MPLS MTU Command Changes

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This document explains the change in the behavior of the **mpls mtu** command for the following Cisco IOS releases:

- 12.2(27)SBC and later
- 12.2(33)SRA and later
- 12.2(33)SXH and later
- 12.4(11)T and later
- 15.0(1)M1
- 15.1(2)S

You cannot set the Multiprotocol Label Switching (MPLS) maximum transmission unit (MTU) to a value larger than the interface MTU value. This eliminates problems such as dropped packets, data corruption, and high CPU rates from occurring when the MPLS MTU value settings are larger than the interface MTU values. Cisco IOS software allows the MPLS MTU value to be higher than the interface MTU value only for interfaces that have a default interface MTU value of 1580 or less.

Note In Cisco IOS Release 15.0(1)M1, you can configure the interface MTU on PA-1FE and PA-2FE port adapters (PAs). The range of values is from 1500 to 1530. Before this enhancement, the MTU of those interfaces was not configurable, and any attempt to configure the interface MTU displayed the following message:

```
% Interface {Interface Name} does not support user settable mtu.
```

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see 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 for MPLS MTU Command Changes" section on page 11.

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

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MPLS MTU Values During Upgrade

If you have configuration files with MPLS MTU values that are larger than the interface MTU values and you upgrade to Cisco IOS Release 12.2(27)SBC, 12.2(33)SRA, 12.4(11)T, 12.2(33)SXH, or later releases, the software does not change the MPLS MTU value. When you reboot the router, the software accepts the values that are set for the MPLS MTU and the interface MTU. The following error message is displayed during system initialization:

```
Setting the mpls mtu to xxxx on interface x/x, which is higher than the interface MTU
xxxx. This could lead to packet forwarding problems including packet drops.

You must set the MPLS MTU values equal to or lower than the interface MTU values.
```

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Caution If you do not set the MPLS MTU less than or equal to the interface MTU, data corruption, dropped packets, and high CPU conditions can occur.

Guidelines for Setting MPLS MTU and Interface MTU Values

When configuring the network to use MPLS, set the core-facing interface MTU values greater than the edge-facing interface MTU values using one of the following methods:

- Set the interface MTU values on the core-facing interfaces to a higher value than the interface MTU values on the customer-facing interfaces to accommodate any packet labels, such as MPLS labels, that an interface might encounter. Make sure that the interface MTUs on the remote end interfaces have the same interface MTU values. The interface MTU values on both ends of the link must match.

- Set the interface MTU values on the customer-facing interfaces to a lower value than the interface MTU on the core-facing interfaces to accommodate any packet labels, such as MPLS labels, that an interface might encounter. When you set the interface MTU on the edge interfaces, ensure that the interface MTUs on the remote end interfaces have the same values. The interface MTU values on both ends of the link must match.

Changing the interface MTU can also modify the IP MTU, Connectionless Network Service (CLNS) MTU, and other MTU values because they depend on the value of the interface MTU. The Open Shortest Path First (OSPF) routing protocol requires that the IP MTU values match on both ends of the link. Similarly, the Intermediate System-to-Intermediate System (IS-IS) routing protocol requires that the CLNS MTU values match on both ends of the link. If the values on both ends of the link do not match, IS-IS or OSPF cannot complete initialization.

If the configuration of the adjacent router does not include the **mpls mtu** and **mtu** commands, add these commands to the router.

Note The MPLS MTU setting is displayed only in the show running-config output if the MPLS MTU value is different from the interface MTU value. If the values match, only the interface MTU value is displayed.

If you attempt to set the MPLS MTU value higher than the interface MTU value, the software displays the following error message, which prompts you to set the interface MTU to a higher value before you set the MPLS MTU value:

```
% Please increase interface mtu to xxxx and then set mpls mtu
```

Note In Cisco IOS Release 15.1(2)S, the **mpls mtu** command was modified. This command was made available in L3VPN encapsulation configuration mode. The **maximum** keyword was replaced with the **max** keyword. The **override** keyword and the *bytes* argument were removed from the GRE tunnel interface. To set MPLS MTU to the maximum MTU on L3VPN profiles, use the **mpls mtu** command in L3VPN encapsulation configuration mode.

MPLS MTU Values for Ethernet Interfaces

If you have an interface with a default interface MTU value of 1580 or less (such as an Ethernet interface), the **mpls mtu** command provides an **override** keyword, which allows you to set the MPLS MTU to a value higher than the interface MTU value. The **override** keyword is not available for interface types that do not have a default interface MTU value of 1580 or less. For configuration details, see the "Setting the MPLS MTU Value on an Ethernet Interface" section on page 5.

Setting the MPLS MTU value higher than the Ethernet interface MTU value can lead to dropped packets, data corruption, or high CPU rates. When you set the MPLS MTU value higher than the Ethernet interface MTU value, the software displays the following message:

```
%MFI-30-MPLS_MTU_SET: Setting the mpls mtu to xxxx on Ethernet x/x, which is higher than
the interface MTU xxxx. This could lead to packet forwarding problems including packet
drops.
Most drivers will be able to support baby giants and will gracefully drop packets that are
too large. Certain drivers will have packet forwarding problems including data corruption.
Setting the mpls mtu higher than the interface mtu can lead to packet forwarding problems
and may be blocked in a future release.
```

> ✎
> **Note** The **override** keyword is supported in Cisco IOS Release 12.2(27)SBC, 12.2(33)SRA, 12.4(11)T,
> 12.2(33)SXH, and later releases, but may not be supported in a future release.

How to Configure MPLS MTU Values

The following sections explain how to configure MPLS MTU and interface MTU values:

Setting the Interface MTU and MPLS MTU Values

Use the following steps to set the interface MTU and the MPLS MTU.

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> **Note** In Cisco IOS Release 15.0(1)M1, you can configure the interface MTU on PA-1FE and PA-2FE port
> adapters. The range of values is from 1500 to 1530. Before this enhancement, the MTU of those
> interfaces was not configurable.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot*/*port*
4. **mtu** *bytes*
5. **mpls mtu** *bytes*
6. **end**

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.

	Command or Action	Purpose
Step 3	`interface` *type slot*/*port*	Enters interface configuration mode to configure the interface.
	Example: `Router(config)# interface Serial 1/0`	
Step 4	`mtu` *bytes*	Sets the interface MTU size.
	Example: `Router(config-if)# mtu 1520`	
Step 5	`mpls mtu` *bytes*	Sets the MPLS MTU to match the interface MTU.
	Example: `Router(config-if)# mpls mtu 1520`	
Step 6	`end`	Exits interface configuration mode and returns to privileged EXEC mode.
	Example: `Router(config-if)# end`	

Setting the MPLS MTU Value on an Ethernet Interface

Use the following steps to set the MPLS MTU value on an Ethernet interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot*/*port*
4. **mpls mtu override** *bytes*
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	`enable`	Enables privileged EXEC mode. • Enter your password if prompted.
	Example: `Router> enable`	
Step 2	`configure terminal`	Enters global configuration mode.
	Example: `Router# configure terminal`	

	Command or Action	Purpose
Step 3	**interface** *type slot***/***port* **Example:** Router(config)# interface ethernet 1/0	Enters interface configuration mode to configure the Ethernet interface.
Step 4	**mpls mtu override** *bytes* **Example:** Router(config-if)# mpls mtu override 1510	Sets the MPLS MTU to a value higher than the interface MTU value. ⚠️ **Caution** Setting the MPLS MTU to a value higher than the Ethernet interface MTU value can lead to dropped packets, data corruption, or high CPU rates.
Step 5	**end** **Example:** Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Setting the MPLS MTU Value to the Maximum on L3VPN Profiles

Use the following steps to set the MPLS MTU value to the maximum on L3VPN profiles.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **l3vp encapsulation ip** *profile*
4. **mpls mtu max**
5. **end**

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	**l3vpn encapsulation ip** *profile* **Example:** Router(config)# l3vpn encapsulation ip profile1	Configures an L3VPN encapsulation profile and enters the L3VPN encapsulation configuration mode.

	Command or Action	Purpose

Step 4	`mpls mtu max`
	
	Example:
	`Router(config-l3vpn-encap-ip)# mpls mtu max`
		Sets the MPLS MTU value to the maximum MTU on the L3VPN profile.

Step 5	`end`
	
	Example:
	`Router(config-l3vpn-encap-ip)# end`
		Exits L3VPN encapsulation configuration mode and returns to privileged EXEC mode.

Configuration Examples for Setting the MPLS MTU Values

This section includes the following examples:

Example: Setting the Interface MTU and MPLS MTU

The following example shows how to set the interface and MPLS MTU values. The serial interface in the following configuration examples is at the default interface MTU value. The MPLS MTU value is not set. The interface settings are as follows:

```
interface Serial 4/0
 ip unnumbered Loopback0
 mpls traffic-eng tunnels
 mpls ip
 serial restart-delay 0
 ip rsvp bandwidth 2000 2000
end
```

The following example attempts to set the MPLS MTU value to 1520. This returns an error because MPLS MTU cannot be set to a value greater than the value of the interface MTU.

```
Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface serial 4/0

Router(config-if)# mpls mtu 1520

% Please increase interface mtu to 1520 and then set mpls mtu
```

The following example first sets the interface MTU to 1520 and then sets the MPLS MTU to 1520:

```
Router(config-if)# mtu 1520
Router(config-if)# mpls mtu 1520
```

The following example shows the new interface MTU value. The MPLS MTU value is not displayed because it is equal to the interface value.

```
Router# show running-config interface serial 4/0

Building configuration...
interface Serial4/0
 mtu 1520
 ip unnumbered Loopback0
 mpls traffic-eng tunnels
 mpls ip
 serial restart-delay 0
 ip rsvp bandwidth 2000 2000
end
```

The following example sets the MPLS MTU value to 1510:

```
Router(config-if)# mpls mtu 1510
```

The following example shows the new interface MTU value. The MPLS MTU value is displayed because it is different than the interface MTU value.

```
Router# show running-config interface serial 4/0

Building configuration...
interface Serial4/0
 mtu 1520
 ip unnumbered Loopback0
 mpls mtu 1510
 mpls traffic-eng tunnels
 mpls ip
 serial restart-delay 0
 ip rsvp bandwidth 2000 2000
end
```

Example: Setting the MPLS MTU Value on an Ethernet Interface

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Caution   Setting the MPLS MTU to a value higher than the Ethernet interface MTU value can lead to dropped packets, data corruption, or high CPU rates.

The following example shows how to set the MPLS MTU values on an Ethernet interface. The Ethernet interface in the following configuration examples is at the default interface MTU value. The MPLS MTU value is not set. The interface settings are as follows:

```
interface Ethernet 2/0
 ip unnumbered Loopback0
 mpls traffic-eng tunnels
 mpls ip
 serial restart-delay 0
 ip rsvp bandwidth 2000 2000
end
```

The following example uses the **override** keyword to set the MPLS MTU to 1520, which is higher than the Ethernet interface's MTU value:

```
Router(config-if)# mpls mtu override 1520

%MFI-30-MPLS_MTU_SET: Setting the mpls mtu to 1520 on Ethernet2/0, which is higher than
the interface MTU 1500. This could lead to packet forwarding problems including packet
drops.
```

The following example shows the new MPLS MTU value:

```
Router# show running-config interface ethernet 2/0

Building configuration...
interface Ethernet 2/0
 mtu 1500
 ip unnumbered Loopback0
 mpls mtu 1520
 mpls traffic-eng tunnels
 mpls ip
 serial restart-delay 0
 ip rsvp bandwidth 2000 2000
end
```

Example: Setting the MPLS MTU Value to the Maximum MTU on L3VPN profiles

The following example shows how to set the MPLS MTU value to the maximum MTU on L3VPN profiles:

```
Router# configure terminal
Router(config)# l3vpn encapsulation ip profile1
Router(config-l3vpn-encap-ip)# mpls mtu max
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
MPLS commands	*Cisco IOS MPLS Command Reference*

MIBs

MIBs	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

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for MPLS MTU Command Changes

Table 1 lists the release history for this feature.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 1 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.

Table 1   Feature Information for MPLS MTU Command Changes

Feature Name	Releases	Feature Information
MPLS MTU Command Changes	12.2(27)SBC 12.2(28)SB 12.2(33)SRA 12.2(33)SXH 12.4(11)T 15.0(1)M1 15.1(2)S	This document explains the changes to the **mpls mtu** command. You cannot set the MPLS MTU value larger than the interface MTU value, except for Ethernet interfaces. In 12.2(28)SB, support was added for the Cisco 10000 router. In 12.2(33)SRA, support was added for the Cisco 7600 series router. This feature was integrated into Cisco IOS Release 12.4(11)T. This feature was integrated into Cisco IOS Release 12.2(33)SXH. In 15.0(1)M1, you can configure the interface MTU on PA-1FE and PA-2FE port adapters. In 15.1(2)S, the **mpls mtu** command was made available in L3VPN encapsulation configuration mode. The **maximum** keyword was replaced with the **max** keyword. The **override** keyword and the *bytes* argument were removed from the GRE tunnel interface. The following sections provide information about this feature: • Information About MPLS MTU Command Changes, page 2 • How to Configure MPLS MTU Values, page 4 •

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