FSOS

IP Routing Command Line Reference

Contents

1 IP Unicast-Routing Commands

1.1 ip address

To set a primary or secondary IP address for an interface, use the ip address command in interface configuration mode. To remove an IP address or disable IP processing, use the no form of this command.

Command Syntax

ip address (*ADDRESS WILDCARD-MASK* | *ADDRESS/PREFIX-LENGTH*) (**secondary**|)

ADDRESS	IPv4 address
WILDCARD-MASK	Mask for the associated IP subnet
PREFIX-LENGTH	Prefix length of the address
secondary	(Optional) Specifies that the configured address is a secondary IP address. If this keyword is omitted, the configured address is the primary IP address

Command Mode

Interface Configuration

Default

No IP address is defined for the interface.

Usage

An interface can have one primary IP address and multiple secondary IP addresses. Packets generated by the switch always use the primary IP address. Therefore, all switches and access servers on a segment should share the same primary network number.

Hosts can determine subnet masks using the Internet Control Message Protocol (ICMP) mask request message. Switch respond to this request with an ICMP mask reply message.

You can disable IP processing on a particular interface by removing its IP address with the no ip address command. If the software detects another host using one of its IP addresses, it will print an error message on the console.

The optional secondary keyword allows you to specify up to 15 secondary addresses. Secondary addresses are treated like primary addresses, except the system never generates datagrams other than routing updates with secondary source addresses. IP broadcasts and Address Resolution Protocol (ARP) requests are handled properly, as are interface routes in the IP routing table.

Secondary IP addresses can be used in a variety of situations. The following are the most common applications:

There may not be enough host addresses for a particular network segment. For example, your subnet allows up to 254 hosts per logical subnet, but on one physical subnet you need 300 host addresses. Using secondary IP addresses on the switches or access servers allows you to have two logical subnets using one physical subnet.

Many older networks were built using Level 2 bridges. The judicious use of secondary addresses can aid in the transition to a subnet and router-based network. Switches on an older, bridged segment can be easily made aware that many subnets are on that segment.

Two subnets of a single network might otherwise be separated by another network. This situation is not permitted when subnets are in use. In these instances, the first network is extended, or layered on top of the second network using secondary addresses.

Examples

In the following example, 10.108.1.27 is the primary address and 192.31.7.17 and 192.31.8.17 are secondary addresses for eth-0-1:

Switch(config)# interface eth-0-1

Switch(config-if)# ip address 10.108.1.27 255.255.255.0

Switch(config-if)# ip address 192.31.7.17/24 secondary

Switch(config-if)# ip address 192.31.8.17 255.255.255.0 secondary

Related Commands

None

1.2 ip icmp error-interval

To set the interval of ICMP error messages generated by the switch, use the ip icmp error-interval command in global configuration mode. To restore the default value, use the no form of this command.

Command Syntax

ip icmp error-interval *INTERVAL*

INTERVAL	The interval in milliseconds. The range is 0 to 2147483647 milliseconds

Command Mode

Global Configuration

Default

Default is 1000 milliseconds.

Usage

None

Examples

In the following example, user sets the error interval to 10 seconds, which means only one ICMP error message was generated per 10 seconds:

Switch(config)# ip icmp error-interval 10000

Related Commands

ip redirects

ip unreachables

1.3 ip redirects

To enable send the ICMP redirect messages generated by the switch, use the ip redirects command in interface configuration mode. To restore the default value, use the command ip redirects.

Command Syntax

ip redirects

no ip redirects

Command Mode

Interface Configuration

Default

IP redirect is enabled by default.

Usage

None

Examples

In the following example, users disable to send the ICMP redirect message:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.10.10.1/24

Switch(config-if)# no ip redirects

Related Commands

ip unreachables

ip icmp error-interval

1.4 ip unreachables

To enable send the ICMP unreachable messages generated by the switch, use the ip unreachable command in interface configuration mode. To restore the default value, use ip unreachable command.

Command Syntax

ip unreachables

no ip unreachables

Command Mode

Interface Configuration

Default

IP unreachable is enabled by default.

Usage

None

Examples

In the following example, users disable to send the ICMP unreachable message:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.10.10.1/24

Switch(config-if)# no ip unreachables

Related Commands

ip redirects

ip icmp error-interval

1.5 ip verify unicast reverse-path

To enable RPF check to the interface, use the command ip verify unicast reverse-path in interface configuration mode. To restore the default value, use the no form of this command.

Command Syntax

ip verify unicast reverse-path

no ip verify unicast reverse-path

Command Mode

Interface Configuration

Default

RPF check is disabled by default.

Usage

None

Examples

In the following example, users enable RPF check in interface eth-0-1:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.10.10.1/24

Switch(config)# ip verify unicast reverse-path

Related Commands

ip redirects

ip icmp error-interval

1.6 router-id (global)

To use a fixed router ID for all routing protocols, use the router-id command in global configuration mode. To let switch select the router ID automatically, use the no form of this command.

Command Syntax

router-id *IP- ADDRESS*

IP-ADDRESS	Router ID in IP address format

Command Mode

Global Configuration

Default

No router ID is defined.

Usage

You can configure an arbitrary value in the IP address format for each switch. However, each router ID must be unique.

Examples

The following example specifies a fixed router-id:

Switch(config)# router-id 1.1.1.1

Related Commands

router-id (router)

1.7 ip route

To establish static routes, use the ip route command in global configuration mode. To remove static routes, use the no form of this command.

Command Syntax

ip route (*VRF NAME*|) (*PREFIX MASK* | *PREFIX/PREFIX-LENGTH*) NH-ADDRRESS (*DISTANCE*|)

VRF NAME	VRF instance name
PREFIX	IP route prefix for the destination
MASK	Prefix mask for the destination
PREFIX-LENGTH	Prefix length for the destination
NH-ADDRESS	IP address of the next hop that can be used to reach that network
DISTANCE	(Optional) An administrative distance. The default administrative distance for a static route is 1

Command Mode

Global Configuration

Default

No static routes are established.

Usage

The establishment of a static route is appropriate when the switch cannot dynamically build a route to the destination.

Examples

The following example routes packets for network 172.31.0.0 to a switch at 172.31.6.6:

Switch(config)# ip route 172.31.0.0 255.255.0.0 172.31.6.6

Related Commands

show ip route

1.8 show ip route

To display the current state of the routing table, use the show ip route command in user EXEC or privileged EXEC mode.

Command Syntax

show ip route (*VRF NAME*|) (*IP-ADDRESS* | *PREFIX/PREFIX-LENGTH* | *PROTOCOL*|)

VRF NAME	VRF instance name
IP-ADDRESS	(Optional) Address about which routing information should be displayed
PREFIX	IP route prefix
PREFIX-LENGTH	Prefix length for the route
PROTOCOL	(Optional) The name of a routing protocol, or the keyword connected, static, or summary. If you specify a routing protocol, use one of the following keywords: bgp, ospf, and rip.

Command Mode

User EXEC

Privileged EXEC

Default

None

Usage

You can display all active dynamic and static routes with both the show ip route and show ip route static commands after these active routes are added in the main routing table.

Examples

The following is sample output from the show ip route command when entered without an address:

Switch# show ip route

```
Codes: K - kernel, C - connected, S - static, R - RIP, B - BGP
       O - OSPF, IA - OSPF inter area
```

```
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2
      [*] - [AD/Metric]
      * - candidate default

O       1.1.1.0/24 [110/2] via 10.10.1.1, eth-0-23, 00:34:17
O       2.2.2.0/24 [110/3] via 10.10.1.1, eth-0-23, 00:17:26
C       10.10.1.0/24 is directly connected, eth-0-23
C       10.10.1.23/32 is in local loopback, eth-0-23
O       10.10.2.0/24 [110/2] via 10.10.1.1, eth-0-23, 00:17:26
O       10.10.3.0/24 [110/3] via 10.10.1.1, eth-0-23, 00:17:26
```

Related Commands

ip route

show ip route database

1.9 show ip route database

To display the Routing Information Base (RIB), use the show ip route database command in user EXEC or privileged EXEC mode.

Command Syntax

show ip route database (*VRF NAME*|) (*PROTOCOL*|)

VRF NAME	VRF instance name
PROTOCOL	(Optional) The name of a routing protocol, or the keyword connected, static, or summary. If you specify a routing protocol, use one of the following keywords: bgp, ospf, and rip.

Command Mode

User EXEC

Privileged EXEC

Default

None

Usage

You can display all active dynamic static routes with both the show ip route database and show ip route database static commands after these active routes are added in the Routing Information Base (RIB).

Examples

The following is sample output from the show ip route database command:

Switch# show ip route database

```
Codes: K - kernel, C - connected, S - static, R - RIP, B - BGP
       O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       [*] - [AD/Metric]
       > - selected route, * - FIB route, p - stale info

O    *> 1.1.1.0/24 [110/2] via 10.10.1.1, eth-0-23, 00:48:58
O    *> 2.2.2.0/24 [110/3] via 10.10.1.1, eth-0-23, 00:32:07
S       6.6.6.0/24 [1/0] via 3.3.3.3 inactive
C    *> 10.10.1.0/24 is directly connected, eth-0-23
C    *> 10.10.1.23/32 is in local loopback, eth-0-23
O    *> 10.10.2.0/24 [110/2] via 10.10.1.1, eth-0-23, 00:32:07
O    *> 10.10.3.0/24 [110/3] via 10.10.1.1, eth-0-23, 00:32:07
```

Related Commands

ip route

show ip route

1.10 show ip protocols

To display the parameters and current state of the active routing protocol process, use the show ip protocols command in privileged EXEC mode.

Command Syntax

show ip protocols (**vrf** *NAME* | *PROTOCOL*|)

VRF NAME	VRF instance name
PROTOCOL	(Optional) The name of a routing protocol, or the keyword connected, static, or summary. If you specify a routing protocol, use one of the following keywords: bgp, ospf, and rip.

Command Mode

User EXEC

Privileged EXEC

Default

None

Usage

The information displayed by the show ip protocols command is useful in debugging routing operations. Information in the Routing Information Sources field of the show ip protocols output can help you identify a switch suspected of delivering bad routing information.

Examples

The following is sample output from the show ip protocols command:

Switch# show ip protocols

```
Routing Protocol is "ospf 0"
  Redistributing:
  Routing for Networks:
    3.3.3.0/24
    10.10.1.0/24
    10.10.4.0/24
  Distance: (default is 110)
```

Related Commands

show ip route

1.11 show ip route summary

To display the total route count and different types of route count, use the show ip route summary command in privileged EXEC mode.

Command Syntax

show ip route (vrf *NAME* |) **summary**

VRF NAME	VRF instance name

Command Mode

User EXEC

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip route summary command:

Switch# show ip route summary

```
IP routing table name is Default-IP-Routing-Table(0)
IP routing table maximum-paths is 8
```

```
Route source    networks
connected       2
static          1
Total           3
```

Related Commands

show ip route

1.12 show ip route add-fib-fail

Use this command to display the routes which can not forward packet because of TCAM resource full. Use the show ip route add-fib-fail command in privileged EXEC mode.

Command Syntax

show ip route add-fib-fail

Command Mode

Privileged EXEC

Default

None

Usage

If both of the command line “show ip route” and “show ip route add-fib-file” could show the same route. It represents that the route is not able to inset into the Forwarding Information Table(FIB) due to the hareware resource limit, this route is not able to forward any packets. You could delete and reconfigure this routing when some hardware resource is free.

Examples

The following is sample output from the show ip route add-fib-fail command:

Switch# show ip route add-fib-fail

```
====================================
```

```
VRF                 Route
default              1.1.1.1/32
default              1.1.1.0/24
test                 2.2.2.2/32
test                 2.2.2.0/24
```

Related Commands

show ip route

1.13 max-static-routes

To configure the maximum static routes in system, use the max-static-routes command in global configuration mode. To configure the maximum static routes to default value, use the no form of this command.

Command Syntax

max-static-routes *COUNT*

no max-static-routes *COUNT*

COUNT	The range is <1-65535>, default value is 1024

Command Mode

Global Configuration

Default

1024

Usage

Users should not configure the maximum static routes more than system profile of FIB. Also, users should not configure the maximum static routes less than the current static routes count.

Examples

The following example displays how to change maximum static routes to 10.

Switch# confi terminal

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

Switch(config)# max-static-routes 10

Related Commands

show ip route summary

1.14 show resource fib

Use this command to display the resources used by routes.

Command Syntax

show resource fib

Command Mode

Privileged EXEC

Default

None

Usage

None.

Examples

The following is sample output from the show resource fib command:

Switch# show resource fib

```
RIBFIB
Resource                        Used         Capability
============================================================
Indirect Routes                  0            6144
Host Routes                      0            3072
Static Routes                    0            1024
IPv6 Indirect routes             0            2048
IPv6 Host routes                 0            1024
IPv6 Static routes               0            1024
```

Related Commands

show ip route summary

2 RIP Commands

2.1 default-information originate (RIP)

To generate a default route into Routing Information Protocol (RIP), use the default-information originate command in router configuration mode. To disable this feature, use the no form of this command.

Command Syntax

default-information originate (**route-map**|)

no default-information originate

route-map	Route map reference

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

The route orginated will only be learned by RIP neighbor, and this route is not configured in FIB.

Examples

The following example originates a default route (0.0.0.0/0) over a certain interface when 192.168.0.0/24 is present.

```
Switch(config)# router rip
Switch(config-router)# version 2
Switch(config-router)# network 192.168.16.0/24
Switch(config-router)# default-information originate
```

Related Commands

None

2.2 default-metric (RIP)

To set default metric values for Routing Information Protocol (RIP), use the default-metric command in router configuration mode. To return to the default state, use the no form of this command.

Command Syntax

default-metric *NUMBER-VALUE*

no default-metric

NUMBER-VALUE	Default metric value is 1, the number range is 1 to 16

Command Mode

Router Configuration

Default

By default, the metric is set to 1.

Usage

The default-metric command is used in conjunction with the redistribute router configuration command to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever metrics do not convert, using a default metric provides a reasonable substitute and enables the redistribution to proceed.

Examples

The following example shows a switch using both the RIP and the Open Shortest Path First (OSPF) routing protocols. The example advertises OSPF-derived routes using RIP and assigns the OSPF-derived routes a RIP metric of 10.

Switch(config)#router rip

Switch(config-router)#default-metric 10

Switch(config-router)#redistribute ospf

Related Commands

redistribute (RIP)

2.3 distance (RIP)

To define an administrative distance for routes that are inserted into the routing table, use the distance command in router configuration mode. To return the administrative distance to its default distance definition, use the no form of this command.

Command Syntax

distance *DISTANCE PREFIX/PREFIX-LENGTH* (*ACCESSS-LIST-NAME*|)

no distance

DISTANCE	Administrative distance, an integer from 1 to 255 (routes with a distance value of 255 are not installed in the routing table)
PREFIX	IP prefix for the originator of the imcoming routing updates
PREFIX-LENGTH	Prefix length for the originator
ACCESSS-LIST-NAME	(Optional) Named access list to be applied to incoming routing updates

Command Mode

Router Configuration

Default

By default, the distance is 120.

Usage

Route Source	Default Distance
Connected interface	0
Static route	1
External Border Gateway Protocol (eBGP)	20
Open Shortest Path First (OSPF)	110
Routing Information Protocol (RIP)	120
Internal BGP	200
Unknown	255

An administrative distance is a rating of the trustworthiness of a routing information source, such as an individual switch or a group of switches. Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value, the lower the trust rating. An

administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored.

When this command is configured, it is applied when a network is being inserted into the routing table. It filters routing updates according to the IP address of the switch that supplies the routing information. It could be used, for example, to filter possibly incorrect routing information from switches that are not under your administrative control. The optional access list name is used to filter router entries in routing update.

Examples

The following is sample output from the distance command:

Switch(config)#router rip

Switch(config-router)# network 10.10.0.0/24

Switch(config-router)# network 20.20.0.0/24

Switch(config-router)#distance 200 20.20.0.0/24

Related Commands

distance (OSPF)

2.4 ip rip authentication

To enable authentication for Routing Information Protocol (RIP) Version 2 packets and to specify the set of keys that can be used on an interface, use the ip rip authentication command in interface configuration mode. To prevent authentication, use the no form of this command.

Command Syntax

ip rip authentication (**key-chain** *NAME-OF-CHAIN* | **string** *STRING*)

no ip rip authentication (**key-chain** | **string**)

key-chain NAME-OF-CHAIN	Enables authentication and specifies the group of keys that are valid
string *STRING*	Enables authentication and specifies the authentication string

Command Mode

Interface Configuration

Default

No authentication is provided for RIP packets.

Usage

If neither key chain is configured with the key-chain command nor string is configured with the authentication string command, no authentication is performed on the interface (not even the default authentication). Key chain and authentication string can not be configured on the same interface. If you want configure one, make sure the other is not configured.

Examples

The following example configures the interface to accept and send any key belonging to the key chain named trees:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip authentication key-chain trees

Related Commands

ip rip authentication mode

2.5 ip rip authentication mode

To specify the type of authentication used in Routing Information Protocol (RIP) Version 2 packets, use the ip rip authentication mode command in interface configuration mode. To restore clear text authentication, use the no form of this command.

Command Syntax

ip rip authentication mode (text | md5)

no ip rip authentication mode

text	Normal text authentication
md5	Keyed Message Digest 5 (MD5) authentication

Command Mode

Interface Configuration

Default

Clear text authentication is provided for RIP packets.

Usage

RIP Version 1 does not support authentication.

Examples

The following example configures the interface to use MD5 authentication:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip authentication mode md5

Related Commands

ip rip authentication key-chain

2.6 ip rip receive version

To specify a Routing Information Protocol (RIP) version to receive on an interface basis, use the ip rip receive version command in interface configuration mode. To follow the global version rules, use the no form of this command.

Command Syntax

ip rip receive version [**1** | **2**]

no ip rip receive version

1	(Optional) Accepts only RIP Version 1 packets on the interface
2	(Optional) Accepts only RIP Version 2 packets on the interface

Command Mode

Interface Configuration

Default

Only RIPv2 packet should be received.

Usage

Use this command to override the default behavior of RIP as specified by the version command. This command applies only to the interface being configured. You can configure the interface to accept both RIP versions.

Examples

The following example configures the interface to receive both RIP Version 1 and Version 2 packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip receive version 1 2

Related Commands

version (RIP)

2.7 ip rip receive-packet

To enable the interface to receive Routing Information Protocol (RIP) packets, use the ip rip receive-packet command in interface configuration mode. To disable to receive RIP packets, use the no form of this command.

Command Syntax

ip rip receive-packet

no ip rip receive-packet

Command Mode

Interface Configuration

Default

Receive packet is enabled by default.

Usage

Use this command to enable or disable the capability of receiving RIP packets, whether the network of this interface is added into RIP or not.

Examples

The following example enables the reception of RIP packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip receive-packet

Related Commands

ip rip receive version

2.8 ip rip send version

To specify a Routing Information Protocol (RIP) version to send on an interface basis, use the ip rip send version command in interface configuration mode. To follow the global version rules, use the no form of this command.

Command Syntax

ip rip send version (([**1** | **2**]) | **1-compatible**)

no ip rip send version

1	(Optional) Sends only RIP Version 1 packets out the interface
2	(Optional) Sends only RIP Version 2 packets out the interface
1-compatible	(Optional) Sends RIP Version 2 packets out the interface with broadcast IP address

Command Mode

Interface Configuration

Default

Only RIPv2 packet should be send.

Usage

Use this command to override the default behavior of RIP as specified by the version command. This command applies only to the interface being configured. You can configure the interface to send both RIP versions.

Examples

The following example configures the interface to send both RIP Version 1 and Version 2 packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip send version 1 2

Related Commands

ip rip receive version

2.9 ip rip send-packet

To enable the interface to send Routing Information Protocol (RIP) packets, use the ip rip send-packet command in interface configuration mode. To disable to send RIP packets, use the no form of this command.

Command Syntax

ip rip send-packet

no ip rip send-packet

Command Mode

Interface Configuration

Default

Send packet is enabled by default.

Usage

Use this command to enable or disable the capability of sending RIP packets, whether the network of this interface is added into RIP or not.

Examples

The following example enables the transmission of RIP packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip send-packet

Related Commands

ip rip send version

2.10 ip rip split-horizon

To enable the split horizon mechanism for Routing Information Protocol (RIP), use the ip rip split-horizon command in interface configuration mode. To disable the split horizon mechanism, use the no form of this command.

Command Syntax

ip rip split-horizon (**poisoned**|)

no ip rip split-horizon

poisoned	Split horizon with poisoned reverse

Command Mode

Interface Configuration

Default

This command is enabled with poisoned reverse by default.

Usage

In general, changing the state of the default for the ip rip split-horizon command is not recommended, unless you are certain that your application requires a change in order to properly advertise routes.

Examples

The following example enables split horizon without poisoned reverse:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip rip split- horizon

Related Commands

None

2.11 network (RIP)

To specify a list of networks for the Routing Information Protocol (RIP) routing process, use the network command in router configuration mode. To remove an entry, use the no form of this command.

Command Syntax

network (*PREFIX/PREFIX-LENGTH* | *INTERFACE-ID*)

no network (*PREFIX/PREFIX-LENGTH* | *INTERFACE-ID*)

PREFIX	IP route prefix for the network
PREFIX-LENGTH	Prefix length for the network
INTERFACE-ID	The interface name for the network.

Command Mode

Router Configuration

Default

No networks are specified.

Usage

There is no limit to the number of network commands you can use on the switch. RIP routing updates will be sent and received only through interfaces on this network.

RIP sends updates to the interfaces in the specified networks. Also, if the network of an interface is not specified, the interface will not be advertised in any RIP update.

Examples

The following example defines RIP as the routing protocol to be used on all interfaces connected to networks 10.99.0.0/16 and 192.168.7.0/24:

Switch(config)#router rip

Switch(config-router)# network 10.99.0.0/16

Switch(config-router)# network 192.168.7.0/24

Related Commands

router rip

2.12 neighbor (RIP)

To define a neighboring switch with which to exchange routing information, use the neighbor command in router configuration mode. To remove an entry, use the no form of this command.

Command Syntax

neighbor *IP-ADDRESS*

no neighbor *IP-ADDRESS*

IP-ADDRESS	IP address of a peer switch with which routing information will be exchanged

Command Mode

Router Configuration

Default

No neighboring switches are defined.

Usage

This command permits the point-to-point (non-broadcast) exchange of routing information. When it is used in combination with the passive-interface router configuration command, routing information can be exchanged between a subset of switches and access servers on a LAN.

Multiple neighbor commands can be used to specify additional neighbors or peers.

Examples

In the following example, RIP updates are sent to all interfaces on network 10.108.0.0 except eth-0-1. However, in this case a neighbor switch configuration command is included. This command permits the sending of routing updates to specific neighbors. One copy of the routing update is generated per neighbor.

Switch(config)#router rip

Switch(config-router)# network 10.108.0.0/16

Switch(config-router)# passive-interface eth-0-1

Switch(config-router)# neighbor 10.108.20.4

Related Commands

router rip

2.13 offset-list (RIP)

To add an offset to incoming and outgoing metrics to routes learned via Routing Information Protocol (RIP), use the offset-list command in router configuration mode. To remove an offset list, use the no form of this command.

Command Syntax

offset-list *ACCESSS-LIST-NAME* (**in** | **out**) *METRIC-OFFSET* (*INTERFACE-ID*|)

no offset-list (**in** | **out**) (*INTERFACE-ID*|)

ACCESSS-LIST-NAME	Named access list to be applied
in	Applies the access list to incoming metrics
out	Applies the access list to outgoing metrics
METRIC- OFFSET	Positive offset to be applied to metrics for networks matching the access list. If the offset is 0, no action is taken

INTERFACE-ID	Interface name to which the offset list is applied

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

The offset value is added to the routing metric. An offset list with an interface is considered extended and takes precedence over an offset list that is not extended. Therefore, if an entry passes the extended offset list and the normal offset list, the offset of the extended offset list is added to the metric.

Examples

In the following example, the switch applies an offset of 10 to the delay component of a switch only to access list 21:

Switch(config)# router rip

Switch(config-router)# offset-list 21 out 10

Related Commands

None

2.14 passive-interface (RIP)

To disable sending routing updates for the Routing Information Protocol (RIP) on an interface, use the passive-interface command in router configuration mode. To re-enable the sending of routing updates, use the no form of this command.

Command Syntax

passive-interface *INTERFACE-ID*

no passive-interface *INTERFACE-ID*

INTERFACE-ID	The interface name

Command Mode

Router Configuration

Default

Routing updates are sent on the interface.

Usage

If you disable the sending of routing updates on an interface, the particular subnet will continue to be advertised to other interfaces, and updates from other switches on that interface continue to be received and processed.

Examples

The following example sets the interface eth-0-1 as passive:

Switch(config)#router rip

Switch(config-router)# network 10.108.0.0/16

Switch(config-router)# passive-interface eth-0-1

Related Commands

router rip

2.15 redistribute (RIP)

To redistribute routes from one routing domain into RIP routing domain, use the redistribute command in router configuration mode. To disable redistribution, use the no form of this command.

Command Syntax

redistribute *PROTOCOL* {[**metric** *VALUE*] | **route-map** *WORD*}

no redistribute *PROTOCOL*

PROTOCOL	(Optional) The name of a routing protocol, or the keyword connected, or static. If you specify a routing protocol, use one of the following keywords: bgp, and ospf
metric *VALUE*	(Optional) When redistributing other routing process to the RIP process, the default metric is 1 if no metric value is specified
route-map	Route map reference
WORD	Pointer to route-map entries

Command Mode

Router Configuration

Default

Route redistribution is disabled.

Metric metric-value: 1

Usage

The metric value specified in the redistribute command supersedes the metric value specified using the default-metric command.

Examples

The following examples redistribute the static routes into RIP with metric 10:

Switch(config)#router rip

Switch(config-router)# network 10.108.0.0/16

Switch(config-router)#redistribute static metric 10

Related Commands

default-metric

2.16 router rip

To configure the Routing Information Protocol (RIP) routing process, use the router rip command in global configuration mode. To turn off the RIP routing process, use the no form of this command.

Command Syntax

router rip

no router rip

Command Mode

Global Configuration

Default

No RIP routing process is defined.

Usage

None

Examples

The following example shows how to begin the RIP routing process:

Switch(config)# router rip

Related Commands

network (RIP)

2.17 timers basic (RIP)

To adjust Routing Information Protocol (RIP) network timers, use the timers basic command in router configuration mode. To restore the default timers, use the no form of this command.

Command Syntax

timers basic *UPDATE TIMEOUT INVALID*

no timers basic

UPDATE	Rate (in seconds) at which updates are sent. This is the fundamental timing parameter of the routing protocol
TIMEOUT	Time (in seconds) after which a route is declared invalid without updates that refresh the route. The route then enters into an invalid state and is not used for forwarding packets. It is marked inaccessible and advertised as unreachable
INVALID	Time after which an invalid route is removed from RIP routing database

Command Mode

Router Configuration

Default

update: 30 seconds

timeout: 180 seconds

invalid: 120 seconds

Usage

The basic timing parameters for RIP are adjustable. Because RIP is executing a distributed, asynchronous routing algorithm, these timers must be the same for all switches and access servers in the network.

In addition, an address family can have explicitly specified timers that apply to that address-family only. The timers basic command must be specified for an address family or the system defaults for the timers basic command are used regardless of what is configured for RIP routing.

Examples

The following example sets updates to be broadcast every 5 seconds. If a switch is not heard from in 15 seconds, the route is declared unusable. And after 15 seconds the invalid route will be removed from RIP routing database.

Switch(config)#router rip

Switch(config-router)#timers basic 5 15 15

Related Commands

None

2.18 show ip rip database

Use this command to display RIP information database.

Command Syntax

show ip rip database (vrf |)

vrf	VPN Routing/Forwarding instance

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip rip database command.

Switch# show ip rip database

```
Codes: R - RIP, Rc - RIP connected, Rs - RIP static, K - Kernel,
       C - Connected, S - Static, O - OSPF, I - IS-IS, B - BGP

   Network        Next Hop        Metric From       If       Time
Rc 1.1.1.0/24                         1          eth-0-1
Rc 2.2.2.0/24                         1          eth-0-2
Rc 10.0.0.0/24                        1          vlan10
```

Related Commands

show ip rip interface

2.19 show ip rip interface

To display summary information of Routing Information Protocol (RIP) for a specific interface, use the show ip rip interface command in privileged EXEC mode.

Command Syntax

show ip rip interface (*INTERFACE-ID* |)

INTERFACE-ID	The interface name

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip rip interface command.

Switch# show ip rip interface eth-0-1

```
eth-0-1 is up, line protocol is up
  Routing Protocol: RIP
    Receive RIP packets
    Send RIP packets
    Passive interface: Disabled
    Split horizon: Enabled with Poisoned Reversed
    IP interface address:
      1.1.1.1/24
```

Related Commands

show ip rip database

2.20 version (RIP)

To specify a Routing Information Protocol (RIP) version used globally by the router, use the version command in router configuration mode. To restore the default value, use the no form of this command.

Command Syntax

version (1 | 2)

no version

1	Specifies RIP Version 1
2	Specifies RIP Version 2

Command Mode

Router Configuration

Default

System receives RIP Version 1 and Version 2 packets, but sends only Version 2 packets.

Usage

To specify RIP versions used on an interface basis, use the ip rip receive version and ip rip send version commands.

Examples

The following example enables the software to send and receive RIP Version 2 packets:

Switch(config)# router rip

Switch(config-router)# version 2

Related Commands

ip rip receive version

ip rip send version

2.21 distribute-list

To Filter networks in routing updates, use the distribute-list command in router configuration mode. To restore the default value, use the no form of this command.

Command Syntax

distribute-list (**prefix** |) *WORD* (**in**|**out**)

no distribute-list (**prefix** |) *WORD* (**in**|**out**)

prefix	Filter prefixes in routing update
WORD	Access-list name
in	Filter incoming routing updates
out	Filter outgoing routing updates

Command Mode

Router Configuration

Default

None

Usage

None

Examples

The following is sample output from the distribute-list command:

Switch(config)# router rip

Switch(config-router)# distribute-list prefix 1 in

Related Commands

ip prefix-list

2.22 address-family

To Enter Address Family command mode, use the Enter Address Family command mode command in router configuration mode.

Command Syntax

address-family ipv4 vrf *WORD*

WORD	VPN Routing/Forwarding instance name

Command Mode

Router Configuration

Default

None

Usage

None

Examples

The following example shows how to enter Address Family command mode:

Switch(config-router)# address-family ipv4 vrf 1

Related Commands

None

2.23 show ip protocol rip

To show Routing Information Protocol (RIP), use the show ip protocol rip command in in privileged EXEC mode.

Command Syntax

show ip protocol rip

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip rip interface command.

Switch# show ip protocol rip

```
Routing protocol is "rip"
  Sending updates every 30 seconds with +/-5 seconds
  Timeout after 180 seconds, Garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribution metric is 1
  Redistributing:
    connected  metric default
  Default version control: send version 2, receive version 2
    Interface       Send         Recv   Key-chain
  Routing for Networks:
    10.10.11.0/24
  Routing Information Sources:
    Gateway         Distance  Last Update  Bad Packets  Bad Routes
  Number of routes (including connected): 0
  Distance: (default is 120)
```

Related Commands

None

2.24 debug rip

Use this command to specify the options for the displayed debugging information for RIP events, RIP packets. Use the no parameter with this command to disable all debugging.

Command Syntax

debug rip (**all**|**events**|*PACKET* |)

no debug rip (**all**|**events**|*PACKET* | *)*

no debug all (**rip** |)

all	All RIP debug information
events	RIP events debug information is displayed
PACKET	packet (recv|send) (detail) Specifies RIP packets only
recv	Specifies that information for received packets be displayed
send	Specifies that information for sent packets be displayed

detail	Displays detailed information for the sent or received packet

Command Mode

Privileged EXEC

Default

Disabled

Usage

None

Examples

The following example displays information about the rip packets that are received and sent out from the connected router.

Switch# debug rip packet

Related Commands

show debugging rip

2.25 show debugging rip

Use this command to display the RIP debugging status for these debugging options: nsm debugging, RIP event debugging, RIP packet debugging.

Command Syntax

show debugging rip

Command Mode

Privileged EXEC

Default

None

Usage

Use this command to display the debug status of RIP.

Examples

The following is sample output from the show debugging rip command.

Switch# show debugging rip

```
RIP debugging status:
  RIP packet debugging is on
```

Related Commands

debug rip

2.26 show ip rip database database-summary

Use this command to display the statistics for RIP routes.

Command Syntax

show ip rip database database-summary (**vrf** *NAME* |)

vrf *NAME*	VPN Routing/Forwarding instance

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip rip database database-summary command.

Switch# show ip rip database database-summary

```
Type                Count
RIP connected       1
RIP                 1
Total               2
```

Related Commands

show ip rip database

2.27 show resource rip

Use this command to display the route resources used by RIP protocol.

Command Syntax

show resource rip

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show resource rip command.

Switch# show resource rip

```
RIP

Resource                Used         Capability
================================================
Routes                   2           6144
```

Related Commands

show ip rip database

3 OSPF Commands

3.1 area authentication

To enable authentication for an Open Shortest Path First (OSPF) area, use the area authentication command in router configuration mode. To remove an authentication specification of an area or a specified area from the configuration, use the no form of this command.

Command Syntax

area *AREA-ID* **authentication** (**message-digest**|)

no area *AREA-ID* **authentication**

AREA-ID	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address
message-digest	(Optional) Enables Message Digest 5 (MD5) authentication on the area specified by the area-id argument

Command Mode

Router Configuration

Default

Type 0 authentication (no authentication)

Usage

Specifying authentication for an area sets the authentication to Type 1 (simple password) as specified in RFC 1247. If this command is not included in the configuration file, authentication of Type 0 (no authentication) is assumed.

The authentication type must be the same for all routers and access servers in an area. The authentication password for all OSPF routers on a network must be the same if they are to communicate with each other via OSPF. Use the ip ospf authentication-key interface command to specify this password.

If you enable MD5 authentication with the message-digest keyword, you must configure a password with the ip ospf message-digest-key interface command.

To remove the authentication specification for an area, use the no form of this command with the authentication keyword.

Examples

The following example mandates authentication for areas 0 and 10.0.0.0 of OSPF routing process 201. Authentication keys are also provided.

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 192.168.251.201/24

Switch(config-if)# ip ospf authentication-key adcdefgh

Switch(config)# interface eth-0-2

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.56.0.201/16

Switch(config-if)# ip ospf authentication-key ijklmnop

Switch(config)#router ospf 201

Switch(config-router)# network 10.0.0.0 0.255.255.255 area 10.0.0.0

Switch(config-router)# network 192.168.0.0/16 area 0

Switch(config-router)#area 10.0.0.0 authentication

Switch(config-router)#area 0 authentication

Related Commands

ip ospf authentication-key

3.2 area default-cost

To specify a cost for the default summary route sent into a stub, use the area default-cost command in router configuration mode. To remove the assigned default route cost, use the no form of this command.

Command Syntax

area *AREA-ID* **default-cost** *COST*

no area *AREA-ID* **default-cost**

AREA-ID	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address
COST	Cost for the default summary route used for a stub. The acceptable value is a 24-bit number

Command Mode

Router Configuration

Default

COST: 1

Usage

The command is used only on an Area Border Router (ABR) attached to a stub.

There are two stub area router configuration commands: the stub and default-cost options of the area command. In all routers and access servers attached to the stub area, the area should be configured as a stub area using the stub option of the area command. Use the default-cost option only on an ABR attached to the stub area. The default-cost option provides the metric for the summary default route generated by the ABR into the stub area.

Examples

The following example assigns a default cost of 20 to stub network 10.0.0.0:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.56.0.201/16

Switch(config)#router ospf 201

Switch(config-router)# network 10.0.0.0/8 area 10.0.0.0

Switch(config-router)#area 10.0.0.0 stub

Switch(config-router)#area 10.0.0.0 default-cost 20

Related Commands

None

3.3 area filter-list

To filter prefixes advertised in type 3 link-state advertisements (LSAs) between Open Shortest Path First (OSPF) areas of an Area Border Router (ABR), use the area filter-list command in router configuration mode. To change or cancel the filter, use the no form of this command.

Command Syntax

area *AREA-ID* **filter-list** (**access** *ACCESSS-LIST-NAME* | **prefix** *PREFIX-LIST-NAME*) (**in** | **out**)

no area *AREA-ID* **filter-list** (**access** *ACCESSS-LIST-NAME* | **prefix** *PREFIX-LIST-NAME*) (**in** | **out**)

AREA-ID	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address
ACCESSS	Indicates that an accesslist is used
ACCESSS-LIST-NAME	Name of an access list
prefix	Indicates that a prefix list is used
PREFIX-LIST-NAME	Name of a prefix list
in	Access list or prefix list applied to prefixes advertised to the specified area from other areas
out	Access list or prefix list applied to prefixes advertised out of the specified area to other areas

Command Mode

Router Configuration

Default

This command has no default behavior.

Usage

With this feature enabled in the “in” direction, all type 3 LSAs originated by the ABR to this area, based on information from all other areas, are filtered by the prefix list. Type 3 LSAs that were originated as a result of the area range command in another area are treated like

any other type 3 LSA that was originated individually. Any prefix that does not match an entry in the prefix list is implicitly denied.

With this feature enabled in the “out” direction, all type 3 LSAs advertised by the ABR, based on information from this area to all other areas, are filtered by the prefix list. If the area range command has been configured for this area, type 3 LSAs that correspond to the area range are sent to all other areas, only if at least one prefix in the area range matches an entry in the prefix list.

If all specific prefixes are denied by the prefix list, type 3 LSAs that correspond to the area range command will not be sent to any other area. Prefixes that are not permitted by the prefix list are implicitly denied.

Examples

The following example filters prefixes that are sent from all other areas to area 1:

Switch(config)# router ospf 201

Switch(config-router)# area 1 filter-list prefix AREA_1 in

Related Commands

area range

3.4 area range

To consolidate and summarize routes at an area boundary, use the area range command in router configuration mode. To disable this function, use the no form of this command.

Command Syntax

area *AREA-ID* **range** (*ADDRESS MASK* | *ADDRESS/PREFIX-LENGTH*) (**advertise** | **not-advertise**|)

no area area-id range {ip-address mask | ip-address/prefix-length}

AREA-ID	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address
ADDRESS	IPv4 address
PREFIX-LENGTH	Prefix length of the address
advertise	Advertise this range (default)
not-advertise	Do not advertise this range

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

The area range command is used only with Area Border Routers (ABRs). It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR. Routing information is condensed at area boundaries. External to the area, a single route is advertised for each address range. This behavior is called route summarization.

Multiple area router configuration commands specifying the range option can be configured. Thus, OSPF can summarize addresses for many different sets of address ranges.

Examples

The following example specifies one summary route to be advertised by the ABR to other areas for all subnets on network 10.0.0.0 and for all hosts on network 192.168.110.0:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 192.168.110.201/24

Switch(config)# interface eth-0-2

Switch(config-if)# no switchport

Switch(config-if)# ip address 192.168.120.201/24

Switch(config)# interface eth-0-3

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.0.0.0/8

Switch(config)# router ospf 201

Switch(config-router)# network 192.168.110.0/24 area 0

Switch(config-router)#area 10.0.0.0 range 10.0.0.0/8

Switch(config-router)#area 0 range 192.168.110.0 255.255.0.0

Related Commands

None

3.5 area stub

To define an area as a stub area, use the area stub command in router configuration mode. To disable this function, use the no form of this command.

Command Syntax

area *AREA-ID* **stub** (**no-summary**|)

no area *AREA-ID* **stub** (**no-summary**|)

AREA-ID	Identifier of the area for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address
no-summary	(Optional) Prevents an Area Border Router (ABR) from sending summary link advertisements into the stub area

Command Mode

Router Configuration

Default

No stub area is defined.

Usage

You must configure the area stub command on all routers and access servers in the stub area. Use the area router configuration command with the default-cost keyword to specify the cost of a default internal router sent into a stub area by an ABR.

There are two stub area router configuration commands: the stub and default-cost options of the area router configuration command. In all routers attached to the stub area, the area should be configured as a stub area using the stub keyword of the area command. Use the default-cost keyword only on an ABR attached to the stub area. The default-cost keyword provides the metric for the summary default route generated by the ABR into the stub area.

To further reduce the number of link-state advertisements (LSAs) sent into a stub area, you can configure the no-summary keyword on the ABR to prevent it from sending summary LSAs (LSA type 3) into the stub area.

Examples

The following example assigns a default cost of 20 to stub network 10.0.0.0:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.56.0.201/16

Switch(config)# router ospf 201

Switch(config-router)# network 10.0.0.0/8 area 10.0.0.0

Switch(config-router)#area 10.0.0.0 stub

Switch(config-router)#area 10.0.0.0 default-cost 20

Related Commands

None

3.6 auto-cost

To control how Open Shortest Path First (OSPF) calculates default metrics for the interface, use the auto-cost command in router configuration mode. To assign cost based only on the interface type, use the no form of this command.

Command Syntax

auto-cost reference-bandwidth *RATE*

no auto-cost reference-bandwidth

reference-bandwidthRATE	Rate in Mbps (bandwidth). The range is from 1 to 4294967; the default is 100

Command Mode

Router Configuration

Default

100 Mbps

Usage

The value set by the ip ospf cost command overrides the cost resulting from the auto-cost command.

Examples

The following example changes the cost of the cost link to 1GBps.

Switch(config)# router ospf 1

Switch(config-router)#auto-cost reference-bandwidth 1000

Related Commands

ip ospf cost

3.7 clear ip ospf

To clear redistribution based on the Open Shortest Path First (OSPF) routing process ID, use the clear ip ospf command in privileged EXEC mode.

Command Syntax

clear ip ospf (*PID* |) **process**

PID	(Optional) Process ID

Command Mode

Privileged EXEC

Usage

Use the *PID* argument to clear only one OSPF process. If the *PID* argument is not specified, all OSPF processes are cleared.

Examples

The following example clears all OSPF processes:

Switch# clear ip ospf process

Related Commands

None

3.8 compatible rfc1583

To restore the method used to calculate summary route costs per RFC 1583, use the compatible rfc1583 command in router configuration mode. To disable RFC 1583 compatibility, use the no form of this command.

Command Syntax

compatible rfc1583

no compatible rfc1583

Command Mode

Router Configuration

Default

Not compatible with RFC 1583.

Usage

To minimize the chance of routing loops, all Open Shortest Path First (OSPF) routers in an OSPF routing domain should have RFC compatibility set identically.

Because of the introduction of RFC 2328, OSPF Version 2, the method used to calculate summary route costs has changed. Use the no compatible rfc1583 command to enable the calculation method used per RFC 2328.

Examples

The following example specifies that the router process is compatible with RFC 1583:

Switch(config)# router ospf 1

Switch(config-router)#compatible rfc1583

Related Commands

None

3.9 default-information originate (OSPF)

To generate a default external route into an Open Shortest Path First (OSPF) routing domain, use the default-information originate command in router configuration mode. To disable this feature, use the no form of this command.

Command Syntax

default-information originate [**route-map** *WORD*] | [**always**] | [**metric** *METRIC-VALUE*] [**metric-type** *TYPE-VALUE*]

no default-information originate [always] [metric] [metric-type] [route-map]

always	(Optional) Always advertises the default route regardless of whether the system has a default route
metric	metric-value (Optional) Metric used for generating the default route. If you omit a value and do not specify a value using the default-metric router configuration command, the default metric value is 10. The value used is specific to the protocol
metric-type	(Optional) External link type associated with the default route advertised into the OSPF routing domain. It can be one of the following values
route-map	Route map reference

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

Whenever you use the redistribute or the default-information router configuration command to redistribute routes into an OSPF routing domain, the switch automatically becomes an autonomous System Boundary Router (ASBR). However, an ASBR does not, by default, generate a default route into the OSPF routing domain. The system still must have a default route for itself before it generates one, except when you have specified the always keyword.

Examples

The following example specifies a metric of 100 for the default route redistributed into the OSPF routing domain and an external metric type of Type 1:

Switch(config)# router ospf 109

Switch(config-router)# redistribute rip metric 100

Switch(config-router)#default-information originate metric 100 metric-type 1

Related Commands

redistribute (OSPF)

3.10 default-metric (OSPF)

To set default metric values for the Open Shortest Path First (OSPF) routing protocol, use the default-metric command in router configuration mode. To return to the default state, use the no form of this command.

Command Syntax

default-metric *METRIC-VALUE*

no default-metric (*METRIC-VALUE*)

METRIC-VALUE	Default metric value appropriate for the specified routing protocol. Built-in, automatic metric translations, as appropriate for each routing protocol. The metric of redistributed connected and static routes is set to 0

Command Mode

Router Configuration

Default

None

Usage

The default-metric command is used in conjunction with the redistribute router configuration command to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever metrics do not convert, using a default metric provides a reasonable substitute and enables the redistribution to proceed.

Examples

The following example shows a router in autonomous system using both the Routing Information Protocol (RIP) and the OSPF routing protocols. The example advertises OSPF-derived routes using RIP and assigns the Internal Gateway Protocol (IGP)-derived routes a RIP metric of 10.

Switch(config)# router ospf

Switch(config-router)#default-metric 10

Switch(config-router)# redistribute rip

Related Commands

redistribute (OSPF)

3.11 distance (OSPF)

To define Open Shortest Path First (OSPF) route administrative distances based on route type, use the distance command in router configuration mode. To restore the default value, use the no form of this command.

Command Syntax

distance {*DISTANCE* | **ospf** [**external** *DIST1*] [**inter-area** *DIST2*] | [**intra-area** *DIST3*]}

no distance {*DISTANCE* | **ospf**}

DISTANCE	Administrative distance. An integer from 1 to 255. (Routes with a distance value of 255 are not installed in the routing table.)
external *DIST1*	(Optional) Sets the distance for routes from other routing domains, learned by redistribution. Range is 1 to 255. The default value is 110
inter-area *DIST2*	(Optional) Sets the distance for all routes from one area to another area. Range is 1 to 255. The default value is 110
intra-area *DIST3*	(Optional) Sets the distance for all routes within an area. Range is 1 to 255. The default value is 110

Command Mode

Router Configuration

Default

DIST1: 110

DIST2: 110

DIST3: 110

Usage

You may specify one of the keywords or use distance only to apply to all types of routes.

The distance command allows you to set a distance for an entire group of routes, rather than a specific route that passes an access list.

A common reason to use the distance command is when you have multiple OSPF processes with mutual redistribution, and you want to prefer internal routes from one over external routes from the other.

Examples

The following example shows a router in autonomous system using both the Routing Information Protocol (RIP) and the OSPF routing protocols. The example advertises OSPF-derived routes using RIP and assigns the Internal Gateway Protocol (IGP)-derived routes a RIP distance of 90..

Switch(config)# router ospf

Switch(config-router)#distance 90

Switch(config-router)# redistribute rip

Related Commands

None

3.12 distribute-list (OSPF)

To filter networks received in updates or suppress networks from being advertised in updates, use the distribute-list command in router configuration mode. To cancel this function, use the no form of this command.

Command Syntax

distribute-list *ACCESSS-LIST-NAME* (**in** | **out**)

no distribute-list *ACCESSS-LIST-NAME* (**in** | **out**)

ACCESSS-LIST-NAME	Name of an access list to be applied
in	Filter networks received in updates
out	Suppress networks from being advertised in updates

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

This command must specify an access list.

Examples

In the following example, OSPF process 1 is configured to accept two networks, network 20.0.0.0 and network 10.108.0.0:

Switch(config)# ip access-list acl1

Switch(config-ip-acl)# permit any 20.0.0.0 0.0.255.255 any

Switch(config-ip-acl)# permit any 10.108.0.0 0.0.255.255 any

Switch(config-ip-acl)#deny any any any

Switch(config)# router ospf 1

Switch(config-router)# network 10.108.0.0/16 area 1

Switch(config-router)#distribute-list acl1 in

Related Commands

ip access-list

3.13 ip ospf authentication

To specify the authentication type for an interface, use the ip ospf authentication command in interface configuration mode. To remove the authentication type for an interface, use the no form of this command.

Command Syntax

ip ospf authentication (*MESSAGE-DIGEST* | *NULL*|)

no ip ospf authentication

MESSAGE-DIGEST	(Optional) Specifies that message-digest authentication will be used
NULL	(Optional) No authentication is used. Useful for overriding password or message-digest authentication if configured for an area

Command Mode

Interface Configuration

Default

The area default is no authentication (null authentication).

Usage

Before using the ip ospf authentication command, configure a password for the interface using the ip ospf authentication-key command. If you use the ip ospf authentication message-digest command, configure the message-digest key for the interface with the ip ospf message-digest-key command.

For backward compatibility, authentication type for an area is still supported. If the authentication type is not specified for an interface, the authentication type for the area will be used (the area default is null authentication).

Examples

The following example enables message-digest authentication:

Switch(config-if)# ip ospf authentication message-digest

Related Commands

area authentication

ip ospf authentication-key

ip ospf message-digest-key

3.14 ip ospf authentication-key

To assign a password to be used by neighboring routers that are using the Open Shortest Path First (OSPF) simple password authentication, use the ip ospf authentication-key command in interface configuration mode. To remove a previously assigned OSPF password, use the no form of this command.

Command Syntax

ip ospf authentication-key *PASSWORD*

no ip ospf authentication-key

PASSWORD	Any continuous printable string of characters that can be entered from the keyboard up to 8 bytes in length

Command Mode

Interface Configuration

Default

No password is specified.

Usage

The password created by this command is used as a “key” that is inserted directly into the OSPF header when the switch originates routing protocol packets. A separate password can be assigned to each network on a per-interface basis. All neighboring routers on the same network must have the same password to be able to exchange OSPF information.

Examples

The following example enables the authentication key with the string yourpass:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf authentication-key yourpass

Related Commands

area authentication

ip ospf authentication

3.15 ip ospf cost

To explicitly specify the cost of sending a packet on an interface, use the ip ospf cost command in interface configuration mode. To reset the path cost to the default value, use the no form of this command.

Command Syntax

ip ospf cost *INTERFACE-COST*

no ip ospf cost

INTERFACE-COST	Unsigned integer value expressed as the link-state metric. It can be a value in the range from 1 to 65535

Command Mode

Interface Configuration

Default

No default cost is predefined.

Usage

You can set the metric manually using this command, if you need to change the default. Using the bandwidth command changes the link cost as long as this command is not used.

The link-state metric is advertised as the link cost in the router link advertisement.

In general, the path cost is calculated using the following formula:

108 / bandwidth

Examples

The following example sets the interface cost value to 65:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf cost 65

Related Commands

auto-cost reference bandwidth

3.16 ip ospf database-filter all out

To filter outgoing link-state advertisements (LSAs) to an Open Shortest Path First (OSPF) interface, use the ip ospf database-filter all out command in interface configuration mode. To restore the forwarding of LSAs to the interface, use the no form of this command.

Command Syntax

ip ospf database-filter all out

no ip ospf database-filter all out

Command Mode

Interface Configuration

Default

This command is disabled by default. All outgoing LSAs are flooded to the interface.

Usage

OSPF floods new LSAs over all interfaces in an area, except the interface on which the LSA arrives. This redundancy ensures robust flooding. However, too much redundancy can waste bandwidth and might lead to excessive link and CPU usage in certain topologies, resulting in destabilizing the network. To avoid this, use the database-filter command to block flooding of LSAs over specified interfaces.

Examples

The following example prevents flooding of OSPF LSAs to broadcast, nonbroadcast, or point-to-point networks reachable through the interface eth-0-1:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf database-filter all out

Related Commands

None

3.17 ip ospf dead-interval

To set the interval during which at least one hello packet must be received from a neighbor before the router declares that neighbor down, use the ip ospf dead-interval command in interface configuration mode. To restore the default value, use the no form of this command.

Command Syntax

ip ospf dead-interval *SECONDS*

no ip ospf dead-interval

SECONDS	Interval (in seconds) during which the router must receive at least one hello packet from a neighbor or else that neighbor is removed from the peer list and does not participate in routing. The range is 1 to 65535. The value must be the same for all nodes on the network

Command Mode

Interface Configuration

Default

SECONDS: The neighbor is been considered as dead in 40s by default.

Usage

The dead interval is advertised in OSPF hello packets. This value must be the same for all networking devices on a specific network.

Specifying a smaller dead interval (seconds) will give faster detection of a neighbor being down and improve convergence, but might cause more routing instability.

Examples

The following example sets the OSPF dead interval to 20 seconds:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf dead-interval 20

Related Commands

ip ospf hello-interval

show ip ospf interface

3.18 ip ospf hello-interval

To specify the interval between hello packets that the switch sends on the interface, use the ip ospf hello-interval command in interface configuration mode. To return to the default time, use the no form of this command.

Command Syntax

ip ospf hello-interval *SECONDS*

no ip ospf hello-interval

SECONDS	Interval (in seconds) during which the router must receive at least one hello packet from a neighbor or else that neighbor is removed from the peer list and does not participate in routing. The range is 1 to 65535. The value must be the same for all nodes on the network

Command Mode

Interface Configuration

Default

10 seconds (Ethernet)

30 seconds (non-broadcast)

Usage

This value is advertised in the hello packets. The smaller the hello interval, the faster topological changes will be detected, but more routing traffic will ensue. This value must be the same for all routers and access servers on a specific network.

Examples

The following example sets the interval between hello packets to 15 seconds:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf hello-interval 15

Related Commands

ip ospf dead-interval

3.19 ip ospf message-digest-key md5

To enable Open Shortest Path First (OSPF) Message Digest 5 (MD5) authentication, use the ip ospf message-digest-key command in interface configuration mode. To remove an old MD5 key, use the no form of this command.

Command Syntax

ip ospf message-digest-key *KEY-ID* **md5** *KEY*

no ip ospf message-digest-key *KEY-ID*

KEY-ID	An identifier in the range from 1 to 255
KEY	Alphanumeric password of up to 16 bytes

Command Mode

Interface Configuration

Default

OSPF MD5 authentication is disabled.

Usage

All routers access the same network/sub network share the same password when using this type of authentication. For every OSPF packet, the password is used for generating/examining the “message digest” which is at the tail of the OSPF packet. This “message digest” is processed by OSPF packet and password. There may multiple password be activated on the same interface, this command line always used to transit smoothly to the new password from the old one.

Examples

The following example sets a new key 19 with the password 8ry4222:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf message-digest-key 10 md5 xvv560qle

Switch(config-if)# ip ospf message-digest-key 19 md5 8ry4222

Related Commands

area authentication

ip ospf authentication

3.20 ip ospf mtu

To set the MTU value when sending Database Descriptor (DBD) packets, use the ip ospf mtu command in interface configuration mode. To restore a default value, use the no form of this command.

Command Syntax

ip ospf mtu *MTU-VALUE*

no ip ospf mtu

MTU-VALUE	An MTU value in the range from 576 to 65535

Command Mode

Interface Configuration

Default

1500

Usage

Whenever OSPF constructs packets, it uses interface MTU size as Maximum IP packet size. This command forces OSPF to use the specified value overriding the actual interface MTU size.

This command allows an administrator to configure the MTU size recognized by the OSPF protocol. It does not configure the MTU settings on the kernel. OSPF will not recognize MTU size configuration changes made to the kernel until the MTU size is updated through the CLI.

Examples

The following example sets a new MTU value when sending OSPF DD packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf mtu 1280

Related Commands

ip ospf mtu-ignore

3.21 ip ospf mtu-ignore

To disable Open Shortest Path First (OSPF) maximum transmission unit (MTU) mismatch detection on receiving Database Descriptor (DBD) packets, use the ip ospf mtu-ignore command in interface configuration mode. To reset to default, use the no form of this command.

Command Syntax

ip ospf mtu-ignore

no ip ospf mtu-ignore

Command Mode

Interface Configuration

Default

OSPF MTU mismatch detection is enabled.

Usage

OSPF checks whether neighbors are using the same MTU on a common interface. This check is performed when neighbors exchange DBD packets. If the receiving MTU in the

DBD packet is higher than the IP MTU configured on the incoming interface, OSPF adjacency will not be established.

Examples

The following example disables MTU mismatch detection on receiving DBD packets:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf mtu-ignore

Related Commands

ip ospf mtu

3.22 ip ospf network

To configure the Open Shortest Path First (OSPF) network type to a type other than the default for a given medium, use the ip ospf network command in interface configuration mode. To return to the default value, use the no form of this command.

Command Syntax

ip ospf network (**broadcast | non-broadcast | point-to-multipoint [non-broadcast] | point-to-point**)

no ip ospf network

broadcast	Sets the network type to broadcast.
non-broadcast	Sets the network type to non-broadcast multi-access (NBMA)
point-to-multipoint	Sets the network type to point-to-multipoint. The optional non-broadcast keyword sets the point-to-multipoint network to be non-broadcast. If you use the non-broadcast keyword, the neighbor command is required

point-to-point	Sets the network type to point-to-point

Command Mode

Interface Configuration

Default

Depends on the network type.

Usage

Using this feature, you can configure broadcast networks as NBMA networks when, for example, routers in your network do not support multicast addressing. You can also configure non-broadcast multi-access networks as broadcast networks. This feature saves you from needing to configure neighbors.

Configuring NBMA networks as either broadcast or non-broadcast assumes that there are virtual circuits from every router to every router or fully meshed networks. However, there are other configurations where this assumption is not true. For example, a partially meshed network. In these cases, you can configure the OSPF network type as a point-to-multipoint network. Routing between two routers that are not directly connected will go through the router that has virtual circuits to both routers. You need not configure neighbors when using this feature.

If this command is issued on an interface that does not allow it, this command will be ignored.

OSPF has two features related to point-to-multipoint networks. One feature applies to broadcast networks; the other feature applies to non-broadcast networks:

On point-to-multipoint, broadcast networks, you can use the neighbor command, and you must specify a cost to that neighbor.

On point-to-multipoint, non-broadcast networks, you must use the neighbor command to identify neighbors. Assigning a cost to a neighbor is optional.

Examples

The following example sets your OSPF network as a non-broadcast network:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 192.168.77.17/24

Switch(config-if)# ip ospf network non-broadcast

Related Commands

neighbor (OSPF)

3.23 ip ospf priority

To set the router priority, which helps determine the designated router for this network, use the ip ospf priority command in interface configuration mode. To return to the default value, use the no form of this command.

Command Syntax

ip ospf priority *NUMBER-VALUE*

no ip ospf priority

NUMBER-VALUE	A number value that specifies the priority of the router. The range is from 0 to 255

Command Mode

Interface Configuration

Default

Priority of 1

Usage

When two routers attached to a network both attempt to become the designated router, the one with the higher router priority takes precedence. If there is a tie, the router with the higher router ID takes precedence. A router with a router priority set to zero is ineligible to become the designated router or backup designated router. Router priority is configured only for interfaces to multi-access networks (in other words, not to point-to-point networks).

This priority value is used when you configure Open Shortest Path First (OSPF) for non-broadcast networks using the neighbor router configuration command for OSPF.

Examples

The following example sets the router priority value to 4:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf priority 4

Related Commands

ip ospf network

neighbor (OSPF)

3.24 ip ospf retransmit-interval

To specify the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface, use the ip ospf retransmit-interval command in interface configuration mode. To return to the default value, use the no form of this command.

Command Syntax

ip ospf retransmit-interval *SECONDS*

no ip ospf retransmit-interval

SECONDS	Time (in seconds) between retransmissions. It must be greater than the expected round-trip delay between any two routers on the attached network. The range is from 1 to 65535 seconds. The default is 5 seconds

Command Mode

Interface Configuration

Default

5 seconds

Usage

When a router sends an LSA to its neighbor, it keeps the LSA until it receives back the acknowledgment message. If the router receives no acknowledgment, it will resend the LSA. The setting of this parameter should be conservative, or needless retransmission will result. The value should be larger for serial lines and virtual links.

Examples

The following example sets the retransmit interval value to 8 seconds:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf retransmit-interval 8

Related Commands

None

3.25 ip ospf transmit-delay

To set the estimated time required to send a link-state update packet on the interface, use the ip ospf transmit-delay command in interface configuration mode. To return to the default value, use the no form of this command.

Command Syntax

ip ospf transmit-delay *SECONDS*

no ip ospf transmit-delay

SECONDS	Time (in seconds) between retransmissions. It must be greater than the expected round-trip delay between any two routers on the attached network. The range is from 1 to 65535 seconds. The default is 5 seconds

Command Mode

Interface Configuration

Default

1 second

Usage

Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the seconds argument before transmission. The value assigned should take into account the transmission and propagation delays for the interface.

If the delay is not added before transmission over a link, the time in which the LSA propagates over the link is not considered. This setting has more significance on very low-speed links.

Examples

The following example sets the retransmit delay value to 3 seconds:

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip ospf transmit-delay 3

Related Commands

None

3.26 neighbor (OSPF)

To configure Open Shortest Path First (OSPF) routers interconnecting to non-broadcast networks, use the neighbor command in router configuration mode. To remove a configuration, use the no form of this command.

Command Syntax

neighbor *IP-ADDRESS* {[**priority** *NUMBER*] [**poll-interval** *SECONDS*] | [**cost** *NUMBER*]}

no neighbor *IP-ADDRESS* [**priority** *NUMBER*] [**poll-interval** *SECONDS*] [**cost** *NUMBER*]

IP-ADDRESS	Interface IP address of the neighbor
priority *NUMBER*	(Optional) A number that indicates the router priority value of the non-broadcast neighbor associated with the IP address specified. The default is 0. This keyword does not apply to point-to-multipoint interfaces
poll-interval *SECONDS*	(Optional) A number value that represents the poll interval time (in seconds). RFC 1247 recommends that this value be much larger than

	the hello interval. The default is 120 seconds (2 minutes). This keyword does not apply to point-to-multipoint interfaces. The range is from 1 to 65535 seconds
cost NUMBER	(Optional) Assigns a cost to the neighbor, in the form of an integer from 1 to 65535. Neighbors with no specific cost configured will assume the cost of the interface, based on the ip ospf cost command. For point-to-multipoint interfaces, the cost keyword and the number argument are the only options that are applicable. This keyword does not apply to non-broadcast multi-access (NBMA) networks

Command Mode

Router Configuration

Default

No configuration is specified.

Usage

One neighbor entry must be included in the switch configuration for each known non-broadcast network neighbor. The neighbor address must be the the primary address of the interface.

If a neighboring router has become inactive (hello packets have not been received for the Router Dead Interval period), it may still be necessary to send hello packets to the dead neighbor. These hello packets will be sent at a reduced rate called Poll Interval.

When the router first starts up, it sends only hello packets to those routers with nonzero priority, that is, routers that are eligible to become designated routers (DRs) and backup designated routers (BDRs). After the DR and BDR are selected, DR and BDR will then start sending hello packets to all neighbors in order to form adjacencies.

Examples

The following example declares a router at address 192.168.3.4 on a non-broadcast network, with a priority of 1 and a poll interval of 180 seconds:

Switch(config)# router ospf

Switch(config-router)# neighbor 192.168.3.4 priority 1 poll-interval 180

Related Commands

ip ospf priority

3.27 network area (OSPF)

To define the interfaces on which Open Shortest Path First (OSPF) runs and to define the area ID for those interfaces, use the network area command in router configuration mode. To disable OSPF routing for interfaces defined with the address wildcard-mask pair, use the no form of this command.

Command Syntax

network {*IP-ADDRESS WILDCARD-MASK* | *IP-ADDRESS/PREFIX-LENGTH*} **area** *AREA-ID*

no network {*IP-ADDRESS WILDCARD-MASK* | *IP-ADDRESS/PREFIX-LENGTH*} **area** *AREA-ID*

IP-ADDRESS	Interface IP address of the neighbor
WILDCARD-MASK	IP-address-type mask that includes “don’t care” bits
PREFIX-LENGTH	Prefix length for the network
AREA-ID	Area that is to be associated with the OSPF address range. It can be specified as either a decimal value or as an IP address

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

The *IP-ADDRESS* and *WILDCARD-MASK* arguments together allow you to define one or multiple interfaces to be associated with a specific OSPF area using a single command.

Examples

The following partial example initializes OSPF routing process 109, and defines four OSPF areas: 10.9.50.0, 2, 3, and 0. Areas 10.9.50.0, 2, and 3 mask specific address ranges, and area 0 enables OSPF for all other networks.

Switch(config)# interface eth-0-1

Switch(config-if)# no switchport

Switch(config-if)# ip address 10.108.20.1/24

Switch(config)# router ospf 109

Switch(config-router)# network 10.108.20.0/24 area 10.9.50.0

Switch(config-router)# network 10.108.0.0/16 area 2

Switch(config-router)# network 10.109.10.0/24 area 3

Switch(config-router)# network 0.0.0.0/0 area 0

Related Commands

router ospf

3.28 overflow database external

Use this command to configure the size of the external database and the time the router waits before its entries to exit the overflow state.

Use the no parameter with this command to revert to default.

Command Syntax

overflow database external *MAXLSAS RECOVERTIME*

no overflow database external

MAXLSAS	<0-2147483647> The maximum number of LSAs. Note that this value should be the same
RECOVERTIME	<0-65535> the number of seconds the router waits before trying to exit the database

Command Mode

Router Configuration

Default

None.

Usage

Use this command to limit the number of AS-external-LSAs a router can receive, once it is in the wait state. It takes the number of seconds specified as the RECOVERTIME to recover from this state.

Examples

The following example shows setting the maximum number of LSAs to 5 and the time to recover from overflow state to be 3.

Switch(config)# router ospf 200

Switch(config-router)# network 10.108.0.0/16 area 0

Switch(config-router)# overflow database external 5 3

Related Commands

router ospf

3.29 passive-interface (OSPF)

To disable sending routing updates for the Open Shortest Path First (OSPF) on an interface, use the passive-interface command in router configuration mode. To re-enable the sending of routing updates, use the no form of this command.

Command Syntax

passive-interface *INTERFACE-ID*

no passive-interface *INTERFACE-ID*

INTERFACE-ID	The interface name

Command Mode

Router Configuration

Default

Routing updates are sent on the interface.

Usage

If you disable the sending of routing updates on an interface, the particular subnet will continue to be advertised to other interfaces, and updates from other switches on that interface continue to be received and processed.

Examples

The following example sets the interface eth-0-1 as passive:

Switch(config)# router ospf 200

Switch(config-router)# network 10.108.0.0/16 area 0

Switch(config-router)# passive-interface eth-0-1

Related Commands

router ospf

3.30 redistribute (OSPF)

To redistribute routes from one routing domain into Open Shortest Path First (OSPF) routing domain, use the redistribute command in router configuration mode. To disable redistribution, use the no form of this command.

Command Syntax

redistribute *PROTOCOL* [**route-map** *WORD*] [**tag** *TAG-VALUE*] [**metric** *METRIC-VALUE*] [**metric-type** *TYPE-VALUE*]

no redistribute *PROTOCOL* [**metric** *METRIC -VALUE*] [**metric-type** *TYPE-VALUE*]

route-map *WORD*	Route map reference. WORD :Pointer to route-map entriestag tag-value. Set tag for routes redistributed into OSPF.tag-value: <0-4294967295> 32-bit tag value
PROTOCOL	(Optional) The name of a routing protocol, or the keyword connected, or static. If you specify a routing protocol, use one of the following keywords: bgp, and rip
tag TAG-VALUE	Set tag for routes redistributed into OSPF.tag-value: <0-4294967295> 32-bit tag value
metric METRIC-VALUE	(Optional) When redistributing other processes to an OSPF process, the default metric is 20 when no metric value is specified
metric-type *TYPE-VALUE*	For OSPF, the external link type associated with the default route advertised into the OSPF routing domain. It can be one of two values

Command Mode

Router Configuration

Default

Route redistribution is disabled.

metric metric-value: 20

metric-type *TYPE-VALUE*: Type 2 external route

Usage

The metric value specified in the redistribute command supersedes the metric value specified using the default-metric command.

Examples

The following example redistribute the static routes into OSPF with metric 10:

Switch(config)# router ospf 119

Switch(config-router)# network 10.108.0.0/16 area 100

Switch(config-router)# redistribute static metric 10

Related Commands

default-metric

3.31 router-id (OSPF)

To use a fixed router ID, use the router-id command in router configuration mode. To force Open Shortest Path First (OSPF) to use the previous OSPF router ID behavior, use the no form of this command.

Command Syntax

router-id *IP-ADDRESS*

no router-id

IP-ADDRESS	Router ID in IP address format

Command Mode

Router Configuration

Default

No OSPF routing process is defined.

Usage

You can configure an arbitrary value in the IP address format for each router. However, each router ID must be unique.

If this command is used on an OSPF router process which is already active (has neighbors), the new router-ID is used at the next reload or at a manual OSPF process restart. To manually restart the OSPF process, use the clear ip ospf command.

Examples

The following example specifies a fixed router-id:

Switch(config)# router ospf 119

Switch(config-router)# router-id 10.1.1.1

Related Commands

clear ip ospf

router ospf

3.32 router ospf

To configure an Open Shortest Path First (OSPF) routing process, use the router ospf command in global configuration mode. To terminate an OSPF routing process, use the no form of this command.

Command Syntax

router ospf [*PROCESS-ID* [**vrf** *VPN-NAME*]]

no router ospf [*PROCESS-ID*]

PROCESS-ID	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process
vrf VPN-NAME	(Optional) Specifies the name of the VPN routing and forwarding (VRF) instance to associate with OSPF VRF processes

Command Mode

Global Configuration

Default

No OSPF routing process is defined.

Usage

You can specify multiple OSPF routing processes in each router. If you do not specify the process-id, the process-id will be the default 0.

Examples

The following example configures an OSPF routing process and assign a process number of 109:

Switch(config)# router ospf 109

Switch(config-router)# router ospf 109

Related Commands

network area

3.33 summary-address (OSPF)

To create aggregate addresses for Open Shortest Path First (OSPF), use the summary-address command in router configuration mode. To restore the default, use the no form of this command.

Command Syntax

summary-address *PREFIX* / *PREFIX-LENGTH* [**not-advertise**] [**tag** *TAG-VALUE*]

no summary-address *PREFIX* / *PREFIX-LENGTH* [**not-advertise**] [**tag** *TAG-VALUE*]

PREFIX	IP route prefix for the destination
PREFIX-LENGTH	Prefix length for the network
not-advertise	(Optional) Suppress routes that match the specified prefix/mask pair. This keyword applies to OSPF only
tag TAG- VALUE	<0-4294967295> Set tag**.** tag-value:32-bit tag value

Command Mode

Router Configuration

Default

This command is disabled by default.

Usage

Routes learned from other routing protocols can be summarized. The metric used to advertise the summary is the largest metric of all the more specific routes. This command helps reduce the size of the routing table.

Using this command for OSPF causes an OSPF Autonomous System Boundary Router (ASBR) to advertise one external route as an aggregate for all redistributed routes that are covered by the address. For OSPF, this command summarizes only routes from other routing protocols that are being redistributed into OSPF. Use the area range command for route summarization between OSPF areas.

OSPF does not support the summary-address 0.0.0.0/0 command.

Examples

In the following example, the summary address 10.1.0.0 includes address 10.1.1.0, 10.1.2.0, 10.1.3.0, and so on. Only the address 10.1.0.0 is advertised in an external link-state advertisement.

Switch(config)# router ospf

Switch(config-router)# summary-address 10.1.0.0/16

Related Commands

area range

3.34 show ip ospf

To display general information about Open Shortest Path First (OSPF) routing processes, use the show ip ospf command in user EXEC or privileged EXEC mode.

Command Syntax

show ip ospf (*PROCESS-ID*|)

PROCESS-ID	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process

Command Mode

Privileged EXEC

Usage

None

Examples

The following is sample output from the show ip ospf command when entered without a specific OSPF process ID:

Switch# show ip ospf

```
Routing Process "ospf 100" with ID 11.11.11.11
Process uptime is 0 minute
Process bound to VRF default
Conforms to RFC2328, and RFC1583 Compatibility flag is disabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Refresh timer 10 secs
Number of incomming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum 0x000000
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 0
External LSA database is unlimited.
Number of LSA originated 1
Number of LSA received 3
Number of areas attached to this router: 1
   Area 1
       Number of interfaces in this area is 1(1)
       Number of fully adjacent neighbors in this area is 1
       Number of fully adjacent virtual neighbors through this area is 0
       Area has no authentication
       SPF algorithm last executed 00:00:38.995 ago
       SPF algorithm executed 1 times
       Number of LSA 4. Checksum 0x0235ff
```

Related Commands

None

3.35 show ip ospf border-routers

To display the internal Open Shortest Path First (OSPF) routing table entries to an Area Border Router (ABR) and Autonomous System Boundary Router (ASBR), use the show ip ospf border-routers command in privileged EXEC mode.

Command Syntax

show ip ospf border-routers

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip ospf border-routers command:

Switch# show ip ospf border-routers

```
OSPF process 100 internal Routing Table
Codes: i - Intra-area route, I - Inter-area route
i 22.22.22.22 [1] via 172.10.1.2, eth-0-10, ABR, Area 1
```

Related Commands

None

3.36 show ip ospf database

To display lists of information related to the Open Shortest Path First (OSPF) database for a specific router, use the show ip ospf database command in EXEC mode.

Command Syntax

show ip ospf (*PROCESS-ID*|) **database**

show ip ospf (*PROCESS-ID*|) **database** [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**asbr-summary**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**asbr-summary**] [*LINK-STATE-ID*] [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**asbr-summary**] [*LINK-STATE-ID*] [**self-originate**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**external**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**external**] [*LINK-STATE-ID*] [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**external**] [*LINK-STATE-ID*] [**self-originate**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**network**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**network**] [*LINK-STATE-ID*] [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**network**] [*LINK-STATE-ID*] [**self-originate**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**router**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**router**] [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**router**] [**self-originate**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**self-originate**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**summary**] [*LINK-STATE-ID*]

show ip ospf (*PROCESS-ID*|) **database** [**summary**] [*LINK-STATE-ID*] [**adv-router** [*IP-ADDRESS*]]

show ip ospf (*PROCESS-ID*|) **database** [**summary**] [*LINK-STATE-ID*] [**self-originate**] [*LINK-STATE-ID*]

PROCESS-ID	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process
adv-router [*IP-ADDRESS*]	(Optional) Displays all the LSAs of the specified router. If no IP address is included, the information is about the local router itself (in this case, the same as self-originate)
LINK-STATE-ID	(Optional) Portion of the Internet environment that is being described by the advertisement. The value entered depends on the advertisement's LS type. It must be entered in the form of an IP address
asbr-summary	(Optional)Displays information only about the autonomous system boundary router summary LSAs
external	(Optional) Displays information only about the external LSAs
network	(Optional) Displays information only about the network LSAs
router	(Optional) Displays information only about the router LSAs
self-originate	(Optional) Displays only self-originated LSAs (from the local router
summary	(Optional) Displays information only about the summary LSAs

Command Mode

Privileged EXEC

Default

None

Usage

The various forms of this command deliver information about different OSPF link state advertisements.

Examples

The following is sample output from the show ip ospf database command when no arguments or keywords are used:

Switch# show ip ospf database

```
             Router Link States (Area 3 [Stub])
Link ID         ADV Router      Age  Seq#       CkSum  Link count
10.0.0.1        10.0.0.1         546 0x80000089 0x4567 1
```

Related Commands

None

3.37 show ip ospf interface

To display Open Shortest Path First (OSPF)-related interface information, use the show ip ospf interface command in EXEC mode.

Command Syntax

show ip ospf interface [*INTERFACE-NAME*]

INTERFACE-NAME	(Optional) Interface name. If the interface-name argument is included, only information for the specified interface is included

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output of the show ip ospf interface command when eth-0-3 is specified:

Switch# show ip ospf interface eth-0-3

```
eth-0-3 is up, line protocol is up
  Internet Address 3.3.3.1/24, Area 3 [Stub], MTU 1500
  Process ID 0, Router ID 10.0.0.1, Network Type NBMA, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 10.0.0.1, Interface Address 3.3.3.1
  No backup designated router on this network
  Timer intervals configured, Hello 30, Dead 120, Wait 120, Retransmit 5
    Hello due in 00:00:17
  Neighbor Count is 1, Adjacent neighbor count is 0
  Crypt Sequence Number is 1218176990
  Hello received 0 sent 80, DD received 0 sent 0
  LS-Req received 0 sent 0, LS-Upd received 0 sent 0
  LS-Ack received 0 sent 0, Discarded 0
```

Related Commands

None

3.38 show ip ospf neighbor

To display Open Shortest Path First (OSPF)-neighbor information on a per-interface basis, use the show ip ospf neighbor command in privileged EXEC mode.

Command Syntax

show ip ospf neighbor [*INTERFACE-NAME*] [*NEIGHBOR-ID*] [**detail**] [**all**]

INTERFACE-NAME	(Optional) Interface name. If the interface-name argument is included, only information for the specified interface is included
NEIGHBOR-ID	(Optional) Neighbor ID
detail	(Optional) Displays all neighbors given in detail (lists all neighbors)

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following is sample output from the show ip ospf neighbor command showing a single line of summary information for each neighbor:

Switch# show ip ospf neighbor

```
Neighbor ID     Pri State        Dead Time Address         Interface
10.199.199.137    1 FULL/DR       0:00:31   192.168.80.37   eth-0-1
172.16.48.1       1 FULL/DROTHER 0:00:33   172.16.48.1     vlan1
172.16.48.200     1 FULL/DROTHER 0:00:33   172.16.48.200   vlan2
10.199.199.137    5 FULL/DR       0:00:33   172.16.48.189   eth-0-2
```

Related Commands

None

3.39 show ip ospf summary-address

To display the summary addresses redistribution Information used by OSPF, use the show ip ospf summary-address command in privileged EXEC mode.

Command Syntax

show ip ospf summary-address

Command Mode

Privileged EXEC

Default

None

Usage

Metric equals to 16777215 means not advertise.

Examples

The following example shows how to use show ip ospf summary-address command.

Switch# show ip ospf summary-address

```
OSPF process 0:
10.0.0.0/8 Metric 20, Type 2, Tag 0
20.0.0.0/8 Metric 16777215, Type 0, Tag 0
```

Related Commands

None

3.40 show ip ospf database database-summary

To display the summary of database used by OSPF, use the show ip ospf database database-summary command in privileged EXEC mode.

Command Syntax

show ip ospf (*PROCESS-ID*|)**database database-summary**

PROCESS-ID	(Optional) Internal identification. It is locally assigned and can be any positive integer. The number used here is the number assigned administratively when enabling the OSPF routing process

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following example shows how to use show ip ospf database database-summary command.

Switch# show ip ospf database database-summary

```
          OSPF Router with ID (10.10.10.10) (Process ID 0)
Area 0 database summary
  LSA Type             Count        MaxAge
  Router                1           0
  Network               0           0
  Summary Net           0           0
  Summary ASBR          0           0
  Subtotal                1           0
Process 0 database summary
  LSA Type             Count        MaxAge
  Router                1           0
  Network               0           0
  Summary Net           0           0
  Summary ASBR          0           0
  Type-5 Ext              1           0
```

```
Total                2           0
```

Related Commands

None

3.41 show ip ospf route summary

To display the summary of routes used by OSPF, use the show ip ospf route summary command in privileged EXEC mode.

Command Syntax

show ip ospf (*PROCESS-ID*|) **route summary**

PROCESS-ID	(Optional) Internal identification. It is locally assigned and can be any positive integer. The number used here is the number assigned administratively when enabling the OSPF routing process

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following example shows how to use show ip ospf route summary command.

Switch# show ip ospf summary-address

```
          OSPF Router with ID (10.10.10.10) (Process ID 0)
 Route Type                    Count
 (C)Connected                      1
 (D)Discard                        1
 (O)Intra area                     0
 (IA)Inter area                    0
 (E1)Ext type 1                    0
 (E2)Ext type 2                    0
 (N1)NSSA Ext type 1               0
 (N2)NSSA Ext type 2               0
 Total                             2
```

Related Commands

None

3.42 show ip protocols ospf

To display IP routing protocol process parameters and statistics of Open Shortest Path First (OSPF).use the show ip ospf protocols ospf command in privileged EXEC mode.

Command Syntax

show ip protocols ospf (**vrf** *WORD*|)

vrf	VPN Routing/Forwarding instance
WORD	VPN Routing/Forwarding instance name

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

The following example shows how to use show ip protocols ospf command.

Switch # show ip protocols ospf

```
Routing Protocol is "ospf 0"
  Redistributing:
  Routing for Networks:
  Distance: (default is 110)
```

Related Commands

None

3.43 timers spf

To turn on Open Shortest Path First (OSPF) shortest path first (SPF) throttling, use the timers spf command in router configuration mode. To turn off SPF throttling, use the no form of this command.

Command Syntax

timers spf *SPF-START SPF-HOLD*

no timers spf

SPF-START	Indicates the initial SPF schedule delay in seconds. Value range is 0 to 2147483647 seconds
SPF-HOLD	Indicates the minimum hold time between two consecutive SPF calculations. Value range is 0 to 2147483647 seconds

Command Mode

Router Configuration

Default

spf-start: 5 seconds

spf-hold: 10 seconds.

Usage

None

Examples

The following example shows a router configured with the start, and hold values for the timers spf command set at 5, and 10 seconds, respectively.

Switch(config)# router ospf 1

Switch(config-router)# router-id 10.10.10.2

Switch(config-router)#timers spf 5 10

Switch(config-router)# redistribute static

Switch(config-router)# network 10.21.21.0/24 area 0

Switch(config-router)# network 10.22.22.0/24 area 00

Related Commands

None

3.44 max-concurrent-dd

To specify Maximum number allowed to process DD concurrently, use the max-concurrent-dd command in router configuration mode. To restore default value, use the no form of this command

Command Syntax

max-concurrent-dd *NUMBER-VALUE*

no max-concurrent-dd

NUMBER-VALUE	<1-65535>Number of DD process

Command Mode

Router Configuration

Default

None

Usage

This command used to specify Maximum number allowed to process DD concurrently.

Examples

The following example shows how to use max-concurrent-dd command.

Switch(config)# router ospf 100

Switch(config-router)# router-id 10.10.10.2

Switch(config-router)# max-concurrent-dd 10

Related Commands

None

3.45 maximun-area

To specify Maximum number of ospf area, use the maximum-area command in router configuration mode. To restore default value, use the no form of this command

Command Syntax

maximum-area *NUMBER-VALUE*

no maximum-area

NUMBER-VALUE	<1-65535> Number of DD process

Command Mode

Router Configuration

Default

3000

Usage

This command used to specify Maximum number of ospf area.

Examples

The following example shows how to use maximum-area command.

Switch(config)# router ospf 100

Switch(config-router)# router-id 10.10.10.2

Switch(config-router)# maximum-area 100

Related Commands

None

3.46 refresh timer

To Set refresh timer, use the refresh timer command in router configuration mode. To restore default value, use the no form of this command

Command Syntax

refresh timer *NUMBER-VALUE*

no refresh timer (*NUMBER-VALUE*)

NUMBER-VALUE	<1-65535> Number of DD process

Command Mode

Router Configuration

Default

10 seconds.

Usage

None

Examples

The following example shows how to use refresh timer command.

Switch(config)# router ospf 100

Switch(config-router)# router-id 10.10.10.2

Switch(config-router)# refresh timer 100

Related Commands

None

3.47 debug ospf

Use this command to specify all debugging options for OSPF. Use the no parameter with this command to disable this function.

Command Syntax

debug ospf (**all**|)

no debug ospf (**all**|)

all	enable all debugging

Command Mode

Privileged Exec

Default

None

Usage

The debug ospf all command enables the display of all debug information.

Examples

Switch(config)#debug ospf all

Related Commands

None

3.48 debug ospf events

Use this command to specify debugging options for OSPF event troubleshooting. Use this command without parameters to turn on all the options. Use the no parameter with this command to disable this function.

Command Syntax

debug ospf events (abr|asbr|lsa|os|router|vlink)

no debug ospf events (abr|asbr|lsa|os|router|vlink)

abr	Displays ABR events
asbr	Displays ASBR events
lsa	Displays LSA events
os	Displays OS interaction events
router	Displays others router events
vlink	Displays virtual link events

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf event command enables the display of debug information related to OSPF internal events.

Examples

Switch(config)#debug ospf events lsa

Related Commands

None

3.49 debug ospf ifsm

Use this command to specify debugging options for OSPF Interface Finite State Machine (IFSM) troubleshooting.

Use the no parameter with this command to disable this function.

Command Syntax

debug ospf ifsm (status|events|timers)

no debug ospf ifsm (status|events|timers)

status	Displays IFSM status information
events	Displays IFSM event information
timers	Displays IFSM TIMER information

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf ifsm command enables the display of debug information related to the Interface Finite State Machine (IFSM).

Examples

Switch(config)#debug ospf ifsm timers

Related Commands

None

3.50 debug ospf nfsm

Use this command to specify debugging options for OSPF Neighbor Finite State Machine (NFSM) troubleshooting.

Use the no parameter with this command to disable this function.

Command Syntax

debug ospf nfsm (status|events|timers)

no debug ospf nfsm (status|events|timers)

status	Displays NFSM status information
events	Displays NFSM event information
timers	Displays NFSM TIMER information

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf nfsm command enables the display of debug information related to the Neighbor Finite State Machine (NFSM).

Examples

Switch(config)#debug ospf nfsm timers

Related Commands

None

3.51 debug ospf lsa

Use this command to specify debugging options for OSPF Link State Advertisements (LSA) troubleshooting.

Use the no parameter with this command to disable this function.

Command Syntax

debug ospf lsa (flooding|generate|install|maxage|refresh)

no debug ospf lsa (flooding|generate|install|maxage|refresh)

flooding	Displays LSA flooding
generate	Displays LSA generate

install	Displays LSA installation
maxage	Displays the maximum age of LSA in seconds
refresh	Displays LSA refresh

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf lsa command enables the display of debug information related to internal operations of LSAs.

Examples

Switch(config)#debug ospf lsa install

Related Commands

None

3.52 debug ospf packet

Use this command to specify debugging options for OSPF packets.

Use the no parameter with this command to disable this function..

Command Syntax

debug ospf packet *PARAMETERS*

no debug ospf packet *PARAMETERS*

PARAMETERS = dd|detail|hello|ls-ack|ls-request|ls-update|recv|send

dd	Specifies debugging for OSPF database descriptions
detail	Sets the debug option to detailed information
hello	Specifies debugging for OSPF hello packets
ls-ack	Specifies debugging for OSPF link state acknowledgments
ls-request	Specifies debugging for OSPF link state requests
ls-update	Specifies debugging for OSPF link state updates
recv	Specifies the debug option set for received packets
send	Specifies the debug option set for sent packets

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf packet command enables the display of debug information related to the sending and receiving of packets.

Examples

Switch(config)#debug ospf packet dd send detail

Related Commands

None

3.53 debug ospf route

Use this command to specify which route calculation to debug. Use this command without parameters to turn on all the options.

Use the no parameter with this command to disable this function.

Command Syntax

debug ospf route (ase|ia|install|spf)

no debug ospf route (ase|ia|install|spf)

ase	Specifies the debugging of external route calculation
ia	Specifies the debugging of Inter-Area route calculation
install	Specifies the debugging of route installation
spf	Specifies the debugging of SPF calculation

Command Mode

Privileged EXEC

Default

None

Usage

The debug ospf route command enables the display of debug information related to route-calculation

Examples

Switch(config)#debug ospf route install

Related Commands

None

3.54 show debuggin ospf

Use this command to display the set OSPF debugging option..

Command Syntax

show debugging ospf

Command Mode

Privileged EXEC

Default

None

Usage

None

Examples

This is a sample output from the show debugging ospf command. Some lines in this output wrap around, they might not wrap around in the actual display.

Switch(config)# show debugging ospjf

```
OSPF debugging status:
  OSPF packet Hello send debugging is on
  OSPF packet Database Description send debugging is on
  OSPF packet Link State Request send debugging is on
  OSPF packet Link State Update send debugging is on
  OSPF packet Link State Acknowledgment send debugging is on
  OSPF route installation debugging is on
```

Related Commands

None

3.55 show resource ospf

Use this command to display the route resources used by OSPF protocol.

Command Syntax

show resource ospf

Command Mode

Privileged EXEC

Default

None

Usage

None.

Examples

The following is sample output from the show resource ospf command:

Switch# show resource ospf

```
OSPF
Resource                Used         Capability
================================================
Routes                  1            6144
```

Related Commands

show ip ospf route summary

4 Route Map Commands

4.1 route-map

To define the conditions for redistributing routes from one routing protocol into another, or to enable policy routing in bgp, use the route-map command in global configuration mode and the match and set command in route-map configuration modes. To delete an entry, use the no form of this command.

Command Syntax

route-map *map-TAG* [**permit** | **deny**] [*sequence-NUMBER*]

no route-map *map-TAG* [**permit** | **deny**] [*sequence-NUMBER*]

map-TAG	A meaningful name for the route map. The redistribute router configuration command uses this name to reference this route map. Multiple route maps may share the same map tag name. The length of route-map name should not greater than 20 and the first character should be 'a'-'z', 'A'-'Z' or '0'-'9'
permit	(Optional) If the match criteria are met for this route map, and the permit keyword is specified, the route is redistributed as controlled by the set actions. If the match criteria are not met, and the permit keyword is specified, the next route map with the same map tag is tested. If a route passes none of the match criteria for the set of route maps sharing the same name, it is not redistributed by that set.
deny	(Optional) If the match criteria are met for the route map and the deny keyword is specified, the route is not redistributed

sequence-NUMBER	(Optional) Number that indicates the position a new route map will have in the list of route maps already configured with the same name. If given with the no form of this command, the position of the route map should be deleted

Command Mode

Global Configuration

Defaults

The permit keyword is the default.

Usage

None

Examples

The following example shows how to create a route-map and enter route-map configuration mode:

Switch(config)# route-map rip-to-ospf permit

Switch(config-route-map)# match metric 1

Switch(config-route-map)# set metric 2

Related Commands

match as-path

match community

match interface

match ip address

match local-preference

match metric

match origin

match route-type

match tag

set aggregator

set as-path

set atomic-aggregate

set comm-list

set community

set dampening

set extcommunity

set ip address

set local-preference

set metric

set metric-type

set origin

set originator-id

set tag

set vpnv4

set weight

4.2 match as-path

Use this command to match an autonomous system path access list.

Use the no parameter with this command to remove a path list entry.

The match as-path command specifies the autonomous system path to be matched. If there is a match for the specified AS path, and permit is specified, the route is redistributed or controlled, as specified by the set action. If the match criteria are met, and deny is specified, the route is not redistributed or controlled. If the match criteria are not met then the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes, depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid only for BGP.

Command Syntax

match as-path *LISTNAME*

no match as-path

LISTNAME	Specifies as autonomous system path access list name

Command Mode

Route-map

Defaults

No match as-path is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute deny 34

Switch(config-route-map)# match as-path myaccesslist

Related Commands

match metric

match ip address

match community

set as-path

set community

4.3 match community

Use this command to specify the community to be matched.

Use the no parameter with this command to remove the community list entry.

Communities are used to group and filter routes. They are designed to provide the ability to apply policies to large numbers of routes by using match and set commands. Community lists are used to identify and filter routes by their common attributes.

Use the match community command to allow matching based on community lists.

The values set by the match community command overrides the global values. The route that does not match at least one match clause is ignored.

This command is valid only for BGP.

Command Syntax

match community *WORD*

no match community

WORD	Specifies the Community-list name

Command Mode

Route-map

Defaults

No match community is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute permit 3

Switch(config-route-map)# match community mylist

Related Commands

match ip address

match as-path

set as-path

set community

match metric

4.4 match interface

Use this command to define the interface match criterion.

Use the no parameter with this command to remove the specified match criterion..

The match interface command specifies the next-hop interface name of a route to be matched.

This command is valid only for OSPF.

Command Syntax

match interface *IFNAME*

no match interface

IFNAME	A string that specifies the interface for matching

Command Mode

Route-map

Defaults

No match interface is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap1 permit 10

Switch(config-route-map)# match interface eth-0-1

Related Commands

match tag

match route-type external

4.5 match ip address

Use this command to specify the match address of route.

Use the no parameter with this command to remove the match ip address entry.

The match ip address command specifies the IP address to be matched. If there is a match for the specified IP address, and permit is specified, the route is redistributed or controlled, as specified by the set action. If the match criteria are met, and deny is specified then the route is not redistributed or controlled. If the match criteria are not met, the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes, depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid for BGP, OSPF and RIP only.

Command Syntax

match ip address *ACCESSSLISTID*

no match ip address

ACCESSSLISTID	Specify a IPv4 access-list name, up to 20 characters

Command Mode

Route-map

Defaults

No match ip address is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute permit 3

Switch(config-route-map)# match ip address List1

Related Commands

match community

match as-path

set as-path

set community

match metric

4.6 match ip address prefix-list

Use this command to match entries of prefix-lists.

Use the no parameter with this command to disable this function

This command specifies the entries of prefix-lists to be matched. If there is a match for the specified prefix-list entries, and permit is specified, the route is redistributed or controlled, as specified by the set action. If the match criteria are met, and deny is specified, the route is not redistributed or controlled. If the match criteria are not met, the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid for BGP, OSPF and RIP only.

Command Syntax

match ip address prefix-list *LISTNAME*

no match ip address prefix-list [*LISTNAME* **]**

LISTNAME	Specifies the IP prefix list name

Command Mode

Route-map

Defaults

No match ip address prefix-list is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)#match ip address prefix-list mylist

Related Commands

match community

match as-path

set as-path

set community

match metric

4.7 match ip next-hop

Use this command to specify a next-hop address to be matched in a route-map.

Use the no parameter with this command to disable this function.

The match ip next-hop command specifies the next-hop address to be matched. If there is a match for the specified next-hop address, and permit is specified, the route is redistributed or controlled as specified by the set action. If the match criteria are met, and deny is specified, the route is not redistributed or controlled. If the match criteria are not met, the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid for BGP, OSPF and RIP only.

Command Syntax

match ip next-hop *ACCESSSLISTID*

no match ip next-hop [*ACCESSSLISTID* **]**

ACCESSSLISTID	Specify a IPv4 access-list name, up to 20 characters

Command Mode

Route-map

Defaults

No match ip next-hop is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# match ip next-hop mylist

Related Commands

match community

match as-path

set as-path

set community

match metric

4.8 match ip next-hop prefix-list

Use this command to specify the next-hop IP address match criterion, using the prefix-list.

Use the no parameter with this command to remove the specified match criterion.

Use the match ip next-hop prefix-list command to match the next-hop IP address of a route.

This command is valid for BGP and RIP only.

Command Syntax

match ip next-hop prefix-list *LISTNAME*

no match ip next-hop prefix-list [*LISTNAME*]

LISTNAME	A string specifying the prefix-list name

Command Mode

Route-map

Defaults

No match ip next-hop prefix-list is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap permit 3

Switch(config-route-map)# match ip next-hop prefix-list list1

Related Commands

match metric

match interface

match ip next-hop

4.9 match local-preference

Use this command to specify the local-preference match criterion.

Use the no parameter with this command to remove the specified match criterion.

Use the match local-preference command to match the local preference of a route.

This command is valid for BGP only.

Command Syntax

match local-preference *LOCAL-PREFERENCE*

no match local-preference

LOCAL-PREFERENCE	<0-4294967295> Species the preference value

Command Mode

Route-map

Defaults

No match local-preference is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap permit 3

Switch(config-route-map)# match local-preference 100

Related Commands

match community

match as-path

set as-path

set community

match ip next-hop

4.10 match metric

Use this command to match a metric of a route.

Use the no parameter with this command to disable this function.

The match metric command specifies the metric to be matched. If there is a match for the specified metric, and permit is specified, the route is redistributed or controlled as specified by the set action. If the match criteria are met, and deny is specified, the route is not redistributed or controlled. If the match criteria are not met, the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid for BGP, OSPF and RIP only.

Command Syntax

match metric *METRICVAL*

no match metric

METRICVAL	<+/-metric>|<0-4294967295> The metric value

Command Mode

Route-map

Defaults

No match metric is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute permit 3

Switch(config-route-map)# no match metric

Related Commands

match community

match as-path

set as-path

set community

match ip next-hop

4.11 match origin

Use this command to match origin code.

Use the no parameter with this command to disable this matching.

The origin attribute defines the origin of the path information. The egp parameter is indicated as an e in the routing table, and it indicates that the origin of the information is learned via Exterior Gateway Protocol. The igp parameter is indicated as i in the routing table, and it indicates the origin of the path information is interior to the originating AS.

The incomplete parameter is indicated as a ? in the routing table, and indicates that the origin of the path information is unknown or learned through other means. If a static route is redistributed into BGP, the origin of the route is incomplete.

The match origin command specifies the origin to be matched. If there is a match for the specified origin, and permit is specified, the route is redistributed or controlled as specified by the set action. If the match criteria are met, and deny is specified, the route is not redistributed or controlled. If the match criteria are not met, the route is neither accepted nor forwarded, irrespective of permit or deny specifications.

The route specified by the policies might not be the same as specified by the routing protocols. Setting policies enable packets to take different routes depending on their length or content. Packet forwarding based on configured policies overrides packet forwarding specified in routing tables.

This command is valid for BGP only.

Command Syntax

match origin { egp | igp | incomplete }

no match origin

egp	learned from EGP

igp	Local IGP
incomplete	Unknown heritage

Command Mode

Route-map

Defaults

No match origin is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute deny 34

Switch(config-route-map)# match origin egp

Related Commands

None

4.12 match route-type

Use this command to match specified external route type.

Use the no parameter with this command to turn off the matching.

Use the match route-type external command to match specific external route types. AS-external LSA is either Type-1 or Type-2. External type-1 matches only Type 1 external routes, and external type-2 matches only Type 2 external routes.

NOTE

This command is valid for OSPF only.

Command Syntax

match route-type external { type-1 | type-2 }

no match route-type external

type-1	Match OSPF External Type 1 metrics
type-2	Match OSPF External Type 1 metrics

Command Mode

Route-map

Defaults

No match route-type is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap1 permit 10

Switch(config-route-map)# match route-type external type-1

Related Commands

match tag

4.13 match tag

Use this command to match the specified tag value.

Use the no parameter with this command to turn off the declaration.

Use the match tag command to match the specified tag value.

This command is valid for OSPF RIP only.

Command Syntax

match tag *TAG*

no match tag

TAG	<0-4294967295> Specifies the tag value

Command Mode

Route-map

Defaults

No match tag is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap1 permit 10

Switch(config-route-map)# match tag 100

Related Commands

match metric

match route-type external

4.14 set aggregator

Use this command to set the AS number for the route map and router ID.

Use the no parameter with this command to disable this function.

An Autonomous System (AS) is a collection of networks under a common administration sharing a common routing strategy. It is subdivided by areas, and is assigned a unique 16-bit number. Use the set aggregator command to

assign an AS number for the aggregator.

To use the set aggregator command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set aggregator as *ASNUM IPADDRESS*

no set aggregator

ASNUM	<1-65535>Specifies the AS number of aggregator
IPADDRESS	Specifies the IP address of aggregator

Command Mode

Route-map

Defaults

No set aggregator is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute permit 3

Switch(config-route-map)# set aggregator as 43 10.10.0.3

Related Commands

None

4.15 set as-path

Use this command to modify an autonomous system path for a route.

Use the no parameter with this command to disable this function.

Use the set as-path command to specify an autonomous system path. By specifying the length of the AS-Path, the router influences the best path selection by a neighbor. Use the prepend parameter with this command to prepend an AS path string to routes increasing the AS path length.

To use the set as-path command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set as-path prepend *ASN* [*…ASN*]

no set as-path

ASN	System prepends this number to the AS path
prepend	Prepends the autonomous system path

Command Mode

Route-map

Defaults

No set as-path is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map myroute permit 3

Switch(config-route-map)# set as-path prepend 8 24

Related Commands

None

4.16 set atomic-aggregate

Use this command to set an atomic aggregate attribute.

Use the no parameter with this command to disable this function

To use the set atomic aggregate command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set atomic-aggregate

no set atomic-aggregate

Command Mode

Route-map

Defaults

No set atomic-aggregate is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set atomic-aggregate

Related Commands

None

4.17 set comm-list delete

Use this command to delete the matched communities from the community attribute of an inbound or outbound update when applying route-map.

Use the no parameter with this command to disable this feature.

This command is valid for BGP only.

Command Syntax

set comm-list { *<1-199>*|*<100-199>*|*WORD* } **delete**

no set comm-list

<1-199>	Standard community-list number

<100-199>	Expanded community-list number
WORD	Name of the Community-list
delete	Delete matching communities

Command Mode

Route-map

Defaults

No set comm-list is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set comm-list 34 delete

Related Commands

None

4.18 set community

Use this command to set the communities attribute.

Use the no parameter with this command to delete the entry.

Use this command to set the community attribute and group destinations in a certain community, as well as, apply routing decisions according to those communities.

To use the set community command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set community [*AA:NN* | **internet | local-AS | no-advertise | no-export**]

set community none

no set community

AA:NN	AA:NN: Specifies the community number in this format AA = The AS number NN = The number assigned to community
internet	Specifies the Internet (well-known community)
local-AS	Specifies no sending outside the local AS (well-known community)
no-advertise	Specifies no advertisement of this route to any peer (well-known community)
no-export	Specifies no advertisement of this route to next AS (well-known community)
none	Removes the community attribute from the prefixes that pass the route-map

Command Mode

Route-map

Defaults

No set community is specified by default.

Usage

None

Examples

The following examples show the use of the set community command with different parameters.

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set community no-export no-advertise

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set community no-advertise

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set community 10:01 23:34 12:14 no-export

Related Commands

None

4.19 set dampening

Use this command to enable route-flap dampening and set parameters.

Use the no parameter with this command to disable it.

Set the unreachability half-life time to be equal to, or greater than, reachability half-life time. The suppress-limit value must be greater than or equal to the reuse limit value.

This command is valid for BGP only.

Command Syntax

set dampening *REACHTIME REUSE SUPPRESS MAXSUPPRESS* [*UNREACHTIME*]

no set dampening

REACHTIME	<1-45> Specifies the reachability half-life time in minutes. The time for the penalty to decrease to one-half of its current value. The default is 15 minutes
REUSE	<1-20000> Specifies the reuse-limit value. When the penalty for a suppressed route decays below the reuse value, the routes become unsuppressed. The default reuse limit is 750
SUPPRESS	<1-20000> Specifies the suppress-limit value. When the penalty for a route exceeds the suppress value, the route is suppressed. The default suppress limit is 2000
MAXSUPPRESS	<1-255> Specifies the max-suppress-time. Maximum time that a dampened route is suppressed. The default max-suppress value is 4 times the half-life time (60 minutes)
UNREACHTIME	<1-45> Specifies the un-reachability half-life time for penalty, in minutes. The default value is 15 minutes

Command Mode

Route-map

Defaults

Reference to the syntax description above.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map R1 permit 24

Switch(config-route-map)# set dampening 20 333 534 30

Related Commands

None

4.20 set extcommunity

Use this command to set an extended community attribute.

Use the no parameter with this command to disable this function

To use the set extcommunity command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set extcommunity { *rt* | *soo*} *EXTCOMMNUMBER* [*…EXTCOMMNUMBER*]

no set extcommunity { *rt* | *soo*}

rt	Specifies the route target of the extended community
soo	Specifies the site-of-origin of the extended community
EXTCOMMNUMBER	ASN:NN_or_IP-address:nn VPN extended community
ASN:NN	the AS number
IPADDRESS	the AS number in IP address form

Command Mode

Route-map

Defaults

No set extcommunity is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch (config)# route-map rmap1 permit 3

Switch (config-route-map)# set extcommunity rt 06:01

Switch # configure terminal

Switch (config)# route-map rmap1 permit 3

Switch (config-route-map)# set extcommunity rt 0.0.0.6:01

Switch # configure terminal

Switch (config)# route-map rmap1 permit 3

Switch (config-route-map)# set extcommunity soo 06:01

Switch # configure terminal

Switch (config-route-map)# route-map rmap1 permit 3

Switch (config-route-map)# set extcommunity soo 0.0.0.6:01

Related Commands

None

4.21 set ip next-hop

Use this command to set the specified next-hop value.

Use the no parameter with this command to turn off the setting.

Use this command to set the next-hop IP address to the routes.

This command is valid for BGP, OSPF, and RIP only.

Command Syntax

set ip next-hop *A.B.C.D*

no set ip next-hop

A.B.C.D	Specifies the IP address of the next-hop

Command Mode

Route-map

Defaults

No set ip next-hop is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap permit 3

Switch(config-route-map)# set ip next-hop 10.10.0.67

Related Commands

None

4.22 set local-preference

Use this command to set the specified local-preference value.

Use the no parameter with this command to turn off the setting.

Use this command to set the local-preference value of the routes

This command is valid for BGP only.

Command Syntax

set local-preference *LOCAL-PREFERENCE*

no set local-preference

LOCAL-PREFERENCE	<0-4294967295> Species the preference value

Command Mode

Route-map

Defaults

No set local-preference is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map mymap permit 3

Switch(config-route-map)# set local-preference 100

Related Commands

None

4.23 set metric

Use this command to set a metric value for a route.

Use the no parameter with this command to disable this function.

This command sets the metric value for a route, and influences external neighbors about the preferred path into an Autonomous System (AS). The preferred path is the one with a lower metric value. A router compares metrics for paths from neighbors in the same ASs. To

compare metrics from neighbors coming from different ASs, use the bgp always-compare-med command.

To use the set metric command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP, OSPF and RIP.

Command Syntax

set metric *METRICVAL*

no set metric

METRICVAL	<+/-metric>|<0-4294967295> The metric value

Command Mode

Route-map

Defaults

No set metric is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set metric 600

Related Commands

None

4.24 set metric-type

Use this command to set the metric type for the destination routing protocol.

Use the no parameter with this command to return to the default.

This command sets the type to either Type-1 or Type-2 in the AS-external-LSA when the route-map matches the condition.

This command is valid for OSPF only.

Command Syntax

set metric-type {*TYPE1* | *TYPE2*}

no set metric-type

TYPE1	Select to set external type 1 metric
TYPE2	Select to set external type 2 metric

Command Mode

Route-map

Defaults

No set metric-type is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set metric-type 1

Related Commands

None

4.25 set origin

Use this command to set the BGP origin code.

Use the no parameter with this command to delete an entry.

The origin attribute defines the origin of the path information. The three parameters with this command indicate three different values. IGP is interior to the originating AS. This happens if IGP is redistributed into the BGP. EGP is learned through an Exterior Gateway Protocol. Incomplete is unknown or learned through some other means. This happens when static route is redistributed in BGP and the origin of the route is incomplete.

To use the set origin command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set origin { **egp | igp | incomplete** }

no set origin

egp	Specifies a remote EGP system
igp	A local IGP system
incomplete	Specifies a system of unknown heritage

Command Mode

Route-map

Defaults

No set origin is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set origin egp

Related Commands

None

4.26 set originator-id

Use this command to set the originator ID attribute.

Use the no parameter with this command to disable this function

To use the set originator-id command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set originator-id *IPADDRESS*

no set originator-id

IPADDRESS	Specifies the IP address of originator

Command Mode

Route-map

Defaults

No set originator-id is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set originator-id 1.1.1.1

Related Commands

None

4.27 set tag

Use this command to set a specified tag value.

Use the no parameter with this command to return to the default.

Tag in this command is the route tag which is labeled by another routing protocol (BGP or other IGP when redistributing), because AS-external-LSA has a route-tag field in its LSAs. Also, with using route-map, ZebOS can tag the LSAs with the appropriate tag value. Sometimes, the tag matches with using route-map, and sometimes, the value

may be used by another application.

This command is valid for OSPF and RIP only.

Command Syntax

set tag *TAGVALUE*

no set tag

TAGVALUE	<0-4294967295> Tag value for destination routing protocol.

Command Mode

Route-map

Defaults

No set tag is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set tag 6

Related Commands

redistribute

default-information

4.28 set vpnv4 next-hop

Use this command to set a VPNv4 next-hop address.

Use the no parameter with this command to disable this function

To use the set vpn4-hext-hop command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set vpnv4 next-hop *IPADDRESS*

no set vpnv4 next-hop

IPADDRESS	Specifies the IP address of originator

Command Mode

Route-map

Defaults

No set vpnv4 next-hop is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set vpnv4 next-hop 6.6.6.6

Related Commands

None

4.29 set weight

Use this command to set weights for the routing table.

Use the no parameter with this command to delete an entry.

The weight value is used to assist in best path selection. It is assigned locally to a router. When there are several routes with a common destination, the routes with a higher weight value are preferred.

To use the set weight command, you must first have a match clause. Match and set commands set the conditions for redistributing routes from one routing protocol to another. The match command specifies the match criteria under which redistribution is allowed for the current route-map. The set command specifies the set redistribution actions to be performed, if the match criteria are met

match as-path 10

set weight 400

In the above configuration, all routes that apply to access-list 10 will have the weight set at 400.

If the packets do not match any of the defined criteria, they are routed through the normal routing process.

This command is valid for BGP only.

Command Syntax

set weight *WEIGHT*

no set weight

WEIGHT	<0-4294967295> Specifies the weight value

Command Mode

Route-map

Defaults

No set weight is specified by default.

Usage

None

Examples

Switch# configure terminal

Switch(config)# route-map rmap1 permit 3

Switch(config-route-map)# set weight 60

Related Commands

match as-path

4.30 show route-map

Use this command to display user readable route-map information.

Command Syntax

show route-map [*NAME*]

NAME	route-map name

Command Mode

Privileged EXEC

Usage

None

Examples

Switch1# show route-map

```
route-map abc, permit, sequence 10
  Match clauses:
    ip address acl1
  Set clauses:
    local-preference 200
route-map abc, permit, sequence 20
  Match clauses:
  Set clauses:
```

Related Commands

route-map

5 Prefix-list Commands

5.1 ip prefix-list

To create a prefix list or add a prefix-list entry, use the ip prefix-list command in global configuration mode. To delete a prefix-list or an entry, use the no form of this command.

Command Syntax

ip prefix-list *WORD* [**seq** *SEQUENCE-NUMBER*] (**deny** | **permit**)

(**any** | *A.B.C.D/M* [**ge** *GE-LENGTH*] [**le** *LE-LENGTH*])

no ip prefix-list *WORD* [**seq** *SEQUENCE-NUMBER*] (**deny** | **permit**)

(**any** | *A.B.C.D/M* [**ge** *GE-LENGTH*] [**le** *LE-LENGTH*])

no ip prefix-list *WORD* [**seq** *SEQUENCE-NUMBER*]

WORD	Config a name to identify the prefix list
seq SEQUENCE-NUMBER	Applies a sequence number to a prefix-list entry. The range of sequence number that can be entered is from 1 to 65535. If a sequence number is not entered when configuring this command, a default sequence numbering is applied to the prefix list. The number 5 is applied to the first prefix entry, and subsequent unnumbered entries are incremented by 5
deny	Denies access for a matching condition
permit	Permits access for a matching condition
A.B.C.D/M	Configures the network address, and the length of the network mask in bits. The network number can be any valid IP address or prefix. The bit mask can be a number from 0 to 32

ge GE-LENGTH	(Optional)Specifies the lesser value of a range (the “from” portion of the range description) by applying the ge-length argument to the range specified. The ge-length argument represents the minimum prefix length to be matched
le LE-LENGTH	(Optional)Specifies the greater value of a range (the “to” portion of the range description) by applying the le-length argument to the range specified. The le-length argument represents the maximum prefix length to be matched

Command Mode

Global Configuration

Default

No prefix lists are created.

Usage

The ip prefix-list command is used to configure IP prefix filtering. Prefix lists are configured with permit or deny keywords to either permit or deny the prefix based on the matching condition. A prefix list consists of an IP address and a bit mask. The IP address can be a classful network, a subnet, or a single host route. The bit mask is entered as a number from 1 to 32. An implicit deny is applied to traffic that does not match any prefix-list entry. Prefix lists are configured to match an exact prefix length or a prefix range. The ge and le keywords are used to specify a range of the prefix lengths to match, providing more flexible configuration than can be configured with just the network/length argument. The prefix list is processed using an exact match when neither the ge nor le keyword is entered. If only the ge value is entered, the range is the value entered for the ge ge-length argument to a full 32-bit length. If only the le value is entered, the range is from value entered for the network/length argument to the le le-length argument. If both the ge ge-length and le le-length keywords and arguments are entered, the range falls between the values used for the ge-length and le-length arguments. The following formula shows this behavior:

Network/length < ge ge-length < le le-length <= 32.

A prefix list is configured with a name and/or sequence number. One or the other must be entered when configuring this command. If a sequence number is not entered, a default sequence number of 5 is applied to the prefix list. And subsequent prefix list entries will be increment by 5 (for example, 5, 10, 15, and onwards). If a sequence number is entered for the first prefix list entry but not subsequent entries, then the subsequent entries will also be incremented by 5 (For example, if the first configured sequence number is 3, then subsequent entries will be 8, 13, 18, and onwards). Default sequence numbers can be suppressed by entering the no form of this command with the seq keyword. Prefix lists are evaluated starting with the lowest sequence number and continues down the list until a match is made. Once a match is made that covers the network the permit or deny statement is applied to that network and the rest of the list is not evaluated.

Examples

The following example shows how to configure ip prefix-list:

To deny the default route 0.0.0.0/0:

Switch(config)# ip prefix-list abc deny 0.0.0.0/0

To permit the prefix10.0.0.0/8:

Switch(config)# ip prefix-list abc permit 10.0.0.0/8

To accept a mask length of up to 24 bits in routes with the prefix 192/16:

Switch(config)# ip prefix-list abc permit 192.168.0.0/16 le 24

To deny mask lengths greater than 25 bits in routes with the prefix 192/16:

Switch(config)# ip prefix-list abc deny 192.168.0.0/16 ge 25

Related Commands

ip prefix-list description

ip prefix-list sequence

show ip prefix-list

clear ip prefix-list

5.2 ip prefix-list description

To add a text description of a prefix list, use the ip prefix-list description command in global configuration mode. To remove the text description, use the no form of this command

Command Syntax

ip prefix-list *WORD* **description** *LINE*

no ip prefix-list *WORD* **description** [*LINE*]

WORD	Name of prefix list
LINE	Up to 80 characters describing this prefix-list

Command Mode

Global Configuration

Default

There is no description for prefix-list.

Usage

The prefix list will be created if it didn't exist.

Examples

The following example shows how to add description:

Switch(config)# ip prefix-list abc description Permit routes from customer A

Related Commands

ip prefix-list

ip prefix-list sequence

show ip prefix-list

clear ip prefix-list

5.3 ip prefix-list sequence-number

To enable the generation of sequence numbers for entries in a prefix list, use the ip prefix-list sequence-number command in global configuration mode. To disable this function, use the no form of this command.

Command Syntax

ip prefix-list sequence-number

no ip prefix-list sequence-numbe

Command Mode

Global Configuration

Default

This command has no default behavior.

Usage

This command is used to enable sequence-number display.

Examples

The following example shows how to enable ip prefix-list sequence-number:

Switch(config-if)# ip prefix-list sequence-number

Related Commands

ip prefix-list

show ip prefix-list

clear ip prefix-list

5.4 show ip prefix-list

To show prefix list information, use the show ip prefix-list command.

Command Syntax

show ip prefix-list (**summary** | **detail**|) (*WORD*|)

show ip prefix-list *WORD* (**seq** SEQUENCE-NUMBER|*A.B.C.D/M* (**longer** | **first-match**|) |)

summary	Summary of prefix lists
detail	Detail of prefix lists
WORD	Name of the prefix list
seq SEQUENCE-NUMBER	sequence number of the entry in the prefix list
A.B.C.D/M	IP prefix <network>/<length>, e.g., 35.0.0.0/8
longer	Lookup longer prefix
first-match	First matched prefix

Command Mode

Privileged EXEC

Default

This command has no default behavior.

Usage

None

Examples

The following example shows how to display ip prefix-list:

Switch(config)# show ip prefix-list

```
ip prefix-list aa: 2 entries
  permit 1.1.1.0/24
  permit 1.2.3.0/24
```

Related Commands

ip prefix-list

clear ip prefix-list

5.5 clear ip prefix-list

To Resets the hit count of the prefix list entries, use the clear ip prefix-list command.

Command Syntax

clear ip prefix-list (*WORD* (*A.B.C.D/M*|)|)

WORD	Name of the prefix list
A.B.C.D/M	IP prefix <network>/<length>, e.g., 35.0.0.0/8

Command Mode

Privileged EXEC

Default

This command has no default behavior.

Usage

None

Examples

The following example shows how to clear ip prefix-list:

Switch(config)# clear ip prefix-list test

Related Commands

ip prefix-list

6 Policy-Based Routing Commands

6.1 ip policy route-map

By default, PBR is disabled on the switch. To enable PBR, you must create a route map that specifies the match criteria and the resulting action if all of the match clauses are met. Then, you must enable PBR on a layer3 interface. All packets arriving on the specified interface matching the match clauses are subject to PBR.

Command Syntax

ip policy route-map *map-name*

no ip policy route-map

map-name	policy route-map name

Command Mode

Interface Configuration

Default

disabled

Usage

This command can only be configured on routed port, vlan interface and routed agg port.

Examples

The following example shows how to configure pbr on an interface.

switch (config)# ip access-list 1 extend

switch (config-ex-ip-acl)# 10 permit any any any

switch (config-route-map)#exit

switch (config)#route-map richard permit 10

switch (config-route-map)#match ip address 1

switch (config-route-map)#set ip next-hop 10.1.1.1

switch (config-route-map)#exit

switch (config)#interface eth-0-1

switch (config-if)#no switchport

switch (config-if)#no shutdown

switch (config-if)#ip policy route-map richrad

Related Commands

route-map

6.2 show ip policy route-map

Use this command to display user readable policy route-map information

Command Syntax

show ip policy route-map

Command Mode

Privileged EXEC

Default

Disabled

Usage

If some of the PBR entries are not successfully inserted into tcam, an error tip will be displayed.

Examples

SWITCH# show ip policy route-map

```
Route-map                    interface
richard                       eth-0-1
                             eth-0-3
Failed entry: no
sally                         eth-0-2
Failed entry: yes
Please use Policy Based-Routing CLI: show pbr failed entry to gain more detail.
```

Related Commands

route-map

show pbr failed entry

6.3 show resource pbr

Use this command to display the resource usage over the policy based routing module.

Command Syntax

show pbr failed entry

Command Mode

Privileged EXEC

Default

Disabled

Usage

None

Examples

SWITCH# show resource pbr

```
Policy Based Routing
Resouce               Used         Capability
================================================
Policy Route Map           0           64
Policy Based Routing ACE    0           32
```

Related Commands

route-map

show ip policy route-map