



Configuring the PPPoE Intermediate Agent

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Restrictions for PPPoE Intermediate Agent

PPPoE Intermediate Agent is not supported on routed interfaces.

Information about PPPoE Intermediate Agent

PPPoE Intermediate Agent (PPPoE IA) is placed between a subscriber and BRAS to help the service provider BRAS distinguish between end hosts connected over Ethernet to an access switch. On the access switch, PPPoE IA enables Subscriber Line Identification by appropriately tagging Ethernet frames of different users. (The tag contains specific information such as which subscriber is connected to the switch and VLAN.) PPPoE IA acts as mini security firewall between host and BRAS by intercepting all PPPoE Active Discovery (PAD) messages on a per-port per-VLAN basis. It provides specific security feature such as verifying the intercepted PAD message from untrusted port, performing per-port PAD message rate limiting, inserting and removing VSA Tags into and from PAD messages, respectively.

DSL Forum TR-101 [1] offers a means by which the PPPoE Discovery packets are tagged at the service provider's access switch with subscriber line specific information. The mechanism specifies using VSA of the PPPoE Discovery packets to add the line specific information at the switch. Even though you can perform Subscriber Line Identification (SLI) in another way (recreating virtual paths and circuits using stacked VLAN tags), DSL Forum 2004-071 [4] recommends the PPPoE Intermediate Agent mechanism. It cites lower provisioning costs and simpler co-ordination between OSS systems in charge of access switch and BRAS. PPPoE Intermediate Agent helps the service provider, BRAS, distinguish between end hosts connected over Ethernet to an access switch.

How to Configure PPPoE IA

Enabling PPPoE IA on a Switch



Note By default, PPPoE IA is disabled globally.

Follow these steps to enable or disable PPPoE IA globally on the switch:

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config t | Enters the global configuration mode. |
| Step 3 | pppoe intermediate-agent Example: Device(config)# pppoe intermediate-agent | Enables PPPoE IA globally on the switch. |

Configuring the Access Node Identifier for PPPoE IA on a Switch

Follow these steps to set the Access Node Identifier of the switch.



Note By default, access-node-id is not set.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |

| | Command or Action | Purpose |
|---------------|---|---|
| Step 3 | <p>pppoe intermediate-agent <i>format-type</i> access-node-id string <i>word</i></p> <p>Example:</p> <pre>Device(config)# pppoe intermediate-agent format-type access-node-id string abcd</pre> | <p>Sets the access node identifier.</p> <ul style="list-style-type: none"> • access-node-identifier string <i>word</i> – ASCII string literal value for the access-node-identifier. |

Configuring the Identifier String, Option, and Delimiter for PPPoE IA on a Switch

This functionality overrides the default automatic generation of circuit-id by the system.

The options available are sp, sv, pv and spv denoting slot:port, slot-vlan, port-vlan, and slot-port-vlan combinations, respectively. Valid delimiters are # . , ; / space.

The no form of this command without WORD, options, and delimiters, reverts to the default automatic generation of circuit-id.

This command does not affect the circuit ID configured explicitly per-interface or per-interface per-VLAN with the **pppoe intermediate-agent format-type circuit-id**.

Follow these steps to set an identifier string word with option spv delimited by “:”

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | <p>enable</p> <p>Example:</p> <pre>Device> enable</pre> | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | <p>configure terminal</p> <p>Example:</p> <pre>Device# config t</pre> | Enters the global configuration mode. |
| Step 3 | <p>pppoe intermediate-agent format-type identifier-string string <i>word</i>option {sp sv pv spv} delimiter {, . ; / #}</p> <p>Example:</p> <pre>Device(config)# pppoe intermediate-agent format-type identifier-string string word option spv delimiter :</pre> | <p>Sets the identifier string.</p> <ul style="list-style-type: none"> • option {sp sv pv spv} – sp = slot + port, sv = slot + vlan, pv = port + vlan, spv = slot +port+vlan. • delimiter {, . ; / #} – Delimiter between slot/port/vlan portions of 'option'. |

Configuring the Generic Error Message for PPPoE IA on a Switch

Follow these steps to to configure a generic message of **packet_length>1484**:

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |
| Step 3 | pppoe intermediate-agent format-type generic-error-message string <i>string</i> Example: Device(config)# pppoe intermediate-agent format-type generic-error-message string packet_length>1484 | Sets the generic error message. <ul style="list-style-type: none"> • generic-error-message string <i>string</i> – ASCII string literal value for the generic-error-message. |

Enabling PPPoE IA on an Interface

Follow these steps to enable PPPoE IA on FastEthernet 3/1:

Before you begin

Note Enabling PPPoE IA on an interface does not ensure that incoming packets are tagged. For this to happen PPPoE IA must be enabled globally, and at least one interface that connects the switch to PPPoE server has a trusted PPPoE IA setting. Refer to the following section for details.

This functionality enables the PPPoE IA feature on an interface. The pppoe intermediate-agent command has an effect only if the PPPoE IA feature was enabled globally with this command. (You need to enable globally to activate PPPoE IA static ACL and on an interface for PPPoE IA processing of PPPoE discovery packets received on that interface.)

This setting applies to all frames passing through this interface, regardless of the VLAN they belong to. By default the PPPoE IA feature is disabled on all interfaces. You need to run this command on every interface that requires this feature.

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: | Enters the global configuration mode. |

| | Command or Action | Purpose |
|---------------|--|---|
| | Device# config terminal | |
| Step 3 | interface <i>interface-id</i> Example: Device(config) interface FastEthernet 3/1 | Enter interface configuration mode and the physical interface identification. |
| Step 4 | pppoe intermediate-agent Example: Device(config-if) pppoe intermediate-agent | Enables PPPoE IA on the interface. |

Configuring the PPPoE IA Trust Setting on an Interface



Note Interfaces that connect the switch to PPPoE server are configured as trusted. Interfaces that connect the switch to users (PPPoE clients) are untrusted.

Follow these steps to set FastEthernet interface 3/2 as trusted:

Procedure

| | Command or Action | Purpose |
|---------------|--|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |
| Step 3 | interface <i>interface-id</i> Example: Device(config) interface FastEthernet 3/2 | Enter interface configuration mode and the physical interface identification. |
| Step 4 | pppoe intermediate-agent trust Example: Device(config-if) pppoe intermediate-agent trust | Sets the trust configuration of an interface. |

Configuring PPPoE Intermediate Agent Rate Limiting Setting on an Interface



Note The parameter for rate limiting is the number of packets per second. If the incoming packet rate exceeds this value, the port shuts down.

Follow these steps to to set a rate limit on an interface :

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |
| Step 3 | interface <i>interface-id</i> Example: Device(config)interface FastEthernet 3/1 | Enters interface configuration mode and the physical interface identification. |
| Step 4 | pppoe intermediate-agent limit rate <i>number</i> Example: Device(config-if)pppoe intermediate-agent limit rate 30 | Limits the rate of the PPPoE Discovery packets arriving on an interface. |

Configuring PPPoE IA Vendor-tag Stripping on an Interface



Note Generally, you would configure vendor-tag stripping on an interfaces connected to the PPPoE server. If you configure stripping, incoming packets are stripped of their VSAs (which carry subscriber and line identification information). For this to happen, the PPPoE Intermediate agent must be enabled to make the pppoe intermediate-agent vendor-tag strip command effective, and the interface must be set to trust. In isolation, the command has no effect.



Note BRAS automatically strips the vendor-specific tag off of the PPPoE discovery packets before sending them downstream to the access switch. To operate with older BRAS which does not possess this capability, use the pppoe intermediate-agent vendor-tag strip command on the interface connecting the access switch to BRAS.

Follow these steps to enable vendor-tag stripping :

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |
| Step 3 | interface <i>interface-id</i> Example: Device(config) interface FastEthernet 3/2 | Enters interface configuration mode and the physical interface identification. |
| Step 4 | pppoe intermediate-agent vendor-tag strip Example: Device(config-if) pppoe intermediate-agent vendor-tag strip | Enables vendor-tag stripping on PPPoE Discovery packets from PPPoE Server (or BRAS). |

Configuring PPPoE Intermediate Agent Circuit-ID and Remote-ID on an Interface

The **[no] pppoe intermediate-agent format-type circuit-id** command sets the circuit ID on an interface and overrides the automatic generation of circuit ID by the switch. Without this command, one default tag (for example, Ethernet x/y:z on the PPPoE to which the user is connected) inserted by an intermediate-agent.

The **[no] pppoe intermediate-agent format-type remote-id** command sets the remote ID on an interface.

This functionality causes tagging of PADI, PADR, and PADT packets (belonging to PPPoE Discovery stage) received on this physical interface with circuit ID or remote ID. This happens regardless of their VLAN if PPPoE IA is not enabled for that VLAN.

You should use remote ID instead of circuit ID for subscriber line identification. You should configure this setting on every interface where you enabled PPPoE IA because it is not set by default. The default value for remote-id is the switch MAC address (for all physical interfaces).

Follow these steps to configure the circuit ID as root and the remote ID as granite:

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |

| | Command or Action | Purpose |
|---------------|--|---|
| Step 3 | interface <i>interface-id</i> Example: Device(config)interface FastEthernet 3/1 | Enters interface configuration mode and the physical interface identification. |
| Step 4 | pppoe intermediate-agent format-type {circuit-id remote-id} string <i>string</i> Example: Device(config-if)pppoe intermediate-agent format-type circuit-id string root | Sets circuit-id or remote-id for an interface. <ul style="list-style-type: none"> • circuit-id string string – ASCII string literal value for circuit-id. • remote-id string string – ASCII string literal value for remote-id. |

Enabling PPPoE IA for a Specific VLAN on an Interface



Note The **pppoe intermediate-agent** command in the vlan-range mode is not dependent on the same command in interface mode. The **pppoe intermediate-agent** command will take effect independently of the command in the interface mode. To make this happen, PPPoE IA must be enabled globally and at least one interface is connected to the PPPoE server.

Follow these steps to enable PPPoE IA on a specific VLAN:

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password if prompted. |
| Step 2 | configure terminal Example: Device# config terminal | Enters the global configuration mode. |
| Step 3 | interface <i>interface-id</i> Example: Device(config)interface FastEthernet 3/1 | Enters interface configuration mode and the physical interface identification. |
| Step 4 | vlan-range { <i>vlan-id</i> <i>vlan-list</i> <i>vlan-range</i> } Example: Device(config-if)vlan-range 5 | Enters the vlan-range mode. |

| | Command or Action | Purpose |
|---------------|--|---|
| Step 5 | pppoe intermediate-agent Example: Device(config-if-vlan-range) pppoe intermediate-agent | Enables PPPoE IA on the specified interfaces. |

Configuring PPPoE IA Circuit-ID and Remote-ID for a VLAN on an Interface



Note The circuit-id and remote-id configurations in vlan-range mode are affected only if PPPoE IA is enabled globally and in vlan-range mode.



Note The vlan-range mode commands configure PPPoE IA for either a specific VLAN, multiple VLANs, or VLAN range, depending on what you specify in the syntax.

In this section you set the circuit ID and remote ID for a specific VLAN on an interface. The command overrides the circuit ID and remote ID specified for this physical interface and the switch uses the WORD value to tag packets received on this VLAN. This parameter is unset by default.

The default value of remote-id is the switch MAC address (for all VLANs). You would set this parameter to encode subscriber-specific information.

Follow these steps to set the circuit-id and the remote-id :

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | interface <i>interface-id</i> Example: Device(config)# int g3/7 | Enters interface configuration mode and the physical interface identification. |
| Step 2 | vlan-range <i>vlan-range</i> Example: Device(config-if)# vlan-range5 | Enters the vlan-range mode. |
| Step 3 | pppoe intermediate-agent Example: Device(config-if)# pppoe intermediate-agent | Enables PPPoE IA on the specified interfaces. |
| Step 4 | pppoe intermediate-agent format-type {circuit-id remote-id} string <i>string</i> Example: | Sets circuit-id or remote-id for an interface. <ul style="list-style-type: none"> • circuit-id string string – ASCII string literal value for circuit-id. |

| | Command or Action | Purpose |
|--|---|---|
| | Device(config-if)pppoe intermediate-agent format-type circuit-id string root | <ul style="list-style-type: none"> remote-id string string – ASCII string literal value for remote-id. |

Configuration Examples for PPPoE IA

Example: Enabling PPPoE Intermediate Agent on a Switch

This examples shows how to enable or disable PPPoE IA globally on the switch

```
Device> enable
Device# configure terminal
Device(config)# pppoe intermediate-agent
```

Example: Configuring the Access Node Identifier for PPPoE IA on a Switch

This example shows how to to set an access node identifier of abcd:

```
Device> enable
Device# configure terminal
Device(config)#pppoe intermediate-agent format-type access-node-id string abcd
```

Example: Configuring the Identifier String, Option, and Delimiter for PPPoE IA on a Switch

This example shows how to set an identifier string word with option spv delimited by “.”:

```
Device> enable
Device# configure terminal
Device(config)#pppoe intermediate-agent format-type
identifier-string string word
option spv delimiter :
```

Example: Configuring the Generic Error Message for PPPoE IA on a Switch

This example shows how to configure a generic message of packet_length>1484:

```
Device> enable
Device# configure terminal
Device(config)#pppoe intermediate-agent format-type generic-error-message string
packet_length>1484
```

Example: Enabling PPPoE IA on an Interface

This example shows how to enable PPPoE IA on FastEthernet 3/1:

```
Device> enable
Device# configure terminal
Device(config) interface FastEthernet 3/1
Device(config-if)pppoe intermediate-agent
```

Example: Configuring the PPPoE Intermediate Agent Trust Setting on an Interface

The following example shows how to set FastEthernet interface 3/2 as trusted:

```
Device> enable
Device# configure terminal
Device(config)interface FastEthernet 3/2
Device(config-if)pppoe intermediate-agent trust
```

Example: Configuring PPPoE Intermediate Agent Rate Limiting Setting on an Interface

This example shows how to set a rate limit of 30 at FastEthernet 3/1:

```
Device> enable
Device# configure terminal
Device(config) interface FastEthernet 3/1
Device(config-if)pppoe intermediate-agent limit rate 30
```

Example: Configuring PPPoE IA Vendor-tag Stripping on an Interface

The following example shows how to enable stripping on FastEthernet 3/2:

```
Device> enable
Device# configure terminal
Device(config)interface FastEthernet 3/2
Device(config-if)pppoe intermediate-agent vendor-tag strip
```

Example: Configuring PPPoE IA Circuit-ID and Remote-ID on an Interface

The following example shows how to configure the circuit ID as root and the remote ID as granite:

```
Device> enable
Device# configure terminal
Device(config) interface FastEthernet 3/1
Device(config-if)pppoe intermediate-agent format-type circuit-id string root
Device(config-if)pppoe intermediate-agent format-type remote-id string granite
```

Example: Enabling PPPoE IA for a Specific VLAN on an Interface

The following example shows how to enable PPPOE IA on a specific VLAN:

```
Switch# configure terminal
Switch(config)# interface FastEthernet 3/1
Switch(config-if)# vlan-range 5
Switch(config-if-vlan-range)# pppoe intermediate-agent
```

The following examples shows how to enable PPPoE IA on a comma-separated VLAN list

```
Switch# configure terminal
Switch(config)# interface FastEthernet 3/1
Switch(config-if)# vlan-range 5,6
Switch(config-if-vlan-range)# pppoe intermediate-agent
```

The following example shows how to enable PPPoE IA on a VLAN-range such as “x-y.”

```
Switch# configure terminal
Switch(config)# interface FastEthernet 3/1
Switch(config-if)# vlan-range 5-9
Switch(config-if-vlan-range)# pppoe intermediate-agent
```

Example: Configuring PPPoE IA Circuit-ID and Remote-ID for a VLAN on an Interface

The following example shows how to set the circuit-id to aaa and the remote-id as ccc on interface g3/7:

```
Switch(config)# int g3/7
Switch(config-if)# vlan-range 5
Switch(config-if)# pppoe intermediate-agent
Switch(config-if-vlan-range)# pppoe intermediate-agent format-type circuit-id string aaa
Switch(config-if-vlan-range)# pppoe intermediate-agent format-type remote-id string ccc
```

Displaying Configuration Parameters

The **show pppoe intermediate-agent [info | statistics][interface {interface}]** command displays the various configuration parameters, statistics, and counters stored for PPPoE.

The **info** keyword appears if the PPPoE Intermediate Agent is enabled globally on an interface or on a VLAN (in an interface). It also informs you about the access node ID and generic error message of the switch, as well as the identifier string options, delimiter values configured globally, global circuit id and remote id configuration by using the following command:

```
Switch(config)# pppoe intermediate-agent format-type ?
access-node-id          Access Node Identifier
circuit-id              Circuit Id
generic-error-message   Generic Error Message
identifier-string        Identifier String
remote-id                Remote Id
```

The **info** keyword also displays the circuit ID, remote ID, trust and rate limit configurations, and vendor tag strip setting for all interfaces and for all VLANs pertaining to those interfaces. If any of these parameters are not set, they are not displayed.

The **statistics** option displays the number of PADI/PADR/PADT packets received, and the time the last packet was received on all interfaces and on all VLANs pertaining to those interfaces.

If **interface** is specified, information or statistics applicable only to that physical interface and pertaining VLANs is displayed.

Although PPoE IA is supported on PVLANS, be aware that no PVLAN association (primary and secondary VLAN mapping) information is displayed.

The PPPoE IA show commands such as **show pppoe intermediate-agent info**, **show pppoe intermediate-agent info interface g3/7**, or **show pppoe intermediate-agent statistics** do not provide information about private VLAN association (primary and secondary VLAN mapping).

However, they do provide information about VLANs regardless of private or normal VLANs, as the following example illustrate:

```
Switch# show pppoe intermediate-agent info
Switch PPPOE Intermediate-Agent is enabled
PPPOE Intermediate-Agent trust/rate is configured on the following Interfaces:

Interface          IA          Trusted    Vsa Strip    Rate limit (pps)
```

```

-----
GigabitEthernet3/4      no      yes      yes      unlimited PPPOE
Intermediate-Agent is
configured on following VLANs:
2-3
GigabitEthernet3/7      no      no      no      unlimited OE Intermediate-Agent
is
configured on following VLANs:
-3

Switch# show pppoe intermediate-agent info interface g3/7
Interface      IA      Trusted  Vsa Strip  Rate limit (pps)
-----
GigabitEthernet3/7      yes     no      no      unlimited oE Intermediate-Agent
is
configured on following VLANs:
-3

Switch# show pppoe intermediate-agent statistics
PPPOE IA Per-Port Statistics
-----

Interface : GigabitEthernet3/7 Packets received
All = 0
PADI = 0 PADO = 0
PADR = 0 PADS = 0
PADT = 0
Packets dropped:
Rate-limit exceeded = 0
Server responses from untrusted ports = 0
Client requests towards untrusted ports = 0
Malformed PPPoE Discovery packets = 0

```

The following statistics will be displayed when PPPoE IA feature is enabled on every VLAN interface and the PAD packet counters have a non-zero value.

```

switch# sh run int gi2/0/1
Building configuration...
Current configuration : 135 bytes
!
interface GigabitEthernet2/0/1
switchport mode trunk
pppoe intermediate-agent
vlan-range 200-201
pppoe intermediate-agent
end

Switch# show pppoe intermediate-agent statistics interface gi2/0/3
Interface: GigabitEthernet2/0/3
Packets received
All = 0
PADI = 0 PADO = 0
PADR = 0 PADS = 0
PADT = 0
Packets dropped:
Rate-limit exceeded = 0
Server responses from untrusted ports = 0
Client requests towards untrusted ports = 0
Malformed PPPoE Discovery packets = 0

Switch# show pppoe intermediate-agent statistics interface gi2/0/3
Interface: GigabitEthernet2/0/1
Packets received

```

```

All = 50
PADI = 20 PADO = 0
PADR = 20 PADS = 0
PADT = 10
Packets dropped: Rate-limit exceeded = 0
Server responses from untrusted ports = 0
Client requests towards untrusted ports = 0
Malformed PPPoE Discovery packets = 0
Vlan 200: Packets received PADI = 2 PADO = 0 PADR = 2 PADS = 0 PADT = 1
Vlan 201: Packets received PADI = 2 PADO = 0 PADR = 2 PADS = 0 PADT = 1

```

Clearing Packet Counters

This section illustrates how to clear packet counters on all interfaces (per-port and per-port-per-VLAN).

The following example illustrates how to do this:

```

Switch# clear pppoe intermediate-agent statistics
Issuing of the above command clears the counters for all PPPoE discovery packets
(PADI,PADO,PADR,PADS,PADT) received on DUT.

```

Debugging PPPoE Intermediate Agent

The **debug pppoe intermediate-agent [packet | event | all]** command enables you to display useful PPPoE information that assists in debugging. This command is disabled by default.

The **packet** option of the command displays the contents of a packet received in the software: source and destination MAC address of Ethernet frame, code, version and type of PPPoE Discovery packet and a list of TAGs present.

The **event** option of the command echoes important messages (interface state change to errdisabled due to PPPoE discovery packets entering at a rate exceeding the configured limit). it is the only event shown by the **debug pppoe intermediate-agent event** command.

The **all** option enables both package and event options.

The following example illustrates how to enter the debug command with the packet option:

```

Switch# debug pppoe intermediate-agent packet
PPPOE IA Packet debugging is on
*Sep 2 06:12:56.133: PPPOE_IA: Process new PPPoE packet, Message type: PADI, input interface:

Gi3/7, vlan : 2 MAC da: ffff.ffff.ffff, MAC sa: aabb.cc00.0000
*Sep 2 06:12:56.137: PPPOE_IA: received new PPPOE packet from inputinterface
(GigabitEthernet3/4)
*Sep 2 06:12:56.137: PPPOE_IA: received new PPPOE packet from inputinterface
(GigabitEthernet3/8)
*Sep 2 06:12:56.137: PPPOE_IA: Process new PPPoE packet, Message type: PADO, input interface:

Gi3/4, vlan : 2 MAC da: aabb.cc00.0000, MAC sa: 001d.e64c.6512
*Sep 2 06:12:56.137: PPPOE_IA: Process new PPPoE packet, Message type: PADO, input interface:

Gi3/8, vlan : 2 MAC da: aabb.cc00.0000, MAC sa: aabb.cc80.0000
*Sep 2 06:12:56.137: PPPOE_IA: received new PPPOE packet from inputinterface
(GigabitEthernet3/7)
*Sep 2 06:12:56.137: PPPOE_IA: Process new PPPoE packet, Message type: PADR, input interface:

Gi3/7, vlan : 2 MAC da: 001d.e64c.6512, MAC sa: aabb.cc00.0000

```

```
*Sep 2 06:12:56.145: PPPOE_IA: received new PPPOE packet from inputinterface
(GigabitEthernet3/4)
*Sep 2 06:12:56.145: PPPOE_IA: Process new PPPoE packet, Message type: PAD      ut interface:
Gi3/4, vlan : 2 MAC da: aabb.cc00.0000, MAC sa: 001d.e64c.6512
```

The following example illustrates how to enter the debug command with the event option:

```
Switch# PPPOE I
*Jul 30 19:00:10.254: %PPPOE_IA-4-PPPOE_IA_ERRDISABLE_WARNING: PPPOE IA received 5 PPPOE
packets on interface Gi3/7
*Jul 30 19:00:10.254: %PPPOE_IA-4-PPPOE_IA_RATE_LIMIT_EXCEEDED: The interface Gi3/7 is
receiving more than the threshold set
*Jul 30 19:00:10.394: %PM-4-ERR_DISABLE:      detected on
Gi3/7, putting Gi3/7 in err-disable stat
```

Troubleshooting Tips

When the **radius-server attribute 31 remote-id** global configuration command is entered in the PPPoE Agent Remote-ID Tag and DSL Line Characteristics feature configuration on the BRAS, the **debug radius** privileged EXEC command can be used to generate a report that includes information about the incoming access interface, where discovery frames are received, and about the session being established in PPPoE extended NAS-Port format (format d)

Feature Information for Configuring the PPPoE Intermediate Agent

Table 1: Feature Information for Configuring the PPPoE Intermediate Agent

| Feature Name | Releases | Feature Information |
|--------------------------|------------------------|---|
| PPPoE Intermediate Agent | Cisco IOS XE 15.2(6)E2 | Supports Point-to-point protocol over Ethernet intermediate agent (PPPoE IA) which is placed between a subscriber and broadband remote access server (BRAS). PPPoE IA helps the service provider BRAS to distinguish between end hosts connected over Ethernet to an access switch. |

