MPLS Traffic Engineering over Bridge Domain Interfaces

The MPLS Traffic Engineering(TE) over Bridge Domain Interfaces(BDI) feature enables MPLS traffic engineering over Bridge Domain Interfaces.

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Prerequisites for Configuring MPLS TE over BDI

You must have:

- Enabled MPLS TE on all relevant routers and interfaces
- Configured MPLS TE tunnels

Your network must support the following Cisco IOS features:

- IP Cisco Express Forwarding
- Multiprotocol Label Switching (MPLS)

Your network must support at least one of the following protocols:

- Intermediate SystemtoIntermediate System (ISIS)
- Open Shortest Path First (OSPF)

Restrictions for MPLS TE over BDI

- Explicit Path Node exclusion
- P2MP TE Tunnels
- Auto-tunnel one-hops and backups
- Auto bandwidth

- Inter area or AS TE
- Auto route destinations
- FRR link ornode protection

Information About MPLS Traffic Engineering over BDI

Features of MPLS Traffic Engineering over BDI

The MPLS Traffic Engineering over BDI feature enables MPLS TE tunnels over BDI.

Supported Features

Your network must support the following:

- MPLS TE tunnels
- Policy Routing onto MPLS TE Tunnels
- MPLS TE - Forwarding Adjacency
- MPLS TE – RSVP Hello State Timer
- MPLS TE - LSP Attributes
- MPLS TE - IP Explicit Address Exclusion
- MPLS TE - Configurable Path Calculation Metric for Tunnels
- MPLS TE - Verbatim Path Support
- Pseudo-wire mapping onto TE tunnels.

How to Configure MPLS Traffic Engineering over BDI

This section assumes that you want to configure MPLS TE over BDI.

Configuring MPLS TE over BDI

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface bdi30**
4. **mpls traffic-eng tunnels**
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 interface configuration mode.
Step 3	**interface bdi30** **Example:** `Router(config)# interface bdi30`	Specifies the bridge domain interface and enters interface configuration mode.
Step 4	**mpls traffic-eng tunnels** **Example:** `Router(config-if)# mpls traffic-eng tunnels`	Enables an MPLS TE tunnel to use an established tunnel for the bridge domain interface.
Step 5	**end** **Example:** `Router(config-if)# end`	Returns to privileged EXEC mode.

Configuring the RSVP Bandwidth

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot* / *subslot* / *port*
4. **ip rsvp bandwidth** [*interface-kbps* [*single-flow-kbps*[**bc1** *kbps* | **sub-pool** *kbps*]*]*| **percent** *percent-bandwidth* [*single-flow-kbps*]]
5. **end**

DETAILED STEPS

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

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type slot / subslot / port* **Example:** `Router(config)# interface gigabitEthernet 0/0/0`	Configures the interface type and enters interface configuration mode.
Step 4	**ip rsvp bandwidth** [*interface-kbps* [*single-flow-kbps*[**bc1** *kbps* | **sub-pool** *kbps*]]| **percent** *percent-bandwidth* [*single-flow-kbps*]] **Example:** `Router(config-if)# ip rsvp bandwidth 7500 7500`	Enables RSVP on an interface. • The optional *interface-kbps* and *single-flow-kbps* arguments specify the amount of bandwidth that can be allocated by RSVP flows or to a single flow, respectively. Values are from 1 to 10000000. • The optional **sub-pool**and *kbps*keyword and argument specify subpool traffic and the amount of bandwidth that can be allocated by RSVP flows. Values are from 1 to 10000000. **Note** Repeat this command for each interface on which you want to enable RSVP.
Step 5	**end** **Example:** `Router(config-if)# end`	(Optional) Returns to privileged EXEC mode.

Verifying That MPLS TE over BDI Is Operational

To verify that MPLS TE over BDI can function, perform the following task.

SUMMARY STEPS

1. **enable**
2. **show mpls traffic-eng tunnels brief**
3. **show mpls traffic-eng tunnels summary**
4. **show mpls traffic-eng tunnels tunnel1**

DETAILED STEPS

Step 1 **enable**

Enables privileged EXEC mode.

Step 2 **show mpls traffic-eng tunnels brief**

Use this command to monitor and verify the state of the tunnels.

Step 3 **show mpls traffic-eng tunnels summary**

Use this command to monitor and verify the state of the tunnels.

Step 4 **show mpls traffic-eng tunnels tunnel1**

Use this command to verify that tunnels are up and using BDI.

Troubleshooting Tips

This section describes how you can use the `show mpls traffic-eng tunnels tunnel5` to check for issues.

```
Router# show mpls traffic-eng tunnels tunnel5

Name: router_t5                           (Tunnel5) Destination: 3.3.3.3
  Status:
    Admin: up         Oper: up     Path: valid       Signalling: connected
    path option 1, type dynamic (Basis for Setup, path weight 2)

  Config Parameters:
    Bandwidth: 0        kbps (Global)  Priority: 5  5   Affinity: 0x0/0xFFFF
    Metric Type: TE (default)
    AutoRoute: disabled LockDown: disabled Loadshare: 0 [0] bw-based
    auto-bw: disabled
  Active Path Option Parameters:
    State: dynamic path option 1 is active
    BandwidthOverride: disabled  LockDown: disabled  Verbatim: disabled


  InLabel  :  -
  OutLabel : BDI31, 21
  Next Hop : 12.0.0.2
  RSVP Signalling Info:
       Src 1.1.1.1, Dst 3.3.3.3, Tun_Id 5, Tun_Instance 1
    RSVP Path Info:
      My Address: 12.0.0.1
      Explicit Route: 12.0.0.2 14.0.0.2 14.0.0.1 3.3.3.3
      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=1000 bytes, peak rate=0 kbits
  Shortest Unconstrained Path Info:
    Path Weight: 2 (TE)
    Explicit Route: 12.0.0.1 12.0.0.2 14.0.0.2 14.0.0.1
                    3.3.3.3
  History:
    Tunnel:
      Time since created: 1 minutes, 38 seconds
      Time since path change: 1 minutes, 36 seconds
      Number of LSP IDs (Tun_Instances) used: 1
    Current LSP: [ID: 1]
      Uptime: 1 minutes, 36 seconds
```

Configuration Example for MPLS Traffic Engineering over BDI

The following example enables the BDI on the router:

```
Router(config)#interface bdi30
Router(config-if)#mpls traffic-eng tunnels
```

Configuring Interface Tunnel Example

The following example configures an interface tunnel

```
interface Tunnel1
ip unnumbered Loopback0
tunnel source Loopback0
tunnel mode mpls traffic-eng
tunnel destination 4.4.4.4
tunnel mpls traffic-eng path-option 1 dynamic
```

Configuring RSVP Bandwidth Example

The following example configures RSVP bandwidth

ip rsvp bandwidth [*interface-kbps*] [*single-flow-kbps*]

```
Router(config-if)# ip rsvp bandwidth 500 500
```