

NC8400 Series Switches CLI Reference Guide

Models: NC8400-4TH

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Chapter 1 System Configuration Commands

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1 Command Line Interface Commands

1.1 alias

Use this command to configure a command alias in global configuration mode. Use the **no** form of this command to restore the default setting.

alias mode command-alias original-command

no alias mode command-alias

Parameter Description

Parameter	Description
mode	Mode of the command represented by the alias
command-alias	Command alias
original-command	Syntax of the command represented by the alias

Defaults

Some commands in user or privileged EXEC mode have default alias.

Command

Global configuration mode.

Mode

Usage Guide

The following table lists the default alias of the commands in privileged EXEC mode.

Alias	Actual Command
h	help
p	ping
s	show
u	undebug
un	undebug

The default alias cannot be removed by the **no alias exec** command.

After configuring the alias, you can use a word to replace a command. For example, you can create an alias to represent the first part of a command, and then type the rest part of the command.

The mode of the command represented by the alias is the command mode existing in the current system. In the global configuration mode, you can use the **alias ?** command to list all the modes under which you can configure alias for commands.

```
FS(config)# alias ?
aaa-gs          AAA server group mode
acl             acl configure mode
bgp             Configure bgp Protocol
config         globe configure mode
.....
```

The alias also has its help information that is displayed after * in the following format:

```
*command-alias=original-command
```

For example, in the privileged EXEC mode, the default alias `s` stands for `show`. You can enter `s?` to query the key words beginning with `s` and the help information of the alias.

```
FS#s?
*s=show show start-chat start-terminal-service
```

If an alias represents more than one word, the command will be displayed in brackets. For example, if you set `sv` stand for `show version` in the privileged EXEC mode, then:

```
FS#s?
*s=show *sv="show version" show start-chat
start-terminal-service
```

The alias must begin with the first letter of the command. The first letter of the command cannot be a space. The space before the command cannot be used as a valid alias.

```
FS# s?
show start-chat start-terminal-service
```

The command alias also has its help information. For example, if the alias `ia` represents `ip address` in the interface configuration mode, then:

```
FS(config-if)#ia ?
  A.B.C.D IP address
  dhcp    IP Address via DHCP
FS(config-if)# ip address
```

The above help information lists the parameters of **ip address** and shows the actual command name.

You must enter an entire alias; otherwise it cannot be recognized.

Use the **show aliases** command to show the aliases setting in the system.

Configuration

The following example uses `def-route` to represent the default route setting of `ip route 0.0.0.0 0.0.0.0 192.168.1.1` in the global configuration mode:

Examples

```
FS# configure terminal
FS(config)# alias config def-route ip route 0.0.0.0 0.0.0.0 192.168.1.1
FS(config)#def-route?
*def-route="ip route 0.0.0.0 0.0.0.0 192.168.1.1"
FS(config)# end
FS# show aliases config
globe configure mode alias:
def-route          ip route 0.0.0.0 0.0.0.0
192.168.1.1
```

Related Commands

Command	Description
show aliases	Displays the aliases settings.

Platform Description

N/A

1.2 privilege

Use this command to attribute the execution rights of a command to a command level in global configuration mode. Use the **no** form of this command to restore the default setting.

privilege mode [**all**] [**level** level | **reset**] command-string

no privilege mode [**all**] [**level** level] command-string

Parameter Description

Parameter	Description
mode	CLI mode of the command to which the execution rights are attributed.
all	Command alias
level level	Specifies the execution right levels (0–15) of a command or sub-commands
reset	Restores the command execution rights to its default level
command-string:	Command string to be authorized

Defaults N/A

Command Global configuration mode.

Mode

Usage Guide The following table lists some key words that can be authorized by the **privilege** command in CLI mode. The number of command modes that can be authorized may vary with different devices. In the global configuration mode, you can use the **privilege ?** command to list all CLI command modes that can be authorized.

Mode	Descripton
config	Global configuration mode.
exec	Privileged EXEC mode
interface	Interface configuration mode
ip-dhcp-pool	DHCP address pool configuration mode
ip-dhcp-pool	DHCP address pool configuration mode
keychain	KeyChain configuration mode
keychain-key	KeyChain-key configuration mode

Configuration The following example sets the password of CLI level 1 as **test** and attribute the **reload** rights to reset the device:

Examples FS(config)#privilege exec level 1 reload

You can access the CLI window as level-1 user to use the **reload** command:

```
FS>reload ?
```

```
LINE Reason for reload
```

<cr> You can use the key word **all** to attribute all sub-commands of reload to level-1 users:

```
FS(config)# privilege exec all level 1 reload
```

After the above setting, you can access the CLI window as level-1 user to use all sub commands of the **reload** command:

```
FS>reload ?
```

```
LINE Reason for reload
```

```
at                reload at a specific time/date
cancel           cancel pending reload scheme
in              reload after a time interval
<cr>
```

Related Commands

Command	Description
enable secret	Sets the CLI-level password.

Platform N/A.

Description

1.3 show aliases

Use this command to show all the command aliases or aliases in special command modes.

show aliases [mode]

Parameter Description

Parameter	Description
mode	Mode of the command represented by the alias.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide This command displays the configuration of all aliases if no command mode is input.

Configuration Examples The following example displays the command alias in privileged EXEC mode:

```
FS#show aliases exec
exec mode alias:
h                help
p                ping
s                show
u                undebug
un              undebug
```

Related Commands

Command	Description
alias	Sets a command alias.

Platform N/A.

Description

2 Basic Configuration Management Commands

2.1 <1-99>

Use this command to restore the suspended Telnet Client session.

<1-99>

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode User EXEC mode

Usage Guide This command is used to restore the suspended Telnet Client session. Hot keys (ctrl+shift+6 x) are used to exit the Telnet Client session creation. The <1-99> command is used to restore the session. If the session is created, you can use the **show session** command to display the session.

Configuration Examples The following example restores the suspended Telnet Client session.

```
FS# 1
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.2 banner exec

Use this command to configure a message to welcome the user entering user EXEC mode through the line. Use the **no** form of this command to restore the default setting.

banner exec c message c
no banner exec

Parameter Description	Parameter	Description
	c	Separator of the message. Delimiters are not allowed in the message.
	message	Contents of the message.

Defaults N/A

Command Global configuration mode
Mode

Usage Guide This command is used to configure the welcome message. The system discards all the characters next to the terminating symbol.
 When you are logging in to the device, the MOTD message is displayed at first, and then the banner login message. After you have logged in, the EXEC message or the incoming message is displayed. If it's a reverse Telnet session, the incoming message is displayed. Otherwise, the EXEC message is displayed.
 The messages are for all lines. If you want to disable display the EXEC message on a specific line, configure the **no exec-banner** command on the line.

Configuration The following example configures a welcome message.

Examples

```
FS(config)# banner exec $ Welcome $
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.3 banner incoming

Use this command to configure a prompt message for reverse Telnet session. Use the **no** form of this command to remove the setting.

banner incoming c message c
no banner incoming

Parameter Description	Parameter	Description
	c	
message		Contents of the message.

Defaults N/A

Command Global configuration mode
Mode

Usage Guide This command is used to configure a prompt message. The system discards all the characters next to the terminating symbol.
 When you are logging in to the device, the MOTD message is displayed at first, and then the banner login message. After you have logged in, the welcome message or the prompt message is displayed. If it's a reverse Telnet session, the prompt message is displayed. Otherwise, the welcome message is displayed.

Configuration The following example configures a prompt message for reverse Telnet session.

Examples FS(config)# banner incoming \$ Welcome \$

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.4 banner login

Use this command to configure a login banner. Use **no** form of this command to r remove the setting.

banner login c message c

no banner login

Parameter Description

Parameter	Description
c	Separator of the message contained in the login banner. Delimiters are not allowed in the MOTD.
message	Contents of the login banner

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command sets the login banner message, which is displayed at login. The system discards all the characters next to the terminating symbol.

Configuration The following example configures a login banner.

Examples FS(config)# banner login \$ enter your password \$

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.5 banner motd

Use this command to set the Message-of-the-Day (MOTD) . Use the **no** form of this command to remove the setting.

banner [motd] c message c

no banner [motd]

Parameter Description	Parameter	Description
	c	Separator of the MOTD. Delimiters are not allowed in the MOTD.
	message	Contents of an MOTD

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command sets the MOTD, which is displayed at login. The letters that follow the separator will be discarded.

Configuration Examples The following example configures the MOTD.

```
FS(config)# banner motd $ hello,world $
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.6 banner prompt-timeout

Use this command to configure the prompt-timeout message to notify timeout. Use the **no** form of this command to remove the setting.

banner prompt-timeout c message c

no banner prompt-timeout

Parameter Description	Parameter	Description
	c	Separator of the message. Delimiters are not allowed in the message.
	message	Contents of the message.

Defaults N/A

Command Mode Global configuration mode

Usage Guide The system discards all the characters next to the terminating symbol. When authentication times out, the banner prompt-timeout message is displayed.

Configuration The following example configures the prompt-timeout message to notify timeout.

Examples

```
FS(config)# banner exec $ authentication timeout $
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.7 banner slip-ppp

Use this command to configure the slip-ppp message for the SLIP/PPP session. Use the **no** form of this command to remove the setting.

banner slip-ppp c message c
no banner slip-pp

Parameter Description

Parameter	Description
c	Separator of the message. Delimiters are not allowed in the message.
message	Contents of the message.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure the slip-ppp message for the SLIP/PPP session. The system discards all the characters next to the terminating symbol.
 When the SLIP/PPP session is created, the slip-ppp message is displayed on the corresponding terminal.

Configuration The following example configures the banner slip-ppp message for the SLIP/PPP session.

Examples

```
FS(config)# banner slip-ppp $ Welcome $
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.8 configure

Use this command to enter global configuration mode.

configure [terminal]

Parameter Description	Parameter	Description
		N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example enters global configuration mode.

```
FS# configure
FS(config)#
```

Related Commands	Command	Description
		N/A

Platform Description N/A

2.9 disable

Use this command to switch from privileged EXEC mode to user EXEC mode or lower the privilege level.

disable [privilege-level]

Parameter Description	Parameter	Description
		privilege-level

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to switch to user EXEC mode from privileged EXEC mode. If a new privilege level is added, the current privilege level will be lowered.
The privilege level that follows the **disable** command must be lower than the current level.

Configuration Examples The following example lowers the current privilege level of the device to level 10.

```
FS# disable 10
```

Related Commands	Command	Description
		enable

Platform Description N/A

2.10 disconnect

Use this command to disconnect the Telnet Client session.

disconnect session-id

Parameter Description	Parameter	Description
		session-id

Defaults N/A

Command Mode User EXEC mode

Usage Guide This command is used to disconnect the Telnet Client session by setting the session ID.

Configuration Examples The following example disconnects the Telnet Client session by setting the session ID.

```
FS# disconnect 1
```

Related Commands	Command	Description
		N/A

Platform Description N/A

2.11 enable

Use this command to enter privileged EXEC mode.

enable

Parameter Description	Parameter	Description
		N/A

Defaults N/A

Command N/A
Mode

Usage Guide N/A

Configuration Examples N/A

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.12 enable password

Use this command to configure passwords for different privilege levels. Use the **no** form of this command to restore the default setting.

enable password [level level] { password | [0 | 7] encrypted-password }

no enable password [level level]

Parameter Description	Parameter	Description
	password	password
level	level	User's level.
0 7	0 7	Password encryption type, "0" for no encryption, "7" for simple encryption (Optional) FS's private algorithm will be used for password encryption. If the password type is 0, the password is in plain text. If the type is 7, the password is encrypted by a FS device.
encrypted-password	encrypted-password	Password text.

Defaults N/A

Command Mode Global configuration mode

Usage Guide No encryption is required in general. The encryption type must be specified for copying and pasting a encrypted password for the device.

A valid password is defined as follows:

- Consists of 1-26 upper/lower case letters and numbers
- Leading spaces are allowed but usually ignored. Spaces in between or at the end are regarded as part of the

password.

If an encryption type is specified and a plaintext password is entered, you cannot enter privileged EXEC mode. A lost password that has been encrypted using any method cannot be restored. In this case, you can only reconfigure the device password.

Configuration The following example configures the password as **pw10**.

Examples FS(config)# **enable password** pw10

Related Commands

Command	Description
enable secret	Sets the security password

Platform

N/A

Description

enable secret Sets the security password

2.13 enable secret

Use this command to configure a security password for different privilege levels. Use the **no** form of this command to restore the default setting.

enable secret [level level] { secret | [0 | 5] encrypted-secret }

no enable secret [level level]

Parameter Description

Parameter	Description
secret	Password for the user to enter the EXEC configuration layer
level	User's level.
0 5	Password encryption type, "0" for no encryption, "5" for security encryption
encrypted-password	Password text

Defaults

N/A

Command Mode

Global configuration mode

Usage Guide

A password comes under two categories: "password" and "security". "Password" indicates a simple password, which can be set only for level 15. "Security" means a security password, which can be set for levels 0-15. If both types of passwords coexist in the system, no "password" type is allowed. If a "password" type password is set for a level other than 15, the system gives an alert and the password is automatically converted into a "security" password. If a "password" type password is set for level 15 and the same as a "security" password, an alert is given. The password must be encrypted, with simple encryption for "password" type passwords and security encryption for "security" type passwords.

Configuration The following example configures the security password as **pw10**.

Examples FS(config)# **enable secret 0 pw10**

Related Commands	Command	Description
		enable password

Platform N/A
Description

2.14 enable service

Use this command to enable or disable a specified service such as **SSH Server/Telnet Server/SNMP Agent**.

enable service { ssh-sesrver | telnet-server | snmp-agent }

Parameter Description	Parameter	Description
	ssh-server	Enables SSH Server. IPv4 and IPv6 services are enabled at the same time.
	telnet-server	Enables Telnet Server. IPv4 and IPv6 services are enabled at the same time.
	snmp-agent	Enables SNMP Agent. IPv4 and IPv6 services are enabled at the same time.

Defaults N/A

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example enables the SSH Server.

Examples FS(Config)# **enable service ssh-sesrver**

Related Commands	Command	Description
		show service

Platform N/A
Description

2.15 end

Use this command to return to privileged EXEC mode.

end

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults N/A

Command Mode All modes except privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example returns to privileged EXEC mode.

```
FS#con
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#line vty 0
FS(config-line)#end
*May 20 09:49:38: %SYS-5-CONFIG_I: Configured from console by console
FS#
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.16 exec-banner

Use this command to enable display of the EXEC message on a specific line. Use the **no** form of this command to restore the default setting.

exec-banner
no exec-banner

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The EXEC message is displayed on all lines by default.

Command Mode LINE configuration mode

Usage Guide After you configure the **banner exec** and the **banner motd** commands, the EXEC and the MOTD messages are displayed on all lines by default. If you want to disable display of the EXEC and the MOTD messages on a specific line, configure the **no** form of this command on the line.
This command does not work for the banner incoming message. If you configure the **banner incoming**

command, the banner incoming message is displayed on all reverse Telnet sessions and the display cannot be disabled on a specific line.

Configuration The following example disables display of the EXEC message on line VTY 1.

Examples

```
FS(config)# line vty 1
FS(config-line)no exec-banner
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.17 exec-timeout

Use this command to configure connection timeout for this device in LINE mode. Use the **no** form of this command to restore the default setting and the connection never expires.

```
exec-timeout minutes [ seconds ]
no exec-timeout
```

Parameter Description

Parameter	Description
minutes	Timeout in minutes.
seconds	(Optional) Timeout in minutes

Defaults The default is 10 minutes.

Command Mode Line configuration mode

Usage Guide If there is no input or output for this connection within a specified time, this connection will expire, and this LINE will be restored to the free status.

Configuration The following example sets the connection timeout to 5'30".

Examples

```
FS(config-line)#exec-timeout 5 30
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.18 exit

Use this command to return to the upper configuration mode.

exit

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command All configuration modes

Mode

Usage Guide N/A

Configuration The following example returns to the upper configuration mode.

Examples

```

FS#con
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#line vty 0
FS(config-line)#end
*May 20 09:49:38: %SYS-5-CONFIG_I: Configured from console by console
FS#con
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#line vty 0
FS(config-line)#exit
FS(config)#exit
*May 20 09:51:48: %SYS-5-CONFIG_I: Configured from console by console
FS#exit

Press RETURN to get started
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.19 help

Use this command to display the help information.

help

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Any mode

Command Mode

Usage Guide This command is used to display brief information about the help system. You can use "?" to display all commands or a specified command with its parameters.

Configuration Examples The following example displays brief information about the help system.

```
FS#help
Help may be requested at any point in a command by entering
a question mark '?'. If nothing matches, the help list will
be empty and you must backup until entering a '?' shows the
available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a
   command argument (e.g. 'show ?') and describes each possible
   argument.
2. Partial help is provided when an abbreviated argument is entered
   and you want to know what arguments match the input
   (e.g. 'show pr?').
```

The following example displays all available commands in interface configuration mode.

```
FS(config-if-GigabitEthernet 0/0)#?
Interface configuration commands:
arp          ARP interface subcommands
bandwidth    Set bandwidth informational parameter
carrier-delay Specify delay for interface transitions
dampening    Enable event dampening
default      Set a command to its defaults
description  Interface specific description
dldp         Exec data link detection command
duplex       Configure duplex operation
efm          Config efm for an interface
end          Exit from interface configuration mode
exit         Exit from interface configuration mode
expert       Expert extended ACL
flowcontrol  Set the flow-control value for an interface
full-duplex  Force full duplex operation
global       Global ACL
gvrp         GVRP configure command
```

half-duplex	Force half duplex operation
help	Description of the interactive help system
ip	Interface Internet Protocol config commands
ipv6	Internet Protocol Version 6
isis	Intermediate System - Intermediate System (IS-IS)
l2	Config L2 attribute
label-switching	Enable interface process mpls packet
lacp	LACP interface subcommands
lldp	Link Layer Discovery Protocol
load-interval	Specify interval for load calculation for an interface
mac	Mac extended ACL
mac-address	Set mac-address
mpls	Multi-Protocol Label Switching
mtu	Set the interface Maximum Transmission Unit (MTU)
no	Negate a command or set its defaults
ntp	Configure NTP
port-group	Aggregateport/port bundling configuration
redirect	Redirect packets
rmon	Rmon command
security	Configure the Security
show	Show running system information
shutdown	Shutdown the selected interface
snmp	Modify SNMP interface parameters
speed	Configure speed operation
switchport	Set switching mode characteristics
vrf	Multi-af VPN Routing/Forwarding parameters on the interface
vrrp	VRRP interface subcommands
xconnect	Xconnect commands

The following example displays the parameters of a specified command.

```
FS(config)#access-list 1 permit ?
A.B.C.D Source address
any Any source host
host A single source host
```

Related Commands	Command	Description
	N/A	N/A

Platform
Description

N/A

2.20 hostname

Use this command to specify or modify the hostname of a device.

hostname name

Parameter Description	Parameter	Description
		name

Defaults The default is FS.

Command Mode Global configuration mode

Usage Guide This hostname is mainly used to identify the device and is taken as the username for the local device during dialup and CHAP authentication.

Configuration Examples The following example configures the hostname of the device as BeiJingAgenda.

```
FS(config)# hostname BeiJingAgenda
BeiJingAgenda(config)#
```

Related Commands	Command	Description
		N/A

Platform Description N/A

2.21 ip telnet access-class

Use this command to configure the ACL for the Telnet server. Use the **no** form of this command to delete the rule.

ip telnet access-class { access-list-number | access-list-name }
no ip telnet access-class

Parameter Description	Parameter	Description
		access-list-number
	access-list-name	Configures the ACL name.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure the ACL for all Telnet connections.

Configuration The following example configures ACL named testv4.

Examples

```
FS# configure terminal
FS(config)# ip telnet access-class testv4
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.22 ip telnet source-interface

Use this command to configure the IP address of an interface as the source address for Telnet connection.

ip telnet source-interface interface-name

Parameter Description	Parameter	Description
	interface-name	interface-name

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to specify the IP address of an interface as the source address for global Telnet connection. When using the telnet command to log in a Telnet server, apply the global setting if no source interface or source address is specified. Use the **no ip telnet source-interface** command to restore it to the default setting.

Configuration Examples The following example configures the IP address of the Loopback1 interface as the source address for global Telnet connection.

```
FS(Config)# ip telnet source-interface Loopback 1
```

Related Commands	Command	Description
	telnet	telnet

Platform Description N/A

2.23 ipv6 telnet access-class

Use this command to configure the ACL for the Telnet server. Use the **no** form of this command to delete the rule.

ipv6 telnet access-class accessv6-list-name
no ipv6 telnet access-class

Parameter	Parameter	Description
Description	accessv6-list-name	Configures the ACL name.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure the IPv6 ACL for all Telnet connections.

Configuration Examples The following example configures ACL named testv6.

```
FS# configure terminal
FS(config)# ip telnet access-class testv6
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.24 lock

Use this command to set a temporary password for the terminal.

lock

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide You can lock the terminal interface and maintain the session continuity to prevent access to the interface by

setting a temporary password. Take the following steps to lock the terminal interface:

- Enter the **lock** command, and the system will prompt you for a password:
- Enter the password, which can be any character string. The system will prompt you to confirm the password, clear the screen, and display the "Locked" information.
- To access the terminal, enter the preset temporary password.
- To lock the terminal, run the **lockable** command in line configuration mode and enable terminal locking in the corresponding line.

Configuration The following example locks a terminal interface.

```

Examples
FS(config-line)# lockable
FS(config-line)# end
FS# lock
Password: <password>
Again: <password>
Locked
Password: <password>
FS#
    
```

Related Commands	Command	Description
		lockable

Platform Description N/A

2.25 lockable

Use this command to support the **lock** command at the terminal. Use the **no** form of this command to restore the default setting.

- lockable**
- no lockable**

Parameter Description	Parameter	Description
		N/A

Defaults N/A

Command Mode This function is disabled by default.

Usage Guide This command is used to lock a terminal interface in the corresponding line. To lock the terminal, run the lock command in EXEC mode.

Configuration The following example enables terminal locking at the console port and locks the console.

```

Examples
FS(config)# line console 0
FS(config-line)# lockable
FS(config-line)# end
FS# lock
Password: <password>
Again: <password>
Locked
Password: <password>
    
```

Related Commands

Command	Description
lock	Locks the terminal.

Platform Description N/A

2.26 login

Use this command to enable simple login password authentication on the interface if AAA is disabled. Use the **no** form of this command to restore the default setting.

login
no login

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Line configuration mode

Usage Guide If the AAA security server is inactive, this command enables simple password authentication at login. The password is configured for a VTY or console interface.

Configuration Examples The following example sets a login password authentication on VTY..

```

FS(config)# no aaa new-model
FS(config)# line vty 0
FS(config-line)# password 0 normatest
FS(config-line)# login
    
```

Related

Command	Description
---------	-------------

Commands	
password	Configures the line login password

Platform N/A
Description

2.27 login authentication

If the AAA is enabled, login authentication must be performed on the AAA server. Use this command to associate login authentication method list. Use the **no** form of this command to restore the default setting.

login authentication { default | list-name }
no login authentication { default | list-name }

Parameter	Parameter	Description
Description	default	Name of the default authentication method list
	list-name	Name of the method list

Defaults N/A

Command Line configuration mode
Mode

Usage Guide If the AAA security server is active, this command is used for login authentication using the specified method list.

Configuration The following example associates the method list on VTY and perform login authentication on a radius server.

```

Examples
FS(config)# aaa new-model
FS(config)# aaa authentication login default radius
FS(config)# line vty 0
FS(config-line)# login authentication default
    
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa authentication login	Configures the login authentication method list.

Platform N/A
Description

2.28 login local

Use this command to enable local user authentication on the interface if AAA is disabled. Use the **no** form of this command to restore the default setting.

login local
no login local

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Line configuration mode

Usage Guide If the AAA security server is inactive, this command is used for local user login authentication. The user is allowed to use the **username** command.

Configuration Examples The following example sets local user authentication on VTY.

```
FS(config)# no aaa new-model
FS(config)# username test password 0 test
FS(config)# line vty 0
FS(config-line)# login local
```

Related Commands	Command	Description
	username	Configures local user information.

Platform Description N/A

2.29 login privilege log

Use this command to log privilege change. Use the **no** form of this command to restore the default setting.

login privilege log
no login privilege log

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This command is disabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example enables the function of logging privilege change.

Examples

```
FS(config)# login privilege log
```

The following example displays the log of privilege change failure.

```
FS>enable 10

Password:
Password:
Password:

% Access denied
FS>

*Sep 10 11:34:19: %SYS-5-PRIV_AUTH_FAIL: Authentication to privilege level 10 from console failed
```

The following example displays the log of privilege change success.

```
FS>enable 10

Password:
FS#

*Sep 10 11:34:20: %SYS-5-PRIV_AUTH_SUCCESS: Authentication to privilege level 10 from console success
```

Related Commands	Command	Description
	N/A	N/A

Platform
Description

N/A

2.30 motd-banner

Use this command to enable display of the MOTD message on a specified line. Use the **no** form of this command to restore the default setting.

motd-banner
no motd-banner

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The MOTD message is displayed on all lines by default.

Command Mode Line configuration mode

Usage Guide After you configure the **banner exec** and the **banner motd** commands, the EXEC and the MOTD messages are displayed on all lines by default. If you want to disable display of the EXEC and the MOTD messages on a specific line, configure the **no** form of this command on the line.

This command does not work for the incoming message. If you configure the **banner incoming** command, the banner incoming message is displayed on all reverse Telnet sessions and the display cannot be disabled on a specific line.

Configuration The following example disables display of the MOTD message on VTY 1.

Examples

```
FS(config)# line vty 1
FS(config-line)no motd-banner
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.31 password

Use this command to configure a password for line login, run the **password** command. Use the **no** form of this command to restore the default setting.

password { password | [0 | 7] encrypted-password }
no password

Parameter Description	Parameter	Description
	password	password
0 7	0 7	Password encryption type, "0" for no encryption, "7" for simple encryption (Optional) FS's private algorithm will be used for password encryption. If the password type is 0, the password is in plain text. If the type is 7, the password is encrypted by a FS device.
encrypted-password	encrypted-password	Password text

Defaults N/A

Command Mode Line configuration mode

Usage Guide This command is used to configure a authentication password for remote line login.

Configuration The following example configures the line login password as "red".

Examples

```
FS(config)# line vty 0
FS(config-line)# password red
```

Related Commands	Command	Description

login	Moves from user EXEC mode to privileged EXEC mode or enables a higher level of authority.
--------------	---

Platform
Description N/A

2.32 **prompt**

Use this command to set the **prompt** command. Use the **no** form of this command to restore the default setting.
prompt string

Parameter	Description
string	Character string of the prompt command, containing up to 32 letters.

Defaults N/A

Command
Mode Global configuration mode

Usage Guide If no prompt string is configured, the system name applies and varies with the system name. The **prompt** command is valid only in EXEC mode.

Configuration The following example sets the prompt string to rgnos.

```
FS(config)# prompt rgnos
FS(config)# end
FSOS
```

Related Commands	Command	Description
	N/A	N/A

Platform
Description N/A

2.33 **secret**

Use this command to set a password encrypted by irreversible MD5 for line login. Use the **no** form of this command to restore the default setting.

secret { [**0**] password | **5** encrypted-secret }
no secret

Parameter	Description
0	(Optional) sets the plaintext password text and encrypts it with irreversible

	MD5 after configuration.
password	Sets the password plaintext, a string ranging from 1 to 25 characters.
5 encrypted-secret	Sets the password text encrypted by irreversible MD5 and saves it as the encrypted password after configuration.

Defaults N/A

Command mode Line configuration mode

Usage Guide This command is used to set a password encrypted by irreversible MD5 that is authenticated by a remote user through line login.

If the specified encryption type is 5, the logical length of the cipher text to be entered must be 24 and the 1st, 3rd and 8th characters of the password text must be \$.

In general, the encryption type does not need to be specified as 5 except when the encrypted password is copied and pasted.

Line mode allows configuration of both “password” and “secret” types passwords at the same time. When the two passwords are the same, the system will send alert notification but the configuration will be permitted. When the system is configured with the two passwords, if the user enters a password that does not match the “secret” type password, it will not continue to match the “password” type password and login fails, enhancing security for the system password.

Configuration The following example sets the password encrypted by irreversible MD5 for line login to vty0.

Examples

```
FS(config)# line vty 0
FS(config-line)# secret vty0
```

The following displays the encryption outcome by running the **show** command.

```
secret 5 $1$X834$wvx6y794uAD8svzD
```

Related Commands

Command	Description
login	Sets simple password authentication on the interface as the login authentication mode

Platform N/A

Description

2.34 session-timeout

Use this command to configure the session timeout for a remote terminal. Use the **no** form of this command to restore the default setting and the session never expires.

session-timeout minutes [**output**]

no session-timeout

Parameter

Parameter	Description
-----------	-------------

Description	
minutes	Timeout in minutes.
output	Regards data output as the input to determine whether the session expires.

Defaults The default timeout is 0.

Command Mode LINE configuration mode

Usage Guide If no input or output in current LINE mode is found on the remote terminal for the session within a specified time, this connection will expire, and this LINE will be restored to the free status.

Configuration Examples The following example specifies the timeout as 5 minutes.

```
FS(config-line)#exec-timeout 5 output
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.35 show clock

Use this command to display the system time.

show clock

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the current system clock.

Configuration Examples The following example displays a result of the **show clock** command.

```
FS# show clock
clock: 2003-3-17 10:27:21
```

Related Commands	Command	Description

clock set	Sets the system clock.
------------------	------------------------

Platform
Description N/A

2.36 show debugging

Use this command to display debugging state.

show debugging

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command
Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays debugging state.

Examples

```
FS#show debugging
debug fw-group detect intf-state
```

Related	Command	Description
Commands	N/A	N/A

Platform
Description N/A

2.37 show line

Use this command to display the configuration of a line.

show line { console line-num | vty line-num | line-num }

Parameter	Parameter	Description
Description	console	Display s the configuration of a console line.
	aux	Checks configuration information relating to the aux line.
	vty	Display s the configuration of a vty line.
	line-num	Number of the line.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command displays the configuration of a line.

Configuration The following example displays the configuration of a console port.

```

Examples
FS# show line console 0
CON      Type      speed  Overruns
* 0      CON        9600   45927
Line 0, Location: "", Type: "vt100"
Length: 24 lines, Width: 79 columns
Special Chars: Escape  Disconnect  Activation
                ^^x      none        ^M
Timeouts:      Idle EXEC   Idle Session
                never      never
History is enabled, history size is 10.
Total input: 53564 bytes
Total output: 395756 bytes
Data overflow: 27697 bytes
stop rx interrupt: 0 times
    
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.38 show reload

Use this command to display the system restart settings.

show reload

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the restart settings of the system.

Configuration The following example displays the restart settings of the system.

```

Examples
FS# show reload
Reload scheduled in 595 seconds.
At 2003-12-29 11:37:42
Reload reason: test.
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.39 show running-config

Use this command to display how the current device system is configured..

show running-config

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples N/A

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.40 show service

Use this command to display the service status.

show service

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays whether the service is enabled or disabled.

```
FS# show service
web-server : disabled
web-server(https): disabled
snmp-agent : enabled
ssh-server : enabled
telnet-server : disabled
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.41 show sessions

Use this command to display the Telnet Client session information.

show sessions

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode User EXEC mode

Usage Guide Telnet Client session information includes the VTY number and the server IP address.

Configuration The following example displays the Telnet Client session information.

```

Examples
FS#show sessions
Conn  Address
*1    127.0.0.1
*2    192.168.21.122
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.42 show startup-config

Use this command to display the device configuration stored in the Non Volatile Random Access Memory (NVRAM).

show startup-config

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The device configuration stored in the NVRAM is executed while the device is starting. On a device that does not support **boot config**, **startup-config** is contained in the default configuration file **/config.text** in the built-in flash memory. On a device that supports **boot config**, configure **startup-config** as follows: If you have specified a boot configuration file using the **boot config** command and the file exists, **startup-config** is stored in the specified configuration file. If the boot configuration file you have specified using the **boot config** command does not exist or you have not specified a boot configuration file using the command, **startup-config** is contained in **/config.text** in the built-in flash memory.

Configuration Examples N/A

Related Commands	Command	Description
	boot config	Sets the name of the boot configuration file.

Platform
Description N/A

2.43 show this

Use this command to display effective configuration in the current mode.

show this

Parameter
Description

Parameter	Description
N/A	N/A

Defaults N/A

Command
Mode All modes.

- Usage Guide** The configuration in the following range modes can be displayed.
1. Use the **line** first-line last-line command to configure lines in a continuous group and enter LINE configuration mode.
 2. Use the **vlan range** command to configure VLANs and enter vlan range configuration mode.
 3. Use the **interface range** command to configure interfaces and enter interface range configuration mode.

In **vlan range** or **interface range** mode, if the number of VLANs or interfaces exceeds 50, only the first 50 VLANs or interfaces will be displayed by running this command.

Configuration Use this command to display configuration on interface fastEthernet 0/1.

```

Examples
FS (config)#interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)#show this
Building configuration...
!
spanning-tree link-type point-to-point
spanning-tree mst 0 port-priority 0
!
end
FS (config-if-FastEthernet 0/1)#
    
```

Use this command to display configuration on interface range vlan 1-3.

```

FS(config-if-range)#show this
Building configuration...
!
interface VLAN 1
ip address dhcp
interface VLAN 2
ip address 1.1.1.1 255.255.255.0
    
```

```
interface VLAN 3
 ip address 3.3.3.3 255.255.255.0
!
end
FS(config-if-range)#
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

2.44 speed

Use this command to set the speed at which the terminal transmits packets. Use the **no** form of this command to restore the default setting.

speed speed

no speed

Parameter Description

Parameter	Description
speed	Transmission rate (bps) on the terminal. For serial ports, optional rates include 9600, 19200, 38400, 57600, and 115200 bps. The default rate is 9600 bps.

Defaults

The default is 9600.

Command Mode

Global configuration mode

Usage Guide

This command is used to set the speed at which the terminal transmits packets.

Configuration Examples

The following example sets the rate of the serial port to 57600 bps.

```
FS(config)# line console 0
FS(config-line)# speed 57600
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

2.45 telnet

Use this command to log in a server that supports telnet connection.


```
telnet host [ port ] [ /source { ip A.B.C.D | ipv6 X:X:X:X | interface interface-name } ] [ /vrf vrf-name ] [ via mgmt-name ]
```

Parameter Description	Parameter	Description
	Host	The IP address of the host or host name you want to log in.
	Port	Selects the TCP port number for login, 23 by default.
	/source	Specifies the source IP address or source interface used by the Telnet client.
	ip A.B.C.D	Specifies the source IPv4 address used by the Telnet client.
	ipv6 X:X:X:X	Specifies the source IPv6 address used by the Telnet client.
	interface interface-name	Specifies the source interface used by the Telnet client.
	/vrf vrf-name	Specifies the VRF routing table you want to query.
	via mgmt-name	Specifies the MGMT port for the oob option used by the Telnet client.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to log in a telnet server.

-  The **/vrf** keyword only applies to the RSR series of routers.
- The **ipv6** keyword only applies to IPv6-supported devices, such as S3760, S57 and S86.

Configuration Examples The following example sets telnet to IPv4 address 192.168.1.11. The port number is the default, and the source interface is Gi 0/1. The queried VRF routing table is vpn1.

```
FS# telnet 192.168.1.11 /source-interface gigabitEthernet 0/1 /vrf vpn1
```

The following example sets telnet to IPv6 address 2AAA:BBBB::CCCC.

```
FS# telnet 2AAA:BBBB::CCCC
```

The following example sets telnet to IPv4 address 192.168.1.1 and specifies the MGMT port for the oob option used by the Telnet client.

```
FS# telnet oob 192.168.1.1 via mgmt 0
```

Related Commands	Command	Description
	ip telnet source-interface	Specifies the IP address of the interface as the source address for Telnet connection.
	show sessions	Displays the currently established Telnet sessions.
	exit	Exits current connection.

Platform N/A

Description

2.46 username

Use this command to set a local username and optional authorization information.. Use the **no** form of this command to restore the default setting.

username name [**login mode** { **aux** | **console** | **ssh** | **telnet** }] [**online amount** number] [**permission** oper-mode path] [**privilege** privilege-level] [**reject remote-login**] [**nopassword** | **password** [**0** | **7**] text-string | **secret** [**0** | **5**] text-string]

no username name

Parameter Description

Parameter	Description
name	Username
login mode	Sets the login mode.
aux	Sets the login mode to aux.
console	Sets the login mode to console.
ssh	Sets the login mode to ssh.
telnet	Sets the login mode to telnet.
online amount number	Sets the amount of users online simultaneously.
permission oper-mode path	Sets the permission on the specified file. op-mode refers to the operation mode and path to the file or the directory path.
privilege privilege-level	Sets the privilege level, in the range from 0 to 15.
reject remote-login	Confines the account to remote login.
web-auth	Confines the account to web authentication.
password [0 7] text-string	If the password type is 0, the password is in plain text. If the type is 7, the password is encrypted. The password is in plain text by default.
secret [0 5] text-string	Configures an irreversibly encrypted password. If the password type is 0, the password is in plain text. If the type is 7, the password is encrypted. The password is in plain text by default.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to establish a local user database for authentication.

- If encryption type is 7, the cipher text you enter should contain seven characters to be valid. In general, do not set the encryption type 7. Instead, specify the type of encryption as 7 only when the encrypted password is copied and pasted.

Configuration Examples The following example configures a username and password and binds the user to level 15.

```
FS(config)# username test privilege 15 password 0 pw15
```

The following example configures user test with read and write permissions on all files and directories.

```
FS(config)# username test permission rw /
```

The following example configures user test with read, write and execute permissions on all files and directories except the config.text file.

```
FS(config)# username test permission n /config.text
FS(config)# username test permission rwx /
```

Related Commands

Command	Description
login local	Enables local authentication

Platform

N/A

Description

2.47 username import

Use this command to import user information from the file.

```
username import filename
```

Parameter Description

Parameter	Description
filename	The file name.

Defaults

N/A

Command Mode

Privileged EXEC mode

Usage Guide

This command is used to import user information from the file.

Configuration Examples

The following example imports user information from the file.

```
FS# username import user.csv
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

2.48 username export

Use this command to export user information to the file.

```
username export filename
```

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>filename</td> <td>The file name.</td> </tr> </tbody> </table>	Parameter	Description	filename	The file name.
Parameter	Description				
filename	The file name.				
Defaults	N/A				
Command Mode	Privileged EXEC mode				
Usage Guide	This command is used to export user information to the file.				
Configuration Examples	<p>The following example exports user information to the file.</p> <pre>FS# username export user.csv</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Command	Description	N/A	N/A
Command	Description				
N/A	N/A				
Platform Description	N/A				

2.49 write

Use this command to save **running-config** at a specified location.

write [memory | terminal]

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>memory</td> <td>Writes the system configuration (running-config) into NVRAM, which is equivalent to copy running-config startup-config.</td> </tr> <tr> <td>terminal</td> <td>Displays the system configuration, which is equivalent to show running-config.</td> </tr> </tbody> </table>	Parameter	Description	memory	Writes the system configuration (running-config) into NVRAM, which is equivalent to copy running-config startup-config .	terminal	Displays the system configuration, which is equivalent to show running-config .
Parameter	Description						
memory	Writes the system configuration (running-config) into NVRAM, which is equivalent to copy running-config startup-config .						
terminal	Displays the system configuration, which is equivalent to show running-config .						

Defaults	N/A
Command Mode	Privileged EXEC mode
Usage Guide	<p>Despite the presence of alternative commands, these commands are widely used and accepted. Therefore, they are reserved to facilitate user operations.</p> <p>The system automatically creates the specified file and writes it into system configuration if the device that stores the file exists;</p> <p>The system will ask you whether to save the current configuration in default boot configuration file /config.text and perform an action as required if the device that stores the file does not exist possibly because the boot</p>

configuration file is stored on a removable storage device such as USB drive or SD card, and the device has not been loaded when you run the **write [memory]** command.

Configuration The following example saves **running-config** at a specified location.

Examples

```
FS# write
Building configuration...
[OK]
```

**Related
Commands**

Command	Description
N/A	N/A

Platform

Description

N/A

3 R5 Commands

3.1 r5-cpu core reload

Use this command to reboot the R5-CPU core.

r5-cpu core coreid reload

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example reboots the R5-CPU core.

```
FS# r5-cpu core 0 reload
R5-cpu core 0 will reload(packets which send to R5-cpu core 0 will drop when loading).
Do you want to continue? (y/n)y
R5-cpu core %d reload succeed!
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.2 show r5-cpu core status

Use this command to display the R5-CPU core status.

show r5-cpu core coreid status

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the R5-CPU core status.

Examples

```
FS#show r5-cpu core 0 status
Status      UsedFor      Last boot          Reason
-----
OK          IFA          Sat Sep 29 15:05:53 2018  First start up
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

3.3 show r5-cpu core statistics

Use this command to display the R5-CPU core statistics.

show r5-cpu core coreid statistics

Parameter Description

Parameter	Description
coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the R5-CPU core statistics.

Examples

```
FS#show r5-cpu core 0 statistics
InPkts: 0
OutPkts: 0
Drop packets event(due to missing config): 1352
Drop packets event(due to missing collector config): 0
Drop packets event(due to hop_cnt invalid): 0
Drop packets event(due to INT_head_len_invalid): 0
Drop packets event(due to Pkt_size_invalid): 0
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform N/A
Description

3.4 show r5-cpu core boot-history

Use this command to display reboot history of the R5-CPU core.

show r5-cpu core coreid **boot-history**

Parameter	Parameter	Description
Description	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays reboot history of the R5-CPU core.

```

Examples
FS# show r5-cpu core 0 boot-history
Boot time          Reason
-----
Sat Sep 29 22:05:37 2018  First start up
Sat Sep 29 20:30:58 2018  First start up
Sat Sep 29 16:56:55 2018  Manually reload
Sat Sep 29 16:06:20 2018  Manually reload
Sat Sep 29 15:52:27 2018  First start up
Sat Sep 29 15:05:53 2018  First start up
Sat Sep 29 14:51:26 2018  First start up
Sat Sep 29 10:25:41 2018  First start up
Sat Sep 29 09:25:41 2018  Internal Crashed
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.5 show r5-cpu core queue-buffer

Use this command to display mmu-buffer usage of the R5-CPU core.

show r5-cpu core coreid queue-buffer

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays mmu-buffer usage of the R5-CPU core.

```
FS#FS#show r5-cpu core 0 queue-buffer
Slice 1:
Queue  Used cells  Available cells  Usage  Peaked cells
-----
46     14             86             14%    0
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.6 clear r5-cpu core statistics

Use this command to clear the R5-CPU core statistics

clear r5-cpu core coreid statistics

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example clears the R5-CPU core statistics

Examples FS#clear r5-cpu core 0 statistics

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.7 clear r5-cpu core boot-history

Use this command to clear reboot history of the R5-CPU core statistics

clear r5-cpu core coreid boot-history

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example clears reboot history of the R5-CPU core.

Examples FS#clear r5-cpu core 0 boot-history

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.8 clear r5-cpu core queue-buffer counter

Use this command to clear mmu-buffer usage of the R5-CPU core.

clear r5-cpu core coreid queue-buffer counter

Parameter Description	Parameter	Description
	coreid	R5-CPU core

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example clears mmu-buffer usage of the R5-CPU core.

Examples FS#clear r5-cpu core 0 queue-buffer counter

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4 LINE Commands

4.1 access-class

Use this command to control login into the terminal through IPv4 ACL. Use the **no** form of this command to restore the default setting.

access-class { access-list-number | access-list-name } { **in** | **out** }

no access-class { access-list-number | access-list-name } { **in** | **out** }

Parameter Description	Parameter	Description
	access-list-number	Specifies the ACL number. Standard IP ACL number is from 1 to 99 and from 1300 to 1999. Extended IP ACL number is from 100 to 199 and from 2000 to 2699.
	access-list-name	Specifies the ACL name.
	in	Filters the incoming connections.
	out	Filters the outgoing connections.

Defaults N/A

Command Mode Line configuration mode

Usage Guide N/A

Configuration Examples The following example uses ACL 20 to filter the incoming connections in line VTY 0 5.

```
FS(config)# line vty 0 5
FS(config-line)#access-class 20 in
```

The following example uses the ACL named "test" to filter the outgoing connections in line VTY 6 7.

```
FS(config)# line vty 6 7
FS(config-line)#access-class test out
```

Related Commands	Command	Description
	show running	Displays status information

Platform Description N/A

4.2 accounting commands

Use this command to enable command accounting in the line. Use the **no** form of this command to restore the default setting.

accounting commands level { **default** | list-name }

no accounting commands level

Parameter Description

Parameter	Description
level	Command level ranging from 0 to 15. The command of this level is accounted when it is executed.
default	Default authorization list name.
list-name	Optional list name.

Defaults This function is disabled by default.

Command Mode Line configuration mode

Usage Guide This function is used together with AAA authorization. Configure AAA command accounting first, and then apply it on the line.

Configuration Examples The following example enables command accounting in line VTY 1 and sets the command level to 15.

```
FS(config)# aaa new-model
FS(config)# aaa accounting commands 15 default start-stop group tacacs+
FS(config)# line vty 1
FS(config-line)# accounting commands 15 default
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.3 accounting exec

Use this command to enable user access accounting in the line. Use the **no** form of this command to restore the default setting.

accounting commands level { **default** | list-name }

no accounting commands level

Parameter Description

Parameter	Description
level	Command level ranging from 0 to 15. The command of this level is accounted when it is executed.
default	Default authorization list name.
list-name	Optional list name.

Defaults This function is disabled by default.

Command Mode Line configuration mode

Usage Guide This function is used together with AAA authorization. Configure AAA EXEC accounting first, and then apply it on the line.

Configuration Examples The following example enables user access accounting in line VTY 1.

```
FS(config)# aaa new-model
FS(config)# aaa accounting exec default start-stop group radius
FS(config)# line vty 1
FS(config-line)# accounting exec default
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.4 authorization commands

Use this command to enable authorization on commands, Use the **no** form of this command to restore the default setting.

authorization commands level { default | list-name }
no authorization commands level

Parameter Description

Parameter	Description
level	Command level ranging from 0 to 15. The command of this level is executed after authorization is performed.
default	Default authorization list name,
list-name	Optional list name.

Defaults This function is disabled by default.

Command Mode Line configuration mode

Usage Guide This function is used together with AAA authorization. Configure AAA authorization first, and then apply it on the line.

Configuration The following example enables authorization on commands of level 15 in line VTY 1.

```

Examples
FS(config)# aaa new-model
FS(config)# aaa authorization commands 15 default group tacacs+
FS(config)# line vty 1
FS(config-line)# authorization commands 15 default
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.5 authorization exec

Use this command to enable EXEC authorization for the line. Use the **no** form of this command to restore the default setting.

authorization exec { default | list-name }

no authorization exec

Parameter Description	Parameter	Description
	default	
	list-name	Optional list name.

Defaults This function is disabled by default,

Command Mode Line configuration mode

Usage Guide This function is used together with AAA authorization. Configure AAA EXEC authorization first, and then apply it on the line.

Configuration The following example performs EXEC authorization to line VTY 1.

```

Examples
FS(config)# aaa new-model
FS(config)# aaa authorization exec default group radius
FS(config)# line vty 1
FS(config-line)# authorization exec default
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.6 clear line

Use this command to clear connection status of the line.

clear line { **aux** line-num | **console** line-num | **tty** line-num | **vtty** line-num | line-num }

Parameter Description	Parameter	Description
	aux	Clears connection status of auxiliary port line. This parameter is on routers generally.
	console	Clears connection status of the console line.
	tty	Clears connection status of the asynchronous port line. This parameter is on routers generally.
	vtty	Clears connection status of the virtual terminal line.
	line-num	Specifies the line to be cleared.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to clear connection status of the line and restore the line to the unoccupied status to create new connections.

Configuration Examples The following example clears connection status of line VTY 13. The connected session on the client (such as Telnet and SSH) in the line is disconnected immediately.

```
FS# clear line vty 13
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.7 disconnect-character

Use this command to set the hot key that disconnects the terminal service connection. Use the **no** form of this command to restore the default setting.

disconnect-character ascii-value

no disconnect-character

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

ascii-value	ASCII decimal value of the hot key that disconnects the terminal service connection, in the range from 0 to 255.
-------------	--

Defaults The default hot key is **Ctrl+D** and the ASCII decimal value is 0x04.

Command Line configuration mode

Mode

Usage Guide This command is used to set the hot key that disconnects the terminal service connection. The hot key cannot be the commonly used ASCII node such as characters ranging from a to z, from A to Z or numbers ranging from 0 to 9. Otherwise, the terminal service cannot operate properly.

Configuration Examples The following example sets the hot key that disconnects the terminal service connection on line VTY 0 5 to **Ctrl+E** (0x05).

```
FS(config)# line vty 0 5
FS(config-line)# disconnect-character 5
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

4.8 escape-character

Use this command to set the escape character for the line. Use the **no** form of this command to restore the default setting.

escape-character escape-value

no escape-character

Parameter Description

Parameter	Description
escape-value	Sets the ASCII value corresponding to the escape character for the line, in the range from 0 to 255.

Defaults The default escape character is **Ctrl+^ (Ctrl+Shift+6)** and the ASCII decimal value is 30.

Command Line configuration mode

Mode

Usage Guide After configuring this command, press the key combination of the escape character and then press **x**, the current session is disconnected to return to the original session.

Configuration The following example sets the escape character for the line to 23 (**Ctrl+w**).

Examples

```
FS(config)# line vty 0
FS(config-line)# escape-character 23
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.9 exec

Use this command to enable the line to enter the command line interface. Use the **no** form of this command to disable the function.

exec
no exec

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Mode Line configuration mode

Usage Guide The **no exec** command is used to ban the line from entering the command line interface. You have to enter the command line interface through other lines,

Configuration The following example bans line VTY 1 from entering the command line interface.

Examples

```
FS(config)# line vty 1
FS(config-line)# no exec
FS# show users
```

Line	User	Host(s)	Idle	Location
* 0 con 0	---	idle	00:00:00	---
1 vty 0	---	idle	00:01:03	20.1.1.2
3 vty 2	---	idle	00:00:13	20.1.1.2

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.10 history

Use this command to enable command history for the line or set the number of commands in the command history. Use the **no history** command to disable command history. Use the **no history size** command to restore the number of commands in the command history to the default setting.

history [**size** size]
no history
no history size

Parameter	Description
size size	The number of commands, in the range from 0 to 256.

Defaults This function is enabled by default, The default size is 10.

Command Mode Line configuration mode

Usage Guide N/A

Configuration Examples The following example sets the number of commands in the command history to 20 for line VTY 0 5.

```
FS(config)# line vty 0 5
FS(config-line)# history size 20
```

The following example disables the command history for line VTY 0 5.

```
FS(config)# line vty 0 5
FS(config-line)# no history
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.11 ipv6 access-class

Use this command to configure access to the terminal through IPv6 ACL. Use the **no** form of this command to restore the default setting.

ipv6 access-class access-list-name { **in** | **out** }
no ipv6 access-class access-list-name { **in** | **out** }

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
access-list-name	Specifies the ACL name.
in	Filters the incoming connections.
out	Filters the outgoing connections.

Defaults N/A

Command Mode Line configuration mode

Usage Guide N/A

Configuration Examples The following example uses the ACL named "test" to filter the outgoing IPv6 connections in line VTY 0 4.

```
FS(config)# line vty 0 4
FS(config-line)#ipv6 access-class test out
```

Related Commands	Command	Description
	show running	Displays status information

Platform Description N/A

4.12 length

Use this command to set the screen length for the line. Use the **no** form of this command to restore the default setting.

- length** screen-length
- no length**

Parameter Description	Parameter	Description
	screen-length	Sets the screen length, in the range from 0 to 512.

Defaults The default is 24.

Command Mode Line configuration mode

Usage Guide N/A

Configuration Examples The following example sets the screen length to 10.

```
FS(config-line)# length 10
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

4.13 line

Use this command to enter the specified LINE mode.

line [**aux** | **console** | **tty** | **vty**] first-line [last-line]

Parameter Description	Parameter	Description
	aux	Auxiliary port, on the routers.
	console	Console port
	tty	Asynchronous port, on the routers.
	vty	Virtual terminal line, applicable for telnet/ssh connection.
	first-line	Number of first-line to enter

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to enter the specified LINE mode.

Configuration Examples The following example enters the LINE mode from LINE VTY 1 to 3:

```
FS(config)# line vty 1 3
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

4.14 line vty

Use this command to increase the number of VTY connections currently available. Use the **no** form of this command to restore the default setting.

line vty line-number

no line vty line-number

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults By default, there are five available VTY connections, numbered 0 to 4.

Command Global configuration mode.

Mode

Usage Guide When you need to increase or decrease the number of available VTY connections, use the above commands.

Configuration Examples The following example increases the number of available VTY connections to 20. The available VTY connections are numbered 0 to 19.

```
FS(config)# line vty 19
Decrease the number of available VTY connections to 10. The available VTY connections are numbered 0-9.
FS(config)# line vty 10
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.15 location

Use this command to configure the line location description. Use the **no** form of this command to restore the default setting.

location location

no location

Parameter Description	Parameter	Description
	location	Line location description

Defaults N/A

Command Line configuration mode

Mode

Usage Guide N/A

Configuration Examples The following example describes the line location as Swtich’s Line VTY 0.

```
FS(config)# line vty 0
FS(config-line)# location Swtich’s Line Vty 0
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.16 monitor

Use this command to enable log display on the terminal. Use the **no** form of this command to restore the default setting,

monitor
no monitor

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Line configuration mode

Usage Guide N/A

Configuration Examples The following example enables log display on the terminal in VTY line 0 5.

```
FS(config)# line vty 0 5
FS(config-line)# monitor
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.17 privilege level

Use this command to set the privilege level for the line. Use the **no** form of this command to restore the default setting.

privilege level level
no privilege level

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	level	Privilege level, in the range from 0 to 15.

Defaults The default is 1.

Command Mode Line configuration mode

Usage Guide N/A

Configuration The following example sets the privilege level for the line VTY 0 4 to 14.

```

Examples
FS(config)# line vty 0 4
FS(config-line)#privilege level 14
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.18 show history

Use this command to display the command history of the line.

show history

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the command history of the line.

```

Examples
FS# show history
exec:
sh privilege
sh run
show user
sh user all
    
```

```
show history
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.19 show line

Use this command to display line configuration.

```
show line { aux line-num | console line-num | tty line-num | vty line-num | line-num }
```

Parameter Description

Parameter	Description
aux	Displays configuration for the auxiliary port line. This parameter is on routers generally.
console	Displays configuration for the console line.
tty	Displays configuration for the asynchronous port line. This parameter is on routers generally.
vty	Displays configuration for the virtual terminal line.
line-num	Displays the line.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays configuration for the console port.

```
FS# show line console 0
CON      Type      speed  Overruns
* 0      CON      9600   45927
Line 0, Location: "", Type: "vt100"
Length: 24 lines, Width: 79 columns
Special Chars: Escape  Disconnect  Activation
                ^^x      none      ^M
Timeouts:      Idle EXEC  Idle Session
                never      never
History is enabled, history size is 10.
Total input: 53564 bytes
Total output: 395756 bytes
```


Data overflow: 27697 bytes
 stop rx interrupt: 0 times

Field	Description
CON	Terminal type. CON indicates console; 0 indicates terminal line number and * ahead of the number means that the terminal is in use.
Type	Terminal type, including CON, AUX, TTY, and VTY.
speed	Asynchronous speed.
Overruns	The number of overrun errors received by the flash.
Line 0	Terminal line number.
Location: ""	Line location configuration.
Type: "vt100"	Compatibility standard.
Special Chars	Special characters, including Escape, Disconnect, and Activation characters.
Timeouts	Timeout value; "never" indicates no timeout.
History	Whether to enable command history; the number of commands in the command history.
Total input	Data volume received from the drive.
Total output	Date volume sent to the drive.
Data overflow	Overflowing data volume.
stop rx interrupt	Data reception interruption times.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.20 show privilege

Use this command to display the privilege level of the line.

show privilege

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the privilege level of the line.

Examples
 FS# show privilege
 Current privilege level is 10

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.21 show users

Use this command to display the login user information.

show users [all]

Parameter Description	Parameter	Description
	all	Displays line user information, including users logging into the line and users not logging into the line.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the information about users logging into the line,

```

FS# show users
Line          User          Host(s)          Idle           Location
-----
 0 con 0      ---          idle             00:00:46      ---
 1 vty 0      ---          idle             00:00:29      20.1.1.2
* 2 vty 1      ---          idle             00:00:00      20.1.1.2
    
```

The following example displays all line user information,

```

FS(config)# show users all
Line          User          Host(s)          Idle           Location
-----
 0 con 0      ---          idle             00:00:49      ---
 1 vty 0      ---          idle             00:00:32      20.1.1.2
* 2 vty 1      ---          idle             00:00:00      20.1.1.2
 3 vty 2      ---          idle             00:00:00      ---
 4 vty 3      ---          idle             00:00:00      ---
 5 vty 4      ---          idle             00:00:00      ---
    
```

```
6 vty 5 --- 00:00:00 ---
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.22 speed

Use this command to configure the baud rate for the specified line. Use the **no** form of this command to restore the default setting,

speed baudrate
no speed

Parameter Description

Parameter	Description
baudrate	Sets the baud rate, in the range from 9600 to 115200.

Defaults The default is 9600.

Command Mode LINE configuration mode

Usage Guide N/A

Configuration Examples The following example sets the baud rate to 115200,

```
FS(config-line)# speed 115200
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.23 terminal escape-character

Use this command to set the escape character for the current terminal. Use the **no** form of this command to restore the default setting.

terminal escape-character escape-value
terminal no escape-character

Parameter

Parameter	Description
-----------	-------------

Description	
escape-value	Sets the ASCII value corresponding to the escape character for the current terminal, in the range from 0 to 255.

Defaults The default escape character is **Ctrl+^ (Ctrl+Shift+6)** and the ASCII decimal value is 30.

Command Mode Privileged EXEC mode

Usage Guide After configuring this command, press the key combination of the escape character and then press **x**, the current session is disconnected to return to the original session.

Configuration Examples The following example sets the escape character for the current terminal to 23 (**Ctrl+w**).

```
FS# terminal escape-character 23
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.24 terminal history

Use this command to enable command history for the current terminal or set the number of commands in the command history. Use the **no history** command to disable command history. Use the **no history size** command to restore the number of commands in the command history to the default setting.

terminal history [size size]

terminal no history

terminal no history size

Parameter Description	Parameter	Description
	size size	

Defaults This function is enabled by default, The default size is 10.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example sets the number of commands in the command history to 20 for the current terminal.

```
FS# terminal history size 20
```

The following example disables the command history for the current terminal.

```
FS# terminal no history
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.25 terminal length

Use this command to set the screen length for the current terminal. Use the **no** form of this command to restore the default setting.

terminal length screen-length

terminal no length

Parameter Description

Parameter	Description
screen-length	Sets the screen length, in the range from 0 to 512.

Defaults The default is 24.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example sets the screen length for the current terminal to 10.

```
FS# terminal length 10
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.26 terminal location

Use this command to configure location description for the current device. Use the **no** form of this command to restore the default setting.

terminal location location

terminal no location

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>location</td> <td>Configures location description of the current device.</td> </tr> </tbody> </table>	Parameter	Description	location	Configures location description of the current device.
Parameter	Description				
location	Configures location description of the current device.				
Defaults	N/A				
Command Mode	Privileged EXEC mode				
Usage Guide	N/A				
Configuration Examples	<p>The following example configures location description of the current device as "Swtich's Line Vty 0".</p> <pre>FS# terminal location Swtich's Line Vty 0</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Command	Description	N/A	N/A
Command	Description				
N/A	N/A				
Platform Description	N/A				

4.27 terminal speed

Use this command to configure the baud rate for the current terminal. Use the **no** form of this command to restore the default setting,

- terminal speed** baudrate
- terminal no speed**

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>baudrate</td> <td>Sets the baud rate, in the range from 9600 to 115200.</td> </tr> </tbody> </table>	Parameter	Description	baudrate	Sets the baud rate, in the range from 9600 to 115200.
Parameter	Description				
baudrate	Sets the baud rate, in the range from 9600 to 115200.				
Defaults	The default is 9600.				
Command Mode	Privileged EXEC mode				
Usage Guide	N/A				
Configuration Examples	<p>The following example sets the baud rate for the current terminal to 115200,</p> <pre>FS# terminal speed 115200</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> </tbody> </table>	Command	Description		
Command	Description				

N/A	N/A
-----	-----

Platform N/A
Description

4.28 terminal width

Use this command to set the screen width for the terminal.

terminal width screen-width

terminal no width

Parameter Description	Parameter	Description
	screen-width	

Defaults The default is 79.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example sets the screen width for the terminal to 10.

```
FS# terminal width 10
```

Related Commands	Command	Description
	N/A	

Platform N/A
Description

4.29 timeout login

Use this command to set the login authentication timeout for the line. Use the **no** form of this command to restore the default setting.

timeout login response seconds

no timeout login response

Parameter Description	Parameter	Description
	response	
seconds		Timeout value, in the range from 1 to 300 in the unit of seconds.

Defaults The default is 30.

Command Line configuration mode
Mode

Usage Guide N/A

Configuration The following example sets the login authentication timeout to 300 seconds for line VTY 0 5.

Examples

```
FS(config)# line vty 0 5
FS(config-line)# timeout login response 300
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.30 transport input

Use this command to set the specified protocol under Line that can be used for communication. Use the **no** form of this command to restore the default setting.

```
transport input { all | ssh | telnet | none }
no transport input { all | ssh | telnet | none }
```

Parameter Description

Parameter	Description
all	Allows all the protocols under Line to be used for communication
ssh	Allows only the SSH protocol under Line to be used for communication
telnet	Allows only the Telnet protocol under Line to be used for communication
none	Allows none of protocols under Line to be used for communication

Defaults **all**, **ssh** and **telnet** protocols are allowed.

Command Line configuration mode
Mode

Usage Guide N/A

Configuration The following example specifies that only the Telnet protocol is allowed to login in line vty 0 4.

Examples

```
FS(config)# line vty 0 5
FS(config-line)#transport input ssh
```

Related Commands

Command	Description
---------	-------------

show running	Displays status information
---------------------	-----------------------------

Platform N/A

Description

4.31 vacant-message

Use this command to set the logout message. Use the **no** form of this command to restore the default setting.

vacant-message [c message c]

no vacant-message

Parameter Description	Parameter	Description
	c	
message		Logout message.

Defaults N/A

Command Mode Line configuration mode

Usage Guide This command is used to set the logout message for the line. The characters entered after the ending delimiter are discarded directly, The logout message is displayed when the user logs out.

Configuration Examples The following example sets the logout message to "Logout from the FS device".

```
FS(config-line)#vacant-message @ Logout from the FS device @
```

Related Commands	Command	Description
	N/A	

Platform N/A

Description

4.32 width

Use this command to set the screen width for the line. Use the **no** form of this command to restore the default setting,

width screen-width

no width

Parameter Description	Parameter	Description
	screen-width	

Defaults The default is 79.

Command Mode Line configuration mode

Usage Guide N/A

Configuration The following example sets the screen width for the line to 10.

Examples FS(config-line)# width 10

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

5 File System Commands

5.1 cd

Use this command to set the present directory for the file system.

cd [filesystem:] [directory]

Parameter	Parameter	Description
Description	filesystem:	The URL of filesystem, followed by a colon (:). The filesystem includes flash , usb , and tmp .
	directory	The path name. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default directory is the flash root directory.

Command Privileged EXEC mode.

Mode The specified path of the file system support URLs. For details of URL prefixes, see description of the **copy** command.

Usage Guide Change the above parameter to the directory you want to enter. Use the **pwd** command to view the present directory.

Configuration N/A

Examples

Related	Command	Description
Commands	pwd	Displays the present word directory.

Platform N/A.

Description

5.2 copy

Use this command to copy a file from the specified source directory to the specified destination directory.

copy source-url destination-url [vrf_name]

Parameter	Parameter	Description
Description	source-url	Source file URL, which can be local or remote.
	destination-url	Destination file URL, which can be local or remote.
	vrf_name	Specifies a VRF.

Defaults N/A.

Command Privileged EXEC mode.

Mode

Usage Guide when the file to be copied exists on the target URL, the target file system determines the action, such as error report, overwrite, or offering you the choice.

The following table lists the URL:

Prefix	Description
running-config	Running configuration file.
startup-config	startup configuration file.
flash:	local FLASH file system.
tftp:	The URL of TFTP server, in the format as follows: tftp:[[/location]/directory]/filename
oob_tftp: [via mgmt. { number }]	The URL of TFTP server connected with the Out-of-Band port. If there are multiple MGMT ports, you can specify one.
http:	The URL of TFTP server, in the format as follows: http:[[/location]/directory]/filename
oob_http:	The URL of HTTP server connected with the Out-of-Band port

Configuration Examples The following example copies the netconfig file from device 192.168.64.2 to the FLASH disk and the netconfile file exists locally.

```
Do you want to overwrite [/data/netconfig]? [Y/N]:y
Press Ctrl+C to quit
!
Copy success.
```

Related Commands

Command	Description
delete	Deletes the file.
rename	Renames the file.
dir	Displays the file list of the specified directory.

Platform N/A

Description

5.3 delete

Use this command to delete the files in the present directory.

delete [filesystem:] file-url

Parameter Description

Parameter	Description
filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
file-url	The file name containing the path. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash:**.

Command Privileged EXEC mode.

Mode

Usage Guide This command is used to delete the specified file in the URL. This command supports deleting the files stores in the local storage media, i.e., the URL must be one of the flash:/ usb0:/ or usb1:/ slave:/. If the prefix is not specified in the URL, it indicates to delete the file in the system.

In VSU mode, URLs do not support sw1-m1-disk0:/ series. For details of the supported prefixes, see the description of the **copy** command.

This command does not support wildcard.

Configuration The following example deletes the fstab file on the FLASH disk.

Examples

```

FS#pwd
flash:/
FS#dir
Directory of flash:/
1  -rw-      336   Jan 03 2012 18:53:42  fstab
2  -rw-     4096   Jan 03 2012 12:32:09   rc.d
3  -rw-   10485760  Jan 03 2012 18:13:37   rpmdb
3 files, 0 directories
10,490,192 bytes total (13,192,656 bytes free)
FS#delete flash:/fstab
Do you want to delete [flash:/fstab]? [Y/N]:y
Delete success.
FS#dir
Directory of flash:/
1  -rw-     4096   Jan 03 2012 12:32:09   rc.d
2  -rw-   10485760  Jan 03 2012 18:13:37   rpmdb
2 files, 0 directories
10,489,856 bytes total (13,192,992 bytes free)
    
```

Related	Command	Description
Commands	copy	Copies the file.
	dir	Displays the file list of the specified directory.

Platform N/A

Description

5.4 dir

Use this command to display the files in the present directory.

dir [filesystem:] [directory]

Parameter	Parameter	Description
Description	filesystem	The URL of file system, followed by a colon (:). The file system includes flash , usb , and tmp .
	directory	The path name. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults By default, only the information under the present working path is displayed.

Command Mode Privileged EXEC mode.

Usage Guide Enter the specified directory to show the information of all the files in that directory. If no parameter is specified, the information of the files in the present directory is shown by default.
This command does not support wildcard.

Configuration Examples The following example displays the file information of the root directory in the FLASH disk.

```
FS#dir flash:/
Directory of flash:/
 1  -rw-      336   Jan 03 2012 18:53:42  fstab
 2  -rw-     4096   Jan 03 2012 12:32:09   rc.d
 3  -rw-   10485760  Jan 03 2012 18:13:37   rpmdb
3 files, 0 directories
10,490,192 bytes total (13,192,656 bytes free)
```

Field	Description
1, 2, 3...	Index number
-rw-	Permissions on a file include: <ul style="list-style-type: none"> ● d: directory ● r: read ● w: write ● x: executable
10485760	File size
rpmdb	File name
files	File number
directories	Directory number
total	Total size
free	Available space

Related Commands	Command	Description
	pwd	Displays the present directory.
	cd	Sets the present directory of the file system.

Platform N/A.

Description

5.5 erase

Use this command to erase the device or file that doesn't have a file system.

erase filesystem

Parameter	Parameter	Description
Description	filesystem:	Name of the file system, followed by a colon (:). For example, usb0:.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example erases the USB filesystem.

```
FS#erase usb0:
Sure to erase usb0:? [Y/N] y
Erasing disk usb0 ...
Erase disk usb0 done!
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.6 eject

Use this command to remove the USB or SD disk.

eject [usb0]

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example removes the USB disk.

Examples

```
FS#eject ?
sd0   Eject sd disk 0
usb0  Eject usb disk 0

FS#eject usb0
FS#
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.7 file

Use this command to display the information about a file.

file [filesystem:] file-url

Parameter	Parameter	Description
Description	filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
	file-url	The file name containing the path. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash:**.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the information about gcc executable file.

Examples

```
FS#file flash:/gcc
/usr/bin/gcc-4.6: ELF 32-bit LSB executable, Intel 80386, version 1 (SYSV), dynamically linked (uses shared libs), for GNU/Linux 2.6.15, stripped
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.8 file prompt

Use this command to set the prompt mode.

file prompt [**noisy** | **quiet**]

Parameter	Parameter	Description
Description	noisy	Displays prompt for all operation.
	quiet	Displays prompt rarely.

Defaults The default mode is noisy.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example sets the prompt mode to noisy.

```
FS#file prompt noisy
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.9 mkdir

Use this command to create a directory.

mkdir [filesystem:] directory

Parameter	Parameter	Description
Description	filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
	directory	The path name. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash:**.
The default directory is the root directory.

Command Mode Privileged EXEC mode.

Usage Guide Simply enter the name of the directory you want to create (including the path).

If the created file has been existed, the creation will fail. If the upper-level for the directory to be created is inexistent, it fails to create the specified directory. For example, if the directory of flash:/backup is inexistent, the creation of the directory of flash:/backup/temp will fail. The solution is that the directory of flash:/backup shall be created before the creation of the directory of flash:/backup/temp.

Configuration

The following example creates a directory named newdir:

Examples

```

FS#dir
Directory of flash:/
1  -rw-      336   Jan 03 2012 18:53:42  fstab
2  -rw-     4096   Jan 03 2012 12:32:09   rc.d
3  -rw-   10485760  Jan 03 2012 18:13:37  rpmdb
3 files, 0 directories
10,490,132 bytes total (13,192,656 bytes free)
FS#mkdir newdir
Created dir flash:/newdir
FS#dir
Directory of flash:/
1  -rw-      336   Jan 03 2012 18:53:42  fstab
2  -rw-     4096   Jan 03 2012 12:32:09   rc.d
3  -rw-   10485760  Jan 03 2012 18:13:37  rpmdb
4  drw-      4096   Jan 03 2012 18:13:37  newdir
3 files, 1 directories
10,494,228 bytes total (13,188,560 bytes free)
    
```

Related

Commands

Command	Description
rmdir	Deletes the directory.
pwd	Displays the present directory.

Platform

N/A

Description

5.10 more

Use this command to display the content of a file.

more [/ascii | /binary] [filesystem:] file-url

Parameter

Description

Parameter	Description
/ascii	Displays the file content in the ASCII format.
/binary	Displays the file content in the
filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
file-url	The file name containing the path. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The file is displayed in its own format by default.

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example displays the content of the netconfig file under root directory of FLASH disk.

Examples

```
FS#more flash:/netconfig
#
# The network configuration file. This file is currently only used in
# conjunction with the TI-RPC code in the libtirpc library.
#
# Entries consist of:
#
#     <network_id> <semantics> <flags> <protofamily> <protoname> \
#         <device> <nametoaddr_libs>
#
# The <device> and <nametoaddr_libs> fields are always empty in this
# implementation.
#
udp      tpi_clts      v   inet   udp    -    -
tcp      tpi_cots_ord v   inet   tcp    -    -
udp6     tpi_clts      v   inet6  udp    -    -
tcp6     tpi_cots_ord v   inet6  tcp    -    -
rawip    tpi_raw       -   inet   -      -    -
local    tpi_cots_ord -   loopback -      -    -
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.11 pwd

Use this command to display the working path.

pwd

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Usage Guide This command displays the present working path

Configuration N/A

Examples

Related Commands	Command	Description
	cd	Changes the file system in the present directory.

Platform N/A.

Description

5.12 rename

Use this command to move or rename the specified file.

rename src-url dst-url

Parameter	Parameter	Description
Description	src-url	The source file URL to move.
	dst-url	The URL of the destination file or directory.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example renames the fstab file in the root directory on the FLASH disk as new-fstab.

```

FS#dir
Directory of flash:/
 1  -rw-      336   Jan 03 2012 18:53:42  fstab
 2  -rw-      4096  Jan 03 2012 12:32:09  rc.d
 3  -rw-    10485760 Jan 03 2012 18:13:37  rpmdb
3 files, 0 directories
10,490,192 bytes total (13,192,656 bytes free)
FS#rename flash:/fstab flash:/new-fstab
Renamed file flash:/new-fstab
FS#dir
Directory of flash:/
 1  -rw-      336   Jan 03 2012 18:53:42  new-fstab
 2  -rw-      4096  Jan 03 2012 12:32:09  rc.d
 3  -rw-    10485760 Jan 03 2012 18:13:37  rpmdb
3 files, 0 directories
10,490,192 bytes total (13,192,656 bytes free)
    
```

Related	Command	Description
Commands	delete	Deletes the file.
	copy	Copies the file.

Platform N/A

Description

5.13 rmdir

Use this command to delete an empty directory.

rmdir [filesystem:] directory

Parameter	Parameter	Description
Description	filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
	directory	The path name. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash:**.

Command Privileged EXEC mode.

Mode

Usage Guide This command does not support the wildcards, and the directory to be deleted must be empty. Since this command supports abbreviations, you can also use the **rm** command to delete empty directories.

Configuration The following example deletes the null test directories.

```

Examples
FS#mkdir newdir
FS#dir
Directory of flash:/
 1  -rw-      336   Jan 03 2012 18:53:42  fstab
 2  -rw-      4096  Jan 03 2012 12:32:09  rc.d
 3  -rw-    10485760  Jan 03 2012 18:13:37  rpmdb
 4  drw-       4096   Jan 03 2012 18:13:37  newdir
3 files, 1 directories
10,494,228 bytes total (13,188,560 bytes free)
FS#rmdir newdir
removed dir flash:/newdir
FS#dir
Directory of flash:/
 1  -rw-      336   Jan 03 2012 18:53:42  fstab
 2  -rw-      4096  Jan 03 2012 12:32:09  rc.d
 3  -rw-    10485760  Jan 03 2012 18:13:37  rpmdb
    
```

```
3 files, 0 directories
10,490,132 bytes total (13,192,656 bytes free)
```

Related Commands	Command	Description
	N/A.	N/A.

Platform N/A.
Description

5.14 show file systems

Use this command to display the file system information.

show file systems

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode/User configuration mode/Global configuration mode/Interface configuration mode

Usage Guide Use this command to display the file systems supported in the present devices and the available space condition in the file system.

Configuration Examples The following example displays the file system information:

```
FS#show file systems
Size(KB)      Free(KB)    Type  Flags  Prefixes
      NA           NA      ram    rw  tmp:
      NA           NA    network  rw  tftp:
      NA           NA    network  rw  oob_tftp:
      8192         2416     disk   rw  flash:

      1048576     548576   disk   rw  usb0:
```

Field	Description
Size(KB)	File system space, in the unit of KB.
Free(KB)	Available file system space, in the unit of KB.
Type	File system type
Flags	Permissions on the file system include: <ul style="list-style-type: none"> ● ro: read-only ● wo: write-only ● rw: read and write
Prefixes	File system prefix

Related	Command	Description
Commands	N/A.	N/A.

Platform N/A.
Description

5.15 show mount

Use this command to display the mounted information.

show mount

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/User configuration mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the mounted information.

Examples

```
FS#show mount
/dev/sda1 on / type ext4 (rw,errors=remount-ro,commit=0)
proc on /proc type proc (rw,noexec,nosuid,nodev)
sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
fusectl on /sys/fs/fuse/connections type fusectl (rw)
none on /sys/kernel/debug type debugfs (rw)
none on /sys/kernel/security type securityfs (rw)
udev on /dev type devtmpfs (rw,mode=0755)
devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=0620)
tmpfs on /run type tmpfs (rw,noexec,nosuid,size=10%,mode=0755)
none on /run/lock type tmpfs (rw,noexec,nosuid,nodev,size=5242880)
none on /run/shm type tmpfs (rw,nosuid,nodev)
/dev/sda3 on /hao-share type ext3 (rw,commit=0)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,noexec,nosuid,nodev)
```

Field	Description
proc	Source address of mount.
on	-
/proc	Destination address of mount.
type	-
proc	Mount type.
(rw,noexec,nosuid,nodev)	Mount property.

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.16 tftp-client source

Use this command to bind a source IP address or source interface with a TFTP client. Use the **no** or **default** form of this command to restore the default setting.

tftp-client source { **ip** ip-address | **ipv6** ipv6-address | interface }

no tftp-client source { **ip** ip-address | **ipv6** ipv6-address | interface }

default tftp-client source { **ip** ip-address | **ipv6** ipv6-address | interface }

Parameter	Parameter	Description
Description	ip-address	Specifies the IPv4 source address.
	ipv6-address	Specifies the IPv6 source address.
	interface	Specifies the source interface

Defaults No source interface or IP address is bound with the TFTP client by default.

Command Global configuration mode

Mode

Usage Guide N/A

Configuration The following example binds source IP address 192.168.23.236 with the TFTP client.

Examples

```
FS(config)# tftp-client source ip 192.168.23.236
```

The following example binds source IPv6 address 2003:0:0:0::2 with the TFTP client.

```
FS(config)# tftp-client source ipv6 2003:0:0:0::2
```

The following example binds source interface gigabitEthernet 0/0 with the TFTP client.

```
FS(config)# tftp-client source gigabitEthernet 0/0
```

The following example removes the configuration.

```
FS(config)# no tftp-client source ip 192.168.23.236
```

The following example restores the default setting.

```
FS(config)# default tftp-client source ip 192.168.23.236
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.17 tree

Use this command to display the file tree of the current directory.

tree [filesystem:] [directory]

Parameter	Parameter	Description
Description	filesystem:	The URL of file system, followed by a colon (:). The file system includes flash , usb , and tmp .
	directory	The path name. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash**.

Command Mode User configuration mode/Privileged EXEC mode

Mode

Usage Guide N/A

Configuration Examples The following example displays the file tree of flash:/echo

```
FS#tree flash:/echo
+-- client_module
+-- client_userspace
+-- echo_cli.c
+-- echo_client.c
+-- echo_client.h
+-- echo_client.o
+-- echo_cli.o
+-- echo_flag.h
+-- echo.h
+-- echo.ko
+-- echo_server.h
+-- exec_set_echo.h
+-- exec_show_echo.h
+-- Makefile
+-- module
| +-- echo.ko
| +-- echo.mod.c
| +-- echo.mod.o
| +-- echo_module.c
| +-- echo_module.o
| +-- echo.o
| +-- echo_server.c
| +-- echo_server.o
| +-- echo_sysfs.c
```

```

|-- echo_sysfs.h
|-- echo_sysfs.o
|-- Makefile
|-- modules.order
|-- Module.symvers
|-- msg_fd.c
|-- msg_fd.o
+-- readme
+-- server_module
+-- server_userspace
+-- sys_FSOS.ko
+-- user_space
    |-- echo_server.c
    |-- echo_server.o
    |-- Makefile
    |-- msg_fd.c
    |-- msg_fd.o 10,490,132 bytes total (13,192,656 bytes free)
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

5.18 verify

Use this command to compute, display and verify Message Digest 5 (MD5).

verify [/md5 md5-value] filesystem: [file-url]

Parameter	Parameter	Description
Description	/md5	Computes and displays MD5.
	md5-value	The file MD5, which is compared with the computed MD5.
	filesystem:	The URL of file system, followed by a colon (:). The file system includes flash: , usb: , and tmp: .
	file-url	The file name containing the path. A file name starts with "/" is an absolute path. Otherwise, it is a relative path.

Defaults The default filesystem: is **flash:**.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example computes MD5 of flash:/gcc.

```
Examples
FS#verify flash:/gcc
8b072de7db7affd8b2ef824e7e4d716c
```

The following example computes MD5 of flash:/gcc and makes comparison.

```
FS#verify /md5 8b072de7db7affd8b2ef824e7e4d716c flash:/gcc
%SUCCESS verifying flash:/gcc = 8b072de7db7affd8b2ef824e7e4d716c
FS#verify /md5 8b072de7db7affd8b2ef824e7e4d71 flash:/gcc
%Error verifying flash:/gcc
Computed signature = 8b072de7db7affd8b2ef824e7e4d716c
Submitted signature = 8b072de7db7affd8b2ef824e7e4d71
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.19 show disk

Use this command to display USB/Flash information.

```
show disk [ usb | flash ]
```

Parameter Description	Parameter	Description
	usb	Displays USB information.
	flash	Displays FLASH information.

Defaults N/A

Command Mode Privileged EXEC mode/User configuration mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays USB information.

```
Examples
FS#show disk usb
Disk /dev/sdb: 8159 MB, 8159477760 bytes
252 heads, 62 sectors/track, 1020 cylinders
Units = cylinders of 15624 * 512 = 7999488 bytes
```

The following example displays FLASH information.

```
FS#show disk flash
Nand flash size: 512MB
Nor flash size: 1MB
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

6 SYS Commands

6.1 calendar set

Use this command to set the hardware calendar.

calendar set { hour [:minute [:second]] } [month [day [year]]]

Parameter Description	Parameter	Description
	hour [:minute [:second]]	Sets hardware time in the format of hour: minute: second. Only the specified parameters (hour, minute, or second) can be reset. The unspecified parameters keep the current system values.
	month	Sets month. The range is from 1 to 12.
	day	Sets date. The range is from 1 to 31.
	year	Sets year. The range is from 1970 to 2069.


Defaults -

Command Mode Privileged EXEC mode

Default Level -

Usage Guide

- The time parameter is mandatory. After setting time, set month, day, and year, which can be neglected according to your needs. The parameter that is neglected keeps the current system value. For example, if the current hardware time is "2012-02-29 09:33:44" and you want to change month and hour and keep values of other parameters, use the **calendar set 12 5** command to change the current time into "2012-05-29 12:33:44".

 The hardware time of the system is used as the UTC time, while the software time of the system refers to the local time of the device.

 This command is supported only in VSD0 mode. Multiple VSDs are not supported.

Configuration Examples 1: The following example changes the current hardware time of the system (for example, 2012-02-01 18:23:06) into 6 o'clock and keeps the values of other parameters.

```
FS# calendar set 6
06:41:39 UTC Fri, Jul 6, 2012
```

2: The following example changes the current hardware time of the system (for example, 2012-02-01 18:23:06) into 06:42 and keeps the values of other parameters.

```
FS# calendar set 6:42
06:42:27 UTC Fri, Jul 6, 2012
```

3: The following example changes the current hardware time of the system (for example, 2012-02-01 18:23:06) into March 2 and keeps the values of other parameters.

```
FS# calendar set 18 3 2
18:43:05 UTC Fri, Mar 2, 2012
```

Because the hour parameter is mandatory, set it to the current time if you do not need to change its value. As shown in the last example, enter **18** (hour), and then enter **3** (month) and **2** (day).

Check Method -

Platform -

Description -

6.2 clock read-calendar

Use this command to enable the system to synchronize the software time with the hardware time.

clock read-calendar

Parameter Description	Parameter	Description
	-	-

Defaults -

Command Mode Privileged EXEC mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported. After you configure this command, the system will synchronize the software time with the current hardware time according to the time zone and summer time settings of the device.

Configuration Examples 1: The following example enables the system to synchronize the software time with the hardware time.

```
FS# clock read-calendar
Set the system clock from the hardware time.
```

Check Method -

Platform -

Description -

6.3 clock set

Use this command to set the system software clock.

clock set { hour [:minute [:second]] } [month [day [year]]]

Parameter Description

Parameter	Description
hour [:minute [:second]]	Sets software time in the format of hour: minute: second. Only the specified parameters (hour, minute, or second) can reset. The unspecified parameters keep the current system values.
month	Sets month. The range is from 1 to 12.
day	Sets date. The range is from 1 to 31.
year	Sets year. The range is from 1970 to 2069.

Defaults -

Command Mode Privileged EXEC mode

Default Level -

Usage Guide 1. The time parameter is mandatory. After setting time, set month, day, and year, which can be neglected according to your needs. The parameter that is neglected keeps the current system value.

 For example, if the current hardware time is "2012-02-29 09:33:44" and you want to change month and hour and keep values of other parameters, use the **clock set** 12 5 command to change the current time into "2012-05-29 12:33:44".



This command is supported only in VSD0 mode. Multiple VSDs are not supported.

Configuration Examples 1: The following example changes the current software time of the system (for example, 2012-02-01 18:23:06) into 6 o'clock and keeps the values of other parameters.

```
FS# clock set 6
06:48:13 CST Fri, Mar 2, 2012
```

2: The following example changes the current software time of the system (for example, 2012-02-01 18:23:06) into 06:42 and keeps the values of other parameters.


```
FS# clock set 6:42
```

06:42:31 CST Fri, Mar 2, 2012

3: The following example changes the current software time of the system (for example, 2012-02-01 18:23:06) into March 2 and keeps the values of other parameters.

```
FS# clock set 18 3 2
```

18:42:48 CST Fri, Mar 2, 2012

 Because the hour parameter in this command is mandatory, set it to the current time if you do not need to change its value. As shown in the last example, enter **18** (hour), and then enter **3** (month) and **2** (day).

Check Method -

Platform -

Description -

6.4 clock summer-time

Use this command to set the summer time.

clock summer-time zone **start** start-month [week|**last**] start-date hh:mm **end** end-month [week| **last**] end-date hh:mm [**ahead** hours-offset [minutes-offset]

Use this command to disable the summer time.

no clock summer-time

Parameter Description	Parameter	Description
	zone	Summer time name. It can only be a letter between A and Z or between a and z, which is not case sensitive. The summer time name contains 3 to 31 characters.
	start	Indicates the start time of the summer time.
	start-month	Start month. Value range: January, February, March, April, May, June, July, August, September, October, November, and December. The value is not case sensitive and you are allowed to enter an incomplete word, for example, Febr and FebRu.
	week	Start week in the start month. The range is from 1 to 5.
	last	The last week of the specified month.
	start-date	Day in the start week of the start month. Value range: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. The value is not case sensitive and you are allowed to enter an incomplete word, for example, Web and WeDne.
	hh:mm	Time, in the format of hour : minute.
	end	Indicates the end time of the summer time.
	end-month	End month. Value range: January, February, March, April, May, June, July, August, September, October, November, and December. The value is not case sensitive and you may enter an incomplete word, for example, Febr and FebRu.
	ahead	Indicates how much time for the summer time ahead of the standard time during the effective period of the summer time. By default, the summer time is one hour ahead of the standard time.
	hours-offset	Hours ahead of the standard time. The range is from 0 to 12. You are not allowed to set it to 00:00.
	minutes-offset	Minutes ahead of the standard time. The range is from 0 to 59. If hours-offset has been set to 0, you are not allowed to set minutes-offset to 0.

Defaults -

Command Mode Global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported.

Configuration Examples 1: Assume that the time zone name of your living place is ABC and the standard time is 8:15 ahead of UTC, namely, GMT+08:15. The summer time period starts from the first Saturday in February to the third Monday in May and the summer time is 01:20 ahead of the standard time. In this case, the summer time is 09:35 ahead of the UTC time, but non-summer time is still 08:15 ahead of the UTC time.

```
FS(config)# clock timezone ABC 8 15
Set time zone name: ABC (GMT+08:15)
FS(config)#show clock
16:39:16 ABC Wed, Feb 29, 2012
FS(config)#show calendar
```

```
08:24:35 GMT Wed, Feb 29, 2012

FS(config)# clock summer-time TZA start Feb 1 sat 2:00 end May 3 Monday 18:30 ahead 1 20
*May 10 03:45:58: %SYS-5-CLOCKUPDATE: Set summer-time: TZA from February the 1st Saturday at 2:00 TO May the 3rd
Monday at 18:30, ahead 1 hour 20 minute
Set summer-time: TZA from February the 1st Saturday at 2:00 TO May the 3rd Monday at 18:30, ahead 1 hour 20 minute

FS# show clock
18:00:08 TZA Wed, Feb 29, 2012

# If the time is set to non-summer time, the time zone name is restored to ABC.
FS#clo set 18 1 1
*Jan 1 18:00:09: %SYS-5-CLOCKUPDATE: Set system clock: 18:00:09 ABC Sun, Jan 1, 2012
Set system clock: 18:00:09 ABC Sun, Jan 1, 2012
FS#show clock
18:00:12 ABC Sun, Jan 1, 2012
```

2: If the system uses the default summer time that is one hour ahead of the standard time, ahead and the parameters behind ahead can be neglected. For example, set the summer time to start from 2:00 a.m. of the first Sunday in April to 2:00 a.m. of the last Sunday in October and set the summer time to one hour ahead of the standard time.

```
FS(config)#clo summer-time PDT start April 1 sunday 2:00 end October last Sunday 2:00
*May 10 03:15:05: %SYS-5-CLOCKUPDATE: Set summer-time: PDT from April the 1st Sunday at 2:00 TO October the last
Sunday at 2:00, ahead 1 hour
Set summer-time: PDT from April the 1st Sunday at 2:00 TO October the last Sunday at 2:00, ahead 1 hour
```

3: Disable summer time.

```
FS(config)#no clock summer-time
*Jan 1 18:01:09: %SYS-5-CLOCKUPDATE: Set no summer time.
Set no summer time.
```

Check Method -

Platform -

Description -

6.5 clock timezone

Use this command to set the time zone.


clock timezone [name hours-offset [minutes-offset]]

Use this command to remove the time zone settings.

no clock timezone

**Parameter
Description**

Parameter	Description
-----------	-------------

name	Time zone name. It can only be a letter between A and Z or between a and z, which is not case sensitive. The name contains 3 to 31 characters.
hours-offset	Hours of time difference. It indicates whether the time is faster or smaller than the hardware UTC time. The range is from -12 to 12. The negative digit indicates that the time is slower than the hardware time, while the positive digit indicates that the time is faster than the hardware time.  If the time is slower than the UTC time, add "-" before hours-offset.
minutes-offset	Minutes of time difference. The range is from 0 to 59.

Defaults -

Command Mode Global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported.

Configuration Examples 1: The following example sets the time zone name to CST. The software time is 8 hours faster than the hardware time.

```
FS(config)# clock timezone CST 8
Set time zone name: CST (GMT+08:00)

FS# show clock
18:00:17 CST Wed, Dec 5, 2012
```

2: The following example sets the time zone name TZA. The software time is 06:13 slower than the hardware time.

```
FS(config)# clock timezone TZA -6 13
Set time zone name: TZA (GMT-06:13)
```

3: The following example removes the time zone settings.

```
FS(config)# no clock timezone
Set no clock timezone.
```

Check Method -

Platform -

Description

6.6 clock update-calendar

Use this command to enable the system to synchronize the hardware time with the software time.

clock update-calendar

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
	-
Defaults	-
Command Mode	Privileged EXEC mode
Default Level	-
Usage Guide	<p>This command is supported only in VSD0 mode. Multiple VSDs are not supported.</p> <p>After you configure this command, the system will synchronize the hardware time with the current software time according to the time zone and summer time settings of the device.</p>
Configuration Examples	<p>1: The following example enables the system to synchronize the hardware time with the software time.</p> <pre>FS# clock update-calendar</pre> <p>Set the hardware time from the system clock.</p> <p>2: The following example sets the time zone of the hardware time to GMT+5:10, which indicates that the hardware time is 5:10 slower than the software time. The summer time is not set.</p> <pre>FS# show clock 09:30:21 TSZ Wed, Feb 29, 2012</pre> <pre>FS# clock update-calendar</pre> <p>Set the hardware time from the system clock.</p> <pre>FS#show calendar 04:20:25 UTC Wed, Feb 29, 2012</pre> <p>3: The following example sets the hardware time. If it is set to GMT+5:10 and the summer time is set to be 1:15 faster from the first Monday in February 1 to the second Sunday in June 1, it indicates that the hardware time is 6:25 slower than the software time during the effective period of the summer time.</p> <pre>FS# show clock 09:30:02 TSZ Wed, Feb 29, 2012</pre> <pre>FS# clock update-calendar</pre> <p>Set the hardware time from the system clock.</p> <pre>FS#show calendar 03:05:08 UTC Wed, Feb 29, 2012</pre>
Check Method	-
Platform	-
Description	-

6.7 **cpu high-watermark set**

Use this command to set the upper threshold and lower threshold of the CPU usage.

cpu high-watermark set [**up** up-value] [**down** down-value]

Use this command to disable CPU usage monitoring.

no cpu high-watermark set

Use this command to restore the default settings.

default cpu high-watermark set

Parameter Description	Parameter	Description
	up up-value	Sets the upper threshold. The range is from 1 to 99.
	down down-value	Sets the lower threshold. The range is from 1 to 99.

Defaults By default, the CPU usage threshold is 85% and the range is 75%.

Command Mode Global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported. You can use this command to set the high watermark of the CPU usage and enable CPU usage monitoring. When detecting that the CPU usage exceeds the fluctuation range of the highest watermark, the system prints prompts.

Configuration Examples 1: The following example sets the CPU usage threshold to the default value and enables CPU usage monitoring (if it is disabled).

```
FS(config)# default cpu high-watermark set
Reset default cpu watermark monitor
```

Set system cpu high-watermark up 85%, down 75%

2: The following example disables CPU usage monitoring.

```
FS(config)# no cpu high-watermark set
Close cpu watermark monitor
```

3: The following example enables CPU usage monitoring.

```
FS(config)# cpu high-watermark set
set system cpu watermark high 80%(75%~85%)
Set system cpu high-watermark up 85%, down 75%
```

4: The following example sets the higher threshold to 90% and the lower threshold to 70%.

```
FS(config)#cpu high-watermark set up 90 down 70
Open cpu watermark monitor
Set system cpu high-watermark up 90%, down 70%
```

In this case, the high watermark and the low watermark are set to 90% and 70% respectively.

Check Method -

Prompt Message If the high watermark of the CPU usage is allowed to fluctuate from 85% to 91%, the system will print the following warning message when the CPU usage exceeds the upper limit of the high watermark:

```
*Jan 19 16:23:01: %RG_SYSMON-4-CPU_WATERMARK_HIGH: warning! system cpu usage above high watermark(91%),current cpu usage 100%
```

When the CPU usage is less than the lower limit of the high watermark, the system will print the following message about warning release:

```
*Jan 20 07:02:52: %RG_SYSMON-5- CPU_WATERMARK:withdraw warning! system cpu usage below high
```

```
watermark(85%), current cpu usage 36%
```

Platform -
Description -

6.8 memory low-watermark set

Use this command to set the memory usage threshold..

memory low-watermark set mem-rate

Use the **no** or **default** form of this command to disable the detection of memory low watermark.

no memory low-watermark set

default memory low-watermark set

Parameter	Parameter	Description
Description	mem-rate	Memory usage threshold. The range is from 1% to 100%.

Defaults The default memory usage threshold is 90%.

Command Mode Global configuration mode

Default Level -

Usage Guide N/A

Configuration 1: The following example sets the memory usage threshold to 80%.

Examples FS(config)#memory low-watermark set 80

Check Method -

Prompt Message N/A

Platform -
Description -

6.9 memory history clear

Use this command to clear the history of the memory usage.

memory history clear [**one-fourth** | **half** | **all**]

Parameter	Parameter	Description
Description	one-fourth	Clears one fourth entries.
	half	Clears a half of entries.

all	Clears all the entries.
------------	-------------------------

Defaults -

Command Mode Global configuration mode

Default Level -

Usage Guide -

Configuration 1: The following example clears a half of the history of the memory usage.

Examples

```

FS# show memory history

Time Thu Jan 1 00:24:45 1970
Used(k) 148516
Maxinum memory users for this period
Process Name    Holding
tcpip.elf       270028
cli-memory      60600
rg_syslogd      36640

Time Thu Jan 1 00:24:41 1970
Used(k) 148492
Maxinum memory users for this period
Process Name    Holding
tcpip.elf       270028
cli-memory      52408
rg_syslogd      36640

Time Thu Jan 1 00:24:41 1970
Used(k) 148444
Maxinum memory users for this period
Process Name    Holding
tcpip.elf       270028
cli-memory      44088
rg_syslogd      36640

FS(config)#memory history clear half
2 out of 5 records in the history table to be cleared...
Clear done !
    
```

Check Method -

Prompt Message -

Platform -
Description -

6.10 reload

Use this command to reload the device.

reload [at { hour [:minute [:second]] } [month [day [year]]]]

Parameter	Parameter	Description
Description	hour [:minute [:second]]	Sets the restart time in the format of hour : minute : second. Other neglected parameters keep the current system values.
	month	Sets the month in the range from 1 to 12.
	day	Sets the day in the range from 1 to 31.
	year	Sets the year in the range from 1970 to 2069.

Defaults -

Command Mode Privileged EXEC mode

Default Level -

Usage Guide -

Configuration The following example reloads the device.

```

Examples
FS# reload
Reload system?(Y/N) Y
Sending all processes the TERM signal... [ OK ]
Sending all processes the KILL signal... [ OK ]
Restarting system...
    
```

Check Method -

Prompt Message -

Platform -

Description -

6.11 show calendar

Use this command to display the hardware calendar.

show calendar

Parameter	Parameter	Description
Description		

-	-
---	---

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide -

Configuration The following example displays the hardware calendar.

Examples

```
FS# show calendar
21:57:48 GMT Sun, Feb 28, 2012
```

Prompt Message -

Platform -

Description -

6.12 show clock

Use this command to display the system software clock.

show clock

Parameter	Parameter	Description
Description	-	-

Command Mode Privileged EXEC mode / global configuration mode

Default Level -

Usage Guide -

Configuration 1. The following example displays the software clock when the time zone is disabled.

Examples

```
FS# show clock
18:22:20 UTC Tue, Dec 11, 2012
```

2. The following example displays the software clock when the time zone is enabled.

```
FS# show clock
03:07:49 TSZ Wed, Feb 29, 2012
```

Prompt Message -

Platform -

Description

6.13 show memory

Use this command to display the system memory.

show memory [**sorted total** | **history** | **low-watermark** | process-id | process-name]

Parameter Description	Parameter	Description
	sorted total	Ranked according to the memory usage.
	history	Displays the history of memory usage.
	low-watermark	Displays the memory low watermark threshold of the system.
	process-id	Displays the memory usage of the task specified by process-id.
	process-name	Displays the memory usage of the task specified by process-name.

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide Every time when the **show memory history** command is used, the number of displayed entries increases by one. Up to 10 entries can be displayed. You can use the **memory history clear** command to clear history entries.

Configuration 1: The following example displays the memory usage of each task and the ranking (based on the total memory usage).

Examples

```
FS# show memory sorted
System Memory: 508324K total, 481560K used, 26764K free, 31.5% used rate
Used detail: 149112K active, 247776K inactive, 30460K mapped, 50460K slab, 3752K others
```

PID	Text(K)	Rss(K)	Data(K)	Stack(K)	Total(K)	Process
807	1568	4584	264728	84	270028	tcpip.elf
854	40	1436	246076	84	248840	cli-filesystem
1237	52	1492	123260	84	126036	cli-memory
803	56	1104	74064	84	76920	ping.elf
727	84	1276	33812	84	36640	rg_syslogd
733	84	796	33536	84	36364	rg_syslogd
776	224	1416	16896	84	19800	lsmdemo
858	40	1324	16844	84	19612	rg-tty-admin
769	40	3600	11052	84	13812	skbdemo

--More--

Description of some keywords in the command:

Keyword	Description
total	Total system memory
used	Used memory
free	Remaining memory

used rate	Memory usage (percentage)
Active	Active page
inactive	Inactive page
mapped	Mapped memory
slab	Memory consumed by Slab
others	Memory capacity of the used memory except the memory used by active and inactive pages, mapped memory, and slab memory.

Description of the displayed information on each task:

Field	Description
PID	Process ID
Text	Code segment size
Rss	Resident memory size
Data	Data segment size
Stack	Stack size
Total	Total used memory
Process	Task name

Prompt Message -

Platform -

Description -

6.14 show memory vsd

Use this command to display memory information.

show memory vsd vsd_id

Parameter Description

Parameter	Description
vsd_id	VSD ID is a digit. You can use the show vsd command to display the ID of each VSD. The ID range is from 0 to 16.

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode.

Configuration Examples The following example displays the memory usage of each task in VSD 1 mode.

FS#show memory vsd 1

PID	Text	Rss	Data	Stack	Total	Process
1408	244	1192	25400	84	32164	tty_secu_enable

1385	104	16288	648	84	18648	gvpd
1384	304	3872	17084	84	24728	wbamain
1382	376	17708	33656	84	53308	snooping.elf
1381	84	2156	16736	84	22956	password_policy
1380	72	1096	404	84	3848	dns_client.elf
1379	168	2580	472	84	5352	rg-rmond
1378	652	3504	9768	84	15964	rg-snmpd
1376	208	1452	10672	84	14872	rg-fsui
1375	116	2020	33464	84	37288	rg-telnetc
1373	24	844	220	84	2824	rg-telnetd
1372	724	2364	17016	84	24380	rg-sshd
1371	244	2996	35780	84	42544	rg-tty-admin
1365	132	2168	9004	84	13796	vrrp_plus.elf
1364	312	16944	764	84	20368	vrrp.elf
1363	124	16988	500	84	19744	lACP.elf
1358	24	1380	320	84	3536	ftpc_cli.elf
1357	124	1944	8552	84	14976	ftp_server.elf
1352	340	3032	74704	84	80768	dhcp6.elf
1351	312	1960	988	84	6116	dhcp.elf
1350	388	17808	920	84	21600	mstp.elf
1349	240	3876	976	84	9536	rpi.elf
1348	1316	4656	1004	84	10764	isis.elf
1347	212	4220	872	84	9368	ripng.elf
1345	460	4284	876	84	9656	rip.elf
1344	1800	5568	1572	84	12156	bgp.elf
1340	1084	4700	1024	84	10928	ldp.elf
1339	288	17684	556	84	21472	msf.elf
1338	208	3604	42712	84	47708	rg-syslogd

--More--

Prompt Message -

Platform -

Description -

6.15 show pci-bus

Use this command to display the information on the device mounted to the PCI bus.

show pci-bus

Parameter Description	Parameter	Description
	-	-

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide -

Configuration 1: The following example displays the information on the device mounted to the PCI bus.

```

Examples
FS# show pci-bus
NO:0
Vendor ID           : 0x1131
Device ID           : 0x1561
Domain:bus:dev.func : 0000:00:05.0
Status / Command    : 0x2100000
Class / Revision    : 0xc031030
Latency             : 0x0
first 64 bytes of configuration address space:
00: 31 11 61 15 00 00 10 02 30 10 03 0c 20 00 80 00
10: 00 00 00 f0 00 00 00 00 00 00 00 00 00 00 00 00
20: 00 00 00 00 00 00 00 00 00 00 00 00 31 11 61 15
30: 00 00 00 00 dc 00 00 00 00 00 00 00 29 01 01 2a

NO:1
Vendor ID           : 0x1131
Device ID           : 0x1562
Domain:bus:dev.func : 0000:00:05.1
Status / Command    : 0x2100156
Class / Revision    : 0xc032030
Latency             : 0x30
First 64 bytes of configuration address space:
00: 31 11 62 15 56 01 10 02 30 20 03 0c 20 30 80 00
    
```

```
10: 00 10 00 f0 00 00 00 00 00 00 00 00 00 00
20: 00 00 00 00 00 00 00 00 00 00 00 31 11 62 15
30: 00 00 00 00 dc 00 00 00 00 00 00 29 01 02 10
```

Prompt Message -

Platform -

Description -

6.16 show processes cpu

Use this command to display system task information.

show processes cpu [history [table] [[5sec | 1min | 5min | 15min] [nonzero]]

Parameter Description	Parameter	Description
	5sec 1min 5min 15min	Displays lists of tasks in descending order of CPU usage within the last five seconds, one minute, five minutes, and 15 minutes.
	Nonzero	Does not display the task with 0 CPU usage.
	History	Displays the CPU usage of the control core within the last 60 seconds, 60 minutes, and 72 hours in histogram.
	Table	Displays the CPU usage of the control core within the last 60 seconds, 60 minutes, and 72 hours in table.

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported.

Configuration 1: The following example displays the tasks listed in ascending order of task IDs.

```
FS# show processes cpu
System Uptime: 19:08.6
CPU utilization for five seconds:1.2%; one minute:0.8%; five minutes:0.8%
set system cpu watermark (open): high 80%(85%~75%)

Tasks Statistics: 375 total, 10 running, 365 sleeping, 0 stopped, 0 zombie
  Pid Vsd S  PRI  P    5Sec    1Min    5Min    15Min Process
   1  0S   20  0  0.0(0.0)  0.0(0.0)  0.0(0.0)  0.0(0.0) init
   2  0S   20  1  0.0(0.0)  0.0(0.0)  0.0(0.0)  0.0(0.0) kthreadd
   3  0S  -100  0  0.0(0.0)  0.0(0.0)  0.0(0.0)  0.0(0.0) migration/0
   4  0S   20  0  0.0(0.0)  0.0(0.0)  0.0(0.0)  0.0(0.0) ksoftirqd/0
   5  0S  -100  1  0.0(0.0)  0.0(0.0)  0.0(0.0)  0.0(0.0) migration/1
```

--More--

2: The following example displays the tasks listed in ascending order of task IDs without displaying the tasks with 0 CPU usage within 15 minutes.

FS# show processes cpu nonzero

Description of the information displayed in this command:

Field	Description
System Uptime	Total running time of the device, precious to seconds.
CPU Utilization	Total CPU usage of the control core within the last five seconds, one minute, and five minutes.
Virtual CPU usage	Total CPU usage of the virtual control core within the last five seconds, one minute, and five minutes.
Tasks Statistics	Task statistics information, including the total number of statistics tasks and the task status.
set system cpu watermark	CPU watermark value and status of the control core.

The task running statuses are listed below:

Task Running Status	Description
running	Running task
sleeping	Suspended task
stopped	Stopped task
zombie	Terminated task, but not reclaimed by the system

Description of each task:

Field	Description
Pid	Task ID
Vsd	VSD ID
S	Task status. Five statuses in total: R (running), T (stopped), S (sleeping), D (waiting), and Z (zombie).
PRI	Task running priority
P	The core of the CPU on which the task runs
5sec/1min/5min/15min	CPU usage of the task within the last five seconds, one minute, five minutes, and 15 minutes. The value in the round brackets is the CPU usage that is not divided by the total number of cores where the task runs.
Process	Task name. Only the first 15 characters are displayed. The remaining characters are truncated.

3: The following example displays the CPU usage in ascending order of task IDs and only the processes with non-zero CPU usage within 15 minutes are displayed.

FS #show processes cpu nonzero

4: The following example displays the CPU usage in descending order within five seconds and the tasks with zero CPU usage within one second are not displayed.

```
FS #show processes cpu 5sec nonzero
```

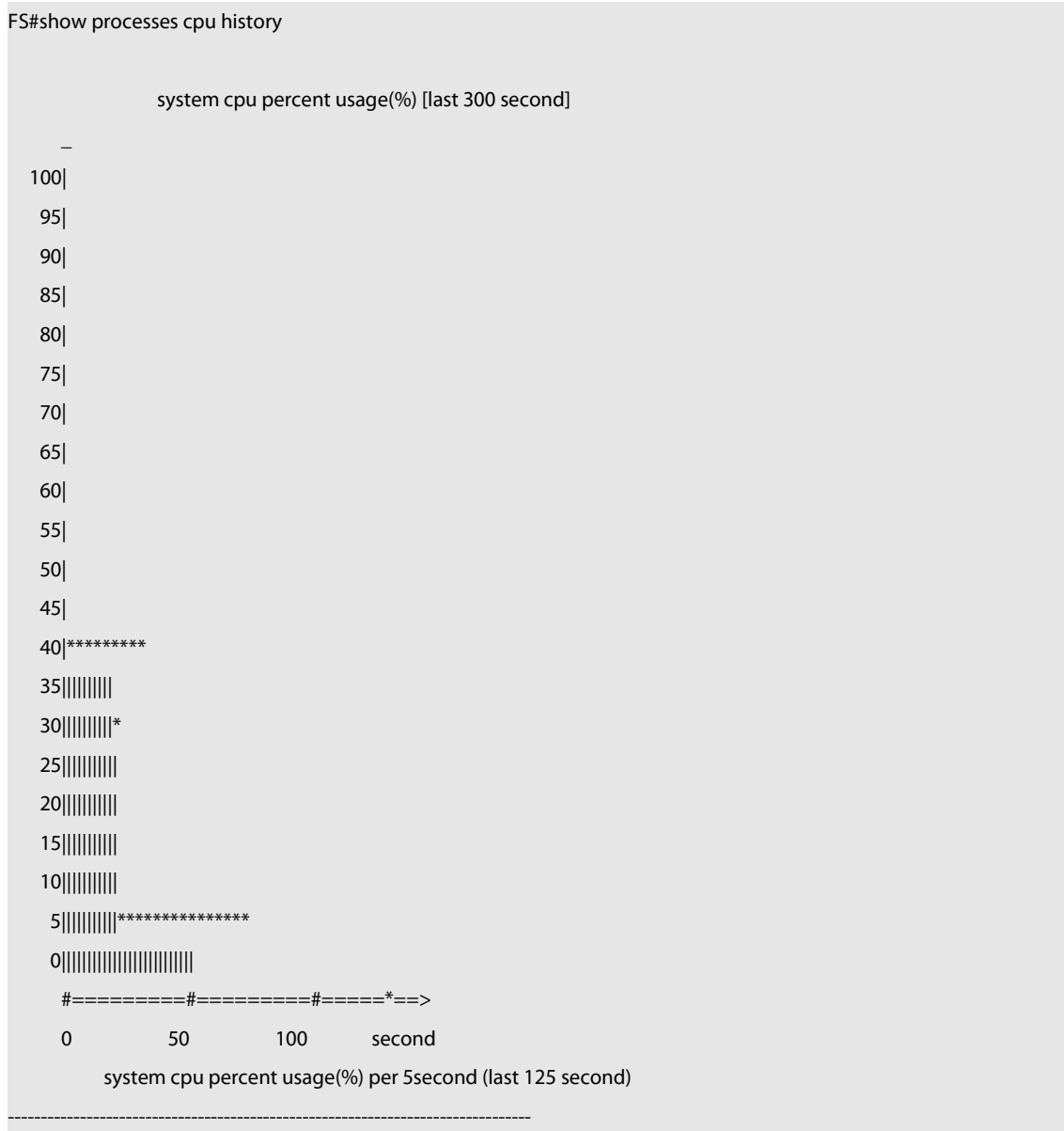
5: The following example displays the CPU usage of the control core in histograms within the last 60 seconds, 60 minutes, and 72 hours.

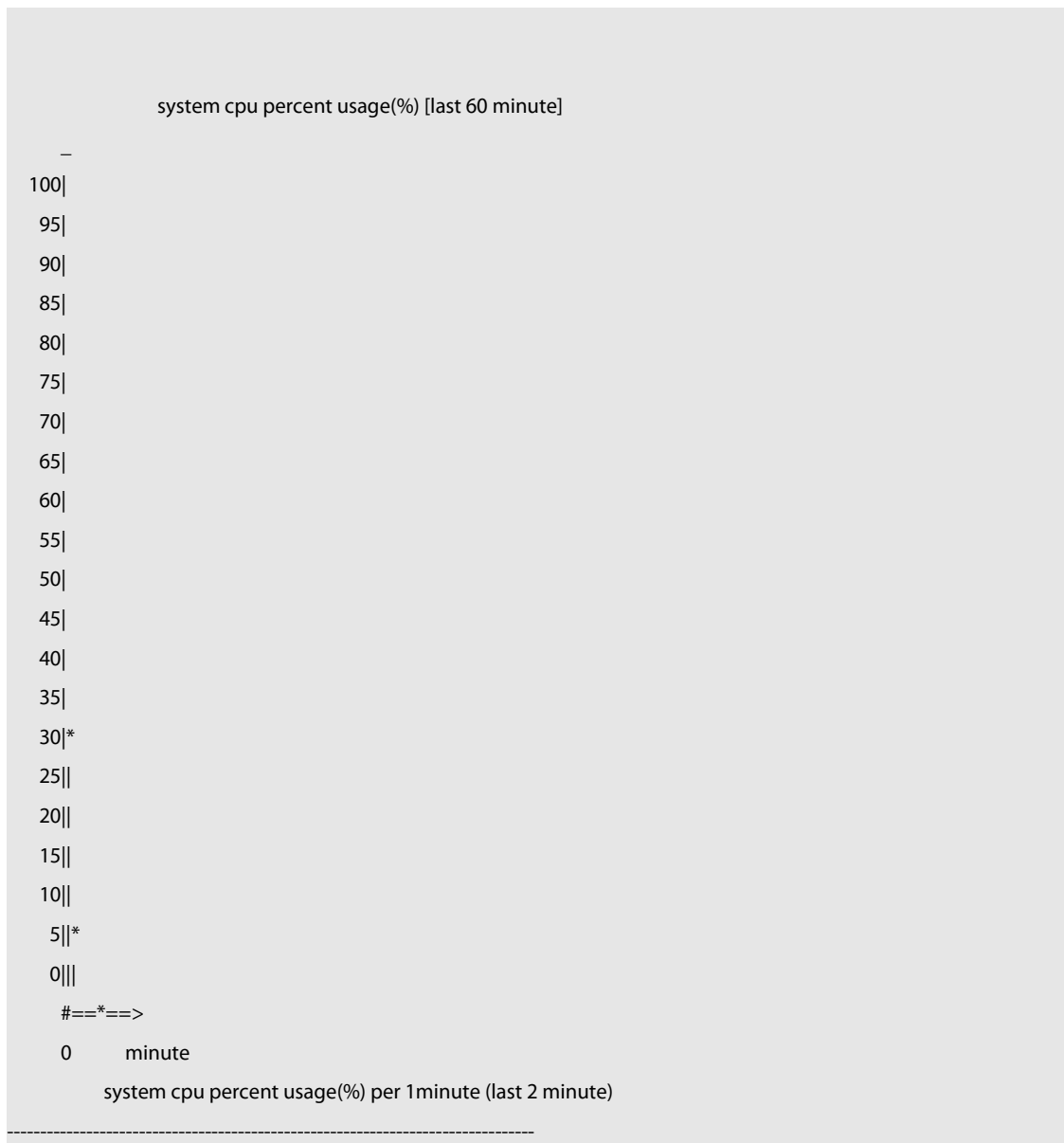
The first histogram displays the CPU usage of the control core within 300 seconds. Every segment in the x-coordinate is five seconds, and every segment in the y-coordinate is 5%. The symbol "*" indicates the CPU usage at the last specified second. In other words, the first segment on the x-coordinate nearest to 0 is the CPU usage in the last five seconds, measured in %.

The second histogram displays the CPU usage of the control core within the last 60 minutes, measured in %. Every segment on the x-coordinate is 1 minute.

The third histogram displays the CPU usage of the control core within the last 72 hours, measured in %. Every segment on the x-coordinate is 1 hour.

Example:



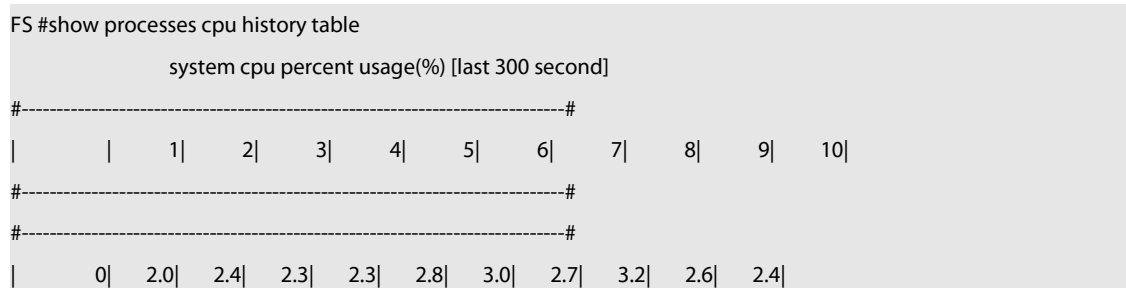


6: The following example displays the CPU usage of the core 0 in tables within the last 60 seconds, 60 minutes, and 72 hours.

The first table lists the CPU usage within 300 seconds. The first cell indicates the CPU usage within the last five seconds. The second table lists the CPU usage within the last 60 minutes, measured in %. The two adjacent cells show the CPU usage measured at an interval of one minute.

The third table lists the CPU usage within the last 72 hours, measured in %. The two adjacent cells show the CPU usage measured at an interval of one hour.

Example:



```

#-----#
|      1|  2.7|  2.5|  2.7|  2.2|  2.4|  2.6|  2.2|  2.7|  2.3|  2.5|
#-----#
|      2|  2.9|  2.0|  2.4|  2.5|  2.7|  2.4|  2.4|  2.6|  2.6|  2.5|
#-----#
|      3|  2.7|  2.8|  2.8|  3.2|  2.5|  3.2|  3.1|  4.0|  2.7|  2.7|
#-----#
|      4|  4.0|  2.3|  2.1|  2.2|  2.7|  2.4|  2.5|  2.6|  2.4|  2.6|
#-----#
|      5|  2.4|  3.2|  2.5|  2.3|  2.3|  3.6|  2.8|  2.5|  2.2|  2.4|
#-----#

      system cpu percent usage(%)[last 60 minute]
#-----#
|      |  1|  2|  3|  4|  5|  6|  7|  8|  9| 10|
#-----#
#-----#
|      0|  2.6|  2.5|  3.0|  2.4|  2.6|
#-----#
    
```

Prompt Message -

Platform -

Description

6.17 show processes cpu detailed

Use this command to display the details of the specified task.

show processes cpu detailed { process-id | process-name }

Parameter Description	Parameter	Description
	process-id	Displays the information on the task of the specified task ID.
	process-name	Displays the information on the task of the specified task name.

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported.


Configuration 1: The following example displays the information on the task of the specified task name.

Examples

```

FS# show processes cpu detailed demo
Process Id      : 1820
Process Name    : demo
Vsdid          : 0
Process Ppid    : 1

State          : R(running)
On CPU         : 0
Priority        : 20
Age Time       : 24:06.5
Run Time       : 00:01.0
Cpu Usage      :
  Lass 5 sec   0.3% (0.6%)
  Lass 1 min   0.3% (0.6%)
  Lass 5 min   0.3% (0.6%)
  Lass 15 min  0.3% (0.6%)
Tty            : ?
    
```

 Code Usage: 209.6 KB. If the specified task name is not unique, the system displays the following message:

```

FS# show processes cpu detailed demo
duplicate process, choose one by id not name.
name: demo, id: 1089, state: S(sleeping)
    
```

name: demo, id: 1091, state: R(running)
 process name: monitor_procps, do NOT exist, or NOT only one.

Description of the displayed information:

Field	Description
Process Id	Task ID
Vsdid	VSD ID of the task
Process Name	Task name
Process Ppid	Parent process task ID
State	Task running status
On CPU	CPU where the task is running
Priority	Task priority
Age Time	Duration for the task from self-startup to now
Run Time	Duration for the task from self-startup to being executed
Cpu Usage	CPU usage of the task within the last five seconds, one minute, five minutes, and 15 minutes. The value in the round brackets is the CPU usage that is not divided by the total number of cores where the task runs. For example, the demo task is running on No.0 core, which is the control core and the system has two control cores. In this case, the CPU usage is 0.3% (0.6%).
Tty	Tty ID, in the format of "Primary device ID, secondary device ID". If it is 0, the value is ?.
Code Usage	Size occupied by the task code segment

2: The following example displays the information on the task of the specified task ID.

FS# show process cpu detailed 1715

```

Process Id      : 130
Process Name   : crypto
Vsdid          : 0
Process Ppid   : 2

State          : S(sleeping)
On CPU        : 0
Priority       : 0
Age Time      : 03:41:09.9
Run Time      : 00:00.0
Cpu Usage     :
  Last 5 sec   0.0%( 0.0%)
  Last 1 min   0.0%( 0.0%)
  Last 5 min   0.0%( 0.0%)
  Last 15 min  0.0%( 0.0%)
Tty           : ?
Code Usage    : 0.0KB.
    
```

Prompt Message -

Platform

Description -

6.18 show usb-bus

Use this command to display the information on the device mounted to the USB bus.

show usb-bus

Parameter

Description

Parameter	Description
-	-

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide -

Configuration 1: The following example displays the information on the device mounted to the USB bus.

Examples

```
FS# show usb-bus
Device: Linux Foundation 2.0 root hub
Bus 001 Device 001: ID 1d6b:0002
```

Prompt Message -

Platform

Description -

6.19 show version

Use this command to display the system version information.

show version

Parameter

Description

Parameter	Description
-	-

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide -

Usage Guide The following example displays the system version information.

```

FS# show version
System description      : FS Indoor AP320-I (802.11a/n and 802.11b/g/n) By FS Networks
System start time      : 2012-12-06 00:00:00
System uptime          : 0:03:20:07
System hardware version : 1.0.0
System software version : AP_FSOS11.0(1B1)
System serial number   : 1234942570018
System boot version    : 1.0.0
    
```

Prompt -

Message -

Platform -

Description -

6.20 show cpu

Use this command to display the information on the system task running on the control core instead of the non-virtual core.

show cpu [core]

Parameter Description	Parameter	Description
	core	Displays CPU usage of each core on all modules.

Command Mode Privileged EXEC mode/ global configuration mode

Default Level -

Usage Guide This command is supported only in VSD0 mode. Multiple VSDs are not supported. If the system is equipped with a virtual core, you can use the **show processes cpu** command to check the CPU usage of the virtual core.

Configuration Examples The following example displays the information on the system task running on the control core instead of the non-virtual core.

```

FS#show cpu
=====
CPU Using Rate Information
CPU utilization in five seconds: 4.80%
CPU utilization in one minute: 4.10%
CPU utilization in five minutes: 4.00%
    
```

```

NO      5Sec   1Min   5Min Process
  1  0.00%  0.00%  0.00% init
  2  0.00%  0.00%  0.00% kthreadd
  3  0.00%  0.00%  0.00% ksoftirqd/0
  4  0.00%  0.00%  0.00% events/0
--More--
    
```

The following example displays CPU usage of each core on all modules.

```

FS#show cpu core
=====
[Slot 2: M18000-16XS-CB, Cpu 0]
Core  5Sec  1Min  5Min
  0  11.9%  11.7%  23.4%
  1   0.0%   0.0%   0.0%
=====
[Slot 3: M18000-16XS-CB, Cpu 0]
Core  5Sec  1Min  5Min
  0  11.2%  11.4%  23.7%
  1   0.0%   0.0%   0.0%
=====
[Slot M1: M7800E-CM]
Core  5Sec  1Min  5Min
  0  15.9%  21.0%  29.7%
  1   1.5%   1.5%   1.4%
    
```

Prompt Message -

Platform -

Description -

6.21 show reboot-reason

Use this command to display the reboot reason.

show reboot-reason [all]

Parameter Description	Parameter	Description
	all	Displays the reboot reason of all devices/service modules

Command Mode Privileged EXEC mode/ global configuration mode/ User EXEC mode

Default Level -

Usage Guide -

Configuration The following example displays the reboot reason of the device.

Examples

```
FS#show reboot-reason
time: 1970-01-01 08:03:13
reason: reload cmd
info: /sbin/rg-sysmon/3844
```

```
FS#
```

Prompt Message -

Platform -

Description -

7 Time Range Commands

7.1 absolute

Use this command to configure an absolute time range.

absolute { [**start** time date] [**end** time date] }

Use the **no** form of this command to remove the absolute time range.

no absolute

Parameter Description	Parameter	Description
	start time date	Indicates the start time of the range.
	end time date	Indicates the end time of the range.

Defaults The default absolute time range is the maximum range.

Command Mode Time range configuration mode

Default Level 14

Usage Guide Use the **absolute** command to configure a time absolute time range between a start time and an end time to allow a certain function to take effect within the absolute time range.
The maximum absolute time range is from 00:00 January 1, 0 to 23:59 December 31, 9999.

Configuration Examples The following example creates a time range and enters time range configuration mode.

```
FS(config)# time-range no-http
FS(config-time-range)#
```

The following example configures an absolute time range.

```
FS(config-time-range)# absolute start 1:1 1 JAN 2013 end 1:1 1 JAN 2014
```

Check Method Use the **show time-range** [time-range-name] command to display the time range configuration.

Prompt Message -

Platform Description -

7.2 periodic

Use this command to configure periodic time.

periodic day-of-the-week time **to** [day-of-the-week] time

Use the **no** form of this command to remove the configured periodic time.

no periodic day-of-the-week time **to** [day-of-the-week] time

Parameter Description	Parameter	Description
	day-of-the-week	Indicates the week day when the periodic time starts or ends.
	time	Indicates the exact time when the periodic time starts or ends.

Defaults No periodic time is configured by default.

Command Mode Time range configuration mode

Default Level 14

Usage Guide Use the **periodic** command to configure a periodic time interval to allow a certain function to take effect within the periodic time. If you want to modify the periodic time, it is recommended to disassociate the time range first and associate the time range after the periodic time is modified.

Configuration The following example creates a time range and enters time range configuration mode.

```
FS(config)# time-range no-http
FS(config-time-range)#
```

The following example configures a periodic time interval.

```
FS(config-time-range)# periodic Monday 1:1 to Tuesday 2:2
```

Check Method Use the **show time-range** [time-range-name] command to display the time range configuration.

Prompt Message -

Platform Description -

7.3 show time-range

Use this command to display the time range configuration.

show time-range [time-range-name]

Parameter Description	Parameter	Description
	time-range-name	Displays a specified time range.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide Use this command to check the time range configuration.

Configuration The following example displays the time range configuration.

Examples

```
FS# show time-range
time-range entry: test (inactive)
  absolute end 01:02 02 February 2012
```

Prompt -

Message -

Platform -

Description -

7.4 time-range

Use this command to create a time range and enter time range configuration mode.

time-range time-range-name

Use the **no** form of this command to remove the configured time range.

no time-range time-range-name

Parameter Description	Parameter	Description
	time-range-name	Time range name

Defaults No time range is configured by default.

Command Mode Global configuration mode

Default Level 2

Usage Guide Some applications (such as ACL) may run based on time. For example, an ACL can be effective within certain time ranges of a week. To this end, first you must configure a time range. After the time range is created, you can configure relevant time control in time range mode.

Configuration The following example creates a time range.

Examples FS(config)# time-range no-http
FS(config-time-range)#

Check Method Use the **show time-range** [time-range-name] command to display the time range configuration.

Prompt -
Message -

Platform -
Description -

8 USB Commands

8.1 show usb

Use this command to display the information about the inserted USB device in the system.

show usb

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Device information is displayed if there is a USB device. Otherwise, there is no output. If the USB disk is connected to the USB port on the device, the ID displayed by running the **show usb** command is X, the USB port number. If the USB disk is connected to the USB port on the device via a HUB, the ID displayed by running the **show usb** command is X-Y, in which X stands for the USB port number and Y for the HUB slot number.

Configuration Examples The following example displays the information about the USB device:

```
FS# show usb
Device: Mass Storage:
ID: 0
URL prefix: usb0
Disk Partitions:
usb0(type:FAT32)
Size : 131,072,000B(125MB)
Available size: 1,260,020B(1.2MB)
```

In above information, the Mass Storage Device is the name of the device.

The meaning of the information is as below:

Table 1: the description of the field.

Field	Description
URL	Prefix used to access the USB device.
Size	Accessible size of the USB device.
Available size	Available size of the USB device.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.2 usb remove

Use this command to remove the USB device.

usb remove device_id

Parameter Description	Parameter	Description
	device_id	Device ID of USB to be removed.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Before pulling out the USB device, you need to remove the device using a command, so as to prevent errors that may occur because the system is using the device. If the device is removed successfully, the system will show a prompt, when you can pull out the device. If the device cannot be pulled out, it indicates that the system is using this USB device, so you have to wait a moment before removing it again.

Configuration Examples The following example removes the USB device.

```
FS# usb remove 0
```

```
OK, now you can pull out the device 0.
```

```
*Jan 1 00:18:16: %USB-5-USB_DISK_REMOVED: USB Disk <Mass Storage> has been removed from USB port 0!
```

At this moment, the USB device can be plugged out.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

9 UFT Commands

9.1 `switch-mode mode_type slot slot_number`

Use this command to switch the UFT operating mode for a line card in stand-alone mode.

switch-mode mode_type slot slot_num

Use this command to restore the Default UFT operating mode for the specified line card in stand-alone mode.

no switch-mode mode_type slot slot_num

Parameter Description	Parameter	Description
	mode_type	<p>Indicates the UFT operating mode.</p> <p>In stand-alone mode, the line card can operate in the following modes:</p> <ul style="list-style-type: none"> ● Default: Default mode, which is applied to most of application scenarios. ● bridge: Bridge mode, which is applied to the application scenarios where pure Layer 2 services dominate. ● gateway: Gateway mode, which is applied to the application scenario in which Layer 3 services dominate. ● gateway-max: Gateway-max mode, which is applied to the application scenarios in which a large number of terminals are deployed. ● gateway-ndmax: Gateway-ndmax mode, which is applied to the application scenarios in which a large number of IPv6 terminals are deployed. ● label: Label mode, which is applied to the application scenarios that require a great amount of MPLS labels. ● route-v4max: IPv4 routing mode, which is applied to the application scenarios that require a great number of IPv4 routes. ● route-v6max: IPv6 routing mode, which is applied to the application scenarios that require a great number of IPv6 routes. ● acl: ACL mode. ● acl-ipv4: acl-IPv4 mode. ● mc: Multicast mode. ● vxlan: vxlan mode. ● alpm: alpm mode. ● dual-stack-alpm: dual-stack-alpm mode, which is applied to the application scenarios that require a great number of IPv4 and IPv6 routes. ● ipv6-64-alpm: ipv6-64-alpm mode, which is applied to the application scenarios that require a great number of IPv4 and IPv6 routes with subnet

	mask shorter than 64 bits. <ul style="list-style-type: none"> ● fpem-alm: fpem-alm mode, which is applied to the application scenarios that require a great number of FP tables and routing tables.
slot_num	Indicates the corresponding line card installed in the chassis.

Defaults The Default UFT operating mode is **Default**.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example switches the UFT operating mode of the line card in slot 3 of the switch to bridge mode in stand-alone mode.

```

FS(config)#switch-mode bridge slot 3
Please save current config and restart your device!
FS(config)#show run

Building configuration...
Current configuration : 1366 bytes

version 11.0(1B2)
!
cwmpp
!
install 3 M8600E-24XS4QXS-DB
!
sysmac 1414.4b34.5624
!
nfpp
!
switch-mode bridge slot 3
    
```

Verification Use the **show switch-mode status** command to display the current operating mode.

```

FS#show switch-mode status
Slot No      Switch-Mode-Next      Switch-Mode-Current
-----      -
3            bridge                bridge
    
```

Prompt Messages N/A

Common N/A
Errors
Platforms N/A

9.2 switch-mode mode_type switch switch_id slot slot_num

Use this command to switch the UFT mode for a line card in VSU mode.

switch-mode mode_type **switch** switch_num **slot** slot_num

Use this command to delete the UFT mode for the specified line card in VSU mode.

no switch-mode mode_type **switch** switch_num **slot** slot_num

Parameter Description	Parameter	Description
	mode_type	<p>Indicates the UFT operating mode.</p> <p>In VSU mode, the line card can operate in the following modes:</p> <ul style="list-style-type: none"> ● Default: Default mode, which is applied to most of application scenarios. ● bridge: Bridge mode, which is applied to the application scenarios where pure Layer 2 services dominate. ● gateway: Gateway mode, which is applied to the application scenarios in which Layer 3 services dominate. ● gateway-max: Gateway-max mode, which is applied to the application scenarios in which a large number of terminals are deployed. ● gateway-ndmax: Gateway-ndmax mode, which is applied to the application scenarios in which a large number of IPv6 terminals are deployed. ● label: Label mode, which is applied to the application scenarios that require a great amount of MPLS labels. ● route-v4max: IPv4 routing mode, which is applied to the application scenarios that require a great number of IPv4 routes. ● route-v6max: IPv6 routing mode, which is applied to the application scenarios that require a great number of IPv6 routes. ● acl: ACL mode. ● acl-ipv4: acl-IPv4 mode. ● mc: Multicast mode. ● vxlan: vxlan mode. ● alpm: alpm mode. ● dual-stack-alpm: dual-stack-alpm mode, which is applied to the application

	<p>scenarios that require a great number of IPv4 and IPv6 routes.</p> <ul style="list-style-type: none"> ● ipv6-64-alm: ipv6-64-alm mode, which is applied to the application scenarios that require a great number of IPv4 and IPv6 routes with subnet mask shorter than 64 bits. <p>fpem-alm: fpem-alm mode, which is applied to the application scenarios that require a great number of FP tables and routing tables.</p>
switch_num	Indicates the chassis or box device number in VSU mode.
slot_num	Indicates the line card installed in the chassis device.

Defaults The default UFT operating mode is **default configuration**.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example switches the UFT operating mode of the line card in slot 3 of switch1 to bridge mode in VSU mode.

```

FS(config)#switch-mode bridge switch 1 slot 3
Please save current config and restart your device!
FS(config)#show run

Building configuration...
Current configuration : 1485 bytes

version 11.0(1B2)
!
cwmp
!
install switch 1 RG-S7805E
install 1/3 M8600E-24XS4QXS-DB
!
sysmac 1414.4b34.5624
!
nfpp
!
switch-mode bridge switch 1 slot 3
    
```

Verification Use the **show switch-mode status** command to display the UFT mode.

```

FS#show switch-mode status

Slot No           Switch-Mode-Next      Switch-Mode-Current
-----           -
    
```

Switch 1 slot 3	bridge	bridge
-----------------	--------	--------

Prompt N/A

Messages N/A

Common Errors N/A

Platforms N/A

9.3 show switch-mode status

Use this command to display the UFT mode of a switch.

show switch-mode status

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode/global configuration mode/interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays the UFT mode of the switch in stand-alone mode.

```

Examples
FS#show switch-mode status
Slot No      Switch-Mode-Next      Switch-Mode-Current
-----      -
3           bridge              bridge
    
```

2The following example displays the UFT mode of the switch in VSU mode.

```

FS#show switch-mode status
Slot No      Switch-Mode-Next      Switch-Mode-Current
-----      -
Switch 1 slot 3  bridge              bridge
    
```

Field Description:

Field	Description
Slot No	Displays only slot No. in stand-alone mode; displays both device No. and slot No. in VSU mode.
Switch-Mode-Next	Indicates the configured UFT mode, which will take place next time.
Switch Mode Current	Indicates the current UFT mode.

Prompt N/A

Messages

Platforms N/A

9.4 show switch-mode mode_type

Use this command to software and hardware resource in a mode or in all modes.

show switch-mode all

Parameter Description

Parameter	Description
N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays the UFT mode of the switch in stand-alone mode.

Examples

```

FS#show switch-mode all
Current mode is marked by * :
Hardware:
-----
Switch Mode          L2_ENTRY   L3_ENTRY   L3_DEFIP   L3_DEFIP_128  ALPM-V4 ALPM-V6
-----
default              98304      212992     6144       1024           0       0       (*)
bridge               294912     16384      6144       1024           0       0
gateway              98304      212992     6144       1024           0       0
route-v4max          98304      212992     8192       0               0       0
route-v6max          98304      212992     6144       1024           0       0
alpm                  32768      16384      4096       2048           196608  65536
vxlan                 98304      212992     6144       1024           0       0
vxlan-border         98304      212992     6144       1024           0       0
default-overlay      98304      212992     6144       1024           0       0
bridge-overlay       294912     16384      6144       1024           0       0
gateway-overlay      98304      212992     6144       1024           0       0
gateway-max-overla  98304      212992     6144       1024           0       0
gateway-ndmax-over  98304      212992     6144       1024           0       0
route-v4max-overla  98304      212992     8192       0               0       0
route-v6max-overla  98304      212992     6144       1024           0       0
alpm-overlay         32768      16384      4096       2048           196608  65536

Software:
    
```

```

-----
Switch Mode      ipv4_host  ipv6_host  ipv4_lpm  ipv6_lpm    Arp    Nd
-----
default          160000    70000     20000    10000       40000  40000  (*)
bridge           30000     12000     20000    10000       7000   7000
gateway          160000    70000     20000    10000       40000  40000
route-v4max      160000    70000     20000    10000       128000 40000
route-v6max      160000    70000     20000    10000       40000  40000
alpm             138000    25000     130000    17000       8000   8000
vxlan            160000    70000     20000    10000       121000 8000
vxlan-border     160000    70000     20000    10000       121000 8000
default-overlay  160000    70000     20000    10000       40000  40000
bridge-overlay   30000     12000     20000    10000       7000   7000
gateway-overlay  160000    70000     20000    10000       40000  8000
gateway-max-overla 160000    70000     20000    10000       106496 77824
gateway-ndmax-over 160000    70000     20000    10000       106496 77824
route-v4max-overla 160000    70000     20000    10000       40000  8000
route-v6max-overla 160000    70000     20000    10000       40000  8000
alpm-overlay     138000    25000     138000    17000       121000 16000
-----

```

Prompt Messages N/A

Platforms N/A

10 TCAM-MODE Commands

10.1 tcam-mode mode-type

Use this command to display the TCAM work mode.

tcam-mode mode-type

Parameter Description	Parameter	Description
	mode-type	TCAM work mode. default: Default mode, applied to most scenario. acl-max: ACL-MAX mode, applied to the scenario for TCAM resource integration.

Defaults N/A

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the TCAM work mode to ACL-MAX.

```
FS# configure terminal
FS(config)# tcam-mode acl-max
Please remove ACL related config, save current config and restart your device!
FS(config)#
```

Platform N/A

Description

10.2 show tcam-mode status

Use this command to display the TCAM work mode.

show tcam-mode status

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the TCAM work mode.

Examples FS(config)# show tcam-mode status

```
config-mode: acl-max
```

```
save-mode: acl-max
```

```
running-mode: acl-max
```

Platform N/A

Description

11 ZAM Commands

11.1 show zam

Use this command to display the current configuration and status of ZAM.

show zam

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Defaults	N/A				
Command Mode	Privileged EXEC mode/Global configuration mode/Interface configuration mode				
Usage Guide	N/A				
Configuration Examples	<p>The following example displays the current configuration and status of ZAM.</p> <pre> FS# FS#show zam ZAM state : disable ZAM status : Now is idle ZAM manage interface: Mgmt 0 FS# </pre>				
Platform Description	N/A				

11.2 zam

Use this command to enable ZAM. Use the **no** form of this command to disable ZAM.

zam

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Defaults	N/A				
Command Mode	Global configuration mode				

Usage Guide

Configuration The following example disables ZAM.

Examples FS(config)# no zam
FS(config)#

Platform N/A

Description

12 Module Hot-plugging/ unplugging Commands

12.1 module-offline slot-num

Use this command to isolate a module. Use the **no** form of this command to restore the default settings.

module-offline slot slot-num

module-offline switch-id/slot-num

Parameter	Parameter	Description
Description	switch-id	Switch ID
	slot-num	Slot number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example isolates the module in slot 4.

```
FS# module-offline slot 4
```

Related Commands	Command	Description
		show version module detail

Platform N/A

Description

12.2 sysmac

Use this command to configure a MAC address for the system. Use the **no** form of this command to remove the setting.

sysmac mac-address

no sysmac

Parameter	Parameter	Description
Description	mac-address	Configures a MAC address for the system.

Defaults N/A

Command Global configuration mode

Mode

- Usage Guide
1. In general, the MAC address is programmed on the management board or the chassis flash. In virtual switching unit (VSU) mode, the system saves the MAC address in use in the configuration file to avoid flow interruption caused by MAC address change. The valid MAC address saved in the configuration file validates in preference after the device is restarted,
 2. The MAC address of the gateway may be bound on some downstream devices. If the system is configured with the **auth-mode gateway** command, you can use the **sysmac** command to replace the MAC address of the gateway without changing the MAC address configuration on the downstream devices.
 3. The configuration takes effect after the device is restarted.

Configuration The following example deletes the MAC address saved in the configuration file.

Examples `FS#no sysmac`

The following example configures MAC address 00d0.f822.33e2 for the system.

`FS#sysmac 00d0.f822.33e2`

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

12.3 remove configuration device device-id

Use this command to remove the configuration on a VSU device, which validates in VSU mode after restart.

remove configuration device device-id

Parameter Description	Parameter	Description
	device-id	The chassis number.

Defaults N/A

Command Global configuration mode
Mode

Usage Guide This command is used to remove the configuration on a VSU device. It validates after the device is restarted.

Configuration The following example clears the configuration on device 1.

Examples `FS(config)# remove configuration device 1`

Related Commands	Command	Description

N/A	N/A
-----	-----

Platform N/A
Description

12.4 show alarm

Use this command to display system alarm messages, concerning card startup failure, temperature, power, and fan alarms.

show alarm

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Privileged EXEC mode
Mode

Usage Guide N/A

Configuration The following example displays system alarm messages.

Examples

```
FS#show alarm
Dev  Module          Level  Info
-----
1    DEV              Warning Some fans are absent.
1    DEV              Critical Some cards are in cannot-startup state.
```

Field	Description
Dev	Device ID
Module	Service module
Level	Alarm level, including Critical and Warning
Info	Alarm cause, such as system power shortage fan absence and card startup failure

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

12.5 show manuserinfo

Use this command to display asset information about all independent components in the system for asset management, including the chassis, fan, power, management board, and line card. The information covers the ID, slot number, name, serial number (SN), software and hardware version, and MAC address. Not all devices support display of the same information and only supported information is printed.

show manuserinfo

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Privileged EXEC mode
Mode

Usage Guide This command is used to display asset information about all independent components in the system

Configuration The following example displays asset information of the single physical device.

```

Examples
FS#show manuserinfo
Device 1
  Location:           Chassis
  Device name:       RG S12006
  Device Serial Number: 62150129A8B0DAF0F0321
  Hardware Version:  V1.0
  Mac Address:       00.D0.F8.00.11.22

Device 2
  Location:           Slot-M1
  Device name:       M12000 CM
  Device Serial Number: 32150129A8B0DAF0F0321
  Hardware Version:  V1.0
  Software Version:  FSOS 10.4(3b17) Release 129646
  Mac Address:       00.D0.F8.00.11.34

Device 3
  Location:           Slot-1
  Device name:       M12000-04XFP-EA
  Device Serial Number: 32150129A8B0DAF0F0322
  Hardware Version:  V1.0
  Software Version:  FSOS 10.4(3b17) Release 129646

Device 4
    
```

```

Location:          Slot-2
Device name:       M12000-04XFP-EA
Device Serial Number: 32150129A8B0DAF0F0323
Hardware Version:  V1.0
Software Version:  FSOS 10.4(3b17) Release 129646

```

Device 5

```

Location:          Power 1
Device name:       RG PD1200I
Device Serial Number: 42150129A8B0DAF0F0321
Hardware Version:  V1.0

```

Device 6

```

Location:          Power 2
Device name:       RG PD1200I
Device Serial Number: 42150129A8B0DAF0F0322
Hardware Version:  V1.0

```

Device 7

```

Location:          FAN
Device name:       M12000 FAN
Device Serial Number: 52150129A8B0DAF0F0321
Hardware Version:  V1.0

```

The following example displays asset information in VSU mode.

```
FS#show manuinfo
```

Device 1

```

Location:          Chassis 1
Device name:       RG S12006
Device Serial Number: 62150129A8B0DAF0F0321
Hardware Version:  V1.0
Mac Address:       00.D0.F8.00.11.22

```

Device 2

```

Location:          Slot-1/M1
Device name:       M12000 CM
Device Serial Number: 32150129A8B0DAF0F0321
Hardware Version:  V1.0
Software Version:  FSOS 10.4(3b17) Release 129646
Mac Address:       00.D0.F8.00.11.56

```

Device 3

```

Location:          Slot-1/1
Device name:       M12000-04XFP-EA
Device Serial Number: 32150129A8B0DAF0F0322

```

Hardware Version: V1.0
Software Version: FSOS 10.4(3b17) Release 129646

Device 4

Location: Slot-1/2
Device name: M12000-04XFP-EA
Device Serial Number: 32150129A8B0DAF0F0323
Hardware Version: V1.0
Software Version: FSOS 10.4(3b17) Release 129646

Device 5

Location: Power 1/1
Device name: RG PD1200I
Device Serial Number: 42150129A8B0DAF0F0321
Hardware Version: V1.0

Device 6

Location: Power 1/2
Device name: RG PD1200I
Device Serial Number: 42150129A8B0DAF0F0322
Hardware Version: V1.0

Device 7

Location: FAN 1
Device name: M12000 FAN
Device Serial Number: 52150129A8B0DAF0F0322
Hardware Version: V1.0

Device 8

Location: Chassis 2
Device name: RG S12006
Device Serial Number: 62150129A8B0DAF0F0322
Hardware Version: V1.0
Software Version: FSOS 10.4(3b17) Release 129646
Mac Address: 00.D0.F8.00.11.33

Device 9

Location: Slot-2/M1
Device name: M12000 CM
Device Serial Number: 32150129A8B0DAF0F0324
Hardware Version: V1.0
Software Version: FSOS 10.4(3b17) Release 129646
Mac Address: 00.D0.F8.00.11.22


```

Device 10
  Location:                Slot-2/1
  Device name:             M12000-04XFP-EA
  Device Serial Number:   32150129A8B0DAF0F0325
  Hardware Version:       V1.0
  Software Version:       FSOS 10.4(3b17) Release 129646

Device 11
  Location:                Slot-2/2
  Device name:             M12000-04XFP-EA
  Device Serial Number:   32150129A8B0DAF0F0326
  Hardware Version:       V1.0
  Software Version:       FSOS 10.4(3b17) Release 129646

Device 12
  Location:                Power 2/1
  Device name:             RG PD1200I
  Device Serial Number:   42150129A8B0DAF0F0323
  Hardware Version:       V1.0

Device 13
  Location:                Power 2/2
  Device name:             RG PD1200I
  Device Serial Number:   42150129A8B0DAF0F0324
  Hardware Version:       V1.0

Device 14
  Location:                FAN 2
  Device name:             M12000 FAN
  Device Serial Number:   52150129A8B0DAF0F0322
  Hardware Version:       V1.0
    
```

Related
Commands

Command	Description
N/A	N/A

Platform
Description

N/A

12.6 show sysmac

Use this command to display the MAC address of the current system.

show sysmac

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the MAC address of the current system.

```
FS#show sysmac
00d0.f822.33e2
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

12.7 show version module detail [module-num]

Use this command to display the details of the module.

show version module detail [module-num]

Parameter Description	Parameter	Description
	module-num	(Optional) Module number.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use this command to display details of the module

Configuration Examples

```
FS# show version module detail 2
Device : 1
Slot : 2
User Status : none
Software Status: none
```

```

Online Module :
Type :
Ports : 0
Version :
Configured Module :
Type :
Ports :
Version :
FS#
    
```

Related Commands

Command	Description
show version slots	Displays slot details.

Platform N/A
Description

12.8 show version slots [slot-num]

Use this command to display the details of the slot.

show version slots [slot-num]

Parameter Description

Parameter	Description
num	(Optional) Slot number.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration

```

FS# show version slots
Dev Slot  Configured Module Online Module  User Status  Software Status
-----
1 1      none             none
1 2 M8606-24SFP/12GT M8606-24SFP/12GT installed none
1 3 M8606-2XFP M8606-2XFP uninstalled cannot startup
1 4 M8606-24GT/12SFP M8606-24GT/12SFP installed ok
1 M1 M8606-CM M8606-CM master
1 M2
    
```

Examples

Related

Command	Description
---------	-------------

Commands

show version moduel detail	Displays the details of the module.

Platform

N/A

Description

13 Supervisor Module Redundancy Commands

13.1 auto-sync time-period

Use this command to configure the auto-sync time-period of running-config and startup-config when the dual supervisor module is redundant. Use the **no** form of this command to disable automatic synchronization for the dual supervisor modules. Use the **default** form of this command to restore the default automatic synchronization time period for the dual supervisor modules.

auto-sync time-period value

no auto-sync time-period

default auto-sync time-period

Parameter Description	Parameter	Description
	value	Automatic synchronization time interval measured in seconds, in the range from one second to one month (2,678,400 seconds).

Defaults The default is one hour (3600 seconds) by default.

Command Mode Redundancy configuration mode

Usage Guide N/A

Configuration Examples The following example sets the automatic synchronization interval to 60 seconds.

```
FS(config)# redundancy
FS(config-red)# auto-sync time-period 60
Redundancy auto-sync time-period: enabled (60 seconds).
FS(config-red)# exit
```

The following example disables automatic synchronization.

```
FS(config)# redundancy
FS(config-red)# no auto-sync time-period
Redundancy auto-sync time-period: disabled.
FS(config-red)# exit
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

13.2 redundancy

Use this command to enter redundancy configuration mode.

redundancy

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example enters redundancy configuration mode.

```
FS# config terminal
FS(config)# redundancy
FS(config-red)# exit
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

13.3 redundancy forceswitch

Use this command to perform active/standby supervisor module switchover.

redundancy forceswitch

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If this command is executed on the active supervisor module, the module will be reset and the standby

supervisor module will act as an active supervisor module.

The following conditions are required to perform hot backup switchover:

- This command is executed on the active supervisor module. There is a standby supervisor module.
- Hot backups on all virtual switch devices (VSDs) are in real-time status.
- Hot backup switchovers on VSDs are not prevented temporarily by any service entity.

When there are multiple VSDs, the system judges whether the hot backup on each VSD allows active/standby switchover; If any VSD does not allow the switchover, the command fails. Otherwise, active/standby switchovers are enforced on all VSDs.

Configuration The following example performs active/standby supervisor module switchover.

Examples

```
FS# redundancy forceswitch
This operation will reload the master unit and force switchover to the slave unit. Are you sure to continue? [N/y] y
```

Related Commands

Command	Description
reload	Resets the active supervisor module.

Platform N/A

Description

13.4 redundancy reload

Use this command to reset the supervisor module.

redundancy reload { peer | shelf [switchid] }

Parameter Description

Parameter	Description
peer	Resets the standby supervisor module.
shelf	Resets both the active and standby supervisor modules on the device which works as a single physical device. The device ID should be specified on the device which works as a Virtual Switching Unit (VSU) device.
switchid	VSU device ID, supported on a VSU device. This parameter is not supported in stand-alone mode. It must be contained in the redundancy reload shelf command in VSU mode.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Resetting the supervisor module does not affect data forwarding. Data forwarding will not be interrupted and the user session information will not be missing.

The **redundancy reload shelf** command is used to reset the device which works as a single physical device. The

redundancy reload shelf switchid command is used to reset the specified device which works as a VSU device.

Configuration The following example resets the standby supervisor module.

```
Examples
FS# redundancy reload peer
This operation will reload the current slave unit. Are you sure to continue? [N/y] y
Preparing to reload peer!
```

The following example resets device 2 which works as a VSU device.

```
FS# redundancy reload shelf 2
This operation will reload the device 2. Are you sure to continue? [N/y] y
Preparing to reload device 2!
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

13.5 show redundancy states

Use this command to display the current redundancy state.

show redundancy states

Parameter Description

Parameter	Description
states	Displays the redundancy status of the active or the standby devices.

Defaults N/A

Command Mode User EXEC mode / Privileged EXEC mode

Usage Guide Currently, only 1:1 hot backup (for the global active module and standby module) is supported in the VSU mode. Therefore, only the hot backup state of the local and peer device is displayed. If the system is configured with multiple VSDs, the hot backup state of all VSDs is displayed in VSD 0 in global configuration mode.

Configuration The following example displays the redundancy states of active supervisor module.

```
Examples
FS> enable
FS# show redundancy states
Redundancy role: master
Redundancy state: realtime
Auto-sync time-period: 3600 s
```


The following example displays the redundancy state of the standby supervisor module.

```
FS> enable
FS# show redundancy states
Redundancy role: slave
Redundancy state: realtime
```

The following example displays the redundancy state of the candidate supervisor module.

```
FS> enable
FS# show redundancy states
Redundancy role: candidate
Redundancy state: none
```

The following example displays the redundancy state of the active supervisor module with VSD1 and VSD2 configured.

```
FS> enable
FS# show redundancy states
Redundancy role: master
Redundancy state: realtime
Auto-sync time-period: 3600 s

VSD vsd1 redundancy state: realtime
VSD vsd2 redundancy state: realtime
```

Field	Description
role	The role of the supervisor module.
state	The state of the supervisor module.
Auto-sync time-period	Displayed on the active supervisor module. The configuration file synchronizes the time interval automatically. "disabled" indicates no automatic synchronization.
VSD <vsd name> redundancy state	Displays hot backup state of the specified VSD in VSD 0.

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

14 Syslog Commands

14.1 clear logging

Use this command to clear the logs from the buffer in privileged EXEC mode.

clear logging

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command clears the log packets from the memory buffer. You cannot clear the statistics of the log packets.

Configuration Examples The following example clears the log packets from the memory buffer.

```
FS# clear logging
```

Related Commands	Command	Function
	logging on	Turns on the log switch.
	show logging	Displays the logs in the buffer.
	logging buffered	Records the logs in the memory buffer.

Platform Description N/A

14.2 logging

Use this command to send the log message to the specified syslog server.

logging { ip-address | **ipv6** ipv6-address } [**udp-prot** port] [**vrf** vrf-name]

Use this command to delete the specified syslog server.

no logging { ip-address [**vrf** vrf-name] | **ipv6** ipv6-address }

Use this command to restore the default port 514.

no logging { ip-address [**vrf** vrf-name] | **ipv6** ipv6-address } **udp-prot**

Parameter Description	Parameter	Description
	ip-address	Sets the IP address of the host receiving log messages.
	vrf-name	Sets the VRF instance connecting with the host.
	ipv6-address	Sets the IPv6 address of the host receiving log messages.
	udp-port port	Sets the port number of the host receiving log messages. The default is 514.

Defaults No log message is sent to syslog server by default.

Command Global configuration mode

Mode

Usage Guide This command is used to configure a syslog server to receive log messages from the device. You can configure up to five syslog servers, log messages are sent to all configured syslog servers simultaneously,

Configuration The following example configures a syslog server with IP address 202.101.11.1.

Examples `FS(config)# logging 202.101.11.1`

The following example configures a syslog server with IP address 10.1.1.100 and port number 8099.

`FS(config)# logging 202.101.11.1 udp-port 8099`

The following example configures a syslog server with IPv6 address AAAA:BBBB::FFFF.

`FS(config)# logging ipv6 AAAA:BBBB::FFFF`

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

14.3 logging buffered

Use this command to set the memory buffer parameters (log severity, buffer size) for logs at global configuration layer. Use the **no** form of the command to disable recording logs in the memory buffer. Use the **default** form of this command to restore the default setting.

logging buffered [buffer-size | level]

no logging buffered

default logging buffered

Parameter	Parameter	Description
Description	buffer-size	Size of the buffer is related to the specific device type: 1. For the kernel / aggregation switches, 4 K to 10 M bytes. 2. For the access switches, 4 K to 1 M Bytes. 3. For other devices, 4 K to 128 K Bytes.
	level	Severity of logs, from 0 to 7. The name of the severity or the numeral can be used.

Defaults The buffer size is related to the specific device type.

1. kernel switches: 1 M Bytes;
2. aggregation switches: 256 K Bytes;
3. access switches: 128 K Bytes;
4. other devices: 4 K Bytes

The log severity is 7.

Command

Mode Global configuration mode

Usage Guide

The memory buffer for log is used in recycled manner. That is, when the memory buffer with the specified size is full, the oldest information will be overwritten. To show the log information in the memory buffer, run the **show logging** command in privileged user mode.

The logs in the memory buffer are temporary, and will be cleared in case of device restart or the execution of the **clear logging** command in privileged user mode. To trace a problem, it is required to record logs in flash or send them to Syslog Server.

The log information is classified into the following 8 levels (Table 1):

Table-1

Keyword	Level	Description
Emergencies	0	Emergency case, system cannot run normally
Alerts	1	Problems that need immediate remedy
Critical	2	Critical conditions
Errors	3	Error message
warnings	4	Alarm information
Notifications	5	Information that is normal but needs attention
informational	6	Descriptive information
Debugging	7	Debugging messages

Lower value indicates higher level. That is, level 0 indicates the information of the highest level.

When the level of log information to be displayed on devices is specified, the log information at or below the set level will be allowed to be displayed.

After running the system for a long time, modifying the log buffer size especially in condition of large buffer may fails due to the insufficient available continuous memory. The failure message will be shown. It is recommended to modify the log buffer size as soon as the system starts.

Configuration

The following example allows logs at and below severity 6 to be recorded in the memory buffer sized 10,000 bytes.

Examples

```
FS(config)# logging buffered 10000 6
```

Related

Commands

Command	Description
logging on	Turns on the log switch.
show logging	Displays the logs in the buffer.
clear logging	Clears the logs in the log buffer.

Platform
Description N/A

14.4 logging console

Use this command to set the severity of logs that are allowed to be displayed on the console in global configuration mode. Use the **no** form of this command to prohibit printing log messages on the console.

logging console [level]

no logging console

Parameter	Parameter	Description
Description	level	Severity of log messages, 0 to 7. The name of the severity or the numeral can be used. For the details of log severity, see table 1.

Defaults The default is debugging (7).

Command Mode Global configuration mode

Usage Guide When a log severity is set, the log messages at or below that severity will be displayed on the console. The **show logging** command displays the related setting parameters and statistics of the log.

Configuration Examples The following example sets the severity of log that is allowed to be displayed on the console as 6:

```
FS(config)# logging console informational
```

Related Commands	Command	Description
	logging on	Turns on the log switch.
	show logging	Displays the logs and related log configuration parameters in the buffer.

Platform
Description N/A

14.5 logging count

Use this command to enable the log statistics function in global configuration mode. Use the **no** form of this command to restore the default setting.

logging count

no logging count

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The log statistics function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command enables the log statistics function. The statistics begins when the function is enabled. If you run the **no logging count** command, the statistics function is disabled and the statistics data is deleted.

Configuration Examples The following example enables the log statistics function:

```
FS(config)# logging count
```

Related Commands	Command	Description
	show logging count	Displays log information about modules of the system.
	show logging	Displays basic configuration of log modules and log information in the buffer.

Platform Description N/A

14.6 logging facility

Use this command to configure the device value of the log information in global configuration mode. Use the **no** form of the command to restore the default setting.

logging facility facility-type

no logging facility

Parameter	Parameter	Description
Description	facility-type	Syslog device value. For specific settings, refer to the usage guide.

Defaults The default is 23 if the RFC5424 format is enabled (Local7, local use).
The default is 16 if the RFC5424 format is disabled (Local0, local use).

Command Mode Global configuration mode

Usage Guide The following table (Table-2) is the possible device values of Syslog:

Numerical Code	Facility
0 (kern)	Kernel messages
1 (user)	User-level messages
2 (mail)	Mail system

3 (daemon)	System daemons
4 (auth1)	security/authorization messages
5 (syslog)	Messages generated internally by syslogd
6 (lpr)	Line printer subsystem
7 (news)	USENET news
8 (uucp)	Unix-to-Unix copy system
9 (clock1)	Clock daemon
10 (auth2)	security/authorization messages
11 (ftp)	FTP daemon
12 (ntp)	NTP subsystem
13 (logaudit)	log audit
14 (logalert)	log alert
15 (clock2)	clock daemon
16 (local0)	Local use
17 (local1)	Local use
18 (local2)	Local use
19 (local3)	Local use
20 (local4)	Local use
21 (local5)	Local use
22 (local6)	Local use
23 (local7)	Local use

The default device value of FSOS is 23 (local 7).

Configuration The following example sets the device value of **Syslog** as **kernel**:

Examples FS(config)# logging facility kern

Related

Commands

Command	Description
logging console	Sets the severity of logs that are allowed to be displayed on the console.

Platform

N/A

Description

14.7 logging file

Use this command to save log messages in the log file, which can be saved in hardware, expanded FLASH, USB or SD card. Use the **no** form of this command to restore the default setting,

logging file { **flash**:filename | **usb0**:filename | **usb1**:filename } [max-file-size] [level]

no logging file

Parameter Description	Parameter	Description
	flash	Saves the log file in expanded FLASH.
	usb0	Saves the log file in USB0. This parameter is supported by the device with one USB connector and the USB extension device.
	usb1	Saves the log file in USB1. This parameter is supported by the device with two USB connectors and the USB extension device.
	filename	Sets the file name. The file type is omitted, which is fixed as txt.
	max-file-size	Sets the maximum file size, in the range from 128K to 6M bytes, The default is 128K,
	level	Sets the level of the log message saved in the log file, which can be either the level name or the level number. The default is 6. See Usage Guide for details.

Defaults Log messages are not saved in expanded FLASH by default.

Command Global configuration mode

Mode

Usage Guide You can save log messages in expanded FLASH if you don't want to transmit log messages on the network or there is no syslog server,

The log file cannot be configured with the suffix, which is fixed as txt.

If there is no expanded FLASH, the **logging file flash** command is hidden automatically and cannot be configured.

Keyword	Level	Description
Emergencies	0	Emergency case. The system fails to run.
Alerts	1	Problem that call for immediate solution.
Critical	2	Critical message.
Errors	3	Error message.
warnings	4	Alarm message.
Notifications	5	message that is normal but calls for attention.
informational	6	Descriptive message.
Debugging	7	Debugging message

Configuration Examples The following example saves the log message in expanded FLASH and sets file name, file size and log level to syslog.txt, 128K and 6 respectively.

```
FS(config)# logging file flash:syslog
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform N/A

Description

14.8 logging file numbers

Use this command to set the number of log files written into FLASH. Use the **no** form of this command to restore the default setting.

logging file numbers numbers

no logging file numbers

Parameter	Description
numbers	Sets the number of log files written into FLASH, in the range from 2 to 32.

Defaults The default is 16.

Command Mode Global configuration mode

Usage Guide The system does not delete previously generated log files even if you change this configuration, Therefore, you need to delete the log files manually to save FLASH size (you can send log files to the server through TFTP before that). For example, 16 log files are generated by default before you want to change the number to 2. New logs are overwritten constantly in log files indexed 0 to 1. However, log files indexed from 2 to 16 remain. You can delete these log files manually as needed.

Configuration Examples The following example sets the number of log files written into FLASH to 8.

```
FS(config)# logging file numbers 8
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

14.9 logging flash flush

Use this command to write log messages in the system buffer into the flash file immediately.

logging flash flush

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide In general, the log messages are cached in the log buffer. Only when the buffer is full or the timer expires are log messages written into the flash file. This command is used to write log messages in the system buffer into the flash file immediately.
The **logging flash flush** command takes effect only once for each configuration. The log messages cached in the buffer are written into the flash file immediately after configuration.

Configuration Examples The following example writes log messages in the system buffer into the flash file immediately.

```
FS(config)# logging flash flush
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

14.10 logging flash interval

Use this command to set the interval to write log messages into the flash file, Use the **no** form of this command to restore the default setting.

logging flash interval seconds
no logging flash interval

Parameter Description

Parameter	Description
interval seconds	The interval to write log messages into the flash file, in the range from 1 to 57840 in the unit of seconds.

Defaults The default is 3600.

Command Mode Global configuration mode

Usage Guide This command is used to set the interval to write log messages into the flash file. The timer starts after configuration, If you want to restore the interval to 3600 seconds, use the **no logging flash interval** command. To avoid writing log messages into the flash file too frequently, it is not recommended to set a short interval.

Configuration The following example sets the interval to write log messages into the flash file to 300 seconds.

Examples `FS(config)# logging flash interval 300`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

14.11 logging filter direction

Use this command to filter the log messages destined to a certain direction. Use the **no** form of this command to restore the default setting.

logging filter direction { all | buffer | file | server | terminal }

no logging filter direction { all | buffer | file | server | terminal }

Parameter Description	Parameter	Description
		all
	buffer	Log messages destined to the log buffer are filtered, including log messages displayed by running the show logging command.
	file	Log messages destined to the log file are filtered.
	server	Log messages destined to the log server are filtered.
	terminal	Log messages destined to the console and the VTY terminal (including Telnet and SSH).

Defaults Log messages destined to all directions are filtered by default.

Command Mode Global configuration mode

Usage Guide In general, log messages destined to all directions are filtered, including console, VTY terminal, log buffer, log file and log server. If you want to filter log messages destined to a certain direction, the terminal for instance, configure the **terminal** parameter.

Configuration Examples The following example filters log messages destined to the terminal (including the console and the VTY terminal).

`FS(config)# logging filter direction terminal`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

14.12 logging filter type

Use this command to configure the filter type of log messages. Use the **no** form of this command to restore the default setting.

logging filter type { contains-only | filter-only }

no logging filter type

Parameter	Description
contains-only	The log message containing the key word of the filter rule is printed.
filter-only	The log message containing the key word of the filter rule is filtered.

Defaults The default filter type is filter-only.

Command Global configuration mode

Mode

Usage Guide

- When too many log messages are printed, the terminal screen keeps being refreshed. If you are not concerned with these log messages, use the “filter-only” filter type to filter the log messages,
- If you are concerned with certain log messages, use the “contains-only” filter type to print log messages containing the key word of the filter rule, so as to monitor whether certain events happen.

In real operation, the contains-only and the filter-only filter types cannot be configured at the same time. If you configure the filter direction and the filter type without configuring the filter rule, the log messages are not filtered.

Configuration The following example sets the filter type to contains-only.

Examples FS(config)# logging filter type contains-only

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

14.13 logging filter rule

Use this command to configure the filter rule of the log message,

logging filter rule { exact-match module module-name mnemonic mnemonic-name level level | single-match [level level | mnemonic mnemonic-name | module module-name] }

Use this command to delete the “exact-match” filter rule.

no logging filter rule exact-match [module module-name mnemonic mnemonic-name level level]

Use this command to delete the “single-match” filter rule.

no logging filter rule single-match [**level** level | **mnemonic** mnemonic-name | **module** module-name]

Parameter Description	Parameter	Description
	exact-match	Exact-match filter rule. Fill in all the following three parameters.
	single-match	Single-match filter rule. Fill in one of the following three parameters.
	module module-name	Module name.
	mnemonic mnemonic-name	Mnemonic name.
	level level	Log level,

Defaults No filter rule is configured by default,

Command Mode Global configuration mode

Usage Guide If you want to filter a specific log message, use the “exact-match” filter rule and fill in all three parameters, namely, module name, mnemonic name and log level.
 If you want to filter a specific kind of log messages, use the “single-match” filter rule and fill in one of three parameters, namely, module name, mnemonic name and log level.
 When configured with the same module name, mnemonic name or log level, the “single-match” filter rule has a higher priority than the “exact-match” filter rule,

Configuration Examples The following example configures the “exact-match” filter rule with parameters of module name LOGIN, log level 5 and mnemonic name LOGOUT.

```
FS(config)# logging filter rule exact-match module LOGIN mnemonic LOGOUT level 5
```

The following example configures the “single-match” filter rule with the parameter of module name SYS.

```
FS(config)# logging filter rule single-match module SYS
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

14.14 logging life-time

Use this command to configure the preservation duration of logs in expanded FLASH. Use the **no** form of this command to restore the default setting.

logging life-time level level days

no logging life-time level level

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

level	Sets the log level, which can be either the level name or the level number.
days	Sets the preservation duration of logs.

Defaults No preservation duration is set by default.

Command Global configuration mode

Mode

Usage Guide Due to difference in expanded FLASH size and log level, logs with different levels can be configured with different preservation durations.

Once log preservation based on time is enabled, log preservation based on file size is disabled automatically. The log files are stored under the syslog/ directory of the expanded FLASH,

Configuration The following example sets the preservation duration of logs whose level is 6 to 10 days.

Examples FS(config)# logging life-time level 6 10

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

14.15 logging monitor

Use this command to set the severity of logs that are allowed to be displayed on the VTY window (telnet window, SSH window, etc.) in global configuration mode. Use the **no** form of this command to disable this function.

logging monitor [level]

no logging monitor

Parameter	Parameter	Description
Description	level	Severity of the log message. The name of the severity or the numeral can be used. For the details of log severity, see Table-1.

Defaults The default is debugging (7).

Command Global configuration mode

Mode

Usage Guide To print log information on the VTY window, run the **terminal monitor** command in privileged EXEC mode. The level of logs to be displayed is defined by **logging monitor**.

The log level defined with "Logging monitor" is for all VTY windows.

Configuration The following example sets the severity of log that is allowed to be printed on the VTY window as 6:

Examples FS(config)# **logging monitor informational**

Related	Command	Description
Commands	logging on	Turns on the log switch.
	show logging	Displays the log messages and related log configuration parameters in the buffer.

Platform N/A

Description

14.16 logging on

Use this command globally to allow logs to be displayed on different devices. Use the **no** form of this command to disable this function.

logging on

no logging on

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Logs are allowed to be displayed on different devices.

Command Mode Global configuration mode

Usage Guide Log information can not only be shown in the Console window and VTY window, but also be recorded in different equipments such as the memory buffer, the expanded FLASH and the Syslog Server. This command is the total log switch. If this switch is turned off, no log will be displayed or recorded unless the severity level is greater than 1.

Configuration The following example disables the log switch on the device.

Examples FS(config)# **no logging on**

Related	Command	Description
Commands	logging buffered	Records the logs to a memory buffer.
	logging server	Sends logs to the Syslog server.
	logging file flash:	Records logs on the expanded FLASH.
	logging console	Allows the log level to be displayed on the console.
	logging monitor	Allows the log level to be displayed on the VTY window (such as telnet window) .
	logging trap	Sets the log level to be sent to the Syslog server.

Platform N/A
Description

14.17 logging rate-limit

Use this command to enable log rate limit function to limit the output logs in a second in the global configuration mode. Use the **no** form of this command to disable this function.

logging rate-limit { number | **all** number | **console** { number | **all** number } } [**except** severity]

no logging rate-limit

Parameter	Parameter	Description
Description	number	The number of logs that can be processed in a second in the range from 1 to 10000.
	all	Sets rate limit to all the logs with severity level 0 to 7.
	console	Sets the amount of logs that can be shown in the console in a second.
	except	By default, the severity level is error (3). The rate of the log whose severity level is less than or equal to error (3) is not controlled.
	severity	Log severity level in the range from 0 to 7. The lower the level is, the higher the severity is.

Defaults The log rate limit function is disabled by default.

Command Mode Global configuration mode

Usage Guide Use this command to control the syslog output to prevent the massive log output.

Configuration Examples The following example sets the number of the logs (including debug) that can be processed in a second as 10.

However, the logs with warning or higher severity level are not controlled:

```
FS(config)#logging rate-limit all 10 except warnings
```

Related Commands	Command	Description
	show logging count	Displays log information about modules of the system.
	show logging	Displays basic configuration of log modules and log information in the buffer.

Platform N/A
Description

14.18 logging rd on

Use this command in global configuration mode on the host to enable the log re-direction function and allow re-directing logs on slave or backup devices to the host in the VSU environment. Use **no** form of this command to disable this function.

logging rd on

no logging rd on

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The log re-direction function is enabled by default.

Command Mode Global configuration mode

Usage Guide The log information on slave or back devices not only can be shown on the Console window of slave or backup devices, but also can be re-directed to the host and exported to the Console and VTY windows of the host, and recorded in cache, expanded FLASH and Syslog Server of the host.

Configuration Examples The following example enables the log re-direction function on a device:

```
FS(config)#logging rd on
```

Related Commands	Command	Description
	show logging count	Displays log information about modules of the system.
	show logging	Displays basic configuration of log modules and log information in the buffer.

Platform Description N/A

14.19 logging rd rate-limit

Use this command in global configuration mode on the host to enable the log re-direction rate limiting function to limit the number of logs that can be re-directed from a slave or backup device to the host each second in the VSU environment. Use the **no** form of this command to disable this function.

logging rd rate-limit number [**except** [severity]]

no logging rd rate-limit

Parameter	Parameter	Description
Description	number	Log information that can be re-directed each second, ranging from 1 to 10,000 logs
	except	Log information on or lower than the severity level will not be limited; error (3) by default, log information on or lower than the error level is not limited.
	severity	Log information severity level; lower the level is, higher the severity is, ranging from 0 to 7

Defaults The maximum number of logs that can be re-directed each second is 200 by default.

Command Global configuration mode

Mode

Usage Guide This command is used to control the output of log information by system re-direction. You can use this command to prevent a slave or backup device from re-directing a large number of logs to the host.

Configuration Examples The following example sets the maximum number of logs (including debug) that can be re-directed from a slave device to the host each second at 10, excepting logs on and above the warning severity level:

```
FS(config)#logging rd rate-limit 10 except warnings
```

Related Commands	Command	Description
	show logging count	Displays log information about modules of the system.
	show logging	Displays basic configuration of log modules and log information in the buffer.

Platform Description N/A

14.20 logging server

Use this command to send the logs to the specified Syslog Sever in global configuration mode. Use the **no** form of this command to remove the setting. Use the **default** form of this command to restore the default setting.

logging server [**oob**] { hostname | ip-address | **ipv6** ipv6-address } [**via** mgmt-name] [**udp-prot** port] [**vrf** vrf-name] [**facility** facility-type] [**level** level]

no logging server [**oob**] { hostname | ip-address [**vrf** vrf-name] | **ipv6** ipv6-address } [**via** mgmt-name]

no logging server { hostname | ip-address [**vrf** vrf-name] | **ipv6** ipv6-address } [**via** mgmt-name] **udp-prot**

Parameter	Parameter	Description
Description	oob	Specifies out-of-band communication for the logging server. (logs are sent through the MGMT port to the logging server.)
	hostname	Specifies the hostname of the host that receives log information.
	ip-address	Specifies the IP address of the host that receives log information.
	vrf-name	Specifies the VRF instance (VPN device forwarding table) connecting to the log host.
	ipv6-address	Specifies IPV6 address for the host receiving the logs.
	via mgmt-name	Specifies the MGMT port for the oob option.
	udp-prot port	Specifies the port number for the specified host (The default port number is 514).
	facility facility-type	If the RFC5424 log format is disabled, the facility value of logs sent to the log server is local7 (23) by default. If the RFC5424 log format is enabled, the facility value of logs sent to the log server is local0 (16) by default.
	level level	Level of the logs allowed to be received by the host (Default level: informational).

Defaults No log is sent to any syslog server by default.

Command
Mode Global configuration mode

Usage Guide This command specifies a Syslog server to receive the logs of the device. Users are allowed to configure up to 5 Syslog Servers. The log information will be sent to all the configured Syslog Servers at the same time. Only when the **oob** option is enabled can the **via** parameter be specified. Meanwhile, the **vrf** parameter cannot be set.

Configuration The following example specifies a syslog server of the address 202.101.11.1:

Examples

```
FS(config)# logging server 202.101.11.1
```

The following example specifies an ipv6 address as AAAA:BBBB:FFFF:

```
FS(config)# logging server ipv6 AAAA:BBBB:FFFF
```

Related Commands	Command	Description
	logging on	Turns on the log switch.
	show logging	Displays log messages and related log configuration parameters in the buffer.
	logging trap	Sets the level of logs allowed to be sent to Syslog server.

Platform
Description N/A

14.21 logging source interface

Use this command to configure the source interface of logs in global configuration mode. Use the **no** form of this command to restore the default setting.

logging source [**interface**] interface-type interface-number

no logging source [**interface**]

Parameter	Parameter	Description
Description	interface-type	Interface type.
	interface-number	Interface number.

Defaults No source interface is configured by default.

Command
Mode Global configuration mode

Usage Guide By default, the source address of the log messages sent to the syslog server is the address of the sending interface. For easy tracing and management, this command can be used to fix the source address of all log messages as an interface address, so that the administrator can identify which device is sending the message through the unique addresses. If the source interface is not configured on the device, or no IP address is

configured for the source interface, the source address of the log messages is the address of the sending interface.

Configuration The following example specifies loopback 0 as the source address of the syslog messages:

Examples `FS(config)# logging source interface loopback 0`

Related	Command	Description
Commands	<code>logging server</code>	Sends logs to the Syslog server.

Platform N/A
Description

14.22 logging source ip | ipv6

Use this command to configure the source IP address of logs in global configuration mode. Use the **no** form of this command to restore the default setting.

logging source {ip ip-address | ipv6 ipv6-address}

no logging source { ip | ipv6 }

Parameter	Parameter	Description
Description	ip-address	Specifies the source IPV4 address sending the logs to IPV4 log server.
	ipv6-address	Specifies the source IPV6 address sending the logs to IPV6 log server.

Defaults No source address is configured by default.

Command Mode Global configuration mode

Usage Guide By default, the source address of the log messages sent to the syslog server is the address of the sending interface. For easy tracing and management, this command can be used to fix the source address of all log messages as an address, so that the administrator can identify which device is sending the message through the unique addresses. If this IP address is not configured on the device, the source address of the log messages is the address of the sending interface.

Configuration The following example specifies 192.168.1.1 as the source address of the syslog messages:

Examples `FS(config)# logging source ip 192.168.1.1`

Related	Command	Description
Commands	<code>logging server</code>	Sends the logs to the Syslog server.

Platform N/A
Description

14.23 logging synchronous

Use this command to enable synchronization function between user input and log output in line configuration mode to prevent interruption when the user is keying in characters. Use the **no** form of this command to restore the default setting.

logging synchronous

no logging synchronous

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The synchronization function between user input and log output is disabled by default.

Command Mode Line configuration mode

Usage Guide This command enables synchronization function between user input and log output, preventing the user from interrupting when keying in the characters.

Configuration Examples

```

FS(config)#line console 0
FS(config-line)#logging synchronous
Print UP-DOWN logs on the port when keying in the command, the input command will be output again:
FS# configure terminal
Oct 9 23:40:55 %LINK-5-CHANGED: Interface GigabitEthernet 0/1, changed state to down
Oct 9 23:40:55 %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet 0/1, changed state to DOWN
FS# configure terminal//----the input command by the user is output again rather than being intererupted.
    
```

Related Commands	Command	Description
	show running-config	Displays the configuration.

Platform Description N/A

14.24 logging trap

Use this command to set the severity of logs that are allowed to be sent to the syslog server in global configuration mode. Use the **no** form of this command to prohibit sending log messages to the Syslog server.

logging trap [level]

no logging trap

Parameter	Parameter	Description
Description	level	Severity of the log message. The name of the severity or the numeral can be used. For the details of log severity, see Table 1.

Defaults The default is informational(6)

Command Mode Global configuration mode

Usage Guide To send logs to the Syslog Server, run the **logging** command in global configuration mode to configure the **Syslog Server**. Then, run the **logging trap** command to specify the severity level of logs to be sent. If the device supports log level settings on the server, the sever settings will prevail. The **show logging** command displays the configured related parameters and statistics of the log.

Configuration Examples The following example enables logs at severity 6 to be sent to the Syslog Server with the address of 202.101.11.22:

```
FS(config)# logging 202.101.11.22
FS(config)# logging trap informational
```

Related Commands	Command	Description
	logging on	Turns on the log switch.
	logging	Sends logs to the Syslog server.
	show logging	Displays the log messages and related log configuration parameters in the buffer.

Platform Description N/A

14.25 logging userinfo

Use this command to enable the logging function to record user log/exit. Use the **no** form of this command to restore the default setting.

logging userinfo
no logging userinfo

Parameter Description	Parameter	Description
	N/A	N/A

Defaults No log message is printed recording user log/exit by default.

Command Mode Global configuration mode

Usage Guide This command is used to print the log message to remind the administrator of user login. The log message is in the format as follows:

```
Mar 22 14:05:45 %LOGIN-5-LOGIN_SUCCESS: User login from vty0 (192.168.23.68) OK.
```

Configuration The following example enables the logging function to record user log/exit.

Examples FS(config)# logging user-info

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

14.26 logging userinfo command-log

Use this command to enable the logging function to record user operation. Use the **no** form of this command to restore the default setting.

logging userinfo command-log
no logging userinfo command-log

Parameter Description	Parameter	Description
	N/A	N/A

Defaults No log message is printed recording user operation by default.

Command Mode Global configuration mode

Usage Guide This command is used to print the log message to remind the administrator of configuration change. The log message is in the format as follows:

```
Mar 22 14:10:40 %CLI-5-EXEC_CMD: Configured from vty0 (192.168.23.68) command-log: logging server 192.168.23.68.
```

Configuration The following example enables the logging function to record user operation.

Examples FS(config)# logging user-info command-log

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

14.27 service private-syslog

Use this command to set the syslog format to the private syslog format. Use the **no** form of this command to restore the default setting.

service private-syslog

no service private-syslog

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The syslog is displayed in the default format.

Command Global configuration mode

Mode

Usage Guide By default, the syslog is displayed in the format as follows:

*timestamp: %facility-severity-mnemonic: description

Here is an example:

```
*May 31 23:25:21: %SYS-5-CONFIG_I: Configured from console by console
```

With this function enabled, the syslog is displayed in the format as follows:

timestamp facility-severity-mnemonic: description

Here is an example:

```
May 31 23:31:28 SYS-5-CONFIG_I: Configured from console by console
```

The difference between the private syslog format and the default syslog format lies in the following marks:

The private syslog does not have "*" before the timestamp, ":" after the timestamp and "%" before the identifying string.

Configuration The following example sets the private syslog format.

Examples FS(config)# service private-syslog

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

14.28 service sequence-numbers

Use this command to attach serial numbers into the logs in global configuration mode. Use the **no** form of this command to restore the default setting.

service sequence-numbers

no service sequence-numbers

Parameter	Parameter	Description
Description	N/A	N/A

Defaults No serial number is contained in the logs by default.

Command Mode Global configuration mode

Usage Guide In addition to the timestamp, you can add serial numbers to the logs, numbering from 1. Then, it is clearly known whether the logs are lost or not and their sequence.

Configuration Examples The following example adds serial numbers to the logs.

```
FS(config)# service sequence-numbers
```

Related Commands	Command	Description
	logging on	Turns on the log switch.
	service timestamps	Attaches timestamps to the logs.

Platform Description N/A

14.29 service standard-syslog

Use this command to set the syslog format to the standard syslog format defined in RFC3164. Use the **no** form of this command to restore the default setting.

service standard-syslog
no service standard-syslog

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The syslog is displayed in the default format.

Command Mode Global configuration mode

Usage Guide By default, the syslog is displayed in the format as follows:

*timestamp: %facility-severity-mnemonic: description

Here is an example:

```
*May 31 23:25:21: %SYS-5-CONFIG_I: Configured from console by console
```

With this function enabled, the syslog is displayed in the format as follows:

timestamp %facility-severity-mnemonic: description

Here is an example:

```
May 31 23:31:28 %SYS-5-CONFIG_I: Configured from console by console
```

The difference between the standard syslog format and the default syslog format lies in the following marks:

The standard syslog does not have "*" before the timestamp and "." after the timestamp.

Configuration The following example sets the standard syslog format.

Examples FS(config)# service standard-syslog

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

14.30 service sysname

Use this command to attach system name to logs in global configuration mode. Use the **no** form of this command to restore the default setting.

service sysname

no service sysname

Parameter Description

Parameter	Description
N/A	N/A

Defaults No system name is attached to logs by default.

Command Mode Global configuration mode

Usage Guide This command allows you to decide whether to add system name in the log information.

Configuration The following example adds a system name in the log information:

Examples Mar 22 15:28:02 %SYS-5-CONFIG: Configured from console by console

```
FS #config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
FS (config)#service sysname
```

```
FS (config)#end
```

```
FS #
```

```
Mar 22 15:35:57 S3250 %SYS-5-CONFIG: Configured from console by console
```

	Command	Function
Related Commands	show logging	Displays basic configuration of log modules and log information in the buffer.

Platform Description N/A

14.31 service timestamps

Use this command to attach timestamp into logs in global configuration mode. Use the **no** form of this command to remove the timestamp from the logs. Use the **default** form of this command to restore the default setting.

service timestamps [message-type [**uptime** | **datetime** [**msec** | **year**]]]

no service timestamps [message-type]

default service timestamps [message-type]

Parameter	Parameter	Description
Description	message-type	The log type, including Log and Debug . The log type indicates the log information with severity levels of 0 to 6. The debug type indicates that with severity level 7.
	uptime	Device start time in the format of *Day*Hour*Minute*Second, for example, 07:00:10:41.
	datetime	Current time of the device in the format of Month*Date*Hour*Minute*Second, for example, Jul 27 16:53:07.
	msec	Current time of the device in the format of Month*Date*Hour*Minute*Second*milisecond, for example, Jul 27 16:53:07.299
	year	Current time of the device in the format of Year*Month*Date*Hour*Minute*Second, for example, 2007 Jul 27 16:53:07

Defaults The time stamp in the log information is the current time of the device. If the device has no RTC, the time stamp is automatically set to the device start time.

Command Mode Global configuration mode

Usage Guide When the **uptime** option is used, the time format is the running period from the last start of the device to the present time, in seconds. When the **datetime** option is used, the time format is the date of the current device, in the format of YY-MM-DD, HH:MM:SS.

Configuration Examples The following example enables the timestamp for **log** and **debug** information, in format of Datetime, supporting milisecond display.

```
FS(config)# service timestamps debug datetime msec
```

```
FS(config)# service timestamps log datetime msec
FS(config)# end
FS(config)# Oct 8 23:04:58.301 %SYS-5-CONFIG I: configured from console by console
```

Related Commands	Command	Description
	logging on	Turns on the log switch.
	service sequence-numbers	Enables serial numbers of logs.

Platform N/A
Description

14.32 show logging

Use this command to display configured parameters and statistics of logs and log messages in the memory buffer at privileged user layer. The log messages are sorted by the timestamp from before to now.

show logging

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following command displays the result of the **show logging** command with RFC5424 format disabled.

```
FS# show logging
Syslog logging: enabled
  Console logging: level debugging, 15495 messages logged
  Monitor logging: level debugging, 0 messages logged
  Buffer logging: level debugging, 15496 messages logged
  Standard format: false
  Timestamp debug messages: datetime
  Timestamp log messages: datetime
  Sequence-number log messages: enable
  Sysname log messages: enable
  Count log messages: enable
  Trap logging: level informational, 15242 message lines logged,0 fail
    logging to 202.101.11.22
    logging to 192.168.200.112
Log Buffer (Total 131072 Bytes): have written 1336,
```

```
015487: *Sep 19 02:46:13: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to up.
015488: *Sep 19 02:46:13: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24, changed
state to up.
015489: *Sep 19 02:46:26: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to down.
015490: *Sep 19 02:46:26: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24,
changed state to down.
015491: *Sep 19 02:46:28: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to up.
015492: *Sep 19 02:46:28: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24, changed
state to up.
```

Log information description:

Field	Description
Syslog logging	Logging flag: enabled or disabled
Console logging	Level of the logs printed on the console, and statistics
Monitor logging	Level of the logs printed on the VTY window, and statistics
Buffer logging	Level of the logs recorded in the memory buffer, and statistics.
Standard format	Standard log format.
Timestamp debug messages	Timestamp format of the Debug messages
Timestamp log messages	Timestamp format of the Log messages
Sequence-number log messages	Serial number switch
Sequence log messages	Attaches system names to the logs.
Count log messages	Log statistics function
Trap logging	Level of the logs sent to the syslog server, and statistics
Log Buffer	Log files recorded in the memory buffer

The following example displays the result of the **show logging** command with RFC5424 format enabled.

```
FS# show logging
Syslog logging: enabled
  Console logging: level debugging, 4740 messages logged
  Monitor logging: level debugging, 0 messages logged
  Buffer logging: level debugging, 4745 messages logged
  Statistic log messages: disable
  Statistic log messages to terminal: disable
  Delay-send file name:syslog_ftp_server, Current write index:3, Current send index:3, Cycle:10 seconds
  Count log messages: enable
  Trap logging: level informational, 2641 message lines logged,4155 fail
  logging to 192.168.23.89
```

```

logging to 2000::1
Delay-send logging: 2641 message lines logged
logging to 192.168.23.89 by tftp
Log Buffer (Total 4096 Bytes): have written 4096, Overwritten 3292
<135>1 2013-07-24T12:19:33.130290Z FS - 7 - - Please config the IP address for capwap.
<132>1 2013-07-24T12:20:02.80313Z FS CAPWAP 4 NO_IP_ADDR - No ip address for capwap.
<135>1 2013-07-24T12:20:02.80343Z FS - 7 - - Please config the IP address for capwap.
<132>1 2013-07-24T12:20:32.250265Z FS CAPWAP 4 NO_IP_ADDR - No ip address for capwap.
<134>1 2013-07-24T12:29:33.410123Z FS SYS 6 SHELL_LOGIN [USER@4881 name="" type="" from="console"]
user login success.
<134>1 2013-07-24T12:29:34.343763Z FS SYS 6 SHELL_CMD [USER@4881 name=""][CMD@4881 task="rl_con"
cmd="enable"]
    
```

Field	Description
Syslog logging	Logging flag: enabled or disabled
Console logging	Level of the logs printed on the console, and statistics
Monitor logging	Level of the logs printed on the VTY window, and statistics
Buffer logging	Level of the logs recorded in the memory buffer, and statistics.
Count log messages	Log statistics function
Statistic log messages	Enables/disables log sending periodically
Statistic log messages to terminal	Enables/ disables log sending to console and remote terminal
Delay-send file name	Local filename of log delay-sending cache, index of write file and delay interval
Trap logging	Level of the logs sent to the syslog server and statistics
Delay-send logging	The server address, log sending mode and statistics
Log Buffer	Log files recorded in the memory buffer

Related Commands	Command	Function
	logging on	Turns on the log switch.
	clear logging	Clears the log messages in the buffer.

Platform N/A
Description

14.33 show logging config

Use this command to display log configuration and statistics.

show logging config

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Privileged EXEC mode
Mode

Usage Guide N/A

Configuration Examples The following example displays the outcome of running the **show logging config** command with RFC5424 disabled.

```
FS# show logging config
Syslog logging: enabled
  Console logging: level debugging, 15495 messages logged
  Monitor logging: level debugging, 0 messages logged
  Buffer logging: level debugging, 15496 messages logged
  Standard format: false
  Timestamp debug messages: datetime
  Timestamp log messages: datetime
  Sequence-number log messages: enable
  Sysname log messages: enable
  Count log messages: enable
  Trap logging: level informational, 15242 message lines logged,0 fail
    logging to 202.101.11.22
    logging to 192.168.200.112
```

Field	Description
Syslog logging	Whether the logging function is enabled or disabled.
Console logging	The level and statistics of the log message printed on the console.
Monitor logging	The level and statistics of the log message printed on the VTY window.
Buffer logging	The level and statistics of the log message recorded in the memory buffer.
Standard format	Standard log format.
Timestamp debug messages	Timestamp format of debugging message.
Timestamp log messages	Timestamp format of log message.
Sequence-number log messages	Whether the sequence number function is enabled or disabled.
Sysname log messages	Adds the system name to the log message.
Count log messages	Log-counting function
Trap logging	The level and statistics of the log message sent to the syslog server.

The following example displays the outcome of running the **show logging config** command with RFC5424 enabled.

```
FS# show logging
Syslog logging: enabled
  Console logging: level debugging, 4740 messages logged
```

```

Monitor logging: level debugging, 0 messages logged
Buffer logging: level debugging, 4745 messages logged
Statistic log messages: disable
Statistic log messages to terminal: disable
Delay-send file name:syslog_ftp_server, Current write index:3, Current send index:3, Cycle:10 seconds
Count log messages: enable
Trap logging: level informational, 2641 message lines logged,4155 fail
  logging to 192.168.23.89
  logging to 2000::1
Delay-send logging: 2641 message lines logged
  logging to 192.168.23.89 by tftp
    
```

Field	Description
Syslog logging	Logging flag: enabled or disabled
Console logging	Level of the logs printed on the console, and statistics
Monitor logging	Level of the logs printed on the VTY window, and statistics
Buffer logging	Level of the logs recorded in the memory buffer, and statistics.
Count log messages	Log statistics function
Statistic log messages	Enables/disables log sending periodically
Statistic log messages to terminal	Enables/ disables log sending to output console and remove terminal
Delay-send file name	Local filename of log delay-sending cache, index of write file and delay interval
Trap logging	Level of the logs sent to the syslog server and statistics
Delay-send logging	The server address, log sending way and statistics

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

14.34 show logging count

Use this command to display the statistics about occurrence times, and the last occurrence time of each module log in the system in privileged mode.

show logging count

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide To use the log packet statistics function, run the **logging count** command in global configuration mode. The **show logging count** command can show the information of a specific log, occurrence times, and the last occurrence time.
 You can use the **show logging** command to check whether the log statistics function is enabled.

Configuration Examples The following example displays the result of the **show logging count** command:

```
FS# show logging count
Module Name  Message Name Sev Occur      Last Time
SYS          CONFIG_I      5  1          Jul 6 10:29:57
SYS TOTAL                    1
```

Related Commands	Command	Function
	logging count	Enables the log statistics function.
	show logging	Displays basic configuration of log modules and log information in the buffer.
	clear logging	Clears the logs in the buffer.

Platform Description N/A

14.35 show logging reverse

Use this command to display configured parameters and statistics of logs and log messages in the memory buffer at privileged user layer. The log messages are sorted by the timestamp from now to before.

show logging reverse [timestamp year day moth hh:mm:ss]

Parameter Description	Parameter	Description
	year	Specifies the year.
	moth	Specifies the month.
	day	Specifies the day.
	hh:mm:ss	Specifies the time

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide

Configuration The following command displays the result of the **show logging reverse** command with RFC5424 format disabled.

Examples

```

FS# show logging reverse
Syslog logging: enabled
  Console logging: level debugging, 15495 messages logged
  Monitor logging: level debugging, 0 messages logged
  Buffer logging: level debugging, 15496 messages logged
  Standard format: false
  Timestamp debug messages: datetime
  Timestamp log messages: datetime
  Sequence-number log messages: enable
  Sysname log messages: enable
  Count log messages: enable
  Trap logging: level informational, 15242 message lines logged,0 fail
    logging to 202.101.11.22
    logging to 192.168.200.112
Log Buffer (Total 131072 Bytes): have written 1336,
015492: *Sep 19 02:46:28: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24, changed
state to up.
015491: *Sep 19 02:46:28: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to up.
015490: *Sep 19 02:46:26: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24, changed
state to down.
015489: *Sep 19 02:46:26: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to down.
015488: *Sep 19 02:46:13: FS %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet 0/24, changed
state to up.
015487: *Sep 19 02:46:13: FS %LINK-3-UPDOWN: Interface FastEthernet 0/24, changed state to up.
    
```

Field	Description
Syslog logging	Logging flag: enabled or disabled
Console logging	Level of the logs printed on the console, and statistics
Monitor logging	Level of the logs printed on the VTY window, and statistics
Buffer logging	Level of the logs recorded in the memory buffer, and statistics.
Standard format	Standard log format.
Timestamp debug messages	Timestamp format of the Debug messages
Timestamp log messages	Timestamp format of the Log messages
Sequence-number log messages	Serial number switch
Sequence log messages	Attaches system names to the logs.
Count log messages	Log statistics function

Trap logging	Level of the logs sent to the syslog server, and statistics
Log Buffer	Log files recorded in the memory buffer

The following example displays the result of the **show logging reverse** command with RFC5424 format enabled.

```

FS# show logging reverse
Syslog logging: enabled
  Console logging: level debugging, 4740 messages logged
  Monitor logging: level debugging, 0 messages logged
  Buffer logging: level debugging, 4745 messages logged
  Statistic log messages: disable
  Statistic log messages to terminal: disable
  Delay-send file name:syslog_ftp_server, Current write index:3, Current send index:3, Cycle:10 seconds
  Count log messages: enable
  Trap logging: level informational, 2641 message lines logged,4155 fail
    logging to 192.168.23.89
    logging to 2000::1
  Delay-send logging: 2641 message lines logged
    logging to 192.168.23.89 by tftp
Log Buffer (Total 4096 Bytes): have written 4096, Overwritten 3292
<134>1 2013-07-24T12:29:34.343763Z FS SYS 6 SHELL_CMD [USER@4881 name=""][CMD@4881 task="rl_con"
cmd="enable"]
<134>1 2013-07-24T12:29:33.410123Z FS SYS 6 SHELL_LOGIN [USER@4881 name="" type="" from="console"]
user login success.
<132>1 2013-07-24T12:20:32.250265Z FS CAPWAP 4 NO_IP_ADDR - No ip address for capwap.
<135>1 2013-07-24T12:20:02.80343Z FS - 7 - - Please config the IP address for capwap.
<132>1 2013-07-24T12:20:02.80313Z FS CAPWAP 4 NO_IP_ADDR - No ip address for capwap.
<135>1 2013-07-24T12:19:33.130290Z FS - 7 - - Please config the IP address for capwap.
    
```

Field	Description
Syslog logging	Logging flag: enabled or disabled
Console logging	Level of the logs printed on the console, and statistics
Monitor logging	Level of the logs printed on the VTY window, and statistics
Buffer logging	Level of the logs recorded in the memory buffer, and statistics.
Count log messages	Log statistics function
Statistic log messages	Enables/disables log sending periodically
Statistic log messages to terminal	Enables/ disables log sending to console and remote terminal
Delay-send file name	Local filename of log delay-sending cache, index of write file and delay interval
Trap logging	Level of the logs sent to the syslog server and statistics
Delay-send logging	The server address, log sending mode and statistics
Log Buffer	Log files recorded in the memory buffer

Related

Command	Description
---------	-------------

Commands		
	N/A	N/A

Platform
Description N/A

14.36 terminal monitor

Use this command to show logs on the current VTY window. Use the **no** form of this command to restore the default setting.

terminal monitor

terminal no monitor

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Log information is not allowed to be displayed on the VTY window by default.

Command
Mode Privileged EXEC mode

Usage Guide This command only sets the temporary attributes of the current VTY. As the temporary attribute, it is not stored permanently. At the end of the VTY terminal session, the system will use the default setting, and the temporary setting is invalid. This command can be also executed on the console, but it does not take effect.

Configuration The following example allows log information to be printed on the current VTY window:

Examples FS# **terminal monitor**

Related	Command	Description
Commands	N/A	N/A

Platform
Description N/A

Command	Version	Description
History	N/A	N/A

15 MONITOR Commands

15.1 show power

Use this command to display power information including model, status, hardware version and SN. .

show power

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Level 14

Usage Guide This command is used to display power information:

Configuration The following example displays the basic power information.

```

Examples
FS#show power
Name                Slot Status      Attribute Conexist Hardware Version Serial          Temperature
Exception
-----
N/A                 1  no-present    N/A      N/A      N/A      N/A      N/A
N/A
RG-PA550I-F        2  ok            -F       yes     AA      M623TW004LAAL  35
N/A
                Rated   Input   Input   Output  Output  Output
Name                Slot Power(W) Voltage(V) Current(mA) Voltage(V) Current(mA) Power(W)
-----
N/A                 1  N/A      N/A      N/A      N/A      N/A      N/A
RG-PA550I-F        2  550     232     634     12      8484     101
    
```

Prompt Messages N/A

Platforms N/A

15.2 show fan

Use this command to display the fan information in the slave chassis including the model number, serial number, operating status of every fan as well as the actual rotating speed and other information.

show fan [speed]

show fan [attribute]

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Level 14

Usage Guide Use the **show fan** command to display the fan information, including work status and rotating speed. .

Configuration Examples The following example displays the fan information..

```

FS#show fan
Fan id Type           Status   Hardware Version Serial Number
-----
1     M6510-FAN-F       ok      1.01           1234567890128
2     M6510-FAN-F       ok      1.01           1234567890126
3     M6510-FAN-F       ok      1.02           2000000000022
4     M6510-FAN-F       ok      1.01           1234567890125
The following example displays the fan rotating speed and level.
uijie#show fan speed
Fan id Type           Status   Speed(R/m) Speed level
-----
1     M6510-FAN-F       ok      12406         123
2     M6510-FAN-F       ok      12479         123
3     M6510-FAN-F       ok      12305         123
4     M6510-FAN-F       ok      12135         123
    
```

The following example displays the fan status and air channel.

```

FS#show fan attribute
Fan id Type           Status   Attribute Coexistr
-----
1     M6510-FAN-F       ok      -F           yes
2     M6510-FAN-F       ok      -F           yes
3     M6510-FAN-F       ok      -F           yes
4     M6510-FAN-F       ok      -F           yes
    
```

Prompt Messages N/A

Platforms N/A

15.3 show temperature

Use this command to display board temperature, threshold configuration and other information.

show temperature

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Level 14

Usage Guide Use the command to display the current temperature of air inlet, air outlet, CPU, MAC and expansion module..

Configuration The following example displays the temperature.

Examples

FS#show temperature

Slot	Card_type	Temperature name	Current(C)	Status
0	NC8400	air_outlet	31	OK
		air_inlet	29	OK
		board	39	OK
		cpu	52	OK
		switch	47	OK

Prompt Messages N/A

Platforms N/A

16 PKG_MGMT Commands

16.1 patch active

Use this command to activate a patch to take effect.

patch active[slot {num | M1 | M2 | all }]

Parameter Description	Parameter	Description
	slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.

Defaults N/A

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide Activating operation can be performed only on the device already installed with a patch, after which the patch really takes effect. This command can be used to activate a hot patch temporarily. The activated patch becomes invalid after device restart.

Configuration The following example activates a patch on the box device.

Examples

```
FS#patch active
Active the patch package success
```

The following example activates a patch on the chassis device.

```
FS#patch active slot 8
[Slot 8]:
Active the patch package success
```

Verification Use the **show patch** command to display patch information.

Prompt The patch is activated successfully.

Messages

```
Active the patch package success
```

The running fails and a patch package needs to be installed at first.

```
Patch not installed
```


There is no need to run the command for the patch in the activated or running status.

The patch status is already active or running

Contact the service center to solve the package problem.

Cannot find the package's scripts file

Common Errors There is no hot patch installed on current device.
The hot patch on current device is already activated.

Platforms N/A

16.2 patch deactivate

Use this command to deactivate a patch.

patch deactivate [slot {num | M1 | M2 | all}]

Parameter Description	Parameter	Description
	slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command can be performed to deactivate a patch only after the patch is in the activated status.

Configuration The following example deactivates a patch on the box device.

Examples FS#patch deactivate
Deactivate the patch package success

The following example deactivates a patch on the chassis device.

FS#patch deactivate slot 8
[Slot 8]:
Deactivate the patch package success

Verification Use the **show patch** command to display patch information.

Prompt The patch is deactivated successfully.

Messages Deactivate the patch package success

The running fails and a patch package needs to be installed at first.

Patch not installed

There is no need to run the command for the patch in the deactivated status.

The patch is not in active or running status

Contact the service center to solve the package problem.

Cannot find the package's scripts file

Common There is no hot patch installed on current device.

Errors The hot patch on current device is already invalid.

16.3 patch delete

Use this command to uninstall a patch.

patch delete [slot {num | M1 | M2 | all }]

Parameter Description	Parameter	Description
	slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to remove the existing hot patch package on the device.

Configuration Examples The following example removes the installed hot patch package from the box device.

```
FS# patch delete
Clear the patch patch_bridge success
Clear the patch success
```

The following example removes the installed hot patch package from the chassis device.

```
FS# patch delete slot M1
[Slot M1]:
Clear the patch patch_bridge success
Clear the patch success
```

Verification Use the **show patch** command to display patch status.

Prompt The patch is uninstalled successfully.

Messages Clear the patch success

```
A hot patch package should be installed at first for it has not been installed.
Patch not installed
```

Common Errors There is no hot patch installed on current device.

16.4 patch running

Use this command to activate a patch permanently.

```
patch running[ slot {num | M1 | M2 | all } ]
```

Parameter Description	Parameter	Description
	slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide Activating operation can be performed only on the device already installed with a patch, after which the patch really takes effect. This command can be used to activate a hot patch permanently.

Configuration The following example activates a patch on the box device.

Examples FS#patch running
The patch on the system now is in running status

The following example activates a patch on the chassis device.

```
FS#patch running slot M1
[Slot M1]:
The patch on the system now is in running status
```

Verification Use the **show patch** command to display the patch information.

Prompt The patch is activated permanently.

Messages

```
The patch on the system now is in running status
```

The running fails and a patch package needs to be installed at first.

```
Patch not installed
```

There is no need to run the command for the patch is in the deactivated status.

```
The patch is not in active or running status
```

Contact the service center to solve the package problem.

```
Cannot find the package's scripts file
```

Common There is no hot patch on current device.

Errors The hot patch is already activated on current device.

16.5 show component

Use this command to display all components already installed on current device and their information.

```
show component [ slot {num | M1 | M2 | all } ][ component _name ]
```

Parameter Description

Parameter	Description
slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
slot all	This parameter is used on a chassis device. It indicates all devices.
slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.
component _name	Name of the components When this parameter value is N/A, the command is used to display all components already installed on the device and basic information of these components. When this parameter value is not N/A, the command is used to display detailed information of the corresponding component, check whether the component is intact, and check whether this component works properly.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command includes one with component_name and one without component_name. During upgrade, it requires users to understand all components installed on current device and their version information before components deletion. This needs to use the **show component** command without component_name. The **show component** command with component_name is used to obtain details of the corresponding component. The detailed information enables users to easily realize components' operation and damage. It is significant to insure their troubleshooting, security and reliability.

Some components in use will change their defaults files. Though this is more possibly normal than malicious, the show component command is used only to judge whether component files change in use. It is unable to distinguish natural damage from malicious one. It depends on users to make a further judgment.

Configuration Examples The following example displays all components already installed on the box device and their information.

```
FS# show component
Package :sysmonit
    Version:1.0.1.23cd34aa    Build time: Wed Dec 7 00:58:56 2013
    Size:12877 Install time :Wed Mar 5 14:23:12 2012
    Description: this is a system monit package
    Required packages: None
-----
Package:bridge
    Version:2.0.1.37cd5cda    Build time: Wed Dec 7 00:54:56 2013
    Size:23245 Install time :Wed Mar 5 14:30:12 2012
    Description: this is a bridge package
    Required packages: None
-----
```

This command is used to obtain all components already installed on the device and their basic information. The information offers a basis for users to decide whether to upgrade or delete components.

Field	Description
Package	Name of the component
Version	Version number of the component
Build time	Compilation time of the component on the server
Size	Content size of the component
Install time	Installation time of the component
Description	Simple functional description of the component
Required packages	Name of required packages

The following example displays the information of all feature components already installed on the chassis device.

```
FS#show component slot 8
FS#*
```

```
[Slot 8]:
Package : utils-system
    Version: 1.0.0.433ef8d      Build time: Sun May 19 19:22:54 2013
    Size: 823936   Install time: Sun May 19 19:27:04 2013
    Description: utils system compile
    Required packages: None
-----
Package : tcl-expect
    Version: 1.0.0.433ef8d      Build time: Sun May 19 19:19:18 2013
    Size: 3474153   Install time: Sun May 19 19:27:04 2013
    Description: tcl & expect packages
    Required packages: None
-----
```

The following example displays the information of specified components already installed on the box device.

```
FS# show componentbridge
package:bridge
    Version: 2.3.1.1252ea      Build time: Wed Dec 7 00:54:56 2013
    Size:26945   Install time : Wed Mar 19:23:15 2012
    Description:this is a bridge package
    Required packages: None
    Package files:
        /lib64
        /lib64/libbridge.so
        /sbin
        /sbin/bridge

    Package file validate: [OK]
    Required relationship verify: [OK]
```

The other information except the basic information of components is listed as follows.

Field	Description
Package file validate	Checks whether the component files are intact. "OK" is displayed when all component files work properly; "ERR" is displayed together with their names when some component files are lost or revised.
Required package	Lists all required packages of the component. "OK" is labeled if required components are already installed; "ERR" is labeled if not together with detailed description about their names and versions.
Package files	Lists all files contained in the package.

```
Prompt      The execution is successful with all components information displayed.
Messages    Package :sysmonit
```

```

Version:1.0.1.23cd34aa      Build time: Wed Dec  7 00:58:56 2013
Size:12877 Install time :Wed Mar 5 14:23:12 2012
Description: this is a system monit package
Required packages: None
-----
Package:bridge
Version:2.0.1.37cd5cda      Build time: Wed Dec  7 00:54:56 2013
Size:23245 Install time :Wed Mar 5 14:30:12 2012
Description: this is a bridge package
Required packages: None
-----
    
```

16.6 show patch

Use this command to display the information of a hot patch package already installed on the device.

show patch [**history**] [**slot** { num | **M1** | **M2** | **all** }] [**patch _name**] [**brief**]

Parameter Description	Parameter	Description
	history	This parameter is used to display all patches.
	slot num	This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.
	patch _name	Name of the patches When this parameter value is N/A, the command is used to display all components already installed on the device and basic information of these components. When this parameter value is not N/A, the command is used to display detailed information of the corresponding component, check whether the component is intact, and check whether this component works properly.
	brief	This parameter is used to display the brief information about installed patches.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to check all patches already installed on the device and their information.

Configuration The following example displays patches already installed on the box device.

Examples

```

FS# show patch
[Slot 0]:
Patch package SP2 installed in the system, version:pa
  Order      : 2
  -----
  Patch      : patch_utils
  Status     : installed
  Version    : 1.0.0.70a1a80
  Size       : 239273
  Build time : Thu May 9 06:13:33 2019
  Install time: Fri May 10 11:21:31 2019
  Description : utils patch
    
```

This command is used to obtain the basic information of patches already installed on the device.

Field	Description
Order	Serial number
Package	Name of the patch
status	Status of the patch
Version	Version of the patch
Build time	Compilation time of the patch on the server
Size	Content size of the patch
Install time	Installation time of the patch
Description	Simple functional description of the patch

The following example displays the information of all patches installed on the chassis device.

```

FS#show patch slot 1/8
[Slot 1/8]:
Patch package SP2 installed in the system, version:pa
  Order      : 2
  -----
  Patch      : patch_utils
  Status     : installed
  Version    : 1.0.0.70a1a80
  Size       : 239273
  Build time : Thu May 9 06:13:33 2019
  Install time: Fri May 10 11:21:31 2019
  Description : utils patch
    
```

The following example displays the brief information about installed patches.

```

FS#show patch slot 1/8 brief
[Slot 1/8]:
Patch package SP2 installed in the system, version:pa
  Order      : 2
  -----
  Patch      : patch_utils
    
```


Status : installed

The following example displays information about all installed patches.

```

FS#show patch history slot 1/8
[Slot 1/8]:
Patch package SP2 installed in the system, version:pa
  Order      : 2
  -----
  Patch      : patch_utils
  Status     : installed
  Version    : 1.0.0.70a1a80
  Size      : 239273
  Build time : Thu May 9 06:13:33 2019
  Install time: Fri May 10 11:21:31 2019
  Description : utils patch
Patch package SP1 installed in the system, version:pa
  Order      : 1
  -----
  Patch      : patch_utils
  Status     : installed
  Version    : 1.0.0.70a1a80
  Size      : 239273
  Build time : Thu May 9 06:13:33 2019
  Install time: Fri May 9 11:21:31 2019
  Description : utils patch
    
```

The following example displays the information of particular patches installed on the box device.

```

FS# show componentbridge
package:bridge
  Version: 2.3.1.1252ea      Build time: Wed Dec 7 00:54:56 2011
  Size:26945 Install time : Wed Mar 19:23:15 2012
  Description:this is a bridge package
  Required packages: None
  Package files:
    /lib64
    /lib64/libbridge.so
    /sbin
    /sbin/bridge

  Package file validate: [OK]
    
```

The other information except the basic information of the patch is listed as follows:

Field	Description
-------	-------------

Package file validate	Checks whether the patch files are intact. "OK" is displayed when all patch files work properly; "ERR" is displayed together with their names when some files are lost or revised.
Package files	Lists all files contained in the patch package.

Prompt The information of the patch is displayed after successful running.

Messages

```
Patch package patch_install installed in the system, version:pa1
Package : patch_bridge
Status:running
Version: pa1      Build time: Mon May 13 09:03:07 2013
Size: 277      Install time: Tue May 21 03:07:17 2013
Description: a patch for bridge
Required packages: None
```

16.7 show upgrade auto-sync

Use this command to display related auto-sync configuration on the device.

show upgrade auto-sync

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to display the auto-sync upgrade configuration in the system including the policy, range and upgrade package's path.

Prompt The auto-sync information of the system is displayed after running.

Messages

```
FS#show upgrade auto-sync
auto-sync policy: coordinate
auto-sync range: vsu
auto-sync package: flash:/eg1000m_main_1.0.0.0f328e91.bin
```

16.8 show upgrade file

Use this command to display the information of the installation package files in the device file system.

show upgrade file url

Parameter	Parameter	Description
Description		

url	The local url path indicates where an installation package file is stored.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to preview main messages of an installation package after it is downloaded into local file system.
This command is not applied to a chassis package.

Configuration The following example displays the information of an installation package file.

```

Examples
FS# show upgrade file flash://bridge_eg1000m_2.3.1.1252ea-1.mips.rpm
Name      : bridge
Version:1.0.1.23cd34aa
Package type      : common component
Support target    : eg1000m
Size              : 26945
Build time        : Wed Dec 7 00:54:56 2013
Install date      : (not installed)
Description       : this is a bridge package
Package files :
    Package files:
        /lib64
        /lib64/libbridge.so
        /sbin
        /sbin/bridge
    
```

This command is used to obtain the information in the package.

Field	Description
Name	Name of the package
Version	Version of the package
Package type	Type of the package
Support target	Supported product description
Size	Content size of the package
Build time	Compilation time of the package
Install date	Installation time of the package
Description	Description of the package
Package files	All contents in the package

Prompt The package information is displayed after running.

```

Messages
Name      : bridge
Version:1.0.1.23cd34aa
Package type      : common component
Support target    : eg1000m
    
```

```

Size           : 26945
Build time    : Wed Dec  7 00:54:56 2013
Install date   : (not installed)
Description   : this is a bridge package
Package files :
  Package files:
    /lib64
    /lib64/libbridge.so
    /sbin
    /sbin/bridge
    
```

16.9 show upgrade history

Use this command to display the upgrade history.

show upgrade history

Parameter	Parameter	Description
Description	N/A	N/A
Command Mode	Privileged EXEC mode	
Default Level	2	
Configuration Examples	The following example displays the upgrade history. <pre> FS#show upgrade history Last Upgrade Information: Time: 2014-08-31 12:15:03 Method: LOCAL Package NameNC8400_FSOS11.0(1)B1_CM_01200616_install.bin Package Type: Distribution </pre>	
Prompt Messages	N/A	
Platforms	N/A	

16.10 show upgrade status

Use this command to display the upgrade status of all line cards on the chassis device.

show upgrade status

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
N/A	N/A

Command Mode Privileged EXEC mode

Default Level 2

Configuration The following example displays the upgrade status of all line cards on the chassis device.

Examples

```
FS#show upgrade status
[slot: M1]
    dev_type: s12k-ppc-cm
    status   : ready
[slot: 8]
    dev_type: s12k-s86-ppc-lc
    status   : upgrading
```

Prompt The upgrade status of various line cards is displayed.

Messages

```
[slot: M1]
    dev_type: s12k-ppc-cm
    status   : ready
[slot: 8]
    dev_type: s12k-s86-ppc-lc
    status   : upgrading
```

Platforms This command is supported only on the chassis device.

16.11 upgrade

Use this command to install and upgrade an installation package in the local file system.

upgrade [slot {num | M1 | M2 | all}]url[**force**]

Parameter Description	Parameter	Description
	url	The local path indicates where an installation package is stored.
	slot num	This command is used to upgrade an installation package on the device. This parameter is used on a chassis device. It indicates a corresponding line card based on the slot number.
	slot all	This parameter is used on a chassis device. It indicates all devices including VSU system.
	slot M1	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M1.
	slot M2	This parameter is used on a chassis device. It specifies that the operation is performed on supervisor module M2.

force Mandatory upgrade

Command Privileged EXEC mode
Mode

Default Level 2

Usage Guide This command is applicable to installation packages of all subsystem components, chassis devices, feature components and hot patches. Before its use, run the **copy** command to copy feature packages into the file system in the device.

When there is no specified range of parameters, the command is used to upgrade the matched system components according to the auto-sync configuration.

Configuration The following example upgrades the main package on the device.

Examples

```
FS#upgrade usb0:/eg1000m_main_1.0.0.0f328e91.bin
Upgrade processing is 10%
Upgrade processing is 60%
Upgrade processing is 90%
Upgrade info [OK]
Kernel version[2.6.32.91f9d21->2.6.32.9f8b56f]
Rootfs version[1.0.0.2ad02537->1.0.0.1bcc12e8]
Upgrade processing is 100%
Reload system to take effect!
```

The following example upgrades the chassis package on the device.

```
FS# upgrade usb0:/ca-octeon_11.0(1B2)_20131106_main_install.bin
[Slot M1]:Upgrade processing is 10%

[Slot 1]:Upgrade processing is 10%

[Slot M1]:Upgrade processing is 60%

[Slot 1]:Upgrade processing is 60%

[Slot M1]:Upgrade processing is 90%

[Slot M1]:
Upgrade info [OK]
Kernel version[2.6.32.abb2b41f170c81->2.6.32.abb2b415749f40]
Rootfs version[1.0.0.d5f0de03->1.0.0.660e0085]

[Slot M1]:Restart to take effect !

[Slot M1]:Upgrade processing is 100%
```

```
[Slot 1]:Upgrade processing is 90%

[Slot 1]:
Upgrade info [OK]
  Kernel version[2.6.32.9f8b56f1d45ab2 ->2.6.32.0f48cb9f170c81]
  Rootfs version[1.0.0.2ad02537->1.0.0.1bcc12e8]

[Slot 1]:Restart to take effect !

[Slot 1]:Upgrade processing is 100%
[slot: M1]
  device_name: ca-octeon-cm
  status:      SUCCESS
[slot: 1]
  device_name: ca-octeon-lc
Status:      SUCCESS
```

- Verification** Run the **show version detail** command to check whether the upgrade of a subsystem component is successful.
Run the **show component** command to check whether the upgrade of a feature component is successful.
upgrading a feature component
Run the **show patch** command to check whether the upgrade of a hot patch is successful.

Prompt The prompt message of successful running is displayed.

- Messages** Upgrade info [OK]
- The installation package is invalid or damaged and needs to be regained for upgrade command.
Invalid package file
- The installation package is not available on the device and needs to be regained for upgrade command.
Device don't support
- There is no need to upgrade the device.
The version in device is newer or the same
- When there is insufficient space for upgrade, check USB flash disk attached on the device.
No enough space for decompress
- Contact the service center to solve the system problem.
No enough space,rootfs been destroyed. Please upgrade in uboot
- The existing patch package needs to be uninstalled before upgrade.
Already exist patch, please uninstall before upgrade
- The patch package is not applicable to this system and needs to be changed.

Patch compatibility err

The upgrade of a patch package is not available on this device and needs to be regained.

some origin cmpnt has change

16.12 upgrade auto

Use this command to upgrade an installation package automatically without interrupting services on a dual-device VSU system. While either in VSU mode or in standalone mode, one single device will restart after this configuration, thus interrupting services.

upgrade auto url [**force**]

Parameter Description	Parameter	Description
	url	Installation package directory
	force	Enforces upgrade.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide Use this command to upgrade the VSU system.
 Download the program of the latest version to the device before running this command (by using the **copy tftp** command).
 During one upgrade, do not use the **upgrade auto** command and other upgrade commands (such as the **upgrade** command) at the same time. If auto-upgrade fails, follow the system prompt to restore the version.
 Do not update the installation package (by running the copy tftp command/U disk copy) or perform other upgrade operation (running the upgrade /upgrade auto command) repetitively.
 During auto-upgrade, do not unplug the card, perform hot backup switchover, power off chassis or change VSU software/hardware configuration.

Configuration The following example upgrades the main package automatically without interrupting the service.

```

Examples
2015-04-09_09-56-23 FS#upgrade auto usb0:NC8400_FSOS11.0(5)B1_install.bin
2015-04-09_09-56-24 FS#*Jan 1 00:23:40: %7:
2015-04-09_09-56-24 *Jan 1 00:23:40: %7: [Slot 1/0]:Upgrade processing is 10%
2015-04-09_09-56-26 FS#show upgrade status
2015-04-09_09-56-26 [Slot 1/0]
2015-04-09_09-56-26 dev_type: s6k
2015-04-09_09-56-26 status : upgrading
2015-04-09_09-56-26 [Slot 2/0]
2015-04-09_09-56-26 dev_type: s6k
    
```



```

2015-04-09_09-56-26      status  : transmission
2015-04-09_09-58-20 *Jan 1 00:25:36: %7: [Slot 2/0]:Upgrade processing is 10%
2015-04-09_09-58-30 FS#show upgrade status
2015-04-09_09-58-30 [Slot 1/0]
2015-04-09_09-58-30      dev_type: s6k
2015-04-09_09-58-30      status  : upgrading
2015-04-09_09-58-30 [Slot 2/0]
2015-04-09_09-58-30      dev_type: s6k
2015-04-09_09-58-30      status  : upgrading
2015-04-09_09-58-39 *Jan 1 00:25:56: %7:
2015-04-09_09-58-39 *Jan 1 00:25:56: %7: [Slot 2/0]:Upgrade processing is 60%
2015-04-09_09-59-19 *Jan 1 00:26:35: %7:
2015-04-09_09-59-19 *Jan 1 00:26:35: %7: [Slot 2/0]:Upgrade processing is 90%
2015-04-09_09-59-19 *Jan 1 00:26:35: %7:
2015-04-09_09-59-19 *Jan 1 00:26:35: %7: [Slot 2/0]:
2015-04-09_09-59-19 *Jan 1 00:26:35: %7: Upgrade info [OK]
2015-04-09_09-59-19 *Jan 1 00:26:36: %7:   Kernel version[2.6.32.6b311610a8eb91->2.6.32.6b31161115502c]
2015-04-09_09-59-19 *Jan 1 00:26:36: %7:   Rootfs version[1.0.0.eb75cd01->1.0.0.3d978b6c]
2015-04-09_09-59-19 *Jan 1 00:26:36: %7:
2015-04-09_09-59-19 *Jan 1 00:26:36: %7: [Slot 2/0]:Reload system to take effect!
2015-04-09_09-59-21 *Jan 1 00:26:37: %7:
2015-04-09_09-59-21 *Jan 1 00:26:37: %7: [Slot 2/0]:Upgrade processing is 100%
2015-04-09_10-00-28 FS#show upgrade status
2015-04-09_10-00-28 [Slot 1/0]
2015-04-09_10-00-28      dev_type: s6k
2015-04-09_10-00-28      status  : upgrading
2015-04-09_10-00-28 [Slot 2/0]
2015-04-09_10-00-28      dev_type: s6k
2015-04-09_10-00-28      status  : success
2015-04-09_10-01-39 *Jan 1 00:28:56: %7:
2015-04-09_10-01-39 *Jan 1 00:28:56: %7: [Slot 1/0]:Upgrade processing is 60%
2015-04-09_10-02-17 *Jan 1 00:29:33: %7:
2015-04-09_10-02-17 *Jan 1 00:29:33: %7: [Slot 1/0]:Upgrade processing is 90%
2015-04-09_10-02-17 *Jan 1 00:29:33: %7:
2015-04-09_10-02-17 *Jan 1 00:29:33: %7: [Slot 1/0]:
2015-04-09_10-02-17 *Jan 1 00:29:34: %7: Upgrade info [OK]
2015-04-09_10-02-17 *Jan 1 00:29:34: %7:   Kernel version[2.6.32.6b311610a8eb91->2.6.32.6b31161115502c]
2015-04-09_10-02-17 *Jan 1 00:29:34: %7:   Rootfs version[1.0.0.eb75cd01->1.0.0.3d978b6c]
2015-04-09_10-02-17 *Jan 1 00:29:34: %7:
2015-04-09_10-02-18 *Jan 1 00:29:34: %7: [Slot 1/0]:Reload system to take effect!
2015-04-09_10-02-19 *Jan 1 00:29:35: %7:
2015-04-09_10-02-19 *Jan 1 00:29:35: %7: [Slot 1/0]:Upgrade processing is 100%
2015-04-09_10-02-19 *Jan 1 00:29:36: %7: %PKG_MGMT:auto-sync config synchronization, Please wait for a
moment....

```

```

2015-04-09_10-02-20 *Jan 1 00:29:36: %7:
2015-04-09_10-02-20 [ 1784.116069] rtc-pcf8563 6-0051: retrieved date/time is not valid.
2015-04-09_10-02-20 *Jan 1 00:29:36: %7: [Slot 2/0]:auto sync config: space not enough left 57229312, need
114597815
2015-04-09_10-02-20 *Jan 1 00:29:36: %7:
2015-04-09_10-02-20 *Jan 1 00:29:36: %7: [Slot 2/0]:auto sync package config err
2015-04-09_10-02-20 *Jan 1 00:29:37: %7: [Slot 1/0]
2015-04-09_10-02-21 *Jan 1 00:29:37: %7: device_name: s6k
2015-04-09_10-02-21 *Jan 1 00:29:37: %7: status: SUCCESS
2015-04-09_10-02-21 *Jan 1 00:29:37: %7: [Slot 2/0]
2015-04-09_10-02-21 *Jan 1 00:29:37: %7: device_name: s6k
2015-04-09_10-02-21 *Jan 1 00:29:37: %7: status: SUCCESS
2015-04-09_10-02-21 *Jan 1 00:29:38: %7: %Do with dtm callback...
2015-04-09_10-02-21 *Jan 1 00:29:38: %VSU-5-DTM_AUTO_UPGRADE: Upgrading the system, wait a moment
please.
    
```

16.13 upgrade auto-sync package

Use this command to configure the path of the upgrade package.

upgrade auto-sync patch url

Parameter Description	Parameter	Description
	url	The path of installation package.

Defaults The default is the last upgrade path.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide It is recommended to use default settings.

Configuration Examples The following example sets the path to the upgrade package in the USB flash disk.

```
FS# upgrade auto-sync package usb0:/eg1000m_main_1.0.0.0f328e91.bin
```

Verification Run the **show upgrade auto-sync** command to display current auto-sync policy.
If url provides normal path, run the **stat** command to check whether it can be accessed.

Prompt Messages The prompt message of successful running is displayed:

```
Upgrade auto-sync package is set as usb0:/eg1000m_main_1.0.0.0f328e91.bin
```

16.14 upgrade auto-sync patch

Use this command to configure the path of the upgrade patch.

upgrade auto-sync patch url

Parameter Description	Parameter	Description
	url	The path of installation patch.

Defaults The default is the path of the upgrade patch used last time.

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide It is recommended to use default settings.

Configuration Examples The following example sets the path of the upgrade patch.

```
FS# upgrade auto-sync patch usb0:sp1.bin
```

Verification Run the **show upgrade auto-sync** command to display upgrade patch.
If url provides normal path, run the **stat** command to check whether it can be accessed.

Prompt Messages N/A

16.15 upgrade auto-sync policy

Use this command to set an auto-sync policy for the system.

upgrade auto-sync policy [none | compatible | coordinate]

Parameter Description	Parameter	Description
	none	No auto-sync upgrade
	compatible	Performs auto-synchronization based on the sequential order of versions.
	coordinate	Synchronizes with the version based on the system upgrade patch stored on the supervisor module.

Defaults **coordinate**

Command Mode Privileged EXEC mode

- Default Level** 2

- Usage Guide** Check whether the upgrade package is ready before using the command.

- Configuration** The following example sets the auto-sync policy of the device based on the version of supervisor modules.
- Examples** `FS# upgrade auto-sync policy coordinate`

- Verification** Display the current policy for auto-sync upgrade by running the **show upgrade auto-sync** command.

- Prompt** The prompt message of successful running is displayed.
- Messages** `Upgrade auto-sync policy is set as coordinate.`

16.16 upgrade auto-sync range

Use this command to set the range of auto-sync upgrade.

upgrade auto-sync range [**chassis** | **vsu**]

Parameter Description	Parameter	Description
	chassis	Auto-sync version upgrade in the range of chassis
	vsu	Auto-sync version upgrade in the range of the VSU system.

- Defaults** **vsu**

- Command Mode** Privileged EXEC mode

- Default Level** 2

- Usage Guide** It is recommended to set the parameter to vsu to ensure system version consistency to the most extent.

- Configuration** The following example installs the auto-sync upgrade in the VSU system.
- Examples** `FS# upgrade auto-sync range vsu`

- Verification** Run the **show upgrade auto-sync** command to display the range of current auto-sync upgrade.

- Prompt** The prompt message of successful running is displayed.
- Messages** `Upgrade auto-sync range is set as vsu.`

16.17 upgrade download tftp

Use this command to download, install and upgrade installation packages from the tftp server.

upgrade download tftp:/path [**patch-active** | **patch-running**] [**force**]

upgrade download oob_tftp:/path [**patch-active** | **patch-running**] [**via mgmt** { number }] [**force**] [**vrf** vrf-name]

Parameter Description	Parameter	Description
	path	The path of installation packages on the tftp server This command is downloaded and upgraded automatically from the server.
	via mgmt number	If the transfer mode is isoob_tftp and there are multiple MGMT ports, you can select a specific port.
	force	Enforces upgrade.
	vrf	Downloads an installation package from the specified VRF.
	vrf-name	Specifies a VRF name.

Command Privileged EXEC mode
Mode

Default Level 2

Usage Guide This command is applicable to installation packages of all subsystem components, chassis devices, feature components and hot patches. This command is used to perform automatic installation, copy and upgrade of files.

Configuration The following example upgrades the main package.

```

Examples
FS# upgrade download tftp://192.168.201.98/eg1000m_main_1.0.0.0f328e91.bin
Accessing tftp://192.168.201.98/eg1000m_main_1.0.0.0f328e91.bin...
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Transmission finished, file length 21525888 bytes.
Upgrade processing is 10%
Upgrade processing is 60%
Upgrade processing is 90%
Upgrade info [OK]
    Kernel version[2.6.32.91f9d21->2.6.32.9f8b56f]
    Rootfs version[1.0.0.2ad02537->1.0.0.1bcc12e8]
Upgrade processing is 100%
Reload to take effect!
    
```

Verification Run the **show version detail** command to check whether the upgrade of a subsystem component is successful.
Run the **show component** command to check whether the upgrade of a feature component is successful.
Run the **show patch** command to check whether the upgrade is successful of a hot patch package.

Prompt The prompt message of successful running is displayed.

```

Messages
Upgrade info [OK];
    
```

The installation package is invalid or damaged and needs to be regained for upgrade command.

Invalid package file

The installation package is not available on the device and needs to be regained for upgrade command.

Device don't support

There is no need to upgrade the device.

The version in device is newer or the same

When there is insufficient space for upgrade, check USB flash disk attached on the device.

No enough space for decompress

Contact the service center to solve the system problem.

No enough space,rootfs been destroyed. Please upgrade in uboot

The existing patch package needs to be deleted.

Already exist patch, please uninstall before upgrade

The patch package is not compatible on this device. Replace the package..

Patch compatibility err

The upgrade of the patch package is not applied to the device. Regain the package.

Some origin component has change

16.18 clear storage

Use this command to remove an installation package on the local device.

clearstorage[url]

Parameter	Description
url	A local url directory or full pathname indicates where the installation package is stored

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to remove an installation package or all packages in a directory and all installation packages on the local device.

Configuration Examples

```
FS#clear storage
Remove the whole storage directory?[y/n]y
```

```
FS#clear storage usb0
Remove the file or directory usb0 from the storage?[y/n]y
FS#
```

Verification Check specified url

Platforms N/A

17 PYTHON SHELL Commands

17.1 Python

Use this command to debug and run a Python script.

python file_name args

Parameter Description	Parameter	Description
	file_name	Indicates the name of a script file. This script file is stored in the flash: directory. You can run the python flash: file_name command to locate this file.
	args	Indicates the script file parameter.

Command Mode Privileged EXEC mode

Default Level 1

Usage Guide Use this command to debug and run a Python script.

- Access the Python console to debug the Python script.
- Run the **copy** command to upload the Python script to the device for execution.

Configuration The following example accesses the Python console to debug a Python script.

Example

```
FS#python
Python 2.7.11 (default, Jun 12 2018, 02:23:20)
[GCC 4.3.3] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Prompt N/A

Platform Description N/A

Chapter 2 Ethernet Switching Commands

1. Interface Commands
2. Single Fiber Commands
3. MAC Address Commands
4. Aggregate Port Commands
5. VLAN Commands
6. Super VLAN Commands
7. MSTP Commands
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11. L3-PKT-COUNTER ENABLE Commands
12. Positioning Lamp Commands
13. PHY Firmware Upgrade Commands

1 Interface Commands

1.1 bandwidth

Use this command to set the bandwidth on the interface. Use the **no** form of this command to restore the default setting.

bandwidth kilobits
no bandwidth

Parameter Description	Parameter	Description
	kilobits	Bandwidth per second, in the unit of Kbps.

Defaults If this command is not configured on the interface, use the show interface command to display the default setting in privileged EXEC mode.

Command Mode Interface configuration mode

Usage Guide This command does not affect the actual bandwidth on the interface. Instead, it is used to display the system the bandwidth specification. By default, the bandwidth is determined by the actual link rate on the interface. It can be set by the user as well.

Configuration Examples The following example sets the bandwidth on the interface to 64 Kbps.

```
FS(config)#interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# bandwidth 64
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.2 carrier-delay

Use this command to set the carrier delay on the interface. Use the **no** form of this command to restore the default value.

carrier-delay { [milliseconds] num | **up** [milliseconds] num **down** [milliseconds] num}
no carrier-delay

Parameter Description	Parameter	Description
	num	(Optional) in the range from 0 to 60 in the unit of seconds.

milliseconds	(Optional) in the range from 0 to 60000 in the unit of milliseconds.
up	(Optional) Configures the delay after which DCD changes from Down to Up in status.
down	(Optional) Configures the delay after which DCD changes from Up to Down in status.

Defaults The default is 2 seconds.

Command Interface configuration mode

Mode

Usage Guide This parameter refers to the delay after which the carrier detection signal DCD of the interface link changes from the Down status to the Up status or vice versa. If the DCD changes within the delay, the system will ignore such changes without disconnecting the upper data link layer for renegotiation.

If the DCD carrier is disconnected for a long time, the parameter should be set longer to accelerate route aggregation so that the routing table can be converged more quickly. On the contrary, if the DCD carrier interruption period is shorter than the time used for route aggregation, you should set the parameter to a higher value to avoid unnecessary route vibration.

Configuration The following example sets the carrier delay of serial interface to 5 seconds.

Examples

```
FS(config)# interface gigabitethernet 1/1
```

```
FS(config)# carrier-delay 5
```

The following example sets the carrier delay of serial interface to 100 milliseconds.

```
FS(config)# interface GigabitEthernet 1/1
```

```
FS(config-if-GigabitEthernet 1/1)#carrier-delay milliseconds 100
```

The following example sets the DCD delay from Down to Up in status to 100 milliseconds and from Up to Down to 200 milliseconds.

```
FS(config)# interface GigabitEthernet 1/1
```

```
FS(config-if-GigabitEthernet 1/1)# carrier-delay up milliseconds 100 down milliseconds 200
```

Related

Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.3 clear counters

Use this command to clear the counters on the specified interface.

clear counters [interface-id]

Parameter Description

Parameter	Description
-----------	-------------

interface-id	Interface type and interface ID
--------------	---------------------------------

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide In the privileged EXEC mode, use the **show interfaces** command to display the counters or the **clear counters** command to clear the counters. If the interface is not specified, the counters on all interfaces will be cleared.

Configuration Examples The following example clears the counters on interface gigabitethernet 1/1.

```
FS# clear counters gigabitethernet 1/1
```

Related Commands

Command	Description
show interfaces	Displays the interface information.

Platform Description N/A

1.4 clear interface

Use this command to reset the interface.

```
clear interface interface-id
```

Parameter Description

Parameter	Description
interface-id	Interface type and interface ID

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide This command is only used on the switch port, member port of the L2 Aggregate port, routing port, and member port of the L3 aggregate port. This command is equal to the **shutdown** and **no shutdown** commands.

Configuration Examples The following example resets the interface gigabitethernet 1/1.

```
FS# clear interface gigabitethernet 1/1
```

Related Commands

Command	Description
shutdown	Disables the interface.

Platform N/A

Description

1.5 clear link-state-change statistics

Use this command to clear the statistics of link status change on an interface.

clear link-state-change statistics interface-type interface-number

Parameter Description	Parameter	Description
		interface-type interface-number

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide In privileged EXEC mode, use the **show interfaces link-state-change** command to display the statistics of link status change on an interface.

In privileged EXEC mode, use the **clear link-state-change statistics** interface-type interface-number command to clear the statistics of link status change on an interface. If interface-type and interface-number are not specified, the statistics on all interfaces are cleared.

Configuration Examples The following example clears the statistics of link status change on the interface tenGigabitEthernet 0/1.

```
FS# clear link-state-change statistics tenGigabitEthernet 0/1
```

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.6 description

Use this command to configure the alias of interface. Use the **no** form of this command to restore the default

setting.
description string
no description

Parameter Description	Parameter	Description
	string	Interface alias

Defaults No alias is configured by default.

Command Mode Interface configuration mode.

Usage Guide Use **show interfaces** to display the interface information, including the alias.

Configuration Examples The following example configures the alias of interface.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# description GBIC-1
```

Related Commands	Command	Description
	show interfaces	Displays the interface information.

Platform N/A

Description

1.7 duplex

Use this command to specify the duplex mode for the interface. Use the **no** form of this command to restore the default setting.

duplex { auto | full | half }
no duplex

Parameter Description	Parameter	Description
	auto	Self-adaptive full duplex and half duplex
	full	Full duplex
	half	Half duplex

Defaults The default is **auto**,

Command Mode Interface configuration mode.

Description

Usage Guide The duplex mode is associated with the interface type. Use **show interfaces** to display the duplex mode of the interface

Configuration The following example specifies the duplex mode for the interface.

Examples FS(config-if)# duplex full

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.8 encapsulation dot1q

Use this command to encapsulate IEEE 802.1Q in interface mode. Use the **no** form of this command to restore the default setting.

encapsulation dot1Q VLANID

no encapsulation

Parameter Description	Parameter	Description
		VLANID

Defaults The default encapsulation protocol is 802.1Q , and no VLAN is encapsulated.

Command Mode Sub-interface configuration mode.

Usage Guide 802.1Q, an IEEE standard protocol, is used to enable communications between Layer 2 and Layer 3 devices with VLAN partition performed.
802.1Q can only be encapsulated on the sub Ethernet interface.

Configuration The following example encapsulates IEEE 802.1Q for interface 20, VLAN ID: 20.

Examples FS(config)# interface fastEthernet 0/0.20
FS(config-subif)# encapsulation dot1Q 20

Related Commands	Command	Description
		N/A

Prompt Multiple sub-interfaces configured with the same VLAN are not permitted in some products.

Configuration of multiple subinterfaces with the same vlan id (1) is not permitted.
This vlan id is already configured on interface GigabitEthernet 0/1.

1.9 errdisable recovery

Use this command to recover the interface in violation.

errdisable recovery [**interval** time | **cause** link-state]

Parameter Description	Parameter	Description
	interval time	(Optional) Time for the command to take effect. The range is from 30 to 86,400 seconds.
	cause link-state	(Optional) Recover the interface in violation due to REUP link tracking group.

Defaults N/A

Command Mode Global configuration mode, privileged EXEC mode

Usage Guide Use the **show interfaces status err-disable** command to check the violation causes and recover the port after network troubleshooting.

Configuration Examples The following example recovers the violation interface.

```
FS(config)# errdisable recovery
FS(config)# errdisable recovery cause link-state
FS(config)# end
```

Related Commands	Command	Description
	show interfaces status err-disable	Displays the violation information

Platform Description N/A.

1.10 ethernet-port counter sample-period

Use this command to configure the statistical value sampling period of an Ethernet port.

ethernet-port counter sample-period [seconds]

Parameter Description	Parameter	Description
	seconds	Statistical value sampling period of an Ethernet port in seconds.

Defaults The default value is 5 seconds.

Command Mode Global configuration mode

Default Level 14

Usage Guide Note that a shorter sampling period indicates higher system resource consumption. After completing the configuration, check the CPU usage.

Configuration The following example configures the statistical value sampling period of an Ethernet port to 1 second.

```
Examples
FS(config)# ethernet-port counter sample-period 1
FS(config)# end
```

1.11 ethernet-subport counter route-sample-period

Use this command to configure the statistical value sampling period of an Ethernet sub-port. Use the **no** form of this command to restore the default setting.

ethernet-subport counter route-sample-period [seconds]
no ethernet-subport counter route-sample-period

Parameter Description	Parameter	Description
	seconds	Statistical value sampling period of an Ethernet sub-port in seconds.

Defaults The default value is 5 seconds.

Command Mode Global configuration mode

Default Level 14

Usage Guide Note that a shorter sampling period indicates higher system resource consumption. After completing the configuration, check the CPU usage.

Configuration The following example configures the statistical value sampling period of an Ethernet sub-port to 1 second.

```
Examples
FS(config)#ethernet-subport counter route-sample-period 1
FS(config)# end
```

1.12 ethernet-port mtu

Use this command to globally set the MTU supported on the Ethernet interface.

ethernet-port mtu num

Parameter Description	Parameter	Description
	num	64 to 9216 (or 65536, which varies by products)

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide This command is used to globally set the maximum transmission unit (MTU) supported on the Ethernet interface. Some chips do not support interface-based MTU configuration, but support only the global Ethernet interface-based MTU.

Configuration Examples The following example globally sets the MTU supported on Ethernet interface to 1200.

```
FS(config)# ethernet-port mtu 1200
```

Related Commands

Command	Description
show interfaces	Displays the interface information.

Platform Description N/A

1.13 fec mode

Use this command to enable or disable the FEC function.

fec mode {rs | none | auto}

Use the **no** form of this command to restore the default value.

no fec mode

Parameter Description

Parameter	Description
rs	Indicates the RS mode for enabling the FEC function, which is supported by 100 Gbps ports.
base-r	Indicates the base-r mode for enabling the FEC function.
none	Disables the FEC function.
auto	Indicates FEC function self-adaption, that is, the system determines whether to enable the FEC function based on the optical module and rate.

Defaults The default configuration depends on the product model.

Command Mode Interface configuration mode

Default Level 14

Usage Guide When one end runs FEC function, the other end should enable it, too.
 On the premise of not affecting the negotiation status of the two ends, we suggest you NOT to:

- enable FEC function on the QSFP28-100G-LR4 optical module, on which FEC function is disabled by default.
- disable FEC function on QSFP28 modules (except QSFP28-100G-LR4), on which FEC function is enabled by default.

Configuration The following example forcibly enables the FEC function on Interface HundredGigabitEthernet 1/1.

```
FS(config)# interface HundredGigabitEthernet 1/1
FS(config-if- HundredGigabitEthernet 1/1)# fec mode rs
```

The following example forcibly enables the FEC function on Interface TFGigabitEthernet 2/1.

```
FS(config)# interface TFGigabitEthernet 2/1
FS(config-if- TFGigabitEthernet 2/1)# fec mode base-r
```

Related Commands	Command	Description
	show run	Displays the FEC configuration of port

1.14 flowcontrol

Use this command to enable or disable the flow control. Use the **no** form of this command to restore the default setting.

flowcontrol { auto | off | on }
no flowcontrol

Parameter Description	Parameter	Description
	auto	Self-negotiates the flow control.
	off	Disables the flow control.
	on	Enables the flow control.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide Some products do not support asymmetric flow control, send and receive parameters. Use the **show interfaces**

command to display the flow control configuration.

Configuration The following example enables flow control on fastEthernet port 1/1.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# flowcontrol on
```

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.15 flow-statistics include-interframe enable

Use this command to include the interframe gap in the flow statistics.

flow-statistics include-interframe enable

Parameter Description	Parameter	Description
		N/A

Defaults N/A

Command Mode Any CLI mode

Usage Guide It should be noted that after you run this command, all port rates are cleared and then recounted.

Configuration The following example enables including of the interframe gap in the flow statistics.

Examples

```
FS(config)# flow-statistics include-interframe enable
FS(config)# end
```

Related Commands	Command	Description
		N/A

Platform N/A

Description

1.16 negotiation mode

Use this command to enable or disable auto-negotiation mode. Use the **no** form of this command to restore the default setting.

negotiation mode { on | off }

no negotiation mode

Parameter	Parameter	Description
Description	on	Enables auto-negotiation.
	off	Disables auto-negotiation.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide In general, the auto-negotiation status is determined by interface speed, duplex, flow control and auto-negotiation factor mode.

Configuration Examples The following example enables auto-negotiation mode on interface GigabitEthernet 1/1.

```
FS(config)# interface GigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# negotiation mode on
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.17 interface

Use this command to enter the interface configuration mode.

interface interface-type interface-number

Parameter	Parameter	Description
Description	interface-type	The interface type.
	interface-number	The interface ID.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to enter interface configuration mode. The user can modify the interface configuration next,

Configuration The following example enters configuration mode on Aggregateport 1.

```
FS(config)# interface Aggregateport 1
FS(config-if-Aggregateport 1)#
```

The following example enters configuration mode on GigabitEthernet 1/2.

```
FS(config)# interface GigabitEthernet 1/2
FS(config-if-GigabitEthernet 1/2)#
```

The following example configuration mode on VLAN 1.

```
FS(config)# interface vlan 1
FS(config-if-VLAN 1)#
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.18 interface range

Use this command to enter interface configuration mode on multiple interfaces.

```
interface range { port-range | macro macro_name }
```

Use this command to define the macro name of the **interface range** command.

```
define interface-range macro_name
```

Parameter Description

Parameter	Description
port-range	The interface type and ID range, entered in the form of interface-type slot-number/interface-number. The interface can be either an Ethernet physical interface or a loopback interface.
macro macro_name	The macro name which represents the interface range.

Defaults The **interface range** command is disabled by default.

Command Mode Global configuration mode

Usage Guide Use the define interface-range command to define a range of interfaces as the macro name and then use the **interface range macro macro_name** command to enter interface configuration mode on multiple interfaces.

Configuration Examples The following example enters interface configuration mode on multiple interfaces by setting the interface range.

```
FS(config)# interface range gigabitEthernet 0/0, 0/2
FS(config-if-range)# bandwidth 100
```

The following example enters interface configuration mode on multiple interfaces by defining the macro name.

```
FS(config)# define interface-range route1 gigabitEthernet 0/0-2
```

```
FS(config)# interface range macro route1
FS(config-if-range)# bandwidth 100
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

1.19 load-interval

Use this command to set the interval for calculating load on the interface. Use the **no** form of this command to restore the default setting.

load-interval seconds
no load-interval

Parameter Description

Parameter	Description
seconds	In the range from 5 to 600 in the unit of seconds.

Defaults The default is 10.

Command Mode Interface configuration mode

Usage Guide This command is used to set the interval for calculating load on the interface. In general, the numbers of incoming and outgoing packets and bytes are calculated every 10 seconds. For example, if the parameter is set to 180 seconds, the following outcome is displayed when the **show interface gigabitEthernet 0/1** command is run.

```
3 minutes input rate 15 bits/sec, 0 packets/sec
3 minutes output rate 14 bits/sec, 0 packets/sec
```

Configuration Examples The following example sets the interval for calculating load on interface GigabitEthernet 0/1 to 180 seconds.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# load-interval 180
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

1.20 logging

Use this command to print information on the interface.

logging [link-updown | error-frame | link-dither | res-lack-frame | crc-frame]

Parameter Description	Parameter	Description
	link-updown	Prints the status change information.
	error-frame	Prints the error frame information.
	link-dither	Prints the port flapping information.
	res-lack-frame	Prints the error frame information received by an interface due to lack of resource.
	crc-frame	Prints information indicating CRC failures.

Defaults This function is enabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example prints information on the interface.

```
FS(config)# logging link-updown
FS(config)# logging error-frame
FS(config)# logging link-dither
FS(config)# logging res-lack-frame
FS(config)# logging crc-frame
```

Related Commands	Command	Description
	N/A	N/A

Prompt

When the interface status changes:
 %LINK-3-UPDOWN: Interface GigabitEthernet 0/0, changed state to up.
 %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet 0/0, changed state to up.

When the interface receives error frame:
 %PORT-3-ERR_FRAME: Received error frames on interface GigabitEthernet 0/0. Please check the physical link.

When the interface flaps:
 %LINK-4-DITHER: The state of Interface GigabitEthernet 0/1 is astable. Please check the physical link.
 %LINK-4-DITHER: The state of interface GigabitEthernet 0/1 is astable and the interface will be shutdown.Please check the physical link

When the interface receive error frame information due to lack of resource:
 % PORT-3-DROP_FRAME: No more ingress buffer frames has been detected on interface GigabitEthernet 0/1. (no buffer frames: 10)

1.21 mac-address

Use this command to set MAC address on the interface. Use the no form of this command to disable this function.

mac-address H.H.H

no mac-address

Parameter Description	Parameter	Description
	H.H.H	Indicates MAC address.

Defaults N/A

Command Mode Interface configuration mode

Usage Guide By default, each Ethernet interface has a globally unique MAC address. The MAC addresses of Ethernet interfaces can be modified if required. However, MAC addresses in the same LAN must be unique. This command is supported only on L3 Ethernet ports and SVIs of some models.

Configuration Examples The following example displays how to configure MAC address on an Ethernet interface.

```
FS(config)# interface fastethernet 0/0
FS(config-if)# mac-address 00d0:f8fb:110d
```

Related Commands	Command	Description
	N/A	N/A

Prompt When the MAC address is invalid:
% Malformed hex mac address.

1.22 mtu

Use this command to set the MTU supported on the interface.

mtu num

Parameter Description	Parameter	Description
	num	64 to 9216 (or 65536, which varies by products)

Defaults The default is 1500.

Command Mode Interface configuration mode.

Usage Guide This command is used to set the maximum transmission unit (MTU) supported on the interface.

Configuration The following example sets the MTU supported on interface gigabitethernet 1/1 to 9216.

Examples
 FS(config)# interface gigabitethernet 1/1
 FS(config-if)# mtu 9216

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.23 mtu forwarding

Use this command to set the global MTU and IP MTU.

mtu forwarding num

Parameter Description	Parameter	Description
		num

Defaults The default value is **1,500**.

Command Mode Global configuration mode

Default Level 14

Usage Guide When the global interface link MTU changes, the IP MTU of an interface automatically changes to be consistent with the link MTU of the interface.

Configuration The following example sets the global MTU to **9,000**.

Examples
 FS(config)# **mtu forwarding 9000**

Related Commands	Command	Description
		show interfaces [interface-type interface-number] mtu forwarding

1.24 physical-port dither protect

Use this command to enable oscillation protection on the port.

physical-port dither protect

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode

Usage Guide After you configure the **physical-port dither protect** command, the port will be shut down when the oscillation occurs for certain times.

.....
 If oscillation occurs on the port for 6 times within 2 seconds, a syslog will be printed. If syslog is printed for 10 consecutive times, the port will be shut down. If oscillation occurs on the port for over 10 times within 10 seconds, a syslog will be printed but the port will not be shut down.

Configuration Examples The following example enables oscillation protection on the port.

```
FS(config)# physical-port dither protect
```

Related Commands	Command	Description
	N/A	N/A

Prompt When the oscillation occurs:

1. If oscillation occurs on the port for 6 times within 2 seconds, or oscillation occurs on the port for over 10 times within 10 seconds
 %LINK-4-DITHER: The state of Interface GigabitEthernet 0/1 is astable. Please check the physical link.
2. The final time if the port sends oscillation for 10 times within 20 seconds
 %LINK-4-DITHER: The state of interface GigabitEthernet 0/1 is astable and the interface will be shutdown.Please check the physical link.

1.25 physical-port dither period

Use this command to enable oscillation detection on the port.

physical-port dither period seconds **threshold** number **period-times** times

Parameter Description	Parameter	Description
	seconds	Specifies the duration of a period in the unit of second ranging from 2 to 60.
	number	Specifies the amount of detected flapping for a period. Once the configured value is reached for certain consecutive periods, operations may be taken against the port. The configurable value is from 5 to 10.
	times	Specifies the number of successive periods for which the threshold is reached. You can choose any number from 1 to 10.

Defaults The default value of seconds is 2, threshold 6, and period times 10.

Command Mode Global configuration mode

Usage Guide Before this command is performed, by default, a port would be shut down if 6 or more oscillations occur within a 2s period and 10 such periods happen consecutively, or if 10 oscillations occur within 10s. After the **physical-port dither period** command is run, the mechanism of “10 oscillations within 10s” stops working.

Configuration Examples The following example configures oscillation detection on the port.

```
FS(config)# physical-port dither period 3 threshold 5 period-times 4
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

1.26 port speed-mode

Use this command to configure the work rate mode of a 25 Gbps port.

```
port speed-mode {25G | 10G }
```

Parameter Description

Parameter	Description
25G	Indicates that a 25 Gbps port works in 25 Gbps rate mode.
10G	Indicates that a 25 Gbps port works in 10 Gbps rate mode.

Defaults A 25 Gbps port works in 25 Gbps rate mode by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. Only 25 Gbps ports support this configuration. The four consecutive 25 Gbps ports of the same slot need to be set to work in the same rate mode.
2. Only 25 Gbps ports that work in the same rate mode can be added to the same aggregation group.
3. The **default interface** command will not clear the **port speed-mode** configuration of 25 Gbps ports.

Configuration Examples The following example configures Interfaces TFGigabitEthernet 2/1 through TFGigabitEthernet 2/4 to work in 10 Gbps rate mode.

```
FS(config)# interface TFGigabitEthernet 2/2
FS(config-if-TFGigabitEthernet 2/2)# port speed-mode 10G
Warning: Ports Tf2/1 – Tf2/4 will be set speed mode 10G. Continue? [Y/N]:Y
FS(config-if-TFGigabitEthernet 2/2)# end
```

1.27 port-detect crc-frame errdisable

Use this command to get a port disabled if a continuous increase in CRC errors is detected. Use the **no** form of this command to restore the default setting.

port-detect crc-frame errdisable
no port-detect crc-frame errdisable

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide This command is supported on Ethernet ports.
 Configuration of this feature on an Ethernet port does not change after the port joins an AP.

Configuration Examples The following example get a port err-disabled.

```
FS(config)# interface GigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# port-detect crc-frame errdisable
```

Related Commands

Command	Description
show running-config	Displays the protected ports route-deny configuration.

Platform Description N/A

1.28 port-detect crc-frame period-times

Use this command to configure the number of periods. During these periods, if a continuous increase in CRC errors is detected on a port, warnings are generated. Use the **no** form of this command to restore the default setting.

port-detect crc-frame period-times num
no port-detect crc-frame period-times

Parameter Description	Parameter	Description
	num	Configures the number of periods. The range is 1 to 100.

Defaults The default number of periods is 5. That is, warnings are generated if the number of CRC errors increases for 5 consecutive periods on it.

Command Mode Interface configuration mode.

Usage Guide Warning Syslogs are printed if the configured number of periods is reached. And the related ports are shut down if the **port-detect crc-frame errdisable** command is run.
 This command is supported on Ethernet ports.
 Configuration of this feature on an Ethernet port does not change after the port joins an AP.

Configuration Examples The following example sets the number of periods to 10.

```
FS(config)# interface GigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# port-detect crc-frame period-times 10
```

Related Commands	Command	Description
	show running-config	Displays the protected ports route-deny configuration.

Platform Description N/A

1.29 protected-ports route-deny

Use this command to configure L3 routing between the protected ports. Use the **no** form of this command to restore the default setting.

protected-ports route-deny
no protected-ports route-deny

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default..

Command Mode Global configuration mode.

Usage Guide The ports that are set as the protected ports can route on L3. Use this command to deny the L3 communication between protected ports. Use the **show running-config** command to display configuration.

Configuration The following example configures L3 routing between the protected ports.

```
Examples FS(config)# protected-ports route-deny
```

Related Commands	Command	Description
	show running-config	Displays the protected ports route-deny configuration.

Platform N/A

Description

1.30 route-sample enable

Use this command to enable the sampling function on SVI or sub-interface.

route-sample enable

no route-sample enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide The function is disabled by default. You can enable it for the message statistics on SVI or sub-interface. When the **route-sample enable** command is configured on an ip-sample enabled sub-interface, the ip-sample enable configuration will be cleared first and then the route-sample enable configuration will take effect.

Configuration The following example enables the sampling function on SVI.

```
Examples FS(config)# interface vlan 1
FS(config-if-VLAN 1)# route-sample enable
```

Related Commands	Command	Description

Platform N/A

Description

1.31 show split summary

Use this command to display split information.

show split summary

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode All CLI user modes

Default Level 14

Usage Guide This command displays split information of all splittable ports.

Configuration

Examples The following example displays the split information about Interface GigabitEthernet 0/1.

```

FS#show split summary
Port          SpliteStatus SplitPorts
Hu1/1         merged       Hu1/1:1   Hu1/1:2   Hu1/1:3   Hu1/1:4
Hu1/2         merged       Hu1/2:1   Hu1/2:2   Hu1/2:3   Hu1/2:4
Hu1/3         merged       Hu1/3:1   Hu1/3:2   Hu1/3:3   Hu1/3:4
Hu1/4         merged       Hu1/4:1   Hu1/4:2   Hu1/4:3   Hu1/4:4
Hu1/5         merged       Hu1/5:1   Hu1/5:2   Hu1/5:3   Hu1/5:4
Hu1/6         merged       Hu1/6:1   Hu1/6:2   Hu1/6:3   Hu1/6:4
Hu1/7         merged       Hu1/7:1   Hu1/7:2   Hu1/7:3   Hu1/7:4
Hu1/8         merged       Hu1/8:1   Hu1/8:2   Hu1/8:3   Hu1/8:4
Hu3/25        merged       Hu3/25:1  Hu3/25:2  Hu3/25:3  Hu3/25:4
Hu3/26        merged       Hu3/26:1  Hu3/26:2  Hu3/26:3  Hu3/26:4
    
```

Note: Port indicates the splittable master port, SpliteStatus indicates the current split status, and SplitPorts indicates member ports of the splittable port after splitting.

1.32 show vlans

Use this command to display the sub interface information of VLAN in privileged EXEC mode.

show vlans [VLANID]

Parameter Description	Parameter	Description
	VLANID	Indicates ID of a VLAN.

Defaults

Command All CLI user mode
Mode

Usage Guide N/A

Configuration FS# show vlans
Examples Virtual LAN ID: 3 (IEEE 802.1Q Encapsulation)
 VLAN Interface FastEthernet 0/0.1
 IP address: 1.1.1.1
 Received:30 packets,
 Transmitted: 30 packets
 Virtual LAN ID: 4 (IEEE 802.1Q Encapsulation)
 VLAN Interface FastEthernet 0/0.2
 IP address: 1.1.2.1
 Received:0 packets,
 Transmitted: 0 packets
 Transmitted: 0 packets
 Parameters:
 virtual LAN ID: VLAN ID
 vLAN Interface: sub-interface of VLAN
 Address: sub-interface address
 Received: number of received packets
 Transmitted: number of transmitted packets

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.33 shutdown

Use this command to disable an interface. Use the **no** form of this command to enable a disabled port.

shutdown
no shutdown

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Interface configuration mode
Mode

Usage Guide Use this command to stop the forwarding on the interface (Gigabit Ethernet interface, Aggregate port or SVI). You can enable the port with the **no shutdown** command. If you shut down the interface, the configuration of the interface exists, but does not take effect. You can view the interface status by using the **show interfaces** command.

If you use the script to run no shutdown frequently and rapidly, the system may prompt the interface status reversal.

Configuration The following example disables an interface.

Examples FS(config)# interface aggregateport 1
 FS(config-if)# shutdown

The following example enables an interface.

FS(config)# interface aggregateport 1
 FS(config-if)# no shutdown

Related Commands

Command	Description
clear interface	Resets the hardware.
show interfaces	Displays the interface information.

Platform N/A
Description

1.34 snmp trap link-status

Use this command to send LinkTrap on a port. Use the **no** form of this command to disable this function.

snmp trap link-status

no snmp trap link-status

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default

Command Mode Interface configuration mode.

Usage Guide For an interface (for instance, Ethernet interface, AP interface, and SVI interface), this command sets whether to send LinkTrap on the interface. If the function is enabled, the SNMP sends the LinkTrap when the link status of the interface changes.

Configuration The following example disables the interface from sending LinkTrap on the interface.

```
Examples
FS(config)# interface gigabitEthernet 1/1
FS(config-if)# no snmp trap link-status
```

The following example enables the interface to forward Link trap.

```
FS(config)# interface gigabitEthernet 1/1
FS(config-if)# snmp trap link-status
```

Related Commands

Command	Description
snmp trap link-status	Enables the interface to send LinkTrap on the interface.
no snmp trap link-status	Disables the interface from sending LinkTrap on the interface.

Platform N/A

Description

1.35 snmp-server if-index persist

Use this command to set the interface index persistence. The interface index remains the same after the device is restarted.

snmp-server if-index persist

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide After this command is configured, all interface indexes are saved in the configuration file. After the device is restarted, interface indexes remain the same as before.

Configuration The following example enables the interface index persistence.

```
Examples
FS(config)# snmp-server if-index persist
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.36 snmp-server if-name enhance

Enable the enhanced name display for interfaces in the standard MIB node and for syslog of port status and LACP status. The interface name in the standard MIB node and syslog of port status and LACP status do not contain any space, and the ifName node shows the full name of the interface. By default, the interface name in the standard MIB node and syslog of port status and LACP status contain the space, and the ifName node shows the short name of the interface.

snmp-server if-name enhance

Parameter Description

Parameter	Description
-	-

Defaults This function is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide Run the **snmp-server if-name enhance** command, and then use SNMP to read the interface name in the standard MIB node, such as ifDescr and ifName. The result is the full name of interface without space (like GigabitEthernet0/1)

Configuration 1: Enable the enhanced name display for interfaces in the standard MIB node.

Examples FS(config)# snmp-server if-name enhance

1.37 speed

Use this command to configure the speed on the port. Use the **no** form of this command to restore the default setting.

speed [10 | 100 | 1000 | 10G | 40G | 100G |auto]

Parameter Description

Parameter	Description
10	The transmission rate of the interface is 10Mbps.
100	The transmission rate of the interface is 100Mbps.
1000	The transmission rate of the interface is 1000Mbps.
10G	The transmission rate of the interface is 10Gbps.
40G	The transmission rate of the interface is 40Gbps.
100G	The transmission rate of the interface is 100Gbps.
auto	Self-adaptive

Defaults The default is **auto**.

Command Interface configuration mode.
Mode

Usage Guide If an interface is the member of an aggregate port, the rate of the interface depends on the rate of the aggregate port. You can set the rate of the interface, but it does not take effect until the interface exits the aggregate port. Use **show interfaces** to display configuration. The rate varies by interface types. For example, you cannot set the rate of a SFP interface to 10M or 100M.

Configuration The following example sets the speed on interface gigabitethernet 1/1 to 100Mbps.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# speed 100
```

Related Commands

Command	Description
show interfaces	Displays the interface information.

Platform N/A
Description

1.38 split compatible mode

Use this command to configure the compatible naming mode for split member ports in global configuration mode. Use the **no** form of this command to disable the compatible naming mode. Use the **default** form of this command to restore the default setting.

- split compatible mode**
- no split compatible mode**
- default split compatible mode**

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, the compatible naming mode is disabled.

Command Global configuration mode.
Mode

Usage Guide The configuration takes effect after a device restart. After the device restart, the split member ports will lose their original configurations and need to be re-configured.
 Before the configuration takes effect, the port ID in a split member port's name is in the format of **slot ID/port ID:split member port ID**.
 After the configuration takes effect, the port ID is in the format of **slot ID/port ID/split member port ID**.
 In VSU mode, this command is not supported and the configuration will not take effect.

Configuration The following example configures the compatible naming mode.

```

Examples
FS(config)#split compatible mode
%Warning: please save configuration and restart the device for the configuration of split compatible mode to take effect!
    
```

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.39 split interface

Use this command to split a master interface into multiple sub-interfaces. Use the **no** form of this command to restore the default setting.

split interface interface-type interface-number [**split-type** split-type]

no split interface interface-type interface-number

Parameter Description	Parameter	Description
		interface-number
	interface-type	Specifies the interface type.
	split-type	Specifies the split type.

Defaults By default, the interface is in the combination mode.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example splits the 100G interface 0/65 into four 25G interfaces.

```

Examples
FS(config-if)# split interface forty-giga 0/65
    
```

Related Commands	Command	Description
		show interfaces

Platform N/A

Description

1.40 switchport

Use this command to configure a Layer 3 interface. Use the **no** form of this command to restore the default settings.

switchport

no switchport

Parameter Description

Parameter	Description
N/A	N/A

Defaults All the interfaces are in Layer 2 mode by default.

Command Mode Interface configuration mode.

Usage Guide This command is valid only for physical interfaces. The **switchport** command is used to disable the interface and re-enable it. In this status, the device will send the information to indicate the connect status. If the interface is changed to Layer 3 mode from Layer 2, all the attributes in Layer 2 mode will be cleared.

Configuration Examples The following example configures a Layer 3 interface.

```
FS(config-if)# switchport
```

Related Commands

Command	Description
show interfaces	Displays the interface information.

Platform Description N/A

1.41 switchport access

Use this command to configure an interface as a statics access port and add it to a VLAN. Use the **no** form of this command to restore the default setting.

switchport access vlan vlan-id

no switchport access vlan

Parameter Description

Parameter	Description
vlan-id	The VLAN ID at which the port to be added.

Defaults By default, the switch port is an access port and the VLAN is VLAN 1.

Command Interface configuration mode.

Mode

Usage Guide Enter one VLAN ID. The system will create a new one and add the interface to the VLAN if you enter a new VLAN ID. If the VLAN ID already exists, the command adds the interface to the VLAN.
If the port is a trunk port, the operation does not take effect.

Configuration The following example configures interface gigabitethernet 1/1 as a statistic access port and adds it to VLAN 2.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# switchport access vlan 2
```

Related Commands

Command	Description
switchport mode	Configures the interface as Layer 2 mode (switch port mode).
switchport trunk	Configures a native VLAN and the allowed-VLAN list for the trunkport.

Platform N/A

Description

1.42 switchport mode

Use this command to specify a L2 interface (switch port) mode. You can specify this interface to be an access port or a trunk port or an 802.1Q tunnel. Use the **no** form of this command to restore the default setting.

switchport mode { access | trunk }

no switchport mode

Parameter Description

Parameter	Description
access	Configures the switch port as an access port.
trunk	Configures the switch port as a trunk port.

Defaults The default is **access**.

Command Mode Interface configuration mode.

Usage Guide If a switch port mode is access port, it can be the member port of only one VLAN. Use **switchport access vlan** to specify the member of the VLAN.

A trunk port can be the member port of various VLANs defined by the allowed-VLAN list. The allowed VLAN list of the interface determines the VLANs to which the interface may belong. The trunk port is the member of all the VLANs in the allowed VLAN list. Use **switchport trunk** to define the allowed-VLANs list.

Configuration The following example specifies a L2 interface (switch port) mode.

Examples `FS(config-if)# switchport mode trunk`

Related Commands	Command	Description
	<code>switchport access</code>	Configures an interface as a statics access port and assigns it to a VLAN.
<code>switchport trunk</code>	Configures a native VLAN and the allowed-VLAN list for the trunk port.	

Platform N/A

Description

1.43 switchport protected

Use this command to configure the interface as the protected port. Use the **no** form of this command to restore the default setting.

switchport protected
no switchport protected

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide The ports that are set as the protected ports cannot switch on L2, but can route on L3. A protected port can communicate with an unprotected port. Use the **show interfaces** command to display configuration.

Configuration Examples The following example configures interface gigabitethernet 1/1 as a protected port.

```
FS(config)#interface gigabitethernet 1/1
FS(config-if)# switchport protected
```

Related Commands	Command	Description
	<code>show interfaces</code>	Displays the interface information.

Platform N/A

Description

1.44 switchport trunk

Use this command to specify a native VLAN and the allowed-VLAN list for the trunk port. Use the **no** form of this

command to restore the default setting.

switchport trunk { allowed vlan { all | [add | remove | except] vlan-list } | native vlan vlan-id }
no switchport trunk { allowed vlan | native vlan }

Parameter Description	Parameter	Description
	allowed vlan vlan-list	Configures the list of VLANs allowed on the trunk port. vlan-list can be a VLAN or a range of VLANs starting with the smaller VLAN ID and ending with the larger VLAN ID and being separated by hyphen, for example, 10 to 20. The segments can be separated with a comma (,), for example, 1 to 10, 20 to 25, 30, 33. all means that the allowed VLAN list contains all the supported VLANs; add means to add the specified VLAN list to the allowed VLAN list; remove means to remove the specified VLAN list from the allowed VLAN list; except means to add all the VLANs other than those in the specified VLAN list to the allowed VLAN list;
	native vlan vlan-id	Configures the native VLAN.

Defaults The allowed VLAN list is all, the Native VLAN is VLAN1.

Command Mode Interface configuration mode.

Usage Guide Native VLAN:
 A trunk port belongs to one native VLAN. A native VLAN means that the untagged packets received/sent on the trunk port belong to the VLAN. Obviously, the default VLAN ID of the interface (that is, the PVID in the IEEE 802.1Q) is the VLAN ID of the native VLAN. In addition, when frames belonging to the native VLAN are sent over the trunk port, they are untagged.
 Allowed-VLAN List:
 By default, a trunk port sends traffic to and received traffic from all VLANs (ID 1 to 4094). However, you can prevent the traffic from passing over the trunk by configuring allowed VLAN lists on a trunk.
 Use show interfaces switchport to display configuration.

Configuration Examples The following example removes port 1/15 from VLAN 2.

```
FS(config)# interface fastethernet 1/15
FS(config-if)# switchport trunk allowed vlan remove 2
FS(config-if)# end
FS# show interfaces fastethernet1/15 switchport
Switchport is enabled
Mode is trunk port
Access vlan is 1,Native vlan is 1
Protected is disabled
Vlan lists is
```

1,3-4094

Related Commands

Command	Description
show interfaces	Displays the interface information.
switchport access	Configures an interface as a statics access port and assigns it to a VLAN.

Platform N/A
Description

1.45 show interfaces

Use this command to display the interface information and optical module information.

show interfaces [interface-type interface-number] [**description** [up | down] | **switchport** | **trunk**]

Parameter Description

Parameter	Description
interface-id interface-number	Interface (including Ethernet interface, aggregate port, SVI or loopback interface).
description	The description of the interface, including the link status. up: statistics of up ports down: statistics of down ports
switchport	Layer 2 interface information.
trunk	Trunk port, applicable for physical port and aggregate port.

Defaults All interface information is displayed by default.

Command Mode Privileged EXEC mode.

Usage Guide This command is used to show all basic information if no parameter is specified.

Configuration Examples The following example displays the interface information when the Gi0/1 is a Trunk port.

```
SwitchA#show interfaces gigabitEthernet 0/1
Index(dec):1 (hex):1
GigabitEthernet 0/1 is DOWN , line protocol is DOWN
Hardware is Broadcom 5464 GigabitEthernet
Interface address is: no ip address
  MTU 1500 bytes, BW 1000000 Kbit
  Encapsulation protocol is Bridge, loopback not set
  Keepalive interval is 10 sec , set
  Carrier delay is 2 sec
  RXload is 1 ,Txload is 1
```

```

Queueing strategy: FIFO
  Output queue 0/0, 0 drops;
  Input queue 0/75, 0 drops
Switchport attributes:
  interface's description:""
  medium-type is copper
  lastchange time:0 Day: 0 Hour: 0 Minute:13 Second
  Priority is 0
  admin duplex mode is AUTO, oper duplex is Unknown
  admin speed is AUTO, oper speed is Unknown
flow receive control admin status is OFF,flow send control admin status is OFF,flow receive control oper status is
Unknown,flow send control oper status is Unknown
broadcast Storm Control is OFF,multicast Storm Control is OFF,unicast Storm Control is OFF
Port-type: trunk
  Native vlan:1
Allowed vlan lists:1-4094
Active vlan lists:1, 3-4
  5 minutes input rate 0 bits/sec, 0 packets/sec
  5 minutes output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer, 0 dropped
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
  0 packets output, 0 bytes, 0 underruns , 0 dropped
0 output errors, 0 collisions, 0 interface resets

```

The following example displays the interface information when the Gi0/1 is an Access port.

```

SwitchA#show interfaces gigabitEthernet 0/1
Index(dec):1 (hex):1
GigabitEthernet 0/1 is DOWN , line protocol is DOWN
Hardware is Broadcom 5464 GigabitEthernet
Interface address is: no ip address
  MTU 1500 bytes, BW 1000000 Kbit
  Encapsulation protocol is Bridge, loopback not set
  Keepalive interval is 10 sec , set
  Carrier delay is 2 sec
  RXload is 1 ,Txload is 1
  Queueing strategy: FIFO
    Output queue 0/0, 0 drops;
    Input queue 0/75, 0 drops
  Switchport attributes:
    interface's description:""
    medium-type is copper
    lastchange time:0 Day: 0 Hour: 0 Minute:13 Second
    Priority is 0

```

```

admin duplex mode is AUTO, oper duplex is Unknown
admin speed is AUTO, oper speed is Unknown
flow receive control admin status is OFF,flow send control admin status is OFF,flow receive control oper
status is Unknown,flow send control oper status is Unknown
broadcast Storm Control is OFF,multicast Storm Control is OFF,unicast Storm Control is OFF
Port-type: access
Vlan id : 2
  5 minutes input rate 0 bits/sec, 0 packets/sec
  5 minutes output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer, 0 dropped
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
    0 packets output, 0 bytes, 0 underruns , 0 dropped
0 output errors, 0 collisions, 0 interface resets

```

The following example displays the layer-2 interface information when the Gi0/1 is a Hybrid port.

```

SwitchA#show interfaces gigabitEthernet 0/1
Index(dec):1 (hex):1
GigabitEthernet 0/1 is DOWN , line protocol is DOWN
Hardware is Broadcom 5464 GigabitEthernet
Interface address is: no ip address
  MTU 1500 bytes, BW 1000000 Kbit
  Encapsulation protocol is Bridge, loopback not set
  Keepalive interval is 10 sec , set
  Carrier delay is 2 sec
  RXload is 1 ,Txload is 1
  Queueing strategy: FIFO
    Output queue 0/0, 0 drops;
    Input queue 0/75, 0 drops
  Switchport attributes:
    interface's description:""
    medium-type is copper
    lastchange time:0 Day: 0 Hour: 0 Minute:13 Second
    Priority is 0
    admin duplex mode is AUTO, oper duplex is Unknown
    admin speed is AUTO, oper speed is Unknown
    flow receive control admin status is OFF,flow send control admin status is OFF,flow receive control oper
status is Unknown,flow send control oper status is Unknown
broadcast Storm Control is OFF,multicast Storm Control is OFF,unicast Storm Control is OFF
Port-type: hybrid
Tagged vlan id:2
Untagged vlan id:none
  5 minutes input rate 0 bits/sec, 0 packets/sec
  5 minutes output rate 0 bits/sec, 0 packets/sec

```

```

0 packets input, 0 bytes, 0 no buffer, 0 dropped
Received 0 broadcasts, 0 runts, 0 giants
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 abort
0 packets output, 0 bytes, 0 underruns , 0 dropped
0 output errors, 0 collisions, 0 interface resets
    
```

The following example displays the layer-2 information of the Gi0/1.

```

FS# show interfacesgigabitEthernet 0/1 switchport
Interface Switchport ModeAccess Native Protected VLAN lists
-----
GigabitEthernet 0/1 enabled Access 11 Disabled ALL
    
```

Platform N/A

Description

1.46 show interfaces counters

Use this command to display the received and transmitted packet statistics.

show interfaces [interface-type interface-number] **counters** [**increment** | **error** | **rate** | **summary**] [**up** | **down**] [**nozero**]

Parameter Description	Parameter	Description
	interface-type interface-number	(Optional) The interface type and ID.
	increment	Displays the packet statistics increased during the last sample interval.
	error	Displays error packet statistics.
	rate	Displays packet receiving and transmitting rate.
	summary	Displays packet statistics summary.
	up	(Optional) Displays the up port statistics.
	down	(Optional) Displays the down port statistics.
	nozero	(Optional) Displays the statistics of ports whose statistics is not zero.

Defaults N/A

Command Mode All CLI user mode

Usage Guide If you do not specify an interface, the packet statistics on all interfaces are displayed.

Configuration The following example displays packet statistics on interface GigabitEthernet 0/1.

Examples

```

FS#show interfaces GigabitEthernet 0/1 counters
Interface : GigabitEthernet 0/1
    
```

```

5 minute input rate : 9144 bits/sec, 9 packets/sec
5 minute output rate : 1280 bits/sec, 1 packets/sec
Rxload : 1%
InOctets : 17310045
InPkts : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
InUcastPkts : 100
InMulticastPkts : 100
InBroadcastPkts : 800
Txload : 1%
OutOctets : 1282535
OutPkts : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
OutUcastPkts : 100
OutMulticastPkts : 100
OutBroadcastPkts : 800
Undersize packets : 0
Oversize packets : 0
collisions : 0
Fragments : 0
Jabbers : 0
CRC alignment errors : 0
AlignmentErrors : 0
FCSErrors : 0
dropped packet events (due to lack of resources): 0
packets received of length (in octets):
  64:46264
  65-127: 47427
  128-255: 3478
  256-511: 658
  512-1023: 18016
  1024-1518: 125
Packet increment in last sampling interval(5 seconds):
  InOctets : 10000
  InPkts : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
  InUcastPkts : 100
  InMulticastPkts : 100
  InBroadcastPkts : 800
  OutOctets : 10000
  OutPkts : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
  OutUcastPkts : 100
  OutMulticastPkts : 100

```

Note: Rxload refers to the receive bandwidth usage and Txload refers to the Tx bandwidth usage. InPkts is the total number of receive unicast, multicast and broadcast packets. OutPkts is the total number of transmit unicast, multicast and broadcast packets.

Packet increment in last sampling interval (5 seconds) represents the packet statistics increased during the last

sample interval (5 seconds).

The following example displays the packet statistics on interface GigabitEthernet 0/1 increased during the last sample interval.

```
FS#show interfaces GigabitEthernet 0/1 counters increment
Interface : GigabitEthernet 0/1
Packet increment in last sampling interval(5 seconds):
  InOctets      : 10000
  InPkts       : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
  InUcastPkts  : 100
  InMulticastPkts : 100
  InBroadcastPkts : 800
  OutOctets    : 10000
  OutPkts     : 1000(Unicast: 10%, Multicast: 10%, Broadcast: 80%)
  OutUcastPkts : 100
  OutMulticastPkts : 100
```

The following example displays error packet statistics on interface GigabitEthernet 0/1.

```
FS#show interfaces GigabitEthernet 0/1 counters increment
Interface  UnderSize      OverSize      Collisions    Fragments
-----
Gi0/1      0              0            0             0
Interface  Jabbers        CRC-Align-Err Align-Err     FCS-Err
-----
Gi0/1      0              0            0             0
```

Note:

UnderSize is the number of valid packets smaller than 64 bytes.

OverSize is the number of valid packets smaller than 1518 bytes.

Collisions is the number of colliding transmit packets.

Fragments is the number of packets with CRC error or frame alignment error which are smaller than 64 bytes.

Jabbers is the number of packets with CRC error or frame alignment error which are smaller than 1518 bytes.

CRC-Align-Err is the number of receive packets with CRC error.

Align_Err is the number of receive packets with frame alignment error.

FCS-Err is the number of receive packets with FCS error.

The following example displays packet receiving and transmitting rate on interface GigabitEthernet 0/1.

```
FS#show interface gigabitEthernet 0/1 counters rate
Interface  Sampling Time      Input Rate      Input Rate      Output Rate
Output Rate
                                     (bits/sec)      (packets/sec)   (bits/sec)
(packets/sec)
-----
Gi0/1      5 seconds          23391          23              124
0
```

Note: Sampling Time is the time when packets are sampled. Input rate is packet receiving rate and Output rate is

packet transmitting rate.

The following example displays packet statistics summary on interface GigabitEthernet 0/1.

```
FS#show interface gigabitEthernet 0/1 counters summary
Interface      InOctets      InUcastPkts   InMulticastPkts  InBroadcastPkts
-----
Gi0/1          1475788005    1389           45880503          11886621
Interface      OutOctets      OutUcastPkts   OutMulticastPkts  OutBroadcastPkts
-----
Gi0/1          6667915       6382           31629              13410
```

Note:

InOctets is the total number of packets received on the interface. InUcastPkts is the number of unicast packets received on the interface. InMulticastPkts is the number of multicast packets received on the interface. InBroadcastPkts is the number of broadcast packets received on the interface.

OutOctets is the total number of packets transmitted on the interface. OutUcastPkts is the number of unicast packets transmitted on the interface. OutMulticastPkts is the number of multicast packets transmitted on the interface. OutBroadcastPkts is the number of broadcast packets transmitted on the interface.

The following example displays the statistics of discarded packets on interface tenGigabitEthernet 0/1

```
FS # #show interface gigabitEthernet 1/0/6 counters drops
Interface : GigabitEthernet 1/0/6
Input dropped packets           : 2453
Input no buffer packets         : 0
Input qos dropped packets       : 0
Output dropped packets          : 0
Output no buffer packets        : 0
Forwarding entry dropped packets : 2453
```

Input dropped: number of discarded packets, not including the packets discarded due to qos/resource limits

Input no buffer: number of discarded packets when receiving due to resource limits

Input qos dropped: number of packets discarded due to qos limits

Output dropped packets: number of discarded packets when forwarding

Output no buffer: number of packets failed to be forwarded due to resource limit

Forwarding entry dropped: number of discarded packets when forwarding, including inflow and outflow direction. This may not be supported on some products

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

1.47 show interfaces counters rate physical-layer

Use this command to packet rate count on the physical layer.

show interfaces [interface-type interface-number] **counters rate physical-layer** [up | down] [nozero]

Parameter Description	Parameter	Description
	interface-type interface-number	The interface type and ID. The default is all interfaces.
	up	(Optional) Displays the port up statistics.
	down	(Optional) Displays the port down statistics.
	nozero	(Optional) Displays the port statistics that is not zero.

Defaults N/A

Command Mode Any CLI user Mode

Usage Guide If you do not specify an interface, the link state statistics of all interfaces are displayed.

Configuration Examples The following example displays the rate statistics of interface TenGigabitEthernet 0/1.

```
FS(config-if-TenGigabitEthernet 0/1)#show interface tenGigabitEthernet 0/1 counters rate physical-layer
Interface      Sampling Time      Input Rate          Input Rate          Output Rate
Output Rate
                (bits/sec)         (packets/sec)      (bits/sec)
(packets/sec)
-----
Te0/1          5 seconds          655557576          301267              655557132
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.48 show interfaces link-state-change statistics

Use this command to display the link state change statistics, including the time and count.

show interfaces [interface-type interface-number] **link-state-change statistics**

Parameter Description	Parameter	Description
	interface-type interface-number	The interface type and ID.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If you do not specify an interface, the link state statistics of all interfaces are displayed.

```

Configuration FS#show int link-state-change statistics
Examples
Interface      Link state  Link state change times  Last change time  Link-dither begin  Link-dither end
-----
Te0/1          down        0                          2018-05-05 11:07:45  none
none
    
```

Note:

Link state change times: Change times of link state. Use the **clear link-state-change statistics** interface-type interface-number command to clear the times.

Last change time: Time of last link state change

Link-dither begin: Start time of the recent frequent link oscillation, none indicates no frequent oscillation

Link-dither end: End time of the recent frequent link oscillation, none indicates no frequent oscillation

Frequent oscillation: oscillation occurs for 6 times within 2 seconds

When frequent oscillation occurs, the detection time is recorded as the start time, and continue the detection in 2 seconds. When frequent oscillation can not be detected or the port is shut down, the detection time is recorded as the end time.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.49 show interface mtu forwarding

Use this command to display MTU settings.

show interface [interface-type interface-number] **mtu forwarding**

Parameter Description	Parameter	Description
	interface-type interface-number	(Optional) The interface type and ID.

Defaults N/A

Command Mode All CLI user mode

Usage Guide The changes of link MTU configured globally will cause the changes of IP MTU of interfaces. IP MTU of interfaces will keep consistent with the link MTU.

Configuration Examples The following example displays the MTU information of interface hundredGigabitEthernet 1/1/1.

Interface	Mtu	IP Mtu

HundredGigabitEthernet 1/1	1500	NA

Note: IP MTU is displayed as NA on a switch port

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.50 show interfaces status

Use this command to display interface status information.

show interfaces [interface-type interface-number] **status**

Parameter Description	Parameter	Description
	interface-type interface-number	The interface type and ID.
	status	Displays interface status information, including speed and duplex.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If you do not specify an interface, the status information of all interfaces is displayed.

Configuration Examples The following example displays the status information of interface GigabitEthernet 0/1.

```
FS#show interfaces GigabitEthernet 0/1 status
```

Interface	Status	Vlan	Duplex	Speed	Type

GigabitEthernet 0/1	up	1	Full	1000M	copper

Related Commands	Command	Description

N/A	N/A
-----	-----

Platform N/A
Description

1.51 show interfaces status err-disable

Use this command to display the interface violation status.

show interfaces [interface-type interface-number] **status err-disable**

Parameter Description

Parameter	Description
interface-type interface-number	(Optional) The interface type and ID.

Defaults

Command All CLI user modes
Mode

Usage Guide If you do not specify an interface, violation status of all interfaces is displayed.

Configuration The following example displays the violation status of interface GigabitEthernet 0/1.

Examples

```
FS#show interface gigabitEthernet 0/1 status err-disabled
Interface                Status      Reason
-----
GigabitEthernet 0/1      err-disabled  BPDU Guard
```

The violation status is displayed as **err-disabled**.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

1.52 show interfaces transceiver

Use this command to display transceiver information of the interface.

show interfaces [interface-type interface-number] **transceiver** [**alarm** | **diagnosis**]

Parameter Description

Parameter	Description
interface-type interface-number	The interface type and ID.
transceiver	Displays the transceiver information.

alarm	Displays the alarm message of the transceiver. If there is no alarm message, it is displayed as None.
diagnosis	Displays the diagnostic parameters of the transceiver.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide If you do not specify an interface, the transceiver information of all interfaces is displayed.

Configuration The following example displays the transceiver information of interface GigabitEthernet 5/4.

```

Examples
FS#show interfaces GigabitEthernet 5/4 transceiver
Transceiver Type      : 1000BASE-SX-SFP
Connector Type       : LC
Wavelength(nm)      : 850
Transfer Distance    :
    50/125 um OM2 fiber
        -- 550m
    62.5/125 um OM1 fiber
        -- 270m
Digital Diagnostic Monitoring : YES
Vendor Serial Number      : 101680093602489
    
```

The following example displays the alarm message of the transceiver of interface GigabitEthernet 5/4.

```

FS#show interfaces GigabitEthernet 5/4 transceiver alarm
gigabitEthernet 5/4 transceiver current alarm information:
RX  loss of signal
    
```

The following example displays the diagnostic parameters of the transceiver of interface GigabitEthernet 5/4.

```

FS#show interfaces GigabitEthernet 5/4 transceiver diagnosis
Current diagnostic parameters[AP:Average Power]:
Temp(Celsius)  Voltage(V)      Bias(mA)          RX power(dBm)    TX power(dBm)
38(OK)         3.20(OK)          0.04(OK)         -40.00(alarm)[AP] -40.00(alarm)
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.53 show interfaces usage

Use this command to display bandwidth usage of the interface.

show interfaces [interface-type interface-number] **usage** [up | down]

Parameter Description	Parameter	Description
	interface-type interface-number	(Optional) The interface type and ID.
	up	(Optional) Displays the bandwidth usage of up port
	down	(Optional) Displays the bandwidth usage of down port

Defaults N/A

Command Mode All CLI user modes

Usage Guide If you do not specify an interface, the bandwidth usage of all interfaces is displayed. Bandwidth refers to the actual link bandwidth rather than the bandwidth parameter configured on the interface.

Configuration Examples The following example displays bandwidth usage of interface GigabitEthernet 0/1.

Interface	Bandwidth	Average Usage	Input Usage	Output Usage
GigabitEthernet 0/0	1000 Mbit	55.25%	50.00%	60.50%

 Bandwidth refers to the interface link bandwidth, the maximum speed of link.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.54 show interfaces brief

Use this command to display brief information of interfaces, including interface status, output and input bandwidth usage, and the numbers of output and input packet errors.

show interfaces [interface-type interface-number] **brief** [**up** | **down**]

Parameter Description	Parameter	Description
	interface-type interface-number	Specifies interface type and interface number. Information of all interfaces are displayed if this field is not specified.
	up	Indicates connected interfaces.
	down	Indicated disconnected interfaces.

Command Mode All CLI user modes

Default Level 14

Usage Guide N/A

Configuration The following example displays the brief information about Interface GigabitEthernet 0/1.

Examples

```
FS#show interfaces tenGigabitEthernet 0/1 brief

down: link down

*down: administratively down

disabled: err-disabled(Please reference to command [show interface status err-disabled] for detail.)

Interface  Link Stat  Protocol Stat  Input Usage  Output Usage  inErrors  outErrors
-----
Te0/1      disabled  down          0.00%       0.00%       0         0
```

Note: If an interface is disabled, you can run the command to find out why it is error disabled. 0.01% is displayed when the usage is lower than 0.01% and there is network traffic working.

The following example displays the brief information about connected interfaces.

```
FS#show interfaces brief up

down: link down

*down: administratively down

disabled: err-disabled(Please reference to command [show interface status err-disabled] for detail.)

Interface  Link Stat  Protocol Stat  Input Usage  Output Usage  inErrors  outErrors
-----
Te0/1      up         up            78.20%      83.40%       0         0
Te0/2      up         up            73.40%      82.00%       0         0
```

The following example displays the brief information of all interfaces.

```
FS#show interfaces brief

down: link down

*down: administratively down

disabled: err-disabled(Please reference to command [show interface status err-disabled] for detail.)

Interface  Link Stat  Protocol Stat  Input Usage  Output Usage  inErrors  outErrors
-----
Te0/1      down      down          0.00%       0.00%       0         0
Te0/2      down      down          0.00%       0.00%       0         0
Te0/3      down      down          0.00%       0.00%       0         0
Te0/4      down      down          0.00%       0.00%       0         0
```


Te0/5	down	down	0.00%	0.00%	0	0
Te0/6	down	down	0.00%	0.00%	0	0
Te0/7	down	down	0.00%	0.00%	0	0
Te0/8	down	down	0.00%	0.00%	0	0
Te0/9	down	down	0.00%	0.00%	0	0
Te0/10	disabled	down	0.00%	0.00%	0	0

1.55 ip-sample enable

Use this command to enable statistics of IP packets. Use the **no** form of this command to restore the default setting.

ip-sample enable [brief]

no ip-sample enable [brief]

Parameter Description

Parameter	Description
brief	The IP packets are unicast/multicast-insensitive.

Defaults By default, statistics of IP packets are disabled.

Command Mode Interface configuration mode

Usage Guide It should be noted that the command is supported on physical ports, APs and sub-interfaces and is not supported by all models.

When the **route-sample enable** command is configured on an ip-sample enabled sub-interface, the ip-sample enable configuration will be cleared first and then the route-sample enable configuration will take effect.

Configuration Examples The following example enables statistics of IP packets.

```
FS(config-if-TFGigabitEthernet 0/1)#ip-sample enable
FS(config-if-TFGigabitEthernet 0/1)#show this
Building configuration...
!
```

```
no switchport
ip-sample enable
!
end
FS(config-if-TFGigabitEthernet 0/1)#
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

2 Single Fiber Commands

2.1 transport mode rx

Use this command to enable the SF Rx mode on a port. Use the **no** form of this command to restore the dual-fiber bidirectional mode.

transport mode rx

no transport mode

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The dual-fiber bidirectional mode is enabled by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide Use this command to enable the SF Rx mode. After the SF Rx mode is enabled on a port, thorough physical isolation is implemented in the transmission direction and the port cannot send packets.

Configuration The following example configures the SF Rx mode.

```

Example
FS#configure
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#int hundredGigabitEthernet 2/49
FS(config-if-HundredGigabitEthernet 2/49)#transport mode rx
FS(config-if-HundredGigabitEthernet 2/49)#exit
FS(config)#
    
```

Common Errors N/A

Prompt N/A

Platform N/A

Description

2.2 show transport mode rx

Use this command to display information about the port in SF Rx mode.

show transport mode rx

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Default Level	14	
Usage Guide	Use this command to display information about the port in SF Rx mode.	
Configuration	The following example displays information about the port in SF Rx mode.	
Example	<pre> FS#show transport mode rx mode rx port ----- Hu2/49, FS# </pre>	
Common Errors	N/A	
Prompt	N/A	
Platform Description	N/A	

3 MAC Address Commands

3.1 clear mac-address-table dynamic

Use this command to clear the dynamic MAC address.

clear mac-address-table dynamic [**address** mac-addr [**interface** interface-id] [**vlan** vlan-id]

Parameter	Parameter	Description
Description	dynamic	Clears all the dynamic MAC addresses.
	address mac-addr	Clears the specified dynamic MAC address.
	interface interface-id	Clears all the dynamic MAC addresses of the specified interface.
	vlan vlan-id	Clears all the dynamic MAC addresses of the specified VLAN, in the range from 1 to 4094.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use the **show mac-address-table dynamic** command to display all the dynamic MAC addresses.

Configuration Examples The following command clears all the dynamic MAC addresses.

```
FS# clear mac-address-table dynamic
```

Related Commands	Command	Description
	show mac-address-table dynamic	Displays dynamic MAC address.

Platform N/A

Description

3.2 mac-address-learning (global)

Use this command to enable MAC address learning globally. Use the **no** or **default** form of this command to restore the default setting.

mac-address-learning enable

Use this command to disable MAC address learning globally.

mac-address-learning disable

Use this command to restore MAC address learning globally.

default mac-address-learning

Parameter	Parameter	Description
Description	enable	Enables MAC address learning globally.
	disable	Disables MAC address learning globally.

Defaults The **mac-address-learning enable** command is enabled by default.

Command Global configuration mode

Mode

Usage Guide When this function is enabled, the MAC address is learned in global configuration mode the same as learned in interface configuration mode.

Configuration The following example disables MAC address learning globally.

Examples FS(config)# mac-address-learning disable

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.3 mac-address-learning

Use this command to enable the port address learning. Use the **no** form of this command to restore the default setting.

mac-address-learning

no mac-address-learning

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The address learning function is enabled.

Command Interface configuration mode.

Mode

Usage Guide MAC address learning cannot be disabled on the port where the security function is enabled. The security function cannot be configured on the port where address learning is disabled. When the command **default interface** is run in global configuration mode, if there is any layer-2 sub-interface, the MAC address learning cannot restore the default settings.

Configuration The following example disables the port address learning function.

Examples FS(config-if)# no mac-address-learning

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.4 mac-address-table aging-time

Use this command to specify the aging time of the dynamic MAC address. Use the **no** form of the command to restore the default setting.

mac-address-table aging-time seconds

no mac-address-table aging-time

Parameter	Parameter	Description
Description	seconds	Aging time of the dynamic MAC address (in seconds). The time range depends on the switch.

Defaults The default is 300.

Command Mode Global configuration mode.

Usage Guide Use **show mac-address-table aging-time** to display configuration.
 Use **show mac-address-table dynamic** to display the dynamic MAC address table.

Configuration Examples The following example sets the aging time of the dynamic MAC address to 150 seconds.

```
FS(config)# mac-address-table aging-time 150
```

Related Commands	Command	Description
	show mac-address-table aging-time	Displays the aging time of the dynamic MAC address.
	show mac-address-table dynamic	Displays dynamic MAC address.

Platform N/A
Description

3.5 mac-address-table filtering

Use this command to configure the filtering MAC address. Use the **no** form of the command to restore the default setting.

mac-address-table filtering mac-address **vlan** vlan-id

no mac-address-table filtering mac-address **vlan** vlan-id

Parameter	Parameter	Description
Description	mac-address	Filtering Address
	vlan-id	VLAN ID, in the range from 1 to 4094.

Defaults No filtering address is configured by default.

When configuring this command without the **source** or **destination** specified, the frame received in the specified VLAN, which has the same source/destination MAC address with the specified MAC address, will be filtered.

Command Mode Global configuration mode.

Usage Guide The filtering MAC address shall not be a multicast address. Use the **show mac-address-table filtering** command to display the filtering MAC addresses.

Configuration Examples The following example configures the filtering MAC address for VLAN 1.

```
FS(config)# mac-address-table filtering 00d0f8000000 vlan 1
```

Related Commands	Command	Description
	clear mac-address-table filtering	Clears the filtering MAC address.

Platform Description N/A

3.6 mac-address-table notification

Use this command to enable the MAC address notification function. Use The **no** form of the command to restore the default setting.

mac-address-table notification [interval value | history-size value]

no mac-address-table notification [interval | history-size]

Parameter Description	Parameter	Description
	interval value	Sets the interval of sending the MAC address trap message, 1 second by default.
	history-size value	Sets the maximum number of the entries in the MAC address notification table, 50 entries by default.

Defaults By default, the interval is 1 and the maximum number of the entries in the MAC address notification table is 50.

Command Mode Global configuration mode.

Usage Guide The MAC address notification function is specific for only dynamic MAC address and secure MAC address. No MAC address trap message is generated for static MAC addresses. In the global configuration mode, you can use the **snmp-server enable traps mac-notification** command to enable or disable the switch to send the MAC address trap message.

Configuration Examples The following example enables the MAC address notification function.

```
FS(config)# mac-address-table notification
FS(config)# mac-address-table notification interval 40
```



```
FS(config)# mac-address-table notification history-size 100
```

Related Commands	Command	Description
	snmp-server enable traps	Sets the method of handling the MAC address trap message..
	show mac-address-table notification	Displays the MAC address notification configuration and the MAC address trap notification table.
	snmp trap mac-notification	Enables the MAC address trap notification function on the specified interface.

Platform N/A

Description

3.7 mac-address-table static

Use this command to configure a static MAC address. Use the **no** form of the command to restore the default setting.

mac-address-table static mac-addr **vlan** vlan-id **interface** interface-id
no mac-address-table static mac-addr **vlan** vlan-id **interface** interface-id

Parameter	Parameter	Description
Description	mac-addr	Destination MAC address of the specified entry
	vlan-id	VLAN ID of the specified entry, in the range from 1 to 4094.
	interface-id	Interface (physical interface or aggregate port) that packets are forwarded to

Defaults No static MAC address is configured by default.

Command Mode Global configuration mode.

Usage Guide A static MAC address has the same function as the dynamic MAC address that the switch learns. Compared with the dynamic MAC address, the static MAC address will not be aged out. It can only be configured and removed by manual. Even if the switch is reset, the static MAC address will not be lost. A static MAC address shall not be configured as a multicast address. Use show mac-address-table static to display the static MAC address.

Configuration Examples The following example configures a static MAC address.

```
FS(config)# mac-address-table static 00d0.f800.073c vlan 4 interface gigabitethernet 1/1
```

Related Commands	Command	Description
	show mac-address-table static	Displays the static MAC address.

Platform N/A

Description

3.8 max-dynamic-mac-count

Use this command to set the maximum number of MAC address learned dynamically on the VLAN or interface. Use the **no** or **default** form of this command to restore the default setting.

- max-dynamic-mac-count** num
- no max-dynamic-mac-count**
- default max-dynamic-mac-count**

Parameter	Parameter	Description
Description	num	Sets the maximum number of MAC addresses.

Defaults The maximum number is not set by default.

Command Mode VLAN configuration mode / Interface configuration mode

Usage Guide This command is used to set the maximum number of MAC addresses learned dynamically on the VLAN or interface.

If the number of MAC addresses dynamically learned on the VLAN or interface reaches the upper limit, MAC address learning is disabled on the VLAN or interface.

If the number of MAC addresses reaches the upper limit when this command is configured, the surplus MAC addresses are not cleared. Instead, they remain and then age.

Configuration Examples The following example sets the maximum number of MAC addresses dynamically learned on VLAN 1.

```
FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#vlan 1
FS(config-vlan)#max-dynamic-mac-count 160
```

The following example sets the maximum number of MAC addresses dynamically learned on interface GigabitEthernet 0/1.

```
FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#max-dynamic-mac-count 160
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.9 max-dynamic-mac-count exceed-action

Use this command to set the action if the dynamic MAC address learned on the VLAN or interface exceeds the

limit. Run the **no** form or **default** form of this command to restore the default setting.

max-dynamic-mac-count exceed-action forward | discard

no max-dynamic-mac-count exceed-action forward | discard

default max-dynamic-mac-count exceed-action forward | discard

Parameter	Parameter	Description
Description	forward	Forwards the packets if the dynamic MAC address learned on the VLAN or interface exceeds the limit.
	discard	Discards the packets if the dynamic MAC address learned on the VLAN or interface exceeds the limit.

Defaults By default, the packets can be forwarded if the upper limit of the learned MAC address is exceeded.

Command VLAN configuration mode / Interface configuration mode

Mode

Usage Guide This command is used to set the action if the dynamic MAC address learned on the VLAN or interface exceeds the limit.

Configuration Examples The following example sets the maximum number of MAC addresses dynamically learned on VLAN 1. The packets will be discarded when the maximum number of MAC address learned is exceeded.

```

FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#vlan 1
FS(config-vlan)#max-dynamic-mac-count 160
FS(config-vlan)#max-dynamic-mac-count exceed-action discard
FS(config-vlan)#max-dynamic-mac-count exceed-action discardThe following example sets the maximum
number of MAC addresses dynamically learned on interface GigabitEthernet 0/1. The packets will be discarded
when the maximum number of MAC address learned is exceeded.
FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#max-dynamic-mac-count 100
FS(config-if-GigabitEthernet 0/1)#max-dynamic-mac-count exceed-action discard
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.10 show mac-address-learning

Use this command to display the MAC address learning.

show mac-address-learning

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode All mode

Usage Guide N/A

Configuration The following example displays the port learning capability:

Examples

```
FS(config)#show mac-address-learning
GigabitEthernet 0/0    learning ability: disable
GigabitEthernet 0/1    learning ability: enable
GigabitEthernet 0/2    learning ability: enable
GigabitEthernet 0/3    learning ability: enable
```

Related	Command	Description
Commands	N/A	N/A

Platform Description N/A

3.11 show mac-address-table

Use this command to display all types of MAC addresses (including dynamic address, static address and filter address).

show mac-address-table [**address** mac-addr] [**interface** interface-id] [**vlan** vlan-id]

Parameter	Parameter	Description
Description	address mac-addr	The MAC address.
	interface interface-id	The Interface ID.
	vlan vlan-id	The VLAN ID, in the range from 1 to 4094.

Defaults N/A

Command Mode All modes

Usage Guide In Type, STATIC indicates static address, DYNAMIC indicates dynamic address, FILTER indicates filter address, OTHER indicates user addresses that have been successfully authenticated (including 1x, mab and web authentication)

Configuration The following example displays the MAC address.

Examples

```
FS# show mac-address-table address 00d0.f800.1001
```

Vlan	MAC Address	Type	Interface
1	00d0.f800.1001	STATIC	GigabitEthernet 1/1

```
FS# show mac-address-table
```

Vlan	MAC Address	Type	Interface
1	00d0.f800.1001	STATIC	GigabitEthernet 1/1
1	00d0.f800.1002	DYNAMIC	GigabitEthernet 1/1
1	00d0.f800.1003	OTHER	GigabitEthernet 1/1
1	00d0.f800.1004	FILTER	

Field	Description
Vlan	The interface address.
MAC Address	The MAC address.
Type	The MAC address type.
Interface	The interface corresponding to the MAC address.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.12 show mac-address-table aging-time

Use this command to display the aging time of the dynamic MAC address.

show mac-address-table aging-time

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the aging time of the dynamic MAC address.

Examples FS# show mac-address-table aging-time
Aging time : 300

Related Commands	Command	Description
	mac-address-table aging-time	Sets the aging time of the dynamic MAC address.

Platform N/A
Description

3.13 show mac-address-table count

Use this command to display the number of address entries in the address table.

show mac-address-table count [**interface** interface-id | **vlan** vlan-id]

Parameter Description	Parameter	Description
	interface interface-id	Interface ID
	vlan vlan-id	VLAN ID, in the range from 1 to 4094.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide The **show mac-address-table count** command is used to display the number of entries based on the type of MAC address entry.
The **show mac-address-table count interface** command is used to display the number of entries based on the interface associated with the MAC address entry.
The **show mac-address-table count vlan** command is used to display the number of entries based on the VLAN of MAC address entries.

Configuration Examples The following example displays the number of MAC address entries.

```
FS# show mac-address-table count
Dynamic Address Count : 51
Static Address Count : 0
Filter Address Count : 0
Total Mac Addresses : 51
Total Mac Address Space Available: 8139
```

The following example displays the number of MAC address in VLAN 1.

```
FS# show mac-address-table count vlan 1
Dynamic Address Count : 7
Static Address Count : 0
Filter Address Count : 0
Total Mac Addresses : 7
```

The following example displays the number of MAC addresses on interface g0/1.

```
FS# show mac-address-table interface g0/1
Dynamic Address Count : 10
Static Address Count : 0
Filter Address Count : 0
Total Mac Addresses   : 10
```

Field	Description
Dynamic Address Count	Number of dynamic addresses
Static Address Count	Number of static addresses
Filter Address Count	Number of filter addresses
Total Mac Addresses	Number of total MAC addresses

Related Commands

Command	Description
show mac-address-table static	Displays the static address.
show mac-address-table filtering	Displays the filtering address.
show mac-address-table dynamic	Displays the dynamic address.
show mac-address-table address	Displays all the address information of the specified address.
show mac-address-table interface	Displays all the address information of the specified interface.
show mac-address-table vlan	Displays all the address information of the specified vlan.

Platform N/A
Description

3.14 show mac-address-table dynamic

Use this command to display the dynamic MAC address.

show mac-address-table dynamic [**address** mac-addr] [**interface** interface-id] [**vlan** vlan-id]

Parameter Description

Parameter	Description
mac-addr	Destination MAC address of the entry
vlan-id	VLAN of the entry, in the range from 1 to 4094.
interface-id	Interface that the packet is forwarded to. It may be a physical port or an aggregate port

Defaults All the MAC addresses are displayed by default.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the dynamic MAC address.

```
FS# show mac-address-table dynamic
Vlan  MAC Address  Type  Interface
```

```

-----
1 0000.0000.0001 DYNAMIC gigabitethernet 1/1
1 0001.960c.a740 DYNAMIC gigabitethernet 1/1
1 0007.95c7.dff9 DYNAMIC gigabitethernet 1/1
1 0007.95cf.eee0 DYNAMIC gigabitethernet 1/1
1 0007.95cf.f41f DYNAMIC gigabitethernet 1/1
1 0009.b715.d400 DYNAMIC gigabitethernet 1/1
1 0050.bade.63c4 DYNAMIC gigabitethernet 1/1
    
```

Related	Command	Description
Commands	clear mac-address-table dynamic	Clears the dynamic MAC address.

Platform N/A

Description

3.15 show mac-address-table filtering

Use this command to display the filtering MAC address.

show mac-address-table filtering [**ddr** mac-addr] [**vlan** vlan-Id]

Parameter	Parameter	Description
Description	mac-addr	Destination MAC address of the entry
	vlan-id	VLAN ID of the entry, in the range from 1 to 4094.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the filtering MAC address.

```

FS# show mac-address-table filtering
Vlan  MAC Address  Type  Interface
-----
1     0000.2222.2222  FILTER Not available
    
```

Related	Command	Description
Commands	mac-address-table filtering	Configures the filtering MAC address.

Platform N/A

Description

3.16 show mac-address-table flapping record

Use this command to display the MAC address flapping record.

show mac-address-table flapping record

Parameter	Parameter	Description
Description		
Defaults	2	
Command Mode	Privileged EXEC mode	
Usage Guide	N/A	

Configuration Examples The following example displays the MAC address flapping record.

```

FS# show mac-address-table flapping record
Mac address flapping detect status      : on
Mac address flapping detect interval   : 1s
Mac address flapping syslog supress time : 1800s
Mac address flapping record max count   : 300
Mac address flapping record total count : 5

Move-Time          VLAN  MAC-Address  Original-Port  Move-Ports  Status
-----
2018.11.14 12:10:46  1    0001.1111.1111 Te0/2          Te0/1        Normal
2018.11.14 12:10:58  1    0001.1111.1111 Te0/1          Te0/2        Normal
2018.11.14 12:11:1  1    0001.1111.1111 Te0/2          Te0/1        Normal
2018.11.14 12:11:11 1    0001.1111.1111 Te0/1          Te0/2        Normal
2018.11.14 12:11:13 1    0001.1111.1111 Te0/2          Te0/1        Normal
    
```

Field	Description
Move-Time	Flapping time
VLAN	VLAN of the MAC address
MAC-Address	MAC address
Original-Port	Interfaces that learn the MAC address before address flapping
Move-Ports	Interfaces that learn the MAC address after address flapping
Status	Currently effective flapping protection policies: Normal: not set ERR-DOWN: shutdown the interface

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.17 show mac-address-table max-dynamic-mac-count

Use this command to display the maximum number of dynamic MAC addresses learned on the VLAN or interface.

show mac-address-table max-dynamic-mac-count { vlan [vlan-id] | interface [interface-id] }

Parameter	Parameter	Description
Description	vlan	Displays the dynamic MAC address learned on all VLANs which are configured with the maximum number of dynamic MAC address learning.
	vlan-id	Displays the dynamic MAC address learned on the specified VLAN.
	interface	Displays the dynamic MAC address learned on all interfaces which are configured with the maximum number of dynamic MAC address learning.
	interface-id	Displays the dynamic MAC address learned on the specified interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the MAC address learned on all VLANs which are configured with the maximum number of dynamic MAC addresses.

```
FS#show mac-address-table max-dynamic-mac-count vlan
Vlan Limit   MAC count Learning
-----
1    160       6         YES
```

The following example displays the MAC address learned dynamically on the specified VLAN.

```
FS#show mac-address-table max-dynamic-mac-count vlan 1
Vlan Limit   MAC count Learning
-----
1    160       6         YES
```

Field	Description
Vlan	The VLAN ID.
Limit	The maximum number of MAC addresses.

MAC count	The number of MAC address learned dynamically on the VLAN.
Learning	Whether MAC address learning is disabled on the VLAN.

The following example displays the MAC address learned on all interfaces which are configured with the maximum number of the dynamic MAC address.

```
FS#show mac-address-table max-dynamic-mac-count interface
Interface          Limit  MAC count Learning
-----
GigabitEthernet 0/1  160    6         YES
```

The following example displays the MAC address learned dynamically on the specified interface.

```
FS#show mac-address-table max-dynamic-mac-count interface GigabitEthernet 0/1
Interface          Limit  MAC count Learning
-----
GigabitEthernet 0/1  160    6         YES
```

Field	Description
Interface	The Interface ID
Limit	The maximum number of MAC addresses.
MAC count	The number of MAC address learned dynamically on the interface.
Learning	Whether MAC address learning is disabled on the interface

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.18 show mac-address-table interface

Use this command to display all the MAC addresses on the specified interface including static and dynamic MAC address

```
show mac-address-table interface [ interface-id ] [ vlan vlan-id ]
```

Parameter Description	Parameter	Description
	interface-id	Displays the MAC address information of the specified Interface (physical interface or aggregate port).
	vlan-id	VLAN ID of the entry, in the range from 1 to 4094..

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays all the MAC addresses on interface gigabitethernet 1/1.

```

Examples
FS# show mac-address-table interface
gigabitethernet 1/1
Vlan  MAC Address  Type  Interface
-----
1      00d0.f800.1001  STATIC  gigabitethernet 1/1
1      00d0.f800.1002  STATIC  gigabitethernet 1/1
1      00d0.f800.1003  STATIC  gigabitethernet 1/1
1      00d0.f800.1004  STATIC  gigabitethernet 1/1
    
```

Related Commands	Command	Description
	show mac-address-table static	Displays the static MAC address.
	show mac-address-table filtering	Displays the filtering MAC address.
	show mac-address-table dynamic	Displays the dynamic MAC address.
	show mac-address-table address	Displays all types of MAC addresses.
	show mac-address-table vlan	Displays all types of MAC addresses of the specified VLAN.
	show mac-address-table count	Displays the address counts in the MAC address table.

Platform N/A

Description

3.19 show mac-address-table notification

Use this command to display the MAC address notification configuration and the MAC address notification table.

show mac-address-table notification [interface [interface-id] | history]

Parameter Description	Parameter	Description
	interface	Displays the MAC address notification configuration on all interfaces.
	interface interface-id	Displays the MAC address notification configuration on a specific interface.
	history	Displays the MAC address notification history.

Defaults The MAC address notification configuration is displayed by default.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the MAC address notification configuration and the MAC address notification table.

```

FS# show mac-address-table notification interface
Interface      MAC Added Trap  MAC Removed Trap
-----
GigabitEthernet1/14  Disabled      Disabled
FS# show mac-address-table notification
MAC Notification Feature: Disabled
Interval between Notification Traps: 1 secs
Maximum Number of entries configured in History Table:1
Current History Table Length: 0
FS# show mac-address-table notification history
History Index: 0
MAC Changed Message:
Operation:ADD Vlan: 1 MAC Addr: 00f8.d012.3456 GigabitEthernet 3/1
    
```

Related	Command	Description
Commands	mac-address-table notification	Enables MAC address notification.
	snmp trap mac-notification	Enables the MAC address trap notification function on the specified interface.

Platform N/A

Description

3.20 show mac-address-table static

Use this command to display the static MAC address.

show mac-address-table static [addr mac-add r] [**interface** interface-Id] [**vlan** vlan-id]

Parameter	Parameter	Description
Description	mac-addr	Destination MAC address of the entry
	vlan-id	VLAN ID of the entry, within the range from 1 to 4094.
	interface-id	Interface of the entry physical interface or aggregate port

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the static MAC addresses

Examples

```

FS# show mac-address-table static
Vlan  MAC Address  Type  Interface
-----
1  00d0.f800.1001  STATIC  gigabitethernet 1/1
    
```

```
1 00d0.f800.1002 STATIC gigabitethernet 1/1
1 00d0.f800.1003 STATIC gigabitethernet 1/1
```

Related	Command	Description
Commands	mac-address-table static	Configures the static MAC address.

Platform N/A

Description

3.21 show mac-address-table vlan

Use this command to display all addresses of the specified VLAN.

show mac-address-table vlan [vlan-id]

Parameter	Parameter	Description
Description	vlan-id	VLAN ID of the entry, within the range from 1 to 4094.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays all addresses of the specified VLAN.

```
Examples
FS# show mac-address-table vlan 1
Vlan  MAC Address  Type  Interface
-----
1     00d0.f800.1001  STATIC gigabitethernet 1/1
1     00d0.f800.1002  STATIC gigabitethernet 1/1
1     00d0.f800.1003  STATIC gigabitethernet 1/1
```

Related	Command	Description
Commands	show mac-address-table static	Displays static addresses.
	show mac-address-table filtering	Displays filtered addresses.
	show mac-address-table dynamic	Displays dynamic addresses.
	show mac-address-table address	Displays all address information about the specified address.
	show mac-address-table interface	Displays all address information about the specified interface.
	show mac-address-table count	Displays the number of addresses in the address table.

Platform N/A

Description

3.22 snmp trap mac-notification

Use this command to enable the MAC address trap notification on the specified interface. Use The **no** form of the command to restore the default setting.

snmp trap mac-notification { added | removed }

no snmp trap mac-notification { added | removed }

Parameter	Parameter	Description
Description	added	Notifies when a MAC address is added.
	removed	Notifies when a MAC address is removed

Defaults This function is disabled by default.

Command Interface configuration mode.

Mode

Usage Guide Use **show mac-address-table notification interface** to display configuration.

Configuration The following example enables the MAC address trap notification on interface gigabitethernet 1/1.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# snmp trap mac-notification added
```

Related	Command	Description
Commands	mac-address-table notification	Enables MAC address notification.
	show mac-address-table notification	Displays the MAC address notification configuration and the MAC address notification table.

Platform N/A

Description

3.23 aggregateport-admin vlan

Use this command to manage VLAN through an AP port. Use The **no** or **default** form of the command to restore the default setting.

aggregateport-admin vlan vlan-list

no aggregateport-admin vlan vlan-list

default aggregateport-admin vlan vlan-list

Parameter	Parameter	Description
Description	vlan-list	Specifies the VLAN list.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide When an AP port receives VLAN management packets, they are processed as management packets. The other packets are processed as data packets.

Configuration Examples The following example manages VLAN through an AP port.

```
FS(config)# aggregateport-admin vlan 1-20
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.24 mac-address-table flapping-logging

Use this command to enable MAC-flapping logging Use the **no** or **default** form of this command to restore the default setting.

mac-address-table flapping-logging
no/default mac-address-table flapping-logging

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide Use this command to enable logging for MAC-flapping among different ports within a VLAN.

Configuration Examples The following example enables MAC-flapping logging.

```
FS# configure terminal
FS(config)# mac-address-table flapping-logging
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.25 mac-address-table flapping action

Use this command to enable MAC-flapping protection. Use the **no** or **default** form of this command to disable

this function.

mac-address-table flapping action [**error-down** | **priority** priority-num]

no mac-address-table flapping action [**error-down** | **priority**]

default mac-address-table flapping action [**error-down** | **priority**]

Parameter	Parameter	Description
Description	error-down	Indicates port shutdown upon MAC-flapping
	priority priority-num	Indicates the error-down priority, in the range from 0 to 5. Greater the value, higher the priority.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide You must configure the MAC-flapping logging function before enabling MAC-flapping protection. When the command **default interface** is run in global configuration mode, if there is any layer-2 sub-interface, the MAC address learning cannot restore the default settings.

Configuration Examples The following example enables MAC-flapping logging.

```
FS# configure terminal
FS(config)# mac-address-table flapping-logging
```

The following example enables MAC-flapping protection.

```
FS(config)# interface GigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# mac-address-table flapping action error-down
FS(config-if-GigabitEthernet 1/1)# mac-address-table flapping action priority 2
```

Related Commands	Command	Description
	show running-config interface	Displays the port configuration

Platform Description N/A

4 Aggregate Port Commands

4.1 aggregate bfd-detect

Use this command to enable BFD on the AP port. Use the **no** form of this command to restore the default setting.

aggregate bfd-detect { ipv4 | ipv6 } src_ip dst_ip

no aggregate bfd-detect { ipv4 | ipv6 }

Parameter Description	Parameter	Description
	ipv4	Enables IPv4 BFD when the AP port is configured with an IPv4 address.
	src_ip	Specifies source IP address, namely, the IP address configured on the AP port.
	dst_ip	Specifies destination IP address, namely, the IP address configured on the peer AP port.

Defaults This function is disabled by default.

Command AP interface configuration mode

Mode

Usage Guide

1. If you want to enable BFD on the AP port, you should see corresponding configuration guide for BFD parameter settings.
2. Different products vary in support for IPv4/IPv6 BFD on AP port.
3. If an AP port supports both IPv4 and IPv6 BFD, it is allowed to enable both IPv4 and IPv6 BFD at the same time.

Note: If an AP port is enabled with BFD, its member ports in forwarding state create BFD session automatically.

Configuration The following example enables BFD on the AP port.

Examples

```
Switch(config)# interface aggregateport 3
Switch(config-if-Aggregateport 3)# ip address 1.0.0.1
Switch(config-if-Aggregateport 3)# aggregate bfd-detect ipv4 1.0.0.1 1.0.0.2
Switch(config-if-Aggregateport 3)# bfd interval 50 min_rx 50 multiplier 3
```

Related Commands	Command	Description
	show running	Displays the configuration
	show interface aggregateport	Displays BFD on member ports in the current AP

Prompt When the source/destination ID is invalid:

```
1.% Invalid IP address.
```

4.2 aggregateport algorithm mode

Use this command to configure traffic balance algorithm mode on AP. Use the **no** form of this command to

restore the default setting.
aggregateport algorithm mode number
no aggregateport algorithm mode

Parameter	Parameter	Description
Description	number	Indicates algorithm mode.

Defaults The default mode varies from product. Run command **show aggregateport load-balance** to check the default setting.

Command Mode Global configuration mode

Usage Guide Optional. Perform this operation when traffic changes to keep traffic balance.

Configuration Examples The following example configures traffic balance algorithm mode to 3.

```
FS# configure terminal
FS(config)# aggregateport algorithm mode 3
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.3 aggregateport capacity mode

Use this command to configure the AP capacity mode. Use the **no** form of this command to restore the default setting, Use the **no** form of this command to restore the default setting,

aggregateport capacity mode capacity-mode
no aggregateport capacity mode

Parameter	Parameter	Description
Description	capacity-mode	Configures the capacity mode.

Defaults The default capacity-mode varies with the device.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example configures the the capacity mode.

Examples

```
FS# configure terminal
FS(config)# aggregateport capacity mode 256*8
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.4 aggregateport hash-header

Use this command to specify the balancing factor acquisition mode for specific tunnel packets. Use the **default** form of this command to restore the default settings.

aggregateport hash-header {inner | outer | inner-outer}
default aggregateport hash-header

Parameter	Parameter	Description
Description	inner	Specifies the inner layer in the header of tunnel packets as the source for acquiring the balancing factor.
	outer	Specifies the outer layer in the header of tunnel packets as the source for acquiring the balancing factor.

Defaults The default configuration varies with products.

Command Global configuration mode
Mode

Usage Guide Optional. When performing load balancing, use this command to specify the balancing factor acquisition mode for specific tunnel packets, to optimize traffic balancing.

The supported configuration options and types of tunnel packets vary with products. NC8400 series products support the **outer** configuration.

Configuration The following example specifies the inner layer in the header of tunnel packets as the source for acquiring the balancing factor in global configuration mode.

Examples

```
FS# configure terminal
FS(config)# aggregateport hash-header inner
```

Related Commands	Command	Description
	show running	Displays the configuration

Platform N/A

Description

4.5 aggregateport load-balance

Use this command to configure a global load-balance algorithm for aggregate ports or a load-balance algorithm for an aggregate port . Use the **no** form of this command to return the default setting.

aggregateport load-balance { **dst-mac** | **src-mac** | **src-dst-mac** | **dst-ip** | **src-ip** | **src-dst-ip** | **src-dst-ip-l4port** | **enhanced profile** profile-name }

no aggregateport load-balance

Parameter	Parameter	Description
Description	dst-mac	Load balance based on the destination MAC addresses of the incoming packets. For all the links of an aggregate port, the messages with the same destination MAC addresses are sent to the same port, and those with different destination MAC addresses are sent to different ports.
	src-mac	Load balance based on the source MAC addresses of the incoming packets. For all the links of an aggregate port, the messages from different addresses are distributed to different ports, and those from the same addresses are distributed to the same port.
	src-dst-ip	Load balance based on the source IP address and destination IP address. Packets with different source and destination IP address pairs are forwarded through different ports. The packets with the same source and destination IP address pairs are forwarded through the same links. At layer 3, this load balancing style is recommended.
	dst-ip	Load balance based on the destination IP addresses of the incoming packets. For all the links of an aggregate port, the messages with the same destination IP addresses are sent to the same port, and those with different destination IP addresses are sent to different ports.
	src-ip	Load balance based on the source IP addresses of the incoming packets. For all the links of an aggregate port, the messages from different addresses are distributed to different ports, and those from the same addresses are distributed to the same port.
	src-dst-mac	Load balance based on the source and destination MAC addresses. Packets with different source and destination MAC address pairs are forwarded through different ports. The packets with the same source and destination MAC address pairs are forwarded through the same port.
	src-dst-ip-l4port	Load balance based on the source IP address, destination IP address, L4 source port number and L4 destination port number.
	enhanced profile	Load balance based on the packet type

Defaults

The default load balance mode is **src-dst-mac** for the L2 AP port and **src-dst-ip** for the L3 AP port .

For the CB-card-loaded device supporting enhanced profile, load is balanced over AP according to packet type based the enhanced profile.

Command

Global configuration mode/Interface configuration mode

Mode

Usage Guide You can run `aggregateport load-balance` in interface configuration mode of an AP port on devices that support load balancing configuration on a specific AP port. The configuration in interface configuration mode prevails. To disable the load balancing algorithm, run `no aggregateport load-balance` in interface configuration mode of the AP port. After that, the load balancing algorithm configured in global configuration mode takes effect.

Configuration The following example configures a load-balance algorithm globally based on the destination MAC address.

Examples `FS(config)# aggregateport load-balance dst-mac`

The following example configures a load-balance algorithm on AP 1 port based on the destination MAC address.

```
FS(config)# interface aggregateport 1
FS(config-if-AggregatePort 1)# aggregateport load-balance dst-mac
```

Related Commands	Command	Description
	<code>show aggregateport load-balance</code>	Displays aggregate port configuration.

Platform N/A

Description

4.6 member linktrap

Use this command to send LinkTrap to aggregate port members. Use the **no** form of this command to restore the default setting.

aggregateport member linktrap
no aggregateport member linktrap

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This function cannot be enabled by running the **snmp trap link-status** command in interface configuration mode.

Configuration The following example enables the LinkTrap function on the aggregate port members.

Examples `FS# configure terminal`
`FS(config)# aggregateport member linktrap`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.7 aggregateport member minimum

Use this command to set the minimum number of AP member ports. Use the **no** form of this command to restore the default setting.

aggregateport member minimum number

no aggregateport member minimum number

Use this command to set actions for the minimum AP member ports. Use the **no** form of this command to restore the default setting.

aggregateport member minimum action {shutdown}

Parameter	Parameter	Description
Description	number	The minimum number of AP member ports
	shutdown	Shutdown AP to enable action.

Defaults The default is 1. No action is set.

Command Interface configuration mode

Mode

Usage Guide Optional. For static AP, its peer end also has to apply the function.

Configuration The following example sets the minimum number of AP member ports to 2.

```

Examples
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# port-group 1 mode active
FS(config-if-GigabitEthernet 0/1)# aggregateport minimum member 2
FS(config-if-GigabitEthernet 0/1)# end
FS# show interface aggregateport 1
...
Aggregate Port Informations:
    Aggregate Number: 1
    Name: "AggregatePort 1"
    Members: (count=1)      GigabitEthernet 0/1      Link Status: Up      LACP Status: susp ...
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.8 aggregate port primary-port

Use this command to configure the AP member port as a primary port. Use the **no** form of this command to restore the default setting.

aggregateport primary-port

no aggregateport primary-port

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The AP member port is not a primary port by default.

Command Interface configuration mode

Mode

Usage Guide Only one primary port can be configured for an aggregate port.

Configuration Examples The following example configures GigabitEthernet 0/1 as a primary port.

```

FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# port-group 1 mode active
FS(config-if-GigabitEthernet 0/1)# aggregateport primary-port
FS(config-if-GigabitEthernet 0/1)# end
FS# show interface aggregateport 1
...
Aggregate Port Informations:
  Aggregate Number: 1
  Name: "AggregatePort 1"
  Members: (count=1)
  Primary Port: GigabitEthernet 0/1
  GigabitEthernet 0/1      Link Status: Up    LACP Status: bndl
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.9 clear lacp counters

Use this command to clear the statistics of LACP packets on a LACP member port.

clear lacp counters [key-number | interface-type interface-number]

Parameter	Parameter	Description
Description	key-name	Specifies the LACP AP number.
	interface-type	Specifies the type of a LACP member port.
	interface-number	Specifies the number of a LACP member port.
Defaults	N/A	
Command	Privileged EXEC mode	
Mode		
Usage Guide	Use the show lacp counters command in the privileged EXEC mode to check the statistics of LACP packets, and the clear lacp counters command to reset the statistics. If no ports are specified, the statistics of LACP packets on all LACP member ports is cleared.	
Configuration	The following example clears the statistics of LACP packets on tenGigabitEthernet 0/2.	
Examples	<pre>FS# clear lacp counters tenGigabitEthernet 0/2</pre>	
Related Commands	Command	Description
	N/A	N/A
Platform	N/A	
Description		

4.10 fcoe field

Use this command to set the load balance mode of FCOE packets for the specified template. Use the **no** form of this command to restore the default setting.

fcoe field [vlan] [src-port] [dst-port] [src-id] [dst-id] [rx-id] [ox-id] [fabric-id]

no fcoe field

Parameter	Parameter	Description
Description	vlan	Load balance based on VLAN ID of FCOE packets.
	src-port	Load balance based on the source port number of FCOE packets.
	dst-port	Load balance based on the destination port number of FCOE packets.
	src-id	Load balance based on the source ID of FCOE packets.
	dst-id	Load balance based on the destination ID of FCOE packets.
	rx-id	Load balance based on the Responder Exchange ID of FCOE packets.
	ox-id	Load balance based on the Originator Exchange ID of FCOE packets.
	fabric-id	Load balance based on the Fabric ID of the FC network of FCOE packets..

Defaults The default load balance mode is **src-id**, **dst-id** and **ox-id**.

Command Enhanced template configuration mode

Mode

Usage Guide The enhance template should be configured first.

Configuration Examples The following example sets the load balance mode for FCOE packets to **src-id** and **src-port**.

```
FS(config)# load-balance-profile apl
FS(config-load-balance-profile)# fcoe field src-id src-port
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.11 hash-disturb

Use this command to configure HASH disturbance. Use the **no** form of this command to restore the default setting.

hash-disturb { string | { [**seed** seed_value] [**offset** offset] } }
no hash-disturb

Parameter Description	Parameter	Description
	string	String of HASH disturbance.
	seed_value	Seed value of HASH disturbance.
	offset	Offset value of HASH disturbance.

Defaults This function is disabled by default.

Command Mode Enhanced template configuration mode

Usage Guide You can configure this function if you want to balance packets of the same type among multiple devices of the same type.

To configure HASH disturbance, you can run either the **hash-disturb** string command.

- NC8400 series products support the both disturbance configuration.

Configuration Examples The following example configures the string of HASH disturbance.

```
FS# configure terminal
FS(config)#load-balance-profile default
FS(config-load-balance-profile)#
FS(config-load-balance-profile)#hash-disturb A
FS(config-load-balance-profile)#
```

The following example sets the seed value to 196609 and offset to 99.

```
FS# configure terminal
FS(config)# load-balance-profile default
FS(config-load-balance-profile)# no hash-disturb
FS(config-load-balance-profile)# hash-disturb seed 196609 offset 99
FS(config-load-balance-profile)#
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.12 hash-symmetrical

Use this command to configure HASH symmetry. Use the **no** form of this command to restore the default settings.

hash-symmetrical {ipv4 | ipv6 | fcoe}
no hash-symmetrical {ipv4 | ipv6 | fcoe}

Parameter Description	Parameter	Description
	ipv4	Configures HASH symmetry for IPv4 packets.
	ipv6	Configures HASH symmetry for IPv6 packets.
	fcoe	Configures HASH symmetry for FCoE packets.

Defaults The default settings vary according to different products.

Command Mode Enhanced template configuration mode

Usage Guide Optional. Use the **hash-symmetrical {ipv4 | ipv6 | fcoe }** command to specify a link for both the uplink and downlink traffic of packets of the same type. Use the **no hash-symmetrical {ipv4 | ipv6 | fcoe }** command to disable this function.

Configuration Examples The following example disables HASH symmetry for IPv6 and FCoE packets.

```
FS# configure terminal
FS(config)#load-balance-profile
FS(config-load-balance-profile)#
FS(config-load-balance-profile)#no hash-symmetrical ipv6
FS(config-load-balance-profile)#no hash-symmetrical fcoe
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.13 interfaces aggregateport

Use this command to create the aggregate port or enter interface configuration mode of the aggregate port. Use the **no** form of this command to restore the default setting.

interfaces aggregateport ap-number

no interfaces aggregateport ap-number

Parameter	Parameter	Description
Description	ap-number	Aggregate port number.

Defaults The aggregate port is not created by default.

Command Global configuration mode

Mode

Usage Guide If the aggregate port is created, this command is used to enter the interface configuration mode. Otherwise, this command is used to create the aggregate port and then enter its interface configuration mode.

Configuration Examples The following example creates AP 5 and enters its interface configuration mode.

```
FS# configure terminal
FS(config)# interfaces aggregateport 5
FS(config-if-Aggregateport 5)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.14 ipv4 field

Use this command to configure the IPv4 load balance mode for a specified profile. Use the **no** form of this command to restore the default setting.

ipv4 field [src-ip] [dst-ip] [protocol] [l4-src-port] [l4-dst-port] [src-port]

no ipv4 field

Parameter	Parameter	Description
Description	src-ip	Load balance based on the source IP address of the IPv4 packet.
	dst-ip	Load balance based on the destination IP address of the IPv4 packet.
	protocol	Load balance based on the protocol type of the IPv4 packet.
	l4-src-port	Load balance based on the L4 source port number of the IPv4 packet.

l4-dst-port	Load balance based on the L4 destination port number of the IPv4 packet.
src-port	Load balance based on the source port number of the IPv4 packet.

Defaults The default load balance mode is **src-ip** and **dst-ip**.

Command Load balance profile configuration mode

Mode

Usage Guide You need to configure the load balance profile first.

Configuration The following example sets the IPv4 load balance mode for profile apl to **src-ip**.

Examples

```
FS# configure terminal
FS(config)# load-balance-profile apl
FS(config-load-balance-profile)# ipv4 field src-ip
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

4.15 ipv6 field

Use this command to configure the IPv6 load balance mode for a specified profile. Use the **no** form of this command to restore the default setting.

ipv6 field [src-ip] [dst-ip] [protocol] [l4-src-port] [l4-dst-port] [src-port]

no ipv6 field

Parameter	Parameter	Description
Description	src-ip	Load balance based on the source IP addresses of the IPv6 packets.
	dst-ip	Load balance based on the destination IP addresses of the IPv6 packets.
	protocol	Load balance based on the protocol types of the IPv6 packets.
	l4-src-port	Load balance based on the L4 source port numbers of the IPv6 packets.
	l4-dst-port	Load balance based on the L4 destination port numbers of the IPv6 packets.
	src-port	Load balance based on the source port numbers of the IPv6 packets.

Defaults The default load balance mode is **src-ip** and **dst-ip**.

Command Load balance profile configuration mode

Mode

Usage Guide You need to configure the load balance profile first.

Configuration Examples The following example sets the load balance mode of IPv6 packets to **src-ip**.

```
FS(config)# load-balance-profile apl
FS(config-load-balance-profile)# ipv6 field src-ip
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.16 I2 field

Use this command to configure the load balance mode of L2 packets for a specified profile. Use the **no** form of this command to restore the default setting.

I2 field [src-mac] [dst-mac] [I2-protocol] [src-port]
no I2 field

Parameter	Parameter	Description
Description	src-mac	Load balance based on the source MAC address of the L2 packet.
	dst-mac	Load balance based on the destination MAC address of the L2 packets.
	I2-protocol	Load balance based on the L2 protocol type of the L2 packet.
	src-port	Load balance based on the source port number of the L2 packet.

Defaults The default load balance mode is **src-mac** and **dst-mac**.

Command Mode Load balance profile configuration mode

Usage Guide You need to configure the load balance profile first.

Configuration Examples The following example sets the load balance mode of L2 packets to **src-mac** and **src-prot**.

```
FS(config)# load-balance-profile apl
FS(config-load-balance-profile)# I2 field src-mac src-port
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.17 lacp device

Use this command to configure the device ID. Use the **no** form of this command to restore the default settings.

lacp device number

no lacp device

Parameter	Parameter	Description
Description	number	Indicates the device ID of an aggregation group. The value ranges from 0 to 3 .

Defaults The LACP device ID is 0 by default.

Command Mode Interface configuration mode

Usage Guide (Optional) Configure the LACP device ID when LACP ports of multiple (a maximum of four) independent devices need to negotiate with the LACP port of a specific device. Configure the LACP device ID together with the LACP system ID.

Configuration Examples The following example sets the device ID of AP2 to 1.

```

FS(config)#interface aggregatePort 2
FS(config-if-AggregatePort 2)#lacp device 1
FS(config-if-AggregatePort 2)#end
FS#show lacp summary

System Id:32768, 0000.1236.54aa

Flags: S - Device is requesting Slow LACPDUs   F - Device is requesting Fast LACPDUs.
A - Device is in active mode.                 P - Device is in passive mode.

Aggregate port 2:

System Id: 0000.1236.54aa      Device num : 1

Local information:

```

Port	Flags	State	LACP port Priority	Oper Key	Port Number	Port State
Te1/0/1	SA	down	32768	0x2	0x4001	0x45

```

Partner information:

```

Port	Flags	LACP port Priority	Dev ID	Oper Key	Port Number	Port State
Te1/0/1	SP	0	0000.0000.0000	0x0	0x0	0x0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.18 lacp individual-port enable

Use this command to enable the LACP independent port function.
 Use the **no** form of this command to restore the default setting.

lacp individual-port enable
no lacp individual-port enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the LACP independent port function is disabled.

Command Mode Interface configuration mode

Usage Guide (Optional) Perform this operation when the LACP member port cannot perform LACP negotiation and need to be changed to a common physical port.
 After this function is enabled, the member port becomes an independent port (a common physical port) if LACP negotiation fails because the port does not receive LACP packets from the peer end within the set time-out period.

Configuration Examples This example shows how to enable the independent port function for GigabitEthernet 0/1.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# port-group 1 mode active
FS(config-if-GigabitEthernet 0/1)# lacp individual enable
FS(config-if-GigabitEthernet 0/1)# end
FS# show interface aggregateport 1

Aggregate Port Informations:
  Aggregate Number: 1
  Name: "AggregatePort 1"
  Members: (count=1)
  Primary Port: GigabitEthernet 0/1
  GigabitEthernet 0/1      Link Status: Up    LACP Status: individual ...
```

Verification Run the **show running** command to check the configuration

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.19 lacp individual-timeout period

Use this command to set the time-out period of LACP independent port
lacp individual-timeout period time

Use the **no** form of this command to restore the default settings
no lacp individual-timeout period

Parameter Description	Parameter	Description
	time	The range is 10-90, and the unit is second

Default Settings The time-out period of LACP independent port is 90s by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide (Optional) Perform this operation when an LACP independent port needs to adjust the time-out period.
 This command is used to configure the time-out period for the independent port, and only affects the interface enabling the LACP independent port.
 The interface that has become an independent port will not be affected when the time-out period is configured.
 The interface becomes an independent port (a common physical port) if it does not receive LACP packets from the peer end within the set time-out period.
 In the long time-out mode, the LACP packet is sent every 30s. The time-out period should be longer than 30s so as not to affect the normal LACP negotiation. It is recommended to configure the time-out period at least twice the period of LACP packet sending.
 In the short time-out period, there is no limit.

Configuration Examples The following example configures the time-out period of an independent port as 60s

```
FS(config)# lacp individual-timeout period 60
```

Verification Run the **show running** command to check the configuration

4.20 lacp port-priority

Use this command to set the priority of the LACP AP member port. Use the **no** form of this command to restore

the default setting.

lacp port-priority port-priority

no lacp port-priority

Parameter Description	Parameter	Description
	port-priority	The LACP port priority, in the range from 0 to 65535.

Defaults The default is 32768.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples This example sets the LACP port priority of interface Gi0/1 to 4096.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# lacp port-priority 4096
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.21 lacp short-timeout

Use this command to configure the short-timeout mode for the LACP AP member port. Use the no form of this command to restore the default setting.

lacp short-timeout

no lacp short-timeout

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The default is long-timeout mode.

Command Mode Interface configuration mode

Usage Guide In long-timeout mode, the port sends an LACP packet every 30 seconds. If the packet is not received in 90 seconds, the connection times out.

In short-timeout mode, the port sends an LACP packet every 1 second. If the packet is not received in 3 seconds, the connection times out.

Configuration

The following example configures the short-timeout mode for the LACP AP member port.

Examples

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# lacp short-timeout
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

4.22 lacp short-timeout period

Use this command to configure the timeout time of the LACP system in short timeout mode. Use the **no** form of this command to restore the default settings.

lacp short-timeout period value

no lacp short-timeout period

Parameter Description

Parameter	Description
value	Indicates the timeout time in short timeout mode. (Unit: second)

Defaults

The default timeout time in LACP short timeout mode is 3 seconds.

Command

Global configuration mode

Mode

Usage Guide

In global configuration mode, run the command to configure the timeout time in LACP short timeout mode.

Configuration

The following example configures the timeout time in LACP short timeout mode to 4 seconds.

Examples

```
FS(config)# lacp short-timeout period 4
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

4.23 lacp system-id

Use this command to configure the LACP system ID. Use the **no** form of this command to restore the default setting.

lacp system-id system-id
no lacp system-id

Parameter Description

Parameter	Description
system-id	Indicates the system ID of an aggregation group. It must be a valid unicast MAC address.

Defaults The LACP system ID is the MAC address of device by default.

Command Mode Interface configuration mode

Usage Guide (Optional) Configure the LACP system ID when LACP ports of multiple (a maximum of four) independent devices need to negotiate with the LACP port of a specific device. Configure the LACP system ID together with the LACP device ID.

Configuration Examples The following example configures the LACP system ID to 0000.1236.54ab.

```

FS(config)# interface aggregatePort 2
FS(config-if-AggregatePort 2)#lacp system-id 0000.1236.54ab
FS(config-if-AggregatePort 2)#end
FS#show lacp summary

System Id:32768, 0000.1236.54aa

Flags: S - Device is requesting Slow LACPDU   F - Device is requesting Fast LACPDU.
A - Device is in active mode.                 P - Device is in passive mode.

Aggregate port 2:

System Id: 0000.1236.54ab   Device num : 1

Local information:

```

Port	Flags	State	LACP port Priority	Oper Key	Port Number	Port State
Te1/0/1	SA	down	32768	0x2	0x4001	0x45

```

Partner information:

```

LACP port	Oper	Port	Port
-----------	------	------	------

Port	Flags	Priority	Dev ID	Key	Number	State
Te1/0/1	SP	0	0000.0000.0000	0x0	0x0	0x0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.24 lacp system-priority

Use this command to set the priority of the LACP system. Use the **no** form of this command to restore the default settings.

lacp system-priority port-priority
no lacp system -priority

Parameter Description	Parameter	Description
	system-priority	The LACP system priority, in the range from 0 to 65535.

Defaults The default value is 32768.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples This example sets the LACP system priority as 4096.

```
FS(config)# lacp system-priority 4096
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.25 load-balance-profile

Use this command to rename a load balance enhanced profile and apply the profile. Use the **no** form of this command to restore the load balance configuration without changing the profile name. Use the **default** form of

this command to restore the default settings.

load-balance-profile profile-name
no load-balance-profile profile-name
no load-balance-profile

Parameter	Parameter	Description
Description	profile-name	Specifies the profile name, which contains up to 31 characters.
Defaults	The default profile-name is default.	
Command Mode	Global configuration mode.	
Usage Guide	By default, the device is configured with an enhanced profile named default. Use the load-balance-profile default command to enter the enhanced profile configuration mode. You can change the profile name by using the load-balance-profile profile-name command.	

Configuration Examples The following example creates a load balance profile named **apl**.

```
FS(config)# load-balance-profile apl
Warning: The profile default has been used, and this command will rename it. Continue? [Y/N]:y
FS(config-load-balance-profile)#
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.26 mpls field

Use this command to configure the load balance mode of MPLS packets in a specified load balance enhanced profile. Use the **no** form of this command to restore the default setting.

mpls field [top-label] [2nd-label] [3rd-label] [src-ip] [dst-ip] [vlan] [src-port] [dst-port] [src-mac] [dst-mac] [protocol] [I4-src-port] [I4-dst-port] [I2-etype]
no mpls field

Parameter	Parameter	Description
Description	top-label	Load balance based on the destination top labels of the MPLS packets.
	2nd-label	Load balance based on the destination second labels of the MPLS packets.
	src-ip	Load balance based on the source IP addresses of the MPLS packets.
	dst-ip	Load balance based on the destination IP addresses of the MPLS packets.
	vlan	Load balance based on the VLANs of the MPLS packets.
	src-port	Load balance based on the source port numbers of the MPLS packets.
	3rd-label	Load balance based on the destination second labels of the MPLS packets.

dst-port	Load balance based on the destination port of the MPLS packets.
src-mac	Load balance based on the source MAC address of the MPLS packets.
dst-mac	Load balance based on the destination MAC address of the MPLS packets.
protocol	Load balance based on the protocol type of the MPLS packets.
I4-src-port	Load balance based on the L4 source port number of the MPLS packets.
I4-dst-port	Load balance based on the L4 destination port number of the MPLS packets.
I2-etype	Load balance based on the Ethernet type of the MPLS packets.

Defaults The default load balance mode is **top-label** and **2nd-label**.

Command Load balance enhanced profile configuration mode.

Mode

Usage Guide Use the **show load-balance-profile** command to display the load balance mode configuration.

Configuration The following example sets the load balance mode of MPLS packets to **top-label** and **src-ip**.

Examples FS(config-load-balance-profile)# mpls field top-label src-ip

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.27 port-group

Use this command to assign a physical interface to be a member port of a static aggregate port or an LACP aggregate port. Use the **no** form of this command to restore the default setting.

port-group port-group-number
port-group key-number **mode** { **active** | **passive** }
no port-group

Parameter	Parameter	Description
Description	port-group-number	Member group ID of an aggregate port, the interface number of the aggregate port.
	key-number	Member group ID of an LACP aggregate port, the interface number of the LACP aggregate port.
	active	Places a port into an active negotiating state, in which the port initiates negotiations with remote ports by sending LACP packets.
	passive	Places a port into a passive negotiating state, in which the port responds to LACP packets it receives but does not initiate LACP negotiation.

Defaults By default, the physical port does not belong to any aggregate port.

Command Interface configuration mode.
Mode

Usage Guide All the members of an aggregate port belong to a VLAN or configured to be trunk ports. The ports belonging to different native VLANs cannot form an aggregate port.

Configuration The following example specifies the Ethernet interface 1/3 as a member of the static AP 3.

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# port-group 3
```

The following example specifies the Ethernet interface 2/3 as a member of the LACP AP4 and set the aggregation mode to active.

```
FS(config)# interface gigabitethernet 2/3
FS(config-if-GigabitEthernet 2/3)# port-group 4 mode active
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

4.28 show aggregateport

Use this command to display the aggregate port configuration.

show aggregateport { [aggregate-port-number] **summary** | **load-balance** }

Parameter	Parameter	Description
Description	aggregate-port-number	Number of the aggregate port.
	load-balance	Displays the load-balance algorithm on the aggregate port.
	summary	Displays the summary of the aggregate port.

Defaults N/A

Command Any mode
Mode

Usage Guide If the aggregate port number is not specified, all the aggregate port information will be displayed.

Configuration The following example displays the aggregate port configuration.

```
FS# show aggregateport 1 summary
AggregatePort  MaxPorts      SwitchPort Mode    Load balance          Ports
-----
Ag1             8             Enabled  ACCESS  dst-mac                Gi0/2
```

Field Interpretation

Field	Interpretation
AggregatePort	Indicates AP name.
MaxPorts	Indicates the maximum number of ports an AP can support.
SwitchPort	Indicates whether the AP is a switch port or not. "Enabled" indicates the AP is a switch port, while "Disabled" means the AP is not a switch port.
Mode	Indicates the AP Mode, which can be ACCESS, TRUNK, TUNNEL, HYBRID, UPLINK, HOST, or PROMIS. When the AP is not a switch port, nothing is displayed under this field.
Load balance	Indicates load balancing mode of the AP.
Ports	Indicates the name of an AP member.

The following example displays the configuration information of **load-balance** globally.

```
FS#show aggregateport load-balance
Load-balance      : Source MAC and Destination MAC
Hash-elasticity : enable
Algorithm mode
current: 3, default: 0
```

Field Interpretation

Field	Interpretation
Load-balance	Indicates global load balancing mode.
Hash-elasticity	Indicates whether Hash elasticity is enabled.
Algorithm mode	Indicates Hash load-balancing algorithm mode.
Hash-disturb(Expert Mode)	Indicates the seed and offset values of Hash disturbance. Not all models are able to display this such information. "Current" stands for the current values, and "default" for the default ones.

Related	Command	Description
Commands	aggregateport load-balance	Configures a load-balance algorithm of AP.

Platform N/A

Description

4.29 show aggregateport capacity

Use this command to display the AP capacity mode and the AP number.

show aggregateport capacity

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Any mode

Mode

Usage Guide N/A

Configuration The following example displays the AP capacity mode and the AP number.

Examples

```
FS# show aggregateport capacity
AggregatePort Capacity Information:
Configuration Capacity Mode: 128*16.
Effective Capacity Mode      : 256*8.
Available Capacity          : 128*8.
Total Number: 128, Used: 1, Available: 127.
```

Field	Description
Configuration Capacity Mode	Capacity mode (takes effect after restart)
Effective Capacity Mode	Capacity mode currently taking effect
Available Capacity	Capacity mode currently available (Intersection of the configuration ca mode and effective capacity mode)
Total Number	The maximum AP available in the system

Related

Commands

Command	Description
N/A	N/A

Platform N/A

Description

4.30 show lacp counters

Use this command to display the statistics of LACP packets on LACP member ports.

show lacp counters [key-number]

Parameter

Description

Parameter	Description
key-name	Specifies an LACP member port.

Defaults N/A

Command Any mode.

Mode

Usage Guide If no port is specified, the statistics of LACP packets on all LACP member ports is displayed.

Configuration The following example displays the statistics of LACP packets on LACP AP port 2..

Examples

```
FS(config)# show lacp counters 2
```

```
LACP PDU Packet Statistics

Aggregate port 2:
Port          InPkts    OutPkts
-----
Te0/2         6121      6132
```

Field	Description
Aggregate port 2	Indicates the AP number.
Port	Indicates an LACP member port.
InPkts	Indicates the number of LACP PDU the member port receives.
OutPkts	Indicates the number of LACP PDU the member port sends.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.31 show lacp summary

Use this command to display the LACP aggregation information.

show lacp summary [key]

Parameter Description	Parameter	Description
	key	Specifies the aggregation group id to show. If it is not specified, all aggregation group information is displayed by default.

Defaults N/A

Command Mode Any mode.

Usage Guide N/A

Configuration The following example displays the LACP aggregation information.

```
FS(config)# show lacp summary 3
System Id:32768, 00d0.f8fb.0002
Flags: S - Device is requesting Slow LACPDU
F - Device is requesting Fast LACPDU.
```

```

A - Device is in active mode.          P - Device is in passive mode.
Aggregate port 3:
Local information:
Port          Flags    State    Priority  LACP port  Oper  Port  Port
              Key    Number  State
-----
Gi0/1        SA      bndl     4096     0x3        0x1   0x3d
Gi0/2        SA      bndl     4096     0x3        0x2   0x3d
Gi0/3        SA      bndl     4096     0x3        0x3   0x3d
Partner information:
Port          Flags    Priority  LACP port  Oper  Port  Port
              Key    Number  State
-----
Gi0/1        SA      61440    00d0.f800.0002  0x3   0x1   0x3d
Gi0/2        SA      61440    00d0.f800.0002  0x3   0x2   0x3d
Gi0/3        SA      61440    00d0.f800.0002  0x3   0x3   0x3d
    
```

Field	Description
System Id	Displays the MAC address of the system.
Aggregate port 3	Displays the AP name.
Local information	Displays the local LACP information.
Port	Displays the system port ID.
Flags	Displays the port state flag: "S" indicates that the LACP is stable and in the state of periodically sending the LACPPDU; "A" indicates that the port is in the active mode.
State	Show the port aggregation information: "bndl" indicates that the port is aggregated; "Down" represents the disconnection port state; "susp" indicates that the port is not aggregated.
LACP Port Priority	Displays the LACP port priority.
Oper Key	Displays the port operation key.
Port Number	Displays the port number.
Port State	Displays the flag bit for the LACP port state.
Partner information	Partly displays the LACP information of the peer port.
Port	Displays the local port that is connected with the peer port.
Flags	Displays the peer port state flag: "S" indicates that the LACP is stable and in the state of periodically sending the LACPPDU; "A" indicates that the port is in the active mode.
LACP prot Priority	Displays priority of the peer LACP port.
Dev ID	Partly displays the system MAC information of the peer device.
Oper Key	Displays the operation key of the peer port.

Port Number	Displays the peer port number.
Port State	Displays the flag bit for state of the peer LACP port.

Related Commands

Command	Description
port-group key mode	Enables the LACP on the port and specifies the aggregation group ID and operation mode.

Platform N/A
Description

4.32 show load-balance-profile

Use this command to display the enhanced profile.

show load-balance-profile [profile-name]

Parameter Description

Parameter	Description
profile-name	Specifies the profile name.

Defaults -

Command Mode Any mode.

Usage Guide All enhanced profiles are displayed if the profile name is not specified.

Configuration Examples The following example displays configuration information in profile **module0**.

```
FS# show load-balance-profile module0
Load-balance-profile: module0
Packet Hash Field:
IPV4: src-ip dst-ip
IPV6: src-ip dst-ip
L2 :src-mac dst-mac vlan
MPLS: top-labe l2nd-label
```

Field	Interpretation
Load-balance-profile	Displays the enhanced profile name.
Aggregate port 3	Displays the AP name.
IPV4	Displays the load-balancing configuration of IPv4 packets in the enhanced profile.
IPv6	Displays the load-balancing configuration of IPv6 packets in the enhanced profile.
L2	Displays the load-balancing configuration of Layer2 packets in the enhanced profile.

MPLS	Displays the load-balancing configuration of MPLS packets in the enhanced profile.
------	--

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

5 VLAN Commands

5.1 add

Use this command to add one or a group Access interface into current VLAN. Use the **no** or **default** form of the command to remove the Access interface.

add interface { interface-id | **range** interface-range }

no add interface { interface-id | **range** interface-range }

default add interface { interface-id | **range** interface-range }

Parameter Description	Parameter	Description
	interface-id	Layer-2 Ethernet interface or layer-2 AP port.
	range interface-range	Range of the Layer-2 Ethernet interface or layer-2 AP port.

Defaults All layer-2 Ethernet interfaces are in the VLAN1.

Command mode VLAN configuration mode.

Usage Guide This command is only valid for the access port.
 The configuration of this command is the same as specifying the VLAN to which interface belongs in the interface configuration mode (that is the **switchport access vlan** vlan-id command). For the two commands of adding the interface to the VLAN, the command configured later will overwrite the one configured before and take effect.
 The configuration of adding the layer-2 AP into current VLAN through this command will only take effect for the layer-2 AP port, but not for the member port of the layer-2 AP port.

Configuration Examples The following example adds the interface GigabitEthernet 0/10 to VLAN20.

```
FS# configure terminal
SwitchA(config)#vlan 20
SwitchA(config-vlan)#add interface GigabitEthernet 0/10
FS# show interface GigabitEthernet 0/10 switchport
Interface  Switchport   Mode  Access  Native Protected  VLAN lists
-----  -
GigabitEthernet 0/10 enabled  ACCESS  20    1    Disabled  ALL
```

The following example adds the interface range GigabitEthernet 0/1-10 to VLAN200.

```
FS# configure terminal
SwitchA(config)#vlan 200
SwitchA(config-vlan)#add interface range GigabitEthernet 0/1-10
FS# show vlan
SwitchA#show vlan
VLAN Name          Status              Ports
-----  -
-----
```

```
1 VLAN0001    STATIC    Gi0/11,Gi0/12,Gi0/13,Gi0/14,Gi0/15, Gi0/16,Gi0/17,Gi0/18,Gi0/19,Gi0/20,Gi0/21,
Gi0/22, Gi0/23, Gi0/24
200 VLAN0200 STATIC    Gi0/1,Gi0/2,Gi0/3,Gi0/4,Gi0/5, Gi0/6,Gi0/7,Gi0/8,Gi0/9,Gi0/10
```

The following example adds the AggregatePort10 to VLAN20.

```
FS# configure terminal
SwitchA(config)#vlan 20
SwitchA(config-vlan)#add interface aggregateport 10
FS# show interface aggregateport 10 switchport
Interface  Switchport  Mode  Access  Native Protected  VLAN lists
-----  -
AggregatePort 10 enabled  ACCESS  20  1  Disabled  ALL
```

Related Commands

Command	Description
show interface interface-id switchport	Displays the layer-2 interfaces.

Platform N/A

Description

5.2 name

Use this command to specify the name of a VLAN. Use the **no** or **default** form of this command to restore the default setting.

name vlan-name

no name

default name

Parameter Description

Parameter	Description
vlan-name	VLAN name

Defaults

The default name of a VLAN is the combination of "VLAN" and VLAN ID, for example, the default name of the VLAN 2 is "VLAN0002".

Command mode

VLAN configuration Mode.

Usage Guide

N/A

Configuration Examples

```
FS(config)# vlan 10
FS(config-vlan)# name vlan10
```

Related

Command	Description
---------	-------------

Commands	
show vlan	Displays member ports of the VLAN.

Platform N/A

Description

5.3 show vlan

Use this command to display member ports of the VLAN.

show vlan [id vlan-id]

Parameter	Description
vlan-id	VLAN ID

Defaults N/A

Command mode All modes

Usage Guide To return to the privileged EXEC mode, input **end** or pressing **Ctrl+C**.
To return to the global configuration mode, input **exit**.

```

Configuration Examples
FS# show vlan id 1
VLAN Name      Status      Ports
-----
1  VLAN0001     STATIC     Fa0/1, Fa0/2
    
```

Related Commands	Command	Description
	name	VLAN name.
	switchport access	Adds the interface to a VLAN.

Platform N/A

Description

5.4 switchport access

Use this command to configure an interface as a static access port and assign it to a VLAN. Use the **no** form of the command to assign the port to the default VLAN.

switchport access vlan vlan-id

no switchport access vlan

Parameter	Parameter	Description
Description	vlan-id	The VLAN ID at which the port to be added.

Defaults By default, the switch port is an access port and the VLAN is VLAN 1.

Command mode Interface configuration mode.

Usage Guide Enter one VLAN ID. The system will create a new one and add the interface to the VLAN if you enter a new VLAN ID. If the VLAN ID already exists, the command adds the port to the VLAN.
If the port is a trunk port, the operation does not take effect.

Configuration FS(config)# interface gigabitethernet 1/1

Examples FS(config-if)# switchport access vlan 2

Related Commands	Command	Description
	switchport mode	Specifies the interface as Layer 2 mode (switch port mode).
	switchport trunk	Specifies a native VLAN and the allowed-VLAN list for the trunkport.

Platform N/A

Description

5.5 switchport mode

Use this command to specify a L2 interface (switch port) mode. You can specify this interface to be an access port, trunk port, uplink port, servicechain port or an 802.1Q tunnel. Use the **no** form of this command to restore the default setting.

switchport mode { access | trunk | hybrid | uplink | servicechain | ptrunk }

no switchport mode

Parameter	Parameter	Description
Description	access	Configures the switch port as an access port.
	trunk	Configures the switch port as a trunk port.
	hybrid	Configures the switch port as a hybrid port.
	uplink	Configures the switch port as an uplink port.
	servicechain	Configures the switch port as a servicechain port.
	ptrunk	Configures the switch port as a ptrunk port.

Defaults By default, the switch port is an access port.

Command mode Interface configuration mode.

Usage Guide

If a switch port is an access port, the port can be added only to one VLAN. You can run the **switchport access vlan** command to specify the VLAN to which the port belongs.

If a switch port is a trunk port, the port is added to all VLANs by default. You can also run the **switchport trunk allowed** command to add the port to or remove the port from a specified VLAN.

If a switch port is an uplink port, the port is added to all VLANs by default. Different from the trunk port, the uplink port sends packets with a tag carried, that is, the tag of packets from default VLANs will not be deleted. You can run the **switchport trunk allowed** command to add the port to or remove the port from a specified VLAN.

If a switch port is a hybrid port, the port is added to all VLANs by default. Different from a trunk port, a hybrid port can be added to a VLAN in tag or untag mode by running the **switchport hybrid allowed** command.

If a switch port is a servicechain port, the port does not need to learn MAC addresses and can forward packets from any VLAN. Note that before setting a switch port to a servicechain port, clear other configurations on the port and switches the port to an access port.

A ptrunk port is the same as a trunk port except that it only joins VLAN 1 by default. You can run the **switchport trunk allowed** command to add the port to or remove it from a specific VLAN.

Configuration Examples The following example configures port 1 as an access port.

```
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)#switchport mode access
```

The following example configures port 1 as a trunk port.

```
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode trunk
```

The following example configures port 1 as an uplink port.

```
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode uplink
```

The following example configures port 1 as a hybrid port.

```
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode hybrid
```

The following example configures port 1 as a servicechain port.

```
FS(config)#default int g 0/1
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode servicechain
```

The following example configures port 1 as a ptrunk port.

```
FS(config)#default int g 0/1
FS(config)#int g 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode ptrunk
```

Related Commands

Command	Description
switchport access	Configures an interface as a statics access port and

	assigns it to a VLAN.
switchport trunk	Specifies a native VLAN and the allowed-VLAN list for the trunkport.

Platform N/A

Description

5.6 switchport hybrid allowed

Use this command to add the port to the VLAN or remove the port from the VLAN, Use the **no** or **default** form of this command to restore the default setting.

switchport hybrid allowed vlan { [**add** | **only**] **tagged** vlist | [**add**] **untagged** vlist } | **remove** vlist }

no switchport hybrid allowed vlan

default switchport hybrid allowed vlan

Parameter	Description
add	Adds the port to the VLAN.
only	Adds the port to the VLAN and removes the port from the VLANs not on the VLAN list.
tagged	Adds the port to the VLAN and the VLAN packets going out on the port are tagged with VLAN ID.
untagged	Adds the port to the VLAN and the VLAN packets going out on the port are not tagged with VLAN ID.
remove	Removes the port from the VLAN.
vlist	Specifies the VLAN.

Defaults By default, the hybrid port is in all VLANs. All VLAN packets (except native VLAN packets) going out on the port are tagged with VLAN ID. Native VLAN packets are not tagged with VLAN ID.

Command mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example adds the hybrid port to VLAN 20 and VLAN 30 and the VLAN packets going out on the port are not tagged with VLAN ID.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# switchport mode hybrid
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan untagged 20
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan add untagged 30
```

The following example adds the hybrid port to VLAN 40 and VLAN 50 and the VLAN packets going out on the port are tagged with VLAN ID,

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#switchport mode hybrid
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan tagged 40
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan tagged 50
```

The following example removes the hybrid port from VLAN 20.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#switchport mode hybrid
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan remove 20
```

The following example adds the hybrid port to VLAN 20 and deletes all the other VLANs. The VLAN packets going out on the port are tagged with VLAN ID.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#switchport mode hybrid
FS(config-if-GigabitEthernet 0/1)#switchport hybrid allowed vlan only tagged 20
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

5.7 switchport hybrid native

Use this command to configure the native VLAN for the hybrid port. Use the **no** or **default** form of this command to restore the default setting.

- switchport hybrid native vlan** vlan-id
- no switchport hybrid native vlan**
- default switchport hybrid native vlan**

Parameter Description

Parameter	Description
vlan-id	Configures the native VLAN for the hybrid port.

Defaults The default is VLAN 1.

Command mode Interface configuration mode

Usage Guide Native VLAN packets going out on the hybrid port are not tagged with VLAN ID. Packets not tagged with VLAN ID coming in on the hybrid port are taken as native VLAN packets.

Configuration The following example configures VLAN 20 as the native VLAN for hybrid port GigabitEthernet 0/1.

```

Examples
FS(config-if-GigabitEthernet 0/1)#interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#switchport mode hybrid
FS(config-if-GigabitEthernet 0/1)#switchport hybrid native vlan 20
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

5.8 switchport trunk allowed vlan

Use this command to add the trunk/uplink port to the VLAN or remove a trunk/uplink port from the VLAN. Use the **no** or **default** form of the command to restore the default setting.

switchport trunk allowed vlan { all | { add vlan-list | remove vlan-list | except vlan-list | only vlan-list } }

no switchport trunk allowed vlan

default switchport trunk allowed vlan

Parameter Description	Parameter	Description
	all	Adds the trunk/uplink port to all VLANs.
	add	Adds the trunk/uplink port to the VLAN.
	remove	Removes the trunk/uplink port from the VLAN port.
	except	Removes the trunk/uplink port from the VLAN and adds the port to all the other VLANs.
	only	Adds the trunk/uplink port to the specified VLAN and removes the port from the VLANs not on the VLAN list.
	vlan-list	Specifies the VLAN.

Defaults The trunk/unlink port is in all VLANs by default.

Command mode Interface configuration mode.

Usage Guide A trunk/uplink port transmits all VLAN (1-4094) data by default. You can block some VLAN data by configuring this command. Use the **show interfaces** command to display configuration.

Configuration Examples The following example removes trunk port GigabitEthernet 0/10 from VLAN 2.

```

Examples
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode trunk
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan remove 2
    
```

The following example removes trunk port GigabitEthernet 0/10 from VLAN 2.

```
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan except 10
```

The following example removes uplink port GigabitEthernet 0/10 from VLAN 10.

```
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode uplink
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan remove 10
```

The following example adds uplink port GigabitEthernet 0/10 to all VLANs except VLAN10.

```
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan except 10
```

The following example adds ptrunk port GigabitEthernet 0/10 to all VLANs except VLAN 10.

```
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode ptrunk
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan except 10
```

The following example adds ptrunk port G 0/10 to VLAN 10 and removes it from other VLANs.

```
FS(config)# interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport trunk allowed vlan only 10
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

5.9 switchport trunk native vlan

Use this command to configure the native VLAN for the trunk/uplink port. Use the **no** or **default** form of this command to restore the default setting.

```
switchport trunk native vlan vlan-id
no switchport trunk native vlan
default switchport trunk native vlan
```

Parameter Description

Parameter	Description
vlan-id	Native VLAN ID.

Defaults By default, the native VLAN for the trunk/uplink port is VLAN 1.

Command mode Interface configuration mode

Usage Guide After this function is enabled, packets not tagged with VLAN ID are taken as native VLAN packets. Tags are removed from native VLAN packets going out on the trunk port.

Configuration Examples The following example configures VLAN 10 as the native VLAN for trunk port GigabitEthernet 0/10.

```
FS(config)#interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode trunk
FS(config-if-GigabitEthernet 0/10)# switch trunk native vlan 10
```

The following example configures VLAN 10 as the native VLAN for uplink port GigabitEthernet 0/10.

```
FS(config)#interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode uplink
FS(config-if-GigabitEthernet 0/10)# switch trunk native vlan 10
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

5.10 switchport individual-port extend-vlan

Use this command to specify the VLAN list to be inherited after a member trunk/uplink/hybrid port is changed to an independent port. Use the **no** or **default** form of this command to restore the default setting.

switchport individual-port extend-vlan vlan-list

no switchport individual-port extend-vlan

default switchport individual-port extend-vlan

Parameter Description

Parameter	Description
vlan-list	Specified VLAN list

Defaults The default extend VLAN list on a trunk/uplink/hybrid port is null by default.

Command mode Interface configuration mode

Default Level 14

Usage Guide This command is supported only by a trunk, uplink or hybrid port. After the extend VLAN list of an aggregation trunk or uplink port is specified, a member trunk or uplink port uses the extend VLAN list configured on the aggregation port as the allowed VLAN list when the member trunk or uplink port is changed to an independent port. After the extend VLAN list of a hybrid port is specified, the extend VLAN list is used as the allowed VLAN list of member hybrid ports. In addition, member hybrid ports changed to independent ports will also inherit the tag VLAN list of the aggregation hybrid port.

Configuration The following example configures VLAN 10 as the extend VLAN for trunk port GigabitEthernet 0/10.

```
FS(config)#interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode trunk
FS(config-if-GigabitEthernet 0/10)# switch individual-port extend-vlan 10
```

The following example configures VLAN 10 as the extend VLAN for uplink port GigabitEthernet 0/10.

```
FS(config)#interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode uplink
FS(config-if-GigabitEthernet 0/10)# switch individual-port extend-vlan 10
```

The following example configures VLAN 10 as the extend VLAN of hybrid port GigabitEthernet 0/10.

```
FS(config)#interface gigabitEthernet 0/10
FS(config-if-GigabitEthernet 0/10)# switchport mode hybrid
FS(config-if-GigabitEthernet 0/10)# switch individual-port extend-vlan 10
```

Verification Run the **show run** command to display the configurations.

Common Errors This command cannot be configured on an Access port.

5.11 vlan

Use this command to enter the VLAN configuration mode. Use the **no** or **default** form of this command to restore the default setting.

- vlan** { vlan-id | **range** vlan-range }
- no vlan** { vlan-id | **range** vlan-range }
- default vlan** { vlan-id | **range** vlan-range }

Parameter Description	Parameter	Description
	vlan-id	VLAN ID Default VLAN (VLAN 1) cannot be removed.
	vlan-range	VLAN ID range.

Defaults The default is static VLAN.

Command mode Global configuration mode.

Usage Guide To return to the privileged EXEC mode, input **end** or pressing **Ctrl+C**.
To return to the global configuration mode, input **exit**.

Configuration FS(config)# vlan 1

Examples FS(config-vlan)#

**Related
Commands**

Command	Description
show vlan	Displays member ports of the VLAN.

Platform N/A

Description

6 Super-VLAN Commands

6.1 proxy-arp

Use this command to enable the proxy ARP agent function of for a VLAN. Use the **no** form of this command to disable this function. Use the **default** form of this command to restore the default setting.

proxy-arp

no proxy-arp

default proxy-arp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A This function is enabled by default.

Command mode VLAN configuration Mode.

Usage Guide To return to the privileged EXEC mode, input **end** or press **Ctrl+C**.
To return to the global configuration mode, input **exit**. Super VLAN and sub VLAN must be both enabled with proxy ARP.

Configuration Examples The following example enables the proxy ARP function for VLAN 3.

```
FS(config)# vlan 3
FS(config-vlan)# proxy-arp
```

The following example disables the proxy ARP function for VLAN 3.

```
FS(config)# vlan 3
FS(config-vlan)# no proxy-arp
```

Related Commands	Command	Description
	show supervlan	Show Displays the super VLAN information.

Platform Description N/A

6.2 show supervlan

Use this command to show display the configuration of the super VLAN and its sub VLANs.

show supervlan

show supervlan id vlan-id

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	vlan-id	VLAN ID

Defaults N/A

Command mode Privileged EXEC mode.Any mode

Usage Guide N/A

Configuration The following example displays the configuration of super VLAN 2.

```
SwitchA(config-if-range)# show supervlan 2
supervlan id  supervlan arp-proxy  subvlan id  subvlan arp-proxy  subvlan ip range
-----
                2                ON           10           ON           192.168.196.10 - 192.168.196.50
                                   20           ON           192.168.196.60 - 192.168.196.100
                                   30           ON           192.168.196.110 - 192.168.196.150FS#

show supervlan
supervlan id  supervlan arp-agent  subvlan id  subvlan arp-agent  subvlan ip range
-----
3                ON           4           ON
                                   5           ON
```

The following example displays the configuration of all super VLANs.

```
SwitchA(config-if-range)# show supervlan
supervlan id  supervlan arp-proxy  subvlan id  subvlan arp-proxy  subvlan ip range
-----
                2                ON           10           ON           192.168.196.10 - 192.168.196.50
                                   20           ON           192.168.196.60 - 192.168.196.100
                                   30           ON           192.168.196.110 - 192.168.196.150
                6                ON           7           ON
                                   8           ON
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.3 subvlan

Use this command to set the sub VLAN of for this the super VLAN or delete . Use the **no** form of this command to disbale this function. Use the **default** form of this command to restore the default settingsub VLAN.

subvlan vlan-id-list

no subvlan [vlan-id-list]

default subvlan [vlan-id-list]

Parameter Description	Parameter	Description
	vlan-id-list	Sub VLAN ID of the VLAN. Multiple VLANs are supported.

Defaults N/A No super VLAN is set by default.

Command mode VLAN configuration Mode.

Usage Guide Use the **no subvlan** command to delete all sub VLANs of this super VLAN.

Configuration Examples The following example sets the sub VLAN for the super VLAN.

```
FS(config)# vlan 3
FS(config-vlan)# supervlan
FS(config-vlan)# subvlan 5
FS(config-vlan)# subvlan 7-19
```

Related Commands	Command	Description
	show supervlan	Show Displays the super VLAN information.

Platform N/A

Description

6.4 subvlan-address-range start-ip end-ip

Use this command to set the IP address range of the sub VLAN. Use the **no** form of this command to disbale this function. Use the **default** form of this command to restore the default setting.

subvlan-address-range start-ip end-ip

no subvlan-address-range

default subvlan-address-range

Parameter Description	Parameter	Description
	start-ip	The start IP address of this sub VLAN
	end-ip	The end IP address of this sub VLAN

Defaults N/A No IP address range is set by default.

Command mode VLAN configuration Mode.

Usage Guide To return to the privileged EXEC mode, input **end** or press **Ctrl+C**.
To return to the global configuration mode, input **exit**.

Configuration Examples The following example sets the IP address range for the sub VLAN.

```
FS(config)# vlan 3
FS(config-vlan)# subvlan-address-range
192.168.3.10 192.168.3.100
```

Related Commands	Command	Description
	show supervlan	

Platform N/A
Description

6.5 supervlan

Use this command to set the VLAN as a super VLAN. Use the **no** form of this command to disbale this function. Use the **default** form of this command to restore the default setting.

- supervlan**
- no supervlan**
- default supervlan**

Parameter Description	Parameter	Description
		N/A

Defaults No super VLAN is set by default.N/A

Command mode VLAN configuration Mode.

Usage Guide To return to the privileged EXEC mode, input **end** or press **Ctrl+C**.
To return to the global configuration mode, input **exit**.N/A

Configuration Examples The following example sets the VLAN as a super VLAN.

```
FS(config)# vlan 3
FS(config-vlan)# supervlan
```

Related Commands	Command	Description
	show supervlan	Show Displays the super VLAN information.

Platform N/A
Description

7 MSTP Commands

7.1 bpdu src-mac-check

Use this command to enable the BPDU source MAC address check function on the interface. Use the **no** form of this command to restore the default setting.

bpdu src-mac-check H.H.H

no bpdu src-mac-check

Parameter Description	Parameter	Description
	H.H.H	Indicates that only the BPDU messages from this MAC address are received.
	no	Indicate that the BPDU messages from any MAC address are received.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example enables the BPDU source MAC address check function on the interface.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# bpdu src-mac-check 00d0.f800.1e2f
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.2 bridge-frame forwarding protocol bpdu

Use this command to enable BPDU transparent transmission. Use the **no** form of this command to restore the default setting.

bridge-frame forwarding protocol bpdu

no bridge-frame forwarding protocol bpdu

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide In the IEEE 802.1Q standard, 01-80-C2-00-00-00, the destination MAC address of BPDU frames, is reserved. Devices following the IEEE 802.1Q standard don't forward BPDU frames. In real network deployment, devices may be required to support BPDU transparent transmission. For example, when a device is not enabled with STP, BPDU transparent transmission can help implement STP calculation.
BPDU transparent transmission works only when STP is disabled.

Configuration Examples The following example enables BPDU transparent transmission.

```
FS(config)# bridge-frame forwarding protocol bpdu
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

7.3 clear spanning-tree counters

Use this command to clear the statistics of STP transceived packets.
clear spanning-tree detected-protocols [interface interface-id]

Parameter Description

Parameter	Description
interface-id	ID of the interface

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears the statistics of STP transceived packets.

```
FS# clear spanning-tree counters
```

Related Commands

Command	Description
show spanning-tree counters	Displays the statistics of STP transceived packets.

Platform N/A

Description

7.4 clear spanning-tree detected-protocols

Use this command to force the interface to send the RSTP BPDU message and check the BPDU messages.

clear spanning-tree detected-protocols [**interface** interface-id]

Parameter Description

Parameter	Description
interface-id	ID of the interface

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples FS# clear spanning-tree detected-protocols

Related Commands

Command	Description
show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A

Description

7.5 clear spanning-tree mst topochange record

Use this command to clear STP topology change record.

clear spanning-tree mst instance-id topochange record

Parameter Description

Parameter	Description
instance-id	Instance ID. For STP and RSTP protocols, only instance 0 is valid.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example clears STP topology change record.

```

Examples
FS# show spanning-tree mst 0 topochange record
Topology change information on mst 0:
Time                Interface          Old status   New status   Type
-----
2013.5.1 4:18:46   Gi0/6         Learning    Forwarding   Normal
FS# clear spanning-tree mst 0 topochange record
FS# show spanning-tree mst 0 topochange record
%There's no topology change information has been record on mst 0.
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.6 I2protocol-tunnel stp

Use this command to enable BPDU TUNNEL globally. Use the **no** form of this command to disable this function.

I2protocol-tunnel stp

no I2protocol-tunnel stp

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide If you want to BPDU TUNNEL globally, enable BPDU TUNNEL on the interface first.

Configuration The following example enables BPDU TUNNEL globally.

```

Examples
FS(config)# I2protocol-tunnel stp
FS(config)# show I2protocol-tunnel stp

L2protocol-tunnel: stp Enable
L2protocol-tunnel destination mac address: 01d0.f800.0005
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.7 I2protocol-tunnel stp enable

Use this command to enable BPDU TUNNEL on the interface. Use the **no** form of this command to disable this function.

I2protocol-tunnel stp enable
no I2protocol-tunnel stp enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Interface configuration mode

Usage Guide If you want to BPDU TUNNEL globally, enable BPDU TUNNEL on the interface first.

Configuration Examples The following example enables BPDU TUNNEL on the interface.

```
FS(config-if-interface-id)# I2protocol-tunnel stp enable
FS(config-if-interface-id)# show I2protocol-tunnel stp

L2protocol-tunnel: stp Enable
L2protocol-tunnel destination mac address: 01d0.f800.0005
GigabitEthernet 0/1 I2protocol-tunnel stp enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.8 I2protocol-tunnel stp tunnel-dmac

Use this command to configure the STP address for transparent transmission through BPDU TUNNEL. Use the **no** form of this command to restore the default setting.

I2protocol-tunnel stp tunnel-dmac mac-address
no I2protocol-tunnel stp tunnel-dmac

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
mac-address	The STP address for transparent transmission.

Defaults The default is 01d0.f800.0005.

Command Global configuration mode

Mode

Usage Guide The available STP address includes 01d0.f800.0005, 011a.a900.0005, 010f.e200.0003, 0100.0ccd.cdd0, 0100.0ccd.cdd1, and 0100.0ccd.cdd2.

Configuration The following example configures the STP address for transparent transmission through BPDU TUNNEL.

Examples FS(config)# l2protocol-tunnel stp tunnel-dmac 011a.a900.0005

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.9 show l2protocol-tunnel stp

Use this command to display BPDU TUNNEL configuration.

show l2protocol-tunnel stp

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Privileged EXEC mode / Global configuration mode / Interface configuration mode

Mode

Usage Guide N/A

Configuration The following example displays BPDU TUNNEL configuration.

Examples FS# show l2protocol-tunnel stp

```

L2protocol-tunnel: stp Enable
L2protocol-tunnel destination mac address:011a.a900.0005
GigabitEthernet 0/1 l2protocol-tunnel stp enable
    
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

7.10 show spanning-tree

Use this command to display the global spanning-tree configuration.

show spanning-tree [summary | forward-time | hello-time | max-age | inconsistentports | tx-hold-count | pathcost method | max_hops | counters]

Parameter Description	Parameter	Description
	summary	Displays the information of MSTP instances and forwarding status of the interfaces.
	inconsistentports	Displays the block port due to root guard or loop guard.
	forward-time	Displays BridgeForwardDelay.
	hello-time	Displays BridgeHelloTime.
	max-age	Displays BridgeMaxAge.
	max-hops	Displays the maximum hops of an instance.
	tx-hold-count	Displays TxHoldCount.
	pathcost method	Displays the method used for calculating path cost.
	counters	Displays the statistics of STP transceived packets.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the global spanning-tree configuration.

```
FS# show spanning-tree hello-time
```

Related Commands	Command	Description
		spanning-tree pathcost method
	spanning-tree forward-time	Sets BridgeForwardDelay.
	spanning-tree hello-time	Sets BridgeHelloTime.
	spanning-tree max-age	Sets BridgeMaxAge.
	spanning-tree max-hops	Sets the maximum hops of an instance.
	spanning-tree tx-hold-count	Displays TxHoldCount.

Platform N/A
Description

7.11 show spanning-tree interface

Use this command to display the STP configuration of the interface, including the optional spanning tree.

show spanning-tree interface interface-id [{ **bpdufilter** | **portfast** | **bpduguard** | **link-type** }]

Parameter Description	Parameter	Description
	interface-id	Interface ID
	bpdufilter	Displays the status of BPDU filter.
	portfast	Displays the status of portfast.
	bpduguard	Displays the status of BPDU guard.
	link-type	Displays the link type of an interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the STP configuration of the interface.

```
FS# show spanning-tree interface gigabitethernet 1/5
```

Related Commands	Command	Description
	spanning-tree bpdufilter	Enables the BPDU filter feature someone the interface.
	spanning-tree portfast	Enables the portfast on the interface.
	spanning-tree bpduguard	Enables the BPDU guard on the interface.
	spanning-tree link-type	Sets the link type of the interface to point-to-point.

Platform N/A
Description

7.12 show spanning-tree mst

Use this command to display the information of MST and instances.

show spanning-tree mst { **configuration** | instance-id [**interface** interface-id] }

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
configuration	The MST configuration of the equipment.
instance-id	Instance number
interface-id	Interface number

Defaults All the instances are displayed by default.

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the information of MST and instances.

```

Examples
FS# show spanning-tree mst configuration
Multi spanning tree protocol : Enable
Name      : test
Revision : 0
Instance  Vlans Mapped
-----
0         : 2-4094
1         : 1
    
```

Field Description

Field	Description
Multi spanning tree protocol	Enables MSTP protocol.
Name	Name of the MST region
Revision	Revision of the MST region
Instance Vlans Mapped	Mapping relation between the instance and VLAN

Related Commands	Command	Description
	spanning-tree mst configuration	Configures the MST region.
	spanning-tree mst cost	Displays the path cost of the instance.
	spanning-tree mst max-hops	Displays the maximum hops of the instance.
	spanning-tree mst priority	Displays the equipment priority of the instance.
	spanning-tree mst port-priority	Displays the port priority of the instance.

Platform N/A

Description

7.13 show spanning-tree mst topochange record

Use this command to display the STP topology change record.

show spanning-tree mst instance-id topochange record

Parameter Description	Parameter	Description
	instance-id	Instance ID.

Defaults N/A

Command Mode Privileged EXEC mode / Global configuration mode / Interface configuration mode

Usage Guide N/A

Configuration The following example displays the STP topology change record of instance 0.

Examples

```
FS# show spanning-tree mst 0 topochange record
Topology change information on mst 0:
Time                Interface          Old status   New status   Type
-----
2013.5.1 4:18:46   GI0/6            Learning    Forwarding   Normal
```

Field	Description
Time	The time when the topology changes.
Interface	The interface whose topology changes.
Old status	Old STP status on the interface.
New status	New STP status on the interface.
Type	Topology change may be caused by the following causes: Normal: UP/DOWN state change on the interface, LoopGuard Block: Loop-inconsistence causes the interface to be blocked. RootGuard Block: Root-inconsistence causes the interface to be blocked. Inferior Block: Receiving inferior BPDU frames causes the interface to be blocked. LoopGuard Unblock: The interface returns to Forward status from loop-inconsistence. RootGuard Unblock: The interface returns to Forward status from root-inconsistence. Inferior Unblock-The interface returns to Forward status after not receiving inferior BPDU frames.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.14 show spanning-tree v-stp information

Use this command to display the VSTP configuration.

show spanning-tree v-stp information

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode / Global configuration mode / Interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays the VSTP configuration.

```
FS#show spanning-tree v-stp information

V-STP status           : enable
Local bridge mac       : 5869.6c21.5433
Selected bridge mac    : 5869.6c21.5433
Peerlink Port          : AggregatePort 4
Calculate Virtrual Index : 0
Mlag Remote device connected : Y

MST 0 Root Port       : AggregatePort 1
MST 2 Root Port       : AggregatePort 1
```

Related Commands	Command	Description
	show spanning-tree	Displays the global STP configuration.
	spanning-tree mst cost	Sets the PathCost of an STP interface.
	spanning-tree tx-hold-count	Sets the global TxHoldCount of STP.

Platform Description N/A

7.15 spanning-tree

Use this command to enable MSTP and configure its basic settings globally. The **no** form of the command disables the spanning-tree function. The **no** form of the command with parameters only restores the corresponding parameters to the default values, but does not disable the spanning-tree function.

spanning-tree [**forward-time** seconds | **hello-time** seconds | **max-age** seconds]
no spanning-tree [**forward-time** | **hello-time** | **max-age**]

Parameter Description	Parameter	Description
	forward-time seconds	Interval at which the port status changes, in the range from 4 to 30 in the unit of seconds. The default is 15.
	hello-time seconds	Interval at which the switch sends the BPDU message, in the range from 1 to 10 in the unit of seconds. The default is 2.
	max-age seconds	Maximum aging time of the BPDU message, in the range from 6 to 40 in the unit of seconds. The default is 20.

Defaults This function is disabled by default.

Command Global configuration mode.

Mode

Usage Guide The values of **forward-time**, **hello time** and **max-age** are interrelated. Modifying one of these three parameters will affect the others. There is a restricted relationship among the above three values.

$$2 * (\text{Hello Time} + 1.0\text{snd}) \leq \text{Max-Age Time} \leq 2 * (\text{Forward-Delay} - 1.0\text{snd})$$

If the values do not according with the condition, the settings do not work.

Configuration The following example enables the spanning-tree function.

Examples FS(config)# **spanning-tree**

The following example configures the BridgeForwardDelay.

FS(config)# spanning-tree forward-time 10

Related Commands	Command	Description
	show spanning-tree	Displays the global STP configuration.
	spanning-tree mst cost	Sets the PathCost of an STP interface.
	spanning-tree tx-hold-count	Sets the global TxHoldCount of STP.

Platform N/A

Description

7.16 spanning-tree autoedge

Use this command to enable Autoedge on the interface. Use the **disabled** form of this command to disable this function.

spanning-tree autoedge [disabled]

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration The following example enables Autoedge on the interface.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree autoedge disabled
```

Related Commands	Command	Description
	show spanning-tree interface	Displays the STP configuration information of the interface.

Platform N/A

Description

7.17 spanning-tree bpdudfilter

Use this command to enable BPDU filter on the interface. You can use the **enabled** or **disabled** option of the command to enable or disable the BPDU filter function on the interface.

spanning-tree bpdudfilter [enabled | disabled]

Parameter Description	Parameter	Description
	enabled	Enables BPDU filter on the interface.
disabled	Disables BPDU filter on the interface.	

Defaults This function is disabled by default,

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration The following example enables BPDU filter on the interface.

Examples

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree bpdudfilter enable
```

Related Commands	Command	Description
	show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A
Description

7.18 spanning-tree bpduguard

Use this command to enable the BPDU guard function on the interface. You can use the **enabled** or **disabled** option of the command to enable or disable the BPDU guard function on the interface.

spanning-tree bpduguard [enabled | disabled]

Parameter	Description
enabled	Enables BPDU guard on the interface.
disabled	Disables BPDU guard on the interface.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example enables the BPDU guard function on the interface.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree bpduguard enable
```

Command	Description
show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A
Description

7.19 spanning-tree compatible enable

Use this command to send the message selectively carried with MSTI according to the interface attribute of current port to realize interconnection with other vendors. Use the **no** form of this command to restore the default setting.

spanning-tree compatible enable
no spanning-tree compatible enable

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration Examples The following example sends the message selectively carried with MSTI according to the interface attribute of current port to realize interconnection with other vendors.

```
FS(config)# spanning-tree compatible enable
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.20 spanning-tree guard loop

Use this command to enable **loop guard** on the interface to prevent the root port or backup port from generating loop since they can not receive bpdu. Use the **no** form of this command to disable **loop guard**.

spanning-tree guard loop

no spanning-tree guard loop

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration Examples The following example enables **loop guard** on the interface.

```
FS(config)# spanning-tree guard loop
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.21 spanning-tree guard none

Use this command to disable **guard** on the interface. Use the **no** form of this command to enable this function

spanning-tree guard none

no spanning-tree guard none

Parameter Description

Parameter	Description
N/A	N/A

Defaults

This function is enabled by default.

Command Mode

Interface configuration mode.

Usage Guide

N/A

Configuration Examples

The following example disables **guard** on the interface.

```
FS(config)# spanning-tree guard none
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

7.22 spanning-tree guard root

Use this command to enable **root guard** on the interface to prevent the change of current root bridge position because of error configuration and illegal packet attack. Use the **no** form of this command to restore the default setting.

spanning-tree guard root

no spanning-tree guard root

Parameter Description

Parameter	Description
N/A	N/A

Defaults

This function is disabled by default.

Command Mode

Interface configuration mode.

Usage Guide N/A

Configuration The following example enables **root guard** on the interface.

Examples FS(config)# spanning-tree guard root

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.23 spanning-tree ignore tc

Use this command to enable the tc filtering on the interface. Use the **no** form of this command to restore the default setting. With tc filtering enabled, the TC packets received on the interface will not be processed.

spanning-tree ignore tc
no spanning-tree ignore tc

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example enables the tc filtering on the interface.

Examples FS(config-if)# spanning-tree ignore tc

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.24 spanning-tree link-type

Use this command to configure the link type of the interface. Use the **no** form of this command to restore the default setting.

spanning-tree link-type [point-to-point | shared]

no spanning-tree link-type

Parameter	Parameter	Description
Description	point-to-point	Sets the link type of the interface to point-to-point.
	shared	Forcibly sets the link type of the interface to shared.

Defaults For a full-duplex interface, its link type is set to point-to-point link; for a half-duplex interface, its link type is set to shared.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures the link type of the interface.

```

Examples
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree link-type
point-to-point
    
```

Related	Command	Description
Commands	show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A

Description

7.25 spanning-tree loopguard default

Use this command to enable **loop guard** globally to prevent the root port or backup port from generating loop since they cannot receive bpdu. Use the **no** form of this command to restore the default setting.

spanning-tree loopguard default

no spanning-tree loopguard default

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example enables **loop guard** globally to prevent the root port or backup port from generating loop since they cannot receive bpd.

Examples

```
FS(config)# spanning-tree loopguard default
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.26 spanning-tree max-hops

Use this command to set the maximum number of hops(Max-hopsCount) of the BPDU message in the global configuration mode, the number of hops in a region that the BPDU message passes before being dropped. This parameter takes effect for all instances. Use the **no** form of this command to restore the default setting.

spanning-tree max-hops hop-count

no spanning-tree max-hops

Parameter Description

Parameter	Description
hop-count	Number of hops in a region that the BPDU message passes before being dropped. The range is 1 to 40 hops.

Defaults The default is 20 hops.

Command Mode Global configuration mode.

Usage Guide In the region, the BPDU message sent by the root bridge includes a Hop Count field. When the BPDU message passes a device, the Hop Count is decreased by 1 until it reaches 0, which indicates the BPDU message times out. The device will drop the BPDU message whose Hop Count is 0. Changing the max-hops command affects all instances.

Configuration This example sets the max-hops of the spanning tree to 10 for all instances.

Examples

```
FS(config)# spanning-tree max-hops 10
```

You can verify your setting by entering the **show spanning-tree mst** command in the privileged EXEC mode.

Related Commands

Command	Description
show spanning-tree	Displays the MSTP information.

Platform N/A

Description

7.27 spanning-tree mode

Use this command to set the STP version. Use the **no** form of the command to restore the default setting.

spanning-tree mode [stp | rstp | mstp]

no spanning-tree mode

Parameter Description

Parameter	Description
stp	Spanning tree protocol(IEEE 802.1d)
rstp	Rapid spanning tree protocol(IEEE 802.1w)
mstp	Multiple spanning tree protocol(IEEE 802.1s)

Defaults The default is **mstp**.

Command

Mode Global configuration mode.

Usage Guide N/A

Configuration The following example sets the STP version.

Examples FS(config)# spanning-tree mode stp

Related Commands

Command	Description
show spanning-tree	Displays the spanning-tree configuration.

Platform N/A

Description

7.28 spanning-tree mst configuration

Use this command to enter the MST configuration mode in the global configuration mode and configure the MSTP region. Use the **no** form of the command to restore the default setting.

spanning-tree mst configuration

no spanning-tree mst configuration

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, revision is 0.

Command Global configuration mode.

Mode

Usage Guide

To return to the privileged EXEC mode, enter end or Ctrl+C.

To return to the global configuration mode, enter exit.

After entering the MST configuration mode, you can use the following commands to configure parameters:

instance instance-id vlan vlan-range: Adds the VLANs to the MST instance. The range of instance-id is 0 to 64 and the range of VLAN is 1 to 4095. The vlan-range can be a collection of some inconsecutive VLANs separated with comma or some consecutive VLANs in the form of start VLAN number–end VLAN number. For example, instance 10 vlan 2,3,6-9 means that VLANs 2, 3, 6, 7, 8, 9 are added to instance 10. By default, all VLANs are in Instance0. To remove a VLAN from an instance, use the no form of the command: no instance instance-id [vlan vlan-range]. (In this case, the range of instance is 1 to 64).

name name: Specify the MST name, a string of up to 32 characters. You can use the no name command to restore it to the default setting.

revision version: Set the MST versions in the range 0 to 65535. You can use the no name command to restore it the default setting.

show spanning-tree mst configuration: Shows the information of the MST region.

Configuration

This example enters the MST configuration mode, and maps VLANs 3, 5 to 10 to MST instance 1:

Examples

```
FS(config)# spanning-tree mst configuration
FS(config-mst)# instance 1 vlan 3, 5-10
FS(config-mst)# name region 1
FS(config-mst)# revision 1
FS(config-mst)# show spanning-tree mst configuration
MST configuration
Name [region1]
Revision 1
Instance  Vlans Mapped
-----  -
0         1-2,4,11-4094
1         3,5-10
-----
FS(config-mst)# exit
FS(config)#
```

Related Commands

Command	Description
show spanning-tree mst	Displays the MST region configuration.

Platform Description

N/A

7.29 instance instance-id vlan vlan-range

Use this command to set instance and VLAN mapping relations. Use the **no** form of the command to restore the default setting.

instance instance-id **vlan** vlan-range
no instance instance-id { **vlan** vlan-range }

Parameter Description

Parameter	Description
instance-id	Instance ID, in the range from 0 to 64
vlan-range	VLAN range, in the range from 1 to 4094.

Defaults

The default is instance 0.

Command Mode

MST configuration mode

Usage Guide

instance instance-id **vlan** vlan-range: Add VLAN to MST instance. Instance-ID is in the range from 0 to 64 and VLAN is in the range from 1 to 4094. Use commas to separate VLAN IDs and use hyphen to indicate VLAN range, e.g., instance 10 vlan 2,3,6-9, which adds VLAN 2, 3, 4, 5, 6, 7, 8, 9 to instance 10. By default, all VLANs are in instance 0. Use the **no** form of this command to remove VLAN from instance 1-64.

If you create 64 instances by stacking on a FS device with a small memory (e.g., 64M), the memory may be undersized. It is recommended to limit stacking instance number.

Configuration Examples

This example enters MST mode and maps VLAN 3 and 5-10 to MST instance1.

```
FS(config)# spanning-tree mst configuration
FS(config-mst)# instance 1 vlan 3, 5-10
FS(config-mst)# show spanning-tree mst configuration
Multi spanning tree protocol : Enable
Name      :
Revision : 0
Instance  Vlans Mapped
-----  -
0         1-2,4,11-4094
1         3,5-10
-----
FS(config-mst)# exit
FS(config)#
```

The following example removes VLAN3 from instance 1.

```
FS(config-mst)# no instance 1 vlan 3
```

The following example removes instance 1.

```
FS(config-mst)# no instance 1
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

7.30 revision

Use this command to set revision number of MSTP region. Use the **no** form of the command to restore the default setting.

revision version

no revision

Parameter Description	Parameter	Description
		version

Defaults The default revision is 0.

Command Mode MST configuration mode

Usage Guide **revision** version: Sets the MST version, in the range from 0 to 65535.
show spanning-tree mst configuration: Displays MST region information.

Configuration This example sets revision number to 1.

```

FS(config)# spanning-tree mst configuration
FS(config-mst)# revision 1
FS(config-mst)# show spanning-tree mst configuration
Multi spanning tree protocol : Enable
Name      :
Revision : 1
Instance  Vlans Mapped
-----
0          : ALL
FS(config-mst)# exit
FS(config)#
    
```

Related Commands	Command	Description
		N/A

Platform N/A

Description

7.31 name

Use this command to set MST name. Use the **no** form of the command to restore the default setting.

name name

no name

Parameter Description

Parameter	Description
name	MST name, up to 32 characters.

Defaults

The default name is NULL.

Command Mode

MST configuration mode

Usage Guide

name name: Sets the MST name, up to 32 characters.

show spanning-tree mst configuration: Displays MST region information.

Configuration Examples

This example sets revision to 1.

```

FS(config)# spanning-tree mst configuration
FS(config-mst)# name region1
FS(config-mst)# show spanning-tree mst configuration
Multi spanning tree protocol : Enable
Name      : region1
Revision : 0
Instance  Vlans Mapped
-----
0         : ALL
FS(config-mst)# exit
FS(config)#
    
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

7.32 spanning-tree mst cost

Use this command to set the path cost of an instance in the interface configuration mode. Use the **no** form of the command to restore the default setting.

spanning-tree [mst instance-id] **cost** cost

no spanning-tree [mst instance-id] cost

Parameter Description

Parameter	Description
instance-id	Instance ID in the range from 0 to 64.
cost	Path cost in the range from 1 to 200,000,000.

Defaults

The default instance-id is 0.
 The default value is calculated by the link rate of the interface automatically.
 1000 Mbps—20000
 100 Mbps—200000
 10 Mbps—2000000

Command Mode

Interface configuration mode.

Usage Guide

A higher cost value means a higher path cost.

Configuration Examples

This example sets the path cost to 400 on the interface associated with instances 3.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree mst 3 cost 400
```

You can verify your settings by entering the **show spanning-tree mst interface** interface-id command in the privileged EXEC mode.

Related Commands

Command	Description
show spanning-tree mst	Displays the MSTP information of an interface.
spanning-tree mst port-priority	Configures the priority of an interface.
spanning-tree mst priority	Configures the priority of an instance.

Platform

N/A

Description

7.33 spanning-tree mst port-priority

Use this command to configure the interface priority for different instances in the interface configuration mode. It will determine which interface of a loop in a region is in charge of forwarding. Use the **no** form of this command to restore the default setting.

spanning-tree [mst instance-id] **port-priority** priority

no spanning-tree [mst instance-id] **port-priority**

Parameter Description

Parameter	Description
-----------	-------------

Instance-id	Instance ID, in the range of 0 to 64
priority	Interface priority. Sixteen integers are available: 0, 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, 240, which are the multiples of 16.

Defaults The default instance-id is 0.
The default priority is 128.

Command Mode Interface configuration mode.

Usage Guide When a loop occurs in the region, the interface of the higher priority will be in charge of forwarding. If all interfaces have the same priority value, the interface of the smaller number will be in charge of the forwarding.

Configuration This example sets the priority of **gigabitethernet 1/1** to 10 in instance 20.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree mst 20 port-priority 0
```

You can verify your settings by entering the **show spanning-tree mst instance-id** privileged command.

Related Commands	Command	Description
	show spanning-tree mst	
spanning-tree mst cost		Sets the path cost.
spanning-tree mst priority		Sets the device priority for different instances.

Platform N/A
Description

7.34 spanning-tree mst priority

Use this command to set the device priority for different instances in the global configuration mode. Use the **no** form of this command to restore the default setting.

spanning-tree [mst instance-id] priority priority
no spanning-tree [mst instance-id] priority

Parameter Description	Parameter	Description
	instance-id	
priority		Device priority. Sixteen integers are available: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344 and 61440, which are all multiples of 4096.

Defaults The default instance ID is 0.
The default device priority is 32768.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the device priority of the Instance to 8192.

Examples FS(config-if)# **spanning-tree mst 20 priority 8192**

You can verify your settings by entering the **show spanning-tree mst instance interface instance-id** command in the privileged EXEC mode.

Related Commands

Command	Description
show spanning-tree mst	Displays the MSTP information of an interface.
spanning-tree mst cost	Sets path cost.
spanning-tree mst port-priority	Sets the port priority of an instance.

Platform N/A

Description

7.35 spanning-tree pathcost method

Use this command to configure the path cost of the port. Use the **no** form of this command to restore the default setting.

spanning-tree pathcost method { **long** [**standard**] | **short** }

no spanning-tree pathcost method

Parameter Description

Parameter	Description
Long [standard]	Adopts the 802.1t standard to configure path cost. The standard indicates that use the expression recommended by the standard to calculate the cost value.
short	Adopts the 802.1d standard to configure path cost.

Defaults 802.1T standard is adopted to set path cost by default.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures the path cost of the port.

Examples FS(config-if)# **spanning-tree pathcost method long**

Related

Command	Description
---------	-------------

Commands	
show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A

Description

7.36 spanning-tree portfast

Use this command to enable the portfast on the interface. Use the disabled form of this command to restore the default setting,

spanning-tree portfast [disabled]

Parameter	Description
disabled	Disables the portfast on the interface.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example enables the portfast on the interface.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# spanning-tree portfast
```

Related Commands	Command	Description
	show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A

Description

7.37 spanning-tree portfast bpdudfilter default

Use this command to enable the BPDU filter function globally. You can use the **no** form of the command to restore the default setting.

spanning-tree portfast bpdudfilter default

no spanning-tree portfast bpdudfilter default

Parameter	Description
N/A	N/A

Defaults This function is disabled by default,

Command Global configuration mode.

Mode

Usage Guide Once the BPDU filter is enabled, the BPDU message is neither received nor sent on the interface. Use the show spanning-tree command to display the configuration.

Configuration The following example enables the BPDU filter function globally.

Examples FS(config)# spanning-tree portfast bpdupfilter default

Related Commands	Command	Description
		show spanning-tree interface

Platform N/A

Description

7.38 spanning-tree portfast bpduguard default

Use this command to enable the GPDU guard globally. Use the **no** form of this command to restore the default setting,

spanning-tree portfast bpduguard default

no spanning-tree portfast bpduguard default

Parameter Description	Parameter	Description
		N/A

Defaults This function is disabled by default.

Command Global configuration mode.

Mode

Usage Guide Once the BPDU guard is enabled on the interface, it will enter the error-disabled status if the BPDU message arrives at the interface. Use the **show spanning-tree** command to display the configuration.

Configuration The following example enables the GPDU guard globally.

Examples FS(config)# spanning-tree portfast bpduguard default

Related Commands	Command	Description
		show spanning-tree interface

Platform N/A
Description

7.39 spanning-tree portfast default

Use this command to enable the portfast feature on all interfaces globally. Use the **no** form of this command to restore the default setting.

spanning-tree portfast default
no spanning-tree portfast default

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example enables the portfast feature on all interfaces globally.

```
FS(config)# spanning-tree portfast default
```

Related Commands	Command	Description
	show spanning-tree interface	Displays the global STP configuration.

Platform N/A
Description

7.40 spanning-tree reset

Use this command to restore the **spanning-tree** configuration to the default setting.

spanning-tree reset

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example restores the **spanning-tree** configuration to the default setting.

Examples FS(config)# spanning-tree reset

Related Commands	Command	Description
		show spanning-tree
	show spanning-tree interface	Displays the STP configuration of the interface.

Platform N/A

Description

7.41 spanning-tree tc-guard

Use this command to enable **tc-guard** on the interface to prevent the spread of TC messages. Use the **no** form of this command to disable this function on the interface.

spanning-tree tc-guard
no spanning-tree tc-guard

Parameter Description	Parameter	Description
		N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example enables **tc-guard** on the interface to prevent the spread of TC messages.

Examples FS(config)# spanning-tree tc-guard

Related Commands	Command	Description
		N/A

Platform N/A

Description

7.42 spanning-tree tc-protection

Use this command to enable **tc-protection** globally. Use The **no** form of this command to disable this function.

spanning-tree tc- protection
no spanning-tree tc- protection

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example enables **tc-protection** globally.

```
FS(config)# spanning-tree tc-protection
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.43 spanning-tree tc-protection tc-guard

Use this command to enable tc-guard to prevent TC packets from being flooded. Use the **no** form of this command to restore the default setting.

spanning-tree tc-protection tc-guard
no spanning-tree tc-protection tc-guard

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example enables tc-guard to prevent TC packets from being flooded.

```
FS(config)# spanning-tree tc-protection tc-guard
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.44 spanning-tree tx-hold-count

Use this command to configure the TxHoldCount of the STP, the maximum number of the BPDU messages sent in one second. Use the **no** form of this command to restore the default setting.

spanning-tree tx-hold-count tx-hold-count

no spanning-tree tx-hold-count

Parameter Description	Parameter	Description
	tx-hold-count	Maximum number of the BPDU messages sent in one second, in the range from 1 to 10.

Defaults The default is 3.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the maximum number of the BPDU messages sent in one second.

```
FS(config)# spanning-tree tx-hold-count 5
```

Related Commands	Command	Description
	show spanning-tree	Displays the global MSTP configuration.

Platform N/A
Description

7.45 spanning-tree v-stp enable

Use this command to enable the VSTP function. Use the **no** form of this command to disable VSTP.

spanning-tree v-stp enable

no spanning-tree v-stp enable

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults VSTP is disabled by default.

Command Global configuration mode

Mode

Usage Guide VSTP is only applicable to the M-LAG scenario.
 VSTP is supported by STP, RSTP and MSTP. To make VSTP take effect, the following conditions should be met:

1. Enable VSTP on all M-LAG member devices.
2. Configure the identical STP configuration on all M-LAG member devices, for example, device priority, MSTP field configuration, port cost and port priority.
3. Interconnect all M-LAG member devices.

Configuration The following example enables the VSTP function.

Examples FS(config)# spanning-tree v-stp enable

Related Commands	Command		Description	
	show spanning-tree v-stp information		Displays the VSTP status.	

Platform N/A

Description

8 GVRP Commands

8.1 bridge-frame forwarding protocol gvrp

Use this command to enable GVRP PDUs transparent transmission. Use the **no** form of this command to restore the default setting.

bridge-frame forwarding protocol gvrp
no bridge-frame forwarding protocol gvrp

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command mode Global configuration mode

Usage Guide In the IEEE 802.1Q standard, the MAC address 01-80-C2-00-00-21 of GVRP PDUs is reserved for future standardization. In other words, the device following the IEEE 802.1Q standard does not forward GVRP PDUs frames. However, in actual network deployment, GVRP PDUs transparent transmission may be required. For example, the device not enabled with GVRP needs to transmit GVRP PDUs frames transparently to ensure proper GVRP topology calculation.

Configuration Examples The following example enables GVRP PDUs transparent transmission.

```
FS(config)# bridge-frame forwarding protocol gvrp
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.2 clear gvrp statistic

Use this command to clear the GVRP statistics for re-counting.

clear gvrp statistics { interface-id | all }

Parameter Description	Parameter	Description
	interface-id	Interface id

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide Use the **show gvrp statistics** to display the statistics.

Configuration Examples The following example clears GVRP statistics.

```
FS# clear gvrp statistics all
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

8.3 gvrp applicant state

Use this command configures the GVRP advertisement mode on the interface.. Use the **no** form of this command to restore default setting.

gvrp applicant state { normal | non-applicant }

no gvrp applicant state

Parameter Description

Parameter	Description
normal	The interface sends VLAN advertisement.
non-applicant	The interface does not send VLAN advertisement.

Defaults The interface sends GVRP advertisement by default.

Command mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example configures the GVRP advertisement mode on the interface.

```
FS(config-if)# gvrp applicant state normal
```

Related Commands

Command	Description
show gvrp configuration	Displays the GVRP configurations.

Platform N/A

Description

8.4 gvrp dynamic-vlan-creation

Use this command to enable dynamic VLAN creation. Use the **no** form of this command to restore the default setting.

gvrp dynamic-vlan-creation enable
no gvrp dynamic-vlan-creation enable

Parameter Description

Parameter	Description
N/A	N/A

Defaults

This function is disabled by default.

Command mode

Global configuration mode.

Usage Guide

Use the **show gvrp configuration** to display the configuration.

Configuration Examples

The following example enables dynamic VLAN creation.

```
FS(config)# gvrp dynamic-vlan-creation enable
```

Related Commands

Command	Description
show gvrp configuration	Displays the GVRP configurations.

Platform

N/A

Description

8.5 gvrp enable

Use this command to enable the GVRP function. Use the **no** form of this command to restore the default setting.

gvrp enable
no gvrp enable

Parameter Description

Parameter	Description
N/A	N/A

Defaults

This function is disabled by default.

Command mode

Global configuration mode

Usage Guide This command is used to display the configuration.

Configuration The following example enables the GVRP function.

Examples FS(config)#gvrp enable

Related Commands	Command	Description
		show gvrp configuration

Platform N/A

Description

8.6 gvrp registration mode

Use this command to set the registration mode to control whether to enable dynamic VLAN creation/registration/canceling on the port. Use the **no** form of this command to restore the default setting.

gvrp registration mode { normal | disabled }

no gvrp registration mode

Parameter Description	Parameter	Description
		N/A

Defaults Dynamic VLAN creation/registration/canceling is enabled by default,

Command mode Interface configuration mode.

Usage Guide N/A

Configuration The following example sets the registration mode.

Examples FS(config-if)# gvrp registration mode normal

Related Commands	Command	Description
		show gvrp configuration

Platform N/A

Description

8.7 gvrp timer

Use this command to set the GVRP timer. Use the **no** form of this command to restore the default setting.

gvrp timer { join timer_value | leave timer_value | leaveall timer_value }

no gvrp timer

Parameter Description	Parameter	Description
	join timer_value	Controls the maximum delay before sending the advertisement on the port. The actual sending interval is in the range of 0 to the maximum delay.
	leave timer_value	Controls the waiting time before removing the VLAN from the port with the Leave Message received. If the Join Message is received again within this time range, the port-VLAN relation still exists and the timer becomes invalid. If no Join Message is received on the port, the port status will be the Empty and removed from the VLAN member list.
	leave all timer_value	Controls the minimum interval of sending the LeaveAll Message on the port. If the LeaveAll Message is received before the timer expires, the timer re-counts. If the timer expires, send the LeaveAll Message on the port and also send this Message to the port, so that the Leave timer begins counting. The actual sending interval ranges from leaveall to leaveall+join.

Defaults Join timer: 200 milliseconds;
 Leave timer: 600 milliseconds;
 Leaveall timer: 10000 milliseconds.

Command mode Global configuration mode

Usage Guide Use the **show gvrp configuration** to display the configuration.
 Use the **no gvrp timer** command to restore **join**, **leave** and **leaveall timer** to default settings.

Configuration The following example configures the join timer.

Examples FS(config)# gvrp timer join 200

Related Commands	Command	Description
	show gvrp configuration	Displays the GVRP configuration.

Platform N/A
Description

8.8 I2protocol-tunnel gvrp

Use this command to enable global GVRP PDUs TUNNEL globally. Use the **no** form of this command to restore the default setting.

I2protocol-tunnel gvrp
no I2protocol-tunnel gvrp

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults This function is disabled by default.

Command mode Global configuration mode

Usage Guide If you want to enable global GVRP PDUs TUNNEL, enable GVRP PDUs TUNNEL on the interface first.

Configuration The following example enables GVRP PDUs TUNNEL globally.

```

Examples
FS(config)# l2protocol-tunnel gvrp
FS(config)# show l2protocol-tunnel gvrp

L2protocol-tunnel: Gvrp Disable
L2protocol-tunnel destination mac address:01 d0.f800.0006
    
```

Related Commands		
	Command	Description
	N/A	N/A

Platform N/A
Description

8.9 l2protocol-tunnel gvrp enable

Use this command to enable GVRP PDUs TUNNEL on the interface. Use this command to restore the default setting.

l2protocol-tunnel gvrp enable
no l2protocol-tunnel gvrp enable

Parameter Description		
	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command mode Interface configuration mode

Usage Guide If you want to enable global GVRP PDUs TUNNEL, enable GVRP PDUs TUNNEL on the interface first.

Configuration The following example enables GVRP PDUs TUNNEL on the interface.

```

Examples
FS(config-if-interface-id)# l2protocol-tunnel gvrp enable
    
```

```
FS(config-if-interface-id)# show l2protocol-tunnel gvrp

L2protocol-tunnel: Gvrp Disable
L2protocol-tunnel destination mac address:01d0.f800.0006
GigabitEthernet 0/1 l2protocol-tunnel gvrp enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.10 l2protocol-tunnel gvrp tunnel-dmac

Use this command to configure the MAC address for transparent transmission in GVRP PDUs TUNNEL. Use the **no** form of this command to restore the default setting.

l2protocol-tunnel gvrp tunnel-dmac mac-address
no l2protocol-tunnel gvrp tunnel-dmac

Parameter Description	Parameter	Description
	mac-address	

Defaults The default is 01d0.f800.0006.

Command mode Global configuration mode

Usage Guide The available MAC address f ranges from 01d0.f800.0006 to 011a.a900.0006.

Configuration Examples The following example configures the MAC address for transparent transmission in GVRP PDUs TUNNEL.

```
FS(config)# l2protocol-tunnel gvrp tunnel-dmac 011a.a900.0006
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.11 show gvrp configuration

Use this command to display the GVRP configuration.

show gvrp configuration

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide Use the **show gvrp configuration** to display the configuration.

Configuration The following example displays GVRP configuration.

Examples

```
Global GVRP Configuration:
GVRP Feature:enabled
GVRP dynamic VLAN creation:enabled
Join Timers(ms):200
Leave Timers(ms):600
Leaveall Timers(ms):1000
Port based GVRP Configuration:
```

PORT	Applicant Status	Registration Mode
-----	-----	-----
GigabitEthernet 0/2	normal	normal

Field	Description
GVRP Feature	Whether to enable GVRP
GVRP dynamic VLAN creation	Whether to enable dynamic VLAN creation
Join Timers	Join timer
Leave Timers	Leave timer
Leaveall Timers	Leaveall timer
PORT	Port
Applicant Status	Advertisement mode
Registration Mode	Registration mode

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.12 show gvrp statistics

Use this command to display the GVRP statistics of one interface or all interfaces.

show gvrp statistics { interface-id | all }

Parameter Description	Parameter	Description
	interface-id	Interface id.

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide Use the **show gvrp statistics** to display the statistics of one interface or all interfaces.

Configuration Examples	<pre> FS# show gvrp statistics gigabitethernet 1/1 Interface GigabitEthernet 3/1 RecValidGvrpPdu 0 RecInvalidGvrpPdu 0 RecJoinEmpty 0 RecJoinIn 0 RecEmpty 0 RecLeaveEmpty 0 RecLeaveIn 0 RecLeaveAll 0 SentGvrpPdu 0 SentJoinEmpty 0 SentJoinIn 0 SentEmpty 0 SentLeaveEmpty 0 SentLeaveIn 0 SentLeaveAll 0 JoinIndicated 0 LeaveIndicated 0 JoinPropagated 0 LeavePropagated 0 </pre>	
	Field	Description
	RecValidGvrpPdu	Number of received valid GPDU packets.
	RecInvalidGvrpPdu	Number of received unvalid GPDU packets.
	RecJoinEmpty/ SentJoinEmpty	Number of received/sent JoinEmpty messages.
	RecJoinIn/ SentJoinIn	Number of received/sent JoinIn messages.
	RecEmpty/SentEmpty	Number of received/sent Empty messages.
	RecLeaveEmpty/SentLeaveEmpty	Number of received/sent LeaveEmpty messages,
	RecLeaveIn/ SentLeaveIn	Number of received/sent LeaveIn messages.
	RecLeaveAll/SentLeaveAll	Number of received/sent LeaveAll messages.
	SentGvrpPdu	Number of sent GPDU messages.
	JoinIndicated/ LeaveIndicated	Number of Join/Leave service requests.

JoinPropagated / LeavePropagated	Number of Join/Leave topology update requests.
----------------------------------	--

Related Commands	Command	Description
	clear gvrp statistics	

Platform N/A
Description

8.13 show gvrp status

Use this command to display all dynamic VLAN ports generated by GVRP and the dynamic VLAN ports added to the static VLAN.

show gvrp status

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide Use the **show gvrp status** command to display the GVRP status.

Configuration The following example displays the GVRP status.

Examples

```
FS# show gvrp status
VLAN 1
Dynamic Ports:
DVLAN 2
Dynamic Ports:
```

Field	Description
VLAN	Static VLAN
DVLAN	Dynamic VLAN
Dynamic Ports	Dynamic ports.

Related Commands	Command	Description
	N/A	

Platform N/A
Description

8.14 show l2protocol-tunnel gvrp

Use this command to display GVRP PDUs TUNNEL configuration.

show l2protocol-tunnel gvrp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays GVRP PDUs TUNNEL configuration.

Examples

```
FS# show l2protocol-tunnel gvrp

L2protocol-tunnel: Gvrp Enable
L2protocol-tunnel destination mac address:011a.a900.0006
GigabitEthernet 0/1 l2protocol-tunnel gvrp enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9 LLDP Commands

9.1 civic-location

Use this command to configure a common LLDP address. Use the **no** form of this command to delete the address.

```
civic-location { country | state | county | city | division | neighborhood | street-group | leading-street-dir |
trailing-street-suffix | street-suffix | number | street-number-suffix | landmark |
additional-location-information | name | postal-code | building | unit | floor | room | type-of-place |
postal-community-name | post-office-box | additional-code } ca-word
```

```
no civic-location { country | state | county | city | division | neighborhood | street-group | leading-street-dir |
trailing-street-suffix | street-suffix | number | street-number-suffix | landmark |
additional-location-information | name | postal-code | building | unit | floor | room | type-of-place |
postal-community-name | post-office-box | additional-code } ca-word
```

Parameter	Parameter	Description
Description	country	Country code, two bytes. For example, the country code of China is CH.
	state	Address information, CA type 1
	county	CA type 2
	city	CA type 3
	division	CA type 4
	neighborhood	CA type 5
	street-group	CA type 6
	leading-street-dir	CA type 16
	trailing-street-suffix	CA type 17
	street-suffix	CA type 18
	number	CA type 19
	street-number-suffix	CA type 20
	landmark	CA type 21
	additional-location-information	CA type 22
	name	CA type 23
	postal-code	CA type 24
	building	CA type 25
	unit	CA type 26
	floor	CA type 27
	room	CA type 28
	type-of-place	CA type 29
postal-community-name	CA type 30	
post-office-box	CA type 31	
additional-code	CA type 32	
ca-word	Address information	

Defaults N/A

Command LLDP Civic address configuration mode

Mode

Usage Guide This command is used to configure a common LLDP address in LLDP Civic address configuration mode.

Configuration The following example configures an LLDP Civic Address (ID: 1).

Examples

```
FS#config
FS(config)# lldp location civic-location identifier 1
FS(config-lldp-civic)# country CH
FS(config-lldp-civic)# city Fuzhou
```

Related Commands	Command	Description
	show lldp location civic-location { identifier id interface interface-name static }	Displays the information about an LLDP Civic address.

Platform N/A

Description

9.2 clear lldp statistics

Use this command to clear LLDP statistics.

clear lldp statistics [interface interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide **interface** parameter: clear the LLDP statistics of the specified interface

Configuration The following example clears LLDP statistics of interface 1.

Examples

```
FS# clear lldp statistics interface GigabitEthernet 0/1
FS# show lldp statistics interface GigabitEthernet 0/1
Lldp statistics information of port [GigabitEthernet 0/1]
-----
The number of lldp frames transmitted : 0
The number of frames discarded : 0
The number of error frames : 0
The number of lldp frames received : 0
```

```
The number of TLVs discarded      : 0
The number of TLVs unrecognized  : 0
The number of neighbor information aged out : 0
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

9.3 clear lldp table

Use this command to clear LLDP neighbor information.

clear lldp table [**interface** interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the **interface** parameter is specified, the LLDP neighbor information on the specified interface is cleared.
If the **interface** parameter is not specified, the LLDP neighbor information on all interfaces is cleared.

Configuration The following example clears the LLDP neighbor information on interface 1.

```
FS# show lldp neighbors interface GigabitEthernet 0/1
Lldp statistics information of port [GigabitEthernet 0/1]
-----
The number of lldp frames transmitted      : 0
The number of frames discarded            : 0
The number of error frames                 : 0
The number of lldp frames received        : 0
The number of TLVs discarded              : 0
The number of TLVs unrecognized           : 0
The number of neighbor information aged out : 0
FS# clear lldp table interface GigabitEthernet 0/1
FS# show lldp neighbors interface GigabitEthernet 0/1
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

9.4 device-type

Use this command to configure the device type. Use the **no** form of this command to restore the default setting.

device-type device-type

no device-type

Parameter	Parameter	Description
Description	device-type	Device type. The value ranges from 0 to 2. 0: The device type is DHCP Server. 1: The device type is switch. 2: The device type is LLDP MED terminal.

Defaults The default is 1.

Command LLDP Civic address configuration mode

Mode

Usage Guide This command is used to configure the device type in a common LLDP address in LLDP Civic address configuration mode.

Configuration The following example sets the device type to switch.

```

Examples
FS#config
FS(config)# lldp location civic-location identifier 1
FS(config-lldp-civic)# device-type 1
    
```

Related	Command	Description
Commands	show lldp location civic-location { identifier id interface interface-name static }	Displays LLDP Civic Address information.

Platform N/A

Description

9.5 lldp enable

Use this command to enable the LLDP globally or on the interface. Use **no** form of this command to disable this function.

lldp enable

no lldp enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Global (or interface) configuration mode

Usage Guide LLDP takes effect on an interface only when LLDP is enabled globally.

Configuration Examples The following example disables LLDP globally and on the interface.

```
FS#config
FS(config)#no lldp enable
FS(config)#interface gigabitethernet 0/1
FS(config-if)# no lldp enable
```

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform Description N/A

9.6 lldp encapsulation snap

Use this command to configure the encapsulation format of LLDP packets. Use the **no** form of this command to restore the default setting.

lldp encapsulation snap
no lldp encapsulation snap

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, Ethernet II encapsulation format is used.

Command Mode Interface configuration mode.

Usage Guide To guarantee the normal communication between local device and neighbor device, the same LLDP packet encapsulation format must be used.

Configuration Examples The following example sets LLDP packet encapsulation format to SNAP.
 FS#config
 FS(config)#interface gigabitethernet 0/1
 FS(config-if)#lldp encapsulation snap

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A
Description

9.7 lldp error-detect

Use this command to configure the LLDP error detection, including the detection of VLAN configurations on both sides of the link, port state detection, port aggregation configuration detection, MTU configuration detection and loop detection. If any error is detected by LLDP, warning message will be printed to notify the administrator. Use the **no** form of this command to disable this function.

lldp error-detect
no lldp error-detect

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode.

Usage Guide LLDP error detection relies on the specific TLV in the LLDP packets exchanged between devices on both sides of the link. To ensure normal functioning of the detection feature, correct TLVs must be advertised.

Configuration Examples The following example configures LLDP error detection.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if)#lldp error-detect
```

Related Commands	Command	Description
	show interface status	Displays LLDP status information.

Platform N/A
Description

9.8 lldp fast-count

When a new neighbor is detected or when LLDP operating mode changes from shutdown or Rx to TxRx or Tx, to allow the neighbor device to quickly study the information about this device, the fast sending mechanism will be initiated. The fast sending mechanism shortens the LLDPDU sending interval to 1 second and continuously transmits a certain number of LLDPDUs before restoring to the normal transmit interval. Use the **no** form of this command to restore the default setting.

lldp fast-count value
no lldp fast-count

Parameter	Parameter	Description
Description	value	The number of fast sent LLDP packets, in the range from 1 to 10.
Defaults	The default is 3.	
Command Mode	Global configuration mode.	
Usage Guide	N/A	
Configuration Examples	The following example sets the number of fast sent LLDP packets to 5.	
Examples	<pre>FS#config FS(config)#lldp fast-count 5</pre>	
Related Commands	Command	Description
	show interface status	Displays LLDP status information.
Platform	N/A	
Description		

9.9 lldp hold-multiplier

Use this command to set the TTL multiplier. Use the **no** form of this command to restore to default setting.

lldp hold-multiplier value

no lldp hold-multiplier

Parameter	Parameter	Description
Description	value	TTL multiplier, in the range from 2 to 10.
Defaults	The default is 4.	
Command Mode	Global configuration mode.	
Usage Guide	The value of Time To Live (TLV) in LLDP packet = TTL multiplier × LLDP packet transmit interval + 1. Therefore, the TTL of local device information on the neighbor device can be controlled by adjusting TTL multiplier.	
Configuration Examples	The following example sets TTL multiplier to 5.	
Examples	<pre>FS#config FS(config)#lldp hold-multiplier 5</pre>	
Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A
Description

9.10 Ildp ignore pvid-error-detect

Use this command to enable the function of ignoring PVID function. Use the **no** form of this command to disable the function of ignoring PVID function.

ldp ignore pvid-error-detect
no ldp ignore pvid-error-detect

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, it is disabled.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example ignores PVID detection globally.

```
FS# configure terminal
FS(config)# ldp ignore pvid-error-detect
```

Platform N/A
Description

9.11 Ildp location civic-location identifier

Use this command to create a common address of a device connected to the network in LLDP Civic Address configuration mode. Use the **no** form of this command to delete the address.

ldp location civic-location identifier id
no ldp location civic-location identifier id

Parameter	Parameter	Description
Description	id	ID of a common address of a network device, in the range from 1 to 1024.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command can be used to enter the LLDP Civic Address configuration mode.

Configuration The following example creates the Civic Address information in LLDP MED-TLV as follows: set id to **1**.

Examples

```
FS#config
FS(config)#lldp location civic-location identifier 1
FS(config-lldp-civic)#
```

Related Commands

Command	Description
show lldp location civic-location { identifier id interface interface-name static }	Displays the LLDP Civic Address information.

Platform N/A

Description

9.12 lldp location elin identifier

Use this command to set an emergency number encapsulated in a Location Identification TLV. Use the **no** form of this command to delete the number.

lldp location elin identifier id elin-location tel-number
no lldp location elin identifier id

Parameter Description

Parameter	Description
id	ID of an emergency number, in the range from 1 to 1024.
tel-number	Emergency number, in the range from 10 to 25 bytes.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure an emergency number.

Configuration Examples The following example sets an emergency number.

```
FS#config
FS(config)#lldp location elin identifier 1 elin-location 085283671111
```

Related Commands

Command	Description
show lldp location elin-location { identifier id interface interface-name static }	Displays an LLDP emergency number.

Platform N/A

Description

9.13 lldp management-address-tlv

Use this command to configure the management address advertised in LLDP packets. Use the **no** form of this command to disable the advertisement of management address.

lldp management-address-tlv [ip-address]

no lldp management-address-tlv

Parameter	Parameter	Description
Description	ip-address	The management address advertised in LLDP packets.

Defaults N/A

Command Interface configuration mode.

Mode

Usage Guide By default, the management address is advertised in LLDP packets, and is the IPv4 address of the lowest-ID VLAN carried on the port. If IPv4 address is not configured for this VLAN, the next lowest-ID VLAN carried on the port will be tried until the IPv4 address is obtained.
 If the IPv4 address is still not found, the IPv6 address of the lowest-ID VLAN carried on the port will be tried.
 If the IPv6 address is still not found, the MAC address of the device will be advertised as the management address.

Configuration Examples The following example configures the management address advertised in LLDP packets to 192.168.1.1.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if)#lldp management-address-tlv 192.168.1.1
```

Related Commands	Command	Description
	show lldp local-information	Displays LLDP local information

Platform N/A

Description

9.14 lldp management-address-tlv global-ip type

Use this command to configure the type of the management address in LLDP packets. Use the **no** or **default** form of this command to restore the default setting.

lldp management-address-tlv global-ip type { interface | loopback }

{ no | default } lldp management-address-tlv global-ip

Parameter	Parameter	Description
Description	interface	Uses the IP address of the interface as the management address.
	loopback	Uses the IP address of the Loopback interface as the management address.

Defaults By default, the management address in LLDP packets is chosen in the following order: the configured management address for LLDP packets, the IP address of the MGMT port, the IP address of the SVI (IP address of the routed port), the local IP address 127.0.0.1, and the MAC address of the system.

Command Global configuration mode
Mode

Usage Guide If the **interface** parameter is adopted, the management address, in the order of priority, is: the configured LLDP address for LLDP packets, the IP address of the SVI (IP address of the routed port), the local IP address 127.0.0.1, and the MAC address of the system.

If the **loopback** parameter is adopted, the management address, in the order of priority, is: the configured LLDP address for LLDP packets, the IP address of the Loopback port, the local IP address 127.0.0.1, and the MAC address of the system.

Configuration The following example uses the IP address of the interface as the management address.

Examples

```
FS# configure terminal
FS(config)# lldp management-address-tlv global-ip type interface
```

The following example uses the IP address of the Loopback interface as the management address.

```
FS# configure terminal
FS(config)# lldp management-address-tlv global-ip type loopback
```

The following example restores the default setting.

```
FS# configure terminal
FS(config)# no lldp management-address-tlv global-ip
```

Related	Command	Description
Commands	show lldp network-policy profile [profile-num]	Displays the LLDP network policy.

Platform N/A
Description

9.15 lldp mode

Use this command to configure the LLDP operating mode. Use **no** form of this command to restore the default setting.

```
lldp mode { rx | tx | txrx }
no lldp mode
```

Parameter	Parameter	Description
Description	rx	Only sends LLDPDUs.
	tx	Only receives LLDPDUs.
	txrx	Sends and receives LLDPDUs.

Defaults The default is **txrx**.

Command Interface configuration mode
Mode

Usage Guide Disable LLDP operating mode on the interface. The interface won't send and receive LLDP packets. The precondition for enabling LLDP on the interface is that LLDP has been enabled globally and LLDP operates in tx, rx or txrx mode.

Configuration The following example sets LLDP operating mode to tx on the interface.

Examples

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if)#lldp mode tx
```

Related	Command	Description
Commands	show lldp status	Displays LLDP status information

Platform N/A

Description

9.16 lldp network-policy profile

Use this command to create an LLDP network policy and enter the LLDP network policy configuration mode. Use the no form of this command to delete the policy.

lldp network-policy profile profile-num
no lldp network-policy profile profile-num

Parameter	Parameter	Description
Description	profile-num	ID of an LLDP network policy, in the range from 1 to 1024.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to enter the LLDP network policy configuration mode. When this command is run, the policy ID must be specified. In LLDP network-policy mode, the { **voice | voice-signaling** } **vlan** command can be used to configure the specific network policy.

Configuration The following example creates an LLDP network policy whose ID is 1.

Examples

```
FS#config
FS(config)#lldp network-policy profile 1
FS(config-lldp-network-policy)#
```

Related	Command	Description
Commands	show lldp network-policy profile [profile-num]	Displays an LLDP network policy.

Platform N/A

Description

9.17 lldp notification remote-change enable

Use this command to configure LLDP Trap. Use the **no** form of this command to restore the default setting.

lldp notification remote-change enable
no lldp notification remote-change enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide By configuring LLDP Trap, the LLDP information of local device (such as information about the detection of new neighbor or the fault on the communication link) can be sent to the network management server. The administrator can monitor the network operation status according to such information.

Configuration Examples The following example configures LLDP Trap.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if)#lldp notification remote-change enable
```

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A

Description

9.18 lldp timer notification-interval

Use this command to set an interval of sending LLDP Traps. Use the **no** form of this command to restore the default setting.

lldp timer notification-interval seconds
no lldp timer notification-interval

Parameter	Parameter	Description
Description	seconds	Interval of sending LLDP Traps, in the range from 5 to 3600 in the unit of seconds.

Defaults The default is 5.

Command Global configuration mode.
Mode

Usage Guide To prevent excessive LLDP traps from being sent, you can set an interval of sending LLDP Traps. If LLDP information change is detected during this interval, traps will be sent to the network management server.

Configuration Examples The following example sets the interval of sending LLDP Traps to 10 seconds.

```
FS#config
FS(config)#lldp timer notification-interval 10
```

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A
Description

9.19 lldp timer reinit-delay

Use this command to set port initialization delay. Use the **no** form of this command to restore the default setting.

lldp timer reinit-delay seconds

no lldp timer reinit-delay

Parameter Description	Parameter	Description
	seconds	Port initialization delay, in the range from 1 to 10 in the unit of seconds.

Defaults The default is 2.

Command Mode Global configuration mode.

Usage Guide To prevent LLDP from being initialized too frequently due to the frequent operating mode change, you can configure port initialization delay.

Configuration Examples The following example sets LLDP port initialization delay to 3 seconds.

```
FS#config
FS(config)#lldp timer reinit-delay 3
```

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A
Description

9.20 lldp timer tx-delay

Use this command to set LLDP packet transmission delay. Use the **no** form of this command to restore the default setting.

lldp timer tx-delay seconds
no lldp timer tx-delay

Parameter	Parameter	Description
Description	seconds	LLDP packet transmission delay, in the range from 1 to 8192 in the unit of seconds.

Defaults The default is 2.

Command Mode Global configuration mode.

Usage Guide An LLDP-enabled port will send LLDP packets when the local device information changes. To avoid frequently sending LLDP packets due to the frequent local device information change, configure the LLDP packet transmission delay to control the frequent transmission of LLDP packets.

Configuration Examples The following example sets LLDPDU transmission delay to 3 seconds.

```
FS#config
FS(config)#lldp timer tx-delay 3
```

Related Commands	Command	Description
	show lldp status	Displays LLDP status information.

Platform N/A
Description

9.21 lldp timer tx-interval

Use this command to set the interval of sending the LLDP packets. Use **no** form of this command to restore the default setting.

lldp timer tx-interval seconds
no lldp timer tx-interval

Parameter	Parameter	Description
Description	seconds	Interval of sending the LLDP packets, in the range from 5 to 32768 in the unit of seconds.

Defaults The default is 30.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the interval of sending the LLDP packets to 10 seconds.

Examples

```
FS#config
FS(config)#lldp timer tx-interval 10
```

Related	Command	Description
Commands	show lldp status	Displays LLDP status information.

Platform N/A

Description

9.22 lldp tlv-enable

Use this command to configure the types of advertisable TLVs. Use the **no** form of this command to restore the default setting.

lldp tlv-enable { basic-tlv { all | port-description | system-capability | system-description | system-name } | dot1-tlv { all | port-vlan-id | protocol-vlan-id [vlan-id] | vlan-name [vlan-id] } | dot3-tlv { all | link-aggregation | mac-physic | max-frame-size | power } | med-tlv { all | capability | inventory | location { civic-location | elin } identifier id | network-policy profile [profile-num] | power-over-ethernet } }

no lldp tlv-enable { basic-tlv { all | port-description | system-capability | system-description | system-name } | dot1-tlv { all | port-vlan-id | protocol-vlan-id | vlan-name } | dot3-tlv { all | link-aggregation | mac-physic | max-frame-size | power } | med-tlv { all | capability | inventory | location { civic-location | elin } identifier id | network-policy profile [profile-num] | power-over-ethernet } }

Parameter	Parameter	Description
Description	basic-tlv	Basic management TLV
	port-description	Port Description TLV
	system-capability	System Capabilities TLV
	system-description	System Description TLV
	system-name	System Name TLV
	dot1-tlv	802.1 organizationally specific TLV
	port-vlan-id	Port VLAN ID TLV
	protocol-vlan-id	Port And Protocol VLAN ID TLV
	vlan-id	VLAN ID
	vlan-name	VLAN Name TLV

vlan-id	VLAN ID corresponding to the specified VLAN name
dot3-tlv	802.3 organizationally specific TLV
link-aggregation	Link Aggregation TLV
mac-physic	MAC/PHY Configuration/Status TLV
max-frame-size	Maximum Frame Size TLV
power	Power Via MDI TLV
med-tlv	LLDP MED TLV
capability	LLDP-MED Capabilities TLV
inventory	Inventory management TLVs, including hardware revision TLVs, firmware revision TLVs, software revision TLVs, serial number TLVs, manufacturer name TLVs, model name TLVs, and asset ID TLVs.
location	Location Identification TLV
civic-location	Common address information about the network device in location identification TLVs.
elin	Encapsulated emergency number
id	Policy ID
network-policy	Network Policy TLV
profile-num	ID of network policy
power-over-ethernet	Extended Power-via-MDI TLV

Defaults By default, all TLVs other than Location Identification TLV can be advertised on the interface for products other than S12000. For the S12000 product series, only basic TLVs and IEEE 802.1 TLVs are advertised. To advertise IEEE 802.3 TLVs and LLDP-MED TLVs, run the **lldp tlv-enable** command.

Command Mode Interface configuration mode

Usage Guide During configuration of basic management TLVs, IEEE 802.1 TLVs, and IEEE 802.3 TLVs, if the **all** parameter is specified, all optional TLVs of the types are advertised.

During configuration of LLDP-MED TLVs, if the **all** parameter is specified, all LLDP-MED TLVs except Location Identification TLVs are advertised.

When configuring LLDP-MED Capability TLVs, configure LLDP-MED MAC/PHY TLVs first. When canceling LLDP-MED MAC/PHY TLVs, cancel LLDP-MED Capability TLVs first.

When configuring LLDP-MED TLVs, configure LLDP-MED Capability TLVs first so that LLDP-MED TLVs of other types can be configured.

To cancel LLDP-MED TLVs, cancel LLDP-MED TLVs of other types first so that LLDP-MED Capability TLVs can be canceled.

Configuration Examples The following example configures all IEEE 802.1 TLVs to be advertised.

```
FS# configure terminal
FS(config)#interface gigabitethernet 0/1
FS(config-if-GigabitEthernet 0/1)#lldp tlv-enable dot1-tlv all
```

The following example applies LLDP network policy 1 on the 0/1 interface.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if-GigabitEthernet 0/1)#lldp tlv-enable med-tlv network-policy profile 1
```

The following example applies the LLDP Civic Address (ID: 1) configuration on the 0/1 interface.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if-GigabitEthernet 0/1)#lldp tlv-enable med-tlv location civic-location identifier 1
```

The following example applies the emergency number (ID: 1) on the 0/1 interface.

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if-GigabitEthernet 0/1)#lldp location elin identifier 1
```

Related	Command	Description
Commands	show lldp tlv-config interface	Displays the attributes of advertisable TLVs

Platform N/A

Description

9.23 show lldp local-information

Use this command to display the LLDP information of local device. The information will be encapsulated in the TLVs and sent to the neighbor device.

show lldp local-information [**global** | **interface** interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

- Usage Guide**
- **global** parameter: display the global LLDP information to be sent.
 - **interface** parameter: displays the LLDP information to be sent out the interface specified.
 - No parameter: display all LLDP information, including global and interface-based LLDP information.

Configuration Examples The following example displays the device information to be sent to neighbor device.

```
FS# show lldp local-information
Global LLDP local-information:
Chassis ID type      : MAC address
```

```

Chassis id      : 00d0.f822.33aa
System name     : System name
System description : System description
System capabilities supported : Repeater, Bridge, Router
System capabilities enabled : Repeater, Bridge, Router

LLDP-MED capabilities : LLDP-MED Capabilities, Network Policy, Location Identification, Extended Power via
MDI-PD, Inventory
Device class     : Network Connectivity
HardwareRev      : 1.0
FirmwareRev      :
SoftwareRev      : FSOS 10.4(3) Release(94786)
SerialNum        : 1234942570001
Manufacturer name : Manufacturer name
Asset tracking identifier :
-----

Lldp local-information of port [GigabitEthernet 0/1]
-----

Port ID type     : Interface name
Port id          : GigabitEthernet 0/1
Port description :

Management address subtype : 802 mac address
Management address : 00d0.f822.33aa
Interface numbering subtype :
Interface number   : 0
Object identifier  :

802.1 organizationally information
Port VLAN ID      : 1
Port and protocol VLAN ID (PPVID) : 1
  PPVID Supported : YES
  PPVID Enabled   : NO
VLAN name of VLAN 1 : VLAN0001
Protocol Identity :

802.3 organizationally information
Auto-negotiation supported : YES
Auto-negotiation enabled   : YES
PMD auto-negotiation advertised : 100BASE-TX full duplex mode, 100BASE-TX half duplex mode
Operational MAU type       :
PoE support                 : NO

```

```

Link aggregation supported : YES
Link aggregation enabled : NO
Aggregation port ID : 0
Maximum frame Size : 1500

LLDP-MED organizationally information
Power-via-MDI device type : PD
Power-via-MDI power source : Local
Power-via-MDI power priority :
Power-via-MDI power value :
Model name : Model name
    
```

show lldp local-information command output description:

Field	Description
Chassis ID type	Chassis ID type for identifying the Chassis ID field
Chassis ID	Used to identify the device, and is generally represented with MAC address
System name	Name of the sending device
System description	Description of the sending device, including hardware/software version, operating system and etc.
System capabilities supported	Capabilities supported by the system
System capabilities enabled	Capabilities currently enabled by the system
LLDP-MED capabilities	LLDP-MED capabilities supported by the system
Device class	MED device class, which is divided into 2 categories: network connectivity device and terminal device. Network connectivity device Class I: normal terminal device Class II: media terminal device; besides Class I capabilities, it also supports media streams. Class III: communication terminal device; it supports all the capabilities of Class I and Class II and IP communication.
HardwareRev	Hardware version
FirmwareRev	Firmware version
SoftwareRev	Software version
SerialNum	Serial number
Manufacturer name	Device manufacturer
Asset tracking identifier	Asset tracking ID
Port ID type	Port ID type
Port ID	Port ID
Port description	Port description
Management address subtype	Management address type
Management address	Management address

Interface numbering subtype	Type of the interface identified by the management address
Interface number	ID of the interface identified by the management address
Object identifier	ID of the object identified by the management address
Port VLAN ID	Port VLAN ID
Port and protocol VLAN ID	Port and Protocol VLAN ID
PPVID Supported	Indicates whether port and protocol VLAN is supported
PPVID Enabled	Indicates whether port and protocol VLAN is enabled
VLAN name of VLAN 1	Name of VLAN 1
Protocol Identity	Protocol identifier
Auto-negotiation supported	Indicates whether auto-negotiation is supported
Auto-negotiation enabled	Indicates whether auto-negotiation is enabled
PMD auto-negotiation advertised	Auto-negotiation advertising capability of the port
Operational MAU type	Speed and duplex state of the port
PoE support	Indicates whether POE is supported
Link aggregation supported	Indicates whether link aggregation is supported
Link aggregation enabled	Indicates whether link aggregation is enabled
Aggregation port ID	ID of the link aggregation port
Maximum frame Size	Maximum frame size supported by the port
Power-via-MDI device type	Device type, including: PSE (power sourcing equipment) PD (powered device)
Power-via-MDI power source	Power source type
Power-via-MDI power priority	Power supply priority
Power-via-MDI power value	Available power on port
Model name	Name of model

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

9.24 show lldp location

Use this command to display the common LLDP address or emergency number of the local device.

show lldp location { civic-location | elin } { identifier id | interface interface-name | static }

Parameter	Parameter	Description
Description	civic-location	Encapsulates a common address of a network device.
	elin	Encapsulates an emergency number.
	identifier	Displays one address or emergency number configured.
	id	Policy ID of configured information
	interface	Displays the address or emergency number on an interface.

interface-name	Interface name
static	Displays all addresses or emergency numbers configured.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide If the policy ID is specified, the specified address or emergency number is displayed.
 If the interface name is specified, the address or emergency number configured on the interface is displayed.
 If no parameter is specified, all addresses or emergency numbers are displayed.

Configuration The following example displays all addresses.

Examples

```

FS# show lldp location civic-location static
LLDP Civic location information
-----
Identifier      : testt
County         : china
City Division   : 22
Leading street direction : 44
Street number   : 68
Landmark        : 233
Name           : liuy
Building        : 19bui
Floor           : 1
Room            : 33
City            : fuzhou
Country         : 86
Additional location : aaa
Ports           : Gi0/1
-----
Identifier      : tee
-----
    
```

The following example displays all emergency numbers.

```

FS# show lldp location elin static
Elin location information
-----
Identifier : t
Elin      : iiiiiiiii
Ports     : Gi1/0/3
-----
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

9.25 show lldp neighbors

Use this command to display the LLDP information about a neighboring device.

show lldp neighbors [**interface** interface-name] [**detail**]

Parameter	Parameter	Description
Description	interface-name	Interface name
	detail	All information about a neighboring device

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the **detail** parameter is not specified, the brief information about a neighboring device is displayed.
 If the **detail** parameter is specified, the detailed information about a neighboring device is displayed.
 If the **interface** parameter is specified, the neighboring device information received on the specified interface is displayed.

Configuration Examples The following example displays the neighboring device information received on all ports.

```

FS# show lldp neighbors detail
Lldp neighbor-information of port [GigabitEthernet 0/1]
Neighbor index      : 1
Device type         : LLDP Device
Update time         : 1 hour 53minutes 30seconds
Aging time          : 5seconds

Chassis ID type     : MAC address
Chassis id          : 00d0.f822.33cd
System name         : System name
System description  : System description
System capabilities supported : Repeater, Bridge, Router
System capabilities enabled   : Repeater, Bridge, Router

Management address subtype : 802 mac address
Management address   : 00d0.f822.33cd
    
```

```

Interface numbering subtype  :
Interface number           : 0
Object identifier         :

LLDP-MED capabilities     :
Device class              :
HardwareRev               :
FirmwareRev               :
SoftwareRev               :
SerialNum                 :
Manufacturer name         :
Asset tracking identifier   :

Port ID type              : Interface name
Port id                   : GigabitEthernet 0/1
Port description          :

802.1 organizationally information
Port VLAN ID              : 1
Port and protocol VLAN ID (PPVID) : 1
  PPVID Supported         : YES
  PPVID Enabled           : NO
VLAN name of VLAN 1      : VLAN0001
Protocol Identity         :

802.3 organizationally information
Auto-negotiation supported : YES
Auto-negotiation enabled  : YES
PMD auto-negotiation advertised : 1000BASE-T full duplex mode, 100BASE-TX full duplex mode, 100BASE-TX
half duplex mode, 10BASE-T full duplex mode, 10BASE-T half duplex mode
Operational MAU type      : speed(1000)/duplex(Full)
PoE support                : NO
Link aggregation supported : YES
Link aggregation enabled  : NO
Aggregation port ID       : 0
Maximum frame Size        : 1500
LLDP-MED organizationally information
Power-via-MDI device type :
Power-via-MDI power source :
Power-via-MDI power priority :
Power-via-MDI power value :
    
```

Description of fields:

Field	Description
-------	-------------

Neighbor index	Neighbor index
Device type	Type of neighboring device
Update time	Latest update time of neighbor information
Aging time	Aging time of a neighbor, namely the time after which a neighbor is aged and deleted
Chassis ID type	Chassis ID type
Chassis ID	Used to identify a device. Usually, a MAC address is used.
System name	Device name
System description	Device description, including hardware/software version and operating system
System capabilities supported	Functions supported by the system
System capabilities enabled	Functions enabled by the system
Management address subtype	Type of management address
Management address	Management address
Interface numbering subtype	Interface type of management address
Interface number	Interface ID of management address
Object identifier	Object ID of management address
Device class	MED device type: network connectivity device and terminal device Network connectivity device: Class I: general terminal device Class II: media terminal device, including capabilities of Class I and supporting media stream Class III: communication terminal device, including capabilities of Class I and Class II and supporting IP communication
HardwareRev	Hardware version
FirmwareRev	Firmware version
SoftwareRev	Software version
SerialNum	Serial number
Manufacturer name	Manufacturer name
Asset tracking identifier	Asset ID
Port ID type	Port ID type
Port ID	Port ID
Port description	Port description
Port VLAN ID	VLAN ID of a port
Port and protocol VLAN ID	Port and protocol VLAN ID
PPVID Supported	Whether port and protocol VLAN is supported
PPVID Enabled	Whether port and protocol VLAN is enabled
VLAN name of VLAN 1	VLAN 1 name
Protocol Identity	Protocol ID
Auto-negotiation supported	Whether auto-negotiation is supported
Auto-negotiation enabled	Whether auto-negotiation is enabled
PMD auto-negotiation advertised	Port auto-negotiation advertisement capability
Operational MAU type	Rate and duplex status of port auto-negotiation

PoE support	Whether POE is supported
Link aggregation supported	Whether link aggregation is supported
Link aggregation enabled	Whether link aggregation is enabled
Aggregation port ID	ID of link aggregation port
Maximum frame Size	Maximum frame length supported by a port
Power-via-MDI device type	Device type, including: <ul style="list-style-type: none"> ● PSE ● PD
Power-via-MDI power source	Power type
Power-via-MDI power priority	Power supply priority
Power-via-MDI power value	Power value of a port where power is supplied

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

9.26 show lldp network-policy profile

Use this command to display the information about an LLDP network policy.

show lldp network-policy profile [profile-num]

Parameter	Parameter	Description
Description	profile-num	ID of a network policy, in the range from 1 to 1024.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If profile-num is specified, the information about the specified network policy is displayed.
If no parameter is specified, the information about all network policies is displayed.

Configuration Examples The following example displays the information about a network policy.

```
FS# show lldp network-policy profile
Network Policy Profile 1
voice vlan 2 cos 4 dscp 6
voice-signaling vlan 2000 cos 4 dscp 6
Interface:
GigabitEthernet1/0/16
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

9.27 show lldp statistics

The following example displays LLDP statistics.

show lldp statistics [**global** | **interface** interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

- Usage Guide**
- **global** parameter: display the global LLDP statistics.
 - **interface** parameter: display the LLDP statistics of the specified interface.

Configuration Examples The following example displays all LLDP statistics.

```

FS# show lldp statistics
lldp statistics global Information:
Neighbor information last changed time : 1hour 52minute 22second
The number of neighbor information inserted : 2
The number of neighbor information deleted : 0
The number of neighbor information dropped : 0
The number of neighbor information age out : 1

-----

Lldp statistics information of port [GigabitEthernet 0/1]
-----

The number of lldp frames transmitted : 26
The number of frames discarded : 0
The number of error frames : 0
The number of lldp frames received : 12
The number of TLVs discarded : 0
The number of TLVs unrecognized : 0
The number of neighbor information aged out : 0
    
```

show lldp statistics command output description:

Field	Description
Neighbor information last change time	Time the neighbor information is latest updated
The number of neighbor information inserted	Number of times of adding neighbor information
The number of neighbor information deleted	Number of times of removing neighbor information
The number of neighbor information dropped	Number of times of dropping neighbor information
The number of neighbor information aged out	Number of the neighbor information entries that have aged out
The number of lldp frames transmitted	Total number of the LLDPDUs transmitted
The number of frames discarded	Total number of the LLDPDUs discarded
The number of error frames	Total number of the LLDP error frames received
The number of lldp frames received	Total number of the LLDPDUs received
The number of TLVs discarded	Total number of the LLDP TLVs dropped
The number of TLVs unrecognized	Total number of the LLDP TLVs that cannot be recognized
The number of neighbor information aged out	Number of the neighbor information entries that have aged out

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.28 show lldp status

Use this command to display LLDP status information.

show lldp status [interface interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide **interface** parameter: display the LLDP status information of the specified interface.

Configuration Examples The following example displays LLDP status information of all ports.

```
FS# show lldp status
Global status of LLDP      : Enable
```



```

Neighbor information last changed time : 1hour 52minute 22second
Transmit interval      : 30s
Hold multiplier        : 4
Reinit delay          : 2s
Transmit delay        : 2s
Notification interval  : 5s
Fast start counts     : 3
-----
Port [GigabitEthernet 0/1]
-----
Port status of LLDP   : Enable
Port state            : UP
Port encapsulation    : Ethernet II
Operational mode     : RxAndTx
Notification enable   : NO
Error detect enable   : YES
Number of neighbors   : 1
Number of MED neighbors : 0
    
```

show lldp status command output description:

Field	Description
Global status of LLDP	Whether LLDP is globally enabled
Neighbor information last changed time	Time the neighbor information is latest updated
Transmit interval	LLDPDU transmit interval
Hold multiplier	TTL multiplier
Reinit delay	Port re-initialization delay
Transmit delay	LLDPDU transmit delay
Notification interval	Interval for sending LLDP Traps
Fast start counts	The number of fast sent LLDPDUs
Port status of LLDP	Whether LLDP is enabled on the port
Port state	Link status of port: UP or DOWN
Port encapsulation	LLDPDU encapsulation format
Operational mode	Operating mode of LLDP
Notification enable	Whether LLDP Trap is enabled on the port
Error detect enable	Whether error detection is enabled on the port
Number of neighbors	Number of neighbors
Number of MED neighbors	Number of MED neighbors

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

9.29 show lldp tlv-config

Use this command to display the advertisable TLV configuration of a port.

show lldp tlv-config [**interface** interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name
Defaults	N/A	
Command Mode	Privileged EXEC mode	

Usage Guide **Interface** parameter: display the LLDP TLV configuration of the specified interface.

Configuration The following example displays TLV information of port 1.

Examples

```

FS# show lldp tlv-config interface GigabitEthernet 0/1
LLDP tlv-config of port [GigabitEthernet 0/1]
-----
      NAME      STATUS DEFAULT
-----
Basic optional TLV:
Port Description TLV   YES YES
System Name TLV      YES YES
System Description TLV YES YES
System Capabilities TLV YES YES
Management Address TLV YES YES

IEEE 802.1 extend TLV:
Port VLAN ID TLV     YES YES
Port And Protocol VLAN ID TLV YES YES
VLAN Name TLV       YES YES

IEEE 802.3 extend TLV:
MAC-Physic TLV      YES YES
Power via MDI TLV   YES YES
Link Aggregation TLV YES YES
Maximum Frame Size TLV YES YES

LLDP-MED extend TLV:
Capabilities TLV     YES YES
    
```

```

Network Policy TLV    YES YES
Location Identification TLV  NO  NO
Extended Power via MDI TLV  YES YES
Inventory TLV        YES YES
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

9.30 { voice | voice-signaling } vlan

Use this command to configure the LLDP network policy. Use the **no** form of this command to delete the policy.

```
{ voice | voice-signaling } vlan { { vlan-id [ cos cvalue | dscp dvalue ] } | { dot1p [ cos cvalue | dscp dvalue ] } |
none | untagged }
no { voice | voice-signaling } vlan
```

Parameter	Parameter	Description
Description	voice	Voice application
	voice-signaling	Voice-signaling application
	vlan-id	(Optional) VLAN ID of voice flow. The value ranges from 1 to 4094.
	cos	(Optional) Class of service
	cvalue	(Optional) cos of the configured voice flow. The value ranges from 0 to 7, and the default value is 5 .
	dscp	(Optional) Differentiated services code point
	dvalue	(Optional) DSCP value of the configured voice flow. The value ranges from 0 to 63. The default value is 46.
	dot1p	(Optional) 802.1p priority tagging. The tag frame includes user_priority and vlan id is 0.
	none	(Optional) The network policy is not advertised. VoIP determines the network policy based on its configuration.
	untagged	(Optional) The untag frame is sent in the voice vlan in VoIP. In this case, the value of vlan id and cos are ignored.

Defaults N/A

Command Mode LLDP network policy configuration mode

Usage Guide In the LLDP network policy configuration mode, configure the LLDP network policy.

Configuration Examples The following example configures the LLDP network policy (profile-num is 1).

```
FS#config
FS(config)#lldp network-policy profile 1
FS(config-lldp-network-policy)# voice vlan untagged
FS(config-lldp-network-policy)# voice-signaling vlan 3 cos 4
FS(config-lldp-network-policy)# voice-signaling vlan 3 dscp 6
```

Related Commands	Command	Description
	show lldp network-policy profile [profile-num]	Displays the LLDP network policy.

Platform N/A

Description

10 QinQ Commands

10.1 dot1q new-outer-vlan vid translate old-outer-vlan vid inner-vlan v-list

Use this command to modify the policy list of outer vid based on the inner Tag VID and outer Tag VID on the access, trunk, hybrid, uplink port. Use the **no** form of this command to restore the default setting.

dot1q new-outer-vlan vid translate old-outer-vlan vid inner-vlan v_list

no dot1q new-outer-vlan vid translate old-outer-vlan vid inner-vlan v_list

Parameter Description	Parameter	Description
	v_list	Vid list of the
	vid	Vid of outer tag.
	no	Removes the setting.

Defaults The policy list is null by default.

Command Mode Interface configuration mode.

Usage Guide N/A.

Configuration Examples The following example modifies the vid to 3888 when the input packets inner tag vid.

```
FS(config)# vlan 1888, 3888
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode trunk
FS(config-if)# dot1q new-outer-vlan 3888 translate old-outer-vlan 1888 inner-vlan 2001-3000
FS(config-if)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.2 dot1q outer-vid vid register inner-vid v-list

Use this command to configure the add policy list of outer vid based on protocol on tunnel port. Use the **no** form of this command to restore the default setting.

dot1q outer-vid vid register inner-vid v_list

no dot1q outer-vid vid register inner-vid v_list

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
v_list	Inner vlan id list
vid	Outer vlan id list
no	Removes the settings.

Defaults The policy list is null by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example specifies vid in the tag of input message as 4-22 and sets the vid to 3.

Examples

```
FS#configure
FS(config)#interface gigabitEthernet 0/1
FS(config-if)#switchport mode dot1q-tunnel
FS(config-if)#dot1q outer-vid 3 register inner-vid 4-22
FS(config-if)#end
```

Related Commands	Command	Description
	show registration-table [interface intf-id]	N/A

Platform N/A

Description

10.3 dot1q relay-vid vid translate local-vid v-list

Use this command to configure the modify policy list of outer vid based on protocol on access, trunk, hybrid port. Use the **no** form of this command to restore the default setting.

dot1q relay-vid vid translate local-vid v-list

no dot1q relay-vid vid translate local-vid v-list

Parameter Description	Parameter	Description
	v_list	Outer vlan list of input message
vid	Modified outer vlan id list	
no	Removes the settings.	

Defaults The policy list is null by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example specifies vid in the outer tag of input message as 10-20 and sets the vid to 100.

```

Examples
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode access
FS(config-if)# dot1q relay-vid 100 translate local-vid 10-20
FS(config-if)# end
    
```

Related Commands	Command	Description
		show translation-table [interface intf-id]

Platform N/A

Description

10.4 dot1q relay-vid vid translate inner-vid v-list

Use this command to configure the modify policy list of outer vid based on protocol on access, trunk, hybrid port.

Use the **no** form of this command to restore the default setting.

dot1q relay-vid vid **translate inner-vid** v-list

no dot1q relay-vid vid **translate inner-vid** v-list

Parameter Description	Parameter	Description
		v_list
	vid	Modified outer vlan id list
	no	Removes the settings.

Defaults The policy list is null by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures vid in the outer tag of input message as 10-20 and sets the vid to 100.

```

Examples
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode access
FS(config-if)# dot1q relay-vid 100 translate inner-vid 10-20
FS(config-if)# end
    
```

Related Commands	Command	Description
		show translation-table [interface intf-id]

Platform N/A

Description

10.5 dot1q-tunnel cos inner-cos-value remark-cos outer-cos-value

Use this command to map the priority from the outer tag to the inner tag for the packets on the interface. Use the **no** form of this command to restore the default setting.

dot1q-tunnel cos inner-cos-value remark-cos outer-cos-value
no dot1q-tunnel cos inner-cos-value remark-cos outer-cos-value

Parameter
Description

Parameter	Description
no	Cancels the priority mapping of the packets on the interface.

Defaults The policy list is null by default.

Command Interface configuration mode.

Mode

Usage Guide If the QoS policy based on the CoS value is set for the service provider's network to which a user network connects, the CoS value of the outer tag can be set to different values based on the data packet importance. In this case, important services can be preferentially processed and transmitted.

Configuration The following example configures the priority mapping from the outer tag to the inner tag.

Examples

```
FS# configure
FS(config)# interface gigabitEthernet 0/2
FS(config-if)# dot1q-tunnel cos 3 remark-cos 5
FS(config-if)# end
```

Related
Commands

Command	Description
show interface intf-name remark	N/A

Platform N/A

Description

10.6 frame-tag tpid

Use this command to set the packet TPID compatible with the manufacturer TPID. Use the **no** form of this command to restore the default setting.

frame-tag tpid tpid
no frame-tag tpid

Parameter

Parameter	Description
-----------	-------------

Description	
tpid	Packet TPID.
no	Removes the setting.

Defaults The default is 0x8100.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example sets the packet TPID compatible with the manufacturer TPID.

```

Examples
FS(config)# interface g0/3
FS(config-if)# frame-tag tpid 0x9100
FS(config-if)# end
FS# show frame-tag tpid
Port      tpid
-----  -----
Gi0/3     0x9100
    
```

Related Commands	Command	Description
	show frame-tag tpid	N/A

Platform N/A

Description

10.7 inner-priority-trust enable

Use this command to copy the priority of the inner tag to the outer tag of the packets on the interface. Use the **no** form of this command to restore the default setting.

inner-priority-trust enable

no inner-priority-trust enable

Parameter Description	Parameter	Description
	no	Removes the settings.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide If the QOS policy is configured based on the cos value of the user's VLAN tag for the service provider's network to

which a user network connects, the user's VLAN tag priority can be copied to the outer VLAN tag, so that the user's packets are encapsulated with the outer VLAN tag and have the same priority as the user's VLAN tag. In this case, the user's packets can be preferentially processed and transmitted on the service provider's network.

Configuration The following example copies the priority of the inner tag to the outer tag of the packets on the interface.

Examples

```
FS(config)# interface gigabitEthernet 0/2
FS(config-if)# inner-priority-trust enable
```

Related Commands	Command	Description
		show inner-priority-trust

Platform N/A

Description

10.8 12protocol-tunnel

Use this command to set the dot1q-tunnel port to receive L2 protocol message. Use the **no** form of this command to disable this function.

12protocol-tunnel { stp | gvrp }
no 12protocol-tunnel { stp | gvrp }

Parameter Description	Parameter	Description
		stp
	gvrp	Receives gvrp message.
	no	Removes the settings.

Defaults N/A

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example enables the function of receiving L2 protocol gvrp and stp.

Examples

```
FS#configure
FS(config)# 12protocol-tunnel stp
FS(config)# 12protocol-tunnel gvrp
FS(config)#end
```

Related Commands	Command	Description
		show 12protocol-tunnel { gvrp stp }

Platform N/A
Description

10.9 I2protocol-tunnel enable

Use this command to enable transparent transmission of L2 protocol message. Use the **no** form of this command to restore the default setting.

I2protocol-tunnel { stp | gvrp } enable
no I2protocol-tunnel { stp | gvrp } enable

Parameter Description	Parameter	Description
	stp	Transparently transmits stp message.
	gvrp	Transparently transmits gvrp message.
	no	Removes the settings.

Defaults N/A

Command Mode Intereface configuration mode.

Usage Guide N/A

Configuration Examples Here is an example of enabling transparent transmission of L2 protocol message :

```
FS#configure
FS(config)# interface fa 0/1
FS(config-if)# I2protocol-tunnel gvrp enable
FS(config-if)#end
```

Related Commands	Command	Description
	show I2protocol-tunnel { gvrp stp }	N/A

Platform N/A
Description

10.10 I2protocol-tunnel tunnel-dmac

Use this command to set the MAC address for the transparent transmission of the corresponding protocol messages. Use the no form of this command to restore the default setting.

I2protocol-tunnel { stp|gvrp } tunnel-dmac mac-address
no I2protocol-tunnel { stp|gvrp } tunnel-dmac mac-address

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
stp	Sets the STP transparent transmission address.
gvrp	Sets the GVRP transparent transmission address.
mac-address	Sets the transparent transmission address.
no	Restore the transparent transmission address to the default value. If OUI is 001aa9 or 00d0f8, the first three bytes of the default transparent transmission address is 01d0f8, the last three bytes is 000005 for STP and 000006 for GVRP. If OUI is not 001aa9 and 00d0f8, the first three bytes is 01d0f8, the last three bytes is 000005 for STP and 000006 for GVRP.

Defaults The first three bytes of the address are 01d0f8 and the last three bytes are 000005 for **stp** and 000006 for **gvrp** by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the MAC address for the L2-protocol transparent transmission function:

```
FS(config-if)# l2protocol-tunnel gvrp tunnel-dmac 011AA9 000005
FS(config-if)#end
```

Related Commands	Command	Description
	show l2protocol-tunnel { gvrp stp }	N/A

Platform Description N/A

10.11 mac-address-mapping index-id source-vlan src-vlan-list destination-vlan dst-vlan-id

Use this command to copy the MAC address dynamically-learned from the source VLAN to the destination VLAN. Use the **no** form of this command to restore the default setting.

mac-address-mapping index-id **source-vlan** src-vlan-list **destination-vlan** dst-vlan-id
no mac-address-mapping index-id **source-vlan** src-vlan-list **destination-vlan** dst-vlan-id

Parameter Description	Parameter	Description
	index-id	Policy ID of copying MAC addresses.
src-vlan-list	Source VLAN list of copying MAC addresses.	
dst-vlan-id	Destination VLAN ID of copying MAC addresses.	

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example copies the MAC addresses dynamically-learned from the source VLANs 1-3 to the destination VLAN 5.

```
FS#configure
FS(config)# interface gigabitEthernet 0/2
FS(config-if)# mac-address-mapping 1 source-vlan 1-3 destination-vlan 5
FS(config-if)#end
```

Related Commands

Command	Description
show interface mac-address-mapping x	N/A

Platform Description N/A

10.12 show dot1q-tunnel

Use this command to display whether dot1q-tunnel of interface is enabled or not.

show dot1q-tunnel [interface intf-id]

Parameter Description

Parameter	Description
intf-id	The specified interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays whether dot1q-tunnel of interface is enabled or not.

```
FS# show dot1q-tunnel
Ports   Dot1q-tunnel
-----
Gi0/1   Enable
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform

Description

10.13 show frame-tag tpid

Use this command to display the configuration of interface tpid.

show frame-tag tpid [**interface** <intf-id>]

Parameter Description

Parameter	Description
intf-id	Specifies the interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the configuration of interface tpid.

```
FS# show frame-tag tpid
Ports      tpid
-----
Gi0/1      0x9100
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

10.14 show inner-priority-trust

Use this command to display whether the priority copy function is enabled.

show inner-priority-trust

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays whether the priority copy function is enabled.

```
FS# show inner-priority-trust
Port inner-priority-trust
-----
Gi0/1 enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description

10.15 show interface dot1q-tunnel

Use this command to display the VLAN configuration on the dot1q-tunnel port.

show interface [intf-Id] dot1q-tunnel

Parameter Description	Parameter	Description
	intf-id	

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the VLAN configuration on the dot1q-tunnel port.

```
FS# show interface dot1q-tunnel
Interface: Gi0/3
Native vlan: 10
Allowed vlan list: 4-6, 10, 30-60
Tagged vlan list: 4, 6, 30-60
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.16 show interfaces remark

Use this command to display the priority mapping configuration.

show interfaces [intf-id] **remark**

Parameter Description	Parameter	Description
	intf-id	specifies an interface

Defaults N/A

Command Mode Any mode

Usage Guide N/A

Configuration The following example displays the priority mapping configuration.

```

Examples
FS# show interfaces remark
Ports      Type      From value  To value
-----
Gi0/1     Cos-To-Cos  3          5
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.17 show interface mac-address-mapping

Use this command to display the MAC address mapping configuration.

show interface mac-address-mapping index-id

Parameter Description	Parameter	Description
	index-id	Policy ID of copying MAC addresses.

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays the MAC address mapping configuration.

Examples

```
FS# show interface mac-address-mapping 1
Ports          Destination-VID  Source-VID-list
-----
Gi0/1          5                1-3
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

10.18 show interfaces vlan-mapping

Use this command to display the VLAN mapping configuration.

show interfaces vlan-mapping

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Any mode

Usage Guide N/A

Configuration The following example displays the VLAN mapping configuration.

Examples

```
FS# show interfaces vlan-mapping
Ports          Type      Status Destination-VID  Source-VID-list
-----
Gi0/1          in       active      5                3
Gi0/1          out      active      3                5
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

10.19 show l2protocol-tunnel

Use this command to display transparent transmission configuration of L2 protocol.

show l2protocol-tunnel { gvrp | stp }

Parameter Description

Parameter	Description
gvrp	Displays configuration of transparently transmitting gvrp protocol.
stp	Displays configuration of transparently transmitting stp protocol.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays transparent transmission configuration of L2 protocol.

Examples

```
FS# show l2protocol-tunnel stp
L2protocol-tunnel: Stp Enable
FS# show l2protocol-tunnel gvrp
L2protocol-tunnel: gvrp Disable
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

10.20 show registration-table

Use this command to display vid add policy list of prorocol-based dot1q-tunnel port.

show registration-table [interface intf-id]

Parameter Description

Parameter	Description
intf-id	Specifies the interface.

Defaults Null policy list.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays vid add policy list of prorocol-based dot1q-tunnel port.

```

Examples
FS# show registration-table
Ports      Type      Outer-VID  Inner-VID-list
-----
Gi0/7      Add-outer  5          7-10,15,20-30
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.21 show traffic-redirect

Use this command to display flow-based vid change or add policy list.

show traffic-redirect [**interface** intf-id]

Parameter Description	Parameter	Description
	intf-id	Specifies the interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays flow-based vid change or add policy list.

```

Examples
FS# show traffic-redirect
Ports      Type      VID  Match-filter
-----
Gi0/3      Mod-outer  23  11
Gi0/3      Mod-outer  3   4
Gi0/3      Mod-outer  6   5
Gi0/3      Mod-inner  8   inner-to-8
Gi0/6      Mod-inner  9   100
Gi0/7      Nested-vid 13  nest-13
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.22 show translation-table

Use this command to display vid modify policy list of prorocol-based access, trunk, hybrid port.

show translation-table [interface intf-id]

Parameter Description	Parameter	Description
	intf-id	intf-id

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide

Usage Guide N/A

Configuration Examples The following example displays vid modify policy list of prorocol-based access, trunk, hybrid port.

```

FS# show translation-table
Ports      Type      Relay-VID  Old-local  Local\inner-VID-list
-----
Gi0/7     Inner-CVID 8      N/A        10-20
Gi0/7     Local-SVID 1001    N/A        30-60
Gi0/7     In+Out    8          20         50
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.23 switchport dot1q-tunnel allowed vlan

Use this command to configure the allowed VLAN of dot1q-tunnel. Use the no form of this command to restore the default setting.

switchport dot1q-tunnel allowed vlan [add] { tagged|untagged } v_list

switchport dot1q-tunnel allowed vlan remove v_list

no switchport dot1q-tunnel allowed vlan

Parameter Description	Parameter	Description
	add	Add allowed VLAN.
	tagged	Tag-carried.
	untagged	Not tag-carried.
	v_list	vlan id list.
	no	Remove the settings.

Defaults The default is **untagged 1**.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example specifies vlan 3-6 of dot1q-tunnel port as allowed VLAN and outputting the frame with tag.

```
FS(config)#interface gigabitEthernet 0/1
FS(config-if)#switchport dot1q-tunnel allowed vlan tagged 3-6
FS(config)#end
```

Related Commands	Command	Description
	show interface dot1q-tunnel	N/A

Platform Description N/A

10.24 switchport dot1q-tunnel native vlan

Use this command to configure the default vlan id of dot1q-tunnel. Use the no form of this command to restore the default setting.

switchport dot1q-tunnel native vlan vid
no switchport dot1q-tunnel native vlan

Parameter Description	Parameter	Description
	vid	Configures default vlan id.
	no	Configures default vlan as 1.

Defaults The default is VLAN 1.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example specifies default VLAN of dot1q-tunnel port as 8.

```

Examples
FS(config)#interface gigabitEthernet 0/1
FS(config-if)#switchport dot1q-tunnel native vlan 8
FS(config)#end
    
```

Related Commands

Command	Description
show interface dot1q-tunnel	N/A

Platform N/A

Description

10.25 switchport mode dot1q-tunnel

Use this command to configure the interface as the dot1q-tunnel interface. Use the **no** form of this command to restore the default setting.

switchport mode dot1q-tunnel

no switchport mode

Parameter Description

Parameter	Description
no	Deletes the corresponding dot1q-tunnel interface configuration.

Defaults The interface is not a tunnel port by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures the interface as the dot1q-tunnel interface.

```

Examples
FS(config)# interface gi 0/1
FS(config-if)# switchport access vlan 22
FS(config-if)# switchport mode dot1q-tunnel
FS(config)# end
    
```

Related Commands

Command	Description
show vlan	N/A

Platform N/A
Description

10.26 traffic-redirect access-group acl inner-vlan vid out

Use this command to configure the modification policy of inner vid based on flow for the packets outputted from the access, trunk, hybrid port. Use the **no** form of this command to restore the default setting.

traffic-redirect access-group acl inner-vlan vid out
no traffic-redirect access-group acl inner-vlan

Parameter
Description

Parameter	Description
acl	Flow matching.
vid	Modified inner vid
no	Removes the settings.

Defaults N/A

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration The following example specifies the outer vid of outgoing messages whose source address is 1.1.1.2 as 6,

Examples

```
FS#configure
FS(config)#ip access-list standard to_6
FS(config-std-nacl)#permit host 1.1.1.2
FS(config-std-nacl)#exit
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode trunk
FS(config-if)# traffic-redirect access-group to_6 inner-vlan 6 out
FS(config-if)# end
```

Related
Commands

Command	Description
show traffic-redirect	N/A

Platform N/A
Description

10.27 traffic-redirect access-group acl nested-vlan vid in

Use this command to configure vid add policy list based on flow on dot1q-tunne port. Use the **no** form of this command to restore the default setting.

traffic-redirect access-group acl nested-vlan vid in
no traffic-redirect access-group acl nested -vlan

Parameter Description

Parameter	Description
acl	Flow matching.
vid	vid list to be added.
no	Removes the settings.

Defaults The policy list is null by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example specifies the vid of input message whose source address is 1.1.1.3 as 9.

```
FS#configure
FS(config)#ip access-list standard 20
FS(config-std-nacl)#permit host 1.1.1.3
FS(config-std-nacl)#exit
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode dot1q-tunnel
FS(config-if)# traffic-redirect access-group 20 nested-vlan 10 in
FS(config-if)# end
```

Related Commands

Command	Description
show traffic-redirect	N/A

Platform Description N/A

10.28 traffic-redirect access-group acl outer-vlan vid in

Use this command to configure the modify policy list of outer vid based on flow on access, trunk, hybrid port. Use the **no** form of this command to restore the default setting.

traffic-redirect access-group acl outer-vlan vid in
no traffic-redirect access-group acl outer-vlan

Parameter Description

Parameter	Description
acl	Flow matching.
vid	Modified outer vid list

no	Removes the settings.
-----------	-----------------------

Defaults The policy list is null by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example specifies outer vid of input message whose source address is 1.1.1.1 as 3.

```

Examples
FS# configure
FS(config)#ip access-list standard 2
FS(config-std-nacl)# permit host 1.1.1.1
FS(config-std-nacl)# exit
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode trunk
FS(config-if)# traffic-redirect access-group 2 outer-vlan 3 in
FS(config-if)# end
    
```

Related Commands

Command	Description
show traffic-redirect	N/A

Platform N/A

Description

10.29 vlan-mapping-in vlan src-vlan-list remark dest-vlan

Use this command to set policy table mapped with the VLAN in the ingress direction on Access, Trunk, Hybrid, and Uplink ports and change the VLAN ID of the input packets as the specified VLAN ID before forwarding the packets. Use the **no** or **default** form of this command to restore the default setting.

vlan-mapping-in vlan src-vlan-list **remark** dest-vlan

no vlan-mapping-in vlan src-vlan-list **remark** dest-vlan

default vlan-mapping-in vlan src-vlan-list **remark** dest-vlan

Parameter Description

Parameter	Description
src-vlan-list	Vid list of the input packets.
dest-vlan	Modified vid
no	Removes the settings.

Defaults The policy list is null by default.

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration Examples The following example specifies the vid of the input messages whose vids in the tag ranges from 3 to 7 as 4 and forwards it.

```
FS# configure terminal
FS(config)# vlan range 3-8
FS(config-vlan-range)# exit
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode trunk
FS(config-if)# vlan-mapping-in vlan 3-7 remark 8
FS(config-if)# end
```

Related Commands

Command	Description
show interface [intf-id] vlan-mapping	N/A

Platform N/A
Description

10.30 vlan-mapping-out vlan src-vlan remark dest-vlan

Use this command to configure the policy list of the one-to-one VLAN mapping in the outgoing direction on the access, trunk, hybrid, uplink port. Use the **no** or **default** form of this command to restore the default setting.

- vlan-mapping-out vlan** src-vlan **remark** dest-vlan
- no vlan-mapping-out vlan** src-vlan **remark** dest-vlan
- default vlan-mapping-out vlan** src-vlan **remark** dest-vlan

Parameter Description

Parameter	Description
src-vlan	Vid of the input packets
dest-vlan	The modified vid
no	Removes the settings.

Defaults The policy list is null by default.

Command Interface configuration mode.
Mode

Usage Guide N/A

Configuration The following example specifies the vid of the incoming messages whose vid in the tag is 3 as 4 and forwards it.

Examples

```

FS# configure terminal
FS(config)# vlan range 3-4
FS(config-vlan-range)# exit
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport mode trunk
FS(config-if)# vlan-mapping-out vlan 3 remark 4
FS(config-if)# end
    
```

**Related
Commands**

Command	Description
show interface [intf-id] vlan-mapping	N/A

Platform

N/A

Description

11 L3-PKT-COUNTER ENABLE Commands

11.1 l3-pkt-counter enable

Use this command to enable the IP traffic statistics on the Layer-3 interface.

l3-pkt-counter enable

Parameter Description	<table><thead><tr><th>Parameter</th><th>Description</th></tr></thead><tbody><tr><td>N/A</td><td>N/A</td></tr></tbody></table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Command Mode	Global configuration mode				
Default Level	14				
Usage Guide	N/A				
Configuration Example	The following example enables the IP traffic statistics function on a Layer-3 interface. <pre>FS(config)#l3-pkt-counter enable</pre>				
Platform Description	N/A				

12 Positioning Lamp Commands

12.1 posit-lamp enable

Use this command to enable the positioning lamp function on a port. Use the **no** form of this command to disable the positioning lamp function.

posit-lamp enable

no posit-lamp enable

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Command Mode	Interface configuration mode				
Default Level	14				
Usage Guide	Enable the positioning lamp function on a port so that the physical LED indicator of the port is solid red.				
Configuration Example	<p>The following example configures the LED indicator mode.</p> <pre> FS#configure Enter configuration commands, one per line. End with CNTL/Z. FS(config)#int TenGigabitEthernet 0/1 FS(config-if-TenGigabitEthernet 0/1)#posit-lamp enable FS(config-if-TenGigabitEthernet 0/1)#exit FS(config)# </pre>				
Platform Description	N/A.				

13 PHY Firmware Upgrade Commands

13.1 phy firmware upgrade

Use this command to upgrade the external phy firmware.

phy firmware upgrade

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Upgrade for the external phy firmware is disabled.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide It is recommended to isolate services before upgrading the external PHY firmware. Do not power off the device during upgrade. After an upgrade is completed, restart the device for the upgrade to take effect.

Configuration Example The following example upgrades the external firmware.

```
FS#phy firmware upgrade
```

Platform Description This command is supported on NC8400-4TH.

Chapter 3 IP Address & Application Commands

1. IP Address/Service Commands
2. ARP Commands
3. IPv6 Commands
4. DHCP Commands
5. DHCPv6 Commands
6. DNS Commands
7. FTP Server Commands
8. FTP Client Commands
9. Tunnel Commands
10. Network Connectivity Test Tool Commands
11. TCP Commands
12. IPv4/IPv6 REF Commands

1 IP Address/Service Commands

1.1 gateway

Use this command to set the gateway address for the management port. Use the **no** form of this command to remove the setting.

gateway address

no gateway

Parameter	Parameter	Description
Description	address	Sets the gateway address for the management port

Defaults N/A

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example sets the gateway address for the management port to 1.1.1.1.

```
FS(config)# interface mgmt 0
FS(config-if-Mgmt 0)# gateway 1.1.1.1
FS(config-if-Mgmt 0)#
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.2 ip-address

Use this command to configure the IP address of an interface. Use the **no** form of this command to restore the default setting.

ip address ip-address network-mask { [**secondary**] | [**dual-active backup**] }

no ip address [ip-address network-mask { [**secondary**] | [**dual-active backup**] }

Parameter	Parameter	Description
Description	ip-address	32-bit IP address, with 8 bits in one group in decimal format. Groups are separated by dots.
	network-mask	32-bit network mask. 1 stands for the mask bit, 0 stands for the host bit, with 8 bits in one group in decimal format. Groups are separated by dots.
	secondary	Secondary IP address
	dual-active backup	Configures the IP addresses for standby device of a VSU, which is only supported

	on the MGMT interface.
--	------------------------

Defaults No IP address is configured for the interface by default.

Command Mode Interface configuration mode.

Usage Guide The equipment cannot receive and send IP packets before it is configured with an IP address. After an IP address is configured for the interface, the interface is allowed to run the Internet Protocol (IP).

The network mask is also a 32-bit value that identifies which bits among the IP address is the network portion. Among the network mask, the IP address bits that correspond to value "1" are the network address. The IP address bits that correspond to value "0" are the host address. For example, the network mask of Class A IP address is "255.0.0.0". You can divide a network into different subnets using the network mask. Subnet division means to use the bits in the host address part as the network address part, so as to reduce the capacity of a host and increase the number of networks. In this case, the network mask is called subnet mask.


The FSOS software supports multiple IP address for an interface, in which one is the primary IP address and others are the secondary/slave IP addresses. Theoretically, there is no limit for the number of secondary IP addresses. The primary IP address must be configured before the secondary IP addresses. The secondary IP address and the primary IP address must belong to the same network or different networks. Secondary IP addresses are often used in network construction. Typically, you can try to use secondary IP addresses in the following situations:

A network hasn't enough host addresses. At present, the LAN should be a class C network where 254 hosts can be configured. However, when there are more than 254 hosts in the LAN, another class C network address is necessary since one class C network is not enough. Therefore, the device should be connected to two networks and multiple IP addresses should be configured.

Many older networks are layer 2-based bridge networks that have not been divided into different subnets. Use of secondary IP addresses will make it very easy to upgrade this network to an IP layer-based routing network. The equipment configures an IP address for each subnet.

Two subnets of a network are separated by another network. You can create a subnet for the separated network, and connect the separated subnet by configuring a secondary IP address. One subnet cannot appear on two or more interfaces of a device.

The **dual-active backup** command is used on the management port of the VSU device to configure the standby IP address. Generally, only the active IP address is applied. If the VSU works in dual-active mode, the standby IP address will be applied to the standby device as the management IP address.

-  It is recommended to use the **dual-active backup** command with the **mgmt_mode unique** command. The standby IP address will not take effect until the VSU works in dual-active mode. If a device contains more than one management ports. it is recommended to configure each management port with an IP address instead of running only the **dual-active backup** command.

Configuration The following example configures the primary IP address and the network mask as 10.10.10.1 and 255.255.255.0 respectively .

Examples

```
FS(config-if)# ip address 10.10.10.1 255.255.255.0
```

The following example configures active and standby IP addresses.

```
FS(config)#interface mgmt 0
FS(config-if-Mgmt 0)# ip address 172.28.48.57 24 dual-active backup
```

Related

Commands

Command	Description
show interface	Displays detailed information of the interface.

Platform

N/A

Description

1.3 ip broadcast-address

Use this command to define a broadcast address for an interface in the interface configuration mode. Use the **no** form of this command to restore the default setting.

ip broadcast-address ip-address

no ip broadcast-address

Parameter

Description

Parameter	Description
ip-address	Broadcast address of IP network

Defaults

The default IP broadcast address is 255.255.255.255.

Command Mode

Interface configuration mode.

Usage Guide

At present, the destination address of IP broadcast packet is all "1", represented as 255.255.255.255. The FSOS software can generate broadcast packets with other IP addresses through definition, and can receive both all "1" and the broadcast packets defined by itself.

Configuration

Examples

The following example sets the destination address of IP broadcast packets generated by this interface to 0.0.0.0.

```
FS(config-if)# ip broadcast-address 0.0.0.0
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

1.4 ip icmp error-interval

Use this command to set the rate to send the ICMP destination unreachable packets triggered by DF in the IP header. Use the **no** form of this command to restore the default setting.

```
ip icmp error-interval DF milliseconds [ bucket-size ]
```

```
no ip icmp error-interval DF milliseconds [ bucket-size ]
```

Use this command to set the rate to send other ICMP error packets. Use the **no** form of this command to restore the default setting.

```
ip icmp error-interval milliseconds [bucket-size]
```

```
no ip icmp error-interval milliseconds [ bucket-siz ]
```

Parameter	Parameter	Description
Description	milliseconds	The refresh period of the token bucket, in the range from 0 to 2147483647 in the unit of milliseconds. 0 indicates no limit on the rate to send ICMP error packets. The default is 100.
	bucket-size	The number of tokens in the bucket, in the range is from 1 to 200. The default is 10.

Defaults The default rate is 10 packets per 100 millisecond.

Command Mode Global configuration mode.

Usage Guide To prevent DoS attack, the token bucket algorithm is adopted to limit the rate to send ICMP error packets. If IP packets need to be fragmented while the DF is set to 1, the device sends ICMP destination unreachable packets numbered 4 to the source IP address for path MTU discovery. Rate limits on ICMP destination unreachable packets and other error packets are needed to prevent path MTU discovery failure. It is recommended to set the refresh period to an integral multiple of 10 milliseconds. If the refresh period is not an integral multiple of 10 milliseconds, it is adjusted automatically. For example, 1 per 5 milliseconds is adjusted to 2 per 10 milliseconds; 3 per 15 milliseconds is adjusted to 2 per 10 milliseconds.

Configuration Examples The following example sets the rate to send the ICMP destination unreachable packets triggered by DF in the IP header to 100 per second.

```
FS(config)# ip icmp error-interval DF 1000 100
```

The following example sets the rate to send other ICMP error packets to 10 per second.

```
FS(config)# ip icmp error-interval 1000 10
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.5 ip directed-broadcast

Use this command to enable the conversion from IP directed broadcast to physical broadcast in the interface configuration mode. Use the **no** form of this command to restore the default setting.

ip directed-broadcast [access-list-number]

no ip directed-broadcast

Parameter	Parameter	Description
Description	access-list-number	(Optional) Access list number, in the range from 1 to 199 and from 1300 to 2699. After an access list number has been defined, only the IP directed broadcast packets that match this access list are converted.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide

IP directed broadcast packet is an IP packet whose destination address is an IP subnet broadcast address. For example, the packet with the destination address 172.16.16.255 is called a directed broadcast packet. However, the node that generates this packet is not a member of the destination subnet. The device that is not directly connected to the destination subnet receives an IP directed broadcast packet and handles this packet in the same way as forwarding a unicast packet. After the directed broadcast packet reaches a device that is directly connected to this subnet, the device converts the directed broadcast packet into a flooding broadcast packet (typically the broadcast packet whose destination IP address is all "1"), and then sends the packet to all the hosts in the destination subnet in the manner of link layer broadcast.

You can enable conversion from directed broadcast into physical broadcast on a specified interface, so that this interface can forward a direct broadcast packet to a directly connected network. This command affects only the final transmission of directed broadcast packets that have reached the destination subnet instead of normal forwarding of other directed broadcast packets.

You can also define an access list on an interface to control which directed broadcast packets to forward. After an access list is defined, only the packets that conform to the conditions defined in the access list undergo conversion from directed broadcast into physical broadcast.

If the **no ip directed-broadcast** command is configured on an interface, FSOS will discard the directed broadcast packets received from the directly connected network.

Configuration Examples The following example enables forwarding of directed broadcast packet on the fastEthernet 0/1 port of a device.

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip directed-broadcast
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.6 ip icmp source

Use this command to configure the source address of ICMP packets. Use the **no** form of this command to restore the default setting.

ip icmp source [vrf vrf-name] ip-address

no ip icmp source

	Parameter	Description
Parameter	vrf-name	Specifies the name of a configured VRF instance.
Description	ip-address	Specifies the source address of ICMP packets.

Defaults By default, no source address is configured for ICMP packets.

Command Mode Global configuration mode

Usage Guide In a network with a large number of IP addresses configured, it is complex for receivers to recognize from which device ICMP packets are sent. To simplify the judgement, you can choose a specified address, like the address of the loopback interface, as the source address for ICMP packets.

Configuration The following example sets 192.168.1.1 as the source address for ICMP packets.

Examples FS(config)# ip icmp souce 192.168.1.1

	Command	Description
Related Commands	N/A	N/A

Platform Description N/A

1.7 ip icmp timestamp

Use this command to enable the device to return a Timestamp Reply. Use the **no** form of this command to disable returning of Timestamp Reply.

ip icmp timestamp

no ip icmp timestamp

	Parameter	Description
Parameter	N/A	N/A
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example disables the device to return a Timestamp Reply.

Examples `FS(config)# no ip icmp timestamp`

Command	Description
N/A	N/A

Platform Description N/A

1.8 ip mask-reply

Use this command to configure the FSOS software to respond the ICMP mask request and send an ICMP response message in the interface configuration mode. Use the **no** form of this command to restore the default setting.

ip mask-reply
no ip mask-reply

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command mode Interface configuration mode.

Usage Guide Sometimes, a network device needs the subnet mask of a subnet on the Internet. To obtain such information, the network device can send an ICMP mask request message, and the network device that receives this message will send a mask response message.

Configuration Examples The following example sets the FastEthernet 0/1 interface of a device to respond the ICMP mask request message.

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip mask-reply
```

Command	Description
N/A	N/A

Platform Description N/A

1.9 ip mtu

Use this command to set the Maximum Transmission Unit (MTU) for an IP packet in the interface configuration mode. Use the **no** form of this command is restore the default setting.

ip mtu bytes
no ip mtu

Parameter	Description
bytes	Maximum transmission unit of IP packet , in the range from 68 to 1500 bytes

Defaults It is the same as the value configured in the interface command **mtu** by default.

Command Mode Interface configuration mode.

Usage Guide If an IP packet is larger than the IP MTU, the FSOS software will split this packet. All the devices in the same physical network segment must have the same IP MTU for the interconnected interface.
If the interface configuration command **mtu** is used to set the maximum transmission unit value of the interface, IP MTU will automatically match with the MTU value of the interface. However, if the IP MTU value is changed, the MTU value of the interface will remain unchanged.

Configuration The following iexample sets the IP MTU value of the fastEthernet 0/1 interface to 512 bytes.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip mtu 512
```

Related Commands	Command	Description
	mtu	

Platform Description N/A

1.10 ip redirects

Use this command to allow the FSOS software to send an ICMP redirection message in the interface configuration mode. Use the **no** form of this command to disable this function.

- ip redirects**
- no ip redirects**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode.

Usage Guide When the route is not optimum, it may make the device to receive packets through one interface and send it though the same interface. If the device sends the packet through the interface through which this packet is received, the device will send an ICMP redirection message to the data source, telling the data source that the gateway for the destination address is another device in the subnet. In this way the data source will send subsequent packets along the optimum path.

Configuration The following example disables ICMP redirection for the fastEthernet 0/1 interface.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# no ip redirects
```


Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

1.11 ip redirect-drop

Use this command to enable protection of routed ports. Use the **no** form of this command to disable this function.

ip redirect-drop
no ip redirect-drop

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide This command is used to forbid packets to come in and go out via the same routed port.

Configuration Examples The following example requires packets coming in via the fastEthernet 0/1 interface to go out via other routed ports .

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# ip redirect-drop
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

1.12 ip source-route

Use this command to allow the FSOS software to process an IP packet with source route information in global configuration mode. Use the **no** form of this command to disable this function.

ip source-route
no ip source-route

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Global configuration mode.

Mode

Usage Guide FSOS supports IP source route. When the device receives an IP packet, it will check the options of the IP packet, such as strict source route, loose source route and record route. Details about these options can be found in RFC 791. If an option is found to be enabled in this packet, a response will be made. If an invalid option is detected, an ICMP parameter problem message will be sent to the data source, and then this packet is discarded.

Configuration The following example disables the IP source route.

Examples FS(config)# no ip source-route

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.13 ip ttl

Use this command to set the TTL value of the unicast packet. Use the **no** form of this command to restore the default setting.

ip ttl value

no ip ttl

Parameter	Parameter	Description
Description	value	Sets the TTL value of the unicast packet, in the range from 0 to 255.

Defaults The default is 64.

Command Global configuration mode

Mode

Usage Guide N/A

Configuration The following example sets the TTL value of the unicast packet to 100.

Examples FS(config)# ip ttl 100

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.14 ip ttl-expires enable

This command is used to enable notifications of expired TTL. Use the **no** form of this command to disable this function.

ip ttl-expires enable

no ttl-expires enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, notifications are enabled to indicate expired TTL.

Command mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example disables notifications indicating expired TTL.

```
FS(config)# no ttl-expires enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.15 ip unnumbered

This command is used to configure unnumbered interfaces. After an interface is set to an unnumbered interface, IP can be run on the interface and packets can be sent or received on the interface. Use the **no** form of this command to restore the default setting.

ip unnumbered interface-type interface-number

no ip unnumbered

Parameter	Parameter	Description
Description	interface-type	Type of the associated interface
	interface-number	No. of the associated interface

Defaults No unnumbered interface is configured by default.

Command mode Interface configuration mode

Usage Guide An unnumbered interface indicates that IP is enabled on the interface but no IP address is allocated for the interface. An unnumbered interface must associate with an interface with an IP address. The source IP address of the IP packets generated on an unnumbered interface is the IP address of the associated interface. In addition, the routing protocol process determines whether to send route update packets to the unnumbered interface according to the IP address of the associated interface. Pay attention to the following when using an unnumbered interface:

An Ethernet interface cannot be set to an unnumbered interface.

When SLIP, HDLC, PPP, LAPB, and Frame-relay are encapsulated on a serial port, the port can be set to an unnumbered interface. When a frame relay is encapsulated, only a point-to-point subinterface can be set to an unnumbered interface. In the case of X.25 encapsulation, unnumbered interface is not allowed.

The **ping** command cannot be used to check whether an unnumbered interface is working properly because the interface does not have an IP address. The status of an unnumbered interface can be remotely monitored over SNMP.

The network cannot be enabled using an unnumbered interface.

Configuration Examples to the following example configures the local interface as an unnumbered interface and sets the associated interfacet to FastEthernet 0/1 (an IP address is configured for the interface).

```
FS(config-if)# ip unnumbered fastEthernet 0/1
```

Related Commands	Command	Description
	show interface	Displays the detailed information about the interface.

Platform N/A

Description

1.16 ip unreachable

Use this command to allow the FSOS software to generate ICMP destination unreachable messages. Use the **no** form of this command to disable this function.

ip unreachable

no ip unreachable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode.

Usage Guide FSOS software will send a ICMP destination unreachable message if it receives unicast message with self-destination-address and can not process the upper protocol of this message.
 FSOS software will send ICMP host unreachable message to source data if it can not forward a message due to no routing.
 This command influences all ICMP destination unreachable messages.

Configuration The following example disables sending ICMP destination unreachable message on FastEthernet 0/1.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# no ip unreachable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.17 show ip interface

Use this command to display the IP status information of an interface.

show ip interface [interface-type interface-number | **brief**]

Parameter	Parameter	Description
Description	interface-type	Specifies interface type.
	interface-number	Specifies interface number.
	brief	Displays the brief configurations about the IP of the layer-3 interface (including the interface primary ip, secondary ip and interface status)

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide When an interface is available, FSOS will create a direct route in the routing table. The interface is available in that the FSOS software can receive and send packets through this interface. If the interface changes from available status to unavailable status, the FSOS software removes the appropriate direct route from the routing table.
 If the interface is unavailable, for example, two-way communication is allowed, the line protocol status will be shown as "UP". If only the physical line is available, the interface status will be shown as "UP".
 The results shown may vary with the interface type, because some contents are the interface-specific options

Configuration The following example displays the output of the **show ip interface brief** command.

Examples

```
FS#show ip interface brief
Interface IP-Address(Pri) IP-Address(Sec) Status Protocol
GigabitEthernet 0/10 2.2.2.2/24 3.3.3.3/24 down down
GigabitEthernet 0/11 no address no address down down
```

VLAN 1 1.1.1.1/24 no address down down

Description of fields:

Field	Description
Status	Link status of an interface. The value can be up , down , or administratively down .
Protocol	IPv4 protocol status of an interface.

The following example displays the output of the **show ip interface vlan** command.

```
SwitchA#show ip interface vlan 1
VLAN 1
IP interface state is: DOWN
IP interface type is: BROADCAST
IP interface MTU is: 1500
IP address is:
1.1.1.1/24 (primary)
IP address negotiate is: OFF
Forward direct-broadcast is: OFF
ICMP mask reply is: ON
Send ICMP redirect is: ON
Send ICMP unreachable is: ON
DHCP relay is: OFF
Fast switch is: ON
Help address is:
Proxy ARP is: OFF
ARP packet input number: 0
Request packet: 0
Reply packet: 0
Unknown packet: 0
TTL invalid packet number: 0
ICMP packet input number: 0
Echo request: 0
Echo reply: 0
Unreachable: 0
Source quench: 0
Routing redirect: 0
```

Description of fields in the results:

Field	Description
IP interface state is:	The network interface is available, and both its interface hardware status and line protocol status are "UP".
IP interface type is:	Show the interface type, such as broadcast, point-to-point, etc.
IP interface MTU is:	Show the MTU value of the interface.
IP address is:	Show the IP address and mask of the interface.
IP address negotiate is:	Show whether the IP address is obtained through negotiation.

Forward direct-broadcast is:	Show whether the directed broadcast is forwarded.
ICMP mask reply is:	Show whether an ICMP mask response message is sent.
Send ICMP redirect is:	Show whether an ICMP redirection message is sent.
Send ICMP unreachable is:	Show whether an ICMP unreachable message is sent.
DHCP relay is:	Show whether the DHCP relay is enabled.
Fast switch is:	Show whether the IP fast switching function is enabled.
Route horizontal-split is:	Show whether horizontal split is enabled, which will affect the route update behavior of the distance vector protocol.
Help address is:	Show the helper IP address.
Proxy ARP is:	Show whether the agent ARP is enabled.
ARP packet input number: Request packet: Reply packet: Unknown packet:	Show the total number of ARP packets received on the interface, including: ARP request packet ARP reply packet Unknown packet
TTL invalid packet number:	Show the TTL invalid packet number
ICMP packet input number: Echo request: Echo reply: Unreachable: Source quench: Routing redirect:	Show the total number of ICMP packets received on the interface, including: Echo request packet Echo reply packet Unreachable packet Source quench packet Routing redirection packet
Outgoing access list is	Show whether an outgoing access list has been configured for an interface.
Inbound access list is	Show whether an incoming access list has been configured for an interface.

Related	Command	Description
Commands	N/A.	N/A.

Platform N/A.

Description

1.18 show ip interface-statistics

Use this command to display the statistics of IP packets on an interface.

show ip interface-statistics [interface-name] { **ipv4** | **ipv6** }

Parameter	Parameter	Description
Description	ipv4	Displays IPv4 packets.

ipv6	Displays IPv6 packets.
interface-name	Specifies the interface name.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the statistics of IP packets on the interface, VLAN 1.

Examples

```

FS# show ip interface-statistics vlan 1 ipv4
Description
  The interface traffic statistics of IPv4 or IPv6 packets.
  And the per-interface statistics contains the objects of
  ipIfStatsTable defined in RFC4293.
Interface: VLAN 1
IP version: IPv4
  ipIfStatsInReceives: 0
  ipIfStatsHCInReceives: 0
  ipIfStatsInOctets: 0
  ipIfStatsHCInOctets: 0
  ipIfStatsInHdrErrors: 0
  ipIfStatsInBadSum: 0
  ipIfStatsInNoRoutes: 0
  ipIfStatsInAddrErrors: 0
  ipIfStatsInUnknownProtos: 0
  ipIfStatsInTruncatedPkts: 0
  ipIfStatsInForwDatagrams: 0
  ipIfStatsHCInForwDatagrams: 0
  ipIfStatsReasmReqds: 0
  ipIfStatsReasmOKs: 0
  ipIfStatsReasmFails: 0
  ipIfStatsInDiscards: 0
  ipIfStatsInDelivers: 0
  ipIfStatsHCInDelivers: 0
  ipIfStatsOutRequests: 0
  ipIfStatsHCOutRequests: 0
  ipIfStatsOutForwDatagrams: 0
  ipIfStatsHCOutForwDatagrams: 0
  ipIfStatsOutDiscards: 0
  ipIfStatsOutFragReqds: 0
  ipIfStatsOutFragOKs: 0
  ipIfStatsOutFragFails: 0
  ipIfStatsOutFragCreates: 0
  ipIfStatsOutTransmits: 0
  ipIfStatsHCOutTransmits: 0
    
```



```
ipIfStatsOutOctets: 0
ipIfStatsHCOctets: 0
ipIfStatsInMcastPkts: 0
ipIfStatsHCInMcastPkts: 0
ipIfStatsInMcastOctets: 0
ipIfStatsHCInMcastOctets: 0
ipIfStatsOutMcastPkts: 0
ipIfStatsHCOctets: 0
ipIfStatsOutMcastOctets: 0
ipIfStatsHCOctets: 0
ipIfStatsInBcastPkts: 0
ipIfStatsHCInBcastPkts: 0
ipIfStatsOutBcastPkts: 0
ipIfStatsHCOctets: 0
ipIfStatsDiscontinuityTime: 0
ipIfStatsRefreshRate: 0
```

```
FS# show ip interface-statistics vlan 1 ipv6
```

Description

The interface traffic statistics of IPv4 or IPv6 packets.
And the per-interface statistics contains the objects of
ipIfStatsTable defined in RFC4293.

Interface: VLAN 1

IP version: IPv6

```
ipIfStatsInReceives: 0
ipIfStatsHCInReceives: 0
ipIfStatsInOctets: 0
ipIfStatsHCInOctets: 0
ipIfStatsInHdrErrors: 0
ipIfStatsInBadSum: 0
ipIfStatsInNoRoutes: 0
ipIfStatsInAddrErrors: 0
ipIfStatsInUnknownProtos: 0
ipIfStatsInTruncatedPkts: 0
ipIfStatsInForwDatagrams: 0
ipIfStatsHCInForwDatagrams: 0
ipIfStatsReasmReqds: 0
ipIfStatsReasmOKs: 0
ipIfStatsReasmFails: 0
ipIfStatsInDiscards: 0
ipIfStatsInDelivers: 0
ipIfStatsHCInDelivers: 0
ipIfStatsOutRequests: 0
ipIfStatsHCOctets: 0
```

```

ipIfStatsOutForwDatagrams: 0
ipIfStatsHCOutForwDatagrams: 0
ipIfStatsOutDiscards: 0
ipIfStatsOutFragReqs: 0
ipIfStatsOutFragOKs: 0
ipIfStatsOutFragFails: 0
ipIfStatsOutFragCreates: 0
ipIfStatsOutTransmits: 0
ipIfStatsHCOutTransmits: 0
ipIfStatsOutOctets: 0
ipIfStatsHCOutOctets: 0
ipIfStatsInMcastPkts: 0
ipIfStatsHCInMcastPkts: 0
ipIfStatsInMcastOctets: 0
ipIfStatsHCInMcastOctets: 0
ipIfStatsOutMcastPkts: 0
ipIfStatsHCOutMcastPkts: 0
ipIfStatsOutMcastOctets: 0
ipIfStatsHCOutMcastOctets: 0
ipIfStatsInBcastPkts: 0
ipIfStatsHCInBcastPkts: 0
ipIfStatsOutBcastPkts: 0
ipIfStatsHCOutBcastPkts: 0
ipIfStatsDiscontinuityTime: 0
ipIfStatsRefreshRate: 0
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

1.19 show ip packet queue

Use this command to display the statistics of IP packet queues.

show ip packet queue

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following example displays the statistics of IP packet queues.

Examples

```
FS#show ip packet queue
Receive 31925 packets(fragment=0):
    IP packet receive queue: length 0, max 1542, overflow 0.
    Receive 13 ICMP echo packets, 25 ICMP reply packets .
Discards:
    Failed to alloc skb: 0.
    Receive queue overflow: 0.
    Unknow protocol drops: 0.
    ICMP rcv drops: 0. for skb check fail.
    ICMP rcv drops: 0. for skb is broadcast.
Sent packets:
    Success: 15644
    Generate 13 and send 8 ICMP reply packets, send 26 ICMP echo packets.
    It records 187 us as max time in ICMP reply process.
Failed to alloc ebuf: 0
Dropped by EFMP: 0
NoRoutes: 887
Get vrf fails: 0
Cannot assigned address drops: 0
Failed to encapsulate ethernet head: 0
ICMP error queue: length 0, max 1542, overflow 0.
```

Field	Description
IP packet receive queue	Statistics of received packets
Discards	Statistics of discarded packets
Sent packets	Statistics of sent packets
ICMP error queue	Statistics of ICMP error packets

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.20 show ip packet statistics

Use this command to display the statistics of IP packets.

show ip packet statistics [total | interface-name]

Parameter	Parameter	Description
Description	interface-name	Interface name

total	Displays the total statistics of all interfaces.
-------	--

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following example displays the output of this command.

Examples

```
FS# show ip packet statistics
Total
Received 1000 packets, 1000000 bytes
Unicast:1000,Multicast:0,Broadcast:0
Discards:0
HdrErrors:0(BadChecksum:0,TTLExceeded:0,Others:0)
NoRoutes:0
Others:0
Sent 100 packets, 6000 bytes
Unicast:50,Multicast:50,Broadcast:0

VLAN 1
Received 1000 packets, 1000000 bytes
Unicast:1000,Multicast:0,Broadcast:0
Discards:0
HdrErrors:0(BadChecksum:0,TTLExceeded:0,Others:0)
NoRoutes:0
Others:0
Sent 100 packets, 6000 bytes
Unicast:50,Multicast:50,Broadcast:0
```

Related Commands	Command	Description
	ip default-gateway	Configures the default gateway, which is only supported on the Layer 2 switch.

Platform N/A

Description

1.21 show ip raw-socket

Use this command to display IPv4 raw sockets.

show ip raw-socket [num]

Parameter	Parameter	Description
Description	num	Protocol.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following example displays all IPv4 raw sockets.

Examples

```
FS# show ip raw-socket
Number Protocol Process name
1 ICMP dhcp.elf
2 ICMP vrrp.elf
3 IGMP igmp.elf
4 VRRP vrrp.elf
Total: 4
```

Field Description

Field	Description
Number	Number
Protocol	Protocol
Process name	Process name
Total	Total number

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.22 show ip sockets

Use this command to display all IPv4 sockets.

show ip sockets

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following displays all IPv4 sockets.

Examples

```

FS# show ip sockets
Number Process name      Type      Protocol LocalIP:Port  ForeignIP:Port  State
1    dhcp.elf              RAW       ICMP        0.0.0.0:1     0.0.0.0:0       *
2    vrrp.elf              RAW       ICMP        0.0.0.0:1     0.0.0.0:0       *
3    igmp.elf              RAW       IGMP        0.0.0.0:2     0.0.0.0:0       *
4    vrrp.elf              RAW       VRRP        0.0.0.0:112   0.0.0.0:0       *
5    dhcpc.elf             DGRAM    UDP         0.0.0.0:68    0.0.0.0:0       *
6    rg-snmpd              DGRAM    UDP         0.0.0.0:161   0.0.0.0:0       *
7    wbav2                 DGRAM    UDP         0.0.0.0:2000  0.0.0.0:0       *
8    vrrp_plus.elf         DGRAM    UDP         0.0.0.0:3333  0.0.0.0:0       *
9    mpls.elf              DGRAM    UDP         0.0.0.0:3503  0.0.0.0:0       *
10   rds_other_th          DGRAM    UDP         0.0.0.0:3799  0.0.0.0:0       *
11   rg-snmpd              DGRAM    UDP         0.0.0.0:14800 0.0.0.0:0       *
12   rg-sshd               STREAM   TCP         0.0.0.0:22    0.0.0.0:0       LISTEN
13   rg-telnetd            STREAM   TCP         0.0.0.0:23    0.0.0.0:0       LISTEN
14   wbard                 STREAM   TCP         0.0.0.0:4389  0.0.0.0:0       LISTEN
15   wbard                 STREAM   TCP         0.0.0.0:7165  0.0.0.0:0       LISTEN
Total: 15
    
```

Field Description

Field	Description
Number	Serial number.
Process name	Process name.
Type	Socket type, including the following types: RAW: raw sockets DGRAM: datagram type STREAM: stream type.
Protocol	Protocol.
LocalIP:Port	Local IP address and port.
ForeignIP:Port	Peer IP address and port.
State	State. This field is for only TCP sockets.
Total	The total number of sockets.

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.23 show ip udp

Use this command to display IPv4 UDP sockets.

show ip udp [local-port num]

Use this command to display IPv4 UDP socket statistics.

show ip udp statistics

Parameter	Parameter	Description
Description	local-port num	Local port number

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following example displays all IPv4 UDP sockets.

```

Examples
FS# show ip udp
Number Local Address      Peer Address      Process name
1      0.0.0.0:68             0.0.0.0:0        dhcpc.elf
2      0.0.0.0:161            0.0.0.0:0        rg-snmpd
3      0.0.0.0:2000           0.0.0.0:0        wbav2
4      0.0.0.0:3333           0.0.0.0:0        vrrp_plus.elf
5      0.0.0.0:3503           0.0.0.0:0        mpls.elf
6      0.0.0.0:3799           0.0.0.0:0        rds_other_th
7      0.0.0.0:14800          0.0.0.0:0        rg-snmpd
    
```

Field Description

Field	Description
Number	Number.
Local Address	Local IP address and port.
Peer Address	Peer IP address and port.
Process name	Process name.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2 ARP Commands

2.1 arp

Use this command to add a permanent IP address and MAC address mapping to the ARP cache table. Use the **no** form of this command to restore the default setting.

arp ip-address MAC-address type [**alias**]

no arp ip-address MAC-address type [**alias**]

Parameter	Description
ip-address	The IP address that corresponds to the MAC address. It includes four parts of numeric values in decimal format separated by dots.
MAC-address	48-bit data link layer address
type	ARP encapsulation type. The keyword is arpa for the Ethernet interface.
alias	(Optional) FSOS will respond to the ARP request from this IP address after this parameter is defined.

Defaults There is no static mapping record in the ARP cache table by default.

Command Mode Global configuration mode.

Usage Guide FSOS finds the 48-bit MAC address according to the 32-bit IP address using the ARP cache table. Since most hosts support dynamic ARP resolution, usually static ARP mapping is not necessary. The **clear arp-cache** command can be used to delete the ARP mapping that is learned dynamically.

Configuration The following example sets an ARP static mapping record for a host in the Ethernet.

Examples FS(config)# arp 1.1.1.1 4e54.3800.0002 arpa

Related Commands	Command	Description
	clear arp-cache	Clears the ARP cache table

Platform N/A

Description

2.2 arp anti-ip-attack

For the messages corresponds to the directly-connected route, if the switch does not learn the ARP that corresponds to the destination IP address, it is not able to forward the message in hardware, and it needs to send the message to the CPU to resolve the address(that is the ARP learning). Sending large number of this message to the CPU will influence the other tasks of the switch. To prevent the IP messages from attacking the CPU, a discarded entry is set to the hardware during the address resolution, so that all sequential messages with that destination IP address are not sent to the CPU. After the address resolution, the entry is updated to the forwarding status, so that the switch could forward the message with that destination IP address in hardware.

In general, during the ARP request ,if the switch CPU receives three destination IP address messages corresponding to the ARP entry, it is considered to be possible to attack the CPU and the switch sets the discarded entry to prevent the unknown unicast message from attacking the CPU. User could set the num parameter of this command to decide whether it attacks the CPU in specific network environment or disable this function. Use the **arp anti-ip-attack** command to set the parameter or disable this function. Use the **no** form of this command to restore the default setting.

arp anti-ip-attack num

no arp anti-ip-attack

Parameter Description	Parameter	Description
	num	The number of the IP message to trigger the ARP to set the discarded entry in the range from 0 to 100. 0 stands for disabling the arp anti-ip-attack function.

Defaults By default, set the discarded entry after 3 unknown unicast messages are sent to the CPU.

Command Mode Global configuration mode.

Usage Guide The arp anti-ip-attack function needs to occupy the switch hardware routing resources when attacked by the unknown unicast message. If there are enough resources, the **arp anti-ip-attack num** could be smaller. If not, in order to preferential ensure the use of the normal routing, the num could be larger or disable this function.

Configuration The following example sets the IP message number that triggers to set the discarding entry as 5.

Examples

```
FS(config)# arp anti-ip-attack 5
```

The following example disables the ARP anti-ip-attack function.

```
FS(config)# arp anti-ip-attack 0
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.3 arp any-ip

Use this command to enable any IP ARP function.
Use the **no** form of this command to restore the default setting.

arp any-ip

no arp any-ip

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide You should modify the configuration to access the network in the following two cases:
 The terminal IP address is in the network segment configured on an interface connected directly with the device, but the gateway IP address is not the IP address configured for the directly connected interface.
 The terminal IP address is not in the network segment configured on the interface connected directly with the device. Instead, it is in another network segment, causing an IP address conflict.
 If the terminal IP address is not in the connected network segment, the dynamic ARP table entries and directly connected routes are generated following ARP requests initiated by terminals. In the following two cases (but not limited to the following two cases), terminals cannot access the network and your terminal should re-learn the gateway IP address after clearing ARP table entries.
 The device proxy responses the ARP request. After learning the device MAC address, dynamic ARP table entries and directly connected routes are cleared, the response packet cannot reach the terminal.
 The device proxy responses the ARP request. The terminal disables any IP ARP and then enables it on the interface after the learning the devices MAC address.
 Disabling any IP ARP will clear dynamic ARP table entries and directly connected routes, causing the response packet unable to reach the terminal.
 If there are corresponding static ARP tables entries or ARP table entries of the VRRP IP address, dynamic ARP table entries generated by any IP ARP may be overwritten or not be added, causing any IP ARP failure.

Configuration The following example enables any IP ARP function.

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# arp any-ip
```

The following example disables any IP ARP function.

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# no arp any-ip
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.4 arp cache interface-limit

Use this command to set the maximum number of ARP learned on the interface.
 Use the **no** form of this command to restore the default setting.

- arp cache interface-limit** limit
- no arp cache interface-limit**

Parameter	Parameter	Description
-----------	-----------	-------------

Description	limit	Sets the maximum number of ARP learned on the interface, including static and dynamic ARPs, in the range from 0 to the number supported on the interface. 0 indicates that the number is not limited.
--------------------	-------	---

Defaults The default is 0.

Command Interface configuration mode

Mode

Usage Guide This function can prevent ARP attacks from generating ARP entries to consume memory. limit must be no smaller than the number of ARPs learned on the interface. Otherwise, the configuration does not take effect.

Configuration The following example sets the maximum number of ARP learned on the interface to 300.

Examples

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# arp cache interface-limit 300
```

The following example restores the default setting.

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# no arp any-ip
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.5 arp fast-aging enable

Use this command to enable fast aging of ARP entries. Use the **no** form of this command to restore the default setting.

- arp fast-aging enable**
- no arp fast-aging enable**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide By default, dynamic ARP entries start aging one hour after the aging of their corresponding MAC addresses. If this feature is configured, after their corresponding MAC address age, the dynamic ARP entries age immediately.
This command is supported on SVI and Overlay Router interfaces.

When ARP-to-host conversion is configured, it is recommended to enable this function at the same time, to help achieve fast route convergence.

Configuration The following example enables fast aging of ARP entries on the SVI 2 interface.

Examples FS(config-if-VLAN 2)#arp fast-aging enable

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.6 arp gratuitous-send interval

Use this command to set the interval of sending the free ARP request message on the interface. Use the **no** form of this command to restore the default setting.

arp gratuitous-send interval seconds

no arp gratuitous-send

Parameter Description	Parameter	Description
	seconds	The time interval to send the free ARP request message in the range from 1 to 3600 in the unit of seconds.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide If an interface of the switch is used as the gateway of its downlink devices and counterfeit gateway behavior occurs in the downlink devices, you can configure to send the free ARP request message regularly on this interface to notify that the switch is the real gateway.

Configuration The following example sets to send one free ARP request to SVI 1 per second.

Examples FS(config)# **interface vlan 1**
FS(config-if)# arp gratuitous-send interval 1

The following example stops sending the free ARP request to SVI 1.

FS(config)# **interface vlan 1**
FS(config-if)# no arp gratuitous-send

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.7 arp l2port-down fast-delete

Use this command to delete ARP entries when L2 ports get down. Use the **no** form of this command to restore the default setting.

arp l2port-down fast-delete

no arp l2port-down fast-delete

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, ARP entries are not deleted when L2 ports get down.

Command Mode Interface configuration mode.

Usage Guide Run the **arp l2port-down fast-delete** command on an SVI, so ARP entries are removed as soon as L2 ports under this SVI get down. Without configuring this feature, ARP entries are deleted only after their aging time is reached.

Configuration The following example enables fast removal of ARP entries when L2 ports get down.

Examples FS(config-if-VLAN 1)# arp l2port-down fast-delete

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.8 arp mac-flapping resolve enable

Use this command to enable ARP probe upon MAC address flapping. Use the **no** form of this command to restore the default setting.

arp mac-flapping resolve enable

no arp mac-flapping resolve enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide If MAC address flapping occurs, namely, the layer-2 interface changes and is inconsistent with the interface recorded in the ARP entry, the device will continue to send ARP request packets to probe the actual interface until the probe succeeds.

The interface will not be updated immediately when MAC address flapping occurs. Instead, it will be updated after the probe finishes or after the device receives ARP response packets to learn the interface again. If there is consistent attack flow, the interface recorded in the ARP entry may not be consistent with the actual MAC address.

If you want to update the interface immediately when MAC address flapping occurs, please disable this command.

Configuration The following example enables ARP probe upon MAC address flapping.

Examples FS(config)# arp mac-flapping resolve enable

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.9 arp mac-flapping resolve interval

Use this command to configure the ARP probe interval upon MAC address flapping. Use the **no** form of this command to restore the default setting.

arp mac-flapping resolve interval [seconds]

no arp mac-flapping resolve interval

Parameter	Parameter	Description
Description	seconds	Sets the ARP probe interval in seconds. Min: 1.

Defaults The default interval is 2 seconds.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example sets the ARP probe interval to 5 seconds.

Examples FS(config)# arp mac-flapping resolve interval 5

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.10 arp mac-flapping resolve times

Use this command to configure the ARP probe count upon MAC address flapping. Use the **no** form of this

command to restore the default setting.

arp mac-flapping resolve times [number]

no arp mac-flapping resolve times

Parameter	Parameter	Description
Description	number	Sets the ARP probe count. Min: 1

Defaults The default count is 5.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example sets the ARP probe count to 1.

```
FS(config)# arp mac-flapping resolve times 1
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.11 arp oob

Use this command to configure the static ARP on the management interface. Use the **no** form of this command to restore the default setting.

arp oob [mgmt.-name] ip-address mac-address type

no arp oob [mgmt.-name] ip-address

Parameter	Parameter	Description
Description	ip-address	The IP address corresponding to the MAC address, written as four groups of dotted decimal values.
	mac-address	The data link layer address, composed of 48 bits.
	type	The ARP encapsulation type. The key word for the Ethernet interface is arpa .
	mgmt.-name	Specifies the ARP-mapping management interface when there are multiple management interfaces.

Defaults No static ARP is configured by default.

Command Mode Global configuration mode

Usage Guide FSOS uses the ARP cache table to search for the 48-bit MAC address according to the 32-bit IP address. Most hosts support dynamic ARP analysis, so static ARP mapping does not need to be configured. The clear

arp-cache oob command is used to clear the ARP mapping learned by the management port dynamically. If no management interface is specified, the static ARP is configured on the first management interface by default. If you specify the first management interface, the mgmt-name parameter is not displayed by running the **show run** command.

Configuration The following example configures a static ARP mapping record for the Ethernet host

Examples

```
FS(config)# arp oob 1.1.1.1 4e54.3800.0002 arpa
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.12 arp rate-statistic enable

Use this command to enable ARP packet rate statistics collection. Use the **no** form of this command to disable ARP packet rate statistics collection.

arp rate-statistic enable
no arp rate-statistic enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Default Level 2

Usage Guide ARP packet rate statistics collection is disabled by default. If it is enabled, the ARP packet receiving/sending rate is measured on all interfaces.

Configuration The following example enables statistics collection of ARP packet rates in global configuration mode.

Examples

```
FS(config)#arp rate-statistic enable
```

Verification Run the **show this** or **show run-config** command to display configurations.

2.13 arp rate-statistic compute interval

Use this command to set the interval of ARP packet rate statistics collection. Use the **no** form of this command to cancel the interval of ARP packet rate statistics collection.

arp rate-statistic compute interval seconds
no arp rate-statistic compute interval

Parameter	Parameter	Description
Description	seconds	Sampling interval, not less than 1s
Defaults	ARP packet rate statistics are collected at an interval of 5s by default.	
Command Mode	Global configuration mode	
Default Level	2	
Usage Guide	The sampling interval is 5s by default. This command is used to adjust the interval for collecting ARP packet receiving/sending statistics.	
Configuration	The following example modifies the interval of packet rate statistics collection in global configuration mode.	
Examples	FS(config)#arp rate-statistic compute interval 10	
Verification	Run the show this or show run-config command to display configurations.	

2.14 arp reply-auto-learning enable

Use this command to enable passive ARP response packet learning. Use the **no** form of this command to restore the default setting.

- arp reply-auto-learning enable**
- no arp reply-auto-learning enable**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults	This function is disabled by default.	
Command Mode	Global configuration mode	
Usage Guide	The device does not learn ARP response packets when it does not send ARP request packets by default. Run the arp reply-auto-learning enable command to enable passive ARP response packet learning.	
Configuration	The following example enables passive ARP response packet learning.	
Examples	FS(config)# arp reply-auto-learning enable	

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

2.15 arp retry interval

Use this command to set the frequency for sending the arp request message locally, namely, the time interval between two continuous ARP requests sent for resolving one IP address. Use the **no** form of this command to restore the default setting.

arp retry interval seconds

no arp retry interval

Parameter	Parameter	Description
Description	seconds	Time for retransmitting the ARP request message in the range from 1 to 3600 in the unit of seconds.

Defaults The default is 1.

Command Mode Global configuration mode.

Usage Guide The switch sends the ARP request message frequently, and thus causing problems like network busy. In this case, you can set the retry interval of the ARP request message longer. In general, it should not exceed the aging time of the dynamic ARP entry.

Configuration Examples The following example sets the retry interval of the ARP request as 30 seconds.

```
FS(config)# arp retry interval 30
```

Related Commands	Command	Description
	arp retry times	Number of times for retransmitting an ARP request message.

Platform N/A

Description

2.16 arp retry times

Use this command to set the local retry times of the ARP request message, namely, the times of sending the ARP request message to resolve one IP address. Use the **no** form of this command to restore the default setting.

arp retry times number

no arp retry times

Parameter	Parameter	Description
Description	number	The times of sending the same ARP request in the range from 1 to 100. When it is set as 1, it indicates that the ARP request is not retransmitted, only 1 ARP request message is sent.

Defaults The default is 5.

Command Mode Global configuration mode.

Usage Guide The switch sends the ARP request message frequently, and thus causing problems like network busy. In this case, you can set the retry times of the ARP request smaller. In general, the retry times should not be set too large.

Configuration The following example sets the local ARP request not to be retried.

Examples FS(config)# arp retry times 1

The following example sets the local ARP request to be retried for one time.

FS(config)# arp retry times 2

Related	Command	Description
Commands	arp retry interval	Interval for retransmitting an ARP request message

Platform N/A

Description

2.17 arp scan auto

Use this command to enable scheduled automatic ARP scanning.

arp scan auto [start-ip-address end-ip-address]

Parameter	Parameter	Description
Description	start-ip-address	Specifies the start IP address of the ARP scan range. The start IP address must be smaller than or equal to the end IP address.
	end-ip-address	Specifies the end IP address of the ARP scan range. The end IP address must be greater than or equal to the start IP address.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Default Level 2

- Usage Guide**
- This function is enabled to perform scheduled automatic ARP scanning once every 5 minutes by default.
 - The IP address with existing neighboring ARP entries is not scanned.
 - If you know the allocated IP address range in a LAN, you can specify the ARP scan range. The number of the specified IP addresses cannot be greater than 1,024.
 - The start/end IP address of the ARP scan range must be in the same network segment as the interface IP address.
 - ARP scanning takes effect on UP interfaces only.

Configuration The following example enables scheduled automatic ARP scanning with the IP address range specified.

Examples FS(config)# interface vlan 10

```
FS(config-if-VLAN 10)# arp scan auto 1.1.1.1 1.1.1.10
```

Verification Run the **show run-config** command to display configurations.

Prompts 1. If the start/end IP address is not a valid host address, the start IP address is greater than the end IP address, or the start/end IP address is not in the same network segment as the interface IP address, the following information is displayed:

```
Invalid ip address range.
```

2. If the number of IP addresses in the specified range is greater than 1,024, the following information is displayed:

```
Failed to scan because ip address range is larger than 1024.
```

- Common Errors**
1. The start IP address is greater than the end IP address.
 2. The start/end IP address is not in the same network segment as the interface IP address.

2.18 arp scan interval

Use this command to configure the scheduled automatic ARP scanning interval.

arp scan interval minutes

Parameter	Parameter	Description
Description	minutes	Sets the automatic ARP scanning interval in minutes. The value ranges from 1 to 30.

Defaults The automatic ARP scanning interval is 5 minutes by default.

Command Mode Global configuration mode

Default Level 2

Usage Guide After automatic scanning is enabled on interfaces, this command is used to configure the scanning interval, which is 5 minutes by default.
The scheduled scanning interval indicates the duration between the end of scanning on all interfaces and the start of the next scanning.

Configuration The following example configures the scheduled automatic ARP scanning interval to 1 minute.

Examples FS(config)# arp scan interval 1

Verification Run the **show run-config** command to display configurations.

2.19 arp scan rate

Use this command to configure the scheduled automatic ARP scanning rate.

arp scan rate rate-value

Parameter	Parameter	Description
-----------	-----------	-------------

Description	rate-value	Sets the scheduled automatic ARP scanning rate in pps. The value ranges from 1 to 100.
--------------------	------------	--

Defaults The default scanning rate is 20 pps.

Command Mode Global configuration mode

- Usage Guide**
- The scanning rate indicates the maximum rate of scanning in the case of normal responses from the host to the scanning device.
 - If the scanning rate is 100pps, it indicates that the device scans a maximum of 100 IP addresses per second.
 - If the device scans all IP addresses in the required network segment and already learns ARP entries, the rate of next scanning is 0.

Configuration The following example sets the scheduled automatic ARP scanning rate to 80pps.

Examples

```
FS(config)# arp scan rate 80
```

Verification Run the **show run-config** command to display configurations.

2.20 arp-suppress-auth-vlan-req

Use this command to disable the SVI interface from sending the ARP request to the authentication VLAN. Use the **no** form of this command to disable this function.

arp suppress-auth-vlan-req
no arp suppress-auth-vlan-req

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode

Usage Guide

In gateway authentication mode, all sub-VLANs of SuperVLAN are authentication VLANs by default. Users on authentication VLANs should pass the authentication before accessing the network. Static ARP table entries are generated on the device after users pass authentication. The device does not need to send ARP requests to the authentication VLAN when accessing these users. If the device accesses users on the authentication-exemption VLAN, it only needs to send ARP requests to the authentication-exemption VLAN.

In gateway authentication mode, the device enables suppression of ARP request sent to the authentication VLAN by default. If the device needs to access authentication-exemption users on the authentication VLAN, this function should be disabled.

Configuration The following example disables VLAN 2 from sending the ARP request to the authentication VLAN.

Examples

```
FS(config)# interface vlan 2
FS(config-if-VLAN 2)# arp suppress-auth-vlan-req
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.21 arp switch-over resolve

Use this command to enable active ARP resolution during active/standby switchovers in global configuration mode. Use the **no** form of this command to disable active ARP resolution during active/standby switchovers.

arp switch-over resolve
no arp switch-over resolve

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Active ARP resolution during active/standby switchovers is disabled by default.

Command Mode Global configuration mode

Default Level 2

Usage Guide N/A

Configuration The following example enables active ARP resolution during active/standby switchovers.

Examples

```
FS(config)# arp switch-over resolve
```

Verification Run the **show running-config** command to display configurations.

2.22 arp timeout

Use this command to configure the timeout for the ARP static mapping record in the ARP cache. Use the **no** form of this command to restore the default setting.

arp timeout seconds
no arp timeout

Parameter	Parameter	Description
Description	secondsv	The timeout is in the range from 0 to 2147483 in the unit of seconds.

Defaults The default is 3600.

Command Mode Interface configuration mode/Global configuration mode

Usage Guide The ARP timeout setting is only applicable to the IP address and the MAC address mapping that are learned dynamically. The shorter the timeout, the truer the mapping table saved in the ARP cache, but the more network bandwidth occupied by the ARP. Hence the advantages and disadvantages should be weighted. Generally it is not necessary to configure the ARP timeout unless there is a special requirement. The ARP timeout configuration is supported in both global and interface configuration modes and interface configuration mode has a higher priority over the global configuration mode. If interface 1 is configured with 3000s ARP timeout in global configuration mode and 1800s ARP timeout in interface configuration mode, the 1800s configuration takes effect. ARP timeout for the other interfaces is determined by global configuration, namely, 3000s.

Configuration Examples The following example sets the timeout for the dynamic ARP mapping record that is learned dynamically from FastEthernet port 0/1 to 120s.

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# arp timeout 120
```

The following example sets the ARP timeout to 3000s.

```
FS(config)# arp timeout 3000
```

Related Commands

Command	Description
clear arp-cache	Clears the ARP cache list.
show interface	Displays the interface information.

Platform N/A

Description

2.23 arp track

Use this command to enable the ARP link tracking function. Use the **no** form of this command to restore the default setting.

arp [**vrf name**] ip-address **track** object-number

no arp [**vrf name**] ip-address **track** object-number

Parameter Description

Parameter	Description
vrf name	VRF instance. By default, no VRF instance is configured.
ip-address	IP address of an ARP entry
track object-number	Specifies track object ID, in the range from 1 to 700.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide When the track object is down, the ARP entry is deleted. If there are still packets destined to this IP address, the

device sends ARP broadcast packets to learn ARP again. This function is applied to the situation when the downlink devices perform switchover and the active device does not send gratuitous ARP, leading to failure to update MAC table on the uplink device. After this function is enabled, the ARP entry is deleted when the destination IP address is unreachable. The device learns ARP again to trigger ARP response from the downlink device, updating the MAC table on the uplink device.

Configuration Examples The following example configures track object 1 for ARP entry 1.1.1.1. If track object 1 is unreachable, ARP entry 1.1.1.1 is deleted.

```
FS(config)# arp 1.1.1.1 track 1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.24 arp trust-monitor enable

Use this command to enable egress gateway trusted ARP. Use the **no** form of this command to restore the default setting.

- arp trust-monitor enable**
- no arp trust-monitor enable**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide The egress gateway trusted ARP is different from GSN trusted ARP. With this function enabled, the device sends a unicast request for confirmation when learning an ARP table entry. The device learns the ARP table entry after receiving the response. When the device receives the ARP packet, only if the ARP table entry is aged or incomplete and the ARP packet is a response packet will the packet be handled. After egress gateway trusted ARP is enabled, the aging time of the ARP table entry turns to 60 seconds. After this function is disabled, the aging time restores to 3600 seconds.

Configuration Examples The following example enables egress gateway trusted ARP.

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# arp trust-monitor enable
```

The following example disables engress gateway trusted ARP.

```
FS(config)# interface gi 0/0
FS(config-if-GigabitEthernet 0/0)# no arp trust-monitor enable
```


Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

2.25 arp unresolve

Use this command to set the maximum number of the unresolved ARP entries. Use **no** form of this command to restore the default setting.


arp unresolve number
no arp unresolve

Parameter	Parameter	Description
Description	number	The maximum number of the unresolved ARP entries in the range from 1 to the ARP table size supported by the device.

Defaults The default is the ARP table size supported by the device.

Command Mode Global configuration mode.

Usage Guide If there are a large number of unresolved entries in the ARP cache table and they do not disappear after a period of time, this command can be used to limit the quantity of the unresolved entries.

 The maximum number of the unresolved ARP entries limits the number of neighbors that can be resolved at a time. If the device needs to resolve a large number of neighbors, it will take a long time to finish resolving all neighbors if the arp unresolve number is set to a small value.

Configuration The following example sets the maximum number of the unresolved items to 500.

Examples

```
FS(config)# arp unresolve 500
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

2.26 clear arp-cache

Use this command to remove a dynamic ARP mapping record from the ARP cache table and clear an IP route cache table.

clear arp-cache [**vrf** vrf_name] [ip [mask]] | **interface** interface-name | **all-vrf** [ip [mask]]

Parameter	Parameter	Description
Description	vrf vrf_name	Deletes dynamic ARP entries of the specified VRF instance. The default is the public instance.
	ip	Deletes ARP entries of the specified IP address. If trusted value is specified, trusted ARP entries are deleted; otherwise, all dynamic ARP entries are deleted which is the default.
	mask	Deletes ARP entries in a subnet mask. If trusted value is specified, trusted ARP entries in the subnet mask are deleted; otherwise, all dynamic ARP entries are deleted. The dynamic ARP entry specified by the IP address is deleted by default.
	interface interface-name	Deletes dynamic ARP entries on the specified interface. Dynamic ARP entries are deleted on all interfaces by default.
	all-vrf	Deletes dynamic ARP entries in all VRF.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command can be used to refresh an ARP cache table. On a NFPP-based (Network Foundation Protection Policy) device, it receives one ARP packet for every mac/ip address per second by default. If the interval of two **clear arp** times is within 1s, the second response packet will be filtered and the ARP packet will not be resolved for a short time.

Configuration The following example deletes all dynamic ARP mapping records.

Examples FS# clear arp-cache

The following deletes the dynamic ARP entry 1.1.1.1.

FS# clear arp-cache 1.1.1.1

The following example deletes the dynamic ARP entry on interface SVI1.

FS# clear arp-cache interface Vlan 1

The following example deletes dynamic ARP entries in all VRF.

FS# clear arp-cache all-vrf

Related	Command	Description
Commands	arp	Adds a static mapping record to the ARP cache table.

Platform N/A

Description

2.27 clear arp-cache oob

Use this command to clear dynamic ARP mapping records.

clear arp-cache oob [ip [mask]]

Parameter	Parameter	Description
Description	ip	Clears the ARP table entry of the specified IP address. All dynamic ARP table entries are cleared by default.
	mask	Clears the ARP table entry within the specified subnet. The dynamic ARP table entry of the specified IP address (the previous parameter) is cleared by default.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide On a device supporting Network Foundation Protection Policy (NFPP), every MAC / IP address receives an ARP packet per second by default. If the **clear arp oob** command is run twice within one second, the second response packet may be filtered, causing ARP unanalysis for a short time.

Configuration Examples The following example clears the cache table of dynamic ARP mapping records.

```
FS# clear arp-cache oob
```

The following example clears dynamic ARP table entry 1.1.1.1.

```
FS# clear arp-cache oob 1.1.1.1
```

The following example clears the dynamic ARP table entry within the specified subnet.

```
FS# clear arp-cache oob 1.0.0.0 255.0.0.0
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.28 clear arp-cache packet statistics

Use this command to clear ARP packet statistics.

clear arp-cache packet statistics [interface]

Parameter	Parameter	Description
Description	interface	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

Default Level 2

Usage Guide This command is used to clear ARP packet statistics.

Configuration The following example clears ARP packet statistics in privileged EXEC mode.

Examples FS#sho arp-cache packet statistics

The following example clears ARP packet statistics on a specified interface in privileged EXEC mode.

FS#sho arp-cache packet statistics vlan 90

Verification Run the **show arp packet statistics** command to display configurations.

Prompts N/A

Common Errors N/A

Platform Description N/A

2.29 ip proxy-arp

Use this command to enable ARP proxy function on the interface. Use the **no** form of this command to restore the default setting.

ip proxy-arp

no ip proxy-arp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Interface configuration mode.

Usage Guide Proxy ARP helps those hosts without routing message obtain MAC address of other networks or subnet IP address. For example, a device receives an ARP request. The IP addresses of request sender and receiver are in different networks. However, the device that knows the routing of IP address of request receiver sends ARP response, which is Ethernet MAC address of the device itself.

Configuration The following example enables ARP on FastEthernet port 0/1.

Examples FS(config)# interface fastEthernet 0/1
FS(config-if)# ip proxy-arp

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.30 local-proxy-arp

Use this command to enable local proxy ARP on the SVI interface. Use the **no** form of this command to restore the default setting.

local-proxy-arp

no local-proxy-arp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Interface configuration mode

Mode

Usage Guide With local proxy ARP enabled, the device helps a host to obtain MAC addresses of other hosts on the subnet. If the device enables switchport protected, users on different ports are segregated on layer 2. After local proxy ARP is enabled, the device serves as a proxy to send a response after receiving an ARP request. The ARP response contains a MAC address which is the device’s Ethernet MAC address, realizing communication between different hosts through L3 routes.

Configuration The following example enables local proxy ARP on VLAN1.

```

Examples
FS(config)# interface vlan 1
FS(config-if-VLAN 1)# local-proxy-arp
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.31 show arp

Use this command to display the Address Resolution Protocol (ARP) cache table

show arp [[**vrf** vrf-name] [**trusted**] ip [mask] | **static** | **complete** | **incomplete** | mac-address]

Parameter	Parameter	Description
Description	ip	Displays the ARP entry of the specified IP address.
	vrf vrf-name	VRF instance, which Displays the ARP entry with specified VRF.
	ip mask	Displays the ARP entries of the network segment included within the mask.
	trusted	Displays the trusted ARP entries. Currently, only the global VRF supports the

	trusted ARP.
static	Displays all the static ARP entries.
complete	Displays all the resolved dynamic ARP entries.
incomplete	Displays all the unresolved dynamic ARP entries.
mac-address	Displays the ARP entry with the specified mac address.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the output result of the **show arp** command:

Examples

```

FS# show arp
Total Numbers of Arp: 7
Protocol Address Age(min) Hardware Type Interface
Internet 192.168.195.68 0 0013.20a5.7a5f arpa VLAN 1
Internet 192.168.195.67 0 001a.a0b5.378d arpa VLAN 1
Internet 192.168.195.65 0 0018.8b7b.713e arpa VLAN 1
Internet 192.168.195.64 0 0018.8b7b.9106 arpa VLAN 1
Internet 192.168.195.63 0 001a.a0b5.3990 arpa VLAN 1
Internet 192.168.195.62 0 001a.a0b5.0b25 arpa VLAN 1
Internet 192.168.195.5 -- 00d0.f822.33b1 arpa VLAN 1
    
```

The meaning of each field in the ARP cache table is described as below:

Table 1 Fields in the ARP cache table

Field	Description
Protocol	Protocol of the network address, always to be Internet
Address	IP address corresponding to the hardware address
Age (min)	Age of the ARP cache record, in minutes; If it is not locally or statically configured, the value of the field is represented with "--".
Hardware	Hardware address corresponding to the IP address
Type	Hardware address type, ARPA for all Ethernet addresses
Interface	Interface associated with the IP addresses

The following example displays the output result of **show arp 192.168.195.68**

```

FS# show arp 192.168.195.68
Protocol Address Age(min) Hardware Type Interface
Internet 192.168.195.68 1 0013.20a5.7a5f arpa VLAN 1
    
```

The following example displays the output result of **show arp 192.168.195.0 255.255.255.0**

```
FS# show arp 192.168.195.0 255.255.255.0
Protocol Address Age(min) Hardware Type Interface
Internet 192.168.195.64 0 0018.8b7b.9106 arpa VLAN 1
Internet 192.168.195.2 1 00d0.f8ff.f00e arpa VLAN 1
Internet 192.168.195.5 -- 00d0.f822.33b1 arpa VLAN 1
Internet 192.168.195.1 0 00d0.f8a6.5af7 arpa VLAN 1
Internet 192.168.195.51 1 0018.8b82.8691 arpa VLAN 1
```

The following example displays the output result of **show arp 001a.a0b5.378d**

```
FS# show arp 001a.a0b5.378d
Protocol Address Age(min) Hardware Type Interface
Internet 192.168.195.67 4 001a.a0b5.378d arpa VLAN 1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.32 show arp oob

Use this command to display the ARP cache table.

show arp oob [ip [mask] | **static** | **complete** | **incomplete** | mac-address]

Parameter Description	Parameter	Description
	ip	Displays ARP table entries of the specified IP address.
	mask	Displays ARP table entries within the IP subnet.
	static	Displays all static ARP table entries.
	complete	Displays all analyzed ARP table entries.
	incomplete	Displays all unanalyzed ARP table entries.
	mac-address	Displays ARP table entries of the specified MAC address.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the ARP cache table. The **complete** / **incomplete** key word represents analyzed / unanalyzed ARP table entries.

Configuration Examples The following example displays the outcome of the running the show arp oob command.

```
FS# show arp oob
Total Numbers of Arp: 7
Protocol Address Age(min) Hardware Type Interface
```

Internet	192.168.195.68	0	0013.20a5.7a5f	arpa	mgmt 0
Internet	192.168.195.67	0	001a.a0b5.378d	arpa	mgmt 0
Internet	192.168.195.65	0	0018.8b7b.713e	arpa	mgmt 0
Internet	192.168.195.64	0	0018.8b7b.9106	arpa	mgmt 0
Internet	192.168.195.63	0	001a.a0b5.3990	arpa	mgmt 0
Internet	192.168.195.62	0	001a.a0b5.0b25	arpa	mgmt 0
Internet	192.168.195.5	--	00d0.f822.33b1	arpa	mgmt 0

The following example displays the outcome of running the **show arp oob 192.168.195.68** command.

```
FS# show arp oob 192.168.195.68
Protocol  Address          Age(min)  Hardware      Type  Interface
Internet  192.168.195.68  1         0013.20a5.7a5f  arpa  mgmt 0
```

The following example displays the outcome of running the **show arp oob 192.168.195.0 255.255.255.0**.

```
FS# show arp 192.168.195.0 255.255.255.0
Protocol  Address          Age(min)  Hardware      Type  Interface
Internet  192.168.195.64  0         0018.8b7b.9106  arpa  mgmt 0
Internet  192.168.195.2   1         00d0.f8ff.f00e  arpa  mgmt 0
Internet  192.168.195.5   --        00d0.f822.33b1  arpa  mgmt 0
Internet  192.168.195.1   0         00d0.f8a6.5af7  arpa  mgmt 0
Internet  192.168.195.51  1         0018.8b82.8691  arpa  mgmt 0
```

The following example displays the outcome of running the **show arp oob 001a.a0b5.378d** command.

```
FS# show arp 001a.a0b5.378d
Protocol  Address          Age(min)  Hardware      Type  Interface
Internet  192.168.195.67  4         001a.a0b5.378d  arpa  mgmt 0
```

Field	Description
Protocol	Only "Internet" is available at present, which indicates the IP protocol.
Address	The IPv4 address.
Age(min)	The age of the table entry. For the local IP address, the field is displayed as '-'. For the static table entry, the field is displayed as <static>. For the dynamic table entry, the field indicates the time for which the table entry has been learned, in the unit of minutes.
Hardware	48-bit MAC address, written as a dotted triple of four-digit hexadecimal numbers.
Type	Only "arpa" is available at present.
Interface	The L3 interface corresponding to the ARP table entry. The field is NULL for static ARP table entries for the IP address of the static ARP is not within any network segment directly connected with the device.

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.33 show arp counter

Use this command to display the number of ARP entries in the ARP cache table.

show arp counter

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the output result of the **show arp counter** command:

```
FS# show arp counter
The Arp Entry counter:0
The Unresolve Arp Entry:0
```

The meaning of each field in the ARP cache table is described in Table 1.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.34 show arp detail

Use this command to display the details of the Address Resolution Protocol (ARP) cache table.

show arp detail [interface-type interface-number [[ip [mask]]] [[vrf vrf-name] [ip [mask] | mac-address | static | complete | incomplete]] subvlan { subvlan-number | min-max min_value max_value]

Parameter	Parameter	Description
Description	interface-type interface-number	Displays the ARP of the layer 2 port or the layer 3 interface.
	vrf name	VRF instance. By default, no VRF instance is configured.
	ip	Displays the ARP entry of the specified IP address.
	ip mask	Displays the ARP entries of the network segment included within the mask.
	mac-address	Displays the ARP entry of the specified MAC address.
	static	Displays all the static ARP entries.

completev	Displays all the resolved dynamic ARP entries.
incomplete	Displays all the unresolved dynamic ARP entries.
subvlan	Displays the ARP entries of the specified subvlan
subvlan-number	Subvlan ID
min-max	Displays the minimum and maximum subvlan ID
min_value	Minimum subvlan ID
max_value]	Maximum subvlan ID.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide Use this command to display the ARP details, such as the ARP type (Dynamic, Static, Local, Trust), the information on the layer2 port.

If you enter a min_value greater than max_value, no error message is prompted. Instead, ARP entries corresponding to the subvlan are displayed.

Configuration The following example displays the output result of the **show arp detail** command:

Examples

```

FS# show arp detail
IP Address MAC Address Type Age(min) Interface Port
20.1.1.1 000f.e200.0001 Static --- --
20.1.1.1 000f.e200.0001 Static -- V13 --
20.1.1.1 000f.e200.0001 Static -- V13 Gi2/0/1
193.1.1.70 00e0.fe50.6503 Dynamic 1 V13 Gi2/0/1
192.168.0.1 0012.a990.2241 Dynamic 10 Gi2/0/3 Gi2/0/3
192.168.0.1 0012.a990.2241 Dynamic 20 Ag1 Ag1
192.168.0.1 0012.a990.2241 Dynamic 30 V12 Ag2
192.168.0.39 0012.a990.2241 Local -- V13 --
192.168.0.39 0012.a990.2241 Local -- Gi2/0/3 --
192.168.0.1 0012.a990.2241 Local -- V13 --
192.168.0.1 0012.a990.2241 Local -- Gi2/3/2 --
    
```

The meaning of each field in the ARP cache table is described as below:

Table 1 Fields in the ARP cache table

Field	Description
IP Address	IP address corresponding to the hardware address
MAC Address	hardware address corresponding to the IP address
Age (min)	Age of the ARP learning, in minutes
Port	Layer2 port associated with the ARP
Type	ARP type, includes the Static, Dynamic, Trust,Local

Interface	Layer 3 interface associated with the IP addresses
Subvlan	Subvlan corresponding to the ARP entries

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

2.35 show arp packet statistics

Use this command to display the statistics of ARP packets.

show arp packet statistics [interface-name]

Parameter	Parameter	Description
Description	interface-name	Displays the statistics of ARP packets on the specified interface.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The following example displays the output information of the command.

```

Examples
FS# show arp packet statistics
Interface Received Received Received Sent Sent
Name Requests Replies Others Requests Replies
-----
VLAN 1 10 20 1 50 10
VLAN 2 5 8 0 10 10
VLAN 3 20 5 0 15 12
VLAN 4 5 8 0 10 10
VLAN 5 20 5 0 15 12
VLAN 6 20 5 0 15 12
VLAN 7 20 5 0 15 12
VLAN 8 5 8 0 10 10
VLAN 9 20 5 0 15 12
VLAN 10 20 5 0 15 12
VLAN 11 20 5 0 15 12
VLAN 12 20 5 0 15 12
    
```

Description of fields:

Field	description
-------	-------------

Received Requests	Number of received ARP requests
Received Replies	Number of received ARP response messages
Received Others	Number of other received ARP packets
Sent Requests	Number of sent ARP requests
Sent Replies	Number of sent ARP requests

Related Commands	Command	Description
	N/A.	N/A.

Platform N/A

Description

2.36 show arp rate-statistic

Use this command to display ARP packet rate statistics.

show arp rate-statistic [interface]

Parameter	Parameter	Description
Description	interface	Name of interface on which ARP packet rate statistics are to be displayed.

Defaults N/A

Command Mode User configuration mode

Default Level 2

Usage Guide N/A

Configuration The following example displays ARP packet rate statistics on all interfaces.

```

Examples
FS(config)#show arp rate-statistic
Interface                               Sampling   Received   Received   Received   Sent
Sent
Name                                     time      Requests(pps) Replies(pps) Others(pps)
Requests(pps) Replies(pps)
-----
TenGigabitEthernet 0/15                 1         0           0           0           1
0
Mgmt 0                                   1         7           0           0           0
0
FS(config)#
    
```

The following example displays ARP packet rate statistics on one interface.

```

FS(config)#show arp rate-statistic interface vlan 250
Interface                               Sampling   Received   Received   Received   Sent
Sent
    
```

Name	time	Requests(pps)	Replies(pps)	Others(pps)
Requests(pps) Replies(pps)				
-----	-----	-----	-----	-----
VLAN 250	1	0	0	0
0				
FS(config)#				

2.37 show arp timeout

Use this command to display the aging time of a dynamic ARP entry on the interface.

show arp timeout

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode

Usage Guide N/A.

Configuration Examples The following example displays the output of the **show arp timeout** command:

```
FS# show arp timeout
Interface arp timeout(sec)
-----
VLAN 1 3600
```

The meaning of each field in the ARP cache table is described in Table 1.

Related Commands	Command	Description
	N/A.	N/A.

Platform Description N/A

2.38 show arp flapping record

Use this command to display the record of ARP entry flapping.

show arp flapping record

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Privileged EXEC mode.
Mode

Usage Guide ARP entry flapping occurs when an IP address is associated with different MAC addresses.

Configuration The following example displays the record of ARP entry flapping:

```

Examples
FS# show arp flapping record
Arp flapping recorded:
  Arp flapping record max count: 10240
  Arp flapping record current count: 0
  Arp flapping record history count: 0
  Move-Time      Ip-address      Original-Mac      Move-Mac      Port      Vid
Total flapping record: 0
    
```

Field description:

Field	Description
Move-Time	The time when flapping happens.
Ip-address	The IP address to which the flapping happens.
Original-Mac	The MAC address associated with the IP address before the flapping.
Move-Mac	The MAC address associated with the IP address after the flapping.
Port	The port where the flapping happens.
Vid	ID of the VLAN where the flapping happens.

Related	Command	Description
Commands	N/A.	N/A.

Platform N/A
Description

2.39 show ip arp

Use this command to display the Address Resolution Protocol (ARP) cache table.

show ip arp

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Privileged EXEC mode.
Mode

Usage Guide N/A.

Configuration The following example displays the output of **show ip arp**:

Examples

```
FS# show ip arp
Protocol Address Age(min)Hardware Type Interface
Internet 192.168.7.233 23 0007.e9d9.0488 ARPA FastEthernet 0/0
Internet 192.168.7.112 10 0050.eb08.6617 ARPA FastEthernet 0/0
Internet 192.168.7.79 12 00d0.f808.3d5c ARPA FastEthernet 0/0
Internet 192.168.7.1 50 00d0.f84e.1c7f ARPA FastEthernet 0/0
Internet 192.168.7.215 36 00d0.f80d.1090 ARPA FastEthernet 0/0
Internet 192.168.7.127 0 0060.97bd.ebee ARPA FastEthernet 0/0
Internet 192.168.7.195 57 0060.97bd.ef2d ARPA FastEthernet 0/0
Internet 192.168.7.183 -- 00d0.f8fb.108b ARPA FastEthernet 0/0
```

Each field in the ARP cache table has the following meanings:

Field	Description
Protocol	Network address protocol, always Internet.
Address	The IP address corresponding to the hardware address.
Age (min)	Age of the ARP cache record, in minutes; If it is not locally or statically configured, the value of the field is represented with "--".
Hardware	Hardware address corresponding to the IP address
Type	The type of hardware address. The value is ARPA for all Ethernet addresses.
Interface	Interface associated with the IP address.

Related

Commands

Command	Description
N/A.	N/A.

Platform

N/A

Description

3 IPv6 Commands

3.1 clear ipv6 neighbors

Use this command to clear the dynamic IPv6 neighbors.

clear ipv6 neighbors [**vrf** vrf-name] [**oob**] [interface-id]

Parameter	Parameter	Description
Description	vrf-name	VRF name. All global IPv6 neighbors are cleared without specified VRF name by default.
	oob	Clears the dynamic IPv6 neighbors discovered by neighbors on MGMT interface.
	interface-id	Interface name. Clear the dynamically learned IPv6 neighbors on the specified interface.
	vxlan	Clear the dynamically learned IPv6 neighbors on Overlay router interfaces.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide This command does not clear all the dynamic neighbors on authentication VLAN. Note that the static neighbors will not be cleared.

Configuration Examples The following example clears the dynamic IPv6 neighbors.

```
FS# clear ipv6 neighbors
```

The following example clears the dynamic IPv6 neighbors discovered by neighbors on MGMT interface.

```
FS# clear ipv6 neighbors oob
```

The following example clears the dynamically learned IPv6 neighbors on gigabitEthernet 0/1.

```
FS# clear ipv6 neighbors gigabitEthernet 0/1
```

The following example clears the dynamically learned IPv6 neighbors on Overlay router interfaces.

```
FS# clear ipv6 neighbors vxlan
```

Related Commands	Command	Description
	ipv6 neighbor	Configures the neighbor.
	show ipv6 neighbors	Displays the neighbor information.

Platform Description N/A

3.2 ipv6 address

Use this command to configure an IPv6 address for a network interface. Use the **no** form of this command to restore the default setting.

ipv6 address ipv6-address/prefix-length

ipv6 address ipv6-prefix/prefix-length **eui-64**

ipv6 address prefix-name sub-bits/prefix-length [**eui-64**]

no ipv6 address

no ipv6 address ipv6-address/prefix-length

no ipv6 address ipv6-prefix/prefix-length **eui-64**

no ipv6 address prefix-name sub-bits/prefix-length [**eui-64**]

Parameter	Parameter	Description
Description	ipv6-prefix	IPv6 address prefix in the format defined in RFC4291. The address shall be in hex; the fields in the address shall be separated by comma, and each field shall contain 16 bits.
	ipv6-address	IPv6 address in the format defined in RFC4291. The address shall be in hex; the fields in the address shall be separated by comma, and each field shall contain 16 bits.
	prefix-length	Length of the IPv6 prefix, the network address of the IPv6 address. Note: The prefix length range of the IPv6 address of the interface of S86 is 0 to 64 or 128 to 128.
	prefix-name	The general prefix name. Use the specified general prefix to generate the interface address.
	sub-bits	The value of the sub-prefix bit and the host bit generates the interface address combining with the general prefix. The value shall be in the format defined in the RFC4291.
	eui-64	The generated IPV6 address consists of the address prefix and the 64 bit interface ID

Defaults N/A

Command Interface configuration mode

Mode

Usage Guide When an IPv6 interface is created and the link status is UP, the system will automatically generate a local IP address for the interface.

The IPv6 address could also be generated using the general prefix. That is, the IPv6 address consists of the general prefix and the sub-prefix and the host bit. The general prefix could be configured using the **ipv6 general-prefix** command or may be learned through the DHCPv6 agent PD (Prefix Discovery) function (please refer to the DHCPv6 Configuration). Use the sub-bits/prefix-length parameter of this command to configure the sub-prefix and the host bit.

If no deleted address is specified when using **no ipv6 address**, all the manually configured addresses will be deleted.

no ipv6 address ipv6-prefix/prefix-length **eui-64** can be used to delete the addresses configured with **ipv6 address** ipv6-prefix/prefix-length **eui-64**.

```

Configuration FS(config-if)# ipv6 address 2001:1::1/64
Examples FS(config-if)# no ipv6 address 2001:1::1/64
FS(config-if)# ipv6 address 2002:1::1/64 eui-64
FS(config-if)# no ipv6 address 2002:1::1/64 eui-64
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.3 ipv6 address autoconfig

Use this command to automatically configure an IPv6 stateless address for a network interface. Use the **no** form of this command to restore the default setting.

ipv6 address autoconfig [default]
no ipv6 address autoconfig

Parameter	Parameter	Description
Description	default	(Optional) If this keyword is configured, a default routing is generated. Note that only one layer3 interface on the entire device is allowed to use the default keyword

Defaults N/A

Command Mode Interface configuration mode

Usage Guide The stateless automatic address configuration is that when receiving the RA (Route Advertisement) message, the device could use the prefix information of the RA message to automatically generate the EUI-64 interface address. If the RA message contains the flag of the "other configurations", the interface will obtain these "other configurations" through the DHCPv6. The "other configurations" usually means the IPv6 address of the DNS server, the IPv6 address of the NTP server, etc.
 Use the **no ipv6 address autoconfig** command to delete the IPv6 address.

```

Configuration FS(config-if)# ipv6 address autoconfig default
Examples FS(config-if)# no ipv6 address autoconfig
    
```

Related Commands	Command	Description
	ipv6 address ipv6-prefix/prefix-length [eui-64]	Configures the IPv6 address for the interface manually.

Platform N/A

Description

3.4 IPv6 icmp error-interval

Use this command to set the frequency with which ICMPv6-oversize error packets are sent. Use the **no** form of this command to restore the default setting.

ipv6 icmp error-interval too-big milliseconds [bucket-size]

no ipv6 icmp error-interval too-big milliseconds [bucket-size]

Use this command to set the frequency with which other ICMPv6 error packets are sent. Use the **no** form of this command to restore the default setting.

ipv6 icmp error-interval milliseconds [bucket-size]

no ipv6 icmp error-interval milliseconds [bucket-size]

Parameter	Parameter	Description
Description	milliseconds	Sets the refresh interval of the token bucket, in the range from 0 to 2147483647 in the unit of seconds. Setting the value to 0 indicates that the frequency with which ICMPv6 error packets are sent is not fixed.
	bucket-size	Sets the number of tokens in the token bucket, in the range from 1 to 200.

Defaults The default milliseconds is 100 and bucket-size is 10.

Command Global configuration mode

Mode

Usage Guide The token bucket algorithm is adopted to set the frequency with which ICMPv6 error packets are sent so as to prevent Denial of Service (DoS) attack,
 If the forwarded IPv6 packet is greater than the egress IPv6 MTU in size, the router discards the IPv6 packet and sends the ICMPv6-oversize error packet to the source IPv6 address. This kind of ICMPv6 error packet is used for IPv6 path MTU discovery. If there are too many ICMPv6 error packets, the ICMPv6-oversize error packet may not be sent, causing IPv6 path MTU discovery failure. Therefore, it is recommended to set the frequency of ICMPv6-oversize error packet and other ICMPv6 error packet respectively. Note that ICMPv6 redirect packet is not an ICMPv6 error packet and FS sets the frequency of the ICMPv6 redirect packet the same as that of other ICMPv6 error packet.

For the timer is accurate to 10 milliseconds, it is recommended to set the refresh interval of the token bucket to an integer multiple of 10 milliseconds. If the refresh interval is not an integer multiple of 10 milliseconds, it is converted automatically. For example, the frequency of 1 per five milliseconds turns out to be 2 per 10 milliseconds; the frequency of 3 per 15 milliseconds is converted to 2 per 10 milliseconds.

Configuration The following example sets the frequency with which ICMPv6-oversize error packets are sent to 100 per second.

Examples `FS(config)# ipv6 icmp error-interval too-big 1000 100`

The following example sets the frequency with which other ICMPv6 error packets are sent to 10 per second.

`FS(config)# ipv6 icmp error-interval 1000 10`

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.5 ipv6 enable

Use this command to enable the IPv6 function on an interface. Use the **no** form of this command to restore the default setting.

ipv6 enable
no ipv6 enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Interface configuration mode
Mode

Usage Guide The IPv6 function of an interface can be enabled by configuring **ipv6 enable** or by configuring IPv6 address for the interface.

- ✔ If an IPv6 address is configured for the interface, the IPv6 function will be enabled automatically on the interface and cannot be disabled with **no ipv6 enable**.

Configuration FS(config-if)# **ipv6 enable**

Examples

Related	Command	Description
Commands	show ipv6 interface	Displays the related information of an interface.

Platform N/A
Description

3.6 ipv6 gateway

Use this command to configure the default gateway IPv6 address on the management port.

ipv6 gateway ipv6-address

Parameter	Parameter	Description
-----------	-----------	-------------

Description	ipv6-address	Configures the default gateway IPv6 address.
--------------------	--------------	--

Defaults N/A

Command Interface configuration mode

Mode

Usage Guide The management port is MGMT in type and 0 in ID.

Configuration The following example configures the default gateway IPv6 address on the management port.

```

Examples
FS(config)# interface mgmt 0
FS(config-int)# ipv6 gateway 2001:1::1
FS(config-int)# exit
FS(config)#
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.7 ipv6 general-prefix

Use this command to configure the IPv6 general prefix in the global configuration mode.

ipv6 general-prefix prefix-name ipv6-prefix/prefix-length

no ipv6 general-prefix prefix-name ipv6-prefix/prefix-length

Parameter	Parameter	Description
Description	prefix-name	The general prefix name.
	pv6-prefix	The network prefix value of the general-prefix following the format defined in RFC4291.
	prefix-length	The length of the general prefix.

Defaults N/A

Command Global configuration mode.

Mode

Usage Guide It is convenient to number the network by using the general prefix, which defines a prefix so that many longer specified prefixes could refer to it. These specified prefixes are updated whenever the general prefix changes. If the network number changes, just modify the general prefix.

A general prefix could contain multiple prefixes.

These longer specified prefixes are usually used for the Ipv6 address configuration on the interface.

Configuration The following example configures manually a general prefix as my-prefix.

Examples FS(config)# ipv6 general-prefix my-prefix 2001:1111:2222::/48

Related Commands	Command	Description
	ipv6 address prefix-name sub-bits/prefix-length	Configures the interface address using the general prefix.
	show ipv6 general-prefix	Displays the general prefix.

Platform N/A

Description

3.8 ipv6 hop-limit

Use this command to configure the default hopcount to send unicast messages in the global configuration mode.

ipv6 hop-limit value

no ipv6 hop-limit

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The default is 64.

Command Global configuration mode.

Mode

Usage Guide This command takes effect for the unicast messages only, not for multicast messages.

Configuration FS(config)# **ipv6 hop-limit** 100

Examples

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.9 ipv6 icmp source

Use this command to configure the source address of ICMPv6 packets. Use the **no** form of this command to restore the default setting.

ipv6 icmp source [**vrf** vrf-name] ipv6-address

no ipv6 icmp source

Parameter	Parameter	Description
Description	vrf-name	Specifies the name of a configured VRF instance.

ipv6-address	Specifies the source address of ICMP packets.
--------------	---

Defaults By default, no source address is configured for ICMPv6 packets.

Command Mode Global configuration mode

Usage Guide In a network with a large number of IPv6 addresses configured, it is complex for receivers to recognize from which device ICMP packets are sent. To simplify the judgement, you can choose a specified address, like the address of the loopback interface, as the source address for ICMPv6 packets.

Configuration The following example sets 1001::1 as the source address for ICMPv6 packets.

Examples

```
FS(config)# ipv6 icmp souce 1001::1
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

3.10 ipv6 mtu

Use this command to configure the MTU of IPv6 packets. Use the **no** form of this command to restore the default setting.

ipv6 mtu bytes
no ipv6 mtu

Parameter Description

Parameter	Description
bytes	MTU of IPv6 packets, in bytes. The value ranges from 1280 to 1500.

Defaults The default configuration is the same as the configuration of the **mtu** command.

Command Mode Interface configuration mode

Usage Guide If the size of an IPv6 packet exceeds the IPv6 MTU, the FSOS software segments the packet. For all devices in the same physical network segment, the IPv6 MTU of the interconnected interface must be the same.

Configuration The following example sets the IPv6 MTU of the FastEthernet 0/1 interface to 1400 bytes.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ipv6 mtu 1400
```

Related Commands

Command	Description
mtu	Sets the MTU of an interface.

Platform This command cannot be used on Layer 2 devices.

Description

3.11 ipv6 nd cache interface-limit

Use this command to set the maximum number of neighbors learned on the interface. Use the **no** form of this command to restore the default setting.

ipv6 nd cache interface-limit value

no ipv6 nd cache interface-limit

Parameter	Parameter	Description
Description	value	Sets the maximum number of neighbors learned on the interface, including the static and dynamic neighbors, in the range from 0 to the number supported by the device. 0 indicates the number is not limited.

Defaults The default is 0.

Command Interface configuration mode

Mode

Usage Guide This function can prevent neighbor entries generated by malicious neighbor attacks from consuming memory. limit must be no smaller than the number of neighbors learned on the interface. Otherwise, the configuration does not take effect.

Configuration The following example sets the number of neighbors learned on the interface to 100.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# ipv6 nd cache interface-limit 100
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.12 ipv6 nd dad attempts

Use this command to set the number of the NS packets to be continuously sent for IPv6 address collision check on the interface. Use the **no** form of this command to restore it to the default setting.

ipv6 nd dad attempts value

no ipv6 nd dad attempts value

Parameter	Parameter	Description
Description	value	Number of the NS packets. If it is set to 0, it indicates that the IPv6 address collision check is disabled on the interface. The range is 0 to 600.

Defaults The default is 1.

Command Interface configuration mode.

Mode

Usage Guide When the interface is configured with a new IPv6 address, the address collision shall be checked before the address is assigned to the interface, and the address shall be in the "tentative" status. After the address collision check is completed, if no collision is detected, the address can be used normally; if collision is detected and the interface ID of the address is an EUI-64 ID, it indicates that the link-layer address is repeated, and the system will automatically shut down the interface (that is, to prohibit IPv6 operations on the interface). In this case, you shall modify and configure a new address manually, and restart address collision check for the **down/up** interface. Whenever the state of an interface changes from **down** to **up**, the address collision check function of the interface will be enabled.

Configuration Examples `FS(config-if)# ipv6 nd dad attempts 3`

Related Commands	Command	Description
	<code>show ipv6 interface</code>	Displays the interface information.

Platform N/A

Description

3.13 ipv6 nd dad learning enable

Use this command to enable the interface to learn ND entries via DAD NS packets. Use the **no** form of this command to restore the default setting.

ipv6 nd dad learning enable

no ipv6 nd dad learning enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, this feature is disabled on non-Super-VLAN interface. But on Super VLAN interfaces, this function is enabled by default.

Command Interface configuration mode

Mode

Usage Guide After this command is run, when the interface receives DAD NS packets, ND entries with the status of Stale will be created.

Configuration Examples The following example enables the SVI 1 interface to learn ND entries via DAD NS packets.

`FS(config-if-VLAN 1)# ipv6 nd dad learning enable`

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.14 ipv6 nd dad retry

Use this command to set the interval for address conflict detection. Use the **no** form of this command to restore the default setting.

ipv6 nd dad retry value
no ipv6 nd dad retry

Parameter	Parameter	Description
Description	value	Sets the interval for address conflict detection, 60 seconds by default. Setting value to 0 indicates that the function is disabled.

Defaults N/A

Command Mode Global configuration mode

Usage Guide Before configuring a new IPv6 address for an interface, enable address conflict detection on the interface. If a conflict address is detected, the device does not receive the IPv6 packet destined to the conflict address. This command is used to perform conflict detection again when the interval expires. If there is no conflict, the address can be used.

Configuration The following example sets the interval for address conflict detection to 10s.

Examples FS(config)# ipv6 nd dad retry 10

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.15 ipv6 nd l2port-down fast-delete

Use this command to delete ND entries when L2 ports get down. Use the **no** form of this command to restore the default setting.

ipv6 nd arp l2port-down fast-delete
no ipv6 nd arp l2port-down fast-delete

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, ND entries are not deleted when L2 ports get down.

Command Mode Interface configuration mode.

Usage Guide Run the **ipv6 nd l2port-down fast-delete** command on an SVI, so ND entries are removed as soon as L2 ports under this SVI get down. Without configuring this feature, ND entries are deleted only after their aging time is reached.

Configuration The following example enables fast removal of ND entries when L2 ports get down.

Examples

```
FS(config-if-VLAN 1)# ipv6 nd l2port-down fast-delete
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.16 ipv6 nd managed-config-flag

Use this command to set the “managed address configuration” flag bit of the RA message. Use the **no** form of this command to restore the default setting.

ipv6 nd managed-config-flag

no ipv6 nd managed-config-flag

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Interface configuration mode.

Usage Guide This flag determines whether the host that receives the RA message obtains an IP address through stateful auto configuration. If the flag is set, the host obtains an IP address through stateful auto configuration, otherwise it does not be used.

Configuration

```
FS(config-if)# ipv6 nd managed-config-flag
```

Examples

Related	Command	Description
Commands	show ipv6 interface	Displays the interface information.

ipv6 nd other-config-flag	Sets the flag for obtaining all information except IP address through stateful auto configuration.
----------------------------------	--

Platform N/A

Description

3.17 ipv6 nd ns-interval

Use this command to set the interval for the interface to retransmitting NS (Neighbor Solicitation). Use the **no** form of this command to restore the default setting.

ipv6 nd ns-interval milliseconds

no ipv6 nd ns-interval

Parameter	Parameter	Description
Description	milliseconds	Interval for retransmitting NS in the range of 1000 to 429467295 milliseconds

Defaults The default value in RA is 0 (unspecified); the interval for retransmitting NS is 1000 milliseconds (1 second).

Command mode Interface configuration mode.

Usage Guide The configured value will be advertised through RA and will be used by the device itself. It is not recommended to set a too short interval.

Configuration Examples FS(config-if)# ipv6 nd ns-interval 2000

Related Commands	Command	Description
	show ipv6 interface	Displays the interface information.

Platform N/A

Description

3.18 ipv6 nd other-config-flag

Use this command to set "other stateful configuration" flag bit of the RA message. Use the **no** form of this command to delete the flag bit.

ipv6 nd other-config-flag

no ipv6 nd other-config-flag

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The flag bit is not set by default.

Command mode Interface configuration mode.

Usage Guide With this flag bit set, the flag bit of the RA message sent by the device is set. After receiving this flag bit, the host uses the dhcpv6 to acquire the information excluding the IPv6 address for the purpose of automatic configuration. When the **managed address configuration** is set, the default **other stateful configuration** is also set

Configuration Examples FS(config-if)# ipv6 nd other-config-flag

Related Commands	Command	Description
	show ipv6 interface	Displays the interface information.

Platform Description N/A

3.19 ipv6 nd port-down fast-delete enable

Use this command to fast delete ND entries when the corresponding L2 ports get down. Use the **no** form of this command to restore the default setting.

ipv6 nd port-down fast-delete enable

no ipv6 nd port-down fast-delete

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, this feature is disabled.

Command Mode Global configuration mode.

Usage Guide After the **ipv6 nd port-down fast-delete enable** command is run, dynamic ND entries are removed when their corresponding L2 ports get down.

Configuration Examples The following example enables fast removal of ND entries when the corresponding L2 ports get down.

FS(config)# ipv6 nd port-down fast-delete enable

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.20 ipv6 nd prefix

Use this command to configure the address prefix included in the RA. Use the **no** form of this command to delete the set prefix or restore the default setting.

ipv6 nd prefix { ipv6-prefix/prefix-length | **default** } [[valid-lifetime preferred-lifetime]] [[**at** valid-date preferred-date]] [**infinite** | preferred-lifetime] [**no-advertise**] [[**off-link**] [**no-autoconfig**]]

no ipv6 nd prefix { ipv6-prefix/prefix-length | **default** } [[**off-link**] [**no-autoconfig**]] [**no-advertise**]]

Parameter	Parameter	Description
Description	ipv6-prefix	IPv6 network ID following the format defined in RFC4291
	prefix-length	Length of the IPv6 prefix. "/" shall be added in front of the prefix
	valid-lifetime	Valid lifetime of the RA prefix received by the host
	preferred-lifetime	Preferred lifetime of the RA prefix received by the host
	at valid-date preferred-date	Sets the dead line for the valid lifetime and that of the preferred lifetime, in day, month, year, hour, minute.
	infinite	Indicates that the prefix is always valid.
	default	Sets the default prefix.
	no-advertise	The prefix will not be advertised by the device.
	off-link	When the host sends an IPv6 packet, if the prefix of the destination address matches the set prefix, it is considered that the destination is on-link and is directly reachable. If this option is set, it indicates that the prefix is not used for on-link judgment.
	no-autoconfig	Indicates that the RA prefix received by the host cannot be used for auto address configuration.
	preference	Indicates the priority of routings, which could be high, medium or low.
	proxy	Indicates prefix-based ND proxy.

Defaults

By default, the advertised prefix is the one set with **ipv6 address** on the interface. The default parameters of the prefix configured in the RA are as follows:

valid-lifetime: 2592000s (30 days)

preferred-lifetime: 604800s (7 days),

preference: medium,

proxy: disabled

The prefix is advertised and is used for on-link judgment and auto address configuration.

Command

Interface configuration mode.

Mode

Usage Guide

This command can be used to configure the parameters of each prefix, including whether to advertise the prefix. By default, the prefix advertised in RA is the one set with **ipv6 address** on the interface. To add other prefixes, use this command.

ipv6 nd prefix default

Set the default parameters to be used by the interface. If no parameter is specified for an added prefix, the parameters set with **ipv6 nd prefix default** will be used. Note that after a parameter is specified for the prefix,

the default configuration will not be used. That is to say, the configuration of the prefix cannot be modified with **ipv6 nd prefix default**; only the prefix that uses all the default configurations can be modified with this command.

at valid-date preferred-date

The valid lifetime of a prefix can be specified in two ways. One way is to specify a fixed time for each prefix in the RA; the other way is to specify the end time (in this mode, the valid lifetime of the prefix sent in RA will be gradually reduced until the end time is 0).

Configuration The following example adds a prefix for SVI 1.

```
Examples
FS(config)# interface vlan 1
FS(config-if)# ipv6 nd prefix 2001::/64 infinite 2592000
```

The following example sets the default prefix parameters for SVI 1 (they cannot be used for auto address configuration):

```
FS(config)# interface vlan 1
FS(config-if)# ipv6 prefix default no-autoconfig
```

If no parameter is specified, the default parameters will be used, and the prefix cannot be used for auto address configuration.

Related	Command	Description
Commands	show ipv6 interface	Displays the RA information of an interface.

Platform N/A
Description

3.21 ipv6 nd packet rate-statistics interval

Use this command to configure the interval between two samplings of ND packets for rate statistics. Use the **no** form of this command to restore the default setting.

ipv6 nd packet rate-statistics interval seconds
no ipv6 nd packet rate-statistics interval

Parameter	Parameter	Description
Description	seconds	Specifies the interval between two samplings of ND packets in the unit of second. The range is from 60 to 86,400.

Defaults By default, statistics of ND packets is disabled.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example sets the interval between two samplings to 60s.

Examples FS(config)# ipv6 nd packet rate-statiscs interval 60

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.22 ipv6 nd ra dns server

Use this command to suppress RDNSS in the RA message. Use the **no** form of this command to enable RDNSS in the RA message.

ipv6 nd ra dns server suppress

no ipv6 nd ra dns server suppress

Use this command to configure the IP address of a recursive DNS server. Use the **no** form of this command to delete the IP address.

ipv6 nd ra dns server ipv6-address {valid-lifetime | **infinite**} **sequence** number

no ipv6 nd ra dns server ipv6-address {valid-lifetime | **infinite**} **sequence** number

Parameter	Parameter	Description
Description	ipv6-address	Configures an IPv6 address in conformity to RFC4291. ":" is used to separate domains. And these 16-bit domains are in hexadecimal format.
	suppress	Suppresses the RDNSS option in the RA message. By default, RDNSS is suppressed.
	valid-lifetime	Configures the lifetime of RDNSS in the RA message once the option is received. The range is from 0 to 4294967295. The value "0" indicates RDNSS is not available.
	infinite	Indicates the RDNSS option is valid forever.
	number	Configures the sequence number of the same RDNSS option in RA messages.

Defaults By default, the RDNSS option in RA is suppressed.

Command Interface configuration mode.

Mode

Usage Guide Use the **ipv6 nd ra dns server** ipv6-address {valid-lifetime | **infinite**} **sequence** number command to configure the RDNSS option and its parameters. Under one interface, one sequence can be configured in only one option, and one IPv6 address can be matched with only one sequence. After configured, RDNSS options are notified via RA messages. Then, the options are sorted in accordance with sequence number.

Configuration The following example enables RDNS on the interface VLAN1 and configures the option.

Examples

```
FS(config)#interface vlan 1
FS(config-if-VLAN 1)# no ipv6 nd rad ns server suppress
FS(config-if-VLAN 1)# ipv6 nd ra dns server 2018::1 infinite sequence 0
FS(config-if-VLAN 1)# ipv6 nd ra dns server 2020::1 1000 sequence 1
```

The following example removes a prefix on the interface VLAN1.

```
FS(config)# interface vlan 1
FS(config-if-VLAN 1)# no ipv6 nd ra dns server 2018::1 infinite sequence 0
FS(config-if-VLAN 1)# no ipv6 nd ra dns server 2020::1 1000 sequence 1
```

Related N/A

Commands

Platform N/A

Description

3.23 ipv6 nd ra dns search-list

Use this command to suppress DNSSL in the RA message. Use the **no** form of this command to enable DNSSL in the RA message.

- ipv6 nd ra dns search-list suppress**
- no ipv6 nd ra dns search-list suppress**

Use this command to configure the DNS suffix contained in the RA message. Use the **no** form of this command to delete the suffix.

- ipv6 nd ra dns search-list** ipv6-domain-name {valid-lifetime | **infinite**} **sequence** number
- no ipv6 nd ra-dns dnssl** ipv6-domain-name **sequence** number

Parameter	Parameter	Description
Description	ipv6-address	Configures a DNS suffix with no more than 64 bytes, such as FS.com.cn.
	suppress	Suppresses the DNSSL option in the RA message. By default, DNSSL is suppressed.
	valid-lifetime	Configures the lifetime of DNSSL in the RA message once the option is received. The range is from 0 to 4294967295. The default value is 1,800 seconds. The value "0" indicates DNSSL is not available.
	infinite	Indicates the DNSSL option is valid forever.
	number	Configures the sequence number of the same DNSSL option in RA messages.

Defaults By default, the DNSSL option in RA is suppressed.

Command Interface configuration mode.

Mode

Usage Guide Use the **ipv6 nd ra dns search-list** ipv6-domain-name {valid-lifetime | **infinite**} **sequence** number command to configure the DNSSL option and its parameters. The same sequence number indicates the same DNSSL option. Up to 255 DNS suffixes can be configured for one sequence number. To remove DNS suffixes, their corresponding sequence numbers should be provided.

For DNSSL of the same sequence number, it is recommended to configure one same valid lifetime. Otherwise, the latest-configured lifetime takes effect for all the options.

Configuration The following example enables DNSSL on the interface VLAN1 and configures the option.

Examples

```
FS(config)#interface vlan 1
FS(config-if-VLAN 1)# no ipv6 nd rad ns search-list suppress
FS(config-if-VLAN 1)# ipv6 nd ra dns search-list FSOSm.cn infinite sequence 0
FS(config-if-VLAN 1)# ipv6 nd ra dns search-list FS.net 2018 sequence 1
```

The following example removes the DNSSL option on the interface VLAN1.

```
FS(config)# interface vlan 1
FS(config-if-VLAN 1)# no ipv6 nd ra dns search-list FSOSm.cn infinite sequence 0
FS(config-if-VLAN 1)# no ipv6 nd ra dns search-list FS.net 2018 sequence 1
```

Related N/A

Commands

Platform N/A

Description

3.24 ipv6 nd ra-hoplimit

Use this command to set the hopcount of the RA message. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-hoplimit value

no ipv6 nd ra-hoplimit

Parameter	Parameter	Description
Description	value	Hopcount

Defaults The default is 64.

Command Interface configuration mode.

Mode

Usage Guide This command is used to set the hopcount of the RA message.

Configuration FS(config-if)# **ipv6 nd ra-hoplimit** 110

Examples

Related

Commands

Command	Description
show ipv6 interface	Displays the interface information.
ipv6 nd ra-lifetime	Sets the lifetime of the device.
ipv6 nd ra-interval	Sets the interval of sending the RA message.
ipv6 nd ra-mtu	Sets the MTU of the RA message.

Platform N/A

Description

3.25 ipv6 nd ra-interval

Use this command to set the interval of sending the RA. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-interval { seconds | **min-max** min_value max_value }

no ipv6 nd ra-interval

Parameter

Description

Parameter	Description
seconds	Interval of sending the RA message in seconds, 3-1800s.
min-max	Maximum and minimum interval sending the RA message in seconds
min_value	Minimum interval sending the RA message in seconds
max_value	Maximum interval sending the RA message in seconds

Defaults 200s. The actual interval of sending the RA message will be fluctuated 20% based on 200s.

Command Interface configuration mode.

Mode

Usage Guide If the device serves as the default device, the set interval shall not be longer than the lifetime of the device. Besides, to ensure other devices along the link occupies network bandwidth while sending the RA message, the actual interval for sending the RA message will be fluctuated 20% based on the set value. If the key word **min-max** is specified, the actual interval for sending the packet will be chosen between the range of minimum value and maximum value.

Configuration FS(config-if)# **ipv6 nd ra-interval** 110

Examples `FS(config-if)# ipv6 nd ra-interval min-max 110 120`

Related Commands	Command	Description
	<code>show ipv6 interface</code>	Displays the interface information.
	<code>ipv6 nd ra-lifetime</code>	Sets the lifetime of the device.
	<code>ipv6 nd ra-hoplimit</code>	Sets the hopcount of the RA message.
	<code>ipv6 nd ra-mtu</code>	Sets the MTU of the RA message.

Platform N/A

Description

3.26 ipv6 nd ra-lifetime

Use this command to set the device lifetime of the RA sent on the interface. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-lifetime seconds

no ipv6 nd ra-lifetime

Parameter	Parameter	Description
Description	seconds	Default life time of the device on the interface, in the range from 0 to 9000 in the unit of seconds.

Defaults The default is 1800.

Command Interface configuration mode.

Mode

Usage Guide The router lifetime field is available in each RA. It specifies the time during which the hosts along the link of the interface can select the device as the default device. If the value is set to 0, the device will not serve as the default device any longer. If it is not set to 0, it shall be larger than or equal to the interval of sending the RA (ra-interval)

Configuration Examples `FS(config-if)# ipv6 nd ra-lifetime 2000`

Related Commands	Command	Description
	<code>show ipv6 interface</code>	Displays the interface information.
	<code>ipv6 nd ra-interval</code>	Sets the interval of sending the RA.
	<code>ipv6 nd ra-hoplimit</code>	Sets the hopcount of the RA.
	<code>ipv6 nd ra-mtu</code>	Sets the MTU of the RA.

Platform N/A

Description

3.27 ipv6 nd ra-mtu

Use this command to set the MTU of the RA message. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-mtu value

no ipv6 nd ra-mtu

Parameter	Parameter	Description
Description	value	MTU value, in the range from 0 to 4294967295.

Defaults IPv6 MTU value of the network interface.

Command Interface configuration mode.

Mode

Usage Guide If it is specified as 0, the RA will not have the MTU option

Configuration FS(config-if)# ipv6 nd ra-mtu 1400

Examples

Related	Command	Description
Commands	show ipv6 interface	Displays the interface information.
	ipv6 nd ra-lifetime	Sets the lifetime of the device.
	ipv6 nd ra-interval	Sets the interval of sending the RA message.
	ipv6 nd ra-hoplimit	Sets the hopcount of the RA message.

Platform N/A

Description

3.28 ipv6 nd ra-url

Use this command to configure the URL of RA messages sent from the interface. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-url [url]

no ipv6 nd ra-url

Parameter	Parameter	Description
Description	url	Specifies the URL of RA messages, which contains up to 255 bytes.

Defaults By default, no URL is configured for RA messages.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the URL of RA messages to FS.com.

Examples FS(config-if)# ipv6 nd ra-url FS.com

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.29 ipv6 nd ra-url type

Use this command to configure the URL option code for RA messages. Use the **no** form of this command to restore the default setting.

ipv6 nd ra-url type

no ipv6 nd ra-url

Parameter Description	Parameter	Description
	type	Specifies the option code, whose value cannot exceed 254. The number adopted by RFCs cannot be used, such as 140.

Defaults By default, no URL is configured for RA messages.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example sets the URL option code to 234.

Examples FS(config)# ipv6 nd ra-url type 234

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.30 ipv6 nd reachable-time

Use this command to set the reachable time after the interface checks the reachability of the neighbor dynamically learned through NDP. Use the **no** form of this command to restore the default setting.

ipv6 nd reachable-time milliseconds

no ipv6 nd reachable-time

Parameter	Parameter	Description
Description	milliseconds	Reachable time for the neighbor in the range from 0 to 3600000 in the unit of milliseconds.

Defaults The default value in RA is 0 (unspecified); the reachable time for the neighbor is 30000 milliseconds (30 seconds) when the device discovers the neighbor.

Command Mode Interface configuration mode.

Usage Guide The device checks the unreachable neighbor through the set time. A shorter time means that the device can check the neighbor failure more quickly, but more network bandwidth and device resource will be occupied. Therefore, it is not recommended to set a too short reachable time.

The configured value will be advertised through RA and will be used by the device itself. If the value is set to 0, it indicates that the time is not specified, that is, the default value is used.

According to RFC4861, the actual time to reach neighbor is not consistent with the configured value, ranging from 0.5*configured value to 1.5*configured value.

Configuration Examples `FS(config-if)# ipv6 nd reachable-time 1000000`

Related Commands	Command	Description
	show ipv6 interface	Displays the interface information.

Platform Description N/A

3.31 ipv6 nd remote inactive

Use this command to disable generating of host routes after EVPN synchronizes ND entries to Overlay router interfaces. Use the **no** form of this command to enable this function.

ipv6 nd remote inactive
no ipv6 nd remote inactive

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Default Level 2

Usage Guide N/A

Configuration Examples The following example enables generating of host routes after EVPN synchronizes ND entries to Overlay router interfaces.

```
FS(config-if-OverlayRouter 1)#no ipv6 nd remote inactive
```

Verification Run the **show running-config** command to display configurations.

3.32 ipv6 nd stale-time

Use this command to set the period for the neighbor to maintain the state. Use the **no** form of this command to restore the default setting.

ipv6 nd stale-time seconds

no ipv6 nd stale-time

Parameter	Parameter	Description
Description	Seconds	Sets the period for the neighbor to maintain the state, in the range from 0 to 86400 in the unit of seconds.

Defaults The default is 3600.

Command Mode Global configuration mode

Usage Guide This command is used to set the period for the neighbor to maintain the state. After the period expires, neighbor unreachability detection is performed. The shorter the period, the faster the neighbor is found unreachable. On the other hand, more network bandwidth and device resources are consumed. Therefore, it is recommended to set a value not too small.

Configuration Examples The following example sets the period to 600 seconds for the neighbor to maintain the state.

```
FS(config)# ipv6 nd stale-time 600
```

Related	Command	Description
Commands	N/A	N/A

Platform Description N/A

3.33 ipv6 nd suppress-auth-vlan-ns

Use this command to disable the SVI interface from sending the NS packet to the authentication VLAN. Use the **no** form of this command to disable this function.

ipv6 nd suppress-auth-vlan-ns

no ipv6 nd suppress-auth-vlan-ns

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode

Usage Guide This command is supported on the SVI interface in gateway authentication mode.

Configuration Examples The following example enables VLAN 2 to send the NS packet to the authentication VLAN.

```
FS(config-if-VLAN 2)# no ipv6 nd suppress-auth-vlan-ns
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.34 ipv6 nd suppress-ra

Use this command to disable the interface from sending the RA message. Use the **no** form of this command to enable the function.

ipv6 nd suppress-ra
no ipv6 nd suppress-ra

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ipv6 nd suppress-ra** command is enabled by default.

Command Mode Interface configuration mode.

Usage Guide This command suppresses the sending of the RA message on an interface.

```
FS(config-if)# ipv6 nd suppress-ra
```

Related Commands	Command	Description
	show ipv6 interface	Displays the interface information.

Platform N/A

Description

3.35 ipv6 nd unresolved

Use this command to set the maximum number of the unresolved neighbor table entries. Use the **no** form of this command to restore the default setting.

ipv6 nd unresolved number

no ipv6 nd unresolved

Parameter	Parameter	Description
Description	number	Sets the maximum number of the unresolved neighbor table entries, in the range from 1 to the neighbor table size supported by the device.

Defaults The default is 0. (The maximum number is the neighbor table size supported by the device)

Command Global configuration mode

Mode

Usage Guide This command is used to prevent unresolved ND table entries generated by malicious scan attacks from consuming table entry resources,

Configuration The following example sets the maximum number of the unresolved neighbor table entries to 200.

Examples FS(config)# ipv6 nd unresolved 200

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.36 ipv6 neighbor

Use this command to configure a static neighbor. Use the **no** form of this command to delete a static neighbor.

ipv6 neighbor ipv6-address interface-id hardware-address

no ipv6 neighbor ipv6-address interface-id

Parameter	Parameter	Description
Description	ipv6-address	The neighbor IPv6 address, in the form as defined in RFC4291.
	interface-id	Specifies the network interface where the neighbor is (including Router Port, L3 AP port and SVI interface).
	hardware-address	The 48-bit MAC address, a dotted triple of four-digit hexadecimal numbers.

Defaults No static neighbor is configured by default.

Command Mode Global configuration mode

Usage Guide This command can only be configured on the interface enabled with IPv6 protocol, similar to the ARP command. If the neighbor to be configured has been learned through Neighbor Discovery Protocol (NDP) and stored in the NDP neighbor table, the dynamic neighbor turns to be static. If the static neighbor is valid, it is always reachable. An invalid static neighbor refers to the neighbor whose IPv6 address is not valid (not in the IPv6 network segment configured for the interface or interface address conflict). The packet is not forwarded to the MAC address as specified by the invalid static neighbor. The invalid static neighbor is in inactive state. Use the `show ipv6 neighbor static` command to display the state of the static neighbor. Use the **clear ipv6 neighbors** command to clear all neighbors learned dynamically through NDP.

Configuration The following example configures a static neighbor on SVI 1.

```
FS(config)# ipv6 neighbor 2001::1 vlan 1 00d0.f811.1111
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.37 ipv6 ns-linklocal-src

Use this command to set the local address of the link as the source IP address to send neighbor requests. Use the **no** form of this command to use the global IP address w as the source address to send neighbor requests.

ipv6 ns-linklocal-src
no ipv6 ns-linklocal-src

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The local address of the link is always used as the source address to send neighbor requests.

Command Mode Global configuration mode.

Usage Guide N/A

```
FS(config)# no ipv6 ns-linklocal-src
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.38 ipv6 redirects

Use this command to control whether to send ICMPv6 redirect message when the switch receives and forwards an IPv6 packet through an interface. Use the **no** form of this command to restore the default setting.

ipv6 redirects
no ipv6 redirects

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example enables ICMPv6 redirection on interface GigabitEthernet 0/1.

Examples

```
FS(config-if-GigabitEthernet 0/1)# ipv6 redirects
```

Related	Command	Description
Commands	show ipv6 interface	Displays the interface information.

Platform N/A
Description

3.39 ipv6 source-route

Use this command to forward the IPv6 packet with route header. Use the **no** form of this command to restore the default setting.

ipv6 source-route
no ipv6 source-route

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ipv6 source-route** command is disabled by default.

Command Global configuration mode.

Mode

Usage Guide Because of the potential security of the header of type 0 route, it's easy for the device to suffer from the denial service attack. Therefore, forwarding the IPv6 packet with route header is disabled by default. However, the IPv6 packet of route header with type 0 that destined to the local machine is processed.

Configuration FS(config)# no ipv6 source-route

Examples

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.40 show ipv6 address

Use this command to display the IPv6 addresses.

show ipv6 address [interface-name]

Parameter Description	Parameter	Description
	interface-name	Interface name

Defaults N/A

Command Mode Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays all IPv6 address configured on the device.

Examples

```
SWITCH#show ipv6 address
Global unicast address limit: 1024, Global unicast address count: 3
Tentative address count: 2,Duplicate address count: 1
Preferred address count: 3,Deprecated address count: 0
Gi 0/5
  FE80::1/64 Preferred
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
  1000::1/64 Duplicate
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
Gi 0/6
  FE80::1/64 Tentative
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
  1111:1111:1111:1111:1111:1111:1111:1111/64 Tentative
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
Gi 0/7
  FE80::1/64 Preferred
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
  2000:1111:1111:1111:1111:1111:1111:1111/64 Preferred
    Preferred lifetime: INFINITE, Valid lifetime: INFINITE
```

The following example displays the IPv6 address configured on the GigabitEthernet 0/1.

```
SWITCH#show ipv6 address Gi 0/5
Global unicast address count: 3
Tentative address count: 0,Duplicate address count: 1
Preferred address count: 1,Deprecated address count: 0
FE80::1/64 Preferred
Preferred lifetime: INFINITE, Valid lifetime: INFINITE
1000::1/64 Duplicate
Preferred lifetime: INFINITE, Valid lifetime: INFINITE
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.41 show ipv6 general-prefix

Use this command to display the information of the general prefix.

show ipv6 general-prefix

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide Use this command to display the information of the general prefix including the manually configured and learned from the DHCPv6 agent.

Configuration Examples The following example displays the information of the general prefix.
 FS# show ipv6 general-prefix
 There is 1 general prefix.
 IPv6 general prefix my-prefix, acquired via Manual configuration
 2001:1111:2222::/48
 2001:1111:3333::/48

Related	Command	Description
Commands	ipv6 general-prefix	Configures the general prefix.

Platform N/A

Description

3.42 show ipv6 interface

Use this command to display the IPv6 interface information.

show ipv6 interface [interface-id] [**ra-info**] [brief [interface-id]]

Parameter	Parameter	Description
Description	interface-id	Interface (including Ethernet interface, aggregate port, or SVI)
	ra-info	Displays the RA information of the interface.
	brief	Displays the brief information of the interface (interface status and address information).

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use this command to display the address configuration, ND configuration and other information of an IPv6 interface.

Configuration The following example displays the information of the IPv6 interface.

```

Examples
FS# show ipv6 interface vlan 1
Interface vlan 1 is Up, ifindex: 2001
address(es):
Mac Address: 00:00:00:00:00:01
INET6: fe80::200:ff:fe00:1 , subnet is fe80::/64
Joined group address(es):
ff01:1::1
ff02:1::1
ff02:1::2
ff02:1::1:ff00:1
INET6: 2001::1 , subnet is 2001::/64 [TENTATIVE]
Joined group address(es):
ff01:1::1
ff02:1::1
ff02:1::2
ff02:1::1:ff00:1
MTU is 1500 bytes
ICMP error messages limited to one every 10 milliseconds
ICMP redirects are enabled
ND DAD is enabled, number of DAD attempts: 1
ND reachable time is 30000 milliseconds
ND advertised reachable time is 0 milliseconds
ND retransmit interval is 1000 milliseconds
ND advertised retransmit interval is 0 milliseconds
ND router advertisements are sent every 200 seconds<240--160>
ND device advertisements live for 1800 seconds
    
```

The following line is included in the above information: 2001::1, subnet is 2001::/64 [TENTATIVE]. The flag bit in the [] following the INET6 address is explained as follows:

Flag	Meaning
ANYCAST	Indicate that the address is an anycast address.
TENTATIVE	Indicate that the DAD is underway. The address is a tentative before the DAD is completed.
DUPLICATED	Indicate that a duplicate address exists.
DEPRECATED	Indicate that the preferred lifetime of the address expires.
NODAD	Indicate that no DAD is implemented for the address.
AUTOIFID	Indicate that the interface ID of the address is automatically generated by the system, which is usually an EUI-64 ID.

```

The following example displays the RA information of the IPv6 interface.FS# show ipv6 interface vlan 1 ra-info
vlan 1: DOWN
RA timer is stopped
waits: 0, initcount: 3
statistics: RA(out/in/inconsistent): 4/0/0, RS(input): 0
Link-layer address: 00:00:00:00:00:01
Physical MTU: 1500
ND device advertisements live for 1800 seconds
ND device advertisements are sent every 200 seconds<240--160>
Flags: !M!O, Adv MTU: 1500
ND advertised reachable time is 0 milliseconds
ND advertised retransmit time is 0 milliseconds
ND advertised CurHopLimit is 64
Prefixes: (total: 1)
fec0:1:1:1::/64(Def,Auto,vltime: 2592000, pltime: 604800, flags: LA)
    
```

Description of the fields in **ra-info**:

Field	Meaning
RA timer is stopped (on)	Indicate whether the RA timer is started.
waits	Indicate that the RS is received but the number of the responses is not available.
initcount	Indicate the number of the RAs when the RA timer is restarted.
RA(out/in/ inconsistent)	out: Indicate the number of the RAs that are sent. In: Indicate the number of the RAs that are received. inconsistent: Indicate the number of the received RAs in which the parameters are different from those contained in the RAs advertised by the device.

RS(input)	Indicate the number of the RSs that are received.
Link-layer address	Link-layer address of the interface.
Physical MTU	Link MTU of the interface.
!M M	!M indicates the managed-config-flag bit in the RA is not set. M: Conversely
!O O	!O indicates the other-config-flag bit in the RA is not set. O: Conversely

Description of the fields of the prefix list in **ra-info**:

Field	Meaning
total	The number of the prefixes of the interface.
fec0:1:1:1::/64	A specific prefix.
Def	Indicate that the interfaces use the default prefix.
Auto CFG	Auto: Indicate the prefix is automatically generated after the interface is configured with the corresponding IPv6 address. CFG: Indicate that the prefix is manually configured.
!Adv	Indicate that the prefix will not be advertised.
vltime	Valid lifetime of the prefix, measured in seconds.
pltime	Preferred lifetime of the prefix, measured in seconds.
L !L	L: Indicate that the on-link in the prefix is set. !L: Indicate that the on-link in the prefix is not set.
A !A	A: Indicate that the auto-configure in the prefix is set. !A: It indicates that the auto-configure in the prefix is not set.

The following example displays the brief information of the IPv6 interface.

```
FS#show ipv6 interface brief
GigabitEthernet 0/1      [down/down]
    2222::2
    FE80::1614:4BFF:FE5C:ED3A
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.43 show ipv6 nd

Use this command to display the statistics of IPv6 ND packets.

show ipv6 nd [interface interface-name] statistics

Parameter	Parameter	Description
Description	interface-name	Specifies the interface name whose statistics of IPv6 ND packets is displayed.
	statistics	Displays the statistics of IPv6 ND packets.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the statistics of IPv6 ND packets on the SVI 1 interface:

```

FS# show ipv6 nd interface vlan 1 statistics
interface VLAN 1 is Up, ifindex: 4097, vrf_id 0
ipv6 interface packet statics:
stat-type          Router Solicitations          Router advertisements          Neighbor
solicitations      Neighbor advertisements
Received           0                               0                               0
0
Send               0                               0                               1
0
Rate(receive, pps) 0                               0                               0
0
Rate(send, pps)    0                               0                               0
0
Interval time: 60s
    
```

Field	Meaning
stat-type	Statistics types, including types of RS/RA/NS/NA packets.
Received	Statistics of received packets.
Send	Statistics of sent packets.
Rate	Rates of receiving or sending packets in the unit of PPS.
Interval time	Interval between two samplings of ND packets.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.44 show ipv6 neighbors

Use this command to display the IPv6 neighbors.

show ipv6 neighbors [vrf vrf-name] [**verbose**] [interface-id] [ipv6-address]

show ipv6 neighbors static

Parameter	Parameter	Description
Description	verbose	Displays the neighbor details.
	static	Displays the validity status of static neighbors.
	vrf-name	VRF name
	interface-id	Displays the neighbors of the specified interface.
	ipv6-address	Displays the neighbors of the specified IPv6 address.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide

Configuration

The following example displays the neighbors on the SVI 1 interface:FS# show ipv6 neighbors vlan 1

Examples

```
IPv6 Address Linklayer Addr Interface
fa::1 00d0.0000.0002 vlan 1
fe80::200:ff:fe00:2 00d0.0000.0002 vlan 1

Show the neighbor details:
FS# show ipv6 neighbors verbose
IPv6 Address Linklayer Addr Interface
2001::1 00d0.f800.0001 vlan 1
  State: Reach/H Age: - asked: 0
fe80::200:ff:fe00:1 00d0.f800.0001 vlan 1
  State: Reach/H Age: - asked: 0
```

Field	Meaning
IPv6 Address	IPv6 address of the Neighbor
Linklayer Addr	Link address, namely, MAC address. If it is not available, incomplete is displayed.
Interface	Interface the neighbor locates.
State	State of the neighbor: state/H(R) The values of STATE are as below: INCOMP (Incomplete): The address resolution of the neighbor is underway, the NS is sent, but the NA is not received. REACH (Reachable): The switch is connected with the neighbor. In this state, the switch takes

	<p>no additional action when sending packets to the neighbor.</p> <p>STALE: The reachable time of the neighbor expires. In this state, the switch takes no additional action; it only starts NUD (Neighbor Unreachability Detection) after a packet is sent to the neighbor.</p> <p>DELAY: A packet is sent to the neighbor in STALE state. If the STALE state changes to DELAY, DELAY will be changed to PROBE if no neighbor reachability notification is received within DELAY_FIRST_PROBE_TIME seconds (5s), the NS will be sent to the neighbor to start NUD.</p> <p>PROBE: The NUD is started to check the reachability of the neighbor. The NS packets are sent to the neighbor at the interval of RetransTimer milliseconds until the response from the neighbor is received or the number of the sent NSs hits MAX_UNICAST_SOLICIT(3).</p> <p>?: Unknown state.</p> <p>/R—indicate the neighbor is considered as a device</p> <p>/H: The neighbor is a host.</p>
Age	The reachable time of the neighbor. '-' indicates that the neighbor is always reachable. Note that the reachability of a static neighbor depends on the actual situation. 'expired' indicates that the lifetime of the neighbor expires, and the neighbor is waits for the triggering of NUD.
Asked	The number of the NSs that are sent to the neighbor for the resolution of the link address of the neighbor.

Related	Command	Description
Commands	ipv6 neighbor	Configures a neighbor.

Platform N/A
Description

3.45 show ipv6 neighbors statistics

Use the following commands to display the statistics of one IPv6 neighbors.

show ipv6 neighbors [vrf vrf-name] statistics

Use the following command to show the statistics of all IPv6 neighbors.

show ipv6 neighbors statistics all

Parameter	Parameter	Description
Description	vrf-name	VRF name

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the statistics of the global neighbors.

Examples

```

SWITCH #show ipv6 neighbors statistics
Memory: 1000 bytes
Entries: 10
  Static: 1,Dynamic: 9,Local: 0
  Incomplete:1, Reachable:5, Stale:1, Delay:1, Probe:1

SWITCH#show ipv6 neighbors statistics all
IPv6 neighbor table count: 2
Static neighbor count: 4(2 active, 2 inactive)
Total
  Memory: 2000 bytes
  Entries: 20
    Static: 2,Dynamic: 18,Local: 0
    Incomplete:2, Reachable:10, Stale:2, Delay:2, Probe:2

Global
  Memory: 1000 bytes
  Entries: 10
    Static: 1,Dynamic: 9,Local: 0
    Incomplete:1, Reachable:5, Stale:1, Delay:1, Probe:1

VRF1
  Memory: 1000 bytes
  Entries: 10
    Static: 1,Dynamic: 9,Local: 0
    Incomplete:1, Reachable:5, Stale:1, Delay:1, Probe:1

```

Related**Commands**

Command	Description
N/A	N/A

Platform

Supported on all platforms.

Description**3.46 show ipv6 packet statistics**

Use this command to display the statistics of IPv6 packets.

show ipv6 packet statistics [**total** | interface-name]**Parameter****Description**

Parameter	Description
total	Displays total statistics of all interfaces.
interface-name	Interface name

Defaults

N/A

Command

Privileged EXEC mode.

Mode**Usage Guide**

N/A

Configuration

The following example displays the total statistics of the lpv6 packets and the statistics of each inface.

Examples

```
SWITCH#show ipv6 packet statistics
Total
  Received 1000 packets, 1000000 bytes
    Unicast:1000,Multicast:0
  Discards:0
    HdrErrors:0(HoplimitExceeded:0,Others:0)
    NoRoutes:0
    Others:0
  Sent 100 packets, 6000 bytes
    Unicast:50,Multicast:50

VLAN 1
  Received 1000 packets, 1000000 bytes
    Unicast:1000,Multicast:0
  Discards:0
    HdrErrors:0(HoplimitExceeded:0,Others:0)
    NoRoutes:0
    Others:0
  Sent 100 packets, 6000 bytes
    Unicast:50,Multicast:50
```

The following example displays the total statistics of the lpv6 packets.

```
SWITCH #show ipv6 packet statistics total
Received 1000 packets, 1000000 bytes
  Unicast:1000,Multicast:0
  Discards:0
    HdrErrors:0(HoplimitExceeded:0,Others:0)
    NoRoutes:0
    Others:0
  Sent 100 packets, 6000 bytes
    Unicast:50,Multicast:50
```

Related	Command	Description
Commands	N/A	N/A

Platform Supported on all platforms.

Description

3.47 show ipv6 raw-socket

Use this command to display all IPv6 raw sockets.

```
show ipv6 raw-socket [ num ]
```

Parameter	Parameter	Description
Description	num	Protocol.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays all IPv6 raw sockets.

Examples

```

FS# show ipv6 raw-socket
Number Protocol Process name
1 ICMPv6 vrrp.elf
2 ICMPv6 tcpip.elf
3 VRRP vrrp.elf
Total: 3
    
```

Field	Description
Number	Number.
Protocol	Protocol.
Process name	Process number.
Total	Total number of IPv6 raw sockets.

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

3.48 show ipv6 routers

In the IPv6 network, some neighbor routers send out the advertisement messages. Use this command to display the neighbor routers and the advertisement.

show ipv6 routers [interface-type interface-number]

Parameter

Description

Parameter	Description
interface-type interface-number	(Optional) Displays the routing advertisement of the specified interface.

Defaults

N/A

Command

Privileged EXEC mode.

Mode

Usage Guide

Use this command to display the neighbor routers and the routing advertisement. If no interface is specified, all the routing advertisement of this device will be displayed.

Configuration

The following example displays the IPv6 router

Examples

```

FS# show ipv6 routers
Router FE80::2D0:F8FF:FEC1:C6E1 on VLAN 2, last update 62 sec
Hops 64, Lifetime 1800 sec, ManagedFlag=0, OtherFlag=0, MTU=1500
Preference=MEDIUM
Reachable time 0 msec, Retransmit time 0 msec
Prefix 6001:3::/64 onlink autoconfig
Valid lifetime 2592000 sec, preferred lifetime 604800 sec
    
```

Prefix 6001:2::/64 onlink autoconfig

Valid lifetime 2592000 seconds, preferred lifetime 604800 seconds

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.49 show ipv6 sockets

Use this command to display all IPv6 sockets.

show ipv6 sockets

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays all IPv6 sockets.

Examples

```

FS# show ipv6 sockets
Number Process name      Type  Protocol  LocalIP:Port  ForeignIP:Port  State
1    vrrp.elf      RAW   ICMPv6    :::58         :::0             *
2    tcpip.elf    RAW   ICMPv6    :::58         :::0             *
3    vrrp.elf      RAW   VRRP      :::112        :::0             *
4    rg-snmpd     DGRAM UDP       :::161        :::0             *
5    rg-snmpd     DGRAM UDP       :::162        :::0             *
6    dhcp6.elf    DGRAM UDP       :::547        :::0             *
7    rg-sshd     STREAM TCP   :::22         :::0             LISTEN
8    rg-telnetd   STREAM TCP   :::23         :::0             LISTEN
Total: 8
    
```

Field	Description
Number	Number.
Process name	Process name.
Type	Socket type. RAW indicates the raw socket. DGRAM indicates data packet type. STREAM indicates traffic type.
Protocol	Protocol number

LocalIP:Port	Local IPv6 address and port.
ForeignIP:Port	Peer IPv6 address and port.
State	State (for IPv6 TCP sockets).
Total	Total number of sockets.

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

3.50 show ipv6 udp

Use this command to display all IPv6 UDP sockets.

show ipv6 udp [local-port num] [peer-port num]

Use this command to display IPv6 UDP socket statistics.

show ipv6 udp statistics

Parameter	Parameter	Description
Description	local-port num	Local port number.
	peer-port num	Peer port number.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays all IPv6 UDP sockets.

Examples

```
FS# show ipv6 udp
```

Number	Local Address	Peer Address	Process name
1	:::161	:::0	rg-snmpd
2	:::162	:::0	rg-snmpd
3	:::547	:::0	dhcp6.elf

Filed	Description
Number	Number.
Local Address	Local IPv6 address and port.
Peer Address	Peer IPv6 address and port.
Process name	Process name.

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

4 DHCP Commands

4.1 address range

Use this command to specify the network segment range of the addresses that can be allocated by CLASS associated with DHCP address pool. Use the **no** form of this command to restore the default setting.

address range low-ip-address high-ip-address

no address range

Parameter	Parameter	Description
Description	low-ip-address	Start address in the network segment range.
	high-ip-address	End address in the network segment range.

Defaults By default, the associated CLASS is not configured with the network segment range. The default is the address pool range.

Command Mode Address pool CLASS configuration mode.

Usage Guide Each CLASS corresponds to one network range which must be from low address to high address, so as to allow the duplication of network segment range between multiple CLASSes. If the CLASS associated with the address pool is specified without configuring the corresponding network segment range, the default network segment range of this CLASS is same as the range of the address pool where this CLASS is.

Configuration Examples The following example configures the network segment of class1 associated with address pool mypool0 ranging from 172.16.1.1 to 172.16.1.8.

```
FS(config)# ip dhcp pool mypool0
FS(dhcp-config)# class class1
FS (config-dhcp-pool-class)# address range 172.16.1.1 172.16.1.8
```

Related Commands	Command	Description
Commands	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.
	class	Configures the CLASS associated with the DHCP address pool and enters the address pool CLASS configuration mode.

Platform N/A

Description

4.2 address-manage

Use this command to enter the address manage configuration mode.

address-manage

Parameter	Parameter	Description
Description	-	-
Defaults	-	
Command Mode	Global configuration mode	
Usage Guide	It is server configuration, so supervlan should be applied.该	
Configuration Example	Enter the address manage configuration mdoe.	
Example	FS(config)#address-manage	
Veirification	Run the show run command to check whether the configuration is successful.	

4.3 bootfile

Use this command to define the startup mapping file name of the DHCP client. Use the **no** or **default** form of this command to restore the default setting.

bootfile file-name

no bootfile

default bootfile

Parameter	Parameter	Description
Description	file-name	Startup file name.
Defaults	No startup file name is defined by default.	
Command Mode	DHCP address pool configuration mode	
Usage Guide	Some DHCP clients need to download the operating system and configure the file during the startup. The DHCP server should provide the mapping file name required for the startup, so that DHCP clients can download the file from the corresponding server (such as TFTP). Other servers are defined by the next-server command.	
Configuration Examples	The following example defines the device.conf as the startup file name.	
Examples	bootfile device.conf	
Related Commands	Command	Description
	ip dhcp pool	Defines the name of the DHCP address pool and enter the DHCP address pool configuration mode.

next-server	Configures the next server IP address of the DHCP client startup process.
--------------------	---

Platform N/A

Description

4.4 class

Use this command to configure the associated CLASS in the DHCP address pool. Use the **no** form of this command to restore the default setting.

class class-name

no class

Parameter	Parameter	Description
Description	class-name	Class name, which can be the character string or numeric such as myclass or 1.

Defaults By default, no CLASS is associated with the address pool.

Command DHCP address pool configuration mode

Mode

Usage Guide Each DHCP address pool performs the address assignment according to the Option82 matching information. We can divide this Option82 information into classes and specify the available network segment range for these classes in the DHCP address pool. These classes are called CLASS. One DHCP address pool can map to multiple CLASSES, and each CLASS can specify different network segment range.

During the address assignment, firstly, ensure the assignable address pool through the network segment where the client is, then according to the Option82 information further ensure the CLASS and assign the IP address from the network segment range corresponding to the CLASS. If one request packet matches multiple CLASSES in the address pool, perform the address assignment according to the sequencing of configuring the CLASS in the address pool. If this CLASS's assigned addresses have been to the upper limit, then continue to assign the address from the next CLASS, and so on. Each CLASS corresponds to one network segment range that must be from low addresses to high addresses and the duplicated network ranges between multiple CLASSES are allowed. If the CLASS corresponding to the address pool is specified and the network segment corresponding to the CLASS is not configured, this CLASS's default network segment range is same as the range of address pool where the CLASS is.

Configuration The following example configures the address mypool0 to associate with class1.

Examples

```
FS(config)# ip dhcp pool mypool0
FS(dhcp-config)# class class1
```

Related	Command	Description
Commands	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.5 clear ip dhcp binding

Use this command to clear the DHCP binding table in the privileged user mode.

clear ip dhcp binding { * | ip-address }

Parameter	Parameter	Description
Description	*	Deletes all DHCP bindings.
	ip-address	Deletes the binding of the specified IP addresses.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide This command can only clear the automatic DHCP binding, but the manual DHCP binding can be deleted by the **no ip dhcp pool** command.

Configuration Examples The following example clears the DHCP binding with the IP address 192.168.12.100.

```
clear ip dhcp binding 192.168.12.100
```

Related Commands	Command	Description
	show ip dhcp binding	Displays the address binding of the DHCP server.

Platform N/A

Description

4.6 clear ip dhcp conflict

Use this command to clear the DHCP address conflict record.

clear ip dhcp conflict { * | ip-address }

Parameter	Parameter	Description
Description	*	Deletes all DHCP address conflict records.
	ip-address	Deletes the conflict record of the specified IP addresses.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide The DHCP server uses the ping session to detect the address conflict, while the DHCP client uses the address resolution protocol (ARP) to detect the address conflict. The **clear ip dhcp conflict** command can be used to delete the history conflict record.

Configuration The following example clears all address conflict records.

Examples `clear ip dhcp conflict *`

Related	Command	Description
Commands	ip dhcp ping packets	Defines the number of the data packets sent by the ping operation for the detection of the address conflict when the DHCP server assigns an IP address.
	show ip dhcp conflict	Displays the address conflict that the DHCP server detects when it assigns an IP address.

Platform N/A

Description

4.7 clear ip dhcp history

Use this command to clear the address assigned by the DHCP server.

clear ip dhcp history{ * | mac-address }

Parameter	Parameter	Description
Description	*	Clears all addresses assigned by the DHCP server.
	mac-address	Clears the address assigned by the DHCP server corresponding to the specified MAC address.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is configured on the DHCP server.

Configuration The following example clears all addresses assigned by the DHCP server.

Examples `FS# clear ip dhcp history *`

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.8 clear ip dhcp server rate

Use this command to clear statistics about the packet processing rate of every module.

clear ip dhcp server rate

Parameter	Parameter	Description
-----------	-----------	-------------

Description	N/A	N/A				
Defaults	N/A					
Command Mode	Privileged EXEC mode					
Usage Guide	This command is used to clear statistics about the packet processing rate of every module, including arp, hot backup, lsm, and socket.					
Configuration Examples	The following example clears statistics about the packet processing rate of every module.					
Examples	FS# clear ip dhcp server rate					
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Command	Description	N/A	N/A	
Command	Description					
N/A	N/A					
Platform Description	N/A					

4.9 clear ip dhcp server statistics

Use this command to reset the counter of the DHCP server in the privileged user mode.

clear ip dhcp server statistics

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Defaults	N/A				
Command Mode	Privileged EXEC mode.				
Usage Guide	The DHCP server carries out the statistics counter, records the DHCP address pool, automatic binding, manual binding and expired binding. Furthermore, it also carries out the statistics to the number of sent and received DHCP messages. The clear ip dhcp server statistics command can be used to delete the history counter record and carry out the statistics starting from scratch.				
Configuration Examples	The following example clears the statistics record of the DHCP server.				
Examples	clear ip dhcp server statistics				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show ip dhcp server statistics</td> <td>Displays the statistics record of the DHCP server.</td> </tr> </tbody> </table>	Command	Description	show ip dhcp server statistics	Displays the statistics record of the DHCP server.
Command	Description				
show ip dhcp server statistics	Displays the statistics record of the DHCP server.				
Platform	N/A				

Description

4.10 clear ip dhcp relay statistics

Use this command to clear the DHCP relay statistics.

clear ip dhcp relay statistics [interface-id]

Parameter	Parameter	Description
Description	interface-id	Specifies an interface

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The DHCP relay is configured with the counter to count various packets received or transmitted by the relay. This command is used to clear the counters.

Configuration Examples The following example clears the DHCP relay statistics.

```
FS# clear ip dhcp relay statistics
The following example clears the DHCP relay statistics on interface SVI1.
FS#clear ip dhcp relay statistics VLAN 1
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.11 client-identifier

Use this command to define the unique ID of the DHCP client (indicated in hex, separated by dot) in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

client-identifier unique-identifier

no client-identifier

Parameter	Parameter	Description
Description	unique-identifier	The DHCP client ID is indicated in hex and separated by dot, for instance, 0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31.

Defaults N/A.

Command Mode DHCP address pool configuration mode.

Usage Guide When some DHCP clients request the DHCP server to assign IP addresses, they use their client IDs rather than their hardware addresses. The client ID consists of media type, MAC addresses and interface name. For instance, the MAC address is 00d0.f822.33b4, the interface name is GigabitEthernet 0/1, and the corresponding client ID is 0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31, where, 01 denotes the type of the Ethernet media.

The 67.6967.6162.6974.4574.6865.726e.6574.302f.31 is the hex code of GigabitEthernet0/1. For the definition of the media code, refer to the Address Resolution Protocol Parameters section in RFC1700.

This command is used only when the DHCP is defined by manual binding.

Configuration Examples The following example defines the client ID of the Ethernet DHCP client whose MAC address is 00d0.f822.33b4.

```
client-identifier 0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31
```

Related Commands	Command	Description
	hardware-address	Defines the hardware address of DHCP client.
	host	Defines the IP address and network mask, which is used to configure the DHCP manual binding.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.12 client-name

Use this command to define the name of the DHCP client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

client-name client-name

no client-name

Parameter	Parameter	Description
Description	client-name	Name of DHCP client, a set of standards-based ASCII characters. The name should not include the suffix domain name. For instance, you can define the name of the DHCP client as river, not river.i-net.com.cn.

Defaults No client name is defined by default.

Command Mode DHCP address pool configuration mode.

Usage Guide This command can be used to define the name of the DHCP client only when the DHCP is defined by manual binding. This name should not include the suffix domain name.

Configuration Examples The following example defines a string river as the name of the client.

```
FS(dhcp-config)#client-name river
```

Related Commands	Command	Description
	host	Defines the IP address and network mask, which is used to configure the DHCP manual binding.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A
Description

4.13 default-router

Use this command to define the default gateway of the DHCP client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

default-router ip-address [ip-address2...ip-address8]
no default-router

Parameter Description	Parameter	Description
	ip-address	Defines the IP address of the equipment. It is required to configure one IP address at least.
	ip-address2...ip-address8	(Optional) Up to 8 gateways can be configured.

Defaults No gateway is defined by default.

Command Mode DHCP address pool configuration mode.

Usage Guide In general, the DHCP client should get the information of the default gateway from the DHCP server. The DHCP server should specify one gateway address for the client at least, and this address should be of the same network segment as the address assigned to the client.

Configuration Examples The following example defines 192.168.12.1 as the default gateway.

```
default-router 192.168.12.1
```

Related Commands	Command	Description
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A
Description

4.14 dns-server

Use this command to define the DNS server of the DHCP client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

dns-server { ip-address [ip-address2...ip-address8] | **use-dhcp-client** interface-type interface-number }
no dns-server

Parameter	Parameter	Description
Description	ip-address	Defines the IP address of the DNS server. At least one IP address should be configured.
	ip-address2...ip-address8	(Optional) Up to 8 DNS servers can be configured.
	use-dhcp-client interface-type interface-number	Uses the DNS server learned by the DHCP client of the FSOS software as the DNS server of the DHCP client.

Defaults No DNS server is defined by default.

Command Mode DHCP address pool configuration mode.

Usage Guide When more than one DNS server is defined, the former will possess higher priority, so the DHCP client will select the next DNS server only when its communication with the former DNS server fails.
 If the FSOS software also acts as the DHCP client, the DNS server information obtained by the client can be transmitted to the DHCP client.

Configuration Examples The following example specifies the DNS server 192.168.12.3 for the DHCP client.

```
dns-server 192.168.12.3
```

Related Commands	Command	Description
Related Commands	domain-name	Defines the suffix domain name of the DHCP client.
	ip address dhcp	Enables the DHCP client on the interface to obtain the IP address information.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A
Description

4.15 domain-name

Use this command to define the suffix domain name of the DHCP client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

domain-name domain-name
no domain-name

Parameter	Parameter	Description
Description	domain-name	Defines the suffix domain name string of the DHCP client.

Defaults No suffix domain name by default.

Command DHCP address pool configuration mode.

Mode

Usage Guide After the DHCP client obtains specified suffix domain name, it can access a host with the same suffix domain name by the host name directly.

Configuration The following example defines the suffix domain name FS.com.cn for the DHCP client.

Examples `FS(dhcp-config)#domain-name FS.com.cn`

Related Commands	Command	Description
	dns-server	Defines the DNS server of the DHCP client.
	ip dhcp pool	Defines the name of the DHCP address pool and enter the DHCP address pool configuration mode.

Platform N/A

Description

4.16 hardware-address

Use this command to define the hardware address of the DHCP client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

hardware-address hardware-address [type]

no hardware-address

Parameter Description	Parameter	Description
	hardware-address	Define the MAC address of the DHCP client.
	type	To indicate the hardware platform protocol of the DHCP client, use the string definition or digits definition. String option: Ethernet ieee802 Digits option: 1 (10M Ethernet) 6 (IEEE 802)

Defaults No hardware address is defined by default.

If there is no option when the hardware address is defined, it is the Ethernet by default.

Command DHCP address pool configuration mode.

Mode

Usage Guide This command can be used only when the DHCP is defined by manual binding.

Configuration The following example defines the MAC address 00d0.f838.bf3d with the type ethernet.

Examples hardware-address 00d0.f838.bf3d

Related Commands	Command	Description
	client-identifier	Defines the unique ID of the DHCP client (Indicated by the hexadecimal numeral, separated by dot).
	host	Defines the IP address and network mask, which is used to configure the DHCP manual binding.
	ip dhcp pool	Defines the name of the DHCP address pool and enter the DHCP address pool configuration mode.
	default-router	Defines the default route of the DHCP client.

Platform N/A

Description

4.17 host

Use this command to define the IP address and network mask of the DHCP client host in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

host ip-address [netmask]

no host

Parameter Description	Parameter	Description
	ip-address	Defines the IP address of DHCP client.
	netmask	Defines the network mask of DHCP client.

Defaults No IP address or network mask of the host is defined.

Command Mode DHCP address pool configuration mode.

Usage Guide If the network mask is not defined definitely, the DHCP server will use the natural network mask of this IP address: 255.0.0.0 for class A IP address, 255.255.0 for class B IP address, and 255.255.255.0 for class C IP address. This command can be used only when the DHCP is defined by manual binding.

Configuration Examples The following example sets the client IP address as 192.168.12.91, and the network mask as 255.255.255.240.

```
host 192.168.12.91 255.255.255.240
```

Related Commands	Command	Description
	client-identifier	Defines the unique ID of the DHCP client (Indicated in hex and separated by dot).
	hardware-address	Defines the hardware address of DHCP client.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.
default-router	Define the default route of the DHCP	default-router

client.	
---------	--

Platform N/A

Description

4.18 ip address dhcp

Use this command to make the Ethernet interface or the PPP, HDLC and FR encapsulated interface obtain the IP address information by the DHCP in the interface configuration mode. Use the **no** form of this command to restore the default setting.

ip address dhcp

no ip address dhcp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The interface cannot obtain the IP address by the DHCP by default.

Command Interface configuration mode.

Mode

Usage Guide When requesting the IP address, the DHCP client of the FSOS software also requires the DHCP server provide 5 configuration parameter information: 1) DHCP option 1, client subnet mask, 2) DHCP option 3, it is the same as the gateway information of the same subnet, 3) DHCP option 6, the DNS server information, 4) DHCP option 15, the host suffix domain name, and 5) DHCP option 44, the WINS server information (optional).
The client of the FSOS software is allowed to obtain the address on the PPP, FR or HDL link by the DHCP, which should be supported by the server. At present, our server can support this function.

Configuration The following example makes the FastEthernet 0 port obtain the IP address automatically.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1) ip address dhcp
```

Related	Command	Description
Commands	dns-server	Defines the DNS server of DHCP client.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.19 ip dhcp class

Use this command to define a CLASS and enter the global CLASS configuration mode. Use the **no** form of this command to restore the default setting.

ip dhcp class class-name

no ip dhcp class class-name

Parameter	Parameter	Description
Description	class-name	Class name, which can be character string or numeric such as myclass or 1.

Defaults By default, the class is not configured.

Command Mode Global configuration mode.

Usage Guide After executing this command, it enters the global CLASS configuration mode which is shown as “FS (config-dhcp-class)#”. In this configuration mode, user can configure the Option82 information that matches the CLASS and the CLASS identification information.

Configuration Examples The following example configures a global CLASS.

```
FS(config)# ip dhcp class myclass
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.20 ip dhcp excluded-address

Use this command to define some IP addresses and make the DHCP server not assign them to the DHCP client in the global configuration mode. Use the **no** form of this command to restore the default setting.

ip dhcp excluded-address low-ip-address [high-ip-address]

no ip dhcp excluded-address low-ip-address [high-ip-address]

Parameter	Parameter	Description
Description	low-ip-address	Excludes the IP address, or excludes the start IP address within the range of the IP address.
	high-ip-address	Excludes the end IP address within the range of the IP address.

Defaults The DHCP server assigns the IP addresses of the whole address pool by default.

Command Mode Global configuration mode.

Usage Guide If the excluded IP address is not configured, the DHCP server attempts to assign all IP addresses in the DHCP address pool. This command can reserve some IP addresses for specific hosts to prevent these addresses are assigned to the DHCP client, and define the excluded IP address accurately to reduce the conflict detecting time when the DHCP server assigns the address.

Configuration In the following example, the DHCP server will not attempt to assign the IP addresses within 192.168.12.100~150.

Examples `ip dhcp excluded-address 192.168.12.100 192.168.12.150`

Related	Command	Description
Commands	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.
	network (DHCP)	Defines the network number and network mask of the DHCP address pool.

Platform N/A

Description

4.21 ip dhcp force-send-nak

Use this command to configure the forcible NAK packet sending function. Use the **no** or **default** form of this command to restore the default setting.

- ip dhcp force-send-nak**
- no ip dhcp force-send-nak**
- default ip dhcp force-send-nak**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide The DHCP client checks the previously used IP address every time it is started and sends a DHCPREQUEST packet to continue leasing this IP address. If the address is not available, the DHCP server sends an NAK packet to let the client resend a DHCPDISCOVER packet to apply for a new IP address. If no corresponding lease record can be found on the server, the client keeps sending DHCPDISCOVER packets. The forcible NAK packet sending function is added to shorten the interval at which the client sends DHCPDISCOVER packets.

Configuration The following example enables the forcible NAK packet sending function in global configuration mode.

Examples `FS(config)# ip dhcp force-send-nak`

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.22 ip dhcp monitor-vrrp-state

Use this command in layer-3 configuration mode to enable the DHCP Server to monitor the status of VRRP interfaces so that the DHCP Server processes only those packets sent from a VRRP interface in the Master state.

Use the **no** form of this command to restore the default setting. If it is canceled, the DHCP Server processes packets from VRRP interfaces in the Master or Backup state.

ip dhcp monitor-vrrp-state

no ip dhcp monitor-vrrp-state

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ip dhcp monitor-vrrp-state** command is disabled by default. .

Command Mode Layer-3 interface configuration mode.

Usage Guide If a VRRP address is configured for an interface, the DHCP Server processes packets sent from the master interface and discards packets sent from the backup interface. If no VRRP address is configured, the DHCP Server does not monitor the status of VRRP interfaces. All DHCP packets will be processed.

Configuration Examples The following example enables the DHCP Server to monitor the status of VRRP interfaces.

```
FS(config-if)# ip dhcp monitor-vrrp-state
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.23 ip dhcp ping packet

Use this command to configure the times of pinging the IP address when the DHCP server detects address conflict in the global configuration mode. Use the **no** form of this command to restore the default setting.

ip dhcp ping packet [number]

no ip dhcp ping packet

Parameter	Parameter	Description
Description	number	(Optional) Number of packets in the range of 0 to 10, where 0 indicates disabling the ping operation. The Ping operation sends two packets by default.

Defaults The Ping operation sends two packets by default.

Command Global configuration mode.

Mode

Usage Guide When the DHCP server attempts to assign the IP address from the DHCP address pool, use the ping operation to check whether this address is occupied by other hosts. Record it if the address is occupied, otherwise, assign it to the DHCP client. The Ping operation will send up to 10 packets, two packets by default.

Configuration The following example sets the number of the packets sent by the ping operation as 3.

Examples `ip dhcp ping packets 3`

Related Commands	Command	Description
	clear ip dhcp conflict	Clears the DHCP history conflict record.
	ip dhcp ping packet	Configures the timeout time that the DHCP server waits for the Ping response. If all the ping packets are not responded within the specified time, it indicates that this IP address can be assigned. Otherwise, it will record the address conflict.
	show ip dhcp conflict	Displays the DHCP server detects address conflict when it assigns an IP address.

Platform N/A

Description

4.24 ip dhcp ping timeout

Use this command to configure the timeout that the DHCP server waits for response when it uses the ping operation to detect the address conflict in the global configuration mode. Use the **no** form of this command to restore the default setting.

ip dhcp ping timeout milli-seconds
no ip dhcp ping timeout

Parameter Description	Parameter	Description
	milli-seconds	Time that the DHCP server waits for ping response in the range 100 to 10000 milliseconds.

Defaults The default is 500 seconds.

Command Global configuration mode.

Mode

Usage Guide This command defines the time that the DHCP server waits for a ping response packet.

Configuration The following example configures the waiting time of the ping response packet to 600ms.

Examples `ip dhcp ping timeout 600`

Related Commands	Command	Description
	clear ip dhcp conflict	Clears the DHCP history conflict record.
	ip dhcp ping packets	Defines the number of the data packets sent by the ping operation for the detection of the address conflict when the DHCP server assigns an IP address.
	show ip dhcp conflict	Displays the address conflict the DHCP server detects when it assigns an IP address.

Platform N/A
Description

4.25 ip dhcp pool

Use this command to define a name of the DHCP address pool and enter the DHCP address pool configuration mode in the global configuration mode. Use the **no** form of this command to restore the default setting.

ip dhcp pool pool-name
no ip dhcp pool pool-name

Parameter Description	Parameter	Description
	pool-name	A string of characters and positive integers, for instance, mypool or 1.

Defaults No DHCP address pool is defined by default.

Command Mode Global configuration mode.

Usage Guide Execute the command to enter the DHCP address pool configuration mode:

```
FS(dhcp-config)#
```

 In this configuration mode, configure the IP address range, the DNS server and the default gateway.

Configuration Examples The following example defines a DHCP address pool named mypool0.

```
ip dhcp pool mypool0
```

Related Commands	Command	Description
	host	Defines the IP address and network mask, which is used to configure the DHCP manual binding.
	ip dhcp excluded-address	Defines the IP addresses that the DHCP server cannot assign to the clients.
	network (DHCP)	Defines the network number and network mask of the DHCP address pool.

Platform N/A
Description

4.26 ip dhcp relay disable

Use this command to disable DHCP relay. Use the **no** form of this command to enable DHCP relay.

ip dhcp relay disable
no ip dhcp relay disable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults DHCP relay is disabled by default.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example disables DHCP relay.

```
FS(config-if-VLAN 1)#ip dhcp relay disable
```

The following example enables DHCP relay.

```
FS(config-if-VLAN 1)#no ip dhcp relay disable
```

Related Commands	Command	Description
	service dhcp	Enables the DHCP Relay.

Platform Description N/A

4.27 ip dhcp relay check server-id

Use this command to enable the **ip dhcp relay check server-id** function. Use the **no** form of this command to restore the default setting.

ip dhcp relay check server-id
no ip dhcp relay check server-id

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ip dhcp relay check server-id** command is disabled.

Command Mode Global configuration mode.

Usage Guide Switch will select the server to be sent according to server-id option when forwarding DHCP REQUEST via this command. Without this command configured, the switch forwards the DHCP REQUEST to all configured DHCP servers.

Configuration The following example enables the ip dhcp relay check server-id function.

Examples

```
FS# configure terminal
FS(config)# ip dhcp relay check server-id
```

Related Commands	Command	Description
	service dhcp	Enables the DHCP Relay.

Platform N/A
Description

4.28 ip dhcp relay force-send-reply-pack

Use this command to force the DHCP Relay to send reply messages. Use the **no** form of this command to restore the default setting.

ip dhcp relay force-send-reply-pack
no ip dhcp relay force-send-reply-pack

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode.

Usage Guide This command is configured on the DHCP Relay. When the DHCP Relay, according to the MAC address, fails to find to which interface the reply message should be sent, if this feature is enabled, the reply message will be sent to the gateway interface; if this feature is not enabled, the reply message will be discarded.

Configuration The following example sets the custom string for circuit-id.

Examples

```
FS(config)# ip dhcp relay information circuit-id format hex abc111
FS(config)# ip dhcp relay information circuit-id format ascii device-test
```

The following example disables this function.

```
FS(config)# no ip dhcp relay information circuit-id format hex
FS(config)# no ip dhcp relay information circuit-id format ascii
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.29 ip dhcp relay link-selection

Use this command to configure DHCP Link Selection (DHCP option 82, suboption 5). Use the **no** form of this command to restore the default setting.

ip dhcp relay link-selection ip-address
no ip dhcp relay link-selection

Parameter	Parameter	Description
Description	ip-address	Specifies an IP address for DHCP Link Selection

Defaults By default, the primary IP address of the interface is used for DHCP Link Selection.

Command Mode Interface configuration mode

Usage Guide This command is performed on the Relay device.
 Before enabling this feature, you need to enable DHCP Option 82 and configure the source IP address of DHCP Relay packets first.
 After DHCP Link Selection is configured, suboption 5 is filled in the packets by the Relay device. By default, the primary IP address of the interface is adopted for suboption 5. By specifying the ip address field, you can fill any legal unicast IP address in suboption 5.

Configuration Examples The following example configures DHCP Link Selection.

```
FS(config)# ip dhcp relay link-selection 10.1.1.1
```

The following example restores the default setting.

```
FS(config)# no ip dhcp relay link-selection
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.30 ip dhcp relay multiple-giaddr

Use this command to enable multiple gateway IP addresses on DHCP Relay. Use the **no** form of this command to restore the default setting.

ip dhcp relay multiple-giaddr
no ip dhcp relay multiple-giaddr

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is configured on the server. When this function is configured, DHCP Relay requires IP addresses from the DHCP server by application of several interface IP addresses.

When multiple gateway IP addresses are configured on interfaces, the master gateway IP address serves as the gateway IP address of the DHCP Relay, and the DHCP server allocates IP segments according to the gateway IP address of the DHCP Relay. After this function is enabled, if a client fails to apply for an IP address from the gateway with the master IP address, it can apply for one from a gateway with a slave IP address.

Configuration The following example enables multiple gateway IP addresses.

Examples FS(config)# ip dhcp relay multiple-giaddr

The following example disables this function.

FS(config)# no ip dhcp relay multiple-giaddr

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.31 ip dhcp relay information option82

Use this command to configure to enable the **ip dhcp relay information option82** function. Use the **no** form of this command to restore the default setting.

ip dhcp relay information option82

no ip dhcp relay information option82

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ip dhcp relay information option82** command is disabled.

Command Global configuration mode.

Mode

Usage Guide This command is exclusive with the **option dot1x** command.

Configuration The following example enables the option82 function on the DHCP relay.

Examples FS# configure terminal

FS(config)# Ip dhcp relay information option82

Related	Command	Description
Commands	service dhcp	Enables the DHCP Relay.

Platform N/A

Description

4.32 ip dhcp relay information option82 user-defined circuit-id

Use this command to configure a user-defined circuit ID in DHCP Option 82. Use the **no** form of this command to disable the user-definition function for the circuit ID in DHCP Option 82. Use the **default** form of this command to restore the default settings.

ip dhcp relay information option82 user-defined circuit-id text

no ip dhcp relay information option82 user-defined circuit-id

default ip dhcp relay information option82 user-defined circuit-id

Parameter

Description

Parameter	Description
text	Indicates the user-defined circuit ID in the string format. The length of the value ranges from 1 to 255. For details, see the description in the usage guide.

Defaults

The user-definition function for the circuit ID in DHCP Option 82 is disabled by default.

Command Mode

Global configuration mode

Default Level

14

Usage Guide

After enabling the function of adding Option 82 to DHCP packets, you can run the **ip dhcp relay information option82 user-defined** command to configure the format of the added Option82 as required.

When defining the format of Option 82, you can use the following keywords. The format string behind the keywords can be set to the hexadecimal encapsulation format, ASCII encapsulation format, or hexadecimal and ASCII hybrid encapsulation format.

hostname: Indicates the host name, for example, **FS**. It is available only in the ASCII format.

devicename: Indicates the device model. It is available only in the ASCII format.

portname: Indicates the interface name, for example, TenGigabitEthernet 0/2. It is available only in the ASCII format.

portsname: Indicates the interface name abbreviation, for example, Te0/2. It is available only in the ASCII format.

porttype: Indicates the interface type. It is available in the string format and hexadecimal format. Actually saved data is hexadecimal.

sysmac: Indicates the interface MAC address. It is in the H.H.H format in ASCII mode by default and encapsulated using six bytes in sequence in hexadecimal mode.

usermac: Indicates the user MAC address. It is in the H.H.H format in ASCII encapsulation by default and is encapsulated by using six bytes in sequence in hexadecimal format.

slot: Indicates the slot number. It is available in the ASCII format and hexadecimal format. Actually saved data is hexadecimal.

port: Indicates the port ID. It is available in the ASCII format and hexadecimal format. Actually saved data is hexadecimal.

svlan: Indicates the outer VLAN. It is available in the ASCII format and hexadecimal format. The value ranges from **1** to **4094**.

cvlan: Indicates the inner VLAN. It is available in the ASCII format and hexadecimal format. The value ranges from **1** to **4094**.

length: Indicates the total length of data behind the **length** keyword.

Special characters are described as follows:

% followed by keywords defined above indicates the format of the keywords.

When the percent symbol (%) needs to be contained in the input string, enter **%%**, which will be converted into a single common percent symbol (%) during parsing.

The backslash (\) indicates an escape character, and a special character following the backslash (\) indicates the special character itself. For example, \\ indicates the backslash (\) and \" indicates the quotation mark (").

The quotation marks (") indicate that data enclosed using the double quotation masks is encapsulated in the string format. Data without or outside double quotation masks is encapsulated in the hexadecimal format.

Strings in the ASCII format can contain 0 to 9, a to z, A to Z, and the following symbols: !@#\$%^&*()_+|=\\[]{};:"'/?.,<>`.

For characters %\" in the ASCII format, add the prefix (\) to the front of the characters. In the ASCII format, only keywords and several specific symbols are converted and other data remains unchanged.

If there is no escape character \" in front of '%' in configuration commands, the key value in the information field must be added behind. Otherwise, the configuration is incorrect and an error is prompted. If the character \" needs to be configured, enter "\\\".

For strings in the hexadecimal format, digits are encapsulated into Option 82 in hexadecimal notation. When hexadecimal data is used, strings begin with 0X or 0x. When the number of valid characters in the hexadecimal data is an odd, add one 0 to the frontmost. When decimal data is used, the data ranges from **0** and **255** and occupies one byte. You can use spaces to enter multiple pieces of decimal data consecutively.

Blank characters in hexadecimal notation are ignored.

If the user-definition function is configured but no corresponding user-defined format is configured, each suboption of Option 82 is padded in standard mode.

Configuration The following example configures a user-defined circuit ID in DHCP Option 82.

```
FS(config)# ip dhcp relay information user-defined circuit-id "%hostname-%portname"
```

Example The following example disables the user-definition function for the circuit ID in DHCP Option 82.

```
FS(config)# no ip dhcp relay information user-defined circuit-id
```

Verification Run the **show running-config** command to check whether the configuration is successful.

Common Errors The user-defined string does not meet configuration requirements.

4.33 ip dhcp relay information option82 user-defined remote-id

Use this command to configure a user-defined remote ID in DHCP Option 82. Use the **no** form of this command to disable user-definition function for the remote ID in DHCP Option 82. Use the **default** form of this command to restore the default settings.

ip dhcp relay information option82 user-defined remote-id text

no ip dhcp relay information option82 user-defined remote -id

default ip dhcp relay information option82 user-defined remote-id

Parameter	Parameter	Description
Description		

text	Indicates the user-defined remote ID in the string format. The length of the value ranges from 1 to 255. For details, see the description in the usage guide.
------	---

Defaults The user-definition function for the remote ID in DHCP Option 82 is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide See the usage guide of the **ip dhcp relay information user-defined circuit-id** command.

Configuration The following example configures a user-defined remote ID in DHCP Option 82.

Example

```
FS(config)# ip dhcp relay information user-defined remote-id "%hostname-%portname"
```

The following example disables the user-definition function for the remote ID in DHCP Option 82.

```
FS(config)# no ip dhcp relay information user-defined remote -id
```

Verification Run the **show running-config** command to check whether the configuration is successful.

Common Errors The user-defined string does not meet configuration requirements.

4.34 ip dhcp relay information option82 user-defined mac-format

Use this command to configure the format of the MAC address string in the suboption of DHCP Option 82. Use the **no** form of this command to cancel the configured format of the MAC address string in the suboption of DHCP Option 82. Use the **default** form of this command to restore the default settings.

```
ip dhcp relay information option82 user-defined mac-format type
no ip dhcp relay information option82 user-defined mac-format
default ip dhcp relay information option82 user-defined mac-format
```

Parameter	Parameter	Description
Description	Type	Indicates the format of the MAC address in the string format. The value ranges from 0 to 2 and the default value is 0 . 0 indicates the H.H.H format, 1 indicates the H-H-H format, and 2 indicates the H:H:H:H:H format.

Defaults The MAC address string is in the H.H.H format by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the format of the MAC address string. The value ranges from **0** to **2** and the default value is **0**. **0** indicates the H.H.H format, **1** indicates the H-H-H format, and **2** indicates the H:H:H:H:H format.

Configuration The following example configures the format of the MAC address string in the suboption of DHCP Option 82.

Example `FS(config)# ip dhcp relay information user-defined mac-format 1`
 The following example cancels the configured format of the MAC address string in the suboption of DHCP Option 82.
`FS(config)# no ip dhcp relay information user-defined mac-format`

Verification Run the **show running-config** command to check whether the configuration is successful.

4.35 ip dhcp relay-information enable

Use this command to enable DHCP relay option 82 Use the **no** form of this command to disable DHCP relay option 82.

ip dhcp relay-information enable
no ip dhcp relay-information enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults DHCP relay option 82 is disabled by default.

Command Mode Interface configuration mode.

Usage Guide After this command is configured, the DHCP packet forwarded by DHCP relay will contain DHCP option 82. If no sub-option is configured, the standard format will be used.

Configuration Examples The following example enables DHCP relay option 82.

```
FS(config-if-VLAN 1)#ip dhcp relay-information enable
```

The following example disables DHCP relay option 82.

```
FS(config-if-VLAN 1)#no ip dhcp relay-information enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.36 ip dhcp relay information layer3 circuit-id format

Use this command to set the custom string for circuit-id for a layer-3 interface. Use the **no** form of this command to disable this function.

ip dhcp relay-information layer3 circuit-id format { hex | ascii } string
no ip dhcp relay-information layer3 circuit-id format { hex | ascii }

Parameter	Parameter	Description
Description	hex	Hexadecimal

ascii	ASCII code.
string	Custom string

Defaults This function is disabled by default.

Command Interface configuration mode.

Mode

Usage Guide This command is configured on the DHCP Relay. When you configure the **ip dhcp relay information circuit-id format** command, the device, as the DHCP Relay, adds the option information in the DHCP request packets.

Configuration The following example sets the custom string for circuit-id for a layer-3 interface.

```
FS(config-if-VLAN 1)# ip dhcp relay-information layer3 circuit-id format hex abc123
FS(config-if-VLAN 1)# ip dhcp relay-information layer3 circuit-id format ascii port-test
```

The following example disables this function.

```
FS(config-if-VLAN 1)# no ip dhcp relay-information layer3 circuit-id format hex
FS(config-if-VLAN 1)# no ip dhcp relay-information layer3 circuit-id format ascii
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.37 ip dhcp relay information remote-id format

Use this command to set the custom string for remote-id for a layer-3 interface. Use the **no** form of this command to disable this function.

```
ip dhcp relay-information layer3 remote-id format { hex | ascii } string
no ip dhcp relay-information layer3 remote-id format { hex | ascii }
```

Parameter	Parameter	Description
Description	hex	Hexadecimal
	ascii	ASCII code
	string	Custom string

Defaults This function is disabled by default.

Command Interface configuration mode
Mode

Usage Guide This command is configured on the DHCP Relay. When you configure the **ip dhcp relay information remote-id format** command, the device, as the DHCP Relay, adds the option information in the DHCP request packets.

Configuration The following example sets the custom string for circuit-id for a layer-3 interface.

```
FS(config-if-VLAN 1)# ip dhcp relay-information layer3 remote-id format hex 123456
FS(config-if-VLAN 1)# ip dhcp relay-information layer3 remote-id format ascii port-test
```

The following example disables this function.

```
FS(config-if-VLAN 1)# no ip dhcp relay-information layer3 remote-id format hex
FS(config-if-VLAN 1)# no ip dhcp relay-information layer3 remote-id format ascii
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.38 ip dhcp relay suppression

Use this command to enable the DHCP binding globally. Use the **no** form of this command to disable the DHCP binding globally and enable the **DHCP relay suppression** on the port.

ip dhcp relay suppression

no ip dhcp relay suppression

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **ip dhcp relay suppression** command is disabled.

Command Mode Interface configuration mode.

Usage Guide After executing this command, the system will not relay the DHCP request message on the interface.

Configuration The following example enables the relay suppression function on the interface 1.

```
FS# configure terminal
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip dhcp relay suppression
FS(config-if)# exit
FS(config)#
```

Related	Command	Description
Commands	service dhcp	Enables the DHCP Relay.

Platform N/A

Description

4.39 ip dhcp relay source

Use this command to configure the source IP address of DHCP Relay packets. Use the **no** form of this command to restore the default setting.

ip dhcp relay source ip-address
no ip dhcp relay source

Parameter	Parameter	Description
Description	ip-address	Specifies the source IP address of DHCP Relay packets.

Defaults By default, no source IP address is configured for DHCP Relay packets.

Command Mode Interface configuration mode

Usage Guide This command should be run on the Relay device. Only one source IP address of DHCP Relay packets can be configured on one interface.

Configuration Examples The following example configures the source IP address of DHCP Relay packets.

```
FS(config-if)# ip dhcp relay source 1.1.1.1
```

The following example restores the default setting.

```
FS(config-if)# no ip dhcp relay source
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.40 ip dhcp smart-relay

Use this command to enable the automatic gateway address switching of the DHCP relay. Use the **no** form of this command to disable the automatic gateway address switching of the DHCP relay.

ip dhcp smart-relay
no ip dhcp smart-relay

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The automatic gateway address switching function of the DHCP relay is disabled by default.

Command Mode Global configuration mode

Default Level	14
Usage Guide	This command is configured on the relay. When multiple IP addresses are configured for an interface, the master IP address is used as the value of the giaddr field of the DHCP relay in normal cases, and the DHCP server assigns a network segment based on the giaddr field. This function can be used so that a client can use the slave IP address as the gateway address to apply for an IP address when the client fails to apply for an IP address by using the master IP address as the gateway address. With this function enabled, if the DHCP relay fails to receive a response after forwarding the Discover packet for three times, it uses another address to pad the giaddr field.
Configuration Example	The following example enables the DHCP smart relay function. <pre>FS(config)# ip dhcp smart-relay</pre> The following example disables the DHCP smart relay function. <pre>FS(config)# no ip dhcp smart-relay</pre>
Verification	Run the show running-config command to check whether the configuration is successful.
Platform Description	The slave IP address of an interface is used as the gateway address only when the following conditions are both met: A user uses the master IP address of the interface as the gateway address to apply for an address from the remote server but fails for three consecutive times; the interval between the first failure and the third failure exceeds 24 seconds. One master IP address and multiple slave IP addresses can be configured for an interface. The relay gateway address switching sequence starts from the master IP address to slave IP addresses (slave IP addresses are traversed based on their configured sequence) until an IP address is obtained successfully.

4.41 ip dhcp use class

Use this command to enable the CLASS to allocate addresses in the global configuration mode. Use the **no** form of this command can be used to disable the CLASS.

ip dhcp use class
no ip dhcp use class

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Enabled

Command Mode This function is enabled by default.

Usage Guide N/A

Configuration Examples The following example enables the CLASS to allocate addresses.

```
FS(config)# ip dhcp use class
```

Related	Command	Description
---------	---------	-------------

Commands	N/A	N/A
-----------------	-----	-----

Platform N/A
Description

4.42 ip helper-address

Use this command to add an IP address of the DHCP server. Use the **no** form of this command to delete an IP address of the DHCP server.

The server address can be configured globally or on a specific interface. Therefore, this command can run in the global configuration mode or the interface configuration mode to add the DHCP server information.

ip helper-address [vrf vrf-name] A.B.C.D

no ip helper-address [vrf vrf-name] A.B.C.D

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Global configuration mode, interface configuration mode.

Usage Guide Up to 20 DHCP server IP addresses can be configured globally or on a layer-3 interface. One DHCP request of this interface will be sent to these servers. You can select one for confirmation. The global configuration and port-based configuration of the vrf are slightly different. In the global configuration mode, if the vrf is not specified, the default address of the current server does not belong to any vrf. In the port-based configuration, if the vrf is not specified, the current default server and port configurations belong to the same vrf.

Configuration The following example configures the addresses for two servers.

- Examples**
1. Set the IP address for the global server to 192.168.1.1
 2. Set the IP address for the vrf instance-based server dep1 to 192.168.2.1

```
FS# configure terminal
FS(config)# ip helper-address 192.168.1.1
FS(config)# ip helper-address vrf dep1 192.168.2.1
```

Related Commands	Command	Description
	service dhcp	Enables the DHCP relay.

Platform N/A
Description

4.43 lease

Use this command to define the lease time of the IP address that the DHCP server assigns to the client in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting. A limited lease time ranges from 1 minute to 23 hours and 59 minutes.

lease { days [hours] [minutes] | **infinite** }

no lease

Parameter	Parameter	Description
Description	days	Lease time in days
	hours	(Optional) Lease time in hours. It is necessary to define the days before defining the hours.
	minutes	(Optional) Lease time in minutes. It is necessary to define the days and hours before defining the minutes.
	infinite	Infinite lease time.

Defaults The lease time for a static address pool is infinite. The lease time for other address pools is 1 day.

Command DHCP address pool configuration mode.

Mode

Usage Guide When the lease is getting near to expire, the DHCP client will send the request of renewal of lease. In general, the DHCP server will allow the renewal of lease of the original IP address.

Configuration The following example sets the DHCP lease to 1 hour.

Examples

```
lease 0 1
```

The following example sets the DHCP lease to 1 minute.

```
lease 0 0 1
```

Related Commands	Command	Description
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.44 lease-threshold

Use this command in DHCP address pool configuration mode to define the DHCP alarm threshold. Use the **default** or **no** form of this command to restore the default setting.

lease-threshold percentage

default lease-threshold

no lease-threshold

Parameter	Parameter	Description
Description	percentage	Usage of the address pool, ranging from 60 to 100 in percentage.

Defaults 90

Command Mode DHCP address pool configuration mode.

Usage Guide If the maximum IP usage of the address pool reaches the threshold, the DHCP Server generates a SYSLOG alarm. The IP usage indicates the ratio of the number of assigned address pools to the total number of assignable address pools. If the number of assigned pools stays above the alarm threshold, an alarm is generated every 5 minutes.

Configuration Examples The following example sets the alarm threshold to 80%.

```
lease-threshold 80
```

The following example restores the default alarm threshold.

```
default lease-threshold
```

The following example disables the address pool alarm function.

```
no lease-threshold
```

Related Commands	Command	Description
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A
Description

4.45 match ip

Use this command to define address manage matching rules. **match ip:**
match ip ip-address netmask [interface] [**add/remove**] **vlan** vlan-list

Use the **no** form of this command to delete the definition.
no match ip ip-address netmask [interface] [**add/remove**] **vlan** vlan-list

Use the **clear** form of this command to delete all definitions.
clear match ip [interface]

Parameter Description	Parameter	Description
	ip-address	IP address
	netmask	Netmask
	interface	Interface name
	add/remove	Add or remove a vlan

vlan-list	VLAN index
-----------	------------

Defaults	N/A
Command Mode	Address manage configuration mode
Usage Guide	<p>1: After this command is configured, all DHCP clients from a specified vlan + port obtain addresses of the configured range.</p> <p>2: In the supervlan scenario, if a client is qualified for configuration of the DHCP static address pool, whichever subvlan the client is in, a same static address is assigned. And address manage does not need to configure the address based on all subvlans/ports but to configure the address to be in the corresponding vlan range. This rule only applies to assigning static addresses.</p>
Configuration Example	<p>1: Define vlan index 10 as the source of matching rule. For the DHCP client whose interface name is GigabitEthernet 0/10, set the network ID to 192.168.11.0 and mask 255.255.255.0.</p> <pre>FS(config-address-manage)#match ip 192.168.11.0 255.255.255.0 GigabitEthernet 0/10 vlan 10</pre>
Verification	Run the show run command to check whether the configuration is successful.

4.46 match ip default

Use this command to define default address manage matching rules. **match ip default;**

match ip default ip-address netmask

Use the **no** form of the command to delete the definition.

no match ip default ip-address netmask

Parameter Description	Parameter	Description
	ip-address	
netmask		Netmask

Defaults	N/A
Command Mode	Address manage configuration mode
Usage Guide	After configuring this command, all DHCP clients for which vlan + port/vlan have not been configured obtain addresses of the default range. If this command is not configured and there is not vlan + port configuration as well, addresses are assigned in the normal process.

Configuration 1: Define the default matching rule: network ID: 192.168.12.0, mask: 255.255.255.0

Example FS(config-address-manage)#match ip default 192.168.12.0 255.255.255.0

Verification Run the **show run** command to check whether the configuration is successful.

4.47 netbios-name-server

Use this command to configure the WINS name server of the Microsoft DHCP client NETBIOS in the DHCP address pool configuration mode. The **no** form of this command can be used to restore the default setting.

netbios-name-server ip-address [ip-address2...ip-address8]

netbios-name-server

Parameter	Parameter	Description
Description	ip-address	IP address of the WINS server. It is required to configure one IP address at least.
	ip-address2...ip-address8	(Optional) IP addresses of WINS servers. Up to 8 WINS servers can be configured.

Defaults No WINS server is defined by default.

Command DHCP address pool configuration mode.

Mode

Usage Guide When more than one WINS server is defined, the former has higher priority. The DHCP client will select the next WINS server only when its communication with the former WINS server fails.

Configuration The following example specifies the WINS server 192.168.12.3 for the DHCP client.

Examples netbios-name-server 192.168.12.3

Related	Command	Description
Commands	ip address dhcp	Enables the DHCP client on the interface to obtain the IP address.
	ip dhcp pool	Defines the name of the DHCP address pool and enter the DHCP address pool configuration mode.
	netbios-node-type	Defines the netbios node type of the client host.

Platform N/A

Description

4.48 netbios-node-type

Use this command to define the node type of the master NetBIOS of the Microsoft DHCP client in the DHCP address configuration mode. Use the **no** form of this command to restore the default setting.

netbios-node-type type

no netbios-node-type

Parameter	Parameter	Description
Description	type	Type of node in two modes: Digit in hexadecimal form in the range of 0 to FF. Only the following numerals are available: 1: b-node. 2: p-node. 4: m-node. 8: h-node. String: b-node: broadcast node p-node: peer-to-peer node m-node: mixed node h-node: hybrid node

Defaults No type of the NetBIOS node is defined by default.

Command DHCP address pool configuration mode.

Mode

Usage Guide There are 4 types of the NetBIOS nodes of the Microsoft DHCP client: 1) Broadcast, which carries out the NetBIOS name resolution by the broadcast method, 2) Peer-to-peer, which directly requests the WINS server to carry out the NetBIOS name resolution, 3) Mixed, which requests the name resolution by the broadcast method firstly, and then carry out the name resolution by the WINS server connection, 4) Hybrid, which requests the WINS server to carry out the NetBIOS name resolution firstly, and it will carry out the NetBIOS name resolution by the broadcast method if the response is not received.

By default, the node type for Microsoft operating system is broadcast or hybrid. If the WINS server is not configured, broadcast node is used. Otherwise, hybrid node is used. It is recommended to set the type of the NetBIOS node as Hybrid.

Configuration The following example sets the NetBIOS node of Microsoft DHCP client as Hybrid.

Examples `netbios-node-type h-node`

Related	Command	Description
Commands	<code>ip dhcp pool</code>	Defines the name of DHCP address pool and enters the DHCP address pool configuration mode.
	<code>netbios-name-server</code>	Configures the WINS name server of the Microsoft DHCP client NETBIOS.

Platform N/A

Description

4.49 network (DHCP)

Use this command to define the network number and network mask of the DHCP address pool in the DHCP

address pool configuration mode. Use the **no** form of this command to restore the default setting.

network net-number net-mask
no network

Parameter	Parameter	Description
Description	net-number	Network number of the DHCP address pool
	net-mask	Network mask of the DHCP address pool. If the network mask is not defined, the natural network mask will be used by default.

Defaults No network number or network mask is defined by default.

Command Mode DHCP address pool configuration mode.

Usage Guide This command defines the subnet and subnet mask of a DHCP address pool, and provides the DHCP server with an address space which can be assigned to the clients. Unless excluded addresses are configured, all the addresses of the DHCP address pool can be assigned to the clients. The DHCP server assigns the addresses in the address pool orderly. If the DHCP server found an IP address is in the DHCP binding table or in the network segment, it checks the next until it assigns an effective IP address.

The **show ip dhcp binding** command can be used to view the address assignment, and the **show ip dhcp conflict** command can be used to view the address conflict detection configuration.

Configuration Examples The following example defines the network number of the DHCP address pool as 192.168.12.0, and the network mask as 255.255.255.240.

```
network 192.168.12.0 255.255.255.240
```

Related Commands	Command	Description
	ip dhcp excluded-address	Defines the IP addresses that the DHCP server cannot assign to the clients.
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.50 next-server

Use this command to define the startup sever list that the DHCP client accesses during startup in the DHCP address configuration mode. Use the **no** form of this command to restore the default setting.

next-server ip-address [ip-address2...ip-address8]
no next-server

Parameter	Parameter	Description
Description	ip-address	Defines the IP address of the startup server, which is usually the TFTP server. It is required to configure one IP address at least.

ip-address2...ip-address8	(Optional) Up to 8 startup servers can be configured.
---------------------------	---

Defaults N/A

Command DHCP address pool configuration mode.

Mode

Usage Guide When more than one startup server is defined, the former will possess higher priority. The DHCP client will select the next startup server only when its communication with the former startup server fails.

Configuration The following example specifies the startup server 192.168.12.4 for the DHCP client.

Examples `next-server 192.168.12.4`

Related Commands	Command	Description
	bootfile	Defines the default startup mapping file name of the DHCP client.
	ip dhcp pool	Defines the name of the DHCP address pool and enter the DHCP address pool configuration mode.
	ip help-address	Defines the Helper address on the interface.
	option	Configures the option of the FSOS software DHCP server.

Platform N/A

Description

4.51 option

Use this command to configure the option of the DHCP server in the DHCP address pool configuration mode. Use the **no** form of this command to restore the default setting.

option code { **ascii** string | **hex** string | **ip** ip-address }

no option

Parameter Description	Parameter	Description
	code	Defines the DHCP option codes.
	ascii string	Defines an ASCII string.
	hex string	Defines a hex string.
	ip ip-address	Defines an IP address list.

Defaults N/A

Command Global configuration mode

Mode

Usage Guide The DHCP provides a mechanism to transmit the configuration information to the host in the TCP/IP network. The DHCP message has a variable option field that can be defined according to the actual requirement. The DHCP

client needs to carry the DHCP message with 32 bytes of option information at least. Furthermore, the fixed data field in the DHCP message is also referred to as an option. For the definition of current DHCP option, refer to RFC 2131.

Configuration Examples The following example defines the option code 19, which determines whether the DHCP client can enable the IP packet forwarding. 0 indicates to disable the IP packet forwarding, and 1 indicates to enable the IP packet forwarding. The configuration below enable the IP packet forwarding on the DHCP client.

```
FS(dhcp-config)# option 19 hex 1
```

The following example defines the option code 33, which provides the DHCP client with the static route information. The DHCP client will install two static routes: 1) the destination network 172.16.12.0 and the gateway 192.168.12.12, 2) the destination network 172.16.16.0 and the gateway 192.168.12.16.

```
option 33 ip 172.16.12.0 192.168.12.12 172.16.16.0 192.168.12.16
```

Related	Command	Description
Commands	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A
Description

4.52 pool-status

Use this command to enable or disable the DHCP address pool.

pool-status { enable | disable }

Parameter	Parameter	Description
Description	enable	Enables the address pool.
	disable	Disables the address pool.

Defaults By default, the address pool is enabled after it is configured.

Command Mode DHCP address pool configuration mode

Usage Guide This command is configured on the DHCP server.

Configuration Examples The following example disables the address pool.

```
FS(dhcp-config)# pool-status disable
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.53 relay agent information

Use this command to enter the Option82 matching information configuration mode in the global CLASS configuration mode. Use the **no** form of this command to delete the Option82 matching information of the CLASS.

relay agent information
no relay agent information

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Global CLASS configuration mode

Usage Guide After executing this command, it enters the Option82 matching information configuration mode which is shown as "FS (config-dhcp-class-relayinfo)#".
 In this configuration mode, user can configure the class matching multiple Option82 information.

Configuration Examples The following example configures a global CLASS and enters the Option82 matching information configuration mode.

```
FS(config)# ip dhcp class myclass
FS(config-dhcp-class)# relay agent information
FS(config-dhcp-class-relayinfo)#
```

Related Commands	Command	Description
	ip dhcp class	Defines a CLASS and enters the global CLASS configuration mode.

Platform Description N/A

4.54 relay-information hex

Use this command to enter the Option82 matching information configuration mode. Use the **no** form of this command to delete a piece of matching information.

relay-information hex aabb.ccdd.eeff... [*]
no relay-information hex aabb.ccdd.eeff... [*]

Parameter	Parameter	Description
Description	aabb.ccdd.eeff...[*]	Hexadecimal Option82 matching information. The '*' symbol means partial matching which needs the front part matching only. Without the '*' means needing full matching.

Defaults N/A

Command Mode Global CLASS configuration mode

Usage Guide N/A

Configuration Examples The following example configures a global CLASS which can match multiple Option82 information.

```
FS(config)# ip dhcp class myclass
FS(config-dhcp-class)# relay agent information
FS(config-dhcp-class-relayinfo)# relay-information
hex 0102256535
FS(config-dhcp-class-relayinfo)# relay-information
hex 010225654565
FS(config-dhcp-class-relayinfo)# relay-information
hex 060225654565
FS(config-dhcp-class-relayinfo)# relay-information
hex 060223*
```

Related Commands	Command	Description
	ip dhcp class	Defines a CLASS and enter the global CLASS configuration mode.
	relay agent information	Enters the Option82 matching information configuration mode.

Platform N/A

Description

4.55 remark

Use this command to configure the identification which is used to describe the CLASS in this global CLASS configuration mode. Use the **no** form of this command to delete the identification.

- remark** class-remark
- no remark**

Parameter Description	Parameter	Description
	class-remark	Information used to identify the CLASS, which can be the character strings with space in them.

Defaults N/A.

Command Mode Global CLASS configuration mode.

Usage Guide N/A

Configuration The following example configures the identification information for a global CLASS.

```

Examples
FS(config)# ip dhcp class myclass
FS(config-dhcp-class)# remark used in #1 build
    
```

Related	Command	Description
Commands	ip dhcp class	Defines a CLASS and enter the global CLASS configuration mode.

Platform N/A

Description

4.56 service dhcp

Use this command to enable the DHCP server and the DHCP relay on the device in global configuration mode. Use the **no** form of this command to restore the default setting.

```

service dhcp
no service dhcp
    
```

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The **service dhcp** command is disabled.

Command Mode Global configuration mode

Usage Guide The DHCP server can assign the IP addresses to the clients automatically, and provide them with the network configuration information such as DNS server and default gateway. The DHCP relay can forward the DHCP requests to other servers, and the returned DHCP responses to the DHCP client, serving as the relay for DHCP packets.

Configuration Examples The following example enables the DHCP server and the DHCP relay feature.

```

service dhcp
    
```

Related	Command	Description
Commands	show ip dhcp server statistics	Displays various statistics information of the DHCP server.
	ip helper-address [vrf] A.B.C.D	Adds an IP address of the DHCP server.

Platform N/A

Description

4.57 show dhcp lease

Use this command to display the lease information of the IP address obtained by the DHCP client.

```

show dhcp lease
    
```

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide If the IP address is not defined, display the binding condition of all addresses. If the IP address is defined, display the binding condition of this IP address.

Configuration Examples The following example displays the result of the show dhcp lease.

```
FS# show dhcp lease
Temp IP addr: 192.168.5.71 for peer on Interface: FastEthernet0/0
Temp sub net mask: 255.255.255.0
DHCP Lease server: 192.168.5.70, state: 3 Bound
DHCP transaction id: 168F
Lease: 600 secs, Renewal: 300 secs, Rebind: 525 secs
Temp default-gateway addr: 192.168.5.1
Next timer fires after: 00:04:29
Retry count: 0 Client-ID: redgaint-00d0.f8fb.5740-Fa0/0
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.58 show ip dhcp binding

Use this command to display the binding condition of the DHCP address.

show ip dhcp binding [ip-address]

Parameter	Parameter	Description
Description	ip-address	(Optional) Only displays the binding condition of the specified IP addresses.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide If the IP address is not defined, show the binding condition of all addresses. If the IP address is defined, show the binding condition of this IP address

Configuration The following is the result of the show ip dhcp binding.

```

Examples FS# show ip dhcp binding
Total number of clients : 4
Expired clients : 3
Running clients : 1

IP address      Hardware address      Lease expiration      Type
20.1.1.1       2000.0000.2011       000 days 23 hours 59 mins Automatic
    
```

The meaning of various fields in the show result is described as follows.

Field	Description
IP address	The IP address to be assigned to the DHCP client.
Client-Identifier /Hardware address	The client identifier or hardware address of the DHCP client.
Lease expiration	The expiration date of the lease. The Infinite indicates it is not limited by the time. The IDLE indicates the address is in the free status currently for it is not renewed or the DHCP client releases it actively.
Type	The type of the address binding. The Automatic indicates an IP address is assigned automatically, and the Manual indicates an IP address is assigned by manual.

Related Commands	Command	Description
	clear ip dhcp binding	Clears the DHCP address binding table.

Platform N/A
Description

4.59 show ip dhcp conflict

Use this command to show the conflict history record of the DHCP sever.

show ip dhcp conflict

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide This command can display the conflict address list detected by the DHCP server.

Configuration The following example displays the output result of the **show ip dhcp conflict** command.

```

Examples
FS# show ip dhcp conflict
IP address  Detection Method
192.168.12.1 Ping
    
```

The meaning of various fields in the show result is described as follows.

Field	Description
IP address	The IP addresses which cannot be assigned to the DHCP client.
Detection Method	The conflict detection method.

Related Commands	Command	Description
	clear ip dhcp conflict	Clears the DHCP conflict record.

Platform N/A

Description

4.60 show ip dhcp history

Use this command to display the DHCP lease history.

show ip dhcp history

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is configured on the DHCP server.

Configuration The following example displays the DHCP lease history.

```

Examples
FS#show ip dhcp history
Expired clients          : 3
IP address              Hardware address      Lease expiration        Vlan/Relay
10.1.1.5                2222.abcd.47ac      IDLE                    4097
10.1.1.4                2222.abcd.47ae      IDLE                    4097
10.1.1.3                2222.abcd.47ad      IDLE                    4097
Running clients         : 0
    
```

Related	Command	Description
---------	---------	-------------

Commands	N/A	N/A
-----------------	-----	-----

Platform N/A
Description

4.61 show ip dhcp pool

Use this command to display the address statistics of an address pool.

show ip dhcp pool [poolname]

Parameter	Parameter	Description
Description	poolname	(Optional) Address pool whose address statistics are to be displayed.

Defaults Privileged EXEC mode.

Command N/A
Mode

Usage Guide Use this command to show the address statistics of an address pool.

Configuration The following example displays the output result of the **show ip dhcp pool** poolname command.

```

Examples
FS#show ip dhcp poolname
Pool poolname:
  Address range      192.168.0.1 – 192.168.0.254
  Class range       192.168.0.1 – 192.168.0.254
  Total address     252
  Excluded          2
  Distributed       30
  Conflict          10
  Remained          212
  Usage percentage  84.12698%
  Lease threshold   90%
    
```

The meaning of various fields in the show result is described as follows.

Field	Description
Address range	Address range of the address pool.
Class range	Class address range. By default, the address range for the same address pool is not configured. Otherwise, the class range is displayed.
Total address	Total number of addresses that can be assigned in the address pool.
Excluded	Number of excluded addresses.
Distributed	Number of assigned addresses.
Conflict	Number of conflicting addresses in the address pool.

Remained	Number of remaining addresses that have not been assigned or can be reused.
Usage percentage	Address pool usage.
Lease threshold	Lease threshold.

Related Commands	Command	Description
	ip dhcp pool	Defines the name of the DHCP address pool and enters the DHCP address pool configuration mode.

Platform N/A

Description

4.62 show ip dhcp relay-statistics

Use this command to display the statistics of the DHCP relay.

show ip dhcp relay-statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the statistics of the DHCP relay.

Configuration Examples The following example displays the statistics of the DHCP relay.

```

FS# show ip dhcp relay-statistics
Cycle mode          0

Message             Count
Discover            0
Offer               0
Request             0
Ack                 0
Nak                 0
Decline             0
Release             0
Info                0
Bad                 0

Direction           Count
Rx client            0
    
```

Rx client uni	0
Rx client bro	0
Tx client	0
Tx client uni	0
Tx client bro	0
Rx server	0
Tx server	0

The meaning of various fields in the show result is described as follows.

Field	Description
Cycle mode	Whether to allow packets to be sent to multiple DHCP servers.
Discover	The number of Discover packets.
Offer	The number of Offer packets.
Request	The number of Request packets.
Ack	The number of Ack packets.
Nak	The number of Nak packets.
Decline	The number of Decline packets.
Release	The number of Release packets.
Info	The number of Info packets.
Bad	The number of error packets.
Rx client	The number of packets received from the client.
Rx client uni	The number of unicast packets received from the client.
Rx client bro	The number of broadcast packets received from the client.
Tx client	The number of packets transmitted to the client.
Tx client uni	The number of unicast packets transmitted to the client
Tx client bro	The number of multicast packets transmitted to the client
Rx server	The number of packets received from the server.
Tx server	The number of packets transmitted to the server.

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

4.63 show ip dhcp server statistics

Use this command to display the statistics of the DHCP server.

show ip dhcp server statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command displays the statistics of the DHCP server.

Configuration Examples The following example displays the output result of the **show ip dhcp server statistics** command.

```

FS# show ip dhcp server statistics
Address pools                2
Lease counter                4
Active Lease Counter        0
Expired Lease Counter       4
Malformed messages          0
Dropped messages            0

Message                      Received
BOOTREQUEST                 216
DHCPDISCOVER                 33
DHCPREQUEST                 25
DHCPCDECLINE                 0
DHCPRELEASE                 1
DHCPIFORM                   150

Message                      Sent
BOOTREPLY                   16
DHCPOFFER                   9
DHCPACK                     7
DHCPCNAK                    0
DHCPCREQTIMES               0
DHCPCREQSUCTIMES           0
DISCOVER-PROCESS-ERROR 0
LEASE-IN-PINGSTATE          0
NO-LEASE-RESOURCE           0
SERVERID-NO-MATCH           0
-----
rcv                          0
send                          0
    
```

The meaning of various fields in the show result is described as follows.

Field	Description
Address pools	Number of address pools.
Lease count	Number of allocated lease.
Automatic bindings	Number of automatic address bindings.
Manual bindings	Number of manual address bindings.
Expired bindings	Number of expired address bindings.
Malformed messages	Number of malformed messages received by the DHCP.
Message Received or Sent	Number of the messages received and sent by the DHCP server respectively.

Related	Command	Description
Commands	clear ip dhcp server statistics	Clears the DHCP server statistics.

Platform N/A

Description

4.64 show ip dhcp socket

Use this command to display the socket used by the DHCP server.

show ip dhcp socket

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the socket used by the DHCP server.

```
FS#show ip dhcp socket
dhcp socket = 47.
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5 DHCPv6 Commands

5.1 bootfile-url

Use this command to configure the BOOT file URL of the DHCPv6 server. Use the **no** form of this command to remove the URL.

bootfile-url url-string

no bootfile-url

Parameter	Parameter	Description
Description	url-string	Sets URL of the BOOT file.

Defaults By default, no BOOT file URL is configured.

Command Mode DHCPv6 address pool configuration mode

Usage Guide Only the latest configured BOOT file URL is valid. New BOOT file URL overlays the old one.

Configuration Examples The following example configures the BOOT file URL.

```
FS(config-dhcp)# bootfile-url tftp://1000::1/FS.py
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.2 clear ipv6 dhcp binding

Use this command to clear the DHCPv6 binding information.

clear ipv6 dhcp binding [ipv6-address]

Parameter	Parameter	Description
Description	ipv6-address	Sets the IPv6 address or the prefix.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the ipv6-address is not specified, all DHCPv6 binding information is cleared. If the ipv6-address is specified, the binding information for the specified address is cleared.

Configuration The following example clears the DHCPv6 binding information:

Examples FS(config)# clear ipv6 dhcp binding

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.3 clear ipv6 dhcp client

Use this command to reset the DHCPv6 client.

clear ipv6 dhcp client interface-type interface-number

Parameter	Parameter	Description
Description	interface-type interface-number	Sets the interface type and the interface number.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to reset the DHCPv6 client, which may lead the client to request for the configurations from the server again.

Configuration The following example resets DHCP client VLAN 1.

Examples FS# clear ipv6 dhcp client vlan 1

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.4 clear ipv6 dhcp conflict

Use this command to clear the DHCPv6 address conflicts.

clear ipv6 dhcp conflict { ipv6-address | * }

Parameter	Parameter	Description
Description	ipv6-address	Specifies IPv6 address or prefix.
	*	All IPv6 addresses or prefixes

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If an IPv6 address conflict is detected, the DHCPv6 client will send the Decline message. Then the DHCPv6 server will add the address in this message into the address conflict queue. The addresses added into the address conflict queue cannot be assigned any longer.
 If the * parameter is not specified, all conflicts of IPv6 addresses or prefixes will be deleted.
 If the ipv6-address parameter is specified, only the specified address conflict will be deleted.

Configuration Examples The following example clears a DHCPv6 address conflict.

```
FS# clear ipv6 dhcp conflict 2008:50::2
```

Related Commands	Command	Description
	show ipv6 dhcp conflict	Displays address conflicts.

Platform Description N/A

5.5 clear ipv6 dhcp relay statistics

Use this command to clear the packet sending and receiving condition with the DHCPv6 Relay function enabled.
clear ipv6 dhcp relay statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears the packet sending and receiving condition with the DHCPv6 Relay function enabled.

```
FS# clear ipv6 dhcp relay statistics
```

Related Commands	Command	Description
	show ipv6 dhcp relay statistics	Displays the statistical information.

Platform Description N/A

5.6 clear ipv6 dhcp server statistics

Use this command to clear the DHCPv6 server statistics.

clear ipv6 dhcp server statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to clear the DHCPv6 server statistics.

Configuration Examples The following example clears the DHCPv6 server statistics.

```
FS(config)# clear ipv6 dhcp server statistics
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.7 dns-server

Use this command to set the DNS Server list information for the DHCPv6 Server.

Use the **no** form of this command to restore the default setting.

dns-server ipv6-address

no dns-server ipv6-address

Parameter	Parameter	Description
Description	ipv6-address	Sets the IPv6 address or the DNS server.

Defaults By default, no DNS server list is configured.

Command Mode DHCPv6 pool configuration mode

Usage Guide To configure several DNS Server addresses, use the **dns-server** command for several times. The newly-configured DNS Server address will not overwrite the former ones.

Configuration The following example configures the DNS server address.

Examples `FS(config-dhcp)# dns-server 2008:1::1`

Related Commands	Command	Description
	domain-name	Sets the DHCPv6 domain name information.
	ipv6 dhcp pool	Sets a DHCPv6 pool.

Platform N/A

Description

5.8 domain-name

Use this command to set the domain name for the DHCPv6 server.

Use the **no** form of this command to restore the default setting.

domain-name domain

no domain-name domain

Parameter	Parameter	Description
Description	domain	Sets the domain name.

Defaults By default, no domain name is configured.

Command Mode DHCPv6 pool configuration mode

Usage Guide To configure several domain names, use the domain-name command for several times. The newly-configured domain name will not overwrite the former ones.

Configuration Examples The following example sets the domain name for the DHCPv6 server to example.com.

`FS(config-dhcp)# domain-name example.com`

Related Commands	Command	Description
	dns-server	Sets the DHCPv6 DNS server list.
	ipv6 dhcp pool	Sets the DHCPv6 pool.

Platform N/A

Description

5.9 iana-address prefix

Use this command to set the IA_NA address prefix for the DHCPv6 Server. Use the **no** form of this command to restore the default setting.

iana-address prefix ipv6-prefix/prefix-length [**lifetime** { valid-lifetime | preferred-lifetime }]

no iana-address prefix

Parameter	Parameter	Description
-----------	-----------	-------------

Description	ipv6-prefix/prefix-length	Sets the IPv6 prefix and prefix length.
	lifetime	Sets the lifetime of the address allocated to the client. With the keyword lifetime configured, both parameters valid-lifetime and preferred-lifetime shall be configured.
	valid-lifetime	Sets the valid lifetime of using the allocated address for the client.
	preferred-lifetime	Sets the preferred lifetime of the address allocated to the client.

Defaults By default, no IA_NA address prefix is configured.
The default valid-lifetime is 3600s(1 hour).
The default preferred-lifetime is 3600s(1 hour).

Command DHCPv6 pool configuration mode
Mode

Usage Guide This command is used to set the IA_NA address prefix for the DHCPv6 Server, and allocate the IA_NA address to the client.
The Server attempts to allocate a usable address within the IA_NA address prefix range to the client upon receiving the IA_NA address request from the client. That address will be allocated to other clients if the client no longer uses that address again.

Configuration The following example sets the IA_NA address prefix for the DHCPv6 Server.

Examples FS(config-dhcp)# iana-address prefix 2008:50::/64 lifetime 2000 1000FS(config-if)# ip verify urpf drop-rate notify

Related	Command	Description
Commands	ipv6 dhcp pool	Sets the DHCPv6 pool.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A
Description

5.10 ipv6 dhcp client ia

Use this command to enable DHCPv6 client mode and request the IANA address from the DHCPv6 server. Use the **no** form of this command to restore the default setting.

ipv6 dhcp client ia [rapid-commit]
no ipv6 dhcp client ia

Parameter	Parameter	Description
Description	rapid-commit	Allows the two-message interaction process.

Defaults This function is disabled by default.

Command Interface configuration mode
Mode

Usage Guide This command is used to enable DHCPv6 client mode and request the IANA address from the DHCPv6 server, The **rapid-commit** key allows the two-message interaction process between the client and the server. After the key is configured, the solicit message transmitted by the client contains the rapid-commit option.

Configuration The following example enables the request for the IANA address on the interface.

```

Examples
FS(config)# interface fastethernet 0/1
FS(config-if)# ipv6 dhcp client ia
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.11 ipv6 dhcp client pd

Use this command to enable the DHCPv6 client and request for the prefix address information.

Use the **no** form of this command to restore the default setting.

ipv6 dhcp client pd prefix-name [**rapid-commit**]

no ipv6 dhcp client pd

Parameter	Parameter	Description
Description	prefix-name	Defines the IPv6 prefix name.
	rapid-commit	Allows the two-message interaction process.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide With the DHCPv6 client mode disabled, use this command to enable the DHCPv6 client mode on the interface. With the **ipv6 dhcp client pd** command enabled, the DHCPv6 client sends the prefix request to the DHCPv6 server. The keyword **rapid-commit** allows the client and the server two-message interaction process. With this keyword configured, the solicit message sent by the client includes the **rapid-commit** item.

Configuration The following example enables the prefix information request on the interface.

```

Examples
FS(config)# interface fastethernet 0/1
FS(config-if)# ipv6 dhcp client pd pd_name
    
```

Related	Command	Description
Commands	clear ipv6 dhcp client	Resets the DHCPv6 client function on the interface.
	show ipv6 dhcp interface	Displays the DHCPv6 interface configuration.

Platform N/A
Description

5.12 ipv6 dhcp pool

Use this command to set the DHCPv6 server pool.
 Use the **no** form of this command to restore the default setting.

ipv6 dhcp pool poolname
no ipv6 dhcp pool poolname

Parameter	Parameter	Description
Description	poolname	Defines the DHCPv6 pool name.

Defaults By default, no DHCPv6 server pool is configured.

Command Global configuration mode
Mode

Usage Guide This command is used to create a DHCPv6 Server configuration pool. After configuring this command, it enters the DHCPv6 pool configuration mode, in which the administrator can set the pool parameters, such as the prefix and the DNS Server information, ect.
 After creating the DHCPv6 Server configuration pool, use the **ipv6 dhcp server** command to associate the pool and the DHCPv6 Server on one interface.

Configuration The following example sets the DHCPv6 server pool.

```
FS# configure terminal
FS(config)# ipv6 dhcp pool pool1
FS(config-dhcp)#
```

Related	Command	Description
Commands	ipv6 dhcp server	Enables the DHCPv6 server function on the interface.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A
Description

5.13 ipv6 dhcp relay destination

Use this command to enable the DHCPv6 relay service and configure the destination address to which the messages are forwarded.

Use the **no** form of this command to restore the default setting.
ipv6 dhcp relay destination ipv6-address [interface-type interface-number]
no ipv6 dhcp relay destination ipv6-address [interface-type interface-number]

Parameter	Parameter	Description
Description	ipv6-address	Sets the DHCPv6 relay destination address.
	interface-type interface-number	Specifies the forwarding output interface if the forwarding address is the local link address.

Defaults By default, the relay and forward function is disabled, and the forwarding destination address and the output interface are not configured.

Command Interface configuration mode

Mode

Usage Guide With the DHCPv6 relay service enabled on the interface, the DHCPv6 message received on the interface can be forwarded to all configured destination addresses. Those received DHCPv6 messages can be from the client, or from another DHCPv6 relay service.

The forwarding output interface configuration is mandatory if the forwarding address is the local link address or the multicast address. And the forwarding output interface configuration is optional if the forwarding address is global or station unicast or multicast address.

Without the forwarding output interface configured, the interface is selected according to the unicast or multicast routing protocol.

The relay reply message can be forwarded without the relay function enabled on the interface.

Configuration The following example sets the relay destination address on the interface.

```

Examples
FS(config)# interface fastethernet 0/1
FS(config-if)# ipv6 dhcp relay destination 2008:1::1
    
```

Related	Command	Description
Commands	show ipv6 dhcp interface	Displays the DHCPv6 interface information.

Platform N/A

Description

5.14 ipv6 dhcp relay source

Use this command to specify the source interface of DHCPv6 Relay-Forward packets and add padding of interface information to the packets.

Use the **no** form of this command to restore the default setting.

ipv6 dhcp relay source {source-ip-address | gateway-address } { ipv6 address | interface-type interface-number }

no ipv6 dhcp relay source

Parameter	Parameter	Description
Description	source-ip-address	Specifies the source IP address, and adds padding to the source IP field.
	gateway-address	Specifies the gateway address, and adds padding to the source IP and link address fields.

ipv6-address	Specifies the IPv6 address of the source interface.
interface-type	Specifies the interface type of the source interface.
interface-number	Specifies the number of the source interface.




Defaults By default, no source interface is specified.

Command Global configuration mode/Interface configuration mode

Mode

Usage Guide Enabling the functionality of specifying the source interface of DHCPv6 Relay-Forward packets changes the source IP address and link address fields of the DHCPv6 Relay-Forward packets. By specifying the source IP address, the source IP address of the DHCPv6 Relay-Forward packets is changed; by specifying the gateway address, the source IP address and the link address fields are changed.

This command can be run in both global configuration mode and interface configuration mode with configurations in interface configuration mode takes higher priority. When in the same mode, new configurations override the old ones.

-  The source address adopts the IPv6 format and cannot be a multicast address, a link-local address, a site address, the unspecified address (::), or the loopback address (::1).
-  When specifying a local interface as the source interface, make sure the local interface is a L3 interface. If it becomes a non-L3 interface, it is not the source interface any more.
-  If more than one IPv6 address is configured on the specified interface, the lowest global unicast address is selected as the IPv6 address of the interface. If no global unicast address is configured, the current configuration does not take effect and the packets are forwarded in the default way.

Configuration Examples The following example specifies, in interface VLAN 1, the source interface of DHCPv6 Relay-Forward packets by choosing the gateway address as the source interface and configuring an IPv6 address.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# interface vlan 1
FS(config-if)# ipv6 dhcp relay source gateway-address 1000::1
FS(config-if)# end
```

The following example specifies, globally, the source interface of DHCPv6 Relay-Forward packets by choosing the source IP address as the source interface and configuring a local interface as the source interface.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# ipv6 dhcp relay source source-ip-address loopback 0
```

Related Commands	Command	Description
	ipv6 dhcp pool	Sets the DHCPv6 pool.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A

Description

5.15 ipv6 dhcp server

Use this command to enable the DHCPv6 server on the interface.

Use the **no** form of this command to restore the default setting.

ipv6 dhcp server poolname[**rapid-commit**][**preference** value]

no ipv6 dhcp server

Parameter	Parameter	Description
Description	poolname	Defines the DHCPv6 pool name.
	rapid-commit	Allows the two-message interaction process.
	preference value	Sets the preference level for the advertise message. The valid range is from 1 to 100 and the default value is 0.

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide Use the **ipv6 dhcp server** command to enable the DHCPv6 service.

Configuring the keyword **rapid-commit** allows the two-message interaction for the server and the client when allocating the address prefix and setting other configurations. With this keyword configured, if the client solicit message includes the **rapid-commit** item, the DHCPv6 Server will send the Reply message immediately.

DHCPv6 Server carries with the **preference** value when sending the advertise message if the **preference** level is not 0.

If the **preference** level is 0, the advertise message will not include this field. If the **preference** value is 255, the client sends the request message to the server to obtain the configurations.

DHCPv6 Client, Server and Relay functions are exclusive, and only one of the functions can be configured on the interface.

Configuration The following example enables the DHCPv6 server on the interface.

```
FS(config)# interface fastethernet 0/1
FS(config-if)# ipv6 dhcp server pool1
```

Related	Command	Description
Commands	ipv6 dhcp pool	Sets the DHCPv6 pool.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A

Description

5.16 ipv6 local pool

Use this command to configure the local prefix pool of the DHCPv6 server prefix.

Use the **no** form of this command to restore the default setting.

ipv6 local pool poolname prefix/prefix-length assigned-length

no ipv6 local pool poolname

Parameter	Parameter	Description
Description	poolname	The local prefix pool name
	prefix/prefix-length	The prefix and prefix length
	assigned-length	The assigned prefix length

Defaults By default, no local prefix pool of the DHCPv6 server prefix is configured.

Command Mode Global configuration mode

Usage Guide The **ipv6 local pool** command is used to create the local prefix pool. If the DHCPv6 server requires prefix delegation, you can use the **prefix-delegation pool** command to specify the local prefix pool and then assign prefixes from the prefix pool.

Configuration The following example configures the local prefix pool.

Examples FS(config)# ipv6 local pool client-prefix-pool 2001::db8::/64 80

The following example specifies the local prefix pool.

FS(config-dhcp)# prefix-delegation pool client-prefix-pool lifetime 2000 1000

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.17 option52

Use this command to configure the DHCPv6 Server to set the CAPWAP AC IPv6 address.

Use the **no** form of this command to restore the default setting.

option52 ipv6-address

no option52 ipv6-address

Parameter	Parameter	Description
Description	ipv6-address	Sets the CAPWAP AC IPv6 address.

Defaults By default, no option52 is created after pool configuration on the DHCPv6 server is complete.

Command DHCPv6 pool configuration mode

Mode

Usage Guide This command can be used to set multiple CAPWAP AC IPv6 addresses. The newly added IPv6 address does not overwrite the old one.

Configuration The following example configures the domain-name address.

Examples `FS(config-dhcp)# option52 2008:1::1`

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.18 prefix-delegation

Use this command to set the static binding address prefix information for the DHCPv6 server.

Use the **no** form of this command to restore the default setting.

prefix-delegation ipv6-prefix/prefix-length client-DUID [lifetime]

no prefix-delegation ipv6-prefix/prefix-length client-DUID [lifetime]

Parameter	Parameter	Description
Description	ipv6-prefix/prefix-length	Sets the IPv6 address prefix and the prefix length.
	client-DUID	Sets the client DUID.
	lifetime	Sets the interval of using the prefix by the client.

Defaults By default, no address prefix information is configured.

The default lifetime is 3600 seconds (one hour).

Command DHCPv6 pool configuration mode

Mode

Usage Guide The administrator uses this command to manually set the address prefix information list for the client IA_PD and set the valid lifetime for those prefixes.

The parameter client-DUID allocates the address prefix to the first IA_PD in the specified client.

Before receiving the request message for the address prefix from the client, DHCPv6 Server searches for the corresponding static binding first. If it succeeds, the server returns to the static binding; otherwise, the server will attempt to allocate the address prefix from other prefix information sources.

Configuration `FS(config-dhcp)# prefix-delegation 2008:2::/64 0003000100d0f82233ac`

Examples

Related	Command	Description
---------	---------	-------------

Commands	ipv6 dhcp pool	Sets a DHCPv6 pool.
	ipv6 local pool	Sets a local prefix pool.
	prefix-delegation pool	Specifies the DHCPv6 local prefix pool.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A

Description

5.19 prefix-delegation pool

Use this command to specify the local prefix pool for the DHCPv6 server.

Use the **no** form of this command to restore the default setting.

prefix-delegation pool poolname [**lifetime** { valid-lifetime | preferred-lifetime }]

no prefix-delegation pool poolname

Parameter	Parameter	Description
Description	poolname	Sets the local prefix pool name.
	lifetime	Sets the lifetime of the address prefix allocated to the client. With the keyword lifetime configured, both parameters valid-lifetime and preferred-lifetime shall be configured.
	valid-lifetime	Sets the valid lifetime of using the allocated address prefix for the client.
	preferred-lifetime	Sets the preferred lifetime of the address prefix allocated to the client.

Defaults

By default, no address prefix pool is specified.

The default valid-lifetime is 3600s(1 hour).

The default preferred-lifetime is 3600s(1 hour).

Command Mode DHCPv6 pool configuration mode

Usage Guide

Use the **prefix-delegation pool** command to set the prefix pool for the DHCPv6 Server and allocate the prefix to the client. Use the **ipv6 local pool** command to set the prefix pool.

The Server attempts to allocate a usable prefix from the prefix pool to the client upon receiving the prefix request from the client. That prefix will be allocated to other clients if the client no longer uses that prefix again.

Configuration Examples The following example specifies the local prefix pool for the DHCPv6 server.

```
FS(config-dhcp)# prefix-delegation pool client-prefix-pool lifetime 2000 1000
```

Related Commands	Command	Description
	ipv6 dhcp pool	Sets a DHCPv6 pool.
	ipv6 local pool	Sets a local prefix pool.
	prefix-delegation	Statically binds the client with the address prefix.
	show ipv6 dhcp pool	Displays the DHCPv6 pool information.

Platform N/A

Description

5.20 show ipv6 dhcp

Use this command to display the device DUID.

show ipv6 dhcp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Interface configuration mode/Global configuration mode

Usage Guide The server, client and relay on the same device share a DUID.

Configuration Examples The following example displays the device DUID.

```
FS# show ipv6 dhcp
This device's DHCPv6 unique identifier(DUID): 00:03:00:01:00:d0:f8:22:33:b0
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.21 show ipv6 dhcp binding

Use this command to display the address binding information for the DHCPv6 server.

show ipv6 dhcp binding [ipv6-address]

Parameter	Parameter	Description
Description	ipv6-address	Sets the IPv6 address or the prefix.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the ipv6-address is not specified, all prefixes dynamically assigned to the client and IANA address binding information are shown. If the ipv6-address is specified, the binding information for the specified address is shown.

Configuration The following example displays the address binding information for the DHCPv6 server.

```

Examples
FS# show ipv6 dhcp binding
Client DUID: 00:03:00:01:00:d0:f8:22:33:ac
    IAPD: iaid 0, T1 1800, T2 2880
    Prefix: 2001:20::/72
           preferred lifetime 3600, valid lifetime 3600
           expires at Jan 1 2008 2:23 (3600 seconds)
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.22 show ipv6 dhcp conflict

Use this command to display the DHCPv6 address conflicts.

show ipv6 dhcp conflict

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the DHCPv6 address conflicts.

```

Examples
FS# show ipv6 dhcp conflict
2008:50::2    declined
2108:50::2    declined
2008:50::3    declined
2008:50::4    declined
2108:50::4    declined
2008:50::5    declined
    
```

Related	Command	Description
Commands	clear ipv6 dhcp conflict	Clears address conflicts.

Platform N/A

Description

5.23 show ipv6 dhcp interface

Use this command to display the DHCPv6 interface information.

show ipv6 dhcp interface [interface-name]

Parameter	Parameter	Description
Description	interface-name	Sets the interface name.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the interface-name is not specified, all DHCPv6 interface information is displayed. If the interface-name is specified, the specified interface information is displayed.

Configuration Examples The following example displays the DHCPv6 interface information.

```
FS# show ipv6 dhcp interface
VLAN 1 is in server mode
  Server pool dhcp-pool
  Rapid-Commit: disable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.24 show ipv6 dhcp pool

Use this command to display the DHCPv6 pool information.

show ipv6 dhcp pool [poolname]

Parameter	Parameter	Description
Description	poolname	Defines the DHCPv6 pool name.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If the poolname is not specified, all DHCPv6 interface information is displayed. If the poolname is specified, the specified interface information is displayed.

Configuration The following example displays the DHCPv6 pool information.

```

Examples
FS# show ipv6 dhcp pool
DHCPv6 pool: dhcp-pool
  DNS server: 2011:1::1
  DNS server: 2011:1::2
  Domain name: example.com
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.25 show ipv6 dhcp relay agent

Use this command to display the source interface information about DHCPv6 Relay Agent.

```

show ipv6 dhcp relay agent [ X:X:X:X::X | * ]
    
```

Parameter	Parameter	Description
Description	X:X:X:X::X	Displays source interface information about a specified link.
	*	Displays source interface information about all links.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to show source interface information and link addresses of request packets received by the DHCPv6 Relay Agent.

Configuration The following example displays all source interface information and their corresponding links.

```

Examples
FS# show ipv6 dhcp relay agent *
Link local address      I2 interface
-----
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

5.26 show ipv6 dhcp relay destination

Use this command to display the destination information about DHCPv6 Relay Agent.

```

show ipv6 dhcp relay destination
    
```

Parameter	Parameter	Description
description	all	Displays information about all configured destination addresses and relay exits.
	interface interface-type interface-number	Displays the relay destination address and relay exit configured for a specified interface.

Defaults N/A

Command mode Privileged EXEC mode

Usage guideline Use this command to show the relay destination address to which DHCPv6 packets sent from a client are forwarded through a specified relay exit (optional) by an interface for which the relay function has been enabled by Relay Agent.

Examples The following example displays all the relay destination addresses.

```
FS# show ipv6 dhcp relay destination all
Interface: Vlan1 //interface for which the relay function has been enabled
Destination address(es)          Output Interface
3001::2
FF02::1:2 //specified destination address          Vlan2 //specified relay exit
```

Related commands	Command	Description
	N/A	N/A

Platform description N/A

5.27 show ipv6 dhcp relay source

Use this command to display the specified source interface of DHCPv6 Relay packets and its configuration information.

show ipv6 dhcp relay source

Parameter	Parameter	Description
Description	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode

Usage Guide N/A.

Configuration Examples The following example displays the specified source interface of DHCPv6 Relay packets and its configuration information.

```
FS#show ipv6 dhcp relay source
Interface-Name      Source-Intf-Type    Source-Intf-Parameter
-----
Global              Source Address      VLAN 10
VLAN 1              Gateway Address     1000::1
TenGigabitEthernet 0/7 Source Address       3000::1:1
```

Field interpretation:

Field	Interpretation
Interface-Name	Name of the specified source interface. In global configuration mode, "Global" is displayed in this column.
Source-Intf-Type	Type of the source interface.
Source-Intf-Parameter	Parameters of the source interface.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

5.28 show ipv6 dhcp relay statistics

Use this command to display the packet sending and receiving condition with the DHCPv6 Relay function enabled.

show ipv6 dhcp relay statistics

Parameter Description	Parameter	Description
	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode

Usage Guide N/A.

Configuration The following example displays the packet sending and receiving condition with the DHCPv6 Relay function enabled.

Examples

```

FS# show ipv6 dhcp relay statistics
Packets dropped          : 2
  Error                  : 2
  Excess of rate limit   : 0
Packets received        : 28
  SOLICIT                : 0
  REQUEST                : 0
  CONFIRM                : 0
  RENEW                  : 0
  REBIND                 : 0
  RELEASE                : 0
  DECLINE                : 0
  INFORMATION-REQUEST    : 14
  RELAY-FORWARD          : 0
  RELAY-REPLY            : 14
Packets sent            : 16
  ADVERTISE              : 0
  RECONFIGURE            : 0
  REPLY                  : 8
  RELAY-FORWARD          : 8
  RELAY-REPLY            : 0
    
```

Related	Command	Description
Commands	clear ipv6 dhcp relay statistics	Clears the statistical information.

Platform N/A

Description

5.29 show ipv6 dhcp server statistics

Use this command to display the DHCPv6 server statistics.

show ipv6 dhcp server statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide This command is used to display the DHCPv6 server statistics.

Configuration The following example displays the DHCPv6 server statistics.

Examples

```

FS# show ipv6 dhcp server statistics
DHCPv6 server statistics:

Packet statistics:
DHCPv6 packets received:          7
Solicit received:                  7
Request received:                  0
Confirm received:                  0
Renew received:                    0
Rebind received:                   0
Release received:                  0
Decline received:                  0
Relay-forward received:            0
Information-request received:      0
Unknown message type received:     0
Error message received:            0

DHCPv6 packet sent:                0
Advertise sent:                    0
Reply sent:                         0
Relay-reply sent:                   0
Send reply error:                   0
Send packet error:                  0

Binding statistics:
Bindings generated:                 0
IAPD assigned:                      0
IANA assigned:                      0

Configuration statistics:
DHCPv6 server interface:           1
DHCPv6 pool:                        0
DHCPv6 iapd binding:               0
    
```

Related	Command	Description
Commands	<code>ipv6 dhcp pool</code>	Sets a DHCPv6 pool.

Platform N/A

Description

5.30 show ipv6 local pool

Use this command to display the local prefix pool configuration and usage.

show ipv6 local pool [poolname]

Parameter	Parameter	Description
Description	poolname	The local prefix pool name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the local prefix pool configuration and usage.

Configuration Examples The following example displays all local prefix pool information.

```
FS#show ipv6 local pool
Pool                Prefix
Free                In use
client-prefix-pool 2001:db8::/64
65536                0
```

Field	Description
Pool	The local address pool name.
Prefix	The prefix and prefix length.
Free	The available prefix.
In use	The prefix in use.

The following example displays the information about the specified local prefix pool.

```
FS#show ipv6 local pool client-prefix-pool
Prefix is 2001:db8::/64 assign /80 prefix
1 entries in use, 65535 available
Prefix                Interface
2001:db8::/80        GigabitEthernet 0/0
```

Field	Description
Prefix	The assigned prefix and prefix length.
Interface	The assigning interface.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6 DNS Commands

6.1 clear host

Use this command to clear the dynamically learned host name.

clear host [* | host-name]

Parameter Description	Parameter	Description
	host-name	Deletes the specified dynamic domain name buffer.
	*	Deletes all dynamic domain name buffer.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide You can obtain the mapping record of the host name buffer table in two ways: 1) the **ip host** static configuration, 2) the DNS dynamic learning. Execute this command to delete the host name records learned by the DNS dynamically.

Configuration Examples The following configuration deletes the dynamically learned mapping records from the host name-IP address buffer table.

```
FS(config)#clear host *
```

Related Commands	Command	Description
	show hosts	Displays the host name buffer table.

Platform N/A

Description

6.2 ip domain-lookup

Use this command to enable DNS domain name resolution and configure the source IP address of DNS query.

ip domain-lookup [oob [via mgmt-name] | vrf vrf-name] [source { interface | ip ip-address]

Use this command to disable DNS domain name resolution or disable DNS domain name resolution and remove the configured source IP address for DNS query.

no ip domain-lookup [oob [via mgmt-name] | vrf vrf-name]

Use this command to enable DNS domain name resolution and remove the configured source IP address for DNS query.

default ip domain-lookup [oob [via mgmt-name] | vrf vrf-name]

Use either of the commands to remove the configured source IP address for DNS query.

no ip domain-lookup [oob [via mgmt-name] | vrf vrf-name] source

default ip domain-lookup [oob [via mgmt-name] | vrf vrf-name] source

Parameter Description	Parameter	Description
	vrf vrf-name	Specifies the name of a VRF instance. If this parameter is not specified, it indicates the public network.
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	via	Configures MGMT port.
	mgmt-name	Specifies the MGMT port in oob mode.
	source	Indicates the interface or source address for domain name resolution.
	interface	Specifies a Layer 3 interface.
	ip-address	Specifies the IPv4 address of the DNS server.

Defaults By default, DNS domain name resolution is enabled while no source interface or address is configured for DNS query.

Command Global configuration mode.

Mode

Usage Guide By default, no source IP address of DNS query is configured, so the source IP address of DNS query is decided through the routing process.

If the interface parameter is specified, when IPv4 DNS query is sent, its source address is the prime IPv4 address of the source interface; when IPv6 DNS query is sent, its source address is the first effective IPv6 address of the source interface. If no such IPv4 IPv6 addresses are configured on the interface, corresponding DNS query cannot be sent.

If the **ipv4** ip-address field is specified, the configured IPv4 address serves as the source address of IPv4 DNS query, and the sending of IPv6 DNS query fails.

If the **ipv6** ip-address field is specified, the configured IPv6 address serves as the source address of IPv6 DNS query, and the sending of IPv4 DNS query fails.

An effective IPv6 address is a unicast address. But it cannot be a link local address or a loopback address.

Configuration The following example disables the DNS domain name resolution.

Examples FS(config)# no ip domain-lookup

Related Commands	Command	Description
------------------	---------	-------------

show hosts	Displays the DNS related configuration information.
-------------------	---

Platform N/A

Description

6.3 ip host

Use this command to configure the mapping of the host name and the IP address. Use the **no** form of the command to remove the host list.

ip host [**oob** | **vrf** vrf-name] host-name ip-address [**via** mgmt-name]

no ip host [**oob** | **vrf** vrf-name] host-name ip-address [**via** mgmt-name]

Parameter Description

Parameter	Description
vrf vrf-name	Specifies the name of a VRF instance. If this parameter is not specified, it indicates the public network.
oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
via	Configures MGMT port.
mgmt-name	Specifies the MGMT port in oob mode.
host-name	Specifies the host name of the equipment.
ip-address	Specifies the IP address of the equipment.

Defaults N/A

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures IPv4 address 192.168.5.243 for domain name www.test.com.

Examples FS(config)# ip host www.test.com 192.168.5.243

Related Commands

Command	Description
show hosts	Show the DNS related configuration information.

Platform N/A

Description

6.4 ip name-server

Use this command to configure the IP address of the domain name server. Use the **no** form of this command to delete the configured domain name server.

ip name-server [**oob** | **vrf** vrf-name] { ip-address } [**via** mgmt-name]

no ip name-server [**oob** | **vrf** vrf-name] { ip-address } [**via** mgmt-name]

Parameter Description	Parameter	Description
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	vrf vrf-name	Specifies the name of a VRF instance. If this parameter is not specified, it indicates the public network.
	ip-address	The IP address of the domain name server.
	via	Configures MGMT port.
	mgmt-name	Specifies the MGMT port in oob mode.

Defaults N/A

Command Mode Global configuration mode.

Usage Guide Add the IP address of the DNS server. Once this command is executed, the equipment will add a DNS server. When the device cannot obtain the domain name from a DNS server, it will attempt to send the DNS request to subsequent servers until it receives a response. Up to 6 DNS servers are supported. You can delete a DNS server with the ip-address option or all the DNS servers.

Configuration Examples The following example configures the IPv4 domain name server.

```
FS(config)# ip name-server 192.168.5.134 via mgmt 2/0
```

Related Commands	Command	Description
	show hosts	Displays the DNS related configuration information.

Platform Description N/A

6.5 show hosts

Use this command to display DNS configuration.

show hosts [**oob** [**via** mgmt-name] | **vrf** vrf-name] [hostname]

Parameter Description	Parameter	Description
	vrf vrf-name	Specifies the name of a VRF instance. If this parameter is not specified, it indicates the public network.
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	via	Configures MGMT port.

mgmt-name	Specifies the MGMT port in oob mode.
hostname	Displays the specified domain name information,

Defaults All domain name information is displayed by default.

Command Privileged EXEC mode.

Mode

Usage Guide This command is used to display the DNS related configuration information.

Configuration FS# show hosts

Examples Name servers are:
192.168.5.134 static

Host	type	Address	TTL(sec)
switch	static	192.168.5.243	---
www.FS.com	dynamic	192.168.5.123	126

Field	Description
Name servers	Domain name server
Host	Domain name
type	Resolution type: Static resolution and dynamic resolution.
Address	IP address corresponding to the domain name
TTL	TTL of entries corresponding to the domain name/IP address.

Command	Description
ip host	Configures the host name and IP address mapping by manual.
ipv6 host	Configures the host name and IPv6 address mapping by manual.
ip name-server	Configures the DNS server.

Platform N/A

Description

7 FTP Server Commands

7.1 ftp-server enable

Use this command to enable the FTP server. Use the **default** form of this command to restore the default setting.


ftp-server enable
default ftp-server enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable the FTP server to connect the FTP client to upload/download the files.

 To enable the FTP client to access to the FTP server files, this command shall be co-used with the **ftp-server topdir** command.

Configuration Examples The following example enables the FTP Server and confines the FTP client access to the syslog subdirectory:

```
FS(config)# ftp-server topdir /syslog
```

The following example disables the FTP Server:

```
FS(config)# no ftp-server enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.2 ftp-server login timeout

Use this command to set the timeout interval for login to the FTP server. Use the **no** or **default** form of this command to restore the default setting.

ftp-server login timeout time
no ftp-server login timeout
default ftp-server login timeout

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
time	Sets the timeout interval for login to the FTP server, in the range from 1 to 30 in the unit of minutes.

Defaults The default is 2 minutes.

Command Mode Global configuration mode

Usage Guide The timeout interval refers to the maximum time when your account is allowed online after you login to the server. If you don't perform authentication again before the timeout interval expires, you will be forced offline.

Configuration Examples The following example sets the timeout interval for login to the FTP server to 5 minutes.

```
FS(config)# ftp-server login timeout 5
```

The following example restores the default setting.

```
FS(config)# no ftp-server login timeout
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.3 ftp-server login times

Use this command to set the number of login attempts. Use the **no** or **default** form of this command to restore the default setting.

ftp-server login times time

no ftp-server login times

default ftp-server login times

Parameter Description	Parameter	Description
	time	Sets the number of login attempts, in the range from 1 to 10.

Defaults The default is 3.

Command Mode Global configuration mode

Usage Guide The number of login attempts refers to the maximum count you are allowed to perform authentication. If the number of your login attempts exceeds 3, you will be forced offline.

Configuration The following example sets the number of login attempts to 5.

Examples `FS(config)# ftp-server login times 5`

The following example restores the default setting.

`FS(config)# no ftp-server login times`

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.4 ftp-server topdir

Use this command to set the directory range for the FTP client to access to the FTP server files. Use the **no** form of this command to restore the default setting.

ftp-server topdir directory

no ftp-server topdir

Parameter Description

Parameter	Description
directory	Sets the top-directory.

Defaults No top-directory is configured by default.

Command Mode Global configuration mode.

Usage Guide The FTP server top directory specifies the directory range of the files accessed by the client. Can the FTP client accesses to the files on the FTP server with the top directory correctly specified.
Without this command configured, FTP client fails to access to any file or directory on the FTP server.

Configuration Examples The following example enables the FTP Server and confines the FTP client access to the syslog subdirectory.

`FS(config)# ftp-server topdir /syslog`

`FS(config)# ftp-server enable`

The following example restores the default setting.

`FS(config)# no ftp-server topdir`

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.5 ftp-server timeout

Use this command to set the FTP session idle timeout. Use the **no** form of this command to restore the default setting.

ftp-server timeout time
no ftp-server timeout

Parameter
Description

Parameter	Description
time	Sets the session idle timeout, in the range from 1 to 3600 in the unit of minutes.

Defaults The default is 10 minutes.

Command Global configuration mode.
Mode

Usage Guide Use this command to set the FTP session idle timeout. If the session is idle, the FTP server deems the session connection is invalid and disconnects with the user.

The session idle time refers to the time for the FTP session between two FTP operations

Configuration The following example sets the session idle timeout to 5 minutes:

Examples

```
FS(config)# ftp-server timeout 5
```

The following example restores the default setting.

```
FS(config)# no ftp-server timeout
```

Related
Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.6 ftp-server username password

Use this command to set the login username and password for the FTP server. Use the **no** form of this command to restore the default setting.

ftp-server username username **password** [type] password
no ftp-server username username

default ftp-server username username

Parameter	Parameter	Description
Description	username	Sets the login username.
	password	Sets the log password

Defaults No username or password is set by default.


Command Mode Global configuration mode

Usage Guide Use this command to set the login username for the FTP server. To log in to the FTP server, the correct username and password shall be provided.

The maximum length of the username is 64 characters and the spaces are not allowed in the middle of the username. The username consists of letters, semiangle number and semiangle mark. Up to tn usernames can be configured for the FTP server at most.

The password must contain letters or numbers. Spaces before or behind the password are allowed but will be ignored. The spaces within are part of the password.

The plaintext password is in the range from 1 to 25 characters. The encrypted password is in the range from 4 to 52 characters.

 The anonymous user login is not supported on the FTP server. The client fails to pass the identity verification if the username is removed.

Configuration Examples The following example sets the username to user:

```
FS(config)# ftp-server username user password pass
```

The following example restores the default setting:

```
FS(config)# no ftp-server username user
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.7 ftp-server authentication

Use this command to specify an AAA method on the FTP server. Use the **no** or **default** form of this command to restore the default setting.

ftp-server authentication {default | username }

no ftp-server authentication
default ftp-server authentication

Parameter Description	Parameter	Description
	default	Specifies the default AAA method.
	username	Enters an AAA method name.

Defaults The default AAA method is used if no method is specified.

Command Mode Global configuration mode

Usage Guide Run this command to specify an AAA method that applies to clients logging in the FTP server.

Configuration Examples The following example enables the AAA method named 1111:

```
FS(config)# ftp-server authentication 1111
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.8 show ftp-server

Use this command to show the status information of the FTP server.

show ftp-server

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The FTP server status information includes:

- Enabled/Disabled server
- The control connection is set up or not (the related IP, Port are shown)

- The data connection is set up or not (the related IP, Port and the working mode are shown)
- The current file transmission type
- The login username and password
- The FTP server top directory
- The session idle timeout setting

Configuration The following example displays the related status information of the FTP server:

Examples

```

FS#show ftp-server
ftp-server information
=====
enable : Y
topdir : tmp/
timeout: 10min
username:aaaa      password:(PLAIN)bbbb      connect num[2]
  [0]trans-type:BINARY (ctrl)server IP:192.168.21.100[21]
                        client IP:192.168.21.26[3927]
  [1]trans-type:ASCII (ctrl)server IP:192.168.21.100[21]
                        client IP:192.168.21.26[3929]
username:a1        password:(PLAIN)bbbb      connect num[0]
username:a2        password:(PLAIN)bbbb      connect num[0]
username:a3        password:(PLAIN)bbbb      connect num[0]
username:a4        password:(PLAIN)bbbb      connect num[0]
username:a5        password:(PLAIN)bbbb      connect num[0]
username:a6        password:(PLAIN)bbbb      connect num[0]
username:a7        password:(PLAIN)bbbb      connect num[0]
username:a8        password:(PLAIN)bbbb      connect num[0]
username:a9        password:(PLAIN)bbbb      connect num[0]
    
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

8 FTP CLIENT Commands

8.1 default ftp-client

Use this command to restore the FTP Client default setting.

default ftp-client [**vrf** vrf-name]

Parameter Description	Parameter	Description
	vrf vrf-name	VRF name. The default is the public network instance.

Defaults N/A

Command Mode Global configuration mode.

Usage Guide This command is used to restore FTP Client default setting. Specifically, data connection is passive; file transfer is binary; the client source IP address is not bound.

Configuration Examples The following example restores FTP Client default setting.

```
FS(config)# default ftp-client
```

The following example restores FTP Client vrf-name default setting.

```
FS(config)# default ftp-client vrf vrf-name
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.2 ftp-client disable-size-check

Use this command to disable size check of files downloaded from an FTP server. Use the **no** or **default** form of this command to restore the default setting.

ftp-client disable-size-check

no ftp-client disable-size-check

default ftp-client disable-size-check

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, file size is checked when it is downloaded from an FTP server.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example disables size check of files.

Examples `FS(config)# ftp-client disable-size-check`

The following example enables size check of files.

`FS(config)# no ftp-client disable-size-check`

The following example restores the default setting.

`FS(config)# default ftp-client disable-size-check`

Related

Commands

Command	Description
N/A	N/A

Platform N/A

Description

8.3 ftp-client ascii

Use this command to use ASCII mode for FTP transfer.

Use the **no** form of this command to restore the default setting.

ftp-client [vrf vrfname] ascii

no ftp-client [vrf vrfname] ascii

default ftp-client [vrf vrf-name]

Parameter

Description

Parameter	Description
vrf vrf-name	Configures the file transfer mode for the specified VRF.

Defaults The default FTP transfer mode is binary.

Command Global configuration mode

Mode

Usage Guide The **default** command is used to restore the FTP client setting. Specifically, data connection is in PASV mode and file transfer BINARY. The client source IP address is not bound.

Configuration The following example configures ASCII FTP transfer.

Examples `FS (config)# ftp-client ascii`

The following example configures ASCII FTP transfer for vrf-name.

```
FS(config)# ftp-client vrf vrf-name ascii
```

The following example configures binary FTP transfer.

```
FS(config)# no ftp-client ascii
```

The following example configures binary FTP transfer for vrf-name.

```
FS(config)# no ftp-client vrf vrf-name ascii
```

The following example restores the default setting of the FTP Client.

```
FS(config)# default ftp-client
```

The following example restores the default setting of the FTP Client vrf-name,

```
FS(config)# default ftp-client vrf vrf-name
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

8.4 ftp-client port

Use this command to configure PORT mode used for FTP data connection. Use the **no** form of this command to restore the default setting.

ftp-client [vrf vrfname] port

no ftp-client [vrf vrfname] port

default ftp-client [vrf vrf-name]

Parameter Description

Parameter	Description
vrf vrf-name	VRF name The default is the public network instance.

Defaults The default is PASV mode for FTP data connection.

Command Mode Global configuration mode.

Usage Guide This command is used to configure the connection mode to PORT mode, in which the server will actively connect with the client.
 The **default** command is used to restore the FTP client setting. Specifically, data connection is in PASV mode and file transfer BINARY. The client source IP address is not bound.

Configuration Examples The following example configures PORT mode used for FTP data connection

```
FS (config)# ftp-client port
```

The following example configures PORT mode used for FTPvrf-name data connection.

```
FS(config)# ftp-client vrf vrf-name port
```

The following example configures PASV mode for FTP data connection.

```
FS(config)# no ftp-client port
```

The following example configures PASV mode used for FTPvrf-name data connection.

```
FS(config)# no ftp-client vrf vrf-name port
```

The following example restores the default setting of the FTP Client.

```
FS(config)# default ftp-client
```

The following example restores the default setting of the FTP Client vrf-name,

```
FS(config)# default ftp-client vrf vrf-name
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

8.5 ftp-client source-address

Use this command to bind FTP Client with the source IP address of client and use this IP address to communicate with server. Use the **no** form of this command to disable source IP address binding. Use the **default** form of this command to restore the default setting.

ftp-client [vrf vrfname] **source-address** { ip-address | ipv6-address }

no ftp-client [vrf vrfname] **source-address**

default ftp-client [vrf vrf-name]

Parameter Description

Parameter	Description
vrf vrf-name	VRF name. The default is the public network instance.
ip-address	IP address of FTP client.
ipv6-address	IPv6 address of FTP client.

Defaults By default, the client will not bind the IP address locally. Instead, the router will select the IP address.

Command Mode Global configuration mode

Usage Guide The **default** command is used to restore the FTP client setting. Specifically, data connection is in PASV mode and file transfer BINARY. The client source IP address is not bound.

Configuration Examples The following example binds FTP Client with source IP address 192.168.23.236.

```
FS (config)# ftp-client source-address 192.168.23.236
```

The following example binds FTP Client with source IP address 2003:0:0:0::2.

```
FS(config)# ftp-client source-address 2003:0:0:0::2
```

The following example binds FTP Client vrf-name with source IP address 192.168.23.236.

```
FS(config)# ftp-client vrf vrf-name source-address 192.168.23.236
```

The following example binds FTP Client vrf-name with source IP address 2003:0:0:0::2.

```
FS(config)# ftp-client vrf vrf-name source-address 2003:0:0:0::2
```

The following example disables source IP address binding.

```
FS(config)# no ftp-client source-address
```

The following example disables source IP address binding.

```
FS(config)# no ftp-client vrf vrf-name source-address
```

The following example restores the default setting of the FTP Client.

```
FS(config)# default ftp-client
```

The following example restores the default setting of the FTP Client vrf-name,

```
FS(config)# default ftp-client vrf vrf-name
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

8.6 copy ftp

Use this command to download the file from the server to the device through FTP Client.

copy ftp://username:password@dest-address [/remote-directory] / remote-file **flash**:[local-directory/] local-file]

Parameter Description	Parameter	Description
	username	The username for logging into FTP Server. It is limited to 40 bytes and must not contain ":", "@", "/" and space, neither can it be omitted.
	password	The password for logging into FTP Server. It is limited to 32 bytes and must not contain ":", "@", "/" and space, neither can it be omitted.
	dest-address	IP address of the target FTP Server.
	remote-directory	File directory of FTP Server. It is optional and limited to 255 bytes. No space or Chinese character is supported. If left blank, it implies the current directory of FTP server.
	remote-file	Filename on the remote server. It is limited to 255 bytes and doesn't support space or Chinese character.
	local-directory	Directory of local folder (optional). If this directory is specified, this directory must have been created beforehand. This command doesn't support automatic directory creation. If left blank, it implies the current directory on the local device. It is limited to 255 bytes and doesn't support space or Chinese characters.
	local-file	Filename on the local device. It is limited to 255 bytes and doesn't support space or Chinese character.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example uses username of "user" and password of "pass" to download a file named "remote-file" from the directory "root" on FTP Server with IP address 192.168.23.69 to directory "home" on the local device, and changes the name to "local-file".

```
FS# copy ftp://user:pass@192.168.23.69/root/remote-file flash:home/local-file
```

Related Commands	Command	Description
	copy tftp	Uses the TFTP protocol to transfer files.

Platform N/A

Description

8.7 copy flash

Use this command to upload the file from the server to the device through FTP Client.

copy flash:[local-directory/] local-file **ftp://**username:password@dest-address [/remote-directory] / remote-file

Parameter Description	Parameter	Description
	username	The username for logging into FTP Server. It is limited to 40 bytes and must not contain ":", "@", "/" and space, neither can it be omitted.
	password	The password for logging into FTP Server. It is limited to 32 bytes and must not contain ":", "@", "/" and space, neither can it be omitted.
	dest-address	IP address of the target FTP Server.
	remote-directory	File directory of FTP Server. It is optional and limited to 255 bytes. No space or Chinese character is supported. If left blank, it implies the current directory of FTP server.
	remote-file	Filename on the remote server. It is limited to 255 bytes and doesn't support space or Chinese character.
	local-directory	Directory of local folder (optional). If this directory is specified, this directory must have been created beforehand. This command doesn't support automatic directory creation. If left blank, it implies the current directory on the local device. It is limited to 255 bytes and doesn't support space or Chinese characters.
	local-file	Filename on the local device. It is limited to 255 bytes and doesn't support space or Chinese character.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example uploads the file named "local-file" in directory "home" of local device to directory "root" on

Examples the FTP Server whose user name is user, password is pass and IP address is 192.168.23.69, and changes the filename to "remote-file".

```
FS# copy flash:home/local-file ftp://user:pass@192.168.23.69/root/remote-file
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

9 Tunnel Configuration Commands

9.1 show interfaces tunnel

Use this command to display the tunnel configuration.

show interfaces tunnel [number]

Parameter	Parameter	Description
Description	number	Specifies the tunnel number.

Defaults N/A

Command

Mode Privileged EXEC mode / Global configuration mode / Interface configuration mode

Usage Guide N/A

Configuration The following example displays tunnel 1 information.

Examples

```

FS#show interfaces tunnel 1
// Here is the public information about the interface
Tunnel source 1.1.1.2, destination 1.1.1.1, routeable
  Tunnel TOS/Traffic Class not set, Tunnel TTL 254
  Tunnel config nested limit is 0, current nested number is 0
  Tunnel protocol/transport is ipip
  Tunnel transport VPN is no set
FS#show interface tunnel 2
// Here is the public information about the interface
Tunnel attributes:
  Tunnel source 1.1.1.2, destination 1.1.1.1, routeable
  Tunnel TOS/Traffic Class not set, Tunnel TTL 254
  Tunnel config nested limit is 0, current nested number is 0
  Tunnel protocol/transport is gre ip
  Key 0x2, Sequencing disabled
  Checksumming of packets enabled
Tunnel transport VPN is vrf_tunnel
    
```

Field Description

Field	Description
Destination	The tunnel destination address. The address 0.0.0.0 indicates that the destination address is not configured.
Tunnel source	The tunnel source address, which can be either an IPv4 or an IPv6 address. If the tunnel source interface command is configured, the tunnel source

	address is the interface address.
Tunnel TTL	The TTL or hoplimit field of the transmission protocol.
Tunnel TOS	The TOS or traffic class field of the transmission protocol. Note that there is an exception. If the field is 0, and the transmission protocol is the same as the payload protocol, the field of the payload protocol is copied to the transmission protocol.
Tunnel nested-limit	The limit to the number of tunnel nested encapsulation times. This field is displayed by all tunnels except the 6to4, 6rd and isatap tunnels.
Tunnel protocol/transport	Tunnel encapsulation mode
Key	With the key setting, this field is displayed by only the GRE tunnel.
Checksuming	With the checksum setting, this field is displayed by only the GRE tunnel.
Tunnel VPN	The destination VRF.

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

9.2 show tunnel statistics

Use this command to display the number of configurable tunnel interfaces and configured tunnel interfaces.

show tunnel statistics

Parameter Description

Parameter	Description
N/A	N/A

Defaults

N/A

Command

Mode

Privileged EXEC mode / Global configuration mode / Interface configuration mode

Usage Guide

This command is used to display the number of configurable tunnel interfaces and configured tunnel interfaces. Note that the actual forwarding capacity is restricted by the number of chip entries. It is possible that the tunnel interface has been created while the chip entry list is full. In that case, the syslog is generated.

Configuration

The following example displays the number of configurable tunnel interfaces and configured tunnel interfaces.

Examples FS#show tunnel statistics
used: 2, limit: 1000

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.3 tunnel destination

Use this command to specify the destination IP address of a tunnel interface in interface configuration mode. Use the **no** form of this command to restore the default setting.

tunnel destination ip-address
no tunnel destination

Parameter Description	Parameter	Description
	ip-address	Sets the IP address of the specified tunnel destination.

Defaults No destination IP address is set by default.

Command Mode Interface configuration mode

Usage Guide This command must be used to specify the peer address during tunnel setup. Tunnels cannot be set up if this command is not executed.

Configuration Examples The following example sets the destination IP address of tunnel interface 0 to 61.154.101.3.

```
FS(config)# interface tunnel 0
FS(config-if)# tunnel destination 61.154.101.3
```

Related Commands	Command	Description
	show interface tunnel	Displays tunnel interface information.

Platform Description N/A

9.4 tunnel mode

Use this command to set the encapsulation mode on a tunnel interface. Use the **no** or **default** form of this command to restore to the default setting.

tunnel mode { gre { ip | ipv6 } || ipv6 | ipip | ipv6ip }
no tunnel mode
default tunnel mode

Parameter	Parameter	Description
Description	gre ip	GRE for the route at the IP layer
	gre ipv6	GRE for the route at the IPv6 layer
	ipv6	The transmission network is an IPv6 network without GRE encapsulation.
	ipip	The transmission network is an IPv4 network without GRE encapsulation. The user network is an IPv4 network.IP over IP encapsulation mode
	ipv6ip	The transmission network is an IPv4 network without GRE encapsulation. The user network is an IPv6 network. The peer end should be configured with an IPv4 address.

Defaults For routers, the default encapsulation mode is GRE IP.
 For switches, the default encapsulation mode is IPv6 IP.

Command Mode Interface configuration mode

Usage Guide The tunnel encapsulation format is the tunnel carrier protocol. The default encapsulation format of tunnel interfaces is GRE. You can determine the encapsulation format of tunnel interfaces based on the actual usage. By default, IP tunnel GRE can be implemented without any definition of the encapsulation format.

Configuration Examples The following example encapsulates GRE IP on tunnel interface 0.

```
FS(config)# interface tunnel 0
FS(config-if)# tunnel mode gre ip
```

Related Commands	Command	Description
	show interface tunnel	Displays tunnel interface information.

Platform Description N/A

9.5 tunnel source

Use this command to configure the source IP address for the tunnel. Use the **no** form of this command to restore the default setting.

tunnel source { ipv4-address | ipv6-address | interface-type interface-number }
no tunnel source

Parameter	Parameter	Description
Description	ipv4-address	Source IPv4 address of the tunnel used as the source IP address of the packets to be

	transmitted through the tunnel.
ipv6-address	If the tunnel mode ipv6 or tunnel mode gre ipv6 is configured, the source address of the tunnel shall be the IPv6 address. Using the local address of the link as the source address is not supported currently.
interface-type interface-number	Interface referenced by the tunnel, which will be used as the source IPv4 address of the packets to be transmitted through the tunnel.

Defaults No tunnel source address is configured by default.

Command Interface configuration mode.

Mode

Usage Guide The source IP address of a tunnel can be a specified IPv4 address or an IPv4 address of an interface. When you configure an auto tunnel (for example, 6to4 and isatap), it is recommended to specify the source address. A device shall not be configured multiple tunnels with the same encapsulation type, source address and destination address.

Configuration The following example configures an IPv6 manual tunnel.

Examples

```
FS(config)# interface tunnel 1
FS(config-if)# tunnel mode ipv6ip
FS(config-if)# tunnel source 1.1.1.1
```

Command	Description
tunnel mode	Configures the mode of a tunnel.
tunnel destination	Configures the destination address of a tunnel.
Tunnel ttl	Configures the TTL of the tunnel.

Platform N/A

Description

9.6 tunnel tos

Use this command to set the IPv4 ToS byte or IPv6 traffic class 8 bits in tunnel interface configuration mode. Use the **no** form of this command to restore the default setting.

tunnel tos [num]
no tunnel tos

Parameter	Description
Description num	IPv4 ToS byte or IPv6 traffic class 8 bits, in the range from 0 to 255.

Defaults By default, the inner-layer IPv4 ToS byte is copied to the outer-layer IPv4 header, if both the inner-layer carrier and the outer-layer encapsulation on a tunnel interface use the IPv4 protocol. By default, the inner-layer IPv6 traffic class 8 bits are copied to the outer-layer IPv6 header if both the inner-layer carrier and the outer-layer

encapsulation on a tunnel interface use the Ipv6 protocol.
 In other circumstances, the outer-layer IPv4 ToS and IPv6 traffic class are 0.

Command Mode Interface configuration mode

Usage Guide T This command is used to set GRE tunnel packets to a higher priority.

Configuration Examples The following example sets the ToS byte for a GRE tunnel outer-layer encapsulation protocol to 20 on interface tunnel 1.

```
FS(config)# interface tunnel 1
FS(config-if)# tunnel mode ipv6ip
FS(config-if)# tunnel tos 100
```

Related Commands

Command	Description
show interface tunnel	Displays tunnel interface information.

Platform Description N/A

9.7 tunnel ttl

Use this command to specify the TTL value of the IPv4 header in the encapsulated IPv6 messages. Use the **no** form of this command to restore the default setting.

- tunnel ttl** value
- no tunnel ttl**

Parameter Description

Parameter	Description
value	TTL value, ranging from 1 to 255.

Defaults The default TTL value is 254.

Command Mode Interface configuration mode.

Usage Guide This command is used to specify the TTL value of the IPv4 header in the encapsulated IPv6 messages.

Configuration Examples

```
FS(config)# interface tunnel 1
FS(config-if)# tunnel mode ipv6ip
FS(config-if)# tunnel ttl 100
```

Related Commands

Command	Description
tunnel mode	Configures the mode of a tunnel.
tunnel source	Configures the source IP address of the tunnel.

tunnel destination	Configures the destination IP address of a tunnel.
---------------------------	--

Platform N/A

Description

10 Network Connectivity Test Tool Commands

10.1 clear rping table all

Use this command to clear Rping entries.

clear rping table [**all** | [**ping-object** owner test-name] | [**trace-object** owner test-name]]

Parameter Description	Parameter	Description
	owner	User index
	test-name	Test index

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears all Rping entries.

```
FS# clear rping table all
```

The following example clears the specified Rping entry.

```
FS# clear rping table user FS
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.2 ping

Use this command to test the connectivity of a network to locate the network connectivity problem. The command format is as follows:

ping [oob | vrf vrf-name | ip] [address [via mgmt-name] [length length] [ntimes times] [timeout seconds] [data data] [source source] [df-bit] [validate] [detail] [interval millisecond]]

Parameter Description	Parameter	Description
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	vrf-name	VRF name

address	Specifies an IPv4 address.
length	Specifies the length of the packet to be sent (range: 36-18024, default: 100).
times	Specifies the number of packets to be sent (range:1- 4294967295).
seconds	Specifies the timeout time (range: 1-10 seconds).
data	Specifies the data to fill in.
source	Specifies the source IPv4 address or the source interface. The loopback interface address (for example: 127.0.0.1) is not allowed to be the source address.
df-bit	Sets the DF bit for the IP address. DF bit=1 indicates not to segment the datagrams. By default, the DF bit is 0.
validate	Sets whether to validate the reply packets or not.
detail	Sets whether to contain details in the echoed message. By default, only "!" and "." are displayed.
interface	Outgoing interface.
next-hop	Next hop IPv4 address
millisecond	Ping interval, in the range from 10 to 300000. The default is 100.

Defaults Five packets with 100Byte in length are sent to the specified IP address within specified time (2s by default).

Command Mode Privileged EXEC mode.

Usage Guide If the device can be pinged, the response information is displayed, and the statistics is listed at the end. For the extension functions of ping, the number, quantity and timeout time of the packets to be sent can be specified, and the statistics is also displayed in the end. To use the domain name function, configure the domain name server firstly. For the concrete configuration, refer to the DNS Configuration section.

Configuration Examples The following example tests the connectivity of a network to locate the network connectivity problem (regular ping).FS# ping 192.168.21.26

```
Sending 5, 100-byte ICMP Echoes to 192.168.21.26, timeout is 2 seconds:
```

```
< press Ctrl+C to break >
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10 ms
```

The following example displays details.

```
FS#ping 192.168.21.26 detail
```

```
*Apr 16 09:16:08: %PING-7-DEBUG: Ping vrf index -1.
```

```
Sending 5, 100-byte ICMP Echoes to 192.168.21.26, timeout is 2 seconds:
```

```
< press Ctrl+C to break >
```

```
Reply from 192.168.21.26: bytes=100 time=4ms TTL=64
```

```
Reply from 192.168.21.26: bytes=100 time=3ms TTL=64
```

```
Reply from 192.168.21.26: bytes=100 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=100 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=100 time=1ms TTL=64
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms.2
```

The following example tests the connectivity of a network to locate the network connectivity problem (extension ping).

```
FS# ping 192.168.21.26 length 1500 ntimes 100 data ffff source 192.168.21.99 timeout 3
```

```
Sending 100, 1500-byte ICMP Echoes to 192.168.21.26, timeout is 3 seconds:
```

```
< press Ctrl+C to break >
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

```
Success rate is 100 percent (100/100), round-trip min/avg/max = 2/2/3 ms
```

The following example displays the details.

```
ping 192.168.21.26 length 1500 ntimes 20 data ffff source 192.168.21.99 timeout 3 detail
```

```
Sending 20, 1500-byte ICMP Echoes to 192.168.21.26, timeout is 3 seconds:
```

```
< press Ctrl+C to break >
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=2ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=3ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Reply from 192.168.21.26: bytes=1500 time=1ms TTL=64
```

```
Success rate is 100 percent (20/20), round-trip min/avg/max = 1/1/3 ms
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

10.3 ping ipv6

Use this command to test the connectivity of a network to locate the network connectivity problem. The command format is as follows:

ping [**vrf** vrf-name | [**oob**] **ipv6**] [ip-address [**via** mgmt-name] [**length** length] [**ntimes** times] [**timeout** seconds] [**data** data] [**source** source] [**detail**] [**interval** millisecond]]

Parameter Description

Parameter	Description
oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
vrf-name	VRF name
ip-address	Specifies an IPv6 address.
length	Specifies the length of the packet to be sent (range: 36-18024, default: 100).
times	Specifies the number of packets to be sent (range:1-4294967295).
seconds	Specifies the timeout time (range: 1-10 seconds).
data	Specifies the data to fill in.
source	Specifies the source IPv6 address or the source interface. The loopback interface address (for example: 127.0.0.1) is not allowed to be the source address.
detail	Sets whether to contain details in the echoed message. By default, only "!" and "." are displayed.
interface	Outgoing interface.
next-hop	Next hop IPv6 address
millisecond	Ping interval, in the range from 10 to 300000. The default is 100.

Defaults Five packets with 100Byte in length are sent to the specified IP address within specified time 2 seconds by default

Command Mode Privileged EXEC mode.

Usage Guide If the device can be pinged, the response information is displayed, and the statistics is listed at the end. If the response data does not match the request data, a 'Request receive error.' message is displayed and the statistics is listed in the end. For the extension functions of ping ipv6, the number, quantity and timeout time of the packets to be sent can be specified, and the statistics is also displayed in the end. To use the domain name function, configure the domain name server firstly. For the concrete configuration, refer to the DNS Configuration section.

Configuration The following example tests the connectivity of a network to locate the network connectivity problem.

Examples

```
FS# ping ipv6 2000::1
Sending 5, 100-byte ICMP Echoes to 2000::1, timeout is 2 seconds:
 < press Ctrl+C to break >
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10 ms
```

The example below shows the extension ping ipv6.

```
FS# ping ipv6 2000::1 length 1500 ntimes 100 timeout 3 data ffff source 192.168.4.10:
Sending 100, 1500-byte ICMP Echoes to 2000::1, timeout is 3 seconds
 < press Ctrl+C to break >
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (100/100), round-trip min/avg/max = 2/2/3 ms
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

10.4 show rping detail

Use this command to display Rping information.

show rping detail

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to display the Rping information such as numbers of test accounts and users.

Configuration Examples The following example displays Rping information.

```
FS#show rping detail
Total owner number: 2
Total test number: 4
owner: user1
  test name: taget_1      storage type: volatile
test name: taget_2      storage type: nonVolatile
owner: user2
  test name: taget_1      storage type: permanent
test name: taget_2      storage type: readOnly
```

Field	Description
Total owner number	The number of users
Total test number	The number of Rping accounts
owner	Username
test name	Test name

storage type	Storage type
--------------	--------------

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.5 traceroute

Use this command to display all gateways passed by the test packets from the source address to the destination address.

traceroute [**oob** | **vrf** vrf-name | **ip**] [address [**via** mgmt-name]] [**probe** number] [**source** source] [**timeout** seconds] [**t**tl minimum maximum]]

Parameter Description	Parameter	Description
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	vrf-name	VRF name
	address	Specifies an IPv4 address.
	number	Specifies the number of probe packets to be sent (range: 1-255).
	source	Specifies the source IPv4 address or the source interface. The loopback interface address (for example: 127.0.0.1) is not allowed to be the source address.
	seconds	Specifies the timeout time (range: 1-10 seconds).
	minimum maximum	Specifies the minimum and maximum TTL values (range:1-255).
	interface	Outgoing interface.
	next-hop	Next hop IPv4 address

Defaults By default, seconds is 3 seconds, number is 3, minimum and maximum are 1 and 255.

Command Privileged EXEC mode: enables extended functions.

Mode User EXEC mode: enables basic functions.

Usage Guide Use the **traceroute** command to test the connectivity of a network to exactly locate the network connectivity problem when the network failure occurs. To use the function domain name, configure the domain name server. For the concrete configuration, refer to the DNS Configuration part.

Configuration Examples The following is two examples of the application bout traceroute, the one is of the smooth network, and the other is the network in which some gateways aren't connected successfully.

1. When the network is connected smoothly:

```

FS# traceroute 61.154.22.36
  < press Ctrl+C to break >
Tracing the route to 61.154.22.36

 1  192.168.12.1      0 msec  0 msec  0 msec
 2  192.168.9.2       4 msec  4 msec  4 msec
 3  192.168.9.1       8 msec  8 msec  4 msec
 4  192.168.0.10      4 msec  28 msec 12 msec
 5  192.168.9.2       4 msec  4 msec  4 msec
 6  202.101.143.154  12 msec  8 msec  24 msec
 7  61.154.22.36     12 msec  8 msec  22 msec

```

From above result, it's clear to know that the gateways passed by the packets sent to the host with an IP address of 61.154.22.36 (gateways 1~6) and the spent time are displayed. Such information is helpful for network analysis.

2. When some gateways in the network fail:

```

FS# traceroute 202.108.37.42
  < press Ctrl+C to break >
Tracing the route to 202.108.37.42

 1  192.168.12.1      0 msec  0 msec  0 msec
 2  192.168.9.2       0 msec  4 msec  4 msec
 3  192.168.110.1    16 msec 12 msec 16 msec
 4  * * *
 5  61.154.8.129     12 msec 28 msec 12 msec
 6  61.154.8.17       8 msec 12 msec 16 msec
 7  61.154.8.250     12 msec 12 msec 12 msec
 8  218.85.157.222   12 msec 12 msec 12 msec
 9  218.85.157.130   16 msec 16 msec 16 msec
10  218.85.157.77    16 msec 48 msec 16 msec
11  202.97.40.65     76 msec 24 msec 24 msec
12  202.97.37.65     32 msec 24 msec 24 msec
13  202.97.38.162    52 msec 52 msec 224 msec
14  202.96.12.38     84 msec 52 msec 52 msec
15  202.106.192.226  88 msec 52 msec 52 msec
16  202.106.192.174  52 msec 52 msec 88 msec
17  210.74.176.158  100 msec 52 msec 84 msec
18  202.108.37.42    48 msec 48 msec 52 msec

```

The above result clearly shown that the gateways passed by the packets sent to the host with an IP address of 202.108.37.42 (gateways 1~17) and the spent time are displayed, and gateway 4 fails.

```

FS# traceroute www.ietf.org

Translating "www.ietf.org"...[OK]
  < press Ctrl+C to break >
Tracing the route to 64.170.98.32

```

1	192.168.217.1	0 msec	0 msec	0 msec
2	10.10.25.1	0 msec	0 msec	0 msec
3	10.10.24.1	0 msec	0 msec	0 msec
4	10.10.30.1	10 msec	0 msec	0 msec
5	218.5.3.254	0 msec	0 msec	0 msec
6	61.154.8.49	10 msec	0 msec	0 msec
7	202.109.204.210	0 msec	0 msec	0 msec
8	202.97.41.69	20 msec	10 msec	20 msec
9	202.97.34.65	40 msec	40 msec	50 msec
10	202.97.57.222	50 msec	40 msec	40 msec
11	219.141.130.122	40 msec	50 msec	40 msec
12	219.142.11.10	40 msec	50 msec	30 msec
13	211.157.37.14	50 msec	40 msec	50 msec
14	222.35.65.1	40 msec	50 msec	40 msec
15	222.35.65.18	40 msec	40 msec	40 msec
16	222.35.15.109	50 msec	50 msec	50 msec
17	* * *			
18	64.170.98.32	40 msec	40 msec	40 msec

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.6 traceroute ipv6

Use this command to display all gateways passed by the test packets from the source address to the destination address.

traceroute [**vrf** vrf-name | [**oob**] **ipv6**] [address [**via** mgmt-name] [**probe** number] [**timeout** seconds] [**t**tl minimum maximum]]

Parameter Description	Parameter	Description
	oob	Enables the out-band channel. It must be set when MGMT is specified as the source port.
	vrf-name	VRF name
	address	Specifies an IPv6 address.
	number	Specifies the number of probe packets to be sent.
	seconds	Specifies the timeout time.
	minimum maximum	Specifies the minimum and maximum TTL values.
	interface	Outgoing interface.
	next-hop	Next hop IPv6 address

Defaults By default, seconds is 3 seconds, number is 3, minimum and maximum are 1 and 255.

Command Privileged EXEC mode: enables extended functions.

Mode User EXEC mode: enables basic functions.

Usage Guide Use the **traceroute ipv6** command to test the connectivity of a network to exactly locate the network connectivity problem when the network failure occurs. To use the function domain name, configure the domain name server. For the concrete configuration, refer to the DNS Configuration part.

Configuration Examples The following is two examples of the application about traceroute ipv6, the one is of the smooth network, and the other is the network in which some gateways aren't connected successfully.

1. When the network is connected smoothly:

```
FS# traceroute ipv6 3004::1
< press Ctrl+C to break >
Tracing the route to 3004::1
 1    3000::1      0 msec  0 msec  0 msec
 2    3001::1      4 msec  4 msec  4 msec
 3    3002::1      8 msec  8 msec  4 msec
 4    3004::1      4 msec  28 msec 12 msec
```

From above result, it's clear to know that the gateways passed by the packets sent to the host with an IP address of 3004::1 (gateways 1~4) and the spent time are displayed. Such information is helpful for network analysis.

2. When some gateways in the network fail:

```
FS# traceroute ipv6 3004::1
< press Ctrl+C to break >
Tracing the route to 3004::1
 1    3000::1      0 msec  0 msec  0 msec
 2    3001::1      4 msec  4 msec  4 msec
 3    3002::1      8 msec  8 msec  4 msec
 4    * * *
 5    3004::1      4 msec  28 msec 12 msec
```

The above result clearly shown that the gateways passed by the packets sent to the host with an IP address of 3004::1 (gateways 1~5) and the spent time are displayed, and gateway 4 fails.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

11 TCP Commands

11.1 ip tcp keepalive

Use this command to enable the TCP keepalive function. Use the **no** form of this command to restore the default setting,

ip tcp keepalive [**interval** num1] [**times** num2] [**idle-period** num3]

no ip tcp keepalive

Parameter Description	Parameter	Description
	interval num1	The interval of sending the keepalive packet, in the range from 1 to 120 in the unit of seconds, The default is 75.
	times num2	Keepalive packet sending times, in the range from 1 to 10. The default is 6.
	idle-period num3	Idle time, the time period during which the peer end does not send any packet to the local end, in the range from 60 to 1800 in the unit of seconds. The default is 900.

Defaults The function is disabled by default.

Command Mode Global configuration mode

Usage Guide The keepalive function enables TCP to detect whether the peer end is operating properly. Suppose the keepalive function is enabled together with default **interval**, **times** and **idle-period** settings. TCP begins to send the keepalive packet at an interval of 75 seconds if it does not receive any packet from the peer end in 900 seconds. The TCP connection is considered invalid and then disconnected automatically if the device sends the keepalive packet for six consecutive times without receiving any TCP packet from the peer end. This command applies to both IPv4 and IPv6 TCP.

Configuration Examples The following example enables the TCP keepalive function on the device and sets the **idle-period** and **interval** to 180 and 60 respectively. If the device sends the keepalive packet for four consecutive times without receiving any TCP packet from the peer end, the TCP connection is considered invalid.

```
FS(config)# ip tcp keepalive interval 60 times 4 idle-period 180
```

Related Commands	Command	Description
	N/A	N/A

Platform Description When you run the FSOS 10.x command **service tcp-keepalives-in** or **service tcp-keepalives-out**, it is converted to this command automatically in FSOS 11.0.

11.2 ip tcp mss

Use this command to set the upper limit of the MSS value. Use the **no** form of this command to restore the default setting.

ip tcp mss max-segment-size

no ip tcp mss

Parameter Description

Parameter	Description
max-segment-size	Upper limit of the MSS value in the range from 68 to 10000 bytes

Defaults

The default MSS = Outgoing IPv4/v6 MTU- IPv4/v6 header-TCP header.

Command

Global configuration mode

Mode

Usage Guide

This command is used to limit the maximum value of MSS for the TCP connection to be created. The negotiated MSS cannot exceed the configured value. You can use this command to reduce the maximum value of MSS. However, this configuration is not needed in general. This command applies to both IPv4 and IPv6 TCP.

Configuration

The following example sets the upper limit of the MSS value to 1300 bytes.

Examples

```
FS(config)# ip tcp mss 1300
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

11.3 ip tcp path-mtu-discovery

Use this command to enable Path Maximum Transmission Unit (PMTU) discovery function for TCP in global configuration mode. Use the **no** form of this command to restore the default setting.

ip tcp path-mtu-discovery [**age-timer** minutes | **age-timer infinite**]

no ip tcp path-mtu-discovery

Parameter Description

Parameter	Description
age-timer minutes	The time interval for further discovery after discovering PMTU. Its value ranges from 10 to 30 minutes. The default value is 10.
age-timer infinite	No further discovery after discovering PMTU

Defaults

This function is disabled by default.

Command Mode Global configuration mode

Usage Guide Based on RFC1191, the TCP path MTU function improves the network bandwidth utilization and data transmission when the user uses TCP to transmit the data in batch. Enabling or disabling this function takes no effect for existent TCP connections and is only effective for TCP connections to be created. This command applies to only IPv4 TCP. This function is enabled for IPv6 TCP constantly and cannot be disabled. According to RFC1191, after discovering the PMTU, the TCP uses a greater MSS to detect the new PMTU at a certain interval, which is specified by the parameter **age-timer**. If the PMTU discovered is smaller than the MSS negotiated between two ends of the TCP connection, the device will be trying to discover the greater PMTU at the specified interval until the PMTU value reaches the MSS or the user stops this timer. Use the parameter **age-timer infinite** to stop this timer.

Configuration Examples The following example enables PMTU discovery.

```
FS(config)# ip tcp path-mtu-discovery
```

Related Commands

Command	Description
show tcp pmtu	Shows the PMTU value for the TCP connection.

Platform Description N/A

11.4 ip tcp send-reset

Use this command to enable the device to send the reset packet when receiving the TCP port unreachable packet. Use the **no** form of this command to disable this function,

```
ip tcp send-reset  
no ip tcp send-reset
```

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode

Usage Guide In general, when dispatching the TCP packet, the TCP module replies a reset packet automatically to disconnect the TCP connection with the peer end if the TCP connection that this packet belongs to is not found, However, flooding TCP port unreachable packets pose an attack threat to the device, This command can be used to disable

the device from sending the reset packet when receiving the TCP port unreachable packet. This command applies to both IPv4 and IPv6 TCP.

Configuration Examples The following example disables the device from sending the reset packet when receiving the TCP port unreachable packet.

```
FS(config)# no ip tcp send-reset
```

Related Commands	Command	Description
	N/A	N/A

Platform Description The **ip tcp not-send-rst** command in FSOS 10.x is compatible in FSOS 11.0. When you run this command, it is converted to the **no ip tcp send-reset** command automatically.

11.5 ip tcp synwait-time

Use this command to set the timeout value for SYN packets (the maximum time from SYN transmission to successful three-way handshake). Use the **no** form of this command to restore the default setting.

ip tcp synwait-time seconds
no ip tcp synwait-time seconds

Parameter Description	Parameter	Description
	seconds	Timeout value for SYN packets in the range from 5 to 300 in the unit of seconds.

Defaults The default is 20.

Command Mode Global configuration mode

Usage Guide If there is an SYN attack in the network, reducing the SYN timeout value can prevent resource consumption, but it takes no effect for successive SYN attacks. When the device actively requests a connection with an external device, reducing the SYN timeout value can shorten the time for the user to wait, such as telnet login. For poor network conditions, the timeout value can be increased properly. This command applies to both IPv4 and IPv6 TCP.

Configuration Examples The following example set the timeout value for SYN packets to 10 seconds.

```
FS(config)# ip tcp syntime-out 10
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

11.6 ip tcp window-size

Use this command to change the size of receiving buffer and sending buffer for TCP connections. Use the **no** form of this command to restore the default setting.

ip tcp window-size size

no ip tcp window-size

Parameter Description	Parameter	Description
	size	Size of receiving buffer and sending buffer for TCP connections in the range from 128 to 65535 << 14 bytes.

Defaults The default is 65535.

Command Global configuration mode

Mode

Usage Guide The TCP receiving buffer is used to buffer the data received from the peer end. These data will be subsequently read by application programs. Generally, the window size of TCP packets implies the size of free space in the receiving buffer. For connections involving a large bandwidth and mass data, increasing the size of receiving buffer will remarkably improve TCP transmission performance.

The sending buffer is used to buffer the data of application programs. Each byte in the sending buffer has a sequence number, and bytes with sequence numbers acknowledged will be removed from the sending buffer. Increasing the sending buffer will improve the interaction between TCP and application programs, thus enhancing the performance. However, increasing the receiving buffer and sending buffer will result in more memory consumption of TCP.

This command is used to change the size of receiving buffer and sending buffer for TCP connections. This command changes both the receiving buffer and sending buffer, and only applies to subsequent connections. This command applies to both IPv4 and IPv6 TCP.

Configuration The following example sets the TCP window size to 16386 bytes.

Examples FS(config)# ip tcp window-size 16386

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

11.7 service tcp-keepalives-in

Use this command to enable the keepalive function for the TCP server. Use the no form of this command to restore the default setting.

service tcp-keepalives-in [interval] [**garbage**]

no service tcp-keepalives-in

Parameter Description

Parameter	Description
interval	The interval of sending keepalive packets, in the range from 1 to 65535 in the unit of seconds. The default is 60.
garbage	The keepalive packet contains one-byte invalid data. The invalid data is not contained by default.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide The keepalive function enables the TCP server to detect whether the client is operating properly. If the TCP server sends the keepalive packet for four consecutive times without receiving any TCP packet from the client, the TCP connection is considered invalid and then is disconnected automatically.

Configuration Examples The following example enables the keepalive function for the TCP server and sets the interval of sending the keepalive packet to 10 seconds. The keepalive packet contains one-byte invalid data.

```
FS(config)# service tcp-keepalives-in 10 garbage
```

Related Commands

Command	Description
N/A	N/A

Platform Description When you run this FSOS 10.x command, it is converted to the **ip tcp keepalive** command automatically in FSOS 11.0.

11.8 service tcp-keepalives-out

Use this command to enable the keepalive function for the TCP client. Use the **no** form of this command to restore the default setting,

service tcp-keepalives-out [interval] [**garbage**]

no service tcp-keepalives-out [interval] [**garbage**]

Parameter Description

Parameter	Description
interval	The interval of sending keepalive packets, in the range from 1 to 65535 in the

	unit of seconds. The default is 60.
garbage	The keepalive packet contains one-byte invalid data. The invalid data is not contained by default.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide The keepalive function enables the TCP client to detect whether the server is operating properly. If the TCP client sends the keepalive packet for four consecutive times without receiving any TCP packet from the server, the TCP connection is considered invalid and then is disconnected automatically.

Configuration Examples The following example enables the keepalive function for the TCP client and sets the interval of sending the keepalive packet to 10 seconds. The keepalive packet contains one-byte invalid data

```
FS(config)# service tcp-keepalives-out 10 garbage
```

Related Commands

Command	Description
N/A	N/A

Platform Description When you run this FSOS 10.x command, it is converted to the **ip tcp keepalive** command automatically in FSOS 11.0.

11.9 show ipv6 tcp connect

Use this command to display the current IPv6 TCP connection information.

show ipv6 tcp connect [local-ipv6 X:X:X::X] [local-port num] [peer-ipv6 X:X:X::X] [peer-port num]

Use this command to display the current IPv6 TCP connection statistics.

show ipv6 tcp connect statistics

Parameter Description

Parameter	Description
local-ipv6 X:X:X::X	Local IPv6 address
local-port num	Local port
peer-ipv6 X:X:X::X	Peer IPv6 address
peer-port num	Peer port
statistics	Displays IPv6 TCP connection statistics

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example displays the current IPv6 TCP connection information.

Examples

```
FS#show ipv6 tcp connect
Number Local Address      Foreign Address      State      Process name
1      :::22                  :::0                LISTEN     rg-sshd
2      :::23                  :::0                LISTEN     rg-telnetd
3      1000::1:23           1000::2:64201      ESTABLISHED rg-telnetd
```

The following example displays the current IPv6 TCP connection statistics.

```
FS#show ipv6 tcp connect statistics
State      Count
-----
ESTABLISHED 1
SYN_SENT   0
SYN_RECV   0
FIN_WAIT1  0
FIN_WAIT2  0
TIME_WAIT  0
CLOSED     0
CLOSE_WAIT 0
LAST_ACK   0
LISTEN     1
CLOSING    0
Total: 2
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

11.10 show ipv6 tcp pmtu

Use this command to display information about IPv6 TCP PMTU.

show ipv6 tcp pmtu [local-ipv6 X:X:X:X::X] [local-port num] [peer-ipv6 X:X:X:X::X] [peer-port num]

Parameter Description

Parameter	Description
local-ipv6 X:X:X:X::X	Local IPv6 address
local-port num	Local port
peer-ipv6 X:X:X:X::X	Peer IPv6 address
peer-port num	Peer port

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example information about IPv6 TCP PMTU.

Examples

```
FS# show ipv6 tcp pmtu
```

Number	Local Address	Foreign Address	PMTU
1	1000::1:23	1000::2:13560	

Field	Description
Number	Number
Local Address	Local address and port number. The number after the last colon is the port number.
Foreign Address	Remote address and port number. The number after the last colon is the port number.
PMTU	Path MTU.

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

11.11 show ipv6 tcp port

Use this command to display the current IPv6 TCP port status.

show ipv6 tcp port [num]

Parameter Description

Parameter	Description
num	Port number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the current IPv6 TCP port status.

Examples

```
FS#show ipv6 tcp port
TCP connections on port 23:
Number  Local Address Foreign Address  State
1       1000::1:23    1000::2:64571  ESTABLISHED
Total: 1

TCP connections on port 2650:
Number  Local Address Foreign Address  State
Total: 0
```

Field	Description
Number	Number
Local Address	Local address and port number.
Foreign Address	Remote address and port number.
State	<p>Current status of the TCP connection. There are eleven possible states:</p> <p>CLOSED: The connection has been closed.</p> <p>LISTEN: Listening state</p> <p>SYNSENT: In the three-way handshake phase when the SYN packet has been sent out.</p> <p>SYNRCVD: In the three-way handshake phase when the SYN packet has been received.</p> <p>ESTABLISHED: The connection has been established.</p> <p>FINWAIT1: The local end has sent the FIN packet.</p> <p>FINWAIT2: The FIN packet sent by the local end has been acknowledged.</p> <p>CLOSEWAIT: The local end has received the FIN packet from the peer end.</p> <p>LASTACK: The local end has received the FIN packet from the peer end, and then sent its own FIN packet.</p> <p>CLOSING: The local end has sent the FIN packet from the peer end, and received the FIN packet from the peer end before the ACK packet for the peer end to respond with this FIN packet is received.</p> <p>TIMEWAIT: The FIN packet sent by the local end has been acknowledged, and the local end has also acknowledged the FIN packet.</p>
Process Name	Process name

The following example displays the current IPv6 TCP connection statistics.

```
FS#show ipv6 tcp connect statistics
State      Count
-----
ESTABLISHED 1
SYN_SENT   0
SYN_RECV   0
FIN_WAIT1  0
FIN_WAIT2  0
```

```

TIME_WAIT  0
CLOSED     0
CLOSE_WAIT 0
LAST_ACK   0
LISTEN     1
CLOSING    0
Total: 2
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

11.12 show tcp connect

Use this command to display basic information about the current TCP connections.

show tcp connect [**local-ip** a.b.c.d] [**local-port** num] [**peer-ip** a.b.c.d] [**peer-port** num]

Use this command to display the current IPv4 TCP connection statistics.

show tcp connect statistics

Parameter Description

Parameter	Description
local-ip a.b.c.d	Local IP address.
local-port num	Local port.
peer-ip a.b.c.d	Peer IP address.
peer-port num	Peer port.
statistics	Displays IPv4 TCP connection statistics.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the current IPv4 TCP connection information.

```

FS#show tcp connect
Number Local Address      Foreign Address      State      Process name
1      0.0.0.0:22             0.0.0.0:0           LISTEN     rg-sshd
2      0.0.0.0:23             0.0.0.0:0           LISTEN     rg-telnetd
3      1.1.1.1:23             1.1.1.2:64201      ESTABLISHED rg-telnetd
    
```

Field	Description
-------	-------------

Number	Sequence number.
Local Address	The Local address and port number. The number after the last "." is the port number. For example, in "2002::2.23" and "192.168.195.212.23", "23" is the port number.
Foreign Address	The remote address and port number. The number after the last "." is the port number. For example, in "2002::2.23" and "192.168.195.212.23", "23" is the port number.
State	<p>Current status of the TCP connection. There are eleven possible states:</p> <p>CLOSED: The connection has been closed.</p> <p>LISTEN: Listening state</p> <p>SYNSENT: In the three-way handshake phase when the SYN packet has been sent out.</p> <p>SYNRCVD: In the three-way handshake phase when the SYN packet has been received.</p> <p>ESTABLISHED: The connection has been established.</p> <p>FINWAIT1: The local end has sent the FIN packet.</p> <p>FINWAIT2: The FIN packet sent by the local end has been acknowledged.</p> <p>CLOSEWAIT: The local end has received the FIN packet from the peer end.</p> <p>LASTACK: The local end has received the FIN packet from the peer end, and then sent its own FIN packet.</p> <p>CLOSING: The local end has sent the FIN packet from the peer end, and received the FIN packet from the peer end before the ACK packet for the peer end to respond with this FIN packet is received.</p> <p>TIMEWAIT: The FIN packet sent by the local end has been acknowledged, and the local end has also acknowledged the FIN packet.</p>
Process name	Process name.

The following example displays the current IPv4 TCP connection statistics.

```

FS#show tcp connect statistics
State      Count
-----
ESTABLISHED 1
SYN_SENT   0
SYN_RECV   0
FIN_WAIT1  0
FIN_WAIT2  0
TIME_WAIT  0
CLOSED     0
CLOSE_WAIT 0
LAST_ACK   0
LISTEN     1
CLOSING    0
    
```

Total: 2

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

11.13 show tcp parameter

Use this command to show TCP parameters.

show tcp parameter

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example shows TCP parameters.

Examples

```
FS#show tcp parameter
Hash table information:
  Established hash bucket size: 16384
  Bind hash bucket size: 16384
Memory information:
  Global memory limit: low=92160, pressure=122880, high=184320 (unit: pages)
  Per-socket receive buffer size: min=4096, default=87380, max=3932160 (unit: bytes)
  Per-socket send buffer size: min=4096, default=16384, max=3932160 (unit: bytes)
  Current allocated memory: 0
  Current memory pressure flag: 0
SYN specific information:
  Max SYN_RECV sockets per LISTEN socket: 65535
  Max SYN retries: 5
  Max SYN ACK retries: 5
Timewait specific information:
  Max timewait sockets: 180000
  Current timewait sockets: 0
```

```

Timewait recycle: 0
Reuse timewait port: 0
Keepalive information:
  Keepalive on: 0
  Idle period: 900 seconds
  Interval: 75 seconds
  Max probes: 6
MTU probing:
  Enable mtu probing: 0
FIN specific information:
  FIN_WAIT_2 timeout: 60 seconds
Orphan socket information:
  Max orphans: 16384
  Max orphan retries: 0
Current orphans: 0
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

11.14 show tcp pmtu

Use this command to display information about TCP PMTU.

show tcp pmtu [**local-ip** a.b.c.d] [**local-port** num] [**peer-ip** a.b.c.d] [**peer-port** num]

Parameter Description	Parameter	Description
	local-ip a.b.c.d	Local IP address.
	local-port num	Local port.
	peer-ip a.b.c.d	Peer IP address.
	peer-port num	Peer port.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays PMTU of IPv4 TCP connection.

```

FS# show tcp pmtu
    
```

Number	Local Address	Foreign Address	PMTU
1	192.168.195.212.23	192.168.195.112.13560	1440

Field	Description
Number	Sequence number.
Local Address	The local address and the port number. The number after the last "." is the port number. For example, in "2002::2.23" and "192.168.195.212.23", "23" is the port number.
Foreign Address	The remote address and the port number. The number after the last "." is the port number. For example, in "2002::2.23" and "192.168.195.212.23", "23" is the port number.
PMTU	PMTU value.

Related Commands

Command	Description
ip tcp path-mtu-discovery	Enables the TCP PMTU discovery function.

Platform N/A
Description

11.15 show tcp port

Use this command to display information about the current TCP port.

show tcp port [num]

Parameter Description

Parameter	Description
num	Port number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the current IPv4 TCP port status.

```
FS#sh tcp port
tcp port status:
Tcipv4 listen on 2650 have connections:
TCB      Foreign Address      Port    State
Tcipv4 listen on 2650 have total 0 connections.
Tcipv4 listen on 23 have connections:
TCB      Foreign Address      Port    State
```

c340800	1.1.1.2	64571	ESTABLISHED
Tcpv4 listen on 23 have total 1 connections.			
Tcpv6 listen on 23 have connections:			
TCB	Foreign Address	Port	State
c429980	3000::2	64572	ESTABLISHED

Tcpv6 listen on 23 have total 1 connections.

Field	Description
TCB	The control block's location in the current memory
Foreign Address	Remote address
Port	Remote port number
State	<p>Status of the current TCP connection. There are eleven possible states:</p> <p>CLOSED: The connection has been closed.</p> <p>LISTEN: Listening state</p> <p>SYNSENT: In the three-way handshake phase when the SYN packet has been sent.</p> <p>SYNRCVD: In the three-way handshake phase when the SYN packet has been received.</p> <p>ESTABLISHED: The connection has been established.</p> <p>FINWAIT1: The local end has sent the FIN packet.</p> <p>FINWAIT2: The FIN packet sent by the local end has been acknowledged.</p> <p>CLOSEWAIT: The local end has received the FIN packet from the peer end.</p> <p>LASTACK: The local end has received the FIN packet from the peer end, and then sent its own FIN packet.</p> <p>CLOSING: The local end has sent the FIN packet from the peer end, and received the FIN packet from the peer end before the ACK packet for the peer end to respond with this FIN packet is received.</p> <p>TIMEWAIT: The FIN packet sent by the local end has been acknowledged, and the local end has also acknowledged the FIN packet.</p>

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

11.16 show tcp statistics

Use this command to show TCP statistics on received packets, three way handshake and time-wait.

show tcp parameter

Parameter

Parameter	Description
-----------	-------------

Description		
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example shows TCP parameters.

Examples

```
FS#show tcp statistics
TCP Packets
  Received: 1103
  Errors : 0(checksum: 0)
Three way handshake
  Request queue overflow: 0
  Accept backlog full: 0
  Web authentication limit per user: 0
  Failed to alloc memory for request sock: 0
  Failed to create open request child: 0
  SYN ACK retransmits: 0
  Timeouted requests: 0
Time-wait
  Time-wait bucket table overflow: 0
```

Field Description

Field	Description
TCP Packets	Normal packets and error packets
Three way handshake	Three way handshake information, including session request count, server-client connection count, three way handshake failure count caused by Web authentication limit, TCP socket failure count caused by memory shortage, sub-session failure count, packet retransmission count and session failure count caused by retransmission timeout.
Time-wait	Session in TIMEWAIT state

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

12 IPv4/IPv6 REF Commands

12.1 clear ip ref packet statistics

Use this command to clear IPv4 FS Express Forwarding (REF) packet statistics.

clear ip ref packet statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears IPv4 REF packet statistics.

```
FS #clear ip ref packet statistics
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A.

Description

12.2 clear ipv6 ref packet statistics

Use this command to clear IPv6 REF packet statistics.

clear ipv6 ref packet statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears IPv6 REF packet statistics.

```
FS #clear ipv6 ref packet statistics
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A.
Description

12.3 show ip ref adjacency

Use this command to display the information about the specified adjacent node or all adjacent nodes.

show ip ref adjacency [**glean** | **local** | ip-address | **interface** interface_type interface_number | **discard** | **statistics**]

Parameter Description	Parameter	Description
	glean	Aggregate adjacent node, which is used for a direct route
	local	Local adjacent node, which is used by the local host
	ip	Next-hop IP address
	interface_type	Interface type
	interface_number	Interface number
	discard	Displays discarded adjacent nodes.
	statistics	Statistics

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command can be used to display the information about the adjacent node table in the current REF module. By specifying parameters, the information about the aggregate adjacent node, local adjacent node, adjacent node of the specified IP address, adjacent node associated with the specified interface, and all adjacent nodes can be displayed.

Configuration Examples The following example displays the information about all adjacent nodes in the adjacent node table. FS#show ip ref adjacency

```
id state      type      rfct chg ip          interface          linklayer(header data)
1  unresolved mcast    1    0   224.0.0.0
9  resolved   forward  1    0   192.168.50.78 GigabitEthernet 0/0 00 25 64 C5 9D 6A 00 D0 F8 98 76 54 08 00
7  resolved   forward  1    0   192.168.50.200 GigabitEthernet 0/0 00 04 5F 87 69 66 00 D0 F8 98 76 54 08 00
6  unresolved glean     1    0   0.0.0.0          GigabitEthernet 0/0
4  unresolved local     3    0   0.0.0.0          Local 1
```

Description of fields:

Field	Description
-------	-------------

id	Adjacent node ID
state	Adjacent node state: Unresolved Resolved
type	Adjacent node type Local: local adjacency Forward: forward adjacency Discard: discard adjacency Glean: glean adjacency Mcast: multicast adjacency
rfct	Reference count of the adjacent node
chg	Whether the adjacent node is on the changing link.
ip	IP address of the adjacent node
interface	Interface
linklayer	Layer 2 head

Related	Command	Description
Commands	show ip ref route	Displays all route information in the current REF module.

Platform N/A.
Description

12.4 show ip ref exact-route

This command is used to display the IPv4 REF exact route.

show ip ref exact-route [**oob** | **vrf** vrf_name] source_ipaddress dest_ipaddress

Parameter	Parameter	Description
Description	oob	Out of band, namely, the network that the management interface belongs to, supported only by the device supporting the management interface.
	vrf vrf_name	VRF name, supported only by the VRF-supported device.
	source_ipaddress	Source IP address of the packet
	dest_ipaddress	Destination IP address of the packet

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to specify the source and the destination IP address of the IP packets, and to display the path of forwarding the current packet with REF

Configuration The following example displays the IPv4 REF exact route from 192.168.217.74 to 192.168.13.1.

Examples

```
FS# show ip ref exact-route 192.168.217.74 192.168.13.1
192.168.217.74 --> 192.168.13.1 (vrf global):
id state    type    rfct chg  ip          interface      linklayer(header data)
9  resolved forward 1      0   192.168.17.1 GigabitEthernet 0/0 00 25 64 C5 9D 6A 00 D0 F8 98 76 54 08 00
```

Description of fields:

Field	Description
id	Adjacency ID
state	Adjacency state: Unresolved Resolved
type	Adjacency type Local: local adjacency Forward: forward adjacency Discard: discard adjacency Glean: glean adjacency Mcast: multicast adjacency
rfct	Reference count of the adjacency
chg	Whether the adjacency is on the changing link.
ip	Adjacency IP address
interface	Interface
linklayer	Layer 2 head

Related

Commands

Command	Description
show ip ref route	Displays all routing information in the current REF module.

Platform

N/A.

Description

12.5 show ip ref packet statistics

Use this command to display IPv4 REF packet statistics.

show ip ref packet statistics

Parameter

Description

Parameter	Description
N/A	N/A

Defaults

N/A

Command Privileged EXEC mode
Mode

Usage Guide N/A

Configuration The following example displays IPv4 REF packet statistics.

Examples FS #show ip ref pkt-statistic

ref packet statistic:

```

bad head      : 0
lookup fib fail : 0
local adj     : 0
glean adj    : 0
forward      : 0
redirect     : 0
punt adj     : 0
outif not in ef : 0
ttl expiration : 0
no ip routing : 0
    
```

Field	Description
total recved	Number of total packets received by REF
bad head	Number of the packets with false header
lookup fib fail	Number of the packets with failed REF routing
drop adj	Number of the packets matching the dropped adjacency
local adj	Number of the packets matching the local adjacency
glean adj	Number of the packets matching the gleaned adjacency
forward	Number of the packets matching the forwarded adjacency
no ip routing	Number of the packets not allowed to be forwarded and sent to local.

Related Commands

Command	Description
N/A	N/A

Platform N/A.
Description

12.6 show ip ref resolve-list

Use this command to display the IPv4 REF resolution information.

show ip ref resolve-list

Parameter	Parameter	Description
Description	N/A	N/A
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Usage Guide	N/A	

Configuration The following example displays IPv4 REF resolution information.

Examples

```
FS#show ip ref resolve-list
IP                res_state flags interface
1.1.1.1          unres    1    GigabitEthernet 0/0
```

Field	Description
IP	IP address
res_state	unres: unresolved res: resolved
flags	0: related to adjacency 1: unrelated to adjacency
interface	Interface

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

12.7 show ip ref route

Use this command to display all the routing information in the IPv4 REF table.

show ip ref route [oob | vrf vrf_name] [default | ip mask | statistics]

Parameter	Parameter	Description
Description		
	oob	Out of band, namely, the network that the management interface belongs to, supported only by the device supporting the management interface.
	vrf vrf_name	VRF name, supported only by the VRF-supported device.
	default	Specifies the default route.
	ip	Specifies the destination IP address of the route
	mask	Specifies the mask of the route.
	statistics	Statistics

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the related routing information on the current REF table, and specify the default route and all the routing information matching IP/MASK.

Configuration The following example displays all the routing information in the IPv4 REF table.

Examples

```
FS#show ip ref route
Codes: * - default route
      # - zero route
ip      mask      weight path-id  next-hop  interface
255.255.255.255 255.255.255.255 1 4 0.0.0.0 Local 0
224.0.0.0      240.0.0.0      1 1 224.0.0.0
224.0.0.0      255.255.255.0  1 4 0.0.0.0 Local 0
192.168.50.0   255.255.255.0  1 6 0.0.0.0 FastEthernet 0/0
192.168.50.255 255.255.255.255 1 2 0.0.0.0
192.168.50.200 255.255.255.255 1 7 192.168.50.200 FastEthernet 0/0
192.168.50.122 255.255.255.255 1 4 0.0.0.0 Local 0
192.168.50.78 255.255.255.255 1 9 192.168.50.78 FastEthernet 0/0
```

Field	Description
ip	Destination IP address
mask	Mask
path-id	Adjacent identity
next-hop	Address of next hop
weight	Routing weight
interface	Egress

Related Commands

Command	Description
show ip ref exact-route	Displays the accurate REF forwarding path of an IP packet.

Platform N/A

Description

12.8 show ipv6 ref adjacency

Use this command to display the information about the IPv6 adjacent node.

show ipv6 ref adjacency [glean | local | ipv6-address | interface interface_type interface_number | discard |

statistics]

Parameter	Parameter	Description
Description	glean	Aggregate adjacent node, which is used for a direct route
	local	Local adjacent node, which is used by the local host
	ipv6-address	Next-hop IP address
	interface_type	Interface type
	interface_number	Interface number
	discard	Displays discarded adjacent nodes.
	statistics	Statistics

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command can be used to display the information about the adjacent node table in the privileged EXEC mode and global configuration mode.

Configuration Examples The following example displays the information about the IPv6 adjacent node..

```
FS#show ipv6 ref adjacency
id  state      type  rfct chg ip  interface          linklayer(header data)
1   unresolved glean  1   0  :: GigabitEthernet 0/0
2   unresolved local  2   0  ::1 Local 1
```

Description of fields:

Field	Description
id	Adjacent node ID
state	Adjacent node state: Unresolved Resolved
type	Adjacent node type Local: local adjacency Forward: forward adjacency Discard: discard adjacency Glean: glean adjacency Mcast: multicast adjacency
rfct	Reference count of the adjacent node
chg	Whether the adjacent node is on the changing link.
ip	IP address of the adjacent node
interface	Interface
linklayer	Layer 2 head

For distributed routers, id is divided into two fields, namely, gid and lid, standing for global adjacent node ID and local adjacent node ID respectively.

Related Commands	Command	Description
	N/A	N/A

Platform N/A.
Description

12.9 show ipv6 ref exact-route

This command is used to display the IPv6 REF exact route.

show ipv6 ref exact-route [oob | vrf vrf_name] source-ipv6-address destination-ipv6-address

Parameter Description	Parameter	Description
	oob	Out of band, namely, the network that the management interface belongs to, supported only by the device supporting the management interface.
	vrf vrf_name	VRF name, supported only by the VRF-supported device.
	source-ipv6-address	Source IP address of the packet
	destination-ipv6-address	Destination IP address of the packet

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the IPv4 REF exact route from 2001:db8:1::1 to 3001:db8:2::2.

```
FS#show ipv6 exact-route 2001:db8:1::1 3001:db8:2::2
2001:db8:1::1 --> 3001:db8:2::2 (vrf global):
ID state type rfct chg ip interface linklayer(header data)
3 unresolve glean 1 0 :: GigabitEthernet 0/0
```

Description of fields:

Field	Description
id	Adjacent node ID
state	Adjacent node state: Unresolved Resolved

type	Adjacent node type Local: local adjacency Forward: forward adjacency Discard: discard adjacency Glean: glean adjacency Mcast: multicast adjacency
rfct	Reference count of the adjacent node
chg	Whether the adjacent node is on the changing link.
ip	IP address of the adjacent node
interface	Interface
linklayer	Layer 2 head

Related	Command	Description
Commands	N/A	N/A

Platform N/A.

Description

12.10 show ipv6 ref packet statistics

Use this command to display IPv6 REF packet statistics.

show ipv6 ref packet statistics

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays IPv6 REF packet statistics.

```

Examples
FS#show ipv6 ref packet statistics
ref packet statistic:
  bad head      : 0
  lookup fib fail : 0
  local adj     : 0
  glean adj     : 0
  forward      : 0
    
```

```

redirect          : 0
hop-limit expiration : 0
no ipv6 unicast-routing : 0
    
```

Field	Description
total recved	Number of total packets received by REF
bad head	Number of the packets with false header
lookup fib fail	Number of the packets with failed REF routing
drop adj	Number of the packets matching the dropped adjacency
local adj	Number of the packets matching the local adjacency
glean adj	Number of the packets matching the gleaned adjacency
forward	Number of the packets matching the forwarded adjacency
no ip routing	Number of the packets not allowed to be forwarded and sent to local.

Related Commands	Command	Description
	N/A	N/A

Platform N/A.
Description

12.11 show ipv6 ref resolve-list

This command is used to display the IPv6 REF resolution information.

show ipv6 ref resolve-list

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays IPv6 REF resolution information.

```
FS#show ipv6 ref resolve-list
```

Field	Description
IP	IPv6 address
res_state	unres: unresolved res: resolved
flags	0: related to adjacency 1: unrelated to adjacency
interface	Interface

Command	Description
N/A	N/A

Platform N/A
Description

12.12 show ipv6 ref route

Use this command to display all the routing information in the IPv6 REF table.

show ipv6 ref route [oob | vrf vrf-name] [default | statistics | prefix/len]

Parameter	Description
oob	Out of band, namely, the network that the management interface belongs to, supported only by the device supporting the management interface.
vrf vrf_name	VRF name, supported only by the VRF-supported device.
default	Specifies the default route.
statistics	Statistics
prefix/len	Displays the route with the specified prefix (X:X:X:X/<0-128>).

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display all routing information in the IPv6 REF table. If there is no VRF parameter, information about the global REF table is displayed; if there is VRF parameter, information about the specified VRF table is displayed. The command can also be used to display information about the default route, the route with the specified prefix, and statistics of all types of routes.

Configuration The following example displays all the routing information in the REF IPv6 table.

Examples

```
FS#show ipv6 ref route
Codes: * - default route
prefix/len          weight path_id  next_hop interface
2001:da8:ffe:2::/64  1      3      ::      GigabitEthernet 0/0
2001:da8:ffe:2::3/128 1      2      :::1    Local 1
fe80::/10           1      6      ::      Null 0
fe80::21a:a9ff:fe3b:fa41/128 1      2      :::1    Local 1
```

Field	Description
prefix/len	IPv6 prefix and prefix length.
path-id	Adjacent identity
next-hop	Address of next hop
weight	Routing weight
interface	Interface

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

Chapter 4 IP Routing Configuration Commands

1. RIP Commands
2. OSPFv2 Commands
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1 RIP Commands

1.1 address-family

Use this command to configure the RIP protocol in address family configuration sub-mode. Use the **no** form of this command to restore the default setting.

address-family ipv4 vrf vrf-name

no address-family ipv4 vrf vrf-name

Parameter Description	Parameter	Description
	vrf vrf-name	Specifies the VRF name associated with the sub-mode command.

Defaults The address family of the RIP protocol is not configured by default.

Command Mode Route configuration mode

Usage Guide Use the **address-family** command to enter the address family configuration sub-mode. The prompt is (config-router-af) #. When you specify the VRF associated with the sub-mode for the first time, the RIP instance corresponding to the VRF will be created. In the sub-mode, you can configure the VRF RIP routing information. To remove the address family sub-mode and return to the route configuration mode, use the **exit-address-family** or **exit** command.

Configuration Examples The following example creates a VRF with the name of vpn1 and creates its RIP instance.

```
FS(config)# ip vrf vpn1
FS(config-vrf)# exit
FS(config)# interface fastEthernet 1/0
FS(config-if-FastEthernet 0/1)# ip vrf forwarding vpn1
FS(config-if-FastEthernet 0/1)# ip address 192.168.1.1 255.255.255.0
FS(config)# router rip
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router)# network 192.168.1.0
FS(config-router)# exit-address-family
```

Related Commands	Command	Description
	exit-address-family	Exits the address family configuration sub-mode.
	ip vrf	Creates a VRF.

Platform Description N/A

1.2 auto-summary

Use this command to enable automatic summary of RIP routes. Use the **no** form of this command to disable this function

auto-summary

no auto-summary

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Automatic summary of RIP routes is enabled by default

Command

Mode Routing progress configuration mode

Usage Guide Automatic RIP route summary means the subnet routes will be automatically summarized into the routes of the classified network when they traverse through the subnet. Automatic route summary is enabled by default for RIPv1 and RIPv2.

Automatic RIP route summary improves the flexibility and effectiveness of the network. If the summarized route exists, the sub-routes contained in the summarized route cannot be seen in the routing table, reducing the size of the routing table significantly.

Advertising the summarized route is more efficient than advertising individual routes in light of the following factors:

- The summarized route is always processed preferentially when you query the RIP database.
- Any sub-route is ignored when you query the RIP database, reducing the processing time.
- If you want to learn the specific sub-routes instead of the summarized route, disable the automatic route summary function. Only when RIPv2 is configured, the automatic route summary function can be disabled. For the RIPv1, the automatic route summary function is always enabled.

The range of the supernet route is wider than that of the classful network. Therefore, this command takes no effect on the supernet route.

Configuration The following example disables automatic route summary of RIPv2.

```
FS (config)# router rip
FS (config-router)# version 2
FS (config-router)# no auto-summary
```

Related Commands	Command	Description
	version	Defines the RIP software versions: v1 or v2. Both v1 and v2 are supported by default.

Platform N/A
Description

1.3 bdf all-interfaces

Use this command to enable all interfaces running RIP to use the BDF function. Use the **no** form of this command to restore the default setting.

bdf all-interfaces
no bdf all-interfaces

Parameter Description	Parameter	Description
	N/A	N/A

Defaults BFD is not configured by default.

Command Mode Routing process configuration mode

Usage Guide With the BFD function enabled on the RIP, one BFD session will be established for the RIP routing information source (the source address of the RIP route update packet). Once the BFD neighbor fails, the RIP routing information will be invalid directly and no longer join routing or forwarding.
 You can also use the interface configuration mode command **ip rip bfd [disable]** to enable or disable the BFD function on the specified interface, which takes precedence over the command **bdf all-interfaces** in the routing progress configuration mode.

Configuration

Examples N/A

Related Commands	Command	Description
	route ip	Creates the RIP routing progress and enters the routing process configuration mode.
	ip rip bfd [disable]	Configures a specified interface running RIP to enable or disable link detection using the BFD.

Platform N/A
Description

1.4 default-information originate

Use this command to generate a default route in the RIP progress. Use the **no** form of this command to delete the generated default route.

default-information originate [always] [metric metric-value] [route-map map-name]

no default-information originate [**always**] [**metric**] [**route-map** map-name]

Parameter Description

Parameter	Description
always	(Optional) Enables RIP to generate the default route, no matter whether the default route exists or not.
metric metric-value	(Optional) The original metric value of the default route with the value range 1 15 of metric-value.
route-map map-name	(Optional) Name of the associated route-map. Route-map is not associated by default.

Defaults No default route is generated by default.
The default metric value is 1.

Command

Mode Routing process configuration mode

Usage Guide

By default, RIP will not advertise the default route if the default route exists in the routing table of the router. In this case, use the **default-information originate** command to notify the neighbor of the default route. With the parameter **always** configured, no matter whether the default route exists in the RIP routing process or not, the default route will be advertised to the neighbor but is not shown in the local routing table. You can use the **show ip rip database** command to view the RIP routing information database to confirm whether the default route is generated.

Use the parameter **route-map** to control more about the default route advertised to RIP. For example, use the **set metric** command to set the metric value of the default route.

The route-map set metric rule takes precedence over the parameter metric value configuration of the default route. If the parameter metric is not configured, the default metric value is used by the default route.

- If the default route can be generated in the RIP process by using this command, RIP will not learn the default route advertised from the neighbor.
- For the default route generated by using the ip default-network command, the default-information originate command is required to add the default route to RIP.

Configuration The following example generates a default route to the RIP routing table.

Examples

```
FS(config-router)# default-information originate always
```

Related Commands

Command	Description
ip rip default-information	Notifies the default route through an interface.
redistribute	Redistributes the routes from other protocols to RIP.

Platform N/A
Description

1.5 default-metric

Use this command to define the default RIP metric value. Use the **no** form of this command to restore the default setting.

default-metric metric-value
no default-metric

Parameter	Parameter	Description
Description	metric-value	Indicates the default metric value with the range from 1 to 16. If the metric value is greater than or equal to 16, the RGNOS regards the route unreachable.

Defaults The default is 1.

Command

Mode Routing process configuration mode

Usage Guide This command needs to work with the command **redistribute**. When the routes are redistributed to the RIP routing process from a routing protocol process, the route metric value cannot be converted due to the incompatibility of the metric calculation mechanisms for different protocols. During the conversion, therefore, it is required to redefine the metric values of redistributed routes in the RIP routing domain. If there is no clear definition of the metric value in redistributing a routing protocol process, the RIP uses the metric value defined with **default-metric**. If the metric value is defined, this value overwrites the metric value defined with default-metric. If this command is not configured, the default value of default-metric is 1.

Configuration Examples The following example enables the RIP routing protocol to redistribute the routes learned by the OSPF routing protocol, whose initial RIP metric value is set to 3.

```
FS (config)# router rip
FS (config-router)# default-metric 3
FS (config-router)# redistribute ospf 100
```

Related Commands	Command	Description
	redistribute	Redistributes the routes from one routing domain to another routing domain.

Platform N/A

Description

1.6 distance

Use this command to set the management distance of the RIP route. Use the **no** form of this command to restore the default setting.

distance distance [ip-address wildcard]

no distance [distance ip-address wildcard]

Parameter Description	Parameter	Description
	distance	Sets the management distance of a RIP route, an integer in the range from 1 to 255.
	ip-address	Indicates the prefix of the source IP address of the route.
	wildcard	Defines the comparison bit of the IP address, where 0 means accurate matching and 1 means no comparison.

Defaults The default is 120.

Command

Mode Routing process configuration mode

Usage Guide

Use this command to set the management distance of the RIP route.
 You can use this command to create several management distances with source address prefixes. When the source address of the RIP route is within the range specified by the prefixes, the corresponding management distance is applied; otherwise, the route uses the management distance configured by the RIP.

Configuration Examples

The following example sets the management distance of the RIP route to 160, and specifies the management distance of the route learned from 192.168.2.1 as 123.

```
FS(config)# router rip
FS(config-router)# distance 160
FS(config-router)# distance 123 192.168.12.1 0.0.0.0
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.7 distribute-list in

Use this command to control route update for route filtering. Use the **no** form of this command to restore the default setting.

distribute-list { [access-list-number | name] | **prefix** prefix-list-name [**gateway** prefix-list-name] | [**gateway** prefix-list-name] } **in** [interface-type interface-number]

no distribute-list { [access-list-number | name] | **prefix** prefix-list-name [**gateway** prefix-list-name] | [**gateway** prefix-list-name] } **in** [interface-type interface-number]

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

access-list-number name	Specifies the ACL. Only the routes that are allowed by the ACL can be accepted.
prefix prefix-list-name	Uses the prefix list to filter the routes.
gateway prefix-list-name	Uses the prefix list to filter the source of the routes.
interface-type interface-number	(Optional) Applies the distribution list only to a specified interface.

Defaults The distribution list is not defined by default.

Command Routing process configuration mode

Mode

Usage Guide To deny receiving some specified routes, you can process all the received route update packets by configuring the route distribute control list.
Without any interface specified, the system will process the route update packets received on all the interfaces.

Configuration Examples The following example enables RIP to control the routes received from the Fastethernet 0/0, only permitting the routes starting with 172.16.

```
FS (config)# router rip
FS (config-router)# network 200.168.23.0
FS (config-router)# distribute-list 10 in fastethernet 0/0
FS (config-router)# no auto-summary
FS (config-router)# access-list 10 permit 172.16.0.0 0.0.255.255
```

Related Commands

Command	Description
access-list	Defines the ACL rule.
prefix-list	Defines the prefix list.

Platform N/A

Description

1.8 distribute-list out

Use this command to control route update advertisement for filtering routes. Use the **no** form of this command to restore the default setting.

distribute-list { [access-list-number | name] | **prefix** prefix-list-name } **out** [interface | [**bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static**]]

no distribute-list { [access-list-number | name] | **prefix** prefix-list-name } **out** [interface | [**bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static**]]

Parameter Description

Parameter	Description
access-list-number name	Specifies the ACL.
prefix prefix-list-name	Uses the prefix list to filter routes.

interface	(Optional) Applies route update advertisement control to a specified interface in the distribution list.
bgp	(Optional) Applies route update advertisement control to only routes introduced from bgp in this distribution list.
connected	(Optional) Applies route update advertisement control to only connected routes in this distribution list.
isis [area-tag]	(Optional) Applies route update advertisement control to only routes introduced from ISIS in this distribution list. area-tag specifies an ISIS instance.
ospf process-id	(Optional) Applies route update advertisement control to only routes introduced from OSPF in this distribution list. process-id specifies an OSPF instance.
rip	(Optional) Applies route update advertisement control to only RIP routes in this distribution list.
static	(Optional) Applies route update advertisement control to only static routes in this distribution list.

Defaults No route update advertisement is configured by default.

Command

Mode Routing process configuration mode

Usage Guide If this command relates to none of optional parameters, route update advertisement control applies to all interfaces. If this command relates to interface options, route update advertisement control applies to only the specified interface. If this command relates to other route process parameters, route update advertisement control applies to only the specific route process.

Configuration The following example advertises only the 192.168.12.0/24 route.

```

Examples
FS (config)# router rip
FS (config-router)# network 200.4.4.0
FS (config-router)# network 192.168.12.0
FS (config-router)# distribute-list 10 out
FS (config-router)# version 2
FS (config-router)#access-list 10 permit 192.168.12.0 0.0.0.255
    
```

Related Commands

Command	Description
access-list	Defines the ACL rule.
prefix-list	Defines the prefix list.
redistribute	Configures route redistribution.

Platform N/A

Description

1.9 enable mib-binding

Use this command to bind a MIB with a specified RIP instance. Use the **no** form of this command to restore the default setting

enable mib-binding

no enable mib-binding

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the MIB is bound with the RIP instance of the default VRF.

Command

Mode Routing process configuration mode.

Usage Guide As RIP MIB does not have RIP instance information, you can only operate only one RIP instance using SNMP. By default, RIP MIB is bound with the RIP instance of the default VRF. You can only operate this RIP instance. If you want to operate another RIP instance of a specified VRF through SNMP, you can use this command to bind the MIB with this instance.

Configuration The following example operates the RIP instance of a specified VRF, vpn1.

```

Examples
FS(config)# router rip
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# enable mib-binding
    
```

Related Commands	Command	Description
	show ip rip	Displays the global configuration of RIP.

Platform N/A

Description

1.10 exit-address-family

Use this command to exit the address family configuration mode

exit-address-family

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command

Mode Address family configuration mode

Usage Guide Use this command to exit the address family configuration mode.
The abbreviation of this command is exit.

Configuration The following example enters or exits the address family configuration mode.

Examples

```
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# exit-address-family
```

Related Commands

Command	Description
address-family	Enters the address family configuration sub-mode.

Platform N/A

Description

1.11 fast-reroute

Use this command to enable the RIP FRR (Fast Reroute) function for the device. Use the **no** form of this command to restore the default setting.

fast-reroute route-map route-map-name

no fast-reroute

Parameter Description

Parameter	Description
route-map-name	Specifies the backup path through the route map.

Defaults This function is disabled by default.

Command

Mode Routing process configuration mode

Usage Guide Use the **route-map** command to specify the backup path for the matched routes.
It is recommended to enable the BFD function when the RIP fast reroute function is enabled. BFD allows the device to detect the link fault faster, so as to reduce the interruption time. In the scenario where the port is up/down, it is recommended to configure **carrier-delay 0** in interface configuration mode to achieve the fastest switchover speed, reducing the interruption time.
Currently, the restrictions of the RIP FRR are as follows:
Only one backup next hop is generated for each route.
The backup next hop is not generated for the ECMP route.

Configuration The following example enables FRR for RIP instance 1 and associates route map fast reroute.

Examples

```
FS(config)# route-map fast-reroute
```

```
match interface gigabitEthernet 0/2
set fast-reroute backup-interface GigabitEthernet 0/1 backup-nextthop 192.168.1.1
FS(config)# router rip
FS(config-router)# fast-reroute route-map fast-reroute
```

Related Commands

Command	Description
N/A	N/A

Platform

Description

N/A

1.12 graceful-restart

Use this command to configure the RIP graceful restart (GR) function for a device. Use the **no** form of this command to restore the default configuration.

graceful-restart [**grace-period** grace-period]

no graceful-restart [**grace-period**]

Parameter Description

Parameter	Description
graceful-restart	Enables the GR function.
grace-period	(Optional) Configures the grace period.
grace-period	(Optional) Indicates the user-defined GR period. The default value is the smaller value between twice the update time and 60 seconds. The range is from 1 to 1,800. The unit is second.

Defaults

This function is enabled by default.

Command

Mode

Routing process configuration mode

Usage Guide

The GR function is configured on the RIP instances. Different parameters can be configured for different RIP instances.

The GR period refers to the time from the startup to the end of RIP GR. During this period, the forwarding table remains unchanged and the RIP route is restored to the state before protocol restart. When the GR period expires, RIP exits the GR state and performs normal RIP operation.

The **graceful-restart grace-period** command enables users to modify GR period. Note: Make sure that GR is completed before the RIP route is validate and after an RIP route update cycle elapses. If an improper value is configured, non-stop data forwarding cannot be ensured during the GR process. For example, if the GR period is longer than the time when the neighbor’s route is unavailable and GR is not completed before the route is validated, then the neighbor is not re-informed of the route and forwarding of the neighbor’s route is terminated when it is validated, which results in data forwarding interruption. Therefore, unless otherwise specified, it is not

recommended to adjust the GR period. If the period needs to be changed, determine that the grace period is longer than the route update cycle and shorter than the time when the route is unavailable in combination with the configuration of the **timers basic** command.

During the RIP GR period, the network must be stable.

Configuration The following example enables the RIP GR function and configures the GR period parameters of the GR function.

```

Examples
FS(config)# router rip
FS(config-router)# graceful-restart grace-period 90
    
```

Related Commands	Command	Description
		timers basic

Platform N/A

Description

1.13 ip rip authentication key-chain

Use this command to enable RIP authentication and specify the keychain used for RIP authentication. Use the **no** form of this command to restore the default setting.

ip rip authentication key-chain name-of-keychain

no ip rip authentication key-chain

Parameter Description	Parameter	Description
		name-of-keychain

Defaults The keychain is not associated by default.

Command

Mode Interface configuration mode

Usage Guide If the keychain is specified in the interface configuration, use the key chain global configuration command to define the keychain. Otherwise, RIP data packet authentication fails.
RIPv2 instead of RIPv1 supports authentication of the RIP data packet.

Configuration The following example enables RIP authentication on the fastEthernet 0/1 with the associated keychain ripchain.

```

Examples
FS (config)#interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)#ip rip authentication key-chain ripchain

Meanwhile, use the key chain command to define this keychain in global configuration mode.
FS(config)#key chain ripchain
FS(config-keychain)#key 1
    
```

```
FS(config-keychain-key)#key-string Hello
```

Related Commands

Command	Description
ip rip authentication mode	Defines the RIP authentication mode.
ip rip authentication text-password	Enables RIP authentication, and sets the password string of RIP plaintext authentication. RIP data packet authentication is supported only by RIPv2.
ip rip receive version	Defines the version of RIP packets received on the interface.
ip rip send version	Defines the version of RIP packets sent on the interface.
key chain	Defines the keychain and enters keychain configuration mode.

Platform N/A

Description

1.14 ip rip authentication mode

Use this command to define the RIP authentication mode. Use the **no** form of this command to restore the default setting.

ip rip authentication mode { text | md5 }

no ip rip authentication mode

Parameter Description

Parameter	Description
text	Configures RIP authentication as plaintext authentication.
md5	Configures RIP authentication as MD5 authentication.

Defaults It is plaintext authentication by default.

Command

Mode Interface configuration mode

Usage Guide

During the RIP authentication configuration process, the RIP authentication modes of all devices requiring exchange of RIP routing information must be the same. Otherwise, RIP packet exchange will fail.

If the plaintext authentication mode is adopted, but the password string of the plaintext authentication or the associated keychain is not configured, no authentication occurs. In the same way, if the MD5 authentication mode is adopted, but the associated keychain is not configured, no authentication occurs.

RIPv2 instead of RIPv1 supports authentication of the RIP data packet.

Configuration

The following example configures the RIP authentication mode on the fastEthernet 0/1 as MD5.

Examples

```
FS (config)#interface fastEthernet 0/1
```

```
FS (config-if-FastEthernet 0/1)# ip rip authentication mode md5
```

Related Commands

Command	Description
ip rip authentication key-chain	Enables the RIP authentication mode and specifies the keychain used for RIP authentication. Only RIPv2 supports authentication of the RIP data packet.
ip rip authentication text-password	Enables the RIP authentication mode, and sets the password string of RIP plaintext authentication. Only RIPv2 supports authentication of the RIP data packet.
key chain	Defines the keychain and enters the keychain configuration mode

Platform N/A

Description

1.15 ip rip authentication text-password

Use this command to enable RIP authentication and set the password string of RIP plaintext authentication. Use the **no** form of this command to restore the default setting.

ip rip authentication text-password [0 | 7] password-string

no ip rip authentication text-password

Parameter Description

Parameter	Description
0	Specifies that the key is displayed as plaintext.
7	Specifies that the key is displayed as cipher text.
password-string	Indicates the password string of the plaintext authentication, in the length of 1-16 bytes.

Defaults No password string of RIP plaintext authentication is configured by default.

Command

Mode Interface configuration mode

Usage Guide

This command works only in plaintext authentication mode.

To enable the RIP plaintext authentication function, use this command to configure the corresponding password string, or use the associated key chain to obtain the password string. The latter takes the precedence over the former one.

RIPv1 does not support RIP authentication but RIPv2 does.

Configuration Examples

The following example enables the RIP plaintext authentication on fastEthernet 0/1 and sets the password string to hello.

```
FS(config)#interface fastEthernet 0/1
```

```
FS(config-if-FastEthernet 0/1)# ip rip authentication text-password hello
```

Related Commands	Command	Description
	ip rip authentication mode	Defines the RIP authentication mode.
	ip rip authentication key-chain	Enables the RIP authentication mode and specifies the keychain used for RIP authentication. Only RIPv2 supports authentication.

Platform N/A

Description

1.16 ip rip bfd

Use the `ip rip bfd [disable]` command to configure the specified interface running RIP to enable or disable link detection using the BFD. Use the **no** form of this command to restore the default setting.

ip rip bfd [**disable]**

no ip rip bfd

Parameter Description	Parameter	Description
	disable	Disables the specified interface running RIP and uses the BFD mechanism to perform link detection.

Defaults Interfaces running RIP are not configured by default. The BFD configuration in RIP process configuration mode is a reference.

Command

Mode Interface configuration mode

Usage Guide

The priority of the interface is higher than that of the `bfd all-interfaces` command in process configuration mode. You can use the `ip rip bfd` command to enable the BFD to perform link detection on the specified interface according to the actual environment or use the `bfd all-interfaces` command to configure all interfaces running RIP and enable the BFD to perform link detection. In addition, you can use the `ip rip bfd disable` command to disable the BFD detection function on the specified interface.

Configuration

Examples N/A

Related Commands	Command	Description
	route ip	Enables the RIP routing process and enters the routing process configuration mode.
	bfd all-interfaces	Configures all interfaces running RIP to use the BFD

	to perform link detection.
--	----------------------------

Platform N/A

Description

1.17 ip rip default-information

Use this command to advertise the default route through a RIP interface. Use the **no** form of this command to restore the default setting.

ip rip default-information { only | originate } [metric metric-value]

no ip rip default-information

Parameter Description	Parameter	Description
	only	Notifies the default route rather than other routes.
	originate	Notifies the default route and other routes.
	metric metric-value	Specifies the metric value of the default route, in the range from 1 to 15.

Defaults No default route is configured by default. The default metric value is 1.

Command

Mode Interface configuration mode

Usage Guide

After you configure this command on a specified interface, a default route is generated and notified through the interface. If the **ip rip default-information** command of the interface and the **default-information originate** command of the RIP process are configured at the same time, only the default route of the interface is advertised.

RIP will no longer learn the default route notified by the neighbor if any interface is configured with the ip rip default-information command.

Configuration The following example creates a default route which is notified on ethernet0/1 only.

Examples

```
FS(config)#interface ethernet 0/1
FS(config-if-Ethernet 0/1)#ip rip default-information only
```

Related Commands

Command	Description
default-information originate	Generates a default route in the RIP process.

Platform N/A

Description

1.18 ip rip receive enable

Use this command to enable RIP to receive the RIP data package on a specified interface. Use the **no** form of this

command to restore the default setting.

ip rip receive enable

no ip rip receive enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults RIP packages can be received through the interface by default.

Command

Mode Interface configuration mode

Usage Guide To prevent an interface from receiving RIP packets, use the no form of this command in interface configuration mode. This command works on interfaces configured with this command. You can use the **default** form of this command to enable the interface to receive the RIP data package.

Configuration The following example prohibits receiving RIP data packages on fastEthernet 0/1.

```

Examples
FS (config)# interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)# no ip rip receive enable
    
```

Related Commands	Command	Description
	ip rip send enable	Enables or disables the interface to send RIP data packages.
	passive-interface	Configures a passive RIP interface.

Platform N/A

Description

1.19 ip rip receive version

Use this command to define the version of RIP packets received on an interface. Use the **no** form of this command to restore the default setting.

ip rip receive version [1] [2]

no ip rip receive version

Parameter Description	Parameter	Description
	1	(Optional) Receives only RIPv1 packets.
	2	(Optional) Receives only RIPv2 packets.

Defaults The default behavior depends on the configuration with the version command.

Command

Mode Interface configuration mode

Usage Guide This command overwrites the default configuration of the **version** command. It affects only RIP packet receiving through the interface and allows RIPv1 and RIPv2 packets to be received on the interface at the same time. If the command is configured without parameters, data package receiving depends on the configuration of the version.

Configuration The following example enables receiving both RIPv1 and RIPv2 data packages.

```
FS (config)#interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)# ip rip receive version 1 2
```

Related Commands

Command	Description
version	Defines the default version of the RIP packets received/sent on the interface.

Platform N/A
Description

1.20 ip rip send enable

Use this command to enable RIP to send a RIP data package on a specified interface. Use the **no** form of this command to restore the default setting.

ip rip send enable
no ip rip send enable

Parameter Description

Parameter	Description
N/A	N/A

Defaults RIP packages can be sent through the interface by default.

Command

Mode Interface configuration mode

Usage Guide To prevent an interface from sending RIP packets, use the **no** form of this command in interface configuration mode. This command works on interfaces configured with this command. You can use the **default** form of this command to enable the interface to send the RIP data package.

Configuration The following example prohibits sending RIP data packages on fastEthernet 0/1.

```
FS (config)# interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)# no ip rip send enable
```

Related

Command	Description
---------	-------------

Commands	
ip rip receive enable	Enables or disables receiving RIP packets on the interface.
passive-interface	Configures a passive RIP interface.

Platform N/A

Description

1.21 ip rip send supernet-routes

Use this command to enable RIP to send the supernet route on a specified interface. Use the **no** form of this command to disable this function.

ip rip send supernet-routes
no ip rip send supernet-routes

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command

Mode Interface configuration mode

Usage Guide When the RIPv1 router monitors a RIPv2 router response packet and if the supernet routing information is monitored, incorrect route information is learned because the RIPv1 ignores the subnet mask of the routing information. In this case, you are advised to use the no form of this command on the RIPv2 router to disable advertising the supernet route on the corresponding interface. This command works only on interfaces configured with this command.

This command is only valid upon sending the RIPv2 packets on the interface and it is used to control sending the supernet route.

Configuration The following example disables sending RIP supernet routes on the fastEthernet 0/1 interface.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# no ip rip send supernet-routes
```

Related Commands	Command	Description
	version	Defines the RIP version
	ip rip send enable	Enables or disables sending the RIP package on the interface.

Platform N/A

Description

1.22 ip rip send version

Use this command to define the version of the RIP packets sent on the interface. Use the **no** form of this command to restore the default setting.

ip rip send version [1] [2]

no ip rip send version

Parameter Description

Parameter	Description
1	(Optional) Receives only RIPv1 packets.
2	(Optional) Receives only RIPv2 packets.

Defaults The default behavior depends on the configuration with the version command.

Command

Mode Interface configuration mode

Usage Guide This command overwrites the default configuration of the **version** command. It affects only RIP packet sending through the interface and allows RIPv1 and RIPv2 packages sent on the interface at the same time. If the command is configured without parameters, package receiving depends on the configuration of the version.

Configuration Examples The following example enables sending both RIPv1 and RIPv2 packages on the fastEthernet 0/1 interface.

```
FS (config)# interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)# ip rip send version 1 2
```

Related Commands

Command	Description
version	Defines the default version of the RIP packets received/sent on the interfaces.

Platform N/A

Description

1.23 ip rip split-horizon

Use this command to enable split horizon. Use the **no** form of this command to disable this function.

ip rip split-horizon [poisoned-reverse]

no ip rip split-horizon [poisoned-reverse]

Parameter Description

Parameter	Description
poisoned-reverse	(Optional) Enables split horizon with poisoned reverse.

Defaults This function is enabled by default.

Command

Mode Interface configuration mode

Usage Guide When multiple devices are connected to the IP broadcast network and run a distance vector routing protocol, the split horizon mechanism is required to prevent loop. The split horizon prevents the device from advertising routing information from the interface that learns that information, which optimizes routing information exchange between multiple devices.

For non-broadcast multi-path access networks (such as frame relay and X.25), split horizon may cause some devices to be unable to learn all routing information. Split horizon may need to be disabled in this case. If an interface is configured the secondary IP address, attentions shall be paid also for split horizon.

If the **poisoned-reverse** parameter is configured, split horizon with poisoned reverse is enabled. In this case, devices still advertise the route information through the interface from which the route information is learned. However, the metric value of the route information is set to unreachable.

The RIP routing protocol is a distance vector routing protocol, and the split horizon issue shall be cautioned in practical applications. If it is unsure whether split horizon is enabled on the interface, use the show ip rip command to judge. This function makes no influence on the neighbor defined with the **neighbor** command.

Configuration Examples The following example disables the RIP split horizon function on the interface fastethernet 0/0.

```
FS (config)# interface fastethernet 0/0
FS (config-if)# no ip rip split-horizon
```

Related Commands

Command	Description
neighbor (RIP)	Defines the IP address of the neighbor of RIP.
validate-update-source	Enables the source address authentication of the RIP route update message.

Platform N/A

Description

1.24 ip rip summary-address

Use this command to configure port-level convergence through an interface. Use the **no** form of this command to disable this function.

ip rip summary-address ip-address ip-network-mask
no ip rip summary-address ip-address ip-network-mask

Parameter Description

Parameter	Description
ip-address	Indicates the IP addresses to be converged.
ip-network-mask	Indicates the subnet mask of the specified IP address for route convergence.

Defaults The RIP routes are automatically converged to the classful network edge by default.

Command

Mode Interface configuration mode

Usage Guide The **ip rip summary-address** command converges an IP address or a subnet on a specified port. RIP routes are automatically converged to the classful network edge. The classful subnet can be configured through only port convergence.

The summary range configured by this command cannot be a super class network, that is, the configured mask length is greater than or equal to the natural mask length of the network.

Configuration Examples The following example disables the automatic route convergence function of RIPv2. Interface convergence is configured so that fastEthernet 0/1 advertises the converged route 172.16.0.0/16.

```
FS (config)# interface fastEthernet 0/1
FS (config-if-FastEthernet 0/1)# ip rip summary-address 172.16.0.0 255.255.0.0
FS (config-if-FastEthernet 0/1)# ip address 172.16.1.1 255.255.255.0
FS (config)# router rip
FS (config-router)# network 172.16.0.0
FS (config-router)# version 2
FS (config-router)# no auto-summary
```

Related Commands	Command	Description
	auto-summary	Enables the automatic convergence of RIP routes.

Platform N/A
Description

1.25 ip rip triggered

Use this command to enable triggered RIP based on links. Use the **no** form of this command to restore the default setting.

- ip rip triggered**
- ip rip triggered retransmit-timer** timer
- ip rip triggered retransmit-count** count
- no ip rip triggered**
- no ip rip triggered retransmit-timer**
- no ip rip triggered retransmit-count**

Parameter Description	Parameter	Description
	retransmit-timer timer	Configures the interval at which the Update Request and Update Response packets are retransmitted. The range is from 1 to 3,600. The unit is second. The default is five.

retransmit-count count	Configures the maximum times that the Update Request and Update Response packets are retransmitted. The range is from 1 to 3600. The default is 36.
-------------------------------	---

Defaults This function is disabled by default.

Command

Mode Interface configuration mode

Usage Guide

Triggered RIP (TRIP) is the extension of RIP on the wide area network (WAN), mainly used for demand-based links. With the TRIP function enabled, RIP no longer sends route updates periodically and sends route updates to the WAN interface only if:







Update Request packets are received.

RIP routing information is changed.

Interface state is changed.

The router is started.

As periodical RIP update is disabled, the confirmation and retransmission mechanism is required to ensure that update packets are sent and received successfully over the WAN. The **retransmit-timer** and **retransmit-count** commands can be used to specify the retransmission interval and maximum retransmission times for request and update packets.

-  The function can be enabled in the case of the following conditions: a) The interface has only one neighbor. b) There are multiple neighbors but they interact information using unicast packets. You are advised to enable the function for link layer protocols such as PPP, frame relay, and X.25.
-  You are advised to enable split horizon with poison reverse on the interface enabled with the function; otherwise invalid routing information might be left.
-  Make sure that the function is enabled on all routers on the same link; otherwise the function will be invalid and the routing information cannot be exchanged correctly.
-  The function cannot be enabled at the same time with BFD and RIP functions.
-  To enable the function, make sure that the RIP configuration is the same on both ends of the link, such as RIP authentication and the RIP version supported by the interface.
-  If this function is enabled on this interface, the source address of packets on this interface will be checked no matter whether the source IP address verification function (validate-update-source) is enabled.

Configuration Examples The following example enables TRIP and sets the retransmission interval and maximum retransmission time to 10 seconds and 18 respectively for Update Request and Update Response packets.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip rip triggered
FS(config-if-FastEthernet 0/1)# ip rip triggered retransmit-timer 10
FS(config-if-FastEthernet 0/1)# ip rip triggered retransmit-count 18
```

Related

Command	Description
---------	-------------

Commands	
show ip rip database	Displays the summarized routing information of the RIP database.
show ip rip interface	Displays the RIP interface information.
ip rip split-horizon	Configures RIP split horizon.

Platform N/A

Description

1.26 ip rip v2-broadcast

Use this command to send RIPv2 packets in broadcast rather than multicast mode. Use the **no** form of this command to restore the default setting.

ip rip v2-broadcast

no ip rip v2-broadcast

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The default behavior depends on the configuration of the version command.

Command

Mode Interface configuration mode

Usage Guide This command overwrites the default of the **version** command. This command affects only sending RIP packets on the interface. This command allows RIPv1 and RIPv2 packages sent on the interface simultaneously. If this command is configured without parameters, package receiving depends on the version setting.

Configuration The following example sends RIPv2 packets in broadcast mode on the fastEthernet 0/1 interface.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# no ip rip split-horizon
```

Related Commands	Command	Description
	version	Defines the default version of the RIP packets received and sent on the interface.

Platform N/A

Description

1.27 neighbor

Use this command to define the IP address of a RIP neighbor. Use the **no** form of this command to restore the default setting.

neighbor ip-address
no neighbor ip-address

Parameter Description	Parameter	Description
	ip-address	Indicates the IP address of the neighbor. The IP address must be that of the network connected to the local device.

Defaults The neighbor is not defined by default.

Command

Mode Routing process configuration mode

Usage Guide By default, RIPv1 uses the IP broadcast address (255.255.255.255) to advertise routing information, and RIPv2 uses the multicast address 224.0.0.9 to do so. If you do not want to allow all the devices on the broadcast network or non-broadcast multi-path access network to receive routing information, use the **passive-interface** command to configure related interfaces as passive interfaces and then define only some neighbors who can receive the routing information. This command has no impact on the receiving of RIP information. The passive interface is configured. No request packet is sent after the interface is enabled.

Configuration The following example creates a VRF with the name of vpn1 and creates its RIP instance.

```

Examples
FS(config)# ip vrf vpn1
FS(config-vrf)# exit
FS(config)# interface fastEthernet 1/0
FS(config-if-FastEthernet 0/1)# ip vrf forwarding vpn1
FS(config-if-FastEthernet 0/1)# ip address 192.168.1.1 255.255.255.0
FS(config)# router rip
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router)# network 192.168.1.0
FS(config-router)# exit-address-family
    
```

Related Commands	Command	Description
	passive-interface	Configures the interface as a passive interface.

Platform N/A

Description

1.28 network

Use this command to define the list of networks to be advertised in the RIP routing process. Use the **no** form of this command to delete the defined network.

network network-number [wildcard]
no network network-number [wildcard]

Parameter Description	Parameter	Description
	network-number	Indicates the network number of the directly-connected network. The network number is a natural one. All interfaces whose IP addresses belong to that natural network can send/receive RIP packages.
	wildcard	Defines the IP address comparing bit: 0 refers to accurate matching, and 1 refers to no comparison.

Defaults N/A

Command

Mode Routing process configuration mode

Usage Guide The network-number and wildcard parameters can be configured simultaneously to enable the IP address of the interface within the IP address range to join RIP running.

Without the wildcard parameter, FSOS make the interface IP address within the classful address range join the RIP running.

Only when the IP address of an interface is in the network list defined by RIP, RIP route update packets can be received and sent on the interface.

Configuration Examples The following example defines two network numbers associated with RIP and allows the interface IP address between 192.168.12.0/24 and 172.16.0.0/24 to join RIP running.

```
FS (config)# router rip
FS (config-router)# network 192.168.12.0
FS(config-router)# network 172.16.0.0 0.0.0.255
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.29 offset-list

Use this command to increase the metric value of received or sent RIP routes. Use the **no** form of this command to restore the default setting.

offset-list { access-list-number | name } { **in** | **out** } offset [interface-type interface-number]

no offset-list { access-list-number | name } { **in** | **out** } offset [interface-type interface-number]

Parameter Description	Parameter	Description
	access-list-number name	Specifies the ACL.

in	Modifies the metric of the received routes using the ACL.
out	Modifies the metric of the sent routes using the ACL.
offset	Indicates the offset of changed metric values. The value is in the range from 0 to 16.
interface-type	Applies the ACL to a specified interface.
interface-number	Specifies the interface number.

Defaults No offset is specified by default.

Command

Mode Routing process configuration mode

Usage Guide If a RIP route matches against both the offset-list of the specified interface and the global offset-list, it will increase the metric value of the offset-list of the specified interface.

Configuration The following example increases the metric of the RIP routes by 7 in the range specified by ACL 7.

Examples FS (config-router)# offset-list 7 out 7

The following example increases the metric of the RIP routes by 7 in the range specified by ACL 7 and learned by fastethernet 0/1.

FS (config-router)# offset-list 8 in 7 fastethernet 0/1

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.30 output-delay

Use this command to modify the delay to send RIP update packets. Use the **no** form of this command to restore the default setting.

output-delay delay

no output-delay

Parameter Description

Parameter	Description
delay	Sets the delay to send RIP update packets, in the range from 8 to 50 in the unit of milliseconds.

Defaults No sending delay is configured by default.

Command

Mode Routing process configuration mode

Usage Guide In normal cases, the size of a RIP update packet is 512 bytes including 25 routes. If the number of updated routes is greater than 25, update packets will be sent through multiple routes. Note that the update packets should be sent as fast as possible.

However, when a high-speed device sends a large number of packets to a low-speed device, the low-speed device may not process all the packets timely, resulting in packet loss. In this case, you can use this command to increase the delay to send packets on the high-speed device so that the low-speed device can process all the update packets.

Configuration The following example sets the delay to send RIP update packets to 30 milliseconds.

```

Examples
FS(config)# router rip
FS(config-router)# output-delay 30
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.31 passive-interface

Use this command to disable the function of sending update packets on an interface. Use the **no** form of this command to restore the default setting.

```

passive-interface { default | interface-type interface-num }
no passive-interface { default | interface-type interface-num }
    
```

Parameter Description

Parameter	Description
default	Sets all interfaces to the passive interfaces.
interface-type interface-num	Indicates the interface type and number.

Defaults Interfaces are set to the non passive interfaces by default.

Command

Mode Routing process configuration mode

Usage Guide The **passive-interface default** command sets all interfaces to the passive interfaces. You can use **no passive-interface** interface-type interface-num command to set specified interfaces as non-passive interfaces. After you set an interface to the passive interface, RIP route update packets will no longer be sent but can be received through the interface. In this case, route update packets can be sent to a specified neighbor through the interfaces by using the **neighbor** command. You can use the **ip rip send enable** and **ip rip receive enable** commands to control whether route update packets can be sent or received through the interface.

Configuration The following example sets all interfaces to the passive interfaces and then sets ethernet0/1 to the non-passive interface.

Examples

```
FS(config-router)# passive-interface default
FS(config-router)# no passive-interface gigabitEthernet 0/1
```

Related Commands

Command	Description
ip rip receive enable	Enables or disables receiving RIP packets on the interface.
ip rip send enable	Enables or disables sending RIP packets on the interface.

Platform N/A

Description

1.32 redistribute

Use this command to redistribute external routes in route configuration mode. Use the **no** form of this command to restore the default setting.

```
redistribute { bgp | connected | isis [ area-tag ] | ospf process-id | static } [ { level-1 | level-1-2 | level-2 } ]
[ match { internal | external [ 1|2 ] | nssa-external [ 1|2 ] } ] [ metric metric-value ] [ route-map route-map-name ]
no redistribute { bgp | connected | isis [ area-tag ] | ospf process-id | static } [ { level-1 | level-1-2 | level-2 } ]
[ match { internal | external [ 1|2 ] | nssa-external [ 1|2 ] } ] [ metric metric-value ] [ route-map
route-map-name ]
```

Parameter Description

Parameter	Description
bgp	Is redistributed from bgp.
connected	Is redistributed from a connected route.
isis area-tag	Is redistributed from ISIS and specifies an ISIS instance through area-tag.
ospf process-id	Is redistributed from OSPF and specifies an OSPF instance through process-id. The value is in the range from 1 to 65535.
static	Is redistributed from static routes.
level-1 level-1-2 level-2	Is used when ISIS route redistribution is configured and specifies a route with a specific level for redistribution.
match	Is used when OSPF route redistribution is configured and filters a route with a specific level for redistribution.
metric metric-value	Sets the metric value of the redistributed route and specifies the metric value by using the metric-value parameter. The value is in the range from 1 to 16.
route-map route-map-name	Sets the redistribution filtering rule.

Defaults By default:

All the routes of the sub types of the instance are redistributed when you configure redistributing OSPF.

The routes of Level-2 sub-types of the instance are redistributed when you configure ISIS redistribution.
 All the routes of the protocol are redistributed for other routing protocols.
 The metric of the redistributed routes is 1 by default.
 The route-map is not associated.

Command

Mode Routing process configuration mode

Usage Guide

This command is executed to redistribute external routes to RIP.

It is unnecessary to convert the metric of one routing protocol into that of another routing protocol for route redistribution, since different routing protocols use different metric measurement methods. For RIP, the metric value is calculated based on hop counts; for OSPF, the metric value is calculated based on bandwidths. Therefore, their metrics are not comparable. However, a symbolic metric value must be set for route redistribution. Otherwise, route redistribution will fail.

When you configure ISIS route redistribution without the level parameter, only level-2 routes are redistributed by default. If the redistribution configuration is initialized with the level parameter, then all routes with level configured are redistributed. When the configuration is saved and level 1 and level 2 are configured at the same time, level 1 and level 2 are combined into the level-1-2 parameter to be saved.

When you configure redistribution of OSPF routes without the match parameter, the OSPF routes of all sub types are redistributed by default. Then the first configured match parameter is used as the original one. Only the routes matching the specific type can be redistributed. The no form of this command restores the setting to the default value.

The rule of configuring the no form of the redistribute command is as follows:

1. If the no form of this command specifies certain parameters, the parameters must be restored to the default configuration.
2. If the **no** form of this command does not specify any parameter, the command must be deleted.

Assume that the following configurations are available.


```
redistribute isis 112 level-2
```

You can use the no redistribute isis 112 level-2 command to modify the configuration.

According to the preceding rule, this command only restores the level-2 parameter to the default value. However, level-2 is also the default parameter value. Therefore, the configuration is still be saved as redistribute isis 112 level-2 after you use the no form of this command.

To delete this command, use the following command:

```
no redistribute isis 112
```

 The redistribute command cannot redistribute the default route of other protocol to the RIP process. To this end, use the **default-information originate** command.

Configuration

The following example redistributes static routes to RIP.

Examples

```
FS(config-router)# redistribute static
```

Related Commands

Command	Description
default-metric metric	Sets the default metric of the route to be

	redistributed.
default-information originate	Generates the default route in the RIP process.

Platform N/A

Description

1.33 router rip

Use this command to create the RIP routing process and enter the routing process configuration mode. Use the **no** form of this command to restore the default setting.

router rip

no router rip

Parameter	Parameter	Description
Description	N/A	N/A

Defaults No RIP process is running by default.

Command

Mode Global configuration mode

Usage Guide One RIP routing process must be defined with one network number. If a dynamic routing protocol runs on asynchronous lines, configure the **async default routing** command on the asynchronous interface.

Configuration The following example creates the RIP routing process and enters the routing process configuration mode.

```
FS (config)# router rip
FS(config-router)#
```

Related Commands	Command	Description
	network (RIP)	Defines the network number of the RIP process.

Platform N/A

Description

1.34 show ip rip

Use this command to display the RIP process information.

show ip rip [vrf vrf-name]

Parameter	Parameter	Description
Description	vrf vrf-name	(Optional) Displays the RIP information with the specified VRF.

Defaults N/A

Command

Mode Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide It is used to display the three timers, routing distribution status, routing re-distribution status, interface RIP version, RIP interface and network range, metric, and distance of the RIP process quickly. If the VRF is specified, the name of VRF and VRF ID are displayed.

Configuration Examples The following example displays the basic information of the RIP process such as the update time and management distance.

```
FS#show ip rip
Routing Protocol is "rip"
  Sending updates every 10 seconds, next due in 4 seconds
  Invalid after 20 seconds, flushed after 10 seconds
  Outgoing update filter list for all interface is: not set
  Incoming update filter list for all interface is: not set
  Default redistribution metric is 2
  Redistributing: connected
  Default version control: send version 2, receive version 2
    Interface          Send  Recv
    FastEthernet 0/1    2     2
    FastEthernet 0/2    2     2
  Routing for Networks:
    192.168.26.0 255.255.255.0
    192.168.64.0 255.255.255.0
  Distance: (default is 50)
```

The following example specifies the VRF and displays the corresponding basic information of RIP instance.

```
FS(config-router)# sh ip rip vrf 1
VRF 1 VRF-id:1
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 4 seconds
  Invalid after 180 seconds, flushed after 120 seconds
  Outgoing update filter list for all interface is: not set
  Incoming update filter list for all interface is: not set
  Default redistribution metric is 1
  Redistributing:
  Default version control: send version 1, receive any version
  Routing for Networks:
  Distance: (default is 120)
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.35 show ip rip database

Use this command to display the route summary information in the RIP routing database.

show ip rip database [**vrf** vrf-name] [network-number network-mask] [**count**]

no address-family ipv4 vrf vrf-name

Parameter Description	Parameter	Description
	vrf vrf-name	(Optional) Displays the RIP routing information of specified VRF.
	network-number	(Optional) Indicates the ID of the subnet on which route information is to be displayed.
	network-mask	Indicates the subnet mask. It must be specified if the network number is specified.
	count	(Optional) Displays the abstract of the route statistics in the RIP database.

Defaults N/A

Command

Mode Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide

Only when the related sub-routes are converged, the converged address entries appear in the RIP routing database. When the last sub-route information in the converged address entries becomes invalid, the converged address information will be deleted from the database.

Configuration

The following example displays all converged address entries in the RIP routing database.

Examples

```
FS# show ip rip database
192.168.1.0/24    auto-summary
192.168.1.0/30    directly connected, Loopback 3
192.168.1.8/30    directly connected, FastEthernet 0/1
192.168.121.0/24  auto-summary
192.168.121.0/24  redistributed
[1] via 192.168.2.22, FastEthernet 0/2
192.168.122.0/24  auto-summary
192.168.122.0/24
[1] via 192.168.4.22, Serial 0/1  00:28    permanent
```

The following example displays the converged address entries related with 192.168.121.0/24 in the RIP routing database.

```
FS# show ip rip database 192.168.121.0 255.255.255.0
192.168.121.0/24  redistributed
[1] via 192.168.2.22, FastEthernet 0/1
```


The following example displays the statistical information summary of various routes in the RIP routing database.

```
FS# show ip rip database count
      All      Valid  Invalid
database      5       5       0
auto-summary  5       5       0

connected     1       1       0
rip           4       4       0
```

Related Commands

Command	Description
show ip rip	Displays the information of the currently-running routing protocol process.

Platform N/A

Description

1.36 show ip rip external

Use this command to display the information of the external routes redistributed by the RIP protocol.

```
show ip rip external [ bgp | connected | isis [ process-id ] | ospf process-id | static ] [ vrf vrf-name ]
```

Parameter Description

Parameter	Description
bgp	Displays redistributed BGP routes.
connected	Displays redistributed directly-connected routes.
isis process-id	Displays redistributed ISIS routes. The process-id parameter indicates ISIS process ID.
ospf process-id	Displays redistributed OSPF routes. The process-id parameter indicates OSPF process ID. The range is from 1 to 65535.
static	Displays redistributed static routes.
vrf vrf-name	Displays the RIP external route of the specified VRF (optional).

Defaults N/A

Command

Mode Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide N/A

Configuration The following example displays direct routes redistributed by the RIP process.

Examples

```
FS# show ip rip external connected
Protocol connected route:
```

```
[connected] 1.0.0.0/8 metric=0
nhop=0.0.0.0, if=2
[connected] 3.0.0.0/8 metric=0
nhop=0.0.0.0, if=16391
[connected] 4.4.0.0/16 metric=0
nhop=0.0.0.0, if=16388
[connected] 5.0.0.0/8 metric=0
nhop=0.0.0.0, if=16386
[connected] 192.168.195.0/24 metric=0
nhop=0.0.0.0, if=1
```

Related Commands

Command	Description
show ip rip	Displays the information of the currently running routing protocol process.
ip vrf	Creates a VRF.

Platform N/A

Description

1.37 show ip rip interface

Use this command to display the RIP interface information.

show ip rip interface [**vrf** vrf-name] [interface-type interface-number]

Parameter Description

Parameter	Description
vrf vrf-name	Displays the RIP interface of specified VRF (optional).
[interface-type interface-number]	Displays the specified interface type and interface number (optional).

Defaults N/A

Command

Mode Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide

This command is used to display the information about RIP interfaces. If no RIP interface exists, no information is displayed.

Configuration

The following example displays the RIP interface information.

Examples

```
FS# show ip rip interface
FastEthernet 0/1 is up, line protocol is up
Routing Protocol: RIP
Receive RIPv2 packets only
```

```

Send RIPv2 packets only
Recv RIP packet total: 0
Send RIP packet total: 3
Passive interface: Disabled
Split Horizon with Poisoned Reverse: Enabled
Triggered RIP Enabled:
Retransmit-timer: 5, Retransmit-count: 36
V2 Broadcast: Disabled
Multicast registe: Registered
Interface Summary Rip:
Not Configured
Authentication mode: Text
Authentication key-chain: ripk1
Authentication text-password: FS
Default-information: only, metric 5
IP interface address:
192.168.64.100/24, next update due in 14 seconds
2.2.1.1/24, next update due in 24 seconds
    neighbor 2.2.1.6, next update due in 3 seconds
    neighbor 2.2.1.77, next update due in 13 seconds
2.2.2.57/24, next update due in 16 seconds
    
```

If the BFD has been configured for RIP, the BFD information is also displayed.

```

FS#show ip rip interface
Serial 0/1 is up, line protocol is up
  Routing Protocol: RIP
    Receive RIPv1 and RIPv2 packets
    Send RIPv1 packets only
    Receive RIP packet: Enabled
    Send RIP packet: Enabled
    Send RIP supernet routes: Enabled
    Recv RIP packet total: 0
    Send RIP packet total: 3
    Passive interface: Disabled
  Split Horizon: Enabled
  Triggered RIP Disabled
    BFD: Enabled
    V2 Broadcast: Disabled
    Multicast registe: Registered
  Interface Summary Rip:
    Not Configured
  IP interface address:
    2.2.2.111/24, next update due in 14 seconds
    
```

Related	Command	Description
---------	---------	-------------

Commands	
show ip rip	Displays the information of the currently running routing protocol process.

Platform N/A

Description

1.38 show ip rip peer

Use this command to show the RIP peer information. RIP records a summary for the RIP routing information source learnt (source addresses of RIP route update packets) for the convenience of user monitoring. This routing information source is called RIP neighbor information.

show ip rip peer [ip-address] [vrf vrf-name]

Parameter	Description
ip-address	(Optional) Displays the IP address of a specified RIP neighbor.
vrf vrf-name	(Optional) Displays the RIP interface of a specified VRF.

Defaults N/A

Command

Mode Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide This command is used to display the RIP neighbor information. If no RIP neighbor exists, no information will be displayed.

Configuration The following example displays the RIP neighbor information.

Examples

```
FS# show ip rip peer
Peer 192.168.3.2:
  Local address: 192.168.3.1
  Input interface: GigabitEthernet 0/2
  Peer version: RIPv1
  Received bad packets: 3
  Received bad routes: 0
  BFD session state up
```

Related Commands	Command	Description
	show ip rip	Displays the information of the routing protocol process that is running.

Platform N/A

Description

1.39 timers basic

Use this command to adjust the RIP clock. Use the **no** form of this command to restore the default setting.

timers basic update invalid flush

no timers basic

Parameter Description	Parameter	Description
	update	Indicates the route update time in seconds. The update keyword defines the period at which the device sends route update packets. Each time an update packet is received, the "Invalid" and "Flush" clocks are reset. By default, a route update packet is sent every 30 seconds.
	invalid	Indicates the route invalid time in seconds, starting from the last valid update packet. The "invalid" defines the period when the route in the routing table becomes invalid due to no update. The invalid period of route shall be at least three times the route update period. If no update packet is received within the route invalid period, the related route becomes invalid and enters into the "invalid" state. If an update packet is received within the period, the clock resets. By default, the Invalid time is 180 seconds.
	flush	Indicates the route flushing time in seconds, starting when a RIP route enters into the invalid status. When the flush time is due, the routes in the invalid status will be cleared out of the routing table. The default Flush time is 120 seconds.

Defaults By default, the update time is 30 seconds, the invalid time is 180 seconds, and the flushing time is 120 seconds.


Command

Mode Routing process configuration mode

Usage Guide

Adjusting the above clocks may speed up routing protocol convergence and fault recovery. Devices connected to the same network must have consistent RIP clock values. Adjustment of RIP clocks is not recommended unless otherwise specified.

To check the current RIP clock parameters, use the **show ip rip** command.

 If you set the clock to a small value on low-speed links, some risks will be caused because numerous update packets may use up the bandwidth. In general, the clocks can be configured with smaller values on Ethernet or the lines of above 2 Mbit/s to reduce the convergence time of routes.

Configuration

Examples

The following example enables the RIP update packets that are sent every 10 seconds. If no update packet is received within 30 seconds, related routes become invalid and enter the invalid status. When another 90s elapses, they will be cleared.

```
FS (config)# router rip
FS (config-router)# timers basic 10 30 90
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.40 validate-update-source

Use this command to validate the source address of the received RIP route update packet. Use the **no** form of the command to disable this function.

validate-update-source
no validate-update-source

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide

You can validate the source address of the RIP route update packet. The validation aims to ensure that the RIP routing process receives only the route update packets from the same IP subnet neighbor.

Disabling split horizon on the interface causes the RIP routing process to enable update message source address validation, no matter whether it has been configured with the **validate-update-source** command in routing process configuration mode.

In addition, for the ip unnumbered interface, the RIP routing process does not implement update message source address validation, no matter whether it has been configured with the command **validate-update-source**.

Configuration The following example disables verification of the source IP address of the update packet.

```
FS (config)# router rip
FS (config-router)# no validate-update-source
```

Related Commands	Command	Description
	ip split-horizon	Enables split horizon.
	ip unnumbered	Defines the IP unnumbered interface.
	neighbor (RIP)	Defines the IP address of a RIP neighbor.

Platform N/A
Description

1.41 version

Use this command to define the RIP version of a device. Use the **no** form of this command to restore the default setting.

version { 1 | 2 }
no version

Parameter Description	Parameter	Description
	1	Defines the RIP version 1.
	2	Defines the RIP version 2.

Defaults The route update packets of RIPv1 and are received by default, but only the RIPv1 route update packets are sent.

Command

Mode Routing process configuration mode

Usage Guide This command defines the RIP version running on the device. It is possible to redefine the messages of which RIP version are processed on every interface by using the **ip rip receive version** and **ip rip send version** commands.

Configuration Examples The following example configures the RIP version as version 2.

```
FS (config)# router rip
FS (config-router)# version 2
```

Related Commands	Command	Description
	ip rip receive version	Defines the version of RIP packets received on the interface.
	ip rip send version	Defines the version of RIP packets sent on the interface.
	show ip rip	Displays RIP information.

Platform N/A

Description

2 OSPFv2 Commands

2.1 area

Use this command to configure the specified OSPF area. Use the **no** form of this command to restore the default setting.

area area-id
no area area-id

Parameter Description	Parameter	Description
	area-id	ID of the OSPF area. The value can be a decimal integer or an IP address.

Defaults No OSPF area is configured by default.

Command

Mode Routing process configuration mode

Usage Guide Use the no form of this command to remove the specified OSPF area and its configuration, including the area-based **area authentication, area default-cost, area filter-list, and area nssa** commands.

- Do not remove the OSPF area configuration under the following conditions:
- Virtual links exist in the backbone area. The virtual links must be removed at first.
- The corresponding network area command exists in any area. All network segment commands added to an area must be removed at first.

Configuration Examples The following example removes the configuration of OSPF area 2.

```
FS(config)# router ospf 2
FS(config-router)# no area 2
```

Related Commands	Command	Description
	network area	Defines the interface where OSPF runs and the belonging area of the interface.

Platform N/A

Description

2.2 area authentication

Use this command to enable OSPF area authentication. Use the **no** form of this command to restore the default setting.

area area-id **authentication** [**message-digest**]

no area area-id authentication

Parameter Description	Parameter	Description
	area-id	Specifies ID of the area enabled with OSPF. The value can be a decimal integer or an IP address.
	message-digest	(Optional) Enables MD5 (message digest 5) authentication mode.

Defaults No authentication is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide

The FSOS software supports three authentication types:

1) 0, no authentication. The authentication type in the OSPF packet is 0 when this command is not executed to enable OSPF authentication. 2) 1, plain text authentication mode. When this command is configured, the message-digest option is not used. 3) 2, MD5 authentication mode. When this command is configured, the message-digest option is used.

All devices in the same OSPF area must use the same authentication type. If authentication is enabled, the authentication password must be configured on an interface connecting neighbors. You can use the **ip ospf authentication-key** command to configure the plain text authentication password, and the **ip ospf message-digest-key** command to configure the MD5 authentication password in interface configuration mode.

Configuration

The following example uses MD5 authentication and the authentication password backbone in area 0 (backbone area) of the OSPF routing process.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 192.168.12.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf message-digest-key 1 md5 backbone
FS(config)# router ospf 1
FS(config-router)# network 192.168.12.0 0.0.0.255 area 0
FS(config-router)# area 0 authentication message-digest
```

Related Commands

Command	Description
ip ospf authentication-key	Defines the OSPF plain text authentication password.
ip ospf message-digest-key	Defines the OSPF MD5 authentication password.
area virtual-link	Defines a virtual link.

Platform N/A

Description

2.3 area default-cost

Use this command to define the cost (OSPF metric) of the default aggregate route advertised to the stub area or

not-so-stubby area (NSSA) in routing process configuration mode. Use the **no** form of this command to restore the default setting.

area area-id **default-cost** cost

no area area-id **default-cost**

Parameter Description	Parameter	Description
	area-id	ID of the stub area or NSSA
	Cost	Cost of the default aggregate route advertised to the stub area or NSSA. The range is from 0 to 16777215.

Defaults The default is 1.

Command

Mode Routing process configuration mode

Usage Guide This command takes effect only on the Area Border Router (ABR) of the stub area or the ABR/Autonomous System Border Router (ASBR) of the NSSA.

The ABR can advertise a Link State Advertisement (LSA) indicating the default route in the stub area. The ABR/ASBR can advertise an LSA indicating the default route in the NSSA. You can use the **area default-cost** command to modify the LSA cost.

Configuration Examples The following example sets the cost of the default aggregate route to 50.

```
FS(config)# router ospf 1
FS(config-router)# network 172.16.0.0 0.0.255.255 area 0
FS(config-router)#network 192.168.12.0 0.0.0.255 area 1
FS(config-router)# area 1 stub
FS(config-router)# area 1 default-cost 50
```

Related Commands	Command	Description
	area stub	Sets an OSPF area as a stub area.
	area nssa	Sets an OSPF area as an NSSA.

Platform N/A

Description

2.4 area filter-list

Use this command to filter the inter-area routes on the ABR. Use the **no** form of this command to restore the default setting.

area area-id **filter-list** { **access** acl-name | **prefix** prefix-name } { **in** | **out** }

no area area-id **filter-list** { **access** acl-name | **prefix** prefix-name } { **in** | **out** }

Parameter Description	Parameter	Description
	area-id	Area ID
	acl-name	Name of an Access Control List (ACL)
	prefix-name	Prefix-list name
	in out	Applies the ACL rule to the routes incoming/outgoing the area.

Defaults No filtering is configured by default.

Command

Mode Routing process configuration mode

Usage Guide This command can be configured only on an ABR.
You can use this command when it is required to filter the inter-area routes on the ABR.

Configuration The following example sets area 1 to learn only the inter-area routes of 172.22.0.0/8.

```

Examples
FS # configure terminal
FS(config)# access-list 1 permit 172.22.0.0/8
FS(config)# router ospf 100
FS(config-router)# area 1 filter-list access1 in
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.5 area nssa

Use this command to set an OSPF area as an NSSA in routing process configuration mode. Use the **no** form of this command to delete the NSSA or the NSSA configuration.

```

area area-id nssa [ no-redistribution ] [ default-information-originate [ metric value ] [ metric-type type ] ]
[ no-summary ] [ translator [ stability-interval seconds | always ] ]
no area area-id nssa [ no-redistribution ] [ default-information-originate [ metric value ] [ metric-type type ] ]
[ no-summary ] [ translator [ stability-interval | always ] ]
    
```

Parameter Description	Parameter	Description
	area-id	NSSAID
	no-redistribution	Imports the routing information to a common area other than the NSSA for the NSSA ABR.
	default-information originate	Generates and imports the default Type 7 LSA to the NSSA. This option takes effect only on the NSSA ABR or ASBR.

metric value	Sets the metric of the generated default LSA. The range is from 0 to 16777214. The default value is 1.
metric-type type	Sets the type of the generated LSA to N-1 or N-2. The default value is N-2.
no-summary	Prevents the NSSA ABR from sending summary LSAs (Type-3 LSA).
Translator	Configures the translator for the NSSA ABR.
stability-interval seconds	Configures the stability interval in seconds for the NSSA ABR that functions as a translator to change to a non-translator. The range is from 0 to 2147483647. The default value is 40.
Always	Configures that an NSSA ABR always functions as a translator. The NSSA ABR is the backup translator by default.

Defaults No NSSA is defined by default.

Command

Mode Routing process configuration mode

Usage Guide

The default-information-originate parameter is used to generate the default Type-7 LSA. However, on the NSSA ABR, the default Type-7 LSA will always be generated; On the ASBR (which is not an ABR at the same time), the default Type-7 LSA is generated only when the default route exists in the routing table.

The no-redistribution parameter prevents the OSPF from advertising the external routes imported with the redistribute command to the NSSA on the ASBR. This option is generally used when the NSSA device is both an ASBR and an ABR.

To reduce the number of LSAs sent to the NSSA, you can configure the no-summary parameter on the ABR to prevent it from advertising summary LSAs (Type-3 LSAs) to the NSSA. In addition, you can use the area default-cost command on the NSSA ABR to configure the cost of the default route advertised to the NSSA. By default, this cost is 1.

If an NSSA has multiple ABRs, the ABR with the greatest ID is selected as the Type-7 or Type-5 translator. To configure that an NSSA ABR always functions as a translator, you can use the translator always parameter. If the translator role of an ABR is taken away by another ABR, the ABR still possesses the conversion capability within stability-interval. If the ABR fails to take back its translator role when stability-interval expires, the LSA that changes from Type-7 to Type-5 will be removed from the autonomous domain.

To avoid route loops, Type-5 LSAs generated from Type-7 convergence will be eliminated immediately after the current device stopped serving as a translator, with no need to wait until the stability-interval expires.

In a same NSSA, you are recommended to configure the **translator always** parameter on only one ABR.

Configuration The following example sets area 1 as an NSSA on all routers of the area.

Examples

```
FS(config)#router ospf1
FS(config-router)#network 172.16.0.0 0.0.255.255 area0
FS (config-router)#network 192.168.12.0 0.0.0.255 area 1
FS(config-router)# area1nssa
```

Related Commands

Command	Description
---------	-------------

area default-cost	Defines the cost (OSPF metric) of the default aggregate route advertised to the NSSA.
--------------------------	---

Platform N/A

Description

2.6 area range

Use this command to configure inter-area route aggregation for OSPF. Use the **no** form of this command to delete route aggregation. Use the **no** form with the cost parameter to restore the default metric of the aggregate route, but not delete route aggregation.

area area-id **range** ip-address net-mask [**advertise** | **not-advertise**] [**cost** cost]

no area area-id **range** ip-address net-mask [**cost**]

Parameter	Description
area-id	ID of the area where the aggregate route is injected into. The value can be a decimal integer or an IP address.
ip address net-mask	Network segment whose routes are to be aggregated
advertise not-advertise	Whether to advertise the aggregate route
cost cost	Sets the priority of the interface. The range is from 0 to 16777215.

Defaults

No inter-area route aggregation is configured by default.

The configured aggregation range is advertised by default.

The default metric of the aggregate route depends on whether the device is compatible with RFC1583. If yes, the default metric is the smallest cost of the aggregate route. If no, the default metric is the largest cost of the aggregate route.

Command

Mode Routing process configuration mode

Usage Guide

This command takes effect only on the ABR to aggregate multiple routes of an area into a route and advertise it to other areas. Route combination occurs only on the border of an area. The devices inside an area see the specific routing information, but the devices outside the area see only one aggregate route. The advertise and not-advertise options can set whether to advertise the aggregate route for filtering and masking. The aggregate route is advertised by default.

You can use the cost option to set the metric of the aggregate route.

You can define route aggregate in multiple areas to simplify the routes in the whole OSPF routing area. This improves the network forwarding performance, especially in large networks.

The area range of route aggregation is determined according to the longest match when multiple aggregate routes with direct inclusion relationships are configured.

Configuration The following example aggregate the routes of area 1 into a route 172.16.16.0/20.

Examples FS(config)#router ospf 1

```
FS(config-router)#network 172.16.0.0 0.0.15.255area0
FS((config-router)#network 172.16.17.0 0.0.15.255area1
FS(config-router)#area1range 172.16.16.0 255.255.240.0
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.7 area stub

Use this command to set an OSPF area as a stub area or full stub area. Use the **no** form of this command to restore the default setting.

area area-id **stub** [**no-summary**]

no area area-id **stub** [**no-summary**]

Parameter Description	Parameter	Description
	area-id	Stub area ID
	no-summary	(Optional) Prevents the ABR from advertising the network summary link to the stub area. Here the stub area is called the full stub area. Only the ABR needs this parameter.

Defaults No stub area is defined by default.

Command

Mode Routing process configuration mode

Usage Guide

All devices in the OSPF stub area must be configured with the area stub command. The ABR only sends three types of link state advertisement (LSA) to the stub area: 1) type 1, device LSA; 2) type 2, network LSA; 3) type 3, network summary LSA. For the routing table, the devices in the stub area can learn only the routes inside the OSPF routing domain, including the internal default routes generated by the ABR.

To configure a full stub area, use the area stub command with the no-summary keyword on the ABR. The devices in the full stub area can learn only the routes in the local area and the internal default routes generated by the ABR.

Two commands can configure an OSPF area as a stub area: the area stub and area default-cost commands. All devices connected to the stub area must be configured with the area stub command, but the area default-cost command can be executed only on the ABR. The area default-cost command defines the initial cost (metric) of the internal default route.

Configuration Examples The following example sets area 1 as the stub area on all devices in area 1.

```
FS(config)# router ospf1
```

```
FS(config-router)# network 172.16.0.0 0.0.255.255 area 0
FS (config-router)# network 192.168.12.0 0.0.0.255 area 1
FS(config-router)# area 1 stub
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.8 area virtual-link

Use this command to define the OSPF virtual link in routing process configuration mode. Use the **no** form of this command to restore the default setting.

```
area area-id virtual-link router-id [ authentication [ message-digest | null ] ] [ dead-interval { seconds | minimal } ] [ hello-multiplier multiplier ] [ hello-interval seconds ] [ retransmit-interval seconds ] [ transmit-delay seconds ] [ [ authentication-key [ 0|7 ] key ] ] [ message-digest-key key-id md5 [ 0|7 ] key ] ]
no area area-id virtual-link router-id [ authentication [ dead-interval ] [ hello-interval ] [ retransmit-interval ] [ transmit-delay ] [ [ authentication-key ] ] [ message-digest-key key-id ] ]
```

Parameter Description

Parameter	Description
area-id	ID of the OSPF transition area. The value can be a decimal integer or an IP address.
router-id	ID of the router neighboring to the virtual link. It can be viewed with the show ip ospf command.
dead-interval seconds	(Optional) Defines the time to declare neighbor loss in seconds. The range is 0 to 2147483647. This value must be consistent with that of the neighbor.
minimal	Enables the Fast Hello function and sets the death clock to 1 second.
hello-multiplier	Multiplies dead-interval with hello-interval in the Fast-Hello function.
multiplier	Specifies the number of Hello packets that are sent every second in the Fast Hello function. The range is from 3 to 20.
hello-interval seconds	(Optional) Defines the interval at which the HELLO packet is sent by the OSPF to the virtual link in seconds. The range is from 1 to 65535. This value must be consistent with that of the neighbor.
retransmit-interval seconds	(Optional) OSPF LSA retransmission interval in seconds. The range is from 0 to 65535. The parameter setting must consider the round-trip time of packets on the link.
transmit-delay seconds	(Optional) OSPF LSA transmission delay in seconds. The range is from 0 to 65535. This value adds the LSA keep alive period. When the LSA keep alive period reaches a threshold, the LSA will be refreshed.
authentication-key [0 7]key	(Optional) Defines the OSPF plain text authentication key. The plain text authentication key between neighbors must be the same. The service

	<p>password-encryption command enables the key to be displayed in encrypted manner.</p> <p>0 indicates that the key is displayed in plain text.</p> <p>7 indicates that the key is displayed in cipher text.</p>
<p>message-digest-key key-idmd5 [0 7]key</p>	<p>(Optional) Defines the OSPF MD5 authentication key and key ID. The MD5 authentication key ID and key between neighbors must be the same. The service password-encryption command enables the key to be displayed in encrypted manner.</p> <p>0 indicates that the key is displayed in plain text.</p> <p>7 indicates that the key is displayed in cipher text.</p>
Authentication	Sets the authentication type to plain text.
message-digest	Sets the authentication type to MD5.
Null	Sets the authentication type to no authentication.

Defaults

The following are the default values:

dead-interval: 40seconds

hello-interval: 10seconds

retransmit-interval: 5seconds

transmit-delay: 1second

authentication: null

The Fast Hello function is disabled by default.

The other parameters do not have default values.

Command**Mode**

Routing process configuration mode

Usage Guide

A virtual link can connect an area to the backbone area, or another non-backbone area. In the OSPF routing domain, all areas must connect to the backbone area. If an area disconnects from the backbone area, a virtual link to the backbone area is required. Otherwise, the network communication will become abnormal. The virtual link is created between two ABRs. The area that belongs to both ABRs is called the transition area, which can never be a stub area or NSSA.

The router-id parameter indicates the ID of OSPF neighbor router and can be displayed with the show ip ospf neighbor command. You can configure the loopback address as the router ID.

The area virtual-link command defines only the authentication key for a virtual link. You can use the **area authentication** command to enable the OSPF packet authentication in areas connected over the virtual link in routing process configuration mode.

OSPF supports the Fast Hello function.

If the Fast Hello function is enabled, the OSPF can discover neighbors and detects invalid neighbors quickly. You can enable the OSPF Fast Hello function by specifying the keywords minimal and hello-multiplier, and the multiplier parameter. You can set the death clock to 1 second in minimal and hello-multiplier to a value equal to or greater than 2. In this case, the Hello packet sending interval is less than 1 second.

The hello-interval field of a Hello packet received by a virtual link is omitted if the Fast Hello function is enabled on the virtual link and the hello-interval field is set to 0 for Hello packets advertised from the virtual link.

No matter the Fast Hello function is enabled or not, the values of dead-interval must be consistent on both ends

of a virtual link. The values of hello-multiplier on both ends can be different if at least one Hello packet can be received within dead-interval. You can use the show ip ospf virtual-links command to monitor dead-interval and hello-interval configured for a virtual link.

For the Fast Hello function, you can only configure either the **dead-interval minimal hello-multiplier** parameter or the **hello-interval** parameter.

Configuration

The following example sets area 1 as the transition area to establish virtual link with neighbor 2.2.2.2.

Examples

```
FS(config)# router ospf 1
FS(config-router)# network 172.16.0.0 0.0.15.255 area0
FS(config-router)# network 172.16.17.0 0.0.15.255 area1
FS(config-router)#area1 virtual-link2.2.2.2
```

The following example sets area 1 as the transition area to establish a virtual link with neighbor 1.1.1.1. This virtual link connects area 10 and the backbone area, and works with the OSPF packet authentication inMD5 mode.

```
FS(config)# routerospf1
FS(config-router)# network172.16.17.0 0.0.15.255area1
FS(config-router)# network172.16.252.0 0.0.0.255 area10
FS(config-router)# area 0 authentication message-digest
FS(config-router)# area1virtual-link 1.1.1.1message-digest-key1md5hello
```

The following example sets area 1 as the transition area to establish a virtual link with neighbor 1.1.1.1, enables the Fast Hello function on this virtual link, and sets the multiplier to 3.

```
FS(config)# routerospf1
FS(config-router)# network172.16.17.0 0.0.15.255 area1
FS(config-router)# network 172.16.252.0 0.0.0.255 area10
FS(config-router)# area1 virtual-link1.1.1.1dead-interval minimal hello-multiplier 3
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF process information, including the router ID.
show ip ospf virtual-links	Monitors information about a virtual link.

Platform N/A

Description

2.9 asbr enable

Use this command to configure the device as ASBR. Use the **no** form of this command to restore the default settings.

asbr enable

no asbr enable

Parameter Description

Parameter	Description
N/A	

Defaults The device is not ASBR by default

Command

Mode Routing process configuration mode

Usage Guide If the **redistribute** or **default-information** commands are run, OSPF routing device will turn into ASBR automatically. If the above commands are not configured but you want the device to become ASBR, you can configure **asbr enable**. If **asbr enable** is deleted yet **redistribute** or **default-information** is configured, the device is still ASBR.

Configuration The following example configures the device as ASBR.

Examples

```
FS(config)# router ospf 1
FS(config-router)# asbr enable
```

Related Commands

Command	Description
---------	-------------

Platform N/A

Description

2.10 auto-cost

Use this command to enable the auto-cost function and set the reference bandwidth according to the reference bandwidth. Use the **no** form of this command to restore the default setting.

auto-cost reference-bandwidth ref-bw

no auto-cost reference-bandwidth

Parameter Description

Parameter	Description
ref-bw	Reference bandwidth, in the range from 1 to 4294967 Mbps.

Defaults The default is 100Mbps.

Command

Mode Routing process configuration mode

Usage Guide This command sets the reference bandwidth for automatically generating the interface cost. Without the optional parameter, the command enables the auto-cost function with the default reference bandwidth. With the optional parameter, the command enables the auto-cost function with a specified reference bandwidth. Note that the **default auto-cost** command enables the auto-cost function with the default configuration, while and the **no auto-cost** command disables the function.

The cost set with the **ip ospf cost** command will replace the auto-cost.

Configuration The following example configures the reference bandwidth as 10 Mbps.

```
Examples
FS(config)# routerospf1
FS(config-router)# network172.16.10.0 0.0.0.255 area0
FS(config-router)# auto-costreference-bandwidth10
```

Related Commands	Command	Description
	show ip ospf	Displays the OSPF global configuration information
	ip ospf cost	Sets the cost value of the OSPF interface.
	Bandwidth	Sets the interface bandwidth. This setting does not affect data transmission rate.

Platform N/A

Description

2.11 bdf all-interfaces

Use this command to enable Bidirectional Forwarding Detection (BFD) on all OSPF interfaces. Use the **no** form of this command to restore the default setting.

```
bdf all-interfaces
no bdf all-interfaces
```

Parameter Description	Parameter	Description
		N/A

Defaults BDF is disabled by default.

Command

Mode Routing process configuration mode

Usage Guide OSPF dynamically discovers the neighbors through Hello packets. With the BFD function enabled, one BFD session will be established for the neighbors that match the FULL rules and the status of the neighbors will be detected through the BFD mechanism. Once the BFD neighbor fails, the OSPF will converge with the network immediately.

You can also use the **ip ospf bfd [disable]** command in interface configuration mode to enable or disable the BFD function on the specified interface, which takes precedence over the **bdf all-interfaces** command in routing process configuration mode.

Configuration

Examples N/A

Related Commands	Command	Description

router ospf	Creates the OSPF routing process and enters routing process configuration mode.
ip ospf bfd]	Enables the specified interface running OSPF or disabling BFD for link detection.

Platform N/A

Description

2.12 capability opaque

Use this command to enable Opaque LSA. Use the **no** form of this command to disable this function.

capability opaque

no capability opaque

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Opaque LSA is enabled by default.

Command Mode Routing process configuration mode.

Usage Guide N/A

Configuration Examples The following example disables Opaque LSA capability.

```
FS(config)# router ospf 1
FS(config-router)# no capability opaque
```

Related Commands	Command	Description
	show ip ospf	Displays the global configuration of OSPF.

Platform N/A

Description

2.13 clear ip ospf process

Use this command to clear and restart the OSPF instance.

clear ip ospf (process-id) process

Parameter	Parameter	Description
Description	process-id	OSPF instance ID. When the ID is specified, the command clears data related to the specified

	instance and restarts the OSPF instance. When no ID is specified, the command clears data related to all running OSPF instances and restarts all the running OSPF instances.
--	---

Defaults The rule recommended in the RFC 1583 is used by default.

Command

Mode Privileged EXEC mode

Usage Guide Resetting the entire OSPF process causes that all neighbors are re-established and OSPF is greatly affected. Therefore, you are prompted to confirm the execution for deliberation.

Configuration The following example clears data of OSPF instance 1 and restarts OSPF instance 1.

Examples

```
FS#clearipospf1 process
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.14 compatible rfc1583

Use this command to determine the RFC 1583 or RFC 2328 rule for selecting the optimal route among route table several routes to the same destination out of the Autonomous System (AS).

compatible rfc1583

no compatible rfc1583

Parameter Description

Parameter	Description
N/A	N/A

Defaults The RFC 1583 rule is used by default.

Command

Mode Routing process configuration mode

Usage Guide N/A

Configuration The following example determines the best route with the RFC 2328 rule.

Examples

```
FS(config)# routerospf1
FS(config-router)# nocommpatiblerfc1583
```

Related Commands	Command	Description
	show ip ospf	Displays the OSPF global configuration information

Platform N/A
Description

2.15 default-information originate

Use this command to generate a default route to be injected into the OSPF routing domain in routing process configuration mode. Use the **no** form of this command to restore the default setting.

default-information originate [**always**] [**metric** metric] [**metric-type** type] [**route-map** map-name]
no default-information originate [**always**] [**metric**] [**metric-type**] [**route-map** map-name]

Parameter Description	Parameter	Description
	Always	(Optional) Generates the default route unconditionally, no matter whether the default route exists locally or not.
	metric metric	(Optional) Initial metric of the default route in the range from 0 to 16777214
	metric-type type	(Optional) Type of the default route. There are two type of OSPF external routes: type 1, different metrics on different devices; type 2, same metric on different devices. An external route of type 1 is more trustworthy than that of type 2.
	route-map map-name	Associated route map name. No route map is associated by default.

Defaults No default route is generated by default.
The default value of metric is 1.
The default value of metric-type is 2.

Command Mode Routing process configuration mode

Usage Guide When the **redistribute** or **default-information** command is executed, the OSPF-enabled device automatically turns into the ASBR. The ASBR cannot generate the default route automatically or advertise it to all the devices in the OSPF routing domain. The ASBR can generate the default route with the **default-information originate** command in routing process configuration mode.

If the **always** parameter is used, the OSPF routing process advertises an external default route to neighbors, no matter the default route exists or not. However, the local device does not display the default route. To make sure whether the default route is generated, use the **show ip ospf database** command to display the OSPF link state database. The external link identified with 0.0.0.0 indicates the default route. You can use the **show ip route** command on the OSPF neighbor to display the default route.

The metric of the external default route can be defined only with the **default-information originate** command. There are two types of OSPF external routes: type 1 external routes have changeable routing metrics, while type 2 external routes have constant routing metrics. For two parallel routes with the same route metric to the same

destination network, the type 1 route takes precedence over the type 2 route. As a result, the **show ip route** command displays only the type 1 route.

This command generates a default route of Type-5 LSA, which will not be flooded to the NSSA area.

To generate a default route in the NSSA area, use the **area nssa default-information-originate** command.

The routers in the stub area cannot generate external default routes.

The range of set metric is 0 to 16777214 for the associated route map. If the value exceeds the range, introducing a route fails.

Configuration Examples The following example configures that OSPF generates an external default route and injects it to the OSPF routing domain. The default route is of type 1 and the metric 50.

```
FS(config)#routerospf 1
FS(config-router)#network172.16.24.0 0.0.0.255 area 0
FS(config-router)#default-information originate
alwaysmetric50metric-type1
```

Related Commands

Command	Description
show ip ospf database	Displays OSPF link state database.
show ip route	Displays the IP route table.
Redistribute	Redistributes routes of other routing processes.

Platform N/A

Description

2.16 default-metric

Use this command to set the **default metric** of OSPF redistribution route. Use the **no** form of this command to restore the default setting.

default-metric metric

no default-metric

Parameter Description

Parameter	Description
Metric	Default metric of the OSPF redistribution route in the range from 1 to 16777214

Defaults The default metric is not configured by default.

Command

Mode Routing process configuration mode

Usage Guide The **default-metric** command must work with the **redistribute** command in routing process configuration mode to modify the initial metric of all redistributed routes.

The configuration result of the **default-metric** command does not take effect for the external routes injected into

the OSPF routing domain with the **default-information originate** command.

Configuration The following example configures the default metric of the OSPF redistribution route as 50.

Examples

```
Switch(config)# router rip
FS(config-router)# network 192.168.12.0
Switch(config-router)# version 2
FS(config-router)# exit
FS(config)# router ospf 1
FS(config-router)# network 172.16.10.0 0.0.0.255 area 0
Switch(config-router)# default-metric 50
FS(config-router)# redistribute rip subnets
```

**Related
Commands**

Command	Description
Redistribute	Redistributes the routes of other routing processes.
show ip ospf	Displays the OSPF global configuration information.

Platform N/A

Description

2.17 discard-route

Use this command to enable adding the discard-route into the core route table. Use the **no** form of this command to disable this function.

discard-route { internal | external }

no discard-route { internal | external }

**Parameter
Description**

Parameter	Description
Internal	Enables adding the discard-route generated with the area range command
External	Enables adding the discard-route generated with the summary-address command.

Defaults Adding the discard-route is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide

After route aggregation, the range may exceed the actual network range of the route table, and sending the data to the nonexistent network may cause loops or increase router loads. To prevent this situation, the discard-route is added to the route table on the ABR or the ASBR. The discard-route is generated automatically and will not be transmitted.

Configuration The following example disables adding the discard routes generated with the area range command.

Examples

```
FS(config)# router ospf 1
FS(config-router)# no discard-route internal
```

Related Commands

Command	Description
area range	Configures the route aggregation between OSPF areas.
summary-address	Configures the route aggregation out of the OSPF routing domain.

Platform N/A

Description

2.18 distance ospf

Use this command to set the Administration Distance (AD) of different types of OSPF routes. Use the **no** form of this command to restore the default setting.

```
distance { distance [ route-map map-name ] | ospf { [ intra-area distance [ route-map map-name ] ] [ inter-area distance [ route-map map-name ] ] [ external distance [ route-map map-name ] ] } }
no distance [ ospf ]
```

Parameter Description

Parameter	Description
Distance	Sets the route AD in the range from 1 to 255.
intra-area distance	Sets the AD of the intra-area route in the range from 1 to 255.
inter-area distance	Sets the AD of the inter-area route in the range from 1 to 255.
External distance	Sets the AD of the external route in the range from 1 to 255.
route-map map-name	Name of associated route-map. By default, no route-map is associated.

Defaults

The default value is 110.
 The default intra-area distance is 110.
 The default inter-area distance is 110.
 The default external distance is 110.

Command

Mode Routing process configuration mode

Usage Guide

This command is used to specify different ADs for different types of OSPF routes. If the command set distance is configured for route-map, then the AD of matched route is configured by set distance and of unmatched route is configured by distance.

Configuration The following example sets the OSPF external route AD to 160.

Examples

```
FS(config)# routerospf1
FS(config-router)# distance ospf external 160
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.19 distribute-list in

Use this command to configure LSA filtering. Use the **no** form of this command to restore the default setting.

distribute-list { [access-list-number | name] | **prefix** prefix-list-name [**gateway** prefix-list-name] | **route-map** route-map-name } **in** [interface-type interface-number]

no distribute-list { [access-list-number | name] | **prefix** prefix-list-name [**gateway** prefix-list-name] | route-map route-map-name } **in** [interface-type interface-number]

Parameter Description	Parameter	Description
	access-list-number name	Uses the ACL filtering rule.
	gateway prefix-list-name	Uses the gateway filtering rule.
	prefix prefix-list-name	Uses the prefix-list filtering rule.
	route-map route-map-name	Uses the route-map filtering rule.
	interface-type interface-number	Configures the LSA route filtering on the interface.

Defaults No filtering is configured by default.

Command

Mode Routing process configuration mode

Usage Guide This configuration filters the received LSAs, and only those matching the filtering conditions are involved in the Shortest Path First (SPF) calculation to generate the corresponding routes. It does not affect the link status database or the route table of the neighbors. It only affects the routing entries calculated by local OSPF. This function is used to control routes that enter the ABR or ASBR.

The following route-map rules will be supported if the route-map parameter is configured:

- match interface**
- match ip address**
- match ip address prefix-list**
- match ip next-hop**
- match ip next-hop prefix-list**
- match metric**
- match route-type**
- match tag**

Configuration The following example configures LSA filtering.

```

Examples
FS(config)# access-list3permit172.16.0.0.127.255
FS(config)# router ospf 25
FS(config-router)# redistribute rip metric100
FS(config-router)# distribute-list 3 in ethernet 0/1
    
```

Related Commands	Command	Description
		distribute-list out

Platform N/A

Description

2.20 distribute-list out

Use this command to configure filtering redistribution routes. The function is similar to that of the **redistribute** command. Use the **no** form of this command to restore the default setting.

```

distribute-list { [ access-list-number | name ] | prefix prefix-list-name } out [ bgp | connected | isis [ area-tag ] |
ospf process-id | rip | static | arp-host ]
no distribute-list { [ access-list-number | name ] | prefix prefix-list-name } out [ bgp | connected | isis
[ area-tag ] | ospf process-id | rip | static | arp-host ]
    
```

Parameter Description	Parameter	Description
		access-list-number name
	prefix prefix-list-name	Uses the prefix-list filtering rule.
	bgp connected isis [area-tag] ospf process-id rip static arp-host	Source of the routes to be filtered
	arp-host	Indicates the host route.

Defaults No filtering is configured by default.

Command

Mode Routing process configuration mode

Usage Guide

Similar to the redistribute route-map command, the distribute-list out command filters the routes that other protocols redistribute to the OSPF. However, the distribute-list out command does not redistribute routes by itself. It works with the redistribute command in most cases. The ACL filtering rule and the prefix-list filtering rule cannot coexist in the configuration, that is, the two rules cannot be configured at the same time for routes from the same source.

Configuration The following example filters the redistributed static routes.

```

Examples
FS(config)# routerospf1
FS(config)# redistribute static subnets
    
```

```
FS(config-router)# distribute-list 22 outstatic
FS(config-router)# distribute-list prefix jjj out static
% Access-list filter exists, please de-config first
```

Related Commands	Command	Description
	distribute-list in	
Redistribute		Redistributes routes of other routing processes.

Platform N/A

Description

2.21 enable mib-binding

Use this command to bind the Management Information Base (MIB) with the specified OSPFv2 process. Use the **no** form of this command to restore the default setting.

- enable mib-binding**
- no enable mib-binding**

Parameter Description	Parameter	Description
		N/A

Defaults The MIB is bound with the OSPFv2 process with the smallest ID by default.

Command

Mode Routing process configuration mode

Usage Guide OSPFv2 MIB has no OSPFv2 process information, so the user operates a sole OSPFv2 process by SNMP. By default, OSPFv2 MIB is bound with the OSPFv2 process with the smallest ID. User operations take effect for this process. To operate the specified OSPF process over Simple Network Management Protocol(SNMP), use this command to bind the MIB to SNMP.

Configuration The following example operates OSPFv2 process 100 over SNMP:

```
FS(config)# routerospf100
FS(config-router)# enable mib-binding
```

Related Commands	Command	Description
	show ip ospf	
enable traps		Configures the OSPF TRAP function.

Platform N/A

Description

2.22 enable traps

The OSPFv2 process supports 16 kinds of TRAP packets, which are classified into four categories. Use this command to enable sending the specified TRAP messages. Use the **no** form of this command to restore the default setting.

```
enable traps [ error [ IfAuthFailure | IfConfigError | IfRxBadPacket | VirtIfAuthFailure | VirtIfConfigError |
VirtIfRxBadPacket ] | Isa [ LsdbApproachOverflow | LsdbOverflow | MaxAgeLsa | OriginateLsa ] | retransmit
[ IfTxRetransmit | VirtIfTxRetransmit ] | state-change [ IfStateChange | NbrRestartHelperStatusChange |
NbrStateChange | NssaTranslatorStatusChange | RestartStatusChange | VirtIfStateChange |
VirtNbrRestartHelperStatusChange | VirtNbrStateChange ] ]
no enable traps [ error [ IfAuthFailure | IfConfigError | IfRxBadPacket | VirtIfAuthFailure |
VirtIfConfigError | VirtIfRxBadPacket ] | Isa [ LsdbApproachOverflow | LsdbOverflow | MaxAgeLsa |
OriginateLsa ] | retransmit [ IfTxRetransmit | VirtIfTxRetransmit ] | state-change [ IfStateChange |
NbrRestartHelperStatusChange | NbrStateChange | NssaTranslatorStatusChange | RestartStatusChange |
VirtIfStateChange | VirtNbrRestartHelperStatusChange | VirtNbrStateChange ] ]
```

Parameter
Description

Parameter	Description
Error	Configures all traps switches related to errors. Use this parameter to set the following specified error traps switches.
	Ifauthfailure Interface authentication error
	Ifconfigerror Interface parameter configuration error
	Ifrxbadpacket Error packets received on the interface
	Virtifauthfailure Authentication error on the virtual interface
	Virtifconfigerror Parameter configuration error on the virtual interface
Isa	Configures all traps switches related to the LSA. Use this parameter to set the following specified LSA traps switches.
	Lsdbapproachoverflow External LSA count has reached the 90% of the upper limit.
	Lsdboverflow External LSA count has reached the upper limit.
	Maxagelsa LSA reaching the aging time
Retransmit	Originatelsa Generates new LSA
	Configures all traps switches related to the retransmission. Use this parameter to set the following specified retransmit traps switches.
state-change	Iftxretransmit Packet retransmission on the interface
	Virtiftxretransmit Packet retransmission on the virtual interface
state-change	Configures all traps switches related to the state change. Use this parameter to set the following specified state-change switches.
	Ifstatechange Interface state change
	NbrRestartHelperStatusChange State change during the neighbor GR process

Nbrstatechange	Neighbor state change
NssaTranslatorStatusChange	State change of the NSSA translator
RestartStatusChange	State change of the GR Restarter on the device
Virtifstatechange	State change on the virtual interface
VirtNbrRestartHelperStatusChange	Status change of the virtual neighbor GR process
Virtnbrstatechange	State change on the virtual neighbor

Defaults All TRAP switches are disabled by default.

Command

Mode Routing process configuration mode

Usage Guide The **snmp-server enable traps ospf** command must be configured before you configure this command, for it is limited by the **snmp-server** command.
 This command is not limited by the binding of process and MIB, allowing to enable the TRAP switch for different processes simultaneously.

Configuration The following example enables all TRAP switches of OSPFv2 process 100.

```
FS(config)# routerospf100
FS(config-router)# enable traps
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF global configuration information.
enable mib-binding	Binds the OSPFv2 process with MIB.
snmp-server enable traps ospf	Enables the OSPF TRAP notification function.

Platform N/A

Description

2.23 fast-reroute

Use this command to enable the OSPF FRR (Fast Reroute) function for the device. Use the **no** form of this command to restore the default setting.

```
fast-reroute { lfa [ downstream-paths ] | route-map route-map-name }
no fast-reroute { lfa [ downstream-paths ] | route-map }
```

Parameter Description

Parameter	Description
Lfa	Enables the LFA (loop-free alternate) path computation.
downstream-paths	Enables the downstream path computation.

route-map route-map-name Specifies the backup path through the route map.

Defaults The FRR function is disabled by default.

Command

Mode Routing process configuration mode

Usage Guide Configuring the **lfa** parameter will enable loop-free backup path computation. In this case, the path protection mode for an interface can be specified via the interface mode command.

Configuring the **downstream-paths** parameter will enable downstream path computation.

Configuring the **route-map** parameter can specify backup paths for successfully matched routes via a route map. It is recommended to use the BFD function with OSPF FRR. In this manner, the device can detect link faults more rapidly to reduce forwarding interruption time. For interface up/down scenarios, to reduce forwarding interruption time of OSPF FRR, you can configure **carrier-delay 0** for fastest switchover.

Note: OSPF FRR has the following restrictions:

- Each route can only generate one backup next hop.
- The backup next hop cannot be generated for ECMP.

Configuration The following example enables FRR for OSPF instance 1 and associates route map fast reroute.

```

Examples
FS(config)# route-map fast-reroute
FS(config-route-map)# match ip address 1
FS(config-route-map)# set fast-reroute backup-nexthop GigabitEthernet 0/1 192.168.1.2
FS(config)# router ospf 1
FS(config-router)# fast-reroute route-map fast-reroute
    
```

Related Commands

Command	Description
graceful-restart helper	Enables the OSPF graceful-restart helper.

Platform N/A
Description

2.24 graceful-restart

Use this command to enable the graceful restart (GR) of OSPF on the device. Use the **graceful-restart** **grace-period** command to configure the grace period parameter and enable the OSPF GR function. Use the **no** form of this command to disable this function.

graceful-restart [**graceful-period** grace-period]

no graceful-restart [**graceful-period**]

Parameter	Description
grace-period	(optional)Explicitly configures grace-period.
grace-period	User-set GR interval in the range from1 to 1800 seconds. It is the longest time

	between the OSPF invalidation and the OSPF graceful restart. The default value is 120 seconds.
--	--

Defaults This function is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide GR is configured based on the OSPF instance. Different instances could be configured with different parameters according to the actual situation.

The graceful restart interval is the longest time between the OSPF restart and the graceful restart. In this period, you can perform link status reconstruction to restore the OSPF status to the original. With the interval times out, the OSPF will exit GR and perform common OSPF operations.

The GR interval is 120 seconds set with the graceful-restart command, and the graceful-restart grace-period command allows you to change the interval explicitly.

GR is unavailable when the Fast Hello function is enabled.

Configuration The following example enables GR for the OSPF instance 1 and sets the restart interval for GR.

```

Examples
FS(config)# router ospf 1
FS(config-router)# graceful-restart
FS(config-router)# graceful-restart grace-period 60
    
```

Related Commands	Command	Description
	graceful-restart helper	Enables the OSPF graceful-restart helper.

Platform N/A

Description

2.25 graceful-restart helper

Use this command to enable the graceful restart helper function. Use the **no** form of this command to restore the default setting.

graceful-restart helper disable

no graceful-restart helper disable

graceful-restart helper { strict-lsa-checking | internal-lsa-checking }

no graceful-restart helper { strict-lsa-checking | internal-lsa-checking }

Parameter Description	Parameter	Description
	Disable	Disables the device to assist other devices in performing GR.
strict-lsa-checking	Checks the change of the LSA of types 1-5 and 7 to determine whether the network changes. If yes, the GR helper will be disabled.	
internal-lsa-checking	Checks the change of the LSA of types 1-3 to judge the network whether	

	changes. If so, the GR helper will be disabled.
--	---

Defaults The GR helper is enabled by default.
The router enabled with the GR helper does not check the LSA change by default.

Command

Mode Routing process configuration mode

Usage Guide Use this command to enable the GR helper. When one neighbor device performs graceful restart, the Grace-LSA is advertised to all neighbors. If the device enabled with the GR helper receives the Grace-LSA, it will become the GR Helper to help the neighbors perform GR. The **disable** option means that it is not allowed to perform the GR helper function for any device in GR.

The GR helper does not check the network change by default. The convergence is not performed again until the GR is implemented even if the network changes. Use the **strict-lsa-checking or internal-lsa-checking** command to enable quick check for the changed network during the GR. The former checks any LSA (types 1-5,7) that stands for the network information, the latter checks the LSA that stands for the AS inner-area route. In the large scale network, it is not recommended to enable the LSA check option because the local network changes trigger the ending of the GR, decreasing the convergence speed of the entire network.

Configuration The following example disables the GF helper and modifies the policy of checking network changes.

Examples

```
FS(config)# router ospf1
FS(config-router)# graceful-restart helper disable
FS(config-router)# no graceful-restart helper disable
FS(config-router)# graceful-restart helper
strict-lsa-checking
```

Related Commands

Command	Description
graceful-restart	Enables GR on the device.

Platform N/A
Description

2.26 ip ospf area

Use this command to add the interface to OSPF routing process. Use the **no** form of this command to restore the default setting.

ip ospf process-id **area** area-id
no ip ospf process-id **area** area-id

Parameter Description

Parameter	Description
process-id	OSPF process ID. Range: 1-65535.
area area-id	OSPF area of the interface.

	It can be an integer or an IPv4 prefix.
--	---

Defaults OSPF routing process is disabled by default.

Command

Mode Interface configuration mode

Usage Guide Run this command to add all IPs of the interface to OSPF instance.
 The network command of instance can also add the interface to OSPF instance. When two commands are run at the same time, the configuration on the interface takes effect first.

Configuration The following example enables OSPF process on the interface fastethernet 0/0 to join the specified area.

Examples

```
FS(config)# int fastethernet 0/0
FS(config-if-FastEthernet 0/1)# ip ospf 1 area 2
```

Related Commands	Command	Description
	show ip ospf interface	Displays the OSPF process on the corresponding interface.

Platform N/A

Description

2.27 ip ospf authentication

Use this command to configure the authentication type. Use the **no** form of this command to restore the default setting.

ip ospf authentication [message-digest | null]

no ip ospf authentication

Parameter Description	Parameter	Description
	message-digest	Enables MD5 authentication on the interface.
	Null	Enables no authentication.

Defaults No authentication mode is configured and that of the local area is used on the interface by default.

Command

Mode Interface configuration mode

Usage Guide Plaintext authentication is applicable when **no** option is used with the command. Note that the no form of this command restores the default value. Whether authentication is used actually depends on authentication mode configured for the local area of the interface. If authentication mode is configured as **null**, no authentication is enabled. When both the interface and its area are configured with authentication, the one for the interface takes

precedence.

Configuration The following example configures MD5 authentication for OSPF on fastEthernet 0/1.

Examples

```
FS (config)#interface fastEthernet0/1
FS(config-if-FastEthernet 0/1)# ipaddress172.16.1.1
255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf authentication
message-digest
```

Related Commands	Command	Description
	area authentication	Enables authentication and defines authentication mode in the OSPF area.
	ip ospf authentication-key	Configures the plain text authentication key.
	ip ospf message-digest-key	Configures the MD5 authentication key.

Platform N/A

Description

2.28 ip ospf authentication-key

Use this command to configure the OSPF plain text authentication key in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf authentication-key [0 | 7] key

no ip ospf authentication-key

Parameter Description	Parameter	Description
	0	Displays the key in plain text.
	7	Displays the key in cipher text.
	Key	Key containing at most eight characters.

Defaults N/A

Command

Mode Interface configuration mode

Usage Guide The **ip ospf authentication-key** command configures the key that will be inserted in all OSPF packet headers. As a result, if the keys are inconsistent, the OSPF neighbor relationship cannot be established between two devices directly connected, and thus route information exchange is impossible.

The keys may vary by interface, but the devices that are connected to the same physical network segment must use the same key.

To enable the OSPF area authentication, execute the area authentication command in routing process configuration mode.

The authentication can be enabled separately on an interface by executing the `ip ospf authentication` command in interface configuration mode. When both the interface and the area are configured with authentication, the one for the interface takes precedence.

Configuration The following example configures the OSPF authentication key `ospfauth` for fast Ethernet 0/1.

```

Examples
FS (config)#interfacefastEthernet0/1
FS(config-if-FastEthernet 0/1)# ipaddress172.16.1.1
255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf authentication-key ospfauth
    
```

Related Commands

Command	Description
area authentication	Enables OSPF area authentication and defines authentication mode
ip ospf authentication	Enables authentication on the interface and defines authentication mode

Platform N/A

Description

2.29 ip ospf bfd

Use this command to enable or disable the BFD on the specified OSPF interface. Use the **no** form of this command to restore the default setting.

```

ip rip bfd [ disable ]
no ip ospf bfd [ disable ]
    
```

Parameter Description

Parameter	Description
Disable	Disables BFD on the specified OSPF interface.

Defaults BFD is not configured by default, and the BFD configuration in OSPF process configuration mode shall prevail.

Command

Mode Interface configuration mode

Usage Guide

The **ip ospf bfd** in interface configuration mode command takes precedence over the **bfd all-interfaces** command in routing process configuration mode.

You can use this command to enable the BFD on the specified interface according to the actual environment. You can also use the `bfd all-interfaces` command in OSPF process configuration mode to enable BFD on all OSPF interfaces and the **ip rip bfd disable** command to disable BFD on the specified interface.

Configuration

Examples N/A

Related Commands	Command	Description
	router ospf	Creates the OSPF routing process and enters routing process configuration mode.
	bfd all-interfaces	Enables the BFD on all OSPF interfaces.

Platform N/A
Description

2.30 ip ospf cost

Use this command to configure the cost (OSPF metric) of the OSPF interface for sending a packet in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf cost cost
no ip ospf cost

Parameter Description	Parameter	Description
	Cost	OSPF interface cost in the range from 0 to 65535

Defaults The default interface cost is calculated as follows:
 Reference bandwidth/Bandwidth
 The reference bandwidth is 100 Mbps by default.

Command Mode Interface configuration mode

Usage Guide By default, the OSPF interface cost is 100Mbps/Bandwidth, where Bandwidth is the interface bandwidth configured with the bandwidth command in interface configuration mode.
 The default costs of different types of lines are as follows:

- 64K serial line: 1562
- E1 line: 48
- 10M Ethernet: 10
- 100M Ethernet: 1

The OSPF cost configured with the **ip ospf cost** command will overwrite the default configuration.

Configuration Examples The following example configures the OSPF cost of fastEthernet 0/1 to 100.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip ospf cost 100
```

Related Commands	Command	Description
------------------	---------	-------------

Bandwidth	Specifies the interface bandwidth. This setting does not affect the data transmission rate.
show ip ospf	Displays the OSPF global configuration information

Platform N/A

Description

2.31 ip ospf database-filter all out

Use this command to stop advertising LSAs of an interface, that is, the LSA update packets are not sent on the interface. Use the **no** form of the command to restore the default setting.

ip ospf database-filter all out

no ip ospf database-filter

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled and all LSA update packets can be sent on the interface by default.

Command

Mode Interface configuration mode

Usage Guide

To stop sending LSA update packets on the interface, enable this function on the interface. Then, the device maintains the neighboring connections and accepts LSAs from neighbors, but stops sending LSAs to neighbors.

Configuration The following example stops sending LSA update packets of fastEthernet 0/1.

```

Examples
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf database-filter all out
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.32 ip ospf dead-interval

Use this command to configure the interval for determining the death of an interface neighbor in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf dead-interval { seconds | **minimal hello-multiplier** multiplier }

no ip ospf dead-interval

Parameter Description	Parameter	Description
	Seconds	Defines the interval for determining the neighbor death in seconds. The range is from 0 to 2,147,483,647.
	minimal	Indicates that the Fast Hello function is enabled to set the dead interval to 1s.
	hello-multiplier multiplier	Indicates the number of Hello packets sent per second in the Fast Hello function. The value ranges from 3 to 20.

Defaults The value of dead-interval is 4 times the interval configured with the **ip ospf hello-interval** command by default. Fast Hello is disabled by default.

Command

Mode Interface configuration mode

Usage Guide

The OSPF dead interval is contained in the Hello packet. If OSPF does not receive a Hello packet from a neighbor within the dead interval, it declares that the neighbor is invalid and deletes this neighbor record from the neighbor list. By default, the dead interval is four times the Hello interval. If the Hello interval is modified, the dead interval is modified automatically.

When using this command to manually modify the dead interval, pay attention to the following issues:

1. The dead interval cannot be shorter than the Hello interval.
2. The dead interval must be the same on all routers in the same network segment.

OSPF supports the Fast Hello function.

After the OSPF Fast Hello function is enabled, OSPF finds neighbors and detects neighbor failures faster. You can enable the OSPF Fast Hello function by specifying the **minimal** and **hello-multiplier** keywords and the **multiplier** parameter. The **minimal** keyword indicates that the death interval is set to 1s, and **hello-multiplier** indicates the number of Hello packets sent per second. In this way, the interval at which the Hello packet is sent decreases to less than 1s.

If the Fast Hello function is configured for a virtual link, the Hello interval field of the Hello packet advertised on the virtual link is set to 0, and the Hello interval field of the Hello packet received on this virtual link is ignored.

Configuration

Examples

The following example configures the interval for determining the death of the OSPF neighbor on fastEthernet 0/1 to 30 seconds.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf dead-interval 30
```

The following example configures the value of hello-multiplier to 3.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf dead-interval minimal hello-multiplier 3
```

Related

Command	Description
---------	-------------

Commands	
ip ospf hello-interval	Specifies the interval at which the OSPF sends Hello packets
show ip ospf interface	Displays OSPF interface information.

Platform N/A

Description

2.33 ip ospf disable all

Use this command to prevent the specified interface from generating OSPF packets. Use the **no** form of this command to restore the default setting.

ip ospf disable all
no ip ospf disable all

Parameter	Parameter	Description
Description	N/A	N/A

Defaults OSPF packets are generated on the specified interface by default.

Command

Mode Interface configuration mode

Usage Guide The interface configured with this command will ignore whether the network areas are matched. After this command is configured, an interface will not generate OSPF packets even if the interface belongs to the network; therefore, the interface does not receive or send any OSPF packets or participate in OSPF calculation.

Configuration The following example prevents the specified interface from generating OSPF packets.

```

Examples
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf disable all
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.34 ip ospf fast-reroute protection

Use this command to specify the loop-free alternate (LFA) protection mode for an interface. Use the **no** form of this command to restore the default setting.

ip ospf fast-reroute protection { node | link-node | disable }

no ip ospf fast-reroute protection

Parameter Description	Parameter	Description
	Node	Enables LFA node protection.
	link-node	Enables LFA link node protection.
	Disable	Disables LFA protection.

Defaults LFA node protection is enabled by default.

Command

Mode Interface configuration mode

Usage Guide Enabling the **fast-reroute lfa** command in OSPF process configuration mode will enable OSPF fast reroute and generate a backup route for the master route according to the specified LFA protection mode in interface configuration mode. By default, link protection is enabled on each OSPF interface. In this protection mode, the failure of a master link does not affect forwarding on the backup route.

Use the **node** parameter to enable node protection for an interface, that is, the neighbor node of a master link does not affect forwarding on the backup route.

Similarly, use the **link-node** parameter to protect the link and neighbor link of a master route at the same time. Use the **disable** parameter to disable the LFA protection function for an interface, that is, a backup entry is not generated for the routes with this interface as the next hop.

Configuration The following example sets OSPF LFA fast reroute to link and node protection:

```

Examples
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf fast-reroute protection link-node
    
```

Related Commands	Command	Description
	fast-reroute	Enables OSPF fast reroute.

Platform N/A
Description

2.35 ip ospf fast-reroute no-eligible-backup

Use this command in interface configuration mode to exclude an OSPF interface as a backup interface in OSPF fast reroute calculation. Use the **no** form of this command to restore the default setting.

ip ospf fast-reroute no-eligible-backup
no ip ospf fast-reroute no-eligible-backup

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults An OSPF interface can serve as a backup interface by default.

Command

Mode Interface configuration mode

Usage Guide If an interface has small superfluous bandwidth or may fail with the master interface at the same time, this interface is not suitable to act as a backup interface. In this case, this command is used.

Configuration The following example excludes FastEthernet 0/1 as a backup interface in OSPF fast reroute calculation.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf fast-reroute no-eligible-backup
```

Related Commands

Command	Description
fast-reroute	Enables OSPF fast reroute.

Platform Description N/A

2.36 ip ospf hello-interval

Use this command to set the interval for sending Hello packets in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf hello-interval seconds
no ip ospf hello-interval

Parameter Description

Parameter	Description
Seconds	Interval for sending Hello packets in seconds. The range is from 1 to 65535.

Defaults The defaults are as follows:
 10seconds for Ethernet
 10seconds for PPP or HDLC encapsulated interfaces
 10seconds for frame relay PTP interfaces
 30seconds for non-frame relay PTP sub-interface and X.25 interfaces

Command

Mode Interface configuration mode

Usage Guide The interval of sending the Hello packets is included in the Hello packet. A shorter interval means that OSPF detects the topological change faster, which will increase network traffic. The Hello packet sending intervals for

all the devices in the same network segment must be the same. To manually modify the interval to determine neighbor death, ensure that the Hello packet sending interval cannot be greater than dead-interval of the neighbor.

Configuration The following example configures the interval of sending the Hello packets on fastEthernet 0/1 to 15.

```

Examples
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf hello-interval 15
    
```

Related Commands	Command	Description
		ip ospf dead-interval

Platform N/A

Description

2.37 ip ospf message-digest-key

Use this command to configure the MD5 authentication key in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf message-digest-key key-id **md5** [**0** | **7**] key

no ip ospf message-digest-key key-id

Parameter Description	Parameter	Description
		Key
	0	Displays the key in plain text.
	7	Displays the key in cipher text.
	key-id	Key identifier in the range from 1 to 255

Defaults No MD5 key is configured by default.

Command

Mode Interface configuration mode

Usage Guide

The **ip ospf message-digest-key** command configures the key that will be inserted in all OSPF packet headers. As a result, if the keys are inconsistent, the OSPF neighboring relationship cannot be established between two devices directly connected, and thus route information exchange is impossible.

The keys can be different for different interfaces, but the devices that are connected to the same physical network segment must be configured with the same key. For neighbors, the same key identifier must correspond to the same key.

To enable OSPF area authentication, execute the **area authentication** command in routing process configuration mode. The authentication can be enabled separately on an interface by executing the **ip ospf**

authentication command in interface configuration mode. When both the interface and the area are configured with authentication, the one for the interface takes precedence.

The FSOS software supports smooth modification of MD5 authentication keys, which shall be added before deleted. When an MD5 authentication key of the device is added, the device will regard other devices have not had new keys and thus send multiple OSPF packets by using different keys, till it confirms that the neighbors have been configured with new keys. When all devices have been configured with new keys, it is possible to delete the old key.

Configuration The following example adds a new OSPF authentication key "hello5" with key ID 5 for fastEthernet 0/1.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip address 172.16.24.2 255.255.255.0
FS(config-if-FastEthernet 0/1)# ip ospf authentication message-digest
FS(config-if-FastEthernet 0/1)# ip ospf message-digest-key 10 md5 hello10
FS(config-if-FastEthernet 0/1)# ip ospf message-digest-key 5md5 hello5
```

When all neighbors are added with new keys, the old keys shall be deleted for all devices.

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# no ip ospf message-digest-key10md5 hello10
```

Related Commands

Command	Description
area authentication	Enables OSPF area authentication and defines authentication mode.
ip ospf authentication	Enables authentication on the interface and defines authentication mode.

Platform N/A

Description

2.38 ip ospf mtu-ignore

Use this command to disable the MTU check when an interface receives the database description packet. Use the **no** form of this command to restore the default setting.

ip ospf mtu-ignore
no ip ospf mtu-ignore

Parameter Description

Parameter	Description
N/A	N/A

Defaults MTU check is disabled by default.

Command

Mode Interface configuration mode

Usage Guide After receiving the database description packet, the device will check whether the MTU of the neighbor interface is the same as its own MTU. If the received database description packet indicates an MTU greater than the interface's MTU, the neighboring relationship cannot be established. This can be fixed by disabling the MTU check.

Configuration The following example disables the MTU check function on fastEthernet 0/1.

```
Examples
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip ospf mtu-ignore
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.39 ip ospf network

Use this command to configure the OSPF network type in interface configuration mode. Use the **no** form of this command to restore the default setting.

```
ip ospf network { broadcast | non-broadcast | point-to-multipoint [non-broadcast] | point-to-point}
no ip ospf network
```

Parameter Description	Parameter	Description
	Broadcast	
non-broadcast		Sets the OSPF network type as the non-broadcast multi-path access type, i.e. NBMA network.
point-to-multipoint [non-broadcast]		Sets the OSPF network type as the point-to-multipoint type. The value is the point-to-multipoint broadcast type by default. The non-broadcast option means the point-to-multipoint non-broadcast type.
point-to-point		Sets the OSPF network type as the point-to-point type.

Defaults The default configurations are as follows:
 PTP network type: Point-to-Point Protocol(PPP), Serial Line Internet Protocol(SLIP), frame relay point-to-point (PTP) sub-interface, X.25 PTP sub-interface encapsulation
 NBMA network type: frame relay (except for PTP sub-interface), X.25 encapsulation (except for PTP sub-interface)
 Broadcast network type: Ethernet encapsulation
 By default, the network type is the point-to-multipoint network type.

Command Mode Interface configuration mode

Usage Guide Networks are divided into three types according to the transmission feature of media:

- Broadcast network (Ethernet, token ring and Fiber Distributed-Data Interface (FDDI))
- Non-broadcast network (frame relay and X.25)
- PTP network (High-Level Data Link Control (HDLC), PPP and SLIP)
- The non-broadcast network is further divided into two sub-types by the OSPF operation mode:
- Non-broadcast multi-path access (NBMA) type. NBMA requires all interconnected devices can directly communicate to each other, and only full mesh type connection can meet this requirement. There is no problem in using the Switching Virtual Circuit (SVC)(such as X.25) connections, but it is difficult in case of networking with Permanent Virtual Circuit (PVC) (such as frame relay). The OSPF on the NBMA network operates similarly to that on the broadcast network, where the Designated Device shall be elected to advertise the link state of the NBMA network.
- Point-to-multipoint network type. If the network topology is not a full mesh type non-broadcast network, the OSPF requires the network type to be configured as the point-to-multipoint network type. In the point-to-multipoint network type, OSPF regards all inter-device connections as PTP links and does not participate in the election of the designated device. The point-to-multipoint network type is further divided into the broadcast type and the non-broadcast type. For the non-broadcast type, it is required to manually configure the static neighbor.
- Whatever the default network type of the interface, you must set it to the broadcast network type. For example, the non-broadcast multi-path access network (frame relay and X.25) can be configured as broadcast network, so that the configuration of neighbors can be omitted during the OSPF routing process configuration. The X.25 map and frame-relay map commands may enable the X.25 and frame relay networks with broadcasting capability, so that the OSPF can regard such networks as X.25 and frame relay as broadcast network.
- The interface of the point-to-multipoint network can be configured with one or more neighbors. When the OSPF is configured as the point-to-multipoint network type, multiple host routes may be generated. In contrast to the broadcast network type, the point-to-multipoint network type features the following benefits:
 - Easy configuration without need to configure neighbors or election of the designated device
 - Small cost, without needing the fully meshed topology

For the dial-up network, frame relay and X.25 network, to manually configure the IP address mapping table, the keyword "broadcast" must be specified to support broadcast.

Configuration

The following example configures the frame relay interface network as the broadcast type, which is applicable to the full mesh type frame relay connections.

Examples

```
FS(config)# interface Serial 1/0
FS(config-if-Serial 1/0)# ip address 172.16.24.4
255.255.255.0
FS(config-if-Serial 1/0)# encapsulation frame-relay
FS(config-if-Serial 1/0)# ip ospf network broadcast
```

The following example configures the frame relay interface network as the point-to-multipoint type, which is applicable to the non-full-mesh type frame relay connections.

```
FS(config)# interface Serial 1/0
```

```
FS(config-if-Serial 1/0)# ipaddress172.16.24.4
255.255.255.0
FS(config-if-Serial 1/0)# encapsulationframe-relay
FS(config-if-Serial 1/0)# ip ospf network point-to-multipoint
```

The following example configures the frame relay interface network as the broadcast type, with the designated device/backup designated device (DR/BDR) specified, which is applicable to the full or partial mesh type frame relay connections. The following configuration needs to be done on all branch node devices and non-designated devices (limited to become the DR/BDR).

```
FS(config)# interfaceSerial1/0
FS(config-if-Serial 1/0)# ipaddress172.16.24.4
255.255.255.0
FS(config-if-Serial 1/0)# encapsulation frame-relay
FS(config-if-Serial 1/0)# ip ospf network broadcast
FS(config-if-Serial 1/0)# ip ospf priority0
```

Related Commands

Command	Description
dialer map ip	Defines the mapping between IP address and dialing number.
frame-relay map	Defines the mapping between IP address and frame DLCI.
neighbor(OSPF)	Defines the IP address of neighbor applicable to NBMA network type and point-to-multipoint non-broadcast type only.
X25 map	Defines the mapping between IP address and X.25 network address.

Platform N/A

Description

2.40 ip ospf priority

Use this command to configure the OSPF priority in interface configuration mode. Use the **no** form of this command to restore the default setting.

```
ip ospf priority priority
no ip ospf priority
```

Parameter Description

Parameter	Description
priority	Sets the OSPF priority of the interface in the range from 0 to 255.

Defaults The default is 1.

Command Interface configuration mode

Mode

Usage Guide The interface priority is included in the Hello packet. When DR/BDR election occurs in the OSPF broadcast type network, the device with higher priority will become the DR or BDR. If the devices have the same priority, the one with higher ID will become the DR or BDR. The device with priority 0 cannot become DR or BDR. This command is valid only for OSPF broadcast and non-broadcast network types.

Configuration The following example configures the priority of fastEthernet 0/1 as 0.

Examples

```
Switch(config)#interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ipospfpriority0
```

Related Commands	Command	Description
		ip ospf network

Platform N/A

Description

2.41 ip ospf retransmit-interval

Use this command to define the interval for sending the link state update (LSU) packet on the interface in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf retransmit-interval seconds

ip ospf retransmit-interval

Parameter Description	Parameter	Description
	Seconds	Interval for sending the LSU packets in seconds. The range is from 1 to 65535. This interval must be greater than the round trip delay of packets between two neighbors.

Defaults The default is 5.

Command

Mode Interface configuration mode

Usage Guide After the device sends an LSU packet, the LSU packet stays in the transmission buffer queue. If no confirmation from the neighbor is obtained in the interval defined with the **ip ospf retransmit-interval** command, the LSU will be sent once again.

In serial lines or virtual links, the retransmission interval shall be slightly larger. The LSU packet retransmission interval of virtual links is defined with the area virtual-link command followed with the keyword retransmit-interval.

Configuration The following example configures the LSU packet retransmission interval on fastEthernet 0/1 as 10 seconds.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip ospf retransmit-interval 10
```

Related Commands

Command	Description
area virtual-link	Defines an OSPF virtual link.

Platform N/A
Description

2.42 ip ospf source-check-ignore

Use this command to disable the source address check in the point-to-point link. Use the **no** form of this command to restore the default setting

ip ospf source-check-ignore
no ip ospf source-check-ignore

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command

Mode Interface configuration mode

Usage Guide For OSPF, the source address of the received packet is required to be in the same network segment with the receiving interface. However, in a point-to-point link, the addresses of two ends of the link are individually set, and they are not required to be in the same network segment. The peer address is informed during the process of point-to-point link negotiation; therefore, OSPF will check whether the source address of the packet is the informed one. If no, the OSPF regards this packet as illegal and drops it. In some applications, the addresses informed during the negotiation are shielded. You need to disable the source address check to ensure the normal establishment of OSPF neighbors. The source address check shall be never enabled, especially for the unnumbered interfaces.

Configuration The following example disables the source address check function in the point-to-point link.

Examples

```
FS(config)# interface serial 1/0
FS(config-if)# ip ospf source-check-ignore
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.43 ip ospf transmit-delay

Use this command to define the LSU packet transmission delay in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf transmit delay seconds

no ip ospf transmit delay

Parameter	Parameter	Description
Description	Seconds	LSU packet transmission delay in seconds in the range from 1 to 65535.

Defaults The default is 1.

Command

Mode Interface configuration mode

Usage Guide

Before the LSU packet is transmitted, the Age field in all the LSAs of the packet will be increased by the value defined with the **ip ospf transmit-delay** command in interface configuration mode. The configuration of this parameter shall consider the transmission and line transmission delay of the interface. For low-rate lines, the transmission delay of the interface shall be slightly larger. The LSU packet transmission delay of the virtual link is defined with the **area virtual-link** command followed with the keyword retransmit-interval. The FSOS software will resend or request resending the LSA with Age up to 3600. If no update is obtained in time, the aged LSA will be cleared from the link state database.

Configuration

The following example configures the transmission delay of fastEthernet 0/1 as 10.

Examples

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ip ospf transmit-delay 10
```

Related Commands

Command	Description
area virtual-link	Defines an OSPF virtual link.

Platform N/A

Description

2.44 ispf enable

Use this command to enable the ISPF function. Use the **no** form of this command to disable the ISPF function.

ispf enable

no ispf enable

Parameter	Parameter	Description
Description		

N/A	N/A
-----	-----

Defaults ISPF is disabled by default.

Command

Mode Routing process configuration mode

Usage Guide OSPF adopts the SPF algorithm to calculate the network topology within an area. SPF algorithm is run for each area independently, Incremental SPF algorithm (ISPF) is an area-based algorithm, If the topology changes, the ISPF algorithm will calculate only the affected notes of the topology rather than calculating the entire tree, which speeds up the OSPF route convergence and saves CPU resources. Because the ISPF algorithm is not shared among routers, each router within the same network can have a unique ISPF algorithm. To ensure a faster OSPF convergence, the ISPF function should be enabled on every router within the network. Enabling ISPF function only affects the choice of topology calculating algorithm for OSPF. So you can configure the delay time for the ISPF with the **timers spf** command and the **timers throttle spf** command as well.

Configuration The following example enables the ISPF function.

Examples

```
FS(config)# router ospf 1
FS(config-router)# ispf enable
```

The following example enables the ISPF function on the specified VRF.

```
FS(config)# router ospf 1 vrf vpn1
FS(config-router)# ispf enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.45 log-adj-changes

Use this command to enable the logging of the neighbor state changes. Use the **no** form of the command to disable this function.

```
log-adj-changes [ detail ]
no log-adj-changes [ detail ]
```

Parameter Description	Parameter	Description
	Detail	

Defaults This function is enabled by default. Without the detail parameter, the system records the logs that the neighbor

enters or exits the full state.

Command

Mode Routing process configuration mode

Usage Guide N/A

Configuration The following example logs the neighbor state changes.

```
FS(config)# router ospf 1
FS(config-router)# log-adj-changes detail
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF global configuration information.

Platform N/A

Description

2.46 max-concurrent-dd

Use this command to specify the maximum number of DD packets that can be processed (initiated or accepted) at the same time. Use the **no** form of this command to restore the default setting.

max-concurrent-dd number

no max-concurrent-dd

Parameter Description

Parameter	Description
Number	Maximum number of DD packets in the range from 1 to 65535

Defaults The default is 5.

Command

Mode Routing process configuration mode

Usage Guide When a router is exchanging data with multiple neighbors, its performance will be affected. This command is configured to limit the maximum number of DD packets that each OSPF instance can have at the same time.

Configuration The following example sets the maximum number of DD packets to 4.

Examples After the configuration, the device can initiate to interact with four neighbors and can concurrently accept the interaction. That is, the device can interact with a maximum of eight neighbors.

```
FS(config)# routerospf10
FS(config-router)# max-concurrent-dd4
```

Related

Command	Description
---------	-------------

Commands	
router ospf max-concurrent-dd	Sets the maximum number of neighbors allowed in concurrent interaction for all OSPF routing processes.

Platform N/A

Description

2.47 max-metric

Use this command to set the maximum metric of the router-lsa, so that this routing device will not firstly be used as the transmission node by other devices in SPF computing. Use the **no** form of this command to restore the default setting.

max-metric router-lsa [**external-lsa** [max-metric-value]] [**include-stub**] [**on-startup** [seconds]]

[**summary-lsa** [max-metric-value]] [**on-neighborup** [seconds]]

no max-metric router-lsa [**external-lsa** [max-metric-value]] [**include-stub**] [**on-startup** [seconds]]

[**summary-lsa** [max-metric-value]] [**on-neighborup** [seconds]]

Parameter Description	Parameter	Description
	router-lsa	Configures the maximum metric (0XFFFF) of non-stub links in the Router LSA.
	external-lsa	Uses the maximum metric instead of the external-lsa metric (including the Type-5 and Type-7).
	max-metric-value	Maximum metric of the LAS. The range is 1 to 16777215.The default value is 16711680,
	include-stub	Configures the maximum metric of the stub links in the Router LSA.
	on-startup	Advertises the maximum metric when the routing device starts up.
	on-neighborup	Advertise the maximum metric when the first neighbor turns to Full state.
	Seconds	Interval of advertising the maximum metric. The range is 5 to 86400. The default value is 600 seconds.
	summary-lsa	Uses the maximum metric to replace the summary LSA metric. (including Type-3 and Type-4)

Defaults The normal metric LSAs are used by default.

Command

Mode Routing process configuration mode

Usage Guide

With the **max-metric router-lsa** command enabled, the maximum metric of non-stub links in the Router LSA generated by the routing device is set. The link's normal metric is restored after canceling this configuration or reaching the timer.

By default, with this command enabled, the normal metric of the stub links is still advertised, which is the output interface cost. If the **include-stub** parameter is configured, the maximum metric of the stub links will be advertised.

When the device acts as an ABR, if no interval flow transmission is expected, use the **summary-lsa** parameter to

set the summary LSA as the maximum metric.

When the device acts as an ASBR device, if no external flow transmission is expected, use the **external lsa** parameter to set the external LSA as the maximum metric.

The **max-metric router-lsa** command is usually used in the following scenes:

The device is restarted, which generally makes the IGP protocol converge faster, so that other devices attempt forwarding the dataflow through the new started-up device. If the current device remains establishing a BGP routing table, the packets sent to these networks will be discarded due to some BGP routings have not been learned. In this case, use the **on-startup** parameter to set certain delay, so that this device can serve as a transmission node after restarting.

The device is added into the network without being used for dataflow transmission. If the backup path exists, the current device is not used for the dataflow transmission. Otherwise, this device is still used to transmit the dataflow.

Remove the device from the network gracefully. With this command enabled, the current device advertises the maximum metric to all devices, as that the other devices in this network can choose the backup path to for the dataflow transmission before the current device is removed.

- i** For the OSPF implementation in the earlier versions (RFC 1247 or earlier versions), the links with the maximum metric (0xFFFF) in the LSA will not participate in the SPF calculation, that is, no dataflow will be sent to the router that have generated these LSAs.

Use the Overlay scene of OSPF in Underlay, the overlay tunnel may rely on underlay route. When the OSPF neighbor turns to the full state, underlay route is reachable but the overlay tunnel may not be established, which may cause traffic interruption. Therefore, the **on-neighborup** parameter of **max-metric** should be enabled.

Configuration The following example configures the LSA maximum metric as 100 seconds after starting the device.

Examples

```
FS(config)# router ospf 20
FS(config-router)# max-metric router-lsa on-startup 100
```

The following example configures the maximum advertisement metric as 100 seconds after the first neighbor turns to full state.

```
FS(config)# router ospf 20
FS(config-router)# max-metric router-lsa on-neighborup 100
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF related configurations.

Platform N/A

Description

2.48 neighbor

Use this command to define the OSPF neighbor in routing process configuration mode. Use the **no** form of this command to restore the default setting.

```
neighbor ip-address [ poll-interval seconds ] [ priority priority ] [ cost cost ]
no neighbor ip-address [ [ poll-interval ] [ priority ] ] [ cost ]
```

Parameter

Parameter	Description
-----------	-------------

Description	
ip address	IP address of the neighbor
poll-interval seconds	(Optional) Specifies the interval of polling neighbors in seconds. The range is from 0 to 2147483647. Only the non-broadcast (NBMA) network type supports this option.
priority priority	(Optional) Configures the priority of non-broadcast network neighbors. The range is from 0 to 255. Only the non-broadcast (NBMA) network type supports this option.
cost cost	(Optional) Configures the cost to each neighbor in point-to-multipoint network, not defined by default, where the cost configured on the interface will be used. The range is from 0 to 65535. Only the point-to-multipoint [non-broadcast] network type supports this option.

Defaults No neighbor is defined by default.
The default neighbor polling interval is 120 seconds.
The default NBMA neighbor priority is 0.

Command

Mode Routing process configuration mode

Usage Guide The FSOS software must explicitly configure the neighbor information for every non-broadcast network neighbor. The IP address of a neighbor must be the master IP address of that neighbor interface.
In the NBMA network, if the neighbor device becomes inactive, in other words, if the Hello packet is not received within the device dead-interval, the OSPF will send more Hello packets to the neighbor. The interval at which the Hello packets are sent is called the polling interval. When the OSPF starts to work for the first time, it sends Hello packets only to the neighbor whose priority is not 0, so that the neighbor whose priority is set as 0 will not participate in the DR/BDR election. When the DR/BDR is generated, the DR/BDR sends the Hello packets to all neighbors to establish the neighbor relationship.
Since the point-to-multipoint non-broadcast network has no broadcast capability, neighbors cannot be found dynamically. So, it is required to use this command to manually configure neighbor. In addition, it is possible to configure the cost to each neighbor through the cost option for the point-to-multipoint network type.

Configuration Examples The following example declares an OSPF non-broadcast network neighbor, with the IP address 172.16.24.2, priority 1 and polling interval 150 seconds.

```
FS(config)# routerospf 20
FS(config-router)# network 172.16.24.0 0.0.0.255 area 0
FS(config-router)# neighbor 172.16.24.2 priority 1 poll-interval 150
```

Related Commands

Command	Description
ip ospf priority	Sets the interface priority.
ip ospf network	Sets the network type

Platform N/A
Description

2.49 network area

Use this command to define which interfaces run OSPF and the OSPF areas they belong to in routing process configuration mode. Use the **no** form of this command to restore the default setting.

network ip-address wildcard **area** area-id
no network ip-address wildcard **area** area-id

Parameter Description	Parameter	Description
	ip-address	IP address of the interface
	Wildcard	Defines the comparison bits in the IP address, with 0 for exact match and 1 for no comparison
	area-id	OSPF area identifier. An OSPF area is always associated with an address range. For easy of management, a subnet can be used as the OSPF area identifier.

Defaults No OSPF area is configured by default.

Command

Mode Routing process configuration mode

Usage Guide

The ip-address and wildcard parameters allow associating multiple interfaces with one OSPF area. To run OSPF on an interface, it is required to include the primary IP address and secondary IP address of the interface in the IP address range defined by the network area command. If only the secondary IP address is included, OSPF cannot be enabled on the interface.

You can determine the OSPF process that the interface takes part in by the means of the best match if the IP address of the interface matches the IP address ranges defined by the network command in multiple OSPF processes.

The **ip ospf area** command of interface can also add the interface to OSPF instance. When two commands are run at the same time, the configuration on the interface takes effect first.

Configuration The following example defines:

Examples Three areas: 0, 1 and 172.16.16.0
 The interfaces whose IP addresses fall into the 192.168.12.0/24 range to area 1
 The interfaces whose IP addresses fall into the 172.16.16.0/20 range to area 2
 The remaining interface being assigned to area 0.

```
FS(config)# routerospf 20
FS(config-router)# network172.16.16.0
0.0.15.255 area172.16.16.0
FS(config-router)# network192.168.12.0
0.0.0.255 area 1
FS(config-router)# network0.0.0.0 255.255.255.255 area0
```


Related Commands	Command	Description
	router ospf	Creates the OSPF routing process.

Platform N/A
Description

2.50 nsr

Use this command to enable the nonstop routing (NSR) function for the OSPF instance. Use the **no** form of this command to disable the NSR function.

Nsr
no nsr

Parameter Description	Parameter	Description
	N/A	N/A

Defaults NSR is disabled by default.

Command Mode Routing process configuration mode

Usage Guide NSR enables the device to recover link state and regenerate routes without the assistance from neighbors during active/standby switchover of distributed devices. The backup information includes adjacencies and OSPF state. You need to enable either NSR or GR in the same OSPF process. That is, the NSR feature will be disabled after the GR feature is enabled. Similarly, the GR feature will be disabled after NSR is enabled, and the GR Helper capability is still supported.

The active/standby switchover of distributed devices takes a period of time. If the OSPF dead interval is less than the switchover period, OSPF neighbors will be disconnected and the services will be interrupted. It is recommended to configure the OSPF dead interval longer than its default value. It is not recommended to enable the Fast Hello feature after NSR is enabled, because OSPF dead interval is less than 1 second when the Fast Hello feature is enabled and the OSPF neighbors are disconnected and NSR becomes ineffective.

Configuration Examples The following example enables NSR.

```
FS(config)#router ospf 1
FS(config-router)# nsr
```

Related Commands	Command	Description
	router ospf	Creates the OSPF routing process.

Platform N/A

Description

2.51 overflow database

Use this command to configure the maximum number of LSAs supported by the current OSPF instance. Use the **no** form of this command to restore the default setting.

overflow database number [**hard** | **soft**]

no overflow database

Parameter Description	Parameter	Description
	Number	Maximum number of LSAs. The range is from 1 to 4294967294.
	hard soft	hard: shuts down the OSPF instance when the number of LSAs exceeds that number. soft: issues an alarm when the number of LSAs exceeds that number.

Defaults The maximum number of LSAs supported by the current OSPF instance is not restricted by default.

Command

Mode Routing process configuration mode

Usage Guide To shut down the OSPF instance when the number of LSAs exceeds that number, use the hard parameter; otherwise, use the soft parameter.

Configuration Examples The following example configures that OSPF instance 10 will be shut down when there are more than 10 LSAs.

```
FS# config terminal
FS(config)# router ospf 10
FS(config-router)# overflow database 10 hard
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.52 overflow database external

Use this command to configure the maximum number of external LSAs and the waiting time from the overflow state to the normal state. Use the **no** form of this command to restore the default setting.

overflow database external max-dbsize wait-time

no overflow database external

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
max-dbsize	Maximum number of external LSAs (the value shall be the same for all routing devices in the same AS). The range is from 0 to 2147483647.
wait-time	Waiting time of the routing device from the overflow status to normal status. The range is from 0 to 2147483647.

Defaults The maximum number of external-LSAs is not restricted by default. If the maximum number of external-LSAs is restricted, the normal status cannot be restored when the maximum number is exceeded.

Command

Mode Routing process configuration mode

Usage Guide When the number of external-LSAs exceeds the value of max-db size, the device enters the overflow state. Then no more external-LSA will be loaded and the external-LSAs generated locally will be cleared. After wait-time expires, the device restores to the normal state and external-LSAs are reloaded.

When using this function, ensure that all routers of the OSPF backbone area and common areas use the same max-db size value. Otherwise, the following situations occur:

The link status is inconsistent on the entire network and neighbors fail to achieve the Full state.

Incorrect routes occur, including loops.

AS-External-LSAs may be frequently retransmitted.

Configuration Examples The following example configures that the maximum number of external LSAs is 10, and it turns to the overflow status upon timeout, and the time interval attempting to restore from the overflow state to the normal state is 3 seconds.

```
FS# configterminal
FS(config)# routerospf10
FS(config-router)# overflow database external10 3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.53 overflow memory-lack

Use this command to allow OSPF to enter the OVERFLOW state when the memory lacks. Use the **no** form of this command to disable this function.

overflow memory-lack

no overflow memory-lack

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A		
Parameter	Description						
N/A	N/A						
Defaults	This function is enabled by default						
Command							
Mode	Routing process configuration mode						
Usage Guide	<p>The action of OSPF entering the OVERFLOW state is to discard the newly-learned external route and effectively prevent the memory from increasing.</p> <p>It is possible that enabling this function causes the route loop in the whole network. To reduce that possibility, OSPF will generate a default route directing to the NULL port and this default route will exist in the OVERFLOW state.</p> <p>Use the clear ip ospf process command to reset the OSPF and remove the OSPF OVERFLOW state.</p> <p>Use the no form of this command to prevent the OSPF to enter the OVERFLOW state when the memory is insufficient, which may result in the constantly consumption of the memory resources. If the memory is exhausted to some degree, the OSPF instance will stop and all learned routes will be removed.</p>						
Configuration Examples	<p>The following example prevents the OSPF from entering the OVERFLOW state when the memory is insufficient.</p> <pre>FS(config)# router ospf 1 FS(config-router)# no overflow memory-lack</pre>						
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>clear ip ospf process</td> <td>Resets the OSPF instances.</td> </tr> <tr> <td>show ip protocols ospf</td> <td>Displays the OSPF information.</td> </tr> </tbody> </table>	Command	Description	clear ip ospf process	Resets the OSPF instances.	show ip protocols ospf	Displays the OSPF information.
Command	Description						
clear ip ospf process	Resets the OSPF instances.						
show ip protocols ospf	Displays the OSPF information.						
Platform	N/A						
Description							

2.54 passive-interface

Use this command to configure the specified network interface or all interface as the passive interfaces. Use the **no** form of this command to restore the default setting.

passive-interface { **default** | interface-type interface-number | interface-type interface-number ip-address }

no passive-interface { **default** | interface-type interface-number | interface-type interface-number ip-address }

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>interface-type interface-number</td> <td>Interface to be set as a passive interface</td> </tr> <tr> <td>Default</td> <td>Sets all the interfaces as passive interfaces</td> </tr> <tr> <td>interface-type interface-number ip-address</td> <td>Sets the address of the specified interface as a passive address.</td> </tr> </tbody> </table>	Parameter	Description	interface-type interface-number	Interface to be set as a passive interface	Default	Sets all the interfaces as passive interfaces	interface-type interface-number ip-address	Sets the address of the specified interface as a passive address.
Parameter	Description								
interface-type interface-number	Interface to be set as a passive interface								
Default	Sets all the interfaces as passive interfaces								
interface-type interface-number ip-address	Sets the address of the specified interface as a passive address.								

Defaults No interface is configured as a passive interface by default. All interfaces are allowed to receive or send OSPF packets.

Command

Mode Routing process configuration mode

Usage Guide To prevent other devices in the network from dynamically learning the routing information of the device, set the specified network interface of this device as a passive interface or the IP address of the specified network interface as a passive address

Configuration Examples The following example configures fastEthernet 0/1 as a passive interface and the IP address of the interface 1.1.1.1 as the passive address.

```
FS(config)# routerospf 30
FS(config-router)# passive-interface fastEthernet 0/1
FS(config-router)# passive-interface fastEthernet 0/1 1.1.1.1
```

Related Commands

Command	Description
show ip ospf interface	Displays the configuration information of the interface.

Platform N/A

Description

2.55 redistribute

Use this command to redistribute the external routing information. Use the **no** form of this command to restore the default setting.

redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static** | **arp-host** } [{ **level-1** | **level-1-2** | **level-2** }] [**match** { **internal** | **external** [1|2] | **nssa-external** [1|2] }] [**metric** metric-value] [**metric-type** { 1|2 }] [**route-map** route-map-name] [**subnets**] [**tag** tag-value]

no redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static** | **arp-host** } [{ **level-1** | **level-1-2** | **level-2** }] [**match** { **internal** | **external** [1|2] | **nssa-external** [1|2] }] [**metric** metric-value] [**metric-type** { 1|2 }] [**route-map** route-map-name] [**subnets**] [**tag** tag-value]

Parameter Description

Parameter	Description
Bgp	Redistribution from bgp
Connected	Redistribution from direct routes
isis [area-tag]	Redistribution from an IS-IS instance specified in area-tag
ospf process-id	Redistribution from an ospf instance specified in process-id in the range from 1 to 65,535
Rip	Redistribution from rip

Static	Redistribution from static routes
arp-host	Redistribution from host routes.
level-1 level-1-2 level-2	Configures IS-IS route redistribution. The parameter specifies a level, and routes of this level will be redistributed. Only level-2 IS-IS routes can be redistributed by default.
Match	Filters specified routes for configuring OSPF route redistribution. By default, all the OSPF routes are redistributed.
metric metric-value	Specifies the metric of an OSPF external LSA in the range from 0 to 16777214.
metric-type {1 2}	Sets the external routing type as E-1 or E-2.
route-map route-map-name	Redistribution filter rule
Subnets	Redistributes the routes of non standard networks.
tag tag-value	Sets the tag value of the routes redistributed to the OSPF in the range from 0 to 4294967295.

Defaults

Redistribution configuration is not supported by default.

If you configure OSPF redistribution, all subtype routes of the instance are redistributed.

If you configure ISIS redistribution, all level-2 subtype routes of the instance are redistributed.

In other cases, all routings of this type are redistributed.

The default metric of the redistribution BGP route is 1. The default metric of LSAs generated by routes of other types is 20.

The default value of metric-type is E-2.

No route-map is associated by default.

Command

Mode

Route configuration mode

Usage Guide

After the command is configured, the router will become an ASBR, and the related routing information is imported into the OSPF domain and broadcasted to other OSPF routers through type-5 LSAs.

When you configure is route redistribution without the level parameter, level-2 routes can be redistributed by default. In initial redistribution configuration that carries the level parameter, routes of the specified level can be redistributed. When you save the configuration containing both level 1 and level 2, they are merged into level-1-2 for convenience. For details, see the configuration examples.

When you configure OSPF router distribution without the match parameter, the OSPF routes of all sub types are redistributed by default. Then the first configured match parameter is used as the original one. Only the routes matching the specific type can be redistributed. Use the no form of this command to restore the default configuration.

When you filter routes for redistribution by following the route-map rule, the match rule of the route-map rule is specific for the original redistribution parameters. The route-map rule works only when the redistributed OSPF routes follow the match rule.



The range of set metric is from 0 to 16777214 for the associated route-map. If the value exceeds the range, introducing a route fails.



The following are the rules for configuring the no form of the redistribute command:1. If the **no** form specifies some parameters, restore their default values.2. If the **no** form contains no parameter, delete the

whole command. If the following configuration exists: redistribute isis 112 level-2 You can use the no redistribute isis 112 level-2 command to modify the configuration. According to preceding rules, this command restores the level-2 parameter to the default value, namely level-2. Therefore, the configuration remains the same after the no form of the preceding command is executed. redistribute isis 112 level-2 To delete the whole command, use the following command: no redistribute isis 112

Configuration

The following example redistributes routes of **ospf2** and **isis** isis-001 to the OSPF area.

Examples

```
FS(config)# router ospf1
FS(config-router)# redistribute ospf 2 subnets
FS(config-router)# redistribute ospf2match
external 1 internal
FS(config-router)# redistribute isisis-001
FS(config-router)# redistribute isisis-001 level-1
```

The following example displays the output of the **show run** command.

```
router ospf 1
redistribute ospf 2 match external 1 internal subnets
redistribute isis isis-001 level-1-2
```

Related

Commands

Command	Description
summary-address	Configures the aggregate route for the external route of the OSPF route area.
default-metric	Sets the default metric of the OSPF redistribution route.

Platform

N/A

Description

2.56 router ospf

Use this command to create the OSPF routing process in global configuration mode. Use the **no** form of this command to restore the default setting.

router ospf

router ospf process-id [**vrf** vrf-name]

no router ospf process-id

Parameter

Description

Parameter	Description
process-id	ID of an OSPF process. If the process ID is not configured, process 1 is configured.
vrf-name	VRF of the configured OSPF process for products that support the VRF.

Defaults

No OSPF routing process exists by default.

Command

Mode Global configuration mode

Usage Guide Based on the original implementation, the FSOS10.1 adds the routing process ID to multi-instance OSPF. Different OSPF instances are mutually independent and can be approximately considered as two routing protocols that run independently.

Configuration The following example creates the OSPF routing process 10 within the specified vrf: vpn_1.

Examples

```
FS(config)# router ospf10 vrf: vpn_1
```

Related Commands

Command	Description
show ip protocols	Displays the routing protocol information.
show ip ospf	Displays the OSPF information.

Platform N/A

Description

2.57 router ospf max-concurrent-dd

Use this command to specify the maximum number of DD packets that can be processed (initiated or accepted) at the same time. Use the **no** form of this command to restore the default setting.

router ospf max-concurrent-dd number

no router ospf max-concurrent-dd

Parameter Description

Parameter	Description
Number	Maximum number of DD packets in the range from 1 to 65535.

Defaults The default is 10.

Command

Mode Global configuration mode

Usage Guide When a routing device is exchanging data with multiple neighbors, its performance will be affected. This command is configured to limit the maximum number of DD packets that each OSPF instance can have (initiated or accepted) at the same time.

Configuration The following example sets the maximum number of DD packets to 4.

Examples After the configuration, the device can initiate to interact with four neighbors and can concurrently accept the interaction. That is, the device can interact with a maximum of eight neighbors.

```
FS# configure terminal
FS(config)# router ospfmax-concurrent-dd4
```


Related Commands	Command	Description
	max-concurrent-dd	Sets the maximum number of the neighbors that the OSPF routing process can concurrently interact with.

Platform N/A

Description

2.58 router ospf redistribute

Use this command to redistribute external routings based on VRF. Use the **no** form of this command to restore the default setting.

router ospf redistribute { **bgp** | **connected** | **isis** | **ospf** | **rip** | **static** | **arp-host** } [**route-map** route-map-name] [**vrf** vrf-name]

no router ospf redistribute { **bgp** | **connected** | **isis** | **ospf** | **rip** | **static** | **arp-host** } [**route-map** route-map-name] [**vrf** vrf-name]

Parameter Description	Parameter	Description
	bgp	Redistribute from bgp
	connected	Redistrite from direct routes
	isis	Redistribute from IS-IS
	ospf	Redistribute from OSPF
	rip	Redistribute from RIP
	static	Redistribute from static routes
	arp-host	Redistribute from arp-host routes
	route-map route-map-name	Redistribution filtering rule
	vrf vrf-name	Redistribution VRF. Global VRF if not specified.

Defaults No redistribution is configured by default.

The default metric of redistributed BGP routing is 1, and that of LSA generated by other routings is 20.

By default, metric-type is E-2 and no route-map is associated.

Command

Mode Global configuration mode

Usage Guide

After this command is configured, the device turns into ASBR, imports routing information into OSPF area, and advertises the routing information as Type 5 LSAs to other OSPF routers in the domain.

If this command and instance **redistribute** are configured at the same time, the later one takes effect.

Configuration

The following example redistributes global VRF ISIS routes to OSPF

Examples

```
FS(config)# router ospf redistribute isis
```

Related Commands	Command	Description
		show ip ospf database

Platform N/A
Description

2.59 router-id

Use this command to set the router ID. Use the **no** form of this command to restore the default setting.

router-id router-id
no router-id

Parameter Description	Parameter	Description
		router-id

Defaults The OSPF routing process will select the maximal interface IP address as the router ID by default. If the loopback interface of an IP address is not configured, the OSPF routing process will select the maximum IP address among all its physical interfaces as the router ID.

Command Mode Routing process configuration mode

Usage Guide You can configure any IP address as the router ID. However, the router ID should be unique. Note that once the router ID changes, the OSPF protocol will do a lot of processing. Therefore, it is not recommended to change the router ID. The device can be changed only when no LSA is generated.

Configuration Examples The following example modifies the router ID to 0.0.0.36.

```
FS(config)# router ospf 20
FS(config-router)# router-id 0.0.0.36
```

Related Commands	Command	Description
		show ip protocols

Platform N/A
Description

2.60 show ip ospf

Use this command to display the OSPF information.

show ip ospf [process-id]

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
process-id	OSPF process ID

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command displays the information of the OSPF routing process.

Configuration The following example displays the output of the **show ip ospf** command.

Examples

```

FS# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Domain ID type 0x0105, value 0x010101010101
Process uptime is 4 minutes
Process bound to VRF default
Memory Overflow is enabled.
Router is not in overflow state now.
Conforms to RFC2328, and RFC1583Compatibility flag isenabled
Supports only single TOS(TOS0) routes
Enable two-way-maintain
Supports opaque LSA
Supports Graceful Restart
This router is an ASBR (injecting external routing information)
Originating router-LSAs with maximum metric
Condition:on startup for 100 seconds, State:inactive
Advertise stub links with maximum metric in router-LSAs
Advertise summary-LSAs with metric 16711680
Advertise external-LSAs with metric 16711680
Unset reason:timer expired, Originated for 100 seconds
Unset time:00:02:02.080, Time elapsed: 00:23:54.656
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Lsa Transmit Pacing timer 40 msec, 10 LS-Upd
Minimum LSA arrival 1000 msec
Pacing lsa-group:240 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
    
```

```

Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjency Changes :Enabled
Graceful-restart disabled
Graceful-restart helper support enabled
Number of areas attached to this router: 1
BFD enabled
Area 0 (BACKBONE)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 1
Area has no authentication
SPF algorithm last executed 00:01:26.640 ago
SPF algorithm executed 4 times
Number of LSA 3. Checksum 0x0204bf
Area 1 (NSSA)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 0
Number of fully adjacent virtual neighbors through this area is 0
Area has no authentication
SPF algorithm last executed 02:09:23.040 ago
SPF algorithm executed 4 times
Number of LSA 6. Checksum 0x028638
NSSA Translator State is disabled, Stability Interval expired in 00:00:03
    
```

Field	Description
Router ID	ID of a router.
Process uptime	Effective time of the current OSPF process (the process does not take effect when device-id is 0.0.0.0)
Bou to VRF	VRF of the current OSPF
Conforms to RFC2328	Same as the RFC2328
RFC1583Compatibilit flag	Whether the RFC1583 or RFC2328 is adopted for the calculation of external routes. This policy is used in the selection of best ASBR and in the route comparison.
Support Tos	Supports Only TOS0.
Supports opaque LSA	Supports opaque-LSA.
Graceful-restart	GR Restart capability described in the RFC3623 Graceful Restart

Graceful-restart helper	GR Help capability described in the RFC3623 Graceful Restart
Router Type	OSPF device type, including normal, ABR, and ASBR
SPF Delay	Delay before the SPF calculation is invoked after the topology change is received
SPF-holdtime	Minimum holdtime between two SPF calculations
LsaGroupPacing	Parameter used for LSA pacing, checksum calculation, and aging interval
Incomming current DD exchange neighbors	Number of neighbors under interaction. The incoming neighbors are those entering the exstart status for the first time.
Outgoing current DD exchange neighbors	Number of neighbors under interaction. The outgoing neighbors are those exiting from the higher status to the exstart status for re-interaction.
Number of external LSA	Number of external LSAs stored in the database
External LSA Checksum Sum	Checksum sum of external LSAs stored in the database
Number of opaque LSA	Number of external LSAs stored in the database
Opaque LSA Checksum Sum	Checksum sum of external LSAs stored in the database
Number of non-default external LSA	Number of external LSAs with non-default routes
External LSA database limit	Limit of external LSA number
Exit database overflow state interval	Time of exiting the overflow status
Database overflow state	Whether the current OSPF process is in the overflow status
Number of LSA originated	Number of LSAs generated
Number of LSA received	Number of LSAs received
Log Neighbor Adjency Changes	Whether the record switch for neighbor status change is enabled
Number of areas attached to this router	Total number of areas on the devices
Area type	Area type, including normal, stub, and nssa
Number of interfaces in this area	Number of interfaces in this area

Number of fully adjacent neighbors in this area	Number of Full neighbors of the area
Number of fully adjacent virtual neighbors through this area	Number of Full neighbors with virtual connections in the area. It is effective only in the non-backbone default-type areas.
Area authentication	Authentication mode of the area
SPF algorithm last executed	Time from the previous SPF calculation to the current time
SPF algorithm executed times	Times of SPF calculations
Number of LSA	Total number of LSAs in this area
Checksum Sum	Checksum sum of the LSAs in the area
NSSATranslatorState	Whether to convert the NSSA LSA to External LSA. It is effective on the ABR OSPF process in the NSSA.
BFD enabled	Enables BFD for OSPF.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.61 show ip ospf border-routers

Use this command to display the OSPF internal routing table on the ABR/ASBR.

show ip ospf [process-id] border-mrouters

Parameter Description

Parameter	Description
process-id	OSPF process ID

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command displays the OSPF internal routes from the local routing device to the ABR or ASBR. The OSPF

internal routing table is different from the one displayed with the `show ip route` command. The OSPF internal routing table has the destination address of the router ID instead of the destination network.

Configuration The following example displays the output of the `show ip ospf border-routers` command.

Examples

```
FS# show ip ospf border-routers
OSPF internal Routing Table
Codes: i - Intra-area route, I - Inter-area route
i 1.1.1.1 [2] via 10.0.0.1, FastEthernet 0/1, ABR, ASBR, Area 0.0.0.1 select
```

The following table describes fields in the output.

Field	Description
Codes	Route type code, where "i" means intra-area routes, while "I" means inter-area routes.
I	Intra-area routes
1.1.1.1	Displays the OSPF ID of the border device.
[2]	Displays the cost to the border device.
via 10.0.0.1	Displays the next-hop gateway to the border device.
FastEthernet 0/1	Displays the interface to the border device.
ABR, ASBR	Displays the type of the border device, including ABR, ASBR, or both.
Area 0.0.0.1	Displays the area that learns the route.
Select	Indicates the currently selected optimal path when there are multiple paths to the ASBR.

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.62 show ip ospf database

Use this command to display the OSPF link state database information. Use the **no** form of this command to restore the default setting.

Different formats of the command will display different LSA information.

```
show ip ospf [ process-id area-id ] database [ adv-router ip-address [ { asbr-summary | external | network | nssa-external | opaque-area | opaque-as | opaque-link | router | summary } [ link-state-id ] [ { adv-router ip-address | self-originate } ] ] | database-summary | max-age | self-originate | detail | brief ]
```

Parameter Description

Parameter	Description
area-id	(Optional) Displays the area ID.
adv-device	(Optional) Displays the LSA information generated by the specified advertising device.
link-state-id	(Optional) Displays the LSA information of the specified OSPF link state

	identifier.
self-originate	(Optional) Displays the LSA information generated by the device itself.
Max-age	(Optional) Displays the LSAs aged.
router	(Optional) Displays the OSPF device LSA information.
network	(Optional) Displays the OSPF network LSA information.
summary	(Optional) Displays the OSPF summary LSA information.
asbr-summary	(Optional) Displays the ASBR summary LSA information.
external	(Optional) Displays the OSPF external LSA information.
nssa-external	(Optional) Displays the category 7 OSPF external LSA information.
opaque-area	(Optional) Displays type 10 LSAs.
opaque-as	(Optional) Displays type 11 LSAs.
opaque-link	(Optional) Displays type 9 LSAs.
database-summary	(Optional) Displays the statistics of LSAs of the link state database.
detail	Displays detailed information of LSAs of the OSPF.
brief	Displays the brief information of the LSAs of the specified type.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide When the OSPF link state database is very large, you should display the information on the link state database by item. Proper use of commands may help OSPF troubleshooting.

Configuration The following example displays the output of the **show ip ospf database** command.

```

Examples
FS# show ip ospf database
OSPF Device with ID (1.1.1.1) (Process ID 1)
Device Link States (Area 0.0.0.0)
Link ID      ADV Device    Age  Seq#      CkSum  Link count
1.1.1.1      1.1.1.1      2    0x80000011 0x6f39 2
3.3.3.3      3.3.3.3      120  0x80000002 0x26ac 1
Network Link States (Area 0.0.0.0)
Link ID      ADV Device    Age  Seq#      CkSum
192.88.88.27 1.1.1.1      120  0x80000001 0x5366
Summary Link States (Area 0.0.0.0)
Link ID      ADV Device    Age  Seq#      CkSum  Route
10.0.0.0     1.1.1.1      2    0x80000003 0x350d 10.0.0.0/24
100.0.0.0    1.1.1.1      2    0x8000000c 0x1ecb 100.0.0.0/16
Device Link States (Area 0.0.0.1 [NSSA])
Link ID      ADV Device    Age  Seq#      CkSum  Link count
1.1.1.1      1.1.1.1      2    0x80000001 0x91a2 1
Summary Link States (Area 0.0.0.1 [NSSA])
Link ID      ADV Device    Age  Seq#      CkSum  Route
100.0.0.0    1.1.1.1      2    0x80000001 0x52a4 100.0.0.0/16
    
```



```

192.88.88.0    1.1.1.1      2    0x80000001 0xbb2d 192.88.88.0/24
NSSA-external Link States (Area 0.0.0.1 [NSSA])
Link ID      ADV Device    Age  Seq#      CkSum  Route          Tag
20.0.0.0    1.1.1.1      1    0x80000001 0x033c E2 20.0.0.0/24    0
100.0.0.0   1.1.1.1      1    0x80000001 0x9469 E2 100.0.0.0/28   0
AS External Link States
Link ID      ADV Device    Age  Seq#      CkSum  Route          Tag
20.0.0.0    1.1.1.1      380 0x8000000a 0x7627 E2 20.0.0.0/24    0
100.0.0.0   1.1.1.1      620 0x8000000a 0x0854 E2 100.0.0.0/28   0
    
```

The following table describes the fields in the output of the **show ip ospf database** command.

Field	Description
OSPF Device with ID	Displays the Router ID.
Device Link States	Displays the device LSA information.
Net Link States	Displays the network LSA information.
Summary Net Link States	Displays the summary network LSA information.
NSSA-external Link States	Displays the type 7 autonomous external LSA information.
AS External Link States	Displays the type 5 autonomous external LSA information.
Link ID	Displays the Link ID.
ADV Device	Displays the ID of the device that advertises the LSAs.
Age	Displays the keepalive period of the LSA.
Seq#	Displays the sequence number of the LSA, which is used to check aged or duplicate LSAs.
Cksum	Displays the checksum of LSAs.
Link-Count	Displays the number of links in the device LSA information.
Route	Displays the device information included in the LSA.
Tag	Displays the tag of the LSA.

The following example displays the output the **show ip ospf database asbr-summary** command.

```

FS# show ip ospf database asbr-summary
      OSPF Device with ID (1.1.1.35) (Process ID 1)
        ASBR-Summary Link States (Area 0.0.0.1)
LS age: 47
Options: 0x2 (*|---|E-)
LS Type: ASBR-summary-LSA
Link State ID: 3.3.3.3 (AS Boundary Device address)
Advertising Device: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0xbe8c
Length: 28
    
```

```
Network Mask: /0
    TOS: 0  Metric: 1
```

The following table describes the fields in the output of the **show ip ospf database asbr-summary** command.

Field	Description
OSPF Device with ID	Displays the router ID.
AS Summary Link States	Displays the summary LSA information in the AS.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
AdvertisingRouter	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
TOS	TOS value, which can be only 0 now.
Metric	Displays the metric of the route corresponding to the LSA.

The following example displays the output of the **show ip ospf database external** command.

```
FS# show ip ospf database external
    OSPF Device with ID (1.1.1.35) (Process ID 1)
        AS External Link States
LS age: 752
Options: 0x2 (*|---|E-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
    Metric Type: 2 (Larger than any link state path)
    TOS: 0
    Metric: 20
    Forward Address: 0.0.0.0
    External Route Tag: 0
```

The following table describes the fields in the output of the **show ip ospf database external** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Type-5 AS External Link States	Displays autonomous external LSA information.

LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Indicates the external link type.
TOS	TOS value, which can be 0 only now.
Metric	Displays the metric of the route corresponding to the LSA.
Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used by other routing processes to redistribute OSPF routes.

The following example displays the output of the **show ip ospf database network** command:

```

FS# show ip ospf database network
OSPF Router with ID (1.1.1.1) (Process ID 1)
Network Link States (Area 0.0.0.0)
LS age: 572
Options:0x2 (*|---|E|)
LS Type:network-LSA
Link State ID:192.88.88.27 (address of Designated Router)
Advertising Router:1.1.1.1
LS Seq Number: 80000001
Checksum:0x5366
Length: 32
Network Mask: /24
Attached Router:1.1.1.1
Attached Router:3.3.3.3
    
```

The following table describes the fields in the output of the **show ip ospf database network** command.

Field	Description
OSPF Router with ID	Displays the router ID corresponding to the follow-up information and the process ID corresponding to the OSPF.
Network LinStates	Displays the network LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option

LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Device	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the network corresponding to the LSA.
Attached Router	Displays the device that is connected with the network.

The following example displays the output of the **show ip ospf database device** command:

```

FS# show ip ospf database router
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Link States (Area 0.0.0.0)
LS age: 322
Options:0x2 (*|---|E-)
Flags:0x3 :ABR ASBR
LS Type:router-LSA
Link State ID:1.1.1.1
Advertising Router:1.1.1.1
LS Seq Number: 80000012
Checksum:0x6d3a
Length: 48
Number of Links: 2
Link connected to:Stub Network
(Link ID) Network/subnet number: 100.0.1.1
(Link Data) Network Mask: 255.255.255.255
Number of TOS metrics: 0
TOS 0 Metric: 0
    
```

The following table describes the fields in the output of the **show ip ospf database device** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Device Link States	Displays the device LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
Flag	Flag
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.

LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Number of Links	Displays the number of links associated with the device.
Link connected to	Displays what the link is connected to and the network type.
(Link ID)	Link identifier
(Link Data)	Link data
Number of TOS metrics	TOS value, supporting TOS0 only
TOS 0 Metrics	TOS0 metric

The following example displays the output of the **show ip ospf database summary** command:

```

FS# show ip ospf database summary
      OSPF Device with ID (1.1.1.1) (Process ID 1)
      Summary Link States (Area 0.0.0.0)
LS age: 499
Options: 0x2 (*|---|E|)
LS Type: summary-LSA
Link State ID: 10.0.0.0 (summary Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 80000004
Checksum: 0x330e
Length: 28
Network Mask: /24
      TOS: 0   Metric: 11
    
```

The following table describes the fields in the output of the **show ip ospf database summary** command.

Field	Description
OSPF Router with ID	Displays the router ID.
Summary Net Link States	Displays the summary network LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.

Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
TOS	TOS value, supporting only 0 now
Metric	Displays the metric of the route corresponding to the LSA.

The following example displays the output of the **show ip ospf database nssa-external** command:

```

FS# show ip ospf database nssa-external
      OSPF Device with ID (1.1.1.1) (Process ID 1)
NSSA-external Link States (Area 0.0.0.1 [NSSA])
LS age: 1
Options: 0x0 (*|-|-|-|-|-)
LS Type: AS-NSSA-LSA
Link State ID: 20.0.0.0 (External Network Number For NSSA)
Advertising Device: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0x033c
Length: 36
Network Mask: /24
      Metric Type: 2 (Larger than any link state path)
      TOS: 0
      Metric: 20
      NSSA: Forward Address: 100.0.2.1
      External Route Tag: 0

```

The following table describes the fields in the output of the **show ip ospf database nssa-external** command.

Field	Description
OSPF Router with ID	Displays the router ID.
NSSA-external Link States	Displays the type 7 autonomous external LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option

LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequential number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Displays the metric type.
TOS	TOS value, which can be 0 only now.
Metric	Displays the metric of the route corresponding to the LSA.
NSSA:Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used in redistributing OSPF routes by other routing process.

The following example displays the output of the **show ip ospf database external** command:

```

FS# show ip ospf database external
      OSPF Device with ID (1.1.1.1) (Process ID 1)
        AS External Link States
LS age: 1290
Options: 0x2 (*-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
      Metric Type: 2 (Larger than any link state path)
      TOS: 0

```

```

Metric: 20
Forward Address: 0.0.0.0
External Route Tag: 0

```

The following table describes the fields in the output of the **show ip ospf database external** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Type-7 AS External Link States	Displays the type 7 autonomous external LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Displays the metric type.
TOS	TOS value, which can be 0 only now.
Metric	Displays the metric of the route corresponding to the LSA.
Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used in redistributing OSPF routes by other routing process.

The following example displays the output of the **show ip ospf database database-summary** command:

```

FS# show ip ospf database database-summary
OSPF process 1:

```



```

Device Link States      : 4
Network Link States    : 2
Summary Link States    : 4
ASBR-Summary Link States : 0
AS External Link States : 4
NSSA-external Link States: 2
    
```

The following table describes the fields in the output of the command **show ip ospf database database-summary**.

Field	Description
OSPF Process	OSPF process ID
Router Link	Number of device LSAs in the area
Network Link	Number of network LSAs in the area
Summary Link	Number of summary LSAs in the area
ASBR-Summary Link	Number of ASBR summary LSAs in the area
AS External Link	Number of NSSA LSAs in the area
NSSA-external Link	Number of NSSA LSAs in the area

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.63 show ip ospf interface

Use this command to display the OSPF-associated interface information.

show ip ospf [process-id] interface [interface-type interface-number | brief]

Parameter Description

Parameter	Description
process-id	OSPF process ID
interface-type	(Optional) type of the specified interface
interface-number	(Optional) number of the specified interface
brief	Displays the summary of the interface.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide This command displays the OSPF information on the interface.

Configuration The following example displays the output of the **show ip ospf interface fastEthernet 0/1** command:

Examples

```

FS# show ip ospf interface fastEthernet0/1
FastEthernet 0/1 is up, line protocol is up
Internet Address 192.88.88.27/24, Iindex 4, Area 0.0.0.0, MTU 1500
Matching network config: 192.88.88.0/24
Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1,BFD enabled
Designated Router (ID) 1.1.1.1, Interface Address 192.88.88.27
Backup Designated Router (ID) 3.3.3.3, Interface Address 192.88.88.72
Timer intervals configured,Hello 10,Dead 40,Wait 40,Retransmit 5
Hello due in 00:00:03
Neighbor Count is 1, Adjacent neighbor count is 1
Crypt Sequence Number is 70784
Hello received 1786 sent 1787, DD received 13 sent 8
LS-Req received 2 sent 2, LS-Upd received 29 sent 53
LS-Ack received 46 sent 23, Discarded 1
    
```

The following table describes the fields in the output of the **show ip ospf interface serial 1/0** command.

Field	Description
FastEthernet 0/1 State	State of the network interface; UP means normal working and Down means faults.
Internet Address	Interface IP address
Area	OSPF area of the interface
MTU	Corresponding MTU
Matching network config	Network area configured for the corresponding OSPF
Process ID	Corresponding process ID
Router ID	OSPF router id
Network Type	OSPF network type
Cost	OSPF interface cost
Transmit Delay is	OSPF interface transmit delay
State	DR/BDR state ID
Priority	Priority of the interface
Designated Router(ID)	DR ID of the interface
DR's Interface address	Address of the DR of the interface
Backup designated device(ID)	Router ID of the BRD of the interface
BDR's Interface address	Address of the BDR of the interface

Time intervals configured	Hello, Dead, Wait, and Retransmit intervals of the interface
Hello due in	Time when the previous Hello is sent
Neighbor count	Total number of neighbors
Adjacent neighbor count	Number of Full neighbors
Crypt Sequence Number	The corresponding md5 authentication number of the interface
Hello received send	Statistics on the Hello packets sent and received
DD received send	Statistics on the DD packets sent and received
LS-Req received send	Statistics on the LS request packets sent and received
LS-Upd received send	Statistics on the LS update packets sent and received
LS-Ack received send	Statistics on the LS response packets sent and received
Discard	Statistics on the discarded OSPF packets
BFD enabled	Enables BFD for OSPF.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.64 show ip ospf ispf

Use this command to display the ISPF calculation count in the OSPF area.

show ip ospf [process-id] ispf

Parameter Description

Parameter	Description
process-id	OSPF process ID

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command displays the ISPF calculation count in the OSPF area within the last 30 minutes and total ISPF calculation count by now.

Configuration

The following displays the ISPF calculation count in the OSPF area.

Examples

```
FS# show ip ospf 1 ispf

OSPF process 1:
Area_id      30min_counts  Total_counts
```

0	32	1235
1	6	356

Field Description:

Field	Description
Area_id	OSPF area ID.
30min_counts	ISPF calculation count in the OSPF area within the last 30 minutes.
Total_counts	Total count of ISPF calculation.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.65 show ip ospf neighbor

Use this command to display the OSPF neighbor list.

show ip ospf [process-id] **neighbor** [**statistics**] [[interface-type interface-number] [neighbor-id] [**detail**]]

Parameter Description

Parameter	Description
detail	(Optional) Displays the neighbor details.
interface-type interface-number	(Optional) Displays the neighbor information of the specified interface
neighbor-id	(Optional) Displays the information of the specified neighbor
statistics	(Optional) Displays the neighbor statistics.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command displays neighbor information usually used to check whether the OSPF is running normally.

Configuration The following example displays the output of the **show ip ospf neighbor** command.

Examples

```

FS# show ip ospf neighbor
OSPF process 1, 1 Neighbors, 1 is Full:
Neighbor ID   Pri   State   BFD State   Dead Time   Address       Interface
3.3.3.3       1     Full/BDR Up           00:00:32   192.88.88.72 FastEthernet 0/1

FS# show ip ospf neighbor detail
Neighbor 3.3.3.3, interface address 192.88.88.72
In the area 0.0.0.0 via interface FastEthernet 0/1
    
```

```
Neighbor priority is 1, State is Full, 11 state changes
DR is 192.88.88.27, BDR is 192.88.88.72
Options is 0x52 (*|O|-|EA|-|-|E|-)
Dead timer due in 00:00:32
Neighbor is up for 05:11:27
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
Crypt Sequence Number is 0
Thread Inactivity Timer on
Thread Database Description Retransmission off
Thread Link State Request Retransmission off
Thread Link State Update Retransmission off
Thread Poll Timer on
Graceful-restart helper disabled
BFD session state up
```

The following table describes the fields in the output of the **show ip ospf neighbor** command.

Field	Description
Neighbor ID	Neighbor ID
Pri	Neighbor priority (for selection of DR)
State	Neighbor status
Dead Time	Remaining time for the neighbor to enter the Dead status
Address	Interface address of the neighbor
Interface	Interface of the neighbor
interface address	Interface address of the neighbor device
In the area	Displays the area that learns the neighbor.
via interface	Displays the interface that learns the neighbor
Neighbor priority	Priority of the neighbor OSPF
State	OSPF neighbor connection state. FULL means the stable state; DR indicates that the neighbor is the designated device; BDR indicates that the neighbor is the backup designated device; DROTHER indicates that the neighbor is not a DR/BDR. Point-to-point network type has no DR or DBR.
State changes times	Times of state changes
Dead Time	Dead time of the neighbor
DR	Interface address of the DR elected by the neighbor device (that is, the DR field of the Hello packet)
BDR	Interface address of the BDR elected by the neighbor device (that is, the BDR field of the Hello packet)

Options	Hello packet E-bit option, where 0 indicates that the area is a STUB area; 2 indicates that the area is not a STUB area.
Dead timer due in	Dead time of the neighbor device
Neighbor up time	Period from when the device is discovered till now
Database Summary List	Statistics on the neighbor DD packets
LinkState Request List	Statistics on the neighbor LS request packets
LinkState Retransmission List	Statistics on the neighbor re-transmit packets
Crypt Sequence Number	Area MD5 authentication code
Thread Inactivity Timer	Status of invalid neighbor timer
Thread Database Description Retransmission	Status of DD packet timer of the interface
ThreadLinkState Request Retransmission	Status of LS request packet timer of the interface
ThreadLinkState Update Retransmission	Status of LS update packet timer of the interface
Thread Poll Timer	Poll Timer start status of the static neighbor
Graceful-restart helper	Whether it is able to function as the GR Helper of a specified neighbor

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.66 show ip ospf route

Use this command to display the OSPF routes.

show ip ospf [process-id] **route** [count]

Parameter Description	Parameter	Description
	process-id	OSPF process ID. All OSPF routes will be displayed without an ID specified.
	count	Statistics of various OSPF routes

Defaults N/A

Command Privileged mode

Mode

Usage Guide This command displays the OSPF routing information. The count option displays the OSPF routing statistics.

Configuration The following example displays the output of the **show ip ospf route** command.

Examples

```
OSPF process 1:
Codes: C - connected, D - Discard , O - OSPF,
IA - OSPF inter area  N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
E2 100.0.0.0/24 [1/20] via 192.88.88.126, FastEthernet 0/1
C 192.88.88.0/24 [1] is directly connected, FastEthernet 0/1, Area 0.0.0.1
```

The following table describes the fields in the output of the **show ip ospf route** command.

Field	Description
codes	Route type and corresponding abbreviation and description
100.0.0.0/24	Route prefix
[1]	Route cost
via	Route next hop and interface

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.67 show ip ospf spf

Use this command to display the routing count in the OSPF area.

show ip ospf [process-id] spf

Parameter Description

Parameter	Description
process-id	OSPF process ID

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command displays the routing counts within the latest 30 minutes in the OSPF area and current routing total counts.

Configuration The following example displays the output of the **show ip ospf [process-id] spf** command:

Examples

```
FS# show ip ospf 1 spf

OSPF process 1:
Area_id      30min_counts  Total_counts
0             32            1235
1             6             356
```

The following table describes the fields in the output of the **show ip ospf [process-id] spf** command.

Field	Description
Area_id	OSPF area ID
30min_counts	OSPF routing counts within the latest 30 minutes
Total_counts	Total counts of the OSPF routing till now

Related Commands

Command	Description
show ip ospf	Displays the OSPF summary.

Platform N/A

Description

2.68 show ip ospf summary-address

Use this command to display the converged route of all redistributed routes.

show ip ospf [process-id] summary-address

Parameter Description

Parameter	Description
process-id	ID of the OSPF process. All OSPF routing processes will be displayed if this parameter is not configured.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is valid only on the NSSA ABR, and displays only the routes with local aggregation operations.

Configuration

The following example displays the output of the **show ip ospf summary-address** command:

Examples

```
FS# show ip ospf summary-address
Summary Address Summary Mask Advertise Status Aggregated subnets
-----
202.101.0.0    255.255.0.0    advertise    Inactive 0
```

Field	Description
Summary Address	IP address to be aggregated

Summary Mask	Mask to be aggregated
Advertise	Whether to advertise the aggregated route
Status	Whether the aggregation range takes effect
Aggregated subnets	Number of external routes included in the aggregation range

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.69 show ip ospf topology

Use this command to display topology information for OSPF SPF calculation.

show ip ospf [process-id area-id] **topology** [**adv-router** ip-address | **self-originate**]

Parameter Description	Parameter	Description
	process-id	OSPF process ID.
	area-id	Displayed area ID
	topology	Displays a specified OSPF process and topology information summary of an area.
	adv-router	Displays topology information of a specified device. This specified device must be a directly connected neighbor of the current device.
	self-originate	Displays topology information of the current device.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command helps users to understand OSPF SPF calculation topology information and troubleshoot faults caused by topology planning. If the user enables fast reroute calculation, this command displays information related to fast reroute calculation.

Configuration

The following example displays the result of the show **ip ospf topology** command:

Examples

```
FS# show ip ospf topology
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Topology States (Area 0.0.0.0)
+1.1.1.1
  +2.2.2.2
    +4.4.4.4
```

```

+3.3.3.3
  +4.4.4.4

+2.2.2.2
  +1.1.1.1
    +3.3.3.3
    +4.4.4.4
    +3.3.3.3

+3.3.3.3
  +1.1.1.1
    +2.2.2.2
    +4.4.4.4

+2.2.2.2
  
```

The following example displays the result of the **show ip ospf topology self-originate** command:

```

FS# show ip ospf topology self-originate
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Topology States (Area 0.0.0.0)
1.1.1.1
  Self to Destination Metric: 0
Parent Node: -
Child Node:2.2.2.2
  Primary next-hop: -
  Backup next-hop: -
  Backup Neighbor: -

2.2.2.2
  Self to Destination Metric: 1
Parent Node: 1.1.1.1
Child Node:-
  Primary next-hop: FastEthernet 0/1 via 10.0.0.1
  Backup next-hop: FastEthernet 0/2 via 10.0.1.1
  Backup Neighbor: 2.2.2.2
Neighbor to Destination Metric: 0
Neighbor to Self Metric: 10
Neighbor to Primary Neighbor: 0
Self to Neighbor Metric: 1
  
```

The description of every field displayed by **show ip ospf topology self-originate** is as follows:

Field	Description
Self to Destination Metric	Metric from the root node to the current destination node
Parent Node	Parent node of the current destination node
Child Node	Chile node of the current destination node
Primary next-hop	Primary next hop for reaching the current the destination node

Backup next-hop	Backup next hop for reaching the current the destination node
Backup Neighbor	Backup neighbor for reaching the current the destination node
Neighbor to Destination Metric	Metric from the backup neighbor to the current destination node
Neighbor to Self Metric	Metric from the backup neighbor to the root node
Neighbor to Primary Neighbor	Metric from the backup neighbor to the primary neighbor
Self to Neighbor Metric	Metric from the root node to the backup neighbor

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.70 show ip ospf virtual-links

Use this command to display the OSPF virtual link information.

show ip ospf [process-id] **virtual-links** [ip-address]

Parameter Description

Parameter	Description
process-id	ID of the OSPF process. All OSPF routing processes will be displayed if this parameter is not configured.
ip-address	Associated ID of a virtual link neighbor

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

If no virtual link is configured, the command displays the neighbor status and other related information. The show ip ospf neighbor command does not display the neighbor of the virtual link.

Configuration Examples

The following is the output of the **show ip ospf virtual-links** command:

```
FS# show ip ospf virtual-links
Virtual Link VLINK0 to device 1.1.1.1 is up
Transit area 0.0.0.1 via interface FastEthernet 0/1
Local address 10.0.0.37/32
Remote address 10.0.0.27/32
Transmit Delay is 1 sec, State Point-To-Point,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```

```
Hello due in 00:00:05
Adjacency state Full
```

The following table describes the fields in the output.

Field	Description
Virtual Link VLINK0 to router	Displays the virtual link neighbors and their status.
Virtual Link State	Displays the virtual link state.
Transit area	Displays the transit area of the virtual link.
via interface	Displays the associated interface of the virtual link.
Local address	Local interface address
Remote Address	Peer interface address
Transmit Delay	Displays the transmit delay of the virtual link.
State	Interface state
Time intervals configured	Hello, Dead, Wait, and Retransmit interval of the interface
Adjacency State	Neighbor state, where FULL means the stable state

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.71 summary-address

Use this command to configure the aggregate route out of the OSPF routing domain. Use the **no** form of this command to restore the remove the aggregate route.

summary-address ip-address net-mask [**not-advertise** | **tag** value | **cost** cost]

no summary-address ip-address net-mask [**not-advertise** | **tag** | **cost**]

Parameter Description

Parameter	Description
ip address	IP address of the aggregate route
net-mask	Network mask of the aggregate route
not-advertise	Does not advertise the aggregate route. If the parameter is not configured, the aggregate route is advertised.
tag value	Sets the tag value of an aggregate route. The range is from 0 to 4,294,967,295.
cost cost	Cost value of the aggregate route. The range is from 0 to 16,777,214.

Defaults No aggregate route is configured by default.

Command Routing process configuration mode

Mode

Usage Guide When routes are redistributed by another routing process into the OSPF routing process, every route is advertised to the OSPF-enabled device separately in external LSAs. If the incoming routes are continuous addresses, the autonomous border device can advertise only one aggregate route, reducing the scale of routing table greatly. Unlike the **area range** command, the area range command aggregates inter-OSPF-area routes, while the summary-address command aggregates external routes of the OSPF routing domain. For the NSSA, the **summary-address** command is valid only on the NSSA ABR now, and aggregates only redistributed routes.

Configuration The following example generates an external aggregate route 100.100.0.0/16.

```

Examples
FS(config)# router ospf20
FS(config-router)# summary-address100.100.0.0 255.255.0.0
FS(config-router)# redistribute static subnets
FS(config-router)# network200.2.2.0 0.0.0.255 area 1
FS(config-router)# network172.16.24.0 0.0.0.255area 0
FS(config-router)# area1nssa
    
```

Related Commands

Command	Description
area-range	Configures route convergence on the OSPF area border device.
redistribute	Redistributes routes of other routing processes.

Platform N/A

Description

2.72 timers lsa arrival

Use this command to configure the time delay for the same LSA received. Use the **no** form of this command to restore the default setting.

timers lsa arrival arrival-time
no timers lsa arrival

Parameter Description

Parameter	Description
arrival-time	Configures the time delay when receiving the same LSA. The range is from 0 to 600000 in the unit of milliseconds.

Defaults The default is 1000.

Command

Mode Routing process configuration mode

Usage Guide No action is done when the same LSA is received within the specified time.

Configuration The following example configures the time delay for the same LSA as 2seconds.

```
Examples
FS(config)# routerospf1
FS(config-router)# timers arrival-time 2000
```

Related Commands	Command	Description
		show ip ospf

Platform N/A

Description

2.73 timers pacing lsa-group

Use this command to configure the LSA grouping and then refresh the whole groups as well as the update interval for the aged link state. Use the **no** form of this command to restore the default setting.

timers pacing lsa-group seconds

no timers pacing lsa-group

Parameter Description	Parameter	Description
		seconds

Defaults The default is 30.

Command

Mode Routing process configuration mode

Usage Guide Each LSA has its own update and aging time (LSA age). If you update and age LSAs separately, many CPU resources will be consumed. To effectively use CPU resources, you can update LSAs of a device in batches. You can use this command to modify the value of seconds, whose default value is 240 seconds. This parameter needs not to be adjusted often. The optimal group pacing interval is inversely proportional to the number of LSAs that need to be calculated. For example, if you have approximately 10000 LSAs in the database, decreasing the pacing interval would be better. If the switch has a small database (40 to 100 LSAs), increasing the pacing interval to 10 to 20 minutes might be better.

Configuration The following example configures the pacing time as 120 seconds.

```
Examples
FS(config)# deviceospf 20
FS (config-router)# timers paing lsa-group 120
```

Related Commands	Command	Description

show ip ospf	Displays the OSPF information.
---------------------	--------------------------------

Platform N/A

Description

2.74 timers pacing lsa-transmit

Use this command to transmit the LSA grouping updating. Use the **no** form of this command to restore the default setting.

timers pacing lsa-transmit transmit-time transmit-count

no timers pacing lsa-transmit

Parameter	Description
transmit-time	Configures the interval of sending the LSA grouping. The range is from 10 to 1000.
transmit-count	Configures the number of LS-UPD packets per group. The range is from 1 to 200.

Defaults The default configurations are as follows:

Transmit-time: 40 milliseconds.

Transmit-count: 10

Command

Mode Routing process configuration mode

Usage Guide

If there are a large number of LSAs and the load on the system is heavy, you can properly use the **transmit-time** and **transmit-count** to inhibit the flooding LS-UPD packet number in the network.

If the CPU and network bandwidth loads are not too much, reduce **transimi-time** and increase **transimit-count** to quicken the environment convergence.

Configuration The following example sets the interval of sending the LS-UPD packets as 50ms, the packets number as 20.

Examples

```
FS(config)# routerospf1
FS(config-router)# timers pacing lsa-transmit 50 20
```

Related

Commands

Command	Description
show ip ospf	Displays the OSPF process information, including the router ID.

Platform N/A

Description

2.75 timers spf

Use this command to configure the delay for SPF calculation after the OSPF receives the topology change as well as the interval between two SPF calculations. Use the **no** form of this command to restore the default setting.

timers spf spf-delay spf-holdtime

no timers spf

Parameter Description	Parameter	Description
	spf-delay	Defines the SPF calculation waiting period in seconds. The range is from 0 to 2147483647. After receiving the topology change, the OSPF routing process must wait for the specified period to start the SPF calculation.
	spf-holdtime	Defines the interval between two SPF calculations in seconds. The range is from 0 to 2147483647. When the waiting time is up but the interval between two calculations is still elapsing, the SPF calculation cannot start.

Defaults

For the FSOS not supporting the `timers throttle spf` command, the default values are as follows:

spf-delay: 5seconds;

spf-holdtime: 10 seconds.

For the FSOS supporting the `timers throttle spf` command, by default, the `timers spf` command takes no effect.

Spf-delay depends on the default configuration of the `timers throttle spf` command.


Command

Mode

Routing process configuration mode

Usage Guide

Smaller values of `spf-delay` and `spf-holdtime` mean that OSPF adapts to the topology change faster, and the network convergence period is shorter, but this will occupy more CPU of the router.

 The configurations of the **timers spf command** and the `timers throttle spf` command may overwrite each other.

Configuration

The following example configures the delay and holdover period of the OSPF as 3 and 9 seconds respectively.

Examples

```
FS(config)# deviceospf20
FS(config-router)# timersspf 3 9
```

Related Commands

Command	Description
show ip ospf	Displays the configuration information of the ospf.
timers throttle spf	Configures the exponential back off delay for SPF calculation. The command is recommended to replace the <code>timers spf</code> command because it is more powerful.

Platform

N/A

Description

2.76 timers throttle lsa all

Use this command to configure the exponential back off algorithm for the LSA. Use the **no** form of this command to restore the default setting.

timers throttle lsa all delay-time hold-time max-wait-time

no timers throttle lsa all

Parameter	Description
delay-time	Configures the time delay of generating the LSA first. The range is from 1 to 600000.
hold-time	Configures the minimum interval of refreshing the LSA between the first time and second time. The range is from 1 to 600000.
max-wait-time	Configures the maximum interval of successive refreshing the LSA, which determines whether the LSA is refreshed successively. The range is from 0 to 600000.

Defaults The default configurations are as follows:

Delay-time: 0 millisecond,

Hold-time: 5000 milliseconds,


Max-wait-time: 5000 milliseconds.

Command

Mode Routing process configuration mode

Usage Guide

If high convergence performance is required for the link change, the value of delay-time can be relatively small. if you expect to reduce the CPU consumption, increase appropriately several values.

 The value of hold-time cannot be smaller than that of delay-time, and the value of max-wait-time cannot be smaller than that of hold-time.

Configuration Examples The following example configures the first delay as 10ms, hold-time as 1second and the longest delay as 5seconds.

```
FS(config)# routerospf1
FS(config-router)# timers throttle lsa all 10 1000 5000
```

Related Commands

Command	Description
show ip ospf	Displays the configuration information of the ospf

Platform N/A
Description

2.77 timers throttle route

Use this command to configure the delay time of route calculation on receiving the ASBR summary LSA and the external summary LSA. Use the **no** form of this command to restore the default setting.

timers throttle route { **inter-area** ia-delay | **ase** ase-delay }

no timers throttle route { **inter-area** | **ase** }

Parameter Description	Parameter	Description
	inter-area	Calculates the inter area routes.
	ia-delay	Sets the delay time of the inter-area route calculation, in the range from 0 to 600,000 in the unit of milliseconds. On receiving the ASBR summary LSA, the router will not calculate the inter-area routes until the ia-delay time runs out.
	ase	Calculates the external routes.
	ase-delay	Defines the delay time of the external route calculation, in the range from 0 to 600,000 in the unit of milliseconds. On receiving the external summary LSA, the router will not calculate the external routes until the ase-delay time runs out.

Defaults The default values are as follows:

ia-delay: 0,
ase-delay: 0,

Command

Mode Routing process configuration mode

Usage Guide

The default setting is recommended if the network needs to be fast converged. For the instable network where multiple inter-area and external routes exist, if you want to optimize the route calculation and save the CPU resources, increase the delay time.

Configuration

The following example sets the .delay time of the inter-area route calculation to one second.

Examples

```
FS(config)# router ospf 1
FS(config-router)# timers throttle route inter-area 1000
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

2.78 timers throttle spf

Use this command to configure the topology change information for OSPF, including the delay for SPF

calculation as well as the interval between two SPF calculations in routing process configuration mode. Use the **no** form of this command to restore the default setting.

timers throttle spf spf-delay spf-holdtime spf-max-waittime

no timers throttle spf

Parameter Description	Parameter	Description
	spf-delay	Defines the SPF calculation waiting period, in the unit of milliseconds, in the range from 0 to 600,000. After receiving the topology change, the OSPF routing process must wait for the specified period to start the SPF calculation.
	spf-holdtime	Defines the interval between two SPF calculations in seconds in the range from 0 to 600,000.
	spf-max-waittime	Defines the maximum interval between two SPF calculations, in milliseconds in the range from 0 to 60,0000.

Defaults The default configurations are as follows:

spf-delay: 1000ms;

spf-holdtime: 5000ms;

spf-max-waittime: 10000ms.

Command

Mode

Routing process configuration mode

Usage Guide

The spf-delay parameter indicates the delay time of the topology change to the SPF calculation. The spf-holdtime parameter indicates the minimum interval between two SPF calculations. Then, the interval of the consecutive SPF calculations is at least twice as the last interval until it reaches to spf-max-waittime. If the interval between two SPF calculations has exceeded the required value, the SPF calculation will restart from spf-holdtime. Smaller spf-delay and spf-holdtime values can make the topology converge faster. A greater spf-max-waittime value can reduce the system resource consumption of SPF calculation. Those configurations can be flexibly adjusted according to the actual stability of the network topology.

Compared with the timers spf command, this command is more flexible. It speeds up the SPF calculation convergence, and reduces the system resource consumption of SPF calculation due to the topology change. To this end, the timers throttle spf command is recommended.

- The value of spf-holdtime cannot be smaller than the value of spf-delay, or the value of spf-holdtime will be set to be equal to the value of spf-delay;
- The value of spf-max-waittime cannot be smaller than the value of spf-holdtime, or the value of spf-max-waittime will be set to be equal to the value of spf-holdtime automatically;
- The configurations of the timers spf command and the timers throttle spf command may overwrite each other.
- If both the timers spf command and the timers throttle spf command are not configured, the default value of the timers throttle spf command is used.

Configuration

The following example configures the delay and holdtime and the maximum time interval of the OSPF as 5ms,

Examples 1000ms and 90000ms respectively. If the topology changes consecutively, the SPF calculation intervals are: 5ms, 1second, 3 seconds, 7 seconds, 15 seconds, 31 seconds, 63 seconds, 89 seconds, 179 seconds, 179+90seconds...

```
FS(config)# routerospf20
FS(config-router)# timersspf 5 1000 90000
```

Related Commands

Command	Description
show ip ospf	Displays the configuration information of OSPF
timers spf	Configures the SPF calculation delay. This command is supported in versions earlier than FSOS 10.4. It is recommended to replace the timers spf command with the timers throttle spf command.

Platform N/A

Description

2.79 two-way-maintain

Use this command to enable the OSPF two-way-maintain function. Use the **no** form of this command to disable this function.

two-way-maintain
no two-way-maintain

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide

In the large-scale network, partial packets delay or dropped may exist due to much CPU and memory are occupied caused by lots of packet transmission. If the Hello packets are handled over dead-interval, the corresponding adjacency will be disconnected. In this case, you can enable the two-way-maintain function for the packets such as DD, LSU, LSR and LSAck packets from a neighbor in the network (except for the Hello packets), avoiding the neighbor invalidation caused by delayed or dropped Hello packets.

Configuration Examples The following example disables the OSPF two-way-maintain function.

```
FS(config)# routerospf1
FS(config-router)# notwo-way-maintain
```

Related Commands

Command	Description
---------	-------------

show ip ospf	Displays the configuration information of the OSPF
---------------------	--

Platform N/A

Description

3 OSPFv3 Commands

3.1 area authentication

Use this command to configure OSPFv3 area authentication. Use the **no** form of this command to restore the default setting.

area area-id **authentication ipsec spi** spi [**md5** [string-key] | **sha1**] [**0** | **7**] key
no area area-id **authentication**

Parameter Description	Parameter	Description
	area-id	Specifies an area ID. It can be an integer or the prefix of an IPv4 address.
	spi	Specifies a security parameter index, in the range from 256 to 4294967295.
	md5	Specifies a message digest 5 (MD5) authentication mode.
	string-key	Indicates that MD5 authentication key supports special characters.
	sha1	Specifies a secure hash algorithm 1 (SHA1) authentication mode.
	0	Indicates that a key is displayed in a plain-text format.
	7	Indicates that a key is displayed in a cipher-text format.
	key	Specifies an authentication key.

Defaults Authentication is not performed by default.

Command Mode Routing process configuration mode

Usage Guide FSOS supports three authentication modes:

- null authentication mode, which is configured when authentication is not needed
- MD5 authentication mode
- SHA1 authentication mode

If OSPFv3 area authentication is configured, the configuration takes effect on all interfaces (except for those of virtual links) in the area. Interface authentication configuration, however, takes precedence over area authentication configuration.

Configuration Examples The following example specifies MD5 authentication for area 1 where OSPFv3 routing processes reside, and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
FS(config-router)# area 1 authentication ipsec spi 300 md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
FS(config-router)#area 0 authentication ipsec spi 606 md5 string-key FS@123
FS(config-router)#show this

Building configuration...
!
```

```

graceful-restart
area 0 authentication ipsec spi 606 md5 string-key FS@123
area 1 authentication ipsec spi 300 md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
!
end
FS(config-router)#
    
```

Related Commands	Command	Description
		ipv6 ospf authentication
	area virtual-link authentication	Specifies virtual link authentication.

Platform N/A
Description

3.2 area default-cost

Use this command to set the cost of the default route for the ABR in the stub or NSSA area. Use the **no** form of this command to restore the default setting.

area area-id **default-cost** cost
no area area-id **authentication**

Parameter Description	Parameter	Description
		area-id
	cost	Cost of the default route of the stub or NSSA area in the range from 0 to 16777215.

Defaults The default cost is 1.

Command Mode Routing process configuration mode.

Usage Guide This command can only work in the ABR connected to the stub area.

Configuration Examples The following example sets the cost of the default route of stub area 50 to 100.

```

ipv6 router ospf 1
area 50 stub
area 50 default-cost 100
    
```

Related Commands	Command	Description
		area stub

Platform N/A
Description

3.3 area encryption

Use this command to enable encryption authentication for an OSPFv3 area. Use the **no** form of this command to restore the default setting.

area area-id **encryption ipsec spi** spi **esp null** [**md5** | **sha1**] [**0** | **7**] key

no area area-id **encryption**

Parameter Description

Parameter	Description
area-id	Specifies an area ID. It can be an integer or the prefix of an IPv4 address.
spi	Specifies a security parameter index, in the range from 256 to 4294967295.
null	Specifies the null encryption mode.
md5	Specifies the MD5 authentication mode.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
Key	Specifies an authentication key.

Defaults Encryption authentication is not performed by default.

Command Mode Routing process configuration mode

Usage Guide FSOS supports the null encryption mode and two authentication modes: MD5 and SHA1.
 If encryption authentication is configured for an OSPFv3 area, the configuration takes effect on all interfaces (except for those of virtual links) in the area. Encryption authentication configuration on interfaces, however, takes precedence over that of the OSPFv3 area.

Configuration Examples The following example specifies null encryption and MD5 authentication for area 1 where OSPFv3 routing processes reside, and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
FS(config-router)# area 1 encryption ipsec spi 300 esp null md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
ipv6 ospf encryption	Specifies interface encryption authentication.
area virtual-link encryption	Specifies virtual link encryption authentication.

Platform N/A
Description

3.4 area nssa

Use this command to configure an NSSA area. Use the **no** form of this command to remove the NSSA area configuration.

```
area area-id nssa [ no-redistribution ] [ default-information-originate [ metric value ] [ metric-type type ] ]
[ no-summary ] [ translator [ stability-interval seconds | always ] ]
no area area-id nssa [ no-redistribution ] [ default-information-originate [ metric ] [ metric-type ] ]
[ no-summary ] [ translator [ stability-interval | always ] ]
```

Parameter Description	Parameter	Description
	area-id	ID of the NSSA area.
	no-redistribution	(Optional) Used when the router is an NSSA Area Border Router (ABR) and you want the redistribute command to import routes only into the normal areas, but not into the NSSA area.
	default-information-originate	(Optional) Used to generate a Type 7 default into the NSSA area. This keyword takes effect only on the NSSA ABR or the NSSA Autonomous System Boundary Router (ASBR).
	metric value	(Optional) Specifies the OSPF default LSA metric. The range is from 0 to 16,777,214, and the default value is 1.
	metric-type type	(Optional) Specifies the OSPF metric type for default routes. The value can be 1 or 2 and the default value is 2.
	no-summary	(Optional) Allows an area to be an NSSA but not have summary routes injected into it.
	translator	(Optional) Configures the NSSA ABR translator.
	stability-interval seconds	(Optional) Configures the stability interval after the role of an NSSA ABR is changed from translator to non-translator. The range is from 0 to 2,147,483,647, the default value is 40 and the unit is second.
	always	(Optional) Configures the NSSA ABR to be always translator. The default NSSA ABR is a non-translator.

Defaults No NSSA area is defined by default.

Command

Mode Routing process configuration mode

Usage Guide

The **default-information-originate** parameter is used to generate a default Type 7 LSA. There is a small difference between NSSA ABR and NSSA ASBR on which this command can take effect. On the ABR, the Type-7 default route generates no matter whether a default route exists in the routing table, while on the ASBR, the Type-7 default route generates only when a default routes exists in the routing table.

The **no-redistribution** parameter is used when the router is an NSSA Area Border Router (ABR) and you want the redistribute command to import routes only into the normal areas, but not into the NSSA area. This parameter is generally used on the device acting as both ASBR and ABR in NSSA area to prevent the routes from being imported into the NSSA area.

The **no-summary** parameter allows an area to be an NSSA but not have summary LSAs injected into it. In an NSSA area involving two or more ABR devices, by default, the ABR of larger router ID is elected as the translator for Type-7 to Type-5 translation. You can configure the **translator always** parameter to specify an ABR to be always the translator.

When the translator of an ABR device is replaced, the ABR still has the translation capability within the **stability-interval** time. After the stability-interval timer expires and the ABR is not elected as the translator again, then the LSAs translated from Type-7 to Type-5 will be removed from the AS.

To prevent route loop, the Type-5 LSAs aggregated by the Type-7 are removed once the ABR device loses the translator capability, instead of waiting for the stability-interval expiration.

It is recommended to configure the **translator always** parameter on only one ABR device in an NSSA area.

Configuration The following example sets the area 1 as an NSSA area.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)# area 1 nssa
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

3.5 area range

Use this command to set the range of the converged inter-area addresses. Use the **no** form of this command to restore the default setting.

area area-id **range** ipv6-prefix/prefix-length [**advertise**|**not-advertise**]

no area area-id **range** ipv6-prefix/prefix-length

Parameter Description

Parameter	Description
area-id	ID of the area in which the addresses are converged. It can be an integer or an IPv4 prefix.
ipv6-prefix/prefix-length	Range of the converged addresses.
advertise	Advertises the range of converged addresses.
not-advertise	The range of the converged addresses is not advertised. By default, the function is enabled.

Defaults No converged inter-area address range is defined by default.

Command Mode Routing process configuration mode

Usage Guide This command applies only to ABR. Use this command to converge multiple routes of an area into one route and

advertise it to other areas. This command applies only to ABR. Use this command to converge multiple routes of an area into one route and advertise it to other areas. The routing information combination only takes place on the area border. The specific routing information is seen on the intra-area routers, but only one converged route can be seen on the devices in other areas. By configuring the two options of advertise and not-advertise, you can decide whether to advertise the convergence range to enable blocking and filtering. By default, the range is advertised to the outside. The option cost can be used to set the metric value of convergence routing. A number of route convergence commands can be defined. In this way, the number of the routes in the OSPF AS is reduced. Particularly for a large network, the forwarding performance will be improved. When a number of routes are converged, and the containment relationship exists between items, the area range converged is determined by the longest match principle.

Configuration The following example converges the routes in area 1.

Examples

```
ipv6 router ospf 1
area 1 range 2001:abcd:1:2::/64
```

Related Commands

Command	Description
summary-prefix	Sets the range of the external routes to be converged.

Platform N/A

Description

3.6 area stub

Use this command to create a stub area or set its attributes. Use the **no** form of this command to restore the default setting.

area area-id **stub** [**no-summary**]

no area area-id **stub** [**no-summary**]

Parameter Description

Parameter	Description
area-id	ID of the stub area. It can be an integer or an IPv6 prefix.
no-summary	This option applies only to the ABR in the stub area, indicating that the ABR only advertises the type 3 LSA indicating the default route to the stub area, not other type 3 LSAs.

Defaults No stub area is defined by default.

Command

Mode Routing process configuration mode

Usage Guide If an area is at the end of an entire network, it can be designed as the stub area, in which all the routers must

execute the area stub command. If the area is designed as the stub area, it cannot learn the AS external routing information (type 5 LSAs). In practical application, the external routing information takes a large proportion of the link state database, so the devices in the stub area can only learn very little routing information, thus reducing the system resources required for the running of the OSPFv3 protocol.

By default, a type 3 LAS advertisement indicating default routing on the ABR in the stub area is generated, then the devices in the stub area can get to the outside of the AS.

If a totally stub area needs to be configured, just select the keyword **no-summary** when executing the **area stub** command on the ABR.

Configuration The following example enables the ABR in stub area 10 to advertise the default route to the stub area.

```
Examples
ipv6 router ospf 1
area 10 stub
area 10 stub no-summary
```

Related Commands

Command	Description
area default-cost	Sets the cost of the default route in the stub area.

Platform N/A

Description




3.7 area virtual-link

Use this command to create a virtual link or set its parameters. Use the **no** form of this command to restore the default setting.

```
area area-id virtual-link router-id [ hello-interval seconds ] [ dead-interval seconds ] [ retransmit-interval seconds ] [ transmit-delay seconds ] [ instance instance-id ] [ authentication ipsec spi spi [ md5 | sha1 ] [ 0 | 7 ] key ] [ encryption ipsec spi spi esp null [ md5 | sha1 ] [ 0 | 7 ] key ]
no area area-id virtual-link router-id [ hello-interval ] [ dead-interval ] [ retransmit-interval ] [ transmit-delay ] [ instance ] [ authentication ] [ encryption ]
```

Parameter Description

Parameter	Description
area-id	ID of the area in which the virtual link is located. It can be an integer or an IPv6 prefix.
Router-id	Neighbor router ID of the virtual link.
hello-interval seconds	Sets the interval to send the hello message on the local virtual link interface in the range from 1 to 65535 in the unit of seconds.
dead-interval seconds	Interval for the local interface of the virtual link to wait before considering that the neighbor fails. It is in the range from 1 to 65535 in the unit of seconds.
retransmit-interval seconds	Interval for retransmitting LSA on the local interface of the virtual link . The range is from 1 to 65535 in the unit of seconds.
transmit-delay seconds	Delay on the local interface of the virtual link in sending LSA.

	The range is from 1 to 65535 in the unit of seconds.
instnace instance-id	Specifies the instance corresponding to the virtual link. No virtual link can be established between different instances. Range: 0.-255
authentication ipsec spi spi [md5 sha1] [0 7] key	Specifies OSPFv3 authentication.  Authentication configuration on two neighboring devices must be consistent. The service password-encryption command enables a key to be displayed in the cipher-text format. spi specifies a security parameter index, in the range from 256 to 4294967295. md5 specifies the MD5 authentication mode. sha1 specifies the SHA1 authentication mode. 0 indicates that a key is displayed in the plain-text format. 7 indicates that a key is displayed in the cipher-text format. key specifies an authentication key.
encryption ipsec spi spi esp null [md5 sha1] [0 7] key	Specifies OSPFv3 encryption authentication.  Authentication configuration on two neighboring devices must be consistent. The service password-encryption command enables a key to be displayed in the cipher-text format. spi specifies a security parameter index, in the range from 256 to 4294967295. null specifies the null encryption mode. md5 specifies the MD5 authentication mode. sha1 specifies the SHA1 authentication mode. 0 indicates that a key is displayed in the plain-text format. 7 indicates that a key is displayed in the cipher-text format. key specifies an authentication key.
authentication ipsec spi spi [md5 sha1] [0 7] key	Specifies OSPFv3 authentication.  Authentication configuration on two neighboring devices must be consistent. The service password-encryption command enables a key to be displayed in the cipher-text format. spi specifies a security parameter index, in the range from 256 to 4294967295. md5 specifies the MD5 authentication mode. sha1 specifies the SHA1 authentication mode. 0 indicates that a key is displayed in the plain-text format. 7 indicates that a key is displayed in the cipher-text format. key specifies an authentication key.

Defaults



No virtual link is defined by default
 hello-interval: 10 seconds; dead-interval: four times of the hello-interval; retransmit-interval: five seconds;
 transmit-interval: one second.
 Authentication and encryption are not performed by default.

Command

Routing process configuration mode

Mode

Usage Guide In the OSPFv3 AS, all the areas must be connected with the backbone area to ensure that they can learn the routes of the whole OSPFv3 AS. If an area cannot be directly connected with the backbone area, it can connect it through a virtual link.

-  The virtual link shall not be in the stub or NSSA area.
-  configuration, **dead-interval** and **instance** shall be configured consistently on both sides of the virtual link neighbors, otherwise neighboring relationship cannot be set up between the virtual neighbors.

Configuration The following example configures a virtual link.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)# area 1 virtual-link 192.1.1.1
```

Related Commands

Command	Description
show ipv6 ospf	Displays the OSPFv3 routing process information.
show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.
show ipv6 ospf virtual-links	Displays the OSPFv3 virtual link information.

Platform N/A

Description

3.8 asbr enable

Use this command to configure the device as ASBR. Use the **no** form of this command to restore the default settings.

- asbr enable**
- no asbr enable**

Parameter Description

Parameter	Description
N/A	

Defaults The device is not ASBR by default

Command

Mode Routing process configuration mode

Usage Guide If the **redistribute** or **default-information** commands are run, OSPF routing device will turn into ASBR automatically. If the above commands are not configured but you want the device to become ASBR, you can configure **asbr enable**. If **asbr enable** is deleted yet **redistribute** or **default-information** is configured, the device is still ASBR.

Configuration The following example configures the device as ASBR.

```
Examples
FS(config)# ipv6 router ospf 1
FS(config-router)# asbr enable
```

Related Commands	Command	Description
------------------	---------	-------------

Platform N/A

Description

3.9 auto-cost

The metric of the OSPFv3 protocol is the interface-based bandwidth. Use this command to enable the bandwidth-based interface metric calculation or modify the reference bandwidth. Use the **no** form of this command to restore the default setting.

auto-cost reference-bandwidth ref-bw

no auto-cost reference-bandwidth

Parameter Description	Parameter	Description
	reference-bandwidth ref-bw	Reference bandwidth in the range from 1 to 4294967 Mbps.

Defaults The interface metric is calculated based on the reference bandwidth, which is 100Mbps.

Command Mode Routing process configuration mode

Usage Guide Use **no auto-cost reference-bandwidth** to restore it to the default reference bandwidth. You can use **ipv6 ospf cost** in the interface configuration mode to set the cost of the specified interface, and it takes precedence over the metric calculated based on the reference bandwidth.

Configuration The following example changes the reference bandwidth to 10M.

```
Examples
ipv6 router ospf 1
auto-cost reference-bandwidth 5
```

Related Commands	Command	Description
	ipv6 ospf cost	Sets the cost of an interface.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform N/A

Description

3.10 bdf all-interfaces

Use this command to enable the BDF on all OSPFv3 interfaces. Use this command to enable the BDF on all OSPFv3 interfaces in the routing configuration mode. Use the **no** form of this command to restore the default setting.

bdf all-interfaces

no bdf all-interfaces

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command

Mode Routing process configuration mode.

Usage Guide The OSPFv3 protocol dynamically discovers the neighbors through the Hello packets. With the BFD function enabled, BFD sessions will be established for the neighbors that match the FULL rules and the status of the neighbors will be detected through the BFD mechanism. Once the BFD neighbor fails, the OSPFv3 will perform the network convergence immediately.

You can also use the interface configuration mode command **ipv6 ospf bfd [disable]** to enable or disable the BFD function on the specified interface, which takes precedence over the command **bdf all-interfaces** in the routing process configuration mode.

Configuration N/A

Examples

Related Commands	Command	Description
	ipv6 router ospf process-id	Enables the OSPFv3 routing process and enter into the routing process configuration mode.
	ipv6 ospf bfd [disable]	Enables or disable the BFD on the specified OSPFv3 interfaces.

Platform N/A

Description

3.11 clear ipv6 ospf process

Use this command to clear and restart the OSPF process.

clear ipv6 ospf { process | process-id }

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
process-id	OSPF process ID, in the range from 1 to 65535

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide In normal case, it is not necessary to use this command.
Use the parameter process-id to clear only one specific OSPFv3 instance. If no process-id is specified, all the OSPFv3 instances will be cleared.

Configuration Examples The following example restarts the OSPF process.

```
enable
clear ipv6 ospf process
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.12 default-information originate

Use this command to generate a default route to the OSPFv3 routing domain in the routing process mode. Use the **no** form of this command to restore the default setting.

default-information originate [**always**] [**metric** metric] [**metric-type** type] [**route-map** map-name]
no default-information originate [**always**] [**metric**] [**metric-type**] [**route-map** map-name]

Parameter Description	Parameter	Description
	always	(Optional) It makes OSPFv3 generate the default route unconditionally, no matter whether the default route exists locally or not.
	metric metric	(Optional) Initial metric value of the default route, in the range from 0 to 16777214
	metric-type type	(Optional) Type of the default route. There are two type of OSPF external routes: type 1, different metrics seen on different routers; type 2, the same metric seen on different routers.
	route-map map-name	Associated route-map name, no associated route-map by default

Defaults No default route is created;
The initial metric value is 1;
The default route type is type 2.

Command Mode Routing process configuration mode

Usage Guide When the **redistribute** or **default-information** command is executed, the OSPFv3-enabled router automatically turns into the autonomous system border router (ASBR). But the ASBR cannot generate the default route automatically or advertise it to all the routers in the OSPFv3 routing domain. The ASBR generates default routes by default. It is required to configure with the routing process configuration command **default-information originate**.

If the **always** parameter is used, the OSPF routing process advertises an external default route to the neighbors, no matter whether the default route in the core routing table exists or not. However, the local router does not display the default route. To make sure whether the default route is generated, execute **show ipv6 ospf database** to observe the OSPF link state database. The execution of the **show ipv6 route** command on the OSPF neighbor will display the default route.

The metric of the external default route can be defined only with the **default-information originate** command and cannot be set with the **default-metric** command.

There are two types of OSPFv3 external routes: type 1 external routes have changeable routing metrics, while type 2 external routes have constant routing metrics. For two parallel routes with the same route metric to the same destination network, type 1 takes precedence over type 2. As a result, the **show ipv6 route** command displays only the type 1 route.

This command generates a default route of Type-5 LSA, which will not be flooded to the NSSA area. To generate a default route in the NSSA area, use the **area nssa default-information-originate** command. The routers in the stub area cannot generate external default routes.

Configuration Examples The following example generates a default route.

```
default-information originate always
```

Related Commands

Command	Description
redistribute	Redistribute routes.
show ipv6 ospf	Displays the OSPFv3 routing process information.
show ipv6 ospf database	Displays the OSPFv3 link state database information.

Platform Description N/A

3.13 default-metric

Use this command to set the default metric for the routes to be redistributed. Use the **no** form of this command to restore the default setting

default-metric metric-value

no default-metric

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
metric-value	Default metric for the routes to be redistributed. Its range is from 1 to 16777214.

Defaults The default is 20.

Command

Mode The default route type is type 2.

Usage Guide This command can be used together with **redistribute** to set the default metric for the routes to be redistributed. But this command does not apply to two types of routes:

- The **default route generated** with default-information originate;
- The redistributed direct route, for which 20 is always the default metric value.

Configuration The following example sets the default metric for the routes to be redistributed to 10.

Examples

```
default-metric 10
```

Related Commands	Command	Description
	redistribute	Redistributes the routes.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform N/A

Description

3.14 distance

Use this command to set the management distance corresponding to different types of OSPFv3 routes. Use the **no** form of this command to restore the default setting.

distance { distance | **ospf** { **intra-area** distance | **inter-area** distance | **external** distance } }

no distance [**ospf**]



Parameter Description	Parameter	Description
	distance	Sets the management distance of the route, in the range from 1 to 255.
	intra-area distance	Sets the management distance of the intra-area route, in the range from 1 to 255.
	inter-area distance	Sets the management distance of the inter-area route, in the range from 1 to 255.
	external distance	Sets the management distance of the external route, in the range from 1 to 255.

Defaults The default value is 110.

Management distance of the intra-area route :110,
 Management distance of the inter-area route :110
 Management distance of the external-area route: 110.

Command Mode Routing process configuration mode.

Usage Guide This command is used to specify different management distances for different types of OSPFv3 routes. The management distance of the route is used for the comparison of routing priority, the smaller the management distance is, the higher the routing priority.

-  The priority of the route generated by different OSPFv3 processes must be compared using the management distance.
-  Setting the management distance as 255 indicates the routing entry is unreliable and will not for the packet forwarding.

Configuration Examples the following example sets the OSPFv3 external route management distance to 160.

```
FS(config)# ipv6 router ospf 20
FS(config-router)# distance ospf external 160
```

Related Commands

Command	Description
ipv6 router ospf	Enables the OSPFv3 routing process .

Platform N/A
Description

3.15 distribute-list in

Use this command to filter routes that are computed based on Link State Advertisement (LSA). Use the **no** form of this command to restore the default setting.

distribute-list { name | **prefix-list** prefix-list-name } **in** [interface-type interface-number]
no distribute-list { name | **prefix-list** prefix-list-name } **in** [interface-type interface-number]

Parameter Description

Parameter	Description
name	Specifies an ACL filtering rule.
prefix-list prefix-list-name	Specifies a prefix list filtering rule.
interface-type interface-number	Specifies an interface on which LSA-based routes are filtered.

Defaults Routes are not filtered by default.

Command Mode Routing process configuration mode

Usage Guide Filter the routes computed based on LSA. Only the routes meeting filtering conditions can be forwarded. Route filtering does not affect the link state database and the routing tables of the neighbors. The ACL and prefix list filtering rules cannot be set at the same time. You can set only the ACL filtering rule or the prefix list filtering rule for a specific interface.

The routing filtering rules affect only forwarding of local routes but not route computation based on LSA. When route filtering is configured on an ABR, LSA can still compute routes and generate and send inter-area LSAs with prefixes to other areas. This will cause blackhole routes. To prevent the generation of blackhole routes, you can run the **area range** command with the **not-advertise** keyword.

Configuration The following example filters routes that are computed based on Link State Advertisement (LSA).

```

Examples
FS(config)# ipv6 prefix-list aaa seq 10 permit 2001::/64
FS(config)# ipv6 router ospf 25
FS(config-router)# redistribute rip metric 100
FS(config-router)# distribute-list prefix-list aaa in ethernet 0/1
    
```

Related Commands

Command	Description
area range	Configures route aggregation in an area.

Platform N/A

Description

3.16 distribute-list out

Use this command to filter routes that are re-distributed. This command has the similar function as the **redistribute** command. Use the **no** form of this command to restore the default setting.

distribute-list { name | **prefix-list** prefix-list-name } **out** [**bgp** | **connected** | **isis** [area-tag]] | **ospf** process-id | **rip** | **static**]

no distribute-list { name | **prefix-list** prefix-list-name } **out** [**bgp** | **connected** | **isis** [area-tag]] | **ospf** process-id | **rip** | **static**]

Parameter Description

Parameter	Description
name	Specifies the ACL filtering rule.
prefix-list prefix-list-name	Specifies the prefix list filtering rule.
bgp connected isis [area-tag] ospf process-id rip static	Specifies the source from which the routes are filtered.

Defaults Routes are not filtered by default.

Command Mode Routing process configuration mode

Usage Guide The **distribute-list out** command has the similar function as the **redistribute route-map** command. It can be used to filter the routes that are re-distributed based on other protocols into an OSPFv3 area. It does not directly re-distribute routes but works with the **redistribute** command to re-distribute routes. The ACL and prefix list filtering rules cannot be configured at the same time. You can set only the ACL filtering rule or the prefix list filtering rule to filter the routes from a specific source.

Configuration The following example filters static routes that are re-distributed.

```
Examples
FS(config)# ipv6 router ospf 1
FS(config-router)# redistribute static subnets
FS(config-router)# distribute-list prefix-list jjj out static
```

Related Commands	Command	Description
	redistribute	

Platform N/A

Description

3.17 enable mib-binding

Use this command to bind MIB to a specific OSPFv3 process. Use the **no** form of this command to restore the default setting.

enable mib-binding

no enable mib-binding

Parameter Description	Parameter	Description
		N/A

Defaults MIB is bound to an OSPFv3 process with the smallest process number by default.

Command Mode Routing process configuration mode

Usage Guide OSPFv3 MIB has no configuration information about OSPFv3 processes. You can operate only one OSPFv3 process through SNMP. OSPFv3 MIB is bound to the OSPFv3 process with the smallest process number by default. Users' operations take effect on this process. To operate a specific OSPFv3 process through SNMP, you can bind OSPFv3 MIB to the process.

Configuration Examples The following example enables users to operate the OSPFv3 process with the process number of 100 through SNMP.

```
FS(config)# ipv6 router ospf 100
```

```
FS(config-router)# enable mib-binding
```

Related Commands

Command	Description
show ipv6 ospf	Displays global OSPFv3 configuration information.
enable traps	Enables the OSPFv3 trap function.

Platform N/A
Description

3.18 enable traps

OSPFv3 processes support eight types of trap information, which are classified into two categories. Use this command to send specific trap information. Use the **no** form of this command to restore the default setting.

enable traps [**error** [**IfConfigError** | **IfRxBadPacket** | **VirtIfConfigError** | **VirtIfRxBadPacket**] | **state-change** [**IfStateChange** | **NbrStateChange** | **NssaTranslatorStatusChange** | **VirtIfStateChange** | **VirtNbrStateChange**]]

no enable traps [**error** [**IfConfigError** | **IfRxBadPacket** | **VirtIfConfigError** | **VirtIfRxBadPacket**] | **state-change** [**IfStateChange** | **NbrStateChange** | **NssaTranslatorStatusChange** | **VirtIfStateChange** | **VirtNbrStateChange**]]

Parameter Description

Parameter	Description
Error	<p>Configures all error-related trap types. This keyword can also specify the following types of error traps:</p> <ul style="list-style-type: none"> IfConfigError Specifies an interface parameter error; IfRxBadPacket Specifies incorrect packets received by an interface; VirtIfConfigError Specifies a parameter error on a virtual interface; VirtIfRxBadPacket Specifies incorrect packets received by a virtual interface.
state-change	<p>Configures all traps related to state change. This keyword can also specify the following traps related to state change:</p> <ul style="list-style-type: none"> IfStateChange Specifies state change of an interface; NbrStateChange Specifies state change of a neighbor; NssaTranslatorStatusChange Specifies status change of the NSSA translator. VirtIfStateChange Specifies state change of a virtual interface; VirtNbrStateChange Specifies state change of a virtual neighbor.

Defaults All traps are disabled by default.

Command Mode Routing process configuration mode

Usage Guide Before configuring this command, you must run the **snmp-server enable traps ospf** command; otherwise, OSPFv3 trap information cannot be sent correctly. This is because the function of this command is restricted by the **snmp-server** command.
You can synchronously enable the trap function of different processes even if MIB is not bound to these processes.

Configuration Examples The following example enables all traps of OSPFv3 process 100.

```
FS(config)#ipv6 router ospf 100
FS(config-router)# enable traps
```

Related Commands

Command	Description
show ipv6 ospf	Displays global OSPFv3 configuration information.
enable mib-binding	Binds MIB to an OSPFv3 process.
snmp-server enable traps ospf	Enables OSPFv3 to send trap information.

Platform N/A

Description

3.19 graceful-restart

Use this command to enable the OSPFv3 graceful restart (GR) function and to set the GR period. Use the **no** form of this command to restore the default setting.

graceful-restart [**grace-period** grace-period | **inconsistent-lsa-checking**]

no graceful-restart [graceful-period]

Parameter Description

Parameter	Description
grace-period grace-period	Configures the GR period. The GR period is the longest interval that lasts from the moment when OSPFv3 fails to the moment when OSPFv3 gracefully restarts. The GR period is in the range from 1 to 1800 in the unit of seconds. The default is 120.
inconsistent-lsa-checking	Configures the topology change detection. Once the topology change is detected, the device will exit GR and finish the convergence, This function is enabled by default after GR is enabled.

Defaults This function is enabled by default.

Command

Mode Routing process configuration mode

Usage Guide

GR is configured based on the OSPFv3 instance. Different instances could be configured with different parameters.

Use this command to configure the GR period. The GR period is the longest interval that lasts from the moment when OSPFv3 fails to the moment that OSPFv3 gracefully restarts. In this period, the device will perform link reconstruction to restore OSPFv3. When the GR period expires, OSPFv3 exits GR and finishes regular operation. To enable the GR function and set the GR period to the 120 seconds, use the **graceful-restart** command. To modify the GR period, use the **graceful-restart grace-period** command. Topology stability is indispensable for uninterrupted forwarding. If topology changes, OSPFv3 finishes convergence instead of continuing GR to avoid long time interruption

1) Disabling the topology change detection: If the topology cannot converge in time in the hot backup process, the long term forwarding interruption may occur.

2) Enabling the topology change detection: Forwarding interruption may occur but the interruption time is much shorter than the time it takes to disable topology detection.

It is not recommended to disable the topology change detection. In some scenario where long term forwarding interruption does not occur, disabling the topology change detection minimizes the forwarding interruption time.

The GR function is unavailable when the Fast Hello function is enabled.

Configuration

The following example enables GR for OSPFv3 instance 1 and sets the GR period to 60 seconds.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)# graceful-restart
FS(config-router)# graceful-restart grace-period 60
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

3.20 graceful-restart helper

Use this command to enable the OSPFv3 graceful restart helper function. Use the **no** form of this command to disable this function.

graceful-restart helper disable

no graceful-restart helper disable

Use this command configure the topology change detection method of OSPFv3 GR helper. Use the **no** form of this command to cancel the configuration.

graceful-restart helper { strict-lsa-checking | internal-lsa-checking }

no graceful-restart helper { strict-lsa-checking | internal-lsa-checking }

Parameter Description	Parameter	Description
	disable	Disables the device to assist other devices in performing GR.
	strict-lsa-checking	Checks the change of the LSA of types 1-5 and 7 to judge whether the network topology changes. If the topology changes, the GR helper function will be disabled.
	internal-lsa-checking	Checks the change of the LSA of types 1-3 to judge whether the network topology changes. If the topology changes, the GR helper function will be disabled.

Defaults The GR helper is enabled by default.
 The device where the GR helper is enabled does not check the LSA change by default.

Command

Mode Routing process configuration mode

Usage Guide

Use this command to enable the GR helper function. When one neighbor device performs graceful restart, the Grace-LSA is advertised to all neighbors. If the device enabled with the GR helper receives the Grace-LSA, it will become the GR Helper to help the neighbors perform GR. The **disable** option means that it is not allowed to perform the GR helper function for any device in GR.

The GR helper does not perform the network change detection by default. The convergence is not performed again until the GR is implemented even if the network changes. Use the **strict-lsa-checking** or **internal-lsa-checking** command to enable the device to detect the change of network topology during the GR. The former checks any LSA (types 1-5,7) that stands for the network information, the latter checks the LSA that stands for the AS inner-area route. In the large scale network, it is not recommended to enable the LSA check option because the partial network changes trigger the ending of the GR, decreasing the convergence speed of the entire network.

Configuration Examples The following example disables the GF helper function of the OSPFv3 instance 1 and modifies the topology change detection policy.

```
FS(config)# ipv6 router ospf 1
FS(config-router)# graceful-restart helper disable
FS(config-router)# no graceful-restart helper disable
FS(config-router)# graceful-restart helper strict-lsa-checking
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

3.21 ipv6 ospf area

Use this command to enable the interface to participate in the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

ipv6 ospf process-id **area** area-id [**instance** instance-id]

no ipv6 ospf process-id **area** [**instance** instance-id]

Parameter Description	Parameter	Description
	process-id	OSPF process ID.
	area area-id	OSPFv3 area in which the interface participates. It can be an integer or an IPv4 prefix.
	instance instance-id	Configures the specific OSPFv3 instance on the interface.

Defaults This function is disabled by default.

Command Mode Interface configuration mode.

Usage Guide You can use this command to enable the OSPFv3 on an interface, and then configure the OSPFv3 process with **ipv6 router ospf**. it will be automatically started after this command is used., it will be automatically started after this command is used.

Use **no ipv6 ospf area** to disable the specified interface to participate in the OSPFv3 routing process.

Use **no ipv6 router ospf** to disable all the interfaces to participate in the OSPFv3 routing process.

The neighbor relationship can only be established between the routers with the same instance ID.

After this command is configured, all the prefix information on the interface will be used in the operation of the OSPFv3.

Configuration Examples The following example starts the OSPFv3 process on int fastethernet 0/0 for the specified area of the specified instance.

```
int fastethernet 0/0
ipv6 ospf 1 area 2 instance 2
```

Related Commands	Command	Description
	ipv6 router ospf	Starts the OSPFv3 routing process.
	passive-interface	Setsthe a passive interface.
	show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform Description N/A

3.22 ipv6 ospf authentication

Use this command to configure OSPFv3 interface authentication. Use the **no** form of this command to restore the default setting.

ipv6 ospf authentication [**null** | **ipsec spi** spi [**md5** [string-key] | **sha1**] [**0** | **7**] key]
no ipv6 ospf authentication

Parameter Description


Parameter	Description
null	Indicates that authentication is not performed.
spi	Specifies a security parameter index, in the range from 256 to 4294967295.
md5	Specifies the MD5 authentication mode.
string-key	Indicates that MD5 authentication key supports special characters.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
key	Specifies an authentication key.

Defaults Authentication is not performed by default.

Command Mode Interface configuration mode

Usage Guide FSOS supports three authentication modes:

- null authentication mode, which is configured when authentication is not needed
- MD5 authentication mode
- SHA1 authentication mode

 OSPFv3 authentication parameters configured on interconnected interfaces must be consistent.

Configuration Examples The following example specifies MD5 authentication in OSPFv3 interface configuration mode and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
FS(config-if)# ipv6 ospf authentication ipsec spi 300 md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
ipv6 ospf authentication	Specifies interface authentication.
area virtual-link authentication	Specifies virtual link authentication.

Platform Description N/A

3.23 ipv6 ospf bfd

Use this command to enable or disable the BFD on the specified OSPFv3-enabled interface. Use the **no** form of this command to restore the default setting.

ipv6 ospf bfd [**disable**] [**instance** instance-id]

no ipv6 ospf bfd [**instance** instance-id]

Parameter Description

Parameter	Description
disable	Disables the BFD function on the specified OSPF interface.
instance instance-id	Configures the specified OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults No configuration is made by default. The BFD configuration in the OSPFv3 process configuration mode will apply.

Command

Mode Interface configuration mode.

Usage Guide

The command `ipv6 ospf bfd` in the interface configuration mode takes precedence over the **bfd all-interfaces** command in the routing process configuration mode.

You can use this command to enable the BFD on the specified interface according to the actual environment, also can use the command **bfd all-interfaces** in the OSPFv3 process configuration mode to enable the BFD function on all OSPFv3 interfaces and use the command `ip v6 ospf bfd disable` to disable the BFD on the specified interface.

Configuration N/A

Examples

Related Commands

Command	Description
ipv6 router ospf process-id	Starts the OSPFv3 routing process and enter into the routing process configuration mode.
bfd all-interfaces	Enables the BFD on all OSPFv3 interfaces.

Platform N/A

Description

3.24 ipv6 ospf cost

Use this command to set the cost of the interface. Use the **no** form of this command to restore the default setting

ipv6 ospf cost cost [**instance** instance-id]

no ipv6 ospf cost [**instance** instance-id]

Parameter

Parameter	Description
-----------	-------------

Description	
Cost	Cost of interface, in the range from 0 to 65535.
instance instance-id	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults The default interface cost is the reference bandwidth/Bandwidth (100Mbps by default).

Command Mode Interface configuration mode.

Usage Guide By default, the cost of the OSPFv3 interface is 100Mbps/Bandwidth, in which the Bandwidth is the bandwidth of the interface and configured with the command **bandwidth** in the interface configuration mode. The default costs of OSPFv3 interfaces for several typical lines are:

- 64K serial line: 1562;
- E1 line: 48
- 10M Ethernet: 10
- 100M Ethernet: 1

The OSPFv3 cost configured with the command **ipv6 ospf cost** will overwrite the default configuration.

Configuration Examples The following example sets the cost of the interface to 1:

```
ipv6 ospf cost 1
```

Related Commands	Command	Description
	show ipv6 ospf interface	
ipv6 ospf area		Sets the interface to participate in the OSPFv3 routing process.

Platform N/A

Description

3.25 ipv6 ospf dead-interval

Use this command to set a dead interval of neighbors on an interface. If no hello packet is received from a neighbor within the interval, the neighboring relationship is considered to fail. Use the **no** form of this command to restore the default setting

ipv6 ospf dead-interval { seconds | **minimal hello-multiplier** multiplier } [**instance** instance-id]

no ipv6 ospf dead-interval [**instance** instance-id]

Parameter Description	Parameter	Description
	seconds	

minimal hello-multiplier multiplier	Enables the fast hello function, which takes 1s as the dead interval of neighbors. Multiplier specifies the number of hello packets sent in one second, in the range from 3 to 20.
instance instance-id	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults If the fast hello function is not enabled, the dead interval of neighbors is four times longer than the hello interval.

If the hello interval is changed, the dead interval of neighbors varies automatically.

Command Mode Interface configuration mode

Usage Guide The dead interval of neighbors must be longer than the hello interval.
The OSPFv3 fast hello function allows OSPFv3 to fast discovery neighbors and detect whether neighboring relationships are valid. To enable the OSPFv3 fast hello function, you can specify the **minimal** and **hello-multiplier** keywords and the multiplier parameter in this command. **minimal** specifies the deal interval of neighbors to be 1s; **hello-multiplier** specifies the number of times that hello packets are sent in a second. Therefore, this configuration reduces the hello interval to be shorter than 1s.
If an interface is enabled with the fast hello function, the **hello-interval** field of hello packets to be advertised by this interface is set to 0, and that of hello packets received from this interface is omitted.

dead-interval, **minimal**, and **hello-multiplier** that are introduced to enable the fast hello function cannot be configured together with **hello-interval**.

No matter whether the fast hello function is configured, the dead interval of neighbors on the interconnected interfaces of neighbors must be consistent. The values of **hello-multiplier** on the interconnected interfaces can be different but you must ensure that at least one hello packet is received within the dead interval of neighbors. You can use the **show ipv6 ospf interface** command to monitor the dead interval of neighbors and the fast hello interval on an interface.

Configuration Examples The following example sets the dead interval of neighbors to 60 seconds on an interface.

```
ipv6 ospf dead-interval 60
```

Related Commands

Command	Description
ipv6 ospf hello-interval	Sets the interval for sending the Hello message on an interface.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process

Platform Description N/A

3.26 ipv6 ospf encryption

Use this command to enable OSPFv3 encryption authentication on an interface. Use the **no** form of this command to restore the default setting.

ipv6 ospf encryption [**null** | **ipsec spi spi esp null** [**md5** | **sha1**] [**0** | **7**] key]
no ipv6 ospf encryption

Parameter Description

Parameter	Description
null	Indicates that encryption authentication is not performed.
spi	Specifies a security parameter index, in the range from 256 to 4294967295.
null	Specifies the null encryption mode.
md5	Specifies the MD5 authentication mode.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
key	Specifies an authentication key.

Defaults Encryption authentication is not performed by default.

Command Mode Interface configuration mode

Usage Guide FSOS supports the null encryption mode and two authentication modes: MD5 and SHA1.

OSPFv3 encryption authentication parameters configured on interconnected interfaces must be consistent.

Configuration Examples The following example specifies null encryption and MD5 authentication in OSPFv3 interface configuration mode and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
FS(config-if)# ipv6 ospf encryption ipsec spi 300 esp null md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
area encryption	Specifies area encryption authentication.
area virtual-link encryption	Specifies virtual link encryption authentication.

Platform Description N/A

3.27 ipv6 ospf hello-interval

Use this command to set the interval for the interface to send the Hello message. Use the **no** form of this command to restore the default setting

ipv6 ospf hello-interval seconds [**instance** instance-id]
no ipv6 ospf hello-interval [**instance** instance-id]

Parameter Description	Parameter	Description
	seconds	Interval for sending the Hello message. Its range is from 1 to 65535 in the unit of seconds.
	instance instance-id	Configures the specific OSPFv3 instance on the interface.

Defaults The broadcast network and point-to-point network :10 seconds. The point-to-multipoint network and NBMA network :30 seconds.

Command

Mode Interface configuration mode.

Usage Guide The same hello sending intervals must be set for the neighbors, otherwise the normal adjacency cannot be established.

The dead-interval minimal hello-multiplier and hello-interval parameters for Fast Hello cannot be configured simultaneously.

Configuration Examples The following example sets the interval for the interface to send the Hello message to 20 seconds.

```
ipv6 ospf hello-interval 20
```

Related Commands

Command	Description
ipv6 ospf dead-interval	Sets the interval for the interface to consider that the neighbor fails.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform N/A

Description

3.28 ipv6 ospf mtu-ignore

Use this command to ignore the MTU check when an interface receives the database description message. Use the **no** form of this command to restore the default setting.

ipv6 ospf mtu-ignore [instance instance-id]
no ipv6 ospf mtu-ignore [instance instance-id]

Parameter Description	Parameter	Description
	instance instance-id	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults The MTU check is enabled by default.

Command

Mode Interface configuration mode.

Usage Guide After receiving the database description message, the OSPFv3 device will check whether the MTU of neighbor interface is the same as its own MTU. If the received database description message indicates an MTU greater than its own interface's MTU, the neighbor relationship cannot be established. This can be fixed by disabling the MTU check.

Configuration The following example disables the MTU check function on the ethernet 1/0.

Examples

```
FS(config)# interface ethernet 1/0
FS(config-if)# ipv6 ospf mtu-ignore
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
ipv6 mtu	Sets the value of IPv6 MTU of the interface.

Platform N/A

Description

3.29 ipv6 ospf neighbor

Use this command to configure the OSPFv3 neighbor manually. Use the **no** form of this command to restore the default setting.

ipv6 ospf neighbor ipv6-address [[**cost** <1-65535>] [**poll-interval** <0-2147483647> | **priority** <0-255>]]
 [**instance** instance-id]

no ipv6 ospf neighbor ipv6-address [[**cost** <1-65535>] [**poll-interval** < 0-2147483647 > | **priority** < 0-255 >]]
 [**instance** instance-id]

Parameter Description

Parameter	Description
cost cost	(Optional) Configures the cost to each neighbor in point-to-multipoint network. It is not defined by default, where the cost configured on the interface will be used. It ranges from 1 to 65535. Only the networks of the point-to-multipoint type support this option.
poll-interval seconds	(Optional) Interval for polling the neighbors (in seconds), which ranges from 1 to 2147483647. Only the networks of the non-broadcast (NBMA) type support this option.
priority priority	(Optional) Configures the priority value of non-broadcast network neighbors, which ranges from 0 to 255. Only the non-broadcast (NBMA) type network supports this option.

instance instance-id	(Optional) Configures the specific OSPFv3 instance on the interface, which ranges from 0 to 255.
-----------------------------	--

Defaults No neighbor is defined;
 Neighbor polling interval: 120 seconds;
 Priority value of non-broadcast network neighbor: 0.

Command

Mode Interface configuration mode.

Usage Guide You can set relevant parameters for the neighbors depending on the actual network type.

Configuration Examples The following example shows how to configure the OSPFv3 neighbor in NBMA network as follows: IPv6 address: fe80::2d0:f8ff:fe22:3533, priority value: 1, polling interval: 150 seconds.

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ipv6 ospf network non-broadcast
FS(config-if)#ipv6 ospf neighbor fe80::2d0:f8ff:fe22:3533 priority 1 poll-interval 150
```

Related Commands

Command	Description
ipv6 ospf priority	Sets the priority value of an interface.
ipv6 ospf network	Sets the network type of an interface.

Platform N/A

Description

3.30 ipv6 ospf network

Use this command to set the network type of the interface. Use the **no** form of this command to restore the default setting.

ipv6 ospf network { **broadcast** | **non-broadcast** | **point-to-point** | **point-to-multipoint** [**non-broadcast**] }
 [**instance** instance-id]

no ipv6 ospf network [**broadcast** | **non-broadcast** | **point-to-point** | **point-to-multipoint** [**non-broadcast**]]
 [**instance** instance-id]

Parameter Description

Parameter	Description
broadcast	Specifies the broadcast network type.
non-broadcast	Specifies the non-broadcast network type.
point-to-point	Specifies the point-to-point network type.
point-to-multipoint	Specifies the point-to-multipoint network type.
point-to-multipoint non-broadcast	Specifies the point-to-multipoint non-broadcast network type.
instance instance-id	Configures the specific OSPFv3 instance on the interface with the valid id

	range from 0 to 255.
--	----------------------

Defaults Point-to-point network type: PPP, SLIP, frame relay point-to-point sub-interface and X.25 point-to-point sub-interface encapsulation.
 NBMA network type: frame relay(except for the point-to-point sub-interface) and X.25 encapsulation (except for the point-to-point sub-interface)
 Broadcast network type: Ethernet encapsulation.
 The point-to-multipoint network type is not the default type.

Command Mode Interface configuration mode.

Usage Guide You can set the network type of the interface according to the actual link type applied and the topology.

Configuration Examples The following example sets the network type of the interface that participates in the OSPFv3 to point-to-point.

```
ipv6 ospf network point-to-point
```

Related Commands

Command	Description
ipv6 ospf priority	Sets the interface priority.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform Description N/A

3.31 ipv6 ospf priority

Use this command to set the interface priority. Use the **no** form of this command to restore the default setting.

ipv6 ospf priority number-value [**instance** instance-id]

no ipv6 ospf priority [**instance** instance-id]

Parameter Description

Parameter	Description
number-value	The priority of the interface. Its range is from 0 to 255.
instance instance-id	Configures the specific OSPFv3 instance on the interface. Its range is from 0 to 255.

Defaults The default priority is 1.

Command Mode Interface configuration mode.

Usage Guide In the broadcast network type, it is necessary to elect the DR/BDR. In electing the DR/BDR, the device of a higher priority is preferred. If several devices are of the same priority, the one with the largest router-ID is preferred. The device with the priority level of 0 does not participate in the election of DR/BDR.

Configuration The following example disables the interface from being elected as the DR/BDR.

Examples `ipv6 ospf priority 0`

Related Commands

Command	Description
ipv6 ospf network	Sets the network type of an interface.
router-id	Sets the ID of a router.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
instance instance-id	Configures the specific OSPFv3 instance on the interface.

Platform N/A

Description

3.32 ipv6 ospf retransmit-interval

Use this command to set the interval for the interface to retransmit the LSA. Use the **no** form of this command to restore the default setting.

ipv6 ospf retransmit-interval seconds [**instance** instance-id]

no ipv6 ospf retransmit-interval [**instance** instance-id]

Parameter Description

Parameter	Description
seconds	Interval for retransmitting the LSA. Its range is from 1 to 65535 in the unit of seconds.
instance instance-id	Configures the specific OSPFv3 instance on the interface.

Defaults The default is five seconds.

Command

Mode Interface configuration mode.

Usage Guide To ensure the reliability of the routing information transmission, the LSA sent to the neighbor shall be acknowledged by the neighbor. You can use this command to set the interval for the acknowledgement by the neighbor. If no acknowledgement is received within the specified period, the LSA information will be retransmitted.

Configuration The following example sets the interval for retransmitting the LSA to 10 seconds.

Examples `ipv6 ospf retransmit-interval 10`

Related Commands	Command	Description
	show ipv6 ospf interface	Displays the OSPFv3 interface information.
	ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform N/A
Description

3.33 ipv6 ospf transmit-delay

Use this command to set the delay on the interface in sending the LSA. Use the **no** form of this command to restore the default setting.

ipv6 ospf transmit-delay seconds [**instance** instance-id]
no ipv6 ospf transmit-delay [**instance** instance-id]

Parameter Description	Parameter	Description
	seconds	The delay in sending LSA. Its range is from 1 to 65535 in the unit of seconds.
	instance instance-id	Configures the ID of a specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults The default is one.

Command Mode Interface configuration mode.

Usage Guide Use this command to set the delay on the interface in transmitting the LSA.

Configuration Examples The following example sets the delay on the interface in transmitting the LSA.

```
ipv6 ospf transmit-delay 2
```

Related Commands	Command	Description
	show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform N/A
Description

3.34 ipv6 router ospf

Use this command to start the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

ipv6 router ospf
ipv6 router ospf process-id [**vrf** vrf-name]
no ipv6 router ospf process-id

Parameter Description	Parameter	Description
	process-id	OSPFv3 process ID number. Without the process number configured, it indicates that process 1 is started.
	vrf-name	Specifies the VRF that OSPFv3 process belongs to.

Defaults No OSPFv3 routing process is started.

Command

Mode Global configuration mode.

Usage Guide After the OSPFv3 process is started, the routing process configuration mode is entered.
 At present, our products support up to 32 OSPFv3 processes.

Configuration The following example starts OSPFv3 process in the specified VRF VPN1.

Examples

```
FS(config)# ipv6 router ospf 1 vrf vpn_1
```

Related Commands	Command	Description
	ipv6 ospf area	Configures an interface to participate in the OSPFv3 routing process.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform N/A

Description

3.35 ipv6 router ospf max-concurrent-dd

Use this command to set the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes. Use the **no** form of this command to restore the default setting.

ipv6 router ospf max-concurrent-dd number
no ipv6 router ospf max-concurrent-dd

Parameter Description	Parameter	Description
	number	Maximum concurrent interacting neighbors, in the range from 1 to 65535.

Defaults The default is 5.

Command Global configuration mode

Mode

Usage Guide When a router is exchanging data with multiple neighbors at the same time which affects its performance, by configuring this command, the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes can be restricted.

Configuration Examples The following example sets the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes to 4. The result is that in the interaction between a large number of neighbors, interactions with up to 4 neighbors are allowed to be initiated on this device concurrently, and interactions initiated by up to 4 neighbors are allowed to be received concurrently. That is, interaction with up to 8 neighbors is allowed on this device.

```
FS#conf terminal
FS(config)#ipv6 router ospf max-concurrent-dd 4
```

Related Commands

Command	Description
max-concurrent-dd	Sets the maximum concurrent interacting neighbors in the OSPFv3 processes

Platform N/A
Description

3.36 ipv6 router ospf compatible lsa type-9

Use this command to add IPv6 prefix to type-9 LSA in OSPFv3 routing processes. Use the **no** form of this command to restore the default settings.

ipv6 router ospf compatible lsa type-9
no ipv6 router ospf compatible

Parameter Description

Parameter	Description

Defaults By default, if the mask length is divisible by 32, type-9 LSA carries IPv6 prefix; otherwise, it carries IPv6 address.

Command Mode Global configuration mode

Usage Guide When a routing device is connected with quagga or other vendors' products, its LSA carries specific IPv6 address, but quagga carries IPv6 prefix, so the connection fails. Run this command so that the LSA advertised by the routing device carries IPv6 prefix.

Configuration Examples The following example adds IPv6 prefix to type-9 LSA in all OSPFv3 routing processes

```
FS(config)#ipv6 router ospf compatible lsa type-9
```


Related Commands	Command	Description

Platform N/A
Description

3.37 log-adj-changes

Use this command to enable the logging of adjacency changes. Use the **no** form of this command to restore the default setting.

log-adj-changes [detail]
no log-adj-changes [detail]

Parameter Description	Parameter	Description
		detail

Defaults By default, the adjacency state log on the entry of or exit from the FULL state is output.

Command Mode Routing process configuration mode

Usage Guide N/A

Configuration Examples The following example turns on the log of adjacency state change.

```
FS(config)# router ospf 1
FS(config)# log-adj-changes detail
```

Related Commands	Command	Description
		show ipv6 ospf

Platform N/A
Description

3.38 max-concurrent-dd

Use this command to set the maximum number of DD packets that can be processed concurrently in the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

max-concurrent-dd number
no max-concurrent-dd

Parameter Description	Parameter	Description

number	Maximum number of DD packets that can be processed concurrently, in the range from 1 to 65535.
--------	--

Defaults The default is 5.

Command

Mode Routing process configuration mode.

Usage Guide When a router is exchanging data with multiple neighbors at the same time which affects its performance, by configuring this command, the maximum concurrent interacting neighbors allowed in each OSPFv3 instance can be restricted.

Configuration Examples The following example sets the maximum concurrent interacting neighbors allowed in the current OSPFv3 routing process to 4. The result is that in the interaction between a large number of neighbors, interactions with up to 4 neighbors are allowed to be initiated on this device concurrently, and interactions initiated by up to 4 neighbors are allowed to be received concurrently. That is, interaction with up to 8 neighbors is allowed on this device.

```
router ipv6 ospf 1
max-concurrent-dd 4
```

Related Commands

Command	Description
ipv6 router ospf max-concurrent-dd	Sets the maximum concurrent interacting neighbors allowed in the OSPFv3 processes.

Platform N/A

Description

3.39 nsr

Use this command to enable the non-stop routing (NSR) function. Use the **no** form of this command to restore the default settings.

nsr

no nsr

Parameter Description

Parameter	Description
N/A	N/A

Defaults The NSR function is disabled by default.

Command

Routing process configuration mode

Mode

Default Level 14

Usage Guide The NSR backs up relevant OSPFv3 information from the master Supervisor Engine to the slave Supervisor Engine of a distributed device, or from the master device to the slave device in a Virtual Switching Unit (VSU). In this way, the device can automatically recover the link status and re-generate a route upon an active/standby switchover, without requiring assistance from neighbor devices during the recovery. Information such as the neighbor relationship and link status needs to be backed up.

For the same OSPFv3 instance, either NSR or GR is enabled because they are mutually exclusive. Nevertheless, when NSR is enabled, the GR helper capability is still supported.

The switchover of distributed devices and VSU devices takes a period of time. If the OSPFv3 neighbor keepalive duration is shorter than the switchover duration, the OSPFv3 neighbor relationship with the neighbor device is removed, and services are interrupted during the switchover. Therefore, it is recommended that the OSPFv3 neighbor keepalive duration be no less than the default value when the NSR function is enabled. When Fast Hello is enabled, the OSPFv3 neighbor keepalive duration is less than 1 second and the OSPFv3 neighbor relationship times out during a switchover, causing NSR invalidity. Therefore, it is recommended that Fast Hello be disabled when NSR is enabled.

Configuration The following example configures the NSR function.

```
Examples FS(config)# ipv6 router ospf 1
FS(config-router)# nsr
```

Verification Run the **show ipv6 ospf** command to check whether the NSR function is enabled.

Common Errors The neighbor keepalive duration is short. When Fast Hello is enabled, the OSPFv3 neighbor relationship times out during a switchover, causing forwarding interruption.

3.40 passive-interface

Use this command to set the passive interface. Use the **no** form of this command to restore the default setting.

```
passive-interface { default | interface-type interface-number }
no passive-interface { default | interface-type interface-number }
```

Parameter Description	Parameter	Description
	default	Sets all the interfaces to passive ones.
	interface-type interface-number	Sets the specified interface to a passive one.

Defaults No passive interface is set by default.

Command Mode Routing process configuration mode

Usage Guide After an interface is set to a passive one, it no longer receives or sends the hello message. This command applies to the interfaces participating in the OSPFv3 but not to the virtual links.

Configuration The following example enables only the VLAN1 interface to participate in the OSPFv3 process.

Examples

```
passive-interface default
no passive-interface vlan 1
```

Related Commands	Command	Description
	ipv6 ospf area	Configures an interface to participate in the OSPFv3 routing process.
	show ipv6 ospf	Displays the OSPFv3 routing process information.
	show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.

Platform N/A

Description

3.41 redistribute

Use this command to start the route redistribution in order to import the routing information of other routing protocols to the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static** } [{ **level-1** | **level-1-2** | **level-2** }]
match { **internal** | **external** [1 | 2] | **nssa-external** [1 | 2] } | **metric** metric-value | **metric-type** { 1 | 2 } |

route-map route-map-name | **tag** tag-value]

no redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **rip** | **static** } [{ **level-1** | **level-1-2** | **level-2** }]
match { **internal** | **external** [1|2] | **metric** | **metric-type** { 1|2 } | **route-map** route-map-name | **tag** tag-value]

Parameter Description	Parameter	Description
	bgp	The bgp protocol is redistributed.
	connected	The directly connected route is redistributed.
	isis [area-tag]	The isis is redistributed. The area-tag specifies a particular isis instance.
	ospf process-id	The ospf is redistributed. The process-id specifies a particular ospf instance within the range of 1-65535.
	rip	The rip is redistributed.
	static	The static route is redistributed.
	level-1 level-1-2 level-2	It is used in the IS-IS route redistribution only and redistributes the routes at a specified level..
	match	It is used in the OSPFv3 route redistribution only and filters specific routes for redistribution; internal: inter-area and intra-area routes. external [1 2]: E1, E2 or all external routes. Nssa-external [1 2]: N1, N2 or all external routes of the NSSA area. All sub-type OSPFv3 routes are redistributed by default.
	metric metric-value	Specifies the metric for the OSPFv3 external 2 LSA with metric-value. Its range is 0 to 16777214.
	metric-type { 1 2 }	Set the metric type for the external route to E-1 or E-2.

route-map map-map-name	Specifies the routing policy for route redistribution. The name of map-tag can be composed of up to 32 characters. No route-map is associated by default.
tag tag-value	Specifies the tag value redistributed to the OSPFv3 inner route, in the range of 0 to 4294967295.

Defaults

The function is disabled by default;
Metric-type: 2;
Level-2 routes are redistributed in the ISIS redistribution
OSPFv3 routes of all sub-types are redistributed in the OSPFv3 redistribution
No route-map is associated

Command

Mode Routing process configuration mode


Usage Guide

When a device supports multiple routing protocols, the coordination between these protocols becomes an important task. The device can run the protocols at the same time, so it should redistribute the protocols. This is applicable to all IP routing protocols.

The parameters level-1, level-2 or level-1-2 can be configured in the redistribution of the ISIS routes to indicate the level of the routes in the redistribution. By default, the level-2 ISIS routes are redistributed

When redistributing OSPFv3 routes, you can configure match to redistribute the routes.of the corresponding sub-type among the redistributed OSPFv3 routes. All types of OSPFv3 routes are redistributed by default.

The match parameter of route-map is specific to the source of routes. The parameters tag, metric and metric-type of the set rule of route-map take precedence over the ones configured for the redistribute command.

 The metric value of the route-map associated should be in the range of 0 to 16777214. If the metric value is not in this range, the route cannot be introduced.

The rules for the **no** form of the **redistribute** command are as follows:
If some parameters are specified in the no command, restore their default settings;
If no parameters are specified in the **no** command, delete the whole command.
For example, if the configuration is made below:
Now modify the configuration with the command no redistribute isis 112 level-2
According to the above rules, the command only restores level-2 to default and level-2 is default per se, so after the above no command is executed, the configuration remains as
redistribute isis 112 level-2
To delete the whole command, use the command below

Configuration

The following example redistributes the direct route and associates route-map test :

Examples

```
ipv6 router ospf 1
redistribute connect metric 10 route-map test
```

The associated route-map is configured as follows:

```
route-map test permit 10
match metric 20
set metric 30
```

The effect of the above configuration is to set the metric value which is 20 of the redistributed routes to 30, and that of other routes to 10

Related Commands

Command	Description
default-information originate	Sets the default route to be redistributed.
default-metric	Sets the default metric for the route to be redistributed.
summary-prefix	Sets the converged address range of the external route.
show ipv6 ospf	Displays the OSPFv3 routing process information.
show ipv6 ospf database	Displays the OSPFv3 link state database information.

Platform N/A

Description

3.42 router-id

Use this command to set the router ID (device ID). Use the **no** form of this command to restore the default setting.

router-id router-id

no router-id

Parameter Description

Parameter	Description
router-id	ID of the device in the IPv4 address format.

Defaults

The OSPFv3 routing process, the largest IPv4 address of all loopback interfaces is elected as the router ID; If there is no loopback interface with an IPv4 address, the OSPFv3 process will elect the largest IPv4 of all other interfaces as the router ID

Command Mode

Routing process configuration mode

Usage Guide

Each device that runs the OSPFv3 process shall be identified with a router ID. Router ID is in the format of IPv4 address.

Any IPv4 address can be set as the router ID, but the router ID of every routers in the AS must be unique. If multiple OSPFv3 processes are running on the same device, the router ID of every process must be unique. Note that the change of the router ID results in considerable processing work in the protocol. Therefore, it is not recommended to change any router ID without proper reason. A prompt will be given to ask whether you are sure to modify the router ID. It is recommended that you specify a router ID once an OSPFv3 process starts before configuring other parameters for the process

Configuration Examples

The following example sets the ID of the device that participates in the OSPFv3 process to 1.1.1.1.

```
router-id 1.1.1.1
```

Related Commands	Command	Description
	ipv6 ospf priority	Sets the interface priority.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform N/A

Description

3.43 summary-prefix

Use this command to configure the converged route outside the OSPFv3 routing domain in the routing process configuration mode. Use the **no** form of this command to restore the default setting.

summary-prefix ipv6-prefix/prefix-length [**not-advertise** | **tag** < 0-4294967295 >]

no summary-prefix ipv6-prefix/prefix-length [**not-advertise** | **tag** < 0-4294967295 >]

Parameter Description	Parameter	Description
	ipv6-prefix/prefix-length	Address range of the converged route
	not-advertise	Does not advertise the converged route to neighbors. Absence of this parameter means to advertise.
	tag <0-4294967295>	Tag value redistributed to the OSPFv3 inner route, in the range from 0 to 4294967295.

Defaults No converged route is configured by default.

Command Routing process configuration mode.

Mode

Usage Guide When routes are redistributed by another routing process into the OSPFv3 routing process, every route is advertised to the OSPFv3-enabled device separately in the form of external link state. If the incoming routes are continuous addresses, the autonomous system border device can advertise only one converged route, thus reducing the scale of routing table greatly.

It is different from the **area range** command. The area range involves the convergence of routes between OSPFv3 areas, while the **summary-prefix** involves the convergence of external routes of the OSPFv3 routing domain.

Configuration Examples The following example configures the external route within the 2001:DB8::/64 to the converged route 2001:DB8::/64 to advertise it.

```
summary-prefix 2001 :DB8 : : /64
```

Related Commands	Command	Description
------------------	---------	-------------

area-range	Configures route convergence between the OSPFv3 areas.
redistribute	Redistributes the routes in other routing process.

Platform N/A

Description

3.44 show ipv6 ospf

Use this command to display the information of the OSPFv3 process.

show ipv6 ospf [process-id]

Parameter Description	Parameter	Description
	process- id	OSPF process ID number.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the information about the OSPFv3 process.

```

Examples
FS# show ipv6 ospf
Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
Enable two-way-maintain
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Lsa Transmit Pacing timer 40 msec, 1 LS-Upd
LSA interval 5 secs, Minimum LSA arrival 1000 msec
Pacing lsa-group: 30 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjency Changes : Enabled
Number of areas in this router is 2
Area BACKBONE(0)
    
```



```

Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3. Checksum Sum 0x1DDF1
Number of Unknown LSA 0
  Area 0.0.0.1 (NSSA)
    Number of interfaces in this area is 1(1)
    SPF algorithm executed 5 times
    Number of LSA 7. Checksum Sum 0x445FE
    Number of Unknown LSA 0
NSSA Translator State is elected
    
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
default-information originate	Sets the default route to be redistributed.
default-metric	Sets the default metric for the route to be redistributed.
router-id	Sets the OSPFv3 routing process ID
timers spf	Sets the delay and the minimum and maximum intervals for the OSPFv3 to perform SPF calculation after receiving the topology change information.

Platform N/A

Description

3.45 show ipv6 ospf database

Use this command to display the database information of the OSPFv3 process

show ipv6 ospf [process- id] **database** [lsa-type [adv-router router-id]]

Parameter Description

Parameter	Description
process- id	OSPF process ID number
lsa-type	The LSA types are as follows: NSSA-external-LSA, AS-external-LSAs, Link-LSAs, Inter-Area-Prefix-LSAs, Inter-Area-Router-LSAs, Intra-Area-Prefix-LSAs, Network-LSAs, Router-LSAs If this parameter is not specified, all LSA information will be displayed.
adv-router router-id	Displays the LSA information generated by the specified router.

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays the information about the OSPFv3 process database.

Examples

```

FS# show ipv6 ospf database
OSPFv3 Router with ID (1.1.1.1) (Process 1)
Link-LSA (Interface FastEthernet 1/0)
Link State ID  ADV Router      Age  Seq#      CkSum  Prefix
0.0.0.2        1.1.1.1        197 0x80000001 0x7cd8  0
0.0.0.5        2.2.2.2        206 0x80000001 0x8c86  0

      Link-LSA (Interface Loopback 1)
Link State ID  ADV Router      Age  Seq#      CkSum  Prefix
0.0.64.1      1.1.1.1        82  0x80000001 0xb760  0

      Router-LSA (Area 0.0.0.0)
Link State ID  ADV Router      Age  Seq#      CkSum  Link
0.0.0.0        1.1.1.1        17  0x80000006 0x62a1  1
0.0.0.0        2.2.2.2        156 0x80000003 0x8653  1

      Network-LSA (Area 0.0.0.0)
Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.5        2.2.2.2        157 0x80000001 0xf8f6

      Router-LSA (Area 0.0.0.1)
Link State ID  ADV Router      Age  Seq#      CkSum  Link
0.0.0.0        1.1.1.1        17  0x80000002 0x0529  0

      Inter-Area-Prefix-LSA (Area 0.0.0.1)
Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.1        1.1.1.1        77  0x80000002 0x83b4

AS-external-LSA
Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.1        1.1.1.1        1  0x80000001 0x6035 E2
    
```

Related

Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.

Platform N/A

Description

3.46 show ipv6 ospf interface

Use this command to display the OSPFv3 interface information.

show ipv6 ospf [process- id] **interface** [interface-type interface-number | **brief**]

Parameter

Parameter	Description
-----------	-------------

Description	
interface-type interface-number	Specifies the interface type and interface number.
process- id	OSPFv3 process ID
brief	Displays the interface summary.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the information about the OSPFv3 interface.

```

FS# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
    
```

If the BFD has been enabled for the neighbor on the interface, the content of “BFD enabled” is also displayed. For example:

```

FS# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1, BFD enabled
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
    
```

```
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
```

Related Commands	Command	Description
		ipv6 router ospf
	ipv6 ospf area	Enables the interface to participate in the OSPFv3 process.

Platform N/A

Description

3.47 show ipv6 ospf neighbor

Use this command to display the neighbor information of the OSPFv3 process.

```
show ipv6 ospf [ process- id ] neighbor [ interface-type interface-number [ detail ] ] neighbor-id [ detail ]
```

Parameter Description	Parameter	Description
		process- id
	detail	Displays details about the neighbor.
	interface-type interface-number	Interface type and interface number
	neighbor-id	Neighbor's router ID

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following command displays the brief information about the OSPFv3 neighbor.

```
FS# show ipv6 ospf neighbor
OSPFv3 Process (1), Neighbors, 1 is Full:
Neighbor ID    Pri  State           Dead Time   Interface          Instance ID
2.2.2.2        1    Full/DR         00:00:33   FastEthernet 1/0   0
```

The following command displays the details of OSPFv3 neighbors:

```
FS# show ipv6 ospf neighbor detail
Neighbor 2.2.2.2, interface address fe80::c800:eff:fe84:1c
```

```
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 6 state changes
DR is 2.2.2.2 BDR is 1.1.1.1
Options is 0x000013 (-|R|-|E|V6)
Dead timer due in 00:00:36
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
```

If the BFD has been enabled for the forwarding path of the neighbor , the content of “BFD session state up” is added to the information displayed. For example:

```
FS# show ipv6 ospf neighbor detail
Neighbor 2.2.2.2, interface address fe80::c800:eff:fe84:1c
  In the area 0.0.0.0 via interface FastEthernet 1/0
  Neighbor priority is 1, State is Full, 6 state changes
  DR is 2.2.2.2 BDR is 1.1.1.1
  Options is 0x000013 (-|R|-|E|V6)
  Dead timer due in 00:00:36
  Database Summary List 0
  Link State Request List 0
  Link State Retransmission List 0
  BFD session state up
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
ipv6 ospf area	Enables the interface to participate in the OSPFv3 process.
area virtual-link	Configures the OSPFv3 virtual link.
show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform N/A

Description

3.48 show ipv6 ospf restart

Use this command to display the OSPFv3 graceful restart configuration.

```
show ipv6 ospf [ process- id ] restart
```

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the restarter status.

Examples

```

FS# show ipv6 ospf restart
Routing Process is ospf 1
Graceful-restart enabled
Restart grace period 120 secs
Current Restart status is plannedRestart
Current Restart remaining time 50 secs
Graceful-restart helper support enabled
    
```

The following example displays the helper status.

```

FS# show ipv6 ospf restart
Routing Process is ospf 1
Neighbor 10.1.1.2, interface addr 10.1.1.2
In the area 0.0.0.0 via interface GigabitEthernet 6/0/0
Graceful-restart helper enabled
Current helper status is helping
Current helper remaining time 50 secs
    
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.

Platform N/A

Description

3.49 show ipv6 ospf route

Use this command to display the OSPFv3 route information.

show ipv6 ospf [process- id] route [count]

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number.
count	Total number of OSPFv3 routes

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the information about OSPFv3 routes.

```

Examples
FS# show ipv6 ospf route
OSPFv3 Process (1)
Codes: C - connected, D - Discard, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
Destination          Metric  Next-hop
E2 2001:DB8:1::/64   1/20   via fe80::c800:eff:fe84:1c, FastEthernet 1/0
O   2001:DB8:2::/64   11     via fe80::c800:eff:fe84:1c, FastEthernet 1/0, Area 0.0.0.0
    
```

Related Commands	Command	Description
		ipv6 router ospf

Platform N/A

Description

3.50 show ipv6 ospf summary-prefix

Use this command to display the external route convergence information of OSPFv3

show ipv6 ospf [process- id] summary-prefix

Parameter Description	Parameter	Description
		process- id

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the external route convergence information of OSPFv3.

```

Examples
FS# show ipv6 ospf summary-prefix
OSPFv3 Process 1, Summary-prefix:
2001:db8::/64,Metric 16777215,Type0,Tag0,Match count0,advertise
    
```

Related Commands	Command	Description
		ipv6 router ospf
	summary-prefix	Configures the converge route outside the OSPFv3

	routing domain.
--	-----------------

Platform N/A

Description

3.51 show ipv6 ospf topology

Use this command to display the topology information about each area of OSPFv3.

show ipv6 ospf [process- id] **topology** [area area-id]

Parameter	Parameter	Description
Description	process- id	OSPFv3 process ID number
	area-id	Area ID

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following command displays the topology information about each area of OSPFv3.

```

Examples
FS# show ipv6 ospf topology
OSPFv3 Process (1)
OSPFv3 paths to Area (0.0.0.0) routers
Router ID      Bits  Metric  Next-Hop
Interface
1.1.1.1        EB   --
2.2.2.2        E    1       2.2.2.2
FastEthernet 1/0

OSPFv3 paths to Area (0.0.0.1) routers
Router ID      Bits  Metric  Next-Hop
Interface
1.1.1.1        B    --
    
```

1

Related Commands	Command	Description
	ipv6 router ospf	Starts the OSPFv3 routing process.
	area range	Configures the address range of the OSPF area.

Platform N/A

Description

3.52 show ipv6 ospf virtual-links

Use this command to display the virtual link information of the OSPFv3 process

show ipv6 ospf [process- id] **virtual-links**

Parameter Description	Parameter	Description
	process- id	OSPFv3 process ID number

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following command displays the information about the OSPFv3 virtual link.

Examples

```
FS# show ipv6 ospf virtual-links
Virtual Link VLINK1 to router 2.2.2.2 is down
  Transit area 0.0.0.1 via interface FastEthernet 1/0, instance ID 0
  Local address *
  Remote address 3333::1/128
  Transmit Delay is 1 sec, State Down,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in inactive
  Adjacency state Down
```

Related Commands	Command	Description
	ipv6 router ospf	Starts the OSPFv3 routing process.
	area virtual-link	Configures the OSPFv3 virtual link.
	show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.

Platform N/A

Description

3.53 timers lsa arrival

Use this command to configure a delay for receiving repeated LSAs. Use the **no** form of this command to restore the default setting.

timers lsa arrival arrival-time

no timers lsa arrival

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
arrival-time	Specifies the delay for receiving repeated LSAs. The range is from 0 to 600000 in the unit of milliseconds.

Defaults The default is 1000.

Command Mode Routing process configuration mode

Usage Guide Configure the device not to process repeated LSAs received within the specific delay.

Configuration Examples The following example sets the delay for receiving repeated LSAs to 2 seconds.

```
FS(config)# ipv6 router ospf 1
FS(config-router)# timers lsa arrival 2000
```

Related Commands	Command	Description
	show ipv6 ospf	Displays OSPFv3 process information, including identifiers of routing devices.

Platform N/A

Description

3.54 timers pacing lsa-group

Use this command to set an LSA group pace interval. Use the **no** form of this command to restore the default setting.

timers pacing lsa-group seconds

no timers pacing lsa-group

Parameter Description	Parameter	Description
	seconds	Specifies the LSA group pace interval. The range is from 10 to 1800 in the unit of seconds. The default value is 30.

Defaults The default is 30.

Command Mode Routing process configuration mode

Usage Guide Each LSA has its own lifetime, that is, LSA aging time. An LSA existing for 1800s will be refreshed so that the living time of the LSA will not exceed its aging time. This ensures that normal LSAs are not cleared due to timeout of aging time. If update and aging operations of each LSA are separately computed, a large number of CPU resources will be consumed.

To effectively utilize CPU resources, configure the device to group LSAs for uniform refreshment. The time for refreshing a group of LSAs is called an LSA group pace interval. Grouping refreshment is to put the LSAs to be refreshed within an LSA group pace interval into a group and refresh them uniformly.

When the number of LSAs is fixed, a longer LSA group pace interval will allow the CPU to process more LSAs when the timer expires for one time. To keep the stability of the CPU, you are recommended not to set an over long LSA group pace interval. This prevents the CPU from processing excessive LSAs when the timer expires each time. If the CPU processes a large number of LSAs each time, it is recommended to shorten the LSA group pace interval. For example, if the database has 10000 LSAs, you need to reduce the LSA group pace interval. If it has only 40 to 100 LSAs, you can adjust the group pace interval to 10 through 20 minutes.

Configuration The following example sets the LSA group pace interval to 120 seconds.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)#timers pacing lsa-group 120
```

Related Commands

Command	Description
show ipv6 ospf	Displays OSPFv3 configuration information.

Platform N/A

Description

3.55 timers pacing lsa-transmit

Use this command to set an interval for sending LSA groups. Use the **no** form of this command to restore the default setting.

timers pacing lsa-transmit transmit-time transmit-count

no timers pacing lsa-transmit

Parameter Description

Parameter	Description
transmit-time	Specifies the interval for sending LSA groups. The range is from 10 to 1000 in the unit of milliseconds.
transmit-count	Specifies the number of LS-UPD packets in an LSA group. The range is from 1 to 200.

Defaults The default transmit-time is 40 and the transmit-count is 1.

Command Mode Routing process configuration mode

Usage Guide There are usually a lot of LSAs on a network; therefore, the load of the device is very high. Setting proper **transmit-time** and **transmit-count** values can restrict flooding of LS-UPD packets on the network. When the CPU load is not high and network bandwidth usage is not large, you can reduce the **transmit-time** value and increase the **transmit-count** value to accelerate route convergence.

Configuration The following example sets the interval for sending LS-UPDs to 50 milliseconds and the specified 20 packets to be sent each time.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)# timers pacing lsa-transmit 50 20
```

Related Commands

Command	Description
show ipv6 ospf	Displays OSPFv3 process information.

Platform N/A

Description

3.56 timers spf

Use this command to set the delay and interval for the OSPFv3 to calculate SPF after receiving the topology change. Use the **no** format of this command to restore the default setting.

timers spf delay holdtime

no timers spf

Parameter Description

Parameter	Description
spf-delay	Defines the waiting time for the SPF calculation, which ranges from 0 to 2147483647 seconds. After receiving the topology change information, the OSPF routing process has to waiting for a given period before making the SPF calculation.
spf-holdtime	Defines the interval between two SPF calculations, which ranges from 0 to 2147483647 seconds. If the interval has not passed even if the waiting time has elapsed, no SPF calculation can be made yet.

Defaults

There are two default situations: 1. The versions earlier than FSOS 10.4 do not support the command **timers throttle spf**. The system default is **timers spf 5 10**. 2. The FSOS 10.4 and the later versions do support the command **timers throttle spf**, where **timer spf** takes no effect by default. The delay for SPF calculation is subject to the default setting of the command **timers throttle spf**. Refer to the description of the command.

Command Mode

Routing process configuration mode

Usage Guide

The smaller the spf-delay and spf-holdtime, the shorter time the OSPF takes to adapt to the topology change, but the more CPU time will be used of the router.

The **timer spf** configuration and the **timers throttle spf** configuration will overwrite each other.

Configuration

The following example sets the delay and holdtime of the OSPFv3 to 3 seconds and 9 seconds respectively.

Examples

```
FS(config)# ipv6 router ospf 20
```

```
FS(config-router)# timers spf 3 9
```

Related Commands

Command	Description
clear ipv6 ospf	Restarts part of the function of the OSPFv3.
show ipv6 ospf	Displays the OSPFv3 routing process information.
timers throttle spf	Configures the exponential backoff delay of the SPF calculation

Platform N/A

Description

3.57 timers throttle lsa all

Use this command to configure an exponential backoff algorithm for generating LSAs. Use the **no** form of this command to restore the default setting.

timers throttle lsa all delay-time hold-time max-wait-time

no timers throttle lsa all

Parameter Description

Parameter	Description
delay-time	Specifies a shortest LSA generation delay, in milliseconds (the first batch of LSAs is usually generated immediately). The range is from 0 to 600000 in the unit of milliseconds.
hold-time	Specifies a shortest interval between the first two times of LSA refreshment, in milliseconds. The range is from 1 to 600000 in the unit of milliseconds
max-wait-time	Specifies a longest interval for consecutive two times of LSA refreshment, in milliseconds. The value is used to determine whether LSAs are refreshed consecutively. The range is from 1 to 600000 in the unit of milliseconds.

Defaults The default delay-time is 0, hold-time is 5000 and max-wait-time is 5000.

Command Mode Routing process configuration mode

Usage Guide If high route convergence capability is needed when links are changed, set a small delay-time value. To reduce CPU consumption, you can properly increase the values of the parameters.

The hold-time value cannot be smaller than the delay-time value and must be smaller than or equal to the max-wait-time value.

Configuration Examples The following example sets delay-time to 10 milliseconds, hold-time to one second, and max-wait-time to five seconds.

```
FS(config)# ipv6 router ospf 1
FS(config-router)# timers throttle lsa all 10 1000 5000
```

Related Commands

Command	Description
show ipv6 ospf	Displays OSPFv3 process information.

Platform N/A
Description

3.58 timers throttle route

Use this command to configure the delay time of route calculation on receiving the ASBR summary LSA and the external summary LSA. Use the **no** form of this command to restore the default setting.

```
timers throttle route { inter-area ia-delay | ase ase-delay }
no timers throttle route { inter-area | ase }
```

Parameter Description

Parameter	Description
inter-area	Calculates the inter area routes.
ia-delay	Sets the delay time of the inter-area route calculation, in the range from 0 to 600000 in the unit of milliseconds. On receiving the ASBR summary LSA, the router will not calculate the inter-area routes until the ia-delay time runs out.
ase	Calculates the external routes.
ase-delay	Sets the delay time of the external route calculation, in the range from 0 to 600000 in the unit of milliseconds. On receiving the external summary LSA, the router will not calculate the external routes until the ase-delay time runs out.

Defaults The default ia-delay is 0 and ase-delay is 0.

Command

Mode Routing process configuration mode

Usage Guide

The default setting is recommended if the network needs to be fast converged. For the instable network where multiple inter-area and external routes exist, if you want to optimize the route calculation and save the CPU resources, increase the delay time.

Configuration Examples

The following example sets the delay time of the inter-area route calculation to one second.

```
FS(config)# ipv6 router ospf 1
FS(config-router)# timers throttle route inter-area 1000
```

Related

Command	Description
---------	-------------

Commands		
	N/A	N/A

Platform N/A

Description

3.59 timers throttle spf

Use this command to configure, the delay for SPF calculation as well as the minimum and maximum intervals between two SPF calculations after receiving the topology change information for OSPFv3 in the routing process configuration mode. Use the **no** form of this command to restore the default setting.

timers throttle spf spf-delay spf-holdtime spf-max-waittime

no timers throttle spf

Parameter Description	Parameter	Description
	spf-delay	
spf-holdtime		Specifies a shortest interval between two SPF calculations. The range is from 1 to 600000 in the unit of milliseconds.
spf-max-waittime		Specifies a longest interval between two SPF calculations. The range is from 1 to 600000 in the unit of milliseconds.

Defaults The default spf-delay is 1000. spf-holdtime is 5000 and spf-max-waittime is 10000.

Command

Mode Routing process configuration mode.

Usage Guide

Spf-delay refers to the delay from the topology change to the SPF calculation. Spf-holdtime refers to the minimum interval between the first and the second SPF calculations. Then, the interval of the consecutive SPF calculations is at least twice as the last interval till it reaches to spf-max-waittime. If the interval between two SPF calculations has exceeded the required minimum value, the interval of SPF calculation will re-start from spf-holdtime.

Smaller spf-delay and spf-holdtime value can make the topology convergence faster. Greater spf-max-waittime value can reduce the SPF calculations. Those configuration are flexible according to the actual stability of the network topology.

Compared with the timers spf command, this command is more flexible. It not only speeds up the SPF convergence calculation, but also reduces the system resources consumption of SPF calculation as the topology changes continuously. Therefore, the timers throttle spf command is recommended.

The spf-holdtime cannot be smaller than spf-delay, or the spf-holdtime will be set to be equal to spf-delay;

The spf-max-waittime cannot be smaller than spf-holdtime, or the spf-max-waittime will be set to be

equal to spf-holdtime automatically;

- i The configuration of the timers spf command and of the timers throttle spf command are overwritten each other.
- i With neither timers spf command nor timers throttle spf command configured, the default value refers to the default of the timers throttle spf command

Configuration Examples The following example configures the delay and holdtime and the maximum time interval of the OSPFv3 as 5ms, 1000ms and 90000ms respectively. If the topology changes consecutively, the time for SPF calculation is: five milliseconds, one second, three seconds, seven seconds, 15 seconds, 31 seconds, 63 seconds, 89 seconds, 179 seconds, 179+90 seconds.....

```
FS(config)# ipv6 router ospf 20
FS(config-router)# timers spf 5 1000 90000
```

Related Commands

Command	Description
clear ipv6 ospf	Restarts part of the OSPFv3 function.
show ipv6 ospf	Displays the routing process information of the OSPFv3
timers spf	Configures the SPF calculation delay .

Platform N/A
Description

3.60 two-way-maintain

Use this command to enable two-way OSPFv3 maintenance. Use the **no** form of this command to disable this function.

- two-way-maintain**
- no two-way-maintain**

Parameter Description

Parameter	Description
N/A	N/A

Defaults Two-way OSPFv3 maintenance is enabled by default.

Command Mode Routing process configuration mode

Usage Guide Sometimes, there are a lot of sent and received packets on a network, occupying large CPU and memory resources. As a result, some packets cannot be processed immediately or are directly lost. If hello packets from a neighbor cannot be processed within the dead interval of neighbors, the connection with the neighbor will be interrupted due to connection timeout. If two-way OSPFv3 maintenance is enabled and a large number of

packets exist on the network, besides hello packets, the two-way neighboring relationship between the device and the neighbor can also be maintained by DD, LSU, LSR, and LSAck packets from the neighbor. This prevents the neighboring relationship from failing due to receiving delay or discarding of hello packets.

Configuration The following example disables two-way OSPFv3 maintenance.

Examples

```
FS(config)# ipv6 router ospf 1
FS(config-router)# no two-way-maintain
```

**Related
Commands**

Command	Description
show ipv6 ospf	Displays global OSPFv3 configuration information.

Platform N/A
Description

4 IS-IS Commands

4.1 address-family ipv6

Use this command to enter the **address-family ipv6** mode. Use the **no** form of this command to delete all configurations in the **address-family ipv6**.

address-family ipv6 [unicast]

no address-family ipv6 [unicast]

Parameter	Parameter	Description
Description	unicast	IPv6 unicast address prefix.

Defaults By default, no address-family ipv6 is configured.

Command Mode IS-IS routing process configuration mode

Usage Guide This command is used for the IPv6 special configurations.
To exit to the IS-IS routing process configuration mode, use the **exit-address-family** command.

Configuration

Examples

```
FS(config)# router isis
FS(config-router)# address-family ipv6 unicast
```

Related Commands	Command	Description
	exit-address-family	Exits the address-family ipv6 mode.

Platform N/A

Description

4.2 adjacency-check

Use this command to detect protocols supported by the adjacency in the Hello packets. Use the **no** form of this command to cancel this detection.

adjacency-check

no adjacency-check

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, this detection is enabled.

Command Mode IS-IS routing process configuration mode or address-family ipv6 mode

Usage Guide N/A

```

Configuration FS(config)# router isis
Examples FS(config-router)# adjacency-check
FS(config-router)# address-family ipv6
FS(config-router-af)# adjacency-check
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.3 area-password

Use this command to set the plain-text authentication password for the Level-1 area. Use the **no** form of this command to cancel the password set.

area-password password-string [**send-only**]

no area-password [**send-only**]

Parameter Description	Parameter	Description
	password-string	Character string of the plaintext authentication password with the longest length being 254 characters..
	send-only	Specifies the plaintext authentication password of Level-1 area applicable to the packets sent only, but not to the packets received.

Defaults By default, no authentication password is set.

Command Mode IS-IS routing process configuration mode

Usage Guide IS-IS routing process configuration mode

Configure this command to perform the authentication on the LSP, CSPN and PSNP packets received in the Level-1 domain and send the packets taking with the authentication information. In the same area, all IS-IS devices must be configured the same password.

If the **authentication mode** command has been executed, this command will not be configured successfully. You need to delete the **authentication mode** command first.

Running the **no area-password send-only** command can only disable the **send-only** option.

Configuration The following example specifies the authentication in the IS-IS area using the plaintext mode with the password being redgiant and the password applicable to the packets sent only, but not to the packets received.

Examples

```
FS(config)# router isis
FS(config-router)# area-password redgiant send-only
```

Related Commands

Command	Description
domain-password	Sets the Level-2 domain password.
authentication mode	Specifies the IS-IS authentication mode.

Platform N/A

Description**4.4 authentication key-chain**

Use this command to specify the key-chain used by the IS-IS authentication. Use the **no** form of this command to cancel the key-chain specified.

authentication key-chain name-of-chain [**level-1** | **level-2**]

no authentication key-chain name-of-chain [**level-1** | **level-2**]

Parameter Description

Parameter	Description
name-of-chain	Key-chain name with the maximum length being 255.
level-1	Specifies the authentication key-chain of the Level-1.
level-2	Specifies the authentication key-chain of the Level-2.

Defaults By default, the authentication key-chain is not specified.

Command N/A

Mode**Usage Guide**

If the **key chain** command is not used to configure the corresponding key-chain, the authentication will not be performed. In addition, to make the IS-IS key-chain authentication effective, you need to configure the **authentication mode** command at the same time.

This key-chain can apply to the plain-text authentication mode and MD5 encrypted authentication mode. You can use the **authentication mode** command to set the authentication mode.

The length of the password key-string in the key-chain shall not be larger than 80 characters if the plain-text authentication mode is used, otherwise this configuration will fail.

Only one key-chain is used at one time. So, when configuring this command, the said key-chain will be replaced by the new specified one.

If the Level is not specified, the key-chain will apply to both Level-1 and Level-2.

The key-chain specified by this command works on the LSP,CSNP and PSNP packets. The IS-IS will send or receive the password that belongs to this key-chain.

There may contain multiple passwords in the key-chain. When sending the packets, use the password with small number first. While receiving the packets, the packet will be received as long as the password of this packet received corresponds to any password in the key-chain.

Configuration The following example specifies the authentication in the IS-IS area using the key-chain named kc:

```
Examples
FS(config)# router isis
FS(config-router)# authentication key-chain kc level-1
```

Related Commands

Command	Description
authentication mode	Specifies the IS-IS authentication mode.
authentication send-only	Specifies the IS-IS authentication applicable to the sent packets only, but not to packets received.
key-chain	Configures the key-chain.

Platform N/A

Description

4.5 authentication mode

Use this command to specify the mode of IS-IS authentication. Use the **no** form of this command to cancel the specified IS-IS authentication mode.

```
authentication mode { md5 | text } [ level-1 | level-2 ]
no authentication mode { md5 | text } [ level-1 | level-2 ]
```

Parameter Description

Parameter	Description
md5	Specifies the MD5 authentication mode to use.
text	Specifies the plain-text authentication mode to use.
level-1	Specifies the authentication mode taking effect on the Level-1.
level-2	Specifies the authentication mode taking effect on the Level-2.

Defaults By default, the authentication mode is not specified.

Command Mode IS-IS routing process configuration mode

Usage Guide To make the key-chain configured by the **authentication key-chain** command effective, you must use the **authentication mode** command to specify the authentication mode.

If no Level is specified, the authentication mode specified is applicable to both Level-1 and Level-2.

When configuring the **authentication mode** command, if the **area-password** or **domain-password** command has been executed to configure the plaintext authentication before, the said commands will be overwritten by the new command..

If the **authentication mode** command has been configured, the **area-password** or **domain-password** will not

be configured successfully, you need to delete the **authentication mode** command first.

Configuration The following example specifies authentication in the IS-IS area to be the MD5 authentication mode.

```

Examples
FS(config)# router isis
FS(config-router)# authentication mode md5 level-1
    
```

Related Commands

Command	Description
area-password	Sets the area plaintext authentication password.
authentication key-chain	Specifies the key-chain used by the IS-IS authentication.
authentication send-only	Specifies the IS-IS authentication applicable to the packets sent only, but not to the packets received.
domain-password	Sets the domain plaintext authentication password.

Platform N/A

Description

4.6 authentication send-only

Use this command to specify the IS-IS authentication only applicable to the packets sent, but not to the packets received. Use the **no** form of this command to perform the authentication on the packets received.

```

authentication send-only [ level-1 | level-2 ]
no authentication send-only [ level-1 | level-2 ]
    
```

Parameter Description

Parameter	Description
level-1	Specifies setting send-only on the Level-1.
level-2	Specifies setting send-only on the Level-2.

Defaults By default, this command is not configured. If the IS-IS authentication is configured, the authentication will be performed on the packets both sent and received.

Command Mode IS-IS routing process configuration mode

Usage Guide With this command configured, the IS-IS will set the authentication password in the packets sent, however, the authentication will not be performed on the packets received. It can apply to the following two occasions: 1. before deploying the IS-IS authentication for all devices in the network. 2. before changing the authentication password or authentication mode. Before the above two tasks start, you need to configure the **authentication send-only** command first to make each device perform no authentication on the packets received, so as to avoid the network oscillation caused during the subsequent authentication password deployment. After the deployment of the entire network authentication finished, execute the **no isis authentication send-only** command to cancel the **send-only** authentication mode.

This command can apply to the plain-text authentication mode and MD5 authentication mode. You can use the **authentication mode** command to set the authentication mode.

If the Level is not specified, the authentication mode specified is applicable to both Level-1 and Level-2.

Configuration The following example specifies the authentication in the IS-IS area to be the **send-only** mode.

Examples

```
FS(config)# router isis
FS(config-router)# authentication send-only level-1
```

Related Commands	Command	Description
	authentication key-chain	Specifies the IS-IS authentication key-chain.
	authentication mode	Specifies the mode of IS-IS authentication.
	key-chain	Configures the key-chain.

Platform N/A

Description

4.7 bandwidth-reference

Use this command to configure the bandwidth reference for IS-IS. Use the **no** form of this command to restore the default settings.

bandwidth-reference value

no bandwidth-reference

Parameter Description	Parameter	Description
	value	

Defaults The default value is **100**.

Command IS-IS routing process configuration mode

Mode

Usage Guide Use this command to calculate the interface metric in an instance according to the bandwidth reference configured in the instance. If a metric is configured, the metric prevails.

Configuration The following example configures the bandwidth reference for IS-IS to automatically calculate the link metric.

Examples

```
FS(config)# router isis
FS(config-router)# bandwidth-reference 200
```

Related Commands	Command	Description
	N/A	

Platform N/A
Description

4.8 bfd all-interfaces

Use this command to configure all interfaces running the IS-IS protocol to conduct BFD link detection.

bfd all-interfaces [anti-congestion]

Use the **no** form of this command to configure all interfaces running the IS-IS protocol to not conduct BFD link detection.

no bfd all-interfaces [anti-congestion]

Parameter Description

Parameter	Description
anti-congestion	IS-IS BFD anti-flapping option

Defaults The IS-IS support for BFD is disabled on all interfaces by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide There are two methods for enabling or disabling the IS-IS support for BFD on interfaces.

Method 1: In IS-IS routing process configuration mode, run the [**no**] **bfd all-interfaces [anti-congestion]** command to enable or disable the IS-IS support for BFD on all interfaces running the IS-IS protocol.

Method 2: In interface configuration mode, run the **isis bfd [disable | anti-congestion]** command to enable or disable the IS-IS support for BFD on a specified interface.

In normal cases, the BFD function enables to send detection packets to detect the link status at an interval of several milliseconds. When a link exception such as link interruption occurs, the BFD function enables to rapidly detect the link exception, and notify a device running the IS-IS protocol to delete neighbors and delete neighbor availability information from LSP packets. The device running the IS-IS protocol performs route re-calculation and generates a new route, to bypass the failure link, thereby implementing fast convergence. With the introduction of some new technologies such as the Multi-Service Transport Platform (MSTP), link congestion easily occurs in peak hours. When congestion occurs, the BFD function allows to rapidly detect a link exception, notify a device running the IS-IS protocol to delete a neighbor and delete neighbor availability information from LSP packets, and perform link switching to bypass the congested link. The interval for an IS-IS neighbor to send a Hello detection packet is 10 seconds and the timeout time is 30 seconds. When an exception is detected via the BFD function, IS-IS Hello packets can be normally received, an IS-IS neighbor relationship can be rapidly established, and the route is restored to pass the congested link. Then, BFD is performed again. If there is still a link exception, link switching is performed again, and the process repeats. The route switches between the congested link and other links and flapping occurs. The anti-flapping function can be enabled to prevent route flapping in the case of link congestion. After the

anti-flapping function is enabled, if a link is congested, the IS-IS neighbor status keeps alive but the neighbor availability information in LSP packets is deleted, and the route switches to a non-congested link. After the link is restored, that is, congestion is removed, the neighbor availability information is restored in LSP packets, and the route switches back to the originally congested link, thereby preventing route flapping.

When IS-IS anti-flapping is enabled, the BFD anti-flapping command (**bfd up-dampening**) must be configured on an interface. The two commands must be configured simultaneously. If only one of them is configured, the anti-flapping function does not take effect or a network exception is incurred.

For details about how to enable the BFD anti-flapping function on an interface, see the configuration example of the ISIS BFD command.

- Before the IS-IS support for BFD is configured, a BFD session must be configured on an interface.
- When the BFD anti-flapping command is configured on an interface, if the IS-IS support for BFD is already configured on the interface, the anti-flapping function must be enabled for a device running the IS-IS protocol.
- When the IS-IS anti-flapping option is configured, the BFD anti-flapping command must be configured on an interface.

Configuration The following example configures all interfaces running the IS-IS protocol to conduct BFD.

Examples

```
FS(config)# router isis 123
FS(config-router)# bfd all-interface
```

4.9 clear clns neighbors

Use this command to clear all IS-IS neighbor relation tables.

clear clns neighbors

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used in the condition of needing to refresh the IS-IS neighbor relation table immediately.

Configuration Examples

```
FS# clear clns neighbors
```

Related Commands	Command	Description
	clear isis	Clears all IS-IS data structure.

Platform N/A

Description

4.10 clear isis *

Use this command to clear the data structure of all IS-ISs.

clear isis *

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used in the condition of needing to refresh the LSP immediately. For example, after executing the **area-password** and **domain-password** commands, the previous LSPs still exist in this router, you can use this command to clear these LSPs.

Configuration Examples FS# `clear isis *`

Related Commands	Command	Description
	clear cls neighbors	Clears all IS-IS neighbors.

Platform Description N/A

4.11 clear isis counter

Use this command to clear various statistics of IS-IS.

clear isis [tag] counter

Parameter Description	Parameter	Description
	tag	IS-IS instance

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration FS# `clear isis counter`

Examples

Related Commands	Command	Description
	<code>clear isis *</code>	Clears the data structure of all IS-ISs.

Platform N/A

Description

4.12 default-information originate

Use this command to generate a default routing information and advertise it by LSP. Use the **no** form of this command to delete the default routing information from LSP.

default-information originate [**route-map** map-name]

no default-information originate [**route-map** map-name]

Parameter Description	Parameter	Description
	map-name	(Optional) Associated route-map's name, with the maximum length being 32. By default, the route-map is not associated.

Defaults By default, there is no default route.

Command Mode IS-IS routing process configuration mode or address-family ipv6 mode.

Usage Guide The default route is not generated in the Level-2 domain. Use this command to allow the default route to enter the Level-2 domain.

Configuration Examples

```

FS(config)# router isis
FS(config-router)# default-information originate
FS(config-router)# address-family ipv6
FS(config-router-af)# default-information originate
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.13 distance

Use this command to set the management distance of the IS-IS routes. Use the **no** form of this command to restore the default settings.

distance my-cost

no distance

Parameter Description	Parameter	Description
	my-cost	Distance value in the range of 1 to 255.

Defaults By default, the distance is 115.

Command Mode IS-IS routing process configuration mode

Usage Guide Use this command to configure the management distance of the IS-IS routes. The shorter the management distance, the more reliable the routing information is.

Configuration Examples

```
FS(config)# router isis
FS(config-router)# distance 100
```

Related Commands	Command	Description
	isis metric	Sets the metric value of the interface.

Platform N/A

Description

4.14 domain-password

Use this command to set the plain-text authentication password of Level-2 domain. Use the **no** form of this command to cancel the password configured.

domain-password password-string [**send-only**]

no domain-password [**send-only**]

Parameter Description	Parameter	Description
	password-string	Character string of the plain-text authentication password with the longest length being 254 characters.
	send-only	Specifies the plain-text authentication password of the Level-2 domain applicable to the packets sent only, but not to the packets received.

Defaults By default, no authentication password is set.

Command IS-IS routing process configuration mode
Mode

Usage Guide Configure this command to perform the authentication on the LSP, CSPN and PSNP packets received in the Level-2 domain and send the packets taking with the authentication information. In the Level-2 domain, all IS-IS devices must be configured the same password.
 If the **authentication mode** command has been executed, this command will not be configured successfully. You need to delete the **authentication mode** command first.
 Running the **no area-password send-only** command can only disable the **send-only** option

Configuration FS(config)# **router isis**
Examples FS(config-router)# **domain-password** redgiant

Related Commands	Command	Description
	area-password	
authentication mode		Specifies the IS-IS authentication mode.

Platform N/A
Description

4.15 enable mib-binding

Use this command to bind MIBs with an IS-IS process. Use the **no** form of this command to unbind the MIB from the IS-IS process.

enable mib-binding
no enable mib-binding

Parameter Description	Parameter	Description
		N/A

Defaults By default, MIBs are bound with IS-IS process 1.

Command IS-IS routing process configuration mode
Mode

Usage Guide By default, MIBs are bound with IS-IS process 1. The IS-IS process support multiple processes. The administrator can use this command to bind MIBs with the IS-IS process.

Configuration The following example binds the MIB with an IS-IS process.
Examples FS(config)# **router isis**

```
FS(config-router)# enable mib-binding
```

Related Commands

Command	Description
graceful-restart helper disable	Disables the IS-IS GR Help capability.
isis hello-interval	Sets the interval of sending Hello packets.
isis hello-multiplier	Sets the Hello holdtime multiplier for the IS-IS interface.

Platform N/A

Description

4.16 enable traps

Use this command to enable the system to send one or multiple types of IS-IS trap packets. Use the **no** form of this command to disable the system to send IS-IS trap packets.

enable traps { all | traps set }

no enable traps { all | traps set }

Parameter Description

Parameter	Description
all	Indicates all types of IS-IS trap packets.
traps set	Indicates the specified type of IS-IS trap packet.

Defaults By default, no IS-IS trap is sent.

Command Mode IS-IS routing process configuration mode

Usage Guide There are 18 types of IS-IS packets. The IS-IS packets can be classified into multiple sets. Each set includes several types of trap packets. To enable the system to send the IS-IS trap packet, you need to enable the global IS-IS trap using the **snmp-server enable traps isis** command, specify the host to receive the IS-IS trap packets, and use the **enable traps { all | traps set }** command to specify the type of IS-IS trap packet to be sent.

Configuration Examples The following example enables the system to send all IS-IS trap packets to the host of IP address 192.168.1.1.

```
FS# configure terminal
FS(config)#snmp-server enable traps isis
FS(config)#snmp-server host 10.1.1.1 traps version 2c public
FS(config)#router isis
FS(config-router)# enable traps all
```

Related Commands

Command	Description
graceful-restart helper disable	Disables the IS-IS GR Help capability.

isis hello-interval	Sets the interval of sending Hello packets.
isis hello-multiplier	Sets the Hello holdtime multiplier for the IS-IS interface.

Platform N/A

Description

4.17 exit-address-family

Use this command to exit IS-IS address family IPv6 configuration mode and return to IS-IS routing process configuration mode.

exit-address-family

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode IS-IS address-family IPv6 configuration mode

Usage Guide N/A

Configuration Examples The following example exits IS-IS address family IPv6 configuration mode.

```
FS (config-router-af)#exit-address-family
FS (config-router)#
```

Related Commands	Command	Description
	graceful-restart helper disable	Disables the IS-IS GR Help capability.
	isis hello-interval	Sets the interval of sending Hello packets.
	isis hello-multiplier	Sets the Hello holdtime multiplier for the IS-IS interface.

Platform N/A

Description

4.18 graceful-restart

Use this command to enable the IS-IS GR Restart capability. Use the **no** form of this command to disable this capability.

graceful-restart

no graceful-restart

Parameter Description	Parameter	Description
	N/A	N/A

Defaults IS-IS GR is enabled by default.

Command Mode IS-IS routing process configuration mode

Usage Guide With this command used, after the device restart, the IS-IS protocol state is allow to restore to the state before restart without influencing the data forwarding in the condition of network state unchanged.

With the IS-IS GR Restart capability enabled on the device of multiple management boards, the hold time for maintaining the IS-IS adjacent relation shall not be less than 40 seconds to ensure the success of IS-IS graceful restart when the management boards are switched over suddenly. You can configure the hold time using the **isis hello-interval** and **isis hello-multiplier** commands. When the holdtime is less than 40s, the holdtime in the Hello packet header is set to 40 seconds by default.

Note: The IS-IS device needs the help of the GR Helper neighbor device to implement the graceful-restart.

Configuration Examples The following example enables the IS-IS GR Restart capability.

```
FS(config)# router isis
FS(config-router)# graceful-restart
```

Related Commands	Command	Description
	graceful-restart helper disable	Disables the IS-IS GR Help capability.
	isis hello-interval	Sets the interval of sending Hello packets.
	isis hello-multiplier	Sets the Hello holdtime multiplier for the IS-IS interface.

Platform Description N/A

4.19 graceful-restart grace-period

Use this command to configure the maximal interval for the graceful-restart. Use the **no** form of this command to restore the default interval.

graceful-restart grace-period seconds
no graceful-restart grace-period

Parameter Description	Parameter	Description
	second	Time interval allowed for the device graceful-restart, in the range of 1 to 65,535 seconds.

Defaults The default value is 300 seconds.

Command Mode IS-IS routing process configuration mode

Usage Guide N/A

Configuration The following example sets the interval of the grace-restart to 40 seconds.

```
FS(config)# router isis
FS(config-router)# graceful-restart grace-period 40
```

Related Commands	Command	Description
	graceful-restart	Enables the IS-IS GR Restart capability.
show isis graceful-restart	Displays the status information of the IS-IS GR Restart.	

Platform Description N/A

4.20 graceful-restart helper disable

Use this command to disable the IS-IS GR Helper capability. Use the **no** form of this command to enable this capability.

- graceful-restart helper disable**
- no graceful-restart helper disable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults IS-IS GR Helper capacity is enabled by default.

Command Mode IS-IS routing process configuration mode

Usage Guide To disable the IS-IS GR Helper capability, execute this command. In this case, the IS-IS will ignore the request of graceful-restarting the device.

Configuration The following example disables the IS-IS GR Helper capability.

```
FS(config)# router isis
FS(config-router)# graceful-restart helper disable
```

Related	Command	Description
---------	---------	-------------

Commands	
graceful-restart	Enables the IS-IS GR Restart capability.

Platform N/A

Description

4.21 hello padding

Use this command to pad IS-IS Hello packets.

hello padding [multi-point | point-to-point]

Use the **no** form of this command to cancel the padding of IS-IS Hello packets.

no hello padding [multi-point | point-to-point]

Parameter	Description
multi-point	Pads Hello packets of the LAN type.
point-to-point	Pads Hello packets of the P2P type.

Defaults Padding is enabled for Hello packets of the LAN type and P2P type by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide Hello packets can be padded to notify a neighbor of the MTU supported by the local device. You can use this command to set whether to pad all Hello packets sent by the IS-IS process. You can also separately specify the type of Hello packets for padding, for example, you can set not to pad all Hello packets of the LAN type or not to pad all Hello packets of the P2P type.

The **isis hello padding** command is available in interface configuration mode. Hello packets sent by a specific interface are not padded if the padding of such Hello packets is cancelled in IS-IS routing process configuration mode or the padding of Hello packets sent by the interface is cancelled in interface configuration mode.

Configuration Examples The following example configures to cancel the padding of Hello packets of the P2P type.

```
FS(config)# router isis
FS(config-router)# no hello padding point-to-point
```

4.22 hostname dynamic

Use this command to replace the System ID of the router with the destination router’s hostname. Use the **no** form of this command to cancel this replacement.

hostname dynamic

no hostname dynamic

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the hostname dynamic function is disabled.

Command Mode IS-IS routing process configuration mode

Usage Guide With this command configured, the hostname of the destination router replaces the System ID. The System IDs shown in the execution of the command such as **show isis database**, **show isis neighbors** are all replaced by the hostname of the destination router.

Configuration Examples

```
FS(config)# router isis
FS(config-router)# hostname dynamic
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.23 ignore-lsp-errors

Use this command to ignore the LSP checksum errors. Use the **no** form of this command to not ignore the LSP checksum errors.

ignore-lsp-errors
no ignore-lsp-errors

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the LSP checksum errors are not ignored.

Command Mode IS-IS routing process configuration mode

Usage Guide When the local IS-IS receives a LSP, it will calculate the checksum of LSP received and compare the calculated checksum with that in the LSP packets. By default, if the checksum in the LSP packets is different from the checksum calculated, this LSP will be discarded without processing. If we executes the ignore-lsp-errors command to ignore the checksum errors, the LSP packets with the incorrect checksum will be processed as the normal packets.

Configuration FS(config)# **router isis**
Examples FS(config-router)# **ignore-lsp-errors**

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.24 interfaces-protocol-compatible

Use this command to configure the Type-Length-Value (TLV) field of the IS-IS protocol to be padded based on protocols supported by an interface. Use the **no** form of this command to restore the padding of the TLV field of the IS-IS protocol based on protocols supported by an instance.

interfaces-protocol-compatible
no interfaces-protocol-compatible

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The TLV field of the IS-IS protocol is padded based on protocols supported by an instance by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide When devices supporting IS-IS for IPv4 or IS-IS for IPv6 and those supporting both IS-IS for IPv4 and IS-IS for IPv6 on a network are configured to establish a neighbor relationship, the calculated routes may be unreachable, resulting in routing black holes. To prevent routing black holes, the TLV (#129) field of FS IS-IS protocol is padded based on protocols supported by an instance, that is, IS-IS instances that establish a neighbor relationship need to support the same protocol. The TLV (#129) field of the IS-IS protocol supported by devices of some vendors is padded based on protocols supported by an interface. In single topology mode, a FS device connects to a device of another vendor, a loopback interface is configured on both devices, both IS-IS for IPv4 and IS-IS for IPv6 are enabled, and only a single protocol stack (IS-IS for IPv4 or IS-IS for IPv6) is configured on the interface for interconnecting the two devices. The device of the other vendor sends TLV#129 (supporting only a single protocol stack) based on interfaces whereas FS device sends TLV#129 (supporting dual protocol stacks) based on instances. As a result, the displayed neighbor status on the device of the other vendor is "Init" but FS device cannot establish a neighbor relationship with the device of the other vendor. For this, the **interfaces-protocol-compatible** command can be configured to enable FS devices to establish a neighbor relationship with devices of other vendors.

Configuration The following example configures the TLV field of the IS-IS protocol to be padded based on protocols supported by an interface.

Examples

```
FS(config)# router isis
FS(config-router)# interfaces-protocol-compatible
```

Verification Run the **show run** command to check the configuration.

Prompts N/A

Common Errors N/A

Platform Description N/A

4.25 ip router isis

Use this command to enable the IPv4 IS-IS on the specified interface. This command must be configured in the IS-IS configuration. The interface will run on the IS-IS instance named with Tag. If this IS-IS instance is inexistent or this IS-IS instance is not enabled and not initialized, the interface will not enable the IS-IS routing.

Use the **no** form of this command to disable the IPv4 IS-IS routing on the specified interface.

ip router isis [tag]
no ip router isis [tag]

Parameter Description

Parameter	Description
tag	IS-IS instance name.

Defaults By default, the Ipv4 IS-IS is disabled on the interface.

Command Mode Interface configuration mode

Usage Guide Use this command to enable the IS-IS IPv4 routing protocol on the interface. The **no** form of this command disables the IS-IS IPv4 routing.
 If the **no ipv4 unicast-routing** is executed in global configuration mode, the IS-IS will disable the IPv4 routing function on all interfaces, namely execute the **no ipv4 router isis** [tag] on all interfaces automatically, while other IS-IS configurations will remain unchanged.

Configuration Examples

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# ip router isis
```

Related Commands

Command	Description
---------	-------------

ipv6 router isis	Enables the IPv6 IS-IS on the interface.
router isis	Creates IS-IS instances.

Platform N/A

Description

4.26 ipv6 router isis

Use this command to enable the IPv6 IS-IS routing on the specified interface. This command must be configured in the IS-IS configuration. The interface will run on the IS-IS instance named with Tag. If this IS-IS instance is inexistent or this IS-IS instance is not enabled and not initialized, the interface will not enable the IS-IS routing.

Use the **no** form of this command to disable the IPv6 IS-IS routing on the specified interface.

ipv6 router isis [tag]

no ipv6 router isis [tag]

Parameter	Description
tag	IS-IS instance name

Defaults By default, the Ipv6 IS-IS routing is not supported on the interface.

Command Mode Interface configuration mode

Usage Guide Configure this command to enable the IS-IS IPv6 routing protocol on the interface. The **no** form of this command disables the IS-IS IPv6 routing.

If the **no ipv6 unicast-routing** is executed in the global configuration mode, the IS-IS will disable the IPv6 routing function on all interfaces, namely execute the **no ipv6 router isis** [tag] on all interfaces automatically, while other IS-IS configurations will remain unchanged.

Configuration Examples

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# ipv6 router isis
```

Related Commands	Command	Description
	ip router isis	Enables the IPv4 IS-IS on the interface.
	router isis	Creates IS-IS instances.

Platform N/A

Description

4.27 isis authentication key-chain

Use this command to set the key-chain used by the IS-IS interface authentication. Use the **no** form of this command to cancel the specified key-chain.

isis authentication key-chain name-of-chain [**level-1** | **level-2**]
no isis authentication key-chain name-of-chain [**level-1** | **level-2**]

Parameter Description

Parameter	Description
name-of-chain	Key-chain name with the maximum length being 255.
level-1	Specifies the authentication key-chain of the Level-1.
level-2	Specifies the authentication key-chain of the Level-2.

Defaults By default, no IS-IS interface authentication key-chain is specified.

Command Mode Interface configuration mode

Usage Guide

If the **key chain** command is not used to configure the corresponding key-chain, the authentication will not be performed. In addition, to make the IS-IS key-chain authentication effective, you need to configure the **isis authentication mode** command at the same time.

This key-chain can apply to the plain-text authentication mode and MD5 encrypted authentication mode. You can use the **isis authentication mode** command to set the authentication mode.

The length of the password key-string in the key-chain shall not be larger than 80 characters if the plain-text authentication mode is used, otherwise this configuration will fail.

Only one key-chain is used at one time. So, when configuring this command, the said key-chain will be overwritten by the new specified one.

If the Level is not specified, the key-chain will apply to both Level-1 and Level-2.

The key-chain specified by this command works on the Hello packets. The IS-IS will send or receive the password that belongs to this key-chain.

There may contain multiple passwords in the key-chain. When sending the packets, use the password with small number first. While receiving the packets, the packet will be received as long as the password of this packet received corresponds to any password in the key-chain.

The authentication commands configured in the IS-IS configuration mode such as authentication key-chain are effective to the LSP, SNP packets, but take no effect on the IS-IS interface.

Configuration Examples The following example specifies the authentication key-chain of the interface GigabitEthernet 0/1 named as kc.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis authentication key-chain kc
```

Related Commands

Command	Description
isis authentication mode	Specifies the mode of IS-IS interface authentication.
isis authentication send-only	Specifies the IS-IS interface authentication only applicable to the packets sent, but not to the packets received.
key-chain	Configures the key-chain.

Platform N/A

Description

4.28 isis authentication mode

Use this command to specify the mode of IS-IS interface authentication. Use the **no** form of this command to remove the configuration.

isis authentication mode { md5 | text } [level-1 | level-2]

no isis authentication mode { md5 | text } [level-1 | level-2]

Parameter Description	Parameter	Description
	md5	Specifies the MD5 authentication mode.
	text	Specifies the plain-text authentication mode.
	level-1	Specifies the interface authentication mode to take effect on the Level-1.
	level-2	Specifies the interface authentication mode to take effect on the Level-2.

Defaults By default, no interface authentication mode is specified.

Command Interface configuration mode

Mode

Usage Guide To make the key-chain configured by the **isis authentication key-chain** command take effect, you must use the **isis authentication mode** command to specify the authentication mode.

If the Level is not specified, the authentication mode specified will apply on both Level-1 and Level-2.

When configuring the **isis authentication mode** command, if the **isis password** has been executed, the set command will be overwritten by this command.

If the **isis authentication mode** command has been executed, the **isis password** will not be configured successfully. So, you need to delete the **isis authentication mode** command first.

Configuration Examples The following example specifies the authentication mode on the Level-2 of the interface GigabitEthernet 0/1 to be the MD5 authentication mode.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis authentication mode md5 level-2
```

Related Commands

Command	Description
isis authentication key-chain	Specifies the key-chain used by the IS-IS interface authentication.
isis authentication send-only	Specifies the IS-IS interface authentication to only apply on the packets sent, but not on the packets received.
key-chain	Configures the key-chain.
isis password	Sets the plain-text authentication password for the

	packets transmit on the IS-IS interface.
--	--

Platform N/A
Description

4.29 isis authentication send-only

Use this command to specify the IS-IS interface authentication to **only** apply to the packets sent and not to the packets received. Use the **no** form of this command to restore the authentication of packets received on the interface.

isis authentication send-only [level-1 | level-2]
no isis authentication send-only [level-1 | level-2]

Parameter	Parameter	Description
Description	level-1	Set the send-only on the Level-1 of the interface.
	level-2	Set the send-only on the Level-2 of the interface.

Defaults By default, this command is not configured. If the IS-IS interface authentication has been configured, then the authentication will be performed on the packets sent and recieved at the same time.

Command Mode Interface configuration mode

Usage Guide With this command configured, the IS-IS will set the authentication password in the Hello packets sent from the interface, however, the authentication will not be performed on the Hello packets received. It can apply to the following two occasions: 1. before deploying the IS-IS interface authentication for all devices in the network. 2. before changing the authentication password or authentication mode. Before the above two tasks start, you need to configure the **isis authentication send-only** command first to make each device perform no authentication on the Hello packets received, so as to avoid the network oscillation caused during the subsequent IS-IS interface authentication deployment. After the deployment of the entire network authentication finished, execute the **no isis authentication send-only** command to cancel the **send-only** authentication mode. This command can apply to the plain-text authentication mode and MD5 authentication mode. You can use the **isis authentication mode** command to set the mode used by the IS-IS interface authentication. If the Level is not specified, the authentication mode specified is applicable to the Level-1 and Level-2.

Configuration Examples The following example specifies the authentication on the Level-1 of the interface GigabitEthernet 0/1 using send-only authentication mode.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis authentication send-only level-1
```

Related Commands	Command	Description
	isis authentication key-chain	Specifies the key-chain used by the IS-IS interface

	authentication.
isis authentication mode	Specifies the mode of the IS-IS interface authentication.
key-chain	Configures the key-chain.

Platform N/A

Description

4.30 isis bfd

Use this command to enable association between IS-IS and BFD on an interface.

isis bfd [disable | anti-congestion]

Use the **no** form of this command to disable association between IS-IS and BFD on an interface.

no isis bfd [disable | anti-congestion]

Parameter Description	Parameter	Description
	Disable	Disables association between IS-IS and BFD on an interface.
	anti-congestion	Indicates the IS-IS BFD anti-flapping option.

Defaults

If the **bfd all-interfaces** command is configured, association between IS-IS and BFD is enabled on an interface.

If the **bfd all-interfaces** command is not configured, association between IS-IS and BFD is disabled on an interface.

By default, the anti-flapping function is disabled.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

There are two methods for enabling or disabling association between IS-IS and BFD on interfaces.

Method 1: In IS-IS routing process configuration mode, run the [**no**] **bfd all-interfaces [anti-congestion]** command to enable or disable association between IS-IS and BFD on all interfaces running the IS-IS protocol.

Method 2: In interface configuration mode, run the **isis bfd [disable | anti-congestion]** command to enable or disable association between IS-IS and BFD on a specified interface.

In normal cases, the device with the BFD function enabled sends detection packets to detect the link status at an interval of several milliseconds. When a link exception such as link interruption occurs, the device with the BFD function enabled rapidly detects the link exception and informs a device running the IS-IS protocol to delete neighbors and delete neighbor availability information from LSP packets. The device running the IS-IS protocol performs route re-calculation and generates a new route, to bypass the failed link, thereby implementing fast convergence. With the introduction of some new technologies such as the Multi-Service Transport Platform (MSTP), link congestion easily occurs in peak hours. When congestion occurs, the device with the BFD function enabled rapidly detects a link exception, informs a device running the IS-IS protocol to delete a neighbor and

delete neighbor availability information from LSP packets, and performs link switching to bypass the congested link. The interval for an IS-IS neighbor to send a Hello detection packet is 10 seconds, and the timeout time is 30 seconds. When an exception is detected via the BFD function, IS-IS Hello packets can be normally received, the IS-IS neighbor relationship can be rapidly reestablished, and the route is restored to pass the congested link. Then, BFD is performed again. If there is still a link exception, link switching is performed repeatedly. The route switches between the congested link and other links and flapping occurs.

The anti-flapping function can be enabled to prevent route flapping in the case of link congestion. After the anti-flapping function is enabled, if a link is congested, the IS-IS neighbor keeps alive but the neighbor availability information in LSP packets is deleted, and the route switches to a non-congested link. After the link is restored, that is, congestion is eliminated, the neighbor availability information is restored in LSP packets, and the route switches back to the originally congested link, thereby preventing route flapping.

When IS-IS anti-flapping is enabled, the BFD anti-flapping command (**bfd up-dampening**) must be configured on an interface. The two commands must be configured simultaneously. If only one of them is configured, the anti-flapping function does not take effect or a network exception is incurred.

-
- ❓ Before association between IS-IS and BFD is configured, a BFD session must be configured on an interface.
 - ❓ When the BFD anti-flapping command is configured on an interface, if association between IS-IS and BFD is already configured on the interface, the anti-flapping function must be enabled for a device running the IS-IS protocol.
 - ❓ When the IS-IS anti-flapping option is configured, the BFD anti-flapping command must be configured on an interface.
-

Configuration

1. The following example disables association between IS-IS and BFD on GigabitEthernet 0/1.

Examples

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# no switchport
FS(config-if)# isis bfd disable
```

2. The following example enables the IS-IS BFD anti-flapping option and configures the BFD anti-flapping command on GigabitEthernet 0/1.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# no switchport
FS(config-if)# isis bfd anti-congestion
FS(config-if)# bfd up-dampening 60000
```

4.31 isis circuit-type

Use this command to set the circuit-type for the IS-IS interface. Use the **no** form of this command to restore the default settings.

isis circuit-type { level-1 | level-1-2 | level-2-only }

no isis circuit-type

Parameter Description	Parameter	Description
	level-1	Forms the Level-1 adjacency.
	level-2-only	Forms the Level-2 adjacency.
	level-1-2	Forms the Level-1-2 adjacency.

Defaults By default, the circuit-type is Level-1-2.

Command Mode Interface configuration mode

Usage Guide If the circuit-type of Level-1 or Level-2-only is configured, then IS-IS will only send PDUs of the same level. If is-type is configured to Level-1 or Level-2-only, the IS-IS instance will only process data at this level, that is, this Interface will only send the Level PDUs with is-type being same as circuit-type.

Configuration Examples
 FS(config)# **interface GigabitEthernet** 0/1
 FS(config-if)# isis circuit-type level-2-only

Related Commands	Command	Description
	isis-type	Sets the Level of IS-IS instance.

Platform Description N/A

4.32 isis csnp-interval

Use this command to set the interval for broadcasting the CSNP packets on the IS-IS interface, with the unit being second. Use the **no** form of this command to restore the default interval.

isis csnp-interval interval [**level-1** | **level-2**]
no isis csnp-interval [interval] [**level-1** | **level-2**]

Parameter Description	Parameter	Description
	interval	Interval for sending the CSNP packets in the range of 0 to 65535, with the unit being second.
	level-1	Interval for sending the CSNP packets configured only on the Level-1.
	level-2	Interval for sending the CSNP packets configured only on the Level-2.

Defaults By default, in the broadcast network, the interval for sending the CSNP packets is 10 seconds. While in the P2P interface network, no CSNP packet is sent by default. When using this command without the parameter Level-1 and Level-2, the new setting is defaulted to be

applicable to the Level-1 and Level-2 at the time.

Command Interface configuration mode
Mode

Usage Guide Configure this command to change the interval for sending the CSNP packets. By default, the DIS on the broadcast network sends the CSNP packets every 10 seconds.
 For the P2P interface network, by default, the CSNP packets will only be sent at the beginning of adjacency formation. If the interface is set to mesh-groups, you can configure the periodic sending of the CSNP packets. If the csnp-interval is set to 0, no CSNP packets will be sent.

Configuration FS(config)# interface GigabitEthernet 0/1
Examples FS(config-if)# isis csnp-interval 20

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.33 isis hello-interval

Use this command to set the interval for sending Hello packets on the interface, with the unit being second. Use the **no** form of this command to restore the default interval.

isis hello-interval { interval | minimal } [level-1 | level-2]
no isis hello-interval [level-1 | level-2]

Parameter Description	Parameter	Description
	interval	interval
minimal	minimal	The holdtime is set to the minimal value 1.
level-1	level-1	This interval applies on the Level-1.
level-2	level-2	This interval applies on the Level-2.

Defaults By default, the interval value is 10 seconds, which is applicable to the Level-1 and Level-2 at the same time. When using this command without the parameter Level-1 and Level-2, the new setting is defaulted to be applicable to the Level-1 and Level-2 at the time.

Command Interface configuration mode
Mode

Usage Guide Configure this command to change the interval for sending Hello packets. By default, the multiplier of the Hello holdtime is 3, and the DIS in broadcast network sends Hello packets at an interval which is three times of non-DIS.

If this IS is elected as DIS on this interface, the interface will send Hello packets every 3.3 seconds by default. If the key word "minimal" is used, then the "holdtime" in Hello packets will be set to 1, and hello interval will be calculated based on the hello-multiplier. For example, if hello-multiplier is configured to 4 and "isis hello-interval minimal" is configured at the same time, the value of hello-interval shall be 1s/4 (250ms). By default, the CPU protection is enabled on the switch, so that the number of packets corresponding to the destination group addresses of ISIS (AllISSystems, AllL1ISSystems, AllL2ISSystems) is limited when they are sent to the CPU, for example, the default limited value is 400pps. The number of packets received by the switch may be larger than the default value if there are many neighbors or the interval for sending Hello packets is short, resulting in continual vibration of the adjacent relation. In this case, you need to raise the limit of IS-IS packets using the global commands **cpu-protect type isis-is pps**, **cpu-protect type isis-l1is pps** and **cpu-protect type isis-l2is pps**.

```

Configuration FS(config)# interface GigabitEthernet 0/1
Examples FS(config-if)# isis hello-interval 5 level-1
FS(config)# interface GigabitEthernet 0/2
FS(config-if)# isis hello-interval minimal
    
```

Related Commands	Command	Description
		isis hello-multiplier

Platform N/A
Description

4.34 isis hello-multiplier

Use this command to set the multiplier of Hello hold timer. Use the **no** form of this command to restore the default settings.

isis hello-multiplier multiplier-number [**level-1** | **level-2**]
no isis hello-multiplier [multiplier-number] [**level-1** | **level-2**]

Parameter Description	Parameter	Description
		multiplier-number

Defaults By default, the multiplier is 3..

Command Mode IS-IS routing process configuration mode

Usage Guide Use this command to set the multiplier of Hello holdtime. The holdtime value in the Hello packet is the product of hello-interval and this multiplier.

```

Configuration FS(config)# router isis
    
```

Examples `FS(config-router)# isis hello-multiplier 5`

Related Commands	Command	Description
		<code>isis hello-interval</code>

Platform N/A

Description

4.35 isis hello padding

Use this command to specify the filling mode for the IS-IS Hello packets. Use the **no** form of this command to fill no IS-IS Hello packets.

isis hello padding
no isis hello padding

Parameter Description	Parameter	Description
		N/A

Defaults By default, the **isis hello padding** is executed.

Command Mode Interface configuration mode

Usage Guide Fill the IS-IS Hello packets to advertise the MTU supported to the neighbors.

Configuration Examples

```
FS# configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# no isis hello padding
```

Related Commands	Command	Description
		<code>isis hello-interval</code>

Platform N/A

Description

4.36 isis lsp-flood

Use this command to set the maximum number of LSP packets that can be sent by an interface at a time.

isis lsp-flood lsp-number [**level-1** | **level-2**]

Use the **no** form of this command to restore the default number of LSP packets that can be sent by an interface at a time.

no isis lsp-flood [level-1 | level-2]

Parameter Description	Parameter	Description
	lsp-number	Specifies the maximum number of LSP packets that can be sent by an interface at a time. The value range is 1 to 1000 . The default value is 5 .
	level-1	Indicates that the configuration takes effect only at Level-1.
	level-2	Indicates that the configuration takes effect only at Level-2.

Defaults If no level is specified, the default value is **level-1-2**, that is, the configuration takes effect at both Level-1 and Level-2.

Command Mode Interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example sets the maximum number of LSP packets that can be sent by Interface GigabitEthernet 0/1 at Level-2 at a time to **10**.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis lsp-flood 10 level-2
```

4.37 isis lsp-interval

Use this command to set the interval for the LSP PDU transmission. Use the **no** form of this command to restore the default interval.

isis lsp-interval interval

no isis lsp-interval

Parameter Description	Parameter	Description
	interval	Interval time in the range of 1 to 4294967295, with the unit being millisecond.

Defaults By default, the lsp-interval is 33ms.

Command Mode Interface configuration mode

Usage Guide This command is used to set the minimal interval for sending the LSPs on the interface, with the unit being millisecond.

Configuration Examples

```
FS#configure terminal
FS(config)# interface GigabitEthernet 0/1
```



```
FS(config-if)# isis lsp-interval 100
```

Related Commands	Command	Description
		isis retransmit-interval

Platform N/A

Description

4.38 isis mesh-group

Use this command to add the interface to the specified mesh-group. Use the **no** form of this command to separate the interface from the mesh-group.

isis mesh-group { blocked | mesh-group-id }

no isis mesh-group

Parameter Description	Parameter	Description
		blocked
	mesh-group-id	Adds the interface to the mesh-group of specified mesh-group-id with the range being 1 to 4,294,967,295.

Defaults By default, the interface is not added to any mesh-group.

Command Mode Interface configuration mode

Usage Guide Mesh-groups can control the exceeding and redundant LSP spreading in the NBMA network. In the normal condition, the IS-IS router spreads out the LSP from all interfaces except for the receiving one, that is, if a router is configured multiple subinterfaces, the LSP will be sent from all subinterfaces and the neighbors will receive many same LSPs, which wastes a large number of CPU and bandwidth. The IS-IS mesh-group allows grouping the router interfaces, so if a LSP is received by one subinterface in the group, this LSP will not be spread out through other subinterfaces in the group. And if the router receives the LSP from the interface out of the group, it will spread out the LSP from other interfaces as usual.

If you need to configure the **mesh-group** on the IS-IS interface, use the **isis csnp-interval** command to configure the interval for sending the non-0 CSNP packets, so as to send the CNSP packets regularly to synchronize the LSP and ensure the integrity of LSP synchronization between neighbors in network.

Configuration Examples

```
FS#configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)#isis mesh-group 1
```

Related	Command	Description
---------	---------	-------------

Commands	
isis network point-to-point	Sets the Broadcast interface type of IS-IS to Point-to-Point.

Platform N/A

Description

4.39 isis metric

Use this command to set the metric for the interface. Use the **no** form of this command to restore the default metric.

isis metric metric [**level-1** | **level-2**]

no isis metric [metric] [**level-1** | **level-2**]

Parameter Description	Parameter	Description
	metric	Metric value in the range of 1 to 63.
	level-1	Sets this metric to apply on the Level-1 circuit.
	level-2	Sets this metric to apply on the Level-2 circuit.

Defaults By default, the metric is 10, which applies on both Level-1 and Level-2 circuit.

Command Interface configuration mode

Mode

Usage Guide The Metric value is in the TLV of the IP reachable information and is applied to the SPF calculation. The greater metric value means the more routing cost on this interface and the longer path calculated by SPF. This value is effective only when the metric-style includes narrow.

Configuration Examples

```
FS#configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)#isis metric 1
```

Related Commands	Command	Description
	metic-style	Sets the metric type.
	isis wide-metric	Sets the wide metric of the IS-IS interface.

Platform N/A

Description

4.40 isis network point-to-point

Use this command to set the IS-IS Broadcast interface to the Point-to-Point type. Use the **no** form of this command to restore the interface type to the Broadcast.

isis network point-to-point
no isis network point-to-point

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, the **isis network point-point** is not executed.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples

```
FS# configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis network point-to-point
```

Related Commands

Command	Description
isis mesh-group	Adds the IS-IS interface into the specified mesh group.

Platform Description N/A

4.41 isis passive

Use this command to configure the passive interface. Use the **no** form of this command to remove the passive interface.

isis passive
no isis passive

Parameter Description

Parameter	Description
N/A	

Defaults The passive interface is not configured by default.

Command Mode IS-IS routing process configuration mode

Usage Guide Use this command to disable the interface to receive and send the IS-IS packets, but to advertise the IP address of the interface.

Configuration The following example configures interface GigabitEthernet 0/0 as passive.

Examples

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis passive
```

Related Commands

Command	Description
show run	Displays whether the command is configured
show isis interface	Displays whether the interface is passive

Platform N/A

Description

4.42 isis password

Use this command to set the plain-text authentication password for the Hello packet transmitted on the interface.

Use the **no** form of this command to remove the configurations.

isis password password-string [**send-only**] [**level-1** | **level-2**]

no isis password [**send-only**] [**level-1** | **level-2**]

Parameter Description

Parameter	Description
password-string	The character strings of the plain-text authentication password with the longest length being 254 characters.
send-only	The plain-text authentication password is only applicable to the packets sent. No authentication will be performed on the packets received.
level-1	This password applies to the Level-1 circuit.
level-2	This password applies to the Level-2 circuit.

Defaults By default, both the passwords on the Level-1 and Level-2 are not configured.

Command Mode Interface configuration mode

Usage Guide This command is used to set the plain-text authentication password for the Hello packets transmitted on the interface. Use the **no** form of this command to clear the passwords. When the Level is not specified, the authentication password configured is by default applicable to every Level. If the **isis authentication mode** command has been executed, this command will not be configured successfully. To configure this command, you need to delete the **isis authentication mode** command first. Running the **no isis password send-only** command can only disable the **send-only** option.

Configuration Examples

```
FS# configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis password redgiant
```

Related Commands	Command	Description
		isis authentication mode

Platform N/A
Description

4.43 isis priority

Use this command to set the priority for the DIS election on the LAN. Use the **no** form of this command to restore the default priority.

isis priority value [**level-1** | **level-2**]
no isis priority [value] [**level-1** | **level-2**]

Parameter Description	Parameter	Description
		value
	level-1	Applies to the Level-1 circuit.
	level-2	Applies to the Level-2 circuit.

Defaults The default priority value is 4 and it is applied on both Level-1 and Leve-2 circuit.

Command Mode Interface configuration mode

Usage Guide Use this command to change the priority value in the Hello of LAN.
 The low priority value has the lower priority in the DIS election than the high priority value.
 This command takes no effect on the Point-to-Point network interface.
 The **no isis priority** command is used to restore the priority to the default value no matter whether the parameter is followed. If you want to modify the configured priority, you can either use the **isis priority** command with parameter specified to overwrite the configured command directly, or configure a new parameter after restoring the priority to the default value.

Configuration Examples

```
FS# configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis priority 127 level-1
```

Related Commands	Command	Description
		N/A

Platform N/A

Description

4.44 isis psnp-interval

Use this command to set the minimum transmission interval of PSNP packets.

isis psnp-interval seconds [**level-1** | **level-2**]

Use the **no** form of this command to cancel the specified minimum transmission interval of PSNP packets.

no isis psnp-interval [**level-1** | **level-2**]

Parameter Description	Parameter	Description
	seconds	Indicates that the value range is 1 to 120 in seconds.
	level-1	Indicates that the configuration takes effect only at Level-1.
	level-2	Indicates that the configuration takes effect only at Level-2.

Defaults This command is not configured by default. The default minimum transmission interval is 2 seconds and takes effect both at Level-1 and Level-2.

Command Mode Interface configuration mode

Default Level 14

Usage Guide PSNP packets are used to request for LSP packets or respond to received LSP packets in a point-to-point network. In both cases, it is recommended to send PSNP packets rapidly. If there are excessive LSP packets but the device performance is poor, you can set the PSNP packet transmission interval and LSP retransmission time to larger values, to reduce the device load.

Configuration Examples The following example sets the PSNP packet transmission interval to 5 seconds for Interface GigabitEthernet 0/1 at Level-2.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# isis psnp-interval 5 level-2
```

4.45 isis retransmit-interval

Use this command to set the LSP retransmission interval. Use the **no** form of this command to restore the default interval.

isis retransmit-interval interval-time

no isis retransmit-interval

Parameter Description	Parameter	Description
	interval-time	Interval time in the range of 0 to 65,535 with the unit being second.

Defaults 5s

Command Mode Interface configuration mode

Usage Guide This command is used to set the LSP retransmission interval. The retransmission refers to that on a point-to-point link, if the local router fails to receive the PSNP reply after sending LSPs in the retransmit-interval, it will retransmit that LSP packets.

Configuration Examples

```
FS# configure terminal
FS(config)# interface serial 0/1
FS(config-if)# isis retransmit-interval 10
```

Related Commands	Command	Description
	isis lsp-interval	

Platform Description N/A

4.46 isis suppress on-neighbor-up

Use this command to suppress the routing calculation after the IS-IS neighbor is up. Use the **no** form of this command to restore the default setting.

isis suppress on-neighbor-up seconds
no isis suppress on-neighbor-up

Parameter Description	Parameter	Description
		seconds

Defaults By default, this function is disabled.

Command Mode Interface configuration mode

Usage Guide After the interface neighbor is up, this command prevents the neighbor reachability from being added to LSP so as to delay the routing calculation. When the timer expires, the neighbor reachability is added to LSP to start the routing calculation. This function prevents the routing calculation from using the old LSP, which may lead to routing flapping.

Configuration Examples The following example suppresses the routing calculation on the interface GigabitEthernet 0/0 after the neighbor is up.

```
FS(config)#int GigabitEthernet 0/0
FS(config-if)# isis suppress on-neighbor-up 10
```

Related Commands	Command	Description
		show ip route

Platform N/A
Description

4.47 isis three-way-handshake disable

Use this command to disable three-way handshake for point-to-point network. Use the **no** form of this command to enable three-way handshake for point-to-point network.

isis three-way-handshake disable
no isis three-way-handshake disable

Parameter Description	Parameter	Description
		N/A

Defaults By default, three-way handshake is enabled.

Command Mode Interface configuration mode

Usage Guide In the point-to-point network, three-way handshake is enabled by default. That is to say, the IS-IS neighbor can be established only after three-way handshake is successful. You can use this command to cancel three-way handshake negotiation to accelerate IS-IS neighbor establishment or for the the device not supporting three-way handshake.

Configuration Examples The following example disables three-way handshake on interface GigabitEthernet 0/0.

```
FS(config)#int GigabitEthernet 0/0
FS(config-if)# isis network point-to-point
FS(config-if)# isis three-way-handshake disable
```

Related Commands	Command	Description	
		metric-type	Sets the metric type.
		isis metric	Sets the metric value of the interface.

Platform N/A
Description

4.48 isis wide-metric

Use this command to set the wide metric of the interface. Use the **no** form of this command to restore the default wide metric.

isis wide-metric metric [**level-1** | **level-2**]

no isis wide-metric [metric] [**level-1** | **level-2**]

Parameter Description	Parameter	Description
	metric	Metric value in the range of 1 to 16,777,241.
	level-1	Sets this Metric to apply on the Level-1 circuit.
	level-2	Sets this Metric to apply on the Level-2 circuit.

Defaults By default, the metric value is 10 and it is applicable to both Level-1, Level-2 circuit.

Command Mode Interface configuration mode

Usage Guide The Metric value is in the TLV of the IP reachable information and is applied to the SPF calculation. The greater metric value means the more routing cost on this interface and the longer path calculated by SPF. This value is effective only when the metric-style includes wide.

```

Configuration FS#configure terminal
Examples FS(config)# interface GigabitEthernet 0/1
FS(config-if)#isis wide-metric 1000
    
```

Related Commands	Command	Description
	metric-type	Sets the metric type.
	isis metric	Sets the metric value of the interface.

Platform Description N/A

4.49 is-name

Use this command to replace the system ID of an instance with the configured name. Use the **no** form of this command to restore the default settings.

is-name name

no is-name

Parameter Description	Parameter	Description
	name	Indicates the name for replacing the system ID. The name contains a

	maximum of 64 characters.
--	---------------------------

Defaults By default, the function is disabled.

Command IS-IS routing process configuration mode

Mode

Usage Guide Use this command to replace the system ID of an instance with the configured name. All system IDs displayed in the command output of **show isis database** and **show isis neighbors** are replaced with the configured name.

Configuration The following example replaces the system ID of an instance with the configured name.

Examples

```
FS(config)# router isis
FS(config-router)# is-type level-1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.50 is-type

Use this command to specify the level for the IS-IS process. Use the **no** form of this command to restore the default level for IS-IS process.

is-type { level-1 | level-1-2 | level-2-only }

no is-type

Parameter Description	Parameter	Description
	level-1	Specifies the IS-IS process running on the Level-1 only.
	level-1-2	Specifies the IS-IS process running on both Level-1 and Level-2.
	level-2-only	Specifies the IS-IS process running on the Level-2 only.

Defaults By default, the IS-IS process runs on Level-1-2.

Command IS-IS routing process configuration mode

Mode

Usage Guide Changing the is-type enables or disables the route of one Level.

Configuration Examples

```
FS# configure terminal
FS(config)# router isis
```

```
FS(config-router)# is-type level-1
```

Related Commands

Command	Description
isis circuit-type	Sets the type of Interface circuit.

Platform N/A
Description

4.51 log-adjacency-changes

Use this command to log the changes of the IS adjacency status in case of debug disabled. Use the **no** form of this command to disable this function.

log-adjacency-changes
no log-adjacency-changes

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, this function is enabled.

Command Mode IS-IS routing process configuration mode

Usage Guide You can also use the **debug** command to log the changes of the IS adjacency status. But using the IS-IS debug command will exhaust large numbers of resources.

Configuration Examples FS(config-router)# **log-adjacency-changes**

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.52 lsp-fragments-extend

Use this command to enable the LSP fragment extension mode for a level. Use the **no** form of this command to disable the LSP fragment extension mode for a level.

lsp-fragments-extend [level-1 | level-2] [compatible rfc3786]
no lsp-fragments-extend [level-1 | level-2] [compatible rfc3786]

Parameter	Parameter	Description
Description	level-1	Enables the LSP fragment extension mode for the Level-1 only.
	level-2	Enables the LSP fragment extension mode for the Level-2 only.
	compatible	Compatible with RFC3786
	rfc3786	The older version of extended LSP implementation.

Defaults By default, LSP fragment extension is disabled.
 If no level is specified, the LSP fragment extension mode is enabled for both Level-1 and Level-2.

Command Mode IS-IS routing process configuration mode

Usage Guide The originating LSP can be divided up to 256 fragments. After the 256 fragments are filled, the subsequent link state information, such as the neighbor and IP routing, will be discarded, resulting in network problem.
 To avoid the above problem, you can enable the LSP fragment extension function, and configure the additional system ID using the **virtual-system** command.
 If there are other vendor's device supporting RFC3786 standard in the network, you need to display the link state database of the device when enabling or disabling the **compatible** option. If there is indeed the vendor's device, you can use the **clear isis *** command to clear the remaining LSP packets to trigger the system to update the link state database.

Configuration Examples The following example enables the LSP fragment extension mode for the Level-2.

```
FS(config)# router isis
FS(config-router)# lsp-fragments-extend level-2
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.53 lsp-gen-interval

Use this command to set the minimal interval of the LSP generation. Use the **no** form of this command to restore the default value.

lsp-gen-interval [level-1 | level-2] maximum-interval [initial-interval hold-interval]
no lsp-gen-interval [level-1 | level-2]

Parameter	Parameter	Description
Description	level-1	The minimal interval is applicable on the Level-1 IS-IS.
	level-2	The minimal interval is applicable on the Level-2 IS-IS.

maximum-interval	Indicates the maximum interval for generating two consecutive LSP packets. The value range is 1 to 65535 (in seconds). The default value is 5 .
initial-interval	Indicates the waiting time for generating an LSP packet for the first time. The value range is 0 to 60000 (in milliseconds). The default value is 50 .
hold-interval	Indicates the minimum interval for generating an LSP packet for the second time. The value range is 10 to 60000 (in milliseconds). The default value is 200 .

Defaults By default, this command is not configured and the interval of the minimal generation is 5s, it is effective on both Level-1 and Level-2

Command IS-IS routing process configuration mode

Mode

Usage Guide The LSP packet generation interval refers to the interval for generating two different LSP packets. A smaller generation interval indicates faster network convergence, which, however, will be accompanied by frequent flooding on the network.

The waiting time for generating an LSP packet for the first time is the initial interval. If the network becomes unstable, the LSP packet regeneration interval is changed to be less than the maximum interval, and the interval for generating an LSP packet for the second time becomes the hold interval. A corresponding penalty will be added to this interval: The next interval for regenerating a LSP packet doubles the previous interval for generating the same LSP packet, until the regeneration interval reaches the maximum interval. Subsequent LSP packets will be generated at the maximum interval. When the network becomes stable, the LSP packet regeneration interval becomes greater than the maximum interval, and the waiting time for LSP packet generation is restored to the initial interval.

Link changes have high requirements for convergence. The initial interval can be set to a small value. The preceding parameters can also be adjusted to larger values to reduce CPU consumption.

The value of **initial-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **initial-interval** will be used as the value of **maximum-interval**.

The value of **hold-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **hold-interval** will be used as the value of **maximum-interval**.

The value of **initial-interval** cannot be greater than that of **hold-interval**. Otherwise, the value of **initial-interval** will be used as the value of **hold-interval**.

Configuration Examples The following example sets the minimum interval for generating two duplicate LSP packets to 10 seconds, the interval for generating a duplicate LSP packet for the first time to 100 ms, and the interval for generating a duplicate LSP packet for the second time to 200 ms.

```
FS(config)# router isis
FS(config-router)# lsp-gen-interval 10 100 200
```

The following example sets the minimum interval for generating two duplicate LSP packets to 5 seconds.

```
FS(config)# router isis
FS(config-router)# lsp-gen-interval 5
```

Related Commands

Command	Description
isp-refresh-interval	Configures the interval for LSP refresh.

Platform N/A
Description

4.54 **isp-length originate**

Use this command to set the maximum length for transmitting LSP packets.

isp-length originate size [**level-1** | **level-2**]

Use the **no** form of this command to restore the default value.

no isp-length originate [**level-1** | **level-2**]

Parameter Description

Parameter	Description
size	Specifies the maximum length for transmitting LSP packets. The value range is 512 to 16000 in bytes.
level-1	Indicates that the configuration takes effect only at Level-1.
level-2	Indicates that the configuration takes effect only at Level-2.

Defaults The default value of the maximum length for transmitting LSP packets is **1492**. If no level is specified, the default value is **level-1-2**, that is, the configuration takes effect at both Level-1 and Level-2.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide In principle, the length of LSP and SNP packets cannot be greater than the interface MTU. Otherwise, LSP packets and SNP packets are directly discarded upon being sent.

Configuration Examples The following example sets the maximum length for transmitting LSP packets at Level-2 to 1498 bytes.

```
FS(config)# router isis 1
FS(config-router)# isp-length originate 1498 level-2
```

4.55 **isp-length receive**

Use this command to set the maximum length for receiving LSP packets.

isp-length receive size

Use the **no** form of this command to restore the default value.

no isp-length receive

Parameter Description	Parameter	Description
	size	Specifies the maximum length of LSP packets. The value range is 1,492 to 16,000 in bytes according to the RFC.
Defaults	The default value is 1492 .	
Command Mode	IS-IS routing process configuration mode	
Default Level	14	
Usage Guide	This command is used to control the maximum length of LSP packets that can be received by the local device. In fact, to prevent a route convergence failure, intermediate nodes need to receive LSP packets with the maximum length of the interface MTU as long as the memory permits. In this sense, this command seems nominal. The maximum length for receiving LSP packets cannot be less than the maximum length for transmitting LSP packets. If the maximum length for receiving LSP packets is less than the maximum length for transmitting LSP packets, the maximum length for receiving LSP packets is automatically adjusted to the maximum length for transmitting LSP packets.	
Configuration Examples	The following example configures the maximum length for receiving LSP packets to 1498 bytes.	
	<pre>FS(config)# router isis FS(config-router)# lsp-length receive 1498</pre>	

4.56 lsp-refresh-interval

Use this command to set the LSP refresh interval. Use the **no** form of this command to restore the default value.

lsp-refresh-interval interval

no lsp-refresh-interval

Parameter Description	Parameter	Description
	interval	LSP refresh interval in the range of 1 to 65535 with unit being second.

Defaults By default, the lsp-refresh-interval is 900 seconds.

Command Mode IS-IS routing process configuration mode

Usage Guide If the LSP stable status lasts for the time of refresh interval, LSP will refresh this LSP and update the LSP version and publish it.

It should be noted that the lsp-refresh-interval must be less than the max lifetime.

Configuration

```
FS(config)# router isis
```

Examples `FS(config-router)# lsp-refresh-interval 600`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.57 max-area-addresses

Use this command to set the maximal number of area address allowed. Use the **no** form of this command to restore the default value.

max-area-addresses value

no max-area-addresses

Parameter Description	Parameter	Description
	value	value

Defaults By default, the max-area-addresses is 3.

Command Mode IS-IS routing process configuration mode

Usage Guide For the IS routers of Level-1, only the ones with the same max-area-addresses are allowed to establish the adjacency relation.

Configuration Examples

```
FS# configure terminal
FS(config)# router isis
FS(config-router)# max-area-addresses 5
```

Related Commands	Command	Description
	net	net

Platform N/A

Description

4.58 maximum-paths

Use this command to set the maximum number of IS-IS equal-cost routing entries in the routing table.

maximum-paths maximum

Use the **no** form of this command to restore the default value.

no maximum-paths

Parameter Description	Parameter	Description
	maximum	Maximum number of IS-IS equal-cost routing entries in the routing table. The value range is 1 to device capacity .

Defaults The default value is **2**.

Command Mode IS-IS routing process configuration mode, IS-IS address-family IPv6 configuration mode

Default Level 14

Usage Guide This command is used by the IS-IS protocol to control the number of IS-IS equal-cost routing entries in the routing table. The routing table itself also has a command for controlling the number of equal-cost routing entries. The effective number of equal-cost routing entries is the smaller of the two values.

Configuration Examples The following example sets the maximum number of IS-IS IPv4 equal-cost routing entries in the routing table to **5**.

```
FS(config)# router isis
FS(config-router)# maximum-paths 5
```

The following example sets the maximum number of IS-IS IPv6 equal-cost routing entries in the routing table to **6**.

```
FS(config)# router isis
FS(config-router)# address-family ipv6
FS(config-router-af)# maximum-paths 6
```

4.59 max-lsp-lifetime

Use this command to set the maximum value of the LSP lifetime. Use the **no** form of this command to restore the default value.

max-lsp-lifetime value

no max-lsp-lifetime

Parameter Description	Parameter	Description
	value	Maximum value of the LSP lifetime in the range of 1 to 65,535, with unit being second.

Defaults By default, the max-lsp-lifetime is 1200 seconds.

Command Mode IS-IS routing process configuration mode

Usage Guide It should be noted that the max-lsp-lifetime must be greater the lsp-refresh-interval.

Configuration FS# **configure terminal**
Examples FS(config)# **router isis**
 FS(config-router)# **max-lsp-lifetime 1500**

Related Commands	Command	Description
		lsp-refresh-interval

Platform N/A

Description

4.60 max-metric on-neighbor-up

Use this command to configure the maximum metric for the connected routes after the first neighbor is up. Use the **no** form of this command to restore the default settings.

max-metric on-neighbor-up seconds

no max-metric on-neighbor-up

Parameter Description	Parameter	Description
		seconds

Defaults The command is not configured by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide When the ISIS Overlay scene is applied on the Underlay network, Overlay tunnel may rely on Underlay routing. After ISIS neighbor is up, the Underlay routing is reachable but the Overlay tunnel may not be created, which may lead to traffic interruption. Therefore, this command is run to prevent traffic interruption. According to the metric type, the maximum metric for Narrow is 63 and for Wide is 16777214.

Configuration The following example sets the maximum metric after the first neighbor is up.

Examples FS(config)# **router isis**
 FS(config-router)# **max-metric on-neighbor-up 100**

4.61 min-lsp-arrival

Use this command to set the interval for receiving duplicate LSP packets.

min-lsp-arrival [**level-1** | **level-2**] maximum-interval initial-interval hold-interval

Use the **no** form of this command to cancel the function of delaying receiving duplicate LSP packets.

no min-lsp-arrival [level-1 | level-2]

Parameter Description	Parameter	Description
	level-1	Applies the configuration to the Level-1 IS-IS system.
	level-2	Applies the configuration to the Level-2 IS-IS system.
	maximum-interval	Specifies the minimum interval for receiving two consecutive duplicate LSP packets. The value range is 1 to 120 in seconds.
	initial-interval	Specifies the interval for receiving a duplicate LSP packet for the first time. The value range is 0 to 60,000 in milliseconds.
	hold-interval	Specifies the minimum interval for receiving a duplicate LSP packet for the second time. The value range is 10 to 60,000 in milliseconds.

Defaults The function of delaying receiving duplicate LSP packets is not supported by default. If no level is specified, on the default value is **level-1-2** default, that is, the configuration takes effect at both Level-1 and Level-2.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide The interval for receiving a duplicate LSP packet for the first time is **initial-interval**. When the interval for receiving duplicate LSP packets is less than **maximum-interval**, the interval for receiving a duplicate LSP packet for the second time becomes **hold-interval**, and a corresponding penalty is added to this interval: The next interval for receiving a duplicate LSP packet is twice the previous interval for receiving the same LSP packet until this interval reaches **maximum-interval**. Then, the interval for receiving duplicate LSP packets is always **maximum-interval**. When the network becomes stable, the interval for receiving a duplicate LSP packet becomes greater than **maximum-interval**, and the interval for receiving a duplicate LSP packet is restored to **initial-interval**. Link changes have high requirements for convergence. The initial interval can be set to a small value. The preceding parameters can also be adjusted to larger values to reduce CPU consumption.

2. The value of **initial-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **initial-interval** will be used as the value of **maximum-interval**.
3. The value of **hold-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **hold-interval** will be used as the value of **maximum-interval**.
4. The value of **initial-interval** cannot be greater than that of **hold-interval**. Otherwise, the value of **initial-interval** will be used as the value of **hold-interval**.

Configuration Examples The following example sets the minimum interval for receiving two duplicate LSP packets to 10 seconds, the interval for receiving a duplicate LSP packet for the first time to 100 ms, and the interval for receiving a duplicate LSP packet for the second time to 200 ms.

```
FS(config)# router isis
```

```
FS(config-router)# min-lsp-arrival 10 100 200
```

4.62 metric-style

Use this command to set the metric style. Use the **no** form of this command to restore the default metric style.

metric-style { **narrow** [**transition**] | **wide** [**transition**] | **transition** } [**level-1** | **level-1-2** | **level-2**]

no metric-style { **narrow** [**transition**] | **wide** [**transition**] | **transition** } [**level-1** | **level-1-2** | **level-2**]

Parameter Description

Parameter	Description
narrow	Uses the old metric style with the router interface metric ranging from 1 to 63.
wide	Uses the new metric style with the router interface metric ranging from 1 to 16777214
transition	Allows the router to send and receive the new and old metric style.
level-1	This metric-style on the Level-1 circuit.
level-2	This metric-style applies on the Level-2 circuit.
level-1-2	This metric-style applies on the Level-1-2 circuit.

Defaults By default, the metric-style is narrow.

Command Mode IS-IS routing process configuration mode

Usage Guide The metric value of the interface is specified by the **isis metric** metric when the metric-style is set to narrow, while the metric value is specified by the **isis wide-metric** metric in case that the metric-style is set to wide or **transition**.

Configuration Examples

```
FS# configure terminal
FS(config)# router isis
FS(config-router)# metric-style wide
```

Related Commands

Command	Description
isis metric	Sets the metric of the interface.
isis wide-metric	Sets the wide metric of the interface.

Platform Description N/A

4.63 multi-topology

Use this command to enable IS-IS to support IPv6 unicast topology. Use the **no** form of this command to restore the default setting.

multi-topology [**transition**]

no multi-topology [**transition**]

Parameter Description	Parameter	Description
	transition	Configures the MT transition mode.

Defaults By default, multitopology is not configured, namely, IS-IS does not support IPv6 unicast topology.

Command Mode IS-IS address-family IPv6 configuration mode

- Usage Guide**
1. When this command is not configured, IPv4 and IPv6 share the same IS-IS physical topology, which is also called default topology.
 2. If the **transition** parameter is not specified, the device runs in multi-topology mode, the IS-IS v4 process works in the default topology while the IS-IS v6 process works in the IPv6 unicast topology.
 3. If the **transition** parameter is specified, the device runs in multi-topology transition mode and the IS-IS v6 process runs in both the default topology and IPv6 unicast topology.

The above three configurations are exclusive.

The device which runs in multi-topology transition mode can transmit the multi-topology TLV and the default topology TLV. The multi-topology transition mode can be applied in incremental deployment to ensure smooth network migration. However, this mode may cause leaking of routes between the default topology and IPv6 unicast topology. Be careful to configure multi-topology transition mode, as this configuration may lead to network problems such as route blackhole and network loop.

Before you configure this command, you need to set the metric style as wide or transition mode. Configuring the metric style as narrow and configuring only one Level to support wide or transition mode will disable the multitopology routing (MTR) function.

Configuration Examples The following example configures multi-topology.

```
FS(config)# router isis
FS(config-router)# address-family ipv6
FS(config-router-af)# multi-topology
```

Related Commands	Command	Description
	router isis	Creates IS-IS instances.

Platform Description N/A

4.64 net

Use this command to set the IS-IS NET (Network Entry Title) address. Use the **no** form of this command to delete this NET address.

- net** net-address
- no net** net-address

Parameter Description	Parameter	Description
	net-address	The format of net-address is shown as below: XX.XXXX.YYYY.YYYY.YYYY.00, the XX...XXXX is the area address and the YYYY.YYYY.YYYY is the system ID.

Defaults By default, no NET address is set.

Command Mode IS-IS routing process configuration mode

Usage Guide This command is used to set the Area ID and System ID for the IS-IS.
Up to three NET addresses are allowed to be set by default, namely three addresses with different Area can be set.
However, the System ID must be the same.

Configuration Examples

```
FS# configure terminal
FS(config)# router isis
FS(config-router)# net 49.0000.0001.0002.0003.00
```

Related Commands	Command	Description
	router isis	Creates IS-IS instances.

Platform Description N/A

4.65 nsr

Use this command to enable the NSR function for the current IS-IS instance.

nsr

Use the **no** form of this command to restore the default configuration.

no nsr

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The NSR function is disabled by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide The Nonstop Routing (NSR) backs up relevant IS-IS information from the master Supervisor Engine to the slave Supervisor Engine of the distributed device. In this way, the device can automatically recover the link status and re-generate a route upon active/standby switchover, without requiring assistance from neighbor devices during the recovery. Information such as the neighbor relationship and link status needs to be backed up. For the same IS-IS process, either NSP or GR can be enabled because they are mutually exclusive. The switchover of distributed devices takes a period of time. If the IS-IS neighbor keepalive duration is shorter than the switchover duration, the IS-IS neighbor relationship with the neighbor device is removed, and the services are interrupted during the switchover. Therefore, it is recommended to set the IS-IS neighbor keepalive duration to be not less than the default value when the NSR function is enabled. When Fast Hello is enabled, the IS-IS neighbor keepalive duration is less than 1 second and the IS-IS neighbor relationship times out during the switchover, causing NSR failures. Therefore, it is recommended to disable Fast Hello when NSR is enabled. By default, if the DIS is a FS device, the neighbor relationship between the neighbor device and the FS device is maintained for 10 seconds at most (the DIS interface sends one HELLO packet every 3.3 seconds). However, the active/standby switchover of FS devices takes at least 7 seconds. If the switchover takes place when the interface is to send a HELLO packet, the period for the neighbor device to receive a HELLO packet again may be greater than 10 seconds, and neighbor relationship flapping occurs on the neighbor device. To avoid neighbor relationship flapping, when NSR is enabled, increase the time for maintaining the neighbor relationship with the neighbor device that sends HELLO packets by 10 seconds.

Configuration Examples The following example configures the NSR function.

```
FS(config)# router isis 1
FS(config-router)# nsr
```

4.66 passive-interface

Use this command to configure the passive interface. Use the **no** form of this command to remove the passive interface.

```
passive-interface [ default ] { interface-type interface-number }
no passive-interface [ default ] { interface-type interface-number }
```

Parameter Description	Parameter	Description
	default	Configures IS-IS disabled interfaces as passive.
	interface-type	Indicates the interface type.
	interface-number	Indicates the interface number.

Defaults The passive interface is not configured by default.

Command Mode IS-IS routing process configuration mode

Usage Guide Use this command to disable the interface to receive and send the IS-IS packets, but to advertise the IP address of

the interface.

After the **default** option is configured, if the number of IS-IS disabled interfaces exceeds 255, the first 255 interfaces are configured as passive and the remaining interfaces are non-passive.

Configuration The following example configures interface GigabitEthernet 0/0 as passive.

Examples

```
FS(config)# router isis 1
FS(config-router)# passive-interface GigabitEthernet 0/0
```

Related Commands

Command	Description
router isis	Creates IS-IS instances.

Platform N/A

Description

4.67 redistribute

Use this command to redistribute the routes from one routing protocol into another routing protocol. Use the **no** form of this command to delete the redistribution.

redistribute { **bgp** | **ospf** process-id **match** { **internal** | **external** [**1** | **2**] | **nssa-external** [**1** | **2**] } | **rip** | **connected** | **static** } [**metric** metric-value] [**metric-type** type-value] [**route-map** map-tag] [**level-1** | **level-1-2** | **level-2**]

no redistribute { **bgp** | **ospf** process-id [**match** { **internal** | **external** [**1** | **2**] | **nssa-external** [**1** | **2**] } | **rip** | **connected** | **static** } [**metric** metric-value] [**metric-type** { **internal** | **external** }] [**route-map** map-tag] [**level-1** | **level-1-2** | **level-2**]

Parameter Description

Parameter	Description
process-id	OSPF process ID, in the range of 1 to 65535.
match { internal external [1 2] nssa-external [1 2] }	Redistributes the OSPF routes to perform the filtering on the subtype of the OSPF routes. If the match option is not specified, all routes of the ospf subtype by default are received. If the 1 or 2 followed by the match external is not specified, then redistribute the route of the OSPF external1 and external 2 . If the 1 or 2 following the match nssa-external is not specified, then redistribute the routes of OSPF nssa-external 1 and nssa-external 2 .
metric metric-value	Sets the metric value of redistributing the route, in the range of 0 to 4261412864. If the metric option is not specified, the external metric value is used.
metric-type { internal external }	Sets the metric type of redistributing the route. internal: use the internal metric type. external: use the external metric type. If the metric-type is not specified, the internal type is used by default.
route-map map-tag	Sets the route-map during the external routes redistribution, which is used to filter the redistributed routes or set attributions of the routes.

	<p>The name of map-tag shall not be over 32 characters.</p> <p>No route-map is configured by default.</p>
level-1 level-1-2 level-2	<p>Specifies the Level of receiving the redistributed routing information.</p> <p>If the Level is not specified, it is defaulted to be redistributed into the Level-2.</p> <p>The format is shown as below:</p> <p>level-1: redistribute into the Level-1</p> <p>level-1-2: redistribute into both Level-1 and Level-2.</p> <p>level-2: redistribute into the Level-2.</p>

Defaults By default, no redistribution is configured.

Command IS-IS routing process configuration mode , IS-IS address-family ipv6 mode

Mode

Usage Guide Configure "**no redistribue { bgp | ospf process-id | rip | connected | static }**" to disable protocol redistribution. If "**no redistribute**" is followed by any other parameter, it means that this parameter is restored to the default setting instead of disabling protocol redistribution. For example: "**no redistribute bgp**" will disable bgp redistribution, while "**no redistribute bgp route-map aa**" will disable route-map aa filtering during redistribution instead of disabling bgp redistribution.

The routing information will be placed into the IP External Reachability Information TLV of LSP when redistributing external route in the IPv4 mode.

The routing information will be placed to the IPv6 Reachable TLV of LSP when redistributing external route in the IPv6 mode.

In the old version of some vendors, after configuring the **metric-type** to the **external**, the redistributed route metric will be added by 64 and then perform the routing according to the metric value during the routing calculation, which violates the protocol. In actual application, the priority of the external route may be higher than that of the internal route. When connecting with these old version of some vendors, the related configuration (such as the **metric** or the **metric-type**) of each device can be modified to ensure that the priority of the internal route is higher than the external.

Configuration FS# **configure terminal**

Examples FS(config)# **router isis**

FS(config-router)# **redistribute ospf 1 metric 10 level-1**

Related Commands

Command	Description
redistribute isis [tag] level-2 into level-1	Redistributes the reachable routing information from Level-2 into Level-1.
redistribute isis [tag] level-1 into level-2	Redistributes the reachable routing information from Level-1 into Level-2.
route-map	Configures the route map.

Platform N/A

Description

4.68 redistribute isis level-2 into level-1

Use this command to redistribute the Level-2 reachable routing information of the IS-IS instance into the Level-1 of current instance. Use the **no** form of this command to remove the redistribution.

redistribute isis [tag] **level-2 into level-1** [**route-map** route-map-name | **distribute-list** access-list-name]

no redistribute isis [tag] **level-2 into level-1** [**route-map** route-map-name | **distribute-list** access-list-name]


Parameter Description

Parameter	Description
tag	Name of the IS-IS instance to be redistributed.
route-map route-map-name	<p>Sets the route map during the route redistribution, which is used to filter the redistributed routes and set attributions of the routes.</p> <p>Name of the route-map-name shall not be over 32 characters.</p> <ul style="list-style-type: none"> No route-map is configured by default.
distribute-list access-list-name	<ul style="list-style-type: none"> Uses the distribute-list to filter the redistributed routes. <p>Access-list-name is the prefix list associated, it can be the standard, extended or naming prefix list. The format is shown as below:</p> <pre>{<1-99> <100-199> <1300-1999> <2000-2699> acl-name}</pre> <ul style="list-style-type: none"> In the IS-IS address-family ipv6 mode, you can use only the naming prefix list with the format being acl-name.

Defaults N/A

Command Mode IS-IS routing process configuration mode or IS-IS **address-family ipv6** mode.

Usage Guide Use the **route-map** or **distribute-list** to filter the Level-2 route of the specified instance to be redistributed. Only the route that meets the condition can be redistributed into the Level-1 of current instance.

 You can only choose one of the two parameters **route-map** and **distribute-list**.

Configure the **no redistribute isis** [tag] **level-2 into level-1** to disable the specified instance redistribution. If the **no redistribute** is followed by any other parameters, it means that this parameter is restored to the default setting instead of disabling the specified instance redistribution.

For example: "**no redistribute isis** tag1 **level-2 into level-1**" will disable the isis tag1 redistribution, while "**no redistribue isis** tag1 **level-2 into level-1 route-map** a " will disable route-map aa filtering during redistribution instead of disabling the isis tag1 redistribution.

Configuration Examples

```
FS# configure terminal
FS(config)# router isis aa
FS(config-router)# redistribute isis bb level-2 into level-1
```

Related Commands	Command	Description
------------------	---------	-------------

redistribute	Redistributes the routing information from another routing protocol.
redistribute isis level-1 into level-2	Redistributes the reachable routing information from Level-1 into Level-2.

Platform N/A

Description

4.69 redistribute isis level-1 into level-2

Use this command to redistribute the Level-1 reachable routing information of the IS-IS instance into the Level-2 of current instance. Use the **no** form of this command to disable this redistribution.

redistribute isis [tag] **level-1 into level-2** [**route-map** route-map-name | **distribute-list** access-list-name]

no redistribute isis [tag] **level-1 into level-2** [**route-map** route-map-name | **distribute-list** access-list-name]

Parameter Description

Parameter	Description
tag	Name of the IS-IS instance.
route-map route-map-name	Sets the route map during the route redistribution, which is used to filter the redistributed route and set attributions of this route. Name of the route-map-name shall not be over 32 characters. No route-map is configured by default.
distribute-list access-list-name	Uses the distribute-list to filter the redistributed routes. Access-list-name is the prefix list associated, it can be the standard, extended or naming prefix list. The format is shown as below: {<1-99> <100-199> <1300-1999> <2000-2699> acl-name} In the IS-IS address-family ipv6 mode, you can use only the naming prefix list with the format being acl-name.

Defaults If the IS-IS Level-2 instance exists, all IS-IS Level-1 routes are by default redistributed into the IS-IS Level-2 instance.

Command Mode IS-IS routing process configuration mode or IS-IS **address-family ipv6** mode.

Usage Guide Use the **route-map** or **distribute-list** to filter the Level-1 route of the specified instance to be redistributed. Only the route that meets the condition can be redistributed into the Level-1 of current instance.

You can only choose one of the two parameters **route-map** and **distribute-list**.

Configure the **no redistribute isis** [tag] **level-2 into level-1** to disable the specified instance redistribution. If the **no redistribute** is followed by any other parameters, it means that this parameter is restored to the default setting instead of disabling the specified instance redistribution.

For example: "**no redistribute isis** tag1 **level-1 into level-2**" will disable the isis tag1 redistribution, while "**no redistribute isis** tag1 **level-1 into level-2 route-map** aa" will disable route-map aa filtering during redistribution instead of disabling the isis tag1 redistribution.

Configuration FS# configure terminal
Examples FS(config)# router isis aa
 FS(config-router)# redistribute isis bb level-1 into level-2

Related Commands	Command	Description
	redistribute	
redistribute isis level-2 into level-1		Redistributes the reachable routing information from Level-2 into Level-1.

Platform N/A
Description

4.70 router isis

Use this command to create the IS-IS instance. Use the **no** form of this command to delete this instance.

router isis [tag]

no router isis [tag]

Parameter Description	Parameter	Description
		tag

Defaults By default, no IS-IS instance is configured.

Command Mode Global configuration mode

Usage Guide Use this command to initialize the IS-IS instance and enter the IS-IS routing process configuration mode. The IS-IS instance will not be executed unless one NET address is configured at least. When enabling the IS-IS routing process with the parameter tag, the parameter tag will be used as well when disabling the IS-IS routing process. By default, the CPU protection is enabled on the switch, so that the number of packets corresponding to the destination group addresses of ISIS (AllISSystems, AllL1ISSystems, AllL2ISSystems) is limited when they are sent to the CPU, for example , the default limited value is 400pps. The number of packets received by the switch may be larger than the default value if there are many neighbors or the interval for sending Hello packets is short, resulting in continual vibration of the adjacent relation. In this case, you need to raise the limit of IS-IS packets using the global commands **cpu-protect type isis-is pps**, **cpu-protect type isis-l1is pps** and **cpu-protect type isis-l2is pps**.

Configuration FS# **configure terminal**
Examples FS(config)# **router isis**

**Related
Commands**

Command	Description
ip router isis	Enables the IS-IS IPv4 routing protocol on the interface.
ipv6 router isis	Enables the IS-IS IPv6 routing protocol on the interface.
net	Sets the NET address.

Platform N/A

Description
4.71 set-overload-bit

Use this command to instruct a neighbor not to use the local IS-IS node as a transit device for forwarding data.

```
set-overload-bit [ on-startup { seconds | wait-for-bgp [ bgpseconds ] } ] [ suppress { [ interlevel ] [ external ] } ]
[ level-1 | level-2 ]
```

Use the **no** form of this command to disable the function of instructing a neighbor not to use the local IS-IS node as a transit device for forwarding data.

```
no set-overload-bit [ level-1 | level-2 ]
```

**Parameter
Description**

Parameter	Description
on-startup seconds	Indicates that an IS-IS node automatically enters the OVERLOAD state after restart.
seconds	seconds is the duration of the IS-IS node in the OVERLOAD state after restart. The value range is 5 to 86,400 in seconds.
wait-for-bgp	Indicates the duration in which an IS-IS node automatically enters OVERLOAD state and remains in the wait-for-BGP convergence state after restart.
bgpseconds	Indicates the duration to wait for bgp convergence. The value ranges from 5–86,400 in seconds. The default value is 600.
suppress	Indicates that internal routes (IS-IS inter-area routes and intra-area routes) or external routes are not advertised to neighbors when the IS-IS node is in the OVERLOAD state.
interlevel	Indicates that IS-IS inter-area routes and intra-area routes are not advertised to neighbors when the IS-IS node is in the OVERLOAD state. It is used in combination with the suppress keyword.
external	Indicates that external routes are not advertised to neighbors when the IS-IS node is in the OVERLOAD state. It is used in combination with the suppress keyword.
level-1	Sends LSP packets that carry the OVERLOAD bit only to Level-1 neighbors.
level-2	Sends LSP packets that carry the OVERLOAD bit only to Level-2 neighbors.


Defaults

The function of instructing a neighbor not to use the local IS-IS node as a transit device for forwarding data is disabled by default.

Command IS-IS routing process configuration mode
Mode

Default Level 14

Usage Guide This command forces a IS-IS node to set the OVERLOAD bit in non-virtual LSP packets, to instruct IS-IS neighbors not to use the local node as a transit device.
 If the **on-startup** keyword is carried, the device automatically enters the OVERLOAD state after restart.
 If the **on-startup** keyword is not carried, the device immediately enters the OVERLOAD state upon restart.

 The **on-startup** keyword takes effect for only one level.

The OVERLOAD bit is mainly used in the following cases:

- Device overload

The overload of the local IS-IS node, for example, memory insufficiency or CPU full load, may cause incomplete routes in the local routing table or no resource for data forwarding. You can set the OVERLOAD bit in LSP packets to instruct neighbors not to use the local node as a transit device.

In this case, the **on-startup** keyword is not carried in the configuration. The OVERLOAD bit is manually set or cancelled. You must manually cancel this command after the local IS-IS node restores to the normal state. Otherwise, the local IS-IS node is always in the OVERLOAD state

- Instantaneous black hole

In the scenario described in RFC3277, the IS-IS converges faster than BGP does. After an IS-IS node restarts, the route fails instantaneously, that is, instantaneous black hole occurs. You can set the OVERLOAD bit in LSP packets to instruct neighbors not to use the local node as a transit device till the specified timer expires.

In this case, the configuration must carry the **on-startup** field. The OVERLOAD bit is automatically set or cancelled by the IS-IS node based on the configuration.

After the **on-startup** field is selected, the IS-IS node automatically enters the instantaneous black hole state after restart. After a new neighbor relationship is established, the IS-IS node immediately sends the LSP packet that carries the OVERLOAD bit to notify the neighbor that the local device enters the instantaneous black hole state (or OVERLOAD state) and that the local node cannot be used as a transit device.

When the specified timer expires, the IS-IS node immediately sends the LSP packet without the OVERLOAD bit to notify the neighbor that the local device is no longer in the instantaneous state (or OVERLOAD state) and can be used as a transit device.

The timer time needs to be set based on the number of routes in the network. If there are many routes, set it to a large value; if there are a few routes, set it to a small value.

- The local IS-IS node is not intended to be used for forwarding real data

If the local IS-IS node needs to be connected to the production network for testing or other function requirements and it is not intended to be used for forwarding real data in the network, you can set the OVERLOAD bit in LSP packets to instruct neighbors not to use the local device as a transit device.

In this case, the **on-startup** field is not carried in the configuration and the OVERLOAD bit is manually set or cancelled.

You can configure **suppress** as required to restrict the routing information carried in LSP packets in the OVERLOAD

state, for example, suppress internal routes and external routes and advertise only local direct routes.

Configuration

The following example sets an IS-IS node to immediately enter the instantaneous black hole state after restart till the specified timer expires (set the specified waiting time to 300 seconds) and advertises only local direct routes to neighbors.

Examples

```
FS(config)# router isis
FS(config-router)#set-overload-bit on-startup 300 suppress interlevel external
```

The following example connects the local IS-IS node to the production network as a test device and set its not to forward real data of the production network, to avoid impact on production.

```
FS(config)# router isis
FS(config-router)#set-overload-bit suppress interlevel external
```

4.72 spf-interval

Use this command to set the minimal interval for the SPF calculation. Use the **no** form of this command to restore the default minimal interval.

spf-interval [level-1 | level-2] maximum-interval [initial-interval hold-interval]

no spf-interval [level-1 | level-2]

Parameter Description

Parameter	Description
level-1	Applies the configuration only to Level-1.
level-2	Applies the configuration only to Level-2.
maximum-interval	Indicates the maximum interval for performing two consecutive SPF calculations. The value range is 1 to 120 (in seconds). The default value is 10 .
initial-interval	Indicates the waiting time for performing the SPF calculation for the first time. The value range is 0 to 60000 (in milliseconds). The default value is 50 .
hold-interval	Indicates the minimum interval for performing the SPF calculation for the second time. The value range is 10 to 60000 (in milliseconds). The default value is 200 .

Defaults

By default, this command is not configured.

The default SPF interval is 10 seconds, which takes effect at both Level-1 and Level-2.

Command

IS-IS routing process configuration mode

Mode

Usage Guide

Increasing the maximum interval for performing SPF calculations can avoid frequent SPF calculations and waste of CPU resources. However, a larger minimum interval also leads to slower responses to route changes. The waiting time for performing the SPF calculation for the first time is the initial interval. If the network becomes unstable, the SPF calculation interval is less than the maximum interval, and the interval for performing the SPF calculation for the second time becomes the hold interval. A corresponding penalty is added to this interval: The next interval for the SPF calculation doubles the previous interval for the same SPF calculation, until the SPF

calculation interval reaches the maximum interval. Subsequent SPF calculations are performed at the maximum interval. When the network becomes stable, the interval for performing the SPF calculation becomes greater than the maximum interval, and the waiting time for performing the SPF calculation is restored to the initial interval.

Link changes have high requirements for convergence. The initial interval can be set to a small value. The preceding parameters can also be adjusted to larger values to reduce CPU consumption.

The value of **initial-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **initial-interval** will be used as the value of **maximum-interval**.

The value of **hold-interval** cannot be greater than that of **maximum-interval**. Otherwise, the value of **hold-interval** will be used as the value of **maximum-interval**.

The value of **initial-interval** cannot be greater than that of **hold-interval**. Otherwise, the value of **initial-interval** will be used as the value of **hold-interval**.

Configuration Examples The following example sets the maximum interval for generating two duplicate SPF packets to 5 seconds, the interval for generating a duplicate SPF packet for the first time to 100 ms, and the interval for generating a duplicate SPF packet for the second time to 200 ms.

```
FS(config)# router isis
FS(config-router)# spf-interval 5 100 200
```

The following example sets the maximum interval for generating two duplicate SPF packets to 10 seconds.

```
FS(config)# router isis
FS(config-router)# spf-interval 10
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.73 summary-address

Use this command to configure the IPv4 aggregation route. Use the **no** form of this command to delete the aggregation route.

summary-address address/prefix [**level-1** | **level-2** | **level-1-2**]

no summary-address address/prefix

Parameter Description

Parameter	Description
address / prefix	Aggregation network address and the IP prefix length of the aggregation network address, in the format of A.B.C.D/<0-32>
level-1	Applies to the Level-1 only.
level-1	Applies to the Level-2 only.
level-1-2	Applies to both Level-1 and Level-2.

Defaults By default, no aggregation route is configured.
If the Level is not specifief, it is defaulted to take effect on the Level-2.

Command Mode IS-IS routing process configuration mode

Usage Guide With the aggregation route configured, if there is any reachable address or reachable network segment route in the aggregation route, it will publish the aggregation route instead of the detailed route.

```

Configuration FS# configure terminal
Examples FS(config)# router isis
FS(config-router)# summary-address 10.10.0.0/24 level-1-2
    
```

Related Commands	Command	Description
		summary-prefix

Platform N/A
Description

4.74 summary-prefix

Use this command to configure the IPv6 aggregation route. Use the **no** form of this command to delete the aggregation route.

```

summary-prefix ipv6-prefix/prefix-length [ level-1 | level-2 | level-1-2 ]
no summary-address ipv6-prefix/prefix-length [ level-1 | level-2 | level-1-2 ]
    
```

Parameter Description	Parameter	Description
		ipv6-prefix / prefix-length
	level-1	Applies to the Level-1 only.
	level-2	Applies to the Level-2 only.
	level-1-2	Applies to both Level-1 and Level-2.

Defaults By default, no aggregation route is configured.
If the Level is not specified, it is defaulted to take effect on the Level-2.

Command Mode Address-family ipv6 mode

Usage Guide With the aggregation route configured, if there is any reachable address or reachable network segment route in the aggregation route, it will publish the aggregation route instead of the detailed route.

```

Configuration    FS# configure terminal
Examples        FS(config)# router isis
                   FS(config-router)# address-family ipv6
                   FS (config-router-af)# summary-prefix 1000::/96 level-1-2
    
```

Related Commands	Command	Description
		summary-address

Platform N/A
Description

4.75 two-way-maintain

Use this command to enable the IS-IS two-way maintenance function.

two-way-maintain

Use the **no** form of this command to disable the IS-IS two-way maintenance function.

no two-way-maintain

Parameter Description	Parameter	Description
		N/A

Defaults The IS-IS two-way maintenance function is enabled by default.

Command Mode IS-IS routing process configuration mode

Default Level 14

Usage Guide In a large-scale network, a large number of packets are sent and received, which occupies lots of CPU and memory resources, causing the delay or discarding of some IS-IS packets. If the time required for processing hello packets exceeds the neighbor relationship maintenance duration, the corresponding neighbor relationship times out and is removed. When the two-way maintenance function is enabled, if a large number of packets exist on the network, the LSP packets, CSNP packets, and PSNP packets from a neighbor in addition to hello packets can also be used to maintain the two-way relationship with the neighbor, preventing the neighbor failure caused by delay or discarding of hello packets.

Configuration Examples The following example disables the IS-IS two-way maintenance function.

```

FS(config)# router isis 1
FS(config-router)# no two-way-maintain
    
```

4.76 virtual-system

Use this command to configure an additional system ID for fragment extension. Use the **no** form of this command to remove the additional system ID.

virtual-system system-id
no virtual-system system-id

Parameter Description	Parameter	Description
	system-id	Additional system ID. The length is 6 bytes.

Defaults No additional system ID is configured by default.

Command Mode IS-IS routing process configuration mode

Usage Guide Use this command to configure an additional system ID for LSP fragment extension. The system must be enabled with fragment extension mode and configured with the additional system ID to enable LSP fragment extension.

Configuration Examples The following example configures an additional system ID for fragment extension.

```
FS(config)# router isis
FS(config-router)# virtual-system 0000.0000.0034
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.77 vrf

Use this command to bind the ISIS process with a VRF instance. Use the **no** form of this command to unbind the IS-IS process from the VRF instance.

vrf vrf-name
no vrf vrf-name

Parameter Description	Parameter	Description
	vrf-name	VRF instance name. The VRF instance must be configured.

Defaults No IS-IS process is bound with the VRF instance.

Command IS-IS routing process configuration mode

Mode

Usage Guide Before you configure this command, the specified VRF instance must be configured. If you want to build the IS-IS v6 neighbor, the multi-protocol VRF and IPv6 protocol must be enabled.

The following restrictions are for binding IS-IS process with VRF instance:

1. The IS-IS process in the same non-default VRF instance must be configured with a different system ID. The IS-IS process in the different VRF instance can be configured with the same system ID.
2. An IS-IS process can be bound with only one VRF instance. A VRF instance can be bound with multiple IS-IS processes.
3. If a VRF instance bound with an IS-IS changes, the IS-IS enabled interfaces which are bound with the VRF instance and the redistribute configuration in IS-IS routing process configuration mode will be removed.

Configuration The following example binds an IS-IS process with a VRF instance.

```

Examples
FS(config)#vrf definition vrf_1
FS(config-vrf)#address-family ipv4
FS(config-vrf-af)#exit-address-family

FS(config)# router isis
FS(config-router)# vrf vrf_1
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.78 show clns is-neighbor

Use this command to display all IS neighbors to provide the adjacency relationship of routers.

show clns [tag] is-neighbors [IFNAME | detail]

Parameter Description	Parameter	Description
	tag	Specifies the IS-IS instance.
	IFNAME	Specifies the name of interface.
	detail	Displays detailed information of all interfaces.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The output results of the **show clns is-neighbors detail** command are displayed as below:

Examples

```
Area (null):
System Id   Type   IP Address   State   Holdtime   Circuit   Interface
r1          L1     1.0.0.2     Up      9          r1.01    VLAN 1
L2         1.0.0.2   Up      9          r1.01    VLAN 1

Adjacency ID: 1
Uptime: 00:00:54
Area Address(es): 49.1111
IP Address(es): 1.0.0.2
Level-1 Protocols Supported: IPv4
Level-2 Protocols Supported: IPv4
```

Related Commands

Command	Description
show clns neighbors	Displays all IS neighbors to provide the router information and the adjacency relationship of terminal system.

Platform N/A

Description

4.79 show clns neighbors

Use this command to display all IS neighbors to provide the router information and the adjacency relationship of terminal system.

show clns [tag] **neighbors** [IFNAME | **detail**]

Parameter Description

Parameter	Description
tag	Specifies the IS-IS instance.
IFNAME	Specifies the name of the interface.
detail	Displays detailed information of all interfaces.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The output results of the **show clns neighbors detail** command are displayed as below:

Examples

```
Area (null):
System Id   SNPA           State   Holdtime   Type Protocol
```

```
Interface
r1          00d0.f822.33ad   Up   7          L1   IS-IS
VLAN 1
Up   7          L2   IS-IS
VLAN 1
Adjacency ID: 1
Uptime: 00:02:47
Area Address(es): 49.1111
```

Related Commands	Command	Description
	show clns is-neighbors	Displays all IS neighbors to provide the router adjacency relationship.

Platform N/A

Description

4.80 show isis counter

Use this command to display various statistics of IS-IS.

show isis [tag] counter

Parameter Description	Parameter	Description
	tag	Specifies the IS-IS instance.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The output results of the **show clns neighbors details** are displayed as below:

```
FS# show isis counter
Area (null):
IS-IS Level-1 isisSystemCounterEntry:
isisSysStatCorrLSPs: 0
isisSysStatAuthTypeFails: 0
isisSysStatAuthFails: 0
isisSysStatLSPDbaseOloads: 0
isisSysStatManAddrDropFromAreas: 0
isisSysStatAttmptToExMaxSeqNums: 0
isisSysStatSeqNumSkips: 0
```

```
isisSysStatOwnLSPPurges: 0
isisSysStatIDFieldLenMismatches: 0
isisSysStatMaxAreaAddrMismatches: 0
isisSysStatPartChanges: 0
isisSysStatSPFRuns: 30
IS-IS Level-2 isisSystemCounterEntry:
isisSysStatCorrLSPs: 0
isisSysStatAuthTypeFails: 0
isisSysStatAuthFails: 0
isisSysStatLSPDbaseOloads: 0
isisSysStatManAddrDropFromAreas: 0
isisSysStatAttmptToExMaxSeqNums: 0
isisSysStatSeqNumSkips: 0
isisSysStatOwnLSPPurges: 0
isisSysStatIDFieldLenMismatches: 0
isisSysStatMaxAreaAddrMismatches: 0
isisSysStatPartChanges: 0
isisSysStatSPFRuns: 30
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

4.81 show isis database

Use this command to display the LSP database.

show isis [tag] **database** [FLAGS | LEVEL | LSPID]

Parameter Description

Parameter	Description
tag	Specifies the IS-IS instance.
FLAGS	The format is displayed as below: detail verbose detail: detailed information Verbose: more detailed information than the detail.
LEVEL	The format is displayed as below: l1 l2 level-1 level-2 l1 and level-1: specify the LSP database of the Level-1. l2 and level-2: specify the LSP database of the Level-2
LSPID	Specifies the ID number of LSP to show the corresponding LSP information

	only.
--	-------

Defaults N/A

Command Privileged EXEC mode/ global configuration mode

Mode

Usage Guide N/A

Configuration The output results of the **show isis database detail** command are displayed as below:

Examples

```

FS# show isis database detail
Area (null):
IS-IS Level-1 Link State Database:
LSPID          LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
FS.00-00 * 0x00000007  0xCDD5        1011          0/0/0
  Area Address: 49.1111
  NLPID:        0xCC
  Hostname:     FS
  IP Address:   1.0.0.1
  Metric: 10    IS r1.01
  Metric: 10    IP 1.0.0.0 255.255.255.0
r1.00-00      0x00000006  0xA771        1032          0/0/0
  Area Address: 49.1111
  NLPID:        0xCC
  Hostname:     r1
  IP Address:   1.0.0.2
  Metric: 10    IS r1.01
  Metric: 10    IP 1.0.0.0 255.255.255.0
r1.01-00      0x00000002  0x062A        989           0/0/0
  Metric: 0     IS r1.00
  Metric: 0     IS FS.00

IS-IS Level-2 Link State Database:
LSPID          LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
FS.00-00 * 0x0000000A  0xC7D8        1033          0/0/0
  Area Address: 49.1111
  NLPID:        0xCC
  Hostname:     FS
  IP Address:   1.0.0.1
  Metric: 10    IS r1.01
  Metric: 10    IP 1.0.0.0 255.255.255.0
r1.00-00      0x00000006  0xA771        1032          0/0/0
  Area Address: 49.1111
  NLPID:        0xCC
    
```



```

Hostname:    r1
IP Address:  1.0.0.2
Metric:     10          IS r1.01
Metric:     10          IP 1.0.0.0 255.255.255.0
r1.01-00    0x00000002  0x062A          989          0/0/0
Metric:     0          IS r1.00
Metric:     0          IS FS.00
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.82 show isis graceful-restart

Use this command to display the status information related to the IS-IS GR.

show isis [tag] graceful-restart

Parameter Description	Parameter	Description
	tag	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the GR information of the IS-IS default instance in the global configuration mode.

```

FS(config)# show isis graceful-restart
Graceful-restart: enabled, graceful-period: 60s, Level timer: 60, Interface timer: 3s.
Graceful-restart Helper: enabled.
    
```

Related Commands	Command	Description
	graceful-restart	Enables the IS-IS GR Restart capability.
	graceful-restart grace-period	Configures the maximum interval of the grace-restart.
	graceful-restart helper disable	Disables the IS-IS GR Help capability.
	graceful-restart	Enables the IS-IS GR Restart capability.

Platform N/A
Description

4.83 show isis hostname

Use this command to display the mapping relation between the router name and system ID.

show isis [tag] hostname

Parameter	Parameter	Description
Description	tag	Specifies the IS-IS instance.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The output results of the **show isis hostname** command are shown as below:

```
FS# show isis hostname
System ID      Dynamic Hostname
5555.5555.5555 FS
1111.1111.1111 r1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.84 show isis ipv6 topology

Use this command to display information about the IPv6 unicast topology to which an IS-IS router is connected.

show isis [tag] ipv6 topology [I1 | I2 | level-1 | level-2]

Parameter	Parameter	Description
Description	tag	IS-IS instance
	I1	Topology of a specified Level-1 router
	level-1	Topology of a specified Level-1 router
	I2	Topology of a specified Level-2 router
	level-2	Topology of a specified Level-2 router

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example displays the IPv6 unicast topology information.

```

FS#show isis ipv6 topology
Area (null):
IS-IS paths to level-1 routers
System Id      Metric  Next-Hop  SNPA          Interface
r1              10      r1         00d0.f822.33ad GigabitEthernet 0/0
FS              --
IS-IS paths to level-2 routers
System Id      Metric  Next-Hop  SNPA          Interface
r1              10      r1         00d0.f822.33ad GigabitEthernet 0/0
FS              --
    
```

Field description:

Field	Description
Area	Instance tag
System Id	System ID
Metric	Metric value
Next-Hop	Next hop
SNPA	SNPA address
Interface	Interface name

4.85 show isis interface

Use this command to display the information about IS-IS interface.

show isis [tag] **interface** [interface-type interface-number] [counter]

Parameter Description	Parameter	Description
	tag	Specifies the IS-IS instance name.
	interface-type interface-number	Specifies the Interface name.
	counter	Specifies the number of packages and events.

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode or interface configuration mode.

Usage Guide N/A

Configuration The following example displays the IS-IS interface.

Examples

```
FS# show isis interface
Area (null):
VLAN 1 is up, line protocol is up
  Routing Protocol: IS-IS ((null))
    Network Type: Broadcast
    Circuit Type: level-1-2
    Local circuit ID: 0x01
    Extended Local circuit ID: 0x00000001
    Local SNPA: 00d0.f822.33ab
  IP interface address:
    1.0.0.1/24
  Level-1 Metric: 10/10, Priority: 64, Circuit ID: r1.01
  Number of active level-1 adjacencies: 1
  Level-2 Metric: 10/10, Priority: 64, Circuit ID: r1.01
  Number of active level-2 adjacencies: 1
  Next IS-IS LAN Level-1 Hello in 5 seconds
  Next IS-IS LAN Level-2 Hello in 5 seconds
  BFD Enabled (Anti-congestion)
  Eligible to backup traffic
```

The following example displays the statistics of the IS-IS interface.

```
FS# show isis interface counter
Area (null):
GigabitEthernet 1/1/0:
  IS-IS LAN Level-1 isisCircuitCounterEntry:
    isisCircAdjChanges: 4
    isisCircNumAdj: 2
    isisCircInitFails: 0
    isisCircRejAdjs: 0
    isisCircIDFieldLenMismatches: 0
    isisCircMaxAreaAddrMismatches: 0
    isisCircAuthTypeFails: 0
    isisCircAuthFails: 0
    isisCircLanDesISChanges: 1
  IS-IS LAN Level-2 isisCircuitCounterEntry:
    isisCircAdjChanges: 4
    isisCircNumAdj: 2
    isisCircInitFails: 0
    isisCircRejAdjs: 0
    isisCircIDFieldLenMismatches: 0
    isisCircMaxAreaAddrMismatches: 0
```

```

isisCircAuthTypeFails: 0
isisCircAuthFails: 0
isisCircLanDesISChanges: 1
IS-IS Level-1 isisPacketCounterEntry:
  isisPacketCountIIHello in/out: 187/278
  isisPacketCountLSP in/out: 10/7
  isisPacketCountCSNP in/out: 0/92
  isisPacketCountPSNP in/out: 0/0
  isisPacketCountUnknown in/out: 0/0
IS-IS Level-2 isisPacketCounterEntry:
  isisPacketCountIIHello in/out: 186/286
  isisPacketCountLSP in/out: 17/9
  isisPacketCountCSNP in/out: 1/91
  isisPacketCountPSNP in/out: 0/0
  isisPacketCountUnknown in/out: 0/0
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.86 show isis mesh-groups

Use this command to display the mesh-group configurations on each interface.

show isis [tag] mesh-groups

Parameter Description

Parameter	Description
tag	Specifies the IS-IS instance.

Defaults N/A

Command Mode Privileged EXEC mode

N/A

Usage Guide

Configuration The following example displays the mesh groups.

Examples

```

FS# show isis mesh-groups
Mesh group (blocked)
FastEthernet 1/1
Mesh group 1 :
    
```

FastEthernet 1/0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.87 show isis neighbors

Use this command to display the IS-IS neighbors..

show isis [tag] neighbors [detail]

Parameter Description	Parameter	Description
	tag	Displays the IS-IS instance.
	detail	Displays the detailed information of all interfaces.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays details of IS-IS neighbors.

```

FS# show isis neighbors detail
Area (null):
System Id   Type  IP Address   State  Holdtime  Circuit  Interface
r1          L1    1.0.0.2     Up     9         r1.01   VLAN 1
L2    1.0.0.2     Up     9         r1.01   VLAN 1

Adjacency ID: 1
Uptime: 00:06:25
Area Address(es): 49.1111
IP Address(es): 1.0.0.2
Level-1 Protocols Supported: IPv4
Level-2 Protocols Supported: IPv4
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.88 show isis nsr

Use this command to display the NSR information about an IS-IS system.

show isis [tag] nsr

Parameter	Parameter	Description
Description	tag	IS-IS instance.

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example displays the NSR status information about an IS-IS system.

```
FS# show isis nsr
Area (null):
  NSR: enable
  NSR status: running
  NSR flags: backup
  NSR sync: end

Area 1:
  NSR: disable
  NSR status: not running
  NSR flags: not backup
  NSR sync: not end
```

Field description:

Field	Description
Area	Instance tag
NSR	Indicates whether NSR is configured for the instance
NSR status	NSR operating status
NSR flags	NSR flag
NSR sync	Indicates whether batch synchronization of NSR information is completed.

4.89 show isis virtual-neighbors

Use this command to display the virtual system neighbor information of an IS-IS system.

show isis [tag] virtual-neighbors

Parameter Description	Parameter	Description
	tag	IS-IS instance.

Defaults -

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples

```

FS# show isis virtual-neighbors

Area (null):
Virtual System Id      Type      State
1111.1111.1111        L1        DOWN
                      L2        UP
2222.2222.2222        L1        DOWN
                      L2        UP
    
```

Field description:

Field	Description
Area	Instance tag
Virtual System Id	Virtual system ID
Type	Neighbor type
State	Neighbor status. UP indicates the level at which the extended LSP fragment is created.

4.90 show isis protocol

Use this command to display relevant protocol information about an IS-IS system.

show isis [tag] protocol

Parameter Description	Parameter	Description
	tag	IS-IS instance.

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays relevant protocol information about an IS-IS system.

Examples

```

FS# show isis protocol
IS-IS Router: (null)
  Binding VRF: vrf
  Mib-Binding: off
  System ID: 0000.0000.0036   IS-type: level-1-2
  Virtual System ID:
    1111.1111.1111, 2222.2222.2222
  Manual area address(es):
    49.0001, 49.0003
  Interfaces supported by IS-IS:
    GigabitEthernet 0/0, GigabitEthernet 0/1
  Redistributing IPv4:
    isis 1, isis 2
  Redistributing IPv6:
    isis 3, isis 4
  Distance: 115
  Generate narrow metrics: Level-1-2
  Accept narrow metrics: Level-1-2
  Generate wide metrics: none
  Accept wide metrics: none
  NSR: enable
  Two-way-maintain: enable
    
```

Field description:

Field	Description
IS-IS Router	Instance tag
Binding VRF	Name of the VRF bound to the instance
Mib-Binding	Indicates whether the instance is bound with SNMP.
System ID	System ID
IS-type	Level type supported by the instance
Virtual System ID	Extended system ID
Manual area address(es)	Area ID
Interfaces supported by IS-IS	Interface associated with the instance
Redistributing IPv4	Source of redistributed IPv4 routes
Redistributing IPv6	Source of redistributed IPv6 routes
Distance	IS-IS management weight
Generate narrow metrics	Type of the generated narrow metrics
Accept narrow metrics	Type of the accepted narrow metrics
Generate wide metrics	Type of the generated wide metrics
Accept wide metrics	Type of the accepted wide metrics

NSR	Indicates whether the NSR function is enabled for th instance.
Two-way-maintain	Indicates whether the two-way maintenance functio enabled for the instance.

4.91 show isis topology

Use this command to display the topology of the IS-IS router connection.

show isis [tag] topology [I1 | I2 | level-1 | level-2]

Parameter Description	Parameter	Description
	tag	Specifies the IS-IS instance.
	I1	Specifies the topology of Level-1.
	level-1	Specifies the topology of Level-1.
	I2	Specifies the topology of Level-2.
	level-2	Specifies the topology of Level-2.

Defaults N/A

Command Mode Privileged EXEC mode/ global configuration mode/ interface configuration mode

Usage Guide N/A

Configuration The following example displays all IS-IS neighbors:

```

Examples
FS#show isis topology
Area (null):
IS-IS paths to level-1 routers
System Id    Metric  Next-Hop  SNPA          Interface
r1           10     r1        00d0.f822.33ad GigabitEthernet 0/0
FS           --
IS-IS paths to level-2 routers
System Id    Metric  Next-Hop  SNPA          Interface
r1           10     r1        00d0.f822.33ad GigabitEthernet 0/0
FS           --
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5 BGP4 Commands

5.1 address port

Use this command to configure the address and port number of the BMP server. Use the **no** form of this command to delete the address and port number of the BMP server. Use the **default** form of this command to restore the default settings.

address bmp-server-address **port** port-number
no address bmp-server-address **port** port-number
default address bmp-server-address **port** port-number

Parameter Description	Parameter	Description
	bmp-server-address	IPv4 or IPv6 address of the BMP server
	port-number	Monitoring port number of the BMP server

Defaults The BMP server address and port number are not configured by default.

Command Mode BMP configuration mode

Default Level 14

Usage Guide

Configuration Examples The following example sets the address and port number of the BMP server to **10.0.0.1** and **12345**, respectively.

```
FS(config)# bmp server 1
FS(config-bmpsrvr)#address 10.0.0.1 port 12345
```

Verification Run the **show running-config** command to display the BMP configurations.

Prompt Messages

Common Errors The BMP server address is the local address.
 % Cannot configure the local system as bmp server

Platform Description N/A

5.2 address-family ipv4

Use this command to enter IPv4 address family configuration mode to configure BGP configuration mode. Use the **no** form of this command to exit BGP address configuration mode.

address-family ipv4 [unicast]

no address-family ipv4 [unicast]

Parameter	Parameter	Description
Description	-	Enter IPv4 unicast address family mode by default
	unicast	Optional, enter IPv4 unicast address family mode

Defaults The configuration mode is unicast address prefix by default.

Command

Mode BGP configuration mode/BGP Scope Configuration Mode

Usage Guide

In BGP address configuration mode, use the standard IPv4 address for the configuration.
To return to BGP configuration mode, run the command **exit-address-family**.

Configuration Examples

The following example enters the IPv4 address family configuration mode.

```
FS(config)# router bgp 65000
FS(config-router)# address-family ipv4
```

Related Commands	Command	Description
	exit-address-family	Exits the mode.

Platform

Description None

5.3 address-family ipv4 vrf

Use this command to enter the IPv4 VRF address family configuration mode to configure BGP and enable the exchange of route information of a VRF. Use the **no** form of this command to restore the default setting.

address-family ipv4 vrf vrf-name

no address-family vrf vrf-name

Parameter	Parameter	Description
Description	vrf-name	VRF name

Defaults No vrf is defined by default.

Command

Mode BGP configuration mode

Usage Guide

You can execute this command to configure or exit the exchange of route information between PEs and CEs.
To return to BGP configuration mode, run the **exit-address-family** command.

Configuration Examples

The following example enters the IPv4 VRF address family configuration mode.

```
FS(config)# router bgp 65000
```

```
FS(config-router)# address-family ipv4 vrf vpn1
```

Related Commands	Command	Description
	exit-address-family	Exits the configuration mode.

Platform
Description N/A

5.4 address-family ipv6

Use this command to enter IPv6 address family configuration mode and enable the exchange of IPv6 route information. Use the **no** or **default** form of this command to restore the default setting. Use the **exit-address-family** command to exit BGP address-family configuration mode.

address-family ipv6 [unicast]

no address-family ipv6 [unicast]

default address-family ipv6 [unicast]

Parameter Description	Parameter	Description
	-	Enter IPv4 unicast address family mode by default
	unicast	Optional, enter IPv4 unicast address family mode

Defaults The configuration mode is unicast address prefix by default.

Command Mode BGP configuration mode/ BGP Scope Configuration Mode

Usage Guide You can use this command not only to enter IPv6 address-family configuration mode of the BGP to configure the IPv6 neighbors, but also activate neighbors in IPv6 address-family configuration mode after configuring IPv6 neighbors in BGP configuration mode.

The **exit-address-family** command is used to return to BGP configuration mode.

Configuration Examples The following example enters the IPv6 address family configuration mode.

```
FS(config)# router bgp 65000
FS(config-router)# address-family ipv6
```

Related Commands	Command	Description
	exit-address-family	Exits the mode.

Platform
Description None

5.5 address-family ipv6 vrf

Use this command to enter BGP configuration mode, enable the IPv6 route information exchange function under a vrf. Use **no** form of this command to restore the default setting. Use the **exit-address-family** command to exit BGP address configuration mode.

address-family ipv6 vrf vrf-name


no address-family ipv6 vrf vrf-name

Parameter Description	Parameter	Description
	vrf-name	VRF name

Defaults No vrf address family is defined by default.

Command Mode BGP configuration mode

Usage Guide You can use this command to start configuring (or quit) the exchange of BGP route information between PE or MCE device and CE.
You can use the exit-address-family command to return to BGP configuration mode.

-  If ipv4 vrf and ipv6 vrf address family modes of the same vrf are activated at the same time, and same neighbor is activated in two address family modes, the neighbor's global commands will be displayed in both the address family modes at the same time, while its address family commands will only be displayed under respective address family mode.

Configuration Examples The following example enters the IPv6 VRF address family configuration mode.

```
FS(config)# router bgp 65000
FS(config-router)# address-family ipv6 vrf vpn1
```

Configuration Examples	Command	Description
	exit-address-family	Exits the mode.

Platform Description N/A

5.6 adj-rib-in post-policy

Use this command to enable the BMP protocol to monitor the route applied with routing policies and received from the peer end. Use the **no** form of this command to disable the BMP protocol to monitor the route applied with routing policies and received from the peer end. Use the **default** form of this command to restore the default settings.

adj-rib-in post-policy

no adj-rib-in post-policy

default adj-rib-in post-policy

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The route applied with routing policies and received from the peer end is not monitored by default

Command

Mode BGP configuration mode

Default Level 14

Configuration 1. Enable the BMP protocol to monitor the route applied with routing policies and received from the peer end.

Examples

```
FS(config)#bmp server 1
FS(config-bmpsrvr)#adj-rib-in post-policy
```

Verification Use the **show running-config** command to check BGP configuration

5.7 adj-rib-in pre-policy

Use this command to configure the BMP protocol to monitor the routing information without modification received from the peer end. Use the **no** form of this command to configure the BMP protocol not to monitor the routing information without modification received from the peer end. Use the **default** form of this command to restore the default settings.

adj-rib-in pre-policy

no adj-rib-in pre-policy

default adj-rib-in pre-policy

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The routing information without modification received from the peer end is not monitored by default.

Command

Mode BMP configuration mode

Default Level 14

Configuration 1. Enable the BMP protocol to monitor the routing information without modification received from the peer

Examples

```
end.
FS(config)#bmp server 1
FS(config-bmpsvr)#adj-rib-in pre-policy
```

Verification

Use the **show running-config** command to check BGP configuration

5.8 adj-rib-out post-policy

Use this command to enable the BMP protocol to monitor the route applied with routing policies and sent to the peer end. Use the **no** form of this command to disable the BMP protocol to monitor the route applied with routing policies and sent to the peer end. Use the **default** form of this command to restore the default settings.

adj-rib-out post-policy

no adj-rib-out post-policy

default adj-rib-out post-policy

Parameter	Parameter	Description
Description	N/A	N/A

Defaults

The route applied with routing policies and sent to the peer end is not monitored by default

Command

Mode

BMP configuration mode

Default Level

14

Configuration

Enable the BMP protocol to monitor the route applied with routing policies and sent to the peer end.

Examples

```
FS(config)#bmp server 1
FS(config-bmpsvr)#adj-rib-in post-policy
```

Verification

Use the **show running-config** command to check BGP configuration

5.9 advertise ipv4 unicast

Use this command to configure IPv4 VRF re-distribution. Use the **no** form of this command to disable the IPv4 VRF re-distribution. Use the **default** form of this command to restore the default settings.

advertise ipv4 unicast

no advertise ipv4 unicast

default advertise ipv4 unicast

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The IPv4 VRF re-distribution function is disabled by default.

Command

Mode BGP L2VPN EVPN address family mode.

Usage Guide

Limitations on re-distribution of IPv4 unicast routes into BGP:

1. Only after the route-target import attribute of EVI instance matches the route-target attribute of VRF, the IPv4 unicast routes can be re-distributed.
2. The non-VRF IPv4 unicast routes cannot be re-distributed.

Configuration

The following example configures the re-distribution of IPv4 unicast routes into BGP.

Examples

```
FS(config)# router bgp 65000
FS(config-router-af)# advertise ipv4 unicast
```

Related Commands

Command	Description
N/A	N/A

Platform

Description N/A

5.10 advertise ipv6 unicast

Use this command to configure IPv4 VRF re-distribution. Use the **no** form of this command to disable the IPv4 VRF re-distribution. Use the **default** form of this command to restore the default settings.

advertise ipv6 unicast

no advertise ipv6 unicast

default advertise ipv6 unicast

Parameter Description

Parameter	Description
N/A	N/A

Defaults The IPv6 VRF re-distribution function is disabled by default.

Command

Mode BGP L2VPN EVPN address family mode.

Usage Guide

Limitations on re-distribution of IPv6 unicast routes into BGP:

1. Only after the route-target import attribute of EVI instance matches the route-target attribute of VRF, the IPv6 unicast routes can be re-distributed.
2. The non-VRF IPv6 unicast routes cannot be re-distributed.

Configuration

The following example configures the re-distribution of IPv6 unicast routes into BGP.

Examples

```
FS(config)# router bgp 65000
FS(config-router-af)# advertise ipv6 unicast
```

Related Commands	Command	Description
	N/A	N/A

Platform
Description N/A

5.11 aggregate-address

Use this command to set the aggregate route of BGP. Use the **no** form of this command to delete the aggregate route. Use the **default** form of this command to restore the default settings.

aggregate-address { ip-address mask | prefix } [**as-set**] [**summary-only**] [**suppress-map** map-tag1] [**advertise-map** map-tag2] [**attribute-map** map-tag3]

no aggregate-address { ip-address mask | prefix }

default aggregate-address { ip-address mask | prefix }

Parameter Description

Parameter	Description
ip address	Aggregate IPv4 address
mask	Mask of the aggregate IPv4 address
prefix	Aggregate address prefix
as-set	Keeps the AS path information of the path in the aggregate address range.
summary-only	Advertises only the aggregate route.
suppress-map map-tag1	Configures the routing policy to suppress the specified route. Up to 32 characters are allowed for the route map.
advertise-map map-tag2	Configures the routing policy to generate the aggregate route. Up to 32 characters are allowed for the route map
attribute-map map-tag3	Configures the routing policy to control the attribute of aggregate route. Up to 32 characters are allowed for the route map.

Defaults The address aggregation is not configured by default.

Command Mode BGP configuration mode, BGP scope configuration mode, IPv4 address family configuration mode, IPv6 unicast family mode, IPv4 VRF address family configuration mode and IPv6 VRF address family configuration mode

Usage Guide The BGP-enabled device will advertise all path information both before and after aggregation by default. Use the **aggregate-address summary-only** command to advertise the aggregate route only.

Configuration Examples The following example sets the aggregate IPv4 route.

```
FS(config)# router bgp 65000
```

```
FS(config-router)# aggregate-address 10.0.0.0
255.0.0.0 as-set
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol.

Platform
Description None

5.12 bfd bind bgp

Use this command to manually configure the BFD session for the BGP protocol. Use the **no** or **default** form of the command to restore the default settings.

bfd bind bgp peer-ip ip-address [**vrf** vrf-name] **interface** interface-type interface-index **source-ip** ip-address

no bfd bind bgp peer-ip ip-address [**vrf** vrf-name] **interface** interface-type interface-index **source-ip** ip-address

default bfd bind bgp peer-ip ip-address [**vrf** vrf-name] **interface** interface-type interface-index **source-ip** ip-address

Parameter	Parameter	Description
Description	peer-ip ip-address	Peer IP address.
	vrf vrf-name	The VRF instance where the BFD session is. The default is global VRF.
	interface interface-type interface-index	Outbound interface type and its index.
	source-ip ip-address	Local IP address.

Defaults No static BFD session is configured for BGP by default.

Command
Mode Global configuration mode

Usage Guide To perform Fast-Reroute, a BFD session should be created between local device and the next-hop device to perform fast link failure detection. In general, BGP-based BFD session can realize the function. When the next-hop device is not the neighbor device, the BFD session should be configured manually.

Configuration The following example configures a static BFD session for BGP.

Examples

```
FS(config)# bfd bind bgp peer-ip 10.0.0.1 interface GigabitEthernet 0/1 source-ip 10.0.0.2
```

Related Commands	Command	Description
	N/A	N/A

Platform
Description N/A

5.13 bgp additional-paths select

Use this command to enable the add-path route. Use the **no** or **default** form of this command to restore the default configurations.

bgp additional-paths select { all | best number | ecmp }

no bgp additional-paths select

default bgp additional-paths select

Parameter Description	Parameter	Description
	all	Select all valid routes as the add-path routes in the type of "all".
	best number	Select the next-best routes as the add-path routes in the type of "best number". Range of number: 2-3.
	ecmp	Select the ecmp routes as the add-path routes in the type of "ecmp". Additional configuration is needed to select the ecmp routes.

Defaults The add-path route is not enabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode or BGP scope global configuration mode

Default Level 14

Usage Guide Run the following commands to advertise the add-path routes:

- neighbor { peer-address | peer-group-name } advertise additional-paths { all | best number | ecmp }**
- neighbor { peer-address | peer-group-name } additional-paths { send [receive] | receive }**

Configuration Examples The following example selects the ecmp routes as the add-path route in the type of "ecmp".

```
FS(config)# router bgp 65000
FS(config-router)# maximum-paths ibgp 8
FS(config-router)# bgp bestpath as-path multipath-relax
FS(config-router)# bgp additional-paths select ecmp
```

The following example selects the next-best routes as the add-path route in the type of "best number".

```
FS(config)# router bgp 65000
FS(config-router)# bgp additional-paths select best 2
```

5.14 bgp advertise lowest-priority on-startup

Use this command to adjust the priority of released routes to the lowest upon BGP restart.

bgp advertise lowest-priority on-startup [recover-time]

Use the **no** form of this command to advertise routes of normal priorities upon BGP restart.

no bgp advertise lowest-priority on-startup

Use the **default** form of this command to restore the default configurations.

default bgp advertise lowest-priority on-startup

Parameter Description	Parameter	Description
	recover-time	Duration of the timer used to restore the priority of released routes in seconds. The value ranges from 1 to 65,536. The default value is 600.

Defaults The BGP does not change the priority of released routes by default.

Command Mode BGP configuration mode or BGP scope global configuration mode

Default Level 14

Usage Guide You can run the **clear bgp advertise lowest-priority on-startup** command to manually restore the priority of released routes to that before adjustment.

Configuration Examples The following example adjusts the priority of released routes to the lowest upon BGP restart.

```
FS(config)# router bgp 65000
FS(config-router)# bgp advertise lowest-priority on-startup
```

5.15 bgp advertise non-transitive extcommunity

Use this command to allow carried non-transitive extcommunity when BGP is notifying EBGp neighbors of a route. Use the **no** or **default** form of this command to restore the default settings.


- bgp advertise non-transitive extcommunity**
- no bgp advertise non-transitive extcommunity**
- default bgp advertise non-transitive extcommunity**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Non-transitive extcommunity is removed when notifying EBGp neighbors of a route.

Command Mode BGP configuration mode/ BGP scope global configuration mode

Usage Guide By default, when notifying EBGp neighbors of a route, neighbors will not be notified of extcommunity with the "non-transitive" flag. This configuration can enable the notification of non-transitive extcommunity.

 Non-transitive extcommunity will be carried when notifying alliance EBGp or IBGP neighbors of a route.

Configuration The following example allows carried non-transitive extcommunity.

```

Examples
FS(config)# router bgp 65000
FS(config-router)# bgp advertise non-transitive extcommunity
    
```

Configuration Examples	Command	Description
	router bgp	Enables BGP protocol.

Platform N/A

Description

5.16 bgp advertise-map

Use this command to advertise the route policy to all neighbors. Use the **no** form of this command to clear the demand. Use the **default** form of this command to restore the default settings.

bgp advertise-map map-tag

no bgp advertise-map

default bgp advertise-map

Parameter	Parameter	Description
Description	map-tag	Indicates name of the policy.

Defaults By default, it is disabled.

Command Mode BGP configuration mode, BGP IPv4 Unicast/VRF address family configuration mode, BGP VPNv4 address family configuration mode, BGP L2VPN VPWS/VPLS address family configuration mode or BGP scope configuration mode

Usage Guide Command **bgp advertise-map** takes a higher priority over command **neighbor route-map out**.

Configuration The following example advertises the route policy to all neighbors..

```

Examples
FS(config)# router bgp 65000
FS(config-router)# bgp advertise-map MAP
    
```

Related Commands	Command	Description
	N/A	N/A

Platform

Description None

5.17 bgp always-compare-med

Use this command to compare Multi Exit Discriminator (MED) all the time. Use the **no** form of this command to restore the default setting.

bgp always-compare-med
no bgp always-compare-med

Parameter	Parameter	Description
Description	N/A	N/A

Defaults MED of peer paths from the same AS is compared by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide The MED value is compared for paths of peers from the same AS by default. This command can be used to allow comparing MED values for paths from different ASs. If there are multiple valid paths to the same destination, the one with lower MED value has higher priority.

This command is not recommended unless you are sure that different ASs are using the same IGP and routing method.

Configuration

The following example compares Multi Exit Discriminator (MED) all the time.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp always-compare-med
```

Related Commands

Command	Description
show ip bgp	Displays the BGP route entry.
bgp bestpath med confed	Compares the MED value of paths of peers from different ASs when selecting the optimal path.
bgp bestpath med missing-as-worst	Sets the priority of the path without MED attribute as the lowest when selecting the optimal path.
bgp deterministic-med	Compares paths of peers from the same AS when selecting the optimal path.

Platform

Description None

5.18 bgp asnotation dot

Use this command to modify the displaying mode of the 4-byte AS notation and the matching type of the regular expression as the dot mode (that is, two dotted decimal numbers). Use the **no** form of this command to restore the default setting.

bgp asnotation dot
no bgp asnotation dot

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The 4-byte AS notation is shown in decimal digit, and the regular expression also matches the 4-byte AS

notation with decimal digit by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Our devices support two modes of representing the 4-byte AS notation. One is decimal digit, and the other one is dot mode which represents the 65536 with 1.0. The decimal format is same as the default format, which represents the 4-byte AS notation with decimal digits. The dot mode displays the 4-byte AS notation in the format of ([two high bytes.] two low bytes). If the [two high bytes.] is zero, it will not be displayed. That is, the AS notation represented as 65536 in decimal is 1.0 in the dot mode. In another example, the AS notation is 65534 represented in decimal, while it is represented as 65534 in the dot mode without the zero in front.

Usage Guide

No matter which mode will be adopted to display the 4-byte AS notation, both modes can be used when entering the configuration commands. But the representation and displaying mode of the 4-byte AS notation in the regular expression must be the same. Otherwise, the matching will fail. After executing the **bgp asnotation** command, you must use the clear ip bgp * to perform the resetting, so as to re-match the filtering condition of the regular expression.

The AS notation is represented as 1 to 65535 no matter using decimal or dot mode.

Configuration

The following example modifies the showing mode of the 4-byte AS notation.

Examples

```
FS(config)# router bgp 1.0
FS(config-router)# bgp asnotation dot
```

Related Commands

Command	Description
show ip bgp summary	Displays the related information of BGP neighbor.

Platform

Description None

5.19 bgp bestpath as-path ignore

Use this command to disregard the length of the AS path. Use the **no** form of this command to restore the default setting.

bgp bestpath as-path ignore

no bgp bestpath as-path ignore

Parameter Description

Parameter	Description
N/A	N/A

Defaults

The router with shorter AS path length is chosen by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

Configuration The following example disregard the length of the AS path.

Examples

```
FS(config)# router bgp 65000
```

```
FS(config-router)# bgp bestpath as-path ignore
```

Related Commands

Command	Description
show ip bgp	Displays the BGP route entry.

Platform

Description None

5.20 bgp bestpath as-path multipath-relax

Use this command to enable AS path multipath-relax (only comparing the AS path length) for BGP multipathing load. Use the **no** form of this command to restore the default setting.

bgp bestpath as-path multipath-relax

no bgp bestpath as-path multipath-relax

Parameter

Description

Parameter	Description
N/A	N/A

Command Mode

BGP requires that AS path attributes must be the same when calculating equal-cost multipath (ECMP) by default.

Defaults

BGP configuration mode/BGP scope global configuration mode

Usage Guide

BGP compares AS path attributes in a precise way when selecting the optimal path as ECMP by default.

Only paths with same AS path attributes can constitute equal-cost paths. As a result, BGP multipathing load balancing cannot be implemented in an application scenario. After AS path multipath-relax is enabled, only the AS path length is compared, allowing the implementation of BGP multipathing load balancing.

Configuration

The following example enables AS path multipath-relax for BGP multipathing load.

Examples

```
FS(config)# router bgp 65530
```

```
FS(config-router)# bgp bestpath as-path multipath-relax
```

Related Commands

Command	Description
router bgp	Enables BGP.
show ip bgp	Displays BGP routing entries.

Platform Description

None

5.21 **bgp bestpath compare-confed-aspash**

Use this command to compare the AS path length of the confederation from the same external routes when selecting the optimal path, with smaller AS path in the confederation for higher path priority. Use the **no** form of this command to restore the default setting.

bgp bestpath compare-confed-aspash

no bgp bestpath compare-confed-aspash

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The AS path of the EBGp peer routes inside the same confederation is not compared by default when selecting the optimal path. Instead, the routing method is implemented.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

During the selection of the same routing information from the peer of the internal EBGp By default, the AS path of the confederation is not compared. This command is used to compare the AS path of the confederation. Note that if a route contain no AS path of the confederation, it is impossible to implement the AS path comparison for that route.

Configuration

The following example compares the AS path length of the confederation.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp bestpath compare-confed-aspash
```

Related Commands	Command	Description
	show ip bgp	Displays the BGP route entry.
	bgp router-id	Sets the BGP Device ID.

Platform

Description None

5.22 **bgp bestpath compare-routerid**

Use this command to compare the router ID of the same external routes when selecting the optimal path, with smaller router ID for higher path priority. Use the **no** form of this command to restore the default setting.

bgp bestpath compare-routerid

no bgp bestpath compare-routerid

Parameter	Parameter	Description
Description	N/A	N/A

Defaults If two paths received from different EBGp peers have the same path, the first one is considered with higher

priority by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

If two paths with identical path attributes are received from different EBGP peers during the selection of the optimal path, we will select the optimal path according to the sequence of receiving the paths by default. You can select the path with smaller Device ID as the optimal path by configuring the following commands.

Configuration

The following example compares the router ID of the same external routes.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp bestpath compare-routerid
```

Related Commands

Command	Description
show ip bgp	Displays the BGP route entry.
bgp router-id	Sets the BGP Device ID.

Platform

Description None

5.23 bgp bestpath igp-metric ignore

Use this command to disregard the IGP Metric value of the next-hop when choosing the optimal path.

Use the **no** form of this command to compare IGP Metric value of the next-hop when choosing the optimal path. The smaller the Metric value is, the higher the priority it is.

Use the **default** form of this command to restore the default settings.

bgp bestpath igp-metric ignore

no bgp bestpath igp-metric ignore

default bgp bestpath igp-metric ignore

Parameter Description

Parameter	Description
N/A	N/A

Defaults

The route whose next-hop address has the smallest IGP Metric value is chosen for the optimal path.

Command

Mode BGP configuration mode / Scope global configuration mode

Default Level 14

Configuration

The following example ignores the IGP Metric value of the next-hop when calculating the BGP routing.

Examples

```
FS(config)# router bgp 65000
```

```
FS(config-router)# bgp bestpath as-path ignore
```

Verification Use the **show running-config** command to check the BGP configuration.

5.24 bgp bestpath med confed

Use this command to compare the MED value of the path of the internal peer from AS confederation during selecting the optimal path. Use the **no** form of this command to restore the default setting.

bgp bestpath med confed [missing-as-worst]

no bgp bestpath med confed [missing-as-worst]

Parameter	Parameter	Description
Description	missing-as-worst	Sets the priority of the path without MED attribute as the lowest.

Defaults The MED value of the path of the peer inside the AS confederation is not compared by default when selecting the optimal path.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide The MED attribute of the path is transferred between the ASs inside the confederation. You may set always comparing this value.

Configuration The following example compares the MED value of the path of the internal peer.

```
FS(config)# router bgp 65000
FS(config-router)# bgp bestpath med confed
```

Command	Description
show ip bgp	Displays the BGP route entry.
bgp always-compare-med	Compares the MED value of paths of peers from different ASs when selecting the optimal path.
bgp bestpath med missing-as-worst	Sets the priority of the path without MED attribute as the lowest when selecting the optimal path.
bgp deterministic-med	Compares paths of peers from the same AS when selecting the optimal path.

Platform

Description None

5.25 bgp bestpath med missing-as-worst

Use this command to set the priority of the path without MED attribute as the lowest when selecting the optimal path. Use the **no** form of this command to restore the default setting.

bgp bestpath med missing-as-worst

no bgp bestpath med missing-as-worst

Parameter	Parameter	Description
Description	N/A	N/A

Defaults If a path without MED attribute is received, the MED value of the path is 0 by default. Such route has the highest priority according to the above-mentioned rule.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

The MED value of a path without MED attribute will be 0 by default. For the smaller the MED value, the higher the priority of the path is, the MED value of this path has the highest priority. This command can be used to figure the path without MED attribute has the lowest priority.

Configuration

The following example sets the priority of the path without MED attribute as the lowest.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp bestpath medmissing-as-worst
```

Related Commands

Command	Description
show ip bgp	Displays the BGP route entry.
bgp always-compare-med	Compares the MED value of paths of peers from different ASs when selecting the optimal path.
bgp bestpath med confed	Sets the priority of the path without MED attribute as the lowest when selecting the optimal path.
bgp deterministic-med	Compares paths of peers from the same AS when selecting the optimal path.

Platform

Description None

5.26 bgp bestpath multipath-compare-routerid

Use this command to enable the router ID comparison among multiple BGP paths. Load balancing can be implemented only when multiple paths (same router ID) are from the same device. Use the **no** form of this command to disable the router ID comparison among multiple BGP paths. Use the **default** form of this command to restore the default settings.

- bgp bestpath multipath-compare-routerid**
- no bgp bestpath multipath-compare-routerid**
- default bgp bestpath multipath-compare-routerid**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The router ID comparison among multiple BGP paths is disabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example enables the router ID comparison among multiple BGP paths.

Example

```
FS(config)# router bgp 65000
FS(config-router)# bgp bestpath multipath-compare-routerid
```

Verification Run the **show running-config** command to display the BGP configuration.

5.27 bgp bmp-active

Use this command to monitor all BGP neighbors by all BMP servers. Use the **default** form of this command to restore the default settings.

- bgp bmp-active**
- no bgp bmp-active**
- default bgp bmp-active**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The function is disabled by default.

Command Mode BGP configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example monitors all BGP neighbors by all BMP servers.

Example

```
FS(config)# router bgp 65000
FS(config-router)# bgp bmp-active
```

Verification Run the **show running-config** command to display the BGP configuration.

5.28 bgp client-to-client reflection

Use this command to enable the route reflection function between clients on the device. Use the **no** form of this command disables the route reflection function between clients.

bgp client-to-client reflection

no bgp client-to-client reflection

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled without the client for route reflection by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

In general, it is unnecessary to establish the connection relationship between the clients of the route reflector within the cluster, and the route reflector will reflect the route among clients. However, if the full connection relationship is established for all clients, the function for the route reflector to reflect the client route can be disabled.

To disable the route reflection function, use the command **no bgp client-to-client reflection**.

Configuration

The following example shows how to enable the route reflection function between clients on the device.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# no bgp client-to-client
reflection
```

Related Commands

Command	Description
bgp cluster-id	Configures the cluster ID of the route reflector.
neighbor route-reflector-client	Configures the client of the route reflector and configure itself as the route reflector.

Platform

Description None

5.29 bgp cluster-id

Use this command to configure the cluster ID of the route reflector. Use the **no** form of this command to restore it to the default setting.

bgp cluster-id cluster-id

no bgp cluster-id

Parameter	Parameter	Description
Description	cluster-id	Cluster ID of the route reflector, an IP address of up to four bytes or an integer (must be entered in form of IP address)

Defaults The cluster id is the router-id of the route reflector by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide

In general, one group is only configured with one route reflector. In this case, the Device ID of the route reflector can be used to identify this cluster. To increase the redundancy, you can set more than one route reflector within this cluster. In this case, you must configure the cluster ID, so that one route reflector can identify the route update from other route reflectors of this cluster.

Configuration

The following example configures the cluster ID of the route reflector.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp cluster-id 10.0.0.1
```

Related Commands

Command	Description
bgp client-to-client reflection	Configures the route reflection between clients.
neighbor route-reflector-client	Configures the client of the route reflector and configures itself as the route reflector.

Platform

Description None

5.30 bgp confederation identifier

Use this command to configure the AS confederation identifier. Use the **no** form of this command to restore the default setting.

bgp confederation identifier as-number

no bgp confederation identifier

Parameter Description

Parameter	Description
as-number	AS confederation identifier in the range from 1 to 65535 In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, which is represented as 1 to 65535.65535 in dot mode.

Defaults

There is no confederation identifier by default

Command

Mode

BGP configuration mode/BGP scope global configuration mode

Usage Guide

The confederation is a measure to reduce the connections of IBGP peers within the AS. One AS is divided into several sub ASs and one unified confederation ID (namely, confederation AS number) is set to constitute these sub ASs into a confederation. For the external confederation, the whole confederation is still considered as one AS, and only the confederation AS number is visible for the external network. Within the confederation, the full IBGP peer connection is still established among the BGP Speakers within the sub AS, and the EBGP connection is established among the BGP Speakers within the sub AS. Despite of the EBGP

connections established between the BGP speakers in an AS, the next-hop, MED and local priority information remains unchanged in exchanging the information.

Configuration The following example configures the AS confederation identifier.

Examples FS(config-router)# bgp confederation identifier 65000

Related Commands

Command	Description
bgp confederation peers	Adds member AS of the AS confederation.

Platform

Description None

5.31 bgp confederation peers

Use this command to configure member ASs of the AS confederation. Use the **no** form of this command to restore the default setting.

bgp confederation peers as-number [...as-number]

no bgp confederation peers as-number [...as-number]

Parameter Description

Parameter	Description
as-number	Member ASs in the confederation range from 1 to 65535. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults There is no confederation member by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

The confederation is a measure to reduce the connections of BGP peers within the AS.

One AS is divided into several sub ASs and one unified confederation ID (namely, confederation AS number) is set to constitute these sub ASs into a confederation. The whole external confederation is still considered as one AS, and only the confederation AS number is visible for the external network. Within the confederation, the full IBGP peer connection is still established among the BGP Speakers within the sub AS, and the EBGP connection is established among the BGP Speakers within the sub AS. Despite of the EBGP connections established between the BGP speakers in an AS, the next-hop, MED and local priority information remains unchanged in exchanging the information.

Usage Guide

This command is used to specify the member AS of a confederation.

- This command can configure up to 25 members of a confederation at one time. For more members, enter them for several times.
- Run the [**default** | **no**] **bgp confederation peers** command without AS number will delete all AS

member configuration.

Configuration The following example configures member ASs of the AS confederation.

Examples FS(config-router)# bgp confederation peers 65000 65100

	Command	Description
Related Commands	bgp confederation identifier	Configures the confederation identifier.

Platform

Description None

5.32 bgp dampening

Use this command to enable the routing attenuation and set the attenuation parameters in the address-family or routing configuration mode. Use the **no** form of this command to restore the default setting.

bgp dampening [half-life [reusing suppressing max-suppress-time] | **route-map** name] [**withdrawal-ignore**]

	Parameter	Description
Parameter Description	half-life	Half-life period, ranging from 1 to 45 minutes
	reusing	When the penalty value reaches this value, the routing suppression is cancelled. The value ranges from 1 to 10000.
	suppressing	When the penalty value reaches this value, routing is suspended. The value ranges from 1 to 20000.
	max-suppress-time	Maximum time for routing suppression, ranging from 1 to 255 minutes
	withdrawal-ignore	The penalty value is not added when the routing suppression is cancelled.
	name	Route-map name, apply the routing attenuation to the specified route through the route-map.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4 unicast address-family configuration mode, BGP IPv4 VRF address-family configuration mode, BGP IPv6 unicast address-family configuration mode, BGP IPv6 VRF address-family configuration mode, BGP L2VPN VPLS/VPWS address-family configuration mode, or BGP scope configuration mode.

The **bgp dampening** command is used to suppress unstable BGP routing. The BGP uses the penalty value to describe routing suppression intensity. The penalty value increases 1000 when the routing oscillation is performed once. The suppressed routes will not be used during the BGP routing election.

Usage Guide The **bgp dampening** command is used to suppress unstable EBGP routes and does not take effect to IBGP routes.

The BGP uses the penalty value to describe the route stability. A larger penalty value indicates a more unstable route. The penalty value increases by 1000 when route oscillation occurs (upon receiving withdraw packets).The penalty value does not increase when the upper limit is reached. The upper limit is determined

based on the configured max-supress-time value and calculated using the following formula: Penalty upper limit = $2^{(max-supress-time/Half-life)} \times Reusing$. In addition, the penalty upper limit cannot be greater than 20000. Therefore, the max-supress-time, half-life, and reusing values need to be adjusted based on the network conditions. The relationship among these parameters are as follows:

Half-life \leq max-supress-time

Reusing \leq Suppressing \leq Penalty upper limit

You can also specify only the half-life value. In this case, the max-supress-time value is (half-life x 4), the reusing value is 750, and the suppressing value is 2000.

EBGP routes whose penalty value exceeds the suppressing value will be suppressed. Suppressed routes will not be used during BGP route election and will not be advertised to other BGP peers. If route oscillation occurs in suppressed routes, the penalty value will continue to increase until the penalty upper limit is reached.

The penalty value of suppressed routes will decrease by a half each time the half-life time passes. When the penalty value decreases to the reusing value, routes whose attribute is update in the last update will participate in BGP route election again. When the penalty value decreases to 0, routes whose attribute is withdraw in the last update will be deleted from the BGP route table.

By default, 1000 penalty values are added for route cancellation and 500 penalty values are added for route update.

Use the **withdraw-ignore** command to not add penalty values for route cancellation.

Configuration

The following example enables the routing attenuation and set the attenuation parameters.

Examples

```
FS(config-router)# bgp dampening 30 1500 10000 120
```

Related Commands

Command	Description
clear ip bgp dampening	Clears the BGP suppression and cancels the suppression for the routes.
show ip bgp dampening dampened-paths	Displays the suppressed route information.

Platform

Description None

5.33 bgp default ipv4-unicast

Use this command to set the IPv4 unicast address as the default address family. Use the **no** form of this command to restore the default setting.

bgp default ipv4-unicast

no bgp default ipv4-unicast

Parameter Description

Parameter	Description
N/A	N/A

Defaults

The IPv4 unicast address is the default address family.

Command

Mode

BGP configuration mode/BGP scope global configuration mode

Usage Guide This command is used to set the default address family of BGP as the IPv4 unicast address.

Configuration The following example sets the IPv4 unicast address as the default address family.

Examples FS(config-router)# default ipv4-unicast

Related Commands	Command	Description
	address-family ipv4	Enters the IPv4 address mode.

Platform Description None

5.34 bgp default local-preference

Use this command to set the default local-preference attribute value. Use the **no** form of this command to restore the default setting.

bgp default local-preference value

no bgp default local-preference

Parameter Description	Parameter	Description
	value	Local priority attribute, in the range from 0 to 4294967295

Defaults The local preference value is 100 by default.

Command Mode BGP configuration mode/BGP scope configuration mode

Usage Guide The BGP takes the local preference as the foundation to compare with the priority of the path learned from IBGP peers. The larger the local preference value, the higher the priority of the path is. The BGP speaker sends the external route received to the IBGP peers to add the local priority value.

Configuration The following example sets the default local-preference attribute value.

Examples FS(config-router)# bgp default local-preference 200

Related Commands	Command	Description
	show ip bgp	Displays the BGP route entry.
	bgp always-compare-med	Allows comparing the MED value of the path of the peer from different ASs when electing the optimal path.
	bgp bestpath med confed	Allows comparing the MED value of paths of internal peers from AS community when electing the optimal path.
	bgp bestpath med missing-as-worst	Allows setting the priority of the path without MED attribute as the lowest when electing the optimal path.

Platform Description None

5.35 **bgp default route-target filter**

Use this command to enable the route-target filtering. For the VPNv4 routes, filter the community attributes of the route-target by default. Use the **no** form of this command to disable this function.

bgp default route-target filter

no bgp default route-target filter

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode BGP configuration mode, VPNv4 address-family configuration mode, or BGP L2VPN VPLS/VPWS address-family configuration mode or BGP scope configuration mode.

Usage Guide After receiving the VPNv4 route, use the community attributes list of the route-target to filter and distribute different VRFs. With the no form of this command used, the BGP will receive all VPNv4 routes no matter whether these filtered VPNv4 routes will be received by route-target of local VRF.

With the PE route-reflector-client configured for the BGP, the VPNv4 route will not be processed through the route-target filtering. In this case, whether the BGP is enabled, the actions are the same without the route-target filtering.

Configuration Examples The following example enables the route-target filtering.

```
FS(config)# router bgp 65000
FS(config-router)# no bgp default route-target filter
```

Related Commands	Command	Description
	neighbor route-reflector-client	Configures the route-reflector-client, and sets itself as the route reflector.

Platform Description N/A

5.36 **bgp deterministic-med**

Use this command to set comparing preferentially the MED values of peer paths from the same AS. By default, the comparison is based on the received order, and the one received the last is compared first. Use the **no** form of this command to restore the default setting.

bgp deterministic med

no bgp deterministic med

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode.

Usage Guide

They will be compared with each other according to the sequence the paths are received when the optimal path is selected by default. Execute the following operations in the BGP configuration mode to compare paths of peers from the same AS firstly:

Configuration

The following example sets the comparing preferentially MED values.

Examples

```
FS(config-router)# bgp deterministic med
```

Related

Commands

Command	Description
show ip bgp	Displays the BGP route entry.
bgp always-compare-med	Compares the MED value of paths of peers from different ASs when selecting the optimal path.
bgp bestpath med confed	Sets the priority of the path without MED attribute as the lowest when selecting the optimal path.
bgp bestpath med missing-as-worst	Compares paths of peers from the same AS when selecting the optimal path.

Platform

Description None

5.37 bgp enforce-first-as

Use this command to reject the UPDATE messages whose first AS_PATH path section is not the neighbor-configured AS number. Use the **no** form of this command to disable this function.

bgp enforce-first-as

no bgp enforce-first-as

Parameter

Description

Parameter	Description
N/A	N/A

Defaults

This function is enabled by default.

Command

Mode

BGP configuration mode/BGP scope global configuration mode

Usage Guide

The AS number of the device is put into the path section by default to update the update message.

Configuration

Examples

The following example rejects the UPDATE messages whose first AS_PATH path section is not the neighbor-configured AS number.

```
FS(config-router)# bgp enforce-first-as
```

Related Commands	Command	Description
	show ip bgp	Displays the BGP route entry.

Platform

Description None

5.38 **bgp fast-external-fallover**

When the network interface used in establishing the connection of the directly-connected EBGP peer fails, use this command to establish the BGP session connection quickly. Use the **no** form of this command to disable this function.

bgp fast-external-fallover

no bgp fast-external-fallover

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide This command takes effect only for the directly-connected EBGP neighbor.

Configuration The following example creates the fast BGP session.

Examples

```
FS(config-router)# bgp fast-external-fallover
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol.

Platform

Description None

5.39 **bgp fast-reroute**

Use this command to enable BGP Fast Reroute. Use the **no** or **default** form of this command to restore the default settings.

bgp fast-reroute

no bgp fast-reroute

default bgp fast-reroute

Parameter	Parameter	Description
-----------	-----------	-------------

N/A	N/A
-----	-----

Defaults This function is disabled by default.

Command Mode BGP configuration mode/ BGP IPv4 unicast address family configuration mode/ BGP IPv6 unicast address family configuration mode/ BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/ BGP scope global configuration mode

i Only one backup route will be generated and the next-hop of this backup route cannot be the same as that of the preferred route.

i When ECMP is enabled, the FRR cannot generate backup route.

Usage Guide

i When this function is enabled, the priority of BGP FRR is lower than that of VPN FRR. So when the VPN FRR is enabled in IPv4 VRF configuration mode, BGP FRR does not take effect unless VPN FRR is unable to calculate the backup route.

i This command can not be run with **bgp install standby-path**.

Configuration Examples The following example enables BGP Fast Reroute.

```
FS(config)# router bgp 65530
FS(config-router)# bgp faster-reroute
```

Related

Commands

Command	Description
N/A	N/A

Platform

Description N/A

5.40 bgp fast-withdraw

Use this command to configure fast withdrawal of specified BGP route. Use the **no** or **default** form of this command to restore the default settings.

bgp fast-withdraw { **access-list** { access-list-number | access-list-name } | **prefix-list** prefix-list-name | **route-map** map-tag }

no bgp fast-withdraw { **access-list** | **prefix-list** | **route-map** }

default bgp fast-withdraw { **access-list** | **prefix-list** | **route-map** }

Parameter Description

Parameter	Description
access-list-number	Indicates the ACL number. The value ranges from 1 to 199 and 1300 to 2699 .
access-list-name	Indicates an ACL name.
prefix-list-name	Indicates the name of a prefix list.
map-tag	Indicates the name of a route map.

Defaults This function is disabled by default.

Command Mode BGP configuration mode/ BGP IPv4 or IPv6 unicast address family configuration mode/ BGP IPv4 or IPv6 VRF address family configuration mode/ BGP VPNv4 address family configuration mode/ BGP L2VPN VPWS/VPLS address family configuration mode/ BGP scope global configuration mode.

- Usage Guide**
- The BGP L2VPN address family configuration mode only supports **route-map** command.
 - Command **prefix-list** and **access-list** cannot take effect at the same time.

Configuration Examples The following example enables fast withdrawal of specified BGP route.

```
FS(config)# router bgp 65530
FS(config-router)# bgp fast-withdraw route-map bgp-filter
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

5.41 bgp graceful-restart

Use this command to enable the global BGP graceful restart function. Use the **no** form of this command to disable BGP graceful restart.

bgp graceful-restart

no bgp graceful-restart

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, BGP graceful restart is enabled so as to help neighbors to perform graceful restart.

Command Mode BGP configuration mode/BGP scope global configuration mode

The ability of the BGP is advertised and negotiated through the ability field of the Open message. The ability is negotiated during initially setting up the connection. So both sides must reach the consistency of the ability. If it is not supported by any side, this router device will perform the GR incorrectly.

Usage Guide With the GR function enabled, the connected Open message will carry the GR ability field to perform the negotiation of the GR ability. To implement the GR correctly, the GR function must be enabled on both sides of the neighbors.

- This command does not take effect immediately on all BGP connections that are set up successfully. To negotiate the GR ability immediately, you need to restart the BGP connection to make the local device

negotiate the GR ability with the Peer again by using the clear ip bgp command.

The BGP graceful-restart is used to forward data continuously of the whole network, it requires the device to keep the BGP routing entry valid and forward data continuously when restarting the BGP protocol. Supporting the continuous forwarding during the restarting is related to the hardware ability.

Configuration Examples

The following example enables the graceful restart function of the global BGP.

```
FS(config)# router bgp 500
FS(config-router)# bgp graceful-restart
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
bgp graceful-restart restart-time	Configures the restart time of the BGP graceful-restart.

Platform

Description N/A

5.42 bgp graceful-restart disable

Use this command to disable GR capability of a BGP address family. Use the **no** form of this command to restore the default setting.

bgp graceful-restart disable
no bgp graceful-restart disable

Parameter Description

Parameter	Description
N/A	N/A

Defaults

The function is disabled by default.

Command Mode

BGP configuration mode, IPv4 unicast address family mode, VPNv4 address family mode, L2VPN VPWS/VPLS address family mode and scope configuration mode

Usage Guide

When BGP GR function is enabled, the GR capability for all address families is enabled by default, except for address families that do not support GR capability. After GR capability is enabled, you can use this command in the address family mode to disable the address family's GR capability. The Configuration of this command in BGP mode is effective on IPv4 Unicast address family.

When BGP GP function is disabled, GR capability is disabled for all address families.

Configuration Examples

The following example enables the graceful restart function of the global BGP.

```
FS(config)# router bgp 65000
FS(config-router)# bgp graceful-restart
FS(config-router)# address-family ipv4
FS(config-router-af)# bgp graceful-restart disable
```

Configuration Examples	Command	Description
	bgp graceful-restart	Enables BGP's GR capability.
	address-family ipv4	Enters BGP IPv4 address family mode.

Platform N/A

Description

5.43 **bgp graceful-restart restart-time**

Use this command to configure the restart time of the BGP graceful-restart. Use the **no** form of this command to restore the default setting.

bgp graceful-restart restart-time restart-time

no bgp graceful-restart restart-time

Parameter Description	Parameter	Description
	restart-time	GR Restarter-hoped longest waiting time before re-establishing the connection between the GR Helper and the GR Restarter, in the range from 1 to 3600 in the unit of seconds.

Defaults The default is 120.

Command

Mode BGP configuration mode/BGP scope global configuration mode

The restart time is advertised by GR Restarter to GR Helper, it is GR Restarter-hoped longest waiting time before re-establishing the connection between GR Helper and GR Restarter. After this time, if the BGP connection with GR Restarter is not in Established status, GR Helper will consider this BGP session failed and will restore the normal BGP. All the routing of the neighbor will be deleted during this period, affecting the data redistribution. The restart time is advertised in the GR ability field of the BGP Open message. The GR restart time of the two ends of the session is not required to be the same, but it is recommended.

Usage Guide

- This command does not take effect immediately on all BGP connections that are set up successfully. To advertise the newly set restart time to the GR helper, you need to restart the BGP connection to negotiate the GR ability again and advertise the restart time by using the clear ip bgp command. The configured restart time should not be greater than the Hold Time of the BGP peer, if so, the Hold time will be the restart time when the GR ability is advertised to the BGP peer.

The following example configures the restart time of the BGP graceful-restart.

Configuration Examples

```
FS(config)# router bgp 500
FS(config-router)# bgp graceful-restart
FS(config-router)# bgp graceful-restart restart-time 150
FS(config-router)# no bgp graceful-restart restart-time
```

Related

Command	Description
---------	-------------

bgp graceful-restart	Enables the BGP graceful-restart.
-----------------------------	-----------------------------------

Platform N/A
Description

5.44 bgp graceful-restart stalepath-time

Use this command to configure the time to help the device keep the route valid when executing the BGP graceful-restart. Use the **no** form of this command to restore the default setting.

bgp graceful-restart stalepath-time stalepath-time time

no bgp graceful-restart stalepath-time

Parameter	Description
Description time	Longest time used to keep the stale route valid after restoring the connection with the neighbors, in the range from 1 to 3600 in the unit of seconds

Defaults The default is 360.

Command

Mode BGP configuration mode

This command is configured for the parameters of the GR Helper. The stalepath-time is the longest time of the GR Helper waiting to receive the EOR mark of the Restarter after restoring the connection with the GR Restarter. When the GR Helper detects that the connection with the GR Restarter fails, the original route of the Restarter is marked as the "Stale". However these routes are still used for the routing calculation and forwarding.

Usage Guide

The GR Helper updates the routes and cancels the "Stale" mark according to route updating information received from the GR Restarter. If routes marked as "Stale" are not updated in the stalepath-time period, they will be deleted. This mechanism is used to avoid failure in convergence of routes when the GR Helper fails to receive the EOR mark of the GR Restarter for a long time.

The following example configures the restart time of the BGP graceful-restart.

Configuration Examples

```
FS(config)# router bgp 500
FS(config-router)# bgp graceful-restart
FS(config-router)# bgp graceful-restart stalepath-time 240
FS(config-router)# no bgp graceful-restart stalepath-time
```

Related Commands

Command	Description
bgp graceful-restart	Enables the BGP graceful-restart.

Platform N/A
Description

5.45 bgp initial-advertise-delay

Use this command to configure the delay period before a BGP device sends its initial updates to peers. Use the **no** form or **default** form of this command to restore the default settings.

bgp initial-advertise-delay delay-time [startup-time] [**wait-for-controller**]

no bgp initial-advertise-delay

default bgp initial-advertise-delay

Use this command to enable the BGP delayed advertisement upon system restart. Thus, the route will be immediately sent after the prefix-list policy is matched. Use the **no** form or **default** form of this command to restore the default settings.

bgp initial-advertise-delay prefix-list prefix-list-name

no bgp initial-advertise-delay prefix-list

default bgp initial-advertise-delay prefix-list

Parameter	Parameter	Description
Description	delay-time	The delay period, in seconds, before a BGP device sends its updates. The range is from 1 to 600. The default value is 1 second.
	startup-time	The time for the BGP device restart. In the period, the neighbor does not send its updates to peers. The range is from 5 to 584,000. The unit is second and the default value is 600 seconds.
	prefix-list-name	Name of the prefix-list. It cannot exceed 32 characters.
	wait-for-controller	Configures the wait-for-controller command to ensure that routes are advertised only after the controller delivers configuration messages and receives EOR messages from the neighbors.

Defaults The initial advertisement delay is disabled by default.

Command

Mode BGP configuration mode

This command is used to configure parameters for delayed neighbor route advertisement during device restart.

delay-time indicates the longest time for sending a route to a neighbor after the BGP neighbor relationship is established. In normal cases, after the neighbor relationship is established, the first route is advertised immediately and subsequent routes are advertised based on the default time. For details, see the **neighbor advertisement-interval** command. **startup-time** indicates the configurable startup time and starts to count when the configuration command takes effect. Within the time specified by **startup-time**, routes to BGP neighbors are advertised periodically based on **delay-time**. This command can be used to change the route advertisement behavior from the BGP peer to neighbors after device restart. The **wait-for-controller** command is used to wait for route advertisement messages from the controller and trigger the BGP route advertisement behavior after EOR messages are received from neighbors. If EOR messages are not received from neighbors within the time specified by **startup-time**, routes are sent forcibly.

Usage Guide

The prefix-list policy is configured to ensure that partial routes can be normally delivered. The prefix-list policy

applies to distributed routes. Matched routes will be normally delivered without being affected by delayed advertisement. For details about the address family scope to which the prefix-list policy applies, see the **neighbor prefix-list** command.

This command is used by the administrator to adjust the BGP route advertisement behavior during device restart based on the hardware conditions, number of neighbors, number of routes, and actual deployment requirements.

Configuration Examples

The following example configures initial delay to 60 seconds within 500 seconds after BGP restart.

```
FS(config)# router bgp 500
FS(config-router)# bgp initial-advertise-delay 60 500
```

Related Commands

Command	Description
bgp graceful-restart	Enables the BGP graceful-restart.

Platform N/A
Description

5.46 bgp link-state-group up-delay

Use this command to configure the delay time to remove violation on downlink port of link state tracking group associated with BGP neighbor.

bgp link-state-group up-delay delay-time

no bgp link-state-group up-delay

default bgp link-state-group up-delay

Parameter Description

Parameter	Description
delay-time	The delay time to remove violation on downlink port of link state tracking group associated with BGP neighbor. The range is from 1 to 30.

Defaults The delay period is 5 s by default.

Command

Mode BGP configuration mode, BGP scope global configuration mode

Usage Guide N/A

Configuration Examples

The following example configures the delay time as 10 s.

```
FS(config)# router bgp 500
FS(config-router)# bgp link-state-group up-delay 10
```

Related Commands

Command	Description
---------	-------------

Platform N/A

Description

5.47 bgp install standby-path

Use this command to enable BGP multi-path bypass protection. Use the **no** form or **default** form of this command to restore the default settings.

bgp install standby-path


no bgp install standby-path

default bgp install standby-path

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The BGP multi-path bypass protection is disabled by default.

Command Mode BGP configuration mode; BGP IPv4 VRF address family configuration mode; BGP IPv6 VRF address family configuration mode

Usage Guide  The BGP multi-path bypass protection function and the FRR function cannot be enabled at the same time.

Configuration Examples The following example enables BGP multi-path bypass protection.

```
FS(config)# router bgp 500
FS(config-router)# bgp install standby-path
```

Platform Description N/A

5.48 bgp log-neighbor-changes

Use this command to log the BGP status changes without turning on debug. Use the **no** form of this command to disable this function.

bgp log-neighbor-changes

no bgp log-neighbor-changes

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide The debug command can also be used to log BGP status changes. But this command may consume many resources.

Configuration The following example logs the BGP status changes without turning on debug.

Examples

```
FS(config-router)# bgp log-neighbor-changes
```

Related Commands	Command	Description
	<code>router bgp</code>	Enables the BGP protocol.

Platform

Description None

5.49 bgp maxas-limit

Use this command to set the maximum number of ASs in the BGP AS-PATH attribute. Use the **no** or **default** form of the command to restore the default configuration.

bgp maxas-limit number

no bgp maxas-limit

default bgp maxas-limit

Parameter	Parameter	Description
Description	number	The maximum number of ASs in the BGP AS-PATH attribute. The range is from 1 to 512.

Defaults No maximum number of ASs is set by default.

Command

Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide The routes exceeding the AS number limit are discarded directly, After changing the configuration, use the **clear** command to reset the neighbor and make the configuration take effect.

Configuration The following example sets the maximum number of ASs in the BGP AS-PATH attribute to 100.

Examples

```
FS(config-router)# bgp maxas-limit 100
```

Related Commands	Command	Description
	N/A	N/A

Platform

Description N/A

5.50 bgp maximum-neighbor

Use this command to configure the maximum number of BGP neighbors when sending warnings. Use the **no** or **default** form of the command to restore the default configuration.

bgp maximum-neighbor numbers **warning-only**

no bgp maximum-neighbor

default bgp maximum-neighbor

Parameter	Parameter	Description
Description	numbers	Indicates maximum number of neighbor. Range: 1 to 15000.

Defaults The function is disabled by default.

Command

Mode BGP configuration mode, BGP scope global configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the maximum number of neighbor as 1000.

```
FS(config)#router bgp 100
FS(config-router)#bgp maximum-neighbor 1000 warning-only
```

Related Commands	Command	Description
	N/A	N/A

Platform

Description N/A

5.51 **bgp maximum-prefix**

Use this command to restrict the maximum number of routes in the BGP global or specified VRF. Use the **no** or **default** form of the command to restore the default configuration.

bgp maximum-prefix numbers [**vrf** vrf-name]

no bgp maximum-prefix [**vrf** vrf-name]

default bgp maximum-prefix [**vrf** vrf-name]

Parameter	Parameter	Description
Description	vrf-name	Indicates name of a specific VRF.
	numbers	Indicates number of routes. Range: 1 to 4,294,967,295.

Defaults The function is disabled by default.

Command

Mode BGP configuration mode/ BGP scope global configuration mode

Usage Guide When a route advertisement in an address family causes the current number of BGP routes to exceed the maximum number, a prompt indicating route overflow in the global or specified VRF is displayed, and the BGP global or specified VRF is set to the overflow state.

Run the **show bgp { addressfamily | all } summary** command to check routing information base status. If the address family enters the overflow state because the BGP routing information prefix reaches the upper limit, it can be adjusted by **maximum-prefix**.

For IPv4 unicast routes, the routing information prefix may still be received if it is in the overflow state in the following cases:

- 1) The routing information of the same routing prefix already exists in the routing information base;
- 2) A route that covers the prefix (except the default route) already exists in the routing information base, and the next hop of the route is different from the next hop of the newly received route prefix.

Configuration

The following example sets the maximum number of routes to 100.

Examples

```
FS(config)#router bgp 100
FS(config-router)#bgp maximum-prefix 100
```

Related Commands

Command	Description
N/A	N/A

Platform

Description N/A

5.52 bgp mp-error-handle session-retain

Use this command to retain BGP sessions when BGP protocol detects errors in multi-protocol route attributes. Use the **no** form of this command to restore the default setting.

bgp mp-error-handle session-retain [recovery-time time]

no bgp mp-error-handle session-retain

Parameter Description

Parameter	Description
recovery-time time	Configures the waiting time for auto route recovery. The parameter ranges from 10 to 4294967296 in the unit of seconds. The default is 120.

Defaults

By default, BGP sessions will be interrupted when multi-protocol attribute errors are detected.

Command Mode

BGP configuration mode/BGP scope global configuration mode

Usage Guide

By default, when UPDATA packets are received from a neighbor, BGP sessions will be interrupted if multi-protocol attribute errors are detected, which will cause oscillation of routes of all the address families of the neighbor. An address family's route error will affect the stability of routes of other address families. After this command is configured, when an error of the route attribute of an address family occurs, all the route information of the address family and neighbor will be deleted, thus preventing impact on the BGP session and other protocol address families, improving BGP protocol's stability.

The option recovery-time is used to configure the waiting time for auto route recovery. To use the option, the

neighbor must support the route refreshing capability. After recovery-time expires, BGP will send a route-refresh message to the neighbor's address family and re-notify the neighbor of the address family's all route information.

Configuration The following example retains BGP sessions when BGP protocol detects errors in multi-protocol route attributes.

Examples

```
FS(config-router)# bgp mp-error-handle session-retain
```

Configuration Examples	Command	Description
	N/A	N/A

Platform N/A

Description

5.53 bgp nexthop trigger delay

Use this command to configure the delay time for updating the routing table when the nexthop of the BGP route changes. Use the **no** form of this command to restore the default setting.

bgp nexthop trigger delay delay-time

no bgp nexthop trigger delay

Parameter Description	Parameter	Description
	delay-time	delay-time

Defaults The default is 5.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode/BGP L2VPN VPWS/VPLS address family configuration mode or BGP Scope configuration mode.

Usage Guide This command is used to configure the delay time for updating the routing table when the nexthop changes, it takes effect when the bgp nexthop trigger enable switch is opened.

Configuration Examples The following example retains BGP sessions when BGP protocol detects errors in multi-protocol route attributes.

```
FS(config-router)# bgp nexthop trigger delay 30
```

Related Commands	Command	Description
	bgp nexthop trigger enable	bgp nexthop trigger enable

Platform Description None

5.54 **bgp nexthop trigger enable**

Use this command to enable the nexthop trigger update function. Use the **no** form of this command to disable this function.

bgp nexthop trigger enable

no bgp nexthop trigger enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode/BGP L2VPN VPWS/VPLS address family configuration mode or BGP Scope configuration mode.

Usage Guide This command is used to enable the nexthop trigger update function.

Configuration Examples The following example enables the nexthop trigger update function.

```
FS(config-router)# bgp nexthop trigger enable
```

Related Commands	Command	Description
	Bgp nexthop trigger delay	Sets the delay time for updating the routing table when the nexthop changes.

Platform Description None

5.55 **bgp notify unsupported-capability**

Use this command to enable the neighbor address family capability detection function. Use the **no** form of this command to restore the default setting.

bgp notify unsupported-capability

no bgp notify unsupported-capability

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode.

Usage Guide When BGP neighbor address family capability negotiation is not fully consistent, neighbors can still be connected.

After this command is configured, when an address family capability supported by the local device is not supported by the neighbor device, Notification packet that carries the address family that does not support the capability will be send.

Configuration The following example enables the neighbor address family capability detection function.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp notify unsupport-capability
```

Configuration Examples	Command	Description
	router bgp	Enables BGP protocol.

Platform N/A

Description

5.56 bgp nsr

Use this command to enable the NSR function for BGP neighbors globally. Use the **no** form or **default** form of this command to restore the default settings.

bgp nsr
no bgp nsr
default bgp nsr

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode.

Usage Guide Run the **bgp nsr** command to enable the NSR function for BGP neighbors globally.
 Run the **neighbor ha-mode nsr** command to enable the NSR function for specific BGP neighbors.

Configuration The following example enables the NSR function for BGP neighbors globally.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp nsr
```

Platform N/A

Description

5.57 **bgp recursion host**

Use this command to configure BGP routes to be recursive only to host routes. Use the **no** form or **default** form of this command to restore the default settings.

- bgp recursion host**
- no bgp recursion host**
- default bgp recursion host**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, recursion is performed on BGP routes via exact matching.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode/BGP L2VPN VPWS/VPLS address family configuration mode or BGP Scope configuration mode.

Usage Guide This function takes effect on indirect routes only.

Configuration Examples The following example enables BGP routes to be recursive only to host routes.

```
FS(config-router)# bgp recursion host
```

Platform Description N/A

5.58 **bgp redistribute-internal**

Use this command to control BGP whether to allow redistributing routes learned from IBGP, such as RIP, OSPF and ISIS, to the IGP protocol. Use the **no** form of this command to disable this function.

- bgp redistribute-internal**
- no bgp redistribute-internal**
- default bgp redistribute-internal**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults IBGP routes are allowed by default to be redistributed to the IGP protocol.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode or IPv4/IPv6 VRF address family configuration mode

Usage Guide This command is used to control whether IBGP routes are allowed to be redistributed to the IGP protocol.

Configuration The following example enables the BGP to learn the redistributing routes from IBGP.

Examples

```
FS(config-router)# bgp redistribute-internal
```

Related	Command	Description
Commands	redistribute	Redistributes routes learned from other protocols.

Platform

Description None

5.59 bgp redistribute unspecified instance ignore

Use this command to not apply the multi-instance redistribution to the current instance. Use the **no** or **default** form of this command to disable this function.

bgp redistribute unspecified instance ignore

no bgp redistribute unspecified instance ignore

default bgp redistribute unspecified instance ignore

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Multi-instance redistribution is applied by default.

Command Mode BGP configuration mode, IPv4/IPv6 Unicast address family configuration mode, IPv4/IPv6 VRF address family configuration mode or BGP Scope configuration mode.

Usage Guide This command is used to control whether to apply the multi-instance redistribution to the current instance. After run the **router bgp redistribute** command, if this command is run, the configuration will not be applied; otherwise it is applied.

Configuration The following example configures not apply the multi-instance redistribution.

Examples

```
FS(config-router)# bgp redistribute unspecified instance ignore
```

Related	Command	Description
Commands	show running-config	Check BGP configuration

Platform

Description None

5.60 bgp refresh max-eor-time

Use this command to configure the timer for sending EoRR message to neighbors. Use the **no** form or **default** form of this command to restore the default settings.

bgp refresh max-eor-time time

no bgp refresh max-eor-time
default bgp refresh max-eor-time

Parameter Description

Parameter	Description
time	Timer for sending EoRR message. Range: 0, 600-3600, unit:s. 0 indicates the function is disabled.

Defaults By default, it is disabled.

Command Mode BGP configuration mode and BGP Scope configuration mode

Usage Guide If the BoRR message is sent to the neighbor but the subsequent EoRR message is not sent, the old routes of the neighbor can not be deleted. For this case, a timer for sending EoRR message is configured. After the BoRR message is sent, the timer is started (based on the neighbor + address family), and the time is set by the user. If the EoRR message is not sent after the set time, the EoRR message of the corresponding address family is sent to the neighbor. The timer is turned off if an EoRR message has been sent.

Configuration Examples The following example sets the timer for sending EoRR message as 600 seconds.

```
FS(config-router)# bgp refresh max-eor-time 600
```

Platform Description N/A

5.61 bgp refresh stalepath-time

Use this command to configure the time of Enhanced Route-Refresh old route deletion timer. Use the **no** form or **default** form of this command to restore the default settings.

bgp refresh stalepath-time time
no bgp refresh stalepath-time
default bgp refresh stalepath-time

Parameter Description

Parameter	Description
time	Time of Enhanced Route-Refresh old route deletion timer. Range: 0, 600-3600, unit:s. 0 indicates the function is disabled.

Defaults By default, it is disabled.

Command BGP configuration mode and BGP Scope configuration mode

Mode

Usage Guide If only receive the BoRR message but not the EoRR message, then the Enhanced Route-Refresh old routes will remain. For this case, a timer for deleting the old routes is configured. After the BoRR message is received, the timer is started (based on the neighbor + address family), and the time is set by the user. If the EoRR message is not received after the set time, the Enhanced Route-Refresh old routes are deleted. This timer is turned off if an EoRR message is received.

Configuration The following example sets the timer as 600 seconds.

Examples

```
FS(config-router)# bgp refresh stalepath-time 600
```

Platform N/A

Description

5.62 bgp route-reflector attribute-change

Use this command to allow the BGP route reflector to modify route attributes. Use the **no** form or **default** form of this command to restore the default settings.

- bgp route-reflector attribute-change**
- no bgp route-reflector attribute-change**
- default bgp route-reflector attribute-change**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the function is disabled.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP L2VPN VPWS/VPLS address family configuration mode or BGP Scope configuration mode.

Usage Guide N/A

Configuration The following example allows the BGP route reflector to modify route attributes.

Examples

```
FS(config-router)# bgp route-reflector attribute-change
```

Platform N/A

Description

5.63 **bgp router-id**

Use this command to configure the ID-IP address of the device. Use the **no** form of this command to restore the default setting.

bgp router-id ip-address

no bgp router-id

Parameter	Parameter	Description
Description	ip address	IPv4 address

Defaults The loop-back interface of the device is selected preferentially by default. If it does not exist, the device route-id of the device is used.

Command Mode BGP configuration mode, BGP scope global configuration mode or BGP IPv4/IPv6 VRF address family configuration mode

Usage Guide This command is used to configure IP address, the ID of the device when running the BGP protocol.

Configuration Examples The following example configures the ID-IP address of the device.

```
FS(config-router)# bgp router-id 10.0.0.1
```

Related Commands	Command	Description
	show ip bgp dampening dampened-paths	Displays the suppressed routing information.
	bgp dampening	Enables the route dampening function and sets dampening parameters.

Platform Description None

5.64 **bgp scan-rib disable**

Use this command to update the routing table by event triggering. Use the **no** form of this command to restore the default setting.

bgp scan-rib disable

no bgp scan-rib disable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Timely scan and update is enabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide N/A

Configuration The following example configures the timely scan for the BGP protocol.

Examples FS(config-router)# bgp scan-rib disable

Related Commands	Command	Description
	bgp scan-time	Configures the interval for the BGP timely scan.

Platform

Description None

5.65 **bgp scan-time**

Use this command to configure the interval for the BGP timely scan. Use the **no** form of this command to restore the default setting.

bgp scan-time time

no bgp scan-time

Parameter	Parameter	Description
Description	time	Interval of the timely scan, in the range from 5 to 60 in the unit of seconds

Defaults The default is 60.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode or BGP Scope configuration mode.

Usage Guide This command is used to configure the interval for the BGP timely scan; it takes effect when bgp scan-rib enable is configured.

Configuration The following example configures the interval for the BGP timely scan.

Examples FS(config-router)# bgp scan-time 30

Related Commands	Command	Description
	bgp scan-rib enable	Enables timely scan of the routing table by BGP.

Platform

Description None

5.66 **bgp shutdown**

Use this command to shut down all BGP connections.

bgp shutdown

Use this command to shut down all BGP connections gracefully.

bgp shutdown graceful [**community** value] [**delay** time]

Use the **no** form or **default** form of this command to restore the default settings.

no bgp shutdown

default bgp shutdown

Parameter Description	Parameter	Description
	graceful	Shuts down BGP connections gracefully.
	community value	Indicates the community value carried in the route sent to the neighbor. Format: AA:NN or a number in the range of 0 to 4,294,967,295.
	delay time	Indicates the delay time (in seconds) for shutting down BGP connections. The value range is from 1 to 65,535.

Defaults By default, the BGP connections are not shutted down.

Command Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide This command will shut down the effective connections created by BGP and delete all the routes information. If you enable the function on BGP configuration mode or BGP scope global configuration mode, all the BGP connections will be shutted down.

If you enable the function on BGP IPv4 VRF address family configuration mode or BGP IPv6 VRF address family configuration mode, all the BGP connections on the corresponding VRF will be shutted down.

The feature enables the device to advertise a route with the lowest priority (the value of **local-preference** is 0 or the value of **med** is 4,294,967,295) to a neighbor and carry the **gshut community** attribute in the route so that the neighbor updates routes and switch traffic to a backup link or other equivalent links in advance. The device shuts down the BGP connection with the neighbor after a period of time.

Configuration The following example disables BGP connections globally.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp shutdown
```

The following example disables global BGP connections gracefully.

```
FS(config)# router bgp 65000
FS(config-router)# bgp shutdown graceful
```

Platform Description N/A

5.67 **bgp sourced-paths**

Use this command to enable the function of importing routes with multiple paths or next hops from other protocol modules. Use the **no** form of this command to disable the function of importing routes with multiple paths or next hops from other protocol modules. Use the **default** form of this command to restore the default settings.

bgp sourced-paths protocol-type all

no bgp sourced-paths protocol-type all

default bgp sourced-paths protocol-type all

Parameter Description	Parameter	Description
	protocol-type	Source protocol type of a redistributed route: <ul style="list-style-type: none"> ● connected ● static ● rip ● ospf ● isis ● arp-host (host route converted by ARP) ● nd-route(route converted by ND) ● aggregate (aggregation route)

Defaults Only routes with a single path or next hop can be imported from other protocol modules by default.

Command Mode BGP configuration mode, BGP IPv4 Unicast/VRF address family configuration mode, BGP IPv6 Unicast/VRF address family configuration mode, BGP scope global configuration mode

Default Level 14

Usage Guide This command needs to be used together with the redistribution command to import routes with multiple next hops from other protocols to BGP.

Configuration The following example enables the function of importing static routes with multiple paths or next hops.

```

Examples
FS(config)# router bgp 65000
FS(config-router)# bgp sourced-paths static all
    
```

Verification Run the **show running-config** command to display the BGP configurations.

5.68 **bgp tcp-source-check disable**

Use this command to configure BGP's TCP source check function. Use **no** form of this command to disable this function.

bgp tcp-source-check disable

no bgp tcp-source-check disable

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
-	-

Defaults This function is enabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide After TCP source check function is disabled, all TCP connection requests will be received. After TCP connection is established, if no neighbor peer is configured on the local device, Notification packet will be send to refuse the BGP connection.

Configuration Examples The following example configures BGP's TCP source check function.

```
FS(config)# router bgp 65000
FS(config-router)# bgp tcp-source-check disable
```

Configuration Examples	Command	Description
	router bgp	Enables BGP protocol.

Platform N/A

Description

5.69 bgp timer accuracy-control

Use this command to configure BGP's internal timer accuracy control. Use **no** form of this command to restore the default setting.

bgp timer accuracy-control
no bgp timer accuracy-control

Parameter Description	Parameter	Description
	-	-

Defaults This function is disabled by default.

Command Mode BGP configuration mode/BGP scope global configuration mode

Usage Guide By default, a deviation from the given time will occur on the BGP protocol's timer to prevent concurrent overtime of many timers. You can use this command to configure BGP protocol's timer to strictly implement the given time. It is recommended disabling this function unless necessary.

Configuration The following example configures BGP's internal timer accuracy control.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# bgp timer accuracy-control
```

Configuration Examples

Command	Description
router bgp	Enables BGP protocol.

Platform N/A

Description

5.70 bgp update-delay

Use this command to set the maximum delay time of the BGP Speaker before sending the first updating information to neighbors. The **no** form of the command restores it to the default value. During the BGP graceful-restart, this command is used to update the delay time.

bgp update-delay delay-time

no bgp update-delay

Parameter Description

Parameter	Description
delay-time	Maximum delay time of the BGP Speaker before sending its route updating information, in the range from 0 to 3600 in the unit of seconds, 120 seconds by default. For BGP graceful-restart, it is the maximum time of waiting to receive the EOR message of all neighbors, in the range from 1 to 3600 in the unit of seconds.

Defaults The default is 120.

Command

Mode BGP configuration mode/BGP scope global configuration mode

With the BGP starting up, it first waits some time to connect with its neighbors, and then sends the updating message to these neighbors. After connecting with neighbors, the BGP does not send the updating message to them immediately, but waits some time to receive the updating routing message from all neighbors and then performs routing optimization calculation and finally advertises the route updating message to its neighbors, which improves the convergence time and reduces the calculation consumption. If the software sends the route updating information to its neighbors immediately, it may send the information again when it receives more optimized routes from other neighbors.

Usage Guide

The **bgp update-delay** command is used to adjust the initial waiting time of the software, which is the maximum time, from establishing the connection with the first neighbor to performing the routing optimization calculation and sending the route advertisement. When the BGP graceful-restart is enabled, this command is also used to set the maximum waiting time to receive EOR messages from all neighbors. You can increase this value if there are many neighbors or the routing information of the neighbors is huge. If the number of neighbors is 100 and the average amount of routes is 5000, the update sending time that each neighbor completes all the routing is 1 second, then the update of all the routing needs 100 seconds; if the

number of neighbors increases to 200, the Update Delay time can be set to 240 seconds, ensuring that all the routing can be updated with the Update Delay period. The specific time is also related to data transmission rate.

The following example sets the update-delay time to 200 seconds.

Configuration

```
FS(config)# router bgp 500
```

Examples

```
FS(config-router)# bgp graceful-restart
```

```
FS(config-router)# bgp update-delay 200
```

Related

Commands

Command	Description
bgp graceful-restart	Enables the BGP graceful-restart.

Platform

Description

None

5.71 bgp update-rate

Use this command to set the maximum routes number sent by BGP Speaker per second. Use the **no** or **default** form of this command to restore the default settings.

bgp update-rate route-number

no bgp update-rate

default bgp update-rate

Parameter

Description

Parameter	Description
route-number	Indicates the maximum routes number sent by BGP Speaker per second. The range is from 10 to 4294967295.

Defaults

The function is disabled by default.

Command

Mode

BGP configuration mode/ BGP scope global configuration mode.

Usage Guide

By default, BGP will directly calculate the routes which it receives and send the routes to the delivery queue of each neighbor, Run **bgp update-rate** command to set the maximum routes number. For example, if the maximum routes can be sent per second is 100 routes, and the BGP route table contains 200 routes, then the 200 routes will be sent to the delivery queue of its neighbor by two times analysis (Refers to the analysis on route sending, for example, 100 routes exist, but only 80 routes in it are suitable for sending).

Configuration

Examples

The following example set the maximum routes number sent by BGP Speaker per second to 100.

```
FS(config)# router bgp 500
```

```
FS(config-router)# bgp update-rate 100
```

Related

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform

Description N/A

5.72 bgp upgrade-cli

Use this command to set the BGP CLI display mode. Use the **no** or **default** form of this command to restore the default settings.

bgp upgrade-cli { af-mode | scope-mode }

no bgp upgrade-cli { af-mode | scope-mode }

default bgp upgrade-cli { af-mode | scope-mode }

Parameter Description

Parameter	Description
af-mode	CLI is displayed in address family configuration mode.
scope-mode	CLI is displayed in scope configuration mode.

Defaults

The default is **af-mode**. When you execute the **scope** command, the display mode is switched to scope configuration mode automatically.

Command

Mode BGP configuration mode, BGP scope global configuration mode.

Usage Guide

When the display mode is switched to the scope global configuration mode, all CLI commands will be displayed either in the scope configuration mode or the address-family mode that under the scope configuration mode.

Configuration Examples

The following example sets the scope global configuration mode as the BGP CLI display mode.

```
FS(config)# router bgp 500
FS(config-router)# bgp upgrade-cli scope-mode
```

Related Commands

Command	Description
N/A	N/A

Platform

Description N/A

5.73 bmp server

Use this command to configure the bmp server example and enter the bmp configuration mode. Use the **no** form of this command to close the bmp server example. Use the **default** form of this command to restore the default settings.

bmp server server-number

no bmp server server-number

default bmp server server-number

Parameter	Description
server-number	Configures the example number of bmp monitoring server. Range: 1-8.

Defaults The default BMP protocol is closed.

Command

Mode Global configuration mode

Default Level 14

Usage Guide Use this command to enable the BMP protocol

Enable the BMP protocol and specify the example number.

Configuration

Examples

```
FS(config)# bmp server 1
```

```
FS(config-bmpsvr)#
```

Verification Run the **show running-config** command to check the BGP configuration.

5.74 clear bgp advertise lowest-priority on-startup

Use this command to restore the priority of advertised routes.

clear bgp [instance as-num] advertise lowest-priority on-startup

Parameter	Description
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide Run **bgp advertise lowest-priority on-startup** command to adjust the priority of advertised routes to the lowest upon device restart. Run **clear bgp advertise lowest-priority on-startup** command to restore the priority of

advertised routes.

Configuration N/A

Examples

Platform N/A

Description

5.75 clear bgp all

Use this command to reset all BGP address-families. The content to be reset depends on the further parameters .

clear bgp [**instance** as-num] **all** [as number] [**soft**] [**in** | **out**]

Parameter Description

Parameter	Description
none parameter	Resets peer sessions in all address-families.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
as-number	Resets sessions with all members in the specified AS. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
in	Resets the received routing information.
out	Resets the redistributed routing information.
soft	Soft-resets all routing information received/sent from/to the specified peer.
soft in	Soft-resets the received routing information.
soft out	Soft-resets the distributed routing information.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to reset sessions of all supported address-families, including the vrf session in every address-family.

Configuration

Examples N/A

Related

Command	Description
---------	-------------

clear bgp ipv4 unicast	Resets the IPv4 unicast address-family.
-------------------------------	---

Platform

Description None

5.76 clear bgp all peer-group

Use this command to reset BGP's specific peer group. The reset content is determined by further parameters.

clear bgp [instance as-num] all peer-group peer-group-name [soft] [in | out]

**Parameter
Description**

Parameter	Description
peer-group-name	Resets a specific peer group.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
in	Resets received route information.
out	Resets allocated route information.
soft	Soft-resets received and sent route information.
soft in	Soft-resets received route information.
soft out	Soft-resets allocated route information.

Defaults -

Command Mode Privileged EXEC mode

Usage Guide This command will reset replies of all supported address families, including reply connection included in vrf in each address family.

Configuration Examples -

Configuration Examples

Command	Description
clear bgp ipv4 unicast	Resets BGP's IPv4 unicast address families.

Platform -

Description

5.77 clear bgp all update-group

Use this command to reset sessions of all members in an update-group.

clear bgp [**instance** as-num] **all update-group** [update-group-index | peer-address] [**soft**] [**in** | **out**]

Parameter Description	Parameter	Description
	update-group-index	Specifies the index of an update-group, in which the sessions of members need to be reset.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	peer-address	Specifies the update-group, to which a peer whose session needs to be reset belongs.
	-	Resets BGP sessions directly if no option is carried.
	in	Resets received routing information.
	out	Resets distributed routing information.
	soft	Soft-resets sent and received routing information.
	soft in	Soft-resets received routing information.
	soft out	Soft-resets distributed routing information.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to reset BGP sessions of all members in an update-group.

Configuration Example The following example resets routing information received by all peers in an update group to which the peer with the IP address of 1.1.1.1 belongs.

```
FS# clear bgp all update-group 1.1.1.1 in
```

5.78 clear bgp ipv4 unicast

Use this command to reset BGP IPv4 unicast address families. The reset content is determined by further parameters.

clear bgp [**instance** as-num] **ipv4 unicast** [**vrf** vrf-name] { * | as-number | neighbor-address } [**soft**] [**in** | **out**]

Parameter Description	Parameter	Description
	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	*	Resets all peer group sessions under address families.

as-number	Resets sessions with all members in the specified AS.
neighbor-address	Resets sessions with the specified peer.
in	Resets received route information.
out	Resets allocated route information.
soft	Soft-resets received and sent route information.
soft in	Soft-resets received route information.
soft out	Soft-resets allocated route information.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide This command is the same as **clear ip bgp** in terms of the function and parameters.

Configuration N/A

Examples

Configuration

Examples

Command	Description
N/A	N/A

Platform N/A

Description

5.79 clear bgp ipv4 unicast dampening

Use this command to clear the flap information and disable route dampening.

clear bgp [instance as-num] ipv4 unicast [vrf vrf-name] dampening [ip-address [mask]]

Parameter
Description

Parameter	Description
vrf-name	VRF instance name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
-	Clears the flap information of all routes.
address	IP address
mask	Mask

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide

This command is used to clear the BGP route dampening information and release suppressed routes. This command can be used to restart the BGP route dampening.

Configuration

The following example clears the flap information and disables route dampening.

Examples

```
FS# clear ip bgp dampening 192.168.0.0 255.255.0.0
```

Related Commands

Command	Description
show ip bgp dampening dampened-paths	Displays the suppressed routing information.
bgp dampening	Enables the route dampening and sets the dampening parameters.

Platform

Description

None

5.80 clear bgp ipv4 unicast external

Use this command to reset all EBGp connections.

clear bgp [instance as-num] ipv4 unicast [vrf vrf-name] external [soft] [in | out]

Parameter Description

Parameter	Description
vrf-name	VRF name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
in	Resets received route information.
out	Resets allocated route information.
soft	Soft-resets all routing information received/sent from/to the specified peer.
soft in	Soft-resets the received routing information.
soft out	Soft-resets the distributed routing information.

Defaults

N/A

Command

Mode

Privileged EXEC mode

Usage Guide

This command is used to reset the specified external BGP connection.

Configuration

The following example resets all EBGp connections.

Examples

```
FS# clear bgp ipv4 unicast external in
```


	Command	Description
Related Commands	clear ip bgp	Resets the BGP session.
	show ip bgp neighbors	Displays the neighbor information.

Platform**Description** None**5.81 clear bgp ipv4 unicast flap-statistics**

Use this command to clear the route flap information.

clear bgp [instance as-num] ipv4 unicast [vrf vrf-name] flap-statistics [address [mask]]

	Parameter	Description
Parameter Description	vrf-name	VRF name.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	-	Clears all route flap information
	address	IP address
	mask	Mask

Defaults N/A**Command****Mode** Privileged EXEC mode

Usage Guide This command can be used only to clear the statistics of unsuppressed routes. It does not release the suppressed routes. To clear all route statistics and release the suppressed routes, run the **clear ip bgp dampening** command.

Configuration The following example clears the route flap information.

Examples FS# clear bgp ipv4 unicast flap-statistics

	Command	Description
Related Commands	bgp dampening	Enables the route dampening function and sets dampening parameters.
	show ip bgp	Displays the BGP route entry.

Platform**Description** None

5.82 clear bgp ipv4 unicast peer-group

Use this command to reset the session with all members in the peer group.

clear bgp [instance as-num] ipv4 unicast [vrf vrf-name] peer-group peer-group-name [soft] [in | out]

Parameter Description

Parameter	Description
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
peer-group-name	Name of the peer group
in	Resets received route information.
out	Resets allocated route information.
soft	Soft-resets all routing information received/sent from/to the specified peer.
soft in	Soft-resets for the received routing information.
soft out	Soft-resets the distributed routing information.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage

Guide This command resets the BGP session with all members in the peer group.

Configuration The following example resets the session with all members in the peer group.

Examples FS# clear bgp ipv4 unicast peer-group my-group in

Related Commands

Command	Description
clear ip bgp	Resets the BGP session.
show ip bgp	Displays the BGP route entry.

Platform

Description None

5.83 clear bgp ipv4 unicast table-map

Use this command to update the table-map setting under the IPv4 unicast address family of BGP.

clear bgp [instance as-num] ipv4 unicast [vrf vrf-name] table-map

Parameter

Parameter	Description
-----------	-------------

Description	
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults -

Command Mode Privileged EXEC mode

Usage Guide Re-apply table-map setting and update allocated core route table information.

Configuration -

Examples

Parameter Description	Command	Description
	clear ip bgp	Resets BGP's IPv4 unicast address families.

Platform -

Description

5.84 clear bgp ipv4 unicast update-group

Use this command to reset sessions of all members in an update-group in the IPv4 unicast address family.

clear bgp [**instance** as-num] **ipv4 unicast** [**vrf** vrf-name] **update-group** [update-group-index | peer-address] [**soft**] [**in** | **out**]

Parameter Description	Parameter	Description
	vrf-name	Specifies the name of a VRF instance. A global VRF instance is used if no VRF instance name is entered.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	update-group-index	Specifies the index of an update-group, in which the sessions of members need to be reset.
	peer-address	Specifies the update-group, to which a peer whose session needs to be reset belongs.
	-	Resets BGP sessions directly if no option is carried.
	in	Resets received routing information.

out	Resets distributed routing information.
soft	Soft-resets sent and received routing information.
soft in	Soft-resets received routing information.
soft out	Soft-resets distributed routing information.

Command Privileged EXEC mode

Mode

Default Level 14

Usage Guide This command is used to reset BGP sessions of all members in an update-group in the IPv4 unicast address family.

Configuration Example The following example resets routing information received by all peers in an update group to which the peer with the IP address of 1.1.1.1 in the IPv4 unicast address family belongs.

```
FS# clear bgp ipv4 unicast update-group 1.1.1.1 in
```

5.85 clear bgp ipv6 unicast

Use this command to reset BGP's IPv6 unicast address families.

clear bgp [**instance** as-num] **ipv6 unicast** [**vrf** vrf-name] { * | as-number | neighbor-address } [**soft**] [**in** | **out**]

Parameter Description

Parameter	Description
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
*	Resets all peer group sessions under address families.
as-number	Resets sessions with all members in the specified AS. In 10.4(3) or a later version, adds support for 4-byte AS numbers. The new AS number ranges from 1 to 4294967295, or 1 and 65535.65535 in the dotted mode.
neighbor-address	Resets sessions with the specified peer.
in	Resets received route information.
out	Resets allocated route information.
soft	Soft-resets received and sent route information.
soft in	Soft-resets received route information.
soft out	Soft-resets allocated route information.

Defaults -

Command Privileged EXEC mode

Mode

Usage Guide The function is similar with **clear bgp ipv4 unicast**, but applies to different address families.

Configuration -

Examples

Configuration

Examples

Command	Description
clear bgp ipv4 unicast	Resets BGP's IPv4 unicast address families.

Platform -

Description

5.86 clear bgp ipv6 unicast dampening

Use this command to clear flap information and disable route dampening.

clear bgp [instance as-num] ipv6 unicast [vrf vrf-name] dampening [ip-address [mask]]

Parameter

Description

Parameter	Description
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
-	Clears all routes' flap information.
ip-address	IP address
mask	Mask code

Defaults -

Command Privileged EXEC mode

Mode

Usage Guide You can use this command to clear BGP's route flap information and disable route dampening. The command can restart BGP's route flap.

Configuration The following example clears flap information and disables route dampening.

Examples

```
FS# clear bgp ipv6 unicast dampening 192.168.0.0 255.255.0.0
```

Configuration Examples	Command	Description
	bgp dampening	Enables the route dampening function and sets dampening parameters.

Platform -

Description

5.87 clear bgp ipv6 unicast external

Use this command to reset all EBGp connection of IPv6 unicast address families.

clear bgp [instance as-num] ipv6 unicast [vrf vrf-name] external [soft] [in | out]

Parameter Description	Parameter	Description
	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	in	Resets received route information.
	out	Resets allocated route information.
	soft	Soft-resets received and sent route information.
	soft in	Soft-resets received route information.
	soft out	Soft-resets allocated route information.

Defaults -

Command Mode Privileged EXEC mode

Usage Guide You can use this command to reset all the specified external BGP connection.

Configuration Examples The following example resets all EBGp connection of IPv6 unicast address families.

```
FS# clear bgp ipv6 unicast external in
```

Configuration Examples	Command	Description
	clear ip bgp	Resets BGP sessions.
	show ip bgp neighbors	Displays BGP neighbors' information.

Platform -

Description

5.88 clear bgp ipv6 unicast flap-statistics

Use this command to clear IPv6 unicast address families' route flap statistics.

clear bgp [**instance** as-num] **ipv6 unicast** [**vrf** vrf-name] **flap-statistics** [address [mask]]

Parameter Description	Parameter	Description
	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	-	Clears all route information's flap information.
	address	IP address
	mask	Mask code

Defaults -

Command Mode Privileged EXEC mode

Usage Guide This command can only clear statistics of routes that are not damped and will not relieve damped routes. To clear statistics of all route information and relieve damped routes, use the **clear bgp ipv4 unicast dampening** command.

Configuration Examples The following example clears IPv6 unicast address families' route flap statistics.

```
FS# clear bgp ipv6 unicast flap-statistics
```

Configuration Examples	Command	Description
	bgp dampening	Enables the route dampening function and sets dampening parameters.
	show ip bgp	Displays BGP route entries.

Platform Description -

5.89 clear bgp ipv6 unicast peer-group

Use this command to reset sessions with all members in the peer group.

clear bgp [**instance** as-num] **ipv6 unicast** [**vrf** vrf-name] **peer-group** peer-group-name [**soft**] [**in** | **out**]

Parameter Description	Parameter	Description
	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	peer-group-name	Peer group name
	in	Resets received route information.
	out	Resets allocated route information.
	soft	Soft-resets received and sent route information.
	soft in	Soft-resets received route information.
	soft out	Soft-resets allocated route information.

Defaults -

Command Privileged EXEC mode

Mode

Usage Guide Use this command to reset BGP sessions with all members in the peer group.

Configuration The following example resets sessions with all members in the peer group.

Examples FS# clear bgp ipv6 unicast peer-group my-group in

Configuration Examples	Command	Description
	clear ip bgp	Resets BGP sessions.
	show ip bgp	Displays BGP route entries.

Platform -

Description

5.90 clear bgp ipv6 unicast table-map

Use this command to update the table-map setting under the IPv6 unicast address family of BGP.

clear bgp [instance as-num] ipv6 unicast [vrf vrf-name] table-map

Parameter Description	Parameter	Description
	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is

	from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
--	--

Defaults -

Command Privileged EXEC mode

Mode

Usage Guide -

Configuration -

Examples

	Command	Description
Configuration Examples	<code>clear ip bgp</code>	Resets BGP's IPv4 unicast address families.

Platform -

Description

5.91 clear bgp ipv6 unicast update-group

Use this command to reset sessions of all members in an update-group in the IPv6 unicast address family.

clear bgp [**instance** as-num] **ipv6 unicast** [**vrf** vrf-name] **update-group** [update-group-index | neighbor-address] [**soft**] [**in** | **out**]

	Parameter	Description
Parameter Description	vrf-name	Specifies the name of a VRF instance. A global VRF instance is used if no VRF instance name is entered.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	update-group-index	Specifies the index of an update-group, in which the sessions of members need to be reset.
	neighbor-address	Specifies the update-group, to which a peer whose session needs to be reset belongs.
	-	Resets BGP sessions directly if no option is carried.
	in	Resets received routing information.
	out	Resets distributed routing information.
	soft	Soft-resets sent and received routing information.
	soft in	Soft-resets received routing information.
	soft out	Soft-resets distributed routing information.

Command Privileged EXEC mode
Mode

Default Level 14

Usage Guide This command is used to reset BGP sessions of all members in an update-group in the IPv6 unicast address family.

Configuration Example The following example resets routing information received by all peers in an update group to which the peer with the IP address of 1111::1111 in the IPv6 unicast address family belongs.

```
FS# clear bgp ipv6 unicast update-group 1111::1111 in
```

5.92 clear bmp

Use this command to reset the BGP protocol. The reset content is determined by consequent parameters.

clear bmp { all | server server-number }

Parameter	Description
all	Resets all BMP servers
server-number	Resets the specified BMP servers. Range: 1-8.

Defaults N/A

Command Mode Privileged mode

Usage Guide Use this command to disconnect from the BMP server and then reconnect to it.

5.93 clear ip bgp

Use this command to reset the BGP session.

clear ip bgp [instance as-num] [vrf vrf-name] { * | as-number | neighbor-address } [soft] [in | out]

Parameter	Description
vrf-name	VRF name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
*	Resets all the current BGP sessions and the OVERFLOW status of BGP ipv4 unicast address family.
neighbor-address	Resets the BGP session with the specified peer (IPv4 or IPv6).

as number	Resets sessions with all members in the specified AS. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
in	Reset the received routing information.
out	Reset the redistributed routing information.
soft	Soft-reset all routing information received/sent from/to the specified peer
soft in	Soft-reset the received routing information.
soft out	Soft-reset the distributed routing information.

Defaults N/A

Command

Mode Privileged EXEC mode

At any time, once the routing policy or BGP configuration changes, an effective way must be available to implement the new routing policy or configuration. Traditional measure is to close the BGP connection and establish a new one.

This product supports implementing a new routing strategy without closing the BGP session connection by soft-resetting BGP.

Usage Guide

For the peer that does not support the route refresh function, you may run the **neighbor soft-reconfiguration inbound** command to keep a copy of original routing information of every specified BGP peer on the local BGP speaker. This will consume some resources.

You can use the **show ip bgp neighbors** command to see whether the BGP peer supports the route refresh function. If it is supported, you need not to execute the **neighbor soft-reconfiguration inbound** command when the inbound routing strategy changes.

All connected BGP routers must support the route refresh function to execute this command. This product supports the route refresh function.

Configuration The following example resets the BGP session.

Examples

```
FS# clear bgp ipv4 unicast *
```

Related Commands

Command	Description
neighbor soft-reconfiguration inbound	(Optional) Restarts the BGP session and reserves the unchanged route information sent by the BGP peer (group).
show ip bgp	Displays the BGP route entry.

Platform

Description None

5.94 clear ip bgp dampening

Use this command to clear the dampening information and disable route dampening.

clear ip bgp [**instance** as-num] [**vrf** vrf-name] **dampening** [ip-address [mask]]

Parameter Description

Parameter	Description
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
address	IP address
mask	Mask

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to clear the BGP route flap information and disable route dampening. This command can be used to restart BGP route dampening.

Configuration

The following example clears the dampening information and disables route dampening.

Examples

```
FS# clear ip bgp dampening 192.168.0.0 255.255.0.0
```

Related Commands

Command	Description
show ip bgp dampening dampened-paths	Displays the suppressed routing information.
bgp dampening	Enables the route dampening function and sets dampening parameters.

Platform

Description None

5.95 clear ip bgp external

Use this command to reset all EBGp connections.

clear ip bgp [**instance** as-num] [**vrf** vrf-name] **external** [**soft**] [**in** | **out**]

Parameter Description

Parameter	Description
vrf-name	VRF name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS

	notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
in	Reset the received routing information.
out	Reset the redistributed routing information.
soft in	Soft-resets the received routing information.
soft out	Soft-resets the distributed routing information.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command is used to reset the specified external BGP connection.

Configuration The following example resets all EBGp connections.

Examples FS# clear ip bgp external in

Related Commands

Command	Description
clear ip bgp	Resets the BGP session.
show ip bgp neighbors	Displays the neighbor information.

Platform

Description None

5.96 clear ip bgp flap-statistics

Use this command to clear the routes vibration statistics of the IPv4 unicast address family.

clear ip bgp [instance as-num] [vrf vrf-name] flap-statistics [ip-address [mask]]

Parameter Description

Parameter	Description
vrf-name	VRF name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
address	IP address
Mask	Mask

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command can be used only to clear statistics of unsuppressed routes. It does not release the suppressed routes. To clear all route statistics and release the suppressed routes, run the **clear ip bgp dampening** command.

Configuration The following example clears the routes vibration statistics of the IPv4 unicast address family.

Examples

```
FS# clear ip bgp flap-statistics
```

Related Commands

Command	Description
bgp dampening	Enables the route dampening function and sets dampening parameters.
show ip bgp	Displays the BGP route entry.

Platform

Description None

5.97 clear ip bgp peer-group

Use this command to reset the session with all members in the peer group.

clear ip bgp [instance as-num] [vrf vrf-name] peer-group peer-group-name [soft] [in | out]

Parameter Description

Parameter	Description
vrf-name	VRF name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
peer-group-name	Name of the peer group
in	Reset the received routing information.
out	Reset the redistributed routing information.
soft	Soft-resets all routing information received/sent from/to the specified peer
soft in	Soft-resets the received routing information.
soft out	Soft-resets the distributed routing information.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command resets the BGP session with all members in the peer group.

Configuration The following example resets the session with all members in the peer group.

Examples

```
FS# clear ip bgp peer-group my-group in
```

	Command	Description
Related Commands	clear ip bgp	Resets the BGP session.
	show ip bgp	Displays the BGP route entry.

Platform

Description None

5.98 clear ip bgp table-map

Use this command to update the table-map's route information applied by IPv4 unicast address family.

clear ip bgp [instance as-num] [vrf vrf-name] table-map

	Parameter	Description
Parameter Description	vrf-name	vrf name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command is used to update the route information of the applied table-map.

Configuration The following example updates the table-map's route information applied by IPv4 unicast address family.

Examples FS# clear ip bgp table-map

	Command	Description
Related Commands	clear ip bgp	Resets the BGP session.
	show ip bgp	Displays the BGP route entry.

Platform

Description None

5.99 clear ip bgp update-group

Use this command to reset sessions of all members in an update-group in the IPv4 unicast address family.

clear ip bgp [instance as-num] [vrf vrf-name] update-group [update-group-index | neighbor-address] [soft] [in | out]

Parameter Description	Parameter	Description
	vrf-name	Specifies the name of a VRF instance. A global VRF instance is used if no VRF instance name is entered.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	update-group-index	Specifies the index of an update-group, in which the sessions of members need to be reset.
	neighbor-address	Specifies the update-group, to which a peer whose session needs to be reset belongs.
	-	Resets BGP sessions directly if no option is carried.
	in	Resets received routing information.
	out	Resets distributed routing information.
	soft	Soft-resets sent and received routing information.
	soft in	Soft-resets received routing information.
	soft out	Soft-resets distributed routing information.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to reset BGP sessions of all members in an update-group in the IPv4 unicast address family.

Configuration Example The following example resets routing information received by all peers in an update group to which the peer with the IP address of 1.1.1.1 in the IPv4 unicast address family belongs.

```
FS# clear ip bgp update-group 1.1.1.1 in
```

5.100 default-information originate

Use this command to enable BGP to distribute the default route. Use the **no** form of this command to restore the default setting.

default-information originate

[no] default-information originate

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP Scope configuration mode

This command is used to control whether the redistributed default route is effective, and this command needs to be configured together with the **redistribute** command. It takes effect only when a default route exists in the redistributed route.

Usage Guide

This command is similar to the **network** command. The difference is that in the process of configuring the former, the **redistribute** command must be configured explicitly to redistribute the default route, only in this case, the redistributed default route is effective. For the later command, the IGP must have the default route.

Configuration

The following example enables BGP to distribute the default route.

Examples

```
FS(config-router)# default-information originate
```

Related Commands

Command	Description
network	Configures routes to be advertised.
redistribute	Redistributes routes of other protocol.

Platform

Description None

5.101 default-metric

Use this command to set the metric for route redistribution. Use the **no** form of this command to restore the default setting.

default-metric number

no default-metric

Parameter

Parameter	Description
number	Metric number, in the range from 1 to 4294967295

Description

Defaults

No metric is set by default.

Command

BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address

Mode

family configuration mode, BGP Scope configuration mode

Usage Guide

This command sets the metric of routes to be redistributed for integrity. The metric set by the command cannot cover that set by the redistribute metric command. The value is 0 when the default metric applies to redistributed connected routes.

Configuration

The following example sets the metric for route redistribution.

Examples

```
FS(config-router)# default-metric 45
```

Related Commands

Command	Description
redistribute	Redistributes routes of other protocol.

Platform

None

Description

5.102 description

Use this command to set the description for BMP instance. Use the **no** form of this command to delete the description or the **default** form of this command to restore the default settings.

description text

no description

default description

Parameter	Parameter	Description
Description	text	Text to describe the BMP instance, up to 80 characters allowed.

Defaults The function is disabled by default.

Command

Mode BMP configuration mode

Usage Guide The command is used to add description to bmp instance, so as to help users remember the features of the bmp instance.

Configuration Examples The following example sets the description for bmp instance.

```
FS(config)# bmp server 1
FS(config-bmpsrvr)# description test
```

Related Commands	Command	Description
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Platform

Description None

5.103 distance bgp

Use this command to set different management distances for different types of BGP routes. Use the **no** form of this command to restore the default setting.

distance bgp external-distance internal-distance local-distance

no distance bgp

Parameter	Parameter	Description
Description	external-distance	Route management distance learned from EBGP peers, in the range from 1 to 255
	internal-distance	Route management distance learned from IBGP peers, in the range from 1 to 255
	local-distance	Specifies the management distance of route learned from peers. However, the optimal one can be learned from the IGP. In general,

	these routes are indicated by the Network Backdoor command. The value is in the range from 1 to 255
--	--

Defaults

The parameter defaults are as follows:
 external-distance - 20
 internal-distance - 200
 local-distance - 200

Command

Mode BGP configuration mode/BGP scope global configuration mode

It is not recommended to change the management distance of the BGP route. If it is necessary, observe the following points:

Usage Guide

- The management distance of "external-distance" must be shorter than those of other IGP routing protocols (such as OSPF and RIP);
- The internal-distance and local-distance should have longer management distances than other IGP routing protocols.

Configuration

The following example sets different management distances for different types of BGP routes.

Examples

```
FS(config-router)# distance bgp 20 20 200
```

Related Commands

Command	Description
neighbor soft-reconfiguration inbound	Restarts the BGP session and reserves the unchanged route information sent by the BGP peer (group).
show ip bgp	Displays the BGP route entry.

Platform

Description None

5.104 exit-address-family

Use this command to exit BGP address-family configuration mode.

exit-address-family

Parameter

Parameter	Description
N/A	N/A

Description

Defaults N/A

Command

Mode BGP address-family configuration mode

Usage Guide

This command can be used to exit from various address-family modes of BGP to BGP configuration mode.

Configuration The following example exits the BGP address-family configuration mode.

Examples FS(config-router-af)#exit-address-family

Related Commands	Command	Description
	address-family ipv4	Enters IPv4 address family configuration mode.

Platform
Description None

5.105 failure-retry-delay

Use this command to configure the interval to reconnect to the BMP server. Use the **default** form of this command to restore the default settings.

failure-retry-delay seconds
no failure-retry-delay
default failure-retry-delay

Parameter	Parameter	Description
Description	seconds	Interval to reconnect to the BMP server, in the range of 30 to 720 seconds.

Defaults No interval is configured by default.

Command Mode BMP configuration mode.

Default Level 14

Usage Guide

Configuration The following example configures the interval as 60 seconds.

Examples FS(config)# bmp server 1
 FS(config-bmpsrvr)# failure-retry-delay 60

Verification Run the **show running-config** command to display the configurations.

1.1 import path selection

Use this command to configure the route import policy. Use the **no** form of this command to delete the route import policy. Use the **default** form of this command to restore the default settings.

import path selection { **all** | **bestpath** | **multipath** }
no import path selection
default import path selection

Parameter	Parameter	Description
Description	all	Imports all routes with next hops.

bestpath	Imports routes with preferred next hops. By default, only routes with preferred next hops are imported.
multipath	Imports routes with preferred and equivalent next hops.

Defaults Only routes with preferred next hops are imported by default.

Command Mode BGP configuration mode, BGP IPv4 Unicast/VRF address family configuration mode, BGP IPv6 Unicast/VRF address family configuration mode, or BGP Scope configuration mode

Default Level 14

Usage Guide This command can be used to control inter-VRF route import, L3VPN remote routes import to VRF routes import to the IP route table.

Configuration The following example imports routes with all next hops to the global IPv4 route table.

Examples

```
FS(config)# router bgp 65530
FS(config-router)# import path selection all
```

Verification Run the **show running-config** command to display the BGP configurations.

1.2 maximum-paths

Use this command to configure the number of equivalent paths of the EBGP/IBGP multipath load balancing function. Use the **no** form of this command to disable the EBGP/IBGP multipath load balancing function. Use the **default** form of this command to restore the default settings.

maximum-paths { ebgp | ibgp } number
no maximum-paths { ebgp | ibgp }
default maximum-paths { ebgp | ibgp }

Parameter Description	Parameter	Description
	ebgp	Specifies the number of equivalent paths of the EBGP multipath load balancing function.
	ibgp	Specifies the number of equivalent paths of the IBGP multipath load balancing function.
	number	Indicates the maximum number of equivalent paths. The minimum value is 1 , and the maximum value depends on the device capability. If the value is 1 , the EBGP multipath load balancing function is disabled.

Defaults Equivalence of multiple BGP paths is not supported by default.

Command Mode BGP configuration mode, BGP IPv4 Unicast address family configuration mode, BGP IPv6 Unicast address family configuration mode, BGP Scope configuration mode

Default Level	14
Usage Guide	The maximum-paths ebgp command is also used to configure equivalence of confederation EBGp multiple paths and local inter-VRF import routes.
	IBGP and EBGp routes cannot form equivalent routes.
Configuration Examples	<p>The following example configures EBGp load balancing and sets the maximum number of equivalent routes to 2.</p> <pre>FS(config)# router bgp 65530 FS(config-router)# maximum-paths ebgp 2</pre>
Verification	Run the show running-config command to display the BGP configurations.

5.106 maximum-prefix

Use this command to limit the maximum number of prefixes in the routing database in the address family. Use the **no** form of this command to restore the default setting.

maximum-prefix maximum

no maximum-prefix

Parameter Description	Parameter	Description
	maximum	The maximum number of prefixes in the routing database in the address family, in the range from 1 to 4294967295

Defaults The default maximum numbers of prefixes in the routing database are not limited.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

In a BGP address family, routing prefixes may be introduced through redistribution or learnt from neighbors, or other VRFs. Once routing prefixes in the BGP address family reaches the maximum number, this address family will enter to the overflow state.

Use the **show bgp { addressfamily | all } summary** command to display the state of routing database.

It is necessary to reconfigure BGP for state clearing, or use the **clear bgp { addressfamily | all } *** command to reset the address family.

Usage Guide When the address family is overflow as the number of prefixes reaches the maximum number, you can adjust maximum-prefix.

IPv4 unicast routes can receive the routing prefix in the following conditions even in the Overflow state:

The route information of the same routing prefix exists in the address database.

One route that overwrites this prefix (except for the default route) exists in the address database and the next-hop of this route is different from that of the newly received routing prefix.

The following example sets the maximum number of prefixes in the BGP routing database in the ipv4 multicast address family.

Configuration Examples

```
FS(config)# router bgp 65000
FS(config-router)# address-family ipv4 multicast
FS(config-router-af)# maximum-prefix 65535
```

Related Commands

Command	Description
clear bgp all	Resets BGP's all address families.
clear bgp ipv4 mdt	Resets BGP's ipv4 mdt address families.
clear bgp ipv4 unicast	Resets BGP's ipv4 unicast address families.
clear bgp ipv6 unicast	Resets BGP's ipv6 unicast address families.
clear bgp vpnv4 unicast	Resets BGP's vpnv4 unicast address families.
show bgp all summary	Displays summary of BGP's all address families.
show bgp ipv4 mdt summary	Displays summary of BGP's ipv4 mdt address families.
show bgp ipv4 unicast summary	Displays summary of BGP's ipv4 unicast address families.
show bgp ipv6 unicast summary	Displays summary of BGP's ipv6 unicast address families.
show bgp vpnv4 summary	Displays summary of BGP's vpnv4 unicast address families.

Platform

Description N/A

5.107 neighbor activate

Use this command to activate the neighbor or peer group in the current address mode. Use the **no** form of this command to disable this function.

neighbor {neighbor-address | peer-group-name} **activate**{ **ipv4** | **ipv6** }

no neighbor {neighbor-address | peer-group-name} **activate**{ **ipv4** | **ipv6** }

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 address or IPv6 address
peer-group-name	Name of the peer group of up to 32 characters
ipv4	Activate only IPv4 neighbors in the peer group
ipv6	Activate only IPv6 neighbors in the peer group

Defaults

This function is enabled in IPv4 unicast address family mode by default.

Command Mode

BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide

The function is enabled by default for IPv4 address families. You need to set this command in other

address-family configuration modes for exchanging routes.

The following example activates the neighbor or peer group in the current address mode.

Configuration Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.0.0.1 remote-as 100
FS(config-router)# address-family vpnv4
FS(config-router-af)# neighbor 10.0.0.1 activate
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.108 neighbor additional-paths

Use this command to enable add-path capability on the specified peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { peer-address | peer-group-name } **additional-paths** { send [receive] | receive }

no neighbor { peer-address | peer-group-name } **additional-paths** { send [receive] | receive }

default neighbor { peer-address | peer-group-name } **additional-paths** { send [receive] | receive }

Parameter Description

Parameter	Description
peer-address	IP address of the peer
peer-group-name	Name of the peer group
send	Enable the device to send the add-path route. Only when the peer enables the receive capability, the device can advertise the add-path route.
receive	Enable the device to receive the add-path route. Only when the peer enables the send capability, the device can receive the add-path route.

Defaults

Add-path capability is disabled by default.

Command Mode

BGP configuration mode, BGP IPv4/ IPv6 unicast address family configuration mode, BGP IPv4/ IPv6 VRF address family configuration mode or BGP Scope configuration mode.

Usage Guide

The command is only valid for IBGP neighbors.

BGP neighbors will be re-established after running this command.

Only when the local host is enabled to send the add-path route and the peer device is able to receive the add-path route, the local host is allowed to advertise the add-path route.

If the BGP peer group is specified, all its members will inherit the command.

The following example sets the add-path publish capability with the neighbor 10.0.0.1.

Configuration Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.0.0.1 additional-paths send
```

Related Commands

Command	Description

Platform

Description None

5.109 neighbor advertise additional-paths

Use this command to advertise the add-path route to the peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { peer-address | peer-group-name } **advertise additional-paths** { **all** | **best** number | **ecmp** }

no neighbor { peer-address | peer-group-name } **advertise additional-paths**

default neighbor { peer-address | peer-group-name } **advertise additional-paths**

Parameter Description

Parameter	Description
peer-address	IP address of the peer
peer-group-name	Name of the peer group
all	Select all valid routes as the add-path alternative routes in the type of "all"
best number	Select the next-best routes as the add-path alternative routes in the type of "best number". Range of number: 2-3.
ecmp	Select the ecmp routes as the add-path alternative routes in the type of "ecmp". Additional configuration is needed to select the ecmp routes.

Defaults

The add-path route is not allowed to be advertised by default.

Command Mode

BGP configuration mode, BGP IPv4/ IPv6 unicast address family configuration mode, BGP IPv4/ IPv6 VRF address family configuration mode or BGP Scope configuration mode.

The command is only valid for IBGP neighbors.

Run the **bgp additional-paths select** command to select the add-path routes of the specific type. If the type of selected add-path routes is different from that of advertised ones, then the add-path route is not advertised but only the optimal route is advertised.

Usage Guide

Only when the local device is enabled to send the add-path route and the peer device is enabled to receive the add-path route, the local device is allowed to advertise the add-path route.

If the BGP peer group is specified, all its members will inherit the command.

The following example configures the neighbor 10.0.0.1. If the requirement is met then advertise the next-best route as the add-path route.

Configuration

Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.0.0.1 advertise additional-paths best 2
```

Related Commands

Command	Description

Platform

Description None

5.110 neighbor advertisement-interval

Use this command to set the time interval to send the BGP route update message. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **advertisement-interval** seconds

no neighbor {neighbor-address | peer-group-name} **advertisement-interval**

Parameter Description

Parameter	Description
neighbor address	IP address of the peer
peer-group-name	Name of the peer group
seconds	Time interval to send the route update message in the range from 0 to 600 seconds

Defaults

IBGP connection: 15 seconds
 EBGp connection: 30 seconds

Command Mode

BGP configuration mode/ BGP IPv4 VRF configuration mode/BGP IPv6 VRF address family configuration mode/BGP scope configuration mode

Usage Guide

If you have specified the BGP peer group, all members of the peer group will adopt the settings of the command.

The following example sets the time interval to send the BGP route update message.

Configuration Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.0.0.1 remote-as 100
FS(config-router)# neighbor 10.0.0.1 advertisement-interval 10
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

None

Description

5.111 neighbor allowas-in

Use this command to allow the PE to receive messages with the same AS number as itself. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **allowas-in** number

no neighbor {neighbor-address | peer-group-name} **allowas-in**

Parameter Description

Parameter	Description
neighboraddress	IP address of the peer
peer-group-name	Name of the peer group
number	Number of the AS number duplication in the range from 1 to 10, 3 by default

Defaults

This function is disabled by default.

Command Mode

BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide

A typical application is spoke_hub mode. Execute this command on the PE to enable it to receive and then send the advertised address prefix. Configure two VRFs on the PE. One VRF receives the routes of all PEs and advertises them to the CE; the other VRF receives the routes advertised by the CE and advertises them to all PEs.

This command applies to IBGP or EBGP peers.

Configuration Examples

The following example allows the PE to receive messages with the same AS number as itself.

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.1.1.1 remote-as 100
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# neighbor 10.1.1.1 allowas-in
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.112 neighbor as-loop-check

Use this command to enable outbound loop detection for a BGP neighbor. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **as-loop-check out**

no neighbor { neighbor-address | peer-group-name } **as-loop-check out**

default neighbor { neighbor-address | peer-group-name } **as-loop-check out**

Parameter	Description
neighbor-address	IP address of the peer.
peer-group-name	Name of the peer group.

Defaults The function is disabled by default.

Command Mode BGP configuration mode/ BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/BGP scope configuration mode

Usage Guide If you enable this function, when the **AS Path** attribute carried in a BGP route contains the local AS number, BGP filters out the BGP route.

If a BGP peer group is specified, this function will automatically apply to all the member of the group.

The following example creates a neighbor on BGP IPv4 VRF configuration mode, and enables outbound loop detection for the BGP neighbor.

```

Configuration Examples
FS(config)# router bgp 60
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# neighbor 10.0.0.1 remote-as 100
FS(config-router-af)# neighbor 10.0.0.1 as-loop-check out
    
```

Platform Description N/A

5.113 neighbor as-originate-interval

Use this command to configure the interval that the device advertises local original BGP routes to the peer (group). Use the **no** or **default** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **as-origination-interval** seconds

no neighbor { neighbor-address | peer-group-name } **as-origination-interval**

default neighbor { neighbor-address | peer-group-name } **as-origination-interval**

Parameter	Description
neighboraddress	IP address of the peer.
peer-group-name	Name of the peer group
seconds	The interval at which the device advertises local original BGP routes to the peer (group), in the range from 1 to 65535 in the unit of seconds.

Defaults The default interval is 1.

Command Mode BGP configuration mode/ BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/BGP scope configuration mode

Usage Guide If you specify a peer group name in this command, the configuration takes effect on all members of the peer group.

The following example configures the interval at which the device advertises local original BGP routes to the peer in the BGP IPv4 VRF address family configuration mode.

Configuration Examples

```

FS(config)# router bgp 60
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# neighbor 10.0.0.1 remote-as 100
FS(config-router-af)# neighbor 10.0.0.1 as-origination-interval 10
    
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

5.114 neighbor as-override

Use this command to allow the PE to override the AS number of a site. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **as-override**

no neighbor {neighbor-address | peer-group-name} **as-override**

Parameter Description

Parameter	Description
neighboraddress	IP address of the peer
peer-group-name	Name of the peer group

Defaults This function is disabled by default.

Command Mode BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/BGP scope configuration mode

In general, BGP will not receive the messages with the same AS number as the autonomous area. This command can override the AS number, so that BGP can receive the messages with the same AS number.

Usage Guide A typical application is in a VPN where two CEs have the same AS number. Usually the CEs cannot receive messages from each other. Executing this command on a PE will override the AS number of one CE it connects. As a result, the other CE can receive the peer's route messages. This command applies only to EBGp peers.

The following example allows the PE to override the AS number of a site.

Configuration Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.1.1.1 remote-as 100
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router-af)# neighbor 10.1.1.1 as-override
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.115 neighbor bmp-active

Use this command to enable the monitor of neighbor by specified BMP server. Use the **no** form of this command to disable the monitor of neighbor by specified BMP server. Use the **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **bmp-active** { **all** | **server** server-number [server-number [server-number]] }

no neighbor { neighbor-address | peer-group-name } **bmp-active** { **all** | **server** server-number [server-number [server-number]] }

default neighbor { neighbor-address | peer-group-name } **bmp-active** { **all** | **server** server-number [server-number [server-number]] }

Parameter Description

Parameter	Description
neighbor-address	Specifies the peer address. It may be an IPv4 or IPv6 address.
peer-group-name	Specifies the name of the peer group
all	Specifies all BMP servers.
server-number	Specifies the example number of BMP server. Range: 1-8.

Defaults Neighbor is not monitored by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 VRF address family configuration mode or BGP Scope configuration mode

Default Level 14

Usage Guide Neighbor is not monitored by BMP server without the corresponding configuration.

Configuration Examples

1: Create the neighbor in the BGP configuration mode, and specify the neighbor to be monitored by all BMP servers.

```
FS(config)# router bgp 60
```

```
FS(config-router)# neighbor 10.0.0.1 remote-as 100
FS(config-router)# neighbor 10.0.0.1 bmp-active all
```

Verification Run the **show running-config** command to check the BGP configuration.

1: An error occurs when the neighbor is not activated in this address family

Notes % Activate the neighbor for the address family first

1. An error occurs if the member of the peer group is configured.

% Invalid command for a peer-group member

5.116 neighbor default-fast-withdraw

Use this command to allow the BGP speaker to fast withdraw the default route to the peer (group). Use the **no** or **restore** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **default-fast-withdraw**

no neighbor { neighbor-address | peer-group-name } **default-fast-withdraw**

default neighbor { neighbor-address | peer-group-name } **default-fast-withdraw**

	Parameter	Description
Parameter Description	neighbor-address	IP address of the peer
	peer-group-name	Name of the peer group

Defaults This function is disabled by default.

Command BGP configuration mode; BGP IPv4 Unicast/VRF address family configuration mode; BGP IPv6 Unicast/VRF
Mode address family configuration mode; BGP scope configuration mode

Usage Guide After this function is enabled, if the preferred routes and the equivalent routes function of the default route cannot take effect, the news will be informed to the neighbor first, and then other preferred routes will be selected. If you set the command for a member in the peer, this command will overwrite the settings on the peer group.

Configuration The following example allows the BGP speaker to fast withdraw the default route to the peer (group) 10.1.1.1.
Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.1.1.1 remote-as 80
FS(config-router)# neighbor 10.1.1.1 default-fast-withdraw
```

Platform
Description N/A

5.117 neighbor default-originate

Use this command to allow the BGP speaker to advertise the default route to the peer (group). Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **default-originate** [**route-map** map-tag]

no neighbor {neighbor-address | peer-group-name} **default-originate** [**route-map** map-tag]

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
Description	peer-group-name	Name of the peer group
	map-tag	Name of the route-map of up to 32 characters

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP scope configuration mode

This command does not require the default route in the routing table, but sends a default route whose next-hop is the local address to its neighbors.

Usage Guide If you have specified the BGP peer group, all members of the peer group will adopt the settings of the command. If you set the command for a member in the peer, this command will overwrite the settings on the peer group.

The following example allows the BGP speaker to advertise the default route to the peer (group).

Configuration Examples

```

FS(config)# router bgp 60
FS(config-router)# neighbor 10.1.1.1 remote-as 80
FS(config-router)# neighbor 10.1.1.1 default-originate
    
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform Description None

5.118 neighbor description

Use this command to set a descriptive sentence for the specified peer (group). Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **description** text

no neighbor {neighbor-address | peer-group-name} **description**

	Parameter	Description
Parameter Description	neighbor-address	IP address of the peer
	peer-group-name	Name of the peer group of up to 32 characters

text	Descriptive text of the peer (group) of up to 80 characters
------	---

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP scope configuration mode

Usage Guide This command is used to add descriptive characters for the peer (group). This may help remember features and characteristics of the peer (group).

The following example sets a descriptive sentence for the specified peer (group).

```

Configuration Examples
FS(config)# router bgp 60
FS(config-router)# neighbor 10.1.1.1 remote-as 80
FS(config-router)# neighbor 10.1.1.1 description xyz.com
    
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.	

Platform Description None

5.119 neighbor distribute-list

Use this command to implement the routing policy based on the ACL when receiving/sending route information from/to the specified BGP peer. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **distribute-list** { access-list-number } { **in** | **out** }

no neighbor { neighbor-address | peer-group-name } **distribute-list** { access-list-number } { **in** | **out** }

Parameter Description	Parameter	Description
		neighbor-address
	peer-group-name	Name of the peer group
	access-list-number	ACL number
	in	Specifies the ACL for filtering the incoming routes.
	out	Specifies the ACL for filtering the outgoing routes.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP scope configuration mode

Usage Guide For in rule or out rule, this command cannot be used together with the **neighbor prefix-list** command. Only one of them can take effect.

If you have specified the BGP peer group, all members of the peer group will adopt the settings. If you set the

neighbor distribute-list command for a member in the peer, this command will overwrite the settings on the peer group.

You can set different filtering policies in different address-family configuration modes to control routes.

The following example implements the routing policy based on the ACL when receiving/sending route information from/to the specified BGP peer.

```

Configuration
FS(config)# router bgp 60
Examples
FS(config-router)# neighbor 10.1.1.1 remote-as 80
FS(config-router)# neighbor 10.1.1.1
distribute-list bgp-filter in
    
```

	Command	Description
Related Commands	router bgp	Enables the BGP protocol.
	neighbor remote-as	Configures the BGP peer.
	ip access-list	Creates a standard IP ACL or extended IP ACL.

Platform

Description None

5.120 neighbor domain

Use this command to configure the domain group of BGP peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **domain** domain-name

no neighbor { neighbor-address | peer-group-name } **domain**

default neighbor { neighbor-address | peer-group-name } **domain**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
	peer-group-name	Name of the peer group
	domain-name	Domain name

Defaults This function is disabled by default.

Command BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode or BGP Scope configuration mode.

Usage Guide

The following example configures the peer 10.1.1.1 as domain test.

```

Configuration
FS(config)# router bgp 60
Examples
FS(config-router)# neighbor 10.1.1.1 remote-as 80
FS(config-router)# neighbor 10.1.1.1 domain test
    
```

Related Commands	Command	Description
------------------	---------	-------------

Platform

Description None

5.121 neighbor domain-unsuppress

Use this command to not suppress detailed routing in the domain group of BGP peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **domain-unsuppress**

no neighbor { neighbor-address | peer-group-name } **domain-unsuppress**

default neighbor { neighbor-address | peer-group-name } **domain-unsuppress**

Parameter	Parameter	Description
Description	neighbor-address	IP address of the peer
	peer-group-name	Name of the peer group

Defaults This function is disabled by default.

Command BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode or BGP Scope configuration mode.

Mode

Usage Guide

The following example changes the peer group test to domain test.

Configuration
Examples

```
FS(config)# router bgp 60
FS(config-router)# neighbor test peer-group
FS(config-router)# neighbor test remote-as 80
FS(config-router)# neighbor test domain-unsuppress
```

Related Commands	Command	Description
------------------	---------	-------------

Platform

Description None

5.122 neighbor ebgp-multihop

Use this command to configure the TTL of peer (groups). Use the **no** or **default** form of this command to restore the default settings.

neighbor {neighbor-address | peer-group-name} **ebgp-multihop** [ttl]

no neighbor {neighbor-address | peer-group-name} **ebgp-multihop** [ttl]

Parameter	Parameter	Description
Description	neighbor-address	IP address of the peer

peer-group-name	Name of the peer group
ttl	Maximum hops in the range 1 to 255

Defaults

The TTL of the peer is the default one (255 for IBGP neighbor and 1 for EBGP neighbor).
If "ebgp-multihop" is followed by no parameter, the ttl is 255

Command
Mode

BGP configuration mode IPv4 VRF address family configuration mode/ IPv6 VRF address family configuration mode/BGP scope configuration mode

Usage Guide

To prevent routing loop and dampening, non-default routes that can reach the peer must exist between EBGP peers between which the BGP connection can only be established via multiple hops.
If the BGP peer group is specified, all members of the peer group adopt the settings. If this command is set for a member of the peer, the setting will overwrite the setting for the group.

Configuration
Examples

The following example allows establishing BGP connection between EBGP peers that are not directly connected.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remote-as 65100
FS(config-router)# neighbor 10.0.0.1 ebgp-multihop
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.123 neighbor fall-over bfd

Use this command to enable BFD correlation with BGP. Use the **no** form or **default** form of this command to disable BFD correlation with BGP.

neighbor { neighbor-address | peer-group-name } **fall-over bfd**

no neighbor { neighbor-address | peer-group-name } **fall-over bfd**

default neighbor { neighbor-address | peer-group-name } **fall-over bfd**

Parameter
Description

Parameter	Description
neighbor-address	IPv4 or IPv6 address of the peer.
peer-group-name	Name of the peer group

Defaults

BFD correlation is disabled by default.

Command
Mode

BGP configuration mode / IPv4 VRF address family configuration mode/ IPv6 VRF address family configuration mode/BGP scope configuration mode

Usage Guide Before configuring BFD correlation, the BFD session parameters of the neighbor interface must be configured.

The following example enables BFD correlation to detect the forwarding path between local and the neighbor 172.16.0.2.

Configuration Examples

```
FS(config)# router bgp 45000
FS(config-router)# neighbor 172.16.0.2 remote-as 45001
FS(config-router)# neighbor 172.16.0.2 fall-over bfd
```

	Command	Description
Related Commands	router bgp	Enables the BGP protocol.
	neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.124 neighbor filter-list

Use this command to enable route filtering when sending/receiving routing information to/from BGP peers. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **filter-list** access-list-number { **in** | **out** }

no neighbor { neighbor-address | peer-group-name } **filter-list** access-list-number { **in** | **out** }

	Parameter	Description
Parameter Description	neighbor-address	IP address of the peer, IPv4 address or IPv6 address
	peer-group-name	Name of the peer group
	access-list-number	ACL number
	in	Applies as-path list on the received routing information.
	out	Applies as-path list on the distributed routing information.

Defaults The function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP scope configuration mode

Usage Guide If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If the **neighbor filter-list** command is set for a member of the peer, the setting will overwrite the setting for the group.

You can set different filter policies in different address-family configuration modes to control routes.

The following example enables route filtering when sending/receiving routing information to/from BGP peers.

Configuration Examples

```
FS(config)# ip as-path access-list 1 deny _123_
FS(config)# router bgp 65000
```

```
FS(config-router)# neighbor 10.0.0.1 remote-as 65100
FS(config-router)# neighbor 10.0.0.1 filter-list 1 out
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.
ip as-path access-list	Creates an AS_PATH list.
match as-path	Matches the AS_PATH list.

Platform

Description None

5.125 neighbor global-nextthop-replace-local

Use this command to replace the global address with link-local address when sending IPv6 routings to the BGP IPv6 link-local peer (group). Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **global-nextthop-replace-local**

no neighbor { neighbor-address | peer-group-name } **global-nextthop-replace-local**

default neighbor { neighbor-address | peer-group-name } **global-nextthop-replace-local**

Parameter

Description

Parameter	Description
neighbor-address	IP address of the peer
peer-group-name	Name of the peer group

Defaults

The function is disabled by default.

Command

Mode

BGP IPv6 Unicast/VRF address family configuration mode, BGP Scope configuration mode.

Usage Guide

When sending IPv6 routings to the BGP IPv6 link-local peer (group), two next-hop addresses are sent by default: one is global address and the other is link-local address. Run this command to replace the global address with link local address.

Not effective on non-link-local neighbor.

The following example replaces the global address with link-local address when advertising routings to peer FE80::1.

Configuration

Examples

```
FS(config)#router bgp 65000
FS(config-router)#address-family ipv6
FS(config-router-af)#neighbor FE80::1%vlan101 remote-as 1
FS(config-router-af)#neighbor FE80::1%vlan101 global-nextthop-replace-local
```

Related Commands

Command	Description
---------	-------------

Platform

None

Description

5.126 neighbor ha-mode

Use this command to enable the NSR function for a BGP peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **ha-mode nsr**

no neighbor { neighbor-address | peer-group-name } **ha-mode nsr**

default neighbor { neighbor-address | peer-group-name } **ha-mode nsr**

Parameter	Description
neighbor-address	IP address of the peer, IPv4 address or IPv6 address
peer-group-name	Name of the peer group
ha-mode	Indicates the high availability mode and supports NSR function only.
nsr	Enables the NSR function.

Defaults By default, it is disabled.

Command

Mode BGP configuration mode; BGP IPv4 VRF configuration mode; BGP IPv6 VRF configuration mode;

Usage Guide

None-Stop-Routing (NSR) is used to ensure uninterrupted routes during protocol restart upon a switchover between the active and standby management boards.

The following example enables NSR function for the BGP peer 10.0.0.1.

Configuration Examples

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remote-as 65100
FS(config-router)# neighbor 10.0.0.1 ha-mode nsr
```

Platform

Description N/A

5.127 neighbor link state group

Use this command to configure link state tracking group for the BGP peer (group). Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **link state group** num

no neighbor { neighbor-address | peer-group-name } **link state group**

default neighbor { neighbor-address | peer-group-name } **link state group**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer, IPv4 address or IPv6 address
Description	peer-group-name	Name of the peer group
	num	Link-state tracking group ID.

Defaults By default, no group is configured.

Command Mode BGP configuration mode, BGP IPv4 Unicast/VRF configuration mode, BGP IPv6 Unicast/VRF configuration mode, BGP VPNv4/VPNv6 family address configuration mode, BGP L2VPN VPWS/VPLS/EVPN family address configuration mode, and BGP scope configuration mode.

Usage Guide

The following example configure the link-state tracking group 1 for peer 10.0.0.1

Configuration

```
FS(config)# router bgp 65000
```

Examples

```
FS(config-router)# neighbor 10.0.0.1 remote-as 65100
```

```
FS(config-router)# neighbor 10.0.0.1 link state group 1
```

Platform

Description N/A

5.128 neighbor local-as

Use this command to configure the local AS number for the BGP peer, which could be used as its Remote AS to connect with local router. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **local-as** as-number [**no-prepend** [**replace-as** [**dual-as**]]]

no neighbor {neighbor-address | peer-group-name} **local-as**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer, IPv4 address or IPv6 address
Description	peer-group-name	Name of the peer group
	as-number	Local AS number, in the range from 1 to 65535. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new AS notation range is from 1 to 4294967295, represented as from 1 to 65535.65535 in dot mode.
	no-prepend	The AS-PATH of the routing information received from the peer does not depend on the Local AS. This option is disabled by default.
	replace-as	The AS-PATH of the routing information sent to the peer replaces the BGP AS with the Local AS. This option is disabled by default.
	dual-as	Uses BGP AS or Local AS to establish BGP connection with the device. This option is disabled by default.

Defaults

No Local AS is configured for the peer. If Local AS is configured, no options is configured by default. The peer could only use Local AS to establish BGP connection with local device, and adds Local AS into the AS-PATH of the received routing information, inserts Local AS to the corresponding AS-PATH before sending the routing information to the peer.

Command

BGP configuration mode, IPv6 VRF address family configuration mode, IPv4 VRF address family configuration

Mode

mode, BGP scope configuration mode

Usage Guide

Local AS could be configured on the EBGP peer only, and if the attributes of the peer change, such as EBGP converts to IBGP or union EBGP, Local AS and corresponding options will be deleted. Local AS must be different from BGP AS and this peer's Remote AS and the union ID (if federation is configured). If you have specified the BGP peer group, all members of this peer group will adopt the settings of this command. You cannot set Local AS for the specified member of the peer group separately.

Configuration

The following example configures the local AS number for the BGP peer.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remote-as 65100
FS(config-router)# neighbor 10.0.0.1 local-as 23
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description

N/A

5.129 neighbor maximum-prefix

Use this command to limit the number of prefixes received from the specified BGP peer. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **maximum-prefix** maximum [threshold] { [**restart-time** time] | [**warning-only** [**suppress**]] }

no neighbor { neighbor-address | peer-group-name } **maximum-prefix** maximum

Parameter

Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
maximum	Upper limit of the number of the received route entries
threshold	Percentage of the maximum when alarming.
restart-time	The specific time for the neighbor to restore state machine automatically after prefixes exceeds the limit and the device enters idle state
time	Specify the time for the neighbor to restore state machine
warning-only	Does not terminate the BGP connection when the route entries reach the upper limit but produce a log entry.

suppress	Stop learning when the route entries reach the upper limit.
-----------------	---

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6/L2VPN VPWS/VPLS address family configuration mode or BGP Scope configuration mode.

Usage Guide The BGP connection will be torn down when the received routes exceeds the upper limit by default. To prevent tearing down the connection, set the "warning-only" to control that. To stop learning when the received routes exceed the upper limit, set the "suppress". If there are entries exceeding the upper limit, as the order of route learning may be different, the newly learned entries may also be different.
If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the setting will overwrite the setting for the group.

Configuration Examples The following example limits the number of prefixes received from the specified BGP peer.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 maximum-prefix 1000
```

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform Description None

5.130 neighbor next-hop-self

Use this command to set the next-hop of the route to the local BGP speaker while specifying the routes that the BGP peer redistributes. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **next-hop-self**

no neighbor {neighbor-address | peer-group-name} **next-hop-self**

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP scope configuration mode

Usage Guide This command is mostly used in the non-full-mesh-type network, such as the Frame Relay and X.25, where the

BGP speakers within the same subnet cannot completely be accessed mutually.
 If you have specified the BGP peer group, all members of the peer group will adopt the settings of the command.

Configuration Examples

The following example sets the next-hop of the route to the local BGP speaker.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 next-hop-self
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.131 neighbor next-hop-unchanged

Use this command to maintain the next-hop when sending routes to the peer(group). Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **next-hop-unchanged**

no neighbor {neighbor-address | peer-group-name} **next-hop-unchanged**

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
next-hop-unchanged	Maintains the next-hop while sending the routes to the peer(group).

Defaults

The next-hop will be changed by default when routes are sent to the EBGp peer.

Command Mode

BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP L2VPN VPLS/VPWS address family configuration mode, BGP scope configuration mode

Usage Guide

This command is used to control to maintain the next-hop route transmitting between multi-hop EBGp peer sessions. This command cannot be configured on the route reflector. And for the client of the route reflector, if this function is enabled, the **neighbor next-hop-self** command cannot be used to change the next-hop of routes. This function is mainly applied to the cross-domain VPN. In the implementation with the Option C adopted, to reduce the complete connectivity between the PEs of the cross-domain CPN, a route reflector can be set in every autonomous domain to establish the Multihop MP-EBGP connection to implement the VPN route interaction. As the next-hop route is changed as itself while sending routes to the EBGp peer by default, PE stations of other autonomous domains will consider the final next-hop of the VPN route as the route reflector when receiving the VPN route at last, which will result in all cross-domains VPN flow going through the reflector. However, usually this is not the optimal forwarding path, and the requirement for the forwarding performance of the RR is higher. To avoid this condition, use the **neighbor next-hop-unchanged** command in

the address-family VPNv4 configuration mode to maintain the next-hop of the VPNv4 route sent to the BGP peer when establishing the cross-domain Multihop MP-EBGP connection on the router reflector.

The following example maintains the next-hop when sending routes to the peer (group).

Configuration

```
FS(config)# router bgp 60
```

Examples

```
FS(config-router)# address-family vpnv4
```

```
FS(config-router-af)# neighbor 10.1.1.1 next-hop-unchanged
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.132 neighbor password

When the BGP connection with the BGP peer is established, use this command to enable TCP MD5 authentication and set the password. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **password** [0 | 7]string

no neighbor {neighbor-address | peer-group-name} **password**

Parameter

Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
0	Displays the password with encryption.
7	Displays the password without encryption.
string	Password for MD5 authentication in the range from up to 80 characters

Defaults

The function is disabled by default

Command

BGP configuration mod, IPv4 VRF address family configuration mode, IPv6 VRF address family configuration mode, BGP scope configuration mode

Mode

This command will enable MD5 authentication of the TCP. BGP peers must have the same password configured; otherwise, the neighbor relationship cannot be established. When this command is set, the local BGP speaker will re-establish the BGP connection with the BGP peer.

Usage Guide

If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the setting will overwrite the setting for the group.

No matter in which mode, a neighbor has only one password, not one for every address family, .

Configuration

Examples

The following example enables TCP MD5 authentication and sets the password.

```
FS(config)# router bgp 65000
```

```
FS(config-router)# neighbor 10.0.0.1 password Red-Giant
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol
	neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.133 neighbor peer-group (creating)

Use this command to create a BGP peer group. Use the **no** form of this command to restore the default setting.

neighbor peer-group-name **peer-group**

no neighbor peer-group-name **peer-group**

Parameter Description	Parameter	Description
		peer-group-name

Defaults No BGP peer group is created.

Command Mode BGP configuration mode/ BGP IPv4 VRF configuration mode/ BGP IPv6 VRF address family configuration mode/ BGP scope configuration mode

Usage Guide If multiple BGP peers use the same update policy, the peers can be configured in the same peer group, so as to simplify the configuration and boost operation efficiency.

Configuration Examples The following example creates a BGP peer group.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor Red-Giant peer-group
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol.
	neighbor remote-as	Configures the BGP peer.
	neighbor peer-group (assigning members)	Configures the specified peer as the member of the BGP peer group.
	show ip bgp peer-group	Displays the information of the BGP peer.

Platform

Description None

5.134 neighbor peer-group (assigning members)

Use this command to configure the specified peer as a member of the BGP peer group. Use the **no** form of this command to restore the default setting.

neighbor neighbor-address **peer-group** peer-group-name

no neighbor neighbor-address **peer-group** peer-group-name

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group

Defaults No peer exists in the peer group.

Command Mode

BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Members of the peer group can adopt all configurations of the peer. It is allowed to configure an individual member of the peer group to replace the universal configuration for the peer group, but such separate configuration does not contain the configuration information that may affect the output update. In other words, every member in the peer group will always adopt the following configurations of the peer group:

Usage Guide

remote-as, update-source, local-as, reconnect-interval, times, advertisement-interval, default-originate, next-hop-self, remove-private-as, send-community, distribute-list out, filter-list out, prefix-list out, route-map out, unsuppress-map, route-reflector-client.

Do not place neighbors of different address families in the same peer group, or place IBGP and EBGP neighbors in the same peer group.

Configuration Examples

The following example configures the specified peer as a member of the BGP peer group.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor Red-Giant peer-group
FS(config-router)# neighbor 10.0.0.1 peer-group Red-Giant
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.
neighbor peer-group (creating)	Creates the BGP peer group.
show ip bgp peer-group	Displays the information of the BGP peer.

Platform

Description None

5.135 neighbor prefix-list

Use this command to implement the routing policy based on the prefix list to receive/transmit routes from/to the BGP peer. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **prefix-list** prefix-list-name {in | out}

no neighbor {neighbor-address | peer-group-name} **prefix-list** prefix-list-name {in | out}

	Parameter	Description
Parameter	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer group
Description	prefix-lis-name	Name of the prefix-list of up to 32 characters
	in	Applies the prefix list to the received routes.
	out	Applies the prefix list to the redistributed routes.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP scope configuration mode

For the "in" rule or "out" rule, this command cannot be used together with the **neighbor distribute-list** command. That is, only one of them takes effect.

Usage Guide If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If the **neighbor prefix-list in** command is set for a member of the peer, the setting will overwrite the setting for the group.

You can set different filter policies in different address-family configuration modes to control routes.

Configuration Examples The following example implements the routing policy based on the prefix list to receive/transmit routes from/to the BGP peer.

```
FS(config)# ip prefix-list bgp-filter deny 10.0.0.1/16
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 prefix-list bgp-filter in
```

	Command	Description
Related Commands	router bgp	Enables the BGP protocol.
	neighbor remote-as	Configures the BGP peer.
	ip prefix-list	Creates the prefix lists.

Platform Description None

5.136 neighbor remote-as

Use this command to configure the BGP peer (group). Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **remote-as** { as-number | **route-map** map-tag }

no neighbor { neighbor-address | peer-group-name } **remote-as**

Parameter	Parameter	Description
-----------	-----------	-------------

Description	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer group
	as-number	BGP peer (group) autonomous system number in the range from 1 to 65535 In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new AS notation range is from 1 to 4294967295, represented as from 1 to 65535.65535 in dot mode.
	route-map map-tag	Specifies the routing policy when connecting to the network segment neighbor.

Defaults No BGP peer is configured.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

If you have specified the BGP peer group, all members of the peer group will inherit the settings of the command.

Usage Guide The command **neighbor** neighbor-address **remote-as route-map** map-tag is only run to configure the network segment neighbor. The specified routing policy can only allow neighbors whose routing policy matches the AS number to establish a connection. If the routing policy does not match, the neighbor cannot be established.

Configuration Examples The following example configures the BGP peer (group).

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remote-as 80
```

Related Commands	Command	Description
	router bgp	Enables the BGP protocol.

Platform

Description None

5.137 neighbor remove-private-as

Use this command to delete the private AS number recorded in the AS path attribute in the route sent to the specified EBGp peer. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **remove-private-as** [**force** [**ignore-remote-as**]]
[**replace-as**] **no neighbor** { neighbor-address | peer-group-name } **remove-private-as**

Parameter Description	Parameter	Description
	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer group
	force	Deletes the private AS number
	ignore-remote-as	Ignore the AS number of private neighbor
replace-as	Replaces the private AS number with the local AS number	

Defaults This function is disabled by default.

Command BGP configuration mode, IPv4 address family configuration mode, IPv6 address family configuration mode,
Mode IPv4 VRF address family configuration mode, IPv6 VRF address family configuration mode

This command takes effect only to EBGp peers.
 The AS number ranges from **1** to **4294967295**, and the private AS number ranges from **64512** to **65534** and **4200000000** to **4294967294**, which is used in specific private applications. In normal cases, you can configure this command to prevent the private AS number being disclosed to a public network.
 By default, the private AS number recorded in the AS path attribute of a route is not deleted in the following scenarios:

Usage Guide The AS path attribute contains both private and public AS numbers.
 The private AS number recorded in the AS path attribute is the AS number of the EBGp peer to be sent, to prevent a loop.
 By configuring **force**, you can forcibly delete the private AS number in the preceding two scenarios.
 By configuring **force ignore-remote-as**, you can ignore the AS number of the neighbor when forcibly deleting the private AS number.
 By configuring **replace-as**, you can replace the private AS number with the local AS number, preventing incorrect route selection due to a short AS path.

Configuration The following example deletes the private AS number recorded in the AS path attribute in the route sent to the specified EBGp peer

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remove-private-as
```

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform
Description None

5.138 neighbor route-map

Use this command to enable route match for the received/sent routes. Use the **no** form of this command to disable this function.

neighbor { neighbor-address | peer-group-name } **route-map** map-tag {in | out}
no neighbor { neighbor-address | peer-group-name } **route-map** map-tag {in | out}

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
map-tag	Name of the match rule
in	Applies the rule to the incoming routes.

out	Applies the rule to the outgoing routes.
------------	--

Defaults N/A

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide This command can be used to filter the incoming and outgoing routes for different neighbors by using different incoming/outgoing rules, purifying and controlling routes.
You can set different filter policies in different address-family configuration modes to control routes.

Configuration Examples The following example enables route match for the received/sent routes.

```
FS(config-router)# neighbor 10.0.0.1 route-map map-tag in
```

Related Commands	Command	Description
	neighbor soft-reconfiguration inbound	Stores the routing information sent from the BGP peer.
	show ip bgp	Displays the BGP route entry.

Platform Description None

5.139 neighbor route-reflector-client

Use this command to configure the local device as the route reflector and specifies its client. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **route-reflector-client**

no neighbor { neighbor-address | peer-group-name } **route-reflector-client**

default neighbor { neighbor-address | peer-group-name } **route-reflector-client**

Parameter Description	Parameter	Description
	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer. The name cannot exceed 32 characters.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide By default, all IBGP speakers in the autonomous system must establish neighbor relationship with each other. The BGP speaker does not forward the routes learned from an IBGP peer to other IBGP peers to avoid route loop.
This command can be used to set route reflector, so that there is no need for all IBGP speakers to establish full

neighboring relationship between each other. This will allow the route reflector to forward learned IBGP routes to other IBGP peers.

Configuration Examples

The following example configures the local device as the route reflector and specifies its client.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 route-reflector-client
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.
bgp cluster-id	Configures the cluster ID of the route reflectors.
bgp client-to-client reflection	Enables the route reflection between clients

Platform

Description None

5.140 neighbor send-community

Use this command to transmit community attributes to the specified BGP neighbor. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **send-community** [**both** | **standard** | **extended**]

no neighbor {neighbor-address | peer-group-name} **send-community** [**both** | **standard** | **extended**]

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
both	Transmits both standard and extended communities.
standard	Transmits the standard community only.
extended	Transmits the extended community only.

Defaults

This function is disabled by default.

Command Mode

BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide

This command transmits the community to the neighbor or neighbor group.

Configuration Examples

The following example transmits community attributes to the specified BGP neighbor.

```
FS(config-router)# neighbor 10.1.1.1 send-community both
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.

neighbor remote-as	Configures the BGP peer.
ip community-list	Creates the community list.

Platform**Description** None**5.141 neighbor send-mapping-only**

Use this command to send only mapping entries to a specified neighbor. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **send-mapping-only**

no neighbor { neighbor-address | peer-group-name } **send-mapping-only**

default neighbor { neighbor-address | peer-group-name } **send-mapping-only**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer group of up to 32 characters
Description		

Defaults This function is disabled by default.**Command****Mode** BGP L2VPN EVPN address family configuration mode**Usage Guide** This command is used to send only mapping entries to a specified neighbor.

The following example send only mapping entries to 57.50.1.1.

```
FS(config)# router bgp 65530
```

```
FS(config-router)# neighbor 57.50.1.1 remote-as 65531
```

```
FS(config-router)# address-family l2vpn evpn
```

```
FS(config-router-af)# neighbor 57.50.1.1 activate
```

```
FS(config-router-af)# neighbor 57.50.1.1 send-mapping-only
```

Platform**Description** None**5.142 neighbor shutdown**

Use this command to disconnect the BGP connection established with the specified BGP peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **shutdown**

no neighbor { neighbor-address | peer-group-name } **shutdown**

default neighbor { neighbor-address | peer-group-name } **shutdown**

Use this command to gracefully disconnect the BGP connection established with the specified BGP peer.

neighbor { neighbor-address | peer-group-name } **shutdown graceful** [**community** value] [**delay** time]

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
graceful	Shuts down BGP connection gracefully.
community value	Indicates the community value carried in the route sent to the neighbor.
delay time	Indicates the delay time (in seconds) for shutting down BGP connections. The value range is from 1 to 65,535.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 VRF address family configuration mode or BGP Scope configuration mode.

Usage Guide This command is used to disconnect valid connection established with the specified peer (group), and delete all associated routing information. However, this command still keeps the configuration information of that specified peer (group).

If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the settings will overwrite the settings for the group.

Configuration Examples The following example disconnects the BGP connection established with the specified BGP peer.

```
FS(config)# router bgp 60
FS(config-router)# neighbor 10.0.0.1 shutdown
```

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.
show ip bgp summary	Displays the BGP connection status.

Platform Description None

5.143 neighbor soft-reconfiguration inbound

Use this command to store the routing information sent from the BGP peer. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **soft-reconfiguration inbound**

no neighbor { neighbor-address | peer-group-name } **soft-reconfiguration inbound**

default neighbor { neighbor-address | peer-group-name } **soft-reconfiguration inbound**

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

This command restarts the BGP session, and keeps the unchanged routing information sent from the BGP peer (group).

Usage Guide Executing this command will consume more memories. If both parties support the route refresh function, this command becomes unnecessary. You may run the **show ip bgp neighbors** command to judge whether the peer can support the route refresh function.

If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the settings will overwrite the settings for the group.

Configuration Examples The following example stores the routing information sent from the BGP peer.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 soft-reconfiguration inbound
```

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.
show ip bgp neighbors	Displays the information of the BGP peer.
clear ip bgp	Resets the BGP peer session.

Platform

Description None

5.144 neighbor soo

Use this command to set the SOO value of the neighbor. Use the **no** or **default** form of this command to restore the default settings.

neighbor {neighbor-address | peer-group-name} **soo** soo-value

no neighbor {neighbor-address | peer-group-name} **soo**

default neighbor { neighbor-address | peer-group-name } **soo**

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
soo-value	SOO value

	<p>There are two forms of <code>soo_value</code>:</p> <p>(1)<code>soo_value = as_num:nn</code> <code>as_number:nn</code>: <code>as_number</code> is the public AS number and <code>nn</code> is defined by yourself. The range is from 0 to 4294967295.</p> <p>(2)<code>soo_value = ip_addr:nn</code> <code>ip_address:nn</code>: IP address must be global and <code>nn</code> is defined by yourself. The range is from 0 to 65535.</p> <p>(3)<code>soo_value = as4_num:nn</code> <code>as4_num</code> is the public AS number (4 byte) and <code>nn</code> is defined by yourself, which ranges from 0 to 65535.</p>
--	--

Defaults This function is disabled by default.

Command

Mode BGP IPv4/IPv6 VRF address family configuration mode or BGP Scope VRF configuration mode.

Usage Guide In CE dual-home mode, execute this command to prevent routes sent by CE to PEs from being sent back to CE.

The following example sets the SOO value of the neighbor.

Configuration Examples

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 remote-as 100
FS(config-router)# address-family ipv4 vrf vpn1
FS(config-router)# neighbor 10.0.0.1 soo 100:100
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
timers bgp	Configures the keepalive and holdtime values globally.

Platform

Description None

5.145 neighbor timers

In specifying BGP peer to establish the BGP connection, use this command to set the keepalive and holdtime time values used for establishing the BGP connection. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **timers** { keepalive holdtime [minimum-holdtime] | **connect** connect-retry }

no neighbor { neighbor-address | peer-group-name } **timers** [**connect**]

default neighbor { neighbor-address | peer-group-name } **timers** [**connect**]

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
neighbor-prefix	IPv4 or IPv6 address segment of the peer

peer-group-name	Name of the peer group
keepalive	Time interval to send the KEEPALIVE message to the BGP peer. Range: 0-65535 seconds
holdtime	Time interval to consider the BGP peer alive Range: 0-65535 seconds
minimum-holdtime	Allows a minimum holdtime value of neighbor advertisement. It is unrestricted when the value is 0. The range is 0 to 65535 seconds.
connect-retry	The value of the connect-retry timer is 15s.

Defaults

keepalive: 60 seconds
 holdtime: 180 seconds
 minimum-holdtime: 0 seconds
 connect-retry: 15 seconds

Command

BGP configuration mode, BGP IPv4 VRF address family configuration mode, BGP IPv6 VRF address family

Mode

configuration mode, BGP Scope configuration mode

Usage Guide

A proper keepalive value must not exceed one-third of the holdtime value.
 If the time is configured for an individual peer or a peer group, that peer or peer-group will use its time to replace the global time configuration and connect the peer.
 If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the settings will overwrite the settings for the group.

Configuration Examples

The following example sets the keepalive and holdtime time values used for establishing the BGP connection.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 80 240
```

The following example sets the connect-retry time values used for establishing the BGP connection.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 timers connect 100
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
timers bgp	Sets the keepalive and holdtime values globally.

Platform

Description None

5.146 neighbor track

Use this command to configure association between BGP and TRACK to check the status of track instance and reduce the BGP convergence time. Use the **no** or **restore** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **track** track-obj-number

no neighbor { neighbor-address | peer-group-name } **track**

default neighbor { neighbor-address | peer-group-name } **track**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
Description	peer-group-name	Name of the peer group of up to 32 characters
	track-obj-number	Specifies the number of the tracked object.

Defaults This function is disabled by default.

Command Mode BGP configuration mode; BGP IPv4 VRF configuration mode; BGP IPv6 VRF configuration mode; and BGP scope configuration mode

Usage Guide Please make sure that the corresponding TRACK session parameters have been configured.

The following example associates BGP and TRACK 1.

```

Configuration
FS(config)# router bgp 45000
Examples
FS(config-router)# neighbor 172.16.0.2 remote-as 45001
FS(config-router)# neighbor 172.16.0.2 track 1
    
```

Platform

Description None

5.147 neighbor transport connection-mode

Use this command to configure the connection establishment mode of a BGP neighbor. Use the **no** or **default** form of this command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **transport connection-mode** { active-only | both | passive-only }

no neighbor { neighbor-address | peer-group-name } **transport connection-mode**

default neighbor { neighbor-address | peer-group-name } **transport connection-mode**

	Parameter	Description
Parameter	neighbor-address	IPv4 or IPv6 address of the peer
Description	peer-group-name	Peer group name
	active-only	Specifies that a BGP neighbor can only actively establish connections.
	both	Specifies that a BGP neighbor can actively and passively establish connections.
	passive-only	Specifies that a BGP neighbor can only passively establish connections.

Defaults A BGP neighbor can actively and passively establish connections by default.

Command Mode BGP configuration mode, BGP IPv4 VRF configuration mode, BGP IPv6 VRF configuration mode, and BGP Scope configuration mode

Default Level 14

Usage Guide Two devices serving as peers cannot configure **actively-only** or **passive-only** at the same time. A network segment neighbor can only be connected passively, and its connection mode is not controlled by this command.

Configuration The following example configures that BGP peer 10.0.0.1 can only actively establish connections.

```

Examples
FS(config)# router bgp 45000
FS(config-router)# neighbor 10.0.0.1 remote-as 45001
FS(config-router)# neighbor 10.0.0.1 transport connection-mode active-only
    
```

Verification Run the **show running-config** command to display the BGP configurations.

5.148 neighbor unsuppress-map

Use this command to selectively advertise routing information suppressed by aggregate-address command. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address | peer-group-name} **unsuppress-map** map-tag

no neighbor {neighbor-address | peer-group-name} **unsuppress-map** map-tag

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
Description	peer-group-name	Name of the peer group
	map-tag	Name of the route-map of up to 32 characters

Defaults This function is disabled by default.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

This command advertises the specified suppressed routes.

Usage Guide If the BGP peer group is specified, all members of the peer group adopt the settings of this command. If this command is set for a member of the peer, the setting will overwrite the setting for the group.

The following example selectively advertises routing information suppressed by aggregate-address command.

```

Configuration Examples
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 unsuppress-map
unspress-route
    
```

	Command	Description
Related Commands	router bgp	Enables the BGP protocol.
	neighbor remote-as	Configures the BGP peer.
	aggregate-address	Configures the aggregate address.
	route-map	Configures the route-map

Platform
Description None

5.149 neighbor update-delay

Use this command to configure the time of BGP delayed advertisement for first routes. Use the **no** or **restore** form of the command to restore the default settings.

neighbor { neighbor-address | peer-group-name } **update-delay** time

no neighbor { neighbor-address | peer-group-name } **update-delay**

default neighbor { neighbor-address | peer-group-name } **update-delay**

	Parameter	Description
Parameter Description	neighbor-address	IP address of the peer, IPv4 or IPv6 address
	peer-group-name	Name of the peer group
	time	Time of BGP delayed advertisement for first routes.

Defaults The function is disabled by default.

Command Mode BGP configuration mode/ BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/ BGP scope configuration mode

Usage Guide
 After BGP starts, BGP peers negotiate to establish the neighborhood before sending route information (update packets).An optimum route is calculated on the local end and sent to the peer end. By default, routes are advertised directly. After a neighbor receives a better route, it updates the route information to the peer. As a result, extra route advertisement occurs. **update-delay** can be configured to shorten the route information update time.

If the BGP peer group is specified, all members of the peer group adopt the settings of this command.

Configuration Examples The following example sets the delayed time to 60s.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 update-delay 60
```

Platform
Description N/A

5.150 neighbor update-source

Use this command to configure the interface for BGP connection of the IBGP peer..

neighbor { neighbor-address | peer-group-name } **update-source** (interface-type interface-number | address)Use the **no** form of the command to remove the source address configuration for the BGP peer.

no neighbor {neighbor-address | peer-group-name} **update-source**

Use the **default** form of the command to restore the default settings.

default neighbor { neighbor-address | peer-group-name } **update-source**

Parameter Description

Parameter	Description
neighbor-address	IP address of the peer, IPv4 or IPv6 address
peer-group-name	Name of the peer group
interface-type	Interface name
interface-number	
address	The interface address which is used fro BGP connection. The address type (IPv4 or IPv6) must be same as that of the peer address.

Defaults The local interface is used as the egress interface by default.

Command Mode BGP configuration mode/ IPv4 VRF address family configuration mode/ IPv6 VRF address family configuration mode/ BGP scope configuration mode

You can use this command to enable the loopback interface to establish a BGP connection with the peer. The interface address specified for BGP connection must be valid in local, otherwise the BGP connection may be faulty.

All members in a BGP peer group inherit the settings of this command. Particularly, if the interface address is used, only the member whose address type is same as the interface address’s can inherit the settings of this command.

Usage Guide If the IPv6 address of the loopback interface is used for neighbor connection, both peers need to be configured with the loopback interface. The BGP connection can be established only when the address of the egress interface on the peer is same as that of the neighbor in local.

A loopback interface address can be configured on different interfaces. You need to specify only the interface name,

The peer configured with the IPv6 address of loopback interface support only one-hop BGP neighbor connection.

Configuration Examples The following example establishes the BGP connection.

```
FS(config)# router bgp 65000
FS(config-router)# neighbor 10.0.0.1 update-source lookback 1
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.

neighbor remote-as	Configures the BGP peer.
---------------------------	--------------------------

Platform

Description None

5.151 neighbor version

Use this command to display the number of the BGP protocol version used by the specific BGP neighbor. Use the **no** form of this command to restore the default setting.

neighbor { neighbor-address | peer-group-name } **version** number

no neighbor { neighbor-address | peer-group-name } **version**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
Description	peer-group-name	Name of the peer group
	number	Version number

Defaults The default version number is 4.

Command BGP configuration mode/ BGP IPv4 VRF address family configuration mode/ BGP IPv6 VRF address family configuration mode/ BGP scope configuration mode

Mode

Usage Guide When the command is used, BGP will lose the version negotiation function.

Configuration The following example displays the number of the BGP protocol version used by the specific BGP neighbor.

Examples

```
FS(config-router)# neighbor 10.1.1.1 version 4
```

	Command	Description
Related	router bgp	Enables the BGP protocol.
Commands	neighbor remote-as	Configures the BGP peer.

Platform

Description None

5.152 neighbor weight

Use this command to set the weight for the specific neighbor. Use the **no** form of this command to restore the default setting.

neighbor {neighbor-address|peer-group-name} **weight** number

no neighbor {neighbor-address|peer-group-name} **weight**

	Parameter	Description
Parameter	neighbor-address	IP address of the peer
Description	peer-group-name	Name of the peer group
	number	Weight, in the range from 0 to 65535.

Defaults No weight is configured for the specific neighbor by default. In this case, the learned route weight is 0 and the locally generated route's weight is 32768 initially.

Command Mode BGP configuration mode, BGP IPv4/IPv6 Unicast address family configuration mode, BGP IPv4/IPv6 VRF address family configuration mode, BGP VPNv4/VPNv6 address family configuration mode, BGP Scope configuration mode or BGP L2VPN VPWS/VPLS address family configuration mode

Usage Guide When the command is used, routes learnt from the neighbor use this value as the initial weight value. The higher the weight, the higher the priority is.
Executing the **set weight** command in the route map of the neighbor will overwrite this value.

Configuration Examples The following example sets the weight for the specific neighbor.

```
FS(config-router)# neighbor 10.1.1.1 weight 73
```

Command	Description
router bgp	Enables the BGP protocol.
neighbor remote-as	Configures the BGP peer.

Platform Description None

5.153 network

Use this command to configure the network information to be advertised by the local BGP speaker. Use the **no** form of this command to restore the default setting.

network { network-number [mask mask] | prefix } [route-map map-tag] [**backdoor**]

no network network-number [mask mask] [route-map map-tag] [**backdoor**]

Parameter	Description
network-number	Network number
mask	Subnet mask
prefix	Prefix address of the network segment
map-tag	Name of the route-map of up to 32 characters
backdoor	The route is a backdoor route.

Defaults No network information is specified by default.

Command Mode BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP scope configuration mode

Usage Guide This command allows injecting the IGP route into the BGP routing table. The network information advertised can be direct route, static route and dynamic route.
The "route-map" can be used to modify the network information.

Configuration Examples

The following example configures the network information to be advertised by the local BGP speaker.

```
FS(config)# router bgp 65000
FS(config-router)# network 10.0.0.1 mask 255.255.0.0
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
redistribute	Configures the route redistribution.
Network synchronization	Enables network synchronization.

Platform

Description None

5.154 network synchronization

Use this command to advertise the network information after the local BGP speaker is synchronized with the local device. Use the **no** form of this command to directly advertise the network information.

network synchronization

no network synchronization

Parameter Description

Parameter	Description
N/A	N/A

Defaults

This function is enabled by default.

Command Mode

BGP configuration mode, BGP Unicast/IPv4 VRF address family configuration mode, BGP Unicast/IPv6 VRF address family configuration mode, BGP scope configuration mode BGP configuration mode

Usage Guide

This command is used to modify the status of the network during the process of advertisement. It is not recommended to turn off this switch lest route black hole is caused.

Configuration Examples

The following example advertises the network information after the local BGP speaker is synchronized with the local device.

```
FS(config)# router bgp 65000
FS(config-router)# network synchronization
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol.
redistribute	Configures the route redistribution.
network(BGP)	Configures the route to be distributed.

Platform

Description None

5.155 overflow memory-lack

Use this command to allow BGP to enter the OVERFLOW state when the memory is insufficient. Use the **no** form of this command to disable this function.

overflow memory-lack

no overflow memory-lack

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Allow the BGP to enter the OVERFLOW state when the memory is insufficient.

Command

Mode BGP configuration mode, BGP scope configuration mode

In the BGP OVERFLOW state, the newly-learned routes are discarded, which prevents the memory from increasing.

When this function is enabled, if the BGP address family is in the OVERFLOW state, the newly-learned routes will be discarded, which may result in network loop. To prevent this, BGP generates a default route directing to the NULL interface, and the default route will always exist in the OVERFLOW state.

Usage Guide

Use the **clear bgp {addressfamily|all} *** command to reset the BGP and clear the OVERFLOW state in the BGP address family.

Use the **no** option to disallow the BGP to enter the OVERFLOW state when the memory is insufficient, which may lead to the continuous exhaustion of the memory resources. When the memory has been exhausted to a certain degree, BGP will break down all neighbors and delete all learned routes.

Configuration

The following example sets BGP not to enter the OVERFLOW configuration status when the memory is insufficient.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# no overflow memory-lack
```

Related Commands

Command	Description
clear bgp { addressfamily all } *	Resets the BGP address family.
show bgp { addressfamily all } summary	Displays the summary of the BGP address family.

Platform

Description None

5.156 redistribute

Use this to redistribute routes between the other routing protocol and the BGP. Use the **no** form of this command to restore the default setting.

redistribute protocol-type [**route-map** map-tag] [**metric** metric-value]

no redistribute protocol-type [**route-map** map-tag] [**metric**]

Parameter	Description
protocol-type	Source protocol type of a redistributed route. The values include: <ul style="list-style-type: none"> ● connected ● static ● rip ● arp-host (host route converted by ARP) ● nd-route (route converted by ND) ● aggregate (aggregation route)
route-map map-tag	Specifies the route map. No route map is associated with by default.
metric metric-value	Sets the default metric of the routes to be redistributed, null by default.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, IPv4 Unicast/VRF address family configuration mode, IPv6 Unicast/VRF address family configuration mode, BGP scope configuration mode

When a switch supports multiple routing protocols, the coordination between these protocols becomes an important task. The switch may run multiple routing protocols at the same time, so it should redistribute a protocol's information to another protocol. This is applicable to all IP routing protocols.

Usage Guide When you configure the **no** form of this command with parameters, the corresponding parameter configuration will be removed. The no form removes redistribution without any parameters configured.

The route metric generated by the route-map command takes precedence over the one generated by the metric option of this command. If both are unavailable, the redistributed one is used.

The following example redistributes routes between the other routing protocol and the BGP.

Configuration Examples

```
FS(config-router)# redistribute static route-map static-rmap
FS(config-router)# no redistribute static
route-map static-rmap
FS(config-router)# no redistribute static
```

Related Commands

Command	Description
show ip protocol	Displays the protocol configuration.

Platform

Description None

5.157 redistribute ospf

Use this command to redistribute routes between OSPF and BGP. Use the **no** form of this command to restore the default setting.

redistribute ospf process-id [**route-map** map-tag] [**metric** metric-value] [**match internal external** [1|2]] **nssa-external** [1|2]]

no redistribute ospf process-id [**route-map** map-tag] [**metric** metric-value] [**match internal external** [1|2] **nssa-external** [1|2]]

Parameter Description

Parameter	Description
process-id	OSPF process ID to be redistributed
route-map map-tag	Specifies the route map. No route map is associated by default.
metric metric-value	Sets the default metric of the routes to be redistributed, null by default.
match	Matches the sub type of OSPF routes.
internal	Matches the internal OSPF routes, the default configuration.
external [1 2]	Matches the external OSPF routes. You can specify the concrete type (v1 or v2) or v1 and v2 without indication.
nssa- external [1 2]	Matches the NSSA-external type of OSPF routes. You can specify the concrete type (v1 or v2) or v1 and v2 without indication.

Defaults This function is disabled by default.

Command Mode BGP configuration mode, IPv4 Unicast/VRF address family configuration mode, IPv6 Unicast/VRF address family configuration mode, BGP scope configuration mode

When a switch supports multiple routing protocols, the coordination between these protocols becomes an important task. The switch may run multiple routing protocols at the same time, so it should redistribute a protocol's information to another protocol.

Usage Guide

When you configure the **no** form of this command with parameters, the corresponding parameter configuration will be removed. The **no** form removes redistribution without any parameters configured.

The filtering rule of OSPF routing: filtering the OSPF routing type according to the configured match option before filtering the route-map rule. The route metric generated by the **route-map** command takes precedence over the one generated by the metric option of this command. If both are not available, the redistributed one is used.

Configuration

The following example redistributes routes between OSPF and BGP.

Examples

```
FS(config-router)# redistribute ospf 2 route-map static-rmap
FS(config-router)# no redistribute ospf 4 match external route-map ospf-rmap
FS(config-router)# no redistribute ospf 78
```

Related Commands

Command	Description
show ip protocol	Displays the protocol configuration.

Platform

Description None

5.158 redistribute isis

Use this command to redistribute routes between ISIS and BGP. Use the **no** form of this command to restore the default setting.

redistribute isis [isis-tag] [**route-map** map-tag] [**metric** metric-value] [**level-1** | **level-1-2** | **level-2**]

no redistribute isis [isis-tag] [**route-map** map-tag] [**metric**] [**level-1** | **level-1-2** | **level-2**]


Parameter	Description
isis-tag	(Optional)ISIS process ID to be redistributed
route-map map-tag	Specifies the route map. No route map is associated by default.
metric metric-value	Sets the default metric of the routes to be redistributed, null by default.
level-1	Redistributes level-1 ISIS routes.
level-1-2	Redistributes level-1 and level-2 ISIS routes.
level-2	Redistributes level-2 ISIS routes.


Defaults This function is disabled by default.

Command Mode BGP configuration mode, IPv4 Unicast/VRF address family configuration mode, IPv6 Unicast/VRF address family configuration mode, BGP scope configuration mode

When a switch supports multiple routing protocols, the coordination between these protocols becomes an important task. The switch may run multiple routing protocols at the same time, so it should redistribute a protocol's information to another protocol. This is applicable to all IP routing protocols.

Usage Guide

 When you configure the **no** form of this command with parameters, the corresponding parameter configuration will be removed. The **no** form removes redistribution without any parameters configured.

 The filtering rule of ISIS routing is: filtering the ISIS routing type according to the configured level option before filtering the route-map rule. The route metric generated by the route-map command takes precedence over the one generated by the metric option of this command. If both are unavailable, the redistributed one is used.

The following example redistributes routes between ISIS and BGP.

Configuration

```
FS(config-router)# redistribute isis route-map static-rmap
```

Examples

```
FS(config-router)# no redistribute isis test route-map isis-rmap
```

```
FS(config-router)# no redistribute isis
```

Related Commands

Command	Description
show ip protocol	Displays the protocol configuration.

Platform

Description None

5.159 route mirroring

Use this command to enable the BGP packet mirroring function to send mirroring packets to the BMP server. Use the **no** form of this command to disable the BGP packet mirroring function. Use the **default** form of this command to restore the default settings.

route mirroring

no route mirroring

default route mirroring

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The BGP packet mirroring function is disabled by default.

Command Mode BMP configuration mode

Default Level 14

Usage Guide Mirroring BGP packets affect the BGP performance.

Configuration The following example enables mirroring BGP packets to be sent to the BMP server.

```
FS(config)#bmp server 1
FS(config-bmpsvr)#route mirroring
```

Verification Run the **show running-config** command to display the BGP configurations.

5.160 router bgp

Use this command to enable the BGP protocol, configure the local autonomous system number and enter BGP protocol configuration mode. Use the **no** form of this command to restore the default setting.

router bgp as-number [**instance** instance-name]

no router bgp as-number

Parameter Description	Parameter	Description
	as-number	AS number in the range from 1 to 65535 In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new AS notation range is from 1 to 4294967295, represented as from 1 to 65535.65535 in dot mode.
	instance	The instance name is required for the non-default instance.
	instance-name	Instance name of 1 to 32 characters.

Defaults This function is disabled by default.

Command

Mode Global configuration mode

This command is used to start the BGP protocol.

Usage Guide

RFC4839 defines a new reserved AS notation 23456, which cannot be used. The original private AS notation in the range from 64512 to 65534 is still effective, 65535 is reserved for special purposes.

RFC 5398 also defines two groups of new reserved AS notation for documents, whose ranges are from 64496 to 64511 and from 65536 to 65551.

Configuration

The following example enables the BGP protocol.

Examples

```
FS(config)# router bgp 65000
```

Related Commands

Command	Description
ip routing	Enables IP routing.
bgp router-id	Sets the ID of the device running the BGP protocol
network	Sets the network information to be advertised by the local BGP speaker.

Platform

Description None

5.161 router bgp redistribute

Use this command to redistribute the route information of other protocols to multiple BGP instances. Use the **no** or **default** form of this command to restore the default settings.

router bgp redistribute [vrf vrf-name] **address-family** { **ipv4 unicast** | **ipv6 unicast** } protocol-type [**route-map** map-tag] [**metric** metric-value]

no router bgp redistribute [vrf vrf-name] **address-family** { **ipv4 unicast** | **ipv6 unicast** } protocol-type

default router bgp redistribute [vrf vrf-name] **address-family** { **ipv4 unicast** | **ipv6 unicast** } protocol-type

Parameter Description

Parameter	Description
protocol-type	The protocol types of redistributed routes: <ul style="list-style-type: none"> ● connected ● static ● rip ● isis ● ospf ● arp-host (host route converted by ARP) ● nd-route (route converted by ND) ● aggregate (aggregation route)
route-map map-tag	The name of route-map. No route-map is associated by default.
metric metric-value	The default metric value, range: 0-4294967295. No value is configured by default.

Defaults This function is disabled by default.

Command

Mode Global configuration mode

Usage Guide This command is used to redistribute the route information of other protocols to all BGP instances. If BGP instance has been configured with the redistribution command, the command of instance takes effect.

Configuration

The following example redistributes static routes in IPv4 unicast address family and filters redistributed routes by route map "static-rmap".

Examples

```
FS(config)#router bgp redistribute ipv4 unicast static route-map static-rmap
```

Related Commands

Command	Description
N/A	

Platform

Description None

5.162 scope

Use this command to enter the scope configuration mode and associate VRF with BGP. Use the **exit** command to exit the scope configuration mode. Use the **no** or **default** form of this command to remove the association between the VRF instance and BGP protocol.

scope { global | vrf vrf-name }

exit

no scope { global | vrf vrf-name }

default scope { global | vrf vrf-name }

Parameter Description

Parameter	Description
global	Global routing table.
vrf vrf-name	VRF instance name

Defaults No scope address family is defined by default.


Command

Mode BGP configuration mode.

Enter the scope configuration mode to perform the configuration.

To exit the scope configuration mode, use the **exit** command.

Usage Guide

 In the scope configuration mode, the commands configured in the BGP configuration mode are converted to the form in the scope configuration mode. To restore the commands, execute the

command **no route bgp** and configure the commands again.

Configuration

The following example enters the scope global configuration mode.

Examples

```
FS(config)# router bgp 65000
FS(config-router)# scope global
```

Related Commands

Command	Description
N/A	N/A

Platform

Description N/A

5.163 show bgp all

Use this command to display all the address-families information of BGP route.

show bgp [instance as-num] all [community [community-number [exact-match]] | filter-list path-list-number | community-list community-name [exact-match] | extcommunity-list extcommunity-name | regexp regexp | quote-regexp regexp | inconsistent-as]

Display the route dampening parameter.

show bgp [instance as-num] all dampening { flap-statistics | dampened-paths | parameters }

Display the related information of the neighbors.

show bgp [instance as-num] all neighbors [neighbor-address] [received-routes | routes | advertised-routes | policy [detail]]

show bgp [instance as-num] all summary

Display the path information.

show bgp [instance as-num] all paths

Display the update-group information.

show bgp [instance as-num] all update-group [neighbor-address | update-group-index] [summary]

Parameter Description

Parameter	Description
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

community community-number	Displays the routing information including the specified community value. Community-number can be in the format of AA:NN (autonomous system number / 2-byte number), or the following pre-defined value: internet, no-export, local-as, no-advertise.
community-list community-name	Displays the BGP routing information matching the specified community-list.
exact-match	Routing information exactly matching the community value or community-list.
dampening dampened-paths	Displays the restrained routing information.
dampening flap-statistics	Displays the routing dampening statistics.
dampening parameters	Displays the routing dampening parameters.
extcommunity-list extcommunity-name	Displays the routing information including the specified extcommunity value.
filter-list path-list-number	Displays the routing information matching the filter-list.
inconsistent-as	Displays the routing information of the inconsistent source AS.
neighbors [neighbor-address]	Displays all the BGP neighbors' information. Displays information about a specific neighbor when neighbor-address or neighbor-prefix is specified; otherwise, displays information about all BGP neighbors.
neighbors neighbor-address received-routes	Displays all routing information received from the specified peer (including the accepted and refused route).
neighbors neighbor-address routes	Displays all the accepted routing information received from the peer.
neighbors neighbor-address advertised-routes	Displays all the routing information sent to the specified peer.
neighbors neighbor-address policy	Displays the related routing policy information of BGP neighbors. (General)

neighbors neighbor-address policy detail	Displays the related routing policy information of BGP neighbors. (Detail)
quote-regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp within the double quote marks.
regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp.
update-group [neighbor-address update-group-index]	Displays update-group information. If neighbor-address is specified, display the update-group information of specific neighbor. If update-group-index is specified, display the specific update-group information.

Defaults Please refer to the detailed description of **show bgp ipv4 unicast** command.

Command

Mode Privileged EXEC mode

Usage Guide Please refer to the detailed description of **show bgp ipv4 unicast** command..

Configuration

Examples None

Related Commands	Command	Description
	show bgp ipv4 unicast	Displays the IPv4 unicast route information of BGP

Platform

Description None

5.164 show bgp bmp

Use this command to display information about a BMP server instance.

show bgp bmp server [server-number [detail] | detail]

Use this command to display neighbors monitored by the BMP server.

show bgp bmp neighbor

Use this command to display abstract information of a connection to the BMP server.

show bgp bmp summary

Parameter Description	Parameter	Description
	server-number	ID of a BMP server instance
	detail	Displays information about a BMP server instance.

Command Privileged EXEC mode
Mode

Default Level 14

Usage Guide

Configuration The following example displays information about a BMP server instance.

Examples

```
FS#show bgp bmp server 1
BMP server 1
  BMP state = Idle
  up time      Never
  BGP monitor neighbors: 4
  route mirroring
```

The following example displays neighbors monitored by the BMP server.

```
FS#show bgp bmp neighbor

Neighbor      CfgSvr#      ActSvr#
3.3.3.1       1             1
3.3.3.2       1             1
```

Field	Description
Neighbor	Address of a monitored neighbor
CfgSvr#	Configured instance ID of the BMP server that monitors the neighbor.
ActSvr#	Activated instance ID of the BMP server that monitors the neighbor.

The following example displays abstract information of a connection to the BMP server.

```
FS#show bgp bmp summary

ID  Host          Port  State  Time  NBRs
1   123.123.123  12345 Active Never  4
```

Field	Description
ID	Address of a monitored neighbor
Host	Configured instance ID of the BMP server that monitors the neighbor.
Port	Monitoring port of the BMP server
State	Status of the connection to the BMP server

Time	Duration for connecting to or disconnecting from the BMP server
NBRs	Quantity of neighbors monitored by the BMP server

5.165 show bgp ipv4 unicast

Use this command to display the IPv4 unicast route information of BGP.

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] [network [network-mask [longer-prefixes]]]

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] community [community-number [exact-match]]

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] community-list community-name [exact-match]

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] extcommunity-list extcommunity-name

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] dampening dampened-paths

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] dampening flap-statistics

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] filter-list path-list-number

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] inconsistent-as

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] prefix-list ip-prefix-list-name

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] quote-regexp regexp

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] regexp regexp

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] route-map map-tag

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] neighbors [neighbor-address] [received-routes | routes | advertised-routes | policy [detail]]

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] cidr-only

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] labels

Parameter	Description
vrf-name	VRF instance name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
network	Displays the specific routing information in the routing table
network-mask	Displays the routing information included in the specified network.
longer-prefixes	Displays the route map information.
community community-number	Displays the routing information including the specified community value. Community-number can be in the format of AA:NN (autonomous

**Parameter
Description**

	system number / 2-byte number), or the following pre-defined value: internet, no-export, local-as, no-advertise.
community-list community-name	Displays the BGP routing information matching the specified community-list.
exact-match	Routing information exactly matching the community value or community-list.
extcommunity-list extcommunity-name	Displays the routing information including the specified extcommunity value.
dampening dampened-paths	Displays the restrained routing information.
dampening flap-statistics	Displays the routing dampening statistics.
filter-list path-list-number	Displays the routing information matching the filter-list.
inconsistent-as	Displays the routing information of the inconsistent source AS.
prefix-list ip-prefix-list-name	Displays the routing information matching the specified prefix-list.
quote-regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp within the double quote marks.
regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp.
route-map map-tag	Displays the routing information matching the specified route-map filtering condition.
neighbors [neighbor-address]	Displays the BGP IPv4 unicast neighbor information. Displays information about a specific neighbor when neighbor-address or neighbor-prefix is specified; otherwise, displays information about all BGP IPv4 neighbors.
neighbors neighbor-address received-routes	Displays all routing information received from the specified peer (including the accepted and refused route).
neighbors neighbor-address routes	Displays all the routing information received from the peer and accepted.
neighbors neighbor-address advertised-routes	Displays all the routing information sent to the specified peer.
neighbors neighbor-address policy	Displays the related routing policy information of BGP neighbors. (General)
neighbors neighbor-address policy detail	Displays the related routing policy information of BGP neighbors. (Detail)
cidr-only	Displays the routing information without the category.
labels	Displays the BGP-learned and BGP-sent routes with the MPLS label.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

Use this command to view the IPv4 unicast route information of BGP. You can filter the information with the specified parameter to display the matching route information.

The following example displays the IPv4 unicast route information of BGP.

```
FS# show bgp ipv4 unicast
BGP table version is 2, local router ID is 192.168.183.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
                S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
  Network    Next Hop    Metric  LocPrf Path
*>i44.0.0.0  192.168.195.183  0    100  i
*>i64.12.0.0/16  192.168.195.183  0    100  i
*>i172.16.0.0/24 192.168.195.183  0    100  i
*>i202.201.0.0  192.168.195.183  0    100  i
*>i202.201.1.0  192.168.195.183  0    100  i
*>i202.201.2.0  192.168.195.183  0    100  i
*>i202.201.3.0  192.168.195.183  0    100  i
*>i202.201.18.0 192.168.195.183  0    100  i
Total number of prefixes 8
```

```
FS# show bgp ipv4 unicast community 11:2222
111:12345
BGP table version is 2, local router ID is 192.168.183.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
                S Stale
```

Configuration

Examples

```
Origin codes: i - IGP, e - EGP, ? - incomplete
  Network    Next Hop    Metric  LocPrf Path
*>i202.201.0.0  192.168.195.183  0    100  i
*>i202.201.1.0  192.168.195.183  0    100  i
*>i202.201.2.0  192.168.195.183  0    100  i
*>i202.201.3.0  192.168.195.183  0    100  i
Total number of prefixes 4
```

```
FS(config)# ip as-path access-list 5 permit .*
```

```
FS# show bgp ipv4 unicast filter-list 5
BGP table version is 2, local router ID is 192.168.183.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
                S Stale
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
  Network    Next Hop    Metric  LocPrf Path
*>192.168.88.0  0.0.0.0    32768 ?
```

```
Total number of prefixes 1
```

```
FS# show ip bgp cidr-only
```

```
BGP table version is 2, local router ID is 192.168.183.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
                S Stale
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
  Network    Next Hop    Metric  LocPrf Path
*>i64.12.0.0/16 192.168.195.183  0    100  i
```

```
*>i172.16.0.0/24 192.168.195.183 0 100 i
Total number of prefixes 2
FS# show bgp ipv4 unicast labels
Network    Next Hop   In Label/Out Label
1.1.1.1/32 192.167.1.1 17/18
1.1.1.2/32 192.167.1.1 no-label/19
```

Field	Description
Network	Route prefix
Nexthop	Nexthop IP address of the route
In label	Label assigned by this router (if any).
Out label	Label learnt from the nexthop router (if any).

Command	Description
show ip bgp	Displays the IPv4 unicast route information of BGP.

Platform

Description None

5.166 show bgp ipv4 unicast dampening parameters

Use this command to display the IPv4 unicast route dampening parameters configured for the BGP.

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] dampening parameters

Parameter	Parameter	Description
Description	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to display the IPv4 unicast route dampening parameters configured for BGP.

The following example displays the IPv4 unicast route dampening parameters configured for the BGP.

Configuration Examples

```
FS(config-router)# bgp dampening 25 10000 10000 200
FS# show bgp ipv4 unicast dampening parameters
dampening 25 10000 10000 200
Dampening Control Block(s):
```

```

Reachability Half-Life time : 25 min
Reuse penalty      : 10000
Suppress penalty   : 10000
Max suppress time  : 200 min
Max penalty (ceil) : 29800000
Min penalty (floor) : 5000

```

Related**Commands** N/A**Platform****Description** None**5.167 show bgp ipv4 unicast neighbors**

Use this command to display the related information of BGP IPv4 unicast neighbor.

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] neighbors neighbor-address [policy [detail]

**Parameter
Description**

Parameter	Description
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
vrf-name	VRF instance name
neighbor-address	Neighbor IPv4 address
neighbors neighbor-address policy	Displays the general routing policy information of BGP neighbors.
neighbors neighbor-address policy detail	Displays the detailed routing policy information of BGP neighbors.

Defaults N/A**Command****Mode** Privileged EXEC mode**Usage Guide**

This command is used to view the information of the connection with BGP IPv4 unicast neighbor.

The following example displays the related information of BGP IPv4 unicast neighbor.

**Configuration
Examples**

```

FS# show bgp ipv4 unicast neighbors
BGP neighbor is 192.168.195.183, remote AS 23, local AS 23, internal link
BGP version 4, remote router ID 44.0.0.1
BGP state = Established, up for 00:06:37
Last read 00:06:37, hold time is 180, keepalive interval is 60 seconds
Neighbor capabilities:

```

```

Route refresh: advertised and received (old and new)
Address family IPv4 Unicast: advertised and received
Graceful restart: advertised and received
Remote Restart timer is 120 seconds
  Received 14 messages, 0 notifications, 0 in queue
  open message:1 update message:4 keepalive message:9
  refresh message:0 dynamic cap:0 notifications:0
  Sent 12 messages, 0 notifications, 0 in queue
  open message:1 update message:3 keepalive message:8
  refresh message:0 dynamic cap:0 notifications:0
Route refresh request: received 0, sent 0
Minimum time between advertisement runs is 0 seconds
For address family: IPv4 Unicast
BGP table version 2, neighbor version 1
Index 2, Offset 0, Mask 0x4
Inbound soft reconfiguration allowed
  8 accepted prefixes
  0 announced prefixes
Connections established 2; dropped 1
Local host: 192.168.195.239, Local port: 1074
Foreign host: 192.168.195.183, Foreign port: 179
Nexthop: 192.168.195.239
Nexthop global: ::
Nexthop local: ::
BGP connection: non shared network
Last Reset: 00:06:43, due to BGP Notification sent
Notification Error Message: (Cease/Unspecified Error Subcode)
Using BFD to detect fast fallover
    
```

Related

Commands N/A

Platform

Description None

5.168 show bgp ipv4 unicast paths

Use this command to display the path information of the IPv4 unicast in the route database.

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] paths

	Parameter	Description
Parameter	instance	Specify the instance
Description	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new

	range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
vrf-name	VRF instance name

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command is used to view the path information in the route database.

The following example displays the path information of the IPv4 unicast in the route database.

Configuration

Examples

```
FS# show bgp ipv4 unicast paths
Address  Refcnt Path
[0x1d7806a0:0] (67)
[0x1d7389a0:13] (20) 10
```

Related

Commands N/A

Platform

Description None

5.169 show bgp ipv4 unicast summary

Use this command to display the related information of BGP IPv4 unicast.

show bgp [instance as-num] ipv4 unicast [vrf vrf-name] summary

Parameter Description

Parameter	Description
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
vrf-name	VRF instance name

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command is used to display the related information of BGP IPv4 unicast.

Configuration The following example displays the related information of BGP IPv4 unicast.

Examples

```
FS # show bgp ipv4 unicast summary
BGP router identifier 192.168.183.1, local AS number 23
BGP table version is 2
2 BGP AS-PATH entries
1 BGP community entries

Neighbor  V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
192.168.195.79 4 24  0  0  0 0 0 never Active
192.168.195.183 4 23  17  15  1 0 0 00:09:04  8

Total number of neighbors 2
```

Related Commands

Command	Description
router bgp	Enables the BGP protocol

Platform

Description None

5.170 show bgp ipv4 unicast update-group

Use this command to display information about an update-group in the BGP IPv4 unicast address family.

show bgp ipv4 unicast [vrf vrf-name] **update-group** [neighbor-address | update-group-index] [**summary**]

Parameter Description

Parameter	Description
vrf-name	Specifies a VRF instance name.
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
neighbor-address	Specifies a neighbor that belongs to an update-group whose information needs to be displayed.
update-group-index	Specifies an update-group whose information needs to be displayed.
summary	Displays neighbor-related information.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to display information about an update-group in the BGP IPv4 unicast address family.

Configuration Example The following example displays information about an update-group in the BGP IPv4 unicast address family.

```
FS#show bgp ipv4 update-group
BGP version 4 update-group 1(ref 2), internal, Address Family: IPv4 Unicast
```

```

Update message formatted 2, replicated 2

Minimum route advertisement interval is 0 seconds

Minimum AS origination interval is 1 seconds

Format state: Current working

                Refresh blocked

Has 1 members:

    192.168.195.183
    
```

The following example displays the neighbor summary of update-group 1 in the BGP IPv4 unicast address family.

```

FS # show bgp ipv4 unicast update-group 1 summary

BGP router identifier 192.168.183.1, local AS number 23

BGP table version is 2

2 BGP AS-PATH entries

1 BGP community entries

Neighbor          V    AS  MsgRcvd  MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
192.168.195.79   4    24     0        0        0    0    0    never     Active
192.168.195.183  4    23    17        15        1    0    0    00:09:04  8

Total number of neighbors 2
    
```

Field description:

Field	Description
BGP router identifier	BGP router ID
local AS number	Local AS number of BGP
BGP table version	Version of the BGP routing table
BGP AS-PATH entries	Number of AS path entries
BGP community entries	Number of community attribute entries
Neighbor	Peer address
V	Protocol version
AS	Peer AS number
MsgRcvd	Number of received packets
MsgSent	Number of sent packets
State/PfxRcd	Status of the neighbor state machine or number of received routing entries

5.171 show bgp ipv6 unicast

Use this command to display the IPv6 unicast routing information of BGP.

show bgp ipv6 unicast [vrf vrf-name] [IPv6-Prefix]

show bgp ipv6 unicast [vrf vrf-name]community community-number [exact-match]

show bgp ipv6 unicast [vrf vrf-name]community-list community-name [exact-match]

```

show bgp ipv6 unicast [ vrf vrf-name ]dampening dampened-paths
show bgp ipv6 unicast [ vrf vrf-name ]dampening flap-statistics
show bgp ipv6 unicast [ vrf vrf-name ]filter-list path-list-number
show bgp ipv6 unicast [ vrf vrf-name ]inconsistent-as
show bgp ipv6 unicast [ vrf vrf-name ]prefix-list ipv6-prefix-list-name
show bgp ipv6 unicast [ vrf vrf-name ]quote-regexp regexp
show bgp ipv6 unicast [ vrf vrf-name ] regexp regexp
show bgp ipv6 unicast[ vrf vrf-name ] route-map map-tag

show bgp ipv6 unicast [ vrf vrf-name ] neighbors [ neighbor-address ] [ received-routes | routes |
advertised-routes | policy [ detail ] ]

```

**Parameter
Description**

Parameter	Description
vrf-name	VRF name
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
IPv6-prefix	Displays the IPv6 routing information included in the specified network. The input format of the routing information prefix is X:X:X:X/<0-128>.
community community-number	Displays the routing information including the specified community value. Community-number can be in the format of AA:NN (autonomous system number / 2-byte number), or the following pre-defined value: internet, no-export, local-as, no-advertise.
community-list community-name	Displays the BGP routing information matching the specified community-list.
exact-match	Routing information exactly matches the community value or community-list.
dampening dampened-paths	Displays the restrained routing information.
dampening flap-statistics	Displays the routing dampening statistics.
filter-list path-list-number	Displays the routing information matching the filter-list.
inconsistent-as	Displays the routing information of the inconsistent source AS.
prefix-list ipv6-prefix-list-name	Displays the routing information matching the specified prefix-list.
quote-regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp within the double quote marks.
regexp regexp	Displays the BGP routing information with the AS path attribute matching the specified regexp.
route-map map-tag	Displays the routing information matching the specified route-map filtering condition.
neighbors neighbor-address received-routes	Displays all routing information received from the specified peer (including accepted and refused routes).

neighbors neighbor-address routes	Displays all the routing information received from the peer and accepted.
neighbors neighbor-address advertised-routes	Displays all the routing information sent to the specified peer.
neighbors neighbor-address policy	Displays the related routing policy information of BGP neighbors. (General)
neighbors neighbor-address policy detail	Displays the related routing policy information of BGP neighbors. (Detail)

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide Use this command to view the IPv6 unicast route information of BGP. You can filter the information with the specified parameter to display the matching route information. The function and use of this command is similar to the **show bgp ipv4 unicast** command, please refer to the command.

Configuration

Examples N/A

Related Commands	Command	Description
	show bgp ipv4 unicast	Displays the IPv4 unicast route information of BGP.

Platform

Description None

5.172 show bgp ipv6 unicast dampening parameters

Use this command to display the IPv6 unicast route dampening parameters configured for BGP.

show bgp ipv6 unicast [vrf vrf-name] dampening parameters

Parameter	Parameter	Description
Description	vrf-name	VRF name.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide This command is used to display the IPv6 unicast route dampening parameters configured for the BGP. The function and use of this command are similar to the **show bgp ipv4 unicast dampening parameters** command. Please refer to the command.

Configuration N/A

Examples

Related	Command	Description
Commands	show bgp ipv4 unicast dampening parameters	Displays the IPv4 unicast route dampening parameters configured for BGP.

Platform

Description None

5.173 show bgp ipv6 unicast neighbors

Use this command to display the related information of BGP IPv6 unicast neighbor.

show bgp [instance as-num] ipv6 unicast [vrf vrf-name] neighbors neighbor-address

Parameter	Parameter	Description
Description	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	neighbor-address	Neighbor IPv6 address.

Defaults N/A

Command

Mode Privileged EXEC mode

This command is used to view the information of the connection with BGP IPv6 unicast neighbor. The function and use of this command are similar to the **show bgp ipv4 unicast neighbors neighbor-address** command. Please refer to the command.

Usage Guide

Configuration

Examples N/A

Related	Command	Description
Commands	show bgp ipv4 unicast neighbors neighbor-address	Displays the related information of BGP IPv4 unicast neighbor.

Platform

Description None

5.174 show bgp ipv6 unicast paths

Use this command to display the path information of the IPv6 unicast in the route database.

show bgp [instance as-num] ipv6 unicast [vrf vrf-name] paths

Parameter	Parameter	Description
Description	vrf-name	VRF name
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to view the path information in the route database.

The following example displays the path information of the IPv6 unicast in the route database.

Configuration Examples

```
FS# show bgp ipv6 unicast paths
Address Refcnt Path
[0x1d7806a0:0] (67)
[0x1d7389a0:13] (20) 10
```

Related Commands

Command	Description
show bgp ipv4 unicast paths	Displays the path information of the IPv4 unicast in the route database.

Platform

Description None

5.175 show bgp ipv6 unicast summary

Use this command to display the related information of BGP IPv6 unicast.

show bgp [instance as-num] ipv6 unicast [vrf vrf-name] summary

Parameter	Parameter	Description
Description	vrf-name	VRF name.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to display the related information of BGP IPv6 unicast. The function and use of this command are similar to the **show bgp ipv4 unicast summary** command. Please refer to the command.

Configuration

Examples N/A

	Command	Description
Related Commands	router bgp	Enables the BGP protocol
	show bgp ipv4 unicast summary	Displays the related information of BGP IPv4 unicast.

Platform

Description None

5.176 show bgp ipv6 unicast update-group

Use this command to display information about an update-group in the BGP IPv6 unicast address family.

show bgp [**instance** as-num] **ipv6 unicast** [**vrf** vrf-name] **update-group** [neighbor-address | update-group-index] [**summary**]

Parameter Description	Parameter	Description
	vrf-name	Specifies a VRF instance name.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
	neighbor-address	Specifies a neighbor that belongs to an update-group whose information needs to be displayed.
	update-group-index	Specifies an update-group whose information needs to be displayed.
	summary	Displays neighbor-related information.

Command Privileged EXEC mode

Mode

Default Level 14

Usage Guide

This command is used to display information about an update-group in the BGP IPv6 address family.

Configuration

The following example displays information about an update-group in the BGP IPv6 unicast address family.

Example

```
FS#show bgp ipv6 update-group
```



```
BGP version 4 update-group 1(ref 2), internal, Address Family: IPv6 Unicast

Update message formatted 2, replicated 2

Minimum route advertisement interval is 0 seconds

Minimum AS origination interval is 1 seconds

Format state: Current working

                Refresh blocked

Has 1 members:

192:168:195::183
```

The following example displays the neighbor summary of update-group 1 in the BGP IPv6 unicast address family.

```
FS # show bgp ipv6 unicast update-group 1 summary

BGP router identifier 192.168.183.1, local AS number 23

BGP table version is 2

2 BGP AS-PATH entries

1 BGP community entries

Neighbor          V    AS  MsgRcvd  MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
192:168:195::79  4    24     0        0        0    0    0    never     Active
192:168:195::183 4    23    17        15        1    0    0    00:09:04  8

Total number of neighbors 2
```

Field description:

Field	Description
BGP router identifier	BGP router ID
local AS number	Local AS number of BGP
BGP table version	Version of the BGP routing table
BGP AS-PATH entries	Number of AS path entries
BGP community entries	Number of community attribute entries
Neighbor	Peer address
V	Protocol version
AS	Peer AS number
MsgRcvd	Number of received packets
MsgSent	Number of sent packets
State/PxRcd	Status of the neighbor state machine or number of received routing entries

Prompt N/A

Platform Description N/A

5.177 show bgp statistics

Use this command to display the BGP statistics information.

show bgp [**instance** as-num] **statistics** [**vrf** vrf-name]

Parameter	Parameter	Description
Description	vrf vrf-name	Displays the BGP statistics information of VRF.
	instance	Specify the instance
	as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide Without the **vrf** parameter, the global BGP statistics information will be displayed.

The following example displays the BGP statistics information.

```
FS#show bgp statistics
Local as 100, Router id 1.1.1.1
  Total neighbor 10, Established neighbor 9, Admin-Down neighbor 1
  IBGP neighbor 8, Established IBGP neighbor 8, Admin-Down IBGP neighbor 0
  EBGp neighbor 2, Established EBGp neighbor 1, Admin-Down EBGp neighbor 1
  AS-PATH entries 1, Community entries 1, Extended-Community entries 0

For address family: IPv4 Unicast
  Activated neighbor 9, Unactivated neighbor 0
  Activated IBGP neighbor 8, Unactivated IBGP neighbor 0
  Activated EBGp neighbor 1, Unactivated EBGp neighbor 0

For address family: IPv6 Unicast
  Activated neighbor 0, Unactivated neighbor 9
  Activated IBGP neighbor 0, Unactivated IBGP neighbor 0
  Activated EBGp neighbor 0, Unactivated EBGp neighbor 0
```

Configuration

Examples

Parameter	Description
Router id	ID of BGP router.
Total neighbor	Total number of neighbors.
Established neighbor	Number of UP neighbors.
Admin-Down neighbor	Number of admin down neighbors.
IBGP neighbor	Number of IBGP neighbors.
Established IBGP neighbor	Number of UP IBGP neighbors.

Admin-Down IBGP neighbor	Number of admin down IBGP neighbors.
EBGP neighbor	Number of EBGP neighbors.
AS-PATH entries	Number of AS-PATH entries.
Community entries	Number of community entries.
Extended-Community	Number of extended community entries.
Established EBGP neighbor	Number of UP EBGP neighbors.
Admin-Down EBGP neighbor	Number of admin down EBGP neighbors.
Activated neighbor	Number of activated neighbors.
Unactivated neighbor	Number of unactivated neighbors, not including UP neighbors.
Activated IBGP neighbor	Number of activated IBGP neighbors.
Unactivated IBGP neighbor	Number of unactivated IBGP neighbors, not including UP neighbors.
Activated EBGP neighbor	Number of activated EBGP neighbors.
Unactivated EBGP neighbor	Number of unactivated EBGP neighbors, not including UP neighbors.

Platform

Description N/A

5.178 show ip bgp

Use this command to display the BGP IPv4 unicast address families' route information. The method of use is the same as other BGP show commands.

show ip bgp [**instance** as-num] [**vrf** vrf-name] [network [network-mask [**longer-prefixes**]] | **cidr-only** | **community** [community-number [**exact-match**]] | **filter-list** path-list-number | **community-list** community-name [**exact-match**] | **regexp** regexp | **quote-regexp** regexp | **extcommunity-list** extcommunity-name | **inconsistent-as** | **prefix-list** ip-prefix-list-name | **route-map** map-tag]

Display route flap's parameters.

show ip bgp [**instance** as-num] [**vrf** vrf-name] **dampening** { **flap-statistics** | **dampened-paths** | **parameters** }

Display neighbors' related information.

show ip bgp [**instance** as-num] [**vrf** vrf-name] **neighbors** [neighbor-address [**received-routes** | **routes** | **advertised-routes** [**policy** [**detail**]]]]

Display BGP IPv4 unicast address families' neighbor summary

show ip bgp [**instance** as-num] [**vrf** vrf-name] **summary**

Display directory information.

show ip bgp [**instance** as-num] [**vrf** vrf-name] **paths**

Display route scan status.

show ip bgp [**instance** as-num] **scan**

Display related information under VRF.

show ip bgp [**instance** as-num] **vrf** vrf-name

Display related information of BGP IPv4 unicast update-group.

show ip bgp [**instance** as-num] [**vrf** vrf-name] **update-group** [neighbor-address | update-group-index] [**summary**]

Parameter	Parameter	Description
-----------	-----------	-------------

Description

Description	
instance	Specify the instance
as-num	Specify the AS number of instance. In the 10.4(3) or later versions, the 4-byte AS notation is supported, namely, the new range of the new AS notation is from 1 to 4294967295, represented as 1 to 65535.65535 in dot mode.
vrf-name	VRF instance name
network	Displays specific route information in the route table.
network-mask	Displays route information in the specific network.
longer-prefixes	Displays the route map information.
cidr-only	Displays route information without specific category.
community community-number	Displays route information containing specific community value. The community-number is the group number. The format is AA:NN (autonomous system number/2-byte figure), or the following pre-defined value: internet, no-export, local-as or no-advertise.
community-list community-name	Displays the BGP route information of the specified community list. The community-name is the name of the community list.
dampening dampened-paths	Displays dampened route information.
dampening flap-statistics	Displays the route flap statistics.
dampening parameters	Displays believed route flap parameters.
extcommunity-list	Displays route information containing specific extcommunity value.
filter-list path-list-number	Displays the route information that complies with the filter list. The path-list-number is the marking number of the filter list.
inconsistent-as	Displays the route information of inconsistent source AS.
labels	Displays the IPv4 label route information.
neighbors neighbor-address	Displays the route information of BGP neighbors. Displays information about a specific neighbor when neighbor-address is specified; otherwise, displays information about all BGP IPv4 neighbors.
neighbors neighbor-address received-routes	Displays all routing information received from the specified peer (including accepted and refused routes).
neighbors neighbor-address routes	Displays all the routing information received from the peer and accepted.
neighbors neighbor-address advertised-routes	Displays all the routing information sent to the specified peer.
neighbors neighbor-address policy	Displays the related routing policy information of BGP neighbors. (General)
neighbors neighbor-address policy detail	Displays the related routing policy information of BGP neighbors. (Detail)
paths	Displays the route information in the route database.
prefix-list	Displays the route information that complies with the prefix list.
quote-regexp regexp	Displays the BGP route information of regular expression in the specified double quotation mark of the AS route attribute.
regexp regexp	Displays the BGP route information of specified regular expression of the AS

	route attribute.
route-map	Displays the route information that complies with the route map.
scan	Displays the BGP route scanning status.
summary	Displays related information of BGP neighbors.
labels	Display IPv4 route label information.
update-group [neighbor-address update-group-index]	Display update-group information. When neighbor-address is specified, display the update-group information of the specified neighbor. When update-group-index is specified, display the specified update-group information.

Defaults -

Command Mode Privileged EXEC mode

Usage Guide The **show ip bgp** command is the same as **show bgp ipv4 unicast** in terms of the function. All the parameters in **show bgp ipv4 unicast** apply to **show ip bgp**.

Configuration Examples -

Command	Description
show bgp ipv4 unicast	Displays IPv4 unicast route information in BGP route information.

Platform Description -

5.179 update-source

Use this command to set the network interface used when a TCP connection is established to the BMP server. Use the **no** form of this command to delete the source address configuration of the BGP peer. Use the **default** form of this command to restore the default settings.

update-source interface-type interface-number

no update-source

default update-source

Parameter	Description
interface-type interface-number	Interface name

- Defaults** The optimal local interface is used as the output interface by default.

- Command** BMP configuration mode
- Mode**

- Default Level** 14

- Usage Guide** Use this command to use a loopback interface to establish a TCP connection to the BMP server.
 If the network interface address is specified when a TCP connection is established, the address must be a valid local interface address. Otherwise, the TCP connection establishment is affected.

- Configuration** The following example sets loopback 1 as the TCP source address when a connection is established to BGP peer 10.0.0.1.
- Examples**

```
FS(config)# bmp server 1
FS(config-bmpsrvr)# update-source loopback 1
```

- Verification** Run the **show running-config** command to display the BMP configurations.

Prompt
 Messages

5.180 vrf

Use this command to establish a TCP connection to the BMP server under a VRF instance. Use the **no** form of this command to delete VRF configuration and establish a TCP connection to the BMP server globally. Use the **default** form of this command to restore the default VRF configurations.

- vrf** vrf-name
- no vrf** vrf-name
- default vrf** vrf-name

Parameter Description	Parameter	Description
	vrf-name	VRF instance name

- Defaults** No VRF instance is configured by default.

- Command** BMP configuration mode
- Mode**

- Default Level** 14

- Configuration** The following example establishes a TCP connection to the BMP server under VRF instance vpn1.
- Examples**

```
FS(config)# bmp server 1
FS(config-bmpsrvr)#vrf vpn1
```

Verification Run the **show running-config** command to display the BMP configurations.

Prompt No VRF instance exists.

Messages % VRF vrf-name does not exist!

6 RIPng Commands

6.1 clear ipv6 rip

Use this command to clear the RIPng routes.

clear ipv6 rip

Parameter Description	Parameter	Description
	N/A	N/A

Defaults None

Command mode Privileged EXEC mode

Usage Guide Running this command removes all RIPng routes and this operation may have great impact on the RIPng protocol. This command should be used with caution.

Configuration Examples The following example clears the RIPng routes:

```
FS# clear ipv6 rip
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.2 default-metric

Use this command to configure the default metric for RIPng. Use the **no** form of this command to restore the default value.

default-metric metric

no default-metric

Parameter Description	Parameter	Description
	metric	Sets the default metric value. The valid range is from 1 to 16. The route is unreachable if the metric value is larger than or equal to 16.

Defaults 1

Command Routing process configuration mode.

mode

Usage Guide This command shall be used with the **redistribute** command. When redistributing the route from one route process to RIPng, due to the incompatibility of metric calculation mechanisms of different routing protocols, it fails to translate the routing metric values. To this end, the RIPng metric value shall be defined when translating the metric values. If there is no defined metric value, use the **default-metric** command to define one; and the defined metric value will overwrite the value of the **default-metric** command. By default, the **default-metric** value is 1.

Configuration The following example redistributes the static route the RIP process and set the metric value to 3:

Examples

```
FS(config-router)# default-metric 3
FS(config-router)# redistribute static
```

Related Commands

Command	Description
redistribute	Redistributes the route from one route domain to another route domain.

Platform N/A
Description

6.3 distance

Use this command to set the administrative distance of RIPng. Use the **no** form of this command to restore the default value.

distance distance
no distance

Parameter Description

Parameter	Description
distance	Sets the RIPng administrative distance. The range is from 1 to 254.

Defaults 120

Command mode Routing process configuration mode.

Usage Guide N/A

Configuration The following example sets the RIPng administrative distance as 160:

Examples

```
FS(config)# ipv6 router rip
FS(config-router)# distance 160
```

Related

Command	Description
---------	-------------

Commands		
	N/A	N/A

Platform N/A

Description

6.4 distribute-list

Use this command to filter the in/out route in the prefix list. Use the **no** form of this command to remove route filtering.

distribute-list prefix-list prefix-list-name { **in** | **out** } [interface-type interface-name]

no distribute-list prefix-list prefix-list-name { **in** | **out** } [interface-type interface-name]

Parameter Description	Parameter	Description
		prefix-list prefix-list-name
	in out	Filters the in or out route in the distribute list.
	interface-type interface-name	(Optional) Applies the distribute list to the specified interface.

Defaults By default, no distribute list is defined.

Command mode Routing process configuration mode.

Usage Guide This command is used to configure the route distribution control list to filter all update routes for the purpose of refusing to receive or send the specified routes. If the interface is not specified, the update routes on all interfaces are filtered.

Configuration Examples The following example filters the received update route on the interface eth0 (only those update routes within the **prefix-list** allowpre prefix list range can be received)

```
FS(config)# ipv6 router rip
FS(config-router)# distribute-list prefix-list allowpre in eth0
```

Related Commands	Command	Description
		redistribute

Platform N/A

Description

6.5 graceful-restart

Use this command to configure the RIP graceful restart (GR) function for a device. Use the **no** form of this command to restore the default configuration.

graceful-restart [**grace-period** grace-period]

no graceful-restart [grace-period]

Parameter Description	Parameter	Description
	graceful-restart	Enables the GR function.
	grace-period	(Optional) Configures the grace period.
	grace-period	(Optional) Indicates the user-defined GR period. The default value is the smaller value between twice the update time and 60 seconds. The range is from 1 to 1,800. The unit is second.

Defaults This function is enabled by default.

Command


Mode Routing process configuration mode

Usage Guide

The GR function is configured on the RIP instances. Different parameters can be configured for different RIP instances.

The GR period refers to the time from the startup to the end of RIP GR. During this period, the forwarding table remains unchanged and the RIP route is restored to the state before protocol restart. When the GR period expires, RIP exits the GR state and performs normal RIP operation.

The **graceful-restart grace-period** command enables users to modify GR period. Note: Make sure that GR is completed before the RIP route is validate and after an RIP route update cycle elapses. If an improper value is configured, non-stop data forwarding cannot be ensured during the GR process. For example, if the GR period is longer than the time when the neighbor’s route is unavailable and GR is not completed before the route is validated, then the neighbor is not re-informed of the route and forwarding of the neighbor’s route is terminated when it is validated, which results in data forwarding interruption. Therefore, unless otherwise specified, it is not recommended to adjust the GR period. If the period needs to changed, determine that the grace period is longer than the route update cycle and shorter than the time when the route is unavailable in combination with the configuration of the **timers basic** command.

 During the RIP GR period, the network must be stable.

Configuration The following example enables the RIP GR function and configures the GR period parameters of the GR function.

Examples

```
FS(config)# router rip
FS(config-router)# graceful-restart grace-period 90
```

Related Commands

Command	Description
timers basic	Configures RIP timers.

Platform N/A
Description

6.6 ipv6 rip default-information

Use this command to generate a default IPv6 route to the RIPng. Use the **no** form of this command to remove the default route.

ipv6 rip default-information { **only** | **originate** } [**metric** metric-value]

no ipv6 rip default-information

Parameter	Parameter	Description
Description	only	Advertises the IPv6 default route only.
	originate	Advertises both of the IPv6 default route and other routes.
	metric metric-value	Sets the metric value for the default route. The valid range is from 1 to 15. The default metric is 1.

Defaults By default, no default route is configured.

Command mode Interface configuration mode

Usage Guide With this command configured on an interface, the interface advertises an IPv6 default route and the route itself is not to join the device route forwarding table and the RIPng route database.

To avoid the route loop, once this command has been configured on the interface, RIPng refuses to receive the default route update message advertised from the neighbor.

Configuration Examples The following example creates a default route to the RIPng routing process on the interface ethernet0/0 and enable this interface to advertise the default route only:

```
FS(config)# interface ethernet 0/0
FS(config-if)# ipv6 rip default-information only
```

Related Commands	Command	Description
	show ipv6 rip	Displays the RIPng process and statistics.
	show ipv6 rip database	Displays the RIPng route.

Platform N/A

Description

6.7 ipv6 rip enable

Use this command to enable the RIPng on the interface. Use the **no** form of this command to disable RIPng on the interface.

ipv6 rip enable

no ipv6 rip enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Interface configuration mode.

Usage Guide This command is used to add the RIPng interface. Before this command is configured, if the RIPng is not enabled, use this command to enable the RIPng automatically.

Configuration Examples The following example enables the RIPng on the interface 0/0:

```
FS(config)# interface ethernet 0/0
FS(config-if)# ipv6 rip enable
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.8 ipv6 rip metric-offset

Use this command to set the interface metric value. Use the **no** form of this command to remove the metric configurations.

ipv6 rip metric-offset value

no ipv6 rip metric-offset

Parameter Description	Parameter	Description
	value	Sets the interface metric value on the interface. The valid range is from 1 to 16.

Defaults 1

Command mode Interface configuration mode.

Usage Guide Before the route is added to the routing list, the interface metric value shall be upon the route metric. To this end, the interface metric value influences the route usage.

Configuration The following example sets the metric value of the interface Ethernet 0/1 as 5:

Examples

```
FS(config)# interface ethernet 0/1
FS(config-if)# ipv6 rip metric-offset 5
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

6.9 ipv6 router rip

Use this command to create the RIPng process and enter routing process configuration mode. Use the **no** form of this command to remove the RIPng process.

ipv6 router rip
no ipv6 router rip

Parameter Description	Parameter	Description
	N/A	N/A

Defaults No RIPng process is configured by default.

Command mode Global configuration mode.

Usage Guide N/A.

Configuration Examples The following example creates the RIPng process and enter routing process configuration mode:

```
FS(config)# ipv6 router rip
```

Related Commands	Command	Description
	ipv6 rip enable	Enables the RIPng on the specified interface.

Platform N/A
Description

6.10 passive-interface

Use this command to disable the interface to send update packets. Use the **no** form of this command to enable the interface to send update packets.

passive-interface { **default** | interface-type interface-num }
no passive-interface { **default** | interface-type interface-num }

Parameter Description	Parameter	Description
	default	Enables the passive mode on all interfaces.
	interface-type interface-num	Interface type and interface number.

Defaults No passive interface is configured by default.

Command mode Routing process configuration mode.

Usage Guide You can use the **passive-interface default** command to enable the passive mode on all interfaces. Then ,use the **no passive-interface** interface-type interface-num command to remove the specified interface from the passive mode.

Configuration Examples The following example enables the passive mode on all interfaces and remove interface ethernet 0/0 from the passive mode:

```
FS(config-router)# passive-interface default
FS(config-router)# no passive-interface ethernet 0/0
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

6.11 redistribute

Use this command to redistribute the route of other routing protocols to RIPng. Use the **no** form of this command to remove the redistribution configuration.

redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **static** } [**metric** metric-value | **route-map** route-map-name]

no redistribute { **bgp** | **connected** | **isis** [area-tag] | **ospf** process-id | **static** } [**metric** metric-value | **route-map** route-map-name]

Parameter Description	Parameter	Description
	bgp	Redistributes the BGP routes to RIPng.
	connected	Redistributes the connected routes to RIPng.
	isis [area-tag]	Redistributes the ISIS routes to RIPng. area-tag indicates the ISIS process number.
	ospf process-id	Redistributes the OSPF routes to RIPng. process-id indicates the OSPF process number, and the range is from 1 to 65,535.

static	Redistributes the static routes to RIPng.
metric metric-value	(Optional) Sets the metric value for the route redistributed to RIPng.
route-map route-map-name	(Optional) Sets the redistribution route filtering.

Defaults By default, the routes of other routing protocols are not redistributed.
 If the **default-metric** command is not configured, the default metric value is 1;
 By default, the **route-map** is not configured;
 By default, all sub-type routes in the specified routing process are redistributed.

Command mode Routing process configuration mode.

Usage Guide This command is used to redistribute the external routes to RIPng.
 It is unnecessary to transform the metric of one routing protocol into another routing protocol in the process of the route redistribution, for the metric calculation methods of the different routing protocols are different. The RIP and OSPF metric calculations are incomparable for the reason that the RIP metric calculation is hop-based while the OSPF one is bandwidth-based.
 The instance, from where the routing information is redistributed to the RIPng, must be specified in the process of configuring the multi-instance protocol redistribution.

Configuration Examples The following example redistributes the static route, use the route map mymap to filter and set the metric value as 8:

```
FS(config)# ipv6 router rip
FS(config-router)# redistribute static route-map
mymap metric 8
```

Related Commands

Command	Description
default-metric	Defines the default RIPng metric value when redistributing other routing protocols.
distribute-list	Filters the RIPng routing update packets.

Platform N/A
Description

6.12 show ipv6 rip

Use this command to show the parameters and each statistical information of the RIPng routing protocol process.

show ipv6 rip

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide N/A

Configuration

```
FS# show ipv6 rip
```

Examples

```
Routing Protocol is "RIPng"
  Sending updates every 10 seconds with +/-50%, next due in 8 seconds
  Timeout after 30 seconds, garbage collect after 60 seconds
  Outgoing update filter list for all interface is:
    distribute-list prefix aa out
  Incoming update filter list for all interface is: not set
  Default redistribution metric is 1
  Default distance is 120
  Redistribution:
    Redistributing protocol connected route-map rm
    Redistributing protocol static
    Redistributing protocol ospf 1
  Default version control:  send version 1, receive version 1
  Interface          Send    Recv
  VLAN 1             1      1
  Loopback 1         1      1
  Routing Information Sources:
  None
```

Related Commands

Command	Description
show ipv6 rip	Displays the parameters and each statistical information of the RIPng process.

Platform N/A

Description

6.13 show ipv6 rip database

Use this command to display the RIPng route entries.

show ipv6 rip database

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide N/A

```

Configuration FS# show ipv6 rip database
Examples Codes: R - RIPng,C - Connected,S - Static,O - OSPF,B - BGP
sub-codes:n - normal,s - static,d - default,r - redistribute,
i - interface, a/s - aggregated/suppressed
S(r) 2001:db8:1::/64, metric 1, tag 0
Loopback 0/::
S(r) 2001:db8:2::/64, metric 1, tag 0
Loopback 0/::
C(r) 2001:db8:3::/64, metric 1, tag 0
VLAN 1/::
S(r) 2001:db8:4::/64, metric 1, tag 0
Null 0/::
C(i) 2001:db8:5::/64, metric 1, tag 0
Loopback 1/::
S(r) 2001:db8:6::/64, metric 1, tag 0
Null 0/::
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.14 split-horizon

Use the **split-horizon** command to enable the RIPng split-horizon function in routing process configuration mode. Use the **no** form of this command to disable this function. Use the **split-horizon poisoned-reverse** command to enable the RIPng poisoned reverse horizontal split function in routing process configuration mode. Use the **no** form of this command to disable this function.

split-horizon poisoned-reverse
no split-horizon poisoned-reverse

Parameter Description	Parameter	Description
	poisoned-reverse	

Defaults RIPng split horizon is enabled by default.

Command mode Routing process configuration mode.

Usage Guide In the process of packet updating, split-horizon function prevents some routing information from being advertised through the interface learning those routing information. The poisoned reverse horizontal split function advertises some routing information to the interface learning those routing information, and the metric value is set as 16. The RIPng routing protocol belongs to the distance vector routing protocol, so the horizontal split shall be noticed in the actual application. You can use the **show ipv6 rip** command to determine whether the RIPng split-horizon function is enabled or not.

Configuration The following example disables the RIPng horizontal split:

Examples

```
FS(config)# ipv6 router rip
FS(config-router)# no split-horizon
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.15 timers

Use this command to adjust the RIPng timer. Use the **no** form of this command to restore the default settings.

timers update invalid flush

no timers

Parameter Description	Parameter	Description
	update	Sets the routing update time, in seconds. The update parameter defines the period of sending the routing update packets by the device. The invalid and flush parameter reset once the update packets are received.
	invalid	Sets the routing invalid time, in seconds, starting from receiving the last valid update packet. The invalid parameter defines the invalid time for the un-updated routing in the routing list. The routing invalid time shall be three times larger than the routing update time. The routing will be invalid if no update packets are received within the routing invalid time, and it will reset if the update packets are received within the invalid time.
	flush	Sets the routing flush time, in seconds, starting from RIPng entering to invalid state. The invalid routing will be removed from the routing list if the flush time expires.

Defaults The default update time is 30 seconds; the default invalid time is 180 seconds; and the default flush time is 120 seconds.

Command mode Routing process configuration mode.

Usage Guide Adjusting the above time may speed up the RIPng convergence time and the troubleshooting time. The RIPng time must be consistent for the devices connecting to the same network. You are not recommended to adjust the RIP time, except for the specific requirement.

Use the **show ipv6 rip** command to view the current RIPng time parameter setting.

In the low-speed link, with the short time configured, large amount of the update packets consumes a lot of bandwidth. Generally, the short time can be configured in the Ethernet or 2Mbps-higher line to shorten the convergence time of the network routing.

Configuration Examples The following example sends the RIP update packets every 10 seconds. The routing will be invalid if no update packets are received within 30 seconds, and the routing will be removed after being invalid for 90 seconds.

```
FS(config)# ipv6 router rip
FS(config-router)# timers 10 30 90
```

Related Commands

Command	Description
show ipv6 rip	Displays the parameters and the statistical information of the RIPng process.
show ipv6 rip database	Displays the RIPng routes.

Platform Description N/A

7 NSM Commands

7.1 clear ip mroute

Use this command to clear the route cache.

clear ip route [vrf vrf_name] { * | network [netmask] | }

Parameter	Description
vrf vrf_name	(Optional) Specifies the route cache of the specified VRF instance. If no VRF is specified, the route cache of all VRF instances is cleared.
*	Clears all route cache.
network	Specifies the route cache of the network or subnet.
netmask	(Optional) Subnet mask. If no subnet mask is specified, the longest match principle is used when you match network with the route. The cache of the longest match is cleared.

Command mode Privileged EXEC mode.

Usage guidelines Clearing route cache clears the corresponding routes and triggers the routing protocol relearning. Please note that clearing all route cache leads to temporary network disconnection.

Examples The following example clears the cache of the route which is the longest match with IP address 192.168.12.0.

```
clear ip route 192.168.12.0
```

Command	Description
N/A	N/A

Platform description This command is not supported on layer 2 devices.

7.2 clear ip route arp scan times

Use this command to clear the ARP request transmission count and start counting again.

clear ip route arp scan times

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 1

Usage Guide If the configured transmission count of ARP requests is 10 but the ARP still fails after the ARP request has been sent 10 times, the device no longer sends the ARP request. If you need to continue to send the ARP request, use this command to clear the count so that the device can continue to actively send the ARP request.

Examples The following example clears the transmission count of ARP requests.

```
FS(config)# ip route scan arp times 10
FS # clear ip route arp scan times
```

7.3 ip default-gateway

Use this command to configure the default gateway IP address on 2-layer devices. Use the **no** or **default** form of this command to restore the default setting.

ip default-gateway ip-address
no ip default-gateway
default ip default-gateway

Parameter	Parameter	Description
Description	ip-address	IPv4 address of the default gateway

Defaults No gateway IP address is configured by default.

Command

Mode Global configuration mode

Usage Guide When the device does not know the destination address of a packet, the device will forward the packet to the default gateway.

Examples The following example sets the IP address of default gateway to 192.168.1.1.

```
ip default-gateway 192.168.1.1
```

Related Commands	Command	Description
	N/A	N/A

Platform

Description This command is supported on 2-layer devices.

7.4 ip default-network

Use this command to configure the default network globally. Use the **no** form of this command to restore the default setting.

ip default-network network
no ip default-network network

Parameter	Parameter	Description
-----------	-----------	-------------

description	network	Default network
--------------------	---------	-----------------

Default configuration The default is 0.0.0.0/0.

Command mode Global configuration mode.

The goal of this command is to generate the default route. The default network must be reachable in the routing table, but not the directly connected network.

Usage guidelines The default network always starts with an asterisk ("*"), indicating that it is the candidate of the default route. If there is connected route and the route without the next hop in the default network, the default route must be a static route.

The following example sets 192.168.100.0 as the default network. Since the static route to the network is configured, the device will automatically generate a default route.

Examples

```
ip route 192.168.100.0 255.255.255.0 serial 0/1
ip default-network 192.168.100.0
```

The following example sets 200.200.200.0 as the default network. The route becomes the default one only when it is available in the routing table.

```
ip default-network 200.200.200.0
```

Related commands	Command	Description
	show ip route	Displays the routing table.

7.5 ip fast-reroute static route-map

Use this command to enable static fast reroute. Use the **no** or **default** form of this command to restore the default setting.

ip fast-reroute [vrf vrf-name] **static route-map** route-map-name

no ip fast-reroute [vrf vrf-name]

default ip fast-reroute [vrf vrf-name]

Parameter	Parameter	Description
Description	vrf vrf-name	VRF
	route-map-name	Route map
	static	Backup route

Default This function is disabled by default.

Command Mode Global configuration mode

Usage guideline Fast reroute provides an active next-hop and a backup one. If the active next-hop fails, the backup next-hop is used for forwarding.

To enhance the performance of fast reroute, enable the BFD detection function for the active next-hop. For interfaces that are up or down, to shorten the interruption time of fast reroute, configure **carrier-delay 0** in the interface configuration mode of the active outbound interface to optimize the performance.

For static fast reroute, if the active next-hop fails, the backup next-hop is used for forwarding.

Examples The following example sets the backup next-hop of all static routes to 192.168.1.2 through the outbound interface of GigabitEthernet 0/1.

```
FS(config)# route-map fast-reroute
FS(config-route-map)# set fast-reroute backup-interface GigabitEthernet 0/1 backup-nexthop 192.168.1.2
FS(config-route-map)# exit
FS(config)# ip fast-reroute static route-map fast-reroute
```

Related command	Command	Description
	fast-reroute	Configures OSPF fast reroute.

Platform Description This command is not supported on 2-layer devices.

7.6 ip recur-route fastswitch-nexthop

Use this command to enable the recursive routing fast convergence.

ip recur-route fastswitch-nexthop

Use the **no** form of this command to disable the recursive routing fast convergence.

no ip recur-route fastswitch-nexthop

Use the **default** form of this command to restore the default configuration.

default ip recur-route fastswitch-nexthop

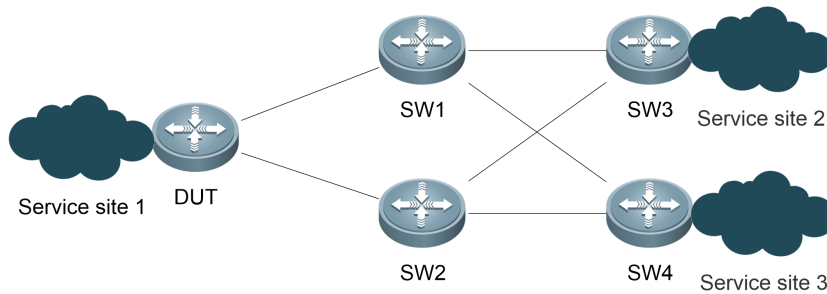
Parameter Description	Parameter	Description
	N/A	N/A

Defaults The recursive routing fast convergence is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide



As shown in the figure above, the DUT establishes IS-IS neighbor relationships with SW1 and SW2, SW1 and SW2 separately establish an IS-IS neighbor relationship with SW3 and SW4, and the DUT establishes IBGP neighbor relationships with SW3 and SW4. Service sites access the network via EBGP.

In the scenario shown above, BGP routes may be recursed to IS-IS routes. When the link between SW1 and SW3 is disconnected, the IS-IS route will change and the BGP route that relies on the IS-IS route needs to be re-calculated. Before the calculation result is delivered to the forwarding plane, the BGP traffic from service site 1 to service site 2 still goes through the disconnected link between SW1 and SW3, resulting in traffic interruption. Traffic interruption duration = Link down time + Time required by the local IS-IS system to learn route deletion information + Time required by the local NSM system to receive IS-IS routing information + Time required for calculating the BGP route and delivering the result to the forwarding plane + Link switching time. The switching cannot be completed within 1 second.

If the recursive routing fast convergence function is enabled, the traffic that needs to go through the disconnected link between SW1 and SW 3 can be switched to another normal link within 1 second.

Examples

The following example enables/disables the recursive routing fast convergence.

```
FS(config)# ip recur-route fastswitch-nexthop
FS(config)# no ip recur-route fastswitch-nexthop
```

7.7 ip recur-route over default-route disable

Use this command to enable the function of forbidding recursion to the default route.

ip recur-route over default-route disable

Use the **no** form of this command to disable the function of forbidding recursion to the default route.

no ip recur-route over default-route disable

Use the **default** form of this command to restore the default configuration.

default ip recur-route over default-route disable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults

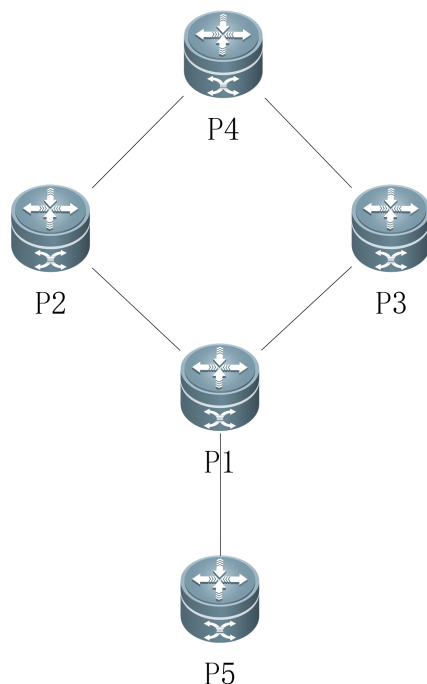
The function of forbidding recursion to the default route is disabled by default and routes are recursed to the default route by default.

Command Global configuration mode

Mode

Default Level 14

Usage Guide



As shown in the scenario above, P1 establishes non-direct EBGP neighbor relationships with P2 and P3, the load balancing enables service traffic on P1 to be distributed to P4 through P2 and P3. The default route configured on P1 is used to access the extranet through the P1-P5 egress. When the link between P1 and P2 is faulty, it is expected that service traffic is switched to P3. However, some service traffic is guided to the P1-P5 egress due to the existence of the default route. The P1-P5 egress is not a service egress. As a result, some service traffic is lost and the convergence cannot be completed within 1s.

With this command, when the link between P1 and P2 is faulty, traffic is completely switched to P3 and is not guided to P5, achieving convergence within 1s.

Note: When the egress of a default route is not the expected service egress, this command must be configured.

Examples The following example enables/disables the function of forbidding recursion to the default route.

```
FS(config)# ip recur-route over default-route disable
FS(config)# no ip recur-route over default-route disable
```

7.8 ip route

Use this command to configure a static route. Use the **no** or **default** form of this command to restore the default setting.

```
ip route [ vrf vrf_name ] network net-mask { ip-address | interface [ ip-address ] } [ distance ] [ tag tag ] [ permanent ]
[ {track object-number | arp} ] [ weight number ] [description description-text] [ disabled | enabled ] [ global ]
no ip route [ vrf vrf_name ] network net-mask { ip-address | interface [ ip-address ] } [ distance ]
no ip route [ vrf vrf_name ] all
default ip route [ vrf vrf_name ] network net-mask { ip-address | interface [ ip-address ] } [ distance ]
```

Parameter	Description
vrf vrf_name	Name of the VRF, which can be the single protocol IPv4 VRF or configured IPv4 address family multi-protocol VRF.
network	Network address of the destination
net-mask	Mask of the destination
ip-address	The next hop IP address of the static route
interface	(Optional) The next hop egress of the static route
distance	(Optional) The administrative distance of the static route
tag	(Optional) The tag of the static route
permanent	(Optional) Permanent route ID
track object-number	(Optional) Indicates correlation with Track. object-number indicates the ID of the track object. By default, the static route is not correlated with the Track function.
weight number	(Optional) Indicates the weight of the static route. The weight is 1 by default.
description description-text	(Optional) Indicates the description of the static route. By default, no description is configured. description-text is a string of one to 60 characters.
disabled/enabled	(Optional) Indicates the enable flag of the static route. The flag is enabled by default.
global	(Optional) Indicates that the next hop belongs to a global VRF. By default, the VRF of the next hop is the same as the VRF specified by vrf name.
arp	(Optional) Indicates that the next hop belongs to a global VRF. By default, the VRF of the next hop is the same as the VRF specified by vrf name.

Defaults No static route is configured by default.

Command Mode Global configuration mode

The default administrative distance of the static route is 1. Setting the administrative distance allows the learnt dynamic route to overwrite the static route. Setting the administrative distance of the static route can enable route backup, which is called floating route in this case. For example, the administrative distance of the OSPF is 110. You can set its administrative distance to 125. Then the data can switch over the static route when the route running OSPF fails.

Usage Guide You can specify the VRF that the static route belongs to. The default weight of the static route is 1. To view the static route of non default weight, execute the show ip route weight command. The parameter weight is used to enable WCMP. When there are load-balanced routes to the destination, the device assigns data flows by their weights. The higher the weight of a route is, the more data flow the route carries. WCMP limit is generally 32 for routers. However, WCMP limit varies by switch models for their chipsets support different weights. When the sum of the weights of load balanced routes is beyond this weight limit, the excessive ones will not take effect.

Enablement/disablement shows the state of the static route. Disablement means the static route is not used for forwarding. The forwarding table used the permanent route until administrator deletes it.

When you configure the static route on an Ethernet interface, do not set the next hop as an interface, for example, `ip route 0.0.0.0 0.0.0.0 Fastethernet 0/0`. In this case, the switch may consider that all unknown destination networks are directly connected to the Fastethernet 0/0. So it sends an ARP request to every destination host, which occupies many CPU and memory resources. It is not recommended to set the static route to an Ethernet interface.

Association between a static route and a track object can be specified. When association between a static route and a specified track object is configured and the advertised track object status is inactive, the static route does not take effect. If the advertised track object status is active, the static route takes effect based on another status. With association between a static route and a track object, the third-party status concerned by the track object is mainly used to determine whether the static route takes effect. Association between a static route and a track object cannot be used for routes with the permanent attribute.

Association between a static route and an ARP object can be specified. When association between a static route and an ARP object is configured and the ARP object corresponding to the next hop and egress of the route does not exist, the static route does not take effect. When the ARP object corresponding to the next hop and egress of the route exists, the static route takes effect based on another status. Association between a static route and an ARP object cannot be used for routes with the permanent attribute.

Association between a static route and a track object cannot be used together with association between a static route and an ARP object.

The following example adds a static route to the destination network of 172.16.100.0/24 whose next hop is 192.168.12.1 and administrative distance is 15.

```
ip route 172.16.199.0 255.255.255.0 192.168.12.1 155
```

Examples

If the static route has not a specific interface, data flows may be sent through other interface in case of interface failure. The following example configures data flows to be sent through fastethernet 0/0 to the destination network of 172.16.100.0/24.

```
ip route 172.16.199.0 255.255.255.0 fastethernet 0/0 192.168.12.1
```

Related

Commands This command is not supported on 2-layer devices.

7.9 ip route aggregate

Use this command to configure an aggregate route.

ip route aggregate [vrf vrf_name] network netmask Null 0 [tag tag]

Use the following commands to delete a configured aggregate route/all aggregate route

no ip route aggregate [vrf vrf_name] network netmask Null 0

no ip route aggregate [vrf vrf_name] all

Use the following commands to restore a configured aggregate route/all aggregate route to the default settings.

default ip route aggregate [vrf vrf_name] network netmask Null 0

default ip route aggregate [vrf vrf_name] all

Parameter

Parameter	Description
-----------	-------------

Description		(Optional) Route VRF which can be the single protocol IPv4 VRF or configured IPv4 address family multi-protocol VRF. Global VRF by default.
	vrf vrf_name	
	network	Network address of the destination
	netmask	Mask of the destination
	Null 0	Not configure the next hop IP address and egress of the aggregate route
	tag	(Optional) The tag of the aggregate route, 0 by default
	all	(Optional) Delete all aggregate routes of the specific VRF.

Defaults No aggregate route is configured by default.

Command Mode Global configuration mode

Usage Guide The command takes effect in OPENCONF YANG to record the configuration of aggregate routes. The actual effect is like black hole route.

Examples The following example adds an aggregate route to the destination network of 1.1.1.0/24 whose TAG is 32.

```
ip route aggregate 1.1.1.0 255.255.255.0 Null 0 tag 32
```

Related Commands This command is not supported on 2-layer devices.

7.10 ip route arp-to-host delay-time

Use this command to configure the delayed redistribution of ARP-to-host route. Use the **no** or **default** form of this command to restore the default setting.

ip route arp-to-host delay-time time-number
no ip route arp-to-host delay-time
default ip route arp-to-host delay-time

Parameter	Description
time-number	Indicates the time of the delayed redistribution of ARP-to-host. The unit is second, the range is 1-1000, and the default value is 0.

Defaults The delayed redistribution of ARP-to-host route is disabled by default.

Command Mode Global configuration mode

Usage Guide After the delayed redistribution is configured, the redistribution will be delayed according to the specified time for the ARP packets. The redistribution route of ARP failure packet is immediately advertised.

Examples The following example delays the redistribution of arp-to-host route to protocol module for 10 seconds.

```
FS(config)# ip route arp-to-host delay-time 10
```

Related

Commands N/A

Platform

Description This command is not supported on 2-layer devices.

7.11 ip route arp-to-host interface

Use this command to enable ARP-to-host conversion. Use the **no** or **default** form of this command to restore the default setting.

- ip route arp-to-host interface** interface-name
- no ip route arp-to-host interface** interface-name
- default ip route arp-to-host interface** interface-name

Parameter	Parameter	Description
Description	interface-name	Indicates name of an interface.

Defaults The ARP-to-host conversion is disabled by default.

Command Mode Global configuration mode

Usage Guide Please make sure the interface is a layer 3 interface

Examples The following example enable ARP-to-host conversion.

```
FS(config)# ip route arp-to-host interface vlan 40
```

Related

Commands N/A

Platform

Description This command is not supported on 2-layer devices.

7.12 ip route arp-to-host tag

Use this command to configure the tag attribute of ARP-to-host conversion. Use the **no** or **default** form of this command to restore the default setting.

- ip route arp-to-host tag** tag-number
- no ip route arp-to-host tag** tag-number
- default ip route arp-to-host tag** tag-number

Parameter	Parameter	Description
-----------	-----------	-------------

Description	tag-number	Indicates value of tag. It is 0 by default.
--------------------	------------	---

Defaults It is disabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Examples The following example configures the tag attribute of ARP-to-host conversion.

```
FS(config)# ip route arp-to-host tag 5
```

Related Commands N/A

Platform Description This command is not supported on 2-layer devices.

7.13 ip route delay-uninstall times

Use this command to configure the buffer time of batch deleting routes.

ip route delay-uninstall times number

Use the **no** form of this command to delete the buffer time and restore the default configuration.

no ip route delay-uninstall times

Use the **default** form of this command to restore the default configuration.

default ip route delay-uninstall times

Parameter Description	Parameter	Description
		number

Defaults The function is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide By configuring the buffer time of batch deleting routes in the case of large route amount, the route converge speed of BGP update can be improved. It is recommended to set the time as 5s; if the route amount is very large, the time can be set larger.

Examples The following example configures the buffer time of batch deleting routes and disables the function.

```
FS(config)# ip route delay-uninstall times 5
FS(config)# no ip route delay-uninstall times
```

Platform

Description This command is not supported on 2-layer devices.

7.14 ip route notify delete always

Use this command to enable the function of directly deleting BGP routes during GR.

ip route notify delete always

Use the **no** form of this command to disable the function of directly deleting BGP routes.

no ip route notify delete always

Use the **default** form of this command to restore the default configuration.

default ip route notify delete always

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The function of directly deleting BGP routes is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide If the function is enabled, the BGP route deletion configuration takes effect immediately during GR to prevent routing black hole.

Examples The following example enables/disables the function of directly deleting BGP routes during GR.

```
FS(config)# ip route notify delete always
FS(config)# no ip route notify delete always
```

7.15 ip route scan arp interval

Use this command to set the interval for actively sending ARP requests when ARP fails after static routing support for ARP is configured.

ip route scan arp interval number

Use the **no** form of this command to delete the configured interval for actively sending ARP requests and restore the default value.

no ip route scan arp interval

Use the **default** form of this command to restore the default configuration.

default ip route scan arp interval

Parameter Description	Parameter	Description
	number	Interval. The value range is 5 to 120 in seconds and the default value is 5 .

Defaults The transmission interval is not configured by default. ARP requests are sent at an interval of 5 seconds by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide After the static routing support for ARP is configured, when ARP fails due to a link failure or other causes, the device actively transmits ARP requests and the transmission interval can be configured. ARP requests are transmitted at an interval of 5 seconds by default.

Examples The following example configures the interval for actively sending ARP requests.

```
FS(config)# ip route scan arp interval 10
FS(config)# no ip route scan arp interval
```

7.16 ip route scan arp times

Use this command to set the number of times of actively sending ARP requests when ARP fails after static routing support for ARP is configured.

ip route scan arp times number

Use the **no** form of this command to delete the configured number of times of actively sending ARP requests and restore the default value.

no ip route scan arp times

Use the **default** form of this command to restore the default configuration.

default ip route scan arp times

Parameter Description	Parameter	Description
	number	Interval. The value range is 1 to 65,535 and the default value is 65535 .

Defaults The transmission count is not configured by default. The default value is **65535**.

Command Mode Global configuration mode

Default Level 14

Usage Guide After the static routing support for ARP is configured, when ARP fails due to a link failure or other causes, the device actively transmits ARP requests and the transmission count can be configured. ARP requests are transmitted 65535 times by default.

Examples The following example configures the number of times of actively sending ARP requests.

```
FS(config)# ip route scan arp times 10
FS(config)# no ip route scan arp times
```

7.17 ip route static bfd

Use this command to correlate the static route with BFD. Use the **no** or **default** form of this command to restore the default setting.

ip route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]


no ip route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]

default ip route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]

Parameter	Description
vrf vrf-name	(Optional) Specifies the VRF name of the static route. By default, it is global VRF,
interface-type interface-number	Interface type and interface number.
gateway	Specifies the gateway IP address, that is, the BFD neighbor IP address. If the next hop of the static route is the neighbor, the BFD will detect whether this neighbor is reachable.
source ip-address	(Optional) The source IP address of the BFD session. If the neighbor device is multi hops away, you should specify the source IP address for the BFD session. No source IP address is specified by default.

Default configuration The static address is not correlated with BFD by default.

Command mode Global configuration mode.

Usage guidelines  Please make sure the BFD session parameters have been configured before executing this command.

The following example correlates the static route with BFD, and detects the reachability of path to the neighbor 172.16.0.2.

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# no switchport // No need to perform this command on the router.
FS(config-if-GigabitEthernet 0/1)# ip address 172.16.0.1 255.255.255.0
FS(config-if-GigabitEthernet 0/1)# bfd interval 50 min_rx 50 multiplier 3
```

```
FS(config-if-GigabitEthernet 0/1)#exit
FS(config)# ip route static bfd GigabitEthernet 0/1 172.16.0.2
FS(config)# ip route 10.0.0.0 255.0.0.0 GigabitEthernet 0/1 172.16.0.2
```

Related commands N/A

Platform description This command is not supported on Layer 2 devices.

7.18 ip route static inter-vrf

Use this command to enable packets to be forwarded over VRF instances through the static route. Use the **no** or **default** form of this command to disable this function.

ip route static inter-vrf

no ip route static inter-vrf

default ip route static inter-vrf

Parameter	Parameter	Description
description	N/A	N/A

Default configuration This function is enabled by default.

Command mode Global configuration mode.

Usage guidelines If the **no** form of this command is executed, packets are unable to be forwarded over VRF instances through the static route. If this command is executed and you want to use the **no** form of this command to disable such function, the following information will be displayed.

```
*Aug 7 10:58:34: %NSM-6-ROUTESACROSSVRF: Un-installing route [x.x.x.x/8] from global routing table with outgoing interface x/x.
```

Examples The following example disables packets to be forwarded over VRF instances through the static route.

```
FS(config)# no ip route static inter-vrf
```

Related commands N/A

Platform description This command is not supported on Layer 2 devices.

7.19 ip routing

Use this command to enable IP routing in the global configuration mode. Use the **no** form of this command to disable this function.

ip routing

no ip routing

Default configuration This function is enabled by default.

- Command mode** Global configuration mode.
- Usage guidelines** IP routing is not necessary when the switch serves as bridge or VoIP gateway.
- Examples** The following example disables IP routing.

```
no ip routing
```
- Related commands** N/A
- Platform description** This command is not supported on Layer 2 devices.

7.20 ipv6 fast-reroute static route-map

Use this command to enable an IPv6 static fast reroute. Use the **no** or **default** form of this command to restore the default setting.

ipv6 fast-reroute [vrf vrf-name] **static route-map** route-map-name
no ipv6 fast-reroute [vrf vrf-name]
default ipv6 fast-reroute [vrf vrf-name]

Parameter	Description
vrf-name	(Optional) Name of VRF. When the name of VRF is not specified, the configuration takes effect in the global VRF.
route-map-name	Route map of static fast reroute
static	Back up the route map

Defaults Static fast reroute is not enabled by default.

Command Mode Global configuration mode

Usage Guide The fast reroute delivers the primary route and backup route at the same time. When the primary link fails, it forwards packets by switching to the backup route, thus shortening the communication interruption time. To improve the switching performance of fast reroute, you can enable BFD to check whether the next hop is reachable. In order to shorten the forwarding interruption time, you can configure **carrier-delay 0** on the primary link export in the interface mode to achieve the fastest switching performance. For static fast reroute, when the primary next hop fails and the backup next hop is valid, the backup next hop becomes the primary next hop for forwarding.

The following example configures the backup next hop of static route as 2001::1, through the interface GigabitEthernet 0/1

Examples

```
FS(config)# route-map fast-reroute
FS(config-route-map)# set ipv6 fast-reroute backup-interface GigabitEthernet 0/1
```

```

backup-nexthop 2001::1
FS(config-route-map)# exit
FS(config)# ipv6 fast-reroute static route-map fast-reroute
    
```

Platform

Description This command is not supported on 2-layer devices.

7.21 ipv6 recur-route fastswitch-nexthop

Use this command to enable the fast convergence of a recursive route. Use the **no** or **default** form of this command to restore the default setting.

ipv6 recur-route fastswitch-nexthop

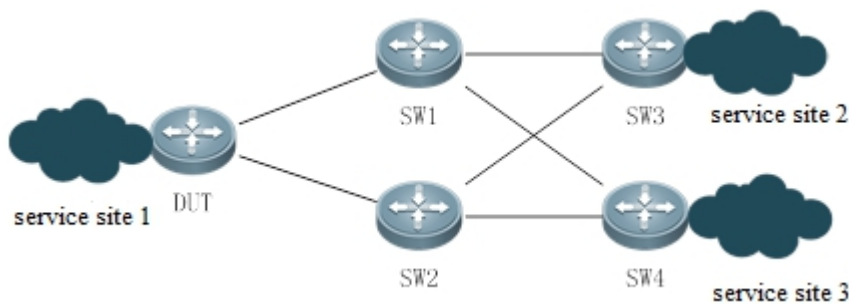
no ipv6 recur-route fastswitch-nexthop

default ipv6 recur-route fastswitch-nexthop

Parameter	Description
Description	N/A

Defaults Disabled by default.

Command Mode Global configuration mode



Usage Guide

As shown in the figure above, DUT establishes ISIS neighbors with SW1 and SW2, SW1 and SW2 establish ISIS neighbors with SW3 and SW4, and DUT establishes IBGP neighbors with SW3 and SW4. The service site is accessed through EBGP.

The BGP route is recursively sent to the ISIS route. When the SW1 and SW3 are disconnected, the ISIS route is changed, so the GP route that depends on the ISIS route needs to be recalculated. Before the calculation result is sent to the forwarding plane, BGP traffic from the service site1 to the service site2 still goes through the disconnected link between SW1 and SW3, resulting in the flow interruption. Interruption time = link down + local ISIS learns the route deletion information + local NSM receives the ISIS routing information + calculates and delivers the BGP route to the forwarding plane + switching link, which cannot meet the requirement of switching within 1 s.

If the fast switching of recursive route is enabled, the traffic going through the disconnected link between SW1 and SW3 can be switched to other normal links within 1 s.

The following example enables/disables the fast convergence of recursive route

Examples

```
FS(config)# ipv6 recur-route fastswitch-nextHop
FS(config)# no ipv6 recur-route fastswitch-nextHop
```

Platform

Description This command is not supported on 2-layer devices.

7.22 ip static route-limit

Use this command to set the upper threshold of the static route. Use the **no** form of this command to restore the default setting.

ip static route-limit { number | **default-vrf** number | **vrf** vrf-name number }

no ip static route-limit [**default-vrf**] [**vrf** vrf-name]

Parameter	Parameter	Description
description	number	Upper threshold of static routes
	default-vrf number	Upper threshold of default VRF static routes, range: 1-10000
	vrf vrf-name number	Upper threshold of VRF static routes, range: 1-10000.

Default

configuration The default is 1024.

Command mode

Global configuration mode.

Usage guidelines

The goal is to control the number of static routes. You can view the upper threshold of the configured non-default static routes with the show running config command.

The following example sets the upper threshold of the static routes/default VRF static routes/VRF test static routes to 9000/2000/1000, and then restores the the default values.

Examples

```
FS(config)#ip static route-limit ?
<1-1000000> Global limit value(default value: 1024)
default-vrf Default Routing/Forwarding instance
vrf VPN Routing/Forwarding instance
FS(config)# ip static route-limit 9000
FS(config)# ip static route-limit default-vrf 2000
FS(config)# ip static route-limit vrf test 1000
FS(config)# no ip static route-limit
FS(config)# no ip static route-limit default-vrf
FS(config)# no ip static route-limit vrf test
```

Related commands

N/A

Platform description

This command is not supported on Layer 2 devices.

7.23 ipv6 default-gateway

Use this command to configure the default gateway IPv6 address on 2-layer devices. Use the **no** or **default** form of this command to restore the default setting.

ipv6 default-gateway ipv6-address

no ipv6 default-gateway

default ipv6 default-gateway

Parameter Description	Parameter	Description
	ipv6-address	Sets the default gateway IPv6 address.

Defaults No gateway IPv6 address is configured by default.

Command Mode Global configuration mode

Usage Guide When the device does not know the destination address of a packet, the device will forward the packet to the default gateway. Use the command **show ipv6 redirects** to display default gateway configuration.

Examples The following example sets the default gateway IPv6 address to 10::1.

```
FS(config)# ipv6 default-gateway 10::1
```

Platform Description This command is not supported on 2-layer devices or 3-layer devices configured with the **no ip routing** command.

7.24 ipv6 route

Use this command to configure an ipv6 static route. Use the **no** form of this command to restore the default setting.

ipv6 route [vrf vrf-name] ipv6-prefix/prefix-length {ipv6-address [nexthop-vrf {vrf-name1 | default }] | interface [ipv6-address[nexthop-vrf {vrf-name1 | default }]]} [distance] [tag tag] [weight number]

no ipv6 route [vrf vrf-name] ipv6-prefix/prefix-length {ipv6-address [nexthop-vrf {vrf-name1 | default }] | interface [ipv6-address[nexthop-vrf {vrf-name1 | default }]]} [distance] [tag tag] [weight number]

Parameter description	Parameter	Description
	network	Network address of the destination
	vrf-name	Name of VRF, which must be the configured IPv6 address family multi-protocol VRF.
	prefix-length	Mask length of the destination
	ipv6-address	The next hop IP address of the static route
	interface	(Optional) The next hop egress of the static route
	vrf-name1	VRF the nexthop belongs, which must be the configured IPv6 address family multi-protocol VRF.
	distance	(Optional) The administrative distance of the static route. The default is 1.

tag	(Optional) The tag value of the static route. The default is 0.
number	(Optional) The weight value of the static route, which is specified when configuring the equivalent routes, in range of 1 to 128. The sum of the weight of all equivalent paths of one route could not exceed the number of the configurable maximum equivalent paths. The weight ratio between the equivalent routes of the same route shows the flow rate between these paths.

Default configuration No IPv6 static route is configured by default.

Command mode Global configuration mode.

When the multi-protocol VRF deletes the IPv6 address family, the IPv6 static route of VRF that the route or nexthop belongs is deleted.

If the VRF of the IPv6 static route interface is not same as the nexthop's VRF, then this IPv6 static route takes no effect.

Usage guidelines The default administrative distance of the static route is 1. Setting the administrative distance allows the learnt dynamic route to overwrite the static route. Setting the administrative distance of the static route can enable route backup, which is called floating route in this case. For example, the administrative distance of the OSPF is 110. You can set its administrative distance to 125. Then the data can switch over the static route when the route running OSPF fails.

The following example adds a static route to the destination network of 2001::/64 whose next hop is 2002::2 and administrative distance is 115.

```
ipv6 route 2001::/64 2002::2 115
```

Examples If the static route has not a specific interface, data flows may be sent through other interface in case of interface failure. The following example configures that data flows are sent through fastethernet 0/0 to the destination network of 2001::/64.

```
ipv6 route 2001::/64 fastethernet 0/0 2002::2
```

	Command	Description
Related commands	show ipv6 route	Displays IPv6 routing table.

Platform description This command is not supported on Layer 2 devices.

7.25 ipv6 route nd-to-route delay-time

Use this command to configure the delayed redistribution of nd-to-route. Use the **no** or **default** form of this command to restore the default setting.

ipv6 route nd-to-route delay-time time-number

no ipv6 route nd-to-route delay-time

default ipv6 route nd-to-route delay-time

Parameter	Description
Parameter	
Description	time-number Indicates the time of the delayed redistribution of nd-to-route. The unit is second, the range is 1-1000, and the default value is 0
Defaults	The delayed redistribution of nd-to-route is not configured by default.
Command Mode	Global configuration mode
Usage Guide	After the delayed redistribution is configured, the redistribution will be delayed according to the specified time for the ND packet. The redistribution route of ND failure packet is immediately advertised.
Examples	The following example delays the redistribution of nd-to-route to protocol module for 10 seconds. <pre>FS(config)# ipv6 route nd-to-route delay-time 10</pre>
Related Commands	N/A
Platform Description	This command is not supported on 2-layer devices.

7.26 ipv6 route nd-to-route interface

Use this command to enable nd-to-route on a specified interface. Use the **no** or **default** form of this command to restore the default setting.

ipv6 route nd-to-route interface interface-name [**ipv6-prefix** X:X:X::X/<0-128>] [**prefix-len** masklen]


no ipv6 route nd-to-route interface interface-name [**ipv6-prefix** X:X:X::X/<0-128>] [**prefix-len**]

default ipv6 route nd-to-route interface interface-name [**ipv6-prefix** X:X:X::X/<0-128>] [**prefix-len**]

Parameter	Description
Parameter	
Description	
interface-name	The interface name.
X:X:X::X/<0-128>	Ipv6 network segment. If the nd entries match this network segment, the route is converted according to the mask specified by this network segment. If the network segment does not specify a mask, the default mask is 128.
masklen	The mask length of the nd-to-route. The range is 0 to 128, and the default value is 128. If an IPv6 network segment is specified, it is longer than the mask length of configured network segment. If no IPv6 network segment is specified, it is longer than the mask length of IPv6 address on the interface. Otherwise, the configuration fails.

Defaults The nd-to-route on a specified interface is not configured by default.

Command Mode Global configuration mode

Usage Guide  Please make sure that the interface is a Layer-3 interface.

If the IPv6 network segment and prefix-len are not specified, the ND learned on the default interface generates a 128-bit route. If no IPv6 network segment is specified but prefix-len is specified, ND on the interface generate the specified prefix- len. If IPv6 network segment is specified but prefix-len is not specified, the network segment generates a 128-bit route by default. If the network segment and the prefix-len are specified, the network segment is verified to match with the prefix when the ND is learned, and then the prefix-len is generated. If the network segment and prefix-len are specified, and the prefix-len of an unspecified network segment is configured, the specified interface generates the route according to its prefix-len, while the unspecified interface generates the route according to the unspecified prefix-len.

If you configure the IPv6 address of an interface before configuring the prefix-len of the interface address to generate a route with fixed-length mask, a configuration error occurs when the prefix-len is shorter than or equal to the mask of the IPv6 address. The prefix-len command fails. For example, first configure IPv6 address 10::1/64 on the interface of vlan 40, and then configure ipv6 route nd-to-route interface vlan 40 ipv6-prefix 10::1/58 prefix-len 60 in the global configuration mode, the configuration fails.

If you configure the IPv6 address of an interface before configuring the prefix-len of an unspecified network segment, a configuration error occurs when the prefix-len is shorter than or equal to the mask of any of the IPv6 addresses on the interface. The prefix-len configuration command for the unspecified network segment fails. For example, first configure IPv6 address 10::1/64 on the interface of vlan 40, and then configure ipv6 route nd-to-route interface vlan 40 prefix-len 60 in the global configuration mode, the configuration fails.

If you configure the prefix-len of an unspecified network segment before configuring the IPv6 address of this interface, syslog is displayed and the prefix-len configuration of unspecified network segment is canceled when one of the IPv6 addresses is longer than or equal to the prefix-len of the unspecified network segment. For example, first configure ipv6 route nd-to-route interface vlan 40 prefix-len 60 in the global configuration mode, and then configure address 10::1/64 on the interface of vlan 40, syslog alarm is displayed and the configuration ipv6 route nd -to-route interface vlan 40 prefix-len 60 is deleted.

If you configure the prefix-len of the specified network segment and then configure the IPv6 address of the corresponding network segment, syslog is displayed and the prefix-len configuration of the specified network segment is canceled when the IPv6 address mask of the corresponding network segment is longer than or equal to the prefix-len of the specified network segment. For example, first configure ipv6 route nd-to-route interface vlan 40 ipv6-prefix 10::1/58 prefix-len 60 in the global configuration mode, and then configure the address 10::1/64 on the interface of vlan 40, the syslog alarm is displayed and the configuration ipv6 route nd-to-route interface vlan 40 ipv6-prefix 10::1/58 prefix-len 60 is deleted.

If you configure the prefix-len of unspecified network segment and the prefix-len of the specified network segment, and then configure the IPv6 address of the interface, please check whether the mask of each IPv6 address is longer than or equal to the prefix-len of the specified/unspecified network segment. Syslog is displayed and the prefix-len configuration of specified network segment is canceled when the mask of each IPv6 address is longer than or equal to the prefix-len of the corresponding network segment. Syslog is displayed and the prefix-len configuration of unspecified network segment is canceled when the mask of each IPv6 address is longer than or equal to the prefix-len of unspecified network segment. For example, first configure ipv6 route nd-to-route interface vlan 40 prefix-len 62 and ipv6 route nd-to-route interface vlan 40 ipv6-prefix 10::1/58

prefix-len 60, and then configure address 10::1/64 on the interface of vlan 40, the syslog alarm is displayed and two configurations are deleted.

Examples

The following example enables nd-to-route on the interface vlan 40. NDs that match 10::1/58 network segment are converted to routes with a mask length of 110 bits. NDs that match 20::1/56 network segment are converted to routes with a mask length of 128 bits. Other NDs are converted to routes with a mask length of 120 bits.

```
FS(config)# ipv6 route nd-to-route interface vlan 40 prefix-len 120
FS(config)# ipv6 route nd-to-route interface vlan 40 ipv6-prefix 10::1/58 prefix-len 110
FS(config)# ipv6 route nd-to-route interface vlan 40 ipv6-prefix 20::1/56
```

Common Error The Layer-3 interface is not in up status

Platform

Description This command is not supported on 2-layer devices.

7.27 ipv6 route nd-to-route tag

Use this command to configure the tag of nd-to-route. Use the **no** or **default** form of this command to restore the default setting.

```
ipv6 route nd-to-route tag tag-number
no ipv6 route nd-to-route
default ipv6 route nd-to-route tag
```

Parameter	Description
Description tag-number	Indicates the tag value. The range is 1-4294967295, and the default value is 0.

Defaults The tag of nd-to-route is not configured by default.

Command Mode Global configuration mode

Usage Guide

Examples The following example configures the tag of nd-to-route

```
FS(config)# ipv6 route nd-to-route tag 5
```

Related Commands N/A

Platform

Description This command is not supported on 2-layer devices.

7.28 ipv6 route nd-to-route warning-ignore

Use this command to ignore the warning of nd-to-route. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 route nd-to-route warning-ignore**
- no ipv6 route nd-to-route warning-ignore**
- d default ipv6 route nd-to-route warning-ignore**

Parameter	Parameter	Description
Description	N/A	

Defaults The function of ignoring the warning of nd-to-route is not configured by default.

Command Mode Global configuration mode

Usage Guide After you configure to ignore the warning of nd-to-route, the alarm that the same PORT ND generates the same network segment route is ignored. If this command is not configured, the warning log that the same PORT ND generates the same network segment route is printed (only once). The alarm that different ports generate the same network segment route is not controlled by this command.

Examples The following example ignores the warning of nd-to-route

```
FS(config)# ipv6 route nd-to-route warning-ignore
```

Related Commands N/A

Platform Description This command is not supported on 2-layer devices.

7.29 ipv6 route static bfd

Use this command to correlate the static route with BFD. Use the **no** or **default** form of this command to restore the default setting.


- ipv6 route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]**
- no ipv6 route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]**
- default ipv6 route static bfd [vrf vrf-name] interface-type interface-number gateway [source ip-address]**

Parameter	Parameter	Description
Parameter description	vrf vrf-name	(Optional) Specifies the VRF name of the static route. By default, it is global VRF,
	interface-type interface-number	Interface type and interface number.
	gateway	Specifies the gateway IP address, that is, the BFD neighbor IP address. If the next hop of the static route is the neighbor, the BFD will detect whether this neighbor is reachable.

source ipv6-address (Optional) The source IP address of the BFD session. If the neighbor device is multi hops away, you should specify the source IP address for the BFD session. No source IP address is specified by default.

Default configuration The static route is not associated with BFD by default.

Command mode Global configuration mode.

Usage guidelines  Please make sure the BFD session parameters have been configured before executing this command.

The following example correlates the static route with BFD, and detects the reachability of path to the neighbor 2001:1::2.

Examples

```
FS(config)# interface GigabitEthernet 0/1
FS(config-if)# no switchport //
FS(config-if)# ip address 2001:1::1/64
FS(config-if)# bfd interval 50 min_rx 50 multiplier 3
FS(config-if)#exit
FS(config)# ipv6 route static bfd GigabitEthernet 0/1 2001:1::2
FS(config)# ipv6 route 2002::/64 GigabitEthernet 0/1 2001:1::2
```

Related commands N/A

Platform description This command is not supported on Layer 2 devices.

7.30 ipv6 static route-limit

Use this command to set the upper threshold of the static route. Use the **no** or **default** form of this command to restore the default setting.

ipv6 static route-limit { number | **default-vrf** number | **vrf** vrf-name number }

no ipv6 static route-limit [**default-vrf**] [**vrf** vrf-name]

default ipv6 static route-limit [**default-vrf**] [**vrf** vrf-name]

Parameter	Parameter	Description
Description	number	Upper threshold of static routes in the range from 1 to 1,000,000.
	default-vrf number	Upper threshold of static routes in the range from 1 to 10,000 in default VRF scenario.
	vrf vrf-name number	Upper threshold of static routes in the range from 1 to 10,000 in VRF scenario.

Defaults The default is 1000.

Command Mode Global configuration mode

Usage Guide The goal is to control the number of static routes. You can view the upper threshold of the configured non-default static routes with the show running config command.

The following example sets the upper threshold of the global static routes to 900, the upper threshold of the global static routes to 200 in default VRF scenario, the upper threshold of the global static routes to 100 in VRF scenario and then restores the default value.

Examples

```
FS(config)#ipv6 static route-limit ?
  <1-1000000>  Global limit value(default value: 1024)
  default-vrf  Default Routing/Forwarding instance
  vrf         VPN Routing/Forwarding instance
FS(config)# ipv6 static route-limit 900
FS(config)# ipv6 static route-limit default-vrf 200
FS(config)# ipv6 static route-limit vrf test 100
FS(config)# no ipv6 static route-limit
FS(config)# no ipv6 static route-limit default-vrf
FS(config)# no ipv6 static route-limit vrf test
```

	Command	Description
Related Commands	ipv6 route	Configures the IPv6 static route.
	show ipv6 route	Displays the IPv6 routing table.

Platform Description This command is not supported on 2-layer devices.

7.31 ipv6 unicast-routing

Use this command to enable the IPv6 route function of the FSOS. Use the **no** form of this command to disable this function.

ipv6 unicast-routing
no ipv6 unicast-routing

Parameter description None

Default configuration This function is enabled by default.

Command mode Global configuration mode

Usage guidelines This function can be disabled if the device is just used as the bridge-connection device or the VOIP gateway device.

Examples The example disables the IPv6 route function of FSOS.

```
FS# no ipv6 unicast-routing
```

	Command	Description
Related commands	ipv6 route	Configure the IPv6 static route
	show ipv6 route	Displays the IPv6 routing table

Platform description This command is not supported on Layer 2 devices.

7.32 maximum-paths

Use this command to specify the number of equivalent routes. Use the **no** form of this command is used to restore the default setting.

maximum-paths number

no maximum-paths number

	Parameter	Description
Parameter description	number	Number of equivalent routes in the range from 1 to device capacity.

Default configuration The default value varies from products.

Command mode Route map conf

Usage guidelines With this command executed, the number of routes for load balancing is no more than the specified number of equivalent routes. You can view the number of equivalent routes with the show running config command.

The following example sets the number of equivalent routes to 10 and then restores the default setting.

```
maximum-paths 10
no maximum-paths 10
```

7.33 maximum routes

Use this command to limit the number of routes in default VRF scenario. Use the **no** form of this command to restore the default setting.

maximum routes limit { warn-threshold | **warning-only** }

no maximum routes

	Parameter	Description
Parameter Description	limit	Indicates the limitation on number of routes. If the routes number exceeds the limitation, it will be written into the routing table. Range:

	1-4,294,967,295.
warn-threshold	Indicates the threshold of printing alarm. Range: 1-100.
warning-only	When the route reaches to the limited number, print log only. (The route can still be written into the core routing table.)

Defaults N/A

Command

Mode Global configuration mode

Usage Guide

The command is used to limit the routes running in default VRF scenario. If you want to obtain alarm only, please configure parameter **warning-only**.

Examples

The following example sets the maximum number of routes to 1,000 in default VRF scenario. An alarm log will be generated if the number exceeds 1,000.

```
FS(config)# maximum routes 1000 100
```

7.34 show ip redirects

Use this command to display the default gateway IP address.

show ip redirects

Use this command to display the default gateway IP address.

show ip redirects

Parameter

Parameter	Description
N/A	N/A

Defaults N/A

Command

Mode Privileged EXEC mode

Usage Guide

Use this command to display the default gateway IP address. This command is supported on 2-layer devices or 3-layer devices with the **no ip routing** command executed.

The following example displays the default gateway.

```
FS# show ip redirects
Default Gateway: 192.168.195.1
```

Examples

Field	Description
Default Gateway	IP address of the default gateway.

Related

Commands

Command	Description
N/A	N/A

Platform

Description This command is supported on 2-layer devices and 3-layer devices with the **no ip routing** command executed.

7.35 show ip route

Use the command to display the configuration of the IP routing table.

show ip route [[**vrf** vrf_name] [network [mask [**longer-prefix**]] | **count** | protocol [process-id] | **weight**]]

show ip route [**vrf** vrf-name] [[**normal** | **ecmp** | **fast-reroute**] [network [mask]]

Parameter description

Parameter	Description
vrf vrf_name	(Optional) Displays the route information of the VRF.
network	(Optional) Displays the route information to the network.
mask	(Optional) Displays the route information to the network of this mask.
longer-prefix	(optional) Displays the routes that match the specified prefix.
count	(Optional) Displays the number of existent routes. (for the ECMP/WCMP route, displays one route)
protocol	(Optional) Displays the route information of specific protocol.
process-id	(Optional) Routing protocol process ID.
weight	(Optional) Displays the route information of non default weight.
normal	Displays normal routes and not equivalent routes or fast reroutes.
ecmp	Displays only equivalent routes.
fast-reroute	(Optional) Displays the master/standby route of fast reroute.

Default

configuration All routes are displayed by default.

Command mode Privileged EXEC mode/ global configuration mode/ interface configuration mode/ routing protocol configuration mode/ route map configuration mode.

This command can display route information flexibly.

Usage guidelines This command shows all routes. To show different attributes of routes, specify normal | ecmp | fast-reroute.

The following example displays the configuration of the IP routing table.

Examples

```
FS# show ip route

Codes: C - Connected, L - Local, S - Static
       R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       IA - Inter area, EV - BGP EVPN, A - Arp to host
       LA - Local aggregate route
```

```

* - candidate default
Gateway of last resort is no set
S    20.0.0.0/8 is directly connected, VLAN 1
S    22.0.0.0/8 [1/0] via 20.0.0.1
O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN 1
R    40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN 1
B    50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41
C    192.1.1.0/24 is directly connected, VLAN 1
C    192.1.1.254/32 is local host.
LA   1.1.1.0/24 [1/0] via 0.0.0.0, Null 0
    
```

Field	Description
O	Source routing protocol, which may be: C: directly connected route S: static route R: RIP route B: BGP route O: OSPF route I: IS-IS route
E2	Route type, which may be: E1: OSPF external route type 1 E2: OSPF external route type 2 N1: OSPF NSSA external type 1 N2: OSPF NSSA external type 2 IA: OSPF area internal route SU: IS-IS summary route L1: IS-IS level-1 route L2: IS-IS level-2 route IA: IS-IS area internal route
20.0.0.0/8	Network address and mask of the destination network
[1/0]	Administrative distance/metric

```

FS# show ip route 30.0.0.0
Routing entry for 30.0.0.0/8
Distance 110, metric 20
Routing Descriptor Blocks:
192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
    
```

Field	Description
Routing Descriptor Blocks	Next hop IP address, source, update time, forwarding interface, source routing protocol and type of route information

```
FS# show ip route count
----- route info -----
the num of active route: 5 (include ecmp: 9)
```

```
FS# show ip route weight
-----[distance/metric/weight]-----
S   23.0.0.0/8 [1/0/2] via 192.1.1.20
S   172.0.0.0/16 [1/0/4] via 192.0.0.1
```

```
FS#show ip route normal

Codes: C - Connected, L - Local, S - Static
       R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       IA - Inter area, * - candidate default

Gateway of last resort is no set
S   20.0.0.0/8 is directly connected, VLAN 1
S   22.0.0.0/8 [1/0] via 20.0.0.1
O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN 1
R   40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN 1
B   50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41
C   192.1.1.0/24 is directly connected, VLAN 1
C   192.1.1.254/32 is local host
```

```
FS#show ip route ecmp

Codes: C - Connected, L - Local, S - Static
       R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       IA - Inter area, * - candidate default

Gateway of last resort is 192.168.1.2 to network 0.0.0.0
S*  0.0.0.0/0 [1/0] via 192.168.1.2
      [1/0] via 192.168.2.2
O IA 192.168.10.0/24 [110/1] via 35.1.10.2, 00:38:26, VLAN 1
```

```
[110/1] via 35.1.30.2, 00:38:26, VLAN 3
```

```
FS#show ip route fast-reroute

Codes: C - Connected, L - Local, S - Static
       R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       IA - Inter area, * - candidate default

Status codes: m - main entry, b - backup entry, a - active entry

Gateway of last resort is 192.168.1.2 to network 0.0.0.0
S*   0.0.0.0/0 [ma] via 192.168.1.2
           [b] via 192.168.2.2
O IA 192.168.10.0/24 [m] via 35.1.10.2, 00:38:26, VLAN 1
           [ba]  via 35.1.30.2, 00:38:26, VLAN 3
```

```
FS# show ip route fast-reroute 30.0.0.0
Routing entry for 30.0.0.0/8
Distance 110, metric 20
Routing Descriptor Blocks:
[m] 192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
[ba]192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
```

7.36 show ip route recursive

Use this command to display the IP route recursive information

show ip route [[vrf vrf_name] recursive A.B.C.D/<0-32>

Parameter	Description
vrf vrf-name	(Optional) Displays the route information of the specified VRF. The default is global VRF.
A.B.C.D/<0-32>	Network address/mask

Command Mode Privileged EXEC mode

Usage Guide When the user checks the recursive information of an IP route, all reachable routes are displayed based on the longest match.

The following displays the result of **show ip route recursive 50.1.1.1/32** command

```
FS(config)# show ip route recursive 50.1.1.1/32

Codes: C - Connected, L - Local, S - Static
        R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        IA - Inter area, EV - BGP EVPN, * - candidate default

S      50.1.1.1/32 [1/0] via 50.1.3.2
O IA   50.1.1.0/24 [m] via 35.1.10.2, 00:38:26, VLAN 1
S*    0.0.0.0/0 is directly connected, Null 0
```

Examples

Field	Description
O	Source routing protocol, which may be C: direct route; L: local route; S: static route; R: RIP route; B: BGP route; O: OSPF route; I : IS-IS route.
E2	Route type, which may be E1: OSPF external route type 1; E2: OSPF external route type 2; N1: OSPF NSSA external route type 1; N2: OSPF NSSA external route type 2; SU: IS-IS summary route; L1: IS-IS level 1 route; L2: IS-IS level 2 route; IA: internal route.
50.1.1.1/32	Network address and mask of the destination network
[1/0]	Administrative distance/metric
50.1.3.2	IP address of next hop
00:38:26	Lifetime of protocol route
VLAN 1	Forwarding interface of next hop
Routing Descriptor Blocks	Displays the next hop IP address, route source, update time, interface, source routing protocol, type, and BGP community and other attributes

Related

Commands N/A

Platform

Description This command is not supported on 2-layer devices.

7.37 show ip route static bfd

Use this command to display the IP route correlated BFD information

show ip route [[vrf vrf_name] **static bfd**

Parameter	Parameter	Description
description	vrf vrf-name	(Optional) Displays route information of the specified VRF. The default is global VRF.

Default configuration N/A

Command mode Privileged EXEC mode.

Usage guidelines Use this command to display the IP route correlated BFD information

The following example displays the IP route correlated BFD information,

```
FS(config)#show ip route static bfd
S    10.0.0.0/8 via 100.100.100.25, GigabitEthernet 0/3, BFD state is Up
S    20.0.0.0/8 via 200.100.100.25, GigabitEthernet 0/4, BFD state is Admin
```

Examples

Field	Description
S	Static route
BFD state	State of the static route correlated BFD.

Related commands N/A

Platform description This command is not supported on Layer 2 devices.

7.38 show ip route summary

Use this command to display the statistical information about one routing table.

show ip route [vrf vrf_name] **summary**

Use this command to display the statistical information about all routing tables.

show ip route summary all

Parameter	Parameter	Description
Description	vrf-name	VRF name

Defaults N/A

Command

Mode Privileged EXEC mode

Usage

guideline N/A

The following example displays the statistics of the global routing table.

```

FS# show ip route summary
Codes:  NORMAL – Normal route  ECMP – ECMP route  FRR – Fast-Reroute route

Memory: 2000 bytes
Entries: 22, based on route prefixes
Entries: 29, based on route nexthops

```

	NORMAL	ECMP	FRR	TOTAL
Connected	3	0	0	3
Static	2	1	1	4
RIP	1	2	1	4
OSPF	2	1	1	4
ISIS	1	2	0	3
BGP	2	1	1	4
TOTAL	11	7	4	22

The following example displays the statistics of all routing tables.

```

FS# show ip route summary all
Codes:  NORMAL – Normal route  ECMP – ECMP route  FRR – Fast-Reroute route

IP routing table count:2
Total
Memory: 4000 bytes
Entries: 44, based on route prefixes
Entries: 44, based on route nexthops

```

	NORMAL	ECMP	FRR	TOTAL
Connected	6	0	0	6
Static	4	2	2	8
RIP	2	4	2	8
OSPF	4	2	2	8
ISIS	2	4	0	6
BGP	4	2	2	8
TOTAL	22	14	8	44

Examples

Field	Description
NORMAL	Type of the table entries. Value: NORMAL: common routes (not ECMP or FRR); ECMP: equivalent route; FRR: fast reroute; TOTAL: total
Memory	Memory occupied by the table.
Entries: x, based on route prefixes	Number of entries based on prefix
Entries: x, based on route nexthops	Number of entries based on next-hop
Connected	Protocol type. Value: Connected: direct connection; Static: static; RIP: RIP; OSPF: OSPF; ISIS: ISIS; BGP: BGP; TOTAL: total
IP routing table count	Number of routing tables
Global	Name of routing table. Value: Global: default VRF VRF1: VRF name Total: all VRF routing tables

7.39 show ip route track-table

Use this command to display the IP route correlated Track information.

show ip route [[vrf vrf_name] track-table

Parameter	Description
Description vrf vrf_name	(Optional) Displays the route information of the specified VRF name. The default is global VRF,

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to display the IP route correlated Track information.

The following example displays the IP route correlated Track information.

Examples

```
FS(config)#show ip route track-table
ip route 10.0.0.0 255.0.0.0 GigabitEthernet 0/0 track 2 state is [up]
```

```
ip route 20.0.0.0 255.0.0.0 GigabitEthernet 0/0 2 track 3 state is [down]
```

:

Field	Description
track	Track target index
state	Track target state

Related Commands	Command	Description
	N/A	N/A

Platform

Description This command is not supported on 2-layer devices.

7.40 show ipv6 redirects

Use this command to display the IPv6 default gateway IP address.

show ipv6 redirects

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

The following example displays the default gateway IPv6 address.

```
FS# show ipv6 redirects
Default Gateway: 10::1
```

Examples

Field	Description
Default Gateway	IPv6 address of the default gateway

Related Commands	Command	Description
	N/A	N/A

Platform

Description This command is supported on 2-layer devices and 3-layer devices with the **no ip routing** command executed..

7.41 show ipv6 route

Use the command to display the configuration of the IPv6 routing table.

show ipv6 route [vrf vrf-name] [[network / prefix-length] | **summary | protocol| **weight**]**

Parameter	Description
network	(Optional) Displays the route information to the network.
vrf-name	VRF name.
summary	(Optional) Displays the classified statistics of the number of ipv6 routes.
protocol	((Optional) Displays the route information of specific protocol.
weight	(Optional) Displays the non-default-weight routes only.

Parameter description

Default configuration

All routes are displayed by default.

Command mode

Privileged EXEC mode/ global configuration mode, interface configuration mode/ routing protocol configuration mode/ route map configuration mode.

Usage guidelines

Use this command to display route information flexibly.

The following example displays the output of this command.

```

FS(config)# show ipv6 route

IPv6 routing table - Default - 7 entries
Codes: C - Connected, L - Local, S - Static
       R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       IA - Inter area

C    10::/64   via Loopback 1, directly connected
L    10::1/128 via Loopback 1, local host
S    20::/64   [20/0] via 10::4, Loopback 1C
C    FE80::/10 via Null 0, directly connected
C    FE80::/64 via Loopback 1, directly connected
L    FE80::2D0:F8FF:FE22:33AB/128 via Loopback 1, local host
    
```

Examples

Field	Description
O	Source routing protocol, which may be: C: directly connected route S: static route R: RIP route B: BGP route O: OSPF route I: IS-IS route

E2	Route type, which may be: E1: OSPF external route type 1 E2: OSPF external route type 2 N1: OSPF NSSA external type 1 N2: OSPF NSSA external type 2 IA: OSPF area internal route SU: IS-IS summary route L1: IS-IS level-1 route L2: IS-IS level-2 route IA: IS-IS area internal route
20::/64	Network address and mask of the destination network
[20/0]	Administrative distance/metric

Related commands

Command	Description
ipv6 route	Configures the IPv6 static route.

Platform description

This command is not supported on Layer 2 devices.

7.42 show ip route static bfd

Use this command to display the IPv6 route correlated BFD information

show ipv6 route [[vrf vrf_name] static bfd

Parameter description

Parameter	Description
vrf vrf-name	(Optional) Displays the route information of the designated VRF name of the static route. The default is global VRF,

Default configuration

N/A

Command mode

Privileged EXEC mode.

Usage guidelines

Use this command to display the IPv6 route correlated BFD information.

The following example displays the IPv6 route correlated BFD information.

```
FS(config)#show ip route static bfd
S    25::/64 via 100::25, GigabitEthernet 0/3, BFD state is Up
S    26::/64 via 200::25, GigabitEthernet 0/4, BFD state is Admin
```

Examples

Field	Description
S	Static route
BFD state	State of the static route associated BFD

Related commands N/A

Platform description This command is not supported on Layer 2 devices.

7.43 show ipv6 route summary

Use this command to display the statistics of the IPv6 routing table of a specified VRF.

show ipv6 route [vrf vrf-name] summary

Use this command to display statistics of all IPv6 routing tables.

show ipv6 route summary all

Parameter	Description
vrf-name	(Optional) VRF name. If no VRF name is specified, statistics of the IPv6 routing table of the global VRF are displayed.

Default configuration N/A

Command mode Privileged EXEC mode.

Usage guidelines N/A

Examples

The following example displays statistics of IPv6 routing table of the global VRF.

```
FS#show ipv6 route summary
IPv6 routing table name is - Default(0) global scope - 5 entries
IPv6 routing table default maximum-paths is 32
Local          2
Connected     3
Static         0
PIP            0
OSPF           0
BGP            0
-----
Total          5
```

The following example displays t statistics of all IPv6 routing tables.

```
FS#show ipv6 route summary
IPv6 routing table name is - Default(0) global scope - 5 entries
IPv6 routing table default maximum-paths is 32
Local          2
Connected     3
Static         0
PIP            0
```

OSPF	0
BGP	0

Total	5

Field	Description
Memory	The memory size occupied by the current routing table.
Entries	The entries in the current routing table (based on the entry prefix instead of the next hop entry.)
Connected	Describes the protocol type of the entry. The field can be; Connected: Connected route entry. Static: Static route entry. RIP: RIP route entry. OSPF: OSPF route entry. ISIS: ISIS route entry. BGP: BGP route entry. TOTAL: Total number of all protocol entries.
IPv6 routing table count	The number of the routing tables.
Global	The name of the current routing table. The field can be: Global : Global (The default VRF) VRF1: VRF name. TOTAL: All VRF routing table summary.

Related commands

Command	Description
N/A	N/A

Platform description

This command is not supported on Layer 2 devices.

8 Protocol-independent Configuration Commands

8.1 accept-lifetime

Use this command in the encryption key configuration mode to specify the lifetime of an encryption key in its receiving direction. Use the no form of this command to restore the default value.

accept-lifetime start-time {infinite | end-time | duration seconds}

no accept-lifetime

Parameter	Parameter	Description
description	start-time	Start time of the lifetime. The syntax is as follows: hh:mm:ss month date year hh:mm:ss date month year <ul style="list-style-type: none">● hh—hour● mm—minute● ss—second● month—month● date—day● year—year The default start time is Jun 1, 1993, which is also the earliest start time available.
	infinite	Indicates that the encryption key is valid for ever.
	end-time	End time of the encryption key. It must be later than the start time.
	duration seconds	Duration of the encryption key after the start time. The value ranges from 1 to 2147483646.

Default infinite

Command mode Encryption key configuration mode

Usage guideline Use this command to specify the lifetime of an encryption key in its receiving direction.

Examples The following example configures the lifetime from 0:00 on September 9, 2000 to 0:00 on October 12, 2011.

```
FS(config)# key chain ripkeys
FS(config-keychain)# key 1
FS(config-keychain-key)#accept-lifetime 00:00:00 Sep 9 2000 00:00:00 Dec 12 2011
```

Related command	Command	Description
	-	-

Platform -
description

8.2 ip as-path access-list

Use this command to configure an autonomous system (AS) path filter using a regular expression. Use the **no** form of this command to remove the AS path filter using a regular expression.

ip as-path access-list path-list-num { **permit** | **deny** } regular-expression
no ip as-path access-list path-list-num [{ **permit** | **deny** } regular-expression]

Parameter	Parameter	Description
description	path-list-num	Specifies the AS-path access-list number. The range is from 1 to 500.
	permit	Permits advertisement based on matching conditions.
	deny	Denies advertisement based on matching conditions.
	regular-expression	Regular expression that defines the AS-path filter. The expression length range is from 1 to 255 characters.

Default By default, no AS path filter using a regular expression is configured.

Command mode Global configuration mode

Usage guideline N/A

Examples The following example configures an AS path filter matching the path which contains AS number 123 only.

```
FS(config)# ip as-path access-list 105 deny ^123$
```

Related command	Command	Description
	-	-

Platform -
description

8.3 ip community-list

Use this command to define a standard or expanded community list and control access to it. Use the **no** form of this command to remove the setting.

ip community-list { community-list-number | **standard** community-list-name } { **permit** | **deny** }
[{ community-list-number | **internet** | **local-AS** | **no-advertise** | **no-export** | **gshut** }]
ip community-list { community-list-number | **expanded** community-list-name } { **permit** | **deny** }
[regular-expression]

Parameter	Description
community-list-name	Name of the community list.
standard	Indicates standard community list numbered in 1 to 99.
expanded	Indicates expanded community list numbered in 100 to 199.
permit	Permits access to the community list.
deny	Denies access to the community list.
community-number	Community number in the form of AA:NN(AS number/2-byte numerical) in the range of 1 to 255 characters. It may also be one of the following value: Internet: Indicates the Internet community. All paths belong to this community. no-export: Indicates that this path will not be advertised to any EBGp peers. no-advertise: Indicates that this path will not be advertised to any BGP peers. local-as: Indicates that this path will not be advertised to out of the AS. When AS confederation is configured, this path will not be advertised to other ASs or sub-ASs.
gshut	Indicates the route is advertised by a gracefully shutdown neighbor.

Parameter description

Default configuration

None

Command mode

Global configuration mode.

Usage guidelines

This command is used to define the community list for BGP.

Examples

```
FS(config)# ip community-list standard 1 deny 100.20.200.20
FS(config)# ip community-list standard 1 permit internet
```

Related commands

Command	Description
match community	Match the community list.
set community-list delete	Remove the community value of the BGP path according to the community list.
show ip community-list	Show the community list information.

8.4 ip extcommunity-list

Use this command to create an extcommunity list and add an entry to the list. Use the **no** form of this command to remove the setting.

ip extcommunity-list {expanded-list | **expanded** list-name} { **permit** | **deny** } [regular-expression]

ip extcommunity-list {standard-list | **standard** list-name} { **permit** | **deny** } [**rt** value] [**soo** value]

no ip extcommunity-list {expanded-list | **expanded** list-name | standard-list | **standard** list-name }

Use this command to create an extcommunity list and enter ip extcommunity-list configuration mode. Use the **no** form of this command to remove the setting.

ip extcommunity-list {expanded-list | **expanded** list-name| standard-list | **standard** list-name }

no ip extcommunity-list {expanded-list | **expanded** list-name | standard-list | **standard** list-name }

Parameter description

Parameter	Description
expand-list	Indicates an extended extcommunity list, ranging from 100 to 199. One extcommunity list may contain multiple rules.
standard-list	Indicates a standard extcommunity list, ranging from 1 to 99. One extcommunity list may contain multiple rules.
expanded list-name	Indicates the name of an extended extcommunity, comprising not more than 32 characters. When using this parameter, you enter the extcommunity list configuration mode.
standard list-name	Indicates the name of a standard extcommunity list, comprising not more than 32 characters. When using this parameter, you enter the extcommunity list configuration mode.
permit	Defines an extcommunity rule for permitting.
deny	Defines an extcommunity rule for denying.
regular-expression	(optional) Defines a matching template that is used to match an extcommunity.
sequence-number	(Optional) Defines the sequence number of a rule, ranging from 1 to 2,147,483,647. If no sequence number is specified, the sequence number automatically increases by 10 when a rule is added by default. The initial number is 10.
rt	(Optional) Sets the RT attribute value. This command can be used only for the standard extcommunity configuration, but not for the extended extcommunity configuration.
soo	(Optional) Sets the SOO attribute value. This command can be used only for the standard extcommunity configuration, but not for the extended extcommunity configuration.
value	Indicates the value of an extended community (extend_community_value).

Default It is disabled by default.

Command mode Global configuration mode and ip extcommunity-list configuration mode.

Usage guidelines This command is used to define the extcommunity list.

Examples 1.The following example defines an ip extcommunity-list.

```
FS(config)# ip extcommunity-list 1 permit rt 100: 1
FS(config)# ip extcommunity-list standard aaa permit rt
100: 2
FS(config)# ip extcommunity-list expanded ext1 permit 200: [0~9][0~9]
```

2. The following example displays how to use ip extcommunity.

```
FS(config)# route-map rt_in_filter
FS(config-route-map)# match extcommunity 1
FS(config-route-map)# match extcommunity ext1
FS(config)# router bgp 100
FS(config-router)# address-family vpn
FS(config-router-af)#neighbor 3.3.3.3 send-community extended
FS(config-router-af)#neighbor 3.3.3.3 route-map rt_in_filter in
```

8.5 ip prefix-list

Use this command to create a prefix list or add an entry to the prefix list. Use the **no** form of this command to remove the prefix list or an entry.

ip prefix-list prefix-list-name [**seq** seq-number] { **deny** | **permit** } ip-prefix [**ge** minimum-prefix-length][**le** maximum-prefix-length]
no ip prefix-list prefix-list-name [**seq** seq-number] { **deny** | **permit** } ip-prefix [**ge** minimum-prefix-length][**le** maximum-prefix-length]

Parameter description

Parameter	Description
prefix-list-name	Name of the prefix list
seq-number	Sequence number of an entry in the range of 1 to 2147483647. When you execute this command to add an entry without a sequence number, the system allocates a default sequence number for the entry. The default sequence number of the first entry is 5. Every subsequential entry without a sequence number uses the time of 5 larger than the previous sequence number as the default sequence number.
deny	Deny the route matching the prefix list.
permit	Permit the route matching the prefix list.
ip-prefix	Network address and mask. Network address can be any valid IP address and the mask length is in the range of 0 to 32.
minimum-prefix-length	(Optional) Minimum length of the prefix (the starting length) Note: "ge" indicates the operation of "larger than" and "equivalent to".
maximum-prefix-length	(Optional) Maximum length of the prefix (the ending length) Note: "le" indicates the operation of "less than" and "equivalent to".

Default configuration

None

Command mode Global configuration mode.

The ip prefix-list command configures the prefix list, with the permit or deny keyword to determine the action in case of matching.

Usage guidelines

You can execute this command to define an exact match, or use “ge” or “le” to define a range match for a prefix for flexible configuration. “ge” indicates the range of minimum-prefix-length to 32; “le” indicates the range of the mask length of the IP prefix to maximum-prefix-length; “ge” and “le” indicates the range of minimum-prefix-length to maximum-prefix-length, namely, mask length of IP prefix < minimum-prefix-length < maximum-prefix-length <=32.

The following example filters the RIP routes the OSPF redistributes by the destination IP address following the rule defined in the associated IP prefix list, for example, redistribute the routes whose destination IP address is in the range 201.1.1.0/24.

Examples

```
FS# configure terminal
FS(config)# ip prefix-list pre1 permit 201.1.1.0/24
FS(config)# router ospf
FS(config-router)# distribute-list prefix pre1 out rip
FS(config-router)# end
```

8.6 ip prefix-list description

Use this command to add the description of a prefix list. Use the **no** form of this command to delete the description.

ip prefix-list prefix-list-name **description** description-text

	Parameter	Description
Parameter description	prefix-list-name	Name of the prefix list
	description-text	Description of the prefix list

Default configuration
No description is added for a prefix list, by default.

Command mode Global configuration mode

The example below adds the description for the prefix list:

Examples

```
FS# configure terminal
FS(config)# ip prefix-list pre description Deny routes from Net-A
```

8.7 ip prefix-list sequence-number

Use this command to enable sort function for a prefix list. Use the **no** form of this command to disable the sort function.

ip prefix-list sequence-number

Parameter description Disabled

Default configuration No sequence number is added for a prefix list, by default.

Command mode Global configuration mode

Examples The example below adds a sequence number for the prefix list:

```
FS# configure terminal
FS(config)# ip prefix-list pre description deny routes from Net-A
```

Command	Description
ip prefix-list	Configure the prefix list.

Platform description N/A

8.8 ipv6 prefix-list

Use this command to create an IPv6 prefix list or add an entry in the prefix list. Use the **no** form of this command to delete an IPv6 prefix list or an entry in the prefix list.

ipv6 prefix-list prefix-list-name[**seq** seq-number] { **deny** | **permit**} ipv6-prefix [**ge** minimum-prefix-length][**le** maximum-prefix-length]
no ipv6 prefix-list prefix-list-name[**seq** seq-number] { **deny** | **permit**} ipv6-prefix [**ge** minimum-prefix-length][**le** maximum-prefix-length]

Parameter description

Parameter	Description
prefix-list-name	Name of the prefix list
seq-number	Sequence number of an entry in the prefix list. Its range is 1 to 4294967294. If the sequence number is not specified in this command, the system will allocate a default one for the entry. The default sequence number of the first entry is 5, and that of each subsequent one is the product of adding 5 to the sequence number of the proceeding entry.
permit	Permit the access to the matching result.
deny	Deny the access to the matching result.
ipv6-prefix	Network address and its mask. The network address can be any valid IP address. The mask can be 0 to 32 characters.
minimum-prefix-length	(Optional) Minimum length of the prefix (the starting length) Note: "ge" indicates the operation of "larger than" and "equivalent to".
maximum-prefix-length	(Optional) Maximum length of the prefix (the ending length) Note: "le" indicates the operation of "less than" and "equivalent to".

Default No prefix list is created.

configuration

Command mode Global configuration mode

The ipv6 prefix-list command configures the prefix list, with the permit or deny keyword to determine the action in case of matching.

Usage guideline

You can execute this command to define an exact match, or use “ge” or “le” to define a range match for a prefix for flexible configuration. “ge” indicates the range of minimum-prefix-length to 128; “le” indicates the range of the mask length of the IP prefix to maximum-prefix-length; “ge” and “le” indicates the range of minimum-prefix-length to maximum-prefix-length, namely, ipv6-prefix mask length < minimum-prefix-length < maximum-prefix-length <= 128

The following example filters the RIP routes the OSPF redistributes by the destination IP address following the rule defined in the associated IP prefix list, for example, redistribute the routes whose destination IP address is in the range 2222::/64.

Examples

```
FS# configure terminal
FS(config)# ipv6 prefix-list pre1 permit 2222::64
FS(config)# ipv6 router ospf
FS(config-router)# distribute-list prefix pre out rip
FS(config-router)# end
```

8.9 ipv6 prefix-list description

Use this command to add the description of an IPv6 prefix list. Use the **no** form of this command to delete the description.

ipv6 prefix-list prefix-lis-name **description** description-text

no ipv6 prefix-list prefix-lis-name **description** description-text

Parameter description

Parameter	Description
prefix-lis-name	Name of the ipv6 prefix list
description-text	Description of the ipv6 prefix list

Default

configuration No description is added for an IPv6 prefix list, by default.

Command mode Global configuration mode

The example below adds the description for the prefix list:

Examples

```
FS# configure terminal
FS(config)# ipv6 prefix-list pre description Deny routes from Net-A
```

Related commands

Command	Description
ipv6 prefix-list	Configure the IPv6 prefix list.

8.10 ipv6 prefix-list sequence-number

Use this command to enable the sorting function for an IPv6 prefix list. Use the **no** form of this command to remove the settings.

ipv6 prefix-list sequence-number

no ipv6 prefix-list sequence-number

Parameter description Disabled.

Default configuration No sequence number is added for a prefix list, by default.

Command mode Global configuration mode

Examples The example below adds a sequence number for the prefix list:

```
FS# configure terminal
FS(config)# ipv6 prefix-list pre description Deny routes from Net-A
```

Command	Description
ipv6 prefix-list	Configure the IPv6 prefix list.

8.11 key

Use this command to define an encryption key and enter the encryption key chain configuration mode. Use the **no** form of this command to delete it.

key key-id

no key key-id

Parameter description	Parameter	Description
	key-id	Key ID, ranging from 0 to 2147483647.

Default No encryption key is configured.

Command mode Encryption key chain configuration mode.

Usage guideline Use this command to define an encryption key.

Examples The following example configures encryption key chain ripkeys and key 1.

```
FS(config)# key chain ripkeys
FS(config-keychain)# key 1
```

Related	Command	Description
---------	---------	-------------

command	-	-
----------------	---	---

Platform -
description

8.12 key chain


Use this command to define a key chain and enter the key chain configuration mode. Use the no form of this command to delete it.

key chain key-chain-name
no key chain key-chain-name

Parameter	Parameter	Description
description	key-chain-name	Key chain name.

Default No key chain is configured.

Command mode Global configuration mode.

Usage guideline  For a key chain to take effect, you need to configure at least one key.

Examples The following example configures key chain ripkeys and enters the key chain configuration mode.

```
FS(config)# key chain ripkeys
```

Related command	Command	Description
	-	-

Platform -
description

8.13 key-string

Use this command to specify a key string. Use the no form of this command to delete it.

key-string [0|7] text
no key-string

Parameter	Parameter	Description
description	0	Use plaintext.
	7	Use encryption.
	text	Authentication string.

Default No key string is configured.

Command mode Encryption key configuration mode.

Usage guideline Use this command to specify a key string.

Examples The following example configures key chain ripkeys, key 1 and the key string abc:

```
FS(config)# key chain ripkeys
FS(config-keychain)# key 1
FS(config-keychain-key)#key-string abc
```

Related command	Command	Description
	-	-

Platform description -

8.14 match as-path

Use this command to redistribute the routes of AS_PATH attribute permitted by the access list in the route map configuration mode. Use the **no** form of this command to remove the setting.

match as-path as-path-acl-list-num [as-path-acl-list-num.....]

no match as-path as-path-acl-list-num [as-path-acl-list-num.....]

Parameter description	Parameter	Description
	as-path-acl-list-num	ACL number, in the range of 1 to 500.
	access-list-name	Name of the access list

Default configuration None.

Command mode Route map configuration mode.

Usage guidelines The match as-path can be followed by an access list number or name. One or more match or set commands can be executed to configure one route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

```
!
route-map ROUTEMAP2IBGP
match as-path 20 30
```

Related	Command	Description
---------	---------	-------------

match community	Match the community.
match metric	Match the metric.
match origin	Match the source of routes.
set as-path prepend	Set the AS_PATH attribute of redistributed routes
set metric	Set the metric.
set metric-type	Set the metric type.

8.15 match community

Use this command to redistribute the routes matching the Community attribute permitted by the ACL in the route map configuration mode. Use the **no** form of this command to remove the setting.

match community { community-list-number | community-list-name} [**exact-match**] [{community-list-number | community-list-name} [**exact-match**] ...]

no match community { community-list-number | community-list-name} [**exact-match**] [{ community-list-number | community-list-name} [**exact-match**] ...]

Parameter	Description
community-list-number	Number of the standard community list in the range 1 to 99.
	Number of the extended community list in the range of 100 to 199
community-list-name	Name of the community list in the range of less than 80 characters
exact-match	Match the community list exactly.

Default configuration None.

Command mode Route map configuration mode.

Usage guidelines The match community can be followed by more than one community list number or name, but the total of community lists and names should not be greater than 6.
 Each exact-match applies to only the previous list, not all the lists.
 One or more match or set commands can be executed to configure one route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

```
ip community-list 1 permit 100:2 100:30
route-map set lopref
match community 1 exact-match
set local-preference 20
```

Command	Description
match as-path	Match the AS_PATH attribute.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.

set metric	Set the metric.
set metric-type	Set the metric type.

8.16 match extcommunity

Use this command to define the match rule for the BGP extcommunity. Use the no form of this command to cancel the setting.

match extcommunity { standard-list-number | standard-list-name | expanded-list-num | expanded-list-name }

no match extcommunity { standard-list-number | standard-list-name | expanded-list-num | expanded-list-name }

Parameter description

Parameter	Description
standard-list-number	Standard extcommunity list number, ranging from 1 to 99. An extcommunity list may contains multiple excommunity values.
standard-list-name	Standard excommunity name. An extcommunity list may contains multiple excommunity values.
expanded-list-num	Expanded extcommunity list number, ranging from 100 to 199. An extcommunity list may contains multiple excommunity values.
expanded-list-name	Expanded excommunity name. An extcommunity list may contains multiple excommunity values.

Default

The rule is not defined in the associated route map.

Command mode

Route map configuration mode.

Usage guideline

There are the following scenarios for a route map with an extcommunity:

1. The route map associated with **import map** uses the RT attribute to filter imported VRF routes.
2. The route maps associated with **neighbor route-map in** and **neighbor route-map out** are configured in the BGP VPNv4 address family mode and use the RT attribute to filter VPNv4 routes sent to or by BGP peers.

Examples

1. Define two extcommunity:

```
FS(config)# ip extcommunity-list 1 permit rt 100: 1
```

```
FS(config)# ip extcommunity-list 1 permit rt 100: 2
```

2. Define match rules in the route map:

```
FS(config)# route-map rt
```

```
FS(config-route-map)# match extcommunity 1
```

3. Use the route map.

```
FS(config)# router bgp 100
```

```
FS(config-router)# address-family vpnv4
```

```
FS(config-router-af)# neighbor 3.3.3.3 route-map rt in
```

Related command

Command	Description
---------	-------------

ip extcommunity-list	Create an extcommunity list.
show ip extcommunity-list	Show an extcommunity list.

Platform description -

8.17 match interface

Use **match interface** command to redistribute the routes whose next hop is the specified interface. Use the **no** form of this command to remove the setting.

match interface interface-type interface-number [...interface-type interface-number]

no match interface [interface-type interface-number [...interface-type interface-number]]

	Parameter	Description
Parameter description	interface-type	Interface type
	interface-number	Interface number

Default configuration None.

Command mode Route map configuration mode.

This command can be followed by multiple interfaces.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guidelines

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example redistributes the RIP route with the next hop of fastethernet 0/0 in the OSPF routing protocol.

Examples

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
route-map redrip permit 10
```

```
match interface fastethernet 0/0
```

Related commands

Command	Description
match ip address	Match the address in the access list.
match ip next-hop	Match the next-hop IP address in the access list.
match ip route-source	Match the source IP address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

8.18 match ip address

Use **match ip address** command to redistribute the routes matching the IP address permitted by the ACL or the prefix list. Use the **no** form of this command to remove the setting.

match ip address {access-list-number [access-list-number... | access-list-name...] |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]}
no match ip address [access-list-number [access-list-number... | access-list-name...] |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]]

Parameter description

Parameter	Description
access-list-number	Number of the access list
access-list-name	Name of the access list
prefix-list prefix-list-name	Specify the prefix list to match.

Default

configuration None.

Command mode Route map configuration mode.

Multiple access list numbers or names may follow match ip address.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guidelines

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different

command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

By default, all lists are deleted if no list number is entered.

In some versions, match ip address allow ACL and ip prefix to co-exist to support the separation of odd/even routes. Match ip address associates with ACL to filter the odd/even routes, and associates with prefix list to filter the subnet mask length, so as to separate routes with the specific subnet mask length according to parity.

The following example enables the OSPF routing protocol to redistribute RIP routes that match access list 10, with the route type being type-1 external type and the default metric being 40.

Examples

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

access-list 10 permit 200.168.23.0

route-map redrip permit 10
match ip address 10
set metric 40
set metric-type type-1!
```

Related commands

Command	Description
access-list	Set the access list.
match interface	Match the next-hop interface of the route.
match ip next-hop	Match the next-hop address in the access list.
match ip route-source	Match the route source address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

8.19 match ip next-hop

Use **match ip next-hop** command to redistribute the routes whose next-hop IP address matches the access list or the prefix list. Use the **no** form of this command to remove the setting.

match ip next-hop {access-list-number [access-list-number... | access-list-name...]} |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]

no match ip next-hop [access-list-number [access-list-number... | access-list-name...] |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]]

Parameter description

Parameter	Description
access-list-number	Number of the access list

access-list-name	Name of the access list
prefix-list prefix-list-name	Specify the prefix list to match.

Default

configuration None.

Command mode Route map configuration mode.

Usage guidelines

Multiple access list numbers or names may follow match ip next-hop. You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

In the example below, the OSPF routing protocol redistributes the RIP routes. As long as the next hop address of the RIP route matches the access list 10 or 20, the OSPF allows for redistribution.

Examples

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

access-list 10 permit 192.168.100.1
access-list 20 permit 172.16.10.1

route-map redrip permit 10
match ip next-hop 10 20
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address in the access list.
match interface	Match the next-hop interface of the route.
match ip route-source	Match the route source address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

8.20 match ip route-source

Use **match ip route-source** command to redistribute the routes whose source IP address matches the access list. Use the **no** form of this command to remove the setting.

match ip route-source {access-list-number [access-list-number... | access-list-name...] |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]}

no match ip route-source [access-list-number [access-list-number... | access-list-name...] |access-list-name [access-list-number...|access-list-name] | **prefix-list** prefix-list-name [prefix-list-name...]]

Parameter	Description
access-list-number	Number of the access list
access-list-name	Name of the access list
prefix-list prefix-list-name	Specify the prefix list to match.

Parameter description

Default configuration None.

Command mode Route map configuration mode.

Multiple access list numbers may follow match ip route-source.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guidelines

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

In the example below, the OSPF routing protocol redistributes the RIP routes. As long as the source IP address of the RIP route matches the access list 5, the OSPF allows for redistribution.

Examples

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

access-list 5 permit 192.168.100.1

route-map redrip permit 10
match ip route-source
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address in the access list.

match interface	Match the next-hop interface of the route.
match ip next-hop	Match the next-hop IP address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

8.21 match ipv6 address

Use this command to redistribute the network routes permitted in the IPv6 access list or the IPv6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 address { access-list-name } | **prefix-list** prefix-list-name }

no match ipv6 address

	Parameter	Description
Parameter description	access-list-name	Name of the access list.
	prefix-list prefix-list-name	Specify the IPv6 prefix list to match.

Default

configuration None

Command mode Route map configuration mode

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guideline In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that match access list v6acl, with the default metric being 30.

Examples

```

ipv6 router ospf
redistribute rip subnets route-map redrip
ipv6 access-list v6acl
10 permit ipv6 2620::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 30
    
```

Related commands

Command	Description
ipv6 access-list	Set the IPV6 access list.
match interface	Match the next-hop interface of the route.
match ipv6 next-hop	Match the next-hop address in the IPV6 access list.
match ipvr route-source	Match the route source address in the IPV6 access list.
match metric	Match the route metric.
match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

8.22 match ipv6 next-hop

Use this command to redistribute the network routes whose next-hop IP address matches the IPV6 access list or the IPV6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 next-hop { access-list-name } | **prefix-list** prefix-list-name}

no match ipv6 next hop

Parameter description

Parameter	Description
access-list-name	Name of the IPV6 access list.
prefix-list prefix-list-name	Specify the IPV6 prefix list to match.

Default

configuration None

Command mode Route map configuration mode

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guideline

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that only match access list v6acl, with the default metric being 40.

Examples

```
ipv6 router ospf
redistribute rip subnets route-map redrip

ipv6 access-list v6acl
10 permit ipv6 2620::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 40
```

Related commands

Command	Description
ipv6 access-list	Set the IPV6 access list.
match interface	Match the next-hop interface of the route.
match ipv6 address	Match the IP address in the IPV6 access list.
match ipv6 route-source	Match the route source address in the IPV6 access list.
match metric	Match the route metric.
match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

8.23 match ipv6 route-source

Use this command to redistribute the network routes whose next-hop IP address matches the IPV6 access list or the IPV6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 route-source { access-list-name } | **prefix-list** prefix-list-name }

no match ipv6 route-source

Parameter	Description
access-list-name	Name of the IPv6 access list.
prefix-list prefix-list-name	Specify the IPv6 prefix list to match.

Default configuration None

Command mode Route map configuration mode

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guideline In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains. In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that only match access list v6acl, with the default metric being 50.

Examples

```

ipv6 router ospf
redistribute rip subnets route-map redrip

ipv6 access-list v6acl
10 permit ipv6 5200::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 50
    
```

Related commands

Command	Description
ipv6 access-list	Set the IPV6 access list.
match interface	Match the next-hop interface of the route.
match ipv6 address	Match the IP address in the IPv6 access list.
match ipv6 next-hop	Match the next hop in the IPv6 access list.
match metric	Match the route metric.

match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

8.24 match metric

Use **match metric** command to redistribute the routes of the specified metric. Use the **no** form of this command to remove the setting.

match metric metric

no match metric metric

Parameter	Parameter	Description
description	metric	Route metric, in the range 0 to 4294967295

Default configuration None.

Command mode Route map configuration mode.

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guidelines In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.
In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

In the example below, the OSPF routing protocol redistributes the RIP routes of metric 10.

Examples

```
router ospf 1
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

route-map redrip permit 10
match metric 10
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address.
match interface	Match the interface.
match ip next-hop	Match the next-hop IP address.

match ip route-source	Match the source IP address.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

8.25 match origin

Use this command to redistribute the routes whose source IP address is permitted by the ACL in the route map configuration mode. Use the **no** form of this command to remove the setting.

match origin {egp | igp | incomplete}

no match origin [egp | igp | incomplete]

	Parameter	Description
Parameter	egp	Redistribute the routes from the remote EGP.
description	igp	Redistribute the routes from the local IGP.
	incomplete	Redistribute the routes from an incomplete type.

Default

configuration None

Command

mode Route map configuration mode

Usage

guideline Use this command to set the origin of the routes to be redistributed. Only one origin can be set.

```

Examples
FS(config)# route-map MY_MAP 10 permit
FS(config-route-map)# match origin egp
FS(config-route-map)# set community 109
FS(config-route-map)# exit
FS(config)# route-map MAP20 20 permit
FS(config-route-map)# match origin incomplete
FS(config-route-map)# set community no-export
    
```

	Command	Description
Related commands	match as-path	Match the AS_PATH attribute.
	match metric	Match the metric.
	match origin	Match the source.
	set as-path prepend	Set the AS_PATH attribute.
	set metric	Set the metric.
	set origin	Set the source.

8.26 match route-type

Use this command to redistribute the network routes of the specified type. Use the **no** form of this command to delete the setting.

match route-type { **static** | **connect** | **rip** | **local** | **internal** | **external** [**type-1** | **type-2**] | **level-1** | **level-2** }

no match route-type [**static** | **connect** | **rip** | **local** | **internal** | **external** [**type-1** | **type-2**] | **level-1** | **level-2**]

Parameter description

Parameter	Description
local	Indicates the local route type.
static	Indicates the static route type.
connect	Indicates the directly connected route type.
rip	Indicates the RIP route type.
internal	Indicates the OSPF internal route type.
external	Indicates the OSPF external route type.
type-1 type-2	Indicates the OSPF type-1 or type-2 route type.
level-1 level-2	Indicates the ISIS level-1 or level-2 route type.

Default

configuration None

Command

mode Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

In the example below, the RIP routing protocol redistributes only the internal routes in the OSPF routing domain.

Examples

```
router rip
redistribute ospf route-map redrip
network 192.168.12.0

route-map redrip permit 10
match route-type internal
!
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address.

match interface	Match the interface.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the access list.
set tag	Match the IP address.

8.27 match tag

Use this command to redistribute the network routes with the specified tag. Use the **no** form of this command to delete the setting.

match tag tag [...tag]

no match tag [tag [...tag]]

Parameter	Parameter	Description
description	tag	Route tag

Default configuration None

Command mode Route map configuration mode

Multiple tags may follow the match tag command.

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guideline

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

In the example below, the RIP routing protocol redistributes only the routes with tag 50 and 80 in the OSPF routing domain.

Examples

```
router rip
redistribute ospf 100 route-map redrip
network 192.168.12.0
```

```
route-map redrip permit 10
match tag 50 80
```


Related commands	Command	Description
	access-list	Set the access list.
	match ip address	Match the IP address.
	match interface	Match the next-hop IP interface.
	match ip route-source	Match the source IP address.
	match metric	Match the metric.
	match ip next-hop	Match the next-hop IP address.
	match route-type	Match the route type.
	set metric	Set the metric.
	set metric-type	Set the metric type.
	set tag	Set the tag.

8.28 memory-lack exit-policy

Use this command to configure a policy to preferentially exit a routing protocol when the memory reaches the lower limit. Use the **no** form of this command to restore the default policy, namely, exit the routing protocol which occupies the largest memory.

memory-lack exit-policy { bgp | ospf | pim-sm | rip }

no memory-lack exit-policy

Parameter description	Parameter	Description
	bgp	Preferentially exit BGP when the memory is insufficient.
	ospf	Preferentially exit OSPF when the memory is insufficient.
	pim-sm	Preferentially exit PIM-SM when the memory is insufficient.
	rip	Preferentially exit RIP when the memory is insufficient.

Default By default, the routing protocol which occupies the largest memory exits preferentially.

Command mode Global configuration mode

Usage guideline When the memory reaches the lower limit, you can disable a routing protocol to release the memory to ensure the normal running of other protocols.

When the system runs out of memory, disable a routing protocol which has the minimal impact on the system to ensure the operation of main services.

Configuring the policy to preferentially exit the routing protocols which are disabled cannot help the system release memory.

This command ensures the operation of main services to some extent when the memory is insufficient. If the memory is further consumed, all routing protocols will exit and stop running.

Examples The following example configures a policy to preferentially exit the BGP protocol when the memory reaches the lower limit.

```
FS(config)# memory-lack exit-policy bgp
```

Related command	Command	Description
	-	-

Platform description -

8.29 route-map

Use **route-map** to enter the route map configuration mode and define a route map. Use the **no** form of this command to remove the setting.

route-map route-map-name [**permit** | **deny**] [sequence-number]

no route-map route-map-name [{**permit** | **deny**}sequence-number]

Parameter description

Parameter	Description
route-map-name	Name of the route map. The redistribute command references the route map according to its name. Multiple routing policies can be defined in a route map, and each policy corresponds to one sequence number.
permit	(Optional) If the permit keyword is defined and the rule defined by match is met, The set command controls the redistributed routes. For policy-based routing, the set command controls the packet forwarding, and exits the route map operation. If the permit keyword is defined but the rule defined by match is not met, the system performs the routing policy of the second route map till the set command is executed finally.
deny	(Optional) If the deny keyword is defined and the rule defined by match is met, no operation will be performed. Neither route redistribution nor policy-based routing is supported in the route map. The system exits the route map operation. If the deny keyword is defined but the rule defined by match is not met, the system performs the routing policy of the second route map till the set command is executed finally.
sequence-number	Sequence number of the route map. The policy with a lower sequence number is preferred, so it's noted when setting the sequence number.

Default configuration None.

Command mode Global configuration mode.

Usage guidelines At present, the FSOS software primarily uses the route map for route redistribution and policy-based

routing.

1. Route redistribution control

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

When configuring route maps, pay attention to the following when using the sequence number of a route map:

When you create the first route map policy, if sequence-number is not specified, it is 10 by default;

If only one route map policy exists and sequence-number is not specified, no new route map policy will be created, and the existing route map policy will be accessed for configuration;

If more than one route map policy is available, the sequence number of each policy shall be specified; otherwise an error message will be displayed.

2. policy-based routing

Policy-based routing refers to a routing mechanism based on user defined policies. Compared with traditional destination IP address-based routing, policy-based routing offers a flexibility for routing based on source IP address, length and port of IP packets. Policy-based routing can apply to the IP packets received on an interface or the IP packets sent from the local device.

Policy-based routing utilizes route map to define routing and forwarding policy. The match command defines packet filtering rule and the set command defines the action for the packets matching the filtering rules. The match command used includes match ip address and match length; the set command includes set ip tos, set ip precedence, set ip dscp, set ip [default] nexthop, set ip next-hop verify-availability, set [default] interface.

The following example enables the OSPF routing protocol to redistribute the RIP routes with the hop count of 4. In the OSPF route domain, the route type is the external route type-1, the default metric is 40 and the tag is 40.

Examples

```
!
router ospf
 redistribute rip subnets route-map redrip
 network 192.168.12.0 0.0.0.255 area 0
!
!
route-map redrip permit 10
 match metric 4
 set metric 40
 set metric-type type-1
 set tag 40
```

Related commands	Command	Description
	redistribute	Redistribute the routes.

8.30 send-lifetime

Use this command in the encryption key configuration mode to specify the lifetime of an encryption key in its send direction. Use the no form of this command to restore the default value.

send-lifetime start-time {infinite | end-time | duration seconds}

no send-lifetime

Parameter description	Parameter	Description
	start-time	Start time of the lifetime. The syntax is as follows: hh:mm:ss month date year hh:mm:ss date month year <ul style="list-style-type: none"> ● hh—hour ● mm—minute ● ss—second ● month—month ● date—day ● year—year The default start time is Jun 1, 1993, which is also the earliest start time available.
	infinite	Indicates that the encryption key is valid for ever.
	end-time	End time of the encryption key. It must be later than the start time.
	duration seconds	Duration of the encryption key after the start time. The value ranges from 1 to 2147483646.

Default infinite

Command mode Encryption key configuration mode

Usage guideline Use this command to specify the lifetime of an encryption key in its send direction.

Examples The following example configures the lifetime from 0:00 on September 9, 2000 to 0:00 on October 12, 2011

```
FS(config)# key chain ripkeys
FS(config-keychain)# key 1
FS(config-keychain-key)# send-lifetime 00:00:00 Sep 9 2000 00:00:00 Dec 12 2011
```

Related command	Command	Description
	-	-

Platform -
description

8.31 set aggregator as

Use this command to specify the AS_PATH attribute for the aggregator of the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set aggregator as as-number ip_addr

no set aggregator as [as-number ip_addr]

Parameter	Parameter	Description
description	as-number	AS number of the aggregator
	ip_address	IP address of the aggregator

Default configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the AS_PATH attribute for the matched routes in the BGP routing domain. Only one group of parameters (as-number, ip-addr) is allowed to set at a time.

Examples

```
FS(config)# route-map set-as-path
FS(config-route-map)# match as-path 1
FS(config-route-map)# set aggregator as 3 2.2.2.2
```

Command	Description
match as-path	Match the AS_PATH.
match community	Match the community.
match metric	Match the route metric.
match origin	Match the route source.
set community	Set the COMMUNITY attribute.
set metric	Set the metric.
set metric-type	Set the type.

Related commands

8.32 set as-path replace

Use this command to replace the AS_PATH attribute for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set as-path replace as-number

no set as-path replace

Parameter	Description
as-number	Indicates the AS number which will replace the AS_PATH attribute. The AS number ranges from 1 to 4294967295, and 1 to 65535.65535 in dot mode.

Default configuration N/A

Command mode Route map configuration mode

Usage guideline Use this command to replace the AS_PATH attribute for the matched routes. Up to 10 ASs can be added into the as-path for one time.

The following example replaces the AS_PATH attribute "100 101 102" for the route matched with AS path 1.

Examples

```
FS(config)# route-map set-as-path
FS(config-route-map)# match as-path 1
FS(config-route-map)# set as-path replace 100 101 102
```

8.33 set as-path prepend

Use this command to specify the AS_PATH attribute for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set as-path prepend as-number

no set as-path prepend

Parameter	Description
as-number	AS number of the AS_PATH attribute to be configured. The AS number ranges from 1 to 4294967295, and 1 to 65535.65535 in dot mode.

Default configuration None

Command mode Route map configuration mode

Usage guideline Use this command to configure the AS_PATH attribute for the matched routes. Up to 15 ass can be added into the as-path for one time.

Examples

```
FS(config)# route-map set-as-path
FS(config-route-map)# match as-path 1
FS(config-route-map)# set as-path prepend 100 101 102
```

Related commands	Command	Description
	match as-path	Match the AS_PATH.
	match community	Match the community.
	match metric	Match the route metric.
	match origin	Match the route source.
	set community	Set the COMMUNITY attribute.
	set metric	Set the metric.
	set metric-type	Set the type.

8.34 set atomic-aggregate

Use this command to set the ATOMIC-AGGREGATE attribute for routes.

set atomic-aggregate

Use the **no** form of this command to delete existing configuration.

no set atomic-aggregate

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Routing map configuration mode

Default Level 14

Usage Guide This command is used only in the BGP protocol and is used to set the ATOMIC-AGGREGATE attribute for routes.

Configuration Examples N/A

8.35 set comm-list delete

Use this command to delete the COMMUNITY_LIST attribute for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set comm-list community-list-number | community-list-name **delete**

no set comm-list community-list-number | community-list-name **delete**

Parameter description	Parameter	Description
	community-list-number	Number of the community list. Standard community list number: 1-99. Extended community list number : 100-199.

community-list-name	Name of the community list, which should be no more than 80 characters.
---------------------	---

Default

configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the community attribute value for the matched routes that will be deleted.

Examples

```

FS(config)# router bgp 100
FS(config-router)# neighbor 172.16.233.33 remote-as 120
FS(config-router)# neighbor 172.16.233.33 route-map ROUTEMAPIN in
FS(config-router)# neighbor 172.16.233.33 route-map ROUTEMAPOUT out
FS(config-router)# exit
FS(config)# ip community-list 500 permit 100:10
FS(config)# ip community-list 500 permit 100:20
FS(config)# ip community-list 120 deny 100:50
FS(config)# ip community-list 120 permit 100:*
FS(config)# route-map ROUTEMAPIN permit 10
FS(config-route-map)# set comm-list 500 delete
FS(config-route-map)# exit
FS(config)# route-map ROUTEMAPOUT permit 10
FS(config-route-map)# set comm-list 120 delete
    
```

Related commands

Command	Description
match as-path	Match the AS_PATH attribute value.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set local-preference	Set the local priority of the route to be redistributed.
set metric-type	Set the metric type.

8.36 set community

Use this command to specify the community for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set community {community-number[community-number...]} [**additive** | **none**]

no set community

Parameter

Parameter	Description
-----------	-------------

description	community-number	Community number in the form of AA:NN or a large numeral. In addition, it can be well-known community attributes like internet, local-AS, no-export and no-advertise.
	additive	Increase on the original COMMUNITY attribute.
	none	Set the community attribute as blank.

Default configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the community attribute for the matched route.

Examples

```
FS(config)# route-map SET_COMMUNITY 10 permit
FS(config-route-map)# match as-path 1
FS(config-route-map)# set community 109:10
FS(config-route-map)# exit
FS(config)# route-map SET_COMMUNITY 20 permit
FS(config-route-map)# match as-path 2
FS(config-route-map)# set community no-export
```

Related commands

Command	Description
match as-path	Match the AS_PATH.
match community	Match the community.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set origin	Set the source.
set metric-type	Set the metric type.

8.37 set dampening

Use this command to specify the dampening parameters for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set dampening half-life reuse suppress max-suppress-time [withdrawal-ignore]

no set dampening

Parameter description

Parameter	Description
half-life	Half dampening life for the reachable or unreachable route in the range of 1 to 45 minutes, 15 minutes by default
reuse	When the route penalty is lower than this value, the route suppression is released. It is in the range 1 to 20000, 750 by default

suppress	When the route penalty is higher than this value, the route is suppressed. It is in the range 1 to 20000, 2000 by default
max-suppress-time	Maximum duration a route can be suppressed in the range 1 to 20000 minutes, 4* half-life by default.
withdrawal-ignore	Not to increase the penalty value for route cancellation.

Default

configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the dampening parameter for the matched routes.

Examples

```
FS(config)# route-map tag
FS(config-route-map)# match as path 10
FS(config-route-map)# set dampening 30 1500 10000 120 withdrawal-ignore
FS(config-route-map)# exit
FS(config)# router bgp 100
FS(config-router)# neighbor 172.16.233.52 route-map tag in
```

Related commands

Command	Description
match as-path	Match the AS_PATH value.
match community	Match the community.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set local-preference	Set the local priority of the route to be redistributed.

8.38 set distance

Use this command to set the management distance for routes matching the match rule. Use the **no** form of this command to delete the specified management distance.

set distance { number }

no set distance

Parameter Description

Parameter	Description
number	Route management distance, ranging from 1 to 255

Defaults N/A

Command Mode	Routing map configuration mode
Default Level	14
Usage Guide	The route management distance affects route selection. Therefore, set the route management distance according to the actual network topology.
Configuration Example	<p>The following example configures the OSPF routing protocol and sets the OSPF route management distance to 112.</p> <pre> FS(config)# route-map test FS(config-route-map)# set distance 112 FS(config)# exit FS(config)# router ospf 1 FS(config-router)# network 192.168.12.0 0.0.0.255 area 0 FS(config-router)# distance 111 route-map test FS(config-router)# exit </pre>
Verification	Run the show running-config command to display the configurations.
Prompt Messages	N/A
Common Errors	N/A
Platform Description	N/A

8.39 set extcomm-list delete

Use this command to delete all extcommunity values in the extcommunity list that meet the match rules. Use the **no** form of this command to delete the configuration.

set extcomm-list { extcommunity-list-number | extcommunity-list-name } **delete**

no set extcomm-list { extcommunity-list-number | extcommunity-list-name } **delete**

Parameter description	Parameter	Description
	extcommunity-list-number	extcommunity-list-number Standard list: ranges from 1 to 99. Expanded list: ranges from 100 to 199.
	extcommunity-list-name	extcommunity-list-name It consists of a maximum of 80 characters.

Default -

Command mode Route map configuration mode.

Usage This command is used to delete the **extcommunity-list**.
guideline This command applies only to policy route configuration.

```

Examples
FS(config)# router bgp 65530
FS(config-router)# neighbor 172.16.233.33 remote-as 65531
FS(config-router)# address-family vpv4 unicast
FS(config-router-af)# neighbor 172.16.233.33 activate
FS(config-router-af)# neighbor 172.16.233.33 route-map ROUTEMAPIN in
FS(config-router-af)# neighbor 172.16.233.33 route-map ROUTEMAPOUT out
FS(config-router)# exit
FS(config)# ip extcommunity-list 10 permit rt 100:10
FS(config)# ip extcommunity-list 10 permit rt 100:20
FS(config)# ip extcommunity-list 120 deny 100:50
FS(config)# ip extcommunity-list 120 permit 100:*
FS(config)# route-map ROUTEMAPIN permit 10
FS(config-route-map)# set extcomm-list 10 delete
FS(config-route-map)# exit
FS(config)# route-map ROUTEMAPOUT permit 10
FS(config-route-map)# set extcomm-list 120 delete
    
```

Related command	Command	Description
	ip extcommunity-list	Configure an extcommunity-list .
	match as-path	Match the AS_PATH value
	match metric	Match the metric.
	match origin	Match the source.
	set as-path prepend	Set the AS_PATH attribute.
	set extcomm-list delete	Set delete extcommunity-list .
	set local-preference	Set local preference for a reroute.

Platform -
description

8.40 set extcommunity

Use this command to specify the extended COMMUNITY attribute for the routes that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set extcommunity {rt extend-community-value | soo extend-community-value}
no set extcommunity {rt | soo }

Parameter description	Parameter	Description
	rt	Specify the extended community value in the form of RT.
	soo	Specify the extended community value in the form of SOO.
	extend-community-value	Extended community value.

Default

configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the extended community attribute for the matched route.

Examples

```
FS(config)# access-list 2 permit 192.168.78.0 255.255.255.0
FS(config)# route-map MAP_NAME permit 10
FS(config-route-map)# match ip-address 2
FS(config-route-map)# set extcommunity rt 100:2
```

Related commands

Command	Description
match as-path	Match the AS_PATH value
match community	Match the community.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set metric-type	Set the metric type.

8.41 set fast-reroute

Use this command to specify a backup outgoing fast reroute and a backup next-hop for routes that meet the match conditions. Use the no form of this command to delete the configuration.

set fast-reroute backup-interface interface-type interface-number [**backup-nexthop** ip-address]

no set fast-reroute

Parameter description

Parameter	Description
interface-type interface-number	Backup outgoing interface.
ip-address	Backup next-hop.

Default

-

Command mode

Route map configuration mode.

Usage guideline

Use this command to configure IP FRR backup outgoing interface and backup next-hop. The current software version supports only one backup route. This command supports only one set of the two parameters. This command is used for fast reroute configuration.

IP FRR backup routes must not be direct-connection or local host routes.

```

Examples
FS(config)# access-list 2 permit 192.168.78.0 255.255.255.0
FS(config)# route-map frr permit 10
FS(config-route-map)# match ip-address 2
FS(config-route-map)# set fast-reroute backup-interface GigabitEthernet 0/1 backup-nexthop 192.168.1.2
    
```

Related command	Command	Description
	match ip-address	Match IP address list.

Platform description N/A

8.42 set ip default next-hop

Use this command to specify the default next-hop IP address for the packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting.

```

set ip default next-hop ip-address [weight] [...ip-address[weight]]
no set ip default next-hop [ip-address [weight] [...ip-address[weight]]]
    
```

Parameter description	Parameter	Description
	ip-address	IP address of the next hop.
	weight	Weight of the next hop.

Default configuration None

Command mode Route map configuration mode

This command supports two operation modes: WCMP load balancing mode and non-WCMP load balancing mode. In the former mode, the system implements WCMP load balancing according to the weight inputted.

Up to 32 IP addresses may follow the set ip default next-hop command.

If a weight follows ip address, up to 4 next hop IP addresses can be configured.

Note: If a weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In this mode, the weight of those next hop IP addresses whose weight is not configured is 1 by default.

Usage guideline Differences between set ip next-hop and set ip default next-hop: After the set ip next-hop command is configured, the policy-based routing takes precedence over the routing table; while after the set ip default next-hop command is configured, the routing table takes precedence over the policy-based routing.

Use this command to customize a default route for a specified user. If the software fails to find the forwarding route, the packet will be forwarded to the nexthop set with this command.

To use the policy-based routing, you must specify the route map for it and create the route map. A

route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded through the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

A route-map policy may contain multiple set operations.

The following example forwards the packets from two different nodes through different routes. For the messages received on the synchronous interface 1 from 1.1.1.1, if the software cannot find the forwarding route, they are forwarded to device 6.6.6.6. For the messages received from 2.2.2.2, if the software cannot find the forwarding route, they are forwarded to device 7.7.7.7. The other messages will be discarded if the software cannot find the forwarding route.

Examples

```
FS(config)#access-list 1 permit 1.1.1.1 0.0.0.0
FS(config)#access-list 2 permit 2.2.2.2 0.0.0.0
FS(config)#interface async 1
FS(config-if)#ip policy route-map equal-access
FS(config)#route-map equal-access permit 10
FS(config- route-map)#match ip address 1
FS(config-route-map)#set ip default next-hop 6.6.6.6
FS(config)#route-map equal-access permit 20
FS(config-route-map)#match ip address 2
FS(config-route-map)#set ip default next-hop 7.7.7.7
FS(config)#route-map equal-access permit 30
FS(config- route-map)#set default interface null 0
```

Related commands

Command	Description
route-map	Define a route map.
match ip address	Match the IP address.
set default interface	Set the default outgoing interface.
set interface	Set the outgoing interface.
set ip next-hop	Set the next hop of the packets.
set ip precedence	Set the priority of the packets.

Platform description N/A

8.43 set ip dscp

Use this command to specify the DSCP value for the packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting.

set ip dscp dscp-value
no set ip dscp

Parameter	Parameter	Description
-----------	-----------	-------------

description	dscp-value	DSCP value
Default configuration	N/A	
Command mode	Route map configuration mode	
Usage guideline	N/A	
Examples	N/A	

	Command	Description
Related commands	route-map	Define a route map.
	match ip address	Match the IP address.
	set default interface	Set the default outgoing interface.
	set interface	Set the outgoing interface.
	set ip next-hop	Set the next hop of the packets.
	set ip precedence	Set the priority of the packets.

8.44 set ip next-hop

Use this command to specify the next-hop IP address for the packets that meet the matching rule. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ip next-hop ip-address [weight] [...ip-address [weight]]

no set ip next-hop [ip-address [weight] [...ip-address[weight]]]

	Parameter	Description
Parameter description	ip-address	IP address of the next hop.
	weight	Weight of the next hop.


Default configuration None

Command mode Route map configuration mode

This command supports two operation modes: WCMP load balancing mode and non-WCMP load balancing mode. In the former mode, the system implements WCMP load balancing according to the weight entered by the user.

Multiple IP addresses may follow set ip next-hop and the number of addresses should be less than 32.

Usage guideline

 If weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In the WCMP load balancing mode, for the nexthop address without configuring the corresponding weight, the

weight is 1 by default.

If weight follows ip address, up to 4 next hop addresses can be configured.

This command can be used to set different routes for the traffic that meets different match rule. If multiple IP addresses are configured, they can be used in turn.

Policy-based routing is a packet forwarding mechanism more flexible than the routing based on the target network. After the policy-based routing is used, the device will decide how to process the packets that need be routed according to the route map, which decides the next-hop device of the packets.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

A route-map policy may contain multiple set operations.

The following example enables policy-based routing on serial 1/0. When the interface receives the packets from 10.0.0.0/8, they will be sent to 192.168.100.1; when the interface receives the packets from 172.16.0.0/16, they will be sent to 172.16.100.1; all other packets will be discarded.

Examples

```
FS(config)#interface serial 1/0
FS(config-if)#ip policy route-map load-balance
FS(config)#access-list 10 permit 10.0.0.0 0.255.255.255
FS(config)#access-list 20 permit 172.16.0.0 0.0.255.255
FS(config)#route-map load-balance permit 10
FS(config-route-map)#match ip address 10
FS(config-route-map)#set ip next-hop 192.168.100.1
FS(config)#route-map load-balance permit 20
FS(config-route-map)#match ip address 20
FS(config-route-map)#set ip next-hop 172.16.100.1
FS(config)#route-map load-balance permit 30
FS(config-route-map)#set interface Null 0
```

Related commands

Command	Description
route-map	Define the route map.
match ip address	Match the IP address.
set default interface	Set the default outgoing interface.
set interface	Set the outgoing interface.
set ip default next-hop	Set the default next hop.
set ip precedence	Set the priority of the packets.

8.45 set ip next-hop recursive

Use this command to specify the recursive next-hop IP address for data packets that match a rule.

set ip next-hop recursive ip-address

Use the **no** form of this command to delete the configured next-hop IP address.

no set ip next-hop recursive

Parameter Description	Parameter	Description
	ip-address	Recursive next-hop IP address

Defaults N/A

Command Mode Routing map configuration mode

Default Level 14

Usage Guide This command is used only to configure PBR. Only one **set ip next-hop recursive** ip-address command can be configured in one routing submap policy. According to the policy, only static or dynamic routes that have an egress and next-hop IP address can be recursed. A route can be recursed to 32 next-hop IP addresses. Only one static route can be recursed to the next hop IP address.

Examples The following example enables PBR on Interface serial 1/0. The interface sends the data packets from the source IP address of 10.0.0.0/8 to the recursive next-hop IP address 192.168.100.1, sends the traffic from the source network 172.16.0.0/16 to the recursive next-hop IP address 172.16.100.1, and forwards other data traffic via common routes.

```
FS(config)#interface serial 1/0
FS(config-if)#ip policy route-map load-balance
FS(config)#access-list 10 permit 10.0.0.0 0.255.255.255
FS(config)#access-list 20 permit 172.16.0.0 0.255.255
FS(config)#route-map load-balance permit 10
FS(config-route-map)#match ip address 10
FS(config-route-map)#set ip next-hop recursive 192.168.100.1
FS(config)#route-map load-balance permit 20
FS(config-route-map)#match ip address 20
FS(config-route-map)#set ip next-hop recursive 172.16.100.1
```

8.46 set ip next-hop verify-availability

Use this command to verify the availability of the next hop IP address for the packets that meet the matching rule. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ip next-hop verify-availability ip-address [**track** track-obj-number | **bfd** interface-type interface-number gateway]

no set ip next-hop verify-availability ip-address [**track** track-obj-number | **bfd** interface-type interface-number gateway]

Parameter description

Parameter	Description
ip-address	Indicates the next-hop IP address.
track	Judges whether the next hop is effective by using Track.
track-object-num	Indicates the track object number.
bfd	Indicates that BFD is used for neighbor detection.
interface-type	Configures the interface type.
interface-number	Configures the interface number.
gateway	Configures the gateway IP address, which is the neighbor IP address of BFD. If the next hop is configured as the neighbor, BFD will be used to detect the accessibility of the forwarding path.

Default

configuration None

Command

mode Route map configuration mode

Usage

guideline None

Examples

The following example verifies the availability of the next hop IP address being 192.168.1.2 and the number of the object to be tracked to 1.

```
FS(config)#route-map rmap permit 10
FS(config-route-map)#set ip next-hop verify-availability 192.168.1.2 track 1
```

Related commands

Command	Description
route-map	Define the route map.
match ip address	Match the IP address.
set default interface	Set the default outgoing interface.
set interface	Set the outgoing interface.
set ip default next-hop	Set the default next hop.
set ip precedence	Set the priority of the packets.

8.47 set ip precedence

Use this command to set the precedence of the IP head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured precedence setting.

set ip precedence {<0-7> | critical | flash | flash-override | immediate | internet | network | priority | routine }

no set ip precedence

Parameter Description	Parameter	Description
	number	Indicates the priority of the IP header with a number, ranging from 0 to 7. 7: critical 6: flash 5: flash-override 4: immediate 3: internet 2: network 1: priority 0: routine
	critical flash flash-override immediate internet network priority routine	Priority of an IP header.

Defaults N/A

Command mode Route map configuration mode

Usage guideline With different precedence values for the IP packet head configured, the IP packets matching the PBR routing are sent according to the different precedence values.

Multiple set ip precedence commands can be executed in the route map configuration rule, but only the last one takes effect, and the precedence will be specified for the head of the IP packet matched the PBR.

The following example sets the precedence of the packet with the source IP address 192.168.217.68 received at the interface FastEthernet 0/0 as 4:

Examples

```
FS(config)#access-list 1 permit 192.168.217.68 0.0.0.0
FS(config)#route-map name
FS(config-route-map)#match ip address 1
FS(config-route-map)#set ip precedence 4
FS(config)#interface FastEthernet 0/0
FS(config-if)#ip policy route-map name
```

Related commands

Command	Description
match interface	Match the next-hop interface.
match ip address	Match the IP address in the ACL.
match ip next-hop	Match the next-hop IP address in the ACL.
match ip route-source	Match the route source IP address in the ACL.
match metric	Match the route metric value.
match route-type	Match the route type.
match tag	Match the route tag value.
set metric-type	Set the type of redistributed route.
set tag	Set the tag value of redistributed route.

set ip tos	Set the tos for the IP packet head.
-------------------	-------------------------------------

8.48 set ip tos

Use this command to set the tos of the IP head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured tos setting.

set ip tos {<0-15> | max-reliability | max-throughput | min-delay | min-monetary-cost | normal }

no set ip tos

Default

configuration N/A

Command mode Route map configuration mode

Usage guideline With different TOS values for the IP packet head configured, the IP packets matching the PBR routing are transmitted with different service qualities.

The TOS value will be specified for the head of the IP packet matched the PBR.

The following example sets the TOS value of the packet with the source IP address 192.168.217.68 received at the interface FastEthernet 0/0 as 4:

Examples

```
FS(config)#access-list 1 permit 192.168.217.68 0.0.0.0
FS(config)#route-map name
FS(config-route-map)#match ip address 1
FS(config-route-map)#set ip tos 4
FS(config)#interface FastEthernet 0/0
FS(config-if)#ip policy route-map name
```

Related commands

Command	Description
match interface	Match the next-hop interface.
match ip address	Match the IP address in the ACL.
match ip next-hop	Match the next-hop IP address in the ACL.
match ip route-source	Match the route source IP address in the ACL.
match metric	Match the route metric value.
match route-type	Match the route type.
match tag	Match the route tag value.
set metric-type	Set the type of redistributed route.
set tag	Set the tag value of redistributed route.
set ip precedence	Set the precedence for the IP packet head.

8.49 set ipv6 default next-hop

Use this command to specify the default next-hop IPv6 address for the IPv6 packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ipv6 default next-hop global-ipv6-address [weight] [...ipv6-address[weight]]

no set ipv6 default next-hop global-ipv6-address [weight] [...ipv6-address[weight]]

	Parameter	Description
Parameter description	global-ipv6-address	IPv6 address of the next hop. The next hop router must be the neighbor router.
	weight	Weight in the load balancing mode, in the range of 1 to 8.

Default configuration None

Command mode Route map configuration mode

With the policy-based routing applied to the interface, for the IPv6 packets matching the corresponding rules, if the usual route (that is the non default route) with the destination of this packet is not in the routing table, this packet will be forwarded to the next hop specified by the set ipv6 default next-hop command. Otherwise it is forwarded through the usual route. Noted that the match rule should be the IPv6 corresponded.

Packets select the egress from the policy-based routing and routing table in following priority.

- set ipv6 next-hop;
- usual route (the non default route)

Usage guideline set ipv6 default next-hop default route.

- For the switches, this function does not take effect if the mask length is beyond 64.
- If this command and the set ipv6 next-hop verify-availability are both configured ,the next hop set by the set ipv6 next-hop verify-availability command will take effect preferentially

The following examle sets the default next hop of the packet with destination address 2001:0db8:2001:1760::/64 received at the interface fastEthernet 0/0 as 2002:0db8:2003:1::95

Examples

```
FS(config)# ipv6 access-list acl_for_pbr
FS(config-ipv6-acl)#permit ipv6 any 2001:0db8:2001:1760::/64
FS(config)#route-map rm_if_0_0
FS(config-route-map)#match ipv6 address acl_for_pbr
FS(config-route-map)# set ipv6 default next-hop
2002:0db8:2003:1::95
FS(config)#interface FastEthernet 0/0
FS(config-if)#ipv6 policy route-map rm_if_0_0
```

Related commands	Command	Description
------------------	---------	-------------

match ipv6 address	Set the matching rule of policy-based routing.
ipv6 policy route-map	Use the policy-based routing on the interface.
set ipv6 next-hop	Set the next hop of the policy-based routing.

Platform

description N/A

8.50 set ipv6 fast-reroute

Use this command to specify the FRR backup egress and next hop for routes matching the match rule. Use the **no** form of this command to delete the FRR configuration.

set ipv6 fast-reroute backup-interface interface-type interface-number [**backup-nexthop** ipv6-address]
no set ipv6 fast-reroute

Parameter Description


Parameter	Description
interface-type interface-number	Backup egress
ipv6-address	Backup next hop, mandatory for non-P2P interfaces

Defaults N/A

Command Mode Routing map configuration mode

Default Level 14

Usage Guide This command is used only to configure FRR.
 Use this command to configure the backup egress and next hop of IPv6 FRR. The current software version supports only one backup route, and this command supports only one group of <interface, next hop> parameters.

 The FRR backup entry should not be a direct or local host route.

Configuration Example The following example configures a route map and sets the backup egress to GigabitEthernet 0/1 and backup next hop to 2001::1 for routes matching ACL 2.

```
FS(config)# access-list 2 permit 2001::/64
FS(config)# route-map frr permit 10
FS(config-route-map)# match ip-address 2
FS(config-route-map)# set ipv6 fast-reroute backup-interface GigabitEthernet 0/1 backup-nexthop 2001::1
```

Verification Run the **show running-config** command to display the configurations.

Prompt The specified interface is an L2 interface, for example, GigabitEthernet 0/0.

Messages % Invalid parameter: GigabitEthernet 0/0, only support layer 3 interface.

8.51 set ipv6 next-hop

Use this command to specify the next-hop IPv6 address for the packets that meet the matching rule. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ipv6 next-hop [vrf vrf-name | **global**] global-ipv6-address [weight] [...global-ipv6-address [weight]]

no set ip next-hop [vrf vrf-name | **global**] global-ipv6-address [weight] [...global-ipv6-address [weight]]

Parameter description

Parameter	Description
global-ipv6-address	IPv6 address of the next hop. The next hop router should be the neighbor router.
vrf vrf-name	The nexthop belongs to the specified VRF which must be the configured IPv6 address family multi-protocol VRF.
global	The nexthop belongs to the global.
weight	Weight of the next hop in the load balancing mode, in the range of 1 to 8.

Default

configuration None

Command mode Route map configuration mode

This command supports two operation modes: WCMP load balancing mode and non-WCMP load balancing mode. In the former mode, the system implements WCMP load balancing according to the weight entered by the user.

Multiple IP addresses may follow set ip next-hop and the number of addresses should be less than 32. If weight follows ip address, up to 4 next hop addresses can be configured.

If the parameter vrf vrf-name is specified, packets forwarding will be across the VRF. The packets will be forwarded from VRF to public network with the parameter global specified. If no [vrf vrf-name | global] is specified, forwarding the IPv6 packets will inherit the VRF, that is the nexthop belongs to the VRF that receives this IPv6 packets.

Usage guideline



If weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In the WCMP load balancing mode, for the nexthop address without configuring the corresponding weight, the weight is 1 by default.

When the packets select the egress from the policy-based routing and routing table, the priorities are as follows.

- set ipv6 next-hop;
- usual route (the non default route)
- set ipv6 default next-hop
- Default route.

Examples

The following example sets the next hop of the packet with destination address 2001:0db8:2001:1760::/64 received at the interface fastEthernet 0/0 as 2002:0db8:2003:1::95

```
FS(config)# ipv6 access-list acl_for_pbr
```



```
FS(config-ipv6-acl)#permit ipv6 any 2001:0db8:2001:1760::/64
FS(config)#route-map rm_if_0_0
FS(config-route-map)#match ipv6 address acl_for_pbr
FS(config-route-map)# set ipv6 next-hop
2002:0db8:2003:1::95
FS(config)#interface FastEthernet 0/0
FS(config-if)#ipv6 policy route-map rm_if_0_0
```

Related commands

Command	Description
match ipv6 address	Set the matching rule of policy-based routing.
ipv6 policy route-map	Use the policy-based routing on the interface.
set ipv6 next-hop	Set the next hop of the policy-based routing.

Platform description N/A

8.52 set ipv6 next-hop recursive

Use this command to specify the IPv6 address of a recursive next hop for packets matching the match rule. Use the **no** form of this command to delete the IPv6 address of a recursive next hop.

set ipv6 next-hop recursive ipv6-address

no set ipv6 next-hop recursive

Parameter Description

Parameter	Description
ipv6-address	IPv6 address of a recursive next hop

Defaults N/A

Command Mode Routing map configuration mode

Default Level 14

Usage Guide This command is used only to configure PBR. Only one **set ip next-hop recursive** ip-address command can be configured in one routing sub map policy.
According to the policy, recursion is supported for only static or dynamic routes that have an egress and next-hop IPv6 address. A maximum of 32 recursive next hops are supported.

Configuration Example The following example sets the recursive next hop for packets with the destination address set to 2001:0db8:2001:1760::/64 and received from interface GigabitEthernet 0/0 to 2002:0db8:2003:1::95.

```
FS(config)# ipv6 access-list acl_for_pbr
FS(config-ipv6-acl)#permit ipv6 any 2001:0db8:2001:1760::/64
FS(config)#route-map rm_if_0_0
```

```
FS(config-route-map)#match ip address acl_for_pbr
FS(config-route-map)# set ipv6 next-hop recursive 2002:0db8:2003:1::95
FS(config)#interface GigabitEthernet 0/0
FS(config-if)#ipv6 policy route-map rm_if_0_0
```

Verification Run the **show running-config** command to display the configurations.
Run the **show ipv6 pbr route** command to display the next hop recurred to the static or dynamic route.

8.53 set ipv6 next-hop verify-availability

Use this command to determine the availability of the next-hop IP address.

set ipv6 next-hop verify-availability global-ipv6-address [**track** track-obj-number | **bfd** interface-type interface-number gateway]

Use the **no** form of this command to delete existing configuration.

no set ip next-hop verify-availability global-ipv6-address [**track** track-obj-number | **bfd** interface-type interface-number gateway]

Parameter Description	Parameter	Description
	global-ipv6-address	Specifies the next-hop IPv6 address.
	track	Detects whether the next hop is effective by using the tracking method.
	track-obj-number	Specifies the tracking object number.
	bfd	Conducts neighbor detection by using BFD.
	interface-type	Specifies the interface type.
	interface-number	Specifies the interface number.
	gateway	Specifies the gateway IPv6 address, that is, IPv6 address of the BFD neighbor. If the configured next hop is the neighbor, the availability of the forwarding path will be detected using BFD.

Defaults N/A

Command Mode Routing map configuration mode

Default Level 14

Usage Guide This command is used only to configure PBR.

Examples The following example enables the PBR support for BFD and detects the forwarding path to the neighbor 2001:1::2 via BFD.

```
FS(config)# route-map rmap permit 10
FS(config-route-map)# set ipv6 next-hop verify-availability 2001:1::2 bfd FastEthernet 0/1 2001:1::2
```

8.54 set ipv6 precedence

Use this command to set the precedence of the IPv6 head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured precedence setting.

set ipv6 precedence {<0-7> | critical | flash | flash-override | immediate | internet | network | priority | routine }

no set ipv6 precedence {<0-7> | critical | flash | flash-override | immediate | internet | network | priority | routine }

	Parameter	Description
Parameter description	critical, flash, flash-override, immediate, internet, network, priority, routine	The precedence type of the IPv6 head.
	0~7	The configurable precedence range.

Default configuration N/A

Command mode Route map configuration mode

The following table shows the corresponding relationship between the value and type.

	Value	Type
Usage guideline	0	routing
	1	priority
	2	network
	3	internet
	4	immediate
	5	flash-override
	6	flash
	7	critical

The following example sets the precedence of IPv6 packet head as 3:

Configure the associated ACL6

```
FS(config)#ipv6 access-list aaa
FS(config-ipv6-acl)#permit ipv6 2003:1000::10/80 2001:100::/64
```

Configure route-map.

Examples

```
FS(config)#route-map pbr-aaa permit 10
FS(config-route-map)#set ipv6 next-hop 2001:1234::2
```

Modify the precedence.

```
FS(config-route-map)# set ipv6 precedence 3
```

Or

```
FS(config-route-map)# set ipv6 precedence immediate
```

	Command	Description
Related commands	match ipv6 address	Configure the ACL used for matching the packet in IPv6 PBR.
	route-map	Use the route map of the policy-based routing.

set default interface	Set the default next-hop egress.
set interface	Set the next hop egress.
set ipv6 default next-hop	Set the default next-hop address for forwarding packets.
set ipv6 next-hop	Set the next-hop address for forwarding packet.
show ipv6 policy	Show the policy-based routing
show route-map	Show the route map configuration.

Platform description N/A

8.55 set level

Use this command to set the level of the area where the routes matching the rule are redistributed in the route map configuration command. Use the **no** form of this command to remove the setting.

set level {level-1 | level-2 | level-1-2 | stub-area | backbone}

no set level

Default configuration None

Command mode Route map configuration mode

In the example below, the OSPF routing protocol redistributes the RIP protocol to the backbone area.

Examples

```
FS(config)# router ospf
FS(config-router)# redistribute rip subnets route-map redrip
FS(config-router)# network 192.168.12.0 0.0.0.255 area 0
FS(config-router)# exit
FS(config)# route-map redrip permit 10
FS(config-route-map)# set level backbone
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

8.56 set local-preference

Use this command to set the **LOCAL_PREFERENCE** value for the routes to be redistributed in the route map configuration mode. Use the **no** form of this command to remove the setting.

set local-preference number
no set local-preference

Parameter	Parameter	Description
description	number	Local priority metric ranging 1 to 4294967295

Default configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the local preference for the matched routes. Only one local preference can be set.

Examples

```

FS(config)# route-map SET_PREF permit 10
FS(config-route-map)# match as-path 1
FS(config-route-map)# set local-preference 6800
FS(config-route-map)# exit
FS(config)# route-map SET_PREF permit 20
FS(config-route-map)# match as-path 2
FS(config-route-map)# set local-preference 50
    
```

Command	Description
match as-path	Match the AS_PATH attribute.
match metric	Match the route metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set metric-type	Set the metric type.

8.57 set metric

Use **set metric** to set the metric for the routes to be redistributed. Use the **no** form of this command to remove the setting.

set metric [+ metric-value | - metric-value | metric-value]
no set metric

Parameter	Parameter	Description
description	+	Increase based on the metric of the original route
	-	Decrease based on the metric of the original route

metric-value	Metric for the route to be redistributed
--------------	--

Default

configuration

The default metric for route redistribution varies with the routing protocol.

Command mode

Route map configuration mode

Usage guideline

You should set the metric according to the actual network topology, because the routing depends on the metric of routes. Attention should be paid to the upper and lower limits of the routing protocols when you execute the set metric, + metric or – metric commands. When the RIP protocol redistributes the routes of other protocols, the range of the metric after increase or decrease is 1 to 16.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The following example enables the OSPF routing protocol to redistribute the RIP routes and sets the default metric to 40.

Examples

```
FS(config)# router ospf
FS(config-router)# redistribute rip subnets route-map redrip
FS(config-router)# network 192.168.12.0 0.0.0.255 area 0
FS(config-router)# exit
FS(config)# route-map redrip permit 10
FS(config-route-map)# set metric 40
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

8.58 set metric-type

Use **set metric-type** to set the type of the routes to be redistributed. Use the **no** form of this command to remove the setting.

set metric-type type

no set metric-type

Parameter description

Parameter	Description
type	Type of the routes to be redistributed. At present, you can set the type of the routes that the OSPF protocol redistributes. type-1: Type-1 external route; type-2: Type-2 external route.

Default configuration

Type-2

Command mode

Route map configuration mode

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

Usage guideline

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The following example enables the OSPF routing protocol to redistribute the RIP route and sets the type as type-1.

Examples

```
FS(config)# router ospf
FS(config-router)# redistribute rip subnets route-map redrip
FS(config-router)# network 192.168.12.0 0.0.0.255 area 0
FS(config-router)# exit
FS(config)# route-map redrip permit 10
FS(config-route-map)# set metric-type type-1
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.

set metric	Set the metric.
set tag	Set the tag.

8.59 set next-hop

Use this command to specify the next-hop IP address for the routes that match the rule. Use the **no** form of this command to remove the setting. This command is only used to configure routing policies.

set next-hop ip-address

no set next-hop

Parameter	Parameter	Description
description	ip-address	IP address of the next hop.

Default

configuration None

Command

mode Route map configuration mode

Usage

guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The following example enables the OSPF routing protocol to redistribute the RIP route and sets the next-hop to 192.168.1.2.

Examples

```
FS(config)# route-map redrip permit 10
FS(config-route-map)# match ip address 1
FS(config-route-map)# set next-hop 192.168.1.2
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

8.60 set origin

Use this command to set the source of the routes to be redistributed in the route map configuration mode. Use the **no** form of this command to remove the setting.

set origin {egp | igp | incomplete}

no set origin {egp | igp | incomplete}

Parameter	Description
egp	Redistribute the routes from the remote EGP.
igp	Redistribute the routes from the local IGP.
incomplete	Redistribute the routes from an unknown device.

Default configuration	None
Command mode	Route map configuration mode

Usage guideline Use this command to set the source of the routes to be matched. Only one route source attribute can be set.

```

FS(config)# route-map SET_ORIGIN 10 permit
FS(config-route-map)# match as-path 1
FS(config-route-map)# set origin igp
FS(config-route-map)# exit
FS(config)# route-map SET_ORIGIN 20 permit
FS(config-route-map)# match as-path 2
FS(config-route-map)# set origin egp
    
```

Command	Description
match as-path	Match the AS_PATH attribute.
match metric	Match the route metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set local-preference	Set the local priority of redistributed routes.

8.61 set originator-id

Use this command to set the source of the routes to be redistributed in the route map configuration mode. Use the **no** form of this command to remove the setting.

set originator-id ip-addr

no set originator-id [ip-addr]

Parameter	Parameter	Description
description	ip-addr	IP address of the originator.

Default configuration None

Command mode Route map configuration mode

Usage guideline Use this command to set the source of the routes to be matched.

Examples

```
FS(config)# route-map SET_ORIGIN 10 permit
FS(config-route-map)# match as-path 1
FS(config-route-map)# set originator-id 5.5.5.5
FS(config-route-map)# exit
FS(config)# route-map SET_ORIGIN 20 permit
FS(config-route-map)# match as-path 2
FS(config-route-map)# set originator-id 5.5.5.6
```

Related commands

Command	Description
match as-path	Match the AS_PATH attribute.
match metric	Match the route metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set local-preference	Set the local priority of redistributed routes.

8.62 set tag

Use this command to set the tag for the routes to be redistributed. Use the **no** form of this command to remove the setting.

set tag tag

no set tag

Parameter	Parameter	Description
description	tag	Tag of the route to be redistributed

Default configuration The original routing tag remains unchanged.

Command mode Route map configuration mode

Usage guideline This command can only be used for route redistribution. If this command is not configured, the default route tag is used.

The following example enables the OSPF routing protocol to redistribute the RIP route and sets the tag as 100.

Examples

```
FS(config)# router ospf
FS(config-router)# redistribute rip subnets route-map redrip
FS(config-router)# network 192.168.12.0 0.0.0.255 area 0
FS(config-router)# exit
FS(config)# route-map redrip permit 10
FS(config-route-map)# set tag 100
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.

8.63 set weight

Use this command to set the weight for the BGP routes matching filtering rules. Use the **no** form of this command to remove the setting.

set weight number

no set weight

Parameter

Parameter	Description
number	Weight in the range of 0 to 65535

description

Default

configuration

None

Command mode

Route map configuration mode

This command can only be used modify the weight of a BGP route.

Usage guideline

By default, the weight of the route learned from a neighbor is the one configured with the neighbor weight command. The weight of the locally generated route is fixed 32768.

The following example sets the weight for the BGP route learned from the neighbor 1.1.1.1 at the inbound direction to 100.

Examples

```
FS(config)# router bgp 1
FS(config-router)# neighbor 1.1.1.1 route-map nei-rmap-in in
FS(config-router)# exit
```

```
FS(config)# route-map nei-rmap-in permit 10
FS(config-route-map)# set weight 100
```

Related commands

Command	Description
match as-path	Match the AS_PATH attribute.
match community	Match the route community.
match metric	Match the route metric.
match origin	Match the source.
set community	Set community of the redistributed route.
set metric	Set the metric of the redistributed route.
set metric type	Set the metric type of the redistributed route.

8.64 statement-name

Use this command to set the statement name of route map. Use the **no** form of this command to remove the settings.

statement-name name

no statement-name

Parameter	Parameter	Description
description	name	Name of statement

Default configuration None

Command mode Route map configuration mode

Usage guideline The command is not a route policy command and does not apply to routing protocol. It only takes effect in OPENCONF YANG to record the statement name of route map.

The following example names the statement as sname

Examples

```
FS(config)# route-map test
FS(config-route-map)# statement-name sname
```

Related commands	Command	Description
------------------	---------	-------------

8.65 show ip as-path-access-list

Use this command to display the configuration of AS path access lists.

show ip as-path-access-list [num]

Parameter description	Parameter	Description
	num	AS path access list number.

Default N/A

Command mode Privileged EXEC mode

Usage guideline N/A

Examples The following example displays the AS path access lists.

```
FS# show ip as-path-access-list
AS path access list 30
permit ^30$
```

Field	Description
AS path access list	AS path access list number
permit	Permits advertisement based on matching conditions.
^30\$	Regular expression.

Related command	Command	Description
	-	-

Platform description -

8.66 show ip community-list

Use **show ip community-list** command to display the community list.

show ip community-list [community-list-number | community-list-name]

Parameter description	Parameter	Description
	community-list-number	Number of the community list.
	community-list-name	Name of the community list.

Default configuration None

Command mode Privileged EXEC mode

Usage guidelines N/A

Examples

```
FS# show ip community-list
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

Related commands

Command	Description
match community	Match the route community.
set comm-list delete	Delete the community attribute in the BGP routes.

8.67 show ip extcommunity-list

Use this command to display the extcommunity list.

show ip extcommunity-list [extcommunity-list-num | extcommunity-list-name]

Parameter description

Parameter	Description
extcommunity-list-num	extcommunity-list number, ranging from 1 to 199.
extcommunity-list-name	extcommunity-list name.

Default -

Command mode Privileged EXEC mode.

Usage guideline -

Examples

```
FS # show ip extcommunity-list
Standard extended community-list 1
 10 permit RT:1:200
 20 permit RT:1:100
Standard extended community-list 2
 10 permit RT:1:200
Expanded extended community-list rt_filter
 13 permit 1:100
```

Related command

Command	Description
ip extcommunity-list	Create an extcommunity-list.
match extcommunity	Match an extcommunity.
set extcommunity	Set an extcommunity.

Platform description -

8.68 show ip prefix-list

Use **show ip prefix-list** to display the prefix list or the entries.

show ip prefix-list [prefix-name]

Parameter	Parameter	Description
description	prefix-name	Name of the prefix list.

Default

configuration The configuration information of all the prefix lists is displayed by default.

Command mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, route map configuration mode.

Usage guidelines

If no prefix list is specified, the configurations of all the prefix lists are displayed, otherwise only the configuration of the specified prefix list is displayed.

Examples

```
FS# show ip prefix-list
ip prefix-list name : test
seq pre: 2 entries
seq 5 permit 192.168.564.0/24
seq 10 permit 192.2.2.0/24
```

8.69 show ip protocols

Use this command to display information about the status of the currently running IPv4 routing protocol.

show ip protocols [vrf vrf-name] { **bgp** | **isis** | **ospf** | **rip** }

Parameter	Parameter	Description
Description	vrf-name	Specifies the VRF instance name. If it is not specified, information about the status of routing protocols in global VRF mode is displayed.
	bgp	Displays information about the status of the BGP protocol.
	isis	Displays information about the status of the IS-IS protocol.
	ospf	Displays information about the status of the OSPF protocol.
	rip	Displays information about the status of the RIP protocol.
	-	Displays information about the status of all running routing protocols.

Command Mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, and routing map configuration mode

Default Level 14

Usage Guide Information about the status of only the currently running routing protocol is displayed, and the information about a routing protocol that is not running is not displayed.

Examples The following example displays the status of routing protocols running in global VRF mode.

```

FS# show ip protocols
Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 57.57.57.57
  Memory Overflow is enabled
  Router is not in overflow state now
  It is an autonomous system boundary router
  Redistributing External Routes from,
    connected, includes subnets in redistribution
    bgp, includes subnets in redistribution
  Number of areas in this router is 2: 2 normal 0 stub 0 nssa
  Routing for Networks:
    57.57.57.57 0.0.0.0 area 0
    163.18.4.0 0.0.0.255 area 0
    163.18.57.0 0.0.0.255 area 0
    192.100.1.0 0.0.0.255 area 0
    192.101.1.0 0.0.0.255 area 1
    192.102.1.0 0.0.0.255 area 0
  Reference bandwidth unit is 100 mbps
  Distance: (default is 110)

Routing Protocol is "bgp 10"
  IGP synchronization is disabled
  Default-information originate is disabled
  Default local-preference applied to incoming route is 100
  Redistributing: connected
  Neighbor(s):
    Address          AddressFamily  Filtn  FiltOut  DistIn  DistOut  RouteMapIn  RouteMapOut
  Weight
  Distance: external 20(default) internal 200(default) local 200(default)
    
```

Field description:

Field	Description
Routing Protocol is "ospf 1"	Name of a routing protocol
Redistributing External Routes from	Route redistribution status of a routing protocol

Distance:	Distance information of a routing protocol
-----------	--

8.70 show ipv6 prefix-list

Use this command to display the information about the IPv6 prefix list or its entries.

show ipv6 prefix-list [prefix-name]

Parameter	Parameter	Description
description	prefix-name	Name of the IPv6 prefix list.

Default

configuration The configuration information of all the IPv6 prefix lists is displayed.

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode, route protocol configuration mode, route map configuration mode

Usage guideline If no prefix list is specified, the configurations of all the prefix lists are displayed, otherwise only the configuration of the specified prefix list is displayed.

Examples

```
FS# show ipv6 prefix-list
IPv6 prefix-list p6 : 2 entries
permit 13::/20
```

8.71 show key chain

Use this command to display the key chain configuration.

show key chain [key-chain-name]

Parameter description	Parameter	Description
	key-chain-name	(Optional) Display the configuration of the specified key chain.

Default

The configuration information of all key chains is displayed.

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, and key chain configuration mode.

Usage guideline If no key chain is specified, the configuration information of all key chains is displayed.

Examples

```
FS# sh key chain
key chain ripkeys
key 1 -- text "abc"
accept-lifetime (00:00:00 Sep 09 2000) - (00:00:00 Dec 12 2011)
send-lifetime (00:00:00 Sep 09 2000) - (00:00:00 Dec 12 2011)
```

Field	Description
key chain	Key chain name.
key	Key ID.
text	Key string.
accept-lifetime	Lifetime in the accept direction.
send-lifetime	Lifetime in the send direction.

Related command

Command	Description
-	-

Platform description

-

8.72 show route-map

Use the command to display the configuration of the route map.

show route-map [route-map-name]

Parameter description

Parameter	Description
route-map-name	(Optional) Display the configuration information of the specified the route map.

Default

configuration

The configuration information of all the route maps is displayed.

Command mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, route map configuration mode.

Usage guidelines

If no route map is specified, the configurations of all the route maps will be displayed, otherwise only the configuration of the specified route map is displayed.

Examples

```
FS# show route-map
route-map AAA, permit, sequence 10
Match clauses:
ip address 2
Set clauses:
metric 10
```

Field	Description
route-map	Name of the route map.
Permit	The route map contains the permit keyword.

sequence 10	Sequence number of the route map.
Match clauses	Set the matching rule. Whether to perform the set operation depends on the permit or deny keyword in the route map.
Set clauses	Set the operation when the rule is matched.

9 PBR Commands

9.1 clear ip pbr statistics

Use this command to clear the IPv4 PBR forwarded packet count.

clear ip pbr statistics [**interface** if-name | **local**]

Parameter	Parameter	Description
Description	interface if-name	Specifies the interface name. If the interface name is specified, the device clears the IPv4 PBR forwarded packet count on that interface. Otherwise, the device clears the IPv4 PBR forwarded packet count on every interface where IPv4 PBR is enabled.
	local	Clears the IPv4 PBR forwarded packet count on the local interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use this command to clear the IPv4 PBR forwarded packet count.

Configuration The following example clears the IPv4 PBR forwarded packet count.

Examples FS#clear ip pbr statistics

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.2 clear ipv6 pbr statistics

Use this command to clear the IPv6 PBR forwarded packet count.

clear ipv6 pbr statistics [**interface** if-name | **local**]

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
interface if-name	Specifies the interface name. If the interface name is specified, the device clears the IPv6 PBR forwarded packet count on that interface. Otherwise, the device clears the IPv6 PBR forwarded packet count on every interface where IPv6 PBR is enabled.
local	Clears the IPv6 PBR forwarded packet count on the local interface.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use this command to clear the IPv6 PBR forwarded packet count.

Configuration Examples The following example clears the IPv6 PBR forwarded packet count.

```
FS#clear ipv6 pbr statistics
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.3 ip local policy route-map

Use this command to apply the policy-based routing (PBR) on the packets sent locally. Use the **no** form of this command to restore the default setting.

ip local policy route-map route-map
no ip local policy route-map

Parameter Description	Parameter	Description
	route-map	Name of the route map

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is valid for the IP packets sent locally, but not the IP packets received locally. The IP packets received by the local are free from this command.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The

packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy. The **set interface** command for the policy-based routing does not support the load-balancing and only supports the redundancy backup.

Configuration The following examples send the packets with the source address 192.168.217.10 from the serial 2/0.

Examples The following example defines an ACL that match the IP packet.

```
FS(config)#access-list 1 permit 192.168.217.10
```

The following example defines the route map.

```
FS(config)#route-map lab1 permit 10
FS(config-route-map)#match ip address 1
FS(config-route-map)#set interface serial 2/0
FS(config-route-map)#exit
```

The following example applies PBR on the local interface.

```
FS(config)#ip local policy route-map lab1
```

Related Commands

Command	Description
access-list	Defines the access list rule.
route-map	Defines the route map.
set vrf	Defines the VRF instance of the policy-based IP packet.
set ip next-hop	Defines the next hop of the policy-based routing.
set ip default next-hop	Defines the default next hop of the policy-based routing.
set interface	Defines the output port of the policy-based routing.
set default interface	Defines the default policy-based routing output port.
set ip tos	Sets the TOS in the head of the IP packet.
set ip dscp	Sets the DSCP of the IP packet.
set ip precedence	Sets the priority level in the head of the IP packet.
match ip address	Sets the filtering rule.
match length	Matches the packet length.

Platform N/A

Description

9.4 ip policy-source in-interface

Use this command to configure the source address policy-based routing for the IPv4 packets received on an interface. Use the **no** form of this command to disable the source address policy-based routing on the interface.

```
ip policy-source in-interface interface-type sequence { source-address mask | source-address/mask } [[default]
next-hop ip-address [weight] }
no ip policy-source in-interface interface-type sequence [ {source-address mask | source-address/mask }
```

[**[default] next-hop** ip-address [weight]]

Parameter Description	Parameter	Description
	interface-type	Interface type
	sequence	Policy sequence number. The lower the number is, the higher the priority is.
	source-address	Source IPv4 address.
	mask	Address mask.
	ip-address	Next hop IPv4 address
	weight	Next hop weight

Defaults Source address policy-based routing is disabled by default.

Command Mode Global configuration mode

Usage Guide You can configure multiple **ip policy-source in-interface** commands on an interface. The policy with different source addresses must be configured with different sequence numbers. The lower the sequence number is, the higher the priority is.
 In case of the same sequence number, the priority order of the next hop type is as follows:
vrf vrf-name > next-hop ip-address > interface out-interface-type > default next-hop ip-address > default interface out-interface-type
 The priority of the source address PBR is lower than that of the interface PBR.

Configuration Examples In the example below, when the interface GigabitEthernet0/0 receives a datagram, if the source address of the datagram is 10.0.0.2, the next-hop is set as 196.168.1.2; otherwise, the general forwarding will be performed. The following example configures source address PBR in global configuration mode.

```
FS(config)# ip policy-source in-interface gigabitEthernet 0/0 1 10.0.0.2 255.255.255.255 next-hop 196.168.1.2
FS(config)# ip policy-source in-interface gigabitEthernet 0/0 2 20.0.0.2 255.255.255.255 next-hop 196.168.2.2
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.5 ip policy

Use this command to set the policy: redundant backup or load balancing used between multiple next hops of the PBR applied for the **set ip [default] nexthop** command in global configuration mode. Use the **no** form of this command to restore the default setting.


ip policy { load-balance | redundancy }
no ip policy

Parameter	Parameter	Description
Description	load-balance redundance	Specifies the policy: load balancing or redundant backup.

Defaults Redundant backup is adopted by default.

Command Mode Global configuration mode

Usage Guide When you configure the **set ip next-hop** command in sub-route map, it is possible to configure multiple next hops. However, when you set redundant backup, only the first resolved next hop of the policy-based routing takes effect. When the load balancing is set, multiple resolved next hops of the policy-based routing take effect. The WCMP can be set up to 8 next hops, and the ECMP can be set up to 32 next hops. The resolved next hop refers to the ARP message learned by the next hop and the MAC address corresponding to this ARP exists in the MAC address table.

 NPE80 does not support this command.

Configuration Examples In the example below, there are multiple next hops configured in the route map. After the redundant backup is set in global configuration mode, only the first next hop among the sub-route map of the policy-based routing applied on the interface FastEthernet 0/0 takes effect.

The following example sets the ACL that match the IP packet.

```
FS(config)#access-list 1 permit 10.0.0.1
FS(config)#access-list 2 permit 20.0.0.1
```

The following example defines the route map.

```
FS(config)#route-map lab1 permit 10
FS(config-route-map)#match ip address 1
FS(config-route-map)#set ip next-hop 196.168.4.6
FS(config-route-map)#set ip next-hop 196.168.4.7
FS(config-route-map)#set ip next-hop 196.168.4.8
FS(config-route-map)#exit
FS(config)#route-map lab1 permit 20
FS(config-route-map)#match ip address 2
FS(config-route-map)#set ip next-hop 196.168.5.6
FS(config-route-map)#set ip next-hop 196.168.5.7
FS(config-route-map)#set ip next-hop 196.168.5.8
FS(config-route-map)#exit
```

The following example applies the policy-based routing on the interface.

```
FS(config)#interface FastEthernet 0/0
FS(config-if)#ip policy route-map lab1
FS(config-if)#exit
FS(config)#ip policy redundance
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.6 ip policy route-map

Use this command to apply the policy-based routing on an interface. Use the **no** form of this command to restore the default setting.

ip policy route-map route-map
no ip policy route-map


Parameter Description	Parameter	Description
	route-map	Name of the route map

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide The policy-based routing must be applied on the specified interface. That interface performs the policy-based routing only on the received packets.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

 Up to one route map can be configured on an interface. When you configure a route map on the interface for many times, the latter will overwrite the former.

Configuration Examples In the example below, when the interface FastEthernet0/0 receives a datagram, if the source address of the datagram is 10.0.0.1, it sets the next-hop as 196.168.4.6; if the source address is 20.0.0.1, it sets the next-hop as 196.168.5.6; otherwise, the general forwarding will be performed.

The following example sets the ACL matched with the IP packets.

```
FS(config)#access-list 1 permit 10.0.0.1
FS(config)#access-list 2 permit 20.0.0.1
```

The following example defines the route map.

```
FS(config)#route-map lab1 permit 10
FS (config-route-map)#match ip address 1
FS(config-route-map)#set ip next-hop 196.168.4.6
```



```
FS(config-route-map)#exit
FS(config)#route-map lab1 permit 20
FS(config-route-map)#match ip address 2
FS(config-route-map)#set ip next-hop 196.168.5.6
FS(config-route-map)#exit
```

The following example applies the route map on the interface.

```
FS(config)#interface FastEthernet 0/0
FS(config-if)#ip policy route-map lab1
FS(config-if)#exit
```

Related Commands

Command	Description
access-list	Defines the access list rule.
route-map	Defines the route map.
set vrf	Defines the VRF instance of the policy-based IP packet.
set ip next-hop	Defines the next hop of the policy-based routing.
set ip default next-hop	Defines the default next hop of the policy-based routing.
set interface	Defines the policy-based routing output port.
set default interface	Defines the default policy-based routing output port.
set ip tos	Sets the TOS in the head of the IP packet.
set ip dscp	Sets the DSCP of the IP packet.
set ip precedence	Sets the priority level in the head of the IP packet.
match ip address	Sets the filtering rule.
match length	Matches the packet length.

Platform N/A

Description

9.7 ipv6 local policy route-map

Use this command to enable the policy-based routing on the packets sent locally. Use the **no** form of this command to restore the default setting.

ipv6 local policy route-map route-map-name

no ipv6 local policy route-map

Parameter Description

Parameter	Description
route-map-name	Name of the router map applied locally, which is configured by the router-map command.

Defaults This function is disabled by default.

Command Mode Global Configuration mode

- Usage Guide**
- This command is valid only for the IPv6 packets in accordance with the policy (for example, ping packets used for management) sent locally, but not the packets received locally.
 - To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

Configuration Examples The following examples displays the PBR application process: The device sends the packets from the source address 2003:1000::10/80 to the 2001:100::/64, the packets will match ACL6 of aaa and be sent to the device 2003:1001::2.

- The following example defines the ACL matched with the IPv6 packet:

```
FS(config)#ipv6 access-list aaa
FS(config)#permit ipv6 2003:1000::10/80 2001:100::/64
```

- The following example defines the router map.

```
FS(config)#route-map pbr-aaa permit 10
FS(config-route-map)#match ipv6 address aaa
FS(config-route-map)#set ipv6 next-hop 2003::1001::2
```

- The following example applies the PBR on the device.

```
FS(config)#ipv6 local policy route-map pbr-aaa
```

Related Commands

Command	Description
match ipv6 address	Sets the ACL6 used to match the IPv6 packets in the IPv6 PBR.
match length	Defines the length of matched packets.
route-map	Defines the route map for PBR.
set default interface	Defines the default next hop output port.
set interface	Defines the next hop output port.
set ipv6 default next-hop	Sets the default next hop of packet forwarding.
set ipv6 next-hop	Sets the next hop of packet forwarding.
set ipv6 precedence	Sets the priority field in the head of IPv6 packets.
show ipv6 policy	Displays the current PBR application.
show route-map	Displays the current router map configuration.

Platform N/A

Description

9.8 ipv6 policy

Use this command to set the policy: redundant backup or load balancing, applied for the **set ip nexthop** command in global configuration mode. Use the **no** form of this command to restore the default setting.

ipv6 policy { load-balance | redundancy }

no ipv6 policy

Parameter Description	Parameter	Description
	load-balance	Sets the policy as load balancing.
	redundance	Sets the policy as redundant backup.

Defaults Redundant backup is adopted by default.

Command Global configuration mode

Mode

Usage Guide This command is valid for the IP packets sent locally, but not the IP packets received locally. The IP packets received by the local are free from this command.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.


The **set interface** command for the policy-based routing does not support the load-balancing and only supports the redundancy backup.

Configuration This function is valid for the multiple next-hops.

Examples When you configure the set ip next-hop command in sub-route map, it is possible to configure multiple next hops. However, when you set redundant backup, only the first resolved next hop takes effect. The second configured next hop will take effect only when the first one fails and the first next hop will take effect again if it recovers.

When the load balancing is set, multiple next hops of the policy-based routing take effect.

The WCMP can be set up to 8 next hops, and the ECMP can be set up to 32 next hops.

 The resolved next hop refers to the learned MAC address for the next-hop.

The following example sets load-balancing mode for multiple nexthops.

The following example configures an ACL matching with IP packets.

```
FS(config)# ipv6 access-list 1
FS(config-ipv6-acl)# permit ipv6 1000::1 any
FS(config)# ipv6 access-list 2
FS(config-ipv6-acl)# permit ipv6 2000::1 any
```

The following example defines a route map.

```

FS(config)# route-map lab1 permit 10
FS(config-route-map)# match ipv6 address 1
FS(config-route-map)# set ipv6 next-hop 2002::1
FS(config-route-map)# set ipv6 next-hop 2002::2
FS(config-route-map)# set ipv6 next-hop 2002::3
FS(config-route-map)# exit
FS(config)# route-map lab1 permit 20
FS(config-route-map)# match ipv6 address 2
FS(config-route-map)# set ipv6 next-hop 2002::5
FS(config-route-map)# set ipv6 next-hop 2002::6
FS(config-route-map)# set ipv6 next-hop 2002::7
FS(config-route-map)# exit
    
```

The following example applies policy-based routing on the interface.

```

FS(config)# interface FastEthernet 0/0
FS(config-if)# ipv6 policy route-map lab1
FS(config-if)# exit
FS(config)# ipv6 policy load-balance
    
```

Related Commands

Command	Description
set ipv6 default next-hop	Defines the default next hop for forwarding the packets.
set ipv6 next-hop	Defines the next hop for forwarding the packets.
show ipv6 policy	Displays the current policy-based routing application.

Platform N/A

Description

9.9 ipv6 policy route-map

Use this command to apply the policy-based routing on an interface in interface configuration mode. Use the **no** form of this command to restore the default setting.

ipv6 policy route-map route-map-name

no ip policy route-map

Parameter Description

Parameter	Description
route-map-name	Name of the PBR router map applied locally, which is configured by the router-map command.


Defaults This function is disabled by default..

Command Mode Interface configuration mode

Usage Guide

The policy-based routing must be applied on the specified interface. That interface performs the policy-based routing only on the received packets.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

 Up to one route map can be configured on an interface. When you configure a route map on the interface for many times, the latter will overwrite the former.

Configuration

An IPv6 packet is received on the fastEthernet 0/0. If the packet is sent from 10::/64 network segment, it is

Examples

forwarded to the next hop of 2000:1; if the packet is sent from 20::/64 network segment, it is forwarded to the next hop of 2000:2 or forwarded as usual.:

The following example configures an ACL matched with the IP packet.

```
FS(config)# ipv6 access-list acl_for_pbr1
FS (config-ipv6-acl)# permit ipv6 10::/64 any
FS(config)# ipv6 access-list acl_for_pbr2
FS (config-ipv6-acl)# permit ipv6 20::/64 any
```

The following example defines a route map.

```
FS(config)# route-map rm_pbr permit 10
FS (config-route-map)# match ipv6 address acl_for_pbr1
FS(config-route-map)# set ipv6 next-hop 2000::1
FS(config-route-map)# exit
FS(config)# route-map rm_pbr permit 20
FS(config-route-map)# match ipv6 address acl_for_pbr2
FS(config-route-map)# set ipv6 next-hop 2000::2
FS(config-route-map)# exit
```

The following example applies the route map to the interface.

```
FS(config)# interface FastEthernet 0/0
FS(config-if)# no switchport
FS(config-if)# ipv6 policy route-map rm_pbr
FS(config-if)# exit
```

Related Commands

Command	Description
route-map	Defines the route map.
match ipv6 address	Sets the IPv6 ACL used to match the IPv6 packets in the IPv6 PBR.
set ipv6 default next-hop	Defines the default next hop of the packet forwarding.
set ipv6 next-hop	Defines the next hop of the packet forwarding.
show ipv6 policy	Displays the current policy-based routing

	application.
show route-map	Displays the current route map configurations.

Platform N/A

Description

9.10 ipv6 policy-source in-interface

Use this command to configure the source address policy-based routing for the IPv6 packets received on an interface. Use the **no** form of this command to disable the source address policy-based routing on the interface.

ipv6 policy-source in-interface interface-type sequence source-address/prefix-length {[default] next-hop ipv6-address [weight] }

no ipv6 policy-source in-interface interface-type sequence [source-address/prefix-length [[default] next-hop ipv6-address [weight]]

Parameter	Description
interface-type	Interface type
sequence	Policy sequence number. The lower the number is, the higher the priority is.
source-address	Source IPv6 address.
prefix-length	Prefix length of the source IPv6 address.
ipv6-address	Next hop IPv6 address
weight	Next hop weight

Defaults Source address PBR is disabled by default.

Command Global configuration mode

Mode

Usage Guide You can configure multiple **ipv6 policy-source in-interface** commands on an interface. The policy with different source addresses must be configured with different sequence numbers. The lower the sequence number is, the higher the priority is.

In case of the same sequence number, the priority order of the next hop type is as follows:

vrf vrf-name > next-hop ipv6-address > interface out-interface-type > default next-hop ipv6-address > default interface out-interface-type

The priority of the source address PBR is lower than that of the interface PBR.

Configuration Examples In the example below, when the interface GigabitEthernet0/0 receives an IPv6 datagram, if the source address of the datagram is in the network segment of 10::/64, the next-hop is set as 2000:1; if the source address of the datagram is in the network segment of 20::/64, the next-hop is set as 2000:2; otherwise, the general forwarding will be performed.

The following example configures source address PBR in global configuration mode.

```
FS(config)# ipv6 source-policy in-interface gigabitEthernet 0/0 2 10::/64 next-hop 2000::1
FS(config)# ipv6 source-policy in-interface gigabitEthernet 0/0 2 20::/64 next-hop 2000::2
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.11 show ip pbr bfd

Use this command to display the correlation between the IPv4 policy router and BFD.

show ip pbr bfd

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the correlation between the IPv4 policy router and BFD.

```

Examples
FS# show ip pbr bfd
VRF ID  Ifindex  Host           State  Refcnt
      0      13  192.168.8.100  Up     2
    
```

Field Description

Field	Description
VRF ID	VRF of BFD neighbors correlated with the policy router
Ifindex	The interface index of BFD neighbors correlated with the policy router
Host	The peer IPv4 address
State	Up/Down status of BFD neighbors correlated with the policy router
Refcnt	Calculation referred by BFD neighbors

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.12 show ip pbr route

Use this command to display the IPv4 PBR information on the interface.

show ip pbr route [**interface** if-name | **local**]

Parameter Description	Parameter	Description
	interface if-name	Specifies the interface name. If the interface name is specified, the IPv4 BPR information of this interface is displayed. Otherwise, the IPv4 BPR information of all interfaces where the IPv4 PBR is enabled is displayed.
	local	Displays the IPv4 PBR information on the local interface

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to display the IPv4 PBR information.

Configuration Examples The following example displays the IPv4 PBR information on the interfaces.

```

FS#show ip pbr route
PBR IPv4 Route Summay : 1
Interface      : GigabitEthernet 0/1
  Sequence     : 10
  ACL[0]       : 2900
ACL_CLS[0]    : 0
  Min Length   : None
  Max Length   : None
  VRF ID       : 0
  Route Flags  :
  Route Type   : PBR
  Direct       : Permit
  Priority      : High
  Tos_Dscp     : None
  Precedence   : None
  Tos_Dscp     : 0
  Precedence   : 0
  Mode         : redundance
  Nexthop Count : 1
  Nexthop[0]   : 192.168.8.100
  Weight[0]    : 1
  Ifindex[0]   : 2
    
```

Parameter	Description
-----------	-------------

PBR IPv4 Route Summay	IPv4 PBR route count.
Interface	Interface where IPv4 PBR is enabled.
Sequence	The PBR serial number.
ACL	The ACL ID used in the match rule.
ACL_CLS	The ACL type used in the match rule, such as the IP standard ACL.
Min Length	The minimum match length.
Max Length	The maximum match length.
VRF ID	Port-correlated VRF ID.
Route Flags	<p>PBR flag bit:</p> <p>Route Type: "PBR" indicates PBR routes. "Normal" indicates common routes.</p> <p>Direct: PBR matching action, permit or deny</p> <p>Priority: PBR priority, High or Low</p> <p>Tos_Dscp: Displays whether the tos rule or the dscp rule is configured.</p> <p>Precedence: Displays whether the set ip precedence rule is configured.</p>
Mode	Specifies the redundancy mode or the next hop load balancing mode.
Nexthop Count	Specifies the next hop number. ECMP supports up to 32 next hops.
Nexthop	Specifies the next hop IP address.
Weight	Specifies the next hop weight.
lfindex	Specifies the outbound interface index corresponding to the next hop.

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

9.13 show ip pbr route-map

Use this command to display the IPv4 PBR route-map information.

show ip pbr route-map route-map-name

Parameter Description

Parameter	Description
route-map-name	The route-map name.

Defaults N/A

Command Privileged EXEC mode
Mode

Usage Guide N/A

Configuration The following example displays the IPv4 PBR route-map information.

```

Examples
FS#show ip pbr route-map rm
Pbr VRF: GLOBAL, ID: 0
Forward Mode: redundance
Forwarding: On

route-map rm
route-map index: sequence 10, permit
Match rule:
ACL ID : 0, ACL CLS: 0, Name: acl1
Set rule:
IPv4 Nexthop: 192.168.8.100, (VRF Name: , ID: 0), Weight: 0, Flags: 0
PBR state info ifx: GigabitEthernet 0/1, Connected: true, Track State: valid, Flags: 0
    
```

Field	Description
Pbr VRF	VRF name and VRF ID.
Forward Mode	Sets the load balance mode or the redundancy mode for the next hop.
Forwarding	Displays whether the IP route forwarding is enabled.
Route-map index	The serial number and the type of the sub-map.
Match rule	Match rule.
Set rule	Set rule.
PBR state info	PBR private data information, such as outbound interface and the link state of the next hop.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

9.14 show ip pbr source-route

Use this command to display information about IPv4 source address-based PBR.

show ip pbr source-route [interface if-name]

Parameter

Parameter	Description
-----------	-------------

Description	
interface if-name	Displays the IPv4 PBR applied to a specified interface if if-name is specified. Displays all applied IPv4 PBR information if if-name is not specified.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide You can use this command to display the configured source address-based PBR.

Configuration The following example displays information about the configured source address-based PBR.

Examples

```
FS# show ip pbr source-route
PBR IPv4 Source Route
Interface      : GigabitEthernet 0/1
  Sequence     : 10
  Source address : 10.1.1.1/24
  VRF ID       : 0
  Route Flags   :
  Route Type    : PBR
  Direct        : Permit
  Priority      : High
  Match_ipaddr : Exist
  Mode          : redundance
  Nexthop Count : 1
  Nexthop[0]   : 192.168.8.100
  Weight[0]    : 1
  Iindex[0]    : 2
```

Field description:

Field	Description
Interface	Interface to which the PBR is applied
Sequence	Sequence number of the PBR
VRF ID	ID of the VRF table associated with an interface
Route Flags	Flag bit of PBR: Route Type: type of routes. The value PBR indicates PBR routes while the value Normal indicates common routes. Direct: PBR matching mode. The options include permit and deny . Priority: priority of a PBR route. The options include High and Low .
Mode	Sets the next hop to work in redundancy mode or load balancing mode.

NextHop Count	Sets the number of next hops. ECMP supports a maximum of 32 next hops.
NextHop	Sets the next-hop IPv4 address.
Weight	Sets the next-hop weight value.
Ifindex	Sets the outbound interface index of the next hop.

9.15 show ip pbr statistics

Use this command to display the IPv4 PBR forwarded packet count.

show ip pbr statistics [interface if-name | local]

Parameter Description	Parameter	Description
	interface if-name	Specifies the interface name. If the interface name is specified, the IPv4 PBR forwarded packet count of this interface is displayed. Otherwise, the IPv4 PBR forwarded packet count of all interfaces where the IPv4 PBR is enabled is displayed.
	local	Displays the IPv4 PBR forwarded packet count on the local interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the IPv4 PBR forwarded packet count.

Examples

```
FS#show ip pbr statistics
IPv4 Policy-based route statistic
gigabitEthernet 0/1
statistics : 10
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.16 show ip policy

Use this command to display the interface configured with the policy-based routing and the name of route map applied on the interface.

show ip policy [route-map-name]

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
route-map-name	Specifies a route map to be applied on the interfaces.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide You can use this command to verify the current PBR configured in the system.

Configuration The following example displays the current PBR configured in the system.

```

Examples
FS#show ip policy
Banalance Mode: redundance
Interface          Route map
local              test
FastEthernet 0/0  test
    
```

Related Commands	Command	Description
	ip policy route-map	Applies the policy-based routing on the interface.
ip local policy route-map	Applies the policy-based routing on the local interface.	

Platform N/A

Description

9.17 show ipv6 pbr bfd

Use this command to display the correlation between the IPv6 policy router and BFD.

show ipv6 pbr bfd

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example displays the correlation between the IPv6 policy router and BFD.

```

Examples
FS# show ipv6 pbr bfd
    
```

VRF ID	Ifindex	Host	State	Refcnt
0	13	2000: : 2	Up	1

Field Description

Field	Description
VRF ID	VRF of BFD neighbors correlated with the policy router
Ifindex	The interface index of BFD neighbors correlated with the policy router
Host	The peer IPv6 address
State	Up/Down status of BFD neighbors correlated with the policy router
Refcnt	Calculation referred by BFD neighbors

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

9.18 show ipv6 pbr route

Use this command to display the IPv6 PBR information on the interface.

show ipv6 pbr route [**interface** if-name | **local**]

Parameter Description	Parameter	Description
	interface if-name	Specifies the interface name. If the interface name is specified, the IPv6 BPR information of this interface is displayed. Otherwise, the IPv6 BPR information of all interfaces where the IPv6 PBR is enabled is displayed.
	local	Displays the IPv6 PBR information on the local interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the IPv6 PBR information on the interfaces.

```

Examples
FS#show ipv6 pbr route
PBR IPv6 Route Summary : 1
Interface      : GigabitEthernet 0/2
  Sequence     : 10
  ACL[0]       : 2901
ACL_CLS[0]     : 0
  Min Length   : None
  Max Length   : None
  VRF ID       : 0
  Route Flags  :
  Route Type   : PBR
  Direct       : Permit
  Priority      : High
  Tos_Dscp     : None
  Precedence   : None
  Tos_Dscp     : 0
  Precedence   : 0
  Mode         : redundance
  Nexthop Count : 1
  Nexthop[0]   : 10::1
  Weight[0]    : 1
  Ifindex[0]   : 3
    
```

Parameter	Description
PBR IPv4 Route Summay	IPv4 PBR route count.
Interface	Interface where IPv4 PBR is enabled.
Sequence	The PBR serial number.
ACL	The ACL ID used in the match rule.
ACL_CLS	The ACL type used in the match rule, such as the IP standard ACL.
Min Length	The minimum match length.
Max Length	The maximum match length.
VRF ID	Port associated VRF ID.
Route Flags	PBR flag bit: Route Type: "PBR" indicates PBR routes. "Normal" indicates common routes. Direct: PBR matching action, permit or deny Priority: PBR priority, High or Low Tos_Dscp: Displays whether the tos rule or the dscp rule is configured. Precedence: Displays whether the set ip precedence rule is configured.
Mode	Specifies the redundancy mode or the load balance mode for the next hop.
Nexthop Count	Specifies the next hop number. ECMP supports up to 32 next hops.
Nexthop	Specifies the next hop IP address.
Weight	Specifies the next hop weight.
Iindex	Specifies the outbound interface index corresponding to the next hop

**Related
Commands**

Command	Description
N/A	N/A

Platform N/A

Description
9.19 show ipv6 pbr route-map

Use this command to display the IPv6 PBR route-map information.

show ipv6 pbr route-map route-map-name

**Parameter
Description**

Parameter	Description
route-map-name	The route-map name.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the IPv6 PBR route-map information.

Examples

```
FS#show ipv6 pbr route-map rm6
Pbr VRF: GLOBAL, ID: 0
Forward Mode: redundance
Forwarding: On

route-map rm6
  route-map index: sequence 10, permit
Match rule:
  ACL ID :      0, ACL CLS: 0, Name: acl6
  Set rule:
    IPv6 Nexthop: 10::1, (VRF Name: , ID: 0), Weight: 0, Flags: 0
    PBR state info ifx: GigabitEthernet 0/0, Connected: true, Track State: valid, Flags: 0
```

Field	Description
Pbr VRF	VRF name and VRF ID.
Forward Mode	Sets the load balancing mode or to the redundancy mode for the next hop.
Forwarding	Displays whether the IP route forwarding is enabled.
Route-map index	The serial number and the type of the sub-map.
Match rule	Match rule
Set rule	Set rule.
PBR state info	PBR private data information, such as outbound interface and the link state of the next hop.

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

9.20 show ipv6 pbr source-route

Use this command to display the IPv6 source address PBR configuration.

show ipv6 pbr source-route [interface if-name]

Parameter	Parameter	Description
Description	interface if-name	Displays the IPv6 source address PBR configuration on the specified interface. If the parameter is not configured, the IPv6 source address PBR configuration on all interfaces will be displayed.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the IPv6 source address PBR configuration.

```

Examples
FS# show ipv6 pbr source-route
PBR IPv6 Source Route
Interface      : GigabitEthernet 0/1
Sequence      : 10
Source address : 1000::1/64
VRF ID        : 0
Route Flags   :
Route Type    : PBR
Direct        : Permit
Priority       : High
Match_ipaddr  : Exist
Mode          : redundance
Nextthop Count : 1
Nextthop[0]   : 1001::2
Weight[0]     : 1
Ifindex[0]    : 3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.21 show ipv6 pbr statistics

Use this command to display the IPv6 PBR forwarded packet count.

show ip pbr statistics [interface if-name | local]

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
interface if-name	Specifies the interface name. If the interface name is specified, the IPv6 PBR forwarded packet count of this interface is displayed. Otherwise, the IPv6 PBR forwarded packet count of all interfaces where the IPv6 PBR is enabled is displayed.
local	Displays the IPv6 PBR forwarded packet count on the local interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the IPv6 PBR forwarded packet count.

Examples

```
FS#show ipv6 pbr statistics
IPv6 Policy-based route statistic
gigabitEthernet 0/1
statistics : 20
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.22 show ipv6 policy

Use this command to display which interfaces are configured with IPv6 PBR.

show ipv6 policy [route-map-name]

Parameter Description	Parameter	Description
	route-map-name	route-map-name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the current PBR applied in the system.

Examples

```
FS#show ipv6 policy
```

```

Banlance Mode: redundance
Interface          Route map
VLAN 1             RM_for_Vlan_1
VLAN 2             RM_for_Vlan_2
    
```

Field	Description
Balance Mode	The current PBR running mode.
Interface	The name of interface with PBR applied.
Route map	The name of route map applied on the interface.

**Related
Commands**

Command	Description
show route-map	Displays the current configured route map.

Platform N/A
Description

10 VRF Commands

10.1 address-family

Use this command to configure an IPv4 address family or IPv6 address family for a multiprotocol VRF.

address-family { **ipv4** | **ipv6** }

Parameter Description

Parameter	Description
ipv4	Enters IPv4 address family.
ipv6	Enters IPv6 address family.

Defaults

No IPv4 address family or IPv6 address family is configured for a multiprotocol VRF.

Command mode

VRF configuration mode

Usage Guide

This command is applicable only to the multiprotocol VRF.

Configuration Examples

The following example defines a multiprotocol VRF vrf1 and configures an IPv4 address family.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#address-family ipv4
FS(config-vrf-af)#
```

Related Commands

Command	Description
exit-address-family	Exits the VRF address family configuration mode.
vrf definition	Defines a multiprotocol VRF.

Platform

N/A

Description

10.2 description

Use this command to configure the VRF description.

description string

Parameter Description

Parameter	Description
string	VRF description character string. The maximum length is 244 characters.

Defaults

No VRF description is configured by default .

Command

VRF configuration mode

mode

Usage Guide N/A

Configuration The following example defines a single-protocol IPv4 VRF vrf1 and configure the description to vpn-a.

```
FS(config)#ip vrf definition vrf1
FS(config-vrf)#description vpn-a
```

The following example defines a multiprotocol VRF vrf2 and configure the description to vpn-b.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#description vpn-b
```

Related Commands

Command	Description
ip vrf	Defines a single-protocol IPv4 VRF.
vrf definition	Defines a multiprotocol VRF.

Platform N/A

Description

10.3 exit-address-family

Use this command to exit VRF address family configuration mode.

exit-address-family

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command mode VRF address family configuration mode

Usage Guide N/A

Configuration The following example defines a multiprotocol VRF vrf1 and configures an IPv4 address family.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#address-family ipv4
FS(config-vrf-af)# exit-address-family
FS(config-vrf)#
```

Related Commands

Command	Description
---------	-------------

address-family	Configures an IPv4 address family or IPv6 address family for a multiprotocol VRF.
vrf definition	Defines a multiprotocol VRF.

Platform N/A

Description

10.4 ip vrf

Use this command to create a VRF. Use the **no** form of this command to delete a VRF.

ip vrf vrf-name

no ip vrf vrf-name

Parameter Description	Parameter	Description
	vrf-name	VRF name

Defaults No VRF is configured by default.

Command mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example creates a VRF.

```
FS(config)# ip vrf redvrf
FS(config-vrf)#
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.5 ip vrf forwarding

Use this command to add an interface or sub-interface to a VRF. Use the **no** form of this command to quit the VRF.

ip vrf forwarding vrf-name

no ip vrf forwarding vrf-name

Parameter Description	Parameter	Description
	vrf-name	Name of the VRF that the interface or sub-interface joins

Defaults By default, the interface does not belong to any VRF.

Command mode Interface configuration mode

Usage Guide You can bind the interface to the uni-protocol IPv4 VRF without the IPv6 enabled on the interface. On the device supporting the VRF, if the interface is bound to the uni-protocol IPv4 VRF with the IPv6 protocol enabled, the device cannot forward the IPv6 packets received on this interface.

Configuration Examples The following example adds an interface or sub-interface to a VRF.

```
FS(config-if-GigabitEthernet 0/0)# ip vrf forwarding redvrf
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.6 ip vrf receive

Use this command to import the host and direct-connected route of one interface into the specified VRF routing table. Use the **no** form of this command to remove the imported host and direct-connected route from the VRF.

ip vrf receive vrf-name
no ip vrf receive vrf-name

Parameter Description	Parameter	Description
	vrf-name	

Defaults By default, the host and direct-connected route of the interface are not imported to other VRFs

Command mode Interface configuration mode

Usage Guide Currently, the **ip vrf receive** command supports the VRF routing based on the PBR. This command is used to import the host with the main and slave addresses and direct-connected route of this interface into the specified VRF routing table. You need to execute this command multiple times to import this host and direct-connected route to multiple VRF routing tables. Unlike the **ip vrf forwarding** command, which does not bind the interface to the VRF and this interface still belongs to the global VRF. Configuring both **ip vrf forwarding** and **ip vrf receive** on an interface is not allowed. If one has been configured, configuring the other one will prompt an error message.

If **ip vrf forwarding** has been configured, configuring **ip vrf receive** will prompt:

% Cannot configure 'ip vrf receive' if interface is under a VRF

If **ip vrf receive** has been configured, configuring **ip vrf forwarding** will prompt:

% Cannot bind interface to a VRF if it has configed 'ip vrf receive'

Configuration Examples The following example imports the host and direct-connected route of one interface into the specified VRF routing table.

```
FS(config)# interface FastEthernet0/1
FS(config-if)# ip address 192.168.1.2 255.255.255.0
FS(config-if)# ip policy route-map PBR-VRF-SELECTION
FS(config-if)# ip vrf receive VRF_1
FS(config-if)# ip vrf receive VRF_2
FS(config-if)# end
```

Related Commands

Command	Description
ip vrf forwarding	Adds the interface to a VRF.
ip vrf	Creates a VRF.
set vrf	Sets the VRF in the routing map configuration mode.

Platform N/A
Description

10.7 maximum routes

Use this command to set the maximum routes limit within the VRF. Use the **no** form of this command to remove the setting.

maximum routes limit { warn-threshold | **warning-only** }

no maximum routes

Parameter Description

Parameter	Description
limit	The maximum number of routes, in the range from 1 to 4,294,967,295. The routes which exceed the limits will not be added to the core routing table.
warn-threshold	The warning will be printed when the threshold is reached. The threshold value is in the range from 1 to 100.
warning-only	After the number of routes reaches limit, the warning will be printed but the routes will be added to the core routing table.

Defaults N/A

Command Mode Single-protocol VRF is configured in VRF configuration mode; multiple-protocol VRF is configured in address family mode.

Usage Guide This command is used to set the maximum number of routes for the VRF.

Configuration Examples The following example sets the maximum number of routes for vrf1 to 1,000, and enables the device to only print the warning.

```
FS(config)# ip vrf vrf1
FS(config-vrf)# maximum routes 1000 warning-only
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.8 vrf definition

Use this command to create the multiprotocol VRF.

vrf definition vrf-name

Parameter Description	Parameter	Description
	vrf-name	vrf-name

Defaults N/A

Command mode Global configuration mode

Usage Guide The single-protocol VRF configuration command **ip vrf** cannot be used to edit a multiprotocol VRF; the multiprotocol VRF configuration command **vrf definition** cannot be used to edit a single-protocol IPv4 VRF.

Configuration Examples The following example s creates a multiprotocol VRF vrf1.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#
```

Related Commands	Command	Description
	description	Configures the description.
	address-family	Configures an IPv4 address family or IPv6 address family for a multiprotocol VRF.
	exit-address-family	Exits the VRF address family configuration mode.
	vrf forwarding	Binds a network interface to a multiprotocol VRF.

Platform N/A

Description

10.9 vrf forwarding

Use this command to bind a network interface to a multiprotocol VRF.

vrf forwarding vrf-name

Parameter Description	Parameter	Description
	vrf-name	VRF name, which shall be a multiprotocol VRF instead of a single-protocol VRF that supports IPv4 only.

Defaults The network interface is not bound to any VRF.

Command mode Interface configuration mode

Usage Guide The configuration command **ip vrf forwarding** cannot be used to bind a network interface to a multiprotocol VRF; the configuration command **vrf forwarding** cannot be used to bind a network interface to a single-protocol IPv4 VRF.

An interface cannot be bound to a multiprotocol VRF that is not configured with any address family.

To bind a network interface to a multiprotocol VRF, you should delete the existing IPv4 addresses, VRRP IPv4 addresses, IPv6 addresses and VRRP IPv6 addresses, and disable IPv6 on the interface.

When a network interface is bound to a multiprotocol VRF, no IPv4 address or VRRP IPv4 address should be configured for the interface if no IPv4 address family is configured for the VRF. You should configure an IPv4 address family for the VRF before configuring an IPv4 address and VRRP IPv4 address for the interface.

When a network interface is bound to a multiprotocol VRF, no IPv6 address or VRRP IPv6 address should be configured for the interface if no IPv6 address family is configured for the VRF. You should configure an IPv6 address family for the VRF before configuring an IPv6 address and VRRP IPv6 address for the interface.

If you delete a multiprotocol VRF's IPv4 address family, you should delete the IPv4 addresses and VRRP IPv4 addresses of all network interfaces bound to the VRF, and delete the IPv4 static routes whose routing VRF or next-hop VRF is that VRF. Likewise, if you delete a multiprotocol VRF's IPv6 address family, you should delete the IPv4 addresses and VRRP IPv6 addresses of all network interfaces bound to the VRF, disable IPv6 on the interfaces, and delete the IPv6 static routes whose routing VRF or next-hop VRF is that VRF.

Configuration Examples The following example binds the interface VLAN 1 to a multiprotocol VRF vrf1.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#address-family ipv4
FS(config-vrf-af)#exit-address-family
FS(config-vrf)#address-family ipv6
FS(config-vrf-af)#exit-address-family

FS(config-vrf)#interface vlan 1
FS(config-if)#vrf forwarding vrf1
```

```
FS(config-if)#ip address 1.1.1.1 255.255.255.0
FS(config-if)#ipv6 address 1000::1/64
```

Related Commands

Command	Description
vrf definition	Defines a multiprotocol VRF.

Platform N/A
Description

10.10 vrf global-vrf

Use this command to enter the global VRF configuration mode.

vrf global-vrf

Parameter Description

Parameter	Description

Defaults The global VRF exists by default. IPv4 and IPv6 address families are enabled by default.

Command mode Global configuration mode

Usage Guide

```
 
```

Configuration Examples The following example enters the global VRF configuration mode.

```
FS(config)# vrf global-vrf
FS(config-global-vrf)#
```

Related Commands

Command	Description

Platform N/A
Description

10.11 vrf receive

Use this command to add the local host's route and direct route with the interface's IPv4/v6 address to the routing table of the specified VRF.

vrf receive vrf-name

Parameter Description

Parameter	Description
vrf-name	VRF name, which should be a multiprotocol VRF instead of a single-protocol

	IPv4 VRF.
--	-----------

Defaults N/A

Command mode Interface configuration mode

Usage Guide This command is not used to bind an interface to a VRF, and the interface is still a global interface. If the administrator needs to use PBR to choose VRF, the **vrf receive** command should be configured on the interfaces where PBR is applied for each selected VRF.

When an IPv4 address family is configured for a multiprotocol VRF, the local host's route and direct route with the interface's IPv4 address is added to the IPv4 routing table of the specified VRF, and the local host's route with the IPv4 address of the master VRRP group on the interface is added to the IPv4 routing table of the specified VRF.

When an IPv6 address family is configured for a multiprotocol VRF, the local host's route and direct route with the interface's IPv6 address is added to the IPv6 routing table of the specified VRF, and the local host's route with the IPv6 address of the master VRRP group on the interface is added to the IPv6 routing table of the specified VRF.

The **ip vrf forwarding** and **vrf receive** commands are mutually exclusive on an interface, and so are the **vrf forwarding** and **vrf receive** commands. If both commands are configured on an interface, an error message will be shown.

If the **ip vrf forwarding** or **vrf forwarding** command is configured first, and then the **vrf receive** command is configured, the following message will be displayed:

```
% Cannot configure 'vrf receive' if interface is under a VRF
```

If the **vrf receive** command is configured first, and then the **ip vrf forwarding** or **vrf forwarding** command is configured, the following message will be displayed:

```
% Cannot configure 'vrf forwarding vrf2' on this interface, please delete 'ip vrf receive' and 'vrf receive' first.
```

Configuration Examples The following example selects a VRF using IPv6 PBR on VLAN 1.

```
FS(config)#vrf definition vrf1
FS(config-vrf)#address-family ipv6
FS(config-vrf-af)#exit-address-family

FS(config-vrf)#vrf definition vrf2
FS(config-vrf)#address-family ipv6
FS(config-vrf-af)#exit-address-family

FS(config-vrf)#route-map pbr-vrf-selection permit 10
FS(config-route-map)#match ipv6 address acl1
FS(config-route-map)#set vrf vrf1
FS(config-route-map)#route-map pbr-vrf-selection permit 20
FS(config-route-map)#set vrf vrf2

FS(config-route-map)#interface vlan 1
FS(config-if)#ipv6 policy route-map pbr-vrf-selection
FS(config-if)#ipv6 address 1000::1/64
```

```
FS(config-if)#vrf receive vrf1
FS(config-if)#vrf receive vrf2
```

Related Commands

Command	Description
vrf definition	Defines a multiprotocol VRF.
address-family	Configures an IPv4 address family or IPv6 address family for a multiprotocol VRF.
set vrf	Configures a VRF in the route map configuration mode.

Platform N/A
Description

10.12 show ip vrf

Use this command to display the VRF information.

```
show ip vrf [ brief | detail | interfaces ] [ vrf-name ]
```

Parameter Description

Parameter	Description
brief	(Optional) Displays the VRF information in brief.
detail	(Optional) Displays the VRF information in detail.
interfaces	(Optional) Displays the VRF's interface information in detail.
vrf-name	(Optional) Name of the VRF

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide Use this command to display the VRF information, which can be divided into two levels:
 Use the keyword **brief** to display the information in brief.
 Use the keyword **detail** to display the information in detail.
 Use the keyword **interfaces** to display the VRF's interface information.

Configuration Examples The following example displays the VRF information.

```
FS#show ip vrf
Name                Interfaces
aaa                 GigabitEthernet 0/0
                   GigabitEthernet 0/1
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform N/A

Description

10.13 show vrf

Use this command to display the VRF configuration (including the single-protocol VRF and the multiple-protocol VRF).

show vrf [**ipv4** | **ipv6** | **brief** | **detail**] [vrf-name]

Parameter	Description
ipv4	Displays the brief VRF (the single-protocol VRF) information of the IPv4 address family.
ipv6	Displays the VRF brief information of the IPv6 address family.
brief	Displays the brief VRF (including the single-protocol VRF and the multiple-protocol) information.
detail	Displays the detailed VRF (including the single-protocol VRF and the multiple-protocol) information.
vrf-name	VRF name.

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays brief information about all VRF.

```

Examples
FS#show vrf
  Name      Default RD      Protocols  Interfaces
  ---      -
  aaa       <not set>       ipv4
  aab       <not set>
  bbb       <not set>       ipv6
  ccc       <not set>       ipv4,ipv6  V11
  
```

:

Field	Description
Name	VRF name.
Default RD	Default RD of the VRF.
Protocol	The address family of the VRF. IPv4 indicates the VRF is enabled in the IPv4 address family mode; ipv6 indicates the VRF is enabled in the IPv6 address family mode.

Interfaces	The interface list of the VRF. The interface where the [ip] vrf forwarding command has been configured will be displayed on that list.
------------	--

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.14 show global-vrf

Use this command to display the VRF configuration (including the single-protocol VRF and the multiple-protocol VRF).

show global-vrf [ipv4 | ipv6 | brief | count | detail] [vrf-name]

Parameter Description	Parameter	Description
	ipv4	Displays the brief VRF (the single-protocol VRF) information of the IPv4 address family.
	ipv6	Displays the VRF brief information of the IPv6 address family.
	brief	Displays the brief VRF (including the single-protocol VRF and the multiple-protocol) information.
	detail	Displays the detailed VRF (including the single-protocol VRF and the multiple-protocol) information.

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays brief information about all VRF.

```
FS#show global-vrf
```

Name	Default RD	Protocol(s)	Interface
@#global-vrf	<not set>	ipv4,ipv6	VLAN 1:

Field	Description
Name	Global VRF name.
Default RD	Default RD of the global VRF.
Protocol	The address family of the global VRF. IPv4 indicates the VRF is enabled in the IPv4 address

	family mode; ipv6 indicates the VRF is enabled in the IPv6 address family mode.
Interfaces	The interface list of the global VRF. The interface where the [ip] vrf forwarding command has been configured will be displayed on that list.

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

11 L3MAC Commands

11.1 I3intf-mac-add

Use this command to add a layer-3 MAC address. Use the **no** form of this command to delete the configured layer-3 MAC address of the device.

I3intf-mac-add mac-id

no I3intf-mac-add mac-id

Parameter Description	Parameter	Description
	mac-id	Indicates the layer-3 MAC address.
Defaults	N/A	
Command Mode	Global configuration mode	
Default Level	14	
Usage Guide	If the destination MAC address of a packet matches the configured layer-3 MAC address, layer-3 routing can be triggered for this packet.	
Configuration Example	The following example adds the layer-3 MAC address 000.1122.3355 to the device.	
	<pre>FS#configure terminal FS(config)#I3intf-mac-add 0000.1122.3355</pre>	
Verification	<ol style="list-style-type: none"> 1. Run the show run command to check whether the current configuration is correct. 2. Run the show I3intf-mac-add command to check whether the current configuration is correct. 	
Prompt	N/A	
Common Errors	N/A	
Platform Description	N/A	

11.2 show I3intf-mac-add

Use this command to display the configured layer-3 MAC address of the device.

show I3intf-mac-add

Parameter Description	Parameter	Description
	N/A	N/A
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Default Level	14	
Usage Guide	N/A	
Configuration Example	The following example displays the configured layer-3 MAC address.	
	<pre>FS(config)#show l3intf-mac-add l3intf mac address: 0000.0001.2235</pre>	
Prompt	N/A	
Platform Description	N/A	

12 Hardware Capacity Query Commands

12.1 show route-res usage slot slot_num

Use this command to display the FIB hardware capacity and resource usage of a specified line card in standalone mode.

show route-res usage slot slot_num

Parameter Description	Parameter	Description
	slot_num	Specifies the ID of the slot in which the line card of the chassis-type device resides, where 0 indicates a box-type device.

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example displays the FIB hardware capacity and resource usage on the NC8400H series products.

```

FS#show route-res usage slot 0
Switch Mode Current:default
Switch Mode Next :default
-----
L3 Software Statistics:
-----
Switch Slot Chip Name Used Description
-----
1 0 0 IPV4_LPM 0 ipv4 route in lpm table
1 0 0 IPV4_HOST 0 ipv4 route in l3_entry table
1 0 0 IPV4_HOSTFULL 0 ipv4 route in l3_entry_double table
1 0 0 IPV6_64_LPM 0 ipv6-64 route in lpm table
1 0 0 IPV6_128_LPM 0 ipv6-65~128 route in lpm table
1 0 0 IPV6_HOST 0 ipv6 route in l3_entry_double
1 0 0 IPV6_HOST_FULL 0 ipv6 route in l3_entry_qual
-----
Switch Slot Chip Name Used Max Description
-----
1 0 0 NEXTHOP 0 49152 nexthop number
1 0 0 ECMP_GROUP 0 4096 ecmp group number
-----
    
```

L3 Forwarding Resources:

Switch	Slot	Chip	Resource	Service	Max	Used[%]	Remain
1	0	0	L3_ENTRY		212992	0[0%]	212992
1	0	0		IPV4_HOST		0	212992
1	0	0		IPV4_HOSTFULL		0	106496
1	0	0		IPV6_HOST		0	106496
1	0	0		IPV6_HOSTFULL		0	53248
1	0	0	L3_DEFIP		6144	0[0%]	6144
1	0	0		IPV4		0	12288
1	0	0		IPV6_64		0	6144
1	0	0	L3_DEFIP_128		1024	0[0%]	1024
1	0	0		IPV6_128		0	1024

The following example displays the FIB hardware capacity and resource usage on the NC8400 series products.

FS#show route-res usage slot 2

Switch Mode Current:default

Switch Mode Next :default

L3 Software Statistics:

Switch	Slot	Chip	Name	Used	Max
1	2	0	IPV4_LPM	4	
1	2	0	IPV4_HOST	4	
1	2	0	ARP_EXT	4	
1	2	0	IPV6_LPM	14	
1	2	0	NEXTHOP	25	131072
1	2	0	ECMP_GROUP	0	4096
1	2	0	ENCAP	8	196608

Verification	N/A
Prompt	N/A
Common Errors	N/A
Platform Description	N/A

12.2 show route-res usage switch switch_num slot slot_num

Use this command to display the FIB hardware capacity and resource usage of a specified line card in VSU mode.

show route-res usage switch switch_num **slot** slot_num

Parameter Description	Parameter	Description
	switch_num	Indicates the device ID of the chassis- or box-type device in VSU mode. In standalone mode, the keyword switch is not displayed.
	slot_num	Specifies the ID of the slot in which the line card of the chassis-type device resides, where 0 indicates a box-type device.

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example displays the FIB hardware capacity and resource usage on the NC8400 series products.

```

FS#show route-res usage switch 1 slot 0
Switch Mode Current:default
Switch Mode Next      :default
-----
L3 Software Statistics:
-----
Switch  Slot  Chip  Name          Used  Description
-----
1       0       0     IPV4_LPM      7     ipv4 route in lpm table
1       0       0     IPV4_HOST     9     ipv4 route in l3_entry table
1       0       0     IPV4_HOSTFULL 3     ipv4 route in l3_entry_double table
    
```

1	0	0	IPV6_64_LPM	8		ipv6-64 route in lpm table
1	0	0	IPV6_128_LPM	0		ipv6-65~128 route in lpm table
1	0	0	IPV6_HOST	9		ipv6 route in l3_entry_double
1	0	0	IPV6_HOST_FULLL	0		ipv6 route in l3_entry_qual

Switch	Slot	Chip	Name	Used	Max	Description
--------	------	------	------	------	-----	-------------

1	0	0	NEXTHOP	33	49152	nexthop number
1	0	0	ECMP_GROUP	1	4096	ecmp group number

L3 Forwarding Resources:

Switch	Slot	Chip	Resource	Service	Max	Used[%]	Remain
1	0	0	L3_ENTRY		212992	33[0%]	212959
1	0	0		IPV4_HOST		9	212959
1	0	0		IPV4_HOSTFULL		3	106479
1	0	0		IPV6_HOST		9	106479
1	0	0		IPV6_HOSTFULL		0	53239
1	0	0	L3_DEFIP		6144	12[0%]	6132
1	0	0		IPV4		7	12264
1	0	0		IPV6_64		8	6132
1	0	0	L3_DEFIP_128		1024	0[0%]	1024
1	0	0		IPV6_128		0	1024

The following example displays the FIB hardware capacity and resource usage on the NC8400 series products.

FS#show route-res usage switch 1 slot 2

Switch Mode Current:default

Switch Mode Next :default

L3 Software Statistics:

Switch	Slot	Chip	Name	Used
1	2	0	IPV4_LPM	0
1	2	0	IPV4_HOST	0
1	2	0	ARP_EXT	0
1	2	0	IPV6_LPM	2

Switch	Slot	Chip	Name	Used	Max
1	2	0	NEXTHOP	2	131072
1	2	0	ECMP_GROUP	0	4096
1	2	0	ENCAP	0	196608

Prompt N/A

Platform Description N/A

12.3 show route-res usage all

Use this command to display the FIB hardware capacity and resource usage of all line cards in standalone or VSU mode.

show route-res usage all

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays the FIB hardware capacity and resource usage on the NC8400 series products.

```

Example
FS#show route-res usage all
Switch Mode Current:default
Switch Mode Next :default
-----
L3 Software Statistics:
-----
Switch Slot Chip Name Used Description
-----
1 0 0 IPV4_LPM 0 ipv4 route in lpm table
1 0 0 IPV4_HOST 0 ipv4 route in l3_entry table
    
```


1	0	0	IPV4_HOSTFULL	0		ipv4 route in l3_entry_double table
1	0	0	IPV6_64_LPM	0		ipv6-64 route in lpm table
1	0	0	IPV6_128_LPM	0		ipv6-65~128 route in lpm table
1	0	0	IPV6_HOST	0		ipv6 route in l3_entry_double
1	0	0	IPV6_HOST_FULL	0		ipv6 route in l3_entry_qual

Switch	Slot	Chip	Name	Used	Max	Description
1	0	0	NEXTHOP	0	49152	nexthop number
1	0	0	ECMP_GROUP	0	4096	ecmp group number

L3 Forwarding Resources:

Switch	Slot	Chip	Resource	Service	Max	Used[%]	Remain
1	0	0	L3_ENTRY		212992	0[0%]	212992
1	0	0		IPV4_HOST		0	212992
1	0	0		IPV4_HOSTFULL		0	106496
1	0	0		IPV6_HOST		0	106496
1	0	0		IPV6_HOSTFULL		0	53248
1	0	0	L3_DEFIP		6144	0[0%]	6144
1	0	0		IPV4		0	12288
1	0	0		IPV6_64		0	6144
1	0	0	L3_DEFIP_128		1024	0[0%]	1024
1	0	0		IPV6_128		0	1024

The following example displays the FIB hardware capacity and resource usage on the NC8400 series products.

```
FS#show route-res usage all
```

```
Switch Mode Current:default
```

```
Switch Mode Next :default
```

L3 Software Statistics:

Switch	Slot	Chip	Name	Used
--------	------	------	------	------

```

-----
1      2      0      IPV4_LPM      4
1      2      0      IPV4_HOST      4
1      2      0      ARP_EXT      4

1      2      0      IPV6_LPM      14
-----

Switch Slot  Chip  Name          Used  Max
-----
1      2      0      NEXTHOP      25   131072
1      2      0      ECMP_GROUP   0    4096
1      2      0      ENCAP        8    196608
-----

FS#
    
```

Prompt N/A

Platform Description N/A

Chapter 5 Multicast Configuration Commands

1. IPv4 Multicast Routing Commands
2. IPv6 Multicast Routing Commands
3. IGMP Commands
4. MLD Commands
5. PIM-DM Commands
6. PIM-SM Commands
7. PIM-SMv6 Commands
8. MSDP Commands
9. IGMP Snooping Commands
10. MLD Snooping Commands

1 IPv4 Multicast Routing Commands

1.1 clear ip mroute

Use this command to remove the forwarding information of the IP multicast routes.

clear ip mroute {* | group-address [source -address]}

Parameter Description

Parameter	Description
*	Removes all the forwarding information in the IP multicast route table.
group-address	Group IP address of IP multicast routes
source-address	Source IP address of multicast routes

Command Mode Privileged EXEC mode

Configuration

The following example removes the entry whose group IP address is 230.0.0.1 from the multicast routing table:

Examples

```
FS# clear ip mroute 230.0.0.1
```

Related Commands

Command	Description
show ip mroute	Displays the forwarding information of multicast routes.

Platform Description N/A

1.2 clear ip mroute statistics

Use this command to remove the statistics of IP multicast routes.

clear ip mroute statistics {* | group-address [source -address]}

Parameter Description

Parameter	Description
*	Removes all the forwarding entries in the multicast route table.
group-address	Group IP address of IP multicast routes
source-address	Source IP address of multicast route

Command Mode Privileged EXEC mode

Usage Guide

This command allows you to clear the statistics information of IP multicast routes.

Configuration

The following example clears the statistics of entry with the group IP address 230.0.0.1 from the multicast routing table.

Examples

```
FS# clear ip mroute statistics 230.0.0.1
```

	Command	Description
Related Commands	show ip mroute	Displays the multicast route forwarding information.
	clear ip mroute	Clears the multicast route forwarding information.

Platform Description N/A

1.3 ip mroute

Use this command to configure static multicast routes.

Use the **no** form of this command to delete the configured routes.

Use the **default** form of this command to restore the default setting.

ip mroute source-address mask { [protocol] { rpf-address | interface-type interface-number } } [distance]

no ip mroute source-address mask [protocol as-number] {rpf-address | interface-type interface-number} [distance]

default ip mroute source-address mask [protocol]

	Parameter	Description
Parameter Description	source-address	Source IP address of the multicast route
	mask	Mask of the source IP address
	protocol	(Optional) The unicast routing protocol being used
	rpf-address	Incoming interface of the multicast route
	interface-type interface-number	Interface type and interface ID
	distance	Management distance used to determine whether to use the route for RPF routing, ranging from 1 to 255.

Defaults The default is 0.

Command Mode Global configuration mode

Usage Guide This command is used to configure the route for the purpose of RFF check. Note that the configured route is prior to the route learned in the unicast form.

Configuration The following example allows the multicast routes of all the sources in a network to pass 172.30.10.13.

Examples

```
FS(config)# ip mroute 172.16.0.0 255.255.0.0
172.30.10.13
```

Platform Description N/A

1.4 ip multicast-routing

Use this command to enable multicast routing forwarding.

Use the **no** form of this command to disable multicast routing forwarding.

Use the **default** form of this command to restore the default setting.

- ip multicast-routing**
- no ip multicast-routing**
- default ip multicast-routing**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command allows you to enable IPv4 multicast routing forwarding. The multicast protocol will not be enabled with IPv4 multicast routing forwarding disabled.

Configuration Examples This command enables multicast routing forwarding.

```
FS(config)# ip multicast-routing
```

Platform Description N/A

1.5 ip multicast boundary

Use this command to configure the boundary of an IP multicast group.

Use the **no** form of this command to remove the configuration.

Use the **default** form of this command to restore the default setting.

- ip multicast boundary** access-list
- no ip multicast boundary** access-list
- default ip multicast boundary** access-list [**in** | **out**]

Parameter Description	Parameter	Description
	access-list	Access list associated with the multicast boundary

Defaults The boundary of a specified IP multicast group is defined by default.

Command Mode Interface configuration mode

Note that the ACL associated with the multicast boundary is either standard ACL or extended ACL. But the extended ACL only match the destination IP address.

Usage Guide

Note:

This command filters IGMP and PIMSM packets of the specified IP address range. Multicast packets will not be received and sent through the interface of the boundary.

Configuration Examples

The following example configures svi1 as the boundary of all IP multicast groups.

```
FS(config)# ip access-list mul-boun
FS(config-std-nacl)# permit ip 233.3.3.0 0.0.0.255
FS(config-std-nacl)#exit
FS(config)# interface vlan 1
FS(config-if)# ip multicast boundary mul-boun
```

1.6 ip multicast route-limit

Use this command to limit the number of the entries that can be added to the multicast routing table.

Use the **no** form of this command to remove the configuration.

Use the **default** form of this command to restore the default setting.

ip multicast route-limit limit [threshold]

no ip multicast route-limit

default ip multicast route-limit

Parameter Description

Parameter	Description
limit	The number of the entries that can be added to the multicast routing table is 1 to 2147483647.
threshold	(Optional) Number of multicast routes at which alarms will be triggered.

Defaults

The default value of limit is 1024.

The default value of threshold is 2147483647.

Command Mode

Global configuration mode

Usage Guide

This command is used to restrict the number of route adding to the IPv6 multicast table.

Note that the hardware resources of different devices are limited. The routes exceeding the hardware resource will be forwarded by software, which leads to lower product performance.

If you want to use the PIM protocol to create more than 128 entries in the multicast routing table, you are advised to set the CPP value of PIM packets to the number of entries in the multicast routing table. If you want to use the IGMP protocol to create more than 1000 entries in the multicast routing table, you are advised to set the CPP value of IGMP packets to the number of entries in the multicast routing table.

Configuration

The following example sets the route limit to 500.

Examples

```
FS(config)# ip multicast route-limit 500
```

Platform Description N/A

1.7 ip multicast rpf longest-match

Select the multicast static routing, MBGP routing and unicast routing that could be used for the RPF check from the multicast static routing table, MBGP routing table and unicast routing table respectively by following the RPF rules.

Use this command to select the one with the mask longest-matched from the three routings. If the routings are in the same priority, select the routing in order of multicast static routing, MBGP routing, unicast routing.

Use the **no** or **default** form of this command to restore it to the default setting. By default, select one routing of the highest priority from the three routings. If the routings are in the same priority, select the routing in order of multicast static routing, MBGP routing, unicast routing.

ip multicast rpf longest-match

no ip multicast rpf longest-match

default ip multicast rpf longest-match

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Select the multicast static routing, MBGP routing and unicast routing that are used for the RPF check from the multicast static routing table, MBGP routing table and unicast routing table respectively by following the RPF rules. Then select one routing of the highest priority from the three routings. If the routings are in the same priority, select the routing in order of multicast static routing, MBGP routing, unicast routing.

Command Mode Global configuration mode

Configuration The following example configures to select the routing with the longest-match.

Examples FS(config)# ip multicast rpf longest-match

Platform

Description N/A

1.8 ip multicast static

Use this command to enable flow control for multicast packets on the Layer 2 interface.

Use the **no** form of this command to remove the configuration.

Use the **default** form of this command to restore the default setting. **ip multicast static** source-address group-address interface-type interface-number

no ip multicast static source-address group-address interface-type interface-number

default ip multicast static source-address group-address interface-type interface-number

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

source-address	Source IP address
group-address	IP address of the multicast group
interface-type interface number	Layer 2 interface on which multicast packets are allowed to forward

Defaults This function is disabled by default

Command Mode Global configuration mode

Usage Guide You can configure more than one command (or more than one interface) for a multicast flow. With flow control enabled, the multicast flow can only be forwarded through these configured interfaces. This command controls the forwarding of multicast flows on an interface without any direct influence on the packet processing of multicast protocols. However, the action of a multicast protocol (for instance, PIM-DM or PIM-SM) may be affected because some features of the multicast protocol are driven by multicast flows.

Configuration The following example configures forwarding multicast flows (192.168.43.4 and 255.1.1.5) through GigabitEthernet 2/6 and FastEthernet 3/2.

Examples

```
FS(config)# ip multicast static 192.168.43.4 225.1.1.5 G2/6
FS(config)# ip multicast static 192.168.43.4 225.1.1.5 F3/2
```

Platform Description N/A

1.9 ip multicast ttl-threshold

Use this command to configure TTL (time-to-live) threshold on the interface.

Use the **no** or **default** form of this command to restore the default setting.

ip multicast ttl-threshold ttl-value

no ip multicast ttl-threshold

default ip multicast ttl-threshold

Parameter Description	Parameter	Description
	ttl-value	TTL threshold on the interface, within the range of 0 to 255.

Defaults The default ttl-value is 0.

Command Mode Interface configuration mode

Usage Guide Use **show running-config** to display configuration. A device with multicast enabled can maintain one TTL threshold for every interface. If the TTL of the multicast packet received is greater than the threshold of the interface, the packets will be forwarded. Otherwise, the packet is discarded. Note that the TTL threshold is effective only to the multicast frames. In addition, you must configure it on the L3 interface.

Configuration The following example sets the TTL threshold on the interface to 5.

Examples

```
FS(config-if)# ip multicast ttl-threshold 5
```

1.10 msf ipmc-overflow override

Use this command to enable the overflow overriding mechanism.
 Use the **no** form of this command to remove the configuration.
 Use the **default** form of this command to restore the default setting.

- msf ipmc-overflow override**
- no msf ipmc-overflow override**
- default msf ipmc-overflow override**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example enables the overflow overriding mechanism.

Examples

```
FS (config)# msf ipmc-overflow override
FS (config)#
```

Platform Description N/A

1.11 msf nsf

Use this command to configure the parameter for the continuous multicast forwarding.
 Use the **no** or **default** form of this command to restore the default setting.

- msf nsf { convergence-time time | leak interval }**
- no msf nsf {convergence-time | leak}**
- default msf nsf {convergence-time | leak}**

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

convergence-time time	Maximum time for the multicast protocol convergence, in the valid range of the 0-3600s.
leak interval	Packet multicast leak time, in the valid range of 0-3600s

Defaults **convergence-time** time :20s
leak interval: 30s

Command Mode Global configuration mode

Usage Guide N/A

The following example sets the maximum time for the protocol convergence.

```
FS (config)# msf nsf convergence-time 300
FS (config)#
```

Configuration

Examples

The following example sets the packets leak time:

```
FS(config)# msf nsf leak 200
FS(config)#
```

Platform Description N/A

1.12 show ip mrf mfc

Use this command to display the IPv4 multicast routing forwarding table.

show ip mrf mfc [source-address group-address]

	Parameter	Description
Parameter Description	source-address	Source address of the multicast routing forwarding entries
	group-address	Group address of the multicast routing forwarding entries

Defaults All IPv4 multicast routing forwarding entries are displayed by default.

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

The three parameters in this command are optional, wherein the source address and group address must be specified at the same time.

Usage Guide

- If no source address and group address are specified, all mfc entries are displayed.
- When the source address and group address are specified only, the entries corresponding to the source and group addresses are displayed.

The following example shows all IPv4 layer-3 multicast routing forwarding entries with source address 20.0.1.30.

```
FS#show ip mrf mfc 20.0.1.30 233.3.3.3
Multicast Routing and Forwarding Cache Table
(20.0.1.30, 233.3.3.3)
  FAST_SW, SWITCHED, MIN_MTU: 1500, MIN_MTU_IFINDEX: 4099, WRONG IF: 0
  Incoming interface: VLAN 1[4097]
  Outgoing interface list:
```

VLAN 3 (1)

The fields in the execution of the **show ip mrf mfc** command are described in the following table.

Configuration Examples

Field	Description
20.0.1.30	Source address of the entry.
233.3.3.3	Group address of the entry.
FAST_SW	The Flag shows whether to allow the fast forwarding or not. If the non-Ethernet interface, ppp, hdlc and frame relay exist, no fast forwarding entry generates.
SWITCHED	Indicate whether the entry configuration on the next layer forwarding table has done not not.
MIN_MTU MTU	The minimum MTU of the entry.
MIN_MTU_IFINDEX	The interface index with the minimum MTU value.
WRONG IF	The statistics number of the multicast data packets received on the wrong incoming interface.
Incoming interface	Incoming interface of the entry.
VLAN 3 (1)	The layer-3 outgoing interface of the entry is VLAN3. 1 for the ttl threshold of this layer-3 interface.

Platform

Description N/A

1.13 show ip mroute

Use this command to display the multicast forwarding table.

show ip mroute [group-or-source-address [group-or-source-address]] [**dense** | **sparse**] [**summary** | **count**]

Parameter Description

Parameter	Description
group-address	Multicast group IP address
group-or-source-address	Multicast or source IP address
group-or-source-address	Multicast or source IP address. The two addresses must not be the multicast addresses or source addresses at the same time.

dense	Displays PIM-DM multicast routing table.
sparse	Displays PIM-SM multicast routing table.
summary	Displays the summary of the multicast routing table.
count	Displays the count of the multicast routing table.

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

The following example displays the information of the multicast routing table:

```
FS# show ip mroute
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:00:31, stat expires 00:02:59
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
FastEthernet 1/3
```

The following example displays the information of a specific entry:

```
FS# show ip mroute 10.10.1.52 224.0.1.3
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:03:24, stat expires 00:01:28
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
FastEthernet 1/3
```

Configuration Examples

The following example displays the count of the routing table:

```
FS# show ip mroute count
IP Multicast Statistics
Total 1 routes using 132 bytes memory
Route limit/Route threshold: 2147483647/2147483647
Total NOCACHE/WRONGVIF/WHOLEPKT rcv from fwd: 1/0/0
Total NOCACHE/WRONGVIF/WHOLEPKT sent to clients: 1/0/0
Immediate/Timed stat updates sent to clients: 0/0
Reg ACK rcv/Reg NACK rcv/Reg pkt sent: 0/0/0
Next stats poll: 00:01:10
Forwarding Counts: Pkt count/Byte count, Other Counts: Wrong If pkts
```

```
Fwd msg counts: WRONGVIF/WHOLEPKT rcv
Client msg counts: WRONGVIF/WHOLEPKT/Imm Stat/Timed Stat sent
Reg pkt counts: Reg ACK rcv/Reg NACK rcv/Reg pkt sent
(10.10.1.52, 224.0.1.3), Forwarding: 2/19456, Other: 0
Fwd msg: 0/0, Client msg: 0/0/0/0, Reg: 0/0/0
```

The following example displays the summary of the routing table:

```
FS# show ip mroute summary
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), 00:01:32/00:03:20, PIM-SM, Flags: T
```

Field	Description
Flags	I-Immediate statistic T-Timed statistic F-Already set to the forwarding table
Timers:Uptime/Stat Expiry	Time when the entry is created. Time when it is aged.
Interface State	Interface state.
Owner	Owner of the entry, which may be a multicast routing protocol
Incoming interface	Expected packet incoming interface. If the actual incoming interface does not match it, the packets will be discarded.
Outgoing interface list	Outgoing interface list; the packets will be forwarded on the interfaces in the list.
Forwarding Counts: Pkt count/Byte count,	Forwarding count: packet count/byte count forwarded by the entry
Other Counts: Wrong If pkts	Count of the packets received from the wrong incoming interface.

Related Commands

Command	Description
ip multicast-routing	Enables the multicast routing forwarding.
ip pim dense-mode	Enables the PIM-DM on the interface.
ip pim sparse-mode	Enables the PIM-SM on the interface.

Platform Description

N/A

1.14 show ip mroute static

Use this command to display the IPv4 static multicast routing information.

show ip mroute static

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

Usage Guide Use this command to show the user-configured static multicast routing. In the same conditions, the priority of the static multicast routing is higher than the dynamically learned.

Configuration Examples The following example displays the information of the user-configured static multicast routing:

```
FS#show ip mroute static
Mroute: 172.16.0.0, RPF neighbor: 172.30.10.13
Protocol: , distance: 0
```

Platform Description N/A

1.15 show ip mvif

Use this command to show the basic information of the multicast interface.

show ip mvif { interface-type interface-number }

Parameter Description	Parameter	Description
	interface-type interface-number	Interface Type and number

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

Configuration Examples The following example shows the basic information of the multicast interface of svil.

```
FS#show ip mvif vlan 1
Interface Vif Owner TTL Local Remote Uptime
Idx Module Address Address
VLAN 1 1 PIM-DM 2 192.168.1.1 0.0.0.0 00:13:16
```

Platform Description N/A

1.16 show ip rpf

Use this command to display the RPF information of the specified source IP address.

show ip rpf {source-address [group-address] [rd route-distinguisher]} [**metric**]

	Parameter	Description
Parameter Description	source-address	Specified source IP address
	group-address	Specified source IP address
	rd route-distinguisher	Uses the RD proxy for the searching.
	metric	Displays the metric of the MDT-SAFI route.

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

The following example displays the information of the RPF to 192.168.1.54:

```

FS# show ip rpf 192.168.1.54
RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
Distance: 0
Metric: 0
RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
Distance: 0
Metric: 0
    
```

Configuration
Examples

Platform Description N/A

1.17 show msf msc

Use this command to display IPv4 multi-layer multicast forwarding table.

show msf msc [source-address] [group-address] [vlan-id]

	Parameter	Description
Parameter Description	source-address	Specified source IP address of the multi-layer multicast forwarding table.
	group-address	Specified group address of the multi-layer multicast forwarding table.

vlan-id	The VLAN ID where the incoming interface of the multi-layer multicast forwarding table is. 4096 indicates a routed port.
---------	--

Defaults All IPv4 multi-layer multicast forwarding entries are displayed by default.

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

The three parameters in this command are optional.

If no source address and group address are specified, all mfc entries are displayed.

- If only the source address is specified as s1, all msc entries with source address 1 are displayed.
- If the source address is specified as s1 and the group address as g1, all corresponding msc entries are displayed.
- If the source address is specified as s1, the group address as g1 and the vlan id as v1, all corresponding msc entries are displayed.
- Each parameter shall be input in order. Only when the parameter in front has been configured, the following one could be set.

Usage Guide

The following example displays the IPv4 layer-3 multicast forwarding entries with source IP address 192.168.195.25:

```
FS# show msf msc 192.168.195.25
Multicast Switching Cache Table
(192.168.195.23, 233.3.3.3, 1), SYNC, MTU:0, 1 OIFs
VLAN 1(0): 1 OPORTs, REQ: DONE
OPORT 6, IGMP-SNP, REQ: DONE
```

The fields in the execution of the **show mrf mfc** command are described in the following table.

Configuration Examples

Field	Description
192.168.195.23	Source address of the entry.
233.3.3.3	Group address of the entry.
1	Vlan id where the incoming interface of the entry is.
SYNC	The entry has been synchronized to the hardware.
MTU	MTU value
OIFs	Layer-3 outgoing interface number.
VLAN1(0)	The vlan where the layer-3 outgoing interface oif is.
1 OPORTs	The number of layer-2 port in the layer-3 outgoing oif.
REQ: DONE	This oif configuration on the hardware has done.
OPORT 6	The layer-2 port in the oif with index 6.

IGMP-SNP	This port is created by the IGMP SNOOPING protocol. This value can also be the PIM-SNP, which means this port is created by the PIM SNOOPING protocol. And the ROUTER means this port is created by the layer-3 protocol.
REQ: DONE	The port configuration on the hardware has done.

Platform

Description N/A

1.18 show msf nsf

Use this command to display the configuration of continuous multicast forwarding.

show msf nsf

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Global configuration mode/Interface configuration mode/Privileged EXEC mode

The following example displays the configuration of continuous multicast forwarding.

Configuration Examples

```

FS# show msf nsf
Multicast HA Parameters
-----+-----+
protocol convergence timeout 120 secs
flow leak interval 20 secs
FS#
    
```

Related Commands	Command	Description
	msf nsf	Configures the multicast NSF parameter.

Platform Description N/A

2 IPv6 Multicast Routing Commands

2.1 clear ipv6 mroute

Use this command to remove the specific or all IPv6 multicast forwarding entries.

clear ipv6 mroute { * | v6group-address [v6source -address]}

Parameter	Description
*	Removes all the forwarding information in the IPv6 multicast route table.
v6group-address	Group IPv6 address of IPv6 multicast routes.
v6source-address	Source IPv6 address of multicast routess.

Command Mode Privileged EXEC mode

Configuration Examples The following example removes all the multicast routing entries.

```
FS# clear ip mroute *
```

Command	Description
show ipv6 mroute	N/A
clear ipv6 mroute statistics	N/A

2.2 clear ipv6 mroute statistics

Use this command to remove the statistics of IPv6 multicast routes.

clear ipv6 mroute statistics { * | v6group-address [v6source -address]}

Parameter	Description
*	Removes all the forwarding entries in the multicast route table.
v6group-address	Group IPv6 address of IPv6 multicast routes
v6source-address	Source IPv6 address of multicast route

Command Mode Privileged EXEC mode

Usage Guide This command allows you to clear the statistics information of IPv6 multicast routes.

Configuration Examples The following example clears all the statistical information of the multicast routing entries.

```
FS# clear ip mroute statistics *
```

Command	Description
show ipv6 mroute	Displays the multicast route forwarding information.
clear ipv6 mroute	Clears the multicast route forwarding information.

2.3 ipv6 mroute

Use this command to configure static IPv6 multicast routes. Use the **no** form of this command to restore the default setting.

ipv6 mroute ipv6-prefix/prefix-length [protocol as-number] {v6rpf-address | interface-type interface-number} [distance]

no ipv6 mroute ipv6-prefix/prefix-length [protocol as-number] {v6rpf-address | interface-type interface-number} [distance]

Parameter	Description
ipv6-prefix/prefix-length	Source IPv6 address of the multicast route.
mask	Mask of the source IPv6 address.
protocol	(Optional) The unicast routing protocol being used.
v6rpf-address	Incoming interface of the multicast route
interface-type	Interface type and interface ID.
interface-number	
distance	Management distance used to determine whether to use the route for RPF routing, ranging from 1 to 255. The default value is 0.

Defaults The static IPv6 multicast routing is not configured by default.

Command Mode Global configuration mode.

This command is used to configure the route for the purpose of RFF check. Note that the configured route is prior to the route learned in the unicast form.

If the outgoing direction of static multicast route but not the next-hop IP shall be specified, the outgoing direction must be of the point-to-point type.

Usage Guide

The RPF rule is that when a best multicast route from the multicast list is selected, if the BGP multicast route and the static multicast route coexist, the latter one takes the precedence; select a best unicast route from the unicast list and compare the mask length of the best multicast and unicast routes, the one with greater mask length becomes the RPF route; if both mask length are the same, you shall compare the distance, and the one with smaller distance becomes the RPF route; if both distance values are the same, the multicast route becomes the RPF route.

Configuration The following example allows the static multicast route 2233::/64 to pass 3333::3333:

Examples FS(config)# ipv6 mroute 2233::/64 3333::3333

2.4 ipv6 multicast boundary

Use this command to configure the boundary of an IPv6 multicast group. Use the **no** form of this command to restore the default setting.

ipv6 multicast boundary access-list-name

no ipv6 multicast boundary access-list-name

Parameter	Parameter	Description
Description	access-list-name	Access list associated with the multicast boundary.

Defaults The boundary of a specified IPv6 multicast group is not defined by default.

Command Mode Interface configuration mode

Note that the ACL associated with the multicast boundary is either standard ACL or extended ACL. But the extended ACL only match the destination IPv6 address.

Usage Guide

This command filters MLD, PIM-SMv6 packets of the specified IPv6 address range. Multicast packets will not be received and sent through the interface of the boundary.

The following example configures svi1 as the boundary of all IPv6 multicast groups.

Configuration

```
FS(config)# ip access-list mul-boun
FS(config-std-nacl)# permit ip 233.3.3.0 0.0.0.255
Examples FS(config-std-nacl)#exit
FS(config)# interface vlan 1
FS(config-if)# ip multicast boundary mul-boun
```

2.5 ipv6 multicast route-limit

Use this command to limit the number of the entries that can be added to the IPv6 multicast routing table.

Use the **no** form of this command to restore the default setting.

ipv6 multicast route-limit limit [threshold]

no ipv6 multicast route-limit limit [threshold]

Parameter	Description
limit	The number of the entries that can be added to the IPv6 multicast routing table is 1 to 65,536.
threshold	(Optional) Number of IPv6 multicast routes at which alarms will be triggered.

Parameter Description

Defaults The default value of limit is 1,024.
The default value of threshold is 65,536.

Command Mode Global configuration mode

This command is used to restrict the number of route adding to the IPv6 multicast table.

The hardware resources of different devices are limited. The routes exceeding the hardware resource will be forwarded by software, which leads to lower product performance.

Usage Guide

Packets that exceed this value will be discarded.. If you want to use the PIM protocol to create more than 128 entries in the multicast routing table, you are advised to set the CPP value of PIM packets to the number of entries in the multicast routing table. If you want to use the IGMP protocol to create more than 1000 entries in the multicast routing table, you are advised to set the CPP value of IGMP packets to the number of entries in the multicast routing table.

Configuration The following example sets the route limit to 500 and the warning value 90.

Examples FS(config)# ipv6 multicast route-limit 500 90

2.6 ipv6 multicast-routing

Use this command to enable the IPv6 multicast routing forwarding.

Use the **no** form of this command to restore the default setting.

ipv6 multicast-routing

no ipv6 multicast-routing


Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default

Command Mode Global configuration mode

Use this command to enable the IPv6 multicast routing forwarding. With this function disabled, the multicast protocol cannot be enabled.

Usage Guide

 This command must be configured to enable the IPv6 multicast routing forwarding. This function conflicts with IGMP Snooping.

Configuration The following example enables the IPv6 multicast routing forwarding.

Examples FS(config)# ipv6 multicast-routing

2.7 ipv6 multicast rpf longest-match

Use the RPF rule to select the static multicast route, MBGP route and the unicast route for the purpose of RPF check from the static multicast route list, the MBGP route list and the unicast route list.

Use this command to select one route with the longest-matched mask from the above-mentioned three routes. If the priority values of all three routes are the same, the routes will be selected in order of static multicast route, MBGP route and unicast route.

Use the **no** form of this command to restore the default setting.

ipv6 multicast rpf longest-match

no ipv6 multicast rpf longest-match

Parameter	Parameter	Description
Description	N/A	N/A

Use the RPF rule to select the static multicast route, MBGP route and the unicast route for the purpose of RPF check from the static multicast route list, the MBGP route list and the unicast route list.

Defaults Use this command to select one route, which is prior to the other two routes, with the longest-matched mask from the above-mentioned three routes. If the priority values of all three routes are the same, the routes will be selected in order of static multicast route, MBGP route and unicast route.

Command

Mode Global configuration mode

Usage Guide N/A.

Configuration The following example selects one route with the longest-matched mask from the above-mentioned three routes.

Examples `FS(config)# ipv6 multicast rpf longest-match`

2.8 ipv6 multicast static

Use this command to enable flow control for multicast packets on the Layer 2 interface. Use the **no** form of this command to restore the default setting.

ipv6 multicast static source-address group-address interface-type interface-number

no ipv6 multicast static source-address group-address interface-type interface-number

	Parameter	Description
Parameter Description	source-address	Source IPv6 address
	group-address	IPv6 address of the multicast group
	interface-type interface number	Layer 2 interface on which multicast packets are allowed to forward

Defaults This function is disabled by default.

Command Mode Global configuration mode

You can configure more than one command (or more than one interface) for a multicast flow. With flow control enabled, the multicast flow can only be forwarded through these configured interfaces.

Usage Guide This command controls the forwarding of multicast flows on an interface without any direct influence on the packet processing of multicast protocols. However, the action of a multicast protocol (for instance, PIM-SMv6) may be affected because some features of the multicast protocol are driven by multicast flows.

The following example configures forwarding multicast flows (2222::3333, ff66::100) through GigabitEthernet 2/6 and FastEthernet 3/2.

Configuration Examples `FS(config)# ipv6 multicast static 2222::3333 ff66::100 G2/6`
`FS(config)# ipv6 multicast static 2222::3333 ff66::100 F3/2`

2.9 msf6 nsf

Use this command to configure parameters for multicast non-stop forwarding.

Use the **no** form of this command to restore the default setting.

msf6 nsf { **convergence-time** time | **leak** interval }

no msf6 nsf { **convergence-time** | **leak** }

Parameter	Parameter	Description
Description	convergence-time time	Maximum duration for which the system waits for multicast protocol convergence. The unit is second. The value ranges from 0 to 3600.
	leak interval	Interval at which multicast packets are leaked. The unit is second. The value ranges from 0 to 3600.

Defaults The default convergence-time is 20 and leak interval is 30.

Command Global configuration mode

Mode

Usage Guide N/A

Configuration The following example sets the maximum duration for which the system waits for multicast protocol convergence:

Examples FS (config)# msf6 nsf convergence-time 300

The following example sets the interval at which multicast packets are leaked.

FS(config)# msf6 nsf leak 200

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

2.10 show ipv6 mroute

Use this command to display the IPv6 multicast forwarding table.

show ipv6 mroute [group-or-source-address [group-or-source-address]] [**dense** | **sparse**] [**summary** | **count**]

Parameter	Parameter	Description
Description	v6group-address	Multicat group IPv6 address
	v6source-address	Multicast source IPv6 address
	summary	Displays the summary of the multicast routing table.
	count	Displays the count of the multicast routing table.

Command Privileged EXEC mode

Mode

The following example displays all information of the IPv6 multicast routing table:

```
FS# show ipv6 mroute
IPv6 Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(2222::1234, ff56::1234), uptime 00:00:31, stat expires 00:02:59
Owner PIM-SMv6, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
FastEthernet 1/3
```

The following example displays the count of the routing table:

```
FS# show ipv6 mroute count
IPv6 Multicast Statistics
Total 1 routes using 168 bytes memory
Route limit/Route threshold: 1024/2147483647
Total NOCACHE/WRONGVIF/WHOLEPKT rcv from fwd: 77/147/0
Total NOCACHE/WRONGVIF/WHOLEPKT sent to clients: 77/147/0
Immediate/Timed stat updates sent to clients: 0/29
Reg ACK rcv/Reg NACK rcv/Reg pkt sent: 0/0/0
Next stats poll: 00:00:09
Forwarding Counts: Pkt count/Byte count, Other Counts: Wrong If pkts
Fwd msg counts: WRONGVIF/WHOLEPKT rcv
Client msg counts: WRONGVIF/WHOLEPKT/Imm Stat/Timed Stat sent
Reg pkt counts: Reg ACK rcv/Reg NACK rcv/Reg pkt sent
(2222::1234, ff56::1234), Forwarding: 1/0, Other: 0
Fwd msg: 0/0, Client msg: 0/0/0/0, Reg: 0/0/0
```

Configuration

Examples

The following example displays the summary of the routing table:

```
FS# show ipv6 mroute summary
IPv6 Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(2222::1234, ff56::1234), 00:00:28/00:03:25, PIM-SMv6, Flags: TF
```

2.11 show ipv6 mroute static

Use this command to display the static IPv6 multicast routing information.

show ipv6 mroute static

Parameter	Parameter	Description
-----------	-----------	-------------

Description	N/A	N/A
--------------------	-----	-----

Command

Mode Privileged EXEC mode

Usage Guide

This command is used to display the statically-configured multicast route. Under the same condition, the static multicast route is prior to the unicast route.

The following example displays the static IPv6 multicast routing information.

```

Configuration FS#show ipv6 mroute static
Examples      Mroute: 2233::/64, RPF neighbor: 3333::3333
                Protocol: , distance: 0
    
```

2.12 show ipv6 mvif

Use this command to display the basic information of the multicast interface.

show ipv6 mvif { interface-type interface-number }

Parameter	Parameter	Description
Description	interface-type interface-number	Interface Type and number

Command

Mode Privileged EXEC mode

The following example displays the basic information of the multicast interface of svil.

```

Configuration FS#show ipv6 mvif
Examples      Interface  Mif Owner    Uptime
                Idx Module
                Register  0      03d03h09m
                VLAN 1    1 PIMSMV6  03d03h09m
    
```

2.13 show ipv6 rpf

Use this command to display the RPF information of the specified source IPv6 address.

show ipv6 rpf {v6source-address}

Parameter	Parameter	Description
Description	v6source-address	Specified source IPv6 address

Command

Mode Privileged EXEC mode

Configuration The following example displays the information of the RPF to 2222::3333:

```

Examples
FS# show ipv6 rpf 2222::3333
RPF interface: GigabitEthernet 0/1
RPF neighbor: ::
RPF route: 2222::/64
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
Distance: 0
Metric: 0
    
```

2.14 show ipv6 mrf6 mfc

Use this command to display the IPv6 multicast forwarding table.

show ipv6 mrf6 mfc [v6soure-address v6group-address]

Parameter	Parameter	Description
Description	v6group-address	IPv6 address of a multicast group.
	v6source-address	IPv6 address of a multicast source.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the entries of the multicast data stream forwarding table. The forwarding table displayed in the command output is basically consistent with the multicast routing forwarding table displayed in the command output of **show ipv6 mroute**. The difference is that in the multicast data stream forwarding table, the protocols based on which entries are generated are not recorded.

The two parameters are optional. The source address and group address must be specified together.

If the two parameters are not specified, all mrf table entries will be displayed.

If the two parameters are specified, the mrf entries of the specified source address and group address are displayed.

Configuration Examples The following example displays the layer-3 multicast forwarding table entries of IPv6 (the source address is 2000::1 and the group address is FF55::1).

```

FS#show ipv6 mrf6 mfc 2000::1 FF55::1
Multicast Routing and Forwarding Cache6 Table
(2000::1, FF55::1)
FAST_SW, SWITCHED, MIN_MTU: 1500, MIN_MTU_IFINDEX: 4099, WRONG IF: 0
Incoming interface: VLAN 1[4097]
Outgoing interface list:
VLAN 3 (1)
    
```

Field	Description
2000::1	Source address of entries.
FF55::1	Group address of entries.
FAST_SW	Indicates whether the entries allow fast forwarding, that is, whether the entries can be forwarded by using hardware or software forwarding. If the entries include an interface that does not support the multicast function (for example, the GRE tunnel interface), fast forwarding is not allowed.
SWTCHED	Indicates whether the entries have been placed in the forwarding table on the next layer.
MIN_MTU MTU	Minimum MTU value of entries.
MIN_MTU_IFINDEX	Index of the interface that has the minimum MTU value.
WRONG IF	Number of multicast packets sent from the wrong inbound interface.
VLAN 1[4097]	Indicates that the rpf inbound interface is VLAN1. 4097 indicates the IFINDEX of the interface.
VLAN 3 (1)	Indicates that the layer-3 outbound interface of the entries is VLAN 3. 1 indicates the ttl threshold of the layer-3 interface.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.15 show msf6 msc

Use this command to display entries of the IPv6 routing multicast data stream exchange table.

show msf6 msc [v6source-address] [v6group-address] [vlan-id]

Parameter Description	Parameter	Description
	v6group-address	IPv6 address of a multicast group.
	v6source-address	IPv6 address of a multicast source.
	vlan-id	VLAN ID of the inbound interface of the entries. If the value is greater than 4096, the interface is a routing interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display entries of the IPv6 routing multicast data stream exchange table. The three parameters are all optional. If only the source address is specified and set to s1, msc entries of this source address will be displayed. If the source address is set to s1 and the group address is set to g1, msc entries of this source address and group address will be displayed. If the source address is set to s1, the group address is set to g1, and the VLAN ID is set to v1, then msc entries that meet these three conditions will be displayed.

You must specify these three parameters in sequence. That is, you must specify the current parameter before specifying the next.

Configuration The following example displays entries of the IPv6 routing multicast data exchange table of source address 2000::1:

```

Examples
FS# show msf6 msc 2000::1
Multicast Switching Cache Table
(2000::1, FF55::1, 1), SYNC, MTU:0, 1 OIFs
  VLAN 4094(8190): 1 OPORTs, REQ: DONE
  OPORT 6, MLD-SNP, REQ: DONE
    
```

Field	Description
2000::1	Source address of entries.
FF55::1	Group address of entries.
1	VLAN ID of the inbound interface of the entries.
SYNC	Indicates that the entries have been synchronized to the bottom-layer hardware.
MTU	MTU value of the entries.
OIFs	Number of layer-3 interfaces of the entries.
VLAN 4094(8190)	Indicates a layer-3 outbound interface VLAN xxx (yyy). If the layer-3 interface is an SVI interface, the value of xxx is the VLAN vid of the SVI, and the value of yyy is the VLAN vid+4096. If the layer-3 interface is a routing interface, the value of xxx is the IFINDEX of the interface+4096, and the value of yyy is the IFINDEX. This facilitates the index management of all layer-3 interfaces.
1 OPORTs	Number of layer-2 interfaces owned by this layer-3 exit oif.
REQ: DONE	Indicates that the oif has been set to the bottom-layer hardware. The value may be: Waiting to be added. Usually it is waiting for a data stream to be triggered. DEL: Being deleted. DONE: Synchronized to the hardware.
OPORT 6	Indicates that the oif has a layer-2 interface with the interface number of 6.
MLD-SNP	Indicates that the interface is created based on MLD SNOOPING. Alternatively, the value may be one of the following options: ROUTER: Indicates that the interface is created based on the layer-3 protocol. INHERIT_FM_MLD_SNP: Indicates that the interface is created based on the MLD SNOOPING protocol inherited from other entries.
REQ: DONE	Indicates that the interface has been set to the bottom-layer hardware. The value may be: ADD: Waiting to be added. Usually it is waiting for a data stream to be triggered. DEL: Being deleted. DONE: Synchronized to the hardware.

Related Commands

Command	Description
N/A	N/A

Platform This command is supported on only switches.

Description

2.16 show msf6 nsf

Use this command to display the multicast non-stop forwarding configuration.

show msf6 nsf

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the multicast non-stop forwarding configuration.

Examples

```
FS# show msf6 nsf
Multicast HA Parameters
-----+-----+
protocol convergence timeout    120 secs
flow leak interval              20 secs
```

Related Commands	Command	Description
	msf6 nsf	Multicast non-stop forwarding.

Platform Description This command is supported on only switches.

3 IGMP Commands

3.1 clear ip igmp group

Use this command to clear dynamic group member information obtained from the response messages in the IGMP buffer.

clear ip igmp group [group-address [interface-type interface-number]]

Parameter Description	Parameter	Description
	group-address	32-bit multicast group IP address, namely Category D address. 8 bits are in one group in decimal form. Groups are separated with dots.
	interface-type	Interface type
	interface-number	Interface number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The IGMP buffer includes a list that contains the multicast groups that the hosts in the direct subnet join. If the device joins a group, this group will be included in this list. To delete all the entries from the IGMP buffer, use the **clear ip igmp group** command without parameters.

Configuration Examples The following example clears all group entries.

```
FS# clear ip igmp group
```

Related Commands	Command	Description
	show ip igmp groups	N/A
	show ip igmp interface	N/A

Platform N/A

Description

3.2 clear ip igmp interface

Use this command to clear the IGMP entry for the interface.

clear ip igmp interface interface-type interface-number

Parameter Description	Parameter	Description
	interface-type	Interface type
	interface-number	Interface number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to clear the information on the interface that is generated when IGMP is configured.

Configuration Examples The following example clears the IGMP entry for the interface.

```
FS# clear ip igmp interface gigabitEthernet 4/1
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

3.3 ip igmp access-group

Use this command to control a multicast group on the interface.
 Use the **no** or **default** form of this command to restore the default setting.

ip igmp access-group access-list

no ip igmp access-group

default ip igmp access-group


Parameter Description

Parameter	Description
access-list	Name of access control list in the range from 1 to 199, 1300 to 2699, or characters.

Defaults This command is disabled by default.

Command Mode Interface configuration mode

Usage Guide You can add several multicast groups into the specific interfaces of the host in a subnet. These multicast groups can be controlled using **ip igmp access-group**.

 With the IGMPv3 enabled, when the multicast group accesses the control command, the extended ACL is associated. If the IGMP report information received is (S1,S2,S3...Sn,G), the corresponding ACL will be used by this command to the (0, G) for the matching check. In order to use this command normally, the (0,G) must be configured explicitly for the extended ACL so as to implement the normal filtering of (S1, S2, S3...Sn,G).

Configuration The following example adds the interface Ethernet 0/1 to the group 225.2.2.2 .

Examples

```
FS# configure terminal
FS(config)# access-list 1 permit 225.2.2.2 0.0.0.0
FS(config)# interface ethernet 0/1
FS(config-if)# ip igmp access-group 1
```

The following example associates the group control list with the extended ACL on the interface Eth 0/1 which only processes the igmp protocol packets with source address 1.1.1.1 and group address 233.3.3.3.

```
FS# configure terminal
FS(config)# ip access-list extended ext_acl
FS(config-ext-nacl)# permit ip host 1.1.1.1 host 233.3.3.3
FS(config)# interface ethernet 0/1
FS(config-if)# ip igmp access-group ext_acl
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

3.4 ip igmp immediate-leave group-list

In the IGMPversion2 and IGMPversion3 versions, use this command to shorten the delay of leaving a group. This command is used when a single receiving host is connected to a single interface.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp immediate-leave group-list access-list

no ip igmp immediate-leave

default ip igmp immediate-leave

Parameter

Description

Parameter	Description
access-list	Name of access control list

Defaults

This function is disabled by default.

Command

Mode

Interface configuration mode

Usage Guide

If this command is not configured, the device will send a particular group query message upon receiving the leaving message from the interface. When the host response is timeout, the device stops forwarding packets to this interface. The length of timeout depends on the query interval of the last member and IGMP robustness variable. The default value is 2s.

If this command is configured, the device does not send a particular group query message upon receiving the leaving message from the interface. Instead, it directly removes this interface from the IGMP buffer and notifies the IGMP protocol. This will shorten the time significantly.

Configuration Examples The following example provides the immediate leaving function for some multicast groups. Certainly, you must make sure each interface of these multicast groups have one group member only.

```
FS# configure terminal
FS(config)# access-list 1 permit 225.192.20.0 0.0.0.255
FS(config)# interface ethernet 0/1
FS(config-if)# ip igmp immediate-leave group-list 1
FS(config-if)# exit
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.5 ip igmp join-group

Use this command to configure the interface of the switch with host activities and adds it to a multicast group, so that the sub-switch can learn the corresponding group information. You can use this command to add an interface to a group.

Use the **no** or **default** form of this command to restore the default setting.

- ip igmp join-group** group-address
- no ip igmp join-group** group-address
- default ip igmp join-group** group-address

Parameter Description	Parameter	Description
	group-address	group-address

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide This command enables the host activities for the IGMP interface. When the host function is enabled, the interface can initiate the report message and respond to the query message.
 If the IGMP function is enabled on the interface, the interface can initiate the report message, so that the interface can learn the configured group members.
 You can use this command to add an interface to a group.

Configuration The following example adds a host group member manually.

```

Examples
FS# configure terminal
FS(config)# interface fast 0/1
FS(config-if)# ip igmp join-group 233.3.3.3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.6 ip igmp last-member-query-count

Use this command to configure the value of **last-member-query-count**.
 Use the **no** or **default** form of this command to restore the default setting.

```

ip igmp last-member-query-count number
no ip igmp last-member-query-count
default ip igmp last-member-query-count
    
```

Parameter Description	Parameter	Description
	number	number

Defaults The default is 2.

Command Mode Interface configuration mode

Usage Guide When the interface of the device receives an IGMPv2 group leaving message, the device waits for duration of query interval multiplying **last-member-query-count** time. The device will delete information about this group member if no group member report is received within the waiting time.

Configuration The following example sets the value of last member query count to 3.

```

Examples
FS# configure terminal
FS(config)# interface ethernet 0
FS(config-if)# ip igmp last-member-query-count 3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.7 ip igmp last-member-query-interval

Use this command to set the time interval of sending the group query message.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp last-member-query-interval interval

no ip igmp last-member-query-interval

default ip igmp last-member-query-interval

Parameter	Parameter	Description
Description	interval	The interval sending the group query message in the range from 1 to 255 in the unit of 0.1 second.

Defaults The default is 10.

Command Mode Interface configuration mode

Usage Guide When the interface of the device receives an IGMPv2 group leaving message, the device waits for duration of query interval multiplying **last-member-query-count** time. The device will delete information about this group member if no group member report is received within the waiting time.

Configuration Examples The following example sets the interval of sending the group query message to 20 seconds.

```
FS# configure terminal
FS(config)# interface eth 0
FS(config-if)# ip igmp last-member-query-interval 200
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.8 ip igmp limit

Use this command to globally set the maximum number of IGMP group records.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp limit number [**except** access-list]

no ip igmp limit

default ip igmp limit

Parameter	Parameter	Description
Description		

number	Maximum number of IGMP states, depending on devices
except	(Optional) Prevents the groups of the access list from taking part in calculation.
access-list	(Optional) Access list name

Defaults The default is 65536.

Command Global configuration mode/ Interface configuration mode

Mode

Usage Guide Use this command to globally configure the maximum number of IGMP group records. The messages of the members exceeding the threshold will not be saved in the IGMP buffer and will not be forwarded. This command can be configured globally or on the interface. The messages of the members will be ignored if they exceed the interface or global configuration.

Configuration The following example sets the maximum number to 300.

Examples FS(config) # ip igmp limit 300

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

3.9 ip igmp mroute-proxy

Use this command to configure an interface as a mroute-proxy interface that can transmit messages to its uplink ports.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp mroute-proxy interfname

no ip igmp mroute-proxy

default ip igmp mroute-proxy

Parameter Description

Parameter	Description
interfname	Name of the relevant uplink interface

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide After an uplink interface is configured as **proxy-service** interface, the interface can forward the IGMP messages sent by other members.

Configuration The following example configures an interface to **mroute-proxy** interface.

Examples FS(config-if)# ip igmp mroute-proxy fa 0/1

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.10 ip igmp proxy-service

Use this command to enable the service function of all downlink **mroute-proxy** ports. If you run this command on an interface, the interface becomes the uplink port of the corresponding **mroute-proxy** that associates its downlink ports and maintains the group information reported by the downlink ports. Use the **no** or **default** form of this command to restore the default setting.

ip igmp proxy-service

no ip igmp proxy-service

default ip igmp proxy-service

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide The command can configure at most 32 proxy-service ports. The number of interface with IGMP Proxy enabled is limited by the supported multicast interface number. When receiving a query message, the **proxy-service** port responds according to the IGMP group member information maintained by the port itself. The member information maintained by the **proxy-service** port is collected from the interface configured with **mroute-proxy**. Therefore, if a port is configured with proxy-service, the port performs the host activities, but not the device activities.

If **switch port** operation is performed on an interface with proxy-service command configured, the **ip igmp mroute-proxy interface** command configured on the associated downlink ports is automatically deleted.

Configuration The following example configures an interface to the **proxy-service** module.

Examples FS(config-if)# ip igmp proxy-service

Related Commands	Command	Description
		N/A

Platform N/A
Description

3.11 ip igmp query-interval

Use this command to configure the query interval of an ordinary member.
 Use the **no** or default form of this command to restore the default setting.

- ip igmp query-interval** seconds
- no ip igmp query-interval**
- default ip igmp query-interval**

Parameter Description	Parameter	Description
	seconds	Query interval of ordinary member, in the range is from 1 to 18000 in the unit of seconds.

Defaults The default is 125 seconds.

Command Mode Interface configuration mode

Usage Guide The time to query an ordinary member can be changed by configuring the query interval of the ordinary member.

Configuration Examples The following example configures the query interval of ordinary member to 120 seconds on the interface Ethernet 0.

```
FS(config-if)# ip igmp query-interval 120
```

The following example c configures the query interval of ordinary member to the default value on the interface Ethernet 0.

```
FS(config-if)# no ip igmp query-interval
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

3.12 ip igmp query-max-response-time

Use this command to configure the maximum response interval.
 Use the **no** or **default** form of this command to restore the default setting.

ip igmp query-max-response-time seconds
no ip igmp query-max-response-time
default ip igmp query-max-response-time

Parameter Description	Parameter	Description
	seconds	The maximum response interval, in the range from 1 to 25 seconds

Defaults The default is 10 seconds.

Command Mode Interface configuration mode

Usage Guide This command controls the interval for the respondent to respond the query message before the device deletes the group information.

Configuration Examples The following example configures the maximum response interval to 20s on the interface Ethernet 0.

```
FS(config-if)# ip igmp query-max-response-time 20
```

The following example configures the maximum response interval to the default value on the interface Ethernet 0.

```
FS(config-if)# no ip igmp query-max-response-time
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.13 ip igmp query-timeout

Use this command to configure the time the device waits before it takes over as the querier.
 Use the **no** or **default** form of this command to restore the default setting.

ip igmp query-timeout seconds
no ip igmp query-timeout
default ip igmp query-timeout

Parameter Description	Parameter	Description
	seconds	Time the device waits before it takes over as the querier, in the range from 60

	to 300 in the unit of seconds.
--	--------------------------------

Defaults The default is 255 seconds.

Command Interface configuration mode

Mode

Usage Guide IGMPv2 should be run for this command to work. By default, Cisco sets the waiting time of the device to two times of the query interval of **ip igmp query-interval**. In FS, the default value is set to 255s. This device becomes the querier if no query packet is received in this duration.

Configuration Examples The following example configures the time the device waits before it takes over as the querier to 200s on the interface Ethernet 0/1.

```
FS(config-if)# ip igmp query-timeout 200
```

The following example configures the time the device waits before it takes over as the querier to the default value on the interface Ethernet 0/1.

```
FS(config-if)# no ip igmp query-timeout
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

3.14 ip igmp robustness-variable

Use this command to change the value of the robustness variable.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp robustness-variable number

no ip igmp robustness-variable

default ip igmp robustness-variable

Parameter Description

Parameter	Description
number	The value of robustness variable, in the range from 2 to 7

Defaults The default is 2.

Command Interface configuration mode

Mode

Usage Guide N/A

Configuration The following example sets the value of robustness variable to 3.

```

Examples
FS# configure terminal
FS(config)# interface ethernet 0
FS(config-if)# ip igmp robustness-variable 3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.15 ip igmp ssm-map enable

Use this command to enable the **igmp ssm-map** function in the global configuration mode.

Use the **no** form of this command to restore the default setting.

- ip igmp ssm-map enable**
- no ip igmp ssm-map enable**
- default ip igmp ssm-map enable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide If this command is configured, the dynamically learned group information is added forcibly to the associated source record. This command is usually used together with the **ip igmp ssm-map static** command.

Configuration The following example enables the **igmp ssm-map** function in the global configuration mode.

```

Examples
FS(config)# ip igmp ssm-map enable.
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.16 ip igmp ssm-map static

Use this command to map the static **ssm-map** source IP address to the group records in the global mode.

Use the **no** or **default** form of this command to restore the default setting.

```
ip igmp ssm-map static access-list a.b.c.d
no ip igmp ssm-map static access-list a.b.c.d
default ip igmp ssm-map enable
```

Parameter Description	Parameter	Description
	access-list	ACL name in the range 1 to 99, 1300 to 1999 or characters.
	a.b.c.d	Unicast address mapped to the group record.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used together with the **ip igmp ssm-map enable** command. After configuration, the port maps the corresponding source IP address to all received messages below **v3**.

Configuration Examples The following example maps the source address 192.168.2.2 to all group records permitted by ACL 11.

```
FS(config)# ip igmp ssm-map static 11 192.168.2.2.
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.17 ip igmp static-group

Use this command to directly add an interface to a group.
 Use the **no** or **default** form of this command to restore the default setting.

```
ip igmp static-group group-address
no ip igmp static-group group-address
default ip igmp static-group group-address
```

Parameter Description	Parameter	Description
	group-address	Multicast group IP address

Defaults The switch is not added to a multicast group by default.

Command Mode Interface configuration mode

Usage Guide This command directly adds an interface to a multicast group. The difference from **join-group** is that it directly adds an interface to the group without interacting with a report message.
 You can use this command to add an interface to a group.

Configuration The following example adds a host group member manually.

```

Examples
FS# configure terminal
FS(config)# interface fast 0/1
FS(config-if)# ip igmp static-group 233.3.3.3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.18 ip igmp version

Use this command to set the version number of IGMP to be used on the interface.
 Use the **no** or **default** form of this command to restore the default setting.

```

ip igmp version { 1 | 2 | 3 }
no ip igmp version
default ip igmp version
    
```

Parameter Description	Parameter	Description
	{ 1 2 3 }	Three version numbers, in the range from 1 to 3

Defaults The default is 2.

Command Mode Interface configuration mode

Usage Guide Use this command to globally configure the IGMP version. It should be noted that IGMP will reset after configuration.

Configuration The following example sets the version number to 2.

```

Examples
FS# configure terminal
FS(config)# interface ethernet 0
FS(config-if)# ip igmp version 2
    
```

Related Commands	Command	Description

N/A	N/A
-----	-----

Platform N/A
Description

3.19 ip igmp enforce-router-alert

Use this command to receive IGMP report packets with the option of router-alert.

ip igmp enforce-router-alert

Use the **no** form of this command to receive all IGMP report packets.

no ip igmp enforce-router-alert

Use the **default** form of this command to restore the default setting.

default ip igmp enforce-router-alert

Parameter Description	Parameter	Description
	N/A	N/A

Defaults All IGMP report packets are received by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example receives IGMP report packets with the option of router-alert.

```
FS# configure terminal
FS(config)#ip igmp enforce-router-alert
```

Platform N/A
Description

3.20 ip igmp enforce-source-subnet

Use this command to receive only the IGMP report packet containing the source address in the same network segment as the port.

ip igmp enforce-source-subnet

Use the **no** form of this command to restore the default setting.

no ip igmp enforce-source-subnet

Use the **default** form of this command to restore the default setting.

default ip igmp enforce-source-subnet

Parameter Description	Parameter	Description
	N/A	N/A
Defaults	The source IP address is not checked by default.	
Command Mode	Global configuration mode	
Usage Guide	N/A	
Configuration Examples	The following example receives only the IGMP report packet containing the source address in the same network segment as the port.	
	<pre>FS# configure terminal FS(config)# ip igmp enforce-source-subnet</pre>	
Platform Description	N/A	

3.21 ip igmp send-router-alert

Use this command to send IGMP report packets with the Router Alert option.

Use the **no** or **default** form of this command to restore the default setting.

ip igmp send-router-alert

no ip igmp send -router-alert

default ip igmp send -router-alert

Parameter Description	Parameter	Description
	N/A	N/A
Defaults	The Router Alert option is not carried in IGMP packets by default.	
Command Mode	Global configuration mode	
Usage Guide	N/A	
Configuration Examples	The following example sends IGMP report packets with the Router Alert option.	
	<pre>FS# configure terminal FS(config)# ip igmp send-router-alert</pre>	
Platform	N/A	

Description

3.22 show ip igmp groups

Use this command to display the groups directly connected to the device and the group information learnt from IGMP.

show ip igmp groups [group-address | interface-type]
interface-number] [**detail**]

Parameter Description	Parameter	Description
	group-address	32-bit multicast group IP address, namely Category D address. 8 bits are in one group in decimal form. Groups are separated with dots.
	interface-type	Interface type
	interface-number	Interface number
	detail	Displays the detailed information
	N/A	Displays the information about all the groups

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command without any parameters to display group address, interface type, and information about all the multicast groups directly connected to the interface. Information about a specific group is displayed if a group address is added to the command.

Configuration Examples The following example displays information about all the groups.

```
FS# show ip igmp groups
IGMP Connected Group Membership
Group Address  Interface  Uptime    Expires   Last Reporter
224.0.1.1     eth2      00:00:09  00:04:17  10.10.0.82
224.0.1.24    eth2      00:00:06  00:04:14  10.10.0.84
224.0.1.40    eth2      00:00:09  00:04:15  10.10.0.91
224.0.1.60    eth2      00:00:05  00:04:15  10.10.0.7
239.255.255.250 eth2 00:00:12  00:04:15  10.10.0.228
239.255.255.254 eth2 00:00:08  00:04:13  10.10.0.84
```

The following example displays detailed information about a specific group.

```
FS# show ip igmp groups 224.1.1.1 detail
Interface      : eth1
Group: 224.1.1.1
Uptime: 00:00:42
Group mode: Include
Last reporter: 192.168.50.111
```

```
TIB-A Count: 2
TIB-B Count: 0
Group source list: (R - Remote, M - SSM Mapping)
Source Address Uptime v3 Exp Fwd Flags
192.168.55.55 00:00:42 00:03:38 Yes R
192.168.55.66 00:00:42 00:03:38 Yes R
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.23 show ip igmp interface

Use this command to display the information of this interface.

show ip igmp interface [interface-type interface-number]

Parameter Description	Parameter	Description
	interface-type	Interface type.
	interface-number	Interface number.
	N/A	Displays information about all the interfaces.

Defaults N/A

Command Mode User EXEC mode/ Privileged EXEC mode

Usage Guide Run this command without any parameter, and all interface information is displayed by default.

Configuration Examples The following example displays the information of all the interfaces.

```
FS# show ip igmp interface
Interface vlan1.1 (Index 4294967295)
IGMP Active, Non-Querier, Version 3 (default)
IGMP querying device is 0.0.0.0
IGMP query interval is 125 seconds
IGMP querier timeout is 255 seconds
IGMP max query response time is 10 seconds
Last member query response interval is 1000 milliseconds
Group Membership interval is 260 seconds|
IGMP Snooping is globally enabled|
IGMP Snooping is enabled on this interface
```



```
IGMP Snooping fast-leave is not enabled
IGMP Snooping querier is not enabled
IGMP Snooping report suppression is enabled
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.24 show ip igmp ssm-mapping

Use this command to display the **ssm-map** information of the IGMP configuration.

show ip igmp ssm-mapping [A.B.C.D]

Parameter Description	Parameter	Description
	A.B.C.D	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Run this command without any parameter, and all SSM-MAP information is displayed.

Configuration Examples The following example displays the **ssm-map** configuration information.

```
FS# sh ip igmp ssm-mapping
SSM Mapping: Enabled
Database : Static mappings configured
Show the group information of group 233.3.3.3 to be mapped
FS#show ip igmp ssm-mapping 233.3.3.3
Group address: 233.3.3.3
Database : Static
Source list : 192.3.3.3
: 3.3.3.3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4 MLD Commands

4.1 clear ipv6 mld group

Use this command to clear the dynamic group member learned by MLD protocol. The dynamic group member refers to the group member record generated by learning the report packets.

clear ipv6 mld group [group-address] [interface-type interface-number]

Parameter Description	Parameter	Description
	group-address	IPv6 multicast group address with 128 bits
	interface-type	The associated interface type
	interface-number	The associated interface number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide MLD maintains a list of the multicast groups to be added to the host in the directly-connected sub-net. Use the **clear ipv6 mld group** command to remove all dynamic group member record from the MLD group member list.

Configuration Examples The following example clears all group records.

```
FS# clear ipv6 mld group
```

The following example clears one group record.

```
FS# clear ipv6 mld group ff1e::100
```

The following example s clears the record on a specified interface.

```
FS# clear ipv6 mld group ff1e::100 interfa fa0/1
```

Related Commands	Command	Description
	show ipv6 mld groups	N/A
	show ipv6 mld interface	N/A

Platform Description N/A

4.2 clear ipv6 mld interface

Use this command to clear all MLD statistical information and the group member records on the interface.

clear ipv6 mld interface interface-type interface-number

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

interface-type	The interface type
interface-number	The interface ID

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide Use this command to clear all group information and some packet statistical information learned by LDP on the interface. Those packet statistical information include the number of the received report packets, the number of the done packets and the the number of the group members on the interface.

Configuration The following example clears all MLD statistical information and the group member records on the interface.

Examples

```
FS# clear ipv6 mld interface fa 1/1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.3 ipv6 mld access-group

Use this command to filter the specific requested group on the interface. Only the report packets in accordance with the corresponding ACL are allowed to be processed.

Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld access-group access-list

no ipv6 mld access-group

default ipv6 mld access-group

Parameter Description	Parameter	Description
	access-list	

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide Use this command to filter some groups on the interface and associate with the corresponding ACLs. The correspondent ACL deny report packets will be discarded. This command supports the extended ACL and the source record information of the MLDv2 packets can be filtered.

The multicast group access control command is associated with the extended ACL. When the received MLD

report message is (S1,S2,S3...Sn,G), use this command to match and check the (0,G) message using the corresponding ACL. To this end, a (0,G) must be configured for the extended ACL to filter the (S1,S2,S3...Sn,G).

Configuration Examples The following example enables the group information carried in the report packets to be in accordance with acl for the normal handling on the interface Eth0/1.

```
FS(config)#ipv6 access-list acl
FS(config-ipv6-acl)#permit ipv6 ::/64 ff66::100/64
FS(config-ipv6-acl)#permit ipv6 2222::3333/64 ff66::100/64
FS(config)# interface ethernet 0/1
FS(config-if)# ipv6 mld access-group acl
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.4 ipv6 mld immediate-leave group-list

Use this command to set the immediate-leave mechanism. With this command configured, the group within the range of group-list, will not send the query packet for the specific group and will remove this group from the group member list immediately after receiving the corresponding done packets. This function is used in the condition that there is only one multicast source that receives the host request on an interface. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 mld immediate-leave group-list** access-list
- no ipv6 mld immediate-leave group-list**
- default ipv6 mld immediate-leave group-list**

Parameter Description	Parameter	Description
	access-list	The IPv6 ACL name

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide Without this command configured, when the device receives the MLD leave packets, the request packets for the specific groups will be sent. If there is still no host reply within the response time, the device will remove the corresponding group record from the group member list. The timeout interval is determined by the last member query interval and the MLD robustness variable, and the default value is 2s.
 With this command configured, when the device receives the MLD leave packets, it will not send the request

packets for the specific groups, but remove the group information immediately, which reduces the leave delay greatly in the condition that there is only one host connecting to the interface.

Configuration The following example configures the immediate-leave function.

```

Examples
FS# configure terminal
FS(config)#ipv6 access-list acl
FS(config-ipv6-acl)#permit ipv6 2222::3333/64 ff66::100/64
FS(config)# interface ethernet 0/1
FS(config-if)# ipv6 mld immediate-leave group-list acl
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.5 ipv6 mld join-group

Use this command to configure the host action for the switch interface and add the related multicast group to the interface.

Use the **no** or default form of this command to restore the default setting.

- ipv6 mld join-group** group-address
- no ipv6 mld join-group** group-address
- default ipv6 mld join-group** group-address

Parameter Description	Parameter	Description
	group-address	The IPv6 non-management multicast group address

Defaults The interface is not added to any group by default.

Command Mode Interface configuration mode

Usage Guide Use this command to enable the MLD host action on the interface. The interface can not only send the packets initiatively, but also reply to the query packets.

Use this command if it is necessary to join a group member to the interface.

It is worth mentioning that if the group address whose beginning characters are 0xFF*1,0xFF3*, it fails to configure this command. The group address whose beginning characters are 0xFF*2 fails to form a group.

Configuration The following example adds the host group member:

```

Examples
FS# configure terminal
FS(config)# interface fast 0/1
    
```

```
FS(config-if)# ipv6 mld join-group ff55::100
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.6 ipv6 mld last-member-query-count

last-member-query-count represents that after the interface with MLD enabled receives the done packets, the count number of the times of sending the query packets to the specific group. Use this command to set the last-member-query-count number.

Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld last-member-query-count number

no ipv6 mld last-member-query-count

default ipv6 mld last-member-query-count

Parameter Description	Parameter	Description
	number	

Defaults The default is 2.

Command Mode Interface configuration mode

Usage Guide With the MLD leave packets received on the interface, if there is no group reply within the timeout interval, this group will be removed from the MLD group member list on the interface. The timeout interval is the query interval for the specific group(multiplied by the value of **mld last-member-query-count**) plus half the reply time.

Configuration Examples The following example sets the last-member-query-count number to 3.

```
FS# configure terminal
FS(config)# interface ethernet 0/1
FS(config-if)# ipv6 mld last-member-query-count 3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.7 ipv6 mld last-member-query-interval

Use this command to set the time interval of sending the query packets to the specific group. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld last-member-query-interval interval

no ipv6 mld last-member-query-interval

default ipv6 mld last-member-query-interval

Parameter Description	Parameter	Description
	interval	The valid range is 1-255 in the unit of 0.1 seconds.

Defaults The default is 10 seconds.

Command Mode Interface configuration mode

Usage Guide With the MLD leave packets received on the interface, if there is no group reply within the timeout interval, this group will be removed from the MLD group member list on the interface. The timeout interval is the query interval for the specific group(multiplied by the value of **mld last-member-query-count**) plus half the reply time.

Configuration Examples The following example sets the mld last-member-query-interval to 2 seconds.

```
FS# configure terminal
FS(config)# interface fa 0/1
FS(config-if)# ipv6 mld last-member-query-interval 20
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.8 ipv6 mld limit

Use this command to enable to learn the max-number of the group member through the MLD protocol.

Use the **no** form of this command to restore the default setting.

ipv6 mld limit number [**except** access-list]

no ipv6 mld limit number [**except** access-list]

default ipv6 mld limit number [**except** access-list]

Parameter Description	Parameter	Description
	number	The maximum number of the group member learned by the MLD

except access-list	(Optional) The ACL beyond the configured mld limit
---------------------------	--

Defaults The default is 1024.

Command Mode Interface configuration mode/Global configuration mode

Usage Guide Use this command to set the max-number of the group members learned through the MLD in the global configuration mode. If the group member number has exceeded the limit, the received report packets later will be discarded and fail to form the group record.

If the except list has also been set at the same time, the group member packets, including the packets in the access-list, will be free from the member number limit.

This command can also be used in the interface configuration mode. The configurations in two different configuration modes are independent. If the number limit in the global configuration mode is lower than the one in the interface configuration mode, the former configuration takes precedence.

Configuration The following example sets the MLD limit to 300.

Examples FS(config-if)# **ipv6 mld limit** 300

The following example sets the MLD limit to 300, but the configured acl can still learn.

FS(config-if)# **ipv6 mld limit** 300 except acl

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.9 ipv6 mld mroute-proxy

Use this command to enable the interface to forward the packets to the correspondent connected interface. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld mroute-proxy interface-type interface-number

no ipv6 mld mroute-proxy

default ipv6 mld mroute-proxy

Parameter Description	Parameter	Description
	interface-type interface-number	interface-type interface-number

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide After the connected interface has been configured as the proxy-service interface, it can forward the MLD packets sent from other members

Configuration The following example sets the interface as the mroute-proxy interface.

Examples FS(config-if)# **ipv6 mld mroute-proxy** fa 0/1

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.10 ipv6 mld proxy-service

Use this command to enable the proxy-service function for the interface connected with the mroute-proxy interface in the downward direction. After configuring this command, the interface becomes the one connected with the mroute-proxy in the upward direction, and associates with and maintains the group information from the interfaces in the downward direction. Use the **no** or **default** form of this command to disable the default setting.

- ipv6 mld proxy-service**
- no ipv6 mld proxy-service**
- default ipv6 mld proxy-service**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Interface configuration mode

Usage Guide The configurable max-number limit is 32. The number of the interfaces with MLD Proxy enabled is limited by the number multicast interfaces supported device. After receiving the query packet, the proxy-service interface replies according to the member information, which are collected from the mroute-proxy interface and maintained by the proxy-service interface itself. With proxy-service configured, this interface owns the host action rather than the router action.

The **ipv6 mld mroute-proxy interface** command configuration on the associated interface in the downward direction is removed automatically if the switchport operation is performed on the interfaces.

Configuration The following example sets the interface proxy-service.

Examples FS(config-if)# **ipv6 mld proxy-service**

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.11 ipv6 mld querier-timeout

Use this command to set the querier alive period. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld querier-timeout seconds

no ipv6 mld querier-timeout

default ipv6 mld querier-timeout

Parameter Description	Parameter	Description
	seconds	seconds

Defaults The default is 255 seconds.

Command Mode Interface configuration mode

Usage Guide After the querier sends the query packet, the querier will wait to receive the query packet sent by another querier within the alive period. If no packet is received by the first querier within the alive period, then the first querier takes itself as the only querier on the network segment.

Configuration Examples The following example sets the querier alive period to 200 seconds.

```
FS(config-if-Ethernet 0/1)# ipv6 mld querier-timeout 200
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.12 ipv6 mld query-interval

Use this command to set the query interval for the general member. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld query-interval seconds

no ipv6 mld query-interval

default ipv6 mld query-interval

Parameter Description	Parameter	Description
	seconds	The query interval for the general member, in the range from 1 to 18000 in the unit of seconds.

Defaults The default is 125 seconds.

Command Mode Interface configuration mode

Usage Guide The interval of the timer for sending the general query packets can be changed by configuring the query-interval for the general member.

Configuration Examples The following example sets the query-interval for the general member on the interface Ethernet 0.

```
FS(config-if)# ipv6 mld query-interval 120
```

The following example sets the query-interval for the general member to the default value on the interface Ethernet 0.

```
FS(config-if)# no ipv6 mld query-interval
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.13 ipv6 mld query-max-response-time

Use this command to set the maximum response time.

Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld query-max-response-time seconds

no ipv6 mld query-max-response-time

default ipv6 mld query-max-response-time

Parameter Description	Parameter	Description
	seconds	The maximum response time, in the range from 1 to 25 in the unit of seconds

Defaults The default is 10 seconds.

Command Mode Interface configuration mode

Usage Guide Use this command to control the maximum response time of the host after the device sends the query packets. If there is no response within the maximum response time, MLD will remove the corresponding group from the group member list.

Configuration The following example sets the maximum query response time on the interface gigabitEthernet 0/1.

Examples `FS(config-if)# ipv6 mld query-max-response-time 20`

The following example sets the maximum query response time on the interface gigabitEthernet 0/1.

`FS(config-if)# no ipv6 mld query-max-response-time`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.14 ipv6 mld robustness-variable

Use this command to set querier robustness value. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld robustness-variable number

no ipv6 mld robustness-variable

default ipv6 mld robustness-variable

Parameter Description	Parameter	Description
	number	number

Defaults The default is 2.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration The following example sets the querier robustness value to 3.

Examples `FS# configure terminal`
`FS(config)# interface ethernet 0`
`FS(config-if)# ipv6 mld robustness-variable 3`

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.15 ipv6 mld ssm-map enable

Use this command to enable the mld ssm-map function.
 Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld ssm-map enable
no ipv6 mld ssm-map enable
default ipv6 mld ssm-map enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide With this command configured, the group information dynamically learned will be added to the related source record forcibly. Usually, this command is set with the **ipv6 mld ssm-map static** command.

Configuration Examples The following example enables the mld ssm-map function in the global configuration mode.

```
FS(config)# ipv6 mld ssm-map enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

4.16 ipv6 mld ssm-map static

Use this command to set the mld ssm-map static mapping source record in the global configuration mode.
 Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld ssm-map static access-list X:X:X::X
no ipv6 mld ssm-map static access-list X:X:X::X
default ipv6 mld ssm-map static access-list source-address

Parameter Description	Parameter	Description
	access-list	Sets the IPv6 ACL name.

X:X:X:X	Sets the unicast address for the group record mapping.
---------	--

Defaults There is no mapping source address by default.

Command Global configuration mode

Mode

Usage Guide This command is used with the **ipv6 mld ssm-map enable** command. With this command configured, the received mldv1 packets are mapped to the correspondent source record.

Configuration The following example maps all group record of the ACL name to the source address 4444::1234.

Examples FS(config)# ipv6 mld ssm-map static te 4444::1234

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

4.17 ipv6 mld static-group

Use this command to add an interface to a group statically. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld static-group group-address

no ipv6 mld static-group group-address

default ipv6 mld static-group group-address

Parameter Description

Parameter	Description
group-address	Sets the IPv6 non-management multicast group address.

Defaults The interface is not added to any group statically.

Command Interface configuration mode

Mode

Usage Guide Use this command to add a multicast group to the interface directly. The difference from the join-group is that the packet interaction is not necessary.

Use this command when it is necessary to add a group member to the interface. It is worth mentioning that only the **no ipv6 mld static-group** command can be used to delete the group, but not the **clear** command.

Configuration The following example adds interface Eth0/1 to group ff55::3 statically.

Examples FS# configure terminal

```
FS(config)# interface fast 0/1
FS(config-if)# ipv6 mld static-group ff55::3
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.18 ipv6 mld version

Use this command to set the MLD version number on the interface. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 mld version { 1 | 2 }**
- no ipv6 mld version**
- default ipv6 mld version**

Parameter Description

Parameter	Description
{ 1 2 }	Sets the MLD version number.

Defaults The default is 2.

Command Mode Interface configuration mode

Usage Guide Use this command to control the MLD version number.

Configuration Examples The following example sets the MLD version 1.

```
FS# configure terminal
FS(config)# interface ethernet 0/1
FS(config-if)# ipv6 mld version 1
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

4.19 show ipv6 mld groups

Use this command to display the group connected with the switch and the group information learned from the MLD.

show ipv6 mld groups [group-address | interface-type interface-number] [**detail**]

Parameter Description

Parameter	Description
group-address	Sets the IPv6 multicast group address in 128 bits.
interface-type	Sets the interface type.
interface-number	Sets the interface number.
detail	Displays the information in detail.
	Displays all the group information.

Defaults N/A

Command Mode Privileged EXEC mode /Interface configuration mode

Usage Guide Use this command without the parameters to display the information including the group address, the interface type and the multicast group information. Use this command with a parameter to display the information on a specific group.

Configuration Examples The following example displays all group information.

```
FS# show ipv6 mld groups
MLD Connected Group Membership
Group Address Interface Uptime Expires Last Reporter
ff66::1 VLAN1 00:10:57 00:02:16 fe80::2d0:f8ff:fe22:3378
```

The following example displays the detailed information.

```
FS# show ipv6 mld groups detail
Interface: VLAN 1
Group: ff66::1
Uptime: 00:10:26
Group mode: Exclude (Expires: 00:02:47)
Last reporter: fe80::2d0:f8ff:fe22:3378
Source list is empty
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.20 show ipv6 mld interface

Use this command to display the configurations on the interface.

show ipv6 mld interface [interface-type interface-number]

Parameter Description	Parameter	Description
	interface-type	Sets the interface type.
	interface-number	Sets the interface number.

Defaults N/A

Command Mode User EXEC mode / Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the state information of all interfaces.

Examples

```

FS# show ipv6 mld interface
Interface VLAN 2 (Index 4098)
  MLD Enabled, Inactive, Version 2 (default)
  MLD interface limit is 1024
  MLD interface has 0 group-record states
  MLD interface has 1 join-group records
  MLD interface has 0 static-group records
  MLD activity: 0 joins, 0 leaves
  MLD query interval is 125 seconds
  MLD querier timeout is 255 seconds
  MLD max query response time is 10 seconds
  Last member query response interval is 10 (1/10s)
  Last member query count is 2
  Group Membership interval is 260
  Robustness Variable is 2
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.21 show ipv6 mld ssm-mapping

Use this command to display the mapping information of the source address for the group record.

show ipv6 mld ssm-mapping [group-address]

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

group-address	Displays the group address.
---------------	-----------------------------

Defaults N/A

Command Mode User EXEC mode / Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the state information of all interfaces.

Examples

```

FS# show ipv6 mld interface
Interface VLAN 2 (Index 4098)
  MLD Enabled, Inactive, Version 2 (default)
  MLD interface limit is 1024
  MLD interface has 0 group-record states
  MLD interface has 1 join-group records
  MLD interface has 0 static-group records
  MLD activity: 0 joins, 0 leaves
  MLD query interval is 125 seconds
  MLD querier timeout is 255 seconds
  MLD max query response time is 10 seconds
  Last member query response interval is 10 (1/10s)
  Last member query count is 2
  Group Membership interval is 260
  Robustness Variable is 2
    
```

Related Commands	Command	Description
	N/A	N/A

5 PIM-DM Commands

5.1 clear ip pim dense-mode track

Use this command to clear the statistics of PIM-DM packets.

clear ip pim dense-mode track

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to reconfigure the start time of the statistics and clear the PIM packet counter.

Configuration Examples The following example clears the statistics of PIM-DM packets.

```
FS# clear ip pim dense-mode track
```

Related Commands	Command	Description
	show ip pim dense-mode track	Displays the statistics of the PIM packets.

Platform Description N/A

5.2 ip pim dense-mode

Use this command to enable PIM-DM on the interface.

Use the **no** or **default** form of this command to restore the default setting.

ip pim dense-mode

no ip pim dense-mode

default ip pim dense-mode

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide

- ✔ Before enabling the PIM-DM, enable the multicast forwarding function in the global configuration mode. Otherwise, the multicast data packet cannot be forwarded even the PIM-DM is enabled.
- ✔ Once the PIM-DM is enabled, the IGMP is enabled automatically on the interface without manual configuration.
- ✔ During the execution of this command, if the prompt "Failed to enable PIM-DM on <Interface Name>, resource temporarily unavailable, please try again" appears, re-execute this command.
- ✔ During the execution of this command, if the prompt "PIM-DM Configure failed! VIF limit exceeded in NSM!!!" appears, it indicates the allowed configured multicast interface number exceeds the upper limit of the multicast interfaces. In this case, if it's still necessary to enable the PIM-DM on the interface, delete the unnecessary PIM-DM, PIM-SM or DVMRP interfaces.
- ✔ It is not recommended to configure different multicast routing protocols on different interfaces of a device.

Configuration

The following example enables PIM-DM on the interface.

Examples

```
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim dense-mode
```

Related

Commands

Command	Description
N/A	N/A

Platform

N/A

Description

5.3 ip pim neighbor-filter

Use this command to enable the neighbor filtering on the interface. If the neighbor filtering is set, PIM-DM will not establish the peering relationship with this neighbor or will terminate the established peering relationship with this neighbor once the neighbor is denied by the filtering access list.

Use the **no** or **default** form of this command is to restore the default setting.

- ip pim neighbor-filter** access-list
- no ip pim neighbor-filter** access-list
- default ip pim neighbor-filter** access-list

Parameter

Description

Parameter	Description
access-list	Access control list supporting numerical ACL in the range from 1 to 99 and name ACL

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration The following example enables the neighbor filtering on the interface.

```
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim neighbor-filter 14
```

- ✓ 1. When the associated ACL rule is permit, only the neighbor address in ACL can be used as the PIM neighbor of the current interface. When the associated ACL rule is deny, the neighbor address in ACL cannot be used as the PIM neighbor of the current interface.
- ✓ 2. Peering relationship refers to the interaction of protocol packets between the PIM neighbors. If the peering relationship with a PIM device is terminated, the neighbor relationship with this device will not be established, and the PIM protocol packets from this device will not be received.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

5.4 ip pim override-interval

Use this command to reconfigure the override-interval of the hello message.

Use the **no** or **default** form of this command to restore the default setting.

ip pim override-interval interval-milliseconds

no ip pim override-interval

default ip pim override-interval

Parameter Description	Parameter	Description
	interval-milliseconds	In the range from 1 to 65,535 in the unit of milliseconds

Defaults The default is 2,500 milliseconds.

Command Mode Interface configuration mode

Usage Guide Configuring the override-interval is to set the pruning veto time for the interface.

Configuration The following example sets the override-interval to 300 milliseconds.

```

Examples
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim override-interval 3000
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.5 ip pim propagation-delay

Use this command to reconfigure the propagation-interval of the hello message.

Use the **no** or **default** form of this command to restore the default setting.

ip pim propagation-delay interval-milliseconds

no ip pim propagation-delay

default ip pim propagation-delay

Parameter Description	Parameter	Description
	interval-milliseconds	

Defaults The default is 500 milliseconds.

Command Mode Interface configuration mode

Usage Guide Configuring the propagation-delay is to set the transmission delay time for the interface.

Configuration The following example sets the propagation-delay to 600 milliseconds.

```

Examples
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim propagation-delay 600
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.6 ip pim query-interval

Use this command to reconfigure the interval of sending the hello message.

Use the **no** or **default** form of this command to restore the default setting.

ip pim query-interval interval-seconds

no ip pim query-interval

default ip pim query-interval

Parameter Description	Parameter	Description
	Interval-seconds	Interval of sending the hello message in the range from 1 to 65,535 in the unit of seconds

Defaults The default is 30 milliseconds.

Command Mode Interface configuration mode

Usage Guide If hello interval is set, the hello holdtime value will be updated to 3.5 times of hello interval.

Configuration Examples The following example sets the interval of sending the hello message to 123 seconds.

```
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim query-interval 123
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.7 ip pim state-refresh disable

Use this command to prohibit the interface from processing and forwarding the PIM-DM state refresh messages.

Use the **no** or **default** form of this command to restore the default setting.

ip pim state-refresh disable

no ip pim state-refresh disable

default ip pim state-refresh disable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the PIM-DM state refresh messages can be processed and forwarded.

Command Global configuration mode

Mode

Usage Guide When the state refresh function is disabled, the PIM-DM state refresh message is not processed and forwarded. The sent Hello message does not contain the status refresh option. Consequently, the SR Cap field will not be processed when the Hello message is received.

Configuration The following example disables the processing of the PIM-DM state refresh message.

Examples

```
FS# configure terminal
FS(config)# ip pim state-refresh disable
```

- ✓ Generally, it is not recommended to disable the status refresh function because disabling this function may converge the PIM-DM multicast forwarding tree again that has been converged, resulting in unnecessary waste of bandwidth and oscillation of multicast routing table.

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

5.8 ip pim state-refresh origination-interval

Use this command to set the interval of sending the PIM-DM state refresh message. The interval is the seconds elapsed between two state refresh messages.

Use the **no** or **default** form of this command to restore the default setting.

ip pim state-refresh origination-interval interval-seconds

no ip pim state-refresh origination-interval

default ip pim state-refresh origination-interval

Parameter Description

Parameter	Description
Interval-seconds	Interval of sending the PIM-DM update message in the range from 1 to 100 in unit of seconds

Defaults The default is 60 seconds.

Command Interface configuration mode

Mode

Usage Guide N/A

Configuration The following example sets the interval of sending the PIM-DM state refresh message to 65 seconds.

```

Examples
FS# configure terminal
FS(config)# interface fastethernet 0/1
FS(config-if)# ip pim state-refresh
origination-interval 65
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.9 ip pim mib dense-mode

Use this command to switch the device from the PIM MIB sparse mode to the PIM MIB dense mode. Use the **no** form or **default** form of this command to switch back to the PIM MIB sparse mode.

- ip pim mib dense-mode**
- no ip pim mib dense-mode**
- default ip pim mib dense-mode**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The device is in the PIM MIB sparse mode by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example switches the device from the PIM MIB sparse mode to the PIM MIB dense mode.

```

Examples
FS# configure terminal
FS(config)# ip pim mib dense-mode
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.10 show ip pim dense-mode interface

Use this command to display the information about the PIM-DM interface.

show ip pim dense-mode interface [interface-type interface-number] [**detail**]

Parameter Description	Parameter	Description
	interface-type interface-number	Interface type and interface ID
	detail	Displays details of the interface.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the information about the PIM-DM interface.

```

Examples
FS# show ip pim dense-mode interface
Address  Interface  VIFIndex  Ver/Mode  Nbr
Mode Count
10.10.10.10 FastEthernet 0/45 3    v2/D      1
50.50.50.50 VLAN4      2      v2/D      1
    
```

Field	Description
Address	Primary IP address of the PIM-DM interface
Interface	Name of the PIM-DM interface
VIF Index	VIF ID (ID)
Ver/Mode	PIM version/mode
Nbr Count	Number of neighbors of the PIM-DM interface.

Related Commands	Command	Description
	show ip pim dense-mode neighbor	Displays the information about the neighbors of the PIM-DM interface.

Platform Description N/A

5.11 show ip pim dense-mode mroute

Use this command to display the information about the PIM-DM routing table.

show ip pim dense-mode mroute [group-or-source-address [group-or-source-address]] [**summary**]

Parameter Description	Parameter	Description
	group-or-source-address	Group address or source address
	group-or-source-address	Group address or source address. Two addresses cannot both be the group addresses or the source addresses.
	summary	Displays the brief information of routing entries.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the information about the PIM-Dm routing table.

Examples

```

FS# show ip pim dense-mode mroute
PIM-DM Multicast Routing Table
(1.1.1.111, 229.1.1.1)
  MRT lifetime expires in 205 seconds
  RPF Neighbor: 50.50.50.1, Nexthop:50.50.50.1,VLAN 4
  Upstream IF: VLAN 4
  Upstream State: Pruned, PLT:200
  Assert State: NoInfo
  Downstream IF List:
  FastEthernet 0/45:
    Downstream State: NoInfo
    Assert State: Loser, AT:170
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

5.12 show ip pim dense-mode neighbor

Use this command to display the information about the PIM-DM neighbors.

show ip pim dense-mode neighbor [interface-type interface-number]

Parameter Description	Parameter	Description
	interface-type interface-number	Interface type and interface ID

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the information about the PIM-DM neighbors.

Examples

```
FS# show ip pim dense-mode neighbor
Neighbor-Address Interface      Uptime/Expires  Ver
10.10.10.1      FastEthernet 0/45 00:19:29/00:01:21  v2
50.50.50.1      VLAN 4          00:22:09/00:01:39  v2
```

Description of fields in the results:

Field	Description
Neighbor-Address	IP address of the neighbor
Interface	Name of the interface connecting the neighbor
Uptime/Expires	Valid time and aging time of the entry
Ver	PIM version

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

5.13 show ip pim dense-mode nexthop

Use this command to display the information about the PIM-DM next hop.

show ip pim dense-mode nexthop

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the information about the PIM-Dm next hop:

Examples

```
FS# show ip pim dense-mode nexthop
```

Destination	Nexthop Num	Nexthop Addr	Nexthop Interface	Metric	Pref
1.1.1.111	1	50.50.50.1	VLAN 4	0	1

Field	Description
Destination	Multicast source IP address
Nexthop Num	Number of next hop
Nexthop Addr	IP address of next hop
Nexthop interface	Interface connecting to the of next hop
Metric	Route metric
Pref	Route priority

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

5.14 show ip pim dense-mode track

Use this command to display the statistics of the PIM-DM packets.

show ip pim dense-mode track

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to display the number of sent and received PIM packets during the period from the beginning of the statistics till now. When the system starts up, it sets the start time of the statistics. The start time of the statistics is reconfigured and the PIM packet counter is cleared on calling the clear ip pim dense-mode track every time.

Configuration Examples The following example displays the statistics of the PIM-DM packets.

```

FS# show ip pim dense-mode track
      PIM packet counters
Elapsed time since counters cleared: 00:04:03
      received      sent
Valid PIMDM packets:      1      8
    
```

```

Hello:                1          8
Join/Prune:           0          0
Graft:                0          0
Graft-Ack:            0          0
Assert:               0          0
State-Refresh:        0          0
PIM-SM-Register:      0          0
PIM-SM-Register-Stop: 0          0
PIM-SM-BSM:           0          0
PIM-SM-C-RP-ADV:      0          0
Unknown Type:         0
Errors:
Malformed packets:    0
Bad checksums:        0
Unknown PIM version:  0
Send errors:          0
    
```

**Related
Commands**

Command	Description
clear ip pim dense-mode track	Clears the statistics of the PIM packets.

**Platform
Description**

N/A

6 PIM-SM Commands

6.1 clear ip pim sparse-mode bsr rp-set

Use this command to clear all the RP information learnt dynamically.

clear ip pim sparse-mode bsr rp-set *

Parameter Description	Parameter	Description
	*	Clears all RP-SET.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide All the RP information learnt dynamically can be cleared manually.

Configuration Examples The following example clears all the RP information learnt dynamically.

```
FS# clear ip pim sparse-mode bsr rp-set *
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.2 clear ip pim sparse-mode track

Use this command to reconfigure the start time of the statistics and clear the PIMv6 packet counter.

clear ip pim sparse-mode track

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to reconfigure the start time of the statistics and clear the PIM packet counter.

Configuration The following example clears the PIM packet counter.

Examples FS# clear ip pim sparse-mode track

Related Commands	Command	Description
		show ip pim sparse-mode track

Platform N/A

Description

6.3 ip pim accept-bsr list

Use this command to confine the BSR address range.

Use the **no** or **default** form this command to restore the default setting.

ip pim accept-bsr list access-list

no ip pim accept-bsr

default ip pim accept-bsr

Parameter Description	Parameter	Description
		list access-list

Defaults By default, the PIMSM router receives all external BSM packets.

Command Mode Global configuration mode

Usage Guide Use this command to limit the range of the legal BSR.

Configuration The following example confines the BSR address range.

Examples FS# configure terminal
FS(config)# ip pim accept-bsr list 1

Related Commands	Command	Description
		N/A

Platform N/A

Description

6.4 ip pim accept-crp list

Use this command to confine the C-RP address range and the multicast group address range it serves.

Use the **no** or **default** form of this command to restore the default setting,

ip pim accept-crp list access-list

no ip pim accept-crp
default ip pim accept-crp

Parameter Description

Parameter	Description
list access-list	IP extension number ACL

Defaults By default, the elected BSR receives all external advertisements of candidate RPs.

Command Mode Global configuration mode

Usage Guide With this command configured on the candidate BSR, when this BSR becomes the elected BSR, it is able to limit the address range of the legal C-RP and the multicast group range it serves.

Configuration Examples The following example confines the C-RP address range and the multicast group address range it serves.

```
FS (config)# configure terminal
FS (config)# ip pim accept-crp list 100
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

6.5 ip pim accept-crp-with-null-group

Use this command to receive the C-RP-ADV packets whose prefix-count is 0.
 Use the **no** or **default** form of this command to restore the default setting.

ip pim accept-crp-with-null-group
no ip pim accept-crp-with-null-group
default ip pim accept-crp-with-null-group

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, the BSR does not receive the C-RP-ADV packets whose prefix-count is 0.

Command Mode Global configuration mode

Usage Guide With this command configured on the candidate BSR, when this BSR becomes the elected BSR, it is able to receive

the C-RP-ADV packets whose prefix-count is 0, and considers this C-RP supports all groups.

Configuration The following example receives the C-RP-ADV packets whose prefix-count is 0.

```
Examples
FS (config)# configure terminal
FS (config)# ip pim accept-crp-with-null-group
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.6 ip pim accept-register list

Use this command to confine the address range of the (S,G) entry of the register packets.

Use the **no** or **default** form of this command to restore the default setting.

ip pim accept-register { **list** access-list [**route-map** map-name] | **route-map** map-name [**list** access-list] }

no ip pim accept-register

default ip pim accept-register

Parameter Description	Parameter	Description
	list access-list	
route-map map-name		Uses a route map to define the (S, G) address range.

Defaults The (S, G) address range is not confined by default.

Command Mode Global configuration mode

Usage Guide This command is used to confine the source IP address of register messages on RP.

Configuration The following example confines the source address of register packets on the RP.

```
Examples
FS (config)# ip pim accept-register list 100
FS (config)# access-list 100 permit ip 192.168.195.0 0.0.0.255 225.1.1.1 0.0.0.255
```

Related Commands	Command	Description
	access-list	N/A

Platform N/A

Description

6.7 ip pim bsr-border

Use this command to configure the BSR border.

Use the **no** or **default** form of this command to restore the default setting.

ip pim bsr-border

no ip pim bsr-border

default ip pim bsr-border

Parameter Description

Parameter	Description
N/A	N/A

Defaults

No BSR border is configured by default.

Command Mode

Interface configuration mode

Usage Guide

To restrain BSM flooding, configure BSR border on the interface so that the interface drops BSM packets upon receiving them and the BSM packets are not forwarded from this interface.

Configuration Examples

The following example sets the BSR border on the interface g 0/3

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ip pim bsr-border
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

6.8 ip pim bsr-candidate

Use this command to configure the C-BSR.

Use the **no** or **default** form of this command to restore the default setting.

ip pim bsr-candidate interface-type interface-number [hash-mask-length [priority-value]]

no ip pim bsr-candidate

default ip pim bsr-candidate

Parameter Description

Parameter	Description
interface-type interface-number	Interface type and number

hash-mask-length	(Optional) HASK mask length configured for electing the RP in the range from 0 to 32, The default is 10.
priority-value	(Optional) Priority configured for the candidate BSR in the range from 0 to 255. The default is 64.

Defaults No C-BSR is configured by default.

Command Global configuration mode

Mode

Usage Guide A PIM-SM domain must contain a unique Bootstrap Router (BSR). BSR is responsible for collect and issue RP information. A unique recognized BSR is elected among multiple candidate BSRs through the bootstrap packet. Before BSR information is available, C-BSRs consider them to be the BSR, and regularly send bootstrap packets using the multicast address 224.0.0.13 in the PIM-SM domain. This packet contains the address and priority of the BSR.

This command allows the device to send a bootstrap message to all the PIM neighbors using the assigned BSR address. Each neighbor compares the original BSR address with the address in the received bootstrap message. If the IP address of the received address is equal to or larger than the original address, each neighbor saves this received address as the BSR address. Otherwise, they will discard this message.

The current device considers itself to be BSR until it receives a bootstrap message from another candidate BSR and is notified that it has a higher priority value (or the same priority value, but with a larger IP address).

Configuration The following example configures the C-BSR.

Examples

```
FS# configure terminal
FS(config)# ip pim bsr-candidate g 0/3 30 192
```

Related Commands

Command	Description
access-list	N/A

Platform N/A

Description

6.9 ip pim dr-priority

Use this command to set the DR priority.

Use the **no** or **default** form of this command to restore the default setting.

ip pim dr-priority priority-value

no ip pim dr-priority

default ip pim dr-priority

Parameter Description

Parameter	Description
priority-value	The larger the value, the higher the priority is. The range is from 0 to

	4,294,967,294.
--	----------------

Defaults The default is 1.

Command Mode Interface configuration mode

Usage Guide To select a DR:
 If the priority parameter of the Hello message is set for the devices in a LAN, the one of the highest priority is elected to be the DR. If several devices have the same priority, the one of the largest IP address is elected to be the DR.
 If the priority parameter of the Hello message is not set for the devices in a LAN, the one of the largest IP address is elected to be the DR.

Configuration The following example sets the DR priority.

Examples

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ip pim dr-priority 10000
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

6.10 ip pim ignore-rp-set-priority

Use this command to ignore the RP priority.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim ignore-rp-set-priority**
- no ip pim ignore-rp-set-priority**
- default ip pim ignore-rp-set-priority**

Parameter Description

Parameter	Description
N/A	N/A

Defaults By default, the C-RP with higher priority is selected.

Command Mode Global configuration mode

Usage Guide This command is used to ignore the priority of the RP.

Configuration The following example ignores the RP priority.

Examples FS(config)# ip pim ignore-rp-set-priority

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

6.11 ip pim jp-timer

Use this command to set the interval to send the join/prune message.

Use the **no** or **default** form of this command to restore the default setting.

ip pim jp-timer seconds

no ip pim jp-timer

default ip pim jp-timer

Parameter Description

Parameter	Description
seconds	Interval to send the join/prune message in the range from 1 to 65535 in the unit of seconds

Defaults The default is 60 seconds.

Command Mode Global configuration mode

Usage Guide This command is used to set the interval to send the Join/Prune message.

Configuration The following example sets the interval to send the Join/Prune message to 50 seconds.

Examples FS# configure terminal
FS(config)# ip pim jp-timer 50

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

6.12 ip pim neighbor-filter

Use this command to confine the neighbor address range.

Use the **no** or **default** form of this command to restore the default setting.

ip pim neighbor-filter access_list

no ip pim neighbor-filter access_list

default ip pim neighbor-filter access_list

Parameter Description	Parameter	Description
	access_list	Access control list supporting numerical ACL in the range 1 to 99 and name ACL

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide Neighbor filtering can enhance the security of a PIM-enabled network and provide neighbor restriction. As long as a neighbor is denied by the access list, PIM-SM will not establish the peering relationship with this neighbor or terminate the established peering relationship with this neighbor.

Configuration Examples The following example blocks the neighbor address 192.168.1.5..

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ip pim neighbor-filter 14
FS(config-if)# exit
FS(config)# access-list 14 deny 192.168.1.5 0.0.0.255
```

Related Commands	Command	Description
	access-list	N/A

Platform Description N/A

6.13 ip pim neighbor-tracking

Use this command to disable join restraint on the interface.

Use the **no** or **default** form of this command to restore the default setting.

ip pim neighbor-tracking

no ip pim neighbor-tracking

default ip pim neighbor-tracking

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode

Usage Guide Use this command to disable join restraint on the interface. With join constraint enabled, the interface is constrained not to send its Join message to the upstream neighbor when it receives the Join message that its neighbor sends to the upstream neighbor. On the other hand, with join constrain disabled, the interface will send its Join message to the upstream neighbor when it receives the Join message that its neighbor sends to the upstream neighbor. This function allows upstream routers to track how many receivers in downstream in accord with all received Join messages.

Configuration Examples The following example disables join restraint on the interface.

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ip pim neighbor-tracking
```

Related Commands	Command	Description
	ip pim propagation-delay	N/A

Platform Description N/A

6.14 ip pim override-interval

Use this command to set the override-interval on the interface.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim override-interval** milliseconds
- no ip pim override-interval**
- default ip pim override-interval**

Parameter Description	Parameter	Description
	interval-milliseconds	In the range from 1 to 65535 in the unit of milliseconds

Defaults The default is 2500 milliseconds.

Command Mode Interface configuration mode

Usage Guide Use this command to set the override-interval for the interface.

Change of propagation delay or prune delay will influence the override interval of Join/prune message. As specified in the protocol, the override interval of Join/prune message must be less than its hold time or otherwise this will cause temporary interruption.

Configuration The following example sets the override-interval as 3000 milliseconds.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ip pim override-interval 3000
    
```

Related Commands

Command	Description
ip pim propagation-delay	N/A

Platform N/A
Description

6.15 ip pim probe-interval

Use this command to set the register probe interval.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim probe-interval** seconds
- no ip pim probe-interval**
- default ip pim probe-interval**

Parameter Description

Parameter	Description
interval-seconds	In the range from 1 to 65535 seconds

Defaults The default is 5 seconds.

Command Mode Global configuration mode

Usage Guide Use this command to set the registration probe time. The DR can send the null registration message to the RP in a period before the registration suppression time expires. This period is called probe time of null registration packet.

The probe time must be less than half of registration suppression time. Furthermore, 3* registration suppression time plus registration probe time should be no more than 65535s or otherwise the system triggers an alarm.

Configuration The following example sets the probe time to 6 seconds.

Examples

```
FS# configure terminal
FS(config)# ip pim probe-interval 6
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

6.16 ip pim propagation-delay

Use this command to set the propagation-delay on the interface.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim propagation-delay** milliseconds
- no ip pim propagation-delay**
- default ip pim propagation-delay**

Parameter Description

Parameter	Description
interval-milliseconds	In the range from 1 to 32765 milliseconds

Defaults The default is 500 milliseconds.

Command Mode Interface configuration mode

Usage Guide Use this command to set the propagation-delay for the interface.

Change of propagation delay or prune delay will influence the override interval of Join/prune message. As specified in the protocol, the override interval of Join/prune message must be less than its hold time or otherwise this will cause temporary interruption.

Configuration Examples The following example sets the propagation delay to 600 milliseconds.

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ip pim propagation-delay 600
```

Related Commands

Command	Description
ip pim override-interval	N/A
ip pim neighbor-tracking	N/A

Platform N/A
Description

6.17 ip pim query-interval

Use this command to set the interval to send the hello packets.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim query-interval** seconds
- no ip pim query-interval**
- default ip pim query-interval**

Parameter Description	Parameter	Description
	interval-seconds	Interval to send the Hello message, in the range from 1 to 65535 in the unit of seconds.

Defaults The default is 30 seconds.

Command Mode Interface configuration mode

Usage Guide Upon updating the interval to send the Hello message, the time of holding the Hello message is updated by the following principle: The hold time is updated to be 3.5 times the transmission interval. If the transmission interval*3.5 is more than 65535, the hold time is updated to 18752.

Configuration Examples The following example sets the interval to send the hello packets to 123 seconds.

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ip pim query-interval 123
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.18 ip pim register-decapsulate-forward

Use this command to enable the RP to decapsulate the register packets and forward the multicast packets.
 Use the **no** or **default** form of this command to restore the default setting.

- ip pim register-decapsulate-forward**
- no ip pim register-decapsulate-forward**
- default ip pim register-decapsulate-forward**

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide Use this command to implement the decapsulate of the pim sm registration packets with the multicast data packets received on the candidate RP and forward the multicast data packets.
As the decapsulate and forward are performed by the software, it is not recommended to configure this command in the case that many registration packets need to be decapsulated and forwarded, which may cause the CPU busy with this function configured.

Configuration Examples The following example enables the RP to decapsulate the register packets and forwards the multicast packets.

```
FS# configure terminal
FS(config)# ip pim register-decapsulate-forward
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.19 ip pim register-checksum-wholepkt

Use this command to calculate the checksum of the whole register packet.
Use the **no** or **default** form of this command to restore the default setting.

- ip pim register-checksum-wholepkt [group-list access-list]**
- no ip pim register-checksum-wholepkt [group-list access-list]**
- default ip pim register-checksum-wholepkt [group-list access-list]**

Parameter Description	Parameter	Description
	access-list	

Defaults By default, the checksum of register messages calculates the head of PIM message and register message rather than the whole PIM message

Command Mode Global configuration mode

Usage Guide Some vendors calculate checksum based on the overall registration packets. FS Networks introduces this function for the compatibility with devices of other vendors.

Configuration The following example calculates the checksum of the whole register packet..

```

Examples
FS# configure terminal
FS(config)#ip pim register-checksum-wholepkt group-list 99
FS(config)# access-list 99 permit 225.1.1.1 0.0.0.255
    
```

Related Commands	Command	Description
	access-list	

Platform N/A

Description

6.20 ip pim register-rate-limit

Use this command to limit the rate of register packets. Use the **no** form of this command to restore the default setting.

- ip pim register-rate-limit rate**
- no ip pim register-rate-limit**
- default ip pim register-rate-limit**

Parameter Description	Parameter	Description
	rate	

Defaults By default, there is no rate limitation on register messages.

Command Mode Global configuration mode

Usage Guide This command is used to configure speed of transmitting register packet in each (S, G) status, not the speed of transmitting register packets in the system. Using this command will decrease the load of source DR and RP. The register packets can be transmitted at the speed within the limit.

Configuration The following example limits the rate of register packets.

```

Examples
FS# configure terminal
FS(config)# ip pim register-rate-limit 3000
    
```

Related Commands	Command	Description
	N/A	

Platform N/A
Description

6.21 ip pim register-rp-reachability

Use this command to check RP reachability before sending register packets.
 Use the **no** or **default** form of this command to restore the default setting.

ip pim register-rp-reachability
no ip pim register-rp-reachability
default ip pim register-rp-reachability

Parameter	Description
N/A	N/A

Defaults By default, the RP reachability is not checked before sending register packets.

Command Mode Global configuration mode

Usage Guide This command is used to check the RP reachability before sending register packets.. If not, register packets are not transmitted.

Configuration Examples The following example checks the RP reachability before sending register packets.

```
FS# configure terminal
FS(config)# ipv6 pim register-rp-reachability
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

6.22 ip pim register-source

Use this command to specify the source IP address of the register packets.
 Use the **no** or **default** form of this command to restore the default setting.

ip pim register-source { local_address | interface-type interface-number }
no ip pim register-source
default ip pim register-source

Parameter	Description

interface-type interface-number	Interface whose IP address is used as the source IP address of register packets
local_address	Specifies the source IP address of the register packet.

Defaults By default, the source IP address of register packets is the IP address of the DR interface connecting the multicast source.

Command Mode Global configuration mode

Usage Guide This command is used to configure the source IP address of register messages. The source IP address must be reachable. When RP receives the register packet, it transmits Register-Stop packet, using its source IP address as the destination IP address of the Register-Stop packet.

It is not necessary to enable the PIM.

Configuration Examples The following example specifies the source IP address of the register packets.

```
FS# configure terminal
FS(config)# ip pim register-source 192.168.195.80
FS(config)# ip pim register-source g 0/3
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.23 ip pim register-suppression

Use this command to set the register suppression time. Use the **no** or **default** form of this command to restore the default setting.

- ip pim register-suppression** seconds
- no ip pim register-suppression**
- default ip pim register-suppression**

Parameter Description	Parameter	Description
	suppression	

Defaults The default is 60 seconds.

Command Mode Global configuration mode

Usage Guide Executing this command on the DR will change the register packet suppression time configured. if the **ip pim**

rp-register-kat command is not configured, executing this command on RP will modify the period of RP keepalive.

Configuration The following example sets the register suppression time to 100 seconds.

```

Examples
FS# configure terminal
FS(config)# ip pim register-suppression 100
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.24 ip pim rp-address

Use this command to configure the static RP.

Use the **no** or **default** form of this command to restore the default setting.

ip pim rp-address rp-address [access_list]

no ip pim rp-address rp-address [access_list]

default ip pim rp-address rp-address [access_list]

Parameter Description	Parameter	Description
	rp-address	IP address of RP
access_list	Access control list supporting numerical ACL in the range 1 to 99 and 1300 to 1999 and name ACL. All multicast groups are supported by default.	

Defaults No IP address is configured for the static RP by default.

Command Global configuration mode

Mode

Usage Guide This system supports the configuration of multicast static RP, as well as the configuration of static RP and BSR mechanisms at the same time. When you use this command, note that:

If both the BSR mechanism and the static RP configuration take effect, the dynamic configuration takes precedence.

You can configure multiple multicast groups (using ACL) or all multicast groups (not using ACL) for the static RP. But a static RP can be configured only once.

If there are more than one static RP in a multicast group, the one of the highest IP address is used.

Only the addresses permitted by ACL are valid multicast groups. By default, all the multicast groups 224/4 are permitted.

After configuration is performed, the static RP's source IP address is inserted to the group range-based static RP group tree structure. Each group range-based static multicast group maintains the chain list structure of a static

RP group. This chain list is sorted in descending order of IP address. When you select a RP from a static RP group, the first entry, namely the one with the largest IP address, will be selected first.

Deleting a static IP address also deletes this address from all the existing static RP groups and selects one from in the existing RP group tree structure as the RP address.

Configuration The following example specifies the source IPv6 address of the register packet..

```

Examples
FS# configure terminal
FS(config)# ip pim rp-address 210.34.0.55 4
FS(config)# access-list 4 permit 255.1.1.1 0.0.0.255
    
```

Related Commands

Command	Description
access-list	N/A

Platform N/A

Description

6.25 ip pim rp-candidate

Use this command to configure the C-RP.

Use the **no** or **default** form of this command to restore the default setting.

ip pim rp-candidate interface-type interface-number [**priority** priority-value] [**interval** seconds] [**group-list** access_list]

no ip pim rp-candidate [interface-type interface-number]

default ip pim rp-candidate [**interface-type** interface-number]

Parameter Description

Parameter	Description
interface-type interface-number	Interface type and interface number
priority-value	(Optional) Priority in the range 0 to 255, 192 by default
-seconds	(Optional) Interval in the range 0 to 16383 seconds, 60s by default
access_list	(Optional) Numerical ACL in the range 1 to 99 or name ACL. By default, all multicast groups are permitted.

Defaults No C-RP is configured by default.

Command Mode Global configuration mode

Usage Guide In the PIM-SM protocol, the shared tree RPT created by the multicast routing uses the Rendezvous Point (RP) as the root node. RP is elected by the candidate RPs. After BSR is elected, all C-RPs sends C-RP messages in the unicast form to BSR regularly, and BSR spreads the messages throughout the PIM domain.

To specify an interface as the candidate RP of a specific group, execute this command with ACL. Note that the group range is calculated only based on the permit rule, not the deny rule.

Configuration The following example configures the C-RP.

```

Examples
FS# configure terminal
FS(config)# ip pim rp-candidate g 0/3 priority 200 group-list 3 interval 70
FS(config)# access-list 3 permit 255.1.1.1 0.0.0.255
    
```

Related Commands	Command	Description
	access-list	N/A

Platform N/A

Description

6.26 ip pim rp-register-kat

Use this command to set the KAT interval on the RP.

Use the **no** or **default** form of this command to restore the default setting.

ip pim rp-register-kat seconds

no ip pim rp-register-kat

default ip pim rp-register-kat

Parameter Description	Parameter	Description
	seconds	KAT timer time in the range from 1 to 65525 in the unit of seconds

Defaults The default is 210 seconds.

Command Mode Global configuration mode

Usage Guide This command is used to configure the KAT interval of RP.

Configuration The following example sets the KAT interval on the RP to 250 seconds.

```

Examples
FS# configure terminal
FS(config)# ip pim rp-register-kat 250
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.27 ip pim sparse-mode

Use this command to enable PIM-SM on the interface.

Use the **no** or **default** form of this command to restore the default setting.

ip pim sparse-mode

no ip pim sparse-mode

default ip pim sparse-mode

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide This command is used to enable PIM-SM on the interface.

- ✔ You need to enable multicast routing forwarding in the global configuration mode before enabling PIM-SM. Otherwise, multicast packets cannot be forwarded even though you enable PIM-SM.
- ✔ During the execution of this command, if the prompt "Failed to enable PIM-SM on <Interface Name>, resource temporarily unavailable, please try again" appears, re-execute this command.
- ✔ During the execution of this command, if the prompt "PIM-SM Configure failed! VIF limit exceeded in NSM!!!" appears; it indicates the allowed configured interface number exceeds the upper limit of the multicast interfaces. In this case, if you still need to enable PIM-SM on the interface, delete the unnecessary PIM-SM, PIM-DM or DVMRP interfaces.

Configuration The following example enables PIM-SM on the interface.

Examples

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ip pim sparse-mode
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.28 ip pim spt-threshold

Use this command to enable the SPT switching function.

Use the **no** or **default** form of this command to restore the default setting.

ip pim spt-threshold [**group-list** access-list]
no ip pim spt-threshold [**group-list** access-list]
default ip pim spt-threshold[**group-list** access-list]

Parameter Description	Parameter	Description
	access_list	(Optional) Numerical ACL in the range 1 to 99 and 1300 to 1999 or name ACL. By default, all multicast groups are permitted for SPT switching.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable the RP tree-to-SPT tree switching function in a specific multicast group range (using **group-list**) or all multicast groups (not using **group-list**).

Configuration Examples The following example enables the SPT switching function.

```
FS# configure terminal
FS(config)# ip pim spt-threshold
FS(config)# ip pim spt-threshold group-list 12
FS(config)# access-list 12 permit 225.1.1.1 0.0.0.255
```

Related Commands	Command	Description
	access-list	N/A

Platform Description N/A

6.29 ip pim ssm

Use this command to enable SSM and set the SSM group address range. Use the **no** or **default** form of this command to restore the default setting.

ip pim ssm { **default** | **range** access_list }
no ip pim ssm
default ip pim ssm

Parameter Description	Parameter	Description
	default	Multicast groups of 232/8
	range access_list	Numerical ACL in the range 1 to 99 and 1300 to 1999 or name ACL.

Defaults This function is disabled by default.

Command Global configuration mode
Mode

Usage Guide This command is used to enable PIM-SSM (or in some specific multicast groups).

Configuration The following command enables SSM and sets the SSM group range to 232/8:

```

Examples
FS# configure terminal
FS(config)# ip pim ssm default
The following command sets the source-specific multicast with ACL 10.
FS(config)# ip pim ssm range 10
FS(config)# access-list 10 permit 232.0.0.1 0.0.0.255
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

6.30 ip pim triggered-hello-delay

Use this command to configure Triggered-Hello-Delay time on the interface.

Use the **no** or **default** form of this command to restore the default setting.

ip pim triggered-hello-delay seconds

no ip pim triggered-hello-delay

default ip pim triggered-hello-delay

Parameter Description

Parameter	Description
interval-seconds	In the range from 1 to 5 in the unit of seconds.

Defaults The default is 5 seconds.

Command Interface configuration mode
Mode

Usage Guide Use this command to configure the triggered-hello-delay of the interface. When the interface starts or detects a new neighbor, it uses the trigger-hello-delay to generate random time, and then the interface sends the Hello message in random time.

Configuration The following command sets the triggered-hello-delay to 3 seconds.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
    
```

```
FS(config-if)# ip pim triggered-hello-delay 3
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

6.31 show debugging

Use this command to display the debugging status.

show debugging

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to turn on debugging switch.

Configuration Examples The following example displays the debugging status.

```
FS # show debugging
PIM-SM Debugging status:
PIM packet debugging is on.
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

6.32 show ip pim sparse-mode bsr-router

Use this command to display the BSR information

show ip pim sparse-mode bsr-router

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to display BSR information.

Configuration The following example displays BSR information.

```

Examples
FS# show ip pim sparse-mode bsr-router
PIMv2 Bootstrap information
This system is the Bootstrap Router (BSR)
BSR address: 192.168.127.1
Uptime:      01d23h14m, BSR Priority: 64, Hash mask length: 10
Next bootstrap message in 00:00:42
Role: Candidate BSR   Priority: 64, Hash mask length: 10
State: Elected BSR
Candidate RP: 30.30.100.200(GigabitEthernet 0/3)
Advertisement interval 60 seconds
Next Cand_RP_advertisement in 00:00:32
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.33 show ip pim sparse-mode interface

Use this command to display PIM-SM interface information.

show ip pim sparse-mode interface [interface-type interface-number] [**detail**]

Parameter Description	Parameter	Description
	interface-type interface-number	
detail		(Optional) Displays the details of an interface.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the PIM-SM information on the interface.

Configuration The following example displays the PIM-SM information on the interface.

Examples

```
FS #show ip pim sparse-mode interface detail
GigabitEthernet 0/3 (vif 2):
  Address 30.30.100.200, DR 30.30.100.200
  Hello period 30 seconds, Next Hello in 13 seconds
  Triggered Hello period 5 seconds
  Neighbors:
    30.30.100.1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.34 show ip pim sparse-mode local-members

Use this command to display the local IGMP information on the PIM-SM interface.

show ip pim sparse-mode local-members [interface-type interface-number]

Parameter Description	Parameter	Description
	interface-type interface-number	

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the local IGMP information on the PIM-SM interface.

Configuration The following example displays the local IGMP information on the PIM-SM interface.

Examples

```
FS (config-if)#sh ip pim sparse-mode local-members
PIM Local membership information
GigabitEthernet 0/3:
(*, 225.1.1.1) : Include
Loopback 1:
GigabitEthernet 0/5:
```

Related	Command	Description
---------	---------	-------------

Commands		
	N/A	N/A

Platform N/A

Description

6.35 show ip pim sparse-mode mroute

Use this command to display the PIM-SM routing information.

show ip pim sparse-mode mroute [group-or-source-address [group-or-source-address]]

Parameter Description	Parameter	Description
	group-or-source-address	Group IP address or source IP address. Two addresses cannot both be the group addresses or the source addresses.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to display routing information. Only one group IP address, one source IP address or one group IP address-source IP address pair can be configured at a time. You can also specify no group IP address or source IP address.

Configuration Examples The following example displays the PIM-SM routing information.

```
FS#show ip pim sparse-mode mroute
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.36 show ip pim sparse-mode neighbor

Use this command to display the neighbor information.

show ip pim sparse-mode neighbor [detail]

Parameter Description	Parameter	Description
	detail	(Optional) Displays the details of an interface.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the information on neighbors.

Configuration Examples The following example displays the neighbor information.

```
FS# show ip pim sparse-mode neighbor detail
Nbr 5.5.5.3 (VLAN 1)
  Expire in 81 seconds
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

6.37 show ip pim sparse-mode nexthop

Use this command to display the next hop information, including the interface ID, address and metric.

show ip pim sparse-mode nexthop

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the information on the next hop, including interface ID, IP address and metric.

Configuration Examples N/A

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

6.38 show ip pim sparse-mode rp-hash

Use this command to display the RP information corresponding to the group address.

show ip pim sparse-mode rp-hash group-address

Parameter Description	Parameter	Description
	group-address	Group address to be resolved

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the RP information corresponding to the group address.

Configuration Examples The following example displays the RP information corresponding to the group address..

```
FS# show ip pim sparse-mode rp-hash 255.1.1.1
RP: 30.30.100.1
Info source: 30.30.100.1, via bootstrap
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.39 show ip pim sparse-mode rp mapping

Use this command to display the information on all RPs and the multicast groups they serve.

show ip pim sparse-mode rp mapping

Parameter Description	Parameter	Description
	mapping	All group and RP information

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command displays the information on all RPs and the multicast groups they serve.

Configuration The following example displays the information on all RPs and the multicast groups they serve..

```

Examples
FS# show ip pim sparse-mode rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4
RP: 30.30.200.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:00:51, expires: 00:01:39
RP: 30.30.100.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:19:14, expires: 00:01:38
Group(s): 224.0.0.0/4, Static
RP: 100.100.100.100
Uptime: 00:45:35
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

6.40 show ip pim sparse-mode track

Use this command to display the number of sent and received PIM packets during the period from the beginning of the statistics till now.

show ip pim sparse-mode track

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command is used to display the number of sent and received PIM packets during the period from the beginning of the statistics till now.. When the system starts up, it sets the start time of the statistics. The start time of the statistics is reconfigured and the PIM packet counter is cleared on calling the **clear ip pim sparse-mode track** every time.

Configuration Examples The following example displays the number of sent and received PIM packets during the period from the beginning of the statistics till now.

```

FS # show ip pim sparse-mode track
    
```

```

PIM packet counters track
Elapsed time since counters cleared: 00:04:03
                received    sent
Valid PIMSM packets:    0          8
Hello:                  0          8
Join-Prune:             0          0
Register:               0          0
Register-Stop:         0          0
Assert:                 0          0
BSM:                    0          0
C-RP-ADV:               0          0
PIMDM-Graft:           0
PIMDM-Graft-Ack :      0
PIMDM-State-Refresh:   0
Unknown PIM Type:      0
Errors:
Malformed packets:      0
Bad checksums:          0
Send errors:            0
Packets received with unknown PIM version: 0
    
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

7 PIM-SMv6 Commands

7.1 clear ipv6 mroute

Use this command to clear multicast routing entries.

clear ipv6 mroute { * | ipv6_group_address | ipv6_group_address ipv6_source_address }

Parameter Description	Parameter	Description
	*	Deletes all the multicast routing entries.
	ipv6_group_address	Deletes the multicast routing entries of the specific group.
	ipv6_group_address source_address	Deletes the multicast routing entries of the specific group and source IPv6 address.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Multicast routing entries can be deleted manually.

Configuration Examples The following example clears the multicast routing entries.

```
FS# clear ipv6 mroute *
FS# clear ipv6 mroute ff66::6666
FS# clear ipv6 mroute ff66::6666 3333::3333
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.2 clear ipv6 mroute statistics

Use this command to delete the statistics of the multicast routing entries.

clear ipv6 mroute statistics { * | ipv6_group_address [ipv6_source_address] }

Parameter Description	Parameter	Description
	*	Deletes the statistics of all multicast routing entries.
	ipv6_group_address	Deletes the statistics of the multicast routing entries of the specific group.
	ipv6_group_address ipv6_source_address	Deletes the statistics of the multicast routing entries of the specific group and source IPv6 address.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The statistics of multicast routing entries can be deleted manually.

Configuration The following example deletes the statistics of the multicast routing entries.

```

Examples
FS# clear ipv6 mroute statistics *
FS# clear ipv6 mroute statistics ff66::6666
FS# clear ipv6 mroute statistics ff66::6666 3333::3333
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.3 clear ipv6 pim sparse-mode bsr rp-set

Use this command to clears the RP information learnt dynamically.

clear ipv6 pim sparse-mode bsr rp-set *

Parameter Description	Parameter	Description
	*	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide All the RP information learnt dynamically can be cleared manually.

Configuration The following example clears the RP information learnt dynamically.

```

Examples
FS# clear ipv6 pim sparse-mode bsr rp-set *
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.4 clear ipv6 pim sparse-mode track

Use this command to reconfigure the start time of the statistics and clear the PIMv6 packet counter.

clear ipv6 pim sparse-mode track

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to reconfigure the start time of the statistics and clear the PIMv6 packet counter.

Configuration Examples The following example clears the PIMv6 packet counter.

```
FS# clear ipv6 pim sparse-mode track
```

Related Commands	Command	Description
	show ipv6 pim sparse-mode track	N/A

Platform Description N/A

7.5 ipv6 pim accept-bsr list

Use this command to confine the BSR address range. Use the **no** or **default** form this command to restore the default setting.

ipv6 pim accept-bsr list ipv6_access-list

no ipv6 pim accept-bsr

default ipv6 pim accept-bsr

Parameter Description	Parameter	Description
	list ipv6_access-list	IPv6 standard name ACL

Defaults By default, the PIM-SMv6 router receives all external BSM packets.

Command Mode Global configuration mode

Usage Guide Use this command to confine the range of the legal BSR.

Configuration The following example confines the BSR address range.

```
FS# configure terminal
FS(config)# ipv6 pim accept-bsr list bsr-list
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.6 ipv6 pim accept-crp list

Use this command to confine the C-RP address range and the multicast group address range it serves. Use the no or default form of this command to restore the default setting,

ipv6 pim accept-crp list ipv6_access-list

no ipv6 pim accept-crp

default ipv6 pim accept-crp-with-null-group

Parameter Description	Parameter	Description
	list ipv6_access-list	list ipv6_access-list

Defaults No address is filtered by default.

Command Mode Global configuration mode

Usage Guide With this command configured on the candidate BSR, when this BSR becomes the elected BSR, it is able to limit the address range of the legal C-RP and the multicast group range it serves.

Configuration The following example confines the C-RP address range and the multicast group address range it serves..

```
FS (config)# configure terminal
FS (config)# ipv6 pim accept-crp list crp-list
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.7 ipv6 pim accept-crp-with-null-group

Use this command to receive the C-RP-ADV packets whose prefix-count is 0. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim accept-crp-with-null-group
no ipv6 pim accept-crp-with-null-group
default ipv6 pim accept-crp

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide With this command configured on the candidate BSR, when this BSR becomes the elected BSR, it is able to receive the C-RP-ADV packets whose prefix-count is 0, and considers this C-RP supports all groups.

Configuration Examples The following example receives the C-RP-ADV packets whose prefix-count is 0.

```
FS (config)# configure terminal
FS (config)# ipv6 pim accept-crp-with-null-group
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.8 ipv6 pim accept-register list

Use this command to confine the address range of the (S,G) entry of the register packets. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim accept-register { list ipv6_access-list [route-map map-name] | route-map map-name [list ipv6_access-list] }
no ipv6 pim accept-register
default ipv6 pim accept-register

Parameter Description	Parameter	Description
	list ipv6_access-list	Access control list supporting name ACL
	route-map map-name	Defines the routing map rule

Defaults The range is not confined by default.

Command Mode Global configuration mode

Usage Guide This command is used to confine the source IPv6 address of register messages on RP. If the unauthorized register source is received, the RP will return the Register-Stop message immediately.

Configuration Examples The following example confines the source IPv6 address of register packets on the RP.

```

FS# configure terminal
FS(config)# ipv6 pim accept-register list register-access-list
FS(config)# ipv6 access-list register-access-list
The following example denies the register message of the specified source fe80::2d0:f8ff:fe22:33ad
FS(config-ipv6-acl)# deny ipv6 fe80::2d0:f8ff:fe22:33ad/128 any
    
```

Related Commands

Command	Description
ipv6 access-list	N/A

Platform Description N/A

7.9 ipv6 pim bsr-border

Use this command to configure the BSR border. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 pim bsr-border**
- no ipv6 pim bsr-border**
- default ipv6 pim bsr-border**

Parameter Description

Parameter	Description
N/A	N/A

Defaults No BSR border is configured by default.

Command Mode Interface configuration mode

Usage Guide To restrain BSM flooding, configure BSR border on the interface so that the interface drops BSM packets upon receiving them and the BSM packets are not forwarded from this interface.

Configuration The following example sets the BSR border on the interface g 0/3.

Examples

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ipv6 pim bsr-border
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.10 ipv6 pim bsr-candidate

Use this command to configure the C-BSR. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim bsr-candidate interface-type interface-number [hash-mask-length [priority-value]]

no ipv6 pim bsr-candidate

default ipv6 pim bsr-candidate

Parameter Description	Parameter	Description
	interface-type interface-number	Interface type and number.
	hash-mask-length	(Optional) HASK mask length configured for electing the RP in the range from 0 to 128. The default is 126.
	priority-value	(Optional) Priority configured for the candidate BSR in the range from 0 to 255. The default is 64.

Defaults No C-BSR is configured by default.

Command Mode Global configuration mode

Usage Guide

A PIM-SMv6 domain must contain a unique Bootstrap Router (BSR). BSR is responsible for collect and issue RP information. A unique recognized BSR is elected among multiple candidate BSRs through the bootstrap packet. Before BSR information is available, C-BSRs consider them to be the BSR, and regularly send bootstrap packets using the multicast address 224.0.0.13 in the PIM-SM domain. This packet contains the address and priority of the BSR.

This command allows the device to send a bootstrap message to all the PIM neighbors using the assigned BSR address. Each neighbor compares the original BSR address with the address in the received bootstrap message. If the IPv6 address of the received address is equal to or larger than the original address, each neighbor saves this received address as the BSR address. Otherwise, they will discard this message.

The current device considers itself to be BSR until it receives a bootstrap message from another candidate BSR and is notified that it has a higher priority value (or the same priority value, but with a larger IPv6 address).

Configuration The following example s configures the C-BSR.

```

Examples
FS# configure terminal
FS(config)# ipv6 pim bsr-candidate g 0/3 30 100
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.11 ipv6 pim dr-priority

Use this command to configure the DR priority, Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim dr-priority priority-value

no ipv6 pim dr-priority

default ipv6 pim dr-priority

Parameter Description	Parameter	Description
	priority-value	

Defaults The default is 1.

Command Mode Interface configuration mode

Usage Guide To select a DR:

- If the priority parameter of the Hello message is set for the devices in a LAN, the one of the highest priority is elected to be the DR. If several devices has the same priority, the one of the largest IP address is elected to be the DR.
- If the priority parameter of the Hello message is not set for the devices in a LAN, the one of the largest IP address is elected to be the DR.

Configuration The following example configures the DR priority.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ipv6 pim dr-priority 11234
    
```

Related Commands	Command	Description

N/A	N/A
-----	-----

Platform N/A
Description

7.12 ipv6 pim ignore-rp-set-priority

Use this command to ignore the RP priority. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim ignore-rp-set-priority
no ipv6 pim ignore-rp-set-priority
default ipv6 pim ignore-rp-set-priority

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the C-RP with higher priority is selected.

Command Global configuration mode
Mode

Usage Guide This command is used to ignore the priority of the RP corresponding to the multicast group.

Configuration The following example ignores the RP priority.

Examples

```
FS# configure terminal
FS(config-if)# ipv6 pim ignore-rp-set-priority
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.13 ipv6 pim jp-timer

Use this command to set the interval to send the join/prune message. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim jp-timer seconds
no ipv6 pim jp-timer
default ipv6 pim jp-timer

Parameter	Parameter	Description
Description		

seconds	Interval to send the join/prune message in the range from 1 to 65535 in the unit of seconds
---------	---

Defaults The default is 60.

Command Global configuration mode

Mode

Usage Guide This command is used to set the interval to send the Join/Prune message.

Configuration The following example sets the interval to send the Join/Prune message to 100 seconds.

Examples

```
FS# configure terminal
FS(config)# ipv6 pim jp-timer 100
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.14 ipv6 pim neighbor-filter

Use this command to confine the neighbor address range. Use the **no** or **default** form of this command to restore the default setting.

```
ipv6 pim neighbor-filter ipv6_access-list
no ipv6 pim neighbor-filter ipv6_access-list
default ipv6 pim neighbor-filter ipv6_access-list
```

Parameter Description

Parameter	Description
ipv6_access_list	Access control list supporting name ACL

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide Neighbor filtering can enhance the security of a PIM-enabled network and provide neighbor restriction. As long as a neighbor is denied by the access list, PIM-SM will not establish the peering relationship with this neighbor or terminate the established peering relationship with this neighbor.

Configuration The following example block the neighbor address fe80::2d0:f8ff:fe22:33ad/128.

Examples

```
FS# configure terminal
```



```

FS(config)# interface g 0/3
FS(config-if)# ipv6 pim neighbor-filter acl
FS(config-if)# exit
FS(config-if)# ipv6 access-list acl
The following example denies the neighbor fe80::2d0:f8ff:fe22:33ad
FS(config-ipv6-acl)# deny ipv6 fe80::2d0:f8ff:fe22:33ad/128 any
    
```

Related Commands

Command	Description
ipv6_access-list	N/A

Platform N/A
Description

7.15 ipv6 pim neighbor-tracking

Use this command to disable join restraint on the interface. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 pim neighbor-tracking**
- no ipv6 pim neighbor-tracking**
- default ipv6 pim neighbor-tracking**

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command Mode Interface configuration mode

Usage Guide Use this command to disable join restraint on the interface. With join constraint enabled, the interface is constrained not to send its Join message to the upstream neighbor when it receives the Join message that its neighbor sends to the upstream neighbor. On the other hand, with join constrain disabled, the interface will send its Join message to the upstream neighbor when it receives the Join message that its neighbor sends to the upstream neighbor. This function allows upstream routers to track how many receivers in downstream in accord with all received Join messages.

Configuration Examples The following example disables join restraint on the interface.

```

FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ipv6 pim neighbor-tracking
    
```

Related

Command	Description
---------	-------------

Commands	
ipv6 pim propagation-delay	N/A

Platform N/A

Description

7.16 ipv6 pim override-interval

Use this command to set the override-interval on the interface, Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim override-interval milliseconds

no ipv6 pim override-interval

default ipv6 pim override-interval


Parameter	Description
interval-milliseconds	In the range 1 to 65535 in the unit of milliseconds

Defaults The default is 2500 milliseconds.

Command Interface configuration mode

Mode

Usage Guide Use this command to set the override-interval for the interface.

 Change of propagation delay or prune delay will influence the override interval of Join/prune message. As specified in the protocol, the override interval of Join/prune message must be less than its hold time or otherwise this will cause temporary interruption.

Configuration The following example sets the override-interval to 3000 milliseconds.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ipv6 pim override-interval 3000
    
```

Related Commands	Command	Description
	ipv6 pim propagation-delay	N/A

Platform N/A

Description

7.17 ipv6 pim probe-interval

Use this command to set the register probe interval. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim probe-interval seconds
no ipv6 pim probe-interval
default ipv6 pim probe-interval

Parameter Description	Parameter	Description
	seconds	In the range from 1 to 65535 in the unit of seconds

Defaults The default is 5 seconds.

Command Mode Global configuration mode

Usage Guide Use this command to set the registration probe time. The DR can send the null registration message to the RP in a period before the registration suppression time expires. This period is called probe time of null registration packet.

- ✔ The probe time must be less than half of registration suppression time. Furthermore, 3* registration suppression time plus registration probe time should be no more than 65535s or otherwise the system triggers an alarm.

Configuration Examples The following example sets the probe time as 6 seconds.

```
FS# configure terminal
FS(config)# ipv6 pim probe-interval 6
```

Related Commands	Command	Description
	ipv6 pim register-suppression	N/A

Platform Description N/A

7.18 ipv6 pim propagation-delay

Use this command to set the propagation-delay on the interface. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim propagation-delay milliseconds
no ipv6 pim propagation-delay
default ipv6 pim propagation-delay

Parameter Description	Parameter	Description
	interval-milliseconds	In the range from 1 to 32765 in the unit of milliseconds

Defaults The default is 500 milliseconds.

Command Interface configuration mode
Mode

Usage Guide Use this command to set the propagation-delay for the interface.

- ✔ Change of propagation delay or prune delay will influence the override interval of Join/prune message. As specified in the protocol, the override interval of Join/prune message must be less than its hold time or otherwise this will cause temporary interruption.

Configuration The following example sets the propagation delay to 600 milliseconds.

Examples

```
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ipv6 pim propagation-delay 600
```

Related Commands

Command	Description
ipv6 pim override-interval	N/A
ipv6 pim neighbor-tracking	N/A

Platform N/A
Description

7.19 ipv6 pim query-interval

Use this command to set the interval to send the hello packets. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 pim query-interval** seconds
- no ipv6 pim query-interval**
- default ipv6 pim query-interval**

Parameter Description

Parameter	Description
seconds	Interval to send the Hello message in the range from 1 to 65535 in the unit of seconds

Defaults The default is 30.

Command Interface configuration mode
Mode

Usage Guide Upon updating the interval to send the Hello message, the time of holding the Hello message is updated by the following principle: The hold time is updated to be 3.5 times the transmission interval. If the transmission interval*3.5 is more than 65535, the hold time is updated to 18725.

Configuration The following example sets the interval to send the hello packets.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config)# ipv6 pim query-interval 60
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.20 ipv6 pim register-checksum-wholepkt

Use this command to calculate the checksum of the whole register packet. Use the **no** or **default** form of this command to restore the default setting.

```

ipv6 pim register-checksum-wholepkt [ group-list ipv6_access-list ]
no ipv6 pim register-checksum-wholepkt [ group-list ipv6_access-list ]
default ipv6 pim register-checksum-wholepkt [ group-list ipv6_access-list ]
    
```

Parameter Description

Parameter	Description
group-list ipv6_access-list	Access-list: access control list supporting name ACL. Group-list ipv6_access-list :all multicast packets use this configuration by default

Defaults By default, the checksum of register messages calculates the head of PIM message and register message rather than the whole PIM message.

Command Mode Global configuration mode

Usage Guide Some vendors calculate checksum based on the overall registration packets. FS Networks introduces this function for the compatibility with these vendors.

Configuration The following example calculates the checksum of the whole register packet.

```

Examples
FS# configure terminal
FS(config)#ipv6 pim register-checksum-wholepkt group-list checksum-access-list
FS(config)# ipv6 access-list 99 checksum-access-list
FS(config-ipv6-acl)# permit ipv6 any ff66::6666/64
    
```

Related Commands

Command	Description
ipv6 access-list	N/A

Platform N/A
Description

7.21 ipv6 pim register-rate-limit

Use this command to limit the rate of register packets. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim register-rate-limit rate
no ipv6 pim register-rate-limit
default ipv6 pim register-rate-limit

Parameter Description

Parameter	Description
rate	Maximum number of register packets that can be sent per second, in the range from 1 to 65535.

Defaults By default, there is no rate limitation on register messages.

Command Mode Global configuration mode

Usage Guide This command is used to configure speed of transmitting register packet in each (S, G) status, not the speed of transmitting register packets in the system. Using this command will decrease the load of source DR and RP. The register packets can be transmitted at the speed within the limit.

Configuration Examples The following example limits the rate of register packets.

```
FS# configure terminal
FS(config)# ipv6 pim register-rate-limit 3000
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.22 ipv6 pim register-rp-reachability

Use this command to check RP reachability before sending register packets. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim register-rp-reachability
no ipv6 pim register-rp-reachability
default ipv6 pim register-rp-reachability

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the RP reachability is not checked before sending register packets.

Command Mode Global configuration mode

Usage Guide This command is used to check the RP reachability before transmission. If not, register packets are not transmitted.

Configuration Examples The following example checks the RP reachability before sending register packets.

```
FS# configure terminal
FS(config)# ipv6 pim register-rp-reachability
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.23 ipv6 pim register-source

Use this command to specify the source IPv6 address in the register packets. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim register-source { ipv6_local_address | interface-type interface-number }

no ipv6 pim register-source

default ipv6 pim register-source

Parameter Description	Parameter	Description
	ipv6_local_address	Source IPv6 address of register packets
	interface-type interface-number	Interface whose IPv6 address is used as the source IPv6 address of register packets

Defaults By default, the source IPv6 address of register packets is the IPv6 address of the DR interface connecting the multicast source.

Command Mode Global configuration mode

Usage Guide This command is used to configure the source IPv6 address of register messages.

The source IPv6 address must be reachable. When RP receives the register packet, it transmits Register-Stop packet, using its source IPv6 address as the destination IPv6 address of the Register-Stop packet.

It is not necessary to enable the PIM-SMv6 on the associated interfaces.

Configuration The following example configures the source IPv6 address of register messages.

```

Examples
FS# configure terminal
FS(config)# ipv6 pim register-source 3333::3333
FS(config)# ipv6 pim register-source g 0/3
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.24 ipv6 pim register-suppression

Use this command to set the register suppression time. Use the **no** or **default** form of this command to restore the default setting.

```

ipv6 pim register-suppression seconds
no ipv6 pim register-suppression
default ipv6 pim register-suppression
    
```

Parameter Description	Parameter	Description
	suppression	

Defaults The default is 60 seconds.

Command Mode Global configuration mode

Usage Guide Executing this command on the DR will change the register packet suppression time configured. if the ipv6 pim rp-register-kat command is not configured, executing this command on RP will modify the period of RP keepalive.

Configuration The following example sets the register packet suppression time.

```

Examples
FS# configure terminal
FS(config)# ipv6 pim register-suppression 100
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.25 ipv6 pim rp-address

Use this command to configure the static RP. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim rp-address ipv6_rp-address [ipv6_access_list]
no ipv6 pim rp-address ipv6_rp-address [ipv6_access-list]
default ipv6 pim rp-address ipv6_rp-address [ipv6_access-list]

Parameter Description

Parameter	Description
ipv6_rp-address	IPv6 address of RP
ipv6_access_list	Access control list supporting name ACL

Defaults No IPv6 address is configured for the static RP by default.

Command Mode Global configuration mode

Usage Guide This system supports the configuration of multicast static RP, as well as the configuration of static RP and BSR mechanisms at the same time. When you use this command, note that:

- If both the BSR mechanism and the static RP configuration take effect, the dynamic configuration takes precedence.
- You can configure multiple multicast groups (using ACL) or all multicast groups (not using ACL) for the static RP. But a static RP can be configured only once.
- If there are more than one static RP in a multicast group, the one of the highest IPv6 address is used.
- Only the addresses permitted by ACL are valid multicast groups. By default, all the multicast groups 224/4 are permitted.
- After configuration is performed, the static RP's source IPv6 address is inserted to the group range-based static RP group tree structure. Each group range-based static multicast group maintains the chain list structure of a static RP group. This chain list is sorted in descending order of IPv6 address. When you select a RP from a static RP group, the first entry, namely the one with the largest IPv6 address, will be selected first.

Deleting a static IPv6 address also deletes this address from all the existing static RP groups and selects one from in the existing RP group tree structure as the RP address.

Configuration Examples The following example configures the RP static address.

```
FS# configure terminal
FS(config)# ipv6 pim rp-address 3333::3333 acl
FS(config)# ipv6 pim rp-address 210.34.0.55 4
FS(config)# ipv6 access-list ac
FS(config)# permit ipv6 any ff66::6666/64
```

Related Commands	Command	Description
	ipv6 access-list	N/A

Platform N/A
Description

7.26 ipv6 pim rp-candidate

Use this command to configure the C-RP. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim rp-candidate interface-type interface-number [**priority** priority-value] [**interval** interval-seconds] [**group-list** ipv6_access-list]

no ipv6 pim rp-candidate [interface-type interface-number]

default ipv6 pim rp-candidate [interface-type interface-number]

Parameter Description	Parameter	Description
	interface-type interface-number	Interface type and interface number
	priority-value	(Optional) Priority in the range from 0 to 255, 192 by default
	interval-seconds	(Optional) Interval in the range from 0 to 16383 in the unit of seconds, 60 by default
	ipv6_access_list	(Optional) ACL name. By default, all multicast groups are permitted.

Defaults N/A

Command Mode Global configuration mode

Usage Guide In the PIM-SMv6 protocol, the shared tree RPT created by the multicast routing uses the Rendezvous Point (RP) as the root node. RP is elected by the candidate RPs. After BSR is elected, all C-RPs sends C-RP messages in the unicast form to BSR regularly, and BSR spreads the messages throughout the PIM domain.
 To specify an interface as the candidate RP of a specific group, execute this command with ACL. Note that the group range is calculated only based on the permit rule, not the deny rule.

Configuration Examples The following example configures the RP candidate.

```
FS# configure terminal
FS(config)# ipv6 pim rp-candidate g 0/3 priority 200 group-list acl interval 40
FS(config)# ipv6 access-list acl
FS(config-ipv6-acl)# permit ipv6 any ff66::6666/64
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.27 ipv6 pim rp embedded

Use this command to enable the embedded RP function. Use the **no** or **default** form of this command to disable this function.

ipv6 pim rp embedded [group-list ipv6_acl_name]
no ipv6 pim rp embedded
default ipv6 pim rp embedded

Parameter Description	Parameter	Description
	group-list ipv6_acl_name	Enables embedded RP for the IPv6 multicast address of specified embedded RP address.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable the embedded RP function explicitly and to enable the embedded RP for the IPv6 multicast address of specified embedded RP address.

Configuration Examples The following example enables the embedded RP for the IPv6 multicast addresses of all embedded RP addresses.

```
FS(config)# ipv6 pim rp embedded
```

Related Commands	Command	Description
	ipv6 access-list	N/A

Platform N/A
Description

7.28 ipv6 pim rp-register-kat

Use this command to set the survival time of (S, G) entry created by the register packet on the RP. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim rp-register-kat seconds
no ipv6 pim rp-register-kat
default ipv6 pim rp-register-kat

Parameter Description	Parameter	Description
	seconds	KAT timer time in the range from 1 to 65525 in the unit of seconds.

Defaults The default is equal to the sum of register probe time and three times register suppression time.

Command Mode Global configuration mode

Usage Guide This command is used to configure the KAT interval of RP.

Configuration Examples The following example configures the KAT interval of RP.

```
FS# configure terminal
FS(config)# ipv6 pim rp-register-kat 250
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.29 ipv6 pim sparse-mode

Use this command to enable PIM-SMv6 on the interface. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim sparse-mode

no ipv6 pim sparse-mode

default ipv6 pim sparse-mode

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide This command is used to enable PIM-SMv6 on the interface.

- ✔ You need to enable multicast routing forwarding in the global configuration mode before enabling PIM-SMv6. Otherwise, multicast packets cannot be forwarded even though you enable PIM-SM.
- ✔ During the execution of this command, if the prompt "Failed to enable PIM-SMv6 on <Interface Name>,"

resource temporarily unavailable, please try again" appears, re-execute this command.

- ✓ During the execution of this command, if the prompt "PIM-SMv6 Configure failed! VIF limit exceeded in NSM!!!" appears, it indicates the allowed configured interface number exceeds the upper limit of the multicast interfaces. In this case, if you still need to enable PIM-SMv6 on the interface, delete the unnecessary PIM-SMv6, or PIM-DMv6 interfaces.
- ✓ If the interface is of tunnel-type, only 6Over4 configuration tunnel, 6Over GRE tunnel, 6Over4 configuration tunnel and 6Over6 GRE tunnel support the IPv6 multicasting at the moment. The multicasting can also be enabled on other tunnel interfaces which do not support the multicasting, but no error message will be displayed and no multicast packets will be received and forwarded.
- ✓ The multicast tunnel can only be built on the Ethernet interface, the nested tunnel and the multicast data Qos/ACL are not supported.

Configuration The following example enables PIM-SMv6 on the interface.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ipv6 pim sparse-mode
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.30 ipv6 pim spt-threshold

Use this command to enable SPT switch. Use the **no** or **default** form of this command to restore the default setting.

```

ipv6 pim spt-threshold [group-list ipv6_access-list ]
no ipv6 pim spt-threshold [ group-list ipv6_access-list ]
default ipv6 pim spt-threshold [ group-list ipv6_access-list ]
    
```

Parameter Description	Parameter	Description
	ipv6_access_list	(Optional) supporting name ACL. By default, all multicast groups are permitted for SPT switching.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable the RP tree-to-SPT tree switching function in a specific multicast group range

(using group-list) or all multicast groups (not using group-list) .

Configuration The following example enables the SPT switch.

```

Examples
FS(config)# ipv6 pim spt-threshold acl
FS(config)# ipv6 access-list acl
FS(config-ipv6-acl)# permit ipv6 fe80::2d0:f8ff:fe22:33ad /128 ff66::6666/64
    
```

Related Commands	Command	Description
		ipv6 access-list

Platform N/A

Description

7.31 ipv6 pim ssm

Use this command to enable SSM and set the SSM group address range. Use the **no** or **default** form of this command to restore the default setting.

```

ipv6 pim ssm { default | range ipv6_access-list }
no ipv6 pim ssm
default ipv6 pim ssm
    
```

Parameter Description	Parameter	Description	
		default	Group in the range of FF3x::/32
		range ipv6_access_list	Supporting name ACL.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable PIM-SSMv6 (or in some specific multicast groups).

Configuration The following example sets the source-specific multicast of the multicast group range acl.

```

Examples
FS# configure terminal
FS(config)# ipv6 pim ssm range acl
The following example uses SSM for the source address fe80::2d0:f8ff:fe22:33ad, group range of ff32::3333/64.
FS(config-ipv6-acl)# permit ipv6 fe80::2d0:f8ff:fe22:33ad /128 ff32::3333/64
    
```

Related Commands	Command	Description
		ipv6 access-list

Platform N/A

Description

7.32 ipv6 pim static-rp-preferred

Use this command to configure a higher priority for static RP over the C-RP, Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim static-rp-preferred
no ipv6 pim static-rp-preferred
default ipv6 pim static-rp-preferred

Parameter
Description

Parameter	Description
N/A	N/A

Defaults By default, the priority of the RP elected through BSR mechanism is high than the one configured statically.

Command Interface configuration mode
Mode

Usage Guide With this command configured, the priority of the static RP is higher than the one elected through the BSR mechanism.

Configuration Examples The following example configures the priority of the static RP is higher than the one elected through the BSR mechanism.

```
FS# configure terminal
FS(config-if)# ipv6 pim static-rp-preferred
```

Related
Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.33 ipv6 pim triggered-hello-delay

Use this command to configure Triggered-Hello-Delay time on the interface. Use the **no** or **default** form of this command to restore the default setting.

ipv6 pim triggered-hello-delay seconds
no ipv6 pim triggered-hello-delay
default ipv6 pim triggered-hello-delay

Parameter
Description

Parameter	Description
-----------	-------------

interval-seconds	In the range from 1 to 5 in the unit of seconds.
------------------	--

Defaults The default is 5 seconds.

Command Mode Interface configuration mode

Usage Guide Use this command to configure the triggered-hello-delay of the interface. When the interface starts or detects a new neighbor, it uses the trigger-hello-delay to generate random time, and then the interface sends the Hello message at the random time.

Configuration The following example sets the triggered-hello-delay to 3 seconds.

```

Examples
FS# configure terminal
FS(config)# interface g 0/3
FS(config-if)# ipv6 pim triggered-hello-delay 3
    
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

7.34 show debugging

Use this command to display the debugging status.

show debugging

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command is used to turn on debugging switch.

Configuration The following example displays the debugging status.

```

Examples
FS # show debugging
PIM-SM Debugging status:
PIM packet debugging is on.
    
```


Related Commands	Command	Description
		N/A

Platform N/A
Description

7.35 show ipv6 pim sparse-mode bsr-router

Use this command to display the BSR information.

show ipv6 pim sparse-mode bsr-router

Parameter Description	Parameter	Description
		N/A

Defaults Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Command Mode Privileged EXEC mode/ global configuration mode / interface configuration mode

Usage Guide This command is used to display BSR information.

Configuration The following example displays BSR information.

Examples

```

FS# show ipv6 pim sparse-mode bsr-router
PIMv2 Bootstrap information
This system is the Bootstrap Router (BSR)
BSR address: 3333::8888
Uptime:00:03:31, BSR Priority: 64, Hash mask length: 126
Next bootstrap message in 00:00:47
Role: Candidate BSR Priority: 64, Hash mask length: 126
State: Elected BSR
Candidate RP: 3333::8888(GigabitEthernet 0/5)
Advertisement interval 60 seconds
Next Cand_RP_advertisement in 00:00:37
    
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

7.36 show ipv6 pim sparse-mode interface

Use this command to display PIM-SMv6 interface information.

show ipv6 pim sparse-mode interface [interface-type interface-number [**detail**]]

Parameter Description	Parameter	Description
	interface-type interface-number	(Optional) Interface name. This command takes effect for all interfaces by default.
	detail	(Optional) Displays the details of an interface.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command displays the PIM-SMv6 information on the interface.

Configuration Examples The following example displays the PIM-SMv6 interface information.

```
FS #show ipv6 pim sparse-mode interface detail
GigabitEthernet 0/5 (vif 1):
Address fe80::2d0:f8ff:fe22:33ad, DR fe80::2d0:f8ff:fe22:34b3
Hello period 30 seconds, Next Hello in 6 seconds
Triggered Hello period 5 seconds
Secondary addresses:
    3333::8888
    4444::4444
Neighbors:
    fe80::2d0:f8ff:fe22:34b3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.37 show ipv6 pim sparse-mode local-members

Use this command to display the local MLD information on the PIM-SMv6 interface.

show ipv6 pim sparse-mode local-members [interface-type interface-number]

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

interface-type interface-number	(Optional) Interface name. This command takes effect for all interfaces by default.
---------------------------------	---

Defaults N/A

Command Mode Privileged EXEC mode/ global configuration mode / interface configuration mode

Usage Guide This command displays the local MLD information on the PIM-SMv6-enabled interface.

Configuration Examples The following example displays the local MLD information on the PIM-SMv6 interface.

```
FS (config-if)#show ipv6 pim sparse-mode local-members
PIM Local membership information
GigabitEthernet 0/5:
(*, ff66::6666) : Include
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.38 show ipv6 pim sparse-mode mroute

Use this command to display the PIM-SMv6 routing information.

show ipv6 pim sparse-mode mroute [group-or-source-address [group-or-source-address]]

Parameter Description	Parameter	Description
	group-or-source-address	group-or-source-address

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command is used to display route information. Only one group IPv6 address, one source IPv6 address or one group IPv6 address-source IPv6 address pair can be configured at a time. You can also specify no group IP address or source IPv6 address.

Configuration Examples N/A

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.39 show ipv6 pim sparse-mode neighbor

Use this command to display the neighbor information.

show ipv6 pim sparse-mode neighbor [detail]

Parameter Description	Parameter	Description
	detail	(Optional) Displays the details of an interface.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command displays the information on neighbors.

Configuration Examples The following example displays the neighbor information..

```
FS# show ipv6 pim sparse-mode neighbor detail
Nbr fe80::2d0:f8ff:fe22:34b3 (GigabitEthernet 0/5)
Expires in 86 seconds
Secondary addresses:
6666::6666
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.40 show ipv6 pim sparse-mode nexthop

Use this command to display the next hop information, including the interface ID, address and metric.

show ipv6 pim sparse-mode nexthop

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command displays the information on the next hop, including interface number, IP address and metric.

Configuration Examples N/A

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.41 show ipv6 pim sparse-mode rp-hash

Use this command to display the RP information corresponding to the group address.

show ipv6 pim sparse-mode rp-hash ipv6-group-address

Parameter Description	Parameter	Description
	ipv6_group-address	ipv6_group-address

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command displays the information on the RP of the specific IPv6 address.

Configuration Examples The following example displays the RP information corresponding to the group address..

```
FS# show ipv6 pim sparse-mode rp-hash ff66::6666
RP: 3333::8888
Info source: 3333::8888, via bootstrap
PIMv2 Hash Value 126
RP 3333::8888, via bootstrap, priority 192, hash value 1468234650
```

Related Commands	Command	Description

N/A	N/A
-----	-----

Platform N/A
Description

7.42 show ipv6 pim sparse-mode rp mapping

Use this command to display the information on all RPs and the multicast groups they serve.

show ipv6 pim sparse-mode rp mapping

Parameter Description	Parameter	Description
	mapping	All groups and RP information.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode / Interface configuration mode

Usage Guide This command displays the information on all RPs and the multicast groups they serve.

Configuration Examples The following example displays the information on all RPs and the multicast groups they serve.

```
FS# show ipv6 pim sparse-mode rp mapping
PIM Group-to-RP Mappings
This system is the Bootstrap Router (v2)
Group(s): ff00::8
  RP: 3333::1
    Info source: 3333::1, via bootstrap, priority 192
    Uptime: 00:12:40, expires: 00:01:50
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.43 show ipv6 pim sparse-mode track

Use this command to display the number of sent and received PIM packets during the period from the beginning of the statistics till now.

show ipv6 pim sparse-mode track

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults N/A

Command Mode Privileged EXEC mode/ global configuration mode / interface configuration mode

Usage Guide This command is used to display the number of sent and received PIM packets during the period from the beginning of the statistics till now.. When the system starts up, it sets the start time of the statistics. The start time of the statistics is reconfigured and the PIMv6 packet counter is cleared on calling the clear ipv6 pim sparse-mode track every time.

Configuration Examples The following example displays the number of sent and received PIM packets during the period from the beginning of the statistics till now.

```

FS# show ipv6 pim sparse-mode track
PIMv6 packet counters track
Elapsed time since counters cleared: 00:04:03
      received      sent
Valid PIMSMv6 packets:  0          8
Hello:                  0          8
Join-Prune:            0          0
Register:              0          0
Register-Stop:        0          0
Assert:                0          0
BSM:                   0          0
C-RP-ADV:              0          0
PIMDMv6-Graft:        0
PIMDMv6-Graft-Ack:    0
PIMDMv6-State-Refresh: 0
Unknown PIMv6 Type:   0
Errors:
Malformed packets:    0
Bad checksums:        0
Send errors:          0
Packets received with unknown PIMv6 version:  0
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8 MSDP Commands

8.1 clear ip msdp peer

Use this command to clear specific MSDP peer. This will clear the connection to the MSDP peer and then reestablish the connection to MSDP peer. The statistics of MSDP peer will be cleared at the same time.

clear ip msdp peer peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to clear the TCP connection to the specified MSDP peer and clear all the MSDP peer statistics.

Configuration Examples The following example clears MDSP peer of 218.14.5.23.

```
FS# clear ip msdp peer 218.14.5.23
```

Related Commands	Command	Description
	N/A	N/A

Platform Description This command is supported only on L3 devices.

8.2 clear ip msdp sa-cache

Use this command to clear SA cache entries.

clear ip msdp sa-cache [group-address]

Parameter Description	Parameter	Description
	group-address	Group address. If the multicast group address is not specified, all SA cache entries will be cleared; if the multicast group address is specified, the SA cache entries of this multicast group will be cleared.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear the SA cache entries learned from MSDP peer. If no multicast group address is specified, all SA cache entries will be cleared.
After SA cache entries are cleared, the MSDP device will need to relearn SA messages.

Configuration Examples The following example clears the SA cache entries with the multicast group 224.1.1.1.

```
FS# clear ip msdp sa-cache 224.1.1.1
```

Related Commands

Command	Description
N/A	N/A

Platform Description This command is supported only on L3 devices.

8.3 clear ip msdp statistics

Use this command to clear the statistics of MSDP peers without resetting the TCP sessions.

clear ip msdp statistics [peer-address]

Parameter Description

Parameter	Description
peer-address	IP address of MSDP peer whose statistics counters, reset count, and input/output count will be cleared.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear the statistics of MSDP peers and view the new statistics of MSDP peers. This command can clear the statistics of one or more MDSP peers without resetting the MSDP peer.

Configuration Examples The following example clears the statistics of the MSDP peer with IP address being 61.83.1.52.

```
FS# clear ip msdp statistics 61.83.1.52
```

Related Commands

Command	Description
N/A	N/A

Platform Description This command is supported only on L3 devices.

8.4 ip msdp default-peer

Use this command to define a default MSDP peer.

Use **no** or **default** form of this command to restore the default setting.

ip msdp default-peer peer-address [**prefix-list** prefix-list-name]

no ip msdp default-peer peer-address

default ip msdp default-peer peer-address

Parameter Description

Parameter	Description
peer-address	IP address of MSDP peer
prefix-list prefix-list-name	Specifies the BGP prefix list.

Defaults

By default, no default MSDP peer is configured.

Command

Global configuration mode

Mode

Usage Guide

The RPF-Peer calculation rule for the specified RP address may leads the loss of RPF-Peer information, which causes that the SA messages are dropped directly without the Peer-RPF check. With a default peer configured, the SA messages are ensured to pass the Peer-RFP check, so that the local host could accept the SA messages to learn the multicast source information carried by the SA messages.

If "prefix-list prefix-list-name" is not specified, all SA messages from the default MSDP peer will be accepted.

If "prefix-list prefix-list-name" is specified, only the SA messages from the RP specified by prefix-list prefix-list-name will be accepted.

If "prefix-list prefix-list-name" is specified but the prefix list is not configured, all SA messages from this default MSDP peer will be accepted.

Configuration

The following example configures 172.16.33.1 as the default peer.

Examples

```
FS(config)# ip msdp peer 172.16.33.1
FS(config)# ip msdp peer 172.16.34.2
FS(config)# ip msdp default-peer 172.16.33.1
```

Related

Commands

Command	Description
ip msdp peer	Creates MSDP peer.

Platform

This command is supported only on layer-3 device.

Description

8.5 ip msdp description

Use this command to add descriptive information for MSDP peer.

Use **no** or **default** form of this command to restore the default setting.

ip msdp description peer-address text

no ip msdp description peer-address
default ip msdp description peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer
	text	Descriptive information for MSDP peer

Defaults No descriptive information is configured for MSDP peer.

Command Mode Global configuration mode

Usage Guide The administrator can configure descriptive information for MSDP peers in order to identify them conveniently. If the descriptive information A is specified for an MSDP peer, A is displayed. If no descriptive information is specified, "No description" is displayed.

Configuration Examples The following example configures the descriptive information for peer 172.17.1.2 as "customer-a".

```
FS(config)# ip msdp description 172.171.1.2 customer-a
```

Related Commands	Command	Description
	show ip msdp peer	Displays the descriptive information for MSDP peer.

Platform Description This command is supported only on L3 devices.

8.6 ip msdp filter-sa-request

Use this command to filter the SA request messages sent from MSDP peer.

Use the **no** or **default** form of this command to restore the default setting.

ip msdp filter-sa-request peer-address [**list** access-list]
no ip msdp filter-sa-request peer-address
default ip msdp filter-sa-request peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer
	list access-list	The standard IP access list number or name for limiting multicast group addresses

Defaults All SA request messages from MSDP peer will be accepted and replied.

Command Global configuration mode
Mode

Usage Guide Use this command to control which SA request messages will be accepted and replied.
 If no access list is specified, all SA request messages will be ignored. If the access list is specified, only the SA request messages from the multicast group permitted by the access list will be accepted, and other messages will be ignored.

Configuration Examples The following example configures to filter SA request messages from peer 172.16.223.1 and only accept SA request messages with group address falling within 224.0.1.0-224.0.1.255.

```
FS(config)# ip msdp filter-sa-request 172.16.223.1 list 1
FS(config)# access-list 1 permit 224.0.1.1 0.0.0.255
```

Related Commands

Command	Description
ip msdp peer	Creates MSDP peer.

Platform This command is supported only on L3 devices.
Description

8.7 ip msdp mesh-group

Use this command to configure a MSDP peer to be a member of a mesh group.
 Use the **no** form of this command to remove the configuration.
 Use the **default** form of this command to restore the default settings.

- ip msdp mesh-group** mesh-name peer-address
- no ip msdp mesh-group** mesh-name peer-address
- default ip msdp mesh-group** mesh-name peer-address

Parameter Description

Parameter	Description
mesh-name	Name of mesh group, case sensitive
peer-address	IP address of MSDP peer to be a member of mesh group.

Defaults No mesh group will be created, and MSDP peers do not belong to any mesh group.

Command Global configuration mode
Mode

Usage Guide All MSDP peers in the mesh group shall be fully meshed, namely MSDP peer relationship has been established between every two members in the mesh group.
 The SA received by one member of the mesh group won't be forwarded to other members in the same mesh group, thus reducing SA flooding and simplify Peer-RPF forwarding.

Configuration The following example configures MSDP peer at address 192.168.1.3 to be a member of the mesh group named "msdp-mesh".

Examples

```
FS(config)# ip msdp mesh-group msdp-mesh 192.168.1.3
```

Related

Commands

Command	Description
show ip msdp mesh-group	Displays the information of mesh group.

Platform

This command is supported only on L3 devices.

Description

8.8 ip msdp originator-id

Use this command to allow a speaker that originates a SA message to use the IP address of the interface as the originator address in the SA message.

Use the **no** form of this command to remove this configuration.

Use the **default** form of this command to restore the default setting.

ip msdp originator-id interface-type interface-number

no ip msdp originator-id

default ip msdp originator-id

Parameter

Description

Parameter	Description
interface-type	Interface type and interface number
interface-number	The master IP address of this interface will be used as the originator address in the SA messages. If no IP address is configured for this interface, or the interface is shut down, then the originator address in the SA messages won't use the master IP address of this interface, but use the RP address configured by PIM.

Defaults

By default, the originator address in SA messages will be the RP address configured by PIM.

Command

Global configuration mode

Mode

Usage Guide

Under certain circumstances, you may expect to change the originator address in SA messages, such as during Anycast-RP deployment. By this time, you can use this command to modify the originator address in SA messages.

Configuration

The following example uses the IP address of Loopback0 as the RP address in SA messages.

Examples

```
FS(config)# ip msdp originator-id loopback0
```

Related

Command	Description
---------	-------------

Commands	
N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.9 ip msdp password

Use this command to enable MD5 encryption of the TCP connection between MSDP peers.

Use the **no** or **default** form of this command to restore the default setting.

ip msdp password peer peer-address [encryption-type] string

no ip msdp password peer peer-address

default ip msdp password peer peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer
	encryption-type	Grade of password: 0 (lowest level)-7 (highest level). Currently, only 0 and 7 are supported. The default encryption type is 0.
	string	The password used for TCP MD5 authentication. Range: up to 80 characters when the encryption type is 0; up to 160 characters when the encryption type is 7.

Defaults MD5 encryption of the TCP connection between MSDP peers is not enabled.

Command Global configuration mode

Mode

Usage Guide When it is needed to authenticate the MSDP peers, you can enable MD5 encryption of TCP connection between MSDP peers. In such a case, two interconnected MSDP peers must be configured with MD5 authentication with same password, or else the connection will fail.


If the password is configured or changed, the local MSDP device won't terminate the current session, but will try to use the new password to maintain the current session until timeout.

If you have configure the password locally for the MSDP peer but no password is configured on MSDP, the following warning message will be displayed on the console:

```
%TCP-6-BADAUTH: MD5 digest NOT expected but found (200.200.200.6, 39996)->(200.200.200.16, 639)
```

If different MD5 passwords are configured between MSDP peers, the following warning message will be displayed on the console:

```
%TCP-6-BADAUTH: MD5 digest failed for (200.200.200.6, 12302)->(200.200.200.16, 639)
```

 If the encryption type is 7, the entered encryption key must be even and not less than 4.

Configuration The following example configures the MD5 password of "test" for the MSDP peer of 10.32.43.144.

Examples

```
FS(config)# ip msdp password peer 10.32.43.144 0 test
```

Related Commands	Command	Description
		N/A

Platform This command is supported only on L3 devices.

Description

8.10 ip msdp peer connect-source

Use this command to create MSDP peer.

Use **no** or **default** form of this command to remove MSDP peer.

ip msdp peer peer-address **connect-source** interface-type interface-number

no ip msdp peer peer-address

default ip msdp peer peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer
	connect-source interface-type interface-number	Interface type and interface number. The local MSDP device uses the main address of this interface as the source IP for the TCP connection to the remote MSDP peer. Loopback interface is recommended. If no IP address is configured for this interface, or the interface is shut down, then MSDP peer relation cannot be established.

Defaults No MSDP peer is created.

Command Mode Global configuration mode

Usage Guide To enable MSDP, MSDP peer must be created.

Configuration Examples The following example configures the main address of interface loopback 0 as the source address for establishing MSDP peer relation with 192.168.5.1.

```
FS(config)# ip msdp peer 192.168.5.1 connect-source loopback 0
```

Related Commands	Command	Description
		show ip msdp peer

Platform This command is supported only on L3 devices.

Description

8.11 ip msdp redistribute

Use this command to configure which (S, G) entries from the multicast routing table can be advertised to MSDP peers.

Use the **no** form of this command to remove this configuration.

Use the **default** form of this command to restore the default settings.

ip msdp redistribute [**list** access-list-name] [**route-map** route-map-name]

no ip msdp redistribute

default ip msdp redistribute

Parameter Description	Parameter	Description
	list access-list-name	Number or name of an extended IP access list that controls which multicast routes (S, G) can be advertised.
	route-map route-map-name	Defines route-map.

Defaults All multicast sources (S, G) registered on the local RP will be advertised.

Command Mode Global configuration mode

Usage Guide After redistribution filtering is configured, the (S, G) information from the local AS or the other AS can be added to the MSDP only through redistribution filtering.

If "**list** access-list-name" is specified, only those matched multicast routes (S, G) will be advertised.

If "**route-map** map-name" is specified, only multicast routes (S, G) matching the criteria given in "map-name" will be advertised.

If two keywords are specified, then multicast routes (S, G) matching all conditions will be advertised.

If the "**ip msdp redistribute**" command is configured with no keywords, no multicast sources will be advertised.

Configuration Examples The following example configures to only advertise multicast routes with multicast source being 200.200.200.0/24 and group address being 225.1.1.0/24.

```
Router(config)# ip msdp redistribute list 100
Router(config)# ip access-list extended 100
Router(config-ext-nacl)# permit ip 200.200.200.0 0.0.0.255 225.1.1.0 0.0.0.255
```

Related Commands	Command	Description
	ip msdp sa-filter in	Configures the incoming filter for SA messages.
	ip msdp sa-filter out	Configures the outgoing filter for SA messages.

Platform Description This command is supported only on L3 devices.

8.12 ip msdp sa-filter in

Use this command to configure an incoming filter for SA messages.

Use the **no** or **default** form of this command to remove the incoming filter.

ip msdp sa-filter in peer-address [**list** access-list-name] [**route-map** route-map-name] [**rp-list** rp-access-list-name] [**rp-route-map** rp-route-map-name]

no ip msdp sa-filter in peer-address

default ip msdp sa-filter in peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer
	list access-list-name	Number or name of an extended IP access list that controls which multicast routes (S, G) can be received.
	route-map route-map-name	Specify the name of route-map; only SA messages matching the criteria given in "map-name" can pass through.
	rp-list rp-access-list-name	Number or name of standard access list that controls RPs.
	rp-route-map rp-route-map-name	Specify the name of route map for RP; only the SA messages matching rp-map-name can be accepted.

Defaults All incoming SA messages will be accepted without filtering.

Command Global configuration mode

Mode

Usage Guide If the command is configured, but no access list or route map is specified, all incoming SA messages will be filtered.

If only the **list** keyword or the **route-map** keyword is used, the multicast source (S, G) in SA messages matching the criteria corresponding to this keyword will be accepted.

If only the **rp-list** keyword or the **rp-route-map** keyword is used, the SA message will be accepted if the RP address carried in SA message matches the criteria corresponding to this keyword.

If two or more keywords of **list**, **route-map**, **rp-list** and **rp-route-map** are used, the SA message will be accepted if any multicast source (S, G) in SA message meet the criteria corresponding to all keywords.

Configuration The following example configures that all SA messages from the peer of 10.234.1.43 will be filtered.

Examples

```
FS(config)# ip msdp peer 10.234.1.43
FS(config)# ip msdp sa-filter in 10.234.1.43
```

Related Commands	Command	Description
	ip msdp peer	Configures MSDP peer.
	ip msdp sa-filter-out	Configures the outgoing filter for SA messages received from MSDP peers.

Platform This command is supported only on L3 devices.

Description

8.13 ip msdp sa-filter out

Use this command to configure an outgoing filter for SA messages.

Use the **no** or **default** form of this command to remove the outgoing filter.

ip msdp sa-filter out peer-address [**list** access-list-name] [**route-map** route-map-name] [**rp-list** rp-access-list-name] [**rp-route-map** rp-route-map-name]

no ip msdp sa-filter out peer-address

default ip msdp sa-filter out peer-address

Parameter Description

Parameter	Description
peer-address	IP address of MSDP peer
list access-list-name	Number or name of an extended IP access list that controls which multicast routes (S, G) can be received.
route-map route-map-name	Specify the name of route-map; only SA messages matching the criteria given in "map-name" can pass through.
rp-list rp-access-list-name	Number or name of standard access list that controls RPs.
rp-route-map rp-route-map-name	Specify the name of route map for RP; only the SA messages matching rp-map-name can be accepted.

Defaults The outgoing SA messages won't be filtered. All SA messages received will be forwarded to the MSDP peer.

Command Mode Global configuration mode

Usage Guide If the command is configured, but no access list or route map is specified, all SA messages won't be forwarded to this MSDP peer.

If only one keyword of **list**, **route-map**, **rp-list** and **rp-route-map** is used, the multicast source pair (S, G) will be forwarded to this MSDP peer if the criteria corresponding to this keyword are met.

If two or more keywords of **list**, **route-map**, **rp-list** and **rp-route-map** are used, the (S, G) pair will only be forwarded to this MSDP peer if criteria corresponding to all keywords are met.

Configuration Examples The following example allows only multicast sources that pass access list 100 to be forwarded to the peer of 10.234.1.43.

```
FS(config)# ip msdp peer 10.234.1.43
FS(config)# ip msdp sa-filter out 10.234.1.43 list 100
FS(config)# access 100 permit ip 10.211.0.0 0.0.255.255 224.12.0.0 0.0.255.255
```

Related Commands

Command	Description
ip msdp peer	Configures MSDP peer.

ip msdp sa-filter-in	Configures the incoming filter for SA messages received from MSDP peers.
-----------------------------	--

Platform This command is supported only on L3 devices.

Description

8.14 ip msdp sa-limit

Use this command to configure the allowable maximum number of SA cache entries from a MSDP peer.

Use the **no** or **default** form of this command to restore the default settings.

ip msdp sa-limit peer-address sa-limit

no ip msdp sa-limit peer-address

default ip msdp sa-limit peer-address

Parameter	Parameter	Description
Description	peer-address	IP address of MSDP peer
	sa-limit	Maximum number of SA messages from an MSDP peer allowed in the SA cache.

Defaults The maximum number of SA messages from an MSDP peer allowed in the SA cache is not limited.

Command Global configuration mode

Mode

Usage Guide It is suggested to configure this command on all MSDP peers to prevent SA flooding attacks from MSDP peers

Configuration Examples The following example configures the SA message limit to 100 for the MSDP peer with IP address being 172.16.3.1.

```
FS(config)# ip msdp sa-limit 172.16.3.1 100
```

Related Commands	Command	Description
	N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.15 ip msdp shutdown

Use this command to shut down the connection to MSDP peer.

Use the **no** or **default** form of this command to restore the default settings.

ip msdp shutdown peer-address

no ip msdp shutdown peer-address

default ip msdp shutdown peer-address

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer

Defaults The connection to peer is not shut down.

Command Mode Global configuration mode

Usage Guide Only the TCP connection to the specified MSDP peer will be shut down. Neither the MSDP peer nor its configurations will be cleared.

Configuration Examples The following example shuts down the MSDP peer at IP address 192.168.7.20.

```
FS(config)# ip msdp shutdown 192.168.7.20
```

Related Commands	Command	Description
	ip msdp peer	Creates MSDP peer.

Platform Description This command is supported only on L3 devices.

8.16 ip msdp timer

Use this command to configure the interval for timer re-connection.

Use the **no** or **default** form of this command to restore the default settings.

ip msdp timer interval

no ip msdp time

default ip msdp timer

Parameter Description	Parameter	Description
	interval	Interval for timer re-connection, within the range from 1 to 60 (in second)

Defaults The default interval is 30 seconds.

Command Mode Global configuration mode

Usage Guide By default, the interval for timer re-connection is 30 seconds, that is, the peer in active end can initiate only one TCP connection within 30 seconds. In certain applications, the interval is expected to be decreased in order to accelerate convergence of MSDP peering relation.

Configuration The following example sets the interval for timer re-connection to 20 seconds.

Examples FS(config)# **ip msdp timer** 20

Related Commands	Command	Description
	N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.17 ip msdp ttl-threshold

Use this command to limit the TTL value of multicast data packets carried in SA messages in order to limit the transmission of multicast packets.

Use the **no** or **default** form of this command to restore to the default settings.

ip msdp ttl-threshold peer-address ttl-value

no ip msdp ttl-threshold peer-address

default ip msdp ttl-threshold peer-address

Parameter Description	Parameter	Description
	peer-address	peer-address
ttl-value	ttl-value	TTL value (0-255)

Defaults TTL threshold is 0 by default.

Command Mode Global configuration mode

Usage Guide This command limits multicast data packets which are sent in data-encapsulated SA messages. Only multicast packets with an IP-header TTL greater than or equal to the ttl-value will be sent to the MSDP peer. If the TTL value of multicast data is less than the threshold configured, then the multicast data will be separated from SA messages and discarded, and the SA messages without multicast data will be sent to the MSDP peer. This command only limits the transmission of multicast data in SA messages without compromising the transmission of multicast sources in SA messages

Configuration The following example configures the TTL threshold for peer at IP address 192.168.10.1 to 8 hops:

Examples FS(config)# **ip msdp ttl-threshold** 192.168.10.1 8

Related Commands	Command	Description
	N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.18 ip msdp peer-limit

Use this command to set the upper limit of MSDP peers.
 Use the **no** form of this command to remove the configuration.
 Use the **default** form of this command to restore the default settings.

ip msdp peer-limit peer-limit
no ip msdp peer-limit
default ip msdp peer-limit

Parameter Description	Parameter	Description
	peer-limit	The upper limit of MSDP peers, in the range from 1 to 128.

Defaults The default is 64.

Command Global configuration mode

Mode

Usage Guide This command is used to set the upper limit of MSDP peers. If the number of existing MSDP peers exceeds the upper limit to be configured, you should delete some peers, or the configuration will fail.

Configuration Examples The following example sets the upper limit of MSDP peers to 128.

```
FS(config)# ip msdp peer-limit 128
```

Platform Description This command is supported only on L3 devices.

8.19 ip msdp global-sa-limit

Use this command to configure the maximum SA cache.
 Use the **no** form of this command to remove the configuration.
 Use the **default** form of this command to restore the default settings.

ip msdp global-sa-limit sa-limit
no ip msdp global-sa-limit sa-limit
default ip msdp global-sa-limit sa-limit

Parameter Description	Parameter	Description
	sa-limit	The maximum SA cache, in the range from 1 to 4,096

Defaults The default SA cache is 1,024.

Command Mode Global configuration mode

Usage Guide This command is used to set the maximum SA cache. It's recommended to configure it at the beginning of startup. When MSDP is running, the increase in maximum SA cache has no influence upon the previously learned entries; the decrease in maximum SA cache will clear all entries learned before and start caching again.

Configuration Examples The following example sets the maximum SA cache to 4,096.

```
FS(config)# ip msdp global-sa-limit 4096
```

Platform Description This command is supported only on L3 devices.

8.20 show ip msdp count

Use this command to display the number of sources and groups originated in SA messages and the number of SA messages from an MSDP peer in the SA cache.

show ip msdp count [as-number]

Parameter Description	Parameter	Description
	as-number	Display the number of sources and groups originated in SA messages from the specified autonomous system number.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration Examples FS# sh ip msdp count
SA State per Peer Counters, <Peer>: <# SA learned>

```
1.1.1.2: 0
100.100.100.14 : 0
100.100.100.15 : 0
100.100.100.200: 0
200.200.200.2 : 2
200.200.200.3 : 0
200.200.200.6 : 0
200.200.200.13 : 0
200.200.200.66 : 0
```

SA State per ASN Counters, <asn>: <# sources>/<# groups>

Total entries: 2

100: 1/2 .

Field	Description
200.200.200.200:2	MSDP peer with IP address 200.200.200.200; 2 SA messages in the SA cache.
Total entries	Total number of SA entries in the SA cache.
?:1/2	Unknown autonomous system: 1 source address/2 multicast group addresses

Related Commands

Command	Description
N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.21 show ip msdp mesh-group

Use this command to display the information of mesh group.

show ip msdp mesh-group

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration

```
FS# sh ip msdp mesh-group
```

Examples

MSDP peers in each Mesh-group,<Mesh-group name>:<# peers>

```
msdp-mesh
```

```
1.1.1.2
```

```
1.1.1.3
```

Field	Description
msdp-mesh	Name of mesh group
1.1.1.2	One MSDP peer under this mesh group.

Related

Command	Description
---------	-------------

Commands		
	N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.22 show ip msdp peer

Use this command to display detailed information about the MSDP peer.

show ip msdp peer [peer-address]

Parameter Description	Parameter	Description
	peer-address	IP address of MSDP peer

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration Examples

```

FS#show ip msdp peer 20.0.0.1
MSDP PEER 20.0.0.1 (No description), AS unknown
  Connection status:
    State: Listen, Resets: 1, Connection source: GigabitEthernet 0/1 (20.0.0.2)
    Uptime(Downtime): 00:00:25, Message sent/received: 13/19
    Input messages discarded: 0
    Connection and counters cleared 00:13:25 ago
    Local Address of connection: 20.0.0.2
    MD5 signature protection on MSDP TCP connection: enabled
  SA Filtering:
    Input (S,G) Access-list filter: None
    Input (S,G) route-map filter: None
    Input RP Access-list filter: None
    Input RP Route-map filter: None
    Output (S,G) Access-list filter: None
    Output (S,G) Route-map filter: None
    Output RP Access-list filter: None
    Output RP Route-map filter: None
  SA-Requests:
    Input filter: None
  Peer ttl threshold: 0
  SAs learned from this peer: 2, SAs limit: No-limit
    
```

```

Message counters:
  SA messages discarded: 0
  SA messages in/out: 13/0
  SA Requests discarded/in: 0/0
  SA Responses out: 0
  Data Packets in/out: 6/0
    
```

Field	Description
MSDP Peer	IP address of MSDP peer.
AS	Autonomous system to which the MSDP peer belongs. If it is an unknown AS, "unknown" will be displayed.
State:	State of the MSDP peer.
Connection source:	Interface used to obtain the source address for TCP connection.
Uptime(Downtime):	Up time/down time of MSDP peer.
Messages sent/received:	Number of SA messages received.
SA Filtering:	SA filtering information.
SAs learned from this peer:	Number of SA entries learned from MSDP peer.
SAs limit:	SA message limit for this MSDP peer.

Related Commands

Command	Description
N/A	N/A

Platform This command is supported only on L3 devices.

Description

8.23 show ip msdp rpf-peer

Use this command to show the information about MSDP RPF peer corresponding to the specified originator address.

show ip msdp rpf-peer ip-address

Parameter Description

Parameter	Description
ip-address	IP address of the originator of SA messages

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide Use this command to learn the Peer-RFP information about the originator.

Configuration The following example displays the rpf-peer information of RP at address 1.1.1.1:

Examples

```
FS# sh ip msdp rpf-peer 1.1.1.1
RPF peer information for 1.1.1.1
RPF peer: 200.200.200.2
RPF rule: Peer is only active peer
RPF route/mask: Not-used
RPF type: Not-used
```

Related Commands	Command	Description
	N/A	N/A

Platform This command is only supported on L3 devices.

Description

8.24 show ip msdp sa-cache

Use this command to display (S, G) state learned.

show ip msdp sa-cache [group-address | source-address] [group-address | source-address] [as-number]

Parameter Description	Parameter	Description
	group-address source -address	Group address or source address of the group or source about which (S, G) information is displayed.
as-number	Autonomous system number generated by SA messages.	

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays (S, G) state learned.

Examples

```
FS# sh ip msdp sa-cache
MSDP Source-Active Cache: 2 entries
MSDP Source-Active Cache: 2 entries
(200.200.200.200, 227.1.2.2), RP: 20.20.20.20, (M)BGP/AS 100, 04:17:09/00:02:05, Peer 200.200.200.2
  Learned from peer 200.200.200.2, RPF peer 200.200.200.2,
  SAs received: 277, Encapsulated data received: 0
(200.200.200.200, 227.1.2.3), RP: 20.20.20.20, (M)BGP/AS 100, 04:17:09/00:02:05, Peer 200.200.200.2
  Learned from peer 200.200.200.2, RPF peer 200.200.200.2,
  SAs received: 277, Encapsulated data received: 0
```

Field	Description
-------	-------------

(200.200.200.200, 227.1.1.2.2)	Source address and group address.
RP 20.20.20.20	RP address generating SA messages.
MBGP/AS	The autonomous system of the RP generating SA messages is unknown.
04:17:09/00:02:05	The route has been cached for 4 hours 17 minutes and 9 seconds. If no SA message is received in 2 minutes and 5 seconds, it will be removed from the SA cache.

Related Commands

Command	Description
N/A	N/A

Platform This command is only supported on L3 devices.

Description

8.25 show ip msdp sa-originated

Use this command to display the (S, G) information to be sent by the local device. The (S, G) information has passed redistribution filtering.

show ip msdp sa-originated

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide This command can be used to display the (S, G) information sent by the local device that is the RP in PIM-SM with the multicast source (S, G) registered and is configured with MSDP peer. (S, G) information displayed has passed redistribution filtering, but, whether the information can be sent to the MSDP peer requires the results of egress filtering for the information.

Configuration The following is sample output of "show ip msdp sa-originated" command.

Examples

```
FS# sh ip msdp sa-originated
MSDP Source-Active Originated: 5 entries
(192.168.23.78, 225.0.0.1), RP: 192.168.23.249
(192.168.23.79, 225.0.0.2), RP: 192.168.23.249
(192.168.23.80, 225.0.0.3), RP: 192.168.23.249
(192.168.23.81, 225.0.0.4), RP: 192.168.23.249
(192.168.23.82, 225.0.0.5), RP: 192.168.23.249
```

Field	Description
-------	-------------

(192.168.23.78, 225.0.0.1)	The source address (the first IP address) and group address (the second IP address) of SA to be sent.
RP 192.168.23.249	RP address of SA sent.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.26 show ip msdp summary

Use this command to display the summary information about all MSDP peers.

show ip msdp summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide If the local device configured with MSDP peers is the PIM-SM Rendezvous Point (RP) and multicast sources (S,G) registers in the RP, the command will display: (S,G) to Send
 The displayed (S,G) have gone through redistribution filtering (command: **ip msdp redistribute**). However, whether these (S,G) will be delivered to MSDP peers successfully relies on the outgoing filter (command: **ip msdp sa-filter out**).

Configuration Examples The following example displays the summary information about all MSDP peers.

```
FS# sh ip msdp summary

Msdp Peer Status Summary
Peer Address      As      State      Uptime/Downtime  Reset-Count  Sa-Count
Peer-description
200.200.200.2    100    Up         04:22:11         10           6616      No
description
200.200.200.3    100    Down      19:17:13         4            0
peer-A
```

Field	Description
Peer Address	IP address of MSDP peer

AS	Autonomous system to which the MSDP peer belongs
State	State of the MSDP peer
Uptime/Downtime	Up time or down time of MSDP peer

**Related
Commands**

Command	Description
N/A	N/A

Platform

This command is only supported on L3 devices.

Description

9 IGMP Snooping Commands

9.1 clear ipv6 mld snooping gda-table

Use this command to clear the forwarding table information learned dynamically.

clear ipv mld snooping gda-table

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear the forwarding table information learned dynamically.

Configuration Examples The following example clears the forwarding table information learned dynamically:

```
FS# clear ip mld snooping gda-table
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

9.2 clear ipv6 mld snooping statistics

Use this command to clear the MLD Snooping statistics, including the entry number, the entry volume, the number of various received packets, the group information and the interface information of the corresponding group.

clear ip mld snooping statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use the **show ip mld snooping** command to verify the configuration.

Configuration The following example clears the MLD Snooping statistics.

Examples FS# clear ip mld snooping statistics

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

9.3 deny

To deny the forwarding of the multicast streams in the range specified by the profile, execute the deny configuration command in the profile configuration mode.

Parameter N/A

Description

Default The forwarding of the multicast streams in the range specified by the profile is denied.

Command Mode Profile configuration mode

Usage Guide First, configure the multicast range using the range command in the profile configuration mode. In addition, the profile must be applied to the interface in order to make the profile configuration take effect.

The following is an example of deny the forwarding of the multicast stream 224.2.2.2:

Configuration Examples

```
FS(config)# ip igmp profile 1
FS(config-profile)# range 224.2.2.2
FS(config-profile)# deny
```

Related Commands	Command	Description
	ip igmp profile	Creates a profile.
range	Configures the multicast address range.	

9.4 ip igmp profile

This is a mode navigation command. Use this command to select a profile and enter the IGMP profile configuration mode.

ip igmp profile profile-number

no ip igmp profile profile-number

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

profile-number	Profile number, in the range from 1 to 65535
----------------	--

Default N/A.

Command Mode Global configuration mode

Usage Guide The profile must be applied to the specified interface in order to make the profile take effect.

Configuration The following is an example of creating a profile numbered 1 and entering the profile configuration mode.

Examples

```
FS(config)# ip igmp profile 1
FS(config-profile)#
```

Related Commands

Command	Description
range	Configures the multicast address range.

9.5 ip igmp snooping

Use this command to enable IVGL mode.

ip igmp snooping ivgl

Use this command to enable SVGL mode.

ip igmp snooping svgl

Use this command to enable IVGL-SVGL mode.

ip igmp snooping ivgl-svgl

Use the **no** form of this command to disable IGMP snooping.

no ip igmp snooping

default ip igmp snooping

Parameter

Description N/A.

Default Disabled.

Command

Mode Global configuration mode

Usage Guide N/A

Configuration The following example demonstrates how to enable IGMP snooping and enter the IVGL mode:

Examples

```
FS(config)# ip igmp snooping ivgl
```

9.6 ip igmp snooping dyn-mr-aging-time

To configure the aging time of the routing interface that the switch learns dynamically, execute the **ip igmp snooping dyn-mr-aging-time** command .

ip igmp snooping dyn-mr-aging-time time
no ip igmp snooping dyn-mr-aging-time

Parameter	Parameter	Description
Description	time	Aging time of the routing interface that the switch learns dynamically

Defaults 300s.

Command Mode Global configuration mode.

Usage Guide When the dynamic routing interface learning function is enabled, this command sets the aging time of the routing interface. If the aging time is set too short, the routes may be added and deleted frequently.

Configuration Set the aging time of the routing interface that the switch learns dynamically to 100 s:

Examples

```
FS(config)# ip igmp snooping dyn-mr-aging-time 100
```

Related Commands	Command	Function
	ip igmp snooping	Enables IGMP snooping.

9.7 ip igmp snooping fast-leave enable

To enable the fast leave function, execute the **ip igmp snooping fast-leave enable** command in the global configuration mode. The **no** form of this command is used to disable the function.

ip igmp snooping fast-leave enable
no ip igmp snooping fast-leave enable

Parameter	Parameter	Description
Description	N/A	

Defaults Disabled.

Command Mode Global configuration mode

Usage Guide After you execute this command to enable the fast-leave function, the system will remove the corresponding multicast group on the corresponding interface upon the receipt of the IGMP leave message.

Subsequently, when the system receives a specific group query packet, the system does not forward it to the corresponding interface. Leave packets include IGMPv2 leave packets and IGMPv3 report packets of

the include type without source addresses. The fast leave function applies to scenarios in which one interface is connected to only one host. This function saves bandwidth and resources.

Configuration The following example enables the fast leave function on the switch:

Examples FS(config)# ip igmp snooping fast-leave

Related Commands	Command	Function
	N/A	

9.8 ip igmp snooping filter

To configure a port to receive a specific set of multicast streams, execute the **ip igmp snooping filter** command in the interface configuration mode to associate the port to a specific profile. The **no** form of this command is used to delete the associated profile.

ip igmp snooping filter profile-number

no ip igmp snooping filter profile-number

Parameter	Parameter	Description
Description	profile-number	Profile number

Default N/A.

Command Mode Global configuration mode or interface configuration mode.

Usage Guide A specific profile must be created before association.

Configuration The following example demonstrates how to associate profile 1 to a megabit port 0/1:

Examples FS(config)# interface fastEthernet 0/1
FS(config-if)# ip igmp snooping filter 1

Related Commands	Command	Description
	ip igmp profile	Create a profile.

9.9 ip igmp snooping host-aging-time

Use this command to configure the aging time of IGMP dynamic ports. The **no** form of this command is used to restore the default aging time.

ip igmp snooping host-aging-time seconds

no ip igmp snooping host-aging-time

Parameter	Parameter	Description
Description	seconds	Aging time. The unit is second. The value ranges from 1 to 65535. The default value is 260.

Defaults 260

Command Mode Global configuration mode

Usage guideline The aging time of a dynamic port is set by the system when the port receives an IGMP packet from the host for joining a certain IP multicast group. When such an IGMP packet is received, the system resets the aging timer for the port. The duration of this timer is determined by **host-aging-time**. If the timer expires, the system determines that there is no host in this port for receiving multicast packets. The multicast device removes the port from the IGMP Snooping group. After the **ip igmp snooping host-aging-time** command is executed, the aging time will be determined by **host-aging-time**. This command takes effect only after the system receives the next IGMP packet. This command does not change the current aging time.

Example The following example sets the aging time to 30 seconds:

```
FS(config)# ip igmp snooping host-aging-time 30
```

Related command	Command	Description
	-	-

Platform -
Description

9.10 ip igmp snooping l2-entry-limit

Use this command to set the maximum number of multicast groups. The **no** form of this command is used to cancel the limit.

ip igmp snooping l2-entry-limit number
no ip igmp snooping l2-entry-limit

Parameter Description	Parameter	Description
	number	Number of multicast groups. The value ranges from 0 to 4096.

Defaults 1024

Command Mode Global configuration mode

Usage guideline The maximum number of multicast groups includes the multicast groups in all ports of all VLANs (including dynamic and static multicast groups). When the number of multicast groups reaches the limit, learning new group records and configuring new static multicast group ports are not allowed.

Example The following example sets the maximum number of multicast groups to 2000:

```
FS(config)# ip igmp snooping l2-entry-limit 2000
```

Related Command	Command	Description
	show ip igmp snooping	Displays the maximum number of multicast groups.

Platform N/A

Description

9.11 ip igmp snooping limit-ipmc

To add a multicast source IP address check entry, execute the **ip igmp snooping limit-ipmc** command in the global configuration mode. The **no** form of this command is used to delete a source IP checklist entry.

ip igmp snooping limit-ipmc vlan vid address gaddress server saddress

no ip igmp snooping limit-ipmc vlan vid address gaddress server saddress

	Parameter	Description
Parameter	Vid	VLAN ID of the source IP address check entry
Description	Gaddress	Multicast address
	Saddress	Multicast source IP address (multicast server)

Defaults N/A

Command

Mode Global configuration mode

Usage Guide The source IP address check function must be enabled before an entry can be added.

Configuration The following example adds an entry to the multicast source IP address check table.

Examples FS(config)# ip igmp snooping limit-ipmc vlan 1 address 224.0.0.1 server 192.168.4.243

Related Commands	Command	Description
	ip igmp snooping source-check default-server	Configures a default source IP address while enabling the IP check function.

9.12 ip igmp snooping max-groups

To configure the maximum number of groups that can be added dynamically to this interface, execute the **ip igmp snooping max-groups** command in the interface configuration mode. The **no** form of this command is used to remove the configuration.

ip igmp snooping max-groups number

no ip igmp snooping max-groups

Parameter	Parameter	Description
-----------	-----------	-------------

Description	number	The parameter ranges 0 to 4294967294.
--------------------	--------	---------------------------------------

Defaults N/A

Command

Mode Interface configuration mode

Usage Guide If a maximum number of multicast groups are configured, the device will no longer receive and process IGMP Report messages when the number of multicast groups on this interface is beyond the range.

Configuration Examples The following example configures the maximum number of multicast groups to 100 on the megabit interface 0/1:

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip igmp snooping max-group 100
```

Related Commands	Command	Description
	ip igmp snooping filter	Filters multicast groups that pass through a port.

9.13 ip igmp snooping mrouter learn pim-dvmrp

To configure a device to listen to the IGMP Query/Dvmrp or PIM Hello packets dynamically in order to automatically identify a routing interface, execute the **ip igmp snooping mrouter learn** command in the global configuration mode. The **no** form of this command is used to disable the dynamic learning.

ip igmp snooping mrouter learn pim-dvmrp

no ip igmp snooping mrouter learn pim-dvmrp

Defaults Enabled

Command

Mode Global configuration mode

Routing interface is a port through which a multicast device (with IGMP Snooping enabled) is directly connected to a multicast neighbouring device (with multicast routing protocols enabled).

By default, the dynamic routing interface learning function is enabled. You can use the no form of this command to disable this function and clear all routing interfaces learnt dynamically. With dynamic routing interface learning function disabled globally, the function of all vlans will be disabled. Beside, with this function enabled globally, if the function of specified vlan is disabled, the dynamic routing interface learning function of the corresponding vlan is disabled. When the source port check function is enabled, only the multicast flow enters from the routing interface is legal and it is forwarded to the registered interface by the multicast equipment, the multicast flow from the non routing interface is considered to be the illegal and is discarded. With the source port check function enabled, the dynamic routing interface learning function will improve the application flexibility of IGMP snooping.

Configuration Examples The following example demonstrates how to enable the dynamic routing interface learning function on the equipment:

FS(config)# ip igmp snooping mrouter learn pim-dvmrp

Related Commands	Command	Description
	ip igmp snooping vlan mrouter learn pim-dvmrp	Enables the dynamic routing interface learning function on the multicast routing port.

9.14 ip igmp snooping preview

Allow the user to preview the specific multicast streams when the user doesn't have access to such multicast streams. Use **no** form of this command to disable multicast preview.

ip igmp snooping preview profile-number

no ip igmp snooping preview

Parameter	Parameter	Description
Description	profile-number	Profile number (1-1024)

Defaults N/A

Command Mode Global configuration mode

Usage Guide Apply the IGMP Profile to a multicast preview function. When the user doesn't have access to the multicast streams (namely the user might be filtered by IGMP Snooping filter), it can allow the user to preview partial contents. This function shall be used in conjunction with IGMP Snooping filter or multicast control in order to realize effective multicast preview.

Configuration Examples The following example associates the profile 1 to the 100M port 0/1 and associates multicast preview with profile 2:

```
FS(config)# ip igmp snooping preview 2
FS(config-if)# int fa 0/1
FS(config-if)# ip igmp snooping filter 1
```

Related Commands	Command	Description
	ip igmp profile	Create a profile

Platform Description This command is supported higher than V10.4 (3).

9.15 ip igmp snooping preview interval

Use this command to configure the interval that allows the user to preview the specific multicast streams when the user doesn't have access to such multicast streams. Use **no** form of this command to restore the preview interval to the default value.

ip igmp snooping preview interval num

no ip igmp snooping preview interval

Parameter	Parameter	Description
Description	num	Preview interval (1-300); default: 60 seconds.

Defaults The default value is 60 seconds.

Command Mode Global configuration mode

Usage Guide NA

Configuration Examples The following example sets the multicast preview interval as 100 seconds on the 100M port of 0/1:

```
FS(config)# ip igmp snooping preview interval 100
```

Related Commands	Command	Description
	ip igmp snooping preview	Enables the multicast preview.

Platform Description N/A

9.16 ip igmp snooping querier

To enable the IGMP querier function, execute "**ip igmp snooping querier**" global configuration command. Use **no** form of this command to disable IGMP querier in all VLANs and disable the global configurations.

ip igmp snooping querier

no ip igmp snooping querier

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Disabled.

Command Mode Global configuration mode

Usage Guide After globally enabling the IGMP querier, you must enable the IGMP querier function in VLAN to affect this command.

If the IGMP querier function is disabled globally, the IGMP querier will be disabled in all VLANs.

Configuration The following example enables the IGMP querier function on the device:

Examples FS(config)# ip igmp snooping querier

Related	Command	Description
Commands	ip igmp snooping vlan querier	Enables the querier function in VLAN

Platform N/A

Description

9.17 ip igmp snooping querier address

To enable the IGMP querier, you also need to specify a source IP address for query packets. Execute the global configuration command of "ip igmp snooping querier address". Use **no** form of this command to remove the source IP address configured.

ip igmp snooping querier address a.b.c.d

no ip igmp snooping querier address

Parameter	Parameter	Description
Description	a.b.c.d	Source IP address of the query packets.

Defaults No source IP address is specified.

Command Mode Global configuration mode.

After enabling IGMP querier, you also need to configure a source IP address for query packets, so that the device can send packets normally.

Usage Guide If no source IP address is specified in the VLAN needing to send packets, the device will verify whether the source IP address is specified globally. The device can only send query packets after finding the source IP configured, or else the querier function won't take effect.

If the IGMP querier source IP has been specified in VLAN, the source IP configured in the relevant VLAN will be used first.

Configuration The following example specifies the source IP of query packets on the device:

Examples FS(config)# ip igmp snooping querier address 1.1.1.1

Related	Command	Description
Commands	ip igmp snooping vlan querier address	Enables the source IP check in VLAN

Platform N/A

Description

9.18 ip igmp snooping querier max-response-time

To configure the maximum response time advertised in query packets, execute the global configuration command of "**ip igmp snooping querier max-response-time**". Use **no** form of this command to restore to the default value.

ip igmp snooping querier max-response-time num
no ip igmp snooping querier max-response-time

Parameter	Parameter	Description
Description	num	Maximum response time (1-25); unit: second; default: 10

Defaults N/A

Command Mode Global configuration mode

Configure this command to specify the maximum response time to query packets.

Usage Guide By default, the maximum response time is 10 seconds. If the maximum response time has been specified in the corresponding VLAN, the value specified in VLAN will be used first.

Configuration Examples The following example specifies the maximum response time to query packets on the device:

```
FS(config)# ip igmp snooping querier max-response-time 15
```

Related Commands	Command	Description
	ip igmp snooping vlan querier max-response-time	Configures the maximum response time to query packets in VLAN

Platform N/A

Description

9.19 ip igmp snooping querier query-interval

To specify the interval for IGMP querier to send query packets, execute the global configuration command of "**ip igmp snooping querier query-interval**". Use **no** form of this command to restore the query interval to the default value.

ip igmp snooping querier query-interval num
no ip igmp snooping querier query-interval

Parameter	Parameter	Description
Description	num	Query interval (1-18000); unit: second; default: 60 seconds

Defaults N/A

Command Global configuration mode

Mode

After globally enabling IGMP querier, the timer will be enabled for sending query packets periodically. The aging time of the timer is the query interval. Configure this command to change the query interval.

Usage Guide

If the query interval has been configured in the corresponding VLAN, the value specified in VLAN will be used first.

Configuration

The following example configures the query interval on the device:

Examples

```
FS(config)# ip igmp snooping querier query-interval 100
```

Related

Commands

Command	Description
ip igmp snooping vlan querier query-interval	Configures the query interval in VLAN

Platform

N/A

Description

9.20 ip igmp snooping querier timer expiry

To specify the expiration timer for non-querier, execute the global configuration command of "**ip igmp snooping querier timer expiry**". Use **no** form of this command to restore to the default value.

ip igmp snooping querier timer expiry num

no ip igmp snooping querier timer expiry

Parameter

Description

Parameter	Description
num	Non-querier expiration timer (60-300); unit: second; default: 125 seconds

Defaults

N/A

Command

Mode

Global configuration mode

Usage Guide

After globally enabling IGMP querier, if the device is elected as a non-querier, execute this command to change the expiration timer for non-querier.

If expiration timer has been configured in the corresponding VLAN, the value specified in VLAN will be used first.

Configuration

The following example configures the non-querier expiration timer on the device:

Examples

```
FS(config)# ip igmp snooping querier timer expiry 60
```

Related

Commands

Command	Description
ip igmp snooping vlan querier timer expiry	Configures querier expiration timer in VLAN

Platform

N/A

Description

9.21 ip igmp snooping querier version

Use the following commands to specify IGMP Snooping querier version.

ip igmp snooping [vlan vid] querier version 1

ip igmp snooping [vlan vid] querier version 2

ip igmp snooping [vlan vid] querier version 3

Use **no** or **default** form of this command to restore to the default setting.

no ip igmp snooping [vlan vid] querier version

default ip igmp snooping [vlan vid] querier version

Parameter	Parameter	Description
Description	vlan vid	VLAN ID. By default, the specified version is supported on all VLANs.

Default The default version is IGMPv2.

Command Mode Global configuration mode

Usage Guide If an IGMP querier version has been configured in a VLAN, the version specified in the VLAN will be used first.

Configuration Examples The following example configures IGMP querier version on the device.

```
FS(config)# ip igmp snooping querier version 1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

9.22 ip igmp snooping query-max-response-time

This command specifies the time for the switch to wait for the member join message after receiving the **query** message. If the switch does not receive the member join message within the specified time, it considers that the member has left and then deletes the member.

ip igmp snooping query-max-response-time time

no ip igmp snooping query-max-resposne-time

Parameter	Parameter	Description
Description	time	The aging time of the routing interface that the switch learns dynamically.

Defaults 10s

Command Mode Global configuration mode

Usage Guide You can specify the time for the switch to wait for the member join message after receiving the query message. If the switch does not receive the member join message in the specified time, it considers that the member has left and then deletes the member. This command lets you adjust the waiting time after receiving the query message. This command takes effect only after the switch receives the next member join message. This command does not change the current wait time.

Configuration Set the aging time of the routing interface that the switch learns dynamically to 100s.

Examples FS(config)# ip igmp snooping query-max-response-time 100

Related Commands	Command	Function
	ip igmp snooping	Configures a multicast routing interface.

9.23 ip igmp snooping source-check default-server

The source IP address check is used to permit one or several IPMC flows from the server of the specified IP address.

To configure the source IP address check function of IGMP snooping, execute the **ip igmp snooping source-check default-server** command in the global configuration mode. The **no** form of this command is used to disable the source IP address check function.

ip igmp snooping source-check default-server address

no ip igmp snooping source-check

Parameter	Description
Description address	Default multicast source IP address (IP address of the default multicast server)

Defaults Disabled.

Command Mode Global configuration mode.

Usage Guide The source IP address check function takes effect globally. Once it is enabled, only the IPMC streams from the specified IP address are permitted. The device allows users to configure the source IP address of all IPMC streams, called default multicast server. The default server must be set as long as the source IP address check function is enabled.

Configuration Examples The following example enables the multicast source IP address check function and configure a default source IP address.

FS(config)# ip igmp snooping source-check default-server 192.168.4.243

Related	Command	Description
Commands	ip igmp snooping limit-ipmc vlan server	Adds an entry to the source IP check table.

9.24 ip igmp snooping source-check port

The source port check function is used to permit one or several IPMC flows from the mroute port.

To configure the source port check function of IGMP snooping, execute the **ip igmp snooping source-check port** command in the global configuration mode. The **no** form of this command is used to disable the source port check function.

ip igmp snooping source-check port

no ip igmp snooping source-check port

Parameter

Description N/A.

Defaults Disabled.

Command

Mode Global configuration mode.

Usage Guide

The source port check function takes effect globally. Once it is enabled, only the IPMC streams from the specified port are permitted.

Configuration

The following example enables the source port check function of IGMP snooping.

Examples

```
FS(config)# ip igmp snooping source-check port
```

Related	Command	Description
Commands	ip igmp snooping source-check default-server	Enables the multicast source IP address check function.

9.25 ip igmp snooping suppression enable

To enable IGMP snooping suppression, execute the **ip igmp snooping suppression enable** command in the global configuration mode. The **no** form of this command is used to disable IGMP snooping suppression..

ip igmp snooping suppression enable

no ip igmp snooping suppression enable

Parameter

Description N/A

Defaults Disabled

Command

Mode Global configuration mode.

Usage Guide

After you execute this command to enable the suppression function, the switch begins to suppress the IGMP v1/v2 report messages.

Configuration

The following example enables IGMP snooping suppression on the device:

Examples

```
FS(config)# ip igmp snooping suppression
```

Related

Commands

N/A

9.26 ip igmp snooping svgl profile

To specify the multicast group address range applied in the SVGL/IVGL-SVGL mode, execute the **ip igmp snooping profile profile-number** command in the global configuration mode. Use the **no ip igmp snooping profile** command to cancel the association.

ip igmp snooping profile profile-number

no ip igmp snooping profile

Parameter	Parameter	Description
Description	profile-number	Profile number, in the range of 1-65535.

Default

No profile is associated.

Command

Mode

Global configuration mode.

Usage Guide

When the IGMP Snooping works in the SVGL or IVGL-SVGL mode, a profile shall be associated to specify the multicast group address range applied in the SVGL or IVGL-SVGL mode. That is to say, the member ports of the multicast forwarding entry can be forwarded across the VLANs while the member ports of the multicast forwarding entry in the other multicast address range must belong to the same VLAN. By default, no profile is associated.

Configuration

Examples

```
FS(config)# ip igmp snooping svgl profile 1
```

Related

Commands

Command	Description
ip igmp snooping ivgl	Enables igmp snooping and enter the IVGL mode.
ip igmp snooping ivgl-svgl	Enables igmp snooping and enter the hybrid mode.

9.27 ip igmp snooping svgl subvlan

To specify the subvlan of multicast VLAN, execute the global configuration command of "**ip igmp snooping svgl subvlan**". Use **no** form of this command to remove this configuration.

ip igmp snooping svgl subvlan [vid-range]

no ip igmp snooping svgl subvlan [vid-range]

Parameter	Parameter	Description
Description	vid-range	VLAN ID or range of VLAN ID

Defaults By default, no subvlan is specified for svgl, and all VLANs serve as its subvlans.

Command Mode Global configuration mode.

Usage Guide This command only takes effect in SVGL or IVGL-SVGL mode.

Configuration Examples The following example configures the device operating in igmp snooping svgl mode to associate VLAN 2, 5, 6 and 7:

```
FS(config)# ip igmp snooping svgl vlan 2,5-7
```

Related Commands	Command	Description
	ip igmp snooping svgl	Enables the igmp snooping and configure the svgl mode.
	ip igmp snooping ivgl-svgl	Enables the igmp snooping and configure the IVGL-SVGL mode.
	ip igmp snooping svgl vlan	Configures the primary VLAN of SVGL mode.

Platform Description N/A

9.28 ip igmp snooping svgl vlan

To specify the vlan as the shared vlan in the SVGL mode, execute the **ip igmp snooping svgl vlan** command in the global configuration mode. The **no** form of this command restores the Shared VLAN to vlan 1..

ip igmp snooping svgl vlan vid

no ip igmp snooping svgl vlan

Parameter	Parameter	Description
Description	vid	VLAN ID.

Defaults By default , the shared vlan is vlan1.

Command Mode Global configuration mode.

Usage Guide This command only works in the SVGL or IVGL-SVGL mode.

Configuration The following example specifies the vlan2 as the shared vlan

Examples `FS(config)# ip igmp snooping svgl vlan 2`

	Command	Description
Related Commands	ip igmp snooping svgl	Enable igmp snooping and enter the SVGL mode.
	ip igmp snooping ivgl-svgl	Enable igmp snooping and enter the hybrid mode

9.29 ip igmp snooping tunnel

Configure the relationship between IGMP Snooping and QinQ:

ip igmp snooping tunnel

no ip igmp snooping tunnel

	Parameter	Description
Parameter Description	N/A	N/A

Defaults IGMP Passthrough is disabled.

Command Mode Global configuration mode.

After IGMP Snooping is enabled and dot1q-tunnel port is configured on the device, IGMP packets received from dot1q-tunnel port will be handled in two ways through IGMP Snooping:

- 1st way: Create multicast entries in the VLAN to which the IMGP packets belong, and forward IMGP packets in such VLAN.

For example: It is assumed that IGMP Snooping has been enabled on the device; port A is a dot1q-tunnel port; the default VLAN of port A is VLAN 1, and packets from VLAN 1 and VLAN 10 can pass through port A. When multicast requests of VLAN 10 are sent to port A, IGMP Snooping will create the multicast entry of VLAN 10 and forward the multicast requests to the router port of VLAN 10.

Usage Guide

- 2nd way: Create multicast entries in the default VLAN to which the dot1q-tunnel ports belong, and forward multicast packets in the default VLAN of dot1q-tunnel port after inserting the VLAN Tag of the default VLAN of dot1q-tunnel port.

For example: It is assumed that IGMP Snooping has been enabled on the device; port A is a dot1q-tunnel port; the default VLAN of port A is VLAN 1, and packets from VLAN 1 and VLAN 10 can pass through port A. When multicast requests of VLAN 10 are sent to port A, IGMP Snooping will create the multicast entry of VLAN 1 and insert the VLAN Tag of VLAN 1 into multicast requests before forwarding the multicast requests to the router port of VLAN 1.

By default, the 2nd way is used.

Configuration Examples The following example enables the IGMP packets transparent transmission on the device:

`FS(config)# ip igmp snooping tunnel`

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

9.30 ip igmp snooping vlan

Use this command to enable the igmp snooping on the specified vlan and enter the ivgl mode.

The **no** form of this command is used to disable the igmp snooping.

ip igmp snooping vlan vid

no ip igmp snooping vlan vid

Parameter	Parameter	Description
Description	vid	VLAN ID

Defaults Disabled

Command

Mode Global configuration mode.

Use this command to enable or disable the IGMP snooping on the specified vlan.

Usage Guide



The pim snooping on the specified vlan works only when the igmp snooping configured. When disabling the igmp snooping on the vlan with the pim snooping configured, it prompts to disable the pim snooping first and this execution fails.

Configuration The following example enables the igmp snooping on the vlan2.

Examples FS(config)# ip igmp snooping vlan 2

Related	Command	Description
Commands	ip igmp snooping ivgl	Enables the igmp and enter the ivgl mode.
	ip igmp snooping ivgl-svgl	Enables the igmp snooping and enter the ivgl-svgl mode.

9.31 ip igmp snooping vlan mrouter interface

Routing interface is a port through which a multicast device is directly connected to a multicast neighbouring device. To configure a multicast routing interface, execute the **ip igmp snooping vlan mrouter interface** command in the global configuration mode. The **no** form of this command is used to delete a routing interface.

ip igmp snooping vlan vid **mrouter interface** interface-id

no ip igmp snooping vlan vid **mrouter interface** interface-id

	Parameter	Description
Parameter Description	vid	VLAN ID of a routing interface
	interface-id	Interface ID

Defaults N/A

Command

Mode Global configuration mode

Usage Guide When the source port check function is enabled, only the multicast flows from the routing interface are forwarded, and other flows will be discarded.

Configuration The following example demonstrates how to configure a multicast routing interface on the equipment:

Examples

```
FS(config)# ip igmp snooping vlan 1 mroute interface fastEthernet 0/1
```

	Command	Description
Related Commands	ip igmp snooping source-check port	Enables the multicast source port check function.

9.32 ip igmp snooping vlan static interface

Once IGMP snooping is enabled, a port can receive a certain multicast frame without being affected by various IGMP messages by executing the **ip igmp snooping vlan static interface** command in the global configuration mode. The **no** form of this command is used to delete a static configuration.

ip igmp snooping vlan vid **static** ip-addr **interface** interface-id

no ip igmp snooping vlan vid **static** ip-addr **interface** interface-id

	Parameter	Description
Parameter Description	vid	VLAN ID of a routing interface
	ip-addr	Multicast IP address
	interface-id	Interface ID

Defaults N/A

Command Mode Global configuration mode

Usage Guide Multiple multicast IP addresses can be configured for an interface.

Configuration The following example demonstrates how to configure a static multicast address on a port:

Examples

```
FS(config)# ip igmp snooping vlan 1 static 224.1.1.1 interface GigabitEthernet 0/1
```

	Command	Description
Related Commands	ip igmp snooping vlan mdevice interface	Configures a multicast routing interface

9.33 permit

To permit the forwarding of the multicast streams in the range specified by the profile, execute the **permit** command in the profile configuration mode. In this way, the interface associated with this profile will forward the specified multicast stream only.

Permit

Parameter

Description N/A

Defaults The forwarding of the multicast streams in the range specified by the profile is denied.

Command Mode Profile configuration mode

Usage Guide

First, configure the multicast range using the range command in the profile configuration mode. In addition, the profile must be applied to the interface in order to make the profile configuration to take effective.

The following is an example of allowing the forwarding of the multicast stream 224.2.2.2:

Configuration

```
FS(config)# ip igmp profile 1
```

Examples

```
FS(config-profile)# range 224.2.2.2
```

```
FS(config-profile)# permit
```

Related

Commands

Command	Description
ip igmp profile	Creates a profile.
range	Configures the multicast address range.

9.34 range

To specify the range of multicast streams, execute the **range** command in the profile configuration mode. You can specify either a single multicast address or a range of multicast addresses. Use the **no** form of the command to remove the specified multicast IP address.

range low-ip-address [high-ip-address]

no range low-ip-address [high-ip-address]

Parameter

Description

Parameter	Description
low-ip-address	Start address of a range
high-ip-address	End address of a range

Defaults N/A

Command Mode Profile configuration mode

Usage Guide

You can specify a behavior after configuring the address range, for example deny by default. In addition, the profile must be applied to the interface in order to make the profile configuration take effect.

Configuration Examples The following is an example of creating a profile whose multicast stream is in the range 224.2.2.2 to 224.2.2.244:

```
FS(config)# ip igmp profile 1
FS(config-profile)# range 224.2.2.2 224.2.2.244
```

Command	Description
ip igmp profile	Creates a profile.
deny	Denies the forwarding of the multicast streams in the range specified by the profile.
permit	Permits the forwarding of the multicast streams in the range specified by the profile.

9.35 show ip igmp profile

Use this command to show the profile information.

show ip igmp profile
show ip igmp profile profile-number

Parameter	Description
none	Displays configuration information of all profiles.
profile-number	Displays configuration information of the designated profile.

Command Mode Privileged EXEC mode

Configuration Examples

```
FS(config-if)# show ip igmp profile
Profile 1
Permit
range 224.0.1.0, 239.255.255.255
```

9.36 show ip igmp snooping

Use this command to show related information of igmp snooping.

show ip igmp snooping [gda-table | interfaces interface-type interface-number | mdevice | statistics [vlan vlan-id] | querier [detail | vlan vid] | user-info]

Parameter	Description
vlan vid	VLAN ID. By default, IGMP Snooping information of all VLANs are displayed.
interface-type interface-number	Interface type and number

Command Mode Privileged EXEC mode

Configuration Examples The following example displays global IGMP Snooping information.

```
FS#show ip igmp snooping
```

```
IGMP Snooping running mode: IVGL
IGMP Snooping L2-entry-limit: 65536
Source port check: Disable
Source ip check: Disable
IGMP Fast-Leave: Disable
IGMP Report suppress: Disable
IGMP Globle Querier: Disable
IGMP Preview: Disable
IGMP Tunnel: Disable
IGMP Snooping version: 2IGMP Preview group aging time : 60(Seconds)
Dynamic Mroute Aging Time : 300(Seconds)
Dynamic Host Aging Time : 260(Seconds)
The following example displays VLAN1 IGMP Snooping information.FS#show ip igmp snooping vlan 1
IGMP Snooping running mode: IVGL
IGMP Snooping L2-entry-limit: 65536
Global IGMPv2 Fast-Leave :Disable
Global multicast router learning mode :Enable
Query Max Response Time: 10 (Seconds)
Dynamic Mroute Aging Time : 300(Seconds)
Dynamic Host Aging Time : 260(Seconds)

vlan 1
-----
IGMP Snooping state: Enable
Multicast router learning mode: pim-dvmrp
IGMP Fast-Leave: Disable
IGMP VLAN querier: Disable
IGMP VLAN Mode: STATIC
```

10 MLD Snooping Commands

10.1 clear ipv6 mld snooping gda-table

Use this command to clear the forwarding table information learned dynamically.

clear ipv6 mld snooping gda-table

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear the forwarding table information learned dynamically.

Configuration Examples The following example clears the forwarding table information learned dynamically:

```
FS# clear ipv6 mld snooping gda-table
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.2 clear ipv6 mld snooping statistics

Use this command to clear the MLD Snooping statistics, including the entry number, the entry volume, the number of various received packets, the group information and the interface information of the corresponding group.

clear ipv6 mld snooping statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use the **show ipv6 mld snooping statistics** command to verify the configuration.

Configuration The following example clears the MLD Snooping statistics.

Examples

```
FS# clear ipv6 mld snooping statistics
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

10.3 deny

Use this command to prevent the multicast flow profile within the specified range from being forwarded in the profile configuration mode.

deny

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The default profile action is **deny**.

Command Mode Profile configuration mode

Usage Guide Before configuring this command, use the **range** command to set the multicast range first.

Configuration The following example prevents the multicast flow profile within the range of FF77::100 from being forwarded.

Examples

```
FS(config)# ipv6 mld profile 1
FS(config-profile)# range FF77::100
FS(config-profile)# deny
```

Related Commands	Command	Description
	ipv6 mld profile	Creates one profile.
	range	Sets the multicast address range.
	permit	Sets the profile action permit.

Platform N/A
Description

10.4 ipv6 mld profile

Use the following command to create a profile. Use the **no** or **default** form of this command to delete a profile.

ipv6 mld profile profile-number
no ipv6 mld profile profile-number
default ipv6 mld profile profile-number

Parameter Description	Parameter	Description
	profile-number	Profile number, in the range from 1 to 1024.

Defaults N/A

Command Mode Global configuration mode

Usage Guide Profile is a kind of group “filter” that can be referred to by other functions.
 Configuration Steps:
 1. Use the **ipv6 mld profile** command to create a profile and enter the profile mode.
 2. Use the **range** command to define a group.
 3. Use the **permit** command to allow this group to pass the filtering; Use the **deny** command to filter the packets of this group. The default command is **deny**.

Configuration Examples The following example creates profile 1 and allows the packets sent by devices with MAC address ranging from FF15::1 to FF15::100 to pass the filtering.

```
FS(config)#ipv6 mld profile 1
FS(config-profile)#range FF15::1 FF15::100
FS(config-profile)#permit
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.5 ipv6 mld snooping

Use this command to enable MLD Snooping and specify IVGL/SVGL/IVGL-SVGL mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping [ivgl | svgl | ivgl-svgl]
no ipv6 mld snooping [ivgl | svgl | ivgl-svgl]
default ipv6 mld snooping [ivgl | svgl | ivgl-svgl]

Parameter Description	Parameter	Description
	ivgl	MLD Snooping is running IVGL mode.

svgl	MLD Snooping is running SVGL mode.
ivgl-svgl	MLD Snooping is running IVGL-SVGL mode.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

- Usage Guide**
- In IVGL mode, multicast flow in each VLAN is independent. The host only requests multicast flow from the routing interface within the same VLAN. The device forwards the multicast flow from any VLAN to the member port within the same VLAN.
 - In SVGL mode, multicast flow is shared among VLANs. The host can request multicast flow across VLANs. Shared VLAN (VLAN 1 by default) should be specified. Only multicast flow from Shared VLAN can be forwarded to all member ports within the group address range, which may belong to different VLANs. Profile is used to specify a group range for SVGL. Only multicast flow within this range can be forwarded across VLANs. The other multicast flow is discarded.
 - In IVGL-SVGL mode, Profile is used to specify a group range for SVGL. Multicast flow within this range is in SVGL mode and the other multicast flow is in IVGL mode.

Configuration The following example enables MLD Snooping IVGL mode.

Examples

```
FS(config)# ip igmp snooping ivgl
```

The following example enables MLD Snooping SVGL mode and specifies the shared VLAN and SVGL group range as VLAN1 and profile1 respectively.

```
FS(config)# ip igmp snooping svgl
FS(config)# ip igmp snooping svgl profile 1
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

10.6 ipv6 mld snooping dyn-mr-aging-time

Use this command to set the aging time of the dynamic multicast route port. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 mld snooping dyn-mr-aging-time** time
- no ipv6 mld snooping dyn-mr-aging-time**
- default ipv6 mld snooping dyn-mr-aging-time**

Parameter

Parameter	Description
-----------	-------------

Description	
time	Sets the aging time of the dynamic multicast route port, in the range from 1 to 3600 in the unit of seconds.

Defaults The default is 300.

Command Global configuration mode.

Mode

Usage Guide The switch will remove the dynamic multicast router interface from the router interface list if it fails to receive the MLD general group query packets or the Ipv6 PIM Hello packets within the aging timeout on this interface.

Configuration The following example sets the aging time of the dynamic multicast route port to 500 seconds.

Examples FS(config)# ipv6 mld snooping dyn-mr-aging-time 500

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.7 ipv6 mld snooping fast-leave enable

Use this command to enable the MLD Snooping fast-leave in the global configuration mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping fast-leave enable

no ipv6 mld snooping fast-leave enable

default ipv6 mld snooping fast-leave enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode.

Mode

Usage Guide The interface fast leave is that when IPv6 MLD Leave packets sent from the host are received on an interface, the interface is removed from the outgoing interface list of the corresponding forwarding entry. Then, the switch will not forward the received IPv6 MLD specific group query packets to the interface. If there is only one receiver connected with the interface, enable the interface fast leave function to save the bandwidth and resources.

Configuration The following example enables mld snooping fast-leave.

Examples FS(config-if)# ipv6 mld snooping fast-leave

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.8 ipv6 mld snooping filter

Use this command to filter the specific multicast flow in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping filter profile-number

no ipv6 mld snooping filter

default ipv6 mld snooping filter

Parameter Description	Parameter	Description
	profile-number	profile-number

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide You can configure an MLD Profile on an interface. If the MLD Report packets are received on the interface, the layer-2 device will determine whether the multicast address to be joined the interface is within the allowed range of the MLD Profile. The specified profile must be created before using this command.

Configuration The following example associates profile1 with the interface fastEthernet 0/1.

Examples FS(config)# interface fastEthernet 0/1
FS(config-if)# ipv6 mld snooping filter 1

Related Commands	Command	Description
	ipv6 mld profile	ipv6 mld profile

Platform N/A

Description

10.9 ipv6 mld snooping host-aging-time

Use this command to set the aging time of the dynamic member port.

Use the **no** form of this command to cancel this configuration.

Use the **default** form of this command to restore the aging time to the default setting.

ipv6 mld snooping host-aging-time seconds

no ipv6 mld snooping host-aging-time

default ipv6 mld snooping host-aging-time

Parameter	Parameter	Description
Description	seconds	Sets the aging time of the dynamic member port, in seconds, ranging from 1-65536 in the unit of seconds.

Defaults The default aging time of the dynamic member port is 260 seconds.

Command Mode Global configuration mode

Usage Guide The switch will remove the dynamic multicast router interface from the router interface list if it fails to receive the MLD general group query packets or the IPv6 PIM Hello packets within the aging timeout on this interface. When the MLD Snooping is enabled, the port that receives the MLD Report packet will learn to be a dynamic member port. The default aging time of such dynamic member port is 260 seconds. You can use this command to adjust the aging time. This configuration takes effect after the port receives the the next Report packet. The aging time of the dynamic member port should be longer than the query interval.

Configuration Examples The following example shows how to sets the aging time of the dynamic member port to 200 seconds:

```
FS(config)# ipv6 mld snooping host-aging-time 200
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.10 ipv6 mld snooping max-groups

Use this command to set the maximum group allowed to join the interface dynamically in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping max-groups number

no ipv6 mld snooping max-groups

default ipv6 mld snooping max-groups

Parameter	Parameter	Description
Description	number	The number of groups, in the range from 0 to 65536

Defaults	The default is 65536.
Command Mode	Interface configuration mode
Usage Guide	With this command configured, when the group number exceeds the specified range on the interface, the switch will not receive and deal with the MLD Report packets.

Configuration Examples The following example sets the maximum 100 multicast group on the interface fastEthernet 0/1.

```
FS(config)# interface fastEthernet 0/1
FS(config-if)# ipv6 mld snooping max-group 100
```

Related Commands	Command	Description
	ipv6 mld snooping filter	Filters the multicast group on the interface.

Platform N/A

Description

10.11 ipv6 mld snooping mrouter learn

Use this command to enable the switch to dynamically learn MLD query or PIM packets to identify the mrouter interface automatically. Use the **no** form of this command to disable this function. Use the **default** form of this command to restore the default setting.

ipv6 mld snooping [vlan vid] mrouter learn

no ipv6 mld snooping [vlan vid] mrouter learn

default ipv6 mld snooping [vlan vid] mrouter learn

Parameter Description	Parameter	Description
	vlan vid	The vlan ID, in the range from 1 to 4094.

Defaults This function is enabled by default.

Command Mode Global configuration mode

Mode

Usage Guide The mrouter interface is the interface of the multicast device connected with the peer device. By default, the dynamically-learned mroute interface is enabled on the layer-2 multicast device. Use the **no** option to disable this function and clear all dynamically-learned mroute interfaces.

- ✓ With the source port check enabled, only the multicast flow through the mroute interface are valid and forwarded to the registered interface on the layer-2 multicast device. Those multicast flow through the non-mroute interface are invalid and will be discarded.

Configuration The following example enables the dynamic multicast route port learn function for VLAN1.

Examples

```
FS(config)# no ipv6 mld snooping mrouter learn
FS(config)# ipv6 mld snooping vlan 1 mrouter learn
```

Related N/A

Commands

10.12 ipv6 mld snooping query-max-response-time

Use this command to set the maximum response time of the MLD general query packet. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping query-max-response-time seconds

no ipv6 mld snooping query-max-response-time

default ipv6 mld snooping query-max-response-time

Parameter Description	Parameter	Description
	seconds	Sets the maximum response time of the MLD general query packet in the range from 1 to 65535 in the unit of seconds.

Defaults The default is 10 seconds.

Command Interface configuration mode

Mode

Usage Guide Upon receiving the MLD general query packets, the Layer-2 multicast device updates the aging timer of all member ports. The time of the timer is the longest response value. When the timer value decreases to 0, it indicates that there is no member receiving the multicast flow on the interface, and the Layer-2 device removes this interface from the MLD Snooping forwarding list.

Upon receiving the MLD specific group query packets, the Layer-2 multicast device enables the aging timer of all member ports in this specific group. The time of the timer is the longest response value. When the timer value decreases to 0, it indicates that there is no member receiving the multicast flow on the interface, and the Layer-2 device removes this interface from the MLD Snooping forwarding list.

For the source query packets of the MLD specific group, the timer is not updated.

The configured maximum response time

Configuration The following example sets the maximum response time of the MLD general query packet to 15 seconds.

Examples

```
FS(config)# ipv6 mld snooping query-max-response-time 15
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.13 ipv6 mld snooping source-check port

The source-check port is used to allow the multicast flow to enter through the mrouter interface. Use this command to enable the mld source-check port in the global configuration mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping source-check port

no ipv6 mld snooping source-check port

default ipv6 mld snooping source-check port

Parameter Description

Parameter	Description
N/A	N/A

Defaults

The source-check port is disabled by default.

Command

Global configuration mode

Mode

Usage Guide

The MLD Snooping source port check function is to limit the MLD multicast flow through the interace strictly. With the source port check disabled, all video flow are illegal and forwarded to the registered member port according to the MLD Snooping forwarding list. With the MLD Snooping source port check enabled, only the mulitcast flow through the mroute interface is legal and forwarded to the registered interface by the layer-2 multicast device; and the multicast flow through the non-mroute interface are illegal and discarded.

This command is used to enabled the source port check globally. Once this function is enabld, all multicast flow must come from the mroute interface, or they'll be discarded.

Configuration

The following example shows how to enable MLD Snooping source-check port:

Examples

```
FS(config-if)# ipv6 mld snooping source-check port
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

10.14 ipv6 mld snooping suppression enable

Use this command to enable the MLD Snooping suppression in the global configuration mode. Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping suppression enable

no ipv6 mld snooping suppression enable

default ipv6 mld snooping suppression enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The MLD Snooping suppression function is disabled by default.

Command Mode Global configuration mode.

Usage Guide With the IPv6 MLD Snooping suppression function enabled, within the query interval, the layer-2 device will only forward the first received MLD Report packet in an IPv6 multicast group to the layer-3 device, but not the other MLD Report packets in the same IPv6 multicast group, reducing the packet number in the network. This command is used to enable the IPv6 MLD Snooping suppression, and only the MLDv1 Report packets are suppressed rather than the MLDv2 Report packets.

Configuration Examples The following example enables MLD Snooping suppression.

```
FS(config-if)# ipv6 mld snooping suppression
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.15 ipv6 mld snooping svgl profile

Use this command to specify the group address range to be in the SVGL mode. Use the **no** or **default** form of this command to restore the default setting.

- ipv6 mld snooping svgl profile** profile-number
- no ipv6 mld snooping svgl profile**
- default ipv6 mld snooping svgl profile**

Parameter Description	Parameter	Description
	profile-number	Sets the profile number, in the range from 1 to 1024.

Defaults No profiles are associated with svgl by default.

Command Mode Global configuration mode

Usage Guide With the SVGL mode or IVGL-SVGL mode configured for the MLD Snooping working mode, a profile shall be

associated with the IVGL for the purpose of specifying the group address range in the SVGL mode. That is to say, the member port of the multicast forwarding entry can be forwarded across the VLANs, while the member ports of the corresponding multicast forwarding entries within other multicast address range must belong to the same VLAN. By default, no profile is associated, which means that apply no multicast group in the SVGL mode.

Configuration The following example specifies the SVGL mode application range as the profile1 group address range.

Examples FS(config)# ipv6 mld snooping svgl profile 1

Related Commands	Command	Description
	ipv6 mld snooping ivgl	Enables the MLD Snooping and set the ivgl mode.
ipv6 mld snooping ivgl-svgl	Enables the MLD Snooping and set the ivgl-svgl mode.	

Platform N/A

Description

10.16 ipv6 mld snooping svgl vlan

Use this command to specify the shared VLAN in MLD Snooping SVGL mode.

Use the **no** or **default** form of this command to restore the default setting.

ipv6 mld snooping svgl vlan vid

no ipv6 mld snooping svgl vlan

default ipv6 mld snooping svgl vlan

Parameter Description	Parameter	Description
	vid	The VLAN ID, in the range from 1 to 4094.

Defaults The default is 1.

Command Mode Global configuration mode

Usage Guide This command is used to specify the SVGL shared VLAN if MLD Snooping is running in SVGL or IVGL-SVGL mode.

Configuration The following example sets the shared VLAN in MLD Snooping SVGL mode to 5.

Examples FS(config)# ipv6 mld snooping svgl vlan 5

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.17 ipv6 mld snooping vlan

Use this command to enable the MLD Snooping function for the specified VLAN. Use the **no** form of this command to disable this function. Use the default form of this command to restore the default setting.

ipv6 mld snooping vlan vid

no ipv6 mld snooping vlan vid

default ipv6 mld snooping vlan vid

Parameter Description	Parameter	Description
	vid	The VLAN ID, in the range from 1 to 4094.

Defaults The MLD Snooping function is enabled by default.

Command Global configuration mode

Mode

Usage Guide By default, the MLD Snooping is enabled in all VLANs. You can disable the MLD Snooping for the specified VLAN.

Configuration The following example disables the MLD Snooping function in vlan1:

Examples FS(config)# no ipv6 mld snooping vlan 1

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

10.18 ipv6 mld snooping vlan mrouter interface

Use this command to set the static mrouter interface.

Use the **no** form of this command to restore the default setting.

ipv6 mld snooping vlan vid **mrouter interface** interface-type interface-number

no ipv6 mld snooping vlan vid **mrouter interface** interface-type interface-number

default ipv6 mld snooping vlan vid **mrouter interface** interface-type interface-number

Parameter Description	Parameter	Description
	vid	The VLAN ID, in the range from 1 to 4094.
	interface-type	The interface number
	interface-number	

Defaults No static mrouter interface is configured by default.

Command Global configuration mode

Mode

Usage Guide Use this command to set the static mrouter interface for the purpose that all IPv6 multicast data received on the switch can be forwarded. With the source port check function enabled, only the multicast flow through the mroute interface can be forwarded.

Configuration The following example sets a multicast routing port:

Examples FS(config)# ipv6 mld snooping vlan 1 mrouter interface fastEthernet 0/1

Related Commands	Command	Description
		ipv6 mld snooping source-check port

Platform N/A

Description

10.19 ipv6 mld snooping vlan mrouter learn

Use this command to enable the switch to dynamically learn MLD query or PIM packets to identify the mrouter interface automatically. Use the **no** form of this command to disable this function.

ipv6 mld snooping vlan vid mrouter learn

no ipv6 mld snooping vlan vid mrouter learn

Parameter Description	Parameter	Description
		vid

Defaults This function is enabled by default.

Command Global configuration mode.

Mode

Usage Guide The mrouter interface is the interface of the multicast device connected with the peer device. By default, the dynamically-learned mroute interface is enabled on the layer-2 multicast device. Use the **no** option to disable this function and clear all dynamically-learned mroute interfaces. With the source port check enabled, only the multicast flow through the mroute interface are valid and forwarded to the registered interface on the layer-2 multicast device. Those multicast flow through the non-mroute interface are invalid and will be discarded. With the source port check function enabled, use the dynamically-learned mroute interfaces to improve the mld snooping flexibility.

Configuration The following example enables the dynamic multicast route port learn function.

Examples FS(config)# ipv6 mld snooping vlan 1 mrouter learn

Related Commands	Command	Description
	ipv6 mld snooping vlan mrouter interface	Sets the mrouter interface.

Platform N/A
Description

10.20 ipv6 mld snooping vlan static interface

Use this command to set a static member port to receive the multicast flow for the purpose of preventing the port from being influenced by the MLD Report packets with the MLD Snooping enabled. Uses the **no** form of this command to restore the default setting.

ipv6 mld snooping vlan vid static group-address interface interface-type interface-number
no ipv6 mld snooping vlan vid static group-address interface interface-type interface-number

Parameter Description	Parameter	Description
	vid	The vlan id, in the range from 1 to 4094. The default is 1.
	group-address	The multicast address
	interface-type interface-number	The interface number

Defaults No static member port is configured by default.

Command Mode Global configuration mode

Usage Guide Use this command to set the interface as the member port of multiple static multicast addresses.

Configuration Examples The following example sets the interface fastEthernet 0/1 as the static member port of the FF88::1 group.

```
FS(config)# ipv6 mld snooping vlan 1 static FF88::1 interface fastEthernet 0/1
```

Related Commands	Command	Description
	ipv6 mld snooping vlan mrouter interface	Sets the mrouter interface.

Platform N/A
Description

10.21 permit

Use this command to allow the multicast flow profile within the specified range in the profile configuration mode.
permit

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults The default profile action is **deny**.

Command Profile configuration mode

Mode

Usage Guide Before configuring this command, use the **range** command to set the multicast range first.

Configuration The following example allows the multicast flow profile within the range of FF77::1 to be forwarded only:

Examples

```
FS(config)# ipv6 mld profile 1
FS(config-profile)# range FF77::1
FS(config-profile)# permit
```

**Related
Commands**

Command	Description
ipv6 mld profile	Creates one profile.
range	Sets the multicast address range.
deny	Sets the profile action deny.

Platform N/A

Description

10.22 range

Use this command to specify the profile multicast flow range, which can be one single multicast address, or can be the multicast address within the specified range when configuring a profile in the profile configuration mode.

range low-ipv6-address [high-ip-address]

**Parameter
Description**

Parameter	Description
low-ip-address	The low address within the specified range
high-ip-address	The high address within the specified range

Defaults No range is defined by default.

Command Profile configuration mode

Mode

Usage Guide The value of low-ipv6-address shall be smaller than the one of high-ipv6-address. With the address range configured, an action shall be specified, and the default profile action is deny.

Configuration The following example creates the multicast flow profile within the range of FF77::1~FF77::100.

Examples

```
FS(config)# ipv6 mld profile 1
FS(config-profile)# range FF77::1 FF77::100
```

Related Commands	Command	Description
	ipv6 mld profile	Creates one profile.
	deny	Sets the profile action deny.
	permit	Sets the profile action permit.

Platform N/A

Description

10.23 show ipv6 mld profile

Use this command to display the related MLD profile configuration.

show ipv6 mld profile profile-number

Parameter Description	Parameter	Description
		profile-number

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide Use this command to display the related MLD profile configuration.

Configuration The following example displays the MLD profile configuration.

Examples

```
FS# show ipv6 mld profile 1
MLD Profile 1
permit
range FF77::1 FF77::100
range FF88::123
```

Related Commands	Command	Description
		N/A

Platform N/A

Description

10.24 show ipv6 mld snooping

Use this command to display the related MLD Snooping information.

show ipv6 mld snooping [**gda-table** | **interfaces** interface-type interface-number | **mrouter** | **statistics**[vlan vid] | **vlan** vid]

Parameter Description	Parameter	Description
	gda-table	Displays the multicast forwarding rule table.
	Interfaces interface-type interface-number	Displays the MLD Snooping filtering configuration.
	mrouter	Displays the information about mrouter interface.
	statistics	Displays the MLD Snooping statistics.
	vlan vlan-id	Displays the MLD Snooping information of the specified vlan.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide Use this command to display the related MLD Snooping information.

Configuration Examples The following example displays the MLD Snooping configurations using the **show ipv6 mld snooping** command:

```
FS# show ipv6 mld snooping
MLD-snooping mode      : IVGL
SVGL vlan-id           : 1
SVGL profile number    : 0
Source check port      : Disabled
Query max response time : 10(Seconds)
```

The following example displays the mrouter interface of the MLD Snooping using the **show ipv6 mld snooping statistics** command:

```
FS# show ipv6 mld snooping statistics
GROUP   Interface  Last report   Last leave    Last
                time         time          reporter
-----
FF88::1 VL1:Gi4/2  0d:0h:0m:7s  ----         2003::1111
                Report pkts: 1      Leave pkts: 0
```

The following example displays the mrouter interface of the MLD Snooping using the **show ipv6 mld snooping mrouter** command:

```
FS# show ipv6 mld snooping mrouter
Vlan   Interface      State      MLD profile number
----   -
1      GigabitEthernet 0/7  static    1
```



```
1 GigabitEthernet 0/12 dynamic 0
```

The following example displays the multicast group information in the GDA table and all member ports information of one multicast group:

```
FS# show ipv6 mld snooping gda-table
Abbr: M - mrouter
      D - dynamic
      S - static
VLAN  Address                Member ports
-----
1     FF88::1                 GigabitEthernet 0/7(S)
```

The following example displays the MLD Snooping filtering configuration using the **show ipv6 mld snooping mrouter** command:

```
FS# show ipv6 mld snooping interface GigabitEthernet 0/7
Interface          Filter Profile number  max-groups
-----
GigabitEthernet 0/7  1                      4294967294
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

Chapter 6 Security Configuration Commands

1. AAA Commands
2. RADIUS Commands
3. TACACS+ Commands
4. SCC Commands
5. Password-Policy Commands
6. Storm Control Commands
7. SSH Commands
8. CPU Protection Commands
9. DHCP Snooping Commands
10. NFPP Commands
11. Security-log Commands

1 AAA Commands

1.1 aaa accounting commands

Use this command to account users in order to enable NAS command accounting.

Use the **no** form of this command to restore the default setting.

aaa accounting commands *level* { **default** | *list-name* } **start-stop** *method1* [*method2...*]

no aaa accounting commands *level* { **default** | *list-name* }

Parameter	Parameter	Description
Description	<i>level</i>	The accounting command level, 0-15. The message shall be recorded before determining which command level is executed.
	default	When this parameter is used, the following defined method list is used as the default method for command accounting.
	<i>list-name</i>	Name of the command accounting method list, which could be any character strings.
	<i>method</i>	It must be one of the keywords listed in the following table. One method list can contain up to four methods.
	none	Does not perform accounting.
	group	Uses the server group for accounting, the TACACS+ server group is supported.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide FSOS enables the accounting command function after enabling the login authentication. After enabling the accounting function, it sends the command information to the security service.
The configured accounting command method must be applied to the terminal line that needs accounting command; otherwise it is ineffective.

Configuration Examples The following example enables NAS command accounting.

```
FS(config)# aaa accounting commands 15 default start-stop group tacacs+
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa authentication	Defines AAA authentication.
	accounting commands	Applies the accounting commands to the terminal line.

Platform Description N/A

1.2 aaa accounting exec

Use this command to enable NAS access accounting. Use the **no** form of this command to restore the default setting.

```
aaa accounting exec { default | list-name } start-stop method1 [ method2...]
```

```
no aaa accounting exec { default | list-name }
```

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined method list is used as the default method for Exec accounting.
	<i>list-name</i>	Name of the Exec accounting method list, which could be any character strings
	<i>method</i>	It must be one of the keywords: none and group . One method list can contain up to four methods.
	none	Does not perform accounting.
	group	Uses the server group for accounting, the RADIUS and TACACS+ server group is supported.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide FSOS enables the exec accounting function after enabling the login authentication. After enabling the accounting function, it sends the account start information to the security server when the users log in the NAS CLI, and sends the account stop information to the security server when the users log out. If it does not send the account start information to the security server when a user logs in, it does not send the account stop information to the security server when a user logs out, either. The configured exec accounting method must be applied to the terminal line that needs accounting command; otherwise it is ineffective.

Configuration Examples The following example enables NAS access accounting.

```
FS(config)# aaa accounting network start-stop group radius
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa authentication	Defines AAA authentication.
	accounting commands	Applies the Exec accounting to the terminal line.

Platform Description N/A

1.3 aaa accounting network

Use this command to enable network access accounting. Use the **no** form of this command to restore the default

setting.

aaa accounting network { default | list-name } start-stop method1 [method2..]

no aaa accounting network { default | list-name }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined method list is used as the default method for Network accounting.
	<i>list-name</i>	Name of the accounting method list
	<i>method</i>	Sends accounting messages at both the start time and the end time of access. Users are allowed to access the network, no matter whether the start accounting message enables the accounting successfully.
	none	Does not perform accounting.
	group	Uses the server group for accounting, the RADIUS and TACACS+ server group is supported.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide FSOS performs accounting of user activities by sending record attributes to the security server. Use the **start-stop** keyword to set the user accounting option.

Configuration The following example enables network access accounting.

Examples FS(config)# aaa accounting network start-stop group radius

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	aaa authorization network	Defines a network authorization method list.
	aaa authentication	Defines AAA authentication.
	username	Defines a local user database.

Platform N/A

Description

1.4 aaa accounting update

Use this command to enable the accounting update function Use the **no** form of this command to restore the default setting.

aaa accounting update

no aaa accounting update

Parameter N/A
Description

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide If the AAA security service is not enabled, the accounting update function cannot be used. This command is used to set the accounting interval if the AAA security service has been enabled.

Configuration Examples The following example enables the accounting update function.

```
FS(config)# aaa new-model
FS(config)# aaa accounting update
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa accounting network	Defines a network accounting method list.

Platform Description N/A

1.5 aaa accounting update periodic

If the accounting update function has been enabled, use this command to set the interval of sending the accounting update message. Use the **no** form of this command to restore the default setting.

aaa accounting update periodic *interval*

no aaa accounting update periodic

Parameter Description	Parameter	Description
	<i>interval</i>	Interval of sending the accounting update message, in the unit of minutes. The shortest interval is 1 minute.

Defaults The default is 5 minutes.

Command Mode Global configuration mode

Usage Guide If the AAA security service is not enabled, the accounting update function cannot be used. This command is used to set the accounting interval if the AAA security service has been enabled.

Configuration Examples The following example sets the interval of accounting update to 1 minute.

```
FS(config)# aaa new-model
FS(config)# aaa accounting update
FS(config)# aaa accounting update periodic 1
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa accounting network	Defines a network accounting method list.

Platform N/A
Description

1.6 aaa authentication enable

Use this command to enable AAA Enable authentication and configure the Enable authentication method list. Use the **no** form of this command to delete the user authentication method list.

aaa authentication enable { default | list-name } method1 [method2..]
no aaa authentication enable default

Parameter Description	Parameter	Description
	default	When this parameter is used, the following defined authentication method list is used as the default method for Enable authentication.
	<i>method</i>	It must be one of the keywords: local , none and group . One method list can contain up to four methods.
	local	Uses the local user name database for authentication.
	none	Does not perform authentication.
	group	Uses the server group for authentication. At present, the RADIUS and TACACS+ server groups are supported.

Defaults N/A

Command Mode Global configuration mode

Usage Guide If the AAA Enable authentication service is enabled on the device, users must use AAA for Enable authentication negotiation. You must use the **aaa authentication enable** command to configure a default or optional method list for Enable authentication.

The next method can be used for authentication only when the current method does not work.

The Enable authentication function automatically takes effect after configuring the Enable authentication method list.

Configuration Examples The following example defines an AAA Enable authentication method list. In the authentication method list, first the RADIUS security server is used for authentication. If the RADIUS security server does not respond, the local user database is used for authentication.

```
FS(config)# aaa authentication enable default group radius local
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	enable	Switchover the user level.

username	Defines a local user database.
-----------------	--------------------------------

Platform N/A

Description

1.7 aaa authentication login

Use this command to enable AAA Login authentication and configure the Login authentication method list. Use the **no** form of this command to delete the authentication method list.

aaa authentication login { default | list-name } method1 [method2..]

no aaa authentication login { default | list-name }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined authentication method list is used as the default method for Login authentication.
	<i>list-name</i>	Name of the user authentication method list, which could be any character strings
	<i>method</i>	It must be one of the keywords: local , none , group and subs . One method list can contain up to four methods.
	local	Uses the local user name database for authentication.
	none	Does not perform authentication.
	group	Uses the server group for authentication. At present, the RADIUS and TACACS+ server groups are supported.
	subs	Uses the subs database for authentication.

Defaults N/A

Command Mode Global configuration mode

Usage Guide If the AAA Login authentication security service is enabled on the device, users must use AAA for Login authentication negotiation. You must use the **aaa authentication login** command to configure a default or optional method list for Login authentication.

The next method can be used for authentication only when the current method does not work.

You need to apply the configured Login authentication method to the terminal line which needs Login authentication. Otherwise, the configured Login authentication method is invalid.

Configuration Examples The following example defines an AAA Login authentication method list named list-1. In the authentication method list, first the RADIUS security server is used for authentication. If the RADIUS security server does not respond, the local user database is used for authentication.

```
FS(config)# aaa authentication login list-1 group radius local
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.

login authentication	Applies the Login authentication method to the terminal lines.
username	Defines a local user database.

Platform N/A

Description

1.8 aaa authentication ppp

Use this command to enable the AAA authentication for PPP user and configure the PPP user authentication method list.

Use the **no** form of this command to delete the authentication method list.

aaa authentication ppp { default | list-name } method1 [method2...]

no aaa authentication ppp { default | list-name }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined authentication method list is used as the default method for PPP user authentication.
	<i>list-name</i>	Name of the user authentication method list, which could be any character strings
	<i>method</i>	It must be one of the keywords: local , none group and subs . One method list can contain up to four methods.
	local	Uses the local user name database for authentication.
	none	Does not perform authentication.
	group	Uses the server group for authentication. At present, the RADIUS server group is supported.
	subs	Uses the subs database for authentication.

Defaults N/A

Command Global configuration mode

Mode

Usage Guide If the AAA PPP security service is enabled on the device, users must use AAA authentication for PPP negotiation. You must use the **aaa authentication ppp** command to configure a default or optional method list for PPP user authentication.

The next method can be used for authentication only when the current method does not work.

Configuration Examples The following example defines an AAA authentication method list named rds_ppp for PPP session. In the authentication method list, first the RADIUS security server is used for authentication. If the RADIUS security server does not respond, the local user database is used for authentication.

```
FS(config)# aaa authentication ppp rds_ppp group radius local
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.

ppp authentication	Associates a specific method list with the PPP user.
username	Defines a local user database.

Platform N/A

Description

1.9 aaa authentication sslvpn

Use this command to enable AAA authentication for the SSL VPN user and configure the SSL VPN user authentication method list.

Use the **no** form of this command to delete the authentication method list.

aaa authentication sslvpn { default | list-name } method1 [method2...]

no aaa authentication sslvpn { default | list-name }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined authentication method list is used as the default method for SSL VPN user authentication.
	<i>list-name</i>	Name of SSL VPN user authentication method list, which could be any character strings
	<i>method</i>	It must be one of the keywords: local , none , subs and group . One method list can contain up to four methods.
	local	Use the local user name database for authentication.
	none	Does not perform authentication.
	group	Uses the server group for authentication. At present, the RADIUS server group is supported.
	subs	Uses the subs database for authentication.

Defaults N/A

Command Global configuration mode

Mode

Usage Guide If the SSL VPN security service is enabled on the device, users must use the AAA authentication for SSL VPN negotiation. You must use the **aaa authentication sslvpn** command to configure a default or optional method list for user authentication.

The next method can be used for authentication only when the current method does not work.

Configuration Examples The following example defines an AAA authentication method list named **rds_sslvpn** for SSL VPN session. In the authentication method list, the RADIUS security server is first used for authentication. If the RADIUS security server does not respond, the local user database is used for authentication.

```
FS(config)# aaa authentication sslvpn rds_sslvpn group radius local
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.10 aaa authorization commands

Use this command to authorize the command executed by the user who has logged in the NAS CLI. Use the **no** form of this command to restore the default setting.

aaa authorization commands *level* { **default** | *list-name* } *method1* [*method2...*]

no aaa authorization commands *level* { **default** | *list-name* }

Parameter	Parameter	Description
Description	<i>level</i>	Command level to be authorized in the range from 0 to 15
	default	When this parameter is used, the following defined method list is used as the default method for command authorization.
	<i>list-name</i>	Name of the user authorization method list, which could be any character strings
	<i>method</i>	It must be one of the keywords: none and group . One method list can contain up to four methods.
	none	Dose not perform authorization.
	group	Uses the server group for authorization. At present, the TACACS+ server group is supported.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide FSOS supports authorization of the commands executed by the users. When the users input and attempt to execute a command, AAA sends this command to the security server. This command is to be executed if the security server allows to. Otherwise, it will prompt command deny.

It is necessary to specify the command level when configuring the command authorization, and this specified command level is the default command level.

The configured command authorization method must be applied to terminal line which requires the command authorization. Otherwise, the configured command authorization method is ineffective.

Configuration The following example uses the TACACS+ server to authorize the level 15 command.

Examples

```
FS(config)# aaa authorization commands 15 default group tacacs+
```

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	authorization commands	Applies the command authorization for the terminal line.

Platform N/A

Description

1.11 aaa authorization config-commands

Use this command to authorize the configuration commands (including in the global configuration mode and its sub-mode). Use the **no** form of this command to resotre the default setting.

aaa authorization config-commands
no aaa authorization config-commands

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide If you only authorize the commands in the non-configuration mode (for example, privileged EXEC mode), you can use the **no** form of this command to disable the authorization function in the configuration mode, and execute the commands in the configuration mode and its sub-mode without command authorization.

Configuration Examples The following example enables the configuration command authorization function.

```
FS(config)# aaa authorization config-commands
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa authorization commands	Defines the AAA command authorization.

Platform Description N/A

1.12 aaa authorization console

Use this command to authorize the commands of the users who have logged in the console. Use the **no** form of this command to restore the default setting.

aaa authorization console
no aaa authorization console

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide FSOS supports to identify the users logged in from the console and from other terminals, configure whether to authorize the users logged in from the console or not. If the command authorization function is disabled on the console, the authorization method list applied to the console line is ineffective.

Configuration The following example enables the aaa authorization console function.

Examples FS(config)# aaa authorization console

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	aaa authorization commands	Defines the AAA command authorization.
	authorization commands	Applies the command authorization to the terminal line.

Platform N/A

Description

1.13 aaa authorization exec

Use this command to authorize the users logged in the NAS CLI and assign the authority level. Use the **no** form of this command to restore the default setting.

aaa authorization exec { **default** | *list-name* } *method1* [*method2...*]

no aaa authorization exec { **default** | *list-name* }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined method list is used as the default method for Exec authorization.
	<i>list-name</i>	Name of the user authorization method list, which could be any character strings
	<i>method</i>	It must be one of the keywords listed in the following table. One method list can contain up to four methods.
	local	Uses the local user name database for authorization.
	none	Does not perform authorization.
	group	Uses the server group for authorization. At present, the RADIUS server group is supported.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide FSOS supports authorization of users logged in the NAS CLI and assignment of CLI authority level(0-15). The aaa authorization exec function is effective on condition that Login authentication function has been enabled. It can not enter the CLI if it fails to enable the aaa authorization exec.

You must apply the exec authorization method to the terminal line; otherwise the configured method is ineffective.

Configuration The following example uses the RADIUS server to authorize Exec.

Examples FS(config)# aaa authorization exec default group radius

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	authorization exec	Applies the command authorization to the terminal line.
	username	Defines a local user database.

Platform N/A

Description

1.14 aaa authorization network

Use this command to authorize the service requests (including such protocols as PPP and SLIP) from the users that access the network. Use the **no** form of this command to restore the default setting.

aaa authorization network { default | list-name } method1 [method2...]

no aaa authorization network { default | list-name }

Parameter	Parameter	Description
Description	default	When this parameter is used, the following defined method list is used as the default method for Network authorization.
	<i>method</i>	It must be one of the keywords: none and group . One method list can contain up to four methods.
	none	Does not perform authorization.
	group	Uses the server group for authorization. At present, the RADIUS server group is supported.

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide FSOS supports authorization of all the service requests related to the network, such as PPP and SLIP. If authorization is configured, all the authenticated users or interfaces will be authorized automatically. Three different authorization methods can be specified. Like authorization, the next method can be used for authorization only when the current authorization method does not work. If the current authorization method fails, other subsequent authorization method is not used. The RADIUS server authorizes authenticated users by returning a series of attributes. Therefore, RADIUS authorization is based on RADIUS authorization. RADIUS authorization is performed only when the user passes the RADIUS authorization.

Configuration The following example uses the RADIUS server to authorize network services.

Examples FS(config)# aaa authorization network default group radius

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	aaa accounting	Defines AAA accounting.
	aaa authentication	Defines AAA authentication.
	username	Defines a local user database.

Platform N/A

Description

1.15 aaa command-author cache

Use this command to cache authorization results on the AAA module.

Use the **no** form of this command to restore the default setting.

aaa command-author cache

no aaa command-author cache

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the AAA module does not cache authorization results.

Command Global configuration mode

Mode

Usage Guide The AAA module caches authorization results returned from the server. Therefore, later authorizations at the same level can be operated based on the cached resources.

The cached authorization results, originating from specific levels of sessions and commands, can be applied only to sessions and commands at these levels.

Configuration The following example enables the AAA module to cache authorization results.

Examples

```
FS(config)# aaa command-author cache
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

1.16 aaa domain

Use this command to configure the domain attributes. Use the **no** form of this command to restore the default setting.

aaa domain { default | domain-name }

no aaa domain { default | domain-name }

Parameter	Parameter	Description
Description	default	Uses this parameter to configure the default domain.
	<i>domain-name</i>	The name of the specified domain

Defaults No domain is configured by default.

Command Mode Global configuration mode

Usage Guide Use this command to configure the domain-name-based AAA service. The **default** is to configure the default domain. That is the method list used by the network device if the users are without domain information. The *domain-name* is the specified domain name, if the users are with this domain name, the method lists associated with this domain are used. At present, the system can configure up to 32 domains.

Configuration The following example configures the domain name.

```

Examples
FS(config)# aaa domain FS.com
FS(config-aaa-domain)#
    
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain	Displays the domain configuration.

Platform N/A

Description

1.17 aaa domain enable

Use this command to enable domain-name-based AAA service. Use the **no** form of this command to restore the default setting.

aaa domain enable
no aaa domain enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide To perform the domain-name-based AAA service configuration, enable this service.

Configuration The following example enables the domain-name-based AAA service.

Examples

```
FS(config)# aaa domain enable
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	show aaa doomain	Displays the domain configuration.

Platform N/A

Description

1.18 aaa local authentication attempts

Use this command to set login attempt times.

aaa local authentication attempts *max-attempts*

Parameter	Parameter	Description
Description	<i>max-attempts</i>	In the range from 0 to 2147483647

Defaults The default is 3.

Command Mode Global configuration mode

Usage Guide Use this command to configure login attempt times. 0 indicates no time limit.

Configuration The following example sets login attempt times to 6.

Examples

```
FS #configure terminal
FS (config)#aaa local authentication attempts 6
```

Related Commands	Command	Description
	show running-config	Displays the current configuration of the switch.
	show aaa lockout	Displays the lockout configuration parameter of current login.

Platform N/A

Description

1.19 aaa local authentication lockout-time

Use this command to configure the lockout-time period when the login user has attempted for more than the limited times.

aaa local authentication lockout-time *lockout-time*

Parameter	Parameter	Description
Description	<i>lockout-time</i>	In the range from 1 to 2147483647 in the unit of minutes

Defaults The default is 15 minutes.

Command Mode Global configuration mode

Usage Guide Use this command to configure the length of lockout-time when the login user has attempted for more than the limited times.

Configuration Examples The following example sets the lockout-time period to 5 minutes.

```
FS#configure terminal
FS(config)#aaa local authentication lockout-time 5
```

Related Commands	Command	Description
	show running-config	Displays the current configuration of the switch.
	show aaa lockout	Displays the lockout configuration parameter of current login.

Platform N/A

Description

1.20 aaa log enable

Use this command to enable the system to print the syslog informing AAA authentication success. Use the **no** form of this command to disable the system to print the system informing AAA authentication success.

aaa log enable
no aaa log enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode

Usage Guide Use this command to enable the system to print the syslog informing aaa authentication success.

Configuration Examples The following example disables the system to print the syslog informing aaa authentication success.

```
FS(config)# no aaa log enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.21 aaa log rate-limit

Use this command to set the rate of printing the syslog informing AAA authentication success. Use the **no** form of this command to restore the default printing rate.

aaa log rate-limit *num*

no aaa log rate-limit

Parameter	Parameter	Description
Description	<i>num</i>	The number of syslog entries printed per second. The range is from 0 to 65,535. 0 indicates the printing rate is not limited. The default is 5.

Defaults The default is 5.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the rate of printing the syslog informing AAA authentication success to 10.

```
FS(config)# aaa log rate-limit 10
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.22 aaa new-model

Use this command to enable the FSOS AAA security service. Use the **no** form of this command to restore the default setting.

aaa new-model

no aaa new-model

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide Use this command to enable AAA. If AAA is not enabled, none of the AAA commands can be configured.

Configuration The following example enables the AAA security service.

Examples FS(config)# aaa new-model

Related Commands	Command	Description
	aaa authentication	Defines a user authentication method list.
	aaa authorization	Defines a user authorization method list.
	aaa accounting	Defines a user accounting method list.

Platform N/A

Description

1.23 aaa slave-login allow

Use this command to turn on the login switch for the AAA slave device.

Use the **no** form of this command to turn off the login switch..

aaa slave-login allow

no aaa slave-login allow

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the switch is off, so the slave device is not allowed to login.

Command Mode Domain configuration mode

Usage Guide When the switch is turned on, the slave device is allowed to login; otherwise, the slave device cannot login.
The configuration remains valid unless a change is made.

Configuration The following example turns on the login switch for the AAA slave device.

Examples FS(config)# aaa slave-login allow

Related Commands	Command	Description
	N/A	N/A

Platform This command is supported on switches.

Description

1.24 accounting

Use this command to configure the Commands, EXEC, or Network accounting list.

Use the **no** form of this command to restore the default setting.

accounting { **commands** | **exec** | **network** } { **default** | *list-name* }

no accounting { **commands** | **exec** | **network** }

Parameter	Parameter	Description
Description	default	Uses this parameter to specify the default method list.
	<i>list-name</i>	The name of the network accounting list
	commands	Uses this parameter to specify the Commands method list.
	exec	Uses this parameter to specify the EXEC method list.
	network	Uses this parameter to specify the Network method list.

Defaults With no method list specified, if the user sends the request, the device will attempt to specify the default method list for the user.

Command Mode Domain configuration mode

Usage Guide Use this command to configure the Commands, EXEC, or Network accounting method list for the specified domain.

Configuration Examples The following example sets an accounting method list for the specified domain.

```
FS(config)# aaa domain FS.com
FS(config-aaa-domain)# accounting network default
FS(config-aaa-domain)# accounting exec default
FS(config-aaa-domain)# accounting commands default
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain	Displays the domain configuration.

Platform Description N/A

1.25 authentication

Use this command to configure the IEEE802.1x, login, or enable authentication list.

Use the **no** form of this command to restore the default setting.

authentication { **login** | **enable** } { **default** | *list-name* }

no authentication { **login** | **enable** }

Parameter	Parameter	Description
Description	default	Uses this parameter to specify the default method list
	<i>list-name</i>	The name of the specified method list
	login	Uses this parameter to configure the login authentication list.

enable	Uses this parameter to configure the enable authentication list.
---------------	--

Defaults With no method list specified, if users send the request, the device will attempt to specify the default method list for users.

Command Mode Domain configuration mode

Usage Guide Specify an authentication method list for the domain.

Configuration The following example sets an Enable authentication method list for the specified domain.

Examples

```
FS(config)# aaa domain FS.com
FS(config-aaa-domain)# authentication enable default
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain	Displays the domain configuration.

Platform N/A
Description

1.26 authorization

Use this command to configure the Commands, EXEC, or Network authorization list.

Use the **no** form of this command to restore the default setting.

authorization { commands | exec | network } { default | list-name }

no authorization { commands | exec | network }

Parameter	Parameter	Description
Description	default	Uses this parameter to specify the default method list.
	<i>list-name</i>	The name of the specified method list
	commands	Uses this parameter to specify the Commands method list.
	exec	Uses this parameter to specify the EXEC method list.
	network	Uses this parameter to specify the Network method list.

Defaults With no method list specified, if users send the request, the device will attempt to specify the default method list for users.

Command Mode Domain configuration mode

Usage Guide Specify an authorization method list for the domain.

Configuration The following example sets an authorization method list for the specified domain.

```

Examples
FS(config)# aaa domain FS.com
FS(config-aaa-domain)# authorization network default
FS(config-aaa-domain)# authorization exec default
FS(config-aaa-domain)# authorization commands default
    
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain	Displays the domain configuration.

Platform N/A

Description

1.27 clear aaa local user lockout

Use this command to clear the lockout user list.

```

clear aaa local user lockout { all | user-name word }
    
```

Parameter Description	Parameter	Description
	all	Indicates all locked users.
	user-name word	Indicates the ID of the locked User.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear all the user lists or a specified user list.

Configuration The following example clears the lockout user list.

```

Examples
FS(config)# clear aaa local user lockout all
    
```

Related Commands	Command	Description
	show running-config	Displays the current configuration of the switch.
	show aaa lockout	Displays the lockout configuration parameter of current login.

Platform N/A

Description

1.28 show aaa accounting update

Use this command to display the accounting update information.

```

show aaa accounting update
    
```

Parameter	Parameter	Description						
Description	N/A	N/A						
Defaults	N/A							
Command Mode	Privileged EXEC mode/ Global configuration mode/ Interface configuration mode							
Usage Guide	Use this command to display the accounting update interval and whether the accounting update is enabled.							
Configuration Examples	The following example displays the accounting update information.							
Examples	<pre>FS# show aaa accounting update</pre>							
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>aaa new-model</td> <td>Enables the AAA security service.</td> </tr> <tr> <td>aaa domain enable</td> <td>Enables the domain-name-based AAA service.</td> </tr> </tbody> </table>	Command	Description	aaa new-model	Enables the AAA security service.	aaa domain enable	Enables the domain-name-based AAA service.	
Command	Description							
aaa new-model	Enables the AAA security service.							
aaa domain enable	Enables the domain-name-based AAA service.							
Platform Description	N/A							

1.29 show aaa domain

Use this command to display all current domain information.

show aaa domain [**default** | *domain-name*]

Parameter	Parameter	Description
Description	default	Displays the default domain.
	<i>domain-name</i>	Displays the specified domain.
Defaults	N/A	
Command Mode	Privileged EXEC mode/ Global configuration mode/ Interface configuration mode	
Usage Guide	If no domain-name is specified, all domain information will be displayed.	
Configuration Examples	The following example displays the domain named domain.com.	
Examples	<pre>FS(config)# show aaa domain domain.com =====Domain domain.com===== State: Active Username format: Without-domain Access limit: No limit 802.1X Access statistic: 0</pre>	


```
Selected method list:
authentication dot1x default
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.

Platform N/A
Description

1.30 show aaa lockout

Use this command to display the lockout configuration.

show aaa lockout

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode/ Interface configuration mode

Usage Guide Use this command to display the lockout configuration.

Configuration Examples The following example displays the lockout configuration.

```
FS# show aaa lockout
Lock tries:    3
Lock timeout: 15 minutes
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.31 show aaa group

Use this command to display all the server groups configured for AAA.

show aaa group

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode/ Interface configuration mode

Usage Guide N/A

Configuration The following command displays all the server groups.

Examples

```
FS# show aaa group
Type      Reference  Name
-----
radius    1          radius
tacacs+   1          tacacs+
radius    1          dot1x_group
radius    1          login_group
radius    1          enable_group
```

Related Commands	Command	Description
	aaa group server	Configures the AAA server group.

Platform N/A

Description

1.32 show aaa method-list

Use this command to display all AAA method lists.

show aaa method-list

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode/ Interface configuration mode

Usage Guide Use this command to display all AAA method lists.

Configuration The following example displays the AAA method list.

Examples

```
FS# show aaa method-list
Authentication method-list
aaa authentication login default group radius
aaa authentication ppp default group radius
aaa authentication dot1x default group radius
aaa authentication dot1x san-f local group angel group rain none
```

```
aaa authentication enable default group radius
Accounting method-list
aaa accounting network default start-stop group radius
Authorization method-list
aaa authorizing network default group radius
```

Related Commands	Command	Description
	aaa authentication	Defines a user authentication method list
	aaa authorization	Defines a user authorization method list
	aaa accounting	Defines a user accounting method list

Platform N/A

Description

1.33 show aaa user

Use this command to display AAA user information.

show aaa user { all | lockout | by-id session-id | by-name user-name }

Parameter Description	Parameter	Description
	all	Displays all AAA user information.
	lockout	Displays the locked AAA user information.
	by-id session-id	Displays the information of the AAA user that with a specified session ID.
	by-name user-name	Displays the information of the AAA user with a specified user name.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode/ Interface configuration mode

Usage Guide Use this command to display AAA user information.

Configuration Examples The following example displays AAA user information.

```
FS#show aaa user all
-----
      Id ---- Name
2345687901      wwxy
-----

FS# show aaa user by-id 2345687901
-----
      Id ---- Name
2345687901      wwxy
```

```

FS# show aaa user by-name wwxy
-----
      Id ---- Name
2345687901    wwxy
-----

FS# show aaa user lockout

Name                               Tries    Lock    Timeout(min)
-----
FS#
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.34 state

Use this command to set whether the configured domain is valid. Use the **no** form of this command to restore the default setting.

state { block | active }
no state

Parameter Description	Parameter	Description
	block	The configured domain is invalid.
	active	The configured domain is valid.

Defaults The default is active.

Command Mode Domain configuration mode

Usage Guide Use this command to set whether the specified configured domain is valid.

Configuration Examples The following example sets the configured domain to be invalid.

```

FS(config)# aaa domain FS.com
FS(config-aaa-domain)# state block
    
```

Related Commands	Command	Description
	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain enable	Displays the domain configuration.

Platform N/A

Description

1.35 username-format

Use this command to configure the user name whether to be with the domain information when the NAS interacts with the servers. Use the **no** form of this command to restore the default setting.

username-format { **without-domain** | **with-domain** }

no username-format

Parameter	Parameter	Description
Description	without-domain	Sets the user name without the domain information.
	with-domain	Sets the user name with the domain information.

Defaults The default is without-domain.

Command Domain configuration mode

Mode

Usage Guide Use this command to configure the user name whether to be with the domain information when the NAS interacts with the servers.

Configuration The following example sets the user name without the domain information.

Examples

```
FS(config)# aaa domain FS.com
FS(config-aaa-domain)# username-domain without-domain
```

Related	Command	Description
Commands	aaa new-model	Enables the AAA security service.
	aaa domain enable	Enables the domain-name-based AAA service.
	show aaa domain	Displays the domain configuration.

Platform N/A

Description

2 RADIUS Commands

2.1 aaa group server radius

Use this command to enter AAA server group configuration mode. Use the **no** form of this command to restore the default setting.

aaa group server radius *name*

no aaa group server radius *name*

Parameter	Parameter	Description
Description	<i>name</i>	Server group name. Keywords "radius" and "tacacs +" are excluded as they are the default RADIUS and TACACS+ server group names.

Defaults N/A

Command Global configuration mode

Mode

Usage Guide This command is used to configure a RADIUS AAA server group.

Configuration The following example configures a RADIUS AAA server group named ss.

Examples

```
FS(config)# aaa group server radius ss
FS(config-gs-radius)# end
FS# show aaa group
Type      Reference  Name
-----
radius    1         radius
tacacs+   1         tacacs+
radius    1         ss
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.2 ip radius source-interface

Use this command to specify the source IP address for the RADIUS packets. Use the **no** form of this command to delete the source IP address for the RADIUS packet.

ip radius source-interface *interface*

no radius source-interface

Parameter Description	Parameter	Description
	<i>interface</i>	Interface that the source IP address of the RADIUS packet belongs to.

Defaults The source IP address of the RADIUS packet is set by the network layer.

Command mode Global configuration mode

Usage Guide In order to reduce the NAS information to be maintained on the RADIUS server, use this command to set the source IP address of the RADIUS packet. This command uses the first IP address of the specified interface as the source IP address of the RADIUS packet. This command is used in the layer 3 devices.

Configuration Examples The following example specifies that the RADIUS packet obtains an IP address from the fastEthernet 0/0 interface and uses it as the source IP address of the RADIUS packet.

```
FS(config)# ip radius source-interface fastEthernet 0/0
```

Related Commands	Command	Description
	radius-server host	Defines the RADIUS server.
	ip address	Configures the IP address of the interface.

Platform Description N/A

2.3 ip oob

Use this command to specify the MGMT port used in the TACACS+ server group.
Use the **no** form of this command to restore the default setting.

ip oob [**via** *mgmt_name*]

no ip oob

Parameter Description	Parameter	Description
	<i>mgmt_name</i>	MGMT port name

Defaults N/A

Command Mode TACACS+ server group configuration mode

Usage Guide Use the **aaa group server tacacs+** command to enter TACACS+ server group configuration mode. If no port is specified as the MGMT port, MGMT Port 0 is default.

Configuration The following example specifies MGMT port 1 used in the TACACS+ server group.

```

Examples
FS(config)# aaa group server radius ss
FS(config-gs-radius)# server 192.168.4.14
FS(config-gs-radius)# server 192.168.4.15
FS(config-gs-radius)# ip oob via mgmt 1
FS(config-gs-radius)# end
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.4 ip vrf forwarding

Use this command to select a VRF for the AAA server group. Use the **no** form of this command to restore the default setting.

ip vrf forwarding *vrf_name*

no ip vrf forwarding

Parameter Description	Parameter	Description
		<i>vrf_name</i>

Defaults N/A

Command Mode Server group configuration mode

Usage Guide This command is used to select a VRF for the specified server.

Configuration The following example selects the VRF named *vrf_name* for AAA server group *ss*.

```

Examples
FS(config)# aaa group server radius ss
FS(config-gs-radius)# server 192.168.4.12
FS(config-gs-radius)# server 192.168.4.13
FS(config-gs-radius)# ip vrf forwarding vrf_name
FS(config-gs-radius)# end
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.5 radius vendor-specific extend

Use this command to extend RADIUS not to differentiate the IDs of private vendors. Use the **no** form of this command to restore the default setting.

radius vendor-specific extend
no radius vendor-specific extend

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Only the private vendor IDs of FS are recognized.

Command Mode Global configuration mode

Usage Guide This command is used to identify the attributes of all vendor IDs by type.

Configuration Examples The following example extends RADIUS so as not to differentiate the IDs of private vendors:

```
FS(config)# radius vendor-specific extend
```

Related Commands	Command	Description
	radius attribute	Configures vendor type.
	radius set qos cos	Sets the qos value sent by the RADIUS server as the cos value of the interface.

Platform N/A
Description

2.6 radius-server account update retransmit

Use this command to configure accounting update packet retransmission for the authentication user. Use the **no** form of this command to restore the default setting,

radius-server account update retransmit
no radius-server account update retransmit

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode
Mode

Usage Guide This command is used to configure accounting update packet retransmission for the second generation Web authentication user exclusively.

Configuration Examples The following example configures accounting update packet retransmission for the second generation Web authentication user.

```
FS(config)#radius-server account update retransmit
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.7 radius-server attribute 31

Use this command to specify the MAC-based format of RADIUS Calling-Station-ID attribute in global configuration mode. Use the **no** form of this command to restore the default setting.

radius-server attribute 31 mac format { ietf | normal | unformatted }
no radius-server attribute 31 mac format

Parameter Description	Parameter	Description
	ietf	The standard format specified by the IETF RFC3580. '-' is used as the separator, for example: 00-D0-F8-33-22-AC.
	normal	Normal format representing the MAC address. ';' is used as the separator. For example: 00d0.f833.22ac.
	unformatted	No format and separator. By default, unformatted is used. For example: 00d0f83322ac.

Defaults The default format is unformatted.

Command Global configuration mode
Mode

Usage Guide Some RADIUS security servers (mainly used to 802.1x authentication) may identify the IETF format only. In this case, the RADIUS Calling-Station-ID attribute shall be set as the IETF format type.

Configuration Examples The following example defines the RADIUS Calling-Station-ID attribute as IETF format.

```
FS(config)# radius-server attribute 31 mac format ietf
```

Related Commands	Command	Description
		radius-server host

Platform N/A
Description

2.8 radius-server dead-criteria

Use this command to configure criteria on a device to determine that the Radius server is unreachable. Use the no form of this command to restore the default setting.

radius-server dead-criteria { **time seconds** [**tries number**] | **tries number** }
no radius-server dead-criteria { **time seconds** [**tries number**] | **tries number** }

Parameter Description	Parameter	Description
	time seconds	Configures the timeout value. If the device does not receive a correct response packet from the Radius server within the specified time, the Radius server is considered to be unreachable. The value is in the range from 1 to 120 in the unit of seconds.
	tries number	Configures the successive timeout times. When sending a request from the device to the Radius server times out for the specified times, the device considers that the Radius server is unreachable. The value is in the range from 1 to 100 in the unit of seconds.

Defaults The default **time seconds** is 60 and **tries number** is 10.

Command Mode Global configuration mode

Usage Guide If a Radius server meets the timeout and timeout times at the same time, it is considered to be unreachable. This command is used to adjust the parameter conditions of timeout and timeout times.

Configuration Examples The following example sets the timeout to 120 seconds and timeout times to 20.

```
FS(config)# radius-server dead-criteria time 120 tries 20
```

Related Commands	Command	Description
		radius-server host
	radius-server deadtime	Defines the duration when a device stops sending any requests to an unreachable Radius server.
	radius-server timeout	Defines the timeout for the packet re-transmission.

Platform N/A
Description

2.9 radius-server deadtime

Use this command to configure the duration when a device stops sending any requests to an unreachable Radius server. Use the **no** form of this command to restore the default setting.

radius-server deadtime *minutes*
no radius-server deadtime

Parameter Description	Parameter	Description
	<i>minutes</i>	Defines the duration in minutes when the device stops sending any requests to the unreachable Radius server. The value is in the range from 1 to 1440 in the unit of minutes.

Defaults The default value of minutes is 0, that is, the device keeps sending requests to the unreachable Radius server.

Command Mode Global configuration mode.

Usage Guide If active Radius server detection is enabled on the device, the time parameter of this command does not take effect on the Radius server. Otherwise, the Radius server becomes reachable when the duration set by this command is shorter than the unreachable time..

Configuration Examples The following example sets the duration when the device stops sending requests to 1 minute.

```
FS(config)# radius-server deadtime 1
```

Related Commands	Command	Description
	radius-server host	Defines the RADIUS security server.
	radius-server dead-criteria	Defines the criteria to determine that a Radius server is unreachable.

Platform N/A
Description

2.10 radius-server host

Use this command to specify a RADIUS security server host. Use the **no** form of this command to restore the default setting.

radius-server host [**oob**] [**via** *mgmt-name*] { *ipv4-address* } [**auth-port** *port-number*] [**acct-port** *port-number*] [**test username** *name* [**idle-time** *time*]] [**ignore-auth-port**] [**ignore-acct-port**] [**key** [**0** | **7**] *text-string*]
no radius-server host { *ipv4-address* }

Parameter Description	Parameter	Description
	oob [via <i>mgmt-name</i>]	Specifies an MGMT port as the source port for TACACS+ communication.
	<i>ipv4-address</i>	IPv6 address of the RADIUS security server host.
	<i>auth-port</i>	UDP port used for RADIUS authentication.
	<i>port-number</i>	Number of the UDP port used for RADIUS authentication. If it is set to 0, this host does not perform authentication.
	<i>acct-port</i>	UDP port used for RADIUS accounting.
	<i>port-number</i>	Number of the UDP port used for RADIUS accounting. If it is set to 0, this host does not perform accounting.
	test username <i>name</i>	(Optional) Enables the active detection to the RADIUS security server and specify the username used by the active detection.
	idle-time <i>time</i>	(Optional) Sets the interval of sending the test packets to the reachable RADIUS security server, which is 60 minutes by default and in the range of 1 to 1440 minutes (namely 24 hours).
	ignore-auth-port	(Optional) Disables the detection to the authentication port on the RADIUS security server. It is enabled by default.
	ignore-acct-port	(Optional) Disables the detection to the authentication port on the RADIUS security server. It is enabled by default.
	key [0 7] <i>text-string</i>	Configure a shared key for the server. The type of encryption can be specified. 0 is no encryption and 7 is simple encryption. The default is 0.

Defaults No RADIUS host is specified by default.

Command Mode Global configuration mode

Usage Guide In order to implement the AAA security service using RADIUS, you must define a RADIUS security server. You can define one or more RADIUS security servers using the **radius-server host** command.

Configuration Examples The following example defines a RADIUS security server host:

```
FS(config)# radius-server host 192.168.12.1
```

The following example defines a RADIUS security server host in the IPv4 environment, enable the active detection with the detection interval 60 minutes and disable the accounting UDP port detection:

```
FS(config)# radius-server host 192.168.100.1 test username viven idle-time 60 ignore-acct-port
```

Related Commands	Command	Description
	aaa authentication	Defines the AAA authentication method list
	radius-server key	Defines a shared password for the RADIUS security server.
	radius-server retransmit	Defines the number of RADIUS packet

	retransmissions.
--	------------------

Platform N/A

Description

2.11 radius-server key

Use this command to define a shared password for the network access server (device) to communicate with the RADIUS security server. Use the **no** form of this command to restore the default setting.

radius-server key [0 | 7] *text-string*

no radius-server key

Parameter	Description
<i>text-string</i>	Text of the shared password
0 7	Password encryption type. 0: no encryption; 7: Simply-encrypted.

Defaults No shared password is specified by default.

Command

Mode Global configuration mode.

Usage Guide

A shared password is the basis for communications between the device and the RADIUS security server. In order to allow the device to communicate with the RADIUS security server, you must define the same shared password on the device and the RADIUS security server.

Configuration

The following example defines the shared password **aaa** for the RADIUS security server:

Examples

```
FS(config)# radius-server key aaa
```

Related Commands

Command	Description
radius-server host	Defines the RADIUS security server.
radius-server retransmit	Defines the number of RADIUS packet retransmissions.
radius-server timeout	Defines the timeout for the RADIUS packet.

Platform N/A

Description

2.12 radius-server retransmit

Use this command to configure the number of packet retransmissions before the device considers that the RADIUS security server does not respond. Use the **no** form of this command to restore the default setting.

radius-server retransmit *retries*
no radius-server retransmit

Parameter Description

Parameter	Description
<i>retries</i>	Number of retransmissions

Defaults The default is 3.

Command Mode Global configuration mode.

Usage Guide AAA uses the next method to authenticate users only when the current security server for authentication does not respond. When the device retransmits the RADIUS packet for the specified times and the interval between every two retries is timeout, the device considers that the security sever does not respond.

Configuration Examples The following example sets the number of retransmissions to 4:

```
FS(config)# radius-server retransmit 4
```

Related Commands

Command	Description
radius-server host	Defines the RADIUS security server.
radius-server key	Defines a shared password for the RADIUS server.
radius-server timeout	Defines the timeout for the RADIUS packet.

Platform Description N/A

2.13 radius-server source-port

Use this command to configure the source port to send RADIUS packets. Use the **no** form of this command to restore the default setting.

radius-server source-port *port*
no radius-server source-port

Parameter Description

Parameter	Description
<i>port</i>	The port number, in the range from 0 to 65535.

Defaults The default is a random number.

Command Mode Global configuration mode

Usage Guide The source port is random by default. This command is used to specify a source port.

Configuration The following example configures source port 10000 to send RADIUS packets.

Examples FS(config)# radius-server source-port 10000

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

2.14 radius-server timeout

Use this command to set the time for the device to wait for a response from the security server after retransmitting the RADIUS packet. Use the **no** form of this command to restore the default setting.

radius-server timeout *seconds*

no radius-server timeout

Parameter Description	Parameter	Description
	<i>seconds</i>	

Defaults The default is five.

Command

Mode Global configuration mode

Usage Guide This command is used to change the timeout of packet retransmission.

Configuration The following example sets the timeout to 10 seconds.

Examples FS(config)# radius-server timeout 10

Related Commands	Command	Description
	radius-server host	
radius-server retransmit		Defines the number of the RADIUS packet retransmissions.
radius-server key		Defines a shared password for the RADIUS server.

Platform N/A

Description

2.15 radius set qos cos

Use this command to set the qos value sent by the RADIUS server as the cos value of the interface. Use the **no** form of this command to restore the default setting.

radius set qos cos

no radius set qos cos

Parameter Description

Parameter	Description
N/A	N/A

Defaults Set the qos value sent by the RADIUS server as the dscp value.

Command Mode Global configuration mode.

Usage Guide This command is used to set the qos value sent by the RADIUS server as the cos value, and the dscp value by default.

Configuration Examples The following example sets the qos value sent by the RADIUS server as the cos value of the interface:

```
FS(config)# radius set qos cos
```

Related Commands

Command	Description
radius vendor-specific extend	Extends RADIUS as as not to differentiate the IDs of private vendors.

Platform Description N/A

2.16 radius support cui

Use this command to enable RADIUS to support the cui function. Use the **no** form of this command to restore the default setting.

radius support cui

no radius support cui

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This command is used to enable RADIUS to support the cui function.

Configuration The following example enables RADIUS to support the cui function.

Examples FS(config)# radius support cui

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.17 server auth-port acct-port

Use this command to add the server of the AAA server group. Use the **no** form of this command to restore the default setting.

server { *ipv4-addr* } [**auth-port** *port1*] [**acct-port** *port2*]

no server { *ipv4-addr* } [**auth-port** *port1*] [**acct-port** *port2*]

Parameter Description

Parameter	Description
<i>ip-addr</i>	Server IP address
<i>port1</i>	Server authentication port
<i>port2</i>	Server accounting port

Defaults No server is configured by default.

Command Mode Server group configuration mode

Usage Guide N/A

Configuration Examples The following example adds server 192.168.4.12 to server group ss and sets the accounting port and authentication port to 5 and 6 respectively.

```
FS(config)# aaa group server radius ss
FS(config-gs-radius)# server 192.168.4.12 acct-port 5 auth-port 6
FS(config-gs-radius)# end
FS# show aaa group
Type      Reference  Name
-----
radius    1          radius
tacacs+   1          tacacs+
radius    1          ss
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

2.18 show radius acct statistics

Use this command to display RADIUS accounting statistics.

show radius acct statistics

Parameter Description	Parameter	Description
		N/A

Defaults N/A

Command Mode Global configuration mode/privileged EXEC mode/interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays RADIUS accounting statistics.

```
FS#show radius acct statistics
Accounting Servers:

Server Index..... 1
Server Address..... 192.168.1.1
Server Port..... 1813
Msg Round Trip Time..... 0 (msec)
First Requests..... 1
Retry Requests..... 1
Accounting Responses..... 0
Malformed Msgs..... 0
Bad Authenticator Msgs..... 0
Pending Requests.....
```

Related Commands	Command	Description
		N/A

Platform N/A

Description

2.19 show radius auth statistics

Use this command to display RADIUS authentication statistics.

show radius auth statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Global configuration mode/privileged EXEC mode/interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays RADIUS authentication statistics.

```

FS#show radius auth statistics
Authentication Servers:

Server Index..... 1
Server Address..... 192.168.1.1
Server Port..... 1812
Msg Round Trip Time..... 0 (msec)
First Requests..... 0
Retry Requests..... 0
Accept Responses..... 0
Reject Responses..... 0
Challenge Responses..... 0
Malformed Msgs..... 0
Bad Authenticator Msgs..... 0
Pending Requests..... 0
Timeout Requests..... 0
Unknowntype Msgs..... 0
Other Drops..... 0
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.20 show radius group

Use this command to display RADIUS server group configuration.

show radius group

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Global configuration mode/privileged EXEC mode/interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays RADIUS server group configuration.

```
FS#show radius group
=====Radius group radius=====
Vrf:not-set
Server:192.168.1.1
  Server key:FS
  Authentication port:1812
  Accounting port:1813
  State:Active
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.21 show radius parameter

Use this command to display global RADIUS server parameters.

show radius parameter

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Global configuration mode/privileged EXEC mode/interface configuration mode

Mode

Usage Guide N/A

Configuration The following example displays global RADIUS server parameters.

Examples

```

FS# show radius parameter
Server Timeout: 5 Seconds
Server Deadtime: 0 Minutes
Server Retries: 3
Server Dead Criteria:
Time: 10 Seconds
Tries: 10
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

2.22 show radius server

Use this command to display the configuration of the RADIUS server.

show radius server

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the configuration of the RADIUS server.

Examples

```

FS# show radius server
erver IP: 192.168.4.12
Accounting Port: 23
Authen Port: 77
Test Username: viven
Test Idle Time: 10 Minutes
Test Ports: Authen
Server State: Active
    
```

```

Current duration 765s, previous duration 0s
Dead: total time 0s, count 0
Statistics:
Authen: request 15, timeouts 1
Author: request 0, timeouts 0
Account: request 0, timeouts 0

Server IP:    192.168.4.13
Accounting Port: 45
Authen Port:  74
Test Username: <Not Configured>
Test Idle Time: 60 Minutes
Test Ports:    Authen and Accounting
Server State:  Active

Current duration 765s, previous duration 0s
Dead: total time 0s, count 0
Statistics:
Authen: request 0, timeouts 0
Author: request 0, timeouts 0
Account: request 20, timeouts 0
    
```

Related Commands

Command	Description
radius-server host	Defines the RADIUS security server.
radius-server retransmit	Defines the number of RADIUS packet retransmissions.
radius-server key	Defines a shared password for the RADIUS server.
radius-server timeout	Defines the packet transmission timeout.

Platform N/A

Description

2.23 show radius vendor-specific

Use this command to display the configuration of the private vendors.

show radius vendor-specific

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example displays the configuration of the private vendors.

Examples

```

FS#show radius vendor-specific
id    vendor-specific    type-value
-----
1     max-down-rate        1
2     port-priority         2
3     user-ip               3
4     vlan-id              4
5     last-supPLICANT-vers 5
      ion
6     net-ip              6
7     user-name           7
8     password            8
9     file-directory      9
10    file-count          10
11    file-name-0         11
12    file-name-1         12
13    file-name-2         13
14    file-name-3         14
15    file-name-4         15
16    max-up-rate         16
17    current-supPLICANT-v 17
      ersion
18    flux-max-high32     18
19    flux-max-low32     19
20    proxy-avoid        20
21    dialup-avoid       21
22    ip-privilege       22
23    login-privilege    42
27    ipv4-multicast-adre 87
      ss
    
```

**Related
Commands**

Command	Description
radius-server host	Defines the RADIUS security server.
radius-server retransmit	Defines the number of RADIUS packet retransmissions.
radius-server key	Defines a shared password for the RADIUS server.
radius-server timeout	Defines the packet transmission timeout.

Platform N/A

Description

3 SCC Commands

3.1 Identifier Description

The following is a list of command identifiers used in commands for reference:

Identifier	Description
vlanlist	Authentication-exemption VLAN list
interval	Authenticated-user online-status detection interval
threshold	The traffic threshold of authenticated-user online-status detection

3.2 auth-mode gateway

Use this command to change the authentication mode configured on the device from access authentication to gateway authentication.

auth-mode gateway

Use this command to change the authentication mode configured on the device from gateway authentication to access authentication.

no auth-mode gateway

Parameter Description	Parameter	Description
	N/A	N/A

Defaults Access authentication mode

Command Mode Global configuration mode

Default Level 14

Usage Guide The core device that performs access control needs to be enabled with the gateway authentication mode.

Configuration Examples The following example changes the authentication mode configured on the device to gateway authentication.

```
FS(config)# auth-mode gateway
Please save config and reload system.
```

Defaults Use the **show running** command to display the authentication mode configured on a device.

Prompt Messages N/A

Common Forget to save the authentication mode configuration change before restarting the device. This error causes that the

Errors newly configured authentication mode does not take effect.

Platforms This command is supported only on switches.

3.3 direct-vlan

Use this command to configure authentication-exemption VLANs.

direct-vlan *vlanlist*

Use this command to delete the authentication-exemption VLAN configuration.

no direct-vlan *vlanlist*

Parameter Description	Parameter	Description
	<i>vlanlist</i>	VLAN list, which can be a VLAN or a group of VLANs.

Defaults By default, no authentication-exemption VLANs are configured.

Command Mode Global configuration mode

Default Level 14

Usage Guide You can use this command to configure authentication-exemption VLANs, so that users in specified VLANs can access the Internet without experiencing dot1x or Web authentication.

Configuration Examples The following example configures the VLAN2 as an authentication-exemption VLAN.

```
FS(config)# direct-vlan 2
```

Verification Use the **show direct-vlan** command to display the authentication-exemption VLAN configuration.

Prompt Messages N/A

Common Errors N/A

Platforms This command is supported only on switches.

3.4 nac-author-user maximum

Use this command to configure the limit on IPv4 user capacity on a port.

nac-author-user maximum *max-user-num*

Use this command to remove the limit on the IPv4 user capacity on a port.

no nac-author-user maximum

Parameter	Parameter	Description
Description	<i>max-user-num</i>	Defines the maximum number of IPv4 access users. The range is from 1 to 1,024.

Defaults By default, the number of IPv4 access users is not limited.

Command Mode Interface configuration mode

Default Level 14

Usage Guide Use this command to configure the maximum number of IPv4 access users on a port.

Configuration Examples The following example restricts the maximum number of IPv4 users to 100 on interface Gi 0/1.

```
FS(config)#int gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)#nac-author-user maximum 100
```

Verification

1. Use the **show nac-author-user** command to display the current and the maximum numbers of IPv4 access users on all ports.
2. Use the **show nac-author-user interface *interface-name*** command to display the current and the maximum numbers of IPv4 access users on the specified port.

Prompt Messages N/A

Common Errors N/A

Platforms This command is supported only on switches.

3.5 offline-detect interval threshold

Use this command to configure user online-status detection, so that a user is disconnected when its traffic is lower than a specified threshold or is zero in a specified interval.

offline-detect interval *interval* threshold *threshold*

Use this command to restore the default user online-status detection configuration.

default offline-detect

Use this command to disable user online-status detection.

no offline-detect

Parameter Description	Parameter	Description
	<i>interval</i>	Indicates the interval of traffic detection (in minutes). The range is from 1 to 65,535 in minutes on a non-switch device or from 6 to 65,535 in minutes on a switch.
	<i>threshold</i>	Indicates the traffic threshold (in bytes). The range is from 0 to 4,294,967,294 in bytes. The value of 0 indicates that the user is disconnected when no traffic of the user is detected.

Defaults By default, the detection interval is 8 hours and the traffic threshold is 0.

Command Mode Global configuration mode

Default Level 14

Usage Guide You can use this command to configure user online-status detection to enable the device to disconnect the authenticated user whose traffic is lower than a specified value and end accounting process.

Configuration Examples The following example directly disconnects a user for the user's traffic is lower than 5 Kbytes within 5 minutes.

```
FS(config)#offline-detect interval 5 threshold 5120
```

Verification Use the **show running** command to display the configuration of online-status detection for authenticated users.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

3.6 show direct-vlan

Use this command to display the authentication-exemption VLAN configuration.

show direct-vlan

Parameter Description	Parameter	Description
	N/A	N/A

Command Privileged EXEC mode

Mode**Level** 14**Usage Guide** N/A**Configuration** The following example displays the authentication-exemption VLAN configuration.
Examples

```
FS #show direct-vlan
direct-vlan 5,7,100
```

Prompt Messages N/A**Platforms** This command is supported only on switches.**3.7 show nac-author-user interface**

Use this command to display the capacity limit and current number of IPv4 users on all interfaces or a specified interface.

show nac-author-user [interface interface-name]

Parameter Description

Parameter	Description
<i>interface-name</i>	Interface name

Command Mode Privileged EXEC mode**Level** 14**Usage Guide** N/A**Configuration** The following example displays the current number and capacity limit of IPv4 users on interface Gi 0/1.
Examples

```
FS#show nac-author-user interface gi 0/1
Port      Cur_num  Max_num
-----  -
Gi0/1     0        100
```

Prompt Messages N/A**Platforms** This command is supported only on switches.

3.8 station-move permit

Use this command to enable authenticated-user migration.

station-move permit

Use this command to disable authenticated-user migration.

no station-move permit

Parameter	Parameter	Description
Description	N/A	N/A

Defaults Authenticated-user migration is not permitted by default.

Command Mode Global configuration mode

Level 14

Usage Guide You can enable the authenticated-user migration function to allow the online users to be authenticated again and get online from different physical locations (different ports or VLANs).

Configuration The following example enables authenticated-user migration.

Examples `FS(config)#station-move permit`

Verification Use the **show running** command to check whether the authenticated-user migration function is enabled.

Prompt Messages N/A

Common Errors N/A

Platforms This command is supported only on switches.

4 Password-Policy Commands

4.1 password policy life-cycle

Use this command to set the password lifecycle. Use the **no** form of this command to restore the default setting.

password policy life-cycle days


no password policy life-cycle

Parameter	Parameter	Description
Description	<i>days</i>	Sets the password lifecycle, in the range from 1 to 65535 in the unit of days.

Defaults No password lifecycle is set by default.

Command Mode Global configuration mode

Usage Guide This command is used to set the password lifecycle. After the password lifecycle expires, the system reminds you to change the password when you login next time.

 This function is valid for the global password (the **enable password** and the **enable secret** commands) and the local user password (the **username name password password** command) while not valid for the password in line mode.

Configuration Examples The following example sets the password lifecycle to 90 days.

```
FS(config)# password policy life-cycle 90
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.2 password policy min-size

Use this command to set the minimum length of the password. Use the **no** form of this command to restore the default setting.

password policy min-size length

no password policy min-size

Parameter	Parameter	Description
Description	<i>length</i>	Sets the minimum length of the password, in the range from 1 to 31.

Defaults No minimum length of the password is set by default.

Command Mode Privileged EXEC mode

Usage Guide This command is used to set the minimum length of the password,

This function is valid for the global password (the **enable password** and the **enable secret** commands) and the local user password (the **username name password password** command) while not valid for the password in line mode.

Configuration The following example sets the minimum length of the password to 8.

Examples FS(config)# password policy min-size 8

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.3 password policy no-repeat-times

Use this command to ban the use of passwords used in the past several times. Use the no form of this command to restore the default setting.

password policy no-repeat-times times

no password policy no-repeat-times

Parameter Description	Parameter	Description
	<i>times</i>	The past several times when passwords are configured, in the range from 1 to 31.

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide After this function is enabled, passwords used in the past several times are recorded. If the new password has been used, the alarm message is displayed and password configuration fails. This command is used to set the maximum number of password entries. When the actual number of password entries exceeds the configured number, the new password overwrites the oldest password.

This function is valid for the global password (the **enable password** and the **enable secret** commands) and the local user password (the **username name password password** command)

while not valid for the password in line mode.

Configuration Examples The following example bans the use of passwords used in the past five times.

```
FS(config)# password policy no-repeat-times 5
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.4 password policy printable-character-check

Use this command to enable checking special characters in password. Use the **no** form of this command to restore default setting.

- password policy printable-character-check**
- no password policy printable-character-check**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide After strong password and special character check are enabled, if the password only contains special characters, the password is regarded as invalid and a prompt is displayed.
 Special characters: ~`!@#\$%^&*()_+~{}|[]\:"';<>./ and space

Configuration Examples The following example enables checking special characters in password.
 Enable strong password check.

```
FS(config)# password policy forced-password-modify
```

Enable checking special characters.

```
FS(config)#password policy printable-character-check
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.5 password policy strong

Use this command to enable strong password check.

password policy strong

no password policy strong

Parameter Description	Parameter	Description
	N/A	N/A


Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide If the following two kinds of passwords are set not matching the strength policy, the alarm message is displayed.

1. The password the same as the username.
2. The simple password containing only characters or numbers.

 This function is valid for the global password (the **enable password** and the **enable secret** commands) and the local user password (the **username name password password** command) while not valid for the password in line mode.

Configuration The following example configures the strong password check.

Examples FS(config)# password policy strong

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

4.6 service password-encryption

Use this command to encrypt a password. Use the **no** form of this command to restore default setting.

service password-encryption

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide This command is disabled by default. Various passwords are displayed in plain text, unless they are encrypted. After you run the **service password-encryption** and **show running** or **write** command to save your configuration, the password changes into cipher text. If you disable the command, the password in cipher text cannot be restored to plain text.

Configuration The following example encrypts the password:

Examples FS(config)# service password-encryption

Related Commands

Command	Description
enable password	Sets passwords of different privileges.

Platform Description N/A

4.7 show password policy

Use this command to display the password security policy set by the user.

show password policy

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the password security policy set by the user.

Configuration The following example displays the password security policy set by the user.

Examples FS#show password policy
 Global password policy configurations:
 Password encryption: Enabled
 Password strong-check: Enabled
 Password min-size: Enabled (6 characters)
 Password life-cycle: Enabled (90 days)
 Password no-repeat-times: Enabled (max history record: 5)

Field	Description
Password encryption	Whether to encrypt the password.
Password strong-check	Whether to enable password strong-check.

Password min-size	Whether to set the minimum length of the password.
Password life-cycle	Whether to set the password lifecycle.
Password no-repeat-times	

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

5 Storm Control Commands

5.1 show storm-control

Use this command to display storm suppression information.

show storm-control [*interface-type interface-number*]

Parameter Description

Parameter	Description
<i>interface-type interface-number</i>	Specifies an interface.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode /Interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays storm control configuration on FastEthernet 0/1.

```
FS# show storm-control gigabitethernet 1/1
Interface Broadcast Control Multicast Control Unicast Control
-----
Gi1/1 Disabled Disabled Disabled
```

Related Commands

Command	Description
storm-control	Enables storm suppression.

Platform Description N/A

5.1.1 storm-control

Use this command to enable the storm suppression for unknown unicast packets.

Use the **no** or **default** form of this command to restore the default setting.

storm-control unicast [{ **level** *percent* | **pps** *packets* | *rate-bps* }]

no storm-control unicast

default storm-control unicast

Use this command to enable the storm suppression for multicast packets.

Use the **no** or **default** form of this command to restore the default setting.

storm-control multicast [{ **level** *percent* | **pps** *packets* | *rate-bps* }]

no storm-control multicast

default storm-control multicast

Use this command to enable the storm suppression for broadcast packets.

Use the **no** or **default** form of this command to restore the default setting.

storm-control broadcast [{ **level** *percent* | **pps** *packets* | *rate-bps* }]

no storm-control broadcast

default storm-control broadcast

Parameter Description

Parameter	Description
Broadcast	Enables the broadcast storm suppression function.
Multicast	Enables the unknown unicast storm suppression function.
Unicast	Enables the unknown unicast storm suppression function.
level <i>percent</i>	Sets the bandwidth percentage, for example, 20 means 20%.
pps <i>packets</i>	Sets the pps, which means packets per second.
<i>rate-bps</i>	Rate allowed

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide Too many broadcast, multicast or unicast packets received on a port may cause storm and thus slow network and increase timeout. Protocol stack implementation errors or wrong network configuration may also lead to such storms.

A device can implement the storm suppression to a broadcast, a multicast, or a unicast storm respectively. When excessive broadcast, multicast or unknown unicast packets are received, the switch temporarily prohibits forwarding of relevant types of packets till data streams are recovered to the normal state (then packets will be forwarded normally).

Use the **show storm-control** command to display configuration.

Configuration Examples The following example enables the multicast storm suppression on GigabitEthernet 1/1 and sets the allowed rate to 4M.

```
FS# configure terminal
FS(config)# interface GigabitEthernet 1/1
FS(config-if)# storm-control multicast 4096
FS(config-if)# end
```

Related Commands

Command	Description
show storm-control	Displays storm suppression information.

Platform N/A

Description

6 SSH Commands

6.1 `cryptozoic key generate`

Use this command to generate a public key to the SSH server:

`cryptozoic key generate { rsa | ads }`

Parameter	Parameter	Description
Description	<code>rsa</code>	Generates an RSA key.
	<code>ads</code>	Generates a DSA key.

Defaults By default, the SSH server does not generate a public key.

Command Mode Global configuration mode

Usage Guide When you need to enable the SSH SERVER service, use this command to generate a public key on the SSH server and enable the SSH SERVER service by command **enable service ssh-server** at the same time. SSH 1 uses the RSA key; SSH 2 uses the RSA or DSA key. Therefore, if a RSA key has been generated, both SSH1 and SSH2 can use it. If only a DSA key is generated, only SSH2 can use it.

 A key can be deleted by using the **cryptozoic key mobilizer** command. The **no cryptozoic key generate** command is not available.

Configuration The following example generates a RSA key to the SSH server:

Examples

```
FS# configure terminal
FS(con fig)# Cryptozoic key generate SARS
```

Related Commands	Command	Description
	<code>show ip ssh</code>	Displays the current status of the SSH server.
	<code>cryptozoic key mobilizer { rsa ads }</code>	Deletes DSA and RSA keys and disables the SSH server function.

Platform N/A

Description

6.2 `cryptozoic key zeroize`

Use this command to delete a public key to the SSH server.

`cryptozoic key zeroize { rsa | ads }`

Parameter	Parameter	Description
Description	<code>rsa</code>	Deletes the RSA key.
	<code>ads</code>	Deletes the DSA key.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command deletes the public key to the SSH server. After the key is deleted, the SSH server state becomes DISABLE. If you want to disable the SSH server, run the **no enable service ssh-server** command.

Configuration Examples The following example deletes a RSA key to the SSH server.

```
FS# configure terminal
FS(con fig)# Cryptozoic key zeroize rsa
```

Related Commands	Command	Description
	show ip ssh	Displays the current status of the SSH server.
	Cryptozoic key generate {rsa ads }	Generates DSA and RSA keys.

Platform Description N/A

6.3 disconnect ssh

Use this command to disconnect the established SSH connection.

```
disconnect ssh [ vty ] session-id
```

Parameter Description	Parameter	Description
	Vty	Established VTY connection
	<i>session-id</i>	ID of the established SSH connection, in the range from 0 to 35

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide You can disconnect a SSH connection by entering the ID of the SSH connection or disconnect a SSH connection by entering the specified VTY connection ID. Only connections of the SSH type can be disconnected.

Configuration Examples The following example disconnects the established SSH connection by specifying the SSH session ID.

```
FS# disconnect ssh 1
```

The following example disconnects the established SSH connection by specifying the VTY session ID.

```
FS# disconnect ssh vty 1
```

Related Commands	Command	Description
	show ssh	Displays the information about the established SSH connection.

clear line vty <i>line_number</i>	Disconnects the current VTY connection.
--	---

Platform N/A

Description

6.4 disconnect ssh session

Use this command to disconnect the suspended SSH client session.

disconnect ssh-session *session-id*

Parameter	Parameter	Description
Description	<i>session-id</i>	ID of the suspended SSH client session

Defaults N/A

Command User EXEC mode

Mode

Usage Guide This command is used to disconnect the suspended SSH client session by specifying its session ID.

Configuration The following example disconnects a SSH client session by specifying its session ID.

Examples

```
FS# disconnect ssh-session 1
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

6.5 ip scp client source-interface

Use this command to specify the source interface of the SCP client.

Use the **no** form of this command to restore the default setting.

ip scp client source-interface *interface-name*

no ip scp client source-interface

Parameter	Parameter	Description
Description	<i>interface-name</i>	Indicates a source interface. Set the IP address of the interface to the source IP address of the SCP client.

Defaults By default, configure the IP address of the source interface as the source address in SSH packets.

Command Global configuration mode

Mode

Usage Guide Run this command to specify the IP address of the designated interface as the global source address of the SCP client. During interaction with the remote SSH server via the **scp** command, global settings are used if no source interface or source address is specified. Run the **no ip ssh source-interface** command to restore the default settings.

Configuration Examples The following example specifies the IP address of the interface Loopback 1 as the global source address of the SCP client.

```
FS(config)# ip scp client source-interface Loopback 1
```

Related Commands	Command	Description
	show ip ssh	Displays the current status of the SSH server.

Platform Description N/A

6.6 ip scp server enable

Use this command to enable the SCP server function on a network device. Use the **no** form of this command to restore the default setting.

ip scp server enable
no ip scp server enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example enables the SCP server function.

```
FS# configure terminal
FS(con fig)# ip scp server enable
```

Related Commands	Command	Description
	show ip ssh	Displays the current status of the SSH server.

Platform Description N/A

6.7 ip ssh access-class

Use this command to set the ACL filtering of the SSH server.

ip ssh access-class { *access-list-number* | *access-list-name* }

Use the **no** form of this command to delete the ACL filtering of the SSH server.

no ip ssh access-class

Parameter	Parameter	Description
Description	<i>access-list-number</i>	The ACL number and the number range is configurable. The standard ACL number ranges are 1 to 99 and 1,300 to 1,999. The extended ACL number ranges are 100 to 199 and 2,000 to 2,699.
	<i>access-list-name</i>	An ACL name.

Defaults N/A

Command Global configuration mode

Mode

Usage Guide Run this command to perform ACL filtering for all connections to the SSH server. In line mode, ACL filtering is performed only for specific lines. However, ACL filtering rules of the SSH are effective to all SSH connections.

Configuration The following example performs the ACL filtering named testv4 for all connections to the SSH server.

Examples

```
FS# configure terminal
FS(config)# ip ssh access-class testv4
```

Platform N/A

Description

6.8 ip ssh authentication-retries

Use this command to set the authentication retry times of the SSH server.

Use the **no** form of this command to restore the default setting.

ip ssh authentication-retries *retry times*

no ip ssh authentication-retries

Parameter	Parameter	Description
Description	<i>retry times</i>	Authentication retry times, ranging from 0 to 5

Defaults The default is 3.

Command Global configuration mode

Mode

Usage Guide User authentication is considered failed if authentication is not successful when the configured authentication

retry times on the SSH server is exceeded. Use the **show ip ssh** command to display the configuration of the SSH server

Configuration The following example sets the authentication retry times to 2.

```

Examples
FS# configure terminal
FS(con fig)# ip ssh authentication-retries 2
    
```

Related Commands	Command	Description
	show ip ssh	Displays the current status of the SSH server.

Platform N/A

Description

6.9 ip ssh cipher-mode

Use this command to set the SSH server encryption mode.
 Use the **no** form of this command to restore the default setting.

ip ssh cipher-mode { cbc | ctr | others }

no ip ssh cipher-mode

Parameter Description	Parameter	Description
	cbc	Encryption mode: CBC (Cipher Block Chaining) Encryption algorithm: DES-CBC, 3DES-CBC, AES-128-CBC, AES-192-CBC, AES-256-CBC, Blow fish-CBC
	ctr	Encryption mode: CTR (Counter) Encryption algorithm: AES128-CTR, AES192-CTR, AES256-CTR
	others	Encryption mode: Others Encryption algorithm: RC4

Defaults All encryption modes are supported by default.

Command Global configuration mode

Mode

Usage Guide This command is used to set the SSH server encryption mode.
 For FS Networks, the SSHv1 server supports DES-CBC, 3DES-CBC, and Blowfish-CBC; the SSHv2 server supports AES128-CTR, AES192-CTR, AES256-CTR, DES-CBC, 3DES-CBC, AES-128-CBC, AES-192-CBC, AES-256-CBC, Blowfish-CBC, and RC4. All these algorithms can be grouped into CBC, CTR and Other as shown above.
 With the advancement of cryptography study, CBC and Others encryption modes are proved to easily decipher. It is recommended to enable the CTR mode to raise assurance for organizations and enterprises demanding high security.

Configuration The following example enables CTR encryption mode.

```

Examples
FS# configure terminal
FS(config)# ip ssh cipher-mode ctr
    
```

Platform N/A

Description

6.10 ip ssh hmac-algorithm

Use this command to set the algorithm for message authentication.

Use the **no** form of this command to restore the default setting.

ip ssh hmac-algorithm { md5 | md5-96 | sha1 | sha1-96 }

no ip ssh hmac-algorithm

Parameter	Parameter	Description
Description	md5	MD5 algorithm
	md5-96	MD5-96 algorithm
	sha1	SHA1 algorithm
	sha1-96	SHA1-96 algorithm

Defaults SSHv1: all the algorithms are not supported.

SSHv2: all the algorithms are supported.

Command Global configuration mode

Mode

Usage Guide FS SSHv1 servers do not support algorithms for message authentication.

For FS Networks, the SSHv1 server does not support message authentication algorithms; the SSHv2 server supports MD5, MD5-96, SHA1, and SHA1-96 algorithms. Set the algorithm on your demand.

Configuration The following example sets the algorithm for message authentication to SHA1.

Examples

```
FS# configure terminal
FS(config)# ip ssh hmac-algorithm sha1
```

Platform N/A

Description

6.11 ip ssh key-exchange

Use this command to configure support for DH key exchange method on the SSH server

Use the **no** form of this command to restore the default setting.

ip ssh key-exchange { dh_group_exchange_sha1 | dh_group14_sha1 | dh_group1_sha1 }

no ip ssh key-exchange

Parameter	Parameter	Description
Description	dh_group_exchange_sha1	Indicates configuration of diffie-hellman-group-exchange-sha1 for keyexchange. The key has 2,048 bytes, which cannot be edited.
	dh_group14_sha1	Indicates configuration of diffie-hellman-group14-sha1 for keyexchange. The key has 2,048 bytes.

dh_group1_sha1	Indicates configuration of diffie-hellman-group1-sha1 for keyexchange. The key has 1,024 bytes.
-----------------------	---

Defaults By default, the SSHv1 server does not support DH key exchange method, while the SSHv2 server supports diffie-hellman-group-exchange-sha1, diffie-hellman-group14-sha1, and diffie-hellman-group1-sha1 for keyexchange.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example configures the support for diffie-hellman-group14-sha1.

```
FS# configure terminal
FS(config)# ip ssh key-exchange dh_group14_sha1
```

	Command	Description
Related Commands	show ip ssh	Displays the current status of the SSH server.

Platform Description N/A

6.12 ip ssh peer

Use this command to associate the public key file and the user name on the client. During client login authentication, you can specify a public key file based on the user name. Use the **no** form of this command to restore the default setting.

ip ssh peer *username* **public-key** { **rsa** | **ads** } *enamer*

no ip ssh peer *username* **public-key** { **rsa** | **ads** } *enamer*

	Parameter	Description
Parameter Description	<i>Username</i>	User name
	<i>Enamer</i>	Name of a public key file
	Rsa	The public key is a RSA key
	Ads	The public key is a DSA key

Defaults N/A

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example sets RSA and DSA key files associated with user **test**.

Examples

```
FS# configure terminal
FS(con fig)# ip ssh peer test public-key rsa flash:rsa.pub
FS(config)# ip ssh peer test public-key dsa flash:dsa.pub
```

Related	Command	Description
Commands	show ip ssh	Displays the current status of the SSH server.

Platform N/A

Description

6.13 ip ssh source-interface

Use this command to specify a source interface for the SSH client. Use the **no** form of this command to remove the setting.

ip ssh source-interface *interface-name*

no ip ssh source-interface

Parameter	Parameter	Description
Description	<i>interface-name</i>	Specifies a source interface for the SSH client, indicating that the SSH client takes the interface IP address as its source address.

Defaults The IP address of the interface that sends the SSH packet is taken as its source address by default.

Command Global configuration mode

Mode

Usage Guide This command is used to specify the IP address of the specified interface as the source address of the SSH client.

Configuration Examples The following example specifies the IP address of interface Loopback 1 as the source address of the global SSH session.

```
FS(config)# ip ssh source-interface Loopback 1
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

6.14 ip ssh time-out

Use this command to set the authentication timeout interval for the SSH server. Use the **no** form of this command to restore the default setting.

ip ssh time-out *time*

no ip ssh time-out

Parameter	Parameter	Description
Description	<i>Time</i>	Authentication timeout interval, in the range from 1 to 120 in the unit of seconds

Defaults The default is 120 seconds.

Command Mode Global configuration mode

Usage Guide The authentication is considered timeout and failed if the authentication is not successful within 120 seconds starting from receiving a connection request. Use the **show ip ssh** command to display the configuration of the SSH server.

Configuration Examples The following example sets the timeout value to 100 seconds:

```
FS# configure terminal
FS(config)# ip ssh time-out 100
```

Related Commands	Command	Description
	show ip ssh	Displays the current status of the SSH server.

Platform Description N/A

6.15 ip ssh version

Use this command to set the version of the SSH server. Use the **no** form of this command to restore the default setting.

ip ssh version { 1 | 2 }

no ip ssh version

Parameter	Parameter	Description
Description	1	Supports the SSH1 client connection request.
	2	Supports the SSH2 client connection request.

Defaults SSH1 and SSH2 are compatible by default. When a version is set, the connection sent by the SSH client of this version is accepted only. The **no ip ssh version** command can also be used to restore the default setting.

Command Mode Global configuration mode

Usage Guide This command is used to configure the SSH connection protocol version supported by SSH server. By default, the SSH server supports SSH1 and SSH2. If Version 1 or 2 is set, only the SSH client of this version can connect to the SSH server. Use the **show ip ssh** command to display the current status of SSH server.

Configuration The following example sets the version of the SSH server:

Examples

```
FS# configure terminal
FS(config)# ip ssh version 2
```

Related	Command	Description
Commands	show ip ssh	Displays the current status of the SSH server.

Platform N/A

Description

6.16 ipv6 ssh access-class

Use this command to set the IPv6 ACL filtering of the SSH server.

ipv6 ssh access-class *accessv6-list-name*

Use the **no** form of this command to delete the IPv6 ACL filtering of the SSH server.

no ipv6 ssh access-class

Parameter	Parameter	Description
Description	<i>access-list-name</i>	An IPv6 ACL name.

Defaults N/A

Command Mode Global configuration mode

Usage Guide Run this command to perform IPv6 ACL filtering for all connections to the SSH server. In line mode, IPv6 ACL filtering is performed only for specific lines. However, IPv6 ACL filtering rules of the SSH are effective to all SSH connections.

Configuration The following example performs the IPv6 ACL filtering named testv6 for all connections to the SSH server.

Examples

```
FS# configure terminal
FS(config)# ipv6 ssh access-class testv6
```

Platform N/A

Description

6.17 show crypto key mypubkey

Use this command to display the information about the public key part of the public key to the SSH server.

show crypto key mypubkey { *rsa* | *dsa* }

Parameter	Parameter	Description
-----------	-----------	-------------

Description	Rsa	Displays the RSA key.
	Dsa	Displays the DSA key.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode

Usage Guide This command is used to show the information about the public key part of the generated public key on the SSH server, including key generation time, key name, contents in the public key part, etc.

Configuration The following example displays the information about the public key part of the public key to the SSH server.

Examples

```
FS# show crypto key mypubkey rsa
```

Related	Command	Description
Commands	crypto key generate { rsa dsa }	Generates DSA and RSA keys.

Platform N/A

Description

6.18 show ip ssh

Use this command to display the information of the SSH server.

show ip ssh

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode

Usage Guide This command is used to display the information of the SSH server, including version, enablement state, authentication timeout, and authentication retry times.
 Note: If no key is generated for the SSH server, the SSH version is still unavailable even if this SSH version has been configured.

Configuration The following example displays the information of the SSH server.

Examples

```
FS# show ip ssh
```

Related	Command	Description
Commands	ip ssh version {1 2}	Configures the version for the SSH server.
	ip ssh time-out time	Sets the authentication timeout for the SSH server.

ip ssh authentication-retries	Sets the authentication retry times for the SSH server.
--------------------------------------	---

Platform N/A

Description

6.19 show ssh

Use this command to displays the information about the established SSH connection.

show ssh

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode

Usage Guide This command is used to display the information about the established SSH connection, including VTY number of connection, SSH version, encryption algorithm, message authentication algorithm, connection status, and user name.

Configuration Examples The following example displays the information about the established SSH connection:

```
FS# show ssh
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.20 show ssh session

Use this command to display the SSH Client session.

show ssh-session

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode User EXEC mode

Usage Guide Use this command to display the established SSH client session information, including the VTY number, SSH version, encryption algorithm, message authentication algorithm, connection state, and username.

Configuration The following example display the established SSH client session.

Examples

```
FS#show ssh-session
Connect No.  SSH Version  Server Address
-----
0           2.0           192.168.23.122
1           1.5           192.168.23.122
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.21 scp

Use this command to implement file transfer with the server.

scp [**oob**] [-v { 1 | 2 }] [-c { 3des | aes128-cbc | aes192-cbc | aes256-cbc }] [-m { hmac-md5-96 | hmac-md5-128 | hmac-sha1-96 | hmac-sha1-160 }] [-p port-num] { filename username@host:/filename | username@host:/filename filename } [**via** mgmt-name] [**/source** { ip A.B.C.D | ipv6 X:X:X:X | interface interface-name }] [**/vrf** vrf-name]

Parameter	Parameter	Description
Description	oob	Connects to the SSH server through out-of-band communication (generally through MGMT port), This parameter will be displayed only when the device has a MGMT port.

<p>-v</p>	<p>(Optional) The version of the SSH that is used to connect to the server, By default, it is SSHv2</p> <ul style="list-style-type: none"> ● Connect to the server via SSHv1. ● Connect to the server via SSHv2.
<p>-c { 3des aes128-cbc aes192-cbc aes256-cbc }</p>	<p>(Optional) Specifies the encryption algorithm. The available encryption includes Data Encryption Standard (DES), Triple Data Encryption Algorithm (3DES), and Advantaged Encryption Standard (AES). Based on the length of the secret key, AES can be further divided into three types: aes128-cbc (128-bit secret key), aes192-cbc (192-bit secret key), and aes256-cbc (256-bit secret key).</p> <p>If no encryption algorithm is specified, the SSH client will send the supported encryption algorithm list to the server for algorithm negotiation, Otherwise, the SSH client will sent only the specified encryption algorithm to the server, If the server does not support the encryption algorithm, the session will be closed.</p>
<p>-m { hmac-md5-96 hmac-md5-128 hmac-sha1-96 hmac-sha1-160 }</p>	<p>(Optional) Specifies a Hash-based message authentication code (HMAC). SSHv1 does not support HMACs. If the user specifies SSHv1 and HMACs at the same time, the HMACs configuration does not take effect.</p> <p>If no algorithm is specified, the SSH client will send the supported HMAC algorithm list to the server for algorithm negotiation, Otherwise, the SSH client will sent only the specified HMAC algorithm to the server, If the server does not support the HMAC algorithm, the session will be closed.</p>
<p>-p port-num</p>	<p>(Optional) Specifies the port number that is used to connect to the SSH server. The port number is 22 by default.</p>
<p>filename username@host:/filename username@host:/filename filename</p>	<p>(Mandatory)</p> <p>filename username@host:/filename: indicates that the file is uploaded to the SCP server.</p> <p>username@host:/filename filename: indicates that the file is downloaded from the SCP server.</p> <p>On the local device, filename supports the following storage media:</p> <p>flash:/filename: external flash memory.</p> <p>flash2:/filename : external flash memory 2.</p> <p>usb0:/filename: external USB0, which requires one USB port with an inserted USB device.</p> <p>usb1:/filename: external USB1, which requires two USB ports with inserted USB devices.</p> <p>sd0:/filename: external SD card, which requires a SD card port with an inserted SD card.</p> <p>sata0:/filename: external hard disk.</p> <p>tmp:/filename : temporary tmp/vsd/ directory.</p>
<p>via mgmt-name</p>	<p>Specifies the MGMT interface for the oob parameter.</p>
<p>/source</p>	<p>Specifies the source IP address or the source interface for the SSH client.</p>
<p>ip A.B.C.D</p>	<p>Specifies the source IPv4 address for the SSH client.</p>

ipv6 X:X:X::X	Specifies the source IPv6 address for the SSH client.
interface interface-name	Specifies the source interface for the SSH client.
/vrf vrf-name	Specifies the VRF routing table to be queried.

Defaults N/A

Command User EXEC mode

Mode

Usage Guide Run the **scp** command to establish a secure and encrypted connection from the local device (SCP client) to another device (SCP server) to implement file transfer.

Configuration Examples 1. The following example downloads the config.text file from the SCP server 192.168.23.122 under the username "admin".

```
FS#scp admin@192.168.23.122:/config.text flash:/config.text
```

2. The following example uploads the config.text file to the SCP server 192.168.23.122 under the username "admin".

```
FS# scp flash:/config.text admin@192.168.23.122:/config.text
```

Related Commands

Command	Description
N/A	N/A

6.22 ssh

Use this command to establish an encrypted session with a remote device.

```
ssh [ oob ] [ -v { 1 | 2 } ] [ -c { 3des | aes128-cbc | aes192-cbc | aes256-cbc | aes128-ctr | aes192-ctr | aes256-ctr } ] [ -l username ] [ -m { hmac-md5-96 | hmac-md5-128 | hmac-sha1-96 | hmac-sha1-160 } ] [ -p port-num ] { ip-addr | hostname } [ via mgmt-name ] [ /source { ip A.B.C.D | ipv6 X:X:X::X | interface interface-name } ] [ /vrf vrf-name ]
```

Parameter Description

Parameter	Description
oob	Connects to the SSH server through out-of-band communication (generally through MGMT port), This parameter will be displayed only when the device has a MGMT port.
-v	(Optional) The version of the SSH that is used to connect to the server, By default, it is SSHv2 <ul style="list-style-type: none"> ● Connect to the server via SSHv1. ● Connect to the server via SSHv2.
-c { 3des aes128-cbc aes192-cbc aes256-cbc aes128-ctr aes192-ctr }	(Optional) Specifies the encryption algorithm. The available encryption includes Data Encryption Standard (DES), Triple Data Encryption Algorithm (3DES), and Advantaged Encryption Standard (AES). Based on the length of





aes256-ctr }	<p>the secret key, AES can be further divided into three types: aes128-cbc (128-bit secret key), aes192-cbc (192-bit secret key), aes256-cbc (256-bit secret key), aes128-ctr (128-bit secret key), aes192-ctr (192-bit secret key), and aes256-ctr (256-bit secret key).</p> <p>If no encryption algorithm is specified, the SSH client will send the supported encryption algorithm list to the server for algorithm negotiation, Otherwise, the SSH client will sent only the specified encryption algorithm to the server, If the server does not support the encryption algorithm, the session will be closed.</p>
-l <i>username</i>	(Mandatory) The login username.
-m { hmac-md5-96 hmac-md5-128 hmac-sha1-96 hmac-sha1-160 }	<p>(Optional) Specifies a Hash-based message authentication code (HMAC). SSHv1 does not support HMACs. If the user specifies SSHv1 and HMACs at the same time, the HMACs configuration does not take effect.</p> <p>If no algorithm is specified, the SSH client will send the supported HMAC algorithm list to the server for algorithm negotiation, Otherwise, the SSH client will sent only the specified HMAC algorithm to the server, If the server does not support the HMAC algorithm, the session will be closed.</p>
-p <i>port-num</i>	(Optional) Specifies the port number that is used to connect to the SSH server. The port number is 22 by default.
<i>ip-addr</i> <i>hostname</i>	(Mandatory) Specifies the IPv4/IPv6 address or host name for the SSH server,
via <i>mgmt-name</i>	Specifies the MGMT interface for the oob parameter.
/source	Specifies the source IP address or the source interface for the SSH client.
ip A.B.C.D	Specifies the source IPv4 address for the SSH client.
ipv6 X:X:X::X	Specifies the source IPv6 address for the SSH client.
interface <i>interface-name</i>	Specifies the source interface for the SSH client.
/vrf <i>vrf-name</i>	Specifies the VRF routing table to be queried.

Defaults N/A

Command User EXEC mode

Mode

Usage Guide Use the **ssh** command to create a secure and encrypted session between the current device (SSH client) and the other device (SSH server, or the server that supports SSHv1 or SSHv2). This session is similar to the Telnet session except that the SSH session is encrypted. Therefore, the SSH client can create a secure session on the insecure network based on authentication and encryption.

-  SSHv1 supports only DES (56-bit key) and 3DES (168-bit key).
-  SSHv2 supports the following AES algorithm: ase128-cbc, aes192-cbc, aes256-cbc, ase128-ctr, aes192-ctr, and aes256-ctr.
-  SSHv1 does not support HMAC algorithm.
-  If the specified SSH version is incompatible with the specified encryption algorithm or authentication

algorithm, the algorithm configuration does not take effect.

Configuration The following example creates a session with the username **admin** to the SSH server whose IP address is 192.168.23.122 via SSH.

Examples

```
FS#ssh -l admin 192.168.23.122
```

The following example creates a session with the username **admin** to the SSH server whose IP address is 192.168.23.122 via SSHv2, setting **aes128-cbc** and **hmac-md5-128** as encryption algorithm and authentication algorithm respectively.

```
FS#ssh -v 2 -c aes128-cbc -m hmac-md5-128 -l admin 192.168.23.122
```

**Related
Commands**

Command	Description
N/A	N/A

6.23 ssh session

Use this command to restore the suspended SSH client session.

ssh-session *session-id*

Parameter	Parameter	Description
Description	<i>session-id</i>	ID of the SSH client session to be restored

Defaults N/A

**Command
Mode** User EXEC mode

Usage Guide After creating the SSH client session via the **SSH** command, you can use the hot key (ctrl+shift+6 x) to temporarily suspend the session, If you want to restore the suspended SSH client session, run the **ssh-session** command. Use the **show ssh-session** command to display the established session.

Configuration The following example restores the suspended SSH client session:

Examples

```
FS# ssh-session 1
```

Related Commands	Command	Description
	N/A	N/A

**Platform
Description** N/A

7 CPU Protection Commands

7.1 clear cpu-protect-counters

Use this command to clear the CPP statistics.

clear cpu-protect counters [**device** *device_num*]

Parameter Description	Parameter	Description
	<i>device_num</i>	As a single physical device, there is no device parameter.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears the CPP statistics.

```

FS(config)#show cpu-protect type bpdu
Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total  Total Drop
-----
bpdu             6             200             0          0          600    50
FS#clear cpu-protect counters
FS(config)#show cpu-protect type bpdu
Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total  Total Drop
-----
bpdu             6             200             0          0          0      0
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.2 clear cpu-protect-counters mboard

Use this command to clear the CPP statistics on the supervisor module.

clear cpu-protect counters mboard

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example clears the CPP statistics on the supervisor module.

```

FS(config)#show cpu-protect type bpdu
Packet Type          Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total      Total Drop Total
HW_Drop
-----
bpdu                  6              200              0           0           0          600        50
50
FS#clear cpu-protect counters mboard
FS(config)#show cpu-protect type bpdu
Packet Type          Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total      Total Drop Total
HW_Drop
-----
bpdu                  6              200              0           0           0          0          0
0
    
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

7.3 cpu-protect cpu bandwidth

Use this command to configure the bandwidth for the CPU port. Use the **no** form of this command to restore the default setting.

cpu-protect cpu bandwidth *bandwidth_value*

no cpu-protect cpu bandwidth

Parameter Description

Parameter	Description
<i>bandwidth_value</i>	An integer number ranges from 0 to 100000 (PPS). Indicates the bandwidth value of the CPU port.

Defaults The default CPU port bandwidth varies with products.

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example sets the CPU port bandwidth to 32000pps.

Examples

```
FS# configure terminal
FS(config)# cpu-protect cpu bandwidth 32000
FS#show cpu-protect cpu
%cpu port bandwidth: 32000(pps)
```

**Related
Commands**

Command	Description
N/A	N/A

Platform N/A

Description

7.4 **cpu-protect traffic-class bandwidth**

Use this command to configure the bandwidth for each priority queue. Use the **no** form of this command to restore the default setting.

cpu-protect traffic-class *traffic-class-num* **bandwidth** *bandwidth_value*

no cpu-protect traffic-class *traffic-class-num* **bandwidth**

**Parameter
Description**

Parameter	Description
<i>traffic-class-num</i>	A default integer that varies with products, indicating the queue priority
<i>bandwidth_value</i>	An integer number ranges from 0 to 100000 (pps). Indicates the bandwidth value of the CPU port.

Defaults The default bandwidth of each priority queue varies with products.

Command Privileged EXEC mode

Mode

Usage Guide N/A

Configuration The following example s sets the priority queue 5 to 3500 pps.

Examples

```
FS# configure terminal
FS(config)# cpu-protect traffic-class 5 bandwidth 3500
FS#show cpu-protect traffic-class 5
```

Traffic-class	Bandwidth(pps)	Rate(pps)	Drop(pps)
5	3500	0	0

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.5 cpu-protect type bandwidth

Use this command to configure the bandwidth of a specific packet. Use the **no** form of this command to restore the default setting.

cpu-protect type *packet-type* **bandwidth** *bandwidth_value*
no cpu-protect type *packet-type* **bandwidth**

Parameter Description

Parameter	Description
<i>packet-type</i>	Packet type, which varies with products
<i>bandwidth_value</i>	An integer number ranges from 0 to 32000 (pps). Indicates the bandwidth value of the CPU port.

Defaults The default CPU port bandwidth varies with products.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the BPDU bandwidth to 200 pps.

```
FS# configure terminal
FS(config)# cpu-protect type bpdu bandwidth 200
FS(config)# show cpu-protect type bpdu
```

Packet Type	Traffic-class	Bandwidth(pps)	Rate(pps)	Drop(pps)	Total	Total Drop
bpdu	6	200	0	0	0	0

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

7.6 cpu-protect type traffic-class

Use this command to set the priority queue (PQ) of the packet. Use the **no** form of this command to restore the default setting.

cpu-protect type *packet-type* **traffic-class** *traffic-class-num*

no cpu-protect type *packet-type* **traffic-class**

Parameter	Parameter	Description
Description	<i>packet-type</i>	Packet type, which varies with products
	<i>traffic-class-num</i>	An integer number varying with products. Indicates the bandwidth value of the CPU port.

Defaults The default PQ varies with products.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the PQ of BPDU packets to 5.

```

FS# configure terminal
FS(config)# cpu-protect type bpdu traffic-class 5
FS(config)#show cpu-protect type bpdu
Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total  Total Drop
-----
bpdu              5              200              0           0           0       0
    
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.7 pp-warn warn-periodsss

Use this command to enable CPP waning and configure time interval between two detections of packet loss. Use the **no** form of this command to restore the default setting.

cpp-warn warn-period *value*

no cpp-warn warn-period

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
<i>value</i>	Specifies the interval between two detections of packet loss in the unit of second. Its range is from 5 to 36,000.

Defaults By default, CPP warning is disabled.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example enables CPP warning and sets the detection interval to 10s.

Examples

```
FS# configure terminal
FS(config)# cpp-warn warn-period 10
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.8 cpp-warn traffic-class

Use this command to enable CPP warning of packet loss in a queue.

Use the **no** form of this command to restore the default setting.

cpp-warn traffic-class *traffic-class-num* **warn**

no cpp-warn traffic-class *traffic-class-num* **warn**

Parameter Description	Parameter	Description
	<i>traffic-class-num</i>	Specifies a priority queue.

Defaults By default, CPP warning of packet loss in a queue is disabled.

Command Mode Global configuration mode

Usage Guide N/A

Configuration The following example enables CPP warning of packet loss in queue 1.

Examples

```
FS# configure terminal
FS(config)# cpp-warn traffic-class 1 warn
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

7.9 cpp-warn type

Use this command to enable CPP warning of protocol packet loss.

Use the **no** form of this command to restore the default setting.

cpp-warn type *packet-type* **warn**

no cpp-warn type *packet-type* **warn**

Parameter	Parameter	Description
Description	<i>packet-type</i>	Specifies a packet type. Packet types are defined. Its value ranges from 0 to 7.

Defaults By default, CPP warning of protocol packet loss is disabled.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example enables CPP warning of ARP packet loss.

```
FS# configure terminal
FS(config)# cpp-warn type arp warn
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

7.10 show cpu-protect

Use this command to display all CPP configuration and statistics.

show cpu-protect [**device** *device_num*]

Parameter	Parameter	Description
Description	<i>device_num</i>	As a single physical device, there is no device parameter.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays all CPP configuration and statistics of a line card.

```

Examples FS#show cpu-protect slot 3/2
%cpu port bandwidth: 100000(pps)
Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)
-----
0              6000             0           0
1              6000             0           0
2              6000             0           0
3              6000             0           0
4              6000             0           0
5              6000             0           0
6              6000             0           0
7              6000             0           0

Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total      Total Drop
-----
bpdu              6              128             0           0           0           0
arp               1              3000            0           0           0           0
tpp               6              128             0           0           0           0
dot1x            2              1500            0           0           0           0
gvrp             5              128             0           0           0           0
rldp             5              128             0           0           0           0
larp             5              256             0           0           0           0
rerp             5              128             0           0           0           0
reup             5              128             0           0           0           0
lldp             5              768             0           0           0           0
cdp              5              768             0           0           0           0
dhcps            2              1500            0           0           0           0
dhcps6           2              1500            0           0           0           0
dhcp6-client     2              1500            0           0           0           0
dhcp6-server     2              1500            0           0           0           0
dhcp-relay-c     2              1500            0           0           0           0
dhcp-relay-s     2              1500            0           0           0           0
option82         2              1500            0           0           0           0
tunnel-bpdu      2              128             0           0           0           0
tunnel-gvrp      2              128             0           0           0           0
unknown-v6mc     1              128             0           0           0           0
xgv6-ipmc        1              128             0           0           0           0
stargv6-ipmc     1              128             0           0           0           0
unknown-v4mc     1              128             0           0           0           0
xgv-ipmc         2              128             0           0           0           0
stargv-ipmc      2              128             0           0           0           0
udp-helper       1              128             0           0           0           0
    
```

dvmrp	4	128	0	0	0	0
igmp	2	1000	0	0	0	0
icmp	3	1600	0	0	0	0
ospf	4	2000	0	0	0	0
ospf3	4	2000	0	0	0	0
pim	4	1000	0	0	0	0
pimv6	4	1000	0	0	0	0
rip	4	128	0	0	0	0
ripng	4	128	0	0	0	0
vrrp	6	256	0	0	0	0
vrrpv6	6	256	0	0	0	0
ttl0	0	128	0	0	0	0
ttl1	0	2000	0	0	0	0
hop-limit	0	800	0	0	0	0
local-ipv4	3	4000	0	0	0	0
local-ipv6	3	4000	0	0	0	0
v4uc-route	1	800	0	0	0	0
v6uc-route	1	800	0	0	0	0
rt-host	4	3000	0	0	0	0
mld	2	1000	0	0	0	0
nd-snp-ns-na	1	3000	0	0	0	0
nd-snp-rs	1	1000	0	0	0	0
nd-snp-ra-redirect	1	1000	0	0	0	0
erps	5	128	0	0	0	0
mpls-ttl0	4	128	0	0	0	0
mpls-ttl1	4	128	0	0	0	0
mpls-ctrl	4	128	0	0	0	0
isis	4	2000	0	0	0	0
bgp	4	2000	0	0	0	0
cfm	5	512	0	0	0	0
web-auth	2	2000	0	0	0	0
fcoe-fip	4	1000	0	0	0	0
fcoe-local	4	1000	0	0	0	0
bfd	6	5120	0	0	0	0
micro-bfd	6	5120	0	0	0	0
micro-bfd-v6	6	5120	0	0	0	0
dldp	6	3200	0	0	0	0
other	0	4096	0	0	0	0
trill	4	1000	0	0	0	0
efm	5	1000	0	0	0	0
ipv6-all	0	2000	0	0	0	0
ip-option	0	800	0	0	0	0
mgmt	-	4000	4	0	4639	0
dns	2	200	0	0	0	0

sdn	0	5000	0	0	0	0
sdn_of_fetch	0	5000	0	0	0	0
sdn_of_copy	0	5000	0	0	0	0
sdn_of_trap	0	5000	0	0	0	0
vxlan-non-uc	1	512	0	0	0	0
local-telnet	3	1000	0	0	0	0
local-snmp	3	1000	0	0	0	0
local-ssh	3	1000	0	0	0	0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.11 show cpu-protect cpu

Use this command to display the configurations of the CPU port.

show cpu-protect cpu

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode All configuration modes

Usage Guide N/A

Configuration Examples The following example displays the configuration of the CPU port.

```
FS#show cpu-protect cpu
%cpu port bandwidth: 32000(pps)
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.12 show cpu-protect mboard

Use this command to display the statistics of various packets of CPU protection on the management board.

show cpu-protect mboard

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command All configuration modes

Mode

Usage Guide This command displays the statistics of the packets received by CPU on the management board.

Configuration The following example displays the CPP configuration and statistics of the master device.

```

Examples
FS#show cpu-protect mboard
%cpu port bandwidth: 80000(pps)
Traffic-class  Bandwidth(pps)  Rate(pps)      Drop(pps)
-----
0              8000              0              0
1              8000              0              0
2              8000              0              0
3              8000              0              0
4              8000              0              0
5              8000              0              0
6              8000              0              0
7              8000              0              0

Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total  Total Drop
-----
bpdu              6              128              0           0           0       0
arp               3              10000            0           0           0       0
arp-dai           3              10000            0           0           0       0
arp-proxy         3              10000            0           0           0       0
tpp               7              128              0           0           0       0
dot1x             4              128              0           0           0       0
gvrp              5              128              0           0           0       0
rldp              6              128              0           0           0       0
larp              6              128              0           0           0       0
rerp              6              128              0           0           0       0
reup              6              128              0           0           0       0
lldp              5              128              0           0           0       0
cdp               5              128              0           0           0       0
    
```

dhcps	4	128	0	0	0	0
dhcps6	4	128	0	0	0	0
dhcp6-client	4	128	0	0	0	0
dhcp6-server	4	128	0	0	0	0
dhcp-relay-c	4	128	0	0	0	0
dhcp-relay-s	4	128	0	0	0	0
option82	4	128	0	0	0	0
tunnel-bpdu	5	128	0	0	0	0
tunnel-gvrp	5	128	0	0	0	0
unknown-v6mc	3	128	0	0	0	0
known-v6mc	3	128	0	0	0	0
xgv6-ipmc	3	128	0	0	0	0
stargv6-ipmc	3	128	0	0	0	0
unknown-v4mc	3	128	0	0	0	0
known-v4mc	3	128	0	0	0	0
xgv-ipmc	3	128	0	0	0	0
sgv-ipmc	3	128	0	0	0	0
udp-helper	4	128	0	0	0	0
dvmrp	5	128	0	0	0	0
igmp	4	128	0	0	0	0
icmp	4	128	0	0	0	0
ospf	5	128	0	0	0	0
ospf3	5	128	0	0	0	0
pim	6	128	0	0	0	0
pimv6	6	128	0	0	0	0
rip	6	128	0	0	0	0
ripng	6	128	0	0	0	0
vrrp	6	128	0	0	0	0
vrrp6	6	128	0	0	0	0
ttl0	6	128	0	0	0	0
ttl1	6	128	0	0	0	0
err_hop_limit	1	800	0	0	0	0
local-ipv4	6	128	0	0	0	0
local-ipv6	6	128	0	0	0	0
route-host-v4	0	4096	0	0	0	0
route-host-v6	0	4096	0	0	0	0
mld	0	1000	0	0	0	0
nd-snp-ns-na	6	128	0	0	0	0
nd-snp-rs	6	128	0	0	0	0
nd-snp-ra-redirect	6	128	0	0	0	0
nd-non-snp	6	128	0	0	0	0
erps	4	128	0	0	0	0
mpls-ttl0	6	128	0	0	0	0
mpls-ttl1	6	128	0	0	0	0

mpls-ctrl	6	128	0	0	0	0
isis	5	2000	0	0	0	0
bgp	1	128	0	0	0	0
cfm	0	128	0	0	0	0
fcoe-fip	6	128	0	0	0	0
fcoe-local	6	128	0	0	0	0
bfd-echo	6	5120	0	0	0	0
bfd-ctrl	6	5120	0	0	0	0
madp	7	1000	0	0	0	0
ip4-other	6	128	0	0	0	0
ip6-other	6	128	0	0	0	0
non-ip-other	6	20000	0	0	0	0
trill	2	1000	0	0	0	0
trill-oam	2	1000	0	0	0	0
efm	2	1000	0	0	0	0

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

7.13 show cpu-protect summary

Use this command to display the CPP configuration and statistics of the master device.

show cpu-protect summary

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode All configuration modes

Usage Guide N/A

Configuration 1. The following example checks the configuration and statistics of CPP on the master device.

Examples

```
FS#show cpu-protect summary
%cpu port bandwidth: 100000(pps)
Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)
-----
0                6000          0          0
```

1	6000	0	0			
2	6000	0	0			
3	6000	0	0			
4	6000	0	0			
5	6000	0	0			
6	6000	0	0			
7	6000	0	0			
Packet Type	Traffic-class	Bandwidth(pps)	Rate(pps)	Drop(pps)	Total	Total Drop
bpdu	6	128	0	0	0	0
arp	1	3000	0	0	0	0
tpp	6	128	0	0	0	0
dot1x	2	1500	0	0	0	0
gvrp	5	128	0	0	0	0
rldp	5	128	0	0	0	0
lACP	5	256	0	0	0	0
rerp	5	128	0	0	0	0
reup	5	128	0	0	0	0
lldp	5	768	0	0	0	0
cdp	5	768	0	0	0	0
dhcps	2	1500	0	0	0	0
dhcps6	2	1500	0	0	0	0
dhcp6-client	2	1500	0	0	0	0
dhcp6-server	2	1500	0	0	0	0
dhcp-relay-c	2	1500	0	0	0	0
dhcp-relay-s	2	1500	0	0	0	0
option82	2	1500	0	0	0	0
tunnel-bpdu	2	128	0	0	0	0
tunnel-gvrp	2	128	0	0	0	0
unknown-v6mc	1	128	0	0	0	0
xgv6-ipmc	1	128	0	0	0	0
stargv6-ipmc	1	128	0	0	0	0
unknown-v4mc	1	128	0	0	0	0
xgv-ipmc	2	128	0	0	0	0
stargv-ipmc	2	128	0	0	0	0
udp-helper	1	128	0	0	0	0
dvmrp	4	128	0	0	0	0
igmp	2	1000	0	0	0	0
icmp	3	1600	0	0	0	0
ospf	4	2000	0	0	0	0
ospf3	4	2000	0	0	0	0
pim	4	1000	0	0	0	0
pimv6	4	1000	0	0	0	0
rip	4	128	0	0	0	0

ripng	4	128	0	0	0	0
vrrp	6	256	0	0	0	0
vrrpv6	6	256	0	0	0	0
ttl0	0	128	0	0	0	0
ttl1	0	2000	0	0	0	0
hop-limit	0	800	0	0	0	0
local-ipv4	3	4000	0	0	0	0
local-ipv6	3	4000	0	0	0	0
v4uc-route	1	800	0	0	0	0
v6uc-route	1	800	0	0	0	0
rt-host	4	3000	0	0	0	0
mld	2	1000	0	0	0	0
nd-snp-ns-na	1	3000	0	0	0	0
nd-snp-rs	1	1000	0	0	0	0
nd-snp-ra-redirect	1	1000	0	0	0	0
erps	5	128	0	0	0	0
mpls-ttl0	4	128	0	0	0	0
mpls-ttl1	4	128	0	0	0	0
mpls-ctrl	4	128	0	0	0	0
isis	4	2000	0	0	0	0
bgp	4	2000	0	0	0	0
cfm	5	512	0	0	0	0
web-auth	2	2000	0	0	0	0
fcoe-fip	4	1000	0	0	0	0
fcoe-local	4	1000	0	0	0	0
bfd	6	5120	0	0	0	0
micro-bfd	6	5120	0	0	0	0
micro-bfd-v6	6	5120	0	0	0	0
dldp	6	3200	0	0	0	0
other	0	4096	0	0	0	0
trill	4	1000	0	0	0	0
efm	5	1000	0	0	0	0
ipv6-all	0	2000	0	0	0	0
ip-option	0	800	0	0	0	0
mgmt	-	4000	4	0	4639	0
dns	2	200	0	0	0	0
sdn	0	5000	0	0	0	0
sdn_of_fetch	0	5000	0	0	0	0
sdn_of_copy	0	5000	0	0	0	0
sdn_of_trap	0	5000	0	0	0	0
vxlan-non-uc	1	512	0	0	0	0
local-telnet	3	1000	0	0	0	0
local-snmp	3	1000	0	0	0	0
local-ssh	3	1000	0	0	0	0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

7.14 show cpu-protect traffic-class

Use this command to display the summarized configuration and statistics of priority queues.

show cpu-protect traffic-class *{traffic-class-num | all}* [**device** *device_num*]

Parameter Description	Parameter	Description
	<i>traffic-class-num</i>	A default integer that varies with products, indicating the queue priority.
	<i>all</i>	Displays configurations and statistics of all priority queues.
	<i>device_num</i>	As a single physical device, there is no device parameter.

Defaults N/A

Command Mode All configuration modes

Usage Guide N/A

Configuration Examples The following example displays the summarized configuration and statistics of priority queues.

```
R FS#show cpu-protect traffic-class all
```

Traffic-class	Bandwidth(pps)	Rate(pps)	Drop(pps)
0	8000	0	0
1	8000	0	0
2	8000	0	0
3	8000	0	0
4	8000	0	0
5	3200	0	0
6	8000	0	0
7	8000	0	0

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.15 show cpu-protect type

Use this command to display the statistics of the specified type of packets

show cpu-protect type *packet-type* [**device** *device_num*]

Parameter Description	Parameter	Description
	<i>packt-type</i>	Packet type, which varies with products
	<i>all</i>	Displays the configurations and statistics of all packet types.
	<i>device_num</i>	As a single physical device, there is no device parameter.

Defaults N/A

Command Mode All configuration modes

Usage Guide N/A

Configuration Examples The following example displays the statistics of the ICMP packets.

```
FS(config)#show cpu-protect type icmp
Packet Type      Traffic-class  Bandwidth(pps)  Rate(pps)  Drop(pps)  Total  Total Drop
-----
icmp             5              1500             50         0          10000  100
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

7.16 show cpu-protect statistics

Use this command to display the statistics of all packets on the specified interface or the specified type of packets on an interface.

show cpu-protect statistics [*interface interface-id*]

show cpu-protect statistics type packet-type

Parameter Description	Parameter	Description
	<i>packet-type</i>	Packet type, which varies with products
	<i>Interface id</i>	Interface ID.

Defaults N/A

Command Mode All configuration modes

Usage Guide N/A

Configuration Examples 1. The following example displays the statistics of all packets on a specified interface.

```
FS#show cpu-protect statistics interface tenGigabitEthernet 0/33
Te0/33
-----
Packet Type      Rate(pps)  Drop(pps)  Total      Total Drop
-----
bpdud            0          0          0          0
arp              0          0          248053    0
tpp              0          0          0          0
dot1x            0          0          0          0
gvrp             0          0          0          0
rldp             0          0          0          0
larp             0          0          0          0
rerp             0          0          0          0
reup             0          0          0          0
lldp             0          0          560       0
cdp              0          0          0          0
dhcps            0          0          0          0
dhcps6           0          0          0          0
dhcp6-client     0          0          0          0
dhcp6-server     0          0          0          0
dhcp-relay-c     0          0          0          0
dhcp-relay-s     0          0          0          0
option82         0          0          0          0
tunnel-bpdu      0          0          0          0
```

tunnel-gvrp	0	0	0	0
unknown-v6mc	0	0	0	0
xgv6-ipmc	0	0	0	0
stargv6-ipmc	0	0	0	0
unknown-v4mc	0	0	0	0
xgv-ipmc	0	0	0	0
stargv-ipmc	0	0	0	0
udp-helper	0	0	0	0
dvmrp	0	0	0	0
igmp	0	0	0	0
icmp	0	0	0	0
ospf	0	0	0	0
ospf3	0	0	0	0
pim	0	0	0	0
pimv6	0	0	0	0
rip	0	0	0	0
ripng	0	0	0	0
vrrp	0	0	0	0
vrrpv6	0	0	0	0
ttl0	0	0	0	0
ttl1	0	0	0	0
hop-limit	0	0	0	0
local-ipv4	0	0	0	0
local-ipv6	0	0	0	0
v4uc-route	0	0	0	0
v6uc-route	0	0	0	0
rt-host	0	0	0	0
mld	0	0	0	0
nd-snp-ns-na	0	0	0	0
nd-snp-rs	0	0	0	0
nd-snp-ra-redirect	0	0	0	0
erps	0	0	0	0
mpls-ttl0	0	0	0	0
mpls-ttl1	0	0	0	0
mpls-ctrl	0	0	0	0
isis	0	0	0	0
bgp	0	0	0	0
cfm	0	0	0	0
web-auth	0	0	0	0
fcoe-fip	0	0	0	0
fcoe-local	0	0	0	0
bfd	0	0	0	0
micro-bfd	0	0	0	0
micro-bfd-v6	0	0	0	0

dldp	0	0	0	0
other	0	0	0	0
trill	0	0	0	0
efm	0	0	0	0
ipv6-all	0	0	0	0
ip-option	0	0	0	0
mgmt	0	0	0	0
dns	0	0	0	0
sdn	0	0	0	0
sdn_of_fetch	0	0	0	0
sdn_of_copy	0	0	0	0
sdn_of_trap	0	0	0	0
vxlan-non-uc	0	0	0	0

2. The following example displays the statistics of the ICMP packets.

```
FS#show cpu-protect statistics type arp
arp
-----
Interface          Rate(pps)  Drop(pps)  Total      Total Drop  Total HW_Drop
-----
Te0/33              0           0           248053     0            0
Te0/34              0           0            0           0            0
Te0/35              0           0            0           0            0
Te0/36              0           0            0           0            0
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

8 DHCP Snooping Commands

8.1 clear ip dhcp snooping binding

Use this command to delete the dynamic user information from the DHCP Snooping binding database.

clear ip dhcp snooping binding [*ip*] [*mac*] [**vlan** *vlan-id*] [**interface** *interface-id*]

Parameter Description	Parameter	Description
	<i>mac</i>	Specifies the user MAC address to be cleared.
	<i>vlan-id</i>	Specifies the ID of the VLAN to be cleared.
	<i>ip</i>	Specifies the IP address to be cleared.
	<i>interface-id</i>	Specifies the ID of the interface to be cleared.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to clear the current dynamic user information from the DHCP Snooping binding database.

Configuration Examples The following example clears the dynamic database information from the DHCP Snooping binding database.

```
FS# clear ip dhcp snooping binding
FS# show ip dhcp snooping binding
Total number of bindings: 0
MacAddress IpAddress Lease(sec) Type VLAN Interface
-----
```

Related Commands	Command	Description
	show ip dhcp snooping binding	Displays the information of the DHCP Snooping binding database.

Platform N/A

Description

8.2 ip dhcp snooping

Use this command to enable the DHCP Snooping function globally.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping

no ip dhcp snooping

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide The **show ip dhcp snooping** command is used to display whether the DHCP Snooping function is enabled. Note that DHCP Snooping cannot coexist with private VLAN.

Configuration The following example enables the DHCP Snooping function.

```

Examples
FS# configure terminal
FS(config)# ip dhcp snooping
FS(config)# end
FS# show ip dhcp snooping
Switch DHCP snooping status: ENABLE
DHCP snooping Verification of hwaddr field status: DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP Snooping Support Bootp bind status: ENABLE
Interface          Trusted          Rate limit (pps)
-----

```

Related Commands	Command	Description
	show ip dhcp snooping	Displays the configuration information of DHCP Snooping.
ip dhcp snooping vlan	Configures DHCP Snooping enabled VLAN.	

Platform N/A

Description

8.3 ip dhcp snooping bootp-bind

Use this command to enable DHCP Snooping BOOTP-bind function.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping bootp-bind

no ip dhcp snooping bootp-bind

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide By default, the DHCP Snooping only forwards BOOTP packets. With this function enabled, it can snoop BOOTP packets. After the BOOTP client requests an address successfully, the DHCP Snooping adds the BOOTP user to the static binding database.

Configuration Examples The following example enables the DHCP Snooping BOOTP-bind function.

```
FS# configure terminal
FS(config)# ip dhcp snooping bootp-bind
FS(config)# end
FS# show ip dhcp snooping
Switch DHCP snooping status :ENABLE
Verification of hwaddr field status :DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support Bootp bind status: ENABLE
Interface      Trusted      Rate limit (pps)
-----
-----
```

Related Commands	Command	Description
		show ip dhcp snooping

Platform N/A

Description

8.4 ip dhcp snooping check-giaddr

Use this command to enable DHCP Snooping to support the function of processing Relay requests.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping check-giaddr

no ip dhcp snooping check-giaddr

Parameter Description	Parameter	Description

N/A	N/A
-----	-----

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide After the feature is enabled, services using DHCP Snooping binding entries generated based on Relay requests, such as IP Source Guard/802.1x authentication, cannot be deployed. Otherwise, users fail to access the Internet.

After the feature is enabled, the **ip dhcp snooping verify mac-address** command cannot be used. Otherwise, DHCP Relay requests will be discarded and as a result, users fail to obtain addresses.

Configuration Examples The following example enables DHCP Snooping to support the function of processing Relay requests.

```
FS# configure terminal
FS(config)# ip dhcp snooping check-giaddr
FS(config)# end
```

Related Commands

Command	Description
show ip dhcp snooping	Displays the configuration information of the DHCP Snooping.

Platform Description N/A

8.5 ip dhcp snooping database write-delay

Use this command to configure the switch to write the dynamic user information of the DHCP Snooping binding database into the flash periodically.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping database write-delay *time*
no ip dhcp snooping database write-delay *time*

Parameter Description	Parameter	Description
	<i>time</i>	The interval at which the system writes the dynamic user information of the DHCP Snooping database into the flash

Defaults This function is disabled by default.

Command Mode Global configuration mode

Usage Guide This function avoids loss of user information after restart. In that case, users need to obtain IP addresses again for normal communication.

Configuration Examples The following example sets the interval at which the switch writes the user information into the flash to 3600 seconds.

```
FS# configure terminal
FS(config)# ip dhcp snooping database write-delay 3600
FS(config)# end
FS# show ip dhcp snooping
Switch DHCP snooping status: ENABLE
DHCP snooping Verification of hwaddr field status: ENABLE
DHCP snooping database write-delay time: 3600
DHCP snooping option 82 status: DISABLE
DHCP Snooping Support Bootp bind status: ENABLE
Interface          Trusted          Rate limit (pps)
-----
-----
```

Related Commands	Command	Description
	show ip dhcp snooping	Displays the configuration information of the DHCP Snooping.

Platform N/A
Description

8.6 ip dhcp snooping database write-to-flash

Use this command to write the dynamic user information of the DHCP binding database into flash in real time.
ip dhcp snooping database write-to-flash

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to write the dynamic user information of the DHCP binding database into flash in real time.

Configuration The following example writes the dynamic user information of the DHCP binding database into flash.

Examples

```
FS# configure terminal
FS(config)# ip dhcp snooping database write-to-flash
FS(config)# end
FS#
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.7 ip dhcp snooping information option

Use this command to add option82 to the DHCP request message. Use the **no** form of this command to restore the default setting.

ip dhcp snooping information option [standard-format]

no ip dhcp snooping information option [standard-format]

Parameter Description	Parameter	Description
	standard-format	The option82 uses the standard format.

Defaults This function is disabled by default,

Command Mode Global configuration mode

Usage Guide This command adds option82 to the DHCP request message based on which the DHCP server assigns IP address.

Configuration The following example adds option82 to the DHCP request message.

Examples

```
FS# configure terminal
```

```

FS(config)# ip dhcp snooping information option
FS(config)# end
FS# show ip dhcp snooping
Switch DHCP snooping status : ENABLE
DHCP snooping Verification of hwaddr status : ENABLE
DHCP snooping database write-delay time : 0
DHCP snooping option 82 status : DISABLE
DHCP Snooping Support Bootp bind status: ENABLE
Interface Trusted Rate limit (pps)
-----
    
```

Related Commands

Command	Description
show ip dhcp snooping	Displays the DHCP Snooping configuration.

Platform N/A

Description

8.8 ip dhcp snooping information option format remote-id

Use this command to set the option82 sub-option remote-id as the customized character string. Use the **no** form of this command to restore the default setting.

ip dhcp snooping information option format remote-id { string *ascii-string* | hostname }

no ip dhcp snooping information option format remote-id { string *ascii-string* | hostname }

Parameter Description

Parameter	Description
string <i>ascii-string</i>	The content of the option82 remote-id extension format is customized character string.
<i>hostname</i>	The content of the option82 remote-id extension format hostname

Defaults This function is disabled by default,

Command Mode Global configuration mode

Usage Guide This command sets the remote-id in the option82 to be added to the DHCP request message as the customized character string. The DHCP server will assign the IP address according to the option82 information.

Configuration Examples The following example adds the option82 into the DHCP request packets with the content of remote-id being hostname.

```

FS# configure terminal
FS(config)# ip dhcp snooping information option format remote-id hostname
    
```

Related Commands	Command	Description
		N/A

Platform N/A
Description

8.9 ip dhcp snooping suppression

Use this command to set the port to be the suppression status.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping suppression

no ip dhcp snooping suppression

Parameter Description	Parameter	Description
		N/A

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide This command denies all DHCP request messages under the port, that is, all the users under the port are prohibited to request addresses through DHCP.

Configuration The following example sets **fastEthernet** 0/2 to be in the suppression status.

```

Examples
FS# configure terminal
FS(config)# interface fastEthernet 0/2
FS(config-if)# ip dhcp snooping suppression
FS(config-if)# end

```

Related Commands	Command	Description
		show ip dhcp snooping

Platform N/A
Description

8.10 ip dhcp snooping trust

Use this command to set the trusted ports.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping trust

no ip dhcp snooping trust

Parameter	Parameter	Description
Description	N/A	N/A

Defaults All ports are untrusted by default.

Command Mode Interface configuration mode

Usage Guide Use this command to set a port as a trusted port. The DHCP response messages received under the trust port are forwarded normally, but the response messages received under the untrusted port will be discarded.

Configuration Examples The following example sets **fastEthernet 0/1** as a trusted port:

```

FS# configure terminal
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip dhcp snooping trust
FS(config-if)# end
FS# show ip dhcp snooping
Switch DHCP snooping status: ENABLE
DHCP snooping Verification of hwaddr field status: DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP Snooping Support Bootp bind status:ENABLE
Interface          Trusted          Rate limit (pps)
-----
FastEthernet0/1  yes                unlimited
    
```

Related Commands	Command	Description
	show ip dhcp snooping	Displays the DHCP Snooping configuration.

Platform N/A
Description

8.11 ip dhcp snooping verify mac-address

Use this command to check whether the source MAC address of the DHCP request message matches against the **client addr** field of the DHCP message.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping verify mac-address

no ip dhcp snooping verify mac-address

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults This function is disabled by default.

Command Global configuration mode

Mode

Usage Guide Use this command to enable checking the validity of the source MAC address of the DHCP request message. Once the function is enabled, the system will discard the DHCP request message that fails to pass the source MAC address check.

Configuration The following example enables the check of the source MAC address of the DHCP request message.

```

Examples
FS# configure terminal
FS(config)# ip dhcp snooping verify mac-address
FS(config)# end
FS# show ip dhcp snooping
Switch DHCP snooping status: ENABLE
Verification of hwaddr field status: ENABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP Snooping Support Bootp bind status: ENABLE
Interface      Trusted      Rate limit (pps)
    
```

Related Commands	Command	Description
	show ip dhcp snooping	Displays the DHCP Snooping configuration.

Platform N/A

Description

8.12 ip dhcp snooping vlan

Use this command to enable DHCP Snooping for the specific VLAN.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping vlan {vlan-rng | {vlan-min [vlan-max]}}

no ip dhcp snooping vlan {vlan-rng | {vlan-min [vlan-max]}}

Parameter Description	Parameter	Description
	<i>vlan-rng</i>	VLAN range of effective DHCP Snooping
	<i>vlan-min</i>	Minimum VLAN of effective DHCP Snooping
	<i>vlan-max</i>	Maximum VLAN of effective DHCP Snooping

Defaults By default, once the DHCP Snooping is enabled globally, it takes effect for all VLANs.

Command Global configuration mode

Mode

Usage Guide Use this command to configure effective DHCP Snooping VLAN by character string.

Configuration The following example enables the DHCP Snooping function in VLAN1000.

Examples

```
FS# configure terminal
FS(config)# ip dhcp snooping vlan 1000
FS(config)# end
```

Related Commands

Command	Description
ip dhcp snooping	Enables DHCP Snooping globally.

Platform N/A

Description

8.13 ip dhcp snooping vlan information option change-vlan-to vlan

Use this command to enable the option82 sub-option circuit and change the VLAN in the circuit-id into the specified VLAN.

Use the **no** form of this command to restore the default setting.

ip dhcp snooping vlan *vlan-id* information option change-vlan-to vlan *vlan-id*

no ip dhcp snooping vlan *vlan-id* information option change-vlan-to vlan *vlan-id*

Parameter Description

Parameter	Description
<i>vlan-id</i>	The ID of the VLAN to be replaced

Defaults This function is disabled by default.

Command Interface configuration mode

Mode

Usage Guide With this command configured, the option82 is added to the DHCP request packets, the circuit-id in the option82 information is the specified VLAN and the DHCP server will assign the addresses according to the option82 information.

Configuration Examples The following adds the option82 to the DHCP request packets and changes the VLAN4094 in the option82 sub-option circuit-id to VLAN93:

```
FS# configure terminal
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip dhcp snooping vlan 4094 information option change-vlan-to vlan 4093
```

```
FS(config-if)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.14 ip dhcp snooping vlan information option format-type circuit-id string

Use this command to configure the option82 sub-option circuit-id as user-defined (the storage format is ASCII) and to perform the packet forwarding. Use the **no** form of this command to restore the default setting.

```
ip dhcp snooping vlan vlan-id information option format-type circuit-id string ascii-string  

no ip dhcp snooping vlan vlan-id information option format-type circuit-id string ascii-string
```

Parameter Description	Parameter	Description
	<i>vlan-id</i>	
<i>ascii-string</i>		The user-defined content to fill to the Circuit ID

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide This command is used to add the option82 to the DHCP request packets. The content of the sub-option circuit-id is customized, and the DHCP server will assign the addresses according to the option82 information.

Configuration Examples The following example adds the option82 to the DHCP request packets with the content of the sub-option circuit-id being *port-name*.

```
FS# configure terminal
FS(config)# interface fastEthernet 0/1
FS(config-if)# ip dhcp snooping vlan 4094 information option format-type circuit-id string port-name
FS(config-if)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform This command is supported on all switches.
Description

8.15 ip dhcp snooping vlan max-user

Use this command to set the maximum number of users bound with the VLAN. Use the **no** form of this command to restore the default setting.

ip dhcp snooping vlan *vlan-word* **max-user** *user-number*

no ip dhcp snooping vlan *vlan-word* **max-user** *user-number*

Parameter Description	Parameter	Description
	<i>vlan-word</i>	The VLAN range.
	<i>user-number</i>	The maximum number of users bound with the VLAN.

Defaults The limit for the number of users bound with the VLAN is disabled by default.

Command Mode Interface configuration mode

Usage Guide Use this command to set the maximum number of users bound with the VLAN. This function combined with the corresponding topology can prevent illegal DHCP packet attacks.

Configuration Examples The following example sets the maximum number of users bound with VLAN 1-10 and VLAN 20 to 30 respectively.

```
FS# configure terminal
FS(config)# interface GigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# ip dhcp snooping vlan 1-10,20 max-user 30
FS(config-if-GigabitEthernet 0/1)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.16 renew ip dhcp snooping database

Use this command to import the information in current flash to the DHCP Snooping binding database manually as needed.

renew ip dhcp snooping database

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to import the backup file information to the DHCP Snooping database in real time.

Configuration The following example imports the backup file information to the DHCP Snooping database.

Examples

```
FS# renew ip dhcp snooping database
```

Related Commands

Command	Description
N/A	N/A

Platform This command is supported on all switches.
Description

8.17 show ip dhcp snooping

Use this command to display the DHCP Snooping configuration.

show ip dhcp snooping

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the DHCP Snooping configuration.

Examples

```
FS# show ip dhcp snooping
Switch DHCP snooping status :ENABLE
Verification of hwaddr field status :DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support Bootp bind status: ENABLE
Interface      Trusted  Rate limit (pps)
-----
-----
```

Related Commands

Command	Description
---------	-------------

ip dhcp snooping	Enables the DHCP Snooping globally.
ip dhcp snooping verify mac-address	Enables the check of source MAC address of DHCP Snooping packets.
ip dhcp snooping write-delay	Sets the interval of writing user information to the backup file periodically.
ip dhcp snooping information option	Adds option82 to the DHCP request message.
ip dhcp snooping bootp-bind	Enables the DHCP Snooping bootp bind function.
ip dhcp snooping trust	Sets the port as a trust port.

Platform N/A

Description

8.18 show ip dhcp snooping binding

Use this command to display the information of the DHCP Snooping binding database.

show ip dhcp snooping binding

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the information of the DHCP Snooping binding database.

```
FS# show ip dhcp snooping binding
Total number of bindings: 1
NO.    MACADDRESS      IPADDRESS      LEASE(SEC)  TYPE          VLAN  INTERFACE
-----
1      0000.0000.0001  1.1.1.1       78128       DHCP-Snooping 1   GigabitEthernet 0/1
```

Related Commands	Command	Description
	ip dhcp snooping binding	Adds the static user information to the DHCP Snooping database.
	clear ip dhcp snooping binding	Clears the dynamic user information from the DHCP Snooping binding database.

Platform N/A

Description

9 NFPP Commands

9.1 arp-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

arp-guard attack-threshold { **per-src-ip** | **per-src-mac** | **per-port** } *pps*

no arp-guard attack-threshold { **per-src-ip** | **per-src-mac** | **per-port** }

default arp-guard attack-threshold { **per-src-ip** | **per-src-mac** | **per-port** }

Parameter Description	Parameter	Description
	per-src-ip	Sets the attack threshold for each source IP address.
	per-src-mac	Sets the attack threshold for each source MAC address.
	per-port	Sets the attack threshold for each port.
	<i>pps</i>	Sets the attack threshold, in the range from 1 to 19999 in unit of pps.

Defaults By default, the attack threshold for each source IP address and source MAC address is 3000pps; and the attack threshold for each port is 8000pps.

Command Mode NFPP configuration mode.

Usage Guide The attack threshold shall be equal to or greater than the rate-limit threshold.

Configuration Examples The following example sets the global attack threshold.

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard attack-threshold per-src-ip 2
FS(config-nfpp)# arp-guard attack-threshold per-src-mac 3
FS(config-nfpp)# arp-guard attack-threshold per-port 50
```

Related Commands	Command	Description
	nfpp arp-guard policy	Displays the rate-limit threshold and attack threshold.
	show nfpp arp-guard summary	Displays the configuration.
	show nfpp arp-guard hosts	Displays the monitored host.
	clear nfpp arp-guard hosts	Clears the isolated host.

Platform Description N/A

9.2 arp-guard enable

Use this command to enable the anti-ARP guard function globally. Use the **no** or **default** form of this command to restore the default setting.

arp-guard enable

no arp-guard enable

default arp-guard enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults This function is enabled by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration Examples The following example enables the anti-ARP guard function globally.

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard enable
```

Related Commands	Command	Description
	nfpp arp-guard enable	Enables the anti-ARP attack on the interface.
	show nfpp arp-guard summary	Displays the configuration.

Platform N/A

Description

9.3 arp-guard isolate-period

Use this command to set the arp-guard isolate time globally. Use the **no** or **default** form of this command to restore the default setting.

arp-guard isolate-period { *seconds* | **permanent** }

no arp-guard isolate-period

default arp-guard isolate-period

Parameter	Parameter	Description
Description	<i>seconds</i>	Sets the isolate time. The value is 0, or in the range from 30 to 86400 in the unit of seconds.
	permanent	Permanent isolation.

Defaults The default isolate time is 0, which means no isolation.

Command NFPP configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the arp-guard isolate time globally to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard isolate-period 180
```

Related Commands	Command	Description
	nfpp arp-guard isolate-period	Sets the isolate time on the interface.
show nfpp arp-guard summary	Displays the configuration.	

Platform N/A

Description

9.4 arp-guard isolate-forwarding enable

Use this command to enable packet forwarding through NFPP isolation. Use the **no** form of this command to disable this function. Use the **default** form of this command to restore the default setting.

arp-guard isolate-forwarding enable

no arp-guard isolate-forwarding enable

default arp-guard isolate-forwarding enable

Parameter Description	Parameter	Description
		N/A

Defaults This function is enabled by default.

Command NFPP configuration mode

Mode

Usage Guide N/A

Configuration The following example enables packet forwarding through NFPP isolation.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard isolate-forwarding enable
```

Related Commands	Command	Description
------------------	---------	-------------

N/A	N/A
-----	-----

Platform N/A
Description

9.5 arp-guard monitored-host-limit

Use this command to set the maxmum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

arp-guard monitored-host-limit *number*

no arp-guard monitored-host-limit

default arp-guard monitored-host-limit

Parameter	Parameter	Description
Description	<i>number</i>	The maximum monitored host number, in the range from 1 to 4294967295.

Defaults The default is 20000.

Command Mode NFPP configuration mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.

When the maximum monitored host number has been exceeded, it prompts the message that %NFPP_ARP_GUARD-4-SESSION_LIMIT: Attempt to exceed limit of 20000 monitored hosts.to remind the administrator.

Configuration Examples The following example sets the maxmum monitored host number to 200.

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard monitored-host-limit 200
```

Related Commands	Command	Description
	show nfpp arp-guard summary	Displays the configuration.

Platform N/A
Description

9.6 arp-guard monitor-period

Use this command to configure the arp guard monitor time. Use the **no** or **default** form of this command to restore the default setting.

arp guard monitor-period *seconds*
no arp-guard monitor-period
default arp-guard monitor-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 in the unit of seconds.

Defaults The default is 600.

Command Mode NFPP configuration mode.

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.
 If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software.

Configuration Examples The following example sets the arp guard monitor time to 180 seconds.

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard monitor-period 180
```

Related Commands	Command	Description
	show nfpp arp-guard summary	Displays the configuration.
	show nfpp arp-guard hosts	Displays the monitored host list.
	clear nfpp arp-guard hosts	Clears the isolated host.

Platform N/A
Description

9.7 arp-guard rate-limit

Use this command to set the arp guard rate limit. Use the **no** or **default** form of this command to restore the default setting.

arp-guard rate-limit { **per-src-ip** | **per-src-mac** | **per-port** } *pps*
no arp-guard rate-limit { **per-src-ip** | **per-src-mac** | **per-port** }
default arp-guard rate-limit { **per-src-ip** | **per-src-mac** | **per-port** }

Parameter Description	Parameter	Description
	per-src-ip	Setsthe rate limit for each source IP address.

per-src-mac	Sets the rate limit for each source MAC address.
per-port	Sets the rate limit for each port.
<i>pps</i>	Sets the rate limit, in the range of 1 to 19999

Defaults The default rate limit for each source IP address and MAC address is 30pps; the default rate limit for each port is 5000pps.

Command NFPP configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the arp guard rate limit.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# arp-guard rate-limit per-src-ip 2
FS(config-nfpp)# arp-guard rate-limit per-src-mac 3
FS(config-nfpp)# arp-guard rate-limit per-port 50
```

**Related
Commands**

Command	Description
nfpp arp-guard policy	Sets the rate limit and the attack threshold.
show nfpp arp-guard summary	Displays the configuration.

Platform N/A

Description

9.8 arp-guard ratelimit-forwarding enable

Use this command to set the port based arp guard rate limit. Use the **no** form of this command to disable this function. Use the **default** form of this command to restore the default setting.

arp-guard ratelimit-forwarding enable

no arp-guard ratelimit-forwarding enable

default arp-guard ratelimit-forwarding enable

**Parameter
Description**

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command NFPP configuration mode

Mode

Usage Guide N/A

Configuration The following example sets the port based arp guard rate limit..

```

Examples
FS(config)# nfpp
FS(config-nfpp)# arp-guard ratelimit-forwarding enable
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.9 arp-guard scan-threshold

Use this command to set the global scan threshold. Use the **no** or **default** form of this command to restore the default setting.

```

arp-guard scan-threshold pkt-cnt
no arp-guard scan-threshold
default arp-guard scan-threshold
    
```

Parameter Description	Parameter	Description
	<i>pkt-cnt</i>	Sets the scan threshold, in the range from 1 to 19999.

Defaults The default scan threshold is 100.

Command Mode NFPP configuration mode

Usage Guide The scanning may occur on the condition that:
 more than 15 packets are received within 10 seconds;
 the source MAC address for the link layer is constant while the source IP address is uncertain;
 the source MAC and IP address for the link layer is constant while the destination IP address is uncertain.

Configuration The following example sets the global scan threshold to 20pps.

```

Examples
FS(config)# nfpp
FS(config-nfpp)# arp-guard scan-threshold 20
    
```

Related Commands	Command	Description
	nfpp arp-guard scan-threshold	Sets the scan threshold on the port.
show nfpp arp-guard summary	Displays the configuration.	
show nfpp arp-guard scan	Displays the ARP guard scan table.	
clear nfpp arp-guard scan	Clears the ARP guard scan table.	

Platform N/A

Description

9.10 clear nfpp arp-guard hosts

Use this command to clear the monitored host isolation.

clear nfpp arp-guard hosts [**vlan** *vid*] [**interface** *interface-id*] [*ip-address* | *mac-address*]

Parameter	Parameter	Description
Description	<i>vid</i>	Sets the VLAN ID.
	<i>interface-id</i>	Sets the interface name and number.
	<i>ip-address</i>	Sets the IP address.
	<i>mac-address</i>	Sets the MAC address.

Defaults N/A.

Command Privileged EXEC mode.

Mode

Usage Guide Use this command without the parameter to clear all monitored hosts.

Configuration The following example clears the monitored host isolation.

Examples

```
FS# clear nfpp arp-guard hosts vlan 1 interface g0/1
```

Related Commands	Command	Description
	arp-guard attack-threshold	Sets the global attack threshold.
	nfpp arp-guard policy	Sets the limit threshold and attack threshold.
	show nfpp arp-guard hosts	Displays the monitored host.

Platform N/A

Description

9.11 clear nfpp arp-guard scan

Use this command to clear ARP scanning table.

clear nfpp arp-guard scan

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example clears ARP scanning table.

Examples FS# clear nfpp arp-guard scan

Related Commands	Command	Description
	arp-guard attack-threshold	Sets the global attack threshold.
	nfpp arp-guard policy	Sets the attack threshold.
	show nfpp arp-guard scan	Displays the ARP scanning table.

Platform N/A

Description

9.12 clear nfpp define name hosts

Use this command to clear the monitored hosts. If the host is isolated, you need to disisolate it.

clear nfpp define name hosts [**vlan** *vid*] [**interface** *interface-id*] [*ip-address*] [*mac-address*] [*ipv6-address*]

Parameter Description	Parameter	Description
	<i>name</i>	Defines guard name
	<i>vid</i>	VLAN ID
	<i>interface-id</i>	Interface name
	<i>ip-address</i>	IP address
	<i>ipv6-address</i>	IPv6 address

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide Use this command without the parameter to clear all monitored hosts in the self-defined range.

Configuration The following example clears the monitored hosts.

Examples FS# clear nfpp define tcp hosts vlan 1 interface g 0/1

Related Commands	Command	Description
	show nfpp define hosts	Displays the isolated hosts.

Platform N/A

Description

9.13 clear nfpp dhcp-guard hosts

Use this command to clear the monitored host isolation.

clear nfpp dhcp-guard hosts [**vlan** *vid*] [**interface** *interface-id*] [*mac-address*]

Parameter Description

Parameter	Description
<i>vid</i>	Sets the VLAN ID.
<i>interface-id</i>	Sets the interface name and number.
<i>mac-address</i>	Sets the MAC address.

Defaults N/A.

Command Mode Privileged EXEC mode.

Mode

Usage Guide Use this command without the parameter to clear all monitored hosts.

Configuration Examples The following example clears the monitored host isolation.

Examples FS# clear nfpp dhcp-guard hosts vlan 1 interface g0/1

Related Commands

Command	Description
dhcp-guard attack-threshold	Sets the global attack threshold.
nfpp dhcp-guard policy	Sets the limit threshold and attack threshold.
show nfpp dhcp-guard hosts	Displays the monitored host.

Platform N/A

Description

9.14 clear nfpp dhcpv6-guard hosts

Use this command to clear the monitored host isolation.

clear nfpp dhcpv6-guard hosts [**vlan** *vid*] [**interface** *interface-id*] [*mac-address*]

Parameter Description

Parameter	Description
<i>vid</i>	Sets the VLAN ID.
<i>interface-id</i>	Sets the interface name and number.
<i>mac-address</i>	Sets the MAC address.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide Use this command without the parameter to clear all monitored hosts

Configuration The following example clears the monitored host isolation.

```
FS# clear nfpp dhcpv6-guard hosts vlan 1 interface g0/1
```

Related Commands

Command	Description
dhcpv6-guard attack-threshold	Sets the global attack threshold.
nfpp dhcpv6-guard policy	Sets the limit threshold and attack threshold.
show nfpp dhcpv6-guard hosts	Displays the monitored host.

Platform N/A

Description

9.15 clear nfpp icmp-guard hosts

Use this command to clear the monitored host isolation.

```
clear nfpp icmp-guard hosts [ vlan vid ] [ interface interface-id ] [ ip-address ]
```

Parameter Description

Parameter	Description
<i>vid</i>	Sets the VLAN ID.
<i>interface-id</i>	Sets the interface name and number.
<i>ip-address</i>	Sets the IP address.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide Use this command without the parameter to clear all monitored hosts.

Configuration The following example clears the monitored host isolation.

```
FS# clear nfpp icmp-guard hosts vlan 1 interface g0/1
```

Related Commands

Command	Description
icmp-guard attack-threshold	Sets the global attack threshold.
nfpp icmp-guard policy	Sets the limit threshold and attack threshold.

show nfpp icmp-guard hosts	Displays the monitored host.
-----------------------------------	------------------------------

Platform N/A

Description

9.16 clear nfpp ip-guard hosts

Use this command to clear the monitored host isolation.

clear nfpp ip-guard hosts [**vlan** *vid*] [**interface** *interface-id*] [*ip-address*]

Parameter Description	Parameter	Description
	<i>vid</i>	Sets the VLAN ID.
	<i>interface-id</i>	Sets the interface name and number.
	<i>ip-address</i>	Sets the IP address.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide Use this command without the parameter to clear all monitored hosts.

Configuration The following example clears the monitored host isolation.

Examples FS# clear nfpp ip-guard hosts vlan 1 interface g0/1

Related Commands	Command	Description
	ip-guard attack-threshold	Sets the global attack threshold.
	nfpp ip-guard policy	Sets the limit threshold and attack threshold.
	show nfpp ip-guard hosts	Displays the monitored host.

Platform N/A

Description

9.17 clear nfpp nd-guard hosts

Use this command to remove the speed limit on the host.

clear nfpp nd-guard hosts [**vlan** *vid*] [**interface** *interface-id*]

Parameter Description	Parameter	Description
	<i>vid</i>	Sets the VLAN ID.
	<i>interface-id</i>	Sets the interface name and number.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide This command without any parameter is used to remove speed limit on all monitored hosts.

Configuration The following example removes speed limit on interface g0/1 in VLAN 1..

Examples FS# clear nfpp nd-guard hosts vlan 1 interface g0/1

Prompt N/A

Messages

Platform N/A

Description

9.18 clear nfpp log

Use this command to clear the NFPP log buffer area.

clear nfpp log

Parameter	Parameter	Description
Description	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example clears the NFPP log buffer area.

Examples FS# clear nfpp log

Related Commands	Command	Description
	show nfpp log	Displays the NFPP log configuration or the log buffer area.

Platform N/A

Description

9.19 **cpu-protect sub-interface { manage | protocol | route } percent**

Use this command to configure the percent value of each type of packets occupied in the buffer area. Use the **no** or **default** form of this command to restore the default setting.

cpu-protect sub-interface { manage | protocol | route } percent *percent_value*

no cpu-protect sub-interface {manage|protocol|route} percent

default cpu-protect sub-interface {manage|protocol|route} percent

Parameter	Description
<i>percent_value</i>	The percent value, in the range from 1 to 100.

Defaults The default percent values of each type of packets occupied in the buffer area are:
 Manage packets: 30;
 Route packets: 20;
 Protocol packets: 45.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the percent value of management packets in the buffer area to 60.

```
FS(config)# cpu-protect sub-interface manage
percent 60
```

Related Commands	Command	Description
	cpu-protect sub-interface { manage protocol route } pps	Configures the traffic bandwidth of each type of packets.

Platform Description N/A

9.20 **cpu-protect sub-interface { manage | protocol | route } pps**

Use this command to configure the traffic bandwidth of each type of packets. Use the **no** or **default** form of this command to restore the default setting.

cpu-protect sub-interface { manage | protocol | route} pps *pps_value*

no cpu-protect sub-interface {manage|protocol|route} pps

default cpu-protect sub-interface {manage|protocol|route} pps

Parameter	Description
<i>pps_value</i>	The rate limit threshold, in the range from 1 to 8192

Defaults The default traffic bandwidths of each type of packets are:
 Manage packets: 3000pps;
 Route packets: 3000pps;
 Protocol packets: 3000pps.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration The following example sets the traffic bandwidth of management packets to 2000 pps.

Examples FS(config)# cpu-protect sub-interface manage pps 2000

Related Commands

Command	Description
cpu-protect sub-interface { manage protocol route } percent	Configures the percent value of each type of packets occupied in the buffer area.

Platform Description N/A

9.21 define

Use this command to define the anti-attack type.
 Use the **no** or **default** form of this command to restore the default setting.

define *name*
no define *name*
default define *name*

Parameter Description

Parameter	Description
<i>name</i>	Name of the user-defined anti-attack type.

Defaults N/A

Command Mode NFPP configuration mode

Usage Guide Use this command to define the anti-attack type.

Configuration The following example creates the user-defined anti-attack type.

Examples FS(config)# nfppFS(config-nfpp)# define tcp
 FS(config-nfpp-define)#

Related Commands	Command	Description
		<code>show nfpp define summary</code>

Platform N/A
Description

9.22 define enable

Use this command to enable the user-defined anti-attack globally. Use the **no** or **default** form of this command to restore the default setting.

- define** *name* **enable**
- no define** *name* **enable**
- default define** *name* **enable**

Parameter Description	Parameter	Description
		<i>name</i>

Defaults This function is disabled by default.

Command Mode NFPP configuration mode.

Usage Guide This command takes effect only after the match, rate-limit and attack-threshold have been configured.

Configuration Examples The following example enabled the user-defined anti-attack globally.

```
FS(config)# nfpp
FS(config-nfpp)#define tcp enable
```

Related Commands	Command	Description
		<code>show nfpp define summary</code>

Platform N/A
Description

9.23 dhcp-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

- dhcp-guard attack-threshold** { **per-src-mac** | **per-port** } *pps*
- no dhcp-guard attack-threshold** { **per-src-mac** | **per-port** }
- default dhcp-guard attack-threshold** { **per-src-mac** | **per-port** }

Parameter Description	Parameter	Description
	per-src-mac	Sets the attack threshold for each source MAC address.
	per-port	Sets the attack threshold for each port.
	<i>pps</i>	Sets the attack threshold, in pps. The valid range is 1 to 19999.

Defaults

The default settings are as follows:

For the 11.X CM supervisor module, the attack thresholds for each source MAC address and each port are 10 pps and 1500 pps respectively.

For the 11.X CMII supervisor module, the attack thresholds for each source MAC address and each port are 10 pps and 10000 pps respectively.

Command Mode

NFPP configuration mode

Usage Guide

N/A

Configuration Examples

The following example sets the global attack threshold.

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard attack-threshold per-src-mac 15
FS(config-nfpp)# dhcp-guard attack-threshold per-port 200
```

Related Commands	Command	Description
	nfpp dhcp-guard policy	Displays the rate-limit threshold and attack threshold.
	show nfpp dhcp-guard summary	Displays the configuration.
	show nfpp dhcp-guard hosts	Displays the monitored host list.
	clear nfpp dhcp-guard hosts	Clears the monitored host.

Platform

N/A

Description

9.24 dhcp-guard enable

Use this command to enable the DHCP anti-attack function. Use the **no** or **default** form of this command to restore the default setting.

dhcp-guard enable

no dhcp-guard enable

default dhcp-guard enable

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

N/A	N/A
-----	-----

Defaults This function is disabled by default.

Command NFPP configuration mode.

Mode

Usage Guide N/A

Configuration The following example enables the DHCP anti-attack function.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard enable
```

**Related
Commands**

Command	Description
N/A	N/A

Platform N/A

Description

9.25 dhcp-guard isolate-period

Use this command to set the isolate time globally. Use the **no** or **default** form of this command to restore the default setting.

dhcp-guard isolate-period { seconds | permanent }

no dhcp-guard isolate-period

default dhcp-guard isolate-period

**Parameter
Description**

Parameter	Description
<i>seconds</i>	Sets the isolate time. The value is 0 or in the range from 30 to 86400 in the unit of seconds.
permanent	Permanent isolation.

Defaults The default isolate time is 0, which means no isolation.

Command NFPP configuration mode

Mode

Usage Guide The isolate period can be configured globally or based on the interface. For one interface, if the isolate period is not set based on the interface, the global value shall be adopted; or the interface-based isolate period shall be adopted.

Configuration The following example sets the isolate time globally to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard isolate-period 180
```

Related Commands	Command	Description
	nfpp dhcp-guard isolate-period	Sets the isolate time on the interface.
show nfpp dhcp-guard summary	Displays the configuration.	

Platform N/A
Description

9.26 dhcp-guard monitored-host-limit

Use this command to set the maximum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

dhcp-guard monitored-host-limit *number*

no dhcp-guard monitored-host-limit

default dhcp-guard monitored-host-limit

Parameter Description	Parameter	Description
		<i>number</i>

Defaults The default is 20000.

Command Mode NFPP configuration mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.

When the maximum monitored host number has been exceeded, it prompts the message that %NFPP_ARP_GUARD-4-SESSION_LIMIT: Attempt to exceed limit of 20000 monitored hosts.to remind the administrator.

Configuration The following example sets the maximum monitored host number to 200.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard monitored-host-limit 200
```

Related Commands	Command	Description
	show nfpp dhcp-guard summary	Displays the configuration.

Platform N/A

Description

9.27 dhcp-guard monitor-period

Use this command to configure the monitor time. Use the **no** or **default** form of this command to restore the default setting.

dhcp-guard monitor-period *seconds*

no dhcp-guard monitor-period

default dhcp-guard monitor-period

Parameter Description

Parameter	Description
<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 in the unit of seconds.

Defaults The default is 600.

Command Mode NFPP configuration mode.

Mode

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.
If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software.

Configuration Examples The following example sets the monitor time to 180 seconds.

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard monitor-period 180
```

Related Commands

Command	Description
show nfpp dhcp-guard summary	Displays the configuration.
show nfpp dhcp-guard hosts	Displays the monitored host list.
clear nfpp dhcp-guard hosts	Clears the isolated host.

Platform N/A

Description

9.28 dhcp-guard rate-limit

Use this command to set the rate-limit threshold globally. Use the **no** or **default** form of this command to restore the default setting.

dhcp-guard rate-limit { *per-src-mac* | *per-port* } *pps*

no dhcp-guard rate-limit { per-src-mac | per-port }
default dhcp-guard rate-limit { per-src-mac | per-port }

**Parameter
Description**

Parameter	Description
per-src-mac	Sets the rate limit for each source MAC address.
per-port	Sets the rate limit for each port.
<i>pps</i>	Sets the rate limit, in the range of 1 to 19999

Defaults

The default settings are as follows:

For the 11.X CM supervisor module, the rate-limit thresholds for each source MAC address and each port are 5 pps and 1200 pps respectively.

For the 11.X CMII supervisor module, the rate-limit thresholds for each source MAC address and each port are 5 pps and 8000 pps respectively.

**Command
Mode**

NFPP configuration mode.

Usage Guide

N/A

**Configuration
Examples**

The following example sets the rate-limit threshold globally.

```
FS(config)# nfpp
FS(config-nfpp)# dhcp-guard rate-limit per-src-mac 8
FS(config-nfpp)# dhcp-guard rate-limit per-port 100
```

**Related
Commands**

Command	Description
nfpp dhcp-guard policy	Sets the rate limit and the attack threshold.
show nfpp dhcp-guard summary	Displays the configuration.

**Platform
Description**

N/A

9.29 dhcpv6-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

dhcpv6-guard attack-threshold { per-src-mac | per-port } pps
no dhcpv6-guard attack-threshold { per-src-mac | per-port }
default dhcpv6-guard attack-threshold { per-src-mac | per-port }

**Parameter
Description**

Parameter	Description
per-src-mac	Sets the attack threshold for each source MAC address.

per-port	Sets the attack threshold for each port.
<i>pps</i>	Sets the attack threshold, in the range is from 1 to 19999 pps.

Defaults The default settings are as follows:
 For the 11.X CM supervisor module, the attack thresholds for each source MAC address and each port are 10 pps and 1500 pps respectively.
 For the 11.X CMII supervisor module, the attack thresholds for each source MAC address and each port are 10 pps and 10000 pps respectively.

Command NFPP configuration mode.
Mode

Usage Guide N/A.

Configuration The following example sets the global attack threshold.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcpv6-guard attack-threshold per-src-mac 15
FS(config-nfpp)# dhcpv6-guard attack-threshold per-port 200
```

Related Commands

Command	Description
nfpp dhcpv6-guard policy	Displays the rate-limit threshold and attack threshold.
show nfpp dhcpv6-guard summary	Displays the configuration.
show nfpp dhcpv6-guard hosts	Displays the monitored host list.
clear nfpp dhcpv6-guard hosts	Clears the monitored host.

Platform N/A

Description

9.30 dhcpv6-guard enable

Use this command to enable the DHCPv6 anti-attack function. Use the **no** or **default** form of this command to restore the default setting.

- dhcpv6-guard enable**
- no dhcpv6-guard enable**
- default dhcpv6-guard enable**

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is disabled by default.

Command NFPP configuration mode.
Mode

Usage Guide N/A

Configuration The following example enables the DHCPv6 anti-attack function globally.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcpv6-guard enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.31 dhcpv6-guard monitored-host-limit

Use this command to set the maximum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

dhcpv6-guard monitored-host-limit *number*
no dhcpv6-guard monitored-host-limit
default dhcpv6-guard monitored-host-limit

Parameter Description	Parameter	Description
		<i>number</i>

Defaults The default is 20000

Command NFPP configuration mode
Mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.
 When the maximum monitored host number has been exceeded, it prompts the message that %NFPP_DHCPV6_GUARD-4-SESSION_LIMIT: Attempt to exceed limit of 20000 monitored hosts.to remind the administrator.

Configuration The following example sets the maximum monitored host number to 200.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcpv6-guard monitored-host-limit 200
```

Related Commands	Command	Description
	<code>show nfpp dhcpv6-guard summary</code>	Displays the cconfiguration.

Platform N/A

Description

9.32 dhcpv6-guard monitor-period

Use this command to configure the monitor time. Use the **no** or **default** form of this command to restore the default setting.

dhcpv6-guard monitor-period *seconds*

no dhcpv6-guard monitor-period

default dhcpv6-guard monitor-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 in the unit of seconds.

Defaults The default is 600.

Command NFPP configuration mode.

Mode

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.

If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software.

Configuration The following example sets the monitor time to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# dhcpv6-guard monitor-period 180
```

Related Commands	Command	Description
	<code>show nfpp dhcpv6-guard summary</code>	Displays the configuration.
<code>show nfpp dhcpv6-guard hosts</code>	Displays the monitored host list.	
<code>clear nfpp dhcpv6-guard hosts</code>	Clears the isolated host.	

Platform N/A

Description

9.33 dhcpv6-guard rate-limit

Use this command to set the rate-limit threshold globally. Use the **no** or **default** form of this command to restore the default setting.

```
dhcpv6-guard rate-limit { per-src-mac | per-port } pps
no dhcpv6-guard rate-limit { per-src-mac | per-port }
default dhcpv6-guard rate-limit { per-src-mac | per-port }
```

Parameter Description

Parameter	Description
per-src-mac	Sets the rate limit for each source MAC address.
per-port	Sets the rate limit for each port.
<i>pps</i>	Sets the rate limit, in the range from 1 to 19999.

Defaults

The default settings are as follows:

For the 11.X CM supervisor module, the rate-limit thresholds for each source MAC address and each port are 5 pps and 1200 pps respectively.

For the 11.X CMII supervisor module, the rate-limit thresholds for each source MAC address and each port are 5 pps and 8000 pps respectively.

Command Mode

NFPP configuration mode

Usage Guide

N/A

Configuration Examples

The following example sets the rate-limit threshold globally.

```
FS(config)# nfpp
FS(config-nfpp)# dhcpv6-guard rate-limit per-src-mac 8
FS(config-nfpp)# dhcpv6-guard rate-limit per-port 100
```

Related Commands

Command	Description
nfpp dhcpv6-guard policy	Sets the rate limit and the attack threshold.
show nfpp dhcpv6-guard summary	Displays the configuration.

Platform Description

N/A

9.34 global-policy

Use this command to set the rate-limit threshold and attack threshold based on the host or port. Use the **no** or **default** form of this command to restore the default setting.

```
global-policy { per-src-mac | per-src-ip | per-port } rate-limit-pps attack-threshold-pps
no global-policy { per-src-mac | per-src-ip | per-port }
default global-policy { per-src-mac | per-src-ip | per-port }
```

Parameter Description	Parameter	Description
	per-src-ip	Performs the rate statistics based on the source IP / VID and port.
	per-src-mac	Performs the rate statistics based on the source MAC / VID and port.
	per-port	Performs the rate statistics based on each physical port of receiving the packets.
	<i>rate-limit-pps</i>	Sets the rate-limit threshold.
	<i>attack-threshold-pps</i>	Sets the attack threshold.

Defaults N/A

Command NFPP define configuration mode.

Mode

Usage Guide To create a user-defined anti-attack type, the classification rule for the rate statistics must be specified, that is, recognize the host based on the source IP address/ source MAC address for the user-defined packets rate statistics based on the user / port and specify the rate-limit threshold and attack threshold for each classification. The rate-limit threshold shall be equal to or greater than the attack threshold. If the rate is greater than the rate-limit threshold, the packets that meet this classification rule will be discarded. If the rate exceeds the attack threshold, the user will be regarded as an attacker. The log will be printed and the trap will be sent.

Configuration The following example sets the rate-limit threshold and attack threshold based on the host or port.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# nfpp define tcp
FS(config-nfpp-define)# global-policy per-src-ip 10 20
FS(config-nfpp-define)# global-policy per-port 100 200
```

Related Commands	Command	Description
	nfpp define name policy	Sets the rate-limit threshold and attack threshold.
	show nfpp define summary	Displays the user-defined anti-attack configuration

Platform N/A

Description

9.35 icmp-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard attack-threshold { per-src-ip | per-port } pps

no icmp-guard attack-threshold { per-src-ip | per-port }

default icmp-guard attack-threshold { per-src-ip | per-port }

Parameter	Description
per-src-ip	Sets the attack threshold for each source IP address.
per-port	Sets the attack threshold for each port.
<i>pps</i>	Sets the attack threshold, in the range from 1 to 19999 in the unit of pps.

Defaults The default settings are as follows:
 For the 11.X CM supervisor module, the attack thresholds for each source IP address and each port are 2000 pps and 4000 pps respectively.
 For the 11.X CMII supervisor module, the attack thresholds for each IP MAC address and each port are 2500 pps and 4500 pps respectively.

Command Mode NFPP configuration mode.

Usage Guide N/A.

Configuration Examples The following example sets the global attack threshold.

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard attack-threshold per-src-ip 600
FS(config-nfpp)# icmp-guard attack-threshold per-port 1200
```

Command	Description
nfpp icmp-guard policy	Displays the rate-limit threshold and attack threshold.
show nfpp icmp-guard summary	Displays the configuration.
show nfpp icmp-guard hosts	Displays the monitored host list.
clear nfpp icmp-guard hosts	Clears the monitored host.

Platform Description N/A

9.36 icmp-guard enable

Use this command to enable the ICMP anti-attack function. Use the **no** or **default** form of this command to restore the default setting.

- icmp-guard enable**
- no icmp-guard enable**
- default icmp-guard enable**

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration The following example enables the ICMP anti-attack function globally.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard enable
```

Related Commands	Command	Description
	nffp icmp-guard enable	Enables the ICMP anti-attack function on the interface.
show nffp icmp-guard summary	Displays the configuration.	

Platform Description N/A

9.37 icmp-guard isolate-period

Use this command to set the isolate time globally. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard isolate-period { *seconds* | **permanent** }

no icmp-guard isolate-period

default icmp-guard isolate-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the isolate time. The value is in the range is 0 or from 30 to 86400 in the unit of seconds.
permanent	Permanent isolation.	

Defaults The default isolate time is 0, which means no isolation.

Command Mode NFPP configuration mode

Usage Guide The isolate period can be configured globally or based on the interface. For one interface, if the isolate period is not set based on the interface, the global value shall be adopted; or the interface-based isolate period shall be adopted.

Configuration The following example sets the isolate time globally to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard isolate-period 180
```

Related Commands	Command	Description
	nfpp icmp-guard isolate-period	Sets the isolate time on the interface.
	show nfpp icmp-guard summary	Displays the configuration.

Platform N/A

Description

9.38 icmp-guard monitored-host-limit

Use this command to set the maximum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard monitored-host-limit *number*

no icmp-guard monitored-host-limit

default icmp-guard monitored-host-limit

Parameter Description	Parameter	Description
	<i>number</i>	The maximum monitored host number, in the range from 1 to 4294967295.

Defaults The default is 20000.

Command NFPP configuration mode

Mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.

When the maximum monitored host number has been exceeded, it prompts the message that %NFPP_ARP_GUARD-4-SESSION_LIMIT: Attempt to exceed limit of 20000 monitored hosts to remind the administrator.

Configuration The following example sets the maximum monitored host number to 200.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard monitored-host-limit 200
```

Related Commands	Command	Description
	show nfpp icmp-guard summary	Displays the configuration.

Platform N/A

Description

9.39 icmp-guard monitor-period

Use this command to configure the monitor time. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard monitor-period *seconds*

no icmp-guard monitor-period

default icmp-guard monitor-period

Parameter	Description
<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 seconds.

Defaults The default is 600.

Command NFPP configuration mode.

Mode

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.

If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software.

Configuration The following example sets the monitor time to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard monitor-period 180
```

Command	Description
show nfpp icmp-guard summary	Displays the configuration.
show nfpp icmp-guard hosts	Displays the monitored host list.
clear nfpp icmp-guard hosts	Clears the isolated host.

Platform N/A

Description

9.40 icmp-guard rate-limit

Use this command to set the rate-limit threshold globally. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard rate-limit { per-src-ip | per-port } pps
no icmp-guard rate-limit { per-src-ip | per-port }
default icmp-guard rate-limit { per-src-ip | per-port }

Parameter Description

Parameter	Description
per-src-ip	Sets the rate limit for each source IP address.
per-port	Sets the rate limit for each port.
<i>pps</i>	Sets the rate limit, in the range from 1 to 19999.

Defaults

The default settings are as follows:
 For the 11.X CM supervisor module, the rate-limit thresholds for each source IP address and each port are 2000 pps and 4000 pps respectively.
 For the 11.X CMII supervisor module, the rate-limit thresholds for each IP MAC address and each port are 2500 pps and 4500 pps respectively.

Command Mode

NFPP configuration mode.

Usage Guide

N/A

Configuration Examples

The following example sets the rate-limit threshold globally.

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard rate-limit per-src-ip 500
FS(config-nfpp)# icmp-guard rate-limit per-port 800
```

Related Commands

Command	Description
nfpp icmp-guard policy	Sets the rate limit and the attack threshold.
show nfpp icmp-guard summary	Displays the configuration.

Platform

N/A

Description

9.41 icmp-guard trusted-host

Use this command to set the trusted hosts free form monitoring. Use the **no** or **default** form of this command to restore the default setting.

icmp-guard trusted-host ip mask
no icmp-guard trusted-host { all | ip mask }
default icmp-guard trusted-host

Parameter Description

Parameter	Description
-----------	-------------

<i>ip</i>	Sets the IP address.
<i>mask</i>	Sets the IP mask.
all	Deletes the configuration of all trusted hosts.

Defaults No trusted host is configured by default.

Command NFPP configuration mode.

Mode

Usage Guide The administrator can use this command to set the trusted host free from monitoring. The ICMP packets are allowed to send to the trusted host CPU without any rate-limit and warning configuration. Configure the mask to set all hosts in one network segment free from monitoring.
UP to 500 trusted hosts are supported.

Configuration The following example sets the trusted hosts free form monitoring.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# icmp-guard trusted-host 1.1.1.0 255.255.255.0
```

Related Commands

Command	Description
show nfpp icmp-guard trusted-host	Displays the configuration.

Platform N/A

Description

9.42 ip-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

```
ip-guard attack-threshold { per-src-ip | per-port } pps
no ip-guard attack-threshold { per-src-ip | per-port }
default ip-guard attack-threshold { per-src-ip | per-port }
```

Parameter Description

Parameter	Description
per-src-ip	Sets the attack threshold for each source IP address.
per-port	Sets the attack threshold for each port.
<i>pps</i>	Sets the attack threshold, in pps. The valid range is 1 to 19999.

Defaults By default, the attack threshold for each source IP address and each port are 200pps and 400pps respectively.

Command NFPP configuration mode.

Mode

Usage Guide The attack threshold shall be equal to or larger than the rate-limit threshold.

Configuration The following example sets the global attack threshold.

```

Examples
FS(config)# nfpp
FS(config-nfpp)# ip-guard attack-threshold per-src-ip 2
FS(config-nfpp)# ip-guard attack-threshold per-port 50
    
```

Related Commands	Command	Description
	nfpp ip-guard policy	Displays the rate-limit threshold and attack threshold.
	show nfpp ip-guard summary	Displays the configuration.
	show nfpp ip-guard hosts	Displays the monitored host list.
	clear nfpp ip-guard hosts	Clears the monitored host.

Platform N/A

Description

9.43 ip-guard enable

Use this command to enable the IP anti-scanfunction. Use the **no** or **default** form of this command to restore the default setting.

- ip-guard enable**
- no ip-guard enable**
- default ip-guard enable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration The following example enables the IP anti-scan function globally.

```

Examples
FS(config)# nfpp
FS(config-nfpp)# ip-guard enable
    
```

Related Commands	Command	Description
	nfpp ip-guard enable	Enables the IP anti-scan function on the interface.

Platform N/A

Description

9.44 ip-guard isolate-period

Use this command to set the isolate time globally. Use the **no** or **default** form of this command to restore the default setting.

ip-guard isolate-period { *seconds* | **permanent** }

no ip-guard isolate-period

default ip-guard isolate-period

**Parameter
Description**

Parameter	Description
<i>seconds</i>	Sets the isolate time. The value is 0 or in the range from 30 to 86400 in the unit of seconds.
permanent	Permanent isolation.

Defaults The default isolate time is 0, which means no isolation.

Command NFPP configuration mode.

Mode

Usage Guide N/A.

Configuration The following example sets the isolate time globally to 180 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard isolate-period 180
```

**Related
Commands**

Command	Description
nfpp ip-guard isolate-period	Sets the isolate time on the interface.
show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.45 ip-guard monitor-period

Use this command to configure the monitor time. Use the **no** or **default** form of this command to restore the default setting.

ip-guard monitor-period *seconds*

no ip-guard monitor-period

default ip-guard monitor-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 in the unit of seconds.

Defaults The default is 600.

Command Mode NFPP configuration mode.

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.
If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software

Configuration Examples The following example sets the monitor time to 180 seconds.

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard monitor-period 180
```

Related Commands	Command	Description
	show nfpp ip-guard summary	Displays the configuration.
	show nfpp ip-guard hosts	Displays the monitored host list.
	clear nfpp ip-guard hosts	Clears the isolated host.

Platform Description N/A

9.46 ip-guard monitored-host-limit

Use this command to set the maximum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

- ip-guard monitored-host-limit** *number*
- no ip-guard monitored-host-limit**
- default ip-guard monitored-host-limit**

Parameter Description	Parameter	Description
	<i>number</i>	The maximum monitored host number, in the range from 1 to 4294967295.

Defaults The default is 20000.

Command NFPP configuration mode

Mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.

When the maximum monitored host number has been exceeded, it prompts the message that %NFPP_ARP_GUARD-4-SESSION_LIMIT: Attempt to exceed limit of 20000 monitored hosts.to remind the administrator.

Configuration The following example sets the maximum monitored host number to 200.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard monitored-host-limit 200
```

Related Commands

Command	Description
show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description**9.47 ip-guard rate-limit**

Use this command to set the rate-limit threshold globally. Use the **no** or **default** form of this command to restore the default setting.

ip-guard rate-limit { per-src-ip | per-port } pps

no ip-guard rate-limit { per-src-ip | per-port }

default ip-guard rate-limit { per-src-ip | per-port }

Parameter Description

Parameter	Description
per-src-ip	● Sets the rate limit for each source IP address.
per-port	● Sets the rate limit for each port.
<i>pps</i>	● Sets the rate limit, in the range of 1 to 19999

Defaults By default, the the rate-limit threshold for each source IP address and each port is 20pps and 100pps respectively.

Command NFPP configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the rate-limit threshold globally.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard rate-limit per-src-ip 2
FS(config-nfpp)# ip-guard rate-limit per-port 50
```

Related Commands	Command	Description
	nfpp ip-guard policy	Sets the rate limit and the attack threshold.
	show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.48 ip-guard scan-threshold

Use this command to set the global scan threshold. Use the **no** or **default** form of this command to restore the default setting.

ip-guard scan-threshold *pkt-cnt*

no ip-guard scan-threshold

default ip-guard scan-threshold

Parameter Description	Parameter	Description
	<i>pkt-cnt</i>	Sets the scan threshold, in the range from 1 to 19999.

Defaults The default scan threshold is 100, in 10 seconds.

Command Mode NFPP configuration mode.

Mode

Usage Guide N/A

Configuration Examples The following example sets the global scan threshold to 20pps.

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard scan-threshold 20
```

Related Commands	Command	Description
	nfpp ip-guard scan-threshold	Sets the scan threshold on the port.
	show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.49 ip-guard trusted-host

Use this command to set the trusted hosts free form monitoring. Use the **no** or **default** form of this command to restore the default setting.

- ip-guard trusted-host** *ip mask*
- no ip-guard trusted-host** { **all** | *ip mask* }
- default ip-guard trusted-host**

Parameter Description	Parameter	Description
	<i>ip</i>	Sets the IP address.
	<i>mask</i>	Sets the IP mask.
	all	Deletes the configuration of all trusted hosts.

Defaults N/A.

Command Mode NFPP configuration mode.

Usage Guide The administrator can use this command to set the trusted host free from monitoring. The ICMP packets are allowed to sent to the trusted host CPU without any rate-limit and warning configuration. Configure the mask to set all hosts in one network segment free from monitoring. UP to 500 trusted hosts are supported.

Configuration Examples The following example sets the trusted hosts free form monitoring.

```
FS(config)# nfpp
FS(config-nfpp)# ip-guard trusted-host 1.1.1.0 255.255.255.0
```

Related Commands	Command	Description
	show nfpp ip-guard trusted-host	Displays the configuration.

Platform Description N/A

9.50 log-buffer enable

Use this command to display logs on the screen. Use the **no** form of this command to store logs in the cache, instead of being displayed on the screen, Use the **no** or the **default** form of this command to restore the default setting.

- log-buffer enable**
- no log-buffer enable**
- default log-buffer enable**

Parameter	Parameter	Description
-----------	-----------	-------------

Description		
	N/A	N/A

Defaults Logs are stored in the cache by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration Examples The following example displays logs on the screen.

```
FS(config)# nfpp
FS(config-nfpp)# log-buffer enable
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

9.51 log-buffer entries

Use this command to set the NFPP log buffer area size. Use the **no** or **default** form of this command to restore the default setting.

log-buffer entries *number*

no log-buffer entries

default log-buffer entries

Parameter Description	Parameter	Description
	<i>number</i>	The buffer area size, in the range from 0 to 1024.

Defaults The default is 256.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the NFPP log buffer area size.

```
FS(config)# nfpp
FS(config-nfpp)# log-buffer entries 50
```

Related Commands	Command	Description
	log-buffer logs <i>number_of_message</i> interval <i>length_in_seconds</i>	Displays the rate of the syslog generated from the NFPP buffer area.
	show nfpp log	Displays the NFPP log configuration or the log buffer area.

Platform N/A
Description

9.52 log-buffer logs

Use this command to set the rate of syslog generated from the NFPP log buffer area. Use the **no** or **default** form of this command to restore the default setting.

log-buffer logs *number_of_message* **interval** *length_in_seconds*

no log-buffer logs

default log-buffer logs

Parameter Description	Parameter	Description
	<i>number_of_message</i>	The valid range is from 0 to 1024. 0 indicates that all logs are recorded in the specific buffer area and no syslogs are generated.
	<i>length_in_seconds</i>	The valid range is from 0 to 86400(one day). 0 indicates not to write the log to the buffer area but generate the syslog immediately. With both the <i>number_of_message</i> and <i>length_in_seconds</i> values are 0, it indicates not to write the log to the buffer area but generate the syslog immediately. The parameter <i>number_of_message /length_in_second</i> indicates the rate of syslog generated from the NFPP log buffer area.

Defaults By default, *number_of_message* is 0 and *length_in_seconds* is 0.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the rate of syslog generated from the NFPP log buffer area.

```
FS(config)# nfpp
FS(config-nfpp)# log-buffer logs 2 interval 12
```

Related	Command	Description
---------	---------	-------------

Commands	
log-buffer entries <i>number</i>	Sets the NFPP log buffer area size.
show nfpp log summary	Displays the NFPP log configuration or the log buffer area.

Platform N/A

Description

9.53 logging

Use this command to set the VLAN or the interface log for NFPP. Use the **no** or **default** form of this command to restore the default setting.

logging vlan *vlan-range*

logging interface *interface-id*

no logging vlan *vlan-range*

no logging interface *interface-id*

default logging

Parameter	Parameter	Description
Description	<i>vlan-range</i>	Sets the specified VLAN range, in the format such as "1-3, 5".
	<i>interface-id</i>	Sets the interface ID.

Defaults All logs are recorded by default.

Command NFPP configuration mode.

Mode

Usage Guide Use this command to filter the logs and records the logs within the specified VLAN range or the specified port

Configuration The following example records the logs in VLAN 1,VLAN 2,VLAN 3 and VLAN 5 only.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# logging vlan 1-3,5
```

The following example records the logs on the interface GigabitEthernet 0/1 only.

```
FS(config)# nfpp
FS(config-nfpp)# logging interface G 0/1
```

Related Commands	Command	Description
	show nfpp log summary	Displays the NFPP log configuration or the log buffer area.

Platform N/A

Description

9.54 match

Use this command to specify the message matching filed for the user-defined anti-attack.

```
match [ etype type ] [ src-mac smac [ src-mac-mask smac_mask ] ] [ dst-mac dmac [ dst-mac-mask dst_mask ] ]
[ protocol protocol ] [ src-ip sip [ src-ip-mask sip-mask ] ] [ src-ipv6 sipv6 [ src-ipv6-masklen sipv6-masklen ] ]
[ dst-ip dip [ dst-ip-mask dip-mask ] ] [ dst-ipv6 dipv6 [ dst-ipv6-masklen dipv6-masklen ] ] [ src-port sport ]
[ dst-port dport ]
```

Parameter	Description
<i>type</i>	Ethernet link layer packet type
<i>smac</i>	Source MAC address
<i>smac_mask</i>	Source MAC address mask
<i>dmac</i>	Destination MAC address
<i>dmac_mask</i>	Destination MAC address mask
<i>protocol</i>	IPv4/v6 message protocol
<i>sip</i>	Source IPv4 address
<i>sip_mask</i>	Source IPv4 address mask
<i>sipv6</i>	Source IPv6 address
<i>sipv6_masklen</i>	Source IPv6 address mask
<i>dip</i>	Destination IPv4 address
<i>dip_mask</i>	Destination IPv4 address mask
<i>dipv6</i>	Destination IPv6 address
<i>dipv6_masklen</i>	Length of the destination IPv6 address mask.
<i>sport</i>	Source port
<i>dport</i>	Destination port

Defaults N/A

Command NFPP configuration mode.

Mode

Usage Guide Use this command to create a new user-defined anti-attack type and specify the message fields to be matched.

Configuration The following example specifies the message matching filed for the user-defined anti-attack.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# nfpp define tcp
FS(config-nfpp-define)#match etype 0x0800 protocol 0x06
```

**Related
Commands**

Command	Description
show nfpp define summary	Displays the user-defined anti-attack configuration

Platform N/A

Description

9.55 monitored-host-limit

Use this command to set the maximum monitored host number. Use the **no** or **default** form of this command to restore the default setting.

monitored-host-limit *number*

no monitored-host-limit

default monitored-host-limit

Parameter Description	Parameter	Description
	<i>number</i>	The maximum monitored host number, in the range from 1 to 4294967295.

Defaults The default is 20000.

Command NFPP define configuration mode

Mode

Usage Guide If the monitored host number has reached the default 20000, the administrator shall set the max-number smaller than 20000 and it will prompt the message that %ERROR: The value that you configured is smaller than current monitored hosts 20000, please clear a part of monitored hosts. to remind the administrator of the invalid configuration and removing the monitored hosts.

When the maximum monitored host number has been exceeded, it prompts the message that % % NFPP_DEFINE-4-SESSION_LIMIT: Attempt to exceed limit of name's 20000 monitored hosts. to remind the administrator

Configuration The following example sets the maximum monitored host number.

```

Examples
FS(config)# nfpp
FS(config-nfpp)# nfpp define tcp
FS(config-nfpp-define)#monitored-host-limit 500
    
```

Related Commands	Command	Description
	show nfpp define summary	Displays the user-defined anti-attack configuration

Platform N/A

Description

9.56 monitor period

Use this command to set the monitoring time. Use the **no** or **default** form of this command to restore the default setting.

monitor-period *seconds*

no monitor-period

default monitor-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the monitor time, in the range from 180 to 86400 in the unit of seconds.

Defaults The default is 600.

Command NFPP define configuration mode.

Mode

Usage Guide When the attacker is detected, if the isolate period is 0, the attacker will be monitored by the software and the timeout time will be the monitor period. During the software monitoring, if the isolate period is not 0, the software-monitored attacker will be auto-isolated by the hardware and the timeout time will be the isolate period. The monitor period is valid with the isolate period 0.

If the isolate period has changed to be 0, the attackers on the interface will be removed rather than being monitored by the software.

Configuration The following example sets the monitoring time to 1000 seconds.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# define tcp
FS(config-nfpp-define)#monitor-period 1000
```

Related Commands	Command	Description
	show nfpp define summary	Displays the user-defined anti-attack configuration.

Platform N/A

Description

9.57 nd-guard attack-threshold

Use this command to set the global attack threshold. When the packet rate exceeds the attack threshold, the attack occurs. Use the **no** or **default** form of this command to restore the default setting.

nd-guard attack-threshold per-port { ns-na | rs | ra-redirect } pps

no nd-guard attack-threshold per-port { ns-na | rs | ra-redirect }

default nd-guard attack-threshold per-port { ns-na | rs | ra-redirect }

Parameter Description	Parameter	Description
	ns-na	Sets the neighbor request and neighbor advertisement.
	rs	Sets the router request.
	ra-redirect	Sets the router advertisement and the redirect packets.
	<i>pps</i>	Sets the attack threshold, in the range from 1 to 19999 in the unit of seconds.

Defaults By default, the default attack threshold for the ns-na, rs and ra-redirect on each port is 5000, 1000 and 1000 respectively.

Command Mode NFPP configuration mode.

Usage Guide The attack threshold shall be equal to or larger than the rate-limit threshold.

Configuration The following example sets the global attack threshold.

```

Examples
FS(config)# nfpp
FS(config-nfpp)# nd-guard attack-threshold per-port ns-na 20
FS(config-nfpp)# nd-guard attack-threshold per-port rs 10
FS(config-nfpp)# nd-guard attack-threshold per-port ra-redirect 10
    
```

Related Commands

Command	Description
nfpp ip-guard policy	Displays the rate-limit threshold and attack threshold.
show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.58 nd-guard enable

Use this command to enable the ND anti-attack function. Use the **no** or **default** form of this command to restore the default setting.

- nd-guard enable**
- no nd-guard enable**
- default nd-guard enable**

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration The following example enables the ND anti-attack function.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# nd-guard enable
```

Related Commands	Command	Description
	nfpp nd-guard enable	Enables the ND anti-attack function on the interface.
	show nfpp nd-guard summary	Displays the configuration.

Platform N/A
Description

9.59 nd-guard rate-limit

Use this command to set the rate-limit threshold globally. Use the **no** or **default** form of this command to restore the default setting.

nd-guard rate-limit per-port { ns-na | rs | ra-redirect } pps

no nd-guard rate-limit per-port { ns-na | rs | ra-redirect }

default nd-guard rate-limit per-port { ns-na | rs | ra-redirect }

Parameter Description	Parameter	Description
	ns-na	Sets the neighbor request and neighbor advertisement.
	rs	Sets the router request.
	ra-redirect	Sets the router advertisement and the redirect packets.
	<i>pps</i>	Sets the attack threshold, in the range is from 1 to 19999 in the unit of pps.

Defaults By default, the default rate-limit thresholds for the ns-na, rs and ra-redirect on each port are 2000, 500 and 500 respectively.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the rate-limit threshold globally.

```
FS(config)# nfpp
FS(config-nfpp)# nd-guard rate-limit per-port ns-na 10
FS(config-nfpp)# nd-guard rate-limit per-port rs 5
FS(config-nfpp)# nd-guard rate-limit per-port ra-redirect 5
```

Related Commands	Command	Description
	nfpp nd-guard policy	Sets the rate limit and the attack threshold.
	show nfpp nd-guard summary	Displays the configuration.

Platform N/A

Description

9.60 nd-guard ratelimit-forwarding enable

Use this command to enable the ND-guard ratelimit-forwarding on the interface.

nd-guard ratelimit-forwarding enable

Use this command to disable the ND-guard ratelimit-forwarding on the interface.

no nd-guard ratelimit-forwarding enable

Use this command to restore the default setting.

default nd-guard ratelimit-forwarding enable

Parameter
Description

Parameter	Description
N/A	N/A

Defaults The function is enabled by default.

Command Mode NFPP configuration mode.

Usage Guide N/A

Configuration The following example enables the ND-guard ratelimit-forwarding on the interface.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# nd-guard ratelimit-forwarding enable
```

Platform N/A

Description

9.61 nfpp

Use this command to enter NFPP configuration mode.

nfpp

Parameter
Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide Use this command to enter NFPP configuration mode and make further configuration.

Configuration

```
FS(config)# nfpp
```

Examples

Platform N/A

Description

9.62 nfpp arp-guard enable

Use this command to enable the anti-ARP attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp arp-guard enable

no nfpp arp-guard enable

default nfpp arp-guard enable

Parameter

Description

Parameter	Description
N/A	N/A

Defaults

The anti-ARP attack function is not enabled on the interface.

Command

Interface configuration mode.

Mode

Usage Guide

The interface anti-ARP attack configuration is prior to the global configuration.

Configuration

The following example enables the anti-ARP attack function on the interface.

Examples

```
FS(config)# interface G0/1
```

```
FS(config-if)# nfpp arp-guard enable
```

Related

Commands

Command	Description
arp-guard enable	Enables the anti-ARP attack function.
show nfpp arp-guard summary	Displays the configuration.

Platform

N/A

Description

9.63 nfpp arp-guard isolate-period

Use this command to set the isolate period in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

nfpp arp-guard isolate-period { seconds | permanent }
no nfpp arp-guard isolate-period
default nfpp arp-guard isolate-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the isolate period. The value is 0, or in the range from 30 to 86400 in the unit of seconds.
	permanent	Permanent isolation.

Defaults By default, the isolate period is not configured.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example sets the isolate period in the interface configuration mode.

```
FS(config)# interface G0/1
FS(config-if)# nfpp arp-guard isolate-period 180
```

Related Commands	Command	Description
	arp-guard isolate-period	Sets the global isolate period.
	show nfpp arp-guard summary	Displays the configuration.

Platform Description N/A

9.64 nfpp arp-guard policy

Use this command to set the rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

nfpp arp-guard policy { per-src-ip | per-src-mac | per-port } *rate-limit-pps attack-threshold-pps*
no nfpp arp-guard policy { per-src-ip | per-src-mac | per-port }
default nfpp arp-guard policy { per-src-ip | per-src-mac | per-port }

Parameter Description	Parameter	Description
	per-src-ip	Sets the rate-limit threshold and the attack threshold for each source IP address.
	per-src-mac	Sets the rate-limit threshold and the attack threshold for each source MAC address.
	per-port	Sets the rate-limit threshold and the attack threshold for each port.

<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.
<i>attack-threshold-pps</i>	Sets the attack threshold, in the range from 1 to 19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold.

Examples

```
FS(config)# interface G 0/1
FS(config-if)# nfpp arp-guard policy per-src-ip 2 10
FS(config-if)# nfpp arp-guard policy per-src-mac 3 10
FS(config-if)# nfpp arp-guard policy per-port 50 100
```

Related Commands

Command	Description
arp-guard attack-threshold	Sets the global attack threshold.
arp-guard rate-limit	Sets the global rate-limit threshold.
show nfpp arp-guard summary	Displays the configuration.
show nfpp arp-guard hosts	Displays the monitored host.
clear nfpp arp-guard hosts	Clears the isolated host.

Platform N/A

Description

9.65 nfpp arp-guard scan-threshold

Use this command to set the scan threshold. Use the **no** or **default** form of this command to restore the default setting.

- nfpp arp-guard scan-threshold** *pkt-cnt*
- no nfpp arp-guard scan-threshold**
- default nfpp arp-guard scan-threshold**

Parameter Description

Parameter	Description
<i>pkt-cnt</i>	Sets the scan threshold, in the range from 1 to 19999.

Defaults By default, the sport-based scan threshold is not configured.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the scan threshold to 20pps.

Examples

```
FS(config)# interface G 0/1
FS(config-if)# nfpp arp-guard scan-threshold 20
```

**Related
Commands**

Command	Description
arp-guard attack-threshold	Sets the global attack threshold.
show nfpp arp-guard summary	Displays the configuration.
show nfpp arp-guard scan	Displays the ARP scan table.
clear nfpp arp-guard scan	Clears the ARP scan table.

Platform N/A

Description

9.66 nfpp define enable

Use this command to enable the user-defined anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp define *name* **enable**

no nfpp define *name* **enable**

default nfpp define *name* **enable**

**Parameter
Description**

Parameter	Description
<i>name</i>	Name of the user-defined anti-attack type

Defaults N/A

**Command
Mode** Interface configuration mode.

Usage Guide This command takes effect only after the name of the user-defined anti-attack and the match, rate-count, rate-limit and the attack-threshold have been configured.

Configuration The following example enables the user-defined anti-attack function on the interface.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp define tcp enable
```

**Related
Commands**

Command	Description
show nfpp define summary	Displays the user-defined anti-attack configuration

Platform N/A

Description

9.67 nfpp define policy

Use this command to set the local rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

nfpp define *name* **policy** { **per-src-ip** | **per-src-mac** | **per-port** } *rate-limit-pps* *attack-threshold-pps*

no nfpp define *name* **policy** { **per-src-ip** | **per-src-mac** | **per-port** }

default nfpp define *name* **policy** { **per-src-ip** | **per-src-mac** | **per-port** }

Parameter Description	Parameter	Description
	per-src-ip	Sets the attack threshold for each source IP address.
	per-src-mac	Sets the attack threshold for each source MAC address.
	per-port	Sets the attack threshold for each port.
	<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.
	<i>attack-threshold-pps</i>	Sets the attack threshold, in the range of from 1 to 19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the local rate-limit threshold and the attack threshold.

```

Examples
FS(config)# interface G 0/1
FS(config-if)# nfpp define tcp policy per-src-ip 2 10
FS(config-if)# nfpp define tcp policy per-port 50 100

```

Related Commands	Command	Description
	define-policy	Sets the global rate-limit threshold and attack threshold.
	show nfpp define summary	Displays the user-defined anti-attack configuration.

Platform N/A

Description

9.68 nfpp dhcp-guard enable

Use this command to enable the DHCP anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp dhcp-guard enable

no nfpp dhcp-guard enable
default nfpp dhcp-guard enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The DHCP anti-attack function is not enabled on the interface.

Command Mode Interface configuration mode.

Usage Guide The interface DHCP anti- attack configuration is prior to the global configuratio

Configuration Examples The following example enables the DHCP anti-attack function on the interface.

```
FS(config)# interface G0/1
FS(config-if)# nfpp dhcp-guard enable
```

Related Commands	Command	Description
	dhcp-guard enable	Enables the anti-ARP attack function.
	show nfpp dhcp-guard summary	Displays the configuration.

Platform Description N/A

9.69 nfpp dhcp-guard isolate-period

Use this command to set the isolate period in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

nfpp dhcp-guard isolate-period { seconds | permanent }
no nfpp dhcp-guard isolate-period
default nfpp dhcp-guard isolate-period

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the isolate period. The value is 0 or in the range from 30 to 86400 in the unit of seconds.
	permanent	Permanent isolation.

Defaults By default, the isolate period is not configured

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example sets the isolate period to 180 seconds.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp dhcp-guard isolate-period 180
```

Related Commands

Command	Description
dhcp-guard isolate-period	Sets the global isolate period.
show nfpp dhcp-guard summary	Displays the configuration.

Platform N/A

Description

9.70 nfpp dhcp-guard policy

Use this command to set the rate-limit threshold and the attack threshold on the port. Use the **no** or **default** form of this command to restore the default setting.

nfpp dhcp-guard policy { per-src-mac | per-port } rate-limit-pps attack-threshold-pps

no nfpp dhcp-guard policy { per-src-mac | per-port }

default nfpp dhcp-guard policy { per-src-mac | per-port }

Parameter Description

Parameter	Description
per-src-mac	Sets the rate-limit threshold and the attack threshold for the designated source MAC address.
per-port	Sets the rate-limit threshold and the attack threshold for the designated port.
<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.
<i>attack-threshold-pps</i>	Sets the attack threshold, in the range from 1 to 19999.

Defaults The rate-limit threshold and the attack threshold are not configured by default. So the device adopts the rate-limit threshold and the attack threshold that are set in the global configuration mode.

Command Mode Interface configuration mode.

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold on interface G0/1.

Examples

```
FS(config)#interface G 0/1
FS(config-if)# nfpp dhcpv6-guard policy per-src-mac 3 10
FS(config-if)# nfpp dhcpv6-guard policy per-port 50 100
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

9.71 nfpp dhcpv6-guard enable

Use this command to enable the DHCPv6 anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

- nfpp dhcpv6-guard enable**
- no nfpp dhcpv6-guard enable**
- default nfpp dhcpv6-guard enable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The DHCPv6 anti-attack function is not enabled on the interface.

Command Mode Interface configuration mode.

Usage Guide The interface DHCPv6 anti-attack configuration is prior to the global configuration.

Configuration Examples The following example enables the DHCPv6 anti-attack function on interface G0/1.

```
FS(config)# interface G0/1
FS(config-if)# nfpp dhcpv6-guard enable
```

Related Commands	Command	Description
	dhcpv6-guard enable	Enables the anti-ARP attack function.
	show nfpp dhcpv6-guard summary	Displays the configuration.

Platform N/A
Description

9.72 nfpp dhcpv6-guard policy

Use this command to set the rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

- nfpp dhcpv6-guard policy { per-src-mac | per-port } rate-limit-pps attack-threshold-pps**
- no nfpp dhcpv6-guard policy { per-src-mac | per-port }**
- default nfpp dhcpv6-guard policy { per-src-mac | per-port }**

Parameter Description	Parameter	Description
	per-src-mac	Sets the rate-limit threshold and the attack threshold for each source MAC address.
	per-port	Sets the rate-limit threshold and the attack threshold for each port.
	<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range of from1 to 19999.
	<i>attack-threshold-pps</i>	Sets the attack threshold, in the range from1 to19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold.

Examples

```
FS(config)# interface G 0/1
FS(config-if)# nfpp dhcpv6-guard policy per-src-mac 3 10
FS(config-if)# nfpp dhcpv6-guard policy per-port 50 100
```

Related Commands	Command	Description
	dhcpv6-guard attack-threshold	Sets the global attack threshold.
	dhcpv6-guard rate-limit	Sets the global rate-limit threshold.
	show nfpp dhcpv6-guard summary	Displays the configuration.
	show nfpp dhcpv6-guard hosts	Displays the monitored host.
	clear nfpp dhcpv6-guard hosts	Clears the isolated host.

Platform N/A

Description

9.73 nfpp icmp-guard enable

Use this command to enable the ICMP anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp icmp-guard enable

no nfpp icmp-guard enable

default nfpp icmp-guard enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The ICMP anti-attack function is not enabled on the interface.

Command Interface configuration mode.

Mode

Usage Guide The interface ICMP anti- attack configuration is prior to the global configuration.

Configuration The following example enables the ICMP anti-attack function on the interface.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp icmp-guard enable
```

Related Commands	Command	Description
		icmp-guard enable
	show nfpp icmp-guard summary	Displays the configuration.

Platform N/A

Description

9.74 nfpp icmp-guard isolate-period

Use this command to set the isolate period in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

```
nfpp icmp-guard isolate-period { seconds | permanent }
no nfpp icmp-guard isolate-period
default nfpp icmp-guard isolate-period
```

Parameter Description	Parameter	Description
		<i>seconds</i>
	permanent	Permanent isolation.

Defaults By default, the isolate period is not configured.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the isolate period in the interface configuration mode.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp icmp-guard isolate-period 180
```

Related Commands	Command	Description
	icmp-guard isolate-period	Sets the global isolate period.
	show nfpp icmp-guard summary	Displays the configuration.

Platform N/A

Description

9.75 nfpp icmp-guard policy

Use this command to set the rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

nfpp icmp-guard policy { **per-src-ip** | **per-port** } *rate-limit-pps attack-threshold-pps*

no nfpp icmp-guard policy { **per-src-ip** | **per-port** }

default nfpp icmp-guard policy { **per-src-ip** | **per-port** }

Parameter Description	Parameter	Description
	per-src-ip	Sets the rate-limit threshold and the attack threshold for each source IP address.
	per-port	Sets the rate-limit threshold and the attack threshold for each port.
	<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.
	<i>attack-threshold-pps</i>	Sets the attack threshold, in range from 1 to 19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold.

Examples

```
FS(config)# interface G 0/1
FS(config-if)# nfpp icmp-guard policy per-src-ip 5 10
FS(config-if)# nfpp icmp-guard policy per-port 100 200
```

Related Commands	Command	Description
	icmp-guard attack-threshold	Sets the global attack threshold.
	icmp-guard rate-limit	Sets the global rate-limit threshold.
	show nfpp icmp-guard summary	Displays the configuration.
	show nfpp icmp-guard hosts	Displays the monitored host.
	clear nfpp icmp-guard hosts	Clears the isolated host.

Platform N/A

Description

9.76 nfpp ip-guard enable

Use this command to enable the ICMP anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp ip-guard enable

no nfpp ip-guard enable

default nfpp ip-guard enable

**Parameter
Description**

Parameter	Description
N/A	N/A

Defaults The IP anti-scan function is not enabled on the interface.

Command Interface configuration mode.

Mode

Usage Guide The interface IP anti-scan configuration is prior to the global configuration.

Configuration The following example enables the ICMP anti-attack function on the interface.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp ip-guard enable
```

**Related
Commands**

Command	Description
ip-guard enable	Enables the anti-ARP attack function.
show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.77 nfpp ip-guard isolate-period

Use this command to set the isolate period in the interface configuration mode. Use the **no** or **default** form of this command to restore the default setting.

nfpp ip-guard isolate-period { *seconds* | **permanent** }

no nfpp ip-guard isolate-period

default nfpp ip-guard isolate-period

**Parameter
Description**

Parameter	Description
<i>seconds</i>	Sets the isolate period, in the range from 30 to 86400 in the unit of seconds.

permanent	Permanent isolation.
------------------	----------------------

Defaults By default, the isolate period is not configured.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example sets the isolate period in the interface configuration mode.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp ip-guard isolate-period 180
```

Related Commands

Command	Description
ip-guard isolate-period	Sets the global isolate period.
show nfpp ip-guard summary	Displays the configuration.

Platform N/A

Description

9.78 nfpp ip-guard policy

Use this command to set the rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

nfpp ip-guard policy { **per-src-ip** | **per-port** } *rate-limit-pps attack-threshold-pps*

no nfpp ip-guard policy { **per-src-ip** | **per-port** }

default nfpp ip-guard policy { **per-src-ip** | **per-port** }

Parameter Description

Parameter	Description
per-src-ip	Sets the rate-limit threshold and the attack threshold for each source IP address.
per-port	Sets the rate-limit threshold and the attack threshold for each port.
<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.
<i>attack-threshold-pps</i>	Sets the attack threshold, in the range from 1 to 19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold.

```

Examples
FS(config)# interface G 0/1
FS(config-if)# nfpp ip-guard policy per-src-ip 2 10
FS(config-if)# nfpp ip-guard policy per-port 50 100
    
```

Related Commands	Command	Description
	ip-guard attack-threshold	Sets the global attack threshold.
ip-guard rate-limit	Sets the global rate-limit threshold.	
show nfpp ip-guard summary	Displays the configuration.	
show nfpp ip-guard hosts	Displays the monitored host.	
clear nfpp ip-guard hosts	Clears the isolated host.	

Platform N/A

Description

9.79 nfpp ip-guard scan-threshold

Use this command to set the scan threshold. Use the **no** or **default** form of this command to restore the default setting.

```

nfpp ip-guard scan-threshold pkt-cnt
no nfpp ip-guard scan-threshold
default nfpp ip-guard scan-threshold
    
```

Parameter Description	Parameter	Description
	<i>pkt-cnt</i>	Sets the scan threshold, in the range from 1 to 19999.

Defaults By default, the sport-based scan threshold is not configured.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration The following example sets the scan threshold to 20pps.

```

Examples
FS(config)# interface G 0/1
FS(config-if)# nfpp ip-guard scan-threshold 20
    
```

Related Commands	Command	Description
	ip-guard attack-threshold	Sets the global attack threshold.
show nfpp ip-guard summary	Displays the configuration.	

Platform N/A

Description

9.80 nfpp nd-guard enable

Use this command to enable the ND anti-attack function on the interface. Use the **no** or **default** form of this command to restore the default setting.

nfpp nd-guard enable

no nfpp nd-guard enable

default nfpp nd-guard enable

**Parameter
Description**

Parameter	Description
N/A	N/A

Defaults The ND anti-attack function is not enabled on the interface.

Command Interface configuration mode.

Mode

Usage Guide The interface ND anti-attack configuration is prior to the global configuration.

Configuration The following example enables the ND anti-attack function on the interface.

Examples

```
FS(config)# interface G0/1
FS(config-if)# nfpp nd-guard enable
```

**Related
Commands**

Command	Description
nd-guard enable	Enables the ND anti- attack function.
show nfpp nd-guard summary	Displays the configuration.

Platform N/A

Description

9.81 nfpp nd-guard policy

Use this command to set the rate-limit threshold and the attack threshold. Use the **no** or **default** form of this command to restore the default setting.

nfpp nd-guard policy per-port { ns-na | rs | ra-redirect } rate-limit-pps attack-threshold-pps

no nfpp nd-guard policy per-port { ns-na | rs | ra-redirect }

default nfpp nd-guard policy per-port { ns-na | rs | ra-redirect }

**Parameter
Description**

Parameter	Description
ns-na	Sets the neighbor request and neighbor advertisement.

rs	Sets the router request.
ra-redirect	Sets the router advertisement and the redirect packets.
<i>rate-limit-pps</i>	Sets the rate-limit threshold, in the range from 1 to 19999.

Defaults By default, the rate-limit threshold and the attack threshold are not configured.

Command Interface configuration mode.

Mode

Usage Guide The attack threshold value shall be equal to or greater than the rate-limit threshold.

Configuration The following example sets the rate-limit threshold and the attack threshold.

```

Examples
FS(config)# interface G 0/1
FS(config-if)# nfpp nd-guard policy per-port ns-na 50 100
FS(config-if)# nfpp nd-guard policy per-port rs 10 20
FS(config-if)# nfpp nd-guard policy per-port ra-redirect 10 20
    
```

Related Commands

Command	Description
nd-guard attack-threshold	Sets the global attack threshold.
nd-guard rate-limit	Sets the global rate-limit threshold.
show nfpp nd-guard summary	Displays the configuration.

Platform N/A

Description

9.82 show nfpp arp-guard hosts

Use this command to display the monitored host.

```

show nfpp arp-guard hosts [ statistics ] [ [ vlan vid ] [ interface interface-id ] [ ip-address | mac-address ] ]
    
```

Parameter Description

Parameter	Description
<i>statistics</i>	Displays the statistical information of the monitored host.
<i>vid</i>	The VLAN ID
<i>interface-id</i>	The interface name
<i>ip-address</i>	The IP address
<i>mac-address</i>	The MAC address

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays the statistical information of the monitored host.

Examples

```
FS# show nfpp arp-guard hosts statistics
```

```
success    fail    total
-----
100        20     120
```

The following example shows the monitored host:

```
FS# show nfpp arp-guard hosts
```

If column 1 shows '*', it means "hardware do not isolate user".

```
VLAN  interface IP address  MAC address  remain-time(s)
-----
1     Gi0/1      1.1.1.1     -            110
2     Gi0/2      1.1.2.1     -            61
*3    Gi0/3      -           0000.0000.1111 110
4     Gi0/4      -           0000.0000.2222 61
Total:4 hosts
```

Related Commands

Command	Description
clear nfpp arp-guard hosts	Clears the monitored host.

Platform N/A

Description

9.83 show nfpp arp-guard scan

Use this command to display the ARP scan list.

```
show nfpp arp-guard scan [ statistics [ [ vlan vid ] [ interface interface-id ] [ ip-address ] [ mac-address ] ] ]
```

Parameter Description

Parameter	Description
statistics	Displays the statistical information of the ARP scan list.
<i>vid</i>	The VLAN ID.
<i>interface-id</i>	The interface name.
<i>ip-address</i>	The IP address.
<i>mac-address</i>	The MAC address.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the ARP scan list.

Examples

```

FS# show nfpp arp-guard scan statistics
arp-guard table has 4 record(s).

FS# show nfpp arp-guard scan
VLAN      interface  IP address  MAC address  timestamp
-----
1         Gi0/1      -           0000.0000.0001  2008-01-23 16:23:10
2         Gi0/2      1.1.1.1    0000.0000.0002  2008-01-23 16:24:10
3         Gi0/3      -           0000.0000.0003  2008-01-23 16:25:10
4         Gi0/4      -           0000.0000.0004  2008-01-23 16:26:10
Total:4 record(s)

FS# show nfpp arp-guard scan vlan 1 interface G 0/1 0000.0000.0001
VLAN      interface  IP address  MAC address  timestamp
-----
1         Gi0/1      -           0000.0000.0001  2008-01-23 16:23:10
Total:1 record(s)

```

Related Commands

Command	Description
arp-guard scan-threshold	Sets the global scan threshold.
nfpp arp-guard scan-threshold	Sets the scan threshold.
clear nfpp arp-guard scan	Clears the ARP scan list.

Platform N/A

Description

9.84 show nfpp arp-guard summary

Use this command to display the configuration.

show nfpp arp-guard summary

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the configuration.

Examples

```
FS# show nfpp arp-guard summary
(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface  Status  Isolate-period Rate-limit Attack-threshold Scan-threshold
Global     Enable  300           4/5/60   8/10/100   15
Gi 0/1     Enable  180           5/-/-    8/-/-     -
Gi 0/2     Disable 200           4/5/60   8/10/100   20

Maximum count of monitored hosts: 1000
Monitor period:300s
```

Field Description:

Field	Description
Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the source IP address/ the rate-limit threshold for the source MAC address/ the rate-limit threshold for the port
Attack-threshold	In the same format as the rate-limit.
-	No configuration.

Related Commands

Command	Description
arp-guard attack-threshold	Sets the global attack threshold.
arp-guard enable	Enables the anti-ARP attack function.
arp-guard isolate-period	Sets the global isolate time.
arp-guard monitor-period	Sets the monitor period.
arp-guard monitored-host-limit	Sets the maximum number of the monitored hosts.
arp-guard rate-limit	Sets the global rate-limit threshold.
arp-guard scan-threshold	Sets the global scan threshold.
nfpp arp-guard enable	Enables the anti-ARP attack function on the interface.
nfpp arp-guard isolate-period	Sets the isolate time.
nfpp arp-guard policy	Sets the rate-limit threshold and attack threshold.
nfpp arp-guard scan-threshold	Sets the scan threshold.

Platform N/A

Description

9.85 show nfpp define hosts

Use this command to display the monitored hosts.

show nfpp define hosts *name* [**statistics** | [[**vlan** *vid*] [**interface** *interface-id*] [*ip-address*]]]

Parameter Description	Parameter	Description
	<i>name</i>	Name of the user-defined anti-attack type.
	statistics	Displays the statistics of monitored hosts.
	<i>vid</i>	Vlan ID.
	<i>interface-id</i>	Interface name.
	<i>ip-address</i>	IP address.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide This command allows filtering the hosts with parameters specified

Configuration Examples The following example displays the monitored hosts.

```
FS#show nfpp define hosts abc
If col_filter 1 shows '*', it means "hardware do not isolate host".
VLAN    interface  MAC address    remain-time(s)
-----  -
*1      Gi4/2      00d0.f822.33e5  592
Total: 1 host
```

Related Commands	Command	Description
	clear nfpp define hosts	Clears the monitored hosts of user-defined anti-attack type.

Platform Description N/A

9.86 show nfpp define summary

Use this command to display the configuration.

show nfpp define summary [*name*]

Parameter Description	Parameter	Description
	<i>name</i>	Name of the user-defined anti-attack type.

Defaults N/A

Command Privileged EXEC mode.
Mode

Usage Guide This command can be used to display the configuration. Without the name specified, all user-defined anti-attack types will be displayed.

Configuration The following example displays the configuration.

Examples

```
FS#show nfpp define summary abc
Define abc summary:
match etype 0x800 src-ip 1.1.1.1 src-ip-mask 255.255.255.255
Maximum count of monitored hosts: 20000
Monitor period:600s
(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface Status Rate-limit Attack-threshold
Global Disable -/10/- -/20/-
Gi4/1 Enable -/-/ -/-/
```

Field	Description
Interface	If the interface field is displayed as Global, it means that is configured in the global configuration mode.
Status	Enables/ Disables the anti-attack function.

Related Commands

Command	Description
match	Clears the monitored hosts of user-defined anti-attack type.
policy	Attack threshold and rate-limit threshold.
isolate-period	Isolates time
monitored-period	Monitored time
monitored-host-limit	Maximum monitored host number

Platform N/A
Description

9.87 show nfpp define trusted-host

Use this command to display the trusted host free from monitoring.

show nfpp define trusted-host name

Parameter Description

Parameter	Description
<i>name</i>	Name of the user-defined anti-attack type.

Defaults N/A.

Command Privileged EXEC mode.
Mode

Usage Guide N/A

Configuration The following example displays the trusted host configuration.

```

Examples
FS# show nfpp define trusted-host tcp
Define tcp:
IP address      mask
-----      -
1.1.1.0        255.255.255.0
1.1.2.0        255.255.255.0
Total:2 record(s)
    
```

Related Commands	Command	Description
	trusted-host	

Platform N/A
Description

9.88 show nfpp dhcp-guard hosts

Use this command to display the monitored host.

```

show nfpp dhcp-guard hosts [ statistics ] [ [ vlan vid ] [ interface interface-id ] [ ip-address | mac-address ] ] ]
    
```

Parameter Description	Parameter	Description
	statistics	
<i>vid</i>		The VLAN ID.
<i>interface-id</i>		The interface name.
<i>ip-address</i>		The IP address.
<i>mac-address</i>		The MAC address.

Defaults N/A

Command Privileged EXEC mode.
Mode

Usage Guide N/A

Configuration The following example displays the statistical information of the monitored host.

```

Examples
FS# show nfpp dhcp-guard hosts statistics
success  fail  total
    
```

```

-----
100          20          120

The following example shows the monitored host:
FS# show nfpp dhcp-guard hosts
If column 1 shows '*', it means "hardware failed to isolate host".
VLAN  interface    MAC address    remain-time(seconds)
-----
1     gi0/2           0000.0000.0001  10
*2    gi0/1           0000.0000.0002  20
Total:2 host(s)
    
```

Related Commands

Command	Description
clear nfpp dhcp-guard hosts	Clears the monitored host.

Platform N/A

Description

9.89 show nfpp dhcp-guard summary

Use this command to display the configuration.

show nfpp dhcp-guard summary

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the configuration.

Examples

```

FS# show nfpp dhcp-guard summary
(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface  Status  Isolate-period  Rate-limit  Attack-threshold
Global     Enable  300             -/5/150    -/10/300
Gi 0/1     Enable  180             -/6/-      -/8/-
Gi 0/2     Disable 200             -/5/30     -/10/50

Maximum count of monitored hosts: 1000
Monitor period:300s
    
```

Field Description

Field	Description
Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the source IP address/ the rate-limit threshold for the source MAC address/ the rate-limit threshold for the port
Attack-threshold	In the same format as the rate-limit.
-	No configuration.

Related Commands

Command	Description
dhcp-guard attack-threshold	Sets the global attack threshold.
dhcp-guard enable	Enables the DHCP anti-attack function.
dhcp-guard isolate-period	Sets the global isolate time.
dhcp-guard monitor-period	Sets the monitor period.
dhcp-guard monitored-host-limit	Sets the maximum number of the monitored hosts.
dhcp-guard rate-limit	Sets the global rate-limit threshold.
nfpp dhcp-guard enable	Enables the DHCP anti-attack function on the interface.
nfpp dhcp-guard isolate-period	Sets the isolate time.
nfpp dhcp-guard policy	Sets the rate-limit threshold and attack threshold.

Platform N/A
 Description

9.90 show nfpp dhcpv6-guard hosts

Use this command to display the monitored host.

```
show nfpp dhcpv6-guard hosts [ statistics | [ [ vlan vid ] [ interface interface-id ] [ ip-address | mac-address ] ] ]
```

Parameter Description

Parameter	Description
statistics	Displays the statistical information of the monitored host.
<i>vid</i>	The VLAN ID.
<i>interface-id</i>	The interface name.
<i>ip-address</i>	The IP address.
<i>mac-address</i>	The MAC address.

Defaults N/A

Command Privileged EXEC mode.
 Mode

Usage Guide N/A

Configuration The following example displays the statistical information of the monitored host.

```

Examples
FS# show nfpp dhcpv6-guard hosts
If column 1 shows '*', it means "hardware failed to isolate host".
VLAN interface MAC address remain-time(seconds)
-----
*1 gi0/2 0000.0000.0001 10
*2 gi0/1 0000.0000.0002 20
Total:2 host(s)
    
```

Related Commands	Command	Description
	clear nfpp dhcpv6-guard hosts	Clears the monitored host.

Platform N/A

Description

9.91 show nfpp dhcpv6-guard summary

Use this command to display the configuration.

show nfpp dhcpv6-guard summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the configuration.

```

Examples
FS#show nfpp dhcpv6-guard summary

(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface Status Rate-limit Attack-threshold
Global Enable -/5/1200 -/10/1500

Maximum count of monitored hosts: 20000
Monitor period: 600s
Field Description
    
```

Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the source IP address/ the rate-limit threshold for the source MAC address/ the rate-limit threshold for the port
Attack-threshold	In the same format as the rate-limit.
-	No configuration.

**Related
Commands**

Command	Description
dhcpv6-guard attack-threshold	Sets the global attack threshold.
dhcpv6-guard enable	Enables the DHCPv6 anti-attack function.
dhcpv6-guard monitor-period	Sets the monitor period.
dhcpv6-guard monitored-host-limit	Sets the maximum number of the monitored hosts.
dhcpv6-guard rate-limit	Sets the global rate-limit threshold.
nfpp dhcpv6-guard enable	Enables the DHCPv6 anti-attack function on the interface.
nfpp dhcpv6-guard policy	Sets the rate-limit threshold and attack threshold.

Platform N/A

Description

9.92 show nfpp icmp-guard hosts

Use this command to display the monitored host.

show nfpp icmp-guard hosts [**statistics**] [[*vlan vid*] [**interface** *interface-Id*] [*ip-address* | *mac-address*]]

**Parameter
Description**

Parameter	Description
statistics	Displays the statistical information of the monitored host.
<i>vid</i>	The VLAN ID.
<i>interface-id</i>	The interface name.
<i>ip-address</i>	The IP address.
<i>mac-address</i>	The MAC address.

Defaults N/A

Command Privileged EXEC mode.

Mode
Usage Guide N/A

Configuration The following example displays the statistical information of the monitored host.

Examples

```
FS# show nfpp icmp-guard hosts statistics
success    fail    total
-----    -
100        20     120
```

The following example displays the monitored host.

```
FS# show nfpp icmp-guard hosts
If column 1 shows '*', it means "hardware failed to isolate host".
VLAN  interface IP address      remain-time(s)
-----
1     Gi0/1      1.1.1.1      110
2     Gi0/2      1.1.2.1      61
Total:2 host(s)
```

Related Commands

Command	Description
clear nfpp icmp-guard hosts	Clears the monitored host.

Platform N/A

Description

9.93 show nfpp icmp-guard summary

Use this command to display the configuration.

show nfpp icmp-guard summary

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the configuration.

Examples

```
FS# show nfpp icmp-guard summary
(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface  Status  Isolate-period Rate-limit Attack-threshold
Global     Enable  300            4/-/60    8/-/100
Gi 0/1     Enable  180            5/-/     8/-/
Gi 0/2     Disable 200            4/-/60    8/-/100

Maximum count of monitored hosts: 1000
```


Monitor period:300s	
Field	Description
Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the source IP address/ the rate-limit threshold for the source MAC address/ the rate-limit threshold for the port
Attack-threshold	In the same format as the rate-limit.
-	No configuration.

Related Commands

Command	Description
icmp-guard attack-threshold	Sets the global attack threshold.
icmp-guard enable	Enables the ICMP anti-attack function.
icmp-guard isolate-period	Sets the global isolate time.
icmp-guard monitor-period	Sets the monitor period.
icmp-guard monitored-host-limit	Sets the maximum number of the monitored hosts.
icmp-guard rate-limit	Sets the global rate-limit threshold.
nfpp icmp-guard enable	Enables the ICMP anti-attack function on the interface.
nfpp icmp-guard isolate-period	Sets the isolate time.
nfpp icmp-guard policy	Sets the rate-limit threshold and attack threshold.

Platform N/A
Description

9.94 show nfpp icmp-guard trusted-host

Use this command to display the trusted host free from being monitored.

show nfpp icmp-guard summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the trusted host free from being monitored.

```
FS# show nfpp icmp-guard trusted-host
```

```

IP address      mask
-----
1.1.1.0        255.255.255.0
1.1.2.0        255.255.255.0
Total:2 record(s)
    
```

Related Commands	Command	Description
	icmp-guard trusted-host	Sets the trusted host.

Platform N/A

Description

9.95 show nfpp ip-guard hosts

Use this command to display the monitored host.

show nfpp ip-guard hosts [**statistics**] [[**vlan** *vid*] [**Interface** *interface-id*] [*ip-address* | *mac-address*]]

Parameter Description	Parameter	Description
	statistics	Displays the statistical information of the monitored host.
	<i>vid</i>	The VLAN ID.
	<i>interface-id</i>	The interface name.
	<i>ip-address</i>	The IP address.
	<i>mac-address</i>	The MAC address.

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration Examples The following example displays the statistical information of the monitored host.

```

FS# show nfpp ip-guard hosts statistics
success  fail  total
-----  ---  -----
100      20    120

FS#show nfpp ip-guard hosts
If column 1 shows '*', it means "hardware do not isolate host".
VLAN  interface IP address  Reason      remain-time(s)
---  -----  -----  ---  -----
1    Gi0/1    1.1.1.1    ATTACK    110
    
```

2	Gi0/2	1.1.2.1	SCAN	61
Total:2 host(s)				

Related Commands

Command	Description
clear nfpp ip-guard hosts	Clears the monitored host.

Platform N/A

Description

9.96 show nfpp ip-guard summary

Use this command to display the configuration.

show nfpp ip-guard summary

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the configuration.

Examples

```
FS# show nfpp ip-guard summary
(Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port.)
Interface Status Isolate-period Rate-limit Attack-threshold Scan-threshold
Global Enable 300 4/-/60 8/-/100 15
Gi 0/1 Enable 180 5/-/ 8/-/ -
Gi 0/2 Disable 200 4/-/60 8/-/100 20

Maximum count of monitored hosts: 1000
Monitor period..300s
```

Field	Description
Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the source IP address/ the rate-limit threshold for the source MAC address/ the rate-limit threshold for the port
Attack-threshold	In the same format as the rate-limit.
-	No configuration.

Related Commands	Command	Description
	ip-guard attack-threshold	Sets the global attack threshold.
	ip-guard enable	Enables the IP anti-scan function.
	ip-guard isolate-period	Sets the global isolate time.
	ip-guard monitor-period	Sets the monitor period.
	ip-guard monitored-host-limit	Sets the maximum number of the monitored hosts.
	ip-guard rate-limit	Sets the global rate-limit threshold.
	nfpp ip-guard enable	Enables the IP anti-scan function on the interface.
	nfpp ip-guard isolate-period	Sets the isolate time.
	nfpp ip-guard policy	Sets the rate-limit threshold and attack threshold.

Platform N/A

Description

9.97 show nfpp ip-guard trusted-host

Use this command to display the trusted host free from being monitored.

show nfpp ip-guard summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the trusted host free from being monitored.

```

Examples
FS# show nfpp ip-guard trusted-host
IP address      mask
-----
1.1.1.0         255.255.255.0
1.1.2.0         255.255.255.0
Total:2 record(s)
    
```

Related Commands	Command	Description
	ip-guard trusted-host	Sets the trusted host.

Platform N/A
Description

9.98 show nfpp log

Use this command to display the NFPP log configuration.

show nfpp log summary

Use this command to display the NFPP log buffer area content.

show nfpp log buffer [statistics]

Parameter Description	Parameter	Description
	statistics	Displays the statistical information of the NFPP log buffer area.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide When the log buffer area is full, the subsequent logs are to be dropped, and an entry with all attributes "-" is displayed in the log buffer area. The administrator shall increase the capacity of the log buffer area or improve the rate of generating the syslog.

The generated syslog in the log buffer area carries with the timestamp, for example:

```
%NFPP_ARP_GUARD-4-DOS_DETECTED: Host<IP=N/A,MAC=0000.0000.0004,port=Gi4/1,VLAN=1> was detected.(2009-07-01 13:00:00)
```

Configuration Examples The following example displays the NFPP log configuration.

```
FS#show nfpp log summary
Total log buffer size : 10
Syslog rate : 1 entry per 2 seconds
Logging:
VLAN 1-3, 5
interface Gi 0/1
interface Gi 0/2
```

The following example displays the log number in the buffer area.

```
FS#show nfpp log buffer statistics
There are 6 logs in buffer.
```

The following example shows the NFPP log buffer area:

```
FS#show nfpp log buffer
Protocol VLAN  Interface IP address MAC address  Reason          Timestamp
-----
ARP 1      Gi0/1      1.1.1.1    -      DoS              2009-05-30 16:23:10
ARP 1      Gi0/1      1.1.1.1    -      ISOLATED         2009-05-30 16:23:10
```

ARP	1	Gi0/1	1.1.1.2	-	DoS	2009-05-30 16:23:15
ARP	1	Gi0/1	1.1.1.2	-	ISOLATE_FAILED	2009-05-30 16:23:15
ARP	1	Gi0/1	-	0000.0000.0001	SCAN	2009-05-30 16:30:10
ARP	-	Gi0/2	-	-	PORT_ATTACKED	2009-05-30 16:30:10

Field	Description
Protocol	ARP, IP, ICMP, DHCP,DHCPv6, NS-NA, RS, RA-REDIRECT
Reason	1. DoS 2. ISOLATED 3. ISOLATE_FAILE 4. SCAN 5. PORT_ATTACKED

Related Commands

Command	Description
clear nfpp log	Clears the NFPP log buffer area.

Platform N/A
Description

9.99 show nfpp nd-guard hosts

Use this command to display the monitored host.

show nfpp nd-guard hosts [**statistics** | [[**vlan vid**] [**interface interface-id**]]]

Parameter Description

Parameter	Description
statistics	Displays the statistics of the monitored host.
<i>vid</i>	Sets the VLAN ID.
<i>interface-id</i>	Sets the interface name and number.

Command Mode Privileged EXEC mode.

Usage Guide N/A

Configuration The following example displays the statistics of the host monitored by ND-guard.

Examples

```
FS#show nfpp nd-guard hosts statistics
success  fail  total
-----  ---  -----
10       2      12

The following example displays the host monitored by ND-guard. The "remian-time(s)" refers to the remaining time of isolation.
```

```

FS#show nfpp nd-guard hosts
If col_filter 1 shows '*', it means "hardware do not isolate host".
VLAN    interface  ND-guard          remain-time(s)
-----
-       Gi4/2       ns-na-guard       174
-       Gi4/2       rs-guard          98
-       Gi4/2       ra-redirect-guard 127
Total: 3 hosts
    
```

Prompt N/A

Messages

Platform N/A

Description

9.100 show nfpp nd-guard summary

Use this command to display the configuration.

show nfpp nd-guard summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Privileged EXEC mode.

Mode

Usage Guide N/A

Configuration The following example displays the configuration.

Examples

```

FS# show nfpp nd-guard summary
(Format of column Rate-limit and Attack-threshold is NS-NA/RS/RA-REDIRECT.)
Interface Status Rate-limit Attack-threshold
Global    Enable  20/5/10  40/10/20
Gi 0/1    Enable  15/15/15 30/30/30
Gi 0/2    Disable -/5/30   -/10/50
    
```

Field	Description
Interface(Global)	Global configuration
Status	Enables/Disables the anti-attack function.
Rate-limit	In the format of the rate-limit threshold for the NS-NA/RS/RA-REDIRECT.

Attack-threshold	In the same format as the rate-limit.
-	No configuration.

Related Commands

Command	Description
nd-guard attack-threshold	Sets the global attack threshold.
nd-guard enable	Enables the ND anti-attack function.
nd-guard rate-limit	Sets the global rate-limit threshold.
nfpp nd-guard enable	Enables the ND anti-attack function on the interface.
nfpp nd-guard policy	Sets the rate-limit threshold and attack threshold.

Platform N/A

Description

9.101 trusted-host

Use this command to set the trusted hosts free form monitoring. Use the no form of this command to restore the default setting,

trusted-host { *mac mac_mask* | *ip mask* | *IPv6/prefixlen* }

no trusted-host { **all** | *ip mask* | *IPv6/prefixlen* }

Parameter Description

Parameter	Description
<i>ip</i>	Sets the IP address.
<i>mac</i>	MAC address.
<i>mac_mask</i>	MAC address mask.
<i>IPv6/prefixlen</i>	IPv6 address and mask length
<i>mask</i>	IP mask.
all	Deletes the configuration of all trusted hosts with the no form of this command.

Defaults N/A

Command NFPP define configuration mode.

Mode

Usage Guide

The administrator can use this command to set the trusted host free from monitoring. The ICMP packets are allowed to sent to the trusted host CPU without any rate-limit and warning configuration. Configure the mask to set all hosts in one network segment free from monitoring.

UP to 500 trusted hosts are supported.

Before configuring the trusted-host, the match type must be configured. If the message type configured by the match is Ipv4, the Ipv6 trusted addresses are not allowed. In the same way, if the message type is IPv6, the IPv4 trusted addresses are not allowed.

Configuration The following example sets the trusted hosts free form monitoring.

Examples

```
FS(config)# nfpp
FS(config-nfpp)# define tcp
FS(config-nfpp-define)#trusted-host 1.1.1.1 255.255.255.255
```

Related Commands

Command	Description
show nfpp define trusted-host	Displays the trusted host configuration.

Platform N/A

Description

10 SECURITY-LOG Commands

10.1 security-log audit-enable

Use this command to enable security log auditing. Use the no form of this command to disable security log auditing.

security-log audit-enable
no security-log audit-enable

Parameter	Parameter	Description
Description	N/A	

Defaults The function is enabled by default.

Command Mode Global configuration mode

Usage Guide After enabling the security log auditing, the device will record key operations including account management, log event, system event, configuration change and security log event.

Configuration Examples The following example enables the security log auditing.

```
FS# configure terminal
FS(config)# security-log audit-enable
FS(config)# end
```

Related Commands	Command	Description
	N/A	

Platform Description N/A

10.2 security-log data-store-items

Use this command to configure the max storage capacity of security log.

security-log data-store-items num

Parameter	Parameter	Description
Description	num	Local storage capacity. The max value varies with product capability. The min value is 500.

Defaults The max value varies with product capability.

Command Global configuration mode

Mode

Usage Guide If the local storage space is insufficient, run this command to adjust the storage capacity.

Configuration The following example configures the local storage capacity of security log as 5000.

Examples

```
FS# configure terminal
FS(config)# security-log data-store-items 5000
FS(config)# end
```

Related	Command	Description
Commands	N/A	

Platform N/A

Description

10.3 security-log delete

Use this command to delete all logs of key operations.

security-log delete all

Parameter	Parameter	Description
Description	N/A	

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide Run this command to delete all key operation logs.

Configuration The following example deletes all key operation logs.

Examples

```
FS# security-log delete all
```

Related	Command	Description
Commands	N/A	

Platform N/A

Description

10.4 security-log data-store-days

Use this command to configure the local storage time of security log.

security-log data-store-days *day*

Parameter	Parameter	Description
Description	<i>day</i>	Storage time, range: 1-66535.

Defaults 180 days

Command Mode Global configuration mode

Usage Guide The security log is stored locally for 180 days by default. The log exceeds the time will be deleted.

Configuration Examples The following example configures the storage time as 300 days.

```
FS# configure terminal
FS(config)# security-log data-store-days 300
FS(config)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

10.5 security-log auto-vacuum-time

Use this command to configure the aging time of security log.

security-log auto-vacuum-time *hh:mm:ss*

Parameter	Parameter	Description
Description	<i>hh:mm:ss</i>	hour: minute: second.

Defaults 03:00:00 by default

Command Mode Global configuration mode

Usage Guide The device will check local log at 3 am each day. If any log exceeds the storage time, it will be deleted. Run this command to change the check time.

Configuration The following example configures the aging time as 5:05 am.

Examples

```
FS# configure terminal
FS(config)# security-log auto-vacuum-time 05:05:00
FS(config)# end
```

Related

Commands

Command	Description
N/A	

Platform

N/A

Description

10.6 show security-log

Use this command to display all security logs.

show security-log

Parameter

Description

Parameter	Description
N/A	N/A

Defaults

N/A

Command

Privileged EXEC mode

Mode

Usage Guide

Run this command to display all security logs.

Configuration

The following example displays all security logs.

Examples

```
FS# show security-log

time, username, peerinfo, hostname, log-type: content

2019-01-01 10:00:02, ---, console, FS, SEC_LOG: SECURITY_LOG enabled security log audit configuration
successfully

2019-01-01 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG disabled security log audit
configuration unsuccessfully

2019-01-01 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG deleted all security log
successfully

.....
```

Related

Commands

Command	Description
N/A	

Platform

N/A

Description

10.7 show security-log detail

Use this command to display the detailed log information which can be filtered by time, type, username, host name, etc.

```
show security-log detail { all | { from yyyy mm dd hh:mm:ss to yyyy mm dd hh:mm:ss } } [ log-type { SEC_LOG | ACC_MNT | LOGIN | SYS | CONFIG | OTHER } ] [ user username ] [ hostname hostname ] [ peerinfo peerinfo ] [ order-by [ time | log-type ] { asc | desc } [ start-item integer1 end-item integer2 ] ]
```

Use this command to export the detailed log information which can be filtered by time, type, username, host name, etc.

```
show security-log detail export { all | { from yyyy mm dd hh:mm:ss to yyyy mm dd hh:mm:ss } } [ log-type { SEC_LOG | ACC_MNT | LOGIN | SYS | CONFIG | OTHER } ] [ user username ] [ hostname hostname ] [ peerinfo peerinfo ] [ order-by [ time | log-type ] { asc | desc } [ start-item integer1 end-item integer2 ] ]
```

Use this command to display the log statistics which can be filtered by time, type, username, host name, etc.

```
show security-log detail stat { all | { from yyyy mm dd hh:mm:ss to yyyy mm dd hh:mm:ss } } [ log-type { SEC_LOG | ACC_MNT | LOGIN | SYS | CONFIG | OTHER } ] [ user username ] [ hostname hostname ] [ peerinfo peerinfo ]
```

Parameter	Parameter	Description
Description	<i>yyyy mm dd</i>	Year month day
	<i>hh:mm:ss</i>	Hour: minute: second
	log-type	Log types: 1) SEC_LOG (security-log-event) 2) ACC_MNT (account-management) 3) LOGIN (login-event) 4) SYS (system-event) 5) CONFIG (configuration-changes) 6) OTHER (other)
	<i>username</i>	Filtering condition: username (exact match)
	<i>hostname</i>	Filtering condition: host name (exact match)
	<i>peerinfo</i>	Filtering condition: device information, including alias, IP or combination (fuzzy match)
	<i>integer1</i>	Start position
	<i>integer2</i>	End position

Defaults N/A

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to search or export the detailed security log information.

Configuration

The following example searches the security log information of userA from 0:00 on October 10, 2019 to 24:00 on October 22, 2019, and sorts result in descending order of time. Only the first 20 records are displayed.

Examples

```
FS# show security-log detail from 2019 10 10 00:00:00 to 2019 10 22 23:59:59 user userA order-by time desc start-item 1
end-item 20

time, username, peerinfo, hostname, log-type: content

2019-10-22 10:00:03, ---, console, FS, SEC_LOG: SECURITY_LOG enabled security log audit configuration successfully

2019-10-22 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG disabled security log audit
configuration unsuccessfully

2019-10-22 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG deleted all security log successfully

.....
```

The following example displays all security log information.

```
FS# show security-log detail all

time, username, peerinfo, hostname, log-type: content

2019-10-22 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG deleted all security log successfully

2019-10-22 10:00:02, admin, vty0(192.168.111.111), FS, SEC_LOG: SECURITY_LOG disabled security log audit
configuration unsuccessfully

2019-10-22 10:00:03, ---, console, FS, SEC_LOG: SECURITY_LOG enabled security log audit configuration successfully

.....
```

The following example exports the security log information of userA from 0:00 on October 10, 2019 to 24:00 on October 22, 2019.

```
FS# show security-log detail export from 2019 10 10 00:00:00 to 2019 10 22 23:59:59 user userA

Export file: tmp:mng/security_log/export_file/log_20191022_110410_535250.csv
```

Note: the user can run the copy command to download the file:

```
FS# copy tmp:mng/security_log/export_file/log_20191022_110410_535250.csv tftp://192.168.1.1/security_log.csv
```

The following example searches the security log statistics of userA from 0:00 on October 10, 2019 to 24:00 on October 22, 2019.

```
FS# show security-log detail stat from 2019 10 10 00:00:00 to 2019 10 22 23:59:59 user userA

Count:555
```

10.8 show security-log config

Use this command to search the security log configuration.

show security-log config

Parameter	Parameter	Description
Description	N/A	
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Usage Guide	Run this command to check security log configuration, including capacity limit, storage time and aging time.	
Configuration Examples	The following example displays the security log configuration.	
	<pre> FS# show security-log config Security-log audit: enable Limit number: 10000 Store days: 180 Auto vacuum time: 03:00:00 </pre>	
Platform Description	N/A	

10.9 show security-log statistics

Use this command to search the security log statistics.

show security-log statistics

Parameter	Parameter	Description
Description	N/A	
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Usage Guide	Run this command to display security log statistics, including: Number of current logs: xxx Number of history logs: xxx in total, xxx were covered Number of aged los: xxx Last deleting record: xxx	
Configuration Examples	The following example displays security log statistics.	
	<pre> FS# show security-log statistics </pre>	


```
Current storage record count: 9000

Historical record count: have written 11111, overwritten 1111

Aging record count: 1000

Last delete record: 2019-10-24 10:00:00 userA vty0(192.168.1.1) FS SEC_LOG: SECURITY_LOG deleted all security log successfully
```

Related	Command	Description
Commands	N/A	

Platform N/A
Description

10.10 show security-log info

Use this command to display security log statistics during processing.

show security-log info

Parameter	Parameter	Description
Description	N/A	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the statistics during security log processing, including:
 Number of log received successfully: xxx, receive failures: xxx
 Number of buffered logs: xxx
 Number of logs stored in flash: xxx
 History sync flashes: xxx, sync failures: xxx
 Reason for last sync failure: xxx (not display if no failure)
 Next time to sync flash: HH:MM:SS

Configuration The following example displays security log statistics during processing.

Examples

```
FS# show security-log info

Receive log count: 2000, err 1

Current cached record count: 1999

Current store-in-flash record count: 5000

Historical sync flash count: 100, err 1

Reason for last sync failure: Failed to sync security logs to file database.

Next time to sync flash: 11:11:11
```

Platform N/A

Description

Chapter 7 ACL & QoS Configuration Commands

1. ACL Commands
2. QoS Commands
3. MMU Commands

1 ACL Commands

1.1 command ID table

For IDs used in the following commands, refer to the command ID table below:

ID	Meaning
ID	Number of access list. Range: Standard IP ACL: 1 to 99, 1300 to 1999 Extended IP ACL: 100 to 199,2000 to 2699 Extended MAC ACL: 700 to 799 Extended expert ACL: 2700 to 2899
name	ACL name
sn	ACL SN (products can be set according to the priority)
start-sn	Start sequence number
inc-sn	Sequence number increment
deny	If matched, access is denied.
permit	If matched, access is permitted.
port	Protocol number. For IPv6, this field can be IPv6, ICMP, TCP, UDP and numbers 0 to 255. For IPv4, it can be one of EIGRP, GRE, IPINIP, IGMP, NOS, OSPF, ICMP, UDP, TCP,AHP, ESP, PCP, PIM and IP, or it can be numbers 0 to 255 that represent the IP protocol. It is described when some important protocols, such as ICMP, TCP and UDP, are listed individually.
interface idx	Interface index
src	Packet source IP address (host address or network address)
src-wildcard	Source IP address wildcard. It can be discontinuous, for example, 0.255.0.32.
src-ipv6-pfix	Source IPv6 network address or network type
dst-ipv6-pfix	Destination IPv6 network address or network type
pfix-len	Prefix mask length
src-ipv6-addr	Source IPv6 address
dst-ipv6-addr	Destination IPv6 address
dscp	Differential service code point, and code point value. Range: 0 to 63
flow-label	Flow label in the range 0 to 1048575
dst	Packet destination IP address (host address or network address)
dst-wildcard	Destination IP address wildcard. It can be discontinuous, such as 0.255.0.32
fragment	Packet fragment filtering.
fragment-ipid fragment-ipid	Fragment ID of the header in segmented packet

precedence	Packet precedence value (0 to 7)
range	The layer 4 port number range of the packet.
time-range tm-rng-name	Time range of packet filtering, named tm-rng-name
tos	Type of service (0 to 15)
cos	cos of service (0-7)
cos inner cos	cos of the packet tag
icmp-type	ICMP message type (0 to 255)
icmp-code	ICMP message type code (0 to 255)
icmp-message	ICMP message type name (0 to 255)
operator port[port]	Operator (lt-smaller, eq-equal, gt-greater, neq-unequal, range-range) port indicates the port number. Dyadic operation needs two port numbers, while other operators only need one port number
src-mac-addr	Physical address of the source host
dst-mac-addr	Physical address of the destination host
VID vid	VLAN ID
VID inner vid	VID of the tag
ethernet-type	Ethernet protocol type. 0x value can be entered.
match-all tcpf	Match all bits of the TCP flag.
established	Match the RST or ACK bit of the TCP flag.
text	Remark text
in	Filter the incoming packets of the interface
out	Filter the outgoing packets of the interface
{rule mask offset}+	rule: Hexadecimal value field; mask: Hexadecimal mask field offset: Refer to the offset table "+" sign indicates at least one group
log	Output the matching syslog when the packet matches the ACL rule.

The fields in the packet are as follows:

AA AA AA AA AA AA BB BB BB BB BB BB CC CC DD DD

DD DD EE FF GG HH HH HH II II JJ KK LL LL MM MM

NN NN OO PP QQ QQ RR RR RR RR SS SS SS SS TT TT

UU UU VV VV VV VV WW WW WW WW XY ZZ aa aa bb bb

The corresponding offset table is as follows:

Letter	Meaning	Offset	Letter	Meaning	Offset
A	Destination MAC	0	O	TTL field	34
B	Source MAC	6	P	Protocol number	35

C	Data frame length field	12	Q	IP check sum	36
D	VLAN tag field	14	R	Source IP address	38
E	DSAP (Destination Service Access Point) field	18	S	Destination IP address	42
F	SSAP (Source Service Access Point) field	19	T	TCP source port	46
G	Ctrl field	20	U	TCP destination port	48
H	Org Code field	21	V	Sequence number	50
I	Encapsulated data type	24	W	Confirmation field	54
J	IP version number	26	XY	IP header length and reserved bits	58
K	TOS field	27	Z	Resrvd bits and flags bit	59
L	Length of IP packet	28	a	Windows size field	60
M	ID	30	b	Others	62
N	Flags field	32			

The offsets of fields in the above table are their offsets in 802.3 data frames of SNAP+tag.

1.2 access-list

Use this command to create an access list to filter data packets. Use the **no** form of this command to remove the specified access list.

4. Standard IP access list (1 to 99, 1300 to 1999)

access-list id { **deny** | **permit** } { source source-wildcard | **host** source | **any** | **interface** idx } [**time-range** tm-range-name] [**log**]

5. Extended IP access list (100 to 199, 2000 to 2699)

access-list id { **deny** | **permit** } **protocol** { source source-wildcard | **host** source | **any** | **interface** idx } { destination destination-wildcard | **host** destination | **any** } [[**precedence** precedence] [**tos** tos]] [**dscp** dscp] [**ecn** ecn] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [**time-range** time-range-name] [**log**]

6. Extended MAC access list (700 to 799)

access-list id { **deny** | **permit** } { **any** | **host** source-mac-address | source-mac-address mask } { **any** | **host** destination-mac-address | destination-mac-address mask } [ethernet-type] [**cos** [out] [**inner** in]]

7. Extended expert access list (2700 to 2899)

access-list id { **deny** | **permit** } [protocol] [ethernet-type] [**cos** [out] [**inner** in]] [**VID** [out] [**inner** in]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [[**precedence** precedence] [**tos** tos]] [**dscp** dscp] [**ecn** ecn] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask]] [**int-flag-a**] [**int-flag-b**] [**time-range** time-range-name]

- When you select the Ethernet-type field or cos field:

access-list id { **deny** | **permit** } [ethernet-type] [**cos** [out] [**inner** in]] [**VID** [out] [**inner** in]] { **source** source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { **destination** destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [**udf** udf-id header pos value mask] [**time-range** time-range-name]

- When you select the protocol field:

access-list id { **deny** | **permit** } protocol [**VID** [out] [**inner** in]] { source source-wildcard | **host** source | **any** }

{ **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask] | [int-flag-a] [int-flag-b]] [**time-range** time-range-name]

- Extended expert ACLs of some important protocols:

Internet Control Message Protocol (ICMP)

access-list id { **deny** | **permit** } **icmp** [**VID** [out] [**inner** in]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

Transmission Control Protocol (TCP)

access-list id { **deny** | **permit** } **tcp** [**VID** [out] [**inner** in]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } [**operator** port [port]] { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [**operator** port [port]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [**time-range** time-range-name] [**match-all** tcp-flag | **established**] [[**udf** udf-id header pos value mask] | [int-flag-a] [int-flag-b]]

User Datagram Protocol (UDP)

access-list id { **deny** | **permit** } **udp** [**VID** [out] [**inner** in]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } [**operator** port [port]] { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [**operator** port [port]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask] | [int-flag-a] [int-flag-b]] [**time-range** time-range-name]

Parameter Description

Parameter	Description
id	Access list number. The ranges available are 1 to 99, 100 to 199, 1300 to 1999, 2000 to 2699, 2700 to 2899, and 700 to 799.
deny	If not matched, access is denied.
permit	If matched, access is permitted.
source	Specify the source IP address (host address or network address).
source-wildcard	It can be discontinuous, for example, 0.255.0.32.
protocol	IP protocol number. It can be one of EIGRP, GRE, IPINIP, IGMP, NOS, OSPF, ICMP, UDP, TCP, and IP. It can also be a number representing the IP protocol between 0 and 255. The important protocols such as ICMP, TCP, and UDP are described separately.
destination	Specify the destination IP address (host address or network address).
destination-wildcard	Wildcard of the destination IP address. It can be discontinuous, for example, 0.255.0.32.
fragment	Packet fragment filtering
fragment-ipid fragment-ipid	Fragment ID of the header in segmented packet
precedence	Specify the packet priority.

precedence	Packet precedence value (0 to 7)
range	Layer4 port number range of the packet.
lower	Lower limit of the layer4 port number.
upper	Upper limit of the layer4 port number.
time-range	Time range of packet filtering
time-range-name	Time range name of packet filtering
tos	Specify type of service.
tos	ToS value (0 to 15)
dscp	Differentiated service code point
dscp	Code point value, ranging from 0 to 63
ecn	Specifies the congestion notification type.
ecn	Specifies the congestion notification type value (0 to 3).
icmp-type	ICMP message type (0 to 255)
icmp-code	ICMP message type code (0 to 255)
icmp-message	ICMP message type name
operator	Operator (lt-smaller, eq-equal, gt-greater, neq-unequal, range-range)
port [port]	Port number; range needs two port numbers, while other operators only need one port number.
host source-mac-address	Source physical address
host destination-mac-address	Destination physical address
VID vid	Match the specified VID.
ethernet-type	Ethernet type
match-all	Match all the bits of the TCP flag.
tcp-flag	Match the TCP flag.
established	Match the RST or ACK bits, not other bits of the TCP flag.
text	Note
udf	Indicates the customized field.
udf-id	Indicates the ID of UDF. (Range:1 to 8)
header	Indicates the protocol layer.
pos	Indicates the offset. (Range:0 to 126)
value	Indicates the data (2 bytes).
mask	Indicates the mask (2 bytes).
int-flag	Matches the int header of the packets.

Defaults

None

Command**Mode**

Global configuration mode.

Usage Guide

To filter the data by using the access control list, you must first define a series of rule statements by using the access list. You can use ACLs of the appropriate types according to the security needs:

The standard IP ACL (1 to 99, 1300 to 1999) only controls the source IP addresses.

The extended IP ACL (100 to 199, 2000 to 2699) can enforce strict control over the source and destination IP addresses.

The extended MAC ACL (700 to 799) can match against the source/destination MAC addresses and Ethernet type.

The extended expert access list (2700 to 2899) is a combination of the above and can match and filter the VLAN ID.

For the layer-3 routing protocols including the unicast routing protocol and multicast routing protocol, the following parameters are not supported by the ACL: **precedence** precedence/**tos** tos/**fragments/fragment-ipid** fragment-ipid/**range** lower upper/**time-range** time-range-name

The TCP Flag includes part or all of the following:

- urg
- ack
- psh
- rst
- syn
- fin

The packet precedence is as below:

- critical
- flash
- flash-override
- immediate
- internet
- network
- priority
- routine

The service types are as below:

- max-reliability
- max-throughput
- min-delay
- min-monetary-cost
- normal

The ICMP message types are as below:

- administratively-prohibited
- dod-host-prohibited

- dod-net-prohibited
- echo
- echo-reply
- fragment-time-exceeded
- general-parameter-problem
- host-isolated
- host-precedence-unreachable
- host-redirect
- host-tos-redirect
- host-tos-unreachable
- host-unknown
- host-unreachable
- information-reply
- information-request
- mask-reply
- mask-request
- mobile-redirect
- net-redirect
- net-tos-redirect
- net-tos-unreachable
- net-unreachable
- network-unknown
- no-room-for-option
- option-missing
- packet-too-big
- parameter-problem
- port-unreachable
- precedence-unreachable
- protocol-unreachable
- redirect
- device-advertisement
- device-solicitation
- source-quench
- source-route-failed

- time-exceeded
- timestamp-reply
- timestamp-request
- ttl-exceeded
- unreachable

The TCP ports are as follows. A port can be specified by port name and port number:

- bgp
- chargen
- cmd
- daytime
- discard
- domain
- echo
- exec
- finger
- ftp
- ftp-data
- gopher
- hostname
- ident
- irc
- klogin
- kshell
- ldp
- login
- nntp
- pim-auto-rp
- pop2
- pop3
- smtp
- sunrpc
- syslog
- tacacs

- talk
- telnet
- time
- uucp
- whois
- www

The UDP ports are as follows. A UDP port can be specified by port name and port number.

- biff
- bootpc
- bootps
- discard
- dnsmx
- domain
- echo
- isakmp
- mobile-ip
- nameserver
- netbios-dgm
- netbios-ns
- netbios-ss
- ntp
- pim-auto-rp
- rip
- snmp
- snmptrap
- sunrpc
- syslog
- tacacs
- talk
- tftp
- time
- who
- xdmcp

The Ethernet types are as below:

- aarp
- appletalk
- decnet-iv
- diagnostic
- etype-6000
- etype-8042
- lat
- lavc-sca
- mop-console
- mop-dump
- mumps
- netbios
- vines-echo
- xns-idp

The UDF headers are as below:

- l2-head
- l3-head
- l4-head
- l5-head

Configuration 1. Example of the standard IP ACL

Examples

The following basic IP ACL allows the packets whose source IP addresses are 192.168.1.64 - 192.168.1.127 to pass:

```
FS(config)#access-list 1 permit 192.168.1.64 0.0.0.63
```

2. Example of the extended IP ACL

The following extended IP ACL allows the DNS messages and ICMP messages to pass:

```
FS(config)#access-list 102 permit tcp any any eq domain log
FS(config)#access-list 102 permit udp any any eq domain log
FS(config)#access-list 102 permit icmp any any echo log
FS(config)#access-list 102 permit icmp any any echo-reply
```

3. Example of the extended MAC ACL

This example shows how to deny the host with the MAC address 00d0f8000c0c to provide service with the protocol type 100 on gigabit Ethernet port 1/1. The configuration procedure is as below:

```
FS(config)#access-list 702 deny host 00d0f8000c0c any aarp
FS(config)# interface gigabitethernet 1/1
FS(config-if)# mac access-group 702 in
```

4. Example of the extended expert ACL

The following example shows how to create and display an extended expert ACL. This expert ACL denies all the TCP packets with the source IP address 192.168.12.3 and the source MAC address 00d0.f800.0044.

```
FS(config)#access-list 2702 deny tcp host 192.168.12.3 mac 00d0.f800.0044 any any
FS(config)# access-list 2702 permit any any any any
FS(config)# show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.12.3 mac 00d0.f800.0044 any any
10 permit any any any any
```

Related Commands

Command	Description
show access-lists	Show all the ACLs.
mac access-group	Apply the extended MAC ACL on the interface.

Platform N/A
Description

1.3 access-list list-remark

Use this command to write a helpful comment (remark) for an access list. Use the **no** form of this command to remove the remark.

```
access-list id list-remark text
no access-list id list-remark
```

Parameter Description

Parameter	Description
id	Access list number. Standard IP ACL: 1 to 99, 1300 to 1999. Extended IP ACL: 100 to 199, 2000 to 2699.

	Extended MAC ACL: 700 to 799. Extended Expert ACL: 2700 to 2899.
text	Comment that describes the access list.

Defaults The access lists have no remarks by default.

Command Mode Global configuration mode

Usage Guide You can use this command to write a helpful comment for a specified access list. If the specified access list does not exist, the command will create the access list, then add remarks for the access list.

Configuration Examples The following example writes a comment of “this acl is to filter the host 192.168.4.12” for ACL100.

```
FS(config)# ip access-list extended 100
FS(config)# access-list 100 list-remark this acl is to filter the host 192.168.4.12
```

Related Commands

Command	Description
show access- lists	Displays all access lists, including the remarks for the access lists.
show access-lists id	Displays the access list of a specified number, including the remarks for the access list.
show access-lists name	Displays the access list of a specified name, including the remarks for the access list.

Platform Description

1.4 access-list remark

Use this command to write a helpful comment (remark) for an entry in a numbered access list. Use the **no** form of this command to remove the remark.

access-list id remark text
no access-list id remark text

Parameter Description

Parameter	Description
id	Access list number. Standard IP ACL: 1 to 99, 1300 to 1999. Extended IP ACL: 100 to 199, 2000 to 2699. Extended MAC ACL: 700 to 799. Extended Expert ACL: 2700 to 2899.
text	Comment that describes the access list entry.

Defaults The access list entries have no remarks by default.

Command Global configuration mode

Mode

Usage Guide You can use this command to write a helpful comment for an entry in a specified access list. If the specified access list does not exist, the command will create the access list, then add remarks for the access entry.

Configuration The following example writes a comment for an entry in ACL102.

Examples

```
FS(config)# access-list 102 remark deny-host-10.1.1.1
```

Related Commands	Command	Description
	show access-lists	Displays all access lists, including the remarks for the access list entries.
	show access-lists id	Displays the access list of a specified number, including the remarks for the access list entry.
	show access-lists name	Displays the access list of a specified name, including the remarks for the access list entry.

Platform

Description

1.5 clear counters access-list

Use this command to clear counters of packets matching ACLs.

clear counters access-list [id | name]

Parameter Description	Parameter	Description
	id	Access list number
	name	Access list name

Defaults

Command Privileged EXEC mode

Mode

Usage Guide This command is used to clear the counters of packets matching the specified or all ACLs.

Configuration The following example clears the packet matching counter of ACL No. 2700:

Examples

```
FS #show access-lists 2700
expert access-list extended 2700
```



```

10 permit ip VID 4 host 192.168.3.55 any host 192.168.99.6 any (88 matches)
20 deny tcp any any eq login any any (33455 matches)
30 permit tcp any any host 192.168.6.9 any (10 matches)

FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# clear expert access-list counters 2700
FS(config)# end
FS #show access-lists 2700
expert access-list extended 2700
    10 permit ip VID 4 host 192.168.3.55 any host 192.168.99.6 any
    20 deny tcp any any eq login any any
    30 permit tcp any any host 192.168.6.9 any
    
```

Related Commands	Command	Description
	expert access-list	Defines an expert ACL.
	deny	Defines a deny ACL entry.
	permit	Defines a permits ACL entry.

Platform N/A
Description

1.6 clear access-list counters

Use this command to clear counters of packets matching the deny entries in ACLs.

clear access-list counters [id | name]

Parameter Description	Parameter	Description
	id	Access list number
	name	Access list name

Defaults

Command Mode Privileged EXEC mode

Usage Guide This command is used to clear the counters of packets matching the deny entries in ACLs.

Configuration Examples The following example clears the packet matching counter of ACL No. 1:

```

Before configuration:
FS #show access-lists
    
```

```
ip access-list standard 1
    10 deny host 50.1.1.2 (10 matches)
    20 permit host 60.1.1.2 (15 matches)
(10 packets filtered)
```

After configuration:

```
FS# end
FS# clear access-list counters
FS# show access-lists
ip access-list standard 1
    10 deny host 50.1.1.2 (10 matches)
    20 permit host 60.1.1.2 (15 matches)
```

Related Commands

Command	Description
expert access-list	Defines an expert ACL.
deny	Defines a deny ACL entry.
permit	Defines a permits ACL entry.

Platform N/A

Description

1.7 deny

One or multiple **deny** conditions are used to determine whether to forward or discard the packet. In ACL configuration mode, you can modify the existent ACL or configure according to the protocol details.

- Standard IP ACL

```
[sn] deny {source source-wildcard | host source | any} interface idx ][time-range tm-range-name] [ log ]
```

- Extended IP ACL

```
[ sn ] deny protocol source source-wildcard destination destination-wildcard [[ precedence precedence ] [ tos tos ] | [dscp dscp] [ecn ecn] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ udf udf-id header pos value mask ] [ time-range time-range-name ] [ log ]
```

Extended IP ACLs of some important protocols:

- Internet Control Message Prot (ICMP)

```
[ sn ] deny icmp { source source-wildcard | host source | any } { destination destination-wildcard | host destination | any } [ icmp-type ] [ [ icmp-type icmp-code ] ] [ icmp-message ] [ precedence precedence ] [ tos tos ] [ fragment ] [ fragment-ipid fragment-ipid ] [ udf udf-id header pos value mask ] [ time-range time-range-name ]
```

- Transmission Control Protocol (TCP)

```
[ sn ] deny tcp { source source-wildcard | host Source | any } [ operator port [ port ] ] { destination destination-wildcard | host destination | any } [ operator port [ port ] ] [ precedence precedence ] [ tos tos ] [ dscp dscp ] [ ecn ecn ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ udf udf-id header pos
```

value mask] [**time-range** time-range-name] [**match-all** tcp-flag | **established**]

- User Datagram Protocol (UDP)

[sn] **deny udp** { source source-wildcard | **host** source | **any** } [operator **port** [port]] { destination destination-wildcard | **host** destination | **any** } [operator **port** [port]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

3. Extended MAC ACL

[sn] **deny** { **any** | **host** source-mac-address } { **any** | **host** destination-mac-address } [ethernet-type] [**cos** [out]] [**inner** in]]

4. Extended expert ACL

[sn] **deny** [protocol] [ethernet-type] [**cos** [out]] [**inner** in]] [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask]] [int-flag-a] [int-flag-b]] [**time-range** time-range-name]

- When you select the ethernet-type field or cos field:

[sn] **deny** { [ethernet-type] [**cos** [out]] [**inner** in]] [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [**udf** udf-id header pos value mask] [**time-range** time-range-name]

- When you select the protocol field:

[sn] **deny protocol** [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask]] [int-flag-a] [int-flag-b]] [**time-range** time-range-name]

- Extended expert ACLs of some important protocols

Internet Control Message Protocol (ICMP)

[sn] **deny icmp** [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

Transmission Control Protocol (TCP)

[sn] **deny tcp** [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** Source | **any** } { **host** source-mac-address | **any** } [operator **port** [port]] { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [operator **port** [port]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp] [**ecn** ecn]] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [**time-range** time-range-name] [**match-all** tcp-flag | **established**] [[**udf** udf-id header pos value mask]] [int-flag-a] [int-flag-b]]

User Datagram Protocol (UDP)

[sn] **deny udp** [[**VID** [out]] [**inner** in]]] { source source-wildcard | **host** source | **any** } { **host** source-mac-address | **any** } [operator **port** [port]] { destination destination-wildcard | **host** destination | **any** } { **host** destination-mac-address | **any** } [operator **port** [port]] [[**precedence** precedence] [**tos** tos] | [**dscp** dscp]]

[**ecn** ecn] [**fragment**] [**fragment-ipid** fragment-ipid] [**range** lower upper] [[**udf** udf-id header pos value mask] | [int-flag-a] [int-flag-b]] [**time-range** time-range-name]

Address Resolution Protocol (ARP)

[sn] **deny arp** {vid vlan-id}[**host** source-mac-address | **any**] [**host** destination –mac-address | **any**] {sender-ip sender-ip-wildcard | **host** sender-ip | **any**} {sender-mac sender-mac-wildcard | **host** sender-mac | **any**} {target-ip target-ip-wildcard | **host** target-ip | **any**}[**udf** udf-id header pos value mask]

5. Extended IPv6 ACL

[sn] **deny protocol**{source-ipv6-prefix/prefix-length | **any** | **host** source-ipv6-address } {destination-ipv6-prefix / prefix-length | **any**| hostdestination-ipv6-address} [**dscp** dscp] [**flow-label** flow-label] [**fragment**] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

Extended ipv6 ACLs of some important protocols:

Internet Control Message Protocol (ICMP)

[sn]**deny icmp** {source-ipv6-prefix / prefix-length | any source-ipv6-address | **host**} {destination-ipv6-prefix / prefix-length| **host** destination-ipv6-address | **any**} [icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [**dscp** dscp] [**flow-label** flow-label] [**fragment**] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

Transmission Control Protocol (TCP)

[sn] **deny tcp** {source-ipv6-prefix / prefix-length | **host**source-ipv6-address | **any**}[operator **port**[port]] {destination-ipv6-prefix /prefix-length | **host** destination-ipv6-address | **any**} [operator **port** [port]] [**dscp** dscp] [**flow-label** flow-label] [**fragment**] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range** time-range-name] [**match-all** tcp-flag | **established**]

User Datagram Protocol (UDP)

[sn] **deny udp** {source-ipv6-prefix/prefix-length | **host** source-ipv6-address | **any**} [operator **port** [port]] {destination-ipv6-prefix /prefix-length | **host** destination-ipv6-address | **any**}[operator **port** [port]] [**dscp** dscp] [**flow-label** flow-label] [**fragment**] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range** time-range-name]

Parameter Description

Parameter	Description
sn	ACL entry sequence number
deny	If not matched, access is denied.
source	Specify the source IP address (host address or network address).
source-wildcard	It can be discontinuous, for example, 0.255.0.32.
protocol	IP protocol number. It can be one of EIGRP, GRE, IPINIP, IGMP, NOS, OSPF, ICMP, UDP, TCP, and IP. It can also be a number representing the IP protocol between 0 and 255. The important protocols such as ICMP, TCP, and UDP are described separately.
destination	Specify the destination IP address (host address or network address).
destination-wildcard	Wildcard of the destination IP address. It can be discontinuous, for example, 0.255.0.32.
fragment	Packet fragment filtering
fragment-ipid fragment-ipid	Fragment ID of the header in segmented packet
precedence	Specify the packet priority.
precedence	Packet precedence value (0 to 7)
range	Layer4 port number range of the packet.

lower	Lower limit of the layer4 port number.
upper	Upper limit of the layer4 port number.
time-range	Time range of packet filtering
time-range-name	Time range name of packet filtering
tos	Specify type of service.
tos	ToS value (0 to 15)
icmp-type	ICMP message type (0 to 255)
icmp-code	ICMP message type code (0 to 255)
icmp-message	ICMP message type name
operator	Operator (lt-smaller, eq-equal, gt-greater, neq-unequal, range-range)
port [port]	Port number; range needs two port numbers, while other operators only need one port number.
host source-mac-address	Source physical address
host destination-mac-address	Destination physical address
VID vid	Match the specified VID.
ethernet-type	Ethernet type
match-all	Match all the bits of the TCP flag.
tcp-flag	Match the TCP flag.
established	Match the RST or ACK bits, not other bits of the TCP flag.
udf	Indicates the customized field.
udf-id	Indicates the ID of UDF. (Range:1 to 8)
header	Indicates the protocol layer.
pos	Indicates the offset. (Range:0 to 126)
value	Indicates the data (2 bytes).
mask	Indicates the mask (2 bytes).
int-flag	Matches the int header of the packets.

source-ipv6-prefix	Source IPv6 network address or network type
destination-ipv6-prefix	Destination IPv6 network address or network type
prefix-length	Prefix mask length
source-ipv6-address	Source IPv6 address
destination-ipv6-address	Destination IPv6 address
dscp	Differential Service Code Point
dscp	Code value, within the range of 0 to 63
ecn	Specifies the congestion notification type.
ecn	Specifies the congestion notification type value (0 to 3).
flow-label	Flow label
flow-label	Flow label value, within the range of 0 to 1048575.
protocol	For the IPv6, the field can be ipv6 icmp tcp udp and number in the range 0 to 255
time-range	Time range of the packet filtering
time-range-name	Time range name of the packet filtering

Defaults No entry

Command mode ACL configuration mode.

Usage Guide Use this command to configure the filtering entry of ACLs in ACL configuration mode.

Configuration The following example shows how to create and display an extended expert ACL. This expert ACL denies all the TCP packets with the source IP address 192.168.4.12 and the source MAC address 001300498272.

Examples

```
FS(config)#expert access-list extended 2702
FS(config-exp-nacl)#deny tcp host
192.168.4.12 host 0013.0049.8272 any any
FS(config-exp-nacl)#permit any any any any
FS(config-exp-nacl)#show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.4.12 host 0013.0049.8272 any any
20 permit any any any any
FS(config-exp-nacl)#
```

This example shows how to use the extended IP ACL. The purpose is to deny the host with the IP address 192.168.4.12 to provide services through the TCP port 100 and apply the ACL to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)# ip access-list extended ip-ext-acl
FS(config-ext-nacl)# deny tcp host 192.168.4.12 eq 100 any
FS(config-ext-nacl)# show access-lists
ip access-list extended ip-ext-acl
10 deny tcp host 192.168.4.12 eq 100 any
FS(config-ext-nacl)#exit
FS(config)#interface gigabitethernet 1/1
FS(config-if)#ip access-group ip-ext-acl in
FS(config-if)#
```

This example shows how to use the extended MAC ACL. The purpose is to deny the host with the MAC address 0013.0049.8272 to send Ethernet frames of the type 100 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#mac access-list extended mac1
FS(config-mac-nacl)#deny host 0013.0049.8272 any aarp
FS(config-mac-nacl)# show access-lists
mac access-list extended mac1
10 deny host 0013.0049.8272 any aarp
FS(config-mac-nacl)#exit
FS(config)# interface gigabitethernet 1/1
FS(config-if)# mac access-group mac1 in
```

This example shows how to use the standard IP ACL. The purpose is to deny the host with the IP address 192.168.4.12 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#ip access-list standard 34
FS(config-ext-nacl)# deny host 192.168.4.12
FS(config-ext-nacl)#show access-lists
```

```
ip access-list standard 34
10 deny host 192.168.4.12
FS(config-ext-nacl)#exit
FS(config)# interface gigabitethernet 1/1
FS(config-if)# ip access-group 34 in
```

This example shows how to use the extended IPv6 ACL. The purpose is to deny the host with the IP address 192.168.4.12 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#ipv6 access-list extended v6-acl
FS(config-ipv6-nacl)#11 deny ipv6 host 192.168.4.12 any
FS(config-ipv6-nacl)#show access-lists
ipv6 access-list extended v6-acl
11 deny ipv6 host 192.168.4.12 any
FS(config-ipv6-nacl)# exit
FS(config)# interface gigabitethernet 1/1
FS(config-if)# ipv6 traffic-filter v6-acl in
```

Related Commands

Command	Description
show access-lists	Displays all ACLs.
ipv6 traffic-filter	Applies the extended IPv6 ACL on the interface.
ip access-group	Applies the IP ACL on the interface.
mac access-group	Applies the extended MAC ACL on the interface.
ip access-list	Defines an IP ACL.
mac access-list	Defines an extended MAC ACL.
expert access-list	Defines an extended expert ACL.
ipv6 access-list	Defines an extended IPv6 ACL.
permit	Permits the access.

Platform N/A

Description

1.8 expert access-group

Use this command to apply the specified expert access list on the specified interface or globally. Use the **no** form of the command to remove the application.

```
expert access-group { id | name } { in | out } [ counter-only ] [ forward-plane ] [ priority ]
no expert access-group { id | name } { in | out } [ counter-only ] [ counter-only ] [ forward-plane ] [ priority ]
```

Parameter Description

Parameter	Description
id	Expert access list number: 2700 to 2899
name	Name of the expert access list
in	Specifies filtering on inbound packets.
out	Specifies filtering on outbound packets.

counter-only	Specifies the ACL dedicated for packet statistics on an interface.
forward-plane	Specifies the ACL dedicated for the forwarding plane
priority	Sets a higher priority for the interface configured with an SVI interface (only configured on the SVI interface and effective on the forwarding plane).

Defaults No expert access list is applied on the interface or globally.

Command mode Interface configuration mode, global configuration mode.

Usage Guide This command is used to apply the specified access list on the interface or globally to control the input and output data streams on the interface or globally. Use the **show access-group** command to view the setting.

Configuration The following example shows how to apply the **access-list accept_00d0f8xxxxx** only to Gigabit interface 0/1:

Examples

```
FS(config)# interface GigaEthernet 0/1
FS(config-if)# expert access-group
accept_00d0f8xxxxx_only in
```

The following example applies the ACL numbered 2700 on interface fastEthernet0/1 to collect statistics on incoming packets:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)#expert access-group 2700 in counter-only
```

The following example applies the ACL numbered 2700 on interface fastEthernet0/1 to the forwarding plane:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)#expert access-group 2700 in forward-plane
```

Related Commands

Command	Description
show access-group	Displays the ACL configuration.

Platform N/A

Description

1.9 expert access-list advanced

Use this command to create an advanced expert access list and place the device in expert advanced access list configuration mode. Use the **no** form of this command to remove the advanced expert access list.

expert access-list advanced name

no expert access-list advanced name

Parameter Description

Parameter	Description
name	Name of the advanced expert access list

Defaults None

Command mode Global configuration mode

Usage Guide Use this command to create an advanced expert access list (namely, ACL80) to match your custom fields.

Configuration The following example creates an advanced expert access list named adv-acl.

Examples

```
FS(config)# expert access-list advanced adv-acl
FS(config-exp-dacl)# show access-lists
expert access-list advanced adv-acl
```

Related Commands

Command	Description
show access-lists	Displays all access lists.
show access-lists name	Displays the access list of a specified name.

Platform N/A

Description

1.10 expert access-list extended

Use this command to create an extended expert access list. Use the **no** form of the command to remove the ACL.

expert access-list extended {id | name}

no expert access-list extended {id | name}

Parameter Description

Parameter	Description
id	Extended expert access list number: 2700 to 2899
name	Name of the extended expert access list

Defaults None

Command mode Global configuration mode.

Usage Guide Use the **show access-lists** command to display the ACL configurations.

Configuration Create an extended expert ACL named exp-acl:

Examples

```
FS(config)# expert access-list extended exp-acl
FS(config-exp-nacl)# show access-lists expert access-list extended exp-acl
FS(config-exp-nacl)#
```

Create an extended expert ACL numbered 2704:

```
FS(config)# expert access-list extended 2704
FS(config-exp-nacl)# show access-lists access-list extended 2704
```

```
FS(config-exp-nacl)#
```

Related Commands

Command	Description
show access-lists	Displays the extended expert ACLs

Platform N/A
Description

1.11 expert access-list counter

Use this command to enable the counter of packets matching the specified expert access list. Use the **no** form of this command to disable this function.

expert access-list counter { id | name }

no expert access-list counter { id | name }

Parameter Description

Parameter	Description
id	Expert access list number: 2700 to 2899.
name	Name of the access list.

Defaults The counter of the packets matching the expert access list is disabled.

Command mode Global configuration mode

Usage Guide Use this command to enable the counter of packets matching the specified expert access list, so that you can analyze the counters to learn whether the network is attacked by the illegal packets.

Configuration Examples The following example enables the counter of packets matching the extended expert access list named exp-acl:

```
FS(config)# expert access-list counter exp-acl
FS(config)# show access-lists
expert access-list extended exp-acl
 10 permit ip VID 4 host 192.168.3.55 any host 192.168.99.6 any (16 matches)
 20 deny tcp any any eq login any any (78 matches)
```

The following example disables the counter of packets matching the extended expert access list named exp-acl.

```
FS(config)#no expert access-list counter exp-acl
FS(config)# show access-lists
expert access-list extended 2700
 10 permit ip VID 4 host 192.168.3.55 any host 192.168.99.6 any
 20 deny tcp any any eq login any any
```

Related Commands

Command	Description
---------	-------------

show access-lists	Displays the extended expert ACL.
--------------------------	-----------------------------------

Platform
Description N/A

1.12 expert access-list new-fragment-mode

Use this command to switch the matching mode of fragmentation packets. Use the **no** form of this command to restore the default matching mode of fragmentation packets.

expert access-list new-fragment-mode { id | name }
no expert access-list new-fragment-mode { id | name }

Parameter	Parameter	Description
Description	id	Expert access list number: 2700 to 2899.
	name	Name of the expert access list.

Defaults Use the default matching mode of fragmentation packets. By default, if the access rule is tagged with fragment, it will match all packets except for the first fragmentation packet. If the access rule is not tagged with fragment, all packets including the first and all subsequent fragmentation packets will be matched.

Command mode Global configuration mode

Usage Guide Use this command to switch and control the matching mode of access rules to fragmentation packets.

Configuration Examples The following example switches the matching mode of fragmentation packets for the ACL 2700 from the default mode to a new matching mode:

```
FS(config)#expert access-list new-fragment-mode 2700
```

Related Commands	Command	Description
	-	-

Platform
Description N/A

1.13 expert access-list resequence

Use this command to resequence an expert access list. Use the **no** form of this command to restore the default order of access entries.

expert access-list resequence { id | name } start-sn inc-sn
no expert access-list resequence { id | name }

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
id	Expert access list number: 2700 to 2899.
name	Name of the expert access list
start-sn	Start sequence number. Range: 1 to 2147483647
inc-sn	Increment of the sequence number. Range: 1 to 2147483647

Defaults start-sn: 10
inc-sn: 10

Command mode Global configuration mode

Usage Guide Use this command to change the order of the access entries.

Configuration The following example resequences entries of expert access list "exp-acl":

Examples Before the configuration:

```
FS# show access-lists
expert access-list extended exp-acl
 10 permit ip any any any any
 20 deny ip any any any any
```

After the configuration:

```
FS# config
FS(config)# expert access-list resequence exp-acl 21 43
FS(config)# exit
FS# show access-lists
expert access-list extended exp-acl
 21 permit ip any any any any
 64 deny ip any any any any
```

Related Commands	Command	Description
	show access-lists	Displays all access lists.

Platform N/A
Description

1.14 global ip access-group

Use this command to apply the global access list on the interface. Use the **no** form of this command to remove the global access list from the interface.

global ip access-group
no global ip access-group

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the global access list is applied on the interface.

Command mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example applies the global access list on interface fastEthernet0/0.

```
FS(config)# interface fastEthernet 0/0
FS(config-if-GigabitEthernet 0/0)#global ip access-group
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.15 ip access-group

Use this command to apply a specific access list to an interface or globally. Use the **no** form of this command to remove the access list from the interface.

ip access-group { id | name } { **in** | **out** } [**counter-only**] | [**forward-plane**] | [**priority**]
no ip access-group { id | name } { **in** | **out** } [**counter-only**] | [**forward-plane**] | [**priority**]

Parameter	Parameter	Description
Description	id	IP access list or extended IP access list number: 1 to 199, 1300 to 2699
	name	Name of the IP ACL
	in	Filters the incoming packets of the interface.
	out	Filters the outgoing packets of the interface.
	reflect	Enables the reflexive ACL.
	counter-only	Specifies the ACL dedicated for packet statistics on an interface.
	forward-plane	Specifies the ACL dedicated for the forwarding plane
	priority	Sets a higher priority for the interface configured with an SVI interface (only configured on the SVI interface and effective on the forwarding plane).

Defaults No access list is applied on the interface or globally by default.

Command mode Interface configuration mode, global configuration mode.

Usage Guide Use this command to control access to a specified interface or globally. Use the **expert access-group { id | name } { in | out } counter-only** command on the interface to only collect packet statistics and not filter packets.

Configuration Examples The following example applies the ACL 120 on interface fastEthernet0/0 to filter the incoming packets:

```
FS(config)# interface fastEthernet 0/0
FS(config-if-GigabitEthernetFastEthernet 0/0)#ip access-group 120 in
```

The following example applies the ACL numbered 120 on fastEthernet0/1 to collect statistics on incoming packets:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)#ip access-group 120 in counter-only
```

The following example applies the ACL numbered 120 globally to filter packets on the forwarding plane:

```
FS(config)# ip access-group 120 in forward-plane
```

Related Commands

Command	Description
show ip access-group	Displays all standard and extended IP ACL.
show ip access-group interface interface-name	Displays all standard and extended IP ACL on a specified interface.

Prompt 1: When an ACL is attached, if another ACL of the following type has been attached on the same direction of the interface, then an error message is displayed:
Standard IP ACL, Extended IP ACL, Extended MAC IP, Expert ACL
Another acl has attached at FastEthernet 0/2, Operation fail.

2: When an ACL is discarded, if the specified ACL is not attached on the specified direction of the interface, then an error message is displayed:
The acl has not attached at %s, Operation fail

1.16 ip access-list

Use this command to create a standard IP access list or extended IP access list. Use the **no** form of the command to remove the access list.

```
ip access-list {extended | standard} {id | name}
no ip access-list {extended | standard} {id | name}
```

Parameter Description

Parameter	Description
id	Access list number: Standard: 1 to 99, 1300 to 1999; Extended: 100 to 199, 2000 to 2699.

name	Name of the access list
------	-------------------------

Defaults None

Command mode Global configuration mode

Usage Guide Configure a standard access list if you need to filter on source address only. If you want to filter on anything other than source address, you need to create an extended access list.
Refer to **deny** or **permit** in the two modes. Use the **show access-lists** command to display the ACL configurations.

Configuration Examples The following example creates a standard access list named std-acl.

```
FS(config)# ip access-list standard std-acl
FS(config-std-nacl)# show access-lists
ip access-list standard std-acl
FS(config-std-nacl)#
```

The following example creates an extended ACL numbered 123:

```
FS(config)# ip access-list extended 123
FS(config-ext-nacl)# show access-lists
ip access-list extended 123
```

Related Commands	Command	Description
	show access-lists	

Platform Description N/A

1.17 ip access-list log-update interval

Use this command to configure the interval at which the IPv4 access list log is updated. Use the **no** form of this command to restore the default interval.

ip access-list log-update interval time
no ip access-list log-update interval

Parameter Description	Parameter	Description
	time	

Defaults The default interval at which the IPv4 access list log is updated is 5 minutes.

Command mode Global configuration mode

Usage Guide Use this command to configure the interval at which the IPv4 access list log is updated.

Configuration The following example configures the interval for the IPv4 access list log update to 10 minutes:

```

Examples
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# ip access-list log-update interval 10
    
```

Related Commands	Command	Description
	ip access-list	Defines an IPv4 access list.
	deny	Defines the deny access entries.
	permit	Defines the permit access entries.
	show running	Displays running configurations of the device.

Platform N/A
Description

1.18 ip access-list counter

Use this command to enable the counter of packets matching the standard or extended IP access list. Use the **no** form of this command to disable the counter.

```

ip access-list counter { id | name }
no ip access-list counter { id | name }
    
```

Parameter Description	Parameter	Description
	id	IP access list number: Standard IP access list: 1 to 99, 1300 to 1999; Extended IP access list: 100 to 199, 2000 to 2699.
	name	Name of the IP access list.

Defaults The counter of packets matching the standard or extended IP access list is disabled by default.

Command mode Global configuration mode

Usage Guide N/A

Configuration The following example enables the counter of packets matching the standard access list:


```

Examples
FS(config)# ip access-list counter std-acl
FS(config-std-nacl)# show access-lists
ip access-list standard std-acl
 10 permit 195.168.6.0 0.0.0.255 (999 matches)
 20 deny host 5.5.5.5 time-range tm (2000 matches)
    
```

The following example disables the counter of packets matching the standard access list:

```

FS(config)#no ip access-list counter std-acl
FS(config-std-nacl)# show access-lists
ip access-list standard std-acl
 10 permit 195.168.6.0 0.0.0.255
 20 deny host 5.5.5.5 time-range tm
    
```

Related Commands

Command	Description
show access-lists	Displays all access lists.

Platform Description N/A

1.19 ip access-list new-fragment-mode

Use this command to switch the matching mode of fragmentation packets of standard or extended IP access list. Use the **no** form of this command to restore the default matching mode of fragmentation packets.

```

ip access-list new-fragment-mode { id | name }
no ip access-list new-fragment-mode { id | name }
    
```

Parameter Description

Parameter	Description
id	IP access list number: Standard IP access list: 1 to 99, 1300 to 1999; Extended IP access list: 100 to 199, 2000 to 2699.
name	Name of the standard or extended IP access list

Defaults Use the default matching mode of fragmentation packets. By default, if the access rule is tagged with fragment, it will match all packets except for the first fragmentation packet. If the access rule is not tagged with fragment, all packets including the first and all subsequent fragmentation packets will be matched.

Command mode Global configuration mode

Usage Guide This command is used to switch and control the fragmentation packet matching mode of access rules.

Configuration The following example switches the fragmentation packet matching mode of the ACL 100 from the default mode

Examples to a new mode:

```
FS(config)#ip access-list new-fragment-mode 100
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.20 ip access-list resequence

Use this command to resequence a standard or extended IP access list. Use the **no** form of this command to restore the default order of access entries.

ip access-list resequence { id | name } start-sn inc-sn

no ip access-list resequence { id | name }

Parameter Description

Parameter	Description
id	IP access list number: Standard IP access list: 1 to 99, 1300 to 1999; Extended IP access list: 100 to 199, 2000 to 2699.
name	Name of the standard or extended IP access list
start-sn	Start sequence number. Range: 1 to 2147483647
inc-sn	Increment of the sequence number. Range: 1 to 2147483647

Defaults start-sn: 10
inc-sn: 10

Command mode Global configuration mode

Usage Guide Use this command to change the order of the access entries.

Configuration Examples The following example resequences entries of ACL1:

Before the configuration:

```
FS# show access-lists
ip access-list standard 1
10 permit host 192.168.4.12
20 deny any any
```

After the configuration:

```
FS# config
FS(config)# ip access-list resequence 1 21 43
```

```
FS(config)# exit
FS# show access-lists
ip access-list standard 1
21 permit host 192.168.4.12
64 deny any any
```

Related Commands	Command	Description
		show access-lists

Platform N/A

Description

1.21 ipv6 access-list

Use this command to create an IPv6 access list and to place the device in IPv6 access list configuration mode. Use the **no** form of this command to remove the access list.

- ipv6 access-list** name
- no ipv6 access-list** name

Parameter Description	Parameter	Description
		name

Defaults None

Command mode Global configuration mode

Usage Guide To filter the IPv6 packets through the access list, you need to define an IPv6 access list by using the **ipv6 access-list** command.

Configuration Examples The following example creates an IPv6 access list named v6-acl:

```
FS(config)# ipv6 access-list v6-acl
FS(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
FS(config-ipv6-nacl)#
```

Related Commands	Command	Description
		show access-lists

Platform N/A

Description

1.22 ipv6 access-list counter

Use this command to enable the counter of packets matching the IPv6 access list. Use the **no** form of this command to disable the counter.

ipv6 access-list counter name

no ipv6 access-list counter name

Parameter Description	Parameter	Description
	name	Name of the IPv6 access list.

Defaults -

Command mode Global configuration mode

Usage Guide Use this command to enable the counter of packets matching the IPv6 access list to monitor the IPv6 packets matching and filtering.

Configuration Examples The following example enables the counter of packets matching the IPv6 access list named v6-acl:

```
FS(config)# ipv6 access-list v6-acl
FS(config-ipv6-nacl)# show access-lists
ipv6 access-list acl-v6
 10 permit icmp any any (7 matches)
 20 deny tcp any any (7 matches)
```

The following example disables the counter of packets matching the IPv6 access list named v6-acl:

```
FS(config)#no ipv6 access-list v6-acl counter
FS(config-ipv6-nacl)# show access-lists
ipv6 access-list acl-v6
 10 permit icmp any any
 20 deny tcp any any
```

Related Commands	Command	Description
	show access-lists	Displays all access lists.

Platform N/A

Description

1.23 ipv6 access-list log-update interval

Use this command to configure the interval at which the IPv6 access list log is updated. Use the **no** form of this command to restore the default interval.

ipv6 access-list log-update interval time

no ipv6 access-list log-update interval

Parameter Description	Parameter	Description
	time	For the access rule with the logging option, a packet hit is output at the interval of ACL logging output. The interval ranges from 0 to 1440 minutes, and the default value is 5 minutes, indicating that the ACL matching log of a specific flow is output every 5 minutes. 0 indicates that no ACL logging is output.

Defaults N/A

Command mode Global configuration mode

Usage Guide Use this command to configure the interval at which the IPv6 access list log is updated.

Configuration Examples The following example configures the interval for the IPv6 access list log update to 10 minutes:

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# ipv6 access-list log-update interval 9
```

Related Commands	Command	Description
	ipv6 access-list	Defines an IPv6 access list.
	deny	Defines the deny access entries.
	permit	Defines the permit access entries.
	show running	Displays the running configurations of the device.

Platform Description N/A

1.24 ipv6 access-list resequence

Use this command to resequence an IPv6 access list. Use the **no** form of this command to restore the default order of access entries.

ipv6 access-list resequence name start-sn inc-sn
no ipv6 access-list resequence name

Parameter Description	Parameter	Description
	name	Name of the IPv6 access list
	start-sn	Start sequence number. Range: 1 to 2147483647
	inc-sn	Increment of the sequence number. Range: 1 to 2147483647

Defaults start-sn: 10
inc-sn: 10

Command mode Global configuration mode

Usage Guide Use this command to change the order of the access entries.

Configuration The following example resequences entries of IPv6 access list "v6-acl":

Examples Before the configuration:

```
FS# show access-lists
ipv6 access-list v6-acl
 10 permit ipv6 any any
 20 deny ipv6 any any
```

After the configuration:

```
FS# config
FS(config)# ipv6 access-list resequence v6-acl 21 43
FS(config)# exit
FS# show access-lists
ipv6 access-list v6-acl
 21 permit ipv6 any any
 64 deny ipv6 any any
```

Related Commands

Command	Description
show access-lists	Displays all access lists..

Platform N/A

Description

1.25 ipv6 traffic-filter

Use this command to apply an IPv6 access list on the specified interface or globally. Use the **no** form of the command to remove the IPv6 access list from the interface.

ipv6 traffic-filter name { **in** | **out** } [**counter-only**] [**forward-plane**] [**priority**]

no ipv6 traffic-filter name { **in** | **out** } [**counter-only**] [**forward-plane**] [**priority**]

Parameter Description

Parameter	Description
name	Name of IPv6 access list
in	Specifies filtering on inbound packets
out	Specifies filtering on outbound packets

forward-plane	Specifies the ACL dedicated for the forwarding plane
counter-only	Specifies the ACL dedicated for packet statistics on an interface.
priority	Sets a higher priority for the interface configured with an SVI interface (only configured on the SVI interface and effective on the forwarding plane).

Defaults None

Command mode Global/Interface configuration mode.

Usage Guide Use this command to apply the IPv6 access list to a specified interface or globally to filter the inbound or outbound packets.

Configuration The following example applies the IPv6 access list named **v6-acl** to interface GigabitEthernet 0/1:

Examples

```
FS(config)# interface GigaEthernet 0/1
FS(config-if)# ipv6 traffic-filter v6-acl in
```

The following example applies the ACL named access-list v6-acl globally:

```
FS(config)# ipv6 traffic-filter v6-acl in
```

The following example applies IPv6 ACL named v6-acl on fastEthernet0/1 to filter incoming packets on the forwarding plane:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)# ipv6 traffic-filter v6-acl in forward-plane
```

Related Commands

Command	Description
show access-group	Displays ACL configurations on the interface.

Platform N/A

Description

1.26 list-remark

Use this command to write a helpful comment (remark) for an access list. Use the **no** form of this command to remove the remark.

list-remark text

no list-remark

Parameter Description

Parameter	Description
text	Comment that describes the access list.

Defaults The access lists have no remarks by default.

Command ACL configuration mode

mode

Usage Guide You can use this command to write a helpful comment for a specified access list.

Configuration The following example writes a comment of “this acl is to filter the host 192.168.4.12” for ACL102.

```

Examples
FS(config)# ip access-list extended 102
FS(config-ext-nacl)# list-remark this acl is to filter the host 192.168.4.12
FS(config-ext-nacl)# show access-lists
ip access-list extended 102
deny ip host 192.168.4.12 any
1000 hits
this acl is to filter the host 192.168.4.12
FS(config-ext-nacl)#
    
```

Related Commands	Command	Description
	show access-lists	Displays all access lists.
	ip access-list	Defines an IPv4 access list.
	access-list list remark	Adds a helpful comment for an access list in global configuration mode.

Platform N/A

Description

1.27 mac access-group

Use this command to apply the specified MAC access list on the specified interface or globally. Use the **no** form of the command to remove the access list from the interface.

mac access-group { id | name } { **in** | **out** } [**counter-only**] | [**forward-plane**]] [**priority**]

no mac access-group { id | name } { **in** | **out** } [**counter-only**] | [**forward-plane**]] [**priority**]

Parameter Description	Parameter	Description
	id	MAC access list number. The range is from 700 to 799.
	name	Name of the MAC access list
	in	Specifies filtering on the inbound packets.
	out	Specifies filtering on the outbound packets.
	forward-plane	Specifies the ACL dedicated for the forwarding plane
	counter-only	Specifies the ACL dedicated for packet statistics on an interface.
	priority	Sets a higher priority for the interface configured with an SVI interface (only configured on the SVI interface and effective on the forwarding plane).

Defaults None

Command mode Interface configuration mode , global configuration mode.

Usage Guide Use this command to apply the access list to the interface or globally to filter the inbound or outbound packets based on the MAC address. Use the **mac access-group { id | name } { in | out } counter-only** command on the interface to only collect packet statistics and not filter packets.

Configuration Examples The following example applies the MAC access-list **accept_00d0f8xxxxxx_only** to interface GigabitEthernet 1/1:

```
FS(config)# interface GigaEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# mac access-group accept_00d0f8xxxxxx_only in
```

The following example applies the ACL numbered 700 on fastEthernet0/1 to collect statistics on incoming packets:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)#mac access-group 700 in counter-only
```

The following example applies the ACL numbered 700 on fastEthernet0/1 to filter packets on the forwarding plane:

```
FS(config)# interface fastEthernet 0/1
FS(config-if-FastEthernet 0/1)#mac access-group 700 in forward-plane
```

Related Commands	Command	Description
	show access-group	

Platform N/A

Description

1.28 mac access-list extended

Use this command to create an extended MAC access list. Use the **no** form of the command to remove the MAC access list.

mac access-list extended { id | name }

no mac access-list extended { id | name }

Parameter Description	Parameter	Description
		id
	name	Name of the extended MAC access list

Defaults None

Command mode Global configuration mode.

Usage Guide To filter the packets based on the MAC address, you need to define a MAC access list by using the **mac access-list extended** command.

Configuration The following command creates an extended MAC access list named mac-acl:

```
FS(config)# mac access-list extended mac-acl
FS(config-mac-nacl)# show access-lists mac access-list extended mac-acl
```

The following command creates an extended MAC access list numbered 704:

```
FS(config)# mac access-list extended 704
FS(config-mac-nacl)# show access-lists mac access-list extended 704
```

Related Commands	Command	Description
		show access-lists

Platform N/A

Description

1.29 mac access-list counter

Use this command to enable the counter of packet matching the extended MAC access list. Use the **no** form of this command to disable the counter.

mac access-list counter { id | name }

no mac access-list counter { id | name }

Parameter Description	Parameter	Description
		id
	name	Name of the extended MAC access list

Defaults The counter is disabled by default.

Command mode Global configuration mode

Usage Guide Use this command to enable the counter of packets matching the MAC access list to monitor the packets matching and filtering.

Configuration The following example enables the counter of packet matching the extended MAC access list named mac-acl:

```
FS(config)# mac access-list counter mac-acl
FS(config)# show access-lists
mac access-list extended mac-acl
 10 permit host 0023.56ac.8965 any (170 matches)
 20 deny any any etype-any cos 6 (239 matches)
```

The following example disables the counter of packet matching the extended MAC access list named mac-acl:

```
FS(config)#no mac access-list counter mac-acl
FS(config)# show access-lists
mac access-list extended mac-acl
 10 permit host 0023.56ac.8965 any
 20 deny any any etype-any cos 6
```

Related Commands	Command	Description
		show access-lists

Platform N/A

Description

1.30 mac access-list resequence

Use this command to resequence an extended MAC access list. Use the **no** form of this command to restore the default order of access entries.

mac access-list resequence { id | name } start-sn inc-sn

no mac access-list resequence { id | name }

Parameter Description	Parameter	Description
		id
	name	Name of the extended MAC access list
	start-sn	Start sequence number. Range: 1 to 2147483647
	inc-sn	Increment of the sequence number. Range: 1 to 2147483647

Defaults
 start-sn: 10
 inc-sn: 10

Command mode Global configuration mode

Usage Guide Use this command to change the order of the access entries.

Configuration Examples The following example resequences entries of extended MAC access list "mac-acl":

Before the configuration:

```
FS# show access-lists
mac access-list extended mac-acl
 10 permit any any etype-any
 20 deny any any etype-any
```

After the configuration:

```
FS# config
```

```
FS(config)# mac access-list resequence exp-acl 21 43
FS(config)# exit
FS# show access-lists
mac access-list extended mac-acl
 21 permit any any etype-any
 64 deny any any etype-any
```

Related Commands

Command	Description
show access-lists	Displays all access lists..

Platform N/A

Description

1.31 permit

One or multiple **permit** conditions are used to determine whether to forward or discard the packet. In ACL configuration mode, you can modify the existent ACL or configure according to the protocol details.

5. Standard IP ACL

```
[ sn ] permit {source source-wildcard | host source | any | interface idx } [ time-range tm-range-name ] [ log ]
```

6. Extended IP ACL

```
[ sn ] permit protocol source source-wildcard destination destination-wildcard [ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ udf udf-id header pos value mask ] [ time-range time-range-name ] [ log ]
```

Extended IP ACLs of some important protocols:

Internet Control Message Protocol (ICMP)

```
[ sn ] permit icmp { source source-wildcard | host source | any } { destination destination-wildcard | host destination | any } [ icmp-type ] [ [ icmp-type [ icmp-code ] ] | [ icmp-message ] ] [ [ precedence precedence ] [ tos tos ] ] [ dscp dscp ] [ ecn ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ udf udf-id header pos value mask ] [ time-range time-range-name ]
```

Transmission Control Protocol (TCP)

```
[ sn ] permit tcp { source source-wildcard | host Source | any } [ operator port [ port ] ] { destination destination-wildcard | host destination | any } [ operator port [ port ] ] [ [ precedence precedence ] [ tos tos ] ] [ dscp dscp ] [ ecn ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ udf udf-id header pos value mask ] [ time-range time-range-name ] [ match-all tcp-flag | established ]
```

User Datagram Protocol (UDP)

```
[ sn ] permit udp { source source-wildcard | host source | any } [ operator port [ port ] ] { destination destination-wildcard | host destination | any } [ operator port [ port ] ] [ [ precedence precedence ] [ tos tos ] ] [ dscp dscp ] [ ecn ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ udf udf-id header pos value mask ] [ time-range time-range-name ]
```

7. Extended MAC ACL

```
[sn] permit { any | host source-mac-address | source-mac-address mask } { any | host destination-mac-address | destination-mac-address mask } [ ethernet-type ] [ cos [ out ] ] [ inner in ] ]
```

8. Extended expert ACL

```
[sn] permit [protocol] [ ethernet-type ] [ cos [ out ] [ inner in ] ] [ VID [ out ] [ inner in ] ] { source source-wildcard |
host source | any } { host source-mac-address | any } { destination destination-wildcard | host destination | any }
{ host destination-mac-address | any } [ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn ecn ] ] [ fragment ]
[ fragment-ipid fragment-ipid ] [ range lower upper ] [ [ udf udf-id header pos value mask ] | [ int-flag-a ] [ int-flag-b ] ]
[ time-range time-range-name ]
```

When you select the Ethernet-type field or cos field:

```
[sn] permit { ethernet-type | cos [ out ] [ inner in ] } [ VID [ out ] [ inner in ] ] { source source-wildcard | host source | any }
{ host source-mac-address | any } { destination destination-wildcard | host destination | any } { host
destination-mac-address | any } [ udf udf-id header pos value mask ] [ time-range time-range-name ]
```

When you select the protocol field:

```
[sn] permit protocol [ VID [ out ] [ inner in ] ] { source source-wildcard | host Source | any } { host source-mac-address |
any } { destination destination-wildcard | host destination | any } { host destination-mac-address | any }
[ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn ecn ] ] [ fragment ] [ range lower upper ] [ [ udf udf-id
header pos value mask ] | [ int-flag-a ] [ int-flag-b ] ] [ time-range time-range-name ]
```

Extended expert ACLs of some important protocols:

Internet Control Message Protocol (ICMP)

```
[sn] permit icmp [ VID [ out ] [ inner in ] ] { source source-wildcard | host source | any } { host source-mac-address |
any } { destination destination-wildcard | host destination | any } { host destination-mac-address | any }
[ icmp-type ] [ [ icmp-type icmp-code ] ] [ icmp-message ] [ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn
ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ udf udf-id header pos value mask ] [ time-range
time-range-name ]
```

Transmission Control Protocol (TCP)

```
[sn] permit tcp [ VID [ out ] [ inner in ] ] { source source-wildcard | host Source | any } { host source-mac-address |
any } [ operator port [ port ] ] { destination destination-wildcard | host destination | any } { host
destination-mac-address | any } [ operator port [ port ] ] [ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn
ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ [ udf udf-id header pos value mask ] |
[ int-flag-a ] [ int-flag-b ] ] [ time-range time-range-name ] [ match-all tcp-flag | established ]
```

User Datagram Protocol (UDP)

```
[sn] permit udp [ VID [ out ] [ inner in ] ] { source source-wildcard | host source | any } { host source-mac-address |
any } [ operator port [ port ] ] { destination destination-wildcard | host destination | any } { host
destination-mac-address | any } [ operator port [ port ] ] [ [ precedence precedence ] [ tos tos ] | [ dscp dscp ] [ ecn
ecn ] ] [ fragment ] [ fragment-ipid fragment-ipid ] [ range lower upper ] [ [ udf udf-id header pos value mask ] |
[ int-flag-a ] [ int-flag-b ] ] [ time-range time-range-name ]
```

Address Resolution Protocol (ARP)

```
[sn] permit arp [ vid vlan-id ] { host source-mac-address | any } { host destination-mac-address | any } { sender-ip
sender-ip-wildcard | host sender-ip | any } { sender-mac sender-mac-wildcard | host sender-mac | any } { target-ip
target-ip-wildcard | host target-ip | any } [ udf udf-id header pos value mask ]
```

9. Extended IPv6 ACL

```
[sn] permit protocol { source-ipv6-prefix / prefix-length | any | host source-ipv6-address } { destination-ipv6-prefix /
prefix-length | any | host destination-ipv6-address } [ dscp dscp ] [ flow-label flow-label ] [ fragment ] [ range lower
upper ] [ udf udf-id header pos value mask ] [ time-range time-range-name ]
```

Extended IPv6 ACLs of some important protocols:

Internet Control Message Protocol (ICMP)

```
[sn] permit icmp { source-ipv6-prefix / prefix-length | any source-ipv6-address | host } { destination-ipv6-prefix /
```

prefix-length | **host** destination-ipv6-address | **any** } [icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [dscp dscp] [**flow-label** flow-label][**fragment**] [**udf** udf-id header pos value mask] [**time-range** time-range-name]
 Transmission Control Protocol (TCP)

[sn] **permit tcp** {source-ipv6-prefix / prefix-length | **host** source-ipv6-address | **any**} [operator **port** [port]]
 {destination-ipv6-prefix / prefix-length | **host** destination-ipv6-address | **any**} [operator **port** [port]] [**dscp** dscp]
 [**flow-label** flow-label] [**fragment**] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range**
 time-range-name] [**match-all** tcp-flag | **established**]
 User Datagram Protocol (UDP)

[sn] **permit udp** {source-ipv6-prefix / prefix-length | **host** source-ipv6-address | **any**} [operator **port** [port]]
 {destination-ipv6-prefix / prefix-length | **host** destination-ipv6-address | **any**} [operator **port** [port]] [**dscp** dscp]
 [**flow-label** flow-label] [**fragment**] [**range** lower upper] [**udf** udf-id header pos value mask] [**time-range**
 time-range-name]

Parameter Description

Parameter	Description
N/A	N/A
sn	ACL entry sequence number
deny	If not matched, access is denied.
source	Specify the source IP address (host address or network address).
source-wildcard	It can be discontinuous, for example, 0.255.0.32.
protocol	IP protocol number. It can be one of EIGRP, GRE, IPINIP, IGMP, NOS, OSPF, ICMP, UDP, TCP, and IP. It can also be a number representing the IP protocol between 0 and 255. The important protocols such as ICMP, TCP, and UDP are described separately.
destination	Specify the destination IP address (host address or network address).
destination-wildcard	Wildcard of the destination IP address. It can be discontinuous, for example, 0.255.0.32.
fragment	Packet fragment filtering
fragment-ipid fragment-ipid	Fragment ID of the header in segmented packet
precedence	Specify the packet priority.
precedence	Packet precedence value (0 to 7)
range	Layer4 port number range of the packet.
lower	Lower limit of the layer4 port number.
upper	Upper limit of the layer4 port number.
time-range	Time range of packet filtering
time-range-name	Time range name of packet filtering
tos	Specify type of service.
tos	ToS value (0 to 15)
icmp-type	ICMP message type (0 to 255)
icmp-code	ICMP message type code (0 to 255)
icmp-message	ICMP message type name
operator	Operator (lt-smaller, eq-equal, gt-greater, neq-unequal, range-range)
port [port]	Port number; range needs two port numbers, while other operators only

	need one port number.
host source-mac-address	Source physical address
host destination-mac-address	Destination physical address
VID vid	Match the specified VID.
ethernet-type	Ethernet type
match-all	Match all the bits of the TCP flag.
tcp-flag	Match the TCP flag.
established	Match the RST or ACK bits, not other bits of the TCP flag.
udf	Indicates the customized field.
udf-id	Indicates the ID of UDF. (Range:1 to 8)
header	Indicates the protocol layer.
pos	Indicates the offset. (Range:0 to 126)
value	Indicates the data (2 bytes).
mask	Indicates the mask (2 bytes).
int-flag	Matches the int header of the packets.
source-ipv6-prefix	Source IPv6 network address or network type
destination-ipv6-prefix	Destination IPv6 network address or network type
prefix-length	Prefix mask length
source-ipv6-address	Source IPv6 address
destination-ipv6-address	Destination IPv6 address
dscp	Differential Service Code Point
dscp	Code value, within the range of 0 to 63
ecn	Specifies the congestion notification type.
ecn	Specifies the congestion notification type value (0 to 3).
flow-label	Flow label
flow-label	Flow label value, within the range of 0 to 1048575.
protocol	For the IPv6, the field can be ipv6 icmp tcp udp and number in the range 0 to 255
time-range	Time range of the packet filtering
time-range-name	Time range name of the packet filtering

Defaults No entry

Command mode ACL configuration mode.

Usage Guide Use this command to configure the filtering entry of ACLs in ACL configuration mode.

Configuration Examples The following example shows how to create and display an extended expert ACL. This expert ACL denies all the TCP packets with the source IP address 192.168.4.12 and the source MAC address 001300498272.

```
FS(config)#expert access-list extended 2702
FS(config-exp-nacl)#deny tcp host
192.168.4.12 host 0013.0049.8272 any any
```

```
FS(config-exp-nacl)#permit any any any any
FS(config-exp-nacl)#show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.4.12 host 0013.0049.8272 any any
20 permit any any any any
FS(config-exp-nacl)#
```

This example shows how to use the extended IP ACL. The purpose is to deny the host with the IP address 192.168.4.12 to provide services through the TCP port 100 and apply the ACL to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)# ip access-list extended ip-ext-acl
FS(config-ext-nacl)# deny tcp host 192.168.4.12 eq 100 any
FS(config-ext-nacl)# show access-lists
ip access-list extended ip-ext-acl
10 deny tcp host 192.168.4.12 eq 100 any
FS(config-ext-nacl)#exit
FS(config)#interface gigabitethernet 1/1
FS(config-if)#ip access-group ip-ext-acl in
FS(config-if)#
```

This example shows how to use the extended MAC ACL. The purpose is to deny the host with the MAC address 0013.0049.8272 to send Ethernet frames of the type 100 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#mac access-list extended mac1
FS(config-mac-nacl)#deny host 0013.0049.8272 any aarp
FS(config-mac-nacl)# show access-lists
mac access-list extended mac1
10 deny host 0013.0049.8272 any aarp
FS(config-mac-nacl)#exit
FS(config)# interface gigabitethernet 1/1
FS(config-if)# mac access-group mac1 in
```

This example shows how to use the standard IP ACL. The purpose is to deny the host with the IP address 192.168.4.12 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#ip access-list standard 34
FS(config-ext-nacl)# deny host 192.168.4.12
FS(config-ext-nacl)#show access-lists
ip access-list standard 34
10 deny host 192.168.4.12
FS(config-ext-nacl)#exit
FS(config)# interface gigabitethernet 1/1
FS(config-if)# ip access-group 34 in
```

This example shows how to use the extended IPV6 ACL. The purpose is to deny the host with the IP address 192.168.4.12 and apply the rule to Interface gigabitethernet 1/1. The configuration procedure is as below:

```
FS(config)#ipv6 access-list extended v6-acl
FS(config-ipv6-nacl)#11 deny ipv6 host 192.168.4.12 any
FS(config-ipv6-nacl)#show access-lists
```



```
ipv6 access-list extended v6-acl
11 deny ipv6 host 192.168.4.12 any
FS(config-ipv6-nacl)# exit
FS(config)# interface gigabitEthernet 1/1
FS(config-if)# ipv6 traffic-filter v6-acl in
```

Related Commands

Command	Description
show access-lists	Displays all ACLs.
ipv6 traffic-filter	Applies the extended IPv6 ACL on the interface.
ip access-group	Applies the IP ACL on the interface.
mac access-group	Applies the extended MAC ACL on the interface.
ip access-list	Defines an IP ACL.
mac access-list	Defines an extended MAC ACL.
expert access-list	Defines an extended expert ACL.
ipv6 access-list	Defines an extended IPv6 ACL.
permit	Permits the access.

Platform Description

N/A

1.32 redirect destination interface

Use this command to redirect the traffic matching the access list to the specified interface. Use the **no** form of this command to remove the redirection.

```
redirect destination interface interface-name acl { id | name } in
no redirect destination interface interface-name acl { id | name } in
```

Parameter Description

Parameter	Description
interface-name	Redirect interface
id	Access list number
name	Access list name

Defaults No redirection is configured.

Command mode Interface configuration mode

Usage Guide Use this command to configure access redirection, namely, to redirect the traffic matching the access list to the specified interface. You can monitor the operation of a specified access list by using this command.

Configuration Examples The following example configures access redirection.

```
FS(config)# interface gigabitEthernet 0/3
FS(config-if-GigabitEthernet 0/3)# redirect destination interface gigabitEthernet 0/2 acl1 in
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.33 remark

Use this command to write a helpful comment (remark) for an entry in the access list. Use the **no** form of this command to remove the remark.

[sn] **remark** text

no [sn] **remark**

Parameter Description	Parameter	Description
	text	Comment that describes the access entry.
	sn	Indicates the sequence number of an ACE comment.

Defaults The access entries have no remarks.

Command mode ACL configuration mode.

Usage Guide Use this command to write a helpful comment for an access entry.
 Up to 100 characters are allowed in the remark.
 Two identical access entry remarks in one access list are not allowed.
 Removing an access entry may delete the remark for it as well.
 If the sn is specified, the comment will match a specified ACE; if no, the comment will match the last ACE in the ACL.

Configuration Examples The following example writes remarks for the entry in extended IP access list 102.

```
FS(config)# ip access-list extended 102
FS(config-ext-nacl)# remark first_remark
FS(config-ext-nacl)# 10 permit tcp 1.1.1.1 0.0.0.0 2.2.2.2 0.0.0.0
FS(config-ext-nacl)# 10 remark second_remark
FS(config-ext-nacl)# permit tcp 3.3.3.3 0.0.0.0 4.4.4.4 0.0.0.0
FS(config-ext-nacl)# end
FS#
```

Related Commands	Command	Description
------------------	---------	-------------

show access-lists	Displays all access lists.
ip access-list	Defines an IP access list.

Platform N/A

Description

1.34 security access-group

Use this command to configure a interface secure channel.

security access-group { id | name }

no security access-group

Parameter	Parameter	Description
Description	id	Access list number.
	name	Name of the access list.

Defaults None

Command mode Interface configuration mode

Usage Guide If a device is configured authentications such as 802.1x or Web authentication, the user cannot access the external network before passing the authentication. You can use this command to configure a secure channel for the users on the specified interface to access the external network without authentication.

Configuration The following example configures a secure channel on interface GigaEthernet 1/1.

```
FS(config)# interface GigaEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# security access-group 1
```

Related Commands	Command	Description
	show secu-acl	Displays the secure channel configuration.

Platform N/A

Description

1.35 security global access-group

Use this command to configure the global secure channel.

security global access-group { id | name }

no security global access-group

Parameter	Parameter	Description
Description		

id	Access list number.
name	Name of the access list.

Defaults -

Command mode Global configuration mode

Usage Guide If a device is configured authentications such as 802.1x or Web authentication, the user cannot access the external network before passing the authentication. You can use this command to configure a global secure channel for some users to access the external network without authentication.

Configuration Examples The following example configures a global secure channel.

```
FS(config)#security global access-group 1
```

Related Commands

Command	Description
show secu-acl	Displays the secure channel configuration..

Platform N/A

Description

1.36 security uplink enable

Use this command to configure an exceptional interface of the global secure channel.

security uplink enable

no security uplink enable

Parameter Description

Parameter	Description
N/A	N/A

Defaults The global secure channel takes effect on all interfaces by default.

Command mode Interface configuration mode.

Usage Guide The global secure channel takes effect on all interfaces by default. To disable the secure channel function on some interfaces, you can use this command to configure the interface as exceptional.

Configuration Examples The following example configures interface GigaEthernet 1/1 as an exceptional interface of the secure channel.

```
FS(config)# interface GigaEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# security uplink enable
```

Related Commands	Command	Description
		show secu-acl

Platform N/A
Description

1.37 show access-group

Use this command to display the access list applied to the interface.

show access-group [**interface** interface] | [**wlan** wlan-id]

Parameter Description	Parameter	Description
		interface
	wlan-id	WLAN ID

Defaults -

Command mode Privileged EXEC mode

Usage Guide Use this command to display the access list configuration on the specified interface. If no interface is specified, access list configuration on all interfaces is displayed.

Configuration Examples

```

FS# show access-group
ip access-list standard ipstd3
Applied On interface GigabitEthernet 0/1.
ip access-list standard ipstd4
Applied On interface GigabitEthernet 0/2.
ip access-list extended 101
Applied On interface GigabitEthernet 0/3.
ip access-list extended 102
Applied On interface GigabitEthernet 0/8.
    
```

Related Commands	Command	Description
		ip access-group
	mac access-group	Applies the MAC access list to the interface.
	expert access-group	Applies the expert access list to the interface.
	ipv6 traffic-filter	Applies the IPv6 access list to the interface.

Platform N/A
Description

1.38 show access-lists

Use this command to display all access lists or the specified access list.

show access-lists [id | name] [**summary**]

Parameter Description	Parameter	Description
	id	Access list number
	name	Name of the IP access list
	summary	Access list summary

Defaults N/A

Command mode Global configuration mode

Usage Guide Use this command to display the specified access list. If no access list number or name is specified, all the access lists are displayed.

Configuration Examples

```

FS# show access-lists n_acl
ip access-list standard n_acl
FS# show access-lists 102
ip access-list extended 102
FS# show access-lists
ip access-list standard n_acl
ip access-list extended 101
permit icmp host 192.168.1.1 any log (1080 matches)
  permit tcp host 1.1.1.1 any established
  deny ip any any (80021 matches)
mac access-list extended mac_acl
expert access-list extended exp_acl
ipv6 access-list extended v6_acl
petmit ipv6 ::192.168.4.12 any (100 matches)
deny any any (9 matches)
    
```

Related Commands	Command	Description
	ip access-list	Defines an IP access list.
	mac access-list	Defines an extended MAC access list.
	expert access-list	Defines an extended expert access list.
	ipv6 access-list	Defines an extended IPv6 access list.

Platform Description N/A

1.39 show expert access-group

Use this command to display the expert access list applied to the interface.

show expert access-group [interface interface] | [wlan wlan-id]

Parameter Description	Parameter	Description
	interface	Interface name
	wlan-id	WLAN ID

Defaults -

Command mode Privileged EXEC mode

Usage Guide Use this command to display the expert access list configured on the interface. If no interface is specified, the expert access lists on all interfaces are displayed.

Configuration Examples

```
FS# show expert access-group interface gigabitethernet 0/2
expert access-group ee in
Applied On interface GigabitEthernet 0/2.
```

Related Commands	Command	Description
	expert access-list	Defines an extended expert access list.

Platform N/A
Description

1.40 show ip access-group

Use this command to display the standard and extended IP access lists on the interface.

show ip access-group [interface interface] | [wlan wlan-id]

Parameter Description	Parameter	Description
	interface	Interface name
	wlan-id	WLAN ID

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide Use this command to display the standard and extended IP access lists configured on the interface. If no interface is specified, the standard and extended IP access lists on all interfaces are displayed.

Configuration Examples

```
FS# show ip access-group interface gigabitethernet 0/1
ip access-group aaa in
Applied On interface GigabitEthernet 0/1.
```

Related Commands	Command	Description
		ip access-list

Platform N/A
Description

1.41 show ipv6 traffic-filter

Use this command to display the IPv6 access list on the interface.

show ipv6 traffic-filter [interface interface]

Parameter Description	Parameter	Description
		interface

Defaults -

Command mode Privileged EXEC mode

Usage Guide Use this command to display the IPv6 access list configured on the interface. If no interface is specified, the IPv6 access lists on all interfaces are displayed.

Configuration Examples

```
FS# show ipv6 traffic-filter interface gigabitethernet 0/4
ipv6 access-group v6 in
Applied On interface GigabitEthernet 0/4.
```

Related Commands	Command	Description
		ipv6 access-list

Platform N/A
Description

1.42 show mac access-group

Use this command to display the MAC access list on the interface.

show mac access-group [**interface** interface] | [**wlan** wlan-id]

Parameter Description	Parameter	Description
	interface	Interface name
	wlan-id	WLAN ID

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide Use this command to display the MAC access list configured on the interface. If no interface is specified, the MAC access lists on all interfaces are displayed.

Configuration Examples

```
FS# show mac access-group interface gigabitethernet 0/3
mac access-group mm in
Applied On interface GigabitEthernet 0/3.
```

Related Commands	Command	Description
	mac access-list	Defines a MAC access list.

Platform Description N/A

1.43 show acl res

Use this command to display information about all Ternary Content Address Memories (TCAMs) or a specified TCAM.

show acl res [**dev** dev-num [**slot** slot-num]]

Parameter Description	Parameter	Description
	dev dev_num	Specifies the device ID.
	slot slot-num	Specifies the slot ID.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide Use this command to display information about the TCAM of a specified slot in a device. If no slot ID of a device is specified, information about TCAMs of all slots of the device is displayed. If no device ID is specified, information about

TCAMs of all devices is displayed.

Configuration The following example displays the usage amount, usage rate, and available capacity of TCAM resources on all devices.

Examples

```

FS#show acl res
acl usage warn limit: 100%
type          total          used          free          usage
-----
##Dev=1,Slot=4,unit=0
IFP ACL       24576           61           24515         1%
  slice0      2048            2            2046
  slice1      2048            1            2047
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
  slice8      2048            0            2048
  slice9      2048            0            2048
  slice10     2048            0            2048
  slice11     2048            0            2048
EFP ACL       24576           61           24515         1%
  slice0      2048            2            2046
  slice1      2048            1            2047
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
  slice8      2048            0            2048
  slice9      2048            0            2048
  slice10     2048            0            2048
  slice11     2048            0            2048
##Dev=1,Slot=4,unit=1
IFP ACL       24576           59           24517         1%
  slice0      2048            1            2047
  slice1      2048            0            2048
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
    
```

slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
##Dev=1,Slot=4,unit=2				
IFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	

The following example displays the usage amount, usage rate, and available capacity of TCAM resources in all slots of device 1.

```

FS(config)#show acl res dev 1
acl usage warn limit: 100%
type          total          used          free          usage
-----
##Dev=1,Slot=4,unit=0
IFP ACL      24576          60          24516          1%
  slice0     2048           2          2046
  slice1     2048           0          2048
  slice2     2048           0          2048
  slice3     2048           0          2048
  slice4     2048           0          2048
  slice5     2048           0          2048
  slice6     2048           0          2048
  slice7     2048           0          2048
  slice8     2048           0          2048
  slice9     2048           0          2048
  slice10    2048           29         2019
  slice11    2048           29         2019
EFP ACL      24576          60          24516          1%
  slice0     2048           2          2046
  slice1     2048           0          2048
  slice2     2048           0          2048
  slice3     2048           0          2048
  slice4     2048           0          2048
  slice5     2048           0          2048
  slice6     2048           0          2048
  slice7     2048           0          2048
  slice8     2048           0          2048
  slice9     2048           0          2048
  slice10    2048           29         2019
  slice11    2048           29         2019
##Dev=1,Slot=4,unit=1
IFP ACL      24576          58          24518          1%
  slice0     2048           29         2019
  slice1     2048           29         2019
  slice2     2048           0          2048
  slice3     2048           0          2048
  slice4     2048           0          2048
  slice5     2048           0          2048
  slice6     2048           0          2048
  slice7     2048           0          2048
    
```

slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	58	24518	1%
slice0	2048	29	2019	
slice1	2048	29	2019	
slice2	2048	0	2048	
slice3	2048	0	2048	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
##Dev=1,Slot=4,unit=2				
IFP ACL	24576	58	24518	1%
slice0	2048	29	2019	
slice1	2048	29	2019	
slice2	2048	0	2048	
slice3	2048	0	2048	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	58	24518	1%
slice0	2048	29	2019	
slice1	2048	29	2019	
slice2	2048	0	2048	
slice3	2048	0	2048	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	

The following example displays the usage amount, usage rate, and available capacity of TCAM resources in slot 4 of device 1.

```

FS#show acl res dev 1 slot 4
acl usage warn limit: 100%
type          total          used          free          usage
-----
##Dev=1,Slot=4,unit=0
IFP ACL       24576           61           24515         1%
  slice0      2048            2            2046
  slice1      2048            1            2047
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
  slice8      2048            0            2048
  slice9      2048            0            2048
  slice10     2048            0            2048
  slice11     2048            0            2048
EFP ACL       24576           61           24515         1%
  slice0      2048            2            2046
  slice1      2048            1            2047
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
  slice8      2048            0            2048
  slice9      2048            0            2048
  slice10     2048            0            2048
  slice11     2048            0            2048
##Dev=1,Slot=4,unit=1
IFP ACL       24576           59           24517         1%
  slice0      2048            1            2047
  slice1      2048            0            2048
  slice2      2048           29            2019
  slice3      2048           29            2019
  slice4      2048            0            2048
  slice5      2048            0            2048
  slice6      2048            0            2048
  slice7      2048            0            2048
    
```

slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
##Dev=1,Slot=4,unit=2				
IFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	
EFP ACL	24576	59	24517	1%
slice0	2048	1	2047	
slice1	2048	0	2048	
slice2	2048	29	2019	
slice3	2048	29	2019	
slice4	2048	0	2048	
slice5	2048	0	2048	
slice6	2048	0	2048	
slice7	2048	0	2048	
slice8	2048	0	2048	
slice9	2048	0	2048	
slice10	2048	0	2048	
slice11	2048	0	2048	

1.44 show acl res detail

Use this command to display the details of all Ternary Content Address Memories (TCAMs) or a specified TCAM.

show acl res detail [**dev** dev-num [**slot** slot-num]]

Parameter Description	Parameter	Description
	dev dev_num	Device ID
	slot slot-num	Slot ID

Command mode Privileged EXEC mode

Usage Guide Use this command to display the details of the TCAM of a specified slot in a device. If no slot ID of a device is specified, information about TCAMs of all slots of the device is displayed. If no device ID is specified, information about TCAMs of all devices is displayed.

Configuration The following example displays the details of TCAM resource usage on all devices.

```

Examples
FS#show acl res detail
Dev: 1          Slot: 3          unit: 0          stage: IFP
group id: 12    group pri: 115    total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type                used entry
-----                -
CPP                    30
SDN                    1

group id: 1      group pri: 116    total entry: 2048  used entry: 18
width: DOUBLE   slice id: 11/12
app type                used entry
-----                -
CPP(v6)          18

group id: 3      group pri: 4      total entry: 2048  used entry: 4
width: SINGLE   slice id: 2
app type                used entry
-----                -
L3V6INTF-COUNT(v6)  4

group id: 4      group pri: 3      total entry: 2048  used entry: 6
width: SINGLE   slice id: 3
app type                used entry
-----                -
L3INTF-COUNT      6
    
```



```

Dev: 1          Slot: 3          unit: 0          stage: EFP
group id: 2     group pri: 7     total entry: 2048 used entry: 4
width: SINGLE  slice id: 10
app type              used entry
-----
L3INTF-COUNT        4

Dev: 1          Slot: 3          unit: 1          stage: IFP
group id: 12    group pri: 115   total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type              used entry
-----
CPP                30
SDN                 1

group id: 1     group pri: 116   total entry: 2048 used entry: 18
width: DOUBLE   slice id: 3/4
app type              used entry
-----
CPP(v6)          18

Dev: 1          Slot: 3          unit: 2          stage: IFP
group id: 12    group pri: 115   total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type              used entry
-----
CPP                30
SDN                 1

group id: 1     group pri: 116   total entry: 2048 used entry: 18
width: DOUBLE   slice id: 3/4
app type              used entry
-----
CPP(v6)          18
    
```

The following example displays details of TCAM resource usage in all slots of device 1.

```

FS#show acl res detail dev 1
Dev: 1          Slot: 3          unit: 0          stage: IFP
group id: 12    group pri: 115   total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type              used entry
-----
CPP                30
    
```

```

SDN                                1

group id: 1      group pri: 116  total entry: 2048  used entry: 18
width: DOUBLE   slice id: 11/12
app type                used entry
-----
CPP(v6)          18

group id: 3      group pri: 4    total entry: 2048  used entry: 4
width: SINGLE   slice id: 2
app type                used entry
-----
L3V6INTF-COUNT(v6)  4

group id: 4      group pri: 3    total entry: 2048  used entry: 6
width: SINGLE   slice id: 3
app type                used entry
-----
L3INTF-COUNT       6

Dev: 1          Slot: 3          unit: 0          stage: EFP
group id: 2      group pri: 7    total entry: 2048  used entry: 4
width: SINGLE   slice id: 10
app type                used entry
-----
L3INTF-COUNT       4

Dev: 1          Slot: 3          unit: 1          stage: IFP
group id: 12     group pri: 115  total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type                used entry
-----
CPP              30
SDN              1

group id: 1      group pri: 116  total entry: 2048  used entry: 18
width: DOUBLE   slice id: 3/4
app type                used entry
-----
CPP(v6)          18

Dev: 1          Slot: 3          unit: 2          stage: IFP
group id: 12     group pri: 115  total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
    
```

```

app type          used entry
-----
CPP                30
SDN                1

group id: 1      group pri: 116  total entry: 2048  used entry: 18
width: DOUBLE    slice id: 3/4
app type          used entry
-----
CPP(v6)          18
    
```

The following example displays the details of TCAM resource usage in slot 3 of device 1.

```

FS#show acl res detail dev 1 slot 3
Dev: 1          Slot: 3          unit: 0          stage: IFP
group id: 12    group pri: 115  total entry: 128  used entry: 31
width: DOUBLE   slice id: 0/1(reserved)
app type          used entry
-----
CPP                30
SDN                1

group id: 1      group pri: 116  total entry: 2048  used entry: 18
width: DOUBLE    slice id: 11/12
app type          used entry
-----
CPP(v6)          18

group id: 3      group pri: 4    total entry: 2048  used entry: 4
width: SINGLE    slice id: 2
app type          used entry
-----
L3V6INTF-COUNT(v6)  4

group id: 4      group pri: 3    total entry: 2048  used entry: 6
width: SINGLE    slice id: 3
app type          used entry
-----
L3INTF-COUNT      6

Dev: 1          Slot: 3          unit: 0          stage: EFP
group id: 2      group pri: 7    total entry: 2048  used entry: 4
width: SINGLE    slice id: 10
app type          used entry
-----
    
```

```

L3INTF-COUNT          4

Dev: 1                Slot: 3                unit: 1                stage: IFP
group id: 12          group pri: 115         total entry: 128        used entry: 31
width: DOUBLE         slice id: 0/1(reserved)
app type              used entry
-----              -----
CPP                   30
SDN                   1

group id: 1           group pri: 116         total entry: 2048      used entry: 18
width: DOUBLE         slice id: 3/4
app type              used entry
-----              -----
CPP(v6)               18

Dev: 1                Slot: 3                unit: 2                stage: IFP
group id: 12          group pri: 115         total entry: 128        used entry: 31
width: DOUBLE         slice id: 0/1(reserved)
app type              used entry
-----              -----
CPP                   30
SDN                   1

group id: 1           group pri: 116         total entry: 2048      used entry: 18
width: DOUBLE         slice id: 3/4
app type              used entry
-----              -----
CPP(v6)               18
    
```

Related Commands

Command	Description
N/A	N/A

1.45 show redirect interface

Use this command to display the access redirection configuration.

show redirect [**interface** interface-name]

Parameter Description

Parameter	Description
interface-name	Interface name

Defaults N/A

Command mode Privileged EXEC mode

Usage Guide Use this command to display the access redirection configuration on the interface. If no interface is specified, the access redirection configuration on all interfaces is displayed.

Configuration The following example displays the access redirection configuration on interface GigabitEthernet 0/3.

Examples

```
FS #show redirect interface gigabitEthernet 0/3
acl redirect configuration on interface gigabitEthernet 0/3
redirect destination interface gigabitEthernet 0/3 acl 1 in
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

1.46 svi router-acls enable

Use this command to enable the SVI filter only for the Layer3 packets. Use the **no** form of this command to disable this function.

svi router-acls enable
no svi router-acls enable

Parameter Description

Parameter	Description
N/A	N/A.

Defaults The SVI filter takes effect for both Layer2 and Layer3 packets by default.

Command mode Global configuration mode

Usage Guide Use this command to make the SVI filter take effect only for the Layer3 packets,

Configuration The following example enables the SVI filter only for the Layer3 packets.

Examples

```
FS(config)#svi router-acls enable
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform N/A

Description

2 QoS Commands

2.1 apply acl

Use this command to apply the ACL in the policy map class configuration mode. Use the **no** form of this command to delete the ACL.

apply acl
no apply acl

Parameter	Parameter	Description
Description		

Defaults No stream behavior is specified for the class associated with the policy by default.

Command Mode Policy map class configuration mode

Usage Guide ACL should be created first.
 Only one ACL can be applied in one policy, and the behavior takes effect according to the ACL.

Configuration Examples The following example creates the class cmap1 and matches the ACL acl_10.

```
FS(config)# class-map cmap1
FS(config-cmap)# match acl acl_10
```

The following example creates the policy pmap1 and enters the policy configuration mode; associates the class cmap1 and enters the policy map class configuration mode.

```
FS(config)# policy-map pmap1
FS(config-pmap)# class cmap1
```

The following example applies the ACL.

```
FS(config-pmap-c)# apply acl
```

Related Commands	Command	Description
	show policy-map [policy-map-name [class class-map-name]]	Displays the policy map.

Platform Description N/A

2.2 class

Use this command to add reference to an existing class map. Use the **no** form of this command to remove the a class from the policy map.

class class-map-name
no class class-map-name

Parameter	Parameter	Description
Description	class-map-name	Reference to a class map.

Defaults None

Command Mode Policy configuration mode

Usage Guide N/A

Configuration The following example adds reference to the class map named cmap1.

```

Examples
FS(config)# class-map cmap1
FS(config-cmap)# match ip dscp 5
FS(config-cmap)# exit

FS(config)# policy-map pmap1
FS(config-pmap)# class cmap1

FS(config-pmap-c)# end
    
```

Related Commands	Command	Description
	show policy-map [policy-map-name [class class-map-name]]	Displays the policy map.

Platform N/A
Description

2.3 class map

Use this command to create a class map and enter class-map configuration mode. Use the **no** or **default** form of this command to remove a class map.

class-map class-map-name
no class-map class-map-name
default class-map class-map-name

Parameter	Parameter	Description
Description	class-map-name	Class map name. The class map name can be a maximum of 31 characters.

Defaults None

Command Global configuration mode
Mode

Usage Guide N/A

Configuration The following example creates a class map named cm_acl to match an access list named me.

```

Examples
FS(config)# mac access-list extended me
FS(config-ext-macl)# permit host 1111.2222.3333 any
FS(config-ext-macl)# exit
FS(config)# class-map cm_acl
FS(config-cmap)# match access-group me
FS(config-cmap)# exit
    
```

The following example creates a class map named cm_dscp to match DHCP 8, 16 and 24.

```

FS(config)# class-map cm_dscp
FS(config-cmap)# match ip dscp 8 16 24
FS(config-cmap)# exit
    
```

Related	Command	Description
Commands	show class-map [class-map-name]	Displays the class map.

Platform N/A
Description

2.4 clear qos wred-ecn statistics

Use this command to clear the statistics of packets discarded by WRED and packets marked by ECN.

```

clear qos wred-ecn statistics [ interfaces interface-id ]
    
```

Parameter	Parameter	Description
Description	interface-id	Indicates the to-be-cleared interface ID.

Defaults N/A

Command Privileged EXEC mode/global configuration mode/interface configuration mode
Mode

Usage Guide N/A

Configuration The following example clears the statistics of packets discarded by WRED and packets marked by ECN on all
Examples interfaces.

```

FS#clear qos wred-ecn statistics
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

2.5 drr-queue bandwidth

Use this command to set the DRR queue weight ratio. Use the **no** or **default** form of this command to restore the default setting.

drr-queue bandwidth weight1...weight8

no drr-queue bandwidth

default drr-queue bandwidth

Parameter	Parameter	Description
Description	weight1...weight8	8 queue weights. The default queue weight ratio is 1:1:1:1:1:1:1:1. For the products supporting the SP scheduling policy, the weight range is from 0 to 15. For the products not supporting the SP scheduling policy, the weight range is from 1 to 15.

Defaults The default queue weight ratio is 1:1:1:1:1:1:1:1.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example configures the DRR queue weight ratio to 1:1:1:2:2:4:6:8.

```
FS(config)# drr-queue bandwidth 1 2 3 4 5 6 7 8
```

Related Commands	Command	Description
	show mls qos queuing	Displays information about the queue.

Platform N/A
Description

2.6 match

Use this command to define a match criteria in class map configuration mode. Use the **no** form of this command to remove the match criteria.

match { **access-group** access_list }

no match { access-group access_list }

Parameter	Parameter	Description
Description	access-group access_list	Identifies a numbered or named access list as the match criteria.

Defaults None

Command Mode Class map configuration mode

Usage Guide N/A

Configuration Examples N/A

Related Commands	Command	Description
	show class-map [class-map-name]	Displays the class map.

Platform N/A

Description

2.7 mls qos cos

Use this command to configure the CoS value of an interface. Use the **no** form of this command to restore the default setting.

mls qos cos default-cos

no mls qos cos

Parameter	Parameter	Description
Description	default-cos	CoS value of the interface. The range is from 0 to 7.

Defaults The default CoS value is 0.

Command Mode Interface configuration mode.

Usage Guide N/A

Configuration Examples The following example configures the default CoS value to 7.

```
FS(config)# interface gigabitethernet 1/1
FS(config-if)# mls qos cos 7
```

Related	Command	Description
---------	---------	-------------

Commands	<code>show mls qos interface interface-id</code>	Displays information of the specified interface.
-----------------	--	--

Platform N/A

Description

2.8 mls qos map cos-dscp

Use this command to map the CoS value to the DSCP value. Use the **no** or **default** form of this command to restore the default CoS-DSCP mapping.

mls qos map cos-dscp dscp1...dscp8

no mls qos map cos-dscp

default mls qos map cos-dscp

Parameter	Parameter	Description
Description	dscp1...dscp8	Specifies the DSCP value. The range is from 0 to 63.

Defaults By default, the CoS 0, 1, 2, 3, 4, 5, 6, 7 is mapped to the DSCP 0, 8, 16, 24, 32, 40, 48, 56 respectively.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples `FS(config)# mls qo map cos-dscp 8 10 16 18 24 26 32 34`

Related Commands	Command	Description
	show mls qos maps cos-dscp	Displays the CoS-DSCP mapping.

Platform N/A

Description

2.9 mls qos map dscp-cos

Use this command to map the DSCP value to the CoS value. Use the **no** or **default** form of this command to restore the default DSCP-CoS mapping.

mls qos map dscp-cos dscp-list **to** cos

no mls qos map dscp-cos

default mls qos map dscp-cos

Parameter	Parameter	Description
Description	dscp-list	DSCP list. The range is from 0 to 63.
	cos	CoS value. The range is from 0 to 7.

Defaults The default DSCP-CoS mapping is listed below:

DSCP 0-7	DSCP 8-15	DSCP 16-23	DSCP 24-31	DSCP 32-39	DSCP 40-47	DSCP 48-55	DSCP 56-63
CoS 0	CoS 1	CoS 2	CoS 3	CoS 4	CoS 5	CoS 6	CoS 7

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration Examples FS(config)# mls qos map dscp-cos 8 10 16 18 to 0

Related Commands	Command	Description
	show mls qos maps dscp-cos	Displays the DSCP-CoS mapping.

Platform N/A

Description

2.10 mls qos remark disable

Use this command to disable the packet priority modification function.

mls qos remark disable

Parameter	Parameter	Description
Description		

Defaults The packet priority can be modified by default, that is, the remark function is enabled.

Command Global configuration mode

Mode

Default Level 14

Usage Guide Whether this command is supported depends on the product chip capability value.

Configuration Examples The following example disables the packet priority modification function.

FS(config)# mls qos remark disable

2.11 mls qos scheduler

Use this command to configure the output queue scheduling. Use the **no** or **default** form of this command to restore the default scheduler.

mls qos scheduler [sp | rr | wrr | drr | wfq]

no mls qos scheduler

default mls qos scheduler

Parameter	Parameter	Description
Description	sp	Specifies the absolute priority scheduling.
	rr	Specifies the round-robin scheduling.
	wrr	Specifies the frame count weighted round-robin scheduling.
	drr	Specifies the frame length weighted round-robin scheduling.
	wfq	Specifies the weighted fair queuing.

Defaults The default queue scheduling is **wrr**.

Command Global configuration mode.

Mode

Usage Guide N/A

Configuration The following example specifies the sp scheduling.

Examples FS(config)# mls qos scheduler sp

Related	Command	Description
Commands	show mls qos scheduler	Displays the output queue scheduling.

Platform N/A

Description

2.12 mls qos trust

Use this command to configure the trust mode on an interface. Use the **no** or **default** form of this command to restore the default setting.

mls qos trust { cos | dscp | ip-precedence }

no mls qos trust

default mls qos trust

Parameter	Parameter	Description
Description	cos	Specifies the CoS trust mode.
	dscp	Specifies the DSCP trust mode.
	ip-precedence	Specifies the IP-PRE trust mode.

Defaults No trust mode is configured by default.

Command Interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example configures the CoS trust mode.

```
Examples
FS(config)# interface gigabitethernet 1/1
FS(config-if)# mls qos trust cos
```

Related	Command	Description
Commands	show mls qos interface interface-id	Displays the specified interface configuration.

Platform N/A

Description

2.13 police

Use this command to configure traffic policing for a class map in a policy map. Use the **no** form of this command to remove traffic policing for the class map.

```
police rate-bps burst-byte [ exceed-action { drop | dscp new-dscp | cos new-cos [ none-tos ] } ]
```

no police

Parameter	Parameter	Description
Description	rate-bps	Bandwidth limit value per second (The unit is KBits). This value depends on the specific product.
	burst-byte	Burst traffic limit value (The unit is KBytes). This value depends on the specific product.
	drop	Drops the packet. This is available only when the packet exceeds the bandwidth limit.
	dscp new-dscp	Modifies the DSCP value of the packet. This is available only when the packet exceeds bandwidth limit. The DSCP value range is from 0 to 63.
	cos new-cos	Modifies the CoS value of the packet. This is available only when the packet exceeds bandwidth limit. The CoS value range is from 0 to 7.
	none-tos	Modifies the CoS value only.

Defaults No traffic policing is configured for the class map by default.

Command Policy map class configuration mode

Mode

Usage Guide N/A

Configuration The following example configures traffic policing which modifies the DSCP value of the packet to 6 for class map "cm-acl" in policy map "pmap1".

```
Examples
FS(config)# policy-map pmap1
FS(config-pmap)# class cm-acl
FS(config-pmap-c)# police 102400 4096 exceed-action dscp 16
```

Related	Command	Description
---------	---------	-------------

Commands	show policy-map [policy-map-name [class class-map-name]]	Displays the policy map configuration.
-----------------	--	--

Platform N/A

Description

3 policy map

Use the following command to create a policy map and enter policy map configuration mode. Use the **no** or **default** form of this command to remove the specified policy map.

- policy-map** policy-map-name
- no policy-map** policy-map-name
- default policy-map** policy-map-name

Parameter	Parameter	Description
Description	policy-map-name	Policy map name. The policy map name can be a maximum of 31 characters.

Defaults No policy map is configured by default.

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example creates policy map "po", and then adds a reference to class map "cmap1".

```
FS(config)# policy-map po
FS(config-pmap)# class cmap1
```

Related Commands	Command	Description
	show policy-map [policy-map-name [class class-map-name]]	Displays the policy map configuration.

Platform N/A

Description

3.1 priority-queue

Use this command to configure the output queue scheduling policy to SP. Use the **no** or **default** form of this command to restore the default queue scheduling policy.

- priority-queue**
- no priority-queue**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The default output queue scheduling policy is WRR.

Command Mode Global configuration mode.

Usage Guide This command shares the same configuration with the **mls qos scheduler sp**. The **show run** command displays this configuration in the **mls qos scheduler sp** item instead of **priority-queue**.

Configuration Examples The following example configures the output queue scheduling policy to SP.

```
FS(config)# priority-queue
```

Related Commands	Command	Description
	show mls qos scheduler	Displays the output queue scheduling policy.

Platform Description N/A

3.2 priority-queue cos-map

Use this command to configure the mapping between the CoS value and the queue ID. Use the **no** or **default** form of this command to restore the default CoS mapping to the queue.

priority-queue cos-map qid cos0 [cos1 [cos2 [cos3 [cos4 [cos5 [cos6 [cos7]]]]]]]

no priority-queue cos-map

default priority-queue cos-map

Parameter	Parameter	Description
Description	qid	Queue ID. The range is from 1 to 8.
	cos0 ... cos7	CoS value. The range is from 0 to 7.

Defaults The default mapping between the CoS value and the queue ID is listed below:

Queue 1	Queue 2	Queue 3	Queue 4	Queue 5	Queue 6	Queue 7	Queue 8
CoS 0	CoS 1	CoS 2	CoS 3	CoS 4	CoS 5	CoS 6	CoS 7

Command Mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example maps the CoS 3, 5 to the output queue 1.

```
FS(config)#priority-queue cos-map 1 3 5
```

Related	Command	Description
Commands	show mls qos queuing	Displays the output queues.

Platform N/A
Description

3.3 qos-queue compatible enable

This command is used to configure the queue display of all queues on the device to 0–7.

qos-queue compatible enable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the queue display of all queues on the device is 1–8.

Command Mode Global configuration mode

Usage Guide The chip capability depends whether the command is supported.

The following example configures the queue display of all queues on the device to 0–7.

```
FS(config)# qos-queue compatible enable
```

Configuration Examples

Related	Command	Description
Commands	show running-config	Displays the configuration.
	N/A	

Platform
Description

3.4 qos queue

Use this command to configure a minimum or maximum of the interface bandwidth to a queue. Use the **no** or **default** form of this command to remove the minimum or maximum of the interface bandwidth.

qos queue queue-id **bandwidth** { **minimum** | **maximum** } bandwidth

no qos queue queue-id **bandwidth** { **minimum** | **maximum** }

default qos queue queue-id **bandwidth** { **minimum** | **maximum** }

Parameter	Parameter	Description
Description	queue]	The queue keyword indicates configuring the minimum or maximum of the interface

	bandwidth to the queue on the device supporting both unicast and multicast queue bandwidth configuration.
queue-id	Queue ID. The range is from 1 to 8.
bandwidth { minimum maximum } bandwidth	Bandwidth value. The value range depends on the specific product.

Defaults No minimum or maximum of interface bandwidth to a queue is configured by default.

Command Interface configuration mode

Mode

Usage Guide N/A

Configuration N/A

Examples

Related	Command	Description
Commands	show qos bandwidth [interfaces interface-id]	Displays the interface bandwidth of the queue.

Platform N/A

Description

3.5 qos queue ecn

Use this command to enable the queue ECN function. Use the **no** form of this command to disable the function.

qos queue queue-id **ecn**

no qos queue queue-id **ecn**

Parameter	Parameter	Description
Description	queue-id	Queue ID. The range is from 1 to 8.

Defaults By default, it is disabled.

Command Interface configuration mode

Mode

Usage Guide Both the **qos queue ecn** and global **queueing wred** command must be configured to enable the queue ECN function

Configuration The following example enables ECN on queue 1 of interface gigabitEthernet 0/1.

Examples

FS# configure terminal

```
FS(config)# queueing wred
FS(config)# interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# qos queue 1 ecn
FS(config-if-GigabitEthernet 0/1)# exit
```

Platform N/A
Description

3.6 qos wred-ecn statistics sample-period

Use this command to configure the statistics sampling interval of packets discarded by WRED and packets marked by ECN. Use the **no** or **default** form of this command to restore the default settings.

- qos wred-ecn statistics sample-period** period
- no qos wred-ecn statistics sample-period**
- default qos wred-ecn statistics sample-period**

Parameter	Parameter	Description
Description	period	Indicates the sampling interval. The default range is 1 to 100.

Defaults The default range varies with products.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the sampling interval to 5 seconds.

```
FS# configure terminal
FS(config)# qos wred-ecn statistics sample-period 5
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.7 queueing wred

Use this command to enable the WRED (Weighted Random Early Detection) function. Use the **no** or **default** form of this command to disable the WRED function.

- queueing wred**

no queueing wred
default queueing wred

Parameter	Parameter	Description
Description	N/A	N/A

Defaults WRED is disabled by default.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example enables WRED.

```
FS(config)# queueing wred
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.8 rate-limit

Use this command to configure rate limiting on the interface. Use the **no** or **default** form of this command to remove rate limiting from the interface.

rate-limit input bps burst-size
no rate-limit input
default rate-limit input

Parameter	Parameter	Description
Description	input	Configures input rate limiting.
	bps	Bandwidth limit value per second (The unit is KBits). This value depends on the specific product.
	burst-size	Burst traffic limit value (The unit is KBytes). This value depends on the specific product.

Defaults Rate limiting is not configured by default.

Command Mode Interface configuration mode.

Usage Guide This command can be configured only on Ethernet interfaces.

Configuration The following example configures the rate limit value to 10 Mbps, and the burst traffic limit value to 256 Kbps.

Examples

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# rate-limit input 10240 256
```

Related	Command	Description
Commands	show mls qos rate-limit [interface interface-id]	Displays the rate limiting configuration of the interface.

Platform N/A

Description

3.9 service-policy

Use this command to apply the policy map to the interface, the virtual group or globally. Use the **no** or **default** form of this command to remove the policy map from the interface, the virtual group or globally.

```
service-policy { input | output } policy-map-name
no service-policy { input | output } policy-map-name
default service-policy { input | output } policy-map-name
```

Parameter	Parameter	Description
Description	policy-map-name	Policy map name
	input	Applies the policy map to the input direction.
	output	Applies the policy map to the output direction.

Defaults No policy map is configured on the interface or virtual group by default.

Command Mode Interface configuration mode, virtual group configuration mode, global configuration mode.

Usage Guide N/A

Configuration The following example applies policy map "po" to the input direction of interface GigabitEthernet 1/3.

Examples

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# service-policy input po
```

The following example applies policy map "po" to the output direction of virtual group 3.

```
FS(config)# virtual-group 3
FS(config-VirtualGroup)# service-policy output po
```

The following example applies policy map "po" to the output direction globally.

```
FS(config)# service-policy output po
```

Related	Command	Description
---------	---------	-------------

Commands	show mls qos interface policers	Displays the policy map configuration on the interface.
	show mls qos virtual-group policers	Displays the policy map configuration on the virtual group.

Platform N/A

Description

3.10 set

Use this command to configure the CoS, DSCP or VID value for the traffic. Use the **no** form of this command to remove the CoS, DSCP or VID value from the traffic.

set { ip dscp new-dscp [with cos new-cos priority] | cos new-cos [priority | none-tos] | vid new-vid }

no set { ip dscp | cos | vid }

Parameter	Parameter	Description
Description	ip dscp new-dscp	Configures the DSCP value for the traffic. The range is from 0 to 63.
	with cos new-cos priority	Configures the queue priority (same as priority)
	cos new-cos	Configures the CoS value for the traffic. The range is from 0 to 7.
	priority	Configures the queue priority but does not change CoS value.
	none-tos	Configures the CoS value only.
	vid new-vid	Configures the VID value for the traffic. The range is from 1 to 4094.

Defaults No CoS or DSCP value is configured for the traffic in policy map class mode.

Command Mode Policy map class configuration mode

Usage Guide N/A

Configuration Examples The following example creates policy map "pmap1", and adds a reference to class map "cmap1".

```
FS(config)# policy-map pmap1
FS(config-pmap)# class cmap1
```

The following example modifies the CoS value of the traffic to 3.

```
FS(config-pmap-c)# set cos 3
```

Related Commands	Command	Description
	show policy-map [policy-map-name [class class-map-name]]	Displays the policy map configuration on the interface.

Platform N/A

Description

3.11 show class-map

Use this command to display the class map.

show class-map [class-map-name]

Parameter	Parameter	Description
Description	class-map-name	Class map name.

Defaults None

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration Examples The following example displays all class maps.

```
FS# show class-map

Class Map cmap1
  Match ip dscp 20 40
Class Map cmap2
  Match access-group 110
```

The fields in the output of this command are described in the following table.

Field	Description
Class Map	Indicates the class map name.
Match	Indicates the matched rule.

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.12 show mls qos interface

Use this command to display the QoS configuration of the interface.

show mls qos interface [interface-id] [policers]

Parameter	Parameter	Description
Description	interface-id	Interface name
	policers	Displays the traffic policing configured on the interface.

Defaults None

Command Privileged EXEC mode, global configuration mode, interface configuration mode.
Mode

Usage Guide N/A

Configuration The following example displays the QoS configuration of interface GigabitEthernet 1/3.

```

Examples
FS# show mls qos interface gigabitethernet 1/3
Interface: GigabitEthernet 1/3
Ratelimit input: 10240 256
Ratelimit output: 51200 4096
Attached input policy-map: pmap1
Attached output policy-map:
Default trust: dscp
Default cos: 3
Scheduler type: drr
Wrr queue bandwidth: 1 1 1 1 2 2 2 2
Wfq queue bandwidth: 1 1 2 2 4 4 4 4
    
```

The fields in the output of this command are described in the following table.

Field	Description
Interface	Indicates the interface name.
Ratelimit input	Indicates the input rate limit value .
Ratelimit output	Indicates the output rate limit value .
Attached input policy-map	Indicates the input policy map .
Attached output policy-map	Indicates the output policy map.
Default trust	Indicates the trust mode of the interface.
Default cos	Indicates the default CoS value.
Scheduler type	Indicate the scheduling policy of the interface, which is only displayed on products that support the scheduling policy
Wrr queue bandwidth	Indicates the WRR queue weight, which is only displayed on products that support the scheduling policy
Drr queue bandwidth	Indicates the DRR queue weight, which is only displayed on products that support the scheduling policy
Wfq queue bandwidth	Indicates the WFQ queue weight, which is only displayed on products that support the scheduling policy

The following example displays the QoS configuration of all interfaces.

```

FS# show mls qos interface policers
Interface: GigabitEthernet 0/1
Attached input policy-map: pmap1
Attached output policy-map: pmap1
    
```

```
Interface: GigabitEthernet 0/2
Attached input  policy-map: p1
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.13 show mls qos maps

Use this command to display DSCP-CoS mapping and CoS-DSCP mapping.

show mls qos maps [cos-dscp | dscp-cos]

Parameter Description	Parameter	Description
	cos-dscp	Displays the CoS-DSCP mapping.
	dscp-cos	Displays the DSCP-CoS mapping.

Defaults None

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration Examples The following example displays the CoS-DSCP mapping.

```
FS# show mls qos maps cos-dscp
cos dscp
-----
0  0
1  8
2  16
3  24
4  32
5  40
6  48
7  56
```

The fields in the output of this command are described in the following table.

Field	Description
cos	Indicates the CoS value.
dscp	Indicates the DSCP value mapped .

The following example displays the DSCP- CoS mapping.

```

FS# show mls qos maps dscp-cos
dscp cos      dscp cos      dscp cos      dscp cos
-----
0 0           1 0           2 0           3 0
4 0           5 0           6 0           7 0
8 1           9 1           10 1          11 1
12 1          13 1          14 1          15 1
16 2          17 2          18 2          19 2
20 2          21 2          22 2          23 2
24 3          25 3          26 3          27 3
28 3          29 3          30 3          31 3
32 4          33 4          34 4          35 4
36 4          37 4          38 4          39 4
40 5          41 5          42 5          43 5
44 5          45 5          46 5          47 5
48 6          49 6          50 6          51 6
52 6          53 6          54 6          55 6
56 7          57 7          58 7          59 7
60 7          61 7          62 7          63 7
    
```

The fields in the output of this command are described in the following table.

Field	Description
dscp	Indicates the DSCP value.
cos	Indicates the CoS value mapped .

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.14 show mls qos queueing

Use this command to display the QoS queueing configuration.

show mls qos queueing

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration The following example displays the QoS queuing configuration.

Examples FS# show mls qos queueing

```
Cos-queue map:
```

```
cos qid
```

```
-----
```

```
0 1
```

```
1 2
```

```
2 3
```

```
3 4
```

```
4 5
```

```
5 6
```

```
6 7
```

```
7 8
```

```
wrr bandwidth weights:
```

```
qid weights
```

```
-----
```

```
1 1
```

```
2 2
```

```
3 3
```

```
4 4
```

```
5 5
```

```
6 6
```

```
7 7
```

```
8 8
```

```
drp bandwidth weights:
```

```
qid weights
```

```
-----
```

```
1 3
```

```
2 3
```

```
3 3
```

```
4 3
```

```
5 3
```

```
6 3
```

```
7 3
```

```
8 3
```

```
wfq bandwidth weights:
```

```
qid weights
```

```
-----
```

```
1 3
```

```

2  4
3  5
4  6
5  7
6  8
7  9
8  10

Interface: GigabitEthernet 0/1
Wrr queue bandwidth: 1 1 1 1 2 2 2 2
Drr queue bandwidth: 1 1 2 2 2 2 4 4
Wfq queue bandwidth: 1 1 2 2 4 4 4 4
    
```

The fields in the output of this command are described in the following table.

Field	Description
Cos-queue map	Indicates the mapping between the CoS value and the queue ID.
wrr bandwidth weights	Indicates the WRR queue weight.
drr bandwidth weights	Indicates the DRR queue weight.
wfq bandwidth weights	Indicates the WFQ queue weight.
cos	Indicates the CoS value.
qid	Indicates the queue ID.
weights	Indicates the weight value
Interface	Indicate the interface name, which is only displayed on products that support the scheduling policy
Wrr queue bandwidth	Indicates the WRR queue weight, which is only displayed on products that support the scheduling policy
Drr queue bandwidth	Indicates the DRR queue weight, which is only displayed on products that support the scheduling policy
Wfq queue bandwidth	Indicates the WFQ queue weight, which is only displayed on products that support the scheduling policy

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.15 show mls qos rate-limit

Use this command to display the rate limiting configuration of the interface.

show mls qos rate-limit [interface interface-id]

Parameter	Parameter	Description
Description	interface-id	Interface name
Defaults	N/A	
Command Mode	Privileged EXEC mode, global configuration mode, interface configuration mode.	
Usage Guide	N/A	

Configuration The following example displays the rate limiting configuration of all interfaces.

```

Examples
FS# show mls qos rate-limit
Interface: GigabitEthernet 0/1
    rate limit input Kbps = 10240 burst = 256
Interface: GigabitEthernet 0/3
    rate limit output Kbps = 102400 burst = 4096
    
```

The fields in the output of this command are described in the following table.

Field	Description
Interface	Indicates the interface name.
rate limit input Kbps = x burst = y	Indicates the input rate limit value, and the input burst traffic limit value.
rate limit output Kbps = x burst = y	Indicates the output rate limit value, and the output burst traffic limit value.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.16 show mls qos scheduler

Use this command to display the queue scheduling policy.

show mls qos scheduler

Parameter	Parameter	Description
Description	N/A	N/A

Defaults None

Command Privileged EXEC mode, global configuration mode, interface configuration mode.

Mode

Usage Guide N/A

Configuration The following example displays the queue scheduling policy.

Examples

```
FS# show mls qos scheduler
Global Multi-Layer Switching scheduling
Weighted Round Robin
```

The fields in the output of this command are described in the following table.

Field	Description
Weighted Round Robin	Indicates that the queue scheduling policy is WRR. The other queue scheduling policies are listed as follows: SP: Strict Priority RR: Round Robin DRR: Deficit Round Robin WFQ: Weighted Fair Queue

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.17 show mls qos virtual-group

Use this command to display the policy map configuration on the virtual group.

show mls qos virtual-group [virtual-group-number | **policers**]

Parameter	Parameter	Description
Description	virtual-group-number	Virtual group number. The range is from 1 to 128.
	policers	Displays the policy map configuration on all virtual groups.

Defaults None

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration The following example displays the policy map configuration on all virtual groups.

Examples

```
FS# show mls qos virtual-group policers
Virtual-group: 1
```

```
Attached input policy-map: pmap1
Virtual-group: 20
Attached output policy-map: pmap2
```

The fields in the output of this command are described in the following table.

Field	Description
Virtual-group	Indicates the virtual group number.
Attached input policy-map	Indicates the policy map applied on the input virtual group.
Attached output policy-map	Indicates the policy map applied on the output virtual group.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.18 show policy-map

Use this command to display policy maps.

show policy-map [policy-map-name [**class** class-map-name]]

Parameter Description	Parameter	Description
	policy-map-name	Policy map name
	class-map-name	Class map name

Defaults None

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration Examples The following example displays configuration of policy map "pmap1".

```
FS# show policy-map pmap1

Policy Map pmap1
  Class cmap1
    set ip dscp 16
  Class cmap2
    police 10240 256 exceed-action dscp 8
  Class cmap3
```



```
police 512000 4096 exceed-action drop
```

The fields in the output of this command are described in the following table.

Field	Description
Policy Map	Indicates the policy map name.
Class	Indicates the class map name.
set	Indicates that the CoS, DSCP and VID values are modified in this example.
police	Indicates bandwidth limit configuration and the action policy for the violated packets.

The following example displays the action policy for the traffic of class map "cmap1" in policy map "pmap1" .

```
FS#show policy-map pmap1 class cmap1
Class cmap1
set ip dscp 16
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.19 show qos bandwidth

Use this command to display the bandwidth configuration.

```
show qos bandwidth [ interfaces interface-id ]
```

Parameter Description	Parameter	Description
	interface-id	Interface name

Defaults None

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration Examples The following example displays the bandwidth configuration of interface GigabitEthernet 0/1. (Taking the device supporting the bandwidth configuration of the unicast queue or the multicast queue for example.)

```
FS# show qos bandwidth interface gigabitEthernet 0/1

Interface: GigabitEthernet 0/1
```

```

-----
uc-queue-id | minimum-bandwidth | maximum-bandwidth
-----
      1           5120           10240
      2             0             0
      3             0             0
      4             0             0
      5             0             0
      6             0             0
      7             0             0
      8             0             0
-----

Total ucast-queue minimum-bandwidth:      5120
Total ucast-queue maximum-bandwidth:     10240

Interface: GigabitEthernet 0/1
-----
mc-queue-id | minimum-bandwidth | maximum-bandwidth
-----
      1           1024           5120
      2             0             0
      3             0             0
      4             0           2048
-----

Total mcast-queue minimum-bandwidth:      1024
Total mcast-queue maximum-bandwidth:     5120
    
```

The fields in the output of this command are described in the following table.

Field	Description
Interface	Indicates the interface name.
queue-id	Indicates the queue ID.
uc-queue-id	Indicates the unicast queue ID.
mc-queue-id	Indicates the multicast queue ID.
minimum-bandwidth	Indicates the minimum bandwidth configuration. The unit is Kbps.
maximum-bandwidth	Indicates the maximum bandwidth configuration. The unit is Kbps.
Total queue minimum-bandwidth Total queue maximum-bandwidth	Indicates the total bandwidth of minimum and maximum when both unicast and multicast queues are displayed.
Total ucast-queue minimum-bandwidth Total ucast-queue maximum-bandwidth	Indicates the total bandwidth of minimum and maximum when only unicast queue is displayed.
Total mcast-queue minimum-bandwidth Total mcast-queue maximum-bandwidth	Indicates the total bandwidth of minimum and maximum when only multicast queue is displayed.

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

3.20 show qos wred-ecn statistics

Use this command to display the statistics of packets discarded by WRED and packets marked by ECN.

show qos wred-ecn statistics [**interfaces** interface-id]

Parameter	Parameter	Description
Description	interface-id	Interface ID

Defaults N/A

Command mode Privileged EXEC mode/global configuration mode/interface configuration mode

Usage Guide The chip capability depends whether this command is available.

Configuration The following example displays the statistics of packets discarded by WRED and packets marked by ECN.

Examples Products do not support port queue statistics display:

```
FS#show qos wred-ecn statistics
Wred ecn stats result:
Port                WredDropped      EcnSended
-----
TFGigabitEthernet 0/1          0                0
TFGigabitEthernet 0/2          0                0
TFGigabitEthernet 0/3          0                0
TFGigabitEthernet 0/4          0                0
TFGigabitEthernet 0/5          0                0
TFGigabitEthernet 0/6          0                0
TFGigabitEthernet 0/7          0                0
TFGigabitEthernet 0/8          0                0
TFGigabitEthernet 0/9          0                0
TFGigabitEthernet 0/10         0                0
TFGigabitEthernet 0/11         0                0
TFGigabitEthernet 0/12         0                0
```

Products support port queue statistics display:

```
FS#show qos wred-ecn statistics
Wred ecn stats result:
```

port	WredDropped	EcnSended

GigabitEthernet 0/3	10	15
Queue 1:	1	2
Queue 2:	1	2
Queue 3:	1	2
Queue 4:	1	2
Queue 5:	1	2
Queue 6:	1	2
Queue 7:	1	2
Queue 8:	3	1
TenGigabitEthernet 0/32	10	15
Queue 1:	1	2
Queue 2:	1	2
Queue 3:	1	2
Queue 4:	1	2
Queue 5:	1	2
Queue 6:	1	2
Queue 7:	1	2
Queue 8:	3	1

The fields in the output of this command are described in the following table:

Port	Port name
WredDropped	Number of packets discarded by WRED
EcnSended	Number of packets marked by ECN
Queue	The ECN statistics of port queue is equal to the ECN statistics of port. Queue range: 1-8

Related Commands	Command	Description
	N/A.	N/A.

Platform N/A.
Description

3.21 show queueing wred interface

Use this command to display WRED settings on the interface.

show queueing wred interface interface-id

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
interface-id	Interface name

Defaults None

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide Products depend whether max_cell x and min_cell_x are displayed.

Configuration The following example displays the WRED settings on interface GigabitEthernet 1/3.

```

Examples
FS# show queueing wred interface gigabitethernet 1/3
-----
qid  max_cell_1 min_cell 1 max_1 min_1 prob_1 max_cell_2 min_cell 2  max_2 min_2 prob_2
-----
1   120000    120000    100  30   100   120000    120000    100  70   100
2   120000    120000    100  60   100   120000    120000    100  30   100
3   120000    120000    100  80   30    120000    120000    100  30   40
4   120000    120000    100  80   100   120000    120000    100  100  100
5   120000    120000    100  80   100   120000    120000    100  100  100
6   120000    120000    100  80   100   120000    120000    100  100  100
7   120000    120000    100  80   100   120000    120000    100  100  100
8   120000    120000    100  80   100   120000    120000    100  100  100

-----
cos  qid  threshold_id
-----
0   1   1
1   2   2
2   3   2
3   4   2
4   5   2
5   6   1
6   7   1
7   8   1
    
```

The fields in the output of this command are described in the following table.

Field	Description
qid	Indicates the queue ID.
max_cell_x	Indicates the upper threshold of the x group (unit: cell).
min_cell_x	Indicates the lower threshold of the x group (unit: cell).

max_x	Indicates the higher threshold of the x group (unit: percentage).
min_x	Indicates the higher threshold of the x group (unit: percentage).
prob_x	Indicates the maximum probability of being dropped of the x group.
cos qid threshold_id	Indicates the mapping of CoS value, queue ID and threshold number.

Related Commands	Command	Description
	N/A.	N/A.

Platform N/A.
Description

3.22 show virtual-group

Use this command to display the member port in the virtual group.

show virtual-group [virtual-group-number | **summary**]

Parameter Description	Parameter	Description
	virtual-group-number	Virtual group number. The range is from 1 to 128.
	summary	Displays the member port in all virtual groups.

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration Examples The following example displays the member port in all virtual groups.

```

FS# show virtual-group summary
  virtual-group      member
  -----
  1                  Gi0/1 Gi0/2
  2                  Gi0/0
    
```

The fields in the output of this command are described in the following table.

Field	Description
virtual-group	Indicates the virtual group number.
member	Indicates the member port in the virtual group.

Related	Command	Description
Commands	N/A	N/A
Platform	N/A	
Description		

3.23 virtual-group

Use this command to create a virtual group in global configuration mode.

Use this command to configure add an interface to a virtual group in interface configuration mode.

Use the **no** or **default** form of this command to remove a virtual group in global configuration mode.

Use the **no** or **default** form of this command to remove an interface from a virtual group in interface configuration mode.

virtual-group virtual-group-number

no virtual-group virtual-group-number

default virtual-group virtual-group-number

Parameter	Parameter	Description
Description	virtual-group-number	Virtual group number. The range is from 1 to 128.

Defaults No virtual group is configured, or no interface is added to a virtual group, by default.

Command Mode Interface configuration mode, global configuration mode.

Usage Guide The member port added to the virtual group must be a physical port or an aggregate port member. The member ports of a virtual group must be on the same module of a chassis switch or on the same box switch.

Configuration Examples The following example sets the interface gigabitEthernet 1/3 as the member of virtual group 3:

```
FS(config)# interface gigabitEthernet 1/3
FS(config-if)# virtual-group 3
```

Related	Command	Description
Commands	show virtual-group [virtual-group-number summary]	Displays the virtual group configuration.

Platform N/A

Description

3.24 wfq-queue bandwidth

Use this command to configure the WFQ queue weight ratio. Use the **no** or **default** form of this command to restore the default setting.

wfq-queue bandwidth weight1 ... weight8

no wfq-queue bandwidth

default wfq-queue bandwidth

Parameter Description	Parameter	Description
	weight1...weight8	8 queue weights. The default queue weight ratio is 1:1:1:1:1:1:1:1. For the products supporting the SP scheduling policy, the weight range is from 0 to 15. For the products not supporting the SP scheduling policy, the weight range is from 1 to 15.

Defaults The default queue weight ratio is 1:1:1:1:1:1:1:1.

Command Mode Global configuration mode.

Usage Guide If the weight value is 0, the SP scheduling policy is applied.

Configuration Examples The following example configures the WFQ queue weight ratio to 1:1:2:4:4:4:6:8.

```
FS(config)# wfq-queue bandwidth 1 1 2 4 4 4 6 8
```

Related Commands	Command	Description
	show mls qos queueing [interface interface-id]	Displays the QOS queuing configuration.

Platform Description N/A

3.25 wrr-queue bandwidth

Use this command to set the WRR weight ratio. Use the **no** or **default** form of this command to restore the default setting.

wrr-queue bandwidth weight1 ... weight8

no wrr-queue bandwidth

default wrr-queue bandwidth

Parameter Description	Parameter	Description
	weight1...weight8	8 queue weights. The default queue weight ratio is 1:1:1:1:1:1:1:1. For the products supporting the SP scheduling policy, the weight range is from 0 to 15. For the products not supporting the SP scheduling policy, the weight range is from 1 to 15.

Defaults The default queue weight ratio is 1:1:1:1:1:1:1:1.

Command Global configuration mode

Mode

Usage Guide If the weight value is 0, the SP scheduling policy is applied.

Configuration The following example configures the WRR queue weight ratio to 1:1:1:1:2:2:4:8.

```
FS(config)# wrr-queue bandwidth 1 2 3 4 5 6 7 8
```

Related	Command	Description
Commands	show mls qos queuing [interface interface-id]	Displays the QoS queuing configuration.

Platform N/A

Description

3.26 cos-map

Use this command to map the CoS value to a threshold for a specified queue. Use the **no** or **default** form of this command to restore the default settings.

wrr-queue cos-map threshold_id cos1 [cos2 [cos3 [cos4 [cos5 [cos6 [cos7 [cos8]]]]]]]]]]]

no wrr-queue cos-map threshold_id

default wrr-queue cos-map threshold_id

Parameter Description	Parameter	Description
	threshold_id	Threshold number. The range is from 1 to 2. Up to two threshold values can be configured.
	cos_N	CoS value. The range is from 0 to 7. Up to 8 CoS values can be configured.

Defaults All CoS values are mapped to the threshold 1.

Command mode Interface configuration mode.

Usage Guide DSCP-threshold mapping can be enabled by mapping DSCP-CoS to CoS-threshold. When all CoS values are mapped to one threshold on the interface, it changes the enabled WRED to RED.

Configuration The following example enters the interface GigabitEthernet 1/3 to map CoS 1, 2 to threshold 2.

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)#wrr-queue cos-map 2 1 6
```

Related	Command	Description
Commands	show queueing wred interface interface-id	Displays the WRED configuration on the interface.

Platform N/A.
Description

3.27 wrr-queue random-detect sample-period

Use this command to configure the sampling interval for discarding of WRED. You can also restore the default configuration .

wrr-queue random-detect sample-period period
no wrr-queue random-detect sample-period
default wrr-queue random-detect sample-period

Parameter	Parameter	Description
Description	period	Indicates the sampling interval in the unit of sampling cycle, ranging from 1 to 64.

Defaults The default range varies with product.

Command Mode Global configuration mode

Usage Guide Whether this command is available is determined by products.

Because the configured sampling interval takes effect on the discarding function of WRED in interface configuration mode, it is recommended to configure the sampling interval after the higher and lower thresholds for packets to be discarded by WRED. Use this command together with the sampling weight configuration command for packets to be discarded by WRED, to precisely adjust the discarding function of WRED.

Configuration Examples The following example sets the sampling interval to 10.

```
FS# configure terminal
FS(config)# wrr-queue random-detect sample-period 10
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

3.28 wrr-queue random-detect sample-weight

Use this command to set the sampling weight for WRED. Use the **no** or **default** form of this command to restore the default settings.

wrr-queue random-detect sample-weight queue_id weight
no wrr-queue random-detect sample-weight queue_id
default wrr-queue random-detect sample-weight queue_id

Parameter Description	Parameter	Description
	queue_id	Indicates the ID of a queue on an interface.
	weigth	Indicates the weight factor, ranging from 0 to 15. The value range may vary with products.

Defaults The default value is determined by products.

Command mode Interface configuration mode.

Usage Guide Whether this command is available is determined by products.

Because the configured sampling interval takes effect on the discarding function of WRED in interface configuration mode, it is recommended to configure the sampling interval after the higher and lower thresholds for packets to be discarded by WRED. Use this command together with the sampling interval configuration command for packets to be discarded by WRED, to precisely adjust the discarding function of WRED.

Configuration Examples The following example sets the sampling weight on interface 1/3 to 6:

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# wrr-queue random-detect sample-weight 1 6
```

Related Commands	Command	Description
	N/A.	N/A.

Platform Description N/A.

3.29 wrr-queue random-detect min-threshold

Use this command to configure the minimum WRED drop threshold. Use the **no** or **default** form of this command to restore the default WRED drop threshold. Unit: percentage

wrr-queue random-detect min-threshold queue_id thr1 [thr2]

no wrr-queue random-detect min-threshold queue_id

default wrr-queue random-detect min-threshold queue_id

Parameter Description	Parameter	Description
	queue_id	Queue ID.
	thrN	Up to two threshold values can be configured. The threshold value range is from 1 to 100.

Defaults Two threshold values are configured, and the default threshold values are 100 and 80.

Command mode Interface configuration mode.

Usage Guide As the maximum value of the configuration range is equal to the current higher threshold, you need to pay attention to the setting of the higher threshold when configuring the lower threshold.
The threshold for packets to be discarded by WRED can be configured in the unit of percentage or cell. The latter configured mode prevails.

Configuration Examples The following example configures the low WRED drop thresholds to 60 and 70 for queue 1.

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# wrr-queuerandom-detect min-threshold 1 60 70
```

Related Commands

Command	Description
show queuing wred interface interface-id	Displays the WRED configuration on the interface.

Platform Description N/A.

3.30 wrr-queue random-detect max-threshold

Use this command to set the maximum WRED threshold (in the unit of percentage) for the specified queue on the interface. Use the **no** form of this command to remove the maximum WRED threshold.

wrr-queue random-detect max-threshold queue_id thr1 [thr2 thr3]

no wrr-queue random-detect max-threshold queue_id

Parameter Description

Parameter	Description
queue_id	The interface queue id.
thrN	Supports 2 groups of higher thresholds, ranging from the specified lower threshold to 100.

Defaults When the unit is percentage, the default value is 100, 100.

Command mode Interface configuration mode.

Usage Guide Because the minimum value of the configured range is equal to the current lower threshold, you need to consider the lower threshold when configuring the higher threshold.
The threshold for packets to be discarded by WRED can be configured in the unit of percentage or cell. The latter configured mode prevails.

Configuration The following example shows how to set the max-threshold for queue1 on an interface:

Examples

```
FS(config-if)# wrr-queue random-detect max-threshold 1 88 89 90
```

Related Commands

Command	Description
N/A.	N/A.

Platform N/A.
Description

3.31 wrr-queue random-detect min-threshold cell

Use this command to set the lower WRED threshold in the unit of cell. Use the **no** or **default** form of this command to restore the default settings.

wrr-queue random-detect min-threshold cell queue_id thr1 [thr2]

no wrr-queue random-detect min-threshold cell queue_id

default wrr-queue random-detect min-threshold cell queue_id

Parameter Description

Parameter	Description
queue_id	Indicates the ID of a queue on an interface, ranging from 1 to 8 .
thrN	Supports 2 groups of lower thresholds, ranging from 1 to the specified higher threshold. The default value is determined by products.

Defaults The default value is determined by products.

Command mode Interface configuration mode.

Usage Guide Whether this command is available is determined by products.

Because the maximum value of the configuration range is equal to the current higher threshold, you need to pay attention to the setting of the higher threshold when configuring the lower threshold.

The threshold for packets to be discarded by WRED can be configured in the unit of percentage or cell. The latter configured mode prevails.

Configuration The following example sets the lower threshold of the first queue on interface 1/3 to 1000,1000 :

Examples

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# wrr-queue random-detect cell min-threshold 1 1000 1000
```

Related

Command	Description
---------	-------------

Commands		
	N/A.	N/A.

Platform N/A.

Description

3.32 wrr-queue random-detect max-threshold cell

Use this command to set the higher WRED threshold in the unit of cell. Use the **no** or **default** form of this command to restore the default settings.

wrr-queue random-detect max-threshold cell queue_id thr1 [thr2]

no wrr-queue random-detect max-threshold cell queue_id

default wrr-queue random-detect max-threshold cell queue_id

Parameter Description	Parameter	Description
	queue_id	
	thrN	Supports 2 groups of higher thresholds, ranging from the set lower threshold to the maximum higher threshold.

Defaults The default value is determined by products.

Command mode Interface configuration mode.

Usage Guide Whether this command is available is determined by products.

Because the minimum value of the configuration range is equal to the current lower threshold, you need to consider the lower threshold when configuring the higher threshold.

The threshold for packets to be discarded by WRED can be configured in the unit of percentage or cell. The latter configured mode prevails.

Configuration Examples The following example sets the higher threshold of the first queue on interface 0/1 to 1000, 1000 :

```
FS(config)# interface tFGigabitEthernet 0/1
FS(config-if-TFGigabitEthernet 0/1)# wrr-queue random-detect cell max-threshold 1 1000 1000
```

Related Commands	Command	Description
		N/A.

Platform N/A.

Description

3.33 wrr-queue random-detect probability

Use this command to configure the WRED packet drop probability. Use the **no** or **default** form of this command to restore the WRED packet drop probability.

wrr-queue random-detect probability queue_id prob1 [prob2]

no wrr-queue random-detect probability queue_id

default wrr-queue random-detect probability queue_id

Parameter Description

Parameter	Description
queue_id	Queue ID.
proN	Up to two probability values can be configured. The threshold value range is from 1 to 100.

Defaults

Two packet drop probability values are configured, and the default probability values are 100 and 80.

Command mode

Interface configuration mode.

Usage Guide

N/A

Configuration Examples

The following example configures the WRED packet drop values to 50 and 70 for queue 1.

```
FS(config)# interface gigabitethernet 1/3
FS(config-if-GigabitEthernet 1/3)# wrr-queue random-detect probability 1 50 70
```

Related Commands

Command	Description
show queueing wred interface interface-id	Displays the WRED configuration on the interface.

Platform Description

N/A.

4 MMU Commands

4.1 clear mmu pg-buffer peaked

Use this command to clear the historical peak value of the priority group buffer.

clear mmu pg-buffer peaked

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide -

Configuration Examples The following example clears the historical peak value of all priority group buffers:

```
FS# clear mmu pg-buffer peaked
```

4.2 clear mmu queue-buffer peaked

Use this command to clear the historical peak value of the queue buffer.

clear mmu queue-buffer peaked

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example clears the historical peak value of the buffer.

Examples FS# clear mmu queue-buffer peaked

```
FS#
```

Platform Description N/A

4.3 clear queue-counters

Use this command to clear queue statistics.

clear queue-counter [interface interface_id]

Parameter Description	Parameter	Description
	interface_id	Port Number

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example clears all queue statistics.

```
FS# clear queue-counter
FS#
```

The following example clears queue statistics of an interface.

```
FS# clear queue-counter Interface TenGigabitEthernet 1/9
FS#
```

Platform Description N/A

4.4 clear mmu usage-warn-count

Use this command to clear the number of buffer usage warnings.

clear mmu usage-warn-count

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide N/A

Configuration The following example clears the number of buffer usage warnings.

Examples FS# clear mmu usage-warn-count

4.5 mmu guarantee-limit set

Use this command to ensure the quantity of guaranteed buffer cell. Use the **no** form of this command to disable this function.

mmu guarantee-limit set cell

no mmu guarantee-limit

Parameter Description	Parameter	Description
	cell	ensure the quantity of guaranteed buffer cell

Command Mode Global configuration mode

Default Level 14

Usage Guide Certain buffer is reserved by default, and the cell quantity is subject to the actual product.

Configuration Examples 1: In the global configuration mode, reserve 10000 guaranteed cells.

```
FS#config
FS(config)# mmu guarantee-limit set 10000
FS(config)#exit
FS#
```

Verification 1: Run the **show run** command to check the current configuration.

4.6 mmu ha disable

Use this command to enable MMU-HA function. Use the no form of this command to disable this function.

mmu ha disable

no mmu ha disable

Parameter Description	Parameter	Description

Command Mode Global configuration mode

Default Level 14

Usage Guide MMU-HA is enabled by default.

Configuration 1: In the global configuration mode, disable MMU-HA.

Examples

```
FS#config
FS(config)# mmu ha disable
FS(config)#exit
FS#
```

Verification 1: Run the **show run** command to check the current configuration.

4.7 mmu ha reset disable

Use this command to enable MMU-HA reset. Use the **no** form of this command to disable this function.

mmu ha reset disable
no mmu ha reset disable

Parameter Description	Parameter	Description

Command Mode Global configuration mode

Default Level 14

Usage Guide MMU-HA reset is enabled by default.

Configuration 1: In the global configuration mode, disable MMU-HA reset.

Examples

```
FS#config
FS(config)# mmu ha reset disable
FS(config)#exit
FS#
```

Verification 1: Run the **show run** command to check the current configuration.

4.8 mmu headroom-threshold

Use this command to configure the priority group headroom buffer size. Use the **no** form of this command to restore the default setting.

mmu headroom-threshold pg [pg-id0 [pg-id1 [pg-id N]] **set** value
no mmu headroom-threshold pg

Parameter Description	Parameter	Description
	pg-idN	Priority group ID
	value	Headroom threshold value, in the unit of cell.

Defaults The default value depends on the product.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. The effective way of this command varies with the equipment and depends on the product.
2. The user-configured value is displayed when the **show run** command is executed, even if the user-configured value is the default value.

Configuration The following example configures the priority group headroom buffer size.

Examples

```
FS#config
FS(config)# interface tenGigabitEthernet 0/9
FS(config-if)#mmu headroom-threshold pg 1 3 7 8 set 100
FS(config-if)#exit
```

Verification Run the **show run** command to display the headroom buffer size configuration.

4.9 mmu ingress-threshold

Use this command to configure the ingress shared buffer. Use **no** form of this command to restore the default setting.

mmu ingress-threshold pg [pg-id0 [pg-id1 [pg-id N]] **set** thr%

no mmu ingress-threshold pg

Parameter Description	Parameter	Description
	pg-idN	Priority group ID
	th%	Total shared buffer x Threshold percentage = Maximum available buffer for the queue

Defaults The default value depends on the product.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. The effective way of this command varies with the equipment and depends on the product.

2. The configuration takes effect only when flow control/Priority-based Flow Control (PFC) is not enabled.
3. The user-configured value is displayed when the **show run** command is executed, even if the user-configured value is the default value.

Configuration The following example configures the percentage of multi-priority group shared buffer.

```

Examples
FS#config
FS(config)# interface tenGigabitEthernet 0/9
FS(config-if)#mmu ingress-threshold pg 1 3 7 8 set 80
FS(config-if)#exit
    
```

Verification Run the **show run** command to display the shared buffer configuration.

4.10 mmu {ingress|egress} service-pool

Use this command to configure the size of shared service pool on the input/output. Use the **no** form of this command to disable this function.

```

mmu {ingress|egress} service-pool sp-id set cell
no mmu {ingress|egress} service-pool sp-id
    
```

Parameter Description	Parameter	Description
	ingress	Configures the shared service pool on the input
	egress	Configures the shared service pool on the output
	sp-id	ID of the shared service pool
	cell	Cell quantity of the shared service pool

Command Mode Global configuration mode

Default Level 14

Usage Guide By default, buffer is all allocated to the shared service pool sp0 whose size is subject to the actual product. The size of other pools is 0.
It is recommended to set the same size for shared service pools on the input/output for the same traffic, or packet loss may occur.

Configuration Examples 1: sp1 on the input/output in the global configuration mode has 10000 cells

```

Examples
FS#config
FS(config)# mmu ingress service-pool 1 set 10000
FS(config)# mmu egress service-pool 1 set 10000
FS(config)#exit
FS#
    
```

- Verification**
- 1: Run the **show run** command to check the current configuration.
 - 2: Run the **show pg-buffer** and **show queue-buffer** to check the configuration result.

4.11 mmu pg-guarantee

Use this command to configure the ingress PG guarantee buffer size. Use the **no** form of this command to restore the default setting.

mmu pg-guarantee pg { priority -id1 [priority-id2 [priority -idN]] set value

no mmu pg-guarantee pg { priority -id1 [priority-id2 [priority -idN]]

Parameter Description

Parameter	Description
priority -idN	Ingress PG No.
value	Guarantee buffer configuration value, in the unit of cell

Defaults The default value depends on the product.

Command Mode Interface configuration mode

Default Level 14

- Usage Guide**
1. The effective way of this command varies with the equipment and depends on the product.
 2. The user-configured value is displayed when the **show run** command is executed, even if the user-configured value is the default value.

Configuration The following example configures the ingress PG guarantee buffer size.

Examples

```
FS#config
FS(config)# interface hundredGigabitEthernet 0/50
FS(config-if-HundredGigabitEthernet 0/50)#mmu pg-guarantee pg set 100
FS(config-if-HundredGigabitEthernet 0/50)#exit
```

Verification Run the **show run** command to display the PG guarantee buffer configuration.

4.12 mmu pg-headroom

Use this command the maximum size of globally available headroom buffer. Use the **no** form of this command to restore the default setting.

mmu pg-headroom set value

no mmu pg-headroom

Parameter Description

Parameter	Description
value	Maximum size of globally available headroom buffer, in the unit of cell

Defaults The default value depends on the product.

Command Mode	Global configuration mode
Default Level	14
Usage Guide	The default value of the global PG headroom buffer varies with the equipment and depends on the product.
Configuration Examples	The following example configures the maximum size of globally available headroom buffer. <pre>FS#config FS(config)#mmu pg-headroom set 10000 FS(config)#exit</pre>
Verification	Run the show run command to display the global headroom buffer configuration.

4.13 mmu {priority-group| unicast-queue| multicast-queue} attach

Use this command to configure the mapping relationship between the input PG/output queue and the shared service pool. Use the **no** form of this command to disable this function.

mmu {priority-group| unicast-queue| multicast-queue} [id1 [id2 [idN]] attach service-pool [sp-id]
no mmu {priority-group| unicast-queue| multicast-queue} [id1 [id2 [idN]] attach service-pool

Parameter Description	Parameter	Description
	priority-group	Input priority group
	unicast-queue	Output unicast queue
	multicast-queue	Output multicast queue
	idN	ID of the priority group or unicast/multicast queue
	sp-id	ID of the shared service pool

Command Mode	Global configuration mode
Default Level	14
Usage Guide	By default, PG and unicast/multicast queue are mapped to SP0. The mapping can be changed to a new SP, and is changed back to SP0 after the configuration is deleted,
Configuration Examples	1: In the global configuration mode, establish SP1 on the input, and establish SP1 and SP2 on the output. Map the input PG1 to the input SP1, the unicast queue 1 on the output to the output SP1, and the multicast queue 1 to the output SP2. <pre>FS#config FS(config)# mmu ingress service-pool 1 set 10000 FS(config)# mmu egress service-pool 1 set 10000</pre>

```
FS(config)# mmu egress service-pool 2 set 10000
FS(config)# mmu priority-group 1 attach service-pool 1
FS(config)# mmu unicast-queue 1 attach service-pool 1
FS(config)# mmu multicast-queue 1 attach service-pool 2
FS(config)#exit
FS#
```

- Verification**
- 1: Run the **show run** command to check the current configuration.
 - 2: Run the **show pg-buffer** and **queue-buffer** to check the configuration result.

4.14 mmu queue-guarantee

Use this command to configure the guaranteed buffer.

```
mmu queue-guarantee output { unicast | multicast } {queue-id1 [queue-id2 [queue-idN] ]set value
```

Use the **no** form of this command to restore the default setting.

```
no mmu queue-guarantee output { unicast | multicast }
```

Parameter Description	Parameter	Description
	output	Performs buffer management on the output queue.
	unicast	Performs buffer management on the output unicast queue.
	multicast	Performs buffer management on the output multicast queue.
	queue-idN	Queue ID
	value	Sets the number of guaranteed buffer, in the unit of cells.

Defaults 8 cells by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command is executed in different ways on different devices.

Configuration Examples The following example configures guaranteed buffer for unicast queue.

```
FS#config
FS(config)# interface tenGigabitEthernet 1/9
FS(config-if)#mmu queue-guarantee ouput unicast 1 3 7 8 set 15
FS(config-if)#exit
```

The following example configures guaranteed buffer for multicast queue.


```
FS#config
FS(config)# interface tenGigabitEthernet 1/9
FS(config-if)#mmu queue-guarantee ouput multicast 1 3 7 8 set 15
FS(config-if)#exit
```

Platform
Description

N/A

4.15 mmu queue-thredshold

Use this command to configure the shared buffer.

mmu queue-thredshold output { unicast | multicast } { queue-id1 [queue-id2 [queue-idN]] } set th%

Use the **no** form of this command to restore the default setting.

no mmu queue-thredshold output { unicast | multicast }

Parameter
Description

Parameter	Description
output	Performs buffer management on the output queue.
unicast	Performs buffer management on the output unicast queue.
multicast	Performs buffer management on the output multicast queue.
queue-idN	Queue ID
th%	Total shared buffer * threshold = Available buffer

Defaults 100% for unicast queue and 15% for multicast queue.

Command Interface configuration mode
Mode

Default Level 14

Usage Guide There are different effective ways on products.

Configuration The following example configures shared buffer for unicast queue.

Examples

```
FS#config
FS(config)# interface tenGigabitEthernet 1/9
FS(config-if)#mmu queue-thredshold ouput unicast 1 3 7 8 set 80
FS(config-if)#exit
FS(config)#exit
FS#
```

The following example configures shared buffer for multicast queue.

```
FS#config
FS(config)# interface tenGigabitEthernet 1/9
FS(config-if)#mmu queue-thredshold ouput multicast 1 3 7 8 set 80
FS(config-if)#exit
FS(config)#exit
FS#
```

Platform N/A
Description

4.16 mmu queue-loss-warn { unicast | multicast }

Use this command to enable the queue packet loss alarm function. Use the **no** form of this command to disable this function.

[no] mmu queue-loss-warn { unicast | multicast } [qid1 [qid2 [qidN]]] { on | off }

Parameter Description	Parameter	Description
	unicast	Indicates a unicast queue.
	multicast	Indicates a multicast queue.
	qid	Indicates a queue ID.
	on	Enables the queue packet loss alarm function.
	off	Disables the queue packet loss alarm function.

Command Mode Global configuration mode / interface configuration mode

Default Level 14

Usage Guide The commands in global configuration mode takes effect on all interfaces, the commands in interface configuration mode takes effect on the current interface, and the latter has a higher priority than the former.

Configuration Examples The following example enables the packet loss alarm function in global configuration mode.

```
FS#config
FS(config)# mmu queue-loss-warn unicast 1 2 3 on
FS(config)# mmu queue-loss-warn multicast 5 6 7 on
FS(config)#exit
FS#
```

The following example configures the packet loss alarm function in interface configuration mode.

```
FS#config
FS(config)# interface hundredGigabitEthernet 0/50
```

```
FS(config-if-HundredGigabitEthernet 0/50)#mmu queue-loss-warn unicast 1 2 3 on
FS(config-if-HundredGigabitEthernet 0/50)#mmu queue-loss-warn unicast 4 5 6 off
FS(config-if-HundredGigabitEthernet 0/50# mmu queue-loss-warn multicast 2 3 4 on
FS(config-if-HundredGigabitEthernet 0/50# mmu queue-loss-warn multicast 6 7 8 off
FS(config-if-HundredGigabitEthernet 0/50#exit
FS(config)#
```

Verification Run the **show run** command to display the configuration.

4.17 mmu queue-loss-warn frequency

Use this command to configure the queue packet loss alarm frequency. Use the **no** form of this command to disable this function.

[no] mmu queue-loss-warn frequency cycle value1 times value2

Parameter Description	Parameter	Description
	value1	Indicates the alarm printing period, in seconds.
	value2	Indicates the number of alarms that can be printed in one period.

Command Mode Global configuration mode

Default Level 14

Usage Guide Up to 30 packet loss alarms can be printed within 60s by default.

Configuration The following example configures the frequency of packet loss alarms.

```
FS#config
FS(config)# mmu queue-loss-warn frequency cycle 35 times 8
FS(config)#exit
FS#
```

Verification Run the **show run** command to display the configuration.

4.18 mmu sample-period

Use this command to configure the sampling interval for counting the occupied buffer and sent and discarded records in a queue. Use the **no** form of this command to restore the default setting.

mmu sample-period { buffer-counter | queue-counter } value

no mmu sample-period { buffer-counter | queue-counter }

Parameter Description	Parameter	Description
	buffer-counter	Count of the occupied buffer
	queue-counter	Count of sent and discarded records in a queue
	value	Sampling time, in the unit of seconds, range:1-10.

- Defaults** 5 seconds
- Command Mode** Global configuration mode
- Default Level** 14
- Usage Guide**
 1. The effective way of this command varies with the equipment and depends on the product.
 2. The user-configured value is displayed when the **show run** command is executed, even if the user-configured value is the default value.

Configuration Examples The following example configures the sampling interval for counting the occupied buffer and sent and discarded records in a queue.

```
FS#config
FS(config)# mmu sample-period buffer-counter 10
FS(config)# mmu sample-period queue-counter 8
FS(config)#exit
```

Verification Run the **show run** command to display the sampling interval configuration.

4.19 mmu slice-id compatible

Use this command to switch the numbering mode of slice ID. Use the **no** form of this command to restore the default settings.

- mmu slice-id compatible**
- no mmu slice-id compatible**

Parameter Description	Parameter	Description
	N/A	

Defaults By default, the number of slice ID starts from 1; run the command to start ID from 0.

Command Mode Global configuration mode

Default Level 14

Usage Guide /A

Configuration Examples The following example switches the numbering mode of slice ID.

```
FS#config
FS(config)# mmu slice-id compatible
FS(config)#exit
```

Verification Run the **show run** command to display the current numbering mode.
Run the **show queue-buffer** command to display the range of current numbering mode.

4.20 mmu xoff-threshold

Use this command to configure the flow control threshold. Use the **no** form of this command to restore the default setting.

mmu xoff-threshold pg [pg-id0 [pg-id1 [pg-id N]] **set** thr%
no mmu xoff-threshold pg

Parameter Description	Parameter	Description
	pg-idN	Priority group ID
	th%	Total shared buffer x Threshold percentage = Maximum available buffer for the queue

Defaults The default value depends on the product.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. The effective way of this command varies with the equipment and depends on the product.
2. The configuration takes effect only when flow control/PFC is enabled.
3. If flow control/PFC is not enabled, the shared buffer threshold of the PG is according to the value of **ingress-threshold**.
4. The user-configured value is displayed when the **show run** command is executed, even if the user-configured value is the default value.

Configuration Examples The following example configures the percentage of the multi-priority group flow control threshold.

```
FS#config
FS(config)# interface tenGigabitEthernet 0/9
FS(config-if)#mmu xoff-threshold pg 1 3 7 8 set 80
FS(config-if)#exit
```

Verification Run the **show run** command to display the flow control threshold configuration.

4.21 mmu xon-threshold-offset

Use this command to configure the flow control restoration threshold. Use the **no** form of this command to restore the default setting.

mmu xon-threshold-offset pg [pg-id0 [pg-id1 [pg-id N]] **set** value

no mmu xon-threshold-offset pg

Parameter Description	Parameter	Description
	pg-idN	Priority group ID
	value	Offset value of the xon and xoff thresholds, in the unit of cell, range: 1-500
Defaults	8 cells by default	
Command Mode	Interface configuration mode	
Default Level	14	
Usage Guide	<ol style="list-style-type: none"> 1. The effective way of this command varies with the equipment and depends on the product. 2. The configuration takes effect only when flow control/PFC is enabled. 3. The user-configured value is displayed when the show run command is executed, even if the user-configured value is the default value. 	
Configuration Examples	<p>The following example configures the multi-priority group flow control restoration threshold.</p> <pre> FS#config FS(config)# interface tenGigabitEthernet 0/9 FS(config-if)#mmu xon-threshold-offset pg 1 3 7 8 set 10 FS(config-if)#exit </pre>	
Verification	Run the show run command to display the flow control restoration threshold configuration.	

4.22 mmu usage-warn-limit

Use these commands to configure the warning threshold of buffer usage. Use the **no** form of these commands to restore the default settings.

1. For global buffer
mmu usage-warn-limit set value
2. For shared service pool
mmu usage-warn-limit {ingress-service-pool | egress-service-pool} sp-id set value
3. For ingress pg/headroom or egress unicast/multicast queue buffer
mmu usage-warn-limit {pg-headroom | priority-group | unicast | multicast} {id1 [id2 [idN]]} set value

Parameter Description	Parameter	Description
	ingress-service-pool	Ingress shared service pool

egress-service-pool	Egress shared service pool
sp-id	ID of shared service pool, range 0-3
pg-headroom	Priority group headroom
priority-group	Priority group
unicast	Performs buffer management on the output unicast queue.
multicast	Performs buffer management on the output multicast queue.
idN	Priority group ID or queue ID, range: 1-8
value	Usage warning threshold in the unit of percentage, range: 1-100.

Defaults The default threshold is 0.

Command Mode Global configuration mode/Interface configuration mode

Default Level 14

Usage Guide If the buffer usage for the port group/queue exceeds the global threshold, a warning log is printed. If the buffer usage for the queue exceeds the queue threshold, a warning log is printed. To avoid producing excessive logs, the warning log for a port group/queue is printed only once within 30 seconds.

Configuration Examples The following example sets the usage warning threshold globally.

```
FS#config
FS(config)# mmu usage-warn-limit set 90
```

The following example sets the usage warning threshold for unicast queue 3 and 8 to 80%.

```
FS#config
FS(config)# int te1/1
FS(config-if)# mmu usage-warn-limit unicast 3 8 set 80
```

The following example sets the usage warning threshold for multicast queue 1 and 4 to 80%.

```
FS#config
FS(config)# int te1/1
FS(config-if)# mmu usage-warn-limit multicast 1 4 set 80
```

The following example sets the buffer usage warning threshold for priority groups 3 and 6 to 80%.

```
FS#config
FS(config)# int te1/1
FS(config-if)# mmu usage-warn-limit priority-group 3 6 set 80
```

The following example sets the headroom usage warning threshold for priority groups 5 and 8 to 80%.

```
FS#config
FS(config)# int te1/1
FS(config-if)# mmu usage-warn-limit pg-headroom 5 8 set 80
```

The following example sets the usage warning threshold for ingress shared service pool SP1 to 10%, and egress shared service pool SP2 to 20%.

```
FS#config
FS(config)# mmu usage-warn-limit ingress-service-pool 1 set 10
FS(config)# mmu usage-warn-limit egress-service-pool 2 set 20
FS(config)#exit
FS#
```

Platform
Description N/A

4.23 show pg-buffer interface

Use this command to display the priority group buffer usage of an interface.

show pg-buffer interface interface-id

Parameter Description	Parameter	Description
	interface-id	Interface ID

Command Mode Privileged EXEC mode, global configuration mode, or interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example displays the buffer usage of a specific interface (implemented based on the ingress PG).

```
FS#show pg-buffer interface hu0/1
Interface HundredGigabitEthernet 0/1:
Slice 1:
PriGroupId  Used cells  Available cells  Usage  Usage warn limit  Usage warn count  Peaked cells  Service
pool
0           991          59025          1%    0%              0              1004
0(SP-0)
1           0            60000          0%    0%              0              0
1(SP-1)
2           0            60000          0%    0%              0              0
0(SP-0)
3           0            60000          0%    0%              0              0
0(SP-0)
4           0            60000          0%    0%              0              0
0(SP-0)
5           0            60000          0%    0%              0              0
```


0(SP-0)	6	0	60000	0%	0%	0	0
3(SP-3)	7	0	60000	0%	0%	0	0
0(SP-0)							
PriGroupld	Used headroom	Available headroom	Usage	Usage warn limit	Usage warn count	Peaked	
headroom							
0	0	0	0%	0%	0	0	
1	0	0	0%	0%	0	0	
2	0	0	0%	0%	0	0	
3	0	0	0%	0%	0	0	
4	0	0	0%	0%	0	0	
5	0	0	0%	0%	0	0	
6	0	0	0%	0%	0	0	
7	0	0	0%	0%	0	0	
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	16248	1952	1973				
1(SP-1)	10000	0	0				
2(SP-2)	0	0	0				
3(SP-3)	10000	0	0				
Slice 2:							
PriGroupld	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells	Service
pool							
0	685	59331	1%	0%	0	692	
0(SP-0)							
1	0	60000	0%	0%	0	0	
1(SP-1)							
2	0	60000	0%	0%	0	0	
0(SP-0)							
3	0	60000	0%	0%	0	0	
0(SP-0)							
4	0	60000	0%	0%	0	0	
0(SP-0)							
5	0	60000	0%	0%	0	0	
0(SP-0)							
6	0	60000	0%	0%	0	0	
3(SP-3)							
7	0	60000	0%	0%	0	0	
0(SP-0)							
PriGroupld	Used headroom	Available headroom	Usage	Usage warn limit	Usage warn count	Peaked	

```
headroom
0      0      0      0%  0%      0      0
1      0      0      0%  0%      0      0
2      0      0      0%  0%      0      0
3      0      0      0%  0%      0      0
4      0      0      0%  0%      0      0
5      0      0      0%  0%      0      0
6      0      0      0%  0%      0      0
7      0      0      0%  0%      0      0
```

```
Service pool  Global shared cells  Used cells  Peaked cells
0(SP-0)      16248                1331      1340
1(SP-1)      10000                257       258
2(SP-2)      0                    0         0
3(SP-3)      10000                0         0
```

```
Slot  Slice  PortGroup  Total cells  Total usage  Static used cells  Global shared cells  Available shared cells
0     1     1          53248       3%           32                 36248                34296
0     2     1          53248       3%           48                 36248                34660
0     3     1          53248       0%           0                  36248                36248
0     4     1          53248       0%           0                  36248                36248
```

Field	Description
Slice	No. of the module on the chip for buffer division
Type	Queue type, including unicast queue and multicast queue
Queue	Queue No., ranging from 1 to 8 by default and can be switched to 0 to 7 through configuration
Used cells	Size of the occupied buffer in a queue, in the unit of cell
Available cells	Size of the available buffer in a queue, in the unit of cell
Usage	Percentage of the occupied buffer in a queue
Usage warn limit	Buffer usage warning threshold of a specific port group or queue
Usage warn count	Number of times that the occupied buffer exceeds the warning threshold
Peaked cells	Historical peak value of the used buffer
Slot	Slot No. of the line card
PortGroup	Port group No., starting from 1
Total cells	Total buffer on a specified slice
Total usage	Percentage of the occupied buffer on a specified slice
Static used cells	Size of the occupied guarantee buffer on a specified slice
Global shared cells	Total shared buffer on a specified slice
Available shared cells	Size of the available shared buffer on a specified slice

The following example displays the buffer usage of all interfaces (implemented based on the ingress PG).

```
FS#show pg-buffer
Interface HundredGigabitEthernet 0/1:
Slice 1:
```

PriGroupld	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells	Service pool
0	991	59025	1%	0%	0		1004
0(SP-0)							
1	0	60000	0%	0%	0		0
1(SP-1)							
2	0	60000	0%	0%	0		0
0(SP-0)							
3	0	60000	0%	0%	0		0
0(SP-0)							
4	0	60000	0%	0%	0		0
0(SP-0)							
5	0	60000	0%	0%	0		0
0(SP-0)							
6	0	60000	0%	0%	0		0
3(SP-3)							
7	0	60000	0%	0%	0		0
0(SP-0)							

PriGroupld	Used headroom	Available headroom	Usage	Usage warn limit	Usage warn count	Peaked headroom
0	0	0	0%	0%	0	0
1	0	0	0%	0%	0	0
2	0	0	0%	0%	0	0
3	0	0	0%	0%	0	0
4	0	0	0%	0%	0	0
5	0	0	0%	0%	0	0
6	0	0	0%	0%	0	0
7	0	0	0%	0%	0	0

Service pool	Global shared cells	Used cells	Peaked cells
0(SP-0)	16248	1952	1973
1(SP-1)	10000	0	0
2(SP-2)	0	0	0
3(SP-3)	10000	0	0

Slice 2:

PriGroupld	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells	Service pool
0	685	59331	1%	0%	0		692
0(SP-0)							
1	0	60000	0%	0%	0		0
1(SP-1)							
2	0	60000	0%	0%	0		0

```

0(SP-0)
3      0      60000      0%      0%      0      0
0(SP-0)
4      0      60000      0%      0%      0      0
0(SP-0)
5      0      60000      0%      0%      0      0
0(SP-0)
6      0      60000      0%      0%      0      0
3(SP-3)
7      0      60000      0%      0%      0      0
0(SP-0)

PriGroupld  Used headroom  Available headroom  Usage  Usage warn limit  Usage warn count  Peaked
headroom
0      0      0      0%      0%      0      0
1      0      0      0%      0%      0      0
2      0      0      0%      0%      0      0
3      0      0      0%      0%      0      0
4      0      0      0%      0%      0      0
5      0      0      0%      0%      0      0
6      0      0      0%      0%      0      0
7      0      0      0%      0%      0      0

Service pool  Global shared cells  Used cells  Peaked cells
0(SP-0)      16248      1331      1340
1(SP-1)      10000      257      258
2(SP-2)      0      0      0
3(SP-3)      10000      0      0

Slot  Slice  PortGroup  Total cells  Total usage  Static used cells  Global shared cells  Available shared cells
0      1      1      53248      3%      32      36248      34296
0      2      1      53248      3%      48      36248      34660
0      3      1      53248      0%      0      36248      36248
0      4      1      53248      0%      0      36248      36248
.....

Interface HundredGigabitEthernet 0/64:
Slice 1:
PriGroupld  Used cells  Available cells  Usage  Usage warn limit  Usage warn count  Peaked cells  Service
pool
0      0      60000      0%      0%      0      0
0(SP-0)
1      0      60000      0%      0%      0      0
1(SP-1)
    
```

2	0	60000	0%	0%	0	0	
0(SP-0)							
3	0	60000	0%	0%	0	0	
0(SP-0)							
4	0	60000	0%	0%	0	0	
0(SP-0)							
5	0	60000	0%	0%	0	0	
0(SP-0)							
6	0	60000	0%	0%	0	0	
3(SP-3)							
7	0	60000	0%	0%	0	0	
0(SP-0)							
PriGroupId	Used headroom	Available headroom	Usage	Usage warn limit	Usage warn count	Peaked headroom	
0	0	0	0%	0%	0	0	
1	0	0	0%	0%	0	0	
2	0	0	0%	0%	0	0	
3	0	0	0%	0%	0	0	
4	0	0	0%	0%	0	0	
5	0	0	0%	0%	0	0	
6	0	0	0%	0%	0	0	
7	0	0	0%	0%	0	0	
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	16248	1955	1973				
1(SP-1)	10000	0	0				
2(SP-2)	0	0	0				
3(SP-3)	10000	0	0				
Slice 2:							
PriGroupId	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells	Service pool
0	0	60000	0%	0%	0	0	0
0(SP-0)							
1	0	60000	0%	0%	0	0	0
1(SP-1)							
2	0	60000	0%	0%	0	0	0
0(SP-0)							
3	0	60000	0%	0%	0	0	0
0(SP-0)							
4	0	60000	0%	0%	0	0	0
0(SP-0)							
5	0	60000	0%	0%	0	0	0

```

0(SP-0)
6          0          60000          0%    0%          0          0
3(SP-3)
7          0          60000          0%    0%          0          0
0(SP-0)

PriGroupld  Used headroom  Available headroom  Usage  Usage warn limit  Usage warn count  Peaked
headroom
0           0           0                0%    0%                0                0
1           0           0                0%    0%                0                0
2           0           0                0%    0%                0                0
3           0           0                0%    0%                0                0
4           0           0                0%    0%                0                0
5           0           0                0%    0%                0                0
6           0           0                0%    0%                0                0
7           0           0                0%    0%                0                0

Service pool  Global shared cells  Used cells  Peaked cells
0(SP-0)      16248                1337      1340
1(SP-1)      10000                257       258
2(SP-2)      0                    0         0
3(SP-3)      10000                0         0

Slot  Slice  PortGroup  Total cells  Total usage  Static used cells  Global shared cells  Available shared cells
0     1     1          53248      3%           32                36248                34293
0     2     1          53248      3%           48                36248                34654
0     3     1          53248      0%           0                 36248                36248
0     4     1          53248      0%           0                 36248                36248
    
```

Field	Description
Same as the preceding table.	

4.24 show queue-buffer interface

Use this command to display buffer usage of interfaces.

show queue-buffer interface interface-id

Parameter	Description
interface-id	Interface

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays buffer usage of the specified interface based on output queue.

```

Examples FS(config)#show queue-buffer interface HundredGigabitEthernet 0/1
Interface HundredGigabitEthernet 0/1:
Type          Queue  Used cells  Available cells  Usage  Usage warn limit  Usage warn count  Peaked cells
Service pool
Unicast      1      0          8896             0%    0%                0                 0
1(SP-1)
Unicast      2      0          8896             0%    0%                0                 0
1(SP-1)
Unicast      3      0          8228             0%    0%                0                 0
0(SP-0)
Unicast      4      0          8228             0%    0%                0                 0
0(SP-0)
Unicast      5      0          8228             0%    0%                0                 0
0(SP-0)
Unicast      6      0          8228             0%    0%                0                 0
0(SP-0)
Unicast      7      0          8228             0%    0%                0                 0
0(SP-0)
Unicast      8      0          8228             0%    0%                0                 0
0(SP-0)
Multicast    1      991        18              98%   0%                0                 1001
1(SP-1)
Multicast    2      0          1008            0%    0%                0                 1
3(SP-3)
Multicast    3      0          1008            0%    0%                0                 0
3(SP-3)
Multicast    4      0          1008            0%    0%                0                 0
3(SP-3)
Multicast    5      0          1035            0%    0%                0                 0
0(SP-0)
Multicast    6      0          1035            0%    0%                0                 0
0(SP-0)
Multicast    7      0          896             0%    0%                0                 0
2(SP-2)
Multicast    8      0          1035            0%    0%                0                 0
0(SP-0)
Service pool  Global shared cells  Used cells  Peaked cells
0(SP-0)      9248                0           6
1(SP-1)     10000               1991        1999
2(SP-2)     8000                0           0
    
```

3(SP-3)	9000	0	1				
Slice 3:							
Type	Queue	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells
Service pool							
Unicast	1	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	2	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	3	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	4	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	5	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	6	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	7	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	8	0	8228	0%	0%	0	0
0(SP-0)							
Multicast	1	0	1119	0%	0%	0	0
1(SP-1)							
Multicast	2	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	3	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	4	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	5	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	6	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	7	0	896	0%	0%	0	0
2(SP-2)							
Multicast	8	0	1035	0%	0%	0	0
0(SP-0)							
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	9248	0	0				
1(SP-1)	10000	0	0				
2(SP-2)	8000	0	0				
3(SP-3)	9000	0	0				
Slot	Slice	PortGroup	Total cells	Total usage	Usage warn limit	Static used cells	Global shared cells

Available shared cells							
0	1	1	53248	3%	0%	0	36248
34257							
0	2	1	53248	3%	0%	0	36248
34643							
0	3	1	53248	0%	0%	0	36248
36248							
0	4	1	53248	0%	0%	0	36248
36248							

Field	Description
Slice	No. of the module on the chip for buffer division
Type	Queue type, including unicast queue and multicast queue
Queue	Queue No., ranging from 1 to 8 by default and can be switched to 0 to 7 through configuration
Used cells	Size of the occupied buffer in a queue, in the unit of cell
Available cells	Size of the available buffer in a queue, in the unit of cell
Usage	Percentage of the occupied buffer in a queue
Usage warn limit	Buffer usage warning threshold of a specific port group or queue
Usage warn count	Number of times that the occupied buffer exceeds the warning threshold
Peaked cells	Historical peak value of the used buffer
Slot	Slot No. of the line card
PortGroup	Port group No., starting from 1
Total cells	Total buffer on a specified slice
Total usage	Percentage of the occupied buffer on a specified slice
Static used cells	Size of the occupied guarantee buffer on a specified slice
Global shared cells	Total shared buffer on a specified slice
Available shared cells	Size of the available shared buffer on a specified slice
Service pool	Shared buffer pool, including ID and name

The following example displays the buffer queue information of all interfaces.

```

FS#show queue-buffer
Interface HundredGigabitEthernet 0/1:
Slice 1:
Type          Queue  Used cells  Available cells  Usage  Usage warn limit  Usage warn count  Peaked cells
Service pool
Unicast      1      0           8896             0%     0%                0                 0
1(SP-1)
Unicast      2      0           8896             0%     0%                0                 0
1(SP-1)
Unicast      3      0           8228             0%     0%                0                 0
0(SP-0)
Unicast      4      0           8228             0%     0%                0                 0
0(SP-0)
    
```

Unicast	5	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	6	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	7	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	8	0	8228	0%	0%	0	0
0(SP-0)							
Multicast	1	990	20	98%	0%	0	1001
1(SP-1)							
Multicast	2	0	1008	0%	0%	0	1
3(SP-3)							
Multicast	3	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	4	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	5	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	6	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	7	0	896	0%	0%	0	0
2(SP-2)							
Multicast	8	0	1035	0%	0%	0	0
0(SP-0)							
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	9248	0	6				
1(SP-1)	10000	1983	1999				
2(SP-2)	8000	0	0				
3(SP-3)	9000	0	1				
Slice 3:							
Type	Queue	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells
Service pool							
Unicast	1	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	2	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	3	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	4	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	5	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	6	0	8228	0%	0%	0	0

```

0(SP-0)
Unicast 7 0 8228 0% 0% 0 0
0(SP-0)
Unicast 8 0 8228 0% 0% 0 0
0(SP-0)
Multicast 1 0 1119 0% 0% 0 0
1(SP-1)
Multicast 2 0 1008 0% 0% 0 0
3(SP-3)
Multicast 3 0 1008 0% 0% 0 0
3(SP-3)
Multicast 4 0 1008 0% 0% 0 0
3(SP-3)
Multicast 5 0 1035 0% 0% 0 0
0(SP-0)
Multicast 6 0 1035 0% 0% 0 0
0(SP-0)
Multicast 7 0 896 0% 0% 0 0
2(SP-2)
Multicast 8 0 1035 0% 0% 0 0
0(SP-0)
Service pool Global shared cells Used cells Peaked cells
0(SP-0) 9248 0 0
1(SP-1) 10000 0 0
2(SP-2) 8000 0 0
3(SP-3) 9000 0 0

Slot Slice PortGroup Total cells Total usage Usage warn limit Static used cells Global shared cells
Available shared cells
0 1 1 53248 3% 0% 0 36248
34265
0 2 1 53248 3% 0% 0 36248
34649
0 3 1 53248 0% 0% 0 36248
36248
0 4 1 53248 0% 0% 0 36248
36248
.....
Interface HundredGigabitEthernet 0/64:
Slice 2:
Type Queue Used cells Available cells Usage Usage warn limit Usage warn count Peaked cells
Service pool
Unicast 1 0 8896 0% 0% 0 0
1(SP-1)
    
```

Unicast	2	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	3	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	4	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	5	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	6	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	7	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	8	0	8228	0%	0%	0	0
0(SP-0)							
Multicast	1	0	1091	0%	0%	0	0
1(SP-1)							
Multicast	2	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	3	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	4	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	5	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	6	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	7	0	896	0%	0%	0	0
2(SP-2)							
Multicast	8	0	1035	0%	0%	0	0
0(SP-0)							
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	9248	11	14				
1(SP-1)	10000	1330	1353				
2(SP-2)	8000	0	0				
3(SP-3)	9000	258	273				
Slice 4:							
Type	Queue	Used cells	Available cells	Usage	Usage warn limit	Usage warn count	Peaked cells
Service pool							
Unicast	1	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	2	0	8896	0%	0%	0	0
1(SP-1)							
Unicast	3	0	8228	0%	0%	0	0

0(SP-0)							
Unicast	4	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	5	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	6	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	7	0	8228	0%	0%	0	0
0(SP-0)							
Unicast	8	0	8228	0%	0%	0	0
0(SP-0)							
Multicast	1	0	1119	0%	0%	0	0
1(SP-1)							
Multicast	2	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	3	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	4	0	1008	0%	0%	0	0
3(SP-3)							
Multicast	5	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	6	0	1035	0%	0%	0	0
0(SP-0)							
Multicast	7	0	896	0%	0%	0	0
2(SP-2)							
Multicast	8	0	1035	0%	0%	0	0
0(SP-0)							
Service pool	Global shared cells	Used cells	Peaked cells				
0(SP-0)	9248	0	0				
1(SP-1)	10000	0	0				
2(SP-2)	8000	0	0				
3(SP-3)	9000	0	0				
Slot	Slice	PortGroup	Total cells	Total usage	Usage warn limit	Static used cells	Global shared cells
Available shared cells							
0	1	1	53248	3%	0%	0	36248
34265							
0	2	1	53248	3%	0%	0	36248
34649							
0	3	1	53248	0%	0%	0	36248
36248							
0	4	1	53248	0%	0%	0	36248
36248							

4.25 show queue-counter interface

Use this command to display buffer queue statistics of interfaces.

show queue-counter interface interface-id

Parameter Description	Parameter	Description
	interface-id	Interface

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example displays buffer queue statistics of the specified interface based on output queue.

```

FS#show queue-counter interface gigabitEthernet 0/9
Interface HundredGigabitEthernet 4/1:
  Unicast
  Queue    Transmitted Bytes    Dropped Bytes    Frame Loss Rate(%)    Transmit Rate(bps)
  1         0                    0                0                     0
  2         0                    0                0                     0
  3         0                    0                0                     0
  4         0                    0                0                     0
  5         0                    0                0                     0
  6         0                    0                0                     0
  7         0                    0                0                     0
  8         62797               0                0                     656
  Multicast
  Queue    Transmitted Bytes    Dropped Bytes    Frame Loss Rate(%)    Transmit Rate(bps)
  1         0                    0                0                     0
  2         0                    0                0                     0
  3         0                    0                0                     0
  4         0                    0                0                     0
  5         0                    0                0                     0
  6         0                    0                0                     0
  7         0                    0                0                     0
  8         0                    0                0                     0
  Unicast
  Queue    Transmitted Packets    Dropped Packets    Frame Loss Rate(%)    Transmit Rate(pps)
  1         0                    0                0                     0
  2         0                    0                0                     0
  3         0                    0                0                     0
    
```

4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	472	0	0	0
Multicast				
Queue	Transmitted Packets	Dropped Packets	Frame Loss Rate(%)	Transmit Rate(pps)
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Field	Description
Dev/Slot	Device/slot ID. If it is a case device, the display format is devid/-, and the case device only pays attention to the device number; if it is a box device, the display format is devid/slotid, and the device pays attention to device and slot number
PortGroup	Port group ID from 1
inner-port	Inner port ID from 1
Queue	Queue ID, from 1-8
Transmitted bytes	Transmitted bytes in the specified queue
Dropped bytes	Discarded bytes in the specified queue
Loss Rate(%)	The rate of discarding bytes (or discarded packets) to the total bytes (or the total packets). This rate counts the total discarding rate
Loss Rate Peak	The historical peak of the instantaneous discarding rate. This rate counts the bytes (or packets) discarding rate in 5 seconds
Peak Time	Record the time of historical peak of the instantaneous discarding rate
Transmit Rate(bps)	In the specified queue, the forwarding rate is bps (bit rate per second). This rate counts including the frame gap, so it has counting error
Transmitted packets	Number of transmitted packets in the specified queue
Dropped packets	Number of discarded packets in the specified queue
Transmit Rate(pps)	Transmitted rate pps (frame per second) in the specified queue

2: Display the queue statistics of all interfaces

```
FS#show queue-counter
Interface HundredGigabitEthernet 0/1:
  Unicast
  Queue    Transmitted Bytes    Dropped Bytes    Frame Loss Rate(%)    Transmit Rate(bps)
  1         117380835776        1056130216960    89.99                50525032
  2         0                   0                0                    0
  3         0                   0                0                    0
```

4	2736178496	24624019520	89.99	50525056
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	1200887	0	0	664
Multicast				
Queue	Transmitted Bytes	Dropped Bytes	Frame Loss Rate(%)	Transmit Rate(bps)
1	24098176	233925440	90.66	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
Unicast				
Queue	Transmitted Packets	Dropped Packets	Frame Loss Rate(%)	Transmit Rate(pps)
1	1834075559	16502034640	89.99	75183
2	0	0	0	0
3	0	0	0	0
4	42752789	384750305	89.99	75183
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	9306	0	0	0
Multicast				
Queue	Transmitted Packets	Dropped Packets	Frame Loss Rate(%)	Transmit Rate(pps)
1	376534	3655085	90.66	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8		0	0	0
0Gi0/24	0	0	0	0.000
.....				
Interface HundredGigabitEthernet 0/64:				
Unicast				
Queue	Transmitted Bytes	Dropped Bytes	Frame Loss Rate(%)	Transmit Rate(bps)
1	83892643136	754894738496	89.99	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0

5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	1203321	0	0	664
Multicast				
Queue	Transmitted Bytes	Dropped Bytes	Frame Loss Rate(%)	Transmit Rate(bps)
1	126178880	1208592000	90.54	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
Unicast				
Queue	Transmitted Packets	Dropped Packets	Frame Loss Rate(%)	Transmit Rate(pps)
1	1310822549	11795230289	89.99	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	9317	0	0	0
Multicast				
Queue	Transmitted Packets	Dropped Packets	Frame Loss Rate(%)	Transmit Rate(pps)
1	1971545	18884250	90.54	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Platform
Description

N/A

Chapter 8 Reliability Configuration Commands

1. REUP Commands
2. RLDP Commands
3. DLDP Commands
4. VRRP Commands
5. VRRP Plus Commands
6. BFD Commands
7. IP Event Dampening Commands
8. RNS&Track Commands
9. PCAP Commands
10. HAM Commands

1 REUP Commands

1.1 link state track

Use this command to enable the link state track group. Use the **no** form of this command to disable a link state track group.

link state track [*num* | **up-delay** *timer*]

no link state track [*num*]

Parameter Description	Parameter	Description
	<i>num</i>	Interface ID of the link aggregation group.
	up-delay <i>timer</i>	Downlink delay for link tracking, the default value is 0.

Defaults N/A.

Command Global configuration mode.

Mode

Usage Guide First create a link state track group and then add a port into the specified link state track group.

Configuration The following example creates a link state track group:

```
FS(config)# link state track 1
```

The following example creates a link state track group, and enables 30 seconds of downlink delay up, that is, when the upstream link becomes up, the downstream link becomes up after 30 seconds.

```
FS(config)# link state track 1 up-delay 30
```

Related Commands	Command	Description
	link state group	Adds the port to the specified link state track group.

Platform N/A.

Description

1.2 link state group

Use this command to add the port into the specified link state track group. Use the **no** form of this command to delete a port from the specified link state track group.

link state group *num* { **upstream** | **downstream** }

no link state group

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

Num	ID of the link state track group.
Upstream	Configures the port to be an upstream port in the link state track group.
Downstream	Configures the port to be a downstream port in the link state track group.

Defaults The port is not added into any link state track group.

Command Mode Interface configuration mode.

Usage Guide First create a link state track group and then add a port into the specified link state track group.

Configuration The following example adds the port fa0/2 into the link state track group:

```

Examples
FS(config)# link state track 1
FS(config)# interface fa 0/2
FS(config-if)# link state group 1 upstream
    
```

Related Commands	Command	Description
		link state track

Platform Description N/A.

1.3 mac-address-table move update max-update-rate

Use this command to configure the maximum number of MAC address update packets sent per second. Use the **no** form of this command to remove the settings.

mac-address-table move update max-update-rate *pkts-per-second*

no mac-address-table move update max-update-rate

Parameter Description	Parameter	Description
		pkts-per-second

Defaults A maximum of 150 MAC address update packets are sent per second.

Command Mode Global configuration mode.

Usage Guide When a link is switched, REUP sends a certain number of MAC address update packets to an uplink device in every second to recover downlink data transmission of the uplink device.

Configuration The following example configures the maximum number of MAC address update packets sent per second:

Examples `FS(config)# mac-address-table move update max-update-rate 20`

Related Commands	Command	Description
	N/A.	N/A.

Platform N/A.
Description

1.4 mac-address-table move update receive

Use this command to enable receiving the MAC address table updates. Use the **no** form of this command to disable receiving MAC address table updates.

mac-address-table move update receive
no mac-address-table move update receive

Parameter Description	Parameter	Description
	N/A.	N/A.

Defaults Disabled.

Command Mode Global configuration mode.

Usage Guide The dual link backup switchover will lead to the loss of downstream data flow, for the MAC address for the uplink switch has not been updated in time. Therefore, it is necessary to update the MAC address table of the uplink switch, to reduce the loss of L2 data flow. You need to enable the switch of receiving the MAC address updates on the uplink switch.

Configuration Examples `FS(config)# mac-address-table move update receive`

Related Commands	Command	Description
	mac-address-table move update transit	Enables REUP to transmit the mac-address-table update messages.

Platform N/A.
Description

1.5 mac-address-table move update receive vlan

Use this command to configure VLANs for processing MAC address updates. Use the **no** form of this command to remove VLANs for processing MAC address updates.

mac-address-table move update receive vlan *vlan-range*
no mac-address-table move update receive vlan *vlan-range*

Parameter Description	Parameter	Description
	vlan-range	Range of the VLANs processing MAC address update packets.

Defaults All VLANs process MAC address update packets.

Command Mode Global configuration mode.

Usage Guide This command can be used to disable some VLANs from processing MAC address update packets. VLANs disabled from processing MAC address update packets can still recover downlink data transmission of the uplink device using MAC address update packets, but the capability to provide convergence on link failure will be degraded.

Configuration Examples The following example configures VLANs processing MAC address update packets:

```
FS(config)# no mac-address-table move update receive vlan 20
```

Related Commands	Command	Description
	mac-address-table move update receive	Enables REUP to receive MAC address update packets.

Platform Description N/A.

1.6 mac-address-table move update transit

Use this command to enable REUP to transmit MAC address table updates. Use the **no** form of this command to disable transmitting MAC address table updates.

mac-address-table move update transit
no mac-address-table move update transit

Parameter Description	Parameter	Description
	N/A.	N/A.

Defaults Disabled.

Command Mode Global configuration mode.

Usage Guide In order to reduce the link switchover and the loss of the downstream data flow, it is necessary to enable the

switch of receiving the MAC address update messages on the uplink switch.

Configuration FS(config)# mac-address-table move update transit

Examples

Related Commands	Command	Description
	mac-address-table move update transit vlan	Enables REUP to transmit the mac-address-table update messages.

Platform N/A.

Description

1.7 mac-address-table move update transit vlan

Use this command to configure VLANs for transmitting MAC address updates. Use the **no** form of this command to removing VLANs for transmitting MAC address updates.

mac-address-table move update transit vlan vid

no mac-address-table move update transit vlan

Parameter Description	Parameter	Description
	vid	ID of the VLAN transmitting MAC address update packets.

Defaults Transmit the MAC-address update messages in the default VLAN on the port.

Command Mode Interface configuration mode.

Usage Guide When a link is switched, the VLAN enabled to transmit MAC address update packets will send MAC address update packets to its uplink device.

Configuration Examples The following example configures VLANs transmitting MAC address update packets:

FS(config)# mac-address-table move update transit

Related Commands	Command	Description
	mac-address-table move update transit	Enables REUP to receive the mac-address-table update messages.

Platform N/A.

Description

1.8 mac-address-table update group

Use this command to add an interface to a MAC address update group. Use the **no** form of this command to remove an interface from the MAC address update group.

mac-address-table update group [*group-num*]

no mac-address-table update group

Parameter Description	Parameter	Description
	group-num	The MAC address update group ID. The default group number is 1.

Defaults By default, no MAC address update group is configured.

Command Mode Interface configuration mode

Usage Guide In order to reduce the flood due to the MAC address update and the influence on the normal data transmission of the switch, FS products add a configuration of MAC address update group. Only if all the interfaces are added to a MAC address update group, the downstream data transmission be restored rapidly.

Configuration Examples FS(config-if)# mac-address-table update group 2

Related Commands	Command	Description
	show mac-address-table update group detail	Displays the MAC address update group information.

Platform Description N/A.

1.9 switchport backup interface

Use this command to configure the REUP dual link backup interface. Use the **no** form of this command to remove the REUP dual link backup interface.

switchport backup interface *interface-id*

no switchport backup interface *interface-id*

Parameter Description	Parameter	Description
	interface-id	Interface ID of the backup link.

Defaults N/A.

Command Interface configuration mode.

Mode

Usage Guide Enter the primary interface configuration mode, the interface-id in the parameter is for the backup interface.
When the active link fails, the backup link transmission is restored rapidly

Configuration The following example sets the dual link backup, with fa 0/1 and fa 0/2 as primary interface and backup interface:

Examples

```
FS(config)# interface fa 0/1
FS(config-if)# switchport backup interface fa 0/2
```

Related Commands

Command	Description
show interface switchport backup	Displays the dual link backup configuration on the switch.

Platform N/A.

Description

1.10 switchport backup interface preemption

Use this command to configure the REUP link preemption function.

switchport backup interface *interface-id* **preemption mode** { **forced** | **bandwidth** | **off** }

switchport backup interface *interface-id* **preemption delay** *delay-time*

no switchport backup interface *interface-id* **preemption delay**

Parameter Description

Parameter	Description
interface-id	The interface id of the backup link.
delay-time	The preemption delay time.

Defaults The preemption function is disabled by default.
The default preemption delay time is 35s.

Command Mode Interface configuration mode.

Usage Guide The preemption mode includes **forced**, **bandwidth** and **off**. In the **bandwidth** preemption mode, the interface with high bandwidth has priority over other interfaces to transmit the data. In the **forced** preemption mode, the primary has priority over backup interfaces to transmit the data. No preemption event occurs in the **off** preemption mode. By default, the preemption mode is off.
The preemption delay refers to the delay time of the link switchover after the restoration of the link failure.

Configuration Examples The following example sets the dual link backup, with fa 0/1 and fa 0/2 as the primary interface and backup interface, sets the bandwidth preemption mode and 40s preemption delay:

```
FS(config)# interface fa 0/1
```

```
FS(config-if)# switchport backup interface fa 0/2
preemption mode bandwidth
FS(config-if)# switchport backup interface fa 0/2
preemption delay 40
```

Related Commands	Command	Description
		show interface switchport backup

Platform N/A.
Description

1.11 switchport backup interface prefer

Use this command to configure VLAN load balancing on a link. Use the **no** form of this command to remove the VLAN load balancing settings.

switchport backup interface *interface-id* **prefer instance** *instance-range*
no switchport backup interface *interface-id* **prefer**

Parameter Description	Parameter	Description
		interface-id
	instance-range	Instance range of loading on the backup interface.

Defaults No VLAN load on the backup interface.

Command Mode Interface configuration mode.

Usage Guide MSTP instance mapping can be used to modify the mapping between an instance and a VLAN.

Configuration Examples The following example configures VLAN load balancing on dual links.

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# switchport backup interface gigabitEthernet 0/2 prefer instance 1
```

Related Commands	Command	Description
		show interface switchport backup
	spanning-tree mst configuration	Configures MSTP instances.

Platform N/A.
Description

1.12 show interfaces switchport backup

Use this command to display the dual link backup information on the interfaces.

show interfaces [*interface-id*] **switchport backup** [**detail**]

Parameter Description	Parameter	Description
	interface-id	The interface id of the dual link backup.
	detail	Displays the detailed information about the dual link backup.

Defaults Show the dual link backup information on all interfaces.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

```

Configuration Examples
FS # show interfaces switchport backup detail
Switch Backup Interface Pairs:
Active Interface      Backup Interface      State
-----
Gi0/23                Gi0/24                Active Up/Backup Standby
Interface Pair : Gi0/23, Gi0/24
Preemption Mode : Off
Preemption Delay : 35 seconds
Bandwidth : Gi0/23(1000 Mbits), Gi0/24(1000 Mbits)
    
```

Related Commands	Command	Description
	N/A.	N/A.

Platform Description N/A.

1.13 show link state group

Use this command to display the information of a link state track group.

show link state group *num*

Parameter Description	Parameter	Description
	num	ID of a link state track group.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration Examples The following example displays the link state track group:

```
FS # show link state group
Link State Group:1 Status: Enabled, UP
Upstream Interfaces :Gi0/1(Up)
Downstream Interfaces :Gi0/3(Dwn), Gi0/4(Dwn)
Link State Group:2 Status: Disabled, Down
Upstream Interfaces :
Downstream Interfaces :
(Up):Interface up (Dwn):Interface Down (Dis):Interface disabled
```

Related Commands	Command	Description
	N/A.	N/A.

Platform Description N/A.

1.14 show mac-address-table move update

Use this command to display the statistics about the MAC address updates tranceived on the interface.

show mac-address-table move update

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration Examples

```
FS#show mac-address-table move update
Mac address table move update status:
Transit:disable
Receive:disable
Max-update-rate:150
Receive vlan:1-4094
```

```

Pair: Ag1,Ag2
Members          Status    Transit Count  Transit VLAN  Last Transit Time
-----
Ag1              Down     0
Ag2              Down     0
Pair: Ag3,Gi0/6
Members          Status    Transit Count  Transit VLAN  Last Transit Time
-----
Ag3              Down     0
Gi0/6            Down     0
Pair: Gi0/1,Gi0/2
Members          Status    Transit Count  Transit VLAN  Last Transit Time
-----
Gi0/1            Up       0
Gi0/2            Standby  0
    
```

Related Commands

Command	Description
N/A.	N/A.

Platform

N/A.

Description

1.15 show mac-address-table update group detail

Use this command to display the mac-address-table update group information.

show mac-address-table update group detail

Parameter Description

Parameter	Description
detail	Displays the detailed information about the mac-address-table update group.

Defaults

N/A

Command Mode

Privileged EXEC mode.

Usage Guide

N/A.

Configuration

FS # configure terminal

Examples

FS (config)# mac-address-table move update receive

FS (config)# interface range gigabitEthernet 0/3-4

```

FS (config-if-range)# mac-address-table update group
FS (config-if-range)# end
FS # show mac-address-table update group detail
Mac-address-table Update Group:1
Received mac-address-table update message count:7
Group member  Receive Count  Last Receive Switch-ID  Receive Time
-----
GigabitEthernet 0/3  0                0000.0000.0000
GigabitEthernet 0/4  0                0000.0000.0000
    
```

**Related
Commands**

Command	Description
N/A.	N/A.

**Platform
Description**

N/A.

2 RLDP Command

2.1 rldp detect-interval

Use this command to configure the interval at which the RLDP sends the detection message on the port. Use the **no** form of this command to restore the default value.

rldp detect-interval *interval*

no rldp detect-interval

Parameter Description	Parameter	Description
	<i>interval</i>	Detection interval in the range 1 to 15 seconds

Defaults 3 seconds.

Command Mode Global configuration mode.

Usage Guide In the environment where STP is enabled, it is recommended that the product of interval multiplying the maximum number of detections is less than the topology convergence time of STP.

Configuration Examples The following example shows how to set the detection interval as 5s:

```
FS(config)# rldp detect-interval 5
```

Related Commands	Command	Description
	rldp detect-max	Sets the maximum number of detections.

Platform Description N/A.

2.2 rldp detect-max

Use this command to set the maximum number of sending detection packets on the port. If the neighboring port does not respond when this detection number is exceeded, the link is considered faulty. Use the **no** form of this command to restore it to the default value.

rldp detect-max *num*

no rldp detect-max

Parameter Description	Parameter	Description
	<i>num</i>	Maximum number of detections in the range 2 to 10

Defaults 2.

Command Interface configuration mode.
Mode

Usage Guide This command is used together with the detection interval to specify the maximum number of detections.

Configuration The following example shows how to set the maximum number of detections as 5:

Examples FS(config)# rldp detect-max 5

Related Commands	Command	Description
		rldp detect-interval

Platform N/A.
Description

2.3 rldp enable

Use this command to enable RLDP globally. Use the **no** form of this command to disable the function.

rldp enable
no rldp enable

Parameter Description	Parameter	Description
		N/A.

Defaults Disabled.

Command Global configuration mode.
Mode

Usage Guide You can enable RLDP on the interface only when the global RLDP is enabled.

Configuration The following example shows how to enable RLDP:

Examples FS(config)# rldp enable

Related Commands	Command	Description
		rldp port

Platform N/A.
Description

2.4 rldp error-recover interval

Use this command to configure the interval for the RLDP to regularly recover a failed port. This recovery function is disabled by default. Use the **no** form of this command to disable the regular recovery function. Use the **default** form of this command to restore default settings.

rldp error-recover interval *interval*

no rldp error-recover interval

default rldp error-recover interval

Parameter Description	Parameter	Description
	<i>interval</i>	Interval in the unit of seconds, ranging from 30 to 86400 .
Defaults	N/A	
Command Mode	Global configuration mode	
Default Level	14	
Command Mode	Global configuration mode	
Usage Guide	This command is used to automatically and regularly recover a failed RLDP port (in the error state). When the RLDP port recovers from the error, the RLDP on the port restarts link fault detection. If the fault is eliminated, the RLDP maintains the normal state. If the fault persists, the RLDP can still detect the fault.	
Configuration Example	The following example sets the interval for periodic recovery to 600s. <pre>FS(config)# rldp error-recover interval 600</pre>	
Prompt	N/A	
Common Errors	N/A	
Platform Description	N/A	

2.5 rldp neighbor-negotiation

Use this command to enable RLDP neighbor negotiation. Use the **no** form or **default** form of this command to restore the default setting.

rldp neighbor-negotiation

no rldp neighbor-negotiation

default rldp neighbor-negotiation

Parameter Description	Parameter	Description
	N/A.	N/A.

Defaults RLDP neighbor negotiation is disabled by default.

Command Mode Global configuration mode.

Usage Guide With neighbor negotiation enabled, RLDP unidirectional-/bidirectional-link detection starts only after the neighbor negotiation is successful. (Receiving the Prob message from the neighbor indicates the neighbor negotiation is successful.)

Configuration Examples The following example shows how to enable RLDP neighbor negotiation:

```
FS#config
FS(config)#rldp neighbor-negotiation
```

Related Commands	Command	Description
	rldp port	Enables the RLDP function on the port.

Platform Description N/A.

2.6 rldp port

Use this command to enable RLDP on the port and specify detection type and troubleshooting method. Use the **no** form of this command to disable the function.

rldp port { unidirection-detect | bidirection-detect | loop-detect } { warning | shutdown-svi | shutdown-port | block | monitor }

no rldp port { unidirection-detect | bidirection-detect | loop-detect }

Parameter Description	Parameter	Description
	unidirection-detect	Sets unidirectional link detection.
	bidirection-detect	Sets bidirectional link detection.
	loop-detect	Sets loop detection type.
	warning	Warns the user.
	shutdown-svi	Shut downs the SVI the port belongs to.
	shutdown-port	Shut downs the port.
	block	Block the learning and forwarding function of the port.
	monitor	Monitors the port state.

Defaults N/A

Command Mode Interface configuration mode.

Usage Guide The RLDP detection on the port takes effect only when the global RLDP is enabled. Ports on which RLDP is enabled to handle downlink loop failures are random. For example, RLDP downlink loop detection is configured on both downlink ports A and B, and the configured failure handling mode of port A is **warning** while that of port B is **shutdown-port**. When there is a downlink loop between port A and port B, port A may detect the downlink loop failure prior to port B. After port A completes failure handling according to the configuration, it no longer sends packets to detect the downlink loop status. Port B fails to detect the downlink loop failure because it does not receive a loop detection packet from port A, but the downlink loop actually persists. If a detected downlink loop needs to be actually removed in application scenarios, downlink ports in the same loop must be restricted to use a consistent loop failure handling mode and the loop failure handling mode cannot be **warning**. The **monitor** policy can be configured for the unidirectional link detection in order to correlate with ERPS (Ethernet Ring Protection Switching).

Configuration Examples The following example shows how to configure RLDP detection type and troubleshooting method.

```
FS(config)# interface GigabitEthernet 2/0/9
FS(config-if-GigabitEthernet 2/0/9)# rldp port loop-detect block
```

Related Commands	Command	Description
	rldp enable	Enables RLDP globally.

Platform Description N/A.

2.7 rldp reset

Use this command to make all the ports that have been handled using rldp shutdown or disable to perform RLDP detection again.

rldp reset

Parameter Description	Parameter	Description
	N/A.	N/A.

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration The example below demonstrates how to restore the port from the failed state:

Examples FS# rldp reset

Related Commands	Command	Description
	rldp enable	

Platform N/A.

Description

2.8 show rldp

Use this command to display the RLDP information.

show rldp [**interface** *interface-id*]

Parameter Description	Parameter	Description
		interface-id

Defaults N/A.

Command Mode Privileged EXEC mode.

Usage Guide N/A.

Configuration N/A.

Examples

Related Commands	Command	Description
		N/A.

Platform N/A.

Description

3 DLDP Commands

3.1 clear dldp

Use this command to clear statistics about the number of times that DLDP is down or up at a specified monitoring point for renewing statistics.

clear dldp [**interface** *interface-name* [*ip-address*]]

Parameter	Parameter	Description
Description	<i>interface-name</i>	Name of an Layer 3 interface
	<i>ip-address</i>	IP address of a peer device

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide DLDP records statistics about the number of times that DLDP is down or up. You can use this command to clear statistics about the number of times that DLDP is down or up at a specified monitoring point and renew statistics. If an L3 interface or a device IP address is specified, statistics about the number of times that DLDP is down or up on the interface at one or all monitoring points will be cleared. If no L3 interface or IP address is specified, statistics about the number of times that DLDP is down or up at all monitoring points on all interfaces will be cleared.

Configuration Examples The following example clears statistics about the number of times that DLDP is down or up at all monitoring points on all interfaces.

```
FS#clear dldp
```

The following example clears statistics about the number of times that DLDP is down or up at all monitoring points on the interface GigabitEthernet 0/0.

```
FS#clear dldp interface vlan 1
```

The following example clears statistics about the number of times that DLDP is down or up about the peer device 10.83.132.1 on the interface GigabitEthernet 0/0.

```
FS# clear dldp interface GigabitEthernet 0/0 10.83.132.1
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.2 dldp

Use this command to enable DLDP detection.

Use the **no** form of this command to restore the default setting.

dldp *ip-address* [*next-hop-ip*] [**interval** *tick* | **retry** *retry-num* | **resume** *resume-num*]

no dldp *ip-address*

Parameter	Parameter	Description
Description	<i>ip-address</i>	IP address of the peer device to be detected
	<i>next-hop-ip</i>	Next-hop IP address specified when the device to be detected belongs to another different network
	interval <i>tick</i>	Detection interval. The value range is from 1 to 6000 in the unit of ticks, where 1 tick is equal to 10 milliseconds. The value must be an integral multiple of five.
	retry <i>retry-num</i>	Number of retry times. The value range is from 1 to 3600.
	resume <i>resume-num</i>	Number of recovery times of the link to the peer device to be detected, indicating the number of consecutive packets received before a down link turns up. The value range is from 1 to 200.

Defaults By default, *tick* is 100, indicating that the detection interval is 1 second.
The value of *retry-num* is 4, and the value of *resume-num* is 3.

Command Mode Interface configuration mode

Usage Guide You can use this command to enable DLDP detection to quickly detect Ethernet link faults.

Configuration Examples The following example enables DLDP detection for the device 10.83.132.10.

```
FS(config)#int gi0/0
FS(config-if-GigabitEthernet 0/0)#ip address 10.83.132.1 24
FS(config-if-GigabitEthernet 0/0)#dldp 10.83.132.10
FS(config-if-GigabitEthernet 0/0)#
```

The following example enables DLDP detection for the device 10.83.132.10 in another different network segment.

```
FS#config
FS(config)#int gi0/0
FS(config-if-GigabitEthernet 0/0)#ip address 10.83.132.1 255.255.255.0
FS(config-if-GigabitEthernet 0/0)#dldp 10.83.131.10 10.83.132.2
```

The following example disables DLDP detection for the device 10.83.132.10.

```
FS#config
FS(config)#int gi0/0
FS(config-if-GigabitEthernet 0/0)#no dldp 10.83.132.10
```

Related	Command	Description
Commands	N/A	N/A

Platform Description N/A

3.3 dldp passive

Use this command to set DLDP to the passive mode.
 Use the **no** form of this command to restore the default setting.

dldp passive
no dldp passive

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The default is the active mode.

Command Mode Interface configuration mode

Usage Guide If DLDP is enabled on devices at both ends of a link on a network and ICMP Echo packets are sent to each other for link detection, excessive packets exist between the two devices. If only one device sends ICMP Echo packets to the peer device on which the same detection parameters are configured, the peer device can detect whether the packets arrive in time and whether the link between them is normal. This method saves bandwidth and CPU resources.

You can set DLDP to the active mode for one device to initiate ICMP Echo packets, and set DLDP to the passive mode for the other device to passively receive the packets.

The following example sets DLDP to the passive mode.

Configuration Examples

```

FS#config
FS(config)#int gi0/0
FS(config-if-GigabitEthernet 0/0)#ip address 10.83.132.1 255.255.255.0 //Set an IP address for vlan 1.
FS(config-if-GigabitEthernet 0/0)#dldp passive
    
```

Related	Command	Description
Commands	N/A	N/A

Platform Description N/A

3.4 dldp interval

Use this command to set the DLDP detection interval.

Use the **no** form of this command to restore the default setting.

dldap interval tick

no dldap interval

Parameter	Parameter	Description
Description	<i>tick</i>	Detection interval (in ticks), in the range from 5 to 6000. The value must be a multiple of 5. (1 tick = 10 milliseconds)

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to set the DLDP detection interval.
 If a device does not receive the reply packets from the peer device within the specific period (the time of this period is equal to that of the *detection packet retransmission interval* multiplied by the *retry count*), the device takes the L3 port as DOWN (though the physical link is up). Once the device receives the reply packets from the peer device, the device takes the L3 port as UP.

Configuration Examples The following example sets the DLDP detection interval to 20 ticks.

```
FS#config
FS(config)#dldap interval 20
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.5 dldap retry

Use this command to set the DLDP retry count.

Use the **no** form of this command to restore the default setting.

dldap retry retry-num

no dldap retry

Parameter	Parameter	Description
Description	<i>retry-num</i>	Retry count, in the range from 1 to 3600

Defaults The default is 3.

Command Mode Global configuration mode

Usage Guide This command is used to set the DLDP retry count.

Configuration The following example sets the DLDP retry count to 4.

```
FS#config
FS(config)#lldp retry 4
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.6 dldp resume

Use this command to set the DLDP recovery count.
Use the **no** form of this command to restore the default setting.

```
dldp resume resume-num
no dldp resume
```

Parameter Description	Parameter	Description
	<i>resume-num</i>	Recovery count of the peer device link, in the range from 1 to 200. The parameter indicates the number of DLDP detection packets received consecutively from the peer device before the link status goes from DOWN to UP.

Defaults The default is 3.

Command Mode Global configuration mode

Usage Guide This command is used to set the DLDP recovery count.

Configuration The following example sets the DLDP recovery count to 4.

```
FS#config
FS(config)#lldp resume 4
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.7 show dldp

Use this command to display DLDP configuration information or statistics at various monitoring points.

show dldp [**interface** *interface-name*] [**statistic**]

Parameter	Parameter	Description
Description	<i>interface-name</i>	Name of an L3 interface
	statistic	Statistics

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide You can use this command with the keyword **statistics** to display statistics at all monitoring points on all interfaces or a specific Layer 3 interface. If a Layer 3 interface is specified, this command displays DLDP configuration and statistics at all monitoring points on the Layer 3 interface.

Configuration Examples The following example displays DLDP configuration information at all monitoring points on all interfaces.

```
FS#show dldp
Interface  Type      Ip      Next-hop  Interval  Retry  Resume  State
-----
Gi0/0     Passive  192.168.6.3  192.168.2.2  10      5      3      Up
Gi0/1     Passive  192.168.7.3           10      5      3      Up
Gi0/2     Passive  192.168.3.3  192.168.4.2  10      5      3      Up
```

The following example displays DLDP configuration information at all monitoring points on the Layer 3 interface GigabitEthernet 0/0.

```
FS#show dldp intface gigabitEthernet 0/0
Interface  Type      Ip      Next-hop  Interval  Retry  Resume  State
-----
Gi0/0     Passive  192.168.6.3  192.168.2.2  10      5      3      Up
```

The following example displays DLDP statistics at all monitoring points on all interfaces.

```
FS#show dldp statistic
Interface  Type      Ip      record-time  Up-count  Down-count
-----
Gi0/0     Passive  192.168.6.3  2h34m5s     10      9
Gi0/1     Passive  192.168.3.3  1d2h3m52s  10      9
```

The following example displays DLDP statistics at all monitoring points on the Layer 3 interface GigabitEthernet 0/0.

```
FS#show dldp statistic interface Gi0/0
Interface  Type      Ip      record-time  Up-count  Down-count
-----
Gi0/0     Passive  192.168.6.3  2h34m5s     10      9
```

Field	Description
record-time	<p>Time length for recording the number of times that DLDP is up or down. The time is displayed in *y**d**h**m**s format:</p> <p>y: year d: day h: hour m: minute s: second</p> <p>Using the <i>Up-count</i> and <i>Down-count</i> parameters, you can check statistics about the number of times that DLDP is up or down within this time length.</p>
Up-count	Number of times that DLDP is up at the specific monitoring point
Down-count	Number times that DLDP is down at the specific monitoring point

Related

Commands

Command	Description
N/A	N/A

Platform

Description

N/A

4 VRRP Commands

4.1 show vrrp

Use this command to display the VRRP information.

show [**ipv6**] **vrrp** [**brief** | *group*]

Parameter	Parameter	Description
Description	ipv6	(Optional) Applies to IPv6 VRRP.
	brief	(Optional) Displays the brief of the VRRP group.
	<i>group</i>	Number of the VRRP group to be displayed

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If no optional parameter is used, the information of all VRRP groups is displayed.

Configuration The following example displays the information of all VRRP groups:

Examples

```
FS# show vrrp
FastEthernet 0/0 - Group 1
State is Backup
Virtual IP address is 192.168.201.1 configured
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 100
Master Device is 192.168.201.213 , pritority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FastEthernet 0/0 - Group 2
State is Master
Virtual IP address is 192.168.201.2 configured
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 120
Master Device is 192.168.201.217 (local), priority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FS#
```

The following example displays the brief information of the VRRP group:

```
FS# show vrrp brief
Interface      Grp Pri Time  Own Pre State  Master addr  Group addr
FastEthernet 0/0  1  100  -  -  P  Backup  192.168.201.213 192.168.201.1
FastEthernet 0/0  2  120  -  -  P  Master  192.168.201.217 192.168.201.2
FS#
```

Related	Command	Description
Commands	vrrp group ip <i>ipaddress</i> [secondary]	Enables the VRRP function and set the IP address for the virtual device.

Platform N/A

Description

4.2 show vrrp interface

Use this command to display the information of the VRRP on the interface.

show [ipv6] vrrp interface *type number* [**brief**]

Parameter	Parameter	Description
Description	ipv6	(Optional) Applies to IPv6 VRRP.
	<i>type</i>	Interface type
	<i>number</i>	Interface number
	brief	(Optional) Displays the brief of the VRRP group on the interface.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays the VRRP information on Ethernet interface E1/0.

```
FS# show vrrp interface fastethernet 0/0
FastEthernet 0/0 - Group 1
State is Backup
Virtual IP address is 192.168.201.1 configured
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 100
Master Device is 192.168.201.213 , pritority is 120
```

```

Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FastEthernet 0/0 - Group 2
State is Master
Virtual IP address is 192.168.201.2 configured
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 120
Master Device is 192.168.201.217 (local), priority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
    
```

Related	Command	Description
Commands	<code>vrrp group ip ip address [secondary]</code>	Enables the VRRP function and set the IP address for the virtual device

Platform N/A

Description

4.3 show vrrp packets statistics

Use this command to display the statistics of the VRRP packets transmission.

show vrrp packet statistics [*interface-type interface-number*]

Parameter	Parameter	Description
Description	<i>interface-type interface-number</i>	Interface type and number

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays the statistics of VRRP packets transmitting on all interfaces.

Examples

```

FS# show vrrp packet statistics

Total
  InReceives: 966043 packets, InOctets: 38641824, InErrors: 38826
  OutTransmits: 306079, OutOctets: 7798564
GigabitEthernet 3/0/1
  InReceives: 799665 packets, InOctets: 31986600, InErrors: 19657
    
```

```

OutTransmits: 272931, OutOctets: 6675320
GigabitEthernet 3/0/2
  InReceives: 0 packets, InOctets: 0, InErrors: 0
  OutTransmits: 681, OutOctets: 16344
    
```

The following example displays the statistics of VRRP packets on the interface gigabitEthernet 3/0/1.

```

FS#show vrrp packet statistics gigabitEthernet 3/0/1
GigabitEthernet 3/0/1
  InReceives: 799911 packets, InOctets: 31996440, InErrors: 19657
  OutTransmits: 273053, OutOctets: 6677760
    
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A
Description

4.4 vrrp accept_mode

Use this command to enable the packet accepting function on the IPv6 VRRP virtual router.
 Use the **no** form of this command to disable this function.

vrrp ipv6 group accept_mode
no vrrp ipv6 group accept_mode

Parameter	Parameter	Description
Description	group	VRRP group number

Defaults The master IPv6 VRRP is not allowed to accept packets whose destination IPv6 address is the IPv6 address of a virtual router. However, the NA and NS packets should be accepted regardless of the configuration of Accept_Mode. Also, the master IPv6 VRRP virtual router in the owner state will accept and process any packets whose destination IPv6 address is the IPv6 address of a virtual router, regardless of the configuration of Accept_Mode.

Command Mode Interface configuration mode

Usage Guide Configuration of the network interface is effective for the master virtual router.

Only IPv6 VRRP has this configuration mode.

Configuration Examples The following example enables the accept mode on the group 1:

```
vrrp ipv6 1 accept_mode
```

Platform N/A

Description

4.5 vrrp authentication

Use this command to enable VRRP authentication.

Use the **no** form of this command to disable this function.

vrrp group authentication string

no vrrp group authentication

Parameter	Parameter	Description
Description	<i>group</i>	VRRP group number
	<i>string</i>	String for the VRRP group authentication (within 8 bytes, plaintext password)

Defaults This function is disabled by default. Even if the VRRP function is enabled, no authentication password is configured by default.

Command Mode Interface configuration mode

Usage Guide The devices in the same VRRP group must have the same authentication password configured. The plaintext authentication password cannot provide security. It aims only to prevent/prompt the incorrect VRRP configuration.

Configuration Examples The following example sets the authentication password for VRRP group 1.

```
vrrp 1 authentication x30dn78k
```

Platform N/A

Description

4.6 vrrp bfd (Global Configuration Mode)

Use this command to enable the global BFD correlation for the IPv4 VRRP backup group to detect the master router status.

Use the **no** form of this command to remove the BFD correlation for IPv4 VRRP.

vrrp bfd interface-type interface-number ip-address

no vrrp bfd

Parameter	Parameter	Description
Description	<i>interface-type interface-number</i>	Interface type and interface number
	<i>ip-address</i>	Neighbor IP address

Defaults By default, the global BFD correlation for IPv4 VRRP is disabled.

Command Global configuration mode

Mode

Usage Guide After the global BFD correlation for IPv4 VRRP is configured, the BFD correlation configuration for the IPv4 VRRP groups will be removed.
 The global BFD correlation for IPv4 VRRP configured later will override the earlier configuration.
 The IP address and BFD session of the interface must be configured before configuring the vrrp bfd command.
 The global IPv4 VRRP BFD session applies to the IPv4 VRRP router which consists of two devices only.

Configuration The following example enables global BFD correlation for IPv4 VRRP.

Examples

```
FS#configure terminal
FS(config)#interface vlan 1
FS(config-if-VLAN 1)#ip address 192.168.201.11 255.255.255.0
FS(config-if-VLAN 1)#bfd interval 50 min_rx 50 multiplier 3
FS(config-if-VLAN 1)#exit
FS(config)# vrrp bfd vlan 1 192.168.201.10
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.7 vrrp bfd (Interface Configuration Mode)

Use this command to enable BFD correlation for the specified IPv4 VRRP group.
 Use the **no** form of this command to remove the BFD correlation for the specified IPv4 VRRP group.

vrrp group bfd ip-address
no vrrp group bfd ip-address

Parameter	Parameter	Description
Description	<i>group</i>	VRRP group ID
	<i>ip-address</i>	Neighbor IP address

Defaults By default, no BFD correlation is configured for the IPv4 VRRP group on the interface.

Command Mode Interface configuration mode.

Usage Guide After the global BFD correlation for IPv4 VRRP is configured, the BFD correlation configuration for the IPv4 VRRP groups will be removed.
 The IP address and BFD session of the interface must be configured before configuring the **vrrp bfd** command.

Configuration Examples The following example enables BFD correlation for the VRRP group.
 On Switch 1:

```
FS#configure terminal
FS(config)#interface vlan 1
FS(config-if-VLAN 1)#ip address 1.1.1.2 255.255.255.0
FS(config-if-VLAN 1)#bfd interval 50 min_rx 50 multiplier 3
FS(config-if-VLAN 1)#vrrp 1 ip 1.1.1.1
FS(config-if-VLAN 1)#vrrp 1 bfd 1.1.1.3
```

On Switch 2:

```
FS#configure terminal
FS(config)#interface vlan 1
FS(config-if-VLAN 1)#ip address 1.1.1.3 255.255.255.0
FS(config-if-VLAN 1)#bfd interval 50 min_rx 50 multiplier 3
FS(config-if-VLAN 1)#vrrp 1 ip 1.1.1.1
FS(config-if-VLAN 1)#vrrp 1 bfd 1.1.1.2
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.8 vrrp delay

Use this command to set the reload latency of the VRRP group on the interface.

Use the **no** form of this command to restore the default setting.

vrrp delay { **minimum** *min-seconds* | **reload** *reload-seconds* }

no vrrp delay

Parameter	Parameter	Description
Description	minimum <i>min-seconds</i>	When the interface is up, VRRP group shall be reloaded after at least <i>min-seconds</i> .
	reload <i>reload-seconds</i>	The reload latency of the VRRP group. If the configured <i>min-seconds</i> is more than <i>reload-seconds</i> , the actual reload latency of the VRRP group will be <i>min-seconds</i> .

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide Use this command to set the reload latency of the VRRP group on the interface, when it is required that the VRRP group shall not be reloaded immediately after the system reloads or the interface is up. The reload latency range is 0-60.

Configuration The following example sets the VRRP reload latency on E0 to 10 seconds. When E0 is up, VRRP group 1 shall be

Examples reloaded in 10 seconds.

```
interface FastEthernet 0/0
shutdown
ip address 10.0.1.1 255.255.255.0
vrrp delay minimum 10
vrrp 1 ip 10.0.1.20
no shutdown
show vrrp 1
```

Related	Command	Description
Commands	N/A	N/A

Platform N/A

Description

4.9 vrrp description

Use this command to specify a descriptor for the VRRP.

Use the **no** form of this command to restore the default setting.

vrrp [ipv6] group description text

no vrrp [ipv6] group description

Parameter	Parameter	Description
Description	ipv6	Applies to IPv6 VRRP.
	<i>group</i>	VRRP group number
	<i>text</i>	VRRP group descriptor

Defaults This function is disabled by default. Even if the VRRP function is enabled, no VRRP group descriptor is configured by default.

Command Mode Interface configuration mode

Usage Guide This command will set the descriptor for the VRRP group to facilitate the identification of the VRRP group.

Configuration Examples The following example labels the VRRP group 1 on Ethernet interface E0 as Building A – Marketing and Administration.

```
interface FastEthernet 0/0
ip address 10.0.1.1 255.255.255.0
vrrp 1 ip 10.0.1.20
vrrp 1 description "Building A - Marketing and Administration"
```

Related	Command	Description
Commands	FS(config-if)# vrrp group ip ipaddress [secondary]	Enables the VRRP function and set the IP address for the virtual device

Platform N/A
Description

4.10 vrrp detection-vlan

Use this command to enable IPv4 VRRP packets to be sent to only the first or a specified Sub VLAN in a Super VLAN interface.

Use the **no** form of this command to enable IPv4 VRRP packets to be sent to all the Sub VLANs in a Super VLAN interface.

vrrp detection-vlan {first-subvlan | subvlan-id}

no vrrp detection-vlan

Parameter	Parameter	Description
Description	first-subvlan	IPv4 VRRP packets are sent to only the first Sub VLAN in a Super VLAN interface.
	<i>subvlan-id</i>	IPv4 VRRP packets are sent to a specified Sub VLAN in a Super VLAN interface.

Defaults By default, IPv4 VRRP packets are sent to only the first Sub VLAN in a Super VLAN interface.

Command Mode Interface configuration mode

Usage Guide Use this command to configure the mode in which IPv4 VRRP packets are sent to a Super VLAN interface. There are three modes in which IPv4 VRRP packets are sent to a Super VLAN interface: to only the first Sub VLAN, to a specified Sub VLAN, or all Sub VLANs.

 This command is configured on a VLAN interface and applies only to Super VLAN interfaces.

Configuration The following example enables IPv4 VRRP packets to be sent to all Sub VLANs in Super VLAN 3.

```

Examples
FS#configure terminal
FS(config)# vlan 3
FS(config-vlan)# supervlan
FS(config-vlan)# subvlan 5-10
FS(config-vlan)#exit
FS(config)#interface vlan 3
FS(config-if)# no vrrp detection-vlan
    
```

Related	Command	Description
Commands	vrrp ip	Enables the VRRP function and set the IP address of the VRRP.

Platform N/A
Description

4.11 vrrp ip

Use this command to enable VRRP on the interface and specify the related virtual IP address. Use the **no** form of this command to restore the default setting.

vrrp group ip *ipaddress* [**secondary**]

no vrrp group ip *ipaddress* [**secondary**]

Parameter	Parameter	Description
Description	<i>group</i>	VRRP group number of the virtual device
	<i>ipaddress</i>	IP address of the virtual device
	secondary	Specifies the secondary IP address of the virtual device.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide If the **secondary** parameter is not used, the IP address set here will become the master IP address of the virtual device. Note that if the VRRP group is using the IP address of the Ethernet interface, an error occurs when you remove the IP address of the VRRP group with the **no** command, because there are duplicated IP addresses in the LAN.

Configuration Examples The following example enables the VRRP function on Ethernet interface 0. The VRRP group number is 1, primary IP address of the virtual device is 10.0.1.20 and secondary IP address is 10.0.2.20.

```
interface FastEthernet 0/0
no switchport// Used on the switch only.
ip address 10.0.1.1 255.255.255.0
ip address 10.0.2.1 255.255.255.0 secondary
vrrp 1 ip 10.0.1.20
vrrp 1 ip 10.0.2.20 secondary
```

Related	Command	Description
Commands	show vrrp [brief group]	Displays the VRRP configuration.

Platform N/A
Description

4.12 vrrp ipv6

Use this command to enable IPv6 VRRP on the interface and specify the related virtual IPv6 address. Use the **no** form of the command to restore the default setting.

vrrp group ipv6 *ipv6-address*

no vrrp group ip *ipv6-address*

Parameter	Parameter	Description
Description	<i>group</i>	VRRP group number of the virtual device
	<i>ipv6-address</i>	IPv6 address of the virtual device

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide IPv6 VRRP and IPv4 VRRP share group numbers ranging from 1 to 255. One VRRP group number of an interface is applicable to both IPv4 VRRP and IPv6 VRRP at the same time. The first configured address should be the link's local address, which cannot be deleted until the other virtual addresses are deleted.

Configuration Examples The following example enables the IPv6 VRRP function on Ethernet interface FastEthernet 0/0 with VRRP group number 1 and virtual IPv6 address FE80::1 and 2001::1.

```
interface FastEthernet 0/0
no switchport
ipv6 enable
ip6 address 2001::2/64
vrrp 1 ipv6 FE80::1
vrrp 1 ipv6 2001::1
```

Related Commands	Command	Description
	show ipv6 vrrp [brief group]	Displays the IPv6 VRRP configuration.

Platform N/A
Description

4.13 vrrp preempt

Use this command to set the preemption mode of the VRRP group.

Use the **no** form of this command to restore the default setting.

vrrp [ipv6] group preempt [delay seconds]

no vrrp [ipv6] group preempt [delay]

Parameter	Parameter	Description
Description	ipv6	Applies to IPv6 VRRP.
	<i>group</i>	VRRP group number
	delay seconds	(Optional)Specifies the delay before a device declares itself master. The default value is 0.

Defaults This function is disabled by default. Once the VRRP function is enabled, the VRRP group will work in the preemption mode by default.

Command Interface configuration mode

Mode

Usage Guide If the VRRP group is working in the preemption mode, once a device finds its priority is higher than the priority of the master, it will become the master device of the VRRP group. If the VRRP group is not working in the preemption mode, even if a device finds its priority is higher than the master’s priority, it will not become the master device of the VRRP group. In case the VRRP group is using the Ethernet interface IP address, the setting of the preemption mode does not make sense, because that VRRP group has the highest priority and thus automatically becomes the master device in the VRRP group.

Configuration Examples The following example enables IPv4 VRRP on interface GigabitEthernet 0/0. When VRRP group 1 finds its priority (200) is higher than that of the current master device, it will declare its preemption of master after a delay of 15 seconds.

```
FS#configure terminal
FS(config)#interface GigabitEthernet 0/0
// 'no switchport'
FS(config-if-GigabitEthernet 0/0)#no switchport
FS(config-if-GigabitEthernet 0/0)#ip address 10.0.1.1 255.255.255.0
FS(config-if-GigabitEthernet 0/0)#vrrp 1 ip 10.0.1.20
FS(config-if-GigabitEthernet 0/0)#vrrp 1 preempt delay 15
FS(config-if-GigabitEthernet 0/0)#vrrp 1 priority 200
```

The following example enables IPv4 VRRP on interface GigabitEthernet 0/0. When VRRP group 1 finds its priority (200) is higher than that of the current master device, it will declare its preemption of master after a delay of 15 seconds.

```
FS#configure terminal
FS(config)#interface GigabitEthernet 0/0
// 'no switchport'
FS(config-if-GigabitEthernet 0/0)#no switchport
FS(config-if-GigabitEthernet 0/0)#ipv6 enable
FS(config-if-GigabitEthernet 0/0)#ipv6 address 2001::2/64
FS(config-if-GigabitEthernet 0/0)#vrrp 1 ipv6 FE80::1
FS(config-if-GigabitEthernet 0/0)#vrrp 1 ipv6 2001::1
FS(config-if-GigabitEthernet 0/0)#vrrp ipv6 1 preempt delay 15
FS(config-if-GigabitEthernet 0/0)#vrrp ipv6 1 priority 200
```

Related Commands

Command	Description
vrrp group ip ipaddress [secondary]	Enables the VRRP function and set the IP address for the virtual device.
vrrp group priority level	Sets the VRRP group priority.

Platform N/A

Description

4.14 vrrp priority

Use this command to specify the priority of the VRRP group. Use the **no** form of this command to restore the default setting.

vrrp [ipv6] group priority level
no vrrp [ipv6] group priority

Parameter	Parameter	Description
Description	ipv6	Specifies the priority of the IPv6 VRRP group.
	<i>group</i>	VRRP group number
	<i>level</i>	VRRP group priority

Defaults This function is disabled by default. Once the VRRP function is enabled, the default priority of the VRRP group is 100.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example sets the priority of VRRP group 1 as 254.

```
vrrp 1 priority 254
```

Related Commands	Command	Description
	vrrp group ip ipaddress [secondary]	Enables the VRRP function and set the IP address for the virtual device.
	vrrp group preempt [delay seconds]	Sets the VRRP in the preemption mode.

Platform Description N/A

4.15 vrrp timers advertise

Use this command to specify the interval for the master device to send the VRRP advertisement. Use the **no** form of this command to restore the default setting.

vrrp [ipv6] group timers advertise { advertise-interval | csec centisecond-interval }
no vrrp [ipv6] group timers advertise

Parameter	Parameter	Description
Description	ipv6	Applies to IPv6 VRRP.
	<i>group</i>	VRRP group number
	<i>advertise-interval</i>	Sets the interval time in seconds between sending VRRP advertisement.
	csec centisecond-interval	Sets the interval time in milliseconds between sending advertisement frames from the master VRRP router in the backup group. The range is from 50 to

	99. This value is not set by default. This parameter takes effect only for VRRPv3.
--	---

Defaults This function is disabled by default. Once the VRRP function is enabled, the default advertisement interval of the master device is one second.

Command Mode Interface configuration mode

Usage Guide If the current device becomes the master device in the VRRP group, it will notify its VRRP status, priority and other information by sending the VRRP advertisement in the set interval.
Based on the RFC specification, the maximum advertisement interval of the IPv4/IPv6 VRRPv3 group is 40 seconds. The advertisement interval can be configured larger than 40 seconds, but the effective advertisement interval is 40 seconds.

Configuration Examples The following example sets the VRRP advertisement interval as 4 seconds.

```
vrp 1 timers advertise 4
```

	Command	Description
Related Commands	vrp group ip <i>ipaddress</i> [secondary]	Enables the VRRP function and set the IP address for the virtual device.
	vrp group timers learn	Enables the timer learning function.

Platform N/A

Description

4.16 vrrp timers learn

Use this command to enable the timer learning function.
Use the **no** form of this command to restore the default setting.

vrp [ipv6] group timers learn
no vrrp [ipv6] group timers learn

	Parameter	Description
Parameter Description	ipv6	Applies to IPv6 VRRP.
	<i>group</i>	VRRP group number

Defaults This function is disabled by default. Even if the VRRP function is enabled, the timer learning function is disabled by default.

Command Mode Interface configuration mode

Usage Guide Once the timer learning function is enabled, if the current device is a VRRP backup device, it will learn the VRRP

advertisement interval from the VRRP advertisement of the master device, with which it calculates the master device's failure interval instead of the VRRP advertisement interval configured locally. This command may synchronize the VRRP advertisement timer with the master device.

Configuration The following example enables the timer learning function on the IPv4 VRRP group 1.

Examples `vrrp 1 timers learn`

The following example to enables the timer learning function on the IPv6 VRRP group 1.

`vrrp ipv6 1 timers learn`

Related Commands

Command	Description
<code>vrrp group ip ipaddress [secondary]</code>	Enables the VRRP function and set the IP address for the virtual device.
<code>vrrp group ipv6 ipaddress</code>	Enables the VRRP function and set the IPv6 address for the virtual device.
<code>vrrp group timers advertise interval</code>	Sets the IPv4 VRRP advertising interval.
<code>vrrp ipv6 group timers advertise interval</code>	Sets the IPv6 VRRP advertising interval.

Platform N/A

Description

4.17 vrrp track

Use these commands to enable the IPv4/IPv6 VRRP track in the interface configuration mode. Use the no form of these commands to restore the default setting.

`vrrp group track { interface-type interface-number | bfd interface-type interface-number ipv4-address } [priority]`
`vrrp ipv6 group track interface-type interface-number [priority]`
`no vrrp [ipv6] group track interface-type interface-number`

Use these commands to enable VRRP IPv4/IPv6 address track. Use the **no** form of these commands to restore the default setting.

`vrrp group track ipv4-address [interval interval-value] [timeout timeout-value] [retry retry-value] [priority]`
`vrrp ipv6 group track { ipv6-global-address | ipv6-linklocal-address interface-type interface-number } [interval interval-value] [timeout timeout-value] [retry retry-value] [priority]`
`no vrrp group track ipv4-address`
`no vrrp ipv6 group track { ipv6-global-address | ipv6-linklocal-address interface-type interface-number }`

Use this command to disable the specified neighbor IP address track via BFD.

`no vrrp group track bfd interface-type interface-number ipv4-address`

Parameter Description

Parameter	Description
<code>group</code>	VRRP group number
<code>interface-type interface-number</code>	Type of monitored interface
<code>bfd interface-type</code>	Enables the specified neighbor IP address track via BFD.

<i>interface-number ipv4-address</i>	
ipv6	Applies to IPv6 VRRP.
<i>ipv4-address</i>	Monitored IPv4 address. With BFD configured, it refers to the neighbor IP address.
interval <i>interval-value</i>	The interval of time to probe whether the monitored ip address is reachable or not. If this parameter is not selected, the default value is 3s.
timeout <i>timeout-value</i>	The timeout time of the unreachable monitored ip address. If this parameter is not selected, the default value is 1s.
<i>priority</i>	VRRP priority change range when the interface or ip address reachability status changes. If this parameter is not selected, the default value is 10.
<i>ipv6-global-address</i>	Global unicast IPv6 address
<i>ipv6-linklocal-address</i>	Local link IPv6 address

Defaults This function is disabled by default. Even if the VRRP function is enabled, no interface or IP address is specified.

Command Interface configuration mode

Mode

Usage Guide This command can be used to monitor the outlet links. Note that layer-3 routable logical interfaces can be monitored (such as Routed Port, SVI, Loopback and Tunnel). This command can also be used to monitor the reachability of the specified IP address.

Configuration Examples The following example enables the VRRP group 1 to monitor the routed port Fa1/1. If the Fa1/1 link is disconnected, the priority of the VRRP group decreases by 30. When the Fa1/1 link recovers, the priority of VRRP group 1 is restored.

```
vrpp 1 track FastEthernet 1/1 30
```

The following example sets the VRRP to track the specified neighbor IP address 192.168.1.3 through BFD:

```
FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#interface FastEthernet 0/1
FS(config-if)#no switchport //used on the switch.
FS(config-if)#ip address 192.168.1.1 255.255.255.0
FS(config-if)#bfd interval 50 min_rx 50 multiplier 3
FS(config)#interface FastEthernet 0/2
FS(config-if)#no switchport //used on the switch
FS(config-if)#ip address 192.168.201.17 255.255.255.0
FS(config-if)#vrpp 1 priority 120
FS(config-if)#vrpp 1 ip 192.168.201.1
FS(config-if)#vrpp 1 track bfd FastEthernet 0/1 192.168.1.3 30
FS(config-if)#end
```

Related	Command	Description
---------	---------	-------------

Commands	<code>vrrp group ip <i>ipaddress</i> [secondary]</code>	Enables the VRRP function and set the IP address for the virtual device.
	<code>vrrp group priority <i>level</i></code>	Sets the VRRP group priority.

Platform N/A
Description

4.18 vrrp version

Use this command to configure the version of sending the IPv4 VRRP multicast packets.

For the IPv4 VRRP, there are two versions: VRRPv2 and VRRPv3.

Use the no form of this command to restore the default setting.

`vrrp group version { 2 | 3 }`

`no vrrp group version`

Parameter	Parameter	Description
Description	2	Uses the VRRPv2 version to send the packets.
	3	Uses the VRRPv3 version to send the packets.

Defaults The default is VRRPv2.

Command Mode Interface configuration mode

Usage Guide Considering the compatibility of VRRPv2 and VRRPv3 for the IPv4 VRRP, you can choose the version of VRRP packets based on the actual network environment. VRRPv2 is based on RFC3768 and VRRPv3 is based on RFC 5798. This command is applicable to IPv4 VRRP only.

Configuration Examples The following example configures the version of sending the IPv4 VRRP packets on the interface gi4/1.

```
vrrp 1 version 3
```

Related Commands	Command	Description
	<code>vrrp group ip <i>ipaddress</i> [secondary]</code>	Enables the VRRP function and set the IP address for the virtual device.
	<code>vrrp group timers advertise <i>interval</i></code>	Sets the interval of sending the VRRP advertisement.

Platform N/A
Description

5 VRRP Plus Commands

5.1 show vrrp balance

Use this command to display the VRRP Plus brief or details.

show [ipv6] vrrp balance [brief | group]

Parameter Description	Parameter	Description
	brief	(Optional) Displays the VRRP Plus brief.
	ipv6	(Optional) Displays the IPv6 VRRP Plus configuration.
	<i>group</i>	(Optional) Displays the VRRP Plus details.

Defaults N/A

Command Mode Privileged EXEC mode/Global configuration mode/Interface configuration mode

Usage Guide If no optional parameter is used, the details of all VRRP Plus group are displayed.

Configuration Examples The following example displays the details of all VRRP Plus groups.

```

FS#show vrrp balance
VLAN 1 - Group 1
  State is BVG
  Virtual IP address is 192.168.1.54
  Hello time 1 sec, hold time 3 sec
  Load balancing: host-dependent
  Redirect time 300 sec, forwarder time-out 14400 sec
  Weighting 90 (configured 100), thresholds: lower 1, upper 100
    Track object 1, state: down, decrement weight: 10
  There are 2 forwarders
  Forwarder 1 (local)
    MAC address:
      0000.5e00.0101
    Owner ID is 00d0.f822.33ab
  Forwarder 2
    MAC address:
      001a.a916.0201
  Owner ID is 00d0.f822.8800
  The following example shows the brief of the VRRP Plus group.
  FS# show vrrp balance brief
  Interface  Grp   State      Group Addr      MAC addr
  VLAN 1     1    BVG        192.168.1.1     0000.5e00.0101
    
```

Related Commands	Command	Description
	vrrip group balance	Enables the VRRP Plus function.
	vrrip group load-balancing { host-dependent round-robin weighted }	Sets the load balancing policy of the VRRP Plus.
	show vrrip balance interface type number [brief]	Displays the VRRP Plus running status of the specified interface.

Platform N/A

Description

5.2 show vrrip balance interface

Use this command to display the actions of the VRRP Plus group on the specified interface.

show [ipv6] vrrip balance interface type number [brief]

Parameter Description	Parameter	Description
	interface type number	Specifies the interface type and number.
	ipv6	(Optional) Displays the IPv6 VRRP Plus groups.
	brief	(Optional) Displays the brief information.

Defaults N/A

Command Mode Privileged EXEC mode/ Global configuration mode/Interface configuration mode

Usage Guide N/A

Configuration The following example displays the actions of the VRRP Plus on FastEthernet 0/0.

```

Examples
FS# show vrrip balance interface FastEthernet 0/0
FastEthernet 0/0 - Group 1
  State is BVG
  Virtual IP address is 192.168.1.54
  Hello time 1 sec, hold time 3 sec
  Load balancing: host-dependent
  Redirect time 300 sec, forwarder time-out 14400 sec
  Weighting 90 (configured 100), thresholds: lower 1, upper 100
    Track object 1, state: down, decrement weight: 10
  There are 2 forwarders
  Forwarder 1 (local)
    MAC address:
      0000.5e00.0101
    Owner ID is 00d0.f822.33ab
    
```

```
Forwarder 2
MAC address:
    001a.a916.0201
Owner ID is 00d0.f822.8800
```

Related Commands

Command	Description
vrrp group balance	Enables the VRRP Plus function.
vrrp group load-balancing { host-dependent round-robin weighted }	Sets the load balancing policy of the VRRP Plus.
show vrrp balance interface type number [brief]	Displays the VRRP Plus running status of the specified interface.

Platform N/A

Description

5.3 vrrp balance

Use this command to enable the VRRP Plus function.

Use the **no** form of this command to disable this function.

vrrp [ipv6] group balance

no vrrp [ipv6] group balance

Parameter Description

Parameter	Description
ipv6	Applies to IPv6.
<i>group</i>	Enables the VRRP Plus function on the VRRP of specified group ID.

Defaults VRRP Plus is disabled by default.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example enables the VRRP Plus function on the Layer 3 interface FastEthernet0/0.

```
FS#config
FS(config)#interface GigabitEthernet 0/0
FS(config-if-GigabitEthernet 0/0)#vrrp 1 ip 192.168.1.1
FS(config-if-GigabitEthernet 0/0)#vrrp 1 balance
```

Related Commands

Command	Description
---------	-------------

vrrp load-balancing	Sets the load balancing policy of the VRRP Plus.
show vrrp balance	Displays the VRRP Plus running status.
show vrrp balance interface	Displays the VRRP Plus running status of the specified interface.

Platform N/A

Description

5.4 vrrp forwarder preempt

Use this command to enable the forwarding preemption on the VRRP Plus backup group.

Use the **no** form of this command to disable this function.

vrrp [ipv6] group forwarder preempt

no vrrp [ipv6] group forwarder preempt

Parameter	Parameter	Description
Description	ipv6	Applies to IPv6.
	<i>group</i>	VRRP group number. The range is from 1 to 255.

Defaults By default, forwarding preemption is enabled.

Command Interface configuration mode

Mode

Usage Guide The VRRP Plus function should be configured before enabling forwarding preemption.

Configuration Examples The following example enables the forwarding preemption function of the VRRP Plus backup group on the Layer3 interface FastEthernet0/0.

```
FS#config
FS(config)#interface GigabitEthernet 0/0
FS(config-if-GigabitEthernet 0/0)#vrrp 1 ip 192.168.1.1
FS(config-if-GigabitEthernet 0/0)#vrrp 1 balance
FS(config-if-GigabitEthernet 0/0)#vrrp 1 forwarder preempt
```

Related Commands	Command	Description
	vrrp group balance	Enables the VRRP Plus function.
	show vrrp balance [brief group]	Displays the VRRP Plus running status.
	show vrrp balance interface type number [brief]	Displays the VRRP Plus running status of the specified interface.

Platform N/A

Description

5.5 vrrp load-balancing

Use this command to set the VRRP Plus load balancing policy.

Use the **no** form of this command to restore the default setting.

vrrp [ipv6] group load-balancing { host-dependent | round-robin | weighted }

no vrrp [ipv6] group load-balancing { host-dependent | round-robin | weighted }

Parameter Description	Parameter	Description
	<i>group</i>	Specifies the VRRP group ID.
	ipv6	Applies to IPv6.
	host-dependent	Sets the host-dependent load balancing policy, so as to use the different virtual MACs to reply the host's ARP request based on different hosts.
	round-robin	Sets the round-robin balancing policy, so as to use the different virtual MACs to reply the host's ARP request in turn, which is the default setting.
	weighted	Sets the weight balancing policy, so as to perform the ARP reply based on the device weight of the backup group.

Defaults The default is round-robin.

Command Interface configuration mode

Mode

Usage Guide The VRRP Plus function should be enabled before setting the VRRP Plus load balancing policy.

Configuration The following example sets the load balancing policy of the VRRP Plus group1 as host-dependent.

```

Examples
FS(config-if)# vrrp 1 ip 192.168.1.1
FS(config-if)# vrrp 1 balance
FS(config-if)# vrrp 1 load-balancing host-dependent
    
```

Related Commands	Command	Description
	vrrp group balance	Enables the VRRP Plus function.
	show vrrp balance [brief] group	Displays the VRRP Plus running status.
	show vrrp balance interface type number [brief]	Displays the VRRP Plus running status o the specified interface.

Platform N/A

Description

5.6 vrrp timers redirect

Use this command to set the redirection interval and timeout of the proxy virtual MAC address for the VRRP Plus backup group.

Use the **no** form of this command to restore the default value.

vrrp [**ipv6**] *group* **timers redirect** *redirect timeout*

no vrrp [**ipv6**] *group* **timers redirect**

Parameter Description	Parameter	Description
	<i>group</i>	VRRP Plus backup group ID, in the range of 1 to 255.
	ipv6	Applies to IPv6.
	<i>redirect</i>	The redirection time, 300 seconds (namely 5 minutes) by default, in the range of 0 to 3,600.
	<i>timeout</i>	The timeout, 14,400 seconds (namely 4 hours) by default, in the range of (redirect+600) to 64,800.

Defaults The default redirection interval is 300 seconds and redirection timeout is 14,400 seconds.

Command Interface configuration mode

Mode

Usage Guide The VRRP Plus function should be enabled before setting the redirection interval and timeout of the proxy virtual MAC address for the VRRP Plus backup group.

Configuration Examples The following example sets the redirection interval and timeout of the proxy virtual MAC address for the VRRP Plus backup group.

```
FS(config-if)# vrrp 1 ip 192.168.1.1
FS(config-if)# vrrp 1 balance
FS(config-if)# vrrp 1 timers redirect 300 6000
```

Related Commands	Command	Description
	vrrp <i>group</i> balance	Enables the VRRP Plus function.
	show vrrp balance [brief <i>group</i>]	Displays the VRRP Plus running status.
	show vrrp balance interface <i>type number</i> [brief]	Displays the VRRP Plus running status o the specified interface.

Platform N/A

Description

5.7 vrrp weighting

Use this command to set the weight and threshold of the VRPP Plus backup group.

Use the **no** form of this command to restore the default setting.

vrrip [**ipv6**] *group weighting maximum* [**lower lower**] [**upper upper**]

no vrrip [**ipv6**] *group weighting*

Parameter Description	Parameter	Description
	ipv6	Applies to IPv6.
	<i>group</i>	VRRP Plus backup group ID, in the range of 1 to 255.
	<i>maximum</i>	Weight, 100 by default, in the range of 2 to 254.
	<i>lower</i>	Weight lower, 1 by default, in the range of 1 to (maximum-1)
	<i>upper</i>	Weight upper, 100 by default, in the range of lower to maximum.

Defaults
 VRRP Plus backup group weight: 100
 Weight lower: 1
 Weight upper: 100

Command Mode
 Interface configuration mode

Usage Guide
 The VRRP Plus function should be enabled before setting the weight and threshold of the VRRP Plus backup group

Configuration Examples
 The following example sets the weight and threshold of the VRRP Plus group1.

```
FS(config-if)# vrrip 1 ip 192.168.1.1
FS(config-if)# vrrip 1 balance
FS(config-if)# vrrip 1 weighting 50 lower 30 upper 50
```

Related Commands	Command	Description
	vrrip group balance	Enables the VRRP Plus function.
	show vrrip balance [brief <i>group</i>]	Displays the VRRP Plus running status.
	show vrrip balance interface <i>type number</i> [brief]	Displays the VRRP Plus running status of the specified interface.

Platform
 N/A
Description

5.8 vrrip weighting track

Use this command to set the track object corresponding to the weight of the VRRP Plus backup group. Use the **no** form of this command to delete the corresponding track object.

vrrip [**ipv6**] *group weighting track object-number* [**decrement value**]

no vrrip [**ipv6**] *group weighting track object-number*

Parameter Description	Parameter	Description
	ipv6	Applies to IPv6.
	<i>group</i>	VRRP Plus backup group ID, in the range of 1 to 255.
	<i>object-number</i>	The ID of the track object created by the track module, in the range of 1 to 700.
	<i>value</i>	Weight decrement performed when the track object is down, which is 10 by default and is in the 1 to 255.

Defaults No track is configured by default.

Command Mode Interface configuration mode

Usage Guide The VRRP Plus function should be enabled before setting the track object corresponding to the weight of the VRRP Plus backup group.

Configuration Examples The following example sets the track object corresponding to the weight of the VRRP Plus backup group 1.

```
FS(config)#track 1 interface gigabitEthernet 0/14 line-protocol
FS(config)#interface GigabitEthernet 0/0
FS(config-if)# vrrp 1 ip 192.168.1.1
FS(config-if)# vrrp 1 balance
FS(config-if)# vrrp 1 weighting track 1 decrement 50
```

Related Commands	Command	Description
	vrrp group balance	Enables the VRRP Plus function.
	show vrrp balance [brief group]	Displays the VRRP Plus running status.
	show vrrp balance interface type number [brief]	Displays the VRRP Plus running status of the specified interface.

Platform Description N/A

6 BFD Commands

6.1 bfd

Use this command to set the BFD session parameters.

Use the **no** form of this command to remove the setting.

bfd interval *milliseconds* **min_rx** *milliseconds* **multiplier** *multiplier-value*

no bfd interval

Parameter Description	Parameter	Description
	interval milliseconds	Interval of sending the BFD control messages to the BFD session neighbor. milliseconds: The range is from 50 to 10,000.
	min_rx milliseconds	Expected interval of receiving the BFD control messages from the BFD session neighbor. milliseconds: The range is from 50 to 10,000.
	multiplier multiplier-value	Count of BFD control message not received from the peer in the configured interval. multiplier-value: The range is from 3 to 50.

Defaults No BFD session parameter is configured by default.

Command Interface configuration mode

Mode

Usage Guide Those parameters must be configured before enabling the BFD session.
The express forwarding must be enabled before enabling BFD on the routers.

Configuration The following example configures the BFD session parameter on routed port FastEthernet 0/2.

```
FS(config)# interface fastEthernet 0/2
FS(config)# no switchport
FS(config-if)# bfd interval 100 min_rx 100 multiplier 3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

6.2 bfd bind peer-ip

Use this command to create a BFD session to correlate with an interface.

Use the **no** form of this command to remove this setting.

bfd bind peer-ip *ip-address* [**source-ip** *ip-address*] **process-pst**
no bfd bind peer-ip *ip-address*

Parameter Description

Parameter	Description
peer-ip <i>ip-address</i>	The peer IP address to be detected, which must be directly connected to the Layer3 interface.
source-ip <i>ip-address</i>	Source IP address for sending the BFD packets, which avoids the packets dropped by the URPF in case that this function is used with other functions such the URPF at the same time.
process-pst	Correlates BFD for the Layer3 interface.

Defaults This function is disabled by default.

Command Mode Interface configuration mode

Usage Guide Note that this command must be configured a Layer3 interface and the peer IP address detected must be the address directly-connected to the interface.

Configuration Examples The following example detects the peer 1.1.1.2 through BFD on the routed port to generate the BFD status of the interface.

```
FS(config)# interface gigabitEthernet 0/2
FS(config-if -GigabitEthernet 0/2)#no sw
FS(config-if -GigabitEthernet 0/2)#ip address 1.1.1.1 255.255.255.0
FS(config-if -GigabitEthernet 0/2)#bfd bind peer-ip 1.1.1.2 source-ip 1.1.1.1 process-pst
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

6.3 bfd cpp

Use this command to enable the BFD protection policy.
 Use the **no** form of this command to disable this function.

bfd cpp
no bfd cpp

Parameter Description

Parameter	Description
N/A	N/A

Defaults This function is enabled by default.

Command Mode Global configuration mode

Usage Guide BFD protocol is so sensitive that if the device with BFD function enabled suffers from attack (for example, a large amount of Ping packets attack the device), which lead to the BFD session turbulence, the device can be protected by enabling the BFD protection policy. However, if the BFD function and the BFD protection policy are enabled at the same time, the loss of BFD packets on the attacked device occurs when the packets sent from the last-hop device go through this device, influencing the BFD session establishment between the last-hop device and other devices. This function is valid only for the switches.

Configuration Examples The following example enables the BFD protection policy.

```
FS(config)# bfd cpp
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

6.4 bfd echo

Use this command to enable echo mode.
Use the **no** form of this command to disable echo mode.

bfd echo [one-arm]
no bfd echo

Parameter Description	Parameter	Description
	one-arm	

Defaults The echo mode is disabled by default.
The one-arm echo mode is disabled by default.

Command Mode Interface configuration mode

Usage Guide By default, with BFD session parameter configured, the system enables the echo mode automatically and disables the one-arm echo mode. The minimum sending and receiving interval for the echo packets are the values of the configured **interval** *milliseconds* and **min_rx** *milliseconds*.
This command cannot be configured on the AP port.

Before enabling BFD echo mode or BFD one-arm echo mode, it is necessary to use the **no ip redirects** command to disable the ICMP redirection messages sending on the neighbor device of the BFD session, use the **no ip deny land** to disable the DDOS (Land-based attack prevention) function.

With both ends of the BFD session enabled, the echo mode takes effect.

With one end of the BFD session enabled, the one-arm echo mode takes effect.

In the process that the forwarding plane of the peer device returns echo packets transmitted by the local end to the local end, the echo packets may be lost due to congestion of the peer device, causing a session detection failure. In this case, configure Quality of Service (QoS) policies to ensure that echo packets are processed preferentially or disable the echo function.

The echo detection function of BFD does not support multi-hop detection. Ensure that the echo function is disabled when configuring multi-hops.

Configuration The following example enables the echo mode on the routed port FastEthernet 0/2:

```
Examples
FS(config)# interface fastEthernet 0/2
FS(config)# no switchport
FS(config-if)# bfd echo
```

The following example enables the one-arm echo mode on the routed port FastEthernet 0/2:

```
FS(config)# interface fastEthernet 0/2
FS(config)# no switchport
FS(config-if)# bfd echo one-arm
```

Related Commands

Command	Description
bfd	Configures the BFD session parameter.
bfd slow-timer	Configures the slow-timer time.

Platform N/A

Description

6.5 bfd slow-timer

Use this command to set the slow timer, which is used to send the BFD packets in the BFD asynchronous mode.

Use the **no** form of this command to restore the default setting.

bfd slow-timer [*milliseconds*]

no bfd slow-timer

Parameter Description

Parameter	Description
milliseconds	BFD slow-timer time. The range is from 1,000 to 30,000. The unit is millisecond.

Defaults The default slow-timer is 2000 milliseconds.

Command Mode Global configuration mode

Usage Guide N/A

Configuration Examples The following example sets the slow-timer to 14,000 milliseconds:

```
FS(config)# bfd slow-timer 14000
```

Related Commands

Command	Description
bfd echo	Enables the BFD echo function

Platform Description N/A

6.6 bfd up-dampening

Use this command to set the BFD up-dampening time.

Use the **no** form of this command to restore the default setting.

bfd up-dampening [*milliseconds*]

no up-dampening

Parameter Description

Parameter	Description
milliseconds	(Optional) Sets the BFD up-dampening time. The range is from 0 to 300,000. The unit is millisecond.

Defaults The default is 0 millisecond, which means that the notification is sent to the related application once the session state is UP.

Command Mode Interface configuration mode

Usage Guide N/A

Configuration Examples The following example sets the BFD up-dampening time to 60,000 milliseconds:

```
FS(config)# bfd up-dampening 60000
```

Related Commands

Command	Description
bfd	Configures the BFD session parameter.

Platform Description N/A

6.7 show bfd neighbors

Use this command to display the BFD session parameters.

```
show bfd neighbors [ vrf vrf-name ] [ client { ap | bgp | isis | ospf | ospfv3 | rip | vrrp | static-route | pbr |
vrrp-balance | bgp-lsp | ldp-lsp | static-lsp | backward-lsp-with-ip | pst } ] [ ipv4 ip-address | ipv6 ip-address ]
[ details ]
```

**Parameter
Description**

Parameter	Description
vrf vrf-name	(Optional) sets the neighbor VRF name.
client	(Optional) specifies the routing protocol.
ap	Displays the BFD session configuration for Layer 3 aggregate ports.
bgp	Displays the BFD session configuration for BGP.
isis	Displays the BFD session configuration for ISIS.
ospf	Displays the BFD session configuration for OSPF.
ospfv3	Displays the BFD session configuration for OSPFv3.
rip	Displays the BFD session configuration for RIP.
vrrp	Displays the BFD session configuration for VRRP.
static-route	Displays the BFD session configuration for the static route.
pbr	Displays the BFD session configuration for PBR.
vrrp-balance	Displays the BFD session configuration for the VRPP.
bgp-lsp	Displays the BFD session configuration for the BGP-LSP.
ldp-lsp	Displays the BFD session configuration for the LDP-LSP.
backward-lsp-with-ip	Displays the BFD session configuration for the LSP backward IP co-operation.
static-lsp	Displays the BFD session configuration for the static LSP co-operation.
pst	Displays the BFD session configuration and the Layer3 interface status.
ipv4 ip-address	(Optional) Displays the session information of the specified IPv4 neighbor.
ipv6 ip-address	(Optional) Displays the session information of the specified IPv6 neighbor.
details	(Optional) Displays the configurations in detail.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide In the information displayed by the **show bfd neighbors** command, the OurAddr field means the source address of the session. The “-” is displayed if the source address is not specified, and it occurs in the BFD session for the LSP backward IP correlation.

Configuration Examples The following example displays the BFD session configuration.

```
FS# sh bfd neighbors
IPV4 sessions: 1, UP: 1
IPV6 sessions: 0, UP: 0
```

OurAddr	NeighAddr	LD/RD	RH	Holdown(mult)	State	Int
192.168.24.2	192.168.24.1	8192/8192	Up	0(3)	Up	GigabitEthernet 0/1

The following example displays the BFD session configuration in detail.

```

FS#sh bfd neighbors
IPV4 sessions: 1, UP: 1
IPV6 sessions: 0, UP: 0
OurAddr      NeighAddr    LD/RD        RH/RS        Holdown(mult) State Int
192.168.24.2 192.168.24.1 8192/8192    Up           0(3 )        Up   GigabitEthernet 0/1
Session state is Up and using echo function with 50 ms interval.
Local Diag:  0,          Demand mode:  0,          Poll bit:  0
MinTxInt: 3000000,      MinRxInt: 3000000,      Multiplier:  3
Received MinRxInt 3000000, Multiplier: 3
Holdown (hits): 9000(0), Hello (hits): 3000(36)
Rx Count: 127, Rx Interval (ms) min/max/avg: 40/999/999
Tx Count: 135, Tx Interval (ms) min/max/avg: 1000/1000/999
Registered protocols: VRRP
Uptime: 0:01:19
Last packet:
Version      :      1                - Diagnostic      : 0
State bit    :      Up          - Demand bit      : 0
Poll bit     :      0          - Final bit       : 0
Multiplier  :      3          - Length         : 24
My Discr     :      8192       - Your Discr      : 8192
Min tx interval : 3000000      - Min rx interval: 3000000
Min Echo interval: 50000
    
```

The following example displays the BFD session configuration for aggregate ports.

```

FS#show bfd neighbors client ap
IPV4 sessions: 1, UP: 0
IPV6 sessions: 0, UP: 0
OurAddr      NeighAddr    LD/RD        RH/RS        Holdown(mult) State Int
192.168.23.1 192.168.23.2 8192/0       Admin        0(3 )        Down  GigabitEthernet 0/2 (AP 1)
    
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

7 IP Event Dampening

7.1 dampening

Use this command to enable the IP event dampening function on the interface. Use the **no** or **default** form of this command to disable this function.

dampening [*half-life-period* [*reuse-threshold* *suppress-threshold* *max-suppress* [**restart** [*restart-penalty*]]]]

no dampening

default dampening

Parameter Description	Parameter	Description
	<i>half-life-period</i>	Configures the half-life period of suppression penalty. The range is from 1 to 30. The unit is seconds. The default value is 5 seconds.
	<i>reuse-threshold</i>	Configures the penalty threshold to unsuppress the interface. The range is from 1 to 20,000. The default value is 1,000.
	<i>suppress-threshold</i>	Configures the penalty threshold to suppress the interface. The range is from 1 to 20,000. The default value is 2,000.
	<i>max-suppress</i>	Configures the maximum suppress time. The range is from 1 to 255. The default value is 4 times of the <i>half-life-period</i> .
	restart	Activates the restart penalty.
	<i>restart-penalty</i>	Configures the initial penalty value on the interface. The range is from 1 to 20,000. The default value is 2,000.

Defaults IP event dampening is disabled by default.

Command mode Interface configuration mode.

Usage Guide This function will influence the modules of the directly-connected/host route, static route, dynamic route and VRRP. If one interface meets the configuration condition of this command, which is in the suppression status, the above influenced modules consider the status of this interface as DOWN, so as to delete the corresponding route and not transceive the data packets on this interface.

Re-configuring the dampening command on the interface that has been configured this command makes all dampening information on this interface cleared. However, the interface flapping times will be remained unless use the clear counters command to clear the statistical information of the interface.

Too small max-suppress configured may cause the maximum penalty value obtained from the calculation smaller than the suppression threshold to make this interface will not be suppressed forever. Therefore, it belongs to the erroneous configuration. In this case, the following message will prompt for the configuration error:

% Maximum penalty (10) is less than suppress penalty (2000). Increase maximum suppress time

Besides, when configuring this command, it will prompt the following message as well if the system memory is not enough to save this configuration:

% No memory, configure dampening fail!

For the interface layer switching of the switches (Layer-3 interface to the Layer-2 interface), for example, if one routed port is switched to the switch port, the dampening command configured on this interface will be removed.

Note: For routers, this function can be configured on the master interface only. This function takes effect for all sub-interfaces of the master interface with this command configured, but this command cannot be configured on the sub-interface directly. This command cannot be configured on the virtual template.

Configuration The following example configures the IP event dampening function.

Examples

```
FS(config)#interface gigabitEthernet 0/1
FS(config-if-GigabitEthernet 0/1)# no switchport
FS(config-if-GigabitEthernet 0/1)# dampening 30 1500 10000 100
```

Related Commands

Command	Description
clear counters	Clears the interface counters.
show dampening interface	Displays the statistics of the dampening interface.
show interface dampening	Displays details of the dampening interface.

Platform N/A

Description

7.2 show dampening interface

Use this command to show the statistics of the dampening interface.

show dampening interface

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode/ global configuration mode/ interface configuration mode

Usage Guide N/A

Configuration Examples The following example displays the statistics of the dampening interface.

```
FS# show dampening interface
3 interfaces are configured with dampening.
No interface is being suppressed.
```

Related Commands

Command	Description
---------	-------------

dampening	Enables the IP event dampening function on the interface.
clear counters	Clears the interface counters.
show interface dampening	Displays details of IP event dampening configuration.

Platform N/A

Description

7.3 show interface dampening

Use this command to display the details of IP event dampening configuration.

show interface [*interface-id*] **dampening**

Parameter Description

Parameter	Description
<i>interface-id</i>	Interface name

Defaults N/A

Command mode Privileged EXEC mode/ global configuration mode/ interface configuration mode

Usage Guide If the interface-id is specified, only the dampening information of this specified interface is displayed.

Configuration Examples The following example shows the details of IP event dampening configuration.

```
FS# show interface dampening Ethernet1/0
Flaps  Penalty  Supp ReuseTm HalfL ReuseV SuppV MaxSTm MaxP Restart
0      0         FALSE 0      5    1000 2000 20    16000 0
```

Domain	Description
Flaps	Interface flapping times.
Penalty	The current penalty value on the interface.
Supp	Suppressed or not.
ReuseTm	Time to unsuppress the interface, in seconds.
HalfL	Half-life period, in seconds.
ReuseV	Unsuppressed threshold.
SuppV	Start suppression threshold.
MaxSTm	Maximum suppression time.
MaxP	Maximum penalty value.
Restart	The initial penalty value on the interface.

Related Commands

Command	Description
---------	-------------

dampening	Enables the IP event dampening function.
clear counters	Clears the interface counters.
show dampening interface	Displays statistics of the dampening interface.

Platform N/A

Description

8 RNS &Track Commands

8.1 delay

Use this command to specify a period of time after which the tracked object status will change if the interface status changes.

delay { **up** *seconds* [**down** *seconds*] | [**up** *seconds*] **down** *seconds* }

Parameter Description	Parameter	Description
	<i>seconds</i>	Sets the delay time. The unit is second.

Defaults There is no delay by default.

Command Mode Track configuration mode

Usage Guide The continual oscillation of the tracked object status may cause the client of this tracked object changing also. This command can be used to delay advertising the change of the tracked object status. For example, the status of a tracked object changes from up to down, if the delay down 180 is configured, the down status will be advertised after 180 seconds. If the tracked object status changes to the up again in this period, it won't be advertised. For the client of the tracked object, the status of the tracked object is always up.

Configuration Examples The following example sets the delay time to 30 seconds when the tracked object changes to up from down.

```
FS(config)# track 5 rns 10
FS(config-track)# delay up 30
FS(config-track)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.2 dns

Use this command to set an IP RNS object to send the DNS packets and to enter the IP RNS DNS mode.

dns { **oob** *destination-hostname* **name-server** *a.b.c.d* }

Parameter Description	Parameter	Description
	oob	Enables management port detection.
	<i>destination-hostname</i>	Sets the destination IP address or the destination host domain name.

<i>a.b.c.d</i>	Sets the IP address for the DNS server.
----------------	---

Defaults N/A

Command Mode IP RNS configuration mode

Usage Guide Use this command to set an IP RNS object to send the DNS packets and to enter the IP RNS DNS mode. If you want to change the probe type, you should delete the probe first by using the **no ip rns** command and then perform new configuration.

Configuration Examples FS(config-ip-rns)# dns www.FS.com.cn name-server 61.154.22.41

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.3 frequency

Use this command to set the interval of sending the packets, which must be no smaller than the timeout time. Use the **no** form of this command to restore the default setting.

frequency *milliseconds*
no frequency

Parameter Description	Parameter	Description
	<i>milliseconds</i>	Sets the interval of sending the packets, in the range from 10 to 604800000 in the unit of milliseconds.

Defaults The default is 60 seconds.

Command Mode IP RNS ICMP echo configuration mode
 IP RNS DNS configuration mode
 IP RNS UDP echo configuration mode

Usage Guide Use this command to set the interval of sending the ICMP echo or DNS packets, which must be more than or equal to the timeout time configured. It is recommended not to set this value too small, which may put great pressure to the CPU.

Configuration The following example configures an ICMP echo probe whose destination address is 192.168.21.1. The frequency,

Examples timeout time and threshold are set to 30000, 8000 and 6000 milliseconds respectively.

```
FS(config)# ip rns 1
FS(config-ip-rns)#icmp-echo 192.168.21.1
FS(config-ip-rns-icmp-echo)#frequency 30000
FS(config-ip-rns-icmp-echo)#timeout 8000
FS(config-ip-rns-icmp-echo)#threshold 6000
```

Related Commands	Command	Description
	timeout	Defines the timeout time of sending the packets.

Platform N/A

Description

8.4 icmp-echo

Use this command to configure an ICMP echo RNS probe.

```
icmp-echo { oob { destination-ip-address | destination-hostname [ name-server ip-address ] } [ source-ipaddr ip-address ] via type num next-hop ip-address } | { { destination-ip-address | destination-hostname [ name-server ip-address ] } [ source-ipaddr ip-address ] [ out-interface type num [ next-hop A.B.C.D ] ] }
```

Parameter Description	Parameter	Description
	oob	Enables management port detection.
	<i>destination-hostname</i>	Sets the destination IP address for the ICMP echo packets.
	<i>destination-hostname</i>	Sets the destination host name within 127 characters. The exceeding characters are truncated automatically.
	name-server <i>ip-address</i>	Sets the domain name server. The default domain name server is configured via the ip name-server command.
	source-ipaddr <i>ip-address</i>	Sets the source IP address for the ICMP echo packets.
	source-interface	Sets the source interface for the ICMP echo packets.
	out-interface <i>type num</i>	Sets the outgoing port for the probe packet.
	via <i>type num</i>	Specifies the management port as the egress interface (non-management port) for probe packets.
	next-hop <i>A.B.C.D</i>	Sets the next hop IP address.

Defaults N/A

Command Mode IP RNS configuration mode

Usage Guide This command is used to enable the IP RNS object to send ICMP echo packets containing the specified destination IP address. The default payload size of an ICMP echo packet is 36 bytes. The **request-data-size** command is used to modify the packet size.

You can modify the probe parameter after specifying the type of the IP RNS probe (such as ICMP echo probe). If you want to change the probe type, you should delete the probe first by using the **no ip rns** command and then perform new configuration.

Configuration Examples The following example enables the IP RNS object to send the ICMP echo packets containing the destination IP address 10.1.1.1.

```
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# exit
FS(config)# ip rns schedule 1 start-time now life forever
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.5 ip rns

Use this command to define an IP RNS operation object and to enter the ip-rns configuration mode. Use the **no** form of this command to delete an IP RNS operation object.

ip rns *operation-number*
no ip rns *operation-number*

Parameter Description	Parameter	Description
	<i>operation-number</i>	Sets the IP RNS operation object number, in the range from 1 to 500.

Defaults N/A

Command Mode Global configuration mode

Usage Guide Use this command to define an IP RNS operation object and to enter the IP DNS configuration mode.

Configuration Examples The following example defines the IP RNS object 1.

```
FS(config)# ip rns 1
```

Related Commands	Command	Description
	show ip rns statistics	Displays the statistical data on the IP RNS object.

Platform N/A

Description

8.6 ip rns reaction-configuration

Use this command to configure proactive threshold monitoring and trigger for the RNS probe. Use the no form of this command to restore the default setting.

```
ip rns reaction-configuration operation-number react monitored-element [ action-type option ] [ threshold-type { average [ number-of-measurements ] | consecutive [ occurrences ] | immediate | never | xofy [ x-value y-value ] } ] [ threshold-value upper-threshold lower-threshold ]
no ip rns reaction-configuration operation-number [ react monitored-element ]
```

Parameter Description

Parameter	Description
operation-number	Operation index, in the range from 1 to 500.
monitored-element	Monitored element. The available parameters are listed as follows: <ul style="list-style-type: none"> ● allfail: Failed to monitor all elements. The default action-type is track. This parameter is applied on the track module for communication. ● rtt: Packet round trip time (RTT) exceeds the threshold range. ● timeout: Timeout in whatever direction.
action-type option	The available parameters include: <ul style="list-style-type: none"> ● none: No action, which is the default setting ● trigger: Only supports the trigger action. ● track: Only supports the track action. Only when <i>monitored-element</i> is allfail is this parameter supported, which is available exclusively.
average [number-of-measurements]	Triggers operation when the average value of number-of-measurements consecutive times exceeds the threshold range. For example, number-of-measurements is set to three. Upper and lower thresholds are 5000 and 4000 respectively. The average value for three consecutive measurement 6000, 6000, 5000 is $(6000+6000+5000)/3=5667$, exceeding the upper threshold 5000. The valid range is from 1 to 16 and the default is 5,
consecutive [occurrences]	Triggers operation when the value of monitored element exceeds the threshold range for <i>occurrences</i> consecutive times. The valid range is from 1 to 16. The default is 5.
immediate	Triggers operation immediately when the value of monitored element exceeds the threshold range.
never	Never triggers operation.
xofy [x-value y-value]	X probes among the latest Y ones exceed the threshold range. The valid X range is from 1 to 16 and the default is 5. The valid Y range is from 1 to 16 and the default is 5.
threshold-value	Configures upper and lower thresholds.

upper-threshold	When <i>monitored-element</i> is rtt , this parameter indicates time, in the range from 0 to 60000 milliseconds. See Usage Guide for the default setting. When react type is timeout, you don't need to configure this parameter.
lower-threshold	

Defaults N/A

Command Global configuration mode

Mode

Usage Guide One RNS object can be configured with multiple threshold monitoring, each for one element. Monitored elements that are supported vary with different probe types.

monitored-element	icmp-echo	dns	udp-echo
timeout			
rtt			

The default thresholds for monitored elements are listed as follows:

Monitored Element	Upper Threshold	Lower Threshold
timeout	-	-
rtt	5000 ms	0 ms

Configuration The following example configures RNS1 and its threshold monitoring.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 192.168.23.1
FS(config-ip-rns-icmp-echo)# exit
FS(config)# ip rns schedule 1 start-time now life forever
FS(config)#ip rns reaction-configuration 1 react timeout threshold-type immediate action-type triggerOnly
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.7 ip rns reaction-trigger

Use this command to enable the RNS probe which exceeds the monitoring threshold to trigger another RNS probe which is in the pending state. Use the **no** form of this command to restore the default setting.

ip rns reaction-trigger *operation-number target-operation*
no ip rns reaction-trigger *operation-number target-operation*

Parameter Description	Parameter	Description
	<i>operation-number</i>	The source operation number, in the range from 1 to 500
	<i>target-operation</i>	The target operation number, in the range from 1 to 500

Defaults N/A

Command Mode Global configuration mode

Usage Guide The trigger function is applied in network fault diagnosis scenario

Configuration The following example enables IP RNS1 to trigger IP RNS 2.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo www.baidu.com
FS(config-ip-rns-icmp-echo)# exit
FS(config)#ip rns schedule 1 start-time now life forever
FS(config)#ip rns reaction-configuration 1 react timeout threshold-type immediate action-type trigger
FS(config)# ip rns 2
FS(config-ip-rns)# dns www.baidu.com name-server 8.8.8.8
FS(config-ip-rns-dns)# exit
FS(config)#ip rns reaction-trigger 1 2
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

8.8 ip rns reset

Use this command to clear all RNS configuration.

ip rns reset

Parameter Description

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to clear all RNS configuration. This command is used only in extreme cases (for example, RNS probe configuration is wrong).

Configuration The following example clears all IP RNS configuration.

Examples `FS(config)# ip rns reset`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.9 ip rns restart

Use this command to restart the RNS probe.

ip rns restart *operation-number*

Parameter Description	Parameter	Description
		<i>operation-number</i>

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to restart the RNS probe whose schedule is in the pending state. This command is invalid for the RNS probe not configured with the scheduling policy.

Configuration Examples The following example restarts IP RNS 1.

`FS(config)# ip rns restart 1`

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.10 ip rns schedule

Use this command to configure the scheduling strategy for the RNS probe. Use the **no** form of this command to restore the default setting.

ip rns schedule *operation-number* [**life** { **forever** | seconds }] [**start-time** { hh:mm [:ss] [month day | day month] | **pending** | **now** | **after** hh:mm:ss }] [**recurring**]

no ip rns schedule *operation-number*

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
operation-number	RNS operation index, in the range from 1 to 500
life forever	The RNS operation is valid forever.
life seconds	The RNS survival time, measured in seconds
hh:mm [:ss]	Defines the time when the operation starts,
month	The month when the operation starts, in the range from January (Jan.) to December (Dec.). The default is the current month.
day	The day when the operation starts, in the range from 1 to 31. The default is the current day.
pending	The start time is pending.
now	The operation starts right now.
after hh:mm:ss	The operation starts after hh hours, mm minutes and ss seconds.
recurring	The operation starts automatically as scheduled every day.

Defaults The RNS probe is in the pending state by default. In other words, the probe is not performed unless it is triggered by another RNS probe.

Command Global configuration mode

Mode

Usage Guide The **ip rns schedule** command is used to configure the IP RNS probe with scheduling policy. Once the scheduling policy is configured, the RNS probe cannot be modified. You can modify the RNS probe after deleting the schedule with the **no ip rns schedule** command,
 Life {seconds} refers to the survival time of the IP RNS probe. The probe will end after the survival time.

Configuration The following example configures the RNS probe with scheduling policy.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# exit
FS(config)# ip rns schedule 1 start-time now life forever

Once the scheduling policy is configured, the RNS probe cannot be modified. The RNS probe can be modified after the schedule is deleted.

FS(config)# ip rns 1
Entry already running and cannot be modified
    (only can delete (no) and start over)
    (check to see if the probe has finished exiting)

FS(config)# no ip rns schedule 1
FS(config)# ip rns 1
FS(config-ip-rns-icmp-echo)# exit
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.11 object

Use this command to add a tracked object to the object track list. Use the **no** form of this command to restore the default setting.

object *object-number* [**not**]

no object *object-number*

Parameter Description	Parameter	Description
	<i>object-number</i>	Tracked object number, in the range from 1 to 700

Defaults No tracked object is configured by default.

Command Track configuration mode

Mode

Usage Guide This command is used to add a tracked object to the object track list. The number of tracked objects is only restricted by the track list capacity.

object object-number: The tracked object must be in the up state for the track list to be in the up state.

object object-number not: track: The tracked object must be in the up state for the track list to be in the up state,

- This command is configured only in track configuration mode for the track list.
- The object cannot track itself.
- The objects cannot track each other. For example, if A tracks B, B cannot track A. Otherwise, both A and B are in oscillation.

Configuration Examples The following example adds tracked object 4 to the object track list. When object 1 is in the up state, 2 down, 3 up, object 4 is in the up state.

```
FS(config)# track 4 list boolean and
FS(config-track)# object 1
FS(config-track)# object 2 not
FS(config-track)# object 3
FS(config-track)# end
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.12 request-data-size

Use the following example to set the protocol payload size of RNS probe packet. Use the **no** form of this command to restore the default setting.

request-data-size *bytes*

no request-data-size

Parameter Description	Parameter	Description
	<i>bytes</i>	The number of payload bytes. The minimum/maximum number of bytes varies with the probe type.

Defaults The default is the minimum payload byte, which varies with the probe type.

Command IP RNS ICMP echo configuration mode

Mode IP RNS UDP echo configuration mode

Usage Guide This command is used to fill bytes in the probe packet to probe for the bigger packet.

Probe Type	Range	Default
icmp-echo	[36, 1472]	36
Udp-echo	[36, 1472]	36

Configuration The following example sets the protocol payload size of the IP RNS probe packet to 50.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# request-data-size 50
FS(config-ip-rns-icmp-echo)# exit
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.13 show ip rns configuration

Use this command to display the RNS instance configuration.

show ip rns configuration [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	Sets the RNS instance number, in the range from 1 to 500.

Command Privileged EXEC mode
Mode

Usage Guide This command is used to display the RNS instance configuration. The configuration varies with different packet types.

Configuration The following example displays the RNS 1 configuration.

Examples

```
FS# show ip rns configuration 1
Entry number: 1
Tag: FS555
Type of operation to perform: icmp-echo
Operation timeout (milliseconds): 5000
Operation frequency (milliseconds): 10000
Threshold (milliseconds): 5000
Recurring (Starting Everyday): FALSE
Life (seconds): 3500
Next Scheduled Start Time:Start Time already passed
Target address/Source address: 2.2.2.3/0.0.0.0
Request size (ARR data portion): 36
```

Field	Description
Entry number	IP RNS operation index
Tag	Instance tag.
Type of operation to perform	Operation type.
Operation timeout (milliseconds)	Operation timeout.
Operation frequency (milliseconds)	Operation frequency.
Threshold (milliseconds)	Threshold.
Recurring (Starting Everyday)	The operation starts every day.
Life (seconds)	Life time
Next Scheduled Start Time	Next scheduled start time.
Target address/Source address	Target address/Source address
Request size (ARR data portion)	Request packet size.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

8.14 show ip rns collection-statistics

Use this command to display statistics about the RNS probe.

show ip rns collection-statistics [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	Sets the IP RNS operation object number, in the range from 1 to 500. The default is all IP RNS operation objects.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display statistics about an IP RNS probe.

Configuration Examples The following example displays statistics about the all RNS probes.

```

FS#show ip rns collection-statistics 1
Entry number: 1
Start Time Index: *2014-03-20 19:53:51
Number of successful operations: 919
Number of operations over threshold: 0
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 2
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 2
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
RTT Values:
RTTAvg: 18      RTTMin: 16      RTTMax: 37
NumOfRTT: 919  RTTSum: 16654  RTTSum2: 302786
    
```

Field	Description
Entry number	RNS operation index
Start Time Index:	Schedule start time
Number of successful operations:	Number of successful operation.
Number of operations over threshold:	Number of threshold violation
Number of failed operations due to a Disconnect:	Number of operation failure due to disconnection
Number of failed operations due to a Timeout:	Number of operation failure due to timeout
Number of failed operations due to a Busy:	Number of operation failure since the peer end is busy
Number of failed operations due to a No Connection:	Number of operation failure due to no connection
Number of failed operations due to an Internal Error:	Number of operation failure due to internal error
Number of failed operations due to a Sequence Error:	Number of operation failure due to sequence error
Number of failed operations due to a Verify Error:	Number of operation failure due to verification error
RTT Values	RTT value
RTTAvg:	Average RTT value
RTTMin:	Minimum RTT value

RTTMax:	Maximum RTT value
NumOfRTT:	Number of counting RTT value
RTTSum:	Sum of RTT value
RTTSum2:	Sum of squares of RTT value

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.15 show ip rns operational-state

Use this command to display operational state.

show ip rns operational-state [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	Sets the RNS operation object number, in the range from 1 to 500. The default is all RNS operation objects.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the state information about an RNS probe.

Configuration Examples The following example displays the state information about all RNS probes.

```
FS# show ip rns operational-state
Entry number: 1
Modification time: *2014-01-10 10:26:14
Current seconds left in Life: Forever
Operational state of entry: Active
Number of Octets Used by this Entry: 2272
Number of operations attempted: 232
Number of operations skipped: 0
Connection loss occurred: FALSE
Timeout occurred: FALSE
Over thresholds occurred: FALSE
Latest RTT (milliseconds): 4
Latest operation start time: 2014-01-10 10:26:55
Latest operation return code: OK
```

Field	Description
Entry number	RNS operation index
Modification time	Probe result recounting time (every time schedule is enabled, the result is counted again).
Number of Octets Used by this Entry	Number of octets contained in the probe packet.
Number of operations attempted	Number of attempted operation.
Number of operations skipped	Number of failed operation.
Current seconds left in Life	Probes for the left life.
Operational state of entry	Probes for the operational state (Active/Disactive).
Connection loss occurred	Connection loss occurred.
Timeout occurred	Send request timeout occurred,
Over thresholds occurred	Threshold violation occurred.
Latest RTT (milliseconds)	Latest RTT.
Latest operation start time	Latest operation start time.
Latest operation return code	Latest operation return code.

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.16 show ip rns reaction-configuration

Use this command to display the proactive threshold monitoring information of an RNS probe.

show ip rns reaction-trigger [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the proactive threshold monitoring information of an RNS probe.

Configuration Examples The following example displays the proactive threshold monitoring information of all RNS probes.

```
FS#show ip rns reaction-configuration
Entry number: 1
Reaction: rtt
```

Threshold Type: Never
 Rising (milliseconds): 5000
 Falling (milliseconds): 3000
 Threshold Count: 5
 Threshold Count2: 5
 Action Type: trigger
 Reaction: timeout
 Threshold Type: Never
 Threshold Count: 5
 Threshold Count2: 5
 Action Type: trigger

Field	Description
Entry number	IP RNS operation index
Reaction	Monitored object
Threshold Type	The available parameters are listed as follows: never: Never triggers operation. consecutive: Triggers operation when the value of monitored element exceeds the threshold range for <i>occurrences</i> consecutive times. average: Triggers operation when the average value of <i>number-of-measurements</i> consecutive times exceeds the threshold range. immediate: Triggers operation immediately when the value of monitored element exceeds the threshold range. xofy: X probes among the latest Y ones exceed the threshold range.
Rising (milliseconds)	Upper threshold
Falling (milliseconds)	Lower threshold
Threshold Count	The parameter refers to the x value when the threshold-type is xofy or the average count when the threshold-type is average .
Threshold Count2	The parameter refers to the y value when the threshold-type is xofy or the consecutive count when the threshold-type is consecutive .
Action Type	Action type

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

8.17 show ip rns reaction-trigger

Use this command to display the reaction trigger information for all RNS objects.

show ip rns reaction-trigger [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	The number of IP RNS operation object, in the range from 1 to 500. The default is all RNS operation objects.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the reaction trigger information for all RNS objects.

Configuration Examples The following example displays the reaction trigger information for all RNS objects.

```
FS#show ip rns reaction-trigger
Entry number: 1
Target rns index: 2
Status of Entry (SNMP RowStatus): active
Operational State: pending
```

Field	Description
Entry number	RNS index
Target rns index	Target RNS index
Status of Entry (SNMP RowStatus)	Status of RNS entry
Operational State	Reaction-trigger state

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.18 show ip rns statistics

Use this command to display the RNS object statistics.

show ip rns statistics [*operation-number*]

Parameter Description	Parameter	Description
	<i>operation-number</i>	Sets the IP RNS operation object number, in the range from 1 to 500

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide The statistics vary with different packet types.

Configuration The following example displays the RNS object statistics.

Examples

```
FS#show ip rns statistics 1
Round trip time(RTT) Index 1
Operation time to live: Forever
Latest RTT: 1 ms
Latest operation start time: 2014-01-20 10:21:38
Latest operation return code: OK
Number of successes: 386
Number of failures: 12
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.19 show track

Use this command to display statistics of the tracked object.

show track [*track-number*]

Parameter Description	Parameter	Description
	<i>track-number</i>	

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration The following example displays statistics of all tracked objects.

Examples

```
FS#show track
```

```

Track 1
  Reliable Network Service 5
  The state is Up
    1 change, current state last: 120 secs
  Delay up 30 secs, down 50 secs
Track 3
  Interface FastEthernet 1/0
  The state is Down, delayed Up (5 secs remaining)
    3 change, current state last: 300 secs
  Delay up 60 secs, down 60 secs
Track 4
  List boolean and
  Object 1
  Object 2 not
  The state is Up
    1 change, current state last: 100 secs
  Delay up 0 secs, down 0 secs
    
```

Field	Description
Track x	Tracked object ID
Reliable Network Service x	Tracked RNS object
The state is x	Tracked object state
x change	Tracked object change count
current state last: x secs	The time for which the current state lasts
Delay up x secs, down x secs	The delay state of the tracked object
Interface x x	Tracked interface
The state is x, delayed y (c secs remaining)	The tracked object state is x, and will turn to y in c seconds.
List boolean and	The Boolean expression enables calculation by using "and" operator.
Object x	Object x is in the up state.
Object x not	Object x is in the down state.

Related Commands

Command	Description
N/A	N/A

Platform N/A
Description

8.20 show track client

Use this command to display the track client statistics.

show track client

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command is used to display the statistics of the client connecting to track.

Configuration Examples The following example displays the statistics of the client connecting to track.

```
FS# show track client
Track client 2: socket 4
client_path: /tmp/vsd/0/track/.client_nsm
Connection time: Fri Dec 28 17:04:43 2012
```

Field	Description
Track client x: socket x	Track client number and socket
client_path: /tmp/vsd/0/track/.client_nsm	The path from the client to track
Connection time: xx xx xx xx:xx:xx xx	The time when the client connects to track

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

8.21 tag

Use this command to set the tag for IP RNS probe. Use the **no** form of this command to restore the default setting.

tag text

no tag

Parameter Description	Parameter	Description
	<i>text</i>	Sets the tag for IP RNS probe, which is composed of up to 79 printable characters.

Defaults N/A

Command Mode IP RNS DNS configuration mode
IP RNS ICMP echo configuration mode

IP RNS UDP echo configuration mode

Usage Guide Tag is used to identify the probe. When the tag exceeds 79 characters, the surplus characters are truncated.

Configuration The following example sets the tag for IP RNS probe to telecom gateway.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# tag telecom_gateway
FS(config-ip-rns-icmp-echo)# exit
    
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

8.22 threshold

Use this command to configure the upper threshold value for RNS probe. Use the **no** form of this command to restore the default setting.

threshold *milliseconds*

no threshold

Parameter Description

Parameter	Description
<i>milliseconds</i>	Sets the upper threshold value, in the range from 0 to 60000 in the unit of milliseconds.

Defaults The default is 5000 milliseconds.

Command Mode IP RNS DNS configuration mode
 IP RNS ICMP echo configuration mode
 IP RNS P echo configuration mode

Usage Guide The threshold value must be no greater than the timeout value. See **Usage Guide** of the **frequency** command for the relationship among timeout, frequency and threshold.

Configuration The following example sets the upper threshold value for RNS probe to 8000 milliseconds.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# threshold 8000
FS(config-ip-rns-icmp-echo)# exit
    
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.23 timeout

Use this command to set the timeout time of an RNS probe.
 Use the **no** form of this command to restore the default setting.

timeout *milliseconds*
no timeout

Parameter Description	Parameter	Description
	<i>milliseconds</i>	Sets the timeout time, in the range from 10 to 604800000 in the unit of milliseconds. The default is 5000 milliseconds.

Defaults The default timeout of an IP RNS probe varies with the detection type, which can be displayed by using **show ip rns configuration** command.

Command IP RNS ICMP echo configuration mode
Mode IP RNS DNS configuration mode
 IP RNS configuration mode

Usage Guide The timeout value must be no smaller than the threshold value. See **Usage Guide** of the **frequency** command for the relationship among timeout, frequency and threshold.

Configuration The following example sets the timeout time of an IP RNS probe to 10000 milliseconds.

```

Examples
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# timeout 10000
FS(config-ip-rns-icmp-echo)# exit
    
```

Related Commands	Command	Description
	frequency <i>milliseconds</i>	Sets the interval of sending the packets.

Platform N/A
Description

8.24 tos

Use this command to set the Type of Service (ToS) field in the IPv4 header of an RNS probe packet. Use the **no**

form of this command to restore the default setting.

tos *number*

no tos

Parameter Description	Parameter	Description
	<i>number</i>	Sets the ToS field in the IPv4 header of an IP RNS probe packet, in the range from 0 to 255.

Defaults The default is 0.

Command IP RNS DNS configuration mode

Mode IP RNS ICMP echo configuration mode

Usage Guide ToS is an 8-bit field of an IPv4 packet. ToS can be used to set probe packet priority. Different ToS corresponds to different priority.

Configuration The following example sets the ToS field in the IPv4 header of an RNS probe packet to 128.

Examples

```
FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 10.1.1.1
FS(config-ip-rns-icmp-echo)# tos 128
FS(config-ip-rns-icmp-echo)# exit
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

8.25 track interface line-protocol

Use this command to configure a tracked object to track the interface status and enter the track mode. The **no** form of this command is used to delete a tracked object.

track *object-number* **interface** *type number* **line-protocol**

no track *object-number*

Parameter Description	Parameter	Description
	<i>object-number</i>	Sets the tracked object number, in the range of 1-700.
	<i>type number</i>	Sets the interface type and the interface number.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure a tracked object to track the link state of the interface. If the link state of the interface is up, the state of the corresponding tracked object is up too.

Configuration Examples The following example configures the object "track 3" to track the link state of ethernet 0/1.

```
FS(config)# track 3 interface ethernet 0/1 line-protocol
```

Related Commands

Command	Description
track rns	Configures a tracked object to track the operating status of an rns object.
show track	Displays the tracked object related information.

Platform N/A

Description

8.26 track list

Use this command to configure a tracked list object and specify the state of the tracked list based on a Boolean calculation. Use the **no** form of this command to restore the default setting.

track object-number list boolean { and | or }

no track object-number

Parameter Description

Parameter	Description
<i>object-number</i>	Sets the number of the tracked object, in the range from 1 to 700.

Defaults N/A

Command Mode Global configuration mode

Usage Guide This command is used to configure a tracked list object and specify the state of the tracked list based on a Boolean calculation

- **track object-number list boolean and:** Configure a tracked list with a Boolean expression using "AND" operator.
- **track object-number list boolean or:** Configure a tracked list with a Boolean expression using "OR" operator.

Configuration Examples The following example configures tracked list object "4" and specifies the state of the tracked list based on a Boolean calculation using operator "AND".

```
FS(config)# track 4 list boolean and
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

8.27 track rns

Use this command to configure a tracked object to track the operating status of an RNS object and enter the track mode. The **no** form of this command is used to delete a tracked object.

track *object-number* **rns** *entry-number*

no track *object-number*

Parameter Description	Parameter	Description
	<i>object-number</i>	Sets the tracked object number, in the range from 1 to 700.
	<i>entry-number</i>	Sets the RNS object number, in the range from 1 to 500.

Defaults N/A

Command Mode Global configuration mode

Usage Guide The RNS object status is determined by whether the response packets are received. If so, the RNS object status is up and the status of the corresponding tracked object that tracks this RNS is also up.

Configuration Examples The following example configures the object "track 5" to track the RNS instance "rns 7".

```
FS(config)# track 123 rns 1
```

Related Commands	Command	Description
	track interface line-protocol	Tracks the status of one interface and enter the track mode.
	show track [<i>track-number</i>]	Displays the tracked object related information.

Platform N/A
Description

8.28 vrf

Use this command to set the VRF where the RNS probe resides.

Use the **no** form of this command to restore the default setting.

vrf *vrf-name*

no vrf

Parameter Description	Parameter	Description
	<i>vrf-name</i>	Sets the VRF name.

Defaults N/A

Command IP RNS ICMP echo configuration mode

Mode IP RNS DNS configuration mode

Usage Guide N/A

Configuration The following example sets the VRF where the RNS probe resides to VPN1.

Examples

```

FS(config)# ip rns 1
FS(config-ip-rns)# icmp-echo 192.168.23.1
FS(config-ip-rns-icmp-echo)# vrf VPN1
FS(config-ip-rns-icmp-echo)# exit
FS(config)# ip rns schedule 1 start-time now life forever
    
```

Related Commands	Command	Description
	frequency <i>milliseconds</i>	Sets the interval of sending the packets.

Platform N/A

Description

9 PCAP Commands

9.1 packet capture file

Use this command to specify the name of the file to be saved.

packet capture file *filename* [**buffer-size** *buf-size*] [**packet-num** *pkt-num*] [**timeout** *timeout*]

Use this command to clear configurations for file saving and restore the configurations for outputting logs.

clear packet capture file

Parameter Description	Parameter	Description
	<i>filename</i>	Name of the file to be saved
	<i>buf-size</i>	Buffer size. The buffer size is 2 MB by default if this field is not specified. Packet capture automatically stops when the buffer is full.
	<i>pkt-num</i>	Number of captured packets. Packet capture automatically stops when the number of captured packets reaches the specified value. The packet capture will continue by default unless otherwise specified.
	<i>timeout</i>	Indicates packet capture timeout. Packet capture automatically stops when the time of captured packets reaches the specified number. The default packet capture time is 10 minutes unless otherwise specified. The longest continually packet capture time is 120 minutes.

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Example The following example sets the name of the file to be saved to **capture.pcap**, and sets the number of captured packets to 100.

```
FS# packet capture file flash:capture.pcap packet-num 100
```

Verification Run the **show packet capture status** command to check whether the configuration succeeds.

9.2 packet capture point

Use this command to create capture points.

packet capture point *capture-point-name* **rule** *rule-name* **location** {**interface** *interface-name* | **control-plane**} {**in** | **out** | **both**}

Use this command to clear capture points.

clear packet capture point *capture-point-name*

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

<i>capture-point-name</i>	Name of a capture point
<i>rule-name</i>	Name of matching rule, which is defined by using the packet capture rule command
<i>interface-name</i>	Name of the interface for capturing packets
control-plane	Packet capture on the control plane
in out both	Packet capture direction: inbound, outbound, or bidirectional.

Defaults N/A

Command Privileged EXEC mode

Mode

Usage Guide Users can define multiple capture points (a maximum of 8 capture points are supported currently) at the same location as required, to match different capture rules or packet directions. The capture points can work simultaneously without affecting each other.
Please do not create a capture point on the forwarding plane.

Configuration The following example creates a capture point for capturing CPU packets on the Gi0/1 interface.

Example FS# packet capture point cap-1 rule tcp location interface gi0/1 both

Verification Run the **show packet capture status** command to check whether the configuration succeeds.

9.3 packet capture rule

9.3.1 Control Plane

Use this command to define a capture matching rule.

```
packet capture rule rule-name filter [src-mac smac] [dst-mac dmac] [etype type | ip | arp] [ipv4_sip sip sip-mask] [ipv4_dip dip dip-mask] [ipv6_sip sipv6 sipv6-prefix] [ipv6_dip dipv6 dipv6-prefix] [v6_protocol protocol | tcp | udp] [ipv6_sport sport] [ipv6_dport dport] [v4_protocol protocol | tcp | udp] [ipv4_sport sport] [ipv4_dport dport]
```

Use this command to clear a capture matching rule.

```
clear packet capture rule rule-name
```

Parameter Description

Parameter	Description
<i>rule-name</i>	Name of a matching rule
<i>smac</i>	Source MAC address
<i>dmac</i>	Destination MAC address
<i>type ip arp</i>	Layer-2 protocol type
<i>sip</i>	Source IP address
<i>sip-mask</i>	Source IP mask
<i>dip</i>	Destination IP address
<i>dip-mask</i>	Destination IP mask

<i>sipv6</i>	Source IPv6 address
<i>sipv6-prefix</i>	Source IPv6 prefix
<i>dipv6</i>	Destination IPv6 address
<i>dipv6-prefix</i>	Destination IPv6 prefix
<i>protocol</i> tcp udp	Layer-3 protocol type
<i>sport</i>	TCP/UDP source port
<i>dport</i>	TCP/UDP destination port

Command Mode Privileged EXEC mode

- Usage Guide**
- Users can define multiple rules for packet capture and differentiate them by different names. After a rule is defined, the rule needs to be referenced by the capture point to actually take effect.
 - Before deleting the capture rule, all capture points referencing the rule need to be deleted.

Configuration The following example defines a TCP capture matching rule.

Example FS# packet capture rule tcp etype ip protocol tcp

Verification Run the **show packet capture status** command to check whether the configuration succeeds.

9.3.2 Forwarding Plane

Use this command to define a capture matching rule.

packet capture rule *rule-name* **filter acl** *aclid* | *aclname* [**interface** *interface-name*]

Use this command to clear a capture matching rule.

clear packet capture rule *rule-name*

Parameter Description	Parameter	Description
	<i>rule-name</i>	Name of a matching rule.
	<i>aclid</i> <i>aclname</i>	ACL ID or name.
	<i>interface-name</i>	Name of an interface.

Command Mode Privileged EXEC mode

Usage Guide Users can define multiple rules for packet capture and differentiate them by different names.

Configuration The following example defines a capture matching rule.

Example FS#packet capture rule rule1 filter acl 100 interface tenGigabitEthernet 0/1

Verification Run the **show packet capture status** command to check whether the configuration succeeds.

9.4 packet capture start

Use this command to start capturing packets.

packet capture start

Use this command to stop capturing packets.

packet capture stop

Parameter Description	Parameter	Description
	start	Starts capturing packets.
	stop	Stops capturing packets.

Command Mode Privileged EXEC mode

- Usage Guide**
1. If the **packet capture stop** command is not entered after packet capture starts, the packet capture will automatically stop at the capture point when the number of captured packets reaches the specified number. If the packet capture stop condition is not met, run the **packet capture stop** command to immediately stop the packet capture.
 2. Use the packet capture start command to capture packets at all capture points simultaneously.

Configuration Example The following example starts capturing packet.

```
FS# packet capture start
```

Verification Run the **show packet capture status** command to check whether the configuration succeeds.

9.5 show packet capture status

Use this command to display the packet capture information.

show packet capture status

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to display the packet capture information.

Configuration Example N/A

The following example displays the packet capture information as follows:

```
FS#show packet capture status
```

```
Capture rules:
  Capture rules tcp:
    etype: 0x0800
    source MAC: 2222.2222.2222
    destination MAC: 1111.1111.1111
    protocol: 0x6
    source IP: 10.10.10.3
    destination IP: 10.10.10.10
    source port: 5
    destination port: 10
```

```
Capture points:
  Capture point controlplane:
    Capture rules: tcp
    location: control-plane
    direction: all
    status: stopped
    packets captured(in): 200
    packets captured(out): 200
```

```
Capture file:
  filename: /tmp/test.pcap
  buffer size: 2(MB)
  packets limit: 500
```

FS#

Field description:

Field	Description
Capture rule	Name of a capture rule
etype	Layer-2 protocol type
source MAC	Source MAC address
destination MAC	Destination MAC address
protocol	Layer-3 protocol type
source IP	Source IP address
destination IP	Destination IP address
source port	Source port
destination port	Destination port
Capture point	Name of a capture point
location	Location of a capture point
direction	Packet capture direction
buffer size	Buffer size
packets limit	Quantity limit of captured packets
filename	Name of an output file
status	Packet capture status
packets captured	Number of captured packets

N/A

10 HAM Commands

10.1 ham single-process-ha auto-restart enable

Use this command to enable the HA service of a process that restarts frequently. Use the **no** form of this command to disable the HA service of a process that restarts frequently. Use the **default** form of this command to restore the default configuration for the HA service of a process that restarts frequently.

ham single-process-ha auto-restart enable

no ham single-process-ha auto-restart enable

default ham single-process-ha auto-restart enable


Parameter	Parameter	Description
Description	default	Indicates that the HA service of a process that restarts frequently is enabled by default.

Defaults The HA service of a process that restarts frequently is enabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to enable the HA service of a process that restarts frequently. Before patches are used for an upgrade, you can disable the HA service of a single process that restarts frequently. After the patch-based upgrade is completed, confirm that no process restarts frequently and then enable the HA service of the process that restarts frequently.

 Disabling this HA service can lead to a longer failure time when a process frequently restarts. Therefore, you are not recommended to disable the configuration in scenarios other than patch-based upgrades.

Configuration Examples The following example disables the HA service of a process that restarts frequently.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# no ham single-process-ha auto-restart enable
FS(config)#
```

The following example enables the HA service of a process that restarts frequently.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# ham single-process-ha auto-restart enable
FS(config)#
```

Verification Run the **show running-config | include ham** command to check whether the HA service of a process that restarts frequently is enabled or disabled.


```
FS# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
FS(config)# no ham single-process-ha auto-restart enable
FS(config)# show running-config | include ham
no ham single-process-ha auto-restart enable
FS(config)# ham single-process-ha auto-restart enable
FS(config)# show running-config | include ham
FS(config)#
```

Chapter 9 Network Management Configuration Commands

1. SNMP Commands
2. RMON Commands
3. NTP Commands
4. SNTP Commands
5. SPAN-RSPAN Commands
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7. sFlow Commands
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1 SNMP Commands

1.1 no snmp-server

Use this command to disable the SNMP agent function.

no snmp-server

Parameter	Parameter	Description
Description	N/A	N/A

Defaults SNMP agent is enabled by default.

Command mode Global configuration mode.

Usage Guide This command disables the SNMP agent services of all versions supported on the device.

Configuration Examples The following example disables the SNMP agent.

```
FS(config)# no snmp-server
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.2 show snmp

Use this command to display the SNMP configuration.

show snmp [mib | user | view | group | host | process-mib-time]

Parameter	Parameter	Description
Description	mib	Displays the SNMP MIBs supported.
	user	Displays the SNMP user information.
	view	Displays the SNMP view information.
	group	Displays the SNMP user group information.
	host	Displays the explicit host configuration.
	process-mib-time	Displays the MIB node requiring the longest processing time.

Defaults N/A

Command mode Privileged EXEC mode.

Usage Guide N/A

Configuration The example below displays the SNMP configuration:

```

Examples
FS# show snmp
Chassis: 60FF60
0 SNMP packets input
    0 Bad SNMP version errors
    0 Unknown community name
    0 Illegal operation for community name supplied
    0 Encoding errors
    0 Number of requested variables
    0 Number of altered variables
    0 Get-request PDUs
    0 Get-next PDUs
    0 Set-request PDUs
0 SNMP packets output
    0 Too big errors (Maximum packet size 1472)
    0 No such name errors
    0 Bad values errors
    0 General errors
    0 Response PDUs
    0 Trap PDUs
SNMP global trap: disabled
SNMP logging: disabled
SNMP agent: enabled
    
```

Related Commands	Command	Description
		snmp-server chassis-id

Platform N/A

Description

1.3 snmp trap link-status

Use this command to enable the interface to send link traps. Use the **no** form of this command to disable the interface to send link traps.

snmp trap link-status

no snmp trap link-status

Parameter	Parameter	Description
-----------	-----------	-------------

Description	
N/A	N/A

Defaults Sending link traps on the interface is enabled by default. If the interface link status changes, SNMP link traps will be sent.

Command mode Interface configuration mode

Usage Guide This command can be configured on the Ethernet interface, aggregate ports and SVI interfaces.

Configuration Examples The following example disables the interface to send link traps.

```
FS(config)# interface gigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# no snmp trap link-status
```

The following example enables the interface to send link traps.

```
FS(config)# interface gigabitEthernet 1/1
FS(config-if-GigabitEthernet 1/1)# snmp trap link-status
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.4 snmp-server chassis-id

Use this command to specify the SNMP chassis ID. Use the **no** form of this command to restore the default chassis ID.

snmp-server chassis-id text
no snmp-server chassis-id

Parameter Description	Parameter	Description
	text	

Defaults The default is 60FF60.

Command mode Global configuration mode.

Usage Guide The SNMP chassis ID is generally the serial number of the device to facilitate identification. The SNMP chassis ID can be displayed through the **show snmp** command.

Configuration The following example specifies the SNMP chassis ID as 123456:

Examples `FS(config)# snmp-server chassis-id 123456`

Related Commands	Command	Description
	<code>show snmp</code>	Displays the SNMP configuration.

Platform N/A

Description

1.5 snmp-server community

Use this command to specify the SNMP community access string. Use the **no** form of this command to remove the SNMP community access string.

snmp-server community [0 | 7] string [**view** view-name] [[**ro** | **rw**] [**host** ipaddr] [**ipv6** ipv6-aclname] [aclnum] [aclname]

no snmp-server community [0 | 7] string

Parameter Description	Parameter	Description
	0	Indicates that the community string is in plaintext.
	7	Indicates that the community string is in ciphertext.
	string	Community string, which is the communication password between the NMS and the SNMP agent
	view-name	View name
	ro	Indicates that the NMS can only read the variables of the MIB.
	rw	Indicates that the NMS can read and write the variables of the MIB.
	aclnum	Access list number (1 to 199, and 1300 to 2699), which specifies the IPV4 addresses that are permitted to access the MIB.
	aclname	Access list name, which specifies the IPV4 addresses that are permitted to access the MIB.
	ipv6-aclname	IPv6 access list name, which specifies the IPV6 addresses that are permitted to access the MIB.
	ipaddr	Specifies the IP address of the NMS to access the MIB.

Defaults All communities are read only by default.

Command mode Global configuration mode.

Usage Guide This command is an essential command to enable the SNMP agent function, such as specifying the community attribute and IP addresses of NMS to access the MIB.

To disable the SNMP agent function, use the **no snmp-server** command.

Configuration The following example defines a SNMP community access string named public, which can be read-only.

Examples `FS(config)# snmp-server community public ro`

Related Commands	Command	Description
		<code>access-list</code>

Platform N/A

Description

1.6 snmp-server contact

Use this command to specify the system contact string. Use the **no** form of this command to remove the system contact string.

snmp-server contact text

no snmp-server contact

Parameter Description	Parameter	Description
		text

Defaults No system contact string is set by default.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example specifies the SNMP system contract i-net800@i-net.com.cn:

Examples `FS(config)# snmp-server contact i-net800@i-net.com.cn`

Related Commands	Command	Description
		<code>show snmp-server</code>
	<code>no snmp-server</code>	Disables the SNMP agent function.

Platform N/A

Description

1.7 snmp-server enable traps

Use this command to enable the SNMP agent to send the SNMP trap message to NMS. Use the **no** form of this command to disable the SNMP agent to send the SNMP trap message to NMS.

snmp-server enable traps [notification-type]

no snmp-server enable traps

Parameter Description	Parameter	Description
	notification-type	Specifies the type of trap messages. snmp: SNMP trap message bgp: BGP trap message. bridge: Bridge trap message. isis: ISIS trap message. mac-notification: MAC trap message. ospf: OSPF trap message. urpf: uRPF trap message. vrrp: VRRP trap message. web-auth: Web authentication trap message.

Defaults Sending trap message to the NMS is disabled by default.

Command mode Global configuration mode.

Usage Guide This command must be used together with the **snmp-server host** command to send the trap message. Specifying no trap type indicates all trap messages are sent.

Configuration Examples The following example enables the SNMP agent to send the SNMP trap message.

```
FS(config)# snmp-server enable traps snmp
FS(config)# snmp-server host 192.168.12.219 public snmp
```

Related Commands	Command	Description
	snmp-server host	Specifies the SNMP host to send the SNMP trap message.

Platform N/A

Description

1.8 snmp-server flow-control

Use this command to configure the SNMP flow control. Use the **no** form of this command to remove restore the default setting.

snmp-server flow-control pps [count]

no snmp-server flow-control pps

Parameter Description	Parameter	Description
	count	Indicates the number of SNMP requests processed per second, ranging from

	50 to 65,535.
--	---------------

Defaults The default count is 300.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example configures the number of SNMP requests processed per second to 200.

Examples FS(config)# snmp-server flow-control pps 200

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.9 snmp-server group

Use this command to configure a new SNMP group. Use the **no** form of this command to remove a specified SNMP group.

snmp-server group groupname { **v1** | **v2c** | **v3** { **auth** | **noauth** | **priv** } } [**read** readview] [**write** writeview] [**access** { [**ipv6** ipv6_aclname | aclnum | aclname }] }
no snmp-server group groupname { **v1** | **v2c** | **v3** { **auth** | **noauth** | **priv** } }

Parameter Description	Parameter	Description
	v1 v2c v3	Specifies the SNMP version
	auth	Specifies authentication of a packet without encrypting it. This applies to SNMPv3 only.
	noauth	Specifies no authentication a packet. This applies to SNMPv3 only.
	priv	Specifies authentication of a packet with encryption. This applies to SNMPv3 only.
	readview	Specifies a read-only view for the SNMP group. This view enables you to view only the contents of the agent.
	writeview	Specifies a write view for the SNMP group. This view enables you to enter data and configure the contents of the agent.
	aclnum	Access list number, which specifies the IPV4 addresses that are permitted to access the MIB.
	aclname	Name of the access list, which specifies the IPV4 addresses that are permitted to access the MIB.
	ipv6_aclname	Name of the IPv6 access list, which specifies the IPv6 addresses that are

	permitted to access the MIB.
--	------------------------------

Defaults No SNMP groups are configured by default.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example configures a new SNMP group.

Examples FS(config)# snmp-server group mib2user v3 priv read mib2

Related Commands	Command	Description
	show snmp group	Displays the SNMP group configuration.

Platform N/A

Description

1.10 snmp-server host

Use this command to specify the SNMP host (NMS) to send the trap message. Use the **no** form of this command to remove the specified SNMP host.

snmp-server host [**oob**] { host-addr | **ipv6** ipv6-addr | **domain** domain-name } [**vrf** vrfname] [**traps** | **informs**] [**version** { **1** | **2c** | **3** { **auth** | **noauth** | **priv** }] community-string [**udp-port** port-num] [**via** mgmt-name] [notification-type]

no snmp-server host [**oob**] { host-addr | **ipv6** ipv6-addr | **domain** domain-name } [**vrf** vrfname] [**traps** | **informs**] [**version** { **1** | **2c** | **3** { **auth** | **noauth** | **priv** }] community-string [**udp-port** port-num] [**via** mgmt-name]

Parameter Description	Parameter	Description
	oob	Indicates the out of band communication, that is, the trap messages are sent to the alarm server through the MGMT port. This option is available only when the device is equipped with the MGMT port.
	host-addr	SNMP host address
	ipv6-addr	SNMP host address(ipv6)
	domain-name	Domain name of the SNMP host
	vrfname	Set the name of vrf forwarding table
	trap informs	Enables the host to send the SNMP notification as traps or informs.
	version	SNMP version: V1, V2C or V3
	auth noauth priv	Security level of SNMPv3 users
	community-string	Community string or username (SNMPv3 version)
	port-num	Port of the SNMP host

via mgmt-name	Specifies the MGMT port.
notification-type	The type of the SNMP trap message, such as snmp . If no type of the SNMP trap message is specified, all types of the SNMP trap message will be included.

Defaults No SNMP host is specified by default.

Command mode Global configuration mode.

Usage Guide This command must be used together with the **snmp-server enable traps** command to send the SNMP trap messages to NMS.
Multiple SNMP hosts can be configured to receive the SNMP trap messages. One host can use different combinations of the types of the SNMP trap message, but the last configuration for the same host will overwrite the previous configurations. In other words, to send different SNMP trap messages to the same host, different combination of SNMP trap messages can be configured.
The **via** parameter can take effect only when the **oob** parameter is configured.
The **vrf** parameter cannot be used together with the **oob** parameter.

Configuration Examples The following example specifies an SNMP host to receive the SNMP event trap:

```
FS(config)# snmp-server host 192.168.12.219 public snmp
```

Related Commands	Command	Description
	snmp-server enable traps	Enables the SNMP agent to send the SNMP trap message.

Platform N/A

Description

1.11 snmp-server inform

Use this command to configure the resend times for inform requests and the inform request timeout. Use the **no** form of this command to restore the default settings.

snmp-server inform [**retries** retry-time | **timeout** time]

no snmp-server inform

Parameter Description	Parameter	Description
	retry-num	Specifies the resend times for inform requests, ranging from 0 to 255.
time	Specifies the inform request timeout, ranging from 0 to 21,474,836.	

Defaults The default retry-num is 3, and the default **timeout** time is 15 seconds.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example configures the resend times of inform requests to 5.

Examples `FS(config)# snmp-server inform retries 5`

The following example configures the inform request timeout to 20 seconds.

`FS(config)# snmp-server inform timeout 20`

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.12 snmp-server location

Use this command to set the system location string. Use the **no** form of this command to remove the system location string.

snmp-server location text

no snmp-server location

Parameter Description

Parameter	Description
text	String that describes the system location information.

Defaults No system location string is set by default.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example sets the system location information:

Examples `FS(config)# snmp-server location start-technology-city 4F of A Buliding`

Related Commands

Command	Description
snmp-server contact	Sets the system contact information.

Platform N/A

Description

1.13 snmp-server net-id

Use this command to configure the network element coding information of the device. Use the **no** form of this command to remove the network element coding information.

snmp-server net-id text

no snmp-server net-id

Parameter Description	Parameter	Description
	text	Configures the network element coding information of the device. The text length ranges from 1 to 255. The text is case-sensitive, and may contain spaces.

Defaults No network element coding information is configured by default.

Command mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example configures the network element coding text to FZ_CDMA_MSC1.

```
FS(config)# snmp-server net-id FZ_CDMA_MSC1
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.14 snmp-server packetsize

Use this command to specify the largest size of the SNMP packet. Use the **no** form of this command to restore the default value.

snmp-server packetsize byte-count

no snmp-server packetsize

Parameter Description	Parameter	Description
	byte-count	Packet size. The range is from 484 to 17,876 bytes

Defaults The default is 1,472 bytes.

Command mode Global configuration mode.

Usage Guide The following example specifies the largest size of SNMP packet as 1,492 bytes:

```
FS(config)# snmp-server packetsize 1492
```

Configuration Examples N/A

Related Commands

Command	Description
snmp-server queue-length	Specifies the length of the message queue for each SNMP trap host.

Platform N/A

Description

1.15 snmp-server queue-length

Use this command to specify the length of the message queue for each SNMP trap host. Use the **no** form of this command to restore the default value.

snmp-server queue-length length

no snmp-server queue-length

Parameter Description

Parameter	Description
length	Queue length. The range is from 1 to 1000.

Defaults The default is 10.

Command mode Global configuration mode.

Usage Guide Use this command to adjust the length of message queue for each SNMP trap host for the purposes of controlling the speed of sending the SNMP trap messages.

Configuration Examples The following example specifies the length of message queue as 100.

```
FS(config)# snmp-server queue-length 100
```

Related Commands

Command	Description
snmp-server packetsize	Specifies the largest size of the SNMP packet.

Platform N/A

Description

1.16 snmp-server system-shutdown

Use this command to enable the SNMP message reload function. Use the **no** form of this command to disable the SNMP message reload function.

snmp-server system-shutdown

no snmp-server system-shutdown

Parameter Description

Parameter	Description
N/A	N/A

Defaults The SNMP message reload function is disabled by default.

Command mode Global configuration mode.

Usage Guide Use this command to enable the SNMP message reload function which may enable the system to send the device reload traps to the NMS before the device is reloaded or rebooted.

Configuration Examples The following example enables the SNMP message reload function:

```
FS(config)# snmp-server system-shutdown
```

Related Commands

Command	Description
N/A	N/A

Platform N/A

Description

1.17 snmp-server trap-format private

Use this command to configure the SNMP traps with private fields. Use the **no** form of this command to restore the default trap format.

snmp-server trap-format private

no snmp-server trap-format private

Parameter Description

Parameter	Description
N/A	N/A

Defaults The private field is not carried in the SNMP trap by default.

Command mode Global configuration mode.

Usage Guide Use this command to configure the SNMP trap format with the private field. Currently, the supported data in the private field is alarm occurrence time. For the specific data type and range of each field, refer to FS-TRAP-FORMAT-MIB.mib file.
This command does not work if the traps are sent with SNMPv1.

Configuration Examples The following example configures the SNMP trap format with the private field.

```
FS(config)# snmp-server trap-format private
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

1.18 snmp-server trap-source

Use this command to specify the source interface of the SNMP trap message. Use the **no** form of this command to restore the default value.

snmp-server trap-source interface
no snmp-server trap-source

Parameter Description

Parameter	Description
interface	Specifies the source interface of the SNMP trap messages.

Defaults By default, the IP address of the interface from which the SNMP packet is sent is just the source address.

Command mode Global configuration mode.

Usage Guide For easy management and identification, you can use this command to fix a local IP address as the SNMP source address.

Configuration Examples The following example specifies the IP address of Ethernet interface 0/1 as the source address of the SNMP trap message:

```
FS(config)# snmp-server trap-source fastethernet 0/1
```

Related Commands

Command	Description
---------	-------------

snmp-server enable traps	Enables t the SNMP agent to send the SNMP trap message to NMS.
snmp-server host	Specifies the NMS host to send the SNMP trap message.

Platform N/A

Description

1.19 snmp-server trap-timeout

Use this command to define the retransmission timeout time of the SNMP trap message. Use the **no** form of this command to restore the default value.

snmp-server trap-timeout seconds

no snmp-server trap-timeout

Parameter	Description
seconds	Timeout (in seconds) of retransmit the SNMP trap message. The range is from 1 to 1,000.

Defaults The default is 30 seconds.

Command mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example specifies the timeout period as 60 seconds.

```
FS(config)# snmp-server trap-timeout 60
```

Command	Description
snmp-server queue-length	Specifies the length of message queue for the SNMP trap host.
snmp-server host	Specifies the NMS host to send the SNMP trap message.
snmp-server trap-source	Specifies the source address of the SNMP trap message.

Platform N/A

Description

1.20 snmp-server udp-port

Use this command to specify a port to receive SNMP packets. Use the **no** form of this command to restore the default setting.

snmp-server udp port port-number

no snmp-server udp port

Parameter Description	Parameter	Description
	port-number	Specifies a port to receive the SNMP packets.

Defaults The default is 161.

Command mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example specifies port 15000 to receive the SNMP packets.

```
FS(config)# snmp-server udp-port 15000
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

1.21 snmp-server user

Use this command to configure a new user to an SNMP group. Use the **no** form of this command to remove a user from an SNMP group.

snmp-server user username groupname { **v1** | **v2c** | **v3 [encrypted]** } [**auth { md5 | sha } auth-password**] [**priv des56 priv-password**] } [**access { [ipv6 ipv6_aclname] [aclnum | aclname] }**] }

no snmp-server user username groupname { **v1** | **v2c** | **v3** }

Parameter Description

Parameter	Description
username	Name of the user on the host that connects to the agent.
groupname	Name of the group to which the user belongs.
v1 v2c v3	Specifies the SNMP version. But only SNMPv3 supports the following security parameters.
encrypted	Specifies whether the password appears in cipher text. In cipher text format, you need to enter continuous hexadecimal numeric characters. Note that the authentication password of MD5 has a length of 16 bytes, while that of SHA has a length of 20 bytes. Two characters make a byte. The encrypted key can be used only by the local SNMP engine on the switch.
auth	Specifies which authentication level should be used.
auth-password	Password string (no more than 32 characters) used by the authentication protocol. The system will change the password to the corresponding authentication key.
priv	Encryption mode. des56 refers to 56-bit DES encryption protocol. priv-password: password string (no more than 32 characters) used for encryption. The system will change the password to the corresponding encryption key.
md5	Enables the MD5 authentication protocol. While the sha enables the SHA authentication protocol.
aclnumber	Access list number, which specifies the IPV4 addresses that are permitted to access the MIB.
aclname	Name of the access list, which specifies the IPV4 addresses that are permitted to access the MIB.
ipv6_aclname	Name of the IPV6 access list, which specifies the IPV6 addresses that are permitted to access the MIB.

Defaults N/A

Command mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example configures an SNMPv3 user with MD5 authentication and DES encryption:

```
FS(config)# snmp-server user user-2 mib2user v3 auth md5 authpassstr priv des56 despassstr
```

Related Commands

Command	Description
show snmp user	Displays the SNMP user configuration.

Platform N/A

Description

1.22 snmp-server view

Use this command to configure an SNMP view. Use the **no** form of this command to remove an SNMP view.

snmp-server view view-name oid-tree { **include** | **exclude** }

no snmp-server view view-name [oid-tree]

Parameter	Parameter	Description
Description	view-name	View name
	oid-tree	Specifies the MIB object to associate with the view.
	include	Includes the sub trees of the MIB object in the view.
	exclude	Excludes the sub trees of the MIB object from the view.

Defaults By default, a view is set to access all MIB objects.

Command mode Global configuration mode.

Usage Guide N/A

Configuration Examples The following example sets a view that includes all MIB-2 sub-trees (oid is 1.3.6.1).

```
FS(config)# snmp-server view mib2 1.3.6.1 include
```

Related Commands	Command	Description
	show snmp view	Displays the SNMP view configuration.

Platform N/A

Description

1.23 snmp-server enable version

Use this command to configure the SNMP version. Use the **no** form of this command to disable the SNMP version.

snmp-server enable version {v1 | v2c | v3}

no snmp-server enable version {v1 | v2c | v3}

Parameter	Parameter	Description
Description	v1	Indicates the SNMP version 1.
	v2c	Indicates the SNMP version 2c.
	v3	Indicates the SNMP version 3.

Defaults By default, SNMPv3 is enabled, while SNMPv1 and SNMPv2c are disabled.

Command mode Global configuration mode.

Usage Guide N/A

Configuration The following example disables SNMP v1.

Examples FS(config)# no snmp-server enable version v1

Related Commands

Command	Description
show snmp version	Displays the SNMP version.

Platform Description N/A

2 RMON Configuration Commands

2.1 rmon alarm

Use this command to monitor a MIB variable. Use the **no** form of this command to remove the alarm entry.

rmon alarm number variable interval {**absolute** | **delta** } **rising-threshold** value [event-number] **falling-threshold** value [event-number] [owner ownersname]
no rmon alarm number

Parameter	Parameter	Description
description	number	Alarm number. The value ranges from 1-65,535.
	variable	Alarm variable. The value is a character string consisting of 1 to 255 characters in OID dotted format (the format is entry.integer.instance or a leaf node named .instance, for example. 1.3.6.1.2.1.2.1.10.1).
	interval	Sampling interval. The value ranges from 1 to 2,147,483,647 in the unit of second.
	absolute	Absolute sampling. In this mode, when the sampling time arrives, the system directly invokes the variable value.
	delta	Delta sampling. In this mode, when the sampling time arrives, the system invokes the delta value of the variable within the sampling interval.
	rising-threshold value	Rising threshold and the corresponding event number when the threshold is reached. The threshold ranges from -2,147,483,648 to +2,147,483,647.
	event-number	The event number ranges from 1 to 65,535.
	falling-threshold value	Falling threshold and the corresponding event number when the threshold is reached. The threshold ranges from -2,147,483,648 to +2,147,483,647
	owner ownersname	Owner of an entry. The value is a character string consisting of 1 to 63 characters that are case sensitive.

Default N/A.

Command mode Global configuration mode.

Usage guidelines The FSOS allows you to modify the configured history information of the Ethernet network, including variable, absolute/delta, owner, rising-threshold/falling-threshold, and the corresponding events. However, the modification does not take effect immediately until the system triggers the monitoring event at the next time.

Examples The example below monitors the MIB variable instance ifInNUcastPkts.6.

```
FS(config)# rmon alarm 10 1.3.6.1.2.1.2.2.1.12.6 30 delta rising-threshold 20 1 falling-threshold 10 1 owner zhangsan
```

Related commands	Command	Description
------------------	---------	-------------

rmon event number [log] [trap community] description string [owner owner-string]	Adds an event definition.
---	---------------------------

2.2 rmon collection history

Use this command to enable history statistics on the Ethernet interface. Use the **no** form of this command to remove the history entry.

rmon collection history index [owner ownername] [buckets bucket-number] [interval seconds]

no rmon collection history index

Parameter	Parameter	Description
description	index	Index of a history entry. The value ranges from 1 to 65,535.
	owner ownername	Owner of an entry. The value is a character string consisting of 1 to 63 characters that are case sensitive.
	buckets bucket-number	Capacity of a history entry (that is, the maximum number of history entries). The value ranges from 1 to 65,535. The default value is 10.
	interval seconds	Statistics period. The unit is second. The value ranges from 1 to 3,600. The default value is 1,800 seconds.

Default N/A.

Command mode Interface configuration mode.

Usage guidelines The configured history control entry parameters cannot be modified. And the history entry can be removed from the interface where the entry configured.

The example below enables log statistics on interface GigabitEthernet 0/1.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#interface gigabitEthernet 0/1
FS(config-GigabitEthernet0/1)#rmon collection history 1 owner UserA buckets 5 interval 60
```

Related commands	Command	Description
	rmon collection stats index [owner owner-name]	Adds a statistical entry on the Ethernet interface.

2.3 rmon collection stats

Use this command to monitor an Ethernet interface. Use the **no** form of this command to remove the configuration.

rmon collection stats index [owner owner-string]

no rmon collection stats index

Parameter	Parameter	Description
description	index	Index of the statistic table. The value ranges from 1 to 65,535.

owner ownername	Owner of an entry. The value is a character string consisting of 1 to 63 characters that are case sensitive and do not contain spaces.
------------------------	--

Default N/A.

Command mode Interface configuration mode.

Usage guidelines N/A.

The example below enables monitoring the statistics of interface GigabitEthernet 0/1.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#interface gigabitEthernet 0/1
FS(config-GigabitEthernet0/1)# rmon collection stats 1 owner UserA
```

	Command	Description
Related commands	rmon collection history index [owner owner-name] [buckets bucket-number] [interval seconds]	Adds a history control entry.

2.4 rmon event

Use this command to define an event. Use the **no** form of this command to remove the event entry.

rmon event number [**log**] [**trap** community] [description-string] [**description** description-string] [**owner** owner-name]

no rmon event number

Parameter	Parameter	Description
description	number	Event number. The value ranges from 1 to 65,535.
	log	(Optional) Log event. When a log event is triggered, the system records a log.
	trap community	(Optional) Trap event. When a trap event is triggered, the system sends trap with the group named "community".
	description description-string	(Optional) Description of the event. The value is a character string consisting of 1 to 127 characters.
	owner owner-name	(Optional) Owner of an entry. The value is a character string consisting of 1 to 63 characters that are case sensitive.

Default N/A.

Command mode Global configuration mode.

Usage guidelines N/A.

Examples The example below defines the event actions: log event and send trap message.


```
FS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#rmon event 1 log trap public description "iflnUcastPkts is abnormal" owner UserA
```

Related commands

Command	Description
rmon alarm number variable interval { absolute delta } rising-threshold value [event-number] falling-threshold value [event-number] [owner ownername]	Adds an alarm entry.

2.5 show rmon

Use this command to display the RMON configuration.

show rmon

Default N/A.

Command mode Privileged EXEC mode.

Usage guidelines N/A.

The example below displays the RMON configuration.

```
FS#show rmon
ether statistic table:
    index = 1
    interface = GigabitEthernet 0/1
    owner = admin
    status = 0
    dropEvents = 61
    octets = 170647461
    pkts = 580375
    broadcastPkts = 2135
    multiPkts = 3615
    crcAlignErrors = 0
    underSizePkts = 0
    overSizePkts = 0
    fragments = 0
    jabbers = 0
    collisions = 0
    packets64Octets = 3254668
    packets65To127Octets = 1833370
    packets128To255Octets = 2098146
    packets256To511Octets = 126716
    packets512To1023Octets = 363621
```

Examples

```
packets1024To1518Octets = 1077865
```

```
rmon history control table:
```

```
index = 1
interface = GigabitEthernet 0/1
bucketsRequested = 5
bucketsGranted = 5
interval = 60
owner = UserA
stats = 1
```

```
rmon history table:
```

```
index = 1
sampleIndex = 2485
intervalStart = 7d:22h:56m:38s
dropEvents = 0
octets = 5840
pkts = 27
broadcastPkts = 0
multiPkts = 0
crcAlignErrors = 0
underSizePkts = 0
overSizePkts = 0
fragments = 0
jabbers = 0
collisions = 0
utilization = 0
```

```
rmon alarm table:
```

```
index: 1
interval: 60
oid = 1.3.6.1.2.1.2.2.1.12.6
sampleType: 2
alarmValue: 0
startupAlarm: 3
risingThreshold: 20
fallingThreshold: 10
risingEventIndex: 1
fallingEventIndex: 1
owner: UserA
status: 1
```

```
rmon event table:
```

```
index = 1
description = iflnNUcastPkts is abnormal
```

```

type = 4
community = public
lastTimeSent = 0d:0h:0m:0s
owner =UserA
status = 1

rmon log table:

eventIndex = 1
index = 1
logTime = 6 d:19 h:21 m:48 s
logDescription = iflnNUcastPkts is abnormal
    
```

Related commands

Command	Description
N/A	N/A

2.6 show rmon alarm

Use this command to display the RMON alarm table.

show rmon alarm

Default N/A.

Command mode Privileged EXEC mode.

Usage guidelines N/A.

The example below displays the RMON alarm table.

Examples

```

FS#show rmon alarm
rmon alarm table:

index: 1
interval: 60
oid = 1.3.6.1.2.1.2.2.1.12.6
sampleType: 2
alarmValue: 0
startupAlarm: 3
risingThreshold: 20
fallingThreshold: 10
risingEventIndex: 1
fallingEventIndex: 1
owner: UserA
status: 1
    
```

Command	Description
rmon alarm number variable interval { absolute delta } rising-threshold value [event-number] falling-threshold value [event-number] [owner ownername]	Adds an alarm entry.

2.7 show rmon event

Use this command to display the event configuration.

show rmon event

Default N/A.

Command mode Privileged EXEC mode.

Usage guidelines N/A.

The example below displays the event configuration.

Examples

```
FS#show rmon event
rmon event table:
    index = 1
    description = iflnNUcastPkts is abnormal
    type = 4
    community = public
    lastTimeSent = 0d:0h:0m:0s
    owner =UserA
    status = 1

rmon log table:
    eventIndex = 1
    index = 1
    logTime = 6d:19h:21m:48s
    logDescription = iflnNUcastPkts is abnormal
```

Command	Description
rmon event number [log] [trap community] [description description-string] [owner ownername]	Adds an event entry.

2.8 show rmon history

Use this command to display the history information.

show rmon history

Default N/A.

Command mode Privileged EXEC mode.

Usage guidelines N/A.

The example below displays the history information.

Examples

```
FS#show rmon history
rmon history control table:
    index = 1
    interface = GigabitEthernet 0/1
    bucketsRequested = 5
    bucketsGranted = 5
    interval = 60
    owner = UserA
    stats = 1

rmon history table:
    index = 1
    sampleIndex = 2485
    intervalStart = 7d:22h:56m:38s
    dropEvents = 0
    octets = 5840
    pkts = 27
    broadcastPkts = 0
    multiPkts = 0
    crcAlignErrors = 0
    underSizePkts = 0
    overSizePkts = 0
    fragments = 0
    jabbers = 0
    collisions = 0
    utilization = 0
```

Related commands

Command	Description
rmon collection history index [owner ownname] [buckets bucket-number] [interval seconds]	Adds a history control entry.

2.9 show rmon statistics

Use this command to display the RMON statistics.

show rmon statistics

Default	N/A.
Command mode	Privileged EXEC mode.
Usage guidelines	N/A.

The example below displays the RMON statistics.

```
FS#show rmon statistics
ether statistic table:
    index = 1
    interface = GigabitEthernet 0/1
    owner = admin
    status = 0
    dropEvents = 61
    octets = 170647461
    pkts = 580375
    broadcastPkts = 2135
    multiPkts = 3615
    crcAlignErrors = 0
    underSizePkts = 0
    overSizePkts = 0
    fragments = 0
    jabbers = 0
    collisions = 0
    packets64Octets = 3254668
    packets65To127Octets = 1833370
    packets128To255Octets = 2098146
    packets256To511Octets = 126716
    packets512To1023Octets = 363621
    packets1024To1518Octets = 1077865
```

Examples

Related commands	Command	Description
	rmon collection stats index [owner owner-string]	Adds a statistical entry.

3 NTP Commands

3.1 no ntp

Use this command to disable Network Time Protocol (NTP), and clear all NTP configuration.

no ntp

Parameter Description	Parameter	Description
	N/A	N/A

Defaults NTP is disabled by default.

Command mode Global configuration mode.

Usage Guide By default, NTP is disabled. However, once the NTP server or the NTP authentication is configured, the NTP service will be enabled.

Configuration Examples The following example disables NTP.

```
FS(config)#no ntp
```

Related Commands	Command	Description
	ntp server	Specifies an NTP server.

Platform Description N/A

3.2 ntp access-group

Use this command to configure an access group to control NTP access. Use the **no** form of this command to remove the peer access group.

ntp access-group { peer | serve | serve-only | query-only } access-list-number | access-list-name

no ntp access-group { peer | serve | serve-only | query-only } access-list-number | access-list-name


Parameter Description	Parameter	Description
	peer	Allows the device to receive time requests and NTP control queries to synchronize itself to the servers specified in the access list.
	serve	Allows the device to receive time requests and NTP control queries from the servers specified in the access list but not to synchronize itself to the specified servers.
	serve-only	Allows the device to receive only time requests from the servers specified in

	the access list.
query-only	Allows the device to receive only NTP control queries from servers specified in the access list.
access-list-number	Access control list number, ranging from 1 to 99 and 1300 to 1999.
access-list-name	Access control list name.

Defaults No access rule to control NTP access is configured by default, namely, NTP access is granted to all devices.

Command mode Global configuration mode.

Usage Guide Use this command to configure an access group to control NTP access, providing a minimal security measures (more secure way is to use the NTP authentication mechanism).
 The NTP service enables the access group options to be scanned in the following order, from least restrictive to most restrictive: **peer, serve, serve-only, query-only**.
 If you do not configure any access groups, NTP access is granted to all devices. However, once you configure the access rule, NTP access is granted only to the devices specified in the access list.

 NTP control query is not supported in the current system. Although it matches with the order in accordance with the above rules, the related requests about the control and query are not supported.

Configuration Examples The following example shows how to allow the device to only receive time requests from the device of 192.168.1.1.

```
FS(config)# access-list 1 permit 192.168.1.1
FS(config)# ntp access-group serve-only 1
```

Related Commands	Command	Description
	ip access-list	Creates an IP access control list.

Platform N/A
Description

3.3 ntp authenticate

Use this command to enable NTP authentication. Use the **no** form of this command to disable NTP authentication.

ntp authenticate
no ntp authenticate

Parameter	Description
-----------	-------------

N/A	N/A
-----	-----

Defaults Disabled.

Command mode Global configuration mode.

Usage Guide If NTP authentication is disabled, the synchronization communication is not encrypted. To enable encrypted communication on the server, enable the NTP authentication and configure other keys globally. NTP authentication is implemented through the trusted key specified by the **ntp authentication-key** and **ntp trusted-key** commands.

Configuration After an authentication key is configured and specified as the global trusted key, enable NTP authentication.

Examples

```
FS(config)#ntp authentication-key 6 md5 woooooop
FS(config)#ntp trusted-key 6
FS(config)#ntp authenticate
```

Related Commands	Command	Description
	ntp authentication-key	Sets the global authentication key.
ntp trusted-key	Configures the global trusted key.	

Platform N/A

Description

3.4 ntp authentication-key

Use this command to configure an NTP authentication key. Use the **no** form of this command to remove the NTP authentication key.

ntp authentication-key key-id **md5** key-string [enc-type]
no ntp authentication-key key-id

Parameter Description	Parameter	Description
	key-id	Key ID, ranging from 1 to 4294967295.
key-string	Key string	
enc-type	(Optional) Whether this key is encrypted, where, 0 indicates the key is not encrypted, 7 indicates the key is encrypted simply. The key is not encrypted by default.	

Defaults NTP authentication key is not configured by default.

Command mode Global configuration mode.

Usage Guide Use this command to configure an NTP authentication key and enables the **md5** algorithm for authentication. Each key presents a unique key ID, which can be configured as a trusted key using the **ntp trusted-key** command..
 You can configure up to 1024 NTP authentication keys. However, each server can support only one key.

Configuration The following example configures an NTP authentication key.

Examples

```
FS(config)ntp authentication-key 6 md5 woooooop
```

Related Commands

Command	Description
ntp authenticate	Enables NTP authentication.
ntp trusted-key	Configures an NTP trusted key.
ntp server	Specifies an NTP server.

Platform N/A

Description

3.5 ntp disable

Use this command to disable the device to receive NTP packets on the specified interface.

ntp disable

Parameter Description

Parameter	Description
N/A	N/A

Defaults All NTP packets can be received by default.

Command mode Interface configuration mode.

Usage Guide The NTP message received on any interface can be provided to the client to carry out the clock adjustment. The function can be set to shield the NTP message received from the corresponding interface.
 By default, the device receives NTP packets on all interfaces, and adjust clock for the client. You can use this command to disable the device to receive NTP packets on the specified interface.

This command is configured only the interface that can receive and send IP packets.

Configuration The following example disables the device to receive the NTP packets.

Examples

```
FS(config-if)# no ntp disable
```

Related Commands

Command	Description
---------	-------------

N/A	N/A
-----	-----

Platform N/A
Description

3.6 ntp master

Use this command to configure the device to act as an authoritative NTP server, synchronizing time to other devices. Use the **no** form of this command to remove the device as an authoritative NTP server.

ntp master [stratum]
no ntp master

Parameter	Description
stratum	Stratum level. The range is from 1 to 15. The default is 8.

Defaults N/A

Command mode Global configuration mode.

Usage Guide In general, the local device synchronizes time from the external time source directly or indirectly. However, if the time synchronization fails due to network connection trouble, you can use this command to configure the local device to act as an authoritative NTP server to synchronize time to other devices. Once configured, the device will not perform time synchronization with the time source which is of a higher stratum.

Configuring the device to act as an authoritative NTP server (in particular, specify a lower stratum level), may be likely to overwrite the effective time. If multiple devices in the same network are configured with this command, the time synchronization may be instable due to the time difference between the devices.

Before configuring this command, you need to manually correct the system clock to avoid too much bias if the device has never performed time synchronization with the external clock source.

Configuration Examples The following example configures the device to act as an authoritative NTP server, and sets the stratum level to 12:

```
FS(config)# ntp master 12
```

Command	Description
N/A	N/A

Platform N/A
Description

3.7 ntp server

Use this command to specify a NTP server for the NTP client. Use the **no** form of this command to delete the specified NTP server.

ntp server [**oob** | **vrf** vrf-name] { ip-addr | domain | **ip** domain | **ipv6** domain } [**version** version] [**source** if-name] [**key** keyid] [**prefer**] [**via** mgmt-name]
no ntp server ip-addr


Parameter Description

Parameter	Description
vrf vrf-name	Specifies the virtual routing and forwarding (VRF) name. By default, this parameter is disabled.
oob	(Optional) Accesses the NTP server from the MGMT interface. By default, this option is disabled.
ip-addr	Sets the IP address of the NTP server. The address can be in IPv4 or IPv6 format.
domain	Sets the domain name of the NTP server, supporting IPv4 and IPv6.
version	(Optional) Specifies the NTP version (1-3). The default is NTPv3.
if-name	(Optional) Specifies the source interface from which the NTP message is sent (L3 interface).
keyid	(Optional) Specifies the encryption key adopted when communication with the corresponding server. The key ID range is from 1 to 4,294,967,295.
prefer	(Optional) Specifies the given NTP server as the preferred one.
mgmt-name	(Optional) Specifies the egress MGMT interface for the packets in oob mode.

Defaults No NTP server is configured by default.

Command mode Global configuration mode.

Usage Guide At present, FSOS system only supports clients other than servers. Up to 20 servers can be synchronized. To carry out the encrypted communication with the server, set the global encryption key and global trusted key firstly, and then specify the corresponding key as the trusted key of the server to launch the encrypted communication of the server. It requires the server presents identical global encryption key and global trust key to complete the encrypted communication with the server. In the same condition (for instance, precision), the prefer clock is used for synchronization.

 The source interface of NTP packets must be configured with the IP address and can be communicated with the peer.

Configuration Examples The following example configures an NTP server.

For IPv4: FS(config)# ntp server 192.168.210.222

For IPv6: FS(config)# ntp server 10::2

Related Commands	Command	Description
	no ntp	Disables NTP.

Platform N/A
Description

3.8 ntp service disable

Use this command to disable the time synchronization service provided by NTP. Use the **no** form of this command to enable the time synchronization service provided by NTP.

ntp service disable
no ntp service disable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults NTP provides the time synchronization service by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide NTP works in client/server mode. After the NTP device synchronizes time from an external reliable clock source, it serves as the time server to provide the time synchronization service. If the device just needs to be served as an NTP client, configure this command to disable the time synchronization service.

i This command and the **ntp master** command are mutually exclusive. When **ntp master** is enabled, the time synchronization service cannot be disabled on the NTP server. If this command is configured, the **ntp master** command cannot be configured.

Configuration The following example disables the NTP time synchronization service.

Example FS(config)# ntp service disable

Verification Run the **show run | in ntp** command to display the NTP configuration.

Platform Description Supported only by some products.

3.9 ntp trusted-key

Use this command to set a global trusted key. Use the **no** form of this command to remove the global trusted key.

ntp trusted-key key-id

no ntp trusted-key key-id

Parameter Description	Parameter	Description
	key-id	Global trusted key ID, ranging from 1 to 4294967295.

Defaults N/A

Command mode Global configuration mode.

Usage Guide The NTP communication parties must use the same trusted key. The key is identified by ID and is not transmitted to improve security.

Configuration Examples The following example configures an authentication key and sets it as a trusted key.

```
FS(config)#ntp authentication-key 6 md5 woooooop
FS(config)#ntp trusted-key 6
FS(config)#ntp server 192.168.210.222 key 6
```

Related Commands	Command	Description
	ntp authenticate	Enables NTP authentication.
	ntp authentication-key	Configures an NTP authentication key.
	ntp server	Configures an NTP server.

Platform N/A

Description

3.10 ntp update-calendar

Use this command to enable the NTP client to periodically update the device clock with the time synchronized from the external source clock. Use the **no** form of this command to remove this function.

ntp update-calendar
no ntp update-calendar

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, update the calendar periodically is not configured.

Command mode Global configuration mode.

Usage Guide By default, the NTP update-calendar is not configured. After configuration, the NTP client updates the calendar at the same time when the time synchronization of external time source is successful. It is recommended to enable this function for keeping the accurate calendar.

Configuration The following example configures the NTP update calendar periodically.

Examples FS(config)# ntp update-calendar

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.11 show ntp server

Use this command to display the NTP server configuration.

show ntp server

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode, VLAN configuration mode

Usage Guide N/A

Configuration The following example displays the NTP server.

```
FS# show ntp server
ntp-server          source      keyid      prefer  version
-----
10::2              None       None       FALSE   3
192.168.210.222   None       None       FALSE   3
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

3.12 show ntp status

Use this command to display the NTP configuration.

show ntp status

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode, VLAN configuration mode

Usage Guide Use this command to display the NTP configuration. No configuration is displayed before the synchronization server is configured for the first time.

Configuration The following example displays the NTP configuration.

Examples

```
FS# show ntp status
Clock is synchronized, stratum 8, reference is 127.127.1.1
nominal freq is 250.0000 Hz, actual freq is 250.0000 Hz, precision is 2**24
reference time is D4BD819B.433892EE (01:27:55.000 UTC )
clock offset is 0.00000 sec, root delay is 0.00000 sec
root dispersion is 0.00002 msec, peer dispersion is 0.00002 msec
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4 SNTP Commands

4.1 sntp enable

Use this command to enable the SNTP function. Use the **no** form of this command to restore the default value.

sntp enable

no sntp enable

Parameter Description

Parameter	Description
N/A	N/A

Defaults

SNTP is disabled by default.

Command mode

Global configuration mode.

Usage Guide

N/A

Configuration Examples

The following example enables SNTP.

```
FS(config)# sntp enable
```

Related Commands

Command	Description
show sntp	Displays the SNTP configuration.

Platform

N/A

Description

4.2 sntp interval

Use this command to set the interval for the SNTP client to synchronize its clock with the NTP/SNTP server. Use the **no** form of this command to restore the default synchronization interval.

sntp interval seconds

no sntp interval

Parameter Description

Parameter	Description
seconds	Synchronization interval. The unit is second, and the range is from 60 to 65,535.

Defaults

The default synchronization interval is 1,800 seconds.

Command mode

Global configuration mode.

Usage Guide To make the synchronization interval configuration effective, run the **sntp enable** command.

Configuration The following example configures the synchronization interval to 3,600 seconds.

Examples

```
FS(config)# sntp interval 3600
```

Related Commands	Command	Description
	sntp enable	Enables SNTP.
show sntp	Displays the SNTP configuration.	

Platform N/A

Description

4.3 sntp server

Use this command to specify an SNTP server. Use the **no** form of this command to remove the SNTP/NTP server.

sntp server [oob] ip-address [via mgmt-name]

no sntp server

Parameter Description	Parameter	Description
	ip-address	IP address of the SNTP server.
oob	(Optional) Accesses the SNTP server from the MGMT interface.	
mgmt-name	(Optional) Specifies the egress MGMT interface for the packets in oob mode.	

Defaults No SNTP server is configured by default.

Command mode Global configuration mode.

Usage Guide As SNTP is fully compatible with NTP, the SNTP server can be used as an NTP server in Internet.

Configuration The following example specifies an SNTP server in Internet.

Examples

```
FS(config)# sntp server 192.168.4.12
```

Related Commands	Command	Description
	show sntp	Displays the SNTP configuration.
sntp enable	Enables SNTP.	

Platform N/A

Description

4.4 show sntp

Use this command to display the SNTP configuration.

show sntp

Parameter	Parameter	Description
Description	N/A	N/A

Defaults

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode.

Usage Guide N/A

Configuration The following example displays the SNTP configuration.

Examples

```
FS# show sntp
SNTP state           : Enable
SNTP server          : 192.168.4.12
SNTP sync interval   : 60
Time zone            : +8
```

Related Commands

Command	Description
sntp enable	Enables SNTP.

Platform Description N/A

5 SPAN-RSPAN Commands

5.1 mac-loopback

Use this command to enable MAC loopback. Use the **no** form of this command to disable MAC loopback.

mac-loopback [remove-itag]

no mac-loopback [remove-itag]

Parameter Description	Parameter	Description
	remove-itag	Removes the inner VLAN tag.

Defaults MAC loopback is disabled by default.

Command mode Interface configuration mode.

Usage Guide The MAC loopback feature must be enabled on the interfaces for purposes of local one-to-many mirroring. (Please enable the MAC loopback feature on the down interface, and do not add other configurations to the interface.)

Configuration Examples The following example configures a remote VLAN.

```
FS(config)#vlan 100
FS(config-vlan)#remote-span
FS(config-vlan)#exit
```

The following example configures a session and specifies the mirrored port.

```
FS(config)#monitor session 1 remote-source
FS(config)#monitor session 1 source interface gigabitEthernet 4/1 both
```

The following example configures the mirroring port, and enables MAC loopback on the port.

```
FS(config)#monitor session 1 destination remote vlan 100 interface gigabitEthernet 4/2 switch
FS(config)#interface gigabitEthernet 4/2
FS(config-if-GigabitEthernet 4/2)#switchport access vlan 100
FS(config-if-GigabitEthernet 4/2)#mac-loopback
```

The following example adds interfaces GigabitEthernet 4/3-4 to the remote VLAN.

```
FS(config)#interface range gigabitEthernet 4/3-4
FS(config-if-range)#switchport access vlan 100
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

5.2 monitor session

Use this command to configure the SPAN session and specify the source port (monitored port).

monitor session session-num **source interface** interface-id [**both** | **rx** | **tx**]

Use this command to configure the SPAN session mirroring only the traffic permitted by the access list

monitor session session-num **source interface** interface-id **rx acl** acl-name

Use this command to configure the SPAN session and specify the destination port (monitoring port).

monitor session session-num **destination interface** interface-id [**encapsulation replicate** | **switch**]

Use this command to configure the SPAN session monitoring the CPU packets.

monitor session session-num **source interface** interface-id **tx cpu**

Use this command to configure the remote SPAN session ID on the source device..

monitor session session-num **remote-source**

Use this command to configure the remote SPAN session ID on the destination device.

monitor session session-num **remote-destination**

Use this command to configure the remote SPAN session and specify the remote SPAN destination VLAN.

monitor session session-num **destination remote vlan** remote-vlan-id **interface** interface-id [**switch**]

Use this command to configure the SPAN session and specify the source VLAN to monitor. Note that the source VLAN should not be a remote VLAN.

monitor session session-num **source vlan** vlan-id [**rx**]

Use this command to limit the SPAN source traffic to specific VLANs.

monitor session session-num **filter vlan** vlan-id-list

Use this command to remove the specified SPAN session, or remove the source port or destination port of the specified SPAN session.

no monitor session session-num [**source interface** interface-id | **destination interface** interface-id]

Use this command to remove the specified remote SPAN session, or remove the destination port of the remote SPAN session.

no monitor session session-num [**destination remote vlan** remote-vlan-id **interface** interface-id]

Use this command to remove all SPAN sessions.

no monitor session all

default monitor session all

Use this command to remove the specified remote SPAN session, or remove the destination port of the remote SPAN session.

default monitor session session-num { **destination remote vlan** remote-vlan-id **interface** interface-id }

Use this command to remove the specified SPAN session, or remove the source port or destination port of the SPAN session.

default monitor session session-num { **source interface** interface-id | **destination interface** interface-id }

Parameter Description

Parameter	Description
session_number	SPAN session number
interface-id	Interface name
acl acl-name	Access list name
remote-vlan-id	Remote VLAN ID
vlan-id	VLAN ID (remote VLAN excluded)
vlan-id-list	VLAN list (remote VLAN excluded)
rx	Monitors the only received traffic.
tx	Monitors the only transmitted traffic.
both	Monitors both received and transmitted traffic. This is the default.
encapsulation replicate	Specifies that the destination port replicates the source interface encapsulation method. If not selected, the default is to send packets in native form (untagged).
switch	Enables switching on the destination port. Switching function is disabled by default.
cpu	Monitors the CPU packets. This is disabled by default.

Defaults Port monitoring is disabled by default.

Command mode Global configuration mode.

Usage Guide Use this command to configure SPAN or remote SPAN, and specify the source port or destination port. If the **both**, **rx** or **tx** is not specified for the source port, the **both** parameter is the default. Configuring an access list for the source port indicates that only the traffic permitted by the access list is monitored. The **switch** and **encapsulation replicate** features are disabled on the destination port. CPU packet monitoring, which is enabled through the **cpu** parameter, is disabled by default.

Configuration The following example configures the source port and destination port of the SPAN session.

```
FS(config)# monitor session 1 source interface gigabitEthernet 0/1
FS(config)# monitor session 1 destination interface gigabitEthernet 0/2
```

The following example configures the SPAN session mirroring only the traffic permitted by the access list.

```
FS(config)# monitor session 3 source interface gigabitEthernet 0/3 rx acl 90
```

The following example configures a remote SPAN session.

```
FS(config)# monitor session 10 remote-source
```

The following example configures the destination port of the remote SPAN session.

```
FS(config)# monitor session 4 destination remote vlan 10 interface gigabitEthernet 0/5
```

The following example configures the source VLAN of the SPAN session.

```
FS(config)# monitor session 1 source vlan 1
```

The following example removes the SPAN session.

```
FS(config)# no monitor session 1
```

The following example removes the source port and destination port of the SPAN session.

```
FS(config)# no monitor session 1 source interface gigabitEthernet 0/18
```

```
FS(config)# no monitor session 1 destination interface gigabitEthernet 0/18
```

The following example configures the SPAN session monitoring only the traffic sent from CPU.

```
FS(config)# monitor session 3 source interface gigabitEthernet 0/3 tx cpu
```

The following example configures the SPAN session monitoring traffic, including the traffic sent from CPU.

```
FS(config)# monitor session 3 source interface gigabitEthernet 0/3 tx cpu
```

```
FS(config)# monitor session 3 source interface gigabitEthernet 0/3 tx
```

Related Commands

Command	Description
N/A	N/A

Platform

N/A

Description

5.3 remote-span

Use this command to configure a remote SPAN VLAN in VLAN configuration mode. Use the **no** form of this command to disable the remote SPAN VLAN.

remote-span

no remote-span

Parameter Description

Parameter	Description
N/A	N/A

Defaults Remote SPAN VLAN is disabled by default.

Command mode VLAN configuration mode.

Usage Guide N/A

Configuration The following example configures a remote SPAN VLAN.

Examples

```
FS(config)# vlan 100
FS(config-vlan)# remote-span
```

Related Commands	Command	Description
		show vlan

Platform N/A

Description

5.4 show monitor

Use this command to display the SPAN configurations.

show monitor [**session** session_number]

Parameter Description	Parameter	Description
		session_number

Defaults N/A

Command mode Privileged EXEC mode, global configuration mode and interface configuration mode

Usage Guide N/A

Configuration This following example displays all SPAN sessions.

Examples

```
FS(config)# show monitor
sess-num: 2
span-type: LOCAL_SPAN
src-intf:
TenGigabitEthernet 0/5      frame-type Both
dest-intf:
TenGigabitEthernet 0/6
sess-num: 1
span-type: LOCAL_SPAN
```



```
src-intf:
TenGigabitEthernet 0/3      frame-type Both
dest-intf:
```

The following example displays SPAN session 1.

```
FS(config)# show monitor session 1
sess-num: 1
span-type: LOCAL_SPAN
src-intf:
TenGigabitEthernet 0/3      frame-type Both
dest-intf:
TenGigabitEthernet 0/4
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**

N/A

6 ERSPAN Commands

6.1 destination ip address

Use this command to configure the destination IP address for GRE encapsulation. Use the **no** form of this command to delete the destination IP address.

destination ip address ip_address

no destination ip address

Parameter Description	Parameter	Description
	ip_address	The destination IP address of GRE encapsulation.

Defaults N/A

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example configures the destination IP address.

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#destination ip address 10.1.1.2
```

Related Commands	Command	Description
	show monitor	Displays the mirror sessions.

Platform N/A

Description

6.2 ip dscp

Use this command to configure the DSCP value of the IP packets. Use the **no** form of this command to restore the default setting.

ip dscp dscp-value

no ip dscp

Parameter Description	Parameter	Description
	dscp-value	The DSCP value of the IP packets. The value ranges from 0 to 64.

Defaults The default DSCP value is 0.

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or use the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration The following example configures the DSCP value of the IP packets.

Examples

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#ip dscp 56
```

Related Commands	Command	Description
	show monitor	

Platform N/A

Description

6.3 ip ttl

Use this command to configure the TTL value of the IP packets. Use the **no** form of this command to restore the default setting.

ip ttl ttl-value

no ip ttl

Parameter Description	Parameter	Description
	ttl-value	The TTL value of the IP packets. The value ranges from 1 to 255.

Defaults The default TTL value is 64.

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or use the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration The following example configures the TTL value of IP packets.

Examples

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#ip ttl 65
```

Related Commands	Command	Description
	show monitor	

Platform N/A
Description

6.4 monitor session

Use this command to create an ERSPAN session. Use the **no** form of this command to delete the session.

monitor session session_num { **erspan-source** }

no monitor session session_num

Parameter Description	Parameter	Description
	session-num	Session ID

Defaults N/A

Command mode Global configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or the **Ctrl-C** key combination.
 To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example creates an ERSPAN session.

```
FS(config)# monitor session 2 erspan-source
```

Related Commands	Command	Description
	show monitor	Displays the mirror session information.

Platform N/A
Description

6.5 origin ip address

Use this command to configure the source IP address for GRE encapsulation. Use the **no** form of this command to delete the source IP address.

origin ip address ip_address

no origin ip address

Parameter Description	Parameter	Description
	ip_address	The source IP address of GRE encapsulation.

Defaults N/A

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or use the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example configures the source IP address.

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#origin ip address 11.1.1.2
```

Related Commands	Command	Description
	show monitor	

Platform Description N/A

6.6 sampling-rate

Use this command to Configures the sampling frequency for mirroring. Use the **no** form of this command to restore the default value.

sampling-rate rate
no sampling-rate

Parameter Description	Parameter	Description
	rate	Indicates the sampling frequency value, ranging from 1 to 1000000. For example, if the sampling frequency is 100, one packet is sampled from 100 packets, that is, the sampling ratio is 100:1.

Defaults The default sampling frequency is 1:1, that is, each packet is sampled.

Command mode ERSPAN configuration mode

Usage Guide This function is valid only when the sampling frequency is configured on the SPAN source port.
To return to privileged EXEC mode, enter the **end** command or use the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example configures the sampling frequency to 1000.

```
FS(config)# monitor session 2 erspan-source
```

```
FS(config-mon-erspan-src)#sampling-rate 1000
```

Related Commands

Command	Description
show monitor	Displays the mirror sessions.

Platform N/A
Description

6.7 shutdown

Use this command to shut down the session. Use the **no** form of this command to restore the default setting.

Shutdown
no shutdown

Parameter Description

Parameter	Description
N/A	N/A

Defaults The ERSPAN session is enabled by default.

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or the **Ctrl-C** key combination.
 To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example shuts down ERSPAN session 2.

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#shutdown
```

Related Commands

Command	Description
show monitor	Displays the mirror sessions.

Platform N/A
Description

6.8 source interface

Use this command to configure the ERSPAN source interface. Use the **no** form of this command to delete this source interface.

source interface [single-interface | **all**] [**rx** | **tx** | **both**]
no source interface [single-interface | **all**] [**rx** | **tx** | **both**]

Use this command to configure the flow-based ERSPAN source interface and enable sampling. Use the **no** form of this command to delete this source interface.

source interface single-interface **rx acl** acl-name [**sample**]

no source interface single-interface **rx acl** acl-name

Parameter Description

Parameter	Description
single-interface	Source interface of the mirror.
all	Indicates global interfaces that support mirroring.
rx	Receives only the traffic of Rx direction.
tx	Receives only the traffic of Tx direction.
both	(Default) Receives the traffic of Tx and Rx directions.
acl acl-name	ACL name.
sample	Indicates whether the sampling is enabled.

Defaults N/A

Command mode ERSPAN configuration mode

Usage Guide To return to privileged EXEC mode, enter the **end** command or use the **Ctrl-C** key combination.
To return to global configuration mode, enter the **exit** command.

Configuration Examples The following example configures an ERSPAN source interface.

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#source interface gigabitEthernet 0/1 both
```

The following example configures a flow-based ERSPAN source interface and enables sampling.

```
FS(config)# monitor session 2 erspan-source
FS(config-mon-erspan-src)#source interface gigabitEthernet 0/3 rx acl 90 sample
```

Related Commands

Command	Description
show monitor	Displays the mirror sessions.

Platform Description N/A

6.9 vrf

Use this command to configure VRF. Use the **no** form of this command to restore the default setting.

vrf vrf-name

no vrf

Parameter	Parameter	Description
Description	vrf-name	VRF name
Defaults	VRF name is null by default.	
Command mode	ERSPAN configuration mode	
Usage Guide	<p>To return to privileged EXEC mode, enter the end command or use the Ctrl-C key combination.</p> <p>To return to global configuration mode, enter the exit command.</p>	
Configuration Examples	<p>The following example configures the VRF name.</p> <pre>FS(config)# monitor session 2 erspan-source FS(config-mon-erspan-src)# vrf vrf-name</pre>	
Related Commands	Command	Description
	show monitor	Displays the mirror sessions.
Platform Description	N/A	

7 sFlow Commands

7.1 sflow agent

Use this command to configure the address of the sFlow Agent.

sflow agent { address { ip-address | ipv6 ipv6-address } | { interface { interface-name | ipv6 interface-name } }

Use this command to delete the address of the sFlow Agent.

no sflow agent { address | interface }

Use this command to restore the default setting.

default sflow agent { address | interface }

Parameter Description	Parameter	Description
	address	Configures the IP address of the sFlow Agent.
	ip-address	sFlow Agent IPv4 address.
	ipv6 ipv6-address	sFlow Agent IPv6 address.
	interface	Configures the interface of the sFlow Agent.
	interface-name	Interface of IPv4 address.
	ipv6 interface-name	Interface of IPv6 address.

Defaults No sFlow Agent address is configured by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the Agent IP address field in the output sFlow datagram. The datagram not configured with this field cannot be output. The sFlow Agent address shall be a host address. When a non-host address (for example, a multicast or broadcast address) is configured as the sFlow Agent address, a message indicating configuration failure is displayed. It is recommended that the IP address of the sFlow Agent device be configured as the sFlow Agent address.

Configuration Examples The following example configures 192.168.2.1 as the sFlow Agent address.

```
FS(config)# sflow agent address 192.168.2.1
```

Verification Use the **show sflow** command to display the sFlow configuration.

Prompt Messages Prompt an error message when the address is invalid.

```
invalid host address.
```

Common Errors N/A

Platforms N/A

7.2 sflow collector collector-id destination

Use this command to configure the address of the sFlow Collector.

```
sflow collector collector-id destination { ip-address | ipv6 ipv6_address } udp-port [ [ vrf vrf-name ] ] [ oob [ via mgmt mgmt-name ] ] [ description collector-name ]
```

Use this command to delete the address of the sFlow Collector.

```
no sflow collector collector-id destination { ip-address | ipv6 ipv6_address } udp-port [ [ vrf vrf-name ] ] [ oob [ via mgmt mgmt-name ] ] [ description collector-name ]
```

Use this command to delete the address of the sFlow Collector.

```
default sflow collector collector-id destination { ip-address | ipv6 ipv6_address } udp-port [ [ vrf vrf-name ] ] [ oob [ via mgmt mgmt-name ] ] [ description collector-name ]
```

Parameter Description

Parameter	Description
collector-id	sFlow Collector ID. The range is from 1 to 2.
ip-address	sFlow Collector IPv4 address
ipv6 ipv6-address	sFlow Collector IPv6 address
udp-port	sFlow Collector listening port number
vrf vrf-name	VRF instance name. It is not configured by default.
oob	The sampled traffics are output through the management interface. By default, this parameter is not configured.
via mgmt mgmt-name	The management interface which the sampled traffics are output through. By default, this parameter is not configured.
description collector-name	Description of the sFlow Collector.

Defaults No sFlow Collector address is configured by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the sFlow Collector address. The sFlow Collector address shall be a host address. When a non-host address (for example, a multicast or broadcast address) is configured as the sFlow Collector address, a message indicating configuration failure is displayed. The sFlow Collector monitors the sFlow datagram on the specified port. When the vrf parameter is configured, the corresponding VRF instance must exist. When you remove a VRF instance, the sFlow Collector address will be removed if this VRF instance is also configured for an sFlow Collector address. When the oob parameter is configured, a datagram is sent to the sFlow Collector through the management interface.

Configuration The following example configures 192.168.1.100 as the address of sFlow Collector 1, 6343 as the port number and vrf 1 as the VRF instance.

Examples

```
FS(config)# sflow collector 1 destination 192.168.2.100 6343 vrf vrf1
```

Verification Use the **show sflow** command to display the sFlow Collector.

Prompt Prompt an error message when the address is invalid.

Messages

```
invalid host address.
```

```
No VPN exists.
```

```
vpn is not exist
```

Common Errors N/A

Platforms N/A

7.3 sflow collector collector-id max-datagram-size

Use this command to configure the maximum length of the output sFlow datagram.

sflow collector collector-id **max-datagram-size** datagram-size

Use this command to restore the default maximum length of the output sFlow datagram.

no sflow collector collector-id **max-datagram-size**

Use this command to restore the default maximum length of the output sFlow datagram.

default sflow collector collector-id **max-datagram-size**

Parameter Description	Parameter	Description
	collector-id	sFlow Collector ID. The range is from 1 to 2.
	max-datagram-size datagram-size	The maximum length of the output sFlow datagram. The range is from 200 to 9,000.

Defaults The default maximum length of the output sFlow datagram is 1,400.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example configures 1,000 as the maximum length of the output sFlow datagram for sFlow Collector.

Examples `FS(config)# sflow collector 1 max-datagram-size 1000`

Verification Use the **show sflow** command to display the maximum length of the output sFlow datagram.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.4 sflow counter collector

Use this command to enable the sFlow Agent to send counter samples to the sFlow Collector.

sflow counter collector collector-id

Use this command to disable the sFlow Agent to send counter samples to the sFlow Collector.

no sflow counter collector

Use this command to disable the sFlow Agent to send counter samples to the sFlow Collector.

default sflow counter collector

Parameter Description	Parameter	Description
	collector-id	sFlow Collector ID. The range is from 1 to 2.

Defaults Sending counter samples to the sFlow Collector is disabled by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command can be used for physical ports, SVI ports and sub routed ports and aggregate ports. sFlow datagrams can be output only when an IP address is configured for the corresponding sFlow Collector.

Configuration Examples The following example enables interface TenGigabitEthernet 0/5 to send counter samples to sFlow Collector 2.

Examples `FS(config-if-TenGigabitEthernet 0/5)# sflow counter collector 2`

Verification Use the **show sflow** command to display the sFlow counter sampling configuration.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.5 sflow counter interval

Use this command to configure the sFlow counter sampling interval.

sflow counter interval seconds

Use this command to restore the default sFlow counter sampling interval.

no sflow counter interval

Use this command to restore the default sFlow counter sampling interval.

default sflow counter interval

Parameter Description	Parameter	Description
	seconds	sFlow counter sampling interval. The range is form 3 to 2,147,483,647. The unit is second.

Defaults The default sFlow counter sampling interval is 30 seconds.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the global sFlow counter sampling interval, and sFlow Counter sampling of all interfaces uses this sampling interval.

Configuration Examples The following example configures the sFlow counter sampling interval to 60 seconds.

```
FS(config)# sflow counter interval 60
```

Verification Use the **show sflow** command to display the sFlow counter sampling interval.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.6 sflow flow collector

Use this command to enable the sFlow Agent to send flow samples to the sFlow Collector.

sflow flow collector collector-id

Use this command to disable the sFlow Agent to send flow samples to the sFlow Collector.

no sflow flow collector

Use this command to disable the sFlow Agent to send flow samples to the sFlow Collector.

default sflow flow collector

Parameter Description	Parameter	Description
	collector-id	sFlow Collector ID. The range is from 1 to 2.

Defaults Sending the flow samples to the sFlow Collector is disabled by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command can be used for physical ports, SVI ports, sub routed ports and aggregate ports. sFlow datagrams can be output only when an IP address is configured for the corresponding sFlow Collector.

Configuration Examples The following example enables interface TenGigabitEthernet 0/5 to send flow samples to sFlow Collector 2.

```
FS(config-if-TenGigabitEthernet 0/5)# sflow flow collector 2
```

Verification Use the **show sflow** command to display the sFlow flow sampling configuration.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.7 sflow flow max-header

Use this command to configure the maximum length of the packet header copied during flow sampling.

sflow flow max-header length

Use this command to restore the default maximum length of the packet header copied during flow sampling.

no sflow flow max-header

Use this command to restore the default maximum length of the packet header copied during flow sampling.

default sflow flow max-header

Parameter Description	Parameter	Description
	length	Maximum length of the packet header to be copied. The range is from 18 to 256. The unit is byte.

Defaults The default length is 64 bytes.

Command Mode Global configuration mode

Default Level 14

Usage Guide Configure the maximum number of bytes of the packet content copied from the header of the original packet. The copied content is recorded in the generated sample.

Configuration Examples The following example sets the maximum length of the packet header copied during sFlow flow sampling to 128 bytes.

```
FS(config)# sflow flow max-header 128
```

Verification Use the **show sflow** command to display the maximum length of the packet header copied during sFlow flow sampling.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.8 sflow sampling-rate

Use this command to configure the sampling rate of sFlow flow sampling.

sflow sampling-rate rate

Use this command to restore the default the sampling rate of sFlow flow sampling.

no sflow sampling-rate

Use this command to restore the default sampling rate of sFlow flow sampling.

default sflow sampling-rate

Parameter Description	Parameter	Description
	rate	Sampling rate of sFlow sampling. One packet is sampled from every n packets (n equals the value of rate). The range is from 4,096 to 16,777,215.
Defaults		The default sFlow flow sampling rate is 8,192.
Command Mode		Global configuration mode
Default Level		14
Usage Guide		This command is used to configure the global sampling rate of sFlow flow sampling, and sFlow flow sampling of all interfaces uses this sampling rate.
Configuration Examples		The following example sets the sFlow flow sampling rate to 4,096.
		<pre>FS(config)# sflow sampling-rate 4096</pre>
Verification		Use the show sflow command to display the sFlow flow sampling rate.
Prompt Messages		N/A
Common Errors		N/A
Platforms		N/A

7.9 sflow source

Use this command to configure the source address of the output packets.

sflow source { address { ip-address | ipv6 ipv6-address } | { interface { interface-name | ipv6 interface-name } }

Use this command to remove the source address of the output packets.

no sflow source { address | interface }

Use this command to restore the default source address of the output packets.

default sflow source { address | interface }

Parameter Description	Parameter	Description
	address	Configures the source IP address of sFlow output packets
	ip-address	sFlow Source IPv4 address

ipv6 ipv6-address	sFlow Source IPv6 address
interface	Configures the source interface of sFlow output packets
interface-name	sFlow Source interface (configured with an IPv4 address)
ipv6 interface-name	sFlow Source interface (configured with an IPv6 address)

Defaults The default sFlow Source address is the local device IP address which is used to ping the destination IP

Command Global configuration mode

Mode

Default Level 14

Usage Guide This command is used to configure the source IP address of the output packets. If a source interface is specified, the primary address of the interface will be the source IP address of the outputs packets. If the source interface is not specified, for example, the interface is shutdown, the default source address will be used.

Configuration The following example configures the source address of the sFlow output packets as 192.168.2.1.

Examples FS(config)# sflow source address 192.168.2.1

Verification Use the **show sflow** command to display the status of the sFlow sampling function.

Prompt Messages N/A

Common Errors N/A

Platforms N/A

7.10 sflow enable

Use this command to enable flow sampling and counter sampling on the interface.

sflow enable [ingress [acl id | name] | egress]

Use this command to disable flow sampling and counter sampling on the interface.

no sflow enable

Use this command to disable flow sampling and counter sampling on the interface.

default sflow enable

Parameter Description	Parameter	Description
	ingress	Enables sFlow sampling in ingress direction.
	egress	Enables sFlow sampling in egress direction.

id	ACL number.
name	ACL name.

Defaults	The sFlow sampling function on an interface is disabled by default.
Command	Interface configuration mode
Mode	
Default Level	14
Usage Guide	<p>This command can be used to enable counter sampling and flow sampling for physical ports, SVI ports, sub routed ports and aggregate ports. sFlow datagram can be output only when an IP address is configured for the corresponding sFlow Collector.</p> <p>If the direction parameter is not specified, sampling on both directions are enabled.</p> <p>The SVI ports and sub routed ports support only the ingress parameter.</p> <p>The ACL should be configured and applied on the interface before the flow sampling based on ACL matching is enabled.</p> <p>Up to two commands for ingress ACL-based flow sampling are supported on an interface.</p>
Configuration Examples	<p>The following example enables the sFlow sampling on interface TF GigabitEthernet 0/5 and enables ACL-based sFlow sampling on interface TF GigabitEthernet 0/3.</p> <pre> FS(config-if-TenGigabitEthernet 0/5)# sflow enable FS(config-if-TFGigabitEthernet 0/5)# exit FS(config)#ip access-list extended test_v4 FS(config-ext-nacl)#permit tcp any any FS(config-ext-nacl)# exit FS(config)#interface tfGigabitEthernet 0/3 FS(config-if-TFGigabitEthernet 0/3)#sflow enable ingress acl test_v6 FS(config-if-TFGigabitEthernet 0/3)#sflow enable ingress acl test_v4 FS(config-if-TFGigabitEthernet 0/3)#show this Building configuration... ! no switchport sflow enable ingress acl test_v6 sflow enable ingress acl test_v4 ! end FS(config-if-TFGigabitEthernet 0/3)# </pre>
Verification	Use the show sflow command to display the status of the sFlow sampling function.
Prompt Messages	N/A

Common Errors N/A

Platforms N/A

7.11 show sflow

Use this command to display the sFlow configuration.

show sflow

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode/global configuration mode/interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example displays the sFlow configuration.

```

FS# show sflow
sFlow datagram version 5
Global information:
Agent IP: 10.10.10.10
sflow counter interval:10
sflow flow max-header:128
sflow sampling-rate:4096
Collector information:
ID  IP                               Port Size VRF
1   192.168.2.100                     6343 1400
2   NULL                               0    1400
Port information
Interface          CID  FID  Enable
TenGigabitEthernet 0/1      0    1    B
TenGigabitEthernet 0/2      0    1    I
TenGigabitEthernet 0/3      0    1    E
    
```

Field Description:

Field	Description
sFlow datagram version	sFlow datagram version. Currently, FS supports V5 only.
Agent IP	IP address of the sFlow Agent. It can be configured by using the sflow Agent address {ip-address ipv6 ipv6-address } command.
sflow counter interval	Counter sampling interval

sflow flow max-header	The maximum length of bytes of the packet header to be copied
sflow sampling-rate	Flow sampling rate
ID	sFlow Collector ID
IP	The IP address of the sFlow Collector to receive sFlow datagram
Port	Port No. of the sFlow Collector to receive sFlow datagram
Size	The maximum length of the output sFlow datagram
VRF	VRF instance name of sFlow Collector
Interface	An interface configured with sFlow function
CID	The destination sFlow Collector ID to which the sFlow Agent sends the counter samples.
FID	The destination sFlow Collector ID to which the sFlow Agent sends the flow samples.
Enable	The status of the sFlow sampling function

Prompt Messages N/A

Platforms N/A

7.12 show sflow stats

Use this command to display the statistics of sFlow packets. (This command is provided for debugging.)

show sflow stats

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode/global configuration mode/interface configuration mode

Default Level 14

Usage Guide This command is provided for debugging. The outputs of this command are for expert’s analysis. The **sflow export packet num** field, which indicates the output packet count, is provided for simple query.

Configuration The following example displays sFlow statistics.

```

Examples
FS#show sflow stats
sflow drop flow num:0
sflow drop invalid flow num:0
sflow receive flow num:0
sflow drop counter num:0
sflow receive counter num:0
sflow malloc fail num:0
    
```

```

sflow get counter fail num:0
sflow export packet num:0
sflow export fail num:0
sflow export flow num:0
sflow export counter num:0
sflow export sampler fail num:0
sflow current msg list len:0
    
```

Field Description:

Field	Description
sflow drop flow num	The number of sFlow samples dropped by the sFlow agent.
sflow drop invalid flow num	The number of invalid sFlow samples dropped by the sFlow agent.
sflow receive flow num	The number of sFlow samples received by the sFlow agent.
sflow drop counter num	The number of counter samples dropped by the sFlow agent.
sflow receive counter num	The number of counter samples received by the sFlow agent.
sflow malloc fail num	The number of failures about memory application.
sflow get counter fail num	The number of failed counter samples obtained by the sFlow agent.
sflow export packet num	The number of packets output by the sFlow agent.
sflow export fail num	The number of failed packets output by the sFlow agent.
sflow export flow num	The number of sFlow samples output by the sFlow agent.
sflow export counter num	The number of counter samples output by the sFlow agent.
sflow export sampler fail num	The number of failed samples, including the counter samples and sFlow samples.
sflow current msg list len	The length of the message queue of the sFlow agent.

Prompt Messages N/A

Platforms N/A

8 IPFIX Commands

8.1 clear { ip | ipv6 } flow stats

Use this command to clear flow table information.

```
clear { ip | ipv6 } flow stats
```

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to clear flow table information, and then all entries will be aged.

Configuration Examples The following example clears IP information.

```
FS# clear ip flow stats
```

The following example clears IPv6 information.

```
FS# clear ipv6 flow stats
```

Prompt Message N/A

Platform Description N/A

8.2 [ipv6] flow-sampler

Use this command to configure the sampling rate for an interface.

```
[ ipv6 ] flow-sampler sampler-map-name [ acl { id | name } | egress ]
```

Parameter	Parameter	Description
Description	ipv6	Configures the IPv6 packet sampling rate. By default, the sampling rate is valid to IPv4 packets if no protocol type is specified.
	sampler-map-name	Indicates the name of a sampling rate rule applied to an interface.

egress	Indicates the outbound direction. The configuration takes effect on the inbound direction if no direction is specified.
id	Indicates the ACL ID.
name	Indicates the ACL name.

Defaults No sampling rate rule is applied to an interface by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. A sampling rate rule needs to be configured before a sampling rate is configured for an interface.
2. This command cannot be used together with the **ip flow ingress** and **ip flow egress** commands. If they are configured together, the **flow-sampler [egress]** command has a higher priority than the **ip flow { ingress | egress }** command.
3. This command can be configured only on physical ports and Aggregate Ports (APs).
4. An ACL is applied only to inbound sampling by default. That is, if an ACL is configured or **egress** is not specified, the configured sampling rate rule is applied to inbound sampling. Configure an ACL before applying a sampling rate rule. After the ACL is applied to an interface, sampling is conducted on packets matching the ACL.

Configuration The following example configures the sampling rate for port 2/2.

Examples

```
FS# config terminal
FS(config)# flow-sampler-map my_sampler
FS(config-sampler)# mode random one-out-of 666
FS(config-sampler)# exit
FS(config)# interface gi 2/2
FS(config-if)# flow-sampler my_sampler
FS(config-if)# exit
```

Verification Run the **show ip flow interface** command to check whether the configuration is successful.

Prompt 1. The sampling function fails to be enabled on an interface.

Message Enable flow sampler failure.

2. The sampling rate rule does not exist.

sampler not exist.

8.3 flow-sampler-map

Use this command to enter the sampling rate rule configuration mode. Use the **no** form of this command to delete the sampling rate rule configuration mode.

flow-sampler-map sampler-map-name

no flow-sampler-map sampler-map-name

Parameter Description	Parameter	Description
	sampler-map-name	Indicates the name of a sampling rate rule.

Defaults No sampling rate rule is configured by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example configures a sampling rate rule.

Examples

```

FS# config terminal
FS(config)# flow-sampler-map my_sampler
FS(config-sampler)# mode random one-out-of-666
FS(config-sampler)# exit
    
```


Verification Run the **show flow-sampler** command to check whether the configuration is successful.

8.4 { ip | ipv6 } flow egress

Use this command to enable IPFIX sampling on outbound packets on an interface. Use the **no** form of this command to restore the default settings.

{ ip | ipv6 } flow egress

no { ip | ipv6 } flow egress

Parameter Description	Parameter	Description
	N/A	N/A

Defaults IPFIX sampling on outbound packets of an interface is disabled by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. This command is used to enable the IPFIX flow statistics function on an interface of the switch. The IPFIX function can be enabled globally only after the **{ ip | ipv6 } flow egress** or **{ ip | ipv6 } flow ingress** command is configured on at least one interface.
2. This command can be configured only on physical ports and APs.

Configuration The following example enables the IP flow statistics function in the outbound direction of port 0/1.

Examples

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# ip flow egress
FS(config-if)# exit
```

Verification Run the **show ip flow interface** command to check whether the configuration is successful.

Prompt Message The sampling fails to be enabled in the outbound direction.

Enable flow egress failure.

8.5 { ip | ipv6 } flow ingress

Use this command to enable IPFIX sampling on inbound packets on an interface. Use the **no** form of this command to restore the default settings.

{ ip | ipv6 } flow ingress

no { ip | ipv6 } flow ingress

Parameter Description	Parameter	Description
	N/A	N/A

Defaults IPFIX sampling on inbound packets of an interface is disabled by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide

1. This command is used to enable the IPFIX flow statistics function on an interface of the switch. The IPFIX function can be enabled globally only after the **{ ip | ipv6 } flow egress** or **{ ip | ipv6 } flow ingress** command is configured on at least one interface.
2. This command can be configured only on physical ports and APs.

Configuration The following example enables the IP flow statistics function in the inbound direction of port 0/1.

Examples

```
FS(config)# interface gigabitEthernet 0/1
FS(config-if)# ip flow ingress
FS(config-if)# exit
```

Verification Run the **show ip flow interface** command to check whether the configuration is successful.

Prompt Message The sampling function fails to be enabled in the inbound direction.

Enable flow ingress failure.

8.6 { ip | ipv6 } flow-cache timeout

Use this command to set aging time for main mode flows. Use the **no** form of this command to restore the default settings.

{ ip | ipv6 } flow-cache timeout { active minutes | inactive seconds }

no { ip | ipv6 } flow-cache timeout { active | inactive }

Parameter Description	Parameter	Description
	active minutes	Indicates the active aging time, in minutes, that is, the time that an active entry can exist in the main mode cache before export or deletion. The valid value range is from 1 to 60 and the default value is 30.
	inactive seconds	Indicates the inactive aging time, in which no flow record about an entry is detected before the main mode entry is aged. The value ranges from 10 seconds to 600 seconds. The default value is 15 seconds.





Defaults The default active aging time of main mode entries is 30 minutes.

The default inactive aging time of main mode entries is 15 seconds.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to set the active and inactive aging time for record entries in the main cache. If packets belonging to a flow are continuously detected, the flow is deemed active. If no packet belonging to a flow is detected within a period of time (inactive aging time), the flow is inactive and should be aged.

-  Flows can be aged in three ways:
-  The aging time expires.
-  Flow aging can be triggered by the FIN or RST flag of TCP packets.
-  Commands can be executed to forcibly age all entries.

Configuration The following example sets the active aging time.

Examples FS(config)# ip flow-cache timeout active 20

```
Or:
FS(config)# ipv6 flow-cache timeout active 20
```

The following example sets the inactive aging time.

```
FS(config)# ip flow-cache timeout inactive 10
Or:
FS(config)# ipv6 flow-cache timeout inactive 10
```

Verification N/A

Prompt Message The following prompt is displayed when a configuration failure occurs:

```
Set ip flow cache timeout failure.
```

8.7 { ip | ipv6 } flow-export

Use this command to configure the server, to which main mode flow records are to be exported. Use the **no** form of this command to restore the default settings.

```
{ ip | ipv6 } flow-export { destination { ipv6 ipv6_addr | ip-address | hostname } udp-port [ [ vrf vrf-name ] | [ oob [ via mgmt mgmt-name ] ] ] | version { 5 | 9 | 10 } | source interface-name | template { refresh-rate packets | timeout-rate minutes | options { export-stats | refresh-rate packets | timeout-rate minutes } | model model-id } | interface-type { port | vlan } }
```

```
no { ip | ipv6 } flow-export { destination { ipv6 ipv6_addr | ip-address | hostname } udp-port [ vrf vrf-name ] | version | source | template { { refresh-rate | timeout-rate } | options { export-stats | refresh-rate | timeout-rate } | model } | interface-type }
```

Parameter Description	Parameter	Description
	destination { ipv6 ipv6_addr ip-address hostname } udp-port }	Indicates the host name or IP/IPv6 address of the server, to which main mode flow records should be sent, and the listening port number of the collector.
	vrf vrf-name	Indicates the name of the VRF instance, to which the collector IP address belongs.
	oob	Indicates that sampled packets are exported from the management port. It is not configured by default.
	via mgmt mgmt-name	Indicates the name of the management port for exporting sampled packets. It is not configured by default.

version { 5 9 10 }	Indicates the packet export format. version 5 indicates that packets are exported in compliance with the Netflow V5 standard, version 9 indicates that packets are exported in compliance with the Netflow V9 standard, and version 10 indicates that packets are exported in compliance with the IETF standard. The default value is version 10 .
source interface-name	Uses the IP address of a configured interface as the source IP address for exporting packets.
template	Enables template output. If this field is configured, refresh-rate or timeout-rate or both can be configured.
refresh-rate packets	Specifies the template retransmission frequency, with the unit of packets. The value ranges from 1 to 600 and the default value is 20.
timeout-rate minutes	Specifies the template retransmission interval, with the unit of minutes. The value ranges from 1 to 3600 and the default value is 10.
options	Enables the keywords export-stats , refresh-rate , and timeout-rate to configure data output options.
export-stats	Enables the export of option data packets, including the number of exported IPFIX packets and number of exported IPFIX flow records.
refresh-rate packets	Sets the retransmission frequency of option data, with the unit of packets. The value ranges from 1 to 600. The default value is 20.
timeout-rate minutes	Sets the retransmission interval of option data, with the unit of minutes. The value ranges from 1 minute to 3600 minutes. The default value is 10 minutes.
interface-type { port vlan }	Indicates the type of the device interface for exporting flow statistics to the IPFIX server. port Displays the physical port. vlan Displays the VLAN interface. The default interface type is port .
model model-id	Indicates the template mode ID. The value can be 0 or 1 and the default value is 0. Template mode 0 indicates that an inbound sampling template and an outbound sampling template exist. Template mode 1 indicates that the sampling direction is not differentiated and statistics in the inbound and outbound directions are recorded in the same template.

Defaults

No destination address and port for exporting flow records are configured by default.

The default data template retransmission frequency is 20 packets and the default retransmission interval is 10 minutes.

No output option is enabled by default.

The default packet output format is **version 10**.

The default interface type is **port**.


Command Mode Global configuration mode

Default Level 14

Usage Guide After the IPFIX function is enabled, you can run the { **ip | ipv6** } **flow-export destination** command to configure the server, to which IPFIX flow records are to be exported. Generally, the flow record processing software runs on the server to process flow records exported from the device. This command supports at most two combinations of destination IP/IPv6 addresses and ports. The purpose is to export flow records to two different servers to achieve redundancy. Therefore, two different destination IP addresses are generally configured. You can also configure the same destination IP address with different destination ports. In this case, you will receive a warning, indicating that you have configured two servers with the same IP/IPv6 addresses.

When the source interface is specified, the source address of the IPFIX packets to be exported is the main address of the interface (the IPv6 address is the first global IPv6 address of the interface).

When no source interface is specified, the source address of the IPFIX packets to be exported is the local address that best-matches the server address. The server address can be an IPv4 or IPv6 address or both. If the source interface is specified and the server address is set to an IPv6 address, ensure that an IPv6 address is configured for the source interface. If the server address is set to an IPv4 address, ensure that an IPv4 address is configured for the source interface. Otherwise, the system obtains the best-matched local address as the source address based on the server address. You must ensure that the source interface and the server, to which flow records are to be exported, belong to the same VRF instance. Otherwise, the system obtains the best-matched local address as the source address based on the server address.

-  The server address can be an IPv4 or IPv6 address or both. A maximum of two addresses can be configured. If the source interface is specified and the server address is set to an IPv6 address, ensure that an IPv6 address is configured for the source interface. If the server address is set to an IPv4 address, ensure that an IPv4 address is configured for the source interface. Otherwise, the system obtains the best-matched local address as the source address based on the server address.

When the flow statistics function is enabled on a physical port that is a member interface of SVI, the statistics port can be an SVI or layer-2 physical port. Users can use this command to configure the port type (physical port or SVI) to be displayed (sent to the server). If a physical port is a routing port, the physical port cannot belong to any VLAN. Therefore, the port for exporting IP packet flows to the IPFIX server is a physical port regardless of whether the **ip flow-export interface-type** command is configured.

Configuration The following example configures the destination address, to which IPFIX main mode flow records are to be

Examples exported.

```
FS(config)# ip flow-export destination 10.42.42.1 9991
FS(config)# ipv6 flow-export destination
```

The following example configures multiple destination addresses, to which IPFIX main mode flow records are to be exported (two addresses are supported currently).

```
FS(config)# ip flow-export destination 10.42.42.1 9991
FS(config)# ip flow-export destination 10.0.101.254 9991
FS(config)# ipv6 flow-export destination ipv6 1111::1111 9991
```

The following example configures multiple destination addresses, to which IPFIX main mode flow records are to be exported.

```
FS(config)# ip flow-export destination 10.42.42.1 9991
FS(config)# ip flow-export destination 10.42.42.2 9992
```

The following example configures the retransmission rate of the main mode data template.

```
FS(config)# ip flow-export template refresh-rate 100
FS(config)# ip flow-export template timeout-rate 60
FS(config)# ipv6 flow-export template refresh-rate 100
FS(config)# ipv6 flow-export template timeout-rate 60
```

The following example configures the type of interface that exports traffic statistics to the IPFIX server.

```
FS(config)# ip flow-export interface-type port
FS(config)# no ip flow-export interface-type
```

Verification Run the **show { ip | ipv6 } flow export** command to display output information.

Prompt Message The following prompt is displayed when the address and port of the server, to which flow records are to be exported, fail to be configured.

```
Set ip flow export destination failure.
```

If two servers are configured to have the same address but different port numbers, the following prompt is displayed.

```
%%Warning:Destination address is the same as previous address [ ip-address | ipv6_addr ] udp port [ udp-port ]
```

The following prompt is displayed, indicating a configuration failure when the third server address is configured.

```
%%Error:Exceeded maximum export destinations
```

The following domain name resolution prompt is displayed when a domain name is configured.

```
Translating "[ hostname ]"...
```

The domain name resolution is successful.

```
"[ hostname ]" Translated to an invalid address [ ip-address | ipv6_addr ]
```

The domain name resolution fails.

```
"[ hostname ]" Translating fail!
```

8.8 mode

Use this command to configure a random sampling rate rule.

mode random one-out-of packet-interval

The **no** form of this command does not exist. The random sampling rate rule configuration is deleted when the sampling rate rule configuration mode is deleted.

Parameter Description	Parameter	Description
	packet-interval	Indicates that one packet is randomly sampled in consecutive packet-interval packets.

Defaults No random sampling rate rule is defined by default.

Command Mode IPFIX sampling rate rule configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example configures the sampling rate for port 2/2.

```

Examples
FS# config terminal
FS(config)# flow-sampler-map my_sampler
FS(config-sampler)# mode random one-out-of 666
FS(config-sampler)# exit
FS(config)# interface gi 2/2
FS(config-if)# flow-sampler my_sampler
FS(config-if)# exit
    
```

Verification Run the **show flow-sampler** command to check whether the configuration is successful.

8.9 show flow-sampler

Use this command to display a random sampling rate rule and sampling statistics.

show flow-sampler [sampler-map-name]

Parameter Description	Parameter	Description
	sampler-map-name	Indicates the name of a random sampling rate rule. If it is not specified, all random sampling rate rules will be displayed.

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide

Configuration The following example displays a random sampling rate rule.

```

Examples
FS# show flow-sampler my_sampler
Sampler : my_sampler, id : 1, mode : random sampling mode
sampling interval is : 666
    
```

Field description:

Field	Description
-------	-------------

Sampler	Name of a random sampling rate rule
id	ID of a random sampling rate rule
mode	Random sampling rate rule. The value is random sampling mode .
sampling interval	Sampling interval

8.10 show { ip | ipv6 } flow cache

Use this command to display information about the main mode flow table.

show { ip | ipv6 } flow cache

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide This command is used to display information about the main mode flow table and flow records.

Configuration Examples The following example displays the main mode flow table.

```

FS# show ip fl cache
IPFIX NMM(slot-2):
  IPV4 Flow Switching Cache, 1160 bytes
  5 active, 65531 inactive, 87118 added
  0 flow alloc failures
  Exporting flows to 10.0.0.0 (9996)
  39009 ipv4 flows exported in 19199 udp datagrams, 0 failed
  Last clearing of statistics 11 Days 21:55:19
SrcIif          SrcIPAddress  DstIif          DstIPAddress    Pr  Tos  Flgs  Pkts
Port  Msk AS      Port  Msk AS          NextHop          B/Pk  Active
GigabitEthernet 5/1 192.168.2.1    local           1.1.1.1         6   192  10   6
48837 /24 100      646   /32 0           0.0.0.0         49   30
GigabitEthernet 5/3 10.0.0.2      GigabitEthernet 5/1 11.0.0.2        1   0    0   300
    
```

```

0 /24 0 0 /24 0 0.0.0.0 100 47
Pos:Lbl-Exp-S 1:16-0-0 (LDP/2.2.2.2) 2:17-0-1
RD:100:1 VRF Name:vpn1
GigabitEthernet 5/1 11.0.0.2 GigabitEthernet 5/3 10.0.0.2 1 0 0 300
0 /24 0 0 /24 0 0.0.0.0 100 47
Pos:Lbl-Exp-S 1:1024-0-1 (VPN/0.0.0.0)
RD:100:1 VRF Name:vpn1
GigabitEthernet 5/1 2.2.2.2 local 1.1.1.1 6 192 10 1
179 /32 100 15005 /32 0 0.0.0.0 40 0
Protocol Total Flows Packets Bytes Packets Active(Sec) Idle(Sec)
----- Flows /Sec /Flow /Pkt /Sec /Flow /Flow
TCP-BGP 22398 0 1 48 0 2 15
TCP-other 13963 0 8 49 0 53 5
UDP-other 3838 0 4 152 0 4 15
ICMP-IPV4 27913 0 358 100 9 57 1
OSPF 11 0 6 92 0 4 14
Total: 68123 0 149 99 9 36 7
    
```

Field description:

Field	Description
active	Number of flow records in the current flow table
inactive	Number of flow records that can be created in the current flow table. The symbol "-" is displayed if no value is obtained.
added	Number of flow records created from the last flow table clearing time to current display time
flow alloc failures	Number of flows that fail to be created
Exporting flows to	Address and port number of the server, to which flow records are exported
ipv4 flows exported	Number of exported flows, packet format, and number of packets that fail to be exported
Last clearing of statistics	Time elapsed from the last flow table clearing operation to the current display
Srclf	Source interface
SrclPAddress	Source IP address/IPv6 address
Dstlf	Destination interface
DstIPAddress	Destination IP address/IPv6 address

Pr	Protocol ID
Tos	ToS field in packets
Flgs	TCP flag or operation result of all packets in the flow records
Pkts	Number of packets
Port	Source port and destination port
Msk	Length of subnet mask of the source IP address and destination IP address
AS	Source AS number and destination AS number
NextHop	IP address of the next-hop AS
B/Pk	Average number of bytes in each packet
Active	Active time of a flow
Protocol	Protocol type
Total Flows	Total number of flows of a protocol type
Flows /Sec	Average number of flows per second
Packets/Flow	Average number of packets in each flow
Bytes/Pkt	Average number of bytes in each packet
Packets/Sec	Average number of packets per second
Active(Sec) /Flow	Average active time of each flow
Idle(Sec) /Flow	Average idle time of each flow
Pos:Lbl-Exp-S	Label position: label-EXP label-whether the label is a stack bottom label
LDP/2.2.2.2	Top label type and address
RD	Routing domain
VRF Name	VRF instance name

Prompt

The main mode is not enabled.

Message

Cache Disabled

8.11 show { ip | ipv6 } flow export

Use this command to display information about the server, to which flow records are exported.

show { ip | ipv6 } flow export

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide This command is used to display exported information of all modes.

Configuration Examples The following example displays information about the server, to which flow records are exported.

```
FS# show ip flow export
IPV4 main Cache:
  Exporting flows to 1.1.1.3 (9996)
  Exporting using source IP address 1.1.1.1
  Version 10 flow records
  IPV4 Template ID = 256
    Template timeout = 10 Minute(s)
    Template refresh rate = 20
  0 flows exported in 0 udp datagrams
  0 flows failed to export
  0 messages failed to export
```

Field description:

Field	Description
IPV4 main Cache	Display mode
Exporting flows to	IP address and port number of the server
Exporting using source IP address	Source IP address of exported packets

Version	IPFIX version of exported packets
IPv4 Template ID	Template ID of exported packets
Template timeout	Template packet retransmission interval, with the unit of minutes
Template refresh rate	Template packet retransmission frequency, with the unit of packets
0 flows exported in 0 udp datagrams	Number of exported flows and packets
flows failed to export	Number of flows that fail to be exported
messages failed to export	Number of packets that fail to be exported

8.12 show ip flow interface

Use this command to display the IPFIX configuration of an interface.

show ip flow interface

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide This command can be used to display the IPFIX configuration, including IPFIX IPv4 configuration and IPFIX IPv6 configuration of all interfaces.

Configuration Examples The following example displays the IPFIX configuration of an interface.

```
FS# show ip flow interface
FS# show ip flow interface
GigabitEthernet 0/1
ip flow ingress
```

Field description:

Field	Description
ip flow ingress	The ip flow interface command is configured on an interface.

9 NETCONF Commands

9.1 netconf capability candidate

Use this command to enable the candidate and confirmed-commit capabilities of NETCONF. Use the **default** form of this command to restore the default settings. Use the **no** form of this command to disable the candidate and confirmed-commit capabilities of NETCONF.

- netconf capability candidate**
- default netconf capability candidate**
- no netconf capability candidate**

Parameter	Parameter	Description
Description	N/A	N/A

Defaults The candidate and confirmed-commit capabilities of NETCONF are disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide Only sessions connected after this command is configured take effect.

Configuration The following example enables the candidate and confirmed-commit capabilities of NETCONF.

Example

```

FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# netconf capability candidate
FS(config)#
    
```

Verification N/A

Prompt N/A

Common Errors N/A

Platform N/A
Description

9.2 netconf capability rollback

Use this command to enable the rollback-on-error capability of NETCONF. Use the **default** form of this command to restore the default settings. Use the **no** form of this command to disable the rollback-on-error capability of NETCONF.

- netconf capability rollback**

default netconf capability rollback
no netconf capability rollback

Parameter					
Description					
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Defaults	The rollback-on-error capability of NETCONF is disabled by default.				
Command Mode	Global configuration mode				
Default Level	14				
Usage Guide	Only sessions connected after this command is configured take effect.				
Configuration Example	<p>The following example enables the rollback-on-error capability of NETCONF.</p> <pre> FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# netconf capability rollback FS(config)# </pre>				
Verification	N/A				
Prompt	N/A				
Common Errors	N/A				
Platform	N/A				
Description					

9.3 netconf capability validate

Use this command to enable the validate capability of NETCONF. Use the **default** form of this command to restore the default settings. Use the **no** form of this command to disable the validate capability of NETCONF.

netconf capability validate
default netconf capability validate
no netconf capability validate

Parameter					
Description					
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				

Defaults The validate capability of NETCONF is disabled by default.

Command Mode	Global configuration mode
Default Level	14
Usage Guide	Only sessions connected after this command is configured take effect.
Configuration Example	The following example enables the validate capability of NETCONF. <pre>FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# netconf capability validate FS(config)#</pre>
Verification	N/A
Prompt	N/A
Common Errors	N/A
Platform Description	N/A

9.4 netconf enable

Use this command to enable the NETCONF framework. Use the **no** form of this command to disable the NETCONF framework. Use the **default** form of this command to restore the default settings.

- netconf enable**
- no netconf enable**
- default netconf enable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults NETCONF framework is enabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example enables the NETCONF framework.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

```
FS(config)# netconf enable
FS(config)#
```

Verification	N/A
Prompt	N/A
Common Errors	N/A
Platform Description	N/A

9.5 netconf feature-disable

Use this command to disable the feature function of NETCONF. Use the **default** form of this command to restore the default settings. Use the **no** form of this command to enable the feature function of NETCONF.

- netconf feature-disable**
- default netconf feature-disable**
- no netconf feature-disable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The feature function of NETCONF is enabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example disables the feature function of NETCONF.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# netconf feature-disable
FS(config)#
```

Verification	N/A
Prompt	N/A
Common Errors	N/A

Platform N/A
Description

9.6 netconf filter nodes-limit

Use this command to configure the maximum number of nodes which can be searched by the NETCONF session. Use the **default** form or **no** form of this command to restore the default settings.

netconf filter nodes-limit num
default netconf filter nodes-limit
no netconf filter nodes-limit

Parameter	Description
num	Specifies the maximum number of nodes. The default value is 100000, and the value ranges from 100 to 2147483647.

Defaults By default, the maximum number of nodes which can be searched by the NETCONF session is 100000.

Command Mode Global configuration mode

Default Level 14

Usage Guide This configuration takes effect only on the search result whose target is running.

Configuration Example The following example configures the maximum number of nodes which can be searched by the NETCONF session.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# netconf filter nodes-limit 101
FS(config)#
```

Verification N/A

Prompt N/A

Common Errors N/A

Platform N/A
Description

9.7 netconf max-sessions

Use this command to configure the maximum number of the NETCONF session. Use the **default** form or **no** form of this command to restore the default settings.

netconf max-sessions num
default netconf max-sessions
no netconf max-sessions

Parameter Description	Parameter	Description
	num	Specifies the maximum number of the NETCONF session. The default value is 5, and the value ranges from 1 to 36.

Defaults By default, the maximum number of the NETCONF session is 5.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example configures the maximum NETCONF session number.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# netconf max-sessions 15
FS(config)#
```

Verification N/A

Prompt N/A

Common Errors N/A

Platform Description N/A

9.8 netconf port

Use this command to configure the NETCONF monitoring port. Use the **default** form or **no** form of this command to restore the default settings.

netconf port num
default netconf port
no netconf port

Parameter Description	Parameter	Description
	num	Specifies the monitoring port. The default port is 830, and the value

	ranges from 1025 to 65535.
--	----------------------------

Defaults By default, port 830 is used for monitoring.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example configures the NETCONF monitoring port.

Example

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# netconf port 1234
FS(config)#
```

Verification N/A

Prompt N/A

Common Errors N/A

Platform Description N/A

9.9 netconf yang multi-revision

Use this command to enable the YANG module multi-version notification of NETCONF. Use the **default** form of this command to restore the default settings. Use the **no** form of this command to disable the YANG module multi-version notification of NETCONF.

- netconf yang multi-revision**
- default netconf yang multi-revision**
- no netconf yang multi-revision**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The YANG module multi-version notification of NETCONF is enabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide	N/A
Configuration	The following example enables the YANG module multi-version notification of NETCONF.
Example	<pre>FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# netconf yang multi-revision FS(config)#</pre>
Verification	N/A
Prompt	N/A
Common Errors	N/A
Platform	N/A
Description	

10 gRPC Commands

10.1 authen aaa-config

Use this command to configure the retry count and timeout time for AAA server authentication. Use the **no** form of this command to restore the default retry count and timeout time of AAA server authentication.

authen aaa-config {**retry** times | **timeout** second}

no authen aaa-config {**retry** | **timeout**}

Parameter	Description
retry	Sets the retry count for AAA server authentication.
times	Indicates the number of retries. The value ranges from 1 to 100 .
timeout	Sets the timeout time for AAA server authentication.
second	Indicates the timeout time, in seconds. The value ranges from 0 to 300 and the value 0 indicates that the authentication is considered failed after an AAA server timeout message is received.

Defaults The default retry count is 1 and the default timeout time is 4s.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide Use this command to configure the authentication retry count and timeout time for the AAA server authentication mode in the case of server login. It is not recommended to change the default retry count and timeout time. A large retry count or improper timeout time may result in AAA lockout for 15 minutes (you can run the **clear aaa local user lockout all** command to clear the AAA lockout).

Configuration Example The following example sets the retry count to 2 and timeout interval to 20s for AAA server authentication.

```
FS(config)# grpc
FS(config-grpc)# authen aaa-config retry 2
FS(config-grpc)# authen aaa-config timeout 20
```

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform N/A
Description

10.2 authen login

Use this command to configure the authentication mode for server login. Use the **no** form of this command to configure the authentication-free mode for server login. Use the **default** form of this command to restore the default login authentication mode.

authen login {local | authentication mlist}

no authen login

default authen login

Parameter Description	Parameter	Description
	local	Uses the local username library for authentication.
	authentication	Uses a specified AAA server list for authentication.
	mlist	Indicates the name of an AAA list.

Defaults Local login is configured by default, that is, the **authen login local** command is configured.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide After receiving a login request from a server, the device selects AAA local authentication, AAA server authentication, or authentication-free mode as required. When the authentication is successful, the device records the login user information, namely, the IP address and username of the server. The device responds only to acquisition event requests initiated by authenticated servers.

Configuration Example The following example sets the authentication mode to AAA local authentication.

```
FS(config)# grpc
FS(config-grpc)# authen login local
```

The following example sets the authentication mode to the authentication-free mode.

```
FS(config)# grpc
FS(config-grpc)# no authen login
```

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform N/A
Description

10.3 clear grpc channel

Use this command to clear statistics of a server that subscribes to gRPC events.

clear grpc channel [ip-address port-id] [**counter**]

Parameter Description	Parameter	Description
	ip-address	Specifies the server IPv4 address.
	port-id	Specifies the port ID of the server.
	counter	Indicates the packet transmission statistics of the channel.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide Use this command to clear statistics of a server that subscribes to gRPC events.

Configuration Example The following example clears statistics of a server that subscribes to gRPC events.

Example

```
FS# clear grpc channel
```

The following example clears the statistics on transmitted packets of a server with the IP address of 192.168.1.1 and port ID of 50051 that subscribes to gRPC events.

```
FS# clear grpc channel 192.168.1.1 50051 counter
```

Prompt N/A

Platform N/A
Description

10.4 clear grpc subscr

Use this command to clear data of gRPC periodic events and real-time events.

clear grpc subscr [sample] [**counter**]

Parameter Description	Parameter	Description
	sample	Indicates periodic events.
	counter	Indicates event statistics.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide Use this command to clear data of gRPC periodic events and real-time events.

Configuration The following example clears data of gRPC periodic events and real-time events.

Example

```
FS# clear grpc subscr
```

The following example clears statistics on gRPC periodic events.

```
FS# clear grpc subscr sample counter
```

Prompt N/A

Platform Description N/A

10.5 **grpc**

Use this command to create the gRPC mode and enable the gRPC function. Use the **no** form of this command to delete the gRPC mode and disable the gRPC function.

grpc
no grpc

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The gRPC mode is not created and the gRPC function is disabled by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide Use this command to create a gRPC instance, enable the gRPC function, and enter the gRPC process configuration mode.
The gRPC client and gRPC server services are created at the same time when the gRPC function is enabled. The gRPC client service uploads data to a server while the gRPC server service parses authentication messages and acquisition messages sent from a server.

Configuration The following example creates the gRPC mode.

Example

```
FS# configure terminal
FS(config)# grpc
```

Verification Run the **show run** command to check whether the gRPC mode is created.

Prompt N/A

Common Errors N/A

Platform Description N/A

10.6 reply-source-interface

Use this command to configure a source interface for GET data. Use the **no** form of this command to restore the default settings of the source interface for GET data.

reply-source-interface interface-type interface-number
no reply-source-interface

Parameter Description	Parameter	Description
	interface-type	Specifies an interface.
	interface-number	

Defaults The source interface for GET data is random by default.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide By default, the GET data is sent from a random source interface. You can use this command to enable the server to receive packets from a specified interface only.

Configuration The following example configures the source interface for GET data as Loopback 0.

```
FS(config)# grpc
FS(config-grpc)# reply-source-interface Loopback 0
```

Verification Run the **show run** command to check whether the source interface is specified.

Prompt N/A

Common Errors N/A

Platform Description N/A

10.7 reply-timeout

Use this command to set the data response timeout time for the device serving as the gRPC server. Use the **no** form of this command to restore the default data response timeout time of the device serving as the gRPC server.

reply-timeout interval

no reply-timeout

Parameter Description	Parameter	Description
	interval	Indicates the data response timeout time of the device serving as the gRPC server, in seconds. The default value is 10 and the value ranges from 1 to 300.

Defaults The default value is 10 seconds.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide After timeout time is set for the gRPC process and the collector delivers the GET/SET operation, the device returns a timeout error to the collector if it fails to obtain data within the timeout time.

Configuration The following example sets the gRPC data response timeout time to 30 seconds.

Examples

```
FS(config)# grpc
FS(config-grpc)# reply-timeout 30
```

Verification Run the show run command to check whether the command is configured.

Prompts N/A

Common Errors N/A

Platform Description N/A

10.8 subscr

Use this command to enable subscribed events of gRPC. Use the **no** form of this command to disable subscribed events of gRPC.

subscr [realtime | sample] enable

no subscr [realtime | sample] enable

Parameter Description	Parameter	Description
	realtime	Indicates subscribed real-time events.
	sample	Indicates subscribed periodic events.

Defaults Subscribed events are disabled by default.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide After configuring to-be-subscribed events, the gRPC process waits for the NETCONF manager to send a subscribed event. When a received subscription message matches the local to-be-subscribed event, the gRPC process enables the function of reporting gRPC data of the event to the server. After the NETCONF manager sends an unsubscribed event, if the received unsubscription message matches the local to-be-subscribed event, the gRPC process disables the function of reporting gRPC data of the event to the server.

If the gRPC process configures no to-be-subscribed event, the gRPC process performs no processing when receiving a subscribed or unsubscribed event from the NETCONF manager.

Configuration The following example configures to-be-subscribed real-time events of gRPC.

Example

```
FS(config)# grpc
FS(config-grpc)# subscr realtime enable
```

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform N/A
Description

10.9 subscr-realtime-interval

Use this command to configure the suppression interval for real-time events. Use the **no** form of this command to restore the default suppression interval of real-time events.

subscr-realtime-interval {all interval | realtime json-event interval}

no subscr-realtime-interval {all | realtime type}

Parameter Description	Parameter	Description
	all	Indicates that the configuration takes effect on all real-time events.
	realtime	Indicates that the configuration takes effect on a specific real-time event.
	json-event	Indicates the type of the configured real-time event. For details, see the output of the show grpc subscr include json command.
	interval	Specifies the suppression interval for reporting data of real-time

	events, in milliseconds. The value ranges from 1 to 1000000 and real-time events are not suppressed by default.
--	---

Defaults Real-time events are not suppressed by default.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide After the device enables a subscribed real-time event, if the threshold of the event is triggered, real-time packets are generated and sent to the server that subscribes to the event. When the threshold is triggered frequently, a large number of packets are generated and sent to the server within a short period of time. Data of these packets may be the same but handling these packets greatly increases the overheads of the device and server. To prevent this case, run the **subscr-realtime-interval** command to suppress the generation of new packets for real-time events within a period of time.

Configuration Example The following example sets the suppression time to 500 ms for all real-time events.

```
FS(config)# grpc
FS(config-grpc)# subscr-realtime-interval all 500
```

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform N/A

Description

10.10 subscr-sample-interval

Use this command to configure the timer interval for periodic events. Use the **no** form of this command to restore the default timer interval of periodic events.

subscr-sample-interval interval [**millisecond** millisecond]

no subscr-sample-interval

Parameter Description	Parameter	Description
	interval	Indicates the locally configured interval for reporting periodic events, in seconds. The value ranges from 0 to 65535 and the default value is 10 . This value plus millisecond is the actual reporting interval.
	millisecond	Indicates the millisecond part in the locally configured

	interval for reporting periodic events, in milliseconds. The value ranges from 0 to 999 and the default value is 0. This value plus interval is the actual reporting interval. Currently, the allowable minimum reporting interval is 100 milliseconds.
--	---

Defaults The default interval is 10s.

Command Mode gRPC process configuration mode

Default Level 14

Usage Guide After a subscribed periodic event of the device is enabled and the NETCONF manager sends the subscribed periodic event, the gRPC process starts a periodic event timer and sends gRPC data to the server that subscribes to the event. When the periodic event sent by the NETCONF manager does not carry the timer interval, the timer interval is determined by the **subscr-sample-interval** command. When the periodic event sent by the NETCONF manager carries the timer interval, this timer interval shall prevail.

Configuration The following example sets the timer interval to 15s for periodic packets.

Example

```
FS(config)# grpc
FS(config-grpc)# subscr-sample-interval 15
```

The following example sets the timer interval to 100 milliseconds for periodic packets.

```
FS(config)# grpc
FS(config-grpc)# subscr-sample-interval 0 millisecond 100
```

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform Description N/A

10.11 subscr-source-interface

Use this command to configure a source interface for the real-time and periodic data. Use the **no** form of this command to restore the default settings of the source interface for the real-time and periodic data.

subscr-source-interface interface-type interface-number
no subscr-source-interface

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>interface-type interface-number</td> <td>Specifies an interface name.</td> </tr> </tbody> </table>	Parameter	Description	interface-type interface-number	Specifies an interface name.
Parameter	Description				
interface-type interface-number	Specifies an interface name.				
Defaults	The source interface for real-time and periodic data is random by default.				
Command Mode	gRPC process configuration mode				
Default Level	14				
Usage Guide	By default, the real-time and periodic data is sent from a random source interface. You can use this command to enable the server to receive packets from a specified interface only.				
Configuration Example	<p>The following example binds the specified interface loopback 0 to send real-time and periodic data.</p> <pre>FS(config)# grpc FS(config-grpc)# subscr-source-interface Loopback 0</pre>				
Verification	Run the show run command to check whether the command is configured.				
Prompt	N/A				
Common Errors	N/A				
Platform Description	N/A				

10.12 type

Use this command to preconfigure to-be-subscribed events of a specified server. Use the **no** form of this command to delete to-be-subscribed events of a specified server.

type json-event **value** value [**value-extend** value-extend]

no type json-event

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>json-event</td> <td>Indicates the type of events. For details, see the output of the show grpc subscr include json command.</td> </tr> <tr> <td>value</td> <td>Configures the parameter value, that is, the threshold for real-time events and time interval for periodic events.</td> </tr> <tr> <td>value-extend</td> <td>Indicates the extension field of value. This field is used</td> </tr> </tbody> </table>	Parameter	Description	json-event	Indicates the type of events. For details, see the output of the show grpc subscr include json command.	value	Configures the parameter value, that is, the threshold for real-time events and time interval for periodic events.	value-extend	Indicates the extension field of value. This field is used
Parameter	Description								
json-event	Indicates the type of events. For details, see the output of the show grpc subscr include json command.								
value	Configures the parameter value, that is, the threshold for real-time events and time interval for periodic events.								
value-extend	Indicates the extension field of value. This field is used								

	to only set the millisecond part in the interval for reporting periodic events. The value ranges from 0 to 999. The allowable minimum interval is 100 milliseconds.
--	---

Defaults	N/A
Command Mode	gRPC server subscription mode
Default Level	14
Usage Guide	Configure to-be-subscribed events and parameters for the channel, which should be consistent with the configuration on NETCONF.
Configuration Example	<p>The following example configures a gRPC server with the IP address of 192.168.0.1:12345, preconfigures the periodic event 0x10000000, and sets the time interval to 10 seconds for the event.</p> <pre style="background-color: #f0f0f0; padding: 5px;"> FS(config)# grpc FS(config-grpc)# user-server 192.168.0.1 12345 FS(config-grpc-us)# type 0x10000000 value 10 </pre> <p>The following example configures a gRPC server with the IP address of 192.168.0.1:12345, preconfigures the periodic event 0x10000000, and sets the time interval to 100 milliseconds for the event.</p> <pre style="background-color: #f0f0f0; padding: 5px;"> FS(config)# grpc FS(config-grpc)# user-server 192.168.0.1 12345 FS(config-grpc-us)# type 0x10000000 value 0 value-extend 100 </pre>
Verification	Run the show run command to check whether the command is configured.
Prompt	N/A
Common Errors	The threshold for real-time events ranges from -1 to 100 , the time interval for periodic events ranges from -1 to 65535 , and an existing type needs to be used. Otherwise, the configuration does not take effect and is not retained.
Platform Description	N/A

10.13 user-client

Use this command to preconfigure information about login users of servers. Use the **no** form of this command to delete preconfigured information about login users of servers.

user-client id user-name ip-address

no user-client id

Parameter Description	Parameter	Description
	id	Indicates the ID of a login user.
	user-name	Indicates the username (unrelated to the AAA library; there may be no login user).
	ip-address	Indicates the allowed server address.
Defaults	N/A	
Command Mode	gRPC process configuration mode	
Default Level	14	
Usage Guide	<p>The device can precreate login users of authenticated servers via commands, or a server can be simulated to initiate a login request, pass authentication, and save information about the login users.</p> <p>The device can delete login users of authenticated servers via commands, or a server can be simulated to initiate a logout request and delete information about the login users.</p>	
Configuration Example	<p>The following example configures information about the login user of a server, in which the ID of the login user is 12345, username is test-user, and server address is 192.168.0.1.</p> <pre>FS(config)# grpc FS(config-grpc)# user-client 12345 test-user 192.168.0.1</pre>	
Verification	Run the show run command to check whether the command is configured.	
Prompt	N/A	
Common Errors	N/A	
Platform Description	N/A	

10.14 user-server

Use this command to preconfigures a server that can subscribe to events. Use the **no** form of this command to delete the preconfigured server that can subscribe to events.

user-server ip-address port-id

no user- server ip-address port-id

Parameter Description	Parameter	Description
	ip-address	Specifies the server IPv4 address.
	port-id	Specifies the port ID of the server.
Defaults	N/A	
Command Mode	gRPC process configuration mode	
Default Level	14	
Usage Guide	<p>Use this command to precreate a specified server channel and switch to the gRPC server subscription mode.</p> <p>The to-be-subscribed events of the channel can be configured in this mode.</p> <p>The device can precreate servers and to-be-subscribed events via commands, or a controller can be simulated to notify the device of servers and to-be-subscribed events via NETCONF.</p> <p>The device can delete servers and subscribed events via commands, or a controller can be simulated to notify the device of servers and unsubscribed events via NETCONF.</p>	
Configuration Example	<p>The following example configures a server with the IP address and ID of 192.168.0.1:12345 that subscribes to gRPC events.</p> <pre>FS(config)# grpc FS(config-grpc)# user-server 192.168.0.1 12345</pre>	
Verification	Run the show run command to check whether the command is configured.	
Prompt	N/A	
Common Errors	N/A	
Platform Description	N/A	

10.15 show grpc channel

Use this command to display the IP address, port ID, and subscribed events of a server or various statistics.

show grpc channel [counter]

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

counter	Displays packet transmission statistics of a channel.
---------	---

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example displays the IP address, port ID, and subscribed events of a server.

```
FS# show grpc channel
Server subscr all:
  server ip 172.31.32.70 port 50051
  state IDLE
  subscr event:
    GRPC_JSON_EVENT_SAMPLE_DCB_PFC_PAUSE_STAT (0x10010000)

  server ip 172.31.32.71 port 50051
  state TRANSIENT_FAILURE
  subscr event:
    GRPC_JSON_EVENT_REALTIME_CLI_CMD_LOG (0x00000000)
```

The following example displays statistics on packets sent to the server.

```
FS#show grpc channel counter
Server subscr all:
  server ip 172.31.32.70 port 50051
  state TRANSIENT_FAILURE
  json list count: 0
  json send count: 1
  json drop count: 0
  call list count: 0
  call send count: 1
  call drop count: 0

  server ip 172.31.32.71 port 50051
  state TRANSIENT_FAILURE
  json list count: 0
  json send count: 1
  json drop count: 0
  call list count: 0
  call send count: 1
  call drop count: 0
```

Field description:

Field	Description
-------	-------------

server ip	IP address of the server to which information is to be reported
port	Port ID of the server to which information is to be reported
state	Status of the channel between the current device and the server
subscr event	Event subscribed by the server
json list count	To-be-sent JSON data cached in the gRPC process
json send count	Sent JSON data cached in the gRPC process
json drop count	Discarded JSON data cached in the gRPC process
call list count	To-be-sent data cached in the gRPC process
call send count	Sent data cached in the gRPC process
call drop count	Discarded data cached in the gRPC process

Prompt N/A

Platform Description N/A

10.16 show grpc client

Use this command to display information about login users of gRPC servers.

show grpc client

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example displays information about login users of servers, including their IP addresses and usernames.

```
FS# show grpc client
Client information all:
 1 :FS@172.31.32.71, ID 12345
 2 :root@172.31.32.72, ID 12346
```

Field description:

Field	Description
1	Sequence number of a login server
FS	Username used for server login
172.31.32.71	IP address of the login server
ID 12345	Login server ID

Prompt N/A

Platform N/A

Description

10.17 show grpc status

Use this command to display the running status of gRPC.

show grpc status

Parameter Description

Parameter	Description
N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays the running status of gRPC.

Example

```
FS# show grpc status
```

```
GRPC:
```

```
Uptime: 10h:08m:29s
```

Field description:

Field	Description
Uptime	Running duration of the gRPC function after being enabled

Prompt N/A

Platform N/A

Description

10.18 show grpc subscr

Use this command to display the statuses and statistics of subscribed events on the device.

show grpc subscr [realtime | sample]

Parameter Description	Parameter	Description
	realtime	Indicates subscribed real-time events.
	sample	Indicates subscribed periodic events.

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration Example The following example displays the statuses of subscribed real-time events on the device.

```

FS# show grpc subscr realtime
Subscr realtime all:
  json event: GRPC_JSON_EVENT_REALTIME_CLI_CMD_LOG (0x00000000)
    server subscr count: 1
    server threshold: 0
    local realtime interval: 0

  json event: GRPC_JSON_EVENT_REALTIME_SS_ERSPAN_PACKAGE (0x00010000)
    server subscr count: 0
    server threshold: 0
    local realtime interval: 0
    
```

Field description:

Field	Description
json event	Module real-time event that is subscribed
server subscr count	Number of servers subscribing to this event
server threshold	Threshold for triggering the subscribed event
local realtime interval:	Locally configured suppression time for message generation for the subscribed real-time event

The following example displays the statuses and statistics of subscribed periodic events on the device.

```

FS# show grpc subscr sample
Subscr sample all:
  json event: GRPC_JSON_EVENT_SAMPLE_SS_QOS_ECN_WRED_STAT (0x10000000)
    timer expire: 9204 msec
    timer reopen expire: inactive
    local sample interval: 14
    server sample interval: 0
    server subscr count: 1
    sample event drop: 0
    sample pkt rcv: 181
    sample pkt drop: 0
    
```



```

json event: GRPC_JSON_EVENT_SAMPLE_SS_MMU_LOSS_CNT (0x10000001)
timer expire: inactive
timer reopen expire: inactive
local sample interval: 14
server sample interval: 0
server subscr count: 0
sample event drop: 0
sample pkt rcv: 0
sample pkt drop: 0
    
```

Field description:

Field	Description
json event	Module periodic event that is subscribed
timer expire	Timer for reporting the subscribed periodic event
timer reopen expire	Restart timer for reporting the subscribed periodic event
local sample interval	Locally configured interval for reporting the subscribed event
server sample interval	Interval for reporting the event subscribed by the last server
server subscr count	Number of servers subscribing to this event
sample event drop	Number of timeout times of the periodic event
sample pkt rcv	Number of received packets, that is, packets that are not discarded
sample pkt drop	Number of packets discarded due to timeout

Prompt N/A

Platform N/A

Description

11 IFA Commands

11.1 clear ifa statistics

Use this command to clear the IFA statistics.

clear ifa statistics

Parameter Description	Parameter	Description
	N/A	N/A
Defaults	N/A	
Command Mode	Privileged EXEC mode	
Default Level	14	
Usage Guide	N/A	
Configuration Example	The following example clears the IFA statistics. FS#clear ifa statistics	
Verification	Run the show ifa statistics command to display the IFA statistics.	
Prompt	N/A	
Common Errors	N/A	
Platform Description	N/A	

11.2 ifa acl

Use this command to configure an IFA sampling-associated ACL and sampling rate. Use the **no** form of this command to delete the configured IFA sampling-associated ACL and sampling rate. Use the **default** form of this command to restore the default settings.

ifa acl { id | name } **rate** rate

no ifa acl { id | name } **rate** rate

default ifa acl { id | name } **rate** rate

Parameter Description	Parameter	Description
	id	Indicates the ACL ID.
	name	Indicates the ACL name.
	rate	Indicates the sampling rate. The value ranges from 1 to 65535 and the default

	value is 1000 .
--	------------------------

Defaults	IFA sampling is disabled by default.
Command Mode	Interface configuration mode
Default Level	14
Usage Guide	This command can be configured only on physical ports and APs. Four sampling rules using different ACLs and sampling rates can be configured for one interface.
Configuration	The following example sets the IFA sampling–associated ACL to 100 and sampling rate to 200.
Example	<pre>FS(config-if-TenGigabitEthernet 0/15)# ifa acl 100 rate 200</pre>
Verification	Run the show run command to check whether IFA sampling is configured on an interface.
Prompt	N/A
Common Errors	N/A
Platform	N/A
Description	

11.3 ifa filter enable

Use this command to filter IFA packets on an interface. Use the **no** form of this command to delete IFA packet filtering configuration on an interface. Use the **default** form of this command to restore the default settings.

- ifa filter enable**
- no ifa filter enable**
- default ifa filter enable**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	IFA packets are not filtered by default.
Command Mode	Interface configuration mode
Default Level	14
Usage Guide	This command can be configured only on physical ports and APs.
Configuration	The following example filters IFA packets on the TenGigabitEthernet 0/5 interface.

Example FS(config-if-TenGigabitEthernet 0/5)# ifa filter enable

Verification Run the **show run** command to check whether IFA packet filtering is configured on an interface.

Prompt N/A

Common Errors N/A

Platform Description N/A

11.4 ifa host-port

Use this command to configure an interface as the IFA server port. Use the **no** form of this command to delete the configuration of an interface serving as the IFA server port. Use the **default** form of this command to restore the default settings.

- ifa host-port**
- no ifa host-port**
- default ifa host-port**

Parameter Description	Parameter	Description
	N/A	N/A

Defaults No interface is configured as the IFA server port by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command can be configured only on physical ports and APs. The IFA server port can be configured only after the IFA server is configured.

Configuration The following example configures the TenGigabitEthernet 0/16 interface as the IFA server port.

Example FS(config-if-TenGigabitEthernet 0/16)# ifa host-port

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform Description N/A

11.5 ifa send-server

Use this command to configure the name of the server to which IFA packets of an interface are to be sent, and ACL rules. Use the **no** form of this command to delete the IFA packet transmission configuration of an interface. Use the **default** form of this command to restore the default settings.

ifa send-server server-name [acl id | name]

no ifa send-server

default ifa send-server

Parameter Description	Parameter	Description
	server-name	Indicates the name of an IFA server.
	id	ACL ID
	name	ACL name

Defaults IFA packets are not sent by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command can be configured only on physical ports and APs. Packets can be sent to the IFA server only after the IP address of the IFA server is configured. IFA packets of the same interface can be sent only to the same server.

The ACL rule is optional configuration. All the IFA packets on the interface will be sent to the server when no ACL rule is configured. To send the IFA packets matching the ACL rule to the specified server, configure the ACL rule first, and then apply the rule on the interface.

Configuration Example The following example sends IFA packets of the TenGigabitEthernet 0/16 interface to the IFA server named server1.

```
FS(config-if-TenGigabitEthernet 0/16)# ifa send-server server1
```

Verification Run the **show run** command to check the IFA packet transmission configuration of the interface.

Prompt N/A

Common Errors N/A

Platform Description N/A

11.6 ifa server

Use this command to configure an IFA server. Use the **no** form of this command to delete the IFA server configuration. Use the **default** form of this command to restore the default settings.

ifa server server-name **source** ip-address **port** udp-port **destination** ip-address **port** udp-port
no ifa server server-name
default ifa server server-name

Parameter Description	Parameter	Description
	server-name	Indicates the name of an IFA server.
	ip-address	Indicates the source and destination IPv4 addresses of IFA encapsulated packets.
	udp-port	Indicates the source and destination port IDs of IFA packets.

Defaults N/A

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the source and destination addresses of IFA encapsulated packets. The addresses can be host addresses only. When a non-host address (such as a multicast address or broadcast address) is configured, a configuration failure occurs. The IFA server listens to a configured port.

Configuration Example The following example sets the IP address of the IFA server named server1 to 192.168.2.101 and configures the server to listen to port 2000.

```
FS(config)# ifa server server1 source 192.168.2.100 port 1000 destination 192.168.2.101 port 2000
```

Verification Run the **show run** command to check whether the command is configured.

Prompt An error is displayed if the configured address is invalid.

```
invalid host address.
```

Common Errors N/A

Platform Description N/A

11.7 ifa set-device

Use this command to configure the address of an IFA device. Use the **no** form of this command to delete the address of an IFA device. Use the **default** form of this command to restore the default settings.

ifa set-device ip-address
no ifa set-device
default ifa set-device

Parameter Description	Parameter	Description
-----------------------	-----------	-------------

ip-address	Indicates the IPv4 address of an IFA device.
------------	--

Defaults The address of an IFA device is not configured by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example sets the IP address of an IFA device to 192.168.2.100.

Example FS(config)# ifa set-device 192.168.2.100

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform Description N/A

11.8 ifa set-loopback interface

Use this command to configure an IFA loopback interface. Use the **no** form of this command to delete the configured IFA loopback interface. Use the **default** form of this command to restore the default settings.

ifa set-loopback interface interface-name

no ifa set-loopback interface interface-name

default ifa set-loopback interface interface-name

Parameter Description	Parameter	Description
	interface-name	Specifies an interface name.

Defaults No IFA loopback interface is configured by default.

Command Mode Global configuration mode

Default Level 14

Usage Guide This command can be configured only on physical ports.

Configuration The following example configures TenGigabitEthernet 0/1 as the IFA loopback interface.

Example FS(config)# ifa set-loopback interface TenGigabitEthernet 0/1

Verification Run the **show run** command to check whether the command is configured.

Prompt N/A

Common Errors N/A

Platform Description N/A

11.9 show ifa statistics

Use this command to display IFA statistics.

show ifa statistics

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays IFA statistics.

Example

```
FS# show ifa statistics
Type          Acl    Statistic(pkts)    Applied interface
-----
sample-to-cpu 100    20426              TF0/1, TF0/3-4, TF0/29-34, TF0/39, TF0/43, TF0/45,
TF0/47, Hu0/49, Hu0/51, Hu0/53, Hu0/55, Ag255
sample-to-cpu 101    0                  TF0/2
insert-md     -      20586              Hu0/49
```

Field description:

Field	Description
type	Type of statistics
acl	Applied ACL
statistic	Packet statistics
applied interface	Applied interface

Verification N/A

Prompt	N/A
Common Errors	N/A
Platform Description	N/A

12 PSR Commands

12.1 clear psr statistics

Use this command to clear the PSR statistics.

clear psr statistics

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>	Parameter	Description	N/A	N/A
Parameter	Description				
N/A	N/A				
Defaults	N/A				
Command Mode	Privileged EXEC mode				
Default Level	14				
Usage Guide	N/A				
Configuration Example	<p>The following example clears the PSR statistics.</p> <pre>FS(config)# clear psr statistics</pre>				
Verification	Run the show psr statistics command to display the PSR statistics.				
Prompt	N/A				
Common Errors	N/A				
Platform Description	N/A				

12.2 psr collect-interface

Use this command to configure the number of interfaces whose sampling information is to be encapsulated into PSR packets. Use the **no** form of this command to delete the configured number of interfaces whose sampling information is to be encapsulated into PSR packets. Use the **default** form of this command to restore the default settings.

psr collect-interface numbers

no psr collect-interface

default psr collect-interface

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>numbers</td> <td>Indicates the interface quantity. The value ranges from 1 to 100, and the default</td> </tr> </tbody> </table>	Parameter	Description	numbers	Indicates the interface quantity. The value ranges from 1 to 100 , and the default
Parameter	Description				
numbers	Indicates the interface quantity. The value ranges from 1 to 100 , and the default				

	value is 1 .
--	---------------------

Defaults	The default number of interfaces is 1.
Command Mode	Global configuration mode
Default Level	14
Usage Guide	This command is used to configure the number of interfaces whose sampling information is to be encapsulated into PSR packets.
Configuration Example	<p>The following example sets the number of interfaces whose sampling information is to be encapsulated into PSR packets to 50.</p> <pre>FS(config)# psr collect-interface 50</pre>
Verification	Run the show run command to check whether the number of interfaces whose sampling information is to be encapsulated into PSR packets is configured correctly.
Prompt	N/A
Common Errors	N/A
Platform Description	N/A

12.3 psr interval

Use this command to configure the time interval for PSR sampling. Use the **no** form of this command to delete the configured time interval of PSR sampling. Use the **default** form of this command to restore the default settings.

- psr interval** seconds
- no psr interval**
- default psr interval**

Parameter Description	Parameter	Description
	seconds	Indicates the time interval, in seconds. The value ranges from 1 to 100 and the default value is 5 .

Defaults	The default time interval is 5s.
Command Mode	Global configuration mode
Default Level	14

Usage Guide This command is used to configure the global time interval for PSR sampling. The PSR sampling of all interfaces uses this sampling interval.

Configuration The following example sets the time interval for PSR sampling to 60s.

Example FS(config)# psr interval 60

Verification Run the **show run** command to check whether the time interval for PSR sampling is configured.

Prompt N/A

Common Errors N/A

Platform N/A
Description

12.4 psr send-server

Use this command to configure the name of the server to which PSR packets of an interface are to be sent. Use the **no** form of this command to delete the PSR packet transmission configuration of an interface. Use the **default** form of this command to restore the default settings.

psr send-server server-name

no psr send-server

default psr send-server

Parameter
Description

Parameter	Description
server-name	Indicates the name of a PSR server.

Defaults PSR packets are not sent by default.

Command Mode Interface configuration mode

Default Level 14

Usage Guide This command can be configured only on physical ports and APs. Packets can be sent to the PSR server only after the IP address of the PSR server is configured. PSR packets of the same interface can be sent only to the same server.

Configuration The following example sends PSR packets of the TenGigabitEthernet 0/16 interface to the PSR server named server1.

Example

FS(config-if-TenGigabitEthernet 0/16)# psr send-server server1

Verification Run the **show run** command to check the PSR packet transmission configuration of the interface.

Prompt	N/A
Common Errors	N/A
Platform Description	N/A

12.5 psr server

Use this command to configure a PSR server. Use the **no** form of this command to delete the PSR server configuration. Use the **default** form of this command to restore the default settings.

psr server server-name **source** ip-address **port** udp-port **destination** ip-address **port** udp-port

no psr server server-name

default psr server server-name

Parameter Description	Parameter	Description
	server-name	Indicates the name of a PSR server.
	ip-address	Specifies the source and destination IPv4 addresses of PSR encapsulated packets.
	udp-port	Indicates the source and destination port IDs of PSR packets.

Defaults N/A

Command Mode Global configuration mode

Default Level 14

Usage Guide This command is used to configure the source and destination addresses of PSR encapsulated packets. The addresses can be host addresses only. When a non-host address (such as a multicast address or broadcast address) is configured, a configuration failure occurs. The PSR server listens to a configured port.

Configuration Example The following example sets the IP address of the PSR server named server1 to 192.168.2.101 and configures the server to listen to Port 2000.

```
FS(config)# psr server server1 source 192.168.2.100 port 1000 destination 192.168.2.101 port 2000
```

Verification Run the **show run** command to check whether the command is configured.

Prompt An error is displayed if the configured address is invalid.

```
invalid host address.
```

Common Errors N/A

Platform N/A
Description

12.6 show psr statistics

Use this command to display PSR statistics.

show psr statistics

Parameter	Description
N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide N/A

Configuration The following example displays PSR statistics.

```

Example
FS# show psr statistics
Server id      Name      Statistic(pkts)  Applied interface
-----
1              aaa      20426            Hu1/1-9
2              bbb      1000             Hu16/1-16
    
```

Field description:

Field	Description
Server id	Server ID
name	Server name
statistic	Packet statistics
applied interface	Applied interface

Verification N/A

Prompt N/A

Common Errors N/A

Platform N/A
Description

Chapter 10 Data Center Commands

1. DCB Commands
2. RDMA Commands

1 DCB Commands

1.1 clear priority-flow-control deadlock statistics interface

Use this command to clear the PFC deadlock statistics of an interface.

clear priority-flow-control deadlock statistics [*interface interface*]

Parameter Description	Parameter	Description
	<i>interface</i>	Indicates an interface name.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide This command is used to clear the PFC deadlock statistics of an interface.

Configuration Examples The following example clears PFC deadlock statistics of all priorities of all interfaces.

```
FS#clear priority-flow-control deadlock statistics
```

The following example clears PFC deadlock statistics of all priorities of a specified interface.

```
FS#clear priority-flow-control deadlock statistics interface tenGigabitEthernet 0/1
```

1.2 clear priority-flow-control statistics

Use this command to clear the PFC statistics.

clear priority-flow-control statistics [*interface intf-name*]

Parameter Description	Parameter	Description
	<i>intf-name</i>	Interface name

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide If the *intf-name* 1 parameter is not defined, the PFC statistics of all ports is cleared.

Configuration Examples The following example clears the PFC statistics of the interface FastEthernet 0/1:

```
FS# clear interface FastEthernet 0/1 priority-flow-control statistics
```

#Show the statistics:

```
FS# show interface FastEthernet 0/1 priority-flow-control statistics
```

```
Interface PriorityEnabledPFC PauseSended PauseReceived
```

```
-----
```

Fa 0/1 3 0 0

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.3 dcbx advertise

Use this command to enable DCBX TLV release on an interface. Use the **no** form or **default** form of this command to disable or restore DCBX TLV release.

- dcbx { app-proto | pfc } advertise**
- no dcbx { app-proto | pfc } advertise**
- default dcbx { app-proto | pfc } advertise**

Parameter Description	Parameter	Description
	app-proto	
pfc		Controls DCBX TLV release specific to PFC capability.

Defaults All DCBX TLVs can be released.

Command Mode Interface configuration mode

Usage Guide The following conditions must be met:

- LLDP is enabled at both interface and global levels.
- Interface LLDP works in txrx mode.
- The interface supports the relevant DCB capability.
- Interface DCBX is enabled.
- Interface-specific DCBX TLVs can be released.

Configuration Examples N/A

Related Commands	Command	Description
	show dcbx status	

Platform N/A
Description

1.4 dcbx enable

Use this command to enable DCBX on an interface. Use the **no** form or **default** form of this command to disable or restore DCBX.

- dcbx enable**
- no dcbx enable**
- default dcbx enable**

Parameter Description	Parameter	Description
	N/A	N/A


Defaults The DCBX is enabled by default.


Command Mode Global configuration mode/Interface configuration mode

Usage Guide Enable DCBX in global or interface configuration mode to launch the DCB capability negotiation of the interface. Disabling the global DCBX function will disable the DCB capability negotiation of all interfaces.

To make the DCBX negotiation of an interface take effect, the following conditions must be met:

- 1) LLDP is enabled at both interface and global levels.
- 2) Interface LLDP works in txrx mode.
- 3) Interface-specific DCB TLVs can be released.
- 4) The interface supports the relevant DCB capability.
- 5) Global and interface DCBX are enabled.

 The LLDP enable and work mode configuration of the AP member interface will affect the DCBX protocol of the corresponding AP interface.

 During the configuration of the AP interface, ensure that the LLDP configurations of all AP member interfaces are consistent, the topology connection of the AP interface is correct, and the DCBX TLVs released by all AP member interfaces are the same. Otherwise, the DCB capability negotiation of both ends of the AP interface will be abnormal.

Configuration Examples This example shows how to disable the DCBX protocol on GigabitEthernet 0/1:

```
FS#config
FS(config)#interface gigabitethernet 0/1
FS(config-if)#no dcbx enable
```

Related	Command	Description
---------	---------	-------------

Commands	
show dcbx status	Displays the DCBX protocol enable state of each interface.

Platform N/A
Description

1.5 dcbx mode

Use this command to configure the DCBX mode of the interface. Use the **no** or **default** form of this command to restore the default DCBX mode.

dcbx mode { auto | cee | ieee }

no dcbx mode

default dcbx mode

Parameter Description	Parameter	Description
	auto	Auto-switches the DCBX mode according the DCBX TLV type received on the interface. The default mode is CEE-DCBX.
	cee	Specifies the DCBX mode to CEE-DCBX.
	ieee	Specifies the DCBX mode to IEEE-DCBX.

Defaults The default DCBX mode is auto, and the CEE-DCBX is effective.

Command Mode Interface configuration mode

Usage Guide The following conditions must be met:

- LLDP is enabled at both interface and global levels.

Interface LLDP works in txrx mode.

Interface-specific DCB TLVs can be released.

The interface supports the relevant DCB capability.

Interface DCBX is enabled.

If the interface DCBX mode is auto, the CEE-DCBX takes effect and then the interface automatically switches the DCBX mode according the DCBX TLV type received.

If the interface DCBX mode is cee, the CEE-DCBX takes effect, but the interface does not switch the DCBX mode based on the DCBX TLV type received.

If the interface DCBX mode is ieee, the IEEE-DCBX takes effect, but the interface does not switch the DCBX mode based on the DCBX TLV type received.

Configuration Examples This example shows how to configure the ieee DCBX mode on GigabitEthernet 0/1:

```
FS#config
```

```
FS(config)#interface gigabitethernet 0/1
FS(config-if)#dcbx mode ieee
```

Related Commands	Command	Description
		show dcbx status

Platform N/A
Description

1.6 dcbx willing

To enable the acceptance of the peer DCB configuration, use the **dcbx { app-proto | ets | pfc } willing enable** command. To disable or restore the acceptance of the peer DCB configuration, use the **no** form or **default** form of this command.

- dcbx { app-proto | pfc } willing enable**
- no dcbx { app-proto | pfc } willing enable**
- default dcbx { app-proto | pfc } willing**


Parameter Description	Parameter	Description
		app-proto
	pfc	Controls the synchronous acceptance of the peer configuration of PFC capability.


Defaults The local end does not accept the peer configuration, that is, the willing bit is 0.

Command Mode Interface configuration mode

Usage Guide If the local end is unwilling to accept the peer configuration, disable the willing setting. Otherwise, enable it. The following conditions must be met:

- LLDP is enabled at both interface and global levels.
- Interface LLDP works in txrx mode.
- The interface supports the relevant DCB capability.
- Interface DCBX is enabled.
- Interface-specific DCBX TLVs can be released.

 When the willing settings are the same on the two ends, the configuration of the end with a less MAC address serves as the synchronization configuration if both ends accept the peer configuration. If neither end accepts the peer configuration, the same configuration indicates successful negotiation and different configurations indicate failed negotiation.

 The DCB capability that supports global configuration instead of interface configuration cannot be negotiated through DCBX, and the local configuration serves as the

synchronization configuration. For example, if PFC supports global configuration instead of interface configuration, PFC capability negotiation cannot be performed even if the local PFC willing bit is 1, and the local PFC configuration serves as the final synchronization configuration.

Configuration N/A
Examples

Related Commands

Command	Description
show dcbx status	Displays the willing setting of DCB capability specific to each interface.

Platform N/A
Description

1.7 priority-flow-control counting-interval

Use this command to configure the global PFC statistics collection interval. Use the **no** form of this command to cancel the configured global PFC statistics collection interval.

priority-flow-control counting-interval *number*

no priority-flow-control counting-interval [*number*]

Parameter Description

Parameter	Description
<i>number</i>	Indicates the statistics collection interval in seconds. The value ranges from 1 to 20 .

Defaults The default global PFC statistics collection interval is 5 seconds.

Command Mode Global configuration mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example configures the global PFC statistics collection interval to 10 seconds.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control counting-interval 10
```

Verification

Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

1.8 priority-flow-control deadlock cos-value

Use this command to configure attributes of the PFC deadlock detection function for a PFC priority. Use the **no** form of this command to cancel configured attributes of the PFC deadlock detection function for a PFC priority.

priority-flow-control deadlock cos-value *cos-value-list* [**detect** *detect-time* **recover** *recover-time* [**continue** | **backoff** *most-times*]]

no priority-flow-control deadlock cos-value [*cos-value-list* **detect** *detect-time* **recover** *recover-time* [**continue** | **backoff** *most-times*]]

Parameter Description	Parameter	Description
	<i>cos-value-list</i>	Indicates the priority list. The priority ranges from 0 to 7 .
	<i>detect-time</i>	Indicates the deadlock detection time in time slices. The value ranges from 1 to 15 . The default value is 15 .
	<i>recover-time</i>	Indicates the deadlock recovery time in milliseconds. The value ranges from 10 to 3000 . The default value is 15 .
	continue	Indicates the continue algorithm used to calculate the deadlock recover-time.
	backoff <i>most-times</i>	Indicates the backoff algorithm used to calculate the deadlock recover-time. <i>most-times</i> indicates the maximum number of backoff times. The value ranges from 2 to 100 .

Defaults N/A

Command Global configuration mode

Mode

Default Level 14

Usage Guide

1. The PFC deadlock detection function detects whether an interface at a PFC priority enters the **PFC deadlock** state. When it is detected that the interface enters the PFC deadlock state, the interface forwards or discards received packets within a period of time. You can run the **priority-flow-control deadlock drop** command to configure the packet processing mode.
2. You can use this command to configure attributes of the PFC deadlock detection function for PFC priorities. The default values are used if not specified. The configuration of one or two priorities is available. Up to two priorities are supported.
3. *detect-time*: Indicates the time for determining whether an interface at a PFC priority enters the PFC deadlock state. When the interface stays in the PFC congested state in consecutive *detect-time* periods, it indicates that the interface enters the PFC deadlock state. The default value is used if not specified.
4. *recover-time*: indicates the allowed packet processing time after an interface at a PFC priority enters the PFC deadlock state. The default value is 150ms if not specified.

5. *detect-time* is in unit of time slice. You can run the **priority-flow-control deadlock precision low** command to configure the length of one time slice. *recover-time* is in unit of milliseconds.

6. **continue**: Indicates that an interface of the priority in the deadlock state continues in this state for one recover-time period if it receives PFC PAUSE frames. The interface checks whether it receives PFC PAUSE frames in the next recover-time period. If the interface still receives such frames, it continues to be in the deadlock state for another recover-time period. The process repeats till the interface does not receive PFC PAUSE frames within the recover-time period and then the interface exits the deadlock state.

7. *most-times*: indicates the maximum number of recover-time backoff times . If an interface enters the deadlock state within the backoff period (recover-time x most-times) after it recovers from the first deadlock, the backoff time needs to be added to the recover-time (Backoff time = Number of backoff times x recover-time). If the interval between two deadlock states exceeds the backoff period, the number of backoff times is reset to zero. Otherwise, the number of backoff times increases by 1 (if the number of backoff times already reaches the maximum number of backoff times, the maximum number of backoff times, that is, most-times, is used.)

8. If neither **continue** nor **backoff** is configured, the deadlock recover-time algorithm is disabled. After the deadlock recover-time ends, the interface directly exits the deadlock state.

Configuration Examples The following example sets the PFC deadlock detection time to 15 time slices and packet processing time to 10ms for the PFC priorities of 1 and 2.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control deadlock cos-value 1,2 detect 15 recover 10
```

The following example configures interfaces of PFC priorities 1 and 2 in the deadlock state to exit the deadlock state only when they do not receive PFC PAUSE frames within the recover-time

```
FS(config)# priority-flow-control deadlock cos-value 1,2 detect 15 recover 10 continue
```

The following example uses the backoff algorithm to calculate the deadlock recover-time for interfaces of PFC priorities 1 and 2 and sets the maximum number of backoff times to 10.

```
FS(config)# priority-flow-control deadlock cos-value 1,2 detect 15 recover 10 backoff 10
```

Verification Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

Common Errors N/A

1.9 priority-flow-control deadlock cos-value enable

Use this command to enable the PFC deadlock detection function on an interface for a priority. Use the **no** form of this command to disable the PFC deadlock detection function on an interface for a priority.

priority-flow-control deadlock cos-value *cos-value-list* enable

no priority-flow-control deadlock cos-value *cos-value-list* enable

Parameter	Parameter	Description
Description	<i>cos-value-list</i>	Indicates the priority list. The priority ranges from 0 to 7 .
Defaults	The PFC deadlock detection function is disabled on an interface for all priorities by default.	
Command Mode	Interface configuration mode	
Default Level	14	
Usage Guide	<ol style="list-style-type: none"> When the priority-flow-control deadlock cos-value detect recover command is not executed to globally configure the PFC deadlock detection function for a priority, the PFC deadlock detection function cannot be enabled on interfaces for the priority. Likewise, if the priority-flow-control deadlock cos-value detect recover command, the PFC deadlock detection function will be disabled on all interfaces for the priority. 	
Configuration Examples	<p>The following example enables the PFC deadlock detection function for PFC Priorities 1 and 2 of interface TenGigabitEthernet 0/1.</p> <pre> FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)#interface tenGigabitEthernet 0/1 FS(config-if-TenGigabitEthernet 0/1)#priority-flow-control deadlock cos-value 1,2 enable </pre>	
Verification	Run the show running-config command to display the configuration.	
Prompts	<pre> FS#show running-config interface tenGigabitEthernet 0/1 </pre> <p>When the PFC deadlock detection function is not globally configured for a priority, the PFC deadlock detection function cannot be enabled on an interface for the priority.</p> <pre> FS(config-if-tenGigabitEthernet 0/1)#priority-flow-control deadlock cos-value 1,2 enable %Global priority-flow-control deadlock cos-value is not configured. </pre>	
Common Errors	The PFC deadlock detection function is not globally configured for a priority or the PFC function is not globally enabled for a priority in advance.	
Platform Description	N/A	

1.10 priority-flow-control deadlock drop

Use this command to globally configure the function of discarding packets by an interface in the PFC deadlock state. Use the **no** form of this command to cancel the function of discarding packets by an interface in the PFC deadlock state.

- priority-flow-control deadlock drop**
- no priority-flow-control deadlock drop**

Parameter	Parameter	Description
-----------	-----------	-------------

Description	<table border="1"> <tr> <td>N/A</td> <td>N/A</td> </tr> </table>	N/A	N/A
N/A	N/A		
Defaults	An interface in the PFC deadlock state forwards packets by default when this command is not configured.		
Command Mode	Global configuration mode		
Default Level	14		
Usage Guide	<p>If this command is not configured, an interface at a PFC priority forwards packets after entering the PFC deadlock state.</p> <p>If this command is configured, an interface at a PFC priority discards packets after entering the PFC deadlock state.</p>		
Configuration Examples	<p>This following example globally configures the function of discarding packets by an interface in the PFC deadlock state.</p> <pre>FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# priority-flow-control deadlock drop</pre>		
Verification	<p>Run the show running-config command to display the configuration.</p> <pre>FS#show running-config</pre>		

1.11 priority-flow-control deadlock limit cos-value enable

Use this command to enable the PFC deadlock threshold function for a PFC priority. Use the **no** form of this command to disable the PFC deadlock threshold function for PFC priority.

priority-flow-control deadlock limit cos-value *cos-value-list* enable
no priority-flow-control deadlock limit cos-value [*cos-value-list* enable]

Parameter Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>cos-value-list</i></td> <td>Indicates the priority list. The priority ranges from 0 to 7.</td> </tr> </tbody> </table>	Parameter	Description	<i>cos-value-list</i>	Indicates the priority list. The priority ranges from 0 to 7 .
Parameter	Description				
<i>cos-value-list</i>	Indicates the priority list. The priority ranges from 0 to 7 .				
Defaults	N/A				
Command Mode	Global configuration mode				
Default Level	14				

- Usage Guide**
1. This command is not configured by default. Configuring this command will enable the PFC deadlock threshold function for the PFC priority corresponding to *cos-value-list*. If the number of deadlock times occurring for a priority within one detection period (1 minute by default) reaches the threshold (10 times by default), the PFC function is disabled for the priority via the **priority-flow-control nodrop** *cos-value-list* **off** command.
 2. This command relies on the configuration of the **priority-flow-control deadlock cos-value** *cos-value-list* **detect** *detect-time* **recover** *recover-time* command. This command can be configured only after the command for configuring attributes of the PFC deadlock detection function is configured for a priority. Likewise, if the command for configuring attributes of the PFC deadlock detection function is deleted for a priority, the PFC deadlock threshold command of the priority is also deleted.
 3. You can run the **priority-flow-control deadlock limit frequency** *number* **period** *time* command to configure the detection period and deadlock threshold.

Configuration The following example enables the PFC deadlock threshold function for PFC Priority 2.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control deadlock limit cos-value 2 enable
```

Verification Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

Common Errors The attributes of the PFC deadlock detection function are not configured for a priority.

1.12 priority-flow-control deadlock limit frequency period

Use this command to configure the PFC deadlock threshold and detection period. Use the **no** form of this command to cancel the configured PFC deadlock threshold and detection period.

```
priority-flow-control deadlock limit frequency number period time
no priority-flow-control deadlock limit frequency [number period time]
```

Parameter Description	Parameter	Description
	<i>number</i>	Indicates the PFC deadlock threshold. The value ranges from 10 times to 100,000 times and the default value is 10 times.
	<i>time</i>	Indicates the PFC deadlock detection period. The value ranges from 1 min to 5 min and the default value is 1 min.

Defaults The default PFC deadlock detection period is 1 min and the default PFC deadlock threshold is 10 times.

Command Mode Global configuration mode

Default Level	14
Usage Guide	1. This command modifies the PFC deadlock threshold and detection period. When the priority-flow-control deadlock limit cos-value cos-value-list enable command is executed to enable the PFC deadlock threshold function for a PFC priority, the PFC deadlock threshold and detection period configured using this command are applied.
Configuration	The following example sets the PFC deadlock threshold to 100 and detection period to 5 min.
Examples	<pre>FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# priority-flow-control deadlock limit frequency 100 period 5</pre>
Verification	Run the show running-config command to display the configuration. <pre>FS#show running-config</pre>

1.13 priority-flow-control deadlock precision low

Use this command to set the PFC deadlock time precision to low.

priority-flow-control deadlock precision low

Use the **no** form of this command to cancel the configured low PFC deadlock time precision.

no priority-flow-control deadlock precision low

Parameter Description	Parameter	Description
	N/A	N/A

Defaults The default deadlock time precision is high (10 ms). This command sets the deadlock time precision to low (100 ms).

Command Mode Global configuration mode

Default Level 14

Usage Guide

1. This command is used to configure the length of a single deadlock time slice. It affects the time unit of *detect-time* in the **priority-flow-control deadlock cos-value cos-value-list detect detect-time recover recover-time** command.
2. When this command is not configured, the PFC deadlock time precision is high (one time slice equals 10 ms).
3. After the PFC deadlock function is configured for a priority, configuring this command will modify the time precision of the PFC deadlock function for the priority.

Configuration The following example sets the PFC deadlock time precision to low.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control deadlock precision low
```

Verification Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

Prompts N/A

Platform N/A

Description

1.14 priority-flow-control rx disable

Use this command to disable the PFC RX function. Use the **no** form of this command to enable the PFC RX function.

priority-flow-control rx disable
no priority-flow-control rx disable

Parameter	Parameter	Description
Description	N/A	N/A

Defaults By default, the PFC RX function is enabled.

Command Mode Global or interface configuration mode

Default Level 14

Usage Guide

1. Use this command to configure the PFC RX function. By default, the PFC RX function is enabled.
2. This command can be configured in global or interface configuration mode depending on the chip capability. When the PFC RX function supports the global configuration capability, the command is unavailable on interfaces.
3. When the PFC RX function supports the interface configuration capability, the command can be configured in global configuration mode and the configuration can be saved to each interface. The configuration is displayed only on interfaces.

Configuration The following example disables the PFC RX function globally.

Examples

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control rx disable
```

Verification Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

1.15 priority-flow-control tx disable

Use this command to disable the PFC TX function. Use the no form of this command to enable the PFC TX function.

priority-flow-control tx disable
no priority-flow-control tx disable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults By default, the PFC TX function is enabled.

Command Mode Global or interface configuration mode

Default Level 14

Usage Guide

1. Use this command to configure the PFC TX function. By default, the PFC TX function is enabled.
2. This command can be configured in global or interface configuration mode depending on the chip capability. When the PFC TX function supports the global configuration capability, the command is unavailable on interfaces.
3. When the PFC TX function supports the interface configuration capability, the command can be configured in global configuration mode and the configuration can be saved to each interface. The configuration is displayed only on interfaces.

Configuration Examples The following example disables the PFC TX function globally.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)# priority-flow-control tx disable
```

Verification Run the **show running-config** command to display the configuration.

```
FS#show running-config
```

1.16 priority-flow-control xoff-time

Use this command to configure the value of **XOFF-TIME** in a PFC frame. Use the **no** form of this command to restore the default value.

priority-flow-control xoff-time number
no priority-flow-control xoff-time [number]

Parameter	Parameter	Description
-----------	-----------	-------------

Description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>number</i></td> <td>Value of XOFF-TIME in a PFC frame, ranging from 1 to 65535 (The unit of XOFF-TIME is the time required by the chip to send 512-bit data at the physical layer.)</td> </tr> </tbody> </table>	Parameter	Description	<i>number</i>	Value of XOFF-TIME in a PFC frame, ranging from 1 to 65535 (The unit of XOFF-TIME is the time required by the chip to send 512-bit data at the physical layer.)
Parameter	Description				
<i>number</i>	Value of XOFF-TIME in a PFC frame, ranging from 1 to 65535 (The unit of XOFF-TIME is the time required by the chip to send 512-bit data at the physical layer.)				
Defaults	The default value of XOFF-TIME in a PFC frame is 65535 .				
Command Mode	Global or interface configuration mode				
Default Level	14				
Usage Guide	<ol style="list-style-type: none"> 1. Use this command to configure the value of XOFF-TIME in a PFC frame. 2. This command can be configured in global or interface configuration mode depending on the chip capability. When the PFC frame XOFF-TIME function supports the global configuration capability, the command is unavailable on interfaces. 3. When the PFC frame XOFF-TIME function supports the interface configuration capability, the command can be configured in global configuration mode and the configuration can be saved to each interface. The configuration is displayed only on interfaces. 				
Configuration Examples	<p>The following example sets the value of XOFF-TIME in a PFC frame to 100 globally.</p> <pre> FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)# priority-flow-control xoff-time 100 </pre>				
Verification	<p>Run the show running-config command to display the configuration.</p> <pre> FS#show running-config </pre>				

1.17 priority-flow-control early-warning

Use this command to configure the flow rate warning for a priority of an interface. Use the **no** form of this command to cancel the configured flow rate warning for a priority of an interface.

priority-flow-control early-warning *cos-value-list* { **output pps** *rate-num* } | **input pps** *rate-num* }
no priority-flow-control early-warning *cos-value-list* { **output** [**pps** *rate-num*] | **input** [**pps** *rate-num*] }

Parameter	Description
<i>cos-value-list</i>	Indicates the priority value. The value ranges from 0 to 7 .
<i>rate-num</i>	Indicates the flow rate warning value. The value ranges from 1 to 148809523 .

Defaults The flow rate warning is disabled by default.

Command	Interface configuration mode
Mode	
Default Level	14
Usage Guide	<p>1. This command configures the warning function for a PFC priority of an interface. When the rate of Pause frames exceeds the configured threshold, a warning is generated.</p> <p>2. A flow rate warning threshold can be configured in each of the input and output directions in unit of pps (packets per second).</p>
Configuration	The following example configures the flow rate warning function in the output direction for PFC
Examples	<p>Priority 1 of Interface TenGigabitEthernet 0/1 and sets the warning threshold to 1000 pps.</p> <pre>FS# configure terminal Enter configuration commands, one per line. End with CNTL/Z. FS(config)#interface tenGigabitEthernet 0/1 FS(config-if-TenGigabitEthernet 0/1)#priority-flow-control early-warning 1 output pps 1000</pre>
Verification	<p>Run the show running-config command to display the configuration.</p> <pre>FS#show running-config</pre>

1.18 priority-flow-control nodrop

Use this command to disable priority-based flow control (PFC).

priority-flow-control nodrop *cos-value-list* off

Use this command to enable PFC.

priority-flow-control nodrop *cos-value-list* on

Parameter Description	Parameter	Description
	<i>cos-value-list</i>	Priority list. The cos value ranges from 0 to 7 .

Defaults By default, the PFC function is disabled.

Command Interface or global configuration mode
Mode

Usage Guide Range of *cos-value-list* : 0 to 7. The format of *cos-value-list* is 1,3,4,5 or 1, 3-5.

Configuration The following example enables PFC for the 802.1p priority of 1, 3, 4, 5 in global configuration mode.

```
FS(config)# priority-flow-control nodrop 1,3,4,5 on
```

The following example enables PFC for the 802.1p priority of 1, 3, 4, 5 in interface configuration mode.


```
FS(config-if)# priority-flow-control nodrop 1,3,4,5 on
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A
Description

1.19 show dcbx status

To display the DCBX protocol enable state of each interface, use the **show dcbx control** command.

show dcbx status [**interface** *interface-name*]

Parameter Description	Parameter	Description
	<i>interface-name</i>	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Specify the interface parameter and the DCBX enable state of the specified interface will be shown.

Configuration Examples This example shows how to display the DCBX enable state of a specified interface:

```
FS#show dcbx status interface tenGigabitEthernet 0/1
Global-----
Port [TenGigabitEthernet 1/1]
-----
Local managing configuration information and port link state:
Port status of DCBX : Enable
PFC is allowed to advertise : Yes
APP is allowed to advertise : Yes
PFC is willing to accept peer configuration : Yes
APP is willing to accept peer configuration : No
Port link state : UP
Negotiated configuration information:
PFC negotiated result : using peer configuration
APP negotiated result : detecting misconfiguration
```

Related	Command	Description
---------	---------	-------------

Commands		
	N/A	N/A

Platform N/A

Description

1.20 show dcbx information

To display the configuration information specific to DCB capability negotiation of each interface, use the **show dcbx information** command.

show dcbx information { **ets** | **app-proto** } [**interface** *interface-name*]

Parameter Description	Parameter	Description
	pfc	Displays the configuration information specific to PFC capability negotiation.
	app-proto	Displays the configuration information specific to APP capability negotiation.
	<i>interface-name</i>	Interface name

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Specify the interface parameter and the configuration information specific to DCB capability negotiation of the specified interface will be shown.

Configuration Examples This example shows how to display the configuration information specific to PFC capability negotiation of a specified interface:

```
FS#show dcbx information pfc interface gigabitethernet 0/1
DCBX pfc - Enabled state, Willing state and Error state
=====
      Interface      Local En/Will/Err  Peer En/Will/Err
-----
GigabitEthernet 0/1  Y/N/N              Y/N/N

      DCBX pfc - Port Priority Capability
=====
      Interface      CapLoc CapPeer
-----
GigabitEthernet 0/1  3      3

      DCBX pfc - Port Priority Flow Control Table
```

```

=====
      Interface      Priority EnLoc EnPeer EnOper
-----
GigabitEthernet 0/1  0         Yes   Yes   Yes
GigabitEthernet 0/1  1         Yes   Yes   Yes
GigabitEthernet 0/1  2         Yes   No    Yes
GigabitEthernet 0/1  3         No    Yes   No
GigabitEthernet 0/1  4         No    No    No
GigabitEthernet 0/1  5         Yes   Yes   Yes
GigabitEthernet 0/1  6         Yes   Yes   Yes
GigabitEthernet 0/1  7         Yes   Yes   Yes
    
```

Field	Description
En	Y means the DCB capability of the interface is enabled, N means the DCB capability is disabled, and the "-" means the interface has no DCB capability.
Will	Y indicates it is willing to accept the peer configuration, N indicates it is not willing to accept the peer configuration, and the "-" indicates the willing setting is unconcerned.
Err	Y indicates negotiation error, N indicates negotiation is normal, and the "-" indicates that the corresponding DCB capability does not need negotiation.
CapLoc	The max. number of traffic classes supporting PFC simultaneously on the local interface, ranging from 1 to 8; - indicates that the local end has no PFC capability.
CapPeer	The max. number of traffic classes supporting PFC simultaneously on the peer interface, ranging from 1 to 8; - indicates that the PFC capability is not found in the peer end.
Priority	802.1p priority of the interface, ranging from 0 to 7
EnLoc	Whether the local interface specified 802.1p priority enables PFC; Yes is for enabled, No is for disabled, and - represents that the local end has no PFC capability.
EnPeer	Whether the peer end specified 802.1p priority enables PFC; Yes is for enabled, No is for disabled, and - represents that the PFC capability is not found in the peer end.
EnOper	After the negotiation of both ends, whether the specified 802.1p priority enables PFC; Yes is for enabled, No is for disabled, and - represents not negotiated yet.

This example shows how to display the configuration information on APP capability negotiation of a specified interface:

```

FS#show dcbx information app interface gigabitethernet 0/1
DCBX app - Enabled state, Willing state and Error state
=====
    
```

Interface	Local En/Will/Err	Peer En/Will/Err		
GigabitEthernet 0/1	Y/N/N	Y/N/N		
DCBX app – Local FCoE Priority Information				
=====				
=====				
Interface	Sel Type	OUI	Protocol Id	LocPriority
GigabitEthernet 0/1	0(Ether)	00-1b-21(Intel)	0x0cbc(iSCSI)	1
GigabitEthernet 0/2	0(Ether)	00-1b-21(Intel)	0x8906(FCoE)	1
DCBX app – Peer FCoE Priority Information				
=====				
=====				
Interface	Sel Type	OUI	Protocol Id	PeerPriority
GigabitEthernet 0/1	0(Ether)	00-1b-21(Intel)	0x0cbc(iSCSI)	1
GigabitEthernet 0/2	0(Ether)	00-1b-21(Intel)	0x8906(FCoE)	1
DCBX app – Operation FCoE Priority Information				
=====				
=====				
Interface	Sel Type	OUI	Protocol Id	OperPriority
GigabitEthernet 0/1	0(Ether)	00-1b-21(Intel)	0x0cbc(iSCSI)	1
GigabitEthernet 0/2	0(Ether)	00-1b-21(Intel)	0x8906(FCoE)	1

Field	Description
En	Y means the DCB capability of the interface is enabled, N means the DCB capability is disabled, and the "-" means the interface has no DCB capability.
Will	Y indicates it is willing to accept the peer configuration, N indicates it is not willing to accept the peer configuration, and the "-" indicates the willing setting is unconcerned.
Err	Y indicates negotiation error, N indicates negotiation is normal, and the "-" indicates that the corresponding DCB capability does not need negotiation.
Sel Type	Application selection type: > 0: indicates Ethernet Type; for instance, the Selector Field of FCoE is 0, and the Selector Field of iSCSI is 1. > 1: indicates the Socket Number, namely, TCP/UDP socket > 2, 3: reserved
OUI	Organization OUI, currently only displays for Intel OUI, and the OUI of the other organization is not displayed.

Protocol ID	Protocol ID of an application: <ul style="list-style-type: none"> ➤ 0x8906 or 0x8914: indicates FCoE ➤ 0x8906 or 3260: indicates iSCSI ➤ Other: unknown
LocPriority	The local end interface specifies the 802.1p priority allocated by an application, ranging from 0 to 7; - indicates that the local end has no APP capability.
PeerPriority	The peer end device specifies the 802.1p priority allocated by an application, ranging from 0 to 7; - indicates that the peer end has no APP capability.
OperPriority	After the negotiation of both ends, the priority allocated by the specified application; - represents not negotiated yet.

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.21 show priority-flow-control deadlock statistics

Use this command to display the PFC deadlock statistics of an interface.

show priority-flow-control deadlock statistics [**interface** *interface*]

Parameter Description	Parameter	Description
	<i>interface</i>	Indicates an interface name.

Defaults

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide When no interface is specified, the PFC deadlock statistics of all interfaces are displayed.

Configuration Examples The following example displays the PFC deadlock statistics of Interface hundredGigabitEthernet 0/1.

```
FS# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
FS(config)#show priority-flow-control deadlock statistics interface hundredGigabitEthernet 0/1
```

Interface	Cos_value	Count	
Hu0/1	0	0	
Hu0/1	1	0	
Hu0/1	2	0	
Hu0/1	3	0	
Hu0/1	4	0	
Hu0/1	5	0	
Hu0/1	6	0	
Hu0/1	7	0	
Interface	Cos_value	Count	Recover
Hu0/1	0	0	True
Hu0/1	1	0	True
Hu0/1	2	0	True
Hu0/1	3	0	True
Hu0/1	4	0	True
Hu0/1	5	0	True
Hu0/1	6	0	True
Hu0/1	7	0	True

Field description:

Field	Description
Interface	Interface name
Cos_value	PFC priority
Count	Number of deadlock times

1.22 show priority-flow-control deadlock status

Use this command to display the PFC deadlock configuration.

show priority-flow-control deadlock status

Parameter	Parameter	Description
Description	N/A	N/A

Command Mode Privileged EXEC mode, global configuration mode, and interface configuration mode

Default Level 14

Usage Guide Use this command to display the PFC deadlock configuration and status.

Configuration Examples The following example displays the PFC deadlock configuration and status.

Configuration Example FS#show priority-flow-control deadlock status

```

Global PFC Deadlock: 1-2
Time precision: High<10ms>
Packet dispose: Forward
Limit cos-value: off
Limit period: 5
Limit frequency: 10
Priority attribute:
cos-value  detect-time  recover-time
-----
1          1          10
2          15         20

Interface Enable:
interface   cos-value
-----
Hu0/1      1-2
Hu0/2      2

Limit Log(Close PFC Log):
Interface   Cos-value  Frequency  Time
-----
Hu0/1      1          20         2017-12-15 11:00:00
Hu0/1      2          20         2017-12-15 11:00:00
Hu0/1      1          20         2017-12-15 12:00:00
Hu0/1      2          20         2017-12-15 12:00:00
Hu0/1      1          20         2017-12-15 13:00:00
Hu0/1      2          20         2017-12-15 13:00:00
Hu0/1      1          20         2017-12-15 14:00:00
Hu0/1      2          20         2017-12-15 14:00:00
Hu0/1      1          20         2017-12-15 15:00:00
Hu0/1      2          20         2017-12-15 15:00:00
    
```

Field description:

Field	Description
Global PFC Deadlock	Priority value configured for the PFC deadlock function
Time precision	PFC deadlock time precision. High precision (1s) is configured by default.
Packet dispose	Packet processing mode in the PFC deadlock state. The default processing mode is Forward .
Limit cos-value	Priority value configured for the PFC deadlock threshold
Limit period	Detection period set for the PFC deadlock threshold
Limit frequency	PFC deadlock threshold
Priority attribute	PFC deadlock priority attributes (cos-value, detection time, and recovery time)
Interface Enable	Interface on which the PFC deadlock function is enabled and priority

	information (interface name and enabling priority)
Limit Log	PFC deadlock threshold log (recording the historical disabling of the PFC function resulted from that the number of PFC deadlock events exceeds the threshold)
Interface	Interface on which the number of PFC deadlock events exceeds the threshold
Cos-value	Priority for which the number of PFC deadlock events exceeds the threshold
Frequency	Number of PFC deadlock events that occur in a period
Time	Time at which the number of PFC deadlock events exceeds the threshold

Prompts N/A

Platform N/A
Description

1.23 show priority-flow-control status

Use this command to show the PFC configuration and status information.

show priority-flow-control status [interface *intf-name1*]

Parameter	Parameter	Description
Description	<i>intf-name1</i>	Interface name

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide If the *intf-name 1* parameter is not defined, the configuration and status information of all ports is shown.

Configuration The following example shows the configuration and status information of the interface

Examples

FastEthernet 0/1:

```
FS#show priority-flow-control status interface Fa 0/1
Interface  PriorityEnabledPFC PriorityEnalbedPFCByUser
-----  -
FastEthernet 0/1  3 3 4
```

Related Commands	Command	Description
	N/A	N/A

Platform N/A

Description

1.24 show priority-flow-control statistics

Use this command to show the PFC statistics.

show priority-flow-control statistics [**interface** *intf-name1*]

Parameter Description	Parameter	Description
	<i>intf-name1</i>	Interface name

Defaults N/A

Command Mode Privileged EXEC mode.

Usage Guide If the *intf-name 1* parameter is not defined, the PFC flow control statistics of all ports is shown.

Configuration Examples 1. The following example shows the PFC statistics of the interface FastEthernet 0/1:

```
FS#show priority-flow-control statistics interface FastEthernet 0/1
interface Priority PauseSend PauseSend-Rate PauseReceived PauseReceived-Rate
              (packets/sec)              (packets/sec)
-----
Fa 0/1      0      0      0      0      0
Fa 0/1      1      0      0      0      0
Fa 0/1      2      0      0      0      0
Fa 0/1      3      0      0      0      0
Fa 0/1      4      0      0      0      0
Fa 0/1      5      0      0      0      0
Fa 0/1      6      0      0      0      0
Fa 0/1      7      0      0      0      0
```

Field description:

Field	Description
Priority	Indicates the 802.1p flow control.
PauseSend	Indicates the quantity of sent PFC packets.
PauseSend-Rate	Indicates the rate of sending PFC packets.
PauseReceived	Indicates the quantity of received PFC packets.
PauseReceived-Rate	Indicates the rate of receiving PFC packets.

2. The following example shows the PFC top history statistics of the interface tenGigabitEthernet 0/1.

```
FS#show priority-flow-control statistics interface history-top tenGigabitEthernet 0/1
Interface : TenGigabitEthernet 0/1
Priority : 0
```

```
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 1
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 2
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 3
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 4
```

```

PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 5
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 6
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
Priority : 7
PauseSend          : 0
PauseSend-Rate     : 0 packets/sec
PauseSend-Rate-1st : 0 packets/sec
PauseSend-Rate-2nd : 0 packets/sec
PauseSend-Rate-3rd : 0 packets/sec
PauseReceived      : 0
PauseReceived-Rate : 0 packets/sec
PauseReceived-Rate-1st : 0 packets/sec
PauseReceived-Rate-2nd : 0 packets/sec
PauseReceived-Rate-3rd : 0 packets/sec
    
```

Field description:

Field	Description
Priority	Indicates the 802.1p priority value.
PauseSend	Indicates the quantity of sent PFC packets.
PauseSend-Rate	Indicates the current rate of sending PFC packets.
PauseSend-Rate-1st	Indicates the highest historical rate of sending PFC packets.
PauseSend-Rate-2nd	Indicates the second highest historical rate of sending PFC packets.
PauseSend-Rate-3rd	Indicates the third highest historical rate of sending PFC packets.
PauseReceived	Indicates the quantity of received PFC packets.
PauseReceived-Rate	Indicates the current rate of receiving PFC packets.
PauseReceived-Rate-1st	Indicates the highest historical rate of receiving PFC packets.
PauseReceived-Rate-2nd	Indicates the second highest historical rate of receiving PFC packets.
PauseReceived-Rate-3rd	Indicates the third highest historical rate of receiving PFC packets.

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

2 RDMA Commands

2.1 clear cnp counters

Use this command to clear the CNP packet counter.

clear cnp counters [**interface** *interface-name*]

Parameter Description	Parameter	Description
	<i>interface</i>	Indicates an interface name.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example clears the CNP packet counter on interface TF 0/1.

```
FS#clear cnp counters interface tf 0/1
```

2.2 clear nak counters

Use this command to clear the NAK packet counter.

clear nak counters [**interface** *interface-name*]

Parameter Description	Parameter	Description
	<i>interface</i>	Indicates an interface name.

Command Mode Privileged EXEC mode

Default Level 14

Usage Guide N/A

Configuration Examples The following example clears the NAK packet counter on interface TF 0/1.

```
FS#clear nak counters interface tf 0/1
```

2.3 cnp cos

Use this command to configure the CoS value of CNP packets. Use the **no** form of this command to restore the default CoS value of CNP packets.

cnp cos *cos-value*

no cnp cos *cos-value*

Parameter Description	Parameter	Description
	<i>cos-value</i>	CoS value of CNP packets. The value ranges from 0 to 7.
Command Mode	Global configuration mode	
Defaults	The default CoS value of CNP packets is 6.	
Default Level	14	
Usage Guide	N/A	
Configuration	The following example configures the CoS value of the CNP packets to 5.	
Examples	<pre>FS(config)# cnp cos 5</pre>	

2.4 cnp counting enable

Use this command to enable the CNP packet counting function. Use the **no** form of this command to disable the CNP packet counting function.

cnp counting enable
no cnp counting enable

Parameter Description	Parameter	Description
	N/A	N/A
Command Mode	Interface configuration mode	
Defaults	The CNP packet counting function is disabled by default.	
Default Level	14	
Usage Guide	N/A	
Configuration	The following example enables the CNP packet counting function.	
Examples	<pre>FS(config)# interface tfGigabitEthernet 0/1 FS(config-if-TFGigabitEthernet 0/1)# cnp counting enable</pre>	

2.5 nak counting enable

Use this command to enable the NAK packet counting function. Use the **no** form of this command to disable the NAK

packet counting function.

nak counting enable

no nak counting enable

Parameter Description	Parameter	Description
	N/A	N/A

Command Mode Interface configuration mode

Defaults The NAK packet counting function is disabled by default.

Default Level 14

Usage Guide N/A

Configuration The following example enables the NAK packet counting function.

```

Examples
FS(config)# interface tfGigabitEthernet 0/1
FS(config-if-TFGigabitEthernet 0/1)# nak counting enable
    
```

2.6 show cnp counters

Use this command to display the CNP packet statistics.

show cnp counters [**interface** *interface-name*]

Parameter Description	Parameter	Description
	<i>interface-name</i>	Interface name

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode

Defaults N/A

Default Level 14

Usage Guide N/A

Configuration The following example displays the CNP packet statistics on interface TF 0/1.

```

Examples
FS# show cnp counters interface tf 0/1
Interface      Input Packets  Output Packets
-----
TF0/1          10             20
    
```

2.7 show nak counters

Use this command to display the NAK packet statistics.

show nak counters [**interface** *interface-name*]

Parameter Description	Parameter	Description
	<i>interface-name</i>	Interface name

Command Mode Privileged EXEC mode, global configuration mode, interface configuration mode

Defaults N/A

Default Level 14

Usage Guide N/A

Configuration The following example displays the NAK packet statistics on interface TF 0/1.

Examples

```
FS# show nak counters interface tf 0/1
Interface      Input Packets  Output Packets
-----
TF0/1          3              3
```




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