PPPoE Relay

The PPPoE Relay feature enables an L2TP access concentrator (LAC) to relay active discovery and service selection functionality for PPP over Ethernet (PPPoE), over a Layer 2 Tunneling Protocol (L2TP) control channel, to an L2TP network server (LNS) or tunnel switch (multihop node). The relay functionality of this feature allows the LNS or tunnel switch to advertise the services it offers to the client, thereby providing end-to-end control of services between the LNS and a PPPoE client.

Feature Specifications for the PPPoE Relay Feature

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3(4)T</td>
<td>This feature was introduced.</td>
</tr>
<tr>
<td>12.2(27)SBA</td>
<td>This feature was integrated into Cisco IOS Release 12.2(27)SBA.</td>
</tr>
</tbody>
</table>

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click Cancel at the login dialog box and follow the instructions that appear.

Contents

- Prerequisites for Using PPPoE Relay, page 2
- Information About PPPoE Relay, page 2
- How to Configure PPPoE Relay, page 2
- Configuration Examples for PPPoE Relay, page 7
- Additional References, page 12
- Command Reference, page 13
Prerequisites for Using PPPoE Relay

This document assumes you understand how to configure a virtual private dial-up network (VPDN) tunnel and a tunnel switch. See the “Related Documents” section on page 12 for more information about these features.

Information About PPPoE Relay

To configure PPPoE relay, you need to understand the following concept:

- L2TP Active Discovery Relay for PPPoE, page 2

L2TP Active Discovery Relay for PPPoE

The PPPoE protocol described in RFC 2516 defines a method for active discovery and service selection of devices in the network by a LAC. A PPPoE client uses these methods to discover an access concentrator in the network, and the access concentrator uses these methods to advertise the services it offers.

The PPPoE Relay feature introduced in Cisco IOS Release 12.3(4)T allows the active discovery and service selection functionality to be offered by the LNS, rather than just by the LAC. The PPPoE Relay feature implements the Network Working Group Internet-Draft titled L2TP Active Discovery Relay for PPPoE. The Internet-Draft describes how to relay PPPoE Active Discovery (PAD) and Service Relay Request (SRRQ) messages over an L2TP control channel (the tunnel). (See the “RFCs” section on page 13 for information on how to access Network Working Group Internet-Drafts.)

The key benefit of the PPPoE Relay feature is end-to-end control of services between the LNS and a PPPoE client.

How to Configure PPPoE Relay

This section contains the following procedures:

- Configuring the LAC and Tunnel Switch for PPPoE Relay, page 2 (required)
- Configuring the LNS (or Multihop Node) to Respond to Relayed PAD Messages, page 4 (required)
- Monitoring PPPoE Relay: Example, page 12 (optional)

Configuring the LAC and Tunnel Switch for PPPoE Relay

To configure the LAC and tunnel switch for PPPoE Relay, you configure a subscriber profile that directs PAD messages to be relayed on an L2TP tunnel. The subscriber profile also will contain an authorization key for the outgoing L2TP tunnel.
SUMMARY STEPS

1. enable
2. configure terminal
3. subscriber profile profile-name
4. service relay pppoe vpdn group vpdn-group-name
5. exit

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td></td>
</tr>
<tr>
<td>Step 2 configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Step 3 subscriber profile profile-name</td>
<td>Configures the subscriber profile name and begins</td>
</tr>
<tr>
<td></td>
<td>subscriber profile configuration mode.</td>
</tr>
<tr>
<td></td>
<td>• profile-name—Is referenced from a PPPoE profile configured by the bba-group pppoe global</td>
</tr>
<tr>
<td></td>
<td>configuration command, so that all the PPPoE sessions using the PPPoE profile defined by the bba-group pppoe command would be treated according to the defined subscriber profile.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router(config)# subscriber profile profile-1</td>
<td></td>
</tr>
<tr>
<td>Step 4 service relay pppoe vpdn group vpdn-group-name</td>
<td>Provides PPPoE relay service using a VPDN L2TP tunnel for the relay. The VPDN group name specified is used to obtain outgoing L2TP tunnel information.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router(config-sss-profile)# service relay pppoe vpdn group Group-A</td>
<td></td>
</tr>
<tr>
<td>RADIUS Subscriber Profile Entry for the LAC</td>
<td>The following example shows how to enter Subscriber Service Switch subscriber service attributes in a AAA RADIUS server profile.</td>
</tr>
<tr>
<td>profile-1 = profile-name</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Cisco: Cisco-Avpair = &quot;sss:sss-service=relay-pppoe&quot;</td>
<td></td>
</tr>
</tbody>
</table>
What to Do Next

Configure the LNS side of the configuration by performing the tasks described in the “Configuring the LNS (or Multihop Node) to Respond to Relayed PAD Messages” section.

Configuring the LNS (or Multihop Node) to Respond to Relayed PAD Messages

On the router that responds to relayed PAD messages, you must configure a PPPoE group and attach it to a VPDN group that accepts dial in calls for L2TP. The relayed PAD messages will be passed from the VPDN L2TP tunnel and session to the PPPoE broadband group for receiving the PAD responses.

SUMMARY STEPS

1. enable
2. configure terminal
3. vpdn-group vpdn-group-name
4. accept-dialin
5. protocol l2tp
6. virtual-template template-name
7. exit
8. terminate-from hostname host-name
9. relay pppoe bba-group pppoe-bba-group-name
10. exit

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><strong>Example:</strong> Router&gt; enable</td>
<td>- Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Step 2</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> vpdn-group vpdn-group-name</td>
<td>Creates a VPDN group and enters VPDN group configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router(config)# vpdn-group Group-A</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> accept-dialin</td>
<td>Configures the LNS to accept tunneled PPP connections from a LAC and creates an accept-dialin VPDN subgroup.</td>
</tr>
<tr>
<td><strong>Example:</strong> Router(config-vpdn)# accept-dialin</td>
<td></td>
</tr>
</tbody>
</table>
### How to Configure PPPoE Relay

#### Command or Action | Purpose
---|---
**Step 5**
`protocol l2tp` | Specifies the L2TP tunneling protocol.  
**Example:**  
`Router(config-vpdn-req-in)# protocol l2tp`

**Step 6**
`virtual-template template-number` | Specifies which virtual template will be used to clone virtual access interfaces.  
**Example:**  
`Router(config-vpdn-req-in)# virtual-template 2`

**Step 7**
`exit` | Exits to VPDN group configuration mode.  
**Example:**  
`Router(config-vpdn-req-in)# exit`

**Step 8**
`terminate-from hostname host-name` | Specifies the LAC host name that will be required when the VPDN tunnel is accepted.  
**Example:**  
`Router(config-vpdn)# terminate-from hostname LAC-1`

**Step 9**
`relay pppoe bba-group pppoe-bba-group-name` | Specifies the PPPoE BBA group that will respond to the PAD messages.  
- The PPPoE BBA group name is defined with the `bba-group pppoe group-name` global configuration command.  
- See the “RADIUS VPDN Group User Profile Entry for the LNS” section for the equivalent RADIUS profile entry.  
**Example:**  
`Router(config-vpdn)# relay pppoe bba-group group-2`

**Step 10**
`exit` | Exits to global configuration mode.  
**Example:**  
`Router(config-vpdn)# exit`

---

### RADIUS VPDN Group User Profile Entry for the LNS

The following example shows how to enter the VPDN group attributes in a AAA RADIUS server profile.

```
profile-1 = profile-name

Cisco:Cisco-Avpair = "vpdn:relay-pppoe-bba-group=group-name"
```
Monitoring PPPoE Relay

Perform this task to monitor PPPoE Relay.

SUMMARY STEPS

1. enable
2. show pppoe session
3. show pppoe relay context all
4. clear pppoe relay context

DETAILED STEPS

<table>
<thead>
<tr>
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<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> show pppoe session</td>
<td>Displays information about currently active PPPoE sessions.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# show pppoe session</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> show pppoe relay context all</td>
<td>Displays the PPPoE relay context created for relaying PAD messages.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router# show pppoe relay context all</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> clear pppoe relay context</td>
<td>Clears the PPPoE relay context created for relaying PAD messages.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td></td>
</tr>
<tr>
<td>Router(config)# clear pppoe relay context</td>
<td></td>
</tr>
</tbody>
</table>

Troubleshooting Tips

Use the following privileged EXEC commands to help you troubleshoot the PPPoE Relay feature:

- debug ppp forwarding
- debug ppp negotiation
- debug pppoe events
- debug pppoe packets
- debug vpdn l2x-events
- debug vpdn l2x-packets
Configuration Examples for PPPoE Relay

This section contains the following examples:

- PPPoE Relay on LAC Configuration: Example, page 7
- Basic LNS Configured for PPPoE Relay: Example, page 8
- Tunnel Switch (or Multihop Node) Configured to Respond to PAD Messages: Example, page 9
- Tunnel Switch Configured to Relay PAD Messages: Example, page 10
- RADIUS Subscriber Profile Entry for the LAC: Example, page 11
- RADIUS VPDN Group User Profile Entry for the LNS: Example, page 11
- Monitoring PPPoE Relay: Example, page 12

PPPoE Relay on LAC Configuration: Example

The following is an example of a standard LAC configuration with the commands to enable PPPoE relay added:

```plaintext
hostname User2
username User1 password 0 field
username User2 password 0 field
username User3 password 0 field
username User4 password 0 field
username User5 password 0 field
username User6-lac-domain password 0 field
username User7-client-domain@cisco.net password 0 field
username User8-lns-domain password 0 field
!
ip domain-name cisco.com
!
vpdn enable
vpdn source-ip 10.0.195.151
!
vpdn-group User2-vpdn-group-domain
request-dialin
protocol l2tp
domain cisco.net
initiate-to ip 10.0.195.133
local name User2-lac-domain
!
interface Loopback123
ip address 10.22.2.2 255.255.255.0
!
interface Ethernet0/0
ip address 10.0.195.151 255.255.255.0
no keepalive
half-duplex
pppoe enable group group_1
no cdp enable
!
interface Virtual-Template1
mtu 1492
ip unnumbered Loopback123
ppp authentication chap
ppp chap hostname User2-lac-domain
```

Cisco IOS Release: Multiple releases (see the Feature History table)
Basic LNS Configured for PPPoE Relay: Example

The following example shows the basic configuration for an LNS with commands added for PPPoE relay:

```plaintext
hostname User5
!
username User5 password 0 field
username user-group password 0 field
username User1 password 0 field
username User2 password 0 field
username User3 password 0 field
username User3-dialout password 0 cisco
username User2-dialout password 0 cisco
username abc password 0 cisco
username dial-7206a password 0 field
username mysgbgpgroup password 0 cisco
username User3-1ns-domain password 0 field
username User2-lac-domain password 0 field
username User1-client-domain@cisco.net password 0 field
username User5-mh password 0 field
username User1@domain.net password 0 field
ip subnet-zero
!
ip domain-name cisco.com
!
vpdn enable
vpdn multihop
vpdn source-ip 10.0.195.133
!
vpdn-group 1
request-dialin
protocol l2tp
!
vpdn-group 2
! Default L2TP VPDN group
accept-dialin
protocol l2tp
!
vpdn-group User5-mh
request-dialin
protocol l2tp
domain cisco.net
initiate-to ip 10.0.195.143
local name User5-mh
!
vpdn-group User3-vpdn-group-domain
accept-dialin
protocol l2tp
```
virtual-template 2
terminate-from hostname User2-lac-domain
local name User3-1ns-domain
relay pppoe group group_1

interface Loopback0
  no ip address

interface Loopback123
  ip address 10.23.3.2 255.255.255.0

interface FastEthernet0/0
  ip address 10.0.195.133 255.255.255.0
duplex auto
speed auto
no cdp enable

interface Virtual-Template2
  mtu 1492
  ip unnumbered Loopback123
  ip access-group virtual-access3#234 in
  ppp mtu adaptive
  ppp authentication chap
  ppp chap hostname User3-1ns-domain

  ip default-gateway 10.0.195.1
  ip classless
  ip route 0.0.0.0 0.0.0.0 10.0.195.1

  bba-group pppoe group_1
  virtual-template 2

---

**Tunnel Switch (or Multihop Node) Configured to Respond to PAD Messages:**

**Example**

The following is an example of a standard tunnel switch configuration with the commands to enable response to PPPoE relay messages added:

hostname User3

username User1 password 0 room1
username User2 password 0 room1
username User3 password 0 room1
username User1@domain.net password 0 room1
username User3-1ns-dnis password 0 cisco
username User3-1ns-domain password 0 room1
username User2-lac-dnis password 0 cisco
username User2-lac-domain password 0 room1
username User5 password 0 room1
username User5-mh password 0 room1
username user-group password 0 room1
username User3-dialout password 0 cisco
username User2-dialout password 0 cisco
username abc password 0 cisco
username dial-7206a password 0 room1
username mysrgbgroup password 0 cisco
username User1-client-domain@cisco.net password 0 room1
username User4-lns-domain password 0 room1
!
ip domain-name cisco.com
!
vpdn enable
!
vpdn-group User3-mh
accept-dialin
protocol l2tp
virtual-template 1
terminate-from hostname User5-mh
relay pppoe bba-group group_1
!
interface Loopback0
ip address 10.4.4.2 255.255.255.0
!
interface Loopback1
ip address 10.3.2.2 255.255.255.0
!
interface Ethernet2/0
ip address 10.0.195.143 255.255.0.0
half-duplex
no cdp enable
!
interface Virtual-Template1
mtu 1492
ip unnumbered Loopback0
no keepalive
ppp mtu adaptive
ppp authentication chap
ppp chap hostname User3-lns-domain
!
ip default-gateway 10.0.195.1
ip route 0.0.0.0 0.0.0.0 10.0.195.1
!
!
bba-group pppoe group_1
virtual-template 1
!

Tunnel Switch Configured to Relay PAD Messages: Example

The following partial example shows a configuration that allows the tunnel switch to relay PAD messages:

subscriber profile profile-1
! Configure profile for PPPoE Relay
service relay pppoe vpdn group Sample1.net
.
.
.
vpdn-group Sample2.net
! Configure L2TP tunnel for PPPoE Relay
accept-dialin
protocol l2tp
.
.
.
PPPoE Relay

Configuration Examples for PPPoE Relay

Cisco IOS Release: Multiple releases (see the Feature History table)

RADIUS Subscriber Profile Entry for the LAC: Example

The following is an example of a typical RADIUS subscriber profile entry for a LAC:

cisco.com Password = "password"
Cisco:Cisco-Avpair = "sssd:service=relay-pppoe",
Tunnel-Type = L2TP,
Tunnel-Server-Endpoint = ......,
Tunnel-Client-Auth-ID = "client-id",
Tunnel-Server-Auth-ID = "server-id",
Cisco:Cisco-Avpair = "vpdn:l2tp-tunnel-password=password",
Cisco:Cisco-Avpair = "vpdn:l2tp-nosession-timeout=never",
Cisco:Cisco-Avpair = "vpdn:relay-pppoe-bba-group=group-name"
Tunnel-Assgignment-Id = assignment-id

RADIUS VPDN Group User Profile Entry for the LNS: Example

The following is an example of a typical RADIUS subscriber profile entry for an LNS:

cisco.com Password = "password"
Tunnel-Type = L2TP,
Tunnel-Server-Endpoint = ......,
Tunnel-Client-Auth-ID = "client-id",
Tunnel-Server-Auth-ID = "server-id",
Cisco:Cisco-Avpair = "vpdn:l2tp-tunnel-password=password",
Cisco:Cisco-Avpair = "vpdn:l2tp-nosession-timeout=never",
Cisco:Cisco-Avpair = "vpdn:relay-pppoe-bba-group=group-name"
Tunnel-Assgignment-Id = assignment-id
Monitoring PPPoE Relay: Example

The following examples show sample output from the `show pppoe relay context all` and `show pppoe session` commands:

```
Router# show pppoe relay context all

Total PPPoE relay contexts 1
UID   ID   Subscriber-profile     State
25    18   cisco.com               RELAYED

Router# show pppoe session

1 session in FORWARDED (FWDED) State
1 session total

Uniq ID  PPPoE  RemMAC          Port                    VT  VA         State
      SID  LocMAC                                      VA-st
26     19  0001.96da.a2c0  Et0/0.1                  5  N/A RELFWD
000c.8670.1066  VLAN:3434
```

Additional References

The following sections provide referenced related to the PPPoE Relay feature.

### Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPDN tunnels</td>
<td><em>Cisco IOS Dial Technologies Configuration Guide</em>; refer to the</td>
</tr>
<tr>
<td></td>
<td>“Configuring Virtual Private Networks” chapter in the “Virtual</td>
</tr>
<tr>
<td></td>
<td>Templates, Profiles, and Networks” part</td>
</tr>
<tr>
<td>VPDN tunnel commands</td>
<td><em>Cisco IOS Dial Technologies Command Reference</em></td>
</tr>
<tr>
<td>Tunnel switching</td>
<td><em>L2TP Tunnel Switching</em> feature module</td>
</tr>
<tr>
<td>PPPoE broadband groups</td>
<td><em>Cisco IOS Wide-Area Networking Configuration Guide</em>; refer to</td>
</tr>
<tr>
<td></td>
<td>the chapters in the “Broadband Access” part</td>
</tr>
<tr>
<td>PPPoE broadband commands</td>
<td><em>Cisco IOS Wide-Area Networking Command Reference</em></td>
</tr>
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### Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>Title</th>
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<td>None</td>
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MIBs

<table>
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<tr>
<th>MIBs</th>
<th>MIBs Link</th>
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<tbody>
<tr>
<td>None</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
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RFCs

<table>
<thead>
<tr>
<th>RFCs</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFC 2516</td>
<td>“Method for Transmitting PPP Over Ethernet (PPPoE)”</td>
</tr>
<tr>
<td>L2TP Active Discovery Relay for PPPoE</td>
<td>Network Working Group Internet-Draft, L2TP Active Discovery Relay for PPPoE, which can be seen at <a href="http://www.ietf.org/internet-drafts/draft-dasilva-l2tp-relaysvc-06.txt">http://www.ietf.org/internet-drafts/draft-dasilva-l2tp-relaysvc-06.txt</a></td>
</tr>
</tbody>
</table>

Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.</td>
<td><a href="http://www.cisco.com/public/support/tac/home.shtml">http://www.cisco.com/public/support/tac/home.shtml</a></td>
</tr>
</tbody>
</table>

Command Reference

This section documents new commands. All other commands used with this feature are documented in the Cisco IOS Release 12.3T command reference publications.

New Commands

- clear pppoe relay context
- relay pppoe bba-group
- service relay
- show pppoe relay context all
- show pppoe session
clear pppoe relay context

To clear the PPP over Ethernet (PPPoE) relay context created for relaying PPPoE Active Discovery (PAD) messages, use the `clear pppoe relay context` command in privileged EXEC mode.

```
clear pppoe relay context {all | id session-id}
```

### Syntax Description

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>all</code></td>
<td>Clears all relay contexts.</td>
</tr>
<tr>
<td><code>id session-id</code></td>
<td>Clears a specific relay context identified in the output of</td>
</tr>
<tr>
<td></td>
<td>the <code>show pppoe relay context all</code> command.</td>
</tr>
</tbody>
</table>

### Command Modes

Privileged EXEC

### Command History

<table>
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<th>Release</th>
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</tr>
</tbody>
</table>

### Usage Guidelines

Use this command to clear relay contexts created for relaying PAD messages.

### Examples

The following example clears all PPPoE relay contexts created for relaying PAD messages:

```
Router# clear pppoe relay context all
```

### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>show pppoe relay context all</code></td>
<td>Displays PPPoE relay contexts created for relaying PAD messages.</td>
</tr>
<tr>
<td><code>show pppoe session</code></td>
<td>Displays information about currently active PPPoE sessions.</td>
</tr>
</tbody>
</table>
relay pppoe bba-group

To configure the PPP over Ethernet (PPPoE) broadband access (BBA) group that responds to PPPoE Active Discovery (PAD) messages, use the `relay pppoe bba-group` command in VPDN group configuration mode. To unconfigure the group, use the `no` form of this command.

```
relay pppoe bba-group pppoe-bba-group-name

no relay pppoe bba-group pppoe-bba-group-name
```

**Syntax Description**

```
pppoe-bba-group-name  Name of the PPPoE BBA group.
```

**Defaults**

This command is disabled by default.

**Command Modes**

VPDN group configuration

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3(4)T</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.2(27)SBA</td>
<td>This command was integrated into Cisco IOS Release 12.2(27)SBA.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

On the router that responds to relayed PAD messages, this command configures a PPPoE group and attaches it to a virtual private dial-up network (VPDN) group that accepts dial-in calls for Layer 2 Tunnel Protocol (L2TP). The relayed PAD messages will be passed from the VPDN L2TP tunnel or session to the PPPoE broadband group for receiving the PAD response.

**Examples**

The following partial example shows how to configure a tunnel switch (or L2TP network server) to respond to PAD messages. The `relay pppoe bba-group` command configures PPPoE “group-1”, which is attached to accept dial-in VPDN group “Group-A”.

```
vpdn-group Group-A
! Configure an L2TP tunnel for PPPoE Relay
  accept-dialin
    protocol 12tp

  terminate-from hostname LAC-1
  relay pppoe bba-group group-1

! Configure the PPPoE group to respond to the relayed PAD messages
bba-group pppoe group-1
```
service profile profile-1

<table>
<thead>
<tr>
<th>Related Commands</th>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bba-group pppoe</td>
<td>Creates a PPPoE profile.</td>
</tr>
<tr>
<td></td>
<td>vpdn-group</td>
<td>Associates a VPDN group with a customer or VPDN profile.</td>
</tr>
</tbody>
</table>
**service relay**

To enable relay of PPPoE Active Discovery (PAD) messages over a Layer 2 Tunnel Protocol (L2TP) tunnel, use the `service relay` command in subscriber profile configuration mode. To disable message relay, use the `no` form of this command.

```
   service relay pppoe vpdn group vpdn-group-name

   no service relay pppoe vpdn group vpdn-group-name
```

**Syntax Description**

- **pppoe**: Provides relay service using PPP over Ethernet (PPPoE) using a virtual private dialup network (VPDN) L2TP tunnel for the relay.
- **vpdn group**: Provides VPDN service by obtaining the configuration from a predefined VPDN group.

**Defaults**

This command is disabled by default.

**Command Modes**

Subscriber profile configuration

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3(4)T</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.2(27)SBA</td>
<td>This command was integrated into Cisco IOS Release 12.2(27)SBA.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

The `service relay` command is configured as part of a subscriber profile. The subscriber profile name is obtained based on the authorization key specified in the `service profile` PPPoE broadband access (BBA) group configuration command. See the “Examples” section for clarification.

**Examples**

The following example configures the group named Sample1.net to contain outgoing tunnel information for the relay of PAD messages over an L2TP tunnel:

```
subscriber profile profile-1
! Configure profile for PPPoE Relay
   service relay pppoe vpdn group Sample1.net
! bba-group pppoe group-1
   virtual-template 1
   service profile profile-1
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bba-group pppoe</td>
<td>Creates a PPPoE profile.</td>
</tr>
<tr>
<td>service</td>
<td>Configures the type of service that will be granted to a subscriber.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>service profile</td>
<td>Assigns a subscriber profile to a PPPoE profile.</td>
</tr>
<tr>
<td>subscriber profile</td>
<td>Defines the SSS policy for searches of a subscriber profile database.</td>
</tr>
</tbody>
</table>
show pppoe relay context all

To display PPPoE relay contexts created for relaying PPPoE Active Discovery (PAD) messages, use the `show pppoe relay context all` command in privileged EXEC mode.

```
show pppoe relay context all
```

**Syntax Description**

This command has no arguments or keywords.

**Command Modes**

Privileged EXEC

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3(4)T</td>
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</tr>
<tr>
<td>12.2(27)SBA</td>
<td>This command was integrated into Cisco IOS Release 12.2(27)SBA.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

Use this command to display relay contexts created for relaying PAD messages.

**Examples**

The following is sample output from the `show pppoe relay context all` command:

```
Router# show pppoe relay context all

Total PPPoE relay contexts 1
UID    ID     Subscriber-profile      State
25     18     Profile-1               RELAYED
```

Table 1 describes the significant fields shown in the `show pppoe relay context all` command output.

**Table 1** `show pppoe relay context all Field Descriptions`

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PPPoE relay contexts</td>
<td>PPPoE relay contexts created for relaying PAD messages.</td>
</tr>
<tr>
<td>UID</td>
<td>Unique identifier for the relay context.</td>
</tr>
<tr>
<td>ID</td>
<td>PPPoE session identifier for the relay context.</td>
</tr>
<tr>
<td>Subscriber-profile</td>
<td>Name of the subscriber profile that is used by the PPPoE group associated with the relay context.</td>
</tr>
<tr>
<td>State</td>
<td>Shows the state of the relay context, which will be one of the following:</td>
</tr>
<tr>
<td></td>
<td>- INVALID—Not valid.</td>
</tr>
<tr>
<td></td>
<td>- RELFWD—PPPoE relay context was forwarded.</td>
</tr>
<tr>
<td></td>
<td>- REQ_RELAY—Relay has been requested.</td>
</tr>
</tbody>
</table>
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>clear pppoe relay context</code></td>
<td>Clears PPPoE relay contexts created by PAD messages.</td>
</tr>
<tr>
<td><code>show pppoe session</code></td>
<td>Displays information about currently active PPPoE sessions.</td>
</tr>
</tbody>
</table>
show pppoe session

To display information about currently active PPPoE sessions, use the `show pppoe session` command in privileged EXEC mode.

`show pppoe session [all | packets]`

**Syntax Description**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>(Optional) Displays detailed information about the PPP over Ethernet (PPPoE) session.</td>
</tr>
<tr>
<td>packets</td>
<td>(Optional) Displays packet statistics for the PPPoE session.</td>
</tr>
</tbody>
</table>

**Command Modes**

Privileged EXEC

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2(4)YG</td>
<td>This command was introduced on the Cisco SOHO 76, 77, and 77H routers.</td>
</tr>
<tr>
<td>12.3(4)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(4)T and was enhanced to display information about relayed PPPoE Active Discovery (PAD) messages.</td>
</tr>
<tr>
<td>12.2(27)SBA</td>
<td>This command was integrated into Cisco IOS Release 12.2(27)SBA.</td>
</tr>
</tbody>
</table>

**Examples**

The following is sample output for the `show pppoe session` command:

```
Router# show pppoe session
1 session in FORWARDED (FWDED) State
1 session total

Uniq ID PPPoE RemMAC Port VT VA State
SID LocMAC          VA-st
26     19 0001.96da.a2c0 Et0/0.1 5 N/A RELFWD
000c.8670.1006 VLAN:3434
```

Table 2 describes the significant fields shown in the `show pppoe session` command output.
Table 2  show pppoe session Field Descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Displays the state of the session, which will be one of the following:</td>
</tr>
<tr>
<td></td>
<td>• FORWARDED</td>
</tr>
<tr>
<td></td>
<td>• FORWARDING</td>
</tr>
<tr>
<td></td>
<td>• LCP_NEGOTIATION</td>
</tr>
<tr>
<td></td>
<td>• LOCALLY_TERMINATED</td>
</tr>
<tr>
<td></td>
<td>• PPP_START</td>
</tr>
<tr>
<td></td>
<td>• PTA_BINDING</td>
</tr>
<tr>
<td></td>
<td>• RELFWD (a PPPoE session was forwarded for which the Active discovery messages were relayed)</td>
</tr>
<tr>
<td></td>
<td>• SHUTTING_DOWN</td>
</tr>
<tr>
<td></td>
<td>• VACCESS_REQUESTED</td>
</tr>
<tr>
<td>Uniq ID</td>
<td>Unique identifier for the PPPoE session.</td>
</tr>
<tr>
<td>PPPoE SID</td>
<td>PPPoE session identifier.</td>
</tr>
<tr>
<td>RemMAC</td>
<td>Remote MAC address.</td>
</tr>
<tr>
<td>LocMAC</td>
<td>Local MAC address.</td>
</tr>
<tr>
<td>Port</td>
<td>Port type and number.</td>
</tr>
<tr>
<td>VT</td>
<td>Virtual template interface.</td>
</tr>
<tr>
<td>VA</td>
<td>Virtual access interface.</td>
</tr>
</tbody>
</table>

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear pppoe relay context</td>
<td>Clears PPPoE relay contexts created for relaying PAD messages.</td>
</tr>
<tr>
<td>show pppoe relay context all</td>
<td>Displays PPPoE relay contexts created for relaying PAD messages.</td>
</tr>
</tbody>
</table>

Cisco IOS Release: Multiple releases (see the Feature History table)