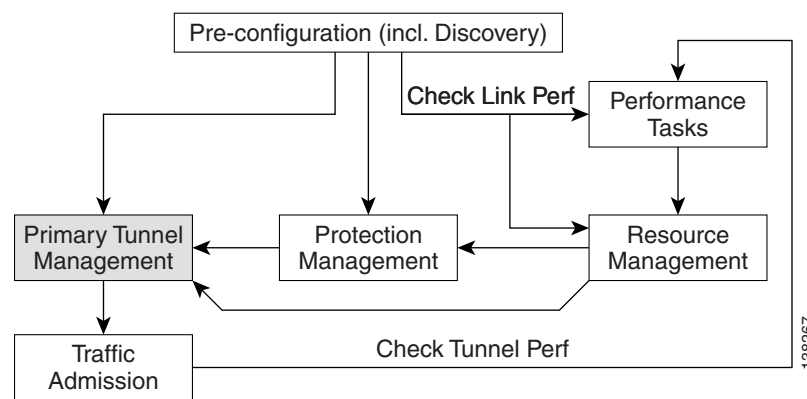




Basic Tunnel Management



This chapter describes the processes involved in creating primary and backup tunnels with ISC TEM. To create a tunnel, certain steps must first be performed as described in previous chapters.

This chapter includes the following sections:

- [Overview, page 5-2](#)
- [Create TE Policy, page 5-2](#)
- [Create Explicit Path, page 5-4](#)
- [Primary Tunnel Operations, page 5-8](#)
 - [Create Primary Tunnel, page 5-8](#)
 - [Edit Primary Tunnel, page 5-16](#)
 - [Delete Primary Tunnel, page 5-19](#)
- [Backup Tunnel Operations, page 5-20](#)
 - [Create Backup Tunnel, page 5-20](#)
 - [Edit Backup Tunnel, page 5-24](#)
 - [Delete Backup Tunnel, page 5-26](#)

Overview

Primary tunnels are characterized by carrying traffic during normal operation. They have a prioritized list of possible paths, by which traffic can be routed. At any one time, the highest priority path available will be used to route traffic. If this fails, traffic will normally be re-routed via the next available path until a higher priority path becomes available again.

Prior to setting up the tunnel, a TE policy governing the traffic must be defined. An explicit path is created to establish the route and, in the case of a primary tunnel, it is created as either a managed or an unmanaged tunnel.

The purpose of a backup tunnel is to carry FRR protected traffic around a failed element until the routing in the network has reconverged. It is intended to protect traffic travelling along primary tunnels. There can be many backup tunnels protecting the same traffic through the use of load balancing.

If the network fails to reconverge, the backup tunnel will remain in place.

The difference between managed and unmanaged tunnels is described in [Managed/Unmanaged Primary Tunnels](#), page 1-3.

The concept of bandwidth pools from which tunnels reserve bandwidth is important to understand. This is described in [Bandwidth Pools](#), page 1-5.

Create TE Policy

To create a primary tunnel, each primary tunnel must be associated with a policy. A policy can be used by multiple tunnels.

For backup tunnels, this step is not necessary. In this case, proceed to [Create Explicit Path](#), page 5-4.

For other TE policy management operations, see [TE Policies](#), page 9-2.

The TE policy is a set of rules governing the TE network and defines the Class-of-Service (for example, gold, silver, bronze) for primary tunnel traffic.

ISC TEM has a notion of **Managed** and **Unmanaged** policies. **Managed** policies have setup/hold priorities of 0/0 and can have additional pathing constraints such as protection level and max delay. Tunnels with **Unmanaged** policies are provisioned by the system, but the system only tracks the deployment, not the operation of the tunnel. **Unmanaged** policies cannot have a setup/hold priority of zero.

Policies are managed under **Policy Manager** in **Service Design**. For a more detailed explanation of the **Policy Manager** GUI, see [TE Policies](#), page 9-2.

To create a TE policy, use the following steps:

Step 1 Navigate to **Service Design > Policy Manager**.

Step 2 Click the **Policy Manager** icon.

The Policies window in [Figure 5-1](#) appears.

Figure 5-1 Policies Window

The screenshot shows the Cisco IP Solution Center interface. The top navigation bar includes links for Home, Shortcuts, Account, Index, Help, About, and Logout. The main menu has tabs for Service Inventory, Service Design, Monitoring, Diagnostics, and Administration. The 'Policies' tab is selected, and the breadcrumb trail shows 'You Are Here: Service Design > Policies'. The 'Policies' window displays a table of policies with the following data:

#	Policy Name	Type	Owner
11.	ISC-P1-isctmp11:tunnel-te2	TE	Provider - Provider2
12.	ISC-P122-isctmp11:tunnel-te1003	TE	Provider - Provider2
13.	ISC-P126-isctmp10:tunnel-te1003	TE	Provider - Provider2
14.	ISC-P2-isctmp11:tunnel-te1000	TE	Provider - Provider2
15.	L2VpnPolicy1	L2VPN	Global
16.	L2VpnPolicy2	L2VPN	Global
17.	MPLSPolicy_PECE	MPLS	Customer - Customer1
18.	MPLSPolicyNO_CE	MPLS	MPLS Policy her1
19.	VPLSPolicy1	VPLS	L2VPN (P2P) Policy
20.	VPLSPolicy2	VPLS	VPLS Policy

Below the table, there are controls for 'Rows per page' (set to 10) and a 'Create' button. The 'Create' button is highlighted with a dropdown arrow. Other buttons include 'Edit', 'Copy', and 'Delete'. The page number '138925' is visible in the bottom right corner.

Step 3 Click **Create** and select **TE Policy** to set up a new TE policy.

To edit an existing policy, select the policy that you want to modify and click **Edit**. The TE Policy Editor window in Figure 5-2 appears.



Note A policy that is being used by a tunnel cannot be modified.

Figure 5-2 *TE Policy Editor*

TE Policy Editor

Policy Name : (1 - 64 characters)

Owner :

Managed: ☐

Pool Type: ☐ Sub Pool (BC1) ☒ Global Pool (BC0)

Setup Priority :

Hold Priority :

Affinity (0x0-0xFFFFFFFF):

Affinity Mask (0x0-0xFFFFFFFF):

FRR Protection Level: ☒ None ☐ Best Effort

Note: * - Required Field

For an explanation of the various window elements, see [TE Policies, page 9-2](#).

Step 4 Fill in the required fields marked with an asterisk (*) and any optional fields.

If you intend to use the TE policy for managed tunnels, make sure to check the **Managed** check box. When setting up a policy for a managed tunnel, the **Setup** and **Hold** priorities are automatically set to zero (highest priority). In the case of a policy for an unmanaged tunnel, you can specify the desired **Setup** and **Hold** priority settings.

Step 5 Click **Save**.

Create Explicit Path

This section describes how to create a TE explicit path. For other TE explicit path operations, see [TE Explicit Paths, page A-33](#).

Paths are defined between source and destination routers, possibly with one or more hops in between. Paths are used for primary and backup tunnels in the explicit path option(s).

If you intend to create an explicit path for managed tunnels, the path should not contain any non-TE enabled interfaces. Paths with non-TE enabled interfaces will be filtered out by the tunnel path chooser of the tunnel editor for managed tunnels and backup tunnels (not unmanaged tunnels).

To create or edit an explicit path, use the following steps:

Step 1 Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.

Step 2 Click **TE Explicit Paths**. The TE Explicit Path List window appears. (see [Figure 5-3](#))

Figure 5-3 TE Explicit Path List

IP Solution Center

Service Inventory | Service Design | Monitoring | Diagnostics | Administration

User: admin

You Are Here: Service Inventory > Inventory and Connection Manager > Traffic Engineering Management

TE Explicit Path List

Provider: Provider2

Show Paths with All matching * Find

Showing 11 - 15 of 67 records

#	Path Name	Head	Dest
11.	isctmp1-isctmp5-1	isctmp1	isctmp5
12.	isctmp1-isctmp6-1	isctmp1	isctmp6
13.	isctmp1-isctmp8-1	isctmp1	isctmp8
14.	isctmp10-isctmp1-1	isctmp10	isctmp1
15.	isctmp10-isctmp6-1	isctmp10	isctmp6

Rows per page: 5 Go to page: 3 of 14 Go

Create Edit Delete

For an explanation of the various window elements, see [Create/Edit Explicit Path, page A-34](#).

Step 3 To create an explicit path in the **TE Explicit Path List**, click **Create**. The New TE Explicit Path window in [Figure 5-4](#) appears.

To edit an explicit path in the explicit path list, select the explicit path that you want to modify and click **Edit**. The TE Explicit Path Editor window in [Figure 5-5](#) appears.



Note An explicit path that is being used by a tunnel cannot be modified. However, use Edit to view the path.

Figure 5-4 *New TE Explicit Path*

New TE Explicit Path

Path Name *:

Head Router *:

Links:

Showing 0 of 0 records

#	Device	Outgoing Interface	Outgoing IP	Next Hop	Incoming Interface	Incoming IP
Rows per page: 10 Go to page: 1 of 1 <input type="button" value="Go"/>						
<input type="button" value="Add Link"/> <input type="button" value="Delete Link"/>						

Provision Preference *: Outgoing Interface ☒ Incoming Interface ☐

Note: * - Required Field

122643

Figure 5-5 *TE Explicit Path Editor*

TE Explicit Path Editor

Path Name *: isctmp1->isctmp3-2

Head Router *: isctmp1

Links:

Showing 0 of 0 records

#	Device	Outgoing Interface	Outgoing IP	Next Hop	Incoming Interface	Incoming IP
1.	<input type="checkbox"/> isctmp1	FastEthernet2/1/1	10.2.3.57	isctmp9	FastEthernet2/1	10.2.3.58
2.	<input type="checkbox"/> isctmp9	POS5/0	10.2.3.69	isctmp3	POS5/0	10.2.3.70
Rows per page: 10 Go to page: 1 of 1 <input type="button" value="Go"/>						
<input type="button" value="Add Link"/> <input type="button" value="Delete Link"/>						

Provision Preference *: Outgoing Interface ☒ Incoming Interface ☐

Note: * - Required Field

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For an explanation of the various window elements, see [Create/Edit Explicit Path](#), page A-34 and [Edit TE SR \(Primary or Backup\)](#), page A-52.

**Note**

If a path is used by any tunnel, no modifications are possible. The **Outgoing Interface** and **Incoming Interface** links are not selectable and the Provision Preference line and the **Add Link**, **Delete Link**, and **Save** buttons disappear.

- Step 4** Specify a path name and select a head router.
- Step 5** Click **Add Link**. A blank line is added to the hop list table.
- Step 6** Now an outgoing or an incoming interface must be selected for the head router. Under **Incoming Interface** or **Outgoing Interface**, click **Add Interface**. The Select Next Hop window in [Figure 5-6](#) appears.

Figure 5-6 Select Next Hop

#	Outgoing Interface	Outgoing IP	Next Hop	Type	Incoming Interface	Incoming IP
1.	<input type="radio"/> FastEthernet2/0/1	10.2.2.145	isctmp2	CISCO_ROUTER	FastEthernet1/0	10.2.2.158
2.	<input type="radio"/>		isctmp2	CISCO_ROUTER	Loopback0	192.168.118.189
3.	<input type="radio"/> FastEthernet2/1/0	10.2.3.54	isctmp9	CISCO_ROUTER	FastEthernet2/0	10.2.3.53
4.	<input type="radio"/>		isctmp9	CISCO_ROUTER	Loopback0	192.168.118.219
5.	<input type="radio"/> FastEthernet2/1/1	10.2.3.57	isctmp9	CISCO_ROUTER	FastEthernet2/1	10.2.3.58
6.	<input type="radio"/> FastEthernet1/0/0	10.2.2.161	isctmp8	CISCO_ROUTER	FastEthernet3/0	10.2.2.174
7.	<input type="radio"/>		isctmp8	CISCO_ROUTER	Loopback0	192.168.118.183
8.	<input type="radio"/> FastEthernet1/1/0	10.2.2.110	isctmp7	CISCO_ROUTER	FastEthernet0/0	10.2.2.97
9.	<input type="radio"/>		isctmp7	CISCO_ROUTER	Loopback0	192.168.118.214
10.	<input type="radio"/> FastEthernet3/1/0	10.2.3.93	isctmp7	CISCO_ROUTER	FastEthernet4/0	10.2.3.94

Showing 1 - 10 of 14 records

Rows per page: 10 Go to page: 1 of 2

Select Cancel

The next hop list contains all the possible next hops of the router, excluding the ones already included in the explicit paths (to avoid path loops).

The next hop list contains TE interfaces and at most one non-TE interface for each router (if the loopback interface is used as the MPLS TE ID of the device). For TE interfaces, the **Outgoing Interface** and **Outgoing IP** columns are populated by the application.

**Note**

If a non-TE interface is selected, **Provision Preference** ([Figure 5-4](#)) is set to **Incoming Interface**. The provision preference cannot be set manually.

- Step 7** Select an interface and click **Select**. The corresponding link information is added to the new explicit path in the **Links** table as shown in [Figure 5-7](#).

The incoming interface field is automatically populated.

Figure 5-7 New Link for TE Explicit Path

New TE Explicit Path

Path Name *: new_path

Head Router *: isctmp3 Select

Links:

Showing 0 of 0 records

#	Device	Outgoing Interface	Outgoing IP	Next Hop	Incoming Interface	Incoming IP
1.	isctmp3	FastEthernet0/1	10.2.2.241	isctmp4	Ethernet5/5	10.2.2.254

Rows per page: 10 Go to page: 1 of 1 Go

Add Link Delete Link

Provision Preference *: Outgoing Interface Incoming Interface

Save Cancel

Note: * - Required Field

Step 8 To add another link, click **Add Link** again.

Step 9 To modify an existing link, click the link in the **Outgoing Interface** or the **Incoming Interface** columns, make the desired changes, and click **Select**.

Step 10 Optionally, select **Provision Preference** by clicking either the **Outgoing Interface** or the **Incoming Interface** radio button.



Note If you try to select the **Provision Preference** before adding a link when non-TE interfaces are present, the **Add Link** process overrides the **Provision Preference** and sets it to incoming.

Step 11 Click **Save** to keep the created TE explicit path or click **Cancel** to quit without saving.

Primary Tunnel Operations

ISC TEM allows you to perform a number of primary tunnel operations, which are described in the following.

Create Primary Tunnel

After a TE Policy and an explicit path have been set up, a primary tunnel can be created. There are two types of primary tunnels:

- Managed Primary Tunnels
- Unmanaged Primary Tunnels

Below, the GUI flow is described for creating unmanaged primary tunnels. It is very similar for managed primary tunnels and the few differences that exist are described in [Managed/Unmanaged Primary Tunnels, page 1-3](#) and [Create Unmanaged TE Tunnel, page A-59](#).

To create a managed or an unmanaged primary tunnel, use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window in [Figure 5-8](#) appears.
- or
- Click **Create Unmanaged TE Tunnel**. The TE Unmanaged Primary Tunnels SR window in [Figure 5-9](#) appears.

Figure 5-8 TE Managed Primary Tunnels SR

TE Managed Primary Tunnels SR

SR Job ID: 8

Provider: Provider2

SR State: REQUESTED

SR ID: New

Creator:

Type: ADD

Description:

Show Existing Tunnels with All matching

Find

Showing 1 - 5 of 23 records

#	Op	Tunnel ID	T#	Head	Dest	Policy	BW	AutoBW	Deploy Status	Verified	Allow Reroute
1.	<input type="checkbox"/>	ISC-P1	2	isctmp11	isctmp10	ISC-P1-isctmp11:tunnel-te2	2	false	LOST	succeed	false
2.	<input type="checkbox"/>	ISC-P2	1000	isctmp11	isctmp1	ISC-P2-isctmp11:tunnel-te1000	200	false	LOST	succeed	false
3.	<input type="checkbox"/>	ISC-P122	1003	isctmp11	isctmp12	ISC-P122-isctmp11:tunnel-te1003	500	false	DEPLOYED	succeed	false
4.	<input type="checkbox"/>	ISC-P123	1004	isctmp11	isctmp8	ISC-P122-isctmp11:tunnel-te1003	500	false	DEPLOYED	succeed	false
5.	<input type="checkbox"/>	ISC-P3	1	isctmp10	isctmp6	ISC-P2-isctmp11:tunnel-te1000	1000	false	DEPLOYED	succeed	false

Rows per page: 5

Go to page: 1 of 5

Go

Close

Display

Details

Admit

Create

Edit

Delete

Import

Placement Tools

Proceed with Changes >>

Save & Deploy

Cancel

138930

Figure 5-9 TE Unmanaged Primary Tunnels SR

TE Unmanaged Primary Tunnels SR

SR Job ID: 1 Provider: pad0 SR State: REQUESTED
 SR ID: New Creator: Type: ADD

Description:

Show Existing Tunnels with All Matching * Find

Showing 1 - 2 of 2 records

#	Op	Tunnel ID	T#	Head	Dest	Policy	BW	AutoBW	Deploy Status	Conformance
1.	<input type="checkbox"/>	ISC-P1	3	isctmp1	isctmp6	ISC-P1-isctmp1:Tunnel3	56	false	DEPLOYED	Yes
2.	<input type="checkbox"/>	ISC-P41	1	isctmp1	isctmp2	unman	44	false	DEPLOYED	Yes

Rows per page: 10 Go to page: 1 of 1 Go

Close Display Details Create Edit Delete

Save & Deploy Cancel

122770

For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#).

Note that for the unmanaged tunnels list, the last two columns in the managed tunnels list in [Figure 5-8](#) (Verified and Allow Reroute) are replaced by the Conformance column.

In this example, we will create an unmanaged tunnel.

Step 3 Click **Create**. The Create TE Unmanaged Primary Tunnel window in [Figure 5-10](#) appears.

Figure 5-10 Create TE Unmanaged Primary Tunnel

Create TE Unmanaged Primary Tunnel

SR Job ID: New	SR ID: New	SR State: REQUESTED
Tunnel ID:	Creator:	Type: ADD
Head Device *:	<input type="text"/>	<input type="button" value="Select"/>
Destination Device *:	<input type="text"/>	<input type="button" value="Select"/>
TE Policy *:	<input type="text"/>	<input type="button" value="Select"/>
Tunnel Bandwidth (kbps):	<input type="text"/>	
Tunnel Number:	Auto Gen <input checked="" type="checkbox"/>	<input type="text"/>
Customer:	<input type="text"/>	
Auto BW:	Enable: <input type="checkbox"/>	
	Freq (sec):	<input type="text"/>
	Min (kbps):	<input type="text"/>
	Max (kbps):	<input type="text"/>
Path Options:		
Showing 0 of 0 records		
<input type="checkbox"/>	Option #	Path Name Path Type Lock Down
Rows per page: 10 <input type="button" value="Go"/> of 1		
		<input type="button" value="Add"/> <input type="button" value="Delete"/>
		<input type="button" value="OK"/> <input type="button" value="Cancel"/>

Note: * - Required Field

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For an explanation of the various window elements, see [Create Managed TE Tunnel](#), page A-41 and [Create Unmanaged TE Tunnel](#), page A-59.

- Step 4** To select a **Head Device** in the Create TE Unmanaged Primary Tunnel window, click the corresponding **Select** button to open the Select Device for TE Head Router window shown in [Figure 5-11](#).

Figure 5-11 Select Device for TE Head Router

Device for **TE Head Router**

Show Devices with: matching

Showing 1 - 5 of 14 records

#	Device Name	IGP ID	MPLS TE ID	Admin Status
1.	<input type="radio"/> isctmp1	192.168.118.176	192.168.118.176	UP
2.	<input type="radio"/> isctmp11	192.168.118.166	192.168.118.166	UP
3.	<input type="radio"/> isctmp10	192.168.118.167	192.168.118.167	UP
4.	<input type="radio"/> isctmp12	192.168.118.168	192.168.118.168	UP
5.	<input type="radio"/> isctmp13	192.168.118.171	192.168.118.171	UP

Rows per page:

For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#) and [Create Unmanaged TE Tunnel, page A-59](#).

- Step 5** Select a device name and click **Select**. The Select Device for TE Head Router window closes and the prompt returns to the Create TE Unmanaged Primary Tunnel window.
- Step 6** To select a **Destination Device** in the Create TE Unmanaged Primary Tunnel window, click the corresponding **Select** button to open the Select Device for TE Tail Router window shown in [Figure 5-12](#).

Figure 5-12 Select Device for TE Tail Router

Device for **TE Tail Router**

Show Devices with: matching

Showing 1 - 5 of 15 records

#	Device Name	IGP ID	MPLS TE ID	Admin Status
1.	<input type="radio"/> 192.168.118.178	192.168.118.178	192.168.118.178	UP
2.	<input type="radio"/> isctmp1	192.168.118.176	192.168.118.176	UP
3.	<input type="radio"/> isctmp11	192.168.118.166	192.168.118.166	UP
4.	<input type="radio"/> isctmp10	192.168.118.167	192.168.118.167	UP
5.	<input type="radio"/> isctmp12	192.168.118.168	192.168.118.168	UP

Rows per page:

For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#) and [Create Unmanaged TE Tunnel, page A-59](#).

- Step 7** Select a device name and click **Select**. The Select Device for TE Tail Router window closes and the prompt returns to the Create TE Unmanaged Primary Tunnel window.

- Step 8** To select a **Tunnel Policy** in the Create TE Unmanaged Primary Tunnel window, click the corresponding **Select** button to open the Select Unmanaged TE Tunnel Policy window shown in [Figure 5-13](#).

**Note**

To create a managed tunnel, make sure that one or more managed tunnel policies are available. If that is not the case, go to **Policy Manager** (see [Create TE Policy, page 5-2](#)) and make sure to check the **Managed** check box.

Figure 5-13 Select Unmanaged TE Tunnel Policy

#	Policy Name	Pool Type	Setup Priority	Hold Priority	Affinity	Affinity Mask	FRR Protection
1.	um1	GLOBAL	1	1	0x0	0xFFFF	None
2.	um2	GLOBAL	2	2	0x0	0xFFFF	None

Rows per page: 10 Go to page: 1 of 1

Select Cancel

For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#) and [Create Unmanaged TE Tunnel, page A-59](#).

- Step 9** Select a policy and click the **Select** button. This brings you back to the tunnel editor.
- Step 10** Click **Add** to set up path options for the tunnel. The Select TE Explicit Path window in [Figure 5-14](#) appears.

The **Path Options** section provides two path types, **Explicit Path** and **Dynamic Path**.

An **Explicit Path** is a fixed path from a specific head to a specific destination device.

A **Dynamic Path** is provisioned by allowing the head router to find a path. The **dynamic** keyword is provisioned to the routers.

Figure 5-14 Select TE Explicit Path

#	Path Name	Head	Dest
1.	Dynamic		

Rows per page: 10 Go to page: 1 of 1

Select Cancel

For unmanaged tunnels, paths can be either explicit or dynamic.

- Step 11** Select the desired TE Explicit Path unless you prefer dynamic path only. If none is available, you can set one up first. To do so, see [Create Explicit Path, page 5-4](#).

Click **Select**.

The selected path appears in the **Path Options** section of the create window as shown in [Figure 5-15](#).

Figure 5-15 Path Options

Path Options:

Showing 1 - 2 of 2 records

<input type="checkbox"/>	Option #	Path Name	Path Type	Lock Down
<input type="checkbox"/>	1	isctmp11-isctmp10-1	Explicit	<input type="checkbox"/>
<input type="checkbox"/>	2	Dynamic Path	Dynamic	<input type="checkbox"/>

Rows per page: 10 Go to page: 1 of 1 Go

For explicit paths (<head_device>-<destination_device>), you can click the path name to open the non-editable Explicit Path Viewer as shown in [Figure 5-16](#).

Figure 5-16 TE Explicit Path Viewer

Path Name *: isctmp11-isctmp10-1

Head Router *: isctmp11

Links:

Showing 1 - 2 of 2 records

#	Device	Outgoing Interface	Outgoing IP	Next Hop	Type	Incoming Interface	Incoming IP
1.	isctmp11	POS0/3/0/1	10.2.4.14	isctmp12	CISCO_ROUTER	POS0/1/0/1	10.2.4.13
2.	isctmp12	POS0/4/0/0	10.2.4.21	isctmp10	CISCO_ROUTER	POS0/2/0/0	10.2.4.22

Rows per page: 10 Go to page: 1 of 1 Go

Provision Preference *: Outgoing Interface Incoming Interface

Close

Note: * - Required Field

For an explanation of the various window elements, see [Create/Edit Explicit Path, page A-34](#).

- Step 12** In the Create TE Unmanaged Tunnel window, click **OK** to accept the entered tunnel information or click **Cancel** to quit and return to the TE Unmanaged Primary Tunnels SR window.
- Step 13** The TE Unmanaged Primary Tunnel SR window appears with the newly created SR ([Figure 5-17](#)) with the Op field set to ADD.



Note

The added tunnel can be reverted from the ADD state to its original state by selecting it and clicking **Delete**. The tunnel is removed from the tunnel list.

Figure 5-17 Service Requests - Unmanaged Tunnels

TE Unmanaged Primary Tunnels SR

SR Job ID: 8 Provider: Provider2 SR State: REQUESTED
 SR ID: New Creator: Type: ADD

Description:

Show Tunnels with matching

Showing 1 - 1 of 1 record

#	<input type="checkbox"/>	Op	Tunnel ID	T#	Head	Dest	Policy	B/W	AutoB/W	Deploy Status	Conformance
1.	<input type="checkbox"/>	ADD	ISC-P151		isctmp11	isctmp10	te_policy1	100000	false	REQUESTED	Yes

Rows per page: Go to page: of 1

- Step 14** In the TE Unmanaged Primary Tunnel window, click **Save & Deploy** (see [Note](#) on page 15) to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more primary tunnels and then save and deploy all changes.

When you click Save & Deploy, a background process is started. To avoid a potential conflict with another deployment, wait until the SR has completed the Requested and Pending states before deploying another SR with Save & Deploy. To see the state of deployment, go to the Service Requests window at **Inventory and Connection Manager > Service Requests** or open **Monitoring > Task Manager**.

For a further description of save and deploy options, see [Create Managed TE Tunnel, page A-41](#).

**Note**

For managed tunnels, you cannot deploy the service request until you have used the **Proceed with Changes >>** button to perform either Tunnel Placement, Tunnel Audit, or Tunnel Repair (see [Chapter 6, “Advanced Primary Tunnel Management”](#)).

**Note**

With the exception of TE Traffic Admission SRs, TE SRs are always deployed immediately from the specific TE SR window, not from **Inventory and Connection Manager > Service Requests**.

- Step 15** The Service Requests window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears (see [Figure 5-18](#)) and displays the state of the deployed SR (first REQUESTED, then PENDING, then DEPLOYED, if successful).

Figure 5-18 Service Requests - Unmanaged Tunnels

Service Requests

Show Services with matching of Type

Showing 6 - 10 of 15 records

#	<input type="checkbox"/>	Job ID	State	Type	Operation Type	Creator	Customer Name	Policy Name	Last Modified	Description
6.	<input type="checkbox"/>	6	REQUESTED	VPLS	ADD	admin	Customer2	VPLSPolicy1	10/19/05 3:29 PM	
7.	<input type="checkbox"/>	7	REQUESTED	VPLS	ADD	admin	Customer2	VPLSPolicy2	10/19/05 3:29 PM	
8.	<input type="checkbox"/>	8	REQUESTED	TE Tunnel	MODIFY	admin			11/6/05 4:15 PM	
9.	<input type="checkbox"/>	9	DEPLOYED	TE Protection	MODIFY	admin			11/2/05 3:54 PM	
10.	<input type="checkbox"/>	10	DEPLOYED	TE Admission	ADD	admin			10/20/05 6:01 PM	tunnel-te1 : CISCO ISC-P55

Rows per page: Go to page: of 3

Auto Refresh: ☒

For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)

If the SR does not go to the **Deployed** state, go to the Task Logs window to see the deployment log (**Monitoring > Task Manager > Logs**) as described in [SR Deployment Logs, page 10-1](#).

To edit the service request from the **Service Requests** window, go back to the TE Managed Primary Tunnels SR or the TE Unmanaged Primary Tunnels SR window as described in [Edit Primary Tunnel, page 5-16](#).

Edit Primary Tunnel

Primary tunnel attributes can be modified in the primary tunnel editor

There are two ways to access the primary tunnel editor:

- from the managed or unmanaged primary tunnels SR window or
- from the Service Requests window.

Access from Primary Tunnel SR Window

To access the primary tunnel editor from the primary tunnel SR window (TE Managed Primary Tunnels SR or TE Unmanaged Primary Tunnels SR window) and edit a managed or an unmanaged primary tunnel, use the following steps:

Step 1 Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.

Step 2 Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears .
or

Click **Create Unmanaged TE Tunnel**. The TE Unmanaged Primary Tunnels SR window in [Figure 5-9](#) appears.

- Step 3** To edit a tunnel SR, select the desired SR and click **Edit**. The Edit TE Managed Primary Tunnel or the Edit TE Unmanaged Primary Tunnel window in [Figure 5-19](#) appears.

Figure 5-19 Edit TE Unmanaged Primary Tunnel

Edit TE Unmanaged Primary Tunnel

SR Job ID: 3	SR ID: 11	SR State: DEPLOYED
Tunnel ID: ISC-P140	Creator: admin	Type: ADD

Head Device *: isctmp5

Destination Device *: isctmp9

TE Policy *: te_policy1 Select

Tunnel Bandwidth (kbps): 150

Tunnel Number: 3

Customer:

Auto BW:

Enable: ☐

Freq (sec):

Min (kbps):

Max (kbps):

Path Options:

Showing 1 - 1 of 1 record

<input type="checkbox"/>	Option #	Path Name	Path Type	Lock Down
<input type="checkbox"/>	1	isctmp5->isctmp9-3	Explicit	<input type="checkbox"/>

Rows per page: 10 Go to page: 1 of 1 Go

Add Delete

OK Cancel

Note: * - Required Field

The primary tunnel editor is identical to that of the create primary tunnel GUI. For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#) and [Create Unmanaged TE Tunnel, page A-59](#).

- Step 4** Make the desired changes and click **OK** or **Cancel** to discard the changes.
- Step 5** In the TE Unmanaged Primary Tunnel SR window, the Op field changes to MODIFY.



Note The modified tunnel can be reverted to its original state by selecting it and clicking **Delete**. The MODIFY flag in the Op column disappears.

Click **Save & Deploy** (see [Note](#) on page 15) to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more primary tunnels and then save and deploy all changes.

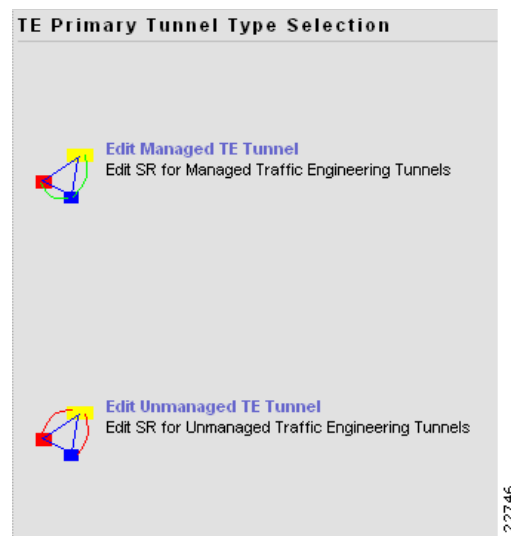
- Step 6** The Service Requests window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears (see [Figure 5-18](#)) and displays the state of the deployed SR.
- For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)

Access from Service Requests Window

To access the primary tunnel editor from the Service Requests window, assuming that the SR has been created, use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Service Requests**.
- Step 2** To edit the desired tunnel SR, select the SR in question and click **Edit**. The TE Primary Tunnel Type Selection window in [Figure 5-20](#) appears.

Figure 5-20 TE Primary Tunnel Type Selection



- Step 3** Specify the type of tunnel, managed or unmanaged. The TE Managed Primary Tunnel SR or the TE Unmanaged Primary Tunnel SR window appears displaying the SR selected in the Service Requests window. An example of the TE Unmanaged Primary Tunnel SR window is shown in [Figure 5-9](#).
- Step 4** Select the tunnel SR and click **Edit**. The Edit TE Unmanaged Primary Tunnel window in [Figure 5-19](#) appears.

Go to [Access from Primary Tunnel SR Window, page 5-16](#) and continue the process from [Step 4](#).

Delete Primary Tunnel

To delete a managed or an unmanaged primary tunnel from the primary tunnel SR window (TE Managed Primary Tunnels SR or TE Unmanaged Primary Tunnels SR window), use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears .
or
Click **Create Unmanaged TE Tunnel**. The TE Unmanaged Primary Tunnels SR window in [Figure 5-9](#) appears.
- Step 3** To delete a tunnel, select the desired tunnel(s) and click **Delete**. The **Op** field status changes to **DELETE** as shown in [Figure 5-21](#).

Figure 5-21 TE Unmanaged Primary Tunnels SR - Delete Requested

The screenshot shows the 'TE Unmanaged Primary Tunnels SR' window. At the top, it displays 'SR Job ID: 1', 'Provider: pad0', 'SR State: REQUESTED', 'SR ID: New', 'Creator:', and 'Type: ADD'. Below this is a 'Description:' field. A search bar shows 'Show Existing Tunnels with All Matching *'. The table below shows two records:

#	Op	Tunnel ID	T#	Head	Dest	Policy	BW	AutoBW	Deploy Status	Conformance
1.	<input type="checkbox"/>	ISC-P1	3	isctmp1	isctmp6	ISC-P1-isctmp1:Tunnel3	56	false	DEPLOYED	Yes
2.	<input checked="" type="checkbox"/> DELETE	ISC-P41	1	isctmp1	isctmp2	unman	44	false	REQUESTED	Yes

Below the table, it says 'Rows per page: 10' and 'Go to page: 1 of 1'. At the bottom, there are buttons for 'Close', 'Display', 'Details', 'Create', 'Edit', 'Delete', 'Save & Deploy', and 'Cancel'.

For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-41](#) and [Create Unmanaged TE Tunnel, page A-59](#).



Note The deleted tunnel can be reverted to its original state by selecting it and clicking **Delete**. The DELETE flag in the Op column disappears.

Click **Save & Deploy** to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more primary tunnels and then save and deploy all changes.

- Step 4** The Service Requests window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears (see [Figure 5-18](#)) and displays the state of the deployed SR.
- For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)
-

Backup Tunnel Operations

ISC TEM allows you to perform a number of backup tunnel operations, which are described in this section.

**Note**

Non-POS interfaces cannot be FRR protected on IOS-XR devices.

Create Backup Tunnel

Backup tunnels are created in much the same way as primary tunnels. In both cases, building an explicit path is not required when an existing path already traverses the desired routers. A path can be used for any number of tunnels within its bandwidth capacity.

A precondition for creating a backup tunnel is the presence of an explicit path. To create an explicit path, see [Create Explicit Path, page 5-4](#).

To create a backup tunnel, use the following steps:

-
- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create TE Backup Tunnel**. The TE Protection SR window in [Figure 5-22](#) appears.

Figure 5-22 TE Protection SR

IP Solution Center

Service Inventory | Service Design | Monitoring | Diagnostics | Administration

Inventory and Connection Manager | Discovery | Device Console

You Are Here: Service Inventory > Inventory and Connection Manager > Traffic Engineering Management

Customer: None

TE Protection SR

SR Job ID: 9 Provider: Provider2 SR State: REQUESTED
 SR ID: New Creator: Type: ADD

Description:

Show: Existing Tunnels with: All matching: * Find

Showing 1 - 5 of 47 records

#	Op	Tunnel ID	T#	Head	Dest	B/W Quota	Deploy Status	Conformance
1.	<input type="checkbox"/>	ISC-B30	3	isctmp11	isctmp12	2	LOST	Yes
2.	<input type="checkbox"/>	ISC-B31	1001	isctmp11	isctmp8	30000	LOST	Yes
3.	<input type="checkbox"/>	ISC-B141	1002	isctmp11	isctmp8	30000	DEPLOYED	Yes
4.	<input type="checkbox"/>	ISC-B142	1005	isctmp11	isctmp12	1000	DEPLOYED	No
5.	<input type="checkbox"/>	ISC-B143	1000	isctmp12	isctmp5	1000	DEPLOYED	No

Rows per page: 5 Go to page: 1 of 10 Go

Close Display Details Create Edit Delete

Audit SR Save & Deploy Cancel

For an explanation of the various window elements, see [Create TE Backup Tunnel](#), page A-59.

Step 3 Click **Create**. The Create TE Backup Tunnel window in [Figure 5-23](#) appears.

Figure 5-23 Create TE Backup Tunnel

Create TE Backup Tunnel

SR Job ID: New	SR ID: New	SR State: REQUESTED
Tunnel ID:	Creator:	Type: ADD

Head Device * :

Destination Device * :

Protected Interface(s) * :

Backup Bandwidth Limit (kbps) * :
☒ Any Pool BW
☐ Sub Pool (BC1) BW Global Pool (BC0) BW

Tunnel Number: Auto Gen ☒

Tunnel Bandwidth (kbps):

Tunnel Pool Type:
☐ Global Pool (BC0)
☐ Sub Pool (BC1)

Setup Priority (0-7):

Hold Priority (0-7):

Affinity (0x0-0xFFFFFFFF):

Affinity Mask (0x0-0xFFFFFFFF):

Path Options:

Showing 0 of 0 records

<input type="checkbox"/>	Option #	Path Name	Path Type	Lock Down
Rows per page: 10 <input type="button" value="Go"/> 1 of 1				
<input type="button" value="Add"/> <input type="button" value="Delete"/>				
<input type="button" value="OK"/> <input type="button" value="Cancel"/>				

Note: * - Required Field

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For an explanation of the various window elements, see [Create TE Backup Tunnel, page A-59](#).

- Step 4** Select, at a minimum, a **Head Device**, a **Destination Device**, and a **Protected Interface**. Also, specify a **Backup Bandwidth Limit** greater than zero. Add other tunnel information as desired.

Figure 5-24 **Select TE Protected Interface**

#	Interface Name	IP Address	Next Hop
1.	ATM5/0.1	10.2.2.49	isctmp2
2.	FastEthernet3/0	10.2.2.81	isctmp4
3.	FastEthernet0/1	10.2.2.17	isctmpe1

Rows per page: 10 Go to page: 1 of 1 Go

Select Cancel

For an explanation of the various window elements, see [Select TE Protected Interface, page A-63](#).

Step 5 Click **Add** to add just one path. The Select TE Explicit Path window in [Figure 5-25](#) appears.

Figure 5-25 **Select TE Explicit Path**

#	Path Name	Head	Dest
1.	isctmp3->isctmp4-2	isctmp3	isctmp9

Rows per page: 10 Go to page: 1 of 1 Go

Select Cancel

Step 6 Select an explicit path. It must match the head and destination of an existing path. If none is available, you first must set one up. To do so, see [Create Explicit Path, page 5-4](#).

Step 7 Click **Select**. The selected path appears in the **Path Options** section of the page as shown in the Select TE Explicit Path window in [Figure 5-26](#).

Figure 5-26 **Path Options**

Option #	Path Name	Path Type	Lock Down
1	backup_path	Explicit	<input type="checkbox"/>

Showing 1 - 1 of 1 record

Select Cancel

For explicit paths, you can click the path name to open the Explicit Path Viewer as shown in [Figure 5-16](#).

Step 8 In the Create TE Backup Tunnel window, click **OK** to accept the entered tunnel information or click **Cancel** to quit the window without saving it. The window closes.

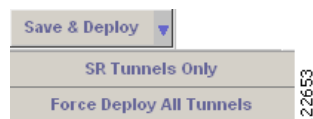
Step 9 In the TE Protection SR window, a new backup tunnel is added in the tunnel list with the Op field set to ADD.

**Note**

The added tunnel can be reverted to its original state by selecting it and clicking **Delete**. The tunnel is removed from the tunnel list.

- Step 10** Click **Save & Deploy** to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more backup tunnels and then save and deploy all changes.

Figure 5-27 Save & Deploy Tunnels



The **Save & Deploy** button provides two options:

- **SR Tunnels Only**—Deploy all tunnel changes that does not impact tunnel placement, or if no changes were made to the SR, use this to re-deploy the SR that was in **Requested** or **Invalid** state.
- **Force Deploy All Tunnels**—Force deployment of all tunnels in this SR. This could be useful when previous provisioning of the SR has failed, so that it is necessary to force through the deployment of all tunnels in the SR.

When you click **Save & Deploy**, a background process is started. To avoid a potential conflict with another deployment, wait until the SR has completed the **Requested** and **Pending** states before deploying another SR with **Save & Deploy**. To see the state of deployment, go to the **Service Request** window under **Inventory and Connection Manager** or open the **Task Manager** under **Monitoring**.

**Note**

With the exception of **TE Traffic Admission SRs**, **TE SRs** are always deployed immediately from the specific **TE SR** window, not from the **Service Requests** page in **Inventory and Connection Manager**.

- Step 11** The **Service Requests** window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears and displays the state of the deployed SR.
- For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)
- If the SR does not go to the **Deployed** state, go to the **Task Logs** window to see the deployment log (**Monitoring > Task Manager > Logs**) as described in [SR Deployment Logs, page 10-1](#).

Edit Backup Tunnel

Backup tunnel attributes can be modified in the backup tunnel editor.

There are two ways to access the backup tunnel editor:

- from the **Protection SR** window or
- from the **Service Requests** window.

From the Protection SR Window

To access the Protection SR window to edit a backup tunnel, use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > Create TE Backup Tunnel**. The TE Protection SR window appears.
- Step 2** To edit a tunnel SR, select the desired SR and click **Edit**. The Edit TE Backup Tunnel window in [Figure 5-28](#) appears.

Figure 5-28 Edit TE Backup Tunnel

Edit TE Backup Tunnel

SR Job ID: 2 SR ID: 4 SR State: DEPLOYED
Tunnel ID: ISC-B41 Creator: admin Type: ADD

Head Device *: isctmp4

Destination Device *: isctmp2

Protected Interface(s) *: FastEthernet2/0 Select

Backup Bandwidth Limit (kbps) *:
☐ Any Pool BW
☒ Sub Pool (BC1) BW 40 Global Pool (BC0) BW
☐ Global Pool (BC0)
☐ Sub Pool (BC1)

Tunnel Number: 9

Tunnel Bandwidth (kbps): 0

Setup Priority (0-7): 0

Hold Priority (0-7): 0

Affinity (0x0-0xFFFFFFFF): 0x0

Affinity Mask (0x0-0xFFFFFFFF): 0x0

Path Options:

Showing 1 - 1 of 1 record

<input type="checkbox"/>	Option #	Path Name	Path Type	Lock Down
<input type="checkbox"/>	1	isctmp4->isctmp2-1	Explicit	<input type="checkbox"/>

Rows per page: 10 Go to page: 1 of 1 Go Next Previous

Add Delete

OK Cancel

Note: * - Required Field

The backup tunnel editor is identical to that of the create backup tunnel GUI. For an explanation of the various window elements, see [Create TE Backup Tunnel](#), page A-59.

- Step 3** Make the desired changes and click **OK**.
- Step 4** In the TE Protection window, the Op field changes to MODIFY.

**Note**

The modified tunnel can be reverted to its original state by selecting it and clicking **Delete**. The MODIFY flag in the Op column disappears.

- Step 5** In the TE Protection SR window, click **Save & Deploy** to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more backup tunnels and then save and deploy all changes.

The **Save & Deploy** button options are discussed in [Create Managed TE Tunnel, page A-41](#).

- Step 6** The Service Requests window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears (see [Figure 5-18](#)) and displays the state of the deployed SR.

For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)

From the Service Requests Window

To edit a backup tunnel from the **Service Requests** window, assuming that the SR has been created use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Service Requests**.
- Step 2** To edit the desired tunnel SR, select the SR in question and click **Edit**. The TE Protection SR window appears displaying the SR selected in the Service Requests window. An example of the TE Protection SR window is shown in [Figure 5-22](#).
- Step 3** Select the tunnel SR and click **Edit**. The Edit TE Backup Tunnel window in [Figure 5-28](#) appears. Go to [From the Protection SR Window, page 5-25](#) and continue the process from [Step 3](#).

Delete Backup Tunnel

To delete a backup tunnel from the TE Protection SR window, use the following steps:

- Step 1** Navigate to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > Create TE Backup Tunnel**.
- The TE Protection SR window in [Figure 5-22](#) appears.
- Step 2** To delete a tunnel SR, select the desired SR and click **Delete**. The **Op** field status changes to **DELETE** as shown in [Figure 5-29](#).

Figure 5-29 TE Protection SR - Delete Requested

TE Protection SR

SR Job ID: 2 Provider: pad0 SR State: REQUESTED
 SR ID: New Creator: Type: ADD

Description:

Show Existing Tunnels with All Matching * Find

Showing 1 - 5 of 5 records

#	<input type="checkbox"/>	Op	Tunnel ID	T#	Head	Dest	BW Quota	Deploy Status	Conformance
1.	<input type="checkbox"/>		ISC-B31	1	isctmp1	isctmp3	10	DEPLOYED	No
2.	<input type="checkbox"/>	DELETE	ISC-B46	4	isctmp1	isctmp8	120	REQUESTED	Yes
3.	<input type="checkbox"/>		ISC-B32	2	isctmp5	isctmp4	10	DEPLOYED	Yes
4.	<input type="checkbox"/>		ISC-B34	1	isctmp3	isctmp1	2000	DEPLOYED	Yes
5.	<input type="checkbox"/>		ISC-B35	1	isctmp9	isctmp8	300	DEPLOYED	Yes

Rows per page: 10 Go to page: 1 of 1 Go

Close Display Details Create Edit Delete

Audit SR Save & Deploy Cancel

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For an explanation of the various window elements, see [Create TE Backup Tunnel, page A-59](#).



Note The deleted tunnel can be reverted to its original state by selecting it and clicking **Delete**. The DELETE flag in the Op column disappears.

Click **Save & Deploy** to either deploy the new tunnel SR to the network or force deploy all tunnels, or you can create or edit more primary tunnels and then save and deploy all changes.

Step 3 The Service Requests window (**Service Inventory > Inventory and Connection Manager > Service Requests**) appears (see [Figure 5-18](#)) and displays the state of the deployed SR.

For more information on working with service requests, see [Appendix B, “Managing Service Requests.”](#)

