

neighbor activate

To enable the exchange of information with a Border Gateway Protocol (BGP) neighbor, use the **neighbor activate** command in address family configuration mode or router configuration mode. To disable the exchange of an address with a BGP neighbor, use the **no** form of this command.

neighbor {*ip-address* | *peer-group-name* | *ipv6-address*} **activate**

no neighbor {*ip-address* | *peer-group-name* | *ipv6-address*} **activate**

Syntax Description

<i>ip-address</i>	IP address of the neighboring router.
<i>peer-group-name</i>	Name of BGP peer group.
<i>ipv6-address</i>	IPv6 address of the BGP neighbor. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.

Defaults

The exchange of addresses with BGP neighbors is enabled for the IPv4 address family. Enabling address exchange for all other address families is disabled.



Note

Address exchange for address family IPv4 is enabled by default for each BGP routing session configured with the **neighbor remote-as** command unless you configure the **no bgp default ipv4-activate** command before configuring the **neighbor remote-as** command, or you disable address exchange for address family IPv4 with a specific neighbor by using the **no** form of the **neighbor activate** command.

Command Modes

Address family configuration
Router configuration

Command History

Release	Modification
11.0	This command was introduced.
12.0(5)T	Support for address family configuration mode and the IPv4 address family were added.
12.2(2)T	The <i>ipv6-address</i> argument and support for the IPv6 address family were added.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines

Use this command to advertise address information in the form of an IP or IPv6 prefix. The address prefix information is known as Network Layer Reachability Information (NLRI) in BGP.

Examples

The following example shows how to enable address exchange for address family vpnv4 for all neighbors in the BGP peer group named PEPEER and for the neighbor 144.0.0.44:

```
Router(config)# address-family vpnv4
Router(config-router-af)# neighbor PEPEER activate
Router(config-router-af)# neighbor 144.0.0.44 activate
Router(config-router-af)# exit-address-family
```

The following example shows how to enable address exchange for address family IPv4 unicast for all neighbors in the BGP peer group named group1 and for the BGP neighbor 172.16.1.1:

```
Router(config)# address-family ipv4 unicast
Router(config-router-af)# neighbor group1 activate
Router(config-router-af)# neighbor 172.16.1.1 activate
```

The following example shows how to enable address exchange for address family IPv6 for all neighbors in the BGP peer group named group2 and for the BGP neighbor 7000::2:

```
Router(config)# address-family ipv6
Router(config-router-af)# neighbor group2 activate
Router(config-router-af)# neighbor 7000::2 activate
```

Related Commands

Command	Description
address-family ipv4	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv4 address prefixes.
address-family ipv6	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv6 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard VPNv4 address prefixes.
exit-address-family	Exits from the address family submenu.

neighbor allowas-in

To configure provider edge (PE) routers to allow readvertisement of all prefixes containing duplicate autonomous system numbers (ASNs), use the **neighbor allowas-in** command in router configuration mode. To disable the readvertisement of the ASN of the PE router, use the **no** form of this command.

neighbor ip-address allowas-in [*number*]

no neighbor ip-address allowas-in [*number*]

Syntax Description

<i>ip-address</i>	IP address of the neighboring router.
<i>number</i>	(Optional) Specifies the number of times to allow the advertisement of a PE router's ASN. Valid values are from 1 to 10. If no number is supplied, the default value of 3 times is used.

Defaults

Readvertisement of all prefixes containing duplicate ASNs is disabled by default.

Command Modes

Router configuration

Command History

Release	Modification
12.0(7)T	This command was introduced.
12.1	This command was integrated into Cisco IOS Release 12.1.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.3	This command was integrated into Cisco IOS Release 12.3.
12.3T	This command was integrated into Cisco IOS Release 12.3T.

Usage Guidelines

In a hub and spoke configuration, a PE router readvertises all prefixes containing duplicate autonomous system numbers. Use the neighbor allowas-in command to configure two VRFs on each PE router to receive and readvertise prefixes as follows:

- One Virtual Private Network routing and forwarding (VRF) instance receives prefixes with ASNs from all PE routers and then advertises them to neighboring PE routers.
- The other VRF receives prefixes with ASNs from the customer edge (CE) router and readvertises them to all PE routers in the hub and spoke configuration.

You control the number of times an ASN is advertised by specifying a number from 1 to 10.

Examples

The following example shows how to configure the PE router with ASN 100 to allow prefixes from the VRF address family Virtual Private Network (VPN) IPv4 vrf1. The neighboring PE router with the IP address 192.168.255.255 is set to be readvertised to other PE routers with the same ASN six times.

```
Router(config)# router bgp 100
Router(config-router)# address-family ipv4 vrf vrf1
```

```
Router(config-router)# neighbor 192.168.255.255 allowas-in 6
```

Related Commands

Command	Description
address-family	Enters the address family configuration submode used to configure routing protocols such as BGP, OSPF, RIP, and static routing.

neighbor as-override

To configure a provider edge (PE) router to override the autonomous system number (ASN) of a site with the ASN of a provider, use the **neighbor as-override** command in router configuration mode. To remove Virtual Private Network (VPN) IPv4 prefixes from a specified router, use the **no** form of this command.

neighbor ip-address as-override

no neighbor ip-address as-override

Syntax Description	<i>ip-address</i>	Specifies the IP address of the router that is to be overridden with the ASN provided.
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Defaults	Automatic override of the ASN is disabled by default.
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Command Modes	Router configuration
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Command History	Release	Modification
	12.0(7)T	This command was introduced.

Usage Guidelines	This command is used in conjunction with the site-of-origin feature, identifying the site where a route originated, and preventing routing loops between routers within a VPN.
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Examples	The following example shows how to configure a router to override the ASN of a site with the ASN of a provider:
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```
Router(config)# router bgp 100
Router(config-router)# neighbor 192.168.255.255 remote-as 109
Router(config-router)# neighbor 192.168.255.255 update-source loopback0
Router(config-router)# address-family ipv4 vrf vpn1
Router(config-router)# neighbor 192.168.255.255 activate
Router(config-router)# neighbor 192.168.255.255 as-override
```

Related Commands	Command	Description
	neighbor activate	Enables the exchange of information with a BGP neighboring router.
	neighbor remote-as	Allows a neighboring router's IP address to be included in the BGP routing table.
	neighbor update-source	Allows internal BGP sessions to use any operational interface for TCP/IP connections.
	route-map	Redistributes routes from one routing protocol to another.

neighbor send-label

To enable a Border Gateway Protocol (BGP) router to send Multiprotocol Label Switching (MPLS) labels with BGP routes to a neighboring BGP router, use the **neighbor send-label** command in address family configuration mode or router configuration mode. To disable the sending of MPLS labels with BGP routes, use the **no** form of this command.

neighbor *ip-address* **send-label**

no neighbor *ip-address* **send-label**

Syntax Description

<i>ip-address</i>	IP address of the neighboring router.
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Defaults

By default, BGP routers distribute only BGP routes.

Command Modes

Address family configuration
Router configuration

Command History

Release	Modification
12.0(21)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines

This command enables a router to use BGP to distribute MPLS labels along with the IPv4 routes to a peer router. You must issue this command on both the local router and the neighboring router.

This command has the following restrictions:

- If a BGP session is running when you issue the **neighbor send-label** command, the command does not take effect until the BGP session is restarted.
- In router configuration mode, only IPv4 addresses are distributed.

Use this command in IPv6 address family configuration mode to bind and advertise IPv6 prefix MPLS labels. Using this command in conjunction with the **mpls ipv6 source-interface** global configuration command allows IPv6 traffic to run over an IPv4 MPLS network without any software or hardware configuration changes in the backbone. Edge routers configured to run both IPv4 and IPv6 forward IPv6 traffic using MPLS and multiprotocol internal BGP (MP-iBGP).

Examples

The following example shows how to enable a router in the autonomous system 65000 to send MPLS labels with BGP routes to the neighbor BGP router at 192.168.0.1:

```
Router(config)# router bgp 65000
Router(config-router)# neighbor 192.168.0.1 remote-as 65001
Router(config-router)# neighbor 192.168.0.1 send-label
```

The following example shows how to enable a router in the autonomous system 65000 to bind and advertise IPv6 prefix MPLS labels and send the labels with BGP routes to the neighbor BGP router at 192.168.99.70:

```
Router(config)# router bgp 65000
Router(config-router)# neighbor 192.168.99.70 remote-as 65000
Router(config-router)# address-family ipv6
Router(config-router-af)# neighbor 192.168.99.70 activate
Router(config-router-af)# neighbor 192.168.99.70 send-label
```

Related Commands

Command	Description
mpls ipv6 source-interface	Specifies the IPv6 address of an interface to be used as the source address for locally generated IPv6 packets to be sent over a network running MPLS.
neighbor activate	Enables the exchange of information with a neighboring router.

network-id

To specify the network ID of a Multiprotocol over ATM (MPOA) server (MPS), use the **network-id** command in MPS configuration mode. To revert to the default value (default value is 1), use the **no** form of this command.

network-id *id*

no network-id

Syntax Description

<i>id</i>	Specifies the network ID of the MPOA server.
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Defaults

The default value for the network ID is 1.

Command Modes

MPS configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines

Specifies the network ID of this MPS. This value is used in a very similar way the NHRP network ID is used. It is for partitioning nonbroadcast multiaccess (NBMA) clouds artificially by administration.

Examples

The following example shows how to set the network ID to 5:

```
Router (mpoa-server-config) # network-id 5
```

next-address

To specify the next IP address in the explicit path, use the **next-address** command in IP explicit path configuration mode. To remove the specified next IP address in the explicit path, use the **no** form of this command.

```
next-address A.B.C.D
```

```
no next-address A.B.C.D
```

Syntax Description

<i>A.B.C.D</i>	Next IP address in the explicit path.
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Defaults

Next IP address in the explicit path is not specified.

Command Modes

IP explicit path configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Examples

The following example shows how to assign the number 60 to the IP explicit path, enable the path, and specify 10.3.27.3 as the next IP address in the list of IP addresses:

```
Router(config)# ip explicit-path identifier 60 enable
Router(cfg-ip-expl-path)# next-address 10.3.27.3
```

```
Explicit Path identifier 60:
  1: next-address 10.3.27.3
Router(cfg-ip-expl-path)#
```

Related Commands

Command	Description
append-after	Inserts the new path entry after the specified index number. Commands might be renumbered as a result.
index	Inserts or modifies a path entry at a specified index.
ip explicit-path	Enters the subcommand mode for IP explicit paths and creates or modifies the specified path.
list	Displays all or part of the explicit paths.
show ip explicit-paths	Displays configured IP explicit paths.

oam-ac emulation-enable

To enable Operation, Administration, and Maintenance (OAM) cell emulation on ATM adaptation layer 5 (AAL5) over Multiprotocol Label Switching (MPLS), use the **oam-ac emulation-enable** command in the ATM VC configuration mode on both provider edge (PE) routers. To disable OAM cell emulation, use the **no** form of this command on both routers.

oam-ac emulation-enable [*ais-rate*]

no oam-ac emulation-enable [*ais-rate*]

Syntax Description

<i>ais-rate</i>	(Optional) The rate (in seconds) at which the alarm indication signal (AIS) cells should be sent. The range is 0 to 60 seconds. If you specify 0, no AIS cells are sent. The default is 1 second, which means that one AIS cell is sent every second.
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Defaults

By default OAM cell emulation is disabled. If you enable OAM cell emulation without specifying an AIS rate, the default is to send one AIS cell every second.

Command Modes

ATM VC configuration mode

Command History

Release	Modification
12.0(23)S	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.

Usage Guidelines

This command is only applicable to AAL5 over MPLS and is not supported with ATM Cell Relay over MPLS.

This command is only available when you specify the **pvc vpi/vci l2transport** command.

Examples

The following example shows how to enable OAM cell emulation on an ATM PVC:

```
Router# interface ATM 1/0/0
Router(config-if)# pvc 1/200 l2transport
Router(config-atm-vc)# oam-ac emulation-enable
```

The following example shows how to set the rate at which an AIS cell is sent to every 30 seconds:

```
Router (config-atm-vc)# oam-ac emulation-enable 30
```

Related Commands

Command	Description
show atm pvc	Displays all ATM PVCs and traffic information.

rd

To create routing and forwarding tables for a Virtual Private Network (VPN) routing/forwarding instance (VRF), use the **rd** command in VRF configuration mode.

rd *route-distinguisher*

Syntax Description	<i>route-distinguisher</i>	Adds an 8-byte value to an IPv4 prefix to create a VPN IPv4 prefix.
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Defaults	There is no default. A route distinguisher (RD) must be configured for a VRF to be functional.
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Command Modes	VRF configuration
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Command History	Release	Modification
	12.0(5)T	This command was introduced.

Usage Guidelines	A RD creates routing and forwarding tables and specifies the default route distinguisher for a VPN. The RD is added to the beginning of the customer's IPv4 prefixes to change them into globally unique VPN-IPv4 prefixes.
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Either RD is an ASN-relative RD, in which case it is composed of an autonomous system number and an arbitrary number, or it is an IP-address-relative RD, in which case it is composed of an IP address and an arbitrary number.

You can enter an RD in either of these formats:

16-bit AS number: your 32-bit number

For example, 101:3.

32-bit IP address: your 16-bit number

For example, 192.168.122.15:1.

Examples	The following example shows how to configure a default RD for two VRFs. It illustrates the use of both AS-relative and IP-address-relative RDs:
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```
Router(config)# ip vrf vrf_blue
Router(config-vrf)# rd 100:3
Router (config-vrf)# exit
Router(config)# ip vrf vrf_red
Router(config-vrf)# rd 173.13.0.12:200
```

Related Commands	Command	Description
	ip vrf	Configures a VRF routing table.
	show ip vrf	Displays the set of defined VRFs and associated interfaces.

route-target

To create a route-target extended community for a Virtual Private Network (VPN) routing/forwarding instance (VRF), use the **route-target** command in VRF configuration mode. To disable the configuration of a route-target community option, use the **no** form of this command.

route-target {**import** | **export** | **both**} *route-target-ext-community*

no route-target {**import** | **export** | **both**} *route-target-ext-community*

Syntax Description

import	Imports routing information from the target Virtual Private network (VPN) extended community.
export	Exports routing information to the target VPN extended community.
both	Imports both import and export routing information to the target VPN extended community.
<i>route-target-ext-community</i>	Adds the route-target extended community attributes to the VRF's list of import, export, or both (import and export) route-target extended communities.

Defaults

There are no defaults. A VRF has no route-target extended community attributes associated with it until specified by the route-target command.

Command Modes

VRF configuration

Command History

Release	Modification
12.0(5)T	This command was introduced.

Usage Guidelines

The **route-target** command creates lists of import and export route-target extended communities for the specified VRF. Enter the command one time for each target community. Learned routes that carry a specific route-target extended community are imported into all VRFs configured with that extended community as an import route target. Routes learned from a VRF site (for example, by Border Gateway Protocol (BGP), Routing Information Protocol (RIP), or static route configuration) contain export route targets for extended communities configured for the VRF added as route attributes to control the VRFs into which the route is imported.

The route target specifies a target VPN extended community. Like a route-distinguisher, an extended community is composed of either an autonomous system number and an arbitrary number or an IP address and an arbitrary number. You can enter the numbers in either of these formats:

16-bit AS number:your 32-bit number

For example, 101:3.

32-bit IP address:your 16-bit number

For example, 192.168.122.15: 1.

Examples

The following example shows how to configure route-target extended community attributes for a VRF. The result of the command sequence is that VRF named *vrf_blue* has two export extended communities (1000:1 and 1000:2) and two import extended communities (1000:1 and 173.27.0.130:200).

```
Router(config)# ip vrf vrf_blue
Router(config-vrf)# route-target both 1000:1
Router(config-vrf)# route-target export 1000:2
Router(config-vrf)# route-target import 173.27.0.130:200
```

Related Commands

Command	Description
import map	Configures an import route map for a VRF.
ip vrf	Configures a VRF routing table.

set mpls experimental

The **set mpls experimental** command is replaced by the **set mpls experimental imposition** command. See the [set mpls experimental imposition](#) command for more information.

set mpls experimental imposition

To set the value of the Multiprotocol Label Switching (MPLS) experimental (EXP) field on all imposed label entries, use the **set mpls experimental imposition** command in QoS policy-map class configuration mode. To disable the setting, use the **no** form of this command.

set mpls experimental imposition {*mpls-exp-value* | *from-field* [**table** *table-map-name*]}

no set mpls experimental imposition {*mpls-exp-value* | *from-field* [**table** *table-map-name*]}

Syntax Description

<i>mpls-exp-value</i>	Specifies the value used to set MPLS EXP bits defined by the policy map. Valid values are numbers from 0 to 7.
<i>from-field</i>	Specific packet-marking category to be used to set the MPLS EXP imposition value. If you are using a table map for mapping and converting packet-marking values, this establishes the “map from” packet-marking category. Packet-marking category keywords are as follows: <ul style="list-style-type: none"> • precedence • dscp
table	(Optional) Used in conjunction with the <i>from-field</i> argument. Indicates that the values set in a specified table map will be used to set the MPLS EXP imposition value.
<i>table-map-name</i>	(Optional) Used in conjunction with the table keyword. Name of the table map used to specify the MPLS EXP imposition value. The name can be a maximum of 64 alphanumeric characters.

Defaults

No MPLS EXP value is set.

Command Modes

QoS policy-map class configuration

Command History

Release	Modification
12.2(13)T	This command replaces (renames) the set mpls experimental command, introduced in 12.1(5)T. The set mpls experimental imposition command was modified for the Enhanced Packet Marking feature. A mapping table (table map) can now be used to convert and propagate packet-marking values.

Usage Guidelines

The **set mpls experimental imposition** command is supported only on input interfaces. Use this command during label imposition. This command sets the MPLS EXP field on all imposed label entries.

Using This Command with the Enhanced Packet Marking Feature

If you are using this command as part of the Enhanced Packet Marking feature, you can use this command to specify the “from-field” packet-marking category to be used for mapping and setting the class of service (CoS) value. The “from-field” packet-marking categories are as follows:

- Precedence
- Differentiated services code point (DSCP)

If you specify a “from-field” category but do not specify the **table** keyword and the applicable *table-map-name* argument, the default action will be to copy the value associated with the “from-field” category as the MPLS EXP imposition value. For instance, if you configure the **set mpls experimental imposition precedence** command, the precedence value will be copied and used as the MPLS EXP imposition value.

You can configure the **set mpls experimental imposition dscp** command, and the DSCP value will be copied and used as the MPLS EXP imposition value.



Note

If you configure the **set mpls experimental imposition dscp** command, only the *first three bits* (the class selector bits) of the DSCP field are used.

Examples

The following example shows how to set the MPLS EXP value to 3 on all imposed label entries:

```
Router(config-pmap) # set mpls experimental imposition 3
```

The following example shows how to create the policy map named `policy1` to use the packet-marking values defined in a table map named `table-map1`. The table map was created earlier with the **table-map** (value mapping) command. For more information about the **table-map** (value mapping) command, see the **table-map** (value mapping) command page.

The following example sets the MPLS EXP imposition value according to the DSCP value defined in `table-map1`.

```
Router(config) # policy-map policy1
Router(config-pmap) # class class-default
Router(config-pmap-c) # set mpls experimental imposition dscp table table-map1
Router(config-pmap-c) # exit
```

Related Commands

Command	Description
set dscp	Marks a packet by setting the Layer 3 DSCP value in the ToS byte.
set mpls experimental topmost	Sets the MPLS EXP field value in the topmost label on either an input or an output interface.
set precedence	Sets the precedence value in the packet header.
show table-map	Displays the configuration of a specified table map or all table maps.
table-map (value mapping)	Creates and configures a mapping table for mapping and converting one packet-marking value to another.

set mpls experimental topmost

To set the Multiprotocol Label Switching (MPLS) experimental (EXP) field value in the topmost label on either an input or an output interface, use the **set mpls experimental topmost** command in QoS policy-map class configuration mode. To disable the setting, use the **no** form of this command.

```
set mpls experimental topmost {mpls-exp-value | qos-group [table table-map-name]}
```

```
no set mpls experimental topmost {mpls-exp-value | qos-group [table table-map-name]}
```

Syntax Description		
	<i>mpls-exp-value</i>	Specifies the value used to set MPLS experimental bits defined by the policy map. Valid values are numbers from 0 to 7.
	qos-group	Specifies that the qos-group packet-marking category is used to set the MPLS EXP imposition value. If you are using a table map for mapping and converting packet-marking values, this establishes the “map from” packet-marking category.
	table	(Optional) Used in conjunction with the qos-group keyword. Indicates that the values set in a specified table map will be used to set the MPLS EXP value.
	<i>table-map-name</i>	(Optional) Used in conjunction with the table keyword. Name of the table map used to specify the MPLS EXP value. The name can be a maximum of 64 alphanumeric characters.

Defaults No MPLS EXP value is set.

Command Modes QoS policy-map class configuration

Command History	Release	Modification
	12.2(13)T	This command was introduced.

Usage Guidelines This command sets the MPLS EXP value only in the topmost label. This command does not affect an IP packet. The MPLS field in the topmost label header is not changed.

Using This Command with the Enhanced Packet Marking Feature

If you are using this command as part of the Enhanced Packet Marking feature, you can use this command to specify the qos-group packet-marking category to be used for mapping and setting the differentiated services code point (DSCP) value.

If you specify the qos-group category but do not specify the **table** keyword and the applicable *table-map-name* argument, the default action will be to copy the value associated with the qos-group category as the MPLS EXP topmost value. For instance, if you configure the **set mpls experimental topmost qos-group** command, the QoS group value will be copied and used as the MPLS EXP topmost value.

The valid value range for the MPLS EXP topmost value is a number from 0 to 7. The valid value range for the QoS group is a number from 0 to 99. Therefore, when configuring the **set mpls experimental topmost qos-group** command, note the following points:

- If a QoS group value falls within both value ranges (for example, 6), the packet-marking value will be copied and the packets will be marked.
- If a QoS group value exceeds the MPLS EXP topmost range (for example, 10), the packet-marking value will not be copied and the packet will not be marked. No action is taken.

Examples

The following example shows how to set the MPLS EXP value to 3 in the topmost label of an input or output interface:

```
Router(config-pmap)# set mpls experimental topmost 3
```

The following example shows how to create the policy map named policy1 to use the packet-marking values defined in a table map named table-map1. The table map was created earlier with the **table-map** (value mapping) command. For more information about the **table-map** (value mapping) command, see the [table-map](#) (value mapping) command page.

The following example shows how to set the MPLS EXP value according to the QoS group value defined in table-map1.

```
Router(config)# policy-map policy1
Router(config-pmap)# class class-default
Router(config-pmap-c)# set mpls experimental topmost qos-group table table-map1
Router(config-pmap-c)# exit
```

Related Commands

Command	Description
match mpls experimental topmost	Matches the MPLS EXP field value in the topmost label.
set mpls experimental imposition	Sets the value of the MPLS EXP field on all imposed label entries.
set qos-group	Sets a group ID that can be used later to classify packets.
show table-map	Displays the configuration of a specified table map or all table maps.
table-map (value mapping)	Creates and configures a mapping table for mapping and converting one packet-marking value to another.

set mpls-label

To enable a route to be distributed with a Multiprotocol Label Switching (MPLS) label if the route matches the conditions specified in the route map, use the **set mpls-label** command in route map configuration mode. To disable this function, use the **no** form of this command.

set mpls-label

no set mpls-label

Syntax Description This command has no arguments or keywords.

Defaults No route with an MPLS label is distributed.

Command Modes Route map configuration

Command History

Release	Modification
12.0(21)ST	This command was introduced.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

This command can be used only with the **neighbor route-map out** command to manage outbound route maps for a Border Gateway Protocol (BGP) session.

Use the **route-map** global configuration command with **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.

Examples

The following example shows how to create a route map that enables the route to be distributed with a label if the IP address of the route matches an IP address in ACL 1.

```
Router(config-router)# route-map incoming permit 10
Router(config-route-map)# match ip address 1
Router(config-route-map)# set mpls-label
```

Related Commands	Command	Description
	match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list.
	match mpls-label	Redistributes routes that contain MPLS labels and match the conditions specified in the route map.
	route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

set ospf router-id

To set a separate Open Shortest Path First (OSPF) router ID for each interface or subinterface on a provider edge (PE) router for each directly attached customer edge (CE) router, use the **set ospf router-id** command in route-map configuration mode.

set ospf router-id

Syntax Description This command has no arguments or keywords.

Defaults Open Shortest Path First (OSPF) router ID is not set.

Command Modes Route-map configuration

Command History

Release	Modification
12.0(7)T	This command was introduced.

Usage Guidelines

To use this command, you must enable OSPF and create a routing process.

Examples

The following example shows how to match the PE router IP address 192.168.0.0 against the interface in access list 1 and set to the OSPF router ID:

```
router ospf 2 vrfvpn1-site1
 redistribute bgp 100 metric-type 1 subnets
 network 202.0.0.0 0.0.0.255 area 1

router bgp 100
 neighbor 172.19.89. 62 remote-as 100
 access-list 1 permit 192.168.0.0
 route-map vpn1-site1-map permit 10
 match ip address 1
 set ospf router-id
```

Related Commands

Command	Description
router ospf	Enables OSPF routing, which places the router in router configuration mode.

set port flowcontrol

To set the receive flow-control value for a particular Gigabit Ethernet switching module port, use the **set port flowcontrol** command in privileged EXEC mode. To reset the receive flow-control value to the default, use the **no** form of this command.

```
set port flowcontrol {receive | send} [module-number | port-number] {off | on | desired}
```

```
no set port flowcontrol {receive | send} [module-number | port-number] {off | on | desired}
```

Syntax Description

receive	Indicates whether the port can receive administrative status from a remote device.
send	Indicates whether the local port can send administrative status to a remote device.
<i>module-number</i>	(Optional) Number of the module.
<i>port-number</i>	(Optional) Number of the port on the module.
off	When used with receive , it turns off an attached device's ability to send flow-control packets to a local port. When used with send , it turns off the local port's ability to send administrative status to a remote device.
on	When used with receive , it requires that a local port receive administrative status from a remote device. When used with send , the local port sends administrative status to a remote device.
desired	When used with receive , it allows a local port to operate with an attached device that is required to send flow-control packets or with an attached device that is not required to, but may send flow-control packets. When used with send , the local port sends administrative status to a remote device if the remote device supports it.

Defaults

receive—off
send—desired

Default on multiplexed ports is **on**. The exception to these defaults applies to the 18-port Gigabit Ethernet switching module. For this module, the defaults are shown below:

- Ports 1-2—**send** is **off** and **receive** is **desired**
- Ports 3-18—**send** is **on** and **receive** is **desired**

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(11)T	This command was introduced and implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers

Usage Guidelines

This command is supported on Gigabit Ethernet switching modules only.

Examples

The following examples show how to use the **set port flowcontrol** command set.

The following example show how to set the port 5/1 flow-control receive administration status to **on** (port requires far end to send flowcontrol packets):

```
Router# set port flowcontrol receive 5/1 on
```

The following example show how to set the port 5/1 flow-control receive administration status to **desired** (port allows far end to send flowcontrol packets if far end supports it):

```
Router# set port flowcontrol receive 5/1 desired
```

The following example show how to set the port 5/1 flow-control receive administration status to **off** (port does not allow far end to send flowcontrol packets):

```
Router# set port flowcontrol receive 5/1 off
```

The following example show how to set port 5/1 flow-control send administration status to **on** (port sends flowcontrol packets to far end):

```
Router# set port flowcontrol send 5/1 on
```

The following example show how to set port 5/1 flow-control send administration status to **desired** (port sends flowcontrol packets to far end if far end supports it):

```
Router# set port flowcontrol send 5/1 desired
```

The following example show how to set port 5/1 flow-control send administration status to **off** (port does not send flowcontrol packets to far end):

```
Router# set port flowcontrol send 5/1 off
```

Related Commands

Command	Description
show port flowcontrol	Displays per-port status information and statistics related to flow control.

set vlan

To group ports into a virtual LAN (VLAN), use the **set vlan** command in privileged EXEC mode.

```
set vlan vlan-number module/port
```

```
set vlan vlan-number [name name] [type { ethernet | fdi | fdinet | trcrf | trbrf }]
[state { active | suspend }] [said said] [mtu mtu] [ring hex-ring-number]
[decring decimal-ring-number] [bridge bridge-number] [parent vlan-number] [mode { srt |
srb }] [stp { ieee | ibm | auto }] [translation vlan-number] [backupcrf { off | on }]
[aremaxhop hop-count] [stemaxhop hop-count]
```

Syntax Description	
<i>vlan-number</i>	Number identifying the VLAN.
<i>module</i>	Number of the module. This argument is not valid when defining or configuring Token Ring Bridge Relay Functions (TRBRFs).
<i>port</i>	Number of the port on the module belonging to the VLAN; this argument does not apply to TRBRFs.
name <i>name</i>	(Optional) Defines a text string used as the name of the VLAN (1 to 32 characters).
type { ethernet fdi fdinet trcrf trbrf }	(Optional) Identifies the VLAN type. The default type is Ethernet.
state { active suspend }	(Optional) Specifies whether the state of the VLAN is active or suspended. VLANs in suspended state do not pass packets. The default state is active.
said <i>said</i>	(Optional) Specifies the security association identifier. Possible values are 1 to 4294967294. The default is 100001 for VLAN1, 100002 for VLAN 2, 100003 for VLAN 3, and so on. This argument does not apply to Token Ring Concentrator Relay Functions (TRCRFs) or TRBRFs.
mtu <i>mtu</i>	(Optional) Specifies the maximum transmission unit (packet size, in bytes) that the VLAN can use. Possible values are 576 to 18190. The default is 1500 bytes.
ring <i>hex-ring-number</i>	(Optional) Specifies the logical ring number for Token Ring VLANs. Possible values are hexadecimal numbers 0x1 to 0xFFF. This argument is valid and required only when defining a TRCRF.
decring <i>decimal-ring-number</i>	(Optional) Specifies the logical ring number for Token Ring VLANs. Possible values are decimal numbers 1 to 4095. This argument is valid and required only when defining a TRCRF.
bridge <i>bridge-number</i>	(Optional) Specifies the identification number of the bridge. Possible values are hexadecimal numbers 0x1 to 0xF. For Token Ring VLANs, the default is 0F. This argument is not valid for TRCRFs.
parent <i>vlan-number</i>	(Optional) Sets a parent VLAN. The range for <i>vlan-number</i> is 2 to 1005. This argument identifies the TRBRF to which a TRCRF belongs and is required when defining a TRCRF.
mode { srt srb }	(Optional) Specifies the TRCRF bridging mode.
stp { ieee ibm auto }	(Optional) Specifies the Spanning Tree Protocol version for a TRBRF to use: source-routing transparent (ieee), source-route bridging (ibm), or automatic source selection (auto).

translation <i>vlan-number</i>	(Optional) Specifies a translational VLAN used to translate FDDI to Ethernet. Valid values are from 1 to 1005. This argument is not valid for defining or configuring Token Ring VLANs.
backuperf {off on}	(Optional) Specifies whether the TRCRF is a backup path for traffic.
aremaxhop <i>hop-count</i>	(Optional) Specifies the maximum number of hops for All-Routes Explorer frames. Possible values are 1 to 14. The default is 7. This argument is only valid when defining or configuring TRCRFs.
stemaxhop <i>hop-count</i>	(Optional) Specifies the maximum number of hops for Spanning-Tree Explorer frames. Possible values are 1 to 14. The default is 7. This argument is only valid when defining or configuring TRCRFs.

Defaults

The default configuration has all switched Ethernet ports and Ethernet repeater ports in VLAN 1. The default SAID is 100001 for VLAN 1, 100002 for VLAN 2, 100003 for VLAN 3, and so on. The default type is Ethernet. The default MTU is 1500 bytes. The default state is active.

The default TRBRF is 1005, the default TRCRF is 1003, and the default MTU for TRBRFs and TRCRFs is 4472. The default state is active. The default **aremaxhop** is 7; the default **stemaxhop** is 7.

Command Modes

Privileged EXEC

Usage Guidelines

You cannot use the **set vlan** command until the networking device is either in VTP transparent mode or until a VTP domain name has been set.

Valid MTU values for Token Ring VLAN are 1500 or 4472. While you can enter any value for the MTU value, the value you enter defaults to the next lowest valid value.

You cannot set multiple VLANs for Inter-Switch Link (ISL) ports using this command. The VLAN name can be from 1 to 32 characters in length. If adding a new VLAN, the VLAN number must be within the range 2 to 1001. When modifying a VLAN, the valid range for the VLAN number is 2 to 1005.

On a new Token Ring VLAN, if you do not specify the parent parameter for a TRCRF, the default TRBRF (1005) is used.

Examples

The following example shows how to set VLAN 850 to include ports 4 through 7 on module 3. Because ports 4 through 7 were originally assigned to TRCRF 1003, the message reflects the modification of VLAN 1003.

```
Router# set vlan 850 3/4-7
VLAN 850 modified.
VLAN 1003 modified.
VLAN  Mod/Ports
-----
850   3/4-7
```

Related Commands

Command	Description
clear vlan	Deletes an existing VLAN from a management domain.
show vlans	Displays VLAN subinterfaces.

set vlan mapping

To map 802.1Q virtual LANs (VLANs) to Inter-Switch Link (ISL) VLANs, use the **set vlan mapping** command in privileged EXEC mode.

```
set vlan mapping dot1q 1q-vlan-number isl isl-vlan-number
```

Syntax Description	dot1q	Specifies the 802.1Q VLAN.
	<i>1q-vlan-number</i>	Number identifying the 802.1Q VLAN; valid values are 1001 to 4095.
	isl	Specifies the ISL VLAN.
	<i>isl-vlan-number</i>	Number identifying the ISL VLAN; valid values are 1 to 1000.

Defaults No 802.1Q-to-ISL mappings are defined.

Command Modes Privileged EXEC

Usage Guidelines IEEE 802.1Q VLAN trunks support VLANs 1 through 4095. ISL VLAN trunks support VLANs 1 through 1000. The switch automatically maps 802.1Q VLANs 1000 and lower to ISL VLANs with the same number.

The native VLAN of the 802.1Q trunk cannot be used in the mapping.

Use this feature to map 802.1Q VLANs above 1000 to ISL VLANs. Note that if you map a 802.1Q VLAN over 1000 to an ISL VLAN, the corresponding 802.1Q VLAN will be blocked. For example, if you map 802.1Q VLAN 2000 to ISL VLAN 200, then 802.1Q VLAN 200 will be blocked.

You can map up to seven VLANs. Only one 802.1Q VLAN can be mapped to an ISL VLAN. For example, if 802.1Q VLAN 800 has been automatically mapped to ISL VLAN 800, do not manually map any other 802.1Q VLANs to ISL VLAN 800.

You cannot overwrite existing 802.1Q VLAN mapping. If the 802.1Q VLAN number is in the mapping table, the command is aborted. You must first clear that mapping.

If *vlan-number* does not exist, then either of the following occurs:

- If the switch is in server or transparent mode, the VLAN is created with all default values.
- If the switch is in client mode, then the command proceeds without creating the VLAN. A warning will be given indicating that the VLAN does not exist.

If the table is full, the command is aborted with an error message indicating the table is full.

Examples The following example shows how to map VLAN 1022 to ISL VLAN 850:

```
Router# set vlan mapping dot1q 1022 isl 850
Vlan 850 configuration successful
Vlan mapping successful
```

The following example shows the display if you enter a VLAN that does not exist:

```
Router# set vlan mapping dot1q 1017 isl 999
```

■ set vlan mapping

```
Vlan mapping successful
Warning: vlan 999 non-existent
Vlan 999 configuration successful
```

The following example shows the display if you enter an existing mapping:

```
Router# set vlan mapping dot1q 1033 isl 722
722 exists in the mapping table. Please clear the mapping first.
```

The following example shows the display if the mapping table is full:

```
Router# set vlan mapping dot1q 1099 isl 917
Vlan Mapping Table Full.
```

Related Commands

Command	Description
clear vlan mapping	Deletes existing 802.1Q VLAN to ISL VLAN-mapped pairs.
show vlans	Displays VLAN subinterfaces.

shortcut-frame-count

To specify the maximum number of times a packet can be routed to the default router within shortcut-frame time before a Multiprotocol over ATM (MPOA) resolution request is sent, use the **shortcut-frame-count** command in MPC configuration mode. To restore the default shortcut-setup frame count value, use the **no** form of this command.

shortcut-frame-count *count*

no shortcut-frame-count

Syntax Description	<i>count</i>	Shortcut-setup frame count. The default is 10 frames.
---------------------------	--------------	---

Defaults	The default is 10 frames.
-----------------	---------------------------

Command Modes	MPC configuration
----------------------	-------------------

Command History	Release	Modification
	11.3(3a)WA4(5)	This command was introduced.

Examples The following example shows how to set the shortcut-setup frame count to 5 for the MPC:

```
Router (mpoa-client-config) # shortcut-frame-count 5
```

Related Commands	Command	Description
	atm-address	Overrides the control ATM address of an MPC or MPS.
	mpoa client config name	Defines an MPC with a specified name.
	shortcut-frame-time	Sets the shortcut-setup frame time (in seconds) for the MPC.

shortcut-frame-time

To set the shortcut-setup frame time (in seconds) for the Multiprotocol over ATM (MPOA) client (MPC), use the **shortcut-frame-time** command in MPC configuration mode. To restore the default shortcut-setup frame-time value, use the **no** form of this command.

shortcut-frame-time *time*

no shortcut-frame-time

Syntax Description

<i>time</i>	Shortcut-setup frame time (in seconds).
-------------	---

Defaults

The default is 1 second.

Command Modes

MPC configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.

Examples

The following example shows how to set the shortcut-setup frame time to 7 for the MPC:

```
Router (mpoa-client-config) # shortcut-frame-time 7
```

Related Commands

Command	Description
atm-address	Overrides the control ATM address of an MPC or MPS.
mpoa client config name	Defines an MPC with a specified name.
shortcut-frame-count	Specifies the maximum number of times a packet can be routed to the default router within shortcut-frame time before an MPOA resolution request is sent.

show adjacency

To display Cisco Express Forwarding (CEF) adjacency table information, use the **show adjacency** command in user EXEC or privileged EXEC mode.

show adjacency [*type number*] [**detail**] [**summary**]

Syntax Description		
<i>type number</i>	(Optional)	Displays CEF adjacency information for the specified interface type and number.
detail	(Optional)	Displays detailed adjacency information, including Layer 2 information.
summary	(Optional)	Displays CEF adjacency table summary information.

Command Modes	
	Exec EXEC Privileged EXEC

Command History	Release	Modification
	11.2 GS	This command was introduced.
	11.1 CC	Multiple platform support was added.
	12.2(8)T	The detail keyword output was modified to show the epoch value for each entry of the adjacency table. The summary keyword output was modified to show the table epoch for the adjacency table.

Usage Guidelines This command is used to verify that an adjacency exists for a connected device, that the adjacency is valid, and that the MAC header rewrite string is correct.

Examples The following is sample output from the **show adjacency detail** command:

```
Router# show adjacency detail

Protocol Interface          Address
IP        Serial5/0/0/1:1         point2point(7)
                                0 packets, 0 bytes
                                0F000800
                                CEF  expires: 00:02:09
                                   refresh: 00:00:09
                                Epoch: 14
IP        Serial5/0/1/1:1         point2point(7)
                                0 packets, 0 bytes
                                0F000800
                                CEF  expires: 00:02:09
                                   refresh: 00:00:09
                                Epoch: 14
```

The following is sample output from the **show adjacency summary** command:

```
Router# show adjacency summary

Adjacency Table has 2 adjacencies
  Table epoch: 14 (2 entries at this epoch)

  Interface                Adjacency Count
Serial5/0/0/1:1           1
Serial5/0/1/1:1           1
```

[Table 3](#) describes the significant fields shown in the displays.

Table 3 *show adjacency Field Descriptions*

Field	Description
Protocol	Routed protocol to which the adjacency is related.
Interface	Outgoing interface associated with the adjacency.
Address	The address can represent one of these addresses: <ul style="list-style-type: none"> • Next-hop address • Point-to-point address The number (in parentheses) that follows this field indicates the number of internal references to the adjacency.
Table epoch	Table epoch value at the time when the adjacency was last modified.

Related Commands

Command	Description
clear adjacency	Clears the CEF adjacency table.

show cable bundle

To display the forwarding table for the specified interface, use the **show cable bundle** command in privileged EXEC mode.

show cable bundle *bundle-number forwarding-table*

Syntax Description	Parameter	Description
	<i>bundle-number</i>	Specifies the bundle identifier. Valid range is from 1 to 255.
	<i>forwarding-table</i>	Displays the forwarding table for the specified interface.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.0(7)XR	This command was introduced.

Examples In the following example, a cable bundle of 25 is specified:

```
Router# show cable bundle 25 forwarding-table
```

```
MAC address      Interface
0050.7366.17ab   Cable3/0
0050.7366.1803   Cable3/0
0050.7366.1801   Cable3/0
```

[Table 4](#) describes the significant fields shown in the display.

Table 4 *show cable bundle Field Descriptions*

Field	Description
MAC address	Media Access Control ID for each interface in the bundle.
Interface	The cable interface slot and port number.

Related Commands	Command	Description
	cable bundle	Creates an interface bundle.

show cef drop

To display a list of which packets each line card dropped, use the **show cef drop** command in user EXEC or privileged EXEC mode.

show cef drop

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	11.2 GS	This command was introduced to support the Cisco 12012 Internet router.
	11.1 CC	Multiple platform support was added.
	12.0(22)S	The display output for this command was modified to include support for Cisco Express Forwarding for IPv6 (CEFv6) and distributed CEF for IPv6 (dCEFv6) packets.
	12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T. Previously there was a show cef command, and drop was a keyword of that command.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines A line card might drop packets because of encapsulation failure, absence of route information, or absence of adjacency information.

A packet is sent to a different switching path (punted) because CEF does not support the encapsulation or feature, the packet is destined for the router, or the packet has IP options, such as time stamp and record route. IP options are process switched.



Note

If CEFv6 or dCEFv6 is enabled globally on the router, the **show cef drop** command displays IPv6 CEF counter information and IPv4 CEF counter information. If CEFv6 or dCEFv6 is not enabled globally on the router, the command displays only IPv4 CEF counter information.

Examples

The following is sample output from the **show cef drop** command:

```
Router# show cef drop

CEF Drop Statistics
Slot  Encap_fail  Unresolved  Unsupported  No_route  No_adj  ChksumErr
RP
1      0             0           0           0         0       0
2      0             0           5           0         0       5

IPv6 CEF Drop Statistics
Slot  Encap_fail  Unresolved  Unsupported  No_route  No_adj
RP
1      0           0           3           0         0
2      0           0           0           0         0
```

Table 5 describes the significant fields shown in the display.

Table 5 show cef drop Field Descriptions

Field	Description
Slot	The slot number on which the packets were received.
Encap_fail	Indicates the number of packets dropped after exceeding the limit for packets punted to the processor due to missing adjacency information (CEF throttles packets passed up to the process level at a rate of one packet per second).
Unresolved	Indicates the number of packets dropped due to an unresolved prefix in the Forwarding Information Base (FIB) table.
Unsupported	Indicates the number of packets fast-dropped by CEF (drop adjacency).
No_route	Indicates the number of packets dropped due to a missing prefix in the FIB table.
No_adj	Indicates the number of packets dropped due to incomplete adjacency.
ChksumErr	Indicates the number of IPv4 packets received with a checksum error. Note This field is not supported for IPv6 packets.

Related Commands

Command	Description
show cef interface	Displays CEF-related interface information.
show ipv6 cef	Displays entries in the IPv6 FIB.

show cef events

To display a list of events internal to the CEF process, use the **show cef events** command in user EXEC or privileged EXEC mode.

show cef events

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	12.0(23)S	This command was introduced.
	12.0(24)S	This command was integrated into Cisco IOS Release 12.0(24)S.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Examples The following is sample output from the **show cef events** command:

```
Router# show cef events

CEF events (14/0 recorded/ignored)

Time          Event      Details
+00:00:00.000 SubSys    ipfib init
+00:00:00.000 SubSys    ipfib_ios init
+00:00:00.000 SubSys    ipfib_util init
+00:00:00.000 SubSys    adj_ios init
+00:00:00.000 SubSys    ipfib_les init
+00:00:01.272 Flag      FIB enabled set to yes
+00:00:01.272 Flag      FIB switching enabled set to yes
+00:00:01.272 GState    CEF enabled
+00:00:02.872 Process   Background created
+00:00:02.872 Flag      FIB running set to yes
+00:00:02.872 Process   Background event loop enter
+00:00:02.912 Flag      FIB switching running set to yes
+00:00:02.920 Process   Scanner created
+00:00:02.920 Process   Scanner event loop enter
```

Table 6 describes the significant fields shown in the display.

Table 6 *show cef events Field Descriptions*

Field	Description
Time	Time that the event occurred.
Event	Type of event that occurred.
Details	Detailed description of the event.

Related Commands

Command	Description
show cef drop	Displays a list of which packets each line card dropped.
show cef interface	Displays CEF-related interface information.
show cef linecard	Displays CEF-related interface information by line card.

show cef interface

To display detailed Cisco Express Forwarding (CEF) information for all interfaces, use the **show cef interface** command in user EXEC or privileged EXEC mode.

show cef interface [*type number*] [**statistics**] [**detail**]

Syntax Description	
<i>type number</i>	(Optional) Interface type and number.
statistics	(Optional) Displays switching statistics for the line card.
detail	(Optional) Displays detailed CEF information for the specified interface type and number.

Command Modes	
	User EXEC Privileged EXEC

Command History	Release	Modification
	11.2 GS	This command was introduced to support the Cisco 12012 Internet router.
	11.1 CC	Multiple platform support was added.
	12.0(14)ST	Documentation for the statistics keyword was updated.
	12.2(2)T	Documentation for the statistics and detail keywords was updated.
	12.0(22)S	The display output for this command was modified to include support for CEF for IPv6 (CEFv6) and distributed (dCEFv6) interface information.
	12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines	
	You can use this command to display the detailed CEF status for all of the interfaces.
	Values entered for the <i>type</i> and <i>number</i> arguments display CEF status information for the specified interface type and number.

Examples	
	The following is sample output from the show cef interface detail command for Ethernet interface 1/0/0:

```
Router# show cef interface Ethernet 1/0/0 detail
```

```
Ethernet1/0/0 is up (if_number 9)
  Corresponding hwidb fast_if_number 9
  Corresponding hwidb firstsw->if_number 9
  Internet address is 10.2.61.8/24
  ICMP redirects are always sent
  Per packet load-sharing is disabled
  IP unicast RPF check is disabled
  Inbound access list is not set
  Outbound access list is not set
```

```

IP policy routing is disabled
Hardware idb is Ethernet1/0/0
Fast switching type 1, interface type 5
IP Distributed CEF switching enabled
IP Feature Fast switching turbo vector
IP Feature CEF switching turbo vector
Input fast flags 0x0, Output fast flags 0x0
ifindex 7(7)
Slot 1 Slot unit 0 VC -1
Transmit limit accumulator 0x48001A82 (0x48001A82)
IP MTU 1500

```

The following is sample output from the **show cef interface Null 0 detail** command:

```
Router# show cef interface Null 0 detail
```

```

Null0 is up (if_number 1)
Corresponding hwidb fast_if_number 1
Corresponding hwidb firstsw->if_number 1
Internet Protocol processing disabled
Interface is marked as nullidb
Packets switched to this interface on linecard are dropped to next slow path
Hardware idb is Null0
Fast switching type 13, interface type 0
IP CEF switching enabled
IP Feature CEF switching turbo vector
Input fast flags 0x0, Output fast flags 0x0
ifindex 0(0)
Slot -1 Slot unit -1 VC -1
Transmit limit accumulator 0x0 (0x0)
IP MTU 1500

```

Table 7 describes the significant fields shown in the displays.

Table 7 show cef interface Field Descriptions

Field	Description
Ethernet1/0/0 is up	Indicates type, number, and status of the interface.
Internet address is	Internet address of the interface.
ICMP redirects are always sent	Indicates how packet forwarding is configured.
Per packet load-sharing is disabled	Indicates status of load sharing on the interface.
IP unicast RPF check is disabled	Indicates status of IP unicast Reverse Path Forwarding (RPF) check on the interface.
Inbound access list is not set	Indicates the number or name of the inbound access list if one is applied to this interface.
Outbound access list is not set	Indicates the number or name of the outbound access list if one is applied to this interface.
IP policy routing is disabled	Indicates the status of IP policy routing on the interface.
Hardware idb is Ethernet1/0/0	Interface type and number configured.
Fast switching type	Used for troubleshooting; indicates switching mode in use.
interface type 5	Indicates interface type.

Table 7 *show cef interface Field Descriptions (continued)*

Field	Description
IP Distributed CEF switching enabled	Indicates whether distributed CEF is enabled on this interface. (Cisco 7500 and 12000 series Internet routers only.)
IP Feature Fast switching turbo vector	Indicates IP fast switching type configured.
IP Feature CEF switching turbo vector	Indicates IP feature CEF switching type configured.
Input fast flags	Indicates the input status of various switching features, as follows: <ul style="list-style-type: none"> • 0x0001 (input Access Control List [ACL] enabled) • 0x0002 (policy routing enabled) • 0x0004 (input rate limiting) • 0x0008 (MAC/Prec accounting) • 0x0010 (DSCP/PREC/QOS GROUP) • 0x0020 (input named access lists) • 0x0040 (NAT enabled on input) • 0x0080 (crypto map on input) • 0x0100 (QPPB classification) • 0x0200 (inspect on input) • 0x0400 (input classification) • 0x0800 (casa input enable) • 0x1000 (Virtual Private Network [VPN] enabled on a swidb) • 0x2000 (input idle timer enabled) • 0x4000 (unicast Reverse Path Forwarding [RPF] check) • 0x8000 (per-address ACL enabled) • 0x10000 (deaggregating a packet) • 0x20000 (GPRS enabled on input) • 0x40000 (URL RenDezvous) • 0x80000 (QoS classification) • 0x100000 (FR switching on interface) • 0x200000 (WCCP redirect on input) • 0x400000 (input classification)

Table 7 *show cef interface Field Descriptions (continued)*

Field	Description
Output fast flags	<p>Indicates the output status of various switching features, as follows:</p> <ul style="list-style-type: none"> • 0x0001 (output ACL enabled) • 0x0002 (IP accounting enabled) • 0x0004 (WCC redirect enabled interface) • 0x0008 (rate limiting) • 0x0010 (MAC/Prec accounting) • 0x0020 (DSCP/PREC/QOS GROUP) • 0x0040 (D-QoS classification) • 0x0080 (output named access lists) • 0x0100 (NAT enabled on output) • 0x0200 (TCP intercept enabled) • 0x0400 (crypto map set on output) • 0x0800 (output firewall) • 0x1000 (RSVP classification) • 0x2000 (inspect on output) • 0x4000 (QoS classification) • 0x8000 (QoS pre-classification) • 0x10000 (output stile)
ifindex 7/(7)	Indicates a Cisco IOS internal index or identifier for this interface.
Slot 1 Slot unit 0 VC -1	The slot number and slot unit.
Transmit limit accumulator	Indicates the maximum number of packets allowed in the transmit queue.
IP MTU	The MTU size set on the interface.

Related Commands

Command	Description
show cef drop	Displays a list of which packets each line card dropped.
show cef linecard	Displays CEF-related interface information by line card.

show cef interface policy-statistics

To display detailed Cisco Express Forwarding (CEF) policy statistical information for all interfaces, use the **show cef interface policy-statistics** command in user EXEC or privileged EXEC mode.

show cef interface [*type number*] **policy-statistics**

Syntax Description

type number (Optional) Interface type and number.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(9)S	This command was introduced to support the Cisco 12000 series Internet routers.
12.0(17)ST	This command was integrated into Cisco IOS Release 12.0(17)ST.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

This command is available only on distributed switching platforms.

The *type* and *number* arguments display CEF status information for the specified interface type and number.

Examples

The following is sample output from the **show cef interface policy-statistics** command:

```
Router# show cef interface policy-statistics
```

```
POS7/0 is up (if_number 8)
```

Index	Packets	Bytes
1	0	0
2	0	0
3	50	5000
4	100	10000
5	100	10000
6	10	1000
7	0	0
8	0	0

The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for Ethernet interface 1/0:

```
Router# show cef interface ethernet 1/0 policy-statistics

Ethernet1/0 is up (if_number 3)
  Corresponding hwidb fast_if_number 3
  Corresponding hwidb firstsw->if_number 3
  Index          Packets          Bytes
  1              0                0
  2              0                0
  3              0                0
  4              0                0
  5              0                0
  6              0                0
  7              0                0
  8              0                0
```

[Table 8](#) describes the significant fields shown in the display.

Table 8 *show cef interface policy-statistics Field Descriptions*

Field	Description
Index	Traffic index set with the route-map command.
Packets	Number of packets switched matching the index definition.
Bytes	Number of bytes switched matching the index definition.

Related Commands

Command	Description
show cef drop	Displays a list of which packets each line card dropped.
show cef linecard	Displays CEF-related interface information by line card.

show cef linecard

To display Cisco Express Forwarding (CEF)-related information by line card, use the **show cef linecard** command in user EXEC or privileged EXEC mode.

show cef linecard [*slot-number*] [**detail**] [**internal**]

Syntax Description

<i>slot-number</i>	(Optional) Slot number containing the line card about which to display CEF-related information. When you omit this argument, information about all line cards is displayed.
detail	(Optional) Displays detailed CEF information for the specified line card.
internal	(Optional) Displays internal CEF information for the specified line card.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support the Cisco 12012 Internet router.
11.1 CC	Multiple platform support was added.
12.0(10)S	Output display was changed.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.0(22)S	The display output for this command was modified to include support for CEF for IPv6 (CEFv6) and distributed CEFv6 (dCEFv6) line card information.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines

This command is available only on distributed switching platforms.

When you omit the *slot-number* argument, information about all line cards is displayed. When you omit the *slot-number* argument and include the **detail** keyword, detailed information is displayed for all line cards. When you omit the *slot-number* argument and include the **internal** keyword, detailed internal information is displayed for all line cards. When you omit all keywords and arguments, the **show cef linecard** command displays important information about all line cards in table format.

Examples

The following is sample output from the **show cef linecard detail** command for all line cards:

```
Router# show cef linecard detail

CEF linecard slot number 0, status up
Sequence number 4, Maximum sequence number expected 28, Seq Epoch 2
Send failed 0, Out Of Sequence 0, drops 0
Linecard CEF reset 0, reloaded 1
95 elements packed in 6 messages(3588 bytes) sent
69 elements cleared
linecard in sync after reloading
0/0/0 xdr elements in LowQ/MediumQ/HighQ
11/9/69 peak elements on LowQ/MediumQ/HighQ
Input packets 0, bytes 0
Output packets 0, bytes 0, drops 0
CEF Table statistics:
Table name           Version Prefix-xdr Status
Default-table        7           4 Active, up, sync
CEF linecard slot number 1, status up
Sequence number 4, Maximum sequence number expected 28, Seq Epoch 2
Send failed 0, Out Of Sequence 0, drops 0
Linecard CEF reset 0, reloaded 1
95 elements packed in 6 messages(3588 bytes) sent
69 elements cleared
linecard in sync after reloading
0/0/0 xdr elements in LowQ/MediumQ/HighQ
11/9/69 peak elements on LowQ/MediumQ/HighQ
Input packets 0, bytes 0
Output packets 0, bytes 0, drops 0
CEF Table statistics:
Table name           Version Prefix-xdr Status
Default-table        7           4 Active, up, sync
```

The following is sample output from the **show cef linecard internal** command for all line cards:

```
Router# show cef linecard internal

CEF linecard slot number 0, status up
Sequence number 11, Maximum sequence number expected 35
Send failed 0, Out Of Sequence 0
Linecard CEF reset 2, reloaded 2
Total elements queued:
prefix                4
adjacency              4
interface              91
address                2
policy routing         2
hw interface           57
state                  6
resequence             2
control                13
table                  2
time                   4484
flow features deactivate 2
flow cache config      2
flow export config     2
dss                    2
isl                    2
mpls atm vc remove     2
mpls atm vc set label  2
                       2
                       3
                       1
```

```

4574 elements packed in 4495 messages(90286 bytes) sent
115 elements cleared
Total elements cleared:
prefix                2
adjacency             1
interface             63
address               1
policy routing        1
hw interface          29
state                 2
control               5
table                 1
flow features deactivate 1
flow cache config     1
flow export config    1
dss                   1
isl                   1
mpls atm vc remove    1
mpls atm vc set label 1
                     1
                     1
                     1
linecard disabled - failed a reload
0/0/0 xdr elements in LowQ/MediumQ/HighQ
Input  packets 0, bytes 0
Output packets 0, bytes 0, drops 0

```

CEF Table statistics:

```

Table name           Version Prefix-xdr Status
Default-table        8             4 Active, sync

```

The following is sample output from the **show cef linecard** command. The command displays information for all line cards in table format.

Router# **show cef linecard**

```

Slot   MsgSent   XDRSent   Window   LowQ   MedQ   HighQ   Flags
0      6          95        24       0      0      0       0 up
1      6          95        24       0      0      0       0 up
VRF Default-table, version 8, 6 routes
Slot Version   CEF-XDR   I/Fs State   Flags
0      7          4         8 Active   up, sync
1      7          4        10 Active   up, sync

```

Table 9 describes the significant fields shown in the displays.

Table 9 show cef linecard Field Descriptions

Field	Description
Table name	Name of the CEF table.
Version	Number of the Forwarding Information Base (FIB) table version.
Prefix-xdr	Number of prefix IPC information elements XDRs processed.
Status	State of the CEF table.
Slot	Slot number of the line card.
MsgSent	Number of IPC messages sent.
XDRSent	XDRs packed into IPC messages sent from the Route Processor (RP) to the line card.

Table 9 *show cef linecard Field Descriptions (continued)*

Field	Description
Window	Size of the IPC window between the line card and the RP.
LowQ/MedQ/HighQ	Number of XDR elements in the Low, Medium, and High priority queues.
Flags	Indicates the status of the line card. States are <ul style="list-style-type: none"> • up—Line card is up. • sync—Line card is in synchronization with the main FIB. • reset—Line card FIB is reset. • reloading—Line card FIB is being reloaded. • disabled—Line card is disabled.
CEF-XDR	Number of CEF XDR messages processed.
I/Fs	Interface numbers.

Related Commands

Command	Description
show cef drop	Displays a list of which packets each line card dropped.
show cef interface	Displays CEF-related interface information.
show ipv6 cef	Displays entries in the IPv6 FIB.

show cef not-cef-switched

To display which packets were sent to a different switching path, use the **show cef not-cef-switched** command in user EXEC or privileged EXEC mode.

show cef not-cef-switched

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support the Cisco 12012 Internet router.
11.1 CC	Multiple platform support was added.
12.0(22)S	The display output for this command was modified to include support for Cisco Express Forwarding for IPv6 (CEFv6) and distributed CEF for IPv6 (dCEFv6) packets.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T. Previously there was a show cef command, and drop was a keyword of that command.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Usage Guidelines

If packets are not being cef switched and you want to determine why, enter the **show cef not-cef-switched** command.



Note

If CEFv6 or dCEFv6 is enabled globally on the router, the **show cef not-cef-switched** command displays IPv6 CEF counter information and IPv4 CEF counter information. If CEFv6 or dCEFv6 is not enabled globally on the router, the command displays only IPv4 CEF counter information.

Examples

The following is sample output from the **show cef not-cef-switched** command:

```
Router# show cef not-cef-switched

CEF Packets passed on to next switching layer
Slot No_adj No_encap Unsupp'ted Redirect Receive Options Access Frag
RP          0          0          0          0      91584         0          0          0
1           0          0          0          0         0           0          0          0
2           0          0          0          0         0           0          0          0

IPv6 CEF Packets passed on to next switching layer
Slot No_adj No_encap Unsupp'ted Redirect Receive Options Access MTU
RP          0          0          0          0      92784         0          0          0
1           0          0          0          0         0           0          0          0
2           0          0          0          0         0           0          0          0
```

[Table 10](#) describes the significant fields shown in the display.

Table 10 *show cef not-cef-switched Field Descriptions*

Field	Meaning
Slot	The slot number on which the packets were received.
No_adj	Indicates the number of packets sent to the processor due to incomplete adjacency.
No_encap	Indicates the number of packets sent to the processor for Address Resolution Protocol (ARP) resolution.
Unsupp'ted	Indicates the number of packets punted to the next switching level due to unsupported features.
Redirect	Records packets that are ultimately destined to the router, and packets destined to a tunnel endpoint on the router. If the decapsulated tunnel is IP, it is CEF switched; otherwise, packets are process switched.
Receive	Indicates the number of packets ultimately destined to the router, or packets destined to a tunnel endpoint on the router. If the decapsulated tunnel packet is IP, the packet is CEF switched. Otherwise, packets are process switched.
Options	Indicates the number of packets with options. Packets with IP options are handled only at the process level.
Access	Indicates the number of packets punted due to an access list failure.
Frag	Indicates the number of packets punted due to fragmentation failure. Note This field is not supported for IPv6 packets.
MTU	Indicates the number of packets punted due to maximum transmission unit (MTU) failure. Note This field is not supported for IPv4 packets.

Related Commands

Command	Description
show cef drop	Displays a list of which packets each line card dropped.
show cef interface	Displays CEF-related interface information.
show ipv6 cef	Displays entries in the IPv6 FIB.

show cef timers

To display the current state of the timers internal to the CEF process, use the **show cef timers** command in user EXEC or privileged EXEC mode.

show cef timers

Syntax Description This command has no arguments or keywords.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	12.3(2)T	This command was introduced.

Examples The following is sample output from the **show cef timers** command:

```
Router# show cef timers

CEF background process
  Expiration  Type
    0.208 (parent)
    0.208 adjacency update hwidb
    0.540 slow resolution
    1.208 ARP throttle

CEF FIB scanner process
  Expiration  Type
    44.852 (parent)
    44.852 checker scan-rib
```

[Table 11](#) describes the significant fields shown in the display.

Table 11 *show cef timers Field Descriptions*

Field	Description
Expiration	Seconds in which the timers will expire.
Type	Identification of the timer.

Related Commands	Command	Description
	show cef interface	Displays CEF-related interface information.
	show ipv6 cef	Displays entries in the IPv6 FIB.