



Hot Standby Pseudowire Support for ATM and TDM Access Circuits



Note Hot Standby Pseudowire Support for ATM and IMA circuits are *not* supported on the Cisco ASR 900 RSP3 module.

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature is an enhancement to the L2VPN Pseudowire Redundancy feature in the following ways:

- Faster failover of to the backup pseudowire
- Less traffic loss during failover

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature allows the backup pseudowire to be in a “hot standby” state, so that it can immediately take over if the primary pseudowire fails. The following sections explain the concepts and configuration tasks for this feature.

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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 www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for Hot Standby Pseudowire Support for ATM and TDM Access Circuits

- This feature requires that you understand how to configure Layer 2 virtual private networks (VPNs). You can find that information in the following documents:
 - Any Transport over MPLS
 - L2 VPN Interworking
 - L2VPN Pseudowire Redundancy
- The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature recommends that the following mechanisms be in place to enable faster detection of a failure in the network:
 - Label-switched paths (LSP) Ping/Traceroute and Any Transport over MPLS Virtual Circuit Connection Verification (AToM VCCV)
 - Local Management Interface (LMI)
 - Operation, Administration, and Maintenance (OAM)

Restrictions for Hot Standby Pseudowire Support for ATM and TDM Access Circuits

- Hot Standby Pseudowire Support for ATM and TDM Access Circuits is *not* supported on L2TPv3. Only MPLS L2VPNs are supported.
- Hot Standby Pseudowire Support for ATM and IMA is *not* supported on the Cisco ASR 900 RSP3 module.
- More than one backup pseudowire is *not* supported.
- Different pseudowire encapsulation types on the MPLS pseudowire are not supported.
- If you use Hot Standby Pseudowire Support for ATM and TDM Access Circuits with L2VPN Interworking, the interworking method must be the same for the primary and backup pseudowires. For TDM access circuits, interworking is *not* supported.
- Only dynamic pseudowires are supported.
- Pseudowire over static VPLS is *not* supported on the Cisco ASR 900 RSP3 module.

Information About Hot Standby Pseudowire Support for ATM and TDM Access Circuits

How the Hot Standby Pseudowire Support for ATM and TDM Access Circuits Feature Works

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature improves the availability of L2VPN pseudowires by detecting failures and handling them with minimal disruption to the service.

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature allows the backup pseudowire to be in a “hot standby” state, so that it can immediately take over if the primary pseudowire fails. The L2VPN Pseudowire Redundancy feature allows you to configure a backup pseudowire too, but in a cold state. With the L2VPN Pseudowire Redundancy feature, if the primary pseudowire fails, it takes time for the backup pseudowire to take over, which causes a loss in traffic.

If you have configured L2VPN Pseudowire Redundancy on your network and upgrade to Cisco IOS Release 15.1(1)S, you do not need add any other commands to achieve Hot Standby Pseudowire Support for ATM and TDM Access Circuits. The backup pseudowire will automatically be in a hot standby state.

Supported Transport Types

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature supports the following transport types:

- ATM
 - ATM AAL5 in VC mode
 - ATM packed cell relay in VC Mode
 - ATM in VP mode
 - ATM packed cell relay in VP mode
 - ATM in port mode
 - ATM packed cell relay in port mode
- Time division multiplexing (TDM)
 - Structure-Agnostic TDM over Packet (SAToP)
 - Circuit Emulation Services over PSN (CESoPSN)

How to Configure Hot Standby Pseudowire Support for ATM and TDM Access Circuits

The Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature enables you to configure a backup pseudowire in case the primary pseudowire fails. When the primary pseudowire fails, the PE router can immediately switch to the backup pseudowire.

Configuring a Pseudowire for Static VPLS



Note Pseudowire for Static VPLS is *not* supported on the Cisco ASR 900 RSP3 module.

The configuration of pseudowires between provider edge (PE) devices helps in the successful transmission of the Layer 2 frames between PE devices.

Use the pseudowire template to configure the virtual circuit (VC) type for the virtual path identifier (VPI) pseudowire. In the following task, the pseudowire will go through a Multiprotocol Label Switching (MPLS)-Tunneling Protocol (TP) tunnel.

The pseudowire template configuration specifies the characteristics of the tunneling mechanism that is used by the pseudowires, which are:

- Encapsulation type
- Control protocol
- Payload-specific options
- Preferred path

Perform this task to configure a pseudowire template for static Virtual Private LAN Services (VPLS).



Note Ensure that you perform this task before configuring the virtual forwarding instance (VFI) peer. If the VFI peer is configured before the pseudowire class, the configuration is incomplete until the pseudowire class is configured. The **show running-config** command displays an error stating that configuration is incomplete.

```
Device# show running-config | sec vfi

12 vfi config manual
   vpn id 1000
   ! Incomplete point-to-multipoint vfi config
```

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **template type pseudowire** *name*
4. **encapsulation mpls**
5. **signaling protocol none**
6. **preferred-path interface Tunnel-tp** *interface-number*
7. **exit**
8. **interface pseudowire** *number*
9. **source template type pseudowire** *name*
10. **neighbor** *peer-address* *vcid-value*
11. **label** *local-pseudowire-label* *remote-pseudowire-label*
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	template type pseudowire <i>name</i> Example: Device(config)# template type pseudowire static-vpls	Specifies the template type as pseudowire and enters template configuration mode.
Step 4	encapsulation mpls Example: Device(config-template)# encapsulation mpls	Specifies the tunneling encapsulation. <ul style="list-style-type: none"> • For Any Transport over MPLS (AToM), the encapsulation type is MPLS.
Step 5	signaling protocol none Example: Device(config-template)# signaling protocol none	Specifies that no signaling protocol is configured for the pseudowire class.
Step 6	preferred-path interface Tunnel-tp <i>interface-number</i> Example: Device(config-template)# preferred-path interface Tunnel-tp 1	(Optional) Specifies the path that traffic uses: an MPLS Traffic Engineering (TE) tunnel or destination IP address and Domain Name Server (DNS) name.
Step 7	exit Example: Device(config-template)# exit	Exits template configuration mode and returns to global configuration mode.
Step 8	interface pseudowire <i>number</i> Example: Device(config)# interface pseudowire 1	Establishes a pseudowire interface and enters interface configuration mode.
Step 9	source template type pseudowire <i>name</i> Example:	Configures the source template type of the configured pseudowire.

	Command or Action	Purpose
	Device(config-if)# source template type pseudowire static-vpls	
Step 10	neighbor <i>peer-address vcid-value</i> Example: Device(config-if)# neighbor 10.0.0.1 123	Specifies the peer IP address and VC ID value of a Layer 2 VPN (L2VPN) pseudowire.
Step 11	label <i>local-pseudowire-label remote-pseudowire-label</i> Example: Device(config-if)# label 301 17	Configures an Any Transport over MPLS (AToM) static pseudowire connection by defining local and remote circuit labels.
Step 12	end Example: Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Hot Standby Pseudowire Support for ATM and TDM Access Circuits

Use the following steps to configure the Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *number*
4. **pvc** [*name*] *vpi/vci* **l2transport**
5. **xconnect** *peer-router-id vcid* {**encapsulation mpls**| **pw-class** *pw-class-name*}
6. **backup peer** *peer-router-ip-addr vcid* [**pw-class** *pw-class-name*]
7. **backup delay** *enable-delay* {*disable-delay* | **never**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	interface atm <i>number</i> Example: <pre>Router(config)# interface atm4/1/0</pre>	Specifies the ATM interface and enters interface configuration mode.
Step 4	pvc [<i>name</i>] <i>vpi/vci</i> l2transport Example: <pre>Router(config-if)# pvc 1/100 l2transport</pre>	Creates or assigns a name to an ATM PVC and enters L2transport PVC configuration mode.
Step 5	xconnect <i>peer-router-id</i> <i>vcid</i> { encapsulation mpls pw-class <i>pw-class-name</i> } Example: <pre>Router(config-if-atm-l2trans-pvc)# xconnect 10.0.0.1 123 pw-class atom</pre>	Binds the attachment circuit to a pseudowire VC.
Step 6	backup peer <i>peer-router-ip-addr</i> <i>vcid</i> [pw-class <i>pw-class-name</i>] Example: <pre>Router(config-if-atm-l2trans-pvc)# backup peer 10.0.0.3 125 pw-class atom</pre>	Specifies a redundant peer for the pseudowire VC. The pseudowire class name must match the name you specified when you created the pseudowire class, but you can use a different pw-class in the backup peer command than the name that you used in the primary xconnect command.
Step 7	backup delay <i>enable-delay</i> { <i>disable-delay</i> never } Example: <pre>Router(config-if-atm-l2trans-pvc)# backup delay 5 never</pre>	Specifies how long (in seconds) the backup pseudowire VC should wait to take over after the primary pseudowire VC goes down. The range is 0 to 180. Specifies how long the primary pseudowire should wait after it becomes active to take over for the backup pseudowire VC. The range is 0 to 180 seconds. If you specify the never keyword , the primary pseudowire VC never takes over for the backup.

Verifying the Hot Standby Pseudowire Support for ATM and TDM Access Circuits Configuration

Use the following commands to verify that the backup pseudowire is provisioned for hot standby support.

SUMMARY STEPS

1. **show atm acircuit**
2. **show atm pvc**
3. **show cem acircuit**
4. **show cem acircuit detail**

DETAILED STEPS

Step 1 show atm acircuit

If the output of the **show atm acircuit** command shows two entries for the same vpi/vci, then the backup pseudowire has been correctly provisioned, as shown in the following example:

Example:

```
Router# show atm acircuit

Interface          VPI  VCI   AC   Id      Switch  Segment  St  Flg  Prov
-----
ATM2/1/0.2         11   111   ATA5  1       2003    4007     2   0    Y
ATM2/1/0.2         11   111   ATA5  1       1002    3006     2   0    Y
```

Step 2 show atm pvc

If the output of the **show atm pvc** command includes **“Red Prov: Yes,”** then the backup pseudowire has been correctly provisioned, as shown in bold in the following example:

Example:

```
Router# show atm pvc 1/1010
Interworking Method: like to like
AC Type: ATM AAL5, Circuit Id: 2, AC State: UP, Prov: YES
Switch Hdl: 0x1005, Segment hdl: 0x4011
Red Switch Hdl: 0x3007, Red Segment hdl: 0x6010, Red Prov: YES
AC Hdl: 0x7200000F, AC Peer Hdl: 0x5D000012, Flg:0, Platform Idx:10
Status: UP
```

Step 3 show cem acircuit

If the output of the **show cem acircuit** command includes **“Redundancy Member Prov: Yes,”** then the backup pseudowire has been correctly provisioned, as shown in bold in the following example:

Example:

```
Router# show cem acircuit
CEM Int.  ID  Flags  Swhdl   Seghdl   Ckttype  Provisioned
-----
CEM3/0/0  1   0     B00E    201E     19       Yes
Redundancy Switch hdl: 0xC00F Redundancy Segment hdl: 0x401F Redundancy Member Prov: Yes
```

Step 4 show cem acircuit detail

If the output of the **show cem acircuit detail** command includes **“Redundancy Member Prov: Yes,”** then the backup pseudowire has been correctly provisioned, as shown in bold in the following example:

Example:

```
Router# show cem acircuit detail

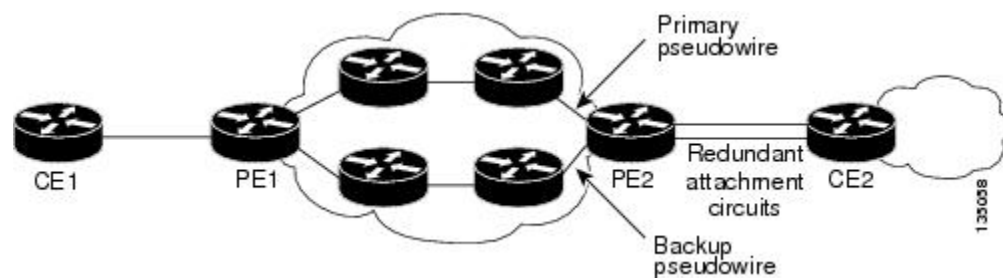
CEM3/0/0  Cemid 1
PW Ckt_type: 19 Aie hdl: EE00000B Peer aie hdl: 0x2000000C
Switch hdl: 0xB00E Segment hdl: 0x201E Redundancy Switch hdl: 0x1000 Redundancy Segment
hdl: 0x4002 Redundancy Member Prov: Yes
```


Configuration Examples for Hot Standby Pseudowire Support for ATM and TDM Access Circuits

Configuring Hot Standby Pseudowire Support for ATM and TDM Access Circuits on CEM Circuits Example

The figure below shows the configuration of Hot Standby Pseudowire Support for ATM and TDM Access Circuits, where the backup pseudowire is on the same PE router.

Figure 1: Hot Standby Pseudowire Topology



The configuration shown in the figure above is used in the following examples:

Table 1: Configuring Hot Standby Pseudowire Support for ATM and TDM Access Circuits on CEM Circuits: Example

PE1	PE2
<pre> interface Loopback0 ip address 10.4.4.4 255.255.255.255 ! Controller E1 9/2/0 clock source internal cem-group 0 timeslots 1-4 ! pseudowire-class atom encapsulation mpls ! interface CEM9/2/0 no ip address class int cesopsn_1 cem 0 xconnect 10.2.2.2 5000 pw-class atom backup peer 10.2.2.2 5005 pw-class atom backup delay 0 5 </pre>	<pre> interface Loopback0 ip address 10.2.2.2 255.255.255.255 ! Controller E1 2/2/0 clock source internal cem-group 0 timeslots 1-4 <<<<<< Primary cem-group 5 timeslots 21-24<<<<< Backup ! interface CEM2/2/0 no ip address class int cesopsn_1 cem 0<<<<<<<<<< Primary service-policy input cem_exp_6 xconnect 10.4.4.4 5000 encapsulation mpls ! cem 5<<<<<<<<<< Backup xconnect 10.4.4.4 5005 encapsulation mpls </pre>

Table 2: Configuring Hot Standby Pseudowire Support for ATM and TDM Access Circuits on ATM Circuits: Example

PE1	PE2
<pre>interface Loopback0 ip address 10.44.44.44 255.255.255.255 ! interface POS3/3/0 ip address 10.4.4.4 255.255.255.0 mpls ip ! interface ATM4/1/0 no ip address no atm enable-ilmi-trap pvc 1/100 l2transport xconnect 10.22.22.22 1 encapsulation mpls backup peer 10.22.22.22 2</pre>	<pre>interface Loopback0 ip address 10.22.22.22 255.255.255.255 ! interface POS3/3/0 ip address 10.4.4.1 255.255.255.0 mpls ip ! interface ATM4/1/0 no ip address no atm enable-ilmi-trap pvc 1/100 l2transport xconnect 10.44.44.44 1 encapsulation mpls ! pvc 1/200 l2transport xconnect 10.44.44.44 2 encapsulation mpls</pre>

Additional References

The following sections provide references related to the Hot Standby Pseudowire Support for ATM and TDM Access Circuits feature.

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
MPLS commands	<i>Cisco IOS Multiprotocol Label Switching Command Reference</i>

Standards

Standard	Title
draft-muley-pwe3-redundancy	Pseudowire Redundancy
draft-ietf-pwe3-iccp-xx.txt	Inter-Chassis Communication Protocol for L2VPN PE Redundancy

MIBs

MIB	MIBs Link
• CISCO-IETF-PW-ATM-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 5085	Pseudowire Virtual Circuit Connectivity Verification (VCCV): A Control Channel for Pseudowires

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/cisco/web/support/index.html</p>

Additional References