

PPP over Ethernet Client

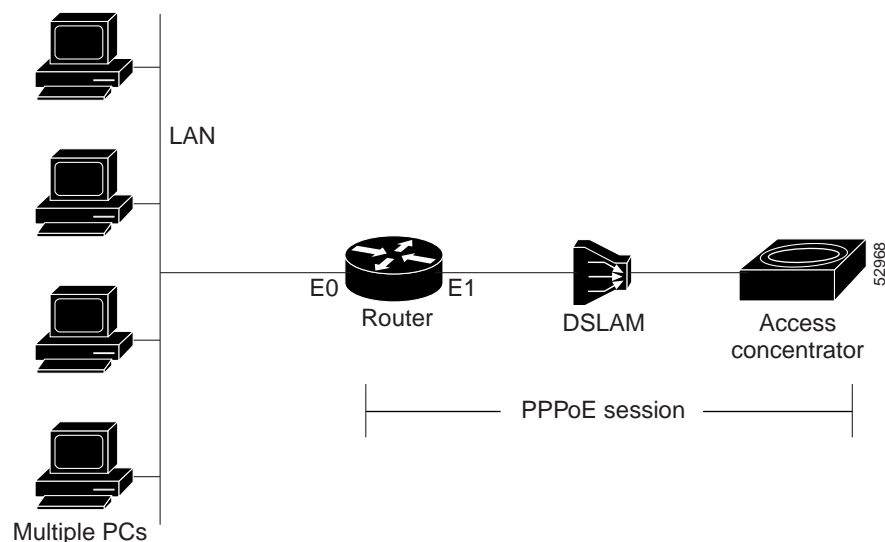
This feature module describes the PPP over Ethernet Client feature and includes the following sections:

- Feature Overview, page 1
- Supported Platforms, page 3
- Supported Standards, MIBs, and RFCs, page 3
- Configuration Tasks, page 3
- Monitoring and Maintaining PPPoE Client, page 6
- Configuration Examples, page 6
- Command Reference, page 7

Feature Overview

The PPP over Ethernet Client feature provides PPP over Ethernet (PPPoE) client support on routers on customer premises. Before the introduction of this feature, Cisco IOS software supported PPPoE on the access server side only. Figure 1 shows the typical network topology for PPPoE client deployment.

Figure 1 Typical Network Topology for PPPoE Deployment



PPPoE Client Support on ATM PVCs and Ethernet Interfaces

The PPPoE Client feature provides PPPoE client support on ATM permanent virtual circuits (PVCs) and Ethernet interfaces. A dialer interface must be used for cloning virtual access.

One ATM PVC will support one PPPoE client. Multiple PPPoE clients can run concurrently on different PVCs, but each PPPoE client must use a separate dialer interface and a separate dialer pool.

Multiple PPPoE client sessions can be configured on an Ethernet interface, but each session must use a separate dialer interface and a separate dialer pool.

PPPoE Client Session Initiation

A PPPoE session is initiated by the PPPoE client. If the session has a timeout or is disconnected, the PPPoE client will immediately attempt to reestablish the session.

The following four steps describe the exchange of packets that occurs when a PPPoE client initiates a PPPoE session:

1. The client broadcasts a PPPoE Active Discovery Initiation (PADI) packet.
2. When the access concentrator receives a PADI that it can serve, it replies by sending a PPPoE Active Discovery Offer (PADO) packet to the client.
3. Because the PADI was broadcast, the host may receive more than one PADO packet. The host looks through the PADO packets it receives and chooses one. The choice can be based on the access concentrator name or on the services offered. The host then sends a single PPPoE Active Discovery Request (PADR) packet to the access concentrator that it has chosen.
4. The access concentrator responds to the PADR by sending a PPPoE Active Discovery Session-confirmation (PADS) packet. At this point a virtual access interface is created that will then negotiate PPP, and the PPPoE session will run on this virtual access.

If a client does not receive a PADO for a preceding PADI, the client sends out a PADI at predetermined intervals. That interval is doubled for every successive PADI that does not evoke a response, until the interval reaches a configured maximum.

If PPP negotiation fails or the PPP line protocol is brought down for any reason, the PPPoE session and the virtual access will be brought down. When the PPPoE session is brought down, the client waits for a predetermined number of seconds before trying again to establish a PPPoE.

Benefits

PPPoE is a commonly used application in the deployment of DSL. The PPP over Ethernet Client feature expands PPPoE functionality by providing support for PPPoE on the client as well as on the server.

Restrictions

For PPPoE over ATM, one PVC will support only one PPPoE client. Multiple PPPoE clients can run concurrently on different PVCs, but each PPPoE client must use a separate dialer interface and a separate dialer pool.

For PPPoE over Ethernet, each PPPoE client must use a separate dialer interface a separate dialer pool.

Related Documents

- *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2
- *Cisco IOS Dial Technologies Command Reference*, Release 12.2
- *Cisco IOS Wide-Area Networking Configuration Guide*, Release 12.2
- *Cisco IOS Wide-Area Networking Command Reference*, Release 12.2

Supported Platforms

- Cisco SOHO 70 series
- Cisco 820
- Cisco 827
- Cisco 1600
- Cisco 1700
- Cisco 2600 series
- Cisco 3600 series
- Cisco 7200 series

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

RFCs

The following RFC is supported by this feature:

- RFC 2516, *A Method for Transmitting PPP Over Ethernet (PPPoE)*

Configuration Tasks

See the following sections for configuration tasks for the PPP over Ethernet Client feature. Each task in the list is identified as either required or optional.

- Enabling PPPoE in a VPDN Group (required)
- Configuring a PPPoE Client (required)
- Configuring the Dialer Interface (required)

- Terminating a PPPoE Client Session (optional)
- Verifying PPPoE Client (optional)

Enabling PPPoE in a VPDN Group

To enable PPPoE in a virtual private dial-up network (VPDN) group, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# vpdn enable	Enables virtual private dialup networking.
Step 2	Router(config)# vpdn-group <i>name</i>	Associates a VPDN group with a customer or VPDN profile.
Step 3	Router(config-vpdn)# request-dialin	Creates a request-dialin VPDN subgroup.
Step 4	Router(config-vpdn-req-in)# protocol pppoe	Enables the VPDN subgroup to establish PPPoE sessions.

Configuring a PPPoE Client

To configure a PPPoE client, perform the tasks in one of the following sections:

- Configuring a PPPoE client on an ATM PVC
- Configuring a PPPoE client on an Ethernet Interface

Configuring a PPPoE client on an ATM PVC

To configure a PPPoE client on an ATM PVC, use the following commands, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface atm <i>number</i>	Configures an ATM interface.
Step 2	Router(config-if)# pvc [<i>name</i>] <i>vpi/vci</i>	Creates an ATM PVC.
Step 3	Router(config-if-atm-vc)# pppoe-client dial-pool-number <i>number</i>	Configures the PPPoE client and specifies the dialer interface to use for cloning on the PVC.



Note

If commands are added to the PVC configuration after the PPPoE client session is established, then the session is automatically terminated and reestablished.

Configuring a PPPoE client on an Ethernet Interface

To configure a PPPoE client on an Ethernet interface, use the following commands, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface ethernet number	Configures an Ethernet interface.
Step 2	Router(config-if)# pppoe-client dial-pool-number number	Configures the PPPoE client and specifies the dialer interface to use for cloning.

Configuring the Dialer Interface

To configure the dialer interface to be used for cloning on the PVC, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface dialer number	Configures a dialer interface.
Step 2	Router(config-if)# ip address negotiated	Specifies that the IP address for the interface is obtained via PPP/IPCP (IP Control Protocol) address negotiation.
Step 3	Router(config-if)# dialer-pool number	Specifies the dialing pool to use to connect to a specific destination subnetwork.
Step 4	Router(config-if)# dialer-group group-number	Configures an interface to belong to a specific dialing group.

Terminating a PPPoE Client Session

To terminate a PPPoE client session, use either the first command in EXEC mode or the second command in interface-ATM-VC mode:

Command	Purpose
Router# clear vpdn tunnel pppoe	Terminates the PPPoE client session and causes the PPPoE client to try immediately to reestablish the session.
On an ATM PVC Router(config-if-atm-vc)# no pppoe-client dial-pool-number number	Terminates the PPPoE client session. The PPPoE client will not attempt to reestablish the session.
On an Ethernet interface Router(config-if)# no pppoe-client dial-pool-number number	

Verifying PPPoE Client

To verify PPPoE client configuration, use the following commands in EXEC mode:

Command	Purpose
Router# <code>show vpdn</code>	Displays information about active Layer 2 Forwarding (L2F) protocol tunnel and L2F message identifiers in a VPDN.
Router# <code>show vpdn session packet</code>	Displays PPPoE session statistics.
Router# <code>show vpdn session all</code>	Displays PPPoE session information for each session ID.
Router# <code>show vpdn tunnel</code>	Displays PPPoE session count for the tunnel.

Monitoring and Maintaining PPPoE Client

To monitor the PPPoE client, use the following commands in EXEC mode:

Command	Purpose
Router# <code>debug vpdn pppoe-data</code>	Displays PPPoE session data packets.
Router# <code>debug vpdn pppoe-errors</code>	Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be terminated.
Router# <code>debug vpdn pppoe-events</code>	Displays PPPoE protocol messages about events that are part of normal session establishment or shutdown.
Router# <code>debug vpdn pppoe-packets</code>	Displays each PPPoE protocol packet exchanged.

Configuration Examples

This section provides the following configuration example:

- PPPoE Client on an ATM PVC Configuration Example
- PPPoE Client on an Ethernet Interface Configuration Example

PPPoE Client on an ATM PVC Configuration Example

In the following example, a PPPoE client is configured on a PVC on ATM interface 0. The PPPoE client will use dialer interface 1 as its virtual access interface.

```
vpdn enable
vpdn-group 1
  request-dialin
  protocol pppoe
!
interface atm0
  pvc 1/100
    pppoe-client dial-pool-number 1
!
interface dialer 1
  ip address negotiated
  dialer pool 1
  dialer-group 1
!
```

PPPoE Client on an Ethernet Interface Configuration Example

In the following example, two PPPoE client sessions are configured on an Ethernet interface. Each PPPoE client will use a separate dialer interface and separate dialer pool.

```
vpdn enable
vpdn-group 1
  request-dialin
  protocol pppoe
!
interface ethernet1/1
  pppoe-client dial-pool-number 1
  pppoe-client dial-pool-number 2
!
interface dialer 1
  ip address negotiated
  dialer pool 1
  dialer-group 1
!
interface dialer 2
  ip address negotiated
  dialer pool 2
  dialer-group 2
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

- **clear vpdn tunnel**
- **pppoe-client dial-pool-number**

clear vpdn tunnel

To shut down a specified tunnel and all sessions within the tunnel, use the **clear vpdn tunnel** command in EXEC mode.

clear vpdn tunnel [**pptp** | **l2f** | **l2tp**] *network-access-server gateway-name* | **pppoe**

Syntax Description		
pptp	(Optional)	Clears the specified Point-to-Point Tunneling Protocol (PPTP) tunnel.
l2f	(Optional)	Clears the specified Layer 2 Forwarding (L2F) tunnel.
l2tp	(Optional)	Clears the specified Layer 2 Tunneling Protocol (L2TP) tunnel.
<i>network-access-server</i>		Name of the network access server at the far end of the tunnel, probably the point of presence of the public data network or the internet service provider (ISP).
<i>gateway-name</i>		Host name of home gateway at the local end of the tunnel.
pppoe		Clears the specified PPP over Ethernet (PPPoE) tunnel.

Command Modes EXEC

Command History	Release	Modification
	11.2	This command was introduced.
	11.3(5)AA	The l2tp keyword was introduced.
	12.0(1)T	The l2tp keyword was integrated into Release 12.0(1)T.
	12.0(5)XE5	The pptp keyword was introduced.
	12.1(5)T	The pptp keyword was integrated into Release 12.1(5)T.
	12.2(2)T	The pppoe keyword was introduced.

Usage Guidelines Use this command to clear a specific tunnel and all sessions within the tunnel. You can also use this command to isolate problems by forcing a tunnel to come down without deconfiguring the tunnel (the tunnel will be restarted immediately when a user logs in).

You can also use this command to isolate problems by forcing a tunnel to come down without deconfiguring the tunnel (the tunnel will be restarted immediately when a user logs in).

If you are using the **l2tp** keyword, you can clear the tunnel by matching either the remote name or the remote name and local name.

If you use the **clear vpdn tunnel** command with the **pppoe** keyword when a PPPoE client session has been established, the PPPoE client session will terminate and the PPPoE client will immediately try to reestablish the session.

Examples**Clearing a Tunnel Example**

The following example clears a tunnel between a network access server called “orion” and a home gateway called “sampson”:

```
clear vpdn tunnel orion sampson
```

Clearing a PPPoE Client Session Example

In the following example, the PPPoE client session will be cleared, and the PPPoE client will immediately try to reestablish the session:

```
clear vpdn tunnel pppoe
```

Clearing an L2TP Tunnel Example

The following example clears an L2TP tunnel to a remote peer named “sophia”:

```
clear vpdn tunnel l2tp aries sophia
```

pppoe-client dial-pool-number

To configure a PPP over Ethernet (PPPoE) client and to specify the dialer interface to use for cloning, use the **pppoe-client** command in interface or interface-ATM-VC configuration mode. To terminate the PPPoE client session, use the **no** form of this command.

pppoe-client dial-pool-number *number*

no pppoe-client dial-pool-number *number*

Syntax Description

dial-pool-number	Specifies that a dialer interface will be used.
<i>number</i>	Dialing pool number.

Defaults

A PPPoE client is not configured.

Command Modes

Interface configuration
Interface-ATM-VC configuration

Command History

Release	Modification
12.1(3)XG	This command was introduced.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(1)T.

Usage Guidelines

One PVC will support only one PPPoE client. Multiple PPPoE clients can run concurrently on different PVCs, but each PPPoE client must use a separate dialer interface and a separate dialer pool.

Examples

PPPoE Client on an ATM PVC

In the following example, a PPPoE client is configured on a PVC on ATM interface 0. The PPPoE client will use dialer interface 1 as its virtual access interface.

```

vpdn enable
vpdn-group 1
  request-dialin
  protocol pppoe
!
interface atm0
  pvc 1/100
    pppoe-client dial-pool-number 1
!
interface dialer 1
  ip address negotiated
  dialer pool 1
  dialer-group 1
!
```

PPPoE Client on an Ethernet Interface

In the following example, two PPPoE client sessions are configured on an Ethernet interface. Each PPPoE client will use a separate dialer interface and separate dialer pool.

```

vpdn enable
vpdn-group 1
  request-dialin
  protocol pppoe
!
interface ethernet1/1
  pppoe-client dial-pool-number 1
  pppoe-client dial-pool-number 2
!
interface dialer 1
  ip address negotiated
  ppp authentication chap
  dialer pool 1
  dialer-group 1
!
interface dialer 2
  ip address negotiated
  dialer pool 2
  dialer-group 1

```

Related Commands	Command	Description
	debug vpdn pppoe-data	Displays PPPoE sessions data packets.
	debug vpdn pppoe-errors	Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be terminated.
	debug vpdn pppoe-events	Displays PPPoE protocol messages about events that are part of normal session establishment or shutdown.
	debug vpdn pppoe-packets	Displays each PPPoE protocol packet exchanged.

■ ppoe-client dial-pool-number