# Multiprotocol Label Switching Commands

# address-family

To enter the address family submode for configuring routing protocols such as Border Gateway Protocol (BGP), Routing Information Protocol (RIP), and static routing, use the **address-family** command in address family configuration submode. To disable the address family submode for configuring routing protocols, use the **no** form of this command.

**VPN-IPv4 Unicast**

**address-family vpnv4** [**unicast**]

**no address-family vpnv4** [**unicast**]

**IPv4 Unicast**

**address-family ipv4** [**unicast**]

**no address-family ipv4** [**unicast**]

**IPv4 Unicast with CE router**

**address-family ipv4** [**unicast**] **vrf** *vrf-name*

**no address-family ipv4** [**unicast**] **vrf** *vrf-name*

## Syntax Description

| | |
|---|---|
| **vpnv4** | Configures sessions that carry customer Virtual Private Network (VPN)-IPv4 prefixes, each of which has been made globally unique by adding an 8-byte route distinguisher. |
| **ipv4** | Configures sessions that carry standard IPv4 address prefixes. |
| **unicast** | (Optional) Specifies unicast prefixes. |
| **vrf** *vrf-name* | Specifies the name of a VPN routing/forwarding instance (VRF) to associate with submode commands. |

## Defaults

Routing information for address family IPv4 is advertised by default when you configure a BGP session using the **neighbor remote-as** command unless you execute the **no bgp default ipv4-activate** command.

## Command Modes

Address family configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

Using the **address-family** command puts the router in address family configuration submode (prompt: `(config-router-af)#` ). Within this submode, you can configure address-family specific parameters for routing protocols, such as BGP, that can accommodate multiple Layer 3 address families.

To leave address family configuration submode and return to router configuration mode, enter the **exit-address-family** or **exit** command.

## Examples

The **address-family** command in the following example puts the router into address family configuration submode for the VPNv4 address family. Within the submode, you can configure advertisement of Network Layer Reachability Information (NLRI) for the VPNv4 address family using **neighbor activate** and other related commands:

```
router bgp 100
address-family vpnv4
```

The **address-family** command in the following example puts the router into address family configuration submode for the IPv4 address family. Use this form of the command, which specifies a VRF, only to configure routing exchanges between provider edge (PE) and customer edge (CE) devices. This **address-family** command causes subsequent commands entered in the submode to be executed in the context of VRF vrf2. Within the submode, you can use **neighbor activate** and other related commands to accomplish the following:

- Configure advertisement of IPv4 NLRI between the PE and CE routers.
- Configure translation of the IPv4 NLRI (that is, translate IPv4 into VPNv4 for NLRI received from the CE, and translate VPNv4 into IPv4 for NLRI to be sent from the PE to the CE).
- Enter the routing parameters that apply to this VRF.

The following example shows how to enter the address family submode:

```
Router(config)# router bgp 100
Router(config-router)# address-family ipv4 unicast vrf vrf2
```

## Related Commands

| Command | Description |
|---|---|
| **default** | Exits from address family submode. |
| **neighbor activate** | Enables the exchange of information with a neighboring router. |

# affinity (LSP Attributes)

To specify attribute flags for links of a label switched path (LSP) in an LSP attribute list, use the **affinity** command in LSP Attributes configuration mode. To remove the specified attribute flags, use the **no** form of this command.

**affinity** *value* [**mask** *value*]

**no affinity**

## Syntax Description

| | |
|---|---|
| *value* | Attribute flag value required for links that make up an LSP. Values of the bits are either 0 or 1. |
| **mask** *value* | (Optional) Indicates which attribute values should be checked. If a bit in the mask is 0, an attribute value of the link or that bit is irrelevant. If a bit in the mask is 1, the attribute value of that link and the required affinity of the tunnel for that bit must match. |

## Command Default

Attribute values are not checked.

## Command Modes

LSP Attributes configuration (config-lsp-attr)

## Command History

| Release | Modification |
|---|---|
| 12.0(26)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Usage Guidelines

Use this command to set the affinity and affinity mask values for an LSP in an LSP attribute list.

The affinity value determines the attribute flags for links that make up the LSP, either 0 or 1. The attribute mask determines which attribute value the router should check. If a bit in the mask is 0, an attribute value of a link or that bit is irrelevant. If a bit in the mask is 1, the attribute value of a link and the required affinity of the LSP for that bit must match.

An LSP can use a link if the link affinity equals the attribute flag value and the affinity mask value.

Any value set to 1 in the affinity should also be set to 1 in the mask.

To associate the LSP affinity attribute and the LSP attribute list with a path option for an LSP, you must configure the **tunnel mpls traffic-eng path option** command with the **attributes** *string* keyword and argument, where *string* is the identifier for the specific LSP attribute list.

## Examples

The following example sets the affinity values for a path option in an LSP attribute list:

```
configure terminal
!
mpls traffic-eng lsp attributes 1
 affinity 0 mask 0
 exit
end
```

## Related Commands

| Command | Description |
|---|---|
| **mpls traffic-eng lsp attributes** | Creates or modifies an LSP attribute list. |
| **show mpls traffic-eng lsp attributes** | Displays global LSP attribute lists. |

# allocate

To configure local label allocation filters for learned routes for Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP), use the **allocate** command in MPLS LDP label configuration mode. To remove the specific MPLS LDP local label allocation filter without resetting the LDP session, use the **no** form of this command.

**allocate global** {**prefix-list** {*list-name* | *list-number*} | **host-routes**}

**no allocate global** {**prefix-list** {*list-name* | *list-number*} | **host-routes**}

## Syntax Description

| | |
|---|---|
| **global** | Specifies the global routing table. |
| **prefix-list** | Specifies a prefix list to be used as a filter for MPLS LDP local label allocation. |
| *list-name* | Name that identifies the prefix list. |
| *list-number* | Number that identifies the prefix list. |
| **host-routes** | Specifies that host routes be used as a filter for MPLS LDP local label allocation. |

## Command Default

Prefix filters are not configured for MPLS LDP local label allocation.

## Command Modes

MPLS LDP label configuration (config-ldp-lbl)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SRC | This command was introduced. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |

## Usage Guidelines

LDP allocates local labels for all learned routes or prefixes. Use the **allocate** command to specify a prefix list or a host route to control local label allocation filtering.

If you configure the **allocate** command with a prefix list as the filter and the prefix list does not exist, a prefix list is created that initially permits all prefixes.

You can configure only one prefix list for the global routing table. Configuring a different prefix list overrides the existing configuration.

If you configure the **allocate** command with host routes as the filter, then LDP allocates local labels for host routes only.

The **no** form in a specific **allocate** command removes that particular local label allocation configuration from the global table.

## Examples

The following example shows how to configure a prefix list named List1 found in the global routing table as a filter for MPLS LDP local label allocation:

```
configure terminal
!
mpls ldp label
 allocate global prefix-list List1
 end
```

LDP allocates local labels only for prefixes that match the configured prefix list.

The following example shows how to remove a local label allocation filter:

```
configure terminal
!
mpls ldp label
 no allocate global prefix-list List1
 end
```

The following example shows how to configure host routes as the filter for the MPLS LDP local label allocation:

```
configure terminal
!
mpls ldp label
 allocate global host-routes
 end
```

LDP allocates local labels only for host routes found in the global routing table.

## Related Commands

| Command | Description |
|---|---|
| **mpls ldp label** | Enters MPLS LDP label configuration mode to specify how MPLS LDP handles local label allocation. |
| **show mpls ldp bindings** | Displays the contents of the LIB. |

# append-after

To insert a path entry after a specified index number, use the **append-after** command in IP explicit path configuration mode.

**append-after** *index command*

## Syntax Description

| | |
|---|---|
| *index* | Previous index number. Valid values are from 0 to 65534. |
| *command* | An IP explicit path configuration command that creates a path entry. (Use the **next-address** command to specify the next IP address in the explicit path.) |

## Defaults

No path entry is inserted after a specified index number.

## Command Modes

IP explicit path configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(5)S | This command was introduced. |
| 12.1(3)T | This command was integrated into Cisco IOS Release 12.1(3)T. |
| 12.0(10)ST | This command was integrated into Cisco IOS Release 12.0(10)ST. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Examples

In the following example, the **next-address** command is inserted after index 5:

```
Router(config-ip-expl-path)# append-after 5 next-address 10.3.27.3
```

## Related Commands

| Command | Description |
|---|---|
| **index** | Inserts or modifies a path entry at a specific index. |
| **interface fastethernet** | Enters the command mode for IP explicit paths and creates or modifies the specified path. |
| **list** | Displays all or part of the explicit paths. |
| **next-address** | Specifies the next IP address in the explicit path. |
| **show ip explicit-paths** | Displays the configured IP explicit paths. |

# auto-bw (LSP Attributes)

To specify automatic bandwidth configuration for a label switched path (LSP) in an LSP attribute list, use the **auto-bw** command in LSP Attributes configuration mode. To remove automatic bandwidth configuration, use the **no** form of this command.

**auto-bw** [**frequency** *secs*] [**max-bw** *kbps*] [**min-bw** *kbps*] [**collect-bw**]

**no auto-bw**

## Syntax Description

| | |
|---|---|
| **frequency** *secs* | (Optional) Interval between bandwidth adjustments. The specified interval can be from 300 to 604800 seconds. |
| **max-bw** *kbps* | (Optional) Maximum automatic bandwidth for the path option. The value can be from 0 to 4294967295 kilobits per second (kbps). |
| **min-bw** *kbps* | (Optional) Minimum automatic bandwidth for the path option. The value is from 0 to 4294967295 kilobits per second (kbps). |
| **collect-bw** | (Optional) Collects output rate information for the path option, but does not adjust its bandwidth. |

## Command Default

If the command is entered with no optional keywords, automatic bandwidth adjustment for the LSP is enabled, with adjustments made every 24 hours and with no constraints on the bandwidth adjustments made.
If the **collect-bw** keyword is entered, the bandwidth is sampled but not adjusted, and the other options, if any, are ignored.
If the **collect-bw** keyword is not entered and some, but not all of the other keywords are entered, the defaults for the keywords not entered are: **frequency**, every 24 hours; **min-bw**, unconstrained (0); **max-bw**, unconstrained.

## Command Modes

LSP Attributes configuration (config-lsp-attr)

## Command History

| Release | Modification |
|---|---|
| 12.0(26)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Usage Guidelines

Use this command to set an automatic bandwidth configuration in an LSP attributes list.

To sample the bandwidth used by an LSP without automatically adjusting it, specify the **collect-bw** keyword in the **auto-bw** command in an LSP attribute list.

If you enter the **auto-bw** command without the **collect-bw** keyword, the bandwidth of the LSP is adjusted to the largest average output rate sampled for the LSP since the last bandwidth adjustment for the LSP was made.

To constrain the bandwidth adjustment that can be made to an LSP in an LSP attribute list, use the **max-bw** or **min-bw** keyword and specify the permitted maximum allowable bandwidth or minimum allowable bandwidth, respectively.

The **no** form of the **auto-bw** command disables bandwidth adjustment for the tunnel and restores the configured bandwidth for the LSP where configured bandwidth is determined as follows:

- If the LSP bandwidth was explicitly configured with the **mpls traffic-eng lsp attributes lsp-id bandwidth** command after the running configuration was written (if at all) to the startup configuration, the configured bandwidth is the bandwidth specified by that command.
- Otherwise, the configured bandwidth is the bandwidth specified for the tunnel in the startup configuration.

To associate the LSP automatic bandwidth adjustment attribute and the LSP attribute list with a path option for an LSP, you must configure the **tunnel mpls traffic-eng path option** command with the **attributes** *string* keyword and argument, where *string* is the identifier for the specific LSP attribute list.

## Examples

The following example sets automatic bandwidth configuration for an LSP in an LSP attribute list:

```
configure terminal
!
mpls traffic-eng lsp attributes 1
 auto-bw
 exit
end
```

## Related Commands

| Command | Description |
|---|---|
| **mpls traffic-eng lsp attributes** | Creates or modifies an LSP attribute list. |
| **show mpls traffic-eng lsp attributes** | Displays global LSP attribute lists. |

# bandwidth (LSP Attributes)

To configure label switched path (LSP) bandwidth in an LSP attribute list, use the **bandwidth** command in LSP Attributes configuration mode. To remove the configured bandwidth from the LSP attribute list, use the **no** form of this command.

**bandwidth** [**sub-pool** | **global**] *kbps*

**no bandwidth**

## Syntax Description

| | |
|---|---|
| **sub-pool** | (Optional) Indicates a subpool path option. |
| **global** | (Optional) Indicates a global pool path option. Entering this keyword is not necessary, for all path options are from the global pool in the absence of the **sub-pool** keyword. |
| *kbps* | Number of kilobits per second set aside for the path option. The range is from 1 to 4294967295. |

## Command Default

The default bandwidth is 0.

## Command Modes

LSP Attributes configuration (config-lsp-attr)

## Command History

| Release | Modification |
|---|---|
| 12.0(26)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Usage Guidelines

Use this command to configure LSP bandwidth in the LSP attribute list. The bandwidth configured can be associated with both dynamic and explicit path options.

To associate the LSP bandwidth and the LSP attribute list with a path option for an LSP, you must configure the **tunnel mpls traffic-eng path option** command with the **attributes** *string* keyword and argument, where *string* is the identifier for the specific LSP attribute list.

The bandwidth configured in the LSP attribute list will override the bandwidth configured on the tunnel.

## Examples

The following example shows how to set the LSP bandwidth to 5000 kbps in the LSP attribute list identified with the numeral 2:

```
configure terminal
!
mpls traffic-eng lsp attributes 2
 bandwidth 5000
```

```
 exit
end
```

**Related Commands**

| Command | Description |
|---|---|
| **mpls traffic-eng lsp attributes** | Creates or modifies an LSP attribute list. |
| **show mpls traffic-eng lsp attributes** | Displays global LSP attribute lists. |

# bgp default route-target filter

To enable automatic Border Gateway Protocol (BGP) default route-target community filtering, use the **bgp default route-target filter** command in router configuration mode. To disable automatic BGP route-target community filtering or to enable pseudowire switching in address family configuration mode, use the **no** form of this command.

**bgp default route-target filter**

**no bgp default route-target filter**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Automatic BGP default route-target community filtering is enabled.

## Command Modes

Router configuration (config-router)
Address family configuration (config-router-af)

## Command History

| Release | Modification |
|---|---|
| 12.1(5)T | This command was introduced. |
| 12.0(16)ST | This command was integrated into Cisco IOS Release 12.0(16)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 15.1(1)S | This command was integrated into Cisco IOS Release 15.1(1)S and the functionality of the **no** form of the command was modified. When this command is used in address family configuration mode, the **no** form of the **bgp default route-target filter** command enables pseudowire switching on an Autonomous System Boundary Router (ASBR). |

## Usage Guidelines

Use the **bgp default route-target filter** command to control the distribution of VPN routing information through the list of VPN route-target communities.

When you use the **no** form of this command, all received VPN-IPv4 routes are accepted by the configured router. Accepting VPN-IPv4 routes is the desired behavior for a router configured as an ASBR or as a customer edge (CE) BGP border edge router.

If you configure the router for BGP route-target community filtering, all received exterior BGP (EBGP) VPN-IPv4 routes are discarded when those routes do not contain a route-target community value that matches the import list of any configured VPN routing and forwarding (VRF) instances. This is the desired behavior for a router configured as a provider edge (PE) router.

**Note** This command is automatically disabled if a PE router is configured as a client of a common VPN-IPv4 route reflector in the autonomous system.

#### Enabling Pseudowire Switching at the ASBR

In Cisco IOS Release 15.1(1)S, the functionality of the **no** form of the **bgp default route-target filter** command has been modified to support Virtual Private LAN Switching (VPLS) on an ASBR.

In router family configuration mode (router-config-af), which is entered by using the **address-family l2vpn** command, the **no bgp default route-target filter** command enables pseudowire switching.

## Examples

In the following example, BGP route-target filtering is disabled for autonomous system 120:

```
router bgp 120
 no bgp default route-target filter
```

#### Pseudowire Switching Enabled at the ASBR

In the following example, pseudowire switching is enabled at the ASBR:

```
Router# enable
Router# configure terminal
Router(config)# router bgp 1
Router(config-router)# address-family l2vpn
Router(config-router-af)# no bgp default route-target filter
```

## Related Commands

| Command | Description |
|---|---|
| **address-family l2vpn** | Enters address family configuration mode to configure a routing session using L2VPN endpoint provisioning address information. |

# bgp next-hop

To configure a loopback interface as the next hop for routes associated with a VPN routing and forwarding instance (VRF), use the **bgp next-hop** command in VRF configuration mode. To return the router to default operation, use the **no** form of this command.

**bgp next-hop loopback** *number*

**no bgp next-hop**

## Syntax Description

| | |
|---|---|
| **loopback** *number* | Specifies the number of the loopback interface. The value that can be entered for this argument is a number from 1 to 2147483647. |

## Defaults

The IP address of the source interface, from which the route was advertised is set as the next hop when this command is not enabled.

## Command Modes

VRF configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(13)T | This command was introduced. |

## Usage Guidelines

The **bgp next-hop** command is used in Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) and Tunnel Engineering (TE) configurations. This command allows you to configure a loopback interface as the next hop for routes that are associated with the specified VRF. This command can be used, for example, to configure VPN traffic to use a specific Label Switched Path (LSP) through an MPLS core network.

## Examples

In the following example, loopback interface 0 is configured as the next hop for VPN traffic associated with VRF RED:

```
Router(config)# ip vrf RED
Router(config-vrf)# rd 40000:1
Router(config-vrf)# route-target import 40000:2
Router(config-vrf)# route-target export 40000:2
Router(config-vrf)# bgp next-hop loopback 0
```

## Related Commands

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

# bgp scan-time

To configure scanning intervals of Border Gateway Protocol (BGP) routers for next hop validation or to decrease import processing time of Virtual Private Network version 4 (VPNv4) routing information, use the **bgp scan-time** command in address family or router configuration mode. To return the scanning interval of a router to its default scanning interval of 60 seconds, use the **no** form of this command.

**bgp scan-time** [**import**] *scanner-interval*

**no bgp scan-time** [**import**] *scanner-interval*

## Syntax Description

| | |
|---|---|
| **import** | (Optional) Configures import processing of VPNv4 unicast routing information from BGP routers into routing tables. |
| *scanner-interval* | The scanning interval of BGP routing information. Valid values used for selecting the desired scanning interval are from 5 to 60 seconds. The default is 60 seconds. |

## Command Default

The default scanning interval is 60 seconds.

## Command Modes

Address family configuration (config-router-af)
Router configuration (config-router)

## Command History

| Release | Modification |
|---|---|
| 12.0(7)T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 15.0(1)M | This command was modified. The **import** keyword was removed. It is not available in Cisco IOS Release 15.0(1)M and later Cisco IOS Release 15.0M releases. |
| 12.2(33)SRE | This command was modified. The **import** keyword was removed. It is not available in Cisco IOS Release 12.2(33)SRE and later Cisco IOS Release 12.2SR releases. |

## Usage Guidelines

Entering the **no** form of this command does not disable scanning, but removes it from the output of the **show running-config** command.

The **import** keyword is supported in address family VPNv4 unicast mode only.

The BGP Event Based VPN Import feature introduced a modification to the existing BGP path import process using new commands and the **import** keyword was removed from the **bgp scan-time** command in Cisco IOS Release 15.0(1)M, 12.2(33)SRE, and later releases.

## Examples

In the following router configuration example, the scanning interval for next hop validation of IPv4 unicast routes for BGP routing tables is set to 20 seconds:

```
router bgp 100
 no synchronization
 bgp scan-time 20
```

In the following address family configuration example, the scanning interval for next hop validation of address family VPNv4 unicast routes for BGP routing tables is set to 45 seconds:

```
router bgp 150
 address-family vpn4 unicast
  bgp scan-time 45
```

In the following address family configuration example, the scanning interval for importing address family VPNv4 routes into IP routing tables is set to 30 seconds:

```
router bgp 150
 address-family vpnv4 unicast
  bgp scan-time import 30
```

## Related Commands

| Command | Description |
|---|---|
| **address-family vpnv4** | Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes. |

# cell-packing

To enable ATM over Multiprotocol Label Switching (MPLS) or Layer 2 Tunneling Protocol Version 3 (L2TPv3) to pack multiple ATM cells into each MPLS or L2TPv3 packet, use the **cell-packing** command in the appropriate configuration mode. To disable cell packing, use the **no** form of this command.

**cell-packing** [*cells*] [**mcpt-timer** *timer*]

**no cell-packing**

## Syntax Description

| | |
|---|---|
| *cells* | (Optional) The number of cells to be packed into an MPLS or L2TPv3 packet.<br>The range is from 2 to the maximum transmission unit (MTU) of the interface divided by 52. The default number of ATM cells to be packed is the MTU of the interface divided by 52.<br>If the number of cells packed by the peer provider edge router exceeds this limit, the packet is dropped. |
| **mcpt-timer** *timer* | (Optional) Specifies which timer to use for maximum cell-packing timeout (MCPT). Valid values are **1**, **2**, or **3**. The default value is **1**. |

## Command Default

Cell packing is disabled.

## Command Modes

Interface configuration
L2transport VC configuration—for ATM VC
L2transport VP configuration—for ATM VP
VC class configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(25)S | This command was introduced. |
| 12.0(29)S | Support for L2TPv3 sessions was added. |
| 12.0(30)S | This command was updated to enable cell packing as part of a virtual circuit (VC) class. |
| 12.0(31)S | This command was integrated into Cisco IOS Release 12.0(31)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.4(11)T | This command was integrated into Cisco IOS Release 12.4(11)T. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.2(33)SRE | This command was modified. Support for static pseudowires was added. |

## Usage Guidelines

The **cell-packing** command is available only if you configure the ATM VC or virtual path (VP) with ATM adaptation layer 0 (AAL0) encapsulation. If you specify ATM adaptation layer 5 (AAL5) encapsulation, the command is not valid.

Only cells from the same VC or VP can be packed into one MPLS or L2TPv3 packet. Cells from different connections cannot be concatenated into the same packet.

When you change, enable, or disable the cell-packing attributes, the ATM VC or VP and the MPLS or L2TPv3 emulated VC are reestablished.

If a provider edge (PE) router does not support cell packing, the PE router sends only one cell per MPLS or L2TPv3 packet.

The number of packed cells need not match between the PE routers. The two PE routers agree on the lower of the two values. For example, if PE1 is allowed to pack 10 cells per MPLS or L2TPv3 packet and PE2 is allowed to pack 20 cells per MPLS or L2TPv3 packet, the two PE routers would agree to send no more than 10 cells per packet.

If the number of cells packed by the peer PE router exceeds the limit, the packet is dropped.

If you issue the **cell-packing** command without first specifying the **atm mcpt-timers** command, you get the following error:

```
Please set mcpt values first
```

In order to support cell packing for static pseudowires, both PEs must run Cisco IOS Release 12.2(1)SRE, and the maximum number of cells that can be packed must be set to the same value on each.

## Examples

The following example shows cell packing enabled on an interface set up for VP mode. The **cell-packing** command specifies that ten ATM cells be packed into each MPLS packet. The command also specifies that the second maximum cell-packing timeout (MCPT) timer be used.

```
Router> enable
Router# configure terminal
Router(config)# interface atm1/0
Router(config-if)# atm mcpt-timers 1000 800 500
Router(config-if)# atm pvp 100 l2transport
Router(config-if-atm-l2trans-pvp)# xconnect 10.0.0.1 234 encapsulation mpls
Router(config-if-atm-l2trans-pvp)# cell-packing 10 mcpt-timer 2
```

The following example configures ATM cell relay over MPLS with cell packing in VC class configuration mode. The VC class is then applied to an interface.

```
Router> enable
Router# configure terminal
Router(config)# vc-class atm cellpacking
Router(config-vc-class)# encapsulation aal0
Router(config-vc-class)# cell-packing 10 mcpt-timer 1
Router(config-vc-class)# exit
Router(config)# interface atm1/0
Router(config-if)# atm mcpt-timers 100 200 250
Router(config-if)# class-int cellpacking
Router(config-if)# pvc 1/200 l2transport
Router(config-if-atm-l2trans-pvc)# xconnect 10.13.13.13 100 encapsulation mpls
```

The following example configures ATM AAL5 over L2TPv3 in VC class configuration mode. The VC class is then applied to an interface.

```
Router(config)# vc-class atm aal5class
Router(config-vc-class)# encapsulation aal5
!
Router(config)# interface atm1/0
Router(config-if)# class-int aal5class
Router(config-if)# pvc 1/200 l2transport
Router(config-if-atm-l2trans-pvc)# xconnect 10.13.13.13 100 encapsulation l2tpv3
```

## Related Commands

| Command | Description |
|---|---|
| **atm mcpt-timers** | Creates cell-packing timers, which specify how long the PE router can wait for cells to be packed into an MPLS or L2TPv3 packet. |
| **debug atm cell-packing** | Displays ATM cell relay cell packing debugging information. |
| **show atm cell-packing** | Displays information about the VCs and VPs that have ATM cell packing enabled. |

# class (MPLS)

To configure a defined Multiprotocol Label Switching (MPLS) class of service (CoS) map that specifies how classes map to label switched controlled virtual circuits (LVCs) when combined with a prefix map, use the **class** command in CoS map submode. To remove the defined MPLS CoS map, use the **no** form of this command.

**class** *class* [**available** | **standard** | **premium** | **control**]

**no class** *class* [**available** | **standard** | **premium** | **control**]

## Syntax Description

| | |
|---|---|
| *class* | The precedence of identified traffic to classify traffic. |
| **available** | (Optional) Means low precedence (In/Out plus lower two bits = 0,4). |
| **standard** | (Optional) Means next precedence (In/Out plus lower two bits = 1,5). |
| **premium** | (Optional) Means high precedence (In/Out plus lower two bits = 2,6). |
| **control** | (Optional) Means highest precedence pair (In/Out plus lower two bits = 3,7). These bits are reserved for control traffic. |

## Defaults

This command is disabled.

## Command Modes

CoS map submode

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Examples

The following example shows how to configure a CoS map:

```
Router(config)# mpls cos-map 55
Router(config-mpls-cos-map)# class 1 premium
Router(config-mpls-cos-map)# exit
```

## Related Commands

| Command | Description |
|---|---|
| **access-list** | Configures the access list mechanism for filtering frames by protocol type or vendor code. |
| **mpls cos-map** | Creates a class map that specifies how classes map to LVCs when combined with a prefix map. |

| Command | Description |
|---|---|
| **mpls prefix-map** | Configures a router to use a specified quality of service (QoS) map when a label definition prefix matches the specified access list. |
| **show mpls cos-map** | Displays the CoS map used to assign quantity of LVCs and associated CoS of those LVCs. |

# clear ip route vrf

To remove routes from the Virtual Private Network (VPN) routing and forwarding(VRF) table, use the **clear ip route vrf** command in user EXEC or privileged EXEC mode.

**clear ip route vrf** *vrf-name* {***** | *network* [*mask*]}

## Syntax Description

| | |
|---|---|
| *vrf-name* | Name of the VRF for the static route. |
| ***** | Indicates all routes for a given VRF. |
| *network* | Destination to be removed, in dotted decimal format. |
| *mask* | (Optional) Mask for the specified network destination, in dotted decimal format. |

## Command Modes

User EXEC
Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(5)T | This command was introduced. |
| 12.0(21)ST | This command was integrated into Cisco IOS 12.0(21)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS 12.0(22)S. |
| 12.0(23)S | This command was integrated into Cisco IOS 12.0(23)S. |
| 12.2(13)T | This command was integrated into Cisco IOS 12.2(13)T. |
| 12.2(14)S | This command was integrated into Cisco IOS 12.2(14)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

Use this command to clear routes from the routing table. Use the asterisk (*) to delete all routes from the forwarding table for a specified VRF, or enter the address and mask of a particular network to delete the route to that network.

## Examples

The following command shows how to remove the route to the network 10.13.0.0 in the vpn1 routing table:

```
Router# clear ip route vrf vpn1 10.13.0.0
```

## Related Commands

| Command | Description |
|---|---|
| **show ip route vrf** | Displays the IP routing table associated with a VRF. |

# clear ip rsvp hello bfd

To globally reset to zero the number of times that the Bidirectional Forwarding Detection (BFD) protocol was dropped on an interface or the number of times that a link was down, use the **clear ip rsvp hello bfd** command in user EXEC or privileged EXEC mode. To disable the resetting of those counters, use the **no** form of this command.

**clear ip rsvp hello bfd** {**lost-cnt** | **nbr-lost**}

**no clear ip rsvp hello bfd** {**lost-cnt** | **nbr-lost**}

## Syntax Description

| | |
|---|---|
| **lost-cnt** | Resets to zero the number of times that the BFD session was lost (dropped) on an interface. |
| **nbr-lost** | Resets to zero the number of times the BFD protocol detected that a link was down. |

## Command Default

The counters are not reset to zero.

## Command Modes

User EXEC
Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SRC | This command was introduced. |

## Usage Guidelines

When you unconfigure BFD-triggered Fast Reroute, the BFD session is not torn down. Enter the **clear ip rsvp hello bfd** command to clear **show** command output for Multiprotocol Label Switching (MPLS) traffic engineering (TE) features that use the BFD protocol.

The **clear ip rsvp hello bfd** command globally resets to zero the LostCnt field in the **show ip rsvp hello bfd nbr summary** command and the **show ip rsvp hello bfd nbr** command. Those fields show the number of times that the BFD session was lost (dropped) on an interface.

The **clear ip rsvp hello bfd** command also resets to zero the Communication with neighbor lost field in the **show ip rsvp hello bfd nbr detail** command. That field shows the number of times the BFD protocol detected that a link was down.

## Examples

The following example resets to zero the Communication with neighbor lost field in the **show ip rsvp hello bfd nbr detail** command that shows the number of times the BFD protocol detected that a link was down:

```
Router# clear ip rsvp hello bfd nbr-lost
```

**Related Commands**

| Command | Description |
|---|---|
| **show ip rsvp hello bfd nbr** | Displays information about all MPLS TE clients that use the BFD protocol. |
| **show ip rsvp hello bfd nbr detail** | Displays detailed information about all MPLS TE clients that use the BFD protocol. |
| **show ip rsvp hello bfd nbr summary** | Displays summarized information about all MPLS TE clients that use the BFD protocol. |

# clear ip rsvp hello instance counters

To clear (refresh) the values for Hello instance counters, use the **clear ip rsvp hello instance counters** command in privileged EXEC mode.

**clear ip rsvp hello instance counters**

## Syntax Description

This command has no arguments or keywords.

## Command Default

None

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(22)S | This command was introduced. |
| 12.2(18)SXD1 | This command was integrated into Cisco IOS Release 12.2(18)SXD1. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(31)SXH. |

## Examples

Following is sample output from the **show ip rsvp hello instance detail** command and then the **clear ip rsvp hello instance counters** command. Notice that the "Statistics" fields have been cleared to zero.

```
Router# show ip rsvp hello instance detail

Neighbor 10.0.0.2  Source  10.0.0.1
    State: UP      (for 2d18h)
    Type: PASSIVE  (responding to requests)
    I/F: Et1/1
    LSPs protecting: 0
    Refresh Interval (msec) (used when ACTIVE)
      Configured: 100
      Statistics: (from 2398195 samples)
        Min:      100
        Max:      132
        Average:  100
        Waverage: 100 (Weight = 0.8)
        Current:  100
```

```
    Src_instance 0xA9F07C13, Dst_instance 0x9BBAA407
    Counters:
      Communication with neighbor lost:
        Num times: 0
        Reasons:
          Missed acks:             0
          Bad Src_Inst received:   0
          Bad Dst_Inst received:   0
          I/F went down:           0
          Neighbor disabled Hello: 0
      Msgs Received:   2398194
           Sent:       2398195
           Suppressed: 0

Router# clear ip rsvp hello instance counters

Neighbor 10.0.0.2  Source  10.0.0.1
    State: UP      (for 2d18h)
    Type: PASSIVE  (responding to requests)
    I/F: Et1/1
    LSPs protecting: 0
    Refresh Interval (msec) (used when ACTIVE)
      Configured: 100
      Statistics:
        Min:        0
        Max:        0
        Average:    0
        Waverage:   0
        Current:    0
    Src_instance 0xA9F07C13, Dst_instance 0x9BBAA407
    Counters:
      Communication with neighbor lost:
        Num times: 0
        Reasons:
          Missed acks:             0
          Bad Src_Inst received:   0
          Bad Dst_Inst received:   0
          I/F went down:           0
          Neighbor disabled Hello: 0
      Msgs Received:   2398194
           Sent:       2398195
           Suppressed: 0
```

## Related Commands

| Command | Description |
|---|---|
| **ip rsvp signalling hello (configuration)** | Enables Hello globally on the router. |
| **ip rsvp signalling hello (interface)** | Enables Hello on an interface where you need Fast Reroute protection. |
| **ip rsvp signalling hello statistics** | Enables Hello statistics on the router. |
| **show ip rsvp hello statistics** | Displays how long Hello packets have been in the Hello input queue. |

# clear ip rsvp hello instance statistics

To clear Hello statistics for an instance, use the **clear ip rsvp hello instance statistics** command in privileged EXEC mode.

**clear ip rsvp hello instance statistics**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Hello statistics are not cleared for an instance.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(22)S | This command was introduced. |
| 12.2(18)SXD1 | This command was integrated into Cisco IOS Release 12.2(18)SXD1. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(31)SXH. |

## Examples

This example shows sample output from the **show ip rsvp hello statistics** command and the values in those fields after you enter the **clear ip rsvp hello instance statistics** command.

```
Router# show ip rsvp hello statistics

  Status: Enabled
  Packet arrival queue:
    Wait times (msec)
      Current:0
      Average:0
      Weighted Average:0 (weight = 0.8)
      Max:4
    Current length: 0 (max:500)
  Number of samples taken: 2398525

Router# clear ip rsvp hello instance statistics

Status: Enabled
  Packet arrival queue:
    Wait times (msec)
      Current:0
      Average:0
      Weighted Average:0 (weight = 0.8)
      Max:0
    Current length: 0 (max:500)
  Number of samples taken: 0
```

## Related Commands

| Command | Description |
|---|---|
| **ip rsvp signalling hello (configuration)** | Enables Hello globally on the router. |
| **ip rsvp signalling hello (interface)** | Enables Hello on an interface where you need Fast Reroute protection. |
| **ip rsvp signalling hello statistics** | Enables Hello statistics on the router. |
| **show ip rsvp hello statistics** | Displays how long Hello packets have been in the Hello input queue. |

# clear ip rsvp hello statistics

To globally clear Hello statistics, use the **clear ip rsvp hello statistics** command in privileged EXEC mode.

**clear ip rsvp hello statistics**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Hello statistics are not globally cleared.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(22)S | This command was introduced. |
| 12.2(18)SXD1 | This command was integrated into Cisco IOS Release 12.2(18)SXD1. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(31)SB2s | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(31)SXH. |

## Usage Guidelines

Use this command to remove all information about how long Hello packets have been in the Hello input queue.

## Examples

Following is sample output from the **show ip rsvp hello statistics** command and the **clear ip rsvp hello statistics** command. Notice that the values in the "Packet arrival queue" fields have been cleared.

```
Router# show ip rsvp hello statistics

  Status: Enabled
  Packet arrival queue:
    Wait times (msec)
      Current:0
      Average:0
      Weighted Average:0 (weight = 0.8)
      Max:4
    Current length: 0 (max:500)
  Number of samples taken: 2398525
```

```
Router# clear ip rsvp hello statistics

  Status: Enabled
  Packet arrival queue:
    Wait times (msec)
      Current:0
      Average:0
      Weighted Average:0 (weight = 0.8)
      Max:0
    Current length: 0 (max:500)
  Number of samples taken: 16
```

## Related Commands

| Command | Description |
|---|---|
| **ip rsvp signalling hello statistics** | Enables Hello statistics on the router. |
| **show ip rsvp hello statistics** | Displays how long Hello packets have been in the Hello input queue. |

# clear ip rsvp msg-pacing

To clear the Resource Reservation Protocol (RSVP) message pacing output from the **show ip rsvp neighbor** command, use the **clear ip rsvp msg-pacing** command in privileged EXEC mode.

**clear ip rsvp msg-pacing**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(14)ST | This command was introduced. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Examples

The following example clears the RSVP message pacing output:

```
Router# clear ip rsvp msg-pacing
```

## Related Commands

| Command | Description |
|---|---|
| **show ip rsvp counters** | Displays counts of RSVP messages that were sent and received. |
| **show ip rsvp neighbor** | Displays the current RSVP neighbors and indicates whether the neighbor is using IP or UDP encapsulation for a specified interface or for all interfaces. |

# clear mpls counters

To clear the Multiprotocol Label Switching (MPLS) forwarding table disposition counters, the Any Transport over MPLS (AToM) imposition and disposition virtual circuit (VC) counters, and the MAC address withdrawal counters, use the **clear mpls counters** command in privileged EXEC mode.

**clear mpls counters**

## Syntax Description

This command has no arguments or keywords.

## Defaults

Checkpoint information resides on the active and standby Route Processor.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.2(25)S | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. This command was updated to clear AToM VC counters. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.2(33)SRE | This command was modified. This command now clears the MAC address withdrawal counters. |
| Cisco IOS XE Release 2.5 | This command was modified. This command now clears the MAC address withdrawal counters. |

## Examples

In the following example, the first **show mpls forwarding-table** command shows that 590 label-switched bytes exist in the forwarding table. The **clear mpls counters** command clears the counters. The second **show mpls forwarding-table** command shows that the number of label-switched bytes is 0.

```
Router# show mpls forwarding-table

Local  Outgoing      Prefix           Bytes Label   Outgoing   Next Hop
Label  Label or VC   or Tunnel Id     Switched      interface
20     30            10.10.17.17      590           Et3/0      172.16.0.2

Router# clear mpls counters

Clear "show mpls forwarding-table" counters [confirm]
mpls forward counters cleared

Router# show mpls forwarding-table

Local  Outgoing      Prefix           Bytes Label   Outgoing   Next Hop
Label  Label or VC   or Tunnel Id     Switched      interface
```

```
20      30              10.10.17.17       0               Et3/0       172.16.0.2
```

In the following example, the first **show mpls l2transport vc detail** command shows that one MAC address withdrawal message was sent (and none were received), 15 packets were received and sent, 1656 bytes were received, and 1986 bytes were sent. The **clear mpls counters** command clears the counters. The second **show mpls l2transport vc detail** command shows that no MAC address withdrawal messages, bytes, or packets were received or sent. (If there are no MAC address withdrawal messages received or sent, the `MAC Withdraw` field is absent.)

```
Router# show mpls l2transport vc detail

Local interface: Et1/0 up, line protocol up, Ethernet up
  Destination address: 12.1.1.1, VC ID: 99, VC status: up
    Output interface: Se2/0, imposed label stack {21 16}
    Preferred path: not configured
    Default path: active
    Next hop: point2point
  Create time: 00:00:32, last status change time: 00:00:14
  Signaling protocol: LDP, peer 12.1.1.1:0 up
    Targeted Hello: 11.1.1.1(LDP Id) -> 12.1.1.1
    Status TLV support (local/remote)   : enabled/supported
      Label/status state machine        : established, LruRru
      Last local dataplane   status rcvd: no fault
      Last local SSS circuit status rcvd: no fault
      Last local SSS circuit status sent: no fault
      Last local  LDP TLV    status sent: no fault
      Last remote LDP TLV    status rcvd: no fault
    MPLS VC labels: local 23, remote 16
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
    Remote interface description:
    MAC Withdraw: sent:1, received:0 <---- MAC address withdrawal totals
  Sequencing: receive disabled, send disabled
  SSO Descriptor: 12.1.1.1/99, local label: 23
    SSM segment/switch IDs: 16387/8193 (used), PWID: 8193
  VC statistics:
    packet totals: receive 15, send 15 <---- packet totals
    byte totals:   receive 1656, send 1986 <---- byte totals
    packet drops:  receive 0, seq error 0, send 0

Router# clear mpls counters

Clear "show mpls forwarding-table" counters [confirm]

mpls forward counters cleared

Router# show mpls l2transport vc detail

Local interface: Et1/0 up, line protocol up, Ethernet up
  Destination address: 12.1.1.1, VC ID: 99, VC status: up
    Output interface: Se2/0, imposed label stack {21 16}
    Preferred path: not configured
    Default path: active
    Next hop: point2point
  Create time: 00:00:32, last status change time: 00:00:14
  Signaling protocol: LDP, peer 12.1.1.1:0 up
    Targeted Hello: 11.1.1.1(LDP Id) -> 12.1.1.1
    Status TLV support (local/remote)   : enabled/supported
      Label/status state machine        : established, LruRru
      Last local dataplane   status rcvd: no fault
      Last local SSS circuit status rcvd: no fault
      Last local SSS circuit status sent: no fault
      Last local  LDP TLV    status sent: no fault
```

```
    Last remote LDP TLV    status rcvd: no fault
  MPLS VC labels: local 23, remote 16
  Group ID: local 0, remote 0
  MTU: local 1500, remote 1500
  Remote interface description:
Sequencing: receive disabled, send disabled
SSO Descriptor: 12.1.1.1/99, local label: 23
  SSM segment/switch IDs: 16387/8193 (used), PWID: 8193
VC statistics:
  packet totals: receive 0, send 0 <---- packet totals
  byte totals:   receive 0, send 0 <---- byte totals
  packet drops:  receive 0, seq error 0, send 0
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls forwarding-table** | Displays the contents of the MPLS FIB. |
| **show mpls l2transport vc detail** | Displays detailed information related to a VC. |

# clear mpls ip iprm counters

To clear the IP Rewrite Manager (IPRM) counters, use the **clear mpls ip iprm counters** command in privileged EXEC mode.

**clear mpls ip iprm counters**

## Syntax Description

This command has no arguments or keywords.

## Defaults

No default behavior or values

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.2(25)S | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Usage Guidelines

This command sets IPRM counters to zero.

## Examples

The command in the following example clears the IPRM counters:

```
Router# clear mpls ip iprm counters

Clear iprm counters [confirm]
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls ip iprm counters** | Displays the IPRM counters. |

# clear mpls ldp checkpoint

To clear the checkpoint information from the Label Information Base (LIB) entries on the active Route Processor (RP) or PRE and to clear the LIB entries created by checkpointing on the standby RP or PRE, use the **clear mpls ldp checkpoint** command in privileged EXEC mode.

**clear mpls ldp checkpoint** [**vrf** *vpn-name*] {**network** {*mask* | *length*} [**longer-prefixes**] | *} [**incomplete**]

**Cisco 10000 Series Routers**

**clear mpls ldp checkpoint** {**network** {*mask* | *length*} [**longer-prefixes**] | *} [**incomplete**]

## Syntax Description

| | |
|---|---|
| **vrf** *vpn-name* | (Optional) Clears the checkpoint information for the specified VPN routing and forwarding (VRF) instance (vpn-name).<br>**Note** Applies to the Cisco 7000 series routers only. |
| **network** | Clears the checkpoint information for the specified destination address. |
| *mask* | Specifies the network mask, written as A.B.C.D. |
| *length* | Specifies the mask length. |
| **longer-prefixes** | (Optional) Clears the checkpoint information for any prefix that matches *mask* with the *length* specified. |
| * | (Optional) Clears the checkpoint information for all destinations. |
| **incomplete** | (Optional) Clears any incomplete checkpoint information from the LIB. |

## Defaults

Checkpoint information resides on the active and standby RP.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.2(25)S | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers. |

## Usage Guidelines

Use this command only when Cisco support personnel recommend it as a means of rectifying a problem.

On the active RP or PRE, this command does the following:

- Clears the checkpoint state information from the specified LIB entries.
- Triggers a checkpoint attempt for those entries.

On the standby RP or PRE, this command deletes all of the LIB entries created by checkpointing.

## Examples

The command in the following example clears the checkpointing information for prefix 10.1.10.1:

```
Router(config)# clear mpls ldp checkpoint 10.1.10.1 32

Clear LDP bindings checkpoint state [confirm]

00:20:29: %LDP-5-CLEAR_CHKPT: Clear LDP bindings checkpoint state (*) by console
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls ldp checkpoint** | Displays information about the LDP checkpoint system on the active RP. |

# clear mpls ldp neighbor

To forcibly reset a label distribution protocol (LDP) session, use the **clear mpls ldp neighbor** command in privileged EXEC mode.

**clear mpls ldp neighbor** [**vrf** *vpn-name*] {*nbr-address* | *****}

## Syntax Description

| | |
|---|---|
| **vrf** *vpn-name* | (Optional) Specifies the VPN routing and forwarding instance (*vpn-name*) for resetting an LDP session. |
| *nbr-address* | Specifies the address of the LDP neighbor whose session will be reset. The neighbor address is treated as <nbr-address>:0, which means it pertains to the LDP session for the LSR's platform-wide label space. |
| * | Designates that all LDP sessions will be reset. |

## Defaults

No default behavior or values

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(26)S | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.3(14)T | This command was integrated into Cisco IOS Release 12.3(14)T. |
| 12.2(18)SXE | This command was integrated into Cisco IOS Release 12.2(18)SXE. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

## Usage Guidelines

The **clear mpls ldp neighbor** command terminates the specified LDP sessions. The LDP sessions should be reestablished if the LDP configuration remains unchanged.

You can clear an LDP session for an interface-specific label space of an LSR by issuing the **no mpls ip** command and then the **mpls ip** command on the interface associated with the LDP session.

## Examples

The following example resets an LDP session:

```
Router# clear mpls ldp neighbor 10.12.12.12
```

To verify the results of the **clear mpls ldp neighbor** command, enter the **show mpls ldp neighbor** command. Notice the value in the "Up time" field.

```
Router# show mpls ldp neighbor 10.12.12.12

 Peer LDP Ident: 10.12.12.12:0; Local LDP Ident 10.13.13.13:0
   TCP connection: 10.12.12.12.646 - 10.13.13.13.15093
   State: Oper; Msgs sent/rcvd: 142/138; Downstream
   Up time: 02:16:28
   LDP discovery sources:
    Serial1/0, Src IP addr: 10.0.0.2
   Addresses bound to peer LDP Ident:
    10.0.0.129       10.12.12.12     10.0.0.2        10.1.0.5
    10.7.0.1
```

Then enter the following **clear mpls ldp neighbor 12.12.12.12** command. With mpls ldp logging configured, the easiest way to verify the **clear mpls ldp neighbor** command is to monitor the LDP log messages.

```
Router# clear mpls ldp neighbor 10.12.12.12

1w1d: %LDP-5-CLEAR_NBRS: Clear LDP neighbors (10.12.12.12) by console
1w1d: %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is DOWN
1w1d: %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is UP
```

Reenter the **show mpls ldp neighbor 10.12.12.12** command. Notice that the "Up time" value has been reset.

```
Router# show mpls ldp neighbor 10.12.12.12

  Peer LDP Ident: 10.12.12.12:0; Local LDP Ident 10.13.13.13:0
    TCP connection: 10.12.12.12.646 - 10.13.13.13.15095
    State: Oper; Msgs sent/rcvd: 125/121; Downstream
    Up time: 00:00:05
    LDP discovery sources:
     Serial1/0, Src IP addr: 10.0.0.2
    Addresses bound to peer LDP Ident:
     10.0.0.129       10.12.12.12     10.0.0.2        10.1.0.5
     10.7.0.1
```

The following example resets all LDP sessions:

```
Router# clear mpls ldp neighbor *
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls ldp neighbor** | Displays the status of the LDP sessions. |

# clear mpls traffic-eng auto-bw timers

To reinitialize the automatic bandwidth adjustment feature on a platform, use the **clear mpls traffic-eng auto-bw timers** command in user EXEC mode.

**clear mpls traffic-eng auto-bw timers**

## Syntax Description

This command has no arguments or keywords.

## Defaults

There are no defaults for this command.

## Command Modes

User EXEC

## Command History

| Release | Modification |
|---|---|
| 12.2(4)T | This command was introduced. |
| 12.2(11)S | This command was integrated into Cisco IOS Release 12.2(11)S. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

For each tunnel for which automatic bandwidth adjustment is enabled, the platform maintains information about sampled output rates and the time remaining until the next bandwidth adjustment. The **clear mpls traffic-eng auto-bw timers** command clears this information for all such tunnels. The effect is as if automatic bandwidth adjustment had just been enabled for the tunnels.

## Examples

The following example shows how to clear information about sampled output rates and the time remaining until the next bandwidth adjustment:

```
Router# clear mpls traffic-eng auto-bw timers

Clear mpls traffic engineering auto-bw timers [confirm]
```

**Related Commands**

| Command | Description |
|---|---|
| **mpls traffic-eng auto-bw timers** | Enables automatic bandwidth adjustment on a platform for tunnels configured for bandwidth adjustment. |
| **tunnel mpls traffic-eng auto-bw** | Enables automatic bandwidth adjustment for a tunnel, specifies the frequency with which tunnel bandwidth can be automatically adjusted, and designates the allowable range of bandwidth adjustments. |

# clear mpls traffic-eng auto-tunnel mesh

To remove all mesh tunnel interfaces and re-create them, use the **clear mpls traffic-eng auto-tunnel mesh** command in privileged EXEC mode.

**clear mpls traffic-eng auto-tunnel mesh**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification |
|---|---|
| 12.0(27)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Examples

The following example shows how to remove all mesh tunnel interfaces and re-create them:

```
Router# clear mpls traffic-eng auto-tunnel mesh
```

## Related Commands

| Command | Description |
|---|---|
| **interface auto-template** | Creates the template interface. |

# clear mpls traffic-eng auto-tunnel backup

To remove all the backup autotunnels and re-create them, use the **clear mpls traffic-eng auto-tunnel backup** command in global configuration mode.

**clear mpls traffic-eng auto-tunnel backup**

## Syntax Description

This command has no arguments or keywords.

## Command Default

No default behavior or values

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(27)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Examples

The following example removes all backup autotunnels and re-creates them:

```
Router# clear mpls traffic-eng auto-tunnel backup
```

## Related Commands

| Command | Description |
|---|---|
| **show ip rsvp fast-reroute** | Displays information about fast reroutable primary tunnels and their corresponding backup tunnels that provide protection. |

# clear mpls traffic-eng auto-tunnel primary

To remove all the primary autotunnels and re-create them, use the **clear mpls traffic-eng auto-tunnel primary** command in global configuration mode.

**clear mpls traffic-eng auto-tunnel primary**

## Syntax Description

This command has no arguments or keywords.

## Command Default

None

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(27)S | This command was introduced. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Examples

The following example removes all primary autotunnels and re-creates them:

```
Router# clear mpls traffic-eng auto-tunnel primary
```

## Related Commands

| Command | Description |
|---|---|
| **show ip rsvp fast-reroute** | Displays information about fast reroutable primary tunnels and their corresponding backup tunnels that provide protection. |

# clear mpls traffic-eng tunnel counters

To clear the counters for all Multiprotocol Label Switching (MPLS) traffic engineering tunnels, use the **clear mpls traffic-eng tunnel counters** command in privileged EXEC mode.

**clear mpls traffic-eng tunnel counters**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification |
|---|---|
| 12.0(14)ST | This command was introduced. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.4(20)T | This command was integrated into Cisco IOS Release 12.4(20)T. |

## Usage Guidelines

This command allows you to set the MPLS traffic engineering tunnel counters to zero so that you can see changes to the counters easily.

## Examples

In the following example, the counters for all MPLS traffic engineering tunnels are cleared and a request is made for confirmation that the specified action occurred:

```
Router# clear mpls traffic-eng tunnel counters

Clear traffic engineering tunnel counters [confirm]
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls traffic-eng tunnels statistics** | Displays event counters for one or more MPLS traffic engineering tunnels. |

# clear pw-udp vc

To clear pseudowire User Datagram Protocol (UDP) virtual circuit (VC) counter values, use the **clear pw-udp vc** command in privileged EXEC mode.

**clear pw-udp vc** {*min-vc max-vc* | **destination** *address* **vcid** *min-vc max-vc* | **vcid** *min-vc max-vc*} **counters**

## Syntax Description

| | |
|---|---|
| *min-vc* | Minimum VC ID. Valid values are from 1 to 4294967295. |
| *max-vc* | Maximum VC ID. Valid values are from 1 to 4294967295. |
| **destination** *address* | Specifies the destination hostname or the IP address of the VC. |
| **vcid** | Specifies the VC ID range. |
| **counters** | Specifies forwarding counters of pseudowire over UDP. |

## Command Default

The pseudowire UDP VC counter values are not cleared.

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification |
|---|---|
| 15.1(2)S | This command was introduced. |

## Examples

The following example shows how to clear the pseudowire UDP VC counter values:

```
Router# clear pw-udp vc destination 10.1.1.1 counters
```

## Related Commands

| Command | Description |
|---|---|
| **encapsulation (pseudowire)** | Specifies an encapsulation type for for tunneling Layer 2 traffic over a pseudowire. |
| **show pw-udp vc** | Displays information about pseudowire UDP VCs. |
| **udp port** | Configures the UDP port information on the xconnect class. |

# clear xconnect

To remove xconnect attachment circuits and pseudowires, use the **clear xconnect** command in privileged EXEC configuration mode.

**clear xconnect** {**all** | **interface** *interface* | **peer** *ip-address* {**all** | **vcid** *vc-id*}}

## Syntax Description

| | |
|---|---|
| **all** | Removes all xconnect attachment circuits and pseudowires. |
| **interface** *interface* | Removes xconnect attachment circuits and pseudowires on the specified interface. |
| **peer** *ip-address* {**all** \| **vcid** *vc-id*} | Removes xconnect attachment circuits and pseudowires associated with the specified peer IP address.<br>• **all**—Removes all xconnects associated with the specified peer IP address.<br>• **vcid** *vcid*—Removes xconnects associated with the specified peer IP address and the specified VCID. |

## Command Default

xconnect attachment circuits and pseudowires are not removed.

## Command Modes

Privileged EXEC (#)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SRE | This command was introduced. |

## Examples

The following example removes all xconnects:

```
Router# clear xconnect all

02:13:56: Xconnect[ac:Et1/0.1(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=1
02:13:56: Xconnect[mpls:10.1.1.2:1234000]: provisioning fwder with fwd_type=2, sss_role=2
02:13:56: Xconnect[ac:Et1/0.2(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=2
02:13:56: Xconnect[mpls:10.1.1.2:1234001]: provisioning fwder with fwd_type=2, sss_role=1
02:13:56: Xconnect[ac:Et1/0.3(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=1
02:13:56: Xconnect[mpls:10.1.2.2:1234002]: provisioning fwder with fwd_type=2, sss_role=2
02:13:56: Xconnect[ac:Et1/0.4(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=2
02:13:56: Xconnect[mpls:10.1.2.2:1234003]: provisioning fwder with fwd_type=2, sss_role=1
02:13:56: MPLS peer 10.1.1.2 vcid 1234000, VC DOWN, VC state DOWN
02:13:56: MPLS peer 10.1.1.2 vcid 1234001, VC DOWN, VC state DOWN
02:13:56: MPLS peer 10.1.2.2 vcid 1234002, VC DOWN, VC state DOWN
02:13:56: MPLS peer 10.1.2.2 vcid 1234003, VC DOWN, VC state DOWN
02:13:56: XC AUTH [Et1/0.1, 1001]: Event: start xconnect authorization, state changed from
IDLE to AUTHORIZING
02:13:56: XC AUTH [Et1/0.1, 1001]: Event: found xconnect authorization, state changed from
AUTHORIZING to DONE
02:13:56: XC AUTH [Et1/0.3, 1003]: Event: start xconnect authorization, state changed from
IDLE to AUTHORIZING
02:13:56: XC AUTH [Et1/0.3, 1003]: Event: found xconnect authorization, state changed from
AUTHORIZING to DONE
```

```
02:13:56: XC AUTH [10.1.1.2, 1234001]: Event: start xconnect authorization, state changed
from IDLE to AUTHORIZING
02:13:56: XC AUTH [10.1.1.2, 1234001]: Event: found xconnect authorization, state changed
from AUTHORIZING to DONE
02:13:56: XC AUTH [10.1.2.2, 1234003]: Event: start xconnect authorization, state changed
from IDLE to AUTHORIZING
02:13:56: XC AUTH [10.1.2.2, 1234003]: Event: found xconnect authorization, state changed
from AUTHORIZING to DONE
02:13:56: XC AUTH [Et1/0.1, 1001]: Event: free xconnect authorization request, state
changed from DONE to END
02:13:56: XC AUTH [Et1/0.3, 1003]: Event: free xconnect authorization request, state
changed from DONE to END
02:13:56: XC AUTH [10.1.1.2, 1234001]: Event: free xconnect authorization request, state
changed from DONE to END
02:13:56: XC AUTH [10.1.2.2, 1234003]: Event: free xconnect authorization request, state
changed from DONE to END
02:13:56: MPLS peer 10.1.1.2 vcid 1234001, VC UP, VC state UP
02:13:56: MPLS peer 10.1.2.2 vcid 1234003, VC UP, VC state UP
02:13:56: MPLS peer 10.1.1.2 vcid 1234000, VC UP, VC state UP
02:13:56: MPLS peer 10.1.2.2 vcid 1234002, VC UP, VC state UP
```

The following example removes all the xconnects associated with peer router 10.1.1.2:

```
Router# clear xconnect peer 10.1.1.2 all

02:14:08: Xconnect[ac:Et1/0.1(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=1
02:14:08: Xconnect[mpls:10.1.1.2:1234000]: provisioning fwder with fwd_type=2, sss_role=2
02:14:08: Xconnect[ac:Et1/0.2(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=2
02:14:08: Xconnect[mpls:10.1.1.2:1234001]: provisioning fwder with fwd_type=2, sss_role=1
02:14:08: MPLS peer 10.1.1.2 vcid 1234000, VC DOWN, VC state DOWN
02:14:08: MPLS peer 10.1.1.2 vcid 1234001, VC DOWN, VC state DOWN
02:14:08: XC AUTH [Et1/0.1, 1001]: Event: start xconnect authorization, state changed from
IDLE to AUTHORIZING
02:14:08: XC AUTH [Et1/0.1, 1001]: Event: found xconnect authorization, state changed from
AUTHORIZING to DONE
02:14:08: XC AUTH [10.1.1.2, 1234001]: Event: start xconnect authorization, state changed
from IDLE to AUTHORIZING
02:14:08: XC AUTH [10.1.1.2, 1234001]: Event: found xconnect authorization, state changed
from AUTHORIZING to DONE
02:14:08: XC AUTH [Et1/0.1, 1001]: Event: free xconnect authorization request, state
changed from DONE to END
02:14:08: XC AUTH [10.1.1.2, 1234001]: Event: free xconnect authorization request, state
changed from DONE to END
02:14:08: MPLS peer 10.1.1.2 vcid 1234001, VC UP, VC state UP
02:14:08: MPLS peer 10.1.1.2 vcid 1234000, VC UP, VC state UP
```

The following example removes the xconnects associated with peer router 10.1.1.2 and VC ID 1234001:

```
Router# clear xconnect peer 10.1.1.2 vcid 1234001

02:14:23: Xconnect[ac:Et1/0.2(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=1
02:14:23: Xconnect[mpls:10.1.1.2:1234001]: provisioning fwder with fwd_type=2, sss_role=2
02:14:23: MPLS peer 10.1.1.2 vcid 1234001, VC DOWN, VC state DOWN
02:14:23: XC AUTH [Et1/0.2, 1002]: Event: start xconnect authorization, state changed from
IDLE to AUTHORIZING
02:14:23: XC AUTH [Et1/0.2, 1002]: Event: found xconnect authorization, state changed from
AUTHORIZING to DONE
02:14:23: XC AUTH [Et1/0.2, 1002]: Event: free xconnect authorization request, state
changed from DONE to END
02:14:23: MPLS peer 10.1.1.2 vcid 1234001, VC UP, VC state UP
```

The following example removes the xconnects associated with interface Ethernet 1/0.1:

```
Router# clear xconnect interface eth1/0.1

02:14:48: Xconnect[ac:Et1/0.1(Eth VLAN)]: provisioning fwder with fwd_type=1, sss_role=2
```

```
02:14:48: Xconnect[mpls:10.1.1.2:1234000]: provisioning fwder with fwd_type=2, sss_role=1
02:14:48: MPLS peer 10.1.1.2 vcid 1234000, VC DOWN, VC state DOWN
02:14:48: XC AUTH [10.1.1.2, 1234000]: Event: start xconnect authorization, state changed
from IDLE to AUTHORIZING
02:14:48: XC AUTH [10.1.1.2, 1234000]: Event: found xconnect authorization, state changed
from AUTHORIZING to DONE
02:14:48: XC AUTH [10.1.1.2, 1234000]: Event: free xconnect authorization request, state
changed from DONE to END
02:14:48: MPLS peer 10.1.1.2 vcid 1234000, VC UP, VC state UP
```

## Related Commands

| Command | Description |
|---|---|
| **show xconnect** | Displays information about xconnect attachment circuits and pseudowires, |

# connect (Frame Relay)

To define connections between Frame Relay permanent virtual circuits (PVCs), use the **connect** command in global configuration mode. To remove connections, use the **no** form of this command.

**connect** *connection-name interface dlci* {*interface dlci* | **l2transport**}

**no connect** *connection-name interface dlci* {*interface dlci* | **l2transport**}

## Syntax Description

| | |
|---|---|
| *connection-name* | A name for this connection. |
| *interface* | Interface on which a PVC connection will be defined. |
| *dlci* | Data-link connection identifier (DLCI) number of the PVC that will be connected. |
| **l2transport** | Specifies that the PVC will not be a locally switched PVC, but will be tunneled over the backbone network. |

## Defaults

No default behavior or values

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(2)T | This command was introduced. |
| 12.0(23)S | The **l2transport** keyword was added. |
| 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. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |

## Usage Guidelines

When Frame Relay switching is enabled, the **connect** command creates switched PVCs in Frame Relay networks.

## Examples

The following example shows how to define a connection called “frompls1” with DLCI 100 on serial interface 5/0.

```
connect frompls1 Serial5/0 100 l2transport
```

The following example shows how to enable Frame Relay switching and define a connection called "one" between DLCI 16 on serial interface 0 and DLCI 100 on serial interface 1.

```
frame-relay switching
connect one serial0 16 serial1 100
```

## Related Commands

| Command | Description |
|---|---|
| **frame-relay switching** | Enables PVC switching on a Frame Relay DCE or NNI. |
| **mpls l2transport route** | Enables routing of Frame Relay packets over a specified VC. |

# connect (L2VPN local switching)

To create Layer 2 data connections between two ports on the same router, use the **connect** command in global configuration mode. To remove such connections, use the **no** form of this command.

#### Syntax for 12.0S, 12.2S and 12.4T Releases

**connect** *connection-name type number* [*dlci* | *pvc* | *pvp*] *type number* [*dlci* | *pvc* | *pvp*] [**interworking ip** | **ethernet**]

**no connect** *connection-name type number* [*dlci* | *pvc* | *pvp*] *type number* [*dlci* | *pvc* | *pvp*] [**interworking ip** | **ethernet**]

#### Syntax for Cisco IOS XE Release 2.5 and Later Releases

**connect** *connection-name type number type number*

**no connect** *connection-name type number type number*

## Syntax Description

| | |
|---|---|
| *connection-name* | A name for this local switching connection. |
| *type* | String that identifies the type of interface used to create a local switching connection; for example, serial or Gigabit Ethernet. |
| *number* | Integer that identifies the number of the interface; for example, 0/0/0.1 for a Gigabit Ethernet interface. |
| *dlci* | (Optional) The data-link connection identifier (DLCI) assigned to the interface. |
| *pvc* | (Optional) The permanent virtual circuit (PVC) assigned to the interface, expressed by its vpi/vci (virtual path and virtual channel identifiers). |
| *pvp* | (Optional) The permanent virtual path (PVP) assigned to the interface. |
| **interworking ip** \| **ethernet** | (Optional) Specifies that this local connection enables different transport types to be switched locally. These keyword options are not necessary for configurations that locally switch the same transport type, such as ATM to ATM, or Frame Relay to Frame Relay. Choices are:<br>• **interworking ip**—Causes IP packets to be extracted from the attachment circuit and sent over the pseudowire. Attachment circuit frames that do not contain IPv4 packets are dropped.<br>• **ethernet**—Causes Ethernet frames to be extracted from the attachment circuit and sent over the pseudowire. Ethernet end-to-end transmission is assumed. Attachment circuit frames that do not contain Ethernet frames are dropped. In the case of VLAN, the VLAN tag is removed, leaving a pure Ethernet frame. |

## Command Default

This command is disabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(27)S | This command was introduced for local switching. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.0(30)S | This command was integrated into Cisco IOS Release 12.0(30)S. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.4(11)T | This command was integrated into Cisco IOS Release 12.4(11)T. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SXH | This command was integrated into Cisco IOS Release 12.2(33)SXH. |
| Cisco IOS XE Release 2.5 | This command was integrated into Cisco IOS XE Release 2.5. |

## Examples

The following example shows an Ethernet interface configured for Ethernet, plus an ATM interface configured for AAL5 Subnetwork Access Protocol (SNAP) encapsulation. The **connect** command allows local switching between these two interfaces and specifies the interworking type as IP mode.

```
Router(config)# interface atm 0/0/0
Router(config-if)# pvc 0/100 l2transport
Router(cfg-if-atm-l2trans-pvc)# encapsulation aal5snap

Router(config)# interface fastethernet 6/0/0.1
Router(config-subif)# encapsulation dot1q 100

Router(config)# connect atm-eth-con atm 0/0/0 0/100 fastethernet 6/0/0.1 interworking ip
```

## Related Commands

| Command | Description |
|---|---|
| **frame-relay switching** | Enables PVC switching on a Frame Relay DCE or NNI. |

# context

To associate a Simple Network Management Protocol (SNMP) context with a particular virtual private network (VPN) routing and forwarding (VRF) instance, use the **context** command in VRF configuration mode. To disassociate an SNMP context from a VPN, use the **no** form of this command.

**context** *context-name*

**no context** *context-name*

## Syntax Description

| | |
|---|---|
| *context-name* | Name of the SNMP VPN context, up to 32 characters. |

## Command Default

No SNMP contexts are associated with VPNs.

## Command Modes

VRF configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(23)S | This command was introduced. |
| 12.3(2)T | This command was integrated into Cisco IOS Release 12.3(2)T. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | Support for IPv6 was added. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |

## Usage Guidelines

Before you use this command to associate an SNMP context with a VPN, you must do the following:

- Issue the **snmp-server context** command to create an SNMP context
- Associate a VPN with a context so that the specific MIB data for that VPN exists in that context.
- Associate a VPN group with the context of the VPN using the **snmp-server group** command with the **context** *context-name* keyword and argument.

SNMP contexts provide VPN users with a secure way of accessing MIB data. When a VPN is associated with a context, MIB data for that VPN exists in that context. Associating a VPN with a context helps enable service providers to manage networks with multiple VPNs. Creating and associating a context with a VPN enables a provider to prevent the users of one VPN from accessing information about users of other VPNs on the same networking device.

A route distinguisher (RD) is required when you configure an SNMP context. An RD creates routing and forwarding tables and specifies the default route distinguisher for a VPN. The RD is added to the beginning of a IPv4 prefix to make it globally unique. An RD is either ASN relative, which means it is composed of an autonomous system number and an arbitrary number, or it is IP address relative and composed of an IP address and an arbitrary number.

## Examples

The following example shows how to create an SNMP context named context1 and associate the context with the VRF named vrf1:

```
Router(config)# snmp-server context1
Router(config)# ip vrf vrf1
Router(config-vrf)# rd 100:120
Router(config-vrf)# context context1
```

## Related Commands

| Command | Description |
|---|---|
| **ip vrf** | Enters VRF configuration mode for the configuration of a VRF. |
| **snmp mib community-map** | Associates an SNMP community with an SNMP context, engine ID, or security name. |
| **snmp mib target list** | Creates a list of target VRFs and hosts to associate with an SNMP v1 or v2c community. |
| **snmp-server context** | Creates an SNMP context. |
| **snmp-server group** | Configures a new SNMP group, or a table that maps SNMP users to SNMP views. |
| **snmp-server trap authentication vrf** | Controls VRF-specific SNMP authentication failure notifications. |
| **snmp-server user** | Configures a new user to an SNMP group. |

# control-word

To enable the Multiprotocol Label Switching (MPLS) control word in an Any Transport over MPLS (AToM) dynamic pseudowire connection, use the **control-word** command in pseudowire class configuration mode. To set the control word to autosense mode, use the **default control-word** command. To disable the control word, use the **no** form of this command.

**control-word**

**default control-word**

**no control-word**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The control word is set to autosense mode.

## Command Modes

Pseudowire class configuration (config-pw-class)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SRE | This command was introduced. |

## Usage Guidelines

If the MPLS control word is enabled for a static pseudowire and you disable it at the xconnect level, any option set by the pseudowire class is disabled.

## Examples

The following example shows how to enable the control word in an AToM dynamic pseudowire connection:

```
Router# configure terminal
Router(config)# pseudowire-class cw_enable
Router(config-pw-class)# encapsulation mpls
Router(config-pw-class)# control-word
Router(config-pw-class)# exit
```

The following example shows how to enable the control word in an AToM dynamic pseudowire connection and set it to autosense mode:

```
Router# configure terminal
Router(config)# pseudowire-class cw_enable
Router(config-pw-class)# encapsulation mpls
Router(config-pw-class)# default control-word
Router(config-pw-class)# exit
```

## Related Commands

| Command | Description |
|---|---|
| **mpls control-word** | Enables the MPLS control word in an AToM static pseudowire connection. |
| **show mpls l2transport binding** | Displays VC label binding information. |
| **show mpls l2transport vc** | Displays information about AToM VCs and AToM static pseudowires that have been enabled to route Layer 2 packets on a router. |
| **xconnect** | Binds an attachment circuit to a pseudowire, and configures an AToM static pseudowire. |

# description (l2 vfi)

To provide a description of the switching provider edge (PE) router for an L2VPN multisegment pseudowire, use the **description** command in L2 VFI configuration mode. To remove the description, use the **no** form of this command.

**description** *string*

**no description** *string*

## Syntax Description

| | |
|---|---|
| *string* | Switching PE router description. The string must be 80 characters or fewer. |

## Command Default

The switching PE router does not have a description.

## Command Modes

L2 VFI (config-vfi)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 2.3 | This command was introduced. |

## Usage Guidelines

This description is useful for tracking the status of each switching PE router.

## Examples

This example adds a description for switching PE router 2:

```
Router(config)# l2 vfi domain_a point-to-point
Router(config-vfi)# description s-pe2
```

## Related Commands

| Command | Description |
|---|---|
| **show mpls l2 transport vc detail** | Displays the status information about the pseudowire, including the switching PE router. |