CHAPTER 5

Turn Up a Network

This chapter explains how to turn up and test Cisco ONS 15310-CL or Cisco ONS 15310-MA nodes in a network, including terminal point-to-point networks and path protection configurations.

Before You Begin

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

1. NTP-C26 Verify Node Turn-Up, page 5-2—Complete this procedure before beginning network turn up.
2. NTP-C27 Provision a Point-to-Point Network, page 5-3—Complete as needed.
3. NTP-C28 Point-to-Point Network Acceptance Test, page 5-4—Complete this procedure after you create a point-to-point network.
4. NTP-C29 Provision a Linear ADM Network, page 5-6—Complete as needed.
5. NTP-C30 Linear ADM Network Acceptance Test, page 5-8—Complete this procedure after you create a linear ADM.
6. NTP-C31 Provision Path Protection Nodes, page 5-10—Complete as needed.
7. NTP-C32 Path Protection Acceptance Test, page 5-12—Complete this procedure after you create a path protection configuration.
8. NTP-C33 Provision an Open-Ended Path Protection Configuration, page 5-15—As needed, complete this procedure after you provision a path protection configuration.
9. NTP-C34 Open-Ended Path Protection Acceptance Test, page 5-18—As needed, complete this procedure after you provision an open-ended path protection configuration.
10. NTP-C146 Provision a Traditional Path Protection Dual-Ring Interconnect on the ONS 15310-MA, page 5-21—As needed, complete this procedure after you provision a path protection configuration.
11. NTP-C147 Provision an Integrated Path Protection Dual-Ring Interconnect on the ONS 15310-MA, page 5-24—As needed, complete this procedure after you provision a path protection configuration.
12. NTP-C35 Create a Logical Network Map, page 5-26—Complete as needed.

NTP-C26 Verify Node Turn-Up

Purpose	This procedure verifies that each ONS 15310-CL or ONS 15310-MA is ready for network turn up before adding nodes to a network.
Tools/Equipment	None
Prerequisite Procedures	Chapter 4, "Turn Up a Node"
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Superuser

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at any node on the network you will test. If you are already logged in, continue with Step 2.

Step 2 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

Step 3 Verify that the SW Version and Defaults in the node view status area match the software version and the network element (NE) defaults shown in your site plan.

Step 4 Click the **Provisioning > General** tabs. Verify that all general node information settings match the settings of your site plan. If not, see the "NTP-C78 Change Node Management Information" procedure on page 11-2.

Step 5 Click the **Provisioning > Timing** tabs. Verify that the timing settings match the settings on your site plan. If not, see the "NTP-C82 Change Node Timing" procedure on page 11-6.

Step 6 Click the **Provisioning > Network** tabs. Ensure that the IP settings and other CTC network access information is correct. If not, see the "NTP-C79 Change CTC Network Access" procedure on page 11-2.

Step 7 Click the **Provisioning > Protection** tabs. Verify that all protection groups have been created according to your site plan. If not, see the "NTP-C143 Modify or Delete Card Protection Settings" procedure on page 11-5.

Step 8 Click the **Provisioning > Security** tabs. Verify that all users have been created and their security levels and policies match the settings indicated by your site plan. If not, see the "NTP-C83 Modify Users and Change Security" procedure on page 11-6.

Step 9 If SNMP is provisioned on the node, click the **Provisioning > SNMP** tabs. Verify that all SNMP settings match the settings of your site plan. If not, see the "NTP-C84 Change SNMP Settings" procedure on page 11-7.

Stop. You have completed this procedure.

NTP-C27 Provision a Point-to-Point Network

Purpose	This procedure provisions two ONS 15310-CL or ONS 15310-MA nodes in a 1+1 point-to-point (terminal) network.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at the ONS 15310-CL or ONS 15310-MA on the network where you want to provision a point-to-point configuration. If you are already logged in, continue with Step 2.

Step 2 Click the **Provisioning > Protection** tabs. Verify that 1+1 protection is created for an optical port on the 15310-CL-CTX or CTX2500. Complete the "NTP-C141 Create Optical Protection Groups for the ONS 15310-CL" procedure on page 4-12 or "NTP-C142 Create Protection Groups for the ONS 15310-MA" procedure on page 4-14 if protection has not been created.

Step 3 Repeat Steps 1 and 2 for the second point-to-point node.

Step 4 Verify that the working and protect ports in the protection groups correspond to the physical fiber connections between the nodes, that is, verify that the working port in one node connects to the working port in the other node and that the protect port in one node connects to the protect port in the other node.

Step 5 Complete the "DLP-C52 Provision Section DCC Terminations" task on page 17-69 for the working optical port signal on both point-to-point nodes. Alternatively, if additional bandwidth is needed for CTC management, complete the "DLP-C53 Provision Line DCC Terminations" task on page 17-72.

Note DCC terminations are not provisioned on the protect ports.

Note The SDCCs and LDCCs should not be provisioned between SONET (ANSI) and SDH (ETSI) nodes using CTC or TL1 because they cannot operate between SONET and SDH nodes. These communication channels should be provisioned on similar nodes, such as SONET-to-SONET or SDH-to-SDH. To establish communication channels between SONET and SDH nodes, create a DCC tunnel. See the "DLP-C67 Create a DCC Tunnel" task on page 17-85 to create a DCC tunnel.

Note If the point-to-point nodes are not connected to a LAN, you will need to create the DCC terminations using a craft (direct) connection to the node. Remote provisioning is possible only after all nodes in the network have DCC terminations provisioned to in-service on the 15310-CL-CTX ports for the ONS 15310 CL or the CTX2500 ports for the ONS 15310 MA.

Step 6 As needed, complete the "DLP-C47 Provision a Proxy Tunnel" task on page 17-65.

Step 7 As needed, complete the "DLP-C48 Provision a Firewall Tunnel" task on page 17-66.

Step 8 As needed, complete the "DLP-C49 Create a Provisionable Patchcord" task on page 17-67 on both point-to-point nodes.

Step 9 Complete the "DLP-C50 Change the Service State for a Port" task on page 17-68 to put the protect port in-service.

Step 10 Verify that timing is set up at both point-to-point nodes. If not, complete the "NTP-C23 Set Up Timing" procedure on page 4-12 for one or both of the nodes.

Step 11 Complete the "NTP-C28 Point-to-Point Network Acceptance Test" procedure on page 5-4.

Stop. You have completed this procedure.

NTP-C28 Point-to-Point Network Acceptance Test

Purpose	This procedure tests two ONS 15310-CLs or two ONS 15310-MAs in a point-to-point network.
Tools/Equipment	Test set/cables appropriate to the test circuit you will create
Prerequisite Procedures	NTP-C27 Provision a Point-to-Point Network, page 5-3
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at one of the point-to-point nodes. If you are already logged in, continue with Step 2.

Step 2 From the View menu choose **Go to Network View**.

Step 3 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export the alarm data to a file.

Step 4 Click the **Conditions** tab.

a. Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

b. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export the condition data to a file.

Step 5 On the network map, double-click a point-to-point node to open it in node view.

Step 6 Create a test circuit from the login node to the other point-to-point node:

- For DS-1 circuits, complete the "DLP-C37 Create a New User on a Single Node" task on page 17-51. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For DS-3 circuits, complete the "NTP-C40 Create an Automatically Routed DS-3 or EC-1 Circuit" procedure on page 6-17. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.

- For optical circuits, complete the "NTP-C47 Create an Automatically Routed Optical Circuit" procedure on page 6-35. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.

Step 7 For the ONS 15310-CL, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-CL, if you are testing an unmuxed DS-1, you must have a DSX-1 panel or use the high-density DS1 interface through the LFH-96 connector. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-CL, if you are testing a clear channel DS-3 or EC-1, you must have a direct DS-3/EC-1 interface into the ONS 15310-CL through the BBE ports on the 15310-CL-CTX. Set the test set for clear channel DS-3. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 8 For the ONS 15310-MA, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-MA, if you are testing an unmuxed DS-1, use the Champ connectors on the BICs on the rear of the chassis. Set the test set for DS-1. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-MA, if you are testing a clear channel DS-3 or EC-1, use the BNC connectors on the BICs on the rear of the chassis. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 9 Verify the integrity of all patch cables that will be used in this test by connecting one end to the test set transmit (Tx) connector and the other end to the test set receive (Rx) connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before going to Step 10.

Step 10 Create a physical loopback at the circuit destination. To do so, attach one end of a patch cable to the destination port Tx connector; attach the other end to the port Rx connector.

Step 11 At the circuit source:

a. Connect the Tx connector of the test set to the Rx connector on the circuit source port.

b. Connect the test set Rx connector to the circuit Tx connector on the circuit source port.

Step 12 Verify that the test set displays a clean signal. If a clean signal is not present, repeat Steps 6 to 11 to make sure the test set and cabling are configured correctly.

Step 13 If a node fails any test, repeat the test while verifying correct setup and configuration. If the test fails again, refer to the next level of support.

Step 14 Inject BIT errors from the test set. Verify that the errors display at the test set, indicating a complete end-to-end circuit.

Step 15 Complete the "DLP-C54 Optical 1+1 Protection Test" task on page 17-73.

Step 16 Set up and complete a BER test. Use the existing configuration and follow your site requirements for the specified length of time. Record the test results and configuration.

Step 17 Remove any loopbacks, switches, or test sets from the nodes after all testing is complete. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

Step 18 From the View menu choose **Go to Network View**.

Step 19 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export the alarm data to a file.

Step 20 Repeat Steps 10 to 19 for the other point-to-point node.

Step 21 If a node fails any test, repeat the test while verifying correct setup and configuration. If the test fails again, refer to the next level of support.

Step 22 Delete the test circuit. See the "DLP-C115 Delete Circuits" task on page 18-21 for instructions.

After all tests are successfully completed and no alarms exist in the network, the network is ready for service application.

Stop. You have completed this procedure.

NTP-C29 Provision a Linear ADM Network

Purpose	This procedure provisions ONS 15310-CL or ONS 15310-MA nodes in a linear add-drop multiplexer (ADM) configuration.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

Note In a linear ADM configuration, two OC-N ports in 1+1 protection are connected to two OC-N ports in 1+1 protection on a second node. On the second node, two more OC-N ports 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. The ONS 15310-CL has only two optical ports. This restricts an ONS 15310-CL to being the end node in a linear ADM network since both ports are necessary to create the 1+1 protection group to the neighbor node. The ONS 15310-MA does not have this restriction since it has four optical ports.

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at an ONS 15310-CL or ONS 15310-MA that you want to provision in a linear ADM network. If you are already logged in, continue with Step 2.

Figure 5-1 shows two ONS 15310-CLs in a linear ADM configuration with an ONS 15454. In this example, working traffic flows from the ONS 15310 Node 1/Slot 2/Port 2-1 to the ONS 15454 Node 2/Slot 5, and from Node 2/Slot 12 to the ONS 15310 Node 3/Slot 2/Port 2-1. You create the protect path by placing Slot 2/Port 2-1 in 1+1 protection with Slot 2/Port 1-1 at Nodes 1 through 3.

Figure 5-1 ONS 15310-CL Linear ADM Configuration

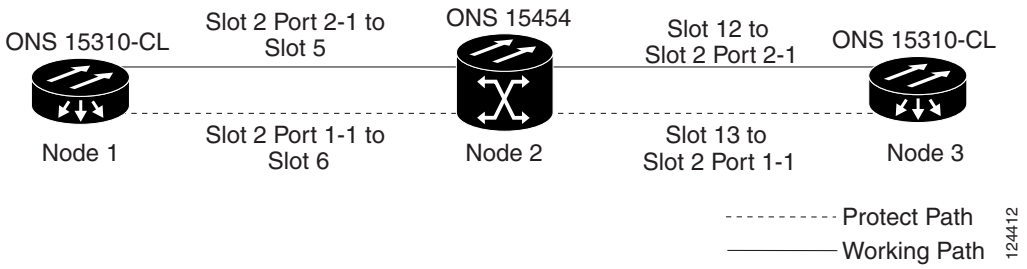
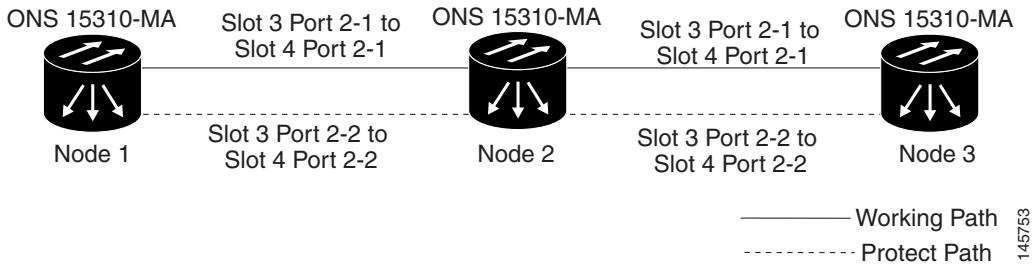


Figure 5-2 shows three ONS 15310-MAs in a linear ADM configuration. In this example, working traffic flows from Node 1/Slot 3/Port 2-1 to Node 2/Slot 4/Port 2-1, and from Node 2/Slot 3/Port 2-1 to the Node 3/Slot 4/Port 2-1. You create the protect path by placing Slot 3/Port 2-1 in 1+1 protection with Slot 3/Port 2-2 at Node 1, Slot 3/Port 2-1 in 1+1 protection with Slot 3/Port 2-2 and Slot 4/Port 2-1 in 1+1 protection with Slot 4/Port 2-2 at Node 2, and Slot 4/Port 2-1 in 1+1 protection with Slot 4/Port 2-2 at Node 3.

Figure 5-2 ONS 15310-MA Linear ADM Configuration



Step 2 Click the **Provisioning > Protection** tabs. Verify that 1+1 protection is created for the 15310-CL-CTX or CTX2500 at the node. If the protection group has not been created, complete the "NTP-C141 Create Optical Protection Groups for the ONS 15310-CL" procedure on page 4-12.

Step 3 Repeat Steps 1 and 2 for all other nodes that you will include in the linear ADM.

Step 4 Verify that the working and protect ports in the 1+1 protection groups correspond to the physical fiber connections between the nodes, that is, working ports are fibered to working ports and protect ports are fibered to protect ports.

Step 5 Complete the "DLP-C52 Provision Section DCC Terminations" task on page 17-69 for the working optical ports on each linear ADM node. Alternatively, if additional bandwidth is needed for CTC management, complete the "DLP-C53 Provision Line DCC Terminations" task on page 17-72.

Note If linear ADM nodes are not connected to a LAN, you will need to create the DCC terminations using a craft (direct) connection to the node. Remote provisioning is possible only after all nodes without LAN connections have DCC terminations provisioned to in-service optical ports.

Note Terminating nodes will have one DCC termination (Nodes 1 and 3 in Figure 5-1 on page 5-7), and intermediate nodes will have two DCC terminations (Node 2/Slot 5 and Node 2/Slot 12 in Figure 5-1). An ONS 15310-CL cannot be used as an intermediate node because two optical ports are required. An ONS 15310-MA can be used as an intermediate node.

Step 6 As needed, complete the "DLP-C47 Provision a Proxy Tunnel" task on page 17-65.

Step 7 As needed, complete the "DLP-C48 Provision a Firewall Tunnel" task on page 17-66.

Step 8 As needed, complete the "DLP-C49 Create a Provisionable Patchcord" task on page 17-67 on all linear ADM nodes.

Step 9 Verify that timing has been set up at each linear node. If not, complete the "NTP-C23 Set Up Timing" procedure on page 4-12.

Step 10 Complete the "NTP-C30 Linear ADM Network Acceptance Test" procedure on page 5-8.

Stop. You have completed this procedure.

NTP-C30 Linear ADM Network Acceptance Test

Purpose	This procedure tests a linear ADM network.
Tools/Equipment	Test set/cables appropriate to the test circuit you will create
Prerequisite Procedures	NTP-C29 Provision a Linear ADM Network, page 5-6
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at an ONS 15310-CL or ONS 15310-MA on the linear ADM network you are testing. If you are already logged in, continue with Step 2.

Step 2 From the View menu choose **Go to Network View**.

Step 3 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export alarm data to a file on your hard drive.

Step 4 Click the **Conditions** tab.

a. Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

b. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export condition data to a file on your hard drive.

Step 5 On the network map, double-click the linear ADM node you are testing to open it in node view.

Step 6 Create a test circuit from that node to an adjacent linear ADM node:

- For DS-1 circuits, complete the "NTP-C37 Create an Automatically Routed DS-1 Circuit" procedure on page 6-6. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For DS-3 circuits, complete the "NTP-C40 Create an Automatically Routed DS-3 or EC-1 Circuit" procedure on page 6-17. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For OC-N circuits, complete the "NTP-C47 Create an Automatically Routed Optical Circuit" procedure on page 6-35. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.

Step 7 For the ONS 15310-CL, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-CL, if you are testing an unmuxed DS-1, you must have a DSX-1 panel or use the high-density DS1 interface through the LFH-96 connector. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-CL, if you are testing a clear channel DS-3 or EC-1, you must have a direct DS-3/EC-1 interface into the ONS 15310-CL through the BBE ports on the 15310-CL-CTX. Set the test set for clear channel DS-3. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 8 For the ONS 15310-MA, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-MA, if you are testing an unmuxed DS-1, use the Champ connectors on the BICs on the rear of the chassis. Set the test set for DS-1. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-MA, if you are testing a clear channel DS-3 or EC-1, use the BNC connectors on the BICs on the rear of the chassis. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 9 Verify the integrity of all patch cables that will be used in this test by connecting one end to the test set transmit (Tx) connector and the other end to the test set receive (Rx) connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before going to the next step.

Step 10 Create a physical loopback at the circuit destination. To do so, attach one end of a patch cable to the destination port's Tx connector; attach the other end to the destination port's Rx connector.

Step 11 At the circuit source:

a. Connect the Tx connector of the test set to the circuit Rx connector.

b. Connect the test set Rx connector to the circuit Tx connector.

Step 12 Verify that the test set displays a clean signal. If a clean signal is not displayed, repeat Steps 6 through 11 to make sure the test set and cabling are configured correctly.

Step 13 Inject BIT errors from the test set. Verify that the errors appear on the test set, indicating a complete end-to-end circuit.

Step 14 Complete the "DLP-C54 Optical 1+1 Protection Test" task on page 17-73 to test the OC-N port protection group switching.

Step 15 Set up and complete a BER test. Use the existing configuration and follow your site requirements for length of time. Record the test results and configuration.

Step 16 Remove any loopbacks, switches, or test sets from the nodes after all testing is complete. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

Step 17 In network view, click the **Alarms** tab. Verify that the network does not have any unexplained alarms. If unexplained alarms are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

Step 18 Delete the test circuit. See the "DLP-C115 Delete Circuits" task on page 18-21 for instructions.

Step 19 Repeat Steps 5 through 18 for the next linear ADM node you are testing.

Step 20 If a node fails any test, repeat the test while verifying correct setup and configuration. If the test fails again, refer to the next level of support.

After all tests are successfully completed and no alarms exist in the network, the network is ready for service application.

Stop. You have completed this procedure.

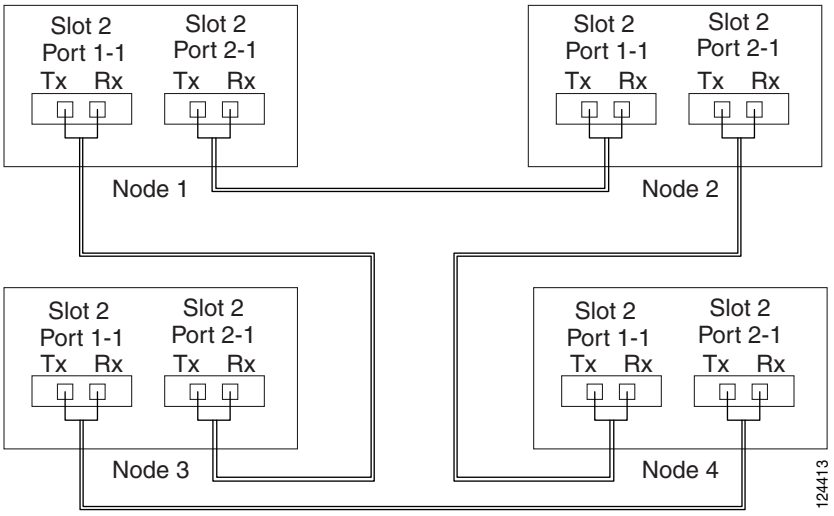
NTP-C31 Provision Path Protection Nodes

Purpose	This procedure provisions nodes for inclusion in a path protection configuration. A path protection configuration is created after the fiber connections are made.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

Note Path protection is the default ONS 15310-CL and ONS 15310-MA topology. It is available as soon as you install the SFPs (which provide the optical ports), connect the OC-N fibers, and create the DCC terminations.

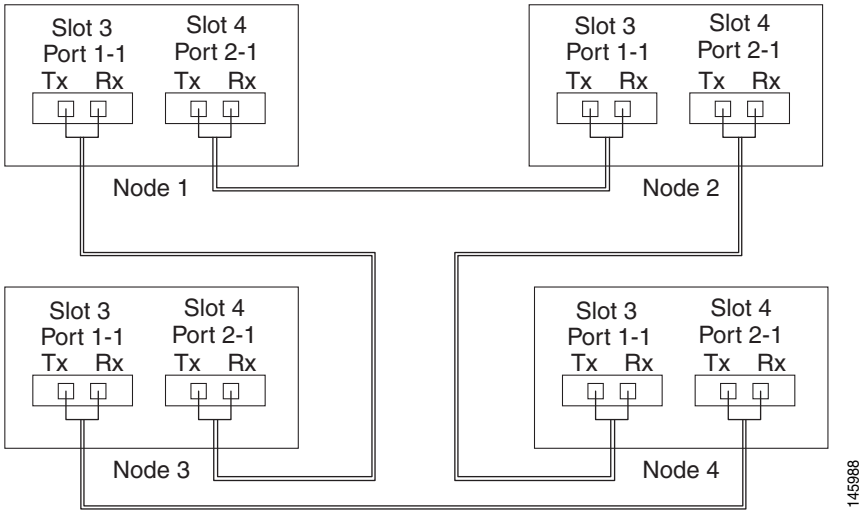
Step 1 For the ONS 15310-CL, verify that the fiber is correctly connected to the path protection trunk (span) optical ports similar to Figure 5-3. See the "NTP-C8 Install Optical Cables" procedure on page 1-13.

Figure 5-3 ONS 15310-CL Path Protection Fiber Connection Example



Step 2 For the ONS 15310-MA, verify that the fiber is correctly connected to the path protection trunk (span) optical ports similar to Figure 5-4. See the "NTP-C160 Install Optical Cables" procedure on page 2-28.

Figure 5-4 ONS 15310-MA Path Protection Fiber Connection Example



Step 3 Complete the "DLP-C29 Log into CTC" task on page 17-43 at an ONS 15310-CL or ONS 15310-MA in the path protection configuration you are turning up. If you are already logged in, continue with Step 4.

Step 4 Complete the "DLP-C52 Provision Section DCC Terminations" task on page 17-69 for the two ports that will serve as the path protection ports on the node. For example, on an ONS 15310-CL you can use Node 1/Slot 2/Port 2-1 (OC-3) and Node 1/Slot 2/Port 1-1 (OC-3). On an ONS 15310-MA, you can use

Node 1/Slot 3/Port 2-1 (OC-3) and Node 1/Slot 4/Port 1-1 (OC-3). (Alternatively, if additional bandwidth is needed for CTC management, complete the "DLP-C53 Provision Line DCC Terminations" task on page 17-72.)

Note If an ONS 15310-CL or ONS 15310-MA is not connected to a corporate LAN, DCC provisioning must be performed through a craft (direct) connection. Remote provisioning is possible only after all nodes in the network have DCC terminations provisioned to in-service for ports on the 15310-CL-CTX for the ONS 15310-CL or the CTX2500 for the ONS 15310-MA.

Step 5 Repeat Steps 3 and 4 for each node in the path protection configuration.

Step 6 As needed, complete the "DLP-C47 Provision a Proxy Tunnel" task on page 17-65.

Step 7 As needed, complete the "DLP-C48 Provision a Firewall Tunnel" task on page 17-66.

Step 8 As needed, complete the "DLP-C49 Create a Provisionable Patchcord" task on page 17-67 on both point-to-point nodes.

Step 9 Complete the "NTP-C32 Path Protection Acceptance Test" procedure on page 5-12.

Stop. You have completed this procedure.

NTP-C32 Path Protection Acceptance Test

Purpose	This procedure tests a path protection configuration.
Tools/Equipment	Test set and cables appropriate to the test circuit you will create
Prerequisite Procedures	NTP-C31 Provision Path Protection Nodes, page 5-10
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43. If you are already logged in, continue with Step 2.

Step 2 From the View menu choose **Go to Network View**.

Step 3 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export alarm data to a file on your hard drive.

Step 4 Click the **Conditions** tab.

a. Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

b. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export condition data to a file on your hard drive.

Step 5 On the network map, double-click the node that you logged into in Step 1.

Step 6 Create a test circuit from that node to the next adjacent path protection node.

- For DS-1 circuits, complete the "NTP-C37 Create an Automatically Routed DS-1 Circuit" procedure on page 6-6. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For DS-3 circuits, complete the "NTP-C40 Create an Automatically Routed DS-3 or EC-1 Circuit" procedure on page 6-17. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For OC-N circuits, complete the "NTP-C47 Create an Automatically Routed Optical Circuit" procedure on page 6-35. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.

Step 7 For the ONS 15310-CL, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-CL, if you are testing an unmuxed DS-1, you must have a DSX-1 panel or use the high-density DS1 interface through the LFH-96 connector. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-CL, if you are testing a clear channel DS-3 or EC-1, you must have a direct DS-3/EC-1 interface into the ONS 15310-CL through the BBE ports on the 15310-CL-CTX. Set the test set for clear channel DS-3. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 8 For the ONS 15310-MA, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-MA, if you are testing an unmuxed DS-1, use the Champ connectors on the BICs on the rear of the chassis. Set the test set for DS-1. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-MA, if you are testing a clear channel DS-3 or EC-1, use the BNC connectors on the BICs on the rear of the chassis. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 9 Verify the integrity of all patch cables that will be used in this test by connecting one end to the test set transmit (Tx) connector and the other end to the test set receive (Rx) connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before continuing.

Step 10 Create a physical loopback at the circuit destination:

a. Attach one end of a patch cable to the destination port Tx connector.

b. Attach the other end to the port Rx connector.

Step 11 At the circuit source:

a. Connect the Tx connector of the test set to the circuit Rx connector.

b. Connect the test set Rx connector to the circuit Tx connector.

Step 12 Verify that the test set displays a clean signal. If a clean signal is not displayed, repeat Steps 1 through 9 to make sure the test set and cabling are configured correctly.

Step 13 Inject BIT errors from the test set. To verify that you have a complete end-to-end circuit, verify that the errors display at the test set.

Step 14 From the View menu choose **Go to Network View**.

Step 15 Click one of the two spans leaving the circuit source node and complete the "DLP-C55 Path Protection Switching Test" task on page 17-75.

Step 16 In network view, click the other circuit source span and complete the "DLP-C55 Path Protection Switching Test" task on page 17-75.

Step 17 Set up and complete a BER Test. Use the existing configuration and follow your site requirements for the length of time. Record the test results and configuration.

Step 18 Complete the "DLP-C115 Delete Circuits" task on page 18-21 to delete the test circuit.

Step 19 Remove any loopbacks, switches, or test sets from the nodes after all testing is complete. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

Step 20 Click the **Alarms** tab.

- **a.** Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.
- **b.** Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.
- **c.** Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export alarm data to a file on your hard drive.

Step 21 Click the **Conditions** tab.

- **a.** Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.
- **b.** Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export condition data to a file on your hard drive.

Step 22 Repeat Steps 6 through 21 for each node on the network.

Step 23 If a node fails any test, repeat the test while verifying correct setup and configuration. If the test fails again, refer to the next level of support.

After all tests are successfully completed and no alarms exist in the network, the network is ready for service application. Continue with Chapter 6, "Create Circuits and VT Tunnels."

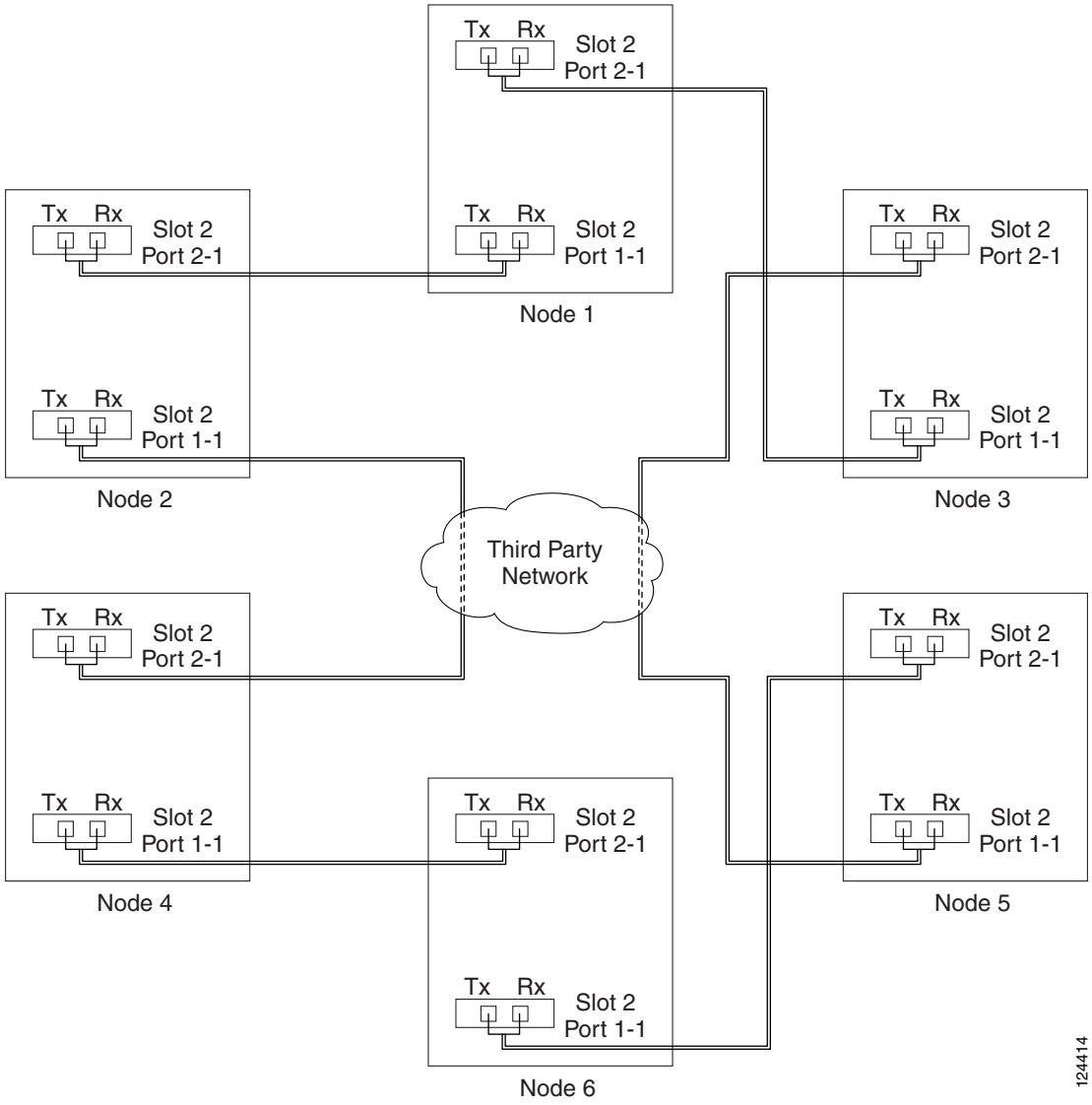
Stop. You have completed this procedure.

NTP-C33 Provision an Open-Ended Path Protection Configuration

Purpose	This procedure provisions ONS 15310-CL or ONS 15310-MA nodes in an open-ended path protection connected to a third-party vendor network. This topology allows you to route a circuit from one ONS 15310 network to another ONS 15310 network through the third-party network.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

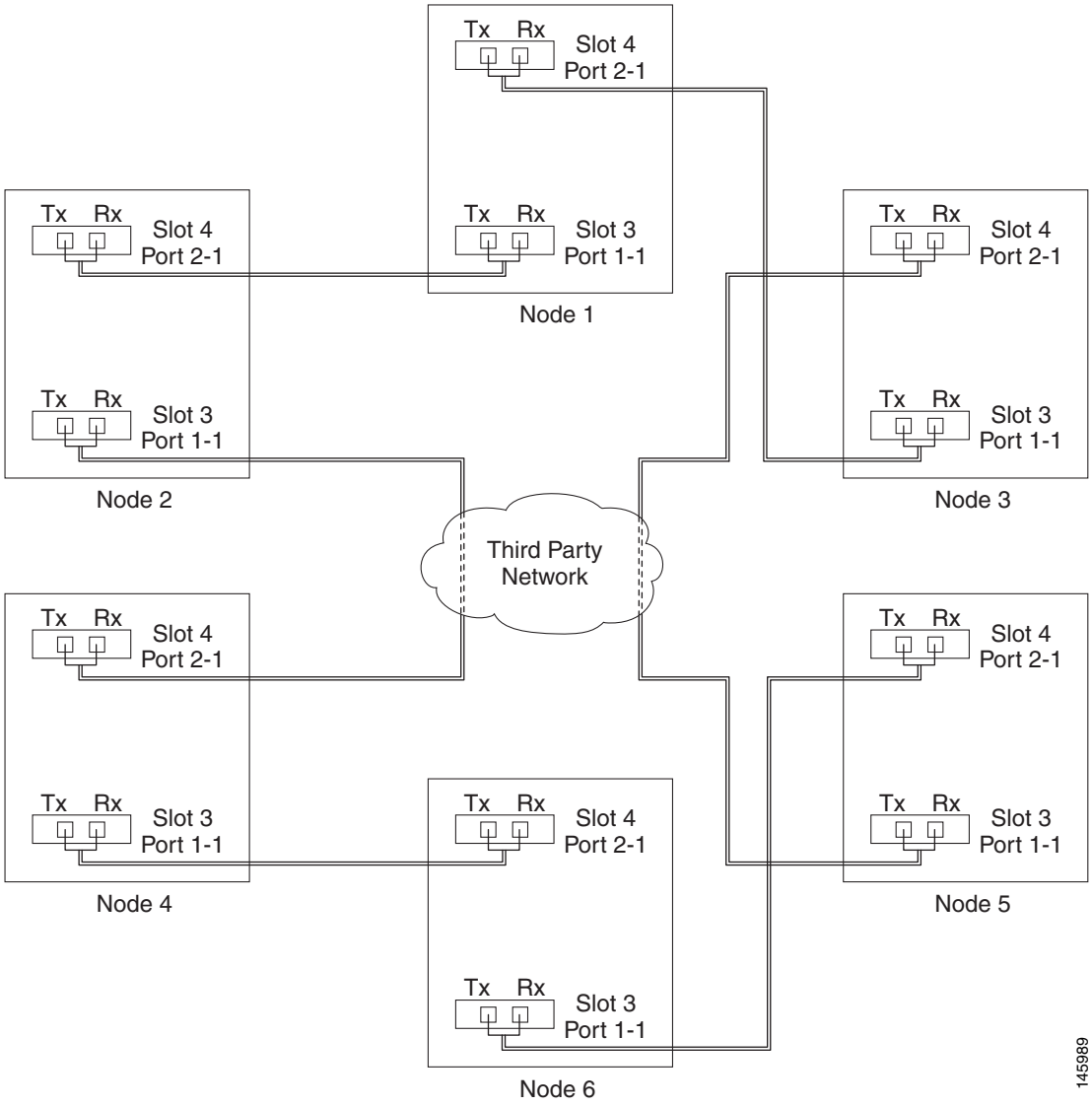
Step 1 Verify that the fiber is correctly connected to the path protection optical ports at each open-ended path protection node. For the ONS 15310-CL, Figure 5-5 shows an example. Node 1 is connected to ONS 15310-CL Nodes 2 and 3 through Slot 2/Port 2-1 and Slot 2/Port 1-1. Optical ports on 15310-CL-CTX at Nodes 2 and 3 are connected to the third-party vendor equipment.

Figure 5-5 ONS 15310-CL Open-Ended Path Protection Configurations Fiber Connection Example



Step 2 For the ONS 15310-MA, Figure 5-6 shows an example. Node 1 is connected to ONS 15310-MA Nodes 2 and 3 through Slot 3/Port 1-1 and Slot 4/Port 2-1. Optical ports on CTX2500 at Nodes 2 and 3 are connected to the third-party vendor equipment.

Figure 5-6 ONS 15310-MA Open-Ended Path Protection Configurations Fiber Connection Example



Step 3 Verify that the third-party cards or units to which the ONS 15310-CL or ONS 15310-MA trunk ports are connected are the same OC-N rate as the ONS 15310 trunk ports. The third-party time slots must match the ONS 15310 time slots to which they are connected. For example, if you are using an OC-3 port, the third-party vendor card or unit must have STSs 1-3 available.

Step 4 Complete the "DLP-C29 Log into CTC" task on page 17-43 at the node you are turning up. If you are already logged in, continue with Step 5.

Step 5 Complete the "DLP-C52 Provision Section DCC Terminations" task on page 17-69 for the ONS 15310-CL or ONS 15310-MA cards/ports that are connected to another ONS 15310-CL or ONS 15310-MA. (Alternatively, if additional bandwidth is needed for CTC management, complete the "DLP-C53 Provision Line DCC Terminations" task on page 17-72.) Do not create a DCC termination for the card/port that connects to the third-party equipment. The ONS 15310-CL for example in Figure 5-5, has DCC terminations created at the following cards/ports:

- Nodes 1 and 6: Slot 2, Port 2-1 and Slot 2, Port 1-1

- Node 2 and 5: Slot 2, Port 2-1
- Node 3 and 4: Slot 2, Port 1-1

The ONS 15310-MA in Figure 5-6, has DCC terminations created at the following cards/ports:

- Nodes 1 and 6: Slot 4, Port 2-1 and Slot 3, Port 1-1
- Node 2 and 5: Slot 4, Port 2-1
- Node 3 and 4: Slot 3, Port 1-1

Note If an ONS 15310-CL or ONS 15310-MA is not connected to a corporate LAN, DCC provisioning must be performed through a direct (craft) connection. Remote provisioning is possible only after all nodes in the network have DCC terminations provisioned to in-service OC-N ports.

Step 6 Repeat Steps 4 through 5 for each node in the path protection configuration.

Step 7 As needed, complete the "DLP-C47 Provision a Proxy Tunnel" task on page 17-65.

Step 8 As needed, complete the "DLP-C48 Provision a Firewall Tunnel" task on page 17-66.

Step 9 As needed, complete the "DLP-C49 Create a Provisionable Patchcord" task on page 17-67 on both point-to-point nodes.

Step 10 Following the documentation provided by the third-party vendor, provision the optical loop leading from the ONS 15310-CL or ONS 15310-MA connection at one end to the ONS 15310-CL or ONS 15310-MA connection at the other end. In other words, you will create an open-ended path protection configuration using procedures for the third-party equipment.

Step 11 Continue with the "NTP-C34 Open-Ended Path Protection Acceptance Test" procedure on page 5-18.

Stop. You have completed this procedure.

NTP-C34 Open-Ended Path Protection Acceptance Test

Purpose	This procedure tests an open-ended path protection configuration.
Tools/Equipment	Test set and cables appropriate to the test circuit you will create
Prerequisite Procedures	NTP-C34 Open-Ended Path Protection Acceptance Test, page 5-18
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at the node that will be the source node for traffic traversing the third-party network. If you are already logged in, continue with Step 2.

Step 2 From the View menu, choose **Go to Network View**.

Step 3 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export alarm data to a file on your hard drive.

Step 4 Click the **Conditions** tab.

a. Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

b. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export condition data to a file on your hard drive.

Step 5 On the network map, double-click the node that you logged into in Step 1.

Step 6 Create a test circuit from that node to the 15310-CL-CTX or CTX2500 OC-N port on the nodes that connect to the third-party network. For example, on the ONS 15310-CL in Figure 5-5 on page 5-16, a circuit is created from Node 1 to the OC-3 port at Node 2/Slot 2/Port 2-1, and a secondary circuit destination is created on the OC-3 port at Node 3/Slot 2/Port 1-1.

On the ONS 15310-MA in Figure 5-6 on page 5-17, a circuit is created from Node 1 to the OC-3 port at Node 2/Slot 4/Port 2-1, and a secondary circuit destination is created on the OC-3 port at Node 3/Slot 3/Port 1-1. For circuit creation procedures, complete one of the following:

- For EC-1 circuits, complete the "NTP-C40 Create an Automatically Routed DS-3 or EC-1 Circuit" procedure on page 6-17. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For DS-1 circuits, complete the "NTP-C37 Create an Automatically Routed DS-1 Circuit" procedure on page 6-6. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.
- For DS-3 circuits, complete the "NTP-C40 Create an Automatically Routed DS-3 or EC-1 Circuit" procedure on page 6-17. When you set the circuit state, choose **IS** and check the **Apply to drop ports** check box.

Step 7 Create a circuit within the third-party network from ONS 15310-CL or ONS 15310-MA connection ports to the second set of ONS 15310-CL or ONS 15310-MA connection ports on both path protection spans. Refer to the third-party equipment documentation for circuit creation procedures.

Step 8 Repeat Step 6 to create a second circuit at the terminating node on the other side of the third-party network. On the ONS 15310-CL in Figure 5-5, this is Node 6. However, this circuit will have two sources, one at Node 4/Slot 2/Port 2-1, and one at Node 5/Slot 2/Port 1-1. The destination will be the 15310-CL-CTX on Node 6.

On the ONS 15310-MA in Figure 5-6, this is Node 6. However, this circuit will have two sources, one at Node 4/Slot 4/Port 2-1, and one at Node 5/Slot 3/Port 1-1. The destination will be the CTX2500 on Node 6.

Step 9 For the ONS 15310-CL, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-CL, if you are testing an unmuxed DS-1, you must have a DSX-1 panel or use the high-density DS1 interface through the LFH-96 connector. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-CL, if you are testing a clear channel DS-3 or EC-1, you must have a direct DS-3/EC-1 interface into the ONS 15310-CL through the BBE ports on the 15310-CL-CTX. Set the test set for clear channel DS-3. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.

- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 10 For the ONS 15310-MA, configure the test set for the test circuit type you created:

- Wideband Electrical ports (WBE) DS-1—On the ONS 15310-MA, if you are testing an unmuxed DS-1, use the Champ connectors on the BICs on the rear of the chassis. Set the test set for DS-1. For information about configuring your test set, consult your test set user guide.
- Broadband Electrical ports (BBE) DS3/EC1—On the ONS 15310-MA, if you are testing a clear channel DS-3 or EC-1, use the BNC connectors on the BICs on the rear of the chassis. Set the test set for clear channel DS-3. For information about configuring your test set, consult your test set user guide.
- OC-N—If you are testing an OC-N circuit, set the test set for the applicable circuit size. For information about configuring your test set, consult your test set user guide.

Step 11 Verify the integrity of all patch cables that will be used in this test by connecting one end to the test set transmit (Tx) connector and the other end to the test set receive (Rx) connector. If the test set does not run error-free, check the cable for damage and check the test set to make sure it is set up correctly before continuing.

Step 12 Create a physical loopback at the circuit destination:

a. Attach one end of a patch cable to the destination port's Tx connector.

b. Attach the other end to the port's Rx connector.

Step 13 At the circuit source:

a. Connect the Tx connector of the test set to the circuit Rx connector.

b. Connect the test set Rx connector to the circuit Tx connector.

Step 14 Verify that the test set shows a clean signal. If a clean signal does not appear, repeat Steps 1 through 9 to make sure the test set and cabling are configured correctly.

Step 15 Inject BIT errors from the test set. To verify that you have a complete end-to-end circuit, verify that the errors appear at the test set.

Step 16 From the View menu, choose **Go to Network View**.

Step 17 Click one of the two spans leaving the circuit source node.

Step 18 Test the path protection switching function on this span. Complete the "DLP-C55 Path Protection Switching Test" task on page 17-75.

Step 19 In network view, click the other circuit source span and repeat Step 18.

Step 20 Set up and complete a BER Test. Use the existing configuration and follow your site requirements for the length of time. Record the test results and configuration.

Step 21 Complete the "DLP-C115 Delete Circuits" task on page 18-21 for the test circuit.

Step 22 Remove any loopbacks, switches, or test sets from the nodes after all testing is complete.

Step 23 Click the **Alarms** tab.

a. Verify that the alarm filter is not on. See the "DLP-C88 Disable Alarm Filtering" task on page 17-112 as necessary.

b. Verify that no unexplained alarms appear on the network. If alarms are present, investigate and resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

c. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export alarm data to a file on your hard drive.

Step 24 Click the **Conditions** tab.

a. Verify that the network does not have any unexplained conditions. If unexplained conditions are present, resolve them before continuing. Refer to the *Cisco ONS 15310-CL and Cisco ONS 15310-MA Troubleshooting Guide* if necessary.

b. Complete the "DLP-C223 Export CTC Data" task on page 19-20 to export condition data to a file on your hard drive.

Step 25 Repeat Steps 6 through 24 for each node that will be a source or destination for circuits traversing the third-party network.

Step 26 If a node fails any test, repeat the test while verifying correct setup and configuration. If the test fails again, refer to the next level of support.

After all tests are successfully completed and no alarms exist in the network, the network is ready for service application. Continue with Chapter 6, "Create Circuits and VT Tunnels."

Stop. You have completed this procedure.

NTP-C146 Provision a Traditional Path Protection Dual-Ring Interconnect on the ONS 15310-MA

Purpose	This procedure provisions path protection configurations in a DRI topology. DRIs interconnect two or more path protection configurations to provide an additional level of protection.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

Note To route circuits on the DRI, you must check the Dual Ring Interconnect check box during circuit creation.

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at any node in the path protection configuration. If you are already logged in, continue with Step 2.

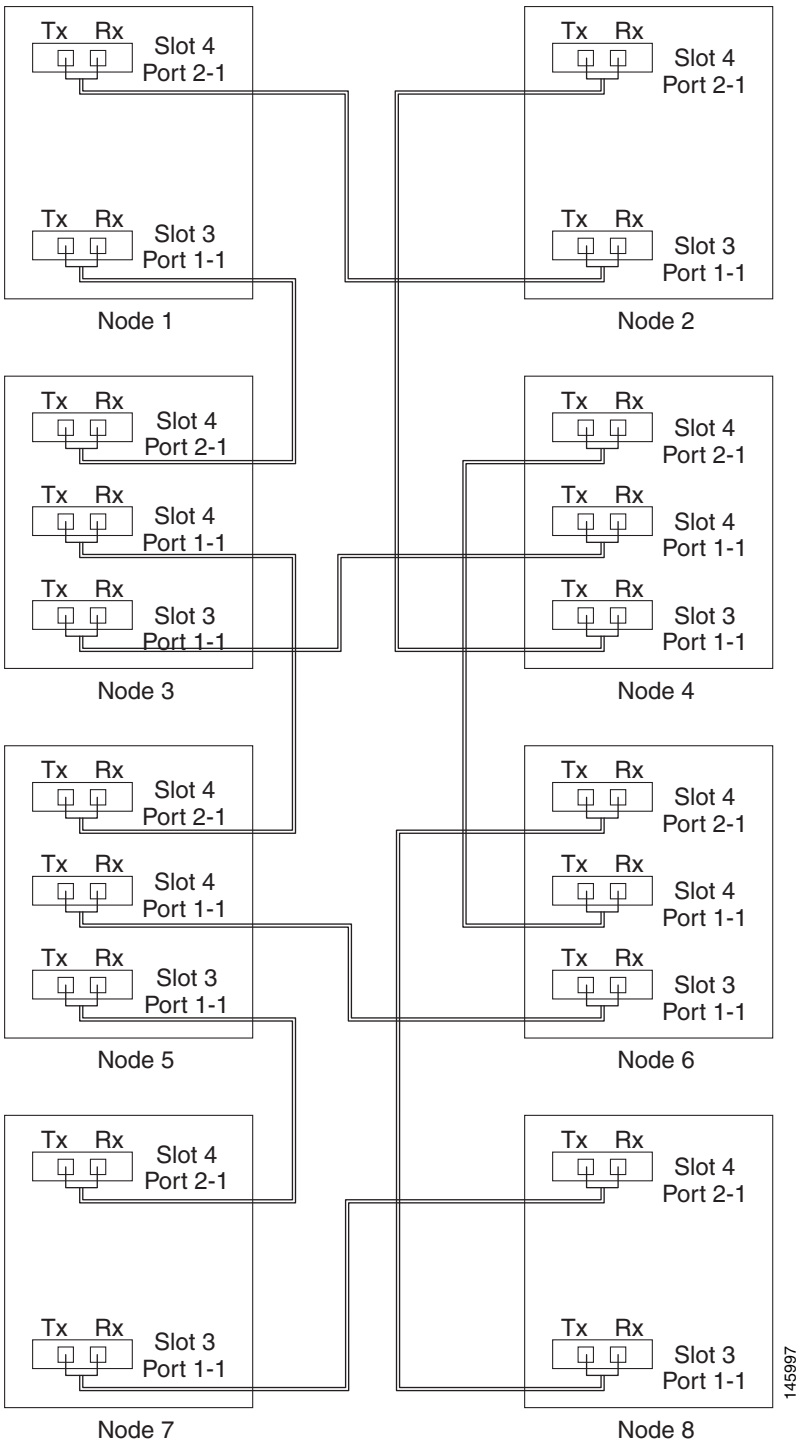
Step 2 Complete the following steps if you have not provisioned the path protection configurations that you will interconnect in a path protection DRI. If the path protection configurations are created, go to Step 3.

a. Complete the "NTP-C31 Provision Path Protection Nodes" procedure on page 5-10 to provision the path protection configurations.

b. Complete the "NTP-C32 Path Protection Acceptance Test" procedure on page 5-12 to test the path protection configurations.

Step 3 Verify that the path protection DRI interconnect nodes have fiber connections to the other interconnect node. An example is shown in Figure 5-7. This example shows a path protection DRI with two rings, Nodes 1 through 4 and 5 through 8. In the example, Slot 4, Port 2-1 at Node 4 is connected to Slot 4, Port 1-1 at Node 6. Nodes 3 and 5 are interconnected by Slot 4, Port 1-1 at Node 3 and Slot 4, Port 2-1 at Node 5.

Figure 5-7 Traditional Path Protection DRI Fiber Connection Example



Stop. You have completed this procedure.

NTP-C147 Provision an Integrated Path Protection Dual-Ring Interconnect on the ONS 15310-MA

Purpose	This procedure provisions path protection configurations in an integrated DRI topology.
Tools/Equipment	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser

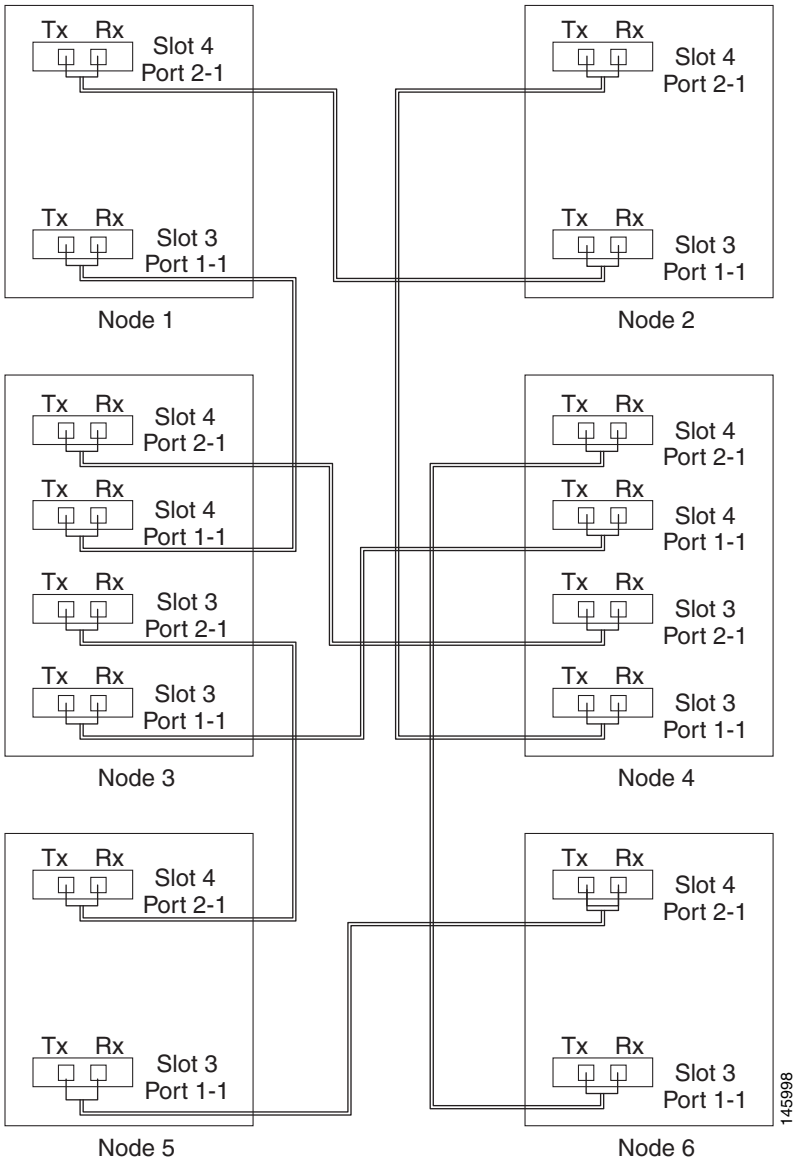
Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43. If you are already logged in, continue with Step 2.

Step 2 Complete the following steps if you have not provisioned the path protection configurations that you will interconnect in a path protection DRI. If the path protection configurations are created, go to Step 3.

- **a.** Complete the "NTP-C31 Provision Path Protection Nodes" procedure on page 5-10 to provision the path protection configurations.
- **b.** Complete the "NTP-C32 Path Protection Acceptance Test" procedure on page 5-12 to test the path protection configurations.

Step 3 Verify that the path protection DRI interconnect nodes have fiber connections to the other interconnect nodes. An example is shown in Figure 5-8 on page 5-25. This example shows a path protection DRI with two rings.

Figure 5-8 Integrated Path Protection DRI Example



Stop. You have completed this procedure.

NTP-C35 Create a Logical Network Map

Purpose	This procedure positions nodes in the network view. This procedure allows a superuser to create a consistent network view for all nodes on the network.
Tools	None
Prerequisite Procedures	NTP-C26 Verify Node Turn-Up, page 5-2 This procedure also assumes that network turn up is completed.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Step 1 Complete the "DLP-C29 Log into CTC" task on page 17-43 at any node on the network. If you are already logged in, continue with Step 2.

Step 2 From the View menu choose **Go to Network View**.

Step 3 Change the position of the nodes in the network view according to your plan.

a. Press the **Ctrl** key while you drag and drop a node icon to a new location.

b. Deselect the previously selected node.

c. Repeat Steps a and b for each node you need to position.

Step 4 On the network view map, right-click and choose **Save Node Position**.

Step 5 Click **Yes in the Save Node Position dialog box.**

CTC displays a progress bar and saves the new node positions.

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

Stop. You have completed this procedure.