L2VPN Commands

This section describes the commands used to configure Gigabit Ethernet services for Layer 2 VPNs.

By default, all interfaces are Layer 3 interfaces. You can change the interface to Layer 2 interface using the **l2transport** command.

For detailed information about concepts and configuration, see the *Introduction to Layer 2 Virtual Private Networks* chapter in the L2VPN and Ethernet Services Configuration Guide for Cisco 8000 Series Routers.

bridge-domain

To establish a bridge domain and to enter L2VPN bridge group bridge domain configuration mode, use the **bridge-domain** command in L2VPN bridge group configuration submode.

bridge-domain *bridge-domain-name*

Syntax Description

bridge-domain-name	Name of the bridge domain. **Note** The maximum number of characters that can be specified in the bridge domain name is 27.

Command Default

The default value is a single bridge domain.

Command Modes

L2VPN bridge group configuration

Command History

Release	Modification
Release 7.2.12	This command was introduced.

Usage Guidelines

Use the **bridge-domain** command to enter L2VPN bridge group bridge domain configuration mode.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to configure a bridge domain:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group BG1
Router(config-l2vpn-bg)# bridge-domain BD1
Router(config-l2vpn-bg-bd)#
```

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
bridge group, on page 4	Creates a bridge group
show l2vpn bridge-domain, on page 26	Display information for the bridge ports such as attachment circuits for the specific bridge domains.

bridge group

To create a bridge group so that it can contain bridge domains and then to assign network interfaces to the bridge domain, use the **bridge group** command in L2VPN configuration mode. To remove all the bridge domains that are created under this bridge group and to remove all network interfaces that are assigned under this bridge group, use the **no** form of this command.

bridge group *bridge-group-name*
no bridge-group *bridge-group-name*

Syntax Description

bridge-group-name	Number of the bridge group to which the interface belongs.

Command Default

No bridge group is created.

Command Modes

L2VPN configuration

Command History

Release	Modification
Release 7.2.12	This command was introduced.

Usage Guidelines

Use the **bridge group** command to enter L2VPN bridge group configuration mode.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows that bridge group 1 is assigned:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group BG1
Router(config-l2vpn-bg)#
```

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
bridge-domain, on page 3	Establishes a bridge domain

clear l2vpn bridge-domain mac-address-table

To clear the learned MAC addresses from the L2VPN MAC address tables at the bridge domain level,use the **clear l2vpn bridge-domain mac-address-table** command in EXEC mode.

clear l2vpn bridge-domain mac-address-table { **address** *address* | **bridge-domain** *name* | **interface** *type interface-path-id* | **location** *node-id* | **all** }

Syntax Description

address	Clears a specified MAC address.
bridge-domain *name*	Clears bridge domains learned from a MAC address table.
type	(Optional) Interface type.
interface-path-id	Physical interface or a virtual interface.
location *node-id*	Clears L2VPN message counters for the specified location. The node-id argument is entered in the rack/slot/module notation.
all	Clears all bridge domains in the system.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Usage Guidelines

Use the **clear l2vpn bridge-domain mac-address-table** command only for troubleshooting, as they can disrupt ARP (Address Resolution Protocol) and ND (Neighbor Discovery) learning on BVI interfaces in both Fixed Systems (8200, 8700, 8010) and Modular Systems (8800).

By removing MAC addresses from the hardware MAC table, you eliminate the need to wait for MAC addresses to age out naturally. This allows you to troubleshoot or recover quickly from MAC learning and forwarding issues. After you clear the MAC addresses, Cisco IOS XR software treats unicast traffic destined for those addresses as unknown unicast, which results in unicast flooding.

Always use the **clear l2vpn bridge-domain mac-address-table** command with extreme caution to avoid unintended network issues.

Task ID

Task ID	Operation
l2vpn	read, write

Example

The following example shows how to clear the learned MAC addresses from the L2VPN MAC address tables at the bridge domain level:

```
Router# clear l2vpn bridge-domain mac-address location 1/1/1
```

clear l2vpn forwarding mac-address-table

To clear L2VPN forwarding MAC address tables, use the **clear l2vpn forwarding mac-address-table** command in EXEC mode.

clear l2vpn forwarding mac-address-table { **address** *address* | **bridge-domain** *name* | **interface** *type interface-path-id* | **location** *node-id* | **all** }

Syntax Description

address	Clears a specified MAC address.
bridge-domain *name*	Clears bridge domains learned from a MAC address table.
type	(Optional) Interface type.
interface-path-id	Physical interface or a virtual interface.
location *node-id*	Clears L2VPN forwarding message counters for the specified location. The node-id argument is entered in the rack/slot/module notation
all	Clears all forwarding message counters in the system.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Usage Guidelines

Use the **clear l2vpn forwarding mac-address-table** command only for troubleshooting, as they can disrupt ARP (Address Resolution Protocol) and ND (Neighbor Discovery) learning on BVI interfaces in both Fixed Systems (8200, 8700, 8010) and Modular Systems (8800).

By removing MAC addresses from the hardware MAC table, you eliminate the need to wait for MAC addresses to age out naturally. This allows you to troubleshoot or recover quickly from MAC learning and forwarding issues. After you clear the MAC addresses, Cisco IOS XR software treats unicast traffic destined for those addresses as unknown unicast, which results in unicast flooding.

Always use the **clear l2vpn forwarding mac-address-table** command with extreme caution to avoid unintended network issues.

Task ID

Task ID	Operation
l2vpn	read, write

Example

The following example shows how to clear L2VPN forwarding MAC address tables on a specified node:

```
Router# clear l2vpn forwarding mac-address location 1/1/1
```

dot1q tunneling ethertype 0x9100

To support legacy QinQ encapsulation 0x9100/0x8100, use the **dot1q tunneling ethertype 0x9100** command in the interface configuration mode.

dot1q tunneling ethertype 0x100

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 24.4.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

This example shows how to support legacy QinQ encapsulation 0x9100/0x8100 on the main interface FH0/0/0/3.1:

```
Router#configure
Router(config)#interface FH0/0/0/3
Router(config-subif)#dot1q tunneling ethertype 0x9100
Router(config-subif)#interface FH0/0/0/3.1 l2transport
Router(config-subif)#encapsulation dot1q 500 second-dot1q 600
Router(config-subif)#commit
Router(config-subif)#exit
Router(config)#exit
```

encapsulation dot1ad

To define the matching criteria to map 802.1ad frames ingress on an interface to the appropriate service instance, use the **encapsulation dot1ad** command in the interface configuration mode.

encapsulation dot1ad *vlan-id*

Syntax Description

vlan-id	Specifies the VLAN ID as an integer, can be given as single ID, range, and list. The range is 1 to 4094. To define a range of VLAN IDs, a hyphen must be entered to separate the starting and ending VLAN ID values. A comma must be entered to separate each VLAN ID range from the next range.

Command Default

No matching criteria are defined.

Command Modes

Interface configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 24.4.1	Support for VLAN range and list were added.

Usage Guidelines

Only one encapsulation statement can be applied to a sub-interface. Encapsulation statements cannot be applied to main interfaces.

An encapsulation dot1ad statement specifies matching for frames with VLAN IDs.

Examples

This example shows how to map 802.1ad frames ingress on an interface to the appropriate service instance.

```
Router(config-if)# encapsulation dot1ad 10
```

This example shows how to map 802.1ad frames ingress on an l2transport sub-interface.

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24.1 l2transport
Router(config-subif)# encapsulation dot1ad 10
```

This example shows how to map 802.1ad frames ingress on an l2transport sub-interface for a range and list of VLANs.

```
Router# configure
Router(config)# interface HundredGigE0/3/0/0.1 l2transport
Router(config-subif)# encapsulation dot1ad 200-400,600-801
```

encapsulation dot1ad dot1q

To define the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance, use the **encapsulation dot1ad dot1q** command in subinterface configuration mode.

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	Specifies the VLAN ID as an integer, can be given as single ID, range, and list. The range is 1 to 4094. To define a range of VLAN IDs, a hyphen must be entered to separate the starting and ending VLAN ID values. A comma must be entered to separate each VLAN ID range from the next range.
any	Matches any VLAN ID.

Command Default

No matching criteria are defined.

Command Modes

Subinterface configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 24.4.1	Support for VLAN range and list were added.

Usage Guidelines

Only one encapsulation statement can be applied to a sub-interface. Encapsulation statements cannot be applied to main interfaces.

Examples

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

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24.1 l2transport
Router(config-subif)# encapsulation dot1ad 10 dot1q 100
```

This example shows how to map the range of VLAN IDs.

```
Router# configure
Router(config)# interface HundredGigE0/3/0/0.1 l2transport
Router(config-subif)# encapsulation dot1ad 100-200 dot1q 300
```

encapsulation dot1ad priority-tagged

To allow priority-tagged traffic to map to the specified interface, use the **encapsulation dot1ad priority-tagged** command in the interface configuration mode. The Priority-tagged traffic has a VLAN tag with VLAN-ID 0.

encapsulation dot1ad priority-tagged

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 24.4.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

The following example shows how to map priority-tagged traffic to TenGigE0/0/0/0.3 interface:

```
Router# configure
Router(config)# interface TenGigE0/0/0/0.3 l2transport
Router(config-subif)# encapsulation dot1ad priority-tagged
Router(config-subif)#commit
Router(config-subif)#exit
Router(config)#exit
```

encapsulation dot1q

To define the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance, use the **encapsulation dot1q** command in the interface configuration mode.

encapsulation dot1q *vlan-id*

Syntax Description

vlan-id	Specifies the VLAN ID as an integer, can be given as single ID, range, and list. The range is 1 to 4094. To define a range of VLAN IDs, a hyphen must be entered to separate the starting and ending VLAN ID values. A comma must be entered to separate each VLAN ID range from the next range.

Command Default

No matching criteria are defined.

Command Modes

Interface configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 24.4.1	Support for VLAN range and list were added.

Usage Guidelines

Only one encapsulation statement can be applied to a sub-interface. Encapsulation statements cannot be applied to main interfaces.

An encapsulation dot1q statement specifies matching for frames with VLAN IDs.

Examples

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

```
Router(config-if)# encapsulation dot1q 10
```

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

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24.1 l2transport
Router(config-subif)# encapsulation dot1q 10
```

This example shows how to map 802.1Q frames ingress on an l2transport sub-interface for a list of VLAN IDs.

```
Router# configure
Router(config)# interface HundredGigE0/5/0/0.1 l2transport
Router(config-subif)# encapsulation dot1q 100 second-dot1q 200,300
Router(config-subif)# commit
```

encapsulation dot1q priority-tagged

To allow priority-tagged traffic to map to the specified interface, use the **encapsulation dot1q priority-tagged** command in the interface configuration mode. The Priority-tagged traffic has a VLAN tag with VLAN-ID 0.

encapsulation dot1q priority-tagged

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 24.4.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

The following example shows how to map priority-tagged traffic to TenGigE0/0/0/0.1 interface:

```
Router# configure
Router(config)# interface TenGigE0/0/0/0.1 l2transport
Router(config-subif)# encapsulation dot1q priority-tagged
Router(config-subif)#commit
Router(config-subif)#exit
Router(config)#exit
```

encapsulation dot1q second-dot1q

To define the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance, use the **encapsulation dot1q second-dot1q** command in interface configuration mode.

encapsulation **dot1q** *vlan-id* [**second-dot1q** *vlan-id*]

Syntax Description

vlan-id	Specifies the VLAN ID as an integer, can be given as single ID, range, and list. The range is 1 to 4094. To define a range of VLAN IDs, a hyphen must be entered to separate the starting and ending VLAN ID values. A comma must be entered to separate each VLAN ID range from the next range.
dot1q	Specifies IEEE 802.1Q VLAN tagged packets.
second-dot1q	

Command Default

No matching criteria are defined.

Command Modes

Interface configuration

Command History

Release	Modification
Release 24.1.1	This command was introduced.
Release 24.4.1	Support for VLAN range and list were added.

Usage Guidelines

These restrictions are applicable for this command:

- The outer tag must be unique and the inner tag may be a single VLAN.
- Only one encapsulation command must be configured per VLAN service instance.
- Overlapping inner VLAN ranges are not supported.

Examples

This example shows how to map ingress frames to a VLAN service instance:

```
Router#configure
Router(config)#interface HundredGigE0/0/0/24.1 l2transport
Router(config-subif)#encapsulation dot1q 200 second-dot1q 201
```

This example shows how to map the list of VLAN IDs.

```
Router# configure
Router(config)# interface HundredGigE0/3/0/0.1 l2transport
Router(config-subif)# encapsulation dot1q 100 second-dot1q 200,300
```

hw-module profile encap-exact encapsulation

To configure exact matching for single-tagged encapsulations (for the specified interface, interface type, or location), use the **hw-module profile encap-exact** command. The default is non-exact matching.

hw-module profile encap-exact [**interface** *type interface-path-id* | **location** *node-id all all-virtual*]

Syntax Description

interface *type interface-path-id*	Configures exact matching for the specified interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
location *all*	Configures exact matching for all bundle main and physical main interfaces.
location *node-id*	Configures exact matching for the specified location. The *node-id* argument is entered in the *rack/slot/module* notation.
location *all-virtual*	Configures exact matching for all bundle main interfaces.

Command Default

None

Command History

Release	Modification
Release 24.4.1	This command was introduced.

Usage Guidelines

For this command to take effect, you must reload the line card/router.

Examples

This example shows how to configure exact matching for all bundle main and physical main interfaces:

```
Router#configure
Router(config)#hw-module profile encap-exact location all
Router(config)#exit
```

interface

To create a VLAN interface or subinterface, use the **interface** command in global configuration mode.

interface *type* *interface-path-id* **.** *subinterface*

Syntax Description

type	Type of Ethernet interface on which you want to create a VLAN interface or subinterface. Enter **HundredGigabitEthernet**.
interface-path-id	Physical interface or virtual interface followed by the interface path ID. Naming notation is *interface-path-id*. For more information about the syntax for the router, use the question mark (?) online help function.
subinterface	Physical interface or virtual interface followed by the subinterface path ID. Naming notation is *interface-path-id.subinterface*. The period in front of the subinterface value is required as part of the notation. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

None

Command Modes

Global configuration mode

Command History

Release	Modification
Release 7.2.12	This command was introduced.

Usage Guidelines

For the *interface-path-id* argument, use the following guidelines:

- If specifying a physical interface, the naming notation is *rack*/*slot*/*module*/*port*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:
  - *rack*: Chassis number of the rack.
  - *slot*: Physical slot number of the line card.
  - *module*: Module number. A physical layer interface module (PLIM) is always 0.
  - *port*: Physical port number of the interface.
- If specifying an Ethernet bundle interface, the range is from 1 through 65535.

For the *subinterface* argument, the range is from 0 through 4095.

To configure a large number of subinterfaces, we recommend entering all configuration data before you commit the **interface** command.

Usage Guidelines

Note A subinterface does not pass traffic without an assigned VLAN ID.

Task ID

Task ID	Operations
vlan	read, write

Examples

This example shows how to configure a VLAN interface on a 100-Gigabit Ethernet interface:

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24
Router(config-subif)# dot1q vlan 1
Router(config-subif)# ipv4 address 10.0.0.1/8
```

This example shows how to configure a VLAN subinterface on a 100-Gigabit Ethernet interface:

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24.1
Router(config-subif)# dot1q vlan 1
Router(config-subif)# ipv4 address 10.0.0.1/8
```

To change an interface from Layer 2 to Layer 3 mode and back, you must delete the interface first and then re-configure it in the appropriate mode.

```
Router# configure
Router(config)# interface HundredGigE 0/0/0/24
Router(config-subif)# exit
Router(config)# no interface HundredGigE 0/0/0/24
```

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)#
```

Related Commands

Command	Description
show l2vpn, on page 25	Displays L2VPN information

mac withdraw

To enable MAC address withdrawal for a specified bridge domain, use the **mac withdraw** command in L2VPN configuration mode.

mac withdraw [**disable** | **optimize** | **state-down**]

Syntax Description

disable	Disables MAC address withdrawal.
optimize	Enables optimization of MAC address withdrawal when the bridge port goes down.
state-down	Sends MAC address withdrawal message when the bridge port goes down.

Command Default

None

Command Modes

L2VPN 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.

The following example shows how to disable MAC address withdrawal.

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group bg1
Router(config-l2vpn-bg)# bridge-domain bd1
Router(config-l2vpn-bg-bd)# mac
Router(config-l2vpn-bg-bd-mac)# withdraw disable
```

The following example shows how to configure MAC address withdrawal when the bridge port goes down.

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group bg1
Router(config-l2vpn-bg)# bridge-domain bd1
Router(config-l2vpn-bg-bd)# mac
Router(config-l2vpn-bg-bd-mac)# withdraw state-down
```

The following example shows how to configure optimization of MAC address withdrawal when the bridge port goes down.

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group bg1
Router(config-l2vpn-bg)# bridge-domain bd1
Router(config-l2vpn-bg-bd)# mac
Router(config-l2vpn-bg-bd-mac)# withdraw optimize
```

propagate remote-status

To propagate Layer 2 transport events, use the **propagate remote-status** command in in the Layer 2 transport configuration. To return to the default behavior, use the **no** form of this command.

propagate remote-status

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

Layer 2 transport configuration

Command History

Release	Modification
Release 24.3.1	This command was introduced.

Usage Guidelines

Link Loss Forwarding (LLF) feature uses this command to propagate link failures to remote endpoints.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to use the command to propagate Layer 2 transport events and to enable LLF.

```
Router(config)# interface tenGigE 0/0/0/1
Router(config-if)# l2transport
Router(config-if-l2)# propagate remote-status
```

pw-class encapsulation mpls

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

pw-class *class-name* **encapsulation mpls** { **control-word** | | **load-balancing flow-label** | **both** }
pw-class *class-name* **encapsulation mpls** { **control-word** | | **load-balancing flow-label** | **both** }

Syntax Description

class-name	Encapsulation class name.
control-word	Disables control word for MPLS encapsulation. Disabled by default.
load-balancing flow-label both	Sets flow-label based load balancing.

Command Default

None

Command Modes

L2VPN pseudowire class configuration

Command History

Release	Modification
Release 7.3.15	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

This example shows how to define MPLS pseudowire encapsulation:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# pw-class path1
Router(config-l2vpn-pwc)# encapsulation mpls
Router(config-l2vpn-pwc-mpls)# control-word
Router(config-l2vpn-pwc-mpls)# load-balancing flow-label both
```

rewrite ingress tag

To specify the encapsulation adjustment that is to be performed on the frame ingress to the VLAN service instance, use the **rewrite ingress tag** command in the interface configuration mode. Use the following VLAN rewrite configuration to add or modify double dot1q VLAN tags on L2 Ethernet frames. To delete the encapsulation adjustment, use the **no** form of this command.

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

Syntax Description

vlan-id	VLAN ID, integer in the range 1 to 4094.
push dot1q *vlan-id*	Pushes one 802.1Q tag with *vlan-id*.
push dot1q *vlan-id* **second-dot1q** *vlan-id*	Pushes a pair of 802.1Q tags in the order first, second.
push dot1ad *vlan-id*	Pushes one 802.1ad tag with *vlan-id*.
push dot1ad *vlan-id* **second-dot1q** *vlan-id*	Pushes a pair of 802.1ad tags in the order first, second.
pop {1 | 2}	One or two tags are removed from the packet. This command can be combined with a push (pop N and subsequent push *vlan-id*).
translate 1-to-1 dot1q *vlan-id*	Replaces the incoming tag (defined in the encapsulation command) into a different 802.1Q tag at the ingress service instance.
translate 1-to-1 dot1ad *vlan-id*	Replaces the incoming tag (defined in the encapsulation command) into a different 802.1ad tag at the ingress service instance.
translate 2-to-1 dot1q *vlan-id*	Replaces a pair of tags defined in the **encapsulation** command by vlan-id.
translate 2-to-1 dot1ad *vlan-id*	Replaces a pair of tags defined in the **encapsulation** command by vlan-id.
translate 1-to-2 dot1q *vlan-id* **second-dot1q** *vlan-id*	Replaces the incoming tag defined by the encapsulation command by a pair of 802.1Q tags.
translate 1-to-2 dot1ad *vlan-id* **second-dot1q** *vlan-id*	Replaces the incoming tag defined by the encapsulation command by a pair of 802.1ad tags.

translate 2-to-2 dot1q *vlan-id* **second-dot1q** *vlan-id*	Replaces the pair of tags defined by the encapsulation command by a pair of VLANs defined by this rewrite.
translate 2-to-2 dot1ad *vlan-id* **second-dot1q** *vlan-id*	Replaces the pair of tags defined by the encapsulation command by a pair of VLANs defined by this rewrite.
symmetric	(Optional) A rewrite operation is applied on both ingress and egress. The operation on egress is the inverse operation as ingress. **Note** Symmetric is the default behavior. Hence, it cannot be disabled.

Command Default

The Dot1q VLAN tags in the Ethernet frame is not modified on ingress.

Command Modes

Interface configuration

Command History

Release	Modification
Release 24.1.1	This command was introduced.
Release 24.4.1	The following keywords were introduced: • **push dot1ad** *vlan-id* • **translate 1-to-1 dot1ad** *vlan-id* • **translate 2-to-1 dotad** *vlan-id*

Usage Guidelines

The **symmetric** keyword is accepted only when a single VLAN is configured in encapsulation.

Define the elements being popped with an encapsulation type before using the **pop** command.

Define the elements being translated with an encapsulation type before using the **rewrite ingress tag translate** command. In the 2-to-1 option, “2” means two tags of a type defined by the **encapsulation** command.

Examples

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

```
Router#configure
Router(config)#interface TenGigE 0/0/0/1.102 l2transport
Router(config-subif)#encapsulation dot1q 200 second-dot1q 201
Router(config-subif)#rewrite ingress tag pop 2 symmetric
Router(config-subif)#commit
Router(config-subif)#exit
Router(config)#exit
```

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 ID	Operation
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
l2vpn, on page 19	Enters L2VPN configuration mode.

show l2vpn bridge-domain

To display information for the bridge ports such as attachment circuits for the specific bridge domains, use the **show l2vpn bridge-domain** command in EXEC Mode.

show l2vpn bridge-domain [**autodiscovery bgp** | **bd-name** *bridge-domain-name* | **brief** | **detail** | **group** *bridge-domain-group-name* | **hardware** | **interface** *type interface-path-id* | **location** *node-id* **neighbor** *ip-address* | **summary** | **no-statistics** | **p2mp tunnel-id** *id* | **standby**]

Syntax Description

autodiscovery bgp	(Optional) Displays BGP autodiscovery information.
bd-name *bridge-domain-name*	(Optional) Displays filter information on the *bridge-domain-name*. The *bridge-domain-name* argument is used to name a bridge domain.
brief	(Optional) Displays brief information about the bridges.
detail	(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 AC.
group *bridge-domain-group-name*	(Optional) Displays filter information on the bridge-domain group name. The *bridge-domain-group-name* argument is used to name the bridge domain group.
hardware	(Optional) Displays hardware information.
interface *type interface-path-id*	(Optional) Displays the filter information for the interface on the bridge domain. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
location*node-id*	(Optional) Displays the location specific information of the node.
neighbor *ip-address*	(Optional) Displays the bridge domains that contain the ACs to match the filter for the neighbor. The *ip-address* argument is used to specify IP address of the neighbor.
no-statistics	(Optional) Disables the collection of statistics for the bridge domain.
p2mp tunnel-id *id*	(Optional) Displays the bridge domain that contain the p2mp enabled bridge domain. The **tunnel-id** *id* argument is used too specify the tunnel of the p2mp brigde domain.
summary	(Optional) Displays the summary information for the bridge domain.
standby	(Optional) Displays whether the node is in the standby mode.

Command Default None

Command Modes EXEC mode

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.

Task ID

Task ID	Operations
l2vpn	read

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

```
Router# show l2vpn bridge-domain bd-name BG1_BD1 detail
Legend: pp = Partially Programmed.
Bridge group: bg1, bridge-domain: bg1_bd1, id: 0, state: up, ShgId: 0, MSTi: 0
  Coupled state: disabled
  MAC learning: enabled
  MAC withdraw: enabled
    MAC withdraw for Access PW: enabled
    MAC withdraw sent on: bridge port up
    MAC withdraw relaying (access to access): disabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  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 10.0.0.1, Multicast Group 225.1.1.1, UDP Port 4789
    Anycast VTEP 100.1.1.1, Anycast Multicast Group 224.10.10.1
    MAC learning: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 4000, Action: none, Notification: syslog
    MAC limit reached: no
    MAC port down flush: enabled
    MAC Secure: disabled, Logging: disabled
    Split Horizon Group: none
    Dynamic ARP Inspection: disabled, Logging: disabled
    IP Source Guard: disabled, Logging: disabled
    DHCPv4 snooping: disabled
    IGMP Snooping: enabled
    IGMP Snooping profile: none
    MLD Snooping profile: none
    Storm Control: bridge-domain policer

List of Access PWs:
List of VFIs:
  VFI bg1_bd1_vfi (up)
    VFI Statistics:
      drops: illegal VLAN 0, illegal length 0
```

Verify the EVPN and VPLS status.

```
Router# show l2vpn bridge-domain
Legend: pp = Partially Programmed.
Bridge group: vplstoevpn, bridge-domain: vplstoevpn, id: 0, state: up, ShgId: 0, MSTi: 0
  Aging: 300 s, MAC limit: 4000, Action: none, Notification: syslog
  Filter MAC addresses: 0
  ACs: 1 (1 up), VFIs: 1, PWs: 2 (1 up), PBBs: 0 (0 up), VNIs: 0 (0 up)
  List of EVPNs:
    EVPN, state: up
  List of ACs:
    Hu0/0/0/0, state: up, Static MAC addresses: 0, MSTi: 5
  List of Access PWs:
  List of VFIs:
    VFI vpls (up)
      Neighbor 172.16.0.1 pw-id 12, state: down, Static MAC addresses: 0
      Neighbor 192.168.0.1 pw-id 13, state: up, Static MAC addresses: 0
```

This indicates that VPLS and EVPN L2 bridging for the same VPN instance coexists and EVPN takes precedence over VPLS.

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
show l2vpn, on page 25	Displays L2VPN information

show l2vpn database

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

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

Syntax Description

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

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 7.2.12	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operation
l2vpn	read

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

```
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-ifname: 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
```

```
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    inited:0, flags:0x 0, circuits:0
MA: evpn         inited:0, flags:0x 0, circuits:0
```

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
show l2vpn, on page 25	Displays L2VPN information

show l2vpn forwarding

To display forwarding information from the Layer 2 FIB manager, use the **show l2vpn forwarding** command in EXEC mode.

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

Syntax Description

counter	Displays the cross-connect counters.
debug	Displays debug information.
detail	Displays detailed information from the layer2_fib manager.
hardware	Displays hardware-related layer2_fib manager information.
interface	Displays the match AC subinterface.
location *node-id*	Displays layer2_fib manager information for the specified location. The *node-id* argument is entered in the *rack/slot/module* notation.
private	Output includes private information.
summary	Displays the summary of the forwarding 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
                                                                     Switched
-------------------------------- -------------------------------- -- ---------
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
Hu/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: HundredGigE 0/0/0/24, Xconnect id: 0x1, Status: up
  Segment 1
    AC, HundredGigE 0/0/0/24, 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, HundredGigE 0/0/0/24, status: Bound

Local interface: HundredGigE 0/0/0/25, Xconnect id: 0x2, Status: up
  Segment 1
    AC, HundredGigE 0/0/0/25, 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, HundredGigE 0/0/0/25, status: Bound

Local interface: HundredGigE 0/0/0/24, Xconnect id: 0x3, Status: up
 Segment 1
    AC, HundredGigE 0/0/0/24, 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, HundredGigE 0/0/0/24, status: Bound
```

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
show l2vpn, on page 25	Displays L2VPN information
show l2vpn database, on page 30	Displays L2VPN database

show l2vpn protection main-interface

To display an overview of the main interface or instance operational information, use the **show l2vpn protection main-interface** command in EXEC mode.

show l2vpn protection main-interface [*interface name* { *Interface* }] [**brief** | **detail** | **private**]

Syntax Description

interface name	Interface name of the Ethernet ring G.8032 name.
interface	The forwarding interface ID in number or in Rack/Slot/Instance/Port format as required.
brief	Brief information about the G.8032 ethernet ring configuration.
detail	Information in detail about the G.8032 ethernet ring configuration.
private	Private information about the G.8032 ethernet ring configuration.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 7.2.12	This command was introduced.
Release 7.7.1	The command output was enhanced to include protection access gateway subtype indication `MST-AG`.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
l2vpn	read

Example

This example shows the output from the **show l2vpn protection main-interface** command:

```
RP/0/0/CPU0:router# show l2vpn protection main-interface

Main Interface ID              Subintf Count Protected  Blocked
------------------------------ ------------- ---------- ----------
GigabitEthernet0/0/0/0         1             None       No
```

```
   Instance : 0
      State         : FORWARDING
      Sub-Intf #    : 1
      Flush    #    : 0
       Sub-interfaces : GigabitEthernet0/0/0/0.4


Main Interface ID              Subintf Count Protected  Blocked
------------------------------ ------------- ---------- ----------
GigabitEthernet0/0/0/1         1             None       No
   Instance : 0
      State         : FORWARDING
      Sub-Intf #    : 1
      Flush    #    : 0
       Sub-interfaces : GigabitEthernet0/0/0/0.4

RP/0/0/CPU0:ios#show l2vpn protection main-interface gigabitEthernet 0/0/0/1
Tue Mar 15 10:54:13.366 EDT
Main Interface ID              # of subIntf Protected  Protect Type
------------------------------ ------------ ---------- ------------
GigabitEthernet0/0/0/1         2            Yes        MST-AG

   Instance : 0
      State          : FORWARDING
      Sub-Intf #     : 1
      Flush    #     : 1

   Instance : 1
      State          : BLOCKED
      Sub-Intf #     : 1
      Flush    #     : 0

RP/0/0/CPU0:ios#show l2vpn protection main-interface gigabitEthernet 0/0/0/2
Tue Mar 15 10:54:15.044 EDT
Main Interface ID              # of subIntf Protected  Protect Type
------------------------------ ------------ ---------- ------------
GigabitEthernet0/0/0/2         2            Yes        STP

   Instance : 0
      State          : FORWARDING
      Sub-Intf #     : 1
      Flush    #     : 0

   Instance : 1
      State          : FORWARDING
      Sub-Intf #     : 1
      Flush    #     : 0

RP/0/0/CPU0:router# show l2vpn protection main-interface brief

Main Interface ID              Ref Count  Instance   Protected  State
------------------------------ ---------- ---------- ---------  -----
GigabitEthernet0/0/0/0         3          2          No     FORWARDING
GigabitEthernet0/0/0/1         1          1          No     FORWARDING


RP/0/RSP0/CPU0:router# show l2vpn protection main-interface detail

Main Interface ID              # of subIntf Protected
------------------------------ ------------ ----------
GigabitEthernet0/1/0/19        4            No

Main Interface ID              # of subIntf Protected
------------------------------ ------------ ----------
```

```
GigabitEthernet0/1/0/20        3            No

Main Interface ID              # of subIntf Protected
------------------------------ ------------ ----------
GigabitEthernet0/1/0/3         2            No

Main Interface ID              # of subIntf Protected
------------------------------ ------------ ----------
GigabitEthernet0/1/0/30        1            No

Main Interface ID              # of subIntf Protected
------------------------------ ------------ ----------
GigabitEthernet0/1/0/7         4            No


RP/0/0/CPU0:router# show l2vpn protection main-interface private

Main Interface ID              Ref Count  Protected  Blocked    If Handle  Registered
------------------------------ ---------- ---------- ---------- ---------- ----------
GigabitEthernet0/0/0/0         3          None       No         0x20000020 No

   Instance : 0
      State          : FORWARDING        Config ID  : 0
      Sub-Intf #     : 0                 Ack      # : 0
      Bridge D #     : 0                 N-Ack    # : 0
      Flush    #     : 0                 Rcv      # : 0
      Sub-interfaces : GigabitEthernet0/0/0/0.4

     Instance event trace history [Total events: 1, Max listed: 8]
     ------------------------------------------------------
     Time                Event                          State           Action
     ====                =====                          ========        ========
     01/01/1970 01:00:01 Rcv state IF known             Invalid         134833160
     07/02/2010 10:13:03 Update L2FIB                   FORWARDING      0
     01/01/1970 01:00:25 Rcvd AC MA create + UP I/F ST  FORWARDING      0
```

Related Commands

Command	Description
l2vpn	Enters L2VPN configuration mode.

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 1: show l2vpn resource Command Field Descriptions

Field	Description
Memory	Displays memory status.

Related Commands

Command	Description
l2vpn, on page 19	Enters L2VPN configuration mode.
show l2vpn, on page 25	Displays L2VPN information

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

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

Command Default

None

Command Modes

EXEC 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
l2vpn, on page 19	Enters L2VPN configuration mode.
show l2vpn, on page 25	Displays L2VPN information
show l2vpn resource, on page 39	Displays the memory state in the L2VPN process.

split-horizon group

To add an AC to a split horizon group, use the **split-horizon group** command in L2VPN bridge group bridge domain attachment circuit configuration mode.

split-horizon group

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

L2VPN bridge group bridge domain attachment circuit configuration mode

Command History

Release	Modification
Release 7.11.1	This command was introduced.

Usage Guidelines

Only one split horizon group exists for ACs per bridge domain. By default, the group does not have any ACs. You can configure individual ACs to become members of the group using the **split-horizon group** configuration command.

You can configure an entire physical interface or EFPs within an interface to become members of the split horizon group.

Task ID

Task ID	Operations
l2vpn	Read, write

Examples

The following example shows the split horizon group configuration:

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group bg
Router(config-l2vpn-bg)# bridge-domain bd
Router(config-l2vpn-bg-bd-ac)# interface Ten0/7/0/22/0 <- (split-horizon group 0, default)
Router(config-l2vpn-bg-bd-ac)# interface Ten0/7/0/22/1.1
Router(config-l2vpn-bg-bd-ac)# split-horizon group <- (split-horizon group 2)
Router(config-l2vpn-bg-bd-ac)# neighbor 10.0.0.1 pw-id 1
Router(config-l2vpn-bg-bd-pw)# split-horizon group <- (split-horizon group 2)
Router(config-l2vpn-bg-bd-pw)# vfi vf
Router(config-l2vpn-bg-bd-vfi)# neighbor 172.16.0.1 pw-id 10001 <- (split-horizon group 1,
 default)
Router(config-l2vpn-bg-bd-vfi-pw)# commit
```

storm-control

To enable storm control on an access circuit (AC) under a VPLS bridge, use the **storm-control** command in l2vpn bridge group bridge-domain access circuit configuration mode. To disable storm control, use the **no** form of this command.

storm-control { **broadcast** | **multicast** | **unknown-unicast** } { **pps** *pps-value* | **kbps** *kbps-value* }
no storm-control { **broadcast** | **multicast** | **unknown-unicast** } { **pps** *pps-value* | **kbps** *kbps-value* }

Syntax Description

broadcast	Configures storm control for broadcast traffic.
multicast	Configures storm control for multicast traffic.
unknown-unicast	Configures storm control for unknown unicast traffic. • Storm control does not apply to bridge protocol data unit (BPDU) packets. All BPDU packets are processed as if traffic storm control is not configured. • Storm control does not apply to internal communication and control packets, route updates, SNMP management traffic, Telnet sessions, or any other packets addressed to the router.
pps *pps-value*	Configures the packets-per-second (pps) storm control threshold for the specified traffic type. Valid values range from 50 to 160000.
kbps *kbps-value*	Configures the storm control in kilo bits per second (kbps). The range is from 100 to 1280000.

Command Default

Storm control is disabled by default.

Command Modes

l2vpn bridge group bridge-domain access circuit configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Usage Guidelines

- Storm control is supported on main ports only.
- Storm control configuration is supported at the bridge-port level, and not at the bridge-domain level.
- PW-level storm control is not supported.
- Storm control is not supported through QoS input policy.
- Although pps is configurable, it is not natively supported. PPS configuration is converted to a kbps value assuming a 256 byte packet size when configuring the hardware policers.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example enables two storm control thresholds on an access circuit:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# l2vpn
RP/0/RSP0/CPU0:router(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:router(config-l2vpn-bg)# bridge-domain BD1
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface HundredGigE0/0/0/0
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# storm-control broadcast kbps 4500
RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)# commit
```

vpws-seamless-integration

To enable EVPN-VPWS seamless integration, use the **vpws-seamless-integration** command in L2VPN configuration mode. To disable EVPN-VPWS seamless integration, use the **no** form of this command.

vpws-seamless-integration

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

L2VPN configuration mode

Command History

Release	Modification
Release 7.8.1	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 enable EVPN-VPWS integration on an edge device for BGP PW.

```
Router# configure
Router(config)# l2vpn xconnect group 1
Router(config-l2vpn-xc)# mp2mp 2
Router(config-l2vpn-xc-mp2mp)# autodiscovery bgp
Router(config-l2vpn-xc-mp2mp-ad)# signaling-protocol bgp
Router(config-l2vpn-xc-mp2mp-ad-sig)# ce-id 3
Router(config-l2vpn-xc-mp2mp-ad-sig-ce)# vpws-seamless-integration
```

The following example shows how to enable EVPN-VPWS integration for TLDP PW.

```
Router# configure
Router(config)# l2vpn xconnect group 1
Router(config-l2vpn-xc)# p2p p1
Router(config-l2vpn-xc-p2p)# interface BE1.1
Router(config-l2vpn-xc-p2p)# neighbor 1.1.1.1 pw-id 1
Router(config-l2vpn-xc-p2p-pw)# exit
Router(config-l2vpn-xc-p2p)# vpws-seamless-integration
```