



## Virtual Private Network Commands

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For detailed information about virtual private network concepts, configuration tasks, and examples, refer to the *Cisco IOS XR Virtual Private Network Configuration Guide for the Cisco XR 12000 Series Router*

- [authentication \(L2TP\), page 3](#)
- [backup \(L2VPN\), page 5](#)
- [backup disable \(L2VPN\), page 7](#)
- [clear l2tp counters control session, page 9](#)
- [clear l2tp counters control tunnel, page 11](#)
- [clear l2tp tunnel, page 12](#)
- [clear l2vpn collaborators, page 13](#)
- [clear l2vpn counters l2tp, page 14](#)
- [clear l2vpn counters bridge mac-withdrawal, page 16](#)
- [clear l2vpn forwarding counters, page 17](#)
- [clear l2vpn forwarding mac-address-table, page 18](#)
- [clear l2vpn forwarding message counters, page 20](#)
- [clear l2vpn forwarding table, page 21](#)
- [digest \(L2TP\), page 22](#)
- [hello-interval \(L2TP\), page 24](#)
- [hidden \(L2TP\), page 26](#)
- [hostname \(L2TP\), page 28](#)
- [interface \(p2p\), page 30](#)
- [l2tp-class, page 32](#)
- [l2tp-class configuration, page 33](#)
- [l2transport, page 35](#)
- [l2transport cell-packing, page 37](#)

- [l2transport l2protocol](#), page 38
- [l2transport propagate](#), page 40
- [l2transport service-policy](#), page 42
- [l2vpn](#), page 43
- [logging \(l2vpn\)](#), page 44
- [mpls static label \(L2VPN\)](#), page 45
- [neighbor \(L2VPN\)](#), page 47
- [password \(L2TP\)](#), page 49
- [preferred-path](#), page 51
- [pw-class \(L2VPN\)](#), page 53
- [pw-class encapsulation l2tpv3](#), page 55
- [pw-class encapsulation mpls](#), page 57
- [p2p](#), page 59
- [receive-window \(L2TP\)](#), page 61
- [retransmit \(L2TP\)](#), page 63
- [rollover \(L3VPN\)](#), page 65
- [sequencing \(L2VPN\)](#), page 66
- [show l2tp class](#), page 68
- [show l2tp counters forwarding session](#), page 70
- [show l2tp session](#), page 72
- [show l2tp tunnel](#), page 74
- [show l2vpn collaborators](#), page 76
- [show l2vpn forwarding](#), page 78
- [show l2vpn forwarding l2tp](#), page 83
- [show l2vpn pw-class](#), page 85
- [show l2vpn resource](#), page 87
- [show l2vpn xconnect](#), page 88
- [tag-rewrite](#), page 96
- [timeout setup \(L2TP\)](#), page 98
- [transport mode \(L2VPN\)](#), page 100
- [tunnel-template](#), page 102
- [xconnect group](#), page 103

# authentication (L2TP)

To enable L2TP authentication for a specified L2TP class name, use the **authentication** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**authentication**

**no authentication**

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

**Command Default** None

**Command Modes** L2TP class configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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



**Note**

You can also enable L2TP authentication for a specified class name from L2TP class configuration submode. To enter this submode, enter the **l2tp-class** command followed by the class name.

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to configure L2TP authentication for the specified L2TP class name “cisco”:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# authentication
```

Related Commands	Command	Description
	<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).

Command	Description
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## backup (L2VPN)

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

**backup neighbor** *IP-address* **pw-id** *value*

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

### Syntax Description

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

### Command Default

None

### Command Modes

L2VPN xconnect p2p pseudowire configuration

### Command History

Release	Modification
Release 3.8.0	This command was introduced.

### Usage Guidelines

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

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure backup pseudowires:

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

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">backup disable (L2VPN), page 7</a>	Specifies how long a backup pseudowire should wait before resuming operation after the primary pseudowire goes down.
<a href="#">l2vpn, page 43</a>	Enters L2VPN configuration mode.
<a href="#">neighbor (L2VPN), page 47</a>	Configures a pseudowire for a cross-connect.
<a href="#">p2p, page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">xconnect group, page 103</a>	Configures cross-connect groups.

## backup disable (L2VPN)

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

**backup disable** {*delay value*| **never**}

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

### Syntax Description

<b>delay value</b>	Specifies the number of seconds that elapse after the primary pseudowire becomes nonfunctional before the Cisco IOS XR software attempts to activate the secondary pseudowire.  The range, in seconds, is from 0 to 180. The default is 0.
<b>never</b>	Specifies that the secondary pseudowire does not fall back to the primary pseudowire if the primary pseudowire becomes available again, unless the secondary pseudowire fails.

### Command Default

The default disable delay is the value of 0, which means that the primary pseudowire is activated immediately when it comes back up.

### Command Modes

L2VPN pseudowire class configuration

### Command History

Release	Modification
Release 3.8.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2vpn
RP/0/0/CPU0:router(config-l2vpn)# pw-class class1
RP/0/0/CPU0:router(config-l2vpn-pwc)# backup disable delay 50
```

```

RP/0/0/CPU0:router(config-l2vpn-pwc)# exit
RP/0/0/CPU0:router(config-l2vpn)# xconnect group A
RP/0/0/CPU0:router(config-l2vpn-xc)# p2p rtrx
RP/0/0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.1 pw-id 2
RP/0/0/CPU0:router(config-l2vpn-xc-p2p-pw)# pw-class class1
RP/0/0/CPU0:router(config-l2vpn-xc-p2p-pw)# backup neighbor 10.2.2.2 pw-id 5
RP/0/0/CPU0:router(config-l2vpn-xc-p2p-pw-backup)#

```

**Related Commands**

Command	Description
<a href="#">l2vpn, page 43</a>	Enters L2VPN configuration mode.
<a href="#">neighbor (L2VPN), page 47</a>	Configures a pseudowire for a cross-connect.
<a href="#">p2p, page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">pw-class (L2VPN), page 53</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">xconnect group, page 103</a>	Configures cross-connect groups.

# clear l2tp counters control session

To clear L2TP control counters for a session, use the **clear l2tp counters control session** command in EXEC mode.

**clear l2tp counters control session fsm [event| state transition]**

Syntax Description	
<b>fsm</b>	(Optional) Clears finite state machine counters.
<b>event</b>	(Optional) Clears state machine event counters.
<b>state</b>	(Optional) Clears state machine state counters.
<b>transition</b>	(Optional) Clears state machine transition counters.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to clear all L2TP state machine transition counters:

```
RP/0/0/CPU0:router (config-l2vpn-xc-p2p-pw-backup)## clear l2tp counters control session fsm
state transition
```

Related Commands	Command	Description
	<a href="#">clear l2tp counters control tunnel, page 11</a>	Clears L2TP control counters for a tunnel.

Command	Description
<a href="#">clear l2vpn counters l2tp, page 14</a>	Clears L2VPN statistical information, such as, packets dropped.

# clear l2tp counters control tunnel

To clear L2TP control counters for a tunnel, use the **clear l2tp counters control tunnel** command in EXEC mode.

**clear l2tp counters control tunnel** {**all**| **authentication**| **id** *tunnel id*}

Syntax Description		
<b>all</b>		Clears all L2TP counters, except authentication counters
<b>authentication</b>		Clears tunnel authentication counters.
<b>id</b> <i>tunnel id</i>		Clears a specified counter. Range is 1 to 4294967295.

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to clear all L2TP control tunnel counters:

```
RP/0/0/CPU0:router# clear l2tp counters control tunnel all
```

Related Commands	Command	Description
	<a href="#">clear l2tp counters control session, page 9</a>	Clears L2TP control counters for a session.
	<a href="#">clear l2vpn counters l2tp, page 14</a>	Clears L2VPN statistical information, such as, packets dropped.

# clear l2tp tunnel

To clear L2TP tunnels, use the **clear l2tp tunnel** command in EXEC mode.

```
clear l2tp tunnel {all| id tunnel id| l2tp-class class name| local ipv4 ipv4 address| remote ipv4 ipv4 address}
```

## Syntax Description

<b>all</b>	Clears all L2TP tunnels.
<b>id</b> <i>tunnel id</i>	Clears a specified tunnel.
<b>l2tp-class</b> <i>class name</i>	Clears all L2TP tunnels based on L2TP class name.
<b>local ipv4</b> <i>ipv4 address</i>	Clears all local tunnels based on the specified local IPv4 address.
<b>remote ipv4</b> <i>ipv4 address</i>	Clears all remote tunnels based on the specified local IPv4 address.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows how to clear all L2TP tunnels:

```
RP/0/0/CPU0:router# clear l2tp tunnel all
```

## Related Commands

Command	Description
<a href="#">clear l2tp counters control session, page 9</a>	Clears L2TP control counters for a session.
<a href="#">clear l2tp counters control tunnel, page 11</a>	Clears L2TP control counters for a tunnel.

# clear l2vpn collaborators

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

**clear l2vpn collaborators**

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

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	<a href="#">show l2vpn collaborators, page 76</a>	Displays information about the state of the interprocess communications connections between l2vpn_mgr and other processes.

# clear l2vpn counters l2tp

To clear L2VPN statistical information, such as, packets dropped, use the **clear l2vpn counters l2tp** command in EXEC mode.

**clear l2vpn counters l2tp** [**neighbor** *ip-address* [**pw-id** *value*]]

## Syntax Description

<b>l2tp</b>	Clears all L2TP counters.
<b>neighbor</b> <i>ip-address</i>	(Optional) Clears all L2TP counters for the specified neighbor.
<b>pw-id</b> <i>value</i>	(Optional) Configures the pseudowire ID. The range is from 1 to 4294967295.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.7.0	The <b>pw-id</b> keyword was added.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows how to clear all L2TP counters:

```
RP/0/0/CPU0:router# clear l2vpn counters l2tp
```

**Related Commands**

Command	Description
<a href="#">show l2vpn collaborators, page 76</a>	Displays information about the state of the interprocess communications connections between l2vpn_mgr and other processes.

# clear l2vpn counters bridge mac-withdrawal

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

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

## Syntax Description

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

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

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

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

# clear l2vpn forwarding counters

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

**clear l2vpn forwarding counters**

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

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

## 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*}

### Syntax Description

<i>address</i>	Clears a specified MAC address.
<b>bridge-domain</b> <i>name</i>	Clears bridge domains learned from a MAC address table.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. <b>Note</b> Use the <b>show interfaces</b> command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
<b>location</b> <i>node-id</i>	Clears L2VPN forwarding message counters for the specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

### Command Default

None

### Command Modes

EXEC

### Command History

Release	Modification
Release 3.5.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

**Examples**

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

```
RP/0/0/CPU0:router# clear l2vpn forwarding mac-address location 1/1/1
```

**Related Commands**

Command	Description
<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# clear l2vpn forwarding message counters

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

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

<b>Syntax Description</b>	<b>location</b> <i>node-id</i>	Clears L2VPN forwarding message counters for the specified location.
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<b>Command Default</b>	None
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<b>Command Modes</b>	EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.5.0	This command was introduced.

**Usage Guidelines**

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

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

**Examples**

The following example shows how to clear L2VPN forwarding message counters on a specified node:

```
RP/0/0/CPU0:router# clear l2vpn forwarding message counters location 0/6/CPU0
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# clear l2vpn forwarding table

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

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

<b>Syntax Description</b>	<b>location</b> <i>node-id</i>	Clears L2VPN forwarding tables for the specified location.
<b>Command Default</b>	None	
<b>Command Modes</b>	EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.4.0	This command was introduced.
<b>Usage Guidelines</b>	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
<b>Task ID</b>	<b>Task ID</b>	<b>Operations</b>
	l2vpn	read, write
<b>Examples</b>	The following example shows how to clear an L2VPN forwarding table from a specified location:	
	<pre>RP/0/0/CPU0:router# clear l2vpn forwarding table location 1/2/3/5</pre>	
<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn forwarding</a> , page 78	Displays forwarding information from the layer2_fib manager on the line card.

## digest (L2TP)

To configure digest options, use the **digest** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

```
digest {check disable| hash {MD5| SHA1}| secret {0| 7| word}}
```

```
no digest {check disable| hash {MD5| SHA1}| secret {0| 7| word}}
```

### Syntax Description

<b>check disable</b>	Disables digest checking.
<b>hash</b> { <b>MD5</b>   <b>SHA1</b> }	Configures the digest hash method (MD5 or SHA1). Default is MD5.
<b>secret</b> { <b>0</b>   <b>7</b>   <i>word</i> }	Configures a shared secret for message digest.

### Command Default

**check disable:** Digest checking is enabled by default.

**hash:** Default is MD5 if the **digest** command is issued without the secret keyword option and L2TPv3 integrity checking is enabled.

### Command Modes

L2TP class configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

The digest secret and hash algorithm can be configured in the l2tp-class configuration for authentication of the control channel. For control channel authentication to work correctly, however, both sides of the L2TP control channel connection must share a common secret and hash algorithm.

To update of digest secret without network disruption, Cisco supports a maximum to two digest secrets. You can configure a new secret while keeping the old secret valid. You can safely remove the old secret after you update all affected peer nodes with a new secret,

### Task ID

Task ID	Operations
l2vpn	read, write

**Examples**

The following example shows how to configure digest options for L2TP:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# digest check disable
RP/0/0/CPU0:router(config-l2tp-class)# digest secret cisco hash md5
```

**Related Commands**

Command	Description
<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## hello-interval (L2TP)

To configure the hello-interval value for L2TP (duration between control channel hello packets), use the **hello interval (L2TP)** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**hello-interval** *interval*

**no hello-interval** *interval*

<b>Syntax Description</b>	<i>interval</i>	Interval (in seconds) between control channel hello packets. The range is from 0 to 1000. Default is 60 seconds.
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<b>Command Default</b>	<i>interval</i> : 60 seconds
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<b>Command Modes</b>	L2TP class configuration
----------------------	--------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.7.0	This command was introduced.

**Usage Guidelines**

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

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

**Examples**

The following example shows how to configure the hello-interval value for L2TP to 22 seconds:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# hello-interval 22
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
	<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
	<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.

Command	Description
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## hidden (L2TP)

To enable hidden attribute-value pairs (AVPs), use the **hidden** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**hidden**

**no hidden**

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

**Command Default** None

**Command Modes** L2TP class configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to enable hidden AVPs:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# hidden
```

Related Commands	Command	Description
	<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
	<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
	<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.

Command	Description
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## hostname (L2TP)

To define the name used in the L2TP hostname AVP, use the **hostname** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**hostname** *name*

**no hostname** *name*

### Syntax Description

<i>name</i>	Hostname used to identify the router during L2TP control channel authentication.
-------------	--

### Command Default

None

### Command Modes

L2TP class configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure a hostname using the word “cisco”:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# hostname cisco
```

### Related Commands

Command	Description
<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).

Command	Description
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## interface (p2p)

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

**interface** *type interface-path-id*

**no interface** *type interface-path-id*

### Syntax Description

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface.
<b>Note</b>	Use the <b>show interfaces</b> command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

### Command Default

None

### Command Modes

p2p configuration submode

### Command History

Release	Modification
Release 3.4.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

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

**Related Commands**

Command	Description
<a href="#">p2p</a> , <a href="#">page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.

# l2tp-class

To enter L2TP class configuration mode where you can define an L2TP signaling template, use the **l2tp-class** command in global configuration mode. To delete the L2TP class, use the **no** form of this command.

**l2tp-class** *l2tp-class-name*

**no l2tp-class** *l2tp-class-name*

## Syntax Description

l2tp-class-name	L2TP class name.
-----------------	------------------

## Command Default

No L2TP classes are defined.

## Command Modes

Global configuration

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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



### Note

An L2TP class name must be defined before configuring L2TP control plane configuration settings.

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows how to enter L2TP configuration mode to create a template of L2TP control plane configuration settings that can be inherited by different pseudowire classes (in this case, the word “cisco” is used):

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)#
```

# l2tp-class configuration

To enter L2TP class configuration mode in which an L2TP signaling template is not defined, use the **l2tp-class configuration** command in global configuration mode. To delete the L2TP class configuration, use the **no** form of this command.

**l2tp-class configuration**

**no l2tp-class configuration**

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

**Command Default** No L2TP classes are defined.

**Command Modes** Global configuration

Command History	Release	Modification
	Release 3.8.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to enter L2TP configuration mode:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class configuration
RP/0/0/CPU0:router(config-l2tp-class)#
```

Related Commands	Command	Description
	<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
	<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
	<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.

Command	Description
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

# l2transport

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

## **l2transport**

### **no l2transport**

This command has no arguments or keywords.

#### **Command Default**

None

#### **Command Modes**

Interface configuration

#### **Command History**

<b>Release</b>	<b>Modification</b>
Release 3.4.0	This command was introduced.

#### **Usage Guidelines**

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

The l2transport command and these configuration items are mutually exclusive:

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



#### **Note**

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

#### **Task ID**

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

**Examples**

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

**Ethernet Port Mode:**

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

**Ethernet VLAN Mode:**

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

**Ethernet VLAN Mode (QinQ):**

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

**Ethernet VLAN Mode (QinAny):**

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

**Related Commands**

Command	Description
<a href="#">show l2vpn forwarding</a> , <a href="#">page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2transport cell-packing

To configure L2VPN cell packing parameters, use the **l2transport cell-packing** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

**l2transport cell-packing** *maximum timer*

**no l2transport cell-packing** *maximum timer*

## Syntax Description

<i>maximum</i>	Maximum number of cells to be packed in a packet. Range is 2 to 86.
<i>timer</i>	Cell packing timer (1, 2, or 3).

## Command Default

No default behavior or values

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.5.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write
atm	read, write

## Examples

The following example shows how to configure L2VPN cell packing parameters:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/0/CPU0:router(config-if)# l2transport cell-packing 33 2
```

## Related Commands

Command	Description
<a href="#">show l2vpn forwarding</a> , <a href="#">page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# I2transport I2protocol

To configure Layer 2 protocol handling, use the **I2transport I2protocol** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

**I2transport I2protocol {cdp| pvst| stp| vtp} {drop| experimental bits| tunnel experimental bits}**

**no I2transport I2protocol {cdp| pvst| stp| vtp} {drop| experimental bits| tunnel experimental bits}**

## Syntax Description

<b>cdp</b>	Configures Cisco Discovery Protocol (CDP).
<b>pvst</b>	Configures Per VLAN Spanning Tree protocol (PVST).
<b>stp</b>	Configures Spanning Tree Protocol (STP).
<b>vtp</b>	Configures VLAN Trunk Protocol (VTP).
<b>drop</b>	Drops the selected protocol packets.
<b>experimental bits</b>	Modifies the MPLS experimental bits.
<b>tunnel experimental bits</b>	Configures tunnel protocol packets.

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.5.0	This command was introduced.

## Usage Guidelines

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

These L2 protocols are available:

- Cisco Discovery Protocol (CDP)—CDP is protocol-independent and is used to obtain protocol addresses, platform information, and other data about neighboring devices.
- PVST maintains a spanning tree instance for each VLAN configured in the network and permits a VLAN trunk to be forwarding for some VLANs and not for others. It can also load balance Layer 2 traffic by forwarding some VLANs on one trunk and other VLANs on others.

- Spanning-Tree Protocol (STP)—STP is a link management protocol that provides path redundancy in the network. For Ethernet networks to function properly, only one active path can exist between two stations.
- VLAN Trunk Protocol (VTP)—VTP is a Cisco-proprietary protocol that reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain.

**Task ID**

Task ID	Operations
l2vpn	read, write
atm	read, write

**Examples**

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

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

**Related Commands**

Command	Description
<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2transport propagate

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

**l2transport propagate remote-status**

**no l2transport propagate remote-status**

## Syntax Description

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

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.9.0	This command was introduced.

## Usage Guidelines

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

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

To display the state of l2transport events, use the **show controller internal** command in

*Cisco IOS XR Interface and Hardware Component Configuration Guide for the Cisco XR 12000 Series Router*

For more information about the Ethernet remote port shutdown feature, see *Cisco IOS XR MPLS Configuration Guide for the Cisco XR 12000 Series Router*.

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

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

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

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2transport service-policy

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

**l2transport service-policy** {input *policy-name*| output *policy-name*}

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

## Syntax Description

<b>input</b> <i>policy-name</i>	Configures the direction of service policy application: input.
<b>output</b> <i>policy-name</i>	Configures the direction of service policy application: output.

## Command Default

None

## Command Modes

Interface configuration

## Command History

Release	Modification
Release 3.5.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write
atm	read, write

## Examples

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

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

## Related Commands

Command	Description
<a href="#">show l2vpn forwarding</a> , <a href="#">page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

# l2vpn

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

**l2vpn**

**no l2vpn**

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

**Command Default** None

**Command Modes** Global configuration

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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



**Note**

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to enter L2VPN configuration mode:

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

Related Commands	Command	Description
	<a href="#">show l2vpn forwarding, page 78</a>	Displays forwarding information from the layer2_fib manager on the line card.

## logging (l2vpn)

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

**logging pseudowire status**

**no logging pseudowire status**

### Syntax Description

pseudowire status	Enables pseudowire state change logging.
-------------------	--

### Command Default

None

### Command Modes

L2VPN configuration submode

### Command History

Release	Modification
Release 3.5.0	This command was introduced.

### Usage Guidelines

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



#### Note

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

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

### Related Commands

Command	Description
<a href="#">l2vpn</a> , page 43	Enters L2VPN configuration mode.

## mpls static label (L2VPN)

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

**mpls static label local** *label* **remote** *value*

**no mpls static label local** *label* **remote** *value*

### Syntax Description

**local** *label* Configures a local pseudowire label. Range is 16 to 15999.

**remote** *value* Configures a remote pseudowire label. Range is 16 to 15999.

### Command Default

The default behavior is a dynamic label assignment.

### Command Modes

L2VPN cross-connect P2P pseudowire configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

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

### Related Commands

Command	Description
<a href="#">l2vpn</a> , <a href="#">page 43</a>	Enters L2VPN configuration mode.

Command	Description
<a href="#">neighbor (L2VPN), page 47</a>	Configures a pseudowire for a cross-connect.
<a href="#">p2p, page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">xconnect group, page 103</a>	Configures cross-connect groups.

## neighbor (L2VPN)

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

**neighbor** *A.B.C.D* **pw-id** *value*

**no neighbor** *A.B.C.D* **pw-id** *value*

### Syntax Description

<i>A.B.C.D</i>	IP address of the cross-connect peer.
<b>pw-id</b> <i>value</i>	Configures the pseudowire ID and ID value. Range is 1 to 4294967295.

### Command Default

None

### Command Modes

p2p configuration submode

### Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.4.1	The <b>vccv disable</b> keyword was added.
Release 3.7.0	The following keywords were removed: <ul style="list-style-type: none"> <li>• <b>control-word</b></li> <li>• <b>pw-static-label local</b></li> <li>• <b>remote</b></li> <li>• <b>vccv</b></li> <li>• <b>transport-mode</b></li> </ul>

### Usage Guidelines

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

A cross-connect may have two segments:

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

**Note**

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

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

**Task ID**

Task ID	Operations
l2vpn	read, write

**Examples**

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

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

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

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

**Related Commands**

Command	Description
<a href="#">l2vpn</a> , <a href="#">page 43</a>	Enters L2VPN configuration mode.
<a href="#">p2p</a> , <a href="#">page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.
<a href="#">pw-class (L2VPN)</a> , <a href="#">page 53</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">xconnect group</a> , <a href="#">page 103</a>	Configures cross-connect groups.

## password (L2TP)

To define the password and password encryption type for control channel authentication, use the **password** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

```
password [0| 7] password
no password
```

Syntax Description		
	0	(Optional) Specifies that an unencrypted password will follow.
	7	(Optional) Specifies that an encrypted password will follow.
	<i>password</i>	Unencrypted or clear text user password.

**Command Default** None

**Command Modes** Global configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to define an unencrypted password using the word “cisco” for control channel authentication:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class sanjose
RP/0/0/CPU0:router(config-l2tp-class)# password 0 cisco
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## preferred-path

To configure an MPLS TE tunnel to be used for L2VPN traffic, use the **preferred-path** command in Encapsulation MPLS configuration mode. To delete the preferred-path, use the **no** form of this command.

**preferred-path interface tunnel-te value [fallback disable]**

**no preferred-path interface tunnel-te value [fallback disable]**

### Syntax Description

<i>interface</i>	Specifies the interface for the preferred path.
<b>tunnel-te</b>	Specifies the tunnel interface name for the preferred path.
<i>value</i>	Tunnel number for preferred path.
<b>fallback disable</b>	(Optional) Disables fallback for preferred path tunnel settings.

### Command Default

None

### Command Modes

Encapsulation MPLS configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

The **preferred-path** command is applicable only to pseudowires with MPLS encapsulation.

Cisco IOS XR software supports only **fallback disable**. Traffic does not use the default LDP path if the tunnel is down.

Use the **show l2vpn xconnect detail** command to show the status of fallback (that is, enabled or disabled).



#### Note

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

### Task ID

Task ID	Operations
l2vpn	read, write

**Examples**

The following example shows how to configure preferred-path tunnel settings:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2vpn
RP/0/0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
RP/0/0/CPU0:router(config-l2vpn-pwc-encap-mpls)# interfacetunnel-te 56 tunnel 6666fallback
disable
```

**Related Commands**

Command	Description
<a href="#">show l2vpn xconnect, page 88</a>	Displays brief information on configured cross-connects.

## pw-class (L2VPN)

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

**pw-class** *class-name*

**no pw-class** *class-name*

### Syntax Description

<i>class-name</i>	Pseudowire class name.
-------------------	------------------------

### Command Default

None

### Command Modes

L2VPN configuration submode

### Command History

Release	Modification
Release 3.5.0	This command was introduced.

### Usage Guidelines

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



#### Note

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

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

**Related Commands**

Command	Description
<a href="#">p2p, page 59</a>	Enters p2p configuration submode to configure point-to-point cross-connects.

## pw-class encapsulation l2tpv3

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

```
pw-class class name encapsulation l2tpv3 [cookie size {0|4|8}| ipv4 source address| pmtu max 68-65535|
protocol l2tpv3 class name| tos {reflect value 0-255| value 0-255}| ttl value]
```

```
pw-class class name encapsulation l2tpv3 [cookie size {0|4|8}| ipv4 source address| pmtu max 68-65535|
protocol l2tpv3 class name| tos {reflect value 0-255| value 0-255}| ttl value]
```

### Syntax Description

<b>class name</b>	Configures an encapsulation class name.
<b>cookie size {0   4   8}</b>	(Optional) Configures the L2TPv3 cookie size setting: <ul style="list-style-type: none"> <li>• 0—Cookie size is 0 bytes.</li> <li>• 4—Cookie size is 4 bytes.</li> <li>• 8—Cookie size is 8 bytes.</li> </ul>
<b>ipv4 source address</b>	(Optional) Configures the local source IPv4 address.
<b>pmtu max 68-65535</b>	(Optional) Configures the value of the maximum allowable session MTU.
<b>protocol l2tpv3 class name</b>	(Optional) Configures L2TPv3 as the signaling protocol for the pseudowire class.
<b>tos {reflect value 0-255   value 0-255}</b>	(Optional) Configures TOS and the TOS value. Range is 0 to 255.
<b>ttl value</b>	Configures the Time-to-live (TTL) value. Range is 1 to 255.

### Command Default

None

### Command Modes

L2VPN pseudowire class configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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



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

**Task ID**

Task ID	Operations
l2vpn	read, write

**Examples**

The following example shows how to define L2TPV3 pseudowire encapsulation:

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

**Related Commands**

Command	Description
<a href="#">pw-class (L2VPN), page 53</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">pw-class encapsulation mpls, page 57</a>	Configures MPLS pseudowire encapsulation.

## pw-class encapsulation mpls

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

```
pw-class class-name encapsulation mpls {control word| preferred-path| protocol ldp| sequencing| tag-rewrite| transport-mode| vccv verification-type none}
```

```
no pw-class class-name encapsulation mpls {control word| preferred-path| protocol ldp| sequencing| tag-rewrite| transport-mode| vccv verification-type none}
```

### Syntax Description

<i>class-name</i>	Configures an encapsulation class name.
<b>control word</b>	Disables control word for MPLS encapsulation. The <b>control word</b> keyword is disabled by default.
<b>preferred-path</b>	Configures the preferred path tunnel settings.
<b>protocol ldp</b>	Configures LDP as the signaling protocol for this pseudowire class.
<b>sequencing</b>	Configures sequencing on receive or transmit.
<b>tag-rewrite</b>	Configures VLAN tag rewrite.
<b>transport-mode</b>	Configures transport mode to be either Ethernet or VLAN.
<b>vccv none</b>	Enables or disables the VCCV verification type.

### Command Default

None

### Command Modes

L2VPN pseudowire class configuration

### Command History

Release	Modification
Release 3.5.0	This command was introduced.
Release 3.8.0	The keywords <b>control word disable</b> and <b>vccv none</b> were replaced by the keywords <b>control word</b> and <b>vccv verification-type none</b> .
Release 3.9.0	The following keywords were added: <ul style="list-style-type: none"> <li>• <b>preferred-path</b></li> <li>• <b>sequencing</b></li> <li>• <b>tag-rewrite</b></li> </ul>

Release	Modification
	• transport-mode

**Usage Guidelines**

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

**Note**

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

**Task ID**

Task ID	Operations
l2vpn	read, write

**Examples**

The following example shows how to define MPLS pseudowire encapsulation:

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

**Related Commands**

Command	Description
<a href="#">pw-class (L2VPN), page 53</a>	Enters pseudowire class submode to define a pseudowire class template.
<a href="#">pw-class encapsulation l2tpv3, page 55</a>	Configures L2TPv3 pseudowire encapsulation.

## p2p

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

**p2p** *xconnect-name*

**no p2p** *xconnect-name*

### Syntax Description

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

### Command Default

None

### Command Modes

L2VPN xconnect

### Command History

Release	Modification
Release 3.4.0	This command was introduced.

### Usage Guidelines

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

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

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

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

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

**Related Commands**

Command	Description
<a href="#">interface (p2p), page 30</a>	Configures an attachment circuit.

## receive-window (L2TP)

To configure the receive window size for the L2TP server, use the **receive-window** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**receive-window** *size*

**no receive-window** *size*

### Syntax Description

<i>size</i>	Maximum number of packets that are received from a peer before back-off is applied. Default is 512.
-------------	---

### Command Default

*size*: 512

### Command Modes

L2TP class configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure the receive window size for the L2TP server to 10 packets:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# receive-window 10
```

### Related Commands

Command	Description
<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).

Command	Description
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.

## retransmit (L2TP)

To configure retransmit retry and timeout values, use the **retransmit** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**retransmit** {**initial** *initial-retries*| **retries** *retries*| **timeout** {**max**| **min**} *timeout*}

**no retransmit** {**initial** *initial-retries*| **retries** *retries*| **timeout** {**max**| **min**} *timeout*}

### Syntax Description

<b>initial</b> <i>initial-retries</i>	Configures the number of SCCRQ messages resent before giving up on a particular control channel. Range is 1 to 1000. Default is 2.
<b>retries</b> <i>retries</i>	Configures the maximum number of retransmissions before determining that peer router does not respond. Range is 5 to 1000. Default is 15.
<b>timeout</b> { <b>max</b>   <b>min</b> } <i>timeout</i>	Configures the maximum and minimum retransmission interval in seconds for control packets. Range is 1 to 8. Maximum timeout default is 8 seconds. Minimum timeout default is 1 second.

### Command Default

*initial retries: 2*  
*retries: 15*  
*min timeout: 1*  
*max timeout: 8*

### Command Modes

L2TP class configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

### Task ID

Task ID	Operations
l2vpn	read, write

**Examples**

The following example shows how to configure a retransmit retry value to 1:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# retransmit initial retries 1
```

**Related Commands**

Command	Description
<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.

## rollover (L3VPN)

To configure rollover times for a tunnel-template, use the **rollover** command in tunnel encapsulation l2tp configuration mode. To return to the default behavior, use the **no** form of this command.

**rollover periodic** *time* **holdown** *time*

**no rollover periodic** *time* **holdown** *time*

Syntax Description		
<b>periodic</b> <i>time</i>		Configures the periodic rollover time in seconds. Range is 60 to 31536000.
<b>holddown</b> <i>time</i>		Configures the holddown time for old session cookie values.

**Command Default** None

**Command Modes** tunnel encapsulation l2tp configuration

Command History	Release	Modification
	Release 3.5.0	This command was introduced.

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

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

Task ID	Task ID	Operations
	l2vpn	read, write

**Examples** The following example shows how to configure rollover times for a tunnel-template:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# tunnel-template kanata_9
RP/0/0/CPU0:router(config-tuntem) encapsulation l2tp
RP/0/0/CPU0:router(config-tunencap-l2tp) # rollover
```

Related Commands	Command	Description
	<a href="#">interface (p2p)</a> , <a href="#">page 30</a>	Configures an attachment circuit.

## sequencing (L2VPN)

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

**sequencing** {both|receive|transmit {resynch 5-65535}}

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

### Syntax Description

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

### Command Default

None

### Command Modes

L2VPN pseudowire class encapsulation mode

### Command History

Release	Modification
Release 3.5.0	This command was introduced.

### Usage Guidelines

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

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



#### Note

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

### Task ID

Task ID	Operations
l2vpn	read, write

**Examples**

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

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

**Related Commands**

Command	Description
<a href="#">pw-class (L2VPN), page 53</a>	Enters pseudowire class submode to define a pseudowire class template.

# show l2tp class

To display information about an L2TP class, use the **show l2tp class** command in EXEC mode.

**show l2tp class** *name name*

## Syntax Description

<b>name</b> <i>name</i>	Configures an L2TP class name.
-------------------------	--------------------------------

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows sample output for the **show l2vtp session class** command:

```
RP/0/0/CPU0:router# show l2tp class name kanata_02

l2tp-class kanata_02
  manually configured class
  configuration parameters:
    (not) hidden
    (no) authentication
    (no) digest
    digest check enable
    hello 60
    (no) hostname
    (no) password
    (no) accounting
    (no) security crypto-profile
    (no) ip vrf
    receive-window 888
    retransmit retries 15
    retransmit timeout max 8
    retransmit timeout min 1
    retransmit initial retries 2
    retransmit initial timeout max 8
```

```
retransmit initial timeout min 1
timeout setup 300
```

This table describes the significant fields shown in the display.

**Table 1: show l2tp class brief Field Descriptions**

Field	Description
l2tp-class	Shows the L2TP class name and the manner of its creation. For example, manually configured class.
configuration parameters	Displays a complete list and state of all configuration parameters.

#### Related Commands

Command	Description
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.

# show l2tp counters forwarding session

To display L2TP forward session counters, use the **show l2tp counter forwarding session** command in EXEC mode.

**show l2tp counters forwarding session** [*id identifier*] **name** *local-name remote-name*]

## Syntax Description

<b>id</b> <i>identifier</i>	(Optional) Configures the session counter identifier.
<b>name</b> <i>local-name remote name</i>	(Optional) Configures the local and remote names for a session counter.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following example shows sample output for the **show l2tp counters forwarding session** command:

```
RP/0/RP00/CPU0:router(config-l2vpn)# pw-class kanata01show l2tp counters forwarding session
```

```
LocID      RemID      TunID      Pkts-In    Pkts-Out   Bytes-In   Bytes-Out
22112     15584     14332         0          0          0          0
```

This table describes the significant fields shown in the display.

**Table 2: show l2tp counters forwarding session Field Descriptions**

Field	Description
LocID	Local session ID.

Field	Description
RemID	Remote session ID.
TunID	Local Tunnel ID for this session.
Pkts-In	Number of packets input in the session.
Pkts-Out	Number of packets output in the session.
Bytes-In	Number of bytes input in the session.
Bytes-Out	Number of bytes output in the session.

**Related Commands**

Command	Description
<a href="#">show l2tp tunnel, page 74</a>	Displays information about L2TP tunnels.

# show l2tp session

To display information about L2TP sessions, use the **show l2tp session** command in EXEC mode.

**show l2tp session** [**detail** | **brief** | **interworking** | **circuit** | **sequence** | **state**] {**id** *id* | **name** *name*}

## Syntax Description

<b>brief</b>	(Optional) Displays summary output for a session.
<b>circuit</b>	(Optional) Displays attachment circuit information for a session.
<b>detail</b>	(Optional) Displays detailed output for a session.
<b>interworking</b>	(Optional) Displays interworking information for a session.
<b>sequence</b>	(Optional) Displays data packet sequencing information for a session.
<b>state</b>	(Optional) Displays control plane state information for a session.
<b>id</b> <i>id</i>	Configures the local tunnel ID. Range is 0 to 4294967295.
<b>name</b> <i>name</i>	Configures the tunnel name.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following sample output is from the **show l2vtp session brief** command:

```
RP/0/RP00/CPU0:router (config-l2vpn-pw) # encapsulation mpls show l2tp session brief
```

```
L2TP Session Information Total tunnels 1 sessions 6
LocID      TunID      Peer-address  State      Vcid
           sess/cir
26093      43554      13.0.0.2     est,UP     60
26094      43554      13.0.0.2     est,UP     40
26095      43554      13.0.0.2     est,UP     50
26096      43554      13.0.0.2     est,UP     70
26097      43554      13.0.0.2     est,UP     20
26098      43554      13.0.0.2     est,UP     30
```

This table describes the significant fields shown in the display.

**Table 3: show l2tp session brief Field Descriptions**

Field	Description
LocID	Local session ID.
TunID	Local tunnel ID for this session.
Peer-address	The IP address of the other end of the session.
State	The state of the session.
Vcid	The Virtual Circuit ID of the session. This is the same value of the pseudowire ID for l2vpn.

#### Related Commands

Command	Description
<a href="#">show l2tp tunnel, page 74</a>	Displays information about L2TP tunnels.

# show l2tp tunnel

To display information about L2TP tunnels, use the **show l2tp tunnel** command in EXEC mode.

**show l2tp tunnel** {**detail**|**brief**|**state**|**transport**} {**id** *identifier*|**name** *local-name remote-name*}

## Syntax Description

<b>detail</b>	Displays detailed output for L2TP tunnels.
<b>brief</b>	Displays summary information for the tunnel.
<b>state</b>	Displays control plane state information.
<b>transport</b>	Displays transport information (IP) for each selected control channel.
<b>id</b> <i>identifier</i>	Displays local control channel identifiers.
<b>name</b> <i>local-name remote-name</i>	Displays the local and remote names of a control channel.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read, write

## Examples

The following sample output is from the **show l2tp tunnel** command:

```
RP/0/0/CPU0:router(config-l2vpn-encap-mps)# sequencing bothshow l2tp tunnel
L2TP Tunnel Information Total tunnels 1 sessions 6
LocID RemID Remote Name   State Remote Address  Port  Sessions L2TP Class
43554 6220  PE2      est   13.0.0.2        0     6         foo
```

This table describes the significant fields shown in the display.

**Table 4: show l2tp tunnel Field Descriptions**

<b>Field</b>	<b>Description</b>
LocID	Local session ID.
RemID	Remote session ID.
Remote Name	Remote name of the session.
State	State of the session.
Remote Address	Remote address of the session.
Port	Session port.
Sessions	Number of sessions.
L2TP	L2TP class name.

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">show l2tp session, page 72</a>	Displays information about L2TP sessions.

# show l2vpn collaborators

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

**show l2vpn collaborators**

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

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

This table describes the significant fields shown in the display.

**Table 5: show l2vpn collaborators Field Descriptions**

Field	Description
Name	Abbreviated name of the task interacting with l2vpn_mgr.

Field	Description
State	Indicates if l2vpn_mgr has a working connection with the other process.
Up Cnts	Number of times the connection between l2vpn_mgr and the other process has been successfully established.
Down Cnts	Number of times that the connection between l2vpn_mgr and the other process has failed or been terminated.

**Related Commands**

Command	Description
<a href="#">clear l2vpn collaborators, page 13</a>	Clears the state change counters for L2VPN collaborators.

# show l2vpn forwarding

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

**show l2vpn forwarding** {**bridge-domain**| **counter**| **detail**| **hardware**| **inconsistent**| **interface**| **l2tp**| **location** [*node-id* ]| **message**| **mstp**| **resource**| **retry-list**| **summary**| **unresolved**}

## Syntax Description

<b>bridge-domain</b>	Displays bridge domain related forwarding information.
<b>counter</b>	Displays the cross-connect counters.
<b>detail</b>	Displays detailed information from the layer2_fib manager.
<b>hardware</b>	Displays hardware-related layer2_fib manager information.
<b>inconsistent</b>	Displays inconsistent entries only.
<b>interface</b>	Displays the match AC subinterface.
<b>l2tp</b>	Displays L2TPv3 related forwarding information.
<b>location</b> <i>node-id</i>	Displays layer2_fib manager information for the specified location. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.
<b>message</b>	Displays messages exchanged with collaborators.
<b>mstp</b>	Displays multi-spanning tree related forwarding information.
<b>resource</b>	Displays resource availability information in the layer2_fib manager.
<b>retry-list</b>	Displays retry list related information.
<b>summary</b>	Displays summary information about cross-connects in the layer2_fib manager.
<b>unresolved</b>	Displays unresolved entries only.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.4.0	This command was introduced.

Release	Modification
Release 3.7.0	Sample output was updated to add MAC information for the layer2_fib manager summary.

**Usage Guidelines**

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

**Task ID**

Task ID	Operations
l2vpn	read

**Examples**

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

```
RP/0/0/CPU0:router# show l2vpn forwarding location 0/2/cpu0
Bridge-domain name: bgl:bd1, id: 0, state: up
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 0
Multi-spanning tree instance: 0

GigabitEthernet0/1/0/1.2, state: oper up
Number of MAC: 0
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0
Storm control drop counters:
  packets: broadcast 0, multicast 0, unknown unicast 0
  bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bgl:bd2, id: 1, state: up
Type: pbb-edge, I-SID: 1234
Core-bridge: pbb-bd2
MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 0
Number of MAC addresses: 0
Multi-spanning tree instance: 0

PBB Edge, state: up
```

## show l2vpn forwarding

```

    Number of MAC: 0
GigabitEthernet0/1/0/1.3, state: oper up
    Number of MAC: 0
    Storm control drop counters:
      packets: broadcast 0, multicast 0, unknown unicast 0
      bytes: broadcast 0, multicast 0, unknown unicast 0

Bridge-domain name: bgl:bd3, id: 2, state: up
  Type: pbb-core
  Number of associated pbb-edge BDs: 1

MAC learning: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
Security: disabled
DHCPv4 snooping: profile not known on this node
IGMP snooping: disabled, flooding: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 0
Number of MAC addresses: 0
Multi-spanning tree instance: 0

PBB Core, state: up
Vlan-id: 1

GigabitEthernet0/1/0/1.4, state: oper up
  Number of MAC: 0
  Storm control drop counters:
    packets: broadcast 0, multicast 0, unknown unicast 0
    bytes: broadcast 0, multicast 0, unknown unicast 0

```

The following sample outputs shows the backup pseudowire information:

```

RP/0/0/CPU0:router#show l2vpn forwarding detail location 0/2/CPU0
Local interface: GigabitEthernet0/2/0/0.1, Xconnect id: 0x3000001, Status: up
  Segment 1
    AC, GigabitEthernet0/2/0/0.1, Ethernet VLAN mode, status: Bound
    RG-ID 1, active
    Statistics:
      packets: received 0, sent 0
      bytes: received 0, sent 0
  Segment 2
    MPLS, Destination address: 101.101.101.101, pw-id: 1000, status: Bound
    Pseudowire label: 16000
    Statistics:
      packets: received 0, sent 0
      bytes: received 0, sent 0
  Backup PW
    MPLS, Destination address: 102.102.102.102, pw-id: 1000, status: Bound
    Pseudowire label: 16001
    Statistics:
      packets: received 0, sent 0
      bytes: received 0, sent 0

RP/0/0/CPU0:router#show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bgl:bd1, id: 0, state: up
...
GigabitEthernet0/2/0/0.4, state: oper up
  RG-ID 1, active
  Number of MAC: 0
  ...

Nbor 101.101.101.101 pw-id 5000
Backup Nbor 101.101.101.101 pw-id 5000
Number of MAC: 0
...

```

The following sample outputs displays the SPAN segment information of the xconnect:

```
RP/0/0/CPU0:router# show l2vpn forwarding counter location 0/7/CPU0
Legend: ST = State, DN = Down

Segment 1                               Segment 2           ST      Byte           Switched
-----
pw-span-test (Monitor-Session) mpls 2.2.2.2 UP        0

RP/0/0/CPU0:router #Show l2vpn forwarding monitor-session location 0/7/CPU0
Segment 1                               Segment 2           State
-----
pw-span-test (monitor-session) mpls 2.2.2.2           UP
pw-span-sess (monitor-session) mpls 3.3.3.3           UP

RP/0/0/CPU0:router #Show l2vpn forwarding monitor-session pw-span-test location 0/7/CPU0
Segment 1                               Segment 2           State
-----
pw-span-test (Monitor-Session) mpls 2.2.2.2           UP
```

Example 4:

```
RP/0/0/CPU0:router #show l2vpn forwarding detail location 0/7/CPU0
Xconnect id: 0xc000001, Status: up
Segment 1
  Monitor-Session, pw-span-test, status: Bound
Segment 2
  MPLS, Destination address: 2.2.2.2, pw-id: 1, status: Bound
  Pseudowire label: 16001
  Statistics:
    packets: received 0, sent 11799730
    bytes: received 0, sent 707983800
```

Example 5:

```
show l2vpn forwarding private location 0/11/CPU0
Xconnect ID 0xc000001
Xconnect info:
  Base info: version=0xaabbcc13, flags=0x0, type=2, reserved=0
  xcon_bound=TRUE, switching_type=0, data_type=3

AC info:
  Base info: version=0xaabbcc11, flags=0x0, type=3, reserved=0
  xcon_id=0xc000001, ifh= none, subifh= none, ac_id=0, ac_type=SPAN,
  ac_mtu=1500, iw_mode=none, adj_valid=FALSE, adj_addr none

PW info:
  Base info: version=0xaabbcc12, flags=0x0, type=4, reserved=0
  pw_id=1, nh_valid=TRUE, sig_cap_flags=0x20, context=0x0,
  MPLS, pw_label=16001
  Statistics:
    packets: received 0, sent 11799730
    bytes: received 0, sent 707983800

Object: NHOP
Event Trace History [Total events: 5]
-----
Time           Event           Flags
====           =====
-----

NextHop info:
  Base info: version=0xaabbcc14, flags=0x10000, type=5, reserved=0
  nh_addr=2.2.2.2, plat_data_valid=TRUE, plat_data_len=128, child_count=1

Object: XCON
Event Trace History [Total events: 16]
-----
```

## show l2vpn forwarding

```

Time          Event          Flags
====          =====          =====
-----
RP/0/0/CPU0:router #show l2vpn forwarding summary location 0/7/CPU0
Major version num:1, minor version num:0
Shared memory timestamp:0x31333944cf
Number of forwarding xconnect entries:2
  Up:2  Down:0
  AC-PW:1 (1 mpls)  AC-AC:0  AC-BP:0  AC-Unknown:0
  PW-BP:0  PW-Unknown:0  Monitor-Session-PW:1
Number of xconnects down due to:
  AIB:0  L2VPN:0  L3FIB:0
Number of p2p xconnects: 2
Number of bridge-port xconnects: 0
Number of nexthops:1
  MPLS:  Bound:1  Unbound:0  Pending Registration:0
Number of bridge-domains: 0
Number of static macs: 0
Number of locally learned macs: 0
Number of remotely learned macs: 0
Number of total macs: 0

```

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

```

RP/0/0/CPU0:router# show l2vpn forwarding location 0/2/cpu0

ID  Segment 1          Segment 2
-----
1   Gi0/2/0/0 1        1.1.1.1 9)

```

The following sample output shows the MAC information in the layer2\_fib manager summary:

```

RP/0/0/CPU0:router# show l2vpn forwarding summary location 0/3/CPU0

Major version num:1, minor version num:0
Shared memory timestamp:0x66ff58e894
Number of forwarding xconnect entries:2
  Up:1  Down:0
  AC-PW:0  AC-AC:0  AC-BP:1  PW-BP:1
Number of xconnects down due to:
  AIB:0  L2VPN:0  L3FIB:0
Number of nexthops:1
Number of static macs: 5
Number of locally learned macs: 5
Number of remotely learned macs: 0
Number of total macs: 10

```

## Related Commands

Command	Description
<a href="#">clear l2vpn forwarding counters</a> , <a href="#">page 17</a>	Clears L2VPN forwarding counters.

# show l2vpn forwarding l2tp

To display L2VPN forwarding information, use the **show l2vpn forwarding l2tp** command in EXEC mode.

**show l2vpn forwarding l2tp disposition** {**local session id** *session-ID*| **hardware**| **location** *node-id*} **location** *node-id*

## Syntax Description

<b>disposition</b>	Displays forwarding disposition information.
<i>session-ID</i>	Displays L2TPv3-related forwarding information for the specified local session ID. Range is 1-4294967295.
<b>hardware</b>	Displays L2TPv3-related forwarding information read from hardware.
<b>location</b>	Displays L2TPv3-related forwarding information for the specified location.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.7.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read

## Examples

The following example shows sample output for the **show l2vpn forwarding l2tp** command:

```
RP/0/0/CPU0:router# show l2vpn forwarding l2tp disposition hardware location 0/3/1
ID   Segment 1           Segment 2
-----
1    Gi0/2/0/0 1        1.1.1.1  9)
```

**Related Commands**

Command	Description
<a href="#">clear l2vpn forwarding counters, page 17</a>	Clears L2VPN forwarding counters.

# show l2vpn pw-class

To display L2VPN pseudowire class information, use the **show l2vpn pw-class** command in EXEC mode.

```
show l2vpn pw-class [detail] name class name
```

## Syntax Description

<b>detail</b>	(Optional) Displays detailed information.
<b>name <i>class-name</i></b>	(Optional) Displays information about a specific pseudowire class name.

## Command Default

None

## Command Modes

EXEC

## Command History

Release	Modification
Release 3.5.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
l2vpn	read

## Examples

The following example shows sample output for the **show l2vpn pw-class** command:

```
RP/0/0/CPU0:router# show l2vpn pw-class
Name                Encapsulation      Protocol
-----            -
mplsclass_75        MPLS                LDP
l2tp-dynamic        L2TPv3             L2TPv3
```

This table describes the significant fields shown in the display.

**Table 6: show l2vpn pw-class Command Field Descriptions**

Field	Description
Name	Displays the name of the pseudowire class.

Field	Description
Encapsulation	Displays the encapsulation type.
Protocol	Displays the protocol type.

**Related Commands**

Command	Description
<a href="#">clear l2vpn forwarding counters, page 17</a>	Clears L2VPN forwarding counters.

# show l2vpn resource

To display the memory state in the L2VPN process, use the **show l2vpn resource** command in EXEC mode.

```
show l2vpn resource
```

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

**Command Default** None

**Command Modes** EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

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

```
RP/0/0/CPU0:router# show l2vpn resource
```

```
Memory: Normal
```

describes the significant fields shown in the display. [Table 7: show l2vpn resource Command Field Descriptions, page 87](#)

**Table 7: show l2vpn resource Command Field Descriptions**

Field	Description
Memory	Displays memory status.

## show l2vpn xconnect

To display brief information on configured cross-connects, use the **show l2vpn connect** command in EXEC mode.

**show l2vpn xconnect** [**detail**| **group**| **interface**| **neighbor**| **state**| **summary**| **type**| **state unresolved**]

### Syntax Description

<b>brief</b>	(Optional) Displays encapsulation brief information.
<b>detail</b>	(Optional) Displays detailed information.
<i>encapsulation</i>	(Optional) Filters on encapsulation type.
<b>group</b>	(Optional) Displays all cross-connects in a specified group.
<b>groups</b>	(Optional) Displays all groups information.
<b>interface</b>	(Optional) Filters on interface and subinterface.
<b>mp2mp</b>	(Optional) Displays MP2MP information.
<b>mpsw</b>	(Optional) Displays ms_pw information.
<b>neighbor</b>	(Optional) Filters on neighbor.
<b>private</b>	(Optional) Displays private information.
<b>pw-class</b>	(Optional) Filters on pseudowire class
<b>state</b>	(Optional) Filters the following xconnect state types: <ul style="list-style-type: none"> <li>• up</li> <li>• down</li> </ul>
<b>summary</b>	(Optional) Displays AC information from the AC Manager database.
<b>type</b>	(Optional) Filters the following xconnect types: <ul style="list-style-type: none"> <li>• ac-pw</li> <li>• locally switched</li> <li>• monitor-session-pw</li> <li>• ms-pw</li> </ul>
<b>detail</b>	(Optional) Displays detailed information.

### Syntax Description

<b>group</b>	(Optional) Displays all cross-connects in a specified group.
<b>interface</b>	(Optional) Filters the interface and subinterface.
<b>neighbor</b>	(Optional) Filters the neighbor.
<b>state</b>	(Optional) Filters the following xconnect state types: <ul style="list-style-type: none"> <li>• up</li> <li>• down</li> </ul>
<b>summary</b>	(Optional) Displays AC information from the AC Manager database.
<b>type</b>	(Optional) Filters the following xconnect types: <ul style="list-style-type: none"> <li>• ac-pw</li> <li>• locally switched</li> </ul>
<b>state unresolved</b>	(Optional) Displays information about unresolved cross-connects.

**Command Default**

None

**Command Modes**

EXEC

**Command History**

Release	Modification
Release 3.4.0	This command was introduced.
Release 3.4.1	VCCV-related show command output was added.
Release 3.6.0	Preferred-path-related show command output was added.
Release 3.7.0	Sample output was updated to display the backup pseudowire information.

**Usage Guidelines**

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

If a specific cross-connect is specified in the command (for instance, AC\_to\_PW1) then only that cross-connect will be displayed; otherwise, all cross-connects are displayed.

**Task ID**

Task ID	Operations
l2vpn	read, write

**Examples**

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

```
RP/0/0/CPU0:router# show l2vpn xconnect
```

Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,  
LU = Local Up, RU = Remote Up, CO = Connected

XConnect Group	Name	ST	Segment 1 Description	ST	Segment 2 Description	ST
g1	x1	UP	pw-span-test	UP	2.2.2.2	1 UP
siva_xc	siva_p2p	UP	Gi0/4/0/1	UP	10.1.1.1	1 UP
					Backup 10.2.2.2	2 UP

The following sample output shows that the backup is in standby mode for the **show l2vpn xconnect detail** command:

```
RP/0/0/CPU0:router# show l2vpn xconnect detail
```

Group siva\_xc, XC siva\_p2p, state is up; Interworking none

Monitor-Session: pw-span-test, state is configured

AC: GigabitEthernet0/4/0/1, state is up

Type Ethernet

MTU 1500; XC ID 0x5000001; interworking none; MSTi 0

Statistics:

packet totals: send 90

byte totals: send 19056

PW: neighbor 10.1.1.1, PW ID 1, state is up ( established )

PW class not set, XC ID 0x5000001

Encapsulation MPLS, protocol LDP

PW type Ethernet, control word enabled, interworking none

PW backup disable delay 0 sec

Sequencing not set

MPLS	Local	Remote
Label	30005	16003
Group ID	0x5000300	0x5000400
Interface	GigabitEthernet0/4/0/1	GigabitEthernet0/4/0/2
Interface	pw-span-test	GigabitEthernet0/3/0/1
MTU	1500	1500
Control word	enabled	enabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2	0x2
	(LSP ping verification)	(LSP ping verification)
VCCV CC type	0x3	0x3
	(control word)	(control word)
	(router alert label)	(router alert label)

Create time: 20/11/2007 21:45:07 (00:49:18 ago)

Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)

Statistics:

packet totals: receive 0

byte totals: receive 0

Backup PW:

PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )

Backup for neighbor 1.1.1.1 PW ID 1 ( standby )

PW class not set, XC ID 0x0

Encapsulation MPLS, protocol LDP

PW type Ethernet, control word enabled, interworking none

PW backup disable delay 0 sec

Sequencing not set

MPLS	Local	Remote
Label	30006	16003

```

Group ID      unassigned                0x5000400
Interface     unknown                    GigabitEthernet0/4/0/2
MTU           1500
Control word  enabled                    enabled
PW type       Ethernet                   Ethernet
VCCV CV type  0x2                        (LSP ping verification)
                (LSP ping verification)
VCCV CC type  0x3                        (control word)
                (control word)
                (router alert label)
                (router alert label)
-----

```

```

Backup PW for neighbor 10.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:45 (00:48:40 ago)
Last time status changed: 20/11/2007 21:45:49 (00:48:36 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

The following sample output shows that the backup is active for the **show l2vpn xconnect detail** command:

```
RP/0/0/CPU0:router# show l2vpn xconnect detail
```

```

Group siva_xc, XC siva_p2p, state is down; Interworking none
Monitor-Session: pw-span-test, state is configured
AC: GigabitEthernet0/4/0/1, state is up
Type Ethernet
MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
Statistics:
  packet totals: send 98
  byte totals: send 20798
PW: neighbor 10.1.1.1, PW ID 1, state is down ( local ready )
PW class not set, XC ID 0x5000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
-----
MPLS          Local                      Remote
-----
Label         30005                                unknown
Group ID      0x5000300                            0x0
Interface     GigabitEthernet0/4/0/1                unknown
  Interface    pw-span-test                          GigabitEthernet0/3/0/1
MTU           1500                                unknown
Control word  enabled                              unknown
PW type       Ethernet                              unknown
VCCV CV type  0x2                                0x0
                (LSP ping verification)        (none)
VCCV CC type  0x3                                0x0
                (control word)                (none)
                (router alert label)
-----
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

```

Backup PW:
PW: neighbor 10.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 10.1.1.1 PW ID 1 ( active )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
-----
MPLS          Local                      Remote
-----
Label         30006                                16003
Group ID      unassigned                            0x5000400

```

## show l2vpn xconnect

```

Interface      unknown      GigabitEthernet0/4/0/2
MTU            1500        1500
Control word   enabled     enabled
PW type        Ethernet    Ethernet
VCCV CV type   0x2        0x2
               (LSP ping verification) (LSP ping verification)
VCCV CC type   0x3        0x3
               (control word)         (control word)
               (router alert label)   (router alert label)
-----

```

```

Backup PW for neighbor 10.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:44 (00:52:54 ago)
Last time status changed: 20/11/2007 21:45:48 (00:52:49 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

```

The following sample output displays the xconnects with switch port analyzer (SPAN) as one of the segments:

```
Show l2vpn xconnect type minotor-session-pw
```

```
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
       LU = Local Up, RU = Remote Up, CO = Connected
```

XConnect Group	Name	Segment 1		Segment 2		ST
		ST	Description	ST	Description	
g1	x1	UP	pw-span-test	UP	2.2.2.2 1	UP

The following sample output shows that one-way redundancy is enabled:

```

Group g1, XC x2, state is up; Interworking none
AC: GigabitEthernet0/2/0/0.2, state is up, active in RG-ID 1
Type VLAN; Num Ranges: 1
VLAN ranges: [2, 2]
MTU 1500; XC ID 0x3000002; interworking none
Statistics:
  packets: received 103, sent 103
  bytes: received 7348, sent 7348
  drops: illegal VLAN 0, illegal length 0
PW: neighbor 101.101.101.101, PW ID 2000, state is up ( established )
PW class class1, XC ID 0x3000002
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
PW backup disable delay 0 sec
One-way PW redundancy mode is enabled
Sequencing not set
....
Incoming Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message
....
Backup PW:
PW: neighbor 102.102.102.102, PW ID 3000, state is standby ( all ready )
Backup for neighbor 101.101.101.101 PW ID 2000 ( inactive )
PW class class1, XC ID 0x3000002
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
Sequencing not set
....
Incoming Status (PW Status TLV):
  Status code: 0x26 (Standby, AC Down) in Notification message
Outgoing Status (PW Status TLV):
  Status code: 0x0 (Up) in Notification message

```

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

```
RP/0/0/CPU0:router# show l2vpn xconnect
```

```
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
       LU = Local Up, RU = Remote Up, CO = Connected
```

XConnect Group	Name	ST	Segment 1 Description	ST	Segment 2 Description		ST
siva_xc	siva_p2p	UP	Gi0/4/0/1	UP	1.1.1.1	1	UP
					Backup 2.2.2.2	2	UP

The following sample output shows that the backup is in standby mode for the **show l2vpn xconnect detail** command:

```
RP/0/0/CPU0:router# show l2vpn xconnect detail

Group siva_xc, XC siva_p2p, state is up; Interworking none
AC: GigabitEthernet0/4/0/1, state is up
  Type Ethernet
  MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
  Statistics:
    packet totals: received 90, sent 90
    byte totals: received 19056, sent 19056
PW: neighbor 1.1.1.1, PW ID 1, state is up ( established )
PW class not set, XC ID 0x5000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
-----
MPLS          Local                               Remote
-----
Label         30005                                     16003
Group ID      0x5000300                               0x5000400
Interface     GigabitEthernet0/4/0/1                  GigabitEthernet0/4/0/2
MTU           1500                                     1500
Control word  enabled                                 enabled
PW type       Ethernet                                 Ethernet
VCCV CV type  0x2                                     0x2
              (LSP ping verification)             (LSP ping verification)
VCCV CC type  0x3                                     0x3
              (control word)                       (control word)
              (router alert label)                 (router alert label)
-----
Create time: 20/11/2007 21:45:07 (00:49:18 ago)
Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

Backup PW:
PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 1.1.1.1 PW ID 1 ( standby )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
-----
MPLS          Local                               Remote
-----
Label         30006                                     16003
Group ID      unassigned                               0x5000400
Interface     unknown                                  GigabitEthernet0/4/0/2
MTU           1500                                     1500
Control word  enabled                                 enabled
PW type       Ethernet                                 Ethernet
VCCV CV type  0x2                                     0x2
              (LSP ping verification)             (LSP ping verification)
VCCV CC type  0x3                                     0x3
              (control word)                       (control word)
              (router alert label)                 (router alert label)
-----
Backup PW for neighbor 1.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:45 (00:48:40 ago)
Last time status changed: 20/11/2007 21:45:49 (00:48:36 ago)
Statistics:
```

## show l2vpn xconnect

```

packet totals: received 0, sent 0
byte totals: received 0, sent 0

```

The following sample output shows that the backup is active for the **show l2vpn xconnect detail** command:

```
RP/0/0/CPU0:router# show l2vpn xconnect detail
```

```
Group siva_xc, XC siva_p2p, state is down; Interworking none
```

```
AC: GigabitEthernet0/4/0/1, state is up
```

```
Type Ethernet
```

```
MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
```

```
Statistics:
```

```
packet totals: send 98
```

```
byte totals: send 20798
```

```
PW: neighbor 1.1.1.1, PW ID 1, state is down ( local ready )
```

```
PW class not set, XC ID 0x5000001
```

```
Encapsulation MPLS, protocol LDP
```

```
PW type Ethernet, control word enabled, interworking none
```

```
PW backup disable delay 0 sec
```

```
Sequencing not set
```

MPLS	Local	Remote
Label	30005	unknown
Group ID	0x5000300	0x0
Interface	GigabitEthernet0/4/0/1	unknown
MTU	1500	unknown
Control word	enabled	unknown
PW type	Ethernet	unknown
VCCV CV type	0x2	0x0
		(none)
	(LSP ping verification)	
VCCV CC type	0x3	0x0
		(none)
	(control word)	
	(router alert label)	

```
-----
```

```
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
```

```
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
```

```
Statistics:
```

```
packet totals: received 0, sent 0
```

```
byte totals: received 0, sent 0
```

```
Backup PW:
```

```
PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
```

```
Backup for neighbor 1.1.1.1 PW ID 1 ( active )
```

```
PW class not set, XC ID 0x0
```

```
Encapsulation MPLS, protocol LDP
```

```
PW type Ethernet, control word enabled, interworking none
```

```
PW backup disable delay 0 sec
```

```
Sequencing not set
```

MPLS	Local	Remote
Label	30006	16003
Group ID	unassigned	0x5000400
Interface	unknown	GigabitEthernet0/4/0/2
MTU	1500	1500
Control word	enabled	enabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2	0x2
	(LSP ping verification)	(LSP ping verification)
VCCV CC type	0x3	0x3
	(control word)	(control word)
	(router alert label)	(router alert label)

```
-----
```

```
Backup PW for neighbor 1.1.1.1 PW ID 1
```

```
Create time: 20/11/2007 21:45:44 (00:52:54 ago)
```

```
Last time status changed: 20/11/2007 21:45:48 (00:52:49 ago)
```

```
Statistics:
```

```
packet totals: received 0, sent 0
```

```
byte totals: received 0, sent 0
```

This table describes the significant fields shown in the display.

**Table 8: show l2vpn xconnect Command Field Descriptions**

Field	Description
XConnect Group	Displays a list of all configured cross-connect groups.
Group	Displays the cross-connect group number.
Name	Displays the cross-connect group name.
Description	Displays the cross-connect group description. If no description is configured, the interface type is displayed.
ST	State of the cross-connect group: up (UP) or down (DN).

**Related Commands**

Command	Description
<a href="#">xconnect group, page 103</a>	Configures cross-connect groups.

## tag-rewrite

To configure VLAN tag rewrite, use the **tag-rewrite** command in Encapsulation MPLS configuration mode. To disable VLAN tag rewrite, use the **no** form of this command.

**tag-rewrite ingress vlan** *vlan-id*

**no tag-rewrite ingress vlan** *vlan-id*

### Syntax Description

<b>ingress</b>	Configures ingress mode.
<b>vlan</b>	Configures VLAN tagged mode
<i>vlan-id</i>	Specifies the value of the ID of the VLAN.

### Command Default

None

### Command Modes

Encapsulation MPLS configuration

### Command History

Release	Modification
Release 3.7.0	This command was introduced.

### Usage Guidelines

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

The **tag-rewrite** command is applicable only to pseudowires with MPLS encapsulation.

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure preferred-path tunnel settings:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2vpn
RP/0/0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
RP/0/0/CPU0:router(config-l2vpn-pwc-encap-mpls)# tag-rewrite vlan 2000
RP/0/0/CPU0:router(config-l2vpn-pwc-encap-mpls)#
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">show l2vpn xconnect, page 88</a>	Displays brief information on configured cross-connects.

## timeout setup (L2TP)

To configure timeout definitions for L2TP session setup, use the **timeout setup** command in L2TP class configuration mode. To return to the default behavior, use the **no** form of this command.

**timeout setup** *seconds*

**no timeout setup** *seconds*

Syntax Description	<i>seconds</i>	Time, in seconds, to setup a control channel. Range is 60 to 6000 seconds. Default is 300 seconds.
--------------------	----------------	--

Command Default	<i>seconds</i> : 300
-----------------	----------------------

Command Modes	L2TP class configuration
---------------	--------------------------

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples	The following example shows how to configure a timeout value for L2TP session setup of 400 seconds:
----------	---

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# timeout setup 400
```

Related Commands	Command	Description
	<a href="#">authentication (L2TP), page 3</a>	Enables L2TP authentication for a specified L2TP class name.
	<a href="#">hello-interval (L2TP), page 24</a>	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	<a href="#">hidden (L2TP), page 26</a>	Enables hidden attribute-value pairs (AVPs).

<b>Command</b>	<b>Description</b>
<a href="#">hostname (L2TP), page 28</a>	Defines the name used in the L2TP hostname AVP.
<a href="#">l2tp-class, page 32</a>	Enters L2TP class configuration mode where you can define an L2TP signaling template.
<a href="#">password (L2TP), page 49</a>	Defines the password and password encryption type for control channel authentication.
<a href="#">receive-window (L2TP), page 61</a>	Configures the receive window size for the L2TP server.
<a href="#">retransmit (L2TP), page 63</a>	Configures retransmit retry and timeout values.
<a href="#">show l2tp session, page 72</a>	Displays information about L2TP sessions.
<a href="#">show l2tp tunnel, page 74</a>	Displays information about L2TP tunnels.

## transport mode (L2VPN)

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

**transport mode** {ethernet| vlan}

**no transport mode** {ethernet| vlan}

### Syntax Description

<b>ethernet</b>	Configures Ethernet port mode.
<b>vlan</b>	Configures VLAN tagged mode.

### Command Default

None

### Command Modes

L2VPN pseudowire class MPLS encapsulation

### Command History

Release	Modification
Release 3.5.0	This command was introduced.
Release 3.7.2	This command was introduced.

### Usage Guidelines

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



#### Note

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

### Task ID

Task ID	Operations
l2vpn	read, write

### Examples

The following example shows how to configure Ethernet transport mode:

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

```
RP/0/0/CPU0:router(config-l2vpn-pw)# encapsulation mpls  
RP/0/0/CPU0:router(config-l2vpn-encap-mpls)# transport transport-mode ethernet
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<a href="#">pw-class (L2VPN), page 53</a>	Enters pseudowire class submode to define a pseudowire class template.

# tunnel-template

To enter tunnel-template configuration submode, use the **tunnel-template** command in global configuration mode.

**tunnel-template** *template name*

**no tunnel-template** *template-name*

## Syntax Description

<i>template-name</i>	Configures a name for the tunnel template.
----------------------	--

## Command Default

None

## Command Modes

Global configuration

## Command History

Release	Modification
Release 3.5.0	This command was introduced.

## Usage Guidelines

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

## Task ID

Task ID	Operations
tunnel	read, write

## Examples

The following example shows how to enter tunnel-template configuration submode:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# tunnel-template template_01
```

## Related Commands

Command	Description
<a href="#">xconnect group, page 103</a>	Configures cross-connect groups.

## xconnect group

To configure cross-connect groups, use the **xconnect group** command in L2VPN configuration mode. To return to the default behavior, use the **no** form of this command.

**xconnect group** *group-name*

**no xconnect group** *group-name*

<b>Syntax Description</b>	<i>group-name</i>	Configures a cross-connect group name using a free-format 32-character string.
---------------------------	-------------------	--

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

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

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Release 3.4.0	This command was introduced.

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



**Note**

You can configure up to a maximum of 16K cross-connects per box.

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

**Examples** The following example shows how to group all cross -connects for customer\_atlantic:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2vpn
RP/0/0/CPU0:router(config-l2vpn)# xconnect group customer_atlantic
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">show l2vpn xconnect, page 88</a>	Displays brief information on configured cross-connects.

