



# Pseudowire Group Switchover

The Pseudowire Group Switchover feature allows all pseudowires in a group to be quickly switched over to backup pseudowires. This group switchover is triggered by a single “group down” status message received from a remote peer.

- [Finding Feature Information, on page 1](#)
- [Prerequisites for Pseudowire Group Switchover , on page 1](#)
- [Restrictions for Pseudowire Group Switchover, on page 2](#)
- [Information About Pseudowire Group Switchover, on page 2](#)
- [How to Configure Predictive Switchover, on page 3](#)
- [Verifying a Pseudowire Group Switchover Configuration, on page 4](#)
- [Troubleshooting a Pseudowire Group Switchover Configuration, on page 6](#)
- [Configuration Examples for Predictive Switchover, on page 6](#)
- [Additional References, on page 7](#)
- [Feature Information for Pseudowire Group Switchover, on page 7](#)

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <https://cfng.cisco.com/>. An account on Cisco.com is not required.

## Prerequisites for Pseudowire Group Switchover

- 
- Label Distribution Protocol (LDP) must be implemented on the network.
- Each xconnect must have a backup pseudowire configured.

# Restrictions for Pseudowire Group Switchover

The Pseudowire Group Switchover feature is supported on Cisco IOS XE Release 3.10S and later releases. This feature is supported on Cisco ASR 903 Series routers on the following attachment circuits:

- Ethernet VLAN
- Asynchronous Transfer Mode (ATM)
- Circuit Emulation over MPLS (CEM)

## Information About Pseudowire Group Switchover

### Introduction to Pseudowire Group Switchover

The Pseudowire Group Switchover feature allows you to reduce the switchover time from main pseudowires to backup pseudowires when a fault is encountered. The reduced switchover time is achieved by grouping Label Distribution Protocol (LDP) status messages and internal interprocess communication (IPC) messages.

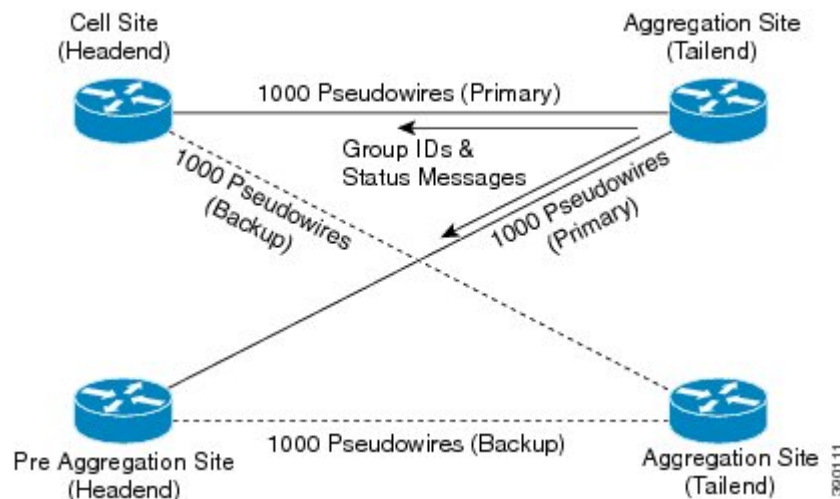
When the remote peer detects an attachment circuit failure, it sends an LDP status message. When this status message is received, the designated backup pseudowires take over. Packets are then routed through the backup pseudowires.

Pseudowires can be grouped together by assigning a group ID. When an LDP status message is received by a pseudowire group, the entire group switches over, thus reducing switchover time.



**Note** The Pseudowire Group Switchover feature is enabled by default and cannot be disabled.

*Figure 1: Primary and Backup Pseudowire Groups*



# How to Configure Predictive Switchover

Predictive switchover allows switchovers from a main pseudowire to a backup pseudowire with a remote "standby" status, without waiting for an "up" status from the remote peer.

Predictive switchover is configured by enabling redundancy predictive mode in global configuration mode or xconnect configuration mode.

## Configuring Predictive Switchover (Global Configuration Mode)

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **l2vpn**
4. **redundancy predictive enabled**
5. **end**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>l2vpn</b> <b>Example:</b> Device(config)# l2vpn	Enters l2vpn configuration mode.
Step 4	<b>redundancy predictive enabled</b> <b>Example:</b> Device(config-l2vpn)# redundancy predictive enabled	Enables redundancy predictive mode. <ul style="list-style-type: none"><li>• By default, redundancy predictive mode is disabled.</li></ul>
Step 5	<b>end</b> <b>Example:</b> Device(config-l2vpn)# end	Exits l2vpn configuration mode and returns to privileged EXEC mode.

## Configuring Predictive Switchover (Xconnect Configuration Mode)

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **l2vpn xconnect context** *context-name*
4. **redundancy predictive enabled**
5. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>l2vpn xconnect context</b> <i>context-name</i> <b>Example:</b> Device(config)# l2vpn xconnect context con1	Creates an L2VPN cross-connect context and enters xconnect configuration mode.
<b>Step 4</b>	<b>redundancy predictive enabled</b> <b>Example:</b> Device(config-xconnect)# redundancy predictive enabled	Enables redundancy predictive mode.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-xconnect)# end	Exits xconnect configuration mode and returns to privileged EXEC mode.

## Verifying a Pseudowire Group Switchover Configuration

You can use **show** commands to view information about a pseudowire group switchover configuration.

The following example shows how to display information about Any Transport over MPLS (AToM) virtual circuits (VCs):

```
Device# show l2vpn atom vc destination 2.1.1.2 group remote 6
```

Interface	Dest Address	VC ID	Service		Status
			Type	Name	
pw100001	2.1.1.2	1234000	p2p	Et1/0.1-1001	UP

The following example shows how to display the status of the pseudowire switching point:

```
Device# show l2vpn atom vc destination 2.1.1.2 group remote 6 detail

pseudowire100001 is up, VC status is up PW type: Ethernet
  Create time: 5d20h, last status change time: 5d20h
  Last label FSM state change time: 5d20h
  Destination address: 2.1.1.2 VC ID: 1234000
  Output interface: Et0/0, imposed label stack {2001}
  Preferred path: not configured
  Default path: active
  Next hop: 20.0.0.2
Member of xconnect service Et1/0.1-1001, group right
Associated member Et1/0.1 is up, status is up
Interworking type is Ethernet
Service id: 0x6d000002
Signaling protocol: LDP, peer 2.1.1.2:0 up
Targeted Hello: 1.1.1.1(LDP Id) -> 2.1.1.2, LDP is UP
Graceful restart: not configured and not enabled
Non stop routing: not configured and not enabled
PWid FEC (128), VC ID: 1234000
Status TLV support (local/remote) : enabled/supported
  LDP route watch : enabled
  Label/status state machine : established, LruRru
  Local dataplane status received : No fault
  BFD dataplane status received : Not sent
  BFD peer monitor status received : No fault
  Status received from access circuit : No fault
  Status sent to access circuit : No fault
  Status received from pseudowire i/f : No fault
  Status sent to network peer : No fault
  Status received from network peer : No fault
  Adjacency status of remote peer : No fault
Sequencing: receive disabled, send disabled
Bindings
Parameter      Local                               Remote
-----
Label          2007                               2001
Group ID      0                                   6
Interface
MTU            1500                               1500
Control word on (configured: autosense)  on
PW type       Ethernet                            Ethernet
VCCV CV type  0x12                                0x12
              LSPV [2], BFD/Raw [5]             LSPV [2], BFD/Raw [5]
VCCV CC type  0x07                                0x07
              CW [1], RA [2], TTL [3]           CW [1], RA [2], TTL [3]
Status TLV    enabled                             supported
Dataplane:
  SSM segment/switch IDs: 12309/4115 (used), PWID: 1
Rx Counters
  106563 input transit packets, 9803650 bytes
  0 drops, 0 seq err
Tx Counters
  0 output transit packets, 0 bytes
  0 drops
```

The following example lists the active and standby segment pairs associated with each peer IP address and group identifier:

```
Device# show ssm group

Active          Standby
IP Address      Group ID      Segment/Switch  Segment/Switch
```

```
=====
2.1.1.2          6          8215/4115          4116/8210
```

The following example displays the number of active and standby segment pairs associated with each peer IP address and group identifier:

```
Device# show ssm group 2.1.1.2 6 summary
```

```
IP Address      Group ID      Group Members
=====
2.1.1.2        6            1
```

The following example displays the number of pseudowires programmed in the hardware, with grouping information:

```
Device# show platform hardware pp active pw eompls group brief
```

```
Brief L2VPN EoMPLS Pseudo Wire Group Info
```

```
IP address      Group ID      Count
-----
0x47474747      100695488     90
```

## Troubleshooting a Pseudowire Group Switchover Configuration

Use the **debug platform software atom brief** command to view information about the following configurations:

- Add Group
- Delete From Group
- Group Switchovers



**Note** We recommend that you use the **debug platform software atom brief** command only under Cisco Technical Assistance Center (TAC) supervision.

## Configuration Examples for Predictive Switchover

### Example: Configuring Predictive Switchover (Global Configuration Mode)

```
Device> enable
Device# configure terminal
Device(config)# l2vpn
Device(config-l2vpn)# redundancy predictive enabled
Device(config-l2vpn)# end
```

### Example: Configuring Predictive Switchover (Xconnect Configuration Mode)

```
Device> enable
Device# configure terminal
Device(config)# l2vpn xconnect context con1
```

```
Device(config-xconnect)# redundancy predictive enabled
Device(config-xconnect)# end
```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
MPLS commands	<a href="#">Cisco IOS Multiprotocol Label Switching Command Reference</a>

### Standards and RFCs

Standard/RFC	Title
RFC 4447	<i>Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)</i>

### Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Pseudowire Group Switchover

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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*Table 1: Feature Information for Pseudowire Group Switchover*

Feature Name	Releases	Feature Information
Pseudowire Group Switchover	Cisco IOS XE Release 3.10S	<p>This feature allows all pseudowires in a group to be quickly switched over to backup pseudowires. This group switchover is triggered by a single “group down” status message received from a remote peer.</p> <p>The following commands were introduced or modified: <b>redundancy predictive, show ssm group.</b></p>