



Provision RSVP-TE Tunnels



Note Throughout this section, the navigation is documented as **Traffic Engineering > Traffic Engineering**. However, when using the Crosswork Network Controller solution, the navigation is **Traffic Engineering & Services > Traffic Engineering**.

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RSVP-TE Tunnel Support

Table 1: Supported Features

Capability	Notes
PCE-initiated tunnels (provisioned or discovered by Crosswork Optimization Engine)	—
PCC-initiated tunnels (discovered by Crosswork Optimization Engine)	—
ERO strict hops	—
ERO loose hops (PCC-initiated only)	—
FRR protection on tunnels provisioned by Crosswork Optimization Engine	—
Path optimization objective min-metric (IGP, TE, or Latency)	—

Capability	Notes
Path constraints (affinity and disjointness)	Only 2 RSVP tunnels per disjoint group or sub-id is supported
Binding Label for explicit and dynamic tunnels	—
Signaled Bandwidth	—
Setup/Hold Priority	—

Table 2: Unsupported Features and Limitations

Description	Notes
Configuring loose hop ERO in COE	Only strict hops can be configured. If strict hops are not configured for every hop along the path and those hops are not remote interface IPs or loopback IPs, unexpected behavior may occur. For example, a tunnel may remain operationally down, hops may be modified, and so on.
Named tunnels configured on PCCs	These tunnels are not discovered by Crosswork Optimization Engine.
Tunnels with Loopback IPs other than TE router ID for headend or endpoint and path hops	—
Display of active FRR protected paths in the topology map.	Crosswork Optimization Engine discovers FRR tunnels which are displayed in the topology map, but will not associate an actively protected tunnel with the FRR tunnel being used. The path in the topology map will not include FRR protected paths when protection is active.
P2MP tunnels	—

RSVP-TE Tunnel Configuration Sources

RSVP-TE tunnels discovered and reported by Crosswork Optimization Engine may have been configured from the following sources:

- PCC initiated—RSVP-TE tunnels configured on a PCC (see [PCC-Initiated RSVP-TE Tunnel Example, on page 3](#)).
- Dynamically created.

PCC-Initiated RSVP-TE Tunnel Example

The following is a sample device configuration for a PCC-initiated RSVP-TE tunnel. See the appropriate documentation to view descriptions and supported RSVP-TE tunnel configuration commands for your particular device (for example: [MPLS Command Reference for Cisco NCS 5500 Series](#), [Cisco NCS 540 Series](#), and [Cisco NCS 560 Series Routers](#)).

```
interface tunnel-te777
  ipv4 unnumbered Loopback0
  destination 192.168.0.8
  path-option 10 dynamic
  pce
  delegation
!
```


Create Explicit RSVP-TE Tunnels

This task creates RSVP-TE tunnels using an explicit (fixed) path consisting of a list of prefix consisting of a list of prefix or adjacency Segment IDs (SID list), each representing a node or link along on the path.

Step 1 From the main menu, choose **Traffic Engineering > Traffic Engineering**.

Step 2 From the right window, click **RSVP-TE**.

Step 3 Under **RSVP-TE Tunnels**, click **+ Create**.

Step 4 Enter the required RSVP-TE Tunnel values. Hover the mouse pointer over  to view a description of each field.

Tip If you have set up device groups, you can select the device group from the **Device Groups** drop-down menu. Then navigate and zoom in on the topology map to click the device for headend or endpoint selection.

Step 5 Under Policy Path, click **Explicit Path** and enter a path name.

Step 6 Add segments that will be part of the RSVP-TE path.

Step 7 Click **Preview**. The path is highlighted on the map.

Step 8 If you want to commit the tunnel path, click **Provision**.

Step 9 Validate the RSVP-TE tunnel creation:

- a. Confirm that the new RSVP-TE tunnel appears in the RSVP-TE Tunnels table. You can also click the check box next to the policy to see it highlighted in the map.

Note The newly provisioned RSVP-TE tunnel may take some time, depending on the network size and performance, to appear in the **RSVP-TE Tunnels** table. The **RSVP-TE Tunnels** table is refreshed every 30 seconds.

- b. View and confirm the new RSVP-TE tunnel details. From the **RSVP-TE** table, click ******* (in the same row as the RSVP-TE tunnel), and select **View**.

Note On a scaled setup with high node, policy, or interface counts, a timeout may occur during policy deployment. Please contact a Cisco representative to fine tune the timers involved.

Configure Link Affinities

Affinities defined on devices are not collected by Crosswork Optimization Engine. The affinity mapping name is only used for visualization in Crosswork Optimization Engine. For this reason, you should manually collect affinities on the device interface, then define affinity mapping in Crosswork Optimization Engine with the same name and bits that are used on the device interface. Crosswork Optimization Engine will only send bit information to SR-PCE during provisioning.

Affinity of an SR-TE policy or RSVP-TE tunnel is used to specify the link attributes for which the SR-TE policy or RSVP-TE tunnel has affinity for. It determines which links are suitable to form a path for the SR-TE policy or RSVP-TE tunnel. It is a 32-bit value, with each bit position (0 - 31) representing a link attribute. Affinity mapping is used to map each bit position or attribute to a color. This makes it easier to refer to link attributes.

See SR configuration documentation for your specific device to view descriptions and supported configuration commands (for example: [Asr9000 Configuration](#))



Note To edit or delete an affinity mapping, click the relevant menu options.

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- Step 1** From the main menu choose **Traffic Engineering > Affinities**. You can also define affinities while creating an SR-TE policy or RSVP-TE tunnel by clicking **Manage Mapping**.
 - Step 2** To add a new affinity mapping, click **+ Create**.
 - Step 3** Enter the name (color) and the bit it will be assigned.
 - Step 4** Click **Save** to save the mapping.

Note You should remove the TE tunnel before removing the affinity to avoid orphan TE tunnels. If you have removed an affinity associated to a TE tunnel, the affinity is shown as "UNKNOWN" in the **SR Policy / RSVP-TE Tunnel Details** window.

Create Dynamic RSVP-TE Tunnels Based on Optimization Intent

This task creates an RSVP-TE tunnel with a dynamic path. SR-PCE computes a path for the tunnel that is based on metrics and path constraints (affinity or disjointness) defined by you. You can select from three available metrics to minimize in path computation: IGP, TE, or delay. SR-PCE will also automatically re-optimize the path as necessary based on topology changes.




Tip If you plan to use affinities, collect affinity information from your devices and then map them in Cisco Crosswork before creating a dynamic RSVP-TE tunnel. For more information, see [Configure Link Affinities](#).

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- Step 1** From the main menu, choose **Traffic Engineering > Traffic Engineering**.

Step 2 From the right window, click **RSVP-TE**.

Step 3 Under **RSVP-TE Tunnels**, click **+ Create**.

Step 4 Enter the required RSVP-TE Tunnel values. Hover the mouse pointer over  to view a description of each field.

Tip If you have set up device groups, you can select the device group from the **Device Groups** drop-down menu. Then navigate and zoom in on the topology map to click the device for headend or endpoint selection.

Step 5 Under **Tunnel Path**, click **Dynamic Path** and enter the Path Name.

Step 6 Under **Optimization Objective**, select the metric you want to minimize.

Step 7 Define any applicable constraints and disjointness.

Note Affinity constraints and disjointness cannot be configured on the same RSVP-TE tunnel. Also, there cannot be more than two RSVP-TE tunnels in the same disjoint group or subgroup. If there are existing RSVP-TE tunnels belonging to a disjoint group that you define here, all RSVP-TE tunnels that belong to that same disjoint group are shown during Preview.


Step 8 Click **Preview**. The path is highlighted on the map.

Step 9 If you want to commit the tunnel path, click **Provision**.

Step 10 Validate the RSVP-TE tunnel creation:

- a. Confirm that the new RSVP-TE tunnel appears in the RSVP-TE Tunnels table. You can also click the check box next to the policy to see it highlighted in the map.

Note The newly provisioned RSVP-TE tunnel may take some time, depending on the network size and performance, to appear in the **RSVP-TE Tunnels** table. The **RSVP-TE Tunnels** table is refreshed every 30 seconds.

- b. View and confirm the new RSVP-TE tunnel details. From the **RSVP-TE** table, click  and select **View**.


Note On a scaled setup with high node, policy, or interface counts, a timeout may occur during policy deployment. Please contact a Cisco representative to fine tune the timers involved.

Modify RSVP-TE Tunnels

To view, modify, or delete an RSVP-TE tunnel, do the following:

Step 1 From the main menu, choose **Traffic Engineering > Traffic Engineering**.

Step 2 From the **Traffic Engineering** window select the **RSVP-TE** tab.

Step 3 Locate the RSVP-TE tunnel you are interested in and click .

Step 4 Choose **View** or **Edit/Delete**.

Note

- You can only modify or delete RSVP-TE tunnels that have been created with the UI.
 - After updating the RSVP-TE tunnel details, you can preview the changes on the map before saving it.
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