Cisco Transport Controller Operation

This chapter describes Cisco Transport Controller (CTC), the Cisco ONS 15327 software interface. For CTC setup and login information, refer to the *Cisco ONS 15327 Procedure Guide*.

Chapter topics include:

4.1 CTC Software Delivery Methods

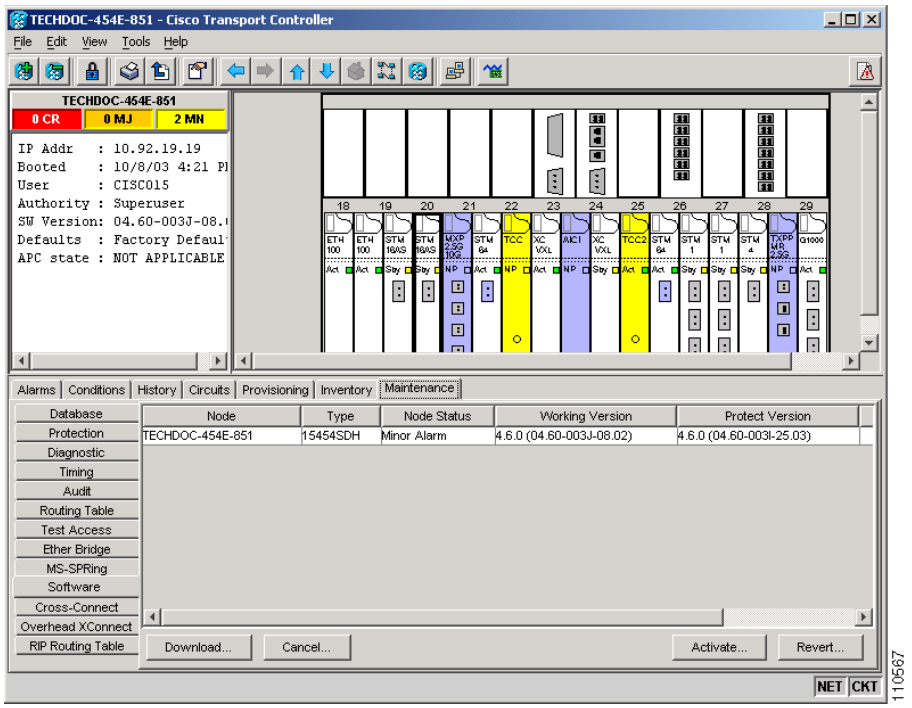
ONS 15327 provisioning and administration is performed using CTC software. CTC is a Java application that is installed in two locations; CTC is stored on the XTC card, and it is downloaded to your workstation the first time you log into the ONS 15327 with a new software release.

4.1.1 CTC Software Installed on the XTC Card

CTC software is preloaded on the ONS 15327 Cross-Connect Timing and Control (XTC) cards; therefore, you do not need to install software on the XTC cards. When a new CTC software version is released, use the release-specific software document to upgrade the ONS 15327 software on the XTC cards.

When you upgrade CTC software, the XTC cards store the new CTC version as the protect CTC version. When you activate the new CTC software, the XTC cards store the older CTC version as the protect CTC version, and the newer CTC release becomes the working version. You can view the software versions that are installed on an ONS 15327 by selecting the Maintenance > Software tabs in node view (Figure 4-1). Select the tabs in network view to view the software versions installed on all the network nodes.

Figure 4-1 CTC Software Versions, Node View



4.1.2 CTC Software Installed on the PC or UNIX Workstation

CTC software is downloaded from the XTC cards and installed on your computer automatically when you connect to the ONS 15327 with a new software release for the first time. Downloading the CTC software files automatically ensures that your computer is running the same CTC software version as the XTC cards you are accessing. The CTC files are stored in the temporary directory designated by your computer operating system. You can use the Delete CTC Cache button to remove files stored in the temporary directory. If the files are deleted, they download the next time you connect to an ONS 15327. Downloading the Java archive (JAR) files for CTC takes several minutes depending on the bandwidth of the connection between your workstation and the ONS 15327. For example, JAR files downloaded from a modem or a data communications channel (DCC) network link require more time than JAR files downloaded over a LAN connection.

4.2 CTC Installation Overview

To connect to an ONS 15327 using CTC, enter the ONS 15327 IP address in the URL field of Netscape Navigator or Microsoft Internet Explorer. After connecting to an ONS 15327, the following events occur automatically:

1. A CTC launcher applet is downloaded from the XTC card to your computer.
2. The launcher determines whether your computer has a CTC release matching the release on the ONS 15327 XTC card.
3. If the computer does not have CTC installed, or if the installed release is older than the XTC card version, the launcher downloads the CTC program files from the XTC card.

4. The launcher starts CTC. The CTC session is separate from the web browser session, so the web browser is no longer needed. Always log into nodes having the latest software release. If you log into an ONS 15327 that is connected to ONS 15327s with older versions of CTC, or to Cisco ONS 15454s or Cisco ONS 15600s, CTC files are downloaded automatically to enable you to interact with those nodes. The CTC file download occurs only when necessary, such as during your first login. You cannot interact with nodes on the network that have a software version later than the node that you used to launch CTC.

Each ONS 15327 can handle up to five concurrent CTC sessions. CTC performance might vary, depending upon the volume of activity in each session, network bandwidth, and XTC card load.

Note You can also use TL1 commands to communicate with the Cisco ONS 15327 through VT100 terminals and VT100 emulation software, or you can Telnet to an ONS 15327 using TL1 port 3083. Refer to the *Cisco ONS SONET TL1 Command Guide* for a comprehensive list of TL1 commands.

4.3 PC and Unix Workstation Requirements

To use CTC in the ONS 15327, your computer must have a web browser with the correct Java Runtime Environment (JRE) installed for the software release in use. The correct JRE for each CTC software release is included on the Cisco ONS 15327 software CD and the ONS 15327 documentation CD. If you are running multiple CTC software releases on a network, the JRE installed on the computer must be compatible with the different software releases. You can change the JRE version on the Preferences dialog box JRE tab. When you change the JRE version on the JRE tab, you must exit and restart CTC for the new JRE version to take effect. Table 4-1 shows JRE compatibility with ONS software releases.

Table 4-1 JRE Compatibility

ONS Software Release	JRE 1.2.2 Compatible	JRE 1.3 Compatible	JRE 1.4 Compatible
ONS 15327 Release 1.0	Yes	No	No
ONS 15327 Release 1.0.1	Yes	Yes	No
ONS 15327 Release 3.3	Yes	Yes	No
ONS 15327 Release 3.4	No	Yes	No
ONS 15327 Release 4.0[1]	No	Yes	No
ONS 15327 Release 4.1	No	Yes	No
ONS 15327 Release 4.6	No	Yes	Yes
ONS 15327 Release 5.0	No	No	Yes

1. Software Releases 4.0 and later will notify you if an older version JRE is running on your PC or UNIX workstation.

Table 4-2 lists the requirements for PCs and UNIX workstations. In addition to the JRE, the Java plug-in and modified java.policy file are also included on the ONS 15327 software CD and the ONS 15327 documentation CD.

Table 4-2 CTC Computer Requirements

Area	Requirements	Notes
Processor	Pentium III 700 MHz, UltraSPARC, or equivalent	700 Mhz is the recommended processor speed. You can use computers with a lower processor speed; however, you might experience longer response times and slower performance.
RAM	384 MB RAM recommended, 512 MB RAM optimum	Cisco recommends using 512 MG RAM for networks with 25 nodes or more to avoid longer response times and slower performance.
Hard drive	20 GB hard drive with 50 MB of space available	—
Operating system	• PC: Windows 98, Windows NT 4.0 with Service Pack 6a, Windows 2000, or Windows XP • Workstation: Solaris versions 8 or 9	—
Java Runtime Environment	JRE 1.4.2 or 1.3.1_02	JRE 1.4.2 is installed by the CTC Installation Wizard included on the Cisco ONS 15327 software and documentation CDs. JRE 1.4.2 provides enhancements to CTC performance, especially for large networks with numerous circuits. Cisco recommends that you use JRE 1.4.2 for networks with Software R5.0 nodes. If CTC must be launched directly from nodes running software earlier than R5.0, Cisco recommends JRE 1.3.1_02.
Web browser	• PC: Netscape 4.76, Netscape 7.x, Internet Explorer 6.x • UNIX Workstation: Netscape 4.76, Netscape 7.x	For the PC, use JRE 1.4.2 or 1.3.1_02 with any supported web browser. For UNIX, use JRE 1.4.2 with Netscape 7.x or JRE 1.3.1_02 with Netscape 4.76. Netscape 4.76 or 7.x is available at the following site: http://channels.netscape.com/ns/browsers/default.jsp Internet Explorer 6.x is available at the following site: http://www.microsoft.com

Table 4-2 CTC Computer Requirements (continued)

Area	Requirements	Notes
Java.policy file	A java.policy file modified for CTC	The java.policy file is modified by the CTC Installation Wizard included on the Cisco ONS 15327 software and documentation CDs.
Cable	User-supplied CAT-5 straight-through cable with RJ-45 connectors on each end to connect the computer to the ONS 15327 directly or though a LAN	—

4.4 ONS 15327 Connection Methods

You can connect to the ONS 15327 in multiple ways. You can connect your PC directly to the ONS 15327 (local craft connection) using the RJ-45 port on the XTC card or the LAN pins on the backplane, or by connecting your PC to a hub or switch that is connected to the ONS 15327. You can connect to the ONS 15327 through a LAN or modem, and you can establish TL1 connections from a PC or TL1 terminal. Table 4-3 lists the ONS 15327 connection methods and requirements.

Table 4-3 ONS 15327 Connection Methods

Method	Description	Requirements
Local craft	Refers to onsite network connections between the CTC computer and the ONS 15327 using one of the following: • The RJ-45 (LAN) port on the XTC card • A hub or switch to which the ONS 15327 is connected	If you do not use Dynamic Host Configuration Protocol (DHCP), you must change the computer IP address, subnet mask, and default router, or use automatic host detection.
Corporate LAN	Refers to a connection to the ONS 15327 through a corporate or network operations center (NOC) LAN.	• The ONS 15327 must be provisioned for LAN connectivity, including IP address, subnet mask, and default gateway. • The ONS 15327 must be physically connected to the corporate LAN. • The CTC computer must be connected to the corporate LAN that has connectivity to the ONS 15327.

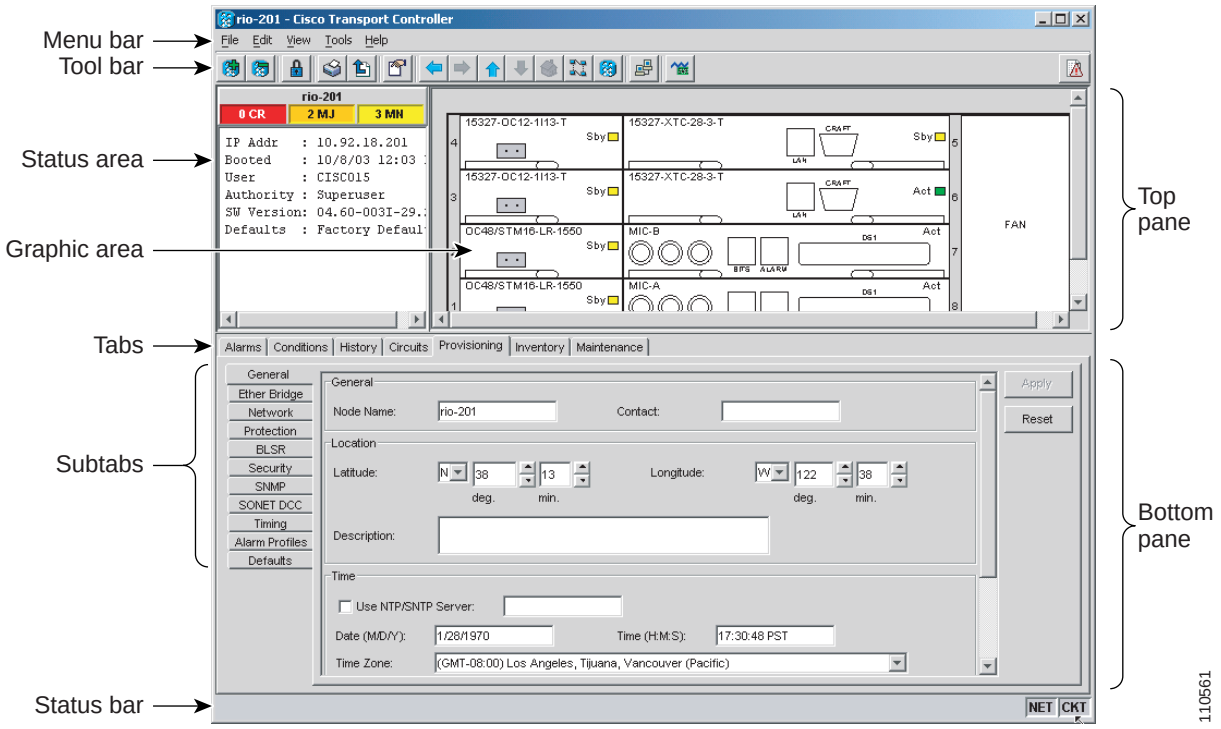
Table 4-3 ONS 15327 Connection Methods (continued)

Method	Description	Requirements
TL1	Refers to a connection to the ONS 15327 using TL1 rather than CTC. TL1 sessions can be started from CTC, or you can use a TL1 terminal. The physical connection can be a craft connection, corporate LAN, or a TL1 terminal. Refer to the *Cisco ONS SONET TL1 Command Guide*.	—
Remote	Refers to a connection made to the ONS 15327 using a modem.	• A modem must be connected to the ONS 15327. • The modem must be provisioned for ONS 15327. To run CTC, the modem must be provisioned for Ethernet access.

4.5 CTC Window

The CTC window appears after you log into an ONS 15327 (Figure 4-2). The window includes a menu bar, a toolbar, and a top and bottom pane. The top pane provides status information about the selected objects and a graphic of the current view. The bottom pane provides tabs and subtabs to view ONS 15327 information and perform provisioning and maintenance. From this window you can display three ONS 15327 views: network, node, and card.

Figure 4-2 Node View (Default Login View)



4.5.1 Node View

Node view, shown in Figure 4-2, is the first view that appears after you log into an ONS 15327. The login node is the first node shown, and it is the home view for the session. Node view allows you to view and manage one ONS 15327 node. The status area shows the node name; IP address; session boot date and time; number of Critical (CR), Major (MJ), and Minor (MN) alarms; the name of the current logged-in user; the security level of the user; software version, and the network element default setup.

4.5.1.1 CTC Card Colors

The graphic area of the CTC window depicts the ONS 15327 shelf assembly. The colors of the cards in the graphic reflect the real-time status of the physical card and slot (Table 4-4).

Table 4-4 Node View Card and Slot Colors

Card and Slot Color	Status
Gray	Slot is not provisioned; no card is installed.
Violet	Slot is provisioned; no card is installed.
White	Slot is provisioned; a functioning card is installed.
Yellow	Slot is provisioned; a Minor alarm condition exists.
Orange	Slot is provisioned; a Major alarm condition exists.
Red	Slot is provisioned; a Critical alarm exists.

Port color in both card and node view indicates the port service state. Table 4-5 lists the port colors and their service states. For more information about port service states, refer to Appendix B, "Administrative and Service States."

Table 4-5 Node View Card Port Colors and Service States

Port Color	Service State	Description
Blue	OOS-MA,LPBK	(Out-of-Service and Management, Loopback) Port is in a loopback state. On the card in node view, a line between ports indicates that the port is in terminal or facility loopback (refer to Figure 4-3 and Figure 4-4). Traffic is carried and alarm reporting is suppressed. Raised fault conditions, whether or not their alarms are reported, can be retrieved on the CTC Conditions tab or by using the TL1 RTRV-COND command.
Blue	OOS-MA,MT	(Out-of-Service and Management, Maintenance) Port is out-of-service for maintenance. Traffic is carried and loopbacks are allowed. Alarm reporting is suppressed. Raised fault conditions, whether or not their alarms are reported, can be retrieved on the CTC Conditions tab or by using the TL1 RTRV-COND command. Use OOS-MA,MT for testing or to suppress alarms temporarily. Change the state to IS-NR, OOS-MA,DSBLD, or OOS-AU,AINS when testing is complete.

Table 4-5 Node View Card Port Colors and Service States (continued)

Port Color	Service State	Description
Gray	OOS-MA,DSBLD	(Out-of-Service and Management, Disabled) The port is out of service and unable to carry traffic. Loopbacks are not allowed in this service state.
Green	IS-NR	(In-Service and Normal) The port is fully operational and performing as provisioned. The port transmits a signal and displays alarms; loopbacks are not allowed.
Violet	OOS-AU,AINS	(Out-of-Service and Autonomous, Automatic In-Service) The port is out of service, but traffic is carried. Alarm reporting is suppressed. The node monitors the ports for an error-free signal. After an error-free signal is detected, the port stays in OOS-AU,AINS state for the duration of the soak period. After the soak period ends, the port service state changes to IS-NR. Raised fault conditions, whether or not their alarms are reported, can be retrieved on the CTC Conditions tab or by using the TL1 RTRV-COND command. The AINS port will automatically transition to IS-NR when a signal is received for the length of time provisioned in the soak field.

Figure 4-3 Terminal Loopback Indicator

Figure 4-4 Facility Loopback Indicator

Table 4-6 lists card status indications.

Table 4-6 Node View Card Statuses

Card Status	Description
Sty	Card is in standby mode.
Act	Card is active.
NP	Card is not present.
Ldg	Card is resetting.

4.5.1.2 Node View Card Shortcuts

If you move your mouse over cards in the graphic, popups display additional information about the card including the card type; card status (active or standby); the type of alarm, such as Critical, Major, and Minor (if any); and the alarm profile used by the card. Right-click a card to reveal a shortcut menu, which you can use to open, reset, or delete a card. Right-click a slot to preprovision a card slot before installing the card.

4.5.1.3 Node View Tabs

Table 4-7 lists the tabs and subtabs available in the node view.

Table 4-7 Node View Tabs and Subtabs

Tab	Description	Subtabs
Alarms	Lists current alarms (CR, MJ, MN) for the node and updates them in real time.	—
Conditions	Displays a list of standing conditions on the node.	—
History	Provides a history of node alarms including date, type, and severity of each alarm. The Session subtab displays alarms and events for the current session. The Node subtab displays alarms and events retrieved from a fixed-size log on the node.	Session, Node
Circuits	Creates, deletes, edits, and maps circuits.	—
Provisioning	Provisions the ONS 15327 node.	General, Ether Bridge, Network, Protection, BLSR, Security, SNMP, Comm Channels, Timing, Alarm Profiles, Defaults
Inventory	Provides inventory information (part number, serial number, Common Language Equipment Identification [CLEI] codes) for cards installed in the node. Allows you to delete and reset cards, or change card service state. For more information on card service states, refer to Appendix B, "Administrative and Service States."	—
Maintenance	Performs maintenance tasks for the node.	Database, Ether Bridge, Protection, BLSR, Software, Cross-Connect, Overhead XConnect, Diagnostic, Timing, Audit, Routing Table, RIP Routing Table, Test Access

4.5.2 Network View

Network view allows you to view and manage ONS 15327s that have DCC connections to the node that you logged into and to any login node groups you have selected.

Note Nodes with DCC connections to the login node will not display if you checked the Disable Network Discovery check box in the Login dialog box.

The lines show DCC connections between the nodes. DCC connections can be green (active) or gray (fail). The lines can also be solid (circuits can be routed through this link) or dashed (circuits cannot be routed through this link). Circuit provisioning uses active, routable links. Selecting a node or span in the graphic area displays information about the node and span in the status area (Table 4-8).

The graphic area displays a background image with colored ONS 15327 icons. The icon colors indicate the node status (Table 4-9).

Table 4-8 DCC Colors Indicating State in Network View

Color and Line Style	State
Green and solid	Active, Routable
Green and dashed	Active, Nonroutable
Gray and solid	Failed, Routable
Gray and dashed	Failed, Nonroutable

The color of a node in network view indicates its node alarm status. Table 4-9 lists the node colors shown in network view and the associated alarm status.

Table 4-9 Node Colors Indicating State in Network View

Color	Alarm Status
Green	No alarms
Yellow	Minor alarms
Orange	Major alarms
Red	Critical alarms
Gray with “Unknown#”	Node initializing for the first time (CTC displays Unknown# because CTC has not yet discovered the name of the node)

Table 4-10 lists the tabs and subtabs available in the network view.

Table 4-10 Network View Tabs and Subtabs

Tab	Description	Subtabs
Alarms	Lists current alarms (CR, MJ, MN) for the network and updates them in real time.	—
Conditions	Displays a list of standing conditions on the network.	—
History	Provides a history of network alarms including date, type, and severity of each alarm.	—
Circuits	Creates, deletes, edits, filters, and searches for network circuits.	—

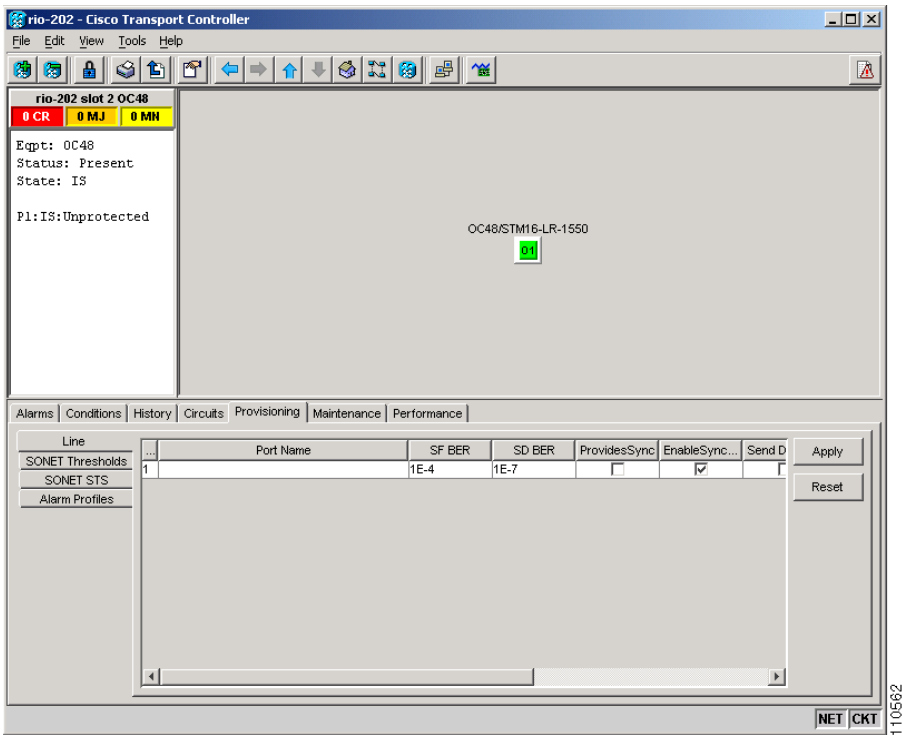
Table 4-10 Network View Tabs and Subtabs (continued)

Tab	Description	Subtabs
Provisioning	Provision security, alarm profiles, bidirectional line switched rings (BLSRs), and overhead circuits.	Security, Alarm Profiles, BLSR, Overhead Circuits, Provisionable Patchcords (PPC)
Maintenance	Displays the type of equipment and the status of each node in the network; displays working and protect software versions, and allows software to be downloaded.	Software

4.5.3 Card View

Card view provides information about individual ONS 15327 cards. Use this view to perform card-specific maintenance and provisioning (Figure 4-5). A graphic showing the ports on the card appears in the graphic area. The status area provides the node name, slot, number of alarms, card type, equipment type, and the card status (active or standby), card service state (if the card is present), or port state (Table 4-5 on page 4-7). The information that appears and the actions you can perform depend on the card.

Figure 4-5 CTC Card View of an OC48 LR 1550 Card



Note CTC provides a card view for all ONS 15327 cards except the mechanical interface card (MIC).

Table 4-11 shows the tabs and subtabs available in card view. The subtabs, fields, and information shown under each tab depend on the card type selected.

Table 4-11 Card View Tabs and Subtabs

Tab	Description	Subtabs
Alarms	Lists current alarms (CR, MJ, MN) for the card and updates them in real-time.	—
Conditions	Displays a list of standing conditions on the card.	—
History	Provides a history of card alarms including date, object, port, and severity of each alarm.	Session (displays alarms and events for the current session), Card (displays alarms and events retrieved from a fixed-size log on the card)
Circuits	Creates, deletes, edits, and search circuits.	Circuits
Provisioning	Provisions an ONS 15327 card.	XTC cards: DS1 (subtabs include Line, Line Thresholds, Elect Path Thresholds, and SONET Thresholds); DS3 (subtabs include Line, Line Thresholds, and SONET Thresholds); External Alarms; External Controls; Alarm Profiles OC-N cards: Line, SONET Thresholds, SONET STS, and Alarm Profiles E-Series and G-Series cards (subtabs depend on the card type): Ether Port, Ether VLAN, Ether Card, Ether Thresholds, RMON Thresholds, Alarm Profiles
Maintenance	Performs maintenance tasks for the card.	XTC cards: DS1 (subtabs include Loopback, Protection, AINS Soak, Path Trace); DS3 (subtabs include Loopback, Protection, AINS Soak); External Alarms; External Controls; Virtual Wires OC-N cards: Loopback, Info, Protection, AINS Soak, J1 Path Trace (options depend on the card type) G-Series cards: Path Trace, Loopback, Bandwidth
Performance	Performs performance monitoring for the card.	XTC cards: DS1, DS3 E-Series and G-Series cards (subtabs depend on the card type): Port, RMON Thresholds, Alarm Profiles

4.6 Print and Export CTC Data

In the card-, node-, or network-level CTC view, choose File > Print to print CTC information in graphical or tabular form on a Windows-provisioned printer. Choose File > Export to export card, node, or network information as editable delineated text files to other applications. Printing and exporting data are useful for record keeping or troubleshooting purposes.

Print card, node, or network CTC information in graphical or tabular form on a Windows-provisioned printer, or export card, node, or network information as editable delineated text files to other applications. This feature is useful for viewing the node inventory, circuit routing, or alarm data in network record-keeping and troubleshooting.

Whether you choose to print or export data, you can choose from the following options:

- Entire frame—Prints or exports the entire CTC window including the graphical view of the card, node, or network. This option is available for all windows.
- Tabbed view—Prints or exports the lower half of the CTC window containing tabs and data. The printout includes the selected tab (on top) and the data shown in the tab window. For example, if you print the History window tabbed view, you print only history items appearing in the window. This option is available for all windows.
- Table Contents—Prints CTC data in table format without graphical representations of shelves, cards, or tabs. This option applies to all windows except:
  - Provisioning > General window
  - Provisioning > Network > General and RIP windows
  - Provisioning > Security > Policy, Access, and Legal Disclaimer windows
  - Provisioning > SNMP window
  - Provisioning > Timing window
  - Maintenance > Database window
  - Maintenance > Diagnostic window
  - Maintenance > Protection window
  - Maintenance > Timing > Source window

  The Table Contents option prints all the data contained in a table with the same column headings. For example, if you print the History window Table Contents view, you print all data included in the table whether or not items appear in the window.

Note The above items are not available for the Export option.

4.7 XTC Card Reset

You can reset the ONS 15327 XTC card using CTC (a soft reset) or by physically reseating the XTC card (a hard reset). A soft reset reboots the XTC card and reloads the operating system and the application software. Additionally, a hard reset temporarily removes power from the XTC card and clears all buffer memory.

If you need perform a hard reset an active XTC card, put the XTC card into standby mode first by performing a soft reset using CTC.

4.8 XTC Card Database

When dual XTC cards are installed in the ONS 15327, each XTC card hosts a separate database; therefore, the protect card database is available if the database on the working XTC fails. You can also store a backup version of the database on the workstation running CTC. This operation should be part of a regular ONS 15327 maintenance program performed at approximately weekly intervals, and should also be completed when preparing an ONS 15327 for a pending natural disaster, such as a flood or fire.

Note The following parameters are not backed up and restored: node name, IP address, mask and gateway, and Internet Inter-ORB Protocol (IIOP) port. If you change the node name and then restore a backed up database with a different node name, the circuits will map to the new node name. Cisco recommends keeping a record of the old and new node names.

4.9 Software Revert

When you click the Activate button after a software upgrade, the XTC copies the current working database and saves it in a reserved location in the XTC flash memory. If you later need to revert to the original working software load from the protect software load, the saved database installs automatically. You do not need to restore the database manually or recreate circuits.

The revert feature is useful if a maintenance window closes while you are upgrading CTC software. You can revert to the standby software load without losing traffic. When the next maintenance window opens, complete the upgrade and activate the new software load.

Circuits that were created and provisioning that was performed after a software load is activated (upgraded to a higher release) will be lost with a revert. The database configuration at the time of activation is reinstated after a revert. This does not apply to maintenance reverts (for example 4.6.2 to 4.6.1), because maintenance releases use the same database.

To perform a supported (non-service-affecting) revert from Software R5.0, the release you want to revert to must have been working at the time you first activated Software R5.0 on that node. Because a supported revert automatically restores the node configuration at the time of the previous activation, any configuration changes made after activation will be lost when you revert the software. Downloading Release 5.0 a second time after you have activated the new load ensures that no actual revert to a previous load can take place (the TCC2/TCC2P cards will reset, but will not be traffic affecting and will not change your database).