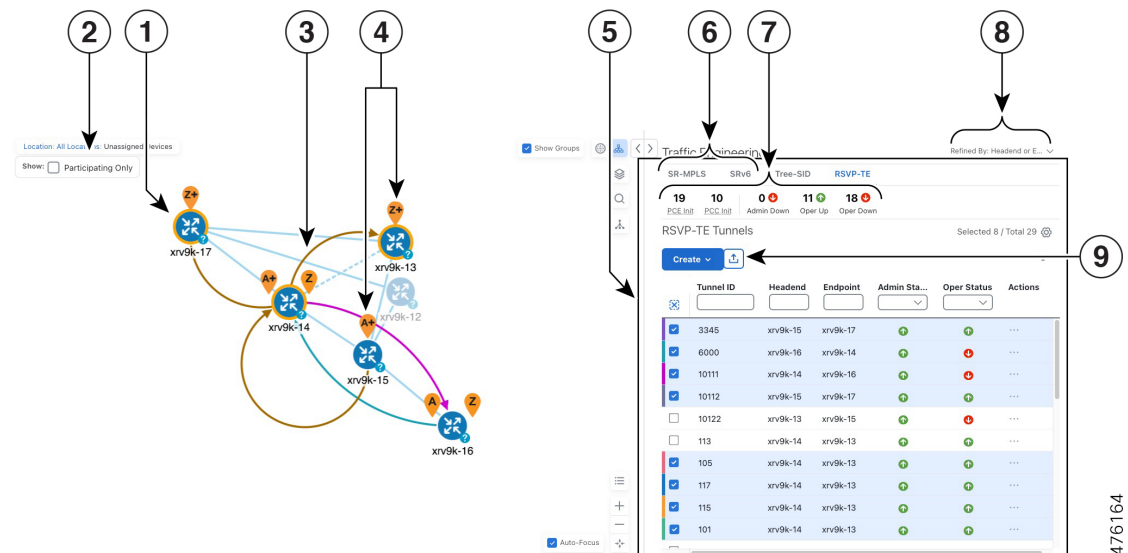# Resource Reservation Protocol (RSVP)

This section describes the RSVP-TE tunnel features that Crosswork Optimization Engine supports. For a list of known limitations and important notes, see the Cisco Crosswork Network Controller Release Notes.

- View RSVP-TE Tunnels on the Topology Map, on page 1
- View RSVP-TE Tunnel Details, on page 3
- Create Explicit RSVP-TE Tunnels, on page 6
- Create Dynamic RSVP-TE Tunnels Based on Optimization Intent, on page 6
- Create RSVP-TE Tunnels (PCC Initiated), on page 7
- Modify RSVP-TE Tunnels, on page 8

View RSVP-TE Tunnels on the Topology Map

To get to the Traffic Engineering topology map for RSVP-TE visualization, choose **Services & Traffic Engineering** > **Traffic Engineering** > **RSVP-TE** tab.

Figure 1: Traffic Engineering UI - RSVP-TE Tunnels

Callout No.	Description
1	Click **Show Participating Only** to display links belonging to the selected RSVP-TE tunnels. All other links and devices disappear.
2	A device with a solid orange outline ( ) indicates that it is a strict hop. A dashed orange outline indicates that a loose hop was discovered. **Note** RSVP-TE tunnels cannot be configured with loose hops when provisioning in the UI.

3	When RSVP-TE tunnels are selected in the RSVP-TE Tunnel table, they show as colored directional lines on the map indicating source and destination.
	
	   • Record Route Object (RRO) paths are shown as straight lines.
	
	   • Explicit Route Object (ERO) paths are shown as curved lines.
	
	      Note If both RRO and ERO paths are available, the RRO path is displayed by default.
	
	   • An adjacency segment ID (SID) is shown as a green dot on a link along the path ( ).
	
	If both **A** and **Z** are displayed in a device cluster, at least one node in the cluster is a source, and another is a destination. The **A+** denotes that there is more than one RSVP-TE tunnel that originates from a node. The **Z+** denotes that the node is a destination for more than one RSVP-TE tunnel.

4	**SR-MPLS and SRv6 Policy Origin and Destination**: If both **A** and **Z** are displayed in a device cluster, at least one node in the cluster is a source, and another is a destination. The **A+** denotes that there is more than one SR-TE policy that originates from a node. The **Z+** denotes that the node is a destination for more than one SR policy.

5	The content of this window depends on what has been selected or filtered. In this example, the RSVP-TE tab is selected and the RSVP-TE Tunnels table is displayed. Depending on what is selected on the topology map, or whether you are in the process of viewing and managing RSVP-TE tunnels, you can do the following:
	
	   • Create Dynamic RSVP-TE Tunnels Based on Optimization Intent, on page 6
	
	   • Create Explicit RSVP-TE Tunnels, on page 6
	
	   • Modify RSVP-TE Tunnels, on page 8
	
	   • View RSVP-TE Tunnel Details, on page 3

6	Click the **RSVP-TE** tab.
7	The **Mini Dashboard** provides a summary of the operational RSVP-TE tunnel status and the number of PCC and PCE initiated tunnels that are *currently* listed in the RSVP-TE tables. If filters are applied, the Mini Dashboard is updated to reflect what is displayed in the RSVP-TE table.

Callout No.	Description
8	This option allows you to choose how the group filter (when in use) should be applied on the table data. For example, if **Headend only** was selected, then it would only display policies where the headend device of the policy is in the selected group. This filter allows you to see specific configurations and is useful when you have a large network. Filter options: • **Headend or Endpoint**—Show policies with either the headend or endpoint device in the selected group. • **Headend and Endpoint**—Show policies if both the headend and endpoint are in the group. • **Headend only**—Show policies if the headend device of the policy is in the selected group. • **Endpoint only**—Show policies if the endpoint device of the policy is in the selected group.
9	Exports *all* data into a CSV file. You cannot export selected or filtered data.

View RSVP-TE Tunnel Details

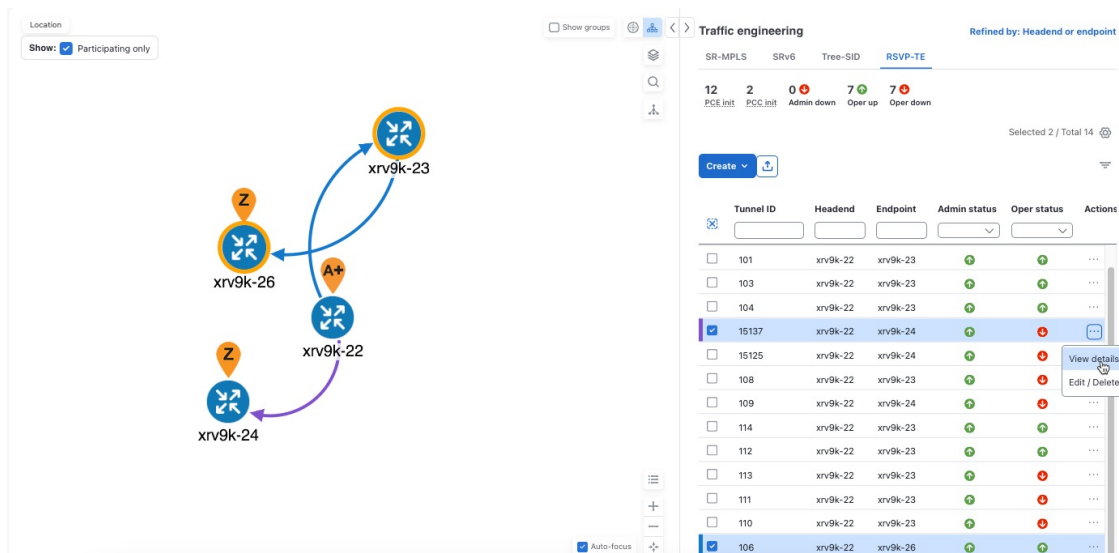View RSVP-TE tunnel details such as binding label, delegated PCE, metric type, ERO/RRO, delay, and so on.

Step 1 From the **Actions** column, click ⋯ > **View details** for one of the RSVP-TE tunnels.

Figure 2: RSVP-TE > View details

Step 2 View RSVP-TE tunnel details. From the browser, you can copy the URL and share with others.

Note
- For end-to-end delays on RSVP-TE tunnels, inter-domain RSVP-TE tunnels must all be explicit (every interface along that path is specified as an adjacency hop).
- If applicable, the Delay value is calculated for all policies every 10 minutes. Click the "i" icon (next to the Delay value) to view the last time the value was updated.
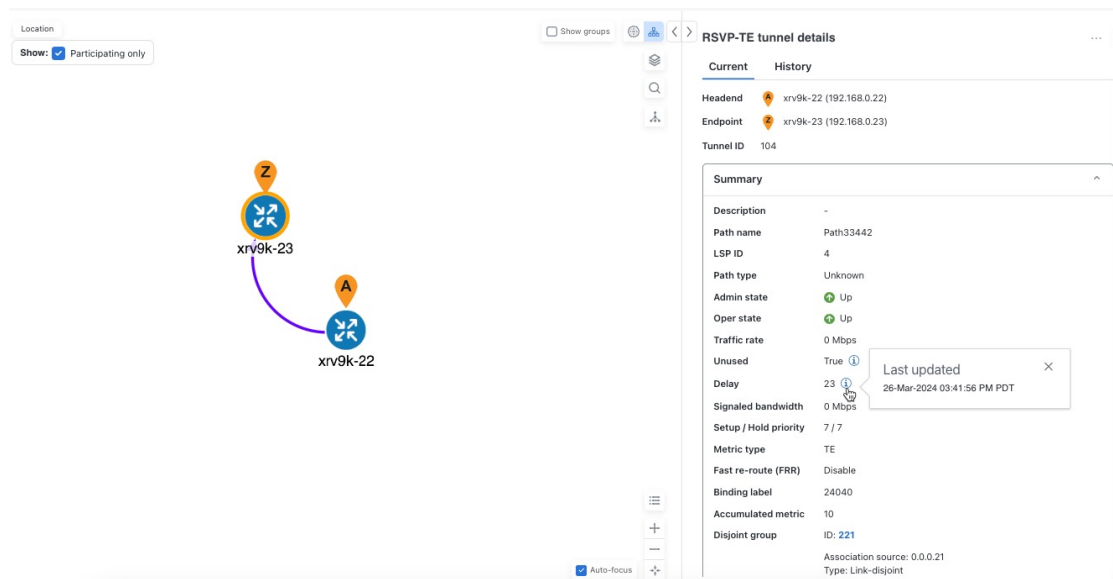
Figure 3: RSVP-TE Tunnel Details

Figure 4: RSVP-TE Tunnel Details (close-up)

Create Explicit RSVP-TE Tunnels

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

Step 1 From the main menu, choose **Services & Traffic Engineering** > **Traffic Engineering > RSVP-TE** tab.

Step 2 Click **Create > PCE Init**.

Note If you would like to provision a PCC initiated tunnel using NSO via the Crosswork UI, see .

Step 3 Under **Tunnel details**, 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: Location** drop-down menu. Then, navigate and zoom in on the topology map to click the device for headend or endpoint selection.

Step 4 Under **Tunnel path**, click **Explicit path** and enter a path name.

Step 5 Add segments that will be part of the RSVP-TE path.

Step 6 Click **Preview**. The path is highlighted on the map.

Step 7 If you want to commit the tunnel path, click **Provision**.

Step 8 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 **Traffic engineering** table. The **Traffic engineering** table is refreshed every 30 seconds.

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

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

Create Dynamic RSVP-TE Tunnels Based on Optimization Intent

This task creates an RSVP-TE tunnel with a dynamic path. SR-PCE computes a tunnel path based on metrics and path constraints (affinity or disjointness) you defined. 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.

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

Step 1 From the main menu, choose **Services & Traffic Engineering** > **Traffic Engineering > RSVP-TE** tab.

Step 2 Click **Create > PCE Init**.

Note If you would like to provision a PCC initiated tunnel using NSO via the Crosswork UI, see Create RSVP-TE Tunnels (PCC Initiated), on page 7.

Step 3 Under **Tunnel details**, 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: Location** drop-down menu. Then, navigate and zoom in on the topology map to click the device for headend or endpoint selection.

Step 4 Under **Tunnel path**, click **Dynamic path** and enter the Path Name.

Step 5 Under **Optimization objective**, select the metric you want to minimize.

Step 6 Define any applicable constraints and disjointness.

Note Affinity constraints and disjointness cannot be configured on the same RSVP-TE tunnel. Also, there can be up to 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 belonging to that same disjoint group are shown during Preview.

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 **Traffic engineering** table. The **Traffic engineering** table is refreshed every 30 seconds.

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

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

Create RSVP-TE Tunnels (PCC Initiated)

This task creates explicit or dynamic RSVP-TE tunnels using Cisco Network Services Orchestrator (NSO) via the Crosswork UI.

Before you begin

If you want to create explicit PCC initiated RSVP-TE tunnels, you must create a Segment IDs list (**Services & Traffic Engineering > Provisioning (NSO) > SR-TE > SID-List**). An explicit (fixed) path consists of a list of prefix or adjacency Segment IDs, each representing a node or link along on the path.

Step 1 From the main menu, choose **Services & Traffic Engineering** > **Provisioning (NSO)**.

Step 2 From **RSVP-TE > Tunnel**, click ➕. Crosswork displays the **Create RSVP-TE > Tunnel** window.

Note You may also click 🔼 to import an existing RSVP-TE tunnel.

Step 3 Enter the policy constraints and required values.

Step 4 When you are finished, click **Dry run** to validate your changes and save them. Crosswork will display your changes in a pop-up window.

Step 5 When you are ready to activate the policy, click **Commit changes**.

Modify RSVP-TE Tunnels

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

Step 1 From the main menu, choose **Services & Traffic Engineering** > **Traffic Engineering > RSVP-TE** tab.

Step 2 Locate the RSVP-TE tunnel you are interested in and click ⋯ .

Step 3 Choose **View details** or **Edit/Delete**.

Note • You can only modify or delete RSVP-TE tunnels that have been created with the UI or API.

• After updating the RSVP-TE tunnel details, you can preview the changes on the map before saving it.