MPLS TE Metric Manipulation

« MPLS TE Bandwidth Reservations (/workbook/view/service-provider-v4/task/mpls-te-bandwidth-reservations-Mjg4Mg%3D%3D) | MPLS TE with Static Routing (/workbook/view/service-provider-v4/task/mpls-te-with-static-routing-Mjg4NA%3D%3D) »

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Note:

Initial Configuration & Diagrams: Load the initial configuration files for the section named **MPLS TE with IS-IS**, which can be found in CCIE SPv4 Topology Diagrams & Initial Configurations (http://labs.ine.com/workbook/view/service-provider-v4/task/ccie-spv4-topology-diagrams-initial-configs). Refer to the **Base IPv4 Diagram** in order to complete this task.

CONTENTS

Task

- R2 and XR1 are preconfigured as PE routers for the MPLS L3VPN customer routers R1 and XR2, respectively, but the core of the Service Provider network is not running LDP.
- Configure the core of the Service Provider network to support MPLS TE tunnels as follows:
  - Enable MPLS TE support for the IS-IS Level 2 core.
  - Set the IS-IS MPLS TE Router-ID to be the Loopback0 interfaces.
  - Enable support for RSVP and MPLS TE on all transit interfaces running IS-IS in the core.
- Configure an MPLS TE tunnel from R2 to XR1 as follows:
  - Unnumber the tunnel to R2's Loopback0 interface.
  - Set the tunnel destination as XR1's Loopback0 interface.
  - Set the tunnel's path option to dynamic.
  - Configure Autoroute Announce on the tunnel so that the IS-IS core can use it for dynamic routing.
- Configure an MPLS TE tunnel from XR1 to R2 as follows:
  - Unnumber the tunnel to XR1's Loopback0 interface.
  - Set the tunnel destination as R2's Loopback0 interface.
  - Set the tunnel's path option to dynamic.
  - Configure Autoroute Announce on the tunnel so that the IS-IS core can use it for dynamic routing.
- Configure MPLS TE metrics as follows:
  - The preferred path from R2 to XR1 should be R2 to R3 to R4 to R6 to XR1.
  - The preferred path from XR1 to R2 should be XR1 to R6 to R4 to R3 to R2.
- When complete, the following reachability should be achieved:
  - R1 and XR2 should have full IP reachability to each other, and a traceroute should indicate that their L3VPN tunnel is transiting over the MPLS TE tunnels in the core of the SP network.

Configuration **Click to *collapse***

```
R2:
mpls traffic-eng tunnels
!
interface Tunnel0
 ip unnumbered Loopback0
 tunnel mode mpls traffic-eng
 tunnel destination 19.19.19.19
 tunnel mpls traffic-eng autoroute announce
 tunnel mpls traffic-eng path-option 1 dynamic
!
interface GigabitEthernet1.23
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.24
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
 ip rsvp bandwidth
 !
router isis
 metric-style wide
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng level-2

R3:
mpls traffic-eng tunnels
!
interface GigabitEthernet1.23
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.34
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.36
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
ip rsvp bandwidth
 !
router isis
 metric-style wide
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng level-2

R4:
mpls traffic-eng tunnels
!
interface GigabitEthernet1.24
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
 ip rsvp bandwidth
!
```

```
interface GigabitEthernet1.34
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.45
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
 ip rsvp bandwidth
!
interface GigabitEthernet1.46
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
router isis
 metric-style wide
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng level-2
```

R5:

```
mpls traffic-eng tunnels
!
interface GigabitEthernet1.45
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
 ip rsvp bandwidth
!
interface GigabitEthernet1.56
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.519
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
router isis
 metric-style wide
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng level-2
```

R6:

```
mpls traffic-eng tunnels
!
interface GigabitEthernet1.36
 mpls traffic-eng tunnels
 mpls traffic-eng administrative-weight 1000
 ip rsvp bandwidth
!
interface GigabitEthernet1.46
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
interface GigabitEthernet1.56
 mpls traffic-eng tunnels
 ip rsvp bandwidth
```

```
!
interface GigabitEthernet1.619
 mpls traffic-eng tunnels
 ip rsvp bandwidth
!
router isis
 metric-style wide
 mpls traffic-eng router-id Loopback0
 mpls traffic-eng level-2


XR1:
interface tunnel-te0
 ipv4 unnumbered Loopback0
 autoroute announce
 destination 2.2.2.2
 path-option 1 dynamic
!
router isis 1
 address-family ipv4 unicast
 metric-style wide
 mpls traffic-eng level-2-only
 mpls traffic-eng router-id Loopback0
!
rsvp
 interface GigabitEthernet0/0/0/0.519
 !
 interface GigabitEthernet0/0/0/0.619
 !
mpls traffic-eng
 interface GigabitEthernet0/0/0/0.519
 !
 interface GigabitEthernet0/0/0/0.619
 !
mpls ldp
```


Verification

When OSPF or IS-IS is used in the SP core for the purpose of MPLS Traffic Engineering, two different metrics are advertised for each link: the IGP metric and the TE metric. By default, the TE metric is inherited from the IGP metric. If the IGP metric is changed (that is, the OSPF cost or the IS-IS metric), the TE metric will likewise change. However, the TE metric can be manually changed separately from the IGP metric, as is the case in this example. Additionally, by default all MPLS TE tunnels will prefer to use the TE metric value for their dynamic path selection. This can be controlled globally or on a per-tunnel basis with the command `tunnel mpls traffic-eng path-selection metric igp` in regular IOS or `path-selection metric igp` in IOS XR at the tunnel interface level.

The TE metrics can be verified by viewing the MPLS TE topology, as follows.

```
R2#show mpls traffic-eng topology | include (TE Id|Intf Address|TE metric)
IGP Id: 0000.0000.0002.00, MPLS TE Id:2.2.2.2 Router Node  (isis  level-2)
      frag_id: 0, Intf Address: 20.2.3.2
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0,  Intf Address: 20.2.4.2
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
IGP Id: 0000.0000.0003.00, MPLS TE Id:3.3.3.3 Router Node  (isis  level-2)
      frag_id: 0,  Intf Address: 20.3.6.3
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.3.4.3
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.2.3.3
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
IGP Id: 0000.0000.0004.00, MPLS TE Id:4.4.4.4 Router Node  (isis  level-2)
      frag_id: 0,  Intf Address: 20.2.4.4
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.3.4.4
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0,  Intf Address: 20.4.5.4
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.4.6.4
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
IGP Id: 0000.0000.0005.00, MPLS TE Id:5.5.5.5 Router Node  (isis  level-2)
      frag_id: 0, Intf Address: 20.5.6.5
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.5.19.5
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0,  Intf Address: 20.4.5.5
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
IGP Id: 0000.0000.0006.00, MPLS TE Id:6.6.6.6 Router Node  (isis  level-2)
      frag_id: 0, Intf Address: 20.6.19.6
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.4.6.6
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.5.6.6
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf  Address: 20.3.6.6
       TE metric: 1000 , IGP metric: 10, attribute flags: 0x0
IGP Id: 0000.0000.0019.00, MPLS TE Id:19.19.19.19 Router Node  (isis  level-2)
      frag_id: 0, Intf Address: 20.5.19.19, Nbr Intf Address: 20.5.19.19
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
      frag_id: 0, Intf Address: 20.6.19.19, Nbr Intf Address: 20.6.19.6
      TE metric: 10, IGP metric: 10, attribute flags: 0x0
```

Note that the interfaces that did not have their TE metrics changed use the default cost of 10 that comes from the IS-IS cost.

The final result of this configuration is that the R3 to R4 to R6 path is preferred bidirectionally for the tunnels from R2 to XR1 and from XR1 to R2, as shown below.

```
R2#show mpls traffic-eng tunnels

P2P TUNNELS/LSPs:

Name: R2_t0                               (Tunnel0) Destination: 19.19.19
  Status:
    Admin: up         Oper: up     Path: valid       Signalling: connected
    path option 1, type dynamic (Basis for Setup,  path weight 40 )

  Config Parameters:
    Bandwidth: 0        kbps (Global)  Priority: 7  7   Affinity: 0x0/0xF
    Metric Type: TE (default)
    AutoRoute: enabled  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 : GigabitEthernet1.23, 16
  Next Hop : 20.2.3.3
  RSVP Signalling Info:
       Src 2.2.2.2, Dst 19.19.19.19, Tun_Id 0, Tun_Instance 10
    RSVP Path Info:
      My Address: 20.2.3.2
      Explicit Route: 20.2.3.3 20.3.4.3 20.3.4.4 20.4.6.4
                      20.4.6.6 20.6.19.6 20.6.19.19 19.19.19.19
      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
  History:
    Tunnel:
      Time since created: 37 minutes
      Time since path change: 3 seconds
      Number of LSP IDs (Tun_Instances) used: 10
    Current LSP: [ID: 10]
      Uptime: 3 seconds
    Prior LSP: [ID: 9]
      ID: path option unknown
      Removal Trigger: tunnel shutdown

<snip>



RP/0/0/CPU0:XR1#show mpls traffic-eng tunnels
Fri May 29 22:48:11.640 UTC



Name: tunnel-te0  Destination: 2.2.2.2
  Signalled-Name: XR1_t0
```

```
  Status:
    Admin:    up Oper:   up   Path:  valid   Signalling: connected

    path option 1,  type dynamic  (Basis for Setup,  path weight 40 )
    G-PID: 0x0800 (derived from egress interface properties)
    Bandwidth Requested: 0 kbps  CT0
    Creation Time: Fri May 29 22:33:04 2015 (00:15:07 ago)
  Config Parameters:
    Bandwidth:        0 kbps (CT0) Priority:  7  7 Affinity: 0x0/0xffff
    Metric Type: TE (default)
    Hop-limit: disabled
    AutoRoute:  enabled  LockDown: disabled   Policy class: not set
    Forward class: 0 (default)
    Forwarding-Adjacency: disabled
    Loadshare:          0 equal loadshares
    Auto-bw: disabled
    Fast Reroute: Disabled, Protection Desired: None
    Path Protection: Not Enabled
    BFD Fast Detection: Disabled
    Reoptimization after affinity failure: Enabled
    Soft Preemption: Disabled
  History:
    Tunnel has been up for: 00:00:19 (since Fri May 29 22:47:52 UTC 2015)
    Current LSP:
      Uptime: 00:00:19 (since Fri May 29 22:47:52 UTC 2015)
    Prior LSP:
      ID: 4 Path Option: 1
      Removal Trigger: tunnel shutdown

   Path info (IS-IS 1 level-2):
  Node hop count: 4
  Hop0: 20.6.19.6
  Hop1: 20.4.6.6
  Hop2: 20.4.6.4
  Hop3: 20.3.4.4
  Hop4: 20.3.4.3
  Hop5: 20.2.3.3
  Hop6: 20.2.3.2
  Hop7: 2.2.2.2
<snip>



R1#traceroute 20.20.20.20
Type escape sequence to abort.
Tracing the route to 20.20.20.20
VRF info: (vrf in name/id, vrf out name/id)
  1 10.1.2.2 4 msec 1 msec 6 msec
  2 20.2.3.3 [MPLS: Labels 17/16015 Exp 0] 12 msec 8 msec 4 msec
  3 20.3.4.4 [MPLS: Labels 19/16015 Exp 0] 24 msec 151 msec 77 msec
  4 20.4.6.6 [MPLS: Labels 16/16015 Exp 0] 44 msec 143 msec 20 msec
  5 20.6.19.19 21 msec 15 msec 15 msec
  6 10.19.20.20 13 msec *  9 msec
```

```
RP/0/0/CPU0:XR2#traceroute 1.1.1.1

Fri May 29 22:37:19.944 UTC


Type escape sequence to abort.

Tracing the route to 1.1.1.1


 1  10.19.20.19 9 msec  0 msec  0 msec

 2  20.6.19.6 [MPLS: Labels 19/19 Exp 0]  9 msec  59 msec  29 msec

 3  20.4.6.4 [MPLS: Labels 17/19 Exp 0]  29 msec  29 msec  29 msec

 4  20.3.4.3 [MPLS: Labels 18/19 Exp 0]  19 msec  19 msec  19 msec

 5  10.1.2.2 [MPLS: Label 19 Exp 0]  19 msec  19 msec  19 msec

 6  10.1.2.1 19 msec  *  9 msec
```

If one of these links or nodes fails, the tunnels will automatically recalculate to the next lowest cost path based on the TE metric, as shown below.

```
R2#debug mpls traffic-eng topology change
MPLS traffic-eng topology change events debugging is on
R2#debug mpls traffic-eng tunnel signalling
MPLS traffic-eng tunnels signalling debugging is on

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int Gig1
R3(config-if)#shut
R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet1, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1, changed state to
down
```

```
TE-SIG-HE: Tunnel0 [10]->19.19.19.19: received  Path Error from 2.2.2.2: Routing Problem: No route available toward destination (flags 4)
TE-SIG-HE: Tunnel0 [10]->19.19.19.19: received RESV DELETE
TE-SIG-HE: Tunnel0 [10]->19.19.19.19:  notified of disappearing label information

TE-SIG-HE: Tunnel0 [10]->19.19.19.19: label information Changed
TE-SIG-LM: 2.2.2.2_10->19.19.19.19_0 {7}: received DELETE RESV request
TE-SIG-LM:  2.2.2.2_10->19.19.19.19_0 {7}:  path next hop is 20.2.3.3 (GigabitEthernet1.23)

TE-SIG-LM: 2.2.2.2_10->19.19.19.19_0 {7}:  sending DELETE RESV reply
TE-SIG-LM: 19.19.19.19_5->2.2.2.2_0 {7}: received DELETE RESV request
TE-SIG-LM:  19.19.19.19_5->2.2.2.2_0 {7}:  path previous hop is 20.2.3.3 (GigabitEthernet1.23)

TE-SIG-LM: 19.19.19.19_5->2.2.2.2_0 {7}: sending DELETE RESV reply
TE-SIG-LM: 19.19.19.19_5->2.2.2.2_0 {7}: received RESV DESTROY  event
TE-SIG-LM: 19.19.19.19_5->2.2.2.2_0 {7}: RSVP tail-end close
TE-SIG-LM: 19.19.19.19_5->2.2.2.2_0 {7}: received PATH TAIL DELETION event

TE-SIG-LM: tunnel path/reservation teardown failed: Tunnel not found (state may have been deleted already)
TE-SIG-HE: Tunnel0 [10]: signalling shutdown (unprotected) []
TE-SIG-HE: Tunnel0 [0]:  Attempting to activate
TE-SIG-HE: Tunnel0 [11]->19.19.19.19: RSVP head-end open
TE-SIG-HE: Tunnel0 [11]:  Activation succeeded
TE-SIG: deactivating setup Tunnel0 [10], reason: unspecified
TE-SIG-HE: Tunnel0 [10]->19.19.19.19: RSVP head-end close
TE-PCALC-LSA:  NODE_CHANGE_UPDATE isis  level-2
    link flags:LINK_CHANGE_DOWN
     nbr_system_id: 0000.0000.0003.01 , link 0.0.0.0
TE-SIG-LM: 2.2.2.2_11->19.19.19.19_0 {7}: received ADD RESV request
TE-SIG-LM: 2.2.2.2_11->19.19.19.19_0 {7}:  path next hop is 20.2.4.4 (GigabitEthernet1.24)

TE-SIG: Installed up_tag 4294967294
TE-SIG: Installed down_tag 16

TE-SIG-LM:  2.2.2.2_11->19.19.19.19_0 {7}:  sending ADD RESV reply
TE-SIG-HE: Tunnel0 [11]->19.19.19.19: received RESV CREATE
TE-SIG-HE:  Tunnel0 [11]->19.19.19.19: notified of new label information
```

```
        GigabitEthernet1.24, nhop 20.2.4.4, frame, 16
TE-SIG-HE: Tunnel0 [11]->19.19.19.19: label information Changed
TE-SIG-HE: Tunnel0: route change: GigabitEthernet1.23:16->GigabitEthernet1.23:16


TE-SIG-LM: 19.19.19.19_6->2.2.2.2_0 {7}: received NEW PATH TAIL ARRIVAL event
TE-SIG-LM: 19.19.19.19_6->2.2.2.2_0 {7}: RSVP tail-end open
Calling ext resv_addmodify
   arginfo: 0x7F683D7810E0, avg: 0, peak: 0, burst: 0x3E8
   mtu: 1500, qos: 5, hint: 0xBE00000B, new: TRUE, tun: 0x7F683D56D298
TE-SIG-LM: tunnel 19.19.19.19_6->2.2.2.2_0 {7} NEW PATH TAIL ARRIVAL event handled successfully


TE-SIG-LM: 19.19.19.19_6->2.2.2.2_0 {7}: received ADD RESV request
TE-SIG-LM: 19.19.19.19_6->2.2.2.2_0 {7}: path previous hop is 20.2.4.4 (GigabitEthernet1.24)


TE-SIG: Installed up_tag 1
TE-SIG: Installed down_tag 4294967294
TE-SIG-LM: 19.19.19.19_6->2.2.2.2_0 {7}: sending ADD RESV reply
TE-PCALC-LSA:  NODE_CHANGE_UPDATE isis  level-2
    link flags:LINK_CHANGE_DOWN
    nbr_system_id: 0000.0000.0003.03 , link 0.0.0.0
TE-PCALC-LSA:  NODE_CHANGE_UPDATE isis  level-2
    link flags:LINK_CHANGE_DOWN
    nbr_system_id: 0000.0000.0003.02 , link 0.0.0.0
```

R2 detects that there is a change in the TE topology, and RSVP is re-signaled to bind a new label via the new path. The customers traffic is likewise rerouted via this new tunnel path.

```
R1#traceroute 20.20.20.20
Type escape sequence to abort.
Tracing the route to 20.20.20.20
VRF info: (vrf in name/id, vrf out name/id)
  1 10.1.2.2 4 msec 1 msec 1 msec
  2  20.2.4.4 [MPLS: Labels 16/16015 Exp 0]  9 msec 6 msec 6 msec
  3  20.4.6.6 [MPLS: Labels 18/16015 Exp 0]  121 msec 29 msec 10 msec
  4 20.6.19.19 20 msec 13 msec 14 msec
  5 10.19.20.20 13 msec *  11 msec



RP/0/0/CPU0:XR2#traceroute 1.1.1.1
Fri May 29 22:55:46.649 UTC

Type escape sequence to abort.
Tracing the route to 1.1.1.1

 1  10.19.20.19 0 msec  0 msec  0 msec
 2  20.6.19.6 [MPLS: Labels 17/19 Exp 0] 9 msec  0 msec  9 msec
 3   20.4.6.4 [MPLS: Labels 18/19 Exp 0] 9 msec  0 msec  0 msec
 4   10.1.2.2 [MPLS: Label 19 Exp 0] 69 msec  19 msec  19 msec
 5  10.1.2.1 19 msec  *  0 msec
```

The tunnels can be forced to use the IGP cost instead of the TE cost:

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int Gig1
R3(config-if)#no shut
R3(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
R3#
%LINK-3-UPDOWN: Interface GigabitEthernet1, changed state to up
R3#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1, changed state to up
```

By forcing the tunnel down and re-enabling it after the change to the path selection metric has been made, CSPF will re-run as the tunnel begins the establishment process, selecting the shortest IGP path and ignoring the TE metrics configured.

CONTENTS

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface Tunnel0
R2(config-if)#shutdown
R2(config-if)#tunnel mpls traffic-eng path-selection metric igp
R2(config-if)#no shutdown
R2(config-if)#end
R2#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel0, changed state to up
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#
```

```
R2#show mpls traffic-eng tunnels

P2P TUNNELS/LSPs:

Name: R2_t0                               (Tunnel0) Destination: 19.19.19.19
  Status:
    Admin: up         Oper: up     Path: valid       Signalling: connected
    path option 1, type dynamic (Basis for Setup,  path weight 30 )

  Config Parameters:
    Bandwidth: 0        kbps (Global)  Priority: 7  7   Affinity: 0x0/0xFFFF
    Metric Type: IGP (interface)
    AutoRoute: enabled  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 : GigabitEthernet1.24, 19
  Next Hop : 20.2.4.4
  RSVP Signalling Info:
       Src 2.2.2.2, Dst 19.19.19.19, Tun_Id 0, Tun_Instance 12
    RSVP Path Info:
      My Address: 20.2.4.2
      Explicit Route: 20.2.4.4 20.4.5.4 20.4.5.5 20.5.19.5
                      20.5.19.19 19.19.19.19
      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
  History:
    Tunnel:
      Time since created: 51 minutes, 31 seconds
      Time since path change: 2 minutes, 22 seconds
      Number of LSP IDs (Tun_Instances) used: 12
    Current LSP: [ID: 12]
```

```
      Uptime: 2 minutes, 22 seconds
    Prior LSP: [ID: 11]
      ID: path option unknown
      Removal Trigger: tunnel shutdown
<snip>


RP/0/0/CPU0:XR1(config)#interface tunnel-te0
RP/0/0/CPU0:XR1(config-if)# path-selection metric igp
RP/0/0/CPU0:XR1(config-if)#commit
Fri May 29 23:11:35.434 UTC
RP/0/0/CPU0:May 29 23:11:35.764 : config[65687]: %MGBL-CONFIG-6-DB_COMMIT : Configuration committed by user 'cisco'. Use 'show configuration
 commit changes 1000000301' to view the changes.
RP/0/0/CPU0:XR1(config-if)#


RP/0/0/CPU0:XR1#show mpls traffic-eng tunnels | begin Path info
Fri May 29 23:12:55.288 UTC
  Path info (IS-IS 1 level-2):
  Node hop count: 3
  Hop0: 20.6.19.6
  Hop1: 20.4.6.6
  Hop2: 20.4.6.4
  Hop3: 20.2.4.4
  Hop4: 20.2.4.2
  Hop5: 2.2.2.2
```

We can still see the path that CSPF would have chosen for this tunnel destination if the path selection criteria would have been left to the default of TE metric:

```
R2#show mpls traffic-eng topology path destination 19.19.19.19
Query Parameters:
  Destination: 19.19.19.19
    Bandwidth: 0
   Priorities: 0 (setup), 0 (hold)
     Affinity: 0x0 (value), 0xFFFFFFFF (mask)
Query Results:
  Min Bandwidth Along Path: 0 (kbps)
  Max Bandwidth Along Path: 750000 (kbps)
  Hop  0: 20.2.3.2            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  1: 20.2.3.3            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  2: 20.3.4.3            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  3: 20.3.4.4            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  4: 20.4.6.4            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  5: 20.4.6.6            : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  6: 20.6.19.6           : affinity 0x00000000, bandwidth 750000 (kbps)
  Hop  7: 20.6.19.19          : affinity 0x00000000, bandwidth 0 (kbps)
  Hop  8: 19.19.19.19
```

« MPLS TE Bandwidth Reservations (/workbook/view/service-provider-v4/task/mpls-te-bandwidth-reservations-Mjg4Mg%3D%3D) | MPLS TE with Static Routing (/workbook/view/service-provider-v4/task/mpls-te-with-static-routing-Mjg4NA%3D%3D) »