M Commands

mac-list

To filter based on a MAC address, use the **mac-list** command. To remove the MAC list entry, use the **no** form of this command.

mac-list *name* [**seq** *number*] {**permit** | **deny**} *mac-address [mac-mask]*
mac-list *name* [**seq** *number*] {**permit** | **deny**} *mac-address [mac-mask]*

Syntax Description

name	MAC list name. The name can be any case-sensitive, alphanumeric string up to 32 characters.
seq *number*	Creates an entry in the MAC list. The *seq* range is from 1 to 4294967294.
permit	Allows the packet or route that matches a MAC address in the MAC list.
deny	Blocks the packet or route that matches a MAC address in the MAC list.
mac-address	MAC address to filter against.
mac-mask	Portion of the MAC address to match against, in MAC address format.

Command Default

No match values are defined.

Command Modes

global configuration

Command History

Release	Modification
5.0(2)	This command was introduced.

Usage Guidelines

To filtean Overlay Transport Virtualization (OTV) packetr based on MAC address, use the mac-list command. You can match against this MAC list in a route map associated with OTV redistribution.

This command requires the LAN Enterprise license.

Examples

This example shows how to create the Red MAC list:

```
switch#configure terminal
switch(config)# mac-list Red seq 1 permit 0022.5579.a4c1 ffff.ffff.0000
```

Related Commands

Command	Description
match mac-list	Matches a MAC address in a MAC list for OTV.
show mac-list	Displays information about a MAC list.

mac address-table reserve-hsrp-vmac

To enable mac reservation for all vlan, use mac address-table reserve-hsrp-vmac command.

mac address-table reserve-hsrp-vmac [*vlan_id*]

Table 1: Syntax Description

vlan_id	Specifies the VLAN id to reserve the mac address table for HSRP.

Table 2: Command History

Release	Modification
8.4(6)	This command was introduced.

```
switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# mac address-table reserve-hsrp-vmac
switch(config)# interface vlan
<1-4094> Vlan interface number
switch(config)# interface vlan 1001
switch(config-if)# shut
switch(config-if)# show mac address-table vlan 1001
Note: MAC table entries displayed are getting read from software.
Use the 'hardware-age' keyword to get information related to 'Age'
Legend:
* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
age - seconds since last seen,+ - primary entry using vPC Peer-Link, E - EVPN entry
(T) - True, (F) - False , ~~~ - use 'hardware-age' keyword to retrieve age info
VLAN/BD MAC Address Type age Secure NTFY Ports/SWID.SSID.LID
---------+-----------------+--------+---------+------+----+------------------
* 1001 0000.0044.0004 static - F F 10.0.3590
* 1001 0005.73a0.03e9 static - F F 10.0.3590
* 1001 8c60.4f9e.4fc2 static - F F 10.0.3590
* 1001 d867.d904.3ec3 dynamic ~~~ F F Po1
switch(config-if)# show mac address-table vlan 1001 address
E.E.E MAC Address (Option 1)
EE-EE-EE-EE-EE-EE MAC Address (Option 2)
EE:EE:EE:EE:EE:EE MAC Address (Option 3)
EEEE.EEEE.EEEE MAC Address (Option 4)
switch(config-if)# show mac address-table vlan 1001 address 0000.0044.0004
Note: MAC table entries displayed are getting read from software.
Use the 'hardware-age' keyword to get information related to 'Age'
Legend:
* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC
age - seconds since last seen,+ - primary entry using vPC Peer-Link, E - EVPN entry
(T) - True, (F) - False , ~~~ - use 'hardware-age' keyword to retrieve age info
VLAN/BD MAC Address Type age Secure NTFY Ports/SWID.SSID.LID
---------+-----------------+--------+---------+------+----+------------------
* 1001 0000.0044.0004 static - F F 10.0.3590
switch(config-if)#
```

match as-number

To match to a Border Gateway Protocol (BGP) autonomous system (AS) number, use the **match as-number** command. To remove an AS number list entry, use the **no** form of this command.

match as-number {*number [,number...]* | **as-path-access-list** *name* [... *name*]}
no match as-number {*number [, number...]* | **as-path-access-list** *name* [... *name*]}

Syntax Description

number	AS number. The range is from 1 to 65535.
...number	(Optional) AS number. The range is from 1 to 65535.
as-path-access-list *name*	Specifies an AS-path access list to match AS numbers against. The name can be any alphanumeric string up to 63 characters.
...name	(Optional) AS-path access list. The name can be any alphanumeric string up to 63 characters.

Command Default None

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.1(2)	This command was introduced.

Usage Guidelines Use the **match as-number** command to provide a list of AS numbers or an AS-path access list using a regular expression. BGP uses this match criteria to determine which BGP peers to create a BGP session with.

Use the route map to specify a range of AS numbers whose peers can establish session with the local BGP through prefix peering. Cisco NX-OS ignores any other **match** commands if the **match as-number** command is present in the route-map.

This command does not require a license.

Examples This example shows how to configure a list of AS numbers:

```
switch#configure terminal
switch(config)# route-map IGP2BGP
switch(config-route-map)# match as-number 64496, 64498-64510
```

Related Commands

Command	Description
ip as-path access-list	Creates an AS-path list.
neighbor	Configures BGP peers.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

match as-path

To match a BGP autonomous system path access list, use the **match as-path** command in route-map configuration mode. To remove a path list entry, use the **no** form of this command.

match **as-path** *name* [. . . *name*]
no **match** **as-path** *name* [. . . *name*]

Syntax Description		
name	Autonomous system path access list. The name can be any alphanumeric string up to 63 characters.
...name	(Optional) Autonomous system path access list. You can configure up to 32 access list names .

Command Default
No path lists are defined.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines
The values set by the **match as-path** command overrides global values.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

This command does not require a license.

Examples
This example sets the autonomous system path to match BGP autonomous system path access list 20:

```
switch#configure terminal
switch(config)# route-map IGP2BGP
switch(config-route-map)# match as-path 20
```

Related Commands

Command	Description
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match route-type	Redistributes routes of the specified type.

Command	Description
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set comm-list	Automatically computes the tag value in a route map configuration.
set community	Sets BGP community list (for deletion).
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set origin (BGP)	Sets the BGP origin code.
set tag	Sets the value of the destination routing protocol.
set vrf	Sets the VRF for next-hop resolution.
set weight	Specifies the BGP weight for the routing table.

match community

To match a Border Gateway Protocol (BGP) community, use the **match community** command. To remove the **match community** command from the configuration file and restore the system to its default condition where the software removes the BGP community list entry, use the **no** form of this command.

community *name* [**...** *name*] [**exact-match**]
no **community** *name* [**...** *name*] [**exact-match**]

Syntax Description

name	One or more community list names. The name can be any alphanumeric string up to 63 characters. You can configure a maximum of 32 community lists.
exact-match	(Optional) Indicates that an exact match is required. All of the communities and only those communities specified must be present.

Command Default

No community list is matched by the route map.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

A route map can have several parts. Any route that does not match at least one **match** command relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

Matching that is based on the community list number is one of the types of **match** commands applicable to BGP.

This command does not require a license.

Examples

This example shows how to match two BGP communities:

```
switch#configure terminal
switch(config)# route-map test2
switch(config-route-map)# match community bgpLow bgpHigh
```

This example shows that the routes matching community list 1 will have the weight set to 200. Any route that has the standard community 109 only will have the weight set to 200.

```
switch#configure terminal
switch(config)# ip community-list standard bgpLow permit 109
switch(config)# route-map set_weight
switch(config-route-map)# match community bgpLow exact-match
switch(config-route-map)# set weight 200
```

This example shows that the routes that match the community list 500. Any route that has expanded community 1 will have the weight set to 150.

```
switch#configure terminal
switch(config)# ip community-list expanded 500 permit [0-9]*
switch(config)# route-map MAP_NAME permit 10
switch(config-route-map)# match community 500
switch(config-route-map)# set weight 150
```

Related Commands

Command	Description
ip community-list	Creates a community list for BGP and controls access to it.
route-map	Defines the conditions for redistributing routes from one routing protocol into another.
set weight	Specifies the BGP weight for the routing table.

match extcommunity

To match a Border Gateway Protocol (BGP) extended community in a route map, use the **match extcommunity** command. To remove the match from the route map, use the **no** form of this command.

extcommunity *name* [**. . .** *name*] [**exact-match**]
no extcommunity *name* [**. . .** *name*] [**exact-match**]

Syntax Description	*name*	One or more extended community list names. The name can be any alphanumeric string up to 63 characters. You can configure a maximum of 32 community lists.
	exact-match	(Optional) Indicates that an exact match is required. All of the communities and only those extended communities specified must be present.

Command Default No community list is matched by the route map.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.2(1)	This command was introduced.

Usage Guidelines A route map can have several parts. Any route that does not match at least one **match** command in the route map will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

Matching that is based on the extended community list number is one of the types of **match** commands applicable to BGP.

This command does not require a license.

Examples This example shows how to match two BGP extended community lists:

```
switch#configure terminal
switch(config)# route-map test2
switch(config-route-map)# match extcommunity bgpLocal bgpRemote
```

This example shows how to that the routes that match the extended community list bgpLocal will change from nontransitive to transitive:

```
switch#configure terminal
switch(config)# ip extcommunity-list standard bgpLocal permit generic nontransitive 1.9
switch(config)# route-map deleteCommunity
switch(config-route-map)# match extcommunity bgpLocal exact-match
switch(config-route-map)# set extcommunity generic transitive 1.9
```

Related Commands

Command	Description
ip extcommunity-list	Creates a community list for BGP and controls access to it.

Command	Description
route-map	Defines the conditions for redistributing routes from one routing protocol into another.
send-community	Configures BGP to propagate community attributes to BGP peers.
set extcommunity	Sets an extended community in a route map.

match interface

To match an interface in a route map, use the **match interface** command. To remove the match, use the **no** form of this command.

match interface {*interface-type number* [, *interface-type number*...]}
nomatch interface {*interface-type number* [, *interface-type number*...]}

Syntax Description

interface-type	Interface type. Use **?** to see a list of supported interfaces.
number	(Optional) Interface number. Use **?** to see the range.

Command Default None

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.1(2)	This command was introduced.

Usage Guidelines Use the **match interface** command to provide a list of interfaces to match a route against. Route next-hop addresses that are reached by one of these interfaces result in a match for the route map.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

This command does not require a license.

Examples This example shows how to configure a list of interfaces:

```
switch#configure terminal
switch(config)# route-map test1
switch(config-route-map)# match interface ethernet 2/1, ethernet 4/3
```

Related Commands

Command	Description
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

match ip address

To distribute any routes that have a destination IPv4 network number address that is permitted by a standard access list, an expanded access list, or a prefix list, or to perform policy routing on packets, use the **match ip address** command. To remove the **match ip address** entry, use the **no** form of this command.

match ip address {*access-list-name* [*access-list-name*...] | **prefix-list** *prefix-list-name* [*prefix-list-name*...]}
nomatch ip address {*access-list-name* [*access-list-name*...] | **prefix-list** *prefix-list-name* [*prefix-list-name*...]}

Syntax Description		
	access-list-name...	Name of a standard or expanded access list. It can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists.
	prefix-list *prefix-list-name...*	Distributes routes based on a prefix list. The prefix list name can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists.

Command Default

No access list names or prefix lists are specified.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

The *access-list-name* argument is supported in route maps for Policy based-routing (PBR) only.

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *access-list-name* or the *prefix-list-name* arguments .

Like matches in the same route map subblock are filtered with "or" semantics. If any one match clause is matched in the entire route map subblock, this match is treated as a successful match. Dissimilar match clauses are filtered with "and" semantics. Dissimilar matches are filtered logically. If the first set of conditions is not met, the second match clause is filtered. This process continues until a match occurs or there are no more match clauses.

Use route maps to redistribute routes or to subject packets to policy routing.

Redistribution

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

When you are passing routes through a route map, a route map can have several sections that contain specific **match** clauses. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route map section with an explicit match specified.

Policy Routing

Another purpose of route maps is to enable policy routing. The match ip address command allows you to policy route packets based on criteria that can be matched with an expanded access list; for example, a protocol, protocol service, and source or destination IP address. To define the conditions for policy routing packets, use the **ip policy route-map** interface configuration command, in addition to the **route-map** global configuration command, and the **match** and **set** route-map configuration commands. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which policy routing occurs. The **set** commands specify the *set actions*—the particular routing actions to perform if the criteria enforced by the **match** commands are met. You might want to policy route packets based on their source, for example, using an access list.

This command does not require a license.

Examples

This example shows how to match routes that have addresses specified by an access list test:

```
switch#configure terminal
switch(config)# feature pbr
switch(config)# interface ethernet 2/10
switch(config-if)# ip policy route-map chicago
switch(config-if)# exit
switch(config)# route-map chicago
switch(config-route-map)# match ip address test
```

Related Commands

Command	Description
ip policy route-map	Identifies a route map to use for policy routing on an interface.
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface	Distributes any routes that have their next hop out one of the interfaces specified.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match metric	Redistributes routes with the metric specified.

Command	Description
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ip next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP,OSPF,RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ip multicast

To configure the IPv4 multicast features for the route-map matching, use the **match ip multicast** route-map configuration command. To remove the match, use the **no** form of this command.

match ip multicast {**group** *address/length* | **source** *address/length* | **rp** *address/length* [**rp-type** {**asm** | **bidir**}]}
no match ip multicast

Syntax Description

group *address/length*	Specifies the group address and the length of the network mask in bits, in this format: *A.B.C.D/length*. The network number can be any valid IP address or prefix. The bit mask can be a number from 0 to 32.
	You can configure group, source, and rp options.
source *address/length*	Specifies the source address and the length of the network mask in bits, in this format: *A.B.C.D/length*. The network number can be any valid IP address or prefix. The bit mask can be a number from 0 to 32.
	You can configure group, source, and rp options.
rp *address/length*	Specifies the IPv4 rendezvous prefix (RP) and the length of the IPv4 prefix mask in bits, in this format: *A.B.C.D/length*. The network number can be any valid IPv4 address or prefix. The bit mask can be a number from 0 to 32.
	You can configure group, source, and rp options.
rp-type	(Optional) Specifies the multicast rendezvous point type.
asm	Specifies the any-source multicast (ASM) rendezvous point type.
bidir	Specifies the bidirectional (bidir) multicast rendezvous point type.

Command Default None

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.
4.1(2)	Added **source** keyword.

Usage Guidelines To specify the multicast attributes to match, use the **match ip multicast** command.

Use the **route-map** command to enter route-map configuration mode. Once you enter the **route-map** command, the prompt changes to the following:

```
switch(config-route-map)#
```

Once you enter route-map configuration mode, you can enter the **match ip multicast** command.

You can configure both group and rp options.

This command does not require a license.

Examples

This example shows how to specify the group IPv4 prefix and the length of the IPv4 prefix for the neighbors to match:

```
switch#configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match ip multicast group 192.0.0.0/19
switch(config-route-map)#
```

This example shows how to specify both the group IPv4 prefix and the rendezvous point the IPv4 prefix for the neighbors to match:

```
switch#configure terminal
switch(config)# route-map raspberry
switch(config-route-map)# match ip multicast group 192.0.0.0/19 rp 209.165.201.0/27
switch(config-route-map)#
```

Related Commands

Command	Description
ip policy route-map	Identifies a route map to use for policy routing on an interface.
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface	Distributes any routes that have their next hop out one of the interfaces specified.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match metric	Redistributes routes with the metric specified.
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.

Command	Description
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ip next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP,OSPF,RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ip next-hop prefix-list

To redistribute any IPv4 routes that have a next hop router address passed by one of the access lists specified, use the **match ip next-hop prefix-list** command in route-map configuration mode. To remove the next hop entry, use the **no** form of this command.

match ip next-hop prefix-list *prefix-list-name* [**. . .** *prefix-list-name*]
nomatch ip next-hop prefix-list *prefix-list-name* [**. . .** *prefix-list-name*]

Syntax Description

| *prefix-list-name* | Number or name of a prefix list. It can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists. |

Command Default

Routes are distributed freely, without being required to match a next hop address.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *prefix-list-name* argument .

Use the route-map global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current route-map command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

When you are passing routes through a route map, a route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route map section with an explicit match specified.

This command does not require a license.

Examples

This example shows how to distributes routes that have a next hop router address passed by the prefix list test:

```
switch#configure terminal
switch(config)# route-map blue
switch(config-route-map)# match ip next-hop prefix-list test
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP,OSPF,RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ip route-source prefix-list

To redistribute IPv4 routes that have been advertised by routers and access servers at the address specified by the access lists, use the **match ip route-source prefix-list** command in route-map configuration mode. To remove the route-source entry, use the **no** form of this command.

match ip route-source prefix-list *prefix-list-name* [. . .*prefix-list-name*]
nomatch ip route-source prefix-list *prefix-list-name* [. . .*prefix-list-name*]

Syntax Description

prefix-list-name	Number or name of a prefix list. It can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists.

Command Default   No filtering on route source.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *prefix-list-name* argument .

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

There are situations in which the next hop and source router address of the route are not the same.

This command does not require a license.

Examples   This example shows how to distribute routes that have been advertised by routers and access servers at the addresses specified by access lists 5 and 80:

```
switch#configure terminal
switch(config)# route-map blue
switch(config-route-map)#  match ip route-source prefix-list 5 80
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match route-type	Redistributes routes of the specified type.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP,OSPF,RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ipv6 address

To distribute any routes that have a destination IPv6 network number address that is permitted by a standard access list, an expanded access list, or a prefix list, or to perform policy routing on packets, use the **match ipv6 address** command in route-map configuration mode. To remove the **match** statement from the route map, use the **no** form of this command.

match ipv6 address {**prefix-list** *prefix-list-name* [*prefix-list-name* **. . .**]*access-list-name*}
nomatch ipv6 address {**prefix-list** *prefix-list-name* [*prefix-list-name* **. . .**]*access-list-name*}

Syntax Description	**prefix-list** *prefix-list-name...*	Distributes routes based on a prefix list. The prefix list name can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered. You can configure up to 32 prefix lists.
	access-list-name...	Name of a standard or expanded access list. It can be any alphanumeric string up to 63 characters.
		You can only use access lists for policy-based routing.

Command Default No access list names or prefix lists are specified.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	**Modification**
4.0(1)	This command was introduced.

Usage Guidelines The *access-list-name* argument is supported in route-maps for PBR only.

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *prefix-list-name* argument .

Like matches in the same route map subblock are filtered with "or" semantics. If any one match clause is matched in the entire route map subblock, this match is treated as a successful match. Dissimilar match clauses are filtered with "and" semantics. So dissimilar matches are filtered logically. If the first set of conditions is not met, the second match clause is filtered. This process continues until a match occurs or there are no more match clauses.

Use route maps to redistribute routes or to subject packets to policy routing. Both purposes are described in this section.

Redistribution

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

When you are passing routes through a route map, a route map can have several sections that contain specific **match** clauses. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route map section with an explicit match specified.

Policy Routing

Another purpose of route maps is to enable policy routing. The match ipv6 address command allows you to policy route packets based on criteria that can be matched with an expanded access list; for example, a protocol, protocol service, and source or destination IP address. To define the conditions for policy routing packets, use the **ipv6 policy route-map** interface configuration command, in addition to the **route-map** global configuration command, and the **match** and **set** route-map configuration commands. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which policy routing occurs. The **set** commands specify the *set actions*—the particular routing actions to perform if the criteria enforced by the **match** commands are met. You might want to policy route packets based on their source, for example, using an access list.

This command does not require a license.

Examples

This example shows how to match routes that have addresses specified by the access list named red:

```
switch#configure terminal
switch(config)# feature pbr
switch(config)# route-map blue
switch(config-route-map)# match ipv6 address red
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface	Distributes any routes that have their next hop out one of the interfaces specified.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match metric	Redistributes routes with the metric specified.
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.

Command	Description
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ip next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP,OSPF,RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ipv6 multicast

To configure the IPv6 multicast features for the route-map matching, use the **match ipv6 multicast** route-map configuration command.

match ipv6 multicast {**group** *address/length* | **source** *address/length* | **rp** *address/length* [**rp-type** {**asm** | **bidir**}]}

Syntax Description

group *address/length*	Specifies the group address and the length of the network mask in bits, in this format: *A:B::C:D/length*. The network number can be any valid IPv6 address or prefix. The range for *length* is 0 to 0x7FFFFFFF . You can specify the **group**, **source**, and **rp** options.
source *address/length*	Specifies the source address and the length of the network mask in bits, in this format: *A:B::C:D/length*. The network number can be any valid IPv6 address or prefix. The range for *length* is 0 to 0x7FFFFFFF . You can specify the **group**, **source**, and **rp** options.
rp *address/length*	Specifies the IPv6 rendezvous prefix (RP) and the length of the IPv6 prefix mask in bits, in this format: *A:B::C:D/length*. The network number can be any valid IPv6 address or prefix. The bit mask can be a number from 0 to 32. You can specify the **group**, **source**, and **rp** options.
rp-type	(Optional) Specifies the multicast rendezvous point type.
asm	Specifies the any-source multicast (ASM) rendezvous point type.
bidir	Specifies the bidirectional (bidir) multicast rendezvous point type.

Command Default None

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.
4.1(2)	Added the **source** keyword.

Usage Guidelines To specify the multicast attributes to match, use the **match ipv6 multicast** route-map configuration command. You must enter the **feature pbr** global configuration mode command to enable PBR before entering the **route-map** command.

Use the **route-map** command to enter route-map configuration mode. Once you enter the **route-map** command, the prompt changes to the following:

```
switch(config-route-map)#
```

Once you enter route-map configuration mode, you can enter the **match ipv6 multicast** command.

You can specify the **group, source,** and **rp** options.

This command does not require a license.

Examples

This example shows how to specify the group IPv6 prefix and the length of the IPv6 prefix for the neighbors to match:

```
switch#configure terminal
switch(config)# route-map blueberry
switch(config-route-map)#match ipv6 multicast group 30:0::0:0/12
switch(config-route-map)#
```

This example shows how to specify both the group IPv6 prefix and the rendezvous point IPv6 prefix for the neighbors to match:

```
switch#configure terminal
switch(config)# route-map red
switch(config-route-map)#match ipv6 multicast group 30:0::0:0/12 rp 2001:0DB8::/48
switch(config-route-map)#
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ipv6 next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ipv6 route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set community	Sets the BGP communities attribute.
set ipv6 default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ipv6 next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.

Command	Description
set metric	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ipv6 next-hop prefix-list

To redistribute any IPv6 routes that have a next hop router address passed by one of the access lists specified, use the **match ipv6 next-hop prefix-list** command. To remove the next hop entry, use the **no** form of this command.

match ipv6 next-hop prefix-list *name* [. . . *name*]
nomatch ipv6 next-hop prefix-list *name* [. . . *name*]

Syntax Description

name...	Prefix list name. It can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists.

Command Default   Routes are distributed freely, without being required to match a next hop address.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *name* argument .

Use the route-map global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current route-map command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Note   A permit route map containing only **set** commands and no **match** commands permits all routes.

When you are passing routes through a route map, a route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route map section with an explicit match specified.

This command does not require a license.

Examples   This example shows how to distribute routes that have a next hop router address passed by prefix list 5:

```
switch# configure terminal
switch(config)# route-map blue
switch(config-route-map)#match ipv6 next-hop prefix-list test
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ipv6 next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match route-type	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set community	Sets the BGP communities attribute.
set ipv6 default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ipv6 next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match ipv6 route-source prefix-list

To redistribute IPv6 routes that have been advertised by routers and access servers at the address specified by the access lists, use the **match ipv6 route-source prefix-list** command in route-map configuration mode. To remove the route-source entry, use the **no** form of this command.

match ipv6 route-source prefix-list *name* [...*name*]
nomatch ipv6 route-source prefix-list *name* [...*name*]

Syntax Description

name...	Prefix list name. It can be any alphanumeric string up to 63 characters. The ellipsis indicates that multiple values can be entered, up to 32 prefix lists.

Command Default

No filtering on route source.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *name* argument .

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

There are situations in which the next hop and source router address of the route are not the same.

This command does not require a license.

Examples

This example shows how to distribute routes that have been advertised by routers and access servers at the addresses specified by the prefix list test:

```
switch# configure terminal
switch(config)# route-map blue
```

```
switch(config-route-map)# match ipv6 route-source prefix-list test
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match route-type	Redistributes routes of the specified type.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match length

To base policy routing on the Level 3 length of a packet, use the **match length** command. To remove the entry, use the **no** form of this command.

match length *minimum-length maximum-length*
no match length *minimum-length maximum-length*

<table>
<tr><td rowspan="4">**Syntax Description**</td></tr>
<tr><td>*minimum-length*</td><td>Minimum Level 3 length of the packet, inclusive, allowed for a match. Range: 0 to 2147483647.</td></tr>
<tr><td>*maximum-length*</td><td>Maximum Level 3 length of the packet, inclusive, allowed for a match. Range: 0 to 2147483647.</td></tr>
</table>

Command Default

No policy routing occurs on the length of a packet.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

In IPv4, use the **ip policy route-map** interface configuration command, the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for policy routing packets. The **ip policy route-map** command identifies a route map by name. Each **route-map** has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which policy routing occurs. The **set** commands specify the *set actions*—the particular routing actions to perform if the criteria enforced by the **match** commands are met.

In PBR for IPv6, use the **ipv6 policy route-map** or **ipv6 local policy route-map** command to define conditions for policy routing packets.

In IPv4, the **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the packet to be routed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

In IPv4, you might want to base your policy routing on the length of packets so that your interactive traffic and bulk traffic are directed to different routers.

This command does not require a license.

Examples

This example shows how to set the packets 3 to 200 bytes long:

```
switch# configure terminal
switch(config)# route-map blue
switch(config-route-map)# match length 3 200
```

Related Commands

Command	Description
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ipv6 address	Specifies an IPv6 access list to use to match packets for PBR for IPv6.
match length	Bases policy routing on the Level 3 length of a packet.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco NX-OS software has no explicit route to a destination.
set ipv6 default next-hop	Specifies an IPv6 default next hop to which matching packets will be forwarded.
set ipv6 next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set ipv6 precedence	Sets the precedence value in the IPv6 packet header.

match metric

To redistribute routes in the routing table that match the routing metric value, use the **match metric** command. To remove the tag entry, use the **no** form of this command.

match metric *metric-value* [**+-***deviation-number*] [**. . . metric-value** [**+-***deviation-number*]]
nomatch metric *metric-value* [**+-***deviation-number*] [**. . . metric-value** [**+-***deviation-number*]]

Syntax Description

metric-value	Internal route metric. The range is from 1 to 4294967295.
+ -	Specifies a standard deviation range of the metric. The router will match any metric that falls inclusively in that range.
deviation-number	(Optional) Standard deviation number that will offset the number configured for the *metric-value* argument. The *deviation-number* argument can be any number. There is no default.

Command Default

No match values are defined.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
5.0(2)	This command was introduced.

Usage Guidelines

To redistribute routes with the specified metric, use the **match metric** command in route-map configuration mode. To remove the entry for the redistributed route from the routing table, use the no form of this command.

You can specify one or more metrics (or) range of metrics using the *deviation-number* argument. At least one of the specified metrics must match for the command to "pass".

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the arguments .

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

This command requires the LAN Enterprise license.

Examples

This example shows how to redistribute routes stored in the routing table with a metric of 5:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match metric 5
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric	Redistributes routes with the metric specified.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match mac-list

To redistribute routes in the routing table that match a MAC address in the MAC list, use the **match mac-list**command in route-map configuration mode. To remove the tag entry, use the **no** form of this command.

match mac-list *listname*
no match mac-list *listname*

Syntax Description

listname	MAC list name. The name can be any case-sensitive, alphanumeric string up to 32 characters.

Command Default No match values are defined.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
5.0(2)	This command was introduced.

Usage Guidelines To redistribute routes with the specified MAC address into an Overlay Transport Virtualization (OTV) network, use the **match mac-list** command in route-map configuration mode. To remove the entry for the redistributed route from the routing table, use the no form of this command.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

This command requires the LAN Enterprise license.

Examples This example shows how to redistribute routes stored in the routing table that match entries in the Red MAC list:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match mac-list Red
```

	Command	Description
Related Commands	**match as-path**	Matches a BGP autonomous system path access list.
	match community	Matches a BGP community.
	match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
	match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
	match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
	match metric	Redistributes routes with the metric specified.
	match tag	Redistributes routes in the routing table that match the specified tags.
	route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
	set as-path	Modifies an autonomous system path for BGP routes.
	set community	Sets the BGP communities attribute.
	set level	Indicates where to import routes.
	set local-preference	Specifies a preference value for the autonomous system path.
	set metric	Sets the metric value for a routing protocol.
	set metric-type	Sets the metric type for the destination routing protocol.
	set next-hop	Specifies the address of the next hop.
	set tag	Sets a tag value of the destination routing protocol.
	set weight	Specifies the BGP weight for the routing table.

match route-type

To redistribute routes of the specified type, use the **match route-type** command in route-map configuration mode. To remove the route type entry, use the **no** form of this command.

match route-type {**external** | **inter-area** | **internal** | **intra-area** | **level-1** | **level-2** | **local** | **nssa-external** | **type-1** | **type-2**}
no match route-type {**external** | **inter-area** | **internal** | **intra-area** | **level-1** | **level-2** | **local** | **nssa-external** | **type-1** | **type-2**}

Syntax Description

external	Specifies the external route (Border Gateway Protocol [BGP], Enhanced Interior Gateway Routing Protocol [EIGRP], and Open Shortest Path First [OSPF] type 1/2).
	You can specify more than one keyword.
inter-area	Specifies OSPF inter area route.
	You can specify more than one keyword.
internal	Specifies the internal route (including the OSPF intra/inter area).
	You can specify more than one keyword.
intra-area	Specifies OSPF intra area route.
	You can specify more than one keyword.
level-1	Specifies the Intermediate System-to-Intermediate System (IS-IS) level-1 route.
	You can specify more than one keyword.
level-2	Specifies the IS-IS level-2 route.
	You can specify more than one keyword.
local	Specifies the locally generated route.
	You can specify more than one keyword.
nssa-external	Specifies the nssa-external route (OSPF type 1/2).
	You can specify more than one keyword.
type-1	Specifies the OSPF external type 1 route.
	You can specify more than one keyword.
type-2	Specifies the OSPF external type 2 route.
	You can specify more than one keyword.

Command Default

This command is disabled by default.

Command Modes

Route-map configuration (config-route-map)

Command History	**Release**	**Modification**
	6.1(1)	Added inter-area and intra-area keywords to the syntax description.
	4.0(1)	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

You can specify more than one keyword.

This command does not require a license.

Examples

This example shows how to redistribute internal routes:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match route-type internal
```

This example shows how to redistribute internal routes and type-1 OSPF routes:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match route-type internal type-1
```

This example shows how to specifies OSPF inter area route:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match route-type inter-area
switch(config-route-map)#
```

This example shows how to specifies OSPF intra area route:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match route-type intra-area
switch(config-route-map)#
```

Related Commands

Command	**Description**
match as-path	Matches a BGP autonomous system path access list.

Command	Description
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric	Redistributes routes with the metric specified.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match source-protocol

To specify a match clause that matches external routes from sources that match the source protocol, use the **match source-protocol** command.

match source-protocol *source-protocol* [*as-number*]

Syntax Description

source-protocol	Source protocol. The valid options are bgp, connected, eigrp, isis, ospf, rip, and static.
as-number	Autonomous System Number (ASN). The range is from 1 to 65535.

Command Default

None

Command Modes

config-router mode

Command History

Release	Modification
6.2(2)	This command was introduced.

Usage Guidelines

This command requires the Enterprise Services license.

Examples

This example shows how to specify a match clause that matches external routes from sources that match the source protocol:

```
switch# configure terminal
switch(config)# route-map metric-rangeouter eigrp Test1
switch(config-router)# match metric external 500 +- 100
switch(config-router)# match source-protocol bgp 45000
switch(config-router)#
```

Related Commands

Command	Description
set tag	Sets a tag value on the route in the destination routing protocol when all the match criteria of a route map are met.

match tag

To redistribute routes in the routing table that match the specified tags, use the **match tag** command. To remove the tag entry, use the **no** form of this command.

match tag *tag-value* [. . . *tag-value*]
nomatch tag *tag-value* [. . . *tag-value*]

Syntax Description

tag-value	List of one or more route tag values. Each can be an integer from 0 to 4294967295. You can configure up to 32 tags.

Command Default

No match tag values are defined.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *tag-value* argument .

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

This command does not require a license.

Examples

This example shows how to redistribute routes stored in the routing table with tag 5:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match tag 5
```

Related Commands	Command	Description
	match as-path	Matches a BGP autonomous system path access list.
	match community	Matches a BGP community.
	match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
	match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
	match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
	match metric	Redistributes routes with the metric specified.
	match tag	Redistributes routes in the routing table that match the specified tags.
	route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
	set as-path	Modifies an autonomous system path for BGP routes.
	set community	Sets the BGP communities attribute.
	set level	Indicates where to import routes.
	set local-preference	Specifies a preference value for the autonomous system path.
	set metric	Sets the metric value for a routing protocol.
	set metric-type	Sets the metric type for the destination routing protocol.
	set next-hop	Specifies the address of the next hop.
	set tag	Sets a tag value of the destination routing protocol.
	set weight	Specifies the BGP weight for the routing table.

match vlan

To filter routes with the specified VLAN, use the **match vlan** command. To remove the entry for the redistributed route from the routing table, use the **no** form of this command.

match vlan *vlan-range*
no match vlan *vlan-range*

Syntax Description

vlan-range	Range of VLAN that this command matches against. The range is from 1 to 4094.

Command Default

No match VLAN values are defined.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
5.0(2)	This command was introduced.

Usage Guidelines

To filter routes with the specified VLAN, use the **match vlan** command You can specify one or more VLANs (or) range of VLANs. At least one of the specified VLANs must match for the command to pass. The command matches any VLAN that falls inclusive in the range.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands can be given in any order, and all **match** commands must "pass" to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure second route map section with an explicit match specified.

This command does not require a license.

Examples

This example redistributes routes that match VLANs 5-10:

```
switch# configure terminal
switch(config)# route-map blueberry
switch(config-route-map)# match vlan 5-10
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or expanded access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric	Redistributes routes with the metric specified.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set community	Sets the BGP communities attribute.
set level	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set tag	Sets a tag value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

max-lsp-lifetime

To set the maximum time for which link-state packets (LSPs) persist without being refreshed, use the **max-lsp-lifetime** command. To restore the default time, use the **no** form of this command.

max-lsp-lifetime *value*
no **max-lsp-lifetime**

| **Syntax Description** | *value* | (Optional) Maximum LSP lifetime in seconds. Range: 1 to 65535. Default: 1200. |

Command Default

The default is 1200 seconds.

Command Modes

Router configurationVRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

The maximum LSP lifetime must be greater than the LSP refresh interval.

This command requires the Enterprise Services license.

Command Default

This example shows how to set the maximum time that the LSP persists to 11,000 seconds (more than three hours):

```
switch# configure terminal
switch(config)# router isis
switch(config-router)# max-lsp-lifetime 11000
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
router isis	Enables IS-IS.

max-metric router-lsa (OSPF)

To configure the Open Shortest Path First (OSPF) protocol to advertise a maximum metric so that other routers do not prefer the router as an intermediate hop in their shortest path first (SPF) calculations, use the **max-metric router-lsa** command. To disable the advertisement of a maximum metric, use the **no** form of this command.

max-metric router-lsa [**external-lsa** *[max-metric-value]* [**include-stub**]] [**on-startup** [{*seconds* | **wait-for bgp** *tag*}]] [**summary-lsa** *[max-metric-value]*]

nomax-metric router-lsa [**external-lsa** *[max-metric-value]* [**include-stub**]] [**on-startup** [{*seconds* | **wait-for bgp** *tag*}]] [**summary-lsa** *[max-metric-value]*]

Syntax Description

external-lsa	Specifies the external LSAs.
max-metric-value	(Optional) Specifies the max-metric values for external LSAs. The range is 1-65535.
include-stub	Advertises the max-metric for stub links.
on-startup	(Optional) Configures the router to advertise a maximum metric at startup.
seconds	(Optional) Maximum metric (in seconds) that is advertised for the specified time interval. The configurable range is from 5 to 86400 seconds. The default is 600 seconds.
wait-for bgp *tag*	(Optional) Advertises a maximum metric until Border Gateway Protocol (BGP) routing tables have converged or the default timer has expired. The default timer is 600 seconds.
summary-lsa	Specifies the summary LSAs.
max-metric-value	(Optional) Specifies the max-metric value for summary LSAs. The range is from 1-65535.

Command Default   Originates router link-state advertisements (LSAs) with normal link metrics.

Command Modes

Router configuration
Router VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Use the **max-metric router-lsa** command to originate LSAs with a maximum metric (LSInfinity: 0xFFFF) through all nonstub links, which allows BGP routing tables to converge without attracting transit traffic (if there are not alternate lower cost paths to the router). The router advertises accurate (normal) metrics after the configured or default timers expire or after BGP sends a notification that routing tables have converged.

Updates hold true to all releases that have this command and option.

wait-for-bgp is a feature to avoid the IGP from declaring its ready to be used for transit after a reload, if BGP on the device has not converged yet (received the entire routing table from its peers and installed in FIB). This prevents an upstream node sending externally bound (BGP) traffic to this node prematurely and causing traffic blackholing.

> **Note** Directly connected links in a stub network are not affected by the configuration of a maximum or infinite metric because the cost of a stub link is always set to the output interface cost.

You can use the max-metric router-lsa command in the following situations:

- Reloading a router. After a router is reloaded, Interior Gateway Protocols (IGPs) converge very quickly, and other routers may try to forward traffic through the newly reloaded router. If the router is still building BGP routing tables, the packets that are destined for other networks that the router has not learned through BGP may be dropped.
- Introducing a router into a network without routing traffic through it. You may want to connect a router to an OSPF network but not want real traffic to flow through the router if there are better alternate paths. If no alternate paths exist, then this router would still accept transit traffic.
- Gracefully removing a router from a network. This feature allows you to gracefully remove a router from the network by advertising a maximum metric through all links, which allows other routers to select alternate paths for transit traffic to follow before the router is shut down.

> **Note** You should not save the running configuration of a router that is configured for a graceful shutdown because the router will continue to advertise a maximum metric after it is reloaded.

This command requires the Enterprise Services license.

Examples

This example shows how to configure a router that is running OSPF to advertise a maximum metric for 100 seconds:

```
switch# configure terminal
switch(config)# router ospf 100
switch(config-router)# max-metric router-lsa on-startup 100
```

This example shows how to configure a router to advertise a maximum metric until BGP routing tables converge or until the default timer expires (600 seconds):

```
switch# configure terminal
switch(config)# router ospf 100
switch(config-router)# max-metric router-lsa on-startup wait-for bgp bgpTag
```

Related Commands

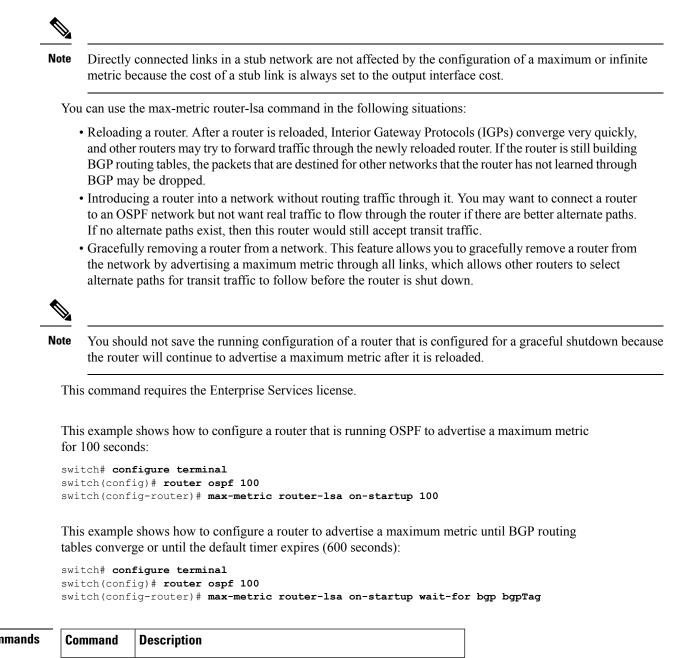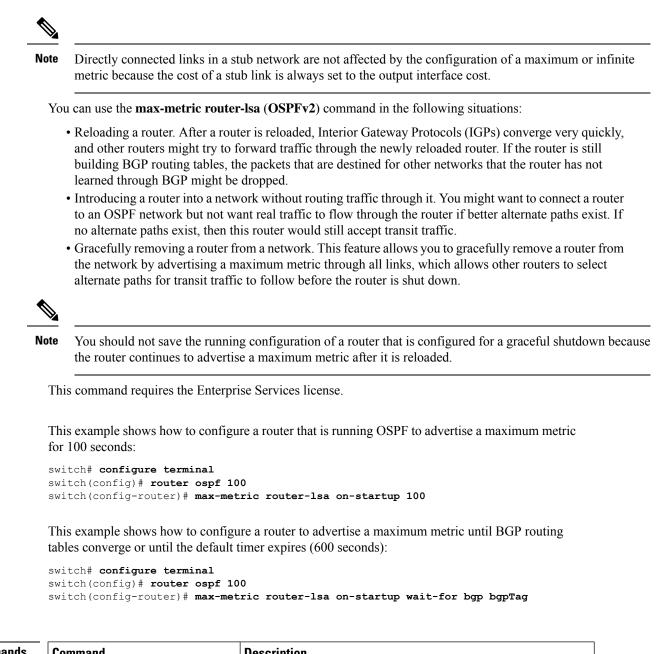| Command	Description
show ip ospf	Displays general information about OSPF routing processes.

max-metric router-lsa (OSPFv2)

To configure the Open Shortest Path First version 2 (OSPFv2) protocol to advertise a maximum metric so that other routers do not prefer the router as an intermediate hop in their shortest path first (SPF) calculations, use the **max-metric router-lsa** (**OSPFv2**) command. To disable the advertisement of a maximum metric, use the **no** form of this command.

max-metric router-lsa [**external-lsa** [*max-metric-value*]] [**include-stub**] [{**on-startup** *[seconds]* | **wait-for bgp** *tag*}] [**summary-lsa** [*max-metric-value*]]
no max-metric router-lsa [**external-lsa** [*max-metric-value*]] [**include-stub**] [{**on-startup** *[seconds]* | **wait-for bgp** *tag*}] [**summary-lsa** [*max-metric-value*]]

Syntax Description	

external-lsa	(Optional) Specifies the external link-state advertisements (LSAs).
max-metric-value	(Optional) Max-metric values for summary LSAs. The range is from 1 to 167777215.
include-stub	Advertises the max-metric for stub links.
on-startup	(Optional) Configures the router to advertise a maximum metric at startup.
seconds	(Optional) Maximum metric (in seconds) that is advertised for the specified time interval. The configurable range is from 5 to 86400 seconds. The default is 600 seconds.
wait-for bgp	(Optional) Advertises a maximum metric until Border Gateway Protocol (BGP) routing tables have converged or the default timer has expired. The default timer is 600 seconds.
tag	(Optional) Tag of the BGP instance. The maximum size is 20 characters.
summary-lsa	Specifies the summary LSAs.

Command Default Originates router link-state advertisements (LSAs) with normal link metrics.

Command Modes

Router configuration
Router VRF configuration

Command History

Release	Modification
6.2(8)	This command was introduced.

Usage Guidelines Use the **max-metric router-lsa** command to originate LSAs with a maximum metric (LSInfinity: 0xFFFF) through all nonstub links, which allows BGP routing tables to converge without attracting transit traffic (if there are not alternate lower cost paths to the router). The router advertises accurate (normal) metrics after the configured or default timers expire or after BGP sends a notification that routing tables have converged.

Updates hold true to all releases that have this command and option.

The **wait-for bgp** keywords allow you to avoid the IGP from declaring it is ready to be used for transit after a reload, if BGP on the device has not converged yet (received the entire routing table from its peers and installed in FIB). This process prevents an upstream node sending externally bound (BGP) traffic to this node prematurely and causing traffic blackholing.

Note   Directly connected links in a stub network are not affected by the configuration of a maximum or infinite metric because the cost of a stub link is always set to the output interface cost.

You can use the **max-metric router-lsa** (**OSPFv2**) command in the following situations:

- Reloading a router. After a router is reloaded, Interior Gateway Protocols (IGPs) converge very quickly, and other routers might try to forward traffic through the newly reloaded router. If the router is still building BGP routing tables, the packets that are destined for other networks that the router has not learned through BGP might be dropped.
- Introducing a router into a network without routing traffic through it. You might want to connect a router to an OSPF network but not want real traffic to flow through the router if better alternate paths exist. If no alternate paths exist, then this router would still accept transit traffic.
- Gracefully removing a router from a network. This feature allows you to gracefully remove a router from the network by advertising a maximum metric through all links, which allows other routers to select alternate paths for transit traffic to follow before the router is shut down.

Note   You should not save the running configuration of a router that is configured for a graceful shutdown because the router continues to advertise a maximum metric after it is reloaded.

This command requires the Enterprise Services license.

Examples   This example shows how to configure a router that is running OSPF to advertise a maximum metric for 100 seconds:

```
switch# configure terminal
switch(config)# router ospf 100
switch(config-router)# max-metric router-lsa on-startup 100
```

This example shows how to configure a router to advertise a maximum metric until BGP routing tables converge or until the default timer expires (600 seconds):

```
switch# configure terminal
switch(config)# router ospf 100
switch(config-router)# max-metric router-lsa on-startup wait-for bgp bgpTag
```

Related Commands

Command	Description
max-metric router-lsa (OSPFv3)	Configures the OSPFv3 protocol to advertise a maximum metric.
show ip ospf	Displays general information about OSPF routing processes.

max-metric router-lsa (OSPFv3)

To configure the Open Shortest Path First version 3 (OSPFv3) protocol to advertise a maximum metric so that other routers do not prefer the router as an intermediate hop in their shortest path first (SPF) calculations, use the **max-metric router-lsa** (**OSPFv3**) command. To disable the advertisement of a maximum metric, use the **no** form of this command.

max-metric router-lsa [**external-lsa** [*max-metric-value*]] [**stub-prefix-lsa**] [{**on-startup** *[seconds]* | **wait-for bgp** *tag*}] [**inter-area-prefix-lsa** [*max-metric-value*]]
no max-metric router-lsa [**external-lsa** [*max-metric-value*]] [**stub-prefix-lsa**] [{**on-startup** *[seconds]* | **wait-for bgp** *tag*}] [**inter-area-prefix-lsa** [*max-metric-value*]]

Syntax Description

external-lsa	(Optional) Specifies the external link-state advertisements (LSAs).
max-metric-value	(Optional) Max-metric values for summary LSAs. The range is from 1 to 167777215.
stub-prefix-lsa	(Optional) Advertises the max-metric for the stub links.
on-startup	(Optional) Configures the router to advertise a maximum metric at startup.
seconds	(Optional) Maximum metric (in seconds) that is advertised for the specified time interval. The configurable range is from 5 to 86400 seconds. The default is 600 seconds.
wait-for bgp	(Optional) Advertises a maximum metric until Border Gateway Protocol (BGP) routing tables have converged or the default timer has expired. The default timer is 600 seconds.
tag	(Optional) Tag of the BGP instance. The maximum size is 20 characters.
inter-area-prefix-lsa	(Optional) Advertises the inter-area LSAs.

Command Default   Originates router link-state advertisements (LSAs) with normal link metrics.

Command Modes

Router configuration
Router VRF configuration

Command History

Release	Modification
6.2(8)	This command was introduced.

Usage Guidelines   Use the max-metric router-lsa (**OSPFv3**) command to originate LSAs with a maximum metric (LSInfinity: 0xFFFF) through all nonstub links, which allows BGP routing tables to converge without attracting transit traffic (if there are not alternate lower cost paths to the router). The router advertises accurate (normal) metrics after the configured or default timers expire or after BGP sends a notification that routing tables have converged.

Updates hold true to all releases that have this command and option.

The **wait-for bgp** keywords allow you to avoid the IGP from declaring it is ready to be used for transit after a reload, if BGP on the device has not converged yet (received the entire routing table from its peers and

installed in FIB). This process prevents an upstream node sending externally bound (BGP) traffic to this node prematurely and causing traffic blackholing.

Note Directly connected links in a stub network are not affected by the configuration of a maximum or infinite metric because the cost of a stub link is always set to the output interface cost.

You can use the max-metric router-lsa (**OSPFv3**) command in the following situations:

- Reloading a router. After a router is reloaded, Interior Gateway Protocols (IGPs) converge very quickly, and other routers might try to forward traffic through the newly reloaded router. If the router is still building BGP routing tables, the packets that are destined for other networks that the router has not learned through BGP might be dropped.
- Introducing a router into a network without routing traffic through it. You might want to connect a router to an OSPF network but not want real traffic to flow through the router if better alternate paths exist. If no alternate paths exist, this router would still accept transit traffic.
- Gracefully removing a router from a network. This feature allows you to gracefully remove a router from the network by advertising a maximum metric through all links, which allows other routers to select alternate paths for transit traffic to follow before the router is shut down.

Note You should not save the running configuration of a router that is configured for a graceful shutdown because the router continues to advertise a maximum metric after it is reloaded.

This command requires the Enterprise Services license.

Examples

This example shows how to configure a router that is running OSPFv3 to advertise a maximum metric for 100 seconds:

```
switch# configure terminal
switch(config)# router ospfv3 200
switch(config-router)# max-metric router-lsa on-startup 100
```

This example shows how to configure a router to advertise a maximum metric for the stub links:

```
switch# configure terminal
switch(config)# router ospfv3 200
switch(config-router)# max-metric router-lsa stub-prefix-lsa
```

Related Commands

Command	Description
max-metric router-lsa (**OSPFv2**)	Configures the OSPFv2 protocol to advertise a maximum metric.
show ip ospf	Displays general information about OSPF routing processes.

maxas-limit

To configure the external Border Gateway Protocol (eBGP) to discard routes that have a high number of autonomous system (AS) numbers in the AS-path attribute, use the **maxas-limit** command. To revert to the default, use the **no** form of this command.

maxas-limit [*number*]
no maxas-limit

Syntax Description

number	(Optional) Maximum number of AS numbers allowed in the AS-path attribute. The range is from 1 to 2000.

Command Default

No limit

Command Modes

Router configuration
VRF configuration

Command History

Release	Modification
4.1(2)	This command was introduced.

Usage Guidelines

This command requires the Enterprise Services license.

Command Default

This example shows how to set the maximum number of AS numbers to 50:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# maxas-limit 50
```

Related Commands

Command	Description
feature bgp	Enables the BGP feature.
router bgp	Creates a BGP instance.

maximum-paths (BGP)

To control the maximum number of parallel routes that the Border Gateway Protocol (BGP) can support, use the **maximum-paths** command. To restore the default number of parallel routes, use the **no** form of this command.

maximum-paths [**ibgp**] *number-paths*
no maximum-paths [**ibgp**] *number-paths*

Syntax Description

ibgp	Configures the maximum interior BGP (iBGP) paths.
number-paths	Maximum number of parallel routes that an IP routing protocol installs in a routing table. The range is from 1 to 16. Starting from Cisco NX-OS Release 8.4(1), the range is from 1 to 64 on M3- and F3-Series I/O modules.

Command Default

1 path

Command Modes

Router address family configuration

Command History

Release	Modification
8.4(1)	The range for the *number-paths* variable was modified for M3- and F3-Series I/O modules. The range is now from 1 to 64.
4.0(1)	This command was introduced.

Usage Guidelines

There are no usage guidelines for this command.

Examples

This example shows how to allow a maximum of 16 paths to a destination for a BGP routing process:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# maximum-paths 16
```

This example shows how to allow a maximum of 64 paths to a destination for a BGP routing process:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# maximum-paths 64
```

Related Commands

Command	Description
feature bgp	Enables the BGP feature on the router.
router bgp	Enables BGP.

maximum-paths (EIGRP)

To control the maximum number of parallel routes that the Enhanced Interior Gateway Routing Protocol (EIGRP) can support, use the **maximum-paths** command. To remove the **maximum-paths** command from the configuration file and restore the default, use the **no** form of this command.

maximum-paths *maximum*
no maximum-paths

Syntax Description

maximum	Maximum number of parallel routes that EIGRP can install in a routing table. The range is from 1 to 16 routes.

Command Default   8 paths

Command Modes

Address-family configuration
Router configuration
Router VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.
4.0(2)	The default maximum paths was *changed to 8 from 16.*

Usage Guidelines   Use the **maximum-paths** command to allow EIGRP to install multiple paths into the routing table for each prefix. Multiple paths are installed for both internal and external routes that are learned in the same autonomous system and that are equal cost (according to the EIGRP best path algorithm).

This command requires the Enterprise Services license.

Examples

This example shows how to allow a maximum of 10 paths to a destination:

```
switch# configure terminal
switch(config)# router eigrp 1
switch(config-router)# maximum-paths 10
```

maximum-paths (IS-IS)

To control the maximum number of parallel routes that an IP routing protocol can support, use the **maximum-paths** configuration mode command. To restore the default number of parallel routes, use the **no** form of this command.

maximum-paths *number-paths*
no maximum-paths

Syntax Description

number-paths	Maximum number of parallel routes that an IP routing protocol installs in a routing table. The range is from 1 to 16.

Command Default   8 paths

Command Modes

Router configurationVRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   There are no usage guidelines for this command.

Examples   This example shows how to allow a maximum of 16 paths to a destination for an IS-IS routing process:

```
switch# configure terminal
switch(config)# router isis 3
switch(config-router)# maximum-paths 16
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
router isis	Enables IS-IS.

maximum-paths (RIP)

To configure the maximum number of equal cost parallel routes that the Routing Information Protocol (RIP) will install into the routing table, use the **maximum-paths** command. To remove the **maximum-paths** command and restore the system to its default condition with respect to RIP, use the **no** form of this command.

maximum-paths *maximum*
no **maximum-paths**

Syntax Description

maximum	Maximum number of parallel routes that RIP can install in a routing table. The range is from 1 to 16.

Command Default

8 paths

Command Modes

Router address-family configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

This command does not require a license.

Examples

This example shows how to allow a maximum of 16 equal cost paths to a destination:

```
switch# configure terminal
switch(config)# router rip Enterprise
switch(config-router)# address-family ipv4 unicast
switch(config-router-af)# maximum-paths 16
```

Related Commands

Command	Description
address-family	Enters address-family configuration mode.

maximum-paths (OSPF)

To control the maximum number of parallel routes that Open Shortest Path First (OSPF) can support, use the **maximum-paths** command. To remove the **maximum-paths** command from the configuration file and restore the system to the default, use the **no** form of this command.

maximum-paths *maximum*
no maximum-paths

Syntax Description

maximum	Maximum number of parallel routes that OSPF can install in a routing table. The range is from 1 to 16 routes.

Command Default 8 paths

Command Modes

Router configuration
Router VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines Use the **maximum-paths** command to allow OSPF to install multiple paths into the routing table for each prefix. Multiple paths are installed for both internal and external routes that are learned in the same autonomous system and that have an equal cost (according to the OSPF shortest path first algorithm).

This command requires the Enterprise Services license.

Examples This example shows how to allow a maximum of 10 paths to a destination:

```
switch# configure terminal
switch(config)# router ospf 1
switch(config-router)# maximum-paths 10
```

maximum-paths (OSPFv3)

To control the maximum number of parallel routes that Open Shortest Path First version 3 (OSPFv3) can support, use the **maximum-paths** command. To remove the **maximum-paths** command from the configuration file and restore the system to the default, use the **no** form of this command.

maximum-paths *maximum*
no maximum-paths

Syntax Description

maximum	Maximum number of parallel routes that OSPFv3 can install in a routing table. The range is from 1 to 16 routes.

Command Default   8 paths

Command Modes

Address-family configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines   Use the **maximum-paths** command to allow OSPFv3 to install multiple paths into the routing table for each prefix. Multiple paths are installed for both internal and external routes that are learned in the same autonomous system and that have an equal cost (according to the OSPFv3 shortest path first algorithm).

This command requires the Enterprise Services license.

Examples   This example shows how to allow a maximum of 10 paths to a destination:

```
switch# configure terminal
switch(config)# router ospfv3 1
switch(config-router)# address-family ipv6 unicast
switch(config-router-af)# maximum-paths 10
```

maximum-prefix

To control how many prefixes can be received from a neighbor, use the **maximum-prefix** command. To disable this function, use the **no** form of this command.

maximum-prefix *maximum* [**threshold**] [**restart** *restart-interval*] [**warning-only**]
no   maximum-prefix

Syntax Description

maximum	Maximum number of prefixes allowed from the specified neighbor. The number of prefixes that can be configured is limited only by the available system resources on a router. Range: 1 to 300000.
threshold	(Optional) Specifies percentage of the maximum-prefix limit at which the router starts to generate a warning message. Range: 1 to 100. Default: 75.
restart *interval*	(Optional) Specifies the time interval (in minutes) that a peering session is reestablished. Range: 1 to 65535.
warning-only	(Optional) Allows the router to generate a syslog message when the maximum-prefix limit is exceeded, instead of terminating the peering session.

Command Default

This command is disabled by default. Peering sessions are disabled when the maximum number of prefixes is exceeded. If you do not configure the restart interval, a disabled session will stay down after the maximum-prefix limit is exceeded.

Command Modes

Peer template configuration
Router bgp configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

The number of prefixes that can be configured is limited only by the available system resources on a router.

The **maximum-prefix** command allows you to configure a maximum number of prefixes that a Border Gateway Protocol (BGP) routing process will accept from the specified peer. This feature provides a mechanism (in addition to distribute lists, filter lists, and route maps) to control prefixes received from a peer.

When the number of received prefixes exceeds the maximum number configured, BGP disables the peering session (by default). If the **restart** keyword is configured, BGP will automatically reestablish the peering session at the configured time interval. If the **restart** keyword is not configured and a peering session is terminated because the maximum prefix limit has been exceed, the peering session will not be be reestablished until the **clear ip bgp** command is entered. If the **warning-only** keyword is configured, BGP sends only a log message and continues to peer with the sender.

There is no default limit on the number of prefixes that can be configured with this command. Limitations on the number of prefixes that can be configured are determined by the amount of available system resources.

Examples

In this example, the maximum prefixes that will be accepted from the 192.168.1.1 neighbor is set to 1000:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# network 192.168.0.0
switch(config-router)# maximum-prefix 1000
```

This example shows the maximum number of prefixes that will be accepted from the 192.168.2.2 neighbor is set to 5000. The router is also configured to display warning messages when 50 percent of the maximum-prefix limit (2500 prefixes) has been reached.

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# network 192.168.0.0
switch(config-router)# maximum-prefix 5000 50
```

This example shows the maximum number of prefixes that will be accepted from the 192.168.3.3 neighbor is set to 2000. The router is also configured to reestablish a disabled peering session after 30 minutes.

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# network 192.168.0.0
switch(config-router)# maximum-prefix 2000 restart 30
```

This example shows the warning messages that will be displayed when the maximum-prefix limit (500) for the 192.168.4.4 neighbor is exceeded:

```
switch# configure terminal
switch(config)# router bgp 64496
switch(config-router)# network 192.168.0.0
switch(config-router)# maximum-prefix 500 warning-only
```

message-digest-key (OSPF virtual link)

To enable Open Shortest Path First (OSPF) Message Digest 5 (MD5) authentication on a virtual link, use the **message-digest-key** command. To remove an old MD5 key, use the **no**form of this command.

message-digest-key *key-id* **md5** [{**0** | **3**}] *key*
no message-digest-key *key-id*

Syntax Description		
key-id	Identifier in the range from 1 to 255.
0	Specifies to use an unencrypted password to generate the md5 key.
3	Specifies to use an encrypted 3DES password to generate the md5 key.
key	Alphanumeric password of up to 16 bytes.

Command Default Unencrypted

Command Modes

Virtual link configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines Use the **message-digest-key** command when you configure the MD5 digest authentication mode. Both interfaces on the virtual link must have the same *key* value.

This command requires the Enterprise Services license.

Examples This example shows how to set key 19 with the password 8ry4222:

```
switch# configure terminal
switch(config-router)# area 22 virtual-link 192.0.2.2
switch(config-router-vlink)# message-digest-key 19 md5 8ry4222
```

Related Commands

Command	Description
authentication (virtual-link)	Configures the authentication mode on a virtual link.

metric direct 0

To enable the cost of direct routes, use the **metric direct 0** command. To disable this function, use the **no** form of this command.

metric direct 0
no metric direct 0

Syntax Description

This command has no arguments or keywords.

Command Default

Disabled

Command Modes

RIP router configuration mode

Command History

Release	Modification
6.1(1)	This command was introduced.

Usage Guidelines

When Cisco IOS and NX-OS are connected in a network, the **metric direct** command needs to be configured on all the NX-OS routers for them to be compatible with Cisco IOS RIP.

When **metric-direct 0** is enabled:

- All the local routes are installed with cost 0.
- All the RIP routes will be advertised with +1 metric.
- No metric will be added to the incoming routes by default (unless there is cost associated with the incoming interface).

When the **metric-direct** is disabled (which is the default behavior):

- All the local routes are installed with cost 1.
- All the RIP routes are advertised as-is.
- Default cost of +1 is added to the incoming routes by default.

This command requires the Enterprise Services license.

Examples

This example shows how to enable the cost of direct routes:

```
switch# configure terminal
switch(config)# feature rip
switch(config)# router rip 1
switch(config-router)# metric direct 0
```

Related Commands

Command	Description
metric weights	Tunes the EIGRP metric calculations.

metric maximum-hops

To advertise that those Enhanced Interior Gateway Routing Protocol (EIGRP) routes with a higher hop count than you specified are unreachable, use the **metric maximum-hops** command. To reset the value to the default, use the **no** form of this command.

metric maximum-hops *hops-number*
no metric maximum-hops

Syntax Description

hops-number	Maximum hop count. The range is from 1 to 255 hops.

Command Default

hops-number:100

Command Modes

Address-family configuration
Router configuration
Router VRF configuration

Command History

Release	Modification
4.0(1)	This command was introduced.

Usage Guidelines

Use the **metric maximum-hops** command to provide a safety mechanism that causes EIGRP to advertise as unreachable routes with a hop count greater than the value assigned to the *hops-number* argument.

This command requires the Enterprise Services license.

Examples

This example shows how to configure a hop count to 200:

```
switch# configure terminal
switch(config)# router eigrp 1
switch(config-router) address-family ipv4 unicast
switch(config-router-af)# metric maximum-hops 200
```

Related Commands

Command	Description
metric weights	Tunes the EIGRP metric calculations.

metric rib-scale

To set the default metrics for the Enhanced Interior Gateway Routing Protocol (EIGRP), use the **metric rib-scale** command. To restore the default state, use the **no** form of this command.

metric rib-scale *scale-value*
no metric rib-scale *scale-value*

Syntax Description

scale-value	Scale value to divide the EIGRP wide metric by converting it to a 4-byte RIB metric. The range is from 1 to 256.

Command Default

128

Command Modes

Router eigrp submode

Command History

Release	Modification
5.2(1)	This command was introduced.

Usage Guidelines

You can set or modify the rib scale value only in 64-bit metric mode.

This command does not require a license.

Examples

This example shows how to set the rib-scaling factor for EIGRP:

```
switch# configure terminal
switch(config)# router eigrp csco123
switch(config-router)# metric rib-scale 130
switch(config-router)#
```

This example shows how to remove the rib-scaling factor for EIGRP and restore the default state:

```
switch# configure terminal
switch(config)# router eigrp csco123
switch(config-router)# no metric rib-scale 130
switch(config-router
```

Related Commands

Command	Description
metric version	Changes the metric version to the 64-bit mode.
metric weights	Tunes the Enhanced Interior Gateway Routing Protocol (EIGRP) metric calculations.

metric weights

To tune the Enhanced Interior Gateway Routing Protocol (EIGRP) metric calculations, use the **metric weights** command. To reset the values to their defaults, use the **no** form of this command.

metric weights *tos k1 k2 k3 k4 k5 k6*
no metric weights

Syntax Description

tos	Type of service (ToS) which must always be zero.
k1 k2 k3 k4 k5 k6	Constants that convert an EIGRP metric vector into a scalar quantity. The arguments are as follows: • k1—The range is from 0 to 255. The default is 1. • k2—The range is from 0 to 255. The default is 0. • k3—The range is from 1 to 255. The default is 1. • k4—The range is from 0 to 255. The default is 0. • k5—The range is from 0 to 255. The default is 0. • k6—The range is from 0 to 255. The default is 0.

Command Default

tos: 0

k1: 1

k2: 0

k3: 1

k4: 0

k5: 0

k:6 0

Command Modes

Address-family configuration
Router configuration
Router VRF configuration

Command History

Release	Modification
5.2(1)	Added the k6 keyword.
4.0(1)	This command was introduced.

Usage Guidelines

Use the **metric weights** command to alter the default behavior of EIGRP routing and metric computation and allow the tuning of the EIGRP metric calculation for a particular ToS.

If k5 equals 0, Cisco NX-OS computes the composite EIGRP metric according to the following formula:

metric = [k1 x bandwidth + (k2 x bandwidth)/(256 – load) + k3 x delay]

If k5 does not equal zero, Cisco NX-OS performs an additional calculation:

metric = metric x [k5/(reliability + k4)]

Use the **bandwidth** command in interface configuration mode to set the bandwidth metric.

Use the **delay** command in interface configuration mode to set the delay.

255 is a reliability of 100 percent or a perfectly stable link. A load of 255 indicates a completely saturated link.

Configuration of k6 is supported only in 64-bit metric version mode.

This command requires the Enterprise Services license.

Examples

This example shows how to set the metric weights to change the default values:

```
switch# configure terminal
switch(config)# router eigrp 1
switch(config-router) address-family ipv4 unicast
switch(config-router-af)# metric weights 0 2 0 2 0 2
```

Related Commands

Command	Description
bandwidth	Sets the EIGRP bandwidth metric in interface configuration mode.
delay	Sets the EIGRP delay metric in interface configuration mode.

metric-style transition

To configure the metric style that Intermediate-System-to-Intermediate System (IS-IS) uses in advertised link-state update messages (LSPs), use the **metric-style transition** command. To revert to the default setting, use the **no** form of this command.

metric-style transition
no metric-style transition

Syntax Description	This command has no keywords or arguments.
Command Default	Wide metric style
Command Modes	Router configuration VRF configuration

Command History

Release	Modification
4.1(2)	This command was introduced.

Usage Guidelines

Use the **metric-style transition** command to configure IS-IS to generate and accept both narrow metric style and wide metric style Type Length Value (TLV) objects.

This command requires the Enterprise Services license.

Examples

This example shows how to configure the metric style:

```
switch# configure terminal
switch(config-router)# metric-style transition
switch(config-router)#
```

Related Commands

Command	Description
feature isis	Enables IS-IS on the router.
router isis	Creates an IS-IS instance.

metric version

To configure the switch to run in the 64-bit metric version, use the **metric version** command. To restore the default state, use the **no** form of this command.

metric version 64bit
no metric version 64bit

Syntax Description

64-bit	64-bit metric version.

Command Default 32-bit mode

Command Modes

Router eigrp submode
VRF submode

Command History

Release	Modification
5.2(1)	This command was introduced.

Usage Guidelines This command does not require a license.

Examples

This example shows how to configure the switch to run in the 64-bit metric version:

```
switch# configure terminal
switch(config)# router eigrp csco123
switch(config-router)# metric version 64bits
switch(config-router)#
```

This example shows how to remove the 64-bit metric version configuration from the switch:

```
switch(config-router)# no metric version 64bits
switch(config-router)#
```

Related Commands

Command	Description
metric rib-scale	Sets the default metrics for Enhanced Interior Gateway Routing Protocol (EIGRP).
metric weights	Tunes the Enhanced Interior Gateway Routing Protocol (EIGRP) metric calculations.