



CHAPTER 7

Turn Up a Network

This chapter explains how to turn up and test a Cisco ONS 15454 dense wavelength division multiplexing (DWDM) network. For DWDM topology reference information and span loss tables, see the “Network Reference” chapter in *Cisco ONS 15454 DWDM Reference Manual*.

There are two main DWDM network types: metro core, where the channel power is equalized and dispersion compensation is applied, and metro access, where the channels are not equalized and dispersion compensation is not applied. The DWDM network topologies supported are hubbed rings, multihubbed rings, meshed rings, linear configurations, and single-span links. The DWDM node types supported are hub, terminal, optical add/drop multiplexing (OADM), reconfigurable optical add/drop multiplexing (ROADM), anti-amplified spontaneous emissions (anti-ASE), and line amplifier. For DWDM and hybrid node turn-up procedures, see [Chapter 4, “Turn Up a Node.”](#)

**Note**

The procedures and tasks described in this chapter for the Cisco ONS 15454 platform is applicable to the Cisco ONS 15454 M2 and Cisco ONS 15454 M6 platforms, unless noted otherwise.

**Note**

Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI shelf assemblies.

Before You Begin

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. [NTP-G51 Verify DWDM Node Turn Up, page 7-2](#)—Complete this procedure before beginning network turn-up.
2. [NTP-G52 Verify Node-to-Node Connections, page 7-3](#)—Complete this procedure next.
3. [NTP-G201 Configure the Raman Pump on an MSTP Link, page 7-4](#)—Complete this procedure to set the Raman total power and Raman ratio.
4. [NTP-G53 Set Up Timing, page 7-22](#)—Complete this procedure next.
5. [NTP-G54 Provision and Verify a DWDM Network, page 7-27](#)—Complete this procedure next.
6. [NTP-G56 Verify the OSNR, page 7-32](#)—Complete as needed.
7. [NTP-G142 Perform a Protection Switch Test, page 7-33](#)—Complete as needed.
8. [NTP-G164 Configure Link Management Protocol, page 7-35](#)—Complete as needed.
9. [NTP-G233 Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-42](#)—Complete as needed.

10. [NTP-G57 Create a Logical Network Map, page 7-60](#)—Complete as needed.
11. [NTP-G325 View the Power Levels of Cisco ONS 15454 MSTP Nodes, page 7-61](#)—Complete as needed.
12. [NTP-G326 Provision SRLG on the Cisco ONS 15454 MSTP Network, page 7-62](#)—Complete as needed.

NTP-G51 Verify DWDM Node Turn Up

Purpose	This procedure verifies that each ONS 15454 is ready for DWDM network turn-up before adding nodes to a network. This procedure applies to all ROADMs, OADM, and line-amplifier nodes.
Tools/Equipment	Network plan provided by your network administrator
Prerequisite Procedures	Chapter 4, “Turn Up a Node”
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

-
- Step 1** Log in to an ONS 15454 node on the network that you will test. See the [“DLP-G46 Log into CTC” task on page 3-30](#) for instructions. If you are already logged in, continue with Step 2.
- Step 2** Click the **Alarms** tab.
- a. Verify that the alarm filter is not turned on. See the [“DLP-G128 Disable Alarm Filtering” task on page 10-26](#) as necessary.
 - b. Verify that no equipment alarms appear (EQPT in the Cond column) indicating equipment failure or other hardware problems. If equipment failure alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* for procedures.
- Step 3** Verify that the software version shown in the node view (single-shelf mode) or multishelf view (multishelf mode) status area matches the version required by your network. (The status area is located to the left of the shelf graphic.) If the software is not the correct version, perform one of the following procedures:
- Perform a software upgrade using a Cisco ONS 15454 software CD or Cisco ONS 15454 SDH software CD. Refer to the release-specific software upgrade document.
 - Replace TCC2/TCC2P/TCC3/TNC/TSC cards with cards containing the correct release.
- Step 4** Click the **Provisioning > General** tabs. Verify that all general node information settings are correct according to documentation provided by the network administrator. If not, see the [“NTP-G80 Change Node Management Information” procedure on page 11-11](#).
- Step 5** Click the **Provisioning > Network** tabs. Ensure that the IP settings and other Cisco Transport Controller (CTC) network access information is correct according to documentation provided by the network administrator. If not, see the [“NTP-G81 Change CTC Network Access” procedure on page 11-22](#).
- Step 6** Click the **Provisioning > Protection** tabs. Verify that all required protection groups have been created according to documentation provided by the network administrator. If not, see the [“NTP-G33 Create a Y-Cable Protection Group” procedure on page 6-21](#) or the [“NTP-G83 Modify or Delete Card Protection Settings” procedure on page 11-39](#).

- Step 7** Click the **Provisioning > Security** tabs. Verify that all users have been created and that their security levels are correct according to documentation provided by the network administrator. If not, see the “[NTP-G88 Modify Users and Change Security](#)” procedure on page 11-54.
- Step 8** If Simple Network Management Protocol (SNMP) is provisioned on the node, click the **Provisioning > SNMP** tabs. Verify that all SNMP settings are correct according to documentation provided by the network administrator. If not, see the “[NTP-G89 Change SNMP Settings](#)” procedure on page 11-66.
- Step 9** Repeat this procedure at each node in the network.
- Stop. You have completed this procedure.**

NTP-G52 Verify Node-to-Node Connections

Purpose	This procedure verifies optical service channel (OSC) terminations between nodes and checks span attenuation. This procedure applies to all ROADMs, OADM, and line-amplifier locations.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up , page 7-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note In this procedure, Side A refers to Slots 1 through 6, and Side B refers to Slots 12 through 17.

- Step 1** Check to see if the fibers coming from the adjacent nodes are connected to the OPT-BST, OPT-BST-E, OPT-AMP-17-C (operating in the booster amplifier mode), or OSC-CSM card LINE RX and TX ports. If yes, continue with [Step 2](#). If adjacent node fibers are not connected to the LINE RX and TX ports, do not continue. Install the cabling to the adjacent nodes using the “[NTP-G34 Install Fiber-Optic Cables on DWDM Cards and DCUs](#)” procedure on page 4-80.
- Step 2** Verify the following network fiber connections:
- The node’s Side A ports (LINE TX and RX) are connected to the Side B ports (LINE RX and TX) of the adjacent node.
 - The node’s Side B ports (LINE RX and TX) are connected to the Side A ports (LINE TX and RX) of the adjacent node.
- Step 3** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 at the network node that you want to verify.
- Step 4** Click the **Provisioning > Comm Channels > OSC** tabs. Verify that OSC terminations appear under the OSC Terminations area for the Side B and Side A OSC-CSM or OSCM cards and that the port state is In-Service and Normal (IS-NR [ANSI]/Unlocked-enabled [ETSI]). If so, continue with [Step 5](#). If OSC terminations are not created, complete the “[NTP-G38 Provision OSC Terminations](#)” procedure on page 4-128.
- Step 5** Complete the “[NTP-G76 Verify Optical Span Loss Using CTC](#)” procedure on page 11-2 for all OSC-CSM cards. If the measured span loss is within the minimum and maximum expected span loss values, continue with [Step 6](#). If not, clean the fiber connected to the OPT-BST, OPT-BST-E, OPT-AMP-17-C (operating in the booster amplifier mode), or OSC-CSM cards on both ends of the span,

then repeat the “[NTP-G76 Verify Optical Span Loss Using CTC](#)” procedure on page 11-2. If the span loss is within the minimum and maximum expected span loss values, continue with [Step 6](#). If not, contact your next level of support.

Step 6 Repeat Steps 2 through 5 at each network node.

Stop. You have completed this procedure.

NTP-G201 Configure the Raman Pump on an MSTP Link

Purpose	This procedure configures the Raman pump on an Multiservice Transport Platform (MSTP) link.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 The Raman pump can be configured in three ways:

- [DLP-G468 Configure the Raman Pump Using the Installation Wizard, page 7-4](#)—This procedure is the preferred and recommended installation process.
- [DLP-G474 Configure the Raman Pump by Importing the CTP XML File, page 7-19](#)—Use this procedure when the span is longer than 42 dB (expand on span). This procedure is not recommended for spans of 42 dB or less.
- [DLP-G489 Configure the Raman Pump by Setting the ANS Parameters Manually, page 7-20](#)—Use this procedure if the Raman installation wizard fails and expert intervention is required.

Stop. You have completed this procedure.

DLP-G468 Configure the Raman Pump Using the Installation Wizard

Purpose	This procedure configures the Raman Pump on an MSTP link using the installation wizard.
Tools/Equipment	None

- Prerequisite Procedures**
- [DLP-G46 Log into CTC, page 3-30](#)
 - [NTP-G30 Install the DWDM Cards, page 4-66](#)
 - [NTP-G51 Verify DWDM Node Turn Up, page 7-2](#)
 - [NTP-G37 Run Automatic Node Setup, page 4-129.](#)
 - Create an optical service channel (OSC) termination link by completing the [“NTP-G38 Provision OSC Terminations” procedure on page 4-128](#) or create an optical transport section (OTS) provisionable patchcord terminations on line ports by completing [“NTP-G184 Create a Provisionable Patchcord” procedure on page 8-52](#), as required.

Required/As Needed	Required
Onsite/Remote	Onsite and remote
Security Level	Provisioning or higher



Note The installation wizard performs optical measurements and data exchange between the nodes. Make sure that the data communications network (DCN) is stable.



Note Running the installation wizard without setting the automatic node setup (ANS) parameters causes the wizard to fail. Complete the [“NTP-G37 Run Automatic Node Setup” procedure on page 4-129.](#)



Note Running the installation wizard can impact traffic. Make sure that nobody is working on the nodes before continuing with this procedure.



Caution To perform optical measurements, the installation wizard automatically turns on hardware resources installed on the nodes. Alarms can occur during the installation process. Following the recommendations is critical to the success of installation.



Note Make sure that a Muxponder, a WSS, or a tunable transponder is present before you run the Raman installation wizard.



Note When the span is longer than 42 dB, do not use the Raman installation wizard.

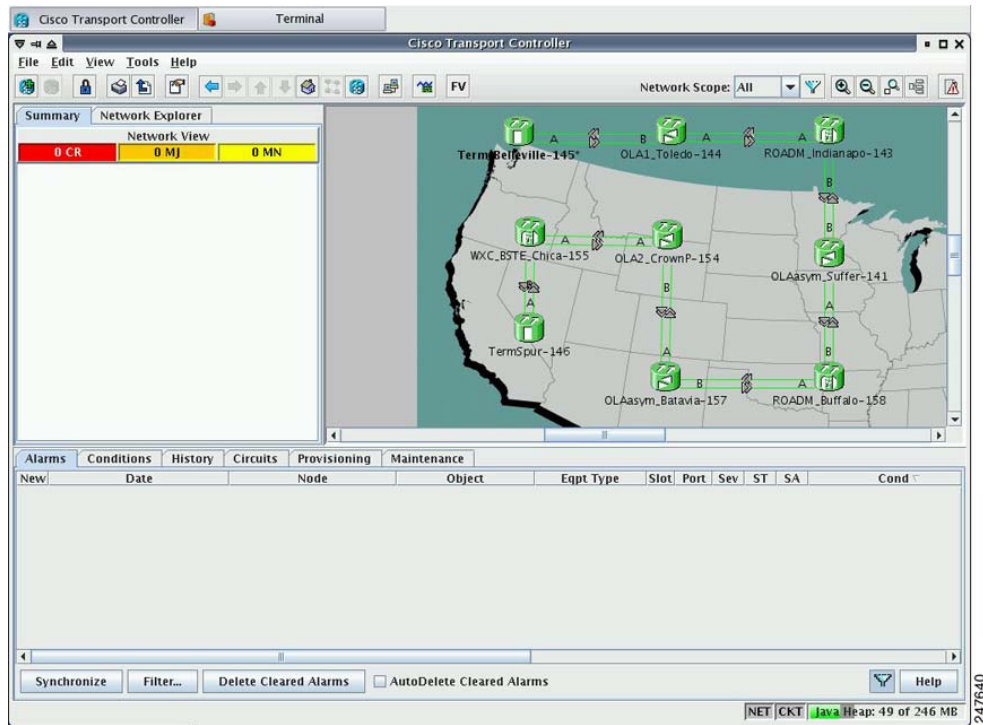


Note A bulk attenuator is not required between the transponder and the OPT-RAMP-C or OPT-RAMP-CE card if the Raman installation wizard is started from a Raman only node (line amplifier node equipped with OPT-RAMP-C or OPT-RAMP-CE card without post-amplifier).

Step 1 From the CTC View menu, choose Go to Network View.

Step 2 [Figure 7-1](#) shows a sample network view of nodes (terminal or ROADM) connected in the network.

Figure 7-1 Network View of Nodes (Terminal or ROADM)



The Raman pump on the OPT-RAMP-C or OPT-RAMP-CE card can be configured on a single span or multiple spans.

Step 3 To start the Raman installation wizard, complete one of the following steps:

- To configure Raman amplification on a single span, go to Network view, right-click on a span and choose **Raman Installation Day0** from the shortcut menu. (Figure 7-2). Go to Step 5.
- To configure Raman amplification on multispans, go to Network view, right-click on a specific node, and choose **Raman Installation Day0 Multi-span** from the shortcut menu (Figure 7-3).

Figure 7-2 Installing the Raman Pump on a Single Span

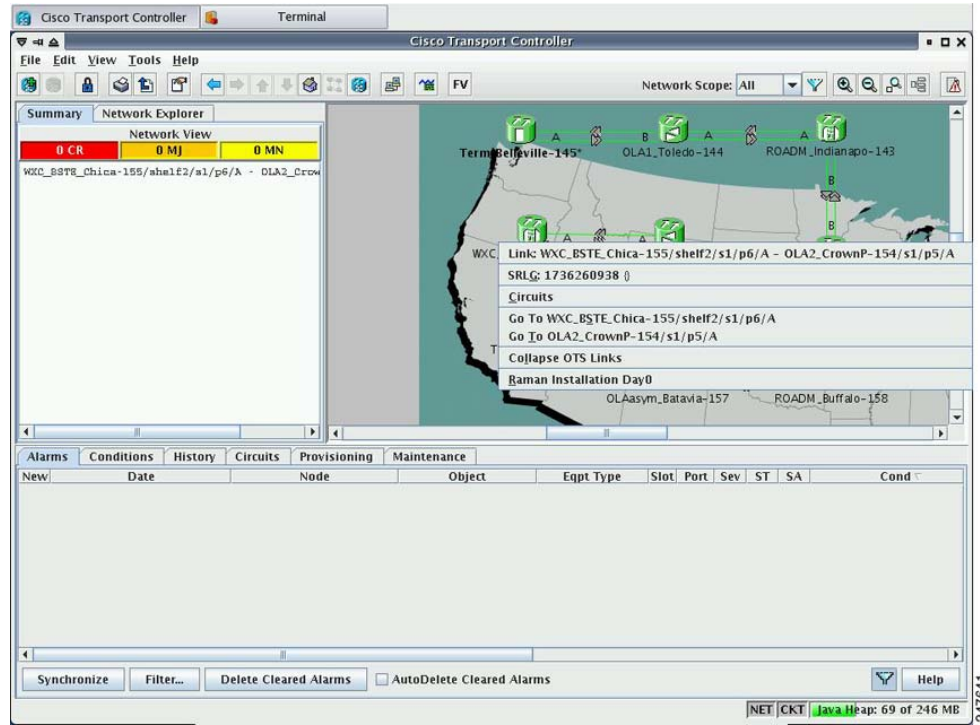
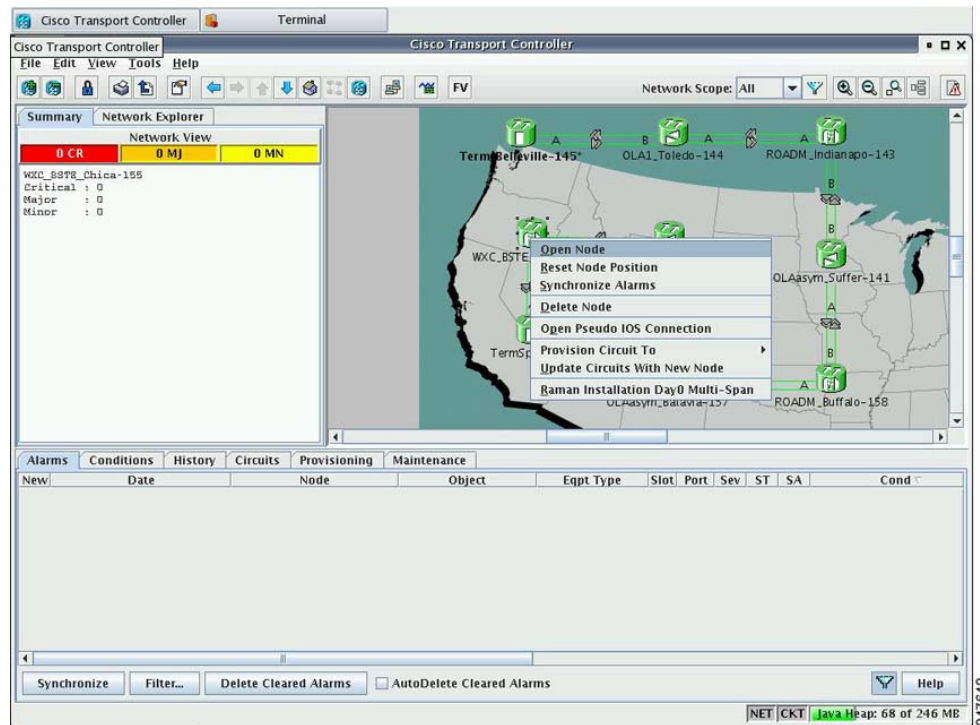
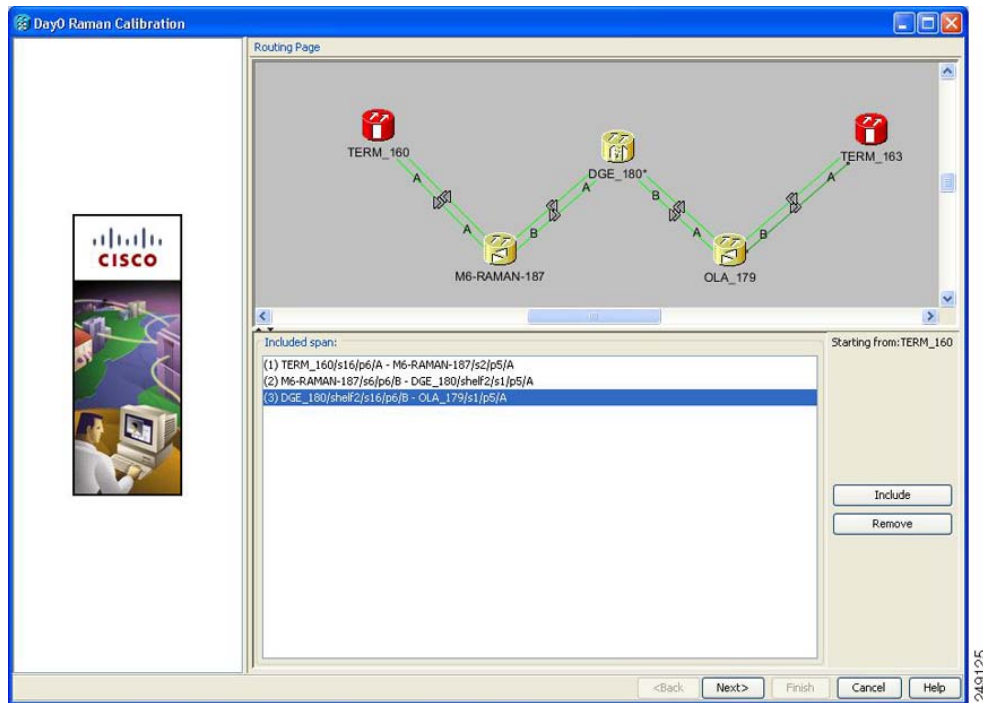


Figure 7-3 Installing the Raman Pump on Multiple Spans



The Routing page is displayed (Figure 7-4).

Figure 7-4 Selecting Spans for Raman Amplification



The Included Span list box lists all spans that are selected in the network.

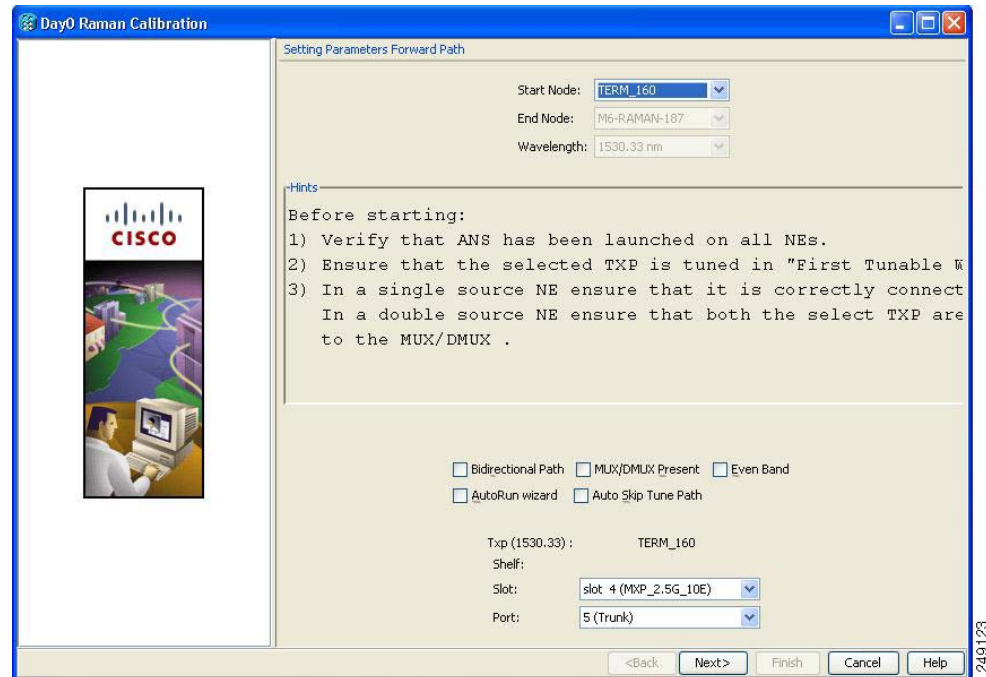
Step 4 Select a span from the network to add a span.

If you are setting up multispan, make sure that the span selection is made in a sequence; otherwise, an error message is displayed.

Step 5 When you have selected the span or spans, click **Next**.

The Setting Parameters page is displayed (see Figure 7-5).

Figure 7-5 Setting Raman Calibration Parameter



Note The Hints area displays the status of internal operations.



Note If multiple spans are selected, the applicable nodes are displayed on the left side of the page.

Step 6 Select one or more checkboxes as applicable:

- **Autorun wizard**—The Installation wizard tunes the selected span automatically, requiring no user intervention. However, if the wizard displays errors, the wizard requests for user acknowledgements.
- **Even Band**—This option is used for optical networks that support only even band channels. If the network supports odd and even channels, the Raman Installation wizard tunes the transponder to the first tunable odd band channel.
- **Auto Skip Tune Path**—The Raman Installation wizard skips spans that have been previously tuned by the wizard.
- **Bidirectional Path**—This configures the OPT-RAMP-C or OPT-RAMP-CE cards in both directions (source to destination and destination to source)
- **MUX/DMUX Present**—This option is used if the optical network has transponders connected to the A/D stage (MUX or WSS).

Several scenarios are discussed in the following section. Select as applicable:

- Check box Bidirectional Path is unchecked and check box MUX/DMUX Present is checked. See [Figure 7-6](#) and [Step 7a](#).
- Check box Bidirectional Path is unchecked and check box MUX/DMUX Present is unchecked. See [Figure 7-7](#) and [Step 7b](#).

- Check box Bidirectional Path is checked and check box MUX/DMUX Present is checked. See [Figure 7-8](#) and [Step 7c](#).
- Check box Bidirectional Path is checked and check box MUX/DMUX Present is unchecked. See [Figure 7-9](#) and [Step 7d](#).

**Note**

Before you check the MUX/DMUX Present check box, ensure that the following prerequisites are completed:

- At least one source node is a terminal node or a ROADM node.
- Two transponders/muxponders supporting wavelength of 1530.33 nm and 1560.61 nm, used as probe signals, are available on the source node for odd channels or wavelengths of 1530.72 nm and 1561.01 nm for even channels.
- Trunk ports are connected to the correct ADD ports.

**Note**

The Raman Wizard does not verify if the selected TXP connections are properly connected. The calibration process is terminated if a LOS-P alarm is detected on the MUX input port when the trunk port is turned on.

**Note**

If you do not use the MUX/DMUX Present check box, ensure that the following prerequisites are completed:

- Connect a UT2-based trunk port (from a transponder/muxponder card) to the COM-RX port of the booster amplifier connected to the OPT-RAMP-C or OPT-RAMP-CE card on the source node.
A full-spectrum, tunable interface allows the system to tune the signal on two required wavelengths without any human intervention.
- A 10-dB bulk attenuator must be connected between the TXP trunk port and the COM-RX port of the booster amplifier.

**Caution**

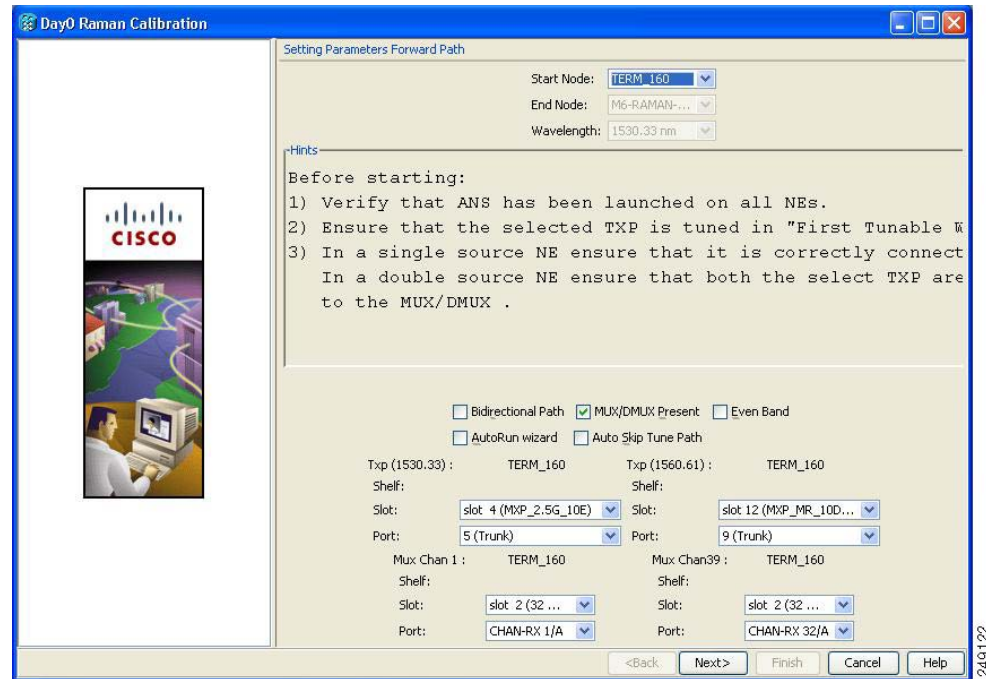
Make sure that the bulk attenuator is removed as soon as installation finishes and the correct fiber is reconnected to the COM-RX port of the booster amplifier.

Step 7

Perform any one of the following steps, based on your selection in [Step 6](#).

- a. Select the two transponders on the source node from the Slot drop-down list. The installation wizard tunes the transponders to the required wavelengths. ([Figure 7-6](#)).

Figure 7-6 Bidirectional Path Is Unchecked and MUX/DMUX Present Is Checked

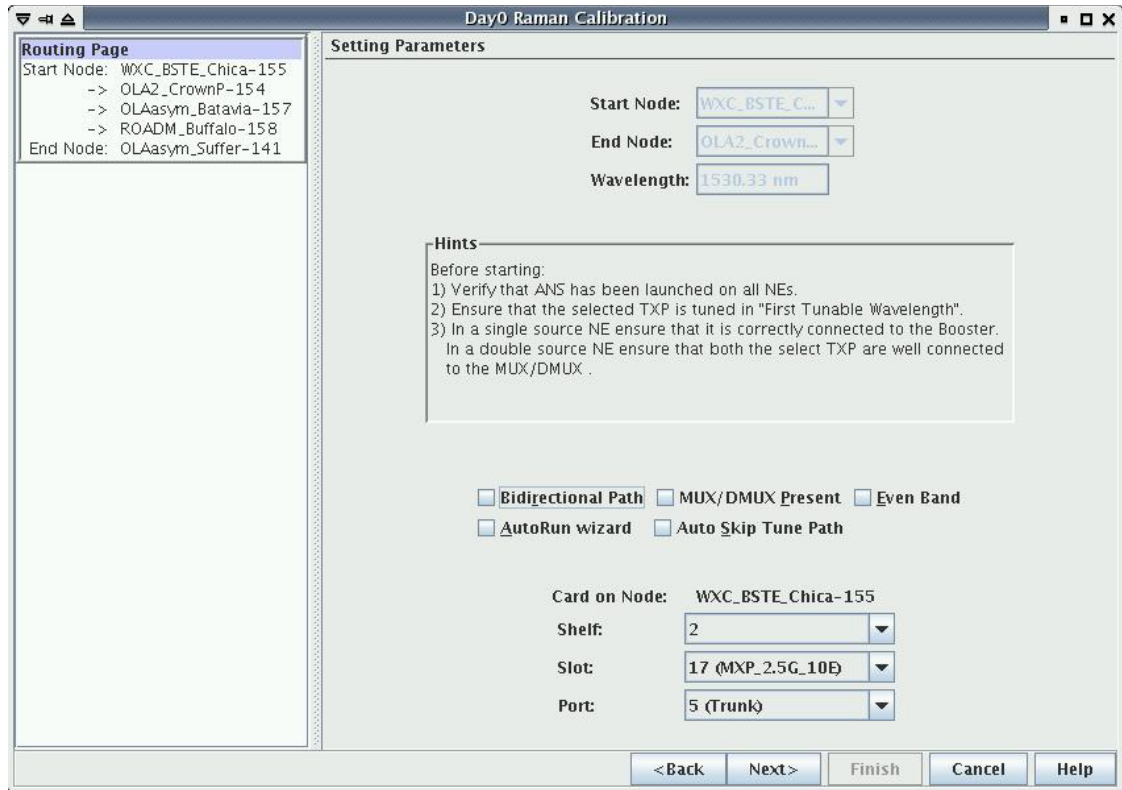


- b. Select one transponder on the source node from the Slot drop-down list. The installation wizard verifies if the transponder can tune on the first tunable wavelength. Make sure that the card used is a tunable C-band transponder and set the transponder to the “first tunable wavelength”. Otherwise, the wizard fails and the installation must be repeated using a correctly configured tunable transponder (Figure 7-7).



Note The wizard uses a pre-installed UT-2 based transponder.

Figure 7-7 Bidirectional Path Is Unchecked and MUX/DMUX Present Is Unchecked



- c. Select the two transponders on the source and destination nodes from the Slot drop-down list. The installation wizard verifies if the transponders are tuned to the expected wavelengths or on the first tunable wavelength. Otherwise, the wizard fails and the installation must be repeated (Figure 7-8).

Figure 7-8 Bidirectional Path Is Checked and MUX/DMUX Present Is Checked

Routing Page

Start Node: WXC_BSTE_Chica-155
 -> OLA2_CrownP-154
 -> OLAasym_Batavia-157
 -> ROADM_Buffalo-158
 End Node: OLAasym_Suffer-141

Setting Parameters

Start Node: WXC_BSTE_C...
 End Node: OLA2_Crown...
 Wavelength: 1530.33 nm

Hints

Before starting:
 1) Verify that ANS has been launched on all NEs.
 2) Ensure that the selected TXP is tuned in "First Tunable Wavelength".
 3) In a single source NE ensure that it is correctly connected to the Booster.
 In a double source NE ensure that both the select TXP are well connected to the MUX/DMUX .

Bidirectional Path MUX/DMUX Present Even Band
 AutoRun wizard Auto Skip Tune Path

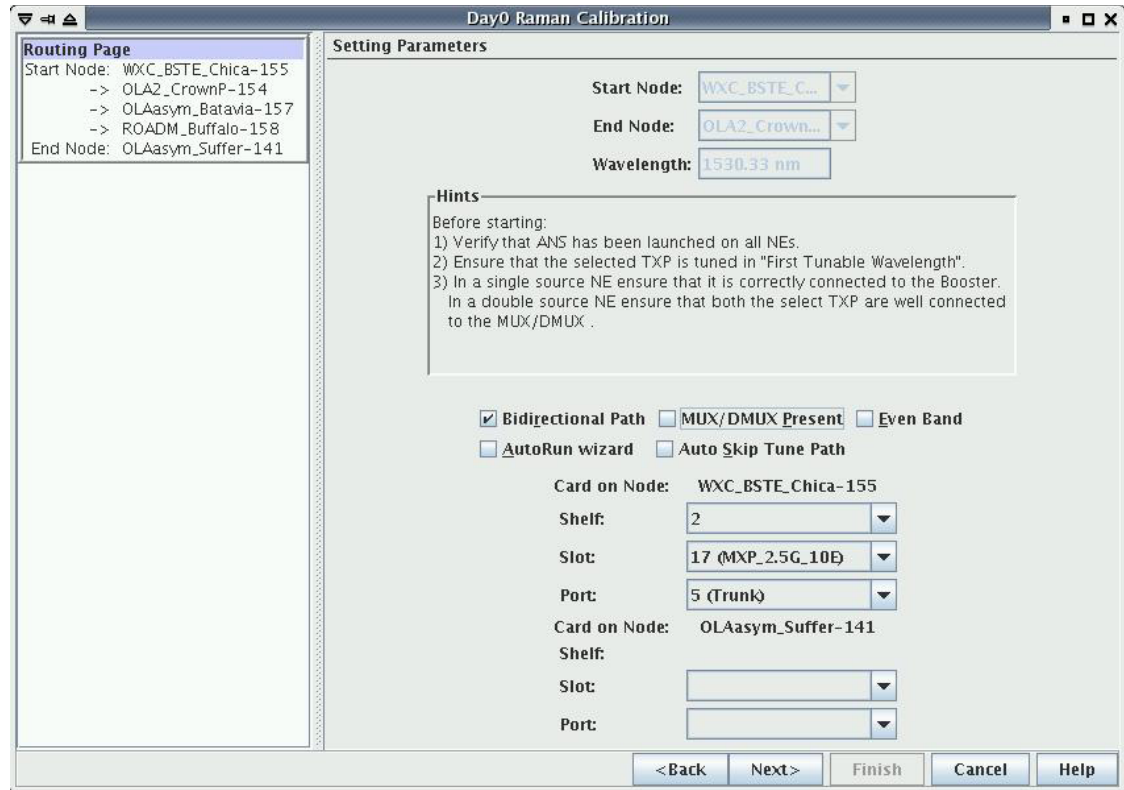
Card on Node: WXC_BSTE_Chica-155	Card on Node: WXC_BSTE_Chica-155
Shelf: 2	Shelf: 2
Slot: 17 (MXP_2.5G_10E)	Slot: 17 (MXP_2.5G_10E)
Port: 5 (Trunk)	Port: 5 (Trunk)
Card on Node: OLAasym_Suffer-141	Card on Node: OLAasym_Suffer-141
Shelf:	Shelf:
Slot:	Slot:
Port:	Port:

<Back Next> Finish Cancel Help

- d. Select a transponder on the source and destination nodes from the Slot drop-down list. The installation wizard verifies if the transponder can be tuned on the first tunable wavelength. Make sure that the transponder is a tunable C-band transponder. Otherwise, the wizard fails and the installation must be repeated (Figure 7-9).

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Figure 7-9 Bidirectional Path Is Checked and MUX/DMUX Present Is Unchecked



Step 8 Click Next. The Calibrate Raman Page is displayed (Figure 7-10).

Figure 7-10 Calibrating Raman Amplification

Routing Page

Start Node: WXC_BSTE_Chica-155
 -> OLA2_CrownP-154
 -> OLAAsym_Batavia-157
 -> ROADM_Buffalo-158
 End Node: OLAAsym_Suffer-141

Setting Parameters

Start Node: WXC_BSTE_Chica-155
 End Node: OLA2_CrownP-154
 End of Wizard
 Shelf: 2
 Slot: 17 (MXP_2.5)
 Port: 5 (Trunk)
 Mux/Dmux not present
 Selected Lambda: 1530.33 nm

Calibrate Raman

Card on Node: WXC_BSTE_Chica-155 Card on Node: OLA2_CrownP-154
 Shelf: 2 Shelf:
 Slot: 1 (OPT-RAMP CD) Slot: slot 1 (OPT-RAMP ...
 Port: RAMAN-TX/A Port: RAMAN-TX/A

Hints

The following steps will be performed:
 1) The Booster present on the Start Node will be turned on.
 2) The OPT-RAMP card on the start node will be turned on.
 3) Received power and the End Node will be measured.

WXC_BSTE_Chica-155 get Raman Params

Time Stamp:
 Low Power (dBm):
 High Power (dBm):

< Back Next > Finish Cancel Help

The installation wizard changes the trunk port to the In-Service (IS) state and turns on all the amplifiers. All the OTS and optical channel (OCH) ports in the span are changed to IS state.

Step 9 As soon as the Raman calibrations are complete, the Next button is enabled. Click **Next**.

Figure 7-11 Calibrating Raman Amplification

Day0 Raman Calibration

Routing Page
 Start Node: WXC_BSTE_Chica-155
 -> OLA2_CrownP-154
 End Node: OLAasym_Batavia-157

Setting Parameters
 Start Node: WXC_BSTE_Chica-155
 End Node: OLA2_CrownP-154
 End of Wizard
 Shelf: 2
 Slot: 17 (MXP_2.5)
 Port: 5 (Trunk)
 Mux/Dmux not present
 Selected Lambda: 1530.33 nm

Calibrate Raman

Card on Node: WXC_BSTE_Chica-155 Card on Node: OLA2_CrownP-154
 Shelf: 2 Shelf: slot 1 (OPT-RAMP...)
 Slot: 1 (OPT-RAMP CE) Slot: slot 1 (OPT-RAMP...)
 Port: RAMAN-TX/A Port: RAMAN-TX/A

Hints
 The following steps will be performed:
 1) The Booster present on the Start Node will be turned on.
 2) The OPT-RAMP card on the start node will be turned on.
 3) Received power and the End Node will be measured.

Repeat

Time Stamp:	16:11:37
Low Power (dBm):	-4.4
High Power (dBm):	1.2

< Back Next > Finish Cancel Help

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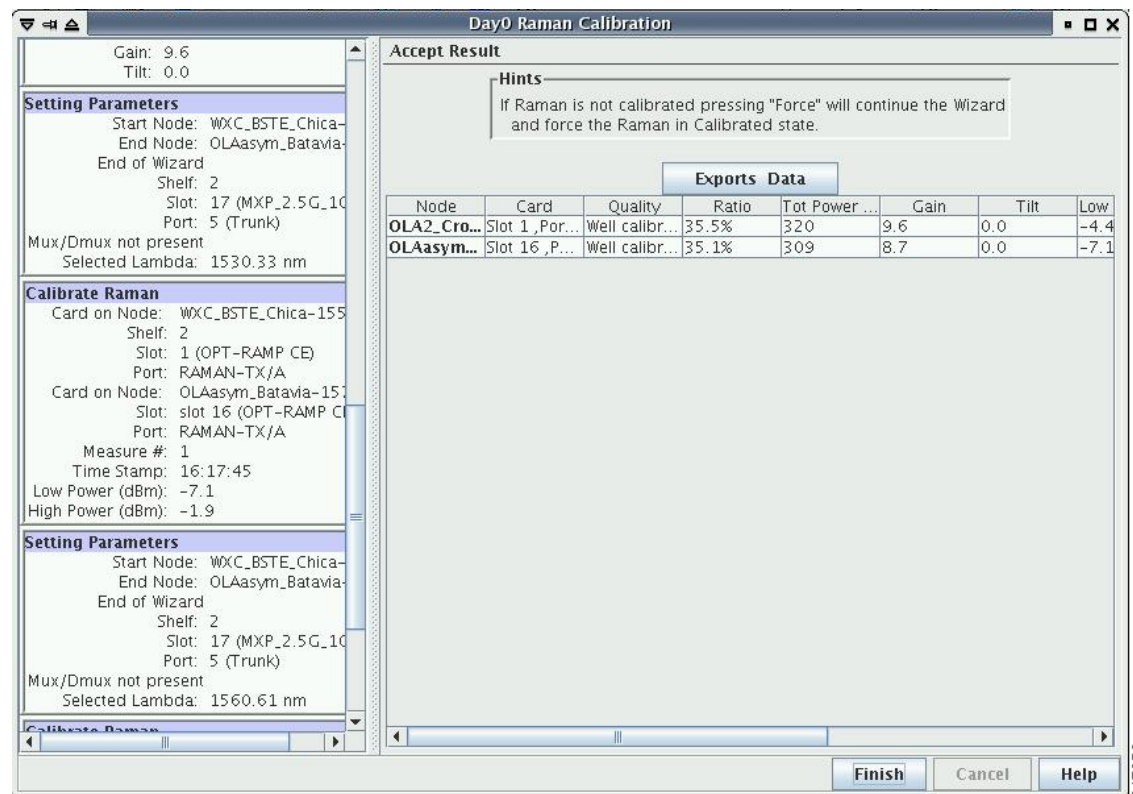
- Step 10** The power received on the destination node when wavelength on the source is turned on is shown. If you installed Raman amplification on multiple spans, click **Next** to view results of other spans.
- Step 11** If the installation wizard fails, click the **Repeat** button. The Raman installation wizard recalibrates the values on the destination node.

**Note**

If you have repeated the calibration several times and the wizard fails, press **Cancel** to abort the installation process. Log in to the Cisco Technical Support Website at <http://www.cisco.com/techsupport> for more information or call Cisco Technical Support at (800) 553-2447.

- Step 12** Click **Next**. The Accept Results page is displayed (Figure 7-12).

Figure 7-12 Raman Amplification Results



The calculated Raman power and Raman gain are displayed. (Figure 7-12.)

Step 13 The wizard compares the calculated Raman gain value with the expected results. Your action depends on the Raman gain values:

- Expected gain (Gt) – 0.5 dB ≤ (gain) ≤ (expected gain) + 0.5 dB—If the Raman gain is within this range, it means that the setup procedure was successful. Go to [Step 14](#).
- (Expected gain) - 3.0 dB ≤ (gain) ≤ (expected gain) – 0.5 dB—If the Raman gain is within this range, it means that the values are slightly outside the range. The wizard recommends that you verify the span length and cabling, and repeat the installation wizard procedure. If the Raman gain values are still not within the expected value range even after repeating the installation process, you can choose to forcibly apply these values by clicking **Force Calibration**.



Note

After you have forced the new calibration, the new value of the Raman gain is applied to the OPT-RAMP-C or OPT-RAMP-CE card as the set point; However, the new value does not update the value of the ANS set point for Raman gain. After the installation is complete, reanalyze the network in Cisco Transport Planner using this new value for the Raman gain set point and verify that it results in a good network design. After the CTP analysis is successful, import the updated CTP XML file again into CTC by completing the “[NTP-G143 Import the Cisco Transport Planner NE Update Configuration File](#)” procedure on page 4-49. Launch, run, and apply the ANS parameters by completing “[NTP-G37 Run Automatic Node Setup](#)” procedure on page 4-129. This resolves the discrepancy between the values of the ANS parameters and the card parameters.

However, we recommend that you log in to the Cisco Technical Support Website at <http://www.cisco.com/techsupport> for more information if the Raman gain values are still not within the expected value range or call Cisco Technical Support at (800) 553-2447.

- $(\text{gain}) < (\text{expected gain}) - 3.0 \text{ dB}$ or if $(\text{gain}) < (\text{expected gain}) + 0.5 \text{ dB}$ —If the Raman gain is within this range and the values calculated are far from the targeted results, the installation fails and the wizard recommends repeating the installation. If the results do not improve, it means that the installation process has failed. The Force Calibration option is not available. Click **Cancel** to abort the installation and log in to the Cisco Technical Support Website at <http://www.cisco.com/techsupport> for more information or call Cisco Technical Support at (800) 553-2447.



Note The reason that the calculated values are not within the range may be due to installation issues (for example, the actual fiber type is different than the one used by Cisco Transport Planner to design the link) or procedural issues.

Step 14 Click **Exports Data** to export the Raman setup tuning data in text format (Figure 7-13).

Step 15 Click **Finish**.

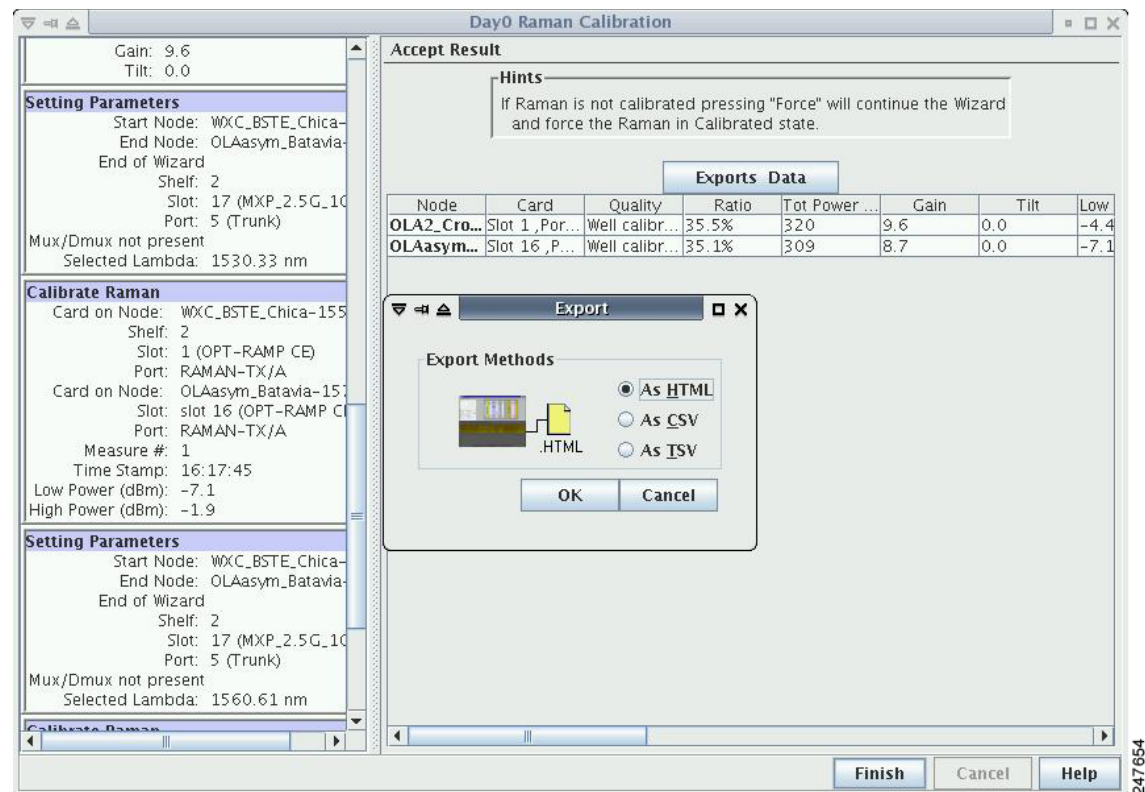


Note When an error occurs during calibration of multiple spans, the calibration process stops and the Force Calibration button becomes visible.



Note If an error occurs during calibration of multiple spans when using the AutoRun wizard, the calibration stops and the Force Calibration button becomes visible. Click **Force Calibration** to force the results.

Figure 7-13 Exporting Raman Tuning Data



Step 16 Return to your originating procedure (NTP).

DLP-G474 Configure the Raman Pump by Importing the CTP XML File

Purpose	This procedure configures the Raman pump by importing the Cisco Transport Planner XML file.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 3-30
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

- Step 1** Install the ANS parameters calculated using Cisco Transport Planner, by completing the “[NTP-G143 Import the Cisco Transport Planner NE Update Configuration File](#)” procedure on page 4-49.
- Step 2** Launch, run, and apply ANS parameters by completing “[NTP-G37 Run Automatic Node Setup](#)” procedure on page 4-129.

- Step 3** Verify if the Raman pump was configured successfully. Perform the following steps:
- In node view (single-shelf mode) or shelf view (multishelf mode), double-click the OPT-RAMP-C or OPT-RAMP-CE amplifier to display the card view.
 - Click the **Maintenance > Installation** tabs.
 - Verify the value of the Raman Ratio and Raman Total Power parameters are consistent with the ANS set points.
 - Verify if the status of the Raman configuration displays the value as “Tuned by ANS”. If not, go to [Step 1](#) to repeat the procedure again.
- Step 4** Return to your originating procedure (NTP).
-

DLP-G489 Configure the Raman Pump by Setting the ANS Parameters Manually

Purpose	This procedure configures the Raman pump by setting the ANS parameters manually.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 3-30
Required/As Needed	As needed, when the wizard fails and expert intervention is required.
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

This procedure can be performed only on a per span basis and not on multiple spans. To configure multiple spans, repeat this procedure on each span that you want to configure.

- Step 1** Provision the ANS parameters manually, by completing the “[DLP-G541 Add an ANS Parameter](#)” task on [page 4-62](#). The ANS parameters are:
- (Slot *i*.OPT-RAMP-CE).Port RAMAN-TX.Amplifier Gain
 - (Slot *i*.OPT-RAMP-CE).Port RAMAN-TX.Raman Ratio
 - (Slot *i*.OPT-RAMP-CE).Port RAMAN-TX.Raman Total Power
- ANS parameters are displayed in the Provisioning > WDM-ANS > Provisioning tab. For more information, see the “Node Reference” chapter in the *Cisco ONS 15454 DWDM Reference Guide*.
- Step 2** Launch, run, and apply ANS parameters by completing “[NTP-G37 Run Automatic Node Setup](#)” procedure on [page 4-129](#).
- Step 3** Verify if the Raman pump was configured successfully. Perform the following steps:
- In node view (single-shelf mode) or shelf view (multishelf mode), double-click the OPT-RAMP-C or OPT-RAMP-CE amplifier to display the card view.
 - Click the **Maintenance > Installation** tabs.
 - Verify the values of the Raman Ratio and Total Pump Power parameters are consistent with the ANS set points.
 - Verify the status of the Raman configuration displays the value, “Tuned by ANS”. If not, go to [Step 1](#) to repeat the procedure again.

Step 4 Return to your originating procedure (NTP).

DLP-490 Restore Raman Link After a Fiber Cut Occurs

Purpose	This procedure tunes Raman set points after a fiber cut has been repaired. The Raman total power value is calculated again, and the original Raman gain is restored.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 3-30
Required/As Needed	As needed.
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

This procedure does not calculate the Raman pump ratio. The Raman pump ratio is not expected to change after the fiber cut is repaired.



Caution

This procedure affects traffic. Ensure that nobody is working on the nodes before you begin.

Step 1 Complete the “[NTP-G54 Provision and Verify a DWDM Network](#)” procedure on page 7-27.

Ensure that the network traffic is restored.

Step 2 Verify if the restore procedure was successful. Perform the following steps:

- a. In node view (single-shelf mode) or shelf view (multishelf mode), double-click the OPT-RAMP-C or OPT-RAMP-CE amplifier to display the card view.
- b. Click the **Maintenance > Installation** tabs.
- c. Verify the value of the Fiber Cut Recovery column. The possible values are:
 - Executed— The restore procedure was completed successfully.
 - Pending—The restore procedure is incomplete.
 - Failed —The system failed to execute the procedure.
- d. If the status is Pending or Failed in [Step 2c.](#), perform the following steps:
 - Click the **Maintenance > APC & Restore** tabs.
 - Click **Restore from Fiber Cut**. This recalculates the Raman gain on the span and verifies if this value is consistent with the ANS set point for Raman gain.

Step 3 Return to your originating procedure (NTP).

NTP-G53 Set Up Timing

Purpose	This procedure provisions Cisco ONS 15454 timing.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up , page 7-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

-
- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 at the node where you will set up timing. If you are already logged in, continue with [Step 2](#).
- Step 2** Complete the “[DLP-G95 Set Up External or Line Timing](#)” task on page 7-22 if an external building integrated timing supply (BITS) source is available. This is the most common ONS 15454 timing setup method.
- Step 3** If an external BITS source is not available, complete the “[DLP-G96 Set Up Internal Timing](#)” task on page 7-25. This task can provide only Stratum 3 timing.
- Step 4** Repeat this procedure at each node in the network.
- Step 5** Return to your originating procedure (NTP).
-

DLP-G95 Set Up External or Line Timing

Purpose	This task defines the ONS 15454 timing source (external or line).
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC , page 3-30
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

-
- Step 1** In node view (single-node mode) or shelf view (multishelf mode), click the **Provisioning > Timing > General** tabs.
- Step 2** In the General Timing area, complete the following information:
- Timing Mode—Choose **External** if the ONS 15454 derives its timing from a BITS source wired to the backplane pins (ANSI) or a MIC-C/T/P front-mount electrical connection (FMEC) (ETSI); choose **Line** if timing is derived from an OSC-CSM or OSCM card that is optically connected to the timing node. A third option, Mixed, allows you to set both external and line timing references. Because Mixed timing might cause timing loops, we do not recommend its use. Use this mode with care.
 - SSM Message Set—Choose the Generation 2 synchronization status messaging (SSM) option. See the “Timing Reference” chapter in *Cisco ONS 15454 DWDM Reference Manual* for more information about SSM, including definitions of the SONET timing levels.



Note Generation 1 is used only by SONET or SDH ONS 15454 nodes that are connected to equipment that does not support Generation 2.

- **Quality of RES**—Sets the timing quality for the user-defined, reserved (RES) S1 byte if your timing sources supports RES. Most timing sources do not use RES. If it does not support RES, choose RES=DUS (do not use for timing reference). Qualities are displayed in descending quality order as ranges. For example, in Generation 1 SSM, ST3<RES<ST2 means that the timing reference RES is higher than a Stratum 3 (ST3) and lower than a Stratum 2 (ST2).
- **Revertive**—Select this check box if you want the ONS 15454 to revert to a primary reference source after the conditions that caused it to switch to a secondary timing reference are corrected.
- **Reversion Time**—If Revertive is checked, choose the amount of time that the ONS 15454 will wait before reverting to its primary timing source. Five minutes is the default.

Step 3 In the Reference Lists area, complete the following information:



Note You can define up to three timing references for the node and up to six BITS Out references. BITS Out references define the timing references used by equipment that can be attached to the node's BITS Out pins on the backplane (ANSI) or the MIC-C/T/P FMEC (ETSI). If you attach equipment to BITS Out pins, you normally attach it to a node with Line mode, because equipment near the external timing reference can be directly wired to the reference.

- **NE Reference**—Allows you to define three timing references (Ref 1, Ref 2, Ref 3). The node uses Reference 1 unless a failure occurs to that reference, in which case the node uses Reference 2. If Reference 2 fails, the node uses Reference 3, which is typically set to Internal Clock. Reference 3 is the Stratum 3 clock provided on the TCC2/TCC2P/TCC3/TNC/TSC card. The options that appear depend on the Timing Mode setting.
 - If the Timing Mode is set to External, your options are BITS-1, BITS-2, and Internal Clock.
 - If the Timing Mode is set to Line, your options are the node's working OSCM cards, OSC-CSM cards, transponder (TXP) cards, muxponder (MXP) cards, and Internal Clock. Choose the cards or ports that are directly or indirectly connected to the node wired to the BITS source. Set Reference 1 to the card that is closest to the BITS source. For example, if Slot 5 is connected to the node wired to the BITS source, choose Slot 5 as Reference 1.
 - If the Timing Mode is set to Mixed, both BITS references and the OSCM, OSC-CSM, TXP, or MXP cards are available, allowing you to set a mixture of external BITS clocks and OSCM, OSC-CSM, TXP, or MXP cards as timing references.
- **BITS-1 Out/BITS-2 Out**—Sets the timing references for equipment wired to the BITS Out backplane (ANSI) or MIC-C/T/P FMEC (ETSI) pins. BITS-1 Out and BITS-2 Out are enabled when BITS-1 Out and BITS-2 Out facilities are put in service. If Timing Mode is set to external, choose the OSCM, OSC-CSM, TXP, or MXP card used to set the timing. If Timing Mode is set to Line, you can choose an OSCM, OSC-CSM, TXP, or MXP card or choose NE Reference to have the BITS-1 Out, BITS-2 Out, or both, follow the same timing references as the network element (NE).



Note All TXP or MXP card client ports are available for timing regardless of the card's termination mode. TXP or MXP trunk ports can be a timing reference when ITU-T G.709 is set to OFF and the Termination Mode is set to LINE. You cannot choose TXP_MR_2.5G and OTU2_XP card client ports as a timing reference.



Note The system prevents BITS In and BITS Out timing to be set on the same node.

Step 4 Click **Apply**.

Step 5 Click the **BITS Facilities** tab.



Note The BITS Facilities section sets the parameters for your BITS-1 and BITS-2 timing references. Many of these settings are determined by the timing source manufacturer. If equipment is timed through BITS Out, you can set timing parameters to meet the requirements of the equipment.

Step 6 In the BITS In area, complete the following information:

- Facility Type—(TCC2P/TNC/TSC only) Choose the BITS signal type supported by your BITS clock, either DS1 or 64Khz+8Khz.
- BITS In State—If Timing Mode is set to External or Mixed, set the BITS In state for BITS-1, BITS-2, or both, to **IS** (in service) depending on whether one or both BITS input pin pairs are connected to the external timing source. If Timing Mode is set to Line, set the BITS In state to **OOS** (out of service).

Step 7 If the BITS In state is set to OOS, continue with [Step 8](#). If the BITS In state is set to IS, complete the following information:

- Coding—Choose the coding used by your BITS reference, either B8ZS (binary 8-zero substitution) or AMI (alternate mark inversion).
- Framing—Choose the framing used by your BITS reference, either ESF (Extended Super Frame) or SF (D4) (Super Frame).
- Sync Messaging—Check this check box to enable SSM. SSM is not available if Framing is set to Super Frame.
- Admin SSM—If the Sync Messaging check box is not checked, you can choose the SSM Generation 2 type from the drop-down list. Choices are PRS (Primary reference source; Stratum 1), ST2 (Stratum 2), TNC (Transit Node Clock), ST3E (Stratum 3E), ST3 (Stratum 3), SMC (SONET minimum clock), and ST4 (Stratum 4).

Step 8 In the BITS Out area, complete the following information, as needed:

- Facility Type—(TCC2P/TNC/TSC only) Choose the BITS Out signal type, either DS1 or 64Khz+8Khz.
- BITS Out state—If equipment is connected to the node's BITS output pins on the backplane (ANSI) or MIC-C/T/P FMEC (ETSI) and you want to time the equipment from a node reference, set the BITS Out state for BITS-1, BITS-2, or both, to **IS**, depending on which BITS Out pins are used for the external equipment. If equipment is not attached to the BITS output pins, set the BITS Out state to **OOS**.

Step 9 If the BITS Out state is set to OOS, continue with [Step 10](#). If the BITS Out state is set to IS, complete the following information:

- Coding—Choose the coding used by your BITS reference, either B8ZS or AMI.
- Framing—Choose the framing used by your BITS reference, either ESF or SF (D4).
- AIS Threshold—If SSM is disabled or Super Frame is used, choose the quality level where a node sends an alarm indication signal (AIS) from the BITS 1 Out and BITS 2 Out backplane pins (ANSI) or MIC-C/T/P FMEC (ETSI). An AIS alarm is raised when the optical source for the BITS reference falls to or below the SSM quality level defined in this field.

- LBO—If an external device is connected to the BITS Out pins, set the line build-out (LBO) distance between the ONS 15454 and an external device. If an external device is connected to BITS Out, choose the distance between the device and the ONS 15454. Options are: 0-133 ft (default), 134-266 ft, 267-399 ft, 400-533 ft, and 534-655 ft. Line build out (LBO) relates to the BITS cable length. If an external device is not connected to BITS Out, leave this field set to the default.

Step 10 Click **Apply**.



Note Refer to *Cisco ONS 15454 DWDM Troubleshooting Guide* for timing-related alarms.

Step 11 Return to your originating procedure (NTP).

DLP-G96 Set Up Internal Timing

Purpose	This task sets up internal timing (Stratum 3) for an ONS 15454.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 3-30
Required/As Needed	As needed (use only if a BITS source is not available)
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Caution

Internal timing is Stratum 3 and is not intended for permanent use. All ONS 15454 SONET (ANSI) or SDH (ETSI) nodes should be timed to a Stratum 2 (or better) primary reference source. Internal timing is appropriate for DWDM nodes.

Step 1 In node view (single-node mode) or shelf view (multishelf mode), click the **Provisioning > Timing > General** tabs.

Step 2 In the General Timing area, enter the following:

- Timing Mode—Set to **External**.
- SSM Message Set—Set to **Generation 1**.
- Quality of RES—Does not apply to internal timing.
- Revertive—Does not apply to internal timing.
- Reversion Time—Does not apply to internal timing.

Step 3 In the Reference Lists area, enter the following information:

- NE Reference
 - Ref 1—Set to **Internal Clock**.
 - Ref 2—Set to **Internal Clock**.
 - Ref 3—Set to **Internal Clock**.
- BITS-1 Out/BITS-2 Out—Set to **None**.

Step 4 Click **Apply**.

- Step 5** Click the **BITS Facilities** tab.
- Step 6** In the BITS Facilities area, change the BITS In state and BITS Out state to **OOS** for BITS 1 and BITS 2. Disregard the other BITS Facilities settings; they are not relevant to internal timing.
- Step 7** Click **Apply**.
- Step 8** Return to your originating procedure (NTP).
-

DLP-G350 Use the Cisco Transport Planner Traffic Matrix Report

Purpose	This task describes how to use the Cisco Transport Planner traffic matrix report to provision and verify a DWDM network.
Tools/Equipment	None
Prerequisite Procedures	NTP-G139 Verify Cisco Transport Planner Reports and Files, page 4-3
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

- Step 1** Display a printed copy of the Cisco Transport Planner Traffic Matrix report for your network. The report can be exported in Microsoft Excel (.xls) or HTML format.
- Step 2** View the following information:
- Service Demand—Lists the general service demand from site to site.
 - Service Circuit—Lists the service circuit.
 - OCH-CC Src—Lists the optical channel client connection (OCHCC) source site and the shelf direction, either Side B or Side A.
 - OCH-CC Src Position—Lists the OCHCC source rack, shelf, and slot.
 - OCH-CC Src Unit—Lists the OCHCC source TXP, MXP, or ITU-T line card.
 - OCH-CC Src Port—Lists the OCHCC source port.
 - A/D Src Position—Lists the optical channel add/drop card source rack, shelf, and slot.
 - A/D Src Unit—Lists the optical channel add/drop card source TXP, MXP, or ITU-T line card.
 - A/D Src Port—Lists the optical channel add/drop card source port.
 - OCH-CC Dst—Lists the OCHCC destination site and shelf direction, either Side B or Side A.
 - OCH-CC Dst Position—Lists the OCHCC destination rack, shelf, and slot.
 - OCH-CC Dst Unit—Lists the OCHCC destination TXP, MXP, or ITU-T line card.
 - OCH-CC Dst Port—Lists the OCHCC destination port.
 - A/D Dst Position—Lists the optical channel add/drop card destination rack, shelf, and slot.
 - A/D Dst Unit—Lists the optical channel add/drop card destination TXP, MXP, or ITU-T line card.
 - A/D Dst Port—Lists the optical channel add/drop card destination port.
 - Dest Unit is the product ID of the optical path source card.
 - Dest Port is the port label reported on the front panel of the optical path destination card.

- **Cl Service Type**—Identifies the service type of the optical channel.
- **Protection**—Identifies the type of protection used for the optical channel:
 - Optical paths for unprotected-Side B and unprotected-Side A optical channels are routed along one direction only in the network.
 - Optical paths for Y-cable, fiber-switched, and client 1+1 optical channels are routed along two independent directions in the network.
- **Op Bypass Site Name**—Identifies where the optical channel is dropped and reinserted when it is not terminated on a TXP or MXP card (optical bypass).



Note If the word *None* appears in the Op Bypass Site Name column, no optical bypass is defined for the optical channel.

- **Wavelength**—Identifies the wavelength used for the optical channel. [Table 8-2 on page 8-7](#) lists the thirty-two available wavelengths.
- **DWDM Interface Type**—Identifies the DWDM interface type that is used for the optical channel:
 - *Transponder* indicates that a transponder (TXP), muxponder (MXP), or DWDM pluggable port module is used for the optical channel.
 - *Line Card* indicates that an ITU line card is used for the optical channel.
- **DWDM Card Type**—Identifies the type of TXP or line card that is used for the optical channel. For information about card types supported by Cisco Transport Planner, see *Cisco Transport Planner DWDM Operations Guide*.

Step 3 Return to your originating procedure (NTP).

NTP-G54 Provision and Verify a DWDM Network

Purpose	This procedure describes how to turn-up an optical service in MSTP networks. It also provides a guidance to perform an entry-level optical performances verification of an optical circuit (OCH-NC/OCH-CC/OCHTrail) created on the MSTP networks.
Tools/Equipment	Test set or protocol analyzer Cisco Transport Planner Traffic Matrix
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards. Provisioning procedures of these cards are provided in Chapter 6, “Provision Transponder and Muxponder Cards”
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note In this procedure, Side A refers to Slots 1 through 6, and Side B refers to Slots 12 through 17.

-
- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to an ONS 15454 node on the network.
- Step 2** Click the **Alarms** tab:
- Verify that the alarm filter is not turned on. See the “[DLP-G128 Disable Alarm Filtering](#)” task on page 10-26, as necessary.
 - Verify that no equipment (EQPT) alarms appear. If equipment failure alarms appear, investigate and resolve them before continuing. Refer to *Cisco ONS 15454 DWDM Troubleshooting Guide* for procedures.
- Step 3** Using the Cisco Transport Planner Traffic Matrix (see [Table 4-1 on page 4-4](#)) for your site, identify the first channel (ITU wavelength) to be provisioned. Use the TXP, MXP, or line card that corresponds to the selected wavelength.
- Step 4** For the ITU wavelength identified in [Step 3](#), create an optical channel client connection (OCHCC) circuit, optical channel network connection (OCHNC) circuit, or optical channel trail circuit using one of the following tasks:
- [DLP-G346 Provision Optical Channel Client Connections](#), page 8-4.
 - [DLP-G105 Provision Optical Channel Network Connections](#), page 8-23.
 - [DLP-G395 Create an Optical Channel Trail](#), page 8-17
- .After creating the OCHCC or OCHNC circuit, return to this procedure and continue with [Step 5](#).



Note Every time a channel is created in the DWDM network, the amplifiers automatically calculate the optical output power needed to maintain a constant power level on each channel when working in Gain Control. If the amplifier is working in power control, APC tool is used for amplifiers power level calculation and setting. Automatic power control (APC) runs when you create new circuits. APC also runs periodically (every 60 minutes) to check and monitor power levels in all the significant sections of the network. If the span length changes, APC modifies amplifier gains and modifies express variable optical attenuation (VOA). For more information about APC, see the “Network Reference” chapter in *Cisco ONS 15454 DWDM Reference Manual*.

- Step 5** In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Circuits** tab. Verify that the OCHCC or OCHNC created in [Step 4](#) has a DISCOVERED status and an IS state. If so, continue with [Step 6](#). If not, complete “[NTP-G183 Diagnose and Fix OCHNC and OCH Trail Circuits](#)” task on page 8-43.
- Step 6** Click the circuit and click **Edit**.
- Step 7** In the Edit Circuit dialog box, click the **State** tab.
- Step 8** In the Cross-Connections table, verify that the circuit path is correct and record all the nodes that appear in the Node column. The first node is the circuit source, and the last node is the circuit destination. If the circuit path is incorrect, delete the circuit and go back to [Step 4](#) to create a new circuit.
- Step 9** Perform the entry-level performance verification of the optical power levels matching with expected setpoints for the OCH-circuit identified in [Step 8](#).
- Optical verification is done for cards in the OCH-circuit. The verification must be done node by node, following the logical signal flow from source to destination node.
- Verify the power levels on the following:
- Fixed or reconfigurable add/drop cards.

- b. Amplifiers, including the raman cards.

**Note**

You need to verify the power setpoint for OPT-PSM cards in the path protection configuration.

Step 10

Display the circuit source node in node view (single-shelf mode), or shelf view (multishelf mode). Following the signal flow from the TXP, MXP, or line card Trunk ports, if an fixed or reconfigurable add/drop card is installed, complete the following steps. If not, continue with [Step 11](#).

**Note**

Use of Node Functional View to identify at a glance, the logical signal flow in complex nodes.

- a. In node view (single-node mode) or multishelf view (multishelf mode) click the **Provisioning > WDM-ANS > Provisioning** tabs.
- b. In the Selector area, select the first fixed or reconfigurable add/drop card to be checked. Identify the power parameter and record the corresponding port and active value from the parameter list.
- c. Check the power setpoint on the ports displayed in the Port field in CTC. The add/drop cards must meet this output power setpoint per channel.
- d. Display the selected fixed or reconfigurable add/drop module in card view:
- e. Click the **Provisioning** tabs.
- f. Locate the port selected in step [b](#) in the CTC menu.

**Note**

The CTC displays the name according to the card installed.

- g. Identify the row associated to the Port. Check the value reported in Power or Power To column in CTC.
 - If the card value matches the VOA Power Ref. cell or the recorded Power value, with +/- 1 dB of tolerance, continue with [Step 11](#).

**Note**

VOA Power Ref at card level must be equal to the Power Active Value recorded in step [b](#). If not, go back to Node view and click the ANS button. Then repeat this procedure.

- If the value is out of tolerance range from the VOA Power Ref, contact your next level of support.

Step 11

Display the circuit source node in node view (single-shelf mode), or shelf view (multishelf mode). Following the signal flow, if an amplifier card is installed, complete the following steps.

**Note**

Use of Node Functional View to identify the logical signal flow in complex nodes at a glance.

If not, continue with [Step 12](#).

- a. In node view (single-node mode) or multishelf view (multishelf mode) click the **Provisioning > WDM-ANS > Provisioning** tabs.
- b. In the Selector area, click the amplifier card to be checked. Identify the power parameter and record the corresponding port and active value from the parameter list.

- c. Check the power setpoint on the ports displayed in the Port field in CTC. The add/drop cards must meet this output power setpoint per channel.
- d. Display the selected amplifier in card view.
- e. Click the **Provisioning > Opt.Ampli.Line > Parameters** tabs. Identify the row associated to the Port selected in step b. Check the signal output power value.
 - If the value is equal to or greater (due to ASE accumulation) than the value shown in the Channel Power Ref cell, continue with [Step 12](#).



Note Channel Power Reference at card level must be equal to the Power Active Value noted in step b. If not, go back to Node view and click the ANS button. Then repeat this procedure.

- If the value is lower than the value shown in the Channel Power Reference cell, contact your next level of support.

Step 12 Go to the Edit Circuit dialog box and move to the next intermediate node in node view (single-shelf mode), or shelf view (multishelf mode). Following the signal flow, repeat [Step 10](#) and [Step 11](#) in order to check fixed or reconfigurable add/drop cards and amplifiers cards.

When all the intermediate nodes have been checked, move to [Step 13](#) to verify the destination node.

Step 13 Display the Destination node in node view (single-shelf mode), or shelf view (multishelf mode). Following the signal flow, if an amplifier card is installed, complete the power levels check according with [Step 11](#).

Complete the power level verification on the fixed or reconfigurable add/drop card that is dropping the signal using the following steps:

- a. In node view (single-node mode) or multishelf view (multishelf mode) click the **Provisioning > WDM-ANS > Provisioning** tabs.
- b. In the Selector area, click the last fixed or reconfigurable drop card to be checked. Identify the drop power parameter among the optical parameters and record the correspondent Port and Active Value.
- c. Check the power setpoint on the ports displayed in the Port field in CTC. The cards must meet this Drop Power setpoint per channel.
- d. Display the selected fixed or reconfigurable add/drop module in card view.
- e. Click the **Provisioning** tabs.
- f. Locate the port selected in step b in the CTC menu.



Note The CTC displays the name according to the card installed.

- g. Identify the row associated to the Port. Check the value reported in Power or Power To column in CTC.
 - If the card value matches the VOA Power Ref. cell (when present) or the recorded Power Drop value, with +/- 2 dB of tolerance, continue with [Step 14](#).



Note VOA Power Ref at card level must be equal to the Power Drop Active Value recorded in step b. If not, go back to Node view and click the ANS button. Then repeat this procedure.

- If the value is out of tolerance range from the VOA Power Ref, contact your next level of support.

- Step 14** Check the received power range on TXP, MXP, or line cards:
- Navigate to the node where the first TXP, MXP, or line card is installed.
 - Display the TXP, MXP, or line card in card view.
 - Complete the “[DLP-G136 Clear Selected PM Counts](#)” task on page 9-7.
 - Click the **Performance > Optics PM** tabs.
 - Record the values shown in the RX Optical Pwr field.
 - Click the **Provisioning > Optics Thresholds** tabs.
 - Verify that the value in Step e falls between the values shown for the RX Power High and RX Power Low. If so, continue with [Step 15](#). If not, complete one of the following.
 - Power lower than range—Clean the trunk fiber at the patch panel and on the TXP or MXP card. Repeat Steps e through g. If the power is still too low, contact your next level of support.
 - Power higher than range—Add attenuation to the fiber and repeat Steps e through g. If the power still does not fall within the range, contact your next level of support.
- Step 15** Perform a short-term bit error rate (BER) test:
- Complete the “[DLP-G136 Clear Selected PM Counts](#)” task on page 9-7 for the TXP, MXP, or line card.
 - Display the TXP, MXP, or line card in card view.
 - Click the **Performance > Payload PM** tabs, or, if OTN is provisioned, the **Performance > OTN PM** tabs.
 - Perform a short-term BER test using a test signal from a test set or protocol analyzer.
 - Monitor the payload performance monitoring (PM) for at least 10 minutes for errors.



Note To see an accurate PM count, the BER test results must be consistent with the transmitted bit rate for at least 10 minutes.



Note For information about using a test set or protocol analyzer, see the test set or protocol analyzer user guide.

- Step 16** Create a new OCHNC or OCHCC circuit for the next ITU wavelength listed in the Cisco Transport Planner Traffic Matrix and perform one of the following tasks:
- If the new circuit optical path is not including nodes different from those the first circuits belongs to, perform only steps from [Step 13](#) to [Step 15](#).
 - If the new circuit optical path includes new nodes, do the proper optical checks:
 - [Step 10](#) and [Step 11](#) if the new node is the Source node
 - [Step 12](#) if the new nodes are intermediate nodes
 - [Step 13](#) if the new node is the destination node

Stop. You have completed this procedure.

NTP-G56 Verify the OSNR

Purpose	This procedure verifies the optical signal-to-noise ratio (OSNR). The OSNR is the ratio between the signal power level and the noise power level.
Tools/Equipment	Optical spectrum analyzer
Prerequisite Procedures	DLP-G46 Log into CTC, page 3-30
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 at an ONS 15454 on the network.

Step 2 Using an optical spectrum analyzer, check the received OSNR for each transmitted channel on both ends of the span. Identify the last OSC-CSM, OPT-PRE, or OPT-BST MON port that the channel passes through before it is dropped.



Note The OPT-PRE reference also applies to the OPT-AMP-17-C card operating in OPT-PRE mode and the OPT-BST reference also applies to the OPT-AMP-17-C card operating in OPT-LINE mode.

Step 3 If OPT-PRE cards are installed with an OPT-BST, OPT-BST-E, or OSC-CSM card, use the OPT-PRE MON port.



Note For OSNR values for each card class, see Chapter 4, “Optical Amplifier Cards.”

Step 4 If the OSNR is too low, check the following, depending on your node configuration:



Note The purpose of this step is not to improve the signal-to-noise ratio (SNR), but to match the per-channel power level within the RX port power range.

- Check the fiber connections between the OPT-BST, OPT-BST-E, or OSC-CSM card and the OPT-PRE amplifier. If needed, clean the connectors. See the “[NTP-G115 Clean Fiber Connectors](#)” procedure on page 14-31.
- On the near-end OPT-BST amplifier, check the equalization of the added channels at the monitor output.
- On the OPT-PRE amplifier, check the output power on both COM TX and DC TX ports.
- On the far-end OPT-PRE amplifier, check the amplifier gain tilt at the monitor output.

If the OSNR is still too low, contact your next level of support.

Step 5 Repeat Steps 2 and 4 for all traffic in the network.

Stop. You have completed this procedure.

NTP-G142 Perform a Protection Switch Test

Purpose	This procedure tests the optical path, client TXP, MXP, GE_XP and GE_XPE (when provisioned in 10GE or 20GE MXP mode), 10GE_XP and 10GE_XPE (when provisioned in 10GE TXP mode), and OTU2_XP (when provisioned in TXP mode) cards and the Y-cable protection groups in your network for proper operation. The test signals can be generated by either the actual client device or a test set (whichever is available). We recommend that you repeat this test at each node in the network where protection group traffic is dropped.
Tools/Equipment	A list of protection groups. This information is provided in the Cisco Transport Planner Traffic Matrix. A test set or actual client device that provides the required payload for the circuits that are provisioned.
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite; personnel are required to be on site at each end of the circuit under test.
Security Level	Provisioning or higher

-
- Step 1** Complete the [“DLP-G46 Log into CTC” task on page 3-30](#) at an ONS 15454 on the network.
- Step 2** Identify the Y-cable circuit to be tested by viewing the Traffic Matrix for your site. Locate the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards in the ONS 15454 node that will be used for the protection group.
- Step 3** Verify that the Y-cable protection group is provisioned:
- In node view (single-node mode) or multishelf view (multishelf mode), click the **Provisioning > Protection** tabs.
 - In the Protect and Working areas, confirm that the correct TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards are in the Y-cable protection group by viewing the slot number and card type.
 - If the required protection group is not provisioned, stop and perform the [“NTP-G33 Create a Y-Cable Protection Group” procedure on page 6-21](#). Otherwise, continue with [Step 4](#).
- Step 4** Repeat [Step 3](#) for each Y-cable protection group at the node. When all protection groups are verified, continue with the next step.
- Step 5** Physically connect the transmitter of the client or test set to either Port 10 or Port 12 of the Y-cable module protecting the test circuit. (See [Table 4-7 on page 4-111](#) and [Table 4-8 on page 4-111](#).)
- Step 6** If you connected the transmitter to Port 10, connect the client or test set receiver to Port 5 on the Y-cable module. If not, connect the client or test set receiver to Port 11 on the Y-cable module.
- Step 7** At the far-end site for the test circuit, physically loop the Y-cable module as follows:
- If this is the first client on the Y-cable module, loop Port 10 to Port 5 on the far-end Y-cable module.
 - If this is the second client on the Y-cable module, loop Ports 11 and 12 on the far-end Y-cable module.
- Step 8** At the near-end site for the test circuit, place the client device or test set into service and begin transmitting the required payload.

- Step 9** In CTC, display the near-end site in node view (single-node mode) or multishelf view (multishelf mode).
- Step 10** Click the **Maintenance > Protection** tabs.
- Step 11** In the Protection Groups area, highlight the protection group to be tested.
- Step 12** In the Selected Group area, identify the active slot and the standby slot.
- Step 13** Verify that the LEDs on the physical cards in the shelf match the following:
- a. For the active TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card, record the slot number: _____. Verify that the port LEDs appear as follows:
 - DWDM port is green.
 - Client port is green.
 - b. For the standby TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card, record the slot number: _____. Verify that the port LEDs appear as follows:
 - DWDM port is green.
 - Client port is not illuminated or amber, depending on the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card.
- Step 14** In the Selected Group area, highlight the active TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP slot.
- Step 15** From the Switch Commands area below the Selected Group area, click **Manual**, then click **YES**.
- Step 16** From the Selected Group area, record the following information and verify that the active and standby TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP slot numbers are the opposite of [Step 13](#).
- a. For the active TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card, record the slot number: _____. Verify that the port LEDs appear as follows:
 - DWDM port is green.
 - Client port is green.
 - b. For the standby TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card, record the slot number: _____. Verify that the port LEDs appear as follows:
 - DWDM port is green.
 - Client port is not illuminated or amber, depending on the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card.
- Step 17** Verify that the LEDs on the physical cards in the shelf match the following:
- a. For the active TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP slot LEDs:
 - DWDM port is green.
 - Client port is green.
 - b. For the standby TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP slot LEDs:
 - DWDM port is green.
 - Client port is not illuminated.
- Step 18** Confirm that the client or test set at the local site is operating normally without alarms. If the test set is reporting active alarms, contact your next level of support.



Note It is normal to see a traffic hit on the test set during a protection switch.

- Step 19** From the Switch Commands area below the Selected Group area, click **Clear**, then click **YES** to return the protection group to the original state.
- Step 20** Repeat Steps 5 through 19 for each protection group at your site.
- Stop. You have completed this procedure.**
-

NTP-G164 Configure Link Management Protocol

Purpose	This procedure configures Link Management Protocol (LMP). LMP manages the channels and links that are required between nodes for routing, signaling, and link management.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up, page 7-2
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

This procedure is normally required only when the Cisco ONS 15454 must run traffic to and from a Calient PXC or a Cisco CRS-1 router.



Note

Cisco ONS Software Release 9.1 and later supports only Cisco CRS-1 router using Cisco IOS XR Software Release 3.9.0. If you have an earlier version of the Cisco IOS XR software, you cannot configure LMP on the Cisco CRS-1 router, and the router will be visible as an unknown node in the CTC network view.

- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to the ONS 15454 on the network.
- Step 2** To enable LMP, complete the “[DLP-G372 Enable LMP](#)” task on page 7-36.
- Step 3** To set up one or more control channels, complete the “[DLP-G373 Create, Edit, and Delete LMP Control Channels](#)” task on page 7-36.
- Step 4** To set up one or more traffic engineering (TE) links, complete the “[DLP-G374 Create, Edit, and Delete LMP TE Links](#)” task on page 7-39.
- Step 5** To set up one or more data links, complete the “[DLP-G378 Create, Edit, and Delete LMP Data Links](#)” task on page 7-40.

Stop. You have completed this procedure.

DLP-G372 Enable LMP

Purpose	This task enables the LMP function on the ONS 15454 node.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

-
- Step 1** In node view, click the **Provisioning > Comm Channels > LMP > General** tabs.
- Step 2** In the Configuration area, click the **Enable LMP** check box to enable the LMP function.
- Step 3** In the Local Node Id text entry box, enter the local node ID in the form of an IP address.



Note Do not set the LMP Local Node ID to another IP address in use on the network. This introduces a duplicate IP address in the network for traffic going to the IP address that is used as the LMP Local Node ID. We recommended to you set the LMP Local Node ID to the node's IP address, because this does not introduce a duplicate IP address in the network.

-
- Step 4** If you are going to use LMP to manage a control channel between a Calient PXC node and a Cisco ONS 15454 DWDM node or between a Cisco CRS-1 router and Cisco ONS 15454 DWDM node, ensure that the LMP-WDM check box is unchecked.
- Step 5** If you are going to use LMP to manage a control channel between the ONS 15454 nodes, check the LMP-WDM check box and use the Role field to choose one of the following roles:
- PEER, to use LMP to manage links between two nodes where the other node is configured as OLS.
 - OLS, to use LMP to manage links between two nodes where the other node is configured as PEER.
- The role selection is available only when LMP-WDM is enabled on the local node. Both the local and remote nodes must be configured with LMP-WDM enabled.
- Step 6** Click **Apply**.
- Step 7** In the Status area, verify that the Operational State is Up. This indicates that LMP is enabled and the link is active.
- Step 8** Return to your originating procedure (NTP).
-

DLP-G373 Create, Edit, and Delete LMP Control Channels

Purpose	This task creates, edits, or deletes one or more LMP control channels between pairs of Cisco ONS 15454 nodes, between a Calient PXC and a Cisco ONS 15454, or between a Cisco CRS-1 router and a Cisco ONS 15454.
Tools/Equipment	None
Prerequisite Procedures	DLP-G372 Enable LMP, page 7-36

Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view, click the **Provisioning > Comm Channels > LMP > Control Channels** tabs.

Step 2 To create a control channel, click **Create**. The Create LMP Control Channel dialog box appears.

**Note**

The values of the Admin State, Requested Hello Interval, Min Hello Interval, Max Hello Interval, Requested Hello Dead Interval, Min Hello Dead Interval, and Max Hello Dead Interval fields correspond to the values specified for these fields in the **NODE > Imp** section of the node view **Provisioning > Defaults** tabs. If you change the **NODE > Imp** values, those values are reflected as defaults in the Create LMP Control Channel dialog box. You can change the default values using the dialog box. However, the **NODE > Imp** values are always used as the initial defaults.

Step 3 In the Create LMP Control Channel dialog box, complete the following:

- **Admin State**—Select **unlocked** (if you are using an ETSI shelf) or **IS** (if you are using an ANSI shelf) to establish the control channel; otherwise, select **locked, disabled** (ETSI) or **OOS-DSBLD** (ANSI) to set the control channel to out of service.
- **Local Port**—Select **Routed** if the control channel is to be sent over the control plane or management network; otherwise, if the control channel is to be sent over the same fiber as the traffic (either in the payload or in the overhead), select one of the available traffic ports.
- **Local Port Id**—(Display only) Displays the local port identifier assigned by the node.
- **Remote Node Type**—Select **15454 or non-CRS1** if you are creating a control channel between two Cisco ONS 15454 nodes or between a Calient PXC and a Cisco ONS 15454 node; otherwise, select **CRS-1** if you are creating a control channel between a Cisco CRS-1 router and a Cisco ONS 15454 node.
- **Remote Node Address**—In dotted-decimal format, enter the number that identifies the IP address of the remote node (either a Calient PXC peer node, a Cisco CRS-1 router, or a Cisco ONS 15454 node) where the control channel will be established.
- **Remote Node ID**—Initially, CTC autopopulates this value to the remote node IP address that you just assigned. However, you can change the identifier to any nonzero 32-bit integer in dotted decimal format (for example, 10.92.29.10).
- **Requested Hello Interval**—Enter the Requested Hello Interval in milliseconds (ms). Before sending Hello messages, the Hello Interval and Hello Dead Interval parameters must be established by the local and remote nodes. These parameters are exchanged in the Config message. The Hello Interval indicates how frequently LMP Hello messages will be sent; the interval must be in the 300 ms to 5000 ms range. The Min Hello Interval must be less than or equal to the Requested Hello Interval, and the Requested Hello Interval must be less than or equal to the Max Hello Interval.
- **Min Hello Interval**—Enter the minimum Hello Interval in milliseconds. When the two nodes negotiate for the Hello Interval, the value that you enter here will be the minimum Hello Interval acceptable for the local node. The Min Hello Interval must be in the 300 ms to 5000 ms range. The Min Hello Interval must be less than or equal to the Requested Hello Interval and the Requested Hello Interval must be less than or equal to the Max Hello Interval.

- **Max Hello Interval**—Enter the maximum Hello Interval in milliseconds. When the two nodes negotiate for the Hello Interval, the value that you enter here will be the maximum Hello Interval acceptable for the local node. The Max Hello Interval must be in the 300 ms to 5000 ms range. The Min Hello Interval must be less than or equal to the Requested Hello Interval and the Requested Hello Interval must be less than or equal to the Max Hello Interval.
- **Requested Hello Dead Interval**—Enter the Requested Hello Dead Interval in milliseconds. The Requested Hello Dead Interval indicates how long a device should wait to receive a Hello message before declaring a control channel dead. The Requested Hello Dead interval must be in the 2000 ms to 20000 ms range. The Min Hello Dead Interval must be less than or equal to the Requested Hello Dead Interval and the Requested Hello Dead Interval must be less than or equal to the Max Hello Dead Interval.



Note The Requested Hello Dead Interval must be at least three times greater than the Requested Hello Interval.

- **Min Hello Dead Interval**—Enter the minimum Hello Dead Interval in milliseconds. The minimum Hello Dead Interval must be in the 2000 ms to 20000 ms range. The minimum Hello Dead Interval must be less than or equal to the Requested Hello Dead Interval and the Requested Hello Dead Interval must be less than or equal to the Max Hello Dead Interval. When the two nodes negotiate for the Hello Dead Interval, the value that you enter here will be the minimum Hello Dead Interval acceptable for the local node.



Note The value of the Min Hello Dead Interval must be greater than the Min Hello Interval.

- **Max Hello Dead Interval**—Enter the maximum Hello Dead Interval in milliseconds. This interval must be in the 2000 ms to 20000 ms range. The Min Hello Dead Interval must be less than or equal to the Requested Hello Dead Interval and the Requested Hello Dead Interval must be less than or equal to the Max Hello Dead Interval. When the two nodes negotiate for the Hello Dead Interval, the value that you enter here will be the maximum Hello Dead Interval acceptable for the local node.



Note The Max Hello Dead Interval must be greater than the Max Hello Interval.

- Step 4** Click **OK** to accept the parameters that you have entered, or click **Cancel** to return to the Control Channels tab without creating a control channel.
- Step 5** If you have chosen the Remote Node Type as CRS-1 in [Step 3](#) and if you have chosen that automatic LMP configuration in the “[DLP-G508 Configure the Cisco CRS-1 Router Parameters](#)” task on [page 7-44](#), a confirmation dialog box is displayed to indicate that this operation will also change the configuration of the Cisco CRS-1 router. Click **Yes**.
- Step 6** If you created a control channel, verify that the parameters for the new Control Channel appear properly in the Control Channels tab.



Note The Actual Hello Interval and Actual Hello Dead Interval parameters reflect the values of these parameters as a result of the negotiated agreement of the local and remote nodes. They may be different than the requested values.

- Step 7** After the LMP control channel has been created, observe the status of the channel in the Operational State column of the Control Channels tab, and take the appropriate action as shown in the following list:

- Up—The control channel contacted the far-end node and successfully negotiated a control channel.
 - Down—LMP is enabled and the link is inactive. Ensure that the Admin State of the control channel is unlocked (ETSI) or IS (ANSI) and not disabled (ETSI) or OOS-DSBLD (ANSI). If the state still does not transition to Up, the far-end control channel might have disjointed Hello negotiation times that prevent a control channel from transitioning to the Up state. For example, the local ONS 15454 Min Hello Interval and Max Hello Interval might be 900 to 1000, while the remote Min Hello Interval and Max Hello Interval is 1100 to 1200.
 - Config Send—The connection could not be made to the remote node. Check to make sure that the remote node address and remote node ID addresses are correct.
 - Config Received—The local node sent a configuration request to the remote node and received a response of either ConfigNack or ConfigAck.
 - Unknown
- Step 8** To delete a control channel, click the channel row to highlight it and click **Delete**. A confirmation dialog box appears that allows you to click **OK** or **Cancel**.
- Step 9** To edit a control channel, click the channel row to highlight it and click **Edit**. A dialog box appears that allows you to change the control channel parameters. You can then click **OK** or **Cancel**. If you are editing a control channel that involves a Cisco CRS-1 router, a confirmation dialog box is displayed. Click **Yes**.
- Step 10** Return to your originating procedure (NTP).

DLP-G374 Create, Edit, and Delete LMP TE Links

Purpose	This task creates, edits, or deletes TE links and their association to neighboring LMP nodes.
Tools/Equipment	None
Prerequisite Procedures	DLP-G372 Enable LMP, page 7-36
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

- Step 1** In node view, click the **Provisioning > Comm Channels > LMP > TE Links** tabs.
- Step 2** To create a TE link, click **Create**. The Create LMP TE Link dialog box appears.
- Step 3** In the Create LMP TE Link dialog box, complete the following:
- Admin State—Select **unlocked** (for ETSI shelves) or **IS** (for ANSI shelves) to put the TE link in service; otherwise, select **locked, disabled** (ETSI) or **OOS-DSBLD** (ANSI) to set the TE link to out of service.
 - Remote Node Id—Select a remote node (either a Calient PXC peer node, a Cisco CRS-1 router, or a Cisco ONS 15454 node) for the other end of the TE link.
 - Remote TE Link Id—Enter an unsigned 32-bit value (such as 0x00000001) to identify the remote node identifier for the other end of the TE link. This option is not available if you have chosen the automatic LMP configuration in “[DLP-G508 Configure the Cisco CRS-1 Router Parameters](#)” task on page 7-44.

- MUX Capability—Select the MUX capability. This option is not available if you are creating a TE link that involves a Cisco CRS-1 router.
- Step 4** Click **OK** to accept the parameters that you have entered and create the TE link, or click **Cancel** to return to the Control Channels tab without creating a TE link.
- Step 5** If you created a TE link, verify that the parameters for the new TE link now appear properly in the TE Links tab.
- Step 6** After the TE link has been created, observe the status of the TE link in the Operational State column of the TE Links pane, and take the appropriate action as shown in the following list:
- Up—The TE link is active.
 - Down—Ensure that the Admin State of the TE link is unlocked (ETSI) or IS (ANSI) and not disabled (ETSI) or OOS-DSBLD (ANSI). The TE link does not transition to the Up state until a data link has been provisioned.
 - Init—Verify that the Remote Node ID and Remote TE Link ID values are correct for the remote node. Verify that the remote node is using the Cisco ONS 15454 or the Cisco CRS-1 router IP address for its remote node IP and that the remote node is using the local TE link index for its remote TE link index.
- Step 7** To delete a TE link, click the link row to highlight it and click **Delete**. A confirmation dialog box appears that allows you to click **OK** or **Cancel**.
- Step 8** To edit a TE link, click the link row to highlight it and click **Edit**. A dialog box appears that allows you to change the TE link parameters. You can then click **OK** or **Cancel**.
- Step 9** Return to your originating procedure (NTP).

DLP-G378 Create, Edit, and Delete LMP Data Links

Purpose	This task creates, edits, or deletes one or more data links, which define the node's transport parameters. CTC supports up to 256 LMP data links.
Tools/Equipment	None
Prerequisite Procedures	NTP-G54 Provision and Verify a DWDM Network, page 7-27 DLP-G372 Enable LMP, page 7-36
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

A port cannot be deleted if it is being used by a data link. A card cannot be deleted if any of its ports are being used by data links. Changing the state of the port impacts the state of a data link using the port.

- Step 1** In node view, click the **Provisioning > Comm Channels > LMP > Data Links** tabs.
- Step 2** To create a data link, click **Create**. The Create LMP Data Link dialog box appears.
- Step 3** In the Create LMP Data Link dialog box, complete the following:
- Local Port—Select one of the available local ports for the data link.
 - Local Port Id—(Display only) Displays the local port identifier.

- **Data Link Type**—Select **Port** or **Component**. A data link is considered to be either a port or a component link on each node where it terminates, depending on the multiplexing capability of the endpoint on that link; component links are multiplex capable, whereas ports are not multiplex capable.
 - **Local TE Link Id**—Select an identifier for one of the local TE links that has already been created.
 - **Remote CRS Port Id**—Select one of the available remote Cisco CRS-1 ports for the data link. This option is not available if you are creating a data link between two Cisco ONS 15454 nodes.
 - **Remote Port Id**—Enter an unsigned 32-bit value (such as 0x00000001) to identify the remote node identifier for the other end of the data link. This option is not available if you have chosen the automatic LMP configuration in the [“DLP-G508 Configure the Cisco CRS-1 Router Parameters” task on page 7-44](#).
- Step 4** Click **OK** to accept the parameters you have entered and create the data link, or click **Cancel** to return to the Data Links tab without creating a data link.
- Step 5** If you are creating a data link that involves a Cisco CRS-1 router and if you have chosen the automatic LMP configuration in the [“DLP-G508 Configure the Cisco CRS-1 Router Parameters” task on page 7-44](#), a confirmation dialog box is displayed to indicate that this operation will also change the configuration of the Cisco CRS-1 router. Click **Yes**.
- Step 6** If you created a data link, verify that the parameters for the new data link now appear properly in the Data Links tab.
- Step 7** After the data link has been created, observe its status in the Operational State column of the Data Links tab, and take the appropriate action as shown in the following list:
- **Up–Alloc or Up–Free**—If the data link state does not transition to Up–Alloc or Up–Free, verify that the port is in service. Verification must be done using the CTC card view > Provisioning tab for the cards. (The difference between Up–Alloc and Up–Free is that an Up–Alloc data link is allocated for data traffic. An Up–Free data link is not allocated for traffic. The far end is either not ready to receive traffic through this port, or the path is being used as a backup in case some other allocated data link goes down).
 - **Down**—The data link will be in the Down state if the port is not unlocked or not in-service. Verify that the remote port ID for the far-end data link is correct. On the far end, verify that the data link is using the local port ID as its remote port ID.
- Step 8** To delete a data link, click the data link row to highlight it and click **Delete**. A confirmation dialog box appears that allows you to click **OK** or **Cancel**.
- Step 9** To edit a data link, click the data link row to highlight it and click **Edit**. A dialog box appears that allows you to change the data link parameters. You can then click **OK** or **Cancel**. If you are editing a data link that involves a Cisco CRS-1 router, a confirmation dialog box is displayed. Click **Yes**.
- Step 10** Return to your originating procedure (NTP).
-

NTP-G233 Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node

Purpose	This procedure configures LMP on the Cisco ONS 15454 DWDM node and on the corresponding Cisco CRS-1 physical layer interface module (PLIM) port.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up, page 7-2
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note This procedure is normally required only when the Cisco ONS 15454 DWDM node must run traffic to and from a Cisco CRS-1 router.

-
- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to a DWDM node on the network.
- Step 2** Complete the “[DLP-G508 Configure the Cisco CRS-1 Router Parameters](#)” task on page 7-44 to configure the CRS-router parameters.
- Step 3** Complete the “[DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration](#)” task on page 7-45 to establish a Telnet session with the Cisco CRS-1 router.
- Step 4** Complete the “[DLP-G510 Create a Task Group, User Group, and User Account on the Cisco CRS-1 Router](#)” task on page 7-46 to create task groups, user groups, and user accounts on the Cisco CRS-1 router.
- Step 5** If you have chosen the automatic LMP configuration in [Step 2](#), complete the “[NTP-G234 Automatically Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node](#)” procedure on page 7-42.

If you have chosen the manual LMP configuration in [Step 2](#), complete the “[NTP-G207 Manually Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node](#)” procedure on page 7-43.

Stop. You have completed this procedure.

NTP-G234 Automatically Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node

Purpose	This procedure automatically configures LMP on the Cisco ONS 15454 DWDM node and on the corresponding Cisco CRS-1 PLIM port.
Tools/Equipment	None

Prerequisite Procedures [NTP-G233 Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-42](#)

Required/As Needed As needed

Onsite/Remote Onsite or remote

Security Level Provisioning or higher

-
- Step 1** Complete the [DLP-G372 Enable LMP, page 7-36](#) to enable the LMP function on the DWDM node.
- Step 2** Complete the [DLP-G373 Create, Edit, and Delete LMP Control Channels, page 7-36](#) to create the LMP control channel between the Cisco CRS-1 router and the DWDM node.
- Step 3** Complete the [DLP-G374 Create, Edit, and Delete LMP TE Links, page 7-39](#) to create TE links between the Cisco CRS-1 router and the DWDM node.
- Step 4** Complete the [DLP-G378 Create, Edit, and Delete LMP Data Links, page 7-40](#) to create a data link, which define the node's transport parameters.

Stop. You have completed this procedure.

NTP-G207 Manually Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node

Purpose This procedure manually configures LMP on the Cisco ONS 15454 DWDM node and on the corresponding Cisco CRS-1 PLIM port.

Tools/Equipment None

Prerequisite Procedures [NTP-G233 Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-42](#)

Required/As Needed As needed

Onsite/Remote Onsite or remote

Security Level Provisioning or higher



Note For more information about the Cisco IOS XR commands used in the DLPs, see the *Cisco IOS XR Command Reference* publication at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

- Step 1** Complete the [DLP-G372 Enable LMP, page 7-36](#) to enable the LMP function on the DWDM node.
- Step 2** Complete the [DLP-G373 Create, Edit, and Delete LMP Control Channels, page 7-36](#) to create the LMP control channel between the Cisco CRS-1 router and the DWDM node.
- Step 3** Complete the [DLP-G374 Create, Edit, and Delete LMP TE Links, page 7-39](#) to create TE links between the Cisco CRS-1 router and the DWDM node.
- Step 4** In node view, click the **Provisioning > Comm Channels > LMP > TE Links** tab and write down the value of the **Local TE Link** field so that it can be used later.
- Step 5** Complete the [DLP-G378 Create, Edit, and Delete LMP Data Links, page 7-40](#) to create a data link, which define the node's transport parameters.

- Step 6** In node view, click the **Provisioning > Comm Channels > LMP > Data Links** tab and write down the value of the **Local Port Id** field so that it can be used later.
- Step 7** Complete the [DLP-G482 Configure a Static Route, page 7-49](#) to configure a static route.
- Step 8** Complete the [DLP-G483 Configure Local and Remote TE Links, page 7-50](#) to configure the local and remote TE links.
- Step 9** Complete the [DLP-G484 Enable the LMP Message Exchange, page 7-52](#) to enable LMP message exchange with the LMP neighbor.
- Step 10** In node view, click the **Provisioning > Comm Channels > LMP > Data Links** tab and from the **Local Port** field, write down the card and the port involved in the LMP link. Double-click the card involved in the LMP link. In card view, click the **Provisioning > Optical Chn > Parameters** tabs and write down the value of the **Actual Wavelength** field for the port involved in the LMP link.
- Step 11** Complete the [DLP-G511 Configure the Wavelength on the Cisco CRS-1 Router, page 7-53](#) to configure the wavelength on the PLIM port of the Cisco CRS-1 router.
- Step 12** If you need RADIUS AAA services, complete the [DLP-G494 Configure the RADIUS Server, page 7-55](#) to configure a RADIUS server.
- Step 13** Complete the [DLP-G485 Enable Index Persistency on an SNMP Interface, page 7-56](#) to enable index persistency on an SNMP interface.
- Step 14** Complete the [DLP-G486 Configure the LMP Router ID, page 7-57](#) to configure LMP router ID.
- Step 15** Complete the [DLP-G487 Configure the 10 Gigabit Ethernet \(GE\) or POS Interface, page 7-58](#) to configure an interface and specify the IPv4 address for the interface.



Note Only users with proper task privileges, or a system administrator, can perform DLP-G482, DLP-G483, DLP-G484, DLP-G494, DLP-G485, and DLP-G486. The task privileges required to perform these DLPs are similar to the privileges required for automatic LMP configuration.

- Step 16** Complete the [DLP-G488 Display Summary of Link Management Information, page 7-59](#) to display the interface resource or a summary of link management information.
- Step 17** Complete the [DLP-G374 Create, Edit, and Delete LMP TE Links, page 7-39](#) to edit the TE link created in [Step 3](#). Change the Remote TE Link ID value to the value (Local TE Link ID) noted in [Step 1](#) of the [DLP-G488 Display Summary of Link Management Information, page 7-59](#).
- Step 18** Complete the [DLP-G378 Create, Edit, and Delete LMP Data Links, page 7-40](#) to edit the data link created in [Step 5](#). Change the Remote Port Id value to the value (Local Data Link ID) noted in [Step 1](#) of the [DLP-G488 Display Summary of Link Management Information, page 7-59](#).

Stop. You have completed this procedure.

DLP-G508 Configure the Cisco CRS-1 Router Parameters

Purpose	This task configures the Cisco CRS-1 router.
Tools/Equipment	None
Prerequisite Procedures	NTP-G54 Provision and Verify a DWDM Network, page 7-27 DLP-G372 Enable LMP, page 7-36
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

-
- Step 1** In any CTC view, from the Edit menu, choose **Preferences**.
- Step 2** In the Preferences dialog box, click the **Router** tab.
- Step 3** Skip automatic LMP configuration on routers—Leave this option unchecked if you want CTC to automatically configure an interface on the Cisco CRS-1 router for the data link. If you check this option, you must manually perform the interface configuration on the Cisco CRS-1 router.
- Step 4** In the Router login area, enter the following:
- Username—Specify the name of the user on the Cisco CRS-1 router.
 - Password—Specify the user password.
 - Confirm Password—Specify the password again to confirm it.



Note If you leave the Username and Password fields blank, the CTC login information (username and password) will be used for the Cisco CRS-1 router.

- Step 5** Click **OK**.
- Step 6** Return to your originating procedure (NTP).
-

DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration

Purpose	This task establishes a Telnet session with the Cisco CRS-1 router and verifies the node configuration, SSH, and/or XML module configuration.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

	Command or Action	Purpose
Step 1	<pre>telnet {ip-address host-name}</pre> <p>Example: router# telnet 10.58.41.169</p>	Establishes a Telnet session with the Cisco CRS-1 router. When the session is established, you can log in with the root-system username and password. After you log in, the router displays the CLI prompt for the Cisco IOS XR software.
Step 2	<pre>show install active summary</pre> <p>Example: router# show install active summary</p>	Displays a summary of the active packages in a system or secure domain router. Ensure that the output of the show install active summary command includes the following lines: hfr-mpls-3.9.x hfr-k9sec-3.9.x hfr-mgbl-3.9.x
Step 3	<pre>show running-config</pre> <p>Example: router# show running-config</p>	Displays the contents of the currently running configuration and verifies that Extensible Markup Language (XML) agent service and Secure Shell (SSH) client are installed on the Cisco CRS-1 router. Ensure that the output of the show running-config command includes the following lines: ssh server v2 ssh server session-limit <i>sessions</i> ssh server rate-limit <i>maxsessions_per_minute</i> vty-pool default <i>first-vty last-vty</i> line-template default xml agent tty If the output does not contain the above lines, check the SSH and/or XML module configuration. Refer to <i>Cisco IOS XR System Security Command Reference</i> and <i>Cisco IOS XR System Management Command Reference</i> for details about SSH and XML configuration.
Step 4	Return to your originating procedure (NTP).	—

DLP-G510 Create a Task Group, User Group, and User Account on the Cisco CRS-1 Router

Purpose	This task creates task groups, user groups, and user accounts on the Cisco CRS-1 router.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

Only users who have permission to create new task groups and configure required task privileges, or a system administrator, can perform this task.

	Command or Action	Purpose
Step 1	<code>configure terminal</code> Example: <code>router# configure terminal</code>	Enters global configuration mode.
Step 2	<code>taskgroup taskgroup-name</code> Example: <code>router# taskgroup ipodwdmop</code>	Creates a new task group and enters task group configuration submode. If you have chosen the automatic LMP configuration in the DLP-G508 Configure the Cisco CRS-1 Router Parameters, page 7-44 , perform Step 3 . If you have chosen the manual LMP configuration in the DLP-G508 Configure the Cisco CRS-1 Router Parameters, page 7-44 , perform Step 4 .
Step 3	<code>task {read write execute debug} taskid-name</code> Example: <code>router(config-tg)# task read cef</code>	Specifies a task ID to be associated with the task group named in Step 2 . Task IDs grant permission to perform certain tasks. Ensure that you specify the following task IDs to set up required privileges for the automatic LMP configuration: task read cef task read dwdm task read oui task read snmp task read static task read sysmgr task read logging task read mpls-te task read network task read interface task read basic-services task write dwdm task write ipv4 task write oui task write snmp task write static task write mpls-te task write network task write interface
Step 4	<code>task {read write execute debug} taskid-name</code> Example: <code>router(config-tg)# task read cef</code>	Specifies a task ID to be associated with the task group named in Step 2 . Task IDs grant permission to perform certain tasks. Ensure that you specify the following task IDs to set up required privileges for the manual LMP configuration: task read cef task read dwdm task read oui task read snmp task read static task read sysmgr task read logging task read mpls-te task read network task read interface task read basic-services task write interface

	Command or Action	Purpose
Step 5	end Example: router(config-tg)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 6	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 7	usergroup <i>usergroup-name</i> Example: router# usergroup ipodwdmop	Creates a new user group and enters user group configuration submode.
Step 8	taskgroup <i>taskgroup-name</i> Example: router(config-ug)# taskgroup ipodwdmop	Associates the user group named in Step 7 with the task group named in this step. The user group takes on the configuration attributes (task ID list and permissions) already defined for the entered task group.
Step 9	end Example: router(config-ug)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 10	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 11	username <i>user-name</i> Example: router# username user123	Creates a name for a new user (or identifies a current user) and enters username configuration submode. The <i>user-name</i> argument can be only one word. Spaces and quotation marks are not allowed. Note The user that you specify for this command must be the user you have specified in the DLP-G508 Configure the Cisco CRS-1 Router Parameters, page 7-44 .
Step 12	password {0 7} <i>password</i> Example: router(config-un)# password 0 passwd	Specifies a password for the user named in Step 11 . Entering 0 following the password command specifies that an unencrypted (clear-text) password follows. Entering 7 following the password command specifies that an encrypted password follows.
Step 13	group <i>group-name</i> Example: router(config-un)# group ipodwdmop	Assigns the user named in Step 11 to a user group that has already been defined through the usergroup command in Step 7 . <ul style="list-style-type: none"> • The user takes on all attributes of the user group, as defined by that user group's association to various task groups. • Each user must be assigned to at least one user group. A user may belong to multiple user groups.

	Command or Action	Purpose
Step 14	<code>end</code> Example: <code>router(config-ug)# end</code>	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 15	Return to your originating procedure (NTP).	—

DLP-G482 Configure a Static Route

Purpose	This task explains how to configure a static route.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher


Note

Only users with proper task privileges, or a system administrator, can perform this task.


Note

In the examples shown in this task, the IP address of the DWDM node is 10.58.41.22 and the IP address of the Cisco CRS-1 router is 10.58.41.169. To remove the static route configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	<code>configure terminal</code> Example: <code>router# configure terminal</code>	Enters global configuration mode.
Step 2	<code>router static</code> Example: <code>router(config)# router static</code>	Enters static router configuration mode.
Step 3	<code>address-family ipv4 unicast</code> Example: <code>router(config-static)# address-family ipv4 unicast</code>	Enters address family configuration mode while configuring static routes.

	Command or Action	Purpose
Step 4	<pre>destination-prefix prefix-mask {ip-address interface-type interface-instance}</pre> <p>Example:</p> <pre>router(config-static-afi)# 10.58.41.22/32 MgmtEth 0/RP0/CPU0/0</pre>	<p>Establishes static routes in address family configuration mode. Specify the following options for this command:</p> <ul style="list-style-type: none"> <i>destination-prefix</i>—IP route prefix for the destination (that is, DWDM node involved in the LMP link). <i>prefix-mask</i>—Prefix mask for the destination. The network mask can be specified as either a four-part, dotted-decimal address or can be indicated as a slash (/) and number. <i>ip-address</i>—(Optional) IP address of the next hop that can be used to reach that network. The IP address is required, not optional, if the interface type and number are not specified. You can specify an IP address and an interface type and interface number. <i>interface-type</i>—(Optional) Interface type. <i>interface-instance</i>—(Optional) Either a physical interface instance or a virtual interface instance. <p>Note The interface that you specify for this command must be the management interface that connects the CRS-router to the DWDM node.</p>
Step 5	<pre>end</pre> <p>Example:</p> <pre>router(config-static-afi)# end</pre>	<p>Saves configuration changes.</p> <p>When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.</p>
Step 6	Return to your originating procedure (NTP).	—

DLP-G483 Configure Local and Remote TE Links

Purpose	This task explains how to configure the local and remote TE links.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher


Note

Only users with proper task privileges, or a system administrator, can perform this task.


Note

In the examples shown in this task, the IP address of the DWDM node is 10.58.41.22 and the IP address of the Cisco CRS-1 router is 10.58.41.169. To remove the local and remote TE link configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 2	mpls traffic-eng interface <i>interface-type</i> <i>interface-instance</i> Example: router(config)# mpls traffic-eng interface TenGigE 0/1/0/1	Enables Multiprotocol Label Switching-Traffic Engineering (MPLS-TE) on an interface and enters MPLS-TE interface submode. Note The interface that you specify for this command must be the optical interface related to the PLIM port involved in the LMP link.
Step 3	lmp data-link adjacency Example: router(config-mpls-te-if)# lmp data-link adjacency	Enters the LMP neighbor adjacency configuration mode.
Step 4	neighbor <i>neighbor-name</i> Example: router(config-mpls-ouni-if-adj)# neighbor 10.58.41.22	Associates an interface with a given LMP neighbor.
Step 5	remote te-link-id unnum <i>identifier</i> Example: router(config-mpls-te-if-adj)# remote te-link-id unnum 1	Configures the LMP neighbor remote TE link ID. Note Specify the value (converted to decimal format) noted in Step 4 of NTP-G207 Manually Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-43 for the te-link-id unnum <i>identifier</i> keywords and argument.
Step 6	remote interface-id unnum <i>identifier</i> Example: router(config-mpls-te-if-adj)# remote interface-id unnum 57410	Configures the LMP neighbor remote interface identifier. Note Specify the value (converted to decimal format) noted in Step 6 of NTP-G207 Manually Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-43 for the interface-id unnum <i>identifier</i> keywords and argument.
Step 7	remote switching-capability fsc Example: router(config-mpls-te-if-adj)# remote switching-capability fsc	Configures the LMP neighbor remote TE interface switching capability.
Step 8	end Example: router(config-mpls-te-if-adj)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 9	Return to your originating procedure (NTP).	—

DLP-G484 Enable the LMP Message Exchange

Purpose	This task explains how to enable the LMP message exchange with the LMP neighbor.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note Only users with proper task privileges, or a system administrator, can perform this task.



Note In the examples shown in this task, the IP address of the DWDM node is 10.58.41.22 and the IP address of the Cisco CRS-1 router is 10.58.41.169. To remove the LMP message exchange configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 2	mpls traffic-eng signalling advertise explicit-null Example: router(config)# mpls traffic-eng signalling advertise explicit-null	Specifies that tunnels terminating on a router use explicit-null labels.
Step 3	mpls traffic-eng lmp neighbor neighbor-name Example: router(config)# mpls traffic-eng lmp neighbor 10.58.41.22	Configures or updates a new or existing LMP neighbor.
Step 4	ipcc routed Example: router(config-mpls-te-nbr-10.58.41.22)# ipcc routed	Configures a routed Internet Protocol Control Channel (IPCC) for the LMP neighbor.

	Command or Action	Purpose
Step 5	<code>remote node-id ip-address</code> Example: router(config-mpls-te-nbr-10.58.41.22)# remote node-id 10.58.41.22	Configures the remote node ID for the LMP neighbor (DWDM node).
Step 6	<code>end</code> Example: router(config-mpls-te-nbr-10.58.41.22)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 7	Return to your originating procedure (NTP).	—

DLP-G511 Configure the Wavelength on the Cisco CRS-1 Router

Purpose	This task explains how to configure the wavelength on the PLIM port of the Cisco CRS-1 router.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note Only users with proper task privileges, or a system administrator, can perform this task.



Note To remove the wavelength setting, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	<p>show controllers dwdm interface-instance wavelength-map</p> <p>Example: router# show controllers dwdm 0/1/0/0 wavelength-map</p>	<p>Displays the wavelength information of an interface.</p> <p>Note The interface that you specify for this command must be the optical interface related to the PLIM port involved in the LMP link.</p> <p>The output of the show command will include the following lines:</p> <pre>Wavelength band: C-band MSA ITU channel range supported: 3~84 03 196.00 1529.553 ----- 04 195.95 1529.944 ----- 05 195.90 1530.334 ----- 06 195.85 1530.725 -----</pre> <p>From the output of the show command, write down the channel number of the wavelength that matches that of the wavelength noted in Step 10 of NTP-G207 Manually Configure Link Management Protocol on the Cisco CRS-1 Router and the Cisco ONS 15454 DWDM Node, page 7-43.</p>
Step 2	<p>configure terminal</p> <p>Example: router# configure terminal</p>	<p>Enters global configuration mode.</p>
Step 3	<p>controller dwdm interface-instance</p> <p>Example: router(config)# controller dwdm 0/1/0/0</p>	<p>Configures the DWDM controller.</p> <p>Note The interface that you specify for this command must be the optical interface related to the PLIM port involved in the LMP link.</p>
Step 4	<p>wavelength channel-number</p> <p>Example: router(config)# wavelength 04</p>	<p>Configures a specific wavelength to the DWDM controller.</p> <p>Note The channel number that you specify for this command must be the value noted down in Step 1.</p>
Step 5	<p>end</p> <p>Example: router(config-mpls-te-nbr-10.58.41.22)# end</p>	<p>Saves configuration changes.</p> <p>When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.</p>
Step 6	<p>Return to your originating procedure (NTP).</p>	<p>—</p>

DLP-G494 Configure the RADIUS Server

Purpose	This task explains how to configure the RADIUS server.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
	For details on configuring a node for RADIUS authentication, see the DLP-G281 Configure the Node for RADIUS Authentication, page 11-64 . See the <i>User Guide for Cisco Secure ACS for Windows Server</i> for more information about configuring the RADIUS server.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note Only users with proper task privileges, or a system administrator, can perform this task.



Note In the examples shown in this task, the IP address of the RADIUS server is 10.58.39.57. To remove the RADIUS server configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	configure terminal	Enters global configuration mode.
	Example: router# configure terminal	
Step 2	radius-server host ip-address [auth-port port-number] [acct-port port-number] [key string]	Specifies the RADIUS server host.
	Example: router(config)# radius-server host 10.58.39.57 auth-port 1812 acct-port 1813 key 7 12485043475F	
Step 3	aaa group server radius group-name	Groups different RADIUS server hosts into distinct lists and enters server group configuration mode.
	Example: router(config)# aaa group server radius radgroup1	

	Command or Action	Purpose
Step 4	<pre>server ip-address [auth-port port-number] [acct-port port-number]</pre> <p>Example:</p> <pre>router(config-sg-radius)# server 10.58.39.57 auth-port 1812 acct-port 1813</pre>	Associates a particular RADIUS server with a defined server group.
Step 5	<pre>end</pre> <p>Example:</p> <pre>router(config-sg-radius)# end</pre>	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 6	<pre>configure terminal</pre> <p>Example:</p> <pre>router# configure terminal</pre>	Enters global configuration mode.
Step 7	<pre>aaa authentication login {{console default} {group group_name local none}}</pre> <p>Example:</p> <pre>router(config)# aaa authentication login default group radgroup1 local</pre>	Configures the authentication method used for login to the Virtual Firewall (VFW) application CLI.
Step 8	<pre>end</pre> <p>Example:</p> <pre>router(config-if)# end</pre>	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 9	Return to your originating procedure (NTP).	—

DLP-G485 Enable Index Persistency on an SNMP Interface

Purpose	This task explains how to enable index persistency on a Simple Network Management Protocol (SNMP) interface.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher



Note

Only users with proper task privileges, or a system administrator, can perform this task.

**Note**

To remove the index persistency configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 2	snmp-server interface <i>interface-type</i> <i>interface-instance</i> Example: router(config)# snmp-server interface TenGigE 0/1/0/1	Enables an interface to send SNMP trap notifications and enters SNMP interface configuration mode. Note The interface that you specify for this command must be the optical interface related to the PLIM port involved in the LMP link.
Step 3	index persistence Example: router(config-snmp-if)# index persistence	Enables index persistency on an SNMP interface. This command must be performed to ensure that the LMP IDs are persistent even after a system reload.
Step 4	end Example: router(config-snmp-if)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 5	Return to your originating procedure (NTP).	—

DLP-G486 Configure the LMP Router ID

Purpose	This task explains how to configure the LMP router ID.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

**Note**

Only users with proper task privileges, or a system administrator, can perform this task.

**Note**

In the examples shown in this task, the IP address of the DWDM node is 10.58.41.22 and the IP address of the Cisco CRS-1 router is 10.58.41.169. To remove the LMP router ID configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	<code>configure terminal</code>	Enters global configuration mode.
	Example: <code>router# configure terminal</code>	
Step 2	<code>mpls traffic-eng lmp router-id ip-address</code>	Configures the LMP router ID.
	Example: <code>router(config)# mpls traffic-eng lmp router-id 10.58.41.169</code>	
Step 3	<code>end</code>	Saves configuration changes.
	Example: <code>router(config)# end</code>	When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 4	Return to your originating procedure (NTP).	—

DLP-G487 Configure the 10 Gigabit Ethernet (GE) or POS Interface

Purpose	This task explains how to configure the 10 GE or POS interface.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

**Note**

Only users with proper task privileges, or a system administrator, can perform this task.

**Note**

To remove the POS interface configuration, use the **no** form of the Cisco IOS XR command. For more information about the Cisco IOS XR commands, see the *Cisco IOS XR Command Reference* at http://www.cisco.com/en/US/products/ps5845/products_product_indices_list.html.

	Command or Action	Purpose
Step 1	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 2	interface <i>interface-type</i> <i>interface-instance</i> Example: router(config)# interface TenGigE 0/1/0/1	Enters interface configuration mode. Note The interface that you specify for this command must be the optical interface related to the PLIM port involved in the LMP link.
Step 3	ipv4 point-to-point Example: router(config-if)# ipv4 point-to-point	Configures a 10 GE interface to act as a point-to-point interface. Note For a POS interface, skip this step and continue with Step 4 .
Step 4	ipv4 unnumbered <i>interface-type</i> <i>interface-instance</i> Example: router(config-if)# ipv4 unnumbered MgmtEth 0/RP0/CPU0/0	Specifies the MPLS-TE tunnel IPv4 address for the interface. Note The interface that you specify for this command must be the management interface that connects the CRS-router to the DWDM node.
Step 5	end Example: router(config-if)# end	Saves configuration changes. When you enter the end command, the system prompts you to commit the changes. Enter yes to save the configuration changes to the running configuration file and return to the EXEC mode.
Step 6	Return to your originating procedure (NTP).	—

DLP-G488 Display Summary of Link Management Information

Purpose	This task displays the interface resource or a summary of link management information.
Tools/Equipment	None
Prerequisite Procedures	DLP-G481 Establish Telnet Session with the Cisco CRS-1 Router and Verify Configuration, page 7-45
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

	Command or Action	Purpose
Step 1	<pre>show mpls traffic-eng lmp interface [interface-type interface-instance]</pre> <p>Example: <pre>router(config-if)# show mpls traffic-eng lmp interface TenGigE 0/1/0/1</pre></p>	Displays the interface resource or a summary of link management information. From the output of the show command, write down the value of the Local TE Link ID and the Local Data Link ID parameters.
Step 2	Return to your originating procedure (NTP).	—

NTP-G57 Create a Logical Network Map

Purpose	This procedure allows a Superuser to create a consistent network view for all nodes on the network, meaning that all users see the same network view on their login nodes.
Tools	None
Prerequisite Procedures	This procedure assumes that network turn-up is complete.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

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- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 at a node on the network where you want to create the network map. If you are already logged in, continue with Step 2.
- Step 2** From the View menu, choose **Go to Network View**.
- Step 3** Change the position of the nodes in the network view according to your site plan:
- Click a node to select it, then drag and drop the node icon to a new location.
 - Repeat Step a for each node that you need to position.
- Step 4** On the network view map, right-click and choose **Save Node Position** from the shortcut menu.
- Step 5** Click **Yes** in the Save Node Position dialog box.
- CTC opens a progress bar and saves the new node positions.



Note Retrieve, Provisioning, and Maintenance users can move nodes on the network map, but only Superusers can save new network map configurations. To restore the view to a previously saved version of the network map, right-click the network view map and choose **Reset Node Position**.

Stop. You have completed this procedure.

NTP-G325 View the Power Levels of Cisco ONS 15454 MSTP Nodes

Purpose	This procedure displays the power levels of the ports of the ONS 15454 MSTP nodes that traverse through an OCH or OCHNC trail using the Photonic Path Trace (PPT). The results are displayed in a histogram.
Tools	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to an ONS 15454 MSTP node on the network.

Step 2 In the network view, node view (single-node mode), multishelf view (multishelf mode), or card view click the **Circuits** tab.



Note An OCHNC or OCH trail circuit must exist on the optical path on which PPT is launched.

Step 3 Select the OCH trail and click **Edit**. The Edit Circuit window appears.

Step 4 In the Edit Circuit window, click the **Photonic Path Trace** tab.

Step 5 Click **Start** to start the PPT. The PPT creates a histogram that displays the power levels of the nodes versus the threshold levels.



Note The circuit must be in the DISCOVERED state to start the PPT.

Step 6 Click **Export** to export the data in the form of HTML.

Stop. You have completed this procedure.

NTP-G326 Provision SRLG on the Cisco ONS 15454 MSTP Network

Purpose	This procedure provisions Shared Risk Link Groups (SRLGs) for MSTP nodes and spans of the currently managed network using the SRLG management wizard. The SRLG information can be synchronized on Cisco CRS-1 routers and viewed as reports.
Tools	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

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- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to an ONS 15454 MSTP node on the network.
- Step 2** To assign, modify, delete, or reset the SRLG attributes for the nodes or links, perform the following steps:
- a. Click the **Manage SRLGs** option in the Tools > Manage IPoDWDM menu. The SRLG Management wizard appears.
 - b. Choose one of the following options from the Select Type drop-down list:
 - **Manage Node SRLG**—To add or update the node SRLGs.
 - **Manage Link SRLG**—To add or update the link SRLGs.
 - c. Click **Next**.
 - d. In the Manage SRLG page, complete the following fields:
 - If you chose the **Manage Node SRLG** option in Step b., select the node from the Node drop-down list. If you chose **Manage Link SRLG** option in Step b., select the span from the Link drop-down list.
 - In the Unique SRLG field, an SRLG number is displayed. You can edit the value. If the SRLG value already exists, a message is displayed.
To reset the SRLG value, click **Set Default**. A confirmation box is displayed. Click **Yes**.



Note The unique SRLG range is from 0 to 4294967294.

- To add an additional SRLG, type a numeric value in the Additional SRLG field and click **Add**. If the SRLG value already exists, a message is displayed.



Note A maximum of 20 SRLGs can be added to the SRLG list.

- To delete an additional SRLG, choose the value from the SRLG list and click **Delete**. To reset the value, click **Set Default**. A confirmation box is displayed. Click **Yes**.
- e. Click **Finish** to exit the wizard.

- Step 3** To view the SRLG values of the nodes and links, perform the following steps:
- To view the SRLG values for the OTS, OSC, or PPC links, go to the Network view and right-click the link, or place the mouse pointer over the link to see the SRLG value as a tooltip.
 - To view the node SRLG values, click the **Provisioning > General** tab in the node view (single-shelf mode) or shelf view (multishelf view).
- Step 4** To synchronize the SRLG information on the Cisco CRS-1 router, go to Network view, right-click the router and choose **Synchronise IPoDWDM** from the shortcut menu.
- Step 5** Complete the “[DLP-G540 View SRLG Reports](#)” section on page 7-63 to view SRLG reports.
- Stop. You have completed this procedure.**
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DLP-G540 View SRLG Reports

Purpose	This task explains how to view SRLG reports.
Tools	None
Prerequisite Procedures	NTP-G326 Provision SRLG on the Cisco ONS 15454 MSTP Network , page 7-62
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

- Step 1** Complete the “[DLP-G46 Log into CTC](#)” task on page 3-30 to log in to an ONS 15454 MSTP node on the network.
- Step 2** To view the SRLG reports, perform the following steps:
- To view the consolidated SRLG report, click the **Consolidated SRLG Report** option in the Tools > Manage IPoDWDM > SRLG Report menu. The report displays the following information:
 - Resource Name—Displays the node name or link name.
 - Resource Type—Displays the resource type (node or link).
 - Unique SRLG—Displays the unique SRLG value.
 - Additional SRLG—Displays additional SRLG values.
 - To view the detailed SRLG report, click the **Detailed SRLG Report** option in the Tools > Manage IPoDWDM > SRLG Report menu. The report displays the following information:
 - Resource Name—Displays the node name or link name.
 - Resource Type—Displays the resource type (node or link).
 - SRLG Id—Displays the SRLG value.
 - SRLG Type—Displays the SRLG type (unique or additional).
- Step 3** Return to your originating procedure (NTP).
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