

mpls mtu

To set the per-interface Multiprotocol Label Switching (MPLS) maximum transmission unit (MTU) for labeled packets, use the **mpls mtu** interface configuration command. To restore the default, use the **no** form of this command.

mpls mtu *bytes*

no mpls mtu

Syntax Description

bytes The MTU in bytes includes the label stack in the value. For example, to transport an IPv4 packet of 1500 bytes from the edge through an MPLS core, you need an MPLS MTU of at least 1504 bytes. This value accounts for the single 4-byte label and avoids fragmentation. Use the following calculation to determine the MTU:

$$\text{MPLS MTU} = \text{edge MTU} + (\text{label stack} * 4 \text{ bytes})$$

Defaults

The default MPLS MTU is the MTU configured for the interface. The minimum allowable value is 64; the maximum allowable value is interface dependent.

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CT	This command was introduced.
12.1(3)T	This command was modified to reflect new MPLS IETF terminology.

Usage Guidelines

- Setting the MPLS MTU to a high number can lead to packets being dropped on some devices, because the labeled packet is larger than the interface physical MTU.
- ATM interfaces cannot accommodate packets that exceed the Segmentation and Reassembly (SAR) buffer size, because labels are added to the packet. The *bytes* argument refers to the number of bytes in the packet before the addition of any labels. If each label is 4 bytes, the maximum value of bytes on an ATM interface is the physical MTU minus $4 * x$ bytes, where x is the number of labels expected in the received packet.
- If a labeled IPv4 packet exceeds the MPLS MTU size for the interface, Cisco IOS software fragments the packet. If a labeled non-IPv4 packet exceeds the MPLS MTU size, the packet is dropped.
- All devices on a physical medium must have the same MPLS MTU value in order for MPLS to interoperate.
- The MTU for labeled packets for an interface is determined as follows:
 - If the **mpls mtu bytes** command has been used to configure an MPLS MTU, the MTU for labeled packets is the *bytes* value.

- Otherwise, the MTU for labeled packets is the default MTU for the interface.
- Because labeling a packet makes it larger due to the label stack, you may want the MPLS MTU to be larger than the interface MTU or IP MTU in order to prevent the fragmentation of labeled packets, which would not be fragmented if they were unlabeled.
- Changing the interface MTU value (using the **mtu** interface configuration command) can affect the MPLS MTU of the interface. If the MPLS MTU value is the same as the interface MTU value (this is the default), and you change the interface MTU value, the MPLS MTU value will automatically be set to this new MTU as well. However, the reverse is not true; changing the MPLS MTU value has no effect on the interface MTU.

Examples

The following example sets the maximum labeled packet size for the Fastethernet interface to 1508, which is common in an MPLS core carrying MPLS VPN traffic, for example:

```
interface Fastethernet0
 mpls mtu 1508
```

mpls netflow egress

To enable Multiprotocol Label Switching (MPLS) egress NetFlow accounting on an interface, use the **mpls netflow egress** command in interface configuration mode. To disable MPLS egress NetFlow accounting, use the **no** form of this command.

mpls netflow egress

no mpls netflow egress

Syntax Description This command has no arguments or keywords.

Defaults This command is disabled.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(10)ST	This command was introduced.
	12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.

Usage Guidelines Use this command to configure the provider edge (PE)-to-customer edge (CE) interface of a PE router.

Examples The following example shows how to enable MPLS egress NetFlow accounting on the egress PE interface that connects to the CE interface at the destination Virtual Private Network (VPN) site:

```
Router(config-if)# mpls netflow egress
```

Related Commands	Command	Description
	debug mpls netflow	Enables debugging of MPLS egress NetFlow accounting.
	show mpls forwarding-table	Displays a message that the quick flag is set for all prefixes learned from the MPLS egress NetFlow accounting enabled interface.
	show mpls interfaces	Displays the value of the output_feature_state. If MPLS egress NetFlow accounting is enabled on an interface, the value is any number other than 0. If MPLS egress NetFlow accounting is disabled on an interface, the value is 0.

mpls prefix-map

To configure a router to use a specified quality of service (QoS) map when a label destination prefix matches the specified access list, use the **mpls prefix-map** command in ATM subinterface submode.

mpls prefix-map *prefix-map* **access-list** *access-list* **cos-map** *cos-map*

Syntax Description

<i>prefix-map</i>	Unique number for a prefix map.
access-list <i>access list</i>	Unique number for a simple IP access list.
cos-map <i>cos-map</i>	Unique number for a QoS map.

Defaults

No access list is linked to a QoS map.

Command Modes

ATM subinterface submode

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(10)ST	This command was modified to reflect Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) syntax and terminology.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.

Usage Guidelines

This **mpls prefix-map** command links an access list to a QoS map when a label distribution prefix matches the specified access list.

Examples

The following example shows how to link an access list to a QoS map:

```
Router(config-subif)# mpls prefix-map 55 access-list 55 cos-map 55
```

Related Commands

Command	Description
show mpls prefix-map	Shows the prefix map used to assign a QoS map to network prefixes that match a standard IP access list.

mpls request-labels for

To restrict the creation of label switched paths (LSPs) through the use of access lists on the label switch controller (LSC) or label edge router (LER), use the **mpls request-labels for** command in global configuration mode. To restrict the creation of LSPs through the use of access lists on the LSC or LER, use the **no** form of this command.

mpls request-labels for *access-list*

no mpls request-labels for

Syntax Description	<i>access-list</i>	A named or numbered standard IP access list.
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Defaults	No LSPs are created using access lists on the LCS or LER.
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Command Modes	Global configuration
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Command History	Release	Modification
	12.1(5)T	This command was introduced.
12.2(4)T	This command was updated to reflect the Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) terminology.	

Usage Guidelines	<p>The command includes the following usage guidelines:</p> <ul style="list-style-type: none"> You can specify either an access list number or name. When you create an access list, the end of the access list contains an implicit deny statement for everything if it did not find a match before reaching the end. If you omit the mask from an IP host address access list specification, 0.0.0.0 is assumed to be the mask.
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Examples	<p>The following example shows how to prevent headend label switched controlled virtual circuits (LVCs) from being established from the LSC to all 192.168.x.x destinations. The following commands are added to the LSC configuration:</p>
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```
Router(config)# mpls request-labels for 1
Router(config)# access-list 1 deny 192.168.0.0 0.255.255.255
Router(config)# access-list 1 permit any
```

Related Commands	Command	Description
	access list	Creates access lists.
	ip access-list	Permits or denies access to IP addresses.

mpls static binding ipv4 vrf

To bind a prefix to a local label, use the **mpls static binding ipv4 vrf** command in global configuration mode. To remove static prefix/label bindings, use the **no** form of this command.

```
mpls static binding ipv4 vrf vpn-name prefix mask [[input] label]
```

```
no mpls static binding ipv4 vrf vpn-name prefix mask [[input] label]
```

Syntax Description

<i>vpn-name</i>	Specifies the VPN routing and forwarding instance (<i>vpn-name</i>).
<i>prefix mask label</i>	Binds a prefix or a mask to a local label.
	Note These arguments are optional for the no form of the command.
input <i>label</i>	(Optional) Binds the specified label to the prefix/mask as a local (incoming) label.

Defaults

Label bindings are dynamically assigned.

Command Modes

Global configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.

Usage Guidelines

The **vrf** keyword can be used only when you configure input labels.

Depending on how you configure VRF aware MPLS static labels, static labels are advertised one of the following ways:

- By Label Distribution Protocol (LDP) between provider edge (PE) and customer edge (CE) routers within a virtual routing and forwarding (VRF)
- In VPNv4 Border Gateway Protocol (BGP) in the service provider's backbone

If you do not specify the **input** keyword, an input (local) label is assumed.

The **no** form of the command functions as follows:

- Omitting the *prefix* and the subsequent parameters removes all static bindings.
- Specifying the *prefix* and *mask* but no other parameters removes all static bindings for that prefix or mask.

Examples

The following example binds a prefix to local label 17:

```
Router(config)# mpls static binding ipv4 vrf vpn100 130.66.0.0 255 255.0.0 input 17
```

Related Commands

Command	Description
show mpls static binding ipv4 vrf	Displays configured static bindings.

mpls traffic-eng

To configure a router running Intermediate System-to-Intermediate System (IS-IS) so that it floods Multiprotocol Label Switching (MPLS) traffic engineering (TE) link information into the indicated IS-IS level, use the **mpls traffic-eng** command in router configuration mode. To disable the flooding of MPLS TE link information into the indicated IS-IS level, use the **no** form of this command.

mpls traffic-eng {level-1 | level-2}

no mpls traffic-eng {level-1 | level-2}

Syntax Description

level-1	Floods MPLS TE link information into IS-IS level 1.
level-2	Floods MPLS TE link information into IS-IS level 2.

Defaults

Flooding is disabled.

Command Modes

Router configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

This command, which is part of the routing protocol tree, causes link resource information (such as available bandwidth) for appropriately configured links to be flooded in the IS-IS link-state database.

Examples

The following example shows how to configure MPLS TE link information flooding for IS-IS level 1:

```
Router(config-router)# mpls traffic-eng level-1
```

Related Commands

Command	Description
mpls traffic-eng router-id	Specifies that the traffic engineering router identifier for the node is the IP address associated with a given interface.

mpls traffic-eng administrative-weight

To override the Interior Gateway Protocol (IGP) administrative weight (cost) of the link, use the **mpls traffic-eng administrative-weight** command in interface configuration mode. To disable the override, use the **no** form of this command.

mpls traffic-eng administrative-weight *weight*

no mpls traffic-eng administrative-weight

Syntax Description	<i>weight</i>	Cost of the link.
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Defaults	IGP cost of the link.
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Command Modes	Interface configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Examples The following example shows how to override the IGP cost of the link and set the cost to 20:

```
Router(config-if)# mpls traffic-eng administrative-weight 20
```

Related Commands	Command	Description
	mpls traffic-eng attribute-flags	Sets the user-specified attribute flags for an interface.

mpls traffic-eng area

To configure a router running Open Shortest Path First (OSPF) Multiprotocol Label Switching (MPLS) so that it floods traffic engineering for the indicated OSPF area, use the **mpls traffic-eng area** command in router configuration mode. To disable flooding of traffic engineering for the indicated OSPF area, use the **no** form of this command.

mpls traffic-eng area *number*

no mpls traffic-eng area *number*

Syntax Description	<i>number</i>	The OSPF area on which MPLS traffic engineering is enabled.
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Defaults	Flooding is disabled.	
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Command Modes	Router configuration	
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines	This command is in the routing protocol configuration tree and is supported for both OSPF and IS-IS. The command affects the operation of MPLS traffic engineering only if MPLS traffic engineering is enabled for that routing protocol instance. Currently, only a single level can be enabled for traffic engineering.	
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Examples	The following example shows how to configure a router running OSPF MPLS to flood traffic engineering for OSPF 0:	
	<pre>Router(config-router)# mpls traffic-eng area 0</pre>	

Related Commands	Command	Description
	mpls traffic-eng router-id	Specifies that the traffic engineering router identifier for the node is the IP address associated with a given interface.
	network area	Defines the interfaces on which OSPF runs and defines the area ID for those interfaces.
	router ospf	Configures an OSPF routing process on a router.

mpls traffic-eng atm cos global-pool

To specify the class of service for all global pools in traffic engineering tunnels traversing XTagATM interfaces on an ATM-label switch router (LSR), use the **mpls traffic-eng atm cos global-pool** command in global configuration mode.

mpls traffic-eng atm cos global-pool [**available** | **standard** | **premium** | **control**]

Syntax Description	available standard premium control (Optional) Four classes of service, ordered from lowest priority (available) to highest priority (control). The default is available .
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Defaults	The default class is the lowest, available .
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Command Modes	Global configuration
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Command History	Release	Modification
	12.2(8)T	This command was introduced.

Usage Guidelines	Because this command works at the global rather than at the interface level, it sets the same class of service for global pool traffic engineering (TE) tunnel traffic on <i>all</i> XTagATM interfaces of the device.
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Examples	The following example shows how to specify the second-lowest possible priority class of service for the global pool traffic:
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```
Router(config)# mpls traffic-eng atm cos global-pool standard
```

Related Commands	Command	Description
	mpls traffic-eng atm cos sub-pool	Specifies class of service for subpool traffic traversing XtagATM interfaces.

mpls traffic-eng atm cos sub-pool

To specify the class of service for all subpools in traffic engineering tunnels traversing XTagATM interfaces on an ATM-label switch router (LSR), use the **mpls traffic-eng atm cos sub-pool** command in global configuration mode.

mpls traffic-eng atm cos sub-pool [available | standard | premium | control]

Syntax Description	available standard premium control Four classes of service, ordered from lowest priority (available) to highest priority (control). The default is control .				
Defaults	The default class is the highest, control .				
Command Modes	Global configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.2(8)T</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	12.2(8)T	This command was introduced.
Release	Modification				
12.2(8)T	This command was introduced.				
Usage Guidelines	Because this command works at the global rather than at the interface level, it sets the same class of service for subpool traffic engineering (TE) tunnel traffic on <i>all</i> XTagATM interfaces of the device.				
Examples	<p>The following example shows how to specify the second-highest possible priority class of service for the subpool traffic:</p> <pre>Router(config)# mpls traffic-eng atm cos sub-pool premium</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>mpls traffic-eng atm cos global-pool</td> <td>Specifies class of service for global-pool traffic traversing XTagATM interfaces.</td> </tr> </tbody> </table>	Command	Description	mpls traffic-eng atm cos global-pool	Specifies class of service for global-pool traffic traversing XTagATM interfaces.
Command	Description				
mpls traffic-eng atm cos global-pool	Specifies class of service for global-pool traffic traversing XTagATM interfaces.				

mpls traffic-eng attribute-flags

To set the user-specified attribute flags for the interface, use the **mpls traffic-eng attribute-flags** command in interface configuration mode. To disable the user-specified attribute flags for the interface, use the **no** form of this command.

mpls traffic-eng attribute-flags *attributes*

no mpls traffic-eng attribute-flags

Syntax Description	<i>attributes</i>	Links attributes that will be compared to a tunnel's affinity bits during selection of a path. Valid values are from 0x0 to 0xFFFFFFFF, representing 32 attributes (bits) where the value of an attribute is 0 or 1.
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Defaults	0x0
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Command Modes	Interface configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines	This command assigns attributes to a link so that tunnels with matching attributes (represented by their affinity bits) prefer this link instead of others that do not match. The interface is flooded globally so that it can be used as a tunnel head-end path selection criterion.
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Examples	The following example shows how to set the attribute flags to 0x0101: Router(config-if)# mpls traffic-eng attribute-flags 0x0101
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Related Commands	Command	Description
	mpls traffic-eng administrative-weight	Overrides the IGP administrative weight of the link.
	tunnel mpls traffic-eng affinity	Configures affinity (the properties that the tunnel requires in its links) for an MPLS traffic engineering tunnel.

mpls traffic-eng auto-bw timers

To enable automatic bandwidth adjustment for a platform and to start output rate sampling for tunnels configured for automatic bandwidth adjustment, use the **mpls traffic-eng auto-bw timers** command in global configuration mode. To disable automatic bandwidth adjustment for the platform, use the **no** form of this command.

mpls traffic-eng auto-bw timers [*frequency seconds*]

no mpls traffic-eng auto-bw timers

Syntax Description	frequency seconds (Optional) Interval, in seconds, for sampling the output rate of each tunnel configured for automatic bandwidth. The value must be from 1 through 604800. The recommended value is 300.				
Defaults	When the optional frequency keyword is not specified, the sampling interval is 300 seconds (5 minutes).				
Command Modes	Global configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 12.2(4)T</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 12.2(4)T	This command was introduced.
Release	Modification				
Release 12.2(4)T	This command was introduced.				
Usage Guidelines	<p>The mpls traffic-eng auto-bw timers command enables automatic bandwidth adjustment on a platform by causing traffic engineering to periodically sample the output rate for each tunnel configured for bandwidth adjustment.</p> <p>The no mpls traffic-eng auto-bw timers command disables automatic bandwidth adjustment for a platform by terminating the output rate sampling and bandwidth adjustment for tunnels configured for adjustment. In addition, the no form of the command restores the configured bandwidth for each tunnel where “configured bandwidth” is determined as follows:</p> <ul style="list-style-type: none"> • If the tunnel bandwidth was explicitly configured via the tunnel mpls traffic-eng bandwidth command after the running configuration was written (if at all) to the startup configuration, the “configured bandwidth” is the bandwidth specified by that command. • Otherwise, the “configured bandwidth” is the bandwidth specified for the tunnel in the startup configuration. 				
Examples	<p>The following example shows how to designate that for each Multiprotocol Label Switching (MPLS) traffic engineering tunnel, the output rate is sampled once every 10 minutes (every 600 seconds):</p> <pre>Router(config)# mpls traffic-eng auto-bw timers frequency 600</pre>				

Related Commands

Command	Description
tunnel mpls traffic-eng auto-bw	Enables automatic bandwidth adjustment for a tunnel, specifies the frequency with which tunnel bandwidth can be automatically adjusted, and designates the allowable range of bandwidth adjustments.

mpls traffic-eng fast-reroute backup-prot-preemption

To change the backup protection preemption algorithm to minimize the amount of bandwidth that is wasted, use the **mpls traffic-eng fast-reroute backup-prot-preemption** command in global configuration mode. To use the default algorithm of minimizing the number of LSPs that are demoted, use the **no** form of this command.

mpls traffic-eng fast-reroute backup-prot-preemption [optimize-bw]

no mpls traffic-eng fast-reroute backup-prot-preemption

Syntax Description	optimize-bw (Optional) Minimizes the amount of bandwidth wasted.
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Defaults	A minimum number of LSPs are preempted.
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Command Modes	Global configuration
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Command History	Release	Modification
	12.0(29)S	This command was introduced.

Usage Guidelines

The **mpls traffic-eng fast-reroute backup-prot-preemption** command allows you to determine the criteria the router will use when selecting the LSPs that will be preempted.

If you enter the command with the **optimize-bw** keyword, the router chooses LSPs that will waste the least amount of bandwidth.

If you do not enter the **mpls traffic-eng fast-reroute backup-prot-preemption optimize-bw** command, the router preempts as few LSPs as possible.

Each router in the network does not have to use the same algorithm; that is, you can specify **optimize-bw** for some routers in the network but not for others.

You can enter the **mpls traffic-eng fast-re-route backup-prot-preemption** command at any time. If you change the algorithm, it does not affect LSPs that already are protected. It only affects the placement of new LSPs signalled after you enter this command. The command can affect LSPs during the next periodic promotion cycle.

Examples

In the following examples, a next-next-hop (NNHOP) backup tunnel has the following characteristics:

- Total backup capacity: 240 units
- Used backup bandwidth: 220 units
- Available backup bandwidth: 20 units

The backup tunnel currently is protecting LSP1 through LSP5, which have the following bandwidth, and do not have backup bandwidth protection (that is, the “bandwidth protection desired” bit was not set via the **tunnel mpls traffic-eng fast-reroute** command):

- LSP1: 10 units
- LSP2: 20 units
- LSP3: 30 units
- LSP4: 60 units
- LSP5: 100 units

As shown above, LSP1 through LSP5 use 220 units of bandwidth.

LSP6 has backup bandwidth protection and needs 95 units of bandwidth. Twenty units of bandwidth are available, so 75 more units of bandwidth are needed.

In the following example, backup bandwidth protection is enabled and the amount of wasted bandwidth is minimized.

```
Router(config)# mpls traffic-eng fast-reroute backup-prot-preemption optimize-bw
```

LSP2 and LS4 are preempted so that the least amount of bandwidth is wasted.

In the following example, backup protection preemption is enabled and the number of preempted LSPs is minimized.

```
Router(config)# no mpls traffic-eng fast-reroute backup-prot-preemption
```

The router selects the LSP whose bandwidth is next-greater than the required bandwidth. Therefore, the router picks LSP5 because it has the next larger amount of bandwidth over 75. One LSP is demoted. 25 units of bandwidth are wasted.

Related Commands

Command	Description
<code>show ip rsvp fast bw-protect</code>	Displays information about whether backup bandwidth protection is enabled and the status of backup tunnels that may be used to provide that protection.

mpls traffic-eng flooding thresholds

To set a reserved bandwidth thresholds for a link, use the **mpls traffic-eng flooding thresholds** command in interface configuration mode. To return to the default settings, use the **no** form of this command.

mpls traffic-eng flooding thresholds { **down** | **up** } *percent* [*percent* ...]

no mpls traffic-eng flooding thresholds { **down** | **up** }

Syntax Description

down	Sets the thresholds for decreased resource availability.
up	Sets the thresholds for increased resource availability.
<i>percent</i> [<i>percent</i>]	Bandwidth threshold level. For the down keyword, valid values are from 0 through 99. For the up keyword, valid values are from 1 through 100.

Defaults

The default for **down** is 100, 99, 98, 97, 96, 95, 90, 85, 80, 75, 60, 45, 30, 15.

The default for **up** is 15, 30, 45, 60, 75, 80, 85, 90, 95, 97, 98, 99, 100.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

When a threshold is crossed, Multiprotocol Label Switching (MPLS) traffic engineering link management advertises updated link information. If no thresholds are crossed, changes can be flooded periodically unless periodic flooding was disabled.

Examples

The following example shows how to set the reserved bandwidth of the link for decreased resource availability (down) and for increased resource availability (up) thresholds:

```
Router(config-if)# mpls traffic-eng flooding thresholds down 100 75 25
Router(config-if)# mpls traffic-eng flooding thresholds up 25 50 100
```

Related Commands

Command	Description
mpls traffic-eng link timers periodic-flooding	Sets the length of the interval used for periodic flooding.

Command	Description
show mpls traffic-eng link-management advertisements	Displays local link information currently being flooded by MPLS traffic engineering link management into the global traffic engineering topology.
show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.

mpls traffic-eng link timers bandwidth-hold

To set the length of time that bandwidth is held for a Resource Reservation Protocol (RSVP) PATH (Set Up) message while waiting for the corresponding RSVP RESV message to come back, use the **mpls traffic-eng link timers bandwidth-hold** command in global configuration mode.

mpls traffic-eng link timers bandwidth-hold *hold-time*

Syntax Description	<i>hold-time</i>	Sets the length of time that bandwidth can be held. The range is from 1 to 300 seconds.
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Defaults	15 seconds
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Command Modes	Global configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Examples

The following example sets the length of time that bandwidth is held to 10 seconds.

```
Router(config)# mpls traffic-eng link-management timers bandwidth-hold 10
```

Related Commands	Command	Description
	show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.

mpls traffic-eng link timers periodic-flooding

To set the length of the interval used for periodic flooding, use the **mpls traffic-eng link timers periodic-flooding** command in global configuration mode.

mpls traffic-eng link timers periodic-flooding *interval*

Syntax Description	<i>interval</i>	Length of interval used for periodic flooding (in seconds). The range is from 0 to 3600. If you set this value to 0, you turn off periodic flooding. If you set this value anywhere in the range from 1 to 29, it is treated as 30.
Defaults	180 seconds	
Command Modes	Global configuration	
Command History	Release	Modification
	12.0(5)S	This command was introduced.
Usage Guidelines	<p>Use this command to set the interval for periodic flooding of traffic engineering (TE) topology information.</p> <p>Changes in the Multiprotocol Label Switching (MPLS) TE topology database are flooded by the link state Interior Gateway Protocol (IGP). Some changes, such as those to link status (up/down) or configured parameters, trigger immediate flooding. Other changes are considered less urgent and are flooded periodically. For example, changes to the amount of link bandwidth allocated to TE tunnels are flooded periodically unless the change causes the bandwidth to cross a configurable threshold.</p>	
Examples	<p>The following example sets the interval length for periodic flooding to advertise flooding changes to 120 seconds.</p> <pre>Router(config)# mpls traffic-eng timers periodic-flooding 120</pre>	
Related Commands	Command	Description
	mpls traffic-eng flooding thresholds	Sets the reserved bandwidth thresholds of a link.

mpls traffic-eng link-management timers bandwidth-hold

To set the length of time that bandwidth is held for an RSVP path (setup) message while you wait for the corresponding RSVP Resv message to come back, use the **mpls traffic-eng link-management timers bandwidth-hold** command in global configuration mode. To disable this function, use the **no** form of this command.

mpls traffic-eng link-management timers bandwidth-hold *hold-time*

no mpls traffic-eng link-management timers bandwidth-hold

Syntax Description	<i>hold-time</i>	Length of time that bandwidth can be held. Valid values are from 1 to 300 seconds.
Defaults	15 seconds	
Command Modes	Global configuration	
Command History	Release	Modification
	12.0(5)S	This command was introduced.
Examples	In the following example, bandwidth is set to be held for 10 seconds: Router(config)# mpls traffic-eng link-management timers bandwidth-hold 10	
Related Commands	Command	Description
	show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.

mpls traffic-eng link-management timers periodic-flooding

To set the length of the interval for periodic flooding, use the **mpls traffic-eng link-management timers periodic-flooding** command in global configuration mode. To disable the specified interval length for periodic flooding, use the **no** form of this command.

mpls traffic-eng link-management timers periodic-flooding *interval*

no mpls traffic-eng link-management timers periodic-flooding

Syntax Description	<i>interval</i>	Length of the interval (in seconds) for periodic flooding. Valid values are from 0 to 3600. A value of 0 turns off periodic flooding. If you set this value from 1 to 29, it is treated as 30.				
Defaults	180 seconds (3 minutes)					
Command Modes	Global configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.0(5)S</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	12.0(5)S	This command was introduced.	
Release	Modification					
12.0(5)S	This command was introduced.					
Usage Guidelines	Use this command to advertise link state information changes that do not trigger immediate action. For example, a change to the amount of allocated bandwidth that does not cross a threshold.					
Examples	<p>The following example shows how to set the interval length for periodic flooding to 120 seconds:</p> <pre>Router(config)# mpls traffic-eng link-management timers periodic-flooding 120</pre>					
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>mpls traffic-eng flooding thresholds</td> <td>Sets a link's reserved bandwidth thresholds.</td> </tr> </tbody> </table>	Command	Description	mpls traffic-eng flooding thresholds	Sets a link's reserved bandwidth thresholds.	
Command	Description					
mpls traffic-eng flooding thresholds	Sets a link's reserved bandwidth thresholds.					

mpls traffic-eng logging lsp

To log certain traffic engineering label switched path (LSP) events, use the **mpls traffic-eng logging lsp** command in global configuration mode. To disable logging of LSP events, use the **no** form of this command.

```
mpls traffic-eng logging lsp {path-errors | reservation-errors | preemption | setups | teardowns} [acl-number]
```

```
no mpls traffic-eng logging lsp {path-errors | reservation-errors | preemption | setups | teardowns} [acl-number]
```

Syntax Description

path-errors	Logs RSVP path errors for traffic engineering LSPs.
reservation-errors	Logs RSVP reservation errors for traffic engineering LSPs.
preemption	Logs events related to the preemption of traffic engineering LSPs.
setups	Logs events related to the establishment of traffic engineering LSPs.
teardowns	Logs events related to the removal of traffic engineering LSPs.
<i>acl-number</i>	(Optional) Uses the specified access list to filter the events that are logged. Logs events only for LSPs that match the access list.

Defaults

Logging of LSP events is disabled.

Command Modes

Global configuration

Command History

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

Examples

The following example shows how to log path errors for LSPs that match access list 3:

```
Router(config)# mpls traffic-eng logging lsp path-errors 3
```

Related Commands

Command	Description
access-list (extended)	Defines an extended IP access list.
logging console	Limits the number of messages logged to the console.
mpls traffic-eng logging tunnel	Logs certain traffic engineering tunnel events.
show logging	Displays the messages that are logged in the buffer.

mpls traffic-eng logging tunnel

To log certain traffic engineering tunnel events, use the **mpls traffic-eng logging tunnel** command in global configuration mode. To disable logging of traffic engineering tunnel events, use the **no** form of this command.

```
mpls traffic-eng logging tunnel lsp-selection [acl-number]
```

```
no mpls traffic-eng logging tunnel lsp-selection [acl-number]
```

Syntax Description

lsp-selection	Logs events related to the selection of a label switched path (LSP) for a traffic engineering tunnel.
<i>acl-number</i>	(Optional) Uses the specified access list to filter the events that are logged. Logs events only for tunnels that match the access list.

Defaults

Logging of tunnel events is disabled.

Command Modes

Global configuration

Command History

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

Examples

The following example shows how to log traffic engineering tunnel events associated with access list 3:

```
Router(config)# mpls traffic-eng logging tunnel lsp-selection 3
```

Related Commands

Command	Description
access-list (extended)	Creates an extended access list.
logging console	Limits the number of messages logged to the console.
mpls traffic-eng logging lsp	Logs certain traffic engineering LSP events.
show logging	Displays the messages that are logged in the buffer.

mpls traffic-eng multicast-intact

To configure a router running Intermediate System-to-Intermediate System (IS-IS) or Open Shortest Path First (OSPF) so that Protocol-Independent Multicast (PIM) and Multiprotocol Label Switching (MPLS) traffic engineering (TE) can work together, use the **mpls traffic-eng multicast-intact** command in router configuration mode. To disable interoperability between PIM and MPLS TE, use the **no** form of this command.

mpls traffic-eng multicast-intact

no mpls traffic-eng multicast-intact

Syntax Description This command has no arguments or keywords.

Defaults PIM and MPLS TE do not work together.

Command Modes Router configuration

Command History

Release	Modification
12.0(12)S	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.3	This command was integrated into Cisco IOS Release 12.3.
12.4T	This command was integrated into Cisco IOS Release 12.4T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **mpls traffic-eng multicast-intact** command allows PIM to use the native hop-by-hop neighbors while unicast routing is using MPLS TE tunnels.

This command works only for OSPF and IS-IS protocols.

Examples

The following example shows how to enable PIM and MPLS TE to interoperate:

```
Router(config-router)# mpls traffic-eng multicast-intact
```

Related Commands

Command	Description
mpls traffic-eng interface	Configures a router running OSPF or IS-IS so that it floods MPLS TE link information in the indicated OSPF area or IS-IS level.
show ospf routes multicast-intact	Displays multicast-intact paths of OSPF routes.

mpls traffic-eng passive-interface

To configure a link as a passive interface between two autonomous system boundary routers (ASBRs), use the **mpls traffic-eng passive-interface** command in interface configuration mode. To disable this feature, use the **no** form of this command.

```
mpls traffic-eng passive-interface [nbr-te-id] [router_id | te_id] [nbr-igp-id] isis | ospf sysid
```

```
no mpls traffic-eng passive-interface [nbr-te-id] [router_id | te_id] [nbr-igp-id] isis | ospf sysid
```

Syntax Description

nbr-te-id	(Optional) Traffic engineering ID of the neighbor router.
<i>router_id</i>	(Optional) IP address of the neighbor router.
<i>te_id</i>	(Optional) IP address of the neighbor router.
nbr-igp-id	(Optional) Used with the isis or ospf keyword if two autonomous systems use different IGPs and have more than one neighbor on the link.
isis <i>sysid</i>	(Optional) System identification of IS-IS.
ospf <i>sysid</i>	(Optional) System identification of OSPF.

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
12.0(29)S	This command was introduced.

Usage Guidelines

On a point-to-point link or on a multiaccess link where there is only one neighbor, you do not have to enter the **isis** or **ospf** keyword (or the *sysid* argument).

If two autonomous systems use different IGPs and have more than one neighbor on the link, you must enter the **nbr-igp-id** keyword followed by **isis** or **ospf** and the *sysid*. The *sysid* must be unique for each neighbor.

Examples

In the following example there is only one neighbor:

```
Router(config-if)# mpls traffic-eng passive-interface nbr-te-id 100.100.100.100
```

In the following example, two autonomous systems use different IGPs and have more than one neighbor on the link:

```
Router(config-if)# mpls traffic-eng passive-interface nbr-te-id 10.10.10.10 nbr-igp-id  
ospf 10.10.10.10
```

If autonomous system (AS) 1 (AS1) is running IS-IS and AS2 is running OSPF, the unique ID on A1 must be in the system ID format. To form the system ID, we recommend that you append zeros to the router ID of the neighbor. For example, if the AS2 router is 20.20.20.20, then you could enter a system ID of 20.0020.0020.0020.00 for IS-IS on the AS1 router.

```
Router(config-if)# mpls traffic-eng passive-interface nbr-te-id 20.20.20.20 nbr-igp-id  
isis 20.0020.0020.0020.00
```

mpls traffic-eng reoptimize

To force immediate reoptimization of all traffic engineering tunnels, use the **mpls traffic-eng reoptimize** command in privileged EXEC mode.

mpls traffic-eng reoptimize

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.0(5)ST	This command was introduced.

Examples The following example shows how to reoptimize all traffic engineering tunnels immediately:

```
Router# mpls traffic-eng reoptimize
```

mpls traffic-eng reoptimize events

To turn on automatic reoptimization of Multiprotocol Label Switching (MPLS) traffic engineering when certain events occur, such as when an interface becomes operational, use the **mpls traffic-eng reoptimize events** command in global configuration mode. To disable automatic reoptimization, use the **no** form of this command.

mpls traffic-eng reoptimize events link-up

no mpls traffic-eng reoptimize events link-up

Syntax Description	link-up	Triggers automatic reoptimization whenever an interface becomes operational.
---------------------------	----------------	--

Defaults Event-based reoptimization is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.1(3)T	This command was introduced.

Examples The following example shows how to turn on automatic reoptimization whenever an interface becomes operational:

```
Router(config)# mpls traffic-eng reoptimize events link-up
```

Related Commands	Command	Description
	mpls traffic-eng logging lsp	Controls the frequency with which tunnels with established LSPs are checked for better LSPs.
	mpls traffic-eng reoptimize	Reoptimizes all traffic engineering tunnels immediately.

mpls traffic-eng reoptimize timers frequency

To control the frequency with which tunnels with established label switched paths (LSPs) are checked for better LSPs, use the **mpls traffic-eng reoptimize timers frequency** command in global configuration mode. To disable this function, use the **no** form of this command.

mpls traffic-eng reoptimize timers frequency *seconds*

no mpls traffic-eng reoptimize timers frequency

Syntax Description	<i>seconds</i>	Sets the frequency of reoptimization (in seconds). A value of 0 disables reoptimization. The range of values is 0 to 604800 seconds (1 week)
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Defaults	3600 seconds (1 hour)
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Command Modes	Global configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines A device with traffic engineering tunnels periodically examines tunnels with established LSPs to learn if better LSPs are available. If a better LSP seems to be available, the device attempts to signal the better LSP; if the signalling is successful, the device replaces the old, inferior LSP with the new, better LSP.



Note If the **lockdown** keyword is specified with the **tunnel mpls traffic-eng path-option** command, then a reoptimize check is not done on the tunnel.



Note If you specify a low reoptimization frequency (e.g., less than 30 seconds), there may be an increase in CPU utilization for configurations with a large number of traffic engineering tunnels.

Examples The following example shows how to set the reoptimization frequency to 1 day:

```
Router(config)# mpls traffic-eng reoptimize timers frequency 86400
```

Related Commands	Command	Description
	mpls traffic-eng reoptimize	Reoptimizes all traffic engineering tunnels immediately.
	tunnel mpls traffic-eng path-option	Configures a path option for an MPLS traffic engineering tunnel.

mpls traffic-eng router-id

To specify that the traffic engineering router identifier for the node is the IP address associated with a given interface, use the **mpls traffic-eng router-id** command in router configuration mode. To remove the traffic engineering router identifier, use the **no** form of this command.

mpls traffic-eng router-id *interface-name*

no mpls traffic-eng router-id

Syntax Description

<i>interface-name</i>	Interface whose primary IP address is the router's identifier.
-----------------------	--

Defaults

No traffic engineering router identifier is specified.

Command Modes

Router configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

This router identifier acts as a stable IP address for the traffic engineering configuration. This IP address is flooded to all nodes. For all traffic engineering tunnels originating at other nodes and ending at this node, you must set the tunnel destination to the traffic engineering router identifier of the destination node, because that is the address that the traffic engineering topology database at the tunnel head uses for its path calculation.

Examples

The following example shows how to specify the traffic engineering router identifier as the IP address associated with interface Loopback0:

```
Router(config-router)# mpls traffic-eng router-id Loopback0
```

Related Commands

Command	Description
mpls atm control-vc	Turns on flooding of MPLS traffic engineering link information in the indicated IGP level/area.

mpls traffic-eng signalling advertise implicit-null

To use the Multiprotocol Label Switching (MPLS) encoding for the implicit-null label in signaling messages sent to neighbors that match the specified access list, use the **mpls traffic-eng signalling advertise implicit-null** command in router configuration mode. To disable this feature, use the **no** form of this command.

```
mpls traffic-eng signalling advertise implicit-null [acl-name | acl-number]
```

```
no mpls traffic-eng signalling advertise implicit-null
```

Syntax Description		
	<i>acl-name</i>	Name of the access list.
	<i>acl-number</i>	Number of the access list.

Defaults Use the Cisco encoding for the implicit-null label in signaling messages.

Command Modes Router configuration

Command History	Release	Modification
	12.0(5)ST	This command was introduced.

Examples The following example shows how to configure the router to use MPLS encoding for the implicit-null label when it sends signaling messages to certain peers:

```
Router(config-router)# mpls traffic-eng signalling advertise implicit-null
```

mpls traffic-eng tunnels (global configuration)

To enable Multiprotocol Label Switching (MPLS) traffic engineering tunnel signaling on a device, use the **mpls traffic-eng tunnels** command in global configuration mode. To disable MPLS traffic engineering tunnel signaling, use the **no** form of this command.

mpls traffic-eng tunnels

no mpls traffic-eng tunnels

Syntax Description This command has no arguments or keywords.

Defaults The command is disabled.

Command Modes Global configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

This command enables MPLS traffic engineering on a device. For you to use the feature, MPLS traffic engineering must also be enabled on the desired interfaces.

Examples

The following example shows how to turn on MPLS traffic engineering tunnel signaling:

```
Router(config)# mpls traffic-eng tunnels
```

Related Commands

Command	Description
mpls traffic-eng tunnels (interface configuration)	Enables MPLS traffic engineering tunnel signalling on an interface.

mpls traffic-eng tunnels (interface configuration)

To enable Multiprotocol Label Switching (MPLS) traffic engineering tunnel signaling on an interface (assuming that it is enabled on the device), use the **mpls traffic-eng tunnels** command in interface configuration mode. To disable MPLS traffic engineering tunnel signaling on the interface, use the **no** form of this command.

mpls traffic-eng tunnels

no mpls traffic-eng tunnels

Syntax Description This command has no arguments or keywords.

Defaults The command is disabled on all interfaces.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines To enable MPLS traffic engineering on the interface, MPLS traffic engineering must also be enabled on the device. An enabled interface has its resource information flooded into the appropriate IGP link-state database and accepts traffic engineering tunnel signalling requests.

Examples The following example shows how to enable MPLS traffic engineering on Ethernet interface 0/0:

```
Router(config)# interface Ethernet0/0
Router(config-if)# mpls traffic-eng tunnels
```

Related Commands	Command	Description
	mpls traffic-eng tunnels (global configuration)	Enables MPLS traffic engineering tunnel signalling on a device.

