Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

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The Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs feature enhances PPP over ATM (PPPoA)/PPP over Ethernet (PPPoE) autosense functionality by providing autosense support on multiplexer (MUX) and Subnetwork Access Protocol (SNAP)-encapsulated ATM permanent virtual circuits (PVCs).

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see 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 for Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs" section on page 11.

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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Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Restrictions for Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

- Do not use this feature on a router that initiates PPPoA sessions.
- This feature supports ATM PVCs. Switched virtual circuits (SVCs) are not supported.
- PPPoA does not support static IP assignments within virtual templates.

Information About Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

PPPoA/PPPoE autosense enables a router to distinguish between incoming PPPoA and PPPoE over ATM sessions and to create virtual access based on demand for both PPP types.

This feature is supported on MUX- and SNAP-encapsulated ATM PVCs and enables the PVC encapsulation type to be autosensed by the router. The router determines the encapsulation type of a PVC by looking at the encapsulation type of the first incoming packet. If the PVC encapsulation type is changed while the PPPoA or PPPoE session on the network access server (NAS) is still up, the incoming packet is dropped, the encapsulation type is reset to autosense, and all sessions are removed from the PVC. The next incoming packet will then determine the new encapsulation type of the PVC.

Benefits of Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

The Autosense of PPPoA/PPPoE for MUX or SNAP Encapsulation feature provides resource allocation on demand. For each PVC configured for both PPPoA and PPPoE, certain resources (including one virtual-access interface) are allocated upon configuration, regardless of the existence of a PPPoA or PPPoE session on that PVC. With the Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs feature, resources are allocated for PPPoA and PPPoE sessions only when a client initiates a session, thus reducing overhead on the NAS.

This feature also saves configuration time by eliminating the need to specify the encapsulation type when provisioning ATM PVCs and by eliminating the need to manually provision ATM PVCs each time the encapsulation type changes.

How to Configure PPPoA/PPPoE Autosense on ATM PVCs

This section contains the following tasks:

- Verifying PPPoA/PPPoE Autosense Configuration, page 5 (optional)
- Monitoring and Maintaining PPPoA/PPPoE Autosense for ATM PVCs, page 6 (optional)

Configuring PPPoA/PPPoE Autosense

Perform this task to configure PPPoA/PPPoE Autosense on a PVC.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface atm** *number*[**.***subinterface-number* {**multipoint** | **point-to-point**}]
4. **pvc** [*name*] *vpi*/*vci*
5. **encapsulation aal5autoppp virtual-template** *number*
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** *number*[**.***subinterface-number* {**multipoint** | **point-to-point**}] **Example:** `Router(config)# interface atm 2/0.2 multipoint`	Specifies the ATM interface and optional subinterface and enters subinterface configuration mode.
Step 4	**pvc** [*name*] *vpi*/*vci* **Example:** `Router(config-subif)# pvc pvc1 45/54`	Configures a PVC on the ATM interface or subinterface and enters interface-ATM-VC configuration mode.

	Command or Action	Purpose
Step 5	**encapsulation aal5autoppp virtual-template** *number* **Example:** `Router(config-if-atm-vc)# encapsulation aal5autoppp virtual-template 3`	Configures PPPoA/PPPoE autosense on the PVC. • Also specifies the virtual template interface to use to clone the new virtual-access interfaces for PPP sessions on this PVC.
Step 6	**end** **Example:** `Router(config-if-atm-vc)# end`	Ends the session and enters privileged EXEC mode.

Configuring PPPoA/PPPoE Autosense on a VC Class

Perform this task to configure PPPoA/PPPoE autosense on a VC class.

Note Virtual-access interfaces for PPPoE sessions are cloned from the virtual template interface specified in the VPDN group.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **vc-class atm** *vc-class-name*
4. **encapsulation aal5autoppp virtual-template** *number*
5. **exit**
6. **interface atm** *number*[**.***subinterface-number* {**multipoint** | **point-to-point**}]
7. **class-int** *vc-class-name*
8. **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.

	Command or Action	Purpose
Step 3	**vc-class atm** *vc-class-name* **Example:** `Router(config)# vc-class atm vc1`	Creates and names a map class.
Step 4	**encapsulation aal5autoppp virtual-template** *number* **Example:** `Router(config-vc-class)# encapsulation aal5autoppp virtual-template 4`	Configures PPPoA/PPPoE autosense. • Also specifies the virtual template interface to use to clone the new virtual-access interfaces for PPP sessions on this PVC.
Step 5	**exit** **Example:** `Router(config-vc-class)# exit`	Returns to global configuration mode.
Step 6	**interface atm** *number*[**.***subinterface-number* {**multipoint** | **point-to-point**}] **Example:** `Router(config)# interface 2/0.2 multipoint`	Specifies the ATM interface enters subinterface configuration mode.
Step 7	**class-int** *vc-class-name* **Example:** `Router(config-subif)# class-int vc1`	Applies the VC class to all VCs on the ATM interface or subinterface.
Step 8	**end** **Example:** `Router(config-subif)# end`	Ends the session and enters privileged EXEC mode.

Verifying PPPoA/PPPoE Autosense Configuration

To verify that you have successfully configured PPPoA/PPPoE autosense, use the **show running-config** command in privileged EXEC mode.

Troubleshooting Tips

To troubleshoot PPP sessions establishment, use the following commands:

- **debug ppp authentication**
- **debug ppp negotiation**

To troubleshoot the establishment of PPP sessions that are authenticated by a RADIUS or TACACS server, use the following commands:

- **debug aaa authentication**
- **debug aaa authorization**

Caution Use **debug** commands with extreme caution because they are CPU-intensive and can seriously impact your network.

Monitoring and Maintaining PPPoA/PPPoE Autosense for ATM PVCs

Perform this task to monitor and maintain PPPoA/PPPoE autosense.

SUMMARY STEPS

1. **enable**
2. **show atm pvc** [**ppp**]
3. **show caller**
4. **show interface virtual** *interface-number*
5. **show user**
6. **show vpdn**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show atm pvc** [**ppp**] **Example:** `Router# show atm pvc ppp`	After the client at the other end of the PVC has initiated a PPPoA session, use this command to check that the PVC contains the PPPoA session.
Step 3	**show caller** **Example:** `Router# show caller`	Displays caller information. Use this command to: • View individual users and consumed resources on the NAS. • Inspect active call statistics for large pools of connections. (The **debug** commands produce too much output and tax the CPU too heavily.) • Display the absolute and idle times for each user. The current values for both of these settings are displayed on the tty line and the asynchronous interface. Users that have been idle for unacceptably long periods of time can be easily identified. By using this information, you can define time out policies and multiple grades of services for different users.

	Command or Action	Purpose
Step 4	**show interface virtual** *interface-number* **Example:** `Router# show interface virtual access 1`	Displays information about the virtual-access interface, LCP[1], protocol states, and interface statistics. • The status of the virtual-access interface should read: Virtual-Access3 is up, line protocol is up
Step 5	**show user** **Example:** `Router# show user`	Displays information about the active lines on the router.
Step 6	**show vpdn** **Example:** `Router# show vpdn`	Displays information about active Level 2 Forwarding (L2F) Protocol tunnel and message identifiers in a VPDN[2].

1. LCP = link control protocol.
2. VPDN = virtual private dial-up network.

Configuration Examples for Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

This section provides the following configuration examples:

- PPPoA/PPPoE Autosense on an ATM PVC: Example, page 7
- PPPoA/PPPoE Autosense on a VC Class: Example, page 8
- PPPoA/PPPoE Autosense on Multiple VC Classes and Virtual Templates: Example, page 8

PPPoA/PPPoE Autosense on an ATM PVC: Example

The following example shows how to configure the NAS with PPPoA/PPPoE autosense on PVC 30/33:

```
! Configure PPP Autosense
!
interface ATM 0/0/0.33 multipoint
 pvc 30/33
 encapsulation aal5autoppp Virtual-Template1
!
! Configure PPPoE
!
vpdn enable
vpdn-group 1
 accept-dialin
  protocol pppoe
  virtual-template 1
!
ip cef
interface virtual-template 1
 ip unnumbered fastethernet 0/0/0
 ip route-cache cef
!
interface fastethernet 0/0/0
 ip address 10.1.1.1 255.255.255.0
```

```
!
! Enable precloning for virtual-template 1
!
virtual-template 1 pre-clone 2000
```

PPPoA/PPPoE Autosense on a VC Class: Example

The following example shows how to configure the NAS with PPPoA/PPPoE autosense on the VC class called ‘MyClass’. The ‘MyClass’ VC class applies PPPoA/PPPoE autosense to all PVCs on the ATM 0/0/0.99 interface:.

```
! Configure PPP Autosense
!
vc-class ATM MyClass
 encapsulation aal5autoppp Virtual-Template1
!
interface ATM 0/0/0.99 multipoint
  class-int MyClass
  no ip directed-broadcast
  pvc 20/40
  pvc 30/33
!
! Configure PPPoE
!
vpdn enable
vpdn-group 1
 accept-dialin
  protocol pppoe
  virtual-template 1
!
ip cef
interface virtual-template 1
  ip unnumbered fastethernet 0/0/0
  ip route-cache cef
!
interface fastethernet 0/0/0
 ip address 10.1.1.1 255.255.255.0
!
! Enable precloning for virtual-template 1
!
virtual-template 1 pre-clone 2000
```

PPPoA/PPPoE Autosense on Multiple VC Classes and Virtual Templates: Example

The following example shows how to handle PPPoA and PPPoE sessions separately by two virtual templates:

```
ip cef
vpdn enable
!
vpdn-group 1
 accept-dialin
  protocol pppoe
  virtual-template 1
pppoe limit per-mac 1
pppoe limit per-vc 1
!
```

```
virtual-template 1 pre-clone 1500
virtual-template 2 pre-clone 1000
!
interface ATM0/0/0.3 multipoint
 no ip directed-broadcast
 class-int pppauto
!
interface ATM0/0/0.9 multipoint
 ip address 10.16.40.1 255.255.0.0
 no ip directed-broadcast
!
interface Virtual-Template1
 ip unnumbered ATM0/0/0.9
 ip route-cache cef
 no ip directed-broadcast
 peer default ip address pool pool-1
 ppp authentication pap
!
interface Virtual-Template2
 ip unnumbered ATM0/0/0.9
 ip route-cache cef
 no ip directed-broadcast
 peer default ip address pool pool-2
 ppp authentication chap
!
interface fastethernet 0/0/0
 ip address 10.1.1.1 255.255.255.0
!
vc-class atm pppauto
 encapsulation aal5autoppp Virtual-Template2
!
```

Note Whenever possible, it is preferable to configure PPPoA and PPPoE to use the same virtual template. Using separate virtual templates leads to the inefficient use of virtual access because the maximum number of virtual-access interfaces will have to be precloned twice: once for PPPoE and once for PPPoA. If PPPoA and PPPoE use the same virtual template, the maximum number of virtual-access interfaces can be precloned once and used for PPPoA and PPPoE as needed.

Additional References

The following sections provide references related to the Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs feature.

Related Documents

Related Topic	Document Title
Configuring PPPoA Autosense for a VC Class	*Providing Protocol Support for Broadband Access Aggregation of PPP over ATM Sessions* module
WAN commands: complete command syntax, defaults, command mode, command history, usage guidelines, and examples.	*Cisco IOS Wide-Area Networking Command Reference*

Related Topic	Document Title
ATM commands: complete command syntax, defaults, command mode, command history, usage guidelines, and examples.	*Cisco IOS Asynchronous Transfer Mode Command Reference*
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	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
None	—

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/cisco/web/support/index.html

Feature Information for Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

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 Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs

Feature Name	Releases	Feature Information
Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs	12.2(15)B 12.2(28)SB 12.2(33)SRE	The Autosense of MUX/SNAP Encapsulation and PPPoA/PPPoE on ATM PVCs feature enhances PPP over ATM (PPPoA)/PPP over Ethernet (PPPoE) autosense functionality by providing autosense support on MUX- and SNAP-encapsulated ATM permanent virtual circuits (PVCs). The following commands were introduced or modified: **encapsulation aal5autoppp virtual-template**

Glossary

cloning—Creating and configuring a virtual-access interface by applying a specific virtual template interface. The template is the source of the generic user information and router-dependent information. The result of cloning is a virtual-access interface configured with all the commands in the template.

LCP—Link control protocol. Protocol that establishes, configures, and tests data-link connections for use by PPP.

NAS—Network access server. A device providing local network access to users across a remote access network such as the Public Switched Telephone Network (PSTN).

PPP—Point-to-Point Protocol. A protocol that encapsulates network layer protocol information over point-to-point links. PPP is defined in RFC 1661.

PPPoA—PPP over ATM.

PPPoE—PPP over Ethernet.

precloning—Cloning a specified number of virtual-access interfaces from a virtual template at system startup or when the command is configured.

PVC—Permanent virtual circuit (or connection). Virtual circuit that is permanently established. PVCs save bandwidth associated with circuit establishment and teardown in situations where certain virtual circuits must exist all the time. In ATM terminology, called a permanent virtual connection.

VC—Virtual channel. Logical circuit created to ensure reliable communication between two network devices. A VC is defined by a VPI/VCI pair and can be either permanent (PVC) or switched (SVC).

virtual-access interface—Instance of a unique virtual interface that is created dynamically and exists temporarily. Virtual-access interfaces can be created and configured differently by different applications, such as virtual profiles and virtual private dialup networks. Virtual-access interfaces are cloned from virtual template interfaces.

virtual template interface—A logical interface configured with generic configuration information for a specific purpose or configuration common to specific users, plus router-dependent information. The template takes the form of a list of Cisco IOS interface commands that are applied to virtual-access interfaces, as needed.

VPDN—virtual private dial-up network. A system that permits dial-in networks to exist remotely from home networks, while giving the appearance of being directly connected.