CHAPTER 4

Turn Up a Node

This chapter explains how to provision a single Cisco ONS 15600 node and turn it up for service, including node name, date and time, timing references, network attributes such as IP address and default router, users and user security, and card protection groups.

Before You Begin

Complete the procedures applicable to your site plan from the following chapters:

- Chapter 1, "Install the Bay and Backplane Connections"
- Chapter 2, "Install Cards and Fiber-Optic Cable"
- Chapter 3, "Connect the Computer and Log into the GUI"

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

1. NTP-E21 Verify Card Installation, page 4-2—Complete this procedure first.

2. NTP-E26 Create Users and Assign Security, page 4-3—Continue with this procedure to create Cisco Transport Controller (CTC) users and assign their security levels.

3. NTP-E22 Set Up Date, Time, and Contact Information, page 4-4—Continue with this procedure to set the node name, date, time, location, and contact information.

4. NTP-E23 Set Up CTC Network Access, page 4-5—Continue with this procedure if the ONS 15600 will be accessed behind firewalls.

5. NTP-E94 Set Up the ONS 15600 for Firewall Access, page 4-6—Continue with this procedure to provision the IP address, default router, subnet mask, and network configuration settings.

6. NTP-E24 Set Up Timing, page 4-6—Continue with this procedure to set up the node SONET timing references.

7. NTP-E25 Create a 1+1 Protection Group, page 4-7—Complete as needed to set up 1+1 protection groups for ONS 15600 optical cards.

8. NTP-E27 Set Up SNMP, page 4-9—Continue with this procedure, as needed.

9. NTP-E28 Set the User Code for Card Inventory, page 4-10—Continue with this procedure, as needed.

10. NTP-E29 Configure a Node Using an Existing Database, page 4-10—Continue with this procedure, as needed.

11. NTP-E48 Set External Alarms and Controls, page 4-12—As needed, complete these tasks to set external alarm reporting, assign external alarms to virtual wires, and view external alarms for ONS 15600 nodes and ONS 15454 nodes.

12. NTP-E174 Provision OSI, page 4-12—complete this procedure if the ONS 15600 will be connected in networks with network elements (NEs) that are based on the Open System Interconnection (OSI) protocol stack. This procedure provisions the TID Address Resolution Protocol (TARP), OSI routers, manual area addresses, subnetwork points of attachment, and IP over OSI tunnels.

NTP-E21 Verify Card Installation

Purpose	This procedure verifies that the ONS 15600 node is ready for turn-up.
Tools/Equipment	None
Prerequisite Procedures	Chapter 1, "Install the Bay and Backplane Connections"
	Chapter 2, "Install Cards and Fiber-Optic Cable"
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Retrieve or higher

Step 1   Verify that the TSC cards are installed in Slots 5 and 10.

Step 2   Verify that the green ACT/STBY LED is illuminated on the active TSC. The ACT/STBY LED will not be illuminated for the standby TSC.

> **Note**   If the TSCs are not installed or their LEDs are not illuminated as described, do not proceed. See Chapter 2, "Install Cards and Fiber-Optic Cable," or refer to the *Cisco ONS 15600 Troubleshooting Guide* to resolve installation problems before proceeding.

Step 3   Verify that the cross-connect (SSXC) cards are installed in Slots 6 and 8. The SSXC card faceplate extends to cover Slots 7 and 9, respectively.

Step 4   Verify that the SRV LED is illuminated on both SSXC cards.

> **Note**   If the SSXC cards are not installed, or their LEDs are not illuminated as described, do not proceed. See Chapter 2, "Install Cards and Fiber-Optic Cable," or refer to the *Cisco ONS 15600 Troubleshooting Guide* to resolve installation problems before proceeding.

Step 5   Verify that the OC-N cards are installed in the slots designated by your site plan. Slots 1 to 4 and 11 to 14 are used for all optical cards.

Step 6   Verify that fiber-optic cables are installed and connected to the locations indicated in the site plan.

Step 7   Verify that fiber is routed correctly in the shelf assembly.

Step 8   Verify that the SSXC cards are working:

    a.   Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node that you will turn up.

    b.   Click the **Maintenance > Diagnostic** tabs.

    c.   Click **Run Diagnostics Test**.

- If errors exist, the Cross Connect Diagnostics Error box opens to list the errors. Click **Close**.

- If no errors exist, click **OK** to close the confirmation dialog box.

✎
Note You must run the diagnostics test before the optical cards are provisioned.

Step 9 Set the optical power received threshold for each optical card. See the "DLP-E124 Set the Optical Power Received Nominal Value" task on page 17-22.

Step 10 If all cards and fiber are installed in the ONS 15600 shelf as described in Steps 1 through 9, continue with the "NTP-E26 Create Users and Assign Security" procedure on page 4-3.

✎
Note If cards are not installed or the LEDs are not shown as described, do not continue. Go to Chapter 2, "Install Cards and Fiber-Optic Cable" or the *Cisco ONS 15600 Troubleshooting Guide* to resolve the installation problems before continuing with shelf turn up.

Stop. You have completed this procedure.

NTP-E26 Create Users and Assign Security

Purpose	This procedure creates ONS 15600 users and assigns security levels.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Step 1 Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node where you need to create users. If you are already logged in, continue with Step 2.

✎
Note You must log in as a Superuser to create additional users. The CISCO15 user provided with each ONS 15600 can be used to set up other ONS 15600 users. You can add up to 500 users to one ONS 15600.

Step 2 Complete the "DLP-E35 Create a New User on a Single Node" task on page 16-53 or the "DLP-E36 Create a New User on Multiple Nodes" task on page 16-54 as needed.

✎
Note You must add the same user name and password to each node that the user will access.

Stop. You have completed this procedure.

NTP-E22 Set Up Date, Time, and Contact Information

Purpose	This procedure provisions identification information for the node, including the node name, a contact name and phone number, the location of the node, and the date, time, and time zone.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39 for the node you will turn up. If you are already logged in, continue with Step 2.

Step 2   Click the **Provisioning > General** tabs.

Step 3   Enter the following information in the fields listed:

- Node Name—Enter a name for the node. For TL1 compliance, names must begin with an alpha character and have no more than 20 alphanumeric (a-z, A-Z, 0-9) characters.

- Contact—(Optional) Enter the name of the node contact person and the phone number, up to 255 characters.

- Latitude—(Optional) Enter the node latitude: N (North) or S (South), degrees, and minutes.

- Longitude—(Optional) Enter the node longitude: E (East) or W (West), degrees, and minutes.

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Tip   You can also position nodes manually in network view. Press Ctrl while you drag and drop the node icon. To create the same network map visible for all ONS 15600 users, complete the "NTP-E86 Create a Logical Network Map" procedure on page 5-33.

CTC uses the latitude and longitude to position ONS 15600 icons on the network view map. To convert a coordinate in degrees to degrees and minutes, multiply the number after the decimal by 60. For example, the latitude 38.250739 converts to 38 degrees, 15 minutes (0.250739 x 60 = 15.0443, rounded to the nearest whole number).

- Description—Enter a description of the node. The description can be a maximum of 255 characters.

- Use NTP/SNTP Server—When checked, CTC uses a Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) server to set the date and time of the node.

  If you do not use an SNTP or NTP server, complete the Date and Time fields. The ONS 15600 will use these fields for alarm dates and times. By default, CTC displays all alarms in the CTC computer time zone for consistency. To change the display to the node time zone, complete the "DLP-E46 Display Events Using Each Node's Time Zone" task on page 16-63.

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Note   Using an NTP or SNTP server ensures that all ONS 15600 network nodes use the same date and time reference. The server synchronizes node time after power outages or software upgrades.

If you check the Use NTP/SNTP Server check box, enter the IP address of one of the following:

– An NTP/SNTP server connected to the ONS 15600

– Another ONS 15600 with NTP/SNTP enabled that is connected to the ONS 15600

If you check Gateway Network Element (GNE) for the ONS 15600 SOCKS proxy server (see the "DLP-E30 Provision IP Settings" task on page 16-45), external ONS 15600s must reference the gateway ONS 15600 for NTP/SNTP timing. For more information about the ONS 15600 gateway settings, refer to the *Cisco ONS 15600 Reference Manual*.

⚠ **Caution**   If you reference another ONS 15600 for the NTP/SNTP server, make sure the second ONS 15600 references an NTP/SNTP server and not the first ONS 15600 (that is, do not create an NTP/SNTP timing loop by having two ONS 15600s reference each other).

- Date—If Use NTP/SNTP Server is not selected, enter the current date in the format mm/dd/yyyy, for example, September 24, 2002 is 09/24/2002.

- Time—If Use NTP/SNTP Server is not selected, enter the current time in the format hh:mm:ss, for example, 11:24:58. The ONS 15600 uses a 24-hour clock, so 10:00 PM is entered as 22:00:00.

- Time Zone—Click the field and choose a city within your time zone from the popup menu. The menu displays the 80 World Time Zones from -11 through 0 (GMT) to +14. Continental United States time zones are GMT-05:00 (Eastern), GMT-06:00 (Central), GMT-07:00 (Mountain), and GMT-08:00 (Pacific).

Step 4   Click **Apply**.

Step 5   In the confirmation dialog box, click **Yes**.

Step 6   Review the node information. If you need to make corrections, repeat Steps 3 through 5 to enter the corrections. If the information is correct, continue with the "NTP-E23 Set Up CTC Network Access" procedure on page 4-5.

Stop. You have completed this procedure.

NTP-E23 Set Up CTC Network Access

Purpose	This procedure provisions network access for a node, including its subnet mask, default router, Dynamic Host Configuration Protocol (DHCP) server, (Internet Inter-Orb Protocol) IIOP listener port, SOCKS proxy server settings, static routes, and Open Shortest Path First (OSPF) protocol.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39. If you are already logged in, continue with Step 2.

Step 2   Complete the "DLP-E30 Provision IP Settings" task on page 16-45 to provision the ONS 15600 IP address, subnet mask, default router, DHCP server, IIOP listener port, and SOCKS proxy server settings.

Step 3   If static routes are needed, complete the "DLP-E31 Create a Static Route" task on page 16-47. Refer to the *Cisco ONS 15600 Reference Manual* for more information about static routes.

Step 4   If the ONS 15600 is connected to a LAN or WAN that uses OSPF and you want to share routing information between the LAN/WAN and the ONS network, complete the "DLP-E32 Set Up or Change Open Shortest Path First Protocol" task on page 16-48.

     Stop. You have completed this procedure.

NTP-E94 Set Up the ONS 15600 for Firewall Access

Purpose	This procedure provisions ONS 15600s and CTC computers for access through firewalls.
Tools/Equipment	IIOP listener port number provided by your LAN or firewall administrator
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39. If you are already logged in, continue with Step 2.

Step 2   If the ONS 15600 resides behind a firewall, complete the "DLP-E125 Provision the IIOP Listener Port on the ONS 15600" task on page 17-22.

Step 3   If the CTC computer resides behind a firewall, complete the "DLP-E126 Provision the IIOP Listener Port on the CTC Computer" task on page 17-23.

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

NTP-E24 Set Up Timing

Purpose	This procedure provisions the ONS 15600 timing.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node where you want to set up timing. If you are already logged in, continue with Step 2.

Step 2   Complete the "DLP-E33 Set Up External or Line Timing" task on page 16-50 if an external BITS source is available. This is the common SONET timing setup procedure.

Step 3   If you cannot complete Step 2 (an external BITS source is not available), complete the "DLP-E34 Set Up Internal Timing" task on page 16-52. This task can only provide Stratum 3E timing.

> ✎
> **Note**   For information about SONET timing, refer to the *Cisco ONS 15600 Reference Manual* or to Telcordia GR-253-CORE.

Stop. You have completed this procedure.

NTP-E25 Create a 1+1 Protection Group

Purpose	This procedure creates a 1+1 protection group. A 1+1 protection group pairs a working OC-N port with a protect OC-N port. The ports on cards can be either working or protect. You can mix working and protect ports on the same card: any OC-192 port can protect another OC-192 port, and any OC-48 port can protect another OC-48 port. You cannot mix OC-192 and OC-48 ports in protection schemes.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node where you want to create the protection. If you are already logged in, continue with Step 2.

Step 2   Verify that the OC-N cards are installed.

Step 3   Click the **Provisioning > Protection** tabs.

Step 4   Click **Create**.

Step 5   In the Create Protection Group dialog box, enter the following:

- Name—Enter a name for the protection group. The name can have up to 32 alphanumeric (a-z, A-Z, 0-9) characters. Special characters are permitted. For TL1 compatibility, do not use question marks (?), backslash (\), or double quote (") characters.

- Type—Choose **1+1 (port)** from the drop-down list.

- Protect (Entity) Port—Choose the protect port from the drop-down list. When you choose 1+1 (port) from the Type drop-down list, this field changes from Protect Entity to Protect Port. The list displays the available OC-N ports (Figure 4-1). If OC-N cards are not installed, no ports appear in the drop-down list.

After you choose the protect port, a list of working ports available for protection appears in the Available Ports list. If no cards are available, no ports appear. If this occurs, you cannot complete this task until you install the physical cards or preprovision the ONS 15600 slots using the "NTP-E13 Preprovision a Card Slot" procedure on page 2-8.

Figure 4-1   Creating a 1+1 Protection Group
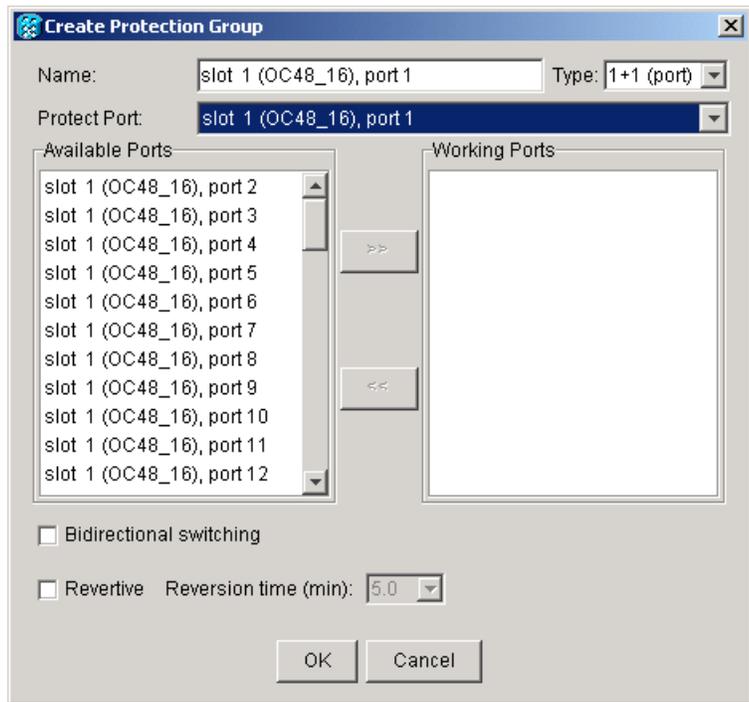
Step 6   From the Available Ports list, choose the working port that will be protected by the port chosen in the Protect Port field. Click the top arrow button to move each port to the Working Ports list.

Step 7   Complete the remaining fields:

- Bidirectional switching—If checked, both the near-end and far-end nodes switch to the designated protection ports. For example, if the near-end node has a loss of signal (LOS) alarm, it switches to the protection port and transmits a switch request to the far-end node to switch to the protection port also. This ensures that both nodes process traffic from the same span.

    If the Bidirectional switching check box is not checked, the near-end and far-end nodes switch independently of each other. For example, if the near-end node has an LOS on its working port it switches to the protection port. If the far-end node does not have a LOS, traffic remains on the working port.

- Revertive—Check this check box if you want traffic to revert to the working port after failure conditions stay corrected for the amount of time entered in the Reversion time field.

- Reversion time—If Revertive is checked, click the Reversion time field and choose a reversion time from the drop-down list. The range is 0.5 to 12.0 minutes. The default is 5.0 minutes. Reversion time is the interval between the point when the fault is cleared and the point when the traffic switches to the working port. The reversion timer starts after conditions causing the switch are cleared.

Step 8   Click **OK**.

Stop. You have completed this procedure.

NTP-E27 Set Up SNMP

Purpose	This procedure sets up Simple Network Management Protocol (SNMP) parameters so that you can use SNMP management software with the ONS 15600.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	Required if SNMP is used at your installation
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node where you want to set up SNMP. If you are already logged in, continue with Step 2.

Step 2   Click the **Provisioning > SNMP** tabs.

Step 3   In the Trap Destinations area, click **Create**.

Step 4   In the Create SNMP Traps Destination dialog box, complete the following:

- IP Address—Enter the IP address of your network management system (NMS). If the node you are logged into is an ENE, set the destination address to the GNE.

- Community—Enter the SNMP community name.

> ✎
> **Note**   The community name is a form of authentication and access control. The community name assigned to the ONS 15600 is case-sensitive and must match the community name of the NMS. For a description of SNMP community names, refer to the "SNMP" chapter in the *Cisco ONS 15600 Troubleshooting Guide*.

- UDP Port—The default User Datagram Protocol (UDP) port for SNMP is 162.

- Trap Version—Choose either SNMPv1 or SNMPv2 from the drop-down list. Refer to your NMS documentation to determine whether to use SNMP v1 or v2.

Step 5   Click **OK**. The node IP address of the node where you provisioned the new trap destination appears in the Trap Destinations area.

Step 6   Click the node IP address in the Trap Destinations area. Verify the SNMP information that appears under Selected Destination.

Stop. You have completed this procedure.

NTP-E28 Set the User Code for Card Inventory

Purpose	This procedure creates a user code to help identify the SSXC, TSC, and optical (traffic) cards. The user code is stored in nonvolatile memory on the card so it is not lost when a card is moved or stored as a spare.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning and higher

Step 1 Complete the "DLP-E26 Log into CTC" task on page 16-39. If you are already logged in, continue with Step 2.

Step 2 Click the **Inventory** tab.

Step 3 In the User Code field, type the code you want to use to identify the card. The user code is a 20-character ASCII string.

Step 4 Click **Apply**.

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

NTP-E29 Configure a Node Using an Existing Database

Purpose	This procedure downloads the provisioning database file from one node to a designated node and assigns a new IP address to the designated node. You can use this procedure to turn up a node or to reconfigure a node.
Tools/Equipment	Database backup file
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Note Only the provisioning database is downloaded from the specified database backup even if the alarm, performance, or audit logs are included in the database backup.

Step 1 Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node that you want to configure. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-E69 Back Up the Database" procedure on page 14-4 to back up the logged in node before reconfiguration.

Step 3 Click the **Maintenance > Database tabs.**

Step 4 Click **Configure**. The Configure Node dialog box appears (Figure 4-2). In the Current Node Configuration area, the Version field displays the current software version.

Figure 4-2   Configuring a Node with Another Node's Database Backup
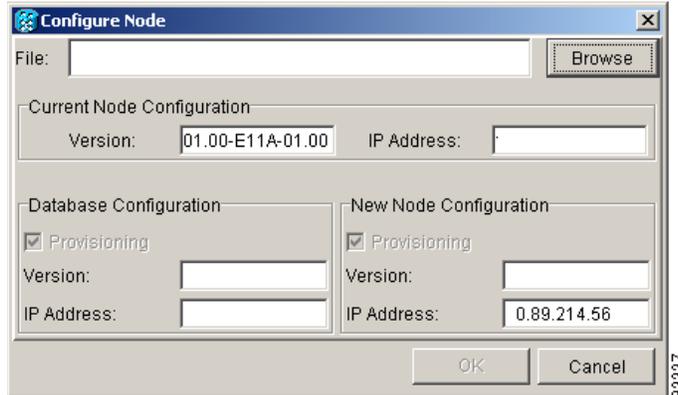
Step 5   Click **Browse** and navigate to the database backup file you will use to configure the node.

Step 6   In the Database Configuration area, verify the following:

- Provisioning—(Display only) Automatically checked to download the provisioning data from the selected database file.

- Version—(Display only) Displays the software version of the selected database file.

- IP address—(Display only) Displays the IP address assigned to the node of the selected database file.

Step 7   In the New Node Configuration area, verify the following:

- Provisioning—(Display only) Downloads the provisioning data from the selected database file.

- Version—(Display only) Displays the current software version.

- IP address—Displays the current IP address. To assign a new IP address, type a new IP address in the field.

Step 8   Click **OK**. When the Node Configuration warning message appears, click **Yes** to continue. The database restoration window appears. The CTC session closes when the TSC reboots.

Step 9   After the TSC completes its reboot, log in to the node using the IP address assigned in Step 7. For login instructions, see the "DLP-E26 Log into CTC" task on page 16-39.

Stop. You have completed this procedure.

NTP-E48 Set External Alarms and Controls

Purpose	This procedure provisions the reporting parameters and/or virtual wires for external alarms and controls (environmental alarms) that are wired to the Customer Access Panel (CAP) alarm contacts.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39. If you are already logged in, continue with Step 2.

Step 2   Complete the "DLP-E53 Provision External Alarms and Virtual Wires" task on page 16-70 to set external alarm inputs.

Step 3   Complete the "DLP-E54 Provision External Controls for External Alarms and Virtual Wires" task on page 16-71 to set external control outputs.

Stop. You have completed this procedure.

NTP-E174 Provision OSI

Purpose	This procedure provisions the ONS 15600 so it can be networked with other vendor NEs that use the Open Systems Interface (OSI) protocol stack for DCN communications. This procedure provisions the TARP, OSI routers, manual area addresses, subnetwork points of attachment, and IP over OSI tunnels.
Tools/Equipment	None
Prerequisite Procedures	NTP-E21 Verify Card Installation, page 4-2
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

⚠ **Caution**   This procedure requires an understanding of OSI protocols, parameters, and functions. Before you begin, review the OSI reference sections in the "Management Network Connectivity" chapter in the *Cisco ONS 15600 Reference Manual*.

⚠ **Caution**   Do not begin this procedure until you know the role of the ONS 15600 within the OSI and IP network.

✎

Note   This procedure requires provisioning of non-ONS equipment including routers and third party NEs. Do not begin until you have the capability to complete that provisioning.

Step 1   Complete the "DLP-E26 Log into CTC" task on page 16-39 at the node where you want to provision the OSI routing mode. If you are already logged in, continue with Step 2.

Step 2   As needed, complete the following tasks:

- DLP-E247 Provision OSI Routing Mode, page 18-68—Complete this task first.
- DLP-E248 Provision or Modify TARP Operating Parameters, page 18-69—Complete this task next.
- DLP-E249 Add a Static TID-to-NSAP Entry to the TARP Data Cache, page 18-72—Complete this task as needed.
- DLP-E251 Add a TARP Manual Adjacency Table Entry, page 18-73—Complete this task as needed.
- DLP-E252 Provision OSI Routers, page 18-73—Complete this task as needed.
- DLP-E253 Provision Additional Manual Area Addresses, page 18-74—Complete this task as needed.
- DLP-E254 Enable the OSI Subnet on the LAN Interface, page 18-75—Complete this task as needed.
- DLP-E255 Create an IP-Over-CLNS Tunnel, page 18-76—Complete this task as needed.

Stop. You have completed this procedure.