PPPoEoA over ATM AAL5Mux

First Published: May 7, 2007
Last Updated: July 11, 2008

The PPPoEoA over ATM AAL5MUX feature enables PPP over Ethernet (PPPoE) and bridging over ATM adaptation layer 5 (AAL5)-multiplexed permanent virtual circuits (PVCs), reducing logical link control (LLC) and Subnetwork Access Protocol (SNAP) encapsulation bandwidth usage and thereby improving bandwidth usage for the PVC.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for PPPoEoA over ATM AAL5MUX" section on page 9.

Finding Support Information for Platforms and Cisco IOS Software Images

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

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Prerequisites for PPPoEoA over ATM AAL5MUX

- You must first understand the concepts described in the Understanding Broadband Access Aggregation module of the *Cisco IOS Broadband and DSL Configuration Guide*.
- You may perform the preparation tasks in the Preparing for Broadband Access Aggregation module of the *Cisco IOS Broadband and DSL Configuration Guide*.

Restrictions for PPPoEoA over ATM AAL5MUX

The legacy method of configuring PPPoE sessions using a release of Cisco IOS software earlier than Cisco IOS Release 12.4 does not support the PPPoEoA over ATM AAL5MUX feature. You must configure PPPoE sessions using the **bba-group pppoe** command to define a PPPoE profile.

When you configure bridging over an AAL5 MUX-type PVC, you must configure the corresponding subinterface for integrated routing and bridging (IRB) or routed bridge encapsulation (RBE), or you must configure the router as a bridge device.

Information About PPPoEoA over ATM AAL5MUX

To configure the PPPoEoA over ATM AAL5MUX feature, you should understand the following concept:

- PPPoEoA over ATM AAL5MUX Functionality, page 2

PPPoEoA over ATM AAL5MUX Functionality

Before Cisco IOS Release 12.4(11)XW, PPPoE and bridging were supported on AAL5SNAP encapsulated PVCs only. In AAL5SNAP encapsulated PVCs, LLC SNAP encapsulation is used to identify the protocol of packets transmitted across the ATM PVC. This encapsulation method adds bandwidth usage with the transmission of PPPoE or bridged frames. The PPPoEoA over ATM AAL5MUX feature reduces SNAP encapsulation bandwidth usage, using multiplexed (MUX) encapsulation to reduce the number of cells needed to carry voice packets. Deploying the PPPoEoA over ATM AAL5MUX feature in a VoIP environment results in improved throughput and bandwidth usage.

You can reduce SNAP encapsulation bandwidth usage only for PVCs that are configured using PPPoE profiles; legacy PPPoE configuration is not supported. MUX bridging is supported on point-to-point interfaces only; the PPPoEoA over ATM AAL5MUX feature does not support bridging over multipoint ATM subinterfaces.

How to Configure PPPoEoA over ATM AAL5MUX

This section contains the following procedures:

- Configuring PPPoE over an AAL5MUX-Encapsulated PVC to Improve Throughput, page 3
- Configuring Bridging over an AAL5MUX-Encapsulated PVC to Improve Throughput, page 4

Configuring PPPoE over an AAL5MUX-Encapsulated PVC to Improve Throughput

This task configures PPPoE over an AAL5MUX-encapsulated PVC, thereby reducing bandwidth usage and improving throughput.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *interface-number* **point-to-point**
4. **pvc** *vpi/vci*
5. **encapsulation aal5mux** *protocol* **group** *group-name*
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface atm** *interface-number* **point-to-point** **Example:** `Router(config)# interface atm 6/0.1 point-to-point`	Specifies an ATM interface or subinterface and enters interface configuration mode.
Step 4	**pvc** *vci/vpi* **Example:** `Router(config-if)# pvc 1/100`	Creates an ATM PVC and enters ATM virtual circuit configuration mode.

	Command or Action	Purpose
Step 5	**encapsulation aal5mux** *protocol* **group** *group-name* **Example:** `Router(config-if-atm-vc)# encapulation aal5mux pppoe group global`	Configures the PPPoE protocol over an AAL5MUX-encapsulated PVC. **Note** Configuring the PPPoE protocol using the **aal5mux encapsulation pppoe** command takes precedence over SNAP encapsulation configured using the **protocol pppoe** command.
Step 6	**end** **Example:** `Router(config-if-atm-vc)# end`	(Optional) Exits the configuration mode and returns to privileged EXEC mode.

Troubleshooting Tips

Use the **show atm pvc** command to troubleshoot ATM PVCs and verify the encapsulation type.

Configuring Bridging over an AAL5MUX-Encapsulated PVC to Improve Throughput

This task configures bridging over an AAL5MUX-encapsulated PVC, thereby reducing bandwidth usage and improving throughput.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *interface-number* **point-to-point**
4. **bridge-group** *number*
5. **pvc** *vpi*/*vci*
6. **encapsulation aal5mux** *protocol*
7. **end**
8. **bridge** *bridge-group* **protocol ieee**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface atm** *interface-number* **point-to-point** **Example:** `Router(config)# interface atm 6/0.1 point-to-point`	Specifies an ATM interface or subinterface and enters interface configuration mode. • **point-to-point**—Specifies point-to-point as the interface type for which a subinterface is to be created.
Step 4	**bridge-group** *number* **Example:** `Router(config-if)# bridge-group 1`	Configures bridging and assigns the interface to a bridge group.
Step 5	**pvc** *vci*/*vpi* **Example:** `Router(config-if)# pvc 1/100`	Creates an ATM PVC and enters ATM virtual circuit configuration mode.
Step 6	**encapsulation aal5mux** *protocol* **Example:** `Router(config-if-atm-vc)# encapsulation aal5mux bridge ieee8023`	Configures bridging over an AAL5MUX- encapsulated PVC.
Step 7	**end** **Example:** `Router(config-if-atm-vc)# end`	(Optional) Exits the configuration mode and returns to privileged EXEC mode.
Step 8	**bridge** *bridge-group* **protocol ieee** **Example:** `Router(config)# bridge 1 protocol ieee`	(Optional) Defines the IEEE Ethernet Spanning-Tree Protocol.

Troubleshooting Tips

Use the **show atm pvc** command to troubleshoot ATM PVCs and verify the encapsulation type.

Configuration Examples for PPPoEoA over ATM AAL5MUX

This section provides the following configuration examples:

- PPPoE over an AAL5MUX PVC: Example, page 6
- Bridging over an AAL5MUX PVC: Example, page 6

PPPoE over an AAL5MUX PVC: Example

The following example shows how to configure PPPoE over an AAL5MUX PVC:

```
bba-group pppoe global
 virtual-template 1
!
interface atm 1/0 point-to-point
 no atm ilmi-keepalive
 pvc 1/100
  encapsulation aal5mux pppoe group global
 !
!
interface Virtual-Template1
 ip addr negotiated
!
```

Bridging over an AAL5MUX PVC: Example

The following example shows how to configure Bridging over an AAL5MUX PVC:

```
bridge irb
interface atm 6/0.1 point-to-point
 ip address 10.1.1.2 255.255.255.0
 no ip route-cache
 no atm enable-ilmi-trap
 bridge-group 1
 pvc 1/100
  encapsulation aal5mux bridge ieee8023
 !
end

bridge 1 protocol ieee
```

Additional References

The following sections provide references related to the PPPoEoA over ATM AAL5MUX feature.

Related Documents

Related Topic	Document Title
Broadband access aggregation concepts	"Understanding Broadband Access Aggregation" module of the *Cisco IOS Broadband and DSL Configuration Guide*
Tasks for preparing for broadband access aggregation.	"Preparing for Broadband Access Aggregation" module of the Cisco IOS Broadband and DSL Configuration Guide
Broadband access commands	• *Cisco IOS Broadband Access Aggregation and DSL Command Reference* • *Cisco IOS Wide-Area Networking Command Reference*
Bridging commands	*Cisco IOS IBM Networking Command Reference*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBS are supported by this feature, and support for existing MIB has not been modified by this feature.	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 1483	*Multiprotocol Encapsulation over ATM Adaptation Layer 5*
RFC 2364	*PPP over AAL5*
RFC 2516	*A Method of Transmitting PPP over Ethernet (PPPoE)*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for PPPoEoA over ATM AAL5MUX

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for PPPoEoA over ATM AAL5MUX

Feature Name	Releases	Feature Information
PPPoEoA over ATM AAL5MUX	12.4(11)XW 12.4(20)T	The PPPoEoA over ATM AAL5MUX feature enables PPP over Ethernet and bridging over ATM adaptation layer 5 (AAL5)-multiplexed PVCs, reducing ATM logical link control (LLC) and Subnetwork Access Protocol (SNAP) encapsulation bandwidth usage and thereby improving bandwidth usage for the PVC. In 12.4(11)XW, this feature was introduced. In 12.4(20)T, this feature was integrated into the T release. The following command was modified: **encapsulation (ATM)**.