



Virtual Private Network Commands

For detailed information about virtual private network concepts, configuration tasks, and examples, refer to the *Virtual Private Network Configuration Guide for Cisco CRS Routers*

- [authentication \(L2TP\)](#), on page 3
- [backup disable \(L2VPN\)](#), on page 5
- [clear l2tp counters control session](#), on page 7
- [clear l2tp counters control tunnel](#), on page 8
- [clear l2tp tunnel](#), on page 9
- [clear l2vpn collaborators](#), on page 10
- [clear l2vpn counters l2tp](#), on page 11
- [clear l2vpn counters bridge mac-withdrawal](#), on page 12
- [clear l2vpn forwarding counters](#), on page 13
- [clear l2vpn forwarding mac-address-table](#), on page 14
- [clear l2vpn forwarding message counters](#), on page 16
- [clear l2vpn forwarding table](#), on page 17
- [digest \(L2TP\)](#), on page 18
- [hello-interval \(L2TP\)](#), on page 20
- [hidden \(L2TP\)](#), on page 22
- [hostname \(L2TP\)](#), on page 24
- [interface \(p2p\)](#), on page 26
- [l2tp-class](#), on page 28
- [l2transport](#), on page 29
- [l2transport l2protocol](#), on page 31
- [l2transport propagate](#), on page 33
- [l2transport service-policy](#), on page 35
- [l2vpn](#), on page 36
- [load-balancing flow-label](#), on page 37
- [logging \(l2vpn\)](#), on page 39
- [logging nsr](#), on page 40
- [monitor-session \(l2vpn\)](#), on page 41
- [mpls static label \(L2VPN\)](#), on page 42
- [neighbor \(L2VPN\)](#), on page 44
- [nsr \(L2VPN\)](#), on page 46
- [password \(L2TP\)](#), on page 47

- pw-class (L2VPN), on page 49
- pw-class encapsulation l2tpv3, on page 50
- pw-class encapsulation mpls, on page 52
- pw-ether, on page 54
- pw-grouping, on page 56
- p2p, on page 57
- receive-window (L2TP), on page 58
- retransmit (L2TP), on page 60
- rollover (L3VPN), on page 62
- show generic-interface-list , on page 63
- show l2tp class, on page 65
- show l2tp counters forwarding session, on page 67
- show l2tp session, on page 69
- show l2tp tunnel, on page 71
- show l2vpn, on page 73
- show l2vpn atom-db, on page 74
- show l2vpn collaborators, on page 77
- show l2vpn database, on page 79
- show l2vpn forwarding, on page 82
- show l2vpn forwarding l2tp, on page 90
- show l2vpn generic-interface-list, on page 91
- show l2vpn index, on page 93
- show l2vpn nsr , on page 95
- show l2vpn process fsm, on page 97
- show l2vpn provision queue, on page 99
- show l2vpn pw-class, on page 101
- show l2vpn pwhe, on page 103
- show l2vpn resource, on page 105
- show l2vpn trace, on page 106
- show l2vpn xconnect, on page 108
- show tunnel-template, on page 118
- storm-control , on page 120
- tag-impose, on page 123
- tag-rewrite, on page 124
- timeout setup (L2TP), on page 125
- transport mode (L2VPN), on page 127
- transport mode vlan passthrough, on page 128
- tunnel-template, on page 129
- xconnect group, on page 130

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 3.9.0	This command was introduced.

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



Note 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)# authentication
```

Related Commands	Command	Description
	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.

Command	Description
l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
retransmit (L2TP), on page 60	Configures retransmit retry and timeout values.

backup disable (L2VPN)

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

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

Syntax Description	<p>delay value Specifies the number of seconds that elapse after the failure with primary pseudowire has been cleared before the Cisco IOS XR software attempts to activate the primary pseudowire.</p> <p>The range, in seconds, is from 0 to 180. The default is 0.</p> <p>never Specifies that the secondary pseudowire does not fall back to the primary pseudowire if the primary pseudowire becomes available again, unless the secondary pseudowire fails.</p>						
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	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.8.0</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 5.2.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.8.0	This command was introduced.	Release 5.2.1	This command was introduced.
Release	Modification						
Release 3.8.0	This command was introduced.						
Release 5.2.1	This command was introduced.						
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write		
Task ID	Operations						
l2vpn	read, write						

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# pw-class class1
RP/0/RP0/CPU0:router(config-l2vpn-pwc)# backup disable delay 50
RP/0/RP0/CPU0:router(config-l2vpn-pwc)# exit
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group A
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p rtrx
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.1 pw-id 2
```

```
RP/0/RP0/CPU0:router (config-l2vpn-xc-p2p-pw) # pw-class class1
RP/0/RP0/CPU0:router (config-l2vpn-xc-p2p-pw) # backup neighbor 10.2.2.2 pw-id 5
RP/0/RP0/CPU0:router (config-l2vpn-xc-p2p-pw-backup) #
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.
	neighbor (L2VPN), on page 44	Configures a pseudowire for a cross-connect.
	p2p, on page 57	Enters p2p configuration submode to configure point-to-point cross-connects.
	pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.
	xconnect group, on page 130	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	fsm	(Optional) Clears finite state machine counters.
	event	(Optional) Clears state machine event counters.
	state	(Optional) Clears state machine state counters.
	transition	(Optional) Clears state machine transition counters.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced.
	Release 5.2.1	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router (config-l2vpn-xc-p2p-pw-backup) ## clear l2tp counters control session fsm state transition
```

Related Commands	Command	Description
	clear l2tp counters control tunnel, on page 8	Clears L2TP control counters for a tunnel.
	clear l2vpn counters l2tp, on page 11	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		
all		Clears all L2TP counters, except authentication counters
authentication		Clears tunnel authentication counters.
id tunnel id		Clears a specified counter. Range is 1 to 4294967295.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# clear l2tp counters control tunnel all
```

Related Commands	Command	Description
	clear l2tp counters control session, on page 7	Clears L2TP control counters for a session.
	clear l2vpn counters l2tp, on page 11	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		
all		Clears all L2TP tunnels.
id <i>tunnel id</i>		Clears a specified tunnel.
l2tp-class <i>class name</i>		Clears all L2TP tunnels based on L2TP class name.
local ipv4 <i>ipv4 address</i>		Clears all local tunnels based on the specified local IPv4 address.
remote ipv4 <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 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples The following example shows how to clear all L2TP tunnels:

```
RP/0/RP0/CPU0:router# clear l2tp tunnel all
```

Related Commands	Command	Description
	clear l2tp counters control session, on page 7	Clears L2TP control counters for a session.
	clear l2tp counters control tunnel, on page 8	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# clear l2vpn collaborators
```

Related Commands	Command	Description
	show l2vpn collaborators, on page 77	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	l2tp	Clears all L2TP counters.
	neighbor <i>ip-address</i>	(Optional) Clears all L2TP counters for the specified neighbor.
	pw-id <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 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

The following example shows how to clear all L2TP counters:

```
RP/0/RP0/CPU0:router# clear l2vpn counters l2tp
```

Related Commands	Command	Description
	show l2vpn collaborators, on page 77	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		
all		Clears the MAC withdrawal statistics over all the bridges.
group <i>group-name</i>		Clears the MAC withdrawal statistics over the specified group.
bd-name <i>bd-name</i>		Clears the MAC withdrawal statistics over the specified bridge.
neighbor <i>ip-address</i>		Clears the MAC withdrawal statistics over the specified neighbor.
pw-id <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 3.9.0	This command was introduced.

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

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/RP0/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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# clear l2vpn forwarding counters
```

Related Commands	Command	Description
	show l2vpn forwarding, on page 82	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		
address	<i>address</i>	Clears a specified MAC address.
bridge-domain	<i>name</i>	Clears bridge domains learned from a MAC address table.
interface	<i>type interface-path-id</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
		Note Use the show interfaces command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.
location	<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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	l2vpn	read, write, execute

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

```
RP/0/RP0/CPU0:router# clear l2vpn forwarding mac-address location 1/1/1
```

Related Commands

Command	Description
show l2vpn forwarding, on page 82	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*

Syntax Description	location <i>node-id</i>	Clears L2VPN forwarding message counters for the specified location.
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Command Default	None
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Command Modes	EXEC
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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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
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Task ID	Task ID	Operations
	l2vpn	read, write

Examples	The following example shows how to clear L2VPN forwarding message counters on a specified node:
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```
RP/0/RP0/CPU0:router# clear l2vpn forwarding message counters location 0/6/CPU0
```

Related Commands	Command	Description
	show l2vpn forwarding, on page 82	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
```

Syntax Description	location <i>node-id</i>	Clears L2VPN forwarding tables for the specified location.	
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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.		
Task ID	Task ID	Operations	
	l2vpn	read, write	
Examples	The following example shows how to clear an L2VPN forwarding table from a specified location:		
	RP/0/RP0/CPU0:router# clear l2vpn forwarding table location 1/2/3/5		
Related Commands	Command	Description	
	show l2vpn forwarding, on page 82	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 | 7word}}
no digest {check disable | hash {MD5 | SHA1} | secret {0 | 7word}}
```

Syntax Description

check disable	Disables digest checking.
hash { MD5 SHA1 }	Configures the digest hash method (MD5 or SHA1). Default is MD5.
secret { 0 <i>7 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 3.9.0	This command was introduced.

Usage Guidelines

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

The 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2tp-class cisco
```

```
RP/0/RP0/CPU0:router(config-l2tp-class)# digest check disable
RP/0/RP0/CPU0:router(config-l2tp-class)# digest secret cisco hash md5
```

Related Commands	Command	Description
	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
	password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
	receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
	retransmit (L2TP), on page 60	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*

Syntax Description	<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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Command Default	<i>interval</i> : 60 seconds
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Command Modes	L2TP class configuration
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Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
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Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)# hello-interval 22
```

Related Commands	Command	Description
	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
	password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.

Command	Description
receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
retransmit (L2TP), on page 60	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 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

The following example shows how to enable hidden AVPs:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)# hidden
```

Related Commands	Command	Description
	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
	password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
	receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.

Command	Description
retransmit (L2TP), on page 60	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.
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Command Default	None
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Command Modes	L2TP class configuration
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Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)# hostname cisco
```

Related Commands	Command	Description
	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
	password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.

Command	Description
receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
retransmit (L2TP), on page 60	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 [PW-Ether | PW-IW]
no interface type interface-path-id [PW-Ether | PW-IW]
```

Syntax Description

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

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

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

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

PW-Ether (Optional) Configures an Ethernet Interface.

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

Command Default

None

Command Modes

p2p configuration submode

Command History

Release	Modification
Release 3.4.0	This command was introduced.
Release 4.2.1	The following keywords were added: <ul style="list-style-type: none"> • PW-Ether • PW-IW

Usage Guidelines

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
```

```
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group gr1  
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p p001  
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# interface TenGigE 1/1/1/1
```

Related Commands	Command	Description
	p2p, on page 57	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	<i>l2tp-class-name</i> L2TP class name.
---------------------------	---

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

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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



Note	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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)#
```

l2transport

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

l2transport
no l2transport

This command has no arguments or keywords.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced.

Usage Guidelines

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

The l2transport command and these configuration items are mutually exclusive:

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



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

Ethernet Port Mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# l2transport
```

Ethernet VLAN Mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RP0/CPU0:router(config-if)# encapsulation dot1q 100dot1q vlan 999
```

Ethernet VLAN Mode (QinQ):

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RP0/CPU0:router(config-if)# encapsulation dot1q 20 second-dot1q 10vlan 999 888
```

Ethernet VLAN Mode (QinAny):

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0.900 l2transport
RP/0/RP0/CPU0:router(config-if)# encapsulation dot1q 30 second-dot1q dot1q vlan 999 any
```

Related Commands

Command	Description
show l2vpn forwarding, on page 82	Displays forwarding information from the layer2_fib manager on the line card.

l2transport l2protocol

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

```
l2transport l2protocol {cdp | pvst | stp | vtp} {drop | experimental bits | tunnel experimental bits}
no l2transport l2protocol {cdp | pvst | stp | vtp} {drop | experimental bits | tunnel experimental bits}
```

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

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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

These L2 protocols are available:

- Cisco Discovery Protocol (CDP)—CDP is protocol-independent and is used to obtain protocol addresses, platform information, and other data about neighboring devices.
- PVST maintains a spanning tree instance for each VLAN configured in the network and permits a VLAN trunk to be forwarding for some VLANs and not for others. It can also load balance Layer 2 traffic by forwarding some VLANs on one trunk and other VLANs 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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# l2transport l2protocol cpsv reverse-tunnelstp drop
```

Related Commands	Command	Description
	show l2vpn forwarding, on page 82	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	remote-status Propagates remote link status changes.
---------------------------	---

Command Default	None
------------------------	------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	Release 3.6.0	This command was introduced.

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

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

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



Note This command is supported on the following Cisco CRS Router SPA cards:

- Cisco 1-Port 10 Gigabit Ethernet Shared Port Adapter, Version 2
- Cisco 2-port, 5-port, 8-port, and 10-port Gigabit Ethernet Shared Port Adapters
- Cisco 2-, 5-, 8-, and 10-Port Gigabit Ethernet Shared Port Adapters, Version 2
- Cisco 1-Port 10 Gigabit Ethernet LAN/WAN-PHY Shared Port Adapter

Any port on 6-10GE-WLO-FLEX (irrespective of SPA or fixed) does not support the **l2transport propagate** command.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# l2transport propagate remote remote-status
```

Related Commands	Command	Description
	show l2vpn forwarding, on page 82	Displays forwarding information from the layer2_fib manager on the line card.

l2transport service-policy

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

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

Syntax Description

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

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

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

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

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
show l2vpn forwarding, on page 82	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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

The following example shows how to enter L2VPN configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2vpn
RP/0/RP0/CPU0:router (config-l2vpn)#
```

Related Commands	Command	Description
	show l2vpn forwarding, on page 82	Displays forwarding information from the layer2_fib manager on the line card.

load-balancing flow-label

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

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

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

Command Default None

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

Command History	Release	Modification
	Release 4.2.0	This command was introduced.
	Release 4.3.2	The code keyword was introduced.

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

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

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

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

Task ID	Task ID	Operation
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router (config) #l2vpn
RP/0/RP0/CPU0:router (config-l2vpn) #pw-class p1
RP/0/RP0/CPU0:router (config-l2vpn-pwc) #encapsulation
RP/0/RP0/CPU0:router (config-l2vpn-pwc) #encapsulation mpls
RP/0/RP0/CPU0:router (config-l2vpn-pwc-mpls) #load-balancing
RP/0/RP0/CPU0:router (config-l2vpn-pwc-mpls) #load-balancing flow-label
RP/0/RP0/CPU0:router (config-l2vpn-pwc-mpls) #load-balancing flow-label both
RP/0/RP0/CPU0:router (config-l2vpn-pwc-mpls) #load-balancing flow-label both static
```

Related Commands	Command	Description
	pw-class encapsulation mpls, on page 52	Configures MPLS pseudowire encapsulation.

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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# logging pseudowire status
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.

logging nsr

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

logging nsr
no logging nsr

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes L2VPN configuration submode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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



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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# logging nsr
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.

monitor-session (l2vpn)

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

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

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

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	Point-to-point cross connect configuration
----------------------	--

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

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

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	See the monitor session command in the <i>Interface and Hardware Component Command Reference for Cisco CRS Routers</i> .	

mpls static label (L2VPN)

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

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

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

Command Default The default behavior is a dynamic label assignment.

Command Modes L2VPN cross-connect P2P pseudowire configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2vpn xconnect group l2vpn
RP/0/RP0/CPU0:router (config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RP0/CPU0:router (config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000
RP/0/RP0/CPU0:router (config-l2vpn-xc-p2p-pw)# mpls static label local 800 remote 500
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.
	neighbor (L2VPN), on page 44	Configures a pseudowire for a cross-connect.
	p2p, on page 57	Enters p2p configuration submode to configure point-to-point cross-connects.

Command	Description
xconnect group, on page 130	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 [{backup | mpls || pw-class | tag-impose}]
no neighbor A.B.C.D pw-id value [{backup | mpls || pw-class | tag-impose}]
```

Syntax Description

<i>A.B.C.D</i>	IP address of the cross-connect peer.
pw-id <i>value</i>	Configures the pseudowire ID and ID value. Range is 1 to 4294967295.
tag-impose	Optional Specifies a tag during a VLAN ID configuration.

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 vccv disable keyword was added.
Release 3.7.0	These keywords were removed: <ul style="list-style-type: none"> • control-word • pw-static-label local • remote • vccv • transport-mode
Release 4.2.1	The keyword tag-impose was introduced.

Usage Guidelines

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

A cross-connect may have two segments:

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



Note

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

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000 pw-class class12
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.3 pw-id 1001 pw-class class13
RP/0/RP0/CPU0:router(config-xc)# p2p rtrC_to_rtrD
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 10.2.2.3 pw-id 200 pw-class class23
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 10.2.2.4 pw-id 201 pw-class class24
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn xconnect group l2vpn
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 10.1.1.2 pw-id 1000 pw-class foo
RP/0/RP0/CPU0:router(config-xc)# p2p rtrC_to_rtrD
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 20.2.2.3 pw-id 200 pw-class bar1
```

Related Commands

Command	Description
l2vpn, on page 36	Enters L2VPN configuration mode.
p2p, on page 57	Enters p2p configuration submode to configure point-to-point cross-connects.
pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.
xconnect group, on page 130	Configures cross-connect groups.

nsr (L2VPN)

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

nsr
no nsr

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes L2VPN configuration submode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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



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

Task ID	Task ID	Operation
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2vpn
RP/0/RP0/CPU0:router (config-l2vpn)# nsr
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.

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	<table border="1"> <tr> <td>0</td> <td>(Optional) Specifies that an unencrypted password will follow.</td> </tr> <tr> <td>7</td> <td>(Optional) Specifies that an encrypted password will follow.</td> </tr> <tr> <td><i>password</i></td> <td>Unencrypted or clear text user password.</td> </tr> </table>	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.
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	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.		
Release	Modification						
Release 3.9.0	This command was introduced.						
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write		
Task ID	Operations						
l2vpn	read, write						
Examples	<p>The following example shows how to define an unencrypted password using the word “cisco” for control channel authentication:</p> <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# l2tp-class sanjose RP/0/RP0/CPU0:router(config-l2tp-class)# password 0 cisco</pre>						
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>authentication (L2TP), on page 3</td> <td>Enables L2TP authentication for a specified L2TP class name.</td> </tr> <tr> <td>hello-interval (L2TP), on page 20</td> <td>Configures the hello-interval value for L2TP (duration between control channel hello packets).</td> </tr> </tbody> </table>	Command	Description	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
Command	Description						
authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.						
hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).						

Command	Description
hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
retransmit (L2TP), on page 60	Configures retransmit retry and timeout values.

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

class-name 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group l1vpn
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p rtrA_to_rtrB
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor 10.1.1.2 pw-id 1000
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p-pw)# pw-class kanata01
```

Related Commands

Command	Description
p2p, on page 57	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}]
no 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

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

Command Default

None

Command Modes

L2VPN pseudowire class configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

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



Note

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

The following example shows how to define L2TPV3 pseudowire encapsulation:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RP0/CPU0:router(config-l2vpn-pwc)# encapsulation l2tpv3
RP/0/RP0/CPU0:router(config-l2vpn-pwc-l2tpv3)# protocol l2tpv3
```

Related Commands

Command	Description
pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.
pw-class encapsulation mpls, on page 52	Configures MPLS pseudowire encapsulation.

pw-class encapsulation mpls

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

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

Syntax Description		
	<i>class-name</i>	Encapsulation class name.
	control word	Disables control word for MPLS encapsulation. Disabled by default.
	ipv4	Sets the local source IPv4 address.
	load-balancing flow-label	Sets flow label-based load balancing.
	preferred-path	Configures the preferred path tunnel settings.
	protocol ldp	Configures LDP as the signaling protocol for this pseudowire class.
	sequencing	Configures sequencing on receive or transmit.
	tag-rewrite	Configures VLAN tag rewrite.
	transport-mode	Configures transport mode to be either Ethernet or VLAN.
	vccv none	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 control word disable and vccv none were replaced by the keywords control word and vccv verification-type none .

Release	Modification
Release 3.9.0	The following keywords were added: <ul style="list-style-type: none"> • preferred-path • sequencing • tag-rewrite • transport-mode
Release 4.3.0	The keyword load-balancing flow-label was introduced.

Usage Guidelines

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



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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

This example shows how to define MPLS pseudowire encapsulation:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RP0/CPU0:router(config-l2vpn-pwc)# encapsulation mpls
```

Related Commands

Command	Description
pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.
pw-class encapsulation l2tpv3, on page 50	Configures L2TPv3 pseudowire encapsulation.

pw-ether

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

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

Syntax Description	<i>value</i> Value of the PWHE Ethernet interface. The range is from 1 to 32768.
---------------------------	--

Command Default	None
------------------------	------

Command Modes	Global configuration p2p configuration
----------------------	---

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

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

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

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# attach generic-interface-list interfacelist1
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group xcl
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p grp1
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# interface pw-ether 78
```

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

```
RP/0/RP0/CPU0:router# configure
```

```
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# load-interval 32
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# load-interval 60
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# logging events link-status
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# mac-address 44-37-E6-89-C3-93
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# mtu 128
```

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface pw-ether 78
RP/0/RP0/CPU0:router(config-if)# bandwidth 256
```

Related Commands

Command	Description
p2p, on page 57	Enters p2p configuration submode to configure point-to-point cross-connects.

pw-grouping

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

pw-grouping
no pw-grouping

Syntax Description	pw-grouping Enables Pseudowire Grouping.
---------------------------	---

Command Default	PW-grouping is disabled by default.
------------------------	-------------------------------------

Command Modes	L2VPN configuration submode
----------------------	-----------------------------

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operation
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2vpn
RP/0/RP0/CPU0:router (config-l2vpn)# pw-grouping
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.
	show l2vpn, on page 73	Displays L2VPN information

p2p

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

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

Syntax Description	<i>xconnect-name</i> (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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group group 1
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p xc1
```

Related Commands	Command	Description
		interface (p2p), on page 26

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

size 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 3.9.0	This command was introduced.

Usage Guidelines

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

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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2tp-class cisco
RP/0/RP0/CPU0:router (config-l2tp-class)# receive-window 10
```

Related Commands

Command	Description
authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.

Command	Description
password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
retransmit (L2TP), on page 60	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		
initial <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.
retries <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.
timeout { max min } <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 3.9.0	This command was introduced.

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

Task ID	Task	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
```

```
RP/0/RP0/CPU0:router(config)# l2tp-class cisco
RP/0/RP0/CPU0:router(config-l2tp-class)# retransmit initial retries 1
```

Related Commands	Command	Description
	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.
	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).
	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).
	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.
	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
	password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
	receive-window (L2TP), on page 58	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	periodic time Configures the periodic rollover time in seconds. Range is 60 to 31536000.
	holddown time 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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# tunnel-template kanata_9
RP/0/RP0/CPU0:router(config-tuntem) encapsulation l2tp
RP/0/RP0/CPU0:router(config-tunencap-l2tp)# rollover
```

Related Commands	Command	Description
	interface (p2p), on page 26	Configures an attachment circuit.

show generic-interface-list

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

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

Syntax Description

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

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 4.3.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operation
l2vpn	read

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

```
RP/0/RP0/CPU0:router# show generic-interface-list
Thu Aug 2 13:48:57.462 CDT
generic-interface-list: nsrIL (ID: 1, interfaces: 2)
  Bundle-Ether2 - items pending 0, downloaded to FIB
  GigabitEthernet0/0/0/1 - items pending 0, downloaded to FIB
Number of items: 400
List is downloaded to FIB
```

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

```
RP/0/RP0/CPU0:router# show generic-interface-list retry private
Thu Aug 2 14:20:42.883 CDT
total: 0 items
```

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

```
RP/0/RP0/CPU0:router# show generic-interface-list standby
```

show generic-interface-list

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

Related Commands

Command	Description
l2vpn, on page 36	Enters L2VPN configuration mode.

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

Command Default	None
------------------------	------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/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
l2tp-class, on page 28	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	id identifier (Optional) Configures the session counter identifier.
	name local-name remote name (Optional) Configures the local and remote names for a session counter.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

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.
RemID	Remote session ID.
TunID	Local Tunnel ID for this session.

show l2tp counters forwarding session

Field	Description
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
#unique_59	

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

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP00/CPU0:router(config-l2vpn-pw)# show l2tp session brief
Tue Jun 10 12:51:30.901 UTC
LocID      TunID      Peer-address  State      Username, Intf/sess/cir  Vcid, Circuit
1606803058 1487464659 26.26.26.26   est,UP     101, Gi0/2/0/1.101
3663696887 1487464659 26.26.26.26   est,UP     100, Gi0/2/0/1.100
```

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.

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

```
RP/0/RP00/CPU0:router(config-l2vpn-pw)# show l2tp session detail
Tue Jun 10 12:53:19.842 UTC
Session id 1606803058 is up, tunnel id 1487464659, logical session id 131097
  Remote session id is 2602674409, remote tunnel id 2064960537
  Remotely initiated session
  Call serial number is 4117500017
  Remote tunnel name is ASR9K-PE2
    Internet address is 26.26.26.26:1248
  Local tunnel name is PRABHRAM-PE1
    Internet address is 25.25.25.25:4272
IP protocol 115
  Session is L2TP signaled
  Session state is established, time since change 00:07:28
  UDP checksums are disabled
  Session cookie information:
    local cookie, size 4 bytes, value 6d 3e 03 67
    remote cookie, size 4 bytes, value 0d ac 7a 3b
  Tie breaker is 0xfee65781a2fa2cfd, enabled TRUE.
  Sequencing is off
  Conditional debugging is disabled
  Unique ID is 101
Session Layer 2 circuit
  Payload type is Ethernet, Name is GigabitEthernet0_2_0_1.101
  Session vcid is 101
  Circuit state is UP
    Local circuit state is UP
    Remote circuit state is UP
```

Related Commands

Command	Description
#unique_59	

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	Option	Description
	detail	Displays detailed output for L2TP tunnels.
	brief	Displays summary information for the tunnel.
	state	Displays control plane state information.
	transport	Displays transport information (IP) for each selected control channel.
	id <i>identifier</i>	Displays local control channel identifiers.
	name <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 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router(config-l2vpn-encap-mp1s)# show l2tp tunnel brief
Tue Jun 10 12:46:04.421 UTC
LocTunID  RemTunID  Remote Name  State  Vrf Name  Remote Address  Sessn L2TP Class/Count
  VPDN Group
1487464659 2064960537  ASR9K-PE2   est              26.26.26.26    2      L2TPV3_CLASS
```

This table describes the significant fields shown in the display.

Table 4: show l2tp tunnel Field Descriptions

Field	Description
LocTunID	Local session ID.
RemTunID	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.

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

```
RP/0/RP0/CPU0:router(config-l2vpn-encap-mpls)# show l2tp tunnel detail
Tue Jun 10 12:47:36.638 UTC
Tunnel id 1487464659 is up, remote id is 2064960537, 2 active sessions
  Remotely initiated tunnel
  Tunnel state is established, time since change 4d19h
  Tunnel transport is IP (115)
  Remote tunnel name is ASR9K-PE2
    Internet Address 26.26.26.26, port 0
  Local tunnel name is PRABHRAM-PE1
    Internet Address 25.25.25.25, port 0
  VRF table id is 0xe0000000
  Tunnel group id
  L2TP class for tunnel is L2TPV3_CLASS
  Control Ns 4178, Nr 4181
  Local RWS 512 (default), Remote RWS 512
  Control channel Congestion Control is disabled
  Tunnel PMTU checking disabled
  Retransmission time 1, max 1 seconds
  Unsent queuesize 0, max 0
  Resend queuesize 0, max 1
  Total resends 0, ZLB ACKs sent 4177
  Total out-of-order dropped pkts 0
  Total out-of-order reorder pkts 0
  Total peer authentication failures 0
  Current no session pak queue check 0 of 5
  Retransmit time distribution: 0 0 0 0 0 0 0 0 0
  Control message authentication is disabled
```

Related Commands

Command	Description
show l2tp session, on page 69	Displays information about L2TP sessions.

show l2vpn

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

show l2vpn

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

Command Default	None
------------------------	------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operation
	l2vpn	read

Example

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

```
RP/0/RP0/CPU0:router# show l2vpn
Mon May 7 15:01:17.963 BST
PW-Status: disabled
PW-Grouping: disabled
Logging PW: disabled
Logging BD state changes: disabled
Logging VFI state changes: disabled
Logging NSR state changes: disabled
TCN propagation: disabled
PWOAMRefreshTX: 30s
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.
	pw-grouping, on page 56	Enables Pseudowire Grouping

show l2vpn atom-db

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

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

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

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

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

```
RP/0/RP0/CPU0:router# show l2vpn atom-db source 1.1.1.1
Peer ID      Source      VC ID      Encap      Signaling  FEC      Discovery
2.2.2.2      1.1.1.1     1          MPLS       LDP        128     none
```

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

RP/0/RP0/CPU0:router# show l2vpn atom-db source 1.1.1.1 detail

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

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

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

show l2vpn atom-db

```

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

```

show l2vpn collaborators

To display information about the state of the interprocess communications connections between l2vpn_mgr and other processes, use the **show l2vpn collaborators** command in EXEC mode.

show l2vpn collaborators

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes EXEC

Command History

Release	Modification
Release 3.4.0	This command was introduced.

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/RP0/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.
State	Indicates if l2vpn_mgr has a working connection with the other process.
Up Cnts	Number of times the connection between l2vpn_mgr and the other process has been successfully established.

show l2vpn collaborators

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

Related Commands

Command	Description
clear l2vpn collaborators, on page 10	Clears the state change counters for L2VPN collaborators.

show l2vpn database

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

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

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

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

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

Task ID	Task ID	Operation
	l2vpn	read

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

```
RP/0/RP0/CPU0:router# show l2vpn database ac
Bundle-Ether1.1:
  Other-Segment MTU: 0
  Other-Segment status flags: 0x0
  Signaled capability valid: No
  Signaled capability flags: 0x0
  Configured capability flags: 0x0
  XCID: 0xffffffff
  PSN Type: Undefined
  ETH data:
    Xconnect tags: 0
    Vlan rewrite tag: 0
  AC defn:
    ac-iframe: Bundle-Ether1.1
    capabilities: 0x00368079
    extra-capabilities: 0x00000000
    parent-ifh: 0x020000e0
    ac-type: 0x15
    interworking: 0x00
  AC info:
```

show l2vpn database

```

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

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

```

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

```

RP/0/RP0/CPU0:router# show l2vpn database node
  0/RSP0/CPU0
    MA: vlan_ma

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

    MA: ether_ma

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

  0/0/CPU0
    MA: vlan_ma

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

```



```
07/27/2012 15:00:40 Replay end rcvd          6006          6001
```

```
MA: ether_ma
```

```
AC event trace history [Total events: 4]
```

```
-----  
Time          Event          Num Rcvd      Num Sent  
====          =====  
07/27/2012 15:00:31 Process joined    0            0  
07/27/2012 15:00:31 Process init success 0            0  
07/27/2012 15:00:31 Replay start rcvd 0            0  
07/27/2012 15:00:31 Replay end rcvd  1            0
```

show l2vpn forwarding

To display forwarding information from the layer2_fib manager on the line card, use the **show l2vpn forwarding** command in EXEC mode.

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

Syntax	Description
xconnect	Displays the cross-connect related information.
bridge-domain	Displays bridge domain related forwarding information.
counter	Displays the cross-connect counters.
detail	Displays detailed information from the layer2_fib manager.
hardware	Displays hardware-related layer2_fib manager information.
inconsistent	Displays inconsistent entries only.
interface	Displays the match AC subinterface.
l2tp	Displays L2TPv3 related forwarding information.
location <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.
message	Displays messages exchanged with collaborators.
mstp	Displays multi-spanning tree related forwarding information.
resource	Displays resource availability information in the layer2_fib manager.
retry-list	Displays retry list related information.

summary	Displays summary information about cross-connects in the layer2_fib manager.
unresolved	Displays unresolved entries only.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.
	Release 3.7.0	Sample output was updated to add MAC information for the layer2_fib manager summary.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

The following sample output is from the **show l2vpn forwarding bridge detail location** command for IOS-XR releases 5.3.1 and earlier:

```
RP/0/RP0/CPU0:router# show l2vpn forwarding bridge detail 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: bg1:bd2, id: 1, state: up
  Type: pbb-edge, I-SID: 1234
  Core-bridge: pbb-bd2
  MAC learning: enabled
  Flooding:
    Broadcast & Multicast: enabled
    Unknown unicast: enabled
  MAC aging time: 300 s, Type: inactivity
  MAC limit: 4000, Action: none, Notification: syslog
  MAC limit reached: no
  Security: disabled
  DHCPv4 snooping: profile not known on this node
  IGMP snooping: disabled, flooding: disabled
  Bridge MTU: 1500 bytes
  Number of bridge ports: 0
  Number of MAC addresses: 0
  Multi-spanning tree instance: 0

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

Bridge-domain name: bg1:bd3, id: 2, state: up
  Type: pbb-core
  Number of associated pbb-edge BDs: 1

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

PBB Core, state: up
  Vlan-id: 1

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

```

The following sample output is from the **show l2vpn forwarding bridge detail location** command for IOS-XR 5.3.2 release:

```

RP/0/RP0/CPU0:router# show l2vpn forwarding bridge detail location 0/0/CPU0

Bridge-domain name: pbb:pbb_core1, id: 10, state: up
  Type: pbb-core
  Number of associated pbb-edge BDs: 1

```

```

MAC learning: enabled
MAC port down flush: enabled
Flooding:
  Broadcast & Multicast: enabled
  Unknown unicast: enabled
MAC aging time: 300 s, Type: inactivity
MAC limit: 4000, Action: none, Notification: syslog
MAC limit reached: no
MAC Secure: disabled, Logging: disabled
DHCPv4 snooping: profile not known on this node
Dynamic ARP Inspection: disabled, Logging: disabled
IP Source Guard: disabled, Logging: disabled
IGMP snooping: disabled, flooding: enabled
MLD snooping: disabled, flooding: disabled
MMRP Flood Optimization: disabled
Storm control: disabled
P2MP PW: disabled
Bridge MTU: 1500 bytes
Number of bridge ports: 1
Number of MAC addresses: 5
Multi-spanning tree instance: 0
PBB-EVPN: enabled
Statistics:
  packets: received 0, sent 963770
  bytes: received 0, sent 263433178

PBB Core, state: Up
Vlan-id: 1
XC ID: 0x80000010
Number of MAC: 0
Statistics:
  packets: received 0 (unicast 0), sent 0
  bytes: received 0 (unicast 0), sent 0
  MAC move: 0
Storm control drop counters:
  packets: broadcast 0, multicast 0, unknown unicast 0
  bytes: broadcast 0, multicast 0, unknown unicast 0

```

The following sample outputs shows the backup pseudowire information:

```

RP/0/RP0/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/RP0/CPU0:router#show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bg1:bd1, id: 0, state: up
```

```
...
GigabitEthernet0/2/0/0.4, state: oper up
  RG-ID 1, active
  Number of MAC: 0
  ...

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

```
RP/0/RP0/CPU0:router#show l2vpn forwarding bridge-domain detail location 0/2/CPU0
Bridge-domain name: bg1:bd1, id: 0, state: up
```

```
...
GigabitEthernet0/2/0/0.4, state: oper up
XC ID: 0x1880002
Number of MAC: 0
Statistics:
packets: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 963770
bytes: received 0 (multicast 0, broadcast 0, unknown unicast 0, unicast 0), sent 263433178
MAC move: 0
Storm control drop counters:
packets: broadcast 0, multicast 0, unknown unicast 0
bytes: broadcast 0, multicast 0, unknown unicast 0
Dynamic arp inspection drop counters:
packets: 0, bytes: 0
IP source guard drop counters:
packets: 0, bytes: 0
```

...

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

```
RP/0/RP0/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/RP0/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/RP0/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/RP0/CPU0:router #show l2vpn forwarding detail location 0/7/CPU0
Xconnect id: 0xc000001, Status: up
Segment 1
```

```

Monitor-Session, pw-span-test, status: Bound
Segment 2
MPLS, Destination address: 2.2.2.2, pw-id: 1, status: Bound
Pseudowire label: 16001
Statistics:
  packets: received 0, sent 11799730
  bytes: received 0, sent 707983800

```

Example 5:

```
show l2vpn forwarding private location 0/11/CPU0
```

```
Xconnect ID 0xc000001
```

```
Xconnect info:
```

```
Base info: version=0xaabbcc13, flags=0x0, type=2, reserved=0
xcon_bound=TRUE, switching_type=0, data_type=3
```

```
AC info:
```

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

```
PW info:
```

```
Base info: version=0xaabbcc12, flags=0x0, type=4, reserved=0
pw_id=1, nh_valid=TRUE, sig_cap_flags=0x20, context=0x0,
MPLS, pw_label=16001
```

```
Statistics:
```

```
  packets: received 0, sent 11799730
  bytes: received 0, sent 707983800
```

```
Object: NHOP
```

```
Event Trace History [Total events: 5]
```

```
-----
```

Time	Event	Flags
====	=====	=====

```
-----
```

```
Nexthop info:
```

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

```
Object: XCON
```

```
Event Trace History [Total events: 16]
```

```
-----
```

Time	Event	Flags
====	=====	=====

```
-----
```

```
RP/0/RP0/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/RP0/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/RP0/CPU0:router# show l2vpn forwarding summary location 0/3/CPU0
```

```

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

```

This example shows the sample output of a configured flow label:

```
RP/0/RP0/CPU0:router# show l2vpn for 0/0/cPU0
```

```

Local interface: GigabitEthernet0/0/1/1, Xconnect id: 0x1000002, Status: up
  Segment 1
    AC, GigabitEthernet0/0/1/1, Ethernet port mode, status: Bound

  Segment 2
    MPLS, Destination address: 3.3.3.3, pw-id: 2, status: Bound, Active
    Pseudowire label: 16004    Control word disabled
    Backup PW
    MPLS, Destination address: 2.2.2.2, pw-id: 6, status: Bound
    Pseudowire label: 16000
    Flow label enabled

    Xconnect id: 0xff000014, Status: down
  Segment 1
    MPLS, Destination address: 2.2.2.2, pw-id: 1, status: Not bound
    Pseudowire label: UNKNOWN    Control word disabled
    Flow label enabled

  Segment 2
    Bridge id: 0, Split horizon group id: 0
    Storm control: disabled
    MAC learning: enabled
    MAC port down flush: enabled
    Flooding:
      Broadcast & Multicast: enabled
      Unknown unicast: enabled
    MAC aging time: 300 s, Type: inactivity
    MAC limit: 4000, Action: none, Notification: syslog
    MAC limit reached: no
    Security: disabled
    DHCPv4 snooping: profile not known on this node, disabled

```



```
IGMP snooping profile: profile not known on this node
Router guard disabled
```

Related Commands

Command	Description
clear l2vpn forwarding counters, on page 13	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	
disposition	Displays forwarding disposition information.
<i>session-ID</i>	Displays L2TPv3-related forwarding information for the specified local session ID. Range is 1-4294967295.
hardware	Displays L2TPv3-related forwarding information read from hardware.
location	Displays L2TPv3-related forwarding information for the specified location.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

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

```
RP/0/RP0/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
	clear l2vpn forwarding counters, on page 13	Clears L2VPN forwarding counters.

show l2vpn generic-interface-list

To display all the L2VPN virtual interfaces, use the **show l2vpn generic-interface-list** command in EXEC mode.

```
show l2vpn generic-interface-list {detail | name | private | summary}
```

Syntax Description	Option	Description
	detail	Specifies the details of the interface.
	name	Specifies the name of the interface.
	private	Specifies the private details of the interface.
	summary	Specifies the summary information of the interface.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

This example shows the sample output of the **show l2vpn generic-interface-list** command:

```
RP/0/RP0/CPU0:router# show l2vpn generic-interface-list
generic-interface-list: 11 (ID: 2, interfaces: 2) Number of items: 20
generic-interface-list: 12 (ID: 3, interfaces: 4) Number of items: 15
```

This example shows the sample output of the **show l2vpn generic-interface-list detail** command:

```
RP/0/RP0/CPU0:router# show l2vpn generic-interface-list detail
generic-interface-list: 11 (ID: 2, interfaces: 2)
  GigabitEthernet0/1/0/0 - items pending 2
  GigabitEthernet0/1/0/1 - items pending 4
  Number of items: 27
  PW-Ether: 1-10, 12-21
  PW-IW: 1-7

generic-interface-list: 12 (ID: 3, interfaces: 4)
```

show l2vpn generic-interface-list

```
GigabitEthernet0/1/0/0 - items pending 2
GigabitEthernet0/1/0/1 - items pending 4
GigabitEthernet0/1/0/2 - items pending 1
GigabitEthernet0/1/0/3 - items pending 0
Number of items: 20
  PW-Ether: 1-15
  PW-IW: 1-7
```

This example shows the sample output of the **show l2vpn generic-interface-list name | detail** command:

```
RP/0/RP0/CPU0:router# show l2vpn generic-interface-list name 11 detail
generic-interface-list: 11 (ID: 2, interfaces: 2)
  GigabitEthernet0/1/0/0 - items pending 2
  GigabitEthernet0/1/0/1 - items pending 4
Number of items: 20
  PW-Ether 1-10, 12-21
```

show l2vpn index

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

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

Syntax Description		
	location	(Optional) Displays index manager statistics for the specified location.
	private	(Optional) Detailed information about all indexes allocated for each pool.
	standby	(Optional) Displays Standby node specific information.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.
	Release 4.3.0	The following keywords are introduced: <ul style="list-style-type: none"> • location • standby

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

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

```
RP/0/RP0/CPU0:router# show l2vpn index
Pool id: 0x4, App: RD
Pool size: 32767
zombied IDs: 0
allocated IDs: 0

Pool id: 0x5, App: IFLIST
```

```
Pool size: 65535
zombied IDs: 0
allocated IDs: 2

Pool id: 0xff000001, App: PW/PBB/Virtual AC
Pool size: 40960
zombied IDs: 0
allocated IDs: 1

Pool id: 0xff000002, App: BD
Pool size: 4095
zombied IDs: 0
allocated IDs: 2

Pool id: 0xff000003, App: MP2MP
Pool size: 65535
zombied IDs: 0
allocated IDs: 1
```

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

```
RP/0/RP0/CPU0:router# show l2vpn index standby
Pool id: 0xffffc0000, App: Global
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 98304
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffffc0002, App: BD
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 8192
  zombied IDs: 0
  allocated IDs: 0

Pool id: 0xffffc0003, App: MP2MP
  Max number of ID mgr instances: 1
  ID mgr instances in use: 1
  Pool size: 65535
  zombied IDs: 0
  allocated IDs: 0
```

show l2vpn nsr

To display the status of l2vpn non-stop routing, use the **show l2vpn nsr** command in EXEC mode.

```
show l2vpn nsr [{location | standby}]
```

Syntax Description	
location	(Optional) Displays non-stop routing information for the specified location.
standby	(Optional) Displays Standby node specific information.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.
	Release 6.1.2	The show command output was updated.

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

Task ID	Task ID	Operation
	l2vpn	read

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

```
RP/0/RP0/CPU0:router# show l2vpn nsr

Mon May 30 19:32:01.045 UTC
L2VPN NSR information
NSR Status:
NSR Ready                : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
Last NSR Withdraw Time  : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
Standby Connected       : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
IDT Done                 : Fri May 27 10:50:59 UTC 2016 (3d08h ago)
Number of XIDs sent     : Virtual AC: 0
                        AC      : 1
                        PW      : 1
                        BD      : 0
                        MP2MP   : 0
                        RD      : 0
                        PBB      : 0
                        IFLIST  : 0
                        ATOM    : 1
                        Global   : 0
```

 show l2vpn nsr

```
PWGroup : 0
EVPN    : 0
```

Related Commands	Command	Description
	l2vpn, on page 36	Enters L2VPN configuration mode.
	nsr (L2VPN), on page 46	Configures non-stop routing.

show l2vpn process fsm

To display the status of the l2vpn process finite state machine, use the **show l2vpn process fsm** command in EXEC mode. It displays the current process role and state, NSR status, ISSU status, role change status, and status of collaborators.

```
show l2vpn process fsm [{location | standby}]
```

Syntax Description	location	(Optional) Displays non-stop routing information for the specified location.
	standby	(Optional) Displays Standby node specific information.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 6.1.2	This command was introduced.

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

Task ID	Task ID	Operation
	l2vpn	read

The following example displays output for the **show l2vpn process fsm** command:

```
RP/0/RP0/CPU0:router# show l2vpn process fsm

Mon May 16 10:20:30.967 PDT
L2VPN Process FSM
  Current process role      : Primary Active (Master)
  Current process state    : Run
  S/w install in progress  : No
  NSR Status:
    NSR Ready              : No
    Last NSR Withdraw Time : Mon May 16 10:19:58 PDT 2016 (00:00:33 ago)
    Standby Connected      : No
    IDT Done               : Never
    Number of XIDs sent    : Virtual AC: 0
                           AC          : 1
                           PW          : 1
                           BD          : 0
                           MP2MP      : 0
                           RD          : 0
                           PBB         : 0
                           IFLIST     : 0
```

show l2vpn process fsm

```

ATOM      : 1
Global    : 0
PWGroup   : 0
EVPN      : 0

Process Role Change Status:
  Role Change Triggered : No Role Change
  Role Change Start     : No
  Role Change End       : No

Process State Transition Time:
  Process-Start         : Mon May 16 10:19:29 PDT 2016 (00:01:02 ago)
  Process-Init          : Mon May 16 10:19:30 PDT 2016 (00:01:01 ago)
  Role-based Init       : Mon May 16 10:19:31 PDT 2016 (00:01:00 ago)
  Wait-Collab-Conn     : Mon May 16 10:19:31 PDT 2016 (00:01:00 ago)
  Run                   : Mon May 16 10:19:58 PDT 2016 (00:00:33 ago)

Process Collaborator Report Card:
  Collaborator          Connection Status (Since)                IDT Done
(At)

-----
NSR-INFRA              Up (Mon May 16 10:19:30 PDT 2016 (00:01:01 ago))                N/A
NSR-PEER                Down (Never came Up)                                           No
ISSU-PEER              Down (Never came Up)                                           No
SYSDB-CONFIG           Up (Mon May 16 10:19:30 PDT 2016 (00:01:01 ago))                Mon May 16
10:19:58 PDT 2016 (00:00:33 ago)

```

Related Commands

Command	Description
l2vpn, on page 36	Enters L2VPN configuration mode.
nsr (L2VPN), on page 46	Configures non-stop routing.
show l2vpn index, on page 93	Displays statistics about the index manager.

show l2vpn provision queue

To display L2VPN configuration provisioning queue information, use the **show l2vpn provision queue** command in EXEC mode.

show l2vpn provision queue [{location | standby}]

Syntax Description	location (Optional) Displays L2VPN configuration provisioning queue information for the specified location.				
	standby (Optional) Displays Standby node specific information.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.3.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.3.0	This command was introduced.
Release	Modification				
Release 4.3.0	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operation	l2vpn	read
Task ID	Operation				
l2vpn	read				

The following example displays output for the **show l2vpn provision queue** command:

```
RP/0/RP0/CPU0:router# show l2vpn provision queue

Legend: P/P/R = Priority/Provisioned/Require Provisioning.
Configuration Item      Object Type      Class              P/P/R Object
Key
-----
VPLS01      BD_NAME      bd_t              vpls_bd_class     0/0/0 BD
VPLS02      BD_NAME      bd_t              vpls_bd_class     0/0/0 BD
VPLS03      BD_NAME      bd_t              vpls_bd_class     0/0/0 BD
```

The following example displays output for the **show l2vpn provision queue standby** command:

```
RP/0/RP0/CPU0:router# show l2vpn provision queue standby

Legend: P/P/R = Priority/Provisioned/Require Provisioning.
Configuration Item      Object Type      Class              P/P/R Object
Key
```

show l2vpn provision queue

```

-----
-----
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS01
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS02
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS03
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS04
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS05
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS06
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS07
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS08
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS09
      BD_NAME          bd_t          vpls_bd_class      0/0/0 BD
VPLS10

```

Related Commands

Command	Description
l2vpn, on page 36	Enters L2VPN configuration mode.

show l2vpn pw-class

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

```
show l2vpn pw-class [{detail | location | name class name | standby}]
```

Syntax Description	detail	(Optional) Displays detailed information.
	location	(Optional) Displays location specific information.
	name <i>class-name</i>	(Optional) Displays information about a specific pseudowire class name.
	standby	(Optional) Displays standby node specific information.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.5.0	This command was introduced.
	Release 4.3.0	The keywords location and standby were introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

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

```
RP/0/RP0/CPU0:router# show l2vpn pw-class

Name                               Encapsulation   Protocol
-----
mplsclass_75                       MPLS            LDP
l2tp-dynamic                       L2TPv3         L2TPv3
```

This example shows sample output for the **show l2vpn pw-class detail** command:

```
RP/0/RP0/CPU0:router# show l2vpn pw-class detail
Encapsulation MPLS, protocol LDP
Transport mode not set, control word unset (default)
Sequencing not set
Static tag rewrite not set
```

```

PW Backup disable delay: 0 sec
MAC withdraw message is sent over PW: no
IPv4 source address 1.1.1.1

```

This table describes the significant fields shown in the display.

Table 6: show l2vpn pw-class Command Field Descriptions

Field	Description
Name	Displays the name of the pseudowire class.
Encapsulation	Displays the encapsulation type.
Protocol	Displays the protocol type.

Related Commands

Command	Description
clear l2vpn forwarding counters, on page 13	Clears L2VPN forwarding counters.

show l2vpn pwhe

To display the pseudowire headend (PWHE) information, use the **show l2vpn pwhe** command in EXEC mode.

```
show l2vpn pwhe {detail | interface | summary}
```

Syntax Description	detail	Specifies the details of the interface.
	interface	Specifies the name of the interface.
	summary	Specifies the summary information of the interface.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

This example show the sample output for **show l2vpn pwhe detail** command:

```
RP/0/RP0/CPU0:router# show l2vpn pwhe detail
Interface: PW-Ether1   Interface State: Down, Admin state: Up
  Interface handle 0x20000070
  MTU: 1514
  BW: 10000 Kbit
  Interface MAC addresses: 0279.96e9.8205
  Label: 16000
  L2-overhead: 0
  VC-type: 5
  CW: N
  Generic-interface-list: ifl1 (id: 1)
    Gi0/2/0/1, in bundle BE3, state: Up, replication: success
    Gi0/2/0/0, in bundle BE5, state: Up, replication: success
    Gi0/2/0/2, in bundle BE5, state: Up, replication: success
    Gi0/2/0/3, state: Up, replication: success

Interface: PW-IW1   Interface State: Up, Admin state: Up
  Interface handle 0x20000070
```

```
MTU: 1514
BW: 10000 Kbit
VC-type: 11
CW: N
Generic-interface-list: ifl2 (id: 2)
  Gi0/3/0/1, in bundle BE6, state: Up, replication: success
  Gi0/3/0/0, in bundle BE6, state: Up, replication: success
  Gi0/3/0/2, state: Up, replication: success
  Gi0/3/0/3, state: Up, replication: success
```

This example show the sample output for **show l2vpn pwhe summary** command:

```
RP/0/RP0/CPU0:router# show l2vpn pwhe summary
Number of PW-HE interface: 1600
Up: 1300 Down: 300 Admindown: 0
Number of PW-Ether interfaces: 900
Up: 700 Down: 200 Admindown: 0
Number of PW-IW interfaces: 700
Up: 600 Down: 100 Admindown: 0
```


show l2vpn resource

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

show l2vpn resource

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read

Examples

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

```
RP/0/RP0/CPU0:router# show l2vpn resource
```

```
Memory: Normal
```

describes the significant fields shown in the display. [Table 7: show l2vpn resource Command Field Descriptions, on page 105](#)

Table 7: show l2vpn resource Command Field Descriptions

Field	Description
Memory	Displays memory status.

show l2vpn trace

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

```
show l2vpn trace [{checker | file | hexdump | last | location | reverse | stats | tailf | unique | usec | verbose
| wide | wrapping}]
```

Syntax Description	Parameter	Description
	checker	Displays trace data for the L2VPN Uerverifier.
	file	Displays trace data for the specified file.
	hexdump	Display traces data in hexadecimal format.
	last	Display last <n> entries
	location	Displays trace data for the specified location.
	reverse	Display latest traces first
	stats	Display trace statistics
	tailf	Display new traces as they are added
	unique	Display unique entries with counts
	usec	Display usec details with timestamp
	verbose	Display internal debugging information
	wide	Display trace data excluding buffer name, node name, tid
	wrapping	Display wrapping entries

Command Default None

Command Modes EXEC

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

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

Task ID	Task ID	Operation
	l2vpn	read

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

```
RP/0/RP0/CPU0:router# show l2vpn trace
310 unique entries (1775 possible, 0 filtered)
Jul 27 14:39:51.786 l2vpn/fwd-detail 0/RSP0/CPU0 2# t1 FWD_DETAIL:415: l2tp session
table rebuilt
Jul 27 14:39:52.106 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:788: ISSU - imdr init called;
'infra/imdr' detected the 'informational' condition 'the service is not supported in the
node'
Jul 27 14:39:52.107 l2vpn/issu 0/RSP0/CPU0 1# t1 ISSU:428: ISSU - attempt to start
COLLABORATOR wait timer while not in ISSU mode
Jul 27 14:39:54.286 l2vpn/fwd-common 0/RSP0/CPU0 1# t1 FWD_COMMON:3257: show edm thread
initialized
Jul 27 14:39:55.270 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC|ERR:783: Mac aging init
Jul 27 14:39:55.286 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1765: l2vpn_gsp_cons_init
returned No error
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:1792: Client successfully
joined gsp group
Jul 27 14:39:55.340 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:779: Initializing the
txlist IPC thread
Jul 27 14:39:55.341 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:2971: gsp_optimal_msg_size
= 4832 (real: True)
Jul 27 14:39:55.351 l2vpn/fwd-mac 0/RSP0/CPU0 1# t1 FWD_MAC:626: Entering mac aging
timer init
```

show l2vpn xconnect

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

show l2vpn xconnect [{**brief** | **detail** | **encapsulation** | **group** | **groups** | **interface** | **location** | **mp2mp** | **mstp** | **neighbor** | **pw-class** | **standby** | **state** | **summary** | **type** | **state unresolved** | **pw-id value**}]

Syntax Description	
brief	(Optional) Displays encapsulation brief information.
detail	(Optional) Displays detailed information.
<i>encapsulation</i>	(Optional) Filters on encapsulation type.
group	(Optional) Displays all cross-connects in a specified group.
groups	(Optional) Displays all groups information.
interface	(Optional) Filters the interface and subinterface.
location	(Optional) Displays location specific information.
mp2mp	(Optional) Displays MP2MP information.
mstp	(Optional) Displays ms_pw information.
neighbor	(Optional) Filters the neighbor.
pw-class	(Optional) Filters on pseudowire class
standby	(Optional) Displays standby node specific information.
state	(Optional) Filters the following xconnect state types: <ul style="list-style-type: none"> • up • down
summary	(Optional) Displays AC information from the AC Manager database.
type	(Optional) Filters the following xconnect types: <ul style="list-style-type: none"> • ac-pw • locally switched
state unresolved	(Optional) Displays information about unresolved cross-connects.
pw-id value	Displays the filter for 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 3.4.1	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.
	Release 4.3.0	The following keywords were introduced: <ul style="list-style-type: none"> • brief • encapsulation • groups • location • mp2mp • mspw • pw-class • standby
	Release 5.1.2	This command was modified to enable filtering the command output for a specific pseudowire with just the pseudowire ID.

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

If a specific cross-connect is specified in the command (for instance, AC_to_PW1) then only that cross-connect will be displayed; otherwise, all cross-connects are displayed.

When configuring Ethernet Connectivity Fault Management (CFM) over l2vpn cross-connect, the CFM Continuity Check Messages (CCM) packets are not accounted for in the cross-connect pseudowire packet counters displayed in this show command output.



Note For Cisco IOS XR software Release 5.1.2 and above, you can filter the command output for specific pseudowire with just the pseudowire ID. However, for pseudowire configurations with FEC 129 Type 2 (in VPWS), filtering the output for a specific pseudowire can only be done with the combination of the neighbour filter and the pseudowire ID.

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

```
RP/0/RP0/CPU0:router# show l2vpn xconnect
Wed May 21 09:06:47.944 UTC
Legend: ST = State, UP = Up, DN = Down, AD = Admin Down, UR = Unresolved,
        SB = Standby, SR = Standby Ready, (PP) = Partially Programmed

XConnect
Group      Name          ST      Segment 1
          Description      ST      Segment 2
          Description      ST
-----
L2TPV3_V4_XC_GRP
          L2TPV3_P2P_1
          UP      Gi0/2/0/1.2      UP      26.26.26.26      100      UP
-----
L2TPV3_V4_XC_GRP
          L2TPV3_P2P_2
          UP      Gi0/2/0/1.3      UP      26.26.26.26      200      UP
-----
```

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

```
RP/0/RP0/CPU0:router# show l2vpn xconnect detail

Group siva_xc, XC siva_p2p, state is up; Interworking none
Monitor-Session: pw-span-test, state is configured
AC: GigabitEthernet0/4/0/1, state is up
  Type Ethernet
  MTU 1500; XC ID 0x5000001; interworking none; MSTi 0
  Statistics:
    packet totals: send 90
    byte totals: send 19056
PW: neighbor 10.1.1.1, PW ID 1, state is up ( established )
PW class not set, XC ID 0x5000001
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

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

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

```
Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0
```

Backup PW:

```
PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 1.1.1.1 PW ID 1 ( standby )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set
```

MPLS	Local	Remote
Label	30006	16003
Group ID	unassigned	0x5000400
Interface	unknown	GigabitEthernet0/4/0/2
MTU	1500	1500
Control word	enabled	enabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2	0x2
	(LSP ping verification)	(LSP ping verification)
VCCV CC type	0x3	0x3
	(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/RP0/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
		(none)

```

                (LSP ping verification)
VCCV CC type 0x3                                0x0
                                                (none)
                (control word)
                (router alert label)
-----
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
Statistics:
  packet totals: receive 0
  byte totals: receive 0

Backup PW:
PW: neighbor 10.2.2.2, PW ID 2, state is up ( established )
  Backup for neighbor 10.1.1.1 PW ID 1 ( active )
  PW class not set, XC ID 0x0
  Encapsulation MPLS, protocol LDP
  PW type Ethernet, control word enabled, interworking none
  PW backup disable delay 0 sec
  Sequencing not set
    MPLS          Local                               Remote
-----
Label            30006                               16003
Group ID         unassigned                          0x5000400
Interface        unknown                          GigabitEthernet0/4/0/2
MTU              1500                               1500
Control word     enabled                               enabled
PW type          Ethernet                          Ethernet
VCCV CV type 0x2 (LSP ping verification)         0x2 (LSP ping verification)
VCCV CC type 0x3 (control word)                   0x3 (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/RP0/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
					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/RP0/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
-----

```

show l2vpn xconnect

```

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

```

```

Create time: 20/11/2007 21:45:07 (00:49:18 ago)
Last time status changed: 20/11/2007 21:45:11 (00:49:14 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

```

Backup PW:

```

PW: neighbor 2.2.2.2, PW ID 2, state is up ( established )
Backup for neighbor 1.1.1.1 PW ID 1 ( standby )
PW class not set, XC ID 0x0
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word enabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

```

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

```

Backup PW for neighbor 1.1.1.1 PW ID 1
Create time: 20/11/2007 21:45:45 (00:48:40 ago)
Last time status changed: 20/11/2007 21:45:49 (00:48:36 ago)
Statistics:
  packet totals: received 0, sent 0
  byte totals: received 0, sent 0

```

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

```
RP/0/RP0/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
              (LSP ping verification)
              (none)
VCCV CC type  0x3          0x0
              (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 example shows that the PW type changes to Ethernet, which is Virtual Circuit (VC) type 5, on the interface when a double tag rewrite option is used.

```
RP/0/RP0/CPU0:router# show l2vpn xconnect pw-class pw-class1 detail
```

```

Group VPWS, XC ac3, state is up; Interworking none
AC: GigabitEthernet0/7/0/5.3, state is up
Type VLAN; Num Ranges: 1
VLAN ranges: [12, 12]
MTU 1508; XC ID 0x2440096; interworking none
Statistics:

```

show l2vpn xconnect

```

packets: received 26392092, sent 1336
bytes: received 1583525520, sent 297928
drops: illegal VLAN 0, illegal length 0
PW: neighbor 3.3.3.3, PW ID 3, state is up ( established )
PW class VPWS1, XC ID 0x2440096
Encapsulation MPLS, protocol LDP
PW type Ethernet, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

```

```

Preferred path tunnel TE 3, fallback disabled
PW Status TLV in use

```

MPLS	Local	Remote
Label	16147	21355
Group ID	0x120001c0	0x120001c0
Interface	GigabitEthernet0/7/0/5.3	GigabitEthernet0/7/0/5.3
MTU	1508	1508
Control word	disabled	disabled
PW type	Ethernet	Ethernet
VCCV CV type	0x2	0x2
	(LSP ping verification)	(LSP ping verification)
VCCV CC type	0x6	0x6
	(router alert label)	(router alert label)
	(TTL expiry)	(TTL expiry)

```

Incoming Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 4294705365
Create time: 21/09/2011 08:05:01 (00:14:01 ago)
Last time status changed: 21/09/2011 08:07:01 (00:12:01 ago)
Statistics:
packets: received 1336, sent 26392092
bytes: received 297928, sent 1583525520

```

This example shows the sample output of a pseudowire headend (PWHE) cross connect:

```

RP/0/RP0/CPU0:router# show l2vpn xconnect interface pw-ether 67 detail
Group g1, XC xcl, state is down; Interworking none
AC:PW-Ether1, state is up
Type PW-Ether
Interface-list: interfacelist1
Replicate status:
Gi0/2/0/1: success
Gi0/3/0/1: pending
Gi0/4/0/1: failed
MTU 1500; interworking none
Statistics:
packets: received 0, sent 0
bytes: received 0, sent 0
PW: neighbor 130.130.130.130, PW ID 1234, state is down ( provisioned )
PW class not set
Encapsulation MPLS, protocol LDP
PW type Ethernet VLAN, control word disabled, interworking none
Sequencing not set
Internal label: 16008
VLAN id imposed: 101

```

MPLS	Local	Remote
Label	16001	unknown

```

Group ID      0x2000600                0x0
Interface     PW-Ether1                unknown
MTU           1500                    unknown
Control word  disabled                 unknown
PW type       Ethernet VLAN         unknown
VCCV CV type  0x2                      0x0
                                   (none)
                                   (LSP ping verification)
VCCV CC type  0x6                      0x0
                                   (none)
                                   (router alert label)
                                   (TTL expiry)
-----

```

```

MIB cpwVcIndex: 2
Create time: 19/02/2010 23:13:01 (1w2d ago)
Last time status changed: 19/02/2010 23:13:16 (1w2d ago)
Statistics:
  packets: received 0, sent 0
  bytes: received 0, sent 0

```

This example shows the sample output of a configured flow label:

```

RP/0/RP0/CPU0:router# show l2vpn xconnect detail
Group g1, XC p1, state is up; Interworking none
  AC: GigabitEthernet0/0/1/1, state is up
    Type Ethernet
    MTU 1500; XC ID 0x1000002; interworking none
    Statistics:
      packets: received 24688, sent 24686
      bytes: received 1488097, sent 1487926
  PW: neighbor 3.3.3.3, PW ID 2, state is up ( established )
    PW class class1, XC ID 0x1000002
    Encapsulation MPLS, protocol LDP
    PW type Ethernet, control word disabled, interworking none
    PW backup disable delay 0 sec
  Sequencing not set
  Flow label flags configured (Rx=1,Tx=1), negotiated (Rx=0,Tx=1)

```

This table describes the significant fields shown in the display.

Table 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
xconnect group, on page 130	Configures cross-connect groups.

show tunnel-template

To display tunnel template information, use the **show tunnel-template** command in the EXEC mode.

show tunnel-template *template-name*

Syntax Description	<i>template-name</i> Name of the tunnel template.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.5.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.5.0	This command was introduced.
Release	Modification				
Release 3.5.0	This command was introduced.				
Usage Guidelines					
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>tunnel</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operation	tunnel	read
Task ID	Operation				
tunnel	read				

Example

The following example shows the output of the **show tunnel-template test** command for Local PE Tunnel:

```
RP/0/RP0/CPU0:router# show tunnel-template test
Fri Jan 30 06:22:46.428 UTC

Tunnel template
-----
Name:      test (ifhandle: 0x00080030)
MTU:      1464
TTL:      255
TOS:      0
Tunnel ID: 1
Source:    25.25.25.25
Session ID: 0x1D174108 Cookie: 8 bytes [0x24FD3ADAA4485333] being rolled into
           Session ID: 0x15A86E93 Cookie: 8 bytes [0xF486195660CCD522]
Next Session-id/Cookie rollover happens in 1 minute 49 seconds
Transmit:  14213298 pkts  1250770344 bytes
Cookie Mismatch: 0 pkts
MTU Violation: 0 pkts
```

The following example shows the output of the **show tunnel-template test** command for Remote PE Tunnel:

```
RP/0/RP0/CPU0:router# show tunnel-template test
Fri Jan 30 06:04:29.800 UTC
```

Tunnel template

```
-----  
Name:      test (ifhandle: 0x00080030)  
MTU:      600  
TTL:      255  
TOS:      0  
Tunnel ID: 1  
Source:    35.35.35.35   Address Pool: 36.36.36.0/28  
Session ID: 0x111F4312 Cookie: 8 bytes [0xB95A806145BE9BE7]  
Transmit:  122168722 pkts 10750845295 bytes  
Cookie Mismatch: 0 pkts  
MTU Violation: 0 pkts
```

Related Commands

Command	Description
tunnel-template, on page 129	Enters tunnel-template configuration submode.

storm-control

Storm control on ASR 9000 Series Routers can be applied at the following service attachment points:

- Bridge domain (BD)
- Attachment Circuit (AC)
- Access pseudowire (PW)

To enable storm control on all access circuits (AC) and access pseudowires (PW) in a VPLS bridge, use the **storm-control** command in l2vpn bridge group bridge-domain configuration mode. To disable storm control, use the **no** form of this command.

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

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

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

Syntax Description

broadcast	Configures storm control for broadcast traffic.
multicast	Configures storm control for multicast traffic.
unknown-unicast	Configures storm control for unknown unicast traffic. <ul style="list-style-type: none"> • Storm control does not apply to bridge protocol data unit (BPDU) packets. All BPDU packets are processed as if traffic storm control is not configured. • Storm control does not apply to internal communication and control packets, route updates, SNMP management traffic, Telnet sessions, or any other packets addressed to the router.
pps <i>pps-value</i>	Configures the packets-per-second (pps) storm control threshold for the specified traffic type. Valid values range from 1 to 160000.
kbps <i>kbps-value</i>	Configures the storm control in kilo bits per second (kbps). The range is from 64 to 1280000.

Command Default

Storm control is disabled by default.

Command Modes

l2vpn bridge group bridge-domain access circuit configuration

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

- Bridge Protocol Data Unit (BPDU) packets are not filtered through the storm control feature.
- The traffic storm control monitoring interval is set in the hardware and is not configurable. On Cisco ASR 9000 Series Router, the monitoring interval is always one second.
- When there is a mix of kbps and pps storm control on bridge or bridge port, the pps value is translated to kbps inside the policer using 1000 bytes per packet as an average.
- The hardware can only be programmed with a granularity of 8 pps, so values are not divisible by eight. These are rounded to the nearest increment of eight.

Task ID

Task ID	Task	Operations
	l2vpn	read, write

Examples

The following example enables storm control thresholds throughout the bridge domain:

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg)# bridge-domain BD1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# storm-control broadcast pps 100
```

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

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# bridge-domain BD2
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# interface Bundle-Ether9001.2001
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# storm-control broadcast pps 100
```

The following example enables storm control thresholds on an access pseudowire:

```
RP/0/RSP0/CPU0:a9k1# configure
RP/0/RSP0/CPU0:a9k1(config)# l2vpn
RP/0/RSP0/CPU0:a9k1(config-l2vpn)# bridge group BG1
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd)# bridge-domain BD2
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-ac)# neighbor 10.1.1.1 pw-id 20011001
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control unknown-unicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control multicast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# storm-control broadcast pps 100
RP/0/RSP0/CPU0:a9k1(config-l2vpn-bg-bd-pw)# commit
```

Running Configuration

```
l2vpn
 bridge group BG1
  bridge-domain BD1
    storm-control unknown-unicast pps 100
```

```
storm-control multicast pps 100
storm-control broadcast pps 100
!
bridge-domain BD2
interface Bundle-Ether9001.2001
storm-control unknown-unicast pps 100
storm-control multicast pps 100
storm-control broadcast pps 100
!
neighbor 10.1.1.1 pw-id 20011001
storm-control unknown-unicast pps 100
storm-control multicast pps 100
storm-control broadcast pps 100
!
!
!
end
RP/0/RSP0/CPU0:a9k1(config)#
```

tag-impose

To specify a tag for a VLAN ID configuration, use the **tag-impose** command in l2vpn configuration submode. To remove the tag, use the **no** form of this command.

tag-impose *vlan value*
no tag-impose *vlan value*

Syntax Description	
vlan	VLAN in tagged mode.
value	Tag value. The range is from 1 to 4094. The default value is 0.

Command Default None

Command Modes L2VPN configuration

Command History	Release	Modification
	Release 4.2.1	This command was introduced.

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples This example shows how to specify a tag for a VLAN:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group xc1
RP/0/RP0/CPU0:router(config-l2vpn-xc)#p2p grp1
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)#neighbor 10.1.1.2 pw-id 78
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p-pw)#tag-impose vlan 8
```

Related Commands	Command	Description
	pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.

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	
ingress	Configures ingress mode.
vlan	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 3.6.0	This command was introduced.

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

The **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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# l2vpn
RP/0/RP0/CPU0:router (config-l2vpn)# pw-class kanata01
RP/0/RP0/CPU0:router (config-l2vpn-pwc)# encapsulation mpls
RP/0/RP0/CPU0:router (config-l2vpn-pwc-encap-mpls)# tag-rewrite vlan 2000
RP/0/RP0/CPU0:router (config-l2vpn-pwc-encap-mpls)#
```

Related Commands	Command	Description
	show l2vpn xconnect, on page 108	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	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.								
Release	Modification												
Release 3.9.0	This command was introduced.												
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.												
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read, write								
Task ID	Operations												
l2vpn	read, write												
Examples	<p>The following example shows how to configure a timeout value for L2TP session setup of 400 seconds:</p> <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# l2tp-class cisco RP/0/RP0/CPU0:router(config-l2tp-class)# timeout setup 400</pre>												
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>authentication (L2TP), on page 3</td> <td>Enables L2TP authentication for a specified L2TP class name.</td> </tr> <tr> <td>hello-interval (L2TP), on page 20</td> <td>Configures the hello-interval value for L2TP (duration between control channel hello packets).</td> </tr> <tr> <td>hidden (L2TP), on page 22</td> <td>Enables hidden attribute-value pairs (AVPs).</td> </tr> <tr> <td>hostname (L2TP), on page 24</td> <td>Defines the name used in the L2TP hostname AVP.</td> </tr> <tr> <td>l2tp-class, on page 28</td> <td>Enters L2TP class configuration mode where you can define an L2TP signaling template.</td> </tr> </tbody> </table>	Command	Description	authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.	hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).	hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).	hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.	l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.
Command	Description												
authentication (L2TP), on page 3	Enables L2TP authentication for a specified L2TP class name.												
hello-interval (L2TP), on page 20	Configures the hello-interval value for L2TP (duration between control channel hello packets).												
hidden (L2TP), on page 22	Enables hidden attribute-value pairs (AVPs).												
hostname (L2TP), on page 24	Defines the name used in the L2TP hostname AVP.												
l2tp-class, on page 28	Enters L2TP class configuration mode where you can define an L2TP signaling template.												

Command	Description
password (L2TP), on page 47	Defines the password and password encryption type for control channel authentication.
receive-window (L2TP), on page 58	Configures the receive window size for the L2TP server.
retransmit (L2TP), on page 60	Configures retransmit retry and timeout values.
show l2tp session, on page 69	Displays information about L2TP sessions.
show l2tp tunnel, on page 71	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 disable the L@VPN pseudowire class transport mode configuration, use the **no** form of this command.

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

Syntax Description

ethernet	Configures Ethernet port mode.
vlan	Configures VLAN tagged mode.

Command Default

None

Command Modes

L2VPN pseudowire class MPLS encapsulation

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines

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



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

This example shows how to configure Ethernet transport mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# pw-class kanata01
RP/0/RP0/CPU0:router(config-l2vpn-pw)# encapsulation mpls
RP/0/RP0/CPU0:router(config-l2vpn-encap-mpls)# transport-mode ethernet
```

Related Commands

Command	Description
pw-class (L2VPN), on page 49	Enters pseudowire class submode to define a pseudowire class template.

transport mode vlan passthrough

To configure L2VPN bridge domain transport mode, use the **transport mode vlan passthrough** command in L2VPN bridge domain configuration mode. To disable the L2VPN bridge domain transport mode configuration, use the **no** form of this command.

transport mode vlan passthrough
no transport mode vlan passthrough

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes L2VPN bridge domain configuration

Command History	Release	Modification
	Release 4.3.1	This command was introduced.

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



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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

This example shows how to configure transport mode vlan passthrough:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# bridge group bg1
RP/0/RP0/CPU0:router(config-l2vpn-bg)# bridge-domain bd1
RP/0/RP0/CPU0:router(config-l2vpn-bg-bd)# transport mode vlan passthrough
```

Related Commands	Command	Description
	bridge-domain (VPLS)	Establishes a bridge domain, and enters L2VPN bridge group bridge domain configuration mode.

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 appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	tunnel	read, write

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# tunnel-template template_01
```

Related Commands	Command	Description
	xconnect group, on page 130	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
```

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

Command Default	None
------------------------	------

Command Modes	L2VPN configuration
----------------------	---------------------

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

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



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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples	The following example shows how to group all cross -connects for customer_atlantic:
-----------------	---

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group customer_atlantic
```

Related Commands	Command	Description
	show l2vpn xconnect, on page 108	Displays brief information on configured cross-connects.