



# CHAPTER 13

## Add and Remove Nodes

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### Note

The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

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This chapter explains how to add and remove Cisco ONS 15600 nodes from bidirectional line switched rings (BLSRs), path protection, and linear add-drop multiplexer (ADM) networks.

## Before You Begin

See [Chapter 9, "Manage Alarms"](#) to investigate all alarms, and manually document existing provisioning. To clear trouble conditions, refer to *Cisco ONS 15600 Procedure Guide, R9.1 and R9.2.1*.

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

1. [NTP-E196 Add a BLSR Node, page 13-1](#)—Complete as needed.
2. [NTP-E169 Remove a BLSR Node, page 13-6](#)—Complete as needed.
3. [NTP-E197 Add a Path Protection Node, page 13-9](#)—Complete as needed.
4. [NTP-E123 Remove a Path Protection Node, page 13-11](#)—Complete as needed.
5. [NTP-E178 Add a Node to a Linear ADM, page 13-13](#)—Complete as needed to add an ONS 15600 node between two nodes in a 1+1 configuration.
6. [NTP-E159 Remove an In-Service Node from a Linear ADM, page 13-15](#)—Complete as needed to remove an ONS 15600 from a linear ADM without disrupting traffic.

## NTP-E196 Add a BLSR Node

<b>Purpose</b>	This procedure expands a BLSR by adding a node. All nodes in the ring must be on the same software version.
<b>Tools/Equipment</b>	Fiber for new node connections

**Prerequisite Procedures** Cards must be installed and node turn-up procedures completed on the node that will be added to the BLSR. See [Chapter 2, “Install Cards and Fiber-Optic Cable,”](#) and [Chapter 4, “Turn Up a Node.”](#)

**Required/As Needed** As needed

**Onsite/Remote** Onsite

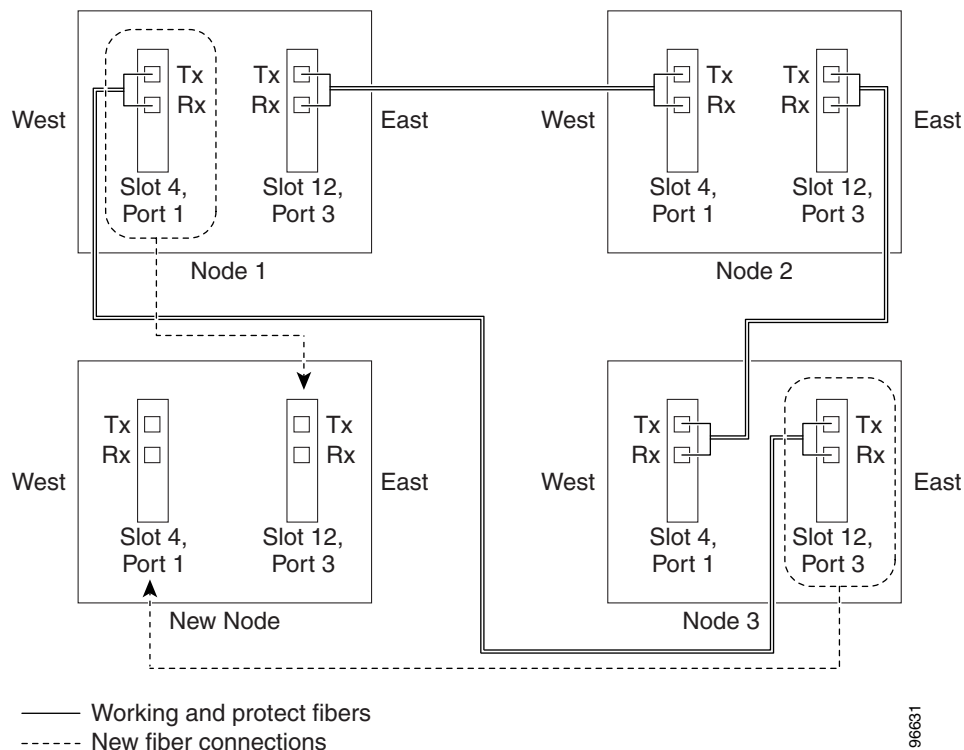
**Security Level** Provisioning or higher

**Caution**

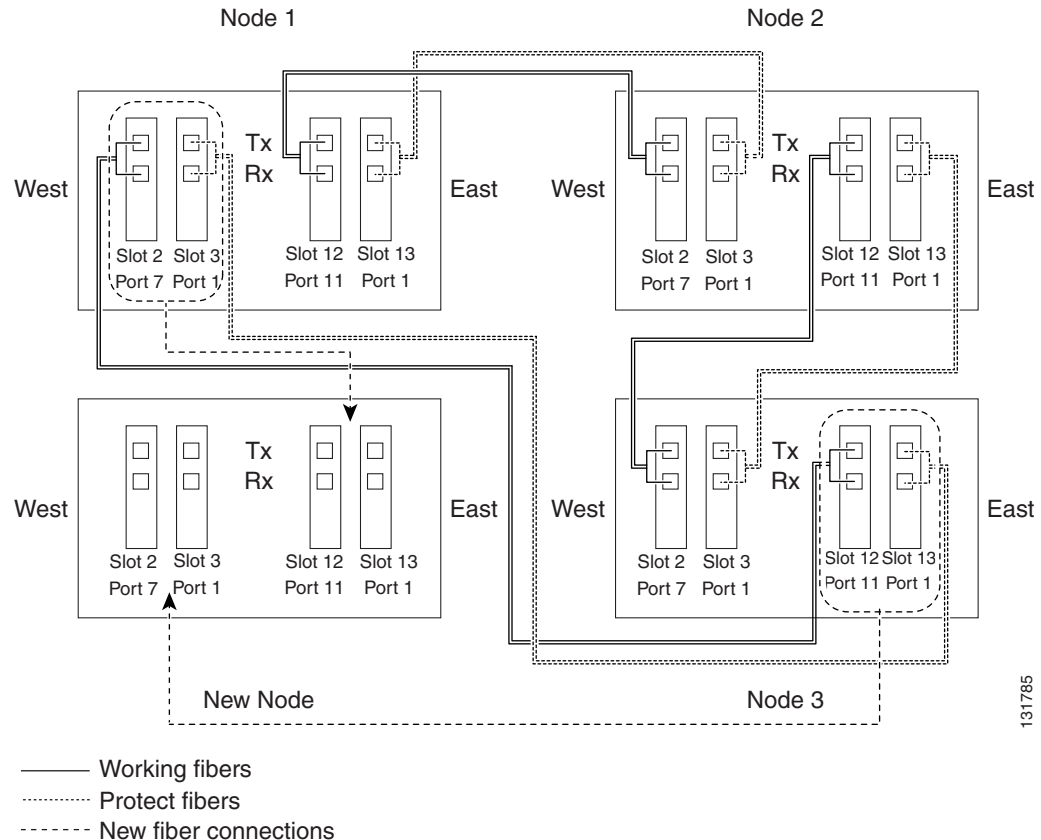
Adding a BLSR node can be service-affecting and should be performed during a maintenance window.

- Step 1** Check the software version on the node you are adding to the BLSR from the node view > Maintenance > Software subtab. If it is not the same version as the nodes in the ring, you must upgrade or downgrade the new node to the same version as the other nodes in the ring. Refer to the release-specific software upgrade guide for more information on upgrading the ONS node software.
- Step 2** Draw a diagram of the BLSR where you will add the node. In the diagram, identify the east and west BLSR OC-N trunk (span) cards and ports that will connect to the new node. (This information is essential to complete this procedure without error.) [Figure 13-1](#) shows a drawing of a three-node, two-fiber BLSR that uses Slot 4/Port 1 and Slot 12/Port 3 for the BLSR trunk cards and ports. The dashed arrows show where the new fiber connections will be made to add a fourth node to the BLSR.

**Figure 13-1** Three-Node, Two-Fiber BLSR Before a Fourth Node Is Added



[Figure 13-2](#) shows a sample drawing of a three-node, four-fiber BLSR. The dashed arrows show the new fiber connections that will be made to add the fourth node. For four-fiber BLSRs, two fiber sets will be reconnected; the working fiber and the protect fiber.

**Figure 13-2** Three-Node, Four-Fiber BLSR Before a Fourth Node is Added

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- Step 3** According to local site practice, complete the “[NTP-E69 Back Up the Database](#)” procedure on page 14-4 for all the nodes in the ring.
- Step 4** Verify the card installation on the new node by completing the “[NTP-E21 Verify Card Installation](#)” procedure on page 4-2. Verify that the OC-N ports to be used as the BLSR trunk ports match the BLSR optical rate. For example, if the BLSR is OC-48, the new node must have OC-48 ports installed. If the OC-N cards are not installed or the optical rates do not match the BLSR, complete the “[NTP-E11 Install the OC-N Cards](#)” procedure on page 2-4.
- Step 5** Verify that fiber is available to connect the new node to the existing nodes. Refer to the diagram drawn in [Step 2](#).
- Step 6** Complete the “[NTP-E32 Verify Node Turn-Up](#)” procedure on page 5-2. In order to have Cisco Transport Controller (CTC) visibility to the new node after adding it, you must be an authorized user on the node and you must have IP connectivity to the node.
- Step 7** Create a static route on the new node if the following conditions are present. If the conditions are not present, continue with [Step 9](#).
- The IP address for the new node is on the same subnet as other nodes in the network.
  - On the new node Provisioning > Network > General subtab, Enable Socks Proxy on Port, External Network Element (ENE) is not checked under Gateway Settings.
  - A CTC computer is directly connected to the new node.
  - CTC computers are directly connected to other nodes on the same subnet.

If these conditions are present, add static routes on the node that will be added to the BLSR, using the following settings:

- Destination IP address: *Local-PC-IP-address*
- Net Mask: **255.255.255.255**
- Next Hop: *IP-address-of-the-Cisco-ONS-15600*
- Cost: **1**

- Step 8** To view Gateway Settings, see the “[DLP-E30 Provision IP Settings](#)” task on page 16-37.
- Step 9** Complete the “[DLP-E26 Log into CTC](#)” task on page 16-31 at a node in the BLSR.
- Step 10** Complete the “[DLP-E147 Check BLSR or Path Protection Alarms and Conditions](#)” task on page 17-39 to verify that the BLSR is free of service-affecting alarms or problems. If trouble is indicated (for example, a service-affecting alarm exists), resolve the problem before proceeding. See [Chapter 9](#), “[Manage Alarms](#)” or, if necessary, refer to the *Cisco ONS 15600 Troubleshooting Guide* for information.
- Step 11** From the View menu, choose **Go to Network View** and click the **Provisioning > BLSR** tabs.
- Step 12** On paper, record the Ring Name, Ring Type, Line Rate, Ring Reversion, and Span Reversion (4 Fiber).
- Step 13** From the Node column, record the Node IDs in the BLSR. The Node IDs are the numbers in parentheses next to the node name.
- Step 14** Log into the new node:
- If the node has a LAN connection and appears on the network map, from the View menu, choose **Go to Other Node**, then enter the new node.
  - If the new node is not connected to the network, log into it using the “[DLP-E26 Log into CTC](#)” task on page 16-31.
- Step 15** Click the **Alarms** tab.
- a. Verify that the alarm filter is not on. See the “[DLP-E157 Disable Alarm Filtering](#)” task on page 17-47 as necessary.
  - b. Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for procedures.
- Step 16** Using the information recorded in Steps 12 and 13 and the diagram created in Step 2, create a BLSR on the new node. See the “[DLP-E231 Create a BLSR on a Single Node](#)” task on page 18-36.
- Step 17** (Optional) Create test circuits, making sure they pass through the BLSR trunk cards/ports, and run test traffic through the node to ensure the cards are functioning properly. See the “[NTP-E161 Create a Manually Routed Optical Circuit](#)” procedure on page 6-9 and the “[NTP-E85 Test Optical Circuits](#)” procedure on page 6-16 for information.
- Step 18** Create the data communications channel (DCC) terminations on the new node. See the “[DLP-E114 Provision Section DCC Terminations](#)” task on page 17-13.




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**Note** Creating the DCC terminations causes the SDCC Termination Failure and Loss of Signal alarms to appear. These alarms will remain active until you connect the node to the BLSR.

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**Note** If you map the K3 byte to another byte (such as E2), you must remap the ports on each side of the new node or span to the same byte. See the “[DLP-E116 Remap the K3 Byte](#)” task on page 17-16.

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- Step 19** Complete the “[DLP-E26 Log into CTC](#)” task on page 16-31 at a BLSR node that will connect to the new node.
- Step 20** Referring to the diagram created in [Step 2](#), complete the “[DLP-E232 Initiate a BLSR Force Ring Switch](#)” task on page 18-37 on the node that will connect to the new node on its west line (port).
- Step 21** Referring to the diagram created in [Step 2](#), complete the “[DLP-E232 Initiate a BLSR Force Ring Switch](#)” task on page 18-37 on the node that will connect to the new node on its east line (port).
- Step 22** Click the **Alarms** tab.
- Verify that the alarm filter is not on. See the “[DLP-E157 Disable Alarm Filtering](#)” task on page 17-47 as necessary.
  - Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for procedures.
- Step 23** Following the diagram created in [Step 2](#), remove the fiber connections from the two nodes that will connect to the new node.
- Remove the west fiber from the node that will connect to the east port of the new node. In the [Figure 13-1](#) example, this is Node 1/Slot 4/Port 1.
  - Remove the east fiber from the node that will connect to the west port of the new node. In the [Figure 13-1](#) example, this is Node 3/Slot 12/Port 3.
- Step 24** Connect fibers from the adjacent nodes to the new node following the diagram created in [Step 2](#). Connect the west port to the east port and the east port to the west port. For four-fiber BLSRs, connect the protect fibers.
- Step 25** After the newly added node appears in network view, double-click it to display the node in node view.
- Step 26** Click the **Provisioning > BLSR** tabs.
- Step 27** Click **Ring Map**. Verify that the new node appears on the Ring Map with the other BLSR nodes, then click **OK**.
- Step 28** From the View menu, choose **Go to Network View** and perform the following steps:
- Click the **Provisioning > BLSR** tabs. Verify that the new node appears in the Node column.
  - Click the **Alarms** tab. Verify that BLSR alarms such as RING-MISMATCH, E-W-MISMATCH, PRC-DUPID (duplicate node ID), and APSCDFLTK (default K) do not appear.
- If the new node does not appear in the Node column, or if BLSR alarms are displayed, log into the new node and verify that the BLSR is provisioned on it correctly with the information from [Steps 12](#) and [13](#). If the node still does not appear, or if alarms persist, refer to the *Cisco ONS 15600 Troubleshooting Guide*.
- Step 29** Click the **Circuits** tab. Wait until all the circuits are discovered. The circuits that pass through the new node are incomplete.
- Step 30** In network view, right-click the new node and choose **Update Circuits With The New Node** from the shortcut menu. Verify that the number of updated circuits in the dialog box is correct.
- Step 31** If incomplete circuits still appear, refer to the *Cisco ONS 15600 Troubleshooting Guide*.
- Step 32** Click the **History** tab. Verify that BLSR\_RESYNC conditions are present for every node in the BLSR.
- Step 33** Complete the “[DLP-E150 Clear a BLSR Force Ring Switch](#)” task on page 17-40 to remove the ring switch from the east BLSR span.
- Step 34** Complete the “[DLP-E150 Clear a BLSR Force Ring Switch](#)” task on page 17-40 to remove the ring switch from the west BLSR span.

**Step 35** According to local site practice, complete the “NTP-E89 Two-Fiber BLSR Acceptance Test” procedure on page 5-10 or the “NTP-E165 Four-Fiber BLSR Acceptance Test” procedure on page 5-11.

**Stop. You have completed this procedure.**

## NTP-E169 Remove a BLSR Node

<b>Purpose</b>	This procedure removes a BLSR ring or multiple BLSR rings from a node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-E164 Create a BLSR, page 5-9</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher



### Caution

The following procedure minimizes traffic outages during node removals. You will delete all circuits that originate and terminate on the node being removed. In addition, you will verify that circuits passing through the node do not enter and exit the node on different STSs. If they do, you will delete and recreate the circuits, and traffic will be lost on that circuit during this time.

**Step 1** According to local site practice, complete the “NTP-E69 Back Up the Database” procedure on page 14-4 for all the nodes in the ring.

**Step 2** Complete the “DLP-E26 Log into CTC” task on page 16-31 at the node you want to remove from the BLSR.

**Step 3** Complete the “DLP-E98 Verify Timing in a Reduced Ring” task on page 16-90.



### Note

If you remove a node that is the only building integrated timing supply (BITS) timing source for the ring, you also remove the only source of synchronization for all the nodes in that ring. Circuits that leave the ring to connect to other networks synchronized to a Stratum 1 clock will experience a high level of pointer adjustments, which might adversely affect traffic performance.

**Step 4** Create a diagram of the BLSR where you will remove the node. You can draw the BLSR manually or complete the following to print the BLSR map from CTC:

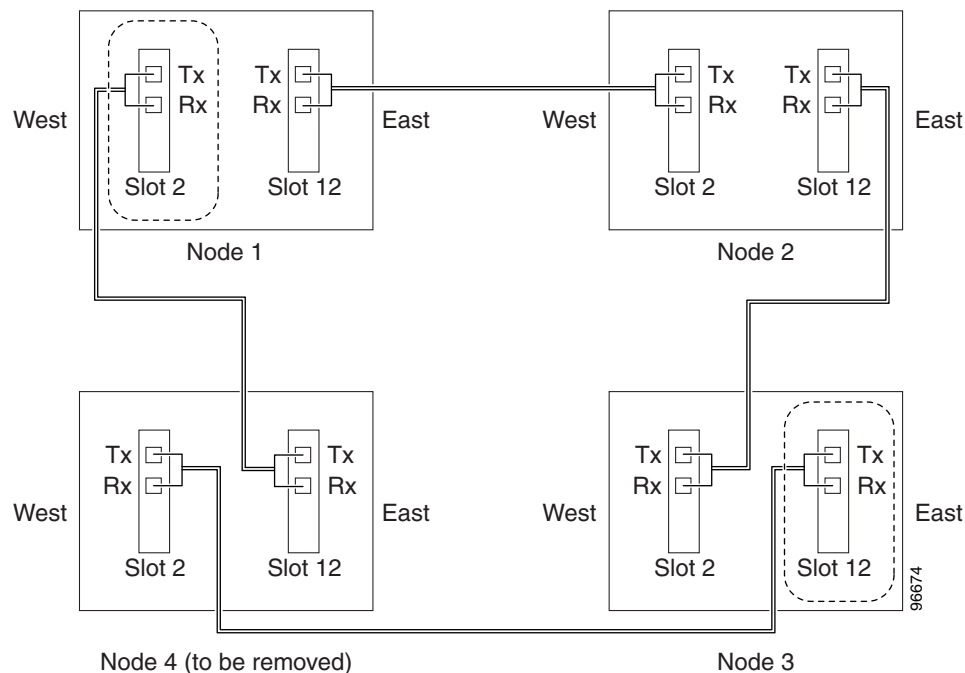
- a. From the View menu, choose **Go to Network View**.
- b. Click the **Provisioning > BLSR** tabs.
- c. Choose the desired BLSR, then click **Edit**.
- d. In the BLSR window, verify that all the port information is visible. If not, press **Ctrl** and drag the node icons to a new location so the information can be viewed.
- e. Complete the “DLP-E214 Print CTC Data” task on page 18-16.
- f. Close the BLSR window by choosing **Close** from the File menu.

**Step 5** Referring to the BLSR diagram, identify the following:

- The node that is connected through its west port to the target (removal) node; for example, if you were removing Node 4 in [Figure 13-3](#), Node 1 is the node connected through its west port to Node 4.
- The node that is connected through its east port to the target (removal) node: in [Figure 13-3](#), Node 3 is the node connected through its east port to Node 4.

Record the slot and port of the BLSR ring in the node.

**Figure 13-3** Four-Node, Two-Fiber BLSR Before a Node Is Removed



- Step 6** Complete the [“DLP-E147 Check BLSR or Path Protection Alarms and Conditions”](#) task on page 17-39 to verify that the BLSR is free of alarms. If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for instructions.
- Step 7** From the View menu, choose **Go to Other Node**. Choose the node that you will remove and click **OK**.
- Step 8** Click the **Circuits** tab. If the Scope setting is set to Network, choose **Node** from the Scope drop-down list. Make sure the Filter button is off (not indented) to ensure that all circuits are visible.
- Step 9** Delete all circuits that originate or terminate on the node. See the [“DLP-E163 Delete Circuits”](#) task on page 17-50.
- Step 10** Complete the [“DLP-E212 Verify Pass-Through Circuits”](#) task on page 18-14 to verify that circuits passing through the target node enter and exit the node on the same STS and/or VT.
- Step 11** If K3 extension byte mapping is supported on adjacent nodes, complete the [“DLP-E160 Verify BLSR Extension Byte Mapping”](#) task on page 17-48. K3 extension byte mapping is supported on all ONS 15600 OC-48 and OC-192 ports, as well as the ONS 15454 OC-48 any slot (AS) card.
- Step 12** From the View menu, choose **Go to Network View**.
- Step 13** Referring to the diagram created in [Step 4](#), complete the [“DLP-E232 Initiate a BLSR Force Ring Switch”](#) task on page 18-37 at each node that connects to the target (removal) node to force traffic away from it. You must perform a Force switch at each port connected to the target node. For example, in [Figure 13-3](#), you would perform a Force switch on the east port of Node 3 and the west port of Node 1.

- Step 14** Click the **Alarms** tab.
- Verify that the alarm filter is not on. See the “[DLP-E157 Disable Alarm Filtering](#)” task on [page 17-47](#) as necessary.
  - Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for procedures.
- Step 15** Remove the fiber connections between the node being removed and the two neighboring nodes.
- Step 16** Reconnect the fiber of the two neighboring nodes directly, west port to east port. For example in [Figure 13-3](#), the east port of Node 3 (Slot 12) connects to the west port of Node 1 (Slot 5).
- Step 17** Complete the following substeps:
- From the View menu, choose **Go to Other Node**. Choose one of the newly connected nodes and click **OK**.
  - Click the **Provisioning > BLSR** tabs.
  - Choose the BLSR that originally contained the removed node, and then click **Ring Map**.
  - Wait until the removed node is no longer listed.
  - Repeat steps **a** through **d** for the other newly connected node in the BLSR.
- Step 18** Complete the “[DLP-E235 Delete a BLSR from a Single Node](#)” task on [page 18-44](#).
- Step 19** Click the **History** tab. Verify that the BLSR\_RESYNC condition appears for every node in the BLSR.
- Step 20** Complete the “[DLP-E150 Clear a BLSR Force Ring Switch](#)” task on [page 17-40](#) to remove the Force protection switches.
- Step 21** According to local site practice, complete the “[NTP-E89 Two-Fiber BLSR Acceptance Test](#)” procedure on [page 5-10](#) or “[NTP-E165 Four-Fiber BLSR Acceptance Test](#)” procedure on [page 5-11](#).
- Step 22** Complete the “[DLP-E186 Remove Pass-through Connections](#)” task on [page 17-68](#).
- Step 23** Log back into a node on the reduced ring. In the CTC Login dialog box, uncheck the **Disable Network Discovery** check box.




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**Note** The deleted node will appear in network view until all SDCC terminations are deleted. To delete SDCC terminations, complete the “[DLP-E7 Delete a Section DCC Termination](#)” task on [page 16-8](#).”

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- Step 24** Click the **Circuits** tab and verify that no incomplete circuits are present. If incomplete circuits appear, repeat Steps [22](#) and [23](#).
- Step 25** If you delete a node that was in a login node group, you will see incomplete circuits for that node in the CTC network view. Although it is no longer part of the ring, the removed node still reports to CTC until it is no longer in a login node group. If necessary, complete the “[DLP-E187 Delete a Node from a Specified Login Node Group](#)” task on [page 17-69](#).
- Step 26** To remove another node from a BLSR, repeat this procedure for the desired node.

**Stop. You have completed this procedure.**

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# NTP-E197 Add a Path Protection Node

<b>Purpose</b>	This procedure adds a node to an existing path protection.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-E35 Provision Path Protection Nodes, page 5-17</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher



**Note** You can add only one node at a time. Perform these steps onsite and not from a remote location.

- Step 1** Verify the card installation on the new node. See the “[NTP-E21 Verify Card Installation](#)” procedure on [page 4-2](#). Verify that the OC-N cards that will serve as the path protection line cards match the path protection optical rate. For example, if the path protection is OC-48, the new node must have OC-48 cards installed. If the OC-N cards are not installed or the rate does not match the path protection, complete the “[NTP-E11 Install the OC-N Cards](#)” procedure on [page 2-4](#) to install them.
- Step 2** Verify that fiber is available to connect the new node to the existing nodes.
- Step 3** Complete the “[NTP-E32 Verify Node Turn-Up](#)” procedure on [page 5-2](#).
- Step 4** According to local site practice, complete the “[NTP-E69 Back Up the Database](#)” procedure on [page 14-4](#) for all the nodes in the ring.
- Step 5** Log into a node in the network where you want to add a path protection node. See the “[DLP-E26 Log into CTC](#)” task on [page 16-31](#) for instructions. In order to have CTC visibility to the node after it is added, you must be an authorized user on the node and you must have IP connectivity to the node.
- Step 6** Check to see if the new node IP address is on the same subnet as other nodes in the network. If two or more PCs are directly connected to different nodes that belong to the same subnet and Enable Socks Proxy on Port, External Network Element (ENE) is not checked under Gateway Settings, add static routes on the gateway ONS 15600 nodes, using the following settings:
- Destination IP address: *Local-PC-IP-address*
  - Net Mask: **255.255.255.255**
  - Next Hop: *IP-address-of-the-Cisco-ONS-15600*
  - Cost: **1**
- See the “[DLP-E31 Create a Static Route](#)” task on [page 16-40](#).
- Step 7** Complete the “[DLP-E147 Check BLSR or Path Protection Alarms and Conditions](#)” task on [page 17-39](#). If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for instructions.
- Step 8** Count the total number of circuits on the fiber that is cut between the existing nodes. To count the number of circuits, right click on the fiber that is cut, and click circuits.
- Step 9** In network view, click the **Circuits** tab.
- To view Partial circuits, click the Filter button and select **PARTIAL** from the **Status** drop-down list. The Partial circuits, if any, are displayed.
- To view Partial\_TL1 circuits, click the Filter button and select **PARTIAL\_TL1** from the **Status** drop-down list. The Partial\_TL1 circuits, if any, are displayed.

Resolve any partial circuits (both Partial and Partial\_TL1) in the network before proceeding. However, if you want to continue with [Step 10](#), match the number of partial circuits and circuit names that existed before and after adding a path protection node. This ensures that no additional partial circuits are created after this procedure is completed.

**Step 10** Log into the new node. If the node has a LAN connection and appears on the network map, from the View menu, choose **Go to Other Node**, then enter the new node. If the new node is not connected to the network, you will need to log into it directly. See the “[DLP-E26 Log into CTC](#)” task on page 16-31.

**Step 11** Click the **Alarms** tab. Verify that no Critical or Major alarms are present, nor any facility alarms, such as LOS, LOF, AIS-L, SF, and SD. If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. Refer to the *Cisco ONS 15600 Troubleshooting Guide* for instructions.

**Step 12** In network view, click the **Circuits** tab.

To view Partial circuits, click the Filter button and select **PARTIAL** from the **Status** drop-down list. The Partial circuits, if any, are displayed.

To view Partial\_TL1 circuits, click the Filter button and select **PARTIAL\_TL1** from the **Status** drop-down list. The Partial\_TL1 circuits, if any, are displayed.

Resolve any partial circuits (both Partial and Partial\_TL1) in the network before proceeding. However, if you want to continue with [Step 13](#), match the number of partial circuits and circuit names that existed before and after adding a path protection node. This ensures that no additional partial circuits are created after this procedure is completed.

**Step 13** (Optional) Create test circuits, making sure they pass through the path protection line cards, and run test traffic through the node to ensure the cards are functioning properly. See the “[NTP-E161 Create a Manually Routed Optical Circuit](#)” procedure on page 6-9.

**Step 14** Create the DCC terminations on the new node. See the “[DLP-E114 Provision Section DCC Terminations](#)” task on page 17-13.

**Step 15** Complete the “[DLP-E96 Switch All Path Protection Circuits on a Span](#)” task on page 16-87 to switch traffic away from the span that will be broken to connect to the new node.



**Caution**

While a forced switch is in effect, traffic is not protected because the forced switch prevents automatic protection switching.

**Step 16** Two nodes will connect directly to the new node; remove their fiber connections:

- a. Remove the east fiber connection from the node that will connect to the west port of the new node.
- b. Remove the west fiber connection from the node that will connect to the east port of the new node.

**Step 17** Replace the removed fibers with fibers connected to the new node.

**Step 18** Check to see if your new node’s IP address is on the same subnet as other nodes in the network. If two or more PCs are directly connected to different nodes that belong to the same subnet, you need to add static routes on the gateway ONS 15600 nodes, following these rules:

- Destination IP-address: *Local-PC-IP-address*
- Net Mask: **255.255.255.255**
- Next Hop: *IP-address-of-the-Cisco-ONS-15600*
- Cost: **1**

See the “[DLP-E31 Create a Static Route](#)” task on page 16-40.

**Step 19** Log out of CTC and log back into a node in the network. Refer to “[DLP-E26 Log into CTC](#)” task on page 16-31 for instructions.

- Step 20** From the View menu, choose **Go to Network View** to display the path protection nodes. The new node should appear in the network map. Wait a few minutes to allow all the nodes to appear.
- Step 21** Click the **Circuits** tab and wait for all the circuits to appear, including spans. Count the number of incomplete circuits.
- Step 22** Ensure that nodes involved in the node addition operation are in the initialized state. This is because, CTC does not consider nodes that are not initialized (they appear as gray icons in the CTC network map) when evaluating the circuits.



**Note** [Step 23](#) is recommended to be performed only on nodes (the newly added node, and the existing two nodes in the network between which the new node is added) involved in the node addition operation. Disable network discovery while launching CTC, add only those nodes involved in the node addition operation.



**Note** CTC automatically creates VT Tunnels. The cross connects should not be created manually in the intermediate nodes.



**Note** [Step 23](#) does not create the overlay ring circuits. To create overlay ring circuits that route traffic around multiple rings passing through one or more nodes more than once, see the [“NTP-E199 Create an Overlay Ring Circuit” procedure on page 6-32](#).

- Step 23** In the network view, right-click the new node and choose **Update Circuits With New Node** from the list of options. Wait for the confirmation dialog box to appear. Verify that the number of updated circuits displayed in the dialog box is correct (the circuit count should be same as obtained in [Step 8](#)).
- Step 24** Click the **Circuits** tab and verify that no incomplete circuits are present. However, if the partial circuits still exist in the network, verify whether they were present in [Step 9](#) and [Step 12](#). This will ensure that no additional partial circuits are created by this procedure.
- Step 25** Use the [“DLP-E97 Clear a Switch for all Path Protection Circuits on a Span” task on page 16-89](#) to clear the protection switch.
- Step 26** Complete the [“NTP-E36 Path Protection Acceptance Test” procedure on page 5-19](#).
- Stop. You have completed this procedure.**

## NTP-E123 Remove a Path Protection Node

<b>Purpose</b>	This procedure removes a path protection or multiple path protections from a node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-E35 Provision Path Protection Nodes, page 5-17</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

**Caution**


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The following procedure minimizes traffic outages during node removals.

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**Caution**


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If you remove a node that is the only BITS timing source for the ring, you will remove the only source of synchronization for all the nodes in that ring. Circuits that leave the ring to connect to other networks that are synchronized to Stratum 1 timing reference will experience a high level of pointer adjustments, which might adversely affect customer service.

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- Step 1** Draw a diagram of the path protection where you will remove the node. In the diagram, identify the following:
- The node that is connected through its west port to the node that will be removed
  - The node that is connected through its east port to the node that will be removed
- Step 2** Complete the “[DLP-E26 Log into CTC](#)” task on page 16-31 at a node in the network where you will remove the path protection node.
- Step 3** Complete the “[DLP-E147 Check BLSR or Path Protection Alarms and Conditions](#)” task on page 17-39 to verify that the path protection is free of alarms. If trouble is indicated (for example, a critical or major alarm exists), resolve the problem before proceeding. Refer to the *Cisco ONS 15600 Troubleshooting Guide*.
- Step 4** At each path protection node, all fibers are securely connected to the appropriate ports.
- Step 5** Complete the “[DLP-E163 Delete Circuits](#)” task on page 17-50 for circuits that originate or terminate in the node you will remove. (If a circuit has multiple drops, delete only the drops that terminate on the node you are deleting.)
- Step 6** Complete the “[DLP-E212 Verify Pass-Through Circuits](#)” task on page 18-14 to verify that circuits passing through the target node enter and exit the node on the same STS and/or VT.
- Step 7** Complete the “[DLP-E96 Switch All Path Protection Circuits on a Span](#)” task on page 16-87 for all spans connected to the node you are removing.

**Caution**


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Traffic is not protected during a Force protection switch.

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- Step 8** Remove all fiber connections between the node being removed and the two neighboring nodes.
- Step 9** Reconnect the fiber of the two neighboring nodes directly, west port to east port.
- Step 10** Exit CTC and log back in. Refer to “[DLP-E26 Log into CTC](#)” task on page 16-31 for instructions.
- Step 11** Complete the “[DLP-E147 Check BLSR or Path Protection Alarms and Conditions](#)” task on page 17-39.
- Step 12** Complete the “[DLP-E98 Verify Timing in a Reduced Ring](#)” task on page 16-90.
- Step 13** Complete the “[DLP-E97 Clear a Switch for all Path Protection Circuits on a Span](#)” task on page 16-89 to clear the protection switch.
- Step 14** Complete the “[NTP-E36 Path Protection Acceptance Test](#)” procedure on page 5-19.
- Step 15** Verify that circuits passing through the target node enter and exit the node on the same STS.
- Step 16** Complete the “[DLP-E186 Remove Pass-through Connections](#)” task on page 17-68.
- Step 17** Log back into a node on the reduced ring. In the CTC Login dialog box, uncheck the **Disable Network Discovery** check box.



**Note** The deleted node will appear in network view until all SDCC terminations are deleted. To delete SDCC terminations, complete the “[DLP-E7 Delete a Section DCC Termination](#)” task on [page 16-8](#).

- Step 18** Click the **Circuits** tab and verify that no incomplete circuits are present. If incomplete circuits appear, repeat Steps 17 and 18.
- Step 19** If you delete a node that was in a login node group, you will see incomplete circuits for that node in the CTC network view. Although it is no longer part of the ring, the removed node still reports to CTC until it is no longer in a login node group. If necessary, complete the “[DLP-E187 Delete a Node from a Specified Login Node Group](#)” task on [page 17-69](#).
- Step 20** To remove another node from a path protection, repeat this procedure for the desired node.
- Stop. You have completed this procedure.**

## NTP-E178 Add a Node to a Linear ADM

<b>Purpose</b>	This procedure adds an ONS 15600 node between two nodes in a 1+1 configuration without losing traffic.
<b>Tools/Equipment</b>	Compatible hardware necessary for the upgrade. Attenuators might be needed for some applications.
<b>Prerequisite Procedures</b>	The in-service topology upgrade procedure requires that the node to be added is reachable (has IP connectivity with CTC). Two technicians who can communicate with each other during the upgrade might be needed if the PC running CTC and the ONS 15600 node are not at the same location.
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher



**Note** OC-N transmit and receive levels should be in their acceptable range as shown in the specifications for each card in the “[NTP-E15 Install the Fiber-Optic Cables](#)” [procedure on page 2-9](#).



**Note** If overhead circuits exist on the network, an in-service topology upgrade procedure is service-affecting. The overhead circuits will drop traffic and have a status of PARTIAL after the upgrade is complete.

- Step 1** Complete the “[DLP-E26 Log into CTC](#)” [task on page 16-31](#) at either node in the 1+1 configuration. If you are already logged in, continue with Step 2.
- Step 2** In network view, right-click the span between the two nodes where you want to add the new node. A dialog box appears.
- Step 3** Select **Upgrade Protection**. A drop-down list appears.
- Step 4** Select **Terminal to Linear** and a dialog box appears.

- Step 5** The dialog box lists the following conditions for adding a new node:
- The terminal network has no Critical or Major alarms.
  - The node that you will add has no Critical or Major alarms.
  - The node has compatible software version with that of the terminal nodes.
  - The node has four unused optical ports matching the speed of the 1+1 protection and no DCC has been provisioned on these four ports.
  - Fiber is available to connect the added node to the terminal nodes.

If all of these conditions are met and you wish to continue with the procedure, click **Next**.




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**Note** If you are attempting to add an unreachable node, you must first log in to the unreachable node using a separate CTC session and configure that node. Delete any existing protection groups as described in the [“DLP-E87 Delete a 1+1 Protection Group” task on page 16-83](#). Delete any existing DCC terminations as described in the [“DLP-E198 Delete a Section DCC Termination” task on page 17-76](#) or the [“DLP-E199 Delete a Line DCC Termination” task on page 17-76](#).

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- Step 6** Enter the node host name or IP address, or choose the name of the new node from the drop-down list. If you type in the name, make sure it is identical to the actual node name. The node name is case sensitive.
- Step 7** Click **Next**. The Select Protection Group Ports page appears.
- Step 8** From the drop-down lists, select the working and protect ports on the new node that you want to connect to each terminal node.
- Step 9** Click **Next**. The Re-fiber the Protected Path dialog box appears. Follow the instructions in the dialog box for connecting the fibers between the nodes.
- Step 10** When the fibers are connected properly, click **Next**. The Update Circuit(s) on *Node-Name* dialog box appears.




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**Note** The Back button is not enabled in the wizard. You can click the **Cancel** button at this point and choose the **Yes** button if you want to cancel the upgrade protection procedure. If the procedure fails after you have physically moved the fiber-optic cables, you must restore the fiber-optic cables to their original positions and verify (through CTC) that traffic is on the working path of the nodes before restarting the process. To check the traffic status, go to node view and click the **Maintenance > Protection** tabs. In the Protection Groups area, click the 1+1 protection group. You can see the status of the traffic in the Selected Group area.

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- Step 11** Click **Next** on the Update Circuit(s) on *Node-Name* page to continue with the procedure.
- Step 12** The Force Traffic to Protect Path page states that it is about to force the traffic from the working to protect path for the terminal nodes. When you are ready to proceed, click **Next**.
- Step 13** Follow each step as instructed by the wizard as it guides you through the process of refibering the working path between nodes and forcing the traffic back to the working path.
- Step 14** The Force Traffic to Working Path page states that it is about to force the traffic from the protect to working path for the terminal nodes. When you are ready to proceed, click **Next**.
- Step 15** The Completed page appears. This page is the final one in the process. Click **Finish**.
- Stop. You have completed this procedure.**
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# NTP-E159 Remove an In-Service Node from a Linear ADM

<b>Purpose</b>	This procedure removes a single ONS 15600 from a linear ADM without disrupting traffic.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	A linear ADM network with an ONS 15600 must be present
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher



## Note

The 1+1 protection group must be unidirectional in order to delete a node from a linear ADM. If your 1+1 protection group is bidirectional, refer to the [“DLP-E86 Modify a 1+1 Protection Group” task on page 16-83](#) to change it to unidirectional. After you have removed the node from the linear group, you can change the protection setting back to bidirectional.

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- Step 1** Complete the [“DLP-E26 Log into CTC” task on page 16-31](#) at a node in the network where you will remove the node.
- Step 2** From the View menu, choose **Go to Network View**.
- Step 3** Click the **Alarms** tab, then complete the following steps:
- Verify that the alarm filter is not on. See the [“DLP-E157 Disable Alarm Filtering” task on page 17-47](#) as necessary.
  - Verify that no unexplained alarms appear on the network. If unexplained alarms appear, resolve them before continuing. Refer to the *Cisco ONS 15600 Troubleshooting Guide* if necessary.
- Step 4** Click the **Conditions** tab. Verify that no unexplained conditions appear on the network. If unexplained conditions appear, resolve them before continuing. Refer to the *Cisco ONS 15600 Troubleshooting Guide* if necessary.
- Step 5** On the network map, double-click a node in the 1+1 protection group that is adjacent to the node you intend to remove from the group (the target node).
- Step 6** In node view, click the **Maintenance > Protection** tabs.
- Step 7** Initiate a Force switch on the working port:
- In the Protection Groups area, click the 1+1 protection group.
  - In the Selected Group area, click the working port.
  - Next to Switch Commands, click **Force**.
  - In the Confirm Force Operation dialog box, click **Yes**.
  - In the Selected Group area, verify that the following appears:
    - Protect port—Protect/Active [FORCE\_SWITCH\_TO\_PROTECT] [PORT STATE]
    - Working port—Working/Standby [FORCE\_SWITCH\_TO\_PROTECT], [PORT STATE]
- Step 8** Repeat [Step 5](#) through [Step 7](#) for the node that is connected directly to the other side of the target node.
- Step 9** Remove the fiber from the working ports on the target node.
- Step 10** Connect the fiber between the working ports of the two nodes that were directly connected to either side of the target node.

- Step 11** On the node where you initiated a Force switch in [Step 8](#), clear the switch:
- Next to Switch Commands, click **Clear**.
  - In the Confirm Clear Operation dialog box, click **Yes**.
- Step 12** Initiate a Force switch on the protect port:
- In the Selected Group area, click the protect port. Next to Switch Commands, click **Force**.
  - In the Confirm Force Operation dialog box, click **Yes**.
  - In the Selected Group area, verify that the following appears:
    - Protect port—Protect/Standby [FORCE\_SWITCH\_TO\_WORKING], [PORT STATE]
    - Working port—Working/Active [FORCE\_SWITCH\_TO\_WORKING], [PORT STATE]
- Step 13** From the View menu, choose **Go to Network View**.
- Step 14** On the network map, double-click the other node where you initiated a Force switch.
- Step 15** In node view, click the **Maintenance > Protection** tabs.
- Step 16** Clear the Force switch on the working port:
- In the Protection Groups area, click the 1+1 protection group.
  - In the Selected Group area, click the working port.
  - Next to Switch Commands, click **Clear**.
  - In the Confirm Clear Operation dialog box, click **Yes**.
- Step 17** Complete [Step 12](#) to initiate a Force switch on the protect port.
- Step 18** Remove the fiber from protect ports of the target node.
- Step 19** Connect the fiber between the protect ports of the two nodes on each side of the target node.
- Step 20** Clear the Force switch:
- Next to Switch Commands, click **Clear**.
  - In the Confirm Clear Operation dialog box, click **Yes**.
  - In the Selected Group area, verify the following states:
    - Protect port — Protect/Standby
    - Working port — Working/Active
- Step 21** Repeat [Step 13](#) through [Step 16](#) to clear the switch on the other node.
- Step 22** From the File menu, choose **Exit** to exit CTC.
- Step 23** Relaunch CTC at any one of the nodes that were adjacent to the target node. The nodes will now show the circuit status as DISCOVERED when checked.
- Stop. You have completed this procedure.**
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