



## **VPN and Ethernet Services Command Reference for Cisco 8000 Series Routers**

**First Published:** 2020-10-01

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## Preface

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This preface contains these sections:

- [Changes to This Document](#), on page v
- [Communications, Services, and Additional Information](#), on page v

## Changes to This Document

This table lists the technical changes made to this document since it was first released.

*Table 1: Changes to This Document*

Date	Summary
October 2020	Initial release of this document.

## Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
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## Virtual LAN Commands

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This section describes the commands used to configure virtual LANs in Layer 2 VPNs.

For detailed information about concepts and configuration, see the *Configure Virtual LANs in Layer 2 VPNs* chapter in the *L2VPN and Ethernet Services Configuration Guide for Cisco 8000 Series Routers*.

- [bundle maximum-active links, on page 2](#)
- [encapsulation dot1ad dot1q, on page 6](#)
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## bundle maximum-active links

To designate one active link and one link in a standby mode that can take over immediately for a bundle if the active link fails, use the **bundle maximum-active links** command in interface configuration mode. To return to the default maximum active links value, use the **no** form of this command.

**bundle maximum-active links** *links* **hot-standby**

**no bundle maximum-active links** *links*

### Syntax Description

*links* Number of active links you want to bring up in the specified bundle, up to the maximum supported on the platform. The range is 1 to 64.

**hot-standby** Modifies some default timeouts, such as wait-while timer and suppress-flaps, to avoid bundle-level flaps when the highest priority link fails or recovers.

### Command Default

No default behavior or values

### Command Modes

Interface configuration

### Command History

Release	Modification
Release 7.2.12	This command was introduced.

### Usage Guidelines

By default, multiple links can actively carry traffic for a bundle. However, if one of the links fails, there is no dedicated standby link to take its place. The **bundle maximum-active links** command enables you to implement the optional 1:1 link protection, which means for the specified bundle, you designate one active link and one or more standby links that can take over immediately if the active link fails.

By setting the **bundle maximum-active links** command to 1, the highest-priority link within the bundle becomes active (distributing state) and the remaining links are in standby mode. If a standby link meets one of the following criteria, it is in the collecting state:

The misconfiguration or inconsistent configuration with a remote side can be causing traffic loss even though the bundle is up. We recommend that you use LACP protocol to better protect against the misconfiguration.

If a standby link does not meet either of these criteria, it is in the waiting state.

The second highest-priority link within the bundle becomes the standby link that takes over immediately if the active link fails. The priority is based on the value from the **bundle port-priority** command, where a lower value is a higher priority. Therefore, you must configure the highest priority (lowest value) for the link that you want to be active and the second-highest priority for the link that you want to act as a backup to the active link.



### Note

We recommend designating only one backup link to the active link. Although you can designate an additional backup link, maintaining two backup links consumes more bandwidth and offsets any benefits that may be gained.





**Note** If a link is not running LACP, the configuration of the **bundle maximum-active links** and **bundle port-priority** commands or equivalent commands must be the same on both ends of the link. If a link is running LACP, the configuration of the **bundle maximum-active links** command only must be the same on both ends of the link.

The **hot-standby** option of using an IEEE standard-based switchover (the default) or a faster proprietary optimized switchover is available only for active and standby links running LACP. For links not running LACP, the proprietary optimized switchover option is used.

When using one of the **hot-standby** options on a Cisco IOS XR device, the peer device must have a standby link configured and be one of the following:

- Another Cisco IOS XR device using the same option.
- Another device using an IEEE standard-based switchover. (Cisco does not recommend using this option because unexpected behavior, such as the peer sending traffic on the standby link, can occur.)

#### Task ID

#### Task Operations ID

bundle read,  
write

#### Examples

In the following example, the user implements 1:1 link protection for Ethernet bundle 5 and specifies that the proprietary optimization is used for the LACP-enabled active and standby links:

```
Router(config)# interface bundle Bundle-Ether 5
Router(config-if)# bundle maximum-active links 1 hot-standby
```

The following example shows how to set default values for timeouts, to avoid bundle-level flaps when the highest priority link fails or recovers:

```
Router(config)# interface bundle Bundle-Ether 5
Router(config-if)# bundle maximum-active links 1 hot-standby
```

#### Examples

The following example shows how to display information about Ethernet bundle 5:

```
Router(config)# show bundle Bundle-Ether 5

State: 0 - Port is Detached. 1 - Port is Waiting.
       2 - Port is Attached. 3 - Port is Collecting.
       4 - Port is Distributing.

Bundle-Ether 5
  B/W (Kbps)  MAC address      Minimum active   Maximum active
  -----
  B/W (Kbps)  MAC address      Links  B/W (Kbps)  Links
```

```
10000000001d.e5eb.2898111
```

Port	State	Port ID	B/W (Kbps)	MAC address
Hu0/1/0/1	4	0x8000, 0x0001	10000000	0000.abab.0001
Hu0/1/0/0	3	0x8000, 0x0002	10000000	0000.abab.0000

In the **show bundle bundle-ether 5** command output, the state of the active link is 4, which indicates that the port is distributing. The state of the standby link is 3, which indicates that the port is collecting.

## Examples

In the following example, the user implements 1:1 link protection for Ethernet bundle 5 and does not specify the **hot-standby** keyword, because the user wants to use the default IEEE standard-based switchover on the LACP-enabled active and standby links:

```
Router(config)# show bundle Bundle-Ether 5
```

```
State: 0 - Port is Detached. 1 - Port is Waiting.
       2 - Port is Attached. 3 - Port is Collecting.
       4 - Port is Distributing.
```

```
Bundle-Ether 5
```

B/W (Kbps)	MAC address	Minimum active		Maximum active	
		Links	B/W (Kbps)	Links	B/W (Kbps)
10000000001d.e5eb.2898111					
Port	State	Port ID	B/W (Kbps)	MAC address	
Hu0/1/0/1	4	0x8000, 0x0001	10000000	0000.abab.0001	
Hu0/1/0/0	1	0x8000, 0x0002	10000000	0000.abab.0000	

In the **show bundle bundle-ether 5** command output, the state of the active link is 4, which indicates that the port is distributing. The state of the standby link is 1, which indicates that the port is waiting.

## Examples

The following example, the user implements 1:1 link protection for Ethernet bundle 5 and does not specify the **hot-standby** keyword, because the LACP-disabled link automatically uses the proprietary optimized switchover:

```
Router(config)# interface Bundle-Ether 5
Router(config-if)#
```

The following example shows how to display information about Ethernet bundle 5:

```
Router# show bundle bundle-ether 5
```

```
State: 0 - Port is Detached. 1 - Port is Waiting.
       2 - Port is Attached. 3 - Port is Collecting.
       4 - Port is Distributing.
```

```
Bundle-Ether 5
```

B/W (Kbps)	MAC address	Minimum active		Maximum active	
		Links	B/W (Kbps)	Links	B/W (Kbps)
10000000001d.e5eb.2898111					

Port	State	Port ID	B/W (Kbps)	MAC address
Te0/1/0/1	4	0x8000, 0x0001	10000000	0000.abab.0001
Te0/1/0/0	3	0x8000, 0x0002	10000000	0000.abab.0000

In the show bundle bundle-ether 5 command output, the state of the active link is 4, which indicates the port is distributing. The state of the standby link is 3, which indicates that the port is collecting.

# 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 sub-interface configuration mode. To remove the configuration, use the **no** form of this command.

**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, can be given as single ID.

## Command Default

No matching criteria are defined.

## Command Modes

Sub-interface configuration

## Command History

Release	Modification
Release 7.2.12	This command was introduced.

## Usage Guidelines

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 sub-interface. 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:

```
Router# configure
Router# interface hundredGigE 0/0/0/1.10
Router(config-subif)# encapsulation dot1ad 100 dot1q 20
```

## Related Commands

Command	Description
<a href="#">rewrite ingress tag, on page 13</a>	Specifies the encapsulation adjustment that is to be performed on the frame ingress to the 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 sub-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
```

<b>Syntax Description</b>	<i>vlan-id</i> VLAN ID, can be given as single ID.
---------------------------	--

<b>Command Default</b>	No matching criteria are defined.
------------------------	-----------------------------------

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

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.2.12	This command was introduced.

<b>Usage Guidelines</b>	Only one encapsulation statement can be applied to a sub-interface. Encapsulation statements cannot be applied to main interfaces.
-------------------------	--

A single encapsulation dot1q statement specifies matching for frames with a single VLAN ID.

## Examples

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

```
Router# configure
Router(config)#interface HundredGigE 0/0/0/24.10
Router(config-if)# encapsulation dot1q 10
```

The following example shows how to map 802.1Q frames ingress on an l2transport sub-interface:

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24.10 l2transport
Router(config-subif)# encapsulation dot1q 10
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">rewrite ingress tag, on page 13</a>	Specifies the encapsulation adjustment that is to be performed on the frame ingress to the service instance.

# 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 or Subinterface 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

This command has no keywords or arguments.

### Command Default

None

### Command Modes

Interface configuration

Sub-interface configuration

### Command History

Release	Modification
Release 7.2.12	This command was introduced.

### Usage Guidelines

The I2transport command and these configuration items are mutually exclusive:

- IPv4 address and L3 feature configuration
- IPv4 enable and L3 feature configuration
- Bundle-enabling configuration
- L3 sub-interfaces
- 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, **I2transport** is rejected.
- The **I2transport** command is mutually exclusive with any Layer 3 interface configuration.

### Task ID

#### Task Operations ID

l2vpn 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:

```
Router# configure
```

```
Router(config)# interface hundredGigE 0/0/0/2
Router(config-if)# l2transport
Router(config-if-l2)#
```



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

The following example shows how to use the l2transport command on an Ethernet sub-interface:

```
Router# configure
Router(config)# interface hundredGigE 0/0/0/2.10 l2transport
Router(config-subif)# encapsulation dot1q 10
```

## Examples

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

Ethernet Port Mode:

```
Router# configure
Router(config)# interface hundredGigE 0/0/0/10
Router(config-if)# l2transport
```

Ethernet VLAN Mode:

```
Router# configure
Router(config)# interface hundredGigE 0/0/0/0.1 l2transport
Router(config-if)# encapsulation dot1q 10
```

Ethernet VLAN Mode (QinQ):

```
Router# configure
Router(config)# interface hundredGigE 0/0/0/0.1 l2transport
Router(config-if)# encapsulation dot1q 10 second-dot1q 11
```



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

## Related Commands

Command	Description
<a href="#">encapsulation dot1q, on page 7</a>	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.

# l2vpn

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

## l2vpn

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

**Command Default** None

**Command Modes** Global Configuration mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	l2vpn	read, write

## Examples

The following example shows how to enter L2VPN configuration mode:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)#
```



# mac limit notification

To generate syslog messages and SNMP trap notifications, use the **mac limit notification** command in the L2VPN BD configuration mode.

**mac limit notification** [{**both** | **none** | **trap** }]

Syntax Description	
<b>both</b>	Generates syslog message and SNMP trap messages.
<b>none</b>	No notifications are generated.
<b>trap</b>	Generates only SNMP trap messages

**Command Default** None.

**Command Modes** L2VPN bridge-domain configuration mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	l2vpn	read, write

## Example

This example shows how to generate syslogs and SNMP trap messages:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group 555
Router(config-l2vpn-bg)# bridge-domain 666
Router(config-l2vpn-bg-bd)# mac limit notification both
Router(config-l2vpn-bg-bd)#commit
```

## mac limit threshold

To configure MAC address limit threshold value, use the **mac limit threshold** command in the L2VPN configuration mode.

**mac limit threshold** *value*

<b>Syntax Description</b>	<i>value</i> Specifies MAC limit threshold value. The valid range is 0 - 100 %.
---------------------------	---

<b>Command Default</b>	75%.
------------------------	------

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

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.2.12	This command was introduced.

<b>Usage Guidelines</b>	MAC address limit action applies only when the number of local MAC addresses exceeds the configured limit. The software unlearns the MAC addresses until it reaches the configured MAC limit threshold value. Later, the router restarts learning new MAC addresses. In the event when the MAC limit threshold is not configured, the default threshold is 75% of the configured MAC address limit.
-------------------------	---

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

### Example

This example shows how to configure MAC limit threshold of 80%:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# mac limit threshold 80
Router(config-l2vpn)#commit
```

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

Syntax Description		
<i>vlan-id</i>		VLAN ID, can be given as single ID.
<b>push dot1q</b> <i>vlan-id</i>		Pushes one 802.1Q tag with <i>vlan-id</i> .
<b>pop {1}</b>		One tag is 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 dot1q</b> <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 1-to-2 dot1q</b> <i>vlan-id dot1q</i> <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 dot1q</b> <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>translate 2-to-1 dot1q</b> <i>vlan-id</i>		Replaces a pair of tags defined in the <b>encapsulation</b> command by <i>vlan-id</i> .
<b>symmetric</b>		(Optional) A rewrite operation is applied on both ingress and egress. The operation on egress is the inverse operation as ingress.  <b>Note</b> Symmetric is the default behavior. Hence, it cannot be disabled.

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

**Command Modes** Interface configuration

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** The **symmetric** keyword is accepted only when a single VLAN is configured in encapsulation. If a list of VLANs 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 **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.

### Examples

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

```
Router(config-if)# rewrite ingress tag push dot1q 200
```

### Related Commands

Command	Description
<a href="#">encapsulation dot1q, on page 7</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.

# show bundle

To display information about all bundles or a specific bundle of a particular type, use the **show bundle** command in XR EXEC mode.

**show bundle** [ **Bundle-Ether** *bundle-id* ]

## Syntax Description

<b>Bundle-Ether</b>	Displays information for the specified Ethernet bundle.
<i>bundle-id</i>	Number from 1 to 65535 that identifies a particular bundle.

## Command Default

Information is displayed for all configured bundles.

## Command Modes

XR EXEC mode

## Command History

Release	Modification
Release 7.2.12	This command was introduced.

## Usage Guidelines

To see information for all bundles configured on the router, use the **show bundle** form of the command.

To see information for a specific bundle, use the **show bundle Bundle-Ether***bundle-id* form of the command with the number of the configured bundle.

## Task ID

Task ID	Operation
bundle	read

This example shows output for all bundle interfaces that are configured on the router:



## Note

Though mLACP related fields are shown in the output, MC-LAG is not currently supported.

```
Router# show bundle
Bundle-Ether 1

Bundle-Ether1
  Status: Up
  Local links <active/standby/configured>: 2 / 0 / 2
  Local bandwidth <effective/available>: 20000000 (20000000) kbps
  MAC address (source): ea74.b3bd.f484 (Chassis pool)
  Inter-chassis link: No
  Minimum active links / bandwidth: 1 / 1 kbps
  Maximum active links: 64
  Wait while timer: 2000 ms
  Load balancing:
    Link order signaling: Not configured
    Hash type: Default
    Locality threshold: None
  LACP: Operational
```

```

Flap suppression timer:           Off
Cisco extensions:                 Disabled
Non-revertive:                   Disabled
mLACP:                           Not configured
IPv4 BFD:                        Not configured
IPv6 BFD:                        Not configured

```

Port	Device	State	Port ID	B/W, kbps
Te0/0/0/0/0 Link is Active	Local	Active	0x8000, 0x0006	10000000
Te0/0/0/0/1 Link is Active	Local	Active	0x8000, 0x0005	10000000

Table 2: show bundle Field Descriptions

Field	Description
Bundle-type number	Full name of the bundle interface, where <i>type</i> is Ether (Ethernet), followed by the configured <i>number</i> of the bundle.
Status:	<p>State of the bundle on the local device, with one of the following possible values:</p> <ul style="list-style-type: none"> <li>• Admin down—The bundle has been configured to be shut down.</li> <li>• Bundle shut—The bundle is holding all links in Standby state and will not support any traffic.</li> <li>• Down—The bundle is operationally down. It has no Active members on the local device.</li> <li>• mLACP cold standby—The bundle is acting as a multichassis LACP Standby device, but the higher layers are not synchronized.</li> <li>• mLACP hot standby—The bundle is Up on the mLACP peer device, and the local device is ready to take over if that bundle goes down on the peer.</li> <li>• Nak—The local and peer devices cannot resolve a configuration error.</li> <li>• Partner down—The partner system indicates that the bundle is unable to forward traffic at its end.</li> <li>• PE isolated—The bundle is isolated from the core.</li> <li>• Up—The bundle has Active members on this device.</li> </ul>

Field	Description
Local links <active/standby/configured>:	<p>The number of links on the device (from 0 to the maximum number of supported links for the bundle) in the format</p> <p><math>x/y/z</math>, with the following values:</p> <ul style="list-style-type: none"> <li>• <math>x</math>—Number of links in Active state on the bundle.</li> <li>• <math>y</math>—Number of links in Standby state on the bundle.</li> <li>• <math>z</math>—Total number of links configured on the bundle.</li> </ul>
Local bandwidth <effective/available>:	<p>Bandwidth characteristics on the bundle in kilobits per second (kbps) in the format <math>x/y</math>, with the following values:</p> <ul style="list-style-type: none"> <li>• <math>x</math>—Current bandwidth of the bundle (this effective bandwidth might be limited by configuration).</li> <li>• <math>y</math>—Available bandwidth of the bundle that is the sum of the bandwidths of all of the locally active links.</li> </ul>
MAC address (source):	<p>Layer 2 MAC address on the bundle interface in the format</p> <p>xxxx.xxxx.xxxx. The (<i>source</i>) of the address is shown in parentheses with the following possible values:</p> <ul style="list-style-type: none"> <li>• Interface name—The MAC address is from the displayed member interface type and path.</li> <li>• Configured—The MAC address is explicitly configured.</li> <li>• Chassis pool—The MAC address is from the available pool of addresses for the chassis.</li> <li>• [unknown MAC source 0]—No MAC address could be assigned to the bundle. (You might see this display if you have not completed your bundle configuration.)</li> </ul>

Field	Description
Minimum active links / bandwidth:	<p>Displays the following information in the format <math>x/y</math> kbps, with the following values:</p> <ul style="list-style-type: none"> <li>• <math>x</math>—Minimum number of active links (from 1 to the maximum number of links supported on the bundle) that are required for the bundle to be operative.</li> <li>• <math>y</math>—Minimum total bandwidth on active links (in kbps) that is required for the bundle to be operative.</li> <li>• (partner)—Shows that the peer system's value is in use.</li> </ul>
Maximum active links:	Maximum number of links (from 1 to the maximum supported on a bundle) that can be active on the bundle.
Wait-while timer:	Amount of time (in milliseconds) that the system allows for the Link Aggregation Control Protocol (LACP) to negotiate on a “working” link, before moving a “protect” or backup link to Standby state.
Load balancing:	<p>Type of load balancing in use on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Default—The default load balancing method for the system is used on the bundle, and the load balancing sub-fields are not displayed.</li> <li>• No value—Another load balancing method is in use on the bundle, with information shown in the related sub-fields of the display.</li> </ul>
Link order signaling:	<p>Displays whether or not link order signaling is operating on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Operational—Link ordering for load balancing is working through the exchange of an additional, Cisco-specific LACP type length value (TLV) that contains the ordering information.</li> <li>• Not operational—A consistent set of link ordering numbers (LONs) has not been received by a higher priority partner, or the LONs to be made active are not consistent with the maximum number of active links supported by the bundle.</li> </ul>



Field	Description
Hash type:	<p>The information to be used for the load balancing hash on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Dst-IP—The load balancing on the bundle is based on the packet's destination IP address.</li> <li>• Src-IP—The load balancing on the bundle is based on the packet's source IP address.</li> </ul>
LACP:	<p>Displays whether or not Link Aggregation Control Protocol (LACP) is active on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Operational—All required configuration has been committed and LACP is in use on active members.</li> <li>• Not operational—LACP is not working because some mandatory configuration is missing on the bundle or on the active members of the bundle.</li> <li>• Not configured—None of the mandatory configuration for LACP has been committed on the bundle, and the LACP sub-fields are not displayed.</li> </ul>
Flap suppression timer:	<p>Displays the status of the flap suppression timer, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Off—The flap suppression timer is not configured using the <b>lACP switchover suppress-flaps</b> command.</li> <li>• <i>x</i> ms—Amount of time allowed (in milliseconds) for standby links to activate after a working link fails, before putting the link in Down state.</li> </ul>
Cisco extensions:	<p>Displays whether or not the Cisco-specific TLVs for LACP are enabled. The possible values are "Enabled" and "Disabled".</p>
Non-revertive:	<p>Displays whether non-revertive behavior for the bundle interface is enabled or not. The possible values are "Enabled" and "Disabled".</p>

Field	Description
mLACP:	<p>Displays whether or not the bundle is operating using Multichassis Link Aggregation (MC-LAG), with the following possible values:</p> <ul style="list-style-type: none"> <li>• Operational—All required configuration has been committed for MC-LAG and mLACP is in use on the bundle.</li> <li>• Not operational—mLACP is not working because some mandatory configuration for MC-LAG is missing on the bundle or on the active members of the bundle.</li> <li>• Not configured—None of the mandatory configuration for MC-LAG has been committed on the bundle, and the mLACP sub-fields are not displayed.</li> </ul>
IPv4 BFD:	<p>Displays whether or not IPv4-based bidirectional forwarding (BFD) is operating on the bundle interface, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Operational—All required configuration has been committed for IPv4 BFD, and it is in use on the bundle.</li> <li>• Not operational—IPv4 BFD is not working because some mandatory configuration is missing on the bundle or on the active members of the bundle.</li> <li>• Not configured—None of the mandatory configuration for IPv4 BFD has been committed on the bundle, and the BFD sub-fields are not displayed.</li> </ul>
State:	<p>When BFD is enabled, displays the state of BFD sessions on the bundle from the sessions running on bundle members that is communicated to interested protocols, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Down—The configured minimum threshold for active links or bandwidth for BFD bundle members is not available so BFD sessions are down.</li> <li>• Off—BFD is not configured on bundle members.</li> <li>• Up—BFD sessions on bundle members are up because the minimum threshold for the number of active links or bandwidth is met.</li> </ul>

Field	Description
Fast detect:	<p>Displays whether or not BFD fast detection is configured on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Enabled—The <b>bfd fast-detect</b> command is configured on the bundle.</li> <li>• Disabled—The <b>bfd fast-detect</b> command is not configured on the bundle.</li> </ul>
Start timer:	<p>Displays status of the BFD start timer that is configured using the <b>bfd address-family ipv4 timers start</b> command, with the following possible values:</p> <ul style="list-style-type: none"> <li>• <i>x s</i>—Number of seconds (from 60 to 3600) after startup of a BFD member link session to wait for the expected notification from the BFD peer to be received, so that the session can be declared up. If the SCN is not received after that period of time, the BFD session is declared down.</li> <li>• Off—The start timer is not configured, and a BFD session is only declared Down upon notification from the BFD server.</li> </ul>
Neighbor-unconfigured timer:	<p>Displays status of the BFD start timer that is configured using the <b>bfd address-family ipv4 timers nbr-unconfig</b> command, with the following possible values:</p> <ul style="list-style-type: none"> <li>• <i>x s</i>—Number of seconds (from 60 to 3600) to wait after receipt of notification that the BFD configuration has been removed by a BFD neighbor, so that any configuration inconsistency between the BFD peers can be fixed. If the BFD configuration issue is not resolved before the specified timer is reached, the BFD session is declared down.</li> <li>• Off—The neighbor-unconfigured timer is not configured, and a BFD session is only declared Down upon notification from the BFD server.</li> </ul>
Preferred min interval:	<p>Number of milliseconds (in the format <i>x ms</i>) as the minimum control packet interval for BFD sessions. The range is 15 to 30000.</p>
Preferred multiple:	<p>Value of the multiplier (from 2 to 50) that is used for echo failure detection, which specifies the maximum number of echo packets that can be missed before a BFD session is declared Down.</p>

Field	Description
Destination address:	Destination IP address for BFD sessions on bundle member links that is configured using the <b>bfd address-family ipv4 destination</b> command. “Not configured” is displayed when no destination IP address is configured.
Port	Name of the local interface port that is configured to be a bundle member, or a foreign interface received by an mLACP peer device. The possible values are the shortened interface name or a text string.
Device	Label Distribution Protocol (LDP) address of the device where the interface port is located, with the following possible values: <ul style="list-style-type: none"> <li>• <i>address</i>—IP address of the device.</li> <li>• Local—Interface port is on the local device.</li> </ul>
State	Status of the port, with one of the following possible values <ul style="list-style-type: none"> <li>• Active—Link can send and receive traffic.</li> <li>• BFD Running—Link is inactive because BFD is down or has not been fully negotiated.</li> <li>• Configured—Link is not operational or remains down due to a configuration mismatch. The link is not available for switchover from failure of an active link.</li> <li>• Hot Standby—Link is ready to take over if an active link fails and can immediately transition to Active state without further exchange of LACP protocol data units (PDUs).</li> <li>• Negotiating—Link is in the process of LACP negotiation and is being held in a lower LACP state by the peer (for example, because the link is Standby on the peer.)</li> <li>• Standby—Link is not sending or receiving traffic, but is available for switchover from failure of an active link.</li> </ul>
Port ID	ID of the interface port in the format <i>x/y</i> , with the following values: <ul style="list-style-type: none"> <li>• <i>x</i>—Port priority as a 2-byte hexadecimal value.</li> <li>• <i>y</i>—Link ID as a 2-byte hexadecimal value.</li> </ul>

Field	Description
B/W, kbps	Bandwidth of the interface port in kilobits per second.
State reason	Text string that is displayed beneath the bundle member listing explaining why a link has not reached Active state.

Table 3: State Reasons

Reason	Description
BFD session is unconfigured on the remote end	The link is in BFD Running state because LACP is negotiated but the BFD session from the remote device has been unconfigured.
BFD state of this link is Down	The link is in BFD Running state because LACP is negotiated but the BFD session between the local system and the remote device is Down.
Bundle has been shut down	The link is in Configured state because the bundle it is configured as a member of is administratively down.
Bundle interface is not present in configuration	The link is in Configured state because the bundle it is configured as a member of has not itself been configured.
Bundle is in the process of being created	The link is in Configured state because the bundle it is configured as a member of is still being created.
Bundle is in the process of being deleted	The link is in Configured state because the bundle it is configured as a member of is being deleted.
Bundle is in the process of being replicated to this location	The link is in Configured state because the bundle it is configured as a member of is still being replicated to the linecard where the link is located.
Forced switchover to the mLACP peer	The link is in Configured state because it has been brought down as part of a forced switchover to the mLACP peer PoA. This happens only when brute force switchovers are configured.
ICCP group is isolated from the core network	The link is in Configured state because there is no connectivity through the network core for the ICCP group that the link and its bundle are part of. Therefore, the link has been brought down to prevent any traffic being sent by the LACP partner device.
Incompatible with other links in the bundle (bandwidth out of range)	The link is in Configured state because its bandwidth is incompatible with other links configured to be in the same bundle. The bandwidth may be too high or too low.

Reason	Description
LACP shutdown is configured for the bundle	The link is in Standby state because the bundle is configured with LACP shutdown.
Incompatible with other links in the bundle (LACP vs non-LACP)	The link is in Configured state because its use of LACP is incompatible with other links configured in the same bundle. Some links might be running LACP while others are not.
Link is Attached and has not gone Collecting (reason unknown)	The link is in Negotiating state because the mLACP peer PoA has not indicated that the link has gone Collecting in the Mux machine. This could be because of an issue between the mLACP peer and its LACP partner or because this state has not been communicated to the local system.
Link is Collecting and has not gone Distributing (reason unknown)	The link is in Negotiating state because the mLACP peer PoA has not indicated that the link has gone Distributing in the Mux machine. This could be because of an issue between the mLACP peer and its LACP partner or because this state has not been communicated to the local system.
Link is being removed from the bundle	The link is being removed from the bundle and remains in Configured state while this happens.
Link is Defaulted; LACPDUs are not being received from the partner	The link is in Configured state because no LACPDUs are being received from the LACP partner device. Either the partner is not transmitting or the packets are getting lost.
Link is down	The link is in Configured state because it is operationally or administratively down.
Link is Expired; LACPDUs are not being received from the partner	The link is in Negotiating state because no LACPDUs have been received from the LACP Partner device in the Current-While period and the link is now marked as Expired in the Receive machine.
Link is in the process of being created	The link is in Configured state because the member configuration is still being processed.
Link is marked as Standby by mLACP peer	The link is in Standby state because this has been indicated by the mLACP peer PoA.
Link is Not Aggregatable (reason unknown)	The link is in Configured state because it is marked as an Individual link by the mLACP peer PoA.
Link is not operational as a result of mLACP negotiations	mLACP negotiations with the peer have led to this link being kept in Configured state. This is likely to indicate a misconfiguration between the two peer devices.

Reason	Description
Link is Standby; bundle has more links than are supported	The link is in Standby state because the number of links in Selected state has already reached the hard platform limit on the number of active links.
Link is Standby due to maximum-active links configuration	The link is in Standby state because the number of links in Selected state has already reached the configured maximum active links threshold.
Link is waiting for BFD session to start	The link is in BFD Running state because LACP is negotiated but the BFD session has not started from the remote device.
Loopback: Actor and Partner have the same System ID and Key	The link is in Configured state because a loopback condition has been detected on the link—two links configured to be members of the bundle are actually connected to each other.
Not enough links available to meet minimum-active threshold	The link is in Standby state because there are not enough selectable links (i.e. links which meet the criteria to be marked Selected within the bundle) to meet the minimum active links/bandwidth threshold.
Partner has marked the link as Not Aggregatable	The link is in Configured state because it is marked as an Individual link by the LACP partner device.
Partner has not advertised that it is Collecting	The link is in Negotiating state because the LACP partner device has not advertised that the link is in Collecting state in its LACPDUs.
Partner has not echoed the correct parameters for this link	The link is in Negotiating state because the LACP partner device has not correctly echoed the local system's port information in the LACPDUs it is sending.
Partner is not Synchronized (Waiting, not Selected, or out-of-date)	The link is in Negotiating state because the mLACP peer PoA has not indicated that its LACP partner device is Synchronized. This could be because the devices are genuinely not Synchronized or because this state has not been communicated to the local system.
Partner is not Synchronized (Waiting, Standby, or LAG ID mismatch)	The link is in Negotiating state because the LACP partner device has not indicated that it is Synchronized in the LACPDUs it is sending. On the partner device the link could still be waiting for the Wait-While timer to expire, it could be held in Standby state, or there could be a misconfiguration leading to a LAG ID mismatch between links configured to be within the same bundle.

Reason	Description
Partner System ID/Key do not match that of the Selected links	The link is in Configured state because the System ID or Operational Key specified by the LACP partner device does not match that seen on other Selected links within the same bundle. This probably indicates a misconfiguration.
Wait-while timer is running	The link is in Configured state because the Wait-While timer is still running and the new state has not yet been determined.



# show bundle brief

To display summary information about all configured bundles, use the **show bundle brief** command in XR EXEC mode.

## show bundle brief

<b>Syntax Description</b>	This command has no keywords or arguments.				
<b>Command Default</b>	Information for all configured bundles is displayed.				
<b>Command Modes</b>	XR EXEC mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.2.12</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.2.12	This command was introduced.
Release	Modification				
Release 7.2.12	This command was introduced.				

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task	Operation
	bundle	read

These examples shows the status of two bundles, BE16 and BE100, that are configured on the router. Both are Ethernet bundles and only bundle 16 is Up:

```
Router# show bundle brief
Thu Mar 3 14:40:35.167 PST

Name | IG | State | LACP | BFD | Links | Local b/w, |
-----|---|-----|-----|----|-----|-----|
BE1 | | - Up | On | Off | 2 / 0 / 2 | 20000000 |
BE2 | | - Down | Off | Off | 0 / 0 / 0 | 0 |
BE3 | | - Admin down | Off | Off | 0 / 0 / 1 | 0 |
BE100 | | - Up | On | Off | 3 / 0 / 6 | 30000000 |
```

The below table describes the fields shown in the display.

**Table 4: show bundle brief Field Descriptions**

Field	Description
Name	Abbreviated name of the bundle interface, with the following possible formats: <ul style="list-style-type: none"> <li>• BEx—Ethernet bundle with ID number <i>x</i>.</li> </ul>
IG	Interchassis group ID (if configured) of which the bundle is a member.

Field	Description
State	<p>State of the bundle on the local device, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Admin down—The bundle has been configured to be shut down.</li> <li>• Bundle shut—The bundle is holding all links in Standby state and will not support any traffic.</li> <li>• Down—The bundle is operationally down. It has no Active members on the local device.</li> <li>• mLACP cold standby—The bundle is acting as a multichassis LACP Standby device, but the higher layers are not synchronized.</li> <li>• mLACP hot standby—The bundle is Up on the mLACP peer device, and the local device is ready to take over if that bundle goes down on the peer.</li> <li>• Nak—The local and peer devices cannot resolve a configuration error.</li> <li>• Partner down—The partner system indicates that the bundle is unable to forward traffic at its end.</li> <li>• PE isolated—The bundle is isolated from the core.</li> <li>• Up—The bundle has Active members on this device.</li> </ul>
LACP	<p>Status of the Link Aggregation Control Protocol (LACP) on the bundle, with the following possible values:</p> <ul style="list-style-type: none"> <li>• On—LACP is in use on the bundle.</li> <li>• Off—LACP is not active.</li> </ul>

Field	Description
BFD	<p>When BFD is enabled, displays the state of BFD sessions on the bundle from the sessions running on bundle members that is communicated to interested protocols, with the following possible values:</p> <ul style="list-style-type: none"> <li>• Down—The configured minimum threshold for active links or bandwidth for BFD bundle members is not available so BFD sessions are down.</li> <li>• Off—BFD is not configured on bundle members.</li> <li>• Up—BFD sessions on bundle members are up because the minimum threshold for the number of active links or bandwidth is met.</li> </ul>
Links act/stby/cfgd	<p>Number of links on the bundle with a particular status in the format <math>x/y/z</math>, with the following values:</p> <ul style="list-style-type: none"> <li>• <math>x</math>—Number of links in Active state on the bundle for the local device (from 1 to the maximum number of links supported on the bundle).</li> <li>• <math>y</math>—Number of links in Standby state on the bundle for the local device (from 1 to the maximum number of links supported on the bundle).</li> <li>• <math>z</math>—Total number of links configured on the bundle for the local device (from 1 to the maximum number of links supported on the bundle).</li> </ul>
Local b/w, kbps	<p>Current bandwidth of the bundle on the local device (this effective bandwidth might be limited by configuration).</p>

# show interfaces

To display the operational information for Ethernet interfaces, use the **show interfaces** in the EXEC mode.

**show interfaces** *type interface-path-id*

<b>Syntax Description</b>	<i>type interface-path-id</i> Specifies the type of interface for which you want to display statistics.				
<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 7.2.12</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.2.12	This command was introduced.
Release	Modification				
Release 7.2.12	This command was introduced.				
<b>Usage Guidelines</b>	None				
<b>Task ID</b>	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td></td> <td>interface read</td> </tr> </tbody> </table>	Task ID	Operations		interface read
Task ID	Operations				
	interface read				

## Examples

This example shows the output from the **show interfaces** command:

```
Router# show interfaces hundredGigE 0/0/0/24
Thu Oct 22 05:57:23.832 UTC
HundredGigE0/0/0/24 is administratively down, line protocol is administratively down
  Interface state transitions: 0
  Hardware is HundredGigE, address is 7860.e105.08c0 (bia 7860.e105.08c0)
  Internet address is Unknown
  MTU 1514 bytes, BW 100000000 Kbit (Max: 100000000 Kbit)
    reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA,
  Full-duplex, 100000Mb/s, link type is force-up
  output flow control is off, input flow control is off
  Carrier delay (up) is 10 msec
  loopback not set,
  Last input never, output never
  Last clearing of "show interface" counters never
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 total input drops
    0 drops for unrecognized upper-level protocol
  Received 0 broadcast packets, 0 multicast packets
    0 runts, 0 giants, 0 throttles, 0 parity
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 total output drops
  Output 0 broadcast packets, 0 multicast packets
  0 output errors, 0 underruns, 0 applique, 0 resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
```



# show l2vpn

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

## show l2vpn

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

**Command Default** None

**Command Modes** EXEC mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task	Operation ID
	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.

```
Router# show l2vpn

Mon Oct 12 14:14:48.869 UTC
HA role      : Active
ISSU role    : Primary
Process FSM  : PrimaryActive
-----
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
```

Related Commands	Command	Description
	<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.

## 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 XR EXEC mode.

```
show l2vpn bridge-domain bgp [{ 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 bgp</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>	XR EXEC mode

**show l2vpn bridge-domain (VPLS)**

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** 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.

When an SR policy is configured as the preferred path for a VPLS circuit, the traffic traverses through the SR policy path. The PW counters are updated with statistics about packets transmitted and received. When the SR policy configuration is deleted, the traffic session is still functional because the traffic transmission switches back to the normal LSP path between the PEs. There is no drop in the end-to-end traffic transmitted. However, the packet statistics counters are reset and start from zero. This is because, when the SR policy is deleted, the PW too gets deleted and the statistics information associated with the old PW is cleared. The counter restarts from zero when the new PW is created after the switch takes place.

Task ID	Task ID	Operations
	l2vpn	read

**Examples**

This is the sample output for **show l2vpn bridge-domain** command with VxLAN parameters configured:

```
Router# show l2vpn bridge-domain bd-name bg1_bdl detail
Legend: pp = Partially Programmed.
Bridge group: bg1, bridge-domain: bg1_bdl, 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: 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: BVI1, state is up
    Type Routed-Interface
    MTU 1514; XC ID 0x80000001; interworking none
    BVI MAC address:
      1000.4444.0001
  AC: HundredgiabitEthernet0/0/0/0.1, 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:
```

**show l2vpn bridge-domain (VPLS)**

```
VFI bg1_bd1_vfi (up)
VFI Statistics:
  drops: illegal VLAN 0, illegal length 0
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
	<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information

# show l2vpn database

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

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

<b>Syntax Description</b>	<b>ac</b> Displays L2VPN Attachment Circuit (AC) database				
	<b>node</b> Displays L2VPN node database.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EXEC mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.2.12</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.2.12	This command was introduced.
Release	Modification				
Release 7.2.12	This command was introduced.				
<b>Usage Guidelines</b>	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.				
<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 database ac** command:

```
Router# show l2vpn database ac

Mon Oct 12 14:15:47.731 UTC
Bundle-Ether1:
  Other-Segment MTU: 0
  Other-Segment status flags: 0x3
  Signaled capability valid: Yes
  Signaled capability flags: 0x360018
  Configured capability flags: 0x0
  XCID: 0xa0000001
  PSN Type: Undefined
  ETH data:
    Xconnect tags: 0
    Vlan rewrite tag: 0
  AC defn:
    ac-iframe: Bundle-Ether1
    capabilities: 0x00368079
    extra-capabilities: 0x00000000
    parent-ifh: 0x00000000
    ac-type: 0x04
    interworking: 0x00
  AC info:
    seg-status-flags: 0x00000003
    segment mtu/l2-mtu: 1500/1514
```

## show l2vpn database

```

HundredGigE0/0/0/0.1:
  Other-Segment MTU: 0
  Other-Segment status flags: 0x3
  Signaled capability valid: Yes
  Signaled capability flags: 0x360018
  Configured capability flags: 0x0
  XCID: 0xea
  PSN Type: Undefined
  ETH data:
    Xconnect tags: 0
    Vlan rewrite tag: 0
  AC defn:
    ac-ifname: HundredGigE0_0_0_0.1
    capabilities: 0x00368079
    extra-capabilities: 0x00000000
    parent-ifh: 0x08000018
    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:

```

Router# show l2vpn database node
Mon Oct 12 14:16:30.540 UTC
Node ID: 0x1000 (0/RP0/CPU0)
MA: vlan_ma      inited:1, flags:0x 2, circuits:3744
  AC event trace history [Total events: 4]
  -----
  Time           Event                               Num Rcvd   Num Sent
  ====           =====                               =
  10/12/2015 12:46:00 Process joined                       0           0
  10/12/2015 12:46:00 Process init success                    0           0
  10/12/2015 12:46:00 Replay start rcvd                      0           0
  10/12/2015 12:46:00 Replay end rcvd                          0           0

MA: ether_ma     inited:1, flags:0x 2, circuits:2
  AC event trace history [Total events: 4]
  -----
  Time           Event                               Num Rcvd   Num Sent
  ====           =====                               =
  10/12/2015 12:41:19 Process joined                       0           0
  10/12/2015 12:41:19 Process init success                    0           0
  10/12/2015 12:41:19 Replay start rcvd                      0           0
  10/12/2015 12:41:19 Replay end rcvd                          0           0

MA: atm_ma       inited:0, flags:0x 0, circuits:0
MA: hdlc_ma      inited:0, flags:0x 0, circuits:0
MA: fr_ma        inited:0, flags:0x 0, circuits:0
MA: ppp_ma       inited:0, flags:0x 0, circuits:0
MA: cem_ma       inited:0, flags:0x 0, circuits:0
MA: vif_ma       inited:0, flags:0x 0, circuits:0
MA: pwhe_ma      inited:0, flags:0x 0, circuits:0
MA: nve_mgr      inited:0, flags:0x 0, circuits:0
MA: mstp         inited:0, flags:0x 0, circuits:0
MA: span         inited:0, flags:0x 0, circuits:0
MA: erp          inited:0, flags:0x 0, circuits:0
MA: erp_test     inited:0, flags:0x 0, circuits:0

```

```
MA: mstp_test    initd:0, flags:0x 0, circuits:0
MA: evpn        initd:0, flags:0x 0, circuits:0
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information

# show l2vpn forwarding

To display forwarding information from the layer2\_fib manager, use the **show l2vpn forwarding** command in EXEC mode.

**show l2vpn forwarding** {**counter** | **debug** | **detail** | **hardware** | **interface** | **location** [*node-id*] | **private**}

Syntax Description		
<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>hardware</b>		Displays hardware-related layer2_fib manager information.
<b>interface</b>		Displays the match AC subinterface.
<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>private</b>		Output includes private information.

**Command Default** None

**Command Modes** EXEC mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	l2vpn	read

## Examples

The following sample output is from the **show l2vpn forwarding** command:

```
Router# show l2vpn forwarding location 0/RP0/CPU0
Mon Oct 12 14:19:11.771 UTC
Segment 1                               Segment 2                               State
-----
Hu0/0/0/0.234                           ac Hu0/0/0/26.234                       UP
Hu0/0/0/0.233                           ac Hu0/0/0/26.233                       UP
Hu0/0/0/0.232                           ac Hu0/0/0/26.232                       UP
Hu0/0/0/0.231                           ac Hu0/0/0/26.231                       UP
Hu0/0/0/0.230                           ac Hu0/0/0/26.230                       UP
```

The following sample output is from the **show l2vpn forwarding counter location** command:

```
Router# show l2vpn forwarding counter location 0/RP0/CPU0

Mon Oct 12 14:18:01.194 UTC
Legend: ST = State, DN = Down

Segment 1                               Segment 2                               ST Byte
-----                               -----                               -
Hu0/0/0/0.234                           ac Hu0/0/0/26.234                       UP 15098997504
Hu0/0/0/0.233                           ac Hu0/0/0/26.233                       UP 15098997568
Hu0/0/0/0.232                           ac Hu0/0/0/26.232                       UP 15098997504
Hu0/0/0/0.231                           ac Hu0/0/0/26.231                       UP 15098997568
HU0/0/0/0.230                           ac Hu0/0/0/26.230                       UP 15098997568
```

The following sample output is from the **show l2vpn forwarding summary location** command:

```
Router# show l2vpn forwarding summary location 0/RP0/CPU0
Thu Oct 22 06:14:17.767 UTC
To Resynchronize MAC table from the Network Processors, use the command...
    l2vpn resynchronize forwarding mac-address-table location <r/s/i>

Major version num:721, minor version num:2
Shared memory timestamp:0x19c9b0f580
Global configuration:
Number of forwarding xconnect entries:0
  Up:0  Down:0
  AC-PW(atom):0 AC-PW(iid):0 AC-PW(l2tpv2):0 AC-PW(l2tpv3):0
  AC-PW(l2tpv3-ipv6):0
  AC-AC:0 AC-BP:0 (PWHE AC-BP:0) AC-Unknown:0
  PW-BP:0 PW-Unknown:0
  PBB-BP:0 PBB-Unknown:0
  EVPN-BP:0 EVPN-Unknown:0
  VNI-BP:0 VNI-Unknown:0
  Monitor-Session-PW:0 Monitor-Session-Unknown:0
Number of xconnects down due to:
  AIB:0 L2VPN:0 L3FIB:0 VPDN:0
Number of xconnect updates dropped due to:
  Invalid XID: 0 VPWS PW, 0 VPLS PW, 0 Virtual-AC, 0 PBB,
  0 EVPN
  0 VNI
  0 Global
  Exceeded max allowed: 0 VPLS PW, 0 Bundle-AC
Number of p2p xconnects: 0
Number of bridge-port xconnects: 0
Number of nexthops:0
Number of bridge-domains: 0
  0 with routed interface
  0 with PBB-EVPN enabled
  0 with 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 ipmacs: 0
  0 Locally learned ip4macs
  0 Remotely learned ip4macs
```

```

0 Locally learned ip6macs
0 Remotely learned ip6macs
Number of total P2MP Ptree entries: 0
Number of PWHE Main-port entries: 0
Number of EVPN Multicast Replication lists: 0 (0 default, 0 stitching, 0 isid)

```

The following sample output is from the **show l2vpn forwarding detail location** command:

```

Router# show l2vpn forwarding detail location 0/RP0/CPU0

Mon Oct 12 14:18:47.187 UTC
Local interface: TenGigE0/0/0/0.234, Xconnect id: 0x1, Status: up
Segment 1
  AC, TenGigE0/0/0/0.234, status: Bound
  Statistics:
    packets: received 238878391, sent 313445
    bytes: received 15288217024, sent 20060480
    packets dropped: PLU 0, tail 0
    bytes dropped: PLU 0, tail 0
Segment 2
  AC, TenGigE0/0/0/26.234, status: Bound

Local interface: TenGigE0/0/0/0.233, Xconnect id: 0x2, Status: up
Segment 1
  AC, TenGigE0/0/0/0.233, status: Bound
  Statistics:
    packets: received 238878392, sent 313616
    bytes: received 15288217088, sent 20071424
    packets dropped: PLU 0, tail 0
    bytes dropped: PLU 0, tail 0
Segment 2
  AC, TenGigE0/0/0/26.233, status: Bound

Local interface: TenGigE0/0/0/0.232, Xconnect id: 0x3, Status: up
Segment 1
  AC, TenGigE0/0/0/0.232, status: Bound
  Statistics:
    packets: received 238878391, sent 313476
    bytes: received 15288217024, sent 20062464
    packets dropped: PLU 0, tail 0
    bytes dropped: PLU 0, tail 0
Segment 2
  AC, TenGigE0/0/0/26.232, status: Bound

```

## Related Commands

Command	Description
<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information
<a href="#">show l2vpn database, on page 37</a>	Displays L2VPN database
<a href="#">show l2vpn forwarding message counters, on page 43</a>	Displays l2vpn forwarding message counters information.



## 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}
```

<b>Syntax Description</b>	<b>hardware</b> Displays message counter information from hardware.				
	<b>location node-id</b> Displays message counter information for the specified location.				
<b>Command Default</b>	None				
<b>Command Modes</b>	EXEC mode				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 7.2.12</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.2.12	This command was introduced.
Release	Modification				
Release 7.2.12	This command was introduced.				
<b>Usage Guidelines</b>	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.				
<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 examples shows the output from the **show l2vpn forwarding message counters location** command:

```
Router# show l2vpn forwarding message counters location 0/RP0/CPU0
Mon Oct 12 14:19:41.768 UTC
Messages exchanged with L2FIB Collaborators:
-----
      Message                               Count      Info1      Info2
      Time
      =====
      =====
      l2vpn provision messages received:    7496      0x800001c  0x0
      Oct 12 13:09:38.477
      l2vpn unprovision messages received:    0          0x0        0x0
      -
      l2vpn bridge provision messages received: 0          0x0        0x0
      -
      l2vpn bridge unprovision messages received: 0          0x0        0x0
      -
      l2vpn bridge main port update messages received: 0          0x0        0x0
      -
      bdx bridge main port update messages received: 0          0x0        0x0
      -
      l2vpn bridge main port update w/ action=MSTI_DELETE 0          0x0        0x0
      -
      l2vpn bridge main port update ACK sent: 0          0x0        0x0
```

## show l2vpn forwarding message counters

```

-
bdxc bridge main port update ACK sent:          0          0x0          0x0
-
l2vpn reception of ACK relay msg received:      0          0x0          0x0
-
l2vpn bridge port provision messages received:  0          0x0          0x0
-
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:  0          0x0          0x0
-
l2vpn static mac unprovision messages received: 0          0x0          0x0
-
l2vpn static mac flush messages received:      0          0x0          0x0
-
l2vpn dynamic mac local learning messages received: 0          0x0          0x0
-
l2vpn dynamic mac local learning dropped queue len: 0          0x0          0x0
-
l2vpn dynamic mac local learning dropped cache: 0          0x0          0x0
-
l2vpn dynamic mac local learning dropped multicast: 0          0x0          0x0
-
l2vpn dynamic mac bcst send failed:           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 delete/create messages received: 0          0x0          0x0
-
l2vpn dynamic mac no-xid dropped:              0          0x0          0x0
-
l2vpn dynamic local mac unprovision messages:  0          0x0          0x0
-
l2vpn dynamic remote mac unprovision messages: 0          0x0          0x0
-
l2vpn dynamic local mac aged out messages sent: 0          0x0          0x0
-
l2vpn dynamic mac limit message received:      0          0x0          0x0
-
l2vpn dynamic mac delete notification:        0          0x0          0x0
-
l2vpn mac move counter:                       0          0x0          0x0
-
l2vpn qid mac remote:                         0          0x0          0x0
-
l2vpn qid mac remote evpn:                   0          0x0          0x0
-
l2vpn qid mac refresh:                       0          0x0          0x0
-
l2vpn qid mac learning:                      0          0x0          0x0
-
AIB update messages received:                 7494       0x8007502   0x8000150
Oct 12 12:49:44.112
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
-
l2vpn hw learn MAC update messages received:  0          0x0          0x0
-
l2vpn hw learn MAC BD limit set messages received: 0          0x0          0x0
-
l2vpn hw learn MAC BD limit clr messages received: 0          0x0          0x0
-
l2vpn hw learn MAC BP limit set messages received: 0          0x0          0x0
-
l2vpn hw learn MAC BP limit clr messages received: 0          0x0          0x0
-
l2vpn backbone source mac provision msg received: 1          0x0          0x0
Oct 12 12:41:19.807
l2vpn backbone source mac unprovision msg received: 0          0x0          0x0
-
l2vpn bridge port MAC flush msg received:     0          0x0          0x0
-
bdxc ISSU drop msg received:                  0          0x0          0x0
-
l2vpn ISSU drop msg received:                 0          0x0          0x0
-
l2vpn BD MAC Flush messages received:         0          0x0          0x0
-
l2vpn TCN messages received:                  0          0x0          0x0
-
bdxc G8032 TCN messages transmitted:          0          0x0          0x0
-
l2fib PD failure count:                       0          0x0          0x0
-
bdxc DHCP binding provision msg received:     0          0x0          0x0
-
bdxc DHCP binding unprovision msg received:   0          0x0          0x0
-
bdxc DHCP configuration msg received:         0          0x0          0x0
-
platform DAI violation msg received:          0          0x0          0x0
-
platform IPSG violation msg received:         0          0x0          0x0
-
platform MAC Secure violation msg received:    0          0x0          0x0
-
l2vpn g8032 ring provision msg received:      0          0x0          0x0
-
l2vpn g8032 ring unprovision msg received:    0          0x0          0x0
-
l2vpn g8032 ring inst provision msg received: 0          0x0          0x0
-
l2vpn g8032 ring inst unprovision msg received: 0          0x0          0x0
-
bdxc VPDN L2TPv2 provision msg received:      0          0x0          0x0
-
bdxc VPDN L2TPv2 unprovision msg received:    0          0x0          0x0
-
bdxc VPDN L2TPv2 invalid msg received:        0          0x0          0x0
-
bdxc P2MP PTREE provision msg received:       0          0x0          0x0
-
bdxc P2MP PTREE unprovision msg received:     0          0x0          0x0
-
bdxc P2MP PTREE provision msg dropped:        0          0x0          0x0

```

## show l2vpn forwarding message counters

```

-
  bdx c P2MP PTREE unprovision msg dropped:          0          0x0          0x0
-
  l2vpn reception of protection ack msg received:    0          0x0          0x0
-
  l2vpn GLOBAL messages received:                  1          0x0          0x0
Oct 12 12:41:19.807
  l2vpn BD Flush request messages to l2vpn:         0          0x0          0x0
-
  l2vpn evpn mcast provision msg received:          0          0x0          0x0
-
  l2vpn evpn mcast unprovision msg received:        0          0x0          0x0
-
  l2vpn evpn mcast invalid msg received:            0          0x0          0x0
-
  l2vpn evpn mcast unprovision all msg received:    0          0x0          0x0
-
  l2vpn evpn main port provision msg received:      0          0x0          0x0
-
  l2vpn evpn main port unprovision msg received:    0          0x0          0x0
-
  l2vpn evpn main port invalid msg received:        0          0x0          0x0
-
  l2vpn MVRP request:                              0          0x0          0x0
-
  l2vpn pwgroup status update msg received:         0          0x0          0x0
-

```

```

Wed Oct 14 11:12:51.311 UTC
Messages exchanged with L2FIB Collaborators:
-----

```

Time	Message	Count	Info1	Info2
=====	=====	=====	=====	=====
====	l2vpn provision messages received:	7496	0x800001c	0x0
	l2vpn unprovision messages received:	0	0x0	0x0
	l2vpn bridge provision messages received:	0	0x0	0x0
	l2vpn bridge unprovision messages received:	0	0x0	0x0
	l2vpn bridge main port update messages received:	0	0x0	0x0
	bdxc bridge main port update messages received:	0	0x0	0x0
	l2vpn bridge main port update w/ action=MSTI_DELETE	0	0x0	0x0
	l2vpn bridge main port update ACK sent:	0	0x0	0x0
	bdxc bridge main port update ACK sent:	0	0x0	0x0
	l2vpn reception of ACK relay msg received:	0	0x0	0x0
	l2vpn bridge port provision messages received:	0	0x0	0x0
	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:	0	0x0	0x0
	l2vpn static mac unprovision messages received:	0	0x0	0x0
	l2vpn static mac flush messages received:	0	0x0	0x0
	l2vpn dynamic mac local learning messages received:	0	0x0	0x0
	l2vpn dynamic mac local learning dropped queue len:	0	0x0	0x0
Oct 14 11:12:51.443	l2vpn dynamic mac local learning dropped cache:	0	0x0	0x0
Oct 14 11:12:51.443	l2vpn dynamic mac local learning dropped multicast:	0	0x0	0x0
Oct 14 11:12:51.443	l2vpn dynamic mac local learning dropped gsp:	0	0x0	0x0
Oct 14 11:12:51.443	l2vpn dynamic mac local learning dropped internal:	0	0x0	0x0
Oct 14 11:12:51.443	l2vpn dynamic mac local learning dropped no xcon:	0	0x0	0x0

```

Oct 14 11:12:51.443
  l2vpn dynamic mac local learning dropped unbound: 0 0x0 0x0
Oct 14 11:12:51.443
  l2vpn dynamic mac bcast send failed: 0 0x0 0x0
Oct 14 11:12:51.443
  l2vpn dynamic mac remote learning messages received 0 0x0 0x0
  l2vpn dynamic mac refresh messages received: 0 0x0 0x0
  l2vpn dynamic mac delete/create messages received: 0 0x0 0x0
  l2vpn dynamic mac no-xid dropped: 0 0x0 0x0
  l2vpn dynamic local mac unprovision messages: 0 0x0 0x0
  l2vpn dynamic remote mac unprovision messages: 0 0x0 0x0
  l2vpn dynamic local mac aged out messages sent: 0 0x0 0x0
  l2vpn dynamic mac limit message received: 0 0x0 0x0
  l2vpn dynamic mac delete notification: 0 0x0 0x0
  l2vpn mac move counter: 0 0x0 0x0
  l2vpn qid mac remote: 0 0x0 0x0
  l2vpn qid mac remote evpn: 0 0x0 0x0
  l2vpn qid mac learning: 0 0x0 0x0
  AIB update messages received: 0 0x0 0x0
  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
  l2vpn hw learn MAC update messages received: 0 0x0 0x0
  l2vpn hw learn MAC BD limit set messages received: 0 0x0 0x0
  l2vpn hw learn MAC BD limit clr messages received: 0 0x0 0x0
  l2vpn hw learn MAC BP limit set messages received: 0 0x0 0x0
  l2vpn hw learn MAC BP limit clr messages received: 0 0x0 0x0
  l2vpn backbone source mac provision msg received: 0 0x0 0x0
  l2vpn backbone source mac unprovision msg received: 0 0x0 0x0
  l2vpn bridge port MAC flush msg received: 0 0x0 0x0
  bdxs ISSU drop msg received: 0 0x0 0x0
  l2vpn ISSU drop msg received: 0 0x0 0x0
  l2vpn BD MAC Flush messages received: 0 0x0 0x0
  l2vpn TCN messages received: 0 0x0 0x0
  bdxs G8032 TCN messages transmitted: 0 0x0 0x0
  l2fib PD failure count: 0 0x0 0x0
  bdxs DHCP binding provision msg received: 0 0x0 0x0
  bdxs DHCP binding unprovision msg received: 0 0x0 0x0
  bdxs DHCP configuration msg received: 0 0x0 0x0
  platform DAI violation msg received: 0 0x0 0x0
  platform IPSG violation msg received: 0 0x0 0x0
  platform MAC Secure violation msg received: 0 0x0 0x0
  l2vpn g8032 ring provision msg received: 0 0x0 0x0
  l2vpn g8032 ring unprovision msg received: 0 0x0 0x0
  l2vpn g8032 ring inst provision msg received: 0 0x0 0x0
  l2vpn g8032 ring inst unprovision msg received: 0 0x0 0x0
  bdxs VPDN L2TPv2 provision msg received: 0 0x0 0x0
  bdxs VPDN L2TPv2 unprovision msg received: 0 0x0 0x0
  bdxs VPDN L2TPv2 invalid msg received: 0 0x0 0x0
  bdxs P2MP PTREE provision msg received: 0 0x0 0x0
  bdxs P2MP PTREE unprovision msg received: 0 0x0 0x0
  bdxs P2MP PTREE provision msg dropped: 0 0x0 0x0
  bdxs P2MP PTREE unprovision msg dropped: 0 0x0 0x0
  l2vpn GLOBAL messages received: 1 0x0 0x0
Oct 14 10:56:08.194
  l2vpn BD Flush request messages to l2vpn: 0 0x0 0x0
  l2vpn evpn mcast provision msg received: 0 0x0 0x0
  l2vpn evpn mcast unprovision msg received: 0 0x0 0x0
  l2vpn evpn mcast invalid msg received: 0 0x0 0x0
  l2vpn evpn mcast unprovision all msg received: 0 0x0 0x0
  l2vpn evpn main port provision msg received: 0 0x0 0x0
  l2vpn evpn main port unprovision msg received: 0 0x0 0x0

```

## show l2vpn forwarding message counters

```

l2vpn evpn main port invalid msg received:      0          0x0          0x0
l2vpn PWHE main port prov msg received:         0          0x0          0x0
l2vpn PWHE main port unprov msg received:       0          0x0          0x0
l2vpn MVRP request:                             0          0x0          0x0
l2vpn pwgroup status update msg received:       0          0x0          0x0
l3-sync interface update messages received:    0          0x0          0x0
l3-sync interface delete messages received:     0          0x0          0x0
l3-sync interface dropped no bd:                0          0x0          0x0

```

The following examples shows the output from the **show l2vpn forwarding message counters hardware location** command:

```

Router# show l2vpn forwarding message counters hardware location 0/RP0/CPU0
Mon Oct 12 14:19:59.017 UTC

```

## Event Statistics Summary

	Create	Modify	Bind	Unbind	Delete
LOCXC AC	7492	3748	7496	4	0
VPWS AC	0	0	0	0	0
VPLS AC	0	0	0	0	0
L2TP AC	0	0	0	0	0
VPWS PW	0	0	0	0	0
VPLS PW	0	0	0	0	0
BRIDGE	0	0	0	0	0
BRIDGEPORT	0	0	0	0	0
MAC	0	0	0	0	0
PBB	0	0	0	0	0
DHCP	0	0	0	0	0
L2TP	0	0	0	0	0
L2TP SESSION	0	0	0	0	0

## Performance Statistics Summary

	Create	Modify	Delete	Bind	Unbind
LOCXC AC	000.032 s	000.790 s	< 1 ms	000.810 s	000.003 s
VPWS AC	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
VPLS AC	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
L2TP AC	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
VPWS PW	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
VPLS PW	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
BRIDGE	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
BRIDGEPORT	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
MAC	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
PBB	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
DHCP	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
L2TP	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms
L2TP SESSION	< 1 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms

## Related Commands

Command	Description
<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information
<a href="#">show l2vpn database, on page 37</a>	Displays L2VPN database
<a href="#">show l2vpn forwarding message counters, on page 43</a>	Displays l2vpn forwarding message counters information.

# show l2vpn index

To display statistics about the index manager, use the **show l2vpn index** command in EXEC mode.

```
show l2vpn index [{ location | private }]
```

<b>Syntax Description</b>	<b>location</b>	(Optional) Displays index manager statistics for the specified location.
	<b>private</b>	(Optional) Detailed information about all indexes allocated for each pool.
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC mode	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.2.12	This command was introduced.
<b>Usage Guidelines</b>	No specific guidelines impact the use of this command.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read

## Examples

This example shows the sample output of the **show l2vpn index** command:

```
Router# show l2vpn index
Wed Oct 14 11:24:34.455 UTC
Pool id: 0xffff80002, App: BD
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 512
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffff80003, App: FXC
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 1
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffff80004, App: MP2MP
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 65535
  zombied IDs: 0
```

```
allocated IDs: 0

Pool id: 0xffff80005, App: RD
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 65536
zombied IDs: 0
allocated IDs: 0

Pool id: 0xffff80007, App: IFLIST
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 65535
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)

Pool id: 0xffff80008, App: ATOM
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 131071
zombied IDs: 0
allocated IDs: 0

Pool id: 0xffff8000a, App: PWGroup
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 65535
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)

Pool id: 0xffff8000c, App: EVPN LBL
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 1
zombied IDs: 0
allocated IDs: 0

Pool id: 0xffff8000d, App: EVPN RD
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 65535
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)

Pool id: 0xffff8000e, App: ITAL
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 131071
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)

Pool id: 0xffff8000f, App: BP
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 20992
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)

Pool id: 0xffff80010, App: L2VPN TEP
Max number of ID mgr instances: 1
ID mgr instances in use: 1
Pool size: 131071
zombied IDs: 0
allocated IDs: 1 (ID 0 pre-allocated)
```



```
Pool id: 0xffff80011, App: EVPN ES
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 65535
  zombied IDs: 0
  allocated IDs: 1 (ID 0 pre-allocated)
```

```
Pool id: 0xffffd0000, App: Global
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 16384
  zombied IDs: 0
  allocated IDs: 0
```

**Related Commands**

Command	Description
<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information
<a href="#">show l2vpn database, on page 37</a>	Displays L2VPN database
<a href="#">show l2vpn forwarding, on page 40</a>	Displays forwarding information from the layer2_fib manager on the line card.

# 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 mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	l2vpn	read

## Examples

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

```
Router# show l2vpn resource
Wed Oct 14 11:27:23.447 UTC
Memory: Normal
```

This table describes the significant fields shown in the display.

**Table 5: show l2vpn resource Command Field Descriptions**

Field	Description
Memory	Displays memory status.

Related Commands	Command	Description
	<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
	<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information
	<a href="#">show l2vpn index, on page 49</a>	Displays statistics about the index manager.

## show l2vpn trace

To display trace data for L2VPN, use the **show l2vpn trace** command in EXEC mode.

```
show l2vpn trace [checker] | [file filename filepath] | [last entry] | [location node-id]
| [udir path] [reverse] | [stats] | [tailf] | [usec] | [verbose] | [wide]
```

Syntax	Description
<b>checker</b>	Displays trace data for the L2VPN Uberverifier.
<b>file filename filepath</b>	Displays trace data for the specified file.
<b>hexdump</b>	Display traces data in hexadecimal format.
<b>last entry</b>	Display last <n> entries
<b>location node-id</b>	Displays trace data for the specified location.
<b>reverse</b>	Display latest traces first
<b>stats</b>	Display trace statistics
<b>tailf</b>	Display new traces as they are added
<b>unique</b>	Display unique entries with counts
<b>usec</b>	Display usec details with timestamp
<b>udir path</b>	Display a temporary directory to copy traces from remote locations
<b>verbose</b>	Display internal debugging information
<b>wide</b>	Display trace data excluding buffer name, node name, tid
<b>wrapping</b>	Display wrapping entries

**Command Default** None

**Command Modes** EXEC mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	l2vpn	read

This example displays output for the **show l2vpn trace** command:

```
Router# show l2vpn trace
Mon Oct 12 14:22:09.082 UTC
188 unique entries (2596 possible, 0 filtered)
Oct 12 12:37:44.197 l2vpn/policy 0/RP0/CPU0 1# t4349 POLICY:320: l2vpn_policy_reg_agent
started - route_policy_supported=False, forward_class_supported=False
Oct 12 12:39:21.870 l2vpn/fwd-pd 0/RP0/CPU0 1# t5664 FWD_PD:731:
Oct 12 12:39:21.883 l2vpn/fwd-err 0/RP0/CPU0 1# t5664 FWD_ERR|ERR:76: Major version mis-match,
SHM: 0x0 Expected: 0x1
Oct 12 12:39:21.883 l2vpn/fwd-err 0/RP0/CPU0 1# t5664 FWD_ERR|ERR:87: Magic number mis-match,
SHM: 0x0 Expected: 0xa7b6c3d8
Oct 12 12:39:21.884 l2vpn/err 0/RP0/CPU0 1# t5664 FWD_ERR|ERR:76: Major version mis-match,
SHM: 0x0 Expected: 0x1
Oct 12 12:39:21.884 l2vpn/err 0/RP0/CPU0 1# t5664 FWD_ERR|ERR:87: Magic number mis-match,
SHM: 0x0 Expected: 0xa7b6c3d8
Oct 12 12:39:21.890 l2vpn/fwd-detail 0/RP0/CPU0 1# t5664 FWD_DETAIL:263: PWGROUP Table init
succeeded
Oct 12 12:39:21.890 l2vpn/fwd-detail 0/RP0/CPU0 2# t5664 FWD_DETAIL:416: l2tp session table
rebuilt
Oct 12 12:39:21.903 l2vpn/fwd-common 0/RP0/CPU0 1# t5664 FWD_COMMON:39: L2FIB_OBJ_TRACE:
trace_buf=0x7d48e0
Oct 12 12:39:25.613 l2vpn/issu 0/RP0/CPU0 1# t5664 ISSU:790: ISSU - iMDR init called;
'infra/imdr' detected the 'informational' condition 'the service is not supported in the
node'
Oct 12 12:39:25.613 l2vpn/issu 0/RP0/CPU0 1# t5664 ISSU:430: ISSU - attempt to start
COLLABORATOR wait timer while not in ISSU mode
Oct 12 12:39:25.638 l2vpn/fwd-common 0/RP0/CPU0 1# t5664 FWD_COMMON:4241: show edm thread
initialized
Oct 12 12:39:25.781 l2vpn/fwd-mac 0/RP0/CPU0 1# t5664 FWD_MAC|ERR:783: Mac aging init
Oct 12 12:39:25.781 l2vpn/fwd-mac 0/RP0/CPU0 2# t5664 FWD_MAC:1954: l2vpn_gsp_cons_init
returned Success
Oct 12 12:39:25.781 l2vpn/err 0/RP0/CPU0 1# t5664 FWD_MAC|ERR:783: Mac aging init
Oct 12 12:39:25.782 l2vpn/fwd-aib 0/RP0/CPU0 4# t5664 FWD_AIB:446: aib connection opened
successfully
Oct 12 12:39:25.783 l2vpn/fwd-mac 0/RP0/CPU0 2# t5664 FWD_MAC:2004: Client successfully
joined gsp group
Oct 12 12:39:25.783 l2vpn/fwd-mac 0/RP0/CPU0 1# t5664 FWD_MAC:781: Initializing the txlist
IPC thread
Oct 12 12:39:25.783 l2vpn/fwd-mac 0/RP0/CPU0 1# t5664 FWD_MAC:3195: gsp_optimal_msg_size =
31264 (real: True)
Oct 12 12:39:25.783 l2vpn/fwd-mac 0/RP0/CPU0 1# t5664 FWD_MAC:626: Entering mac aging timer
init
Oct 12 12:39:25.783 l2vpn/fwd-mac 0/RP0/CPU0 1# t7519 FWD_MAC:725: Entering event loop for
mac txlist thread
Oct 12 12:39:25.797 l2vpn/fwd-mac 0/RP0/CPU0 1# t4222 FWD_MAC:2221: learning_client_colocated
0, is_client_netio 1
```

## Related Commands

Command	Description
<a href="#">l2vpn, on page 10</a>	Enters L2VPN configuration mode.
<a href="#">show l2vpn, on page 32</a>	Displays L2VPN information
<a href="#">show l2vpn index, on page 49</a>	Displays statistics about the index manager.
<a href="#">show l2vpn resource, on page 52</a>	Displays the memory state in the L2VPN process.



## Multiple Spanning Tree Protocol Commands

---

This module describes the commands used to configure multiple spanning tree protocol. For detailed information about MSTP concepts, configuration tasks, and examples, see the *L2VPN and Ethernet Services Configuration Guide for Cisco 8000 Series Routers*.

- [instance \(MSTP\), on page 56](#)
- [interface \(MSTP\), on page 57](#)
- [name \(MSTP\), on page 58](#)
- [portfast, on page 59](#)
- [show spanning-tree mst, on page 60](#)
- [spanning-tree mst, on page 62](#)
- [vlan-id \(MSTP\), on page 63](#)

# 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 7.2.12	This command was introduced.

## Usage Guidelines



**Note** 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

## Examples

The following example shows how to enter the MSTI configuration submode:

```
Router# configure
Router(config)#spanning-tree mst a
Router(config-mstp)# instance 101
Router(config-mstp-inst)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.
	<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submode
	<a href="#">vlan-id (MSTP), on page 63</a>	Associates a set of VLAN IDs with the current MSTI.

# 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 interface-type interface-path-id**

<b>Syntax Description</b>	<p><b>interface</b> Interface type. For more information, use the question mark (?) online help function.</p> <hr/> <p><b>interface-path-id</b> Physical interface.</p> <p>Use the <b>show interfaces</b> command to see a list of all possible 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>						
<b>Command Default</b>	None						
<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 7.2.12</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 7.2.12	This command was introduced.		
Release	Modification						
Release 7.2.12	This command was introduced.						
<b>Usage Guidelines</b>	A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.						
<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 enter the MSTP interface configuration submode:</p> <pre>Router# <b>configure</b> Router(config)# <b>spanning-tree mst M0</b> Router(config-mstp)# <b>interface hundredGigE 0/0/0/1</b> Router(config-mstp-if)#</pre>						
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><a href="#">show spanning-tree mst, on page 60</a></td> <td>Displays the multiple spanning tree protocol status information.</td> </tr> <tr> <td><a href="#">spanning-tree mst, on page 62</a></td> <td>Enters the MSTP configuration submode</td> </tr> </tbody> </table>	Command	Description	<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.	<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submode
Command	Description						
<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.						
<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submode						

## name (MSTP)

To set the name of the MSTP region, use the **name** command in MSTP configuration submode.

**name** *name*

### Syntax Description

*name* Specifies the name of the mstp region.

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

MSTP configuration

### Command History

Release	Modification
Release 7.2.12	This command was introduced.

### Task ID

Task ID	Operations
interface	read, write

### Examples

The following example shows how to set the name of the MSTP region to m1:

```
Router# configure
RP/0/RP0/CPU0:ios(config)#spanning-tree mst M0
Router(config-mstp)# name m1
```

### Related Commands

Command	Description
<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.
<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submode



# 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 7.2.12	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:

```
Router# configure
Router(config)#spanning-tree mst a
Router(config-mstp)#interface HundredGigE0/0/0/2
Router(config-mstp-if)# portfast

Router(config-mstp-if)# portfast bpduguard
```

Related Commands	Command	Description
	<a href="#">interface (MSTP), on page 57</a>	Enters the MSTP interface configuration submenu, and enables STP for the specified port.
	<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.
	<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submenu

# 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 7.2.12	This command was introduced.

Task ID	Task ID	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:

```
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          Port ID          Designated          Port ID
Name               Prio.Nbr Cost   Role State   Cost Bridge ID      Prio.Nbr
```

```

-----
HundredGigEthernet0/0/0/1  128.65  20000  DSGN FWD  0  4097 0004.9b78.0800 128.65
HundredGigEthernet0/0/0/2  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:

```

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 HundredGigEthernet0/0/0/2 , Root Bridge ID 0002.9b78.0812
...
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
-----
HundredGigEthernet0/0/0/4  128.196  200000 ALT  BLK  0  4097 0004.9b78.0800 128.195
...

```

---

**Related Commands**

Command	Description
<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP 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 7.2.12	This command was introduced.

## Usage Guidelines



<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

## Examples

The following example shows how to enter the MSTP configuration submode:

```
Router(config)# spanning-tree mst a
Router(config-mstp)#
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">instance (MSTP), on page 56</a>	Enters the multiple spanning tree instance (MSTI) configuration submode.
	<a href="#">interface (MSTP), on page 57</a>	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.

## 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
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.2.12	This command was introduced.

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

**Examples** The following example shows how to use the vlan-id command:

```
Router(config-mstp-inst)# vlan-id 2-1005
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">instance (MSTP), on page 56</a>	Enters the multiple spanning tree instance (MSTI) configuration submode.
	<a href="#">spanning-tree mst, on page 62</a>	Enters the MSTP configuration submode
	<a href="#">show spanning-tree mst, on page 60</a>	Displays the multiple spanning tree protocol status information.





## Integrated Routing and Bridging Commands

---

This module describes the commands to configure Integrated Routing and Bridging (IRB) on the .

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.

- [interface bvi](#) , on page 66
- [routed interface bvi](#) , on page 68
- [show interfaces bvi](#), on page 69

# interface bvi

To create a bridge-group virtual interface (BVI), use the **interface bvi** command in Global Configuration mode. To delete the BVI, use the **no** form of this command.

**interface bvi** *identifier*

<b>Syntax Description</b>	<i>identifier</i> Number for the BVI interface from 1 to 4294967295.
---------------------------	--

<b>Command Default</b>	No BVI interface is configured.
------------------------	---------------------------------

<b>Command Modes</b>	Global Configuration mode
----------------------	---------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 7.2.12	This command was introduced.

<b>Usage Guidelines</b>	<p>The BVI is a virtual interface within the router that acts like a normal routed interface. The BVI does not support bridging itself, but acts as a gateway for the corresponding bridge-domain to a routed interface within the router.</p> <p>Aside from supporting a configurable MAC address, a BVI supports only Layer 3 attributes, and has the following characteristics:</p> <ul style="list-style-type: none"> <li>• Uses a MAC address taken from the local chassis MAC address pool, unless overridden at the BVI interface.</li> <li>• Is configured as an interface type using the <b>interface bvi</b> command and uses an IPv4 or IPv6 address that is in the same subnet as the hosts on the segments of the bridged domain. The BVI also supports secondary addresses.</li> <li>• The BVI identifier is independent of the bridge-domain identifier. These identifiers do not need to correlate like they do in Cisco IOS software.</li> <li>• Is associated to a bridge group using the <b>routed interface bvi</b> command.</li> <li>• The following interface commands are supported on a BVI: <ul style="list-style-type: none"> <li>• <b>arp purge-delay</b></li> <li>• <b>arp timeout</b></li> <li>• <b>bandwidth</b> (The default is 10 Gbps and is used as the cost metric for routing protocols for the BVI.)</li> <li>• <b>ipv4</b></li> <li>• <b>ipv6</b></li> <li>• <b>mac-address</b></li> <li>• <b>mtu</b> (The default is 1514 bytes.)</li> <li>• <b>shutdown</b></li> </ul> </li> </ul>
-------------------------	--



- The BVI supports IP helper addressing and secondary IP addressing.

To display bridge group, bridge-domain, interface status, line protocol state, and packet counters for the specified BVI, use the **show l2vpn bridge domain interface bvi** form of the **show l2vpn bridge domain (VPLS)** command. To display the reason that a BVI is down, you can use the **detail** keyword option.

Task ID	Operations
	interface read, write

### Examples

The following example shows how to create a BVI interface and configure its IPv4 address:

```
Router# configure
Router(config)# interface bvi 50
Router(config-if)# ipv4 address 10.10.0.4 255.255.255.0
Router(config-if)# commit
```

Related Commands	Command	Description
	<a href="#">routed interface bvi</a>	<a href="#">, on page 68</a>
	<a href="#">show interfaces bvi</a>	<a href="#">, on page 69</a>

# routed interface bvi

To associate the specified bridge group virtual interface (BVI) as the routed interface for the interfaces assigned to the bridge domain, use the **routed interface bvi** command in L2VPN bridge group bridge domain configuration mode. To remove the BVI as the routed interface for the interfaces assigned to the bridge domain, use the **no** form of this command.

**routed interface bvi** *identifier*

Syntax Description	
	<i>identifier</i> Number for the BVI interface from 1 to 65535.

Command Default	
	No routed interface is configured.

Command Modes	
	L2VPN bridge group bridge domain configuration mode (config-l2vpn-bg-bd)

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

Usage Guidelines	
	<ul style="list-style-type: none"> <li>• Only one BVI can be configured in any bridge domain.</li> <li>• The same BVI can not be configured in multiple bridge domains.</li> </ul>

Task ID	Task ID	Operation
		l2vpn

The following example shows association of a BVI interface numbered “50” on the bridge domain named “IRB”:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group 10
Router(config-l2vpn-bg)# bridge-domain IRB
Router(config-l2vpn-bg-bd)# routed interface bvi 50
Router(config-l2vpn-bg-bd-bvi)# commit
```

Related Commands	Command	Description
	<a href="#">interface bvi</a> , on page 66	
	<a href="#">show interfaces bvi</a> , on page 69	

# show interfaces bvi

To display interface status, line protocol state, and packet counters for the specified BVI, use the **show interfaces bvi** command in XR EXEC mode.

**show interfaces bvi** *identifier* [ **accounting** | **brief** | **description** | **detail** | **location** *location* ]

Syntax Description		
	<i>identifier</i>	Number for the BVI interface from 1 to 4294967295.
	<b>accounting</b>	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
	<b>brief</b>	(Optional) Displays summary information about the interface.
	<b>description</b>	(Optional) Displays summary status information and the description for the interface.
	<b>detail</b>	(Optional) Displays detailed information about the interface. This is the default.
	<b>location</b> <i>location</i>	(Optional) Displays information the interface on the specified node. The <i>location</i> argument is entered in the <i>rack/slot/module</i> notation.

**Command Default** Detailed information about the BVI interface is displayed.

**Command Modes** XR EXEC mode

Command History	Release	Modification
	Release 7.2.12	This command was introduced.

**Usage Guidelines** No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	interface	read

The following example shows sample output for the **show interfaces bvi** command:

```
Router# show interfaces bvi 50
Mon Oct 19 07:22:55.233 UTC
BVI50 is down, line protocol is down
  Interface state transitions: 0
  Hardware is Bridge-Group Virtual Interface, address is
  Internet address is 10.10.0.4/24
  MTU 1514 bytes, BW 10000000 Kbit (Max: 10000000 Kbit)
    reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA, loopback not set,
  ARP type ARPA, ARP timeout 04:00:00
  Last input never, output never
  Last clearing of "show interface" counters never
  5 minute input rate 0 bits/sec, 0 packets/sec
```

```

5 minute output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 total input drops
  0 drops for unrecognized upper-level protocol
  Received 0 broadcast packets, 0 multicast packets
  0 packets output, 0 bytes, 0 total output drops
  Output 0 broadcast packets, 0 multicast packets

```

Table 6: show interfaces bvi Field Descriptions

Field	Description
BVIx is	Displays the state of the specified BVI interface, where <i>x</i> is the number of the interface. The possible values are: administratively down, down, or up.
line protocol is	Displays the state of the line protocol for the BVI interface. The possible values are: administratively down, down, or up.  <b>Note</b> The line protocol state is not the same as the protocol state displayed in the <b>show ip interfaces</b> command, because it is the state of Layer 2 (media) rather than Layer 3 (IP protocol).
Interface state transitions:	Displays the number of times the interface has changed states.
Hardware is	Displays Bridge-Group Virtual Interface for a BVI.
address is	Layer 2 MAC address of the BVI.
Description:	Displays the description of the interface when configured.
Internet address is <i>n.n.n.n/n</i>	Layer 3 IP address of the BVI in dotted decimal format.
MTU	Displays the maximum transmission unit (MTU) for the interface. The MTU is the maximum packet size that can be transmitted over the interface.  1514 is the default.
BW <i>x</i> Kbit	Displays the current bandwidth of the interface in kilobits per second.
Max:	Displays the maximum bandwidth available on the interface in kilobits per second.
reliability	Displays the proportion of packets that are not dropped and do not have errors.  <b>Note</b> The reliability is shown as a fraction of 255.

Field	Description
txload	Indicates the traffic flowing out of the interface as a proportion of the bandwidth. <b>Note</b> The txload is shown as a fraction of 255.
rxload	Indicates the traffic flowing into the interface as a proportion of the bandwidth. <b>Note</b> The rxload is shown as a fraction of 255.
Encapsulation	Layer 2 encapsulation on the interface.
loopback	Always displays “not set” for a BVI because loopbacks are not supported.
ARP type	Address Resolution Protocol (ARP) type used on the interface.
ARP timeout	ARP timeout in the format hours:mins:secs. This value is configurable using the <b>arp timeout</b> command.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface and processed locally on the router. Useful for knowing when a dead interface failed.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by the interface. Useful for knowing when a dead interface failed.
Last clearing of “show interface” counters	Time since the counters in this command were last cleared using the <b>clear counters</b> Exec command in hours:mins:secs.

Field	Description
5 minute input rate	<p>Average number of bits and packets received per second in the last 5 minutes. If the interface is not in promiscuous mode, it senses network traffic that it sends and receives (rather than all network traffic).</p> <p><b>Note</b> The 5-minute period referenced in the command output is a load interval that is configurable under the interface. The default value is 5 minutes.</p> <p><b>Note</b> The 5-minute input should be used only as an approximation of traffic per second during a given 5-minute period. This rate is exponentially weighted average with a time constant of 5 minutes. A period of four time constants must pass before the average will be within two percent of the instantaneous rate of a uniform stream of traffic over that period.</p>
5 minute output rate	<p>Average number of bits and packets transmitted per second in the last 5 minutes. If the interface is not in promiscuous mode, it senses network traffic that it sends and receives (rather than all network traffic).</p> <p><b>Note</b> The 5-minute period referenced in the command output is a load interval that is configurable under the interface. The default value is 5 minutes.</p> <p><b>Note</b> The 5-minute output should be used only as an approximation of traffic per second during a given 5-minute period. This rate is exponentially weighted average with a time constant of 5 minutes. A period of four time constants must pass before the average will be within two percent of the instantaneous rate of a uniform stream of traffic over that period.</p>
packets input	Number of packets received on the interface that were successfully delivered to higher layers.
bytes	Number of bytes received on the interface.
total input drops	Total number of valid packets that were dropped after they were received. This includes packets that were dropped due to configured quality of service (QoS) or access control list (ACL) policies. This does not include drops due to unknown Layer 3 protocol.

Field	Description
drops for unrecognized upper-level protocol	Total number of packets that could not be delivered because the necessary protocol was not configured on the interface.
Received <i>x</i> broadcast packets	Total number of Layer 2 broadcast packets received on the interface. This is a subset of the total input packet count.
multicast packets	Total number of Layer 2 multicast packets received on the interface. This is a subset of the total input packet count.
packets output	Number of packets sent from the interface.
bytes	Total number of bytes successfully sent from the interface.
total output drops	Number of packets that were dropped before being transmitted.
Output <i>x</i> broadcast packets	Number of Layer 2 broadcast packets transmitted on the interface. This is a subset of the total output packet count.
multicast packets	Total number of Layer 2 multicast packets received on the interface. This is a subset of the total output packet count.

**Related Commands**

Command	Description
<a href="#">interface bvi</a> , on page 66	

show interfaces bvi





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