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

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://cfnng.cisco.com/. An account on Cisco.com is not required.

Prerequisites for Pseudowire Group Switchover

- The remote provider edge (PE) router must be capable of sending group status messages.

- Label Distribution Protocol (LDP) must be implemented on the network.

- Each xconnect must have a backup pseudowire configured.

Restrictions for Pseudowire Group Switchover

This feature is supported on the following attachment circuits:

- Ethernet VLAN

- Asynchronous Transfer Mode (ATM)

- Circuit Emulation (CEM) over MPLS

- The pseudowire group switch over convergence number increments linearly with thousand virtual circuits taking 16 seconds of convergence time.

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
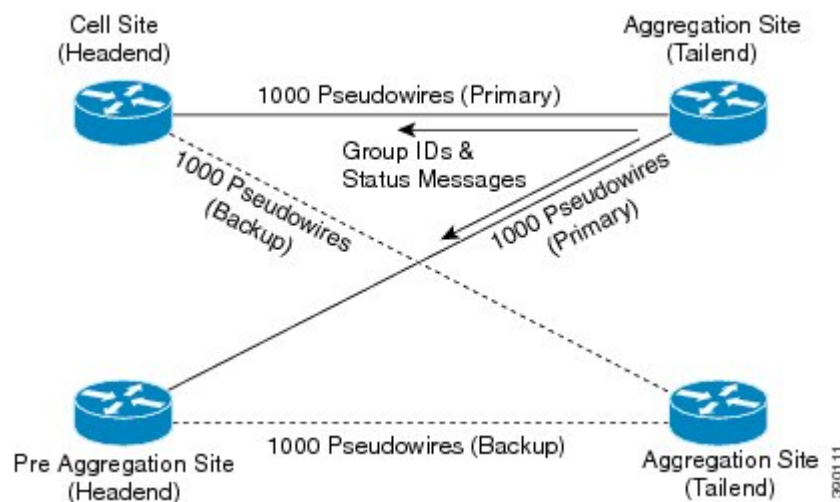
How to Configure Predictive Switchover

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)

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**l2vpn** **Example:** `Device(config)# l2vpn`	Enters l2vpn configuration mode.
Step 4	**redundancy predictive enabled** **Example:** `Device(config-l2vpn)# redundancy predictive enabled`	Enables redundancy predictive mode. • By default, redundancy predictive mode is disabled.
Step 5	**end** **Example:** `Device(config-l2vpn)# end`	Exits l2vpn configuration mode and returns to privileged EXEC mode.

Configuring Predictive Switchover (Xconnect Configuration Mode)

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	**Purpose**
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.

Step 3	**l2vpn xconnect context** *context-name*
	
	Example:
	`Device(config)# l2vpn xconnect context`
	`con1`
		Creates an L2VPN cross-connect context and enters xconnect configuration mode.

Step 4	**redundancy predictive enabled**
	
	Example:
	`Device(config-xconnect)# redundancy`
	`predictive enabled`
		Enables redundancy predictive mode.

Step 5	**end** **Example:** `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

                                     Service
Interface  Dest Address     VC ID     Type    Name                    Status
---------  ---------------  ----------  ------  ------------------------  ----------
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: 10.1.1.1(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	Cisco IOS Master Command List, All Releases
MPLS commands	Cisco IOS Multiprotocol Label Switching Command Reference

Standards and RFCs

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

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.	http://www.cisco.com/cisco/web/support/index.html