

**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.

This chapter explains how to add and remove Cisco ONS 15454 nodes from bidirectional line switched rings (BLSRs), path protection configurations, and linear add-drop multiplexer (ADM) networks.

## Contents

- [1 Before You Begin](#)
- [2 NTP-A350 Add a BLSR Node](#)
  - ◆ [2.1 Figure 14-1: Three-Node, Two-Fiber BLSR Before a Fourth Node Is Added](#)
  - ◆ [2.2 Figure 14-2: Three-Node, Four-Fiber BLSR Before a Fourth Node is Added](#)
- [3 NTP-A240 Remove a BLSR Node](#)
  - ◆ [3.1 Figure 14-3: Four-Node, Two-Fiber BLSR Before a Node Is Removed](#)
- [4 NTP-A351 Add a Path Protection Node](#)
- [5 NTP-A294 Remove a Path Protection Node](#)
- [6 NTP-A262 Add a Node to a Linear ADM](#)
- [7 NTP-A323 Add a Node to a Linear ADM Using the Wizard](#)
  - ◆ [7.1 Figure 14-4: Selecting Protection Group Ports](#)
  - ◆ [7.2 Figure 14-5: Refibering the Protect Path](#)
- [8 NTP-A313 Remove an In-Service Node from a Linear ADM](#)

## Before You Begin

Before performing any of the following procedures, complete the [NTP-A195 Document Card, Node, and Network Provisioning](#). Also investigate all alarms and clear any trouble conditions. Refer to the *Cisco ONS 15454 Troubleshooting Guide* as necessary.

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

1. [NTP-A350 Add a BLSR Node](#)-Complete as needed.
2. [NTP-A240 Remove a BLSR Node](#)-Complete as needed.
3. [NTP-A351 Add a Path Protection Node](#)-Complete as needed.
4. [NTP-A294 Remove a Path Protection Node](#)-Complete as needed.
5. [NTP-A262 Add a Node to a Linear ADM](#)-Complete as needed to add a node to the end of a linear ADM. This procedure can be used to add a node between two linear ADM nodes, but requires that circuits be deleted and recreated. To add a node without disrupting traffic, use the following procedure.
6. [NTP-A323 Add a Node to a Linear ADM Using the Wizard](#)-Complete as needed to add a node between two linear ADM nodes.
7. [NTP-A313 Remove an In-Service Node from a Linear ADM](#)-Complete as needed to remove a node from a linear ADM without disrupting traffic.

## NTP-A350 Add a BLSR Node

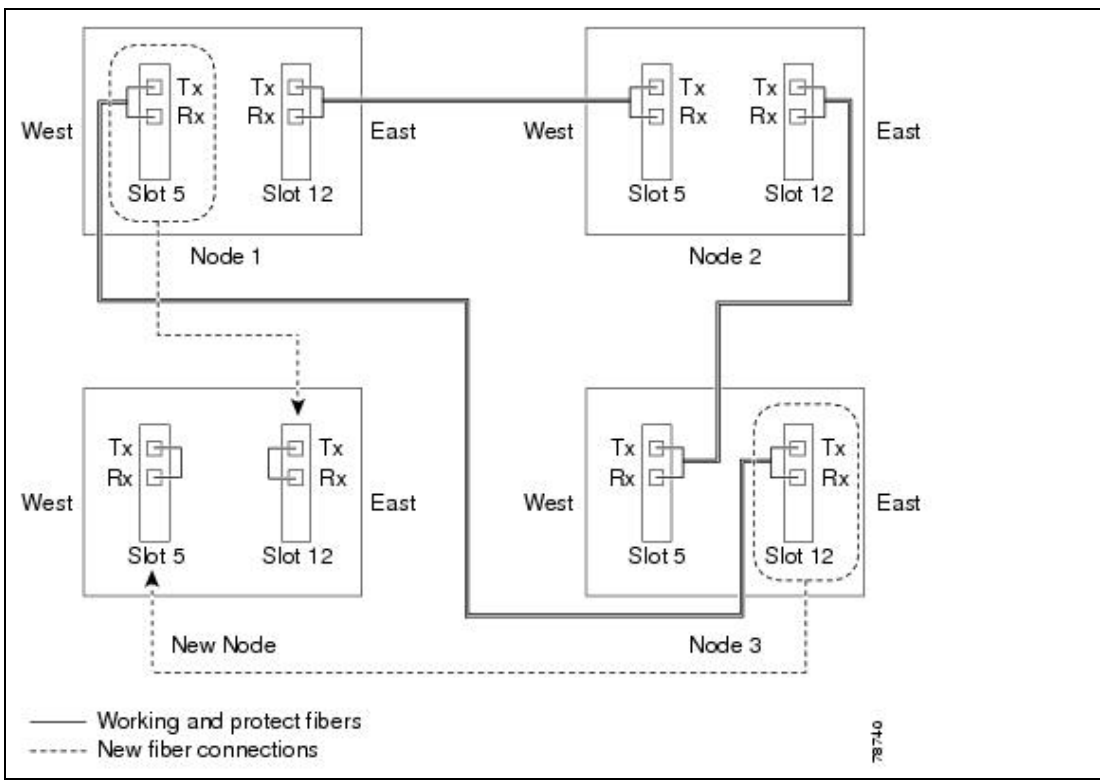
<b>Purpose</b>	
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	This procedure expands a BLSR by adding a node. All nodes in the ring must be on the same software version.
<b>Tools/Equipment</b>	Fiber for new node connections
<b>Prerequisite Procedures</b>	Cards must be installed and node turn-up procedures completed on the node that will be added to the BLSR. See <a href="#">Install Cards and Fiber-Optic Cable</a> , and <a href="#">Turn Up a Node</a> .
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

**Caution!** Adding a BLSR node can be service affecting and should be performed during a maintenance window.

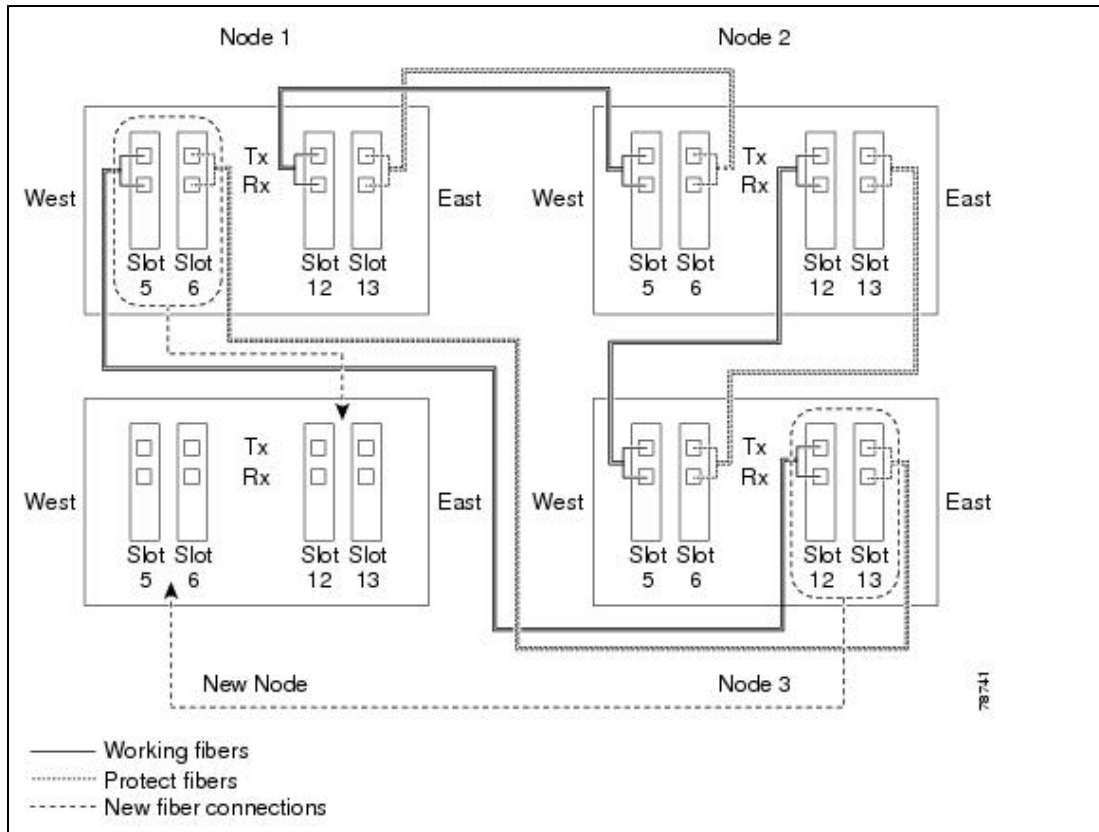
1. Check the software version on the node you are adding to the BLSR from the node view Maintenance > Software subtab. If it is not the same version as the nodes in the ring, you must upgrade or downgrade the new node to the same version as the other nodes in the ring. Refer to the release-specific software upgrade guide for more information on upgrading the ONS node software.
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 that will connect to the new node. This information is essential to complete this procedure without error. [Figure 14-1](#) shows a drawing of a three-node, two-fiber BLSR that uses Slots 5 and 12 for the BLSR trunk cards. The dashed arrow shows the new fiber connections that will be made to add the fourth node to the BLSR.

**Figure 14-1: Three-Node, Two-Fiber BLSR Before a Fourth Node Is Added**



[Figure 14-2](#) shows a sample drawing of a three-node, four-fiber BLSR. The dashed arrow shows 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 14-2: Three-Node, Four-Fiber BLSR Before a Fourth Node is Added



3. According to local site practice, complete the [NTP-A108 Back Up the Database](#) for all the nodes in the ring.
4. Verify the card installation on the new node using the [NTP-A323 Verify Card Installation](#). Verify that the OC-N cards that will be the BLSR trunk cards match the BLSR optical rate. For example, if the BLSR is OC-48, the new node must have OC-48 cards installed. If the OC-N cards are not installed or the optical rates do not match the BLSR, complete the [NTP-A16 Install Optical Cards and Connectors](#).
5. Verify that fiber is available to connect the new node to the existing nodes. Refer to the diagram drawn in Step 2.
6. Complete the [NTP-A35 Verify Node Turn-Up](#). In order to have CTC visibility to the new node after it is added, you must be an authorized user on the node and you must have IP connectivity to the node.
7. Create a static route on the new node if the following conditions are present. If the conditions are not present, continue with Step 8.

- The IP address for the new node is on the same subnet as other nodes in the network.
- On the Provisioning > Network > General subtab, the Enable Socks Proxy on Port and External Network Element (ENE) options are not selected under Gateway Settings on the new node.
- 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:  
*IP-address-of-the-CTC-computer-connected-to-the-new-node*
- Net Mask: **255.255.255.255**
- Next Hop: *IP-address-of-the-Cisco-ONS-15454*

## ONS\_15454\_Procedure\_Guide\_R8.5.1\_--\_Add\_and\_Remove\_Nodes

· Cost: 1

See the "[DLP-A65 Create a Static Route](#)" task. To view gateway settings, see the "[DLP-A249 Provision IP Settings](#)" task.

8. Complete the "[DLP-A60 Log into CTC](#)" task at a node in the BLSR.
9. Complete the "[DLP-A298 Check the Network for Alarms and Conditions](#)" task to verify that the BLSR is free of major alarms or problems. If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. See [Manage Alarms](#) or, if necessary, refer to the *Cisco ONS 15454 Troubleshooting Guide*.
10. From the View menu, choose **Go to Network View** and click the **Provisioning > BLSR** tabs.
11. On paper, record the Ring Name, Ring Type, Line Rate, Ring Reversion, and Span Reversion (4 Fiber).
12. From the Nodes column, record the Node IDs in the BLSR. The Node IDs are the numbers in parentheses next to the node name.
13. 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-A60 Log into CTC](#)" task.
14. Click the **Alarms** tab.
  1. Verify that the alarm filter is not on. See the "[DLP-A227 Disable Alarm Filtering](#)" task as necessary.
  2. Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for procedures.
15. Using the information recorded in Steps 11 and 12 and the diagram created in Step 2, create a BLSR on the new node. See the "[DLP-A242 Create a BLSR on a Single Node](#)" task.
16. (Optional.) Create test circuits, making sure they pass through the BLSR trunk cards and run test traffic through the node to ensure the cards are functioning properly. See the [NTP-A344 Create a Manually Routed Optical Circuit](#) and the [NTP-A62 Test Optical Circuits](#) for information.
17. Create the data communications channel (DCC) terminations on the new node. See the "[DLP-A377 Provision Section DCC Terminations](#)" task.

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

**Note:** If you map the K3 byte to another byte (such as E2), you must remap the line cards on either side of the new node to the same byte. See the "[DLP-A89 Remap the K3 Byte](#)" task.

18. Complete the "[DLP-A60 Log into CTC](#)" task at a BLSR node that will connect to the new node.
19. Referring to the diagram created in Step 2, complete the "[DLP-A303 Initiate a BLSR Force Ring Switch](#)" task on the node that will connect to the new node on its west line (port). In the [Figure 14-2](#) example, the BLSR force ring would occur at Node 1, West line (Slot 5 and 6).
20. Referring to the diagram created in Step 2, complete the "[DLP-A303 Initiate a BLSR Force Ring Switch](#)" task on the node that will connect to the new node on its east line (port). In the [Figure 14-2](#) example, the BLSR force ring would occur at Node 3, East line (Slot 12 and 13).
21. Click the **Alarms** tab.
  1. Verify that the alarm filter is not on. See the "[DLP-A227 Disable Alarm Filtering](#)" task as necessary.
  2. Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for procedures.
22. Following the diagram created in Step 2, remove the fiber connections from the two nodes that will connect to the new node.

## ONS\_15454\_Procedure\_Guide\_R8.5.1\_--\_Add\_and\_Remove\_Nodes

1. Remove the west fiber from the node that will connect to the east port of the new node. In the [Figure 14-1](#) example, this is Node 1, Slot 5, and in [Figure 14-2](#) this is Node 1, Slots 5 and 6.
2. Remove the east fiber from the node that will connect to the west port of the new node. In the [Figure 14-1: Three-Node, Two-Fiber BLSR Before a Fourth Node Is Added](#) example, this is Node 3, Slot 12, and in [Figure 14-2](#) this is Node 3, Slots 12 and 13.
23. 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.
24. After the newly added node appears in network view, double-click it to display the node in node view.
25. Click the **Provisioning > BLSR** tabs.
26. Click **Ring Map**. Verify that the new node appears on the Ring Map with the other BLSR nodes, then click **OK**.
27. From the View menu, choose **Go to Network View** and check the following:
  1. Click the **Provisioning > BLSR** tabs. Verify that the new node appears under the Node column.
  2. 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 present, log into the new node and verify that the BLSR is provisioned on it correctly with the information from Steps 11 and 12. If the node still does not appear, or if alarms persist, refer to the *Cisco ONS 15454 Troubleshooting Guide*.
28. Click the **Circuits** tab. Wait until all the circuits are discovered. The circuits that pass through the new node will be shown as incomplete.

**Note:** If the circuits take more than a minute to appear, log out of CTC, then log back in.

29. 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.
30. If incomplete circuits are still present, refer to the *Cisco ONS 15454 Troubleshooting Guide*.
31. Click the **History** tab. Verify that BLSR\_RESYNC conditions appear for every node in the BLSR.
32. Complete the "[DLP-A194 Clear a BLSR Force Ring Switch](#)" task to remove the ring switch from the east and west BLSR lines.
33. According to local site practice, complete the [NTP-A175 Two-Fiber BLSR Acceptance Test](#) or the [NTP-A176 Four-Fiber BLSR Acceptance Test](#).

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

## NTP-A240 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-A126 Create a BLSR</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

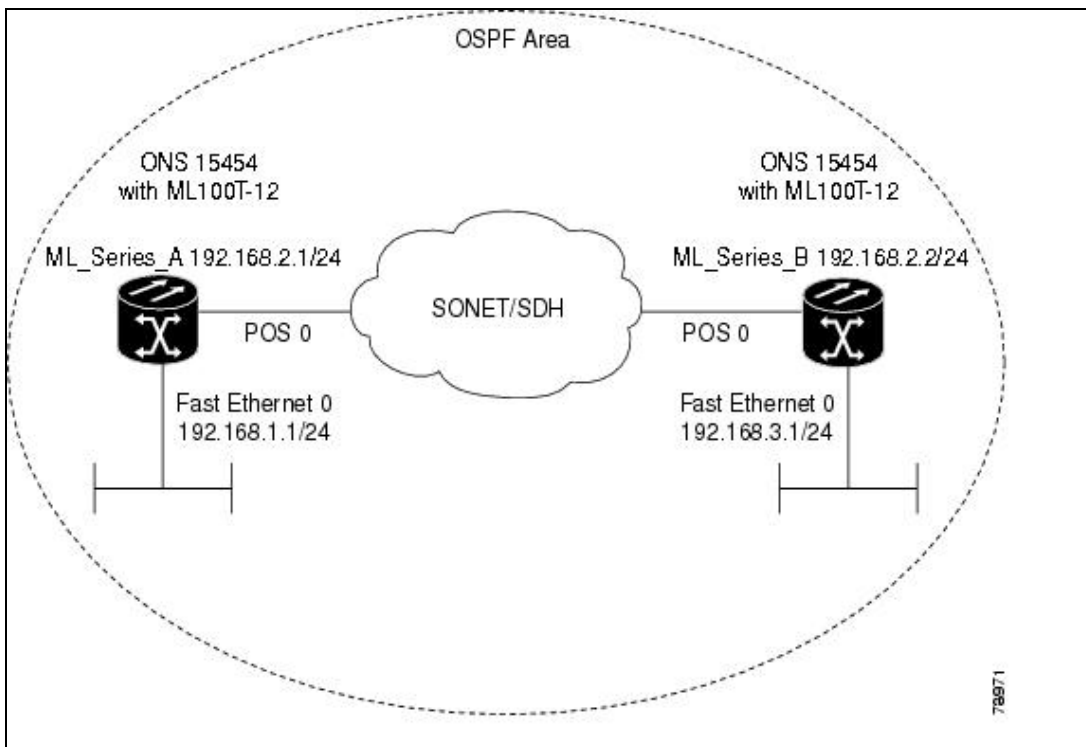
**Caution!** The following procedure minimizes traffic outages during node removals. You will delete all circuits that originate and terminate on the node that will be removed. In addition, you will verify that circuits passing through the node do not enter and exit the node on different STSs and/or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

1. According to local site practice, complete the NTP-A108 Back Up the Database for all the nodes in the ring.
2. Complete the "DLP-A60 Log into CTC" task at the node that you are going to remove from the BLSR.
3. Complete the "DLP-A195 Verify Timing in a Reduced Ring" task.
 

**Note:** If you remove a node that is the only building integrated timing supply (BITS) 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.
4. Create a diagram of the BLSR where you will remove the node. You can draw the BLSR manually, or print it from CTC by performing the following steps:
  1. From the View menu, choose **Go to Network View**.
  2. Click the **Provisioning > BLSR** tabs.
  3. Choose the desired BLSR, then click **Edit**.
  4. 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.
  5. Complete the "DLP-A531 Print CTC Data" task.
  6. Close the BLSR window by choosing **Close** from the File menu.
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 14-3, 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 14-3, Node 3 is the node connected through its east port to Node 4.

Write down the slot and port of the BLSR ring in the node.

**Figure 14-3: Four-Node, Two-Fiber BLSR Before a Node Is Removed**



6. Complete the "DLP-A298 Check the Network for Alarms and Conditions" task to verify that the BLSR is free of alarms. If trouble is indicated (for example, a major alarm exists), resolve the

- problem before proceeding. See [Manage Alarms](#) or, if necessary, refer to the *Cisco ONS 15454 Troubleshooting Guide*.
7. From the View menu, choose **Go to Other Node**. Choose the node that you will remove and click **OK**.
  8. Click the **Circuits** tab. If the Scope setting is set to Network, choose **Node** from the Scope drop-down list. Make sure that the Filter button is off (not indented) to ensure that all circuits are visible.
  9. Delete all circuits that originate or terminate on the node. See the "[DLP-A333 Delete Circuits](#)" task.
  10. Complete the "[DLP-A442 Verify Pass-Through Circuits](#)" task to verify that circuits passing through the target node enter and exit the node on the same STS and/or VT. K3 extension byte mapping is supported on all ONS 15600 OC-48 and OC-192 traffic cards, as well as the ONS 15454 OC-48 AS card.
  11. From the View menu, choose **Go to Network View**.
  12. Referring to the diagram created in Step 4, complete the "[DLP-A303 Initiate a BLSR Force Ring Switch](#)" task 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 14-3](#), you would perform a Force switch on the east port of Node 3 and the west port of Node 1.
  13. Click the **Alarms** tab.
    1. Verify that the alarm filter is not on. See the "[DLP-A227 Disable Alarm Filtering](#)" task as necessary.
    2. Verify that no unexplained alarms appear on the network. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for procedures
  14. Remove the fiber connections between the node being removed and the two neighboring nodes.
  15. If the two nodes that will be connected after the BLSR node is removed have OC-48 AS trunk (span) cards and their K3 bytes were remapped, complete the "[DLP-A422 Verify BLSR Extension Byte Mapping](#)" task. If not, continue with Step 16.
  16. Reconnect the fiber of the two neighboring nodes directly, west port to east port. For example, in [Figure 14-3](#), the east port of Node 3 (Slot 12) connects to the west port of Node 1 (Slot 5).
  17. Complete the following substeps:
    1. From the View menu, choose **Go to Other Node**. Choose one of the newly connected nodes and click **OK**.
    2. Click the **Provisioning > BLSR** tabs.
    3. Choose the BLSR that originally contained the removed node, and then click **Ring Map**.
    4. Wait until the removed node is no longer listed.
    5. Repeat Substeps 1 through 4 for the other newly connected node in the BLSR.
  18. Complete the "[DLP-A196 Delete a BLSR from a Single Node](#)" task.
  19. Click the **History** tab. Verify that the BLSR\_RESYNC condition appears for every node in the BLSR.
  20. Complete the "[DLP-A194 Clear a BLSR Force Ring Switch](#)" task to remove the Force protection switches.
  21. According to local site practice, complete the [NTP-A175 Two-Fiber BLSR Acceptance Test](#).
  22. Complete the "[DLP-A371 Remove Pass-through Connections](#)" task.
  23. 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-A156 Delete a Section DCC Termination](#)" task.

24. Click the **Circuits** tab and verify that no incomplete circuits are present. If incomplete circuits appear, repeat Steps 22 and 23.
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-A372 Delete a Node from a Specified Login Node Group](#)" task.

26. To remove another node from a BLSR, repeat this procedure for the desired node.
27. According to local site practice, complete the [NTP-A175 Two-Fiber BLSR Acceptance Test](#) or the [NTP-A176 Four-Fiber BLSR Acceptance Test](#).

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

## NTP-A351 Add a Path Protection Node

<b>Purpose</b>	This procedure adds a node to a path protection configuration.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	Cards must be installed and node turn-up procedures completed on the node that will be added to the path protection configuration. See <a href="#">Install Cards and Fiber-Optic Cable</a> , and <a href="#">Turn Up a Node</a> .  <a href="#">NTP-A44 Provision Path Protection Nodes</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

1. According to local site practice, complete the [NTP-A108 Back Up the Database](#) for all the nodes in the ring.
2. Log into an existing node in the path protection configuration where you want to add a node. See the "[DLP-A60 Log into CTC](#)" task for instructions. In order to have CTC visibility to the new node after it is added, you must be an authorized user on the node and you must have IP connectivity to the node.
3. Complete the "[DLP-A298 Check the Network for Alarms and Conditions](#)" task to verify that the path protection configuration is free of major alarms or problems. If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. See the *Cisco ONS 15454 Troubleshooting Guide*, as necessary.
4. Verify the card installation on the new node. See the [NTP-A323 Verify Card Installation](#). Check that the OC-N cards that will serve as the path protection trunk (span) cards match the path protection optical rate of the trunk cards to which the new node will be connected. For example, if the adjacent nodes have OC-48 trunk cards, the new node must have OC-48 cards installed. If the OC-N cards are not installed or the rate does not match the rate of the adjacent node trunk cards, complete the [NTP-A16 Install Optical Cards and Connectors](#) to install them.
5. Verify that fiber is available to connect the new node to the existing nodes.
6. Complete the [NTP-A35 Verify Node Turn-Up](#).
7. Create a static route on the new node if the following conditions are present. If the conditions are not present, continue with Step 8.
  - ◆ The IP address for the new node is on the same subnet as other nodes in the network.
  - ◆ On the Provisioning > Network > General subtab, the Enable Socks Proxy on Port and External Network Element (ENE) options are not selected under Gateway Settings for the new node.
  - ◆ 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 path protection configuration, 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-SDH*
  - ◆ Cost: **1**  
See the "[DLP-A65 Create a Static Route](#)" task. To view gateway settings, see the "[DLP-A249 Provision IP Settings](#)" task. The gateway settings area provisions the ONS 15600 SDH SOCKS proxy server features.
8. 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-A60 Log into CTC](#)" task.
  9. 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. See the *Cisco ONS 15454 Troubleshooting Guide*, as necessary.
  10. (Optional.) Create test circuits, making sure they pass through the path protection trunk cards, and run test traffic through the node to ensure that the cards are functioning properly. See the [NTP-A344 Create a Manually Routed Optical Circuit](#) and the [NTP-A62 Test Optical Circuits](#) for information.
  11. Create the DCC terminations on the new node. See the "[DLP-A377 Provision Section DCC Terminations](#)" task.
  12. From the View menu, choose **Go to Network View**.
  13. Complete the "[DLP-A197 Initiate a Path Protection Force Switch](#)" task to switch traffic away from the span that will be broken to connect to the new node.
  14. Two nodes will connect directly to the new node; remove their fiber connections:
    1. Remove the east fiber connection from the node that will connect to the west port of the new node.
    2. Remove the west fiber connection from the node that will connect to the east port of the new node.
  15. Replace the removed fibers with the fibers that are connected to the new node.
  16. Log out of CTC and log back into a node in the network.
  17. 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 for a few minutes to allow all the nodes to appear.
  18. Click the **Circuits** tab and wait for all the circuits to appear, including spans. Count the number of incomplete circuits.
 

**Note:** UNEQ-P alarms might appear on the nodes in your network; this is normal, and the alarms will clear after the circuits are updated.
  19. In the network view, right-click the new node and choose **Update Circuits With New Node** from the shortcut menu. Wait for the confirmation dialog box to appear. Verify that the number of updated circuits in the dialog box is correct.
  20. Click the **Circuits** tab and verify that no incomplete circuits are present.
 

**Note:** If the circuits take more than a minute to appear, log out of CTC, then log back in.
  21. Complete the "[DLP-A198 Clear a Path Protection Force Switch](#)" task to clear the protection switch.
  22. According to local site practice, complete the [NTP-A177 Path Protection Acceptance Test](#).
- Stop. You have completed this procedure.**

## NTP-A294 Remove a Path Protection Node

<b>Purpose</b>	This procedure removes a path protection or multiple path protection configurations from a node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-A44 Provision Path Protection Nodes</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.

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

1. Draw a diagram of the path protection configuration 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.
2. Complete the "[DLP-A60 Log into CTC](#)" task at a node in the network where you will remove a path protection node.
3. Complete the "[DLP-A298 Check the Network for Alarms and Conditions](#)" task to verify that the path protection configuration is free of alarms. If trouble is indicated (for example, a major alarm exists), resolve the problem before proceeding. See [Manage Alarms](#) or, if necessary, refer to the *Cisco ONS 15454 Troubleshooting Guide*.
4. Complete the "[DLP-A333 Delete Circuits](#)" task 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.)
5. Complete the "[DLP-A442 Verify Pass-Through Circuits](#)" task to verify that circuits passing through the target node enter and exit the node on the same STS.
6. Complete the "[DLP-A197 Initiate a Path Protection Force Switch](#)" task for all spans connected to the node you are removing.
7. Remove all fiber connections between the node being removed and the two neighboring nodes.
8. Reconnect the fiber of the two neighboring nodes directly, west port to east port.
9. Exit CTC and log back in. See the "[DLP-A60 Log into CTC](#)" task for instructions.
10. Log into each newly connected node and click the **Alarms** tab. Verify that the span cards are free of alarms. Resolve any alarms before proceeding. Refer to the *Cisco ONS 15454 Troubleshooting Guide*.
11. Complete the "[DLP-A195 Verify Timing in a Reduced Ring](#)" task.
12. Complete the "[DLP-A198 Clear a Path Protection Force Switch](#)" task to clear the protection switch.
13. Complete the [NTP-A177 Path Protection Acceptance Test](#).
14. Complete the "[DLP-A371 Remove Pass-through Connections](#)" task.
15. 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-A156 Delete a Section DCC Termination](#)" task.
16. Click the **Circuits** tab and verify that no incomplete circuits are present. If incomplete circuits appear, repeat Steps 14 and 15.
17. 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-A372 Delete a Node from a Specified Login Node Group](#)" task.
18. To remove another node from a path protection configuration, repeat this procedure for the desired node.

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

## NTP-A262 Add a Node to a Linear ADM

<b>Purpose</b>	This procedure adds a single ONS 15454 node to the end of an ONS 15454 linear add-drop multiplexer (ADM) network. If the linear ADM carries traffic, you cannot add a node between two linear ADM nodes using this procedure unless you delete and recreate the circuits. To avoid deleting and recreating the circuits, use the <a href="#">NTP-A323 Add a Node to a Linear ADM Using the Wizard</a> to add a node between two linear ADM nodes.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-A38 Provision a Linear ADM Network</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

**Note:** Optical transmit and receive levels should be in their acceptable range as shown in the specifications section for each card in [Table 2-5](#).

**Note:** In a linear ADM configuration, two OC-N cards in 1+1 protection are connected to two OC-N cards in 1+1 protection on a second node. On the second node, two more OC-N cards are connected to a third node. The third node can be connected to a fourth node, and so on, depending on the number of nodes in the linear ADM. Slots 1 to 4 and 14 to 17 or Slots 5 to 6 and 12 to 13 can be used if connections between nodes are consistent. For example, Slot 5 on the first linear ADM node connects to Slot 5 on the second linear ADM node for the working path, and Slot 6 connects to Slot 6 for the protect path. The working OC-N ports have DCC terminations, and the OC-N cards are in a 1+1 protection group.

1. According to local site practice, complete the [NTP-A108 Back Up the Database](#) for all the nodes in the ring.
2. At the new node, complete one of the following procedures:
  - ◆ If the node has not been turned up, complete all procedures in [Turn Up a Node](#).
  - ◆ If the node has been turned up, complete the [NTP-A35 Verify Node Turn-Up](#).
3. Verify that the new node has two OC-N cards with the same rate as the linear ADM. If the OC-N cards are not installed, complete the [NTP-A16 Install Optical Cards and Connectors](#).
4. Complete "[DLP-A73 Create a 1+1 Protection Group](#)" task for the two OC-N cards that will connect to the linear ADM node.
5. Complete the "[DLP-A377 Provision Section DCC Terminations](#)" task for the working OC-N card at the new node. Make sure to set the port service state in the Create SDCC Termination dialog box to **IS**. (Do not create a DCC termination on the protect card.)
 

**Note:** DCC failure alarms appear until you create DCC terminations in the linear ADM node and connect the fiber during Step 12.
6. Complete the "[DLP-A60 Log into CTC](#)" task at the linear ADM node that will connect to the new node. If you are already logged in, continue with Step 7.
7. Complete the "[DLP-A298 Check the Network for Alarms and Conditions](#)" task.
8. Install the OC-N cards that will connect to the new node. See the [NTP-A16 Install Optical Cards and Connectors](#). If the cards are already installed, continue with Step 9.
9. Connect the working card at the existing linear ADM node to the working card at the new node. See the "[DLP-A428 Install Fiber-Optic Cables in a 1+1 Configuration](#)" task.
10. Connect the protect card at the existing linear ADM node to the protect card at the new node.
11. Complete the "[DLP-A73 Create a 1+1 Protection Group](#)" task for the two OC-N cards that connect to the new node.

12. Complete the "[DLP-A377 Provision Section DCC Terminations](#)" task for the working OC-N card that connects to the working card on the new node. Make sure to set the port service state in the Create SDCC Termination dialog box to **IS**. (Do not create a DCC termination for the protect card.)
13. From the View menu, choose **Go to Network View**. Verify that the newly created linear ADM configuration is correct. Two green span lines should appear between each linear node.
14. Complete the "[DLP-A298 Check the Network for Alarms and Conditions](#)" task to verify that no unexpected alarms or conditions are present.

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

## NTP-A323 Add a Node to a Linear ADM Using the Wizard

<b>Purpose</b>	This procedure adds a node between two nodes in a 1+1 protection group 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 15454s 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 [Table 2-5](#).

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

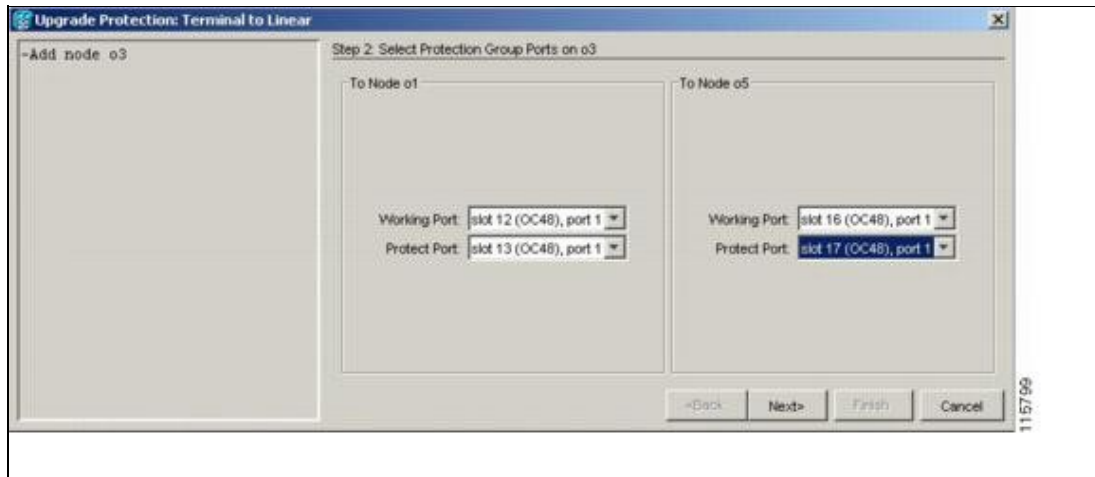
1. Complete the "[DLP-A60 Log into CTC](#)" task at a linear ADM node that will connect to the new node. If you are already logged in, continue with Step 2.
2. In network view, right-click the span between the two nodes where you want to add the new node. A dialog appears.
3. Select Upgrade Protection. A drop-down list appears.
4. Select **Terminal to Linear** and the first page of the upgrade protection: terminal to linear dialog box appears.
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.

**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 "[DLP-A155 Delete a Protection Group](#)" task. Delete any existing DCC terminations as described in the "[DLP-A156 Delete a Section DCC Termination](#)" task and the "[DLP-A359 Delete a Line DCC Termination](#)" task.

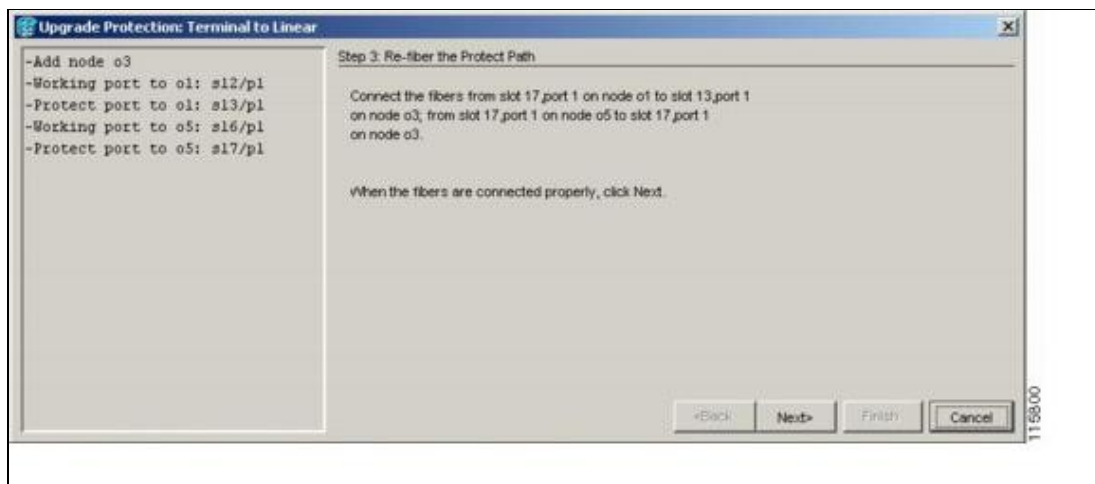
6. Enter the node host name or IP address, or choose the name of the new node from the drop-down list. If you type in the name, make sure it is identical to the actual node name. The node name is case sensitive.
7. Click **Next**. The Select Protection Group Ports page ([Figure 14-4](#)) appears.

**Figure 14-4: Selecting Protection Group Ports**



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.
9. Click **Next**. The Re-fiber the Protected Path dialog box appears ([Figure 14-5](#)).

**Figure 14-5: Refibering the Protect Path**



10. Follow the instructions in the dialog box for connecting the fibers between the nodes.
11. When the fibers are connected properly, click **Next**. The Update Circuit(s) on *Node-Name* dialog box appears.

**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 will need to restore the cables to the original positions and verify through CTC that traffic is on the working path of the nodes before restarting the process. To check 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.

12. Click Next on the Update Circuit(s) on *Node-Name* page to continue with the procedure.
13. 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.
14. 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.
15. 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.
16. The Completed page appears. This page is the final one in the process. Click Finish.

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

## NTP-A313 Remove an In-Service Node from a Linear ADM

<b>Purpose</b>	This procedure removes a node from a linear ADM without losing traffic.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">NTP-A38 Provision a Linear ADM Network</a>
<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, see the "[DLP-A154 Modify a 1+1 Protection Group](#)" task to change it to unidirectional. After you have removed the node from the linear group, you can change the protection setting back to bidirectional.

1. Complete the "[DLP-A60 Log into CTC](#)" task at a node in the network where you will remove the node.
2. From the View menu, choose **Go to Network View**.
3. Click the **Alarms** tab.
  1. Verify that the alarm filter is not on. See the "[DLP-A227 Disable Alarm Filtering](#)" task as necessary.
  2. Verify that no unexplained alarms appear on the network. If unexplained alarms appear, resolve them before continuing. Refer to the *Cisco ONS 15454 Troubleshooting Guide* if necessary.
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 15454 Troubleshooting Guide* if necessary.
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).
6. In node view, click the **Maintenance > Protection** tabs.
7. Initiate a Force switch on the working port:
  1. In the Protection Groups area, click the 1+1 protection group.
  2. In the Selected Group area, click the working port.
  3. Next to Switch Commands, click **Force**.
  4. In the Confirm Force Operation dialog box, click **Yes**.
  5. 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]
8. Repeat Step 5 through Step 7 for the node that is connected directly to the other side of the target node.

9. Remove the fiber from the working ports of the target node.
10. Connect the fiber between the working ports of the two nodes that were directly connected to either side of the target node.
11. On the node where you initiated a Force switch in Step 8, clear the switch:
  1. Next to Switch Commands, click **Clear**.
  2. In the Confirm Clear Operation dialog box, click **Yes**.
12. Initiate a Force switch on the protect port:
  1. In the Selected Group area, click the protect port. Next to Switch Commands, click **Force**.
  2. In the Confirm Force Operation dialog box, click **Yes**.
  3. 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]
13. From the View menu, choose **Go to Network View**.
14. On the network map, double-click the other node where you initiated a Force switch.
15. In node view, click the **Maintenance > Protection** tabs.
16. Clear the Force switch on the working port:
  1. In the Protection Groups area, click the 1+1 protection group.
  2. In the Selected Group area, click the working port.
  3. Next to Switch Commands, click **Clear**.
  4. In the Confirm Clear Operation dialog box, click **Yes**.
17. Complete Step 12 to initiate a Force switch on the protect port.
18. Remove the fiber from the protect ports on the target node.
19. Connect the fiber between the protect ports of the two nodes on each side of the target node.
20. Clear the Force switch:
  1. Next to Switch Commands, click **Clear**.
  2. In the Confirm Clear Operation dialog box, click **Yes**.
  3. In the Selected Group area, verify the following states:
    - ◇ Protect port - Protect/Standby
    - ◇ Working port - Working/Active
21. Repeat Step 13 through Step 16 to clear the switch on the other node.
22. Exit CTC.
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.**