CHAPTER 6

Provisioning Cards

This chapter provides instructions on how to provision a subset of Cisco Prime Optical-supported cards. For more information on card provisioning, see the NE-related documentation.

This chapter contains the following sections:

- 6.1 How Do I Provision Cards?, page 6-1
- 6.2 Common Cards, page 6-2
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6.1 How Do I Provision Cards?

Where supported, use the NE Explorer to view and provision card settings.

Step 1 Select an NE in the Domain Explorer and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the card that you want to provision.

Step 3 In the slot properties pane, click the tab or subtab that corresponds to the settings that you want to modify. For detailed information on the different tabs and subtabs available for each card, see:

- Appendix C, "Slot Properties Pane Information—Common, DWDM, Electrical, and Ethernet Cards"
- Appendix D, "Slot Property Information—FC_MR-4, FMEC, Multirate, and Optical Cards"

Step 4 Modify the settings. For drop-down lists, select an item from the list. For numerics, double-click the field and type the new number.

Step 5 Click **Apply**.

6.2 Common Cards

For the common cards supported in Prime Optical and the NEs that contain common cards, see C.1 Common Cards, page C-1.

6.3 DWDM Cards

For the DWDM cards supported in Prime Optical and the NEs that contain DWDM cards, see C.2 DWDM Cards, page C-111.

6.3.1 Provisioning Pluggable Entities on DWDM Cards

Step 1 Select a CTC-based NE in the Domain Explorer tree and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the DWDM card that you want to provision and click the **PPM** tab.

Step 3 Click **Create**. Depending on the selection context, one of the following dialog boxes opens; fields vary accordingly:

- Create PPM
- Create Port

Step 4 In the PPM No. field, select the PPM number from the drop-down list.

Step 5 In the PPM Type field, select the type of PPM from the drop-down list. (This field is not visible in the Create Port dialog box.)

Step 6 In the Port Rate field, select the port rate from the drop-down list. (This field is not visible in the Create PPM dialog box.)

Step 7 Click **OK**.

6.4 Electrical Cards

For the electrical cards supported in Prime Optical and the NEs that contain electrical cards, see C.3 Electrical Cards, page C-644.

6.4.1 Converting DS1-14 Cards from 1:1 to 1:N Protection

Note This procedure assumes that DS1-14 cards are installed in slots 1 through 6 and/or slots 12 through 17. The DS1-14 cards in slots 3 and 15, which are the protection slots, will be replaced with DS1N-14 cards. The ONS 15454 must run CTC Release 2.0 or later. The procedure also requires at least one DS1N-14 card and a protection group with DS1-14 cards.

Step 1 Select the NE in the Domain Explorer; then, choose **Configuration > NE Explorer**.

Step 2 In NE node property sheet, click the **Protection** tab.

Step 3 In the **Protection Groups** subtab, select the protection group containing slot 3 or slot 15 (where the DS1N-14 card will be installed).

Step 4 Be sure that the slot that is being upgraded is not carrying working traffic. In the **Operations** tab, look at the Protection Groups Details. The protect slot must be Protect/Standby and not Protect/Active. If the protect slot status is Protect/Active, complete the following steps to switch traffic to the working card:

a. In the Protection Group Details list, click the protect card.

b. In the Switch Commands area, click **Switch**.

The working slot should change to Working/Active and the protect slot should change to Protect/Standby. If they do not change, do not continue. Troubleshoot the working card and slot to determine why the card cannot carry working traffic.

c. In the Switch Commands area, click **Clear**.

Step 5 Repeat Step 1 to Step 4 for each protection group that you want to convert.

Step 6 Verify that no standing alarms exist for any of the DS1-14 cards that will be converted. If alarms exist that cannot be cleared, contact the next level of support.

Step 7 Click the **Protection Groups** subtab.

Step 8 Click the 1:1 protection group that contains the cards that will be moved into the new protection group.

Step 9 Click **Delete**.

Step 10 When the confirmation dialog box opens, click **OK**.

Note Deleting the 1:1 protection groups will not disrupt service. However, no protection bandwidth exists for the working circuits until the 1:N protection procedure is completed. Therefore, complete this procedure as quickly as possible.

Step 11 If needed, repeat Step 6 to Step 10 for any other protection groups.

Step 12 Physically remove the DS1-14 card from slot 3 or slot 15. This generates an improper removal alarm.

Step 13 In the node view, right-click the slot that held the removed card and choose **Delete card** from the drop-down list. Wait for the card to disappear from the node view.

Step 14 Physically insert a DS1N-14 card into the same slot.

Step 15 Verify that the card boots up properly.

Step 16 Choose **Configuration > CTC-Based SONET NEs > Equipment Inventory Table** and verify that the new card appears as a DS1N-14 card.

Step 17 Click the node view in the NE Explorer tree.

Step 18 Click the **Protection** tab; then, click the **Protection Groups** subtab.

Step 19 Click **Create**. The Create Protection Group dialog box opens.

Step 20 (Optional) In the Name field, enter a name for the protection group.

Step 21 In the Type field, choose **1:N (card)** from the drop-down list.

Step 22 In the Protect Module field, choose the protection slot from the drop-down list.

The Create Protection Group dialog box shows the protect card in the Protect Card field and the available cards in the Available Cards field.

Step 23 Verify that the DS1N-14 card appears in the Protect Card field.

Step 24 In the Available Cards list, highlight the card that will be included in the protection group. Click the arrow (>>) to move the card to the Working Cards list.

Step 25 In the Reversion Time field, choose the reversion time from the drop-down list.

Step 26 Click **OK**.

Step 27 When the confirmation dialog box opens, click **Yes**.

The protection group should appear in the Protection Groups list on the Protection subtab.

6.4.2 Converting DS3-12 Cards from 1:1 to 1:N Protection

Note This procedure assumes that DS3-12 cards are installed in slots 1 through 6 and/or slots 12 through 17. The DS3-12 cards in slots 3 and 15, which are the protection slots, will be replaced with DS3N-12 cards. The ONS 15454 must run CTC Release 2.0 or later. This procedure also requires at least one DS3N-12 card and a protection group with DS3-12 cards.

Step 1 Select the NE in the Domain Explorer; then, choose **Configuration > NE Explorer**.

Step 2 In the NE node property sheet, click the **Protection** tab.

Step 3 In the **Protection Groups** subtab, select the protection group containing slot 3 or slot 15 (where the DS3N-12 card will be installed).

Step 4 Be sure that the slot that is being upgraded is not carrying working traffic. In the **Operations** tab, look at the Protection Groups Details. The protect slot must be Protect/Standby and not Protect/Active. If the protect slot status is Protect/Active, complete the following steps to switch traffic to the working card:

a. In the Protection Group Details list, click the protect card.

b. In the Switch Commands area, click **Switch**.

The working slot should change to Working/Active and the protect slot should change to Protect/Standby. If they fail to change, do not continue. Troubleshoot the working card and slot to determine why the card cannot carry working traffic.

c. In the Switch Commands area, click **Clear**.

Step 5 Repeat Step 1 to Step 4 for each protection group that you want to convert.

Step 6 Verify that no standing alarms exist for any of the DS3-12 cards that are being converted. If alarms exist that cannot be cleared, contact the next level of support.

Step 7 Click the **Protection Groups** subtab.

Step 8 Click the 1:1 protection group that contains the cards that will be moved into the new protection group.

Step 9 Click **Delete**.

Step 10 When the confirmation dialog box opens, click **OK**.

Note Deleting the 1:1 protection groups will not disrupt service. However, no protection bandwidth exists for the working circuits until the 1:N protection procedure is completed. Therefore, complete this procedure as quickly as possible.

Step 11 If needed, repeat Step 6 to Step 10 for each protection group.

Step 12 Physically remove the DS3-12 card from slot 3 or slot 15. This generates an improper removal alarm.

Step 13 In the node view, right-click the slot that held the removed card and choose **Delete card** from the drop-down list. Wait for the card to disappear from the node view.

Step 14 Physically insert a DS3N-12 card into the same slot.

Step 15 Verify that the card boots up properly.

Step 16 Choose **Configuration > CTC-Based SONET NEs > Equipment Inventory Table** and verify that the new card appears as a DS3N-12 card.

Step 17 Click the node view in the NE Explorer tree.

Step 18 Click the **Protection** tab; then, click the **Protection Groups** subtab.

Step 19 Click **Create**. The Create Protection Group dialog box opens.

Step 20 (Optional) In the Name field, enter a name for the protection group.

Step 21 In the Type field, choose **1:N (card)** from the drop-down list.

Step 22 In the Protect Module field, choose the protection slot from the drop-down list.

The Create Protection Group dialog box shows the protect card in the Protect Card field and the available cards in the Available Cards field.

Step 23 Verify that the DS3N-12 card appears in the Protect Card field.

Step 24 In the Available Cards list, highlight the card that will be included in the protection group. Click the arrow (>>) to move the card to the Working Cards list.

Step 25 In the Reversion Time field, choose a reversion time from the drop-down list.

Step 26 Click **OK**.

Step 27 When the confirmation dialog box opens, click **Yes**.

The protection group should appear in the Protection Groups list on the Protection subtab.

6.4.3 Converting E1-N-14 Cards from 1:1 to 1:N Protection

Note

- This procedure assumes that E1-N-14 cards are installed in slots 1 through 6 and/or slots 12 through 17. The E1-N-14 cards in slots 3 and 15, which are the protection slots, will be converted from 1:1 to 1:N protection. (E1-N-14 cards can work in 1:1 and 1:N protection schemes.)
- Be sure that the slot containing the E1-N-14 card is not carrying working traffic. Also, be sure that there are no existing alarms for the E1-N-14 card that you are converting.

Complete the following steps to convert E1-N-14 cards from 1:1 to 1:N protection:

Step 1 Select the NE in the Domain Explorer; then, choose **Configuration > NE Explorer**.

Step 2 In NE node property sheet, click the **Protection** tab.

Step 3 In the **Protection Groups** subtab, select the protection group containing slot 3 or slot 15 (where the E1-N-14 card will be installed).

Step 4 Be sure that the slot that is being upgraded is not carrying working traffic. In the **Operations** tab, look at the Protection Groups Details. The protect slot must be Protect/Standby and not Protect/Active. If the protect slot status is Protect/Active, complete the following steps to switch traffic to the working card:

a. In the Protection Group Details list, click the protect card.

b. In the Switch Commands area, click **Switch**.

The working slot should change to Working/Active and the protect slot should change to Protect/Standby. If they fail to change, do not continue. Troubleshoot the working card and slot to determine why the card cannot carry working traffic.

c. In the Switch Commands area, click **Clear**.

Step 5 Repeat Step 1 to Step 4 for each protection group that you want to convert.

Step 6 Verify that no standing alarms exist for any of the E1-N-14 cards that are being converted. If alarms exist that cannot be cleared, contact the next level of support.

Step 7 Click the **Protection Groups** subtab.

Step 8 Click the 1:1 protection group that contains the cards that will be moved into the new protection group.

Step 9 Click **Delete**.

Step 10 When the confirmation dialog box opens, click **OK**.

Note Deleting the 1:1 protection groups will not disrupt service. However, no protection bandwidth exists for the working circuits until the 1:N protection procedure is completed. Therefore, complete this procedure as quickly as possible.

Step 11 If needed, repeat Step 6 to Step 10 for each protection group.

Step 12 Click **Create**. The Create Protection Group dialog box opens.

Step 13 (Optional) In the Name field, enter a name for the protection group.

Step 14 In the Type field, choose **1:N (card)** from the drop-down list.

Step 15 Verify that the E1-N-14 card appears in the Protect Card field.

Step 16 In the Available Cards list, highlight the card that will be included in the protection group. Click the arrow (**>>**) to move the card to the Working Cards list.

Step 17 Click **OK**.

Step 18 When the confirmation dialog box opens, click **Yes**.

The protection group should appear in the Protection Groups list on the Protection subtab.

6.4.4 Converting DS3i-N-12 Cards from 1:1 to 1:N Protection

Note This procedure assumes that DS3i-N-12 cards are installed in slots 1 to 6 and/or slots 12 to 17.

Step 1 Select the NE in the Domain Explorer; then, choose **Configuration > NE Explorer**.

Step 2 In NE node property sheet, click the **Protection** tab.

Step 3 In the **Protection Groups** subtab, select the protection group containing slot 3 or slot 15 (where the DS3i-N-12 card will be installed).

Step 4 Be sure that the slot that is being upgraded is not carrying working traffic. In the **Operations** tab, look at the Protection Groups Details. The protect slot must be Protect/Standby and not Protect/Active. If the protect slot status is Protect/Active, complete the following steps to switch traffic to the working card:

a. In the Protection Group Details list, click the protect card.

b. In the Switch Commands area, click **Switch**.

The working slot should change to Working/Active and the protect slot should change to Protect/Standby. If they fail to change, do not continue. Troubleshoot the working card and slot to determine why the card cannot carry working traffic.

c. In the Switch Commands area, click **Clear**.

Step 5 Repeat Step 1 to Step 4 for each protection group that you want to convert.

Step 6 Verify that no standing alarms exist for any of the DS3i-N-12 cards that are being converted. If alarms exist that cannot be cleared, contact the next level of support.

Step 7 Click the **Protection Groups** subtab.

Step 8 Click the 1:1 protection group that contains the cards that will be moved into the new protection group.

Step 9 Click **Delete**.

Step 10 When the confirmation dialog box opens, click **OK**.

Note Deleting the 1:1 protection groups will not disrupt service. However, no protection bandwidth exists for the working circuits until the 1:N protection procedure is completed. Therefore, complete this procedure as quickly as possible.

Step 11 If needed, repeat Step 6 to Step 10 for each protection group.

Step 12 Verify that the card boots up properly.

Step 13 Click the node view in the NE Explorer tree.

Step 14 Click the **Protection** tab; then, click the **Protection Groups** subtab.

Step 15 Click **Create**. The Create Protection Group dialog box opens.

Step 16 (Optional) In the Name field, enter a name for the protection group.

Step 17 In the Type field, choose **1:N (card)** from the drop-down list.

Step 18 Verify that the DS3i-N-12 card appears in the Protect Card field.

Step 19 In the Available Cards list, highlight the card that will be included in the protection group. Click the arrow (**>>**) to move the card to the Working Cards list.

Step 20 Click **OK**.

Step 21 When the confirmation dialog box opens, click **Yes**.

The protection group should appear in the Protection Groups list on the Protection subtab.

Note When a manual OC-N protection switch is performed incorrectly, a warning message indicates that Prime Optical cannot perform the operation.

6.4.5 Resetting NE Thresholds to the Default Values

You can reset NE thresholds on electrical and optical cards.

Step 1 Select the NE in the Domain Explorer; then, choose **Configuration > NE Explorer**.

Step 2 Open the card slot property sheet for the electrical or optical card.

Step 3 Click the **Line** or **STS** tab.

Step 4 Click the threshold subtab that contains the values that you want to revert to the default.

Step 5 In the threshold subtab, click the **Reset to Default** button.

Step 6 At the confirmation prompt, click **Yes**.

6.5 Ethernet Cards

For the Ethernet cards supported in Prime Optical and the NEs that contain Ethernet cards, see C.4 Ethernet Cards, page C-825.

6.5.1 Provisioning E-Series Ethernet Ports for VLAN Membership

Caution The ONS 15305 CTC, ONS 15454 SONET, and ONS 15454 SDH propagate VLANs whenever a node appears on the same network view as another node, regardless of whether or not the nodes connect through data communication channels (DCCs). For example, if two ONS 15454 SONETs or ONS 15454 SDHs without DCC connectivity belong to the same Login Node Group, whenever CTC is launched from within this login node group, VLANs propagate from one to the other. This happens even though the ONS 15454 SONETs or ONS 15454 SDHs do not belong to the same ring.

Caution If a node is unreachable or out of service, and if the DCC connections used to reach the NE still exist, Prime Optical does not allow the deletion of a VLAN on the NE. You must delete the DCC connections before deleting a VLAN.

The ONS 15305 CTC, ONS 15327, ONS 15454 SONET, and ONS 15454 SDH allow configuration of the VLAN membership and Q-tag handling of individual Ethernet ports.

Step 1 Select an ONS 15305 CTC, ONS 15327, ONS 15454 SONET, or ONS 15454 SDH NE in the Domain Explorer tree and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the card that you want to provision and click the **VLAN** tab.

Step 3 To put a port in a VLAN, click the port and choose **Tagged** or **Untag**.

If a port is a member of only one VLAN, go to the row of that VLAN and choose **Untag** from the Port column. Choose **--** for all the other VLAN rows in that Port column. The VLAN with **Untag** selected can connect to the port, but other VLANs cannot access that port.

If a port is a trunk port, it connects multiple VLANs to an external device, such as a switch, that also supports trunking. A trunk port must have tagging (802.1Q) enabled for all the VLANs that connect to that external device. Choose **Tagged** at all VLAN rows that need to be trunked. Choose **Untag** at one or more VLAN rows in the trunk port column that do not need to be trunked; for example, the default VLAN. Each Ethernet port must be attached to at least one untagged VLAN. The following table describes the port settings.

Table 6-1 Port Settings

Setting	Description
--	A port marked with this symbol does not belong to the VLAN.
Untag	The node will tag ingress frames and strip tags from egress frames.
Tagged	The node will handle ingress frames according to VLAN ID; egress frames will not have their tags removed.

Step 4 After each port is in the appropriate VLAN, click **Apply**.

Note If Tagged is chosen, the attached external devices must recognize IEEE 802.1Q VLANs.

Note Both ports on an individual E1000-2 or E1000-2-G card cannot be members of the same VLAN.

6.5.2 Specifying the ML-Series Card Username and Password

Step 1 In the Domain Explorer window, choose **Administration > Control Panel**.

Step 2 Click **Security Properties**; then, click one of the following:

- **CTC-Based SDH** tab > **ONS 15454 SDH**, **ONS 15600 SDH**, **ONS 15305 CTC**, or **ONS 15310 MA SDH** subtab
- **CTC-Based SONET** tab > **ONS 15454**, **ONS 15600**, **ONS 15327**, **ONS 15310 CL**, or **ONS 15310 MA** subtab

Step 3 In the Server - ML Series Card Connection area, enter the username and password. Retype the password as confirmation.

Note The Prime Optical barebone Cisco IOS configuration file uses CTM123+ as the predefined password. By default, the same password is set in the Control Panel at installation.

Step 4 Click **Save**.

6.5.3 Modifying Configuration Settings for the ML-Series Cards—ONS 15310 MA SONET, ONS 15310 MA SDH, ONS 15454 SONET, and ONS 15454 SDH

Full Cisco IOS configuration synchronization is performed automatically by Prime Optical to keep the NE and the Prime Optical Data Provisioning Service synchronized. Full configuration resynchronization might be delayed depending on the usage of the Prime Optical server. For the Prime Optical server deployed as the monitoring server, the recommended value for the delay parameter is 120 seconds. For the Prime Optical server deployed as the provisioning server, the recommended value for the delay parameter is 10 minutes (for example, 600 seconds). The default value is provided in the Control Panel > NE Service > CTC-Based SONET NEs or CTC-Based SDH NEs > NE Service pane > L2 Service Resync Delay field. For example, for the CTC-based SONET or CTC-based SDH network service, the default L2 Service Resync Delay value is 600 seconds.

To upload or download a configuration file for the ML-series card:

Step 1 Select an ONS 15310 MA SONET, ONS 15310 MA SDH, ONS 15454 SONET, or ONS 15454 SDH NE in the Domain Explorer and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the ML card.

Step 3 Click the **Configuration** tab. The following parameters are displayed:

- Source—Source of the configuration file.
- Host—Host machine where the configuration file is stored or the location where the file will be downloaded.
- Filename—Name of the configuration file.
- Directory—Directory on the host machine for the configuration file.
- Time Stamp—Date and time of the file upload or download.

Note These parameters are initially grayed out or disabled. When a file download or upload is completed, the fields display the parameters of the download or upload. These parameters are related to the newly loaded barebone configuration file. Once a change is made to the barebone configuration file, the fields are cleared.

Step 4 To download the file from the Timing Communications and Control (TCC) card to the host machine:

a. In the **Configuration** subtab, click **TCC>>File**. The Download from TCC dialog box opens.

b. Select the location of the file to download. Click either the **Local** or the **Server** radio button.

Step 5 To upload the file from the host machine to the TCC card:

a. In the **Configuration** subtab, click **File>> TCC**. The Upload to TCC dialog box opens.

b. Select the location of the file to upload. Click either the **Local** or **Server** radio button.

Note If you select Local, the file is first copied to the Prime Optical server and then uploaded to the TCC card. The host refers to the server; the directory refers to the directory on the server where the file resides.

Step 6 Be sure to reset the ML-series cards after uploading a Cisco IOS startup config file to a TCC card.

Step 7 To launch the command-line interface (CLI), click **Launch CLI**.

6.5.4 Creating RMON Thresholds

Step 1 Select an NE in the Domain Explorer and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the card.

Step 3 Depending on the card selected, click the **Thresholds** tab or **Line** tab > **RMON Thresholds** or **RPR Span** subtab.

Step 4 Click **Create**. The Create RMON Thresholds dialog box opens. The following table provides descriptions. Fields shown depend on the type of NE that is selected.

Step 5 Click **OK**.

Table 6-2 Field Descriptions for the Create RMON Thresholds Dialog Box

Field	Description
Slot	Choose the appropriate card.
Port	Choose the applicable port on the card you selected.
Variable	Choose the MIB variable to monitor.
Alarm Type	Indicate whether the event will be triggered by the rising threshold, falling threshold, or both the rising and falling thresholds.
Sample Type	Depending on the type of data module used by the NE, choose Relative, Absolute, or Delta. • Relative restricts the threshold to use the number of occurrences in the user-set sample period. • Absolute sets the threshold to use the total number of occurrences, regardless of time period. • Delta tests the delta between samples.
Sample Period	Specify the sample period, in seconds.

Table 6-2 Field Descriptions for the Create RMON Thresholds Dialog Box (continued)

Field	Description
Rising Thresholds	Enter the appropriate number of occurrences for the rising threshold. **Note** For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a falling threshold of 400 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.
Falling Thresholds	Enter the appropriate number of occurrences for the falling threshold. In most cases, the falling threshold is set lower than the rising threshold. A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 minutes subsides and creates only 799 collisions in 15 minutes, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over 1000 per 15 minute period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

6.5.5 Creating Segments

Step 1 Select an NE in the Domain Explorer and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the GE_XP or 10GE_XP card.

Step 3 Click the **REP** tab > **Segment** subtab.

Step 4 Click **Create**. The Create Segment dialog box opens.

Step 5 Enter the segment ID in the Segment field. Valid values are from 1 to 1024.

Step 6 From the Port drop-drown list, choose a REP port that must belong to this segment.

Note A REP port can belong to only one segment.

Step 7 From the Port Role area, choose whether you want to configure the port as an edge port or a regular port. The options are:

- Edge—The port is configured as an edge port.
  - Check the **Primary** check box to configure the edge port as a primary edge port.
  - Uncheck the **Primary** check box to configure the edge port as a secondary edge port.
  - Check the **Preferred** check box to configure the edge port as a preferred alternate port.
  - Check the **NoNeighbor** check box if the edge port must not have a neighbor port. REP does not check for neighbor adjacency.
- None—The port is configured as a regular port. If you choose this option, Segment Topology Change Notifications (STCN) and VLAN Load Balancing (VLB) configurations are disabled.

  Check the **Preferred** check box to configure the regular port as a preferred alternate port.

Step 8 From the STCN area, configure the destination of STCN messages:

a. Check the **Enable** check box to enable sending STCN messages.

b. From the **Port** drop-down list, do one of the following:

- Choose the STCN port to send STCN messages.
- Enter the segment ID in the Segment field to send STCN messages. The STCN port and REP port must be unique.

Step 9 From the VLAN Load Balancing area, configure VLB:

a. Check the **Enable** check box to enable VLB.

b. Enter a single SVLAN or range of SVLANs in the SVLAN field.

c. Enter the REP Port ID in the REP PortId field.

d. Check the **Preferred** check box to identify the preferred alternate port for VLAN load balancing.

Step 10 From the VLB Preempt Delay area, enter the trigger delay for automatic VLB activation. Valid values are from 15 to 300 seconds.

Step 11 Click **Next**.

Step 12 Enter the details of the second port to add it to the segment. Repeat Step 6 through Step 10 when the first port is configured as a regular port and the second port is configured as a primary edge port. Repeat Step 6 and Step 7 when the first port is configured as a primary edge port and the second port is configured as a regular port.

Step 13 Click **Finish**.

6.5.6 Editing Segments

Step 1 Select an NE in the Domain Explorer and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the GE_XP or 10GE_XP card.

Step 3 Click the **REP** tab > **Segment** subtab.

The list of segments appears.

Step 4 Choose a segment from the list of segments that you want to edit.

Step 5 Click **Edit**. The Edit Segment dialog box opens.

Note You can edit only the STCN and VLB entries for a segment.

Step 6 Segment ID—*Display only.* Displays the Segment ID.

Step 7 Port—*Display only.* Displays the REP port that belongs to this segment.

Step 8 In the Port Role area (which is display only), the details of the edge port or regular port is displayed.

Step 9 From the STCN area, modify the destination of STCN messages:

a. Check the **Enable** check box to enable sending STCN messages.

b. From the **Port** drop-down list, do one of the following:

- Choose the STCN port to send STCN messages.
- Modify the segment ID in the Segment field to send STCN messages. The STCN port and REP port must be unique.

Step 10 From the VLAN Load Balancing area, modify VLB:

a. Check the **Enable** check box to enable VLB.

b. Modify a single SVLAN or range of SVLANs in the SVLAN field.

c. Modify the REP Port ID in the REP PortId field.

d. Check the **Preferred** check box to identify the preferred alternate port for VLAN load balancing.

Step 11 From the VLB Preempt Delay area, modify the trigger delay for automatic VLB activation. Valid values are from 15 to 300 seconds.

Step 12 Click **Next**.

Step 13 Modify the details of the second port in the segment, if required.

Step 14 Click **Finish**.

6.5.7 E-Series Spanning Tree Protocol (IEEE 802.1D)

The ONS 15327, ONS 15454 SONET, and ONS 15454 SDH operate Spanning Tree Protocol (STP) according to IEEE 802.1D when an Ethernet card is installed. STP operates over all packet-switched ports, including Ethernet and ONS 15327, ONS 15454 SONET, or ONS 15454 SDH ports. On Ethernet ports, STP is disabled by default and can be enabled by checking the check box under the Port subtab of the **Provisioning** tab at the card-level view. On ONS 15327, ONS 15454 SONET, or ONS 15454 SDH interface ports, STP is active by default and cannot be disabled.

The Ethernet card can enable STP on the Ethernet ports to allow redundant paths to the attached Ethernet equipment. STP spans cards so that both equipment and facilities are protected against failure.

STP detects and eliminates network loops. When STP detects multiple paths between any two network hosts, STP blocks ports until only one path exists between any two network hosts. The single path eliminates possible bridge loops. This is crucial for shared packet rings, which naturally include a loop.

To remove loops, STP defines a tree that spans all of the switches in an extended network. STP forces certain redundant data paths into a standby (blocked) state. If one network segment in the STP becomes unreachable, the spanning-tree algorithm reconfigures the spanning-tree topology and reactivates the blocked path to reestablish the link. STP operation is transparent to end stations, which do not discriminate between connections to a single LAN segment and a switched LAN with multiple segments. The ONS 15327, ONS 15454 SONET, and ONS 15454 SDH support one STP instance per circuit and a maximum of eight STP instances per ONS 15327, ONS 15454 SONET, or ONS 15454 SDH.

Note When an Ethernet card is provisioned, the STP state might need to be updated. Click the **Update** button in the NE Explorer to update the STP state.

The ONS 15327, ONS 15454 SONET, or ONS 15454 SDH can operate multiple instances of STP to support VLANs in a looped topology. Separate circuits can be dedicated across the SONET ring for different VLAN groups (that is, one for private TLS services and one for Internet access). Each circuit runs its own STP to maintain VLAN connectivity in a multiring environment.

6.5.7.1 Viewing E-Series Spanning-Tree Configurations

Step 1 Select an ONS 15327, ONS 15454 SONET, or ONS 15454 SDH NE in the Domain Explorer tree and choose **Configuration > NE Explorer**.

Step 2 Click the **EtherBridge** tab.

Step 3 Click the **Spanning Tree Config** subtab. The spanning-tree configuration parameters are listed in the following table.

Table 6-3 Spanning-Tree Configuration Parameters

Parameter	Cisco Default Value	Value Range
Priority	32768	0–65535
Bridge Max Age	20 seconds	6–40 seconds
Bridge Hello Time	2 seconds	1–10 seconds
Bridge Forward Delay	15 seconds	4–30 seconds

6.5.7.2 Viewing E-Series Spanning-Tree Parameters

Step 1 Select an ONS 15327, ONS 15454 SONET, or ONS 15454 SDH NE in the Domain Explorer tree and choose **Configuration > NE Explorer**.

Step 2 Click the **EtherBridge** tab.

Step 3 Click the **Spanning Tree Status** subtab. The spanning-tree parameters are listed in the following table.

Table 6-4 Spanning-Tree Parameters

Parameter	Description
BridgeID	Unique identifier that transmits the configuration bridge protocol data unit (BPDU); the bridge ID is a combination of the bridge priority and the NE MAC address.
Topo Age	Amount of time in seconds since the last topology change.
Topo Changes	Number of times the spanning-tree topology has been changed since the node booted up.
Designated Root	The designated root of the spanning tree for a particular spanning-tree instance.
Root Cost	The total path cost to the designated root.
Root Port	Port used to reach the root.
Max Age	Maximum time that received-protocol information is retained before it is discarded.
Hello Time	Time interval, in seconds, between the transmission of configuration BPDUs by a bridge that is the spanning-tree root or is attempting to become the spanning-tree root.
Hold Time	Minimum time period, in seconds, that elapses during the transmission of configuration information about a given port.
Forward Delay	Time spent by a port in the listening state and the learning state.

6.6 FC_MR-4 Card

For the NEs that support the FC_MR-4 card, D.1 FC_MR-4 Card, page D-1.

6.7 FMEC Cards

For the FMEC cards supported in Prime Optical and the NEs that contain FMEC cards, see D.2 FMEC Cards, page D-7.

6.8 Multirate Cards

For the multirate cards supported in Prime Optical and the NEs that contain multirate cards, see D.3 Multirate Cards, page D-16.

6.9 Optical Cards

For the optical cards supported in Prime Optical and the NEs that contain optical cards, see D.4 Optical Cards, page D-84.

6.9.1 Provisioning an OC-N Card for ONS 15454 SONET

ONS 15454 SONET OC-3, OC-12, and OC-48 cards can be provisioned to support either SONET or SONET over SDH signals.

Step 1 Select an ONS 15454 SONET NE in the Domain Explorer tree and choose **Configuration > NE Explorer**.

Step 2 In the tree view of the NE Explorer window, select the OC-N card.

Step 3 Click the **Line** tab; then, click the **Line Config** subtab.

Step 4 In the EnableSyncMsg column, uncheck the check box.

Step 5 Be sure that the Admin state of the port is selected as OOS (only then can the SONET port be configured as SDH).

Step 6 In the **Type** column, choose **SDH**.

Step 7 Click **Apply**.

6.9.2 Resetting NE Thresholds to the Default Values

See 6.4.5 Resetting NE Thresholds to the Default Values, page 6-8.