

PPPoE on Ethernet

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.

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Prerequisites for PPPoE on Ethernet

Before you can configure the PPPoE on Ethernet feature, you need to configure a virtual private dialup network (VPDN) group using the **accept dialin** command, enable PPPoE, and specify a virtual template for PPPoE sessions.

Restrictions for PPPoE on Ethernet

- 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

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

Enabling PPPoE on Ethernet in a VPDN Group

To configure the physical interface that will carry the PPPoE session and link it to the appropriate virtual template interface, you need to complete the following steps.

SUMMARY STEPS

1. Router(config)# **vpdn enable**
2. Router(config-if)# **vpdn group** *name*
3. Router(config-if)# **accept dialin**
4. Router(config-if)# **protocol pppoe**
5. Router(config-if)# **virtual-template** *template-number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	Router(config)# **vpdn enable**	Enables virtual private dial-up networking.
Step 2	Router(config-if)# **vpdn group** *name*	Associates a VPDN group to a customer or VPDN profile.
Step 3	Router(config-if)# **accept dialin**	Creates an accept dial-in VPDN group.
Step 4	Router(config-if)# **protocol pppoe**	Specifies the VPDN group to be used to establish PPPoE sessions.

	Command or Action	Purpose
Step 5	Router(config-if)# **virtual-template** *template-number*	Specifies which virtual template will be used to clone virtual access interfaces.

Limiting PPPoE Sessions from a MAC Address

To set the limit of sessions to be sourced from a MAC address, use the following command in VPDN configuration mode:

Command	Purpose
`Router(config-if)# pppoe session-limit per-mac number`	Sets the limit of sessions to be sourced from a MAC address.

Creating and Configuring a Virtual Template

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 S>olutions 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.

To create and configure a virtual template, use the following commands beginning in global configuration mode:

SUMMARY STEPS

1. Router(config)# **interface virtual-template** *number*
2. Router(config-if)# **ip unnumbered ethernet** *number*
3. Router(config-if)# **mtu** *bytes*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	Router(config)# **interface virtual-template** *number*	Creates a virtual template, and enters interface configuration mode.

	Command or Action	Purpose
Step 2	Router(config-if)# **ip unnumbered ethernet** *number*	Enables IP without assigning a specific IP address on the LAN.
Step 3	Router(config-if)# **mtu** *bytes*	Sets the maximum transmission unit (MTU) size for the interface.

Specifying an Ethernet Interface

After you create a virtual template for PPPoE on Ethernet, specify a multipoint or point-to-point interface. To specify an Ethernet multipoint interface, use the following commands in global configuration mode:

Command	Purpose
`Router# interface ethernet interface-number`	Specifies the Ethernet interface using the appropriate format of the **interface ethernet** command.

Enabling PPPoE on an Ethernet Interface

To enable PPPoE on Ethernet interfaces, use the following command in global configuration mode:

Command	Purpose
`Router# pppoe enable`	Specifies the VPDN group to be used for establishing PPPoE sessions.

Monitoring and Maintaining VPDN Groups

To monitor and maintain VPDN groups, use the following commands in EXEC mode:

Command	Purpose
`Router# show vpdn`	Displays information about active Level 2 Forwarding (L2F) Protocol tunnel and message identifiers in a VPDN.
`Router# show vpdn session packet`	Displays PPPoE session statistics.
`Router# show vpdn session all`	Displays PPPoE session information for each session ID.
`Router# show vpdn tunnel`	Displays PPPoE session count for the tunnel.

Configuration Examples for PPPoE on Ethernet

PPPoE on Ethernet Example

The following are examples of the **vpdn enable** and **interface virtual-template** commands:

```
vpdn enable

 vpdn-group 1
 accept dialin
 protocol pppoe
 virtual template 1
 pppoe limit per-mac <number>

 interface virtual-template 1
 ip address 10.100.100.100 255.255.255.0
 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 enables 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

Related Topic	Document Title
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 XE 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

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1: Feature Information for PPPoE on Ethernet

Feature Name	Releases	Feature Information
PPPoE on Ethernet	Cisco IOS XE Release 2.5	This feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers. 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.