



## **Cisco ASR 9000 Series Aggregation Services Router VPN and Ethernet Services Command Reference, Release 6.0.x**

**First Published:** 2016-05-06

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

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## Preface

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The *VPN and Ethernet Services Command Reference for Cisco ASR 9000 Series Routers* preface contains these sections:

- [Communications, Services, and Additional Information](#), on page xv

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# Ethernet Interfaces Commands

This module describes the Cisco IOS XR software commands used to configure the Ethernet interfaces on the Cisco ASR 9000 Series Router.



**Note** This module does not include the commands for Management Ethernet interfaces and Ethernet OAM. To configure a Management Ethernet interface for routing or modify the configuration of a Management Ethernet interface or to configure Ethernet OAM, use the commands described in the *Interface and Hardware Component Configuration Guide for Cisco ASR 9000 Series Routers*

Refer to the *Interface and Hardware Component Command Reference for Cisco ASR 9000 Series Routers* for more information on the Ethernet Interfaces and Ethernet OAM commands.

- [dot1q tunneling ethertype](#), on page 2
- [encapsulation default](#), on page 4
- [encapsulation dot1ad dot1q](#), on page 6
- [encapsulation dot1q](#), on page 8
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# dot1q tunneling ethertype

To configure the Ethertype, used by peer devices when implementing QinQ VLAN tagging, to be 0x9100, use the **dot1q tunneling ethertype** command in the interface configuration mode for an Ethernet interface. To return to the default Ethertype configuration (0x8100), use the **no** form of this command.

```
dot1q tunneling ethertype {0x9100 | 0x9200}
no dot1q tunneling ethertype
```

Syntax Description	
	<b>0x9100</b> Sets the Ethertype value to 0x9100.
	<b>0x9200</b> Sets the Ethertype value to 0x9200.

**Command Default** The Ethertype field used by peer devices when implementing QinQ VLAN tagging is either 0x8100 or 0x8200.

**Command Modes** Interface configuration mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **dot1q tunneling ethertype** command can be applied to a main interface. When applied to the main interface, it changes the subinterfaces, that have been configured with an **encapsulation dot1q second-dot1q** command, under that main interface.

This command changes the outer VLAN tag from 802.1q Ethertype 0x8100 to 0x9100 or 0x9200.

Task ID	Task ID	Operations
	vlan	read, write

## Examples

The following example shows how to configure the Ethertype to 0x9100:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/5/0
RP/0/RSP0/CPU0:router(config-if)# dot1q tunneling ethertype 0x9100
RP/0/RSP0/CPU0:router(config-if)#
```

The following example shows how to configure the Ethertype to 0x9200:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/5/1
```

```
RP/0/RSP0/CPU0:router(config-if)# dot1q tunneling ethertype 0x9200
RP/0/RSP0/CPU0:router(config-if)#
```

Related Commands	Command	Description
	<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1ad dot1q, on page 6</a>	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1q second-dot1q, on page 10</a>	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.
	<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

# encapsulation default

To configure the default service instance on a port, use the **encapsulation default** command in the Interface configuration mode. To delete the default service instance on a port, use the **no** form of this command.

**encapsulation default**  
**no encapsulation default**

**Syntax Description** This command has no keywords or arguments.

**Command Default** No default service instance is configured on the port.

**Command Modes** Interface configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If the default service instance is the only one configured on a port, the **encapsulation default** command matches all ingress frames on that port. If the default service instance is configured on a port that has other non-default service instances, the **encapsulation default** command matches frames that are unmatched by those non-default service instances (anything that does not meet the criteria of other services instances on the same physical interface falls into this service instance).

Only a single default service instance can be configured per interface. If you attempt to configure more than one default service instance per interface, the **encapsulation default** command is rejected.

Only one encapsulation command must be configured per service instance.

## Examples

The following example shows how to configure a service instance on a port:

```
RP/0/RSP0/CPU0:router(config-if)# encapsulation default
```

Related Commands	Command	Description
	<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1ad dot1q, on page 6</a>	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1q second-dot1q, on page 10</a>	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.

Command	Description
<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

# encapsulation dot1ad dot1q

To define the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance, use the **encapsulation dot1ad dot1q** command in subinterface configuration mode. To delete the matching criteria to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance, use the **no** form of this command.

```
encapsulation dot1ad vlan-id dot1q {vlan-id}
no encapsulation dot1ad vlan-id dot1q {vlan-id}
```

## Syntax Description

**dot1ad** Indicates that the IEEE 802.1ad provider bridges encapsulation type is used for the outer tag.

**dot1q** Indicates that the IEEE 802.1q standard encapsulation type is used for the inner tag.

*vlan-id* VLAN ID, integer in the range 1 to 4094.

A hyphen must be entered to separate the starting and ending VLAN ID values that are used to define a range of VLAN IDs. (Optional) A comma must be entered to separate each VLAN ID range from the next range.

## Command Default

No matching criteria are defined.

## Command Modes

Subinterface configuration

## Command History

Release	Modification
Release 3.9.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The outer VLAN tag is an 802.1ad VLAN tag, instead of an 802.1Q tag. An 802.1ad tag has an ethertype value of 0x88A8, instead of 0x8100 that 802.1Q uses.

Some of the fields in the 802.1ad VLAN header are interpreted differently per 802.1ad standard. A **tunneling ethertype** command applied to the main interface does not apply to an 802.1ad subinterface.

An interface with encapsulation dot1ad causes the router to categorize the interface as an 802.1ad interface. This causes special processing for certain protocols and other features:

- MSTP uses the IEEE 802.1ad MAC STP address instead of the STP MAC address.
- Certain QoS functions may use the Drop Eligibility (DE) bit of the IEEE 802.1ad tag.

## Examples

The following example shows how to map single-tagged 802.1ad ingress frames to a service instance:

```
RP/0/RSP0/CPU0:router(config-subif)# encapsulation dot1ad 100 dot1q 20
```

**Related Commands**

Command	Description
<a href="#">encapsulation default, on page 4</a>	Configure the default service instance on a port.
<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

# encapsulation dot1q

To define the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance, use the **encapsulation dot1q** command in the interface configuration mode. To delete the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance, use the **no** form of this command.

```
encapsulation dot1q vlan-id [,vlan-id [-vlan-id]] [{exact | ingress source-mac mac-address |
second-dot1q vlan-id}]
encapsulation dot1q vlan-id, untagged
no encapsulation dot1q
```

## Syntax Description

<b>vlan-id</b>	VLAN ID, integer in the range 1 to 4094.  Hyphen must be entered to separate the starting and ending VLAN ID values that are used to define a range of VLAN IDs. (Optional) Comma must be entered to separate each VLAN ID range from the next range.
<b>exact</b>	(Optional) Prevents matching of frames with more than one tag.
<b>ingress source-mac</b>	(Optional) Performs MAC-based matching.
<b>untagged</b>	(Optional) Allows matches for both the single-tag dot1q frames and untagged frames.

## Command Default

No matching criteria are defined.

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 3.9.1	The <b>ingress source-mac</b> keyword was added.
Release 4.0.1	This command was supported on l2transport subinterfaces.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Only one encapsulation statement can be applied to a subinterface. Encapsulation statements cannot be applied to main interfaces.

A single encapsulation dot1q statement specifies matching for frames with a single VLAN ID; a range of VLAN IDs; or a single VLAN ID or untagged.

## Examples

The following example shows how to map 802.1Q frames ingress on an interface to the appropriate service instance:



```
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q 10
```

Related Commands	Command	Description
	<a href="#">encapsulation default, on page 4</a>	Configure the default service instance on a port.
	<a href="#">encapsulation dot1ad dot1q, on page 6</a>	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1q second-dot1q, on page 10</a>	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.
	<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

# encapsulation dot1q second-dot1q

To define the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance, use the **encapsulation dot1q second-dot1q** command in the interface configuration mode. To delete the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance, use the **no** form of this command.

**encapsulation dot1q** {any | *vlan-id* [*,vlan-id* [*-vlan-id*]]} **second-dot1q** {any | *vlan-id* [*,vlan-id* [*-vlan-id*]]} [{**exact** | **ingress source-mac** *mac-address*}]}

**no encapsulation dot1q** {any | *vlan-id* [*,vlan-id* [*-vlan-id*]]} **second-dot1q** {any | *vlan-id* [*,vlan-id* [*-vlan-id*]]} [{**exact** | **ingress source-mac** *mac-address*}]}

Syntax Description		
<i>vlan-id</i>	VLAN ID, integer in the range 1 to 4094.	
	A hyphen must be entered to separate the starting and ending VLAN ID values that are used to define a range of VLAN IDs.	
	(Optional) A comma must be entered to separate each VLAN ID range from the next range.	
	A maximum of nine ranges or individual values may be specified. The values must not overlap.	
<b>second-dot1q</b>	(Optional) Specifies IEEE 802.1Q VLAN tagged packets.	
<b>any</b>	Any second tag in the range 1 to 4094.	
<b>exact</b>	(Optional) Ensures that frames with more than two tags do not match.	
<b>ingress source-mac</b>	(Optional) Performs MAC-based matching.	

**Command Default** No matching criteria are defined.

**Command Modes** Interface configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.
	Release 3.9.1	The <b>ingress source-mac</b> keyword was added.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The criteria for this command are: the outer tag must be unique and the inner tag may be a single VLAN, a range of VLANs or lists of the previous two.

QinQ service instance, allows single, multiple or range on second-dot1q.

Only one encapsulation command must be configured per service instance.

---

**Examples**

The following example shows how to map ingress frames to a service instance:

```
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q second-dot1q 20
```

---

**Related Commands**

Command	Description
<a href="#">encapsulation default, on page 4</a>	Configure the default service instance on a port.
<a href="#">encapsulation dot1ad dot1q, on page 6</a>	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.
<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

# encapsulation untagged

To define the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance, use the **encapsulation untagged** command in the Interface configuration mode. To delete the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance, use the **no** form of this command.

**encapsulation untagged** [**ingress source-mac** *mac-address*]  
**no encapsulation untagged**

## Syntax Description

<b>ingress</b>	(Optional) Performs MAC-based matching.
<b>source-mac</b>	
<i>mac-address</i>	Specifies the source MAC address.

## Command Default

No matching criteria are defined.

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 3.9.1	The <b>ingress source-mac</b> keyword was added.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Only one service instance per port is allowed to have untagged encapsulation. The reason is to be able to unambiguously map the incoming frames to the service instance. However, it is possible for a port that hosts an service instance matching untagged traffic to host other service instances that match tagged frames. Only one encapsulation command may be configured per service instance.

Only one subinterface may be configured as encapsulation untagged. This interface is referred to as the untagged subinterface or untagged EFP (incase of an L2 interface).

The untagged subinterface has a higher priority than the main interface; all untagged traffic, including L2 protocol traffic, passes through this subinterface rather than the main interface. If the **ethernet filtering** command is applied to a main interface having an untagged subinterface, the filtering is applied to the untagged subinterface.

## Examples

The following example shows how to map untagged ingress Ethernet frames to a service instance:

Example 1:

```
RP/0/RSP0/CPU0:router(config-if)# encapsulation untagged
```

Example 2:

```
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/1/0.100 l2transport
RP/0/RSP0/CPU0:router(config-subif)# encapsulation untagged
```

Related Commands	Command	Description
	<a href="#">encapsulation default, on page 4</a>	Configure the default service instance on a port.
	<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
	<a href="#">encapsulation dot1q second-dot1q, on page 10</a>	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.

# ethernet egress-filter

To enable strict egress filtering on all subinterfaces on the router by default, use the **ethernet egress-filter** command in global configuration mode.

## **ethernet egress-filter strict**

To enable or disable egress filtering explicitly on any Layer 2 subinterface, use the **ethernet egress-filter** command in Layer 2 subinterface mode.

## **ethernet egress-filter {strict | disabled}**

<b>Syntax Description</b>	<p><b>strict</b> Enables strict egress EFP filtering on the interface. Only packets that pass the ingress EFP filter on the interface can be transmitted out of this interface. Other packets are dropped at the egress filter.</p> <p><b>disabled</b> Disables strict egress EFP filtering on the interface. This allows packets that do not match the interface encapsulation to be transmitted out of the interface.</p>				
<b>Command Default</b>	For platforms that support this command, the global default is that subinterface egress encapsulation filtering is disabled.				
<b>Command Modes</b>	Global configuration and Layer 2 subinterface configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.3</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.3	This command was introduced.
Release	Modification				
Release 3.7.3	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td><b>interface</b></td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	<b>interface</b>	read, write
Task ID	Operations				
<b>interface</b>	read, write				

## Examples

The following example shows how to enable strict egress filtering on all subinterfaces in global configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)# ethernet egress-filter strict
```

The following example shows how to enable the strict egress filtering on any Layer 2 subinterface in Layer 2 subinterface mode:

```
RP/0/RSP0/CPU0:router# configure
```

```
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/0/1.1  
RP/0/RSP0/CPU0:router(config-subif)# ethernet egress-filter strict
```

# ethernet filtering

To enable ethernet filtering on interfaces on the router, use the **ethernet filtering** command in the interface configuration mode. To disable ethernet filtering, use the **no** form of the command.

**ethernet filtering** {**dot1ad** | **dot1q**}  
**no ethernet filtering**

## Syntax Description

**dot1ad** Filters only the Ethernet multicast protocol addresses that are reserved by IEEE 802.1ad, used for C-facing interfaces, to prevent C-network traffic from interfering with the S-network protocols.

**dot1q** Filters all Ethernet multicast protocol addresses.

## Command Default

Ethernet filtering is not enabled.

## Command Modes

interface configuration mode

## Command History

Release	Modification
Release 3.9.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The following table lists the DA MAC addresses and specifies the action taken when either the dot1q or the dot1ad keywords are used:

DA MAC Address	Description	dot1q	dot1ad
01-80-C2-00-00-00	STP, RSTP, MSTP, etc.	Discard	Data
01-80-C2-00-00-01	802.3X Pause Protocol	Discard	Discard
01-80-C2-00-00-02	Slow Protocols: 802.3ad LACP, 802.3ah OAM	Discard	Discard
01-80-C2-00-00-03	802.1X	Discard	Discard
01-80-C2-00-00-04	Reserved	Discard	Discard
01-80-C2-00-00-05	Reserved	Discard	Discard
01-80-C2-00-00-06	Reserved	Discard	Discard
01-80-C2-00-00-07	Reserved	Discard	Discard
01-80-C2-00-00-08	Provider Bridge Group Address (e.g. MSTP BPDU)	Discard	Discard
01-80-C2-00-00-09	Reserved	Discard	Discard



DA MAC Address	Description	dot1q	dot1ad
01-80-C2-00-00-0A	Reserved	Discard	Discard
01-80-C2-00-00-0B	Reserved	Discard	Data
01-80-C2-00-00-0C	Reserved	Discard	Data
01-80-C2-00-00-0D	Provider Bridge GVRP address	Discard	Data
01-80-C2-00-00-0E	802.1ab-LLDP	Discard	Data
01-80-C2-00-00-0F	Reserved	Discard	Data
01-80-C2-00-00-10	All Bridges address	Discard	Data
01-80-C2-00-00-20	GMRP / MMRP	Discard	Data
01-80-C2-00-00-21	GVRP / MVRP	Discard	Data
01-80-C2-00-00-22-2F	Other GARP addresses	Discard	Data
01-00-0C-CC-CC-CC	CDP, DTP, VTP, PaGP, UDLD	Discard	Data

**Task ID****Task ID Operations**

```
interface read,
write
```

**Examples**

The following example shows how to apply ethernet filtering on a main interface:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#interface GigabitEthernet0/5/0/1
RP/0/RSP0/CPU0:router(config-if)#ethernet filtering dot1q
RP/0/RSP0/CPU0:router(config-if)#l2transport
RP/0/RSP0/CPU0:router(config-if-l2)#commit

RP/0/RSP0/CPU0:router#show run | begin GigabitEthernet0/5/0/1
Tue Nov 24 12:29:55.718 EST
Building configuration...
interface GigabitEthernet0/5/0/1
  mtu 1500
  ethernet filtering dot1q
  l2transport
  !
!
interface GigabitEthernet0/5/0/2
  shutdown
  !
interface GigabitEthernet0/5/0/3
  shutdown
  !
interface GigabitEthernet0/5/0/4
  shutdown
  !
interface GigabitEthernet0/5/0/5
```

```

shutdown
!
interface GigabitEthernet0/5/0/6
shutdown
!
interface GigabitEthernet0/5/0/7
shutdown
RP/0/RSP0/CPU0:router#

```

The following example shows how to apply ethernet filtering on a subinterface:

```

RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#interface GigabitEthernet0/5/0/1
RP/0/RSP0/CPU0:router(config-if)#ethernet filtering dot1q
RP/0/RSP0/CPU0:router(config-if)#interface GigabitEthernet0/5/0/1.1 12transport
RP/0/RSP0/CPU0:router(config-subif)#encapsulation untagged
RP/0/RSP0/CPU0:router(config-subif)#commit
RP/0/RSP0/CPU0:router(config-subif)#end

RP/0/RSP0/CPU0:router#show run | begin GigabitEthernet0/5/0/1
Tue Nov 24 12:26:25.494 EST
Building configuration...
interface GigabitEthernet0/5/0/1
mtu 1500
ethernet filtering dot1q
!
interface GigabitEthernet0/5/0/1.1 12transport
encapsulation untagged
!
interface GigabitEthernet0/5/0/2
shutdown
!
interface GigabitEthernet0/5/0/3
shutdown
!
interface GigabitEthernet0/5/0/4
shutdown
!
interface GigabitEthernet0/5/0/5
shutdown
!
interface GigabitEthernet0/5/0/6
shutdown
!
interface GigabitEthernet0/5/0/7
RP/0/RSP0/CPU0:router#

```




---

**Note** Ethernet filtering is configured on the main interface; however, the configuration affects the subinterface and not the main interface.

---

# ethernet source bypass egress-filter

To mark all ingress packets, received on the interface, to indicate that the packets should bypass any strict egress filter on any egress interface, use the **ethernet source bypass egress-filter** command in the subinterface configuration mode. To allow packets without being marked, use the **no** form of this command.

**ethernet source bypass egress-filter**  
**no ethernet source bypass egress-filter**

This command has no keywords or arguments.

## Command Default

None

## Command Modes

Subinterface configuration

## Command History

Release	Modification
Release 3.9.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to mark all ingress packets received on the interface:

```
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet0/0/0/3.1 l2transport
RP/0/RSP0/CPU0:router(config-subif)# encapsulation dot1q 1
RP/0/RSP0/CPU0:router(config-subif)# rewrite ingress tag translate 1-to-1 dot1q 4094 symmetric
RP/0/RSP0/CPU0:router(config-subif)# ethernet egress-filter disabled
RP/0/RSP0/CPU0:router(config-subif)# ethernet source-bypass-egress-filter
```


## Related Commands

Command	Description
<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.

## I2protocol (Ethernet)

To configure Layer 2 protocol tunneling and protocol data unit (PDU) filtering on an Ethernet interface, use the **I2protocol** command in Layer 2 transport configuration mode. To disable a Layer 2 protocol tunneling and Layer 2 protocol data units configuration, use the **no** form of this command.

```
I2protocol cpsv {tunnel | reverse-tunnel}
no I2protocol
```

<b>Syntax Description</b>	<p><b>cpsv</b> Enables L2PT for the interface. L2PT is enabled for the following protocols only:</p> <ul style="list-style-type: none"> <li>• CDP</li> <li>• STP</li> <li>• VTP</li> </ul> <p><b>Note</b> STP includes all Spanning Tree protocol derivatives (RSTP, MSTP, etc.)</p>				
	<p><b>tunnel</b> Performs L2PT encapsulation on frames as they enter the interface. Also, performs L2PT de-encapsulation on frames as they exit they interface.</p> <p>L2PT encapsulation rewrites the destination MAC address with the L2PT destination MAC address. L2PT deencapsulation replaces the L2PT destination MAC address with the original destination MAC address.</p>				
	<p><b>reverse-tunnel</b> Performs L2PT encapsulation on frames as they exit the interface. Also, perform L2PT deencapsulation on frames as they enter the interface.</p>				
<b>Command Default</b>	All Layer 2 protocol data units are forwarded through the network without modification.				
<b>Command Modes</b>	Layer 2 transport configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification				
Release 3.9.1	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
					
<b>Note</b>	The <b>I2protocol</b> command is available only when Layer 2 transport port mode is enabled on the interface with the <b>I2transport</b> command.				

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to configure an Ethernet interface to tunnel in the ingress direction:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface TenGigE 0/0/0/1
RP/0/RSP0/CPU0:router(config-if)# l2transport
RP/0/RSP0/CPU0:router(config-if-l2)# l2protocol cpsv tunnel
```

Related Commands	Command	Description
	<a href="#">l2transport (Ethernet), on page 22</a>	Enables Layer 2 transport port mode on an Ethernet interface and enter Layer 2 transport configuration mode.

## I2transport (Ethernet)

To enable Layer 2 transport port mode on an Ethernet interface and enter Layer 2 transport configuration mode, use the **I2transport** command in interface configuration mode for an Ethernet interface. To disable Layer 2 transport port mode on an Ethernet interface, use the **no** form of this command.

**I2transport**  
**no I2transport**

This command has no keywords or arguments.

---

### Command Default

None

---

### Command Modes

Interface configuration

---

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

---

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When you issue the **I2transport** command in interface configuration mode, the CLI prompt changes to “config-if-l2,” indicating that you have entered the Layer 2 transport configuration submenu. In the following sample output, the question mark (?) online help function displays all the commands available under Layer 2 transport configuration submenu for an Ethernet interface:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/1/5/0
RP/0/RSP0/CPU0:router(config-if)# I2transport
RP/0/RSP0/CPU0:router(config-if-l2)# ?
  commit           Commit the configuration changes to running
  describe         Describe a command without taking real actions
  do               Run an exec command
  exit             Exit from this submenu
  no               Negate a command or set its defaults
  service-policy   Configure QoS Service policy
  show             Show contents of configuration
RP/0/RSP0/CPU0:router(config-if-l2)#
```




---

**Note** The **I2transport** command is mutually exclusive with any Layer 3 interface configuration.

---



---

### Task ID

Task ID	Operations
I2vpn	read, write

---

## Examples

The following example shows how to enable Layer 2 transport port mode on an Ethernet interface and enter Layer 2 transport configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEther 0/2/0/0
RP/0/RSP0/CPU0:router(config-if)# l2transport
RP/0/RSP0/CPU0:router(config-if-l2)#
```

The following example shows how to use the **l2transport** keyword in the **interface** command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEther 0/2/0/0 l2transport
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q 200
RP/0/RSP0/CPU0:router(config-if-l2)#commit
```

The following example shows how to use the **l2transport** command on an Ethernet subinterface:



**Note** Ensure that the **l2transport** command is applied on the same line as the **interface** command for the Ethernet subinterface.

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#interface GigabitEthernet 0/5/0/1.1 l2transport
RP/0/RSP0/CPU0:router(config-subif)#encapsulation dot1q 100
RP/0/RSP0/CPU0:router(config-subif)#ethernet egress-filter strict
RP/0/RSP0/CPU0:router(config-subif)#commit
RP/0/RSP0/CPU0:router(config-subif)#end
```

```
RP/0/RSP0/CPU0:router#sh run | begin GigabitEthernet0/5/0/1
Thu Dec 3 10:15:40.916 EST Building configuration...
interface GigabitEthernet0/5/0/1
  mtu 1500
  ethernet filtering dot1q
  !
interface GigabitEthernet0/5/0/1.1 l2transport
  encapsulation dot1q 100
  ethernet egress-filter strict !
interface GigabitEthernet0/5/0/2
  shutdown
  !
  !
```



**Note** To configure **l2transport** on an Ethernet subinterface, ensure that the main interface is configured as a Layer 3 interface.

## Related Commands

Command	Description
<b>show interfaces</b>	Displays statistics for all interfaces configured on the router or for a specific node.
<b>show l2vpn xconnect</b>	Displays brief information on configured xconnects.

## local-traffic default encapsulation

To enable Connectivity Fault Management (CFM) to identify a range of VLAN IDs that are to be used as the default for sourcing CFM packets from the interface, use the **local-traffic default encapsulation** command in the subinterface configuration mode. To return to the default behavior, use the **no** form of this command.

```
local-traffic default encapsulation {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad
vlan-id | dot1ad vlan-id dot1q vlan-id}
no local-traffic default encapsulation {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad
vlan-id | dot1ad vlan-id dot1q vlan-id}
```

Syntax Description	
<b>dot1q</b>	Indicates that the IEEE 802.1q standard encapsulation type is used.
<b>second-dot1q</b>	Indicates that the IEEE 802.1q encapsulation is used.
<b>dot1ad</b>	Indicates that the IEEE 802.1ad provider bridges encapsulation type is used.
<i>vlan-id</i>	Specifies the VLAN ID as an integer. The range is 1 to 4094. A hyphen separates the starting and ending VLAN ID values that are used when defining a range of VLAN IDs.

**Command Default** Lowest numbered VLAN ID is chosen.

**Command Modes** Subinterface configuration

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The tag stack configured by the **local-traffic default encapsulation** command must match the encapsulation specified for this interface in the **encapsulation** command.

For packets that are sent as responses to incoming packets, the encapsulation that is to be used may be derived from the incoming packet. This command determines the encapsulation to use when this is not the case.

Task ID	Task ID	Operations
	interface	read, write

### Examples

The following example indicates that the locally sourced frames (not sent in response to another ingress frame) sent out of GigabitEthernet subinterface 0/3/0/1.1 should be tagged with 802.1Q VLAN 50. When the local-traffic is not configured, chooses the lowest value in the range and sends the frames out tagged with 802.1Q VLAN 10.



```
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/3/0/1.1 l2transport
RP/0/RSP0/CPU0:router(config-subif)# encapsulation dot1q 10-100
RP/0/RSP0/CPU0:router(config-subif)# local-traffic default encapsulation dot1q 50
```

The following example indicates that the locally sourced frames are sent out with an outer VLAN tag of 802.1Q 1000, and an inner VLAN tag of 802.1Q 500. Without configuring the local-traffic, the frames are sent out with an outer VLAN tag of 1000 and an inner VLAN tag of 1:

```
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet0/0/0/0.2 l2transport
RP/0/RSP0/CPU0:router(config-subif)# encapsulation dot1q 1000 second-dot1q 1-500
RP/0/RSP0/CPU0:router(config-subif)# local-traffic default encapsulation dot1q 1000
second-dot1q 500
```

## rewrite ingress tag

To specify the encapsulation adjustment that is to be performed on the frame ingress to the service instance, use the **rewrite ingress tag** command in the interface configuration mode. To delete the encapsulation adjustment that is to be performed on the frame ingress to the service instance, use the **no** form of this command.

```
rewrite ingress tag {push {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id
dot1q vlan-id} | pop {1 | 2} | translate {1to1 {dot1q vlan-id | dot1ad vlan-id} | 2-to-1 dot1q vlan-id
| dot1ad vlan-id} | 1-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | 2-to-2
{dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id}} [symmetric]
no rewrite ingress tag {push {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id
dot1q vlan-id} | pop {1 | 2} | translate {1to1 {dot1q vlan-id | dot1ad vlan-id} | 2-to-1 dot1q vlan-id
| dot1ad vlan-id} | 1-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | 2-to-2
{dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id}} [symmetric]
```

Syntax Description		
	<i>vlan-id</i>	VLAN ID, integer in the range 1 to 4094.
	<b>push dot1q</b> <i>vlan-id</i>	Pushes one 802.1Q tag with <i>vlan-id</i> .
	<b>push dot1q</b> <i>vlan-id</i> <b>second-dot1q</b> <i>vlan-id</i>	Pushes a pair of 802.1Q tags in the order first, second.
	<b>pop</b> {1   2}	One or two tags are removed from the packet. This command can be combined with a push (pop N and subsequent push <i>vlan-id</i> ).
	<b>translate 1-to-1</b> dot1q <i>vlan-id</i>	Replaces the incoming tag (defined in the encapsulation command) into a different 802.1Q tag at the ingress service instance.
	<b>translate 2-to-1</b> dot1q <i>vlan-id</i>	Replaces a pair of tags defined in the <b>encapsulation</b> command by <i>vlan-id</i> .
	<b>translate 1-to-2</b> dot1q <i>vlan-id</i> <b>second-dot1q</b> <i>vlan-id</i>	Replaces the incoming tag defined by the encapsulation command by a pair of 802.1Q tags.
	<b>translate 2-to-2</b> dot1q <i>vlan-id</i> <b>second-dot1q</b> <i>vlan-id</i>	Replaces the pair of tags defined by the encapsulation command by a pair of VLANs defined by this rewrite.
	<b>symmetric</b>	(Optional) A rewrite operation is applied on both ingress and egress. The operation on egress is the inverse operation as ingress.

**Command Default** The frame is left intact on ingress.

**Command Modes** Interface configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **symmetric** keyword is accepted only when a single VLAN is configured in encapsulation. If a list of VLANs or a range VLAN is configured in encapsulation, the **symmetric** keyword is accepted only for push rewrite operations; all other rewrite operations are rejected.

The **pop** command assumes the elements being popped are defined by the encapsulation type. The exception case should be drop the packet.

The **rewrite ingress tag translate** command assume the tags being translated from are defined by the encapsulation type. In the 2-to-1 option, the “2” means “2 tags of a type defined by the **encapsulation** command. The translation operation requires at least “from” tag in the original packet. If the original packet contains more tags than the ones defined in the “from”, then the operation should be done beginning on the outer tag. Exception cases should be dropped.

**Examples**

The following example shows how to specify the encapsulation adjustment that is to be performed on the frame ingress to the service instance:

```
RP/0/RSP0/CPU0:router(config-if)# rewrite ingress push dot1q 200
```

**Related Commands**

Command	Description
<a href="#">encapsulation default, on page 4</a>	Configure the default service instance on a port.
<a href="#">encapsulation dot1ad dot1q, on page 6</a>	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.
<a href="#">encapsulation dot1q, on page 8</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
<a href="#">encapsulation dot1q second-dot1q, on page 10</a>	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.
<a href="#">encapsulation untagged, on page 12</a>	Defines the matching criteria to map untagged ingress Ethernet frames on an interface to the appropriate service instance.

rewrite ingress tag



## Generic Routing Encapsulation Commands

---

This module describes the commands used to configure generic routing encapsulation (GRE).

For detailed information about GRE concepts, configuration tasks, and examples, refer to the *L2VPN and Ethernet Services Configuration Guide for Cisco ASR 9000 Series Routers*.

- [bandwidth](#), on page 30
- [description \(GRE\)](#), on page 31
- [ipv4 address](#), on page 32
- [ipv4 mtu \(LxVPN\)](#), on page 34
- [ipv6 address \(LxVPN\)](#), on page 35
- [ipv6 mtu \(LxVPN\)](#), on page 36
- [keepalive](#), on page 37
- [mtu \(GRE\)](#), on page 38
- [shutdown \(GRE\)](#), on page 39
- [tunnel destination](#), on page 40
- [tunnel key](#), on page 42
- [tunnel key-ignore](#), on page 44
- [tunnel dfbit](#), on page 46
- [tunnel mode](#), on page 48
- [tunnel source](#), on page 50
- [tunnel tos](#), on page 52
- [tunnel ttl](#), on page 53
- [tunnel vrf](#), on page 55

# bandwidth

To set the tunnel interface bandwidth, use the **bandwidth** command in interface configuration mode. To undo the tunnel interface bandwidth that is set, use the **no** form of this command.

**bandwidth** *kbps*  
**no bandwidth** *kbps*

<b>Syntax Description</b>	<i>kbps</i> Interface bandwidth in kilobits per second (kbps). The range is from 0 to 4294967295. The default value is 100.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	interface	read, write

This example shows how to set the bandwidth of the tunnel interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 6677
RP/0/RSP0/CPU0:router(config-if)# bandwidth 56789
```

## description (GRE)

To specify the description of any interface, use the **description** command in the interface configuration mode. To undo the specified description, use the **no** form of the command.

**description** *description-name*  
**no description**

### Syntax Description

*description-name* Description of the Interface.

### Command Default

None

### Command Modes

Interface Configuration

### Command History

Release	Modification
Release 4.2.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operation
interface	read, write

The following output shows how to specify the description of an interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 789
RP/0/RSP0/CPU0:router(config-if)# description Interface
```

# ipv4 address

To set the IPv4 address of the tunnel interface, use the **ipv4 address** command in interface configuration mode. To remove the IPv4 addresses, use the **no** form of this command.

```
ipv4 address prefix subnet mask [{route-tag value | secondary [route-tag value]}]
no ipv4 address prefix subnet mask [{route-tag value | secondary [route-tag value]}]
```

## Syntax Description

<i>prefix</i>	IPv4 address of the interface.
<i>subnet mask</i>	Subnet mask of the interface.
<b>route-tag</b>	Specifies the tag associated with the IP address.
<i>value</i>	Tag value.
<b>secondary</b>	Specifies the secondary IPV4 address.

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 4.2.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
network	read, write
acl	read, write

## Examples

This example shows how to set the IPV4 address with route-tag option:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)#interface tunnel-ip 67 ipv4 address 10.1.1.2 6.7.7.8
route-tag 78
```

This example shows how to set the IPV4 address with secondary option:

```
RP/0/RSP0/CPU0:router# configure
```



```
RP/0/RSP0/CPU0:router(config)#interface tunnel-ip 67 ipv4 address 1.2.3.4 7.8.9.8  
secondary route-tag 89
```

## ipv4 mtu (LxVPN)

To set the IPv4 MTU on the tunnel interface, use the **ipv4 mtu** command in interface configuration mode. To remove the IPv4 MTU, use the **no** form of this command.

**ipv4 mtu** *size*  
**no ipv4 mtu** *size*

<b>Syntax Description</b>	<i>size</i> Size of the MTU in bytes. The range is from 68 to 65535.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	network	read, write
	acl	read, write

<b>Examples</b>	This example shows how to set the IPv4 MTU:
-----------------	---

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)#interface tunnel-ip 78 ipv4 mtu 78
```

## ipv6 address (LxVPN)

To set the IPv6 address of the tunnel interface, use the **ipv6 address** command in interface configuration mode. To remove the IPv6 addresses, use the **no** form of this command.

```
ipv6 {address zone {prefix length | link-local} [route-tag value] | zone/length [route-tag value]}
no ipv6 {address zone {prefix length | link-local} [route-tag value] | zone/length [route-tag value]}
```

Syntax Description	zone	Specifies the IPv6 address of the interface.
	prefix length	Specifies the length of the IPv6 address prefix, in bits. The range is from 1 to 128.
	link-local	Specifies the link-local address.
	route-tag	Specifies the tag associated with the address.
	value	Tag value. The range is from 1 to 4294967295.

**Command Default** None

**Command Modes** Interface configuration

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	network	read, write
	interface	read, write
	ipv6	read, write

### Examples

This example shows how to set the ipv6 address for a tunnel interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)#interface tunnel-ip 67 ipv6 address 10:2::3 link-local
route-tag 78
```

## ipv6 mtu (LxVPN)

To set the IPv6 MTU on the tunnel interface, use the **ipv6 mtu** command in interface configuration mode. To remove the IPv6 MTU, use the **no** form of this command.

**ipv6 mtu** *size*  
**no ipv6 mtu** *size*

<b>Syntax Description</b>	<i>size</i> Size of the MTU in bytes. The range is from 1280 to 65535.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	network	read, write
	interface	read, write
	ipv6	read, write

### Examples

This example shows how to set the IPv4 MTU:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)#interface tunnel-ip 78 ipv6 mtu 3456
```

# keepalive

To enable keepalive for a tunnel interface, use the **keepalive** command. To remove keepalive, use the **no** form of this command.

```
keepalive [time_in_seconds [retry_num]]
no keepalive
```

Syntax Description	
<i>time_in_seconds</i>	Specifies the frequency (in seconds) at which keepalive check is performed. The default is 10 seconds. The minimum value is 1 second.
<i>retry_num</i>	Specifies the number of keepalive retries before declaring that a tunnel destination is unreachable. The default is 3 retries. The minimum value is 1 retry.

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	interface configuration
----------------------	-------------------------

Command History	Release	Modification
	Release 4.2.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **keepalive** command to enable keepalive for a tunnel interface.

Task ID	Task ID	Operations
	interface	read, write

## Examples

The following example shows how to configure interface tunnel:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400
RP/0/RSP0/CPU0:router(config-if)# keepalive 30
```

## mtu (GRE)

To set the MTU size of the tunnel interface, use the **mtu** command in interface configuration mode. To undo the MTU size of the tunnel interface that is set, use the **no** form of this command.

This is a Generic Routing Encapsulation (GRE) command.

**mtu** *size*  
**no mtu** *size*

<b>Syntax Description</b>	<i>size</i> Size of MTU in bytes. The default value is 1500.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	interface	read, write

This example shows how to set the MTU size of the tunnel interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 456
RP/0/RSP0/CPU0:router(config-if)# mtu 334
```

# shutdown (GRE)

To shut down any interface, use the **shutdown** command in interface configuration mode. To start the interface, use the **no** form of the command.

This is a Generic Routing Encapsulation (GRE) command.

**shutdown**  
**no shutdown**

This command has no keywords or arguments.

---

## Command Default

None

---

## Command Modes

Interface configuration

---

## Command History

Release	Modification
Release 4.2.0	This command was introduced.

---

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

---

## Task ID

Task ID	Operation
interface	read, write

This example shows how to shut down a given interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 789
RP/0/RSP0/CPU0:router(config-if)# shutdown
```

# tunnel destination

To specify a tunnel interface's destination address, use the **tunnel destination** command. To remove the destination address, use the **no** form of this command.



**Note** The tunnel will not be operational until the tunnel destination is specified.

**tunnel destination** *ip-address*  
**no tunnel destination** *ip-address*

**Syntax Description** *ip-address* Specifies the IPv4 or IPv6 address of the host destination.

**Command Default** None

**Command Modes** interface configuration

Command History	Release	Modification
	Release 4.2.0	This command was introduced.
	Release 5.2.2	The tunnel destination can be an IPv6 address.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read, write

**Examples** The following example shows how to configure interface tunnel:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400
RP/0/RSP0/CPU0:router(config-if)# tunnel destination 10.10.10.1
```

Related Commands	Command	Description
	<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.
	<a href="#">tunnel source, on page 50</a>	Sets a tunnel interface's source address.



Command	Description
<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.
<a href="#">tunnel ttl, on page 53</a>	Configures the Time-To-Live (TTL) for packets entering the tunnel.

# tunnel key

To configure the key value for packets sent over a tunnel, use the **tunnel key** command. To delete the configured key value, use the **no** form of this command.

**tunnel key** *key-value*  
**no tunnel key** *key-value*

<b>Syntax Description</b>	<i>key-value</i> Specifies the tunnel key value. Range is from 0 to 4294967295.
---------------------------	---

<b>Command Default</b>	No value is configured.
------------------------	-------------------------

<b>Command Modes</b>	interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

- GRE tunnel key feature is supported only on Cisco ASR 9000 Enhanced Ethernet line cards. It is mandatory to have ingress and egress line cards as Enhanced Ethernet line cards.
- GRE tunnel keepalive is not supported with tunnel key. If the configuration for the GRE keepalives and tunnel key are present at the same time, the tunnel is brought down and a warning message is displayed.
- For a given router, either the same key or different keys can be configured under multiple GRE tunnels.
- Different traffic streams passing through the same GRE tunnel contain the same GRE key configured for that tunnel.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	interface	read, write
	tunnel	read, write

This example shows how to configure the tunnel key value at the GRE transmitter and receiver end:

```
!Local GRE Interface
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 10
RP/0/RSP0/CPU0:router(config-if)#ipv4 address 101.0.9.1 255.255.255.0
RP/0/RSP0/CPU0:router(config-if)# tunnel key 10
RP/0/RSP0/CPU0:router(config-if)# tunnel tos 96
RP/0/RSP0/CPU0:router(config-if)# tunnel source Loopback10
RP/0/RSP0/CPU0:router(config-if)# tunnel destination 33.0.9.33
```

```
!  
  
!Remote GRE Interface  
  
RP/0/RSP0/CPU0:router# configure  
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 10  
RP/0/RSP0/CPU0:router(config-if)#ipv4 address 101.0.9.2 255.255.255.0  
RP/0/RSP0/CPU0:router(config-if)# tunnel key 10  
RP/0/RSP0/CPU0:router(config-if)# tunnel tos 96  
RP/0/RSP0/CPU0:router(config-if)# tunnel source Loopback10  
RP/0/RSP0/CPU0:router(config-if)# tunnel destination 11.0.9.11  
  
!
```

# tunnel key-ignore

To ensure that the decapsulation router skips GRE key validation before accepting the packet, use the **tunnel key-ignore** command. To remove the tunnel key ignore feature, use the **no** form of this command.

**tunnel key-ignore**  
**no tunnel key-ignore**

**Syntax Description** This command has no keywords or arguments.

**Command Default** Tunnel key-ignore is disabled.

**Command Modes** interface configuration

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Do not configure any key value under GRE tunnel that has tunnel key-ignore feature enabled. This is because the configured tunnel key overrides the tunnel key-ignore feature. As a result, packets that arrive with configured key value are accepted and undergo further processing at the decapsulation router, while the remaining packets without the key value are dropped.

Task ID	Task ID	Operation
	interface	read, write
	tunnel	read, write

This example shows how to configure the tunnel key-ignore feature at the GRE transmitter and receiver ends:

```
!Local GRE Interface
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 10
RP/0/RSP0/CPU0:router(config-if)# ipv4 address 101.0.9.1 255.255.255.0
RP/0/RSP0/CPU0:router(config-if)# tunnel key-ignore
RP/0/RSP0/CPU0:router(config-if)# tunnel tos 96
RP/0/RSP0/CPU0:router(config-if)# tunnel source Loopback10
RP/0/RSP0/CPU0:router(config-if)# tunnel destination 33.0.9.33
!

!Remote GRE Interface

RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router# interface tunnel-ip 10
```

```
RP/0/RSP0/CPU0:router#ipv4 address 101.0.9.2 255.255.255.0
RP/0/RSP0/CPU0:router# tunnel key-ignore
RP/0/RSP0/CPU0:router# tunnel tos 96
RP/0/RSP0/CPU0:router# tunnel source Loopback10
RP/0/RSP0/CPU0:router# tunnel destination 11.0.9.11

!
```

# tunnel dfbit

To configure the DF bit setting in the tunnel transport header, use the **tunnel dfbit** command. To revert to the default DF bit setting value, use the **no** form of this command.

```
tunnel dfbit {disable | copy}
no tunnel dfbit
```

## Syntax Description

### Syntax Description

**disable** Disables the DF bit in the outer packet. This allows the outer packet to be fragmented, if required.

**copy** Copies the DF bit value from the inner packet to the outer packet.

**Note** This is valid only for an IPv4 transport network in an IP in IP tunnel.

## Command Default

The DF bit value in the outer packet is disabled. This allows outer packet fragmentation, if required.

## Command Modes

interface configuration

## Command History

Release	Modification
Release 4.2.0	This command was introduced.
Release 5.3.1	The <b>copy</b> option is supported.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Copying the DF bit value from the inner packet to the outer packet is only supported for an IPv4 transport network in an IP in IP tunnel. If **copy** option is configured, you cannot configure an IP in IP tunnel over an IPv6 transport network.

## Task ID

### Task ID Operations

interface read,  
write

## Examples

The following example shows how to enable fragmentation over an interface tunnel.

```
RP/0/RSP0/CPU0:router# configure
```

```
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400
RP/0/RSP0/CPU0:router(config-if)# tunnel dfbit disable
```

Related Commands	Command	Description
	<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.
	<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.
	<a href="#">tunnel source, on page 50</a>	Sets a tunnel interface's source address.
	<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.
	<a href="#">tunnel ttl, on page 53</a>	Configures the Time-To-Live (TTL) for packets entering the tunnel.

# tunnel mode

To configure the encapsulation mode of the tunnel interface, use the **tunnel mode** command. To revert the encapsulation to the default IPv4 GRE tunnel mode, use the **no** form of this command.

```
tunnel mode {gre {ipv4 | ipv6} | ipv4 | ipv6}
no tunnel mode
```

## Syntax Description

Syntax Description		
gre	ipv4	Specifies the tunnel as a GRE tunnel over an IPv4 transport network.
gre	ipv6	Specifies the tunnel as a GRE tunnel over an IPv6 transport network.
ipv4		Specifies the tunnel as an IP in IP tunnel over an IPv4 transport network.
ipv6		Specifies the tunnel as an IP in IP tunnel over an IPv6 transport network.

## Command Default

The default tunnel mode is set as a GRE tunnel over an IPv4 transport network.

## Command Modes

interface configuration

## Command History

Release	Modification
Release 4.2.0	This command was introduced.
Release 5.2.2	Support for GRE tunnel on an IPv6 transport network.
Release 5.3.1	Support for IP in IP tunnels.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read, write



## Examples

The following example shows how to configure interface tunnel:

```
RP/0/RSP0/CPU0:router# configure  
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400  
RP/0/RSP0/CPU0:router(config-if)#tunnel mode gre ipv4
```

## Related Commands

Command	Description
<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.
<a href="#">tunnel source, on page 50</a>	Sets a tunnel interface's source address.
<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.
<a href="#">tunnel ttl, on page 53</a>	Configures the Time-To-Live (TTL) for packets entering the tunnel.

# tunnel source

To set a tunnel interface's source address, use the **tunnel source** command. To remove the source address, use the **no** form of this command.



**Note** The tunnel will not be operational until the tunnel source is specified.

```
tunnel source {interface_name | ip-address}
no tunnel source {interface_name | ip-address}
```

## Syntax Description

*interface\_name* Specifies the name of the interface whose IP address will be used as the source address of the tunnel. The interface name can be of a loopback interface or a physical interface.

*ip-address* Specifies the IPv4 or IPv6 address to use as the source address for packets in the tunnel.

## Command Default

None

## Command Modes

interface configuration

## Command History

Release	Modification
Release 4.2.0	This command was introduced.
Release 5.2.2	The tunnel source can be an IPv6 address.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

It is recommended that the tunnel source is identified using the interface ID and not the IP address. Using the interface ID enables the router to mark the tunnel as down when the interface is down and the routing protocol tries to find and use an alternate route to the tunnel route.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to configure interface tunnel:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400
RP/0/RSP0/CPU0:router(config-if)# tunnel source 10.10.10.1
```

Related Commands	Command	Description
	<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.
	<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.
	<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.
	<a href="#">tunnel ttl, on page 53</a>	Configures the Time-To-Live (TTL) for packets entering the tunnel.

# tunnel tos

To specify the value of the TOS field in the tunnel encapsulating packets, use the **tunnel tos** command. To return to the default TOS value, use the **no** form of this command.

**tunnel tos** *tos\_value*  
**no tunnel tos** *tos\_value*

<b>Syntax Description</b>	<i>tos_value</i> Specifies the value of the TOS field in the tunnel encapsulating packets. The TOS value ranges between 0 to 255.
---------------------------	---

<b>Command Default</b>	Copies the TOS/COS bits of the internal IP header to the GRE IP header. In case of labeled payload, EXP bits are copied to TOS bits of the GRE IP header.
------------------------	---

<b>Command Modes</b>	interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to configure interface tunnel:
-----------------	--

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400
RP/0/RSP0/CPU0:router(config-if)# tunnel tos 100
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.
	<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.
	<a href="#">tunnel source, on page 50</a>	Sets a tunnel interface's source address.
	<a href="#">tunnel ttl, on page 53</a>	Configures the Time-To-Live (TTL) for packets entering the tunnel.

# tunnel ttl

To configure the Time-To-Live (TTL) for packets entering the tunnel, use the **tunnel ttl** command. To undo the configuration, use the **no** form of this command.

```
tunnel ttl ttl_value
no tunnel ttl ttl_value
```

<b>Syntax Description</b>	<i>ttl_value</i> Specifies the value of TTL for packets entering the tunnel. The TTL value ranges between 1 to 255.								
<b>Command Default</b>	The default TTL value is set to 255.								
<b>Command Modes</b>	interface configuration								
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.2.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.2.0	This command was introduced.				
Release	Modification								
Release 4.2.0	This command was introduced.								
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>This command specifies the Time-To-Live for packets entering the tunnel so that the packets are not dropped inside the carrier network before reaching the tunnel destination.</p>								
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write				
Task ID	Operations								
interface	read, write								
<b>Examples</b>	<p>The following example shows how to configure interface tunnel:</p> <pre>RP/0/RSP0/CPU0:router# configure RP/0/RSP0/CPU0:router(config)# interface tunnel-ip 400 RP/0/RSP0/CPU0:router(config-if)# tunnel source 10.10.10.1</pre>								
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">tunnel destination, on page 40</a></td> <td>Specifies a tunnel interface's destination address.</td> </tr> <tr> <td><a href="#">tunnel mode, on page 48</a></td> <td>Configures the encapsulation mode of the tunnel interface.</td> </tr> <tr> <td><a href="#">tunnel tos, on page 52</a></td> <td>Specifies the value of the TOS field in the tunnel encapsulating packets.</td> </tr> </tbody> </table>	Command	Description	<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.	<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.	<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.
Command	Description								
<a href="#">tunnel destination, on page 40</a>	Specifies a tunnel interface's destination address.								
<a href="#">tunnel mode, on page 48</a>	Configures the encapsulation mode of the tunnel interface.								
<a href="#">tunnel tos, on page 52</a>	Specifies the value of the TOS field in the tunnel encapsulating packets.								

Command	Description
<a href="#">tunnel source, on page 50</a>	Sets a tunnel interface's source address.

# tunnel vrf

To specify the virtual routing and forwarding (VRF) instance of the interfaces of the tunnel endpoints, use the **tunnel vrf** command in tunnel interface configuration mode. To disassociate a VRF from the tunnel endpoints, use the **no** form of this command.

**tunnel vrf** *vrf-name*

## Syntax Description

*vrf-name* The name of the VRF instance.

## Command Default

The tunnel addresses are looked up in the default VRF instance, that is, the global routing table.

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 5.2.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
<b>tunnel</b>	read, write
<b>interface</b>	read, write

## Example

The following example shows the tunnel "tunnel-ip1" endpoints associated with the VRF instance "blue".

```
RP/0/RSP0/CPU0:router(config)# interface tunnel-ip1
RP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.3.3.3 255.255.255.0
RP/0/RSP0/CPU0:router(config-if)# keepalive 5 3
RP/0/RSP0/CPU0:router(config-if)# tunnel mode gre ipv4
RP/0/RSP0/CPU0:router(config-if)# tunnel source Loopback0
RP/0/RSP0/CPU0:router(config-if)# tunnel destination 10.5.5.5
RP/0/RSP0/CPU0:router(config-if)# tunnel vrf blue
```

tunnel vrf





## Point to Point Layer 2 Services Commands

This module describes the commands used to configure, monitor, and troubleshoot a Layer 2 or Layer 3 virtual private network (VPN).

For detailed information about virtual private network concepts, configuration tasks, and examples, refer to the .

- [address-family l2vpn mspw](#), on page 59
- [bgp](#), on page 60
- [backup \(L2VPN\)](#), on page 61
- [backup disable \(L2VPN\)](#), on page 63
- [clear l2vpn collaborators](#), on page 65
- [clear l2vpn counters bridge mac-withdrawal](#), on page 66
- [clear l2vpn forwarding counters](#), on page 67
- [clear l2vpn forwarding counters bridge-domain mirp-lite](#), on page 68
- [clear l2vpn forwarding message counters](#), on page 69
- [clear l2vpn forwarding table](#), on page 70
- [control-word](#), on page 71
- [dynamic-arp-inspection](#), on page 72
- [flood mode](#), on page 74
- [generic-interface-list](#), on page 76
- [global-id \(L2VPN\)](#), on page 77
- [interface \(p2p\)](#), on page 78
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- [ipv4 source](#), on page 81
- [l2tp static](#), on page 82
- [ip-source-guard](#), on page 85
- [l2transport](#), on page 87
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- [load-balancing pw-label](#), on page 97
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- logging nsr, on page 99
- monitor-session (l2vpn), on page 100
- mpls static label (L2VPN), on page 102
- neighbor (L2VPN), on page 104
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- show l2vpn, on page 128
- show l2vpn atom-db, on page 130
- show l2vpn collaborators, on page 133
- show l2vpn database, on page 135
- show l2vpn discovery, on page 138
- show l2vpn forwarding, on page 140
- show l2vpn forwarding message counters, on page 154
- show l2vpn generic-interface-list, on page 156
- show l2vpn index, on page 158
- show l2vpn nsr , on page 160
- show l2vpn provision queue, on page 162
- show l2vpn pw-class, on page 164
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- show l2vpn trace, on page 169
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- storm-control , on page 186
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- tos (l2vpn), on page 190
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- transport mode vlan passthrough, on page 194
- ttl (l2vpn), on page 195
- xconnect group, on page 197

## address-family l2vpn mspw

To specify the L2VPN address family of the neighbor and to enter the address family configuration mode, use the **address-family l2vpn mspw** in the BGP configuration mode.

### address-family l2vpn mspw

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** BGP configuration

Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	bgp	read, write

The following example shows how to enter the address family configuration mode.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# router bgp 100
RP/0/RSP0/CPU0:router(config-bgp)# address-family l2vpn mspw
RP/0/RSP0/CPU0:router(config-bgp-af)#
```

# bgp

To enable the BGP pseudowire routing capabilities and enter the bgp configuration submenu, use the **bgp** command in the L2VPN routing configuration submenu.

## bgp

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	L2VPN routing configuration submenu
----------------------	-------------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The following example shows how to enable BGP pseudowire routing capabilities.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# router 2.2.2.2
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-routing
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# global-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# bgp
RP/0/RSP0/CPU0:router(config-l2vpn-pwr-bgp)# rd 192.168.1.3:10
```

## backup (L2VPN)

To configure the backup pseudowire for the cross-connect, use the **backup** command in L2VPN xconnect p2p pseudowire configuration mode. To disable this feature, use the **no** form of this command.

```
backup neighbor IP-address pw-id value
no backup neighbor IP-address pw-id value
```

Syntax Description	neighbor IP-address	Specifies the peer to cross connect. The <i>IP-address</i> argument is the IPv4 address of the peer.
	pw-id value	Configures the pseudowire ID. The range is from 1 to 4294967295.

**Command Default** None

**Command Modes** L2VPN xconnect p2p pseudowire configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **backup** command to enter L2VPN xconnect p2p pseudowire backup configuration mode.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to configure backup pseudowires:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group gr1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p p001
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.1 pw-id 2
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# backup neighbor 10.2.2.2 pw-id 5
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw-backup)#
```

Related Commands	Command	Description
	<a href="#">backup disable (L2VPN), on page 63</a>	Specifies how long a backup pseudowire should wait before resuming operation after the primary pseudowire goes down.

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">neighbor (L2VPN), on page 104</a>	Configures a pseudowire for a cross-connect.
<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.

## backup disable (L2VPN)

To specify how long a backup pseudowire should wait before resuming primary pseudowire operation after the failure with primary pseudowire has been cleared, use the **backup disable** command in L2VPN pseudowire class configuration mode. To disable this feature, use the **no** form of this command.

```
backup disable {delay value | never}
no backup disable {delay value | never}
```

<b>Syntax Description</b>	<p><b>delay value</b> Specifies the number of seconds that elapse after the failure with primary pseudowire has been cleared before the Cisco IOS XR software attempts to activate the primary pseudowire.</p> <p>The range, in seconds, is from 0 to 180. The default is 0.</p> <p><b>never</b> Specifies that the secondary pseudowire does not fall back to the primary pseudowire if the primary pseudowire becomes available again, unless the secondary pseudowire fails.</p>				
<b>Command Default</b>	The default disable delay is the value of 0, which means that the primary pseudowire is activated immediately when it comes back up.				
<b>Command Modes</b>	L2VPN pseudowire class configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write
Task ID	Operations				
l2vpn	read, write				

### Examples

The following example shows how a backup delay is configured for point-to-point pseudowire in which the backup disable delay is set to 50 seconds:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class class1
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# backup disable delay 50
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# exit
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group A
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrx
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.1 pw-id 2
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# pw-class class1
```

## backup disable (L2VPN)

```
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# backup neighbor 10.2.2.2 pw-id 5
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw-backup)#
```

### Related Commands

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">neighbor (L2VPN), on page 104</a>	Configures a pseudowire for a cross-connect.
<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.



# clear l2vpn collaborators

To clear the state change counters for L2VPN collaborators, use the **clear l2vpn collaborators** command in EXEC mode.

**clear l2vpn collaborators**

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to clear change counters for L2VPN collaborators:

```
RP/0/RSP0/CPU0:router# clear l2vpn collaborators
```

Related Commands	Command	Description
	<a href="#">show l2vpn collaborators, on page 133</a>	Displays information about the state of the interprocess communications connections between l2vpn_mgr and other processes.

## clear l2vpn counters bridge mac-withdrawal

To clear the MAC withdrawal statistics for the counters of the bridge domain, use the **clear l2vpn counters bridge mac-withdrawal** command in EXEC mode.

**clear l2vpn counters bridge mac-withdrawal** {**all** | **group** *group-name* **bd-name** *bd-name* | **neighbor** *ip-address* **pw-id** *value*}

### Syntax Description

<b>all</b>	Clears the MAC withdrawal statistics over all the bridges.
<b>group</b> <i>group-name</i>	Clears the MAC withdrawal statistics over the specified group.
<b>bd-name</b> <i>bd-name</i>	Clears the MAC withdrawal statistics over the specified bridge.
<b>neighbor</b> <i>ip-address</i>	Clears the MAC withdrawal statistics over the specified neighbor.
<b>pw-id</b> <i>value</i>	Clears the MAC withdrawal statistics over the specified pseudowire. The range is from 1 to 4294967295.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to clear the MAC withdrawal statistics over all the bridges:

```
RP/0/RSP0/CPU0:router# clear l2vpn counters bridge mac-withdrawal all
```

# clear l2vpn forwarding counters

To clear L2VPN forwarding counters, use the **clear l2vpn forwarding counters** command in EXEC mode.

**clear l2vpn forwarding counters**

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to clear L2VPN forwarding counters:

```
RP/0/RSP0/CPU0:router# clear l2vpn forwarding counters
```

Related Commands	Command	Description
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

## clear l2vpn forwarding counters bridge-domain mirp-lite

To clear L2VPN forwarding MIRP counters, use the **clear l2vpn forwarding counters bridge-domain mirp-lite** command in EXEC mode.

```
clear l2vpn forwarding counters bridge-domain mirp-lite {location node-id}
```

### Syntax Description

**location** *node-id* Clears the L2VPN forwarding MIRP counters for the specified location.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.3.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

#### Task Operation ID

l2vpn read, write, execute

This example shows how to clear all the MIRP counters:

```
RP/0/RSP0/CPU0:router# clear l2vpn forwarding counters bridge-domain mirp-lite location 0/1/CPU0
```

This example shows how to clear bridge-domain specific MIRP counters:

```
RP/0/RSP0/CPU0:router# clear l2vpn forwarding counters bridge-domain bg1:bd1 mirp-lite location 0/1/CPU0
```

### Related Commands

Command	Description
<a href="#">clear l2vpn forwarding counters, on page 67</a>	Clears L2VPN forwarding counters.

# clear l2vpn forwarding message counters

To clear L2VPN forwarding message counters, use the **clear l2vpn forwarding message counters** command in EXEC mode.

```
clear l2vpn forwarding message counters location node-id
```

<b>Syntax Description</b>	<b>location</b> <i>node-id</i>	Clears L2VPN forwarding message counters for the specified location.
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write
<b>Examples</b>	The following example shows how to clear L2VPN forwarding message counters on a specified node:  RP/0/RSP0/CPU0:router# <b>clear l2vpn forwarding message counters location 0/6/CPU0</b>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

## clear l2vpn forwarding table

To clear an L2VPN forwarding table at a specified location, use the **clear l2vpn forwarding table** command in EXEC mode.

**clear l2vpn forwarding table location** *node-id*

<b>Syntax Description</b>	<b>location</b> <i>node-id</i>	Clears L2VPN forwarding tables for the specified location.
---------------------------	-----------------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

<b>Examples</b>	The following example shows how to clear an L2VPN forwarding table from a specified location:
-----------------	---

```
RP/0/RSP0/CPU0:router# clear l2vpn forwarding table location 1/2/3/5
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

# control-word

To enable control word for MPLS encapsulation, use the **control-word** command in L2VPN pseudowire class encapsulation submode. To disable the control word, use the **no** form of this command.

**control-word**  
**no control-word**

<b>Syntax Description</b>	This command has no keywords or arguments.
<b>Command Default</b>	None
<b>Command Modes</b>	L2VPN pseudowire class encapsulation configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.2.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

**Examples** This example shows how to enable control word for MPLS encapsulation:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class pwc1
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)# control-word
```

# dynamic-arp-inspection

To validate Address Resolution Protocol (ARP) packets in a network, use the **dynamic-arp-inspection** command in the l2vpn bridge group bridge domain configuration mode. To disable dynamic ARP inspection, use the **no** form of this command.

**dynamic-arp-inspection** {**logging** | **address-validation** {*src-mac**dst-mac**ipv4*}}

**no dynamic-arp-inspection** {**logging** | **address-validation** {*src-mac**dst-mac**ipv4*}}

Syntax Description	logging	(Optional) Enables logging.
	<b>Note</b>	When you use the logging option, the log messages indicate the interface on which the violation has occurred along with the IP or MAC source of the violation traffic. The log messages are rate limited at 1 message per 10 seconds.
	<b>Caution</b>	Not all the violation events are recorded in the syslog.
	<b>address-validation</b>	(Optional) Performs address-validation.
	<i>src-mac</i>	Source MAC address in the Ethernet header.
	<i>dst-mac</i>	Destination MAC address in the Ethernet header.
	<i>ipv4</i>	IP addresses in the ARP body.

**Command Default** Dynamic ARP inspection is disabled.

**Command Modes** l2vpn bridge group bridge domain configuration

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** This example shows how to enable dynamic ARP inspection on bridge bar:

```
RP/0/RSP0/CPU0:router# configure
```



```
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dynamic-arp-inspection
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-dai)#
```

This example shows how to enable dynamic ARP inspection logging on bridge bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dynamic-arp-inspection logging
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-dai)#
```

This example shows how to enable dynamic ARP inspection address validation on bridge bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dynamic-arp-inspection address-validation
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-dai)#
```

#### Related Commands

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## flood mode

To change the flood mode from Bandwidth Optimized to Convergence Optimized, use the **flood mode convergence-optimized** command in the l2vpn bridge group bridge domain configuration mode. To return the bridge to normal flooding behavior (when all unknown unicast, broadcast and multicast packets are flooded over other bridge domain network interfaces), use the **no** form of this command.

```
flood mode {resilience-optimized | convergence-optimized}
no flood mode {resilience-optimized | convergence-optimized}
```

### Syntax Description

**resilience-optimized** Configures bridge to use Resilience Optimized mode.

**convergence-optimized** Configures bridge to use Convergence Optimized mode.

### Command Default

The bridge domain operates in the Bandwidth Optimized Mode.

### Command Modes

l2vpn bridge group bridge domain configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **flood mode** command allows you to change the flood optimization mode to either Convergence Optimized mode or Resilience Optimized mode. The Convergence Optimized mode floods all traffic to all line cards; all unknown unicast packets, all broadcast packets, and all multicast packets are flooded over all other bridge domain network interfaces. The Resilience Optimized Mode works like Bandwidth Optimized mode, except that it floods traffic to both primary and backup FRR links for a Pseudowire.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to clear an L2VPN forwarding table from a specified location:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group MyGroup
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain MyDomain
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd) # flood mode convergence-optimized
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd) #
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.

# generic-interface-list

To configure generic interface list, use the **generic-interface-list** command in global configuration mode.

**generic-interface-list** *list-name*

Syntax Description	
	<i>list-name</i> Name of the interface list.

Command Default	
	None

Command Modes	
	Global configuration

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

Usage Guidelines	
	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

## Example

This example shows how to configure generic interface list:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# generic-interface-list interfacelist1
RP/0/RSP0/CPU0:router(config-if-list)# interface GigabitEthernet 0/2/0/1
RP/0/RSP0/CPU0:router(config-if-list)# interface GigabitEthernet 0/3/0/1
RP/0/RSP0/CPU0:router(config-if-list)# exit
```

Related Commands	Command	Description
	<a href="#">show l2vpn generic-interface-list, on page 156</a>	Displays all the L2VPN virtual interfaces.

## global-id (L2VPN)

To configure the L2VPN global ID value for the router, use the **global-id** command in the L2VPN routing configuration submode.

**global-id** *value*

### Syntax Description

*value* Specifies the global-id value. Range is from 1 to 4294967295.

### Command Default

If BGP is used as the redistribution L2 protocol, then the default value is the BGP AS number. Otherwise, the default value is 0.

### Command Modes

L2VPN routing configuration submode

### Command History

Release	Modification
Release 5.1.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command overwrites the AS number from BGP.

### Task ID

Task ID	Operation
l2vpn	read, write

The following example shows how to configure L2VPN global ID value:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#router-id 2.2.2.2
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-routing
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# global-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# bgp
RP/0/RSP0/CPU0:router(config-l2vpn-pwr-bgp)# rd 192.168.1.3:10
```

## interface (p2p)

To configure an attachment circuit, use the **interface** command in p2p configuration submode. To return to the default behavior, use the **no** form of this command.

```
interface type interface-path-id [PW-Ether | PW-IW]
no interface type interface-path-id [PW-Ether | PW-IW]
```

### Syntax Description

*type* Interface type. For more information, use the question mark (?) online help function.

*interface-path-id* Physical interface or a virtual interface.

**Note** Use the **show interfaces** command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

**PW-Ether** (Optional) Configures an Ethernet Interface.

**PW-IW** (Optional) Configures an IP Interworking Interface.

### Command Default

None

### Command Modes

p2p configuration submode

### Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.2.1	The following keywords were added: <ul style="list-style-type: none"> <li>• PW-Ether</li> <li>• PW-IW</li> </ul>

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure an attachment circuit on a TenGigE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
```

```
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group gr1  
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p p001  
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# interface TenGigE 1/1/1/1
```

Related Commands	Command	Description
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.

# interworking ipv4

To configure IPv4 interworking, use the **interworking ipv4** command in the p2p configuration submode. To return to the default behavior, use the **no** form of this command.

**interworking ipv4**  
**no interworking ipv4**

## Syntax Description

**ipv4** Sets IPv4 interworking.

## Command Default

None

## Command Modes

p2p configuration submode

## Command History

Release	Modification
Release 4.0.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows how to configure an attachment circuit on a TenGigE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group gr1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p gr1
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# interworking ipv4
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)#
```

## Related Commands

Command	Description
<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.



## ipv4 source

To configure source IP address for the pseudowire class with encapsulation mpls, use the **ipv4 source** command in the L2VPN pseudowire class encapsulation mpls configuration mode.

**ipv4 source** *source-ip-address*

### Syntax Description

*source-ip-address* Source IP address.

### Command Default

None

### Command Modes

L2VPN pseudowire class encapsulation mpls configuration

### Command History

Release	Modification
Release 4.2.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operation
l2vpn	read, write

### Example

This example shows how to configure the source ip address:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#pw-class kant1
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)#encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)#ipv4 source 112.22.1.4
```

### Related Commands

Command	Description
<a href="#">pw-class encapsulation mpls, on page 115</a>	Configures MPLS pseudowire encapsulation.

## l2tp static

To enable the Layer 2 Tunneling Protocol (L2TP) static submodule, and perform L2TP pseudowire configurations, use the **l2tp static** command in p2p pseudowire configuration submodule. To disable the L2TP static submodule, use the **no** form of this command.

```
l2tp static [{local {cookie {secondary size | size} {0 | 4 | 8} value value | session session id} | remote
{cookie size {0 | 4 | 8} value value | session session id}}]
no l2tp static [{local {cookie{secondary size | size} {0 | 4 | 8} value cookie value | session session
id} | remote {cookie size {0 | 4 | 8} value cookie value | session session id}}]
```

Syntax Description	
<b>local</b>	(Optional) Configures local cookies and sessions.
<b>cookie</b>	Sets L2TP pseudowire static local or remote cookie.
<b>secondary size</b>	Sets L2TP pseudowire static local cookie secondary size.
<b>size</b>	Sets L2TP pseudowire static local cookie size.
<b>value</b>	Sets the value of the cookie.
<i>cookie value</i>	Value of the cookie.  The cookie values are specified based on the configured cookie size: <ul style="list-style-type: none"> <li>• Cookie size 0—No cookie value is set.</li> <li>• Cookie size 4—Lower 4 bytes value (&lt;0x0-0xffffffff&gt;) is set.</li> <li>• Cookie size 8—Lower 4 bytes value and higher 4 bytes values (&lt;0x0-0xffffffff&gt; &lt;0x0-0xffffffff&gt; ) are set.</li> </ul>
<b>session</b>	Sets L2TP pseudowire static local or remote session.
<i>session id</i>	Session ID. Range is from 1 to 65535.
<b>remote</b>	(Optional) Configures remote cookies and sessions.

**Command Default** None

**Command Modes** p2p pseudowire configuration

Command History	Release	Modification
	Release 4.3.1	This command was introduced

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to enter the l2tp static configuration sub mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static
```

This example shows how to configure local and remote session-id:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static local session 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static remote session 1
```

This example shows how to configure cookie size and values:

This example is with cookie size 0:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static local cookie size 0
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static remote cookie size 0
```

This example is with cookie size 4:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static local cookie size 4 value
<0x0-0xffffffff>
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static remote cookie size 4 value
<0x0-0xffffffff>
```

This example is with cookie size 8 (lower 4 bytes entered first and then higher 4 bytes):

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static local cookie size 8 value
<0x0-0xffffffff> <0x0-0xffffffff>
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static remote cookie size 8 value
<0x0-0xffffffff> <0x0-0xffffffff>
```

This example show how to configure a secondary local cookie:

```

RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# l2tp static local cookie secondary size 8 value
<0x0-0xffffffff> <0x0-0xffffffff>

```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
	<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.
	<a href="#">neighbor (L2VPN), on page 104</a>	Configures a pseudowire for a cross-connect.

# ip-source-guard

To enable source IP address filtering on a layer 2 port, use the **ip-source-guard** command in l2vpn bridge group bridge domain configuration mode. To disable source IP address filtering, use the **no** form of this command.

**ip-source-guard logging**  
**no ip-source-guard logging**

<b>Syntax Description</b>	<b>logging</b> (Optional) Enables logging.				
<b>Command Default</b>	IP Source Guard is disabled.				
<b>Command Modes</b>	l2vpn bridge group bridge domain configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.1	This command was introduced.
Release	Modification				
Release 4.0.1	This command was introduced.				

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

This example shows how to enable ip source guard on bridge bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# ip-source-guard
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ipsg)#
```

This example shows how to enable ip source guard logging on bridge bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# ip-source-guard logging
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ipsg)#
```

**Related Commands**

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# l2transport

To configure a physical interface to operate in Layer 2 transport mode, use the **l2transport** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

**l2transport**  
**no l2transport**

This command has no arguments or keywords.

---

## Command Default

None

---

## Command Modes

Interface configuration

---

## Command History

Release	Modification
Release 3.7.2	This command was introduced.

---

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The l2transport command and these configuration items are mutually exclusive:

- IPv4 address and feature (for example, ACL) configuration
- IPv4 enable, address and feature (for example, ACL) configuration
- Bundle-enabling configuration
- L3 subinterfaces
- Layer 3 QoS Policy



### Note

After an interface or connection is set to Layer 2 switched, commands such as **ipv4 address** are not usable. If you configure routing commands on the interface, **l2transport** is rejected.

---

## Task ID

Task ID	Operations
l2vpn	read, write

---

## Examples

The following example shows how to configure an interface or connection as Layer 2 switched under several different modes:

### Ethernet Port Mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RSP0/CPU0:router(config-if)# l2transport
```

**Ethernet VLAN Mode:**

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q 100dot1q vlan 999
```

**Ethernet VLAN Mode (QinQ):**

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q 20 second-dot1q 10vlan 999 888
```

**Ethernet VLAN Mode (QinAny):**

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RSP0/CPU0:router(config-if)# encapsulation dot1q 30 second-dot1q dot1q vlan 999 any
```

**Related Commands**

Command	Description
<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.



# l2transport l2protocol

To configure Layer 2 protocol handling, use the **l2transport l2protocol** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

```
l2transport l2protocol cpsv {reverse-tunnel | tunnel}
no l2transport l2protocol cpsv {reverse-tunnel | tunnel}
```

## Syntax Description

**cpsv** Enables L2PT for the interface. L2PT is enabled for the following protocols only:

- CDP
- STP
- VTP

**Note** STP includes all Spanning Tree protocol derivatives (RSTP, MSTP, etc.)

**tunnel** Performs L2PT encapsulation on frames as they enter the interface. Also, performs L2PT de-encapsulation on frames as they exit they interface.

L2PT encapsulation rewrites the destination MAC address with the L2PT destination MAC address. L2PT deencapsulation replaces the L2PT destination MAC address with the original destination MAC address.

**reverse-tunnel** Performs L2PT encapsulation on frames as they exit the interface. Also, perform L2PT deencapsulation on frames as they enter the interface.

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.7.2	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

These L2 protocols are available:

- Cisco Discovery Protocol (CDP)—CDP is protocol-independent and is used to obtain protocol addresses, platform information, and other data about neighboring devices.
- PVST maintains a spanning tree instance for each VLAN configured in the network and permits a VLAN trunk to be forwarding for some VLANs and not for others. It can also load balance Layer 2 traffic by forwarding some VLANs on one trunk and other VLANs n others.
- Spanning-Tree Protocol (STP)—STP is a link management protocol that provides path redundancy in the network. For Ethernet networks to function properly, only one active path can exist between two stations.

- VLAN Trunk Protocol (VTP)—VTP is a Cisco-proprietary protocol that reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain.

Task ID	Task ID	Operations
	l2vpn	read, write
	atm	read, write

### Examples

The following example shows how to configure Layer 2 protocol handling:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RSP0/CPU0:router(config-if)# l2transport l2protocol cpsv reverse-tunnelstp drop
```

Related Commands	Command	Description
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2transport propagate

To propagate Layer 2 transport events, use the **l2transport propagate** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

**l2transport propagate remote-status**  
**no l2transport propagate remote-status**

<b>Syntax Description</b>	<b>remote-status</b> Propagates remote link status changes.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **l2transport propagate** command provides a mechanism for the detection and propagation of remote link failure for port mode EoMPLS.

To display the state of l2transport events, use the **show controller internal** command in *Interface and Hardware Component Configuration Guide for Cisco ASR 9000 Series Routers*

For more information about the Ethernet remote port shutdown feature, see *MPLS Configuration Guide for Cisco ASR 9000 Series Routers*.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

## Examples

The following example shows how to propagate remote link status changes:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RSP0/CPU0:router(config-if)# l2transport propagate remote remote-status
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2transport service-policy

To configure a Layer 2 transport quality of service (QoS) policy, use the **l2transport service-policy** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

```
l2transport service-policy {input policy-name | output policy-name}
no l2transport service-policy {input policy-name | output policy-name}
```

## Syntax Description

**input** *policy-name* Configures the direction of service policy application: input.

**output** *policy-name* Configures the direction of service policy application: output.

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.7.2	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
l2vpn	read, write
atm	read, write

## Examples

The following example shows how configure an L2 transport quality of service (QoS) policy:

```
RP/0/RSP0RP00/CPU0:router# configure
RP/0/RSP0RP00/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RSP0RP00/CPU0:router(config-if)# l2transport service-policy input sp_0001
```

## Related Commands

Command	Description
<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2vpn

To enter L2VPN configuration mode, use the **l2vpn** command in global configuration mode. To return to the default behavior, use the **no** form of this command.

**l2vpn**  
**no l2vpn**

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** Global configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configuration can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to enter L2VPN configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#
```

Related Commands	Command	Description
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

## load-balancing flow

To enable all bundle EFPs and PW to use either L2 flow based or L3 flow based balancing, use the **load-balancing flow** command in L2VPN configuration mode.

**load-balancing flow** [{src-dst-mac | src-dst-ip}]

### Syntax Description

**src-dst-mac** Enables global flow load balancing hashed on source and destination MAC addresses.

**src-dst-ip** Enables global flow load balancing hashed on source and destination IP addresses.

### Command Default

The default load balancing is based on the source and destination MAC addresses.

### Command Modes

L2VPN configuration

### Command History

Release	Modification
Release 4.0.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to set the L3 flow based load balancing:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# load-balancing flow src-dst-ip
```

# load-balancing flow-label

To balance the load based on flow-labels, use the **load-balancing flow label** command in the l2vpn pseudowire class mpls configuration submode or l2vpn bridge group bridge-domain vfi autodiscovery bgp or ldp signaling submodes. To undo flow-label based load-balancing, use the **no** form of this command.

```
load-balancing flow-label {both | code | receive | transmit}[{static}]
no load-balancing flow-label {both | code | receive | transmit}[{static}]
```

## Syntax Description

<b>both</b>	Inserts or discards flow labels on transmit or receive.
<b>code</b>	Specifies the flow label TLV (type-length-value) code. The code value is 17.
<b>receive</b>	Discards flow label on receive.
<b>transmit</b>	Inserts flow label on transmit.
<b>static</b>	Sets flow label parameters statically.

## Command Default

None

## Command Modes

L2vpn pseudowire class mpls configuration submode  
 L2vpn bridge group bridge-domain vfi autodiscovery bgp signaling submode  
 L2vpn bridge group bridge-domain vfi autodiscovery ldp signaling submode

## Command History

Release	Modification
Release 4.2.1	This command was introduced.
Release 4.3.2	The <b>code</b> keyword was introduced.
Release 5.3.1	In the L2VPN bridge group bridge-domain vfi autodiscovery BGP signalling submode, the static keyword is optional.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

In the [draft-ietf-pwe3-fat-pw](#) document, the flow label sub-TLV identifier for the Flow Aware Transport Pseudowire (FAT PW) was 0x11. This value has been changed to 0x17, which is also the sub-TLV identifier assigned by the Internet Assigned Numbers Authority (IANA).

Use the **load-balancing flow label code** command to toggle between the sub-TLV identifiers—0x11 and 0x17. If there is a mismatch between two endpoints in the load-balancing flow label code, then the PWs will have a mismatched TLV value resulting in a load balancing failure.

The **no** form of the **load-balancing flow label code** command uses the flow label sub-TLV identifier 0x11.

In the L2VPN bridge group bridge-domain vfi autodiscovery bgp signaling-protocol submode, the static keyword is optional. If the static keyword is not used, flow load balancing is dynamic. In this case, the routers dynamically select ingress or egress or both traffic flows for load balancing, based on this command configuration on both endpoints of a pseudowire. Even if this command configuration on the pseudowire's endpoints mismatch, the least possible of the traffic flows is enabled for load balancing. For example, consider the following mismatched but dynamic flow load balancing configuration: if one endpoint is configured for egress traffic load balancing, while the other is configured for ingress as well as egress load balancing, then load balancing is enabled for egress on the first endpoint and only the ingress on the latter endpoint.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows the output of the **load-balancing flow-label** command of the **both** keyword.

```
RP/0/RSP0/CPU0:router#config
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#pw-class p1
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)#encapsulation
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)#encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)#load-balancing
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)#load-balancing flow-label
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)#load-balancing flow-label both
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)#load-balancing flow-label both static
```

Related Commands	Command	Description
	<a href="#">pw-class encapsulation mpls, on page 115</a>	Configures MPLS pseudowire encapsulation.



# load-balancing pw-label

To enable all pseudowires using the defined class to use virtual circuit based load balancing, use the **load-balancing pw-label** command in pseudowire class configuration mode.

## load-balancing pw-label

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** Pseudowire class configuration

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to set the bridge ID:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class abc
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-mpls)# load-balancing pw-label
```

## logging (l2vpn)

To enable cross-connect logging, use the **logging** command in L2VPN configuration submode. To return to the default behavior, use the **no** form of this command.

**logging pseudowire status**  
**no logging pseudowire status**

### Syntax Description

pseudowire status Enables pseudowire state change logging.

### Command Default

None

### Command Modes

L2VPN configuration submode

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



#### Note

All L2VPN configuration can be deleted using the **no l2vpn** command.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to enable cross-connect logging:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# logging pseudowire status
```

### Related Commands

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# logging nsr

To enable non-stop routing logging, use the **logging nsr** command in L2VPN configuration submode. To return to the default behavior, use the **no** form of this command.

**logging nsr**  
**no logging nsr**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** L2VPN configuration submode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configuration can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to enable non-stop routing logging:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# logging nsr
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## monitor-session (l2vpn)

To attach a traffic monitoring session as one of the segments for a cross connect, use the **monitor-session** command in point-to-point cross connect configuration mode. To remove the association between a traffic mirroring session and a cross connect, use the **no** form of this command.

**monitor-session** *session-name*  
**no monitor-session** *session-name*

<b>Syntax Description</b>	<i>session-name</i> Name of the monitor session to configure.
---------------------------	---

<b>Command Default</b>	No default behavior or values
------------------------	-------------------------------

<b>Command Modes</b>	Point-to-point cross connect configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.0.0	This command was introduced.

<b>Usage Guidelines</b>	Before you can attach a traffic mirroring session to a cross connect, you must define it using the <b>monitor-session</b> global configuration command. Once the traffic mirroring session is defined, use the <b>monitor-session</b> point-to-point cross connect configuration command to attach this session as one of the segments for the cross connect. Once attached, all traffic replicated from the monitored interfaces (in other words, interfaces that are associated with the monitor-session) is replicated to the pseudowire that is attached to the other segment of the cross-connect.
-------------------------	---

The *session-name* argument should be different than any interface names currently used in the system.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

This example shows how to attach a traffic mirroring session as segment for the xconnect:

```
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group g1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p xcon1
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# monitor-session mon1
```

This example shows how an EFP is associated to a monitor session:

```
RP/0/RSP0/CPU0:router(config)# interface Gi0/0/0/4.2 l2transport
RP/0/RSP0/CPU0:router(config-subif)# monitor-session customer-foo
```

This example shows how L2 SPAN is supported on L3 interfaces, but the whole L2 frame is mirrored:

```
RP/0/RSP0/CPU0:router(config)# interface Gi0/0/0/4.2 l2transport
RP/0/RSP0/CPU0:router(config-subif)# ipv6 address 1111:3333::cdef
RP/0/RSP0/CPU0:router(config-subif)# monitor-session customer-foo
```

This example shows how SPAN is also supported on main interfaces:

```
RP/0/RSP0/CPU0:router(config)# interface Gi0/0/0/4.2 l2transport
RP/0/RSP0/CPU0:router(config-subif)# l2transport
RP/0/RSP0/CPU0:router(config-subif)# monitor-session customer-foo
```

This example shows creation of xconnect between the monitor-session and a L2TPv3 over IPv6 tunnel:

```
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group span
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p span-foo
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# monitor-session customer-foo
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor ipv6 1111:3333::cdef pw-id 1001
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# pw-class ts
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# source 1111:3333::abcd
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# l2tp static local cookie size 8 value 0xabcd
0x1234
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# l2tp static remote cookie size 8 value 0xcdef
0x5678
```

#### Related Commands

Command	Description
See the <b>monitor session</b> command in the <i>Interface and Hardware Component Command Reference for Cisco ASR 9000 Series Routers</i> .	

## mpls static label (L2VPN)

To configure static labels for MPLS L2VPN, use the **mpls static label** command in L2VPN cross-connect P2P pseudowire configuration mode. To have MPLS assign a label dynamically, use the **no** form of this command.

```
mpls static label local label remote value
no mpls static label local label remote value
```

Syntax Description	
<b>local</b> <i>label</i>	Configures a local pseudowire label. Range is 16 to 15999.
<b>remote</b> <i>value</i>	Configures a remote pseudowire label. Range is 16 to 15999.

**Command Default** The default behavior is a dynamic label assignment.

**Command Modes** L2VPN cross-connect P2P pseudowire configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to configure static labels for MPLS L2VPN:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# mpls static label local 800 remote 500
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">neighbor (L2VPN), on page 104</a>	Configures a pseudowire for a cross-connect.
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.

Command	Description
<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.

## neighbor (L2VPN)

To configure a pseudowire for a cross-connect, use the **neighbor** command in p2p configuration submode. To return to the default behavior, use the **no** form of this command.

```
neighbor {A.B.C.D | ipv4 ipv4 address | ipv6 ipv6 address} pw-id value [{backup | l2tp static | mpls
| | pw-class | source ipv6 address | tag-impose}]
no neighbor {A.B.C.D | ipv4 ipv4 address | ipv6 ipv6 address} pw-id value [{backup | l2tp static | mpls
| | pw-class | source ipv6 address | tag-impose}]
```

### Syntax Description

<i>A.B.C.D</i>	IP address of the cross-connect peer.
<b>ipv4</b> <i>ipv4 address</i>	Assigns the IPv4 address of the cross-connect peer.
<b>ipv6</b> <i>ipv6 address</i>	Assigns the IPv6 address of the cross-connect peer.
<b>pw-id</b> <i>value</i>	Configures the pseudowire ID and ID value. Range is 1 to 4294967295.
<b>backup</b>	(Optional) Specifies the backup pseudowire for the cross-connect.
<b>l2tp static</b>	(Optional) Configures the L2TP pseudowire static
<b>mpls</b>	(Optional) Configures an MPLS static label.
<b>pw-class</b>	(Optional) Configures the pseudowire class template name to use for this cross-connect.
<b>source</b> <i>ipv6 address</i>	(Optional) Specifies the source IPv6 address of the pseudowire. This option is available only for the IPv6 neighbor.
<b>tag-impose</b>	(Optional) Specifies a tag during a VLAN ID configuration

### Command Default

None

### Command Modes

p2p configuration submode

### Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 4.2.1	The keyword <b>tag-impose</b> was introduced.
Release 4.3.1	The following keywords were added: <ul style="list-style-type: none"> <li>• <b>ipv4</b></li> <li>• <b>ipv6</b></li> <li>• <b>l2tp static</b></li> <li>• <b>source</b></li> </ul>

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



A cross-connect may have two segments:

1. An Attachment Circuit (AC)
2. An second AC or a pseudowire



**Note** The pseudowire is identified by two keys: neighbor and pseudowire ID. There may be multiple pseudowires going to the same neighbor. It is not possible to configure only a neighbor.

All L2VPN configurations can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

This example shows a point-to-point cross-connect configuration (including pseudowire configuration):

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000 pw-class class12
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.3 pw-id 1001 pw-class class13
RP/0/RSP0/CPU0:router(config-xc)# p2p rtrC_to_rtrD
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.2.2.3 pw-id 200 pw-class class23
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.2.2.4 pw-id 201 pw-class class24
```

This example shows a point-to-point cross-connect configuration (including pseudowire configuration):

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000 pw-class foo
RP/0/RSP0/CPU0:router(config-xc)# p2p rtrC_to_rtrD
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor 20.2.2.3 pw-id 200 pw-class bar1
```

This example shows a point-to-point IPv6 cross-connect configuration:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
```

This example shows how to set a source IPv6 address to a point-to-point IPv6 cross-connect :

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
```

## neighbor (L2VPN)

```
RP/0/RSP0/CPU0:router(config-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-xc-p2p-pw)# source 1111:2222::abcd
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
	<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.
	<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.

# neighbor routed

To enable pseudowire routing configuration submode for the p2p cross-connect, use the **neighbor routed** command in the p2p configuration submode.

**neighbor routed** *global-id:prefix:ac-id* **source** *ac-id*

Syntax Description		
	<i>global-id</i>	Targeted remote autonomous system number.
	<i>prefix</i>	Targeted remote PE IP address.
	<i>ac-id</i>	Specifies the targeted remote attachment circuit id.
	<b>source</b> <i>ac-id</i>	Specifies the local attachment circuit ID.

**Command Default** None

**Command Modes** p2p configuration submode

Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

The following example shows how to enable pseudowire routing configuration submode for the p2p cross-connect.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group pw-hel
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p pw-ss
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# interface gigabitethernet 0/1/0/9
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor routed 100:2.2.2.2:10 source 10
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pwr)# pw-class dynamic_sspw
```

## nsr (L2VPN)

To configure non-stop routing, use the **nsr** command in L2VPN configuration submode. To return to the default behavior, use the **no** form of this command.

**nsr**  
**no nsr**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** L2VPN configuration submode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configuration can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operation
	l2vpn	read, write

The following example shows how to configure non-stop routing:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# nsr
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# pw-routing

To enable pseudowire routing capabilities and enter the pseudowire routing configuration submode, use the **pw-routing** command in the L2VPN routing configuration submode.

## pw-routing

**Syntax Description** This command has no keywords or arguments.

**Command Default** None.

**Command Modes** L2VPN routing configuration submode

Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

The following example shows how to enable pseudowire routing capabilities:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#router-id 2.2.2.2
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-routing
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# global-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# bgp
RP/0/RSP0/CPU0:router(config-l2vpn-pwr-bgp)# rd 192.168.1.3:10
```

## protocol l2tpv3

To configure Layer 2 Tunneling Protocol Version 3 (L2TPv3) as the signaling protocol for a pseudowire class, use the **protocol l2tpv3** command in L2VPN pseudowire class encapsulation L2TPv3 configuration mode. To disable L2TPv3 as the signaling protocol for a pseudowire class, use the **no** form of this command.

```
protocol l2tpv3{class class_name}
no protocol l2tpv3{class class_name}
```

### Syntax Description

**class** Specifies the L2TPv3 class.

*class\_name* The L2TPv3 class name.

### Command Default

None

### Command Modes

L2VPN pseudowire class encapsulation L2TPv3 configuration

### Command History

Release	Modification
Release 4.3.1	This command was introduced

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



### Note

All L2VPN configurations can be deleted using the **no l2vpn** command.

### Task ID

Task ID	Operation
l2vpn	read, write

### Example

This example shows how to set the encapsulation and protocol to L2TPv3:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
```

Related Commands	Command	Description
	<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.
	<a href="#">pw-class encapsulation l2tpv3, on page 113</a>	Configures L2TPv3 pseudowire encapsulation.

## pw-class (L2VPN)

To enter pseudowire class submode to define a pseudowire class template, use the **pw-class** command in L2VPN configuration submode. To delete the pseudowire class, use the **no** form of this command.

```
pw-class class-name
no pw-class class-name
```

<b>Syntax Description</b>	<i>class-name</i> Pseudowire class name.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	L2VPN configuration submode
----------------------	-----------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



<b>Note</b>	All L2VPN configurations can be deleted using the <b>no l2vpn</b> command.
-------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to define a simple pseudowire class template:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group l1vpn
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.2 pw-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# pw-class kanata01
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.



## pw-class encapsulation l2tpv3

To configure L2TPv3 pseudowire encapsulation, use the **pw-class encapsulation l2tpv3** command in L2VPN pseudowire class configuration mode. To return to the default behavior, use the **no** form of this command.

```
pw-class class name encapsulation l2tpv3 [{cookie size {0 | 4 | 8} | dfbit set | ipv4 source address | pmtu max 68-65535 | protocol l2tpv3 class name | sequencing both [{resync}] | tos {reflect value 0-255 | value 0-255} | transport-mode {ethernet vlan} | ttl value}]
```

```
no pw-class class name encapsulation l2tpv3 [{cookie size {0 | 4 | 8} | dfbit set | ipv4 source address | pmtu max 68-65535 | protocol l2tpv3 class name | sequencing both [{resync}] | tos {reflect value 0-255 | value 0-255} | transport-mode {ethernet vlan} | ttl value}]
```

Syntax Description	
<b>class name</b>	Configures an encapsulation class name.
<b>cookie size</b> {0   4   8}	(Optional) Configures the L2TPv3 cookie size setting: <ul style="list-style-type: none"> <li>• 0—Cookie size is 0 bytes.</li> <li>• 4—Cookie size is 4 bytes.</li> <li>• 8—Cookie size is 8 bytes.</li> </ul>
<b>dfbit set</b>	(Optional) Sets the Don't Fragment Bit (DFBIT)
<b>ipv4 source address</b>	(Optional) Configures the local source IPv4 address.
<b>pmtu max</b> 68-65535	(Optional) Configures the value of the maximum allowable session MTU.
<b>protocol l2tpv3 class name</b>	(Optional) Configures L2TPv3 as the signaling protocol for the pseudowire class.
<b>sequencing both</b>	(Optional) Configures sequencing on both transmit and receive side
<b>resync</b>	(Optional) Sets the threshold for out-of-sequence packets before resync
<b>transport-mode</b>	(Optional) Configures the remote transport mode
<b>ethernet</b>	Sets the transport mode as ethernet port mode
<b>vlan</b>	Sets the transport mode as vlan tagged mode
<b>tos</b> {reflect value 0-255   value 0-255}	(Optional) Configures TOS and the TOS value. Range is 0 to 255.
<b>ttl value</b>	Configures the Time-to-live (TTL) value. Range is 1 to 255.

**Command Default** None

**Command Modes** L2VPN pseudowire class configuration

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configurations can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to define L2TPV3 pseudowire encapsulation:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
```

The following example shows how to set the encapsulation and protocol to L2TPV3:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
```

Related Commands	Command	Description
	<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.
	<a href="#">pw-class encapsulation mpls, on page 115</a>	Configures MPLS pseudowire encapsulation.

## pw-class encapsulation mpls

To configure MPLS pseudowire encapsulation, use the **pw-class encapsulation mpls** command in L2VPN pseudowire class configuration mode. To undo the configuration, use the **no** form of this command.

```
pw-class class-name encapsulation mpls {control word | ipv4 | load-balancing flow-label |
preferred-path | protocol ldp | redundancy one-way | sequencing | switching tlv | tag-rewrite |
transport-mode | vccv verification-type none}
```

```
no pw-class class-name encapsulation mpls {control word | ipv4 | load-balancing flow-label |
preferred-path | protocol ldp | redundancy one-way | sequencing | switching tlv | tag-rewrite |
transport-mode | vccv verification-type none}
```

Syntax Description		
	<i>class-name</i>	Encapsulation class name.
	<b>control word</b>	Disables control word for MPLS encapsulation. Disabled by default.
	<b>ipv4</b>	Sets the local source IPv4 address.
	<b>load-balancing flow-label</b>	Sets flow label-based load balancing.
	<b>preferred-path</b>	Configures the preferred path tunnel settings.
	<b>protocol ldp</b>	Configures LDP as the signaling protocol for this pseudowire class.
	<b>redundancy one-way</b>	Configures one-way PW redundancy behavior in the Redundancy Group.
	<b>sequencing</b>	Configures sequencing on receive or transmit.
	<b>switching tlv</b>	Configures switching TLV to be hidden or not.
	<b>tag-rewrite</b>	Configures VLAN tag rewrite.
	<b>transport-mode</b>	Configures transport mode to be either Ethernet or VLAN.
	<b>vccv none</b>	Enables or disables the VCCV verification type.
<b>Command Default</b>	None	
<b>Command Modes</b>	L2VPN pseudowire class configuration	

Command History	Release	Modification
	Release 3.7.2	This command was introduced.
	Release 3.9.0	The following keywords were added: <ul style="list-style-type: none"> <li>• <b>preferred-path</b></li> <li>• <b>sequencing</b></li> <li>• <b>switching tlv</b></li> <li>• <b>tag-rewrite</b></li> <li>• <b>transport-mode</b></li> </ul>
	Release 4.2.0	The keyword <b>redundancy one-way</b> was introduced.
	Release 4.3.0	The keyword <b>load-balancing flow-label</b> was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configurations can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** This example shows how to define MPLS pseudowire encapsulation:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
```

Related Commands	Command	Description
	<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.

# pw-ether

To configure a PWHE Ethernet interface, use the **pw-ether** command in global configuration mode or in p2p configuration submodule. To return to the default behavior, use the **no** form of this command.

**pw-ether** *value*  
**no pw-ether** *value*

## Syntax Description

*value* Value of the PWHE Ethernet interface. The range is from 1 to 32768.

## Command Default

None

## Command Modes

Global configuration  
 p2p configuration

## Command History

Release	Modification
Release 4.2.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
interface (global configuration)	read, write
l2vpn (p2p configuration)	read, write

This example shows the sample output of a PWHE Ethernet interface configuration in global configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# attach generic-interface-list interfacelist1
```

This example shows the sample output of a PWHE Ethernet interface configuration in p2p configuration submodule:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group xc1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p grp1
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# interface pw-ether 78
```

This example shows the sample output of L2 overhead configuration for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
```

```
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# l2overhead 32
```

This example shows the sample output of Load-interval configuration for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# load-interval 60
```

This example shows the sample output of how to set logging of interface state change for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# logging events link-status
```

This example shows the sample output of MAC address configuration for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# mac-address 44-37-E6-89-C3-93
```

This example shows the sample output of MTU configuration for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# mtu 128
```

This example shows the sample output of bandwidth configuration for the PW-HE interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface pw-ether 78
RP/0/RSP0/CPU0:router(config-if)# bandwidth 256
```

## Related Commands

Command	Description
<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.

# pw-grouping

To enable Pseudowire Grouping, use the **pw-grouping** command in L2vpn configuration submode. To return to the default behavior, use the **no** form of this command.

```
pw-grouping
no pw-grouping
```

<b>Syntax Description</b>	<b>pw-grouping</b> Enables Pseudowire Grouping.
---------------------------	---

<b>Command Default</b>	PW-grouping is disabled by default.
------------------------	-------------------------------------

<b>Command Modes</b>	L2VPN configuration submode
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows the sample output of pw-grouping configuration in L2VPN configuration submode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-grouping
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">show l2vpn, on page 128</a>	Displays L2VPN information

## p2p

To enter p2p configuration submode to configure point-to-point cross-connects, use the **p2p** command in L2VPN xconnect mode. To return to the default behavior, use the **no** form of this command.

```
p2p xconnect-name
no p2p xconnect-name
```

### Syntax Description

*xconnect-name* (Optional) Configures the name of the point-to-point cross- connect.

### Command Default

None

### Command Modes

L2VPN xconnect

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The name of the point-to-point cross-connect string is a free format description string.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows a point-to-point cross-connect configuration (including pseudowire configuration):

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group group 1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p xc1
```

### Related Commands

Command	Description
<a href="#">interface (p2p), on page 78</a>	Configures an attachment circuit.



## rd (L2VPN)

To configure BGP route distinguisher, use the **rd** command in the L2VPN pseudowire routing bgp configuration submode or the L2VPN bridge domain VFI autodiscovery bgp submode or the L2VPN cross-connect mp2mp autodiscovery bgp sub-mode, as applicable.

```
rd {ASN : index | ipv4-address : index}
```

Syntax Description		
	<i>ASN</i>	Specifies the 2-byte or 4-byte autonomous system number.
	<i>index</i>	Specifies the index value. If the ASN is 2-byte, then the index value is 4-byte. If the ASN is 4-byte or the index is preceded by an IPv4 address, then the index value is 2-byte.
	<i>ipv4-address</i>	Indicates the IP address (4 bytes). The index value associated with the IP address is 2-byte.
Command Default	Default value is auto-generated in the format IPv4 address : nn; where, IPv4 address is set to the BGP router-id for all features or to L2VPN router-id for pseudowire routing only, and nn is the index value that is auto-generated.	
Command Modes	L2VPN pseudowire routing BGP configuration submode	
	L2VPN bridge domain VFI autodiscovery BGP submode	
	L2VPN cross-connect mp2mp autodiscovery BGP submode	
Command History	Release	Modification
	Release 3.7.2	This command is introduced for the L2VPN bridge domain VFI autodiscovery BGP and L2VPN cross-connect mp2mp autodiscovery BGP submodes.
	Release 5.1.2	This command is introduced for the L2VPN pseudowire routing BGP configuration submode.

Release	Modification
Release 5.3.1	For the L2VPN bridge domain VFI autodiscovery BGP and L2VPN cross-connect mp2mp autodiscovery BGP submodes, the index value associated with the IP address can take values higher than 32767 in the range from 0 to 65535.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

**Task ID**

Task ID	Operation
l2vpn	read, write

The following example shows how to configure BGP route distinguisher.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#router-id 2.2.2.2
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-routing
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# global-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-pwr)# bgp
RP/0/RSP0/CPU0:router(config-l2vpn-pwr-bgp)# rd 192.168.1.3:10
```

## sequencing (L2VPN)

To configure L2VPN pseudowire class sequencing, use the **pw-class sequencing** command in L2VPN pseudowire class encapsulation mode. To return to the default behavior, use the **no** form of this command.

```
sequencing {both | receive | transmit {resynch 5-65535}}
no sequencing {both | receive | transmit {resynch 5-65535}}
```

Syntax Description	both	Configures transmit and receive side sequencing.
	receive	Configures receive side sequencing.
	transmit	Configures transmit side sequencing.
	resynch 5-65535	Configures the threshold for out-of-sequence packets before resynchronization. Range is 5 to 65535.

**Command Default** None

**Command Modes** L2VPN pseudowire class encapsulation mode

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Do not configure **sequence resynch** on high speed circuits. On low speed circuits, do not configure a threshold lower than 10 to 20 seconds of traffic.



**Note** This command is not supported on the Cisco ASR 9000 Series Aggregation Services Router.



**Note** All L2VPN configurations can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples**

The following example shows how to configure L2VPN pseudowire class sequencing:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pw)# encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-encap-mpls)# sequencing both
```

**Related Commands**

Command	Description
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.

# show bgp l2vpn mspw

To display the information about L2VPN single-segment pseudowires, use the **show bgp l2vpn mspw** command in the EXEC mode.

## show bgp l2vpn mspw

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	bgp	read

The following example displays the information about L2VPN Single-Segment Pseudowires

```
RP/0/0/CPU0:PE2#show bgp l2vpn mspw
Mon Apr 13 16:27:18.878 PDT
BGP router identifier 200.200.200.200, local AS number 100
BGP generic scan interval 100 secs
BGP table state: Active
Table ID: 0x0 RD version: 14
BGP main routing table version 5
BGP scan interval 60 secs

Status codes: s suppressed, d damped, h history, * valid, > best
               i - internal, r RIB-failure, S stale
Origin codes: i - IGP, e - EGP, ? - incomplete
               Network          Next Hop          Metric LocPrf Weight Path
Route Distinguisher: 4.3.2.1:0
*> [100][200.200.200.200]/64
                               0.0.0.0                    0 i
Route Distinguisher: 4.3.2.1:1
*> [100][100.100.100.100][200]/96
                               10.10.10.2
```

# show generic-interface-list

To display information about interface-lists, use the **show generic-interface-list** in EXEC mode.

**show generic-interface-list** [{ **location** | **name** | **retry** | **standby** }]

## Syntax Description

<b>location</b>	(Optional) Displays information about interface-lists for the specified location.
<b>name</b>	(Optional) Displays information about interface-lists for the specified interface list name.
<b>retry</b>	(Optional) Displays retry-list information.
<b>standby</b>	(Optional) Displays Standby node specific information.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 4.3.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
l2vpn	read

The following example displays output for the **show generic-interface-list** command:

```
RP/0/RSP0/CPU0:router# show generic-interface-list
Thu Aug  2 13:48:57.462 CDT
generic-interface-list: nsrIL (ID: 1, interfaces: 2)
  Bundle-Ether2 - items pending 0, downloaded to FIB
  GigabitEthernet0/0/0/1 - items pending 0, downloaded to FIB
Number of items: 400
List is downloaded to FIB
```

The following example displays output for the **show generic-interface-list retry private** command:

```
RP/0/RSP0/CPU0:router# show generic-interface-list retry private
Thu Aug  2 14:20:42.883 CDT
total: 0 items
```

The following example displays output for the **show generic-interface-list standby** command:

```
RP/0/RSP0/CPU0:router# show generic-interface-list standby
```

```
Thu Aug 2 14:25:01.749 CDT
generic-interface-list: nsrIL (ID: 0, interfaces: 2)
Bundle-Ether2 - items pending 0, NOT downloaded to FIB
GigabitEthernet0/0/0/1 - items pending 0, NOT downloaded to FIB
Number of items: 0
List is not downloaded to FIB
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# show l2vpn

To display L2VPN information, use the **show l2vpn** command in EXEC mode.

## show l2vpn

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	EXEC
----------------------	------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read

## Example

The following example displays output for the **show l2vpn** command. The output provides an overview of the state of the globally configured features.

```
RP/0/RSP0/CPU0:router# show l2vpn
Mon May 7 15:01:17.963 BST
PW-Status: disabled
PW-Grouping: disabled
Logging PW: disabled
Logging BD state changes: disabled
Logging VFI state changes: disabled
Logging NSR state changes: disabled
TCN propagation: disabled
PWOAMRefreshTX: 30s
```

This example displays output for the **show l2vpn** command. The output provides an overview of the state of the globally configured features.

```
RP/0/RSP0/CPU0:router# show l2vpn
Tue Oct 16 14:34:36.116 BST
PW-Status: enabled
PW-Grouping: disabled
Logging PW: disabled
```



```
Logging BD state changes: disabled
Logging VFI state changes: disabled
Logging NSR state changes: disabled
TCN propagation: disabled
PW OAM transmit time: 30s
Multicast P2MP: enabled
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">pw-grouping, on page 119</a>	Enables Pseudowire Grouping

## show l2vpn atom-db

To display AToM database information, use the **show l2vpn atom-db** command in EXEC mode.

**show l2vpn atom-db** [{**detail** | **l2-rid** | **ldp-rid** | **local-gid** | **neighbor** | **preferred-path** | **remote-gid** | **source**}]

Syntax Description	Option	Description
	<b>detail</b>	Specifies the details of the database.
	<b>l2-rid</b>	Specifies the AToM database walking the L2 RID thread.
	<b>ldp-rid</b>	Specifies the AToM database walking the LDP RID thread.
	<b>local-gid</b>	Specifies the AToM database walking the Local GID thread.
	<b>neighbor</b>	Specifies the details of the neighbor database.
	<b>preferred-path</b>	Specifies the preferred path (tunnel) of the database
	<b>remote-gid</b>	Specifies the AToM database walking the Remote GID thread.
	<b>source</b>	Specifies the details of the source database.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

### Examples

This example shows the sample output of the **show l2vpn atom-db source 1.1.1.1** command:

```
RP/0/RSP0/CPU0:router# show l2vpn atom-db source 1.1.1.1
Peer ID      Source      VC ID      Encap      Signaling  FEC      Discovery
2.2.2.2      1.1.1.1    1          MPLS       LDP        128     none
```

This example shows the sample output of the **show l2vpn atom-db source 1.1.1.1 detail** command:

RP/0/RSP0/CPU0:router# show l2vpn atom-db source 1.1.1.1 detail

PW: neighbor 2.2.2.2, PW ID 1, state is down ( provisioned )  
 PW class class1, XC ID 0x1  
 Encapsulation MPLS, protocol LDP  
 Source address 1.1.1.1  
 PW type Ethernet, control word disabled, interworking none  
 PW backup disable delay 0 sec  
 Sequencing not set

MPLS	Local	Remote
Label	16000	unknown
Group ID	0x20000060	0x0
Interface	GigabitEthernet0/0/0/1.1	unknown
MTU	1504	unknown
Control word	disabled	unknown
PW type	Ethernet	unknown
VCCV CV type	0x2	0x0 (none)
	(LSP ping verification)	
VCCV CC type	0x6	0x0 (none)
	(router alert label)	
	(TTL expiry)	

MIB cpwVcIndex: 4278194081  
 Create time: 13/12/2010 15:28:26 (20:32:27 ago)  
 Last time status changed: 13/12/2010 15:28:26 (20:32:27 ago)  
 Configuration info:  
 PW class: class1  
 Peer ID = 2.2.2.2, pseudowire ID = 1  
 Control word is not set  
 Transport mode: not set  
 Configured (Static) Encapsulation: not set  
 Provisioned Encapsulation: MPLS  
 Static tag rewrite: not set  
 MTU: 1504  
 Tunnel interface: None  
 IW type: 0  
 PW type: Dynamic  
 Pref path configured: No  
 Bridge port: No  
 BP learning disabled: No  
 BP ucast flooding disabled: No  
 BP bcast flooding disabled: No  
 CW is mandatory: No  
 Label: local unassigned, remote unassigned  
 L2 Router-ID: 0.0.0.0  
 LDP Router-ID: 0.0.0.0  
 GR stale: No  
 LDP Status: local established, remote unknown  
 LDP tag rewrite: not set  
 Force switchover: inactive  
 MAC trigger: inactive  
 VC sane: Yes  
 Use PW Status: No  
 Local PW Status: Up(0x0); Remote PW Status: Up(0x0)  
 Peer FEC Failed: No  
 LSP: Down  
 Operational state:  
 LDP session state: down  
 TE tunnel transport: No  
 VC in gr mode: No  
 Peer state: up

```
show l2vpn atom-db
```

```

Transport LSP down: Yes
Advertised label to LDP: No
Received a label from LSD: Yes
Need to send standby bit: No
VC created from rbinding: No
PW redundancy dampening on : No
Notified up : No
Detailed segment state: down
PW event trace history [Total events: 8]
-----
Time          Event          Value
====          =====          =====
12/13/2010 15:28:26 LSP Down      0
12/13/2010 15:28:26 Provision    0
12/13/2010 15:28:26 LSP Down      0
12/13/2010 15:28:26 Connect Req   0
12/13/2010 15:28:26 Rewrite create 0x100000
12/13/2010 15:28:26 Got label     0x3e80
12/13/2010 15:28:26 Local Mtu    0x5e0
12/13/2010 15:28:26 Peer Up      0

```

# show l2vpn collaborators

To display information about the state of the interprocess communications connections between l2vpn\_mgr and other processes, use the **show l2vpn collaborators** command in EXEC mode.

## show l2vpn collaborators

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** EXEC

**Command History**

Release	Modification
Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows sample output for the **show l2vpn collaborators** command:

```
RP/0/RSP0/CPU0:router# show l2vpn collaborators
L2VPN Collaborator stats:
Name                State           Up Cnts        Down Cnts
-----
IMC                  Down            0               0
LSD                  Up              1               0
```

This table describes the significant fields shown in the display.

**Table 1: show l2vpn collaborators Field Descriptions**

Field	Description
Name	Abbreviated name of the task interacting with l2vpn_mgr.
State	Indicates if l2vpn_mgr has a working connection with the other process.
Up Cnts	Number of times the connection between l2vpn_mgr and the other process has been successfully established.

**show l2vpn collaborators**

Field	Description
Down Cnts	Number of times that the connection between l2vpn_mgr and the other process has failed or been terminated.

**Related Commands**

Command	Description
<a href="#">clear l2vpn collaborators, on page 65</a>	Clears the state change counters for L2VPN collaborators.

# show l2vpn database

To display L2VPN database, use the **show l2vpn database** command in EXEC mode.

```
show l2vpn database {ac | node}
```

Syntax Description	ac	Displays L2VPN Attachment Circuit (AC) database
	node	Displays L2VPN node database.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Even when xSTP (extended spanning tree protocol) operates in the PVRST mode, the output of the show or debug commands flag prefix is displayed as MSTP or MSTi, instead of PVRST.

Task ID	Task ID	Operation
	l2vpn	read

The following example displays output for the **show l2vpn database ac** command:

```
RP/0/RSP0/CPU0:router# show l2vpn database ac
Bundle-Ether1.1:
  Other-Segment MTU: 0
  Other-Segment status flags: 0x0
  Signaled capability valid: No
  Signaled capability flags: 0x0
  Configured capability flags: 0x0
  XCID: 0xffffffff
  PSN Type: Undefined
  ETH data:
    Xconnect tags: 0
    Vlan rewrite tag: 0
  AC defn:
    ac-ifname: Bundle-Ether1.1
    capabilities: 0x00368079
    extra-capabilities: 0x00000000
    parent-ifh: 0x020000e0
    ac-type: 0x15
    interworking: 0x00
  AC info:
```

## show l2vpn database

```

        seg-status-flags: 0x00000000
        segment mtu/l2-mtu: 1504/1518

GigabitEthernet0/0/0/0.4096:
  Other-Segment MTU: 0
  Other-Segment status flags: 0x0
  Signaled capability valid: No
  Signaled capability flags: 0x0
  Configured capability flags: 0x0
  XCID: 0x0
  PSN Type: Undefined
  ETH data:
    Xconnect tags: 0
    Vlan rewrite tag: 0
  AC defn:
    ac-iframe: GigabitEthernet0_0_0_0.4096
    capabilities: 0x00368079
    extra-capabilities: 0x00000000
    parent-ifh: 0x040000c0
    ac-type: 0x15
    interworking: 0x00
  AC info:
    seg-status-flags: 0x00000003
    segment mtu/l2-mtu: 1504/1518

```

The following example displays output for the **show l2vpn database node** command:

```

RP/0/RSP0/CPU0:router# show l2vpn database node
  0/RSP0/CPU0
    MA: vlan_ma

    AC event trace history [Total events: 4]
    -----
    Time                Event                                Num Rcvd    Num Sent
    ====                =====                                =
    07/27/2012 15:00:31 Process joined                        0           0
    07/27/2012 15:00:31 Process init success                0           0
    07/27/2012 15:00:31 Replay start rcvd                    0           0
    07/27/2012 15:00:31 Replay end rcvd                      2           0

    MA: ether_ma

    AC event trace history [Total events: 4]
    -----
    Time                Event                                Num Rcvd    Num Sent
    ====                =====                                =
    07/27/2012 15:00:31 Process joined                        0           0
    07/27/2012 15:00:31 Process init success                0           0
    07/27/2012 15:00:31 Replay start rcvd                    0           0
    07/27/2012 15:00:31 Replay end rcvd                      0           0

  0/0/CPU0
    MA: vlan_ma

    AC event trace history [Total events: 4]
    -----
    Time                Event                                Num Rcvd    Num Sent
    ====                =====                                =
    07/27/2012 15:00:31 Process joined                        0           0
    07/27/2012 15:00:31 Process init success                0           0
    07/27/2012 15:00:31 Replay start rcvd                    0           0

```



```
07/27/2012 15:00:40 Replay end rcvd          6006          6001
```

```
MA: ether_ma
```

```
AC event trace history [Total events: 4]
```

```
-----
```

Time	Event	Num Rcvd	Num Sent
====	====	====	====
07/27/2012 15:00:31	Process joined	0	0
07/27/2012 15:00:31	Process init success	0	0
07/27/2012 15:00:31	Replay start rcvd	0	0
07/27/2012 15:00:31	Replay end rcvd	1	0

# show l2vpn discovery

To display discovery label block information, use the **show l2vpn discovery** command in EXEC mode.

**show l2vpn discovery** {**bridge-domain** | **xconnect** | **summary** | **private**}

Syntax Description	bridge-domain	Displays bridge domain related forwarding information.
	<b>xconnect</b>	Displays VPWS edge information.
	<b>summary</b>	Displays summary information.
	<b>private</b>	Displays private log or trace information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following examples display output for the **show l2vpn discovery** command with bridge-domain filter:

```
RP/0/RSP0/CPU0:router#show l2vpn discovery bridge-domain
```

```
Service Type: VPLS, Connected
List of VPNs (8001 VPNs):
```

```
Bridge group: bg1, bridge-domain: bg1_bd1, id: 0, signaling protocol: LDP
VPLS-ID: (auto) 1:101
Local L2 router id: 10.10.10.10
List of Remote NLRI (3 NLRIs):
Local Addr      Remote Addr      Remote L2 RID      Time Created
-----
10.10.10.10     20.20.20.20     20.20.20.20       03/13/2010 21:27:05
10.10.10.10     30.30.30.30     30.30.30.30       03/13/2010 21:27:05
10.10.10.10     40.40.40.40     40.40.40.40       03/13/2010 21:27:05
```

The following examples display output for the **show l2vpn discovery summary** command:

```
RP/0/RSP0/CPU0:router#show l2vpn discovery summary
Sun Mar 14 15:13:31.240 EDT
BGP: connected=yes, active=yes, stdby=yes
Services
  Bridge domain: registered=yes, Num VPNs=8001
    Num Local Edges=8001, Num Remote Edges=24001, Num Received NLRIs=24001
  Xconnect: registered=yes, Num VPNs=0
    Num Local Edges=0, Num Remote Edges=0, Num Received NLRIs=0
```

---

**Related Commands**

Command	Description
<a href="#">show l2vpn bridge-domain (VPLS), on page 270</a>	Display information for the bridge ports such as attachment circuits and pseudowires for the specific bridge domains.

---

## show l2vpn forwarding

To display forwarding information from the layer2\_fib manager on the line card, use the **show l2vpn forwarding** command in EXEC mode.

```
show l2vpn forwarding {xconnect | bridge-domain | counter | debug | detail | dhcp binding | ethernet
ring g8032 | gsp | hardware | inconsistent | interface | l2tp | l2tpv2 | location [node-id] | message |
monitor-session | mstp | neighbor | object-queues | pbb | protection | pwgroup | resource | retry-list |
summary | unresolved}
```

Syntax	Description
<b>xconnect</b>	Displays the cross-connect related information.
<b>bridge-domain</b>	Displays bridge domain related forwarding information.
<b>counter</b>	Displays the cross-connect counters.
<b>debug</b>	Displays debug information.
<b>detail</b>	Displays detailed information from the layer2_fib manager.
<b>dhcp binding</b>	Displays DHCP binding related forwarding information.
<b>ethernet ring g8032</b>	Displays Ethernet associated configuration information.
<b>gsp</b>	Displays GSP related forwarding information.
<b>hardware</b>	Displays hardware-related layer2_fib manager information.
<b>inconsistent</b>	Displays inconsistent entries only.
<b>interface</b>	Displays the match AC subinterface.
<b>l2tp</b>	Displays L2TPv3 related forwarding information.
<b>l2tpv2</b>	Displays l2tpv2 related forwarding information.
<b>location</b> <i>node-id</i>	Displays layer2_fib manager information for the specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

<b>message</b>	Displays messages exchanged with collaborators.
<b>monitor-session</b>	Displays the match Monitor-session.
<b>mstp</b>	Displays multi-spanning tree related forwarding information.
<b>neighbor</b>	Displays the match neighbor IP address.
<b>object-queues</b>	Displays object queues related information.
<b>pbb</b>	Displays l2vpn provider backbone bridge information.
<b>protection</b>	Displays protection associated interfaces related forwarding information.
<b>pwgroup</b>	Displays PW-Group related forwarding information.
<b>resource</b>	Displays resource availability information in the layer2_fib manager.
<b>retry-list</b>	Displays retry list related information.
<b>summary</b>	Displays summary information about cross-connects in the layer2_fib manager.
<b>unresolved</b>	Displays unresolved entries only.

**Command Default** None

**Command Modes** EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

---

Release	Modification
---------	--------------

---

Release 4.3.0 The following keywords were introduced:

- debug
- dhcp binding
- ethernet ring g8032
- gsp
- l2tpv2
- monitor-session
- neighbor
- object-queues
- pbb
- protection

---

Release 5.1 The **pwgroup** keyword was introduced.

---

Release 5.3.1 The show command output was enhanced to display VXLAN anycast gateway parameters.

---

Release 5.3.2 The show command output is enhanced to display MAC Move Counters information.

---



---

### Usage Guidelines

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

---

### Task ID

Task ID	Operations
---------	------------

---

l2vpn	read
-------	------

---



---

### Examples

The following sample output is from the **show l2vpn forwarding bridge detail location** command for IOS-XR releases 5.3.1 and earlier:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge detail location 0/2/cpu0
Bridge-domain name: bg1:bd1, id: 0, state: up
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
```

```
Number of MAC addresses: 0
Multi-spanning tree instance: 0

GigabitEthernet0/1/0/1.2, state: oper up
  Number of MAC: 0
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0
  Storm control drop counters:
    packets: broadcast 0, multicast 0, unknown unicast 0
    bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bg1:bd2, id: 1, state: up
  Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  DHCPv4 snooping: profile not known on this node
  IGMP snooping: disabled, flooding: disabled
  Bridge MTU: 1500 bytes
  Number of bridge ports: 0
  Number of MAC addresses: 0
  Multi-spanning tree instance: 0

PBB Edge, state: up
  Number of MAC: 0
GigabitEthernet0/1/0/1.3, state: oper up
  Number of MAC: 0
  Storm control drop counters:
    packets: broadcast 0, multicast 0, unknown unicast 0
    bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bg1:bd3, id: 2, state: up
  Type: pbb-core
  Number of associated pbb-edge BDs: 1

MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  DHCPv4 snooping: profile not known on this node
  IGMP snooping: disabled, flooding: disabled
  Bridge MTU: 1500 bytes
  Number of bridge ports: 0
  Number of MAC addresses: 0
  Multi-spanning tree instance: 0

PBB Core, state: up
  Vlan-id: 1

GigabitEthernet0/1/0/1.4, state: oper up
  Number of MAC: 0
  Storm control drop counters:
```

```

    packets: broadcast 0, multicast 0, unknown unicast 0
    bytes: broadcast 0, multicast 0, unknown unicast 0

```

The following sample output is from the **show l2vpn forwarding bridge detail location** command for IOS-XR 5.3.2 release:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge detail location 0/0/CPU0
```

```

Bridge-domain name: pbb:pbb_core1, id: 10, state: up
Type: pbb-core
Number of associated pbb-edge BDs: 1
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
MLD snooping: disabled, flooding: disabled
MRRP Flood Optimization: disabled
Storm control: disabled
P2MP PW: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 5
Multi-spanning tree instance: 0
PBB-EVPN: enabled
Statistics:
  packets: received 0, sent 963770
  bytes: received 0, sent 263433178

```

```

PBB Core, state: Up
Vlan-id: 1
XC ID: 0x80000010
Number of MAC: 0
Statistics:
  packets: received 0 (unicast 0), sent 0
  bytes: received 0 (unicast 0), sent 0
  MAC move: 0
Storm control drop counters:
  packets: broadcast 0, multicast 0, unknown unicast 0
  bytes: broadcast 0, multicast 0, unknown unicast 0

```

The following sample outputs shows the backup pseudowire information:

```

RP/0/RSP0/CPU0:router#show l2vpn forwarding detail location 0/2/CPU0
Local interface: GigabitEthernet0/2/0/0.1, Xconnect id: 0x3000001, Status: up
Segment 1
  AC, GigabitEthernet0/2/0/0.1, Ethernet VLAN mode, status: Bound
  RG-ID 1, active
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0
Segment 2
  MPLS, Destination address: 101.101.101.101, pw-id: 1000, status: Bound

```



```

Pseudowire label: 16000
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
Backup PW
MPLS, Destination address: 102.102.102.102, pw-id: 1000, status: Bound
Pseudowire label: 16001
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0

RP/0/RSP0/CPU0:router#show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bgl:bd1, id: 0, state: up
....
GigabitEthernet0/2/0/0.4, state: oper up
RG-ID 1, active
Number of MAC: 0
....

Nbor 101.101.101.101 pw-id 5000
Backup Nbor 101.101.101.101 pw-id 5000
Number of MAC: 0
....

RP/0/RSP0/CPU0:router#show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bgl:bd1, id: 0, state: up
....
GigabitEthernet0/2/0/0.4, state: oper up
XC ID: 0x1880002
Number of MAC: 0
Statistics:
packets: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 963770
bytes: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 263433178
MAC move: 0
Storm control drop counters:
packets: broadcast 0, multicast 0, unknown unicast 0
bytes: broadcast 0, multicast 0, unknown unicast 0
Dynamic arp inspection drop counters:
packets: 0, bytes: 0
IP source guard drop counters:
packets: 0, bytes: 0
....

```

The following sample outputs displays the SPAN segment information of the xconnect:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding counter location 0/7/CPU0
Legend: ST = State, DN = Down

Segment 1                               Segment 2           ST      Byte           Switched
-----
pw-span-test (Monitor-Session) mpls  2.2.2.2  UP          0

```

```

RP/0/RSP0/CPU0:router #Show l2vpn forwarding monitor-session location 0/7/CPU0
Segment 1                               Segment 2           State
-----
pw-span-test (monitor-session) mpls  2.2.2.2           UP
pw-span-sess (monitor-session) mpls  3.3.3.3           UP

```

## show l2vpn forwarding

```
RP/0/RSP0/CPU0:router #Show l2vpn forwarding monitor-session pw-span-test location 0/7/CPU0
Segment 1                               Segment 2                               State
-----
pw-span-test (Monitor-Session) mpls     2.2.2.2                               UP
```

## Example 4:

```
RP/0/RSP0/CPU0:router #show l2vpn forwarding detail location 0/7/CPU0
Xconnect id: 0xc000001, Status: up
Segment 1
  Monitor-Session, pw-span-test, status: Bound
Segment 2
  MPLS, Destination address: 2.2.2.2, pw-id: 1, status: Bound
  Pseudowire label: 16001
  Statistics:
    packets: received 0, sent 11799730
    bytes: received 0, sent 707983800
```

## Example 5:

```
show l2vpn forwarding private location 0/11/CPU0
Xconnect ID 0xc000001
Xconnect info:
  Base info: version=0xaabbcc13, flags=0x0, type=2, reserved=0
             xcon_bound=TRUE, switching_type=0, data_type=3

AC info:
  Base info: version=0xaabbcc11, flags=0x0, type=3, reserved=0
             xcon_id=0xc000001, ifh= none, subifh= none, ac_id=0, ac_type=SPAN,
             ac_mtu=1500, iw_mode=none, adj_valid=FALSE, adj_addr none
```

## PW info:

```
Base info: version=0xaabbcc12, flags=0x0, type=4, reserved=0
pw_id=1, nh_valid=TRUE, sig_cap_flags=0x20, context=0x0,
MPLS, pw_label=16001
Statistics:
  packets: received 0, sent 11799730
  bytes: received 0, sent 707983800
```

## Object: NHOP

```
Event Trace History [Total events: 5]
```

```
-----
Time          Event          Flags
====          =====          =====
```

## Nexthop info:

```
Base info: version=0xaabbcc14, flags=0x10000, type=5, reserved=0
             nh_addr=2.2.2.2, plat_data_valid=TRUE, plat_data_len=128, child_count=1
```

## Object: XCON

```
Event Trace History [Total events: 16]
```

```
-----
Time          Event          Flags
====          =====          =====
```

```
RP/0/RSP0/CPU0:router #show l2vpn forwarding summary location 0/7/CPU0
Major version num:1, minor version num:0
Shared memory timestamp:0x31333944cf
```

```

Number of forwarding xconnect entries:2
  Up:2  Down:0
  AC-PW:1 (1 mpls)  AC-AC:0  AC-BP:0  AC-Unknown:0
  PW-BP:0  PW-Unknown:0  Monitor-Session-PW:1
Number of xconnects down due to:
  AIB:0  L2VPN:0  L3FIB:0
Number of p2p xconnects: 2
Number of bridge-port xconnects: 0
Number of nexthops:1
  MPLS:  Bound:1  Unbound:0  Pending Registration:0
Number of bridge-domains: 0
Number of static macs: 0
Number of locally learned macs: 0
Number of remotely learned macs: 0
Number of total macs: 0

```

The following sample output is from the **show l2vpn forwarding** command:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding location 0/2/cpu0

ID   Segment 1           Segment 2
-----
1    Gi0/2/0/0 1        1.1.1.1  9)

```

The following sample output shows the MAC information in the layer2\_fib manager summary:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding summary location 0/3/CPU0

Major version num:1, minor version num:0
Shared memory timestamp:0x66ff58e894
Number of forwarding xconnect entries:2
  Up:1  Down:0
  AC-PW:0  AC-AC:0  AC-BP:1  PW-BP:1
Number of xconnects down due to:
  AIB:0  L2VPN:0  L3FIB:0
Number of nexthops:1
Number of static macs: 5
Number of locally learned macs: 5
Number of remotely learned macs: 0
Number of total macs: 10

```

This example shows the sample output of a configured flow label:

```

RP/0/RSP0/CPU0:router# show l2vpn for 0/0/cPU0
Local interface: GigabitEthernet0/0/1/1, Xconnect id: 0x1000002, Status: up
Segment 1
  AC, GigabitEthernet0/0/1/1, Ethernet port mode, status: Bound

Segment 2
  MPLS, Destination address: 3.3.3.3, pw-id: 2, status: Bound, Active
  Pseudowire label: 16004  Control word disabled
  Backup PW
    MPLS, Destination address: 2.2.2.2, pw-id: 6, status: Bound
    Pseudowire label: 16000
  Flow label enabled

  Xconnect id: 0xff000014, Status: down
Segment 1
  MPLS, Destination address: 2.2.2.2, pw-id: 1, status: Not bound
  Pseudowire label: UNKNOWN  Control word disabled
  Flow label enabled

Segment 2
  Bridge id: 0, Split horizon group id: 0

```

## show l2vpn forwarding

```

Storm control: disabled
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node, disabled
IGMP snooping profile: profile not known on this node
Router guard disabled

```

This example shows sample output for the **show l2vpn forwarding location** command:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding location 0/1/CPU0
LC/0/1/CPU0:JSegment 1                               Segment 2                               State
-----
PBB Edge                                             Bridge id 0, SHG id 0                   UP
Gi0/1/0/1.1(Eth VLAN)                               Bridge id 0, SHG id 0                   UP
Gi0/1/0/1.2(Eth VLAN)                               Bridge id 0, SHG id 0                   UP
mpls 1.2.3.4,22                                     Bridge id 1, SHG id 0                   DN
PBB Core                                             Bridge id 2, SHG id 0                   UP

```

This example shows sample output for the **show l2vpn forwarding summary location** command:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding summary location 0/0/CPU0
Major version num:1, minor version num:0
Shared memory timestamp:0x4005e57a0
Number of forwarding xconnect entries:4
  Up:4  Down:0
  AC-PW:0  AC-AC:0  AC-BP:0  AC-Unknown:0
  PW-BP:0  PW-Unknown:0
  PBB-BP:4  PBB-Unknown:0
Number of xconnects down due to:
  AIB:0  L2VPN:0  L3FIB:0
Number of p2p xconnects: 0
Number of bridge-port xconnects: 4
Number of nexthops:0
Number of bridge-domains: 5
Number of static macs: 0
Number of locally learned macs: 0
Number of remotely learned macs: 0
Number of total macs: 0

```

This example shows sample output for the **show l2vpn forwarding detail location** command for IOS-XR 5.3.1 and earlier releases:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding detail location 0/1/CPU0
Local interface: TenGigE0/0/0/1/0.1, Xconnect id: 0x80005, Status: up
Segment 1
  AC, TenGigE0/0/0/1/0.1, status: Bound
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0
Segment 2
  Bridge id: 19, Split horizon group id: 0
  Storm control: disabled
  MAC learning: enabled
  MAC port down flush: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity

```

```

MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled, Accept-Shutdown: enabled
DHCPv4 snooping: profile not known on this node, disabled
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping profile: profile not known on this node
MLD snooping profile: profile not known on this node
Router guard disabled
P2MP PW: disabled

Local interface: PBB Core, Xconnect id: 0x2000001, Status: up
Segment 1
AC, TenGigE0/0/0/1/0.1, status: Bound
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
Segment 2
Bridge id: 19, Split horizon group id: 0
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0

```

This example shows sample output for the **show l2vpn forwarding detail location** command for IOS-XR 5.3.2 release

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding detail location 0/6/CPU0
Local interface: TenGigE0/0/0/1/0.1, Xconnect id: 0x80005, Status: up
Segment 1
AC, TenGigE0/0/0/1/0.1, status: Bound
Statistics:
  packets: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 0
  bytes: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 0
  MAC move: 0
  packets dropped: PLU 0, tail 0
  bytes dropped: PLU 0, tail 0
Segment 2
Bridge id: 19, Split horizon group id: 0
Storm control: disabled
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled, Accept-Shutdown: enabled
DHCPv4 snooping: profile not known on this node, disabled
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping profile: profile not known on this node
MLD snooping profile: profile not known on this node
Router guard disabled
P2MP PW: disabled

```

The following sample output is from the **show l2vpn forwarding** command:

```

RP/0/RSP0/CPU0:router# show l2vpn for location 0/0/CPU0

Fri May 18 13:56:35.957 EDT

```

```

Segment 1 Segment 2 State
-----
Gi0/0/0/4.2(Eth VLAN) l2tpv3 UP
1111:2222::cdef
Gi0/0/0/4.3(Eth VLAN) mpls 1.2.3.4 DN

```

The following sample output is from the **show l2vpn forwarding neighbor ipv6** command:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding neighbor ipv6 1111:2222::cdef detail loc
0/0/cpu0

```

```

Fri May 18 13:58:14.720 EDT
Local interface: GigabitEthernet0/0/0/4.2, Xconnect id: 0x2, Status: up
Segment 1
AC, GigabitEthernet0/0/0/4.2, Ethernet VLAN mode, status: Bound
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
Segment 2
L2TPv3-IPV6, Destination address: 1111:2222::cdef, status: Bound
Source address: 1111:2222::abcd
Local session:
Session ID: -1
Cookie: size 0 bytes
Remote session:
Session ID: -1
Cookie: size 0 bytes
Control word disabled
Sequencing not set
TOS 40 (reflect disabled), TTL 255, DF bit not set
Path MTU: disabled
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
packets dropped: out of sequence 0, other 0

```

This example shows sample output for the **show l2vpn forwarding detail location** command with P2MP PW enabled on the PW BP for IOS-XR 5.3.1 and earlier releases.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding detail location
Xconnect id: 0xffffc0003, Status: up
Segment 1
MPLS, Destination address: 2.2.2.2, pw-id: 101, status: Bound
Pseudowire label: 16002 Control word disabled
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
Segment 2
Bridge id: 0, Split horizon group id: 1
Storm control: disabled
MAC learning: enabled
MAC port down flush: enabled
Flooding:
Broadcast & Multicast: enabled
Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node, disabled
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping profile: profile not known on this node

```

```
Router guard disabled
P2MP PW enabled
```

This example shows sample output for the **show l2vpn forwarding detail location** command with P2MP PW enabled on the PW BP for IOS-XR 5.3.2 release.

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding detail location
Xconnect id: 0xffffc0003, Status: up
Segment 1
  MPLS, Destination address: 2.2.2.2, pw-id: 101, status: Bound
  Pseudowire label: 16002    Control word disabled
  Statistics:
    packets: received 1000 (unicast 1000), sent 0
    bytes: received 128000 (unicast 128000), sent 0
    MAC move: 10
Segment 2
  Bridge id: 0, Split horizon group id: 1
  Storm control: disabled
  MAC learning: enabled
  MAC port down flush: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  MAC Secure: disabled, Logging: disabled
  DHCPv4 snooping: profile not known on this node, disabled
  Dynamic ARP Inspection: disabled, Logging: disabled
  IP Source Guard: disabled, Logging: disabled
  IGMP snooping profile: profile not known on this node
  Router guard disabled
  P2MP PW enabled
```

This example shows sample output for the **show l2vpn forwarding summary location** command displaying number of bridge-domains with P2MP PW enabled.

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding summary location
Mon Sep 9 22:07:54.000 EDT
Major version num:1, minor version num:0
Shared memory timestamp:0x547395c50
Global configuration:
Number of forwarding xconnect entries:5
  Up:0   Down:5
  AC-PW(atom):1 AC-PW(l2tpv2):0 AC-PW(l2tpv3):0
(1 mpls) AC-AC:0 AC-BP:0 AC-Unknown:0
  PW-BP:4 PW-Unknown:0
  PBB-BP:0 PBB-Unknown:0
  Monitor-Session-PW:0 Monitor-Session-Unknown:0
Number of xconnects down due to:
  AIB:0 L2VPN:5 L3FIB:0 VPDN:0
Number of xconnect updates dropped due to:
  Invalid XID: 0 VPWS PW, 0 VPLS PW, 0 Virtual-AC, 0 PBB
  Exceeded max allowed: 0 VPLS PW, 0 Bundle-AC
Number of p2p xconnects: 1
Number of bridge-port xconnects: 4
Number of nexthops:2
  MPLS: Bound:2 Unbound:0 Pending Registration:0
  P2MP MLDP: Bound:1 Unbound:0 Pending Registration:0
  P2MP TE: Bound:1 Unbound:0 Pending Registration:0
Number of bridge-domains: 2 (0 with routed interface, 2 with P2MP enabled)
Number of bridge-domain updates dropped: 0
```

## show l2vpn forwarding

```

Number of static macs: 0
Number of routed macs: 0
Number of locally learned macs: 0
Number of remotely learned macs: 0
Number of total macs: 0
Number of total P2MP Ptree entries: 2
  MLDP:1 (LMRIB:1) RSVP-TE:0 (LMRIB:0)

```

The example shows sample output for the **show l2vpn forwarding detail** command with PW grouping for multi-segment PWs.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding detail location
Local interface: GigabitEthernet0/0/0/0.100, Xconnect id: 0x100009, Status: up
Segment 1
  AC, GigabitEthernet0/0/0/0.100, Ethernet VLAN mode, status: Bound
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0
Segment 2
  MPLS, Destination address: 1.1.1.10, pw-id: 100, status: Bound, Active
  Pseudowire label: 16000 Control word disabled
  NHOP: 1.1.1.10, PW-Group Id: 0x1001
  Backup PW
    MPLS, Destination address: 3.3.3.30, pw-id: 300, status: Bound
    Pseudowire label: 16000
    NHOP: 3.3.3.30, Backup PW-Group Id: 0x1002
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0

```

The example shows sample output for the **show l2vpn forwarding summary** command with PW grouping for multi-segment PWs.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding summary location 0/0/CPU0
Tue Jun 18 22:29:47.815 DST
Major version num:1, minor version num:0
Shared memory timestamp:0x182a49b4f9
Global configuration:
Number of forwarding xconnect entries:31
  Up:19 Down:12
  AC-PW(atom):0 AC-PW(l2tpv2):0 AC-PW(l2tpv3):0
  AC-PW(l2tpv3-ipv6):0
  AC-AC:3 AC-BP:16 AC-Unknown:0
  PW-BP:12 PW-Unknown:0
  PBB-BP:0 PBB-Unknown:0
  Monitor-Session-PW:0 Monitor-Session-Unknown:0
Number of xconnects down due to:
  AIB:0 L2VPN:12 L3FIB:0 VPDN:0
Number of xconnect updates dropped due to:
  Invalid XID: 0 VPWS PW, 0 VPLS PW, 0 Virtual-AC, 0 PBB
  Exceeded max allowed: 0 VPLS PW, 0 Bundle-AC
Number of p2p xconnects: 1
Number of PW-Group Ids: 1
Number of PW-Group Ids Down: 0
Number of bridge-port xconnects: 28
Number of nexthops:5
  MPLS: Bound:0 Unbound:5 Pending Registration:0
  P2MP MLDP: Bound:0 Unbound:0 Pending Registration:0
  P2MP TE: Bound:0 Unbound:0 Pending Registration:0
Number of bridge-domains: 14
  2 with routed interface

```



```

    0 with PBB evpn enabled
    0 with p2mp enabled
Number of bridge-domain updates dropped: 0
Number of total macs: 0
    0 Static macs
    0 Routed macs
    0 BMAC
    0 Source BMAC
    0 Locally learned macs
    0 Remotely learned macs
Number of total P2MP Ptree entries: 0
Number of EVPN Multicast Replication lists: 0 (0 default)

```

The example shows sample output for the **show l2vpn forwarding pwgroup** command identifying the PWs of the same PW group as known by L2FIB.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding pwgroup ?
debug      Include debug information(cisco-support)
detail     Detailed information
location   Specify a location
peer-addr  PW-Group peer IPv4 address
group-id   Provide information for the given PW-Group Id

```

The example shows sample output for the **show l2vpn forwarding pwgroup group-id** command with a specified group ID.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding pwgroup group-id 0x1001 loc 0/0/cpu0
Xconnect ID 0x1080001
PW info:
  Base info: version=0xaabbcc12, flags=0x0, type=4, reserved=0
  pw_id=100, nh_valid=TRUE, sig_cap_flags=0x20, context=0x0,
  MPLS, Destination address: 1.1.1.10, pw-id: 100, status: Bound, Active
  Pseudowire label: 16000      Control word disabled
  Redundancy role: active, PW-Group Id 0x1001

Xconnect ID 0x1080008
PW info:
  Base info: version=0xaabbcc12, flags=0x0, type=4, reserved=0
  pw_id=108, nh_valid=TRUE, sig_cap_flags=0x20, context=0x0,
  MPLS, Destination address: 1.1.1.10, pw-id: 108, status: Bound, Active
  Pseudowire label: 16000      Control word disabled
  Redundancy role none, PW-Group Id 0x1001

```

Related Commands	Command	Description
	<a href="#">clear l2vpn forwarding counters, on page 67</a>	Clears L2VPN forwarding counters.

# show l2vpn forwarding message counters

To display L2VPN forwarding messages exchanged with L2FIB Collaborators, use the **show l2vpn forwarding message counters** command in EXEC mode.

**show l2vpn forwarding message counters** {hardware | location *node-id*}

Syntax Description	hardware	Displays message counter information from hardware.
	location <i>node-id</i>	Displays message counter information for the specified location.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Even when xSTP (extended spanning tree protocol) operates in the PVRST mode, the output of the show or debug commands flag prefix is displayed as MSTP or MSTi, instead of PVRST.

Task ID	Task ID	Operation
	l2vpn	read

The following examples shows the output from the **show l2vpn forwarding message counters location** command:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding message counters location 0/1/CPU0
Messages exchanged with L2FIB Collaborators:
-----
      Message                               Count          Info1          Info2
      Time
      =====
      =====
====
      l2vpn provision messages received:    0              0x0            0x0
      -
      l2vpn unprovision messages received:  0              0x0            0x0
      -
      l2vpn bridge provision messages received: 2              0x1            0x0
      Jan  8 14:49:19.283
      l2vpn bridge unprovision messages received: 0              0x0            0x0
      -
      l2vpn bridge main port update messages received: 1              0x2000300      0x0
      Jan  8 12:02:15.628
      l2vpn bridge main port update w/ action=MSTI_DELETE 0              0x0            0x0
```

```

-
  l2vpn bridge main port update ACK sent:          1          0x2000300    0x0
Jan  8 12:02:15.628
  l2vpn bridge port provision messages received:    1          0x2000002    0x0
Jan  8 12:02:15.629
  l2vpn bridge port unprovision messages received:  0          0x0          0x0
-
  l2vpn shg provision messages received:           0          0x0          0x0
-
  l2vpn shg unprovision messages received:          0          0x0          0x0
-
  l2vpn static mac provision messages received:     1          0x0          0x0
Jan  9 08:41:36.668
  l2vpn static mac unprovision messages received:   1          0x0          0x0
Jan  9 08:44:24.208
  l2vpn dynamic mac local learning messages received: 0          0x0          0x0
-
  l2vpn dynamic mac remote learning messages received 0          0x0          0x0
-
  l2vpn dynamic mac refresh messages received:      0          0x0          0x0
-
  l2vpn dynamic mac unprovision messages received:  0          0x0          0x0
-
  AIB update messages received:                    4          0x2000102    0x2000300
Jan  8 12:02:15.622
  AIB delete messages received:                    0          0x0          0x0
-
  FIB nhop registration messages sent:              0          0x0          0x0
-
  FIB nhop unregistration messages sent:            0          0x0          0x0
-
  FIB ecd ldi update messages received:             0          0x0          0x0
-
  FIB invalid NHOP prov messages received:          0          0x0          0x0
-
  Backbone-source-mac prov messages received:       0          0x0          0x0
-
  Backbone-source-mac unprov messages received:     0          0x0          0x0
-

```

**Related Commands**

Command	Description
<a href="#">clear l2vpn forwarding message counters, on page 69</a>	Clears L2VPN forwarding message counters.

## show l2vpn generic-interface-list

To display all the L2VPN virtual interfaces, use the **show l2vpn generic-interface-list** command in EXEC mode.

**show l2vpn generic-interface-list** {**detail** | **name** | **private** | **summary**}

Syntax Description	Option	Description
	<b>detail</b>	Specifies the details of the interface.
	<b>name</b>	Specifies the name of the interface.
	<b>private</b>	Specifies the private details of the interface.
	<b>summary</b>	Specifies the summary information of the interface.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

### Examples

This example shows the sample output of the **show l2vpn generic-interface-list** command:

```
RP/0/RSP0/CPU0:router# show l2vpn generic-interface-list
generic-interface-list: l1 (ID: 2, interfaces: 2) Number of items: 20
generic-interface-list: l2 (ID: 3, interfaces: 4) Number of items: 15
```

This example shows the sample output of the **show l2vpn generic-interface-list detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn generic-interface-list detail
generic-interface-list: l1 (ID: 2, interfaces: 2)
  GigabitEthernet0/1/0/0 - items pending 2
  GigabitEthernet0/1/0/1 - items pending 4
  Number of items: 27
  PW-Ether: 1-10, 12-21
  PW-IW: 1-7

generic-interface-list: l2 (ID: 3, interfaces: 4)
```

```
GigabitEthernet0/1/0/0 - items pending 2
GigabitEthernet0/1/0/1 - items pending 4
GigabitEthernet0/1/0/2 - items pending 1
GigabitEthernet0/1/0/3 - items pending 0
Number of items: 20
PW-Ether: 1-15
PW-IW: 1-7
```

This example shows the sample output of the **show l2vpn generic-interface-list name | detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn generic-interface-list name 11 detail
generic-interface-list: 11 (ID: 2, interfaces: 2)
GigabitEthernet0/1/0/0 - items pending 2
GigabitEthernet0/1/0/1 - items pending 4
Number of items: 20
PW-Ether 1-10, 12-21
```

# show l2vpn index

To display statistics about the index manager, use the **show l2vpn index** command in EXEC mode.

**show l2vpn index** [{location | private | standby}]

Syntax Description	location	(Optional) Displays index manager statistics for the specified location.
	private	(Optional) Detailed information about all indexes allocated for each pool.
	standby	(Optional) Displays Standby node specific information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.
	Release 4.3.0	The following keywords are introduced: <ul style="list-style-type: none"> <li>• location</li> <li>• standby</li> </ul>

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

## Examples

This example shows the sample output of the **show l2vpn index** command:

```
RP/0/RSP0/CPU0:router# show l2vpn index
  Pool id: 0x4, App: RD
  Pool size: 32767
  zombied IDs: 0
  allocated IDs: 0

  Pool id: 0x5, App: IFLIST
```

```
Pool size: 65535
zombied IDs: 0
allocated IDs: 2

Pool id: 0xff000001, App: PW/PBB/Virtual AC
Pool size: 40960
zombied IDs: 0
allocated IDs: 1

Pool id: 0xff000002, App: BD
Pool size: 4095
zombied IDs: 0
allocated IDs: 2

Pool id: 0xff000003, App: MP2MP
Pool size: 65535
zombied IDs: 0
allocated IDs: 1
```

This example shows the sample output of the **show l2vpn index standby** command:

```
RP/0/RSP0/CPU0:router# show l2vpn index standby
Pool id: 0xffffc0000, App: Global
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 98304
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffffc0002, App: BD
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 8192
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffffc0003, App: MP2MP
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 65535
  zombied IDs: 0
  allocated IDs: 0
```

## show l2vpn nsr

To display the status of l2vpn non-stop routing, use the **show l2vpn nsr** command in EXEC mode.

**show l2vpn nsr** [{location | standby}]

Syntax Description	
<b>location</b>	(Optional) Displays non-stop routing information for the specified location.
<b>standby</b>	(Optional) Displays Standby node specific information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

The following example displays output for the **show l2vpn nsr** command:

```
RP/0/RSP0/CPU0:router# show l2vpn nsr

Mon May 30 19:32:01.045 UTC
L2VPN NSR information
NSR Status:
  NSR Ready                : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
  Last NSR Withdraw Time  : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
  Standby Connected       : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
  IDT Done                 : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
  Number of XIDs sent     : Virtual AC: 0
                           AC          : 1
                           PW          : 1
                           BD          : 0
                           MP2MP       : 0
                           RD          : 0
                           PBB         : 0
                           IFLIST      : 0
                           ATOM        : 1
                           Global      : 0
                           PWGroup     : 0
```



EVPN : 0

Related Commands	Command	Description
	<a href="#">l2vpn</a> , on page 93	Enters L2VPN configuration mode.
	<a href="#">nsr (L2VPN)</a> , on page 108	Configures non-stop routing.

# show l2vpn provision queue

To display L2VPN configuration provisioning queue information, use the **show l2vpn provision queue** command in EXEC mode.

**show l2vpn provision queue** [{location | standby}]

<b>Syntax Description</b>	<b>location</b> (Optional) Displays L2VPN configuration provisioning queue information for the specified location.				
	<b>standby</b> (Optional) Displays Standby node specific information.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EXEC				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.3.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.3.0	This command was introduced.
Release	Modification				
Release 4.3.0	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read
Task ID	Operation				
l2vpn	read				

The following example displays output for the **show l2vpn provision queue** command:

```
RP/0/RSP0/CPU0:router# show l2vpn provision queue

Legend: P/P/R = Priority/Provisioned/Require Provisioning.
Configuration Item      Object Type      Class              P/P/R Object
Key
-----
BD_NAME                 bd_t             vpls_bd_class     0/0/0 BD
VPLS01
BD_NAME                 bd_t             vpls_bd_class     0/0/0 BD
VPLS02
BD_NAME                 bd_t             vpls_bd_class     0/0/0 BD
VPLS03
```

The following example displays output for the **show l2vpn provision queue standby** command:

```
RP/0/RSP0/CPU0:router# show l2vpn provision queue standby

Legend: P/P/R = Priority/Provisioned/Require Provisioning.
Configuration Item      Object Type      Class              P/P/R Object
Key
```

```

-----
-----
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS01
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS02
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS03
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS04
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS05
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS06
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS07
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS08
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS09
  BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS10

```

**Related Commands**

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## show l2vpn pw-class

To display L2VPN pseudowire class information, use the **show l2vpn pw-class** command in EXEC mode.

**show l2vpn pw-class** [{**detail** | **location** | **name** *class name* | **standby**}]

Syntax Description	Parameter	Description
	<b>detail</b>	(Optional) Displays detailed information.
	<b>location</b>	(Optional) Displays location specific information.
	<b>name</b> <i>class-name</i>	(Optional) Displays information about a specific pseudowire class name.
	<b>standby</b>	(Optional) Displays standby node specific information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.
	Release 4.3.0	The keywords <b>location</b> and <b>standby</b> were introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operations
	l2vpn	read

### Examples

The following example shows sample output for the **show l2vpn pw-class** command:

```
RP/0/RSP0/CPU0:router# show l2vpn pw-class

Name                Encapsulation      Protocol
-----            -
mplsclass_75        MPLS                LDP
l2tp-dynamic        L2TPv3             L2TPv3
```

This example shows sample output for the **show l2vpn pw-class detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn pw-class detail
  Encapsulation MPLS, protocol LDP
  Transport mode not set, control word unset (default)
  Sequencing not set
  Static tag rewrite not set
```

```
PW Backup disable delay: 0 sec
MAC withdraw message is sent over PW: no
IPv4 source address 1.1.1.1
```

This table describes the significant fields shown in the display.

**Table 2: show l2vpn pw-class Command Field Descriptions**

Field	Description
Name	Displays the name of the pseudowire class.
Encapsulation	Displays the encapsulation type.
Protocol	Displays the protocol type.

---

**Related Commands**

---

Command	Description
<a href="#">clear l2vpn forwarding counters, on page 67</a>	Clears L2VPN forwarding counters.

---

# show l2vpn pwhe

To display the pseudowire headend (PWHE) information, use the **show l2vpn pwhe** command in EXEC mode.

**show l2vpn pwhe** {**detail** | **interface** | **summary**}

Syntax Description	detail	interface	summary
	Specifies the details of the interface.	Specifies the name of the interface.	Specifies the summary information of the interface.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

## Examples

This example show the sample output for **show l2vpn pwhe detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn pwhe detail
Interface: PW-Ether1   Interface State: Down, Admin state: Up
  Interface handle 0x20000070
  MTU: 1514
  BW: 10000 Kbit
  Interface MAC addresses: 0279.96e9.8205
  Label: 16000
  L2-overhead: 0
  VC-type: 5
  CW: N
  Generic-interface-list: ifl1 (id: 1)
    Gi0/2/0/1, in bundle BE3, state: Up, replication: success
    Gi0/2/0/0, in bundle BE5, state: Up, replication: success
    Gi0/2/0/2, in bundle BE5, state: Up, replication: success
    Gi0/2/0/3, state: Up, replication: success

Interface: PW-IW1     Interface State: Up, Admin state: Up
  Interface handle 0x20000070
```

```
MTU: 1514
BW: 10000 Kbit
VC-type: 11
CW: N
Generic-interface-list: ifl2 (id: 2)
  Gi0/3/0/1, in bundle BE6, state: Up, replication: success
  Gi0/3/0/0, in bundle BE6, state: Up, replication: success
  Gi0/3/0/2, state: Up, replication: success
  Gi0/3/0/3, state: Up, replication: success
```

This example show the sample output for **show l2vpn pwhe summary** command:

```
RP/0/RSP0/CPU0:router# show l2vpn pwhe summary
Number of PW-HE interface: 1600
Up: 1300 Down: 300 Admindown: 0
Number of PW-Ether interfaces: 900
Up: 700 Down: 200 Admindown: 0
Number of PW-IW interfaces: 700
Up: 600 Down: 100 Admindown: 0
```

# show l2vpn resource

To display the memory state in the L2VPN process, use the **show l2vpn resource** command in EXEC mode.

**show l2vpn resource**

**Syntax Description** This command has no arguments or keywords.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operations ID
	l2vpn	read

## Examples

The following example shows sample output for the **show l2vpn resource** command:

```
RP/0/RSP0/CPU0:router# show l2vpn resource
```

```
Memory: Normal
```

describes the significant fields shown in the display. [Table 3: show l2vpn resource Command Field Descriptions, on page 168](#)

**Table 3: show l2vpn resource Command Field Descriptions**

Field	Description
Memory	Displays memory status.



# show l2vpn trace

To display trace data for L2VPN, use the **show l2vpn trace** command in EXEC mode.

```
show l2vpn trace [{checker | file | hexdump | last | location | reverse | stats | tailf | unique | usec | verbose
| wide | wrapping}]
```

Syntax Description	checker	Displays trace data for the L2VPN Uberverifier.
	file	Displays trace data for the specified file.
	hexdump	Display traces data in hexadecimal format.
	last	Display last <n> entries
	location	Displays trace data for the specified location.
	reverse	Display latest traces first
	stats	Display trace statistics
	tailf	Display new traces as they are added
	unique	Display unique entries with counts
	usec	Display usec details with timestamp
	verbose	Display internal debugging information
	wide	Display trace data excluding buffer name, node name, tid
	wrapping	Display wrapping entries

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

This example displays output for the **show l2vpn trace** command:

```
RP/0/RSP0/CPU0:router# show l2vpn trace
310 unique entries (1775 possible, 0 filtered)
Jul 27 14:39:51.786 l2vpn/fwd-detail 0/RSP0/CPU0 2# t1 FWD_DETAIL:415: l2tp session
table rebuilt
Jul 27 14:39:52.106 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:788: ISSU - imdr init called;
'infra/imdr' detected the 'informational' condition 'the service is not supported in the
node'
Jul 27 14:39:52.107 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:428: ISSU - attempt to start
COLLABORATOR wait timer while not in ISSU mode
Jul 27 14:39:54.286 l2vpn/fwd-common 0/RSP0/CPU0 1# t1 FWD_COMMON:3257: show edm thread
initialized
Jul 27 14:39:55.270 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC|ERR:783: Mac aging init
Jul 27 14:39:55.286 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1765: l2vpn_gsp_cons_init
returned No error
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1792: Client successfully
joined gsp group
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:779: Initializing the
txlist IPC thread
Jul 27 14:39:55.341 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:2971: gsp_optimal_msg_size
= 4832 (real: True)
Jul 27 14:39:55.351 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:626: Entering mac aging
timer init
```

This example displays output with MIRP-Lite entries for the **show l2vpn trace** command:

```
RP/0/RSP0/CPU0:router# show l2vpn trace
310 unique entries (1775 possible, 0 filtered)
Jul 27 14:39:51.786 l2vpn/fwd-detail 0/RSP0/CPU0 2# t1 FWD_DETAIL:415: l2tp session
table rebuilt
Jul 27 14:39:52.106 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:788: ISSU - imdr init called;
'infra/imdr' detected the 'informational' condition 'the service is not supported in the
node'
Jul 27 14:39:52.107 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:428: ISSU - attempt to start
COLLABORATOR wait timer while not in ISSU mode
Jul 27 14:39:54.286 l2vpn/fwd-common 0/RSP0/CPU0 1# t1 FWD_COMMON:3257: show edm thread
initialized
Jul 27 14:39:55.270 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC|ERR:783: Mac aging init
Jul 27 14:39:55.286 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1765: l2vpn_gsp_cons_init
returned No error
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1792: Client successfully
joined gsp group
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:779: Initializing the
txlist IPC thread
Jul 27 14:39:55.341 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:2971: gsp_optimal_msg_size
= 4832 (real: True)
Jul 27 14:39:55.351 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:626: Entering mac aging
timer init
Jul 27 14:39:55.361 l2vpn/fwd-common 0/RSP0/CPU0 t1 FWD_COMMON:1522:
#####MIRP_LITE_SPIO
Jul 27 14:39:55.362 l2vpn/fwd-common 0/RSP0/CPU0 t1 FWD_COMMON:1561: MIRP-lite init
finished
Jul 27 14:39:55.362 l2vpn/fwd-common 0/RSP0/CPU0 t1 FWD_COMMON:1563: MIRP-lite
```

## show l2vpn xconnect

To display brief information on configured cross-connects, use the **show l2vpn xconnect** command in EXEC mode.

```
show l2vpn xconnect [{brief | detail | encapsulation | group | groups | interface | location | mp2mp | mspw | neighbor | pw-class | pw-id | standby | state | summary | | pw-id value | type}]
```

Syntax	Description
<b>brief</b>	(Optional) Displays encapsulation brief information.
<b>detail</b>	(Optional) Displays detailed information.
<b>encapsulation</b>	(Optional) Filters on encapsulation type.
<b>group</b>	(Optional) Displays all cross-connects in a specified group.
<b>groups</b>	(Optional) Displays all groups information.
<b>interface</b>	(Optional) Filters on interface and subinterface.
<b>location</b>	(Optional) Displays location specific information.
<b>mp2mp</b>	(Optional) Displays MP2MP information.
<b>mspw</b>	(Optional) Displays MSPW information.
<b>neighbor</b>	(Optional) Filters on neighbor.
<b>pw-class</b>	(Optional) Filters on pseudowire class
<b>standby</b>	(Optional) Displays standby node specific information.
<b>state</b>	(Optional) Filters the following xconnect state types: <ul style="list-style-type: none"> <li>• up</li> <li>• down</li> <li>• unresolved</li> </ul>
<b>summary</b>	(Optional) Displays AC information from the AC Manager database.
<b>pw-id value</b>	(Optional) Displays the filter for the pseudowire ID. The range is from 1 to 4294967295.
<b>type</b>	(Optional) Filters the following xconnect types: <ul style="list-style-type: none"> <li>• ac-pw</li> <li>• locally switched</li> <li>• monitor-session-pw</li> <li>• ms-pw</li> </ul>
<b>Command Default</b>	None

show l2vpn xconnect

**Command Modes** EXEC**Command History****Release**      **Modification**

Release 3.7.2 This command was introduced.

Release 4.3.0 The following keywords were introduced:

- location
- standby

Release 5.1.2 This command was modified to enable filtering the command output for a specific pseudowire with just the pseudowire ID.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

If a specific cross-connect is specified in the command (for instance, AC\_to\_PW1) then only that cross-connect will be displayed; otherwise, all cross-connects are displayed.

When configuring Ethernet Connectivity Fault Management (CFM) over l2vpn cross-connect, the CFM Continuity Check Messages (CCM) packets are not accounted for in the cross-connect pseudowire packet counters displayed in this show command output.

**Note**

For Cisco IOS XR software Release 5.1.2 and above, you can filter the command output for specific pseudowire with just the pseudowire ID. However, for pseudowire configurations with FEC 129 Type 2 (in VPWS), filtering the output for a specific pseudowire can only be done with the combination of the neighbour filter and the pseudowire ID.

**Task ID****Task ID**      **Operations**l2vpn read,  
write**Examples**

The following example shows sample output for the **show l2vpn xconnect** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect
Wed May 21 09:06:47.944 UTC
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
       SB = Standby, SR = Standby Ready, (PP) = Partially Programmed

XConnect          Segment 1          Segment 2
Group      Name      ST      Description      ST      Description      ST
-----
L2TPV3_V4_XC_GRP
           L2TPV3_P2P_1
                UP      Gi0/2/0/1.2      UP      26.26.26.26      100      UP
```

```

L2TPV3_V4_XC_GRP
      L2TPV3_P2P_2
          UP    Gi0/2/0/1.3          UP    26.26.26.26    200    UP
-----

```

The following sample output shows that the backup is in standby mode for the **show l2vpn xconnect detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect detail
```

```

Group siva_xc, XC siva_p2p, state is up; Interworking none
Monitor-Session: pw-span-test, state is configured
AC: GigabitEthernet0/4/0/1, state is up
  Type Ethernet
  MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
  Statistics:
    packet totals: send 90
    byte totals: send 19056
PW: neighbor 10.1.1.1, PW ID 1, state is up ( established )
PW class not set, XC ID 0x5000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
  MPLS          Local          Remote
  -----
  Label          30005          16003
  Group ID       0x5000300      0x5000400
  Interface      GigabitEthernet0/4/0/1
                  Interface      pw-span-test      GigabitEthernet0/3/0/1
  MTU            1500          1500
  Control word   enabled        enabled
  PW type        Ethernet       Ethernet
  VCCV CV type   0x2            0x2
                  (LSP ping verification)  (LSP ping verification)
  VCCV CC type   0x3            0x3
                  (control word)          (control word)
                  (router alert label)    (router alert label)
  -----
Create time: 20/11/2007 21:45:07 (00:49:18 ago)
Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

Backup PW:
PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 1.1.1.1 PW ID 1 ( standby )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
  MPLS          Local          Remote
  -----
  Label          30006          16003
  Group ID       unassigned     0x5000400
  Interface      unknown        GigabitEthernet0/4/0/2
  MTU            1500          1500
  Control word   enabled        enabled
  PW type        Ethernet       Ethernet
  VCCV CV type   0x2            0x2
                  (LSP ping verification)  (LSP ping verification)
  VCCV CC type   0x3            0x3

```

## show l2vpn xconnect

```

                (control word)                (control word)
                (router alert label)          (router alert label)
-----

```

```

Backup PW for neighbor 10.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:45 (00:48:40 ago)
Last time status changed: 20/11/2007 21:45:49 (00:48:36 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

The following sample output shows that the backup is active for the **show l2vpn xconnect detail** command:

```

RP/0/RSP0/CPU0:router# show l2vpn xconnect detail

Group siva_xc, XC siva_p2p, state is down; Interworking none
Monitor-Session: pw-span-test, state is configured
AC: GigabitEthernet0/4/0/1, state is up
  Type Ethernet
  MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
  Statistics:
    packet totals: send 98
    byte totals: send 20798
PW: neighbor 10.1.1.1, PW ID 1, state is down ( local ready )
PW class not set, XC ID 0x5000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
  MPLS          Local          Remote
-----
Label           30005          unknown
Group ID       0x5000300     0x0
Interface      GigabitEthernet0/4/0/1
                pw-span-test          GigabitEthernet0/3/0/1
MTU            1500          unknown
Control word   enabled       unknown
PW type        Ethernet     unknown
VCCV CV type  0x2          0x0
                (none)
                (LSP ping verification)
VCCV CC type  0x3          0x0
                (none)
                (control word)
                (router alert label)
-----
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

```

Backup PW:
PW: neighbor 10.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 10.1.1.1 PW ID 1 ( active )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
  MPLS          Local          Remote
-----
Label           30006          16003
Group ID       unassigned     0x5000400

```

```

Interface      unknown                               GigabitEthernet0/4/0/2
MTU            1500                                   1500
Control word   enabled                                 enabled
PW type        Ethernet                                Ethernet
VCCV CV type   0x2                                     0x2
                (LSP ping verification)                (LSP ping verification)
VCCV CC type   0x3                                     0x3
                (control word)                       (control word)
                (router alert label)            (router alert label)
-----

```

```

Backup PW for neighbor 10.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:44 (00:52:54 ago)
Last time status changed: 20/11/2007 21:45:48 (00:52:49 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

The following sample output displays the xconnects with switch port analyzer (SPAN) as one of the segments:

```
Show l2vpn xconnect type minotor-session-pw
```

```

Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
       LU = Local Up, RU = Remote Up, CO = Connected

```

XConnect			Segment 1		Segment 2		
Group	Name	ST	Description	ST	Description		ST
g1	x1	UP	pw-span-test	UP	2.2.2.2	1	UP

The following sample output shows that one-way redundancy is enabled:

```

Group g1, XC x2, state is up; Interworking none
AC: GigabitEthernet0/2/0/0.2, state is up, active in RG-ID 1
Type VLAN; Num Ranges: 1
VLAN ranges: [2, 2]
MTU 1500; XC ID 0x3000002; interworking none
Statistics:
  packets: received 103, sent 103
  bytes: received 7348, sent 7348
  drops: illegal VLAN 0, illegal length 0
PW: neighbor 101.101.101.101, PW ID 2000, state is up ( established )
PW class class1, XC ID 0x3000002
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
PW backup disable delay 0 sec
One-way PW redundancy mode is enabled
Sequencing not set
....
Incoming Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
....
Backup PW:
PW: neighbor 102.102.102.102, PW ID 3000, state is standby ( all ready )
Backup for neighbor 101.101.101.101 PW ID 2000 ( inactive )
PW class class1, XC ID 0x3000002
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
Sequencing not set
....
Incoming Status (PW Status TLV):

```

## show l2vpn xconnect

Status code: 0x26 (Standby, AC Down) in Notification message  
 Outgoing Status (PW Status TLV):  
 Status code: 0x0 (Up) in Notification message

The following example shows sample output for the **show l2vpn xconnect** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect
```

Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,  
 LU = Local Up, RU = Remote Up, CO = Connected

XConnect Group	Name	ST	Segment 1 Description	ST	Segment 2 Description		ST
siva_xc	siva_p2p	UP	Gi0/4/0/1	UP	1.1.1.1	1	UP
					Backup		
					2.2.2.2	2	UP

The following sample output shows that the backup is in standby mode for the **show l2vpn xconnect detail** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect detail
```

Group siva\_xc, XC siva\_p2p, state is up; Interworking none  
 AC: GigabitEthernet0/4/0/1, state is up

Type Ethernet  
 MTU 1500; XC ID 0x5000001; interworking none; MSTi 0  
 Statistics:

packet totals: received 90, sent 90  
 byte totals: received 19056, sent 19056

PW: neighbor 1.1.1.1, PW ID 1, state is up ( established )

PW class not set, XC ID 0x5000001

Encapsulation MPLS, protocol LDP

PW type Ethernet, control word enabled, interworking none

PW backup disable delay 0 sec

Sequencing not set

MPLS	Local	Remote
Label	30005	16003
Group ID	0x5000300	0x5000400
Interface	GigabitEthernet0/4/0/1	GigabitEthernet0/4/0/2
MTU	1500	1500
Control word	enabled	enabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2	0x2
	(LSP ping verification)	(LSP ping verification)
VCCV CC type	0x3	0x3
	(control word)	(control word)
	(router alert label)	(router alert label)

Create time: 20/11/2007 21:45:07 (00:49:18 ago)

Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)

Statistics:

packet totals: received 0, sent 0  
 byte totals: received 0, sent 0

Backup PW:

PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )

Backup for neighbor 1.1.1.1 PW ID 1 ( standby )

PW class not set, XC ID 0x0

Encapsulation MPLS, protocol LDP

PW type Ethernet, control word enabled, interworking none



```

PW backup disable delay 0 sec
Sequencing not set
      MPLS          Local          Remote
-----
Label          30006          16003
Group ID       unassigned     0x5000400
Interface      unknown        GigabitEthernet0/4/0/2
MTU            1500           1500
Control word   enabled        enabled
PW type        Ethernet       Ethernet
VCCV CV type  0x2           0x2
                (LSP ping verification)   (LSP ping verification)
VCCV CC type  0x3           0x3
                (control word)           (control word)
                (router alert label)   (router alert label)
-----
Backup PW for neighbor 1.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:45 (00:48:40 ago)
Last time status changed: 20/11/2007 21:45:49 (00:48:36 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

```

The following sample output shows that the backup is active for the **show l2vpn xconnect detail** command:

```

RP/0/RSP0/CPU0:router# show l2vpn xconnect detail

Group siva_xc, XC siva_p2p, state is down; Interworking none
AC: GigabitEthernet0/4/0/1, state is up
Type Ethernet
MTU 1500; XC ID 0x50000001; interworking none; MSTi 0
Statistics:
  packet totals: send 98
  byte totals: send 20798
PW: neighbor 1.1.1.1, PW ID 1, state is down ( local ready )
PW class not set, XC ID 0x50000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
      MPLS          Local          Remote
-----
Label          30005          unknown
Group ID       0x5000300      0x0
Interface      GigabitEthernet0/4/0/1
                unknown
MTU            1500           unknown
Control word   enabled        unknown
PW type        Ethernet       unknown
VCCV CV type  0x2           0x0
                (none)
                (LSP ping verification)
VCCV CC type  0x3           0x0
                (none)
                (control word)
                (router alert label)
-----
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

```

Backup PW:

show l2vpn xconnect

```

PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 1.1.1.1 PW ID 1 ( active )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

```

MPLS	Local	Remote
Label	30006	16003
Group ID	unassigned	0x5000400
Interface	unknown	GigabitEthernet0/4/0/2
MTU	1500	1500
Control word	enabled	enabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2 (LSP ping verification)	0x2 (LSP ping verification)
VCCV CC type	0x3 (control word) (router alert label)	0x3 (control word) (router alert label)

```

Backup PW for neighbor 1.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:44 (00:52:54 ago)
Last time status changed: 20/11/2007 21:45:48 (00:52:49 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

```

This example shows that the PW type changes to Ethernet, which is Virtual Circuit (VC) type 5, on the interface when a double tag rewrite option is used.

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect pw-class pw-class1 detail
```

```

Group VPWS, XC ac3, state is up; Interworking none
AC: GigabitEthernet0/7/0/5.3, state is up
Type VLAN; Num Ranges: 1
VLAN ranges: [12, 12]
MTU 1508; XC ID 0x2440096; interworking none
Statistics:
  packets: received 26392092, sent 1336
  bytes: received 1583525520, sent 297928
  drops: illegal VLAN 0, illegal length 0
PW: neighbor 3.3.3.3, PW ID 3, state is up ( established )
PW class VPWS1, XC ID 0x2440096
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

```

Preferred path tunnel TE 3, fallback disabled

PW Status TLV in use

MPLS	Local	Remote
Label	16147	21355
Group ID	0x120001c0	0x120001c0
Interface	GigabitEthernet0/7/0/5.3	GigabitEthernet0/7/0/5.3
MTU	1508	1508
Control word	disabled	disabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2 (LSP ping verification)	0x2 (LSP ping verification)
VCCV CC type	0x6 (router alert label)	0x6 (router alert label)

```

(TTL expiry)
-----
Incoming Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 4294705365
Create time: 21/09/2011 08:05:01 (00:14:01 ago)
Last time status changed: 21/09/2011 08:07:01 (00:12:01 ago)
Statistics:
packets: received 1336, sent 26392092
bytes: received 297928, sent 1583525520

```

This example shows the sample output of a pseudowire headend (PWHE) cross connect:

```

RP/0/RSP0/CPU0:router# show l2vpn xconnect interface pw-ether 67 detail
Group g1, XC xc1, state is down; Interworking none
AC:PW-Ether1, state is up
  Type PW-Ether
  Interface-list: interfacelist1
  Replicate status:
    Gi0/2/0/1: success
    Gi0/3/0/1: pending
    Gi0/4/0/1: failed
  MTU 1500; interworking none
  Statistics:
    packets: received 0, sent 0
    bytes: received 0, sent 0
PW: neighbor 130.130.130.130, PW ID 1234, state is down ( provisioned )
PW class not set
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
Sequencing not set
Internal label: 16008
VLAN id imposed: 101

MPLS          Local          Remote
-----
Label          16001
Group ID       0x2000600
Interface      PW-Ether1          unknown
MTU            1500
Control word   disabled
PW type        Ethernet VLAN
VCCV CV type   0x2
                (LSP ping verification)
VCCV CC type   0x6
                (router alert label)
                (TTL expiry)
-----
MIB cpwVcIndex: 2
Create time: 19/02/2010 23:13:01 (1w2d ago)
Last time status changed: 19/02/2010 23:13:16 (1w2d ago)
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0

```

This example shows the sample output of a configured flow label:

```

RP/0/RSP0/CPU0:router# show l2vpn xconnect detail

```

## show l2vpn xconnect

```

Group g1, XC p1, state is up; Interworking none
  AC: GigabitEthernet0/0/1/1, state is up
    Type Ethernet
    MTU 1500; XC ID 0x1000002; interworking none
    Statistics:
      packets: received 24688, sent 24686
      bytes: received 1488097, sent 1487926
  PW: neighbor 3.3.3.3, PW ID 2, state is up ( established )
    PW class class1, XC ID 0x1000002
    Encapsulation MPLS, protocol LDP
    PW type Ethernet, control word disabled, interworking none
    PW backup disable delay 0 sec
Sequencing not set
Flow label flags configured (Rx=1,Tx=1), negotiated (Rx=0,Tx=1)

```

This table describes the significant fields shown in the display.

**Table 4: show l2vpn xconnect Command Field Descriptions**

Field	Description
XConnect Group	Displays a list of all configured cross-connect groups.
Group	Displays the cross-connect group number.
Name	Displays the cross-connect group name.
Description	Displays the cross-connect group description. If no description is configured, the interface type is displayed.
ST	State of the cross-connect group: up (UP) or down (DN).

This example shows the output of the **show l2vpn xconnect** command with IPv6 addresses listed:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect
```

```

Fri May 18 10:25:48.279 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc1 DN Gi0/0/0/4.3 UP 1.2.3.4 1 DN
-----
g1 xc2 UR Gi0/0/0/4.1 DN 1 UR
aaaa:bbbb::cdef
-----
g1 xc3 UP Gi0/0/0/4.2 UP 1 UP
1111:2222::cdef
-----
g1 xc4 UR Gi0/0/0/4.4 DN 1 UR
1111:3333::4444
-----

```

This example shows the output of the **show l2vpn xconnect interface** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect interface Gi0/0/0/4.4 detail
```

```

Fri May 18 10:34:28.263 EDT
Group g1, XC xc4, state is unresolved; Interworking none

```

```

Not provisioned reason(s):
IPv6 not supported for this service
AC: GigabitEthernet0/0/0/4.4, state is down (Segment-down)
Type VLAN; Num Ranges: 1
VLAN ranges: [4, 4]
MTU 1500; XC ID 0x4; interworking none
PW: neighbor 1111:3333::4444, PW ID 1, state is unresolved

```

This example shows the output of the **show running-config l2vpn xconnect group** command with IPv6 neighbor information:

```
RP/0/RSP0/CPU0:router# show running-config l2vpn xconnect group g1 p2p xc4
```

```

Fri May 18 10:35:51.734 EDT
l2vpn
xconnect group g1
p2p xc4
interface GigabitEthernet0/0/0/4.4
neighbor ipv6 1111:3333::4444 pw-id 1
!

```

This example shows the output of the **show l2vpn xconnect neighbor ipv4** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect neighbor ipv4 1.2.3.4
```

```

Fri May 18 10:28:22.289 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc1 DN Gi0/0/0/4.3 UP 1.2.3.4 1 DN
-----

```

This example shows the output of the **show l2vpn xconnect neighbor ipv6** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect neighbor ipv6 1111:2222::cdef
```

```

Fri May 18 10:32:46.332 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc3 UP Gi0/0/0/4.2 UP 1 UP
1111:2222::cdef
-----

```

This example shows the output of the **show l2vpn xconnect neighbor ipv6** command:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect neighbor ipv6 1111:2222::cdef
```

```

Fri May 18 10:32:46.332 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc3 UP Gi0/0/0/4.2 UP 1 UP
1111:2222::cdef
-----

```

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect neighbor ipv6 1111:2222::cdef detail
```

```
Fri May 18 10:33:57.813 EDT
```

## show l2vpn xconnect

```

Group g1, XC xc3, state is up; Interworking none
AC: GigabitEthernet0/0/0/4.2, state is up
Type VLAN; Num Ranges: 1
VLAN ranges: [2, 2]
MTU 1500; XC ID 0x2; interworking none
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
drops: MTU exceeded 0, other 0
PW: neighbor 1111:2222::cdef, PW ID 1, state is up
PW class ts, XC ID 0x2
Encapsulation L2TPv3, protocol none
Source address 1111:2222::abcd
PW type Ethernet VLAN, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
L2TP class not set, IPv6 source address 1111:2222::abcd
TOS 40 (reflect disabled), TTL 255, DF bit not set
Path MTU: disabled
L2TPv3 Local Remote
-----

```

```

Session 1 1
Cookie size 0 bytes 0 bytes
Cookie unassigned unassigned
-----
Create time: 18/05/2012 07:40:08 (04:12:49 ago)
Last time status changed: 18/05/2012 07:40:08 (04:12:49 ago)
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
drops: out of sequence 0, other 0

```

This example shows the output of the **show l2vpn xconnect state** commands:

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect state up
```

```

Fri May 18 10:36:45.913 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc3 UP Gi0/0/0/4.2 UP 1 UP
1111:2222::cdef
-----

```

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect state down
```

```

Fri May 18 10:37:25.113 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----
g1 xc1 DN Gi0/0/0/4.3 UP 1.2.3.4 1 DN
-----

```

```
RP/0/RSP0/CPU0:router# show l2vpn xconnect state unresolved
```

```

Fri May 18 10:37:30.610 EDT
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
SB = Standby, SR = Standby Ready, (PP) = Partially Programmed
XConnect Segment 1 Segment 2
Group Name ST Description ST Description ST
-----

```

```
g1 xc2 UR Gi0/0/0/4.1 DN 1 UR  
aaaa:bbb::cdef
```

```
-----  
g1 xc4 UR Gi0/0/0/4.4 DN 1 UR  
1111:3333::4444  
-----
```

**Related Commands**

Command	Description
<a href="#">xconnect group, on page 197</a>	Configures cross-connect groups.

## source (p2p)

To configure source IPv6 address of the pseudowire, use the **source** command in p2p pseudowire configuration mode. To disable the source IPv6 address configuration, use the **no** form of this command.

**source** *ipv6\_address*  
**no source** *ipv6\_address*

<b>Syntax Description</b>	<i>ipv6_address</i> Source IPv6 address of pseudowire
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	p2p pseudowire configuration
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.1	This command was introduced

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



<b>Note</b>	All L2VPN configurations can be deleted using the <b>no l2vpn</b> command.
-------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

### Example

This example shows how to set a source IPv6 address to a point-to-point IPv6 cross-connect:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group g1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p xc3
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# interface GigabitEthernet0/0/0/4.2
```



```
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor ipv6 1111:2222::cdef pw-id 1
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# source 1111:2222::abcd
```

Related Commands	Command	Description
	<a href="#">p2p, on page 120</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
	<a href="#">neighbor (L2VPN), on page 104</a>	Configures a pseudowire for a cross-connect.

## storm-control

Storm control on ASR 9000 Series Routers can be applied at the following service attachment points:

- Bridge domain (BD)
- Attachment Circuit (AC)
- Access pseudowire (PW)

To enable storm control on all access circuits (AC) and access pseudowires (PW) in a VPLS bridge, use the **storm-control** command in l2vpn bridge group bridge-domain configuration mode. To disable storm control, use the **no** form of this command.

To enable storm control on an access circuit (AC) under a VPLS bridge, use the **storm-control** command in l2vpn bridge group bridge-domain access circuit configuration mode. To disable storm control, use the **no** form of this command.

To enable storm control on an access pseudowire (PW) in a VPLS bridge, use the **storm-control** command in l2vpn bridge group bridge-domain neighbor configuration mode. To disable storm control, use the **no** form of this command.

```
storm-control {broadcast | multicast | unknown-unicast} {pps pps-value | kbps kbps-value}
no storm-control {broadcast | multicast | unknown-unicast} {pps pps-value | kbps kbps-value}
```

### Syntax Description

<b>broadcast</b>	Configures storm control for broadcast traffic.
<b>multicast</b>	Configures storm control for multicast traffic.
<b>unknown-unicast</b>	Configures storm control for unknown unicast traffic. <ul style="list-style-type: none"> <li>• Storm control does not apply to bridge protocol data unit (BPDU) packets. All BPDU packets are processed as if traffic storm control is not configured.</li> <li>• Storm control does not apply to internal communication and control packets, route updates, SNMP management traffic, Telnet sessions, or any other packets addressed to the router.</li> </ul>
<b>pps pps-value</b>	Configures the packets-per-second (pps) storm control threshold for the specified traffic type. Valid values range from 1 to 160000.
<b>kbps kbps-value</b>	Configures the storm control in kilo bits per second (kbps). The range is from 64 to 1280000.

### Command Default

Storm control is disabled by default.

### Command Modes

l2vpn bridge group bridge-domain access circuit configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

**Usage Guidelines**

- Bridge Protocol Data Unit (BPDU) packets are not filtered through the storm control feature.
- The traffic storm control monitoring interval is set in the hardware and is not configurable. On Cisco ASR 9000 Series Router, the monitoring interval is always one second.
- When there is a mix of kbps and pps storm control on bridge or bridge port, the pps value is translated to kbps inside the policer using 1000 bytes per packet as an average.
- The hardware can only be programmed with a granularity of 8 pps, so values are not divisible by eight. These are rounded to the nearest increment of eight.

**Task ID****Task Operations ID**

l2vpn read,  
write

**Examples**

The following example enables storm control thresholds throughout the bridge domain:

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg)# bridge-domain BD1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control broadcast pps 100
```

The following example enables storm control thresholds on an access circuit:

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# bridge-domain BD2
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# interface Bundle-Ether9001.2001
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control broadcast pps 100
```

The following example enables storm control thresholds on an access pseudowire:

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# bridge-domain BD2
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# neighbor 10.1.1.1 pw-id 20011001
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control broadcast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# commit
```

**Running Configuration**

```
l2vpn
 bridge group BG1
  bridge-domain BD1
    storm-control unknown-unicast pps 100
```

```
storm-control multicast pps 100
storm-control broadcast pps 100
!
bridge-domain BD2
interface Bundle-Ether9001.2001
storm-control unknown-unicast pps 100
storm-control multicast pps 100
storm-control broadcast pps 100
!
neighbor 10.1.1.1 pw-id 20011001
storm-control unknown-unicast pps 100
storm-control multicast pps 100
storm-control broadcast pps 100
!
!
!
end
RP/0/RSP0/CPU0:a9k1(config)#
```

# tag-impose

To specify a tag for a VLAN ID configuration, use the **tag-impose** command in l2vpn configuration submode. To remove the tag, use the **no** form of this command.

**tag-impose** *vlan value*  
**no tag-impose** *vlan value*

## Syntax Description

<b>vlan</b>	VLAN in tagged mode.
<b>value</b>	Tag value. The range is from 1 to 4094. The default value is 0.

## Command Default

None

## Command Modes

L2VPN configuration

## Command History

Release	Modification
Release 4.2.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

This example shows how to specify a tag for a VLAN:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group xc1
RP/0/RSP0/CPU0:router(config-l2vpn-xc)# p2p grp1
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.2 pw-id 78
RP/0/RSP0/CPU0:router(config-l2vpn-xc-p2p-pw)# tag-impose vlan 8
```

## Related Commands

Command	Description
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.

## tos (l2vpn)

To configure Type of Service (TOS) reflection or to set TOS value, use the **tos** command in L2VPN pseudowire class encapsulation L2TPv3 configuration mode. To reset the TOS value, use the **no** form of this command.

```
tos {reflect [{value tos value}] | value tos value [{reflect}]}
no tos {reflect [{value tos value}] | value tos value [{reflect}]}
```

### Syntax Description

<b>reflect</b>	Enables TOS reflection.
<b>value</b>	Sets the TOS value for L2TPv3 pseudowire class.
<i>tos value</i>	Value of the TOS.

### Command Default

By default, the TOS is copied over, from the class of service (COS) fields of the VLAN header. If the underlying packet is not an IPv4 or IPv6 packet, the COS fields are copied from the VLAN header, even if TOS reflection is configured.

### Command Modes

L2VPN pseudowire class encapsulation L2TPv3 configuration

### Command History

Release	Modification
Release 4.3.1	This command was introduced

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



#### Note

All L2VPN configurations can be deleted using the **no l2vpn** command.

### Task ID

Task ID	Operation
l2vpn	read, write

### Example

This example shows how to configure TOS reflection:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# tos reflect
```

The following example shows how to set a TOS value:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# tos value 64
```

#### Related Commands

Command	Description
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">pw-class encapsulation l2tpv3, on page 113</a>	Configures L2TPv3 pseudowire encapsulation.

## transport mode (L2VPN)

To configure L2VPN pseudowire class transport mode, use the **transport mode** command in L2VPN pseudowire class MPLS encapsulation mode. To disable the L@VPN pseudowire class transport mode configuration, use the **no** form of this command.

```
transport mode {ethernet | vlan passthrough }
no transport mode {ethernet | vlan passthrough }
```

Syntax Description	
<b>ethernet</b>	Configures Ethernet port mode.
<b>vlan</b>	Configures VLAN tagged mode.
<i>passthrough</i>	Enables the pseudowires to pass through the incoming tags.

**Command Default** None

**Command Modes** L2VPN pseudowire class MPLS encapsulation

Command History	Release	Modification
	Release 3.7.2	This command was introduced.
	Release 4.1.0	The variable <b>passthrough</b> was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** All L2VPN configurations can be deleted using the **no l2vpn** command.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

This example shows how to configure Ethernet transport mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pw)# encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-encap-mpls)# transport-mode ethernet
```



The following example shows how to configure pseudowires in a VLAN tagged mode with the passthrough variable:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class pwc1
RP/0/RSP0/CPU0:router(config-l2vpn-pw)# encapsulation mpls
RP/0/RSP0/CPU0:router(config-l2vpn-encap-mpls)# transport-mode vlan passthrough
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.

---

## transport mode vlan passthrough

To configure L2VPN bridge domain transport mode, use the **transport mode vlan passthrough** command in L2VPN bridge domain configuration mode. To disable the L2VPN bridge domain transport mode configuration, use the **no** form of this command.

**transport mode vlan passthrough**  
**no transport mode vlan passthrough**

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	L2VPN bridge domain configuration
----------------------	-----------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



<b>Note</b>	All L2VPN configurations can be deleted using the <b>no l2vpn</b> command.
-------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

This example shows how to configure transport mode vlan passthrough:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group bg1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bd1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# transport mode vlan passthrough
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
		<a href="#">bridge-domain (VPLS), on page 208</a>

## ttl (l2vpn)

To configure Time to Live (TTL) for Pseudowire class, use the **ttl** command in L2VPN pseudowire class encapsulation L2TPv3 configuration mode. To disable the TTL configuration, use the **no** form of this command.

```
ttl ttl_value
no ttl ttl_value
```

### Syntax Description

*ttl\_value* The TTL Value. Range is from 1 to 255.

### Command Default

None

### Command Modes

L2VPN pseudowire class encapsulation L2TPv3 configuration

### Command History

Release	Modification
Release 4.3.1	This command was introduced

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



#### Note

All L2VPN configurations can be deleted using the **no l2vpn** command.

### Task ID

Task ID	Operation
l2vpn	read, write

### Example

This example shows how to configure TTL:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RSP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
RP/0/RSP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# ttl 40
```

### Related Commands

Command	Description
<a href="#">pw-class (L2VPN), on page 112</a>	Enters pseudowire class submode to define a pseudowire class template.

Command	Description
<a href="#">pw-class encapsulation l2tpv3, on page 113</a>	Configures L2TPv3 pseudowire encapsulation.

## xconnect group

To configure cross-connect groups, use the **xconnect group** command in L2VPN configuration mode. To return to the default behavior, use the **no** form of this command.

```
xconnect group group-name
no xconnect group group-name
```

### Syntax Description

*group-name* Configures a cross-connect group name using a free-format 32-character string.

### Command Default

None

### Command Modes

L2VPN configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



#### Note

You can configure up to a maximum of 16K cross-connects per box.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to group all cross -connects for customer\_atlantic:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect group customer_atlantic
```

### Related Commands

Command	Description
<a href="#">show l2vpn xconnect, on page 171</a>	Displays brief information on configured cross-connects.





## Multipoint Layer 2 Services Commands

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- [aging \(VPLS\)](#), on page 203
- [aps-channel](#), on page 205
- [autodiscovery bgp](#), on page 207
- [bridge-domain \(VPLS\)](#), on page 208
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- [debug l2vpn forwarding platform vpls all location](#), on page 211
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- static-address (VPLS), on page 320
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## action (VPLS)

To configure the bridge behavior when the number of learned MAC addresses reaches the MAC limit configured, use the **action** command in L2VPN bridge group bridge domain MAC limit configuration mode. To disable this feature, use the **no** form of this command.

```
action {flood | no-flood | shutdown}
no action {flood | no-flood | shutdown}
```

Syntax Description	Option	Description
	<b>flood</b>	Configures the action to flood all unknown unicast packets when the MAC limit is reached. If the action is set to flood, all unknown unicast packets, with unknown destination addresses, are flooded over the bridge.
	<b>no-flood</b>	Configures the action to no-flood so all unknown unicast packets are dropped when the MAC limit is reached. If the action is set to no-flood, all unknown unicast packets, with unknown destination addresses, are dropped.
	<b>shutdown</b>	Stops forwarding when the MAC limit is reached. If the action is set to shutdown, all packets are dropped.

**Command Default** No action is taken when the MAC address limit is reached.

**Command Modes** L2VPN bridge group bridge domain MAC limit configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **action** command to specify the type of action to be taken when the action is violated.

The configured action has no impact if the MAC limit has not been reached.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to configure the bridge bar to flood all unknown unicast packets when the number of MAC addresses learned by the bridge reaches 10:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group 1
```

```

RP/0/RSP0/CPU0:router(config-l2vpn-bg) #bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd) #mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac) #limit
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit) #action flood
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit) #maximum 10

```

### Related Commands

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">limit (VPLS), on page 233</a>	Sets the MAC address limit for action, maximum, and notification and enters L2VPN bridge group bridge domain MAC limit configuration mode.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
<a href="#">maximum (VPLS), on page 239</a>	Configures the specified action when the number of MAC addresses learned on a bridge is reached.
<a href="#">notification (VPLS), on page 251</a>	Specifies the type of notification that is sent when the number of learned MAC addresses exceeds the configured limit.

## aging (VPLS)

To enter the MAC aging configuration submode to set the aging parameters such as time and type, use the **aging** command in L2VPN bridge group bridge domain configuration mode. To return to the default value for all parameters that are attached to this configuration submode, use the **no** form of this command.

**aging**  
**no aging**

### Syntax Description

This command has no keywords or arguments.

### Command Default

No defaults are attached to this parameter since it is used as a configuration submode. See defaults that are assigned to the [time \(VPLS\), on page 325](#) and the [type \(VPLS\), on page 329](#) parameters.

### Command Modes

L2VPN bridge group bridge domain MAC configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **aging** command to enter L2VPN bridge group bridge domain MAC aging configuration mode.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to enter MAC aging configuration submode and to set the MAC aging time to 120 seconds:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# aging
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-aging)# time 120
```

### Related Commands

Commands	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain and enters L2VPN bridge group bridge domain configuration mode.

Commands	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then assigns network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
<a href="#">time (VPLS), on page 325</a>	Configures the maximum aging time.
<a href="#">type (VPLS), on page 329</a>	Configures the type for MAC address aging.

# aps-channel

To configure G.8032 instance APS channel and to enter Ethernet ring G.8032 instance aps-channel configuration submode, use the **aps-channel** command in the Ethernet ring g8032 instance configuration submode. To remove the G.8032 instance APS channel configuration, use the **no** form of this command.

```
aps-channel [{level message-level | port0 interface {Bundle-Ether | FastEthernet | GigabitEthernet | TenGigE} interface-id | port1 {bridge-domain bridge-domain-name | interface {Bundle-Ether | FastEthernet | GigabitEthernet | TenGigE} interface-id | none | xconnect xconnect-name}}]
no aps-channel [{level message-level | port0 interface {Bundle-Ether | FastEthernet | GigabitEthernet | TenGigE} interface-id | port1 {bridge-domain bridge-domain-name | interface {Bundle-Ether | FastEthernet | GigabitEthernet | TenGigE} interface-id | none | xconnect xconnect-name}}]
```

## Syntax Description

<b>level</b>	Specifies the APS message level. The message level ranges from 0 to 7.
<b>port0</b>	Configures G.8032 aps-channel information associated to port0.
<b>port1</b>	Configures G.8032 aps-channel information associated to port1.
<b>interface</b>	Assigns interface associated to port0 or port1. You can assign one of these interfaces: <ul style="list-style-type: none"> <li>• Bundle Ethernet</li> <li>• Fast Ethernet</li> <li>• Gigabit Ethernet</li> <li>• TenGigabit Ethernet</li> </ul>
<b>bridge-domain</b>	Specifies VPLS domain where virtual channel is connected.
<b>none</b>	Specify APS channel port0 or port1 as none.
<b>xconnect</b>	Specifies VPWS xconnect where virtual channel is connected.

## Command Default

None

## Command Modes

L2VPN configuration mode

## Command History

Release	Modification
Release 4.1.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to configure G.8032 instance APS channel:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# profile p1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# rpl port0 neighbor
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# inclusion-list vlan-ids e-g
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# aps-channel
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance-aps)#
```

Related Commands	Command	Description
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.
	<a href="#">inclusion-list, on page 224</a>	Associates a set of VLAN IDs with the current instance.

# autodiscovery bgp

To enable BGP autodiscovery, use the **autodiscovery bgp** command in the VFI configuration mode. To return to the default value, use the **no** form of this command.

```
autodiscovery bgp
no autodiscovery bgp
```

**Syntax Description** This command has no keywords or arguments.

**Command Default** None.

**Command Modes** VFI configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to configure a bridge domain:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group EGroup
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain eastdomain
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi eastvfi
RP/0/RSP0/CPU0:routerr(config-l2vpn-bg-bd-vfi)# autodiscovery bgp
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## bridge-domain (VPLS)

To establish a bridge domain and to enter L2VPN bridge group bridge domain configuration mode, use the **bridge-domain** command in L2VPN bridge group configuration mode. To return to a single bridge domain, use the **no** form of this command.

**bridge-domain** *bridge-domain-name*  
**no bridge-domain** *bridge-domain-name*

<b>Syntax Description</b>	<i>bridge-domain-name</i> Name of the bridge domain.
	<b>Note</b> The maximum number of characters that can be specified in the bridge domain name is 27.

**Command Default** The default value is a single bridge domain.

**Command Modes** L2VPN bridge group configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines** Use the **bridge-domain** command to enter L2VPN bridge group bridge domain configuration mode.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

**Examples** The following example shows how to configure a bridge domain:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.



## bridge group (VPLS)

To create a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain, use the **bridge group** command in L2VPN configuration mode. To remove all the bridge domains that are created under this bridge group and to remove all network interfaces that are assigned under this bridge group, use the **no** form of this command.

```
bridge group bridge-group-name
no bridge-group bridge-group-name
```

<b>Syntax Description</b>	<i>bridge-group-name</i> Number of the bridge group to which the interface belongs.
---------------------------	---

<b>Command Default</b>	No bridge group is created.
------------------------	-----------------------------

<b>Command Modes</b>	L2VPN configuration
----------------------	---------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Use the **bridge group** command to enter L2VPN bridge group configuration mode.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows that bridge group 1 is assigned:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## clear l2vpn bridge-domain (VPLS)

To clear the MAC addresses and to restart the bridge domains on the router, use the **clear l2vpn bridge-domain** command in EXEC mode.

```
clear l2vpn bridge-domain {all | bd-name name | group group}
```

Syntax Description	all	Clears and restarts all the bridge domains on the router.
	<b>bd-name</b> <i>name</i>	Clears and restarts the specified bridge domain. The <i>name</i> argument specifies the name of the bridge-domain.
	<b>group</b> <i>group</i>	Clears and restarts all the bridge domains that are part of the bridge group.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This is the method that allows a bridge to forward again after it was put in Shutdown state as a result of exceeding the configured MAC limit.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to clear all the MAC addresses and to restart all the bridge domains on the router:

```
RP/0/RSP0/CPU0:router# clear l2vpn bridge-domain all
```

Related Commands	Command	Description
	<a href="#">show l2vpn bridge-domain (VPLS), on page 270</a>	Display information for the bridge ports such as attachment circuits and pseudowires for the specific bridge domains.

# debug l2vpn forwarding platform vpls all location

To display debugging information about L2VPN forwarding Virtual Private LAN Service (VPLS) platform of a specified location, use the **debug l2vpn forwarding platform vpls all location** command in EXEC mode. To disable debugging, use the **no** form of this command.

**debug l2vpn forwarding platform vpls all location** *location*  
**no debug l2vpn forwarding platform vpls all location** *location*

<b>Syntax Description</b>	<i>location</i> Location to display debugging information.	
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	root-system	read, write
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">storm-control (l2vpn)</a>	Enables traffic storm control on a bridge router, bridge port EFP, or access pseudowire.
	<a href="#">show l2vpn forwarding hardware ingress detail location</a>	Displays the hardware location information on the ingress detail location.

## description (G.8032)

To specify a string that serves as a description for a G.8032 Ethernet ring instance, use the **description** command in the Ethernet ring G.8032 instance configuration submode.

**description** *ring-instance-identifier*

<b>Syntax Description</b>	<i>ring-instance-identifier</i> A string that serves as a description for a G.8032 Ethernet ring instance. The string can be a maximum of 32 characters.				
<b>Command Default</b>	None				
<b>Command Modes</b>	Ethernet ring G.8032 instance configuration submode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.1.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.1.0	This command was introduced.
Release	Modification				
Release 4.1.0	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read, write
Task ID	Operation				
l2vpn	read, write				

This example shows how to specify a description for G.8032 Ethernet ring instance:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)#
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.
	<a href="#">instance (G.8032), on page 226</a>	Configures a G.8032 Ethernet ring instance and enters Ethernet ring G.8032 instance configuration submode.

## dhcp ipv4 snoop profile (VPLS)

To enable DHCP snooping on a bridge and to attach a DHCP snooping profile to the bridge, use the **dhcp ipv4 snoop** command in L2VPN bridge group bridge domain configuration mode. To disable DHCP snooping on an interface, use the **no** form of this command.

```
dhcp ipv4 snoop profile profile-name
no dhcp ipv4 snoop
```

<b>Syntax Description</b>	<b>profile</b> <i>profile-name</i> <i>profile-name</i>	Attaches a DHCP profile. Profile name for DHCPv4 snooping.
<b>Command Default</b>	None	
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to enable DHCP snooping on a bridge:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# dhcp ipv4 snoop profile attach
```

This example shows how to enable DHCP snooping over a pseudowire:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#vfi vf1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)#exit
```

```
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd) #neighbor 10.1.1.1 pw-id 100
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd-pw) #dhcp ipv4 snoop profile A
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# ethernet ring g8032

To enable G.8032 ring mode and enter the G.8032 configuration submode, use the **ethernet ring g8032** command in the L2VPN configuration mode. To disable the G.8032 ring mode, use the **no** form of this command.

```
ethernet ring g8032 protocol ring identifier
no ethernet ring g8032 protocol ring identifier
```

<b>Syntax Description</b>	<i>protocol ring identifier</i> Ring profile name. The maximum size of the profile name is 32 characters.				
<b>Command Default</b>	None				
<b>Command Modes</b>	L2VPN configuration mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.1.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.1.0	This command was introduced.
Release	Modification				
Release 4.1.0	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read, write
Task ID	Operation				
l2vpn	read, write				

## Example

This example shows how to enable the G.8032 ring mode:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#ethernet ring g8032 p1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)#
```

Related Commands	Command	Description
	<a href="#">exclusion list</a> , on page 218	Defines a set of Virtual LAN (VLAN) IDs that are not protected by the Ethernet ring protection mechanism.
	<a href="#">instance (G.8032)</a> , on page 226	Configures a G.8032 Ethernet ring instance and enters Ethernet ring G.8032 instance configuration submode.
	<a href="#">port0 interface</a> , on page 254	Enables G.8032 for a specified ring port.
	<a href="#">port1</a> , on page 255	Enables G.8032 for a specified ring port.

## ethernet ring g8032 profile

To configure G.8032 ring profile and to enter the G.8032 ring profile configuration mode, use the **ethernet ring g8032 profile** command in the global configuration mode. To disable the G.8032 ring profile, use the **no** form of this command.

**ethernet ring g8032 profile** *profile-name* [{**non-revertive** | **timer** {**guard** *milliseconds* | **hold-off** *seconds* | **wtr** *minutes* } }]

Syntax Description		
<b>non-revertive</b>		Configures non-revertive ring instance.
<b>timer</b>		Configures G.8032 timer.
<b>guard</b>		Configures G.8032 guard timer. The Guard timer can be configured and the default time interval is 500 ms. The time interval ranges from 10 to 2000 ms.
<b>hold-off</b>		Configures G.8032 hold-off timer. The hold-off timer can be configured and the default time interval is 0 seconds. The time interval ranges from 0 to 10 seconds.
<b>wtr</b>		Configures G.8032 WTR timer. The WTR timer can be configured by the operator, and the default time interval is 5 minutes. The time interval ranges from 1 to 12 minutes.

**Command Default** None

### Command Modes

### Command History

Release	Modification
Release 4.1.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operation
ethernet-services	read, write

This example shows you how to configure a G.8032 ring profile:

```
RP/0/RSP0/CPU0:router# configure
```



```
RP/0/RSP0/CPU0:router(config)# ethernet ring g8032 profile p1
RP/0/RSP0/CPU0:router(config-g8032-ring-profile)#
```

Related Commands	Command	Description
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

# exclusion list

To define a set of Virtual LAN (VLAN) IDs that are not protected by the Ethernet ring protection mechanism, use the **exclusion list** command in Ethernet ring g8032 configuration submode. To delete the set of VLAN IDs, use the **no** form of this command.

**exclusion list** *vlan-ids* *vlan range*

**no exclusion list** *vlan-ids* *vlan range*

<b>Syntax Description</b>	<p><b>vlan-ids</b> Specifies a list of VLANs. Ranges in the form a-b,c,d,e-f,g where VLAN value is 1–4094 and/or untagged.</p> <p>By default, all the VLANs configured under ring ports are blocked. VLAN IDs specified here cannot belong to the inclusion-list. VLAN IDs range cannot overlap with the IDs specified under inclusion-list.</p>
---------------------------	--

**Command Default** Configured physical Ethernet or ether bundle interface

**Command Modes** Ethernet ring g8032 configuration submode

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows the output from the exclusion list command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# exclusion-list vlan-ids e-g
RP/0/RSP0/CPU0:router(config-l2vpn-erp)#
```

Related Commands	Command	Description
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

# flooding disable

To configure flooding for traffic at the bridge domain level or at the bridge port level, use the **flooding disable** command in L2VPN bridge group bridge domain configuration mode. To return the bridge to normal flooding behavior when all unknown unicast packets, all broadcast packets, and all multicast packets are flooded over all other bridge domain network interfaces, use the **no** form of this command.

**flooding disable**  
**no flooding disable**

This command has no keywords or arguments.

**Command Default** The default behavior is that packets are flooded when their destination MAC address is not found.

**Command Modes** L2VPN bridge group bridge domain configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **flooding disable** command to override the parent bridge configuration.

By default, bridge ports inherit the flooding behavior of the bridge domain.

When flooding is disabled, all unknown unicast packets, all broadcast packets, and all multicast packets are discarded.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to disable flooding on the bridge domain called bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# flooding disable
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mtu (VPLS), on page 245</a>	Adjusts the maximum packet size or maximum transmission unit (MTU) size for the bridge domain.

# flooding unknown-unicast disable (VPLS)

To disable flooding of unknown unicast traffic at the bridge domain level or at the bridge port level, use the **flooding unknown-unicast disable** command in L2VPN bridge group bridge domain configuration mode. To return the bridge to normal flooding behavior, use the **no** form of this command.

**flooding unknown-unicast disable**  
**no flooding unknown-unicast disable**

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	The default behavior is that packets are flooded when their destination MAC address is not found.				
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Use the <b>flooding unknown-unicast disable</b> command to override the parent bridge configuration.</p> <p>By default, bridge ports inherit the flooding behavior of the bridge domain.</p> <p>When flooding is disabled, all unknown unicast packets are discarded.</p> <p>Use this command on Layer 2 interfaces. This command is not applicable on BVI interfaces.</p>				

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to disable flooding on the bridge domain called bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# flooding unknown-unicast disable
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mtu (VPLS), on page 245</a>	Adjusts the maximum packet size or maximum transmission unit (MTU) size for the bridge domain.

# igmp snooping disable

To disable IGMP snooping on a bridge domain within the L2VPN, use the **igmp snooping disable** command in the L2VPN bridge group bridge-domain configuration mode. To return to the default, use the **no** form of this command.

**igmp snooping disable**  
**no igmp snooping disable**

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	IGMP snooping is active on a bridge domain when an IGMP snooping profile is configured to the bridge domain.				
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1	This command was introduced.
Release	Modification				
Release 5.1	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

This example shows how to disable IGMP snooping profile for a bridge domain in the L2VPN:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# igmp snooping disable
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

# inclusion-list

To associate a set of VLAN IDs with the current instance, use the **inclusion-list** command in the Ethernet ring G.8032 instance configuration submenu. To disassociate the VLAN IDs with the current instance, use the **no** form of this command.

**inclusion-list** *vlan-ids* *vlan-id*  
**no inclusion-list** *vlan-ids* *vlan-id*

<b>Syntax Description</b>	<b>vlan-ids</b> Associates a set of VLAN IDs with the current instance.				
	<i>vlan-id</i> List of VLAN IDs in the form <code>vlan-id &lt;vlan range&gt;[,&lt;vlan range&gt;][,&lt;vlan range&gt;][,&lt;vlan range&gt;]</code> .				
<b>Command Default</b>	None				
<b>Command Modes</b>	Ethernet ring G.8032 instance configuration submenu				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.1.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.1.0	This command was introduced.
Release	Modification				
Release 4.1.0	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read, write
Task ID	Operation				
l2vpn	read, write				

This example shows how to associate VLAN IDs with instance 1:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# profile p1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# rpl port0 neighbor
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# inclusion-list vlan-ids e-g
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">l2vpn</a> , on page 93	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032</a> , on page 215	Enables G.8032 ring mode and enters the G.8032 configuration submenu.



Command	Description
<a href="#">instance (G.8032), on page 226</a>	Configures a G.8032 Ethernet ring instance and enters Ethernet ring G.8032 instance configuration submode.

## instance (G.8032)

To configure a G.8032 Ethernet ring instance and enter Ethernet ring G.8032 instance configuration submode, use the `instance` command in the Ethernet ring G.8032 configuration submode. To disable the G.8032 Ethernet ring instance, use the `no` form of this command.

**instance** *instance-id*  
**no instance** *instance-id*

<b>Syntax Description</b>	<i>instance-id</i> Instance ID; currently, supports up to two instances per Ethernet ring. The instance ID can be 1 or 2.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Ethernet ring G.8032 configuration submode
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to configure G.8032 Ethernet ring instance:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## interface (VPLS)

To add an interface to a bridge domain that allows packets to be forwarded and received from other interfaces that are part of the same bridge domain, use the **interface** command in L2VPN bridge group bridge domain configuration mode. To remove an interface from a bridge domain, use the **no** form of this command.

```
interface type interface-path-id
no interface type interface-path-id
```

<b>Syntax Description</b>	<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	Physical interface or virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** None

**Command Modes** L2VPN bridge group bridge domain configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **interface** command to enter L2VPN bridge group bridge domain attachment circuit configuration mode. In addition, the **interface** command enters the interface configuration submode to configure parameters specific to the interface.

By default, an interface is not part of a bridge.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to configure the bundle Ethernet interface as an attachment circuit:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
```

## interface (VPLS)

```

RP/0/RSP0/CPU0:router(config-l2vpn-bg) # bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd) # interface gigabitethernet 0/1/0/9
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac) #

```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# l2vpn resynchronize forwarding mac-address-table location

To retrieve a MAC address table from network processors and transfer the MAC address tables to the L2FIB manager, use the **l2vpn resynchronize forwarding mac-address-table location** command in EXEC mode.

**l2vpn resynchronize forwarding mac-address-table location** *node-id*

<b>Syntax Description</b>	<i>node-id</i> Location of the mac-address-table. The <i>node-id</i> argument is entered using the <i>rack/slot/module</i> notation.	
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.0	This command was introduced.
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>To ensure that correct information is displayed, enter this command before issuing any <b>show</b> commands for the mac address tables.</p> <p>The <b>l2vpn resynchronize forwarding mac-address-table location</b> command initiates the transfer of MAC learn information from the network processors, to the L2FIB manager. This operation is CPU intensive especially when there are 512K MACs. Therefore, the command is throttled, so that you cannot issue this command back to back. The throttle time depends on the number of MAC addresses. If the number of MAC addresses is under 16K MACs, the throttle time is five seconds. If it is between 16K and 128K, the throttle time is one minute, and if it is between 128K and 256K, the throttle time is two minutes. The throttle time is four minutes for MAC addresses above 256K.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write, execute
<b>Examples</b>	<p>The following example shows how to retrieve the MAC address table from the network processors:</p> <pre>RP/0/RSP0/CPU0:router# l2vpn resynchronize forwarding mac-address-table location 0/4/CPU0</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding, on page 140</a>	Displays forwarding information from the layer2_fib manager on the line card.

## learning disable (VPLS)

To override the MAC learning configuration of a parent bridge or to set the MAC learning configuration of a bridge, use the **learning disable** command in L2VPN bridge group bridge domain MAC configuration mode. To disable this feature, use the **no** form of this command.

**learning disable**  
**no learning disable**

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	By default, learning is enabled on all bridge domains and all interfaces on that bridge inherits this behavior.				
<b>Command Modes</b>	L2VPN bridge group bridge domain MAC configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When set, the **learning disable** command stops all MAC learning either on the specified interface or the bridge domain.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

In the following example, MAC learning is disabled on all ports in the bridge domain called bar, which is applied to all interfaces in the bridge unless the interface has its own MAC learning enable command.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# learning disable
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.

# level

To specify the APS message level, use the **level** command in the Ethernet ring G.8032 instance `aps-channel` configuration submode.

**level** *number*

<b>Syntax Description</b>	<i>number</i> The APS message level. The range is from between 0 to 7.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Ethernet ring G.8032 instance <code>aps-channel</code> configuration submode
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to enable the G.8032 ring mode:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# profile p1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# rpl port0 neighbor
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# inclusion-list vlan-ids e-g
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# aps-channel
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance-aps)# level 3
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.



## limit (VPLS)

To set the MAC address limit for action, maximum, and notification and to enter L2VPN bridge group bridge domain MAC limit configuration mode, use the **limit** command in L2VPN bridge group bridge domain MAC configuration mode. To remove all limits that were previously configured under the MAC configuration submodes, use the **no** form of this command.

**limit**  
**no limit**

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	None				
<b>Command Modes</b>	L2VPN bridge group bridge domain MAC configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **limit** command to enter L2VPN bridge group bridge domain MAC limit configuration mode. The **limit** command specifies that one syslog message is sent or a corresponding trap is generated with the MAC limit when the action is violated.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how the MAC limit for the bridge bar is set to 100 with an action of shutdown. After the configuration, the bridge stops all forwarding after 100 MAC addresses are learned. When this happens, a syslog message and an SNMP trap are created.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# limit
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# maximum 100
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# action shutdown
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# notification both
```

Related Commands	Command	Description
	<a href="#">action (VPLS), on page 201</a>	Configures bridge behavior when the number of learned MAC addresses reaches the MAC limit configured.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
	<a href="#">maximum (VPLS), on page 239</a>	Configures the specified action when the number of MAC addresses learned on a bridge is reached.
	<a href="#">notification (VPLS), on page 251</a>	Specifies the type of notification that is sent when the number of learned MAC addresses exceeds the configured limit.

## mac (VPLS)

To enter L2VPN bridge group bridge domain MAC configuration mode, use the **mac** command in L2VPN bridge group bridge domain configuration mode. To disable all configurations added under the MAC configuration submodes, use the **no** form of this command.

**mac**  
**no mac**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** L2VPN bridge group bridge domain configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **mac** command to enter L2VPN bridge group bridge domain MAC configuration mode.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to enter L2VPN bridge group bridge domain MAC configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)#
```

Related Commands	Command	Description
	<a href="#">aging (VPLS), on page 203</a>	Enters the MAC aging configuration submode to set the aging parameters such as time and type.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">learning disable (VPLS), on page 230</a>	Overrides the MAC learning configuration of a parent bridge or sets the MAC learning configuration of a bridge.
<a href="#">limit (VPLS), on page 233</a>	Sets the MAC address limit for action, maximum, and notification and enters L2VPN bridge group bridge domain MAC limit configuration mode.
<a href="#">static-address (VPLS), on page 320</a>	Adds static entries to the MAC address for filtering.
<a href="#">withdraw (VPLS), on page 333</a>	Disables MAC address withdrawal for a specified bridge domain

## mac secure

To configure MAC security at a port and to set the default action that is to be taken when security is violated, use the **mac secure** command in the l2vpn bridge group bridge domain configuration mode. To disable MAC security, use the **no** form of this command.

```
mac secure {action [{ none | shutdown | restrict}] | logging | disable}
no mac secure {action [{ none | shutdown}] | logging | disable}
```

<b>Syntax Description</b>	<p><b>action</b> (Optional) Indicates the action to be taken when security is violated.</p> <p><b>none</b> Forwards the violating packet and allows the MAC address to be relearned.</p> <p><b>shutdown</b> Shuts down the violating bridge port.</p> <p><b>restrict</b> Drops the violating packet and disables the learn attempt.</p> <p><b>Note</b> The <b>restrict</b> keyword in applicable to interfaces only.</p> <p><b>logging</b> (Optional) Enables logging.</p> <p><b>disable</b> (Optional) Disables mac security.</p>				
<b>Command Default</b>	If a MAC address has been learned on a secure port and, a relearn attempt from another port (secure or not) is made, the default action is restrict.				
<b>Command Modes</b>	l2vpn bridge group bridge domain configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.1	This command was introduced.
Release	Modification				
Release 4.0.1	This command was introduced.				
<b>Usage Guidelines</b>	This command has no keywords or arguments.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>Read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	Read, write
Task ID	Operations				
l2vpn	Read, write				

### Examples

This example shows how to enable mac security on bridge bar.

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#mac secure
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-secure)#
```

This example shows how to shut down a violating bridge port on bridge bar:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)#bridge group b1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)#bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)#mac secure
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-secure)#action shutdown
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-secure)#
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## maximum (VPLS)

To configure the specified action when the number of MAC addresses learned on a bridge is reached, use the **maximum** command in L2VPN bridge group bridge domain MAC limit configuration mode. To disable this feature, use the **no** form of this command.

**maximum** *value*  
**no maximum** *value*

<b>Syntax Description</b>	<i>value</i> Maximum number of learned MAC addresses. For Release 5.1.0, the range is from 5 to 512000. For Release 5.1.1, the range is from 5 to 128000.				
<b>Command Default</b>	The default maximum value is 4000.				
<b>Command Modes</b>	L2VPN bridge group bridge domain MAC limit configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The action can either be flood, no flood, or shutdown. Depending on the configuration, a syslog, an SNMP trap notification, or both are issued.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows when the number of MAC address learned on the bridge reaches 5000 and the bridge stops learning but continues flooding:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# limit
```

## maximum (VPLS)

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# maximum 5000
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# action no-flood
```

Related Commands	Command	Description
	<a href="#">action (VPLS), on page 201</a>	Configures bridge behavior when the number of learned MAC addresses reaches the MAC limit configured.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">limit (VPLS), on page 233</a>	Sets the MAC address limit for action, maximum, and notification and enters L2VPN bridge group bridge domain MAC limit configuration mode.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
	<a href="#">notification (VPLS), on page 251</a>	Specifies the type of notification that is sent when the number of learned MAC addresses exceeds the configured limit.



# monitor interface (port0)

To specify a port to detect a ring link failure, use the **monitor interface** command in g8032 port0 submode. To delete the port, use the **no** form of this command.

**monitor interface** *interface-name*  
**no monitor interface** *interface-name*

<b>Syntax Description</b>	<i>interface-name</i> Name of the monitored interface. The monitored interface must be a sub-interface of the main interface.						
<b>Command Default</b>	Configured physical Ethernet or Ether Bundle interface						
<b>Command Modes</b>	Ethernet ring g8032 port0 submode						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.1.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.1.0	This command was introduced.		
Release	Modification						
Release 4.1.0	This command was introduced.						
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read, write		
Task ID	Operation						
l2vpn	read, write						
	<p>This example shows the output from the monitor interface command:</p> <pre>RP/0/RSP0/CPU0:router# <b>configure</b> RP/0/RSP0/CPU0:router(config)# <b>l2vpn</b> RP/0/RSP0/CPU0:router(config-l2vpn)# <b>ethernet ring g8032 g1</b> RP/0/RSP0/CPU0:router(config-l2vpn-erp)# <b>port0 interface TenGigE 0/4/0/0</b> RP/0/RSP0/CPU0:router(config-l2vpn-erp-port0)# <b>monitor interface GigabitEthernet 0/0/1/0</b> RP/0/RSP0/CPU0:router(config-l2vpn-erp-port0)#</pre>						
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">l2vpn, on page 93</a></td> <td>Enters L2VPN configuration mode.</td> </tr> <tr> <td><a href="#">ethernet ring g8032, on page 215</a></td> <td>Enables G.8032 ring mode and enters the G.8032 configuration submode.</td> </tr> </tbody> </table>	Command	Description	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.
Command	Description						
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.						
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.						

# monitor interface (port1)

To specify the port to detect a ring link failure, use the **monitor interface** command in g8032 port1 submode. To delete the port, use the **no** form of this command.

**monitor interface** *interface-name*  
**no monitor interface** *interface-name*

## Syntax Description

*interface-name* Name of the monitored interface. The monitored interface must be a sub-interface of the main interface.

## Command Default

Configured physical Ethernet or ether bundle interface

## Command Modes

Ethernet ring g8032 port1 submode

## Command History

Release	Modification
Release 4.1.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
l2vpn	read, write

This example shows the output from the monitor interface command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 g1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# port1 interface TenGigE 0/4/0/0
RP/0/RSP0/CPU0:router(config-l2vpn-erp-port1)# monitor interface GigabitEthernet 0/0/1/0
RP/0/RSP0/CPU0:router(config-l2vpn-erp-port1)#
```

## Related Commands

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## mpls static label (VPLS)

To configure the MPLS static labels and the static labels for the access pseudowire configuration, use the **mpls static label** command in L2VPN bridge group bridge domain VFI pseudowire configuration mode. To assign the dynamic MPLS labels to either the virtual forwarding interface (VFI) pseudowire or the access pseudowire, use the **no** form of this command.

```
mpls static label local value value remote value
no mpls static label local value value remote value
```

Syntax Description	
<b>local</b> <i>value</i>	Configures the local pseudowire label.
<b>Note</b>	Use the <b>show mpls label range</b> command to obtain the range for the local labels.
<b>remote</b> <i>value</i>	Configures the remote pseudowire label.
<b>Note</b>	The range of values for the remote labels depends on the label allocator of the remote router.

**Command Default** By default, the router attempts to assign dynamic labels to the pseudowire.

**Command Modes** L2VPN bridge group bridge domain Access/VFI pseudowire configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Ensure that both ends of the pseudowire have matching static labels.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to configure the VFI pseudowire 10.1.1.2 with pseudowire ID of 1000 to use MPLS label 800 and remote MPLS label 500:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi model
```

## mpls static label (VPLS)

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# neighbor 10.1.1.2 pw-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-pw)# mpls static label local 800 remote 500
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).
	<a href="#">pw-class , on page 259</a>	Configures the pseudowire class template name to use for the pseudowire.
	<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.

## mtu (VPLS)

To adjust the maximum packet size or maximum transmission unit (MTU) size for the bridge domain, use the **mtu** command in L2VPN bridge group bridge domain configuration mode. To disable this feature, use the **no** form of this command.

```
mtu bytes
no mtu
```

<b>Syntax Description</b>	<i>bytes</i> MTU size, in bytes. The range is from 46 to 65535.
---------------------------	---

<b>Command Default</b>	The default MTU value is 1500.
------------------------	--------------------------------

<b>Command Modes</b>	L2VPN bridge group bridge domain configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Each interface has a default maximum packet size or MTU size. This number generally defaults to the largest size possible for that interface type. On serial interfaces, the MTU size varies, but cannot be set smaller than 64 bytes.

The MTU for the bridge domain includes only the payload of the packet. For example, a configured bridge MTU of 1500 allows tagged packets of 1518 bytes (6 bytes DA, 6 bytes SA, 2 bytes ethertype, or 4 bytes qtag).



**Note** Bridge wide MTU is not enforced on the data traffic.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

**Examples** The following example specifies an MTU of 1000 bytes:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg) # bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd) # mtu 1000
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">flooding disable, on page 219</a>	Configures flooding for traffic at the bridge domain level or at the bridge port level.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# multicast p2mp

To enable point to multi-point pseudowire in a VFI and to enter L2VPN bridge group bridge domain VFI multicast P2MP configuration mode, use the **multicast p2mp** command in L2VPN bridge group bridge domain VFI configuration mode. To return to a VFI mode, use the **no** form of this command.

```
multicast p2mp [{signaling-protocol | transport}]
no multicast p2mp [{signaling-protocol | transport}]
```

Syntax Description	
<b>signaling-protocol</b>	Specifies the signaling protocol selection
<b>transport</b>	Specifies the transport type selection

**Command Default** None

**Command Modes** L2VPN bridge group bridge domain VFI configuration

Command History	Release	Modification
	Release 5.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

## Example

This example shows how to configure a point to multi-point pseudowire in a VFI:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi v1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# multicast p2mp
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-p2mp)#
```

Related Commands	Command	Description
	<a href="#">transport rsvp-te, on page 327</a>	Enables RSVP-TE as transport on a VFI.

Command	Description
<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.



## neighbor (VPLS)

To add an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI), use the **neighbor** command in the appropriate L2VPN bridge group bridge domain configuration submode. To remove the pseudowire either from the bridge or from the VFI, use the **no** form of this command.

**neighbor** *A.B.C.D* **pw-id** *value*  
**no neighbor** *A.B.C.D* **pw-id** *value*

<b>Syntax Description</b>	<p><i>A.B.C.D</i> IP address of the cross-connect peer.</p> <p><b>pw-id</b> <i>value</i> Configures the pseudowire ID and ID value. Range is 1 to 4294967295.</p>				
<b>Command Default</b>	None				
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration L2VPN bridge group bridge domain VFI configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Use the <b>neighbor</b> command to enter L2VPN bridge group bridge domain VFI pseudowire configuration mode. Alternatively, use the <b>neighbor</b> command to enter L2VPN bridge group bridge domain access pseudowire configuration mode.</p>				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write
Task ID	Operations				
l2vpn	read, write				
<b>Examples</b>	<p>The following example shows how to configure an access pseudowire directly under a bridge domain in L2VPN bridge group bridge domain configuration mode:</p> <pre>RP/0/RSP0/CPU0:router# configure RP/0/RSP0/CPU0:router(config)# l2vpn RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1 RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# neighbor 10.1.1.2 pw-id 1000 RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pw)#</pre>				

The following example shows how to configure the parameters for any pseudowire in L2VPN bridge group bridge domain VFI configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)# l2vpn
RP/0/RSP0/CPU0:router (config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router (config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd)# vfi v1
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd-vfi)# neighbor 10.1.1.2 pw-id 1000
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd-vfi-pw)#
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mpls static label (VPLS), on page 243</a>	Configures the MPLS static labels and the static labels for the access pseudowire configuration.
	<a href="#">pw-class , on page 259</a>	Configures the pseudowire class template name to use for the pseudowire.
	<a href="#">static-mac-address (VPLS), on page 322</a>	Configures the static MAC address to associate a remote MAC address with a pseudowire or any other bridge interface.
	<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.

## notification (VPLS)

To specify the type of notification that is sent when the number of learned MAC addresses exceeds the configured limit, use the **notification** command in L2VPN bridge group bridge domain MAC limit configuration mode. To use the notification as only a syslog entry, use the **no** form of this command.

```
notification {both | none | trap}
no notification {both | none | trap}
```

<b>Syntax Description</b>	<p><b>both</b> Sends syslog and trap notifications when the action is violated.</p> <p><b>none</b> Specifies no notification.</p> <p><b>trap</b> Sends trap notifications when the action is violated.</p>				
<b>Command Default</b>	By default, only a syslog message is sent when the number of learned MAC addresses reaches the maximum configured.				
<b>Command Modes</b>	L2VPN bridge group bridge domain MAC limit configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>A syslog message and an SNMP trap is generated. Alternatively, an SNMP trap is generated. Finally, no notification is generated.</p>				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write
Task ID	Operations				
l2vpn	read, write				

### Examples

The following example shows how both a syslog message and an SNMP trap are generated with the bridge bar and learns more MAC addresses than the configured limit:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# limit
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-limit)# notification both
```

Related Commands	Command	Description
	<a href="#">action (VPLS), on page 201</a>	Configures bridge behavior when the number of learned MAC addresses reaches the MAC limit configured.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
	<a href="#">maximum (VPLS), on page 239</a>	Configures the specified action when the number of MAC addresses learned on a bridge is reached.

# open ring

To specify Ethernet ring g8032 as an open ring, use the **open-ring** command in Ethernet ring g8032 configuration submodule. To delete, use the **no** form of this command.

**open-ring**  
**no open-ring**

This command has no keywords or arguments.

## Command Default

The default value is FALSE.

## Command Modes

Ethernet ring g8032 configuration submodule

## Command History

Release	Modification
Release 4.1.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
l2vpn	read, write

## Example

This example shows the output from the **open-ring** command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 g1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# open-ring
RP/0/RSP0/CPU0:router(config-l2vpn-erp)#
```

## Related Commands

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submodule.

# port0 interface

To enable G.8032 for a specified ring port, use the **port0 interface** command in g8032 configuration port0 submode. To disable, use the **no** form of this command.

**port 0 interface** *interface name*  
**no port 0 interface** *interface name*

## Syntax Description

*interface name* Any physical Ethernet or Bundle Ethernet interface. A physical port of the local node connected to G.8032 ring.

## Command Default

None

## Command Modes

Ethernet ring g8032 configuration port0 submode

## Command History

Release	Modification
Release 4.1.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
l2vpn	read, write

## Example

This example shows the output from the port0 interface command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 g1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# port0 interface Bundle-Ether 555
RP/0/RSP0/CPU0:router(config-l2vpn-erp-port0)#
```

## Related Commands

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

# port1

To enable G.8032 for a specified ring port, use the **port1** command in g8032 configuration port1 submode. To disable, use the **no** form of this command.

**port1** {**interface** *interface name* | **none**}

Syntax Description	interface <i>interface name</i>	Specifies physical Ethernet or Bundle Ethernet interface. A physical port of the local node connected to G.8032 ring. Enables G.8032 for the specified physical port to form a closed ring.
	<b>none</b>	Specifies local node endpoint of an open-ring.

**Command Default** None

**Command Modes** Ethernet ring g8032 configuration port1 submode

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows the output from the port1 command:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 g1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# port1 interface TenGigE 0/6/0/3
RP/0/RSP0/CPU0:router(config-l2vpn-erp-port1)#
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## port-down flush disable (VPLS)

To disable MAC flush when the bridge port is nonfunctional, use the **port-down flush disable** command in the L2VPN bridge group bridge domain MAC configuration mode. Use the **no** form of this command to enable the MAC flush when the bridge port is nonfunctional.

**port-down flush disable**  
**no port-down flush disable**

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	L2VPN bridge group bridge domain MAC configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **port-down flush disable** command disables the MAC flush when the bridge port is nonfunctional.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
		l2vpn

### Examples

The following example shows how to disable MAC flush when the bridge port is nonfunctional:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# port-down flush disable
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">action (VPLS), on page 201</a>	Configures bridge behavior when the number of learned MAC addresses reaches the MAC limit configured.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.



Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
<a href="#">maximum (VPLS), on page 239</a>	Configures the specified action when the number of MAC addresses learned on a bridge is reached.
<a href="#">notification (VPLS), on page 251</a>	Specifies the type of notification that is sent when the number of learned MAC addresses exceeds the configured limit.

# profile

To specify an associated Ethernet ring G.8032 profile, use the **profile** command in the Ethernet ring G.8032 instance configuration submode.

**profile** *profile-name*

<b>Syntax Description</b>	<i>profile-name</i> Ethernet ring G.8032 profile name.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Ethernet ring G.8032 instance configuration submode
----------------------	---

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

## Example

This example shows how to specify a G.8032 ring profile name:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# profile p1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

# pw-class

To configure the pseudowire class template name to use for the pseudowire, use the **pw-class** command in L2VPN bridge group bridge domain Access pseudowire configuration mode. To delete the pseudowire class, use the **no** form of this command.

```
pw-class class-name
no pw-class class-name
```

<b>Syntax Description</b>	<i>class-name</i> Pseudowire class name.						
<b>Command Default</b>	None						
<b>Command Modes</b>	L2VPN bridge group bridge domain Access pseudowire configuration						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.		
Release	Modification						
Release 3.7.2	This command was introduced.						
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write		
Task ID	Operations						
l2vpn	read, write						
<b>Examples</b>	<p>The following example shows how to attach the pseudowire class to the pseudowire:</p> <pre>RP/0/RSP0/CPU0:router# <b>configure</b> RP/0/RSP0/CPU0:router(config)# <b>l2vpn</b> RP/0/RSP0/CPU0:router(config-l2vpn)# <b>bridge group 1</b> RP/0/RSP0/CPU0:router(config-l2vpn-bg)# <b>bridge-domain bar</b> RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# <b>vfi v1</b> RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# <b>neighbor 10.1.1.2 pw-id 1000</b> RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-pw)# <b>pw-class canada</b></pre>						
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">bridge-domain (VPLS), on page 208</a></td> <td>Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.</td> </tr> <tr> <td><a href="#">bridge group (VPLS), on page 209</a></td> <td>Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.</td> </tr> </tbody> </table>	Command	Description	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
Command	Description						
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.						
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.						

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mpls static label (VPLS), on page 243</a>	Configures the MPLS static labels and the static labels for the access pseudowire configuration.
<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).
<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.

## route-target

To specify a route target for the VFI, PBB EVPN or EVPN bridge domain, use the **route-target** command in the BGP autodiscovery mode or in the EVPN EVI BGP configuration mode. To return to the default value, use the **no** form of this command.

```
route-target {as-number:nn ip-address:nn | [{export | import }]} | none}
no route-target {as-number:nn ip-address:nn | [{export | import }]} | none}
```

### Syntax Description

*as-number:nn* Autonomous system (AS) number of the route distinguisher.

- *as-number*—16-bit AS number

Range for 2-byte numbers is 1 to 65535. Range for 4-byte numbers is 1.0 to 65535.65535.

In the EVPN EVI BGP configuration, range for the 4-byte AS number is 65536-4294967295.

- *nn*—32-bit number

*ip-address:nn* IP address of the route distinguisher.

- *ip-address*—32-bit IP address
- *nn*—16-bit number

**export** Specifies export route target.

**import** Specifies import route target.

**none** Withholds BGP RTs.

**Note** This keyword appears only in the EVPN EVI BGP configuration.

### Command Default

None.

### Command Modes

BGP autodiscovery configuration

EVPN EVI BGP configuration

### Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.3.2	Support for this command in the EVPN EVI BGP configuration was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The default value is auto-generated based on VPN-ID.

**None** is used in the EVPN EVI BGP configuration mode to remove the auto-generated route targets. It can only be applied after all other route targets of that type (import or export) have been removed.

The **Import** and **Export** keywords in the EVPN EVI BGP configuration are optional. If neither is used, both are supported by default.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to configure a bridge domain:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)# l2vpn
RP/0/RSP0/CPU0:router (config-l2vpn)# bridge group EGroup
RP/0/RSP0/CPU0:router (config-l2vpn-bg)# bridge-domain eastdomain
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd)# vfi eastvfi
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd-vfi)# autodiscovery bgp
RP/0/RSP0/CPU0:router (config-l2vpn-bg-bd-vfi-ad)#route-target 100:20
```

The following example shows how to set the BGP route target for the PBB EVPN or EVPN bridge domain:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router (config)# evpn
RP/0/RSP0/CPU0:router (config-evpn)# evi 2
RP/0/RSP0/CPU0:router (config-evpn-evi)# bgp
RP/0/RSP0/CPU0:router (config-evpn-evi-bgp)# route-target 20:30
RP/0/RSP0/CPU0:router (config-evpn-evi-bgp)#
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">evi, on page 348</a>	Enters the EVPN EVI configuration mode to configure optional BGP settings for a bridge domain or EVI.
	<a href="#">bgp (EVPN), on page 339</a>	Enables BGP in the PBB EVPN configuration.

# routed

To specify the bridge domain L3 interface, use the **routed** command in L2VPN bridge-group bridge-domain configuration submodule. To revert, use the **no** form of the command.

**routed interface BVI** *BVI interface number*  
**no routed interface BVI** *BVI interface number*

Syntax Description	interface	Bridge domain L3 interface.
	BVI	Bridge-Group Virtual Interface.
	<i>BVI interface number</i>	BVI interface number. The range is 1-65535.

**Command Default** None

**Command Modes** L2VPN bridge-group bridge-domain configuration submodule

Command History	Release	Modification
	Release 4.2.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

The example shows how to specify the L3 bridge domain interface:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group bg1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bd1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# routed interface BVI 100
```

Related Commands	Command	Description
	<a href="#">dynamic-arp-inspection, on page 72</a>	Validates Address Resolution Protocol (ARP) packets in a network.
	<a href="#">ip-source-guard, on page 85</a>	Enables source IP address filtering on a layer 2 port.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.

Command	Description
<a href="#">mtu (VPLS), on page 245</a>	Adjusts the maximum packet size or maximum transmission unit (MTU) size for the bridge domain.
<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.
<a href="#">shutdown (Bridge Domain), on page 313</a>	Shuts down a bridge domain to bring the bridge and all attachment circuits and pseudowires under it to admin down state.
<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.



# rpl

To specify one ring port on local node being RPL owner, neighbor or next-neighbor, use the **rpl** command in the Ethernet ring G.8032 instance configuration submode. To disable the port as RPL owner, neighbor or next-neighbor, use the **no** form of this command.

```
rpl {port0 | port1} {owner | neighbor | next-neighbor}
no rpl {port0 | port1} {owner | neighbor | next-neighbor}
```

Syntax Description		
	<b>port0</b>	Assigns port0 as RPL owner, neighbor or next-neighbor.
	<b>port1</b>	Assigns port1 as RPL owner, neighbor or next-neighbor.
	<b>owner</b>	Assigns port0 or port1 as RPL owner.
	<b>neighbor</b>	Assigns port0 or port1 as neighbor.
	<b>next-neighbor</b>	Assigns port0 or port1 as next neighbor.

**Command Default** None

**Command Modes** Ethernet ring G.8032 instance configuration submode

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to assign port0 as neighbor:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# ethernet ring g8032 r1
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# instance 1
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# description test
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# profile p1
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)# rpl port0 neighbor  
RP/0/RSP0/CPU0:router(config-l2vpn-erp-instance)#
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## show ethernet ring g8032

To display Ethernet ring G.8032 Protection data, use the **show ethernet ring g8032** command in the EXEC mode.

```
show ethernet ring g.8032 {brief ring-name | profile ring-profile-name | statistics | status {ring-name | location location} | summary}
```

Syntax Description	
<b>brief</b>	Displays brief information on the G.8032 ethernet ring.
<b>profile</b>	Displays information about the G.8032 ethernet ring profile.
<b>statistics</b>	Displays the statistics of the G.8032 ethernet ring.
<b>status</b>	Displays the status of the G.8032 ethernet ring.
<b>summary</b>	Displays a summary of the G.8032 ethernet ring.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	vlan	read
	interface	read
	ethernet-services	read

This example shows the output of the **show ethernet ring g8032** command:

```
RP/0/RSP0/CPU0:router# show ethernet ring g8032 status
```

```
Ethernet ring Subring instance 1 is RPL Owner node in Protection state
  Port0: Bundle-Ether100 (Monitor: Bundle-Ether100)
        APS-Channel: Bundle-Ether100.1
        Status: RPL, faulty, blocked
        Remote R-APS NodeId: 0000.0000.0000, BPR: 0
  Port1: GigabitEthernet0/0/0/38 (Monitor: GigabitEthernet0/0/0/38)
        APS-Channel: GigabitEthernet0/0/0/38.1
```

## show ethernet ring g8032

```

        Status: NonRPL
        Remote R-APS NodeId: 0000.0000.0000, BPR: 0
    APS Level: 7
    Open APS ring topology
    Profile: timer-wtr (not defined)
        WTR interval: 5 minutes
        Guard interval: 500 milliseconds
        Hold-off interval: 0 seconds
        Revertive mode

Ethernet ring Subring-2 instance 1 is RPL Owner node in Idle state
    Port0: GigabitEthernet0/0/0/33 (Monitor: GigabitEthernet0/0/0/33)
        APS-Channel: GigabitEthernet0/0/0/33.1
        Status: RPL, blocked
        Remote R-APS NodeId: 0000.0000.0000, BPR: 0
    Port1: GigabitEthernet0/0/0/3 (Monitor: GigabitEthernet0/0/0/3)
        APS-Channel: GigabitEthernet0/0/0/3.1
        Status: NonRPL
        Remote R-APS NodeId: 0000.0000.0000, BPR: 0
    APS Level: 7
    Open APS ring topology
    Profile: timer-wtr (not defined)
        WTR interval: 5 minutes
        Guard interval: 500 milliseconds
        Hold-off interval: 0 seconds
        Revertive mode
RP/0/RSP0/CPU0:router#

```

```

RP/0/RSP0/CPU0:router# show ethernet ring g8032 brief
Wed Mar 16 07:14:28.719 UTC

```

```

R: Interface is the RPL-link
F: Interface is faulty
B: Interface is blocked
FS: Local forced switch
MS: Local manual switch

```

RingName	Inst	NodeType	NodeState	Port0	Port1
Subring	1	Owner	Protection	R, F, B	
Subring-2	1	Owner	Idle	R, B	

```

RP/0/RSP0/CPU0:F4-2-A9K#

```

```

RP/0/RSP0/CPU0:router# show ethernet ring g8032 summary
Wed Mar 16 07:14:52.419 UTC

```

```

Chassis Node Id 0026.982b.c6e7

```

```

States
-----
Init                0
Idle                1
Protection          1
Manual Switch       0
Forced Switch       0
Pending             0
-----
Total                2
RP/0/RSP0/CPU0:router#

```

```

RP/0/RSP0/CPU0:router# show ethernet ring g8032 statistics Subring instance 1

```

```

Statistics for Ethernet ring Subring instance 1
Local SF detected:
  Port0: 1
  Port1: 0

R-APS   Port0 (Tx/Rx)           Port1 (Tx/Rx)
        Last Tx time         Last Tx time
        Last Rx time         Last Rx time
-----
NR      : 3/0
        Tue Mar 15 04:41:00.964 UTC   Never
        Never                       Never
NR,RB   : 0/0
        Never                       Never
        Never                       Never
SF      : 19129/0
        Wed Mar 16 07:15:28.995 UTC   Wed Mar 16 07:15:28.774 UTC
        Never                       Never
MS      : 0/0
        Never                       Never
        Never                       Never
FS      : 0/0
        Never                       Never
        Never                       Never
EVENT   : 0/0
        Never                       Never
        Never                       Never

State           Last entry into state time
-----
Init           : Tue Mar 15 04:41:00.933 UTC
Idle           : Never
Protection     : Tue Mar 15 04:41:00.973 UTC
Manual Switch  : Never
Forced Switch  : Never
Pending        : Tue Mar 15 04:41:00.962 UTC
RP/0/RSP0/CPU0:router#

RP/0/RSP0/CPU0:router# show ethernet ring g8032 profile timer-wtr
Wed Mar 16 07:20:04.996 UTC

Ethernet ring profile name: timer-wtr
  WTR interval: 1 minutes
  Guard interval: 500 milliseconds
  Hold-off interval: 0 seconds
  Revertive mode
RP/0/RSP0/CPU0:router#
    
```

**Related Commands**

Command	Description
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## show l2vpn bridge-domain (VPLS)

To display information for the bridge ports such as attachment circuits and pseudowires for the specific bridge domains, use the **show l2vpn bridge-domain** command in EXEC mode.

```
show l2vpn bridge-domain [{autodiscovery | bd-name bridge-domain-name | brief | detail | group
bridge-domain-group-name | hardware | interface type interface-path-id | pw-id value }] neighbor
IP-address [{pw-id value | pbb | summary}]
```

Syntax Description	
<b>autodiscovery</b>	(Optional) Displays BGP autodiscovery information.
<b>bd-name</b> <i>bridge-domain-name</i>	(Optional) Displays filter information on the <i>bridge-domain-name</i> . The <i>bridge-domain-name</i> argument is used to name a bridge domain.
<b>brief</b>	(Optional) Displays brief information about the bridges.
<b>detail</b>	(Optional) Displays detailed information about the bridges. Also, displays the output for the Layer 2 VPN (L2VPN) to indicate whether or not the MAC withdrawal feature is enabled and the number of MAC withdrawal messages that are sent or received from the pseudowire.
<b>group</b> <i>bridge-domain-group-name</i>	(Optional) Displays filter information on the bridge-domain group name. The <i>bridge-domain-group-name</i> argument is used to name the bridge domain group.
<b>hardware</b>	(Optional) Displays hardware information.
<b>interface</b> <i>type interface-path-id</i>	(Optional) Displays the filter information for the interface on the bridge domain. <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>neighbor</b> <i>ip-address</i>	(Optional) Displays the bridge domains that contain the pseudowires to match the filter for the neighbor. The <i>ip-address</i> argument is used to specify IP address of the neighbor.
<b>pw-id</b> <i>value</i>	(Optional) Displays the filter for the pseudowire ID. The range is from 1 to 4294967295.
<b>pbb</b>	(Optional) Displays provider backbone bridge information.
<b>summary</b>	(Optional) Displays the summary information for the bridge domain.
<b>Command Default</b>	None
<b>Command Modes</b>	EXEC mode

Command History	Release	Modification
	Release 3.7.2	This command was introduced.
	Release 5.1.2	This command was modified to enable filtering the command output for specific pseudowire with just the pseudowire ID.
	Release 5.3.1	The show command output was enhanced to display VXLAN anycast gateway parameters.
	Release 5.3.2	The show command output is enhanced to display the MAC move counter information.

**Usage Guidelines**

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

Use the **interface** keyword to display only the bridge domain that contains the specified interface as an attachment circuit. In the sample output, only the attachment circuit matches the filter that is displayed. No pseudowires are displayed.



**Note** For Cisco IOS XR software Release 5.1.2 and above, you can filter the command output for a specific pseudowire with just the pseudowire ID. However, in case of configurations with BGP Auto-discovery with BGP or LDP signaling (in VPLS), you can specify the pseudowire only with the combination of the neighbor filter and the pseudowire ID.

**Task ID**

Task ID	Operations
l2vpn	read

**Examples**

This is the sample output for **show l2vpn bridge-domain** command with VxLAN parameters configured:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain bd-name bg1_bd1 detail
Legend: pp = Partially Programmed.
Bridge group: bg1, bridge-domain: bg1_bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Coupled state: disabled
  MAC learning: enabled
  MAC withdraw: enabled
    MAC withdraw for Access PW: enabled
    MAC withdraw sent on: bridge port up
    MAC withdraw relaying (access to access): disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
```

## show l2vpn bridge-domain (VPLS)

```

MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC port down flush: enabled
MAC Secure: disabled, Logging: disabled
Split Horizon Group: none
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
DHCPv4 snooping: disabled
IGMP Snooping: enabled
IGMP Snooping profile: none
MLD Snooping profile: none
Storm Control: disabled
Bridge MTU: 1500
MIB cvplsConfigIndex: 1
Filter MAC addresses:
P2MP PW: disabled
Create time: 30/03/2015 22:25:38 (00:26:08 ago)
No status change since creation
ACs: 2 (2 up), VFIs: 1, PWs: 0 (0 up), PBBs: 0 (0 up)
List of ACs:
  AC: BV11, state is up
    Type Routed-Interface
    MTU 1514; XC ID 0x80000001; interworking none
    BVI MAC address:
      1000.4444.0001
  AC: GigabitEthernet0/8/0/0.1, state is up
    Type VLAN; Num Ranges: 1
    Outer Tag: 1
    VLAN ranges: [1001, 1001]
    MTU 1508; XC ID 0x508000a; interworking none
    MAC learning: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 4000, Action: none, Notification: syslog
    MAC limit reached: no
    MAC port down flush: enabled
    MAC Secure: disabled, Logging: disabled
    Split Horizon Group: none
    Dynamic ARP Inspection: disabled, Logging: disabled
    IP Source Guard: disabled, Logging: disabled
    DHCPv4 snooping: disabled
    IGMP Snooping: enabled
    IGMP Snooping profile: none
    MLD Snooping profile: none
    Storm Control: bridge-domain policer
    Static MAC addresses:

    Storm control drop counters:
      packets: broadcast 0, multicast 0, unknown unicast 0
      bytes: broadcast 0, multicast 0, unknown unicast 0
    Dynamic ARP inspection drop counters:
      packets: 0, bytes: 0
    IP source guard drop counters:
      packets: 0, bytes: 0
List of VNIs:
  VNI 1, state is up
    XC ID 0x80000014
    Encap type VXLAN
    Overlay nve100, Source 1.1.1.1, Multicast Group 225.1.1.1, UDP Port 4789
    Anycast VTEP 100.1.1.1, Anycast Multicast Group 224.10.10.1
    MAC learning: enabled
    Flooding:

```



```

Broadcast & Multicast: enabled
Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC port down flush: enabled
MAC Secure: disabled, Logging: disabled
Split Horizon Group: none
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
DHCPv4 snooping: disabled
IGMP Snooping: enabled
IGMP Snooping profile: none
MLD Snooping profile: none
Storm Control: bridge-domain policer

```

```

List of Access PWs:
List of VFIs:
  VFI bgl_bdl_vfi (up)
  VFI Statistics:
    drops: illegal VLAN 0, illegal length 0

```

The following sample output shows information for the bridge ports such as attachment circuits and pseudowires for the specific bridge domains:

```

RP/0/RSP0/CPU0:router# #show l2vpn bridge-domain
Tue Feb 23 20:21:56.758 PST
Bridge group: 189, bridge-domain: 189, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 2 (2 up), VFIs: 0, PWs: 0 (0 up), PBBs: 0 (0 up)
  List of ACs:
    Gi0/1/0/3.189, state: up, Static MAC addresses: 0
    Gi0/1/0/7.189, state: up, Static MAC addresses: 0
  List of Access PWs:
  List of VFIs:
Bridge group: 190, bridge-domain: 190, id: 1, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 0 (0 up), VFIs: 1, PWs: 3 (3 up), PBBs: 0 (0 up)
  List of ACs:
  List of Access PWs:
  List of VFIs:
    VFI 190
      Neighbor 10.19.19.19 pw-id 190, state: up, Static MAC addresses: 0
Bridge group: 210, bridge-domain: 210, id: 2, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
  List of ACs:
    Gi0/1/0/7.210, state: up, Static MAC addresses: 0
  List of Access PWs:
  List of VFIs:
    VFI 210
      Neighbor 10.19.19.19 pw-id 210, state: up, Static MAC addresses: 0
Bridge group: 211, bridge-domain: 211, id: 3, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
  List of ACs:
    Gi0/1/0/7.211, state: up, Static MAC addresses: 0
  List of Access PWs:

```

## show l2vpn bridge-domain (VPLS)

```

List of VFIs:
  VFI 211
    Neighbor 10.19.19.19 pw-id 211, state: up, Static MAC addresses: 0
Bridge group: 215, bridge-domain: 215, id: 4, state: up, ShgId: 0, MSTi: 0
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 2 (2 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
List of ACs:
  Gi0/1/0/3.215, state: up, Static MAC addresses: 0
  Gi0/1/0/7.215, state: up, Static MAC addresses: 0
List of Access PWs:
List of VFIs:
  VFI 215
    Neighbor 10.19.19.19 pw-id 215, state: up, Static MAC addresses: 0
Bridge group: 2130, bridge-domain: 2130, id: 5, state: up, ShgId: 0, MSTi: 0
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
List of ACs:
  Gi0/1/0/7.2130, state: up, Static MAC addresses: 0
List of Access PWs:
List of VFIs:
  VFI 2130
    Neighbor 10.19.19.19 pw-id 2130, state: up, Static MAC addresses: 0

```

This table describes the significant fields shown in the display.

**Table 5: show l2vpn bridge-domain Command Field Descriptions**

Field	Description
Bridge group	Name of bridge domain group is displayed.
bridge-domain	Name of bridge domain is displayed.
id	ID assigned to this bridge domain is displayed.
state	Current state of the bridge domain is displayed.
ShgId	ID for the default Split Horizon Group assigned to all attachment circuits and access pseudowires that are part of this bridge domain is displayed.  <b>Note</b> Members of the special Split Horizon Group ID 0 forwards to other members of the same SPG.

The following example shows sample output for a bridge named bd1:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain bd-name bd1

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
List of ACs:
  Gi0/1/0/0, state: up, Static MAC addresses: 2, MSTi: 0 (unprotected)
List of Access PWs:
List of VFIs:

```

```
VFI 1
  Neighbor 10.1.1.1 pw-id 1, state: up, Static MAC addresses: 0
```

The following sample output shows brief information about the bridges:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain brief
Bridge Group/Bridge-Domain Name  ID  State  Num ACs/up  Num PWs/up
-----
bg1/bd1                          0   up     1/1         0/0
bg1/bd2                          1   up     0/0         0/0
bg1/bd3                          2   up     0/0         0/0
```

This table describes the significant fields shown in the display.

**Table 6: show l2vpn bridge-domain brief Command Field Descriptions**

Field	Description
Bridge Group/Bridge-Domain Name	Bridge domain group name followed by the bridge domain name are displayed.
ID	ID assigned to this bridge domain is displayed.
State	Current state of the bridge domain is displayed.
Num ACs/up	Total number of attachment circuits that are up in this bridge domain is displayed.
Num PWs/up	Total number of pseudowires that are up in this bridge domain is displayed. The count includes both VFI pseudowires and access pseudowires.

The following sample output shows detailed information for IOS-XR releases 5.3.1 and earlier releases.

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail

Bridge group: 210, bridge-domain: 210, id: 2, state: up, ShgId: 0, MSTi: 0
  MAC learning: enabled
  MAC withdraw: disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  Split Horizon Group: none
  DHCPv4 snooping: disabled
  IGMP Snooping profile: none
  Bridge MTU: 9000
  Filter MAC addresses:
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
  List of ACs:
    AC: GigabitEthernet0/1/0/7.210, state is up
      Type VLAN; Num Ranges: 1
      vlan ranges: [100, 100]
      MTU 9008; XC ID 0x440007; interworking none; MSTi 0 (unprotected)
      MAC learning: enabled
      Flooding:
        Broadcast & Multicast: enabled
```

## show l2vpn bridge-domain (VPLS)

```

Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
Split Horizon Group: enabled
DHCPv4 snooping: disabled
IGMP Snooping profile: none
Storm Control: disabled
Static MAC addresses:
Statistics:
  packet totals: receive 31645, send 6
  byte totals: receive 2405020, send 456
Storm control drop counters:
  packet totals: broadcast 0, multicast 0, unknown unicast 0
  byte totals: broadcast 0, multicast 0, unknown unicast 0
List of Access PWs:
List of VFIs:
VFI 210
PW: neighbor 10.19.19.19, PW ID 210, state is up ( established )
PW class not set, XC ID 0xffffc0004
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
      MPLS          Local          Remote
-----
Label          16001          16
Group ID       0x2            0x0
Interface      210            unknown
MTU            9000           9000
Control word   disabled       disabled
PW type        Ethernet       Ethernet
VCCV CV type   0x2            0x2
                (LSP ping verification)    (LSP ping verification)
VCCV CC type   0x6            0x2
                (router alert label)      (router alert label)
                (TTL expiry)
-----
Create time: 13/04/1900 14:36:13 (17:46:22 ago)
Last time status changed: 13/04/1900 15:37:03 (16:45:32 ago)
MAC withdraw message: send 0 receive 0
Static MAC addresses:
Statistics:
  packet totals: receive 6, send 31655
  byte totals: receive 432, send 2279160
IGMP Snooping profile: none
VFI Statistics:
  drops: illegal VLAN 0, illegal length 0

```

The following sample output shows detailed information for IOS-XR release 5.3.2 release.

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail
Bridge group: pbb, bridge-domain: pbb_core2, id: 11, state: up, ShgId: 0, MSTi: 0
Coupled state: disabled
Type: pbb-core
Number of associated pbb-edge BDs: 1
EVPN:
  EVI: 2
  Route Distinguisher: (auto) 20.20.20.20:2
  Imposition Statistics:
    Packet Count: 0
    Byte Count : 0
  Disposition Statistics:

```

```

    Packet Count: 599123
    Byte Count  : 166433410
  AS Number: 200
  MAC learning: enabled
  MAC withdraw: enabled
    MAC withdraw for Access PW: enabled
    MAC withdraw sent on: bridge port up
    MAC withdraw relaying (access to access): disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  MAC port down flush: enabled
  MAC Secure: disabled, Logging: disabled
  Split Horizon Group: none
  Dynamic ARP Inspection: disabled, Logging: disabled
  IP Source Guard: disabled, Logging: disabled
  DHCPv4 snooping: disabled
  IGMP Snooping: enabled
  IGMP Snooping profile: none
  MLD Snooping profile: none
  Storm Control: disabled
  Bridge MTU: 1500
  MIB cvplsConfigIndex: 12
  Filter MAC addresses:
  P2MP PW: disabled
  Create time: 03/08/2015 04:09:55 (2w6d ago)
  No status change since creation
  ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
  List of PBBs:
    PBB Core, state is up
      Vlan-id: 2; XC ID 0x80000011
      MAC learning: enabled
      Flooding:
        Broadcast & Multicast: enabled
        Unknown unicast: enabled
      MAC aging time: 300 s, Type: inactivity
      MAC limit: 4000, Action: none, Notification: syslog
      MAC limit reached: no
      MAC port down flush: enabled
      Split Horizon Group: none
      DHCPv4 snooping: disabled
      IGMP Snooping: enabled
      IGMP Snooping profile: none
      MLD Snooping profile: none
      MMRP Flood Optimization: disabled
      Storm Control: bridge-domain policer
  List of EVPNs:
    EVPN, state: up
      evi: 2
      XC ID 0x80001f51
  List of ACs:
  List of Access PWs:
  List of VFIs:

```

The following sample output shows detailed information including P2MP enabled, P-Tree-ID and LSM ID with 1 VFI PW in a bridge domain for IOS-XR 5.3.1 and earlier releases:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail
```

```
Bridge group: bgl, bridge-domain: bdl, id: 0, state: up, ShgId: 0, MSTi: 0
```

## show l2vpn bridge-domain (VPLS)

```

MAC learning: enabled
MAC withdraw: enabled
  MAC withdraw for Access PW: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4294967295, Action: none, Notification: syslog
MAC limit reached: no
MAC port down flush: enabled
MAC Secure: disabled, Logging: disabled
Split Horizon Group: none
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
DHCPv4 snooping: disabled
IGMP Snooping profile: none
Bridge MTU: 1500
MIB cvplsConfigIndex: 1
Filter MAC addresses:
Create time: 27/04/2011 10:00:47 (00:14:31 ago)
No status change since creation
ACs: 0 (0 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
List of ACs:
List of Access PWs:
List of VFIs:
  VFI 1
    P2MP:
      RSVP-TE transport, BGP signaling, PTree ID 14
      LSM-ID: 0xdeadbeef
    PW: neighbor 110.110.110.110, PW ID 1234, state is up (established)
      PW class not set, XC ID 0xffffc0001
      Encapsulation MPLS, protocol LDP
      Source address 100.100.100.100
      PW type Ethernet, control word disabled, interworking none
      PW backup disable delay 0 sec
      Sequencing not set

    PW Status TLV in use
      MPLS          Local          Remote
      Label         16000          16000
      Group ID      0x0             0x0
      Interface     1               1
      MTU           1500            1500
      Control word  disabled        disabled
      PW type       Ethernet        Ethernet
      VCCV CV type  0x2             0x2
                    (LSP ping verification)  (LSP ping verification)
      VCCV CC type  0x6             0x6
                    (router alert label)  (router alert label)
                    (TTL expiry)         (TTL expiry)

    Incoming Status (PW Status TLV):
      Status code: 0x0 (Up) in Notification message
    Outgoing Status (PW Status TLV):
      Status code: 0x0 (Up) in Notification message
    MIB cpwVcIndex: 4294705153
    Create time: 27/04/2011 10:14:45 (00:00:34 ago)
    Last time status changed: 27/04/2011 10:15:16 (00:00:02 ago)
    MAC withdraw message: send 0 receive 0
    P2MP-PW:
      FEC          Local          Remote
      Label        NULL (inclusive tree)  NULL (inclusive tree)

```

```

P2MP ID          1                      1
Flags            0x00                  0x00
PTree Type      RSVP-TE                RSVP-TE
Tunnel ID       1000                   1000
Ext. Tunnel ID  192.168.0.1             192.168.0.2

P2MP forwarding: enabled
Static MAC addresses:
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
DHCPv4 snooping: disabled
IGMP Snooping profile: none
VPN-ID: 1
VFI Statistics:
  drops: illegal VLAN 0, illegal length 0

```

The following sample output shows detailed information including P2MP enabled, P-Tree-ID and LSM ID with 1 VFI PW in a bridge domain for IOS-XR 5.3.2 release:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail

Bridge group: bg1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
MAC learning: enabled
MAC withdraw: enabled
MAC withdraw for Access PW: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4294967295, Action: none, Notification: syslog
MAC limit reached: no
MAC port down flush: enabled
MAC Secure: disabled, Logging: disabled
Split Horizon Group: none
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
DHCPv4 snooping: disabled
IGMP Snooping profile: none
Bridge MTU: 1500
MIB cvplsConfigIndex: 1
Filter MAC addresses:
Create time: 27/04/2011 10:00:47 (00:14:31 ago)
No status change since creation
ACs: 0 (0 up), VFIs: 1, PWs: 1 (1 up), PBBs: 0 (0 up)
List of ACs:
List of Access PWs:
List of VFIs:
  VFI 1
    P2MP:
      RSVP-TE transport, BGP signaling, PTree ID 14
      LSM-ID: 0xdeadbeef
    PW: neighbor 110.110.110.110, PW ID 1234, state is up (established)
      PW class not set, XC ID 0xffffc0001
      Encapsulation MPLS, protocol LDP
      Source address 100.100.100.100
      PW type Ethernet, control word disabled, interworking none
      PW backup disable delay 0 sec
      Sequencing not set

PW Status TLV in use
MPLS          Local                      Remote

```

## show l2vpn bridge-domain (VPLS)

```

Label          16000          16000
Group ID       0x0             0x0
Interface      1             1
MTU            1500          1500
Control word   disabled       disabled
PW type        Ethernet     Ethernet
VCCV CV type   0x2             0x2
                (LSP ping verification) (LSP ping verification)
VCCV CC type   0x6             0x6
                (router alert label) (router alert label)
                (TTL expiry)      (TTL expiry)

Incoming Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 4294705153
Create time: 27/04/2011 10:14:45 (00:00:34 ago)
Last time status changed: 27/04/2011 10:15:16 (00:00:02 ago)
MAC withdraw message: send 0 receive 0
P2MP-PW:
  FEC          Local          Remote

  Label        NULL (inclusive tree)  NULL (inclusive tree)
  P2MP ID      1                        1
  Flags        0x00                   0x00
  PTree Type   RSVP-TE                 RSVP-TE
  Tunnel ID    1000                   1000
  Ext. Tunnel ID 192.168.0.1          192.168.0.2

  P2MP forwarding: enabled
  Static MAC addresses:
  Statistics:
  packets: received 1000 (unicast 1000), sent 0
  bytes: received 128000 (unicast 128000), sent 0
  MAC move: 10
  DHCPv4 snooping: disabled
  IGMP Snooping profile: none
  VPN-ID: 1
  VFI Statistics:
  drops: illegal VLAN 0, illegal length 0

```

The following sample output shows that when a bridge operates in VPLS mode, the irrelevant information for MAC learning is suppressed:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail
Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
List of ACs:

```



```
AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003
```

List of Access PWs:

List of VFIs:

VFI 1

```
PW: neighbor 1.1.1.1, PW ID 1, state is up ( established )
PW class mpls, XC ID 0xff000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
```

	MPLS	Local	Remote
Label	16003		16003
Group ID	0x0		0x0
Interface	1		1
MTU	1500		1500
Control word	disabled		disabled
PW type	Ethernet		Ethernet
VCCV CV type	0x2		0x2
	(LSP ping verification)		(LSP ping verification)
VCCV CC type	0x2		0x2
	(router alert label)		(router alert label)

```
-----
Create time: 12/03/2008 14:03:00 (17:17:30 ago)
Last time status changed: 13/03/2008 05:57:58 (01:22:31 ago)
MAC withdraw message: send 0 receive 0
Static MAC addresses:
```

VFI Statistics:

drops: illegal VLAN 0, illegal length 0

Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0

```
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
```

ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)

List of PBBs:

PBB Edge, state is up

## show l2vpn bridge-domain (VPLS)

```

XC ID 0x2000001
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Split Horizon Group: none
DHCPv4 snooping: disabled
IGMP Snooping profile:
Storm Control: disabled
Unknown-unicast-bmac: 666.777.888
CMAC to BMAC Mapping Table:
  CMAC          |      BMAC
  -----
  222.333.444   |    777.888.999
  333.444.555   |    888.999.111
Statistics:
  packet totals: receive 3919680,send 9328
  byte totals: receive 305735040,send 15022146

```

## List of ACs:

```

AC: GigabitEthernet0/1/0/0, state is up
Type Ethernet
MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
Static MAC addresses:
  0000.0000.0000
  0001.0002.0003

```

```

Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0

```

```

Type: pbb-core
Number of associated pbb-edge BDs: 1
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:

```

```

ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)

```

## List of PBBs:

```

PBB Core, state is up
Vlan-id: 1; XC ID 0x2000001
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled

```

```

    Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 600, Action: none, Notification: syslog
    MAC limit reached: no
    Security: disabled
    Split Horizon Group: none
    DHCPv4 snooping: profile foo
    IGMP Snooping profile:
    Storm Control: disabled
    
```

List of ACs:

```

AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003
    
```

This table describes the significant fields shown in the display.

**Table 7: show l2vpn bridge-domain detail Command Field Descriptions**

Field	Description
Bridge group	Name of bridge domain group is displayed.
bridge-domain	Name of bridge domain is displayed.
ID	ID assigned to this bridge domain is displayed.
state	Current state of the bridge domain is displayed.
ShgId	Split horizon group ID. This field is not used.
MSTi	ID for the Multiple Spanning Tree.
Split Horizon Group	Shows whether the AC is a member of the split horizon group for ACs. There is only one split horizon group for ACs per bridge domain. <ul style="list-style-type: none"> <li>• Enabled—The port belongs to the split horizon group for ACs.</li> <li>• None—The port does not belong to the split horizon group for ACs.</li> </ul>

The following sample output shows filter information about the bridge-domain group named g1:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain group g1

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
    
```

**show l2vpn bridge-domain (VPLS)**

```
List of ACs:
  Gi0/1/0/0, state: up, Static MAC addresses: 2, MSTi: 0 (unprotected)
List of Access PWs:
List of VFIs:
  VFI 1
    Neighbor 10.1.1.1 pw-id 1, state: up, Static MAC addresses: 0
```

The following sample output shows display the filter information for the interface on the bridge domain for IOS-XR 5.3.1 and earlier releases:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain interface gigabitEthernet 0/1/0/0

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
  List of ACs:
    Gi0/1/0/0, state: up, Static MAC addresses: 2, MSTi: 0 (unprotected)
```

The following sample output shows display the filter information for the interface on the bridge domain for IOS-XR 5.3.2 release:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain interface gigabitEthernet 0/1/0/0

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
  List of ACs:
    Gi0/1/0/0, state: up, Static MAC addresses: 2, MSTi: 0 (unprotected)
Statistics:
  packets: received 2000 (multicast 0, broadcast 0, unicast 1000, unknown unicast
1000), sent 1000
  bytes: received 93372 (multicast 0, broadcast 0, unicast 64000, unknown unicast
64000), sent 124000
  MAC move: 500
```

The following sample output shows that the bridge domain contains the pseudowires to match the filter for the neighbor for IOS-XR 5.3.1 and earlier releases:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain neighbor 10.1.1.1

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
  List of Access PWs:
  List of VFIs:
    VFI 1
      Neighbor 10.1.1.1 pw-id 1, state: up, Static MAC addresses: 0
```

The following sample output shows that the bridge domain contains the pseudowires to match the filter for the neighbor for IOS-XR 5.3.2 release:

```
RP/0/RSP0/CPU0:router# show l2vpn bridge-domain neighbor 10.1.1.1

Bridge group: g1, bridge-domain: bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
```

```

Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 1, PWs: 1 (1 up)
List of Access PWs:
List of VFIs:
  VFI 1
    Neighbor 10.1.1.1 pw-id 1, state: up, Static MAC addresses: 0
Statistics:
  packets: received 1000 (unicast 1000), sent 0
  bytes: received 128000 (unicast 128000), sent 0
  MAC move: 10
    
```

The following sample output shows the summary information for the bridge domain:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain summary

Number of groups: 1, bridge-domains: 2, Up: 2, Shutdown: 0
Default: 0, pbb-edge: 1, pbb-core: 1
Number of ACs: 1 Up: 1, Down: 0
Number of PWs: 0 Up: 0, Down: 0
    
```

The following sample output shows the summary information for the bridge domain including number of bridge-domains with P2MP PW enabled:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain summary

Number of groups: 1, bridge-domains: 1, Up: 1, Shutdown: 0
Default: 1, pbb-edge: 0, pbb-core: 0
Bridge-domains with P2MP PW enabled: 1
Number of ACs: 3 Up: 3, Down: 0
Number of PWs: 2 Up: 2, Down: 0, Standby: 0
    
```

This table describes the significant fields shown in the display.

**Table 8: show l2vpn bridge-domain summary Command Field Descriptions**

Field	Description
Number of groups	Number of configured bridge domain groups is displayed.
bridge-domains	Number of configured bridge domains is displayed.
Shutdown	Number of bridge domains that are in Shutdown state is displayed.
Number of ACs	Number of attachment circuits that are in Up state and Down state are displayed.
Number of PWs	Number of pseudowires that are in Up state and Down state are displayed. This includes the VFI pseudowire and the access pseudowire.

This example shows the sample output of a configured flow label:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail
Bridge group: g1, bridge-domain: d1, id: 0, state: up, ShgId: 0, MSTi: 0
.....
PW: neighbor 3.3.3.3, PW ID 2, state is up ( established )
PW class class1, XC ID 0x1000002
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word disabled, interworking none
    
```

## show l2vpn bridge-domain (VPLS)

```

PW backup disable delay 0 sec
Sequencing not set
Flow label flags configured (Rx=1,Tx=1), negotiated (Rx=0,Tx=1)

```

This example shows sample output of a PBB Edge Bridge Domain for IOS-XR 5.3.1 and earlier releases:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain bd-name pbb-bd1 detail
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
MAC withdraw: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state is up
  XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Split Horizon Group: none
  DHCPv4 snooping: disabled
  IGMP Snooping profile:
  Storm Control: disabled
  Unknown-unicast-bmac: 666.777.888
  CMAC to BMAC Mapping Table:
    CMAC          |          BMAC
    -----
    222.333.444   |    777.888.999
    333.444.555   |    888.999.111
  Statistics:
    packet totals: receive 3919680,send 9328
    byte totals: receive 305735040,send 15022146
List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003

```

```

Statistics:
  packet totals: receive 3919680,send 9328
  byte totals: receive 305735040,send 15022146

```

This example shows sample output of a PBB Edge Bridge Domain for IOS-XR 5.3.2 release:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain bd-name pbb-bd1 detail
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  MAC withdraw: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  MTU: 1500
  Filter MAC addresses:
ACs: 1 (1 up), VFI: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state is up
  XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Split Horizon Group: none
  DHCPv4 snooping: disabled
  IGMP Snooping profile:
  Storm Control: disabled
  Unknown-unicast-bmac: 666.777.888
  CMAC to BMAC Mapping Table:
    CMAC          |          BMAC
    -----
    222.333.444   |    777.888.999
    333.444.555   |    888.999.111
  Statistics:
    packets: received 1000 (unicast 1000), sent 0
    bytes: received 128000 (unicast 128000), sent 0
    MAC move: 10
List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003

```

## show l2vpn bridge-domain (VPLS)

```

Statistics:
  packets: received 1000 (unicast 1000), sent 0
  bytes: received 128000 (unicast 128000), sent 0
  MAC move: 10

```

This example shows sample output of a PBB Core Bridge Domain:

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain bd-name pbb-bd2 detail
Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
Type: pbb-core
Number of associated pbb-edge BDs: 1
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:

ACs: 1 (1 up), VFIs: 0, PWS: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Core, state is up
  Vlan-id: 1; XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 600, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  Split Horizon Group: none
  DHCPv4 snooping: profile foo
  IGMP Snooping profile:
  Storm Control: disabled
List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003

```

The following sample output shows detailed information about a bridge domain that has VXLAN configured.

```

RP/0/RSP0/CPU0:router# show l2vpn bridge-domain detail
Fri Mar 14 13:30:26.476 EST

```



```

Legend: pp = Partially Programmed.
Bridge group: bgl, bridge-domain: 10, id: 0, state: up, ShgId: 0, MSTi: 0
  Coupled state: disabled
  MAC learning: enabled
  MAC withdraw: enabled
    MAC withdraw for Access PW: enabled
    MAC withdraw sent on: bridge port up
    MAC withdraw relaying (access to access): disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  MAC port down flush: enabled
  MAC Secure: disabled, Logging: disabled
  Split Horizon Group: none
  Dynamic ARP Inspection: disabled, Logging: disabled
  IP Source Guard: disabled, Logging: disabled
  DHCPv4 snooping: disabled
  IGMP Snooping: enabled
  IGMP Snooping profile: none
  MLD Snooping profile: none
  Storm Control: disabled
  Bridge MTU: 1500
  MIB cvplsConfigIndex: 1
  Filter MAC addresses:
  P2MP PW: disabled
  Create time: 14/03/2014 12:37:53 (00:52:33 ago)
  Last time status changed: 14/03/2014 13:12:20 (00:18:06 ago)
  ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 0 (0 up)
  List of ACs:
    AC: GigabitEthernet0/1/0/8.10, state is up
      Type VLAN; Num Ranges: 1
      VLAN ranges: [10, 10]
      MTU 1504; XC ID 0x1880017; interworking none
      MAC learning: enabled
      Flooding:
        Broadcast & Multicast: enabled
        Unknown unicast: enabled
      MAC aging time: 300 s, Type: inactivity
      MAC limit: 4000, Action: none, Notification: syslog
      MAC limit reached: no
      MAC port down flush: enabled
      MAC Secure: disabled, Logging: disabled
      Split Horizon Group: none
      Dynamic ARP Inspection: disabled, Logging: disabled
      IP Source Guard: disabled, Logging: disabled
      DHCPv4 snooping: disabled
      IGMP Snooping: enabled
      IGMP Snooping profile: none
      MLD Snooping profile: none
      Storm Control: disabled
      Static MAC addresses:

      Storm control drop counters:
        packets: broadcast 0, multicast 0, unknown unicast 0
        bytes: broadcast 0, multicast 0, unknown unicast 0
      Dynamic ARP inspection drop counters:
        packets: 0, bytes: 0
      IP source guard drop counters:
        packets: 0, bytes: 0
  List of VNIs:
    VNI 5010, state is up

```

**show l2vpn bridge-domain (VPLS)**

```

Encap type VXLAN
Overlay nve1, Source 55.55.55.52, Multicast Group 225.0.1.10, UDP Port 8472
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC port down flush: enabled
MAC Secure: disabled, Logging: disabled
Split Horizon Group: none
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
DHCPv4 snooping: disabled
IGMP Snooping: enabled
IGMP Snooping profile: none
MLD Snooping profile: none
Storm Control: disabled
List of Access PWs:
List of VFIs:

```

**Related Commands**

Command	Description
<a href="#">clear l2vpn bridge-domain (VPLS), on page 210</a>	Clears the MAC addresses and restarts the bridge domains on the router.

## show l2vpn ethernet ring g8032

To display an overview of the G.8032 ethernet ring configuration, use the **show l2vpn ethernet ring g8032** command in EXEC mode.

```
show l2vpn ethernet ring g8032 [name] [{brief | detail | instance ID | location | private | standby}]
```

Syntax Description	
<i>name</i>	Ethernet ring G.8032 name.
<b>brief</b>	Brief information about the G.8032 ethernet ring configuration.
<b>detail</b>	Information in detail about the G.8032 ethernet ring configuration.
<b>instance</b> <i>ID</i>	Instance number about the G.8032 ethernet ring configuration.
<b>location</b>	Information about the G.8032 ethernet ring configuration for the specified location.
<b>private</b>	Private information about the G.8032 ethernet ring configuration.
<b>standby</b>	Standby node specific information

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.1.0	This command was introduced.
	Release 4.3.0	The <b>location</b> and <b>standby</b> keywords were added.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

### Example

This example shows the output from the **show l2vpn ethernet ring g8032** command:

```
# show l2vpn ethernet ring g8032 foo instance 1
Ethernet ring g8032 foo
  Port0: GigabitEthernet0/1/2/0
  Port1: GigabitEthernet0/1/2/1
```

## show l2vpn ethernet ring g8032

```

Instance 1
  Inclusion-list vlan ids: 500-1000, 1017
  aps-channel
    port0: GigabitEthernet0/1/2/0.1
    port1: GigabitEthernet0/1/2/1.1

# show l2vpn ethernet ring g8032 foo instance 1 brief
Ring      instance  status
-----  -
Foo       1          resolved

# show l2vpn ethernet ring g8032 foo instance 1 detail
Ethernet ring g8032 foo
  Operating in Provider Bridge mode
  Port0: GigabitEthernet0/1/2/0
    Monitor: none
  Port1: GigabitEthernet0/1/2/1
    Monitor: none
  Exclusion-list vlan ids: 2000-2100, untagged
  Open-ring: no

Instance 1
  Description: This_is_a_sample
  Profile      : none
  RPL          : none
  Inclusion-list vlan ids: 500-1000, 1017
  aps-channel
    level: 7
    port0: GigabitEthernet0/1/2/0.1
    port1: GigabitEthernet0/1/2/1.1

# show l2vpn ethernet ring g8032 foo instance 1 private
Ethernet ring g8032 foo (task-id = cisco-support)
  Operating in Provider Bridge mode
  Port0: GigabitEthernet0/1/2/0
    Monitor: none
  Port1: GigabitEthernet0/1/2/1
    Monitor: none
  Exclusion-list vlan ids: 2000-2100, untagged
  Open-ring: no

Instance 1
  Description: This_is_a_sample
  Profile      : none
  RPL          : none
  Inclusion-list vlan ids: 500-1000, 1017
  aps-channel
    level: 7
    port0: GigabitEthernet0/1/2/0.1
    port1: GigabitEthernet0/1/2/1.1

ethernet ring g8032 trace history [Num events: 6]
-----
Time           Event           Sticky Many
====          =====
05/18/2010 21:45:54 Create          No      No
05/18/2010 21:45:54 Resolved        No      No
05/18/2010 21:45:57 Create          No      No
05/18/2010 21:45:57 Modify          No      No
05/18/2010 21:45:57 Resolved        No      No

```

05/18/2010 21:45:57 Delete

No

No

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## show l2vpn forwarding bridge-domain (VPLS)

To display information on the bridge that is used by the forwarding layer, use the **show l2vpn forwarding bridge-domain** command in EXEC mode.

**show l2vpn forwarding bridge-domain** [*bridge-domain-name*] {**detail**|**hardware** {**egress**|**ingress**}}  
**location** *node-id*

### Syntax Description

<i>bridge-domain-name</i>	(Optional) Name of a bridge domain.
<b>detail</b>	Displays all the detailed information on the attachment circuits and pseudowires.
<b>hardware</b>	Displays the hardware location entry.
<b>egress</b>	Reads information from the egress PSE.
<b>ingress</b>	Reads information from the ingress PSE.
<b>location</b> <i>node-id</i>	Displays the bridge-domain information for the specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.7.2	This command was introduced.
Release 5.3.1	The show command output was enhanced to display VXLAN anycast gateway parameters.
Release 5.3.2	The show command output was enhanced to display MAC Move Counter information.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

For each bridge, you can display summary information about the number of bridge ports, number of MAC addresses, configured VXLANs and so forth.

The **detail** keyword displays detailed information on the attachment circuits and pseudowires, and is meant for field investigation by a specialized Cisco engineer.



### Note

All bridge ports in the bridge domain on that line card are displayed. Therefore, if the bridge domain contains non-local bridge ports, those are displayed as well.

Task ID	Task ID	Operations
	l2vpn	read

### Examples

The following sample output shows bridge-domain information for location 0/1/CPU0 for IOS-XR 5.3.1 and earlier releases:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain location 0/1/CPU0
```

```
Bridge-Domain Name          ID      Ports addr  Flooding Learning State
-----
g1:bd1

Bridge-domain name: g1:bd1, id: 0, state: up
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: profile not known on this node
Bridge MTU: 1500 bytes
Number of bridge ports: 2
Number of MAC addresses: 65536
Multi-spanning tree instance: 0

GigabitEthernet0/1/0/0, state: oper up
  Number of MAC: 32770
  Sent(Packets/Bytes): 0/21838568
  Received(Packets/Bytes): 5704781/444972918

Nbor 1.1.1.1 pw-id 1
  Number of MAC: 32766
  Sent(Packets/Bytes): 0/0
  Received(Packets/Bytes): 5703987/444910986
      0      2      65536 Enabled Enabled UP
```

The following sample output shows bridge-domain information for location 0/1/CPU0 for IOS-XR 5.3.2 release:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain location 0/1/CPU0
```

```
Bridge-Domain Name          ID      Ports addr  Flooding Learning State
-----
g1:bd1

Bridge-domain name: g1:bd1, id: 0, state: up
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: profile not known on this node
Bridge MTU: 1500 bytes
```

## show l2vpn forwarding bridge-domain (VPLS)

```

Number of bridge ports: 2
Number of MAC addresses: 65536
Multi-spanning tree instance: 0

GigabitEthernet0/1/0/0, state: oper up
  Number of MAC: 32770
  Sent(Packets/Bytes): 0/21838568
  Received(Packets/Bytes): 5704781/444972918
Statistics:
packets: received 5704781 (multicast 0, broadcast 0, unknown unicast 5704781, unicast 0),
sent 0
bytes: received 444972918 (multicast 0, broadcast 0, unknown unicast 444972918, unicast 0),
sent 4950
MAC move: 0

Nbor 1.1.1.1 pw-id 1
  Number of MAC: 32766
  Sent(Packets/Bytes): 0/0
  Received(Packets/Bytes): 5703987/444910986
      0      2      65536 Enabled Enabled UP
Statistics:
  packets: received 1000 (unicast 1000), sent 0
  bytes: received 128000 (unicast 128000), sent 0
  MAC move: 10

```

This table describes the significant fields shown in the display:

**Table 9: show l2vpn forwarding bridge-domain Command Field Descriptions**

Field	Description
Bridge-Domain Name	Name of bridge domain is displayed.
Bridge ID	ID assigned to this bridge domain is displayed.
Ports	Number of ports that are part of this bridge domain is displayed.
MAC Addr	Number of MAC addresses that are learned on this bridge domain is displayed.
Flooding	Flooding of packets are displayed if they are enabled on this bridge domain.
Learning	Learning of MAC addresses are displayed if they are enabled on this bridge domain.
State	Current state of the bridge domain is displayed.

This example shows sample output of detailed information on the bridge that is used by the forwarding layer:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain detail location 0/0/CPU0
Tue Mar 13 12:35:45.276 PDT

Bridge-domain name: bg1:bd1, id: 0, state: up
Type: pbb-edge, I-SID: 1000
Core-bridge: bg1:pbb-core1
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled

```



```

MAC aging time: 300 s, Type: inactivity
MAC limit: 4294967295, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
Bridge MTU: 1500 bytes
Number of bridge ports: 3
Number of MAC addresses: 0
Multi-spanning tree instance: 0
MIRP-lite: received 0, sent 0

```

This example shows sample output of detailed information on the bridge that is used by the forwarding layer.

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain detail location 0/1/CPU0
Bridge-domain name: bgl:bd1, id: 0, state: up
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 0
Multi-spanning tree instance: 0

GigabitEthernet0/1/0/1.2, state: oper up
Number of MAC: 0
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
Storm control drop counters:
  packets: broadcast 0, multicast 0, unknown unicast 0
  bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bgl:bd2, id: 1, state: up
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 0
Number of MAC addresses: 0
Multi-spanning tree instance: 0

PBB Edge, state: up

```

## show l2vpn forwarding bridge-domain (VPLS)

```

    Number of MAC: 0
GigabitEthernet0/1/0/1.3, state: oper up
    Number of MAC: 0
    Storm control drop counters:
      packets: broadcast 0, multicast 0, unknown unicast 0
      bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bg1:bd3, id: 2, state: up
    Type: pbb-core
    Number of associated pbb-edge BDs: 1

MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 0
Number of MAC addresses: 0
Multi-spanning tree instance: 0

PBB Core, state: up
Vlan-id: 1

GigabitEthernet0/1/0/1.4, state: oper up
    Number of MAC: 0
    Storm control drop counters:
      packets: broadcast 0, multicast 0, unknown unicast 0
      bytes: broadcast 0, multicast 0, unknown unicast 0

```

The following sample output shows detailed information with P2MP PW enabled on the bridge domain:

```

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain detail location
Tue May 24 23:14:22.934 EDT

Bridge-domain name: bg1:bd1, id: 0, state: up
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 0
Multi-spanning tree instance: 0
P2MP PW RSVP-TE enabled, LSM ID: 0x12

GigabitEthernet0/0/0/2.3, state: oper up
    Number of MAC: 0

```

```
Nbor 2.2.2.2 pw-id 101, state: oper up
Number of MAC: 0
```

The following sample output shows detailed information on a bridge domain for location 0/2/CPU0 that has VXLAN configured.

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bgl:10, id: 0, state: up
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
MLD snooping: disabled, flooding: disabled
Storm control: disabled
P2MP PW: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 2
Number of MAC addresses: 0
Multi-spanning tree instance: 0

GigabitEthernet0/2/0/19.10, state: oper up
Number of MAC: 0
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
Storm control drop counters:
  packets: broadcast 0, multicast 0, unknown unicast 0
  bytes: broadcast 0, multicast 0, unknown unicast 0
Dynamic arp inspection drop counters:
  packets: 0, bytes: 0
IP source guard drop counters:
  packets: 0, bytes: 0

VNI5010, state: oper up
Number of MAC: 0
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
```

**Related Commands**

Command	Description
<a href="#">clear l2vpn bridge-domain (VPLS), on page 210</a>	Clears the MAC addresses and restarts the bridge domains on the router.

# show l2vpn forwarding bridge-domain mac-address (VPLS)

To display the summary information for the MAC address, use the **show l2vpn forwarding bridge-domain mac-address** command in EXEC mode.

```
show l2vpn forwarding bridge-domain [bridge-domain-name] mac-address {MAC-address | detail
| hardware {egress | ingress} | interface type interface-path-id | neighbor address pw-id pw-id}
location node-id
```

## Syntax Description

<i>bridge-domain-name</i>	(Optional) Name of a bridge domain.
<i>MAC-address</i>	MAC address.
<b>detail</b>	Displays detailed information for the MAC address.
<b>hardware</b>	Reads information from the hardware.
<b>egress</b>	Reads information from the egress PSE.
<b>ingress</b>	Reads information from the ingress PSE.
<b>interface</b>	Displays the match for the attachment circuit subinterface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>neighbor <i>address</i></b>	Displays the match for the neighbor IP address.
<b>pw-id <i>pw-id</i></b>	Displays the match for the pseudowire ID.
<b>location <i>node-id</i></b>	Displays the bridge-domain information for the MAC address of the specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.
Release 3.7.2	This command was introduced.
Release 3.8.0	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

**Task ID**

Task ID	Operations
l2vpn	read

**Examples**

The following sample output shows the specified location of the bridge-domain name g1:bd1 for the MAC address:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain g1:bd1 location 0/1/CPU0
Bridge-ID      Bridge MAC
Bridge-Domain Name ID   Ports addr   Flooding Learning State
-----
g1:bd1         0    2    65536 Enabled Enabled UP
```

The following sample output shows the list of MAC addresses that are learned on a specified bridge and summary information for the addresses:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address location 0/1/CPU0
Fri Mar 14 13:30:38.285 EST
To Resynchronize MAC table from the Network Processors, use the command...
l2vpn resynchronize forwarding mac-address-table location <r/s/i>
Mac Address      Type      Learned from/Filtered on      LC learned Resync Age      Mapped to
-----
0000.0001.0103 dynamic Gi0/1/0/0                    0/1/CPU0 0d 0h 2m 22s      N/A
0000.0001.0104 dynamic Gi0/1/0/0                    0/1/CPU0 0d 0h 2m 22s      N/A
0000.0001.0105 dynamic Gi0/1/0/0                    0/1/CPU0 0d 0h 2m 22s      N/A
000b.6019.141b dynamic Gi0/1/0/8.10                0/1/CPU0 0d 0h 0m 2s        N/A
000a.42db.e419 dynamic nve1                    0/1/CPU0 0d 0h 0m 21s      55.55.55.53
0013.7faf.681b dynamic nve1                    0/1/CPU0 0d 0h 0m 20s      55.55.55.51
....
```

The following sample output shows the MAC address on a specified interface on a specified bridge:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain g1:bd1 mac-address 1.2.3 location 0/1/CPU0
Mac Address      Type      Learned from/Filtered on      LC learned Age
-----
0001.0002.0003 static Gi0/1/0/0                    N/A      N/A
```

The following sample output shows the hardware information from the egress pse:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain g1:bd1 mac-address hardware egress location 0/1/CPU0
```

## show l2vpn forwarding bridge-domain mac-address (VPLS)

Mac Address	Type	Learned from/Filtered on	LC learned Age
0000.0000.0000	static	Gi0/1/0/0	N/A N/A
0000.0001.0101	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0102	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0103	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0104	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0105	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0106	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0107	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0108	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0109	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010a	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010b	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010c	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010d	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010e	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.010f	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0110	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0111	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0112	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0113	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
0000.0001.0114	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 24s
...			

The following sample output shows the MAC addresses that are learned on a specified pseudowire on a specified bridge:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address neighbor 10.1.1.1
pw-id 1 location 0/1/CPU0
```

Mac Address	Type	Learned from/Filtered on	LC learned Age
0000.0003.0101	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0102	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0103	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0104	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0105	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0106	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0107	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0108	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0109	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010a	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010b	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010c	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010d	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010e	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.010f	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0110	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0111	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0112	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0113	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0114	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
0000.0003.0115	dynamic	10.1.1.1, 1	0/1/CPU0 0d 0h 0m 30s
...			

The following sample output shows the detailed information for MAC addresses that are learned on a specified interface and on specified bridge of a specified interface card. The sample output lists all the MAC addresses, the learned location, and the current age.

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain g1:bd1 mac-address interface
```

**gigabitEthernet 0/1/0/0 location 0/1/CPU0**

Mac Address	Type	Learned from/Filtered on	LC learned Age
0000.0000.0000	static	Gi0/1/0/0	N/A N/A
0000.0001.0101	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0102	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0103	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0104	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0105	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0106	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0107	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0108	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0109	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010a	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010b	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010c	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010d	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010e	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.010f	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0110	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0111	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0112	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0113	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s
0000.0001.0114	dynamic	Gi0/1/0/0	0/1/CPU0 0d 0h 2m 14s

The following example shows the list of MAC addresses along with the location details:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address detail location
0/7/CPU0
l2fib_edm_fill_mac_bag mac_info 0 l2fm_l3_encap_vlan=0
l2fib_get_mac_l3_encap_vlan_str
l2fib_edm_fill_mac_bag mac_info 0 l2fm_l3_encap_vlan=0
l2fib_get_mac_l3_encap_vlan_str
Bridge-domain name: bgl:bd1, id: 0, state: up
MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
Routed interface: BV1100, Xconnect id: 0xffff00001, state: up
  IRB platform data: {0x0, 0x0, 0x0, 0x0}, len: 4
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 2
Multi-spanning tree instance: 0

Mac Address: 029d.af84.4105, LC learned: N/A
Age: N/A, Flag: static, BVI
L3 encapsulation Vlan = 0

GigabitEthernet0/0/0/0.1, state: oper up
Number of MAC: 1

Mac Address: 0000.0002.0003, LC learned: N/A
Age: N/A, Flag: static
```

## show l2vpn forwarding bridge-domain mac-address (VPLS)

L3 encapsulation Vlan = 1001

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address location 0/1/CPU0

Mac Address	Type	Learned from/Filtered on	LC learned	Age
0000.0000.0000	static	Gi0/1/0/0	N/A	N/A
0000.0001.0101	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0102	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0103	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0104	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0105	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0106	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0107	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0108	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0109	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010a	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010b	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010c	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010d	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010e	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.010f	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0110	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0111	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s
0000.0001.0112	dynamic	Gi0/1/0/0	0/1/CPU0	0d 0h 2m 22s

....

This example shows sample output of the show l2vpn forwarding bridge-domain mac-address location command:

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address location 0/1/CPU0

Mac Address	Type	Learned from/Filtered on	LC learned	Age	Mapped to
0002.0003.0004	filter	bg1:bd1	N/A	N/A	
0002.0003.0005	filter	bg1:bd1	N/A	N/A	
0002.0003.0006	filter	bg1:bd1	N/A	N/A	
0002.0002.0002	static	Gi0/0/0/0.1	N/A	N/A	
0333.0444.0555	static	bg1:bd2	N/A	N/A	0777.0888.0999
0444.0555.0666	static	bg1:bd2	N/A	N/A	0888.0999.0111

This example shows sample output of the show l2vpn forwarding bridge-domain mac-address detail location command:

RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain mac-address detail location 0/1/CPU0

```

Bridge-domain name: bg1:bd1, id: 0, state: up
Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4294967295, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  DHCPv4 snooping: profile not known on this node
  IGMP snooping: disabled, flooding: disabled
  Bridge MTU: 1500 bytes
  Number of bridge ports: 2

```



```
Number of MAC addresses: 1
Multi-spanning tree instance: 0

PBB Edge, state: up
  Number of MAC: 1

Mac Address: 0004.0005.0006, LC learned: N/A,
Mapping value: 0007.0008.0009
Age: N/A, Flag: mapping
```

**Related Commands**

Command	Description
<a href="#">show l2vpn forwarding bridge-domain (VPLS), on page 294</a>	Displays information on the bridge that is used by the forwarding layer.

## show l2vpn forwarding ethernet ring g8032

To display an overview of the G.8032 ethernet ring configuration from L2Forwarding Information Base (L2FIB) process, use the **show l2vpn forwarding ethernet ring g8032** command in EXEC mode.

**show l2vpn forwarding ethernet ring g8032** *name* [{*detail* | *instance ID* | *location* | *private*}]

Syntax Description	
<i>name</i>	Ethernet ring G.8032 name.
<i>detail</i>	Information in detail about the G.8032 ethernet ring configuration.
<i>instanceID</i>	Instance number about the G.8032 ethernet ring configuration.
<i>location</i>	Location specified in the rack/slot/module notation.
<i>private</i>	Private information about the G.8032 ethernet ring configuration.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

### Example

This example shows the output from the **show l2vpn forwarding ethernet ring g8032** command:

```
# show l2vpn forwarding ethernet ring g8032 private location <r/s/i>
Ethernet ring g8032 foo (task-id = cisco-support)
  Port0: GigabitEthernet0/1/2/0
    Monitor: none
  Port1: GigabitEthernet0/1/2/1
    Monitor: none
  Open-ring: no
  TCN propagation: no
  Instance 1
    Profile      : none
    RPL          : none
    aps-channel
```

```

    port0: GigabitEthernet0/1/2/0.1, status: bound
    port1: GigabitEthernet0/1/2/1.1, status: unbound
Instance 2
  Profile      : none
  RPL         : none
  aps-channel
    level: 7
    port0: GigabitEthernet0/1/2/0.10, status: unbound
  ethernet ring g8032 trace history [Num events: 6]
-----
Time           Event           Sticky Many
====          =====
05/18/2010 21:45:54 Create          No      No
05/18/2010 21:45:57 Create          No      No
05/18/2010 21:45:57 Modify          No      No
05/18/2010 21:45:57 Delete          No      No

# show l2vpn forwarding ethernet ring g8032 foo instance 1 detail location <r/s/i>
Ethernet ring g8032 foo
  Port0: GigabitEthernet0/1/2/0
    Monitor: none
  Port1: GigabitEthernet0/1/2/1
    Monitor: none
  Open-ring: no
  TCN propagation: no
  Instance 1
    Profile      : none
    RPL         : none
    aps-channel
      level: 7
      port0: GigabitEthernet0/1/2/0.1, status: bound
      port1: GigabitEthernet0/1/2/1.1, status: unbound

# show l2vpn forwarding ethernet ring g8032 foo instance 1 private location <r/s/i>
Ethernet ring g8032 foo (task-id = cisco-support)
  Port0: GigabitEthernet0/1/2/0
    Monitor: none
  Port1: GigabitEthernet0/1/2/1
    Monitor: none
  Open-ring: no
  TCN propagation: no
  Instance 1
    Profile      : none
    RPL         : none
    aps-channel
      level: 7
      port0: GigabitEthernet0/1/2/0.1, status: bound
      port1: GigabitEthernet0/1/2/1.1, status: unbound

  ethernet ring g8032 instance trace history [Num events: 6]
-----
Time           Event           Sticky Many
====          =====
05/18/2010 21:45:54 Create          No      No
05/18/2010 21:45:57 Create          No      No
05/18/2010 21:45:57 Modify          No      No
05/18/2010 21:45:57 Delete          No      No

```

**Related Commands**

Command	Description
<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

# show l2vpn forwarding protection main-interface

To display an overview of the main interface or instance operational information from L2Forwarding Information Base (L2FIB), use the **show l2vpn forwarding protection main-interface** command in EXEC mode.

**show l2vpn forwarding protection main-interface** [*interface name*] [{**detail** | **location** | **private**}]

Syntax Description		
	<i>interface name</i>	Interface name of the Ethernet ring G.8032 name.
	<b>detail</b>	Information in detail about the G.8032 ethernet ring configuration.
	<b>location</b>	Brief information about the G.8032 ethernet ring configuration.
	<b>private</b>	Private information about the G.8032 ethernet ring configuration.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.1.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operation
	l2vpn	read

## Example

This example shows the output from the **show l2vpn forwarding protection main-interface** command:

```
# show l2vpn forwarding protection main-interface location <r/s/i>
Main Interface ID          Instance  State
-----
GigabitEthernet0/0/0/0    1        forward
GigabitEthernet0/0/0/0    2        forward
GigabitEthernet0/0/0/1    1        forward
```

```
# show l2vpn forwarding protection main-interface detail location <r/s/i>
Main Interface ID          Instance  State    # of subIntf
-----
GigabitEthernet0/0/0/0    1        forward  1
GigabitEthernet0/0/0/0    2        forward  3
GigabitEthernet0/0/0/1    1        forward  1

# show l2vpn forwarding protection main-interface private location <r/s/i>

Main Interface ID          Instance  State    # of subIntf
-----
GigabitEthernet0/0/0/0    1        forward  1

Base info: version=0xaabbcc1c, flags=0x0, type=14, reserved=0
Ifhandle: 0x20000040, cfg_instance: 1, Protected: no
```

**Related Commands**

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## show l2vpn protection main-interface

To display an overview of the main interface or instance operational information, use the **show l2vpn protection main-interface** command in EXEC mode.

**show l2vpn protection main-interface** [*interface name*{*Interface*}] [{**brief** | **detail** | **location** | **private** | **standby**}]

Syntax Description		
	<i>interface name</i>	Interface name of the Ethernet ring G.8032 name.
	<i>interface</i>	The forwarding interface ID in number or in Rack/Slot/Instance/Port format as required.
	<b>brief</b>	Brief information about the G.8032 ethernet ring configuration.
	<b>detail</b>	Information in detail about the G.8032 ethernet ring configuration.
	<b>location</b>	Location specific information
	<b>private</b>	Private information about the G.8032 ethernet ring configuration.
	<b>standby</b>	Standby node specific information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.1.0	This command was introduced.
	Release 4.3.0	The keywords <b>location</b> and <b>standby</b> were added.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

### Example

This example shows the output from the **show l2vpn protection main-interface** command:

RP/0/0/CPU0:router# show l2vpn protection main-interface

Main Interface ID	Subintf Count	Protected	Blocked
GigabitEthernet0/0/0/0	1	None	No
Instance : 0			
State	: FORWARDING		
Sub-Intf #	: 1		
Flush #	: 0		
Sub-interfaces : GigabitEthernet0/0/0/0.4			

Main Interface ID	Subintf Count	Protected	Blocked
GigabitEthernet0/0/0/1	1	None	No
Instance : 0			
State	: FORWARDING		
Sub-Intf #	: 1		
Flush #	: 0		
Sub-interfaces : GigabitEthernet0/0/0/0.4			

RP/0/0/CPU0:router# show l2vpn protection main-interface brief

Main Interface ID	Ref Count	Instance	Protected	State
GigabitEthernet0/0/0/0	3	2	No	FORWARDING
GigabitEthernet0/0/0/1	1	1	No	FORWARDING

RP/0/RSP0/CPU0:router# show l2vpn protection main-interface detail

Main Interface ID	# of subIntf	Protected
GigabitEthernet0/1/0/19	4	No

Main Interface ID	# of subIntf	Protected
GigabitEthernet0/1/0/20	3	No

Main Interface ID	# of subIntf	Protected
GigabitEthernet0/1/0/3	2	No

Main Interface ID	# of subIntf	Protected
GigabitEthernet0/1/0/30	1	No

Main Interface ID	# of subIntf	Protected
GigabitEthernet0/1/0/7	4	No

RP/0/0/CPU0:router# show l2vpn protection main-interface private

Main Interface ID	Ref Count	Protected	Blocked	If Handle	Registered
GigabitEthernet0/0/0/0	3	None	No	0x20000020	No
Instance : 0					
State	: FORWARDING		Config ID	: 0	
Sub-Intf #	: 0		Ack #	: 0	
Bridge D #	: 0		N-Ack #	: 0	

## show l2vpn protection main-interface

```

Flush      #      : 0                Rcv      # : 0
Sub-interfaces : GigabitEthernet0/0/0/0.4

```

Instance event trace history [Total events: 1, Max listed: 8]

```

-----
Time          Event                      State          Action
=====
01/01/1970 01:00:01 Rcv state IF known      Invalid        134833160
07/02/2010 10:13:03 Update L2FIB             FORWARDING     0
01/01/1970 01:00:25 Rcvd AC MA create + UP I/F ST FORWARDING     0

```

---

**Related Commands**

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

---



## shutdown (Bridge Domain)

To shut down a bridge domain to bring the bridge and all attachment circuits and pseudowires under it to admin down state, use the **shutdown** command in L2VPN bridge group bridge domain configuration mode. To re-enable the bridge domain, use the **no** form of this command.

**shutdown**  
**no shutdown**

<b>Syntax Description</b>	This command has no keywords or arguments.	
<b>Command Default</b>	By default, the bridge is not shutdown.	
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When a bridge domain is disabled, all VFI's associated with the bridge domain are disabled. You can still attach or detach members to or from the bridge domain as well as the VFI's associated with the bridge domain.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to disable the bridge domain named bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# shutdown
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

## shutdown (VFI)

To disable virtual forwarding interface (VFI), use the **shutdown** command in L2VPN bridge group bridge domain VFI configuration mode. To re-enable VFI, use the **no** form of this command.

**shutdown**  
**no shutdown**

<b>Syntax Description</b>	This command has no keywords or arguments.
<b>Command Default</b>	By default, the VFI is not shutdown.
<b>Command Modes</b>	L2VPN bridge group bridge domain VFI configuration

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to disable VFI:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi v1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# shutdown
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mpls static label (VPLS), on page 243</a>	Configures the MPLS static labels and the static labels for the access pseudowire configuration.

Command	Description
<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).

# signaling-protocol

To enable signaling for the VFI, use the **signaling-protocol** command in the BGP autodiscovery mode or in the L2VPN bridge group bridge domain VFI multicast P2MP configuration mode. To return to the default value, use the **no** form of this command.

```
signaling-protocol {bgp | ldp}
no signaling-protocol {bgp | ldp}
```

## Syntax Description

**bgp** Enables BGP protocol signaling.

**ldp** Enables LDP protocol signaling.

## Command Default

LDP signaling is enabled.

## Command Modes

BGP autodiscovery configuration

L2VPN bridge group bridge domain VFI multicast P2MP configuration

## Command History

### Release

### Modification

Release 3.9.1 This command was introduced.

Release 5.1 Support for this command in the L2VPN bridge group bridge domain VFI multicast P2MP configuration mode was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

### Task Operations ID

l2vpn read,  
write

## Examples

This example shows how to enable signaling for BGP protocol:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group EGroup
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain eastdomain
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi eastvfi
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# autodiscovery bgp
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-ad)#route-target 100:20
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-ad)#signaling-protocol bgp
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# split-horizon group

To add an AC to a split horizon group, use the **split-horizon group** command in L2VPN bridge group bridge domain attachment circuit configuration mode. To remove the AC from the group, use the **no** form of this command.

**split-horizon group**  
**no split-horizon group**

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	None				
<b>Command Modes</b>	L2VPN bridge group bridge domain attachment circuit configuration mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Only one split horizon group exists for ACs per bridge domain. By default, the group does not have any ACs. You can configure individual ACs to become members of the group using the **split-horizon group** configuration command.

You can configure an entire physical interface or EFPs within an interface to become members of the split horizon group.

Task ID	Task ID	Operations
	l2vpn	Read, write

## Examples

The following example adds an EFP under a GigabitEthernet interface to the AC split horizon group:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group metroA
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain east
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface GigabitEthernet0/1/0/6.15
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# split-horizon group  
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# commit
```

Related Commands	Command	Description
	<a href="#">show l2vpn bridge-domain (VPLS), on page 270</a>	Display information for the bridge ports such as attachment circuits and pseudowires for the specific bridge domains.

## static-address (VPLS)

To add static entries to the MAC address for filtering, use the **static-address** command in L2VPN bridge group bridge domain MAC configuration mode. To remove entries profiled by the combination of a specified entry information, use the **no** form of this command.

**static-address** *MAC-address* **drop**  
**no static-address** *MAC-address* **drop**

<b>Syntax Description</b>	<i>MAC-address</i> Static MAC address that is used to filter on the bridge domain.
<b>drop</b>	Drops all traffic that is going to the configured MAC address.

**Command Default** No static MAC address is configured.

**Command Modes** L2VPN bridge group bridge domain MAC configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

**Examples** The following example shows how to add static MAC entries in L2VPN bridge group bridge domain MAC configuration mode. This entry causes all packets with destination MAC address 1.1.1 to be dropped.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# static-address 1.1.1 drop
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.



Command	Description
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.

## static-mac-address (VPLS)

To configure the static MAC address to associate a remote MAC address with a pseudowire or any other bridge interface, use the **static-mac-address** command in the appropriate L2VPN bridge group bridge domain configuration submode. To disable this feature, use the **no** form of this command.

**static-mac-address** *MAC-address*  
**no static-mac-address** *MAC-address*

<b>Syntax Description</b>	<i>MAC-address</i> Static address to add to the MAC address.				
<b>Command Default</b>	None				
<b>Command Modes</b>	L2VPN bridge group bridge domain VFI pseudowire configuration L2VPN bridge group bridge domain attachment circuit configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

### Examples

The following example shows how to associate a remote MAC address with a pseudowire:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi model
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# neighbor 10.1.1.2 pw-id 1000
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-pw)# static-mac-address 1.1.1
```

The following example shows how to associate a GigabitEthernet interface from a bridge domain to static MAC address 1.1.1:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface GigabitEthernet 0/1/0/0
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# static-mac-address 1.1.1
```

The following example shows how to associate an access pseudowire to static MAC address 2.2.2:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# neighbor 10.1.1.2 pw-id 2000
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pw)# static-mac-address 2.2.2
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mpls static label (VPLS), on page 243</a>	Configures the MPLS static labels and the static labels for the access pseudowire configuration.
	<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).
	<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.

# tcn-propagation

To enable topology change notification (TCN) propagation, use the **tcn-propagation** command in the L2VPN configuration submode.

## tcn-propagation

This command has no keywords or arguments.

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	L2VPN configuration submode
----------------------	-----------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to enable the G.8032 ring mode:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn-erp)# tcn-propagation
RP/0/RSP0/CPU0:router(config-l2vpn)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">ethernet ring g8032, on page 215</a>	Enables G.8032 ring mode and enters the G.8032 configuration submode.

## time (VPLS)

To configure the maximum aging time, use the **time** command in L2VPN bridge group bridge domain MAC aging configuration mode. To disable this feature, use the **no** form of this command.

**time** *seconds*  
**no time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> MAC address table entry maximum age. The range is from 300 to 30000 seconds. Aging time is counted from the last time that the switch saw the MAC address. The default value is 300 seconds.
---------------------------	---

<b>Command Default</b>	<i>seconds</i> : 300
------------------------	----------------------

<b>Command Modes</b>	L2VPN bridge group bridge domain MAC aging configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

If no packets are received from the MAC address for the duration of the maximum aging time, the dynamic MAC entry previously learned is removed from the forwarding table.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to increase the maximum aging time to 600 seconds. After 600 seconds of inactivity from a MAC address, the MAC address is removed from the forwarding table.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# aging
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-aging)# time 600
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">aging (VPLS), on page 203</a>	Enters the MAC aging configuration submode to set the aging parameters such as time and type.

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
<a href="#">type (VPLS), on page 329</a>	Configures the type for MAC address aging.

## transport rsvp-te

To enable RSVP-TE as transport on a VFI and to enter L2VPN bridge group bridge domain VFI multicast P2MP RSVP - TE configuration mode, use the **transport rsvp-te** command in L2VPN bridge group bridge domain VFI multicast P2MP configuration mode. To return to P2MP mode, use the **no** form of this command.

```
transport rsvp-te [attribute-set]
no transport rsvp-te [attribute-set]
```

<b>Syntax Description</b>	[attribute-set] Specifies the TE attribute set parameters.				
<b>Command Default</b>					
<b>Command Modes</b>	L2VPN bridge group bridge domain VFI multicast P2MP configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1	This command was introduced.
Release	Modification				
Release 5.1	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read, write
Task ID	Operation				
l2vpn	read, write				

### Example

This example shows how to enable RSVP-TE as transport on a VFI:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi v1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)# multicast p2mp
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-p2mp)# transport rsvp-te
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi-p2mp-te)#
```

Related Commands	Command	Description
	<a href="#">multicast p2mp</a> , on page 247	Configures point to multi-point pseudowire in a VFI.

Command	Description
<a href="#">vfi (VPLS), on page 331</a>	Configures virtual forwarding interface (VFI) parameters.
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.



## type (VPLS)

To configure the type for MAC address aging, use the **type** command in L2VPN bridge group bridge domain MAC aging configuration mode. To disable this feature, use the **no** form of this command.

```
type {absolute | inactivity}
no type {absolute | inactivity}
```

### Syntax Description

**absolute** Configures the absolute aging type.

**inactivity** Configures the inactivity aging type.

### Command Default

By default, the inactivity type is configured.

### Command Modes

L2VPN bridge group bridge domain MAC aging configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

In general, the type is set to inactivity. With an inactivity type configuration, a MAC address is removed from the forwarding table after the MAC address is inactive for the configured aging time.

With an absolute type configuration, a MAC address is always removed from the forwarding table after the aging time has elapsed once it is initially learned.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure the MAC address aging type to absolute for every member of the bridge domain named bar:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
```

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac) # aging
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac-aging) # type absolute
```

Related Commands	Command	Description
	<a href="#">aging (VPLS), on page 203</a>	Enters the MAC aging configuration submode to set the aging parameters such as time and type.
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.
	<a href="#">time (VPLS), on page 325</a>	Configures the maximum aging time.

## vfi (VPLS)

To configure virtual forwarding interface (VFI) parameters and to enter L2VPN bridge group bridge domain VFI configuration mode, use the **vfi** command in L2VPN bridge group bridge domain configuration mode. To remove all configurations that are made under the specified VFI, use the **no** form of this command.

**vfi** *vfi-name*  
**no vfi** *vfi-name*

<b>Syntax Description</b>	<i>vfi-name</i> Name of the specified virtual forwarding interface.	
<b>Command Default</b>	None	
<b>Command Modes</b>	L2VPN bridge group bridge domain configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Use the <b>vfi</b> command to enter L2VPN bridge group bridge domain VFI configuration mode.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write
<b>Examples</b>	<p>The following example shows how to create a VFI:</p> <pre>RP/0/RSP0/CPU0:router# configure RP/0/RSP0/CPU0:router(config)# l2vpn RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1 RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# vfi v1 RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-vfi)#</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.

Command	Description
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
<a href="#">mpls static label (VPLS), on page 243</a>	Configures the MPLS static labels and the static labels for the access pseudowire configuration.
<a href="#">neighbor (VPLS), on page 249</a>	Adds an access pseudowire port to a bridge domain or a pseudowire to a bridge virtual forwarding interface (VFI).

## withdraw (VPLS)

To disable MAC address withdrawal for a specified bridge domain, use the **withdraw** command in L2VPN bridge group bridge domain MAC configuration mode. To enable this feature, use the **no** form of this command

```
withdraw {access-pw disable | disable}
no withdraw {access-pw disable | disable}
```

<b>Syntax Description</b>	<b>access-pw disable</b>	Disables the sending of MAC withdraw messages to access pseudowires.
	<b>disable</b>	Disables MAC address withdrawal.
<b>Command Default</b>	By default, MAC address withdrawal is enabled.	
<b>Command Modes</b>	L2VPN bridge group bridge domain MAC configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.
	Release 4.0.0	The <b>access-pw disable</b> keyword was added.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

### Examples

The following example shows how to enable disable MAC withdrawal:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# withdraw disable
```

The following example shows how to disable sending MAC withdrawal messages to access pseudowires:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bar
```

**withdraw (VPLS)**

```
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# mac
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-mac)# withdraw access-pw disable
```

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">mac (VPLS), on page 235</a>	Enters L2VPN bridge group bridge domain MAC configuration mode.



## Provider Backbone Bridge Commands

The IEEE 802.1ah standard (Ref [4]) provides a means for interconnecting multiple provider bridged networks in order to build a large scale end-to-end Layer 2 provider bridged network.

For detailed information about PBB concepts, configuration tasks, and examples, see the *L2VPN and Ethernet Services Configuration Guide for Cisco ASR 9000 Series Routers*.

- [backbone-source-mac](#), on page 337
- [bgp \(EVPN\)](#), on page 339
- [bgp route-target](#), on page 341
- [clear mmrp-flood-optimization statistics](#), on page 342
- [clear l2vpn forwarding counters bridge-domain mmrp location](#), on page 343
- [debug mmrp-flood-optimization packets](#), on page 344
- [debug mmrp-flood-optimization protocol](#), on page 345
- [ethernet-segment](#), on page 346
- [evi](#), on page 348
- [evpn](#), on page 349
- [evpn evi](#), on page 351
- [flushagain](#), on page 352
- [flood-time](#), on page 354
- [force single-homed](#), on page 355
- [identifer type](#), on page 356
- [join-time \(PBB\)](#), on page 357
- [interface \(EVPN\)](#), on page 358
- [leaveall-time \(PBB\)](#), on page 360
- [leave-time \(PBB\)](#), on page 361
- [load-balancing-mode](#), on page 362
- [mmrp-flood-optimization](#), on page 364
- [mac-flush mvrp](#), on page 365
- [mode singleton](#), on page 366
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- [programming](#), on page 372
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- [service-carving](#), on page 378
- [show evpn ethernet-segment](#), on page 380
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- [show l2vpn bridge-domain pbb](#), on page 389
- [show l2vpn forwarding bridge pbb](#), on page 396
- [show l2vpn forwarding pbb backbone-source-mac](#), on page 398
- [show l2vpn pbb backbone-source-mac](#), on page 399
- [show mmrp-flood-optimization](#), on page 400
- [static-mac-address](#), on page 402
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# backbone-source-mac

To configure the backbone source MAC address, use the **backbone-source-mac** command in pbb configuration mode or in the EVPN Interface Ethernet segment configuration mode. To return to the default behavior, use the **no** form of this command.



**Note** If the backbone source MAC address is not configured then one of the reserved addresses from the Chassis MAC pool is chosen automatically. To view the reserved address, use the **show l2vpn pbb backbone-source-mac** command.

**backbone-source-mac** *mac-address*  
**no backbone-source-mac** *mac-address*

**Syntax Description** *mac address* Backbone source MAC address in hexadecimal format.

**Command Default** None

**Command Modes** PBB configuration  
 EVPN Interface Ethernet segment configuration

Command History	Release	Modification
	Release 3.9.1	This command was introduced.
	Release 4.3.2	Support for this command in the EVPN Interface Ethernet segment configuration was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The command default in the EVPN Interface Ethernet segment configuration is the CE system-id with administrative bit flip. Use this command to overwrite the CE-system id of an Ethernet Segment. The backbone source MAC can be configured only on a bundle interface.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** In the following example, the backbone source MAC address is set to 0045.1200.04:

```
config
l2vpn
```

```

pbb
  backbone-source-mac 0045.1200.0400
!
!

```

This example shows how to set the backbone source MAC address in the EVPN Interface Ethernet segment configuration mode:

```

RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# backbone-source-mac 0045.1200.0400
RP/0/RSP0/CPU0:router(config-evpn-ac-es)#

```

#### Related Commands

Command	Description
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.
<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
<a href="#">ethernet-segment, on page 346</a>	Enters EVPN interface ethernet segment configuration mode.

# bgp (EVPN)

To enable Border Gateway Protocol (BGP) in the PBB EVPN configuration, use the **bgp** command in the EVPN configuration or EVPN EVI configuration mode. To disable the BGP configuration, use the **no** form of this command.

```
bgp [rd]
bgp [{rd | route-target }]
no bgp
```

<b>Syntax Description</b>	<b>rd</b>	Sets the Route Distinguisher.
	<b>route-target</b>	Sets the Route Target.

**Command Default** None.

**Command Modes** EVPN configuration  
EVPN EVI configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The keyword **route-target** is supported only in the EVPN EVI BGP configuration.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to enable BGP in the EVPN configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# bgp
RP/0/RSP0/CPU0:router(config-evpn-bgp)#
```

This example shows how to enable BGP in the EVPN EVI configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# evi 2
```

```
RP/0/RSP0/CPU0:router(config-evpn-evi)# bgp  
RP/0/RSP0/CPU0:router(config-evpn-evi-bgp)#
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
<a href="#">evi, on page 348</a>	Enters the EVPN EVI configuration mode to configure optional BGP settings for a bridge domain or EVI.
<a href="#">route-target, on page 261</a>	Specifies a route target for the VFI, PBB EVPN or EVPN bridge domain.
<a href="#">rd</a>	

---

## bgp route-target

To configure the BGP Import Route-Target for an ethernet segment, use the **bgp route-target** command in EVPN interface ethernet-segment configuration submode. To undo this command, use the **no** form of this command.

**bgp route-target** *ipv4/v6-address*

<b>Syntax Description</b>	<i>ipv4/v6-address</i> Specifies the route target value as an IPv4 or IPv6 address. The value 0000.0000.0000 is not allowed.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EVPN interface ethernet-segment configuration submode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
<b>Usage Guidelines</b>	This command configuration is mandatory for Ethernet Segment Identifier (ESI) type 0. For ESI type 1, the default route-target is computed from the high-order 6-octet portion of the 9 bytes ESI value. You can use this command to overwrite this computed value for ESI type 1.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> </tbody> </table>	Task ID	Operation		
Task ID	Operation				

### Example

The following example configuration shows how to configure BGP Import Route-Target for an ethernet segment.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet-segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# bgp route-target ce01.ce01.ce01
```

## clear mmrp-flood-optimization statistics

To clear the stored MRP protocol statistics on all the pseudowires or a specific pseudowire, use the **clear mmrp-flood-optimization statistics** command in the EXEC mode.

```
clear mmrp-flood-optimization statistics {all | pw pw-ID neighbor}
```

<b>Syntax Description</b>	<b>all</b>	Clear the stored MRP protocol statistics on all the pseudowires.
	<b>pw</b>	Indicates a specific pseudowire.
	<i>neighbor</i>	Indicates the IP address of the neighbor.
	<i>pw-id</i>	Indicates the pseudowire ID.
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

The following command shows how to clear the MMRP flood optimization statistics:

```
RP/0/RSP0/CPU0:router#clear mmrp-flood-optimization statistics all
```

# clear l2vpn forwarding counters bridge-domain mmrp location

To clear the MMRP flood statistics on a given bridge-domain on a specified location, use the **clear l2vpn forwarding counters bridge-domain mmrp location** command in the EXEC command.

**clear l2vpn forwarding counters bridge-domain mmrp location** *location*

<b>Syntax Description</b>	<i>location</i> Specifies the location in rack/slot/module notation.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EXEC				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1.2	This command was introduced.
Release	Modification				
Release 5.1.2	This command was introduced.				
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	ethernet-services	read, write
Task ID	Operation				
ethernet-services	read, write				

The following command shows how to clear the mmrp flood statistics on a given bridge-domain on a specified location:

```
RP/0/RSP0/CPU0:router#clear l2vpn forwarding counters bridge-domain mmrp location 0/1/1
```

## debug mmrp-flood-optimization packets

To debug the flood optimization for PBB VPLS feature at the packet level, use the **debug mmrp-flood-optimization packets** command in the EXEC mode.

**debug mmrp-flood-optimization packets** {brief | full | hexdump} [direction {received | sent}] [pw neighbor pw-id]

Syntax Description	Parameter	Description
	<b>brief</b>	Brief packet debug.
	<b>full</b>	Full packet debug.
	<b>hexdump</b>	Raw packet output.
	<b>direction</b>	Restricts output to a packet direction.
	<b>received</b>	Packets received.
	<b>sent</b>	Packets sent.
	<b>pw</b>	Specifies a pseudowire to filter.
	<i>neighbor</i>	IP address of the neighbor
	<i>pw-id</i>	Pseudowire ID.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	ethernet-services	read, write

The following command shows how to use the **debug mmrp-flood-optimization packets** command:

```
RP/0/RSP0/CPU0:router#debug mmrp-flood-optimization packets brief
```



# debug mmrp-flood-optimization protocol

To debug the flood optimization for PBB VPLS feature at the protocol level, use the **debug mmrp-flood-optimization protocol** command in the EXEC mode.

```
debug mmrp-flood-optimization protocol [isid isid]
```

<b>Syntax Description</b>	<b>isid</b> Specifies the service instance identifier.
	<i>isid</i> Service instance identifier.

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	EXEC
----------------------	------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

The following command shows how to use the debug mmrp-flood-optimization protocol command:

```
RP/0/RSP0/CPU0:router#debug mmrp-flood-optimization protocol isid 3
```

# ethernet-segment

To enter the EVPN interface ethernet segment configuration mode, use the **ethernet-segment** command in the EVPN interface configuration mode. To disable the Ethernet segment configuration, use the **no** form of this command.

```
ethernet-segment [{backbone-source-mac | identifier | load-balancing-mode | service-carving}]
no ethernet-segment [{backbone-source-mac | identifier | load-balancing-mode | service-carving}]
```

Syntax Description	backbone-source-mac	Specifies Backbone Source MAC.
	identifier	Specifies Ethernet Segment Identifier.
	load-balancing-mode	Specifies load balancing mode.
	service-carving	Specifies service carving.

**Command Default** None.

**Command Modes** EVPN interface configuration

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to enter the EVPN interface ethernet segment configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet-segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)#
```

Related Commands	Command	Description
	<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
	<a href="#">backbone-source-mac, on page 337</a>	Configures the backbone source MAC address.

Command	Description
<a href="#">load-balancing-mode, on page 362</a>	Sets the load balancing mode of a physical port or bundle to active-active.
<a href="#">service-carving, on page 378</a>	Specifies the list of service identifiers as active and standby services.

# evi

To enter the EVPN EVI configuration mode and configure optional BGP settings for a bridge domain or EVI, use the **evi** command in the EVPN configuration mode. To return to the EVPN configuration mode, use the **no** form of this command.

**evi** *evi-id*  
**no evi** *evi-id*

<b>Syntax Description</b>	<i>evi-id</i> Specifies the Ethernet VPN ID to set. The range is from 1 to 65534.
---------------------------	---

<b>Command Default</b>	None.
------------------------	-------

<b>Command Modes</b>	EVPN configuration mode
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Use this command to configure static BGP route distinguisher or BGP route target for an EVI.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

## Example

This example shows how to enter the EVPN EVI configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# evi 2
RP/0/RSP0/CPU0:router(config-evpn-evi)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">bgp (EVPN), on page 339</a>	Enables BGP in the PBB EVPN configuration.

# evpn

To enter EVPN configuration mode, use the **evpn** command in the global configuration mode. To return to the global configuration mode, use the **no** form of this command.

```
evpn [{bgp | evi | interface | timers}]
no evpn [{bgp | evi | interface | timers}]
```

<b>Syntax Description</b>	<b>bgp</b>	Configures BGP.
	<b>evi</b>	Configures Ethernet VPN ID (EVI).
	<b>interface</b>	Assigns an interface to EVPN.
	<b>timers</b>	Configures global EVPN timers.
<b>Command Default</b>	None.	
<b>Command Modes</b>	Global configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write
<b>Example</b>		
This example shows how to enter the EVPN configuration mode:		
<pre>RP/0/RSP0/CPU0:router# <b>configure</b> RP/0/RSP0/CPU0:router(config)# <b>evpn</b> RP/0/RSP0/CPU0:router(config-evpn)#</pre>		
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">evi, on page 348</a>	Enters the EVPN EVI configuration mode to configure optional BGP settings for a bridge domain or EVI.
	<a href="#">bgp (EVPN), on page 339</a>	Enables BGP in the PBB EVPN configuration.

Command	Description
<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.

# evpn evi

To enable PBB EVPN and set the EVI for the bridge, use the **evpn evi** command in the L2VPN bridge group bridge domain PBB-core configuration mode. To disable PBB EVPN and reset the EVI, use the **no** form of this command.

```
evpn evi evi-id
no evpn evi evi-id
```

**Syntax Description** *evi-id* Specifies the Ethernet VPN ID to set. The range is from 1 to 65534.

**Command Default** None.

**Command Modes** L2VPN bridge group bridge domain PBB core configuration

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The VPN ID must be unique globally per network.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to enable PBB EVPN and set the EVI for the bridge:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain 1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# evpn evi 2
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)#
```

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

# flushagain

To configure the MAC flush again timer, use the **flushagain** command in the EVPN Interface Timers configuration or in the EVPN Timers configuration mode. To reset the MAC flushagain timer, use the **no** form of this command.

**flushagain** *seconds*  
**no flushagain** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Specifies the value in seconds ranging from 0 to 120 seconds. The default value is 60 seconds.
---------------------------	---

<b>Command Default</b>	None.
------------------------	-------

<b>Command Modes</b>	EVPN Interface Timers configuration EVPN Timers configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to configure the MAC flushagain timer in the EVPN Interface Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)# flushagain 20
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure the MAC flushagain timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
```



```
RP/0/RSP0/CPU0:router(config-evpn-timers)# flushagain 30
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
	<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.
	<a href="#">recovery, on page 374</a>	Configures the recovery timer.
	<a href="#">peering, on page 369</a>	Configures the peering timer.
	<a href="#">programming, on page 372</a>	Configures the programming timer.

# flood-time

To enable flooding of traffic to the entire core bridge when the PBB-VPLS Flood Optimization feature is enabled on the core bridge, use the **flood-time** command in the flood optimization for PBB over VPLS global configuration submode.

**flood-time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Specifies the flood-time in seconds. Range is from 3 to 600 seconds.
---------------------------	---

<b>Command Default</b>	Flooding is disabled during convergence events.
------------------------	---

<b>Command Modes</b>	Flood optimization for PBB over VPLS global configuration submode.
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Enables flooding of traffic on the entire core bridge when flood-time is enabled on the core bridge. This provides time for MMRP to converge with the affected peer(s) before pruning the traffic. Flooding will be disabled and the core bridge will start pruning the traffic when the flood-time has expired.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

The following example shows how to set the flood-time:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# flood-time 80
```

# force single-homed

To configure force single-homed, use **force single-homed** command in the global configuration mode. To return to the default behavior, use the **no** form of this command.

**force single-homed**  
**no force single-homed**

---

## Command Default

None

---

## Command Modes

Global configuration

---

## Command History

Release	Modification
Release 4.3.2	This command was introduced.

---

## Usage Guidelines

All EVPN-based access redundancy (EVLAG) designated forwarder elections are disregarded in favor of the legacy MCLAG access protection protocol.

When CE is directly connected to a PE through a physical or bundle port and the redundant connection to another PE is operating an MCLAG redundancy group.

Specifically, the ESI assignment to the interface is no longer used for EVPN-based access redundancy and protection mechanisms and the MCLAG redundancy protocol will control the state of this interface.

With this command only the access protection is relinquished, and EVPN core mechanisms remain operational including any core functionality requiring the use of an ESI. This command is different than assigning ESI-0 to the interface, and functions also with an assigned ESI. With MCLAG control of the interface state, those EVPN core procedures that depend on interface state remain the same.

Use this command to force the interface into single homed EVPN mode and interoperate with MCLAG access protection.

The following example shows how to configure force single-homed.

```
Router# configure
Router(config)# evpn
Router(config-evpn)# interface GigabitEthernet0/0/0/0
Router(config-evpn-ac)# ethernet-segment force single-homed
```

# identifier type

To configure the Ethernet Segment Identifier (ESI) value for an ethernet segment, use the **identifier type** command in EVPN interface ethernet-segment configuration submode. To undo this command, use the **no** form of this command.

**identifier type** *esi-type esi-value*  
**no identifier type** *esi-type esi-value*

<b>Syntax Description</b>	<i>esi-type</i>	Specifies the ESI type in the range 0 to 5. The ESI types 0 and 1 are supported. The ESI type 1 is auto-configured.
	<i>esi-value</i>	Specifies the Ethernet Segment Identifier value. It is a 9 byte value that depends on the ESI type.
<b>Command Default</b>	None	
<b>Command Modes</b>	EVPN interface ethernet-segment configuration submode	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 6.0	This command was introduced.
<b>Usage Guidelines</b>	This is an optional command to configure the ESI value for a non-bundle interface or to overwrite the computed ESI value.	

## Example

The following example configuration shows how to configure ESI value for an ethernet segment.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet-segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# identifier type 0 ce.01.ce.01.ce.01.ce.01.01
```

## join-time (PBB)

To set the join-time for all active ports, use the **join-time** command in the flood optimization for PBB over VPLS global configuration submode.

**join-time** *milliseconds*

<b>Syntax Description</b>	<i>milliseconds</i> Specifies the maximum time for the join timer parameter for all active ports in milliseconds. Range is from 100 to 1000 milliseconds.				
<b>Command Default</b>	200 milliseconds				
<b>Command Modes</b>	Flood optimization for PBB over VPLS global configuration submode.				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1.2	This command was introduced.
Release	Modification				
Release 5.1.2	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The join-time parameter is used to jitter the sending of MMRPDUs on multi-point LANs, allowing any transmitted messages to take into account received MMRPDUs from multiple peers if they arrive close together. Transmit opportunities are actually uniformly jittered within the range of 0 to join-time.</p>				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	ethernet-services	read, write
Task ID	Operation				
ethernet-services	read, write				

The following example shows how to set the join time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# join-time 300
```

## interface (EVPN)

To enter the physical port interface or the bundle name interface configuration mode, use the **interface** command in the EVPN configuration mode. To return to the EVPN configuration mode, use the **no** form of this command.

```
interface type interface path-id
no interface type interface path-id
```

Syntax Description		
<i>type</i>	Specifies the physical ethernet interface or bundle ethernet Interface type connected to the CE device.	For more information about the syntax for the router, use the question mark (?) online help function.
<i>interface path-id</i>	Physical port name or main bundle name. The range for the bundle name is from 1 to 65535.	<p><b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

**Command Default** None.

**Command Modes** EVPN configuration mode

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

To specify a physical interface, the notation for the *interface-path-id* is *rack/slot/module/port*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:

- *rack*: Chassis number of the rack.
- *slot*: Physical slot number of the line card.
- *module*: Module number. A physical layer interface module (PLIM) is always 0.
- *port*: Physical port number of the interface.

Task ID	Task ID	Operation
	l2vpn	read, write

### Example

This example shows how to enter the EVPN Interface configuration mode for bundle-ether 1:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)#
```

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">ethernet-segment, on page 346</a>	Enters EVPN interface ethernet segment configuration mode.
	<a href="#">mac-flush mvrp, on page 365</a>	Performs a MAC flush on an Ethernet-segment.
	<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.

## leaveall-time (PBB)

To set the leave-all-time for all active ports, use the **leaveall-time** command in the flood optimization for PBB over VPLS global configuration submode.

**leaveall-time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Sets the minimum time in seconds for the leave-all timer parameter for all active ports. Range is from 5 to 30 seconds.
---------------------------	--

<b>Command Default</b>	10 seconds
------------------------	------------

<b>Command Modes</b>	Flood optimization for PBB over VPLS global configuration submode.
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The leave-all timer parameter controls how often the leave-all messages are sent. This forces all the peers to re-declare all the attributes, thereby replaying any registrations or deregistrations that may be lost.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

The following example shows how to set the leave-all time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmp-flood-opt)# leaveall-time 20
```



# leave-time (PBB)

To set the leave-time for all active ports, use the **leave-time** command in the flood optimization for PBB over VPLS global configuration submode.

**leave-time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Sets the leave time for all active ports. Range is from 1 to 90 seconds.
---------------------------	---

<b>Command Default</b>	30 seconds
------------------------	------------

<b>Command Modes</b>	Flood optimization for PBB over VPLS global configuration submode.
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **leave-time** command controls how long registrations stay in the leaving state before being removed; that is, it controls when the garbage collection of stale registrations is performed after unregistration.

The **leaveall-time** and the **leave-time** commands together control the garbage collection.

The IEEE specification states that the value of the **leave-time** command must be less than the value of the **leaveall-time** command.

However, in Cisco IOS-XR, processing outages of several seconds can occur during a process restart or Router Processor Fail-Over (RPFO) leading to a loss of messages.

Therefore, a greater default **leave-time** *value* (thrice that of the **leaveall-time** *value* command) increases the robustness of the Multiple MAC Registration Protocol (MMRP) during packet loss or system outage.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

The following example shows how to set the leave-time on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# leave-time 80
```

# load-balancing-mode

To set the load balancing mode of a physical port or bundle to active-active, use the **load-balancing-mode** command in the EVPN Interface Ethernet segment configuration mode. To disable the load balancing mode from active-active, use the **no** form of this command.

**load-balancing-mode per-service**  
**no load-balancing-mode per-service**

<b>Syntax Description</b>	<b>per-service</b> Specifies the per-service load balancing.
---------------------------	--

<b>Command Default</b>	Active-active per-flow
------------------------	------------------------

<b>Command Modes</b>	EVPN interface Ethernet segment configuration mode
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Use this command in a multi-homing configuration to set the redundancy mode to active-active per service.

In this mode, services that are active on one PoA are not active on the other PoA. Services can be represented by an ISID in case of PBB EVPN.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

## Example

This example shows how to set the load balancing mode of a physical port or bundle to active-active:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# load-balancing-mode per-service
RP/0/RSP0/CPU0:router(config-evpn-ac-es)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">ethernet-segment, on page 346</a>	Enters EVPN interface ethernet segment configuration mode.

Command	Description
<a href="#">service-carving, on page 378</a>	Specifies the list of service identifiers as active and standby services.
<a href="#">backbone-source-mac, on page 337</a>	Configures the backbone source MAC address.

# mmrp-flood-optimization

To enable flood optimization for PBB over VPLS, use the **mmrp-flood-optimization** command on the core bridge in the PBB core configuration submode. To disable the flood optimization for PBB over VPLS, use the **no** form of this command.

**mmrp-flood-optimization**  
**no mmrp-flood-optimization**

<b>Syntax Description</b>	This command has no keywords or arguments.	
<b>Command Default</b>	Disabled.	
<b>Command Modes</b>	PBB core configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1.2	This command was introduced.
<b>Usage Guidelines</b>	Flood optimization is enabled on all the pseudo-wires in the VFI associated with the core bridge domain. This feature is supported only in the standard full mesh topology of a VPLS network.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

The following example shows how to enable flood optimization for PBB over VPLS:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group pbb
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain pbb-core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# pbb core
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-pbb-core)# end
```

## mac-flush mvrp

To perform a MAC flush on an Ethernet-segment, use the **mac-flush** command in the EVPN interface configuration mode. To disable the MAC flush setting, use the **no** form of this command.

**mac-flush mvrp**  
**no mac-flush mvrp**

<b>Syntax Description</b>	<b>mvrp</b> Specifies the MAC flush over MVRP.
---------------------------	--

<b>Command Default</b>	STP-TCN
------------------------	---------

<b>Command Modes</b>	EVPN interface configuration
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to perform the MAC flush over MVRP on an Ethernet segment:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# mac-flush mvrp
RP/0/RSP0/CPU0:router(config-evpn-ac)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.

# mode singleton

To enable singleton ICCP mode, use the **mode singleton** command in the Redundancy ICCP group configuration mode. To disable singleton ICCP mode, use the **no** form of this command.

**mode singleton**  
**no mode singleton**

**Syntax Description** This command has no arguments or keywords.

**Command Default** None.

**Command Modes** Redundancy ICCP group configuration

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

This example shows how to enable singleton ICCP mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# redundancy
RP/0/RSP0/CPU0:router(config-redundancy)# iccp
RP/0/RSP0/CPU0:router(config-redundancy-iccp)# group 1
RP/0/RSP0/CPU0:router(config-redundancy-iccp-group)# mode singleton
RP/0/RSP0/CPU0:router(config-redundancy-iccp-group)#
```

# pbb

To configure the provider backbone bridge core or edge, use the **pbb** command in the bridge domain configuration submenu. To return to the default behavior, use the **no** form of this command.

```
pbb {edge i-sid service-id core-bridge core-bridge-domain-name | core}
no pbb {edge i-sid service-id core-bridge core-bridge-domain-name | core}
```

Syntax Description		
<b>edge</b>		Configures the PBB edge.
<b>i-sid</b>		Specifies the service instance identifier. The ranges is from 256 to 16777214. <b>Note</b> The 16777215 (0xFFFFF) service instance identifier is reserved for wildcard.
<i>service-id</i>		Service instance identifier.
<b>core-bridge</b>		Specifies the name of the core-bridge domain connected to that edge-bridge domain.
<i>core-bridge-domain-name</i>		Core bridge domain name.
<b>core</b>		Configures the PBB core.

**Command Default** None

**Command Modes** L2VPN bridge group bridge domain configuration

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command allows you to enter pbb edge configuration mode or pbb core configuration mode.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to configure the PBB edge component:

```
config
l2vpn
```

```

bridge group PBB
  bridge-domain PBB-EDGE
    interface GigabitEthernet0/0/0/38.100
    !
    interface GigabitEthernet0/2/0/30.150
    !
    pbb edge i-sid 1000 core-bridge PBB-CORE
  !
!
!

```

The following example shows how to configure the PBB core component:

```

config
l2vpn
bridge group PBB
  bridge-domain PBB-CORE
    interface G0/5/0/10.100
    !
    interface G0/2/0/20.200
    !
  pbb core
!
!
!

```

#### Related Commands

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.



# peering

To configure the peering timer, use the **peering** command in the EVPN Timers configuration mode. To delete the peering timer, use the **no** form of this command.

**peering** *seconds*  
**no peering** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Specifies the value in seconds ranging from 0 to 300 seconds. The default value is 45 seconds.
---------------------------	---

<b>Command Default</b>	None.
------------------------	-------

<b>Command Modes</b>	EVPN Timers configuration
----------------------	---------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

In a single homed Ethernet segment, wait for this timer to expire before advertising BGP route target, Ethernet segment identifier (ESI), and local MAC.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to configure the peering timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
RP/0/RSP0/CPU0:router(config-evpn-timers)# peering 30
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.
	<a href="#">flushagain, on page 352</a>	Configures the MAC flushagain timer.
	<a href="#">recovery, on page 374</a>	Configures the recovery timer.

Command	Description
<a href="#">programming, on page 372</a>	Configures the programming timer.

## periodic transmit (PBB)

To enable periodic Multiple MAC Registration Protocol Data Units (MMRPDUs), use the **periodic transmit** command in the flood optimization for PBB over VPLS global configuration submode.

**periodic transmit** [**interval** *seconds*]

<b>Syntax Description</b>	<b>interval</b> <i>seconds</i> Specifies the periodic transmit interval in seconds. Range is from 2 to 10. If the <b>interval</b> keyword is not specified, then the value defaults to 3 seconds.				
<b>Command Default</b>	Periodic MMRPDUs are disabled.				
<b>Command Modes</b>	Flood optimization for PBB over VPLS global configuration submode.				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1.2	This command was introduced.
Release	Modification				
Release 5.1.2	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>This command can optionally be used to configure the protocol to replay data periodically. This is in addition to the periodic replay triggered by the leave-all timer. The use of this command will not be necessary in the vast majority of deployments and enabling it can cause a significant increase in CPU usage.</p>				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	ethernet-services	read, write
Task ID	Operation				
ethernet-services	read, write				

The following example shows how to enable periodic MMRPDUs transmitted on all active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# mmrp-flood-optimization
RP/0/RSP0/CPU0:router(config-mmrp-flood-opt)# periodic transmit interval 3
```

# programming

To configure the programming timer, use the **programming** command in the EVPN Timers configuration mode. To delete the programming timer, use the **no** form of this command.

**programming** *microseconds*  
**no programming** *microseconds*

<b>Syntax Description</b>	<i>microseconds</i> Specifies the value in microseconds ranging from 0 to 100000 seconds. The default value is 1500 microseconds.
---------------------------	---

<b>Command Default</b>	None.
------------------------	-------

<b>Command Modes</b>	EVPN Timers configuration
----------------------	---------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Every time the ES Manager runs DF election, it starts a programming timer to account for the time needed by the hardware to apply the new carving. At the expiry time, the next ES route object is processed or carved, restarting the timer.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to configure the programming timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
RP/0/RSP0/CPU0:router(config-evpn-timers)# programming 5000
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.

Command	Description
<a href="#">flushagain, on page 352</a>	Configures the MAC flushagain timer.
<a href="#">recovery, on page 374</a>	Configures the recovery timer.
<a href="#">peering, on page 369</a>	Configures the peering timer.

# recovery

To configure the recovery timer, use the **recovery** command in the EVPN Interface Timers configuration or in the EVPN Timers configuration mode. To delete the recovery timer, use the **no** form of this command.

**recovery** *seconds*  
**no recovery** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Specifies the value in seconds ranging from 20 to 3600 seconds. The default value is 20 seconds.
---------------------------	---

<b>Command Default</b>	None.
------------------------	-------

<b>Command Modes</b>	EVPN Interface Timers configuration EVPN Timers configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.3.2	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

This timer is used to wait before processing the port state UP event in order to give the CE running STP to converge. If the interface is up and all conditions are already met, this timer is skipped to not add any more delays.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	l2vpn	read, write

This example shows how to configure the recovery timer in the EVPN Interface Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)# recovery 50
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure the recovery timer in the EVPN Timers configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
```

```
RP/0/RSP0/CPU0:router(config-evpn-timers)# recovery 300  
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
	<a href="#">timers, on page 404</a>	Configures timers that affect the convergence of PBB EVPN in failure scenarios.
	<a href="#">flushagain, on page 352</a>	Configures the MAC flushagain timer.
	<a href="#">peering, on page 369</a>	Configures the peering timer.
	<a href="#">programming, on page 372</a>	Configures the programming timer.

# rewrite ingress tag push

To configure the backbone VLAN ID for a PBB core bridge, use the **rewrite ingress tag push** command in the PBB core configuration mode. To return to the default behavior, use the **no** form of this command.

**rewrite ingress tag push dot1ad *vlan-id* symmetric**

Syntax Description	dot1ad	Indicates that the IEEE 802.1ad provider bridges encapsulation type is used.
	<i>vlan-id</i>	VLAN ID. Range is from 1 to 4094.
	<b>symmetric</b>	Specifies that all rewrites must be symmetric.

**Command Default** None

**Command Modes** PBB core configuration

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to configure the backbone VLAN ID for the PBB core bridge:

```

config
l2vpn
  bridge group PBB
  bridge-domain PBB-CORE
  interface G0/5/0/10.100
  !
  interface G0/2/0/20.200
  !
  pbb core
  rewrite ingress tag push dot1ad 100 symmetric
!
```



!  
!

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

## service-carving

To specify a list of service identifiers as active and standby services, use the **service-carving** command in the EVPN Interface Ethernet segment configuration mode. To delete service carving of a list of service identifiers, use the **no** form of this command.

```
service-carving manual[primary service-id-range secondary service-id-range]
no service-carving manual[primary service-id-range secondary service-id-range]
```

Syntax Description	Parameter	Description
	<b>manual</b>	Specifies service identifiers or EVI-list services manually.
	<b>primary</b>	Specifies the primary services list.
	<b>secondary</b>	Specifies the secondary services list.
	<i>service-id-range</i>	Specifies the services list notation in the range 100, 201-300, 401. The range is within 256 to 16777214.

**Command Default** Automatic service carving

**Command Modes** EVPN interface Ethernet segment configuration mode

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read, write

### Example

This example shows how to specify a list of service identifiers as active and standby services:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# ethernet segment
RP/0/RSP0/CPU0:router(config-evpn-ac-es)# service-carving manual primary 201-300 secondary
```

```
400-500  
RP/0/RSP0/CPU0:router(config-evpn-ac-es)#
```

Related Commands	Command	Description
	<a href="#">ethernet-segment, on page 346</a>	Enters EVPN interface ethernet segment configuration mode.
	<a href="#">load-balancing-mode, on page 362</a>	Sets the load balancing mode of a physical port or bundle to active-active.
	<a href="#">backbone-source-mac, on page 337</a>	Configures the backbone source MAC address.

# show evpn ethernet-segment

To display the EVPN Ethernet segment information, use the **show evpn ethernet-segment** command in the EXEC mode.

**show evpn ethernet-segment** [{detail | esi | interface | location | private | standby }]

Syntax Description	Option	Description
	<b>detail</b>	Displays detailed information.
	<b>esi</b>	Filters by Ethernet Segment identifier.
	<b>interface</b>	Filters by interface name.
	<b>location</b>	Displays location specific information.
	<b>private</b>	Displays private information.
	<b>standby</b>	Displays standby node specific information.

**Command Default** None.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.2	This command was introduced.
	Release 6.0	The show command output is updated to provide RFC 7432 compliant Ethernet Segment Identifier (ESI) details.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

## Example

This sample output shows the EVPN Ethernet segment with interface filter:

```
RP/0/RSP0/CPU0:router#show evpn ethernet-segment interface gigabitethernet 0/3/0/0 detail
Ethernet Segment Id      Interface      Nexthops
-----
0210.0300.9e00.0210.0000 Gi0/3/0/0    1.100.100.100
                        2.100.100.100
be01.0300.be01.ce00.0001 BE1           1.100.100.100
```

```

                2.100.100.100
be02.0300.be02.0101.0002 BE2      1.100.100.100
                2.100.100.100
N/A                               Gi0/3/0/3      N/A

```

This sample output shows the EVPN Ethernet segment detailed information:

```
RP/0/RSP0/CPU0:router#show evpn ethernet-segment detail
```

```
Tue Jun 25 14:17:09.610 EDT
```

Legend:

```

A- PBB-EVPN load-balancing mode and Access Protection incompatible,
B- no Bridge Ports PBB-EVPN enabled,
C- Backbone Source MAC missing,
E- ESI missing,
H- Interface handle missing,
I- Interface name missing,
M- Interface in Down state,
O- BGP End of Download missing,
P- Interface already Access Protected,
Pf-Interface forced single-homed,
R- BGP RID not received,
S- Interface in redundancy standby state,
X- ESI-extracted MAC Conflict

```

```

Ethernet Segment Id      Interface      Nexthops
-----
0210.0300.9e00.0210.0000 Gi0/3/0/0    1.100.100.100
                                2.100.100.100

  ES to BGP Gates       : Ready
  ES to L2FIB Gates    : Ready
  Main port             :
    Interface name      : GigabitEthernet0/3/0/0
    IfHandle            : 0x1800300
    State               : Up
    Redundancy          : Not Defined
  Source MAC           : 0001.ed9e.0001 (PBB BSA)
  Topology              :
    Operational        : MHN
    Configured         : A/A per service (default)
  Primary Services     : Auto-selection
  Secondary Services    : Auto-selection
  Service Carving Results:
    Bridge ports       : 3
    Elected           : 0
    Not Elected       : 3
    I-Sid NE          : 1450101, 1650205, 1850309
  MAC Flushing mode    : STP-TCN
  Peering timer        : 45 sec [not running]
  Recovery timer       : 20 sec [not running]
  Flushagain timer     : 60 sec

be01.0300.be01.ce00.0001 BE1      1.100.100.100
                                2.100.100.100

  ES to BGP Gates       : Ready
  ES to L2FIB Gates    : Ready
  Main port             :
    Interface name      : Bundle-Ether1
    IfHandle            : 0x000480
    State               : Up
    Redundancy          : Active
  Source MAC           : 0024.be01.ce00 (Local)
  Topology              :
    Operational        : MHN

```

## show evpn ethernet-segment

```

    Configured      : A/A per flow (default)
    Primary Services : Auto-selection
    Secondary Services: Auto-selection
    Service Carving Results:
      Bridge ports   : 3
      Elected       : 3
      I-Sid E       : 1450102, 1650206, 1850310
      Not Elected   : 0
    MAC Flushing mode : STP-TCN
    Peering timer    : 45 sec [not running]
    Recovery timer   : 20 sec [not running]
    Flushagain timer : 60 sec

```

This sample output shows the EVPN Ethernet segment detailed information with ESI types 0 and 1:

```
RP/0/RSP0/CPU0:router#show evpn ethernet-segment detail
```

Ethernet Segment Id	Interface	Nexthops
0099.1020.9900.0000.0001	Gi0/0/0/0	10.10.10.10 20.20.20.20 50.50.50.50

```

    ES to BGP Gates   : Ready
    ES to L2FIB Gates : Ready
    Main port        :
      Interface name  : GigabitEthernet0/0/0/0
      Interface MAC   : d867.d93e.0c8c
      IfHandle        : 0x40000c0
      State           : Up
      Redundancy      : Not Defined
ESI type           : 0
      Value           : 99.1020.9900.0000.0001
    ES Import RT     : 9900.0000.0001 (Local)
    Source MAC       : 0000.0050.0010 (Local)
    Topology         :
      Operational     : MHN
      Configured      : Single-active (AApS) (default)
    Primary Services : Auto-selection
    Secondary Services: Auto-selection

```

```
RP/0/RSP0/CPU0:router#show evpn ethernet-segment detail
```

0100.1020.0025.0000.1900	BE25	10.10.10.10 20.20.20.20
--------------------------	------	----------------------------

```

    ES to BGP Gates   : Ready
    ES to L2FIB Gates : Ready
    Main port        :
      Interface name  : Bundle-Ether25
      Interface MAC   : 0026.51cc.4e44
      IfHandle        : 0x0006a0
      State           : Up
      Redundancy      : Active
ESI type           : 1
      System-id      : 0010.2000.2500
      Port key       : 0019
    ES Import RT     : 0010.2000.2500 (from ESI)
    Source MAC       : 0210.2000.2500 (from ESI)
    Topology         :
      Operational     : MHN
      Configured      : All-active (AApF) (default)
    Primary Services : Auto-selection

```

Secondary Services: Auto-selection

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">ethernet-segment, on page 346</a>	Enters EVPN interface ethernet segment configuration mode.

# show evpn evi

To display the EVPN E-VPN ID information, use the **show evpn evi** command in the EXEC mode.

**show evpn evi** [{**bridge-domain** | **detail** | **inclusive-multicast** | **location** | **mac** | **standby** | **vpn-id** }]

## Syntax Description

<b>bridge-domain</b>	Displays information for a specified bridge-domain..
<b>detail</b>	Displays detailed information.
<b>inclusive-multicast</b>	Displays EVPN Inclusive Multicast information.
<b>location</b>	Displays location specific information.
<b>mac</b>	Displays EVI MAC route associated configuration information.
<b>standby</b>	Displays standby node specific information.
<b>vpn-id</b>	Displays information for a specified E-VPN Identifier.

## Command Default

None.

## Command Modes

EXEC

## Command History

Release	Modification
Release 4.3.2	This command was introduced.
Release 6.1.2	The show command output is enhanced to display the Service Path Preference parameters.

## Usage Guidelines

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
l2vpn	read

## Example

This sample output shows the EVPN EVI information with the VPN-ID and MAC address filter:

```
RP/0/RSP0/CPU0:router#show evpn evi vpn-id 185 mac 0024.be03.ce01
MAC address      Nexthop                Label    vpn-id
-----
0024.be03.ce01  3.100.100.100          16004    185
                  4.100.100.100          16004    185
```



```

ESI port key : 0x0000
Source       : Remote
Flush Count  : 0

```

This sample output shows the EVPN EVI information with the VPN-ID and inclusive-multicast filter:

```

RP/0/RSP0/CPU0:router#show evpn evi vpn-id 185 inclusive-multicast service-id 1850312 orig-ip
1.100.100.100

```

ISID	Originating IP	vpn-id
1850312	1.100.100.100	185
1850312	2.100.100.100	185
1850312	3.100.100.100	185
1850312	4.100.100.100	185

This sample output shows the EVPN EVI inclusive-multicast information:

```

RP/0/RSP0/CPU0:router#show evpn evi inclusive-multicast detail

```

ISID: 1850312, Originating IP: 1.100.100.100	185
Nexthop: ::	
Label : 16005	
Source : Local	
ISID: 1850312, Originating IP: 2.100.100.100	185
Nexthop: 2.100.100.100	
Label : 16005	
Source : Remote	
ISID: 1850312, Originating IP: 3.100.100.100	185
Nexthop: 3.100.100.100	
Label : 16005	
Source : Remote	
ISID: 1850312, Originating IP: 4.100.100.100	185
Nexthop: 4.100.100.100	
Label : 16005	
Source : Remote	

This sample output shows the EVPN EVI information with the bridge-domain filter:

```

RP/0/RSP0/CPU0:router#show evpn evi bridge-domain tbl-core1 detail

```

EVI	Bridge Domain	Type
145	tbl-core1	PBB
165	tbl-core2	PBB
185	tbl-core3	PBB
65535	ES:GLOBAL	BD

This sample output shows the EVPN EVI detailed information:

```

RP/0/RSP0/CPU0:router#show evpn evi detail

```

EVI	Bridge Domain	Type
145	tbl-core1	PBB
Unicast Label : 16000		
Multicast Label: 16001		
RD Config: none		
RD Auto : (auto) 1.100.100.100:145		
RT Auto : 100:145		
Route Targets in Use		Type

show evpn evi

```

-----
100:145                Import
100:145                Export

165      tb1-core2                PBB
Unicast Label   : 16002
Multicast Label: 16003
RD Config: none
RD Auto  : (auto) 1.100.100.100:165
RT Auto  : 100:165
Route Targets in Use          Type
-----
100:165                Import
100:165                Export

185      tb1-core3                PBB
Unicast Label   : 16004
Multicast Label: 16005
RD Config: none
RD Auto  : (auto) 1.100.100.100:185
RT Auto  : 100:185
Route Targets in Use          Type
-----
100:185                Import
100:185                Export

65535    ES:GLOBAL                BD
Unicast Label   : 0
Multicast Label: 0
RD Config: none
RD Auto  : (auto) 1.100.100.100:0
RT Auto  : none
Route Targets in Use          Type
-----
0100.9e00.0210          Import
0100.be01.ce00          Import
0100.be02.0101          Import

```

**Related Commands**

Command	Description
<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
<a href="#">evi, on page 348</a>	Enters the EVPN EVI configuration mode to configure optional BGP settings for a bridge domain or EVI.

# show evpn summary

To display the EVPN summary, use the **show evpn summary** command in the EXEC mode.

```
show evpn summary[{location | private | standby}]
```

Syntax Description	location	Displays location specific information.
	private	Displays private information.
	standby	Displays standby node specific information.

**Command Default** None.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	l2vpn	read

## Example

This sample output shows the EVPN summary:

```
RP/0/RSP0/CPU0:router#show evpn summary
Thu Jul  4 01:34:58.838 DST
-----
Global Information
-----
Number of EVIs                : 1
Number of Local MAC Routes    : 1
Number of Remote MAC Routes   : 0
Number of Local IMCAST Routes : 0
Number of Remote IMCAST Routes: 0
Number of Internal Labels     : 0
Number of ES Entries          : 0
BGP Router ID                 : ::
BGP ASN                       : Invalid
PBB BSA MAC address           : f866.f214.abd7
Global peering timer          : 45 seconds
Global recovery timer         : 20 seconds
```

## show evpn summary

```
Global programming timer      : 1500 microseconds
Global flushagain timer     :    60 seconds
```

```
-----
High Availability Information
-----
```

```
BGP EOD                      : N
Number of Marked MAC Routes   : 0
Number of Swept MAC Routes    : 0
Number of Marked IMCAST Routes: 0
Number of Swept IMCAST Routes: 0
```

---

**Related Commands**

Command	Description
<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.

---

## show l2vpn bridge-domain pbb

To display the provider backbone bridge details, use the **show l2vpn bridge-domain pbb** command in EXEC mode.

```
show l2vpn bridge-domain pbb {core [{brief|detail|hardware|private}]|edge [{brief|core-bridge|detail|hardware|private}]|i-sid service-id [{brief|detail|hardware|private}]}
```

Syntax Description		
<b>core</b>		Displays the PBB core.
<b>edge</b>		Displays the PBB edge.
<b>i-sid</b>		Displays the service instance identifier.
<i>service-id</i>		Service ID.
<b>brief</b>		Displays brief information about the PBB core, edge or service instance identifier.
<b>detail</b>		Displays detailed information about the PBB core, edge or service instance identifier.
<b>hardware</b>		Displays hardware information.
<b>private</b>		Displays private information about the PBB core, edge or service instance identifier.
<b>core-bridge</b>		Displays the name of the core-bridge domain connected to the edge-bridge domain.

**Command Default** None

**Command Modes** l2vpn

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

### Examples

The following examples shows the output from the **show l2vpn bridge-domain pbb** command:

```
#show l2vpn bridge-domain isid 1234
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 1234
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
```

## show l2vpn bridge-domain pbb

```

Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 0
  List of ACs:
    Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

```

## For IOS-XR 5.3.1 and earlier releases.

```

#show l2vpn bridge-domain detail isid 1234
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state is up
  XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Split Horizon Group: none
  DHCPv4 snooping: disabled
  IGMP Snooping profile:
  Storm Control: disabled
  Unknown-unicast-bmac: 666.777.888
  CMAC to BMAC Mapping Table:
    CMAC          |          BMAC
    -----
    222.333.444   |    777.888.999
    333.444.555   |    888.999.111
  Statistics:
    packet totals: receive 3919680,send 9328
    byte totals: receive 305735040,send 15022146

List of ACs:
AC: GigabitEthernet0/1/0/0, state is up
Type Ethernet
MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
Static MAC addresses:

```

```

0000.0000.0000
0001.0002.0003
Statistics:
packet totals: receive 3919680,send 9328
byte totals: receive 305735040,send 15022146

```

For IOS-XR 5.3.2 release.

```

#show l2vpn bridge-domain detail isid 1234
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
PBB Edge, state is up
  XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Split Horizon Group: none
  DHCPv4 snooping: disabled
  IGMP Snooping profile:
  Storm Control: disabled
  Unknown-unicast-bmac: 666.777.888
  CMAC to BMAC Mapping Table:
    CMAC          |          BMAC
    -----
    222.333.444   |   777.888.999
    333.444.555   |   888.999.111
  Statistics:
    packets: received 1000 (unicast 1000), sent 0
    bytes: received 128000 (unicast 128000), sent 0
    MAC move: 10

List of ACs:
AC: GigabitEthernet0/1/0/0, state is up
Type Ethernet
MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
Static MAC addresses:

```

## show l2vpn bridge-domain pbb

```

0000.0000.0000
0001.0002.0003

Statistics:
  packets: received 3919680, (multicast 0, broadcast 0, unknown unicast 0, unicast
3919680,) , sent 9328
  bytes: received 305735040 (multicast 0, broadcast 0, unknown unicast 0, unicast
0), sent 15022146
  MAC move: 0

#show l2vpn bridge-domain pbb edge
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 1234
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

Bridge group: g2, bridge-domain: pbb-bd3, id: 3, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 2345
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  EDGE, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

Bridge group: g2, bridge-domain: pbb-bd4, id: 4, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 3456
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0

```

## For IOS-XR 5.3.2 release.

```

#show l2vpn bridge-domain pbb-edge detail
Bridge group: g2, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
  Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  MAC withdraw: disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  MTU: 1500
  Filter MAC addresses:
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:

```



```
PBB Edge, state is up
XC ID 0x2000001
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Split Horizon Group: none
DHCPv4 snooping: disabled
IGMP Snooping profile:
Storm Control: disabled
Unknown-unicast-bmac: 666.777.888
```

## CMAC to BMAC Mapping Table:

CMAC	BMAC
222.333.444	777.888.999
333.444.555	888.999.111

## Statistics:

```
packets: received 1000 (unicast 1000), sent 0
bytes: received 128000 (unicast 128000), sent 0
MAC move: 10
```

## List of ACs:

```
AC: GigabitEthernet0/1/0/0, state is up
Type Ethernet
MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
Static MAC addresses:
  0000.0000.0000
  0001.0002.0003
Statistics:
  packets: received 1000 (unicast 1000), sent 0
  bytes: received 128000 (unicast 128000), sent 0
  MAC move: 10
```

## #show l2vpn bridge-domain pbb-core

```
Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
Type: pbb-core
Number of associated pbb-edge BDs: 1
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 1 (1 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Core, state: up
List of ACs:
  Gi0/2/0/0, state: up, Static MAC addresses: 2, MSTi: 0
```

## #show l2vpn bridge-domain pbb-core detail

```
Bridge group: g2, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
Type: pbb-core
Number of associated pbb-edge BDs: 1
MAC learning: enabled
```

## show l2vpn bridge-domain pbb

```

MAC withdraw: disabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: yes
Security: disabled
DHCPv4 snooping: disabled
MTU: 1500
Filter MAC addresses:
ACs: 1 (1 up), PBB: 1
List of PBBs:
  PBB Core, state is up
  Vlan-id: 1; XC ID 0x2000001
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 600, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  Split Horizon Group: none
  DHCPv4 snooping: profile foo
  IGMP Snooping profile:
  Storm Control: disabled
List of ACs:
  AC: GigabitEthernet0/1/0/0, state is up
  Type Ethernet
  MTU 1500; XC ID 0x2000001; interworking none; MSTi 0
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: yes
  Security: disabled
  DHCPv4 snooping: disabled
  Static MAC addresses:
    0000.0000.0000
    0001.0002.0003
  Statistics:
    packet totals: receive 3919680,send 9328
    byte totals: receive 305735040,send 15022146

```

```

#show l2vpn bridge-domain pbb-edge core-bridge core-bd brief
Bridge Group/???????????????????? ID      State      Num ACs/up  Num PWs/up
Bridge-Domain Name
-----
bg/pbb-bd1 ??????????????????????????1    up         0/0 ??????????0/0
bg/pbb-bd2 ??????????????????????????2    up         0/0 ??????????0/0
bg/pbb-bd3 ??????????????????????????3    up         0/0 ??????????0/0

```

```

RP/0/0/CPU0:ios#show l2vpn bridge-domain pbb edge core-bridge bd
Bridge group: bg, bridge-domain: pbb-bd1, id: 1, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4001
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 2

```

```

...
Bridge group: bg, bridge-domain: pbb-bd2, id: 2, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4002
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 1
...
Bridge group: bg, bridge-domain: pbb-bd3, id: 3, state: up, ShgId: 0, MSTi: 0
Type: pbb-edge, I-SID: 4003
Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
Filter MAC addresses: 0
ACs: 0 (0 up), VFIs: 0, PWs: 0 (0 up), PBBs: 1 (1 up)
List of PBBs:
  PBB Edge, state: up, Static MAC addresses: 0
...

```

**Related Commands**

Command	Description
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

# show l2vpn forwarding bridge pbb

To display the PBB bridge forwarding information, use the **show l2vpn forwarding bridge pbb** command in EXEC mode.

```
show l2vpn forwarding bridge pbb core [{debug | detail | hardware | location | private}] | edge
[ {core-bridge | debug | detail | hardware | location | private}] | i-sid service-id [{debug | detail | hardware
| location | private}]
```

Syntax Description		
<b>debug</b>		Displays the debug information.
<b>core</b>		Displays the PBB core.
<b>edge</b>		Displays the PBB edge.
<b>i-sid</b> <i>service-id</i>		Displays the service instance identifier.
<b>brief</b>		Displays brief information about the PBB core, edge or service instance identifier.
<b>detail</b>		Displays detailed information about the PBB core, edge or service instance identifier.
<b>hardware</b>		Displays hardware information.
<b>private</b>		Displays private information about the PBB core, edge or service instance identifier.
<b>core-bridge</b>		Displays the name of the core-bridge domain connected to the edge-bridge domain.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

**Examples** The following example shows the output from the **show l2vpn forwarding pbb backbone-source-mac** command:

```
#show l2vpn forwarding backbone-source-mac location 0/1/CPU0
333.444.555
```

The following example shows the output from the **show l2vpn forwarding bridge-domain pbb edge location** command:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain pbb edge location 0/1/CPU0
```

Bridge-Domain Name	Bridge		MAC		Flooding	Learning	State
	ID	Ports	addr				
bg1:bd2	1	1	0		Enabled	Enabled	UP
bg1:bd4	3	1	0		Enabled	Enabled	UP
bg1:bd5	4	1	0		Enabled	Enabled	UP

The following example shows the output from the **show l2vpn forwarding bridge-domain pbb edge core-bridge bg1:bd3 location** command:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain pbb edge core-bridge bg1:bd3
location 0/1/CPU0
```

Bridge-Domain Name	Bridge		MAC		Flooding	Learning	State
	ID	Ports	addr				
bg1:bd2	1	1	0		Enabled	Enabled	UP
bg1:bd4	3	1	0		Enabled	Enabled	UP
bg1:bd5	4	1	0		Enabled	Enabled	UP

The following example shows the output from the **show l2vpn forwarding bridge-domain pbb core location** command:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain pbb core location 0/1/CPU0
```

Bridge-Domain Name	Bridge		MAC		Flooding	Learning	State
	ID	Ports	addr				
bg1:bd3	1	1	0		Enabled	Enabled	UP

The following example shows the output from the **show l2vpn forwarding bridge-domain pbb i-sid 1000 location** command:

```
RP/0/RSP0/CPU0:router# show l2vpn forwarding bridge-domain pbb i-sid 1000 location 0/0/CPU0
Thu Aug 13 12:08:16.492 EDT
```

Bridge-Domain Name	Bridge		MAC		Flooding	Learning	State
	ID	Ports	addr				
PBB:PBB-EDGE	1	4	2		Enabled	Enabled	UP

## Related Commands

Command	Description
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

# show l2vpn forwarding pbb backbone-source-mac

To display the provider backbone source MAC forwarding information, use the **show l2vpn forwarding pbb backbone-source-mac** command in EXEC mode.

```
show l2vpn forwarding pbb backbone-source-mac {debug [{detail | location | private}] | detail
[ {debug | location node-id ] | location node-id | private}
```

## Syntax Description

<b>debug</b>	Displays the debug information.
<b>detail</b>	Displays the detailed PBB forwarding information.
<b>location</b>	Specifies the location.
<i>node-id</i>	Node ID.
<b>private</b>	Displays private information.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.9.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
l2vpn	read

## Examples

The following example shows the output from the **show l2vpn forwarding pbb backbone-source-mac** command:

```
#show l2vpn forwarding backbone-source-mac location 0/1/CPU0
333.444.555
```

## Related Commands

Command	Description
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

# show l2vpn pbb backbone-source-mac

To display the provider backbone source MAC information, use the **show l2vpn pbb backbone-source-mac** command in EXEC mode.

**show l2vpn pbb backbone-source-mac**

**Syntax Description** This command has no keywords or arguments.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

**Examples** The following example shows the output from the **show l2vpn pbb backbone-source-mac** command:

```
#show l2vpn pbb backbone-source-mac
0111.0222.0333
```

Related Commands	Command	Description
	<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.

# show mmrp-flood-optimization

To display the MMRP flood optimization information, use the **show mmrp-flood-optimization** command in the EXEC mode.

**show mmrp-flood-optimization** [{summary | mad [pw neighbor pw-id] | statistics [pw neighbor pw-id] | registrations [received] [core-bridge bridge-domain-name:group-name] [isid isid]}

Syntax Description		
	<b>summary</b>	Displays the summary of the current timer values, total number of core bridges, pseudowires, I-SIDs configured, declarations, and registrations.
	<b>mad</b>	Displays the current state of the MRP Attribute Declaration (MAD) component on a pseudowire, for each active attribute value (that is, group B-MAC).
	<b>pw</b>	Indicates the pseudowire.
	<i>neighbor</i>	Indicates the IP address of the neighbor.
	<i>pw-id</i>	Indicates the pseudowire ID.
	<b>statistics</b>	Displays the packet statistics per pseudowire.
	<b>registrations</b>	Displays the I-SIDs that are declared and a list of peers that have made registrations for those I-SIDs
	<b>received</b>	Displays all the I-SIDs where registrations have been received, even if those I-SIDs are not configured locally.
	<b>core-bridge</b>	Displays the information about a specific core-bridge.
	<i>bridge-domain-name</i>	Core bridge domain name.
	<i>group-name</i>	Group name.
	<b>isid</b>	Displays information of a specific service instance identifier.
	<i>isid</i>	Service instance identifier.
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	



Command History	Release	Modification
	Release 5.1.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	ethernet-services	read, write

The following example shows the output from the **show mmrp-flood-optimization summary** command.

```
RP/0/RSP0/CPU0:router#show mmrp-flood-optimization summary
Core Bridges:                4
Pseudowires:                 100
I-SIDs configured:           2000
Total MMRP declarations:     200000
Registrations received:      220000

Flood Time:                  disabled
Leaveall Time:                10000 ms
Leave Time:                   30000 ms
Join Time:                   200 ms
Transmit Period:             1000 ms
```

The following example shows the output from the **show mmrp-flood-optimization mad** command.

```
RP/0/RSP0/CPU0:router#show mmrp-flood-optimization mad
Core-Bridge: PBB-VPLS-Core1 PW: neighbor 1.2.3.4, pwid 87
Participant Type: Full; Point-to-Point: Yes
Admin Control: Applicant Normal; Registrar Normal

LeaveAll Passive (next in 5.92s); periodic disabled
Leave in 25.70s; Join not running
Last peer 0293.6926.9585; failed registrations: 0

I-SID      B-MAC      Applicant      Registrar
-----
          1 001E.8300.0001 Very Anxious Observer Leaving
16777216 001E.83FF.FFFF Quiet Passive   Empty
```

# static-mac-address

To map a customer destination MAC address to backbone destination MAC address, use the **static-mac-address** command in the PBB edge configuration mode. To return to the default behavior, use the **no** form of this command.

```
static-mac-address cust-mac-address bmac bmac-mac-address
no static-mac-address cust-mac-address bmac bmac-mac-address
```

Syntax Description	
<i>cust-mac-address</i>	Customer destination MAC address in hexadecimal format.
<b>bmac</b>	Specifies that the static backbone MAC address must be mapped with the customer MAC address.
<i>bmac-mac-address</i>	Static backbone MAC address in hexadecimal format.

**Command Default** None

**Command Modes** PBB edge configuration mode

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to map the customer MAC address with the backbone MAC address:

```
interface GigabitEthernet0/0/0/0.1 l2transport encapsulation dot1q 10 !
interface GigabitEthernet0/0/0/0.2 l2transport encapsulation dot1q 2 !
interface GigabitEthernet0/0/0/1
 shutdown
!
interface GigabitEthernet0/0/0/2
 shutdown
!
interface GigabitEthernet0/0/0/3
 shutdown
!
interface GigabitEthernet0/0/0/4
```

```

shutdown
!
l2vpn
bridge group bg12
  bridge-domain bd1
    interface GigabitEthernet0/0/0/0.1
      static-mac-address 0002.0003.0004
    !
    interface GigabitEthernet0/0/0/0.2
    !
  pbb edge i-sid 1000 core-bridge bd2
    static-mac-address 0006.0007.0008 bmac 0004.0005.0006
  !
!
!
end
!

```

The following example shows the output of the **show l2vpn bridge-domain** command:

```

##sh l2vpn bridge-domain m mac-address mroute

Mac Address      Type      Learned from/          LC learned      Mapped to
                Filtered on              Resync Age
-----
0002.0003.0004  static   Gi0/0/0/0.1           N/A             N/A             N/A
0006.0007.0008  static   BD id: 0               N/A             N/A             0004.0005.0006

```



**Note** To resynchronize the MAC table from the network processors, use the **l2vpn resynchronize forwarding mac-address-table location** *<r/s/i>* command.

#### Related Commands

Command	Description
<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.
<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.

# timers

To configure timers that affect the convergence of PBB EVPN in failure scenarios, use the **timers** command in the EVPN interface configuration or in the EVPN configuration mode. To delete the timer configuration, use the **no** form of this command.

```
timers [{flushagain | recovery | peering | programming}]
no timers [{flushagain | recovery | peering | programming}]
```

Syntax Description		
	<b>flushagain</b>	Specifies the MAC flush again timer.
	<b>recovery</b>	Specifies the recovery timer.
	<b>peering</b>	Specifies the peering timer.
	<b>programming</b>	Specifies the programming timer.

**Command Default** None.

**Command Modes** EVPN interface configuration  
EVPN configuration

Command History	Release	Modification
	Release 4.3.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The timers are configured globally in the EVPN configuration mode whereas in the EVPN interface configuration mode, the timers are configured per Ethernet.

The keywords **peering** and **programming** are supported only in the EVPN configuration mode.

Task ID	Task	Operation
	l2vpn	read, write

This example shows how to configure timers in the EVPN Interface configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# interface bundle-ether 1
RP/0/RSP0/CPU0:router(config-evpn-ac)# timers
RP/0/RSP0/CPU0:router(config-evpn-ac-timers)#
```

This example shows how to configure timers in the EVPN configuration mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# evpn
RP/0/RSP0/CPU0:router(config-evpn)# timers
RP/0/RSP0/CPU0:router(config-evpn-timers)#
```

Related Commands	Command	Description
	<a href="#">evpn, on page 349</a>	Enters EVPN configuration mode.
	<a href="#">interface (EVPN), on page 358</a>	Enters the EVPN Interface configuration mode.
	<a href="#">recovery, on page 374</a>	Configures the recovery timer.
	<a href="#">flushagain, on page 352</a>	Configures the MAC flushagain timer.
	<a href="#">peering, on page 369</a>	Configures the peering timer.
	<a href="#">programming, on page 372</a>	Configures the programming timer.

# unknown-unicast-bmac

To configure the unknown unicast backbone MAC address for a PBB edge bridge, use the **unknown-unicast-bmac** command in the PBB edge configuration mode. To return to the default behavior, use the **no** form of this command.

**unknown-unicast-bmac** *mac-address*  
**no unknown-unicast-bmac** *mac-address*

<b>Syntax Description</b>	<i>mac-address</i> Unknown unicast backbone MAC address in hexadecimal format.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	PBB edge configuration
----------------------	------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write

<b>Examples</b>	The following example shows how to configure the unknown unicast backbone MAC address for a PBB edge bridge:
-----------------	--

```

config
l2vpn
  bridge group PBB
    bridge-domain PBB-EDGE
      interface GigabitEthernet0/0/0/38.100
      !
      interface GigabitEthernet0/2/0/30.150
      !
    pbb edge i-sid 1000 core-bridge PBB-CORE
      unknown-unicast-bmac 0123.8888.8888
  !

```

!  
!

Related Commands	Command	Description
	<a href="#">bridge-domain (VPLS), on page 208</a>	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.
	<a href="#">bridge group (VPLS), on page 209</a>	Creates a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain.
	<a href="#">l2vpn, on page 93</a>	Enters L2VPN configuration mode.
	<a href="#">pbb, on page 367</a>	Configures the provider backbone bridge core or edge.







## Multiple Spanning Tree Protocol Commands

For detailed information about MSTP concepts, configuration tasks, and examples, see the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

- [bridge-id](#), on page 412
- [bringup delay](#), on page 414
- [clear ethernet mvrp statistics](#), on page 416
- [cost](#), on page 418
- [debug ethernet mvrp packets](#), on page 420
- [debug ethernet mvrp protocol](#), on page 422
- [debug spanning-tree mst packet](#), on page 424
- [debug spanning-tree mst protocol-state](#), on page 426
- [debug spanning-tree mstag packet](#), on page 428
- [debug spanning-tree packet raw](#), on page 430
- [debug spanning-tree pvrst](#), on page 432
- [debug spanning-tree pvrstag packet](#), on page 434
- [debug spanning-tree pvstag packet](#), on page 436
- [debug spanning-tree repag packet](#), on page 438
- [edge-mode](#), on page 440
- [external-cost \(MSTAG/REPAG\)](#), on page 441
- [external-cost \(MSTP\)](#), on page 443
- [flush containment disable](#), on page 444
- [forward-delay](#), on page 445
- [forward-delay \(PVRST\)](#), on page 446
- [guard root](#), on page 447
- [guard topology-change](#), on page 448
- [hello-time \(Access Gateway\)](#), on page 450
- [hello-time \(MSTP\)](#), on page 452
- [instance \(MSTAG/REPAG\)](#), on page 453
- [instance \(MSTP\)](#), on page 455
- [instance cost](#), on page 457
- [instance port-priority](#), on page 459
- [interface \(MSTAG/REPAG\)](#), on page 461
- [interface \(MSTP\)](#), on page 463
- [interface \(PVRST\)](#), on page 464

- interface (PVSTAG/PVRSTAG), on page 466
- join-time, on page 468
- leave-time, on page 470
- leaveall-time, on page 472
- link-type, on page 474
- max age, on page 475
- maximum (PVRST), on page 477
- maximum age, on page 478
- maximum hops (MSTP), on page 479
- mvrp static, on page 480
- name (MSTAG/REPAG), on page 482
- name (MSTP), on page 484
- periodic transmit, on page 485
- port-id, on page 487
- port-priority, on page 489
- portfast, on page 491
- preempt delay, on page 493
- priority (Access Gateway), on page 495
- priority (MSTP), on page 497
- provider-bridge (MSTAG/REPAG), on page 498
- provider-bridge (MSTP), on page 500
- revision (MSTAG/REPAG), on page 501
- revision (MSTP), on page 503
- root-cost, on page 504
- root-id, on page 506
- root-priority, on page 508
- show ethernet mvrp mad, on page 510
- show ethernet mvrp statistics, on page 512
- show ethernet mvrp status, on page 514
- show l2vpn mstp port, on page 516
- show l2vpn mstp vlan, on page 518
- show spanning-tree mst, on page 520
- show spanning-tree mst bpdu interface, on page 522
- show spanning-tree mst configuration, on page 524
- show spanning-tree mst errors, on page 526
- show spanning-tree mst interface, on page 528
- show spanning-tree mst topology-change flushes, on page 531
- show spanning-tree mstag, on page 533
- show spanning-tree mstag bpdu interface, on page 535
- show spanning-tree mstag topology-change flushes, on page 537
- show spanning-tree pvrst, on page 539
- show spanning-tree pvrstag, on page 542
- show spanning-tree pvstag, on page 544
- show spanning-tree repag, on page 546
- show spanning-tree repag bpdu interface, on page 548
- show spanning-tree repag topology-change flushes, on page 550

- [spanning-tree mst](#), on page 552
- [spanning-tree mstag](#), on page 554
- [spanning-tree pvrst](#), on page 556
- [spanning-tree pvrstag](#), on page 557
- [spanning-tree pvstag](#), on page 558
- [spanning-tree repag](#), on page 559
- [transmit \(PVRST\)](#), on page 560
- [transmit hold-count](#), on page 561
- [vlan](#), on page 562
- [vlan \(PVRST\)](#), on page 564
- [vlan-ids \(MSTAG/REPAG\)](#), on page 566
- [vlan-id \(MSTP\)](#), on page 568

# bridge-id

To set the bridge ID for this device for an Access Gateway instance, use the **bridge-id** command in MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

**bridge-id** *id* [**startup-value** *startup-id*]

## Syntax Description

<i>id</i>	MAC address of the switch. It can be any 48-bit value.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-id</i>	Sets the startup bridge ID.

## Command Default

For MSTAG/REPAG, the MAC address of the switch. For PVSTAG/PVRSTAG, the interface MAC address. If no startup value is specified, the normal value is used during startup.

## Command Modes

MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration submodes.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When configuring access gateway, this command is used to modify the value of the bridge ID that is advertised in the STP BPDUs.

## Task ID

Task ID	Operations
interface ( for MSTAG/REPAG)	read, write
ethernet-services ( for PVSTAG/PVRSTAG)	read, write

## Examples

The following example shows how to set the bridge ID:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# bridge-id 001c.0000.0011
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

# bringup delay

To configure a delay when an interface is first created before it is added to the MSTP topology, use the **bringup delay** command in the MSTP configuration mode.

```
bringup delay for interval {seconds | minutes | hours}
no bringup delay for interval {seconds | minutes | hours}
```

## Syntax Description

**interval** Length of time to delay adding the interface to the MSTP topology.

**seconds** Specifies the delay in seconds.

**minutes** Specifies the delay in minutes.

**hours** Specifies the delay in hours.

## Command Default

If no bringup delay is configured, interfaces are added to the MSTP topology as soon as they are created.

## Command Modes

MSTP configuration

## Command History

Release	Modification
Release 3.9.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used to change the behaviour of MSTP when interfaces are first functional (for example, when a line card boots for the first time). By default, interfaces are added to the MSTP topology, and may be placed in the forwarding state, as soon as the system declares that the interfaces are functional. However, at this point the data plane may not be fully prepared to forward traffic on the interface. If a bringup delay is configured, MSTP keeps the interface in blocked state for the specified delay, and adds it to the MSTP topology only after the specified interval has occurred.

For information on configuring bringup delay, refer to the *Implementing Multiple Spanning Tree Protocol* module of the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to configure the bringup delay:

```
RP/0/RSP0/CPU0:router# configure
```

```
RP/0/RSP0/CPU0:router(config)#spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# bringup delay for 20 seconds
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## clear ethernet mvrp statistics

To clear MVRP statistics for ethernet interfaces, use the **clear ethernet mvrp statistics** command in the EXEC mode.

**clear ethernet mvrp statistics** {**interface** *type interface-path-id* | **location** *location* | **all**}

### Syntax Description

**interface** (Optional) Clears the MVRP statistics for the given interface.

*type* Interface type. For more information, use the question mark (?) online help function.

*interface-path-id* Physical interface or virtual interface.

**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

**location** Clears MVRP statistics for interfaces in a particular location.

*location* Specifies the fully qualified location.

**all** Clears the MVRP statistics for all interfaces.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.9.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services	execute

### Examples

The following example shows how to configure the bringup delay:



```
RP/0/RSP0/CPU0:router# clear ethernet mvrp statistics all
```

**Related Commands**

Command	Description
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.

## cost

To set the internal path cost for a given instance on the current port, use the **cost** command in MSTAG interface instance or REPAG interface instance configuration submode.

```
cost cost [startup-value startup-cost]
```

### Syntax Description

<i>cost</i>	Port cost. Range is 1 to 200000000.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-id</i>	Sets the startup internal path cost.

### Command Default

If the startup value is not specified, it defaults to 200000000.

### Command Modes

MSTAG interface instance configuration, REPAG Instance Configuration

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used when configuring Access Gateway, to change the cost value that is advertised for this MSTI in the STP BPDUs.



#### Note

MSTP cost for bundle interfaces is fixed to 10000 and does not depend on the number of interfaces and the speed of individual members.

### Task ID

Task ID	Operations
<b>interface</b>	read, write

### Examples

The following example shows how to set the port cost to 10000:

```
RP/0/RSP0/CPU0:router(config-mstag-if-inst)# cost 10000
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submenu, and enables MSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submenu.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submenu.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## debug ethernet mvrp packets

To enable debugging of sent and received MVRP packets, use the **debug ethernet mvrp packets** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ethernet mvrp packets {brief | full | hexdump} [direction {received | sent}] [{interface
interface-name | location node-id}]
no debug ethernet mvrp packets {brief | full | hexdump} [direction {received | sent}] [{interface
interface-name | location node-id}]
```

### Syntax Description

<b>brief</b>	Enables brief debugging output.
<b>full</b>	Enables full debugging output.
<b>hexdump</b>	Enables full debugging output along with the raw contexts of the packet in hex.
<b>direction</b>	{Optional} Restricts output to a packet direction.
<b>received</b>	Indicates packets received.
<b>sent</b>	Indicates packets sent.
<b>interface interface-name</b>	{Optional} Filters by interface. Physical interface or a virtual interface. <b>Note</b> Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>location node-id</b>	{Optional} Indicates the location. The <i>node-id</i> argument is entered in the rack/slot/module notation.

### Command Default

By default, debugging is enabled for both directions for all interfaces.

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.0.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services	read

## Examples

The following example shows how to enable debugging of brief MVRP packets:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets brief
Thu Oct 28 02:56:35.048 DST
```

The following example shows how to enable debugging of full MVRP packets on a specific location:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets full location 0/0/CPU0
Mon Nov 15 20:02:13.636 PST
```

The following example shows how to enable debugging of brief MVRP packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets brief direction received interface
gigabitEthernet 0/0/0/1
Thu Nov 25 21:09:01.986 PST
```

## Related Commands

Command	Description
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# debug ethernet mvrp protocol

To enable MVRP protocol debugging on a specific interface, location or vlan, use the **debug ethernet mvrp protocol** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ethernet mvrp protocol [vlan vlan-id] [{interface interface-name | location node-id}]
no debug ethernet mvrp protocol [vlan vlan-id] [{interface interface-name | location node-id}]
```

Syntax Description	
<b>vlan</b> <i>vlan-id</i>	{Optional} Specific vlan-id to filter on.
<b>interface</b> <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>location</b> <i>node-id</i>	{Optional} Indicates the location. The <i>node-id</i> argument is entered in the rack/slot/module notation.

**Command Default** By default, debug is enabled for all vlans, interfaces, and locations.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

## Examples

The following example shows how to debug an ethernet mvrp protocol:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol
Thu Oct 28 03:05:21.575 DST
```

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol location 0/0/CPU0
Mon Nov 15 20:11:56.607 PST
```

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol interface gigabitEthernet 0/0/0/1
Mon Nov 15 20:12:49.776 PST
```

**Related Commands**

Command	Description
<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# debug spanning-tree mst packet

To enable debugging for sent and received MSTP packets, use the **debug spanning-tree mst packet** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree mst packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree mst packet {brief | full} {sent | received} [interface interface-name]
```

Syntax Description		
<b>brief</b>		Enables brief debugging output.
<b>full</b>		Enables full debugging output.
<b>sent</b>		Display packets being sent.
<b>received</b>		Display packets being received.
<b>interface</b> <i>interface-name</i>	{Optional}	Filters by interface. Physical interface or a virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** If an interface is not specified, then debug is enabled for all interfaces.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	<b>interface</b>	read

**Examples** The following example shows how to enable brief debugging for received packets:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received
Mon Nov 15 20:42:58.584 PST
```



The following example shows how to enable brief debugging for received packets at a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received location 0/0/CPU0
Mon Nov 15 20:44:15.082 PST
```

The following example shows how to enable brief debugging for received packets on a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received interface gigabitEthernet
0/0/0/1
Mon Nov 15 20:45:40.047 PST
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">debug spanning-tree packet raw, on page 430</a>	Enables debugging raw packet output for all received packets or sent packets.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submenu
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# debug spanning-tree mst protocol-state

To enable debugging protocol-state changes such as port role or state changes, topology change notification, use the **debug spanning-tree mst protocol-state** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree mst protocol-state [instance instance-id] [interface interface-name]
no debug spanning-tree mst protocol-state [instance instance-id] [interface interface-name]
```

<b>Syntax Description</b>	<b>instance</b> <i>instance-id</i> View debug for a specific MSTI.						
	<b>interface</b> <i>interface-name</i> View debug for a specific interface.						
<b>Command Default</b>	If no instance or interface is specified, debug is enabled for all instances and interfaces.						
<b>Command Modes</b>	EXEC						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.1	This command was introduced.		
Release	Modification						
Release 4.0.1	This command was introduced.						
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td><b>interface</b></td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	<b>interface</b>	read		
Task ID	Operations						
<b>interface</b>	read						
<b>Examples</b>	<p>The following example shows how to enable protocol state debugging:</p> <pre>RP/0/RSP0/CPU0:router#<b>debug spanning-tree mst protocol-state</b> Mon Nov 15 20:53:52.793 PST  RP/0/RSP0/CPU0:router#<b>debug spanning-tree mst protocol-state interface gigabitEthernet 0/0/0/1</b> Mon Nov 15 20:54:57.310 PST  RP/0/RSP0/CPU0:router#<b>debug spanning-tree mst protocol-state instance 4094</b> Mon Nov 15 20:59:35.860 PST</pre>						
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">debug spanning-tree mst packet, on page 424</a></td> <td>Enables debugging for sent and received MSTP packets.</td> </tr> <tr> <td><a href="#">spanning-tree mst, on page 552</a></td> <td>Enters the MSTP configuration submode</td> </tr> </tbody> </table>	Command	Description	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
Command	Description						
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.						
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode						

Command	Description
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# debug spanning-tree mstag packet

To enable MSTAG packet debugging, use the **debug spanning-tree mstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree mstag packet {brief|full} {sent|received} [interface interface-name]
no debug spanning-tree mstag packet {brief|full} {sent|received} [interface interface-name]
```

## Syntax Description

<b>brief</b>	Enables brief debugging output.
<b>full</b>	Enables full debugging output.
<b>received</b>	Display packets being received.
<b>sent</b>	Display packets being sent.
<b>interface</b> <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

## Command Default

If the interface is not specified, the debug is enabled for all interfaces.

## Command Modes

EXEC

## Command History

Release	Modification
Release 4.0.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read

## Examples

The following example shows how to enable MSTAG packet debugging:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mstag packet brief received
Mon Nov 15 21:11:30.464 PST
```

```
RP/0/RSP0/CPU0:router#debug spanning-tree mstag packet full sent interface gigabitEthernet
```

```
0/0/0/1  
Mon Nov 15 21:12:23.391 PST
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree packet raw, on page 430</a>	Enables debugging raw packet output for all received packets or sent packets.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## debug spanning-tree packet raw

To enable debugging raw packet output for all received packets or sent packets, use the **debug spanning-tree packet raw** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree packet raw {sent|received} [interface interface-name]
no debug spanning-tree packet raw {sent|received} [interface interface-name]
```

### Syntax Description

<b>received</b>	Display packets being received.
<b>sent</b>	Display packets being sent.
<b>interface</b> <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

### Command Default

If an interface is not specified, debug is enabled for all interfaces.

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.0.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables raw packet debug for all STP protocols: MSTP, MSTAG, REPAG, PVSTAG and PVRSTAG.

### Task ID

Task ID	Operations
interface	read

### Examples

The following example shows how to enable debugging raw packet output for packets received at a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree packet raw received location 0/0/CPU0
Mon Nov 15 21:16:42.570 PST
```

The following example shows how to enable debugging raw packet output for packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree packet raw sent interface gigabitEthernet 0/0/0/1
Mon Nov 15 21:17:43.303 PST
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

## debug spanning-tree pvrst

To enable debugging protocol-state changes such as port role, state changes, and topology change notification, use the **debug spanning-tree pvrst** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvrst {controller | io | packet | protocol-state}
no debug spanning-tree pvrst {controller | io | packet | protocol-state}
```

Syntax Description	Keyword	Description
	<b>controller</b>	Enables Spanning Tree Protocol (STP) controller debugging.
	<b>io</b>	Enables PVRST IO debugging.
	<b>packet</b>	Enables PVRST packets debugging.
	<b>protocol-state</b>	Enables protocol state debugging.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

### Examples

This example shows how to enable protocol state debugging:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrst protocol-state
RP/0/RSP0/CPU0:router#
debug spanning-tree pvrst protocol-state interface gigabitEthernet 0/0/0/1 vlan 400
RP/0/RSP0/CPU0:router#
```

This example shows a sample output for when **controller** keyword is used:

This example shows a sample output for when **io** keyword is used:



This example shows a sample output for when **packet** keyword is used:

This example shows a sample output for when **protocol-state** keyword is used:

Related Commands	Command	Description
	<a href="#">spanning-tree pvrst, on page 556</a>	Enters the Per VLAN Rapid Spanning Tree (PVRST) configuration submode.
	<a href="#">show spanning-tree pvrst, on page 539</a>	Displays the Per VLAN Rapid Spanning Tree (PVRST) status information.

## debug spanning-tree pvrstag packet

To enable packet debugging for sent and received PVRSTAG packets, use the **debug spanning-tree pvrstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvrstag packet {brief|full} {sent|received} [interface interface-name]
no debug spanning-tree pvrstag packet {brief|full} {sent|received} [interface interface-name]
```

Syntax Description		
<b>brief</b>		Enables brief debugging output.
<b>full</b>		Enables full debugging output.
<b>sent</b>		Indicates packets sent.
<b>received</b>		Indicates packets received.
<b>interface</b> <i>interface-name</i>	{Optional}	Filters by interface. Physical interface or a virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** If an interface is not specified, then debug is enabled for all interfaces.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	debug

### Examples

The following example shows how to enable packet debugging for PVRSTAG packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrstag packet brief received interface
gigabitEthernet 0/0/0/1
```

Wed Nov 24 22:12:33.861 PST

The following example shows how to enable packet debugging for PVRSTAG packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrstag packet brief sent interface gigabitEthernet  
0/0/0/1  
Wed Nov 24 22:15:12.893 PST
```

---

**Related Commands**

Command	Description
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.

---

## debug spanning-tree pvstag packet

To enable packet debugging for sent and received PVSTAG packets, use the **debug spanning-tree pvstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvstag packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree pvstag packet {brief | full} {sent | received} [interface interface-name]
```

### Syntax Description

<b>brief</b>	Enables brief debugging output.
<b>full</b>	Enables full debugging output.
<b>sent</b>	Indicates packets sent.
<b>received</b>	Indicates packets received.
<b>interface</b> <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

### Command Default

If an interface is not specified, then debug is enabled for all interfaces.

### Command Modes

EXEC

### Command History

Release	Modification
Release 4.0.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services	debug

### Examples

The following example shows how to enable packet debugging for PVSTAG packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvstag packet brief received interface
gigabitEthernet 0/0/0/1
Wed Nov 24 22:12:33.861 PST
```

The following example shows how to enable packet debugging for PVSTAG packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvstag packet brief sent interface gigabitEthernet
0/0/0/1
Wed Nov 24 22:15:12.893 PST
```

**Related Commands**

Command	Description
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.

# debug spanning-tree repag packet

To enable Resilient Ethernet Protocol (REP) Access Gateway debugging commands, use the **debug spanning-tree repag packet** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree repag packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree repag packet {brief | full} {sent | received} [interface interface-name]
```

Syntax Description		
<b>brief</b>		Enables brief debugging output.
<b>full</b>		Enables full debugging output.
<b>received</b>		Display packets being received.
<b>sent</b>		Display packets being sent.
<b>interface</b> <i>interface-name</i>	{Optional}	Filters by interface. Physical interface or a virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** If an interface is not specified, then debug is enabled for all interfaces.

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read

**Examples** The following example shows how to enable brief debug for REP Access Gateway packets received at a specified interface.

```
RP/0/RSP0/CPU0:router#debug spanning-tree repag packet brief received interface
```

```
gigabitEthernet 0/0/0/1  
Mon Nov 15 21:26:08.155 PST
```

The following example shows how to enable full debug for REP Access Gateway packets sent from a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree repag packet full sent location 0/0/CPU0  
Mon Nov 15 21:27:10.674 PST
```

## edge-mode

To enable MSTAG edge mode for Multiple Spanning Tree Instance (MSTI), use the **edge-mode** command in MSTAG instance configuration submode. Use the **no** form of this command to disable the MSTAG edge mode.

**edge-mode**  
**no edge-mode**

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	Disabled
------------------------	----------

<b>Command Modes</b>	MSTAG instance configuration mode
----------------------	-----------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	ethernet-services	read, write

This example shows the output from the **edge-mode** command:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#spanning-tree mstag A
RP/0/RSP0/CPU0:router(config-mstag)#interface GigabitEthernet 0/2/0/1.1
RP/0/RSP0/CPU0:router(config-mstag-if)#instance 100
RP/0/RSP0/CPU0:router(config-mstag-if-inst)#edge-mode
RP/0/RSP0/CPU0:router(config-mstag-if-inst)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.



## external-cost (MSTAG/REPAG)

To set the external path cost on the current port, use the **external-cost** command in MSTAG interface or REPAG interface configuration submenu.

```
external-cost cost [startup-value startup-cost]
```

Syntax Description	
<i>cost</i>	Interface external path cost. Range is 1 to 200000000.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-cost</i>	Sets the external path cost.

**Command Default** If no startup-value is configured, the startup value defaults to 200000000.

**Command Modes** MSTAG interface configuration, REPAG Interface Configuration

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used when configuring Access Gateway, to change the external cost that it advertised in STP BPDUs sent from this interface.

Task ID	Task ID	Operations
	<b>interface</b>	read, write

**Examples** The following example shows how to set the external cost to 10000:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# external-cost 10000
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.

Command	Description
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## external-cost (MSTP)

To set the external path cost on the current port, use the **external-cost** command in MSTP interface configuration submode.

**external-cost** *cost*

### Syntax Description

*cost* Port cost. Range is 1 to 200000000.

### Command Default

The default path cost depends on the speed of the link.

### Command Modes

MSTP interface configuration

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read, write

### Examples

The following example shows how to set the external cost to 10000:

```
RP/0/RSP0/CPU0:router:router(config-mstp-if)# external-cost 10000
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# flush containment disable

To disable the flush containment feature on a bridge, use the **flush containment disable** command in the MSTP configuration submode.

## flush containment disable

**Syntax Description** This command has no keywords or arguments.

**Command Default** Flush containment feature is enabled.

**Command Modes** MSTP configuration

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Flush containment is a Cisco feature that helps prevent unnecessary MAC flushes. Refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	interface	read, write

## Examples

The following example shows how to disable the flush containment feature on a bridge:

```
RP/0/RSP0/CPU0:router(config-mstp)# flush containment disable
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# forward-delay

To set the forward-delay parameter for the bridge, use the **forward-delay** command in MSTP configuration submode.

**forward-delay** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Bridge forward delay time in seconds. Range is 4 to 30.
---------------------------	--

<b>Command Default</b>	<i>seconds</i> : 15
------------------------	---------------------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to set the forward-delay parameter for the bridge to 20:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstp)# forward-delay 20
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## forward-delay (PVRST)

To set the forward-delay time for the bridge, use the **forward-delay** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

**forward-delay** *seconds*  
**no forward-delay** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Bridge forward delay time in seconds. The range is from 4 to 30.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	PVRST configuration
----------------------	---------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

<b>Examples</b>	This example shows how to set the forward-delay parameter for the bridge to 20:
-----------------	---

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# forward-delay 20
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">interface (PVRST), on page 464</a>	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	<a href="#">maximum (PVRST), on page 477</a>	Sets the maximum age for the bridge.
	<a href="#">transmit (PVRST), on page 560</a>	Sets the transmit hold count performance parameter.
	<a href="#">vlan (PVRST), on page 564</a>	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

# guard root

To prevent a port from becoming the root port for the switch, use the **guard root** command in MSTP interface configuration submode.

## guard root

**Syntax Description** This command has no keywords or arguments.

**Command Default** RootGuard is disabled.

**Command Modes** MSTP interface configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables the Root Guard feature on the interface, by preventing the port from becoming a root port. This feature can be used to enforce the location of the root bridge within the MSTP network. For more information on guard root feature, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	<b>interface</b>	read, write

**Examples** The following example shows how to enable RootGuard on the port:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# guard root
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# guard topology-change

To enable topology change guard on the port, use the **guard topology-change** command in MSTP interface configuration submode.

## guard topology-change

**Syntax Description** This command has no keywords or arguments.

**Command Default** TopologyChangeGuard is disabled.

**Command Modes** MSTP interface configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables topology change guard (also known as restricted TCN) on this interface. When this feature is enabled, topology changes originating at this interfaces, or received in BPDUs on this interface, are not propagated to the rest of the MSTP network. For more information on guard topology, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	interface	read, write

## Examples

The following example shows how to enable TopologyChangeGuard on the port:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# guard topology-change
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode



Command	Description
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# hello-time (Access Gateway)

To configure the frequency of sending BPDUs on this interface, use the **hello-time** command in MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

**hello-time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Hello time in seconds. Range is 1 to 2.	
<b>Command Default</b>	<i>seconds</i> : 2	
<b>Command Modes</b>	MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.
	Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration mode.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	<b>interface</b> ( for MSTAG/REPAG)	read, write
	<b>ethernet-services</b> ( for PVSTAG/PVRSTAG)	read, write
<b>Examples</b>	The following example shows how to set the port hello time to 1:  RP/0/RSP0/CPU0:router (config-mstag-if) # <b>hello-time 1</b>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.

Command	Description
<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

## hello-time (MSTP)

To set the port hello time, use the **hello-time** command in MSTP interface configuration submode.

**hello-time** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Hello time in seconds. Range is 1 to 2.
---------------------------	--

<b>Command Default</b>	<i>seconds: 2</i>
------------------------	-------------------

<b>Command Modes</b>	MSTP interface configuration
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	<b>interface</b>	read, write

<b>Examples</b>	The following example shows how to set the port hello time to 1:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstp-if)# hello-time 1
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# instance (MSTAG/REPAG)

To enter MSTAG Instance configuration mode or REPAG Instance configuration mode, use the **instance** command in MSTAG Interface or REPAG Interface configuration mode respectively.

**instance** *id*

## Syntax Description

*id* MSTI ID. Range is 0 to 4094.

## Command Default

None

## Command Modes

MST AG interface configuration, REPAG interface configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** An instance ID of 0 represents the IST for the region.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to enter MSTAG Instance configuration submode:

```
RP/0/RSP0/CPU0:router(config-mstag) # instance 101
RP/0/RSP0/CPU0:router(config-mstag-inst) #
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.

Command	Description
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

# instance (MSTP)

To enter the multiple spanning tree instance (MSTI) configuration submode, use the **instance** command in MSTP configuration submode.

**instance** *id*

<b>Syntax Description</b>	<i>id</i> MSTI ID. Range is 0 to 4094.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



<b>Note</b>	An instance ID of 0 represents the CIST for the region.
-------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	<b>interface</b>	read, write

<b>Examples</b>	The following example shows how to enter the MSTI configuration submode:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstp)# instance 101
RP/0/RSP0/CPU0:router(config-mstp-inst)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">priority (MSTP), on page 497</a>	Sets the bridge priority for the current MSTI

Command	Description
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">vlan-id (MSTP), on page 568</a>	Associates a set of VLAN IDs with the current MSTI.



# instance cost

To set the internal path cost for a given instance on the current port, use the **instance cost** command in MSTP interface configuration submenu.

**instance** *id* **cost** *cost*

<b>Syntax Description</b>	<i>id</i> MSTI ID. Range is 0 to 4094.
	<i>cost</i> Port cost. Range is 1 to 200000000.

**Command Default** The default path cost depends on the speed of the link.

**Command Modes** MSTP interface configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** An instance ID of 0 represents the IST for the region.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	<b>interface</b>	read, write

**Examples** The following example shows how to set the port cost to 10000 for the instance ID 101:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# instance 101 cost 10000
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submenu, and enables STP for the specified port.

Command	Description
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# instance port-priority

To set the port priority performance parameter for the MSTI, use the **instance port-priority** command in MSTP interface configuration submode.

```
instance id port-priority priority
```

<b>Syntax Description</b>	<i>id</i>	MSTI ID. Range is 0 to 4094.
	<i>priority</i>	Port priority. Range is 0 to 240 in multiples of 16.

<b>Command Default</b>	<i>priority</i> : 128
------------------------	-----------------------

<b>Command Modes</b>	MSTP interface configuration
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



**Note** An instance ID of 0 represents the CIST for the region.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

**Examples** The following example shows how to set the port priority to 160 for the instance ID 101:

```
RP/0/RSP0/CPU0:router(config-mstp-if) # instance 101 port-priority 160
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.

Command	Description
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## interface (MSTAG/REPAG)

To enter the MSTAG interface configuration submode, and to enable MSTAG for the specified port, use the **interface** command in MSTAG configuration submode.

```
interface {Bundle-Ether | GigabitEthernet | TenGigE} instance.subinterface
```

<b>Syntax Description</b>	<p><i>instance.subinterface</i> Physical interface instance, followed by the subinterface identifier. Naming notation is instance.subinterface, and a period between arguments is required as part of the notation.</p> <ul style="list-style-type: none"> <li>• Replace the instance argument with the following physical interface instance. Naming notation is rack/slot/module/port and a slash between values is required as part of the notation. <ul style="list-style-type: none"> <li>• rack—Chassis number of the rack.</li> <li>• slot—Physical slot number of the card.</li> <li>• module—Module number. A physical layer interface module (PLIM) is always 0.</li> <li>• port—Physical port number of the interface.</li> </ul> </li> <li>• Replace the subinterface argument with the subinterface value. Range is from 0 through 4095.</li> </ul>				
<b>Command Default</b>	None				
<b>Command Modes</b>	MSTAG configuration, REPAG configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The specified subinterface must be configured to match untagged packets, i.e., it must be configured with <b>encapsulation untagged</b>. Only a single subinterface on any given port may be specified.</p> <p>A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.</p>				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write
Task ID	Operations				
interface	read, write				

**Examples**

The following example shows how to enter the MSTAG interface configuration submode:

```
RP/0/RSP0/CPU0:router(config-mstag) # interface GigabitEthernet0/2/0/30.1
RP/0/RSP0/CPU0:router(config-mstag-if) #
```

**Related Commands**

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

# interface (MSTP)

To enter the MSTP interface configuration submode, and to enable STP for the specified port, use the **interface** command in MSTP configuration submode.

```
interface {Bundle-Ether | GigabitEthernet | TenGigE} instance
```

<b>Syntax Description</b>	<i>instance</i> Forward interface in rack/slot/instance/port format.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

## Examples

The following example shows how to enter the MSTP interface configuration submode:

```
RP/0/RSP0/CPU0:router(config-mstp)# interface GigabitEthernet 0/0/0/1
RP/0/RSP0/CPU0:router(config-mstp-if)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## interface (PVRST)

To enable and configure Per VLAN Rapid Spanning Tree (PVRST) on an interface, use the **interface** command in PVRST configuration mode. To disable PVRST, use the **no** form of this command.

```
interface {Bundle-Ether | FastEthernet | FortyGigE | GigabitEthernet | HundredGigE | TenGigE} [{guard
| hello-time | link-type | portfast | vlan}]
no interface {Bundle-Ether | FastEthernet | FortyGigE | GigabitEthernet | HundredGigE |
TenGigE} [{guard | hello-time | link-type | portfast | vlan}]
```

### Syntax Description

<b>Bundle-Ether</b>	Specifies Aggregated Ethernet interface.
<b>FastEthernet</b>	Specifies FastEthernet/IEEE 802.3 interface.
<b>FortyGigE</b>	Specifies FortyGigabitEthernet or IEEE 802.3 interface.
<b>GigabitEthernet</b>	Specifies GigabitEthernet or IEEE 802.3 interface.
<b>HundredGigE</b>	Specifies HundredGigabitEthernet or IEEE 802.3 interface.
<b>TenGigE</b>	Specifies TenGigabitEthernet or IEEE 802.3 interface.
<b>guard</b>	Specifies bridge guard features.
<b>hello-time</b>	Specifies Hello-Time interface.
<b>link-type</b>	Specifies the link type of an interface.
<b>portfast</b>	Specifies Portfast for an interface.
<b>vlan</b>	Specifies VLAN configuration for an interface.

### Command Default

None

### Command Modes

PVRST configuration

### Command History

Release	Modification
Release 5.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services	read, write



## Examples

This example shows how to enter the PVRST Interface configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# interface GigabitEthernet 0/0/0/1
RP/0/RSP0/CPU0:router(config-pvrst-if)#
```

## Related Commands

Command	Description
<a href="#">forward-delay (PVRST), on page 446</a>	Sets the forward-delay time for the bridge.
<a href="#">maximum (PVRST), on page 477</a>	Sets the maximum age for the bridge.
<a href="#">transmit (PVRST), on page 560</a>	Sets the transmit hold count performance parameter.
<a href="#">vlan (PVRST), on page 564</a>	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

## interface (PVSTAG/PVRSTAG)

To enter PVST or PVRST Access Gateway Interface configuration submode and to enable either PVSTAG or PVRSTAG for the specified port, use the **interface** command in PVST and PVRST Access Gateway configuration submode.

**interface** {GigabitEthernet | TenGigE} *instance*

### Syntax Description

*instance* Forward interface in rack/slot/instance/port format.

### Command Default

None

### Command Modes

PVSTAG and PVRSTAG configuration

### Command History

Release	Modification
Release 4.0.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.

### Task ID

Task ID	Operations
ethernet-services	read, write

### Examples

The following example shows how to enter the PVST or PVRST Access Gateway Interface configuration submode:

```
RP/0/RSP0/CPU0:router(config-pvstag)# interface GigabitEthernet 0/0/0/1
RP/0/RSP0/CPU0:router(config-pvstag-if)#
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.

Command	Description
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submenu.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submenu.
<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

# join-time

To set the join time for all active ports, use the **join-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

**join-time** *interval*  
**no join-time** *interval*

## Syntax Description

*interval* Maximum time for the join timer parameter for all active ports. The range is from 100 to 1000. The default value is 200.

## Command Default

The default is 200 milliseconds.

## Command Modes

MVRP configuration

## Command History

Release	Modification
Release 3.9.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services	read, write

## Examples

The following example shows how to configure the join time for active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrp)# join-time 200
!
```

## Related Commands

Command	Description
<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.

Command	Description
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# leave-time

To set the leave time for all active ports, use the **leave-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

**leave-time** *interval*  
**no leave-time** *interval*

<b>Syntax Description</b>	<i>interval</i> Minimum time, in seconds, for the leaveall timer parameter for all active ports. The range is from 1 to 90 seconds .
---------------------------	--

<b>Command Default</b>	The default is 30 seconds.
------------------------	----------------------------

<b>Command Modes</b>	MVRP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

<b>Examples</b>	The following example shows how to configure the join time for active ports:
-----------------	--

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrp)# leave-time 30!
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
	<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
	<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.

Command	Description
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# leaveall-time

To set the leave all time for all active ports, use the **leaveall-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

**leaveall-time** *interval*  
**no leaveall-time** *interval*

## Syntax Description

*interval* Minimum time, in seconds, for the leaveall timer parameter for all active ports. The range is from 5 to 30 seconds.

## Command Default

The default is 10 seconds.

## Command Modes

MVRP configuration

## Command History

Release	Modification
Release 3.9.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services	read, write

## Examples

The following example shows how to configure the join time for active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrp)# leaveall-time 20
```

## Related Commands

Command	Description
<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.



Command	Description
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# link-type

To set the link type of the port to point-to-point or multipoint, use the **link-type** command in MSTP interface configuration submode.

**link-type** {**point-to-point** | **multipoint**}

## Syntax Description

This command has no keywords or arguments.

## Command Default

The default value is derived from the duplex setting for the link. A full-duplex link is considered point-to-point, and all others are considered multipoint.

## Command Modes

MSTP interface configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to set the link type of the port to point-to-point:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# interface GigabitEthernet 0/3/0/3
RP/0/RSP0/CPU0:router(config-mstp-if)# link-type point-to-point
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# max age

To set the maximum age for BPDUs sent on this interface, use the **max age** command in MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

**max age** *seconds*

## Syntax Description

*seconds* Maximum age time for the bridge in seconds. Range is 6 to 40.

## Command Default

*seconds*: 20

## Command Modes

MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services (PVSTAG and PVRSTAG only)	read, write
interface (MSTAG and REPAG only)	read, write

## Examples

The following example shows how to set the maximum age time for the bridge to 20:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# max age 20
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.

Command	Description
<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

## maximum (PVRST)

To set the maximum age for the bridge, use the **maximum** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

```
maximum age seconds
no maximum age seconds
```

<b>Syntax Description</b>	<b>age</b>	Specifies the age of the bridge.
	<i>seconds</i>	Maximum age time for the bridge in seconds. The range is from 6 to 40.
<b>Command Default</b>	None	
<b>Command Modes</b>	PVRST configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write
<b>Examples</b>	<p>This example shows how to set the maximum age time for the bridge to 40:</p> <pre>RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1 RP/0/RSP0/CPU0:router(config-pvrst)# maximum age 40</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">forward-delay (PVRST), on page 446</a>	Sets the forward-delay time for the bridge.
	<a href="#">interface (PVRST), on page 464</a>	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	<a href="#">transmit (PVRST), on page 560</a>	Sets the transmit hold count performance parameter.
	<a href="#">vlan (PVRST), on page 564</a>	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

# maximum age

To set the maximum age parameter for the bridge, use the **maximum age** command in MSTP configuration submode.

**maximum age** *seconds*

<b>Syntax Description</b>	<i>seconds</i> Maximum age time for the bridge in seconds. Range is 6 to 40.
---------------------------	--

<b>Command Default</b>	<i>seconds</i> : 20
------------------------	---------------------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to set the maximum age time for the bridge to 40:
-----------------	---

```
RP/0/RSP0/CPU0:router(config-mstp)# maximum age 40
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

# maximum hops (MSTP)

To set the maximum hops parameters for the bridge, use the **maximum hops** command in MSTP configuration submode.

**maximum hops** *hops*

<b>Syntax Description</b>	<i>hops</i> Maximum number of hops for the bridge in seconds. Range is 6 to 40.
---------------------------	---

<b>Command Default</b>	<i>hops: 20</i>
------------------------	-----------------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to set the maximum number of hops for the bridge to 30:
-----------------	---

```
RP/0/RSP0/CPU0:router(config-mstp)# max hops 30
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## mvrp static

To enable Multiple VLAN Registration Protocol (MVRP) in static mode and to enter the MVRP configuration submode, use the **mvrp static** command in the MSTP configuration mode. To return to the default setting, use the **no** form of this command.

**mvrp static**  
**no mvrp static**

<b>Syntax Description</b>	This command has no keywords or arguments.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

**Examples** The following example shows how to enable MVRP static mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
	<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
	<a href="#">join-time, on page 468</a>	Sets the join time for all active ports.
	<a href="#">leave-time, on page 470</a>	Sets the leave time for all active ports.
	<a href="#">leaveall-time, on page 472</a>	Sets the leave all time for all active ports.



Command	Description
<a href="#">periodic transmit, on page 485</a>	Sends periodic Multiple VLAN Registration Protocol Data Unit (MVRPDU) on all active ports.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VLAN IDs that are declared or registered.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

## name (MSTAG/REPAG)

To set the name of the MSTP region, use the **name** command in MSTAG interface configuration or REPAG interface configuration submode.

**name** *name*

### Syntax Description

*name* String of a maximum of 32 characters conforming to the definition of SnmpAdminString in RFC 2271.

### Command Default

The MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Std 802.

### Command Modes

MSTAG interface configuration, REPAG interface configuration

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read, write

### Examples

The following example shows how to set the name of the MSTP region to leo:

```
RP/0/RSP0/CPU0:router(config-mstag-if) # name leo
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

Command	Description
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## name (MSTP)

To set the name of the MSTP region, use the **name** command in MSTP configuration submode.

**name** *name*

<b>Syntax Description</b>	<i>name</i> String of a maximum of 32 characters conforming to the definition of SnmpAdminString in RFC 2271.										
<b>Command Default</b>	The MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Std 802.										
<b>Command Modes</b>	MSTP configuration										
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.						
Release	Modification										
Release 3.7.1	This command was introduced.										
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.										
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write						
Task ID	Operations										
interface	read, write										
<b>Examples</b>	<p>The following example shows how to set the name of the MSTP region to m1:</p> <pre>RP/0/RSP0/CPU0:router(config-mstp)# name m1</pre>										
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">debug spanning-tree mst packet, on page 424</a></td> <td>Enables debugging for sent and received MSTP packets.</td> </tr> <tr> <td><a href="#">debug spanning-tree mst protocol-state, on page 426</a></td> <td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td> </tr> <tr> <td><a href="#">spanning-tree mst, on page 552</a></td> <td>Enters the MSTP configuration submode</td> </tr> <tr> <td><a href="#">show spanning-tree mst, on page 520</a></td> <td>Displays the multiple spanning tree protocol status information.</td> </tr> </tbody> </table>	Command	Description	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
Command	Description										
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.										
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.										
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode										
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.										

# periodic transmit

To send periodic Multiple VLAN Registration Protocol Data Unit (MVRPDU) on all active ports, use the **periodic transmit** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

```
periodic transmit [interval interval]
no periodic transmit [interval interval]
```

<b>Syntax Description</b>	<b>interval interval</b> Sends periodic MVRPDU on all active ports at specified time interval. The range is from 2 to 10 seconds.
---------------------------	---

<b>Command Default</b>	The default is 3 seconds.
------------------------	---------------------------

<b>Command Modes</b>	MVRP configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.9.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Sending periodic messages is not required when the state machines operate correctly. The periodic messages are intended purely to cope with a succession of lost new declaration MVRPDUs. In the absence of periodic messages, declarations are re-sent every 10 to 15 seconds in response to the LeaveAll timer expiring.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

<b>Examples</b>	The following example shows how to enable MVRP static mode:
-----------------	---

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
	<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.

Command	Description
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VLAN IDs that are declared or registered.

# port-id

To set the port ID for the current switch, use the **port-id** command in MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

**port-id** *id* [**startup-value** *startup-id*]

Syntax Description	<i>id</i>	Interface port ID.  For MSTAG, REPAG and PVRSTAG the allowed range is between 1 to 4095. For PVSTAG the allowed range is between 1 to 255.
	<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
	<i>startup-id</i>	Sets the startup port ID.

**Command Default** If a startup value is not specified, it defaults to the normal value.

**Command Modes** MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
	Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used when configuring Access Gateway, to set the value of the port ID advertised in BPDUs sent on this interface.

Task ID	Task ID	Operations
	<b>ethernet-services</b> (PVSTAG and PVRSTAG only)	read, write
	<b>interface</b> (MSTAG and REPAG only)	read, write

**Examples** The following example shows how to set the port ID:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# port-id 111
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.



# port-priority

To set the port priority performance parameter for the MSTI, use the **port-priority** command in MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

**port-priority** *priority* [**startup-value** *startup-priority*]

## Syntax Description

<i>priority</i>	Port priority. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 40 in multiples of 16. For PVSTAG, the range is between 0 to 255.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-priority</i>	Sets the startup port priority.

## Command Default

If no startup-value is configured, the normal value is used during startup.

## Command Modes

MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services (PVSTAG and PVRSTAG only)	read, write
interface (MSTAG and REPAG only)	read, write

## Examples

The following example shows how to set the port priority to 160:

```
RP/0/RSP0/CPU0:router (config-mstag-if-inst) # port-priority 160
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

# portfast

To enable Port Fast on the port, and optionally enable BPDU guard, use the **portfast** command in MSTP interface configuration submenu.

**portfast** [**bpduguard**]

**Syntax Description** This command has no keywords or arguments.

**Command Default** PortFast is disabled.

**Command Modes** MSTP interface configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** You must disable and re-enable the port for Port Fast configuration to take effect. Use **shutdown** and **no shutdown** command (in interface configuration mode) to disable and re-enable the port.

This command enables the Port Fast feature (also known as edge port). When this is enabled, MSTP treats the port as an edge port, i.e., it keeps it in forwarding state and does not generate topology changes if the port goes down or comes up. It is not expected to receive MSTP BPDUs on an edge port. BPDU guard is a Cisco extension that causes the interface to be shut down using error-disable if an MSTP BPDU is received. For more information on Port Fast feature, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	interface	read, write

**Examples** The following example shows how to enable PortFast and BPDU guard on the port:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# portfast
RP/0/RSP0/CPU0:router(config-mstp-if)# portfast bpduguard
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submenu, and enables STP for the specified port.

Command	Description
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# preempt delay

To enable topology control and set the preempt delay on startup, use the **preempt delay** command in MSTAG, REPAG, PVSTAG or PVRSTAG configuration mode.

```
preempt delay {for time {seconds | minutes | hours} | until hh:mm:ss}
```

<b>Syntax Description</b>	<p><b>for</b> Specifies length of time to delay preempting for in seconds, minutes or hours.</p> <p><b>until</b> Specifies time to delay preempting until the mentioned interval (24-hour hh:mm:ss).</p>						
<b>Command Default</b>	Startup topology control is disabled.						
<b>Command Modes</b>	MSTAG configuration, REPAG configuration, PVSTAG configuration, PVRSTAG configuration						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.0.0</td> <td>This command was supported in the PVSTAG and PVRSTAG configuration modes.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration modes.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration modes.						

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables startup topology control for Access Gateway. By default, when an interface comes up, Access Gateway starts sending STP BPDUs immediately based on the configured values. This could cause the devices in the access network to immediately start directing traffic to this device. However, the data plane may not yet be ready to forward packets to the core or aggregation network. When a preempt delay is configured, alternative values are sent in the BPDUs for the specified time. These alternative values must be configured using the **startup-value** option, and can be set so as to cause the access devices not to use this link unless it is the only one available.

For more information on preempt delay, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

## Examples

The following example shows how to set the preempt delay for 20 seconds:

```
RP/0/RSP0/CPU0:router(config-mstag)# preempt delay for 20 seconds
```

Related Commands	Command	Description
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## priority (Access Gateway)

To set the bridge priority for the current MSTI or VLAN, use the **priority** command in the MSTAG, REPAG, PVSTAG or PVRSTAG instance configuration submodes.

**priority** *priority* [**startup-value** *startup-priority*]

Syntax Description		
<i>priority</i>	Specifies the bridge priority. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 61440 in multiples of 4096. For PVSTAG, the range is between 0 to 65535.	
<b>startup-value</b>	Sets an alternate value to use when the interface first comes up, while the preempt delay timer is running.	
<i>startup-priority</i>	Specifies the startup priority.	

**Command Default** Default value is 32768. If the startup value is not specified while the standard value is, the startup value defaults to the standard value.

**Command Modes** MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
	Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration mode.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used when configuring Access Gateway to set the bridge priority that is advertised for this MSTI or VLAN in the BPDUs sent from this interface.

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

### Examples

The following example shows how to set the bridge priority for the current MSTI:

**priority (Access Gateway)**

```
RP/0/RSP0/CPU0:router(config-mstag-if-inst)# priority 4096 startup-value 32768
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.



# priority (MSTP)

To set the bridge priority for the current MSTI, use the **priority** command in MSTI configuration submode.

**priority** *priority*

## Syntax Description

*priority* Bridge priority for the current MSTI. Range is 0 to 61440 in multiples of 4096.

## Command Default

*priority: 32768*

## Command Modes

MSTI configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read, write

## Examples

The following example shows how to set the bridge priority to 8192 for the current MSTI:

```
RP/0/RSP0/CPU0:router(config-mstp-inst)# priority 8192
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">instance (MSTP), on page 455</a>	Enters the multiple spanning tree instance (MSTI) configuration submode.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## provider-bridge (MSTAG/REPAG)

To place the current instance of the protocol in 802.1ad mode, use the **provider-bridge** command in MSTAG or REPAG interface configuration submode.

### provider-bridge

#### Syntax Description

This command has no keywords or arguments.

#### Command Default

The default value is FALSE.

#### Command Modes

MSTAG interface configuration, REPAG interface configuration

#### Command History

Release	Modification
Release 3.7.1	This command was introduced.

#### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

#### Task ID

Task ID	Operations
interface	read, write

#### Examples

The following example shows how to use the **provider-bridge** command:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# provider-bridge
```

#### Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.

Command	Description
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

# provider-bridge (MSTP)

To place the current instance of the protocol in 802.1ad mode, use the **provider-bridge** command in MSTP configuration submode.

## provider-bridge

**Syntax Description** This command has no keywords or arguments.

**Command Default** The default value is FALSE.

**Command Modes** MSTP configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read, write

**Examples** The following example shows how to use the **provider-bridge** command:

```
RP/0/RSP0/CPU0:router(config-mstp)# provider-bridge
```

Related Commands	Command	Description
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

## revision (MSTAG/REPAG)

To set the revision level in the BPDUs sent from this interface, use the **revision** command in MSTAG or REPAG interface configuration submode.

**revision** *revision-number*

<b>Syntax Description</b>	<i>revision-number</i> Revision level of the MSTP region. Range is 0 to 65535.
---------------------------	--

<b>Command Default</b>	<i>revision-number</i> : 0
------------------------	----------------------------

<b>Command Modes</b>	MSTAG interface configuration, REPAG interface configuration
----------------------	--

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to set the revision level of the MSTP region to 1:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstag-if)# revision 1
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.

Command	Description
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## revision (MSTP)

To set the revision level of the MSTP region, use the **revision** command in MSTP configuration submode.

**revision** *revision-number*

### Syntax Description

*revision-number* Revision level of the MSTP region. Range is 0 to 65535.

### Command Default

*revision-number*: 0

### Command Modes

MSTP configuration

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read, write

### Examples

The following example shows how to set the revision level of the MSTP region to 10:

```
RP/0/RSP0/CPU0:router(config-mstp)# revision 10
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## root-cost

To set the root path cost to sent in BPDUs from this interface, use the **root-cost** command in PVSTAG VLAN configuration or PVRSTAG VLAN configuration mode.

**root-cost** *cost* [**startup-value** *startup-cost*]

### Syntax Description

<i>cost</i>	Sets the root path cost for the current port. The cost ranges between 0 to 4294967295.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-cost</i>	Sets the startup cost.

### Command Default

The default is 0. If a cost is configured but no startup value is configured, the startup value defaults to the configured cost value. If no cost is configured, the startup value defaults to 1.

### Command Modes

PVSTAG VLAN configuration, PVRSTAG VLAN configuration

### Command History

Release	Modification
Release 4.0.0	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services	read, write

### Examples

The following example shows how to set the root path cost for the current port:

```
RP/0/RSP0/CPU0:router(config-pvrstag-if-vlan)# root-cost 1000000
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.



Command	Description
<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

# root-id

To set the identifier of the root bridge for BPDUs sent from a port and an optional startup-value, use the **root-id** command in the MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration and PVRSTAG VLAN configuration modes.

```
root-id id [startup-value startup-id]
```

## Syntax Description

<b>id</b>	Sets the root bridge ID (MAC address) to set in the BPDUs.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<b>startup-id</b>	Sets the startup root ID.

## Command Default

The MAC address of the region root switch. If the startup value is not specified while the standard value is, the startup value defaults to the standard value. For MSTAG and REPAG, the default is the bridge ID. For PVSTAG and PVRSTAG, the default is 0000.0000.0000.

## Command Modes

MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

## Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services (PVSTAG and PVRSTAG only)	read, write
interface (MSTAG and REPAG only)	read, write

## Examples

The following example shows how to set the identifier of the root bridge for BPDUs:

```
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)#root-id 0000.0000.0000 startup-value
0000.0000.0001
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

## root-priority

To set the root bridge priority sent in BPDUs for this interface for this MSTI or VLAN, and to set an optional startup value, use the **root-priority** command in the MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration and PVRSTAG VLAN configuration modes.

**root-priority** *priority* [**startup-value** *startup-priority*]

### Syntax Description

<i>priority</i>	Sets the root bridge priority to set in the BPDUs. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 61440 in multiples of 4096. For PVSTAG, the range is between 0 to 65535.
<b>startup-value</b>	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-priority</i>	Sets the startup root priority.

### Command Default

Default value is 32768. If the startup value is not specified while the standard value is, the startup value defaults to the standard value.

For MSTAG and REPAG, the default is 32768. For PVSTAG and PVRSTAG, the default is 0.

### Command Modes

MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

### Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
ethernet-services (PVSTAG and PVRSTAG only)	read, write
interface (MSTAG and REPAG only)	read, write

### Examples

The following example shows how to set the root bridge priority for the current MSTI:

```
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)# root-priority 4096 startup-value 8192
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

## show ethernet mvrp mad

To display the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port, for each active attribute value (VID), use the **show ethernet mvrp mad** command in EXEC mode.

**show ethernet mvrp mad** [**brief**] [**interface** *interface-name*] [**vlan** *vlan-id*]

Syntax Description	Parameter	Description
	<b>brief</b>	(Optional) Displays a brief view.
	<b>interface</b>	(Optional) Displays the MVRP state for the given subinterface or base interface name.
	<i>interface-name</i>	(Optional) Displays the interface name.
	<b>vlan</b> <i>vlan-id</i>	(Optional) Displays information for a particular VLAN. The range is between 0 to 4094.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

### Examples

The following sample output is from the **show ethernet mvrp mad** command:

```
RP/0/RSP0/CPU0:router# show ethernet mvrp mad interface GigabitEthernet 0/1/0/1
GigabitEthernet0/1/0/1
  Participant Type: Full; Point-to-Point: Yes
  Admin Control: Applicant Normal; Registrar Normal

  LeaveAll Passive (next in 5.92s); periodic disabled
  Leave in 25.70s; Join not running
  Last peer 0293.6926.9585; failed registrations: 0

VID   Applicant           Registrar
----  -

```

```
1 Very Anxious Observer Leaving
283 Quiet Passive Empty
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

# show ethernet mvrp statistics

To display packet statistics per port, use the **show ethernet mvrp statistics** command in EXEC mode.

**show ethernet mvrp statistics** [**interface** *type interface-path-id*]

Syntax Description	interface	(Optional) Displays the MVRP state for the given subinterface or base interface name.
	<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	(Optional) Physical interface or virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

## Examples

The following sample output is from the **show ethernet mvrp statistics** command:

```
RP/0/RSP0/CPU0:router# show ethernet mvrp statistics interface GigabitEthernet 0/1/0/1
GigabitEthernet0/1/0/1
MVRPDUs TX:      1245
MVRPDUs RX:       7
Dropped TX:       0
Dropped RX:      42
Invalid RX:      12
```

Related Commands	Command	Description
	<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.



Command	Description
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp status, on page 514</a>	Displays a summary of the VIDs that are declared or registered.

## show ethernet mvrp status

To display a summary of the VLANs that are declared or registered, and to learn the origin of these declarations, use the **show ethernet mvrp status** command in EXEC mode.

**show ethernet mvrp status** [**interface** *type interface-path-id*]

Syntax Description	interface	(Optional) Displays the MVRP state for the given subinterface or base interface name.
	<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	(Optional) Physical interface or virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

### Examples

The following sample output is from the **show ethernet mvrp status** command:

```
RP/0/RSP0/CPU0:router# show ethernet mvrp status interface GigabitEthernet 0/1/0/1
GigabitEthernet0/1/0/1
  Statically declared: 1-512,768,980-1034
  Dynamically declared: 2048-3084
  Registered:         1-512
```

Related Commands	Command	Description
	<a href="#">debug ethernet mvrp packets, on page 420</a>	Enables debugging of sent and received MVRP packets.

Command	Description
<a href="#">debug ethernet mvrp protocol, on page 422</a>	Enables MVRP protocol debugging on a specific interface, location or vlan.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show ethernet mvrp mad, on page 510</a>	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
<a href="#">show ethernet mvrp statistics, on page 512</a>	Displays packet statistics per port.

## show l2vpn mstp port

To display the internal MSTI number and number of ports for each VLAN, use the **show l2vpn mstp port** command in EXEC mode.

**show l2vpn mstp port** [**interface** *type interface-path-id*] [**msti** *value*]

Syntax Description	interface	(Optional) Displays the MSTP state for the given interface.
	<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	Physical interface or virtual interface.
	<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.
	<b>msti</b> <i>value</i>	(Optional) Displays the filter for Multiple Spanning Tree Instance (MSTI). The range is from 0 to 100.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

### Examples

The following sample output is from the **show l2vpn mstp port** command:

```
RP/0/RSP0/CPU0:router# show l2vpn mstp port interface gigabitethernet 0/1/0/0 msti 5
```

Related Commands	Command	Description
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submenu

Command	Description
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.

## show l2vpn mstp vlan

To display the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface, use the **show l2vpn mstp vlan** command in EXEC mode.

**show l2vpn mstp vlan** [*interface type interface-path-id*] [*msti value*] [*vlan-id value*]

Syntax Description	
<b>interface</b>	(Optional) Displays the MSTP state for the given subinterface or base interface name.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.
<b>msti value</b>	(Optional) Displays the filter for Multiple Spanning Tree Instance (MSTI). The range is from 0 to 100.
<b>vlan-id value</b>	(Optional) Displays the filter for the VLAN ID. The range is from 0 to 4294967295.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read

**Examples** The following sample output is from the **show l2vpn mstp vlan** command:

```
RP/0/RSP0/CPU0:router# show l2vpn mstp vlan interface gigabitethernet 0/1/0/0 msti 5 vlan-id 5
```

Related Commands	Command	Description
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
	<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.

## show spanning-tree mst

To display the multiple spanning tree protocol status information, use the **show spanning-tree mst** command in EXEC mode.

**show spanning-tree mst** *protocol instance identifier* [**instance** *instance-id*] [{**blocked-ports** | **brief**}]

Syntax Description	
<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>instance</b> <i>instance-id</i>	Forward interface in rack/slot/instance/port format.
<b>brief</b>	Displays a summary of MST information only.
<b>blocked-ports</b>	Displays MST information for blocked ports only.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
	Release 3.9.1	The <b>topology-change</b> keyword was added.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operations
	interface	read

### Examples

The following example shows the output from the **show spanning-tree mst** command, which produces an overview of the spanning tree protocol state:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a instance 0
Operating in Provider Bridge mode
MSTI 0 (CIST):

  VLANS Mapped: 1-100, 500-1000, 1017

  Root ID    Priority    4097
  Address    0004.9b78.0800
  This bridge is the root
  Hello Time 2 sec    Max Age 20 sec    Forward Delay 15 sec

  Bridge ID  Priority    4097    (priority 4096 sys-id-ext 1)
```



```
Address      0004.9b78.0800
Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec
```

Interface Name	Port ID Prio.Nbr	Cost	Role State	Designated Cost	Bridge ID	Port ID Prio.Nbr
GigabitEthernet0/1/2/1	128.65	20000	DSGN FWD	0	4097 0004.9b78.0800	128.65
GigabitEthernet0/1/2/2	128.66	20000	DSGN FWD	0	4097 0004.9b78.0800	128.66
...						

The following example shows the output from the **show spanning-tree mst** command when the **brief** and **blocked-ports** keywords are used:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a brief
```

```
MSTI 0 (CIST):
  VLAN IDs: 1-100, 500-1000, 1017
  This is the Root Bridge
MSTI 1:
  VLAN IDS: 101-499
  Root Port GigabitEthernet0/1/2/2 , Root Bridge ID 0002.9b78.0812
...
```

```
RP/0/RSP0/CPU0:router# show spanning-tree mst blocked-ports
```

```
MSTI 0 (CIST):

Interface          Port ID          Designated          Port ID
Name               Prio.Nbr Cost    Role State    Cost Bridge ID          Prio.Nbr
-----
GigabitEthernet0/0/4/4  128.196  200000 ALT  BLK    0    4097 0004.9b78.0800 128.195
...
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
<a href="#">show spanning-tree mst bpdu interface, on page 522</a>	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
<a href="#">show spanning-tree mst configuration, on page 524</a>	Displays the VLAN ID to MSTI mapping table.
<a href="#">show spanning-tree mst errors, on page 526</a>	Displays information about misconfiguration affecting MSTP.
<a href="#">show spanning-tree mst interface, on page 528</a>	Displays detailed information on the interface state.
<a href="#">show spanning-tree mst topology-change flushes, on page 531</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

## show spanning-tree mst bpdu interface

To display the contents of MSTP BPDUs being sent and received on a particular interface, use the **show spanning-tree mst bpdu interface** command in the EXEC mode.

**show spanning-tree mst** *protocol instance identifier* **bpdu interface** *type interface-path-id* [**direction** {**receive** | **transmit**}]

### Syntax Description

<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>bpdu interface</b>	Displays multiple spanning tree BPDUs.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>direction</b>	Displays per-interface MST BPDUs for a specific direction.
<b>receive</b>	Displays only the MST BPDUs received on this interface.
<b>transmit</b>	Displays only the MST BPDUs being transmitted for this interface.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read

### Examples

The following example shows the output from the **show spanning-tree mst** command, which produces details on the BPDUs being output and received on a given local interface:



**Note** Several received packets can be stored in case of MSTP operating on a shared LAN.

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a bpdu interface GigabitEthernet0/1/2/2
direction transmit
MSTI 0 (CIST):
Root ID : 0004.9b78.0800
Path Cost : 83
Bridge ID : 0004.9b78.0800
Port ID : 12
Hello Time : 2
...
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
<a href="#">show spanning-tree mst configuration, on page 524</a>	Displays the VLAN ID to MSTI mapping table.
<a href="#">show spanning-tree mst errors, on page 526</a>	Displays information about misconfiguration affecting MSTP.
<a href="#">show spanning-tree mst interface, on page 528</a>	Displays detailed information on the interface state.
<a href="#">show spanning-tree mst topology-change flushes, on page 531</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

# show spanning-tree mst configuration

To display the VLAN ID to MSTI mapping table, use the **show spanning-tree mst configuration** command in the EXEC mode.

**show spanning-tree mst *protocol instance identifier* configuration**

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
<b>configuration</b>	Displays a summary of MST related configuration.

**Command Default** None

**Command Modes** EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read

**Examples** The following example shows the output from the **show spanning-tree mst** command, which displays the VLAN ID to MSTI mapping table:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a configuration
Name          leo
Revision      2702
Config Digest 9D-14-5C-26-7D-BE-9F-B5-D8-93-44-1B-E3-BA-08-CE
Instance      Vlans mapped
-----
0             1-9, 11-19, 21-29, 31-39, 41-4094
1             10, 20, 30, 40
-----
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.

Command	Description
<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
<a href="#">show spanning-tree mst bpdu interface, on page 522</a>	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
<a href="#">show spanning-tree mst errors, on page 526</a>	Displays information about misconfiguration affecting MSTP.
<a href="#">show spanning-tree mst interface, on page 528</a>	Displays detailed information on the interface state.
<a href="#">show spanning-tree mst topology-change flushes, on page 531</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

# show spanning-tree mst errors

To display information about misconfiguration affecting MSTP, use the **show spanning-tree mst errors** in the EXEC mode.

**show spanning-tree mst** *protocol instance identifier* **errors**

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
<b>errors</b>	Displays configuration errors for MST.

**Command Default** None

**Command Modes** EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read

## Examples

The following example shows the output from the **show spanning-tree mst** command, which produces information about interfaces that are configured for MSTP but where MSTP is not operational. Primarily this shows information about interfaces which do not exist:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a errors
Interface          Error
-----
GigabitEthernet1/2/3/4  Interface does not exist.
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.

Command	Description
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
<a href="#">show spanning-tree mst bpdu interface, on page 522</a>	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
<a href="#">show spanning-tree mst configuration, on page 524</a>	Displays the VLAN ID to MSTI mapping table.
<a href="#">show spanning-tree mst interface, on page 528</a>	Displays detailed information on the interface state.
<a href="#">show spanning-tree mst topology-change flushes, on page 531</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

# show spanning-tree mst interface

To display detailed information on the interface state, use the **show spanning-tree mst interface** command in EXEC mode.

**show spanning-tree mst** *protocol instance identifier* **interface** *type interface-path-id* [**instance id**]

## Syntax Description

*protocol instance identifier* String of a maximum of 25 characters that identifies the protocol instance.

**interface** *type* Interface type. For more information, use the question mark (?) online help function.

*interface-path-id* Physical interface or virtual interface.

**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

**instance id** Forward interface in rack/slot/instance/port format.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read

## Examples

The following example shows the output from the **show spanning-tree mst** command, which produces more detailed information regarding interface state than the standard command as described above:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a interface GigabitEthernet0/1/2/1 instance
3
GigabitEthernet0/1/2/1
Cost: 20000
link-type: point-to-point
hello-time 1
```



```

Portfast: no
BPDU Guard: no
Guard root: no
Guard topology change: no
BPDUs sent 492, received 3

MST 3:
Edge port:
Boundary : internal
Designated forwarding
Vlans mapped to MST 3: 1-2,4-2999,4000-4094
Port info port id 128.193 cost 200000
Designated root address 0050.3e66.d000 priority 8193 cost 20004
Designated bridge address 0002.172c.f400 priority 49152 port id 128.193
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Transitions to reach this state: 12

```

The output includes interface information about the interface which applies to all MSTIs:

- Cost
- link-type
- hello-time
- portfast (including whether BPDU guard is enabled)
- guard root
- guard topology change
- BPDUs sent, received.

It also includes information specific to each MSTI:

- Port ID, priority, cost
- BPDU information from root (bridge ID, cost, and priority)
- BPDU information being sent on this port (Bridge ID, cost, priority)
- State transitions to reach this state.
- Topology changes to reach this state.

Flush containment status for this MSTI.

Related Commands	Command	Description
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.
	<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
	<a href="#">show spanning-tree mst bpdu interface, on page 522</a>	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
	<a href="#">show spanning-tree mst configuration, on page 524</a>	Displays the VLAN ID to MSTI mapping table.

Command	Description
<a href="#">show spanning-tree mst errors, on page 526</a>	Displays information about misconfiguration affecting MSTP.
<a href="#">show spanning-tree mst topology-change flushes, on page 531</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode

# show spanning-tree mst topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree mst topology-change flushes** command in the EXEC mode.

```
show spanning-tree mst protocol instance identifier topology-change flushes [instance id]
[{interface type interface-path-id | latest}]
```

## Syntax Description

<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>topology-change</b>	Displays topology change information.
<b>flushes</b>	Displays latest topology change flushes for each interface.
<i>instance id</i>	Instance for which information needs to be displayed.
<i>interface type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.
<b>latest</b>	Displays the most recent topology change for each instance.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



### Note

The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

## show spanning-tree mst topology-change flushes

## Task ID

Task Operations  
ID

interface read

## Examples

The following example shows the output from the **show spanning-tree mst** command, which displays details on the MSTIs :

```
RP/0/RSP0/CPU0:router# show spanning-tree mst M topology-change flushes instance$
MSTI 1:
```

Interface	Last TC	Reason	Count
Te0/0/0/1	04:16:05 Mar 16 2010	Role change: DSGN to ----	10
#			
#			

```
RP/0/RSP0/CPU0:router# show spanning-tree mst M topology-change flushes instance$
MSTI 0 (CIST):
```

Interface	Last TC	Reason	Count
Te0/0/0/1	04:16:05 Mar 16 2010	Role change: DSGN to ----	10
#			
#			

## Related Commands

Command	Description
<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
<a href="#">show l2vpn mstp port, on page 516</a>	Displays the internal MSTI number and number of ports for each VLAN.
<a href="#">show l2vpn mstp vlan, on page 518</a>	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.
<a href="#">show spanning-tree mst bpdu interface, on page 522</a>	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
<a href="#">show spanning-tree mst configuration, on page 524</a>	Displays the VLAN ID to MSTI mapping table.
<a href="#">show spanning-tree mst errors, on page 526</a>	Displays information about misconfiguration affecting MSTP.
<a href="#">show spanning-tree mst interface, on page 528</a>	Displays detailed information on the interface state.
<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submenu

# show spanning-tree mstag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree mstag** in the EXEC mode.

**show spanning-tree mstag** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String (a maximum of 25 characters) that identifies the protocol instance.						
<b>Command Default</b>	None						
<b>Command Modes</b>	EXEC						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.1.0</td> <td>The show output of this command was modified to include information on the MSTAG Edge Mode feature.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.1.0	The show output of this command was modified to include information on the MSTAG Edge Mode feature.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.1.0	The show output of this command was modified to include information on the MSTAG Edge Mode feature.						
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	interface	read		
Task ID	Operations						
interface	read						

## Examples

This example shows the output from the **show spanning-tree mstag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree mstag A
GigabitEthernet0/0/0/1
  Preempt delay is disabled.
  Name:                6161:6161:6161
  Revision:            0
  Max Age:             20
  Provider Bridge:    no
  Bridge ID:          6161.6161.6161
  Port ID:            1
  External Cost:      0
  Hello Time:         2
  Active:             no
  BPDUs sent:        0
  MSTI 0 (CIST):
    VLAN IDs:         1-9,32-39,41-4094
    Role:             Designated
    Bridge Priority:   32768
    Port Priority:    128
    Cost:             0
    Root Bridge:     6161.6161.6161
    Root Priority:    32768
```

## show spanning-tree mstag

```

Topology Changes: 123
MSTI 2
VLAN IDs:          10-31
Role:              Designated
Bridge Priority:    32768
Port Priority:     128
Cost:              0
Root Bridge:       6161.6161.6161
Root Priority:     32768
Topology Changes: 123
MSTI 10
VLAN IDs:          40
Role:              Root (Edge mode)
Bridge Priority:    32768
Port Priority:     128
Cost:              200000000
Root Bridge:       6161.6161.6161
Root Priority:     61440
Topology Changes: 0

```

Related Commands	Command	Description
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">show spanning-tree mstag bpdv interface, on page 535</a>	Displays the content of the BPDUs being sent from this interface.
	<a href="#">show spanning-tree mstag topology-change flushes, on page 537</a>	Displays details of the last topology change that occurred for each pair of port and instance.
	<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.

# show spanning-tree mstag bpdu interface

To view the content of the BPDUs being sent from this interface, use the **show spanning-tree mstag bpdu interface** command in the EXEC mode.

**show spanning-tree mstag** *protocol instance identifier* **bpdu interface** *type interface-path-id*

Syntax Description	
<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>bpdu interface</b>	Displays multiple spanning tree BPDUs.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read

**Examples** The following example shows the output from the **show spanning-tree mstag bpdu interface** command:

```
RP/0/RSP0/CPU0:router#show spanning-tree mstag foo bpdu interface GigabitEthernet 0/0/0/0
Transmitted:
  MSTI 0 (CIST):
  ProtocolIdentifier: 0
  ProtocolVersionIdentifier: 3
  BPDUType: 2
```

## show spanning-tree mstag bpdv interface

```

CISTFlags: Top Change Ack 0
           Agreement      1
           Forwarding     1
           Learning       1
           Role           3
           Proposal       0
           Topology Change 0
CISTRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTExternalPathCost: 0
CISTRegionalRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTPortIdentifierPriority: 8
CISTPortIdentifierId: 1
MessageAge: 0
MaxAge: 20
HelloTime: 2
ForwardDelay: 15
Version1Length: 0
Version3Length: 80
FormatSelector: 0
Name: 6969:6969:6969
Revision: 0
MD5Digest: ac36177f 50283cd4 b83821d8 ab26de62
CISTInternalRootPathCost: 0
CISTBridgeIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTRemainingHops: 20
  MSTI 1:
MSTIFlags: Master      0
           Agreement    1
           Forwarding  1
           Learning     1
           Role         3
           Proposal     0
           Topology Change 0
MSTIRegionalRootIdentifier: priority 8, MSTI 1, address 6969.6969.6969
MSTIInternalRootPathCost: 0
MSTIBridgePriority: 1
MSTIPortPriority: 8
MSTIRemainingHops: 20

```

## Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree mstag topology-change flushes, on page 537</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.



# show spanning-tree mstag topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree mstag topology-change flushes** command in the EXEC mode.



**Note** The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

```
show spanning-tree mstag protocol instance identifier topology-change flushes [instance id]
[interface type interface-path-id | latest]
```

## Syntax Description

<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>topology-change</b>	Displays topology change information.
<b>flushes</b>	Displays latest topology change flushes for each interface.
<i>instanceid</i>	Forward interface in rack/slot/instance/port format.
<b>interface</b> type	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.
<b>latest</b>	Displays the most recent topology change for each instance.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.1	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## show spanning-tree mstag topology-change flushes

Task ID	Task ID	Operations
	interface	read

### Examples

The following example shows the output from the **show spanning-tree mstag topology-change flushes** command, which displays details on the MSTIs :

```
RP/0/RSP0/CPU0:router# show spanning-tree mstag b topology-change flushes
```

```
MSTAG Protocol Instance b
```

Interface	Last TC	Reason	Count
Gi0/0/0/1	18:03:24 2009-07-14	Gi0/0/0/1.10 egress TCN	65535
Gi0/0/0/2	21:05:04 2009-07-15	Gi0/0/0/2.1234567890 ingress TCN	2

### Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree mstag bpdud interface, on page 535</a>	Displays the content of the BPDUs being sent from this interface.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.

# show spanning-tree pvrst

To display the Per VLAN Rapid Spanning Tree (PVRST) status information, use the **show spanning-tree pvrst** command in EXEC mode.

**show spanning-tree pvrst** *protocol instance identifier* [{**blocked-ports** | **bpdu** | **brief** | **errors** | **interface** | **topology-change** | **vlan**}]

Syntax Description		
	<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
	<b>blocked-ports</b>	Displays PVRST Bridge Protocol Data Unit (BPDU).
	<b>bpdu</b>	Displays PVRST Bridge Protocol Data Unit (BPDU).
	<b>brief</b>	Displays PVRST Bridge Protocol Data Unit (BPDU).
	<b>errors</b>	Display configuration errors for PVRST.
	<b>interface</b>	Displays PVRST information for every interface.
	<b>topology-change</b>	Displays topology change information.
	<b>vlan</b>	Displays VLAN information.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read

**Examples** This example shows the output from the **show spanning-tree pvrst** command, which produces an overview of the spanning tree protocol state:

## show spanning-tree pvrst

```
RP/0/RSP0/CPU0:router# show spanning-tree pvrst MSTP
Role: ROOT=Root, DSGN=Designated, ALT=Alternate, BKP=Backup
State: FWD=Forwarding, LRN=Learning, BLK=Blocked
```

```
VLAN 10:
```

```
Root ID Priority 4096
Address 8cb6.4fe9.7b9e
This bridge is the root
Max Age 20 sec, Forward Delay 15 sec
```

```
Bridge ID Priority 4096 (priority 4096 sys-id-ext 0)
Address 8cb6.4fe9.7b9e
Max Age 20 sec, Forward Delay 15 sec
Transmit Hold count 6
```

```
Interface Port ID Role State Designated Port ID
Pri.Nbr Cost Bridge ID Pri.Nbr
-----
Gi0/5/0/0 128.1 20000 DSGN FWD 4096 8cb6.4fe9.7b9e 128.1
Gi0/5/0/2 128.2 20000 DSGN FWD 4096 8cb6.4fe9.7b9e 128.2
```

```
VLAN 20:
```

```
Root ID Priority 8192
Address c062.6bac.a07e
Max Age 20 sec, Forward Delay 15 sec
```

```
Bridge ID Priority 16384 (priority 16384 sys-id-ext 0)
Address 8cb6.4fe9.7b9e
Max Age 20 sec, Forward Delay 15 sec
Transmit Hold count 6
```

```
Interface Port ID Role State Designated Port ID
Pri.Nbr Cost Bridge ID Pri.Nbr
-----
Gi0/5/0/0 128.1 20000 ROOT FWD 8192 c062.6bac.a07e 128.1
Gi0/5/0/2 128.2 20000 ALT BLK 8192 c062.6bac.a07e 128.2
```

This example shows the output from the **show spanning-tree pvrst** command when the **brief** and **blocked-ports** keywords are used:

```
RP/0/RSP0/CPU0:router# show spanning-tree pvrst stl brief
VLAN 1 (native-vlan):
  This is the Root Bridge
VLAN 101:
  Root Port GigabitEthernet0/1/2/2 , Root Bridge ID 0002.9b78.0812
...
```

```
RP/0/RSP0/CPU0:router# show spanning-tree pvrst stl blocked-ports
VLAN 1 (native-vlan):

Interface      Port ID      Role State Designated      Port ID
Pri.Nbr Cost      Bridge ID Pri.Nbr
-----
Gi0/0/0/0      128.1      20000      ---- BLK      4097 0004.9b78.0800 128.195
...
```

This example shows the output for the **show spanning-tree pvrst** command when **interface** keyword is used:

```
RP/0/RSP0/CPU0:router#
show spanning-tree pvrst st1 interface GigabitEthernet 0/1/2/1 vlan 10
show spanning-tree pvrst MSTP interface gigabitEthernet 0/5/0/0 vlan 10
Gi0/5/0/0
Configured Cost: 20000
link-type: point-to-point
Configured hello-time: 2
Designated hello-time: 2
Portfast: no
BPDU Guard: no
Guard root: no

VLAN 10:
Edge port: no
designated, forwarding
Port info port id 128.1 cost 20000
Designated root address 8cb6.4fe9.7b9e priority 4096 cost 0
Designated bridge address 8cb6.4fe9.7b9e priority 4096 port id 128.1
Timers: message expires in 0 sec, forward delay 0
BPDUs sent 19433, received 19228
Transitions to reach this state: 2
Topology Changes: 1 total, last at 18:47:29 Jul 1 2013
```

This example shows the output for the **show spanning-tree pvrst** command when **errors** keyword is used:

```
RP/0/RSP0/CPU0:router# show spanning-tree pvrst st1 errors
Interface      Error
-----
Gi/2/3/4      Interface does not exist.
```

This example shows the output for the **show spanning-tree pvrst** command when **bpdu** keyword is used:

```
RP/0/RSP0/CPU0:router#
show spanning-tree pvrst st1 bpdu interface GigabitEthernet 0/1/2/2 vlan 1 direction receive
Received: (0000.0000.000a)
VLAN 1 (native-VLAN):
  Root ID : 0004.9b78.0800
  Path Cost : 83
  Bridge ID : 0004.9b78.0800
  Port ID : 12
  Hello Time : 2
  ...
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree pvrst, on page 432</a>	Enables debugging protocol-state changes such as port role, state changes, and topology change notification.
<a href="#">spanning-tree pvrst, on page 556</a>	Enters the Per VLAN Rapid Spanning Tree (PVRST) configuration submenu.

# show spanning-tree pvrstag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree pvrstag** in the EXEC mode.

**show spanning-tree pvrstag** *protocol instance identifier* [**interface** *type interface-path-id*]

Syntax Description	
<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>interface</b> <i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p><b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read

## Examples

The following example shows the output from the **show spanning-tree pvrstag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree pvrstag interface GigabitEthernet0/0/0/1
GigabitEthernet0/0/0/1
  VLAN 10
    Preempt delay is disabled.
    Sub-interface: GigabitEthernet0/0/0/1.20 (Up)
    Max Age: 20
    Root Priority: 0
    Root Bridge: 0000.0000.0000
    Cost: 0
    Bridge Priority: 32768
```

```
Bridge ID:          6161.6161.6161
Port Priority:      128
Port ID:           1
Hello Time:        2
Active:            no
BPDUs sent:        0
Topology Changes: 123
VLAN 20
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.

# show spanning-tree pvstag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree pvstag** in the EXEC mode.

**show spanning-tree pvstag** *protocol instance identifier* [**interface type interface-path-id**]

## Syntax Description

<b>protocol instance identifier</b>	String of a maximum of 25 characters that identifies the protocol instance.
<b>interface type</b>	Interface type. For more information, use the question mark (?) online help function.
<b>interface-path-id</b>	Physical interface or virtual interface.  <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.  For more information about the syntax for the router, use the question mark (?) online help function.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 4.0.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
interface	read

## Examples

The following example shows the output from the **show spanning-tree pvstag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree pvstag interface GigabitEthernet0/0/0/1
GigabitEthernet0/0/0/1
  VLAN 10
    Preempt delay is disabled.
    Sub-interface: GigabitEthernet0/0/0/1.20 (Up)
    Max Age: 20
    Root Priority: 0
    Root Bridge: 0000.0000.0000
    Cost: 0
    Bridge Priority: 32768
```



```
Bridge ID:          6161.6161.6161
Port Priority:      128
Port ID:           1
Hello Time:         2
Active:             no
BPDUs sent:         0
Topology Changes:  123
VLAN 20
```

# show spanning-tree repag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree repag** in the EXEC mode.

**show spanning-tree repag** *protocol instance identifier* [**interface** *type interface-path-id*] [**brief**]

Syntax Description	
<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
<b>interface</b> <i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read

## Examples

The following example shows the output from the **show spanning-tree repag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree repag interface GigabitEthernet0/0/0/1
GigabitEthernet0/0/0/1
  VLAN 10
    Preempt delay is disabled.
    Sub-interface: GigabitEthernet0/0/0/1.20 (Up)
    Max Age: 20
    Root Priority: 0
    Root Bridge: 0000.0000.0000
    Cost: 0
    Bridge Priority: 32768
```

```
Bridge ID:          6161.6161.6161
Port Priority:      128
Port ID:           1
Hello Time:        2
Active:            no
BPDUs sent:        0
Topology Changes: 123
VLAN 20
```

Related Commands	Command	Description
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">show spanning-tree repag bpdu interface, on page 548</a>	Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.
	<a href="#">show spanning-tree repag topology-change flushes, on page 550</a>	Displays details of the last topology change that occurred for each pair of port and instance.
	<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

## show spanning-tree repag bpd interface

To display BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port (Bridge ID, cost, priority) specific to an MSTI, use the **show spanning-tree repag bpd interface** command in the EXEC mode.

**show spanning-tree repag protocol instance identifier [bpd interface type interface-path-id]**

### Syntax Description

*protocol instance identifier* String of a maximum of 25 characters that identifies the protocol instance.

**bpd interface** Displays multiple spanning tree BPDUs.

*type* Interface type. For more information, use the question mark (?) online help function.

*interface-path-id* Physical interface or virtual interface.

**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read

### Examples

The following example shows the output from the **show spanning-tree repag** command, which produces details on the BPDUs being output and received on a given local interface:

```
RP/0/RSP0/CPU0:router#show spanning-tree mstag foo bpd interface GigabitEthernet 0/0/0/0
Transmitted:
  MSTI 0 (CIST):
ProtocolIdentifier: 0
ProtocolVersionIdentifier: 3
```

```

BPDUDType: 2
CISTFlags: Top Change Ack 0
            Agreement      1
            Forwarding     1
            Learning       1
            Role           3
            Proposal       0
            Topology Change 0
CISTRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTExternalPathCost: 0
CISTRegionalRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTPortIdentifierPriority: 8
CISTPortIdentifierId: 1
MessageAge: 0
MaxAge: 20
HelloTime: 2
ForwardDelay: 15
Version1Length: 0
Version3Length: 80
FormatSelector: 0
Name: 6969:6969:6969
Revision: 0
MD5Digest: ac36177f 50283cd4 b83821d8 ab26de62
CISTInternalRootPathCost: 0
CISTBridgeIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTRemainingHops: 20
    MSTI 1:
MSTIFlags: Master          0
            Agreement      1
            Forwarding     1
            Learning       1
            Role           3
            Proposal       0
            Topology Change 0
MSTIRegionalRootIdentifier: priority 8, MSTI 1, address 6969.6969.6969
MSTIInternalRootPathCost: 0
MSTIBridgePriority: 1
MSTIPortPriority: 8
MSTIRemainingHops: 20

```

**Related Commands**

Command	Description
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag topology-change flushes, on page 550</a>	Displays details of the last topology change that occurred for each pair of port and instance.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submenu.

# show spanning-tree repag topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree repag topology-change flushes** command in the EXEC mode.



**Note** The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

```
show spanning-tree repag protocol instance identifier topology-change flushes [instance id]
[{interface type interface-path-id | latest}]
```

## Syntax Description

*protocol instance identifier* String of a maximum of 25 characters that identifies the protocol instance.

**topology-change** Displays topology change information.

**flushes** Displays latest topology change flushes for each interface.

*instanceid* Forward interface in rack/slot/instance/port format.

**interface type** Interface type. For more information, use the question mark (?) online help function.

*interface-path-id* Physical interface or virtual interface.

**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

**latest** Displays the most recent topology change for each instance.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read

### Examples

The following example shows the output from the **show spanning-tree repag topology-change flushes** command, which displays details on the MSTIs :

```
RP/0/RSP0/CPU0:router#show spanning-tree repag b topology-change flushes
```

```
MSTAG Protocol Instance b
```

Interface	Last TC	Reason	Count
Gi0/0/0/1	18:03:24 2009-07-14	Gi0/0/0/1.10 egress TCN	65535
Gi0/0/0/2	21:05:04 2009-07-15	Gi0/0/0/2.1234567890 ingress TCN	2

### Related Commands

Command	Description
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag bpdu interface, on page 548</a>	Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submenu.

# spanning-tree mst

To enter the MSTP configuration submode, use the **spanning-tree mst** command in global configuration mode.

**spanning-tree mst** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



<b>Note</b>	In MSTP configuration, only one protocol instance can be configured at a time.
-------------	--

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to enter the MSTP configuration submode:
-----------------	--

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mst a
RP/0/RSP0/CPU0:router(config-mstp)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">instance (MSTP), on page 455</a>	Enters the multiple spanning tree instance (MSTI) configuration submode.



Command	Description
<a href="#">interface (MSTP), on page 463</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
<a href="#">mvrp static, on page 480</a>	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

## spanning-tree mstag

To enter the MST Access Gateway configuration submode, use the **spanning-tree mstag** command in global configuration mode.

**spanning-tree mstag** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Refer to the *Implementing Multiple Spanning Tree Protocol* module of the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide* for more information.



<b>Note</b>	Unlike MSTP configuration, multiple MSTAG instances can be configured concurrently.
-------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to enter the MSTAG configuration submode.
-----------------	---

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mstag a
RP/0/RSP0/CPU0:router(config-mstag)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.

Command	Description
<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## spanning-tree pvrst

To enter the Per VLAN Rapid Spanning Tree (PVRST) configuration submode, use the **spanning-tree pvrst** command in global configuration mode. To exit from the PVRST configuration mode, use the **no** form of this command.

**spanning-tree pvrst** *protocol instance identifier*  
**no spanning-tree pvrst** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
---------------------------	---

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

<b>Examples</b>	This example shows how to enter the PVRST configuration submode:
-----------------	--

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">forward-delay (PVRST), on page 446</a>	Sets the forward-delay time for the bridge.
	<a href="#">interface (PVRST), on page 464</a>	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	<a href="#">maximum (PVRST), on page 477</a>	Sets the maximum age for the bridge.
	<a href="#">transmit (PVRST), on page 560</a>	Sets the transmit hold count performance parameter.
	<a href="#">vlan (PVRST), on page 564</a>	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

## spanning-tree pvrstag

To enter the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode, use the **spanning-tree pvrstag** command in global configuration mode.

**spanning-tree pvrstag** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.	
<b>Command Default</b>	None	
<b>Command Modes</b>	Global configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.0.0	This command was introduced.
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Refer to the <i>Implementing Multiple Spanning Tree Protocol</i> module of the <i>Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide</i> for more information.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write
<b>Examples</b>	<p>The following example shows how to enter the PVRSTAG configuration submode:</p> <pre>RP/0/RSP0/CPU0:router(config)# <b>spanning-tree pvrstag a</b> RP/0/RSP0/CPU0:router(config-pvrstag)#</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
	<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan, on page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

## spanning-tree pvstag

To enter the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode, use the **spanning-tree pvstag** command in global configuration mode.

**spanning-tree pvstag** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.0.0	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Refer to the *Implementing Multiple Spanning Tree Protocol* module of the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide* for more information.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	ethernet-services	read, write

### Examples

The following example shows how to enter the PVSTAG configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvstag a
RP/0/RSP0/CPU0:router(config-pvstag)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree pvstag packet</a> , on <a href="#">page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
	<a href="#">interface (PVSTAG/PVRSTAG)</a> , on <a href="#">page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	<a href="#">show spanning-tree pvstag</a> , on <a href="#">page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
	<a href="#">vlan</a> , on <a href="#">page 562</a>	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

# spanning-tree repag

To enter the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode, use the **spanning-tree repag** command in global configuration mode.

**spanning-tree repag** *protocol instance identifier*

<b>Syntax Description</b>	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.	
<b>Command Default</b>	None	
<b>Command Modes</b>	Global configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.
<b>Usage Guidelines</b>	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Refer to the <i>Implementing Multiple Spanning Tree Protocol</i> module of the <i>Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide</i> for more information.</p>	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write
<b>Examples</b>	<p>The following example shows how to enter the REPAG configuration mode:</p> <pre>RP/0/RSP0/CPU0:router(config)# <b>spanning-tree repag a</b> RP/0/RSP0/CPU0:router(config-repag)#</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## transmit (PVRST)

To set the transmit hold count performance parameter, use the **transmit** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

```
transmit hold-count count
no transmit hold-count count
```

Syntax Description	hold-count	Specifies the hold count performance parameter of the bridge.
	<i>count</i>	Bridge transmit hold count. The range is from 1 to 10.

**Command Default** None

**Command Modes** PVRST configuration

Command History	Release	Modification
	Release 5.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services	read, write

**Examples** This example shows how to set the bridge transmit hold-count parameter to 8:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# transmit hold-count 8
```

Related Commands	Command	Description
	<a href="#">forward-delay (PVRST), on page 446</a>	Sets the forward-delay time for the bridge.
	<a href="#">interface (PVRST), on page 464</a>	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	<a href="#">maximum (PVRST), on page 477</a>	Sets the maximum age for the bridge.
	<a href="#">vlan (PVRST), on page 564</a>	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.



# transmit hold-count

To set the transmit hold count performance parameter, use the **transmit hold-count** command in MSTP configuration submode.

**transmit hold-count** *count*

<b>Syntax Description</b>	<i>count</i> Bridge transmit hold count. Range is 1 to 10.
---------------------------	--

<b>Command Default</b>	<i>count: 6</i>
------------------------	-----------------

<b>Command Modes</b>	MSTP configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to set the bridge transmit hold-count parameter to 8:
-----------------	---

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# transmit hold-count 8
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.

# vlan

To enable a PVST or PVRST VLAN instance on the interface and enter PVSTAG or PVRSTAG VLAN configuration mode, use the **vlan** command in PVSTAG or PVRSTAG configuration submode.

**vlan** *vlan-id*

## Syntax Description

*vlan-id* Specifies the VLAN identifier. The range of the VLAN ID is between 1 to 4094.

**Note** There is a limit of 200 VLANs per physical interface and 16000 VLANs across the system.

## Command Default

None

## Command Modes

PVRSTAG interface configuration, PVSTAG interface configuration

## Command History

Release	Modification
Release 4.0.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operations
ethernet-services	read, write

## Examples

The following example shows how to enable a VLAN in the PVSTAG configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvstag A
RP/0/RSP0/CPU0:router(config-pvstag)# interface GigabitEthernet 0/3/03
RP/0/RSP0/CPU0:router(config-pvstag-if)# vlan 100
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)#
```

## Related Commands

Command	Description
<a href="#">debug spanning-tree pvrstag packet, on page 434</a>	Enables packet debugging for sent and received PVRSTAG packets.
<a href="#">debug spanning-tree pvstag packet, on page 436</a>	Enables packet debugging for sent and received PVSTAG packets.
<a href="#">interface (PVSTAG/PVRSTAG), on page 466</a>	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.

Command	Description
<a href="#">show spanning-tree pvrstag, on page 542</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree pvstag, on page 544</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">spanning-tree pvrstag, on page 557</a>	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
<a href="#">spanning-tree pvstag, on page 558</a>	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.

## vlan (PVRST)

To configure Per VLAN Rapid Spanning Tree (PVRST) on a VLAN, use the **vlan** command in PVRST configuration submode. To undo the configuration, use the **no** form of this command.

**vlan** *vlan-id* **priority** *bridge-priority*  
**no vlan** *vlan-id* **priority** *bridge-priority*

Syntax Description	
<i>vlan-id</i>	VLAN ID. The range is from 1 to 4094.
<b>priority</b>	Specifies the bridge priority.
<i>bridge-priority</i>	Bridge priority. The value is a multiple of 4096.

**Command Default** None

**Command Modes** PVRST configuration

Command History	Release	Modification
	Release 5.1	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Bridge-priority must be multiples of 4096, and the valid range is 0 to 61440. Allowed values are: 0 4096 8192 12288 16384 20480 24576 28672 32768 36864 40960 45056 49152 53248 57344 61440.

Task ID	Task ID	Operations
	ethernet-services	read, write

**Examples** This example shows how to use the `vlan-id` command:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# vlan 66 priority 4096
```

Related Commands	Command	Description
	<a href="#">forward-delay (PVRST), on page 446</a>	Sets the forward-delay time for the bridge.
	<a href="#">interface (PVRST), on page 464</a>	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	<a href="#">maximum (PVRST), on page 477</a>	Sets the maximum age for the bridge.

Command	Description
<a href="#">transmit (PVRST), on page 560</a>	Sets the transmit hold count performance parameter.

## vlan-ids (MSTAG/REPAG)

To associate a set of VLAN IDs with the current MSTI, use the **vlan-id** command in MSTAG or REPAG instance configuration submode.

```
vlan-id vlan-range [vlan-range] [vlan-range] [vlan-range]
```

### Syntax Description

*vlan-range* List of VLAN ranges in the form a-b, c, d, e-f, g etc.

### Command Default

None

### Command Modes

MSTAG Instance configuration mode, REPAG Instance configuration mode.

### Command History

Release	Modification
Release 3.7.1	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

### Task ID

Task ID	Operations
interface	read, write

### Examples

The following example shows how to use the `vlan-id` command:

```
RP/0/RSP0/CPU0:router(config-mstag-inst)# vlan-id 2-1005
```

### Related Commands

Command	Description
<a href="#">debug spanning-tree mstag packet, on page 428</a>	Enables MSTAG packet debugging.
<a href="#">debug spanning-tree repag packet, on page 438</a>	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
<a href="#">interface (MSTAG/REPAG), on page 461</a>	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
<a href="#">instance (MSTAG/REPAG), on page 453</a>	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
<a href="#">spanning-tree mstag, on page 554</a>	Enters the MST Access Gateway configuration submode.
<a href="#">spanning-tree repag, on page 559</a>	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

Command	Description
<a href="#">show spanning-tree mstag, on page 533</a>	Displays the values currently used for populating the BPDUs sent by all ports.
<a href="#">show spanning-tree repag, on page 546</a>	Displays the values currently used for populating the BPDUs sent by all ports.

## vlan-id (MSTP)

To associate a set of VLAN IDs with the current MSTI, use the **vlan-id** command in MSTI configuration submode.

```
vlan-id vlan-range [vlan-range] [vlan-range] [vlan-range]
```

<b>Syntax Description</b>	<i>vlan-range</i> List of VLAN ranges in the form a-b, c, d, e-f, g etc.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	MSTI configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	interface	read, write

<b>Examples</b>	The following example shows how to use the vlan-id command:
-----------------	---

```
RP/0/RSP0/CPU0:router(config-mstp-inst)# vlan-id 2-1005
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">debug spanning-tree mst packet, on page 424</a>	Enables debugging for sent and received MSTP packets.
	<a href="#">debug spanning-tree mst protocol-state, on page 426</a>	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	<a href="#">instance (MSTP), on page 455</a>	Enters the multiple spanning tree instance (MSTI) configuration submode.
	<a href="#">spanning-tree mst, on page 552</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 520</a>	Displays the multiple spanning tree protocol status information.





## Layer 2 Access List Commands

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For detailed information about Ethernet services ACL concepts, configuration tasks, and examples, see the *Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Configuration Guide*.

- [copy access-list ethernet-service](#), on page 570
- [deny \(ES ACL\)](#), on page 572
- [ethernet-service access-group](#), on page 575
- [ethernet-services access-list](#), on page 577
- [permit \(ES ACL\)](#), on page 579
- [resequence access-list ethernet-service](#), on page 582
- [show access-lists ethernet-services](#), on page 584
- [show access-lists ethernet-services trace](#), on page 588
- [show access-list ethernet-service usage pfilter](#), on page 590
- [show lpts pifib hardware entry optimized](#), on page 592

## copy access-list ethernet-service

To create a copy of an existing Ethernet services access list, use the **copy access-list ethernet-services** command in EXEC mode.

**copy access-list ethernet-service** *source-acl* *destination-acl*

<b>Syntax Description</b>	<i>source-acl</i> Name of the access list to be copied.				
	<i>destination-acl</i> Name of the destination access list where the contents of the <i>source-acl</i> argument is copied.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EXEC				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **copy access-list ethernet-service** command to copy a configured Ethernet services access list. Use the *source-acl* argument to specify the access list to be copied and the *destination-acl* argument to specify where to copy the contents of the source access list. The *destination-acl* argument must be a unique name; if the *destination-acl* argument name already exists for an access list, the access list is not copied. The **copy access-list ethernet-service** command checks that the source access list exists then checks the existing list names to prevent overwriting existing access lists.

Task ID	Task ID	Operations
	acl	read, write
	filesystem	execute

### Examples

In the following example, a copy of access list list-1 is created as list-2:

```
RP/0/RSP0/CPU0:router# show access-list ethernet-service list-1

ethernet service access-list list-1
 10 permit any any
 20 permit 2.3.4 5.4.3
RP/0/RSP0/CPU0:router# copy access-list ethernet-service list-1 list-2
RP/0/RSP0/CPU0:router# show access-list ethernet-service list-2
ethernet service access-list list2
```

```

10 permit any any
20 permit 2.3.4 5.4.3

```

Related Commands	Command	Description
	<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
	<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
	<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
	<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
	<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
	<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
	<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
	<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

## deny (ES ACL)

To set conditions for an Ethernet services access list, use the **deny** command in Ethernet services access list configuration mode. To remove a condition, use the **no** form of the command.

```
[sequence-number] deny {src-mac-address src-mac-mask | any | host | dest-mac-address dest-mac-mask}
[ {ethertype-number | capture | vlan min-vlan-ID [max-vlan-ID]} ] [cos cos-value] [dei] [inner-vlan
min-vlan-ID [max-vlan-ID]] [inner-cos cos-value] [inner-dei]
no sequence-number
```

### Syntax Description

<i>sequence-number</i>	(Optional) Number of the <b>deny</b> statement in the access list. This number determines the order of the statements in the access list. The number can be from 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.) Use the <b>resequence access-list ethernet-service</b> command to change the number of the first statement and increment subsequent statements of a configured access list.
<i>src-mac-address</i>	Source MAC address in format <i>H.H.H</i> .
<i>src-mac-mask</i>	Source MAC mask in format <i>H.H.H</i> .
<b>any</b>	Denies any source MAC address and mask.
<b>host</b>	Denies host with a specific host source MAC address and mask, in format <i>H.H.H</i> .
<i>dest-mac-address</i>	Destination MAC address in format <i>H.H.H</i> .
<i>dest-mac-mask</i>	Destination MAC mask in format <i>H.H.H</i> .
<i>ethertype-number</i>	16-bit ethertype number in hexadecimal. Range is 0x1 to 0xffff.
<b>capture</b>	(Optional) Captures packets using the traffic mirroring feature and copies this to a capture file.
<b>vlan</b>	(Optional) Denies a specific VLAN or a range of VLANs.
<i>min-vlan-ID</i>	ID for a specific VLAN or the beginning of a range of VLAN IDs.
<i>max-vlan-ID</i>	(Optional) ID for the end of a range of VLAN IDs.
<b>cos</b>	(Optional) Denies based on class of service value.
<i>cos-value</i>	Class of service value. Range is from 0 to 7.
<b>dei</b>	(Optional) Denies based on the setting of the discard eligibility indicator (DEI).
<b>inner-vlan</b>	(Optional) Denies a specific VLAN ID or range of VLAN IDs for the inner header.
<i>min-vlan-ID</i>	ID for a specific VLAN or the beginning of a range of VLAN IDs.
<i>max-vlan-ID</i>	(Optional) ID for the end of a range of VLAN IDs.
<b>inner-cos</b>	(Optional) Denies based on inner header class of service value.

<i>cos-value</i>	Inner header class of service value. Range is from 0 to 7.
<b>inner-dei</b>	(Optional) Denies based on inner header discard eligibility indicator.

**Command Default**

There is no default condition under which a packet is denied passing the Ethernet services access list.

**Command Modes**

Ethernet services access list configuration

**Command History**

Release	Modification
Release 3.7.2	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **deny** command following the **ethernet-service access-list** command to specify conditions under which a packet can pass the access list.

By default, the first statement in an access list is number 10, and the subsequent statements are incremented by 10.

You can add **permit** or **deny** statements to an existing access list without retyping the entire list. To add a new statement anywhere other than at the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

If you want to add a statement between two consecutively numbered statements (for example, between lines 10 and 11), first use the [resequence access-list ethernet-service, on page 582](#) command to renumber the first statement and increment the entry number of each subsequent statement.

**Task ID**

Task ID	Operations
acl	read, write

**Examples**

The following example shows how to define an Ethernet services access list named L2ACL1:

```
RP/0/RSP0/CPU0:router(config)# ethernet-services access-list L2ACL1
RP/0/RSP0/CPU0:router(config-es-acl)# 10 permit 00ff.eedd.0010 ff00.0000.00ff 0011.ab10.cdef
  ffff.0000.ff00 vlan 1000-1100 inner-vlan 100 inner-cos 7 inner-dei
RP/0/RSP0/CPU0:router(config-es-acl)# 20 deny host eedd.0011.ff1c ff00.0000.00ff any vlan
300 cos 1 dei inner-vlan 30 inner-cos 6
RP/0/RSP0/CPU0:router(config-es-acl)# 30 permit any any vlan 500 cos 2 inner-vlan 600
inner-cos 5 inner-dei
```

**Related Commands**

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.

Command	Description
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

## ethernet-service access-group

To control access to an interface, use the **ethernet-service access-group** command in interface configuration mode. To remove the specified access group, use the **no** form of the command.

```
ethernet-service access-group access-list-name {ingress | egress}
no ethernet-service access-group access-list-name {ingress | egress}
```

### Syntax Description

*access-list-name* Name of an Ethernet services access list as specified by the **ethernet-service access-list** command.

**ingress** Filters on inbound packets.

**egress** Filters on outbound packets.

### Command Default

The interface does not have an Ethernet services access list applied to it.

### Command Modes

Interface configuration

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **ethernet-service access-group** command to control access to an interface. To remove the specified access group, use the **no** form of the command. Use the *acl-name* argument to specify a particular Ethernet services access list. Use the **ingress** keyword to filter on inbound packets or the **egress** keyword to filter on outbound packets.

If the list permits the addresses, the software continues to process the packet. If the access list denies the address, the software discards the packet and returns a host unreachable message.

If the specified access list does not exist, all packets are passed.

By default, the unique or per-interface ACL statistics are disabled.

### Task ID

Task ID	Operations
acl	read, write

### Examples

The following example show how to apply filters on packets inbound and outbound from GigabitEthernet interface 0/2/0/0:

```
RP/0/RSP0/CPU0:router(config)# interface gigabitethernet 0/2/0/2
RP/0/RSP0/CPU0:router(config-if)# ethernet-service access-group p-ingress-filter ingress
RP/0/RSP0/CPU0:router(config-if)# ethernet-service access-group p-egress-filter egress
```

**Related Commands**

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.



# ethernet-services access-list

To define an Ethernet services (Layer 2) access list by name, use the **ethernet-services access-list** command in global configuration mode. To remove all entries in an Ethernet services access list, use the **no** form of the command.

**ethernet-services access-list** *access-list-name*  
**no ethernet-services access-list** *access-list-name*

<b>Syntax Description</b>	<i>access-list-name</i> Name of the Ethernet services access list. The name cannot contain a spaces or quotation marks, but can include numbers.
---------------------------	--

<b>Command Default</b>	No Ethernet services access list is defined.
------------------------	--

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **ethernet-services access-list** command places the router in access list configuration mode, in which the denied or permitted access conditions must be defined with the **deny** (ES ACL) or **permit** (ES ACL) command.

Use the [resequence access-list ethernet-service, on page 582](#) command if you need to add a **permit** or **deny** statement between consecutive entries in an existing Ethernet services access lists.

<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	acl	read, write

**Examples** The following example shows how to define an Ethernet services access list named L2ACL1:

```
RP/0/RSP0/CPU0:router(config)# ethernet-services access-list L2ACL1
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
	<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
	<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.

Command	Description
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

## permit (ES ACL)

To set conditions for an Ethernet services access list, use the **permit** command in Ethernet services access list configuration mode. To remove a condition, use the **no** form of the command.

```
[sequence-number] permit {src-mac-address src-mac-mask | any | host | dest-mac-address dest-mac-mask}
[ {ethertype-number | capture | vlan min-vlan-ID [max-vlan-ID]} ] [cos cos-value] [dei] [inner-vlan
min-vlan-ID [max-vlan-ID]] [inner-cos cos-value] [inner-dei]
no sequence-number
```

### Syntax Description

<i>sequence-number</i>	(Optional) Number of the <b>permit</b> statement in the access list. This number determines the order of the statements in the access list. The number can be from 1 to 2147483646. (By default, the first statement is number 10, and the subsequent statements are incremented by 10.) Use the <b>resequence access-list ethernet-service</b> command to change the number of the first statement and increment subsequent statements of a configured access list.
<i>src-mac-address</i>	Source MAC address in format <i>H.H.H</i> .
<i>src-mac-mac</i>	Source MAC mask in format <i>H.H.H</i> .
<b>any</b>	Permits any source MAC address and mask.
<b>host</b>	Permits host with a specific host source MAC address and mask, in format <i>H.H.H</i> .
<i>dest-mac-address</i>	Destination MAC address in format <i>H.H.H</i> .
<i>dest-mac-mac</i>	Destination MAC mask in format <i>H.H.H</i> .
<i>ethertype-number</i>	16-bit ethertype number in hexadecimal. Range is 0x1 to 0xffff.
<b>capture</b>	(Optional) Captures packets using the traffic mirroring feature and copies this to a capture file.
<b>vlan</b>	(Optional) Permits a specific VLAN or a range of VLANs.
<i>min-vlan-ID</i>	ID for a specific VLAN or the beginning of a range of VLAN IDs.
<i>max-vlan-ID</i>	(Optional) ID for the end of a range of VLAN IDs.
<b>cos</b>	(Optional) Permits based on class of service value.
<i>cos-value</i>	Class of service value. Range is from 0 to 7.
<b>dei</b>	(Optional) Permits based on the setting of the discard eligibility indicator (DEI).
<b>inner-vlan</b>	(Optional) Permits a specific VLAN ID or range of VLAN IDs for the inner header.
<i>min-vlan-ID</i>	ID for a specific VLAN or the beginning of a range of VLAN IDs.
<i>max-vlan-ID</i>	(Optional) ID for the end of a range of VLAN IDs.
<b>inner-cos</b>	(Optional) Permits based on inner header class of service value.

<i>cos-value</i>	Inner header class of service value. Range is from 0 to 7.
<b>inner-dei</b>	(Optional) Permits based on inner header discard eligibility indicator.

**Command Default**

There is no specific default condition under which a packet is permitted passing the Ethernet services ACL.

**Command Modes**

Ethernet services access list configuration

**Command History**

Release	Modification
Release 3.7.2	This command was introduced.

**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **permit** command following the **ethernet-service access-list** command to specify conditions under which a packet can pass the access list.

By default, the first statement in an access list is number 10, and the subsequent statements are incremented by 10.

You can add **permit** or **deny** statements to an existing access list without retyping the entire list. To add a new statement anywhere other than at the end of the list, create a new statement with an appropriate entry number that falls between two existing entry numbers to indicate where it belongs.

If you want to add a statement between two consecutively numbered statements (for example, between lines 10 and 11), first use the [resequence access-list ethernet-service, on page 582](#) command to renumber the first statement and increment the entry number of each subsequent statement.

**Task ID**

Task ID	Operations
acl	read, write

**Examples**

The following example show how to set a permit condition for an access list named L2ACL1:

```
RP/0/RSP0/CPU0:router(config)# ethernet-services access-list L2ACL1
RP/0/RSP0/CPU0:router(config-es-al)# 10 permit 00ff.eedd.0010 ff00.0000.00ff 0011.ab10.cdef
fff.0000.ff00 vlan 1000-1100 inner-vlan 100 inner-cos 7 inner-dei
RP/0/RSP0/CPU0:router(config-es-al)# 20 permit any host 000a.000b.000c 0800 vlan 500 cos 2
inner-vlan 600 inner-cos 5 inner-dei
RP/0/RSP0/CPU0:router(config-es-al)# 30 permit any host 000a.000b.000c 8137 vlan 500 cos 2
inner-vlan 600 inner-cos 5 inner-dei
```

**Related Commands**

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list

Command	Description
<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

## resequence access-list ethernet-service

To renumber existing statements and increment subsequent statements to allow a new Ethernet services access list statement, use the **resequence access-list ethernet-service** command in EXEC mode.

**resequence access-list ethernet-service** *access-list-name* [*starting-sequence-number* [*increment*]]

### Syntax Description

<i>access-list-name</i>	Name of the Ethernet services access list. The name cannot contain a spaces or quotation marks, but can include numbers.
<i>starting-sequence-number</i>	(Optional) Number of the first statement in the specified access list, which determines its order in the access list. Maximum value is 2147483646. Default is 10.
<i>increment</i>	(Optional) Number by which the base sequence number is incremented for subsequent statements. Maximum value is 2147483646. Default is 10.

### Command Default

*starting-sequence-number*: 10  
*increment*: 10

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.7.2	This command was introduced.

### Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **resequence access-list ethernet-service** command to add a permit or deny statement between consecutive entries in an existing Ethernet services access list. Specify the first entry number (the *start-sequence-number*) and the increment by which to separate the entry numbers of the statements. the software remembers the existing statements, thereby making room to add new statements with the unused entry numbers.

### Task ID

Task ID	Operations
acl	read, write

### Examples

In the following example, suppose you have an existing access list:

```
ethernet service access-list L2ACL1
  10 permit 1.2.3 4.5.6
```

```
20 deny 2.3.4 5.4.3
30 permit 3.1.2 5.3.4 cos 5
```

You need to add additional entries in the access list ahead of the first permit statement. First, you resequence the entries, renumbering the statements starting with number 20 and an increment of 10, and then you have room for additional statements between each of the existing statements:

```
RP/0/RSP0/CPU0:router# resequence access-list ethernet-service L2ACL1 20 10
RP/0/RSP0/CPU0:router# show access-list ethernet-services L2ACL1
```

```
ethernet service access-list L2ACL1
 20 permit 1.2.3 4.5.6
 30 deny 2.3.4 5.4.3
 40 permit 3.1.2 5.3.4 cos 5
```

## Related Commands

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

# show access-lists ethernet-services

To display the contents of current Ethernet services access lists, use the **show access-lists ethernet-services** command in EXEC mode.

**show access-lists ethernet-services** [{*access-list-name* | **maximum** | **standby** | **summary**}] [{**hardware** | **usage**}] [{**ingress** | **egress**}] [{**implicit** | **detail** | **sequence** | **location** *location*}]

## Syntax Description

<i>access-list-name</i>	(Optional) Name of a specific Ethernet services access list. The name cannot contain a spaces or quotation marks, but can include numbers.
<b>maximum</b>	(Optional) Show the maximum number of configurable Ethernet services ACLs and ACEs.
<b>standby</b>	(Optional) Display all access lists in standby mode.
<b>summary</b>	(Optional) Display a summary of Ethernet services access lists.
<b>hardware</b>	(Optional) Display Ethernet services access list entries in hardware including the match count for a specific ACL in a particular direction across the line card.
<b>usage</b>	(Optional) Display the usage of this ACL in a given location.
<b>ingress</b>	(Optional) Filters on inbound packets.
<b>egress</b>	(Optional) Filters on outbound packets.
<b>implicit</b>	(Optional) Display the count of packets implicitly denied by a particular ACL.
<b>detail</b>	(Optional) Display TCAM entries.
<b>sequence</b>	(Optional) Display statistics for a specific sequence number.
<i>sequence-number</i>	Sequence number value. Range is 1 to 2147483647.
<b>location</b>	(Optional) Display information for a specific node number.
<i>location</i>	Fully qualified location specification

## Command Default

The contents of all Ethernet services access lists are displayed.

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.2	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



Task ID	Task ID	Operations
	acl	read, write

## Examples

The following examples lists defined Ethernet services access list maximum thresholds:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services maximum

Max configurable ACLs: 10000
Max configurable ACEs: 350000

RP/0/RSP0/CPU0:router# show access-lists ethernet-services maximum detail

Total ACLs configured: 2
Total ACEs configured: 3
Max configurable ACLs: 10000
Max configurable ACEs: 350000
```

The following example lists the Ethernet services access-list standby:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services standby

ethernet-services access-list i
10 permit host 0001.0002.0003 host 000a.000b.000c
ethernet-services access-list l2_acl
10 permit any any
20 deny host 0002.0003.0004 host 000.50004.0003
```

The following example displays a summary of the number of Ethernet services ACLs configured on the system:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services summary

ACL Summary:
Total ACLs configured: 2
Total ACEs configured: 3
```

The following example displays the number of packets matching the access list l2\_acl for each ACE:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services l2_ACL hardware ingress location
0/0/CPU0

ethernet service access-list l2_acl
10 permit any any ( 3524 hw matches)
20 deny host 0002.0003.0004 host 0005.0004.0003 (5394 hw matches)
```

The following example displays the number of packets matching the implicit deny in access list l2\_acl:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services l2_ACL hardware ingress implicit
location 0/0/CPU0

ethernet-services access-list l1_acl
2147483647 implicit deny any any (2300 hw matches)
```

The following example displays the number of packets matching a particular sequence number:

## show access-lists ethernet-services

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services l2_ACL hardware ingress sequence
20 location 0/0/CPU0
```

```
ethernet-services access-list l2_acl
20 deny host 0002.0003.0004 host 0005.0004.0003 (5394 hw matches)
```

The following example displays statistics for the TCAM entry for Ethernet services access list l2acl\_4:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services l2acl_4 hardware ingress sequence
10 detail location 0/6/CPU0
Wed Jun 24 00:28:51.367 UTC
```

```
ACL name: l2acl_4
Format type : 1
Channel ID: 2
Sequence Number: 10
Grant: permit
Logging: OFF
Hits: 0
Statistics pointer: 0x150628
Number of TCAM entries: 1
idx = 0
Entry : 0 for ACE : 10
RAW value : 40 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
RAW mask : 00 03 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
```

```
-----Field Details-----
outer_vlan_id value      : 0000
outer_vlan_id mask      : 0ffff
outer_vlan discard eligibility value: 00
outer_vlan discard eligibility mask : 01
outer_vlan_id cos value: 00
outer_vlan_id cos mask: 07
Ethernet type value     : 0000
Ethernet type mask     : ffff
Base app id value       : 02
Base app id value       : 00
Base acl id value       : 0001
Base acl id mask        : 0000
outer_vlan id present value : 0
outer_vlan id present mask : 1
inner_vlan id present value : 0
inner_vlan id present mask : 1
Mac source address value : 0000 0000 0000
Mac source address mask  : ffff ffff ffff
Mac destination address value : 0000 0000 0000
Mac destination address mask : ffff ffff ffff
RP/0/RSP0/CPU0:router#
```

## Related Commands

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.

Command	Description
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

# show access-lists ethernet-services trace

To display Ethernet services access list trace information use the **show access-lists ethernet-services trace** command in EXEC mode.

**show access-lists ethernet-services trace** {client | intermittent | critical | both | all}

Syntax Description	client	Trace data for ES ACL client.
	intermittent	Trace data for intermittent failures.
	critical	Trace data for server-critical failures
	both	Trace data for server-critical and intermittent failures.
	all	Trace data for server-critical and intermittent failures.

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operations
	acl	read

## Examples

The following examples show how to display Ethernet services access list trace information:

```
RP/0/RSP0/CPU0:router# show access-lists ethernet-services trace all
1 unique entries (256 possible, 0 filtered)
Jun 15 06:42:56.980 es/acl_mgr_un 0/RSP0/CPU0 1#t3 Manager state is active
3 wrapping entries (1024 possible, 0 filtered, 3 total)
Jun 15 06:42:57.053 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
  1 batches
Jun 16 02:23:30.075 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
  1 batches
Jun 16 02:29:41.383 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
  2 batches

RP/0/RSP0/CPU0:router# show access-lists ethernet-services trace both
1 unique entries (256 possible, 0 filtered)
Jun 15 06:42:56.980 es/acl_mgr_un 0/RSP0/CPU0 1#t3 Manager state is active
3 wrapping entries (1024 possible, 0 filtered, 3 total)
Jun 15 06:42:57.053 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
```

```

1 batches
Jun 16 02:23:30.075 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
1 batches
Jun 16 02:29:41.383 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
2 batches

RP/0/RSP0/CPU0:router# show access-lists ethernet-services trace critical
1 unique entries (256 possible, 0 filtered)
Jun 15 06:42:56.980 es/acl_mgr_un 0/RSP0/CPU0 1#t3 Manager state is active

RP/0/RSP0/CPU0:router# show access-lists ethernet-services trace intermittent
3 wrapping entries (1024 possible, 0 filtered, 3 total)
Jun 15 06:42:57.053 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
1 batches
Jun 16 02:23:30.075 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
1 batches
Jun 16 02:29:41.383 es/acl_mgr/es_acl_mgr_wr 0/RSP0/CPU0t1 es_aclmgr_verify acl_add: verifying
2 batches

```

**Related Commands**

Command	Description
<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
<a href="#">show access-list ethernet-service usage pfilter, on page 590</a>	Identifies the modes and interfaces on which a particular ACL is applied.

# show access-list ethernet-service usage pfilter

To identify the modes and interfaces on which a particular ACL is applied, use the **show access-list ethernet-service usage pfilter** command in EXEC mode. Information displayed includes the application of all or specific ACLs, the interfaces on which they have been applied and the direction in which they are applied.

**show access-list ethernet-services** [*access-list-name*] **usage pfilter location** {*location* | **all**}

Syntax Description	
<i>access-list-name</i>	(Optional) Name of a specific Ethernet services access list. The name cannot contain a spaces or quotation marks, but can include numbers.
<b>location</b>	Interface card on which the access list information is needed.
<i>location</i>	Fully qualified location specification.
<b>all</b>	Displays packet filtering usage for all interface cards.

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.2	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	acl	read, write

## Examples

The following example shows how to display packet filter usage at a specific location:

```
RP/0/RSP0/CPU0:router# show access-list ethernet-services usage pfilter location 0/0/cpu0
pfilter location 0/0/cpu0
Interface : GigabitEthernet0/0/0/9
  Input ACL : l2_acl
  Output ACL : N/A
Interface : GigabitEthernet0/0/0/30
  Input ACL : N/A
  Output ACL : i
```

The following example shows the results of the command for a specific ACL:

```
RP/0/RSP0/CPU0:router# show access-list ethernet-services l2_acl usage pfilter location
```

```

0/0/CPU0
Interface : GigabitEthernet0/0/0/9
  Input ACL : l2_acl
  Output ACL : N/A

```

Related Commands	Command	Description
	<a href="#">copy access-list ethernet-service, on page 570</a>	Creates a copy of an existing Ethernet services access list.
	<a href="#">deny (ES ACL), on page 572</a>	Sets conditions for an Ethernet services access list
	<a href="#">ethernet-service access-group, on page 575</a>	Controls access to an interface.
	<a href="#">ethernet-services access-list, on page 577</a>	Defines an Ethernet services (Layer 2) access list by name.
	<a href="#">permit (ES ACL), on page 579</a>	Sets conditions for an Ethernet services access list.
	<a href="#">resequence access-list ethernet-service, on page 582</a>	Renumbers existing statements and increment subsequent statements to allow a new Ethernet services access list statement.
	<a href="#">show access-lists ethernet-services, on page 584</a>	Displays the contents of current Ethernet services access lists.
	<a href="#">show access-lists ethernet-services trace, on page 588</a>	Displays Ethernet services access list trace information.

## show lpts pifib hardware entry optimized

To display a set of optimized entries that are combined as a single entry, inside the Ternary Content Addressable Memory (TCAM), use the **show lpts pifib hardware entry optimized** command in EXEC mode.

**show lpts pifib hardware entry optimized** *location*

<b>Syntax Description</b>	<i>location</i> Mandatory. The location of the line card where the interface is present.
---------------------------	--

<b>Command Default</b>	None
------------------------	------

<b>Command Modes</b>	EXEC
----------------------	------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 4.1.1	This command was introduced.

<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	lpts	read

The following example shows the output of the **show lpts pifib hardware entry optimized** command:

```
RP/0/RSP0/CPU0:router# show lpts pifib hardware entry optimized location 0/4/CPU0
Node: 0/4/CPU0:
```

```
-----
Protocol - Layer4 Protocol; Intf - Interface in optimized list
```

Protocol	laddr.Port, raddr.Port	Intf	VRF id	State
IGMP	224.0.0.22.any , any.any	Te0/4/0/0	*	Uldb Set
		Te0/4/0/1	*	Uldb Set
	224.0.0.22.any , any.any	Te0/4/0/0	*	Uldb Set
		Te0/4/0/1	*	Uldb Set
	any.any , any.any	Te0/4/0/0	*	Uldb Set
		Te0/4/0/1	*	Uldb Set





## VXLAN Commands

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For detailed information about VXLAN concepts, configuration tasks, and examples, see the *L2VPN and Ethernet Services Configuration Guide for Cisco ASR 9000 Series Routers*.

- [anycast source-interface loopback, on page 594](#)
- [interface nve, on page 595](#)
- [member, on page 596](#)
- [member vni, on page 598](#)
- [overlay-encapsulation, on page 599](#)
- [show nve interface, on page 600](#)
- [show nve peers, on page 602](#)
- [show nve vni, on page 603](#)
- [source-interface loopback, on page 604](#)

# anycast source-interface loopback

To configure the anycast mode parameters for the VXLAN Tunnel EndPoint (VTEP), use the **anycast source-interface loopback** command in interface configuration submode.

**anycast source-interface loopback** *loopback-interface-identifier* **sync-group** *ip-address*

<b>Syntax Description</b>	<b>anycast</b>	Configures the anycast mode parameters for the VTEP.
	<b>source-interface loopback</b> <i>loopback-interface-identifier</i>	Configures loopback interface as the source interface for the VTEP. The variable <i>loopback-interface-identifier</i> is the loopback interface instance.
	<b>sync-group</b> <i>ip-address</i>	Assigns a bidirectional multicast group for synchronization between anycast gateways.
<b>Command Default</b>	None	
<b>Command Modes</b>	Interface configuration submode	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.3.1	This command was introduced.
<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.	

This example shows how to configure anycast mode parameters for VTEP.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface nve 45
RP/0/RSP0/CPU0:router(config-if)# overlay-encapsulation vxlan
RP/0/RSP0/CPU0:router(config-if)# source-interface loopback 0
RP/0/RSP0/CPU0:router(config-if)# member vni 1 mcast-group 192.20.9.2 0.0.0.0
RP/0/RSP0/CPU0:router(config-if)# anycast source-interface loopback 0 sync-group 192.20.9.2
```

# interface nve

To create a network virtualization endpoint (NVE) interface and enter the NVE interface configuration mode, use the **interface nve** command in Global Configuration mode. To remove the NVE interface, use the **no** form of this command.

```
interface nve nve-id
```

## Syntax Description

*nve-id* The NVE interface ID. It can take values from 1 to 65535.

## Command Default

None

## Command Modes

Global Configuration

## Command History

Release	Modification
Release 5.2.0	This command was introduced.

## Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

## Task ID

Task ID	Operation
interface	read, write

## Example

The following example shows how to create an NVE interface and enter the NVE interface configuration mode.

```
RP/0/RSP0/CPU0:router(config)# interface nve 1
RP/0/RSP0/CPU0:router(config-if)#
```

# member

To associate a VNI member or range of members with the NVE interface and set the multicast group, use the **member** command in NVE interface configuration mode. To disassociate the VNI member or range, use the **no** form of this command.

```
member vni {numberstart_number-end_number} mcast-group ip_address [end_ip_address]
```

Syntax Description	Parameter	Description
	<b>vni</b>	The member VNI.
	<i>number</i>	The VNI for a single VXLAN. The valid values are from 1 to 16777215.
	<i>start_number</i>	The first VNI from a range.
	<i>end_number</i>	The end VNI from a range.
	<i>mcast-group</i>	The multicast group.
	<i>ip_address</i>	A single multicast IP address or the starting multicast IP address from a range.
	<i>end_ip_address</i>	The end multicast IP address from a range.

**Command Default** None

**Command Modes** NVE interface configuration

Command History	Release	Modification
	Release 5.2.0	This command was introduced.

**Usage Guidelines** To associate discontinuous VXLANs or VXLAN ranges with the NVE interface, perform this step for each VXLAN or VXLAN range. For instance,

```
RP/0/RSP0/CPU0:router(config-if)# member vni 10 mcast-group 224.2.2.10
RP/0/RSP0/CPU0:router(config-if)# member vni 23 mcast-group 224.2.2.23
RP/0/RSP0/CPU0:router(config-if)# member vni 50-59 mcast-group 224.2.2.50 224.2.2.59
RP/0/RSP0/CPU0:router(config-if)# member vni 100-120 mcast-group 224.2.2.100 224.2.2.120
```

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	interface	read, write
	tunnel	read, write

### Example

The following example shows VNIs from 5000 to 5009 associated with the nve interface "1" and multicast IP address range 200.0.0.1 to 200.0.0.20.

```
RP/0/RSP0/CPU0:router(config)# interface nve 1
RP/0/RSP0/CPU0:router(config-if)# overlay-encapsulation vxlan
RP/0/RSP0/CPU0:router(config-if)# member vni 5000-5009 mcast-group 228.0.0.0 228.0.0.9
```

# member vni

To map a VXLAN to a bridge domain, use the **member vni** command in bridge-domain configuration mode. To remove the VXLAN from the bridge domain, use the **no** form of this command.

**member vni** *number*

<b>Syntax Description</b>	<b>vni</b>	The member virtual network identifier (VNI).
	<b>number</b>	The ID of the VXLAN to be mapped to the bridge domain. The valid values are from 1 to 16777215.
<b>Command Default</b>	None	
<b>Command Modes</b>	Bridge-domain configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.2.0	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	interface	read, write
	tunnel	read, write

## Example

The following example shows the VXLAN with VNI "5010" associated with the bridge domain "bd1".

```
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group bg1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain bd1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# member vni 5010
```

# overlay-encapsulation

To set a Network Virtualization Endpoint (NVE) interface to provide VXLAN, use the **overlay-encapsulation** command in NVE interface configuration mode. To remove the configured encapsulation on the NVE interface, use the **no** form of this command.

**overlay-encapsulation** {vxlan}

<b>Syntax Description</b>	<b>vxlan</b> Sets the NVE interface as a VXLAN Terminal EndPoint (VTEP).						
<b>Command Default</b>	The NVE interface provides VXLAN encapsulation.						
<b>Command Modes</b>	NVE interface configuration						
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.2.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.2.0	This command was introduced.		
Release	Modification						
Release 5.2.0	This command was introduced.						
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> <tr> <td>tunnel</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	interface	read, write	tunnel	read, write
Task ID	Operation						
interface	read, write						
tunnel	read, write						

## Example

The following example shows an NVE interface configured for VXLAN encapsulation.

```
RP/0/RSP0/CPU0:router(config)# interface nve 1
RP/0/RSP0/CPU0:router(config-if)# overlay-encapsulation vxlan
```

# show nve interface

To display the network virtualization endpoint (NVE) interface information, use the **show nve interface** command in EXEC mode.

**show nve interface** [{detail | nve *nve-id*}

Syntax Description	detail	Displays detailed information about NVE interfaces.
	nve <i>nve-id</i>	Displays information only about the specified NVE interface.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.2.0	This command was introduced.
	Release 5.3.1	The show command output was enhanced to display VXLAN anycast gateway parameters.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	interface	read

## Example

This is the sample output for **show interface nve** command enhanced to display VXLAN anycast gateway parameters.

```
RP/0/RSP0/CPU0:router(config)# show interface nve100 detail
Interface: nve100 State: Up Encapsulation: VXLAN
  Source Interface: Loopback1 (primary: 1.1.1.1)
  Source Interface State: Up
  NVE Flags: 0x1, Admin State: Up, Interface Handle 0xba0
  UDP Port: 4789
  Anycast Source Interface: Loopback100 (primary: 100.1.1.1)
  Mcast Sync Group: 224.10.10.1
  Mcast Flags: 0x1
```

The following shows an example output of the **show interface nve** command.

```
RP/0/RSP0/CPU0:router(config)# show interface nve nve1 detail
Interface: nve1, State:up, encapsulation:VXLAN
source-interface: Lol (primary:1.1.1.1, secondary:1.1.1.2)

VNI          mcast          VNI state
```



```
10.10      239.1.1.1  UP
11.10      239.1.1.1  UP
```

# show nve peers

To display the network virtualization endpoint (NVE) peers configured on the router, use the **show nve peers** command in EXEC mode.

```
show nve peers [{interface nve nve-id | vni vni-id}]
```

Syntax Description	
<b>interface nve nve-id</b>	Displays NVE peers of the specified NVE interface.
<b>vni vni-id</b>	Displays NVE peers of the specified VNIs.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.2.0	This command was introduced.

**Usage Guidelines** The router learns about NVE peers through data plane traffic. Therefore, the **show nve peers** command output displays NVE peers only after VXLAN traffic traverses through the router.

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	tunnel	read

## Example

The following shows an example output of the **show nve peers** command.

```
RP/0/RSP0/CPU0:router# show nve peers
Interface Peer-IP      VNI    Up Time
nve1      1.1.1.2      1000   10h
nve2      1.1.1.3      2000   20h
```

# show nve vni

To display list of all VNIs that are associated with various NVE interfaces and the associated multicast IP address that is used for multi-destination frames, use the **show nve vni** command in EXEC mode.

**show nve vni** [{vni\_number | detail | interface nve nve-id}]

Syntax Description		
<i>vni_number</i>		Displays output for the specific VXLAN.
<b>detail</b>		Displays more detailed output.
<b>interface nve</b> <i>nve-id</i>		Displays details for the specific NVE interface.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 5.2.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	tunnel	read

## Example

The following shows an example output of this show command:

```
RP/0/RSP0/CPU0:router# show nve vni
Interface  VNI          mcast          VNI state
nve1      10.10        239.1.1.1     UP
nve2      11.10        239.1.1.1     UP
```

# source-interface loopback

To specify the IP address for a Network Virtualization Endpoint (NVE) interface, use the **source-interface loopback** command to specify a loopback interface whose IP address should be set as the IP address for the NVE interface.

```
source-interface loopback interface-id
```

<b>Syntax Description</b>	<b>loopback</b>	Specifies a loopback interface as providing IP address for the NVE interface.
	<i>interface-id</i>	Specifies the loopback interface ID. It can take values from 0 to 65535.

**Command Default** None

**Command Modes** NVE interface configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 5.2.0	This command was introduced.

**Usage Guidelines** To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

<b>Task ID</b>	<b>Task ID</b>	<b>Operation</b>
	tunnel	read, write
	interface	read, write

**Example**

The following example shows how to configure the IP address of an NVE interface as the IP address of a loopback interface.

```
RP/0/RSP0/CPU0:router(config)# interface nve 1
RP/0/RSP0/CPU0:router(config-if)# source-interface loopback 1
```