Introduction

Note Cisco MetroPlanner has been renamed to Cisco Transport Planner starting with Release 8.5.

Note In this guide, M2 chassis refers to the Cisco ONS 15454 M2 chassis, M6 chassis refers to the Cisco ONS 15454 M6 chassis, and M12 chassis refers to the Cisco ONS 15454 chassis.

Cisco Transport Planner (CTP) 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 the CTP, 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 1-17
- 1.3 Uninstalling Cisco Transport Planner, page 1-18
- 1.4 Launching the Cisco Transport Planner, page 1-18
- 1.5 Performing Software Updates in CTP, page 1-22
- 1.6 Setting Cisco Transport Planner Options, page 1-23
- 1.8 Understanding the Pay As You Grow Feature, page 1-44

1.1 Overview

This section describes the Cisco Transport Planner, Release 10.0 features, network design process, process flow, traffic planning, traffic services, and parameter states.

1.1.1 Cisco Transport Planner, Release 10.0 Features

Cisco Transport Planner software provides a simple tool set for designing optical networks with Cisco ONS 15454 MSTP products. You enter all network parameters, or minimal information, such as site distance, and Cisco Transport Planner models 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. A single Cisco Transport Planner project can contain multiple copies of a network. This duplication allows you to change parameters in one network copy, and then analyze and compare it with another network copy to study the differences. The new features of Cisco Transport Planner, Release 10.0 are listed in Table 1-1.

Table 1-1 New Features in Cisco Transport Planner, Release 10.0

Features	Description
16-WXC	Support for 16-WXC ROADM card.
100G-CK-LC-C cards	Support for 100G-CK-LC-C cards for 100GE and OTU4 service types.
15216-EF-40-ODD	License for 10 channel exposed faceplate mux/demux ODD patch panel.
96 Channel	Support for 96 channel wavelengths. Wavelength starts from 1528.7 (previously 1530.3) and ends at 1566.7 (previously 1561.8).
Bidirectional communication between CTP and CTC	CTP release10.0 supports importing 9.603, 9.604 and 9.605 networks.
EDRA1 and EDRA2 amplifiers	Support for following EDRA amplifiers in the NG-DWDM nodes: EDRA1-26C, EDRA1-35C, EDRA2-26C, EDRA2-35C.
Enable NCS	Support for NCS PIDs. The existing MSTP PIDs are replaced with the NCS PIDs.
FE Frame as default OSC	Support for FE Frame as the preferred frame type when set in Auto in OSC Frame Type.
Multi release functionalities	Support for direct (single click) release upgrade to either 9.6.0.3 or 10.0 release from any previous release. However, network analysis can be performed only in 9.6.0.3 or 10.0 system release. Support for loading any network and viewing reports of any release. However, release upgrade to 9.6.0.3 or 10.0 system release is mandatory to modify and analyze the network.
NG-DWDM	Support for NG-DWDM (next generation dense wavelength division multiplexing) configuration.
OSCM and OSC-CSM cards	From CTP release 10.0, OSCM and OSC-CSM cards have been made EOL. These cards are not chosen by default by CTP, but available on forcing. These cards are displayed in red in the BoM report indicating EOL.

Features	Description
Passive Optical Modules	Support for the following passive optical modules: • 16-channel Colorless Omnidirectional Add/Drop (NCS2K-MF-16AD-CFS=) • 4-channel Colorless Omnidirectional Add/Drop (NCS2K-MF-4X4-COFS=) • MPO to 8-LC adapter (NCS2K-MF-MPO-8LC=) • 5-Degree Mesh Module (NCS2K-MF-DEG-5=) • 4-Degree Upgrade module (NCS2K-MF-UPG-4=)
WSE Enhancement	Support for 10G FICON,10G Fiber Channel,10GE WAN PHY, 8G FICON, 8G Fiber Channel, OC192/STM64 service types along with 10G LAN PHY, OTU2, and OTU2e.

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, places optical amplifiers with dispersion compensation units (DCUs) or tunable dispersion compensation units (TDCU) to fit the user traffic demands at a minimum cost. The TDCU operates only over the C-band. 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 the 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

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 makes adjustments to parameters such as signal attenuation and amplification. Amplification is achieved using an erbium-doped fiber amplifier (EDFA). Attenuation is achieved using the variable optical attenuator (VOA) modules integrated into the platform. Cisco Transport Planner corrects the optical budget using an algorithm that includes automatic placement of EDFAs and VOA regulation.

For each internodal demand, Cisco Transport Planner 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 R10.0 supports the Cisco ONS 15454 DWDM optical platform Software Releases 9.0, 9.1, 9.2, 9.2.1, 9.3, 9.4, 9.6.0.3, 9.8, and 10.0.

1.1.2.3 Topology Support

The Cisco Transport Planner supports the following network topologies:

- Linear (single-span or multispan)
- Ring (open or closed)
- Meshed

For more information on network topologies, see the "5.1 Supported Cisco Transport Planner Topologies" section on page 5-1.

The Cisco Transport Planner enables you to design flexible networks with up to 150 site locations. A flexible network uses ROADM nodes to allow traffic modification or reconfiguration, or both as traffic requirements change.

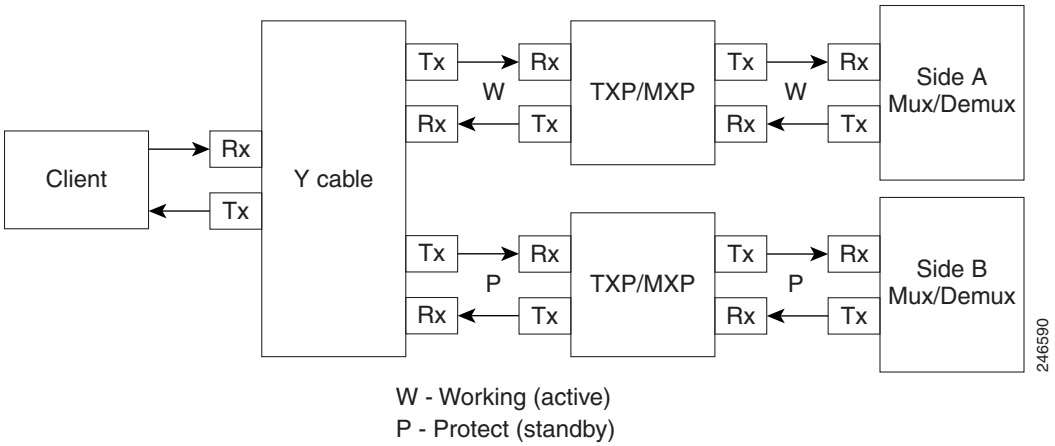
In Cisco Transport Planner Software R10.0, the maximum number of locations where the optical service channel (OSC) is terminated is 40. The maximum number of add/drop locations supported is 40.

1.1.2.4 Protection Scheme Support

Cisco Transport Planner designs support the following protection schemes:

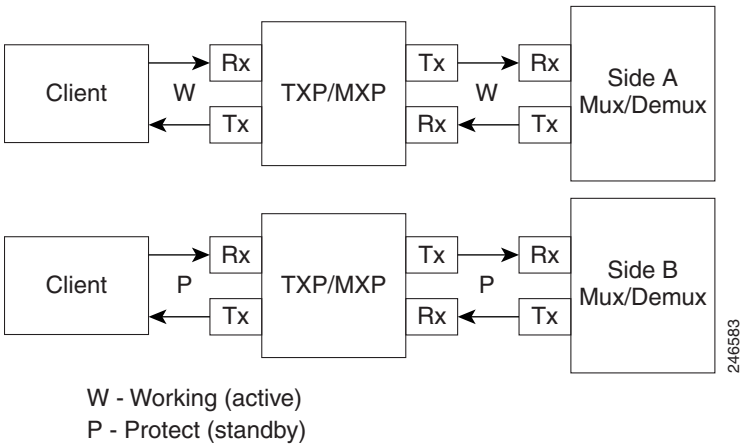
- Y-cable protected—In Y-cable protection, one transponder card is designated as active and the other as standby. The standby transponder card has the client-side laser turned off to avoid corrupting the signal transmitted back to the client. The active transponder monitors the signal from the trunk side and in the event of loss or signal failure, the system switches to the standby path. Figure 1-1 shows an example of a Y-cable protected link.

Figure 1-1 Y-cable protection



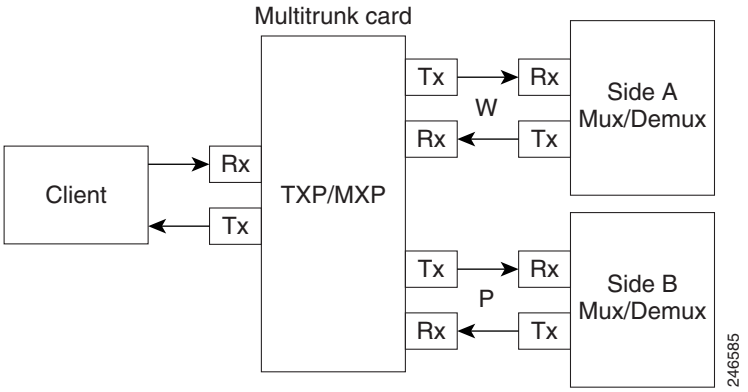
- Client-based 1+1—Two client signals are transmitted to separated line cards or transponder cards instead of using a Y-cable to split one client signal into two line cards or transponder cards. In client 1+1 protection, the failure and switchover is controlled by the client system. Figure 1-2 shows an example of a 1+1 protected link.

Figure 1-2 1+1 Protection



- 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. Figure 1-3 shows an example of a fiber-switched protected link.

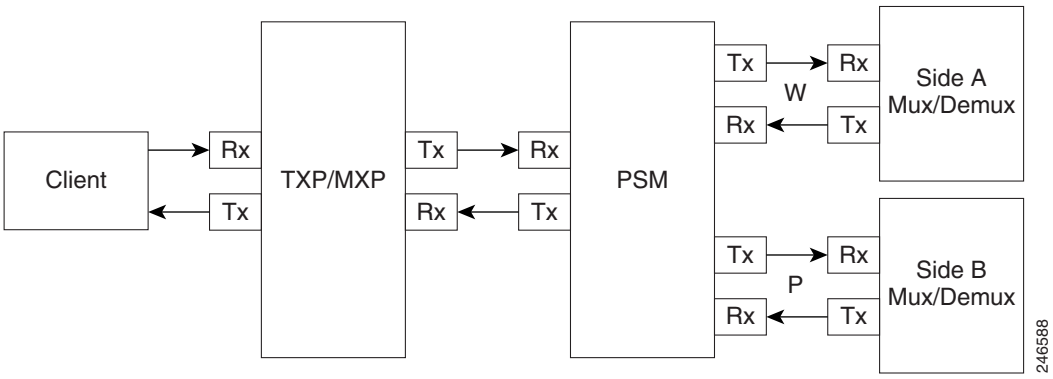
Figure 1-3 Fiber-switched Protection



W - Working (active)
P - Protect (standby)

- 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. Figure 1-4 shows an example of a PSM-OCH protected link.

Figure 1-4 PSM-OCH Protection



W - Working (active)
P - Protect (standby)

- Unprotected—Protection is not used.
- External card switch—Protection not used.

1.1.2.5 Service Support

Cisco Transport Planner 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
- 3G-SDI
- Gigabit Ethernet
- 10GE—10 Gigabit Ethernet (LAN and WAN)
- D1 Video
- DVB-ASI—Digital Video Broadcast-Asynchronous Serial Interface
- DV-6000
- DPSK—Different Phase Shift Keying
- ESCON—Enterprise System Connection
- Fast Ethernet
- Fiber Channel 1G
- Fiber Channel 2G
- Fiber Channel 4G
- Fiber Channel 8G
- Fiber Channel 10G
- FICON—Fiber Connection 1G
- FICON Express 2G
- FICON 4G
- FICON 8G
- FICON 10G
- E3 over FE
- T3 over FE
- DS3 over FE
- High Definition Television (HDTV)
- ISC-3 Peer (1G)
- ISC-3 Peer (1G with STP)
- ISC-3 Peer (2G)
- ISC-3 Peer (2G with STP)
- ISC-3 Peer (2R)
- ISC-3 Peer (2R)
- ISC-Compat (ISC-3 Compatibility mode)
- HD-SDI
- HDTV
- OC-3

- OC-12
- OC-48
- OC-192
- OC-768
- OTU2
- SD-SDI
- SDI—Serial Data Input
- STM-1
- STM-4
- STM-16
- STM-64
- STM-256
- 10GE WAN-Phy
- 10GE LANtoWAN
- 100GE
- 40GE LAN PHY
- OTU1
- OTU2
- OTU2e
- OTU3
- OTU4
- Sysplex CLO—control link oscillator
- Sysplex ETR—external throughput rate
- LAN-WAN Conversion

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.

For more information about the supported topologies for the ETR and CLO services, refer the *Cisco ONS 15454 DWDM Configuration Guide*.

The following features are available only when 100GE or OTU4 is selected as the service type during network creation:

- CRS line card 1-100GE-DWDM (FEC, EFEC [default], or HG-FEC) is available for Point-to-Point, P-Ring, and ROADM demands.
- (For Release 9.6.03 and later) MPO-MPO cables are available in the Net view and Site view of the BoM report. MPO-MPO cables are not available for combination cards. For example, MPO-MPO cables are not available if you have chosen 100G-LC-C+CFP-LC or 100G-LC-C+ASR as card type.

The encryption feature is available only:

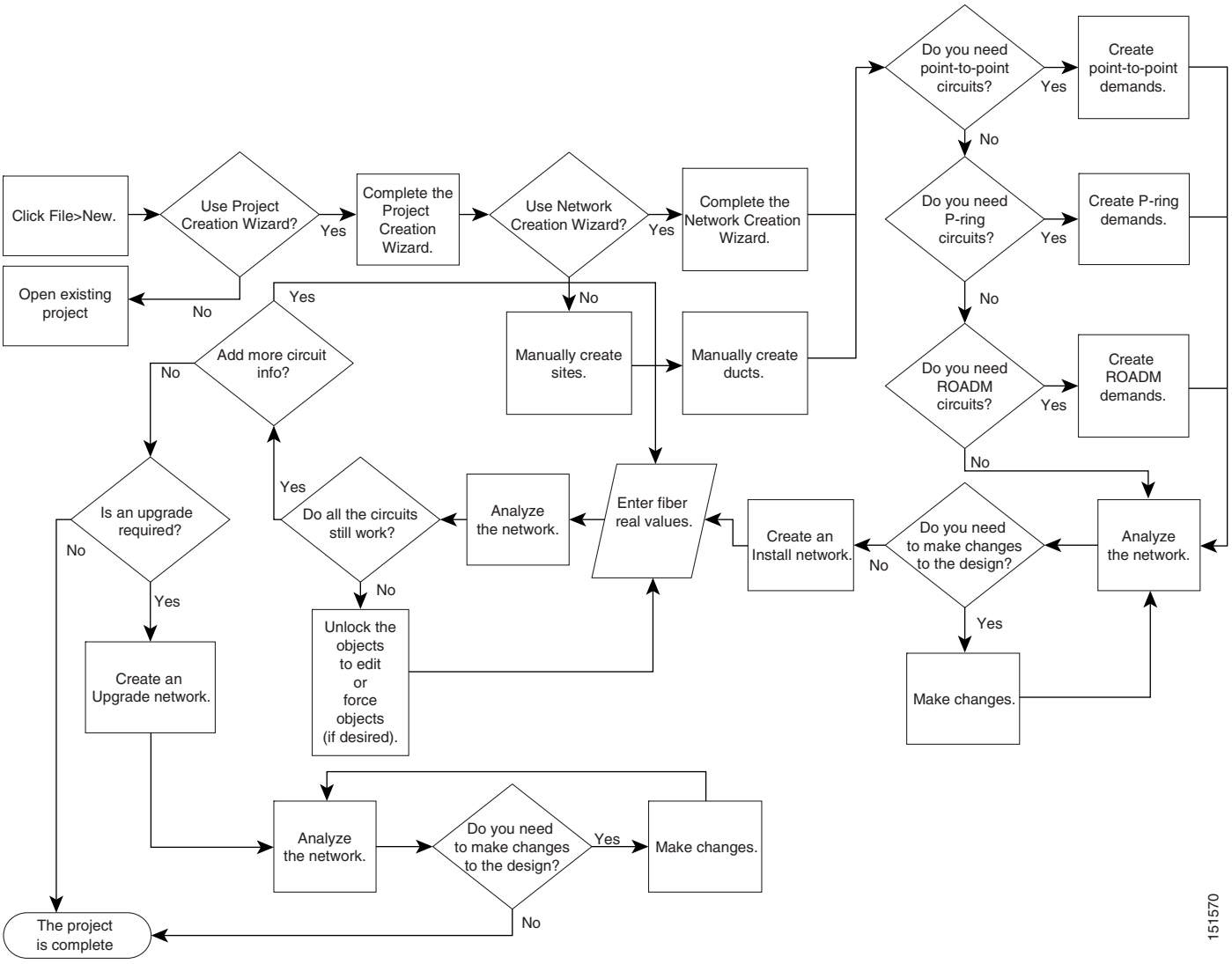
- When 10GE LAN PHY, OTU2e, or OTU2 is selected as the service type during network creation.

1.1.3 Cisco Transport Planner Process Flow

The following stages are used to complete a network design. See Figure 1-5 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, Aggregated Ethernet, 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 1-5 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. The 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 of the nodes. 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.

Note In any-to-any (ROADM) traffic demand, the default routing strategy is Unprotected minimum hop count.

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

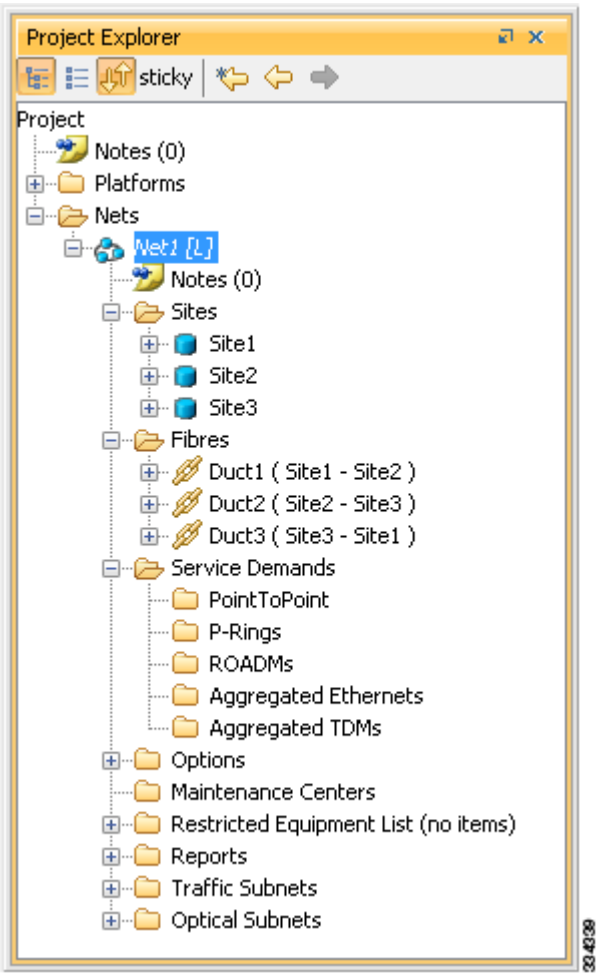
- Protected (Default)—Each node pair in the traffic demand is connected using two connections.
- Unprotected optimum optical path—Each node pair is connected using one connection. The unprotected optimum optical path minimizes the number of required optical amplifiers, but also restricts the number of 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 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 Project Explorer Pane

The Project Explorer pane shows all of the open project information, including networks, network dependencies, sites, fibers, services, and so on. The user-defined traffic services are displayed as folders and icons in the Project Explorer pane, as shown in Figure 1-6.

Figure 1-6 Project Explorer View



After you analyze a network design, the colors of the icons change according to the error/warning condition of the network design. The icons display in red if there are errors in the network design; orange if there are warnings but no errors; and green if 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 2-53.

The Project Explorer pane provides the following options to edit the parameters:

- Right-click the folder/icon in the Project Explorer pane to edit the parameters.
- Click **sticky** to select multiple items in the Project Explorer pane. Edit the properties that are common to the selected items in the Properties pane.

1.1.5.1 Multiple Selection

Click **sticky** in the Project Explorer pane toolbar to select multiple folders and icons in the Project Explorer tree or the Network View. Alternatively, hold the **Ctrl** key on the keyboard and select multiple folders and icons. The folders and icons corresponding to the selection in the Project Explorer pane are highlighted in the Network View and vice-versa. You can also select similar folders and icons by right-clicking them and choosing **Select Similar** in the menu. For example, by right-clicking a site choosing **Select Similar** in the menu, you can select all the sites in the Project Explorer pane. The Select Similar option is available only for the folders and icons in the Project Explorer pane that have properties. The properties that are common to the selected items are displayed in the Properties pane. If any property has a different value than the others, that value is highlighted in a different color in the Properties pane.

The following options are available when multiple folders and icons are selected:

- Sites
  - Delete, Unlock, and Unlock Pay As You Grow Bundles
  - Edit properties
- Ducts
  - Delete, Insert Site, and Unlock
  - Edit properties
- Service Demands
  - Delete and Unlock
  - Edit properties

1.1.5.2 Cisco Transport Planner Traffic in the Project Explorer Pane

Cisco Transport Planner represents all of the user-defined traffic services as folders and icons within the Project Explorer pane.

1.1.5.2.1 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 1-7).

Figure 1-7 Point-to-Point Traffic Demand in the Project Explorer pane

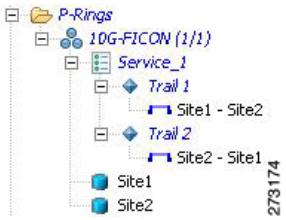
A point-to-point traffic demand includes the following information:

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

1.1.5.2.2 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 1-8 shows an example of a P-ring traffic demand in the Project Explorer pane.

Figure 1-8 P-Ring Traffic Demand in the Project Explorer pane



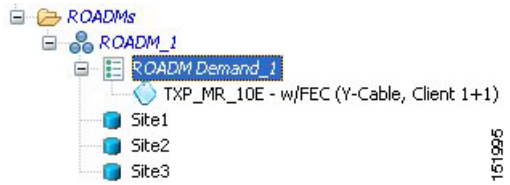
All the P-ring channels between each site pair are listed under each P-ring traffic demand. Each demand is labeled with the following information:

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

1.1.5.2.3 ROADM Traffic Demands

Each ROADM traffic demand appears in the Project Explorer pane 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 1-9 shows an example of a ROADM traffic demand.

Figure 1-9 ROADM Traffic Demand in the Project Explorer pane

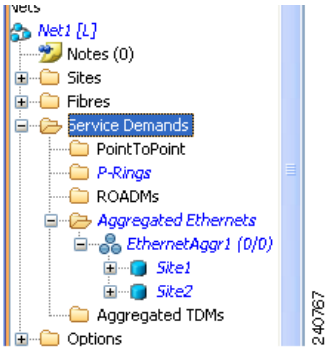


In the Project Explorer pane, each ROADM includes the ROADM demand name and a list of DWDM card types that support the client service types. Protection types appear in parentheses.

1.1.5.2.4 Aggregated Ethernet Demand

Each aggregated ethernet traffic demand appears in the Project Explorer pane 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 1-10 shows an example of an aggregated ethernet traffic demand.

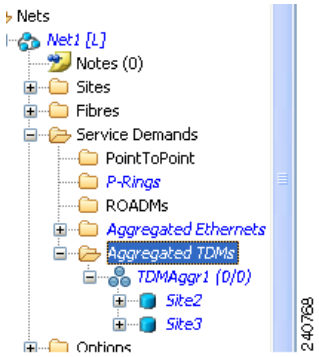
Figure 1-10 Aggregated Ethernet Demand in Project Explorer pane



1.1.5.2.5 TDM Aggregated Demand

Each TDM aggregated demand appears in the Project Explorer pane under the Service Demands > Aggregated TDMs folder. Figure 1-11 shows an example of a TDM aggregated traffic demand in the Project Explorer pane.

Figure 1-11 TDM Aggregated Demand in Project Explorer pane



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 "2.10.5 Unlocking Parameters in the Network Design" section on page 2-59 and "2.10.5.1 Forcing Manager" section on page 2-59. Figure 1-12 shows an example of sites in a locked state.

Note For the WSE card, the encryption option can be modified even when the demand is in locked state. This is available in the Upgrade or Release-upgrade networks and on A2A finalized demands that can be edited from A2A Finalized Circuits. When modifications are made without the unlock, the encryption parameter on the specific port of the WSE card is updated on analysis.

Figure 1-12 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 executable file to a local hard drive.

Step 3 Click **Save**.

Step 4 To start the installation of CTP:

- Windows—Navigate to the folder containing the CTP executable 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 enter:

  % ./CTP.bin

The graphical CTP installation wizard is displayed.

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

Step 6 To accept the license, select the I accept the terms of the License Agreement radio button.

Step 7 Click **Next**.

Step 8 Specify the installation folder. On Windows XP, the default is C:\Program Files\Cisco\CTP-R10.0.

To choose a different folder, click the **Choose...** button and browse to the required folder. 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 option is CTP-R10.0.
- In an existing Program Group—Select a folder from the list of existing folders.
- 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 check box if you want to create shortcuts for all the 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 Uninstall CTP icon available at the location selected in Step 10 of the "1.2 Installing Cisco Transport Planner" section on page 1-17.

The graphical Uninstall CTP wizard is displayed.

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 the Cisco Transport Planner

Before you start the Cisco Transport Planner (CTP), you need to save the user profiles provided by Cisco Systems to the profiles folder available at the installation location. Access to CTP features depends on the user profile you select when you start CTP. The default profile is Base Network Designer.

To launch the CTP, perform the following steps:

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 folder and double-click the ctp.jar file.

CTP validates the installed Java version in the system. If the installed version is Java 1.6 or Java 1.7, the CTP login dialog box is displayed.

Note If Java 1.6 or Java 1.7 is unavailable, CTP displays the JVM Version Error dialog box that lists the incompatible Java versions. Install the required Java version from the http://www.oracle.com/technetwork/java/index.html website. Repeat Step 1.

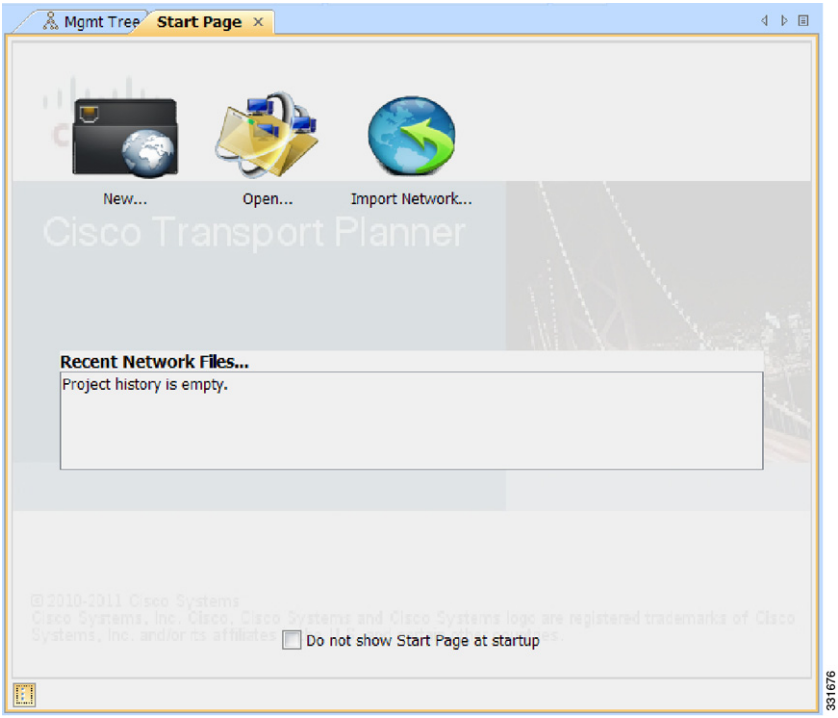
Step 2 From the Current selected profile drop-down list, select the user profile.

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

The login profile type appears in the lower-right corner of the CTP window.

The Start Page is displayed (see Figure 1-13).

Figure 1-13 Cisco Transport Planner Start Page



The Start Page provides the following options:

- **New**—Click to create a new project.
- **Open**—Click to open an existing project.
- **Import Network**—Click to import node parameters from a network.
- **Recent Network Files** area—Select an existing project to open it.

Selecting any of the above options opens a new tab.

Step 4 Check the **Do not show Start Page at startup** checkbox to disable viewing the start page when Cisco Transport Planner is started.

Check **View Start Page** checkbox under Tools > Option > Graphic > Start Page to enable displaying the Start Page when launching the CTP.

1.4.1 Opening a Project

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

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

Step 2 Click **Open** in the Start Page, click **Open** under Project in the Tasks Pane, or in the File menu.

Step 3 In the Open Project dialog box, navigate to the desired folder and choose the project. Click **Open**. The Cisco Transport Planner project appears.

Note You cannot open an existing CTP project in multiple CTP instances. The saved project (.MPZ file) is locked for the use of that CTP. If you try to open the project in another instance of CTP, an error message is displayed. The .MPZ project file is unlocked and released only after you close the Network.

1.4.2 Loading and Unloading Networks

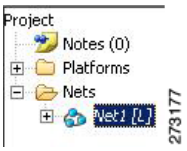
Each network in a project requires memory. To save memory, when Cisco Transport Planner opens a project, all networks are in the Unloaded state. An unloaded network appears in the Project Explorer pane with a "U" next to the network identifier (Figure 1-14). To load an unloaded network, double-click on the network folder in the Project Explorer pane, or right-click the network and choose **Load** from the shortcut menu.

Figure 1-14 Unloaded Network in the Project Explorer pane

A loaded network appears in the Project Explorer pane with an "L" next to the network identifier (Figure 1-15). To unload a loaded network, right-click the network icon in the Project Explorer pane and choose **Unload** from the shortcut menu.

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

Figure 1-15 Loaded Network in the Project Explorer pane



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 folder and enter 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.

1.4.5 Deleting the CTP Cache

To delete the CTP cache, perform the following steps:

Note CTP must be restarted to delete the CTP cache.

Step 1 From the Tools menu, choose **Delete Cache**. An information message is displayed prompting you to restart CTP. If you do not want to restart CTP immediately, cache deletion is postponed to the next restart.

Step 2 To close the project, choose **File > Close** after saving the changes.

Step 3 To exit CTP, choose **File > Exit**.

Step 4 Restart CTP. A message is displayed prompting you to continue with cache deletion.

Step 5 Click **Yes** to delete the CTP cache or **No** to postpone cache deletion.

1.5 Performing Software Updates in CTP

CTP enables you to update the CTP software automatically or manually.

1.5.1 Performing Automatic Software Updates in CTP

This section explains how to perform an automatic software update.

Step 1 When CTP is launched, it checks for the latest software update automatically. If available, the following dialog box appears: **Online Update Available, Would you like to Update CTP?** Click **Yes**.

Step 2 The Software Update Dialog box appears listing the applicable software updates. Select the required software update and click **Apply**.

Step 3 The Update Successful message appears. Click **OK**.

Note The Update dialog box appears every time CTP is launched until the software update is applied.

1.5.2 Performing Manual Software Updates in CTP

The software update files have a **.upz** extension and can be downloaded from the CTP IWE page that is internal to Cisco. Contents of the update will also be made available in the same location: http://iwe.cisco.com/web/corbu/optical/ctp

Notification about the software update is sent through email (subscribe to the mstp_network_design@cisco.com mailer list). The file is hosted on the CTP IWE page and can be downloaded manually. Customers and Partners do not have access to the Cisco internal CTP IWE page. Please contact the Cisco Sales/Account team to get the software update files.

This section explains how to perform a manual software update.

Step 1 In the CTP Help menu, go to **Help > Check updates**. The update CTP dialog box appears.

Step 2 Click **Browse**.

Step 3 Select the **.upz** update file and click **OK**.

Step 4 The Software Update Dialog box appears listing the applicable software updates. Select the required software update and click **Apply**.

Step 5 The Update Successful message appears. Click **OK**.

Step 6 Delete the cache and restart CTP.

1.5.3 Performing Software Update Rollback

CTP allows rollback of software updates. A single rollback moves the CTP software to the previous state (prior to the software update). For example, if there are two updates applied one by one—Update 1 and Update 2, after the first rollback, CTP removes Update 2 and retains Update 1. Further rollback(s) are needed if multiple updates are present.

This section explains how to perform a rollback.

Step 1 Press **R** while CTP is launching. The CTP launch is interrupted to perform a software rollback.

Step 2 Click **Yes** to confirm software rollback. The rollback successful dialog box appears.

Note

- Delete CTP Cache before and after applying update. Procedures about deleting cache are mentioned in the CTP Operations Guide. Take a backup of the required files (User preferences, CTP Design Files (.mpz), NeUpdate File, Alien Files, and so on) before deleting CTP cache.
- Automatic Update can be performed only when you are connected to the Cisco network. If you are not on a Cisco network, try to connect to Cisco VPN first. Otherwise, the software update file should be manually provided by a Cisco representative and manually updated.
- Changes caused by the software update is applicable even if the CTP Cache is deleted after the update. To remove an update, follow the rollback procedure mentioned in the previous section.
- Multiple rollbacks are not supported in this release. Re-install CTP if required.
- In the Java Control Panel, set the Java security to **medium** and mention the CTP installation directory in the Exception Site List (if there are issues with the rollback). If the screen is unresponsive, end CTP process and restart CTP.
- For MAC, force quit the process and restart CTP (if there are issues with the rollback).
- After uninstallation, delete all the files under the directory where CTP is installed manually.
  - Default location on Windows OS: C:\Program Files\Cisco\CTP10.0.
  - Default location on Mac OS: Applications/CiscoCTP10.0.0.

1.6 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.

1.6.1 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 Click **Chart Panel** and complete the following:

- In the Colors area, to change the colors of Border Paint, Background Paint, Line Paint, Plot Background Paint, and Plot Outline Paint, click the relevant fields in the Colors list, and click the drop-down arrow to display a color swatch popup window. Then, click the desired color.

- In the Strokes area, to change the strokes of Border Stroke, Outline Stroke, and Default Line Stroke, click the relevant fields in the Strokes list, and click the drop-down arrow. Then click the desired stroke.
- In the Font area, click the Font drop-down box to display a font popup window. Then select the desired Font, Size and Style.
- In the Alfa area, enter numeric values for Background Alfa and Foreground Alfa.
- In the Shapes area, click the Line Shape drop-down box. Then click the desired line shape.
- In the Gridlines area, check the Range Gridlines and Domain Gridlines check boxes to view the gridlines for the same.

Step 4 To change the color scheme for Cisco Transport Planner, click **Look & Feel** and choose the desired scheme from the drop-down list.

Step 5 To enable displaying the Start Page when launching Cisco Transport Planner, check the **View Start Page** checkbox.

Step 6 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 pane.
- 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 pane. The alarm icon will be green, yellow, orange, or red to indicate the alarm severity.

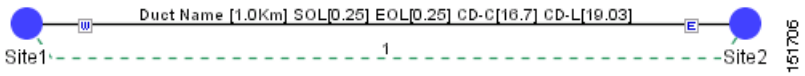
Step 7 To change the NtView *Name* tab appearance, click **Network View** and complete the following tasks as needed:

- 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 Fiber 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.

The duct details displayed in the NtView *Name* tab is shown in Figure 1-16.

Figure 1-16 Duct Details Shown on the NtView Name Tab



- In the Wavelength Usage (%) area, complete the following tasks, as needed.

  The ducts in a network carry a predefined number of wavelengths (2, 4, 8, 16, 32, 64, or 80). Wavelength usage is the percentage of wavelength used by these ducts.

  The percentage of wavelength used in individual ducts are displayed in various colors. Use the Wavelength Usage (%)option to assign any one of the four predefined colors to the different percentage of wavelength used. The custom values remain until the cache is deleted. After the cache is deleted, CTP populates the following default values:

  - Green—25%
  - Yellow—50%
  - Orange—75%
  - Red—100%

  For example, the wavelength usage in an 80 wavelength duct that uses 40 wavelengths is 50%. This duct is displayed in yellow.

  The valid values range from 1 to 100. If you enter a value greater than 100, it is considered as 100, negative value is considered as 1, while 0 is ignored.

  The ducts that do not carry any wavelength are displayed in grey.

Note The Wavelength Usage (%) option is not supported on remote spur ducts.

For more information on wavelength usage, see Table A-1.

- 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.

Step 8 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 9 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 10 Click **Ok**.

1.6.2 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 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 software release.

Step 5 Click **Ok**.

1.6.3 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, 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 Releases 9.0, 9.1, 9.2, 9.2.1, 9.3, 9.4, 9.6.0.3, 9.8, and 10.0, choose the required settings:

- 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 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. For this option, two external Ethernet switch units (Cisco Catalyst 2950 and Cisco Catalyst 3650) are used to support the multishelf configuration. Cisco Catalyst 2950 supports 12 subtending shelves and Cisco Catalyst 3650 supports 24 subtending shelves. CTP supports a maximum of 50 shelves, including the node controller shelf, in a multishelf configuration when the TNC, TNCE, TSC, TSCE, or TCC3 card is used as the node controller. CTP supports a maximum of 5 shelves, including the node controller shelf, in a multishelf configuration when TCC2P card is used as the node controller.

Note When the Multi Shelf External Switch is forced, the multishelf external switch is placed in the layout irrespective of the node controller.

Note The Cisco ONS 15454 M6 (M6) chassis, when used as a node controller with the Multi Shelf External Switch, can support only two subtended shelves.

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

Note Shelf management is disabled for HYBRID 15454 ONS configuration in Release 9.1 and later.

Note M6 chassis, when used as node controller, can support three subtended shelves, the subtended M6 chassis can subtend two more shelves.

- 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.

  Note Node protection is disabled for HYBRID 15454 ONS configuration in Release 9.1 and later.

  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 64 Chs 50 GHz (+2 dBm/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 100 GHz and 50 GHz. You can use even wavelengths for 80, 72, and 64 channel design.

  For HYBRID 15454 ONS configuration, the available options are 8, 16, 20, 32, 40, 48, 64, 72, 80, and 96 channels.

- L-band Rules— Select the options from the drop-down list. The options appear in the following format: 32 Ch. 100 Ghz +5 dBm. 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 100 GHz.

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

  Note L-band is not applicable to HYBRID 15454 ONS configuration in Release 9.1 and later.

- Installation w/o CTP—Check this check 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 that CTP uses to adjust power on 80-WXC cards. Dithering value is provided only for sites with 40-WXC cards, that is, for sites with multidegree 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 than zero and not higher than 32.

- **Insulators**—Check this check box to protect the Express Add/Drop (EAD) colorless ports of the 80-WXC-C cards configured as demux units.

Note The Cisco ONS 15216-FLD-2-ISO optical insulator is not supported in CTP Releases 9.3 and later releases.

Note Optical insulator connections are displayed only in the Patchcord Installation tab in the Internal Connections report.

- Structure—Choose the site structure from this drop-down list. If the network topology does not support the selected site structure, then the selection made in this drop-down list is ignored.
- MSM External Switch—Choose the multi shelf external switch type, from the drop-down list.
- Use Payg—Check this check box to enable the Pay As You Grow feature. For more information about the Pay As You Grow feature, see the "1.8 Understanding the Pay As You Grow Feature" section on page 1-44.
- Service Level—Choose the service level from the drop-down list.
- Service Level Num of Years—Choose the maintenance service level length (in years), from the drop-down list.
- Enable NCS—Check this check box to use NCS PIDs. For more information, see Table 2-3NCS PIDs, page 2-9.
- Redundant Power—This drop-down list enables you to choose whether the redundant power supply is to be added.
- UTS AC Power Cables—Choose the type of cables to be used for the AC power supply, from the drop-down list. Cables are listed based on the country type.
- Filler Card Type—Choose the type of card to be placed in the empty slots of a chassis, from the drop-down list. The options available are:
  - Blank—CTP places only blank cards.
  - UTS Filler—CTP places blank cards in M12 chassis and Universal Transport System (UTS) filler cards in the M2 and M6 chassis. The two type of UTS filler cards placed by CTP are 15454-M-T-FILLER (in TNC and TSC card slots) and 15454-M-FILLER (in other slots).
- Node Controller—Choose a chassis to act as the node controller, from the drop-down list.
- M6 Chassis in Use—Enter an integer value for the number of M6 chassis to be used.
- M12 Chassis in Use—Enter an integer value for the number of M12 chassis to be used.
- Redundant Controller Card—This drop-down list enables you to choose whether to use a redundant controller card.
- Side/Side cabling—Choose the loss value between the west and east side of the site, from the drop-down list. It is useful in case of multi shelf node protection when the racks are not located close to each other.
- Anti ASE— The options available in the drop-down list are:
  - Auto—CTP decides if the site should be configured as anti-amplified spontaneous emissions (anti-ASE).
  - Yes—The site is configured such that all the express channels on the site are optically dropped and reinserted. In addition, all the patch cords between the West and East sections are removed.

  - No—The site is not configured as anti-ASE.

Step 4 Click the **Layout** folder and complete the following settings as required:

- OSMINE Compliant—Check this check box to instruct CTP to ensure that all the sites placing transponder and line cards are compliant with OSMINE.

Note OSMINE is supported in R9.2.1 and R9.6.0.x only.

- Hybrid Node—Check this check box to notify CTP to ensure that cross-connect, SDH, and SONET cards are not placed within the optical transport section (OTS) shelf.
- Max Num of Shelves—Specify the maximum number of shelves per rack. The maximum number of shelves you can specify is 4.
- Fan Tray—Select the type of fan tray to be placed within each node, from the drop-down list.
- AIC—Choose **Yes** from the drop-down list to instruct CTP to put the AIC card in slot 9 of the first shelf in each site.
- Fiber Storage—Choose **Yes** from the drop-down list to instruct CTP to put the fiber storage within the rack below the optical shelf.
- Y-Cable—The the Y-cable options from the drop-down list. The options available are:
  - Auto—Instructs CTP to set the default value for the Y-Cable option.
  - 1RU FlexLayer Shelf Assembly—Instructs CTP to use the ONS 15216 Splitter/Combiner FlexLayer modules to implement the required Y-cable protections.
  - 2RU Y-Cable Panel—Instructs CTP to use the new ADC Splitter/Combiner modules to implement the required Y-cable protections.
- TXP/MXP/XP in OTS—The options in the drop-down list enable you to choose whether to place client cards in OTS shelves.
- Etsi Rack Width—Choose the ETSI rack width from the drop-down list. The 19 inches option adds 15454E-19IEC-KIT for each ETSI shelf.
- Rack Height in RU—Enter an integer value for the rack height. The default option is Auto, which assigns 44 rack units (RU) for ANSI and 40 RUs for ETSI.
- Alien Shelf Height—Enter the height of the alien shelves in RU. If the alien shelf height is greater than the rack height, alien shelves will not be added to the site, and an error message will be displayed in the summary report.
- Number of Alien Shelves—Enter the number of alien shelves that are to be added to the site.

  Number of alien shelves can vary based on the alien shelf height. Maximum number of alien shelves that can be added is 600, if the alien shelf height is 1 Rack Unit (RU) and there are no other shelves in the layout.

  The maximum number of racks supported for a site is 15. If the addition of alien shelves require more than 15 racks, an error message will be displayed in the summary report and the layout is not built for the site.
- Alien Shelf Name—Enter the name of the alien shelves that are added to the site. This name will be displayed in the Layout reports.
- Populate Shelves From Bottom—Check this check box to notify CTP to place the shelves in the rack starting from the bottom. This is useful in installing shelves in tall racks. For more information about the order in which CTP fills the rack, see the "4.16.1 General Placement Rules" section on page 4-76.

- Chassis Type—Choose the type of chassis from the drop-down list. The options available are Auto, M12 Chassis, M6 Chassis, and M2 Chassis. The default option is Auto, which selects combinations of the chassis in an optimized manner.
- Power Supply—Choose the type of power supply from the drop-down list. The options available are Auto, AC Power, AC2 Power, DC Power and DC20 Power. The default option is Auto. However, AC2 Power is not applicable to the M2 Shelf.
- TCC Type (Release 9.4 and later releases)—Choose the type of TCC card from the drop-down list. The options available are Auto, TCC2P, and TCC3. The default option is Auto, which selects the TCC3 card.

Note When used as the node controller, the M12 chassis with TCC2P cards cannot subtend the M6 chassis.

- M6/M2 Controller Type—Choose the type of controller card from the drop-down list. The options available are Auto, TNC/TSC, and TNC-E/TSC-E. The default option is Auto, which selects the TNC-E/TSC-E card.

Note You can select a different M2/M6 controller type for a network in the release upgrade or upgrade state by unlocking the TSCE/TSC or TNCE/TNC card in the site layout.

- DCC Shelves Management—Check this check box to notify CTP to reserve Slot 12 for equipping 15454-MR-L1 units to implement data communication channel (DCC) shelf management.
- Door—Choose the type of door from the drop-down list. The default option is Auto, which does not add any door type. Door and deep doors are two types of front doors that act as protective panels in the ONS 15454 M2 and ONS 15454 M6 chassis. The deep door provides additional space in front of the shelf to accommodate cables that do not fit inside the standard door.
- M12 Shelves—Enter an integer value for the number of empty M12 shelves to be added to the node layout. CTP supports a maximum of 29 extra M12 shelves. The default option is Auto, which does not add any shelves.
- M6 Shelves—Enter an integer value for the number of empty M6 shelves to be added to the node layout. CTP supports a maximum of 29 extra M6 shelves. The default option is Auto, which does not add any shelves.
- M2 Shelves—Enter an integer value for the number of empty M2 shelves to be added to the node layout. The default option is Auto, which does not add any shelves.

  The above values are applied to all the sites in the newly created network. The values can be modified for individual sites after the network creation.

Step 5 Click the **Restricted Equipment** folder. To restrict a unit, check the corresponding check box in the Restricted column for that unit.

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 pane and choose **Edit List** from the shortcut menu. The Restricted Equipment list for MSTP 454 DWDM [*Release Number*] dialog box appears.

c. Click **Update**. The modified Restricted Equipment List is replaced with the global restricted equipment List.

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

Step 6 Click the **Fiber Options** folder and specify the fiber parameters as required:

- 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 this check box is unchecked, you must enter the total loss of the span.
- Tot SOL loss w/o conn [dB]—Enter the total start of life (SOL) link fiber loss value for each span, excluding the connector concentrated loss. This value is applicable only if the Length Based Loss check box is unchecked.
- DCN Extension (With Software R8.0 and later releases)—Check this 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.
- PMD at Fiber—Enter the polarization mode dispersion (PMD) value. PMD is always entered in ps/nm/km.
- Loss—Enter the value of the SOL fiber loss per kilometer used to calculate the loss of each span in the network. The fiber loss factor is always entered in dB/km.

Step 7 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— CTP automatically selects the minimum number of channels that can be deployed among the nodes of the traffic group.
  - 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.

- In the General area, complete the following tasks as needed.
  - Force Mesh Algorithm—For CTP Software Release 8.5, check this check box to force the mesh algorithm.
  - Allow Different Wavelengths—Check this check box to allow different wavelengths to be used for regeneration.
  - Coloring Priority Option—Check this check box to assign the wavelength from the left side of the available band, that is, from 1528.7 nm. If this option is unchecked, the wavelength is assigned from the right side of the available band, that is, from 1566.7 nm.
  - Flat Grid Filling Option—Check this check box to assign the wavelength in a flat grid, allocating each free wavelength without any guard band. If this option is unchecked, the wavelength is assigned according to the actual assignment rules.

Note Guard band is an unused part of the wavelength spectrum, for the purpose of preventing interference between the wavelength channels.

  - Maximum Separation Option—Check this check box to assign the wavelengths for 40 G and 100 G CP-DQPSK service types from the first wavelength in the C-band (1528.7 nm) and for other service types from the last wavelength of the C-band (1566.7 nm) to overcome interference in demands where the wavelength selection is set to Auto.
  - Activate AR-XPE—Check this check box to use the AR-XPE card in the network. When this option is checked, the AR-XP card is replaced by the AR-XPE card in the exported BoM report. The AR-XPE card does not support the client PAYG license. When the **Activate AR-XPE** check box is checked, uncheck the **Use Client Payg** check box in the Properties pane to avoid error during network analysis.

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

- OSNR Alarm For Regeneration—Check this check box to define the optical signal-to-noise ratio (OSNR) alarm severity. When this limit is reached, CTP 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.
- Run Quick Analysis—Check this check box 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-Network-Design—Check this check box 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. The 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 this check box 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 attenuators.”

- No TXT/Line-Card Bulk Attenuator Design—Check this check box 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 Compensation Unit on E-LEAF Dispersion spans—Check this check box to prevent Cisco Transport Planner from using Extended -Large Effective area fiber (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.
- No DCU Design—Check this check box to avoid automatic placement of DCU units.
- Max Scalability Placement —Check this check box to scale up or expand the network made in your network design. You can add new sites and demands depending on your requirements, thus, CTC automatically creates the flexibility of the possible expansion of your network. It also checks to force the CTP to choose an EDFA/DCU placement that is best suited for future expansion of the designed network without any hardware changes.
- TDCU—From the drop-down list, select one of options to place the TDCU units (TDCU Coarse and TDCU Fine) in the network are:
  - Auto—Places the fixed DCU units in the network.
  - All Positions—Places the TDCU units wherever the fixed DCU units can be placed.
  - Never Place—Does not place the TDCU units in the network.
  - Selected Positions—Places the TDCU units in ROADM, WXC, and Dynamic Gain Equalizer (DGE) nodes.
- FDCU—From the drop-down list, select one of the options to place the FDCU units in the network.
  - Auto—Places standard DCUs in the network, automatically. The FDCU option can be set to “Always” at the network level for a specific network. FDCU units can also be forced on specific nodes in the network.
  - Always—Places the FDCU units in the network. The FDCU option for new networks is set to “Always”. Standard DCUs are placed if FDCU units are not available. Standard DCU units can also be forced on specific nodes in the network.
- 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—Enables you to enter the maximum slope compensation value.
- Enable Connector Loss—Check this check box to apply the default connector loss values to the fiber. The applied value depends on the type of site where the fiber is connected:
- Pass through Connector Loss—Enter the connector loss value for a pass-through site.
- OXC Connector Loss—Enter the connector loss value for an OXC site.
- ROADM Connector Loss—Enter the connector loss value for a ROADM site.
- OSC Connector Loss—Enter the connector loss value for an OSC site.
- Line Amplifier Connector Loss—Enter the connector loss value for a line amplifier site.

Note The Pass through Connector Loss, OXC Connector Loss, ROADM Connector Loss, OSC Connector Loss, and Line Amplifier Connector Loss properties are enabled only if the Enable Connector Loss check box is checked.

The values of these properties can also be specified in the Properties pane for the Options>DWDM Design Rules>System Release option in the Project Explorer pane and are applicable to the current network.

Step 9 Click **OK**.

1.6.4 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, 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).
- Measurement 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.
- Restricted Analysis—Check to use Restricted Analysis in the project.
- ANSI/ETSI—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 2.1 Creating a Project, page 2-1.

Step 4 Click **BoM** and complete the following:

- Use Bundles—(Multishelf configuration only) Check this check box to use the Multishelf Management Integrated Kit bundle when generating the BoM instead of the single items. As a bundle, a common price is quoted, which is lesser than when the items are listed individually.

- Use Global Discount—Check this check box to allow you to edit the discount box (Global Discount).
- Global Discount—Enter the global discount to be applied to the whole BoM.
- Use Client Payg—Check this check box to include license for client cards. This option is applicable to AR-MXP, AR-XP, 100G-LC-C, 100G-CK-LC-C and 10X10G-LC cards. This check box is checked by default.
- Enable NCS—Check this check box to use NCS PIDs. For more information, see Table 2-3NCS PIDs, page 2-9.
- Include SW License(s)—This check box is checked by default. The software license for the release is shipped with the Cisco ONS 15454 chassis.
- Include Paper Documentation—Check this check box to ship paper documentation separately with the product and listed in BoM.
- Include CD Documentation—Check this check box to ship CD documentation separately with the product and listed in BoM.
- Hide BoM price/discount—Check this check box to hide the BoM discount and the individual unit price. Only the final price is displayed.
- WSON PID—Check this check box to display the WSON PIDs in the BoM report.
- Service Level—Choose the service level from the drop-down list.
- Service Level Num of Years—Choose the maintenance service level length (in years) from the drop-down list.

Step 5 Click **OK**.

1.6.5 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.

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.

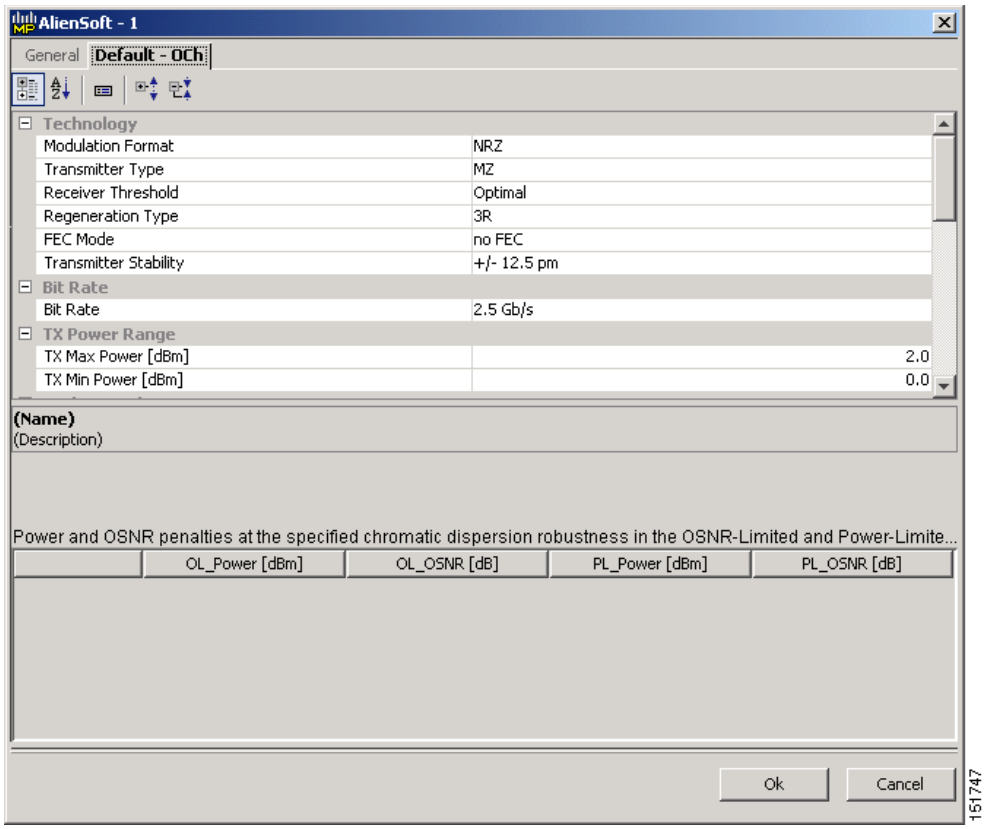
Step 14 In the General tab, complete the following:

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

Step 15 Click any of the following depending on the client card that you choose and proceed to Step 16:

- **Default - OCh** tab (Figure 1-17)
- **DPSK-OCh** tab
- **QPSK-OCh** tab

Figure 1-17 AlienSoft Dialog Box, Default-OCH Tab



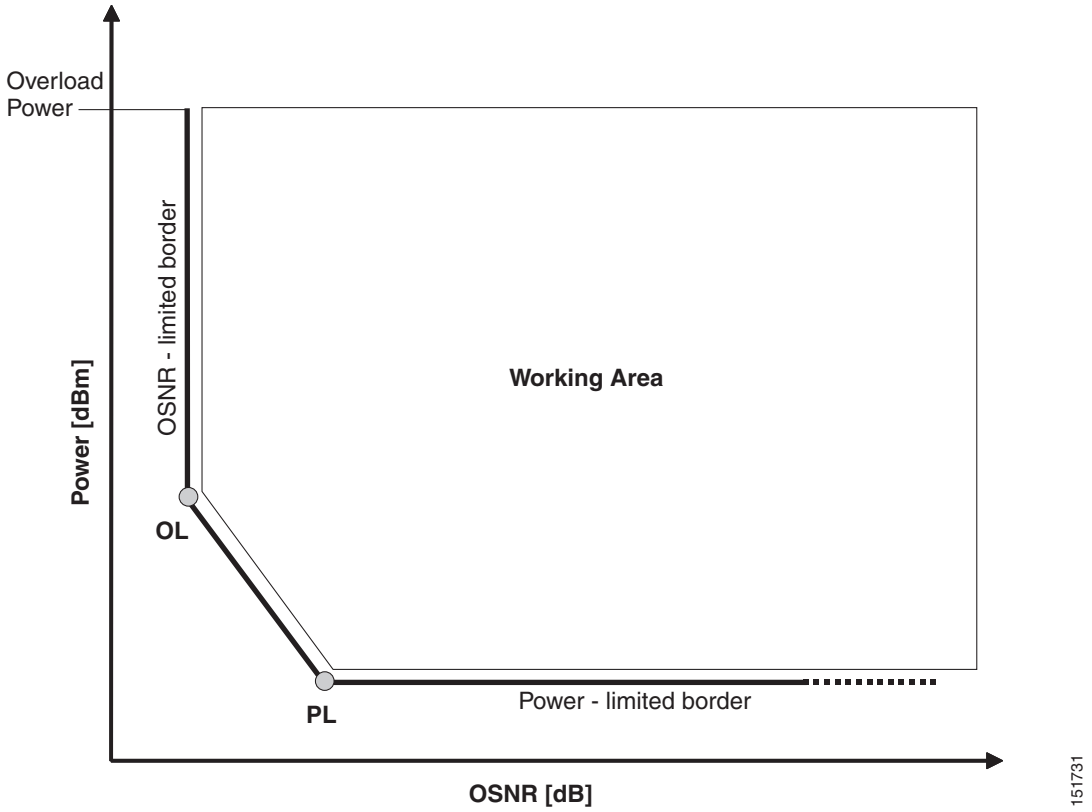
Step 16 Complete the following (see Tables 1-2 through 1-4 for supported value combinations):

- In the Rules area, choose the C-band 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).
    For DPSK—Choose the Receiver Threshold as **Optimal.**
    For QPSK—Choose the Receiver Threshold as **Average**.
  - Regeneration Type—Choose **3R** or **2R** regeneration mode.
  - FEC Mode—Choose **FEC** (Forward Error Correction), **no FEC**, or **E-FEC** (Enhanced FEC). For DPSK or QPSK, set the FEC Mode to E-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. For DPSK or QPSK, choose the Bit Rate as 40 Gb/s.
- 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 1-18 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: 0 dB, 1 dB, 1.5 dB, 2 dB, or 3 dB.
- 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 1-18). 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 1-18). 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 1-18). 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 1-18 Interface Operative Area



Step 17 Click **Ok**.

Table 1-2 lists the supported combinations for 40-Gbps third party interfaces.

Table 1-2 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 1-3 lists the supported combinations for 10-Gbps third party interfaces.

Table 1-3 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
NRZ	MZ	Average	no FEC	± 25	2	0	2	0
NRZ	EML	Average	no FEC	± 100	0	3	3	0

Table 1-4 lists the supported combinations for 2.5-Gbps third party interfaces.

Table 1-4 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

1.6.6 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.

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 folder 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**.

1.6.7 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.

Step 2 In the Import dialog box, click the **...** button and navigate to the desired folder 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**.

1.6.8 Importing the OSMINE Configuration File

The OSMINE configuration updates are provided in an OSMINE configuration file. When a new OSMINE configuration file is available, use this procedure to import it. The networks analyzed after the import operation will be OSMINE compliant as per the configurations provided in the OSMINE configuration file.

Step 1 From the Tools menu, choose **OSMINE File Import**. The Select OSMINE Config File dialog box is displayed.

Step 2 Browse and select the OSMINE configuration XML file.

Step 3 Select the MSTP release from the drop-down list.

Step 4 Click **OK**. The new configuration is loaded into CTP.

1.6.9 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.

1.6.10 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 folder where Cisco Transport Planner is installed on your computer, see the "1.4 Launching the Cisco Transport Planner" section on page 1-18.

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 the Cisco Transport Planner" section on page 1-18. The new profile will appear in the **Current Selected Profile** drop-down list.

1.6.11 Understanding Sides Labeling

In Cisco Transport Planner Software R8.5 and later, the label for each supported site structure is different from the labels that have been used in the previous releases. Table 1-5 summarizes the labeling format in Cisco Transport Planner.

Table 1-5 Sides Labeling in Cisco Transport Planner

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

Note The default labels applied to the sides can be edited. For more information about editing side labels, see the "4.4 Editing Side Labels" section on page 4-49.

1.7 Understanding Hybrid Configuration

Typically a node has ONS 15454 MSTP configuration with add/drop units like 40-MUX-C/40-DMX-C, ROADM units and so on. However, the node configuration can also have ONS 15454 amplifiers along with ONS 15216 FlexLayer add/drop units like FLB-2s, FLA-8s, and FLD-4s, and is known as Hybrid 15454 ONS configuration. A network design can have up to 80 channels in a typical MSTP configuration; however, in a Hybrid configuration the number of channels is restricted to 40. In a Hybrid configuration, the Data Connection Network (DCN) manages the traffic instead of Optical Service Channel (OSC). Hybrid nodes are add/drop nodes with express traffic and are comparatively less expensive than MSTP nodes.

1.8 Understanding the Pay As You Grow Feature

The Pay As You Grow (PAYG) feature enables you to implement a cost effective solution when the wavelength requirements are comparatively less than the maximum capacity of the network. Instead of purchasing a standard card that is configured to work on maximum supported wavelengths, you can purchase a PAYG license that comprises of license restricted cards and a base license. The license restricted cards support only a number of wavelengths for which the licenses are installed on the card. The base license supports only 10 wavelengths. Therefore, a license restricted card having only the base license will support only ten wavelengths even if its maximum capacity is to support 40 wavelengths. The cost of the PAYG license is less than the cost of the standard card. For more information about the PAYG licenses, see the Appendix F, “Pay As You Grow Licensing”.

When there is a need of more than ten wavelengths, additional licenses can be purchased to support the increased demand. Each new license supports ten additional wavelengths. Therefore, the PAYG functionality significantly reduces the initial setup cost and enables the purchase of additional wavelength capacity on a need basis.

During the analysis of the network, the CTP algorithm decides on whether to use a standard card or a PAYG license depending on the lower implementation cost.

The cards and units that support a PAYG bundle are:

- 40-SMR1-C
- 40-SMR2-C
- 80-WXC-C
- AR-MXP
- AR-XP
- 100G-LC-C
- 100G-CK-LC-C
- 10X10G-LC
- 15216-MD-40-ODD
- WSE
- 15216-EF-40-ODD

The PAYG licensing is applied to each side of every site. The license depends on the cards placed on that side and the wavelengths that are added, dropped, or expressed. The PAYG licensing is not dependent on site, type, or functionality.

The applied PAYG bundle is displayed in the Bill of Material of the site. To view it, right-click the site in the Project Explorer pane and select the Bill of Material option from the shortcut menu.

The PAYG bundle to which a card is associated is displayed in the card property. To view it, select the card in the Project Explorer pane; the PAYG bundle name is displayed for the Payg Bundle property in the Properties pane.

1.8.1 Unlock Pay As You Grow Bundles

When a license restricted card is associated with a PAYG bundle, the association is maintained for future analysis. Therefore, if the network is analyzed with increased wavelength demands, CTP adds additional licenses even though using a standard card is cost effective.

During a network upgrade, the association of the license restricted card with the PAYG bundle is not modified unless the Unlock Pay As You Grow Bundle option is selected. Right-click the site either in the Project Explorer pane or in the NtView *Name* tab, and select the Unlock Pay As You Grow Bundles option from the shortcut menu. On selecting the Unlock Pay As You Grow Bundle option all the PAYG bundle information from a previous analysis are deleted and are recalculated when the network is analyzed again.

Note The Unlock Pay As You Grow Bundle option is enabled only in the Upgrade or Install mode.

1.8.2 Forcing PAYG Bundles On a Card

The Developer and Optical Designer profile users can decide whether to associate a card with the PAYG bundle or not. Select the card in the Project Explorer pane; the Force Payg drop-down list is displayed in the Properties pane. The options available are:

- Auto—The PAYG bundle or the standard card is used based on cost effectiveness.
- Yes—The card is always associated with the PAYG bundle even if using the PAYG bundle is not the most cost effective solution.
- No—The card is never associated with a PAYG bundle even if using the PAYG bundle is a more cost effective solution.

Note The Force Payg drop-down list is enabled only in the Upgrade and Install modes, when the card is in the locked state.