



## Advanced Primary Tunnel Management

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In addition to the basic tunnel management tools described in [Chapter 5, “Basic Tunnel Management”](#), ISC TEM gives access to a set of advanced tunnel planning tools that provide optimal placement of tunnels to ensure efficient use of network resources.

The advanced primary tunnel management tools are available for managed tunnels. The difference between managed and unmanaged tunnels is described in the [“Managed/Unmanaged Primary Tunnels” section on page 1-3](#).

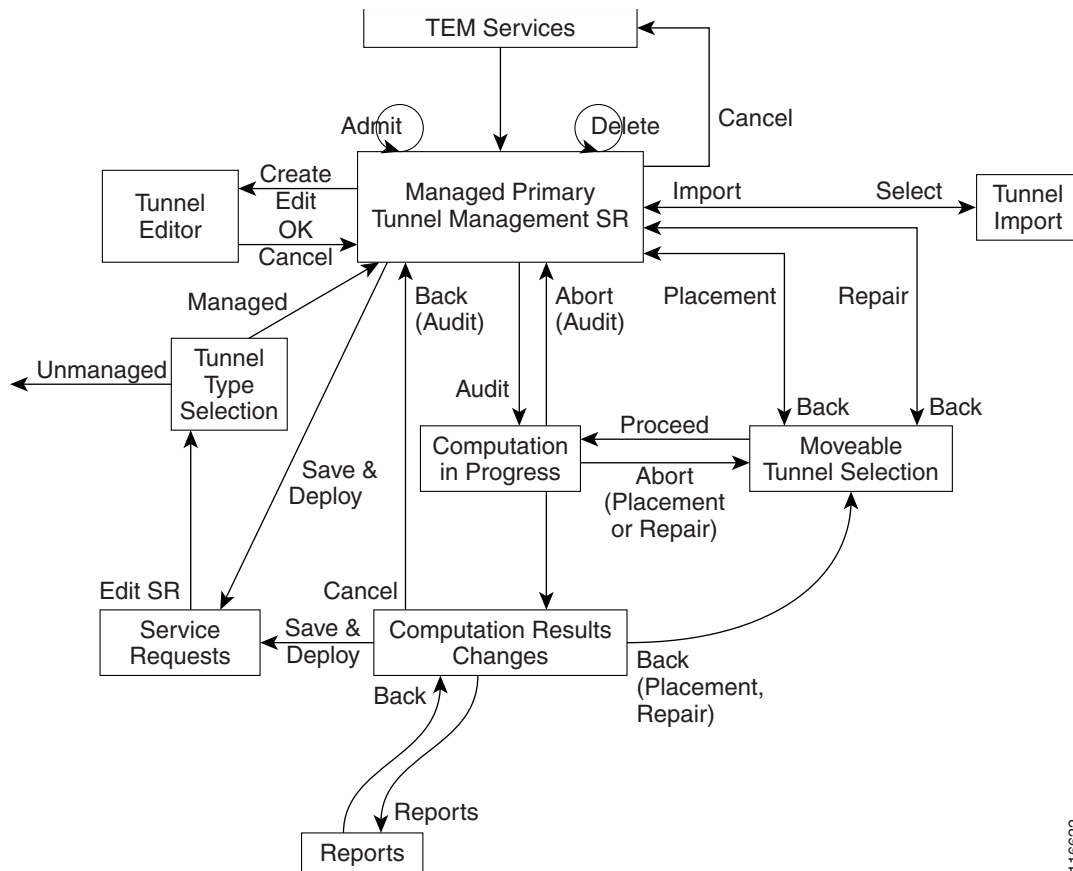
This chapter contains the following sections:

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## Tunnel Operations

This section explains the advanced tunnel operations in ISC TEM that incorporate the planning tools.

An overview of the primary tunnel management process is provided in [Figure 6-1](#).

**Figure 6-1 Primary Tunnel Management Processes**

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For **Tunnel Type Selection**, when you select **Unmanaged** the TE Unmanaged Primary Tunnel SR window appears (see [Chapter 5, “Basic Tunnel Management”](#)).

All other elements in [Figure 6-1](#) are described in this chapter.

## Create Primary Tunnel

To create a TE managed primary tunnel with the RG license installed, use the following steps:

- Step 1** Navigate **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).

Figure 6-2 TE Managed Primary Tunnels SR

**CISCO SYSTEMS** IP Solution Center

Home | Shortcuts | Account | Index | Help | About | Logout

User: admin

Inventory and Connection Manager | Deployment Flow Manager | Device Console

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

Customer: None

**TE Managed 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 - 7 of 7 records

#	Op	Tunnel ID	T#	Head	Dest	Policy	BW	AutoBW	Deploy Status	Verified	Allow Reroute
1.	<input type="checkbox"/>	ISC-P1	3	isctmp1	isctmp8	ISC-P1-isctmp1:Tunnel3	200	false	DEPLOYED	succeed	false
2.	<input type="checkbox"/>	ISC-P2	215	isctmp1	isctmp7	ISC-P1-isctmp1:Tunnel3	300	false	DEPLOYED	succeed	false
3.	<input type="checkbox"/>	ISC-P3	512	isctmp1	isctmp8	ISC-P1-isctmp1:Tunnel3	200	false	DEPLOYED	succeed	false
4.	<input type="checkbox"/>	ISC-P4	260	isctmpe1	isctmp5	ISC-P4-isctmpe1:Tunnel260	400	true	DEPLOYED	unknown	false
5.	<input type="checkbox"/>	ISC-P5	215	isctmp5	isctmp6	ISC-P4-isctmpe1:Tunnel260	500	false	DEPLOYED	succeed	false
6.	<input type="checkbox"/>	ISC-P6	3	isctmp7	isctmp8	ISC-P1-isctmp1:Tunnel3	400	false	DEPLOYED	succeed	false
7.	<input type="checkbox"/>	ISC-P7	1	isctmp3	isctmp4	ISC-P7-isctmp3:Tunnel1	40000	false	DEPLOYED	succeed	false

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

Close Display Details Admit Create Edit Delete

Import Placement Tools Proceed with Changes >> Save & Deploy Cancel

For an explanation of the various window elements, see [Create Managed TE Tunnel](#), page A-39.

**Step 3** Click **Create**. The Create TE Managed Primary Tunnel window appears as shown in [Figure 6-3](#).

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**Figure 6-3 Create TE Managed Primary Tunnel**

**Create TE Managed Primary Tunnel**

<b>SR Job ID:</b> New	<b>SR ID:</b> New	<b>SR State:</b> REQUESTED
<b>Tunnel ID:</b>	<b>Creator:</b>	<b>Type:</b> ADD

Head Device \*:

Destination Device \*:

TE Policy \*:

Tunnel Bandwidth (kbps):

Tunnel Number: Auto Gen ☒

Customer:

Auto BW: Enable: ☐  
 Freq (sec):   
 Min (kbps):   
 Max (kbps):

**Path Options:**

Showing 1 - 2 of 2 records

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

Rows per page: 10

Note: \* - Required Field

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For an explanation of the various window elements, see [Create Managed TE Tunnel, page A-39](#).

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

A **System Path** is an ISC system generated explicit path (immovable). The first path has to be an explicit 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.

**Step 4** To select a **Head Device**, click the corresponding **Select** button to open the window shown in [Figure 6-4](#).

**Figure 6-4** Select Device for TE Head Router

Device for TE Head Router

Show Devices with:  Matching

Showing 1 - 10 of 13 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"/>	isctmp2	192.168.118.189	192.168.6.1	UP
3. <input type="radio"/>	isctmp3	192.168.118.215	192.168.118.215	UP
4. <input type="radio"/>	isctmp4	192.168.118.213	192.168.118.213	UP
5. <input type="radio"/>	isctmp5	192.168.118.212	192.168.118.212	UP
6. <input type="radio"/>	isctmp6	192.168.118.211	192.168.118.211	UP
7. <input type="radio"/>	isctmp7	192.168.118.214	192.168.118.214	UP
8. <input type="radio"/>	isctmp8	192.168.118.183	192.168.118.183	UP
9. <input type="radio"/>	isctmp9	192.168.118.219	192.168.118.219	UP
10. <input type="radio"/>	isctmpe1	192.168.118.188	192.168.118.188	UP

Rows per page:  Go to page:  of 2

For an explanation of the various window elements, see [Create TE Managed Primary Tunnel SR, page A-43](#).

Select a head device and click **Select**.

- Step 5** To select a **Destination Device**, click the corresponding **Select** button to open the window shown in [Figure 6-5](#).

**Figure 6-5 Select Device for TE Tail Router**

Device for TE Tail Router

Show Devices with:  Matching

Showing 1 - 10 of 13 records

#	Device Name	IGP ID	MPLS TE ID	Admin Status
1.	isctmp1	192.168.118.176	192.168.118.176	UP
2.	isctmp2	192.168.118.189	192.168.6.1	UP
3.	isctmp3	192.168.118.215	192.168.118.215	UP
4.	isctmp4	192.168.118.213	192.168.118.213	UP
5.	isctmp5	192.168.118.212	192.168.118.212	UP
6.	isctmp6	192.168.118.211	192.168.118.211	UP
7.	isctmp7	192.168.118.214	192.168.118.214	UP
8.	isctmp8	192.168.118.183	192.168.118.183	UP
9.	isctmp9	192.168.118.219	192.168.118.219	UP
10.	isctmpe1	192.168.118.188	192.168.118.188	UP

Rows per page:  Go to page:  of 2

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For an explanation of the various window elements, see [Create TE Managed Primary Tunnel SR, page A-43](#).

Select a tail device and click **Select**.

**Step 6** To select a **Tunnel Policy**, click the corresponding **Select** button to open the window shown in [Figure 6-6](#).

**Note**

If no tunnel policies are available, the reason could be that they are all unmanaged. To create a managed tunnel, use the **Policy Manager** (see [Create Primary Tunnel, page 6-2](#)) and make sure to check the **Managed** check box.

**Figure 6-6 Select Managed TE Tunnel Policy**

Managed TE Tunnel Policy

Show Policies with:  Matching

Showing 1 - 2 of 2 records

#	Policy Name	Pool Type	Setup Priority	Hold Priority	Affinity	Affinity Mask	Delayed Constraint	FRR Protection
1.	man1	GLOBAL	0	0	0x0	0xFFFF		None
2.	pm-none	GLOBAL	0	0	0x0	0xFFFF		None

Rows per page:  Go to page:  of 2

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For an explanation of the various window elements, see [Create TE Managed Primary Tunnel SR, page A-43](#).

- Step 7** Specify a tunnel bandwidth greater than zero. Add other tunnel information as desired.
- Step 8** Optionally, if you want to specify an explicit path rather than using the system path provided by ISC TEM, delete the system path and subsequently add the explicit path. For a more detailed explanation of this step, see [Create Primary Tunnel, page 5-7](#).
- Step 9** In the Create TE Managed Tunnel window, click **OK** to accept the entered tunnel information or **Cancel** to quit and return to the TE Managed Primary Tunnels SR window.
- In the TE Managed Primary Tunnel SR window, the Op field changes to ADD to signify that an SR has been added.



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

- Step 10** In the TE Managed Primary Tunnel SR window, you can create or edit more tunnels, or if you are done with all the changes, proceed in one of the following two ways depending on which of the following buttons are active:
- **Proceed with Changes:** The changes you entered impacts tunnel placement. Click on this to continue with one of the planning flows described in the Placement Tools (see [Placement Tools, page 6-11](#)) until the SR is save and deployed.
  - **Save & Deploy:** The changes you entered does not impact tunnel placement. Click on this to save and deploy the SR. This function is further described in [Create Managed TE Tunnel, page A-39](#).



**Note** With the exception of TE Traffic Admission SRs, TE SRs are always deployed immediately from the specific TE SR screen, 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**) opens and displays the state of the deployed SR.
- 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 [Task Monitoring, page 10-1](#).

## Edit Primary Tunnel

The only difference between creating and editing tunnels is that in the tunnel editor, the head and destination devices and tunnel number fields are not editable. Otherwise, you create and edit the same attributes.

To edit a primary tunnel, see [Chapter 5, “Basic Tunnel Management.”](#)

## Delete Primary Tunnel

To delete one or more tunnels, see [Chapter 5, “Basic Tunnel Management.”](#)

## Admit Primary Tunnel

The Admit function is used to admit selected tunnels not previously verified into the managed topology. This feature is used only for discovered tunnels that failed verification.

To admit a primary tunnel, use the following steps:

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | In the <b>TE Managed Primary Tunnel SR</b> , select one or more unverified tunnels to migrate.   |
| <b>Step 2</b> | Click <b>Admit</b> . The unverified tunnel(s) are verified and, if successful, and <b>ADMIT</b> flag will appear in the <b>Op</b> column.            |
| <b>Step 3</b> | Select <b>Proceed with Changes &gt;&gt; &gt; Tunnel Placement</b> to determine if the tunnels can be placed. If not, edit the tunnels and try again. |
- 

## Import Primary Tunnel

This feature allows you to update tunnels in bulk through a file-based import mechanism. The data is migrated into the managed primary tunnel service request.

### Construct XML Import File

To import tunnels from a file, first construct an XML import file conforming to the structure defined in the system supplied Document Type Definition (DTD) file (see [Appendix C, “Document Type Definition \(DTD\) File”](#)), and save the XML file together with the DTD file on the ISC server under the same directory. To create a valid import file, use the provided command line validation tool (see [Command Line Validation Tool, page 6-8](#)).

The following files are necessary for importing data into the ISC TEM application and are included in the installation:

- DTD and sample XML file for the import file in  
`<installedDir>/resources/java/xml/com/cisco/vpnsc/ui/te`
  - **TeImport.dtd**
  - **sample.xml**
- Shell script for executing the command line validator in the `<installedDir>/bin` directory.
  - **ImportTeTunnels**

Usage: **importTeTunnels** *<importfile>*

*importfile* is a XML file and must specify **TeImport.dtd** as its DTD. **TeImport.dtd** must be in the same directory as *importfile*.

### Command Line Validation Tool

The purpose of a command line validator is to help construct a valid import file off-line that corresponds to **TeImport.dtd**. The tool helps screen out errors associated with files that are not well-formed and files that do not conform to the rules set by the DTD.

For instructions on how to use the DTD file, see the DTD file documentation.



The tool reads the import file line-by-line, echoes each line in on the output as it parses, and reports any parsing error it encounters. The parsing and validation continues even when parsing errors are encountered for as long as the file structure makes sense.

**Note**

This tool does not check for cross field validation or data integrity errors with respect to the ISC TEM application.

## Import Procedure

The file-based import feature is only enabled when there are no uncommitted new, changed, or deleted tunnels in the service request.

It provides a way of adding, editing, deleting, or migrating many tunnels at a time.

To start the import procedure, use the following steps:

- Step 1** Prepare the XML import file in accordance with the DTD file.
- Step 2** Go to **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 3** Select provider if this has not been done earlier in the session.
- Step 4** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).
- Step 5** Click **Import** to start the import process. The **Select Import File** window in [Figure 6-7](#) appears.

**Note**

The Import button is only enabled when there are no uncommitted new, changed, or deleted tunnels in the service request.

**Figure 6-7 Select Import File**

#	File Name	Size	Last Modified
1.	sample.xml	994	June 9, 2004 11:34:24 AM PDT
2.	good.xml	923	June 10, 2004 10:50:56 AM PDT
3.	migrate.xml	363	June 11, 2004 3:23:36 PM PDT
4.	allData.xml	1159	June 20, 2004 12:27:21 AM PDT
5.	unit.xml	1159	June 25, 2004 5:13:09 PM PDT

For an explanation of the various window elements, see [Import Tunnel, page A-49](#).

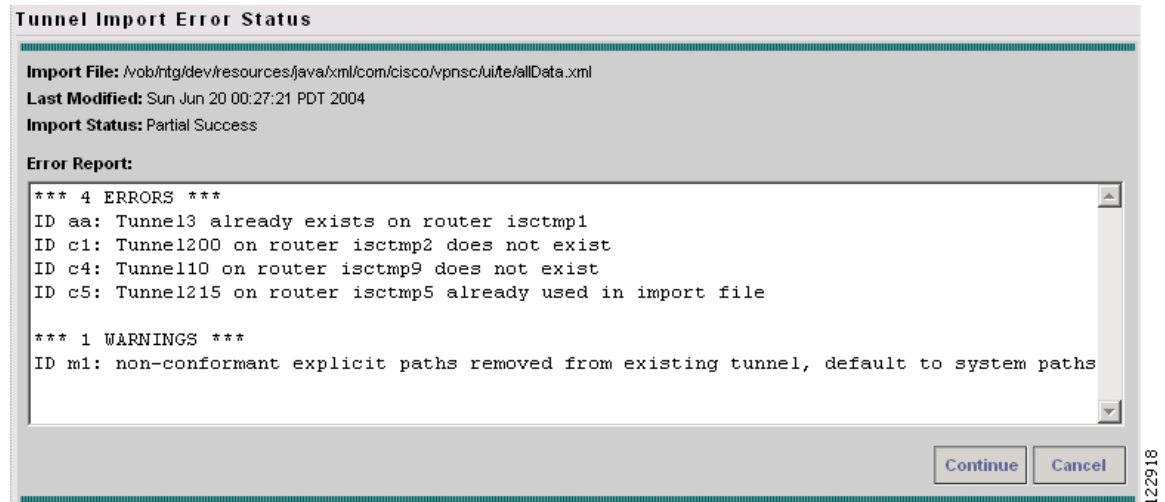
The Select Import File window lists all the XML files and any directories under the directory name shown in the **Look in** field.

The default directory shown in the **Look in** field in [Figure 6-7](#) corresponds to the installation directory in which the DTD and sample XML files reside.

**Step 6** Select the desired XML file to be used for the import operation.

The system then parses the file. If any error is detected, it will be reported in the Tunnel Import Error Status window shown in [Figure 6-8](#).

**Figure 6-8 Tunnel Import Error Status**



For an explanation of the various window elements, see [Import Tunnel](#), page A-49.

The Tunnel Import Error Status window shows the URL of the file, its last modified timestamp, the import status, and any error/warning messages.

**Step 7** If the import operation failed, **Cancel** to return to the previous screen. If it is partially successful, the **Continue** button is enabled, thereby providing an additional option to accept system treatment for errors/warnings and continue with the import operation.

**Step 8** If the file is parsed successfully or you click **Continue**, all valid tunnels in the file are added to the service request and the TE Managed Primary Tunnels SR window is re-displayed in the SR view. The imported tunnels are displayed with the appropriate tunnel **Op** type.

## Planning Strategy

The main objective of using the planning tools is to achieve optimal overall network utilization while causing minimal impact on any existing traffic on the network.

In most cases, the following strategy can be applied:

- Attempt to admit the new traffic optimising on utilisation (Placement feature) without allowing existing traffic to be moved. This offers the possibility of accommodating the new traffic without any changes to the existing traffic, while still optimising reserved bandwidth utilisation under the constraint that existing tunnels do not move.
- If this fails, attempt to admit the same new traffic minimising change to existing traffic (Repair feature) to see if the new traffic can be accommodated without affecting any more existing tunnels than necessary.

- If this succeeds in placing the new traffic, but the user feels that the overall reserved bandwidth utilisation is higher than would be preferred, consider grooming the network.
- If the Repair fails, review the parameters that control how many changes can be considered. Alternatively the specification to the desired traffic could be changed, or resource modifications could be made.

This strategy reflects the different approaches taken by the different algorithms in searching for solutions. However, other combinations are possible.

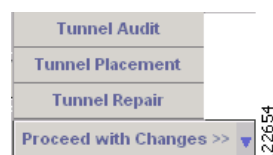
## Placement Tools

Planning tools for primary tunnels are available in two buttons on the TE Primary Tunnel SR screen as shown in [Figure 6-9](#) and [Figure 6-10](#) depending on whether an change has been made to the managed primary tunnels.

- **Proceed with Changes:** Used when you have made changes (add/change/delete/admit) to the tunnels. Tunnel operations are described in [Tunnel Operations, page 6-1](#). Then choose one of the placement tools to verify primary placement with the system and continue with deployment. This button is also available in Resource Management.
- **Placement Tools:** Used to perform planning function on the existing network.
  - The **Tunnel Audit** option should be used to verify the constraint-based placement of existing managed primary tunnels with the existing network topology. You can use this option to find out the optimality of your primary placement. If you are requiring protection levels above "Best Effort" on your primary tunnels, it is also important to perform an audit after any changes have been made in the protection network. If the audit results in warnings/violations, you can use the Tunnel Repair option help you find a solution.
  - The **Groom** option is used for optimizing your primary placement. In all primary computation, a quality report is produced which displays the optimality and utilization of the bandwidth pools. You can perform a Tunnel Audit first to determine if grooming is needed on your network.

They are accessed from two buttons in the TE Managed Primary Tunnels SR window as shown in [Figure 6-9](#) and [Figure 6-10](#).

**Figure 6-9 Proceed with Changes Button**



**Figure 6-10 Placement Tools Button**



The planning tools are described in detail in the following sections.

## Tunnel Audit

When any type of change is required, whether tunnel modifications or TE resource modifications, a Tunnel Audit is run to determine what inconsistencies the change might cause, if any. Tunnel Audit can also be used anytime to check the for optimality of network utilization.

The audit can be performed from the primary tunnel window or from the **TE Resource Modifications** window.

Tunnel Audit can also be invoked from the Resource Management window (see [Chapter 4, “TE Resource Management”](#)).

To perform an audit on the created tunnel, use the following steps:

- 
- Step 1** Navigate **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).
- Tunnel Audit can be used in two ways:
- When one or more tunnels have been created or their attributes altered (see [Create Primary Tunnel, page 6-2](#)), Tunnel Audit can be activated by selecting **Proceed with Changes >>**.
  - When no changes have taken place, Tunnel Audit can be accessed by selecting **Placement Tools**.
- Step 3** As an example, assume that a new primary tunnel SR has been created. The TE Managed Primary Tunnel SR window shown in [Figure 6-11](#) appears.

**Figure 6-11 TE Managed Primary Tunnel SR (Audit)**

**TE Managed Primary Tunnels SR**

SR Job ID: 1      Provider: Provider1      SR State: REQUESTED  
 SR ID: New      Creator:      Type: ADD

Description:

Show **SR** Tunnels with **All** Matching **A** **Find**

Showing 1 - 1 of 1 record

#	<input checked="" type="checkbox"/>	Op	Tunnel ID	T#	Head	Dest	Policy	BW	AutoBW	Deploy Status	Verified	Allow Reroute
1.	<input checked="" type="checkbox"/>	ADD	ISC-P58		isctmp3	isctmp7	ISC-P5-isctmp7:Tunnel2	100	false	REQUESTED	unknown	true

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

**Close** **Display** **Details** **Admit** **Create** **Edit** **Delete**

**Import** **Placement Tools** **Proceed with Changes >>** **Save & Deploy** **Cancel**

**Tunnel Audit**  
**Tunnel Placement**  
**Tunnel Repair**

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For an explanation of the various window elements, see [Create Managed TE Tunnel](#), page A-39.

**Step 4** Select **Proceed with Changes >> > Tunnel Audit**.

The Computation In Progress window shown in [Figure 6-12](#) appears.

**Figure 6-12 Computation In Progress - Audit**

**Computation In Progress**

Please wait...

**Tunnel Audit computation in progress**

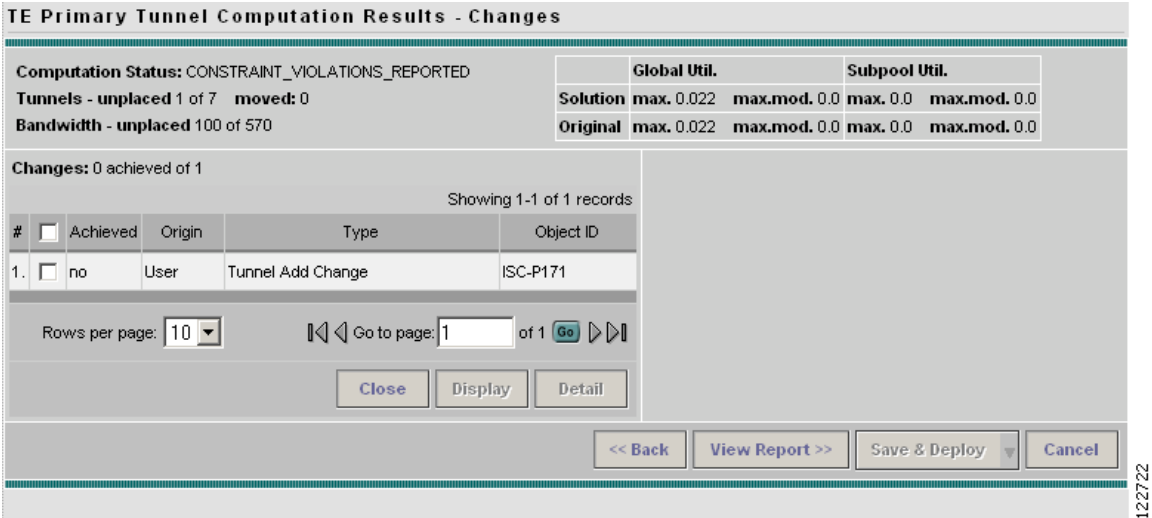
**<< Abort Computation**

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To abort the computation and return to the previous window, click **<< Abort Computation**.

**Step 5** The TE Primary Tunnel Computation Results - Changes window in [Figure 6-13](#) appears.

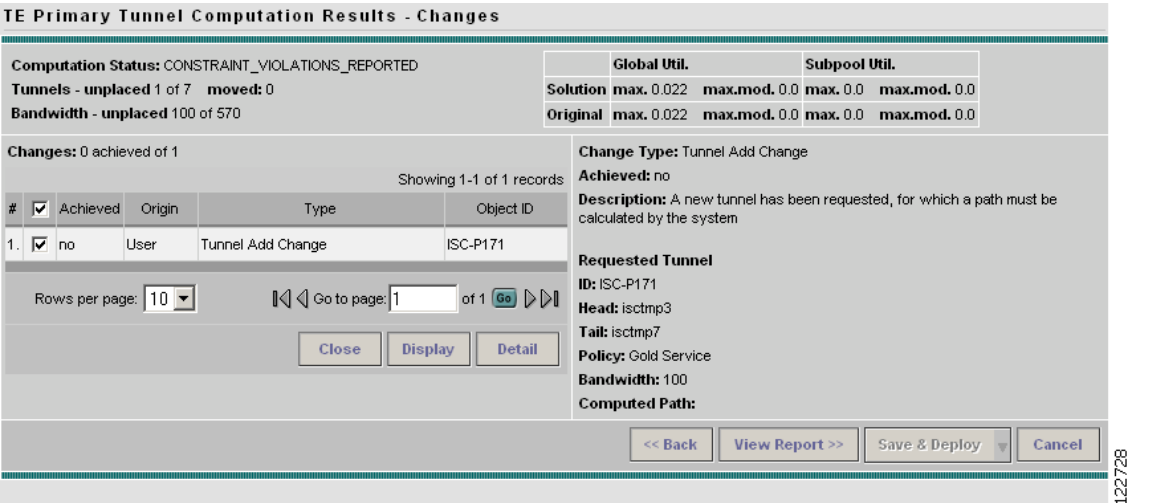
Figure 6-13 TE Primary Tunnel Computation Results - Changes



For an explanation of the various window elements, see [Planning Tools, page A-51](#).

- Step 6** To obtain detailed information about the tunnel and whether the change request was achieved, select the specific tunnel and click **Detail**. The detail section in the right side of the window appears as shown in [Figure 6-14](#).

Figure 6-14 TE Primary Tunnel Computation Results - Audit Changes (Details)



For an explanation of the various window elements, see [Planning Tools, page A-51](#).

A **qualityReport** is always generated. If the computation was successful, this will be the only report. If a warning or a violation was encountered, one or more warning or violation reports will also be generated.

- Step 7** To view an audit report, click **View Report >>**. The TE Primary Tunnel Computation Results - Report window in [Figure 6-15](#) appears.

**Figure 6-15 TE Primary Tunnel Computation Results - Audit Report**

**TE Primary Tunnel Computation Results - Report**

**Computation Status:** CONSTRAINT\_VIOLATIONS\_REPORTED  
**Tunnels -** unplaced 1 of 7 **moved:** 0  
**Bandwidth -** unplaced 100 of 570

	Global Util.		Subpool Util.	
<b>Solution</b>	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0
<b>Original</b>	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0

**Report:**

Showing 1-2 of 2 records

#	<input type="checkbox"/>	Report Type	Summary Info
1.	<input type="checkbox"/>	qualityReport	
2.	<input type="checkbox"/>	violationNoPathInTopology	ISC-P171

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

[Detail](#)

[<< View Result](#)

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

In this case, as shown in [Figure 6-15](#), both a **qualityReport** and a violation report have been generated.

**Step 8**

To view the contents of the **qualityReport**, select the **qualityReport** and click the **Detail** button. The TE Primary Tunnel Computation Results - Report (details) window in [Figure 6-16](#) appears.

**Figure 6-16 TE Managed Primary Tunnels SR - Audit qualityReport (Details)**

**TE Primary Tunnel Computation Results - Report**

**Computation Status:** CONSTRAINT\_VIOLATIONS\_REPORTED  
**Tunnels -** unplaced 1 of 7 **moved:** 0  
**Bandwidth -** unplaced 100 of 570

	Global Util.		Subpool Util.	
<b>Solution</b>	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0
<b>Original</b>	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0

**Report:**

Showing 1-2 of 2 records

#	<input type="checkbox"/>	Report Type	Summary Info
1.	<input checked="" type="checkbox"/>	qualityReport	
2.	<input type="checkbox"/>	violationNoPathInTopology	ISC-P171

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

[Detail](#)

**Report Type:** qualityReport  
**Description:** relates to only 0 priority tunnels  
**Achievement:** CONSTRAINT\_VIOLATIONS\_REPORTED **Solution:**  
**Termination:** COMPLETED **Optimality:**  
**Tunnel Placement:**

	%Placed	Placed	Unplaced	Total
<b>Tunnels -solution</b>	0.0	6	1	7
<b>original</b>	100.0	6	0	6
<b>Bandwidth -solution</b>	0.0	470	100	570
<b>original</b>	100.0	470	0	470

**Tunnels moved** 0

TE-Metric Sum(Primary Tunnel Paths)	-solution	original
	149	149

**Utilization:**

	Median	Max. Modifiable	Mean	Max.
<b>Global Pool -solution</b>	0.0	0.0	7.341954E-4	0.022
<b>original</b>	0.0	0.0	7.341954E-4	0.022
<b>Sub Pool -solution</b>	0.0	0.0	0.0	0.0
<b>original</b>	0.0	0.0	0.0	0.0

[<< View Result](#)

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

The qualityReport fields in the right window pane are described in [TE Primary Tunnel Computation Results - Report](#), page A-56.

- Step 9** To view the contents of the violation report, select the violation report and click the **Detail** button. The TE Primary Tunnel Computation Results - Report (details) window in [Figure 6-17](#) appears.

**Figure 6-17 TE Managed Primary Tunnels SR - Audit Violation Report (Details)**

**TE Primary Tunnel Computation Results - Report**

Computation Status: CONSTRAINT\_VIOLATIONS\_REPORTED  
Tunnels - unplaced 1 of 7 moved: 0  
Bandwidth - unplaced 100 of 570

		Global Util.		Subpool Util.	
Solution	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0	
Original	max. 0.022	max.mod. 0.0	max. 0.0	max.mod. 0.0	

**Report:**

Showing 1-2 of 2 records

#	Report Type	Summary Info
1.	<input type="checkbox"/> qualityReport	
2.	<input checked="" type="checkbox"/> violationNoPathInTopology ISC-P171	

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

**Report Type:** violationNoPathInTopology  
**Description:** Irrespective of other Primary Tunnels placed upon the topology, no valid path is possible for a requested Primary Tunnel  
**Requested Primary Tunnel:**  
Name: ISC-P171 Pool: GLOBAL  
Head: isctmp3 Frr Protection: Link and SRLG  
Tail: isctmp7 Propagation Delay: Constrained/200  
Bandwidth: 100 AffinityBits/Mask: 0x0:0xFFFF  
**Requested Path:**

[Detail](#)

[<< View Result](#)

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

The report fields in the right window pane are described for each report in [Appendix B, “Warnings and Violations.”](#)

- Step 10** Click **<< View Result** to return to the Changes window ([Figure 6-13](#) or [Figure 6-14](#)). If the proposed changes were achieved, you can **Save & Deploy** to save the achievable changes to the repository and implement the tunnel modifications on the network.



**Note**

**Save & Deploy** will discard any changes that were not achievable.

## Tunnel Placement

The Placement feature supports the admission of new tunnels into the network and the modification of tunnels already admitted into the network. ISC TEM will attempt to implement the changes in such a way that network utilization is optimized.

To place a created tunnel, use the following steps:

- Step 1** Navigate **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).



- Step 3** When one or more tunnels have been created or their attributes altered (see [Create Primary Tunnel](#), page 6-2), select **Proceed with Changes >> > Tunnel Placement**. The Movable Tunnel Selection (Placement) window shown in [Figure 6-18](#) appears.

**Figure 6-18 Movable Tunnel Selection - Placement**

**Movable Tunnel Selection**

Computation Type: Tunnel Placement

Maximum computation duration (Timeout in sec): 100

Number of reroutable tunnels selected as movable: 0 of 0 Non-reroutable tunnels: 8

Show Tunnels with: All Matching: \* Find

Showing 1-8 of 8 records

#	Movable	Allow Reroute	Tunnel ID	T#	Head	Dest	Policy	BW
1.	<input type="checkbox"/> NA	false	ISC-P3	200	isctmp2	isctmp1	ISC-P3-isctmp2:Tunnel200	0
2.	<input type="checkbox"/> NA	false	ISC-P4	300	isctmp2	isctmp5	ISC-P3-isctmp2:Tunnel200	0
3.	<input type="checkbox"/> NA	false	ISC-P5	2	isctmp7	isctmp8	ISC-P5-isctmp7:Tunnel2	60
4.	<input type="checkbox"/> NA	false	ISC-P6	3	isctmp7	isctmp1	ISC-P3-isctmp2:Tunnel200	222
5.	<input type="checkbox"/> NA	false	ISC-P8	11	isctmp7	isctmp6	ISC-P5-isctmp7:Tunnel2	25
6.	<input type="checkbox"/> NA	false	ISC-P9	12345	isctmp7	isctmp8	ISC-P9-isctmp7:Tunnel12345	1234
7.	<input type="checkbox"/> NA	false	ISC-P10	45	isctmp3	isctmp4	ISC-P3-isctmp2:Tunnel200	46
8.	<input type="checkbox"/> NA	false	ISC-P11	2	isctmp9	isctmp8	ISC-P3-isctmp2:Tunnel200	20

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

Set Movable Set Unmovable

<< Back Proceed >> Cancel

Note: \* - Required Field

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

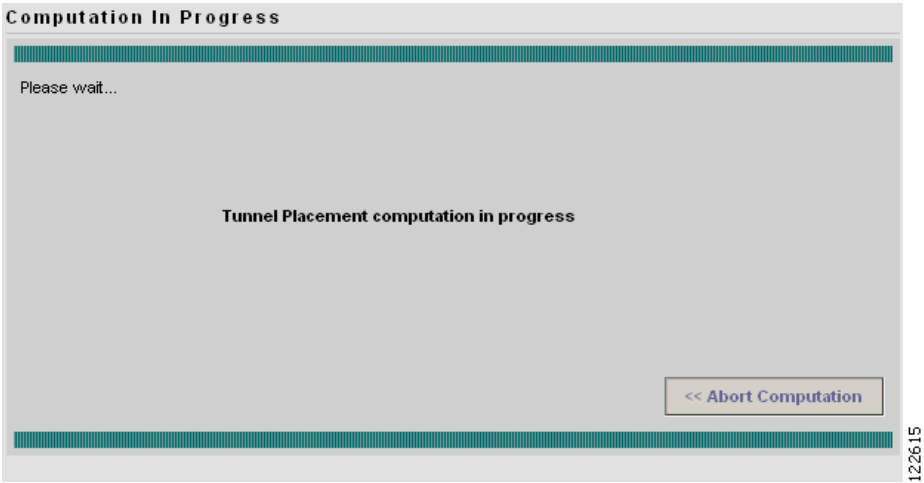
- Step 4** Set the movable and unmovable managed tunnels

The user can specify whether, when admitting a new tunnel, existing tunnels can be moved (re-routed). This is configurable by the user. The default is that managed tunnels are not movable.

The user can also specify a limit on the maximum number of tunnel moves that are acceptable.

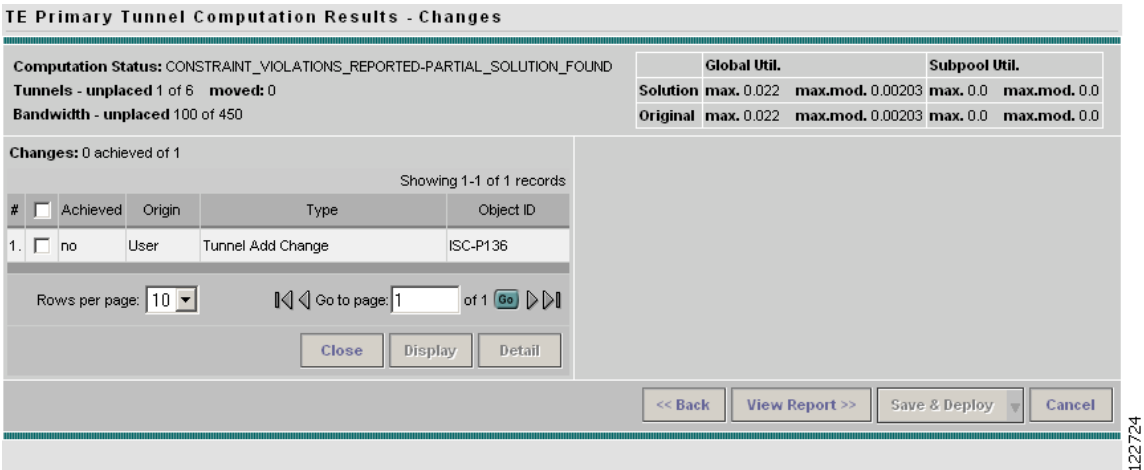
- Step 5** Click **Proceed >>**. The **Computation In Progress** window shown in [Figure 6-19](#) appears.

Figure 6-19 Computation In Progress - Placement



To abort the computation and return to the previous window, click << **Abort Computation**. The TE Primary Tunnel Computation Results - Changes window shown in Figure 6-20 appears.

Figure 6-20 TE Primary Tunnel Computation Results - Placement Changes



For an explanation of the various window elements, see [Planning Tools, page A-51](#).

- Step 6** To obtain detailed information about the tunnel and whether the placement request was achieved, select the specific tunnel and click **Detail**. The detail section in the right side of the window appears as shown in [Figure 6-13](#).

**Figure 6-21 TE Primary Tunnel Computation Results - Placement Changes (Details)**

**TE Primary Tunnel Computation Results - Changes**

**Computation Status:** CONSTRAINT\_VIOLATIONS\_REPORTED-PARTIAL\_SOLUTION\_FOUND

**Tunnels -** unplaced 1 of 6 **moved:** 0

**Bandwidth -** unplaced 100 of 450

		Global Util.		Subpool Util.	
<b>Solution</b>	max. 0.022	max.mod. 0.00203	max. 0.0	max.mod. 0.0	
<b>Original</b>	max. 0.022	max.mod. 0.00203	max. 0.0	max.mod. 0.0	

**Changes:** 0 achieved of 1

Showing 1-1 of 1 records

#	✓	Achieved	Origin	Type	Object ID
1.	✓	no	User	Tunnel Add Change	ISC-P136

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

[Close](#) [Display](#) [Detail](#)

**Change Type:** Tunnel Add Change

**Achieved:** no

**Description:** A new tunnel has been requested, for which a path must be calculated by the system

**Requested Tunnel**

**ID:** ISC-P136

**Head:** isctmp3

**Tail:** isctmp7

**Policy:** Gold Service

**Bandwidth:** 100

**Computed Path:**

[<< Back](#) [View Report >>](#) [Save & Deploy](#) [Cancel](#)

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

If the placement request succeeded (**Achieved:** yes), the Detail pane will contain a Computed Path that is selectable as shown in [Figure 6-22](#).

**Figure 6-22 TE Primary Tunnel Computation Results - Placement Changes Achieved (Details)**

**TE Primary Tunnel Computation Results - Changes**

**Computation Status:** SUCCESS-SOLUTION\_FOUND

**Tunnels -** unplaced 0 of 1 **moved:** 0

**Bandwidth -** unplaced 0 of 10

		Global Util.		Subpool Util.	
<b>Solution</b>	max. 6.6666666E-6	max.mod. 6.6666666E-6	max. 0.0	max.mod. 0.0	
<b>Original</b>	max. 0.0	max.mod. 0.0	max. 0.0	max.mod. 0.0	

**Changes:** 1 achieved of 1

Showing 1-1 of 1 records

#	✓	Achieved	Origin	Type	Object ID
1.	✓	yes	Compute	Tunnel Add Change	ISC-P8529

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

[Close](#) [Display](#) [Detail](#)

**Change Type:** Tunnel Add Change

**Achieved:** yes

**Description:** A new tunnel has been requested, for which a path must be calculated by the system

**Requested Tunnel**

**ID:** ISC-P8529

**Head:** ATLANTA

**Tail:** DALLAS

**Policy:** Global Tunnels No Protection

**Bandwidth:** 10

**Computed Path:** [ATLANTA->DALLAS-2](#)

[<< Back](#) [View Report >>](#) [Save & Deploy](#) [Cancel](#)

To view the path information, click the blue link in the Computed Path field. The TE Explicit Path window shown in [Figure 6-23](#) appears.

Figure 6-23 TE Explicit Path for Placement Request

Path Name \*:

Head Router \*:

Links:

Showing 1 - 3 of 3 records

#	Device	Outgoing Interface	Outgoing IP	Next Hop	Incoming Interface	Incoming IP
1.	isctmp3	FastEthernet3/0	10.2.3.90	isctmp1	FastEthernet3/0/1	10.2.3.89
2.	isctmp1	FastEthernet1/0/0	10.2.2.161	isctmp8	FastEthernet3/0	10.2.2.174
3.	isctmp8	FastEthernet4/0	10.2.2.126	isctmp7	FastEthernet1/0	10.2.2.113

Rows per page:  Go to page:  of 1

Provision Preference \*: ☒ Outgoing Interface ☐ Incoming Interface

Note: \* - Required Field

**Step 7** To view the placement report(s), click **View Report >>** in the Changes window (Figure 6-22). The **TE Primary Tunnel Computation Results - Report** window in Figure 6-24 appears.

Figure 6-24 TE Primary Tunnel Computation Results - Placement Report Window

TE Primary Tunnel Computation Results - Report

Computation Status: CONSTRAINT\_VIOLATIONS\_REPORTED-PARTIAL\_SOLUTION\_FOUND

Tunnels - unplaced 1 of 6 moved: 0

Bandwidth - unplaced 100 of 450

	Global Util.		Subpool Util.	
Solution	max. 0.022	max.mod. 0.00203	max. 0.0	max.mod. 0.0
Original	max. 0.022	max.mod. 0.00203	max. 0.0	max.mod. 0.0

Report:

Showing 1-2 of 2 records

#	<input type="checkbox"/>	Report Type	Summary Info
1.	<input type="checkbox"/>	qualityReport	
2.	<input type="checkbox"/>	violationNoPathInTopology	ISC-P136

Rows per page:  Go to page:  of 1

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

A **qualityReport** is always generated. If the computation was successful, this will be the only report.

If a warning or a violation was encountered, one or more warning or violation reports will be generated as well.

**Step 8** To view the contents of a placement report, select one of the reports and click the **Detail** button. In the case of a **qualityReport**, the TE Primary Tunnel Computation Results - Report (details) window in Figure 6-25 appears in the report pane on the right.

For an example of a violation report, see Figure 6-17.

**Figure 6-25 TE Managed Primary Tunnels SR - Placement Report (Details)**

**TE Primary Tunnel Computation Results - Report**

**Computation Status:** CONSTRAINT\_VIOLATIONS\_REPORTED-PARTIAL\_SOLUTION\_FOUND  
**Tunnels - unplaced** 1 of 6 **moved:** 0  
**Bandwidth - unplaced** 100 of 450

Global Util.		Subpool Util.	
<b>Solution</b>	max. 0.022 max.mod. 0.00203	max. 0.0	max.mod. 0.0
<b>Original</b>	max. 0.022 max.mod. 0.00203	max. 0.0	max.mod. 0.0

**Report:** Showing 1-2 of 2 records

#	Report Type	Summary Info
1.	<input checked="" type="checkbox"/> qualityReport	
2.	<input type="checkbox"/> violationNoPathInTopology ISC-P136	

Rows per page: 10 Go to page: 1 of 1 [Go](#) [Detail](#)

**Report Type:** qualityReport  
**Description:** relates to only 0 priority tunnels  
**Achievement:** CONSTRAINT\_VIOLATIONS\_REPORTED  
**Termination:** COMPLETED  
**Solution:** PARTIAL\_SOLUTION\_FOUND  
**Optimality:** OPTIMAL\_FOR\_ALL\_CRITERIA

**Tunnel Placement:**

	%Placed	Placed	Unplaced	Total
<b>Tunnels -solution</b>	0.0	5	1	6
<b>original</b>	100.0	5	0	5
<b>Bandwidth -solution</b>	0.0	350	100	450
<b>original</b>	100.0	350	0	350

**Tunnels moved** 0

TE-Metric Sum(Primary Tunnel Paths)	-solution	original
	68	68

**Utilization:**

	Median	Max. Modifiable	Mean	Max.
<b>Global Pool -solution</b>	0.0	0.00203	5.6936784E-4	0.022
<b>original</b>	0.0	0.00203	5.6936784E-4	0.022
<b>Sub Pool -solution</b>	0.0	0.0	0.0	0.0
<b>original</b>	0.0	0.0	0.0	0.0

[<< View Result](#)

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

The qualityReport fields in the right window pane are described in [TE Primary Tunnel Computation Results - Report](#), page A-56.

- Step 9** Click **<< View Result** to return to the **Changes** window and click **Save & Deploy** to save the change to the repository and implement the tunnel modifications on network.

## Tunnel Repair

As changes are made to the bandwidth requirements or delay parameters of existing tunnels, inconsistencies can arise with the Tunnel Placement. The user can run a Tunnel Repair to address such inconsistencies. The objective of Tunnel Repair is to try to move as few existing tunnels as possible to accommodate the changes.

Tunnel Repair can also be invoked from the Resource Management window (see [Chapter 4, “TE Resource Management”](#)).

In the following, the case of an edited tunnel has been used:

- Step 1** Navigate **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > Create Managed TE Tunnel**.

**Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).

Tunnel Repair can be used in two ways:

- When one or more tunnels have been created or their attributes altered (see [Create Primary Tunnel](#), [page 6-2](#)), Tunnel Repair can be activated by selecting **Proceed with Changes >> > Tunnel Repair**.
- When no changes have taken place, Tunnel Repair can be accessed by selecting **Placement Tools > Tunnel Repair**.

**Step 3** As an example, let us say that a new primary tunnel SR has been created. Run Tunnel Repair on the modified tunnels from the TE Managed Primary Tunnels SR window ([Figure 6-11](#)) by navigating **Proceed with Changes -> Tunnel Repair**

The Movable Tunnel Selection window shown in [Figure 6-26](#) appears.

**Figure 6-26 Movable Tunnel Selection - Repair**

**Movable Tunnel Selection**

Computation Type: Tunnel Repair

Maximum computation duration (Timeout in sec): 100

Maximum number of tunnel moves:

Number of reroutable tunnels selected as movable: 4 of 4 Non-reroutable tunnels: 2

Show tunnels with: All matching \* Find

Showing 1-6 of 6 records

#	<input type="checkbox"/> Movable	<input type="checkbox"/> Allow Reroute	Tunnel ID	T#	Head	Dest	Policy	BW
1.	<input type="checkbox"/> yes	true	ISC-P66	3	isctmp1	isctmp2	ISC-P1-isctmp8:Tunnel44444	3
2.	<input type="checkbox"/> NA	false	ISC-P1	44444	isctmp8	isctmp6	ISC-P1-isctmp8:Tunnel44444	103
3.	<input type="checkbox"/> NA	false	ISC-P2	44	isctmp2	isctmp3	ISC-P2-isctmp2:Tunnel44	0
4.	<input type="checkbox"/> yes	true	ISC-P132	3	isctmp2	isctmp8	ISC-P2-isctmp2:Tunnel44	120
5.	<input type="checkbox"/> yes	true	ISC-P138	2	isctmp6	isctmp7	ISC-P2-isctmp2:Tunnel44	100
6.	<input type="checkbox"/> yes	true	ISC-P35	2	isctmp4	isctmp6	ISC-P2-isctmp2:Tunnel44	100

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

Set Movable Set Unmovable

<< Back Proceed >> Cancel

Note: \* - Required Field

For an explanation of the various window elements, see [Planning Tools](#), [page A-51](#).

**Step 4** Set the tunnels that should be movable.

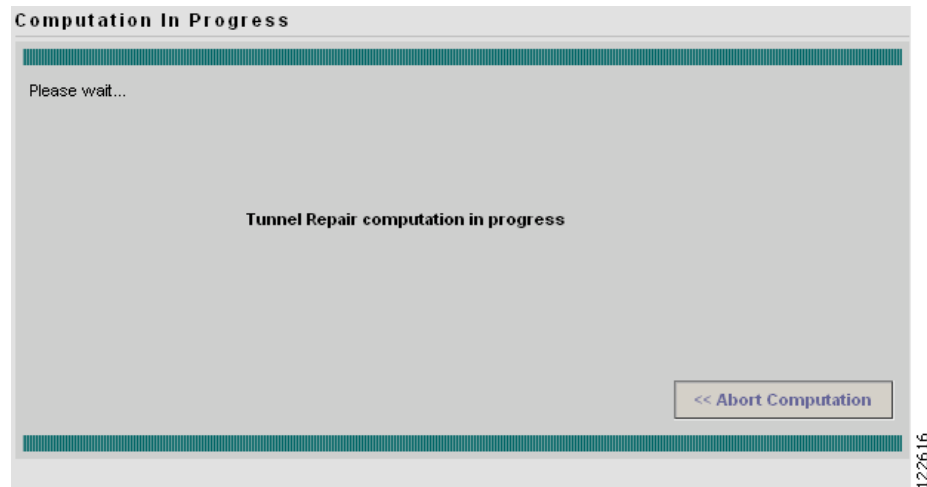
Tunnel Repair will only move existing tunnels if it has to. If the user does not want certain tunnels to be moved during Tunnel Repair, these tunnels should be explicitly excluded from the selected list of movable tunnels.



**Note** It is not necessary to set modified tunnels to be movable as these are movable by default.

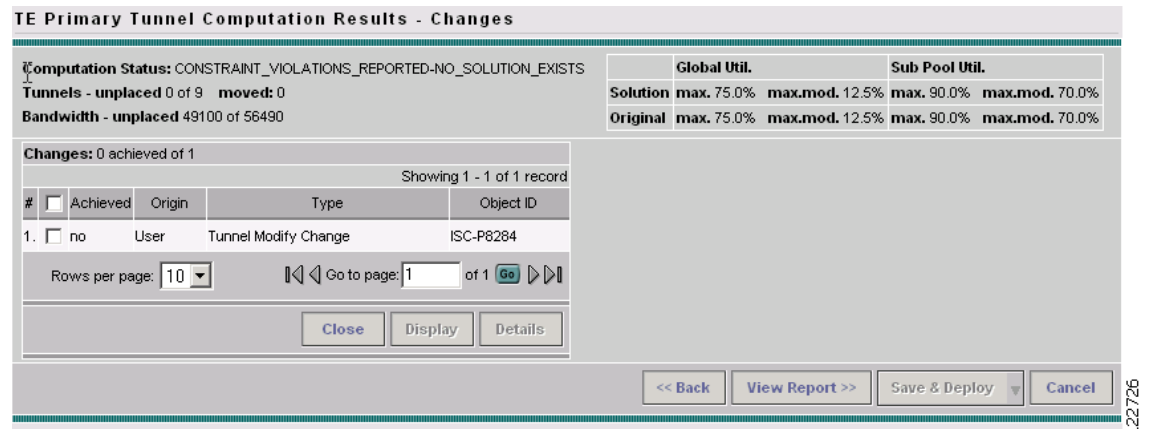
**Step 5** Click **Proceed >>**. The Computation In Progress window shown in [Figure 6-27](#) appears.

**Figure 6-27 Computation In Progress - Repair**



To abort the computation and return to the previous window, click **<< Abort Computation**. The TE Primary Tunnel Computation Results - Changes window shown in [Figure 6-28](#) appears.

**Figure 6-28 TE Primary Tunnel Computation Results - Repair Changes**



For an explanation of the various window elements, see [Planning Tools, page A-51](#).

**Step 6** To obtain detailed information about the tunnel and whether the change request was achieved, select the specific tunnel and click **Detail**. The detail section in the right side of the window appears as shown in [Figure 6-29](#).

Figure 6-29 TE Primary Tunnel Computation Results - Repair Changes (Details)

TE Primary Tunnel Computation Results - Changes

Computation Status: CONSTRAINT\_VIOLATIONS\_REPORTED-NO\_SOLUTION\_EXISTS

Tunnels - **unplaced** 0 of 9    **moved** 0

Bandwidth - **unplaced** 49100 of 56490

	Global Util.		Sub Pool Util.	
<b>Solution</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%
<b>Original</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%

Changes: 0 achieved of 1

Showing 1 - 1 of 1 record

#	<input checked="" type="checkbox"/> Achieved	Origin	Type	Object ID
1.	<input checked="" type="checkbox"/> no	User	Tunnel Modify Change	ISC-P8284

Rows per page: 10

Go to page: 1 of 1

Close

Display

Details

Change Type: Tunnel Modify Change

Achieved: no

Description: Request to modify one or more attributes of an existing tunnel

Requested Tunnel

ID: isctmp9:Tunnel3

Head: isctmp9

Tail: isctmp1

Policy: ISC-P8262-isctmp1:Tunnel4

Bandwidth: 50000

Path: isctmp9->isctmp1-2

Changed Attributes	New Value	Achieved
BW	50000	no

<< Back

View Report >>

Save & Deploy

Cancel

122733

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

**Step 7** To view a repair report, click **View Report >>**. The TE Primary Tunnel Computation Results - Report window in [Figure 6-30](#) appears.

Figure 6-30 TE Primary Tunnel Computation Results - Repair Report

TE Primary Tunnel Computation Results - Report

Computation Status: CONSTRAINT\_VIOLATIONS\_REPORTED-NO\_SOLUTION\_EXISTS

Tunnels - **unplaced** 0 of 9    **moved** 0

Bandwidth - **unplaced** 49100 of 56490

	Global Util.		Sub Pool Util.	
<b>Solution</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%
<b>Original</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%

Report:

Showing 1 - 2 of 2 records

#	Report Type	Summary Info
1.	<input type="checkbox"/> qualityReport	
2.	<input type="checkbox"/> violationLinkPoolOversubscribed	isctmp9/FastEthernet2/1,GLOBAL_POOL

Rows per page: 10

Go to page: 1 of 1

Details

<< View Result

122744

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

A **qualityReport** is always generated. If the computation was successful, this will be the only report. If a warning or a violation was encountered, one or more warning or violation reports will also be generated.

**Step 8** To view the contents of the repair report, click the **Detail** button. In the case of a **qualityReport**, the TE Primary Tunnel Computation Results - Report (details) window in [Figure 6-31](#) appears.

For an example of a violation report, see [Figure 6-17](#).

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**Figure 6-31 TE Managed Primary Tunnels SR - Repair Report (Details)**

**TE Primary Tunnel Computation Results - Report**

**Computation Status:** CONSTRAINT\_VIOLATIONS\_REPORTED-NO\_SOLUTION\_EXISTS  
**Tunnels -** unplaced 0 of 9 **moved:** 0  
**Bandwidth -** unplaced 49100 of 56490

	Global Util.		Sub Pool Util.	
<b>Solution</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%
<b>Original</b>	max. 75.0%	max.mod. 12.5%	max. 90.0%	max.mod. 70.0%

**Report:**

Showing 1 - 2 of 2 records

#	Report Type	Summary Info
1.	<input type="checkbox"/> qualityReport	
2.	<input checked="" type="checkbox"/> violationLinkPoolOversubscribed	isctmp9/FastEthernet2/1, GLOBAL_POOL

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

**Report Type:** violationLinkPoolOversubscribed  
**Description:** The specified bandwidth pool for a directed link is over-subscribed by Primary Tunnels that pass through it

**Directed Link:**  
**Head Device/Interface:** isctmp9/10.2.3.58  
**Tail Device/Interface:** isctmp1/10.2.3.57  
**Pool:** GLOBAL\_POOL  
**Pool Bandwidth:** 20000

**Primary Tunnel:**

Name	Head Device	Tail Device	Bandwidth	Pool	Path
isctmp9.Tunnel3	isctmp9	isctmp1	50000	GLOBAL	isctmp9->isctmp1-2

**<< View Result**

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

The report fields in the right window pane are described for each report in [Appendix B, “Warnings and Violations.”](#)

- Step 9** Click **<< View Result** to return to the Changes window and click **Save & Deploy** to save the change to the repository and implement the tunnel modifications on network.

## Grooming

The purpose of grooming is to analyze the tunnel pathing with respect to the network elements and optimize resource allocation.

Grooming is not available when change requests have been created. In that case, only the placement tools under **Proceed with Changes >>** will be available.

To perform grooming on the network, use the following steps:

- Step 1** Navigate **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > Create Managed TE Tunnel**.
- Step 2** Click **Create Managed TE Tunnel**. The TE Managed Primary Tunnels SR window appears as shown in [Figure 6-2](#).
- Step 3** Run Grooming by navigating **Placement Tools -> Groom**
- The Movable Tunnel Selection window shown in [Figure 6-32](#) appears.

Figure 6-32 Movable Tunnel Selection

**Movable Tunnel Selection**

**Computation Type** Tunnel Placement

**Maximum computation duration (Timeout in sec)**

Number of reroutable tunnels selected as movable: 0 of 0 Non-reroutable tunnels: 8

Show Tunnels with  Matching

Showing 1-8 of 8 records

#	<input type="checkbox"/> Movable	Allow Reroute	Tunnel ID	T#	Head	Dest	Policy	BW
1.	<input type="checkbox"/> NA	false	ISC-P3	200	isctmp2	isctmp1	ISC-P3-isctmp2:Tunnel200	0
2.	<input type="checkbox"/> NA	false	ISC-P4	300	isctmp2	isctmp5	ISC-P3-isctmp2:Tunnel200	0
3.	<input type="checkbox"/> NA	false	ISC-P5	2	isctmp7	isctmp8	ISC-P5-isctmp7:Tunnel2	60
4.	<input type="checkbox"/> NA	false	ISC-P6	3	isctmp7	isctmp1	ISC-P3-isctmp2:Tunnel200	222
5.	<input type="checkbox"/> NA	false	ISC-P8	11	isctmp7	isctmp6	ISC-P5-isctmp7:Tunnel2	25
6.	<input type="checkbox"/> NA	false	ISC-P9	12345	isctmp7	isctmp8	ISC-P9-isctmp7:Tunnel12345	1234
7.	<input type="checkbox"/> NA	false	ISC-P10	45	isctmp3	isctmp4	ISC-P3-isctmp2:Tunnel200	46
8.	<input type="checkbox"/> NA	false	ISC-P11	2	isctmp9	isctmp8	ISC-P3-isctmp2:Tunnel200	20

Rows per page:  Go to page:  of 1

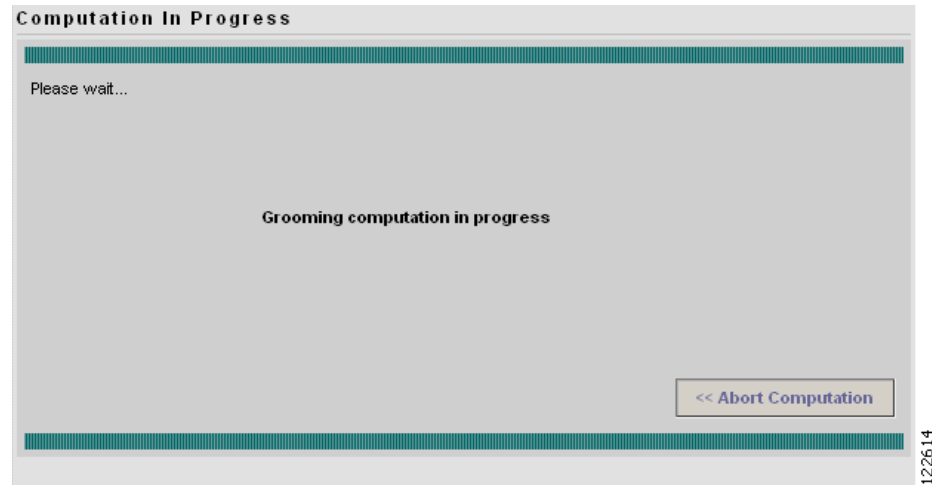
Note: \* - Required Field

For an explanation of the various window elements, see [Planning Tools](#), page A-51.

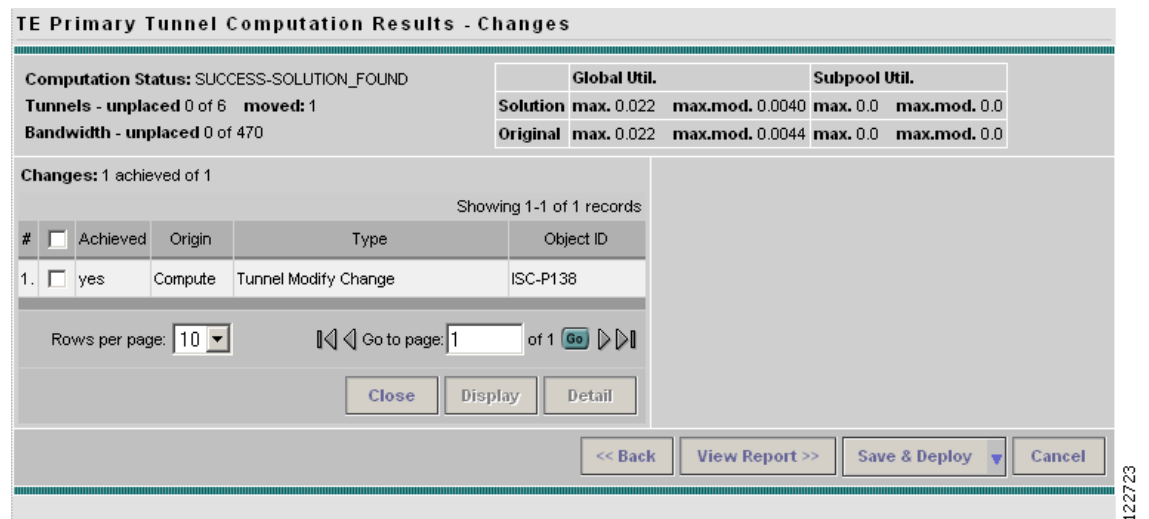
**Step 4** Set the tunnels that should be movable.

As with Tunnel Repair, Grooming will only move existing tunnels if it has to. If you do not want certain tunnels to be moved during the Grooming process, these tunnels should be explicitly excluded from the selected list of movable tunnels.

**Step 5** Click **Proceed >>**. The Computation In Progress window shown in [Figure 6-33](#) appears.

**Figure 6-33 Computation In Progress - Grooming**

To abort the computation and return to the previous window, click **<< Abort Computation**. The TE Primary Tunnel Computation Results - Changes window shown in [Figure 6-34](#) appears.

**Figure 6-34 TE Primary Tunnel Computation Results - Grooming Changes**

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

- Step 6** To obtain detailed information about the Grooming and whether it succeeded, select the specific tunnel and click **Detail**. The detail section in the right side of the window appears as shown in [Figure 6-35](#).

Figure 6-35 TE Primary Tunnel Computation Results - Grooming Changes (Details)

TE Primary Tunnel Computation Results - Changes

Computation Status: SUCCESS-SOLUTION\_FOUND  
Tunnels - unplaced 0 of 6 moved: 1  
Bandwidth - unplaced 0 of 470

Global Util.		Subpool Util.	
Solution	max. 0.022 max.mod. 0.0040	max. 0.0	max.mod. 0.0
Original	max. 0.022 max.mod. 0.0044	max. 0.0	max.mod. 0.0

Changes: 1 achieved of 1  
Showing 1-1 of 1 records

#	Achieved	Origin	Type	Object ID
1.	<input checked="" type="checkbox"/> yes	Compute	Tunnel Modify Change	ISC-P138

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

Close Display Detail

Change Type: Tunnel Modify Change  
Achieved: yes  
Description: Request to modify one or more attributes of an existing tunnel

Requested Tunnel  
ID: isctmp6:Tunnel2  
Head: isctmp6  
Tail: isctmp7  
Policy: ISC-P2-isctmp2:Tunnel44  
Bandwidth: 100  
Path: Computed Path

Changed Attributes	New Value	Achieved
TE_EXPLICIT_PATH_ID	Computed Path	yes

<< Back View Report >> Save & Deploy Cancel

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

- Step 7** To view a Grooming report, click **View Report >>**. The TE Primary Tunnel Computation Results - Report window in [Figure 6-30](#) appears.

Figure 6-36 TE Primary Tunnel Computation Results - Grooming Report

TE Primary Tunnel Computation Results - Report

Computation Status: SUCCESS-SOLUTION\_FOUND  
Tunnels - unplaced 0 of 6 moved: 1  
Bandwidth - unplaced 0 of 470

Global Util.		Subpool Util.	
Solution	max. 0.022 max.mod. 0.0040	max. 0.0	max.mod. 0.0
Original	max. 0.022 max.mod. 0.0044	max. 0.0	max.mod. 0.0

Report:  
Showing 1-1 of 1 records

#	Report Type	Summary Info
1.	<input type="checkbox"/> qualityReport	

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

Detail

<< View Result

For an explanation of the various window elements, see [Planning Tools, page A-51](#).

A **qualityReport** is always generated. If the computation was successful, this will be the only report. If a warning or a violation was encountered, one or more warning or violation reports will also be generated.

- Step 8** To view the contents of the Grooming report, click the **Detail** button. In the case of a **qualityReport**, the TE Primary Tunnel Computation Results - Report (details) window in [Figure 6-37](#) appears.

For an example of a violation report, see [Figure 6-17](#).

Figure 6-37 TE Managed Primary Tunnels SR - Grooming Report (Details)

**TE Primary Tunnel Computation Results - Report**

Computation Status: SUCCESS-SOLUTION\_FOUND  
Tunnels - unplaced 0 of 6 moved: 1  
Bandwidth - unplaced 0 of 470

	Global Util.		Subpool Util.	
Solution	max. 0.022	max.mod. 0.0040	max. 0.0	max.mod. 0.0
Original	max. 0.022	max.mod. 0.0044	max. 0.0	max.mod. 0.0

**Report:** Showing 1-1 of 1 records

#	<input checked="" type="checkbox"/> Report Type	Summary Info
1.	<input checked="" type="checkbox"/> qualityReport	

Rows per page: 10 Go to page: 1 of 1 [Go](#) [Detail](#)

**Report Type:** qualityReport  
**Description:** relates to only 0 priority tunnels  
**Achievement:** SUCCESS **Solution:** SOLUTION\_FOUND  
**Termination:** COMPLETED **Optimality:** OPTIMAL\_FOR\_ALL\_CRITERIA

**Tunnel Placement:**

	%Placed	Placed	Unplaced	Total
Tunnels -solution	100.0	6	0	6
original	100.0	6	0	6
Bandwidth -solution	100.0	470	0	470
original	100.0	470	0	470

Tunnels moved 1

TE-Metric Sum(Primary Tunnel Paths)	-solution	original
	149	59

**Utilization:**

	Median	Max. Modifiable	Mean	Max.
Global Pool -solution	0.0	0.0040	7.341954E-4	0.022
original	0.0	0.0044	6.9971266E-4	0.022
Sub Pool -solution	0.0	0.0	0.0	0.0
original	0.0	0.0	0.0	0.0

[<< View Result](#)

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For an explanation of the various window elements, see [Planning Tools](#), page A-51.

The report fields in the right window pane are described for each report in [Appendix B, “Warnings and Violations.”](#)

- Step 9** Click **<< View Result** to return to the **Changes** window and click **Save & Deploy** to save the change to the repository and implement the tunnel modifications on the network.

