



Virtual Private Network Commands on Cisco IOS XR Software

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

For detailed information about MPLS concepts, configuration tasks, and examples, refer to the *Cisco IOS XR MPLS Configuration Guide*.

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.

Defaults No default behavior or values

Command Modes L2TP class configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



Note

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

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	hello-interval (L2TP)	Configures the duration between control channel hello packets.
	hidden (L2TP)	Enables hidden AVPs.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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	Parameter	Description
	fsm	Clears finite state machine counters.
	event	Clears state machine event counters.
	state	Clears state machine state counters.
	transition	Clears state machine transition counters.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/0/CPU0:router# clear l2tp counters control session fsm state transition
```

Related Commands	Command	Description
	clear l2tp counters control tunnel	Clears L2TP control tunnel counters.
	clear l2tp tunnel	Clears L2TP tunnels.
	show l2tp counters forwarding session	Shows L2TP forward session counters.

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 <i>tunnel id</i>	Clears a specified counter. Range is 1 to 4294967295.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	clear l2tp counters control session	Clears L2TP control session counters.
	clear l2tp tunnel	Clears L2TP tunnels.
	show l2tp counters forwarding session	Shows L2TP forward session counters.

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.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands	Command	Description
	clear l2tp counters control session	Clears L2TP session counters.
	clear l2tp counters control tunnel	Clears L2TP tunnel counters.
	show l2tp session	Displays information about L2TP sessions.

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.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	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	Displays change counters for L2VPN collaborators.

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

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	The pw-id keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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	Displays change counters for L2VPN collaborators.

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.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

clear l2vpn forwarding counters

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

clear l2vpn forwarding counters

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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-id | location node-id}
```

Syntax Description	
address	Clears a specified MAC address.
bridge-domain name	Clears bridge domains learned from a MAC address table.
type	Interface type. For more information, use the question mark (?) online help function.
interface-id	Identifies a 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.
location node-id	Clears L2VPN forwarding message counters for the specified location. The node-id argument is entered in the rack/slot/module notation.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

clear l2vpn forwarding mac-address-table**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	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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 node-id	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.
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Defaults	No default behavior or values
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Command Modes	EXEC
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Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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Task ID	Task ID	Operations
	l2vpn	read, write

Examples	The following example shows how to clear L2VPN forwarding message counters: RP/0/RP0/CPU0:router# clear l2vpn forwarding message counters location 0/1/0
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Related Commands	Command	Description
	show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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 node-id	Clears L2VPN forwarding tables for the specified location. The L2TP class name argument is entered using standard <i>rack/slot/module</i> notation.
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Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

digest (L2TP)

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

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

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

Syntax Description

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

Defaults

check disable: Digest checking is enabled by default.

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

Command Modes

L2TP class configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

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

Related Commands

Command	Description
authentication (L2TP)	Enables L2TP authentication for a specified class name.
hello-interval (L2TP)	Configures the hello-interval value for L2TP.
hidden (L2TP)	Enables hidden AVPs.
hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
password (L2TP)	Defines a password and password encryption type for control channel authentication.
receive-window (L2TP)	Configures the receive window size for the L2TP server.
retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
show l2tp session	Displays information about L2TP sessions.
show l2tp tunnel	Displays information about L2TP tunnels.
timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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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Defaults	<i>interval</i> : 60 seconds
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Command Modes	L2TP class configuration
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Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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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/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# hello-interval 22
```

Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hidden (L2TP)	Enables hidden AVPs.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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.

Defaults No default behavior or values

Command Modes L2TP class configuration

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

Examples The following example shows how to enable hidden AVPs:

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

Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hello-interval (L2TP)	Configures the hello-interval value for L2TP.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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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Defaults	No default behavior or values
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Command Modes	L2TP class configuration
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Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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Task ID	Task ID	Operations
	l2vpn	read, write

Examples	The following example shows how to configure a hostname using the word “cisco”:
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```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# l2tp-class cisco
RP/0/0/CPU0:router(config-l2tp-class)# hostname cisco
```

Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hello-interval (L2TP)	Configures the hello-interval value for L2TP.
	hidden (L2TP)	Enables hidden AVPs.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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 *interface name*

no interface *interface name*

Syntax Description

<i>interface name</i>	Configures the name of the interface or attachment circuit in <i>rack/slot/instance/port</i> format.
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Defaults

No default behavior or values

Command Modes

p2p configuration submode

Command History

Release	Modification
Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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
```

■ interface (p2p)

Related Commands	Command	Description
	p2p	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 signalling 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>	Configures the L2TP class name.
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Defaults

No L2TP classes are defined.

Command Modes

Global configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Use the **l2tp-class** command to enter L2TP class configuration mode.



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

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

Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hello-interval (L2TP)	Configures the hello-interval value for L2TP.
	hidden (L2TP)	Enables hidden AVPs.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The l2transport keyword and the following 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** will be 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)# dot1q 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)# dot1q vlan 999 inner-vlan 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)# dot1q vlan 999 vlan any
```

Related Commands

Command	Description
show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

l2transport cell-packing

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

```
l2transport cell-packing {maximum} {timer}
```

```
no l2transport cell-packing {maximum} {timer}
```

Syntax Description

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

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID

Task ID	Operations
l2vpn	read, write
atm	read, write

Examples

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

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

Related Commands

Command	Description
show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

I2transport I2protocol

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

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

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

Syntax Description

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 <i>bits</i>	Modifies the MPLS experimental bits.
tunnel experimental <i>bits</i>	Configures tunnel protocol packets.

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The following 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.
- Per-VLAN Spanning Tree (PVST)
 - PVST maintains a spanning tree instance for each VLAN configured in the network and permits a VLAN trunk to be forwarding for some VLANs and not for others. It can also load balance Layer 2 traffic by forwarding some VLANs on one trunk and other VLANs on others.

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

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

Examples

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

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

Related Commands

Command	Description
show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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.
----------------------	--

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced on the Cisco CRS-1 router.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

To display the state of l2transport events, use the **show controller internal** command in *Cisco IOS XR Interfaces and Hardware Command Reference*.



Note

Ethernet remote port shutdown is not supported on the Cisco XR 12000 Series Router.

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

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 status
```


Related Commands	Command	Description
	show controller internal	Displays show output for internal interfaces.
	show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

l2transport service-policy

To configure an L2 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 <i>policy-name</i>	Configures the direction of service policy application: input.
output <i>policy-name</i>	Configures the direction of service policy application: output.

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

Related Commands

Command	Description
show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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.

Defaults

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



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
```

Related Commands	Command	Description
	show l2vpn forwarding	Displays the state of the interprocess communications connections between l2vpn_mgr and other processes.

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.
--------------------------	--

Defaults

No default behavior or values

Command Modes

L2VPN configuration submode

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



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	Enters L2VPN configuration submode.

mpls static label (L2VPN)

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

```
mpls static label {local label} {remote value}
```

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

Syntax Description

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

Defaults

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 on the Cisco CRS-1 and Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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	Enters L2VPN configuration mode.
neighbor (L2VPN)	Configures a pseudowire for a cross-connect.

Command	Description
p2p	Enters p2p configuration submode to configure point-to-point cross-connects.
xconnect group	Configures cross-connect groups.

neighbor (L2VPN)

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

```
neighbor {A.B.C.D} {pw-id value}
```

```
no neighbor {A.B.C.D} {pw-id value}
```

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

Defaults	
	No default behavior or values

Command Modes	
	p2p configuration submode

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.4.1	The vccv disable keyword was added.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	The following keywords were removed: <ul style="list-style-type: none"> • control-word • pw-static-label local • remote • vccv • transport-mode

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

A cross-connect may have two segments:

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

**Note**

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

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/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)# neighbor 10.1.1.3 pw-id 1001 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
RP/0/RP0/CPU0:router(config-xc-p2p)# neighbor 20.2.2.4 pw-id 201 pw-class bar2
```

Related Commands

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

password (L2TP)

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

```
password [0 | 7] password
```

```
no password
```

Syntax Description

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

Defaults

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

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

Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hello-interval (L2TP)	Configures the hello-interval value for L2TP.
	hidden (L2TP)	Enables hidden AVPs.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

preferred-path

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

preferred-path {interface} {tunnel-te value} [fallback disable]

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

Syntax Description

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

Defaults

No default behavior or values

Command Modes

Encapsulation MPLS configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced on the Cisco CRS-1.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

Cisco IOS XR Software Release 3.7 supports only **fallback disable**. Traffic does not use the default LDP path if the tunnel is down.

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



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/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)# preferred-path interface tunnel 6666
fallback disable
```

Related Commands

Command	Description
show l2vpn xconnect	Displays detailed information about configured cross-connects.

pw-class (L2VPN)

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

```
pw-class {class name}
```

```
no pw-class {class name}
```

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

Defaults	No default behavior or values
-----------------	-------------------------------

Command Modes	L2VPN configuration submode
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Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
-------------------------	--


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	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

<i>class name</i>	Configures an encapsulation class name.
cookie size { 0 4 8 }	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>	Configures the local source IPv4 address.
pmtu max <i>68-65535</i>	Configures the value of the maximum allowable session MTU.
protocol l2tpv3 class name	Configures L2TPv3 as the signaling protocol for the pseudowire class.
tos { reflect value <i>0-255</i> value <i>0-255</i> }	Configures TOS and the TOS value. Range is 0 to 255.
ttl value	Configures the Time-to-live (TTL) value.

Defaults

No default behavior or values

Command Modes

L2VPN pseudowire class configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



Note

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

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

The following example shows how to define L2TPV3 pseudowire encapsulation:

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

Related Commands

Command	Description
pw-class (L2VPN)	Enters pw-class configuration submode.
pw-class encapsulation mpls	Configures MPLS pseudowire encapsulation.

pw-class encapsulation mpls

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

```
pw-class {class name} encapsulation mpls {control word disable | protocol ldp | vccv none}
```

```
no pw-class {class name} encapsulation mpls {control word disable | protocol ldp | vccv none}
```

Syntax Description

control word disable	Disables control word for MPLS encapsulation.
protocol ldp	Configures LDP as the signaling protocol for this pseudowire class.
vccv none	Enables or disables the VCCV verification type.

Defaults

No default behavior or values

Command Modes

L2VPN pseudowire class configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to define MPLS pseudowire encapsulation:

```
RP/0/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)	Enters pseudowire class submode to define a pseudowire class template.
	pw-class encapsulation l2tpv3	Configures L2TPv3 pseudowire encapsulation.

p2p

To enter p2p configuration submode to configure point-to-point cross-connects, use the **p2p** command in l2vpn xconnect mode. To return to the default behavior, use the **no** form of this command.

```
p2p {xconnect-name}
```

```
no p2p
```

Syntax Description	<i>xconnect-name</i>	(Optional) Configures the name of the point-to-point cross-connect.
--------------------	----------------------	---

Defaults	No default behavior or values
----------	-------------------------------

Command Modes	l2vpn xconnect
---------------	----------------

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
------------------	--

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)	Configures an attachment circuit.

receive-window (L2TP)

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

```
receive-window {size}
```

```
no receive-window {size}
```

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

Defaults	<i>size</i> : 512
-----------------	-------------------

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

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands

Command	Description
authentication (L2TP)	Enables L2TP authentication for a specified class name.
digest (L2TP)	Enables message digest validation.
hello-interval (L2TP)	Configures the hello-interval value for L2TP.
hidden (L2TP)	Enables hidden AVPs.
hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
password (L2TP)	Defines a password and password encryption type for control channel authentication.
retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
show l2tp session	Displays information about L2TP sessions.
show l2tp tunnel	Displays information about L2TP tunnels.
timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

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 SCCRP 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.

Defaults

initial retries: 2

retries: 15

min timeout: 1

max timeout: 8

Command Modes

L2TP class configuration

Command History

Release	Modification
Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

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


Related Commands	Command	Description
	authentication (L2TP)	Enables L2TP authentication for a specified class name.
	digest (L2TP)	Enables message digest validation.
	hello-interval (L2TP)	Configures the hello-interval value for L2TP.
	hidden (L2TP)	Enables hidden AVPs.
	hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
	l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
	password (L2TP)	Defines a password and password encryption type for control channel authentication.
	receive-window (L2TP)	Configures the receive window size for the L2TP server.
	show l2tp session	Displays information about L2TP sessions.
	show l2tp tunnel	Displays information about L2TP tunnels.
	timeout setup (L2TP)	Configures timeout definitions for L2TP session setup.

rollover

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} {holddown time}
```

```
no rollover {periodic time} {holddown time}
```

Syntax Description

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

Defaults

No default behavior or values

Command Modes

tunnel encapsulation l2tp configuration

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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)	Configures an attachment circuit.

sequencing (L2VPN)

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

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

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

Syntax Description

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

Defaults

No default behavior or values

Command Modes

L2VPN pseudowire class encapsulation mode

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

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

```
RP/0/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)# sequencing both
```

Related Commands

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

show l2tp class

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

show l2tp class name *name*

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

Defaults	No default behavior or values
----------	-------------------------------

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

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
------------------	--

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

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

■ show l2tp class

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

Table 86 describes the significant fields shown in the display.

Table 86 *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	Configures an L2TP class.

show l2tp counters forwarding session

To show 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 <i>identifier</i>	Configures the session counter identifier.
	name <i>local-name remote name</i>	Configures the local and remote names for a session counter.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/0/CPU0:router# show l2tp counters forwarding session
```

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

[Table 87](#) describes the significant fields shown in the display.

Table 87 *show l2tp counters forwarding session Field Descriptions*

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

Table 87 *show l2tp counters forwarding session Field Descriptions (continued)*

Field	Description
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
show l2tp tunnel	Displays information about L2TP tunnels.

show l2tp session

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

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

Syntax Description		
brief		Displays summary output for a session.
circuit		Displays attachment circuit information for a session.
detail		Displays detailed output for a session.
interworking		Displays interworking information for a session.
sequence		Displays data packet sequencing information for a session.
state		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.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/0/CPU0:router# show l2tp session brief

L2TP Session Information Total tunnels 1 sessions 6

LocID      TunID      Peer-address  State      Vcid
sess/cir
26093      43554      13.0.0.2     est,UP     60
26094      43554      13.0.0.2     est,UP     40
26095      43554      13.0.0.2     est,UP     50
26096      43554      13.0.0.2     est,UP     70
```

■ **show l2tp session**

```

26097      43554      13.0.0.2      est,UP      20
26098      43554      13.0.0.2      est,UP      30

```

Table 88 describes the significant fields shown in the display.

Table 88 *show l2tp session brief Field Descriptions*

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

Related Commands

Command	Description
show l2tp tunnel	Displays information about L2TP tunnels.

show l2tp tunnel

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

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

Syntax Description	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 identifier	Displays local control channel identifiers.
	name local-name remote-name	Displays the local and remote names of a control channel.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read, write

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

```
RP/0/0/CPU0:router# show l2tp tunnel

L2TP Tunnel Information Total tunnels 1 sessions 6

LocID RemID Remote Name   State  Remote Address  Port  Sessions L2TP
Class
43554 6220  PE2             est   13.0.0.2       0     6         foo
```

Table 89 describes the significant fields shown in the display.

Table 89 *show l2tp tunnel Field Descriptions*

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

Related Commands

Command	Description
show l2tp session	Displays information about L2TP sessions.

show l2vpn collaborators

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

show l2vpn collaborators

Syntax Description This command has no arguments or keywords

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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
```

Table 90 describes the significant fields shown in the display.

Table 90 *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.
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	Clears state change counters for L2VPN collaborators.

show l2vpn forwarding

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

```
show l2vpn forwarding {detail | hardware | interface | location | message | resource | summary
| unresolved} location node-id
```

Syntax Description		
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.
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.
resource		Displays resource availability information in the layer2_fib manager.
summary		Displays summary information about cross-connects in the layer2_fib manager.
unresolved		Displays unresolved entries only.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	Sample output was updated to add MAC information for the layer2_fib manager summary.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read

Examples

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
```

Related Commands

Command	Description
clear l2vpn forwarding counters	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. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	l2vpn	read

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

```
RP/0/0/CPU0:router# show l2vpn forwarding l2tp disposition hardware location 0/3/1
```

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

■ show l2vpn forwarding l2tp

Related Commands	Command	Description
	clear l2vpn forwarding counters	Clears L2VPN forwarding counters.

show l2vpn pw-class

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

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

Syntax Description	detail	Displays detailed information.
	name class name	Displays information about a specific pseudowire class name.

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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
-----
l2tp-dynamic                       L2TPv3         L2TPv3
```

Table 91 describes the significant fields shown in the display.

Table 91 *show l2vpn pw-class 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	Clears L2VPN forwarding counters.

show l2vpn resource

To displays 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

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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
```

[Table 92](#) describes the significant fields shown in the display.

Table 92 *show l2vpn resource Field Descriptions*

Field	Description
Memory	Displays memory status.

show l2vpn xconnect

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

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

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

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.4.1	VCCV-related show command output was added.
	Release 3.5.0	No modification.
	Release 3.6.0	Preferred-path-related show command output was added.
	Release 3.7.0	Sample output was updated to display the backup pseudowire information.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The following command uses the tag customer1 to display all cross-connects in that group. If a specific cross-connect is specified in the command (for instance, AC_to_PW1) then only that cross-connect will be displayed; otherwise, all cross-connects are displayed.

Task ID	Task ID	Operations
	l2vpn	read, write

Examples

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

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

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

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

show l2vpn xconnect

```

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: 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
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)           (none)
                (router alert label)
-----
Create time: 20/11/2007 21:45:06 (00:53:31 ago)
Last time status changed: 20/11/2007 22:38:14 (00:00:23 ago)
Statistics:
  packet totals: receive 0

```



```

byte totals: receive 0

Backup PW:
PW: neighbor 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: receive 0
  byte totals: receive 0

```

Table 93 describes the significant fields shown in the display.

Table 93 *show l2vpn xconnect 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	Configures cross-connect groups.

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.
---------------------------	----------------	--

Defaults	<i>seconds</i> : 300
-----------------	----------------------

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

Command History	Release	Modification
	Release 3.7.0	This command was introduced on the Cisco XR 12000 Series Router.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
-------------------------	--

Task ID	Task ID	Operations
	l2vpn	read, write

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

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

Related Commands

Command	Description
authentication (L2TP)	Enables L2TP authentication for a specified class name.
digest (L2TP)	Enables message digest validation.
hello-interval (L2TP)	Configures the hello-interval value for L2TP.
hidden (L2TP)	Enables hidden AVPs.
hostname (L2TP)	Defines the name used in the L2TP hostname AVP.
l2tp-class	Enters L2TP class configuration mode where you can define L2TP control plane configuration settings.
password (L2TP)	Defines a password and password encryption type for control channel authentication.
receive-window (L2TP)	Configures the receive window size for the L2TP server.
retransmit (L2TP)	Configures retransmit retry and timeout values for the L2TP server.
show l2tp session	Displays information about L2TP sessions.
show l2tp tunnel	Displays information about L2TP tunnels.

transport mode (L2VPN)

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

transport mode { **ethernet** | **vlan** }

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

Syntax Description

ethernet	Configures Ethernet port mode.
vlan	Configures VLAN tagged mode

Defaults

No default behavior or values

Command Modes

L2VPN pseudowire class MPLS encapsulation

Command History

Release	Modification
Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.



Note

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

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to configure Ethernet transport mode:

```
RP/0/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)	Enters pseudowire class submode to define a pseudowire class template.

tunnel-template

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

tunnel-template *template name*

no tunnel-template *template name*

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

Defaults	No default behavior or values
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Command Modes	Global configuration
---------------	----------------------

Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
------------------	--

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	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.
--------------------	-------------------	--

Defaults	No default behavior or values
----------	-------------------------------

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

Command History	Release	Modification
	Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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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
```

■ **xconnect group**

Related Commands	Command	Description
	show l2vpn xconnect	Displays detailed information about configured cross-connects.