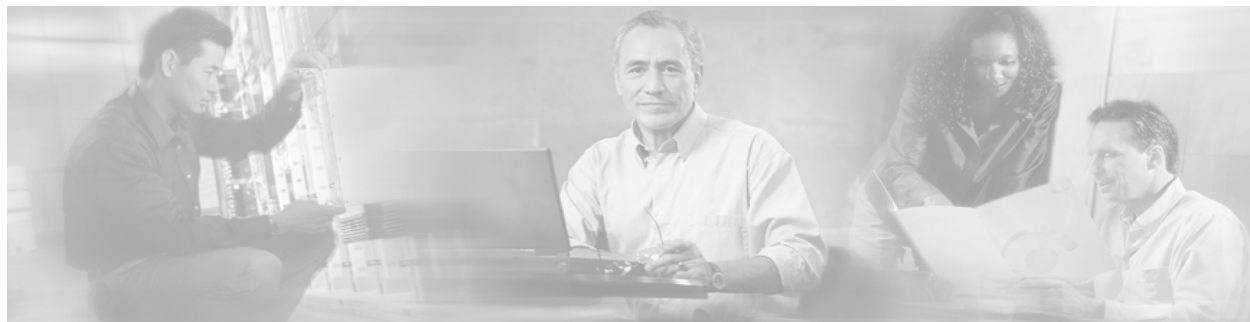




Start Here: MPLS AToM: Transport, Platform, and Release Specifics

The AToM documentation set describes the AToM features and explains how to implement them. This chapter includes the following sections:

- [Documentation Specifics, page 1](#)
- [Feature History, page 2](#)
- [Supported Software Releases and Platforms, page 2](#)
- [Restrictions, page 7](#)
- [Related Features and Technologies, page 9](#)
- [Related Documents, page 9](#)
- [Supported Standards, MIBs, and RFCs, page 10](#)
- [What To Do Next, page 11](#)

Documentation Specifics

This documentation set includes the following sections:

- *Start Here: MPLS AToM: Transport, Platform, and Release Specifics* (this document)
- *MPLS AToM: Overview*
- *MPLS AToM: Configuring*
- *MPLS AToM: Commands*



Note

This chapter details the features that are supported in each release and on each platform. Not all MPLS AToM features are supported in each Cisco IOS software release for each platform. Read the entire chapter before reading the other MPLS AToM chapters.

The other chapters provide overview, configuration, and command reference information for MPLS AToM features.

Feature History

Table 1 outlines the development of the MPLS AToM features.

Table 1 *MPLS AToM Feature History*

Cisco IOS Release	Revision
12.0(10)ST	MPLS AToM: ATM AAL5 over MPLS was introduced on the Cisco 12000 series routers.
12.1(8a)E	MPLS AToM: Ethernet over MPLS was introduced on the Cisco 7600 series Internet router.
12.0(21)ST	Ethernet over MPLS was introduced on the Cisco 12000 series routers. ATM AAL5 over MPLS was updated.
12.0(22)S	Ethernet over MPLS was integrated into this release. Support for the Cisco 10720 router was added. AAL5 over MPLS was integrated into this release.
12.0(23)S	The following MPLS features were introduced: • ATM Cell Relay over MPLS • Frame Relay over MPLS • HDLC over MPLS • PPP over MPLS The following features were updated: • Ethernet over MPLS • AAL5 over MPLS
12.2(14)S	This feature was integrated into Cisco IOS Release 12.2(14)S. Support for the Cisco 7400 router was added.

Supported Software Releases and Platforms

Cisco IOS Release 12.2(14)S includes the following AToM transports, which are supported on the Cisco 7200, 7400, and 7500 series routers:

- ATM AAL5 over MPLS
- ATM Cell Relay over MPLS
- Ethernet over MPLS
- Frame Relay over MPLS
- HDLC over MPLS
- PPP over MPLS

Table 2 and Table 3 provide all the releases and platforms on which ATM AAL5 over MPLS and Ethernet over MPLS are supported.

Table 2 ATM AAL5 over MPLS Supported Releases and Platforms

Supported Releases	Supported Platforms
12.0(10)ST	Cisco 12000 series routers
12.0(21)ST	Cisco 12000 series routers and additional line cards
12.0(23)S	Cisco 7200, 7500, and 12000 series routers Note Earlier releases of AAL5 over MPLS do not work with this release. You must upgrade all routers to the latest release of ATM AAL5 over MPLS.
12.2(14)S	Cisco 7200, 7400, and 7500 series routers

Table 3 Ethernet over MPLS Supported Releases and Platforms

Supported Releases	Supported Platforms
12.1(8a)E	Cisco 7600 series Internet routers
12.0(21)ST	Cisco 12000 series routers
12.0(22)S	Cisco 12000 series routers and 10720 router
12.0(23)S	Cisco 7200, 7500, 10720, and 12000 series routers
12.2(14)S	Cisco 7200, 7400, and 7500 series routers

Supported Chassis Types and Processors

The Cisco 7200 and 7500 series routers can use the following chassis types and processors:

- Cisco 7200 series routers
 - Chassis: All 7200-VXR chassis types
 - Processors: NPE-225, NPE-300, NPE-400, NPE-G, and NSE-1
 -
- Cisco 7500 series routers
 - Chassis: All 7500 chassis types
 - Processors: RSP4, RSP4+, RSP8
 - VIPs: VIP2-50, VIP4-50, VIP4-80



Note

The chassis, processors, and VIPs listed have been tested and are supported for use with MPLS AToM. All other chassis, processors, and VIPs have not been tested and therefore are not supported. In future releases, you will not be able to configure AToM on unsupported hardware.

Supported Port Adapters

The following port adapters are supported for the Cisco 7200 and 7500 series routers for each transport type in Cisco IOS Release 12.0(23)S.

ATM AAL5 over MPLS

- PA-A3-OC3
- PA-A3-T3
- PA-A3-E3
- PA-A3-OC12

Notes:

- Hardware revision 1.0 of the following port adapters is not supported:
 - PA-A3-OC3
 - PA-A3-E3
 - PA-A3-T3
- ATM Cell Relay over MPLS is not supported on the following port adapters:
 - PA-A1-OC3
 - PA-A2-OC3

ATM Cell Relay over MPLS



Note

In this release, ATM Cell Relay over MPLS supports the transport of single cells. The configuration of the AToM circuit requires that you use PVCs.

- PA-A3-OC3
- PA-A3-E3
- PA-A3-T3
- PA-A3-8T1IMA
- PA-A3-8E1IMA

Notes:

- Hardware revision 1.0 of the following port adapters is not supported:
 - PA-A3-OC3
 - PA-A3-E3
 - PA-A3-T3
- ATM Cell Relay over MPLS is not supported on the following port adapters:
 - PA-A1-OC3
 - PA-A2-OC3

Ethernet over MPLS

**Note**

In this release, Ethernet over MPLS supports the transport of Ethernet VLAN cells.

7200 and 7500

- PA-2FE
- PA-FE

7200 only

- PA-GE
- C7200-I/O-2FE
- C7200-I/O-GE+E (Only the Gigabit Ethernet port of this port adapter is supported.)

7500 only

- GEIP
- GEIP+

Frame Relay over MPLS

- PA-MC-8T1
- PA-MC-8E1
- PA-MC-2T3+
- PA-MC-T3
- PA-T3
- PA-2T3
- PA-T3+
- PA-4T+
- PA-2T3+
- PA-8T-V35
- PA-E3
- PA-2E3

- PA-MC-E3
- PA-MC-2E1
- PA-MC-4T1
- PA-MC-STM1
- PA-MC-2T1
- PA-MC-8TE1+
- PA-POS-OC3
- PA-HSSI
- PA-2HSSI
- PA-4E1G120
- PA-8T-232
- PA-8T-X21

HDLC over MPLS

- PA-4T
- PA-4T+
- PA-8T
- PA-H
- PA-2H
- PA-POS-OC3-SMI
- PA-POS-OC3-SML
- PA-POS-OC3-MM



Note Only serial, POS, and HSSI interfaces are supported. Channelized interfaces are not supported.

PPP over MPLS

- PA-4T
- PA-4T+
- PA-8T
- PA-H
- PA-2H
- PA-POS-OC3-SMI
- PA-POS-OC3-SML
- PA-POS-OC3-MM



Note Only serial, POS, and HSSI interfaces are supported. Channelized interfaces are not supported.

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that are supported on specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Restrictions

The following general restrictions pertain to all transport types under AToM:

- **Out-of-order packets:** AToM does not support detecting of out-of-order packets.
- **Fast Reroute:** Fast Reroute (FRR) can co-exist with AToM in a network. However, FRR does not provide link protection for AToM virtual circuits (VCs).
- **Address format:** All loopback addresses on PE routers must be configured with 32-bit masks to ensure proper operation of MPLS forwarding between PE routers.
- **Maximum transmission unit:** Because MPLS AToM does not allow packets to be fragmented and reassembled, ensure that the maximum transmission unit (MTU) of all intermediate links between endpoints is sufficient to carry the largest Layer 2 VLAN packet received. See the Troubleshooting section of the *MPLS AToM: Configuring* chapter for more information.
- **VC ID:** When you use the **mpls l2transport route** command, make sure that the two values you enter (the IP address of the remote PE router and VC ID) make a unique pairing.

The following sections list restrictions by transport type and platform (if applicable).

ATM AAL5 over MPLS Restrictions

The following restrictions pertain to the ATM AAL5 over MPLS feature:

- **SDU mode:** AAL5 over MPLS is supported only in SDU mode.
- **Setting the experimental bits:** You cannot use dCEF mode when setting the experimental bits.
- **PVC configuration:** You can configure ATM AAL5 over MPLS on permanent virtual circuits (PVCs) only. You cannot configure ATM AAL5 over MPLS on main interfaces.

ATM Cell Relay over MPLS Restrictions

The following restrictions pertain to the ATM Cell Relay over MPLS feature:

- **PVC configuration:** You can configure ATM Cell Relay over MPLS on PVCs only. You cannot configure ATM Cell Relay over MPLS on main interfaces.
- **Single cell relay:** In this release, each MPLS packet contains one ATM cell. In other words, each ATM cell is transported as a single packet.
- **Control word:** The use of the control word is not supported.
- **TE tunnels:** If you have traffic engineering (TE) tunnels running between the PE routers, you must enable LDP on the tunnel interfaces.
- **Quality of service (QoS):** ATM Cell Relay does not support QoS in this release.
- **Port Adapters:** Cell Relay over MPLS is not supported on hardware revision 1.0 PA-A3-OC3, PA-A3-E3, and PA-A3-T3 Port Adapters.
- **VCC mode:** ATM Cell Relay over MPLS supports only virtual channel connection (VCC) mode.

Ethernet over MPLS Restrictions

The following restrictions pertain to the Ethernet over MPLS feature:

- **Packet format:** Ethernet over MPLS supports VLAN packets that conform to the IEEE 802.1Q standard. The 802.1Q specification establishes a standard method for inserting VLAN membership information into Ethernet frames. Inter-Switch Link (ISL) protocol is not supported between the PE and customer edge (CE) routers.
- **Configuring on subinterfaces:** You must enable Ethernet over MPLS by specifying the **mpls l2transport route** command on an 802.1Q subinterface.

Cisco 7200/7500 series Routers Restrictions with Ethernet over MPLS

The following restrictions apply to the Cisco 7200 and/or 7500 series routers:

- **Modular QoS:** On the Cisco 7500 series routers, dCEF must be enabled before you set the experimental bits.
- **VLAN ID rewrite:** The Cisco 7200 and 7500 series routers support the VLAN ID rewrite feature, which enables you to use VLAN interfaces with different VLAN IDs at both ends of the tunnel.

Frame Relay over MPLS Restrictions

The following restrictions pertain to the Frame Relay over MPLS feature:

- **Distributed CEF (dCEF):** On the Cisco 7500 series routers, distributed processing for Frame Relay over MPLS is not supported. Therefore, whether you enable CEF or dCEF, the route switch processor (RSP) switches all frame relay packets. This restriction does not affect other features that are processed in distributed mode.
- **Traffic shaping:** Frame Relay traffic shaping is not supported with AToM switched VCs.

HDLC over MPLS Restrictions

The following restrictions pertain to the HDLC over MPLS feature:

- **Asynchronous interfaces:** Asynchronous interfaces are not supported.
- **Interface configuration:** You must configure HDLC over MPLS on router interfaces only. You cannot configure HDLC over MPLS on subinterfaces.
- **Distributed CEF (dCEF):** On the Cisco 7500 series routers, distributed processing for HDLC over MPLS is not supported. This restriction does not affect other features that are processed in distributed mode.

PPP over MPLS Restrictions

The following restrictions pertain to the PPP over MPLS feature:

- **Zero hops between PE routers:** Zero hops on one router is not supported. However, you can have back-to-back PE routers.
- **Asynchronous interfaces:** Asynchronous interfaces are not supported. The connections between the CE and PE routers on both ends of the backbone must have similar link layer characteristics. The connections between the CE and PE routers must both be synchronous.
- **Multilink PPP:** Multilink PPP (MLP) is not supported.
- **Distributed CEF (dCEF):** On the Cisco 7500 series routers, distributed processing for PPP over MPLS is not supported. This restriction does not affect other features that are processed in distributed mode.

Related Features and Technologies

Layer 2 Tunnel Protocol Version 3 (L2TPv3) provides the ability to tunnel any Layer 2 payload over an IP core network using Layer 2 virtual private networks (L2VPNs). For more information on this feature, see the following documents:

- [Layer 2 Tunnel Protocol Feature Summary](#)
- [Layer 2 Tunneling Protocol: A Feature in Cisco IOS Software](#)
- [Unified VPN Suite](#)

Related Documents

See the following documents for more information about AToM:

- [Data Sheet: Any Transport over MPLS](#)

- [White Paper: Cisco Any Transport over MPLS](#)
- [Overview: Cisco Any Transport over MPLS](#)

Supported Standards, MIBs, and RFCs

Standards

- *Transport of Layer 2 Frames Over MPLS*
draft-martini-l2circuit-trans-mpls-08.txt
- *Encapsulation Methods for Transport of Layer 2 Frames Over MPLS*
draft-martini-l2circuit-encap-mpls-04.txt

You can find the drafts of these documents at <http://search.ietf.org>.

MIBs

Transport Type	Supported MIBs
ATM AAL5 over MPLS	MPLS LDP MIB (MPLS-LDP-MIB.my)
and	ATM MIB (ATM-MIB.my)
ATM Cell Relay over MPLS	CISCO AAL5 MIB (CISCO-AAL5-MIB.my)
	Cisco Enterprise ATM Extension MIB (CISCO-ATM-EXT-MIB.my)
	Supplemental ATM Management Objects (CISCO-IETF-ATM2-PVCTRAP-MIB.my)
	Interfaces MIB (IF-MIB.my)
Ethernet over MPLS	CISCO-ETHERLIKE-CAPABILITIES.my
	Ethernet MIB (ETHERLIKE-MIB.my)
	Interfaces MIB (IF-MIB.my)
	MPLS LDP MIB (MPLS-LDP-MIB.my)
Frame Relay over MPLS	Cisco Frame Relay MIB (CISCO-FRAME-RELAY-MIB.my)
	Interfaces MIB (IF-MIB.my)
	MPLS LDP MIB (MPLS-LDP-MIB.my)
HDLC and PPP over MPLS	MPLS LDP MIB (MPLS-LDP-MIB.my)
	Interface MIB (IF-MIB.my)

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

- RFC 3032, *MPLS Label Stack Encoding*
- RFC 3036, *LDP Specification*

What To Do Next

See the following MPLS AToM documentation for more information:

- *MPLS AToM: Overview*
- *MPLS AToM: Configuring*
- *MPLS AToM: Commands*