PPPoE on Ethernet

First Published: March 31, 2000
Last Updated: November 20, 2009

The PPPoE on Ethernet feature adds support to Point-to-Point Protocol over Ethernet (PPPoE) by adding direct connection to actual Ethernet interfaces. PPPoE provides service-provider digital subscriber line (DSL) support. This Ethernet specification can be used by multiple hosts on a shared Ethernet interface to open PPP sessions to multiple destination with one or more bridging modems.

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 PPPoE on Ethernet" section on page 9.

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 PPPoE on Ethernet

Before you can configure the PPPoE on Ethernet feature, you need to configure a broadband access (BBA) group using the **bba-group pppoe** command and specify a virtual template for PPPoE sessions.

Restrictions for PPPoE on Ethernet

The following restrictions apply when the PPPoE on Ethernet feature is used:

- PPPoE is not supported on Frame Relay.
- PPPoE is not supported on any other LAN interfaces such as FDDI and Token Ring.
- Fast switching is supported. PPP over Ethernet over RFC 1483 fibswitching is supported for IP. All other protocols are switched over process switching.

Information About PPPoE on Ethernet

To configure the PPPoE on Ethernet feature, you should understand the following concept:

- Benefits of Using PPPoE on Ethernet, page 2

Benefits of Using PPPoE on Ethernet

Broadband Remote Access

For a bridged-Ethernet topology, the PPPoE on Ethernet feature allows access providers to maintain session abstraction associated with PPP networks.

PPPoE

PPPoE provides the ability to connect a network of hosts over a simple bridging access device to a remote access concentrator where each host utilizes its own PPP stack. It also gives users a familiar interface.

PPPoE provides service-provider DSL support. In service-provider DSL deployments, PPPoE leverages Ethernet scale curves and it uses an embedded base.

How to Enable and Configure PPPoE on Ethernet

This section contains the following procedures:

- Configuring PPPoE on Ethernet in a BBA Group, page 3 (required)
- Limiting PPPoE Sessions from a MAC Address, page 4 (optional)
- Creating and Configuring a Virtual Template, page 5 (optional)

Configuring PPPoE on Ethernet in a BBA Group

Perform this task to configure the physical interface that will carry the PPPoE session in the broadband access (BBA) groups and link it to the appropriate virtual template interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bba-group pppoe** {*group-name* | **global**}
4. **virtual-template** *template-number*
5. **sessions per-mac limit** *per-mac-limit*
6. **sessions per-vlan limit** *per-vlan-limit* [**inner** *vlan-id*]
7. **sessions per-vc limit** *per-vc-limit* [**threshold** *threshold-value*]
8. **exit**

DETAILED STEPS

	Command	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	**bba-group pppoe** {*group-name* | **global**} **Example:** `Router(config)# bba-group pppoe server-selection`	Defines a PPP over Ethernet (PPPoE) profile, and enters BBA group mode. • The **global** keyword creates a profile, which serves as the default profile for any PPPoE port that is not assigned a specific profile.
Step 4	**virtual template** *template-number* **Example:** `(config-bba-group)# virtual-template 20`	Specifies the virtual template number for the BBA group, and places the router in configuration BBA group mode.
Step 5	**sessions per-mac limit** *per-mac-limit* **Example:** `Router(config-bba-group)# sessions per-mac limit 1000`	(Optional) Sets the maximum number of PPPoE sessions allowed per MAC session limit in a PPPoE profile.
Step 6	**sessions per-vlan limit** *per-vlan-limit* [**inner** *vlan-id*] **Example:** `Router(config-bba-group)# session per-vlan limit 4000 inner 3500`	(Optional) Sets the session limit for the inner VLAN on QinQ subinterface. **Note** The per-VLAN limit is only applicable to Gigabit Ethernet subinterfaces (802.1q VLANs).
Step 7	**sessions per-vc limit** *per-vc-limit* [**threshold** *threshold-value*] **Example:** `Router(config-bba-group)# sessions per-vc limit 2000`	(Optional) Sets the maximum number of PPPoE sessions allowed per VC session limit in a PPPoE profile. **Note** The per-VC limit is applicable only to ATM interfaces andsubinterfaces .
Step 8	**exit** **Example:** `Router(config-bba-group)# exit`	Returns to global configuration mode.

Limiting PPPoE Sessions from a MAC Address

Perform this task to set the limit of sessions to be sourced from a MAC address:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **virtual-template** *template-number*
4. **sessions per-mac limit** *per-mac-limit*
5. **exit**

DETAILED STEPS

	Command	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	**virtual-template** *template-number* **Example:** `Router(config-bba-group)# virtual-template 1`	Specifies which virtual template will be used to clone virtual access interfaces for all PPPoE ports that use this PPPoE profile.
Step 4	**sessions per-mac limit** *per-mac-limit* **Example:** `Router(config-bba-group)# sessions per-mac limit 1000`	(Optional) Sets the maximum number of PPPoE sessions allowed per MAC session limit in a PPPoE profile.
Step 5	**exit** **Example:** `Router(config-bba-group)# exit`	Returns to global configuration mode.

Creating and Configuring a Virtual Template

Perform this task to create and configure a virtual template:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *virtual-template number*
4. **ip unnumbered loopback** *number*
5. **mtu** *bytes*
6. **exit**

DETAILED STEPS

	Command	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	`Router(config)# interface virtual-template` *number* **Example:** `Router(config)# interface virtual-template 0`	Creates a virtual template, and enters interface configuration mode.
Step 4	`Router(config-if)# ip unnumbered loopback` *number* **Example:** `Router(config-if)# ip unnumbered loopback 0`	Enables IP without assigning a specific IP address on the LAN.
Step 5	`Router(config-if)# mtu` *bytes* **Example:** `Router(config-if)# mtu 1492`	Sets the maximum transmission unit (MTU) size for the interface.
Step 6	**exit** **Example:** `Router(config-bba-group)# exit`	Returns to global configuration mode.

Other optional configuration commands can be added to the virtual template configuration. For example, you can enable the PPP authentication on the virtual template using the **ppp authentication chap** command. See the "Virtual Interface Template Service" chapter in the *Cisco IOS Dial Solutions Configuration Guide* for more information about configuring the virtual template.

Although Cisco Express Forwarding switching is supported, flow, and optimum switching are not; these configurations are ignored on the PPPoE virtual access interface. Cisco Express Forwarding is enabled by default for IP. All other protocol traffic will be processed switched.

Note The PPP reliable link that uses Link Access Procedure, Balanced (LAPB) is not supported.

Configuration Examples for PPPoE on Ethernet

This section provides the following configuration examples:

- PPPoE on Ethernet: Example, page 7
- Enabling PPPoE on an Ethernet Interface: Example, page 7

PPPoE on Ethernet: Example

The following example shows how to configure the **bba-group** and **virtual-template** commands:

```
bba-group pppoe server-selection
  virtual-template 1
  sessions per-mac limit 1000
  sessions per-vlan limit 4000 inner 3500
  sessions per-vc limit 2000

  interface virtual-template 0
  ip unnumbered loopback 0
  mtu 1492
```

For PPPoE virtual template interfaces, the **mtu** command must be configured because Ethernet has a maximum payload size of 1500 bytes, the PPPoE header is 6 bytes, and PPP Protocol ID is 2 bytes.

Note Dial-out mode will not be supported.

Enabling PPPoE on an Ethernet Interface: Example

The following example shows how to enable PPPoE on an Ethernet interface:

```
interface ethernet1/0
 pppoe enable
```

Additional References

The following sections provide references related to the PPPoE on Ethernet feature.

Related Documents

Related Topic	Document Title
Configuring PPPoE on ATM	*PPPoE over ATM*
Configuring PPPoE on cable interfaces	• *Point-to-Point Protocol over Ethernet Support on the Cisco CMTS* • *Configuring PPPoE Termination on a uBR7100 CMTS with L2TP Tunneling*
Configuring PPPoE on IEEE 802.1Q encapsulation	*PPPoE Over IEEE 802.1Q VLANs*

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 MIBs 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 2516	*A Method for Transmitting PPPoE*
RFC 4813	*Multiprotocol Encapsulation over ATM Adaptation Layer 5*

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 PPPoE on Ethernet

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 PPPoE on Ethernet

Feature Name	Releases	Feature Information
PPPoE on Ethernet	12.1(2)T 12.2(11)YT 12.2(11)YV 12.2(8)T 12.2(13)T 12.2(28)SB 12.2(33)SRC	This feature adds support to PPPoE by adding direct connection to actual Ethernet interfaces. PPPoE provides service-provider digital subscriber line (DSL) support. This Ethernet specification can be used by multiple hosts on a shared Ethernet interface to open PPP sessions to multiple destination with one or more bridging modems.