# management server password

To specify the customer premise equipment (CPE) password that is used in the authentication phase, use the **management server password** command in TR-069 Agent configuration mode.

**management server password** [*encryption-type* | *cleartext-password*] *passwd*

## Syntax Description

| | |
|---|---|
| *encryption-type* | (Optional) Single-digit number that defines whether the text immediately following is encrypted, and, if so, what type of encryption is used. Possible values are as follows:<br>• 0—Specifies that the text immediately following is not encrypted.<br>• 7—Specifies that the text is encrypted using an encryption algorithm defined by Cisco. |
| *cleartext-password* | (Optional) Cleartext Cisco WAN Management Protocol (CWMP) password, which is not encrypted. |
| *passwd* | The CPE password that is used in the authentication phase. This password will be provided to the auto-configuration server (ACS) when the CPE is challenged for credential as part of authentication during the session establishment. |

## Command Modes

TR-069 Agent configuration (config-cwmp)

## Command History

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

## Examples

Thefollowing example shows how to specify the CPE password that is used in the authentication phase. In this example, the password is cisco and is not encrypted:

```
Device(config-cwmp)# management server password 0 cisco
```

# management server url

To specify the HTTP or HTTPS URL to reach the auto-configuration server (ACS), use the **management server url** command in TR-069 Agent configuration mode.

**management server url** *acs-url*

## Syntax Description

| | |
|---|---|
| *acs-url* | The HTTP/HTTPS URL to reach the ACS. This URL is used by the CPE to establish the TR-069 session with the ACS. |

## Command Modes

TR-069 Agent configuration mode (config-cwmp)

## Command History

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

## Examples

The following example shows the **management server url** command when specifying an HTTP URL:

```
Device(config-cwmp)# management server url http://172.27.116.78:7547/acs
```

The following example shows the **management server url** command when specifying an HTTPS URL:

```
Device(config-cwmp)# management server url https://172.27.116.78:7547/acs
```

# max bandwidth

To specify the total amount of outgoing bandwidth available to switched virtual circuits (SVCs) in the current configuration, use the **max bandwidth** command in interface-ATM-VC configuration mode. To remove the current bandwidth setting, use the **no** form of this command.

**max bandwidth** *kbps*

**no max bandwidth** *kbps*

## Syntax Description

| | |
|---|---|
| *kbps* | Total amount of outgoing bandwidth in kilobits per second available to all SVCs in the current configuration. |

## Defaults

No default behavior or values

## Command Modes

Interface-ATM-VC configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(3)T | This command was introduced. |

## Usage Guidelines

Only the guaranteed cell rate of an SVC is counted toward the maximum bandwidth.

## Examples

In following example, an SVC called “svcname” on ATM interface 2/0/0 is configured using the **max bandwidth** command to allow a maximum of 50 Mbps of bandwidth to be used by all of the SVCs in this configuration:

```
interface ATM 2/0/0
 svc svcname
  encapsulation aal5auto
  protocol ppp virtual-template 1
  max bandwidth 50000
```

## Related Commands

| Command | Description |
|---|---|
| **max vc** | Specifies the maximum number of SVCs that can be established using the current configuration. |

# max vc

To specify the maximum number of switched virtual circuits (SVCs) that can be established using the current configuration, use the **max vc** command in interface-ATM-VC configuration mode. To restore the maximum number of SVCs to the default setting, use the **no** form of this command.

**max vc** *number*

**no max vc** *number*

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of SVCs to be established using the current SVC configuration. |

## Defaults

4096 SVCs

## Command Modes

Interface-ATM-VC configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(3)T | This command was introduced. |

## Examples

In following example, an SVC called “svcname” on ATM interface 2/0/0 is configured using the **max vc** command to allow a maximum of 100 SVCs to be established using this configuration:

```
interface ATM 2/0/0
 svc svcname
  encapsulation aal5auto
  protocol ppp virtual-template 1
  max vc 100
```

## Related Commands

| Command | Description |
|---|---|
| **max bandwidth** | Specifies the maximum amount of bandwidth available to all SVCs in the current configuration. |
| **svc** | Creates an ATM SVC. |

# multihop-hostname

To enable a tunnel switch to initiate a tunnel based on the hostname or tunnel ID associated with an ingress tunnel, use the **multihop-hostname** command in VPDN request-dialin subgroup configuration mode. To disable this option, use the **no** form of this command.

**multihop-hostname** *ingress-tunnel-name*

**no multihop-hostname** *ingress-tunnel-name*

## Syntax Description

| | |
|---|---|
| *ingress-tunnel-name* | Network access server (NAS) hostname or ingress tunnel ID. |

## Command Default

No multihop hostname is configured.

## Command Modes

VPDN request-dialin subgroup configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(1)DC1 | This command was introduced on the Cisco 6400 node route processor (NRP). |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

Use the **multihop-hostname** command only on a device configured as a tunnel switch.

The *ingress-tunnel-name* argument must specify either the hostname of the device initiating the tunnel that is to be to be switched, or the tunnel ID of the ingress tunnel that is to be switched.

Removing the request-dialin subgroup configuration will remove the **multihop-hostname** configuration.

## Examples

The following example configures a Layer 2 Tunnel Protocol (L2TP) virtual private dialup network (VPDN) group on a tunnel switch to forward ingress sessions from the host named LAC-1 through an outgoing tunnel to IP address 10.3.3.3:

```
vpdn-group 11
 request-dialin
 protocol l2tp
 multihop-hostname LAC-1
 initiate-to ip 10.3.3.3
 local name tunnel-switch
```

**Related Commands**

| Command | Description |
|---|---|
| **dnis** | Configures a VPDN group to tunnel calls from the specified DNIS, and supports additional domain names for a specific VPDN group. |
| **domain** | Requests that PPP calls from a specific domain name be tunneled, and supports additional domain names for a specific VPDN group. |
| **request-dialin** | Creates a request dial-in VPDN subgroup that configures a NAS to request the establishment of a dial-in tunnel to a tunnel server, and enters request dial-in VPDN subgroup configuration mode. |
| **vpdn multihop** | Enables VPDN multihop. |
| **vpdn search order** | Specifies how the NAS is to perform VPDN tunnel authorization searches. |

# nas-port-id format c

To specify a format for broadband subscriber access line identification coding that complies with a specific set of defined requirements, use the **nas-port-id format c** command in BBA group configuration mode. To disable this format implementation, use the **no** form of this command.

**nas-port-id format c**

**no nas-port-id format c**

## Syntax Description

This command has no arguments or keywords.

## Command Default

If this command is not configured, the default strings for NAS-Port-ID are used.

## Command Modes

BBA group configuration (config-bba-group)#

## Command History

| Release | Modification |
|---|---|
| 12.2(31)SB2 | This command was introduced. |
| Cisco IOS XE 2.3.0 | This command was integrated. |

## Usage Guidelines

The **nas-port-id format c** command defines the following broadband subscriber access line identification (NAS-Port-ID) coding format:

{atm/eth/trunk} NAS_slot/NAS_subslot/NAS_port:XPI:XCI {Circuit-ID/Remote-ID/default string}

- For ATM, XPI is the virtual path identifier (VPI) and XCI is the virtual circuit identifier (VCI).
- For Ethernet, XPI  is outer vlan-tag, XCI is inner vlan-tag.
- Requirements for XPI:XCI for Ethernet are as follows:
  - For 802.1Q tunneling (QinQ), the format should be outer vlan-tag:inner vlan-tag. (Prior to Release 12.2(31)SB2, Cisco IOS software supports inner vlan-tag:outer vlan-tag).
  - For single tag VLAN, XPI should be 4096.
- The Circuit-ID tag (if present) must be appended to this string when the **nas-port-id format c** command is used. The format for the Circuit-ID or Remote-ID tag is as follows:

AccessNodeIdentifier/ANI_rack/ANI_frame/ANI_slot/ANI_subslot/ANI_port[:ANI_XPI.ANI_XCI]

- The digital subscriber line access multiplexer (DSLAM) should append this information to the broadband remote access server (BRAS), and the BRAS transparently delivers it. If the Circuit-ID or Remote-ID tag is not present in DHCP option 82, a string of 0/0/0/0/0/0 should be appended to the NAS-Port-ID tag.

The following examples illustrate this format:

- NAS-Port-ID = atm 31/31/7:255.65535 guangzhou001/0/31/63/31/127

In this example, the subscriber interface type of the BRAS equipment is an ATM interface, the BRAS slot number is 31, the BRAS subslot number is 31, the BRAS port number is 7, the VPI is 255, and the VCI is 65535. The string guangzhou001/0/31/63/31/127 is the Circuit-ID or Remote-ID tag.

- NAS-Port-ID = eth 31/31/7:1234.2345 0/0/0/0/0/0

  In this example, the subscriber interface type of the BRAS equipment is an Ethernet interface, the BRAS slot number is 31, the BRAS subslot number is 31, the BRAS port number is 7, the outer vlan-tag is 1234, and the inner vlan-tag is 2345. The string 0/0/0/0/0/0 is the default.

- NAS-Port-ID = eth 31/31/7:4096.2345 0/0/0/0/0/0

  In this example, the subscriber interface type of the BRAS equipment is an Ethernet interface, the BRAS slot number is 31, the BRAS subslot number is 31, the BRAS port number is 7, and the VLAN ID is 2345. The string 0/0/0/0/0/0 is the default.

## Examples

The following example lists the commands for entering BBA group configuration mode and identifying a profile, configuring a virtual template, and specifying format c for the NAS-Port-ID tag:

```
Router(config)# bba-group pppoe bba-pppoeoe
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# nas-port-id format c
!
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Enters BBA group configuration mode and defines a PPPoE profile. |
| **virtual-template** | Configures a PPPoE profile with a virtual template to be used for cloning virtual access interfaces. |

# nas-port format d (bba)

To set the PPPoX (PPP over Ethernet or PPP over ATM) extended NAS-Port format d service, use the **nas-port format d** command in BBA group configuration mode. To remove the extended NAS-Port format, use the **no** form of this command.

**nas-port format d** *slot/adapter/port* [**transmit**]

**no nas-port format d** *slot/adapter/port*

## Syntax Description

| | |
|---|---|
| *slot/adapter/port* | *slot*—Number of bits to store slot number. The range is from 0 to 8.<br>*adapter*—Number of bits to accommodate the adapter value. The range is from 0 to 8.<br>*port*—Number of bits to accommodate the port value. The range is from 0 to 8. |
| **transmit** | (Optional) Sends the format to the RADIUS or L2TP Network Server (LNS). |

## Command Default

If this command is not applied under bba-group mode, the default behavior is to use AAA configured format format d, where *slot* is 4 bits, *adapter* is 1 bit, and *port* is 3 bits.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 2.6 | This command was integrated into Cisco IOS XE Release 2.6. |

## Usage Guidelines

The **nas-port format d** command is applicable only for PPPOE over Ethernet (PPPoEoE) and PPPoE over ATM (PPPoEoA). It does not apply to PPP over ATM (PPPoA). This command can be used if the slot, adapter, and port values are in a different format and need to be changed to the d 4/1/3 format.

## Examples

The following example show how to set the PPPoX (PPP over Ethernet or PPP over ATM) extended NAS-Port format d:

```
Router# configure terminal
Router(config)# bba-group pppoe global
Router(config-bba-group)# nas-port format d 2/2/4
```

## Related Commands

| Command | Description |
|---|---|
| **nas-port-id format c** | Specifies a format for broadband subscriber access line identification coding that complies with a specific set of defined requirements. |

# operating mode

To select an asymmetric digital subscriber line (ADSL) or very high speed digital subscriber line (VDSL) mode of operation, use the **operating mode** command in controller configuration mode. To restore the default, use the **no** form of this command.

**For the 887VA and 887VA-M**

**operating mode { auto | adsl1 | adsl2 | adsl2+ | vdsl2 | ansi }**

**no operating mode { auto | adsl1 | adsl2 | adsl2+ | vdsl2 | ansi }**

**For the 886VA**

**operating mode { auto [ tone low ] | adsl1 [ tone low ] | adsl2 [ tone low ] | adsl2+ [ tone low ] | vdsl2 }**

**no operating mode [ auto [ tone low ] | adsl1 [ tone low ] | adsl2 [ tone low ] | adsl2+ [ tone low ] | vdsl2 ]**

**Note** It is recommended to use operating mode auto (default). Using a configuration other than the default configuration for the operating mode can lead to unpredictable behavior on the DSL line.

## Syntax Description

| | |
|---|---|
| **auto** | Trains-up to the mode configured on the digital subscriber line access multiplexer. |
| **adsl1** | Configures the router to ADSL1 mode. |
| **adsl2** | Configures the router to ADSL2 mode. |
| **adsl2+** | Configures the router to ADSL2+ mode. |
| **vdsl2** | Configures the router to VDSL2 mode. |
| **ansi** | Configures the router to ANSI[1] mode. |
| **tone low** | Sets the carrier tone range from 29 to 48, C886VA only. |

1. ANSI = American National Standards Institute

## Defaults

auto

## Command Modes

Controller configuration

## Command History

| Release | Modification |
|---|---|
| 15.1(2)T | This command was introduced on the Cisco 886VA. |

## Usage Guidelines

This command enables customer premise equipment to be manually or automatically configured. It can be manually configured in either ADSL1/2/2+, VDSL2, or ANSI modes. Using the auto mode, the CPE automatically trains-up to the mode configured on the digital subscriber line access multiplexer (DSLAM).

## Examples

The following example shows a typical customer premise equipment (CPE) configuration set to auto mode. Outputs in **bold** are critical. When configured in **auto** (default), the operating mode command line interface (CLI) is not displayed in the **show running** command as illustrated in this example.

```
Router# show running
Building configuration...


Current configuration : 1250 bytes
!
! Last configuration change at 02:07:09 UTC Tue Mar 16 2010
!
version 15.1
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
memory-size iomem 10
ip source-route
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO887-V2-K9 sn FHK1313227E
license boot module c880-data level advipservices
!
!
vtp domain cisco
vtp mode transparent
!
!
controller VDSL 0
!
vlan 2-4
!
!
!
!
!
interface Ethernet0
 no ip address
```

```
no fair-queue
!
interface BRI0
 no ip address
 encapsulation hdlc
 shutdown
 isdn termination multidrop
!
interface ATM0
 no ip address
 no atm ilmi-keepalive
!
interface ATM0.1 point-to-point
 ip address 30.0.0.1 255.255.255.0
 pvc 15/32
  protocol ip 30.0.0.2 broadcast
!
!

interface FastEthernet0
!
interface FastEthernet1
!
interface FastEthernet2
!
interface FastEthernet3
!
interface Vlan1
 no ip address
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!
!
!
!
!
!
!
control-plane
!
!
line con 0
 no modem enable
line aux 0
line vty 0 4
 login
 transport input all
!
exception data-corruption buffer truncate
end
```

# parameter change notify interval

To set the time interval for the parameter change notifications, use the **parameter change notify interval** command in TR-069 Agent configuration mode.

**parameter change notify interval** *time-interval*

**Syntax Description**

| | |
|---|---|
| *time-interval* | The time interval, in seconds, for the parameter change notifications. The range for the time interval is 15 to 300. The default value is 60. |

**Command Default**

The time interval is 60 seconds.

**Command Modes**

TR-069 Agent configuration mode (config-cwmp)

**Command History**

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

**Examples**

The following shows how to set the time interval for the parameter change notifications to 75 seconds:

```
Device(config-cwmp)# parameter change notify interval 75
```

# pppoe-client control-packets vlan cos

To enable class of service (CoS) marking for PPP over Ethernet (PPPoE) control packets on the PPPoE client, use the **pppoe-client control-packets vlan cos** command in either interface configuration mode or ATM virtual circuit configuration mode. To disable CoS marking for PPPoE control packets on the PPPoE client, use the **no** form of this command.

**pppoe-client control-packets vlan cos** *number*

**no pppoe-client control-packets vlan cos** *number*

## Syntax Description

| | |
|---|---|
| *number* | CoS marking value for PPPoE control packets. The range is from 0 to 7. The default is 0. |

## Command Default

The CoS value is set to 0.

## Command Modes

Interface configuration (config-if)

ATM virtual circuit configuration (config-if-atm-vc)

## Command History

| Release | Modification |
|---|---|
| 15.1(2)T | This command was introduced. |

## Usage Guidelines

Marking a packet with a CoS value allows you to associate a Layer 2 CoS value with a packet. You can set up to eight different CoS markings.

## Examples

The following example shows how to set the CoS marking for PPPoE control packets on the PPPoE client:

```
Router# configure terminal
Router(config)# interface atm0/1/0.1 point-to-point
Router(config-if)# pvc 9/117
Router(config-if-atm-vc)# pppoe-client control-packets vlan cos 2
```

# pppoe-client dial-pool-number

To configure a PPP over Ethernet (PPPoE) client and to specify dial-on-demand routing (DDR) functionality, use the **pppoe-client dial-pool-number** command in either interface configuration mode or ATM virtual circuit configuration mode. To disable any configured functionality, use the **no** form of this command.

**pppoe-client dial-pool-number** *number* [**dial-on-demand** [**restart** *number*] **[service-name** **"***name***"] | service-name "***name***"**]

**no pppoe-client dial-pool-number** *number* [**dial-on-demand**]

## Syntax Description

| | |
|---|---|
| *number* | Unique number of a dialer pool configured with the **dialer-group** dialer interface command. |
| **dial-on-demand** | (Optional) Enables DDR functionality for the PPPoE connection. |
| **restart** *number* | (Optional) Allows the timer to be configured in seconds. The minimum value is 1, the maximum value is 3600, and the default value is 20. |
| **service-name** | (Optional) Specifies the service name requested by the PPPoE client for the **dial-pool-number** keyword. |
| **"***name***"** | (Optional) A string representing the service name (enclosed within quotation marks) that allows the PPPoE client to signal a service name to the Broadband Access Aggregation System (BRAS). By default, no service name is signalled and the service name tag is set to **"**NULL**"**. |

## Defaults

A PPPoE client is not configured, and DDR functionality is disabled.

## Command Modes

Interface configuration (config-if)
ATM virtual circuit configuration (config-if-atm-vc)

## Command History

| Release | Modification |
|---|---|
| 12.1(3)XG | This command was introduced. |
| 12.2(2)T | This command was integrated into Cisco IOS Release 12.2(2)T. |
| 12.2(13)T | The **dial-on-demand** keyword was added to allow the configuration of DDR interesting traffic control list functionality. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.4(24)T | This command was integrated into Cisco IOS Release 12.4(24)T and PPPoE client functionality was modified to support multiple clients on a single ATM PVC. |

## Usage Guidelines

One PVC supports multiple PPPoE clients, enabling second line connection and redundancy. Use the **pppoe-client dial-pool-number** command to configure one or more concurrent client PPPoE sessions on a single ATM PVC.

Use this command to configure DDR interesting traffic control list functionality of the dialer interface with a PPPoE client. When the DDR functionality is configured for this command, the following DDR commands must also be configured: **dialer-group**, **dialer hold-queue**, **dialer idle-timeout**, and **dialer-list**.

#### Tips for Configuring the Dialer Interface

If you are configuring a hard-coded IP address under the dialer interface, you can configure a default IP route using the **ip route** command as follows:

```
ip route 0.0.0.0 0.0.0.0 dialer1
```

But if you are configuring a negotiated IP address using the **ip address negotiated** command under the dialer interface, you must configure a default IP route using the **ip route** command as follows:

```
ip route 0.0.0.0 0.0.0.0 dialer1 permanent
```

The reason is that the dialer interface will lose its IP address when a PPPoE session is brought down (even if the dialer does not go down), and hence the route removal routine will take effect and remove all IP routes pointed at the dialer interface, even the default IP route. Although the default IP route will be added back about one minute later by IP background processes, you may risk losing incoming packets during the interval.

## Examples

The following example shows how to configure multiple PPPoE clients on a single ATM PVC:

```
Router(config)# interface ATM0
Router(config)# no ip address
Router(config)# no ip mroute-cache
Router(config)# no atm ilmi-keepalive
Router(config)# pvc 4/20
Router(config)# pppoe-client dial-pool-number 1
Router(config)# pppoe-client dial-pool-number 2
```

The following examples show how to configure restart time:

```
Router(config)# pppoe-client dial-pool-number 8 restart 80 service-name "test 4"
Router(config)# pppoe-client dial-pool-number 2 dial-on-demand restart 10
```

#### PPPoE Client DDR Idle Timer on an Ethernet Interface

The following example shows how to configure the PPPoE client DDR idle timer on an Ethernet interface and includes the required DDR commands:

```
!
Router(config)# vpdn enable
Router(config)# no vpdn logging
!
Router(config)# vpdn-group 1
Router(config)# request-dialin
Router(config)# protocol pppoe
!
Router(config)# interface Ethernet1
Router(config-if)# pppoe enable
Router(config-if)# pppoe-client dial-pool-number 1 dial-on-demand
!
Router(config)# interface Dialer1
Router(config-if)# ip address negotiated
Router(config-if)# ip mtu 1492
Router(config-if)# encapsulation ppp
Router(config-if)# dialer pool 1
Router(config-if)# dialer idle-timeout 180 either
Router(config-if)# dialer hold-queue 100
```

```
Router(config-if)# dialer-group 1
!
Router(config-if)# dialer-list 1 protocol ip permit
!
ip route 0.0.0.0 0.0.0.0 Dialer1
```

### PPPoE Client DDR Idle Timer on an ATM PVC

The following example shows how to configure the PPPoE client DDR idle timer on an ATM PVC interface and includes the required DDR commands:

```
!
Router(config)# vpdn enable
Router(config)# no vpdn logging
!
Router(config)# vpdn-group 1
Router(config)# request-dialin
Router(config)# protocol pppoe
!
Router(config)# interface ATM2/0
Router(config-if)# pvc 2/100
Router(config-if)# pppoe-client dial-pool-number 1 dial-on-demand
!
Router(config-if)# interface Dialer1
Router(config-if)# ip address negotiated
Router(config-if)# ip mtu 1492
Router(config-if)# encapsulation ppp
Router(config-if)# dialer pool 1
Router(config-if)# dialer idle-timeout 180 either
Router(config-if)# dialer hold-queue 100
Router(config-if)# dialer-group 1
!
Router(config-if)# dialer-list 1 protocol ip permit
!
ip route 0.0.0.0 0.0.0.0 Dialer1
```

## Related Commands

| Command | Description |
|---|---|
| **debug ppp negotiation** | Displays LCP and NCP session neotiations. |
| **debug vpdn pppoe-data** | Displays PPPoE session data packets. |
| **debug vpdn pppoe-errors** | Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be terminated. |
| **debug vpdn pppoe-events** | Displays PPPoE protocol messages about events that are part of normal session establishment or shutdown. |
| **debug vpdn pppoe-packets** | Displays each PPPoE protocol packet exchanged. |
| **dialer-group** | Controls access by configuring a virtual access interface to belong to a specific dialing group. |
| **dialer hold-queue** | Allows interesting outgoing packets to be queued until a modem connection is established. |
| **dialer idle-timeout** | Specifies the idle time before the line is disconnected. |
| **dialer-list** | Defines a DDR dialer list to control dialing by protocol or by a combination of protocol and an access list. |
| **ip address negotiated** | Specifies the IP address for a particular interface that is obtained via PPP/IPCP address negotiation. |

| Command | Description |
|---|---|
| **ip route** | Allows static routes to be established. |
| **show pppoe session** | Displays information about currently active PPPoE sessions. |

# ppp ip address-save aaa-acct-vsa

To enable the IPv4 address conservation, use the **ppp ip address-save aaa-acct-vsa** command in global configuration mode. To disable IPv4 address conservation, use the **no** form of this command.

**ppp ip address-save aaa-acct-vsa** *vsa-string*

**no no ppp ip address-save**

## Syntax Description

| | |
|---|---|
| *vsa-string* | Value of the vendor-specific attribute (VSA) that is sent to the RADIUS server whenever an IPv4 address is allocated to a customer premises equipment (CPE) device or whenever an IPv4 address is released by a CPE device. This value can be up to 32 characters. |

## Command Default

IPv4 address conservation is disabled.

## Command Modes

Global configuration (config)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 3.5S | This command was introduced. |

## Usage Guidelines

Use this command to conserve IPv4 addresses when a service provider in a dual-stack environment has a limited pool of IPv4 addresses to allocate to subscribers. The *vsa-string* argument value is sent to the RADIUS server whenever an IPv4 address is allocated to a CPE device or whenever an IPv4 address is released by a CPE device.

## Examples

The following example shows how to configure IPv4 address conservation:

```
Router(config)# ppp ip address-save aaa-acct-vsa enable
```

# ppp ipv6cp address unique

To verify if the IPv6 prefix delegation is unique using a PP-enabled interface, and to disconnect the session if the peer IPv6 prefix is duplicated, use the **ppp ipv6cp address unique** command in interface configuration mode. To disable the configuration, use the **no** form of this command.

**ppp ipv6cp address unique**

**no ppp ipv6cp address unique**

## Syntax Description

This command has no arguments or keywords.

## Command Default

Verification of the uniqueness of the IPv6 prefix delegation is not configured.

## Command Modes

Interface configuration (config-if)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 3.2S | This command was introduced. |

## Examples

The following example shows how to verify whether the IPv6 prefix delegation is unique using a PPP-enabled interface, and to disconnect the session if the peer IPv6 prefix is duplicated:

```
Router> enable
Router# configure terminal
Router(config)# interface virtual-template 5
Router(config-if)# ppp ipv6cp address unique
```

# ppp lcp echo mru verify

To verify the negotiated maximum receive unit (MRU) and adjust the PPP virtual access interface maximum transmission unit (MTU), use the **ppp lcp echo mru verify** command in BBA group configuration mode. To disable the effect of the minimum value, use the **no** form of this command.

**ppp lcp echo mru verify** [**minimum** *value*]

**no ppp lcp echo mru verify** [**minimum** *value*]

## Syntax Description

| | |
|---|---|
| **minimum** | (Optional) Indicates that the value specified is a minimum. If a minimum value is specified, the echo request of that size is sent out on the Link Control Protocol (LCP) connection. |
| *value* | (Optional) The value can be any integer from 64 to 1500. |

## Command Default

Timeout on verification requests is the same as the PPP LCP finite state machine (FSM) value.

## Command Modes

BBA group configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(31)SB2 | This command was introduced. |

## Usage Guidelines

This command is entered under the virtual-template interface as a troubleshooting aid to verify the value for the negotiated MRU and to adjust the PPP virtual access interface MTU. The timeout on those verification echo requests would be the same as the PPP LCP FSM timeout. The failure of two such echo requests would be construed as the network not supporting that specific MTU. If a minimum value is configured, echo requests of that alternate size are sent out on the LCP connection. If the minimum value is not configured, or if minimum echo requests also fail, then the PPP session is brought down.

If the verification of minimum MTU succeeds, the PPP connection's interface MTU is set to that value. This reset is useful when you troubleshoot and need to adjust the sessions according to underlying physical network capability. After this command is configured, IP Control Protocol (IPCP) is delayed until verification of the MTU is completed at the LCP.

## Examples

The following example shows the configuration of two PPPoE profiles:

```
virtual-template 1
 ppp lcp echo mru verify minimum 1200
!
virtual-template 2
 ppp lcp echo mru verify minimum 1200
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Enters BBA group configuration mode and defines a PPPoE profile. |
| **virtual template** | Configures a PPPoE profile with a virtual template to be used for cloning virtual access interfaces. |

# ppp ncp override local

To track attributes received in authorization from RADIUS, verify the permitted Network Control Program (NCP), reject the current NCP negotiation, and override the local dual-stack configuration, use the **ppp ncp override local** command in global configuration mode. To disable the configuration, use the **no** form of this command.

**ppp ncp override local**

**no ppp ncp override local**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The tracking of attributes from RADIUS and the local configuration override are not enabled. The local configuration is used.

## Command Modes

Global configuration (config)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 3.2S | This command was introduced. |

## Usage Guidelines

Framed attributes are primarily used for address allocation. The RADIUS server maintains a pool of both IPv4 address and IPv6 prefixes. If IPv4 address or IPv6 prefix attributes are absent in the access-accept response from RADIUS, the **ppp ncp override local** command can be used to override local configuration.

## Examples

The following example shows how to track attributes received in authorization from RADIUS, verify the permitted NCP, reject the current NCP negotiation, and override the local dual-stack configuration:

```
Router> enable
Router# configure terminal
Router(config)# ppp ncp override local
```

# pppoe enable

To enable PPP over Ethernet (PPPoE) sessions on an Ethernet interface or subinterface, use the **pppoe enable** command in the appropriate configuration mode. To disable PPPoE, use the **no** form of this command.

**pppoe enable** [**group** *group-name*]

**no pppoe enable**

## Syntax Description

| | |
|---|---|
| **group** | (Optional) Specifies that a PPPoE profile will be used by PPPoE sessions on the interface. |
| *group-name* | (Optional) Name of the PPPoE profile to be used by PPPoE sessions on the interface. |

## Defaults

PPPoE is disabled by default.

## Command Modes

Interface configuration
VLAN configuration
VLAN range configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(2)T | This command was introduced. |
| 12.1(5)T | This command was modified to enable PPPoE on IEEE 802.1Q encapsulated VLAN interfaces. |
| 12.2(15)T | The **group** option was added. |
| 12.3(2)T | This command was implemented in VLAN configuration mode and VLAN range configuration mode. |
| 12.3(7)XI3 | This command was integrated into Cisco IOS Release 12.3(7)XI3. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

If a PPPoE profile is not specified by using the **group** option, PPPoE sessions will be established using values from the global PPPoE profile. PPPoE profiles must be configured using the **bba-group pppoe** command.

## Examples

### PPPoE on an Ethernet Interface: Example

The following example enables PPPoE sessions on Ethernet interface 1/0. PPPoE sessions will be established using the PPPoE parameters in the global PPPoE profile.

```
Router(config)# interface ethernet 1/0
Router(config-if)# pppoe enable
!
```

```
Router(config)# bba-group pppoe global
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# sessions max limit 8000
Router(config-bba-group)# sessions per-vc limit 8
Router(config-bba-group)# sessions per-mac limit 2
```

### PPPoE on an 802.1Q VLAN Subinterface: Example

The following example shows how to enable PPPoE on an 802.1Q VLAN subinterface. PPPoE sessions will be established using the PPPoE parameters in PPPoE profile "vpn1".

```
Router(config)# interface ethernet 2/3.1
Router(config-if)# encapsulation dot1Q 1
Router(config-if)# pppoe enable group vpn1
!
Router(config)# bba-group pppoe vpn1
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# sessions per-vc limit 2
Router(config-bba-group)# sessions per-mac limit 1
```

### PPPoE on an 802.1Q VLAN Main Interface: Example

The following example shows how to configure PPPoE over a range of 802.1Q VLANs on Fast Ethernet interface 0/0. The VLAN range is configured on the main interface, and therefore each VLAN will not use up a separate subinterface.

```
Router(config)# interface fastethernet 0/0
Router(config-if)# no ip address
Router(config-if)# no ip mroute-cache
Router(config-if)# duplex half
Router(config-if)# vlan-range dot1q 20 30
Router(config-if-vlan-range)# pppoe enable group PPPOE
Router(config-if-vlan-range)# exit-vlan-config
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **debug pppoe** | Displays debugging information for PPPoE sessions. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions permitted on a router and sets the PPPoE session-count threshold. |
| **sessions per-vlan limit** | Specifies the maximum number of PPPoE sessions under each VLAN. |

# pppoe limit max-sessions

**Note** Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit max-sessions** command is replaced by the **sessions max limit** command. See the **sessions max limit** command for more information.

To specify the maximum number of PPP over Ethernet (PPPoE) sessions that will be permitted on a router, use the **pppoe limit max-sessions** command in VPDN group configuration mode. To remove this specification, use the **no** form of this command.

**pppoe limit max-sessions** *number-of-sessions* [**threshold-sessions** *number-of-sessions*]

**no pppoe limit max-sessions**

## Syntax Description

| | |
|---|---|
| *number-of-sessions* | Maximum number of PPPoE sessions that will be permitted on the router. The range is from 0 to the maximum number of interfaces on the router. |
| **threshold-sessions** | (Optional) Sets the PPPoE session-count threshold at which a Simple Network Management Protocol (SNMP) trap will be generated. |
| *number-of-sessions* | (Optional) Number of PPPoE sessions that will cause an SNMP trap to be generated. The range is from 0 to the maximum number of interfaces on the router. |

## Defaults

The maximum number of sessions is not set.

## Command Modes

VPDN group configuration (config-vpdn)

## Command History

| Release | Modification |
|---|---|
| 12.2(1)DX | This command was introduced. |
| 12.2(2)DD | This command was integrated into Cisco IOS Release 12.2(2)DD. |
| 12.2(4)B | This command was integrated into Cisco IOS Release 12.2(4)B. |
| 12.2(13)T | This command was integrated into Cisco IOS Release 12.2(13)T. |
| 12.2(28)SB | This command was replaced by the **sessions max limit** command. |

## Usage Guidelines

PPPoE session limits configured using the **pppoe limit per-vc**, **pppoe limit per-vlan**, **pppoe max-sessions**, **pppoe max-sessions** (VC), and **pppoe max-sessions** (subinterface) commands take precedence over limits configured for the router using the **pppoe limit max-sessions** command.

## Examples

The following example shows a limit of 100 PPPoE sessions configured for the router:

```
vpdn enable
vpdn-group 1
 accept dialin
```

```
 protocol pppoe
 virtual-template 1
pppoe limit max-sessions 100
```

## Related Commands

| Command | Description |
|---|---|
| **debug vpdn pppoe-errors** | Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be closed. |
| **pppoe limit per-mac** | Specifies the maximum number of PPPoE sessions to be sourced from a MAC address. |
| **pppoe limit per-vc** | Specifies the maximum number of PPPoE sessions permitted on all VCs. |
| **pppoe limit per-vlan** | Specifies the maximum number of PPPoE sessions permitted on a VLAN. |
| **pppoe max-sessions** | Specifies the maximum number of PPPoE sessions permitted on an ATM PVC, PVC range, VC class, or Ethernet subinterface. |

# pppoe limit per-mac

**Note** Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit per-mac** command is replaced by the **sessions per-mac limit** command. See the **sessions per-mac limit** command for more information.

To specify the maximum number of PPP over Ethernet (PPPoE) sessions to be sourced from a MAC address, use the **pppoe limit per-mac** command in VPDN configuration mode.

**pppoe limit per-mac** *number*

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of PPPoE sessions that can be sourced from a MAC address. |

## Defaults

100 sessions

## Command Modes

VPDN configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(1)T | This command was introduced. |
| 12.2(28)SB | This command was replaced by the **sessions per-mac limit** command. |

## Examples

The following example sets a limit of 10 sessions to be sourced from a MAC address:

```
pppoe limit per-mac 10
```

## Related Commands

| Command | Description |
|---|---|
| **pppoe limit per-vc** | Specifies the maximum number of PPPoE sessions to be established over a VC. |
| **pppoe limit per-vlan** | Specifies the maximum number of PPPoE sessions under each VLAN. |

# pppoe limit per-vc

**Note** Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit per-vc** command is replaced by the **sessions per-vc limit** command. See the **sessions per-vc limit** command for more information.

To specify the maximum number of PPP over Ethernet (PPPoE) sessions to be established over a virtual circuit (VC), use the **pppoe limit per-vc** command in VPDN configuration mode.

**pppoe limit per-vc** *number*

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of PPPoE sessions that can be established over an ATM PVC. |

## Defaults

100 sessions

## Command Modes

VPDN configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(1)T | This command was introduced. |
| 12.2(28)SB | This command was replaced by the **sessions per-vc limit** command. |

## Examples

The following example sets a limit of 10 sessions to be established over a VC:

```
pppoe limit per-vc 10
```

## Related Commands

| Command | Description |
|---|---|
| **pppoe limit max-sessions** | Specifies the maximum number of PPPoE sessions to be sourced from a MAC address. |
| **pppoe limit per-vlan** | Specifies the maximum number of PPPoE sessions under each VLAN. |

# pppoe limit per-vlan

**Note** Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit per-vlan** command is replaced by the **sessions per-vlan limit** command. See the **sessions per-vlan limit** command for more information.

To specify the maximum number of PPP over Ethernet (PPPoE) sessions permitted under each virtual LAN (VLAN), use the **pppoe limit per-vlan** command in VPDN configuration mode. To remove this specification, use the **no** form of this command.

**pppoe limit per-vlan** *number*

**no pppoe limit per-vlan**

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of PPP over Ethernet sessions permitted under each VLAN. |

## Defaults

100 PPPoE sessions per VLAN

## Command Modes

VPDN configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(5)T | This command was introduced. |
| 12.2(28)SB | This command was replaced by the **sessions per-vlan limit** command. |

## Usage Guidelines

If the **pppoe max-session** command is configured on a VLAN, that command will take precedence over the **pppoe limit per-vlan** command. The **pppoe limit per-vlan** command applies to all VLANs on which the **pppoe max-session** command has not been configured.

The **pppoe limit per-vlan** command must be configured after the accept dial-in VPDN group has been configured using the **accept-dialin** VPDN configuration command.

## Examples

The following example shows a maximum of 200 PPPoE sessions configured for an 802.1Q VLAN subinterface:

```
interface FastEthernet0/0.10
 encapsulation dot1Q 10
 pppoe enable
!
vpdn enable
vpdn-group 1
 accept dialin
  protocol pppoe
  virtual-template 1
 pppoe limit per-vlan 200
```

## Related Commands

| Command | Description |
|---|---|
| **accept dial-in** | Creates an accept dial-in VPDN subgroup. |
| **debug vpdn pppoe-data** | Displays data packets of PPPoE sessions. |
| **debug vpdn pppoe-error** | Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be closed. |
| **debug vpdn pppoe-events** | Displays PPPoE protocol messages about events that are part of normal session establishment or shutdown. |
| **debug vpdn pppoe-packet** | Displays each PPPoE protocol packet exchanged. |
| **pppoe enable** | Enables PPPoE sessions on an Ethernet interface. |
| **pppoe limit max-sessions** | Specifies the maximum number of PPPoE sessions to be sourced from a MAC address. |
| **pppoe limit per-vc** | Specifies the maximum number of PPPoE sessions to be established over a VC. |
| **pppoe max-sessions** | Specifies the maximum number of PPPoE sessions permitted under a VLAN. |

# pppoe max-sessions

To specify the maximum number of PPP over Ethernet (PPPoE) sessions that will be permitted on an ATM permanent virtual circuit (PVC), PVC range, virtual circuit (VC) class, or Ethernet subinterface, use the **pppoe max-sessions** command in the appropriate mode. To remove this specification, use the **no** form of this command.

**pppoe max-sessions** *number-of-sessions* [**threshold-sessions** *number-of-sessions*]

**no pppoe max-sessions**

## Syntax Description

| | |
|---|---|
| *number-of-sessions* | Maximum number of PPPoE sessions that will be permitted. The PPPoE sessions range depends on the device that you use. The range is 1 to 20000 on a Cisco 7200 series device.<br>**Note** The PPPoE session limit in the case of a PVC range applies to *each* PVC in the range. This limit is not cumulative on *all* PVCs belonging to the range. |
| **threshold-sessions** | (Optional) Sets the PPPoE session-count threshold at which a Simple Network Management Protocol (SNMP) trap will be generated. |
| *number-of-sessions* | (Optional) Number of PPPoE sessions that will cause an SNMP trap to be generated. The PPPoE sessions range depends on the device that you use. The range is 8500 to the maximum number specified for the PPPoE sessions on a Cisco 7200 series device. |

## Command Default

The maximum number of sessions is not set.

## Command Modes

ATM PVC range configuration (config-if-atm-range)
ATM PVC-in-range configuration (config-if-atm-range-pvc)
ATM VC-class configuration (config-vc-class)
Ethernet subinterface configuration (config-if)
Interface-ATM-VC configuration (config-if-atm-vc)

## Command History

| Release | Modification |
|---|---|
| 12.1(5)T | This command was introduced. |
| 12.2(4)T | This command was modified to limit PPPoE sessions on ATM PVCs, PVC ranges, and VC classes. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| 12.2(33)SRC | This command was integrated into Cisco IOS Release 12.2(33)SRC for Ethernet interfaces on the Cisco 7600 SIP-400. |

## Usage Guidelines

PPPoE sessions can be limited in the following ways:

- The **pppoe limit max-sessions** command limits the total number of PPPoE sessions on the router, regardless of the type of medium the sessions are using.

**Note** Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit max-sessions** command is replaced by the **sessions max limit** command. See the **sessions max limit** command for more information.

- The **pppoe limit per-mac** command limits the number of PPPoE sessions that can be sourced from a single MAC address. This limit also applies to all PPPoE sessions on the router.
- The **pppoe limit per-vc** and **pppoe limit per-vlan** commands limit the number of PPPoE sessions on all PVCs or VLANs on the router.
- The **pppoe max-sessions** command limits the number of PPPoE sessions on a specific PVC or VLAN. Limits created for a specific PVC or VLAN using the **pppoe max-session** command take precedence over the global limits created with the **pppoe limit per-vc** and **pppoe limit per-vlan** commands.

PPPoE session limits created on an ATM PVC take precedence over limits created in a VC class or ATM PVC range.

## Examples

### Ethernet Subinterface Example

The following example shows a limit of 200 PPPoE sessions configured for the subinterface:

```
interface FastEthernet 0/0.10
 encapsulation dot1Q 10
 pppoe enable
 pppoe max-sessions 200
```

### ATM PVC Example

The following example shows a limit of 10 PPPoE sessions configured for the PVC:

```
interface ATM1/0.102 multipoint
 pvc 3/304
 encapsulation aal5snap
 protocol pppoe
 pppoe max-sessions 10
```

### VC Class Example

The following example shows a limit of 20 PPPoE sessions that will be permitted per PVC in the VC class called “main”:

```
vc-class atm main
 pppoe max-sessions 20
```

### ATM PVC Range Example

The following example shows a limit of 30 PPPoE sessions that will be permitted per PVC in the PVC range called “range-1”:

```
interface atm 6/0.110 multipoint
 range range-1 pvc 100 4/199
 encapsulation aal5snap
 protocol ppp virtual-template 2
 pppoe max-sessions 30
```

### Individual PVC Within a PVC Range Example

The following example shows a limit of 10 PPPoE sessions configured for “pvc1”, which is part of the ATM PVC range called “range1”:

```
interface atm 6/0.110 multipoint
 range range1 pvc 100 4/199
 pvc-in-range pvc1 3/104
 pppoe max-sessions 10
```

## Related Commands

| Command | Description |
|---|---|
| **debug vpdn pppoe-errors** | Displays PPPoE protocol errors that prevent a session from being established or errors that cause an established session to be closed. |
| **pppoe limit max-sessions** | Specifies the maximum maximum number of PPPoE sessions permitted on a router. |
| **pppoe limit per-mac** | Specifies the maximum number of PPPoE sessions to be sourced from a MAC address. |
| **pppoe limit per-vc** | Specifies the maximum number of PPPoE sessions permitted on all VCs. |
| **pppoe limit per-vlan** | Specifies the maximum number of PPPoE sessions permitted on a VLAN. |
| **sessions max limit** | Specifies the maximum number of PPPoE sessions permitted on a router. |

# pppoe server circuit-id delay

To specify the delay based on the PPP over Ethernet (PPPoE) tag circuit ID client, use the **pppoe server circuit-id delay** command in BBA group configuration mode. To remove the delay, use the **no** form of this command.

**pppoe server circuit-id delay** *milliseconds* **string** [**contains**] *circuit-id-string*

**no pppoe server circuit-id delay** *milliseconds* **string** [**contains**] *circuit-id-string*

## Syntax Description

| | |
|---|---|
| *milliseconds* | Time in milliseconds for PPPoE Active Discovery Offer (PADO) delay. The time range is between 0 to 9999 milliseconds. |
| **string** | Specifies the circuit ID string. |
| **contains** | Specifies the partial string match that contains the remote ID string. |
| *circuit-id-string* | Circuit ID tag sent by Digital Subscriber Line Access Multiplexer (DSLAM) or the client in the PPPoE Active Discovery Initiation (PADI) packet.<br>**Note** The value for the *circuit-id-string* argument can contain spaces when enclosed with double quotation marks (for example, "circuit ATM1/ 0/ 0 VC 0/100"). |

## Command Default

If no PADO delay is defined or matched, the PADO is transmitted without delay.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SB3 | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was integrated into Cisco IOS XE Release 2.4. |
| 15.0(1)M | This command was integrated into Cisco IOS 15.0(1)M. |

## Usage Guidelines

Use the **pppoe server circuit-id delay** command to configure a PADO transmission delay per circuit ID. The PPPoE Smart Server Selection feature allows you to configure a specific PADO delay for a received PADI packet. The PADO delay establishes the order in which the Broadband Remote Access Servers (BRASs) respond to PADIs by delaying their responses to particular PADIs as per the delay time specified.

## Examples

The following example shows how to configure PADO delay based on the circuit ID:

```
Router(config)# bba-group pppoe name1
Router(config-bba-group)# pppoe server circuit-id delay 20 string contains TEST
Router(config-bba-group)# pppoe server circuit-id delay 10 string XTH
Router(config-bba-group)# pppoe server circuit-id delay 30 string contains XTH-TEST
Router(config-bba-group)# pado delay 50
```

Generally, the first match found in the list is considered for the delay value. If the remote ID in the client PPPoE tag contains XTH-TEST, then the delay value is 20. In this case, the first match succeeds and the configuration never reaches a delay of 30. If the remote ID in the client PPPoE tag contains TH-no, then no match is found.

The following example shows how to match the "circuit ATM1/ 0/ 0 VC 0/100" string by using a circuit ID or remote ID delay configured for the PPPoE server:

```
Router(config)# bba-group pppoe server-selection
Router(config-bba-group)# pppoe server circuit-id delay 45 string "circuit ATM1/0/0 VC
0/100"
Router(config-bba-group)# pado delay circuit-id 35
Router(config-bba-group)# pado delay 45
```

The following examples show the PADO delay configurations using circuit ID:

1. If the PADI has a circuit ID and a remote ID tag, and the BBA group on the server does not have a circuit ID or remote ID (matching or non-matching) configured, the value configured via **pado delay** *delay-value* is used.

Server example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#pado delay 3333
Router(config-bba-group)#pado delay circuit-id 1111
```

Client example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#test vendor-tag circuit-id string S
```

2. If the PADI has a circuit ID tag and the BBA group on the server has a circuit ID configured, but they do not match, the value configured via **pado delay circuit-id** *delay-value* is used.

Server example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#pado delay 3333
Router(config-bba-group)#pado delay circuit-id 1111
Router(config-bba-group)#pppoe server circuit-id delay 2222 string Ethernet1/0:T
Router(config-bba-group)#pppoe server circuit-id string contains TT
```

Client example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#test vendor-tag circuit-id string S
```

3. If the BBA group on the server has a matching circuit ID configured (partial or strict), the per-circuit-id delay which is configured using the **delay** argument in the **pppoe server circuit-id delay** *value* string *circuit-id-string* command*:*

Server example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#pado delay 3333
```

```
Router(config-bba-group)#pado delay circuit-id 1111
Router(config-bba-group)#pppoe server circuit-id delay 5555 string Ethernet1/0:S
```

Client example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#test vendor-tag circuit-id string S
```

4. If the BBA group on the server has a matching circuit ID configured (partial or strict), and no delay value is configured for the circuit ID string, the PADO delay value configured with the **pado delay circuit-id** *delay-value* command is used.

Server example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#pado delay 3333
Router(config-bba-group)#pado delay circuit-id 1111
Router(config-bba-group)#pppoe server circuit-id string Ethernet1/0:S
```

Client example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#test vendor-tag circuit-id string S
```

5. If the delay value is configured as zero and "nvgen" is the delay string, the non-volatile generation (NVGEN) process is not executed on the delay string, only if you have not configured the delay while configuring the circuit ID.
6. If you configure both the partial and strict match strings for a circuit ID, the preference depends on the order in which they are encountered:

Server example:

```
Router(config)#bba-group pppoe 1
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#vendor-tag remote-id service
Router(config-bba-group)#pado delay 3333
Router(config-bba-group)#pado delay circuit-id 1111
Router(config-bba-group)#pppoe server circuit-id delay 2222 string contains S
Router(config-bba-group)#pppoe server circuit-id delay 4444 string Ethernet1/0:S
```

Client example:

```
Router(config)#bba-group pppoe global
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#test vendor-tag circuit-id string S
```

7. In the case of remote ID configurations, the behavior is the same as described earlier for circuit IDs. If both the remote ID and circuit ID are configured, preference is given to the circuit ID configuration.
8. If the PADO delay is found to be the maximum allowed value (9999 msec), the PADI is discarded as shown in the example:

```
Router(config)#bba-group pppoe 1
Router(config-bba-group)#virtual-template 1
Router(config-bba-group)#vendor-tag circuit-id service
Router(config-bba-group)#vendor-tag remote-id service
Router(config-bba-group)#pado delay 3333
Router(config-bba-group)#pado delay circuit-id 1111
Router(config-bba-group)#pppoe server circuit-id delay 9999 string contains S
```

```
Router(config)#end
Router#show debug
PPPoE:
  PPPoE protocol events debugging is on
  PPPoE protocol errors debugging is on
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **pado delay** | Establishes the order in which the BRASs respond to PADIs by delaying their responses to particular PADIs as per the delay time specified. |
| **pppoe server remote-id delay** | Specifies the delay based on the PPPoE tag remote ID client. |
| **virtual template** | Configures a PPPoE profile with a virtual template to be used for cloning virtual access interfaces. |

# pppoe server remote-id delay

To specify the delay to be applied on the PPP over Ethernet (PPPoE) tag remote ID client, use the **pppoe server remote-id delay** command in BBA group configuration mode. To remove the delay, use the **no** form of this command.

**pppoe server remote-id delay** *milliseconds* **string** [**contains**] *remote-id-string*

**no pppoe server remote-id delay** *milliseconds* **string** [**contains**] *remote-id-string*

## Syntax Description

| | |
|---|---|
| *milliseconds* | Time in milliseconds for the PPPoE Active Discovery Offer (PADO) delay. |
| **string** | Specifies the remote ID string. |
| **contains** | (Optional) Specifies the partial string match that contains the remote ID string. |
| *remote-id-string* | Remote ID tag sent by Digital Subscriber Line Access Multiplexer (DSLAM) or the client in the PPPoE Active Discovery Initiation (PADI) packet.<br>**Note** The value for the *remote-id-string* argument can contain spaces when enclosed with double quotation marks (for example, "subscr mac 1111.2222.3333"). |

## Command Default

If no PADO delay is defined or matched, the PADO is transmitted without delay.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SB3 | This command was introduced. |
| Cisco IOS XE Release 2.4 | This command was integrated into Cisco IOS Release XE 2.4. |

## Usage Guidelines

The PPPoE Smart Server Selection feature allows you to configure a specific PADO delay for a received PADI packet. The PADO delay establishes the order in which the Broadband Remote Access Servers (BRASs) respond to PADIs by delaying their responses to particular PADIs by various times.

Use the **pppoe server remote-id delay** command to configure a PADO transmission delay per remote ID.

## Examples

The following example shows how to configure PADO delay based on the remote ID:

```
Router(config)# bba-group pppoe name1
Router(config-bba-group)# pppoe server remote-id delay 20 string contains TEST
Router(config-bba-group)# pppoe server remote-id delay 10 string XTH
Router(config-bba-group)# pppoe server remote-id delay 30 string contains XTH-TEST
Router(config-bba-group)# pado delay 50
```

Generally, the first match found in the list is considered for the delay value. If the remote ID in the client PPPoE tag contains XTH-TEST, then the delay value is 20. In this case, the first match succeeds and the configuration never reaches a delay of 30. If the remote ID in the client PPPoE tag contains TH-no, then no match is found.

The following example shows how to match the "subscr mac 1111.2222.3333" string by using a remote ID delay configured for PPPoE server:

```
Router(config)# bba-group pppoe server-selection
Router(config-bba-group)# pppoe server remote-id delay 45 string "subscr mac
1111.2222.3333"
Router(config-bba-group)# pado delay remote-id 35
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **pppoe server circuit-id delay** | Specifies the delay based on the PPPoE tag circuit ID client. |

# pppoe service

To add a PPP over Ethernet (PPPoE) service name to a local subscriber profile, use the **pppoe service** command in subscriber profile configuration mode. To remove a PPPoE service name from a subscriber profile, use the **no** form of this command.

**pppoe service** *service-name*

**no pppoe service** *service-name*

## Syntax Description

| | |
|---|---|
| *service-name* | Name of the PPPoE service to be added to the subscriber profile. |

## Command Default

A PPPoE service name is not part of a subscriber profile.

## Command Modes

Subscriber profile configuration (config-sss-profile)#

## Command History

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |
| Cisco IOS XE 2.3.0 | This command was integrated. This command is supported on ASR 1000 series. |

## Usage Guidelines

A subscriber profile contains a list of PPPoE service names. Use the **pppoe service** command to add PPPoE service names to a local subscriber profile.

When you configure PPPoE service selection, you define a RADIUS service profile for each service name, list the service names that you want to advertise in a subscriber profile, and then assign the subscriber profile to a PPPoE profile. The PPPoE server will advertise the service names that are listed in the subscriber profile to each PPPoE client connection that uses the configured PPPoE profile.

## Examples

The following example shows PPPoE service names being added to the subscriber profile called “listA”:

```
!
! Configure the AAA default authorization method
aaa new-model
aaa authorization network default local
!
! Configure the subscriber profile
subscriber profile  listA
 pppoe service isp1
 pppoe service isp2
 pppoe service isp3
!
! Configure the PPPoE profile
bba-group pppoe group1
 virtual-template 1
```

```
 sessions per-vc  5
 service profile listA
!
! Attach the PPPoE profile to a PVC
interface atm1/0.1
 pvc 2/200
 protocol PPPoE group1
!
```

## Related Commands

| Command | Description |
|---|---|
| **clear pppoe derived** | Clears the cached PPPoE configuration of a PPPoE profile and forces the PPPoE profile to reread the configuration from the assigned subscriber profile. |
| **service profile** | Assigns a subscriber profile to a PPPoE profile. |
| **show pppoe derived** | Displays the cached PPPoE configuration that is derived from the subscriber profile for a specified PPPoE profile. |
| **subscriber profile** | Defines Subscriber Service Switch policy for searches of a subscriber profile database. |

# pppoe-sessions threshold

To configure the per-physical interface threshold value of the Cisco ASR 1000 Series Aggregation Services Routers, use the **pppoe-sessions threshold** command in interface configuration mode. To disable the threshold value, use the **no** form of this command.

**pppoe-sessions threshold** *number*

**no pppoe-sessions threshold** *number*

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of permissible PPPoE sessions. Range: 1 to 65535. |

## Command Default

The per-physical interface threshold value is not set.

## Command Modes

Interface configuration (config-if)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 3.2S | This command was introduced. |

## Examples

The following example shows how to configure 90 PPPoE sessions as the per-physical threshold value on the Cisco ASR 1000 Series Router:

```
Router# configure terminal
Router(config)# interface GigabitEthernet 0/0
Router(config-if)# pppoe-sessions threshold 90
```

## Related Commands

| Command | Description |
|---|---|
| **sessions threshold** | Configures the global threshold value of the PPPoE session on the Cisco ASR1000 Series Router. |

# protocol pppoe (ATM VC)

To enable PPP over Ethernet (PPPoE) sessions to be established on permanent virtual circuits (PVCs), use the **protocol pppoe** command in the appropriate configuration mode. To disable PPPoE, use the **no** form of this command.

**protocol pppoe** [**group** *group-name*]

**no protocol pppoe** [**group** *group-name*]

## Syntax Description

| | |
|---|---|
| **group** | (Optional) Specifies a PPPoE profile to be used by PPPoE sessions on the interface. |
| *group-name* | (Optional) Name of the PPPoE profile to be used by PPPoE sessions on the interface. |

## Defaults

PPPoE is not enabled.

## Command Modes

ATM VC configuration
ATM VC class configuration
ATM PVC range configuration
ATM PVC-in-range configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.3(7)XI3 | This command was integrated into Cisco IOS Release 12.3(7)XI3. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

If a PPPoE profile is not specified by using the **group** option, PPPoE sessions will be established using values from the global PPPoE profile. PPPoE profiles must be configured using the **bba-group pppoe** command.

## Examples

The following example shows PPPoE configured in virtual circuit (VC) class “class-pppoe-global” and on the range of PVCs from 100 to 109. PVCs that use VC class “class-pppoe-global” will establish PPPoE sessions using the parameters configured in the global PPPoE profile. PVCs in the PVC range will use PPPoE parameters defined in PPPoE profile “vpn1”.

```
bba-group pppoe global
 virtual-template 1
 sessions max limit 8000
 sessions per-vc limit 8
 sessions per-mac limit 2
!
bba-group pppoe vpn1
 virtual-template 1
```

```
 sessions per-vc limit 2
 sessions per-mac limit 1
!
vc-class atm class-pppoe-global
 protocol pppoe
!
interface ATM1/0.10 multipoint
 range range-pppoe-1 pvc 100 109
  protocol pppoe group vpn1
 !
interface ATM1/0.20 multipoint
 class-int class-pppoe-global
 pvc 0/200
!
 pvc 0/201
 !
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **debug pppoe** | Displays debugging information for PPPoE sessions. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions permitted on a router and sets the PPPoE session-count threshold. |
| **sessions per-mac limit** | Sets the maximum number of PPPoE sessions allowed per MAC address in a PPPoE profile. |
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions to be established over a VC and sets the PPPoE session-count threshold. |

# protocol pppovlan dot1q

To configure an ATM PVC to support PPPoE over a specific IEEE 802.1Q VLAN or range of VLANs, use the **protocol pppovlan dot1q** command in ATM VC configuration or VC class configuration mode. To disable ATM PVC support for PPPoE for a specific IEEE 802.1Q VLAN or a range of VLANs, use the **no** form of this command.

**protocol pppovlan dot1q** {*vlan-id* | *start-vlan-id end-vlan-id*} [**group** *group-name*]

**no protocol pppovlan dot1q** {*vlan-id* | *start-vlan-id end-vlan-id*} [**group** *group-name*]

## Syntax Description

| | |
|---|---|
| *vlan-id* | VLAN identifier. Valid values range from 1 to 4095. |
| *start-vlan-id* | VLAN identifier of the first VLAN in the range. Valid values range from 1 to 4095. |
| *end-vlan-id* | VLAN identifier of the last VLAN in the range. Valid values range from 1 to 4095. |
| **group** | (Optional) Specifies that a PPPoE profile will be used by PPPoE sessions on the interface. |
| *group-name* | (Optional) Name of the PPPoE profile to be used by PPPoE sessions on the interface. |

## Defaults

ATM PVC support for PPPoE over 802.1Q VLAN encapsulation is not enabled.

## Command Modes

ATM VC configuration
VC class configuration

## Command History

| Release | Modification |
|---|---|
| 12.3(2)T | This command was introduced. |

## Usage Guidelines

The **protocol pppovlan dot1q** command enables an ATM PVC to support PPPoE over 802.1Q VLAN traffic that uses bridged RFC 1483 encapsulation.

An ATM PVC will drop 802.1Q traffic that is configured for non-PPPoE VLANs.

PPPoE over 802.1Q VLANs over ATM is supported on the PPPoE server only.

## Examples

The following example shows how to configure an ATM PVC to support PPPoE over a range of 802.1Q VLANs:

```
bba-group pppoe PPPOEOA
 virtual-template 1
 sessions per-mac limit 1

interface virtual-template 1
 ip address 10.10.10.10 255.255.255.0
```

```
 mtu 1492

interface atm 4/0.10 multipoint
 pvc 10/100
  protocol pppovlan dot1q range 10 30 group PPPOEOA
```

## Related Commands

| Command | Description |
|---|---|
| **debug pppoe** | Displays debugging information for PPPoE sessions. |

# provision code

To specify the provision code to be used by the customer premise equipment (CPE), use the **provision code** command in TR-069 Agent configuration mode.

**provision code** *code-string*

**Syntax Description**

| | |
|---|---|
| *code-string* | The provision code. |

**Command Modes**

TR-069 Agent configuration (config-cwmp)

**Command History**

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

**Examples**

The following example shows how to specify the provision code to be used by the CPE:

```
Device(config-cwmp)# provision code ABCD
```

# pvc-in-range

To configure an individual permanent virtual circuit (PVC) within a PVC range, use the **pvc-in-range** command in PVC range configuration mode. To delete the individual PVC configuration, use the **no** form of this command.

**pvc-in-range** [*pvc-name*] [*vpi*/*vci*]

**no pvc-in-range** [*pvc-name*] [*vpi*/*vci*]

## Syntax Description

| | |
|---|---|
| *pvc-name* | (Optional) Name given to the PVC. The PVC name can have a maximum of 15 characters. |
| *vpi*/ | (Optional) ATM network virtual path identifier (VPI) for this PVC. In the absence of the "/" and a *vpi* value, the *vpi* value defaults to 0. The *vpi* value ranges from 0 to 255. |
| *vci* | (Optional) ATM network virtual channel identifier (VCI) for this PVC. The *vci* value ranges from 32 to 2047. |

## Defaults

No default behavior or values

## Command Modes

PVC range configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(5)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

The **pvc-in-range** command defines an individual PVC within a PVC range and enables PVC-in-range configuration mode.

## Examples

In the following example, a PVC called "pppoa" is deactivated. The PVC "pppoa" is an individual PVC within a configured PVC range.

```
pvc-in-range pppoa 0/130
 shutdown
```

## Related Commands

| Command | Description |
|---|---|
| **range pvc** | Defines a range of ATM PVCs. |

# range pvc

To define a range of ATM permanent virtual circuits (PVCs), use the **range pvc** command in subinterface configuration mode. To delete the range of ATM PVCs, use the **no** form of this command.

**range** [*range-name*] **pvc** [*start-vpi*/]*start-vci* [*end-vpi*/]*end-vci*

**no range** [*range-name*] **pvc**

## Syntax Description

| | |
|---|---|
| *range-name* | (Optional) Name of the range. The range name can be a maximum of 15 characters. |
| *start-vpi*/ | (Optional) Beginning value for a range of virtual path identifiers (VPIs). In the absence of the "/" and a *vpi* value, the *vpi* value defaults to 0. The *vpi* value ranges from 0 to 255. |
| *start-vci*/ | Beginning value for a range of virtual channel identifiers (VCIs). The *vci* value ranges from 32 to 65535. |
| *end-vpi*/ | (Optional) End value for a range of virtual path identifiers (VPIs). In the absence of an *end-vpi* value, the *end-vpi* value defaults to the *start-vpi* value. The *vpi* value ranges from 0 to 255. |
| *end-vci* | End value for a range of virtual channel identifiers (VCIs). The *vci* value ranges from 32 to 65535. |

## Defaults

An ATM PVC range is not configured.

## Command Modes

Subinterface configuration

## Command History

| Release | Modification |
|---|---|
| 12.1(5)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

The **range pvc** command defines a range of PVCs and enables PVC range configuration mode.

The number of PVCs in a range can be calculated using the following formula:

number of PVCs = (*end-vpi* – *start-vpi* + 1) x (*end-vci* – *start-vci* +1).

The *start-vpi* argument may be omitted if it is zero. The *end-vpi* argument may be omitted, but if it is omitted, it is assigned the value of *start-vpi*. The *end-vpi* and *end-vci* arguments are always greater than or equal to *start-vpi* and *start-vci* respectively.

When applied to multipoint subinterfaces, the **range pvc** command creates a range of ATM PVCs. When applied to point-to-point subinterfaces, the **range pvc** command creates range of PVCs and a corresponding range of point-to-point subinterfaces.

For point-to-point subinterfaces, subinterface numbering begins with the subinterface on which the PVC range is configured and increases sequentially through the range.

## Examples

### ATM PVC Range Example

In the following example, 100 PVCs with VCI values from 100 to 199 for each VPI value from 0 to 4 are created for a PVC range called “range-pppoa-1”. This configuration creates a total of 500 PVCs in the range. PVC parameters are then configured for the range.

```
interface atm 6/0.110 multipoint
 range range-pppoa-1 pvc 100 4/199
  class-range class-pppoa-1
  ubr 1000
  encapsulation aal5snap
  protocol ppp virtual-Template 2
```

### Subinterface Grouping by PVC Range for Routed Bridge Encapsulation Example

In the following example, a PVC range called “range1” is created with a total of 100 PVCs in the range. A point-to-point subinterface will be created for each PVC in the range. ATM routed bridge encapsulation is also configured.

```
interface atm 6/0.200 point-to-point
 ip unnumbered loopback 1
 atm route-bridged ip
 range range1 pvc 1/200 1/299
  # end
```

## Related Commands

| Command | Description |
|---|---|
| **pvc-in-range** | Configures an individual PVC within a PVC range. |

# rbe nasip

To specify the IP address of an interface on the Dynamic Host Configuration Protocol (DHCP) relay agent that will be sent to the DHCP server via the agent remote ID option, use the **rbe nasip** command in global configuration mode. To remove this specification, use the **no** form of this command.

**rbe nasip** *source-interface*

**no rbe nasip** *source-interface*

## Syntax Description

| | |
|---|---|
| *source-interface* | The type and number of one of the interfaces on the router. The IP address for this interface will be forwarded in the agent remote ID option and can be used by the DHCP server to uniquely identify the DHCP relay agent. |

## Defaults

No IP address is specified.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(2)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into 12.2(28)SB. |

## Usage Guidelines

The **rbe nasip** command is used to configure support for the DHCP relay agent information option (option 82) for ATM routed bridge encapsulation (RBE).

Support for the DHCP relay agent information option must be configured on the DHCP relay agent using the **ip dhcp relay information option** command in order for the **rbe nasip** command to be effective.

## Examples

In the following example, support for DHCP option 82 is enabled on the DHCP relay agent by the use of the **ip dhcp relay agent information option** command. The **rbe nasip** command configures the router to forward the IP address for Loopback0 to the DHCP server. ATM routed bridge encapsulation is configured on ATM subinterface 4/0.1.

```
ip dhcp-server 10.1.1.1
!
ip dhcp relay information option
!
interface Loopback0
 ip address 10.5.1.1 255.255.255.0
!
interface ATM4/0
 no ip address
!
interface ATM4/0.1 point-to-point
 ip unnumbered Loopback0
 ip helper-address 10.1.1.1
```

```
 atm route-bridged ip
 pvc 88/800
  encapsulation aal5snap
!
router eigrp 100
 network 10.0.0.0
!
rbe nasip loopback0
```

## Related Commands

| Command | Description |
|---|---|
| **ip dhcp relay information option** | Enables the system to insert the DHCP relay agent information option in forwarded BOOT REQUEST messages to a Cisco IOS DHCP server. |

# 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 or VPDN template 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. |

## Command Default

No PPPoE BBA group is configured to respond to PAD messages.

## Command Modes

VPDN group configuration
VPDN template configuration

## Command History

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

On the router that responds to relayed PAD messages, this command configures a PPPoE group and attaches it to a virtual private dialup network (VPDN) group or VPDN template 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 tunnel 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 l2tp
.
.
.
 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
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **vpdn-group** | Creates a VPDN group and enters VPDN group configuration mode. |
| **vpdn-template** | Creates a VPDN template and enters VPDN template configuration mode. |

# request outstanding

To set the count for the number of requests that can be sent by the customer premise equipment (CPE) to the auto-configuration server (ACS) without receiving an acknowledgement, use the **request outstanding** command in TR-069 Agent configuration mode.

**request outstanding** *request-count*

## Syntax Description

| | |
|---|---|
| *request-count* | The count for the number of requests. The range for the request count is 0 to 10. The default value is 5. |

## Command Default

The count is set to 5.

## Command Modes

TR-069 Agent configuration (config-cwmp)

## Command History

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

## Examples

The following example shows how to set the count to 6 for the number of requests that can be sent by the CPE to the ACS without receiving an acknowledgement:

```
Device(config-cwmp)# request outstanding 6
```

# rx-speed

To configure the required speed on the ATM virtual circuit (VC) carrying the PPPoX session, and to transfer this information into attribute-value (AV) pair 38 from the Layer 2 Tunnel Protocol (L2TP) Access Concentrator (LAC) to the L2TP network server (LNS) for asymmetric digital subscriber line (DSL) sessions, use the **rx-speed** command in PVC class, PVC-in-range, or PVC range configuration mode. To reset the variable to have the same value as that passed in AVP 24, use the **no** form of this command.

**rx-speed** *incoming-cell-rate*

**no rx-speed**

## Syntax Description

| | |
|---|---|
| *incoming-cell-rate* | Incoming cell rate for L2TP AVP 38, in kb/s. |

## Command Default

The same value as that passed in AVP 24.

## Command Modes

PVC-class (config-if-atm-vc)
PVC-in-range (cfg-if-atm-range-pvc)
PVC range (config-if-atm-range)

## Command History

| Release | Modification |
|---|---|
| 12.3(11)T | This command was introduced. |
| 12.2(33)SRE | This command was modified. It was integrated into Cisco IOS Release 12.2(33)SRE. |

## Usage Guidelines

To allow L2TP to send AVP 38 with the required value from LAC to LNS for DSL services, use the **rx-speed** command in PVC, PVC-in-range, or PVC range configuration mode.

The configured speed is transported to the LNS, which validates the session within AVP 24 and AVP 38.

## Examples

The following examples show how L2TP sends AVP 38 with the required value to the LNS in PVC-class, PVC range, and PVC-in-range configuration modes:

### PVC-class

```
Router(config)# interface atm 6/0.110 multipoint
Router(config-subif)# pvc 0/600
Router(config-if-atm-vc)# rx-speed 128
Router(config-if-atm-vc)# encapsulation aal5snap
Router(config-if-atm-vc)# exit
```

### PVC-in-Range

```
Router(config)# interface atm 6/0.110 multipoint
Router(config-subif)# range range1 pvc 100 4/199
Router(config-if-atm-range)# pvc-in-range 0/300 45/54
Router(cfg-if-atm-range-pvc)# rx-speed 200
Router(cfg-if-atm-range-pvc)# shutdown
```

### PVC Range

```
Router(config)# interface atm 6/0.110 multipoint
Router(config-subif)# range range-pppoa-1 pvc 100 4/199
Router(config-if-atm-range)# rx-speed 400
Router(config-if-atm-range)# exit
```

## Related Commands

| Command | Description |
|---|---|
| **encapsulation** (ATM) | Configures the AAL and encapsulation type for an ATM VC, VC class, VC, bundle, or PVCs. |
| **pvc** | Creates or assigns a name to an ATM PVC, to specify the encapsulation type on an ATM PVC, and to enter ATM VC configuration mode. |
| **pvc-in-range** | Configures an individual PVC within a PVC range. |
| **range pvc** | Defines a range of ATM PVCs. |

# service deny

To deny service for the Subscriber Service Switch (SSS) policy, use the **service deny** command in subscriber profile configuration mode. To remove the configuration, use the **no** form of this command.

**service deny**

**no service deny**

## Syntax Description

This command has no arguments or keywords.

## Defaults

This command is disabled by default.

## Command Modes

Subscriber profile configuration

## Command History

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |

## Usage Guidelines

The **service deny** command denies service to a subscriber for the SSS policy defined with the **subscriber profile** command..

## Examples

The following example denies service to users in the domain cisco.com:

```
!
subscriber profile cisco.com
 service deny
```

## Related Commands

| Command | Description |
|---|---|
| **service local** | Enables local termination service for the SSS policy. |
| **service relay** | Enables relay of PAD messages over an L2TP tunnel. |
| **service vpdn group** | Provides VPDN service for the SSS policy. |
| **subscriber profile** | Defines the SSS policy for searches of a subscriber profile database. |
| **vpdn-group** | Associates a VPDN group to a customer or VPDN profile. |

# service local

To define local termination service for the Subscriber Service Switch (SSS) policy, use the **service local** command in subscriber profile configuration mode. To remove the service, use the **no** form of this command.

**service local**

**no service local**

## Syntax Description

This command has no arguments or keywords.

## Defaults

This command is enabled by default.

## Command Modes

Subscriber profile configuration

## Command History

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |

## Usage Guidelines

The **service local** command is used to configure local termination service for the SSS policy defined with the **subscriber profile** command.

## Examples

The following example provides local termination service to users in the domain cisco.com:

```
!
subscriber profile cisco.com
 service local
```

## Related Commands

| Command | Description |
|---|---|
| **service deny** | Denies service for the SSS policy. |
| **service relay** | Enables relay of PAD messages over an L2TP tunnel. |
| **service vpdn group** | Provides VPDN service for the SSS policy. |
| **subscriber profile** | Defines the SSS policy for searches of a subscriber profile database. |
| **vpdn-group** | Associates a VPDN group to a customer or VPDN profile. |

# service name match

To force the Point to Point Protocol over Ethernet (PPPoE) server to match the service name received in the PPPoE Active Discovery Initiation (PADI) message, use the **service name match** command in BBA group configuration mode. To disable the configuration, use the **no** form of this command.

**service name match**

**no service name match**

## Syntax Description

This command has no arguments or keywords.

## Command Default

No services are configured.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SB | This command was introduced. |

## Usage Guidelines

This command forces the PPPoE server to match the service-name received in the PADI message from the PPPoE client, to one of the PPPoE service names in the policy map type service list with its name configured as service profile before it responds. When a match is found, a Point Protocol over Ethernet Active Discovery Offer (PADO) message is returned to the PPPoE client in response to the PADI message received.

## Examples

The following example illustrates service name match configuration:

```
Router(config)# bba-group pppoe name1
Router(config-bba-group)# service profile list1
Router(config-bba-group)# service name match
Router(config-bba-group)# policy-map type service list1
Router(config-bba-group)# pppoe service name
Router(config-bba-group)# pppoe service name1
```

The following example illustrates how the PPPoE service profile is configured. The service name match requires the requested service to match either service-1 or another-service:

```
Router(config)# bba-group pppoe name1
Router(config-bba-group)# service profile list1
Router(config-bba-group)# service name match
Router(config-bba-group)# policy-map type service list1
Router(config-bba-group)# pppoe service service-1
Router(config-bba-group)# pppoe service another-service
```

**Related Commands**

| Command | Description |
|---|---|
| **pppoe service** | Adds a PPPoE service name to a local subscriber profile. |
| **bba-group pppoe** | Creates a PPPoE profile |
| **policy-map type service** | Creates or modifies a service policy map, which is used to define an ISG subscriber service. |

# service netflow timeout

To configure NetFlow PXF timers for active and inactive flow entries in the Cisco IOS NetFlow cache on the Cisco 10000 series router, use the **service netflow timeout** command in global configuration mode.

**service netflow timeout** [**active** | **inactive**] *value*

## Syntax Description

| | |
|---|---|
| **active** | Specifies the NetFlow PXF timeout for active flow entries. |
| **inactive** | Specifies the NetFlow PXF timeout for inactive flow entries. |
| *value* | Specifies the NetFlow PXF timeout, in seconds. Range is from 0 to 4292967295. |

## Defaults

No default behavior or values

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(28)SB2 | This command was introduced in Cisco IOS Release 12.2(28)SB2 and implemented on the Cisco 10000 series router. |

## Usage Guidelines

This command is not supported for customer use without Cisco Technical Assistance Center (TAC) authorization.

If you configure the timers, the router does not retain your settings on PXF or Performance Routing Engine (PRE) reloads. On PXF and PRE reloads, the active timeout reverts to 60 seconds and the inactive timeout to 15 seconds.

We recommend that the active timeout value be larger than the inactive timeout value. Also, we recommend that you do not configure the inactive timeout lower than 15 seconds to prevent the sending of excessive flow records from the PXF to the Route Processor (RP).

The s**ervice internal** command is required to configure the NetFlow PXF timers.

## Examples

The following example shows how to set the NetFlow PXF active timeout to 90 seconds:

```
Router> enable
Router# configure terminal
Router(config)# service internal
Router(config)# service netflow timeout active 90
Router(config)# end
```

**Related Commands**

| Command | Description |
|---|---|
| **show ip cache flow** | Displays a summary of NetFlow accounting statistics. |

# service profile

To assign a subscriber profile to a PPP over Ethernet (PPPoE) profile, use the **service profile** command in BBA group configuration mode. To remove a subscriber profile assignment from a PPPoE profile, use the **no** form of this command.

**service profile** *subscriber-profile-name* [**refresh** *minutes*]

**no service profile** *subscriber-profile-name* [**refresh** *minutes*]

## Syntax Description

| | |
|---|---|
| *subscriber-profile-name* | Name of the subscriber profile to be assigned to a PPPoE profile. |
| **refresh** | (Optional) Causes the cached PPPoE configuration to be timed out and reread from the subscriber profile. |
| *minutes* | Number of minutes after which the cached PPPoE configuration will be timed out. The range is from 2 to 44640 minutes. There is no default. |

## Command Default

A subscriber profile is not assigned to a PPPoE profile.

## Command Modes

BBA group configuration (config-bba-group)#

## Command History

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |
| Cisco IOS XE 2.3.0 | This command was integrated. This command is supported on ASR 1000 series. |

## Usage Guidelines

A subscriber profile contains a list of PPPoE service names. Use the **service profile** command to assign a subscriber profile to a PPPoE profile. The PPPoE server will advertise the service names that are listed in the subscriber profile to each PPPoE client connection that uses the configured PPPoE profile.

A subscriber profile can be configured locally on the router or remotely on a AAA server. The PPPoE configuration that is derived from a subscriber profile is cached locally under the PPPoE profile. Use the **service profile** command with the **refresh** keyword and the *minutes* argument to cause the cached PPPoE configuration to be timed out after a specified number of minutes. When the cached PPPoE configuration is timed out, the PPPoE profile rereads the configuration in the subscriber profile.

## Examples

The following example shows how to assign a subscriber profile called “customer_tunnels” to a PPPoE profile called “group_A”:

```
!
! Configure the AAA default authorization method
aaa new-model
aaa authorization network default group radius
!
! Configure the PPPoE profile
bba-group pppoe group_A
```

```
 virtual-template 1
 sessions per-vc  5
 service profile customer_tunnels
!
! Attach the PPPoE profile to PVCs
interface atm1/0.1
 pvc 2/200
  protocol PPPoE group pppoe_group_A
!
interface atm1/0.2
 pvc 3/300
  protocol PPPoE group pppoe_group_A
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **clear pppoe derived** | Clears the cached PPPoE configuration of a PPPoE profile and forces the PPPoE profile to reread the configuration from the assigned subscriber profile. |
| **service profile** | Assigns a subscriber profile to a PPPoE profile. |
| **show pppoe derived** | Displays the cached PPPoE configuration that is derived from the subscriber profile for a specified PPPoE profile. |
| **subscriber profile** | Defines Subscriber Service Switch policy for searches of a subscriber profile database. |

# 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** *vpdn-group-name* | 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

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## 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

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **service** | Configures the type of service that will be granted to a subscriber. |

| Command | Description |
|---|---|
| **service profile** | Assigns a subscriber profile to a PPPoE profile. |
| **subscriber profile** | Defines the SSS policy for searches of a subscriber profile database. |

# sessions threshold

To configure the global threshold value of PPP over Ethernet (PPPoE) sessions on the Cisco ASR 1000 Series Aggregation Services Router, use the **sessions threshold** command in BBA group configuration mode. To disable the global threshold value, use the **no** form of this command.

**sessions threshold** *number*

**no sessions threshold** *number*

## Syntax Description

| | |
|---|---|
| *number* | Maximum number of permissible PPPoE sessions. Range: 1 to 65535. |

## Command Default

The global threshold value is not set.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| Cisco IOS XE Release 3.2S | This command was introduced. |

## Examples

The following example shows how to configure 1000 PPPoE sessions as the global threshold value on the Cisco ASR 1000 router:

```
Router# configure terminal
Router(config)# bba-group pppoe global
Router(config-bba-group)# sessions threshold 1000
```

## Related Commands

| Command | Description |
|---|---|
| **pppoe-sessions threshold** | Configures the per-physical interface threshold value of the ASR1000 router. |

# service vpdn group

To provide virtual private dialup network (VPDN) service for the Subscriber Service Switch policy, use the **service vpdn group** command in subscriber profile configuration mode. To remove VPDN service, use the **no** form of this command.

**service vpdn group** *vpdn-group-name*

**no service vpdn group** *vpdn-group-name*

## Syntax Description

| | |
|---|---|
| *vpdn-group-name* | Provides the 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

| Release | Modification |
|---|---|
| 12.3(4)T | This command was introduced. |

## Usage Guidelines

The **service vpdn group** command provides VPDN service by obtaining the configuration from a predefined VPDN group for the SSS policy defined with the **subscriber profile** command.

## Examples

The following example provides VPDN service to users in the domain cisco.com, and uses VPDN group 1 to obtain VPDN configuration information:

```
!
subscriber profile cisco.com
 service vpdn group 1
```

The following example provides VPDN service to dialed number identification service (DNIS) 1234567, and uses VPDN group 1 to obtain VPDN configuration information:

```
!
subscriber profile dnis:1234567
 service vpdn group 1
```

The following example provides VPDN service using a remote tunnel (used on the multihop node), and uses VPDN group 1 to obtain VPDN configuration information:

```
!
subscriber profile host:lac
 service vpdn group 1
```

**Related Commands**

| Command | Description |
|---|---|
| **service deny** | Denies service for the SSS policy. |
| **service local** | Enables local termination service for the SSS policy. |
| **service relay** | Enables relay of PAD messages over an L2TP tunnel. |
| **subscriber profile** | Defines the SSS policy for searches of a subscriber profile database. |
| **vpdn-group** | Associates a VPDN group to a customer or VPDN profile. |

# sessions max limit

To configure the PPP over Ethernet (PPPoE) global profile with the maximum number of PPPoE sessions that will be permitted on a router and to set the PPPoE session-count threshold at which a Simple Network Management Protocol (SNMP) trap will be generated, use the **sessions max limit** command in BBA group configuration mode. To remove these settings, use the **no** form of this command.

**sessions max limit** *number-of-sessions* [**threshold** *number-of-sessions*]

**no sessions max limit** *number-of-sessions* [**threshold** *number-of-sessions*]

## Syntax Description

| | |
|---|---|
| *number-of-sessions* | Maximum number of PPPoE sessions that will be permitted on the router. The range is from 0 to the total number of interfaces on the router. |
| **threshold** | (Optional) Sets the PPPoE session-count threshold at which an SNMP trap will be generated. |
| *number-of-sessions* | (Optional) Number of PPPoE sessions that will cause an SNMP trap to be generated. The range is from 0 to the total number of interfaces on the router. |

## Command Default

There is no default number ofsessions.
The default threshold value is the configured number of sessions.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.3(7)XI3 | This command was integrated into Cisco IOS Release 12.3(7)XI3. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

This command can be used only in a global PPPoE profile.

The **snmp-server enable traps pppoe** command must be configured in order for SNMP traps to be generated when the PPPoE session-count threshold is reached.

## Examples

The following example shows the global PPPoE profile configured with a maximum PPPoE session limit of 8000 sessions. The PPPoE session-count threshold is set at 7000 sessions, so when the number of PPPoE sessions on the router reaches 7000, an SNMP trap will be generated.

```
bba-group pppoe global
 virtual-template 1
 sessions max limit 8000 threshold 7000
 sessions per-vc limit 8
 sessions per-mac limit 2
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **sessions per-mac limit** | Sets the maximum number of PPPoE sessions allowed per MAC address in a PPPoE profile. |
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions permitted over a VC and sets the PPPoE session-count threshold. |
| **sessions per-vlan limit** | Sets the maximum number of PPPoE sessions per VLAN in a PPPoE profile. |
| **snmp-server enable traps pppoe** | Enables PPPoE session-count SNMP notifications. |

# sessions per-mac iwf limit

To set the maximum number of Interworking Functionality (IWF) sessions allowed per MAC address in a PPP over Ethernet (PPPoE) profile, use the **sessions per-mac iwf limit** command in BBA group configuration mode. To remove this setting, use the **no** form of this command.

**sessions per-mac iwf limit** *per-mac-limit*

**no sessions per-mac iwf limit** *per-mac-limit*

## Syntax Description

| | |
|---|---|
| *per-mac-limit* | Maximum number of PPPoE sessions that can be sourced from a MAC address. |

## Command Default

The normal MAC address session limit (default is 100 sessions) is applied to IWF sessions.

## Command Modes

BBA group configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(31)SB2 | This command was introduced. |

## Usage Guidelines

Use the **sessions per-mac iwf limit** command to configure a PPPoE profile with the maximum number of IWF-specific sessions allowed per MAC address.

You cannot configure PPPoE session limits in PPPoE profiles and in virtual private dialup network (VPDN) groups simultaneously. You also cannot configure session limits in PPPoE profiles and directly on PPPoE ports (Ethernet interface, VLAN, or permanent virtual circuit [PVC]) simultaneously.

## Examples

The following example shows a limit of two PPPoE sessions per MAC address configured in the global PPPoE profile:

```
bba-group pppoe global
 virtual-template 1
 sessions max limit 8000 threshold-sessions 7000
 sessions per-vc limit 8
 sessions per-mac iwf limit 2
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Enters BBA group configuration mode and creates a PPPoE profile. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions that will be permitted on a router and sets the PPPoE session-count threshold. |

| Command | Description |
|---|---|
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions to be established over a VC in a PPPoE profile and sets the PPPoE session-count threshold. |
| **sessions per-vlan limit** | Sets the maximum number of PPPoE sessions per VLAN in a PPPoE profile. |

# sessions per-mac limit

To set the maximum number of PPP over Ethernet (PPPoE) sessions allowed per MAC address in a PPPoE profile, use the **sessions per-mac limit** command in BBA group configuration mode. To remove this setting, use the **no** form of this command.

**sessions per-mac limit** *per-mac-limit*

**no sessions per-mac limit** *per-mac-limit*

## Syntax Description

| | |
|---|---|
| *per-mac-limit* | Maximum number of PPPoE sessions that can be sourced from a MAC address. The default is 100 sessions. |

## Defaults

100 sessions

## Command Modes

BBA group configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.3(7)XI3 | This command was integrated into Cisco IOS Release 12.3(7)XI3. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

Use the **sessions per-mac limit** command to configure a PPPoE profile with the maximum number of PPPoE sessions that will be allowed per MAC address.

You cannot configure PPPoE session limits in PPPoE profiles and in VPDN groups simultaneously. You also cannot configure session limits in PPPoE profiles and directly on PPPoE ports (Ethernet interface, VLAN, or permanent virtual circuit (PVC)) simultaneously.

## Examples

The following example show a limit of two PPPoE sessions per MAC address configured in the global PPPoE profile:

```
bba-group pppoe global
 virtual-template 1
 sessions max limit 8000 threshold-sessions 7000
 sessions per-vc limit 8
 sessions per-mac limit 2
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions that will be permitted on a router and sets the PPPoE session-count threshold. |
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions to be established over a VC in a PPPoE profile and sets the PPPoE session-count threshold. |
| **sessions per-vlan limit** | Sets the maximum number of PPPoE sessions per VLAN in a PPPoE profile. |

# sessions per-vc limit

To set the maximum number of PPP over Ethernet (PPPoE) sessions to be established over a virtual circuit (VC) in a PPPoE profile and to set the PPPoE session-count threshold at which a Simple Network Management Protocol (SNMP) trap will be generated, use the **sessions per-vc limit** command in BBA group configuration mode. To remove this specification, use the **no** form of this command.

**sessions per-vc limit** *per-vc-limit* [**threshold** *threshold-value*]

**no sessions per-vc limit** *per-vc-limit* [**threshold** *threshold-value*]

## Syntax Description

| | |
|---|---|
| *per-vc-limit* | Maximum number of PPPoE sessions that can be established over an ATM PVC. The default is 100. |
| **threshold** | (Optional) Sets the PPPoE session-count threshold at which an SNMP trap will be generated. |
| *threshold-value* | (Optional) Number of PPPoE sessions that will cause an SNMP trap to be generated. |

## Defaults

Sessions: 100
The default *threshold-value* is the *per-vc-limit*.

## Command Modes

BBA group configuration

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.3(7)XI3 | This command was integrated into Cisco IOS Release 12.3(7)XI3. |
| 12.2(28)SB | This command was integrated into Cisco IOS Release 12.2(28)SB. |

## Usage Guidelines

Use the **sessions per-vc limit** command to configure a PPPoE profile with the maximum number of PPPoE sessions that will be allowed per VC.

You cannot configure session limits in PPPoE profiles and directly on permanent virtual circuits (PVCs) simultaneously.

The **snmp-server enable traps pppoe** command must be configured in order for SNMP traps to be generated when the PPPoE session-count threshold is reached.

## Examples

The following example shows a limit of eight PPPoE sessions per VC configured in the PPPoE profile "vpn1":

```
bba-group pppoe vpn1
 virtual-template 1
 sessions per-vc limit 8
 sessions per-mac limit 2
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions that will be permitted on a router and sets the PPPoE session-count threshold. |
| **sessions per-mac limit** | Sets the maximum number of PPPoE sessions allowed per MAC address in a PPPoE profile. |
| **sessions per-vlan limit** | Sets the maximum number of PPPoE sessions per VLAN in a PPPoE profile. |
| **snmp-server enable traps pppoe** | Enables PPPoE session-count SNMP notifications. |

# sessions per-vlan limit

To specify the maximum number of PPP over Ethernet (PPPoE) sessions permitted per VLAN in a PPPoE profile, use the **sessions per-vlan limit** command in BBA group configuration mode. To remove this specification, use the **no** form of this command.

**sessions per-vlan limit** *per-vlan-limit* **inner** *inner-vlan-limit*

**no sessions per-vlan limit** *per-vlan-limit*

## Syntax Description

| | |
|---|---|
| *per-vlan-limit* | Maximum number of PPPoE sessions permitted under each VLAN, the permitted range between 1 and 65535. |
| **inner** | The inner session limit per QinQ inner Vlan-id. |
| *inner-vlan-limit* | Maximum inner sessions per QinQ inner Vlan-id, the permitted range between 1 and 65535. |

## Command Default

The default number of sessions per QinQ inner Vlan-id is 100.

## Command Modes

BBA group configuration (config-bba-group)#

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.3(7)XI3 | This command was integrated. |
| 12.2(28)SB | This command was integrated. |
| Cisco IOS XE 2.3.0 | This command was integrated. This command is supported on ASR 1000 series. |

## Usage Guidelines

Use the **sessions per-vlan limit** command to configure a PPPoE profile with the maximum number of PPPoE sessions that will be allowed per VLAN.

You cannot configure session limits in PPPoE profiles and directly on VLANs simultaneously.

## Examples

The following example shows a limit of 200 PPPoE sessions per VLAN configured in the PPPoE profile “vpn1”:

```
Router(config)# bba-group pppoe vpn1
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# sessions per-vlan limit 200 inner 100
```

**Related Commands**

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **sessions max limit** | Configures a PPPoE global profile with the maximum number of PPPoE sessions that will be permitted on a router and sets the PPPoE session-count threshold. |
| **sessions per-mac limit** | Sets the maximum number of PPPoE sessions allowed per MAC address in a PPPoE profile. |
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions to be established over a VC in a PPPoE profile and sets the PPPoE session-count threshold. |

# sessions pre-auth limit ignore

To enable the local session limit configured on the BRAS or LAC to override the per-NAS-port session limit downloaded from the RADIUS server when Subscriber Service Switch (SSS) preauthorization is configured, use the **sessions pre-auth limit ignore** command in BBA group configuration mode. To disable the function, use the **no** form of this command.

**sessions pre-auth limit ignore**

**no sessions pre-auth limit ignore**

## Syntax Description

This command has no arguments or keywords.

## Command Default

The session limit downloaded from RADIUS takes precedence over the local limit.

## Command Modes

BBA group configuration mode

## Command History

| Release | Modification |
|---|---|
| 12.4(15)T | This command was introduced. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| Cisco IOS XE Release 2.1 | Ths command was introduced on the Cisco ASR 1000 Series Routers. |

## Usage Guidelines

The **sessions pre-auth limit ignore** command is used to enable the PPPoE Session Limit Local Override feature. This feature is useful only when you have configured SSS preauthorization on the BRAS or LAC. If preauthorization is not enabled, the **sessions pre-auth limit ignore** command has no effect.

When the **subscriber access pppoe pre-authorize nas-port-id** command is enabled (that is, SSS preauthorization on the LAC is enabled), the PPPoE per-NAS-port session limit downloaded from the RADIUS customer profile database overrides any session limit per VC and per VLAN that you have configured locally.

When the **sessions pre-auth limit ignore** command is used and SSS preauthorization is configured, the LAC handles the session limit checking as if the **subscriber access pppoe pre-authorize nas-port-id** command were disabled; that is, the locally configured per-VC or per-VLAN session limit is applied instead of downloading the PPPoE per-NAS-port session limits that are maintained in the RADIUS server.

If you specify the **sessions pre-auth limit ignore** command and enable preauthorization, but there are no locally configured per-port session limits, then per-NAS-port session limits downloaded from RADIUS are applied.

## Examples

The following example enables the local session limit configured on the LAC to override the per-NAS-port session limit configured on the RADIUS server for the PPPoE profile "vpn1":

```
Router(config)# bba-group pppoe vpn1
Router(config-bba-group)# sessions pre-auth limit ignore
```

The following example re-enables the standard functionality of the the **subscriber access pppoe pre-authorize nas-port-id** command for the PPPoE profile "vpn1":

```
Router(config)# bba-group pppoe vpn1
Router(config-bba-group)# no sessions pre-auth limit ignore
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **subscriber access ppoe pre-authorize nas-port-id** | Configures a NAS to enable SSS to preauthorize the NAS port identifier (NAS-Port-ID) string before authorizing the domain name. |

# sessions per-vlan throttle

To control and throttle the number of PPP over Ethernet (PPPoE) session establishment attempts per MAC address in a particular VLAN, use the **sessions per-vlan throttle** command in BBA group configuration mode. To disable this configuration, use the **no** form of this command.

**sessions per-vlan throttle** *number-of-sessions session-length session-delay*

**no sessions per-vlan throttle** *number-of-sessions session-length session-delay*

## Syntax Description

| | |
|---|---|
| *number-of-sessions* | Maximum number of discovery attempts per VLAN for a given MAC address. |
| *session-length* | Permitted time in seconds for the maximum number of sessions per VLAN. |
| *session-delay* | The time in seconds that further PPPoE session establishment attempts are blocked from the MAC address. |

## Command Default

No configuration to throttle the PPPoE sessions per VLAN.

## Command Modes

BBA group configuration (config-bba-group)

## Command History

| Release | Modification |
|---|---|
| 12.2(33)SB | This command was introduced. |
| Cisco IOS XE Release 2.4.0 | This command was integrated. The **throttle** keyword was added. |

## Usage Guidelines

This command is used to throttle PPPoE discovery attempts in an aggregation deployment when multiple CPEs share the same MAC address, in different VLANs. It allows a per-VLAN throttling mechanism on a per-MAC address basis. The **sessions per-mac throttle** command works in a Broadband Aggregation System (BRAS) global scenario, since the same MAC address is seen in different VLANs.

If the value specified in the *number-of-sessions* argument, in a time-interval defined by the *session-length* argument is exceeded on a particular VLAN, then the particular MAC address is throttled for the period specified in the *session-delay* argument.

## Examples

In the following example, a maximum of 100 sessions can be established on each MAC address on each VLAN, in 5 seconds, with a 5-second delay, before a new session request is allowed. The 101st session request causes a 5-second delay before a new session request is allowed:

```
Router(config)# bba-group pppoe global
Router(config-bba-group)# sessions per-vlan throttle 100 5 5
```

**Related Commands**

| Command | Description |
|---|---|
| **sessions per-mac throttle** | Limits the number of PPPoE session requests that can be made from a single MAC address. |
| **sessions per-vc throttle** | Limits the number of PPPoE session requests that can be made from a single VC. |

# session retry limit

To set the session retry count. Whenever a TR-069 Agent session establishment fails with the auto-configuration server (ACS), the session will be retried for a specified number of times. Use the **session retry limit** command in TR-069 Agent configuration mode.

**session retry limit** *session-count*

## Syntax Description

| | |
|---|---|
| *session-count* | The number of retry count sessions. The range for the session count is 0 to 15. The default value is 11. |

## Command Default

The session retry count is set to 11.

## Command Modes

TR-069 Agent configuration mode (config-cwmp)

## Command History

| Release | Modification |
|---|---|
| 12.4(20)T | This command was introduced. |

## Examples

The following example shows how to set the session retry count to 10 whenever a TR-069 Agent session establishment fails with the ACS:

```
Device(config-cwmp)# session retry limit 10
```

# sessions throttle

To configure PPP over Ethernet (PPPoE) connection throttling, which limits the number of PPPoE session requests that can be made from a virtual circuit (VC) or a Media Access Control (MAC) address within a specified period of time, use the **sessions throttle** command in BBA group configuration mode. To remove this limit, use the **no** version of this command.

**sessions** {**per-mac** | **per-vc**} **throttle** *session-requests session-request-period blocking-period*

**no sessions** {**per-mac** | **per-vc**} **throttle** *session-requests session-request-period blocking-period*

## Syntax Description

| | |
|---|---|
| **per-mac** | Limits the number of PPPoE session requests that can be made from a single MAC address. |
| **per-vc** | Limits the number of PPPoE session requests that can be made from a single VC. |
| *session-requests* | Number of PPPoE session requests that will be allowed within a specified period of time. The range is from 1 to 100000. |
| *session-request-period* | Period of time, in seconds, during which a specified number of PPPoE session requests will be allowed. The range is from 1 to 3600. |
| *blocking-period* | Period of time, in seconds, during which PPPoE session requests are blocked. This period begins when the number of PPPoE session requests from a VC or MAC address exceeds the configured *session-requests* value within the configured *session-request-period* value. The range is from 0 to 3600. |

## Command Default

The number of PPPoE session requests that can be made within a specific period of time is not limited.

## Command Modes

BBA group configuration (config-bba)

## Command History

| Release | Modification |
|---|---|
| 12.2(15)T | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |

## Usage Guidelines

Continuous requests to initiate PPPoE sessions can seriously affect the performance of a router and RADIUS server. Use the **sessions throttle** command to configure the PPPoE server to limit the number of requests for PPPoE sessions that can be made from a MAC address or VC during a configured period of time.

If you exceed the configured number of allowable session requests (*session-requests* value) within the configured time limit (*session-request-period* value), the PPPoE server accepts only the allowable number of session requests and blocks the MAC address or VC from making any more requests for a configured period of time (*blocking-period* value).

After the *blocking-period* value expires, the PPPoE server again accepts the configured number of session requests from the MAC address or VC within the configured *session-request-period* value.

**Note** The Interworking Function (IWF) acts as a gateway between the mobile network and data network infrastructure such as a Wireless Application Protocol (WAP) gateway. All IWF sessions may have a similar MAC adddress. The **sessions per-mac iwf limit** command enables you to define how many sessions can be terminated per-MAC with an IWF tag set.

**Note** The **sessions per-mac throttle** command is applicable to both IWF and non-IWF sessions. Throttling per-MAC on IWF sessions can seriously affect the call configuration for such sessions because each IWF session may use the same MAC address. Cisco does not recommend that IWF sessions be throttled.

## Examples

The following example shows the configuration of per-MAC and per-VC PPPoE connection throttling in PPPoE profile "grp1":

```
bba-group pppoe grp1
 virtual-template 1
 sessions per-mac throttle 10 60 300
 sessions per-vc throttle 100 30 300

interface ATM2/0.1 multipoint
 pvc 2/100
  encapsulation aal5snap
  protocol pppoe group grp1

interface virtual-template1
 ip address negotiated
 no peer default ip address
 ppp authentication chap
```

## Related Commands

| Command | Description |
|---|---|
| **bba-group pppoe** | Creates a PPPoE profile. |
| **sessions per-mac limit** | Sets the maximum number of PPPoE sessions allowed per MAC address in a PPPoE profile. |
| **sessions per-vc limit** | Sets the maximum number of PPPoE sessions to be established over a VC in a PPPoE profile and sets the PPPoE session-count threshold. |
| **sessions per-vlan limit** | Sets the maximum number of PPPoE sessions to be established over a VLAN in a PPPoE profile and sets the PPPoE session-count threshold. |