C H A P T E R 1

Introduction

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> **Note** Cisco MetroPlanner has been renamed to Cisco Transport Planner starting with release 8.5.

Cisco Transport Planner Software R9.0 provides a way to model and test wavelength division multiplexing (WDM) optical networks in a graphical environment. The primary purpose of Cisco Transport Planner is to help sales engineers (SEs) design and validate networks of Cisco Optical Networking System (ONS) 15454 Multiservice Transport Platforms (MSTP). Using Cisco Transport Planner Software R9.0, an SE can create multiple instances of a network to modify different parameters in each instance for comparison. Cisco Transport Planner generates a shelf view of all the sites deployed in the optical network and provides a complete bill of materials (BoM) for the network and the differences between instances of a network.

This chapter describes how you use Cisco Transport Planner to design, analyze, and optimize new or existing Cisco optical networks and contains the following sections:

- 1.1 Overview, page 1-1
- 1.2 Installing Cisco Transport Planner, page 1-12
- 1.3 Uninstalling Cisco Transport Planner, page 1-13
- 1.4 Launching Cisco Transport Planner, page 1-14
- 1.5 Setting Cisco Transport Planner Options, page 1-17

1.1 Overview

This section describes the Cisco Transport Planner 9.0 features, network design process, process flow, traffic planning, traffic services, and parameter states.

1.1.1 Cisco Transport Planner 9.0 Features

Cisco Transport Planner software provides a simple tool set for designing optical networks with Cisco ONS 15454 MSTP products. You can enter all of the network parameters or minimal information, such as site distance, and Cisco Transport Planner will model the network you need to build and generate a detailed BOM with ordering information. Designing optical networks requires the verification of multiple constraints such as optical budget limitations and platform architectural restrictions. One

Cisco Transport Planner project can contain multiple copies of a network. This duplication allows you to change parameters in one network copy, then analyze and compare it to another network copy to determine the differences. Cisco Transport Planner Software R9.0 provides the following new features:

- New CTP.exe installer (on Windows), and CTP.bin installer (Linux).
- Support for OPT-RAMP-C amplifier.
- Support for OTU2_XP card.
- Support for Protection Switching Module (PSM) card.
- Support for GE_XPE and 10GE_XPE cards.
- Enhanced support for ADM-10G card.
- Support for unlock action on the node level and side level.
- Support for omnidirectional node.
- Capability to manually regenerate optical signals.
- Allows quick network analysis using the Run quick analysis option.
- Displays weight of all the units for a node or for the complete network.
- Displays a warning when a network design contains an alien DWDM client.
- Capability to set the height of racks, rack parameters, the number of shelves, and the number of extra shelves.
- Can force MXP, TXP, or XP cards in the nodes.
- Can force different icon colors for node types, amplifier types, and fiber types.
- Enforces rack placement rules.
- Supports creation of network elements (NEs) after the network analysis. Each site contains an NEs folder in which NEs are placed.
- Can run on a Solaris or Linux server, allowing the user to connect to it from a desktop or a laptop. Network analysis is carried out on the server.

1.1.2 Network Design Process

To generate a network design, the SE enters the following parameters:

- The topology of the network—ring, linear, or meshed
- The type of equipment used at each site
- The distance separating the sites
- The type of fiber connecting the sites
- Service demands, including the service type, the protection type, and the number of channels between nodes
- The number of network sites

When the network parameters are entered, Cisco Transport Planner finds the best routing, defines the required add/drop filters, and places optical amplifiers and dispersion compensation units (DCUs) to fit the user traffic demands at the minimum cost. Optimization is performed to meet the boundary conditions. The optimization includes attenuation and amplification.

Finally, Cisco Transport Planner generates a BOM, which includes the product codes, the quantities, and pricing information. In addition, it creates other reports, such as a shelf-level view of the configuration, which can be printed. This information helps the SE understand how the shelf is built and helps to avoid confusion and errors during the actual deployment. Within the BOM is the total network cost, which allows a quick comparison of various design options. The total network cost is the cost of the equipment for all of the sites in the designed network.

1.1.2.1 Network Design Constraints

Cisco Transport Planner searches for the best solution to a designed network using an optimization algorithm.

A network design must meet the optical budget and receiver overload criteria to operate efficiently. An analysis of optical budget and receiver overload evaluates the strength of the signal traversing the ring. If a design solution satisfies the constraints, it is a valid design. The Cisco Transport Planner Software R9.0 optimization algorithms generate multiple solutions and verifies the constraints against those solutions. If the constraints are satisfied, the solution with the lowest cost-to-utilization ratio is selected as the optimal solution.

If the network design solution fails to satisfy all the constraints, Cisco Transport Planner Software R9.0 makes adjustments to parameters such as signal attenuation and amplification. Amplification is achieved by using an erbium-doped fiber amplifier (EDFA). Attenuation is achieved by using variable optical attenuator (VOA) modules integrated into the platform. Cisco Transport Planner Software R9.0 corrects the optical budget using an algorithm that includes automatic placement of EDFAs and VOA regulation.

For each internodal demand, Cisco Transport Planner Software R9.0 performs an optical budget and receiver overload analysis and displays the results in various reports in the Graphical User Interface (GUI). If the network design algorithms are not able to provide a solution, then you can modify the input data (for example, by relaxing some user constraints) and run the analysis again.

1.1.2.2 Platform Support

Cisco Transport Planner Software R9.0 supports the Cisco ONS 15454 DWDM optical platform Software Releases 4.7, 5.0.x, 7.0.x, 8.x and 9.0.

1.1.2.3 Topology Support

Cisco Transport Planner 9.0 supports the following network topologies:

- Bus (single span, point-to-point, and linear)
- Open (or hubbed) ring
- Closed (or meshed) ring
- Any-to-any ring (ROADM)
- Meshed network

Cisco Transport Planner Software R9.0 allows you to design flexible networks with up to 100 site locations. A flexible network is a network that, using ROADM nodes, allows traffic modification/reconfiguration as traffic requirements change.

For Cisco Transport Planner Software R9.0, the maximum number of locations where the optical service channel (OSC) is terminated is 40. The maximum number of add/drop locations is 40.

1.1.2.4 Protection Scheme Support

Cisco Transport Planner Software R9.0 designs support the following protection schemes:

- Y-cable protected—In Y-cable protection, one transponder card is designated as active and the other as standby. The standby transponder card has the client-side laser turned off to avoid corrupting the signal transmitted back to the client. The active transponder monitors the signal from the trunk side and in the event of loss or signal failure, the system switches to the standby path.

- Client-based 1+1—Two client signals are transmitted to separated line cards or transponder cards instead of using a Y-cable to split one client signal into two line cards or transponder cards. In client 1+1 protection, the failure and switchover is controlled by the client system.

- Fiber-switched protection—The single client signal is injected into the client receive (Rx) port. It is then split into two separate signals on the two trunk transmit (Tx) ports. The two signals are transmitted over diverse paths. The far-end card chooses one of the two trunk Rx port signals and injects it into the Tx client port.

- PSM-OCH—Channel protection configuration provides protection at trunk level (like Fiber-Switched protection) for TXP/MXP that do not have dedicated Fiber-Switched cards. PSM splits the traffic originated by transponder trunk on working and protected TX ports. Working Tx (W-Tx) and protected TX (P-Tx) are connected to the add ports of Add-Drop stages adding the channel in two different directions. On the receiving direction PSM W-RX and P-RX are connected to the drop ports of Add-Drop stages receiving the channel from the two different directions. PSM switch selects a path among W-Rx and P-Rx ports so that only one direction at a time is connected to COM-RX ports and therefore to the TXP/MXP.

- Unprotected—Protection is not used.

- External card switch—Protection not used.

1.1.2.5 Service Support

Cisco Transport Planner Software R9.0 can support any subset of the following services:

- Alien (third-party DWDM interface)
- Cisco ONS 15530 2.5 Gbps Aggregated
- ONS 15530 10 Gbps Aggregated
- ONS 15530 Multirate (MR) Transport
- ONS 15530 Data Multiplexer (MXP)
- 2R Any Rate
- Gigabit Ethernet
- 10GE—10 Gigabit Ethernet (LAN and WAN)
- D1 Video
- DVB-ASI—Digital Video Broadcast-Asynchronous Serial Interface
- DV-6000
- ESCON—Enterprise System Connection
- Fast Ethernet
- Fibre Channel 1G
- Fibre Channel 2G

- Fibre Channel 4G

- Fibre Channel 10G

- FICON—Fiber Connection 1G

- FICON Express 2G

- FICON 4G

- High Definition Television (HDTV)

- ISC-3 Peer (1G)

- ISC-3 Peer (2G)

- ISC-3 Peer (2R)

- ISC-Compat (ISC-3 Compatibility mode)

- OC-3

- OC-12

- OC-48

- OC-192

- OC-768

- OTU2

- SDI—Serial Data Input

- STM-1

- STM-4

- STM-16

- STM-64

- STM-256

- Sysplex CLO—control link oscillator

- Sysplex ETR—external throughput rate

Note   The Sysplex CLO and Sysplex ETR services are supported only on the following topologies:

- Single span—Two terminal sites with 32MUX-O and 32DMX-O cards, 40MUX-O and 40DMX-O cards, 40WSS and 40DMX, or 32WSS and 32DMX or 32DMX-O cards installed and no intermediate sites in between.

- Point-to-Point—Two terminal sites with 32MUX-O and 32DMX-O cards. 40MUX-O and 40DMX-O cards, 40WSS and 40DMX, or 32WSS and 32DMX or 32DMX-O cards installed. Line amplifiers can be installed between the terminal sites, but intermediate (traffic terminating) sites cannot be installed.

- Two hubs—Two hub nodes in a ring with 32MUX-O, 32DMX-O, 32WSS, 40MUX-O, 40DMX, 40DMX-O, 40WSS, and 32DMX cards or 32DMX-O cards installed. Line amplifiers can be installed between the hubs.

Refer to the *Cisco ONS 15454 DWDM Reference Manual* for more information about the supported topologies for the ETR and CLO services.

1.1.3 Cisco Transport Planner Process Flow

The following stages are used to complete a network design. See Figure 1-1 for the process flow.

1. Create a project using the Project Creation wizard.

2. Create a network using the Create Network wizard. The Create Network wizards adds sites and places the fiber spans between the sites. A span represents a pair of fibers.

3. Create a point-to-point, AggregatedEthernet, TDM Aggregated, protected ring (P-ring), and/or ROADM service demand.

4. Analyze the network design.

5. If you would like to force automatic tool choices, adjust the design and repeat the analysis until you have reached the desired configuration.

6. Create an Install copy of the network and update the parameters with real data from the field.

7. Analyze the Install network.

8. Create an upgrade copy of the network, as needed, to add forecasted channels.

Figure 1-1   *Cisco Transport Planner Process Flow*
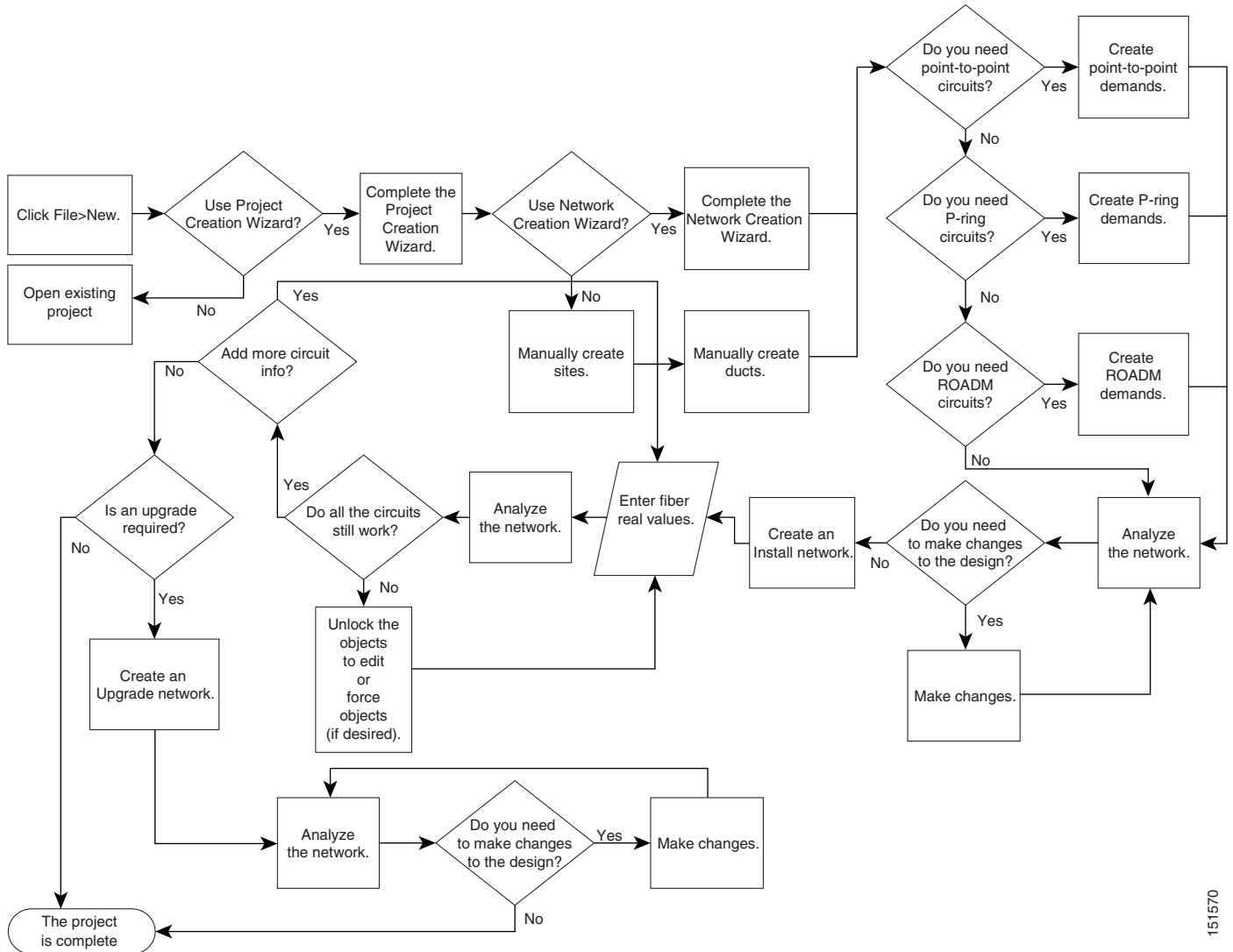
1.1.4 Planning Traffic in Cisco Transport Planner

Traffic in Cisco Transport Planner is defined as an optical path for each pair of nodes requiring a service demand. An optical path is the combined channels between the two nodes. The following list gives definitions for some basic traffic items:

- Circuit—A single channel between a pair of source and destination nodes. In addition to the source and destination nodes and all the attributes that are common to the service containing the circuit, a circuit has the following attributes:

- Present/forecast indication
- Routing direction for unprotected service
- ITU channel
- Optical bypass indication

- Demand—A set of circuits with common characteristics, such as:

- Service demand label
- Number of existing circuits
- Number of forecasted circuits
- Client service type
- Protection type
- Optical bypass (number of channels and/or sites)
- WDM interface type (TXT or ITU-LC)
- WDM card type
- Source client interface (SR, IR, or LR)
- Destination client interface (SR, IR, or LR)

- Traffic demand—All traffic between the same set of nodes. Both L-band and C-band are supported. The following traffic demands are supported: P-ring, Fixed (point-to-point), and Any-to-any (ROADM).

In P-ring traffic demands, all the demands are used to support traffic topologies similar to bidirectional line switched rings (BLSRs) or multiplex section-shared protection rings (MS-SPRings). Each P-ring demand is between a pair of added/dropped nodes where BLSR-like (or MS-SPRing-like) traffic must exist. The number of circuits is the same for each demand, and is user-specified (from 1 to 40).

In fixed (point-to-point) traffic demands, the set of nodes is restricted to two sites. The number of circuits is user-specified (from 1 to 40).

In any-to-any (ROADM) traffic demands, a minimum of two nodes and a maximum of 40 ROADM nodes are supported. An any-to-any traffic demand allows each node to establish one or more circuits with the other nodes, either as a hub or meshed configuration. In a meshed configuration, each node defined in the set is connected to each other node. This is the most common traffic type. In a hub configuration, the user-defined hub node is connected to each of the other nodes. ROADM circuits have the same protection types and services. The number of circuits is not user-specified and can vary from 0 to 40.

A ROADM demand can have multiple client service types and supports multiple DWDM card interfaces for each client service type. A ROADM demand supports the following routing strategies:

- Protected (Default)—Each node pair in the traffic demand is connected using two connections.
- Unprotected optimum optical path—Each node pair is connected using one connection. The unprotected optimum optical path minimizes the number of required optical amplifiers, but also restricts the number of channels that can be deployed among the nodes of the traffic demand (maximum of 40 channels between each node pair) in the installed network.
- Unprotected minimum hop count—Each node pair in the traffic demand is connected by one connection. The unprotected minimum hop count maximizes the number of channels (for unprotected traffic types only) that can be deployed among the nodes of the traffic demand, but can requires a higher number of optical amplifiers on the unprotected optimum optical path (maximum of 40 channels between each node pair) in the installed network.

– Unprotected subnet—Each node pair in the traffic demand is connected using one connection. You can manually force connections on only one branch of the ring. For unprotected subnets, you must manually select one starting node of the branch and the direction the ring must be traversed to define the subnet, starting from the initial site. The branch direction is specified by defining the outgoing side first, referred to as the starting node. This routing strategy option allows you to exclude some critical paths and (with ROADM traffic demands containing two sites) to force each ROADM connection clockwise or counterclockwise.

1.1.5 Cisco Transport Planner Traffic in the Project Explorer Pane

Cisco Transport Planner Software R9.0 represents all of the user-defined traffic services as a tree view within the Project Explorer pane. The Project Explorer shows all of the open project information, including the networks, the network dependencies, sites, fibers, services, and so on. (Figure 1-2).

Figure 1-2   Project Explorer View
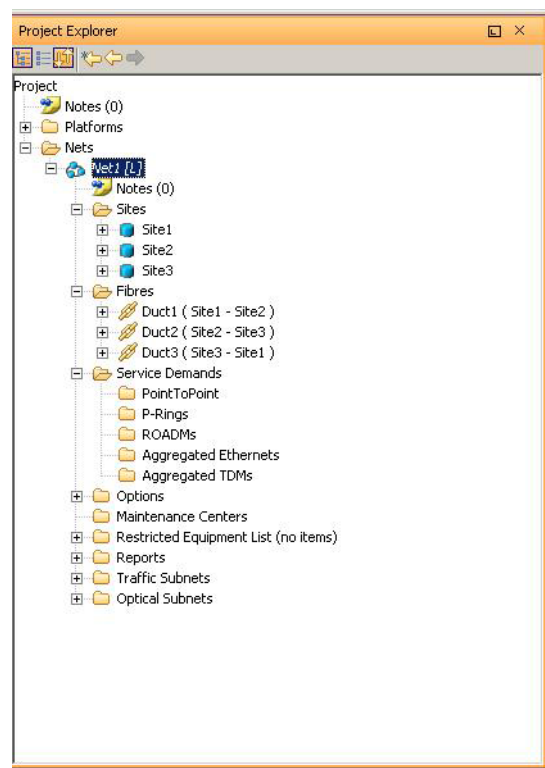
After you analyze a network design, the colors of tree view change according to the error/warning condition of the network design. The icons display as red if there are errors in the network design; orange if there are warnings but no errors; and green of there are no warnings or errors. The icon shows the color of the most severe condition. For more information about analyzing the network, see the "2.9 Analyzing the Network" section on page 2-45.

Right-clicking on certain items in the Project Explorer tree allows you to edit the parameters.

1.1.5.1 Point-to-Point Traffic Demands

Point-to-point traffic demands appear in the Service Demands > PointToPoint folder in the Project Explorer pane. Each point-to-point traffic demand is categorized by its source and destination site names. All of the point-to-point services between the two sites appear under the designated demand name (Figure 1-3).

Figure 1-3   Point-to-Point Traffic Demand in the Project Explorer
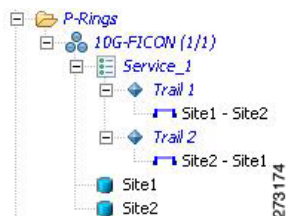

A point-to-point traffic demand includes the following information:

*   Client service type
*   Site# – Site# (source and destination site labels for this demand)

1.1.5.2 P-Ring Traffic Demands

Each protected ring (P-ring) traffic demand appears in the Project Explorer pane under the Service Demands > P-Rings folder. Figure 1-4 shows an example of a P-ring traffic demand in the Project Explorer.

Figure 1-4   P-Ring Traffic Demand in the Project Explorer


All the P-ring channels between each site pair are listed under each P-ring traffic demand. Each demand is labeled with the following information:

*   P-ring number
*   Client service type
*   Site# – Site# (source and destination site labels for this demand)

1.1.5.3 ROADM Traffic Demands

Each ROADM traffic demand appears in the Project Explorer under the Service Demands > ROADMs folder. The ROADM folder contains each defined ROADM demand. You can define more demands for the same ROADM for the same set of nodes. Figure 1-5 shows an example of a ROADM traffic demand.

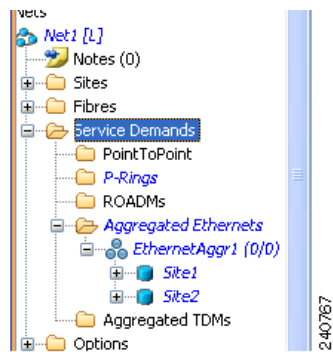*Figure 1-5*   *ROADM Traffic Demand in the Project Explorer*
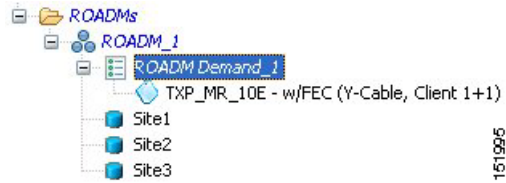
In the Project Explorer, each ROADM includes the ROADM demand name and a list of DWDM card types that support the client service types. Protection types appear in parentheses.

1.1.5.4 Aggregated Ethernet Demand

Each aggregated ethernet traffic demand appears in the Project Explorer under the Service Demands > Aggregated Ethernet folder. The Aggregated Ethernet folder contains each defined aggregated ethernet demand. Aggregated Ethernet demands are supported on ring and linear traffic subnets. Figure 1-6 shows an example of an aggregated ethernet traffic demand.

Figure 1-6   *Aggregated Ethernet Demand in Project Explorer*

1.1.5.5 TDM Aggregated Demand

Each TDM aggregated demand appears in the Project Explorer pane under the Service Demands > Aggregated TDMs folder. Figure 1-7 shows an example of a TDM aggregated traffic demand in the Project Explorer.

Figure 1-7   TDM Aggregated Demand in Project Explorer
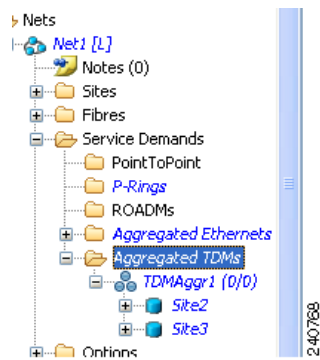
TDM aggregated demands are supported only on a ring traffic subnet.

1.1.6 Auto, Forced, and Locked Parameters

Parameters in CTP can be in one of three states:

- Auto— This parameter allows the highest degree of flexibility to CTP in designing a network. When you select Auto, CTP chooses the parameter value during network analysis.

- Forced—When you set a specific parameter value, other than Auto, CTP designs the network using these constraints. When a setting is forced, the item appears in blue italics in the Project Explorer pane.

- Locked—The state of a parameter after network analysis. The next time the analyzer is run, Cisco Transport Planner cannot change the value when it is in the Locked state. You can unlock an item using the Unlock command. For more information, see the "2.10.4 Unlocking Parameters in the Network Design" section on page 2-49. Figure 1-8 shows an example of sites in a locked state.

Figure 1-8   Locked Sites in the Project Explorer View

Depending on the initial state, the network analyzer will:

- Move the parameter into the Locked state if the unit or parameter was set to Auto.

- Leave the parameter in the same state if the user forced a specific value for the unit or parameter.

1.2 Installing Cisco Transport Planner

Use the following procedure to install Cisco Transport Planner:

Step 1   To download the installer, go to the Cisco software download site.

Step 2   Navigate to the location where you want to save the CTP.exe file to a local hard drive.

Step 3   Click **Save**.

Step 4   To start the installation of CTP:

- Windows—Navigate to the directory containing the CTP.exe file and double-click it.
- Linux—Assuming the CTP.bin file is accessible from the current shell path, navigate to the directory containing the CTP.bin file and type:

    % ./CTP.bin

    The graphical CTP installation wizard appears.

Step 5   Click **Next**. The license agreement is displayed.

Step 6   To accept the license, click the I accept the terms of the License Agreement option.

Step 7   Click **Next**.

Step 8   Specify the installation directory. On Windows, the default is C:\Program Files\Cisco\CTP-R9.0.0.

To choose a different directory, click the **Choose...** button and browse to the required directory. To restore the default path, click the **Restore Default Folder** button.

Step 9   Click **Next**.

Step 10   Specify the shortcut folder by choosing any one of the following options:

- In a new Program Group: Specify a new folder. The default is CTP.
- In an existing Program Group: Select a folder from the list of existing folders. The default is CTP. This option is the default if you installed CTP earlier.
- In the Start Menu
- On the Desktop
- In the Quick Launch Bar
- Other: Use this option to specify a commonly used folder.
- Don't create icons: Choose this option if you do not want to create a shortcut.

> **Note**   Check the Create Icons for All Users option if you want to create shortcuts for all users of a system.

Step 11   Click **Next**. The pre-installation summary is displayed.

Step 12   Review the pre-installation summary. If no changes are required, click **Install**; otherwise, click **Previous** to make modifications.

A progress bar displays the installation status. Click **Cancel** at any time to stop the installation.

When the installation process is complete, a screen indicates whether the installation succeeded or failed.

Step 13   Click **Done** to exit the installation wizard.

1.3 Uninstalling Cisco Transport Planner

Use the following procedure to uninstall Cisco Transport Planner:

Step 1   Click the CTP Uninstaller icon in the Start > All Programs >CTP menu.

The graphical Uninstall CTP wizard appears.

Step 2   Click **Uninstall**.

Step 3   A progress bar displays the uninstallation status. Click **Cancel** at any time to stop the uninstallation.

When the uninstallation process is complete, a screen displays the files that could not be uninstalled.

Step 4   Click **Done** to exit the uninstallation wizard.
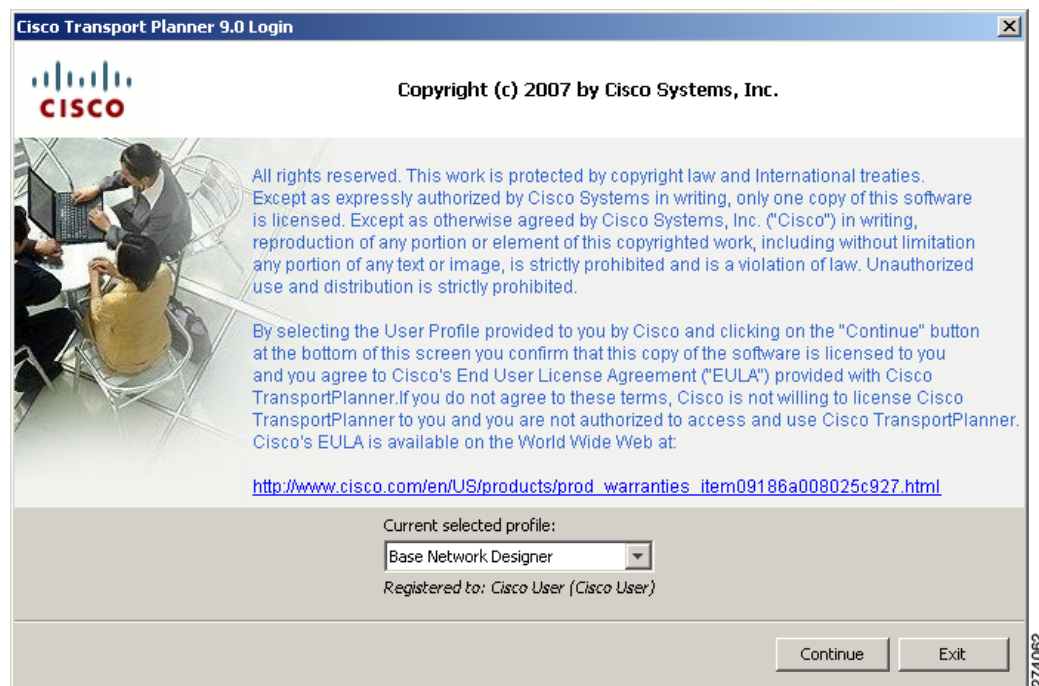
1.4 Launching Cisco Transport Planner

Before you start Cisco Transport Planner, you need to save the user profiles provided to you by Cisco Systems to the profiles directory. Access to Cisco Transport Planner features depends on the user profile you select when you start Cisco Transport Planner. The default profile is Base Network Designer.

Use the following procedure to launch Cisco Transport Planner:

Step 1   Launch Cisco Transport Planner using any of the following options:

- Click the CTP icon in the Start > All Programs > CTP menu.
- Double-click the CTP icon in the quick launch bar.
- Double-click the CTP icon on the desktop.
- Browse to the installation directory and double-click the ctp.jar file.

The Cisco Transport Planner 9.0 login dialog box appears (Figure 1-9).

Figure 1-9   Cisco Transport Planner 9.0 Login Dialog Box

**Step 2**   Select the user profile from the drop-down list.

Step 3   Click **Continue** to open Cisco Transport Planner.

The login profile type appears in the lower-right corner of the Cisco Transport Planner window.

1.4.1 Opening a Project

Use the following procedure to open an existing Cisco Transport Planner project. To create a new project, see the "2.1 Creating a Project" section on page 2-1.

Step 1   Click the project name under Open in the Tasks Pane (Figure 1-10). The project opens. If you do not see the project name listed, continue with Step 2.

Step 2   Click **Open** under Project in the Tasks Pane or in the File menu.

*Figure 1-10*   ***Opening a Project from the Tasks Pane***
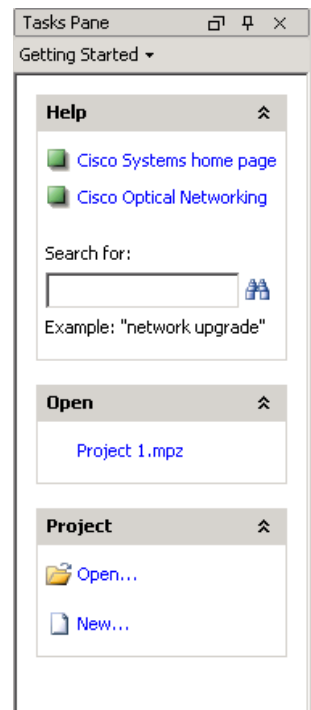
Step 3   In the Open Project dialog box, navigate to the desired directory and choose the project. Click **Open**. The Cisco Transport Planner project appears.

1.4.2 Loading and Unloading Networks

Each network in a project requires memory. To save memory, when Cisco Transport Planner opens a project, all networks are in the Unloaded state. An unloaded network appears in the Project Explorer with a "U" next to the network identifier (Figure 1-11). To load an unloaded network, double-click on the network folder in the Project Explorer, or right-click the network and choose **Load** from the shortcut menu.

Figure 1-11   Unloaded Network in the Project Explorer
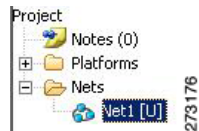
A loaded network appears in the Project Explorer with an "L" next to the network identifier (Figure 1-12). To unload a loaded network, right-click the network icon in the Project Explorer and choose **Unload** from the shortcut menu.

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Note   When you load a network containing an alien interface that is not present in the parts database (DB), warning messages are displayed.

Figure 1-12   Loaded Network in the Project Explorer

1.4.3 Saving a Project

Use the following procedure to save a project:

Step 1   Choose one of the following:

- To save an existing project with the same filename, choose **File > Save**. You have completed this procedure.
- To save a new project, choose **File > Save** and go to Step 2.
- To save an existing project with a different filename, choose **File > Save As** and go to Step 2.

Step 2   In the Save Project dialog box, navigate to the desired directory and type the filename. Click **Save**. Cisco Transport Planner saves projects as zipped files with the MPZ extension.

1.4.4 Closing a Project

Use the following procedure to close a Cisco Transport Planner project:

Step 1   From the File menu, choose **Close**.

Step 2   In the Save Project dialog box, click **Yes** to save or **No** to close without saving changes.

Step 3   If you clicked Yes and have not previously saved the project, the Save Project dialog box appears. Enter the name of the project and click **Save**. The project closes.

Step 4   To exit Cisco Transport Planner, choose **Exit** from the File menu.

1.5 Setting Cisco Transport Planner Options

Cisco Transport Planner provides numerous options for customizing the tool and the design.

> **Note**   The following procedures for setting options using the Tools menu apply to new projects during project creation. To change an existing (open) project, click the desired item in the Project Explorer pane Subnets folder and edit the parameter in the Properties pane.

1.5.1 Setting the Graphical Display

Use the following procedure to set the Cisco Transport Planner graphical display:

Step 1   From the Tools menu, choose **Options**.

Step 2   In the Options Explorer dialog box, right-click the Graphic folder and choose **Expand** from the shortcut menu.

Step 3   To change the color scheme for Cisco Transport Planner, click **Look & Feel** and choose the desired scheme from the drop-down list.

Step 4   To change the appearance of the Project Explorer tree, click **Project Explorer** and complete the following tasks as needed:

- Overlapping—Check to reorder sites for a selected network.

- Alarm Mode—Choose **Single** for an alarm icon to report only the condition of that item or choose **Cumulated** for an alarm icon to summarize the most critical alarm of the item and its children.

- Bottom Right Icon—(Display only) Displays Locking to indicate that the lock icon appears at the bottom right of each locked item in the Project Explorer.

- Top Right Icon—(Display only) Displays Alarm to indicate that the alarm icon appears at the top right of each alarmed item in the Project Explorer. The alarm icon will be green, yellow, orange, or red to indicate the alarm severity.

Step 5   To change the NtView *Name* tab appearance, click **Network View** and complete the following tasks as needed:

- In the Site area, complete the following tasks:

  - Site Color—To set the default site color when no forcing is done, click the drop-down arrow to display a color swatch popup window. Click the desired color.

– Site Selection Color, and Highlight Color—To change the site colors, click in the Color, Selection Color, and/or Highlight Color fields in the Site list. Click the drop-down arrow to display a color swatch popup window. Click the desired color.

– Show Name—Check to display the site name on the NtView *Name* tab.

– Pass Through, OSC, Add/Drop, Hub, Gain equalizer, R-OADM, Line Amplifier, OXC, OIC, Background Amplified Color, Background Raman Amplified Span Color—To change the colors, click in the relevant fields in the Site list. Click the drop-down arrow to display a color swatch popup window. Click the desired color.

– Show Amplifiers—Check to display the amplifier icon for a site on the NtView *Name* tab.

– Show Raman Amplified Span—Check to display the Raman amplified span on the NtView *Name* tab.

• In the Fiber area, complete the following tasks, as needed.

– True wave Reach Color, Dispersion Shifted Color, Metro Core Color, true wave, True Wave Plus Color, True Wave Minus Color, True wave Classic Color, Free Light Color, LS Color, Tera Light Color, E LEAF Color, TRUE WAVE RS Color, G 652 SMF Color, and Selection Color—To change the fiber color, click in the relevant fields in the Fibre list and then click the drop-down arrow.

– Show Name—Check to display the fiber name on the NtView *Name* tab.

– Show Length—Check to display the fiber length on the NtView *Name* tab.

– Show total SOL Loss—Check to display start of life (SOL) loss on the NtView *Name* tab.

– Show total EOL Loss—Check to display end of life (EOL) loss on the NtView *Name* tab.

– Show CD C-band—Check to display C-band chromatic dispersion (CD) on the NtView *Name* tab.

– Show CD L-band—Check to display L-band chromatic dispersion (CD) on the NtView *Name* tab.

• To change the color of the traffic demands on the NtView *Name* tab, in the Point To Point, P-Ring, and Any To Any areas, click in the Color and Selection Color fields, and then click on the drop-down arrow to display a color swatch popup window. Click the desired color.

Figure 1-13   Duct Details Shown on the NtView Name Tab
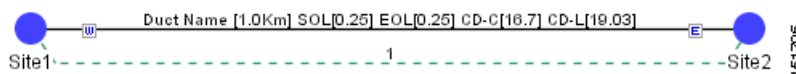
Step 6   To change the Network Mgmt Tree tab appearance, complete the following tasks as needed:

• In the Network area, click in the Color and Selection fields. Click the drop-down arrow to display a color swatch popup window. Click the desired color.

• In the Link area, complete the following tasks:

– To change the link color, click the Color field in the Link list and then click the drop-down arrow. Choose the desired line width from the drop-down list.

– To change the link appearance, click the Stroke field in the Link list and then click the drop-down arrow. Choose the desired line appearance from the drop-down list.

Step 7   To change the layout appearance, click **Layout View** and complete the following tasks as needed:

- In the General area, click in the Background and Selection Color fields. Click the drop-down arrow to display a color swatch popup window. Click the desired color.

- In the Any/Present View area, complete the following tasks:

  - To change the color for Foreground, Locked & Unlocked View, Locked Elements Background, and Locked Elements Foreground, click the relevant field and click the drop-down arrow to display a color swatch popup window. Click the desired color.

- In the Alarmed View area, complete the following tasks:

  - To change the color for Unalarmed Elements Background, Unalarmed Elements Foreground, and Alarmed Elements, click the relevant field and click the drop-down arrow to display a color swatch popup window. Click the desired color.

Step 8   Click **Ok**.

1.5.2 Setting the Default Software Release

Use the following procedure to set the default software release for CTP. This release will be used as the default software release when creating a project. See the section 2.1 Creating a Project, page 2-1.

Step 1   From the Tools menu, choose Options.

Step 2   In the Options Explorer dialog box click **General**.

Step 3   In the column on the right, click the Default CTP Software Release option.
A drop-down list appears.

Step 4   Click an option in the list to choose the desired software release. See Figure 1-14.

Figure 1-14   Default CTP Software Release Window
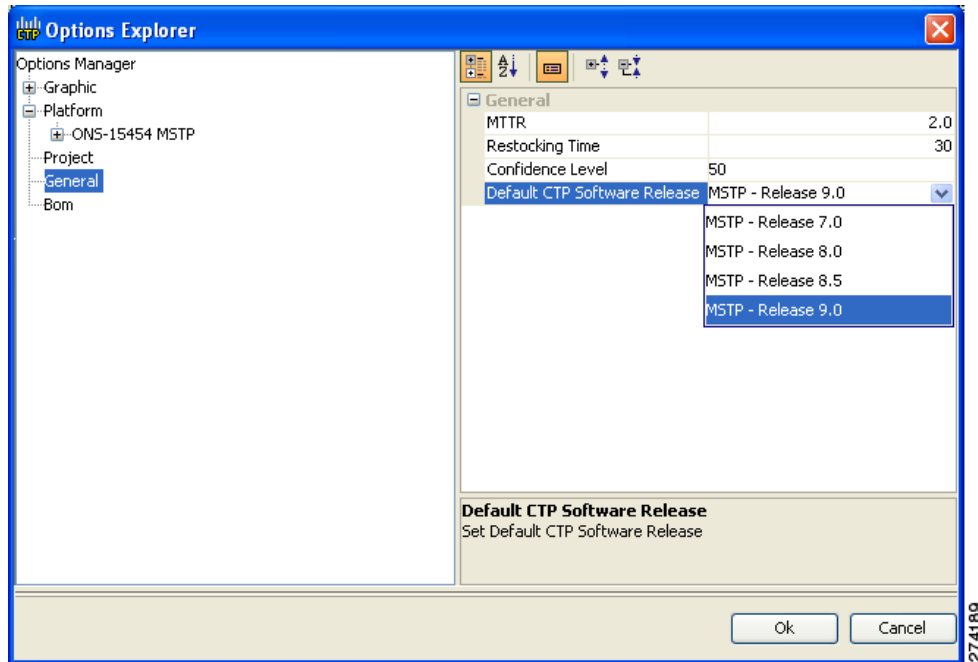
Step 5   Click **Ok**.

1.5.3 Setting the Default Platform Values

Use the following procedure to establish the default traffic mapping, dense wavelength division multiplexing (DWDM) design, and default layout settings for a particular platform and system release. The default settings will appear during project creation. All the options that you specify can be changed after project creation on a per-span basis.

Step 1   From the Tools menu, choose **Options**.

Step 2   In the Options Explorer dialog box (Figure 1-14), right-click **Platform** and choose **Expand** from the shortcut menu.

Step 3   Click the desired **System Release** folder and complete the following tasks as needed:

Note   Default changes apply only to the specified system release.

- For Software Release 9.0, choose the desired settings in the General area:

    – **Shelf Management**—The options available are Auto, Multi Shelf Integrated Switch, Multi Shelf External Switch, and Individual Shelf. These options allow you to specify the type of management to be used for the sites on the network.
    Select **Auto** to set the default option of Multi Shelf Integrated Switch for all the nodes with more than one shelf.
    Select **Multi Shelf Integrated Switch** to configure all the Multiservice Transport Platform

(MSTP) optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches plugged into the MSTP shelves.

Select **Multi Shelf External Switch** to configure all the MSTP optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches external to the MSTP shelves.

Select **Individual Shelf** to configure all the MSTP optical units (OADMs and amplifiers) in the same shelf.

– **Node Protection**—The options available are Same Shelf, Separated Shelves, and Node Split. Select **Same Shelf** to configure the optical units (amplifiers and OADM) on side A (CW direction) and side B (CCW direction) in the same shelf.

Select **Separated Shelves** to configure the optical units (amplifiers and OADM) on side A (CW direction) in one shelf and those on side B (CCW direction) in a second shelf.

Select **Node Split** to configure the optical units (amplifiers and OADM) in two separate shelves belonging to two separate sites. The two sites are adjacent and are connected with a single fiber span without amplification. You can deploy the add/drop equipments (WSS or OADM) and amplifiers only on the external side and deploy the OSC-CSM unit (without amplification) only on the internal side. The two sites are considered as two different NEs with their own management options, that is, site management can be Individual shelf or Multi Shelf, but in the latter case subtended shelves belong only to one single NE site.

> **Note**   The Node split feature is supported under the following conditions:
> - Available only on nodes with the structure as line and the functionality as ROADM or OADM.
> - Available for all OSn with all design rules, provided that there is proper consistency between OSn and equipment.
> - Can terminate only fixed traffic unprotected, client 1+1 protected, or P-Ring traffic, while traffic with protection Y-Cable, FiberSW, or PSM-OCH are not allowed.
> - Not allowed for aggregated demand, both TDM and Ethernet.
> - Cannot be used for a bypass node of any traffic type.

– **C-band Rules**—Select the options from the drop-down list. The options appear in the following format: C 64Chs 50Ghz(+2dBm/Ch). The channels available are 80, 72, 64, 40, 32, 20, 16, and 8; the reference per channel power options available are -1 dBm, -2 dBm, 1 dBm, 2 dBm, 4 dBm, 5 dBm, 7 dBm and 8 dBm; and the spacing options available are 100GHz and 50GHz.

– **L-band Rules**— Select the options from the drop-down list. The options appear in the following format: 32 Ch. 100Ghz +5dBm. The options available are: None, Expand, and channels available are 32; the reference per channel power options available are 2 dBm and 5 dBm; and the only spacing options available is 100GHz.

Select **Expand** to indicate that the L-band rules as upgradable.

– **Installation w/o CTP**—Check this box to install the network with default parameters. If you choose this option, CTP designs the network according to a set of predefined conditions, so that the selected node can be installed without the Cisco Transport Planner configuration files (thresholds and setpoints).

– **Dithering Lower Limit**—Enter a value that satisfies the following conditions:

• Not lower than zero

• Not higher than 32

• Not higher than the dithering upper-limit value

The dithering value is the site identifier used by CTP to adjust power on 40-WXC cards. Dithering value is provided only for sites with 40-WXC cards, that is, for sites with multi-degree site structure and with the functionality "OXC" or "Auto". This parameter is not displayed for non-OXC sites.

- **Dithering Upper Limit**—Enter a value that is not lower from zero and not higher to 32.

- For software release 8.5, choose the desired settings in the General area:

  - **Shelf Management**—The options available are Multi Shelf Integrated Switch, Multi Shelf External Switch, and Individual Shelf. These options allow you to specify the type of management to be used for the sites on the network.
    Select **Multi Shelf Integrated Switch** to configure all the Multi-Service Transport Platform (MSTP) optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches plugged into the MSTP shelves.
    Select **Multi Shelf External Switch** to configure all the MSTP optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches external to the MSTP shelves.
    Select **Individual Shelf** to configure all the MSTP optical units (OADMs and amplifiers) in the same shelf.

  - **Node Protection**—The options available are Same Shelf and Separated Shelves.
    Select **Same Shelf** to configure the optical units (amplifiers and OADM) on side A (CW direction) and side B (CCW direction) in the same shelf.
    Select **Separated Shelves** to configure the optical units (amplifiers and OADM) on side A (CW direction) in one shelf and those on side B (CCW direction) in a second shelf.

  - **C-band Rules**—Select the options from the drop-down list. The options appear in the following format: C 64Chs 50Ghz(+2dBm/Ch). The channels available are 80, 72, 64, 40, 32, 20, 16, and 8; the reference per channel power options available are -1 dBm, -2 dBm, 1 dBm, 2 dBm, 4 dBm, 5 dBm, 7 dBm and 8 dBm; and the spacing options available are 100GHz or 50GHz.

  - **L-band Rules**— Select the options from the drop-down list. The options appear in the following format: 32 Ch. 100Ghz +5dBm. The options available are: None, Expand, and channels available are 32; the reference per channel power options available are 2 dBm and 5 dBm; and the only spacing options available is 100GHz.
    Select **Expand** to indicate that the L-band rules are upgradable.

  - **Installation w/o CTP**—Check this box to install the network with default parameters. If you choose this option CTP designs the network according to a set of predefined conditions, so that the selected node can be installed without the CTP configuration files (thresholds and setpoints).

  - **Dithering Lower Limit**—Enter a value that satisfies the following conditions:

- Not lower than zero

- Not higher than 32

- Not higher than the dithering upper-limit value

  The dithering value is the site identifier used by CTP to adjust power on 40-WXC cards. Dithering value is provided only for sites with 40-WXC cards, that is, for sites with multi-degree site structure and with the functionality "OXC" or "Auto". This parameter is not displayed for non-OXC sites.

  - **Dithering Upper Limit**—Enter a value that is not lower from zero and not higher to 32.

- For software release 7.0, choose the desired settings in the General area:

  - **C-Band** or **L-Band** as the default band.

- Scalable C/L—(System Release 7.0 only) Check to set scalable C bands and L bands as the default setting during project creation. If checked, the design will be scalable to support both C-band and L-band on the same system.

- Scalable C/50GHz—(System Release 7.0 only) Check to set scalable C-band 50 GHz as the default setting during project creation. If checked, the design will be scalable to support 50-Ghz channel spacing in C-band.

- **Shelf Management**—The options available are Multi Shelf Integrated Switch, Multi Shelf External Switch, and Individual Shelf. These options allow you to specify the management to be used for the sites of the network.
  Select **Multi Shelf Integrated Switch** to configure all the MSTP optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches plugged into the MSTP shelves.
  Select **Multi Shelf External Switch** to configure all the MSTP optical units (OADMs and amplifiers) in different shelves connected through a LAN. The LAN is implemented with switches external to the MSTP shelves.
  Select **Individual Shelf** to configure all the MSTP optical units (OADMs and amplifiers) in the same shelf.

- **Node Protection**—The options available are Same Shelf and Separated Shelves.
  Select **Same Shelf** to configure the optical units (amplifiers and OADM) facing the east side (CW direction) and west side (CCW direction) in the same shelf.
  Select **Separated Shelves** to configure the optical units (amplifiers and OADM) facing the east side (CW direction) in one shelf and those facing the west side (CCW direction) in a second shelf.

Step 4 Click the **Restricted List** folder. To restrict a card, check the check box in the Restricted column for that card.

To change the setting back to unrestricted, uncheck the check box. To apply restricted list changes to an open project, complete the following:

  a. Right-click the folder for the network that you want to update and choose **Expand** from the shortcut menu.

  b. Right-click the desired platform and release folder under RestrictedEqptListFolder in the Project Explorer and choose **Edit List** from the shortcut menu. The Restricted Equipment list for MSTP 454 DWDM[*Release Number*] dialog box appears.

  c. Click **Update**.

  d. Click **OK** to close the dialog box.

Step 5 Enter the **Fiber Options** details.

- Span Label Tag—Enter the desired span label; the default label is Duct.

- Span Length—Enter the span length. The displayed unit of measure is retrieved from the Span Measurements Units field.

- EOL Ageing loss [dB]—Enter the EOL aging loss value. The EOL loss-per-span value is added at the end of life to each discrete fiber in the network (for example, to add an EOL margin for splicing).

- EOL Ageing Factor—Enter the number to use when factoring fiber aging. This factor is multiplied by the SOL total span loss without connectors.

> **Note** Enter a value in either EOL Ageing Factor or EOL Ageing loss; you do not need to enter a value in both fields.

- Connector loss [dB]—Enter the concentrated loss at the end of the span.

- Length Based Loss—If checked, the fiber loss is determined by multiplying the Span Length by the Loss Factor. If the check box is not checked, you must enter the total loss of the span.

- Tot SOL loss w/o conn [dB]—Enter the start of life link fiber loss for each span, without the connector concentrated loss. The total SOL loss without connectors is equal to the loss factor multiplied by the length. In the Length Based model, this value is calculated automatically.

- DCN Extension (With Software R8.0 and later)—Click the check box to enable the default use of data connection network (DCN) extension on each span in the project. This setting implies that the OSC channel is not used to connect the two nodes. This default can be overridden on the network wizard pane.

> **Note**   Use one of the following formulas to calculate the fiber loss at SOL:
> SOL = km * dB/km + (2 * connector loss)
> SOL = user entered loss + (2 * connector loss)
> Use one of the following formulas to calculate the fiber loss at EOL:
> EOL = km * dB/km * EOL Aging Factor + (2 * connector loss) + EOL Aging Loss, or
> EOL = user entered loss * EOL Aging Factor + (2 * connector loss) + EOL Aging Loss

- Select the **Fiber Type** of each span of the network. You can specify a fiber type even if the fiber type is not supported for the design.

Step 6   Click the **Traffic Mapping** folder and complete the following tasks as needed.

- In the Fixed traffic area, choose the unprotected routing strategy from the drop-down list:

  - Auto

  - Unprotected optimum optical path—Each node pair is connected using one connection. The unprotected optimum optical path minimizes the number of required optical amplifiers.

  - Unprotected minimum hop count—Each node pair in the traffic group is connected by one connection. The unprotected minimum hop count minimizes the number of channels (for unprotected traffic types only) that can be deployed among the nodes of the traffic group.

Step 7   Select the C-band and L-band rules.

- **C-band Rules—**Select the options from the drop-down list. The options appear in the following format: C 64Chs 50Ghz(+2dBm/Ch). The channels available are 80, 72, 64, 40, 32, 20, 16, and 8; the reference per channel power options available are -1 dBm, -2 dBm, 1 dBm, 2 dBm, 4 dBm, 5 dBm, 7 dBm and, 8 dBm; and the spacing options available are 100GHz and 50GHz.

- For **L-band Rules**— Select the options from the drop-down list. The options appear in the following format: 32 Ch. 100Ghz +5dBm. The options available are: None, Expand, and channels available are 32; the reference per channel power options available are 2 dBm and 5 dBm; and the spacing option available is 100GHz.
  Select **Expand** to indicate the L-band rules as upgradable.

Step 8   Click the **DWDM Design Rules** folder and complete the following tasks as needed:

- Run Quick Analysis—Check to use a quick but less accurate algorithm to analyze the network in a short time. After the analysis, Cisco Transport Planner displays the following warning message: "Dcu design not optimized due to Run Quick Analysis option."

- No Tilt Design—Check to force Cisco Transport Planner to operate the amplifiers inside the gain range where no tilt is generated and to determine the type and number of amplifiers in each site of the network accordingly. This option sets all the intermediary points of the network so that channels are always at the reference power level. Default value is Disabled.

> **Note** Long spans (with insertion loss greater than 25 dB) might not be supportable.

- No In-line Bulk Attenuator Design—Check to design the network without using any inline bulk attenuators.If the network cannot be designed without using external in-line attenuators, Cisco Transport Planner displays the following error message: "Unfeasible Network design. Site *X* should require usage of in-line attenuator. Leave unchecked to allow inline bulk attentuators."

- No TXT/Line-Card Bulk Attenuator Design—Check to design the network without using any external receive (Rx) bulk attenuators on transponder or line cards. If any of the clients require Rx bulk attenuators, then the related channel is shown with the working condition (flagged red, orange, or yellow). No Rx bulk attenuator will be shown in any of the reports (such as Optical Channel Results, Internal Connections, or BoM). Leave unchecked to allow bulk attenuators.

- Prevent Use of E-LEAF Dispersion—Check to prevent Cisco Transport Planner from using E-LEAF dispersion compensation units (DCUs) on E-LEAF spans for the overall network. Leave unchecked if you want the algorithm to automatically optimize the usage of the E-LEAF DCUs.

- OSNR Alarm For Regeneration—Allows you to define the optical signal-to-noise ratio (OSNR) alarm severity. When this limit is reached, Cisco Transport Planner suggests a channel at an appropriate site on the network. After the network is designed and analyzed, in the Tasks pane (under Reports), click **Optical Results** to see if any site requires regeneration. The regeneration column will suggest the site where Regeneration is required.

- Turbo Simplex—Check to achieve faster results by optimizing a subset of the total channels based on type and path rather than optimizing every channel. Unchecking this option can result in longer analysis times for large networks, especially with Any-to-Any ROADM traffic.

- Max Sc Value—Allows you to enter the maximum slope compensation value.

Step 9 To define the shelf configuration parameters, click the **Layout** folder and complete the following tasks:

- Osmine Compliant—Check to instruct Cisco Transport Planner to ensure that all the sites placing transponder and line cards are compliant with OSMINE.

- Hybrid Node—Check to instruct Cisco Transport Planner to ensure that cross-connect, SDH, and SONET cards are not placed within the optical transport section (OTS) shelf.

- Max Number of Shelves—Allows you to specify the maximum number of shelves per rack. The maximum number of shelves you can specify is 4. Default is Auto.

- AIC—Choose Yes to instruct Cisco Transport Planner to put the AIC card in slot 9 of the first shelf in each site.

- Fiber Storage—Choose Yes to instruct Cisco Transport Planner to put the fiber storage within the rack below the optical shelf.

- Y-Cable—The options available are Auto, 1RU FlexLayer Shelf Assembly, and 2RU Y-Cable Panel.

  – Auto—Instructs Cisco Transport Planner to set the default value for the Y-Cable option.

  – 1RU FlexLayer Shelf Assembly—Instructs Cisco Transport Planner to use the ONS 15216 Splitter/Combiner Flex Layer modules to implement the required Y-cable protections.

  – 2RU Y-Cable Panel—Instructs Cisco Transport Planner to use the new ADC Splitter/Combiner modules to implement the required Y-cable protections.

- Fan Tray—(Software R8.0 and later) Instructs Cisco Transport Planner to put the type of fan tray within each node. Options available are FTA3-T and FTA4-T.

- TXP/MXP/XP in OTS—Instructs Cisco Transport Planner to place client cards in OTS shelves. Options available are Auto, Yes, and No. Auto instructs CTP to place client cards in OTS shelves.

- Etsi Rack Width—Allows you to specify the ETSI rack width. Choose 19 inches to add 15454E-19IEC-KIT for each ETSI shelf. Options available are Auto, 19 inches, and 600mm.

- Rack Height in RU—Allows you to specify an integer value for the rack height. Default is Auto. Auto assigns 44 RU for ANSI and 40 RU for ETSI.

- Extra Shelves—Allows you to specify an integer value for the number of empty shelves to be added to the node layout. Auto does not add any shelves.

- DCC Shelves Management—Check to instruct Cisco Transport Planner to reserve slot 12 for equipping 15454-MR-L1 units to implement data communication channel (DCC) shelf management.

Step 10   Click **OK**.

1.5.4 Setting the Default Project Values

Use the following procedure to set the default project settings and repair time. These defaults will appear during project creation.

Step 1   From the Tools menu, choose **Options**.

Step 2   In the Options Explorer dialog box (Figure 1-14 on page 1-20), click **Project** and complete the following tasks to set the defaults that appear in the Project Creation wizard:

- Customer—Enter the default customer name (128-character maximum).

- Created by—Enter the default user name (128-character maximum).

- Units—Choose the default span length unit of measure from the drop-down list, either **Km** or **Miles**.

- Price List—Choose the default price list.

- Layout—Choose either **ANSI** (American National Standards Institute) or **ETSI** (European Telecommunications Standards Institute) from the drop-down list.

Step 3   Click **General** and complete the following tasks:

- MTTR (hours)—Enter the mean time to repair (MTTR) for all sites in the network. This value will apply to every site in the network. If you change the MTTR value after creating sites, the new value will only apply to sites you create after the change.

- Restocking Time (days)—Enter the number of days required (including transportation time) to restock the units into the maintenance center.

- Confidence Level (%)—Choose the confidence level for finding the spare units in the maintenance center (50, 75, 95, or 99 percent).

- Default CTP Software Release—Choose a release to be set as the default CTP software release. This release will be used as the default release when creating a project. See the section 2.1 Creating a Project, page 2-1.

Step 4   Click **OK**.

1.5.5 Defining Third-Party DWDM Interfaces

Cisco Transport Planner allows you to define a third-party DWDM interface to be used in project creation. After you define third-party DWDM interfaces, you can choose them when creating traffic demands. For more information on defining third-party interfaces, see Appendix D, "Third-Party DWDM Wavelength Interface Model."

> **Note** If you create a network design with a third-party interface and need to share the design with other users, you must provide not only the saved network MPZ file but also the exported database file containing the third-party interface definition. To view this project, the other user first must import the database with the third-party interface values.

Use the following procedure to define a third-party DWDM interface:

Step 1 Click **Tools > DB Parts Mgmt**. The DB Parts Manager dialog box appears.

> **Note** You cannot open the DB Parts Manager if a project is open or if you are using the Base Network Designer profile.

Step 2 Right-click **Platform Parts** and choose **Expand** from the shortcut menu.

Step 3 Right-click **Group** and choose **New Group** from the shortcut menu. The new group appears under Group and in each system release under parts DB.

**Step 4** In the Group Editor dialog box, complete the following information:

- Name of group—Enter the name of the new database.
- Note—(Optional) Enter a description of the group.

Step 5 In the parts DB for the desired system release, click the group that you created.

Step 6 In the Parts tab of the DB Parts Manager dialog box, right-click and choose **Client** and then **Alien** from the shortcut menu. A new row appears on the Parts tab for the client hardware.

Step 7 Double-click the row to open the Alien dialog box (Figure 1-15).

Figure 1-15   Alien Card Dialog Box
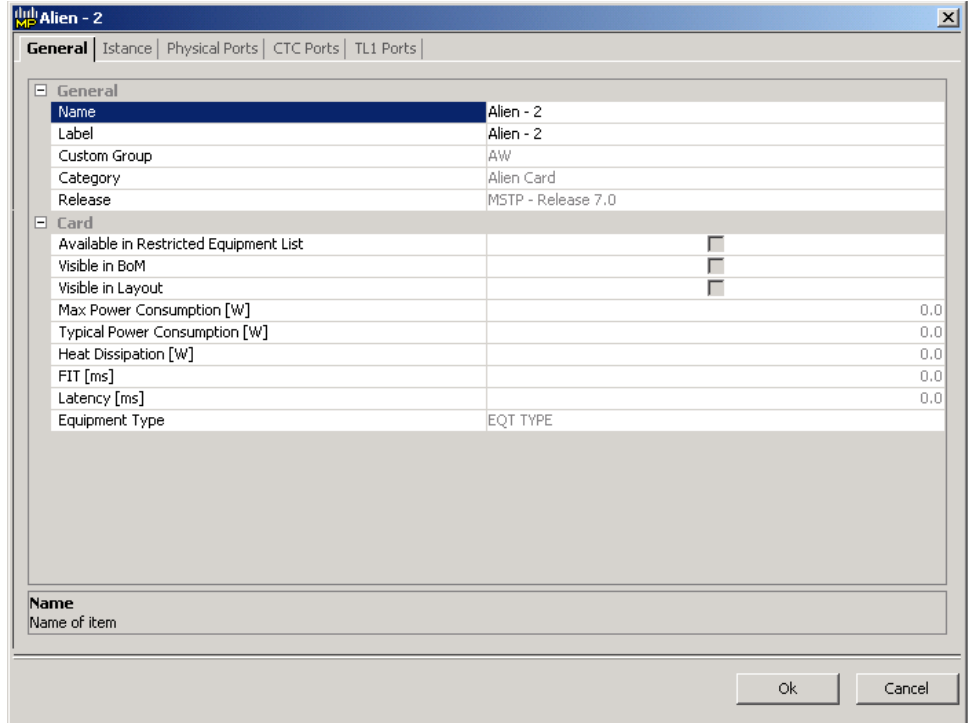
Step 8   In the General tab of the Alien dialog box, type the name of the card in the **Name** field and the enter the **Label** name.

Step 9   Click the **Istance** tab and complete the following:

- Ansi PID—Enter the product identifier of the ANSI system, as needed. If you select BoM visible for this third-party interface with ANSI PID completed, the third-party interface is included in the BoM with the related product identifier.

- Etsi PID—Enter the product identifier of the ETSI system, as needed. If you select BoM visible for this third-party interface with ETSI PID completed, the third-party interface is included in the BoM with the related product identifier.

- TAG—(Display only) For internal use.

- SYS. NAME ANSI—Not applicable for third-party interfaces.

- SYS. NAME ETSI—Not applicable for third-party interfaces.

- WL START—Choose the wavelength starting range that the third-party interface supports from the drop-down list.

- WL END—Choose the wavelength ending range that the third-party interface supports from the drop-down list.

Step 10 Click the **Physical Ports** tab and in the Label column, type a label for each port.

The CTC Ports and TL1 Ports tabs are not applicable for third-party interfaces.

Step 11 Click **Ok**.

Step 12 In the Parts tab of the DB Parts Manager dialog box, right-click and choose **Software** and then **Alien** from the shortcut menu. A new row appears on the Parts tab for the client software.

Step 13 Double-click the row to open the AlienSoft dialog box.

Step 14   In the General tab, complete the following:

- Name—Type the name in the Name field.
- Related Item—Choose the client card that you created in Step 7 to Step 11.

Step 15   Click the **Default - OCh** tab (Figure 1-16).

Figure 1-16   AlienSoft Dialog Box, Default-OCh Tab
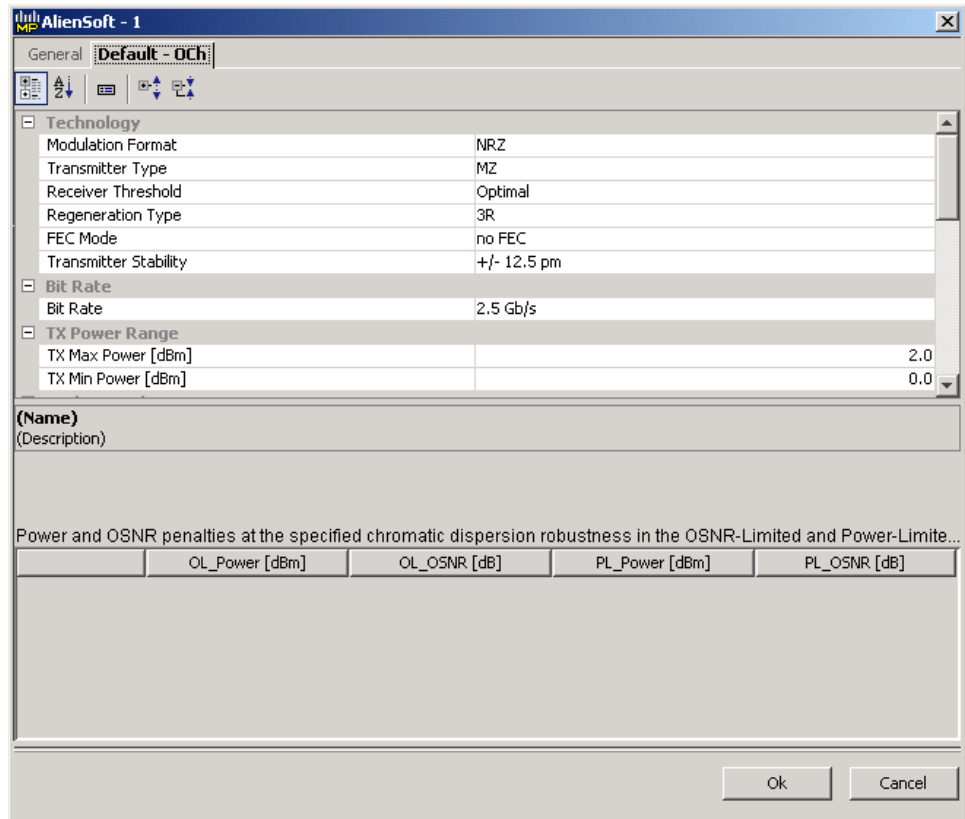
Step 16   Complete the following (see Tables 1-1 through 1-3 for supported value combinations):

- In the Rules area, choose the C- or L-band design rule from the **Design Rule** drop-down list.
- In the Technology area, complete the following:
  - Modulation Format—Choose **NRZ** (Non Return to Zero) or **Duo Binary**.
  - Transmitter Type—Choose **MZ** (Mach Zehnder), **DML** (Direct Modulated Laser), or **EML** (Electro-absorption Modulated Laser).
  - Receiver Threshold—Choose **Optimal** (minimum BER) or **Average** (average received power).
  - Regeneration Type—Choose **3R** or **2R** regeneration mode.
  - FEC Mode—Choose **FEC** (Forward Error Correction), **no FEC**, or **E-FEC** (Enhanced FEC).
  - Transmitter Stability—Choose the maximum wavelength error allowed (pm). The values are 12.5, 25, 50, or 100 pm.
- Bit Rate—Choose the desired bit rate from the drop-down list.
- In the TX Power Range area, complete the following:
  - TX Max Power—Enter the maximum power output level (dBm).

- – TX Min Power—Enter the minimum power output level (dBm).

- • In the Back to Back Receiver Sensitivity area, complete the following as needed to define the working interface area for Back to Back. Back to Back is a configuration where the receiver is placed in front of the transmitter and no other equipment exists between the two. Back to Back is used to measure characteristics of the TX and RX pair. Figure 1-17 shows the interface operative area.

    - – Overload Power [ps/nm]—Enter the overload power level.

    - – OL_Power [dBm]—Enter the minimum power level in the OSNR-limited range.

    - – OL_OSNR [dB] on 0.5 nm RBW—Enter the minimum OSNR level in the OSNR-limited range (measured in 0.5 increments).

    - – PL_Power [dBm]—Enter the minimum power level in the power-limited range.

    - – PL_OSNR [dB] on 0.5 nm RBW—Enter the minimum power level in the OSNR-limited range (measured on 0.5 nm bandwidth).

- • In the Chromatic Dispersion area, complete the following as needed:

    - – Customize CD Robustness—Check to enable the CD Robustness field, as needed. Chromatic dispersion (CD) refers to the broadening of a light pulse after traveling a distance in the fiber.

    - – CD Robustness [ps/(nm*km)]—If Customize CD Robustness is checked, choose the maximum positive dispersion, Dmax_pos [ps/(nm*km)], tolerable by the interface: 0dB, 1dB, 1.5dB, 2dB, or 3dB.

- • Customize Penalties—Check to enable the Gaussian cross-talk Penalties, Single-Interfering Cross-Talk Penalties, and Scale Q factors fields as needed.

- • If Customize Penalties is checked, enter the values to determine the Gaussian cross-talk Penalties in the A_GXt and B_GXt fields, as needed. Gaussian cross talk refers to random power that interferes with a signal. The A_GXt and B_GXt values are the coefficients for the exponential curves that estimate P-penalty (PL), P-penalty (OL), OSNR-penalty (PL), and OSNR-penalty (OL) for Gaussion cross-talk levels in the OL and PL regions of the interface model with dispersion margins added (see Figure 1-17). The formula is Penalty (GXt) = A_GXt * exp(B_GXt *GXt).

- • If Customize Penalties is checked, enter the values to determine the Single-Interfering Cross-Talk Penalties in the A_SIXt and B_SIXt fields, as needed. Single-interfering cross talk refers to interference caused by a single signal. The A_SIXt and B_SIXt values are the coefficients for the exponential curves that estimate P-penalty (PL), P-penalty (OL), OSNR-penalty (PL), and OSNR-penalty (OL) for single-interfering cross-talk in the OL and PL regions of the interface model with dispersion margins added (see Figure 1-17). The formula is Penalty (IXt) = A_SIXt* exp(B_SIXt* IXt).

- • If Customize Penalties is checked, enter Scale Q values in the F-P(PL), F-P(OL), F-OSNR(PL), and F-OSNR(OL) fields, as needed. The scale factors measure how efficient a card is in recovering the signal distortion. The slope of the Q-factor curve versus OSNR or RX power determines how a BER increase could be recovered with an increase of OSNR, power, or both (depending in which OSNR/power working point the card is). In general, the scale factors are two values (one in OSNR and one in power) for each working point OL and PL of the interface model (see Figure 1-17). The the F-P(PL), F-P(OL), F-OSNR(PL), and F-OSNR(OL) values translate a Q-penalty (that is, a BER increase) into power and OSNR penalties. The formulas follow:

    - – P-penalty(PL) = Q-penalty * F-P(PL)

    - – P-penalty(OL) = Q-penalty * F-P(OL)

    - – OSNR-penalty(PL) = Q-penalty * F-OSNR(PL)

    - – OSNR-penalty(OL) = Q-penalty * F-OSNR(OL)

F-P(PL) and F-OSNR(PL) are evaluated in the PL working region, while F-P(OL) and F-OSNR(OL) are evaluated in the OL working region of the curve with the dispersion margins added.

Figure 1-17   Interface Operative Area
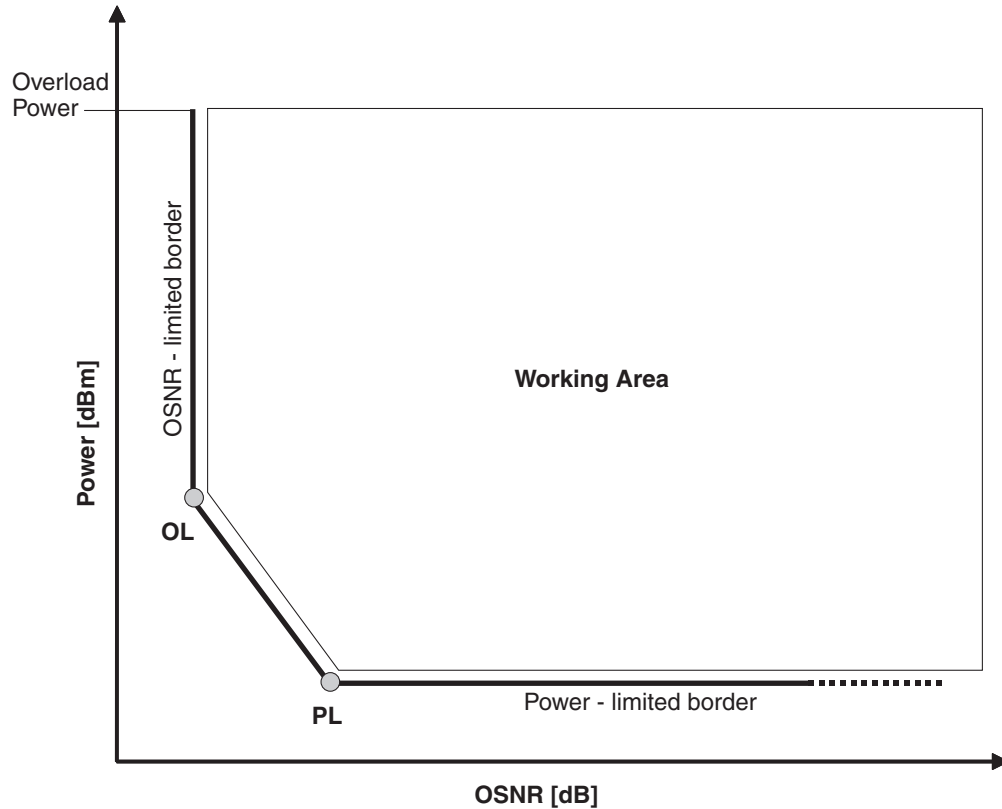
Step 17   Click **Ok**.

Table 1-1 lists the supported combinations for 40-Gbps third party interfaces.

Table 1-1   Supported Combination for 40-Gbps Third-Party Interface

Modulation Format	TX Type	RX Threshold	FEC	TX Stability [pm]	Chromatic Dispersion Penalties [dBm]			
					P-penalty (OL)	OSNR-penalty (OL)	P-penalty (PL)	OSNR-penalty (PL)
Duo Binary	MZ	Optimal	E-FEC	± 12	0	1	0	1

Table 1-2 lists the supported combinations for 10-Gbps third party interfaces.

Table 1-2   Supported Combinations for 10-Gbps Third-Party Interface

Modulation Format	TX Type	RX Threshold	FEC	TX Stability [pm]	Chromatic Dispersion Penalties [dBm]			
					P-penalty (OL)	OSNR-penalty (OL)	P-penalty(PL)	OSNR-penalty (PL)
NRZ	MZ	Optimal	E-FEC	± 25	0	2	1	0
NRZ	MZ	Optimal	FEC	± 25	0	1.5	1	0

Table 1-2   Supported Combinations for 10-Gbps Third-Party Interface

Modulation Format	TX Type	RX Threshold	FEC	TX Stability [pm]	Chromatic Dispersion Penalties [dBm]			
					P-penalty (OL)	OSNR-penalty (OL)	P-penalty(PL)	OSNR-penalty (PL)
NRZ	MZ	Average	no FEC	± 25	2	0	2	0
NRZ	EML	Average	no FEC	± 100	0	3	3	0

Table 1-3 lists the supported combinations for 2.5-Gbps third party interfaces.

*Table 1-3   Supported Combinations for 2.5-Gbps Third-Party Interface*

Modulation Format	TX Type	RX Threshold	FEC	TX Stability [pm]	Chromatic Dispersion Penalties [dBm]			
					P-penalty (OL)	OSNR-penalty (OL)	P-penalty (PL)	OSNR-penalty (PL)
NRZ	DML	Average	FEC	± 25	0	2	2	0
NRZ	DML	Average	no FEC	± 25	0	2	2	0
NRZ	DML	Average	no FEC	± 25	3	0	3	0
NRZ	DML	Average	no FEC	± 25	3	3	3	3
NRZ	EML	Average	no FEC	± 25	0	2	2	0
NRZ	DML	Average	no FEC	± 100	0	3	3	0

1.5.6 Exporting User Options, Price Lists or Alien Definitions

Use the following procedure to export user options, price lists, maintenance contracts, and the parts database files. The export command creates a ZIP file that includes all of the created files.

Step 1   From the Tools menu, choose **Export**. The Export dialog box appears (Figure 1-18).

Figure 1-18   Export Dialog Box
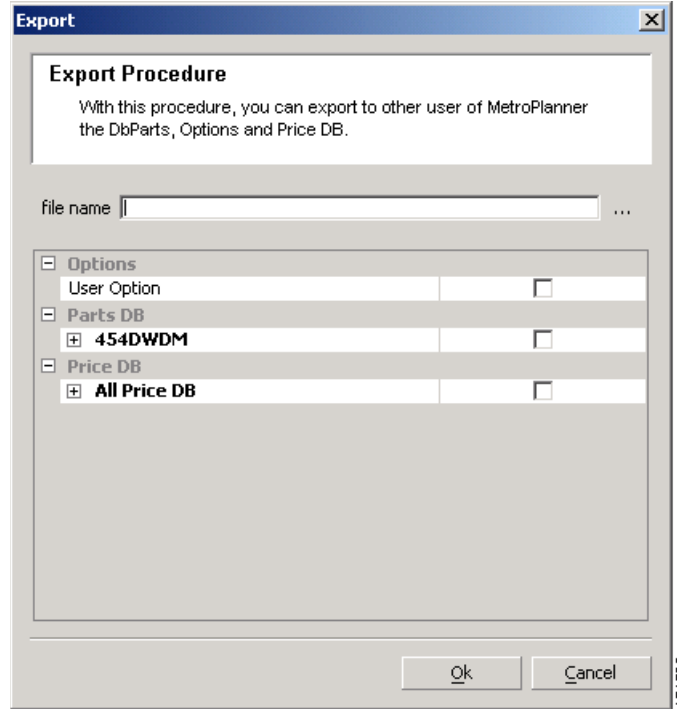
Step 2   In the Export dialog box, enter a file path and name in the file name field. To export to an existing file, click the **...** button and navigate to the desired directory and file. Click **Select** to choose the file.

Step 3   To select the items to export, complete the following as needed:

   - User Option—Check to export the user options set using the Tools > Options command.

   - PartsDB—Check the desired platforms.

   - PriceDB—Check **All Price DB** to export all price lists, or expand All Price DB and check the individual price lists that you want to export.

Step 4   Click **Ok**.

1.5.7 Importing User Options, Price Lists or Alien Definitions

Use the following procedure to import user options, price lists, maintenance contracts, and the parts database files. You can import a ZIP file of multiple exported items or an individual TXT file.

Step 1   From the Tools menu, choose **Import**. The Import dialog box appears (Figure 1-19).

Figure 1-19   Import Dialog Box
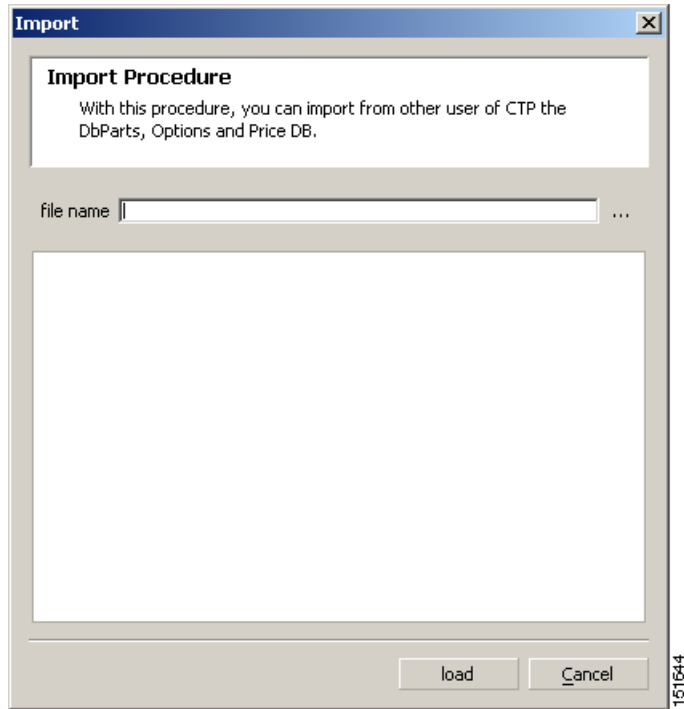
Step 2   In the Import dialog box, click the **...** button and navigate to the desired directory and file. Click **Select** to choose the file to import.

Step 3   Click **load**.

Step 4   If you selected a single TXT file, skip this step and go to Step 5. If you selected a ZIP file with multiple exported options, complete the following as needed:

- User Option—Leave checked to import a file with the user options that were set with the Tools > Options command.

- PartsDB—Leave checked to import the parts database for the desired platform.

- PriceDB—Leave **All Price DB** checked to import all price lists, or uncheck and check the desired individual price lists.

Step 5   Click **OK**.

Step 6   In the confirmation dialog box, click **OK**.

1.5.8 Resetting the Default Layout

Your graphical layout settings are saved when you exit Cisco Transport Planner. The next time that you launch Cisco Transport Planner, the layout appears as it did upon exiting. The default graphical layout includes items such as whether the panes are visible and/or docked.

To return to the Cisco Transport Planner default layout, choose **Default Layout** from the View menu. To restore the user modified layout, choose **My Default View** from the View menu.

1.5.9 Adding User Profiles

A user profile is a set of privileges used for running Cisco Transport Planner. Each profile offers different capabilities. Cisco Transport Planner is packaged with the Network Designer profile, but you can add other user profile types provided by Cisco. All the procedures in the *Cisco Transport Planner DWDM Operations Guide* are written for users with Network Designer access.

Use the following procedure to add a user profile to Cisco Transport Planner:

Step 1 Close all open instances of Cisco Transport Planner.

Step 2 Identify the directory where Cisco Transport Planner is installed on your computer, see the "1.4 Launching Cisco Transport Planner" section on page 1-14.

Step 3 Create a profile folder; if profile folder already exists, go to Step 4.

Step 4 Copy the profile JAR file provided by Cisco Systems into the profile folder.

Step 5 Launch Cisco Transport Planner. For more information, see the "1.4 Launching Cisco Transport Planner" section on page 1-14. The new profile will appear in the **Current Selected Profile** drop-down list.

1.5.10 Understanding Sides Labeling

In Cisco Transport Planner Software R9.0, the label for each supported site structure is different from the labels that have been used in the previous releases. Table 1-4 summarizes the labeling format of the sites in the previous releases and in Cisco Transport Planner Software R9.0.

Table 1-4   Sides Labeling in Cisco Transport Planner Software R9.0 and in previous releases

Sites	Labeling in Previous Releases	Labeling in Cisco Transport Planner Software R8.5
Terminal/Terminal+	Only one side is created and labeled, T.	Only A can be used for the existing side.
Line/Line+	Two sides are created and are labeled, West and East.	Only A and B can be used for the existing sides.
Multi-Degree with PP-MESH-4	—	Only A, B, C, and D can be used for the existing sides.
Multi-Degree with PP-MESH-8	—	Only label A, B, C, D, E, F, G, and H can be used for the existing sides.
PSM Line	—	Only Aw and Ap can be used for the existing sides, where w stands for working and p stands for protection.
PSM Section	—	Only Aw and Ap can be used for the existing sides, where w stands for working and p stands for protection.