



Convert Network Configurations

This chapter explains how to convert from one SDH topology to another in a Cisco ONS 15600 SDH network. For initial network turn-up, see [Chapter 5, “Turn Up a Network.”](#)

Before You Begin

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

1. [NTP-F210 Convert a Point-to-Point to a Linear ADM Automatically, page 12-1](#)—Complete as needed.
2. [NTP-F211 Convert a Point-to-Point to a Linear ADM Manually, page 12-3](#)—Complete as needed if the in-service topology upgrade wizard is not available or you need to back out of the wizard.
3. [NTP-F212 Convert a Point-to-Point or Linear ADM to a Two-Fiber MS-SPRing Manually, page 12-5](#)—Complete as needed.
4. [NTP-F213 Modify an MS-SPRing, page 12-7](#)—Complete as needed.

NTP-F210 Convert a Point-to-Point to a Linear ADM Automatically

Purpose	This procedure upgrades a 1+1 point-to-point configuration (two nodes) to a linear add/drop multiplexing (ADM) configuration (three or more nodes) without disrupting traffic.
Tools/Equipment	Compatible hardware necessary for the upgrade (for example, ASAP cards) Attenuators might be needed for some applications.
Prerequisite Procedures	NTP-F145 Provision a Point-to-Point Connection, page 5-3
	Note This procedure requires that the node to be added is reachable (has IP connectivity with Cisco Transport Controller [CTC]). Two technicians who can communicate with each other during the upgrade might be needed if the PC running CTC and the ONS 15600 SDH nodes are not at the same location.
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	Provisioning or higher

**Note**

STM-N transmit and receive levels should be in their acceptable range as shown in the specifications for each card in [Table 2-2 on page 2-10](#).

**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.

- Step 1** Complete the “[DLP-F181 Log into CTC](#)” task on page 16-34 at either of the point-to-point nodes. If you are already logged in, continue with Step 2.
- Step 2** In network view, right-click the span between the two nodes where you want to add the new node. A dialog box appears.
- Step 3** Choose **Upgrade Protection**. A drop-down list appears.
- Step 4** Choose **Terminal to Linear** and the first page of the wizard, Upgrade Protection: Terminal to Linear, appears. 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 a 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 communications channel has been provisioned on these four ports.
 - Fiber is available to connect the added node to the terminal nodes.
- Step 5** If all conditions listed in [Step 4](#) are met, click **Next**.

**Note**

If you are attempting to add an unreachable node, you must first log into the unreachable node using a separate CTC session and configure that node. Delete any existing protection groups as described in the “[DLP-F229 Delete a 1+1 Protection Group](#)” task on page 17-25. Delete any existing data communications channel (DCC) terminations as described in the “[DLP-F321 Delete an RS-DCC Termination](#)” task on page 18-20 or the “[DLP-F322 Delete an MS-DCC Termination](#)” task on page 18-20.

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

**Note**

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

- Step 11** Click **Next**. The Force Traffic to Protect Path page appears, stating that it is about to force the traffic from the working path to the protect path for the terminal nodes.
- Step 12** Click **Next**.
- Step 13** Follow each step as instructed by the wizard as it guides you through the process of refibering the working path between nodes and forcing the traffic back to the working path. The final page informs you when you have completed the procedure of upgrading from terminal to linear protection.
- Step 14** Click **Finish**.
- Stop. You have completed this procedure.**

NTP-F211 Convert a Point-to-Point to a Linear ADM Manually

Purpose	This procedure converts a 1+1 point-to-point configuration (two nodes) to a linear ADM configuration (three or more nodes) manually, that is, without using the in-service topology upgrade wizard. Use this procedure if the wizard is unavailable or if you need to back out of the wizard.
Tools/Equipment	None
Prerequisite Procedures	NTP-F145 Provision a Point-to-Point Connection, page 5-3
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

**Caution**

This procedure is service-affecting.

**Note**

Optical transmit and receive levels should be in their acceptable range as shown in the specifications section for each card in [Table 2-2 on page 2-10](#).

**Note**

In a point-to-point configuration, two STM-N cards are connected to two STM-N cards on a second node.

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- Step 1** Complete the “[DLP-F181 Log into CTC](#)” task on page 16-34 at either of the point-to-point nodes. If you are already logged in, continue with Step 2.
- Step 2** Complete the “[DLP-F273 Check the Network for Alarms and Conditions](#)” task on page 17-63.
- Step 3** Log into the node that will be added to the point-to-point configuration (the new node).



Note If you are attempting to add an unreachable node you must first log in to the unreachable node using a separate CTC session and configure that node. Delete any existing protection groups as described in the “[DLP-F229 Delete a 1+1 Protection Group](#)” task on page 17-25. Delete any existing DCC terminations as described in the “[DLP-F321 Delete an RS-DCC Termination](#)” task on page 18-20 or the “[DLP-F322 Delete an MS-DCC Termination](#)” task on page 18-20.

- Step 4** Verify that the new node has four STM-N ports at the same rate as the point-to-point node.
- Step 5** Complete the “[NTP-F144 Verify Node Turn-Up](#)” procedure on page 5-2 for the new node.
- Step 6** Physically connect the fibers between the point-to-point node you are logged into and the new node.
- Step 7** On the new node, create a 1+1 protection group for the STM-N cards that will connect to the point-to-point node. See the “[NTP-F138 Create a 1+1 Protection Group](#)” procedure on page 4-9 for instructions.
- Step 8** Complete the “[DLP-F253 Provision RS-DCC Terminations](#)” task on page 17-45 for the working STM-N ports in the new node that will connect to the linear ADM network. (Alternatively, if additional bandwidth is needed for CTC management, complete the “[DLP-F314 Provision MS-DCC Terminations](#)” task on page 18-14.) Make sure to set the port state in the Create RS-DCC Termination dialog box to **Unlocked**.



Note DCC failure alarms appear until you create DCC terminations in the point-to-point node during [Step 13](#).

- Step 9** From the View menu, choose **Go To Network View**.
- Step 10** Double-click the point-to-point node that will connect to the other side of the new node.
- Step 11** Ensure that this point-to-point node has STM-N cards installed that can connect to the new node.
- Step 12** Create a 1+1 protection group for the STM-N ports that will connect to the new node. See the “[NTP-F138 Create a 1+1 Protection Group](#)” procedure on page 4-9 for instructions.
- Step 13** Create DCC terminations on the working STM-N port that will connect to the new node. See the “[DLP-F253 Provision RS-DCC Terminations](#)” task on page 17-45 or the “[DLP-F314 Provision MS-DCC Terminations](#)” task on page 18-14. In the Create RS-DCC Termination dialog box, set the port state to **Unlocked**.
- Step 14** From the View menu, choose **Go To Network View**.
- Step 15** Double-click the new node.
- Step 16** Complete the “[NTP-F137 Set Up Timing](#)” procedure on page 4-8 for the new node. If the new node is using line timing, make the working STM-N card the timing source.
- Step 17** Display the network view to verify that the newly created linear ADM configuration is correct. A single green span line should appear between each linear node.

- Step 18** Click the **Alarms** tab.
- Verify that the alarm filter is not on. See the “[DLP-F288 Disable Alarm Filtering](#)” task on [page 17-78](#) for instructions.
 - Verify that no unexplained alarms appear on the network. If unexplained alarms appear, resolve them before continuing. Refer to the *Cisco ONS 15600 SDH Troubleshooting Guide*.
- Step 19** Repeat the procedure for each node that you want to add to the linear ADM. To create circuits, see [Chapter 6, “Create Circuits.”](#)
- Stop. You have completed this procedure.**
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NTP-F212 Convert a Point-to-Point or Linear ADM to a Two-Fiber MS-SPRing Manually

Purpose	This procedure upgrades a point-to-point configuration to a two-fiber multiplex section-shared protection ring (MS-SPRing).
Tools/Equipment	None
Prerequisite Procedures	NTP-F145 Provision a Point-to-Point Connection , page 5-3
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher



Caution

This procedure is potentially service affecting.



Note

Optical transmit and receive levels should be in their acceptable range as shown in [Table 2-2 on page 2-10](#).

- Step 1** Complete the “[DLP-F181 Log into CTC](#)” task on [page 16-34](#) at one of the nodes that you want to convert from a point-to-point or ADM configuration to an MS-SPRing. If you are already logged in, continue with Step 2.
- Step 2** Complete the “[DLP-F273 Check the Network for Alarms and Conditions](#)” task on [page 17-63](#).
- Step 3** Right-click a span adjacent to the node you are logged into.
- Step 4** From the shortcut menu, choose **Circuits**. The Circuits on Span window appears.
- Step 5** Verify that the total number of active virtual container (VC) circuits does not exceed 50 percent of the span bandwidth. In the Circuits column there is a block titled “Unused.” This number should exceed 50 percent of the span bandwidth.



Note

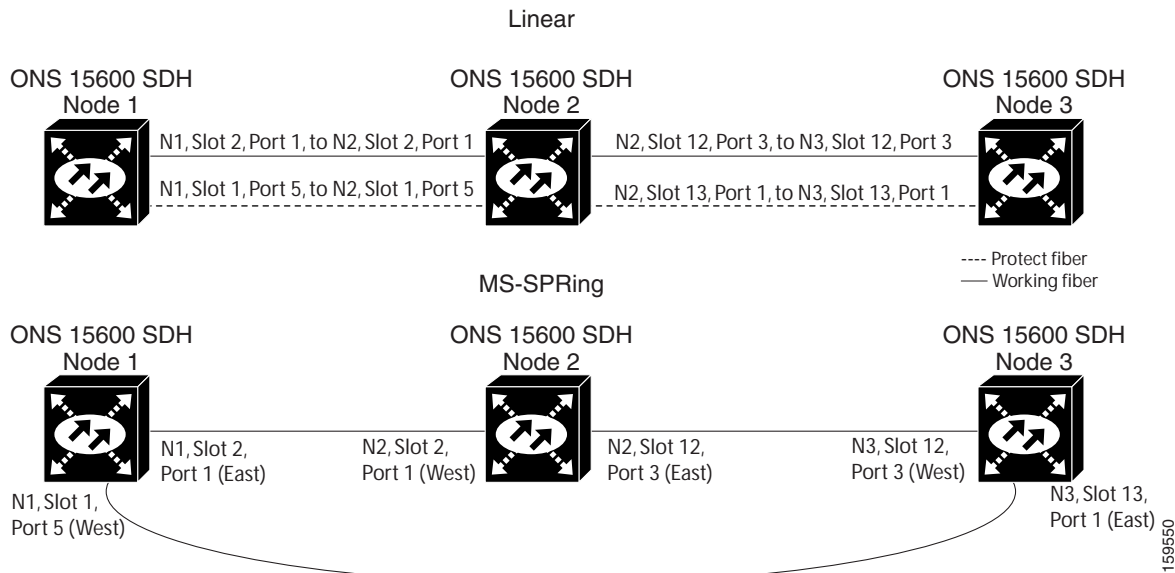
For AU4, if the span is an STM-16, no more than 8 VCs can be provisioned on the span. For AU4, if the span is an STM-64, no more than 32 VCs can be provisioned on the span. For AU3, if the span is STM-16 no more than 24 VCs can be provisioned on the span. For AU3, if the span is an STM-64, no more than 64 VCs can be provisioned on the span.

**Caution**

If the first half of the capacity is exceeded, this procedure cannot be completed. Bandwidth must be 50 percent unassigned to convert to an MS-SPRing. Refer to local procedures for relocating circuits if these requirements are not met.

- Step 6** Repeat Steps 3 through 5 at each node in the point-to-point or linear ADM that you will convert to the MS-SPRing. If all nodes comply with Step 5, continue with Step 7.
- Step 7** Complete the “DLP-F247 Verify that a 1+1 Working Port is Active” task on page 17-39 for every 1+1 protection group that supports a span in the point-to-point or linear ADM network.
- Step 8** Complete the “DLP-F229 Delete a 1+1 Protection Group” task on page 17-25 at each node that supports the point-to-point or linear ADM span.
- Step 9** Complete the “DLP-F254 Change the Service State for a Port” task on page 17-47 to put the protect ports out of service at each node that supports the point-to-point or linear ADM span.
- Step 10** For linear ADMs, physically remove the protect fibers from all nodes in the linear ADM network. For example, in Figure 12-1 you could remove the fiber running from Node 2/Slot 13/Port 1 to Node 3/Slot 13/Port 1.

Figure 12-1 Linear ADM to MS-SPRing Conversion



- Step 11** Create the ring by connecting the protect fiber from one end node to the protect port on the other end node. For example, the fiber between Node 1/Slot 1/Port 5 and Node 2/Slot 1/Port 5 (Figure 12-1) can be rerouted to connect Node 1/Slot 1/Port 5 to Node 3/Slot 13/Port 1.

**Note**

If you need to physically remove any STM-N cards, do so now. In this example, cards in Node 2/Slots 1 and 13 can be removed. See the “NTP-F123 Remove and Replace a Card” procedure on page 2-8.

- Step 12** In network view, click the **Circuits** tab and complete the “DLP-F379 Export CTC Data” task on page 18-88 to save the circuit data to a file on your hard drive.

- Step 13** Complete the “[DLP-F253 Provision RS-DCC Terminations](#)” task on page 17-45 at the end nodes to provision the slot in each node that is not already in the RS-DCC Terminations list.
- Step 14** For circuits provisioned on an AU4 VC that is now part of the protection bandwidth (VCs 9 to 16 for an STM-16 MS-SPRing, and VCs 33 to 64 for an STM-64 MS-SPRing), delete and recreate each circuit:



Note Deleting circuits is service-affecting.

- a. Complete the “[DLP-F293 Delete Circuits](#)” task on page 17-81 for one circuit.
 - b. Create the AU4 circuit on VCs 1 to 8 for an STM-16 MS-SPRing, or 1 to 32 for an STM-64 MS-SPRing on the fiber that served as the protect fiber in the linear ADM. See the “[NTP-F165 Create a Manually Routed Optical Circuit](#)” procedure on page 6-9 for instructions.
 - c. Repeat Steps a and b for each circuit residing on an MS-SPRing protect VC.
- Step 15** Complete the “[NTP-F148 Create an MS-SPRing](#)” procedure on page 5-8 to put the nodes into an MS-SPRing.

Stop. You have completed this procedure.

NTP-F213 Modify an MS-SPRing

Purpose	This procedure changes an MS-SPRing ring ID, node ID, or ring and span reversion times.
Tools/Equipment	None
Prerequisite Procedures	NTP-F148 Create an MS-SPRing, page 5-8
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

- Step 1** Complete the “[DLP-F181 Log into CTC](#)” task on page 16-34 at a node in the MS-SPRing you want to modify. If you are already logged in, continue with Step 2.
- Step 2** Check the MS-SPRing for outstanding alarms and conditions. See the “[DLP-F273 Check the Network for Alarms and Conditions](#)” task on page 17-63 for instructions.



Note Some or all of the following alarms appear during MS-SPRing setup: E-W-MISMATCH, RING-MISMATCH, APSC-IMP, APSCDFLTK, and MSSP-OOSYNC. The alarms clear after you configure all the nodes in the MS-SPRing. For definitions of these alarms, refer to the *Cisco ONS 15600 SDH Troubleshooting Guide*.

- Step 3** To change the MS-SPRing ring ID or the ring or span reversion times, complete the following steps. If you want to change a node ID, continue with [Step 4](#).
- a. In network view, click the **Provisioning > MS-SPRing** tabs.
 - b. Click the MS-SPRing that you want to modify and click **Edit**.
 - c. In the MS-SPRing window, change any of the following:

- Ring ID—If needed, change the MS-SPRing ring ID (an MS-SPRing ring ID is a 6-character string that includes letters and numbers). Do not choose an ID that is already assigned to another MS-SPRing.
- Reversion time—If needed, change the amount of time that will pass before the traffic reverts to the original working path after a ring switch.

d. Click **Apply**.

If you changed the ring ID, the MS-SPRing window closes automatically. If you only changed a reversion time, close the window by choosing **Close** from the File menu.

Step 4 To change an MS-SPRing node ID, complete the following steps; otherwise, continue with [Step 5](#).

- a. On the network map, double-click the node with the node ID you want to change.
- b. Click the **Provisioning > MS-SPRing** tabs.
- c. Choose a Node ID number. Do not choose a number already assigned to another node in the same MS-SPRing.
- d. Click **Apply**.

Step 5 Verify the following:

- A green span line appears between all MS-SPRing nodes.
- All E-W-MISMATCH, RING-MISMATCH, APSC-IMP, APSCDFLTK, MSSP-OOSYNC, and APSCNMIS alarms are cleared.



Note For definitions of these alarms, refer to the *Cisco ONS 15600 SDH Troubleshooting Guide*.

Stop. You have completed this procedure.
