



MPLS Traffic Engineering Automatic Bandwidth

The Automatic bandwidth feature allows you to configure and monitor the bandwidth for MPLS TE or flex LSP tunnels. The automatic bandwidth samples the average output rate of each tunnel marked for automatic bandwidth adjustment. When the automatic bandwidth is enabled for a tunnel, the output rate of the tunnel is sampled and tunnel bandwidth is adjusted automatically. This bandwidth is allocated for a tunnel dynamically using RSVP-TE.

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Restrictions for MPLS Traffic Engineering Automatic Bandwidth

- Automatic bandwidth is supported on the RSP3 module starting with Cisco IOS XE Everest 16.6.1.
- Automatic bandwidth is supported only on TE and flexLSP tunnels.
- The input packet count and rate are not supported, whereas the output packet count and rate are supported.
- Only the point-point traffic (VPWS) is supported. The VPLS traffic is not counted for the output rate of the tunnel.

How to Configure MPLS Traffic Engineering Automatic Bandwidth

This section describes how to configure MPLS TE automatic bandwidth.

Configuring a Platform to Support Automatic Bandwidth Adjustment

Enables automatic bandwidth adjustment on a platform and initiates sampling the output rate for tunnels configured for bandwidth adjustment. This is an optional procedure.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mpls traffic-eng auto-bw timers frequency**
4. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	mpls traffic-eng auto-bw timers frequency Example: Router(config)# mpls traffic-eng auto-bw timers frequency 300	(Optional) Enables automatic bandwidth adjustment on a platform and begins sampling the output rate for tunnels that have been configured for automatic bandwidth adjustment. The sec option can be used to specify the sampling interval, in seconds. The default timer is 300 seconds.
Step 4	end Example: Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Configuring Automatic Bandwidth Adjustment for a Tunnel

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface tunnel *number***
4. **ip unnumbered *interface-type interface-number***
5. **tunnel destination *ip-address***
6. **tunnel mode mpls traffic-eng**
7. **tunnel mpls traffic-eng priority *priority-value***
8. **tunnel mpls traffic-eng bandwidth *bandwidth***
9. **tunnel mpls traffic-eng path-option *number* {dynamic | explicit {*name path-name* | *id path-number*}}** [lockdown]

10. **tunnel mpls traffic-eng auto-bw** [**collect-bw**] [**frequency** *seconds*] [**adjustment-threshold** *percent*] [**overflow-limit** *number* **overflow-threshold** *percent*] [**max-bw** *kbps*] [**min-bw** *kbps*]
11. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	interface tunnel <i>number</i> Example: Router(config)# interface tunnel 1	Creates a new tunnel interface and enters interface configuration mode.
Step 4	ip unnumbered <i>interface-type interface-number</i> Example: Router(config-if)# ip unnumbered loopback 0	Gives the tunnel interface an IP address that is the same as that of interface Loopback0. Note This command is not effective until Loopback0 has been configured with an IP address.
Step 5	tunnel destination <i>ip-address</i> Example: Router(config-if)# tunnel destination 192.0.2.1	Specifies the IP address of the device where the tunnel will terminate. This address should be the router ID of the device.
Step 6	tunnel mode mpls traffic-eng Example: Router(config-if)# tunnel mode mpls traffic-eng	Sets the encapsulation mode of the tunnel to MPLS TE.
Step 7	tunnel mpls traffic-eng priority <i>priority-value</i> Example: Router(config-if)# tunnel mpls traffic-eng priority 7 7	Configures the priority for the MPLS traffic engineering tunnel.
Step 8	tunnel mpls traffic-eng bandwidth <i>bandwidth</i> Example: Router(config-if)# tunnel mpls traffic-eng bandwidth 2000	Configures the bandwidth for the MPLS traffic engineering tunnel.
Step 9	tunnel mpls traffic-eng path-option <i>number</i> { dynamic explicit { name <i>path-name</i> id <i>path-number</i> }} [lockdown]	Configures the tunnel to use a named IP explicit path or a path dynamically calculated from the traffic engineering topology database. A dynamic path is used if an explicit path is currently unavailable.

	Command or Action	Purpose
	Example: Router(config-if)# tunnel mpls traffic-eng path-option 1 dynamic	
Step 10	tunnel mpls traffic-eng auto-bw [collect-bw] [frequency seconds] [adjustment-threshold percent] [overflow-limit number] [overflow-threshold percent] [max-bw kbps] [min-bw kbps] Example: Router(config-if)# tunnel mpls traffic-eng auto-bw frequency 600 max-bw 3000	Enables automatic bandwidth adjustment for a tunnel and controls the manner in which the bandwidth for the tunnel is adjusted.
Step 11	end Example: Device(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Configuration Example for MPLS Traffic Engineering Automatic Bandwidth

The following example enables automatic bandwidth adjustment on a platform and initiates sampling the output rate for tunnels configured for bandwidth adjustment.

```
Router# mpls traffic-eng auto-bw timers frequency 300
```

The following example enables automatic bandwidth adjustment for Tunnel 2 and initiates sampling the output rate for tunnels configured for bandwidth adjustment.

```
Device# configure terminal
Router(config)# interface tunnel 2
Router(config-if)# ip unnumbered loopback 0
Router(config-if)# tunnel destination 192.0.2.1
Router(config-if)# tunnel mode mpls traffic-eng
Router(config-if)# tunnel mpls traffic-eng priority 7 7
Router(config-if)# tunnel mpls traffic-eng bandwidth 2000
Router(config-if)# tunnel mpls traffic-eng path-option 1 dynamic
Router(config-if)# tunnel mpls traffic-eng auto-bw frequency 600 max-bw 3000
Router(config-if)# exit
Router(config)# exit
```

Verifying MPLS Traffic Engineering Automatic Bandwidth Configuration

Use the **show mpls traffic-eng tunnels *tunnel_interface*** to display the information about tunnels, including automatic bandwidth information enabled for that tunnel.

```
Router#show mpls traffic-eng tunnels tunnel 424
Name: RSP3_t424 (Tunnel424) Destination: 192.0.2.20
Status:
```

```
Admin: up Oper: up Path: valid Signalling: connected
path option 1, type dynamic (Basis for Setup, path weight 2)

Config Parameters:
Bandwidth: 100 kbps (Global) Priority: 7 7 Affinity: 0x0/0xFFFF
Metric Type: TE (default)
Path-selection Tiebreaker:
Global: not set Tunnel Specific: not set Effective: min-fill (default)
Hop Limit: disabled
Cost Limit: disabled
Path-invalidation timeout: 10000 msec (default), Action: Tear
AutoRoute: enabled LockDown: disabled Loadshare: 0 [0] bw-based
auto-bw: (300/254) 0 Bandwidth Requested: 100
Adjustment Threshold: 1%
Overflow Limit: 1 Overflow Threshold: 1%
Overflow Threshold Crossed: 0
Samples Missed 0: Samples Collected 0
Fault-OAM: disabled, Wrap-Protection: disabled, Wrap-Capable: No
Active Path Option Parameters:
State: dynamic path option 1 is active
BandwidthOverride: disabled LockDown: disabled Verbatim: disabled
Node Hop Count: 2

InLabel : -
OutLabel : GigabitEthernet0/1/3, 70
Next Hop : 56.1.1.1
RSVP Signalling Info:
Src 192.0.2.1, Dst 192.0.2.20, Tun_Id 424, Tun_Instance 447
RSVP Path Info:
My Address: 198.51.100.2
Explicit Route: 198.51.100.1 198.51.100.150 192.0.2.20
Record Route: NONE
Tspec: ave rate=0 kbits, burst=1000 bytes, peak rate=0 kbits
RSVP Resv Info:
Record Route: NONE
Fspec: ave rate=0 kbits, burst=0 bytes, peak rate=0 kbits
Shortest Unconstrained Path Info:
Path Weight: 2 (TE)
Explicit Route: 198.51.100.1 198.51.100.3 198.51.100.150 192.0.2.20

History:
Tunnel:
Time since created: 17 days, 1 hours, 50 minutes
```

