



PPP Autosense

This feature module describes the PPP Autosense feature. It includes information on the benefits of the new feature, supported platforms, related documents, and configuration.

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Feature Overview

The PPP Autosense feature enables the network access server (NAS) to distinguish between incoming PPP over ATM (PPPoA) and PPP over Ethernet (PPPoE) sessions, and to allocate resources on demand for both PPP types.

Benefits

Reducing Unused Resources

When both PPPoA and PPPoE are configured on the same permanent virtual circuit (PVC), the NAS allocates resources through the PVC for both types of incoming PPP sessions, even though resources are already allocated for PPPoE sessions through VPDN groups. With the PPP Autosense feature, resources are only allocated through the PVC for PPPoA sessions.

Resource Allocation on Demand

For each PVC configured for both PPPoA and PPPoE, certain resources (including one virtual access interface) are allocated for PPPoA upon configuration, regardless of the existence of a PPPoA session on that PVC. With the PPP Autosense feature, resources are allocated for PPPoA sessions only when a client initiates a PPPoA session. This reduces overhead on the NAS.

Restrictions

- The PPP Autosense feature only supports PPPoA sessions that are Logical Link Control (LLC) encapsulated.
- Do not use this feature on a router that initiates PPPoA sessions.
- PPPoE is supported only on ATM PVCs.
- The Cisco 6400 cannot dial-out PPPoE sessions.
- PPPoE only supports Cisco Express Forwarding (CEF). Fast switching on PPPoE virtual access interfaces is not supported.
- PPPoA does not support static IP assignments within virtual templates.

Related Documents

- “Configuring PPP over ATM” section in the *Cisco 6400 UAC Software Configuration Guide*
- “Configuring PPP over Ethernet” section in the *Cisco 6400 UAC Software Configuration Guide*
- *PPP over Ethernet* feature module

Supported Platforms

The PPP Autosense feature is supported on the node route processor (NRP) of the Cisco 6400 UAC.

Supported Standards, MIBs, and RFCs

Standards

None

MIBs

None

RFCs

None

Configuration Tasks

See the following sections to configure the PPP Autosense feature. Each task in the list indicates if the task is optional or required.

- Configuring PPP Autosense (Required)
- Configuring PPPoE (Required)
- Precloning Virtual Access Interfaces (Optional)

Configuring PPP Autosense

PPP Autosense can be configured on a single PVC, or on a VC class that can be applied to all PVCs on an ATM interface.

To configure PPP Autosense on a PVC, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface atm 0/0/0[.subinterface-number] {multipoint point-to-point tag-switching}	Specifies the ATM interface and optional subinterface.
Step 2	Router(config-subif)# pvc [name] vpi/vci	Configures a PVC on the ATM interface or subinterface.
Step 3	Router(config-if-atm-vc)# encapsulation aal5autopp Virtual-Template number	Configures PPP Autosense on the PVC. Also specifies the virtual template interface to use to clone the new virtual access interfaces for PPPoA sessions on this PVC.

To configure PPP Autosense on a VC-class, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# vc-class atm vc-class-name	Create and name a map class.
Step 2	Router(config-vc-class)# encapsulation aal5autopp Virtual-Template number	Configures PPP Autosense on the VC class. Also specifies the virtual template interface to use to clone the new virtual access interfaces for PPPoA sessions on this PVC.
Step 3	Router(config-vc-class)# exit	Returns to global configuration mode.
Step 4	Router(config)# interface atm 0/0/0[.subinterface-number] {multipoint point-to-point tag-switching}	Specifies the ATM interface and optional subinterface.
Step 5	Router(config-subif)# class-int vc-class-name	Applies the VC class to all VCs on the ATM interface or subinterface.



Note

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

Verifying PPP Autosense Configuration

To verify that you successfully configured PPP Autosense, use the **show running-config EXEC** command.

Configuring PPPoE

To configure PPPoE, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# vpdn enable	Enables virtual private dial-up networking (VPDN).
Step 2	Router(config)# vpdn-group <i>number</i>	Selects VPDN-group configuration mode.
Step 3	Router(config-vpdn)# accept dialin pppoe virtual-template <i>number</i>	Configures the router to accept dial-in PPPoE calls. Also specifies the virtual template interface to use to clone the new virtual access interfaces for PPPoE sessions on this PVC.
Step 4	Router(config-vpdn)# pppoe limit per-mac <i>number</i>	(optional) Limits the number of PPPoE sessions that originate from one MAC address. Default is 100.
Step 5	Router(config-vpdn)# pppoe limit per-vc <i>number</i>	(optional) Limits the number of PPPoE sessions that can be established on a virtual circuit (VC). Default is 100.
Step 6	Router(config-vpdn)# exit	Returns to global configuration mode.
Step 7	Router(config)# interface virtual-template <i>number</i>	Selects the virtual template interface to be configured.
Step 8	Router(config-if)# ip mtu 1492	Sets the IP maximum transmission unit to 1492. Necessary for PPPoE to operate over virtual access interfaces.

Verifying the PPPoE Configuration

- Step 1** Enter the **show vpdn** privileged EXEC command. This output shows PPPoE session information. Confirm that the virtual-access interface status (VAST) is UP.

```
Router#show vpdn

PPPOE Tunnel and Session

Session count: 1

PPPoE Session Information
SID          RemMAC          LocMAC          Intf    VASt    OIntf    VC
→ 1          0010.54db.bc38  0050.7327.5dc3  Vi1     UP      AT0/0/0  0/40
```

The session information fields from the **show vpdn** display are detailed below:

Field	Description
SID	Session ID for the PPPoE session.
RemMAC	MAC address of the host.
LocMAC	MAC address of the ATM interface.
Intf	Virtual-access interface associated with the PPP session.
VASt	State of the virtual-access interface.

Field	Description
OIntf	Outgoing interface.
VC	Virtual circuit on which PPP session flows.

- Step 2** Enter the **show atm pvc** command from interface configuration mode. The last line of the output confirms that PPPoE is enabled on this VC.

```
Router#show atm pvc 0/40
ATM0/0/0.2: VCD: 1, VPI: 0, VCI: 40
UBR, PeakRate: 155000
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s), OAM retry
frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
ILMI VC state: Not Managed
InARP frequency: 15 minutes(s)
InPkts: 100, OutPkts: 51, InBytes: 4692, OutBytes: 2294
InProc: 48, OutProc: 51, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 52, OutAS: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP
→ PPPoE enabled.
```

Precloning Virtual Access Interfaces

Precloning virtual access interfaces at the NAS reduces the load on the system during call setup. Use the following global configuration command to preclone a virtual access interface.

	Command	Purpose
Step 1	Router(config)# virtual-template <i>template-number</i> preclone <i>number</i>	Specify the number of virtual access interfaces to be created and cloned from a specific virtual template.

Verifying the Precloned Virtual Access Interfaces

To check the successful precloning of virtual access interfaces, use the **show vtemplate** privileged EXEC command.

Troubleshooting Tips

To troubleshoot PPP sessions establishment, use the following commands:

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

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**



Note

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

Monitoring and Maintaining PPP Autosense

Command	Purpose
Router# show atm pvc ppp	After the client at the other end of the PPP Autosense PVC initiates a PPPoA session, use this command to check that the PVC contains the PPPoA session.
Router# show caller	Use this command to: <ul style="list-style-type: none"> • 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 timeout policies and multiple grades of services for different users.
Router# show interface virtual access number	Displays information about the virtual access interface, LCP, protocol states, and interface statistics. The status of the virtual access interface should read: Virtual-Access3 is up, line protocol is up

Configuration Examples

This section provides the following configuration examples:

- PPP Autosense on a PVC
- PPP Autosense on a VC Class
- PPP Autosense on Multiple VC Classes and Virtual Templates

PPP Autosense on a PVC

In the following example, the NAS is configured with PPP Autosense on PVC 30/33.

```
!  
! Configure PPP Autosense  
!  
interface ATM 0/0/0.33 multipoint  
  pvc 30/33  
    encapsulation aal5autopp Virtual-Template1  
!  
! Configure PPPoE  
!  
vpdn enable  
vpdn-group 1  
  accept dialin pppoe virtual-template 1  
!  
ip cef  
interface virtual-template 1  
  ip unnumbered fastethernet 0/0/0  
  ip mtu 1492  
  ip route-cache cef  
!  
! Enable precloning for virtual-template 1  
!  
virtual-template 1 pre-clone 2000  
!
```

PPP Autosense on a VC Class

In the following example, the NAS is configured with PPP Autosense on the VC class called “MyClass.” MyClass applies the PPP Autosense feature to all PVCs on the ATM 0/0/0.99 interface.

```
!  
! Configure PPP Autosense  
!  
vc-class ATM MyClass  
  encapsulation aal5autopp 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 pppoe virtual-template 1  
!  
ip cef  
interface virtual-template 1  
  ip unnumbered fastethernet 0/0/0  
  ip mtu 1492  
  ip route-cache cef  
!  
! Enable precloning for virtual-template 1  
!  
virtual-template 1 pre-clone 2000  
!
```

PPP Autosense on Multiple VC Classes and Virtual Templates

In the following example, PPPoA and PPPoE sessions are handled separately by two VC classes and 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
!
interface ATM0/0/0.1 multipoint
no ip directed-broadcast
class-int pppoe
!
interface ATM0/0/0.3 multipoint
no ip directed-broadcast
class-int pppoa
!
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
!
vc-class atm pppoe
  encapsulation aal5autoppp Virtual-Template1
!
vc-class atm pppoa
  encapsulation aal5autoppp Virtual-Template2
!
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

- **encapsulation aal5autoppp virtual-template**

encapsulation aal5autopp virtual-template

The PPP Autosense feature enables the NAS to distinguish between incoming PPPoA and PPPoE sessions and allocate resources on demand for both PPP types.

To enable PPP Autosense, use the **encapsulation aal5autopp virtual-template** ATM VC or VC class command. To disable PPP Autosense, use the **no** form of this command.

encapsulation aal5autopp virtual-template *template-number*

no encapsulation aal5autopp virtual-template *template-number*

Syntax Description	<i>template-number</i>	Number of the virtual template that will be used to clone virtual-access interfaces for PPPoA sessions.
Defaults	Disabled	
Command Modes	ATM VC or VC class	
Command History	Release	Modification
	12.1(1) DC1	This command was introduced on the node route processor (NRP) of the Cisco 6400 UAC.
Usage Guidelines	This command functions only when the PPPoA sessions are LLC encapsulated. Do not use this command on a router that initiates PPPoA sessions.	
Examples	The following example enables PPP Autosense for virtual-template 1: <pre>encapsulation aal5autopp virtual-template 1</pre>	
Related Commands	Command	Description
	virtual-template pre-clone	Specifies the number of virtual access interfaces to be created and cloned from a specific 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.

LLC—Logical Link Control. Higher of the two data link layer sublayers defined by the IEEE. The LLC sublayer handles error control, flow control, framing, and MAC-sublayer addressing. The most prevalent LLC protocol is IEEE 802.2, which includes both connectionless and connection-oriented variants.

Logical Link Control—See LLC.

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

network access server—See NAS.

permanent virtual circuit—See PVC.

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 tear down 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 channel—See VC.

Virtual Private Dial-Up Networking—See VPDN.

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 Networking. A system that permits dial-in networks to exist remotely to home networks, while giving the appearance of being directly connected.