



PPPoE Connection Throttling

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Continuous repeated requests to initiate PPPoE sessions can adversely affect the performance of a router and RADIUS server. The PPPoE Connection Throttling feature throttles PPP over Ethernet (PPPoE) connection requests to help prevent intentional denial-of-service attacks as well as unintentional PPP authentication loops. This feature implements session throttling on the PPPoE server to limit the number of PPPoE session requests that can be initiated from MAC address or VC (virtual circuit) during a specified period of time.

History for the PPPoE Connection Throttling Feature

Release	Modification
12.2(15)T	This feature was introduced.
12.2(28)SB	This feature was integrated into Cisco IOS Release 12.2(28)SB.

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Restrictions for PPPoE Connection Throttling

PPPoE connection throttling must be configured in a PPPoE profile.

How to Configure PPPoE Connection Throttling

To configure PPPoE connection throttling, perform the following tasks:

- [Configuring PPPoE Connection Throttling, page 2](#) (required)
- [Monitoring and Maintaining PPPoE Connection Throttling, page 3](#) (optional)

Configuring PPPoE Connection Throttling

Perform the following task to configure PPPoE connection throttling in a PPPoE profile.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bba-group pppoe** { *group-name* | **global** }
4. **virtual-template** *template-number*
5. **sessions** { **per-mac** | **per-vc** } **throttle** *session-requests session-request-period blocking-period*
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	bba-group pppoe { <i>group-name</i> global } Example: Router(config)# bba-group pppoe global	Defines a PPPoE profile, and enters BBA group configuration mode. <ul style="list-style-type: none"> • The global keyword will create a profile that will serve as the default profile for any PPPoE port that is not assigned a specific profile.

	Command or Action	Purpose
Step 4	virtual-template <i>template-number</i> Example:Example: Router(config-bba-group)# virtual-template 1	Specifies which virtual template will be used to clone virtual access interfaces for all PPPoE ports that use this PPPoE profile.
Step 5	sessions { per-mac per-vc } throttle <i>session-requests session-request-period blocking-period</i> Example: Router(config-bba-group)# sessions per-vc throttle 100 30 300	Configures PPPoE connection throttling, which limits the number of PPPoE session requests that can be made from a VC or a MAC address within a specified period of time.
Step 6	end Example: Router(config-bba-group)# end	(Optional) Exits the configuration mode and returns to privileged EXEC mode

What to Do Next

Once a PPPoE profile has been defined, it can be assigned to a PPPoE port (Ethernet interface, VLAN, or PVC), a VC class, or an ATM PVC range. For more information about how to configure PPPoE profiles, refer to the Cisco IOS Release 12.2(15)T feature module, “PPPoE Profiles”.

Monitoring and Maintaining PPPoE Connection Throttling

Perform this task to monitor and maintain PPPoE connection throttling.

SUMMARY STEPS

1. **enable**
2. **show pppoe session** [**all** | **packets**]
3. **clear pppoe** {**interface** *type number* [**vc** {[*vpi*]*vci* | *vc-name*]} | **rmac** *mac-addr* [**sid** *session-id*] | **all**}
4. **debug pppoe** {**data** | **errors** | **events** | **packets**} [**rmac** *remote-mac-address* | **interface** *type number* [**vc** {[*vpi*]*vci* | *vc-name*]}]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	show pppoe session [all packets] Example: Router# show pppoe session all	Displays information about active PPPoE sessions.
Step 3	clear pppoe { interface <i>type number</i> [vc { <i>[vpi/]vci</i> <i>vc-name</i> }] rmac <i>mac-addr</i> [sid <i>session-id</i>] all } Example: Router# clear pppoe interface atm0/1.0	Terminates PPPoE sessions.
Step 4	debug pppoe { data errors events packets } [rmac <i>remote-mac-address</i> interface <i>type</i> <i>number</i> [vc { <i>[vpi/]vci</i> <i>vc-name</i> }]] Example: Router# debug pppoe events	Displays debugging information for PPPoE sessions.

Configuration Examples for PPPoE Connection Throttling

- [PPPoE Connection Throttling Example, page 4](#)

PPPoE Connection Throttling Example

The following example shows PPPoE connection throttling configured in the PPPoE profile “group1”:

```

bba-group pppoe group1
 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 group1
!
interface virtual-template1
 ip address negotiated
 no peer default ip address
 ppp authentication chap
  
```

Additional References

For additional information related to PPPoE Connection Throttling, refer to the following references:

Related Documents

Related Topic	Document Title
PPPoE profile configuration tasks and commands	<i>PPPoE Profiles</i> , Cisco IOS Release 12.2(15)T feature module
PPPoE configuration tasks	<i>Cisco IOS Wide-Area Networking Configuration Guide</i> , Release 12.2
PPPoE commands	<i>Cisco IOS Wide-Area Networking Command Reference</i> , Release 12.2

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	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
None	—

Technical Assistance

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

Command Reference

This section documents modified commands.

- [debug pppoe](#)
- [sessions throttle](#)

debug pppoe

To display debugging information for PPP over Ethernet (PPPoE) sessions, use the **debug pppoe** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug pppoe {data | errors | events | packets} [rmac remote-mac-address | interface type number
[vc {[vpi]vci | vc-name}] [vlan vlan-id]]
```

```
no debug pppoe {data | errors | events | packets} [rmac remote-mac-address |
interface type number [vc {[vpi]vci | vc-name}] [vlan vlan-id]]
```

Syntax Description		
data		Displays data packets of PPPoE sessions.
errors		Displays PPPoE protocol errors that prevent a session from being established, or displays errors that cause an established session to be closed.
events		Displays PPPoE protocol messages about events that are part of normal session establishment or shutdown.
packets		Displays each PPPoE protocol packet that is exchanged.
rmac <i>remote-mac-address</i>		(Optional) Remote MAC address. Debugging information for PPPoE sessions sourced from this address will be displayed.
interface <i>type number</i>		(Optional) Interface for which PPPoE session debugging information will be displayed.
vc		(Optional) Displays debugging information for PPPoE sessions for a specific permanent virtual circuit (PVC).
<i>vpi</i>		(Optional) ATM network virtual path identifier (VPI) for the PVC. In the absence of the slash (/) and a <i>vpi</i> value, the <i>vpi</i> value defaults to 0.
<i>vci</i>		(Optional) ATM network virtual channel identifier (VCI) for the PVC.
<i>vc-name</i>		(Optional) Name of the PVC.
vlan <i>vlan-id</i>		(Optional) IEEE 802.1Q VLAN identifier.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.2(13)T	This command was introduced. This command replaces the debug vpdn pppoe-data , debug vpdn pppoe-error , debug vpdn pppoe-events , and debug vpdn pppoe-packet commands available in previous Cisco IOS releases.
	12.2(15)T	This command was modified to display debugging information on a per-MAC address, per-interface, and per-VC basis.
	12.3(2)T	The vlan <i>vlan-id</i> keyword and argument were added.
	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.

Examples

The following examples show sample output from the **debug pppoe** command:

```
Router# debug pppoe events interface atm1/0.10 vc 101
```

```
PPPoE protocol events debugging is on
Router#
00:41:55:PPPoE 0:I PADI R:00b0.c2e9.c470 L:ffff.ffff.ffff 0/101 ATM1/0.10
00:41:55:PPPoE 0:O PADO, R:00b0.c2e9.c470 L:0001.c9f0.0c1c 0/101 ATM1/0.10
00:41:55:PPPoE 0:I PADR R:00b0.c2e9.c470 L:0001.c9f0.0c1c 0/101 ATM1/0.10
00:41:55:PPPoE :encap string prepared
00:41:55:[3]PPPoE 3:Access IE handle allocated
00:41:55:[3]PPPoE 3:pppoe SSS switch updated
00:41:55:[3]PPPoE 3:AAA unique ID allocated
00:41:55:[3]PPPoE 3:No AAA accounting method list
00:41:55:[3]PPPoE 3:Service request sent to SSS
00:41:55:[3]PPPoE 3:Created R:0001.c9f0.0c1c L:00b0.c2e9.c470 0/101 ATM1/0.10
00:41:55:[3]PPPoE 3:State REQ_NASPORT Event MORE_KEYS
00:41:55:[3]PPPoE 3:O PADS R:00b0.c2e9.c470 L:0001.c9f0.0c1c 0/101 ATM1/0.10
00:41:55:[3]PPPoE 3:State START_PPP Event DYN_BIND
00:41:55:[3]PPPoE 3:data path set to PPP
00:41:57:[3]PPPoE 3:State LCP_NEGO Event PPP_LOCAL
00:41:57:PPPoE 3/SB:Sent vtemplate request on base Vi2
00:41:57:[3]PPPoE 3:State CREATE_VA Event VA_RESP
00:41:57:[3]PPPoE 3:Vi2.1 interface obtained
00:41:57:[3]PPPoE 3:State PTA_BIND Event STAT_BIND
00:41:57:[3]PPPoE 3:data path set to Virtual Access
00:41:57:[3]PPPoE 3:Connected PTA
```

```
Router# debug pppoe errors interface atm1/0.10
```

```
PPPoE protocol errors debugging is on
Router#
00:44:30:PPPoE 0:Max session count(1) on mac(00b0.c2e9.c470) reached.
00:44:30:PPPoE 0:Over limit or Resource low. R:00b0.c2e9.c470 L:ffff.ffff.ffff 0/101
ATM1/0.10
```

[Table 1](#) describes the significant fields shown in the displays.

Table 1 debug pppoe Field Descriptions

Field	Description
PPPoE	PPPoE debug message header.
0:	PPPoE session ID.
I PADI	Incoming PPPoE Active Discovery Initiation packet.
R:	Remote MAC address.
L:	Local MAC address.
0/101	Virtual path identifier (VPI)/virtual channel identifier (VCI) of the PVC.
ATM1/0.10	Interface type and number.
O PADO	Outgoing PPPoE Active Discovery Offer packet.
I PADR	Incoming PPPoE Active Discovery Request packet.

Table 1 *debug pppoe Field Descriptions (continued)*

Field	Description
[3]	Unique user session ID. The same ID is used for identifying sessions across different applications such as PPPoE, PPP, Layer 2 Tunneling Protocol (L2TP), and Subscriber Service Switch (SSS). The same session ID appears in the output for the show pppoe session , show sss session , and show vpdn session commands.
PPPoE 3	PPPoE session ID.
Created	PPPoE session is created.
O PADS	Outgoing PPPoE Active Discovery Session-confirmation packet.
Connected PTA	PPPoE session is established.
Max session count(1) on mac(00b0.c2e9.c470) reached	PPPoE session is rejected because of per-MAC session limit.

Related Commands

Command	Description
encapsulation aal5autoppo virtual-template	Enables PPPoA/PPPoE autosense.
pppoe enable	Enables PPPoE sessions on an Ethernet interface or subinterface.
protocol pppoe (ATM VC)	Enables PPPoE sessions to be established on PVCs.
show pppoe session	Displays information about active PPPoE sessions.
show sss session	Displays Subscriber Service Switch session status.
show vpdn session	Displays session information about L2TP, L2F protocol, and PPPoE tunnels in a VPDN.

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 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.	
<i>session-requests</i>	Number of PPPoE session requests that will be allowed within a specified period of time. Range is from 1 to 100000.	
<i>session-request-period</i>	Period of time, in seconds, during which a specified number of PPPoE session requests will be allowed. Range is from 1 to 3600.	
<i>blocking-period</i>	Period of time, in seconds, during which PPPoE session requests will be blocked. This period begins when the number of PPPoE session requests from a VC or MAC address exceeds the configured <i>session-requests</i> value within the configured <i>session-request-period</i> . Range is from 0 to 3600.	

Defaults

The number of PPPoE session requests that can be made within a specific period of time is not limited. There are no default values for the *session-requests*, *session-request-period*, and *blocking-period* arguments.

Command Modes

BBA group configuration

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

Continuous repeated 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 a client exceeds the configured number of allowable session requests (*session-requests*) within the configured time limit (*session-request-period*), 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*).

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

Examples

The following example shows the configuration of per-VC and per-MAC 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-templatel
  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.

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