

**FiberstoreOS**

**Reliability Command Line Reference**

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# 1 BHM Commands

---

## 1.1 sysmon enable

Use this command to enable system monitor. Use the no command to disable system monitor.

### Command Syntax

**sysmon enable**

**no sysmon enable**

### Command Mode

Global Configuration

### Default

Enable

### Usage

None

### Examples

The following example shows how to enable system monitor:

```
Switch# configure terminal
Switch(config)# sysmon enable
```

### Related Commands

**show sysmon**

## 1.2 show sysmon

Use this command to show system monitor information.

### Command Syntax

**show sysmon**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None



## Examples

The following example shows how to enable system monitor

```
Switch# show sysmon
System monitor is disabling
```

## Related Commands

**sysmon enable**

## 1.3 heart-beat-monitor enable

Use this command to enable heart beat monitor. Use the no command to disable heart beat monitor.

## Command Syntax

**heart-beat-monitor enable**

**no heart-beat-monitor enable**

## Command Mode

Global Configuration

## Default

Enable

## Usage

The default of heart beat monitor is enabled.

## Examples

The following example shows how to enable heart beat monitor:

```
Switch# configure terminal
Switch(config)# heart-beat-monitor enable
```

## Related Commands

**show heart-beat-monitor**

## 1.4 heart-beat-monitor reactivate

Use this command to specify a reactivation after process crash.

## Command Syntax

**heart-beat-monitor reactivate (reload system | shutdown port |warning)**

<b>reload system</b>	reload system
<b>shutdown port</b>	shutdown all port when system crash
<b>warning</b>	print warning on screen

## Command Mode

Global Configuration

## Default

Reload system

## Usage

The default reactivation is to reload system.

## Examples

The following example shows how to set heart-beat-monitor the reactivation

```
Switch# configure terminal
Switch(config)# heart-beat-monitor reactivate reload system
```

## Related Commands

**show heart-beat-monitor**

# 1.5 show heart-beat-monitor

Use this command to show heart beat monitor status.

## Command Syntax

**show heart-beat-monitor**

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to show system monitor information

```
Switch# show heart-beat-monitor
heart-beat-monitor enable.
heart-beat-monitor reactivation: print warning.
```

## Related Commands

**heart-beat-monitor enable**

**heart-beat-monitor reactivate**

# 2 EFM Commands

---

## 2.1 ethernet oam enable

Use this command to enable Ethernet operations, maintenance, and administration (OAM) on an interface.

### Command Syntax

**ethernet oam enable**

**no ethernet oam enable**

### Command Mode

Interface Configuration

### Default

The default status of Ethernet OAM is disabled.

### Usage

This command is used to enable the Ethernet OAM module on a port.

### Examples

The following example shows how to enable Ethernet OAM

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam enable
```

### Related Commands

**no ethernet oam enable**

## 2.2 ethernet oam mode

Use the command to configure Ethernet OAM mode on an interface

### Command Syntax

**ethernet oam mode active**

**ethernet oam mode passive**

**no ethernet oam mode**

### Command Mode

Interface Configuration

## Default

The default Ethernet OAM mode for the DTE is passive.

## Usage

This command is used to set the DTE to active mode or passive mode.

## Examples

The following example shows how to set EFM mode

```
Switch # configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam mode active
Switch(config-if)# ethernet oam mode passive
```

## Related Commands

None

## 2.3 ethernet oam min-rate

Use this command to set the OAMPDU timer. Use the no form of the command to reset to default value.

### Command Syntax

**ethernet oam min-rate** *SECONDS*

**no ethernet oam min-rate**

<i>SECONDS</i>	The number of seconds chosen for this timer. The range is 1~10
----------------	--

### Command Mode

Interface Configuration

### Default

The default value of the OAMPDU timer is 1 second

### Usage

Set the timer to emit at least one OAMPDU per second and ensure that the sublayer adheres to the maximum number of OAMPDUs per second. The minimum is 1 OAMPDU per second and the maximum is 10 OAMPDU per second

### Examples

The following example shows how to set the OAMPDU timer to 1

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam min-rate 1
```

### Related Commands

**show ethernet oam status**

## 2.4 ethernet oam max-rate

Use this command to set the OAMPDU maximum number of PDUS per second. Use the no form of the command to reset max-rate to the default value.

### Command Syntax

**ethernet oam max-rate** *PDUS*

**no ethernet oam max-rate**

<i>PDUS</i>	The maximum number of PDUs per second. The range is 1~10
-------------	--

### Command Mode

Interface Configuration

### Default

The default value of the max-rate is 10 PDUs per second.

### Usage

This command is to ensure that the sublayer adheres to the maximum number of OAMPDUs per second. The minimum is 1 OAMPDU per second and the maximum is 10 OAMPDUs per second.

### Examples

The following example shows how to set the OAMPDU maximum number to 10 per second

```
Switch # configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam max-rate 10
```

### Related Commands

**show ethernet oam status**

## 2.5 ethernet oam link-monitor on

Use this command to turn on link monitoring on an interface. Use the no form of this command to turn link monitoring off.

### Command Syntax

**ethernet oam link-monitor on**

**no ethernet oam link-monitor on**

### Command Mode

Interface Configuration

### Default

When link monitor is supported, link monitoring is automatically turned on.

## Usage

None

## Examples

The following example shows how to turn on link monitoring on interface eth-0-1

```
Switch # configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam link-monitor on
```

## Related Commands

**show ethernet oam status**

## 2.6 ethernet oam link-monitor supported

Use this command to configure link monitoring on an interface. Use the no form of this command to remove support for link monitoring on an interface.

### Command Syntax

**ethernet oam link-monitor supported**

**no ethernet oam link-monitor supported**

### Command Mode

Interface Configuration

### Default

The default state of the link monitor is supported

### Usage

None

## Examples

The following example shows how to configure link monitoring on interface eth-0-1

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam link-monitor supported
```

## Related Commands

**show ethernet oam status**

## 2.7 ethernet oam link-monitor frame

Use this command to configure the low and high threshold and the window for the frame event. If the low threshold is exceeded, an error frame link event is generated. If the high threshold is exceeded, the action defined using the command ethernet oam link-monitor high threshold action is taken.

### Command Syntax

**ethernet oam link-monitor frame threshold high** (*HIGH\_THRES* | **none**) **low** *LOW\_THRES* **window** *WINDOW*

### no ethernet oam link-monitor frame threshold

<i>HIGH_THRES</i>	Value of the high threshold for error frames. The range is 1~65535
<b>none</b>	No high threshold value is set
<b>low</b> <i>LOW_THRES</i>	Value of the low threshold for error frames. 0~65535
<b>window</b> <i>WINDOW</i>	Size of frame event window, expressed in milliseconds, in multiples of 100, in the range 10~600

## Command Mode

Interface Configuration

## Default

The default value for high threshold is none, meaning that no high threshold is configured.

The default value of low threshold is 1.

The default value for the frame event window is 100.

## Usage

None

## Examples

The following example shows how to configure the low and high threshold and the window for the frame event

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam link-monitor frame threshold high 5 low 2 window 200
```

## Related Commands

**show ethernet oam status**

## 2.8 ethernet oam link-monitor frame-seconds threshold

Use this command to configure the low and high threshold and the window for the frame-seconds event. If the low threshold is exceeded, an error-frame-seconds link event is generated. If the high threshold is exceeded then action defined through the command ethernet oam link-monitor high threshold action will be taken.

## Command Syntax

**ethernet oam link-monitor frame-seconds threshold high** (*HIGH\_THRES* | **none**) **low** *LOW\_THRES* **window** *WINDOW*

**no ethernet oam link-monitor frame-seconds threshold high**

<i>HIGH_THRES</i>	High threshold for the number of error frame-seconds in the range of 1~900
-------------------	--

<b>none</b>	No high threshold value is set
<b>low</b> <i>LOW_THRES</i>	Low threshold for the number of error frame-seconds 1~900
<b>window</b> <i>WINDOW</i>	Window for frame-seconds events, in milliseconds, in multiples of 100, in the range 100~9000

## Command Mode

Interface Configuration

## Default

The default value for high threshold is none, meaning that no high threshold is configure. The default value for the low threshold is 1. The default value of frame event window is 1000.

## Usage

None

## Examples

The following example shows how to configure the threshold and window for the frame-seconds event

```
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam link-monitor frame-seconds threshold high 5 low 2 window
200
```

## Related Commands

**show ethernet oam status**

## 2.9 ethernet oam link-monitor high threshold action

Use this command to define action when high threshold is detected. Use no form of the command to reset the action.

## Command Syntax

**ethernet oam link-monitor high threshold action error-disable-interface**

**no ethernet oam link-monitor high threshold action error-disable-interface**

## Command Mode

Interface Configuration

## Default

When high threshold is exceeded it will generate only the corresponding link event and will not trigger any interface events by default

## Usage

None

## Examples

The following example shows how to define action of error-disable interface when high threshold is detected



```
Switch(config)# interface eth-0-1
```

```
Switch(config-if)# ethernet oam link-monitor high-threshold action  
error-disable-interface
```

## Related Commands

**show ethernet oam status**

## 2.10 ethernet oam remote-loopback

Use this command to configure remote loopback on an interface. This command can be used to enable or disable remote loopback and also configure the remote loopback timeout, which is the number of seconds the DTE will wait for the remote DTE to respond to the ethernet oam remote-loopback enable command. Use the no form of this command to remove remote-loopback support from the interface.

### Command syntax

**ethernet oam remote-loopback** {supported | timeout *SECS*}

**no ethernet oam remote-loopback** {supported | timeout}

<b>supported</b>	Remote loopback can be initiated in the DTE
<b>timeout <i>SECS</i></b>	The remote loopback timeout value in the range of 1~10

### Command Mode

Interface Configuration

### Default

The default state for the remote loopback is not supported. If a timeout is not configured, the local DTE remains in remote loopback state until the remote DTE responds or the user stops remote loopback administratively.

One switch supports 4 interfaces in “local Loopback” status at the same time.

### Usage

None

### Examples

The following example shows how to support remote-loopback on interface eth-0-1

```
Switch# configure terminal  
Switch(config)# interface eth-0-1  
Switch(config-if)# ethernet oam remote-loopback supported
```

### Related Commands

**show ethernet oam status**

## 2.11 ethernet oam remote-loopback start

Use this command to start an Ethernet OAM remote-loopback mechanism.

## Command Syntax

**ethernet oam remote-loopback start interface** *IFNAME*

<i>IFNAME</i>	Name of the interface
---------------	-----------------------

## Command Mode

Privileged EXEC

## Default

The default state of the remote loopback function is disabled.

## Usage

None

## Usage

This command is used to start a remote loopback mechanism.

## Examples

The following example shows how to start an Ethernet OAM remote-loopback mechanism

```
Switch# ethernet oam remote-loopback start interface eth-0-1
```

## Related Commands

**show ethernet oam state-machine**

## 2.12 ethernet oam remote-loopback stop

Use this command to stop an Ethernet OAM remote-loopback process.

## Command Syntax

**ethernet oam remote-loopback stop interface** *IFNAME*

<i>IFNAME</i>	Name of the interface
---------------	-----------------------

## Command Mode

Privileged EXEC

## Default

Use this command to stop an Ethernet OAM remote loopback mechanism.

## Usage

Use this command to stop an Ethernet OAM remote loopback mechanism.

## Examples

The following example shows how to stop an Ethernet OAM remote-loopback process

```
Switch# ethernet oam remote-loopback stop interface eth-0-9
```

## Related Commands

**show ethernet oam state-machine**

## 2.13 ethernet oam timeout

Use this command to reset the LOCAL\_LOST\_LINK\_TIMER and start an Ethernet OAM discovery process. Use the no form of the command to reset to the default value.

### Command Syntax

**ethernet oam timeout** *SECONDS*

**no ethernet oam timeout**

<i>SECONDS</i>	The number of seconds chosen for the link-timer in the range 2~30
----------------	---

### Command Mode

Interface Configuration

### Default

The default value of the timeout is 5 seconds

### Usage

This command is used to start a discovery process by resetting the LOCAL\_LOST\_LINK\_TIMER.

### Examples

The following example shows how to set the timeout to 5s

```
Switch # configure terminal
```

```
Switch(config)# interface eth-0-1
```

```
Switch(config-if)# ethernet oam timeout 5
```

### Related Commands

None

## 2.14 ethernet oam remote-failure

Use this command to error-disable port when get remote failure item form peer. Use the no form of the command to unset the action.

## Command Syntax

**ethernet oam remote-failure (link-fault | critical-event | dying-gasp) action error-disable-interface**

**no ethernet oam remote-failure (link-fault | critical-event | dying-gasp) action error-disable-interface**

<b>link-fault</b>	Critical Link Event
<b>critical-event</b>	Dying Gasp Event
<b>dying-gasp</b>	Link Fault Event

## Command Mode

Interface Configuration

## Default

None

## Usage

This command is used to error-disable port when get remote failure item form peer.

## Examples

The following example shows how to error-disable port when get remote failure item form peer on interface eth-0-1

```
Switch # configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet oam remote-failure link-fault action
error-disable-interface
```

## Related Commands

None

## 2.15 show ethernet oam discovery

Use this command to display the ethernet oam administrative and operation configuration for local and remote DTE

## Command Syntax

**show ethernet oam discovery (interface *IFNAME*)**

<b>interface <i>IFNAME</i></b>	Name of the interface
--------------------------------	-----------------------

## Command Mode

Privileged EXEC

## Default

None

## Usage

The following sample output from this command displays ethernet oam administrative and operation configurations for local and remote DTE

## Example

The following example shows how to display the ethernet oam administrative and operation configuration for local and remote DTE of interface eth-0-1

```
Switch1# show ethernet oam discovery interface eth-0-1
```

## Related Commands

None

## 2.16 show Ethernet oam status

Use this command to display the runtime settings of link-monitoring and general OAM operations for all interfaces or for a specific interface

### Command Syntax

**show ethernet oam status** (**interface** *IFNAME*)

<b>interface</b> <i>IFNAME</i>	Name of the interface
--------------------------------	-----------------------

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display the runtime settings of link-monitoring and general OAM operations of interface eth-0-1

```
Switch# show ethernet oam status interface eth-0-1
```

### Related Commands

None

## 2.17 show ethernet oam state-machine

Use this command to display the state machine information.

## Command Syntax

**show ethernet oam state-machine (interface *IFNAME*)**

<b>interface <i>IFNAME</i></b>	Name of the interface
--------------------------------	-----------------------

## Command Mode

Privileged EXEC

## Default

None

## Usage

The command displays the state of the interface.

## Examples

The following example shows how to display the state machine information of eth-0-1

```
Switch# show ethernet oam state-machine interface eth-0-1
```

## Related Commands

None

## 2.18 show ethernet oam statistics

Use this command to display the statistics information.

## Command Syntax

**show ethernet oam statistics (interface *IFNAME*)**

<b>interface <i>IFNAME</i></b>	Name of the interface
--------------------------------	-----------------------

## Command Mode

Privileged EXEC

## Default

None

## Usage

The command displays the statistics of the interface.

## Examples

The following example shows how to display the statistics information of eth-0-1

```
Switch# show ethernet oam statistics interface eth-0-1
```

### Related Commands

None

# 3

## CFM Commands

---

### 3.1 ethernet cfm enable

Use this command to enable CFM globally. Use the no parameter to disable the CFM function on the bridge.

#### Command Syntax

**ethernet cfm enable**

**no ethernet cfm enable**

#### Command Mode

Global Configuration

#### Default

Disabled

#### Usage

This command is used to enable CFM globally.

#### Examples

The following example shows how to enable and disable cfm globally:

```
Switch# configure terminal
Switch(config)# ethernet cfm enable
Switch(config)# no ethernet cfm enable
```

#### Related Commands

None

### 3.2 ethernet cfm domain level

Use this command to create an MD within which you can manage Ethernet traffic or enter cfm domain mode. Ensure you specify the level for each MD. The levels separate MDs from each other and provide different areas of functionality.

#### Command Syntax

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

**no ethernet cfm domain** *DOMAIN\_NAME*

DOMAIN_NAME	Maintenance domain name
LEVEL	MD level, the range is 0 to 7



--	--

### Command Mode

Global Configuration

### Default

None

### Usage

The levels define the MD as follows:

0~2 (operator levels)

3~4 (provider levels)

5~7 (customer levels)

### Examples

The following example shows how to create and destroy domain:

```
Switch# configure terminal
Switch(config)# ethernet cfm domain test level 5
Switch(config-ether-cfm)# exit
Switch(config)# no ethernet cfm domain test
```

### Related Commands

None

## 3.3 service

Use this command to create an MA within which you can create mep.

### Command Syntax

**service** *CSI\_ID* (**vlan** *VLAN\_ID*)

**no service** *CSI\_ID*

<b>CSI_ID</b>	Maintenance association name
<b>vlan VLAN_ID</b>	Vlan id, the range is 1 to 4094

### Command Mode

Ethernet-cfm Configure mode

### Default

None

### Usage

None

## Examples

The following example shows how to create and remove MA:

```
Switch# configure terminal
Switch(config)# ethernet cfm domain test level 5
Switch(config-ether-cfm)# service cst vlan 30
Switch(config-ether-cfm)# no service cst
```

## Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

## 3.4 ethernet cfm mep

Use this command to define an MEP within an MA. Each MEP and remote MEP must have a unique ID within an MA. If two or more MEPs share the same ID, CFM raises an event indicating a duplicate MEP exists in the MA.

### Command Syntax

**ethernet cfm mep** (**down|up**) **mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)  
**interval** (**1 | 2 | 3 | 4 | 5 | 6 | 7**)

**no ethernet cfm mep** (**down|up**) **mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)

<b>down</b>	Down mep
<b>up</b>	Up mep
MEPID	Local mep id, the range is 1 to 8191
DOMAIN_NAME	Maintenance domain name
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094
<b>1</b>	CCM Interval 3.3 millisecond
<b>2</b>	CCM Interval 10 millisecond
<b>3</b>	CCM Interval 100 millisecond
<b>4</b>	CCM Interval 1 second
<b>5</b>	CCM Interval 10 second
<b>6</b>	CCM Interval 1 minute
<b>7</b>	CCM Interval 10 minutes

### Command Mode

Interface Configuration

### Default

None

### Usage

None

## Examples

The following example shows how to create MEP:

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet cfm mep down mpid 1 domain md1 vlan 2 interval 1
```

## Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVE*

**service** *CSI\_ID* (**vlan** *VLAN\_ID*|)

## 3.5 ethernet cfm mep crosscheck mpid

Use this command to define a remote MEP within an MA. Each MEP and remote MEP must have a unique ID within an MA. If two or more MEPs share the same ID, CFM raises an event indicating a duplicate MEP exists in the MA.

### Command Syntax

**ethernet cfm mep crosscheck mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **mac** *MAC*

**no ethernet cfm mep crosscheck mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)

MEPID	The range is 1 to 8191
DOMAIN_NAME	Maintenance domain name
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094
MAC	Remote mep mac address

### Command Mode

Interface Configuration

### Default

None

### Usage

None

### Examples

The following example shows how to create remote MEP:

```
Switch# configure terminal
Switch(config)# ethernet cfm domain test level 5
Switch(config-ether-cfm)# service cst vlan 30
Switch(config-ether-cfm)# exit
Switch(config)# interface eth-0-9
Switch(config-if)# ethernet cfm mep crosscheck mpid 8000 domain test vlan 30 mac 0.0.1
```

## Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

**service** *CSI\_ID* (**vlan** *VLAN\_ID*)

## 3.6 ethernet cfm mip

Use this command to define an MIP. The relative MD and MA should be configured before MIP is configured.

### Command Syntax

**ethernet cfm mip level** *LEVEL* **vlan** *VLAN\_ID*

**no ethernet cfm mip level** *LEVEL* **vlan** *VLAN\_ID*

LEVEL	MD level, the range is 0 to 7
VLAN_ID	Vlan id, the range is 1 to 4094

### Command Mode

Interface Configuration

### Default

None

### Usage

None

### Examples

The following example shows how to create MIP:

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet cfm mip level 5 vlan 2
```

## Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

**service** *CSI\_ID* (**vlan** *VLAN\_ID*)

## 3.7 ethernet cfm cc enable domain

Use the command to enable continuity check for an MA.

### Command Syntax

**ethernet cfm cc enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

**no ethernet cfm cc enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

DOMAIN_NAME	Maintenance domain name
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094

### Command Mode

Global Configuration

### Default

None

### Usage

None

### Examples

The following example shows how to enable cc:

```
Switch# configure terminal
Switch(config)# ethernet cfm cc enable domain test vlan 2
```

### Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

**service** *CSI\_ID* (**vlan** *VLAN\_ID*)

## 3.8 ethernet cfm cc domain priority

Use the command to define continuity check vlan priority for an MA.

### Command Syntax

**ethernet cfm cc domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*) **priority** *VLAN\_PRIORITY*

**no ethernet cfm cc domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*) **priority**

DOMAIN_NAME	Maintenance domain name
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094
VLAN_PRIORITY	Vlan priority, the range is 0 to 7, the default value is 0

### Command Mode

Global Configuration

### Default

None

### Usage

None

### Examples

The following example shows how to configure vlan priority for CC message:

```
Switch# configure terminal
Switch(config)# ethernet cfm cc domain test vlan 2 priority 3
```

## Related Commands

**ethernet cfm domain** *DOMAIN\_NAME* **level** *LEVEL*

**service** *CSI\_ID* (**vlan** *VLAN\_ID*)

**ethernet cfm cc enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

## 3.9 ethernet cfm loopback

Use the command to issue CFM loopback messages for remote mepid or multicast address and verify that remote MEPs are accessible.

### Command Syntax

**ethernet cfm loopback** (**multicast** | **unicast** **rmepid** *RMEPID*) **mepid** *MEPID* (**domain** *DOMAIN\_NAME* | **level** *LEVEL*) (**vlan** *VLAN\_ID*) (**repeat** *COUNT*)(**timeout** *TIMEOUT*)(**priority** *PRIORITY*)

<b>multicast</b>	Send multicast frame
<b>unicast</b>	Send unicast frame
<b>rmepid</b>	Mep ID of remote MEP
<b>RMEPID</b>	Remote mep id, the range is 1 to 8191
<b>MEPID</b>	Source mep id, the range is 1 to 8191
<b>domain</b> <i>DOMAIN_NAME</i>	Maintenaince domain name
<b>level</b> <i>LEVEL</i>	MD level, the range is 0 to 7
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094
<b>repeat</b> <i>COUNT</i>	Repeat count, the range is 1 to 255, the default value is 1
<b>timeout</b> <i>TIMEOUT</i>	The value of timeout, the range is 1 to 65535, the default value is 5
<b>priority</b> <i>PRIORITY</i>	The range is 0 to 7, the default value is 7

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to start loopback:

```
Switch# ethernet cfm loopback multicast mepid 1 domain test vlan 2 repeat 3 timeout 5
priority 7
```

## Related Commands

**ethernet cfm mep (down|up) mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **interval** (1 | 2 | 3 | 4 | 5 | 6 | 7)

**ethernet cfm mep crosscheck mpid** *MEPID* (**vlan** *VLAN\_ID* |) **mac** *MAC*

## 3.10 ethernet cfm loopback mac

Use the command to issue CFM loopback messages for remote MEP or MIP mac address and verify that remote MEPs or MIPs are accessible.

### Command Syntax

**ethernet cfm loopback mac** *MACADDRESS* **unicast mepid** *MEPID* (**domain** *DOMAIN\_NAME* | **level** *LEVEL*) (**vlan** *VLAN\_ID* |) (**repeat** *COUNT* |) (**timeout** *TIMEOUT* |) (**priority** *PRIORITY* |)

<b>MACADDRESS</b>	The remote mep mac address
<b>MEPID</b>	The source local mep id and its range is 1 to 8191
<b>domain</b> <i>DOMAIN_NAME</i>	Maintenance domain name
<b>level</b> <i>LEVEL</i>	MD level, the range is 0 to 7
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094
<b>repeat</b> <i>COUNT</i>	Repeat count, the range is 1 to 255, the default value is 1
<b>timeout</b> <i>TIMEOUT</i>	The value of timeout, the range is 1 to 65535, the default value is 5
<b>priority</b> <i>PRIORITY</i>	The range is 0 to 7, the default value is 7

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to start loopback:

```
Switch# ethernet cfm loopback mac 0.0.1 unicast mepid 1 domain test vlan 2 repeat 3 timeout
5 priority 7
```

## Related Commands

**ethernet cfm mep (down|up) mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **interval** (1 | 2 | 3 | 4 | 5 | 6 | 7)

**ethernet cfm mep crosscheck mpid** *MEPID* (**vlan** *VLAN\_ID* |) **mac** *MAC*

### 3.11 ethernet cfm errors enable domain

Use the command to configure reserve ccm errors. The default action is to reserve ccm errors.

#### Command Syntax

**ethernet cfm errors enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)

**no ethernet cfm errors enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)

<b>DOMAIN_NAME</b>	Maintenance domain name
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094

#### Command Mode

Global Configuration

#### Default

None

#### Usage

For every mep, five latest errors will be reserved.

#### Examples

The following example shows how to configure reserve ccm errors:

```
Switch# configure terminal
Switch(config)# ethernet cfm errors enable domain test vlan 2
```

#### Related Commands

None

### 3.12 clear ethernet cfm errors

Use the command to clear cfm errors for domain.

#### Command Syntax

**clear ethernet cfm errors** (**domain** *DOMAIN\_NAME* | **level** *LEVEL*)

<b>domain</b> <i>DOMAIN_NAME</i>	Maintenance domain name
<b>level</b> <i>LEVEL</i>	MD level, the range is 0 to 7

#### Command Mode

Privileged EXEC



## Default

None

## Usage

None

## Examples

The following example shows how to clear ccm errors:

```
Switch# clear ethernet cfm errors domain test
```

## Related Commands

None

## 3.13 ethernet cfm ais status enable

Use the command to enable or disable ais function and configure relative parameters.

### Command Syntax

**ethernet cfm ais status enable** (**all** | **loc** | **mismerge** | **unexpected-mep** | **unexpected-meg-level** | **unexpected-period**) **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

**tx-level** *LEVEL* (**unicast** *RMEP\_MAC* | **multicast**) (**cvlan** *VLAN\_LIST*)

**no ethernet cfm ais status enable** (**all** | **loc** | **mismerge** | **unexpected-mep** | **unexpected-meg-level** | **unexpected-period**) **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

**level** *LEVEL* (**unicast** *RMEP\_MAC* | **multicast**)

all	Ais for all defect condition
loc	Ais for loss of continuity
mismerge	Ais for incorrect MEG ID
unexpected-mep	Ais for unexpected MEP ID received
unexpected-meg-level	Ais for incorrect MEG level
unexpected-period	Ais for mis-matched in period received
DOMAIN_NAME	Maintenance domain name of the local mep
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094
LEVEL	Ais packet will be sent in this MD level, the range is 1 to 7
unicast	Unicast ais frame to be sent
RMEP_MAC	The remote mep mac address
multicast	Multicast ais frame to be sent
<b>cvlan</b> VLAN_LIST	Cvlan id of ais packet, the range is 1 to 4094

### Command Mode

Interface Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to configure ais:

```
Switch# configure terminal
Switch(config)# ethernet cfm ais status enable all domain test vlan 2 level 5 multicast
```

## Related Commands

None

## 3.14 ethernet cfm ais suppress alarm enable domain

Uses the command to enable ais suppress alarm. When this command is configured and ais condition is enabled, the loc errors will not be reported.

### Command Syntax

**ethernet cfm ais suppress alarm enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

**no ethernet cfm ais suppress alarm enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

<b>DOMAIN_NAME</b>	Maintenance domain name of the local mep
<b>vlan VLAN_ID</b>	Vlan id, the range is 1 to 4094

### Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to enable ais suppress alarm:

```
Switch# configure terminal
Switch(config)# ethernet cfm ais suppress alarm enable domain test vlan 2
```

## Related Commands

None

## 3.15 ethernet cfm server-ais status enable level

Use this command to configure ais server and parameters.

## Command Syntax

**ethernet cfm server-ais status enable level** *LEVEL* (**interval (1|60)**)

**no ethernet cfm server-ais status enable**

<b>LEVEL</b>	Ais packet will be sent in this MD level, the range is 1 to 7
<b>interval (1 60)</b>	Transmission interval for AIS frames, the value is 1 second or 60 seconds, the default value is 1 second

## Command Mode

Interface Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to configure ais server:

```
Switch# configure terminal
Switch(config)# interface eth-0-1
Switch(config-if)# ethernet cfm server-ais status enable level 5 interval 60
```

## Related Commands

None

## 3.16 show ethernet cfm domain

Use the command to display information related to the configuration of MDs and MAs.

## Command Syntax

**show ethernet cfm domain** *DOMAIN\_NAME*

<b>DOMAIN_NAME</b>	Maintenance domain name
--------------------	-------------------------

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to display information related to the configuration of MDs and MAs:

```
Switch# show ethernet cfm domain test
```

## Related Commands

None

## 3.17 show ethernet cfm maintenance-points

Use the command to display information related to configuration of MEPs, remote MEPs, and MIPs.

### Command Syntax

**show ethernet cfm maintenance-points**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

## Examples

The following example shows how to display information related to configuration of MEPs, remote MEPs, and MIPs:

```
Switch# show ethernet cfm maintenance-points
```

## Related Commands

None

## 3.18 show ethernet cfm maintenance-points local

Use the command to display information related to configuration of MEPs and MIPs.

### Command Syntax

**show ethernet cfm maintenance-points local (mep|mip) (interface IFNAME | domain DOMAIN\_NAME | level LEVEL)**

mep	Maintenance end point
mip	Maintenance intermediate point
interface IFNAME	Interface name
<b>domain</b> DOMAIN_NAME	Maintenance domain name
level LEVEL	MD level, the range is 0 to 7

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to display information related to configuration of MEPs and MIPs:

```
Switch# show ethernet cfm maintenance-points local mep interface eth-0-1
```

## Related Commands

None

## 3.19 show ethernet cfm maintenance-points remote

Use the command to display information related to configuration of remote MEPs.

### Command Syntax

**show ethernet cfm maintenance-points remote (mpid *MEPID* | mac *MAC*) (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID*)**

<b>mpid</b> <i>MEPID</i>	The remote mep id, the range is 1 to 8191
mac <i>MAC</i>	The remote mep mac address
<b>domain</b> <i>DOMAIN_NAME</i>	Maintenance domain name
level <i>LEVEL</i>	MD level, the range is 0 to 7
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to display information of remote MEP:

```
Switch# show ethernet cfm maintenance-points remote mpid 1 domain test
```

## Related Commands

None

## 3.20 show ethernet cfm cc config

Use the command to display information related to CC configuration.

### Command Syntax

**show ethernet cfm cc config**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display information related to CC configuration:

```
Switch# show ethernet cfm cc config
```

## Related Commands

None

## 3.21 show ethernet cfm errors

Use the command to display CFM error.

### Command Syntax

**show ethernet cfm errors (domain *DOMAIN\_NAME* | level *LEVEL*)**

<b>domain</b> DOMAIN_NAME	Maintenance domain name
<b>level</b> LEVEL	MD level, the range is 0 to 7

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

## Examples

The following example shows how to display CFM error:

```
Switch# show ethernet cfm errors
```

## Related Commands

None

## 3.22 show ethernet cfm ais mep

Use the command to display ais configuration for local mep.

### Command Syntax

**show ethernet cfm ais mep** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*)

MEPID	Local mep id, the range is 1 to 8191
DOMAIN_NAME	Maintenance domain name
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

## Examples

The following example shows how to display ais configuration for local mep:

```
Switch# show ethernet cfm ais mep 1 domain test vlan 2
```

## Related Commands

None

## 3.23 show ethernet cfm

Use the command to display cfm global information.

### Command Syntax

**show ethernet cfm**

### Command Mode

Privileged EXEC

### Default

None

## Usage

None

## Examples

The following example shows how to cfm global information:

```
Switch# show ethernet cfm
```

## Related Commands

None

## 3.24 ethernet cfm linktrace rmepid

Use the command to issue CFM linktrace messages for remote mep and discovery a path to remote mep.

### Command Syntax

**ethernet cfm linktrace rmepid** *RMEPID* (**domain** *DOMAIN\_NAME* | **level** *LEVEL*) (**vlan** *VLAN\_ID*) (**ttl** *TTL* | **timeout** *TIMEOUT*) (**priority** *PRIORITY*) (**ltn-egress-identifier-tlv** | **sender-id-tlv** | **organization-specific-tlv**)

RMEPID	Remote mep id, the range is 1 to 8191
MEPID	The source local mep id and its range is 1 to 8191
<b>domain</b> <i>DOMAIN_NAME</i>	Maintenance domain name
<b>level</b> <i>LEVEL</i>	MD level, the range is 0 to 7
<b>vlan</b> <i>VLAN_ID</i>	Vlan id, the range is 1 to 4094
<b>ttl</b> <i>TTL</i>	Maximum hops, the range is 1 to 255, the default value is 64
<b>timeout</b> <i>TIMEOUT</i>	The value of timeout, the range is 1 to 65535, the default value is 5
<b>priority</b> <i>PRIORITY</i>	The range is 0 to 7, the default value is 7
<b>ltn-egress-identifier-tlv</b>	LTM egress identifier TLV
<b>sender-id-tlv</b>	Sender ID TLV
<b>organization-specific-tlv</b>	Organization Specific TLV

### Command Mode

Privileged EXEC

### Default

None

### Usage

None



## Examples

The following example shows how to start linktrace:

```
Switch# ethernet cfm linktrace mepid 1 mepid 2 domain test vlan 2 ttl 255 timeout 5
priority 7
```

## Related Commands

**ethernet cfm mep (down|up) mpid MEPID domain DOMAIN\_NAME (vlan VLAN\_ID | interval (1 | 2 | 3 | 4 | 5 | 6 | 7)**

**ethernet cfm mep crosscheck mpid MEPID (vlan VLAN\_ID |) (mac MAC|)**

## 3.25 ethernet cfm linktrace mac

Use the command to issue CFM linktrace messages for remote mep or mip mac address and discovery a path to remote mep or mip.

### Command Syntax

**ethernet cfm linktrace mac MACADDRESS mepid MEPID (domain DOMAIN\_NAME | level LEVEL) (vlan VLAN\_ID|) (ttl TTL | timeout TIMEOUT| priority PRIORITY|)**

MACADDRESS	The remote mep mac address
MEPID	The source local mep id and its range is 1 to 8191
<b>domain</b> DOMAIN_NAME	Maintenance domain name
<b>level</b> LEVEL	MD level, the range is 0 to 7
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094
<b>ttl</b> TTL	Maximum hops, the range is 1 to 255, the default value is 64
<b>timeout</b> TIMEOUT	The value of timeout, the range is 1 to 65535, the default value is 5
<b>priority</b> PRIORITY	The range is 0 to 7, the default value is 7

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to start linktrace:

```
Switch# ethernet cfm linktrace mac 7234.ef5a.2806 mepid 1 domain test vlan 2 ttl 255
timeout 5 priority 7
```

## Related Commands

**ethernet cfm mep (down|up) mpid** *MEPID* **domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)  
**interval** (1 | 2 | 3 | 4 | 5 | 6 | 7)

**ethernet cfm mep crosscheck mpid** *MEPID* (**vlan** *VLAN\_ID* |) (**mac** *MAC*)

## 3.26 ethernet cfm linktrace cache enable

Use the command to configure caching linktrace information. The default value is disabled.

### Command Syntax

**ethernet cfm linktrace cache enable**

**no ethernet cfm linktrace cache enable**

### Command Mode

Global Configuration

### Default

Disabled

### Usage

None

### Examples

The following example shows how to configure caching linktrace information:

Switch# configure terminal

```
Switch(config)# ethernet cfm linktrace cache enable
```

### Related Commands

None

## 3.27 ethernet cfm linktrace cache size

Use the command to configure linktrace cache size.

### Command Syntax

**ethernet cfm linktrace cache size** *ENTRIES*

**no ethernet cfm linktrace cache size**

ENTRIES	Cache entry number, the range is 1 to 65535, the default value is 100
---------	---

### Command Mode

Global Configuration

## Default

100

## Usage

None

## Examples

The following example shows how to configure linktrace cache size:

```
Switch# configure terminal
Switch(config)# ethernet cfm linktrace cache size 200
```

## Related Commands

None

## 3.28 ethernet cfm linktrace cache holdtime

Use the command to configure linktrace cache hold time.

### Command Syntax

**ethernet cfm linktrace cache holdtime** *MINUTES*

MINUTES	Cache entry hold time minutes, the range is 1 to 65535 minutes, the default value is 60 minutes
---------	---

### Command Mode

Global Configuration

### Default

60 minutes

### Usage

None

### Examples

The following example shows how to configure linktrace cache hold time:

```
Switch# configure terminal
Switch(config)# ethernet cfm linktrace cache holdtime 90
```

### Related Commands

None

## 3.29 show ethernet cfm linktrace cache

Use the command to display linktrace cache entries.

### Command Syntax

**show ethernet cfm linktrace cache**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display linktrace cache entries:

```
Switch# show ethernet cfm linktrace cache
```

### Related Commands

None

## 3.30 clear ethernet cfm linktrace cache

Use the command to clear linktrace cache.

### Command Syntax

**clear ethernet cfm linktrace cache**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to clear linktrace cache:

```
Switch# clear ethernet cfm linktrace cache
```

### Related Commands

None

## 3.31 ethernet cfm mip ccm-database size

Use the command to configure mip ccm database size.

### Command Syntax

**ethernet cfm mip ccm-database size** *ENTRIES*

**no ethernet cfm mip ccm-database size**

ENTRIES	Cache entry number, the range is 1 to 65535, the default value is
---------	---

	100
--	-----

### Command Mode

Global Configuration

### Default

100

### Usage

None

### Examples

The following example shows how to configure mip ccm database size:

```
Switch# configure terminal
Switch(config)# ethernet cfm mip ccm-database size 200
```

### Related Commands

None

## 3.32 ethernet cfm mip ccm-database holdtime

Use the command to configure mip ccm-database hold time.

### Command Syntax

**ethernet cfm mip ccm-database holdtime** *MINUTES*

**no ethernet cfm mip ccm-database holdtime**

MINUTES	Mip ccm database hold time minutes, the range is 60 to 65535 minutes, the default value is 60 minutes
---------	---

### Command Mode

Global Configuration

### Default

60 minutes

### Usage

None

### Examples

The following example shows how to configure mip ccm-database hold time:

```
Switch# configure terminal
Switch(config)# ethernet cfm mip ccm-database holdtime 90
```

## Related Commands

None

## 3.33 show ethernet cfm mip ccm-database

Use the command to display mip ccm-database.

### Command Syntax

**show ethernet cfm mip ccm-database**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display mip ccm-database:

```
Switch# show ethernet cfm mip ccm-database
```

## Related Commands

None

## 3.34 clear ethernet cfm mip ccm-database

Use the command to clear mip ccm database.

### Command Syntax

**clear ethernet cfm mip ccm-database**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to clear mip ccm database:

```
Switch# clear ethernet cfm mip ccm-database
```

## Related Commands

None

### 3.35 ethernet cfm sf-reason

Use the command to configure signal fail reasons and these reasons will trigger g8031/g8032.

#### Command Syntax

ethernet cfm sf-reason (all | {loc | rdi-rx | ais-defect} | none)

**no Ethernet cfm sf-reason**

all	Configure all reasons to trigger Signal Fail
loc	Configure loc to trigger Signal Fail
rdi-rx	Configure remote mep rdi to trigger Signal Fail
ais-defect	Configure ais condition to trigger Signal Fail
none	Configure none reason

#### Command Mode

Global Configuration

#### Default

The default value of sf-reason is Loc

#### Usage

None

#### Examples

The following example shows how to configure signal fail reasons:

```
Switch# configure terminal
Switch(config)# ethernet cfm sf-reason all
```

#### Related Commands

None

### 3.36 ethernet cfm mode

Use this command to configure cfm mode globally. Use the no parameter to configure cfm mode to 802.1ag.

#### Command Syntax

**ethernet cfm mode (dot1ag|y1731)**

**no ethernet cfm mode**

dot1ag	IEEE 802.1ag-2007
y1731	ITU-T Y.1731

## Command Mode

Global Configuration

## Default

IEEE 802.1ag-2007

## Usage

None

## Examples

The following example shows how to configure cfm mode globally:

```
Switch# configure terminal
Switch(config)# ethernet cfm mode dotlag
Switch(config)# no ethernet cfm mode
```

## Related Commands

None

## 3.37 ethernet cfm lm enable dual-ended

Use this command to enable dual-ended loss measurement.

### Command Syntax

**ethernet cfm lm enable dual-ended** (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) **mepid** *MEPID* (**all-cos** | **per-cos** | **cos** *COS\_VALUE*) (**stats-interval** *INTERVAL\_VALUE*) (**cache-size** *CACHE\_VALUE*)

**no ethernet cfm lm enable dual-ended** (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) **mepid** *MEPID*

DOMAIN_NAME	Maintenance domain name
LEVEL	MD level, the range is 0 to 7
VLAN_ID	Vlan id, the range is 1 to 4094
MEPID	Local mep id, the range is 1 to 8191
<b>all-cos</b>	All packets with different cos will be counted together
<b>per-cos</b>	Packets with different cos will be counted separately
<b>cos</b> <i>COS_VALUE</i>	Packets with specified cos will be counted.
<b>stats-interval</b> <i>INTERVAL_VALUE</i>	After an interval, system will get counter values and calculate frame loss and frame loss ratio for near end and far end. The range is 1 to 10, unit is second, and the default value is 1.



<b>cache-count</b> CACHE_VALU E	Cache entry number for lm results. The range is 1 to 512, the default value is 128.
---------------------------------------	--

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to enable dual-ended loss measurement:

```
Switch# configure terminal
Switch(config)# ethernet cfm lm enable dual-ended domain md1 vlan 2 mepid 1 all-cos
stats-interval 1 cache-count 256
```

## Related Commands

None

## 3.38 ethernet cfm lm enable single-ended

Use this command to enable single-ended loss measurement.

### Command Syntax

**ethernet cfm lm enable single-ended** (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) **mepid** *MEPID* (**all-cos** | **per-cos** | **cos** *COS\_VALUE*)

**no ethernet cfm lm enable single-ended** (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) **mepid** *MEPID*

DOMAIN_NAME	Maintenance domain name
LEVEL	MD level, the range is 0 to 7
VLAN_ID	Vlan id, the range is 1 to 4094
<b>all-cos</b>	All packets with different cos will be counted together
<b>per-cos</b>	Packets with different cos will be counted separately
<b>cos</b> <i>COS_VALUE</i>	Packets with specified cos will be counted.

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to enable single-ended loss measurement:

```
Switch# configure terminal
Switch(config)# ethernet cfm lm enable single-ended domain md1 vlan 2 mepid 1 all-cos
```

## Related Commands

None

## 3.39 ethernet cfm lm single-ended

Use the command to issue CFM single-ended loss message messages.

### Command Syntax

**ethernet cfm lm single-ended** (**domain** *DOMAIN\_NAME* | **level** *LEVEL*) (**vlan** *VLAN\_ID* |) **rmepid** *RMEPID* **mepid** *MEPID* (**count** *COUNT*) (**interval** (*1|2|3*))

<b>DOMAIN_NAME</b>	Maintenance domain name
<b>LEVEL</b>	MD level, the range is 0 to 7
<b>VLAN_ID</b>	Vlan id, the range is 1 to 4094
<b>RMEPID</b>	Remote mep id, the range is 1 to 8191
<b>MEPID</b>	Source mep id, the range is 1 to 8191
<b>count</b> <i>COUNT</i>	Repeat count, the range is 1 to 60, the default value is 1
<b>interval</b>	LM Transmission interval, default value is 1 second.
<i>1</i>	LM Interval, 100 milliseconds
<i>2</i>	LM Interval, 1 second
<i>3</i>	LM Interval, 10 seconds

### Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to issue CFM single-ended loss message messages:

```
Switch# configure terminal
Switch(config)# ethernet cfm lm single-ended domain md1 vlan 2 rmepid 2 mepid 1 count
10 interval 1
```

## Related Commands

None

## 3.40 show ethernet cfm lm

Use the command to display dual-ended loss measurement results.

### Command Syntax

**show ethernet cfm lm domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID*) **mepid** *MEPID* (**cos** *COS\_VALUE*)

<b>DOMAIN_NAME</b>	Maintenance domain name
<b>VLAN_ID</b>	Vlan id, the range is 1 to 4094
<b>MEPID</b>	Source mep id, the range is 1 to 8191
<b>cos COS_VALUE</b>	Display lm result for specified cos. The range is 0 to 7, the default value is 0

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display dual-ended lm results:

```
Switch# show ethernet cfm lm domain md1 vlan 2 mepid 3
DOMAIN      : md1
VLAN        : 2
MEPID       : 1
Start Time  : 2013/07/15 9:00:09
End Time    : 2013/07/15 9:00:09
Notes       : 1. When the difference of Tx is less than the difference of Rx,
              the node is invalid, loss and loss ratio should be "-";
              2. When loc is reported for mep, the loss should be "-" and loss
              ratio should be 100%;
              3. When calculate average loss and loss ratio, invalid or loc nodes
              will be excluded;
Latest dual-ended loss statistics:
-----
Index Cos Local-loss Local-loss ratio Remote-loss Remote-loss ratio Time
-----
1      all      4      050.0000%      4      050.0000% 09:00:09
```

```

2 all - - - - 09:00:09
3 all 0 000.0000% 100 100.0000% 09:00:09
4 all 0 000.0000% 99 099.0000% 09:00:09
5 all 0 000.0000% 90 090.0000% 09:00:09
6 all 0 000.0000% 1 001.0000% 09:00:09
7 all 0 000.0000% 0 000.0000% 09:00:09
8 all - - - - 09:00:09
9 all 0 000.0000% 4294967039 099.9999% 09:00:09
10 all 0 000.0000% 510 099.8043% 09:00:09
11 all - 100.0000% - 100.0000% 09:00:09
12 all 0 000.0000% 0 000.0000% 09:00:09
13 all 4 050.0000% 4 050.0000% 09:00:09
14 all 4 050.0000% 4 050.0000% 09:00:09
-----
Maximum Local-loss : 4 Maximum Local-loss Ratio : 100.0000%
Minimum Local-loss : 0 Minimum Local-loss Ratio : 000.0000%
Average Local-loss : 1 Average Local-loss Ratio : 013.6363%
Maximum Remote-loss : 4294967039 Maximum Remote-loss Ratio : 100.0000%
Minimum Remote-loss : 0 Minimum Remote-loss Ratio : 000.0000%
Average Remote-loss : 390451622 Average Remote-loss Ratio : 058.1640%

```

## Related Commands

None

## 3.41 ethernet cfm sd-reason

Use the command to configure signal defect reasons. If dual-lm loss ration is greater than limit, log will be printed and trap will be reported.

### Command Syntax

**ethernet cfm sd-reason (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) mepid *MEPID* ratio *RATIO\_VALUE***

**no ethernet cfm sd-reason (domain *DOMAIN\_NAME* | level *LEVEL*) (vlan *VLAN\_ID* |) mepid *MEPID***

DOMAIN_NAME	Maintenance domain name
LEVEL	MD level, the range is 0 to 7
VLAN_ID	Vlan id, the range is 1 to 4094
MEPID	Source mep id, the range is 1 to 8191
RATIO_VALUE	Dual-lm loss ratio limitation, the range is 1 to 1000, unit is one in a thousand,

### Command Mode

Global Configuration

### Default

None

## Usage

None

## Examples

The following example shows how to enable sd-reason:

```
Switch# configure terminal
Switch(config)# ethernet cfm sd-reason domain md1 vlan 2 mepid 1 ratio 100
```

## Related Commands

None

## 3.42 ethernet cfm (1dm|dmm)

Use the command to issue CFM 1dm or dmm messages for remote mepid, receive dmr from remote mep, calculate and display frame delay.

### Command Syntax

**ethernet cfm (1dm|dmm) rmepid** *RMEPID* **mepid** *MEPID* **count** *COUNT* (**domain** *DOMAIN\_NAME* | **level** *LEVEL*) (**vlan** *VLAN\_ID* |) (**priority** *PRIORITY* |interval (1|2|3)) (**frame\_size** *SIZE*)

<b>RMEPID</b>	Remote mep id, the range is 1 to 8191
<b>MEPID</b>	Source mep id, the range is 1 to 8191
<b>COUNT</b>	Repeat count, the range is 1 to 60
<b>DOMAIN_NAME</b>	Maintenance domain name
<b>VLAN_ID</b>	Vlan id, the range is 1 to 4094
<b>LEVEL</b>	MD level, the range is 0 to 7
<b>priority PRIORITY</b>	The range is 0 to 7, the default value is 7
<b>interval</b>	DM Transmission interval, default value is 1 second.
<b>1</b>	DM Interval, 100 milliseconds
<b>2</b>	DM Interval, 1 second
<b>3</b>	DM Interval, 10 seconds
<b>frame_size SIZE</b>	The range of SIZE should be 64 bytes to 9600 bytes, the default value is 64 bytes;

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

## Examples

The following example shows how to issue CFM 1dm or dmm messages:

```
Switch# configure terminal
Switch(config)# ethernet cfm dmm mepid 1 rmepid 2 duration 5 domain md1 vlan 2 priority
3 interval 1
```

## Related Commands

None

## 3.43 ethernet cfm delaymeasurement cache enable

Use the command to configure caching delaymeasurement information. The default value is enabled.

### Command Syntax

**ethernet cfm delaymeasurement cache enable**

**no ethernet cfm delaymeasurement cache enable**

### Command Mode

Global Configuration

### Default

Enabled

### Usage

None

## Examples

The following example shows how to configure delaymeasurement cache enable:

```
Switch# configure terminal
Switch(config)# ethernet cfm delaymeasurement cache enable
```

## Related Commands

None

## 3.44 ethernet cfm delaymeasurement cache size

Use the command to configure delaymeasurement cache size.

### Command Syntax

**ethernet cfm delaymeasurement cache size** *ENTRIES*

**no Ethernet cfm delaymeasurement cache size**

ENTRIES	Cache entry number, the range is 1 to 65535, the default value is 1000
---------	--

## Command Mode

Global Configuration

## Default

1000

## Usage

None

## Examples

The following example shows how to configure delaymeasurement cache size:

```
Switch# configure terminal
Switch(config)# ethernet cfm delaymeasurement cache size 100
```

## Related Commands

None

## 3.45 show ethernet cfm delaymeasurement cache

Use the command to display delaymeasurement cache entries.

### Command Syntax

**show ethernet cfm delaymeasurement cache**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display delaymeasurement cache entries:

```
Switch# show ethernet cfm delaymeasurement cache
```

### Related Commands

None

## 3.46 clear ethernet cfm delaymeasurement cache

Use the command to clear delaymeasurement cache entries.

### Command Syntax

**clear ethernet cfm delaymeasurement cache**

### Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to clear delaymeasurement cache entries:

```
Switch# clear ethernet cfm delaymeasurement cache
```

## Related Commands

None

## 3.47 ethernet cfm csf

Use this command to configure CSF(client signal fail) relation between client mep and server mep.

### Command Syntax

**ethernet cfm csf client domain** *CLI\_DOMAIN\_NAME* (**vlan** *CLI\_VLAN\_ID* |) **mepid** *CLI\_MEPID* **server domain** *SRV\_DOMAIN\_NAME* (**vlan** *SRV\_VLAN\_ID* |) **mepid** *SRV\_MEPID* (**tx-interval** (1|60)|)

**no ethernet cfm csf client domain** *CLI\_DOMAIN\_NAME* (**vlan** *CLI\_VLAN\_ID* |) **mepid** *CLI\_MEPID* **server domain** *SRV\_DOMAIN\_NAME* (**vlan** *SRV\_VLAN\_ID* |) **mepid** *SRV\_MEPID*

<i>CLI_DOMAIN_NAME</i>	Client maintenance domain name
<b>vlan</b> <i>CLI_VLAN_ID</i>	Client vlan id, the range is 1 to 4094
<i>CLI_MEPID</i>	Client local mep id, the range is 1 to 8191
<i>SRV_DOMAIN_NAME</i>	Server maintenance domain name
<b>vlan</b> <i>SRV_VLAN_ID</i>	Server vlan id, the range is 1 to 4094
<i>SRV_MEPID</i>	Server local mep id, the range is 1 to 8191
<b>tx-interval</b> (1 60)	Transmission interval of csf message, the value is 1 second or 60 seconds, the default value is 60 seconds

### Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to configure CSF relation:



```
Switch# configure terminal
Switch(config)# ethernet cfm csf client domain cust vlan 30 mepid 88 server domain provid
vlan 20 mepid 666 tx-interval 1
```

## Related Commands

None

## 3.48 show ethernet cfm csf

Use the command to display csf relation and status.

### Command Syntax

**show ethernet cfm csf**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display csf:

```
Switch# show ethernet cfm csf
En-CSF Enable, Y(Yes)/N(No)
CTR-Client Trigger reason, L(los)/F(fdi)/R(rdi)/N(null)
ECC-Enter CSF Condition, Y(Yes)/N(No)
SRR-Server Rx Reason, L(los)/F(fdi)/R(rdi)/D(dci)/N(null)
Tx-I, Transmit Interval
Rx-I, The period which is gotten from LCK packets
Client Mep                               Server Mep
MPID Cli-Domain  VLAN  CTR   ECC MPID Srv-Domain  VLAN SRR  Tx-I Rx-I
1003 md1234567890 3001 L/F/R  Y  1004 md1234567890 2001 L/F/R  1    1
```

## Related Commands

None

## 3.49 ethernet cfm lck enable

Use this command to lock data packets for mep.

### Command Syntax

**ethernet cfm lck enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **mepid** *MEPID*  
**tx-level** *TX\_LEVEL* [{**tx-interval** (1|60)| **cvlan** *VLAN\_LIST*}|]

**no ethernet cfm lck enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **mepid** *MEPID*

DOMAIN_NAME	Maintenance domain name
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094
MEPID	Local mep id, the range is 1 to 8191
TX_LEVEL	Transmission level of lck message
<b>tx-interval</b> (1 60)	Transmission interval of lck message, the value is 1 second or 60 seconds, the default value is 60 seconds
<b>cvlan</b> VLAN_LIST	Cvlan id of lck packet, the range is 1 to 4094

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to enable lock data packets for mep:

```
Switch# configure terminal
Switch(config)# ethernet cfm lck enable domain md1 vlan 2 mepid 1 tx-level 5 tx-interval
1
```

## Related Commands

None

## 3.50 show ethernet cfm lck

Use the command to display lck information.

## Command Syntax

**show ethernet cfm lck**

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

The following example shows how to display lck information:

```
Switch# show ethernet cfm lck
```

```

En-LCK Enable, Y(Yes)/N(No)
Rx-LC, Receive LCK packets and enter LCK condition, Y(Yes)/N(No)
Rx-I, The period which is gotten from LCK packets
Tx-Domain, frames with ETH-LCK information are sent to this Domain
Tx-I, Transmit Interval
MPID Domain          VLAN En Rx-LC Rx-I Tx-Domain      Tx-I
1001 md1234567890   3001 Y  N      N/A md1234567891 1

```

## Related Commands

None

## 3.51 show ethernet cfm lm brief

Use the command to display all meps which are enabled loss measurement.

### Command Syntax

**show ethernet cfm lm brief**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display lm brief information:

```

Switch# show ethernet cfm lm brief
-----
MPID Domain          VLAN LM-En
-----
1   md1              2   dual-lm-enabled
5   md1              2   single-lm-enabled

```

## Related Commands

None

## 3.52 ethernet cfm tst transmission enable

Use this command to enable test transmission enable.

### Command Syntax

**ethernet cfm tst transmission enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)  
**mepid** *MEPID* **tx-mode** (**fixed pkt-num** *NUMBER* | **continuous**) (**{pattern-type** (**repeat**  
*VALUE* | **random** | **increment-byte** | **decrement-byte**) | **packet-size** *PACKET\_SIZE* |  
**dest-mac** (**multicast** | *MACADDRESS*)}|)

**no ethernet cfm tst transmission enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |)  
**mepid** *MEPID*

DOMAIN_NAME	Maintenance domain name
vlan VLAN_ID	Vlan id, the range is 1 to 4094
MEPID	Local mep id, the range is 1 to 8191
NUMBER	Transmission packet number, the range is 1 to 65535
VALUE	The value of repeat pattern type, the range is 0 to 0xFFFFFFFF
PACKET_SIZE	Transmission packet size, the range is 64 bytes to 16027 bytes, default is 512 bytes
multicast	The destination mac address of tst packets should be multicast address, default is multicast
MACADDRESS	The destination mac address of tst packets should be unicast mac address

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following example shows how to enable tst for mep:

```
Switch# configure terminal
Switch(config)# ethernet cfm tst transmission enable domain md1 vlan 2 mepid 1 tx-mode
continuous pattern-type random packet-size 1518
```

## Related Commands

None

## 3.53 ethernet cfm tst start/stop

Use this command to start or stop test transmission.

### Command Syntax

**ethernet cfm tst start rate** *RATE* **time** (**cos** *COS\_VALUE*) (*second SECOND|15m|2h|24h*)  
(**tx\_port** *TX\_PORT*)

**ethernet cfm tst stop**

RATE	Transmission rate, the range is 1 to 10000, unit is mbps
COS_VALUE	Vlan priority, the range is from 0 to 7, default I 7
SECOND	Transmission time from 1 second to 60 seconds
15m	Transmission time for every rate is 15 minutes
2h	Transmission time for every rate is 2 hours
24h	Transmission time for every rate is 24 hours

TX_PORT	Transmission port, only valid for up mep
---------	--

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to start test transmission for mep:

```
Switch# configure terminal
Switch(config)# ethernet cfm tst start time second 1
```

### Related Commands

None

## 3.54 ethernet cfm tst reception enable

Use this command to enable test packet reception.

### Command Syntax

**ethernet cfm tst reception enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **mepid** *MEPID*

**no ethernet cfm tst reception enable domain** *DOMAIN\_NAME* (**vlan** *VLAN\_ID* |) **mepid** *MEPID*

DOMAIN_NAME	Maintenance domain name
<b>vlan</b> VLAN_ID	Vlan id, the range is 1 to 4094
MEPID	Local mep id, the range is 1 to 8191

### Command Mode

Global Configuration

### Default

None

### Usage

Test transmission and reception must be configured on the same MEP.

### Examples

The following example shows how to enable test reception for mep:

```
Switch# configure terminal
Switch(config)# ethernet cfm tst reception enable domain md1 vlan 2 mepid 1
```

## Related Commands

None

## 3.55 show ethernet cfm tst

Use the command to display test information.

### Command Syntax

**show ethernet cfm tst**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

The following example shows how to display test information:

The transmission side test information:

```
Switch# show ethernet cfm tst
DOMAIN          : md1
VLAN            : 2
MEPID           : 1
Transmission    : Enabled
Reception       : Disabled
Status          : Non-Running
Start Time      : 03:22:35
Predict End Time : 03:23:05
Actual End Time : 03:23:05
Packet Type     : TST
Rate            : 1000 mbps
Packet Size     : 64 bytes
Tx Number       : 28
Tx Bytes        : 1792
Rx Number       : 0
Rx Bytes        : 0
```

The receiving side test information:

```
Switch# show ethernet cfm tst
DOMAIN          : md1
VLAN            : 2
MEPID           : 2
Transmission    : Disabled
Reception       : Enabled
Status          : Non-Running
```

```
Start Time      : null
End Time        : null
Packet Type     : null
Rate            : null
Packet Size     : null
Tx Number       : 0
Tx Bytes        : 0
Rx Number       : 28
Rx Bytes        : 1792
```

## Related Commands

None

## 3.56 clear ethernet cfm tst counters

Use the command to clear test counters.

### Command Syntax

**clear ethernet cfm tst counters**

### Command Mode

Privileged EXEC

### Default

None

### Usage

When test transmission is running, can't clear ethernet cfm test counters.

### Examples

The following example shows how to clear test counters:

```
Switch# clear ethernet cfm tst counters
```

## Related Commands

None

# 4 CPU Traffic Limit Commands

---

## 4.1 `cpu-traffic-limit total rate`

Use this command to set the total rate of all streams destined to CPU. Use the `no` form of this command to set the total rate to the default value.

### Command Syntax

**`cpu-traffic-limit total rate`** *RATE\_RANGE*

**`no cpu-traffic-limit total rate`**

<i>RATE_RANGE</i>	Rate of all streams destined to cpu, pps, <0-1000000>
-------------------	---

### Command Mode

Global Configuration

### Default

2048 pps

### Usage

N/A

### Examples

This example shows how to configure `cpu-traffic-limit total rate`.

```
Switch(config)# cpu-traffic-limit total rate 3000
```

This example shows how to reset `cpu-traffic-limit total rate`.

```
Switch(config)# no cpu-traffic-limit total rate
```

### Related Commands

**`show cpu traffic-limit`**

## 4.2 `cpu-traffic-limit reason rate`

Use this command to set the individual limit rate for the stream carried with this reason. Use the `no` form of this command to set the individual limit rate of the reason to its default value.

### Command Syntax

**`cpu-traffic-limit reason`** {`bpdu` | `slow-protocol` | `eapol` | `erps` | `smart-link` | `arp` | `dhcp` | `rip` | `ldp` | `ospf` | `pim` | `vrrp` | `ipda` | `icmp-redirect` | `mcast-rpf-fail` |



**macsa-mismatch | port-security-discard | vlan-security-discard | ip-mtu-fail | ip-option | ucast-ttl-fail | mpls-ttl-fail | igmp | sflow-ingress | fwd-to-cpu | udld|bfd-learning} rate RATE\_RANGE**

**no cpu-traffic-limit reason {bpdu | slow-protocol | eapol | erps | smart-link | arp | dhcp | rip | ldp | ospf | pim | vrrp | ipda | icmp-redirect | mcast-rpf-fail | macsa-mismatch | port-security-discard | vlan-security-discard | ip-mtu-fail | ip-option | ucast-ttl-fail | mpls-ttl-fail | igmp | sflow-ingress |sflow-egress| fwd-to-cpu | udld|bfd-learning } rate**

<b>bpdu</b>	Reason for BPDU protocols packets(including STP, RSTP, MSTP)
<b>slow-protocol</b>	Reason for slow protocol packets.(including EFM, LACP)
<b>eapol</b>	Reason for Dot1x protocol packets
<b>erps</b>	Reason for ERPS protocol packets
<b>arp</b>	Reason for ARP protocol packets
<b>dhcp</b>	Reason for DHCP protocol packets
<b>rip</b>	Reason for RIP protocol packets
<b>bgp</b>	Reason for BGP protocol packets
<b>ldp</b>	Reason for LDP protocol packets
<b>ospf</b>	Reason for OSPF protocol packets
<b>pim</b>	Reason for PIM protocol packets
<b>vrrp</b>	Reason for VRRP protocol packets
<b>ipda</b>	Reason for packets with IPDA destination to router itself
<b>icmp-redirect</b>	Reason for redirecting ICMP
<b>learning-full</b>	Reason for learning cache is full
<b>mcast_rpf_fail</b>	Reason for multi-cast packets with rpf fail
<b>macsa-mismatch</b>	Reason for packets that are discarded for source mac is learned from another security port
<b>port-security-discard</b>	Reason for packets that are discarded for fdb number equals to allowed maximum number of security port
<b>vlan-security-discard</b>	Reason for packets that are discarded for fdb number equals to allowed maximum number on the specified vlan
ip-mtu-fail	Ip mtu fail
<b>ip-option</b>	Reason for IP packets with optional fields
<b>ucast-ttl-fail</b>	Reason for ucast ip packets with fail TTL
<b>mpls-ttl-fail</b>	Reason for mpls packets with fail TTL
<b>igmp</b>	Reason for IGMP or igmp snooping packets
<b>sflow-ingress</b>	Reason for sflow sampled packets at ingress direction
<b>sflow-egress</b>	Reason for sflow sampled packets at egress direction
<b>fwd-to-cpu</b>	Reason for packets forwarding to cpu
bfd-learning	Reason for bfd learning packets
RATE_RANGE	Individual rate of streams destined to cpu carried with the reason, kbps, <0-1000000>

## Command Mode

Global Configuration

## Default

Reason	Rate(pps)	Reason	Rate(pps)
bpdu	64	icmp-redirect	128
slow-protocol	128	mcast-rpf-fail	128
eapol	128	macsa-mismatch	128
erps	128	port-security-discard	128
smart-link	128	vlan-security-discard	128
arp	640	udld	128
dhcp	128	ip-mtu-fail	64
rip	64	fwd-to-cpu	64
ldp	512	ip-option	512
ospf	256	ucast-ttl-fail	64
pim	128	mpls-ttl-fail	64
vrrp	512	igmp	128
ipda	1024	sflow-ingress	128
sflow-egress	128	<b>bfd-learning</b>	128

## Usage

N/A

## Examples

This example shows how to configure individual rate for BPDU PDU.

```
Switch(config)# cpu-traffic-limit reason bpdu rate 300
```

This example shows how to reset individual rate for BPDU PDU.

```
Switch(config)# no cpu-traffic-limit reason bpdu rate
```

## Related Commands

**show cpu traffic-limit**

## 4.3 cpu-traffic-limit reason all rate

Use this command to set the individual limit rate for all reasons to their default value.

### Command Syntax

**no cpu-traffic-limit reason all rate**

### Command Mode

Global Configuration

### Default

Same as defaults in section “cpu-traffic-limit reason rate”

### Usage

This example shows how to reset individual rate for all reasons.

### Examples

```
Switch(config)# no cpu-traffic-limit reason all rate
```

## Related Commands

**cpu traffic-limit reason rate**

**show cpu traffic-limit**

## 4.4 cpu-traffic-limit reason class

Use this command to set the priority class for the stream carried with the reason. Use the no form of this command to set the priority class of the reason to its default value.

### Command Syntax

**cpu-traffic-limit reason {bpdu | slow-protocol | eapol | erps | smart-link | arp | dhcp | rip | ldp | ospf | pim | vrrp | ipda | icmp-redirect | mcast-rpf-fail | macsa-mismatch | port-security-discard | vlan-security-discard | mtu-dontfrag | mtu-frag | ip-option | ucast-ip-ttl-fail | mpls-ttl-fail | igmp | sflow-ingress | udld|bfd-learning } class *CLASS\_RANGE***

**no cpu-traffic-limit reason {bpdu | slow-protocol | eapol | erps | smart-link | arp | dhcp | rip | ldp | ospf | pim | vrrp | ipda | icmp-redirect | mcast-rpf-fail | macsa-mismatch | port-security-discard | vlan-security-discard | mtu-dontfrag | mtu-frag | ip-option | ucast-ip-ttl-fail | mpls-ttl-fail | igmp | sflow-ingress | sflow-egress|udld|bfd-learning } class**

<i>CLASS_RANGE</i>	Priority of the stream carried with this reason. Reason with class 3 has the highest priority. <0-3>
--------------------	--

### Command Mode

Global Configuration

### Default

Reason	class	Reason	class
bpdu	3	icmp-redirect	0
slow-protocol	1	mcast-rpf-fail	1
eapol	0	macsa-mismatch	0
erps	2	port-security-discard	0
smart-link	2	vlan-security-discard	0
arp	1	udld	3
dhcp	0	mtu-dontfrag	0
rip	1	mtu-frag	0
ldp	1	sflow-ingress	0
ospf	1	ip-option	0
pim	1	ucast-ttl-fail	0
vrrp	1	mpls-ttl-fail	0
ipda	0	igmp	2
mld	2	Sflow-egress	0
<b>bfd-learning</b>	1	fwd-to-cpu	0

## Usage

The reason with the highest priority class will get preference treatment when dealing with scheduling.

## Examples

This example shows how to configure priority class for BPDU.

```
Switch(config)# cpu-traffic-limit reason bpdu class 3
```

This example shows how to configure priority class for BPDU.

```
Switch(config)# no cpu-traffic-limit reason bpdu class
```

## Related Commands

**show cpu traffic-limit**

## 4.5 cpu-traffic-limit reason all class

Use this command to set the priority class for all reasons to their default value.

### Command Syntax

**no cpu-traffic-limit reason all class**

### Command Mode

Global Configuration

### Default

Same as defaults in section “cpu-traffic-limit reason class”

## Usage

## Examples

This example shows how to reset the priority class for all reasons.

```
Switch(config)# no cpu-traffic-limit reason all class
```

## Related Commands

**cpu traffic-limit reason class**

**show cpu traffic-limit**

## 4.6 show cpu traffic-limit

Use this command to show the CPU traffic-limit configurations.

### Command Syntax

**show cpu traffic-limit**

### Command Mode

Privileged EXEC

### Default

None

## Usage

None

## Examples

This example shows cpu traffic-limit configurations.

```
Switch# show cpu traffic-limit
reason          rate (pps)  class
dot1x-mac-bypass 64          2
bpdu            64          3
slow-protocol    128         1
eapol           128         0
erps            128         2
smart-link       128         2
udld            128         3
loopback-detection 64          3
arp             256         1
dhcp            128         0
rip             64          1
ldp             512         1
ospf            256         1
pim             128         1
vrrp            512         1
ipda            1024        0
icmp-redirect    128         0
mcast-rpf-fail  128         1
macsa-mismatch  128         0
port-security-discard 128         0
vlan-security-discard 128         0
mtu-dontfrag     64          0
mtu-frag         64          0
ip-mtu-fail      64          0
bfd-learning     128         1
ip-option        512         0
ucast-ttl-fail   64          0
mpls-ttl-fail    64          0
igmp             128         2
sflow-ingress    128         0
sflow-egress     128         0
fwd-to-cpu       64          0
l2protocol-tunnel 1024        0
Total rate:      2048 (pps)
```

## Related Commands

**cpu-traffic-limit total rate**

**cpu-traffic-limit reason rate**

**cpu-traffic-limit reason class**

# 5

## G.8031 Commands

---

### 5.1 g8031 eps-id

Use this command to enter the eps configuration mode.

If the g8031 eps group with the specified eps-id does not exist, system will create a new one.

Use the no form of this command to delete the g8031 eps group.

#### Command Syntax

**g8031 eps-id** *EPS\_ID* (**working-port** *IFNAME-W* **protection-port** *IFNAME-P*)

**no g8031 eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1-2048)
<b>working-port</b> <i>IFNAME-W</i>	interface name for working port
<b>protection-port</b> <i>IFNAME-P</i>	interface name for protection port

#### Command Mode

Global Configuration

#### Default

None

#### Usage

Use this command to enter the eps configuration mode.

If the g8031 eps group with the specified eps-id does not exist, system will create a new one. User should specify the working port and protection port when creating a group. The working port and protection port is not allowed to change after the eps group created.

If the g8031 eps group with the specified eps-id exists, user can enter the eps configuration mode without specifying the working port and protection port.

#### Examples

The following example shows how to create a g8031 eps group and enter the eps configuration mode:

```
Switch(config)# g8031 eps-id 10 working-port eth-0-9 protection-port eth-0-10
```

## Related Commands

**instance**  
**domain**  
**show g8031**

## 5.2 instance

Use this command to bind an instance in a g8031 eps group.

Use the no form of this command to unbind the protected instance.

### Command Syntax

**instance** *INSTANCE\_ID*  
**no instance** *INSTANCE\_ID*

<i>INSTANCE_ID</i>	Set restrictions for the port of particular instance (0-4094)
--------------------	---

### Command Mode

EPS Configuration

### Default

None

### Usage

Use this command to bind an instance in g8031 eps group. The instance should exist in the mstp config mode before binding.

User can bind more than one instance a g8031 eps group.

### Examples

The following example shows how to bind an instance in g8031 eps group:

```
Switch(g8031-config-switching)# instance 10
```

### Related Commands

**g8031 eps-id**  
**show g8031**

## 5.3 domain

Use this command to bind a cfm maintains domain in the g8031 eps group.

Use the no form of this command to unbind the cfm maintains domain.

### Command Syntax

**domain** *MD\_NAME* **working-service** *MA\_NAME\_W* **protection-service** *MA\_NAME\_P*  
**no domain**

<b>domain</b> <i>MD_NAME</i>	maintenance-domain name
<b>working-service</b> <i>MA_NAME_W</i>	maintenance-association name for working path
<b>protection-service</b> <i>MA_NAME_P</i>	maintenance-association name for protection path

## Command Mode

EPS Configuration

## Default

None

## Usage

Use this command to bind a cfm maintains domain and maintains association in the g8031 eps group.

The cfm maintains domain and maintains association should exist in the cfm configuration.

## Examples

The following example shows how to bind a cfm maintains domain:

```
Switch(g8031-config-switching)# domain test working-service test1 protection-service test2
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.4 mode

Use this command to set the mode of g8031 ethernet protection.

Use the no form of this command to return to the default setting.

## Command Syntax

**g8031 mode** (revertive | non-revertive)

**no mode**

<b>revertive</b>	Revertive mode
<b>non-revertive</b>	Non-revertive mode

## Command Mode

EPS Configuration



## Default

The default setting should be revertive mode.

## Usage

Use this command to set the mode of g8031 ethernet protection.

After set the mode of g8031 ethernet protection, the state machine of APS should restart.

## Examples

The following example shows how to change the mode of a g8031 eps group:

```
Switch(g8031-config-switching)# mode non-revertive
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.5 timer

Use this command to set the hold-off timer or wait-to-restore timer of a g8031 ethernet protection group.

Use the no form of this command to return to the default setting.

## Command Syntax

**timer** (**wait-to-restore** *TIME-VALUE* | **hold-off** *TIME-VALUE* )

**no timer** (**wait-to-restore** | **hold-off** )

<b>wait-to-restore</b> <i>TIME-VALUE</i>	EPS wait-to-restore timer(5-12min)
<b>hold-off</b> <i>TIME-VALUE</i>	EPS hold-off timer(0-100 in steps of 100ms)

## Command Mode

EPS Configuration

## Default

The default value of wait-to-restore (WTR) period is 5 minutes.

The default value of hold-off timer is 0.

## Usage

Use this command to set the hold-off timer or wait-to-restore timer of g8031 ethernet protection.

The wait-to-restore (WTR) period, may be configured by the operator in 1 minute steps between 5 and 12 minutes; the default value is 5 minutes.

The range of the hold-off timer is 0 to 100 in steps of 100 ms

## Examples

The following example shows how to change the timer of a g8031 eps group:

```
Switch(g8031-config-switching)# timer wait-to-restore 8
Switch(g8031-config-switching)# timer hold-off 5
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.6 g8031 force

Use this command to trigger the local force-switch event of a g8031 ethernet protection group.

### Command Syntax

**g8031 force eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1-2048)
-----------------------------	---

### Command Mode

Privileged EXEC

### Default

None

### Usage

Use this command to trigger the local force-switch event of a g8031 ethernet protection group.

When the current state has the higher priority than force-switch, system should reject the operation.

## Examples

The following example shows how to trigger the local force-switch event of a g8031 eps group:

```
Switch# g8031 force eps-id 10
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.7 g8031 manual

Use this command to trigger the local manual-switch event of a g8031 ethernet protection group.

## Command Syntax

**g8031 manual eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1-2048)
-----------------------------	---

## Command Mode

Privileged EXEC

## Default

N/A

## Usage

Use this command to trigger the local manual -switch event of a g8031 ethernet protection group.

When the current state has the higher priority than manual-switch, system should reject the operation.

## Examples

The following example shows how to trigger the local manual-switch event of a g8031 eps group:

```
Switch# g8031 manual eps-id 10
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.8 g8031 lockout

Use this command to trigger the local lockout event of a g8031 ethernet protection group.

## Command Syntax

**g8031 lockout eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1- 2048)
-----------------------------	--

## Command Mode

Privileged EXEC

## Default

N/A

## Usage

Use this command to trigger the local lockout event of a g8031 ethernet protection group.

## Examples

The following example shows how to trigger the local lockout event of a g8031 eps group:

```
Switch# g8031 lockout eps-id 10
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.9 g8031 exercise

Use this command to trigger the local exercise event of a g8031 ethernet protection group.

## Command Syntax

**g8031 exercise eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1-2048)
-----------------------------	---

## Command Mode

Privileged EXEC

## Default

N/A

## Usage

Use this command to trigger the local exercise event of a g8031 ethernet protection group.

## Examples

The following example shows how to trigger the local exercise event of a g8031 eps group:

```
Switch# g8031 exercise eps-id 10
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.10 g8031 clear

Use this command to trigger the local clear event of a g8031 ethernet protection group.

## Command Syntax

**g8031 clear eps-id** *EPS\_ID*

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1- 2048)
-----------------------------	--

## Command Mode

Privileged EXEC

## Default

None

## Usage

Use this command to trigger clear local event of a g8031 ethernet protection group.

## Examples

The following example shows how to trigger clear local event of a g8031 eps group:

```
Switch# g8031 clear eps-id 10
```

## Related Commands

**g8031 eps-id**

**show g8031**

## 5.11 show g8031

Use this command to show the configuration and statuses of g8031 ethernet protection groups.

## Command Syntax

**show g8031** ( **eps-id** *EPS\_ID* | )

<b>eps-id</b> <i>EPS_ID</i>	unique id to identify an EPS protection link (1- 2048)
-----------------------------	--

## Command Mode

Privileged EXEC

## Default

None

## Usage

Use this command to show the configuration and statuses of g8031 ethernet protection groups.

User can enter the eps-id to show the specified group. If the eps-id is not specified, all groups should be shown.

## Examples

The following example shows the result of using this command:

```
Switch# show g8031
Codes: ID - Group id of G.8031
       IF-W - Interface of working entity, IF-P - Interface of protection entity
       MD - Maintenance domain
       MA-W - Maintenance association of working entity
       MA-P - Maintenance association of protection entity
       CS - Current state, LS - Last state, LE - Last event, FS - Far end state
       R/B - Request signal & bridged signal, MODE - Revertive or Non-revertive
       WTR - Wait to restore, DFOP - Failure of protocol defects
=====
ID   IF-W   IF-P   MD    MA-W  MA-P  CS   LS   LE   FS   R/B   MODE
-----
10  eth-0-9 eth-0-10 test  test1 test2 NR   NR   NR   NR   NR   null  REV
APS Vid - 11
Active-Path - Working
DFOP State - Not in defect mode
Protected Instance - 10
=====
```

## Related Commands

**g8031 eps-id**

## 5.12 debug g8031

Use this command to enable the debug of g8031 module.

Use the no form of this command to disable the debug.

## Command Syntax

debug g8031 ( rx | tx | event | all )

no debug g8031 ( rx | tx | event | all )

<b>rx</b>	Enable rx debugs
<b>tx</b>	Enable tx debugs
<b>event</b>	Enable event debugs
<b>all</b>	Enable all debugs

## Command Mode

Privileged EXEC

## Default

None

## Usage

Use this command to enable the debug of g8031 module.

## Examples

The following example shows how to enable the debug of g8031 module:

```
Switch# debug g8031 all
```

```
Switch # terminal monitor
```

## Related Commands

**g8031 eps-id**

# 6

## G.8032 Commands

---

### 6.1 g8032 ring-id

Use this command to enter the g8032 configuration mode.

If the g8032 ring with the specified ring-id does not exist, system will create a new one.

Use the no form of this command to delete the g8032 ring.

#### Command Syntax

**g8032 ring-id** (*RING\_ID* **east-interface** *IFNAME-E* **west-interface** *IFNAME-W*)

**g8032 ring-id** (*RING\_ID* **interface** *IFNAME* **major-ring-id** *MAJOR\_RING\_ID*)

**no g8032 ring-id** *RING\_ID*

<b>ring-id</b> <i>RING_ID</i>	unique id to identify an g8032 ring (1-2048)
<b>east-interface</b> <i>IFNAME-E</i>	interface name for east interface
<b>west-interface</b> <i>IFNAME-W</i>	interface name for west interface
<b>interface</b> <i>IFNAME</i>	interface name for sub-ring interface
<b>major-ring-id</b> <i>MAJOR_RING_ID</i>	unique id to identify an ethernet major-ring protection

#### Command Mode

Global Configuration

#### Default

None

#### Usage

Use this command to enter the g8032 configuration mode.

If the g8032 ring with the specified ring-id does not exist, system will create a new one.

User should specify the east interface and west interface when creating a group. The east interface and west interface is not allowed to change after the g8032 ring created.

If the g8032 ring with the specified ring-id exists, user can enter the g8032 configuration mode without specify the east interface and west interface.



## Examples

The following example shows how to create a g8032 ring and enter the g8032 configuration mode:

```
Switch(config)# g8032 ring-id 1 east-interface eth-0-1 west-interface eth-0-2
Switch(g8032-config-switch)# exit
Switch(config)# g8032 ring-id 2 interface eth-0-3 major-ring-id 1
Switch(g8032-config-switch)# exit
Switch(config)# g8032 ring-id 1
Switch(g8032-config-switch)# exit
Switch(config)# g8032 ring-id 2
Switch(g8032-config-switch)#
```

## Related Commands

**domain**

**instance**

**timer**

**show g8032**

## 6.2 instance

Use this command to bind an instance in g8032 ring.

Use the no form of this command to unbind the instance.

### Command Syntax

**instance** *INSTANCE\_ID*

**no instance** *INSTANCE\_ID*

<i>INSTANCE_ID</i>	Set restrictions for the port of particular instance (0- 4094)
--------------------	--

### Command Mode

G8032 configuration

### Default

None

### Usage

Use this command to bind an instance in g8032 ring. The instance should exist in the mstp config mode before binding.

User can bind more than one instance in a g8032 ring.

## Examples

The following example shows how to bind an instance in g8032 ring:

```
Switch(g8032-config-switch)# instance 1
Switch(g8032-config-switch)#
```

## Related Commands

**domain**  
**timer**  
**show g8032**

## 6.3 domain

Use this command to bind a cfm maintains domain in the g8032 ring.

Use the no form of this command to unbind the cfm maintains domain.

### Command Syntax

**domain** *MD\_NAME* **service** *MA\_NAME*  
**no domain**

<i>MD_NAME</i>	maintenance-domain name
<i>MA_NAME</i>	maintenance-association name

### Command Mode

G8032 configuration

### Default

None

### Usage

Use this command to bind a cfm maintains domain and maintains association in the g8032 ring.

The cfm maintains domain and maintains association should exist in the cfm configuration.

### Examples

The following example shows how to bind a cfm maintains domain:

```
Switch(g8032-config-switch)# domain md1 service mal  
Switch(g8032-config-switch)#
```

### Related Commands

**instance**  
**timer**  
**show g8032**

## 6.4 control-vlan

Use this command to set the R-APS vlan of a g8032 ring.

Use the no form of this command to delete the ring's R-APS vlan.

## Command Syntax

**control-vlan** *VID* (**sub-ring** | )

**no control-vlan**

<i>VID</i>	R-APS channel vlan id
<b>sub-ring</b>	Sub-ring's R-APS channel

## Command Mode

G8032 configuration

## Default

None

## Usage

Use this command to set the R-APS channel vlan of a g8032 ring. R-APS messages should use a dedicated vlan.

Notice that "a dedicated vlan " means learning is disabled for this vlan. Dynamic FDB is flushed and static FDB is deleted. User can not config static FDB for this vlan after is configured as a control vlan.

## Examples

The following example shows how to set R-APS channel vlan:

```
Switch(g8032-config-switch) # control-vlan 22
Switch(g8032-config-switch) #
```

## Related Commands

**domain**

**instance**

**timer**

**show g8032**

## 6.5 rpl owner

Use this command to set the rpl of a g8032 ring.

Use the no form of this command to delete the rpl.

## Command Syntax

**rpl owner** (*EAST-INTERFACE* | *WEST-INTERFACE*)

**no rpl owner**

<i>EAST-INTERFACE</i>	ring's east interface
-----------------------	-----------------------

<i>WEST-INTERFACE</i> )	ring's west interface
-------------------------	-----------------------

## Command Mode

G8032 configuration

## Default

None

## Usage

Use this command to set the rpl of a g8032 ring. In a (major) ring, user can specify east interface or west interface as rpl, but User can only specify east-interface as rpl interface in a sub-ring.

## Examples

The following example shows how to set rpl of a g8032 ring

```
Switch(g8032-config-switch)# rpl owner east-interface
Switch(g8032-config-switch)#
```

## Related Commands

**domain**

**instance**

**timer**

**show g8032**

## 6.6 timer

Use this command to set the wait-to-restore timer or hold-off timer or guard-timer of a g8032 ring.

Use the no form of this command to return to the default setting.

## Command Syntax

**timer** ( **wait-to-restore** *TIMEVAL* | **hold-off** *TIMEVAL* | **guard-timer** *TIMEVAL* )

**no timer** ( **wait-to-restore** | **hold-off** | **guard-timer** )

<b>wait-to-restore</b> <i>TIMEVAL</i>	g8032 wait-to-restore timer(5-12min)
<b>hold-off</b> <i>TIMEVAL</i>	g8032 hold-off timer(0-10s)
<b>guard-timer</b> <i>TIMEVAL</i>	g8032 guard timer(100ms-2s)

## Command Mode

G8032 configuration

## Default

The default value of wait-to-restore (WTR) period is 5 minutes.

The default value of hold-off timer is 0.

The default value of guard timer is 500ms.

## Usage

Use this command to set the wait-to-restore timer or hold-off timer or guard-timer of g8032 ring.

The wait-to-restore (WTR) period, may be configured by the operator in 1 minute steps between 5 and 12 minutes; the default value is 5 minutes.

The range of the hold-off timer is 0 to 10 seconds in steps of 100 ms.

The guard timer may be configured by the operator in 100ms steps between 100ms and 2 seconds, with a default value of 500ms.

## Examples

The following example shows how to change the timer of a g8032 ring:

```
Switch(g8032-config-switch)# timer wait-to-restore 6
Switch(g8032-config-switch)# timer hold-off 100
Switch(g8032-config-switch)# timer guard-timer 200
```

## Related Commands

**domain**

**instance**

**show g8032**

## 6.7 ring enable

Use this command to start the g8032 ring state machine.

### Command Syntax

**ring enable**

### Command Mode

G8032 configuration

### Default

None

### Usage

Use this command to start the g8032 ring state machine. The ring should have bind md/ma and instance before enable the ring.

### Examples

The following example shows how to enable the ring:

```
Switch(g8032-config-switch)# ring enable
Switch(g8032-config-switch)#
```

## Related Commands

**ring disable**

**show g8032**

## 6.8 ring disable

Use this command to stop the g8032 ring state machine.

### Command Syntax

**ring disable**

### Command Mode

G8032 configuration

### Default

None

### Usage

Use this command to stop the g8032 ring state machine.

### Examples

The following example shows how to disable a g8032 ring:

```
Switch(g8032-config-switch)# ring disable
Switch(g8032-config-switch)#
```

## Related Commands

**ring enable**

**show g8032**

## 6.9 show g8032

Use this command to show the configuration and statuses of g8032 ring.

### Command Syntax

show g8032 ( ring-id *RING\_ID* | )

<i>RING_ID</i>	unique id to identify an g8032 ring (1-2048)
----------------	--

### Command Mode

Privileged EXEC

### Default

None

### Usage

Use this command to show the configuration and statuses of g8032 ring.

User can enter the ring-id to show the specified ring. If the ring-id is not specified, all rings should be shown.

## Examples

The following example shows the result of using this command:

```
Switch# show g8032
RingID MajorRing Current Role East Status West Status
-----
1 N/A Idle Owner eth-0-9 Blocked eth-0-20 Forward

Control Vlan : 22
MD Name : mdl
Service Id : mal
Protect Instance : 1
Current Event : NR-RB
Wait-to-restore : 06:00
Hold-off Timer : 0 (msecs)
Guard Timer : 500 (msecs)
-----
```

## Related Commands

g8032 ring-id

## 6.10 debug g8032

Use this command to enable the debug of g8032 module.

Use the no form of this command to disable the debug.

## Command Syntax

**debug g8032 ( rx | tx | event | all )**

**no debug g8032 ( rx | tx | event | all )**

<b>rx</b>	Enable rx debugs
<b>tx</b>	Enable tx debugs
<b>event</b>	Enable event debugs
<b>all</b>	Enable all debugs

## Command Mode

Privileged EXEC

## Default

None

## Usage

Use this command to enable the debug of g8032 module.

## Examples

The following example shows how to enable the debug of g8032 module:

```
Switch# debug g8032 all  
Switch # terminal monitor
```

## Related Commands

**g8032 ring-id**



# 7

## UDLD Commands

---

### 7.1 udd enable

Use this command enable/disable global UDLD state.

#### Command Syntax

**udd enable**

**no udd enable**

#### Command Mode

Global Configuration

#### Default

Disabled

#### Usage

None

#### Examples

This example shows how to enable global UDLD state.

```
Switch(config)# udd enable
```

#### Related Commands

**show udd**

### 7.2 udd port

Use this command to enable/disable UDLD state on a specific interface.

#### Command Syntax

**udd port (aggressive|)**

**no udd port**

<b>aggressive</b>	UDLD aggressive mode
-------------------	----------------------

#### Command Mode

Interface Configuration

## Default

Disabled

## Usage

None

## Examples

This example shows how to enable UDLD on interface eth-0-9.

```
Switch(config)# interface eth-0-9
Switch(config)# udld port
```

## Related Commands

**show udld**

## 7.3 udld message interval

Use this command to set the UDLD message interval. Use no command to set the interval to default value.

### Command Syntax

**udld message interval** *INTERVAL*

**no udld message interval**

<i>INTERVAL</i>	UDLD message interval (seconds). The range is 1-90
-----------------	--

### Command Mode

Global Configuration

## Default

15s

## Usage

None

## Examples

This example shows how to set UDLD message interval to 5 seconds.

```
Switch(config)# udld message interval 5
```

## Related Commands

**show udld**

## 7.4 udld reset

Use this command to reset the interfaces disabled by UDLD.

### Command Syntax

**udld reset**

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

This example shows how to reset interfaces disabled by UDLD.

```
Switch# udld reset
```

## Related Commands

None

## 7.5 show udld

Use this command to show UDLD information of interfaces.

## Command Syntax

**show udld** (*IFNAME*)

<i>IFNAME</i>	Interface name
---------------	----------------

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

This example shows how to show UDLD information of interface eth-0-1.

```
Switch# show udld eth-0-1
Interface eth-0-1
---
UDLD mode      : aggressive mode
Operational state : Bidirectional
Message interval : 15
Time out interval : 3

Neighbor 1
---
Device ID      : 001e.0808.0360
```

```
Port ID       : eth-0-2
Device Name   : DUT2
Message Interval : 15
Timeout Interval : 3
Link status   : Bidirectional
Expiration time : 40
```

## Related Commands

None

## 7.6 show udd neighbors

Use this command to show information of UDLD neighbors.

### Command Syntax

**show udd neighbors**

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

This example shows how to show UDLD neighbor information.

```
Switch# show udd neighbor
Port      Device Name      Device ID      Port ID      Neighbor State
-----  -
eth-0-9   DUT2                d4f2.489f.d100 eth-0-9      bidirectional
```

## Related Commands

None

## 7.7 debug udd

Use this command to debug UDLD.

### Command Syntax

**debug udd** (all|packet|events)

**no debug udd** (all|packet|events)

<b>all</b>	Show both packet and events
<b>packet</b>	Show packets only
<b>events</b>	Show events only

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

This example shows how to enable UDLD debug for packets.

```
Switch# debug udld packet
```

## Related Commands

None

## 7.8 show debugging udld

Use this command to show UDLD debugging status.

## Command Syntax

**show debugging udld**

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

This example shows how to show UDLD debugging status.

```
Switch# show debugging udld
```

## Related Commands

None

# 8

## ERPS Commands

---

### 8.1 erps

Use this command to create/remove erps domain instance.

#### Command Syntax

**erps** *DOMAINID* (*ERPS\_NAME*])

**no erps** *DOMAINID*

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>ERPS_NAME</i>	ERPS domain name

#### Command Mode

Global Configuration

#### Default

None

#### Usage

This command is used to create or delete an erps domain. The command should be used first when config erps.

#### Examples

This example shows how to create an erps domain with ID 11 and name test11.

```
Switch(config)# erps 11 test11
```



#### NOTE

ERPS\_NAME is optional. If no name is provided by command, system will generate the domain name automatically. The name format follows "ERPS00ID", where ID is domain ID provided through the command.

#### Related Commands

**show erps list**

### 8.2 erps control vlan

Use this command to specify erps domain's control vlan.

## Command Syntax

erps *DOMAINID* (primary|sub) control vlan *VLANID*

no erps *DOMAINID* (primary|sub) control vlan

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<b>primary</b>	primary ring
<b>sub</b>	sub ring
<i>VLANID</i>	The range is 2-4094

## Command Mode

Global Configuration

## Default

None

## Usage

The erps protocol packet is transferred in the control vlan.

It is best to add the control vlan into the instance which is bound by the domain.

## Examples

This example shows how to set vlan 15 as primary control vlan for erps domain 11.

```
Switch(config)# erps 11 primary control vlan 15
```

## Related Commands

**show erps**

## 8.3 erps hellotime

Use this command to set/reset hello timer interval for specific erps domain instance. The timer should be the same of all nodes in the ring.

## Command Syntax

**erps** *DOMAINID* **hellotime** HELLOTIME

no erps *DOMAINID* hellotime

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>HELLOTIME</i>	Hello timer interval(seconds). The range is 1-150

## Command Mode

Global Configuration

## Default

The default hellotime is 1s, unit is 100ms

## Usage

None

## Examples

This example shows how to set hello timer interval of erps domain 11 to 2s.

```
Switch(config)# erps 11 hellotime 20
```

## Related Commands

**show erps**

## 8.4 erps failtime

Use this command to set/reset fail timer interval for specific erps domain instance. The timer should be the same of all nodes in the ring.

### Command Syntax

**erps** DOMAINID **failtime** FAILTIME

no erps *DOMAINID* failtime

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>FAILTIME</i>	Fail timer interval (seconds). The range is 3-450

### Command Mode

Global Configuration

## Default

None

## Usage

The default failtime is 3s, unit is 100ms

## Examples

This example shows how to set fail timer interval of erps domain 11 to 6s.

```
Switch(config)# erps 11 failtime 60
```

## Related Commands

**show erps**

## 8.5 erps mstp instance

Use this command to set/reset the mstp instance which ERPS will block.



## Command Syntax

erps *DOMAINID* mstp instance *INSTANCE\_ID*

no erps *DOMAINID* mstp instanc

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>INSTANCE_ID</i>	MSTP instance. The range is 1-4094

## Command Mode

Global Configuration

## Default

None

## Usage

No default instance is specified.

## Examples

This example shows how to set instance 1 as protected instance.

```
Switch(config)# erps 11 mstp instance 1
```

## Related Commands

**show erps**

## 8.6 erps ring level

Use this command to create/remove an ERPS ring for specific ERPS domain.

## Command Syntax

erps *DOMAINID* ring *RINGID* level (primary|sub)

no erps *DOMAINID* ring *RINGID*

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<b>primary</b>	Primary ring
<b>sub</b>	Sub ring

## Command Mode

Global Configuration

## Default

None

## Usage

The rings in the erps domain are divided into primary and subrings that are differentiated by the configuration.

## Examples

This example shows how to create a sub ring with ID 1 for ERPS domain 11.

```
Switch# configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Switch(config)#erps 11 ring 1 level sub
```

## Related Commands

**show erps**

## 8.7 erps ring mode

Use this command to set/unset specific ERPS ring instance node mode.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **mode** (**master|transit|vpls**)

**no erps** *DOMAINID* **ring** *RINGID* **mode**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<b>master</b>	Master node
<b>transit</b>	Transit node
<b>vpls</b>	VPLS node

### Command Mode

Global Configuration

### Default

None

### Usage

The master node is used to send and receive erps protocol packet.

The transit and vpls node is used to transfer erps protocol packet to neighbor switch.

### Examples

This example shows how to set node as ERPS domain 11 ring 1 transit node.

```
Switch(config)# erps 11 ring 1 mode transit
```

### Related Commands

**show erps**

## 8.8 erps ring primary interface

Use this command to set/unset primary interface for specific ERPS ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **primary interface** (*IFPHYSICAL*/*IFAGG*)

**no erps** *DOMAINID* **ring** *RINGID* **primary interface**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

### Command Mode

Global Configuration

### Default

None

### Usage

For master node, the interface with type primary is used to send erps protocol packet.

### Examples

This example shows how to set interface eth-0-9 as primary interface for ERPS domain 11 ring 1.

```
Switch(config)#interface eth-0-9
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk allowed vlan add 15
Switch(config-if)#exit
Switch(config)#erps 11 ring 1 primary interface eth-0-9
```

Note: Only the interface in trunk/dot1q-tunnel mode can be set as primary interface.

### Related Commands

**show erps**

## 8.9 erps ring secondary interface

Use this command to set/unset primary or secondary interface for specific ERPS ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **secondary interface** (*IFPHYSICAL*/*IFAGG*)

**no erps** *DOMAINID* **ring** *RINGID* **secondary interface**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

This example shows how to set interface eth-0-9 as primary interface for ERPS domain 11 ring 1.

```
Switch(config)# interface eth-0-9
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk allowed vlan add 15
Switch(config-if)# exit
Switch(config)# erps 11 ring 1 secondary interface eth-0-9
```

Note: Only the interface in trunk/dot1q-tunnel mode can be set as secondary interface.

## Related Commands

**show erps**

## 8.10 erps ring interface

Use this command to set/unset vpls interface for specific ERPS ring instance.

## Command Syntax

**erps** *DOMAINID* **ring** *DOMAINID* **interface** (*IFPHYSICAL*/*IFAGG*)

**no erps** *DOMAINID* **ring** *DOMAINID* **interface**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

This example shows how to set interface eth-0-9 as vpls interface for ERPS domain 11 ring 1.

```
Switch(config)#interface eth-0-9
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk allowed vlan add 15
Switch(config-if)#exit
Switch(config)#erps 11 ring 1 interface eth-0-9
```

## Related Commands

**show erps**

## 8.11 erps ring edge-mode

Use this command to set/unset specific ERPS ring instance edge node mode.

### Command Syntax

**erps** *DOMAINID* **ring** *DOMAINID* **edge-mode** (**edge**|**assistant-edge**)

**no erps** *DOMAINID* **ring** *DOMAINID* **mode**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<b>edge</b>	Edge node
<b>assistant-edge</b>	Assistant-edge node

### Command Mode

Global Configuration

## Default

None

## Usage

Both the edge node and the assistant-edge node are special transit nodes.

## Examples

This example shows how to set node as ERPS domain 11 ring 1 edge node.

```
Switch(config)# erps 11 ring 1 edge-mode edge
```

 **NOTE**

Once a node is set to edge/assistant-edge node, it will be set to transit node automatically.

## Related Commands

**show erps**

## 8.12 erps ring edge interface

Use this command to set/unset edge interface for specific ERPS ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *DOMAINID* **edge interface** (*IFPHYSICAL*/*IFAGG*)

**no erps** *DOMAINID* **ring** *DOMAINID* **edge interface**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

### Command Mode

Global Configuration

### Default

None

### Usage

Of the two ports via which the edge node (assistant-edge node) accesses the subring, one is a common port and the other is an edge port. The common port is the port for the edge node (assistant-edge node) to access the primary ring and the subring, while the edge port is the port for the edge node to access the subring only.

### Examples

This example shows how to set interface eth-0-9 as edge interface for ERPS domain 11 ring 1.

```
Switch(config)# interface eth-0-9
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk allowed vlan add 15
Switch(config-if)# exit
Switch(config)# erps 11 ring 1 edge interface eth-0-9
```

 **NOTE**

This common is only available for edge/assistant-edge node.

## Related Commands

**show erps**

## 8.13 erps ring common interface

Use this command to set/unset edge or common interface for specific ERPS ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **common interface** (IFPHYSICAL|IFAGG)

no erps *DOMAINID* ring *RINGID* common interface

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

### Command Mode

Global Configuration

### Default

None

### Usage

Of the two ports via which the edge node (assistant-edge node) accesses the subring, one is a common port and the other is an edge port. The common port is the port for the edge node (assistant-edge node) to access the primary ring and the subring, while the edge port is the port for the edge node to access the subring only.

### Examples

This example shows how to set interface eth-0-9 as edge interface for ERPS domain 11 ring 1.

```
Switch(config)# interface eth-0-9
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport trunk allowed vlan add 15
Switch(config-if)# exit
Switch(config)# erps 11 ring 1 common interface eth-0-9
```



#### NOTE

This common is only available for edge/assistant-edge node.

### Related Commands

**show erps**

## 8.14 erps ring srpt

Use this command to enable/disable srpt functionality for specific ERPS ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **srpt** (enable|disable)

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255
<b>enable</b>	Enable the srpt
<b>disable</b>	Disable the srp

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

This example shows how to enable srpt functionality for ERPS domain 11 ring 1.

```
Switch(config)# erps 11 ring 1 srpt enable
```

## Related Commands

**show erps**

# 8.15 erps ring enable

Use this command to enable specific erps ring instance.

## Command Syntax

**erps DOMAINID ring RINGID enable**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

This example shows how to enable ERPS domain 11 ring 1.



```
Switch(config)#erps 11 ring 1 enable
```

**NOTE**

Upon the specific ERPS ring is enabled successfully, the ring state should leave the idle state.

## Related Commands

**show erps**

## 8.16 erps ring disable

Use this command to disable specific erps ring instance.

### Command Syntax

**erps** *DOMAINID* **ring** *RINGID* **disable**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<i>RINGID</i>	ERPS ring ID. The range is 1-255

### Command Mode

Global Configuration

### Default

None

### Usage

None

### Examples

This example shows how to disable ERPS domain 11 ring 1.

```
Switch(config)# erps 11 ring 1 disable
```

**NOTE**

Upon the specific ERPS ring is enabled successfully, the ring state should leave the idle state.

## Related Commands

**show erps**

## 8.17 erps enable

Use this command to enable specific ERPS domain instance.

### Command Syntax

**erps** *DOMAINID* **enable**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
-----------------	------------------------------------

## Command Mode

Global Configuration

## Default

None

## Usage

Use this command to enable all the ring of the erps domain.

## Examples

This example shows how to enable erps domain 11.

```
Switch(config)# erps 11 enable
```



### NOTE

Enable the domain will make all the rings within the domain be enabled. Upon the specific ERPS ring is enabled successfully, the ring state should leave the idle state.

## Related Commands

**show erps**

## 8.18 erps disable

Use this command to disable specific erps domain instance.

## Command Syntax

**erps** *DOMAINID* **disable**

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
-----------------	------------------------------------

## Command Mode

Global Configuration

## Default

None

## Usage

Use this command to disable all the ring of the erps domain.

## Examples

This example shows how to disable erps domain 11.

```
Switch(config)# erps 11 disable
```



### NOTE

Enable the domain will make all the rings within the domain be enabled. Upon the specific ERPS ring is enabled successfully, the ring state should leave the idle state.

## Related Commands

**show erps**

## 8.19 erps mode rrpp

Use this command to compatible with RRPP.

### Command Syntax

**erps mode rrpp**

**no erps mode rrpp**

### Command Mode

Global Configuration

### Default

None

### Usage

This command to compatible with RRPP.

### Examples

This example shows how to compatible with RRPP.

```
Switch(config)# erps mode rrpp
```

## Related Commands

None

## 8.20 show erps

Use this command to show the configuration for specific erps domain.

### Command Syntax

**show erps** *DOMAINID*

<i>DOMAINID</i>	ERPS domain ID. The range is 1-255
-----------------	------------------------------------

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

This example shows how to display the configuration for erps domain 1.

```
Switch# show erps 1
```

```
ERPS domain ID: 1
ERPS domain name: ERPS001
ERPS domain primary control VLAN ID: 0
ERPS domain sub control VLAN ID: 0
ERPS domain hello timer interval: 1 second(s)
ERPS domain fail timer interval: 3 second(s)
```

## Related Commands

None

## 8.21 show erps list

Use this command to show the list of erps domain(s).

### Command Syntax

```
show erps list
```

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

This example shows how to display the erps domain list.

```
Switch# show erps list
ERPS Domain List
ID      Name
=====
  11    ERPS0011
```

## Related Commands

None

## 8.22 clear erps counters

Use this command to clear the statistics for all domains or for single domain or for single ring.

### Command Syntax

```
clear erps counters (all | (domain DOMAINID ([ring RINGID])))
```

<b>all</b>	All domain
<b>domain</b> <i>DOMAINID</i>	ERPS domain ID. The range is 1-255
<b>ring</b> <i>RINGID</i>	One ring ID. The range is 1-255

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

This example shows how to clear all domain statistics:

```
Switch# clear erps counters all
```

## Related Commands

None

## 8.23 debug erps

Use this command to open the debug functions of ERPS.

### Command Syntax

debug erps (all | dump | events)

no debug erps (all | dump | events)

<b>all</b>	all debug information
<b>dump</b>	dump debug information
<b>events</b>	events debug information

### Command Mode

Privileged EXEC

### Default

None

### Usage

None

### Examples

This example shows how to open all debug functions:

```
Switch# debug erps all
```

### Related Commands

None

# 9

## Smart-Link Commands

---

### 9.1 smart-link group

Use this command to create a smart-link group and enter smart-link group configuration mode. To destroy the smart-link group, used no form of this command.

#### Command Syntax

**smart-link group** *GROUP-ID*

**no smart-link group** (*GROUP-ID* | **all** )

<i>GROUP-ID</i>	smart-link group ID. The range is 1-16
<b>all</b>	All the smart-link groups have been exist

#### Command Mode

Global Configuration

#### Default

There is no any smart-link group

#### Usage

Up to 16 smart-link groups can be created.

#### Examples

Create a smart-link group with ID 1.

```
Switch(config)# smart-link group 1
```

#### Related Commands

**show smart-link group**

### 9.2 smart-link relay enable

Use this command to enable the switch to relay the smart-link flush packet. To disable relaying the packets use no form of this command.

#### Command Syntax

**smart-link relay enable**

**no smart-link relay enable**

## Command Mode

Global Configuration

## Default

Relaying the smart-link flush packet is enabled.

## Usage

By default, the smart-link flush packet could be flooded. Use the command, “no smart-link relay enable”, to disable the packet flooding to other switches.

## Examples

```
Switch(config)# no smart-link relay enable
```

## Related Commands

None

## 9.3 interface

Use this command to set master or slave member interface of the smart-link group. To unset the member uses the no form of this command.

## Command Syntax

**interface** (*IFPHYSICAL*|*IFAGG*) (**master** | **slave**)

**no interface** (**master** | **slave** | **all**)

<i>IFPHYSICAL</i>	The name of physical interface, like eth-0-1
<i>IFAGG</i>	The name of link-agg interface, like agg1
<b>master</b>	The interface act as master role
<b>slave</b>	The interface act as slave role
<b>all</b>	Both of the master and slave interface

## Command Mode

Smart-link Group Configuration

## Default

There is no any interface member in the smart-link group by default.

## Usage

Every smart-link group has two member interfaces, master and slave. The interfaces should be physical (i.e. eth-0-1) or aggregator (i.e. agg1) switch interface.



### NOTE

STP must be disabled in the smart-link interfaces first.



## Examples

This example shows how to set interfaces eth-0-9 and eth-0-13 as the member interfaces of smart-link group 1.

```
Switch(config)# interface eth-0-9
Switch(config-if)# spanning-tree port disable
Switch(config-if)# exit
Switch(config)# interface eth-0-13
Switch(config-if)# spanning-tree port disable
Switch(config-if)# exit
Switch(config)# smart-link group 1
Switch(config-smlk-group)# interface eth-0-9 master
Switch(config-smlk-group)# interface eth-0-13 slave
Switch(config-smlk-group)# end
Switch# show smart-link group 1
Smart-link group 1 information:
The smart-link group was disabled.
=====
Auto-restore:
  state      time      count     Last-time
  disabled   60        0         N/A
=====
Protected instance:
Load balance instance:
=====
INTERFACE:
Role    Member    DownCount  Last-Down-Time  FlushCount  Last-Flush-Time
MASTER eth-0-9    0          N/A              0           N/A
SLAVE   eth-0-13  0          N/A              0           N/A
```

## Related Commands

**show smart-link group**

## 9.4 protected mstp instance

Use this command to set/unset protected MSTP instance to the smart-link group.

### Command Syntax

**protected mstp instance** *INSTANCE-ID*

**no protected mstp instance** (**all** | *INSTANCE-ID*)

<i>INSTANCE-ID</i>	MSTP instance ID. The range is 0-4094
<b>all</b>	All the instance have been exist

### Command Mode

Smart-link Group Configuration

### Default

There is no protected MSTP instance in the smart-link group by default.

## Usage

The smart-link groups only protect these VLANs in the protected MSTP instances. The smart-link group can't be enabled if no protected instance is configured. To protect those VLANs which are not bound with MSTP instance, use the command "protected mstp instance 0".

NOTE: If the MTSP instance is removed, it will be removed from smart-link group at the same time.

## Examples

This example shows how to set MSTP instance 0, 10 and 100 to the smart-link group 1.

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# protected mstp instance 0
Switch(config-smlk-group)# protected mstp instance 10
Switch(config-smlk-group)# protected mstp instance 100
Switch(config-smlk-group)# end
Switch# show smart-link group 1
Smart-link group 1 information:
The smart-link group was disabled.
=====
Auto-restore:
  state      time      count    Last-time
disabled    60        0        N/A
=====
Protected instance: 0 100 10
Load balance instance:
=====
INTERFACE:
Role      Member    DownCount Last-Down-Time  FlushCount Last-Flush-Time
MASTER   eth-0-9   0         N/A             0         N/A
SLAVE    eth-0-13  0         N/A             0         N/A
```

## Related Commands

**show smart-link group**

## 9.5 load-balance instance

Use this command to set/unset load-balancing to the smart-link group.

### Command Syntax

**load-balance instance** *INSTANCE-ID*

**no load-balance instance** (*all* | *INSTANCE-ID*)

<i>INSTANCE-ID</i>	MSTP instance ID. The range is 0-4094
<b>all</b>	All the instance have been exist

### Command Mode

Smart-link Group Configuration

## Default

There is no load-balancing instance in the smart-link group by default.

## Usage

Load-balancing instances will be active in the slave interface. If user want to configure load-balancing instances, should before the smart-group is enabled.

## Examples

This example shows how to set protected instance 10 as the load-balancing instance.

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# load-balance instance 10
```

## Related Commands

**show smart-link group**

## 9.6 restore time

Use this command to set restore time of the smart-link group.

### Command Syntax

**restore time** *RESTORE-TIME*

**no restore time**

<i>RESTORE-TIME</i>	The range is 30-1200(seconds)
---------------------	-------------------------------

### Command Mode

Smart-link Group Configuration

## Default

The default restore time is 60 seconds.

## Usage

When the master interface is resumed, the links will not be immediately restored to the master interface, but will be delayed a while. The delay time is called restore time.

## Examples

This example shows how to set restore time as 30 seconds in the smart-link group 1.

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# restore time 30
```

## Related Commands

**show smart-link group**

## 9.7 restore enable

Use this command to enable/disable restoring feature of the smart-link group.

## Command Syntax

**restore enable**

**no restore enable**

## Command Mode

Smart-link Group Configuration

## Default

The restoring feature of the smart-link group is disabled by default.

## Usage

When master interface fails, the link will be switched to the slave interface. Then, if master interface is resumed, the link will not be switched back to keep the flow stable by default. If restoring feature is enabled, the link will be switched back.

NOTE: If load-balancing instance is configured, this feature is recommended strongly.

## Examples

This example shows how to enable the restoring feature in the smart-link group 1.

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# restore enable
```

## Related Commands

**show smart-link group**

## 9.8 flush send

Use this command to set/unset the flush packet sender in the smart-link group.

### Command Syntax

**flush send control-vlan *VLAN-ID* password simple *PASSWORD***

**no flush send**

<i>VLAN-ID</i>	Flush packet will be sent through this VLAN. The range is 1-4094
<i>PASSWORD</i>	The simple password of the flush packet, and the length is 1 to 15

### Command Mode

Smart-link Group Configuration

### Default

There is no flush sender in the smart-link group by default.

### Usage

Mac address-table should be updated when a master (forwarding) link goes down and the slave link begins forwarding traffic. Flush packet is used for this purpose.

NOTE: If the control-vlan is not existed in the switch, sending flush packet will fail.

## Examples

This example shows how to configure flush sender of the smart-link group 1, control-vlan is 4 and password is "test".

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# flush send control-vlan 4 password simple test
```

## Related Commands

**show smart-link group**

**smart-link flush receive**

## 9.9 group enable

Use this command to enable/disable the smart-link group.

### Command Syntax

**group enable**

**no group enable**

### Command Mode

Smart-link Group Configuration

### Default

Smart-link group is disabled by default.

### Usage

After interface and protected instance configuration is finished, this command could be used to enable the group.

## Examples

This example shows how to enable the smart-link group 1.

```
Switch(config)# smart-link group 1
Switch(config-smlk-group)# group enable
```

## Related Commands

**show smart-link group**

## 9.10 smart-link flush receive

Use this command to set/unset the flush packet receiver in the switch interface.

### Command Syntax

**smart-link flush receive control-vlan *VLAN-ID* password simple *PASSWORD***

**no smart-link flush receive**

<i>VLAN-ID</i>	Flush packet will be sent through this VLAN. The range is 1-4094
----------------	--

<i>PASSWORD</i>	The simple password of the flush packet, and the length is 1 to 15
-----------------	--

## Command Mode

Interface Configuration

## Default

There is no flush receiver by default.

## Usage

The received flush packet should have the same VLAN-ID and password with the sender. Otherwise, the packet will be discarded.

## Examples

This example shows how to configure flush receiver in the interface eth-0-9, control-vlan is 4 and password is "test".

```
Switch(config)# interface eth-0-9
Switch(config-if)# smart-link flush receive control-vlan 4 password simple test
Switch(config-if)# end
Switch# show smart-link
Relay smart-link flush packet is enabled
Smart-link received flush packet number:0
Smart-link processed flush packet number:0
Smart link Group Number is 1.
  Group-ID   State      MASTER    SLAVE
  ----
  1          disabled  N/A       N/A
```

## Related Commands

**flush send**

**show smart-link**

## 9.11 smart-link tcn enable

Use this command to enable smart link tcn. To disable the smart-link tcn, used no form of this command.

## Command Syntax

**smart-link tcn enable**

**no smart-link tcn enable**

## Command Mode

Global Configuration

## Default

Disable

## Usage

None

## Examples

```
Switch(config)# no smart-link tcn enable
```

## Related Commands

```
show smart-link
```

## 9.12 smart-link tcn query-count

Use this command to set smart link tcn query count. To reset the smart-link tcn query count to default value, used no form of this command.

### Command Syntax

```
smart-link tcn query-count QUERY-COUNT
```

```
no smart-link tcn query-count
```

<i>QUERY-COUNT</i>	TCN query count. The range is 1-10.
--------------------	-------------------------------------

### Command Mode

Global Configuration

### Default

2

### Usage

None

### Examples

This example shows how to set smart link tcn query count to 5.

```
Switch(config)# smart-link tcn query-count 5
```

### Related Commands

```
show smart-link
```

## 9.13 smart-link tcn query-interval

Use this command to set smart link tcn query interval. To reset the smart-link tcn query interval to default value, used no form of this command.

### Command Syntax

```
smart-link tcn query-interval QUERY-INTERVAL
```

```
no smart-link tcn query-interval
```

<i>QUERY-INTERVAL</i>	TCN query interval. The range is 1-255s.
-----------------------	--

## Command Mode

Global Configuration

## Default

10s

## Usage

None

## Examples

This example shows how to set smart link tcn query interval to 50.

```
Switch(config)# no smart-link tcn query-interval 50
```

## Related Commands

**show smart-link**

## 9.14 show smart-link

Use this command to display information of all smart-link groups.

### Command Syntax

**show smart-link**

### Command Mode

Privileged EXEC

### Default

None

### Usage

This command is used to display summary information of Smart-link group status, including received flush packet, processed flush packet and current Smart-link group number, etc.

### Examples

```
Switch# show smart-link
Relay smart-link flush packet is enabled
Smart-link received flush packet number:7
Smart-link processed flush packet number:0
Smart link Group Number is 1.
Group-ID   State      MASTER      SLAVE
1          enabled   eth-0-1     eth-0-2
```

### Related Commands

None

## 9.15 show smart-link group

Use this command to display detailed information of all smart-link groups or a specific group.



## Command Syntax

**show smart-link group** (*GROUP-ID*)

<i>GROUP-ID</i>	Smart-link group ID. The range is 1-16
-----------------	--

## Command Mode

Privileged EXEC

## Default

None

## Usage

This command is used to display detail information of a specified Smart-link group or all Smart-link groups' status.

## Examples

```
Switch# show smart-link group 1
```

## Related Commands

None

## 9.16 clear smart-link statistic

Use this command to clear the statistic of the smart-link groups.

## Command Syntax

**clear smart-link statistic**

## Command Mode

Privileged EXEC

## Default

None

## Usage

This command is used to clear the statistic of the smart-link groups.

## Examples

```
Switch# clear smart-link statistic
```

## Related Commands

None

## 9.17 debug smart-link

Use this command to debug detail information of smart link.

## Command Syntax

**debug smart-link (all | flush | instance | interface | restore)**

<b>all</b>	All debugging
<b>flush</b>	Smart-Link Flush Packet
<b>instance</b>	Smart-Link Instance
<b>interface</b>	Smart-Link Interface
<b>restore</b>	Smart-Link auto-restore

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

```
Switch# debug smart-link all
```

## Related Commands

None

# 10 Monitor Link Commands

---

## 10.1 monitor-link group

Use this command to create monitor link group.

### Command Syntax

**monitor link group** *GROUP-ID*

**no monitor link group** *GROUP-ID*

<i>GROUP-ID</i>	Monitor link group number. The range is 1-16
-----------------	--

### Command Mode

Global Configuration

### Defaults

No monitor link group is created

### Usage

This command is used to create monitor link group. The group range is 1-16.

### Examples

In the following example, monitor link group 1 is created:

```
Switch# configure terminal
Switch(config)# monitor-link group 1
```

### Related Commands

**no monitor-link group**

## 10.2 monitor-link uplink interface

Use this command to add uplink interface to monitor link group.

### Command Syntax

**monitor-link uplink interface** (*IFPHYSICAL*|*IFAGG*)

**no monitor-link uplink interface** (*IFPHYSICAL*|*IFAGG*)

<i>IFPHYSICAL</i>	Ethernet interface name
-------------------	-------------------------

<i>IFAGG</i>	Link aggregation interface name
--------------	---------------------------------

## Command Mode

Monitor-link Configuration

## Defaults

No interface is add

## Usage

Only Ethernet interface and aggregation interface can be used as monitor link group.

## Examples

In the following example, the ethernet interface is set to monitor link group member

```
Switch(config)# monitor-link group 1
Switch(config-mtlk-group)# monitor-link uplink interface eth-0-1
```

## Related Commands

**show monitor-link group**

## 10.3 monitor-link uplink smart-link group

Use this command to add smart link group to monitor link group.

## Command Syntax

**monitor-link uplink smart-link group** *GROUP-ID*

**no monitor-link uplink smart-link group** *GROUP-ID*

<i>GROUP-ID</i>	Smart link group number. The range is 1-16
-----------------	--

## Command Mode

Monitor-link Configuration

## Defaults

No smart link group is add

## Usage

Only the smart link group which is enabled can be add to monitor link group

## Examples

In the following example, the smart link group is set to monitor link group member:

```
Switch(config)# monitor-link group 1
Switch(config-mtlk-group)# monitor-link uplink smart-link group 1
```

## Related Commands

**show monitor-link group**

## 10.4 no monitor-link uplink

Use this command to delete all the uplink from monitor link group.

### Command Syntax

**no monitor-link uplink**

### Command Mode

Monitor-link Configuration

### Defaults

None

### Usage

This command is used to delete all the uplink from monitor link group.

### Examples

In the following example, all the uplink is deleted from monitor link group

```
Switch(config-mtlk-group)# no monitor-link uplink
```

### Related Commands

**show monitor-link group**

## 10.5 monitor-link downlink interface

Use this command to add downlink interface from monitor link group.

### Command Syntax

**monitor-link downlink interface** (*IFPHYSICAL*|*IFAGG*)

**no monitor-link downlink interface** (*IFPHYSICAL*|*IFAGG*)

<i>IFPHYSICAL</i>	Ethernet interface name
<i>IFAGG</i>	Link aggregation interface name

### Command Mode

Monitor-link Configuration

### Defaults

No interface is add

### Usage

Only Ethernet interface and aggregation interface can be add to monitor link group.

### Examples

In the following example, the Ethernet interface is set to monitor link group member:

```
Switch(config)# monitor-link group 1
```

```
Switch(config-mtlk-group)# monitor-link downlink interface eth-0-1
```

## Related Commands

**show monitor-link group**

## 10.6 monitor-link recover-time

Use this command to set recover time for monitor link group.

### Command Syntax

**monitor-link recover-time** *RECOVER\_TIME*

**no monitor-link recover-time**

<i>RECOVER_TIME</i>	Monitor link group recover time range (second)
---------------------	--

### Command Mode

Global Configuration

### Defaults

The default value is 3 seconds

### Usage

This command is used to set recover time for monitor link group. If the uplink is change to up, all the downlink will be set to up after recover timer.

### Examples

In the following example, monitor link group's recover-time is set to 1s

```
Switch# configure terminal
Switch(config)# monitor-link recover-time 1
```

## Related Commands

**show monitor-link group**

## 10.7 show monitor-link group

Use this command to display all the monitor link group status.

### Command Syntax

**show monitor-link group** (*GROUP-ID*)

<i>GROUP-ID</i>	Monitor link group number. The range is 1-16
-----------------	--

### Command Mode

Privileged EXEC

## Defaults

None

## Usage

This command is used to display a specified or all the monitor link group status, including status, group id, uptime, downtime, etc.

## Examples

In the following example, monitor link group 1 is displayed

```
Switch# show monitor-link group
Group Id: 1
Monitor link status: UP
Role      Member      Last-up-time      Last-down-time      upcount  downcount
UpLk 1   eth-0-2      2011/07/15,01:34:17 2011/07/15,01:34:14 1         1
```

## Related Commands

None

# 10.8 debug monitor-link

Use this command to debug monitor link.

## Command Syntax

**debug monitor-link**

## Command Mode

Privileged EXEC

## Defaults

None.

## Usage

None.

## Examples

In the following example, the debug of monitor link is set to on

```
Switch# debug monitor-link
```

## Related Commands

None

# 11

## VRRP Commands

---

### 11.1 advertisement-interval

To configure the interval between successive advertisements sent by the master virtual router in a Virtual Router Redundancy Protocol (VRRP) group, use the `advertisement-interval` command in router configuration mode. To restore the default value, use the `no` form of this command.

#### Command Syntax

**advertisement-interval** *interval*

**no advertisement-interval**

<i>interval</i>	Time interval between successive advertisements sent by the master virtual router. The unit of the interval is in seconds. The valid range is 1 to 255 seconds.
-----------------	---

#### Command Mode

Router Configuration

#### Default

Default is 1 second.

#### Usage

The advertisements sent by the master virtual router communicate the state and priority of the current master virtual router.

The `advertisement-interval` command configures the time between successive advertisement packets and the time before other routers declare the master router to be down. Routers or access servers on which timer value are not configured can learn timer values from the master router. The timers configured on the master router always override any other timer settings. All routers in a VRRP group must use the same timer value. If the same timer value is not set, the routers in the VRRP group will not communicate with each other and any misconfigured router will change its state to master.

#### Examples

The following example shows how to configure the master virtual router to send advertisements every 4 seconds:

```
Switch(config)# router vrrp 1
Switch(config-router)# advertisement-interval 4
```



## Related Commands

**advertisement-interval msec**

## 11.2 advertisement-interval msec

To configure the advertisement interval with milli-second mode between successive advertisements sent by the master virtual router in a VRRP group, use the `advertisement-interval msec` command in router configuration mode. To restore the second mode, use the `no` form of this command.

### Command Syntax

**advertisement-interval msec** *interval*

**no advertisement-interval msec**

<i>interval</i>	Time interval between successive advertisements sent by the master virtual router. The unit of the interval is in 100 milli-seconds. The valid range is 100 to 900 milli-seconds.
-----------------	---

### Command Mode

Router Configuration

### Default

None

### Usage

The advertisements be sent by the master virtual router communicate the state and priority of the current master virtual router.

The `advertisement-interval msec` command configures the time between successive advertisement packets and the time before other routers declare the master router to be down. Routers or access servers on which timer values are not configured can learn timer values from the master router. The timers configured on the master router always override any other timer settings. All routers in a VRRP group must use the same timer value. If the same timer value is not set, the routers in the VRRP group will not communicate with each other and any misconfigured router will change its state to master.

### Examples

The following example shows how to configure the master virtual router to send advertisements every 100 milli-seconds:

```
Switch(config)# router vrrp 1
Switch(config-router)# advertisement-interval msec 100
```

### Related Commands

**advertisement-interval**

## 11.3 interface (VRRP)

To enable the Virtual Router Redundancy Protocol (VRRP) protocol on a specified interface, use the interface command in router mode. To disable VRRP protocol on this interface, use the no form of this command.

### Command Syntax

**interface** *interface-name*

**no interface**

<i>interface-name</i>	Interface name
-----------------------	----------------

### Command Mode

Router Configuration

### Default

None

### Usage

The max VRRP group number should be no more than 3 for one VRRP interface.

### Examples

The following is a sample output from the interface command:

```
Switch(config)#router vrrp 1
Switch(config-router)#interface eth-0-1
```

### Related Commands

**router vrrp**

## 11.4 learnmaster-mode

To enable the backup router to learn advertisement interval from master router, use the learnmaster-mode true command in router mode. To disable learn advertisement interval from master router, use the learnmaster-mode false.

### Command Syntax

**learnmaster-mode** (true|false)

<b>true</b>	Enable learn advertisement interval from master router
<b>false</b>	Disable learning advertisement interval from master router

### Command Mode

Router Configuration

## Default

Default is false.

## Usage

By default, backup router does not learn advertisement interval from master router.

## Examples

The following example shows how to configure a backup router learning advertisement interval from master router.

```
Switch(config)# router vrrp 1
Switch(config-router)# learnmaster-mode true
```

## Related Commands

**router vrrp**

## 11.5 preempt-mode

To configure the router to take over as master virtual router for a Virtual Router Redundancy Protocol (VRRP) group if it has higher priority than the current master virtual router, use the preempt-mode enable command in router mode. To disable this function, use the preempt-mode disable command.

## Command Syntax

**preempt-mode (true | false)**

<b>true</b>	Preemption enabled
<b>false</b>	Preemption disabled

## Command Mode

Router Configuration

## Default

Default is true.

## Usage

By default, the router configured preempt-mode true will take over as master virtual router for the group if it has a higher priority than the current master virtual router.

## Examples

The following example shows how to configure the router to preempt the current master virtual router when its priority of 200 is higher than that of the current master virtual router.

```
Switch(config)# router vrrp 1
Switch(config-router)# preempt-mode true
Switch(config-router)# priority 200
```

## Related Commands

**preempt delay**

## 11.6 preempt delay

To configure the master down interval when preempt takes effect.

### Command Syntax

**preempt delay** *time*

<i>time</i>	Preempt delay time, the valid range is 0~3600 seconds
-------------	---

### Command Mode

Router Configuration

### Default

Default is 0 second.

### Usage

The original master down interval = (3\*adv\_t\_interval) + skew\_time. when preempt delay time is configured, then master down interval = (3\*adv\_t\_interval) + skew\_time + preempt\_delay. By default, preempt delay is 0 second.

### Examples

The following example shows how to configure the router to preempt the current master virtual router when its priority of 200 is higher than that of the current master virtual router, but delay 30 seconds to preempt.

```
Switch(config)# router vrrp 1
Switch(config-router)# preempt-mode true
Switch(config-router)# priority 200
Switch(config-router)# preempt delay 30
```

## Related Commands

**preempt-mode**

## 11.7 priority (VRRP)

To set the priority level of the router within a Virtual Router Redundancy Protocol (VRRP) group, use the priority command in router configuration mode. To remove the priority level of the router, use the no form of this command.

### Command Syntax

**priority** *level*

**no priority**

<i>level</i>	Priority of the router within the VRRP group. The range is from 1 to 254.
--------------	---

## Command Mode

Router Configuration

## Default

Default is 100

## Usage

Use this command to control which router becomes the master virtual router.

## Examples

The following example shows how to configure the router with a priority of 254:

```
Switch(config)# router vrrp 1
Switch(config-router)# priority 254
```

## Related Commands

**router vrrp**

# 11.8 router vrrp

To create a Virtual Router Redundancy Protocol (VRRP) group, use the `router vrrp` command in Global Configuration mode. To remove this VRRP group, use the `no` form of this command.

## Command Syntax

**router vrrp** *group*

**no router vrrp** *group*

<i>group</i>	Group number to which the tracking applies. The group number range is from 1 to 255
--------------	---

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

The following is a sample shows how to create a VRRP group

```
Switch(config)# router vrrp 1
```

## Related Commands

None

## 11.9 track (VRRP)

To configure the Virtual Router Redundancy Protocol (VRRP) to track an object, use the track command in router configuration mode. To disable the tracking, use the no form of this command.

### Command Syntax

**track** *obj\_id* (**decrement** *VALUE*)

**no track**

<i>obj_id</i>	track object id, the valid range is from 1~500
<b>decrement</b>	Priority decrement
<i>VALUE</i>	Decrement value<1-255>

### Command Mode

Router Configuration

### Default

None

### Usage

Use track to monitor an up link interface, so that when the monitoring interface is down, backup can change to master router.

Only 1 track object is valid for one special VRRP group, and the later configured track object will always overwrite the previous one.

### Examples

The following is a sample output from the track command:

```
Switch(config)# track 10 interface eth-0-1 linkstate
Switch(config)# router vrrp 1
Switch(config-router)# track 10
```

### Related Commands

**router vrrp**

## 11.10 enable /disable

To enable a VRRP session, use the enable command in router configuration mode.

### Command Syntax

**enable/disable**

### Command Mode

Router Configuration

## Default

None

## Usage

None

## Examples

The following is a sample shows how to enable a VRRP session:

```
Switch(config-router)# enable
```

The following is a sample shows how to disable a VRRP session:

```
Switch(config-router)# disable
```

## Related Commands

None

## 11.11 virtual-ip

To enable the Virtual Router Redundancy Protocol (VRRP) on an interface and identify the IP address of the virtual router, use the `virtual-ip` command in router configuration mode. To disable VRRP on the interface and remove the IP address of the virtual router, use the `no` form of this command.

### Command Syntax

**virtual-ip** *ip-address*

**no virtual-ip**

<i>ip-address</i>	IP address of the virtual router
-------------------	----------------------------------

### Command Mode

Router Configuration

## Default

None

## Usage

For VRRP to elect a designated router, at least one router on the cable must have been configured with the primary address of the virtual router.

VRRP does not support address learning. All addresses must be configured.

All routers in the VRRP group must be configured with the same primary address for the virtual router. If different primary addresses are configured, the routers in the VRRP group will not communicate with each other and any mis-configured routers in the group will change their state to master.

The virtual IP address must be in the same subnet with VRRP interface, and if virtual IP is equal to the interface IP address, it is called IP address owner.

## Examples

The following example shows how to enable VRRP on eth-0-1. The VRRP group is 1. IP address 10.0.1.20 is the address of the virtual router.

```
Switch(config)# interface eth-0-1
Switch(config-if)# no switchport
Switch(config-if)# ip address 10.0.1.1/24
Switch(config)# router vrrp 1
Switch(config-router)# interface eth-0-1
Switch(config-router)# virtual-ip 10.0.1.20
Switch(config-router)# enable
```

## Related Commands

**router vrrp**

## 11.12 show vrrp

To display a brief or detailed status of one or all configured Virtual Router Redundancy Protocol (VRRP) groups on the router, use the show vrrp command in Privileged EXEC mode.

## Command Syntax

**show vrrp** (*group* | )

<i>group</i>	(Optional) Virtual router group number of the group for which information is to be displayed.
--------------	---

## Command Mode

Privileged EXEC

## Default

None

## Usage

If no group is specified, all groups are displayed.

## Examples

The following is a sample output from the show vrrp command:

```
Switch# show vrrp
VRID <1>
State           : Master
Virtual IP      : 10.0.20.254(Not IP owner)
Interface       : eth-0-10
VMAC            : 0000.5e00.0101
Advt timer      : 1
Preempt mode    : TRUE
Conf pri        : 200          Run pri   : 200
Master router ip : 10.0.20.1
Master priority  : 200
Master advt timer : 1
```



```
Master down timer : 3
Preempt delay     : 100 second(s)
Learn master mode : FALSE
```

## Related Commands

**router vrrp**

# 12 VRRP Remote Tracking Commands

---

## 12.1 delay up

To specify a period of time (in seconds) to delay communicating state changes of a tracked object, use `delay up` in track mode. To restore to default value, use the `no` form of this command.

### Command Syntax

**delay up** *seconds*

**no delay up**

<i>seconds</i>	time range is from 1 to 180.
----------------	------------------------------

### Command Mode

Track Mode

### Default

None

### Usage

None

### Examples

In the following example, the `delay up` command is used to configure delay when object state is turned from down to up:

```
Switch(config)# track 1 interface eth-0-1 linkstate
Switch(config-track)# delay up 30
```

### Related Commands

**delay down**

## 12.2 delay down

Use `delay down` in track mode to specify a period of time (in seconds) to delay communicating state changes of a tracked object. To restore to default value, use the `no` form of this command.

### Command Syntax

**delay up** *seconds*

**no delay up**

<i>seconds</i>	Time range is from 1 to 180.
----------------	------------------------------

## Command Mode

Track Mode

## Default

None

## Usage

None

## Examples

In the following example, the delay down command is used to configure delay when object state is turned from up to down:

```
Switch(config)# track 1 interface eth-0-1 linkstate
Switch(config-track)# delay down 30
```

## Related Commands

**delay up**

## 12.3 frequency

Sets the rate at which a specified IP SLA operation repeats. To turn to default value, use no form of this command.

## Command Syntax

**frequency** *seconds*

**no frequency**

<i>seconds</i>	Time range is from 1 to 4800. (Frequency ≥ timeout ≥ threshold)
----------------	---

## Command Mode

Ip Sla Mode

## Default

The default value is 60 seconds.

## Usage

None

## Examples

In the following example, the frequency command is used to set the rate at which a specified IP SLAs operation repeats:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# frequency 10
```

## Related Commands

**show ip sla monitor**

## 12.4 ip sla monitor

To create an IP SLA entry and enter IP SLA monitor configuration mode, use ip sla monitor in CONFIG mode. To delete an IP SLA entry, use the no form of this command.

## Command Syntax

**ip sla monitor** *entrynumber*

**no ip sla monitor** *entrynumber*

<i>entrynumber</i>	Identify ip sla monitor entry, its range is from 1 to 500
--------------------	---

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

In the following example, the ip sla monitor command is used to create an ip sla monitor entry:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)#
```

## Related Commands

**show ip sla monitor**

## 12.5 ip sla monitor schedule

To enable an IP SLA entry, use ip sla monitor schedule in CONFIG mode. To disable an IP SLA entry, use the no form of this command.

## Command Syntax

**ip sla monitor schedule** (*entrynumber*)

<i>entrynumber</i>	Identify ip sla monitor entry, its range is from 1 to 500
--------------------	---

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

In the following example, the ip sla monitor schedule command is used to enable an IP SLA monitor entry:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# exit
Switch(config)# ip sla monitor schedule 1
```

## Related Commands

**show ip sla monitor**

## 12.6 timeout

Sets the amount of time an IP SLA operation waits for a response from its request packet. To turn to default value, use no form of this command.

## Command Syntax

**timeout** *seconds*

**no timeout**

<i>seconds</i>	Time range is from 1 to 4800.(Frequency ≥ timeout ≥ threshold)
----------------	--

## Command Mode

Ip Sla Mode

## Default

The default value is 5 seconds.

## Usage

None

## Examples

In the following example, the timeout command is used to set the time range:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# timeout 10
```

## Related Commands

**show ip sla monitor**

## 12.7 threshold

Set the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation. To turn to default value, use no form of this command.

### Command Syntax

**threshold** *seconds*

**no threshold**

<i>seconds</i>	Time range is from 1 to 4800.(Frequency $\geq$ timeout $\geq$ threshold)
----------------	--

### Command Mode

Ip Sla Mode

### Default

The default value is 5 seconds.

### Usage

None

### Examples

In the following example, the threshold command is used to set the threshold time range:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# threshold 10
```

## Related Commands

**show ip sla monitor**

## 12.8 track

To configure a track object, use the track command in Global Configuration mode.

### Command Syntax

**track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
------------------	--

### Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

In the following example, the track command is used to create a track object:

```
Switch(config)# track 1 interface eth-0-1 linkstate
Switch(config-track)#
```

## Related Commands

**show track**

# 12.9 track interface linkstate

Create a track object and track the state of an interface, use the track interface linkstate command in Global Configuration mode. To remove a track, use the no form of this command.

## Command Syntax

**track** *object\_id* **interface** *IFNAME* **linkstate**

**no track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
<i>IFNAME</i>	Interface name

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

In the following example, the track interface linkstate command is used to create an track object:

```
Switch(config)# track 1 interface eth-0-1 linkstate
Switch(config-track)#
```

## Related Commands

**show track**

## 12.10 track rtr reachability

Create a track object and track the state of an ip sla entry, use the track rtr reachability to command in Global Configuration mode. To remove a track, use the no form of this command.

When the state of IP SLA entry is OK or over-threshold, track object state is up; otherwise track object state is down.

### Command Syntax

**track** *object\_id* **rtr** **entrynum** *reachability*

**no track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
<i>entrynumber</i>	Entry number is used to identify IP SLA monitor entry, its range is from 1 to 500

### Command Mode

Global Configuration

### Default

None

### Usage

None

### Examples

In the following example, the track rtr reachability command is used to create a track object:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# exit
Switch(config)# track 1 rtr 1 reachability
Switch(config-track)#
```

### Related Commands

**show track**

## 12.11 track rtr state

Create a track object and track the state of an IP SLA entry, use the track rtr state command in Global Configuration mode. To remove a track, use the no form of this command.

When the state of IP SLA entry is OK, track object state is up; otherwise track object state is down.

### Command Syntax

**track** *object\_id* **rtr** **entrynum** **state**



**no track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
<i>entrynumber</i>	Entry number is used to identify IP SLA monitor entry, its range is from 1 to 500

## Command Mode

Global Configuration

## Default

None

## Usage

None

## Examples

In the following example, the track rtr state command is used to create a track object:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# exit
Switch(config)# track 1 rtr 1 state
Switch(config-track)#
```

## Related Commands

**show track**

## 12.12 track bfd

Create a track object and track the state of bfd session, use the track bfd command in Global Configuration mode. To remove a track, use the no form of this command.

When the state of bfd session is up, track object state is up; otherwise track object state is down.

## Command Syntax

**track** *object\_id* bfd source interface IFNAME destination A.B.C.D

**no track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
interface IFNAME	Interface name
Destination A.B.C.D	Destination IP address of the bfd session

## Command Mode

Global Configuration

## Default

None

## Usage

The source interface should be a Layer 3 interface and ip address should be configured.

The destination ip address should be in the same network of the interface ip address.

## Examples

In the following example, the track bfd command is used to create a track object:

```
Switch (config)# interface eth-0-9
Switch (config-if)# no switchport
Switch (config-if)# no shutdown
Switch (config-if)# ip address 9.9.9.1/24
Switch (config-if)# quit
Switch (config)# track 1 bfd source interface eth-0-9 destination 9.9.9.2
Switch (config-track)#
```

## Related Commands

**show track**

## 12.13 type echo protocol

Defines an Echo operation with ICMP packet and enters destination IP address or hostname.

To delete an Echo operation and destination IP address or hostname, use the no form of this command.

## Command Syntax

**type echo protocol ipIcmpEcho** (destination-ip-address|destination-hostname)

**no type echo protocol ipIcmpEcho**

<i>destination-ip-address</i>	Destination ip address of sending icmp packet
<i>destination-hostname</i>	Destination hostname of sending icmp packet

## Command Mode

Ip Sla Mode.

## Default

None

## Usage

None

## Examples

In the following example, the type echo protocol ipIcmpEcho command is used to set ICMP packet and destination IP address:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# type echo protocol ipIcmpEcho 192.168.0.1
```

## Related Commands

**show ip sla monitor**

## 12.14 show ip sla monitor

To show IP SLA entries, use show ip sla monitor in EXEC mode.

## Command Syntax

**show ip sla monitor** (*entrynumber*)

<i>entrynumber</i>	Entry number is used to identify ip sla monitor entry, its range is from 1 to 500
--------------------	---

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

In the following example, the show ip sla monitor command is used to show ip sla monitor entries:

```
Switch# show ip sla monitor
Entry 1
  Type           : Echo
  Admin state    : Enable
  Destination address : 192.168.0.1
  Frequency      : 3 seconds
  Timeout        : 2 seconds
  Threshold      : 1seconds
  Running Frequency : 3 seconds
  Vrf            : vpn1
  Return code    : OK
```

## Related Commands

**ip sla monitor**

## 12.15 show track

To show TRACK entries, use show track in EXEC mode.

## Command Syntax

**show track** *object\_id*

<i>object_id</i>	Object identity is used to identify track object, its range is from 1 to 500
------------------	--

## Command Mode

Privileged EXEC

## Default

None

## Usage

None

## Examples

In the following example, the show track command is used to show track entries:

```
Switch# show track
Track 2
  Type           : Response Time Reporter (RTR) Reachability
  Interface      : eth-0-2
  State          : down
  Delay up       : 30 seconds
  Delay down     : 30 seconds
```

## Related Commands

**track**

## 12.16 vrf

To use IP SLA operations in VPNs, use vrf in ipsla mode. To remove VPN features from IP SLA operations, use the no form of this command.

## Command Syntax

**vrf** *vrfname*

**no vrf**

<i>vrfname</i>	VRF name
----------------	----------

## Command Mode

Ip Sla Mode

## Default

None

## Usage

None

## Examples

In the following example, the vrf command is used to use ip sla monitor entry in VPN:

```
Switch(config)# ip sla monitor 1
Switch(config-ipsla)# vrf vpn1
```

## Related Commands

**show ip sla monitor**

---

# 13

## VARP Commands

---

### ip virtual-router mac

Use this command to configure a virtual mac for switch.

## Command Syntax

**ip virtual-router mac** *mac-addr*

**no ip virtual-router mac**

<i>mac-addr</i>	Virtual mac address
-----------------	---------------------

## Command Mode

Global Configuration

## Default

None

## Usage

This virtual mac is used for interface configured virtual IP address. The address is receive-only; the switch never sends packets with this address as the source. And it only exists in ARP replay for virtual IP.

## Examples

The following example is the result of this command:

```
Switch(config)# ip virtual-router mac 1.1.1
```

## Related Commands

**ip virtual-router address**

# ip virtual-router address

Use this command to configure a virtual IP address for interface.

## Command Syntax

**ip virtual-router address** *IP-address*

**no ip virtual-router address**

<i>IP-address</i>	Virtual IP address
-------------------	--------------------

## Command Mode

Interface Configuration

## Default

None

## Usage

The `ip virtual-router address` command assigns a virtual IP address to the interface . The virtual IP address should be in the subnet of the IP address assigned to the interface and if virtual mac is not configured, there is no reply to ARP request packet for the virtual IP address.

## Examples

The following example is the result of this command:

```
Switch(config-if)# ip virtual-router address 1.1.1.1
```

## Related Commands

`ip virtual-router mac`

# 14

## IP BFD Commands

### 14.1 bfd interval

Use this command to specify the desired transmit interval, receive interval and detect multiplier of IP BFD on the interface.

Use the “no” form of this command to restore the default value.

#### Command Syntax

**bfd interval {tx <1-1000> | rx <1-1000> | multiplier <1-15>}**

**no bfd interval**

Parameter	Description
<b>mintx &lt;1-1000&gt;</b>	Set BFD minimum transmit interval
<b>minrx &lt;1-1000&gt;</b>	Set BFD minimum receive interval
<b>multiplier &lt;1-15&gt;</b>	Set the value of Hello Multiplier

#### Command Mode

Interface Configuration

#### Default

The default value for minimum tx interval and rx interval is 20ms.

The default value for detect multiple is 3.

#### Usage

Use this command to specify the transmit interval, receive interval and detect multiple of IP BFD on the interface.

This configuration should affect all the IP BFD sessions on this interface. The actual transmit interval and receive interval need to negotiate with another end of the session.

#### Examples

In the following example, the desired transmit interval is set as 1 ms, the desired receive interval is set as 1 ms, the detect multiplier is set as 3 times:

```
Switch (config-if)# bfd interval mintx 1 minrx 1 multiplier 3
```

#### Related Commands

None



## 14.2 ip route

Use this command to specify a IP BFD session for static route.

Use the “no” form of this command to remove the session.

### Command Syntax

**ip** *prefix nexthop bfd*

**no ip** *prefix nexthop bfd*

Parameter	Description
<b>prefix</b>	IP destination prefix (e.g. 10.0.0.0/8)
<b>nexthop</b>	IP gateway address

### Command Mode

Global Configuration

### Default

By default there is no IP BFD session on the system.

### Usage

Use this command to specify a IP BFD session for static route.

When the ip static route is deleted, the session should be destroyed.

### Examples

In the following example, user configures a IP bfd session for static router 1.1.1.0/24 via 9.9.9.2:

```
Switch (config)# ip route 1.1.1.0/24 9.9.9.2 bfd
```

### Related Commands

**ip route**

## 14.3 ip ospf bfd

Use this command to enable IP BFD for ospf on an interface.

Use the “no” form of this command to disable IP BFD for ospf on an interface.

### Command Syntax

**ip ospf bfd**

**no ip ospf bfd**

### Command Mode

Interface Configuration

### Default

By default IP BFD for ospf is disabled on the interface.

## Usage

Use this command to enable IP BFD for ospf on an interface.

The IP BFD session should be created when ospf neighbor is created and the neighbor's state is large than "two-way".

The IP BFD session should be destroyed when ospf neighbor is delete or the neighbor's state is not large than "two-way".

## Examples

In the following example, IP BFD for ospf is enabled on this interface:

```
Switch (config-if)# ip ospf bfd
```

## Related Commands

None

## 14.4 show bfd

Use this command to show the statues of IP BFD module.

## Command Syntax

**show bfd**

## Command Mode

Privileged EXEC

## Default

N/A

## Usage

Use this command to show the statues of IP BFD module.

## Examples

The following example is the result of this command:

```
Switch # show bfd
BFD ID: 00      Start Time:Thu May  2 03:09:41 2013
Number of Sessions:  2
Slow Timer: 1000      Image type: DISTRIBUTED
Echo Mode: Disabled   BFD Notifications disabled
Next Session Discriminator:  10

BFD Clients:
STATIC -> Client ID:
OSPF-> Client ID: 4
```

## Related Commands

None

## 14.5 bfd ip\_addr

Use this command to enable IP BFD for VRRP under each instance.

Use the “no” form of this command to disable IP BFD for VRRP under each instance.

## Command Syntax

```
bfd ip_nexthop_address { increase priority}  
no bfd
```

## Command Mode

Vrrp Router Configuration

## Default

By default IP BFD for VRRP is disabled under each VRRP instance.

## Usage

Use this command to enable IP BFD for VRRP under each instance.

The IP BFD session should be created after VRRP instance is created and virtual-ip, VRRP interface have both been configured.

The IP BFD session should be destroyed when state of links change to down or VRRP instance is deleted.

## Examples

In the following example, IP BFD for VRRP is enabled under the VRRP instance:

```
Switch (config-router) # bfd 9.9.9.2
```

In the following example, IP BFD helps VRRP change the running priority other than configured priority when link happen to be down:

```
Switch (config-router) # bfd 9.9.9.2 increase 30
```

## Related Commands

None

## 14.6 show bfd session

Use this command to show the bfd sessions.

### Command Syntax

```
show bfd session ( detail | )  
show bfd session SRC DST interface IFNAME ( detail | )  
show bfd session SRC DST ( detail | )  
show bfd session index SESS (detail)
```

Parameter	Description
<b>detail</b>	Show session details
<i>SRC</i>	Local IPv4 address
<i>DST</i>	Neighbor IPv4 address
<i>IFNAME</i>	BFD Interface
<b>index</b> <i>SESS</i>	BFD session index

## Command Mode

Privileged EXEC

## Default

N/A

## Usage

Use this command to show the bfd session.

Use the key word “detail” to show the detailed information.

To filter the show result, user can specify the session’s source and destination address and interface.

## Examples

The following example is the result of this command:

```
Switch # show bfd session
abbreviation:
LD: local Discriminator.   RD: Discriminator
S: single hop session.    M: multi hop session.
A: Admin down.           D:down.      I:init.     U:up.
=====
LD  RD  TYPE ST  UP-Time   Remote-Addr
1   0   S   D    00:00:00  2222::1/128
2   2   S   A    00:00:00  9.9.9.1/32
Number of Sessions:      2
```

```
Switch # show bfd session 9.9.9.1 9.9.9.2 interface eth-0-9 detail
Session Interface : eth-0-9           Session Index : 2
Lower Layer : IPv4                    Version : 1
Session Type : Single Hop             Session State : Up
Local Discriminator : 2                Local Address : 9.9.9.1/32
Remote Discriminator : 2               Remote Address : 9.9.9.2/32
Local Port : 49153                    Remote Port : 3784

Diagnostics : None

Timers in Milliseconds :
Min Tx: 1           Min Rx: 1           Multiplier: 15
Neg Tx: 0           Neg Rx: 1           Neg detect mult: 0

Sess up time : 00:00:13
Sess down time : 00:00:00

Protocol Client Info:
STATIC -> Client ID: 1
```

## Related Commands

None

## 14.7 show bfd interface

Use this command to show the IP bfd interface statuses.

### Command Syntax

**show bfd interface** ( *IFNAME* | **all** | )

Parameter	Description
<i>IFNAME</i>	BFD Interface
<b>all</b>	All Interfaces

### Command Mode

Privileged EXEC

### Default

N/A

### Usage

Use this command to show the IP bfd interface statuses.

User can show the specified interface or all interfaces.

### Examples

The following example is the result of this command:

```
Switch # show bfd interface eth-0-9
Interface:  eth-0-9  ifindex: 9 state:  UP
Interface level configuration: NO ECHO, NO SLOW TMR
Timers in Milliseconds
Min Tx: 1  Min Rx: 1  Multiplier: 3
```

### Related Commands

None