

PPP-Max-Payload and IWF PPPoE Tag Support

The PPP-Max-Payload and IWF PPPoE Tag Support feature enables the PPP over Ethernet (PPPoE) component to process the PPP-Max-Payload and Interworking Functionality (IWF) PPPoE tags in the PPPoE discovery frame:

- The **tag ppp-max-payload** command allows PPPoE peers to negotiate PPP maximum receive units (MRUs) greater than 1492 octets if the underlying network supports a maximum transmission unit (MTU) size greater than 1500 octets.
- The IWF PPPoE tag allows the Broadband Remote Access Server (BRAS) to distinguish the IWF PPPoE from the regular PPPoE sessions to overcome the per-MAC session limit put on the BRAS as a protection from denial of service (DOS) attacks sourced from the same MAC address.

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Information About PPP-Max-Payload and IWF PPPoE Tag Support

Accommodating an MTU MRU Greater than 1492 in PPPoE

Per the RFC, "Accommodating an MTU/MRU Greater than 1492 in PPPoE," PPPoE peers can negotiate only MRUs with a maximum of 1492 octets so that the PPPoE header and PPP protocol ID can be inserted in the PPPoE session data packet. The maximum for an Ethernet payload is 1500 octets.

RFC 2516 defines a new tag to allow PPPoE peers to negotiate PPP MRU greater than 1492 if the underlying networks can support an Ethernet payload of greater than 1500 bytes. To enable processing of this new tag, a command has been defined in the Cisco IOS command-line interface as **tag ppp-max-payload.**The PPP-Max-Payload and IWF PPPoE Tag Support feature enhances the PPPoE component so the **tag ppp-max-payload**command can process the new tag to influence the Link Control Protocol (LCP) MRU negotiations for the PPP session based on the MRU value specified in the tag from the PPPoE client.

Interworking Functionality

The DSL Forum defined IWF to define the process for conversion of PPP over ATM (PPPoA) sessions to PPPoE sessions at the digital subscriber line access multiplexer (DSLAM) to the BRAS. This functionality was defined to help the migration of DSLAM networks from ATM to Ethernet media. So, essentially, the PPPoA session comes in to the DSLAM over ATM and is converted to a PPPoE session at the DSLAM, which is then connected to the BRAS as a PPPoE session. Each PPPoA session is mapped to a corresponding PPPoE session.

Typically, the BRAS is configured to limit PPPoE sessions originating from the same MAC address to protect itself from a DOS attack. This presents a problem for IWF PPPoE sessions because all PPPoE sessions originate from the same MAC address DSLAM. To overcome this issue, the IWF PPPoE tag is inserted at the DSLAM and read by the BRAS to distinguish the IWF PPPoE session from the regular PPPoE session during the PPPoE discovery frames.

For more information about this subject, refer to the DSL Forum Technical Report 101, "Migration to Ethernet-Based DSL Aggregation."

How to Configure PPP-Max-Payload and IWF PPPoE Tag Support

Enabling PPP-Max-Payload and IWF PPPoE Tag Support

To enable the PPP-Max-Payload and IWF PPPoE Tag Support feature, perform this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bba-group pppoe** {*group-name* | **global**}
4. **virtual-template** *template-number*
5. **tag ppp-max-payload** [**minimum** *value* **maximum** *value*] [**deny**]
6. **sessions per-mac iwf limit** *per-mac-limit*
7. **interface** {**fastethernet** | **gigabitethernet** | **tengigabitethernet**} *slot* **/subslot/** *port[subinterface]*
8. **pppoe enable [group** *group-name]*
9. **virtual-template** *template-number*
10. **ppp lcp echo mru verify** [**minimum** *value*]
11. **end**
12. **show pppoe session** [**all**| **packets**]

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
	`Router> enable`	
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**bba-group pppoe** {*group-name* | **global**} **Example:** `Router(config)# bba-group pppoe pppoe-group`	Enters BBA group configuration mode and defines a PPPoE profile.
Step 4	**virtual-template** *template-number* **Example:** `Router(config-bba-group)# virtual-template 1`	Configures a PPPoE profile with a virtual template to be used for cloning virtual access interfaces. • The *template-number* argument is an identifying number of the virtual template that will be used to clone virtual-access interfaces.
Step 5	**tag ppp-max-payload** [**minimum** *value* **maximum** *value*] [**deny**] **Example:** `Router(config-bba-group)# tag ppp-max-payload minimum 1200 maximum 3000`	Specifies a range for the ppp-max payload tag value that will be accepted by the BRAS. • Default values are 1492 for the minimum and 1500 for the maximum. • The ppp-max-payload tag value accepted from the client cannot exceed the physical interface value for MTU minus 8.
Step 6	**sessions per-mac iwf limit** *per-mac-limit* **Example:** `Router(config-bba-group)# sessions per-mac iwf limit 200`	Specifies a limit for IWF-specific sessions per MAC address (separate from session limits that are not IWF-specific). • If this command is not entered, the normal MAC-address session limit is applied to IWF sessions. • The *per-mac-limit* argument specifies the allowable number of IWF sessions. The default is 100.
Step 7	**interface** {**fastethernet** | **gigabitethernet** | **tengigabitethernet**} *slot* **/subslot/** *port[subinterface]* **Example:** `Router(config-bba-group)# interface gigabitethernet 0/0/0`	Enters interface configuration mode for a Gigabit Ethernet interface.
Step 8	**pppoe enable [group** *group-name]* **Example:** `Router(config-if)# pppoe enable group 1`	Enables PPPoE sessions on an Ethernet interface or subinterface.

	Command or Action	Purpose
Step 9	**virtual-template** *template-number* **Example:** `Router(config-if)# virtual-template 1`	Configures a PPPoE profile with a virtual template to be used for cloning virtual access interfaces. • The *template-number* argument is an identifying number of the virtual template that will be used to clone virtual-access interfaces.
Step 10	**ppp lcp echo mru verify** [**minimum** *value*] **Example:** `Router(config-if)# ppp lcp echo mru verify minimum 1304`	Verifies the negotiated MRU and adjusts the PPP virtual access interface MTU for troubleshooting purposes. • If the optional **minimum** keyword is entered, the *value* can be from 64 to 1500. • 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.
Step 11	**end** **Example:** `Router(config-if)# end`	Exits the current configuration mode and returns to privileged EXEC mode.
Step 12	**show pppoe session** [**all**| **packets**] **Example:** `Router# show pppoe session all`	Verifies the configuration and displays session information. • **all** --Displays output indicating if a session is IWF-specific or if the PPP-Max-Payload tag is in the discovery frame and accepted. • **packets** --Displays packet statistics for the PPPoE session.

Disabling PPP-Max-Payload and IWF PPPoE Tag Support

The **tag ppp-max-payload** command adjusts PPP MTU of the PPPoE session above the default maximum limit of 1492 bytes. But MTU values greater than 1492 can only be supported (with PPPoE) if the underlying Ethernet network supports these larger frames. Not all Ethernet networks support higher values. If your network does not support values higher than the default maximum, you should disable the PPP-Max-Payload and IWF PPPoE Tag Support feature by performing this task.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **bba-group pppoe** {*group-name* | **global**}
4. **tag ppp-max-payload deny**

DETAILED STEPS

Procedure

	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 interface configuration mode.
Step 3	**bba-group pppoe** {*group-name* | **global**} **Example:** `Router(config-if)# bba-group pppoe pppoe-group`	Enters BBA group configuration mode and defines a PPPoE profile.
Step 4	**tag ppp-max-payload deny** **Example:** `Router(config-bba-group)# tag ppp-max-payload deny`	Disables the processing of the ppp-max-payload tag value higher than the default of 1492 bytes.

Configuration Examples for PPP-Max Payload and IWF PPPoE Tag Support

This section provides a sample configuration showing the PPP-Max-Payload and IWF PPPoE Tag Support feature enabled and a configuration in which the effects of this feature are disabled:

PPP-Max-Payload and IWF PPPoE Tag Support Enabled Example

The following configuration example shows the PPP-Max-Payload and IWF PPPoE Tag Support enabled to accept PPP-Max-Payload tag values from 1492 to 1892, limits the number of sessions per MAC address to 2000 when the IWF is present, and verifies that the PPP session can accept 1500-byte packets in both directions:

```
bba-group pppoe global
 virtual-template 1
 tag ppp-max-payload minimum 1492 maximum 1892
 sessions per-mac limit 1
 sessions per-mac iwf limit 2000
 ppp lcp echo mru verify
!
 interface Virtual-Template 1
!
```

PPP-Max-Payload and IWF PPPoE Tag Support Disabled Example

The following configuration example disables the effect of the **tag ppp-max-payload** command:

```
bba-group pppoe global
 virtual-template 1
 tag ppp-max-payload deny
```

Additional References

The following sections provide references related to the PPP-Max-Payload and IWF PPPoE Tag Support feature.

Related Documents

Related Topic	Document Title
Additional information about commands used in this document	• *Cisco IOS Broadband Access Aggregation and DSL Command Reference* •

Standards

Standard	Title
DSL Forum Technical Report 101	Migration to Ethernet-Based DSL Aggregation

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 XE releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
RFC 2516	A Method for Transmitting PPP Over Ethernet (PPPoE)
Draft RFC document	Accommodating an MTU/MRU Greater than 1492 in PPPoE

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 PPP-Max-Payload and IWF PPPoE Tag Support

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 www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for PPP-Max-Payload and IWF PPPoE Tag Support

Feature Name	Releases	Feature Information
PPP-Max Payload and IWF PPPoE Tag Support	Cisco IOS XE Release 2.3	This feature was introduced on Cisco ASR 1000 Series Routers. This feature enables the PPP over Ethernet (PPPoE) component to process the PPP-Max-Payload and Interworking Functionality (IWF) PPPoE tags in the PPPoE discovery frame. The following commands were introduced or modified: **ppp lcp echo mru verify**, **sessions per-mac iwf limit**, **show pppoe session**, **tag ppp-max-payload**.