PPP over Ethernet Client

The PPP over Ethernet Client feature provides PPP over Ethernet (PPPoE) client support on routers.
PPPoE is a commonly used application in the deployment of digital subscriber lines (DSLs). The PPP over Ethernet Client feature expands PPPoE functionality by providing support for PPPoE on the client and the server.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and 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 table.

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.

Prerequisites for PPP over Ethernet Client

PPP connections must be established between two endpoints over a serial link.

Restrictions for PPP over Ethernet Client

The PPPoE client does not support the following:
- More than ten clients per customer premises equipment (CPE)
• Quality of service (QoS) transmission with queueing on the dialer interface
• Dial-on-demand
• Easy VPN
• Native IPv6
• PPPoE client over ATM permanent virtual circuit (PVC)
• You can configure a dial-pool-number on a physical interface or sub-interface using the `pppoe-client dial-pool-number pool-number` command.

Note: The pool number being unique cannot be used to configure with the same number on any other interfaces.

• Co-existence of the PPPoE client and server on the same device.
• Multilink PPP (MLP) on dialer interfaces
• Nonstop forwarding (NSF) with stateful switchover (SSO)
• When an IPv6 address is assigned to a subinterface from a server and if you remove the subinterface on client device, the IPv6 address might not be removed from the interface resulting in a ping failure after reconfiguring the subinterface. This is because you must shut the interface, first and then remove the subinterface.

Information About PPP over Ethernet Client

PPP over Ethernet Client Network Topology

The PPPoE Client feature provides PPPoE client support on routers at customer premises. Before the introduction of this feature, Cisco IOS XE software supported PPPoE only on the access server side. The figure below shows Dynamic Multipoint VPN (DMVPN) access to multiple hosts from the same PPPoE client using a common dialer interface and shared IPsec.
PPP over Ethernet 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 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 packet that it can serve, it replies by sending a PPPoE active discovery offer (PADO) packet to the client.

3. Because the PADI packet 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 PADDR packet 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 packet for a PADI packet already received, the client sends out a PADI packet at predetermined intervals. That interval length is doubled for every successive PADI packet that does not evoke a response, until the interval reaches the 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 and the client will wait for a predetermined number of seconds before trying to establish another PPPoE session.

How to Configure PPP over Ethernet Client

Configuring a PPPoE Client

SUMMARY STEPS

1. enable
2. configure terminal
3. interface type number
4. no ip address
5. pppoe enable  group global
6. pppoe-client dial-pool-number number
7. no shutdown
8. exit
9. interface dialer number
10. dialer pool number
11. encapsulation type
12. ipv6 enable
13. Do one of the following:
   • ip address negotiated
   • ipv6 address autoconfig
   • ipv6 dhcp client pd prefix-name
14. mtu size
15. ppp authentication pap callin
16. ppp pap sent-username username password password
17. end

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Device&gt; enable</strong></td>
<td>Enters global configuration mode.</td>
</tr>
</tbody>
</table>

**Step 2**

**configure terminal**

*Example:*

```
Device# configure terminal
```

Configures an interface and enters interface configuration mode.

**Step 3**

**interface type number**

*Example:*

```
Device(config)# interface GigabitEthernet 0/0/0
```

Removes the IP address.

**Step 4**

**no ip address**

*Example:*

```
Device(config-if)# no ip address
```

Enables a PPPoE session on the Gigabit Ethernet interface.

**Step 5**

**pppoe enable group global**

*Example:*

```
Device(config-if)# pppoe enable group global
```

**Step 6**

**pppoe-client dial-pool-number number**

*Example:*

```
Device(config-if)# pppoe-client dial-pool-number 1
```

**Step 7**

**no shutdown**

*Example:*

```
Device(config-if)# no shutdown
```

**Step 8**

**exit**

*Example:*

```
Device(config-if)# exit
```

**Step 9**

**interface dialer number**

*Example:*

```
Device(config)# interface dialer 1
```

**Step 10**

**dialer pool number**

*Example:*

```
Device(config-if)# dialer pool 1
```

**Step 11**

**encapsulation type**

*Example:*

```
Device(config-if)# encapsulation ppp
```

**Step 12**

**ipv6 enable**

*Example:*

```
Device(config-if)# ipv6 enable
```

Defines a dialer rotary group and enters interface configuration mode.

Specifies the dialing pool that the dialer interface uses to connect to a specific destination subnetwork.

Specifies the encapsulation type.

- Sets PPP as the encapsulation type.

Enables IPv6 on the dialer interface.
<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device(config-if)# ipv6 enable</td>
<td>Specifies how the IP address is obtained for the dialer interface. This can be through one of the following as specified:</td>
</tr>
<tr>
<td></td>
<td>• PPP/IP Control Protocol (IPCP) address negotiation</td>
</tr>
<tr>
<td></td>
<td>• Dynamic Host Configuration Protocol (DHCP)</td>
</tr>
<tr>
<td><strong>Step 13</strong></td>
<td>Do one of the following:</td>
</tr>
<tr>
<td></td>
<td>• ip address negotiated</td>
</tr>
<tr>
<td></td>
<td>• ipv6 address autoconfig</td>
</tr>
<tr>
<td></td>
<td>• ipv6 dhcp client pd prefix-name</td>
</tr>
<tr>
<td>Example:</td>
<td>For IPv4</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# ip address negotiated</td>
</tr>
<tr>
<td>Example:</td>
<td>For IPv6</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# ipv6 address autoconfig</td>
</tr>
<tr>
<td>Example:</td>
<td>For DHCP IPv6</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# ipv6 dhcp client pd pd1</td>
</tr>
<tr>
<td><strong>Step 14</strong></td>
<td><strong>mtu size</strong></td>
</tr>
<tr>
<td></td>
<td>Sets the maximum transmission unit (MTU) size.</td>
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<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# mtu 1492</td>
</tr>
<tr>
<td><strong>Step 15</strong></td>
<td><strong>ppp authentication pap callin</strong></td>
</tr>
<tr>
<td></td>
<td>Enables at least one PPP authentication protocol and specifies the order in which protocols are selected on the interface.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# ppp authentication pap callin</td>
</tr>
<tr>
<td><strong>Step 16</strong></td>
<td><strong>ppp pap sent-username username password password</strong></td>
</tr>
<tr>
<td></td>
<td>Reenables remote Password Authentication Protocol (PAP) support for an interface and reuses the username and password parameters in the PAP authentication packet to the peer.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# ppp pap sent-username username1 password password1</td>
</tr>
<tr>
<td><strong>Step 17</strong></td>
<td><strong>end</strong></td>
</tr>
<tr>
<td></td>
<td>Exits interface configuration mode and returns to privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>Device(config-if)# end</td>
</tr>
</tbody>
</table>

### Configuring PPPoE on the Server

#### SUMMARY STEPS

1. enable
2. configure terminal
3. username **username password password**
4. bba-group pppoe **bba-group-name**
5. virtual-template **template-number**
6. exit
7. interface loopback interface-number
8. Do one of the following:
   - ip address ip-address mask
   - ipv6 address ipv6-address / prefix
9. exit
10. interface type number
11. Do one of the following:
    - no ip address
    - no ipv6 address
12. pppoe enable group bba-group-name
13. exit
14. interface virtual-template number
15. Do one of the following:
    - ip unnumbered loopback number
    - ipv6 unnumbered loopback number
16. description description
17. mtu size
18. Do one of the following:
    - peer default ip address pool local-pool-name
    - peer default ipv6 address pool local-pool-name
    - ipv6 dhcp server dhcp-pool-name
19. ppp authentication protocol
20. exit
21. ipv6 dhcp pool dhcp-pool-name
22. prefix-delegation pool local-pool-name
23. Do one of the following:
    - ip local pool pool-name [low-ip-address [high-ip-address]]
    - ipv6 local pool pool-name ipv6-subnet-id /prefix prefix-length
24. end

DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>Example: Device&gt; enable</td>
<td>- Enter your password if prompted.</td>
</tr>
<tr>
<td>Step 2</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td></td>
<td>Example: Device# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
<td></td>
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<td>-------------------</td>
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</tr>
<tr>
<td><strong>Step 3</strong> username username password password</td>
<td>Creates a PPPoE profile and enters BBA group configuration mode.</td>
<td></td>
</tr>
<tr>
<td>Example: Device(config)# username username1 password password1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> bba-group pppoe bba-group-name</td>
<td>Creates a PPPoE profile and enters BBA group configuration mode.</td>
<td></td>
</tr>
<tr>
<td>Example: Device(config)# bba-group pppoe bba1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> virtual-template template-number</td>
<td>Creates a virtual template for a PPPoE profile with an identifying number to be used for cloning virtual access interfaces.</td>
<td></td>
</tr>
<tr>
<td>Example: Device(config-bba-group)# virtual-template 1</td>
<td>• The range is 1 to 4095.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong> exit</td>
<td>Exits BBA group configuration mode and returns to global configuration mode.</td>
<td></td>
</tr>
<tr>
<td>Example: Device(config-bba-group)# exit</td>
<td></td>
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<tr>
<td><strong>Step 7</strong> interface loopback interface-number</td>
<td>Creates a loopback interface that emulates an interface that is always up and enters interface configuration mode.</td>
<td></td>
</tr>
<tr>
<td>Example: Device(config)# interface loopback 1</td>
<td>• The range is from 0 to 2147483647.</td>
<td></td>
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<tr>
<td><strong>Step 8</strong> Do one of the following:</td>
<td>Assigns an IP address to the loopback interface.</td>
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<tr>
<td>• ip address ip-address mask</td>
<td></td>
<td></td>
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<tr>
<td>• ipv6 address ipv6-address /prefix</td>
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<td></td>
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<tr>
<td>Example: Using an IPv4 address: Device(config-if)# ip address 192.2.0.2 255.255.255.0</td>
<td></td>
<td></td>
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<tr>
<td>Example: Using an IPv6 address: Device(config-if)# ipv6 address 2001:DB8:2::1/40</td>
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<tr>
<td><strong>Step 9</strong> exit</td>
<td>Exits interface configuration mode and enters global configuration mode.</td>
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<tr>
<td>Example: Device(config-if)# exit</td>
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<tr>
<td><strong>Step 10</strong> interface type number</td>
<td>Configures an interface and enters interface configuration mode.</td>
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<tr>
<td>Example: Device(config)# interface GigabitEthernet 0/0/0</td>
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<tr>
<td><strong>Step 11</strong> Do one of the following:</td>
<td>Removes the IP address.</td>
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<tr>
<td>• no ip address</td>
<td></td>
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<tr>
<td>Command or Action</td>
<td>Purpose</td>
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<tr>
<td>• no ipv6 address</td>
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<tr>
<td><strong>Example:</strong></td>
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<tr>
<td>For an IPv4 address:</td>
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<td></td>
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<tr>
<td>Device(config-if)# no ip address</td>
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<tr>
<td><strong>Example:</strong></td>
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<tr>
<td>For an IPv6 address:</td>
<td></td>
<td></td>
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<tr>
<td>Device(config-if)# no ipv6 address</td>
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<td></td>
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<tr>
<td><strong>Step 12</strong></td>
<td><strong>pppoe enable group bba-group-name</strong></td>
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<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-if)# pppoe enable group bba1</td>
<td>Enables PPPoE sessions on the Gigabit Ethernet interface.</td>
<td></td>
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<tr>
<td><strong>Step 13</strong></td>
<td>exit</td>
<td></td>
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<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Device(config-if)# exit</td>
<td>Exits interface configuration mode and returns to global configuration mode.</td>
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<tr>
<td><strong>Step 14</strong></td>
<td><strong>interface virtual-template number</strong></td>
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<tr>
<td><strong>Example:</strong></td>
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<tr>
<td>Device(config)# interface virtual-template 1</td>
<td>Creates a virtual template interface that can be configured and applied dynamically to create virtual access interfaces and enters interface configuration mode.</td>
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<tr>
<td><strong>Step 15</strong></td>
<td>Do one of the following:</td>
<td></td>
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<tr>
<td>• ip unnumbered loopback number</td>
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<tr>
<td><strong>Example:</strong></td>
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<td></td>
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<tr>
<td>For IPv4:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-if)# ip unnumbered loopback 1</td>
<td>Enables IP processing on an interface without explicitly assigning an IP address to the interface.</td>
<td></td>
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<tr>
<td><strong>Example:</strong></td>
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<tr>
<td>For IPv6:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device(config-if)# ipv6 unnumbered loopback 1</td>
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<tr>
<td><strong>Step 16</strong></td>
<td><strong>description description</strong></td>
<td></td>
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<tr>
<td><strong>Example:</strong></td>
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<td></td>
</tr>
<tr>
<td>Device(config-if)# description pppoe bba1</td>
<td>Adds a description to an interface configuration</td>
<td></td>
</tr>
<tr>
<td><strong>Step 17</strong></td>
<td><strong>mtu size</strong></td>
<td></td>
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<tr>
<td><strong>Example:</strong></td>
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<tr>
<td>Device(config-if)# mtu 1492</td>
<td>Sets the MTU size.</td>
<td></td>
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<tr>
<td>• The range is from 64 to 9216.</td>
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<td></td>
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<tr>
<td><strong>Step 18</strong></td>
<td>Do one of the following:</td>
<td></td>
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<tr>
<td>• peer default ip address pool local-pool-name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• peer default ipv6 address pool local-pool-name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• ipv6 dhcp server dhcp-pool-name</td>
<td>Specifies an address pool to provide IP addresses for remote peers connecting to this interface.</td>
<td></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
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<td>-------------------</td>
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</tr>
</tbody>
</table>
| **Example:** For IPv4 addresses   
Device(config-if)# peer default ip address pool pool1  
**Example:** For IPv6 addresses   
Device(config-if)# peer default ipv6 address pool pool1  
**Example:** For DHCP assigned addresses:   
Device(config-if)# ipv6 dhcp server dhcpv6pool | Enables at least one PPP authentication protocol and specifies the order in which the protocols are selected on the interface. |
| **Step 19** ppp authentication *protocol*  
**Example:** Device(config-if)# ppp authentication pap | Enables at least one PPP authentication protocol and specifies the order in which the protocols are selected on the interface. |
| **Step 20** exit  
**Example:** Device(config-if)# exit | Exits interface configuration mode and returns to global configuration mode. |
| **Step 21** ipv6 dhcp pool *dhcp-pool-name*  
**Example:** Device(config-if)# ipv6 dhcp pool dhcpv6pool | Creates a DHCP information pool and configures a local prefix pool from which prefixes can be delegated to clients. |
| **Step 22** prefix-delegation pool *local-pool-name*  
**Example:** Device(config-if)# prefix-delegation pool pool1 | Specifies a local prefix pool. |
| **Step 23** Do one of the following:  
• ip local pool *pool-name* [*low-ip-address* *
  *high-ip-address*]]]  
• ipv6 local pool *pool-name* ipv6-subnet-id / *prefix* *prefix-length*  
**Example:** For IPv4 addresses   
Device(config)# ip local pool pool1 192.2.0.1 192.2.0.10  
**Example:** For IPv6 addresses   
Device(config)# ipv6 local pool pool1 2001:DB8:1200::/40 48 | Configures a local pool of IP addresses to be used when a remote peer connects to a point-to-point interface. |

**PPP over Ethernet Client**
**Purpose**

Command or Action | Purpose
--- | ---
Step 24 | **end**
| **Example:**
| Device(config)# end

**Configuration Examples for the PPP over Ethernet Client**

**Example: Configuring a PPPoE Client**

```
Device> enable
Device# configure terminal
Device(config)# interface GigabitEthernet 0/0/0
Device(config-if)# no ip address
Device(config-if)# pppoe enable
Device(config-if)# pppoe-client dial-pool-number 1
Device(config-if)# no shutdown
Device(config-if)# exit
Device(config)# interface dialer 1
Device(config-if)# mtu 1492
Device(config-if)# ip address negotiated
Device(config-if)# encapsulation ppp
Device(config-if)# dialer pool 1
Device(config-if)# ppp pap sent-username username1 password password1
Device(config-if)# end
```

**Example: Configuring PPPoE on IPv4**

**Example: Server Configuration**

```
Device> enable
Device# configure terminal
Device# username username1 password password1
Device(config)# bba-group pppoe bba1
Device(config-bba-group)# virtual-template 1
Device(config-bba-group)# exit
Device(config)# interface loopback 1
Device(config-if)# ip address 192.2.0.2 255.255.255.0
Device(config-if)# exit
Device(config)# interface GigabitEthernet 0/0/0
Device(config-if)# no ip address
Device(config-if)# negotiation auto
Device(config-if)# pppoe enable group bba1
Device(config-if)# no shutdown
Device(config-if)# exit
Device(config)# interface virtual-template 1
Device(config-if)# description pppoe bba1
Device(config-if)# mtu 1492
Device(config-if)# ip unnumbered loopback 1
Device(config-if)# peer default ip address pool pool1
```
Example: Configuring PPPoE on IPv6 using DHCP

Example: Client Configuration

```
Device(config-if)# ppp authentication pap
Device(config-if)# exit
Device(config)# ip local pool pool1 192.2.0.1 192.2.0.10
Device(config)# end
```

Example: Configuring PPPoE on IPv6 using DHCP

Example: Server Configuration using DHCP

Configure a username and a password for PPP client:

```
Host(config)# username username1 password password1
```

Create a PPP group GROUPA and associate it with a Virtual Template 1:

```
Host(config)# bba-group pppoe GROUPA
Host(config-bba-group)# virtual-template 1
Host(config-bba-group)# exit
```

Configure a loopback interface to be used on the Virtual Template 1:

```
Host(config)# interface loopback 1
Host(config-if)# ipv6 address 2001:DB8:2::1/40
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
Host(config-if)# exit
```

Create a Virtual Template 1 and use the loopback interface as the IP address:

```
Host(config)# interface virtual-template 1
Host(config-if)# ipv6 unnumbered loopback 1
Host(config-if)# description pppoe GROUPA
Host(config-if)# mtu 1492

!Specify that PPP PAP authentication is used for authenticating connecting PPP clients
Host(config-if)# ppp authentication pap
```
Enables DHCP for IPv6 service for the interface and specifies a pool for prefix delegation.

`Host(config-if)# ipv6 dhcp server dhcpv6pool`

Associate a physical interface with the PPP group GROUPA:

`Host(config)# interface FastEthernet 0/0
Host(config-if)# no ip address
Host(config-if)# pppoe enable group GROUPA
Host(config-if)# no shutdown
Host(config-if)# exit`

Create the local IPV6 address pool pool1 referred to in the Virtual Template 1

`Host(config)# ipv6 local pool pool1 2001:DB8:1200::/40 48`

Create a DHCP information pool and configure a local prefix pool from which prefixes can be delegated to clients.

`Host(config)# ipv6 dhcp pool dhcpv6pool

!Specify local prefix pool
Host(config-dhcpv6)# prefix-delegation pool pool1
Host(config-dhcpv6)# end`

Example: Client Configuration using DHCP

```
Device> enable
Device# configure terminal
Device(config)# hostname Client

Configure a physical interface and allocate it to a dialer pool. A logical dialer interface associated with the dialer pool can select a physical interface from this dialer pool when needed.

Client(config)# interface FastEthernet 0/0
Client(config-if)# no ip address
Client(config-if)# pppoe enable group global

!Allocate the physical interface to the dialer pool
Client(config-if)# pppoe-client dial-pool-number 1
Client(config-if)# no shutdown

%LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Client(config-if)# exit

Create the logical dialer interface and configure the pool used to pick physical interfaces

Client(config)# interface dialer 1

!Configure the pool used to pick physical interfaces.
Client(config-if)# dialer pool 1

!Sets the encapsulation method used by the interface to PPP.
Client(config-if)# encapsulation ppp
Client(config-if)# ipv6 enable
```

*Jun 2 23:51:36.455: %DIALER-6-BIND: Interface Virtual-Access1 bound to profile Di1
*Jun 2 23:51:36.459: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up
Example: Configuring PPPoE on IPv6 using DHCP

*Jun 2 23:51:36.507: %DIALER-6-UNBIND: Interface Vi2 unbound from profile Di1
*Jun 2 23:51:36.519: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to down

!Enable Prefix delegation on the interface
Client(config-if)# ipv6 dhcp client pd dhcp_prefix_label

!Reduce MTU of the dialer interface to avoid unnecessary fragmentation caused by added PPP headers.
Client(config-if)# mtu 1492
Client(config-if)# ppp authentication pap callin

!Configures the username and password that the client can use to authenticate with the server.
Client(config-if)# ppp pap sent-username username1 password password1

*Jun 2 23:52:20.999: %DIALER-6-BIND: Interface Vi2 bound to profile Di1
*Jun 2 23:52:21.003: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up
Client(config-if)# end

Example: Verifying the PPPoE connection

Observe the interfaces of the client:
Client# show ipv6 interface brief

FastEthernet0/0 [up/up]
unassigned
Dialer1 [up/up]
FE80::205:FF:FE50:6C08
Virtual-Access1 [up/up]
unassigned

Observe the PPPoE session on the client:
Client# show pppoe session

1 client session

Uniq ID  PPPoE  RemMAC  Port  VT VA  State
N/A 324 0005.0050.9c08 Fa0/0 Di1 Vi2 UP

Observe the packets exchanged during the PPPoE session:
Client# show pppoe session packets

Total PPPoE sessions 1

SID  Pkts-In  Pkts-Out  Bytes-In  Bytes-Out
2846 0 6216 0 128136

Observe the DHCP session:
Server# show ipv6 dhcp binding

Client: FE80::205:FF:FE50:6c08
DUID: 00030001000500506C08
Username: unassigned
Interface: Virtual-Access1.1
Example: Configuring PPPoE on IPv6

**Configuring PPPoE on the Server**

Device> enable
Device# configure terminal
Device(config)# hostname Host

Configure a username and a password for PPP client:

Host# username username1 password password1

Create a PPP group GROUPA and associate it with a Virtual Template 1:

Host(config)# bba-group pppoe GROUPA

Configure a loopback interface to be used on the Virtual Template 1:

Host(config)# interface loopback 1
Host(config-if)# ipv6 address 2001:DB8:2::1/40

Create a Virtual Template 1 and use the loopback interface as the IP address:

Host(config)# interface virtual-template 1
Host(config-if)# ipv6 unnumbered loopback 1
Host(config-if)# description pppoe GROUPA
Host(config-if)# mtu 1492

Configure the Virtual Template to hand out IP addresses from pool1
Host(config-if)# peer default ipv6 pool pool1

Specify that PPP PAP authentication is used for authenticating connecting PPP clients
Host(config-if)# ppp authentication pap

Associate a physical interface with the PPP group GROUPA:

Host(config)# interface FastEthernet 0/0
Host(config-if)# no ip address
Host(config-if)# pppoe enable group GROUPA
Host(config-if)# no shutdown
Host(config-if)# exit

*Jun 1 21:33:07.199: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Jun 1 21:33:08.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Create the IPV6 address pool pool1 referred to in the Virtual Template 1:

Host(config)# ipv6 local pool pool1 2001:DB8:1200::/40 48
Host(config)# end

Configuring PPPoE on the Client

Device> enable
Device# configure terminal
Device(config)# hostname Host

Configure a physical interface and allocate it to a dialer pool. A logical dialer interface associated with the dialer pool can select a physical interface from this dialer pool when needed.

Client(config)# interface FastEthernet 0/0
Client(config-if)# no ip address
Client(config-if)# pppoe enable group global

!Allocate the physical interface to the dialer pool
Client(config-if)# pppoe-client dial-pool-number 1
Client(config-if)# no shutdown

%LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Client(config-if)# exit

Create the logical dialer interface and configure the pool used to pick physical interfaces

Client(config)# interface dialer 1

!Configure the pool used to pick physical interfaces.
Client(config-if)# dialer pool 1

!Sets the encapsulation method used by the interface to PPP.
Client(config-if)# encapsulation ppp
Client(config-if)# ipv6 enable

*Jun 3 00:10:48.031: %DIALER-6-BIND: Interface Vi2 bound to profile Di1
*Jun 3 00:10:48.035: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up
*Jun 3 00:10:48.083: %DIALER-6-UNBIND: Interface Vi2 unbound from profile Di1
*Jun 3 00:10:48.091: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to down

!Configure the PPP clients to get IP addresses for dialer interfaces by using PPP negotiations with the server.
Client(config-if)# ipv6 address autoconfig

!Reduce MTU of the dialer interface to avoid unnecessary fragmentation caused by added PPP headers.
Client(config-if)# mtu 1492
Client(config-if)# ppp authentication pap callin

!Configures the username and password that the client can use to authenticate with the
Verifying the PPPoE connection

Observe the interfaces of the client:

```
Client# show ipv6 interface brief
FastEthernet0/0    [up/up]    unassigned
Dialer1            [up/up]    FE80::205:FF:FE50:6C08
Virtual-Access1    [up/up]    unassigned
```

Observe the PPPoE session on the client:

```
Client# show pppoe session
1 client session

<table>
<thead>
<tr>
<th>Uniq ID</th>
<th>PPPoE SID</th>
<th>RemMAC</th>
<th>Port</th>
<th>VT</th>
<th>VA</th>
<th>VA-st</th>
<th>State</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>324</td>
<td>0005.0050.9c08</td>
<td>Fa0/0</td>
<td>D1</td>
<td>Vi2</td>
<td>UP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0005.0050.6c08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Observe the packets exchanged during the PPPoE session:

```
Client# show pppoe session packets
Total PPPoE sessions 1

<table>
<thead>
<tr>
<th>SID</th>
<th>Pkts-In</th>
<th>Pkts-Out</th>
<th>Bytes-In</th>
<th>Bytes-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>2846</td>
<td>0</td>
<td>6216</td>
<td>0</td>
<td>128136</td>
</tr>
</tbody>
</table>
```

**Additional References**

**Related Documents**

<table>
<thead>
<tr>
<th>Related Topic</th>
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<tbody>
<tr>
<td>Cisco IOS commands</td>
<td>Cisco IOS Master Commands List, All Releases</td>
</tr>
</tbody>
</table>
## Feature Information for PPP over Ethernet Client

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPP over Ethernet Client for IPv6</td>
<td>Cisco IOS XE Release 3.9S</td>
<td>The PPP over Ethernet Client feature provides IPv6 support.</td>
</tr>
<tr>
<td>PPP over Ethernet Client</td>
<td>Cisco IOS XE Release 3.5S</td>
<td>This feature was introduced. The PPP over Ethernet Client feature provides PPPoE client support on routers.</td>
</tr>
</tbody>
</table>

The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.