

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.

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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

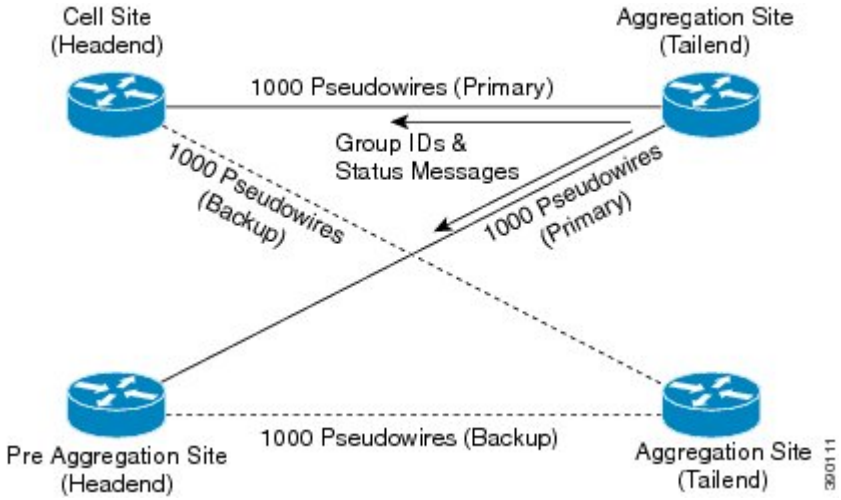
The Pseudowire Group Switchover feature allows you to reduce the switchover time from main pseudowires to backup pseudowires when a fault is encountered. The reduced switchover time is achieved by grouping Label Distribution Protocol (LDP) status messages and internal interprocess communication (IPC)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

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)

SUMMARY STEPS

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

DETAILED STEPS

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 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

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.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for Pseudowire Group Switchover

Feature Name	Releases	Feature Information
Pseudowire Group Switchover	Cisco IOS XE Release 3.10S	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. The following commands were introduced or modified: **redundancy predictive**, **show ssm group**.