Establishing PPPoE Session Limits per NAS Port

The PPPoE Session Limits per NAS Port feature enables you to limit the number of PPP over Ethernet (PPPoE) sessions on a specific permanent virtual circuit (PVC) or VLAN configured on an L2TP access concentrator (LAC). The network access server (NAS) port is either an ATM PVC or a configured VLAN ID. PPPoE per-NAS-port session limits are maintained in a RADIUS server customer profile database and are downloaded during Subscriber Service Switch (SSS) preauthorization.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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

Prerequisites for Establishing PPPoE Session Limits per NAS Port

You must understand the concepts described in the "Preparing for Broadband Access Aggregation" module.

Both the LAC and the L2TP Network Server (LNS) must be running a Cisco IOS image that supports the PPPoE Session Limit Per NAS Port feature.

Protocol support for broadband access aggregation must be established using the procedures in the "Providing Protocol Support for Broadband Access Aggregation of PPPoE Sessions" module.

Restrictions for Establishing PPPoE Session Limits per NAS Port

- Do not configure the PPPoE per-NAS-port session limit to zero.
- PPPoE Session Limit per NAS Port does not support TACACS+.
- PPPoE Session Limit per NAS Port applies only to PVCs and VLANs.

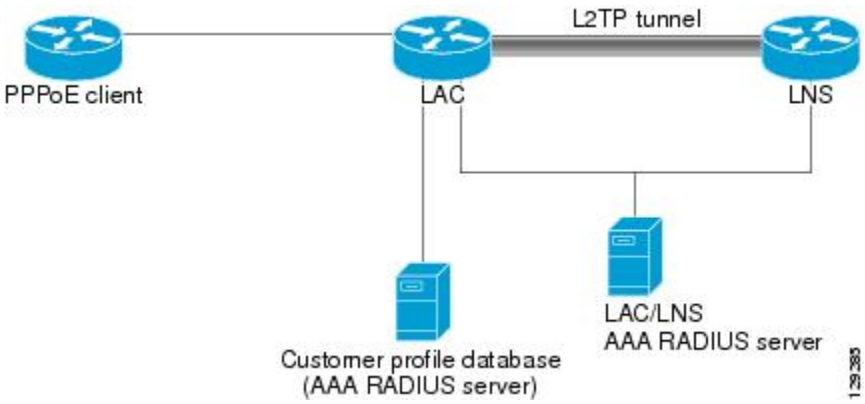
Information About Establishing PPPoE Session Limits per NAS Port

How PPPoE per-NAS-Port Session Limits Work

The PPPoE Session Limits Per NAS Port feature limits the number of PPPoE sessions on a specific PVC or VLAN configured on an LAC. The NAS port is either an ATM PVC or a configured VLAN ID.

The PPPoE per-NAS-port session limit is maintained in a RADIUS server customer profile database. This customer profile database is connected to an LAC and is separate from the RADIUS server that the LAC and LNS use for the authentication and authorization of incoming users. See below for a sample network topology. When the customer profile database receives a preauthorization request from the LAC, it sends the PPPoE per-NAS-port session limit to the LAC.

The LAC sends a preauthorization request to the customer profile database when the LAC is configured for SSS preauthorization. When the LAC receives the PPPoE per-NAS-port session limit from the customer profile database, the LAC compares the PPPoE per-NAS-port session limit with the number of sessions currently on the NAS port. The LAC then decides whether to accept or reject the current call, depending upon the configured PPPoE per NAS port-session-limit and the number of calls currently on the NAS port. PPPoE Session Limit per NAS Port Sample Topology



The customer profile database consists of a user profile for each user that is connected to the LAC. Each user profile contains the NAS-IP-Address (attribute 4) and the NAS-Port-ID (attribute 5.) When the LAC is configured for SSS preauthorization, it queries the customer profile database using the username. When a match is found in the customer profile database, the customer profile database sends the PPPoE per-NAS-port session limit in the user profile. The PPPoE per-NAS-port session limit is defined in the username as a Cisco attribute-value (AV) pair.

Relationship Between the Per-NAS-Port Session Limit and Other Types of Session Limits

You can configure types of session limits other than per-NAS-sort sessions on the LAC, including session limit per VC, per VLAN, per MAC, and a global session limit for the LAC. When PPPoE session limits for a NAS port are enabled (that is, when you have enabled SSS preauthorization on the LAC), local configurations for session limits per VC and per VLAN are overwritten by the PPPoE per-NAS-port session limit downloaded from the customer profile database. Configured session limits per VC and per VLAN serve as backups in case of a download failure of the PPPoE per-NAS-port session limit. Global session limits and per-MAC session limits, if configured on the router, will take effect as other means of limiting PPPoE sessions.

Benefits of PPPoE Session Limits per NAS Port

PPPoE session limits per NAS port provides flexibility and simplifies router configuration by allowing you to download the per-VC and per-VLAN session limits from a RADIUS server in addition to being able to configure them on the router.

How to Establish PPPoE Session Limits per NAS Port

Enabling Subscriber Service Switch Preauthorization

When SSS preauthorization is enabled on an LAC, local configurations for session limit per VC and per VLAN are overwritten by the per-NAS-port session limit downloaded from the server. Perform this task to enable SSS preauthorization:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **subscriber access pppoe pre-authorize nas-port-id** [*aaa-method-list*]
4. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**subscriber access pppoe pre-authorize nas-port-id** [*aaa-method-list*] **Example:** `Router(config)# subscriber access pppoe pre-authorize nas-port-id mlist-llid` **Example:**	Enables SSS preauthorization. • *aaa-method-list* --Name of an authentication, authorization and accounting (AAA) list configured on the LAC. **Note** During SSS preauthorization, per-NAS-port session limits are downloaded to the LAC.
Step 4	**exit** **Example:** `Router(config)# exit`	Exits global configuration mode.

Configuring the RADIUS User Profile for PPPoE Session Limits per NAS Port

Perform the following steps to enable per-NAS-port PPPoE session limits in a RADIUS user profile for the customer profile database. Refer to the Cisco IOS Security Configuration Guide for information about creating a RADIUS user profile.

SUMMARY STEPS

1. User-Name = nas-port:ip-address:slot/subslot/port/vpi.vci
2. User-Name = nas-port:ip-address:slot/subslot/port/vlan-id
3. User-Name = nas-port:ip-address:slot/subslot/port/vlan-id
4. Password = "cisco"
5. cisco-avpair = "pppoe:session-limit-session-limit-per-NAS-port"

DETAILED STEPS

	Command or Action	Purpose
Step 1	User-Name = nas-port:ip-address:slot/subslot/port/vpi.vci	Configures the NAS port username for a PPPoE over ATM NAS port user. • *ip-address* --IP address of the LAC interface that connects to the customer profile database. • *slot* /*subslot*/*port*--ATM interface. • *vpi.vci* --Virtual path identifier (VPI) and virtual channel identifier (VCI) values for the PVC.
Step 2	User-Name = nas-port:ip-address:slot/subslot/port/vlan-id	Configures the NAS port username for a PPPoE over ATM NAS port user. • *ip-address* --IP address of the LAC interface that connects to the customer profile database. • *slot* /*subslot*/*port*--ATM interface. • *vpi.vci* --Virtual path identifier (VPI) and virtual channel identifier (VCI) values for the PVC.
Step 3	User-Name = nas-port:ip-address:slot/subslot/port/vlan-id **Example:**	Configures the NAS port username for a PPPoE over VLAN NAS port user. • *ip-address* --IP address of the LAC interface that connects to the customer profile database. • *slot* /*subslot*/*port*--ATM interface. • *vlan-id* --VLAN identifier.
Step 4	Password = "cisco" **Example:**	Sets the fixed password.
Step 5	cisco-avpair = "pppoe:session-limit-session-limit-per-NAS-port"	Adds the PPPoE session limit per NAS port cisco AVpair to the user profile. • *session-limit-per-NAS-port* --per-NAS-port PPPoE session limit.

	Command or Action	Purpose

Verifying PPPoE Session Limit per NAS Port

Perform this task to verify per-NAS-port session limit performance.

SUMMARY STEPS

1. **enable**
2. **debug aaa authorization**
3. **debug radius** [**brief** | **hex**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**debug aaa authorization** **Example:** `Router# debug aaa authorization`	Displays information about AAA authorization.
Step 3	**debug radius** [**brief**	**hex**] **Example:** `Router(config)# debug radius`	Displays information about RADIUS.

Configuration Examples for Establishing PPPoE Session Limits per NAS Port

Configuring the LAC for per-NAS-Port Session Limits for PPPoE over ATM Example

Note Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit per-mac**, **pppoe limit per-vc**, and **pppoe limit per-vlan** commands are replaced by the **sessions per-mac limit**, **sessions per-vc limit**, and **sessions per-vlan limit** commands, respectively, in bba-group configuration mode. See the **sessions per-mac limit**, **sessions per-vc limit**, and **sessions per-vlan limit** commands for more information.

The following example shows how to configure per-NAS-port session limits for PPPoE over ATM on the LAC:

```
!
username lac password 0 lab
username lns password 0 lab
aaa new-model
!
aaa authentication ppp default group radius local
aaa authentication ppp mlist-nasport group radius
aaa authorization network mlist-nasport group radius
aaa session-id common
ip subnet-zero
!
no ip domain lookup
ip host abrick 209.165.200.225
!
ip cef
subscriber access pppoe pre-authorize nas-port-id mlist-nasport
vpdn enable
!
vpdn-group l2tp-initiator
 request-dialin
  protocol l2tp
  domain example.com
 initiate-to ip 10.1.1.2
 local name lac
!
vpdn-group pppoe-terminate
 accept-dialin
  protocol pppoe
  virtual-template 1
 pppoe limit per-mac 10
 pppoe limit per-vc 10
 pppoe limit per-vlan 10
!
vc-class atm pppoe
  protocol pppoe
  ubr 155000
  encapsulation aal5snap
!
interface ATM2/0
 no ip address
 no ip mroute-cache
 no atm ilmi-keepalive
!
```

```
interface ATM2/0.1 point-to-point
 class-int pppoe
 pvc 1/100
  encapsulation aal5snap
 !
!
interface FastEthernet4/0
 ip address 10.1.1.1 255.255.255.0
 no ip mroute-cache
 duplex full
!
interface FastEthernet6/0
 ip address 10.165.200.225 255.255.255.0
 no ip mroute-cache
 duplex full
!
interface Virtual-Template1
 ip unnumbered Loopback0
 no peer default ip address
 ppp authentication chap mlist-nasport
!
ip default-gateway 10.3.0.1
ip classless
ip route 0.0.0.0 0.0.0.0 10.3.0.1
!
!
ip radius source-interface FastEthernet6/0
!
radius-server host 10.1.1.2 auth-port 1645 acct-port 1646
radius-server key cisco
radius-server authorization permit missing Service-Type
!
```

Configuring the LAC for per-NAS-Port Session Limits for PPPoE over VLAN Example

Note Effective with Cisco IOS Release 12.2(28)SB, the **pppoe limit per-mac**, **pppoe limit per-vc**, and **pppoe limit per-vlan** commands are replaced by the **sessions per-mac limit**, **sessions per-vc limit**, and **sessions per-vlan limit** commands, respectively, in bba-group configuration mode. See the **sessions per-mac limit**, **sessions per-vc limit**, and **sessions per-vlan limit** commands for more information.

The following example shows how to configure per-NAS-port session limits for PPPoE over VLAN on the LAC:

```
!
username lac password 0 lab
username lns password 0 lab
aaa new-model
!
!
aaa authentication ppp default group radius local
aaa authentication ppp mlist-nasport group radius
aaa authorization network mlist-nasport group radius
aaa session-id common
ip subnet-zero
!
!
no ip domain lookup
ip host abrick 192.0.2.0
!
ip cef
subscriber access pppoe pre-authorize nas-port-id mlist-nasport
```

```
vpdn enable
!
vpdn-group l2tp_initiator
 request-dialin
  protocol l2tp
  domain example.com
 initiate-to ip 10.1.1.2
 local name lac
!
vpdn-group pppoe-terminate
 accept-dialin
  protocol pppoe
  virtual-template 1
 pppoe limit per-mac 10
 pppoe limit per-vc 10
 pppoe limit per-vlan 10
!
vc-class atm pppoe
  protocol pppoe
  ubr 155000
  encapsulation aal5snap
!
interface ATM2/0
 no ip address
 no ip mroute-cache
 shutdown
 no atm ilmi-keepalive
!
interface FastEthernet4/0
 ip address 10.1.1.1 255.255.255.0
 no ip mroute-cache
 duplex full
!
interface FastEthernet6/0
 ip address 224.0.0.0 255.255.255.0
 no ip mroute-cache
 duplex full
!
interface Virtual-Template1
 ip unnumbered Loopback0
 no peer default ip address
 ppp authentication chap mlist-nasport
!
ip default-gateway 224.0.0.0
ip classless
ip route 0.0.0.0 0.0.0.0 224.0.0.0
!
!
ip radius source-interface FastEthernet6/0
!
!
!
radius-server host 10.1.1.2 auth-port 1645 acct-port 1646
radius-server key cisco
radius-server authorization permit missing Service-Type
!
```

Configuring the User Profile for PPPoE Session Limits per NAS Port Example

The following example shows how to configure the user profile for PPPoE session limits per NAS port. In this example, the user has a PVC with a VPI of 1 and a VCI of 100 on ATM interface 4/0/0 of the LAC with an IP address of 10.10.10.10:

```
Username=nas_port:10.10.10.10:4/0/0/1.100
Password = "password1"
cisco-avpair= "pppoe:session-limit=<session limit per NAS-port>"
```

Where to Go Next

- If you want to use service tags to enable a PPPoE server to offer PPPoE clients a selection of services during call setup, refer to the "Offering PPPoE Clients a Selection of Services During Call Setup" module.
- If you want to enable an L2TP access concentrator to relay active discovery and service selection functionality for PPPoE over an L2TP control channel to an LNS or tunnel switch, refer to the "Enabling PPPoE Relay Discovery and Service Selection Functionality" module.
- If you want to configure the transfer upstream of the PPPoX session speed value, refer to the "Configuring Upstream Connections Speed Transfer" module.
- If you want to use the Simple Network Management Protocol (SNMP) to monitor PPPoE sessions, refer to the "Monitoring PPPoE Sessions with SNMP" module.
- If you want to identify a physical subscribe line for RADIUS communication with a RADIUS server, refer to the "Identifying a Physical Subscriber Line for RADIUS Access and Accounting" module.
- If you want to configure a Cisco Subscriber Service Switch, refer to the "Configuring Cisco Subscriber Service Switch Policies" module.

Additional References

Related Documents

Related Topic	Document Title
Broadband access commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	"Wide-Area Networking Commands" chapter in the *Cisco IOS Wide-Area Networking Command Reference*
Broadband access aggregation concepts	″Understanding Broadband Access Aggregation″
Task for preparing for broadband access aggregation	"Preparing for Broadband Access Aggregation"
Broadband access aggregation support	"Providing Protocol Support for Broadband Access Aggregation of PPPoE Sessions"

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 2516	*A Method for Transmitting PPP over Ethernet (PPPoE)*
RFC 2684	*Multiprotocol Encapsulation over ATM Adaptation Layer 5*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for Establishing PPPoE Session Limits per NAS Port

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

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

Table 1: Feature Information for PPoE Session Limit per NAS Port.

Feature Name	Releases	Feature Information
PPPoE Session Limit per NAS Port	12.2(31)SRC 12.2(15)B 12.3(4)T	The PPPoE Session Limit per NAS Port feature enables you to limit the number of PPP over Ethernet (PPPoE) sessions on a specific permanent virtual circuit (PVC) or VLAN configured on an L2TP access concentrator (LAC). In Cisco IOS Release 12.2(15)B, this feature was introduced. In Cisco IOS Release 12.3(4)T, this feature was integrated into the T train.