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Cisco MetroPlanner
DWDM Operations Guide

Software Release 7.0
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T A B L E S

About this Guide

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

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Revision History

Date	Notes
December 2010	Updated the "Editing Site Parameters" section in the "Designing Networks with Cisco MetroPlanner" chapter.

Document Objectives

This user guide explains how to design networks using the Cisco MetroPlanner design tool for the Cisco ONS 15454 system. It contains information about how to design an optical network. Use this user guide in conjunction with the appropriate publications listed in the Related Documentation section.

Audience

This publication is intended for experienced network system engineers who are responsible for planning and ordering equipment for Cisco optical networking systems.

Document Organization

This *Cisco MetroPlanner DWDM Operations Guide, Release 7.0* is organized into the following chapters:

- Chapter 1, "Overview" provides a list of features, an overview of the network design process, a description of the internal architecture, and the Cisco MetroPlanner procedural flow.

- Chapter 2, "Designing Networks with Cisco MetroPlanner" provides instructions for using the Cisco MetroPlanner tool to create a network design, adjust and optimize design components, and generate reports and bills of materials.

- Chapter 3, "Modeled Network Examples" provides examples of typical optical networks that you can model using Cisco MetroPlanner.

- Appendix A, "GUI Information and Shortcuts" provides Cisco MetroPlanner graphical user interface shortcuts.

- Appendix B, "Card Types" provides a list of card types that can be used to build a network, and the corresponding Cisco product identifier.

- Appendix C, "Troubleshooting" describes problems you may encounter using Cisco MetroPlanner, and their possible solutions.

Related Documentation

Use this *Cisco MetroPlanner DWDM Operations Guide, Release 7.0* with the following referenced publications:

- *Cisco ONS 15454 DWDM Procedure Guide, R7.0*—Provides procedures to install, turn up, provision, and maintain a Cisco ONS 15454 node and network.

- *Cisco ONS 15454 DWDM Reference Manual, R7.0*—Provides reference material for Cisco ONS 15454 nodes and networks.

- *Cisco ONS 15454 DWDM Troubleshooting Guide, R7.0*—Provides general troubleshooting procedures, and alarm descriptions.

- *Cisco SONET TL1 Command Guide, R7.0* and *Cisco SDH TL1 Command Guide, R7.0*—Provides test access TL1 commands, configurations, and parameter types.

- *Release Notes for the Cisco ONS 15454, R7.0* and *Release Notes for the Cisco ONS 15454 SDH, R7.0*—Provides caveats, closed issues, and new feature and functionality information.

Document Conventions

This publication uses the following conventions:

Convention	Application
boldface	Commands and keywords in body text.
italic	Command input that is supplied by the user.

Convention	Application
[ ]	Keywords or arguments that appear within square brackets are optional.
{ x	x	x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one.
Ctrl	The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key.
screen font	Examples of information displayed on the screen.
boldface screen font	Examples of information that the user must enter.
< >	Command parameters that must be replaced by module-specific codes.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

Caution Means *reader be careful*. In this situation, the user might do something that could result in equipment damage or loss of data.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the translated safety warnings that accompanied this device.

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Obtaining Optical Networking Information

This section contains information that is specific to optical networking products. For information that pertains to all of Cisco, refer to the Obtaining Documentation and Submitting a Service Request section.

Where to Find Safety and Warning Information

For safety and warning information, refer to the *Cisco Optical Transport Products Safety and Compliance Information* document that accompanied the product. This publication describes the international agency compliance and safety information for the Cisco ONS 15454 system. It also includes translations of the safety warnings that appear in the ONS 15454 system documentation.

Cisco Optical Networking Product Documentation CD-ROM

Optical networking-related documentation, including Cisco ONS 15xxx product documentation, is available in a CD-ROM package that ships with your product. The Optical Networking Product Documentation CD-ROM is updated periodically and may be more current than printed documentation.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.

Overview

Cisco MetroPlanner Release 7.0 provides a way to model and test wavelength division multiplexing (WDM) optical networks in a graphical environment. The primary purpose of Cisco MetroPlanner is to help sales engineers (SEs) design and validate networks of Cisco Optical Networking System (ONS) 15454 Multi-Service Transport Platforms (MSTP). Using Cisco MetroPlanner Release 7.0, an SE can create multiple instances of a network to modify different parameters in each instance for comparison. Cisco MetroPlanner 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 MetroPlanner to design, analyze, and optimize new or existing Cisco optical networks and contains the following sections:

1.1 Cisco MetroPlanner Features

Cisco MetroPlanner Release 7.0 provides a simple tool set for designing optical networks with Cisco ONS 15454 MSTP products. You can enter all of the network parameters or minimal information, such as site distance, and Cisco MetroPlanner will model the network you need to build and generate a detailed BOM with ordering information. Designing optical networks requires the verification of multiple constraints such as optical budget limitations and platform architectural restrictions. One Cisco MetroPlanner project can contain multiple copies of a network. This allows you to change parameters in one network copy, then analyze and compare to another network copy to determine the differences. In addition to this capability, Cisco MetroPlanner Release 7.0 provides the following new features:

- Network upgrade to implement forecasted channels
- Slot preprovisioning (by importing the NE Update file into the Cisco Transport Controller [CTC])
- User-defined equipment lists in the parts database
- Fiber separation allowing a user to manage certain parameters (such as loss) for each strand in a fiber pair
- Forced equipment settings (user-defined parameters instead of Cisco MetroPlanner automatic settings)

- Power consumption calculation

- L-band design

- C-band enhanced booster

- C-band + L-band/50-GHz scalable design

- Multishelf management

- New DWDM client interfaces

- Meshed reconfigurable optical add/drop multiplexing (ROADM)

- Capability to select the type of maintenance contract desired to appear in the BOM

1.2 Network Design Process

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

- The number of network sites

- 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

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

Finally, Cisco MetroPlanner 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 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.

1.2.1 Network Design Optimization

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

1.2.2 Network Design Constraints

A network design must meet the optical budget and receiver overload criteria to operate efficiently. An analysis of optical budget and receiver overload evaluates the strength of the signal traversing the ring. If a design solution satisfies the constraints, it is a valid design. The Cisco MetroPlanner Release 7.0 optimization algorithms generate multiple solutions and verify 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 MetroPlanner Release 7.0 makes adjustments to parameters such as signal attenuation and amplification. Amplification is achieved by using an erbium-doped fiber amplifier (EDFA). Attenuation is achieved by using variable optical attenuator (VOA) modules integrated into the platform. Cisco MetroPlanner Release 7.0 corrects the optical budget using an algorithm that includes automatic placement of EDFAs and VOA regulation.

For each internodal demand, Cisco MetroPlanner Release 7.0 performs an optical budget and receiver overload analysis and displays the results in various reports in the 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.

1.2.3 Platform Support

Cisco MetroPlanner Release 7.0 supports the Cisco ONS 15454 DWDM optical platform Software Releases 4.7, 5.0, and 7.0.

1.2.4 Topology Support

Cisco MetroPlanner 7.0 supports the following network topologies:

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

Cisco MetroPlanner 7.0 allows you to design flexible networks with up to 60 site locations. A flexible network is a network that, using ROADM nodes, allows traffic modification/reconfiguration as traffic requirements change. The main feature of flexible networks is the traffic reconfiguration/modification among all the networked nodes or among a subset of them.

The maximum number of locations where the optical service channel (OSC) is terminated is 20. The maximum number of add/drop locations is 16.

1.2.5 Protection Scheme Support

Cisco MetroPlanner 7.0 designs support the following protection schemes:

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

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

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

- Unprotected—Protection is not used.

1.2.6 Service Support

Cisco MetroPlanner 7.0 can support any subset of the following services:

- Alien (third-party client interface)
- Cisco ONS 15530 7.0 Gbps Aggregated
- ONS 15530 10 Gbps Aggregated
- ONS 15530 Multirate (MR) Transport
- ONS 15530 Data Multiplexor (MXP)
- 2R Any Rate
- Gigabit Ethernet
- 10GE—10 Gigabit Ethernet (LAN and WAN)
- D1 Video
- DVB-ASI—Digital Video Broadcast-Asynchronous Serial Interface.
- DV-6000
- ESCON—Enterprise System Connection
- Fast Ethernet
- Fibre Channel 1G
- Fibre Channel 2G
- Fibre Channel 4G
- Fibre Channel 10G
- FICON—Fiber Connection 1G
- FICON Express 2G
- High Definition Television (HDTV)
- ISC-3 Peer (1G)
- ISC-3 Peer (2G)
- ISC-3 Peer (2R)
- ISC-Compat (ISC-3 Compatibility Mode)
- OC-3
- OC-12
- OC-48
- OC-192
- OC-768
- SDI—Serial Data Input
- STM-1
- STM-4
- STM-16
- STM-64
- STM-256

- Sysplex CLO—Control Link Oscillator
- Sysplex ETR—External Throughput Rate

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

- Single span—Two terminal sites with 32MUX-O and 32DMX-O cards, 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. 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, and 32DMX cards or 32DMX-O cards installed. Line amplifiers can be installed between the hubs.

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

1.3 Cisco MetroPlanner Process Flow

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

1. Create a project using the Project Creation wizard.

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

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

4. Analyze the network design.

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

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

7. Analyze the Install network.

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

Figure 1-1   *Cisco MetroPlanner Process Flow*
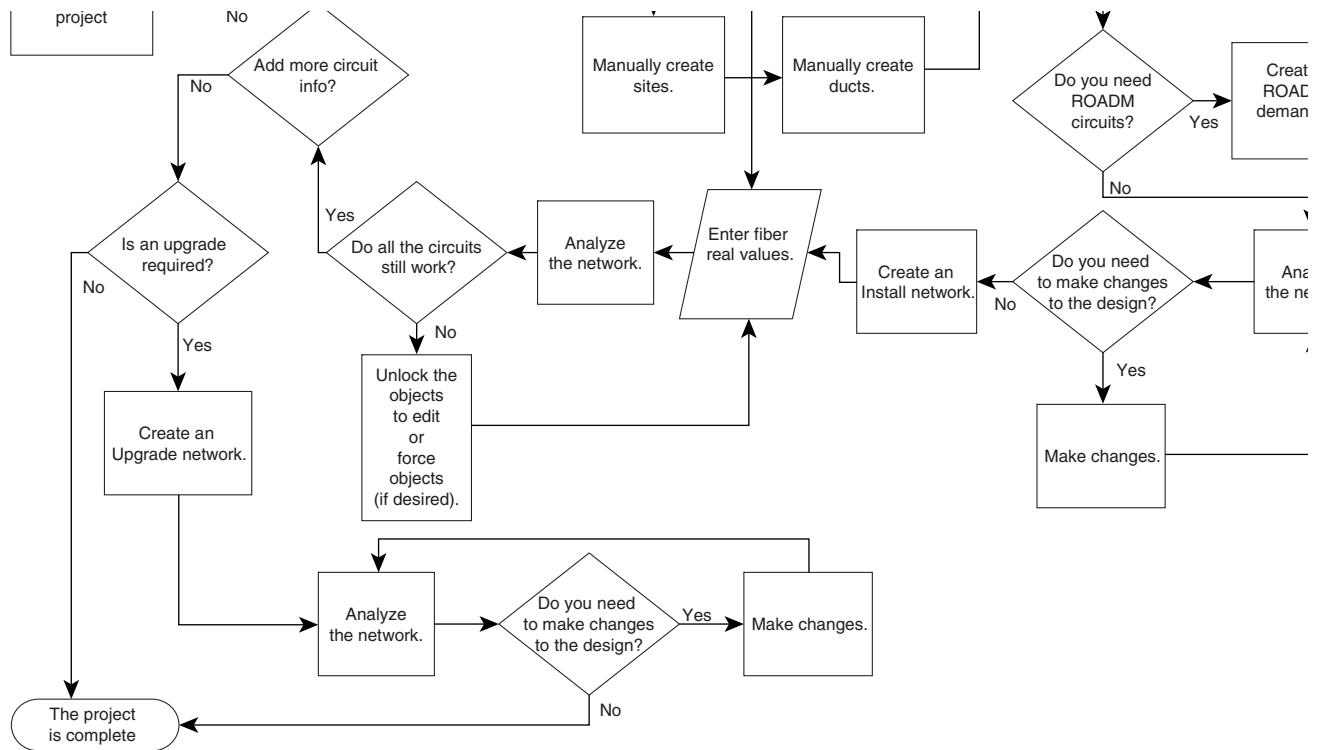
1.4 Planning Traffic in Cisco MetroPlanner 7.0

Traffic in Cisco MetroPlanner 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. Depending on the traffic demand type, the number of circuits can vary from 0 to 32 between a pair of 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 group—All demands between the same set of nodes. Both L-band and C-band are supported. The following traffic groups are supported:

    - P-ring—All the demands used to support traffic topologies similar to bidirectional line switch 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 32).

    - Fixed (point-to-point)—The set of nodes is restricted to two sites. The number of circuits is user-specified (from 1 to 32).

    - Any-to-any (ROADM)—A minimum of two nodes and a maximum of every node in the network. An any-to-any traffic demand allows each node to establish one or more circuits with the other nodes, either as a hub or meshed configuration. In a meshed configuration, each node defined in the set is connected to each other node. This is the most common traffic type. In a hub configuration, the user-defined hub node is connected to each of the other nodes.

      ROADM circuits have the same protection types and services. The number of circuits is not user-specified and can vary from 0 to 32. For ROADM, only L-band is supported.

1.5 Cisco MetroPlanner 7.0 Traffic

Cisco MetroPlanner 7.0 represents all of the user-defined traffic services as a tree view within the Project Explorer pane. The Project Explorer shows all of the open project information, including the networks, the network dependencies, sites, fibers, services, etc. (Figure 1-2).

Figure 1-2   Project Explorer View
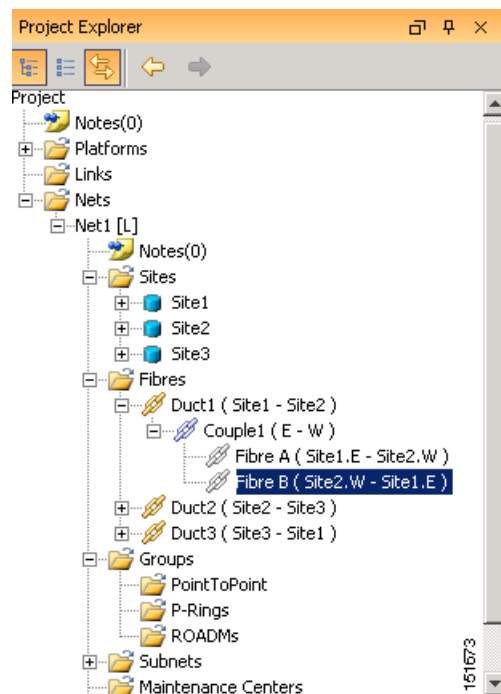
After you analyze a network design, the colors of tree view change according to the error/warning condition of the network design. The icons display as red if there are errors in the network design; orange if there are warnings but no errors; and green of there are no warnings or errors. The icon shows the color of the most severe condition. For more information about analyzing the network, see the "2.4 Analyzing the Network" section on page 2-36.

Right-clicking on certain items in the Project Explorer tree allows you to edit the parameters. Refer to Chapter 2, "Designing Networks with Cisco MetroPlanner" for more information about optical results, the traffic matrix, and editing.

1.5.1 Point-to-Point Traffic Groups

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

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

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

- Client service type

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

- The number of present (P) and forecast (F) channels. The P represents circuits present since the first day and the F represents circuits defined in the forecast.

1.5.2 P-Ring Traffic Groups

Each protected ring (P-ring) traffic group appears in the Project Explorer pane under the Groups > P-Rings folders. Figure 1-4 shows an example of a P-ring traffic group in the Project Explorer.

Figure 1-4   P-Ring Traffic Group in the Project Explorer
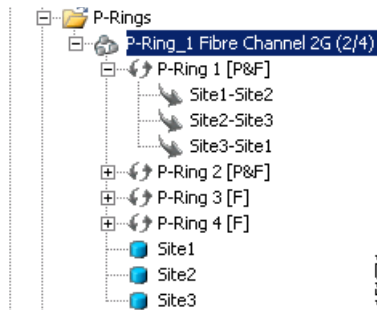
All the P-ring channels between each site pair are listed under each P-ring traffic group. Each demand is labeled with the following information:

- P-ring number

- Client service type

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

- The number of present (P) and forecast (F) channels (an entry appears for each present and forecast channel)

1.5.3 ROADM Traffic Groups

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

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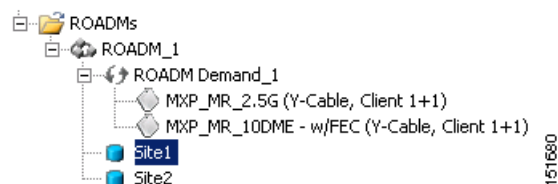
In the Project Explorer, each ROADM demand includes the ROADM demand name and a list of DWDM card types that support the client service types. Protection types appear in parentheses.

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

- Protected (Default)—Each node pair in the traffic group 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 group (maximum of 32 channels between each node pair) in the installed network.

- Unprotected minimum hop count—Each node pair in the traffic group 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 group, but can requires a higher number of optical amplifiers on the unprotected optimum optical path (maximum of 32 channels between each node pair) in the installed network.

- Unprotected subnet—Each node pair in the traffic group 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 groups containing two sites) to force each ROADM connection clockwise or counterclockwise.

C H A P T E R

2

Designing Networks with Cisco MetroPlanner

Cisco MetroPlanner provides you with numerous tools for customizing the software, creating and analyzing networks, and creating a bill of materials (BoM). You can use Cisco MetroPlanner to perform the following tasks:

- 2.1 Launching Cisco MetroPlanner, page 2-1
- 2.2 Setting Cisco MetroPlanner Options, page 2-5
- 2.3 Creating a Project, page 2-21
- 2.4 Analyzing the Network, page 2-36
- 2.5 Viewing Network Reports, page 2-36
- 2.6 Editing a Project, page 2-61
- 2.7 Managing the Network Design, page 2-77
- 2.8 Generating a BoM, page 2-80
- 2.9 Managing the Price List, page 2-86

Note   To run Cisco MetroPlanner, you must install the Java 2 Platform, Standard Edition (J2SE), v 1.4.2_04 Java Runtime Environment (JRE). You can download it from the following URL:

http://java.sun.com/j2se/1.4.2/download.html

2.1 Launching Cisco MetroPlanner

Use the following procedure to launch Cisco MetroPlanner Release 7.0:

Note   Before logging in the first time to Cisco MetroPlanner R7.0, all registered users must get a new password.

Step 1   Launch Cisco MetroPlanner by double-clicking the Cisco MetroPlanner R7.0 icon. The Cisco MetroPlanner 7.0 Login dialog box appears (Figure 2-1).

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Figure 2-1   Cisco MetroPlanner 7.0 Login Dialog Box
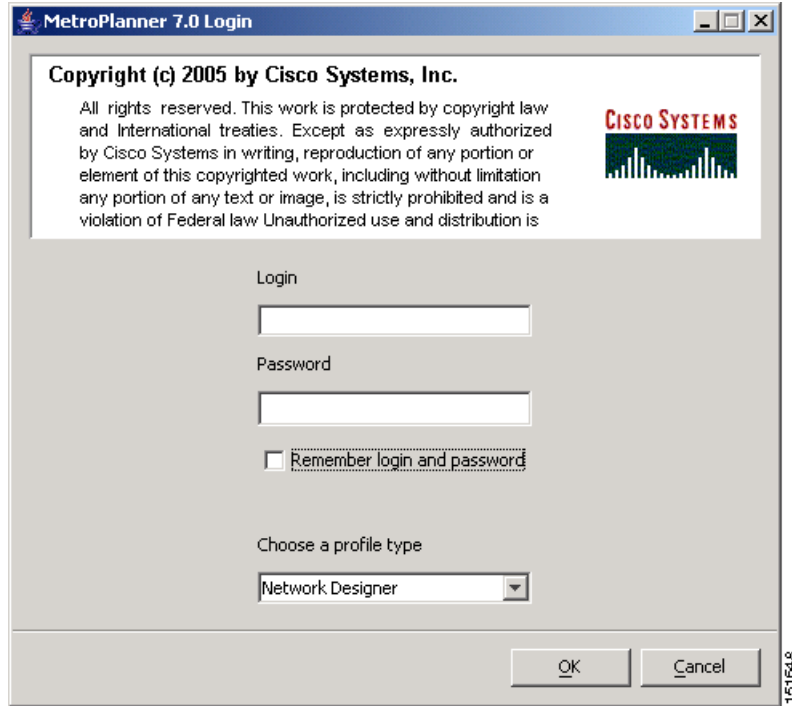
Step 2   Enter your user name in the **Login** field.

Step 3   Enter your password in the **Password** field.

Cisco MetroPlanner provides three chances for you to enter the correct password. The first two times you enter an incorrect password, Cisco MetroPlanner displays an "Incorrect Password or Login. Please try again" error message. After a third failed attempt, Cisco MetroPlanner exits with the error message: "Failed to provide correct password or login, exiting application."

Step 4   Check **Remember login and password** if you want Cisco MetroPlanner to save your user login name and password.

Step 5   From the **Choose a profile type** drop-down list, choose one of the following profiles:

- Network Designer
- Base Network Designer

For more information on profiles and the capabilities they offer, see Table 2-4 on page 2-20.

Step 6   Click **OK** to open Cisco MetroPlanner. The login profile type appears in the lower right corner of the Cisco MetroPlanner window.

2.1.1 Opening a Project

Use the following procedure to open an existing Cisco MetroPlanner project. To create a new project, see the "2.3 Creating a Project" section on page 2-21.

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

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

Figure 2-2   Opening a Project from the Tasks Pane
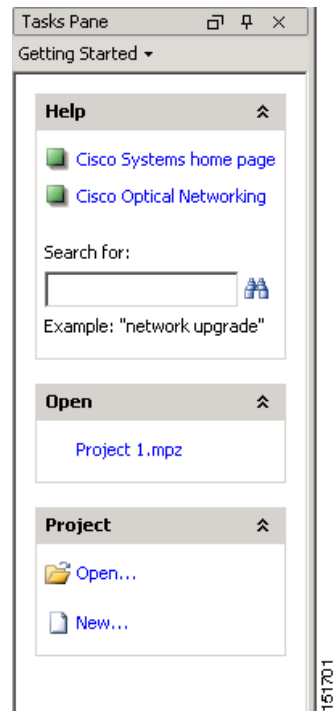
Step 3   In the Open Project dialog box, navigate to the desired directory and choose the project. Click **Open**. The Cisco MetroPlanner project appears.

2.1.2 Loading and Unloading Networks

Each network in a project requires memory. To save memory, when Cisco MetroPlanner opens a project, all networks are in the Unloaded state. An unloaded network appears in the Project Explorer with a "U" next to the network identifier (Figure 2-3). To load an unloaded network, double-click on the network folder in the Project Explorer, or right-click the network and choose **Load** from the shortcut menu.

Figure 2-3   Unloaded Network in the Project Explorer
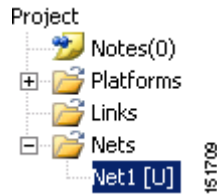
A loaded network appears in the Project Explorer with an "L" next to the network identifier (Figure 2-4). To unload a loaded network, right-click the network icon in the Project Explorer and choose **Unload** from the shortcut menu.

Figure 2-4   Loaded Network in the Project Explorer
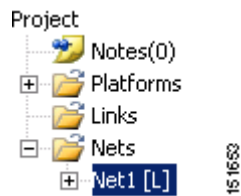
2.1.3 Saving a Project

Use the following procedure to save a project:

Step 1   Choose one of the following:

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

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

2.1.4 Importing a Cisco MetroPlanner 2.5 Project

Use the following procedure to import a Cisco MetroPlanner 2.5 project:

Step 1   From the File menu, choose **Import 2.5.x project**.

Step 2   In the Open Project dialog box, navigate to the desired directory and choose the project. Cisco MetroPlanner 2.5 projects have a file extension of CMZ.

Step 3   Click **Open**. The Cisco MetroPlanner 2.5 project appears.

2.1.5 Closing a Project

Use the following procedure to close a Cisco MetroPlanner 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 save the project, the Save Project dialog box appear. Type the name of the projec and click **Save**. The project closes.

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

2.2 Setting Cisco MetroPlanner Options

Cisco MetroPlanner provides numerous options for customizing the tool and the design.

2.2.1 Setting the Graphical Display

Use the following procedure to set the Cisco MetroPlanner graphical display:

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

Step 2   In the Options Explorer dialog box (Figure 2-5), right-click the Graphic folder and choose **Expand** from the shortcut menu.

Figure 2-5   Options Explorer Dialog Box
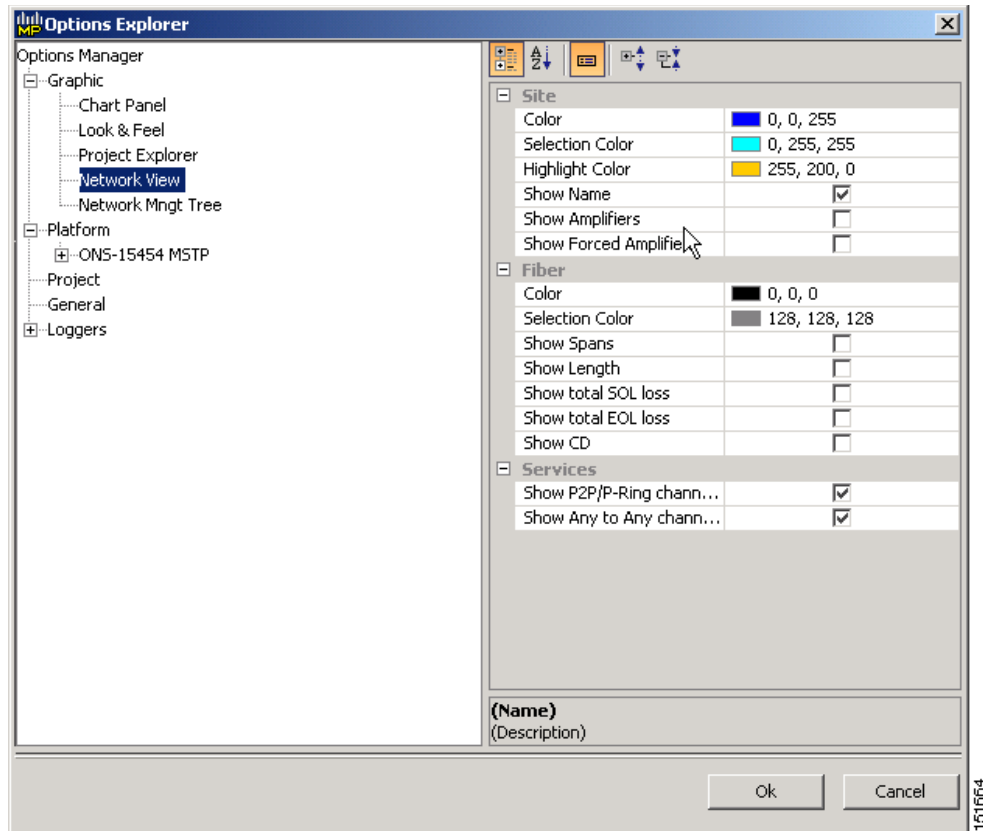
Step 3   To change the color scheme for Cisco MetroPlanner, click **Look & Feel** and choose the desired scheme from the drop-down list.

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

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

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

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

Step 5   To change the NtVw Net# tab appearance, click **Network View** and complete the following as needed:

- In the Site area, complete the following:

  - Color, 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 on 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 NtVw Net# tab.

  - Show Amplifiers—Check to display the amplifier icon for a site on the NtVw Net# tab.

  - Show Forced Amplifiers—Check to display the forced amplifier icon for a site on the NetVw Net# tab.

- In the Fibre area, complete the following, as needed. Figure 2-6 shows an example of a duct with all of the following details shown.

  – Color and Selection Color—To change the fiber color, click in the Color and/or Selection Color fields in the Fibre list and then click on the drop-down arrow.

  – Show Spans—Check to display fiber spans on the NtVw Net# tab.

  – Show Length—Check to display fiber length on the NtVw Net# tab.

  – Show total SOL Loss—Check to display start of life (SOL) loss on the NtVw Net# tab.

  – Show total EOL Loss—Check to display end of life (EOL) loss on the NtVw Net# tab.

  – Show CD C-band—Check to display C-band chromatic dispersion (CD) on the NtVw Net# tab.

  – Show CD L-band—Check to display L-band chromatic dispersion (CD) on the NtVw Net# tab.

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

Figure 2-6   Duct Details Shown on the NtVw Net# Tab
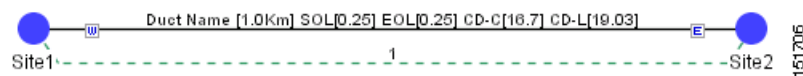
Step 6   To change the Network Mgmt Tree tab appearance, complete the following as needed:

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

- In the Link area, complete the following:

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

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

Step 7   Click **Ok**.

2.2.2 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.

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

Step 2   In the Options Explorer dialog box (Figure 2-5 on page 2-6), right-click **Platform** and choose **Expand** from the shortcut menu.

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

- Topology—(Display only) Displays Ring as the default topology.

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

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

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

Step 4   Click the **Traffic Mapping** folder and complete the following as needed:

- In the General area, choose the desired default setting from the C-Band Rules and/or L-Band Rules drop-down lists. Choose the option that will be the maximum per-channel power and channel spacing for the network design.

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

    – Auto

    – Unprotected optimum optical path—Each node pair is connected using one connection. The unprotected optimum optical path minimizes the number of required optical amplifiers, but also restricts the number of channels that can be deployed among the nodes of the traffic group (maximum of 32 channels between each node pair) in the installed network.

    – Unprotected minimum hop count—Each node pair in the traffic group 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 group, but can requires a higher number of optical amplifiers on the unprotected optimum optical path (maximum of 32 channels between each node pair) in the installed network.

Step 5   Click the **DWDM Design Rules** folder and complete the following as needed:

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

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

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

Step 6   To define the shelf configuration parameters, click the **Layout** folder and complete the following:

- Place AIC—Check to instruct Cisco MetroPlanner to put the AIC card in Slot 9 of the first shelf in each site.

- Place FiberStorage—Check to instruct Cisco MetroPlanner to put the fiber storage within the rack below the optical shelf.

Step 7   Click **Ok**.

2.2.3 Setting the Default Project Values

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

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

Step 2   In the Options Explorer dialog box (Figure 2-5 on page 2-6), click **Project** and complete the following to set the defaults that appear in the Project Creation wizard:

- Customer—Enter the default customer name (128 character maximum).
- Created by—Enter the default user name (128 character maximum).
- Units—Choose the desired default span length unit of measure from the drop-down list, either **Km** or **Miles**.
- Price List—Choose the desired default price list.
- Layout—Choose either **ANSI** (American National Standards Institute) or **ETSI** (European Telecommunications Standards Institute) from the drop-down list.

Step 3   Click **General**.

Step 4   In the MTTR (hours) field, enter the mean time to repair (MTTR) for all sites in the network. This 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.

Step 5   Click **Ok**.

2.2.4 Setting the Fiber Type Default Values

Use the following procedure to set the fiber type default values. The changes do not apply to the current project. After setting the values for the fiber types, you must export the database changes to a file and then import the file. For more information, see the "2.2.7 Exporting a File" section on page 2-16 and the "2.2.8 Importing a File" section on page 2-17.

Step 1   From the Tools menu, choose **DB Parts Mgmt**.

✎
Note   You cannot open the DB Parts Manager if a project is open.

Step 2   In the PartsTreePanel, right-click **PlatformsParts** and choose **Expand**.

Step 3   Click **parts DB** for the desired release to view the fiber options for that release. The Fibres tab in the PartsTreePanel appears. Each item in the database contains the following information:

- Release—(Display only) Displays the system release when the fiber type was introduced.
- Group—(Display only) Displays the group identifier for contained items.
- Category—(Display only) Displays Fibre.
- Label—(Display only) Displays the fiber types: G652-SMF, ELEAF, and TrueWave.
- Name—(Display only) Displays the actual part name.

Step 4   To edit the fiber parameters, right-click on the desired row and choose **Edit** from the shortcut menu. The default values appear in a new window.

Step 5   To modify the default values, complete the following as needed:

- name—Enter the new part name, such as Dispersion Shifted.

- label—Enter the new fiber label, such as DS.

- customer group—(Display only) Displays Cisco.

- category—(Display only) Displays Fibre.

- release—(Display only) Displays the selected release.

- type—Enter a new label to describe the fiber type.

- loss factor—Type the value of the SOL fiber loss per kilometer that will be used to calculate the loss of each span in the network.

- CD factor CBand—Type the fiber chromatic dispersion default factor for the C band.

- CD factor LBand—Type the fiber chromatic dispersion default factor for the L band.

- pmd factor—Type the default polarization mode dispersion factor.

Step 6   Click **Ok** to save the changes and close the edit dialog box.

Step 7   Click **Ok** to close the PartsTreePanel dialog box.

2.2.5 Defining Third-Party DWDM Interfaces

Cisco MetroPlanner allows you to define a third-party DWDM interface to be used in project creation. Once you define third-pary DWDM interfaces, you can choose them when creating traffic demands.

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.

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:

- Name of group—Enter the name of the new database.

- Version of group—Displays 1.0 to indicate that this is the first version of the group.

- Owner—Enter the group owner name.

- Note—(Optional) Enter a description of the group.

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

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

Step 7   Double-click the row to open the Alien dialog box (Figure 2-7).

Figure 2-7   Alien Card Dialog Box

Step 8   In the General tab of the Alien dialog box, complete the following:

- Name—Type the name of the card.
- Visible in BoM—Check if you want to include this third-party interface in the BoM.

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 menu.

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

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

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

Step 11 Click **Ok**.

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

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

Step 14 In the General tab, complete the following:

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

Step 15 Click the **Default - OCh** tab (Figure 2-8).

Figure 2-8   Alien Software Dialog Box

Step 16 Complete the following (see Tables 2-1 through 2-3 for supported value combinations):

- In the Rules area, choose the C- or L-band design rule from the **Design Rule** drop-down list.
- In the Technology Area, complete the following:
  - Modulation Format—Choose **NRZ** (Non Return to Zero) or **Duo Binary**.
  - Transmitter Type—Choose **MZ** (Mach Zehnder), **DML** (Direct Modulated Laser) or **EML** (Electro-absorption Modulated Laser).

- – Receiver Threshold—Choose **Optimal** (minimum BER) or **Average** (average received power).

- – Regeneration Type—Choose **3R** or **2R** regeneration mode.

- – FEC Mode—Choose **FEC** (Forward Error Correction), **no FEC**, or **E-FEC** (Enhanced FEC).

- – Transmitter Stability—Choose the maximum wavelength error allowed (pm). The values are 12.5, 25, 50, or 100 pm.

- • Bit Rate—Choose the desired bit rate from the drop-down list.

- • In the TX Power Range area, complete the following:

  - – TX Max Power—Enter the maximum power output level (dBm).

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

- • In the Back to Back Receiver Sensitivity area, complete the following as needed to define the working interface area for Back to Back. Back to Back is a configuration where the receiver is placed in front of the transmitter and no other equipment exists between the two. Back to Back is used to measure characteristics of the TX and RX pair. Figure 2-9 shows the interface operative area.

  - – Overload Power [dBm]—Enter the overload power level.

  - – OL_Power [dBm]—Enter the minimum power level in the Optical Signal-to-Noise Ratio (OSNR)-limited range.

  - – OL_OSNR [dB] on 0.5 nm RBW—Enter the minimum OSNR level in the OSNR-limited range (measured in .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 OSNL-limited range (measured in .5 increments).

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

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

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

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

- • If Customize Penalties is checked, enter the values to determine the Gaussian Cross-Talk Penalties in the A_GXt and B_GXt fields, as needed. Gaussion cross talk refers to random jitter 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 2-9). 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 2-9). 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 2-9). 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 2-9   Interface Operative Area
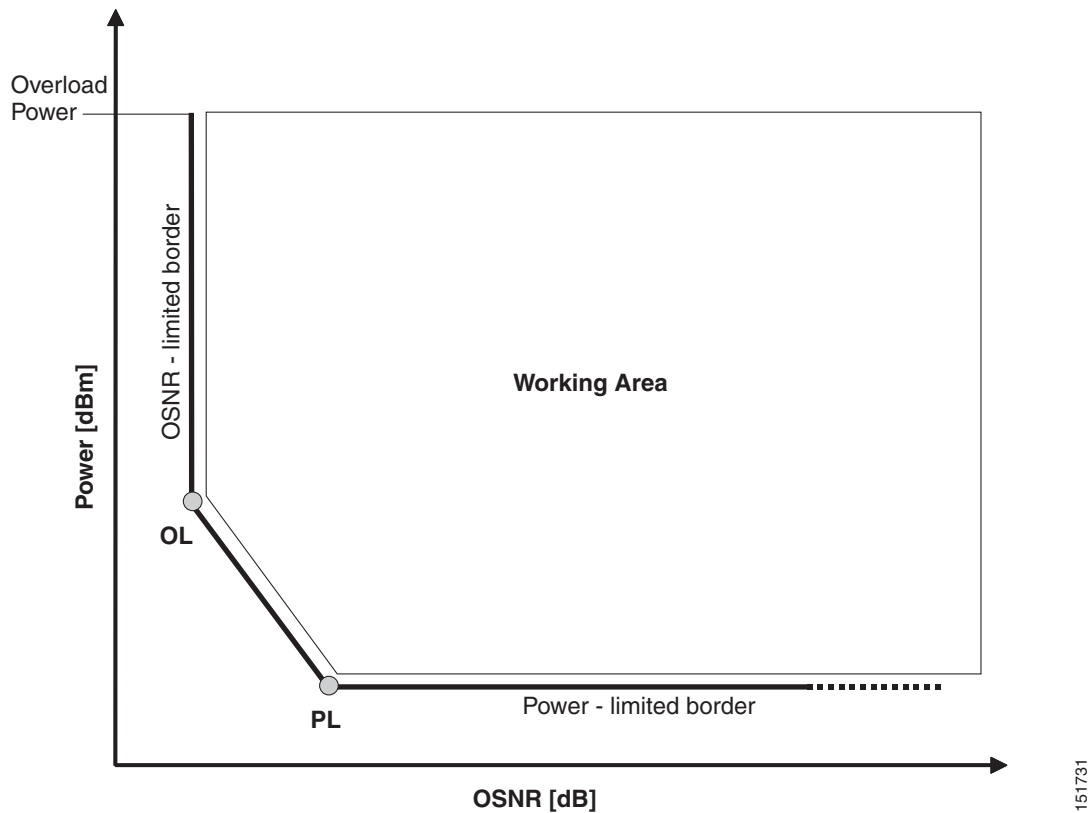
Table 2-1 lists the supported combinations for 40-Gbs third party interfaces.

Table 2-1   Supported Combination for 40-Gbs 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 2-2 lists the supported combinations for 10-Gbs third party interfaces.

Table 2-2   Supported Combinations for 10-Gbs 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 2-3 lists the supported combinations for 2.5-Gbs third party interfaces.

Table 2-3   Supported Combinations for 2.5-Gbs 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

Step 17   Click **Ok**.

2.2.6 Updating the Restricted Equipment List

Use the following procedure to modify the restricted equipment list, which contains a list of parts that Cisco MetroPlanner cannot use when designing the network. Restricted equipment list changes apply when you create a new project, however you can also update a current project with the changes.

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 **Restricted Eqpt List** for the desired system release. The list of cards appears in the right pane of the dialog box.

Step 4   To restrict a card, check the check box in the Restricted column for that card. To change the setting back to unrestricted, uncheck the check box.

Step 5   Click **Ok** to close the dialog box. The restricted list will be used for any new projects.

Step 6 To apply the changes to an existing project, complete the following:

   a. If the project is not currently open, open the project where you want to update the restricted
          equipment list.

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

   c. Right-click the desired platform and release folder under RestrictedEqptListFolder in the Project
          Explorer and choose **Edit List** from the shortcut menu. The Restricted Eqpt list for MSTP 454
          DWDM[*release 7.0*] dialog box appears.

   d. Click **Update**.

   e. Click **Ok** to close the dialog box.

2.2.7 Exporting a File

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

Step 1 From the Tools menu, choose **Export**. The Export dialog box appears (Figure 2-10).

Figure 2-10   Export Dialog Box
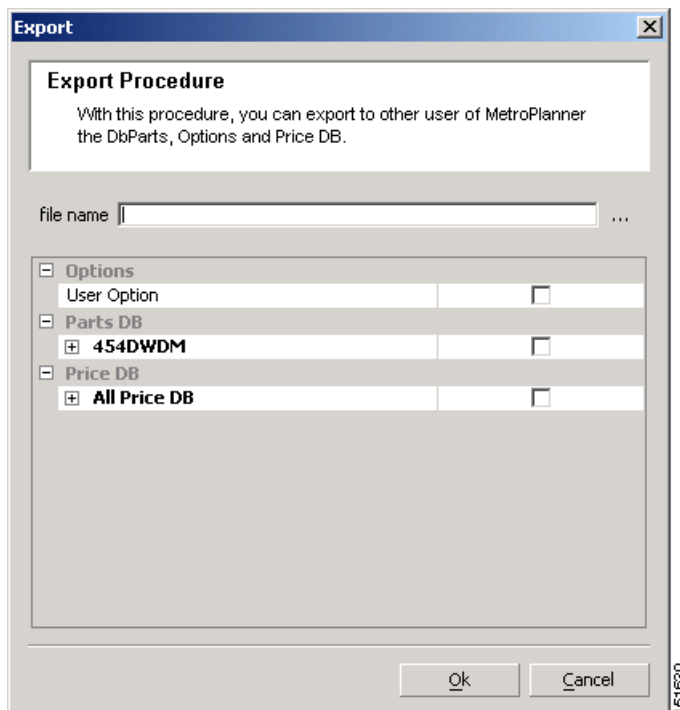
Step 2 In the Export dialog box, enter a file path and name in the file name field. To export to an existing file,
click the **...** button and navigate to the desired directory and file. Click **Select** to choose the file.

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

- User Option—Check to export the user options set using the Tools > Options command.
- PartsDB—Check the desired platforms.
- PriceDB—Check **All Price DB** to export all price lists, or expand All Price DB and check the individual price lists that you want to export.

Step 4   Click **Ok**.

2.2.8 Importing a File

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

Step 1   From the Tools menu, choose **Import**. The Import dialog box appears (Figure 2-11).

Figure 2-11   Import Dialog Box
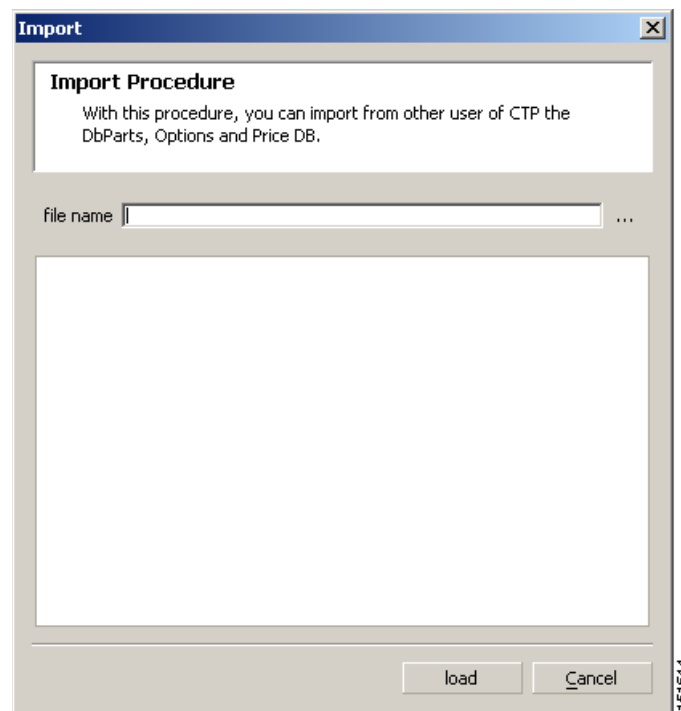
Step 2   In the Import dialog box, click the **...** button and navigate to the desired directory and file. Click **Select** to choose the file to import.

Step 3   Click **load**.

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

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

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

Step 5   Click **Ok**.

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

2.2.9 Resetting the Default Layout

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

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

2.2.10 Adding Plug-ins

Use the following procedure to add plug-ins to Cisco MetroPlanner. Plug-ins are released separately from Cisco MetroPlanner. Using plug-ins, you can customize the released version of Cisco MetroPlanner.

Step 1   Copy the plug-in file into the Documents and Settings*username*\Desktop\MP7\plugins folder.

Step 2   From the File menu, choose **Exit**, then click **Yes** or **No** to save the existing project.

Step 3   Launch Cisco MetroPlanner. For more information, see the .

Step 4   Choose **Tools > Plug-In > View Plugin registry**. The PlugIn Registry dialog box appears (Figure 2-12).

Figure 2-12   PlugIn Registry Dialog Box
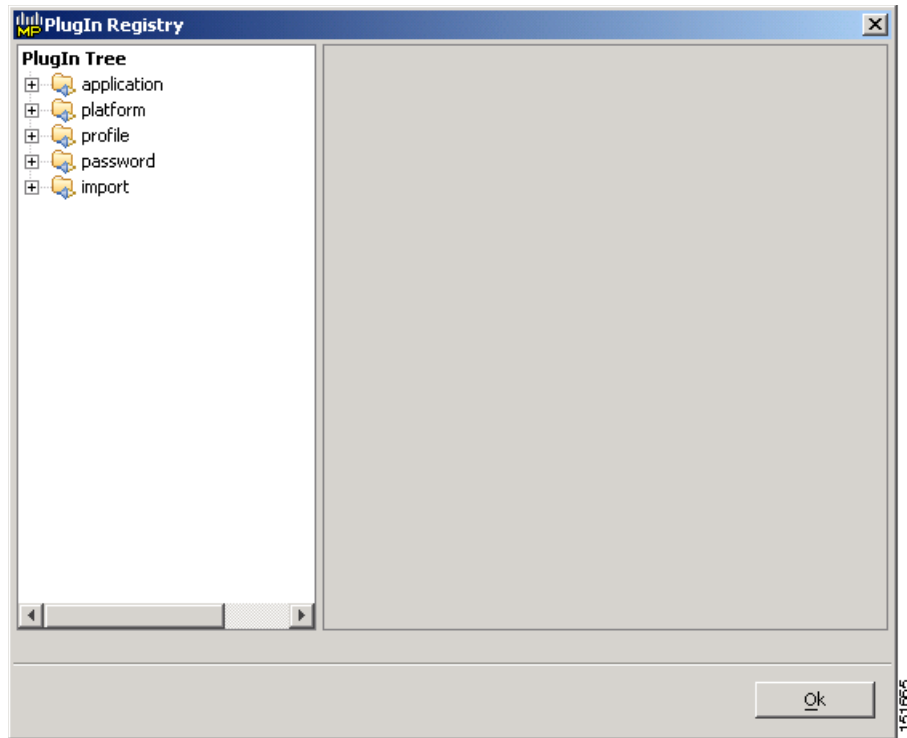
Step 5   In the PlugIn Tree, right-click the new plug-in folder and choose **Expand** from the shortcut menu.

Step 6   Right-click the new plug-in and choose **Run at start** from the shortcut menu.

Step 7   Click **Ok**.

Step 8   In the confirmation dialog box, click **Ok**.

Step 9   Close Cisco MetroPlanner and restart. The new plug-in appears as a command under the File menu.

2.2.11 Managing Plug-ins

Use the following procedure to view and manage plug-ins. For information about adding plug-ins, see "2.2.10 Adding Plug-ins" section on page 2-18.

Step 1   Choose **Tools > Plug-In > View Plugin registry**. The PlugIn Registry dialog box appears (Figure 2-12 on page 2-19).

Step 2   In the PlugIn Tree, right-click the plug-in folder and choose **Expand** from the shortcut menu.

Step 3   Click a plug-in to view information about it. The right pane of the PlugIn Registry dialog box displays the plug-in information.

- The General area of the PlugIn Registry dialog box identifies the following information:
  - Name—(Display only) Displays the name of the plug-in.
  - Path—(Display only) Displays the location of the plug-in.

- Version—(Display only) Displays the version of the plug-in.

- Provider—Displays the name of the supplier of the plug-in.

- Text—(Display only) Displays a brief description of the plug-in.

- Exclusion—(Display only) Displays the exclusion label. The exclusion attribute is a tag that defines an exclusion rule for a plugin. No more that one plugin with a given exclusion tag can be run at the same time.

- The State area of the PlugIn Registry dialog box identifies the plug-in current state and restrictions:

  - Current State—(Display only) Identifies the state of the plug-in.

  - Can be stopped—(Display only) If True, you can disable the plug-in during the current session of Cisco MetroPlanner. The plug-in will disappear from the File menu. To restart a plug-in that has been stopped, you must exit and relaunch Cisco MetroPlanner. If False, you cannot stop the plug-in during an active Cisco MetroPlanner session.

  - Can be suspend—(Display only) If True, you can disable the plug-in during the current session of Cisco MetroPlanner. The plug-in will disappear from the File menu. To restart a plug-in that has been suspended, you can choose Resume in the PlugIn Registry dialog box. It is not necessary to exit and relaunch Cisco MetroPlanner. If False, you cannot suspend and resume this plug-in during an active Cisco MetroPlanner session.

- The Run Information area of the PlugIn Registry dialog box displays the Can be deactivated state. If True, you can deactivate a plug-in but must exit and relaunch Cisco MetroPlanner for the deactivation to take effect. When you relaunch Cisco MetroPlanner, the plug-in will not appear in the File menu. If False, you cannot deactivate this plug-in.

Step 4   To disable or suspend a plug-in, right-click the plug-in and choose one of the following from the shortcut menu:

- Do not run at start—Choose to disable the plug-in the next time Cisco MetroPlanner is launched.

- Suspend/Resume—Choose **Suspend** if you want to disable the plug-in immediately without restarting Cisco MetroPlanner. Choose **Resume** to enable a suspended plug-in.

Step 5   Click **Ok**.

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

Step 7   If you chose Do not run at start, exit and relaunch Cisco MetroPlanner for the plug-in to be disabled.

2.2.12 Adding User Profiles

A user profile is a set of privileges used for running Cisco MetroPlanner. Each profile offers different capabilities. Cisco MetroPlanner is packaged with the Network Designer and Base Network Designer profiles, but you can add other user profile types.

Table 2-4 lists the privileges that differ between the Network Designer and the Base Network Designer user profiles. For all other commands and options, the two user profiles have the same privileges.

Table 2-4   Different Privileges for Network Designer and Base Network Designer

Cisco MetroPlanner Command/Option	Network Designer	Base Network Designer
Tools > Parts Database > New group	Yes	No
Tools > View Plug-in registry	Yes	Yes

Table 2-4   Different Privileges for Network Designer and Base Network Designer (continued)

Cisco MetroPlanner Command/Option	Network Designer	Base Network Designer
Tools > Options > Platform Options > Restricted Equipment list	Yes	Read only
Tools > Price List Mgmt > Master Price Database	Yes	Read only
Tools > Export	Yes	Yes
Tools > Import	Yes	Yes

Use the following procedure to add a user profile to Cisco MetroPlanner:

Step 1   Copy the profile JAR file into the Documents and Settings*username*\\Desktop\\MP7\\profiles folder.

Step 2   Launch Cisco MetroPlanner. For more information, see the "2.1 Launching Cisco MetroPlanner" section on page 2-1. The new profile should appear in the **Choose a profile type** drop-down list.

2.2.13 Running a Script

Use the following procedure to run a script. A script is a sequence of commands in a BSH file format that is used to provide additional Cisco MetroPlanner capabilities. Cisco provides scripts to help you customize your Cisco MetroPlanner software.

Step 1   From the Script menu, choose **Run Script**.

Step 2   In the Choose the script to run dialog box, click the desired script and click **Open**. The script runs.

2.3 Creating a Project

A project consists of a single network or multiple networks that you analyze and compare. In a project, you can have multiple copies of a single network with the same customer input data, but use different options in each to investigate multiple solutions.

Use the following procedure to create a single network in a project. A new network is in the Design state. For more information about the different network states, see the "2.7 Managing the Network Design" section on page 2-77.

Step 1   From the File menu, choose **New**. The Project Creation Wizard appears (Figure 2-13).

Figure 2-13   Project Creation Wizard

Step 2   On the Project page, complete the following:

- Created By—Displays the user login name. You can edit this field (128 character maximum).

- Customer Name—Type the name of the customer (128 character maximum) requiring this network design.

- Network Platform Layout—Choose **ANSI** (the North American standard) or **ETSI** (the international standard) from the drop-down list to indicate the platform type. ANSI networks will not allow you to define SDH (ETSI) service demands. ETSI networks will not allow you to define SONET (ANSI) service demands.

- Span Measurement Units—Choose **Km** (kilometers) or **Miles** from the drop-down list to set the unit of measure used for span length.

- Price List—Choose the price list from the drop-down list.

Step 3   Click **Next**.

Step 4   On the Platform page, check the desired platform and click **Next**.

Step 5   On the Release page, check the desired software release for the network design and click **Next**. The default is the latest release. This attribute defines the list of hardware parts that cannot be used in the design because they are not supported by a particular release.

Step 6   On the Subnet page, complete the following (Figure 2-14):

- Traffic mapping—Check to select the ONS 15454 Release 7.0 version of the interface and wavelength routing optimization algorithm to be used in the network design. Release 7.0 is backward compatible and can manage Software Release 4.7, 5.0, and 7.0.

- Metro Core—Check to select the ONS 15454 Release 7.0 version of the algorithm used to optimize the amplifier and DCU placement within the subnetwork. Release 7.0 is backward compatible and can manage Software Release 4.7, 5.0, and 7.0.

- Layout—Check to define the ONS 15454 Release 7.0 version of the algorithm used to generate the layout of each site within the subnetwork. Release 7.0 is backward compatible and can manage Software Release 4.7, 5.0, and 7.0.

- Bands—Choose **C-Band** or **L-Band**. L-Band is available only for Release 7.0 networks.

- Scalable C/L Bands—Choose **Yes** or **No** to specify if the design will be scalable to support both C-band and L-band on the same system. This option is available only for Release 7.0 networks.

- Scalable C-band/50GHz—Choose **Yes** or **No** to specify if the design will be scalable to support 50-Ghz channel spacing in C-band. This option is available only for Release 7.0 networks.

- C-band Rules—Choose the option that will be the maximum per-channel power and channel spacing for the network design. This option is available when the selected band is C-band.

- L-band Rules—Choose the option that will be the maximum per-channel power and channel spacing for the network design. This option is available when the selected band is L-band or when Scalable C/L Bands is set to Yes.

Figure 2-14   Project Creation Wizard Subnet Page
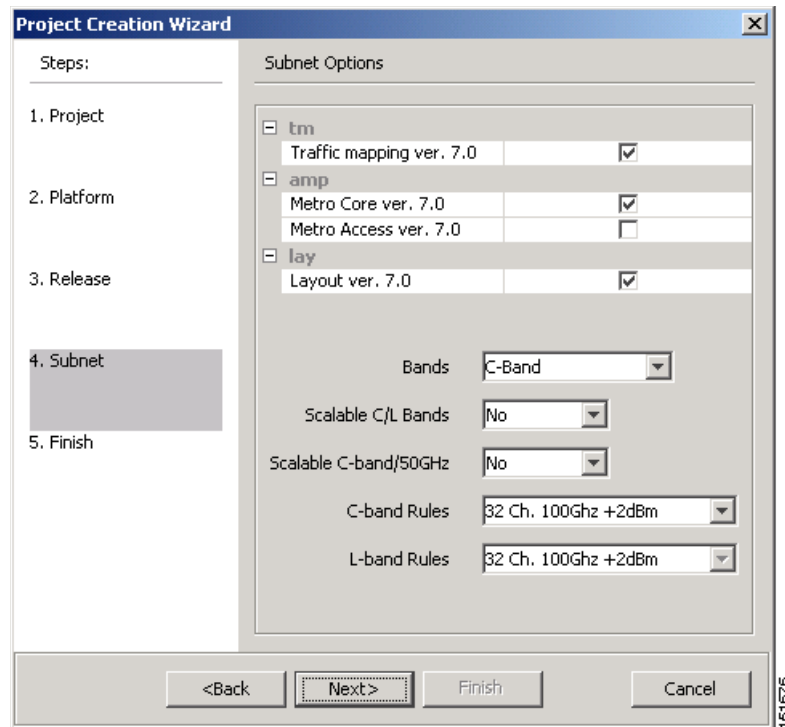
Step 7   Click **Next**.

Step 8   Complete one of the following:

- To run the Network Creation wizard, check the **Run the Network Wizard Now** check box and click **Finish**. Continue with Step 9.

- To create an empty project to add sites and fibers manually, uncheck the **Run the Network Wizard Now** check box and click **Finish**. Project Wizard creates the project and an empty network and subnetwork under which you can manually add sites and fibers. Skip the remaining steps in this procedure. To add sites manually, see the "2.3.1 Adding Sites" section on page 2-27.

Step 9 In the Topology page of the Network Creation wizard (Figure 2-15), choose **Ring** or **Linear** from the Topologies drop-down list and click **Next**.

Figure 2-15   Network Creation Wizard Topology Page
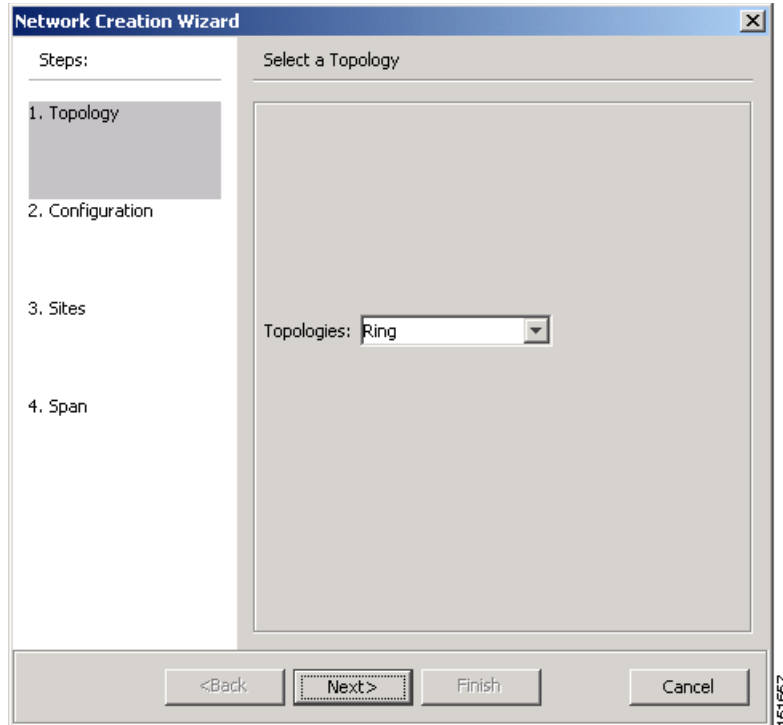
Step 10 On the Configuration page, enter the number of sites in the Site number field and click **Next**. The maximum number of sites per network design is 60 sites and the default is 3 sites.

Step 11 On the Site Management page, complete the following (Figure 2-16):

- Shelf Management—Choose the shelf management configuration:

  - Multi Shelf Integrated Switch—All the Multi Service Transport Platform (MSTP) optical cards (optical add/drop multiplexers [OADMs] and amplifiers) reside in different shelves connected by a LAN. The LAN is implemented with switches connected to the MSTP shelves.

  - Multi Shelf External Switch—All the MSTP optical card (OADMs and amplifiers) reside in different shelves connected by a LAN. The LAN is implemented with switches external to the MSTP shelves.

  - Individual Shelf—All the MSTP optical cards (OADMs and amplifiers) reside in the same shelf.

- Node Protection—Choose **Same Shelf** (single shelf configurations) or **Separated Shelves** (multishelf configurations). Same Shelf is the only option if you chose Individual Shelf as the Shelf Management type.

- Hybrid Node—Check to create all the nodes configured as hybrid MSTP/Multi Service Provisioning Platform (MSPP) nodes. Hybrid Node is only available if you chose Individual Shelf as the Shelf Management type.

- Osmine Compliant—Check to create all the nodes in the network design with transponder and line cards that are compliant with Operations Systems Modifications of Intelligent Network Elements (OSMINE).

- DCC chain—Check to put a TXP(P)_MR_2.5G card in Slot 12 on each shelf of each site. This option is available for individual shelves.
- Max Shelf Num—Choose the maximum number (from 1 to 4) of ANSI or ETSI shelves (equipping optical cards or TXP/MXP card) that can be placed in each rack in the site when generating the layout of the site.

Figure 2-16   Network Creation Wizard Site Management Page
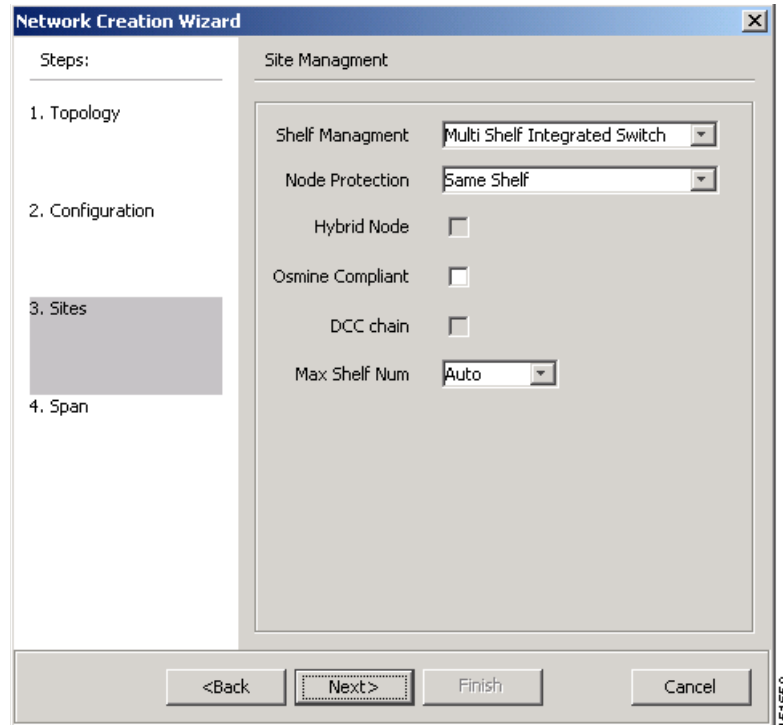
Step 12   Click **Next**.

Step 13   In the Span Parameters, complete the following (Figure 2-17):

- Span Label Tag—Type the desired span label; the default label is Duct.
- Span Fibre Type—Choose the fiber type for each span in the network.
- Span Length—Type the span length. The displayed unit of measure is retrieved from the Span Measurements Units field.
- EOL Ageing Factor—Type the number to use when factoring fiber aging. This factor is multiplied by the SOL total span loss without connectors.
- EOL Ageing loss [dB]—Type 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).

✎ **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]—Type the concentrated loss at the end of the span.

- CD factor [ps/mn/km]—Type the fiber chromatic dispersion (CD) factor. The default value is dependent on the selected fiber type. Any value that you enter in this field is lost whenever you change the fiber type. Chromatic dispersion is always entered in ps/nm/km. Fiber chromatic dispersion is defined for the middle of the wavelength band. C-band is defined at 1545.3 nm; L-band is defined at 1590.4 nm.

- PMD factor [ps/sqrt(km)]—Type the polarization mode dispersion (PMD) factor. The default value is dependent on the selected fiber type. Any value that you enter in this field is lost whenever you change the fiber type. PMD is always entered in kilometers.

- Length Based Loss—Check to define whether the fiber loss is specified as an absolute value or derived from the span length.

- Loss factor [dB/km]—Type the value of the SOL fiber loss per kilometer that is used to calculate the loss of each span in the network. The fiber loss factor is always entered in dB/km.

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

Figure 2-17   Network Creation Wizard Span Parameters Page

Step 14   Click **Finish**. Cisco MetroPlanner checks the validity of the fiber factor values. If the fiber factor values are within the valid range (Table 2-5), Cisco MetroPlanner creates a visual representation of the network. If the values are out of range, Cisco MetroPlanner issues a warning, asking you to confirm the input values.

Table 2-5   Valid Ranges for Fiber Factor Values

Fiber Type	Parameter	Min. Error Value	Min. Warning Value	Default Value	Max. Warning Value	Max. Error Value	Unit
ITU-T G.652-SMF	Loss factor	0	0.2	(*)	0.4	10	dB/km
	Chromatic dispersion factor at 1545.3 nm (C-band)	0	16.2	16.7	17.1	30	ps/nm/km
	Chromatic dispersion factor at 1590.4 nm (L-band)	0	18.53	19.03	19.43	30	ps/nm/km
	PMD factor	0 ps/	0.0	0.1	0.5	10	$ps/(\sqrt{km})$
ITU-T G.655-E-LEAF	Loss factor	0	0.2	(*)	0.4	10	dB/km
	Chromatic dispersion factor at 1545.3 nm	0	3.4	3.80	4.2	10	ps/nm/km
	PMD factor	0	0	0.1	0.5	10	$ps/(\sqrt{km})$
ITU-T G.655-True Wave	Loss factor	0	0.2	(*)	0.4	10	dB/km
	Chromatic dispersion factor at 1545.3 nm	0	3.8	4.19	4.6	10	ps/nm/km
	PMD factor	0	0	0.1	0.5	10	$ps/(\sqrt{km})$
ITU-T G.652-DS (Dispersion shifted)	Loss factor	0	0.2	(*)	0.4	10	dB/km
	Chromatic dispersion factor at 1590.4 nm (L-band)	0	2.43	2.83	3.23	30	ps/nm/km
	PMD factor	0	0	0.1	0.5	10	$ps/(\sqrt{km})$

2.3.1 Adding Sites

Use the following procedure to add new sites to an existing network. A site is a customer premise location where any equipment can be co-located in a rack within a building.

Note   Cisco MetroPlanner supports up to 60 sites. However, the ONS 15454 DWDM platform will only support up to 16 non-pass-through sites on any given network. Although Cisco MetroPlanner will allow you to add more than 16 sites, it will generate errors when the network analysis runs.

Step 1   Right-click the network folder in the Project Explorer and choose **Expand** from the shortcut menu.

Step 2   Right-click the Sites folder and choose **New Site** from the shortcut menu. The Site Creation wizard appears. As an alternative, if sites already exist in the network design and you have the NtVw Net# tab open, click the Create a new site icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

Step 3   Choose the interface type:

- Line—Two pairs of fibers are terminated at the node.

- Terminal—A single pair of fibers is terminated at the node.

- Line+—Two pairs of fibers are terminated at the node but the number of fibers can be increased. An MMU card (topology upgrade) must be installed.

- Terminal+—A single pair of fibers is terminated at the node but the number of fibers can be increased. An MMU card (topology upgrade) must be installed.

Step 4   Click **Finish**.

2.3.2 Deleting Sites

Use the following procedure to delete sites from a network. You can delete a site if the site is in the Unlocked state and does not have a traffic demand set up on it.

Step 1   Verify that the site is in the Unlocked state in the Project Explorer pane. For more information, see the "2.7.4 Unlocking Parameters in the Network Design" section on page 2-80.

Step 2   Delete any traffic demands. For more information, see the "2.6.9 Deleting a Traffic Demand" section on page 2-71.

Step 3   On the NtVw Net# tab, click the Site icon and choose **Delete** from the Tasks Pane. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

2.3.3 Adding Fiber Spans

Use the following procedure to manually add fiber spans between sites. A fiber span consists of a pair of fibers (one transmit and one receive) between two sites. A span is represented by a fiber duct in the NetView Net# tab. Within a fiber duct, more than one fiber pair can exist.

Step 1   In the NtView Net# tab, click the Create a new duct icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

Step 2   Click one of the sites that you want to connect with a fiber span. This site will be the source site for later network analysis output.

Step 3   Click the destination site. A fiber span appears between the two sites. This site will be the destination site for later network analysis output.

For the first span, the source site is set as East and the destination site is set as West. Cisco MetroPlanner automatically adjusts East and West for additional spans.

2.3.4 Creating a Point-to-Point Demand

Use the following procedure to add a point-to-point traffic demand:

Step 1   In the NtView Net# tab, click the Create a new P2P demand icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

Step 2   Click the source site of the demand.

Step 3   Click the destination site of the demand. The Point to Point Demand Creation Wizard appears (Figure 2-18).

Figure 2-18   Point to Point Demand Creation Wizard

Step 4   In the General Parameters area, complete the following:

- Label—Type the name of the demand.
- Source—(Display only) Displays the source site name.
- Destination—(Display only) Displays the destination site name.
- Service Type—Choose the service type from the drop-down list. For a list of services, see the "1.2.6 Service Support" section on page 1-4.
- Present # ch—Enter the number of channels to be created. The Forecast # ch field automatically updates with the number entered in this field.
- Forecast # ch—Enter the number of channels to be installed at a later date. This value includes the Present # ch value. For example, if you entered 4 in the Present # ch value and want to add two channels in the future, enter 6.

Step 5   Click **Next**.

Step 6   In the Platform Parameters area, complete the following:

- Protection—Choose the protection type from the drop-down list: **Y-Cable Protected**, **Client 1+1**, **Fiber Switched**, or **Unprotected**. For more information on protection types, see the "1.2.5 Protection Scheme Support" section on page 1-3.

- Path—(Unprotected only) Choose the routing type from the drop-down list:

  - **Auto**—Allows the highest degree of flexibility in routing the channels. Cisco MetroPlanner routes the channels with the lowest possible cost given the other constraints.

  - **EAST->WEST**—Routes all the channels from the east side of the source site.

  - **WEST->EAST**—Routes all the channels from the west side of the source site.

- Optical Bypass—(Unprotected only) Choose the site where the channels for the current demand will be optically dropped.

Step 7   Complete the following fields in the Interface Parameters area. The options available are based on the service type selected in Step 4.

- Transponder—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

- Line Card—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

- Alien Card—Displays only if you created a third-party interface as described in the "2.2.5 Defining Third-Party DWDM Interfaces" section on page 2-10. Click to expand, and then check the card type check box to select the card at the end sites of the service channels.

- Pluggable Card—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

Step 8   In the Client Interface area, define the client interface type (SR, IR, or LR) for the source and destination from the Source and Destination drop-down lists. This option is available only for transponder interfaces and depends on the selected service type and card type.

Step 9   Click **Finish**. The Edit Point to Point Demand dialog box appears listing the present and forecast channels.

The demand appears in the NtVw Net# tab. A demand is a solid line when selected and a dotted line when not selected. The line has a number above it that indicates the number of channels that are present. Figure 2-19 shows a selected point-to-point demand with five channels between Sites 1 and 2.

> **Note**   To make changes to the demand parameters, see the "2.6.6 Editing a Point-to-Point Demand" section on page 2-67, or click **Cancel** to close the Edit Point to Point Demand dialog box.

Figure 2-19   Point-to-Point Demand Between Two Sites
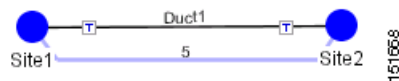
2.3.5 Creating a Protected Ring Demand

Use the following procedure to create a P-ring traffic demand.

Step 1   Create a ring network using either the procedures in the "2.3 Creating a Project" section on page 2-21 or by manually placing sites into a ring configuration.

Step 2   In the Native Net# tab, click the Create a new P-Ring demand icon in the toolbar. The P-Ring Creation Wizard appears (Figure 2-20). For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

Figure 2-20   P-Ring Creation Wizard

Step 3   In the General Parameters area, complete the following:

- Label—Enter the name of the demand.
- Service Type—Choose the service type from the drop-down list. For a list of services, see the "1.2.6 Service Support" section on page 1-4.
- Present # ch—Enter the number of channels to be created. The Forecast # ch field automatically updates with the number entered in this field.
- Forecast # ch—Enter the number of channels to be installed at a later date. This value includes the Present # ch value. For example, if you entered 4 in the Present # ch value and want to add two channels in the future, enter 6.

Step 4   Click **Next**.

Step 5   In the Protection Sites area, press **Ctrl** and click the sites that you want to add to the P-ring. A P-ring requires at least three sites. Click the right arrow button.

Step 6   In the Optical Bypass area, press **Ctrl** and click the sites that you want to add to the P-ring. Click the right arrow button.

Step 7   Click **Next**.

Step 8   Complete the following interface parameters. The options available are based on the service type selected in Step 3.

- Transponder—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

- Line Card—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

- Alien Card—Displays only if you created a third-party interface as described in the "2.2.5 Defining Third-Party DWDM Interfaces" section on page 2-10. Click to expand, and then check the card type check box to select the card at the end sites of the service channels.

- Pluggable Card—Click to expand, then check the card type check box to select the card at the end sites of the service channels.

Step 9   In the Client Interface area, define the client interface type (SR, IR, or LR) for the source and destination from the Source and Destination drop-down lists. This option is available only for transponder interfaces and depends on the selected service type and card type.

Step 10   Click **Finish**. The Edit P-Ring Demand dialog box appears.

The demand appears in the NtVw Net# tab. A demand is a solid line when selected and a dotted line when not selected. The line has a number above it that indicates the number of channels present. Figure 2-21 shows a selected one-channel P-ring between Sites 1, 2, 3, and 5 with an optical bypass of Site 4.

Note   To make changes to the demand parameters, see the "2.6.7 Editing a P-Ring Demand" section on page 2-68, or click **Cancel** to close the Edit P-Ring Demand dialog box.

Figure 2-21   P-Ring Demand
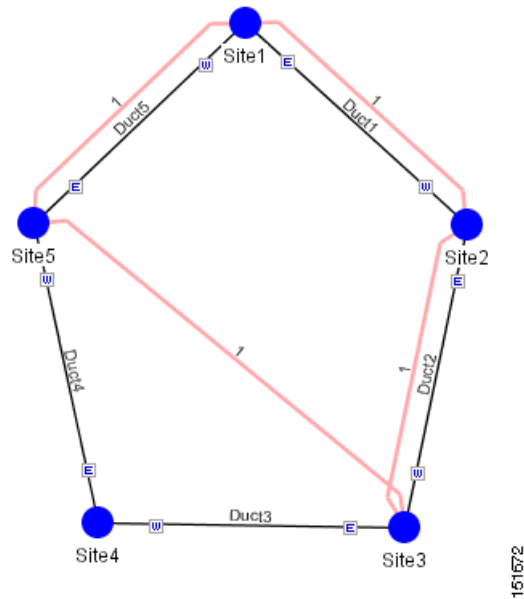
2.3.6 Creating a ROADM Demand

Use the following procedure to create ROADM traffic groups and demands:

Step 1   In the Project Explorer, right-click the **Groups** folder and choose **Expand** from the shortcut menu.

Step 2   Right-click the ROADM folder and choose **Create new ROADM group** from the shortcut menu. The ROADM Group Creation Wizard appears.

Step 3   Type the ROADM traffic group name in the Group Name field.

Step 4   Check the desired sites.

Step 5   Click **Finish**. The new ROADM traffic group appears under the ROADM folder in the Project Explorer.

Step 6   Right-click the new ROADM traffic group and choose **Create new ROADM demand** from the shortcut menu. The Create ROADM Demand dialog box appears (Figure 2-22).

Figure 2-22   Create ROADM Demand Dialog Box

Step 7   Enter a name for the demand in the Demand Name field.

Step 8   Select a traffic pattern type (Hub or Meshed) from the Traffic Type drop-down list. If you select Hub, the First Site drop-down list becomes available. If you selected Meshed, proceed to Step 10.

Step 9   For Hub traffic types, select the originating site from the First Site drop-down list.

Step 10   Select a connectivity type from the Connectivity type drop-down list: **Protected**, **Unprotected Minimum Hop**, **Unprotected Optimum Path**, or **Unprotected Subnet**. Refer to the "1.5.3 ROADM Traffic Groups" section on page 1-9 for more information on the connectivity choices. If you chose Unprotected Subnet, continue with the next step; otherwise proceed to Step 12.

Step 11   If you chose Unprotected Subnet, choose the starting site and the direction the ring must be traversed from the drop-down lists.

Step 12   In the Service Types list, check the boxes for one or more client service types for the ROADM demand. The client interfaces that support each service type appear in the table to the right of the Service Types list.

Step 13   To further define the client interfaces, complete the following options for each client interface listed in the table. Check boxes in gray are not available for selection.

- Yes/No—Check to select this card to implement the service type.
- Client Interface—(Display only) Displays the card type for the selected service type.
- Y Protected—Check to select Y-cable protection if the connectivity type is Protected.
- 1+1 Protected—Check to select 1+1 protection if the connectivity type is Protected.
- Fiber Switched—Check to select fiber-switching protection if the connectivity type is Protected.
- Supported Service—(Display only) Displays the service types supported for the card.

You can select more than one client interface to support the same service type. By default, Cisco MetroPlanner checks the best client interface to support each service.

Step 14   Click **Ok** to create the demand.

2.3.7 Deleting a Network

To delete a network from a project, in the Network Mgmt Tree tab click the network and choose **Delete** from the Tasks Pane. You cannot delete a network if it is the only network in a project.

2.3.8 Adding Notes to a Project

Use the following procedure to add a note to any item in the Project Explorer. Each network has a Notes folder in the Project Explorer. After you have created a note, it appears in the Notes folder for that particular network.

Step 1   Right-click the desired item in the Project Explorer and choose **Edit Note** from the shortcut menu.

Step 2   In the Edit Note creation box, enter the desired text.

Step 3   To close the Edit Note creation box and to save the note, click the **X** in the upper right corner of the window.

Step 4   To view notes, double-click the **Notes** folder. The Notes window appears. Table 2-6 lists the columns in the Notes window.

Table 2-6   Notes Window

Column	Description
Header	Displays the note text. To view the entire note, click the plus (+) sign next to the header to expand the text.
Action	Click **Go** to open the item in the Project Explorer where the note was created.
Source	Displays the location of the note, for example, ProjectManager.Nets.Net2.Sites.Site2.W.

Step 5   To close the Notes window, click the **X** in the upper right corner of the window.

2.3.9 Deleting Notes

Use the following procedure to delete a note from any item in the Project Explorer:

Step 1   Double-click the **Notes** folder.

Step 2   In the Notes window, click **Go** in the Action column for the note that you want to delete. The item is highlighted in the Project Explorer.

Step 3   Right-click the item in the Project Explorer and choose **Delete Note** from the shortcut menu.

2.4 Analyzing the Network

After you have created the desired sites, fiber spans, and service demands, you must analyze the network to determine network performance. The network must be in the Design, Install, or Upgrade state before you can analyze it. Cisco MetroPlanner automatically optimizes the design and summarizes the optical transmission performance. If there are problems with the design, Cisco MetroPlanner lists the problems and descriptions in the Analyzer Messages pane.

Use the following procedure to analyze the network:

Step 1 Click the **Networks Mgmt Tree** tab, and click the network that you want to analyze.

Step 2 Click the Analyze Network icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts." As an alternative, click **Analyze** in the Tasks Pane.

The MetroPlanner analyzer status window appears to indicate the progress. The Cisco MetroPlanner analysis status bar indicates when the network analysis is complete.

Step 3 If any problems occur during the analysis, click the **Analyzer** tab to view the results on the Analyzer Messages pane. The Summary report appears. See the "2.5.1 Viewing the Summary Report" section on page 2-37 for more information.

Step 4 If necessary, resolve the problems listed in the Summary report. After you resolve the problems in the network, you can analyze the network again.

Note You can return a Design-Analyzed network to the design state to make further changes by clicking the network icon in the Networks Mgmt Tree and clicking **Design** in the Tasks Pane.

2.5 Viewing Network Reports

Cisco MetroPlanner provides the reports listed in Table 2-7. Report availability depends on whether a network has been analyzed or whether it is in the Install or Upgrade state. Reports are also available by site. See Table 2-7 for report availability details.

Table 2-7   Report Availability

Report	Network Availability	Site Availability
NE Update	Analyzed	—
Installation Parameters	Analyzed	Analyzed
Traffic Matrix	Analyzed	Analyzed
Layout	Install, Upgrade, and Analyzed	Install, Upgrade, and Analyzed
Link Availability	Analyzed	Analyzed
Internal Connections	Analyzed	—
Optical Results	Analyzed	Analyzed
Wavelength Routing	Analyzed	—

Table 2-7   Report Availability (continued)

Report	Network Availability	Site Availability
Summary	Install, Upgrade, and Analyzed	Install, Upgrade, and Analyzed
Bill of Material	Install, Upgrade, and Analyzed	Install, Upgrade, and Analyzed

For more information on the Bill of Materials report, see the "2.8 Generating a BoM" section on page 2-80. In addition, you can compare the following reports using the Reports Diff tool: Bill of Material, Internal Connections, and Installation Parameters.

To complete the procedures in this section, you must have a project open and the network(s) loaded. See the "2.1.1 Opening a Project" section on page 2-3 and the "2.1.2 Loading and Unloading Networks" section on page 2-3.

2.5.1 Viewing the Summary Report

The Summary report summarizes design information, optical results, design cost, and analyzer messages. You can view it before or after you analyze a network. It automatically appears when you analyze a network. Use the following procedure to view the report at another time:

Step 1   Complete one of the following:

- To view the Summary report for a network, click the **Networks Mgmt Tree** tab and click the network.
- To view the Summary report for a site, click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Summary**. The Summary tab appears (Figure 2-23).

Figure 2-23   Summary Tab

Table 2-8 lists the categories in the Summary tab and their descriptions.

Table 2-8   Summary Tab Categories

Category	Description
Design info	Displays the following information: • Version—Displays the Cisco MetroPlanner software release version. • Customer name—Displays the name of the customer requiring this network design. • Created By—Displays the user login name. • Release—Displays the Cisco MetroPlanner software release number.
Optical results	Indicates how many demands are included in the network, and identifies the number and severity of alarms for each demand.

Table 2-8   Summary Tab Categories (continued)

Category	Description
Design cost info	Displays the following information: • Price list—Displays the price list used. • Currency—Displays the currency selected for the price list. • BoM total discounted—Displays the total price of the products (excluding spare parts) in the network with the discount applied. • Spare total discounted—Displays the total price of the spare parts in the network with the discount applied • BoM + Spare total discounted—Displays the total price of the products (including spare parts) in the network with the discount applied.
Messages	Displays any analyzer messages that occurred as a result of network analysis.

2.5.2 Saving the NE Update File

After Cisco MetroPlanner calculates the installation parameters, you can create a configuration file in XML format for each site in the network. This file can be directly imported to a site using the NE Update feature in CTC. CTC uses this file to preprovision a node.

Cisco MetroPlanner generates one text file for each site in the network in the Cisco MetroPlanner installation folder. Each file is named with the site name string by default. File data format and the list of reported installation parameters depend on the system release selecteded for the designed network. You generally save this file after you analyze an Install network.

Use the following procedure to save the NE Update file:

Step 1   Click the **Networks Mgmt Tree** tab, and click the analyzed network.

Step 2   In the Tasks Pane, click **NE Update**. The Network Element Update File dialog box appears.

Step 3   Check the **Include wavelength parameters** check box to include trunk wavelength preprovisioning in the NE Update XML file. Do not check this box if the network on which you import the NE Update file is using system release 7.0.0. If this option is checked, trunk wavelength is preprovisioned in CTC for all the TXP and MXP units required to support present traffic demands.

> **Note**   During project creation, selecting MSTP- Release 7.0 allows you to create projects for system releases 7.0.0 and 7.0.x. However, when importing the NE Update file on a node using system release 7.0.0, the node cannot read the NE Update XML file if Include wavelength parameters is checked.

Step 4   To save the file in a different directory than the Destination Folder, click **Change** and navigate to the desired directory. Click **Save**.

Step 5   Click **Finish**.

Step 6   Click **Cancel** to close the window without saving a configuration setup file.

2.5.3 Viewing the Installation Parameters

The Installation Parameters reports shows the values to be set (provisioned) at installation time on each site in the network. These parameters are exported when you save the NE Update file and are used to automatically provision a node using CTC.
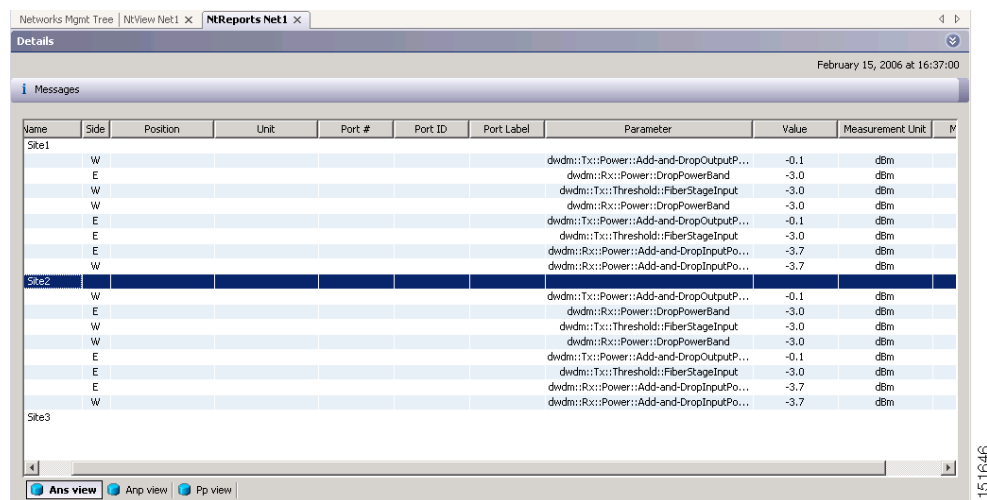
Use the following procedure to view the installation parameters after a network has been analyzed:

Step 1   Complete one of the following:

- To view the Installation Parameters report for a network, click the **Networks Mgmt Tree** tab and click the network.
- To view the Installation Parameters report for a site, click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Installation Parameters**. The Installation Parameters tab appears (Figure 2-24). The ANS view subtab appears by default. This tab displays the automatic node setup information.

Figure 2-24   ANS View Subtab in the Installation Parameters Tab

Table 2-9 describes the columns on the ANS view tab of the Installation Parameters report.

Table 2-9   Installation Parameters Report ANS View Tab Columns

Category	Description
Name	Displays the name of the site.
Side	Displays the node interface: T (terminal), E (east), or W (west).
Position	Displays the rack, shelf, and slot position of the card from which the patchcord originates.
Unit	Displays the name of the card.
Port #	Displays the port number from which the patchcord originates.

Table 2-9   Installation Parameters Report ANS View Tab Columns (continued)

Category	Description
Port ID	Displays the port ID.
Port Label	Displays the name of the port.
Parameter	Displays the name of the parameter to be set, such as RX Power Low.
Value	Displays the name of the value to be set.
Measurement Unit	Displays the measurement unit for the related installation parameter value, such as dBm.
Manual Set	Indicates with a Yes or No which parameters must be manually set using the CTC interface.

Step 3   Click the **ANP view** tab to view the automatic node provisioning information. Table 2-10 describes the columns on the ANP view tab of the Installation Parameters report.

Table 2-10   Installation Parameters Report ANP View Tab

Category	Description
Name	Displays the name of the site.
Shelf ID	Displays the shelf identifier.
Rack number	Displays the rack number.
Rack position	Identifies the rack position in the shelf.
Slot position	Identifies the slot position in the shelf for the card.
Equipment type	Displays the card type.

Step 4   Click the **PP view** tab to view the provisioning parameters information. Table 2-11 describes the columns on the PP view tab of the Installation Parameters report.

Table 2-11   Installation Parameters Report PP View Tab

Category	Description
Name	Displays the name of the site.
Shelf ID	Displays the shelf identifier.
Slot position	Displays the slot number for the card with the PPM.
Port position	Displays the port number.
Ppm position	Displays the PPM location on the card.
Pp name	Displays the name of the PPM.
value	Displays the installation parameter value.

Step 5   To close the Installation Parameters report, click the **X** on the top right of the Installation Parameters tab.

2.5.4 Viewing Internal Connections

Use the following procedure to view the network internal connections after a network has been analyzed.

You can also use this procedure to view the patchcord connections between transponders and the Y-Cable Protection FlexLayer modules. The Y-Cable Protection FlexLayer position is defined using the rack and shelf number. The slots are numbered from left to right on each of the four FlexLayer modules that can be placed in a shelf.

Step 1 Click the**Networks Mgmt Tree** tab, and click the analyzed network.

Step 2 In the Tasks Pane, click **Internal Connections**. The Internal Connections tab appears (Figure 2-25).

Figure 2-25   Internal Connections Tab

Table 2-12 lists the columns in the Internal Connections tab and their descriptions. Click a columns to sort the table information by that column.

- Click the **Patchcord installation view** subtab to view all the patchcord connections that the installer has to mechanically cable within the site between the different ports of the cards.

- Click the **SW Provisioning view** subtab to view the patchcord representation on the local Cisco Transport Controller (CTC) interface. This subtab contains all the connections to be manually set or removed with respect to the default connections that are automatically generated by the software running on the node.

Table 2-12   Internal Connections Tab Columns

Column Name	Description
Name	Displays the name of the site. On the SW provisioning view subtab, this column indicates whether the connection should be manually set using the CTC interface or removed.
Position-1	Displays the rack, shelf, and slot position of the card from which the patchcord originates.
Unit-1	Displays the name of the card.
Port Num	(SW provisioning view subtab only) Displays the port number where the patchcord terminates.
Port ID-1	(SW provisioning view subtab only) Displays the port ID.
Port label-1	Displays the name of the port.
Attenuator	When indicated, this is the product ID of the bulk attenuator to be equipped on this connection. It also reports when an internal attenuator must be placed between the DC-TX and DC-RX ports on the preamplifier (when no DCU is equipped).
Position-2	Displays the rack, shelf, and slot position of the card where the patchcord terminates.
Unit-2	Displays the name of the card.
Port Num	(SW provisioning view subtab only) Displays the port number where the patchcord terminates.
Port ID-2	(SW provisioning view subtab only) Displays the port ID.
Port Label-2	Displays the name of the port.
P/F	Displays whether the connection relates to a present or forecast circuit.

Step 3   To export the information to an external file, click **Export**. In the Internal connections export dialog box, type the name of the file and navigate to the desired folder. Click **Save**.

Step 4   To close he Internal Connections tab, click the **X** in the upper right corner of the tab.

2.5.5 Viewing the Traffic Matrix Report

The Traffic Matrix report displays the point-to-point, P-ring, and ROADM channel data. Use the following procedure to view the traffic matrix report:

Step 1   Complete one of the following:

- To view the Traffic Matrix report for a network, click the **Networks Mgmt Tree** tab and click the network.
- To view the Traffic Matrix report for a site, click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Traffic Matrix**. The Traffic Matrix tab appears.

Step 3   Click **New Query** to open the Query Dialog (Figure 2-26). The Query Dialog allows you to filter the optical results using a variety of parameters and templates.

Figure 2-26   Query Dialog

Step 4   To perform a query using individual parameters, select the desired parameters from the drop-down lists in the Query Definition area. The selected parameters appear in the Query Preview area at the bottom of the screen. Table 2-13 describes the fields in the Query Dialog.

Table 2-13   Query Dialog Fields

Column Label	Description
Group	Allows you to filter the report to include only the data in the selected group. You can also view groups in the Project Explorer view under the network folder.
Demand	Allows you to filter the report to include only the data in the selected demand. The demand field is available only when you select a specific traffic group.
DWDM Card Type	Allows you to filter the report to include only the data in the selected DWDM card type.
Source	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific source site.
Destination	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific destination site.
Wavelength	Allows you to filter the report to include only services using the specified wavelength.
Alarm	Allows you to filter the report to include only services flagged with a green, yellow, orange, or red indicator.
P/F	Allows you to filter the report to include only present services, only forecast services, or both.
Virtual	Allows you to filter the report to include or exclude virtual channels in the Optical Results Table.

Step 5   Choose one of the following, as needed:

- Click **Run Query**. The window closes, and the query results appear in the Traffic Matrix tab (Figure 2-27). The parameters of the query appear in the horizontal area just below the button bar.

- Click **Reset Query** to clear your selections in the Query Dialog.

- Click **Close** to close the window without running a query.

Figure 2-27   Traffic Matrix Tab

Each row in the tab shows the performance of one optical path. Table 2-18 describes the information in the columns. The Traffic Matrix report displays separate rows for the TX and RX direction of the optical channels.

Table 2-14   Traffic Matrix Tab Columns

Column Label	Description
Group	Categorizes each demand type (Point-to-Point, P-ring, and ROADM). Click the plus (+) sign by a demand type to expand and show the optical channels.
Serv. Circuit	Displays the optical channel label; for example, Site1-Site2.
Source	Displays the site name for the optical channel source.
Source Position	Displays the rack, shelf, and slot identifiers for the source of the optical channel. The format of the field is Rack.Shelf.Slot.
Source Unit	Displays the product ID for the optical channel source.
Source Port	Displays the port for the source of the optical channel; for example, Client RX.
Destination Side	Displays the site name for the optical channel destination.
Destination Position	Displays the rack, shelf, and slot identifiers for the destination of the optical channel. The format of the field is Rack.Shelf.Slot.
Destination Unit	Displays the product ID for the optical channel destination.
Destination Port	Displays the port for the destination of the optical channel; for example, Client TX.
Cl. Serv. Type	Displays the client service type of the demand; for example, OC-48.
Protection	Displays the protection type of the demand; for example, P-ring or Y-cable.
Wavelength	Displays the wavelength of the optical channel.

Table 2-14   Traffic Matrix Tab Columns (continued)

Column Label	Description
Opt Bypass	Identifies where the optical channel is dropped and reinserted when it is not terminated on a TXP or MXP card (optical bypass). If "none" appears in the Op Bypass column, no optical bypass is defined for the optical channel.
DWDM Interface Type	Identifies the DWDM interface type that is used for the optical channel: • Transponder indicates that an MSTP transponder, an MSTP muxponder, or a DWDM pluggable port module is used for the optical channel. • Line Card indicates that an ITU line card is used for the optical channel.
DWDM Card Type	Identifies the type of transponder or line card used for the optical channel.

Step 6   To close the Traffic Matrix report, click the **X** in the upper right corner of the tab.

2.5.6 Displaying the Layout

Use the following procedure to view a graphical representation of each site in an analyzed network:

Step 1   Complete one of the following:

- To view the Layout report for a network, click the **Networks Mgmt Tree** tab and click the network.
- To view the Layout report for a site, click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Layout**. The Layout tab appears (Figure 2-28).

Figure 2-28   Layout Report (Rack View)
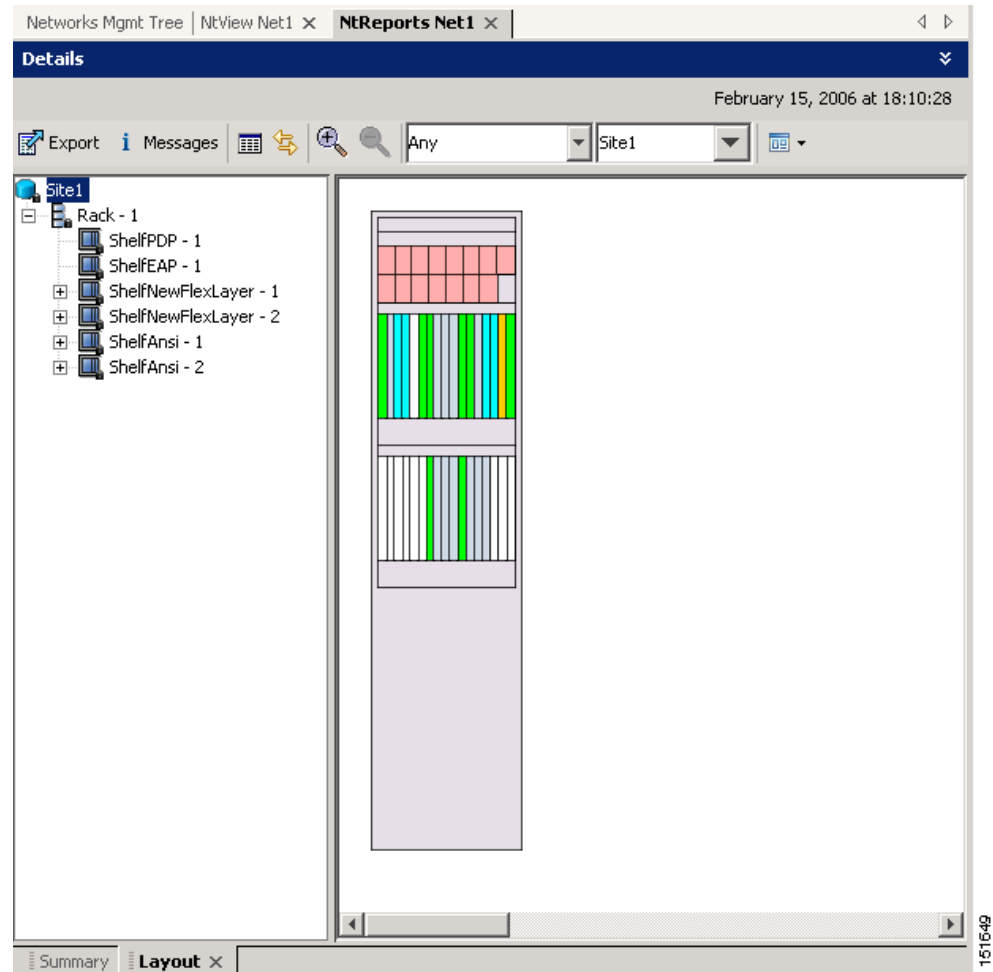
Step 3   From the **Site** drop-down list, choose the site in the network to display in the layout report.

Step 4   In the tree view on the left of the tab, right-click a rack and choose **Expand** to view a list of all shelves and cards in the rack.

Step 5   Click the desired rack or shelf to view it in the layout graphic. Figure 2-29 displays the shelf view.

Figure 2-29   Layout Report (Shelf View)
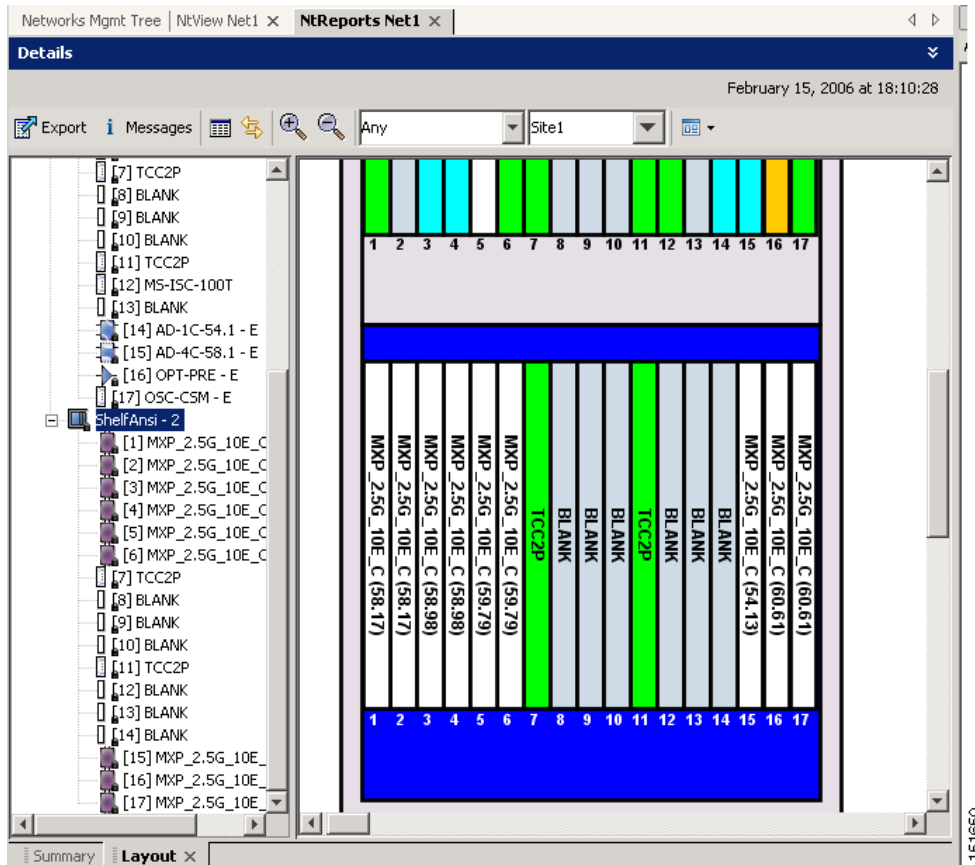
Step 6   To view details about a card, double-click the card. The Details dialog box opens with client information:

- Label—Displays the name of the card.
- Product ID—Displays the product ID of the card.
- Service Category—Future use.
- Description—Provides a brief description of the card functionality.
- Price—Lists the price for the card based on the price list selected during project creation.
- ITU Channel—Identifies the ITU channel wavelength for the card.

Click **Close** to close the Details dialog box.

Step 7   To filter the layout display, choose one of the following from the drop-down list:

- Any—Displays all cards for both the present and forecast traffic demand.
- Present—Displays cards for only the present traffic demand.
- Locked & Unlocked—Highlights the locked and unlocked cards in the layout.
- Alarmed—Highlights the alarmed cards in the layout.

Step 8   After network analysis, all items are in locked mode. To unlock cards so that Cisco MetroPlanner can rearrange the layout to optimize slot usage during network analysis, right-click locked card in the rack tree and choose **Unlock**.

Step 9   To export the graphical representation of the layout in JPEG format, click **Export**. In the Layout export dialog box, type the name of the file and navigate to the desired folder. Click **Save**.

Step 10   To zoom the layout graphic in or out, click the Zoom In and Zoom Out icons. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts."

Step 11   To close the Layout report, click the **X** in the upper right corner of the tab.

2.5.7 Viewing the Link Availability Report

Cisco MetroPlanner determines link availability based on circuit failure rate and time to repair. Use the following procedure to view the Link Availability report:

Step 1   Complete one of the following:

- To view the Link Availability report for a network, click the **Networks Mgmt Tree** tab and click the network.

- To view the Link Availability report for a site, click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Link Availability**. The Link Availability tab appears.

Step 3   Click **New Query** to open the Query Dialog (Figure 2-26 on page 2-44). The Query Dialog allows you to filter the optical results using a variety of parameters and templates.

Step 4   To perform a query using individual parameters, select the desired parameters from the drop-down lists in the Query Definition area. The selected parameters appear in the Query Preview area at the bottom of the screen. Table 2-15 describes the fields in the Query Dialog.

Table 2-15   Query Dialog Fields

Column Label	Description
Group	Allows you to filter the report to include only the data in the selected group. You can also view groups in the Project Explorer view under the network folder.
Demand	Allows you to filter the report to include only the data in the selected demand. The demand field is available only when you select a specific traffic group.
DWDM Card Type	Allows you to filter the report to include only the data in the selected DWDM card type.
Source	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific source site.
Destination	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific destination site.
Wavelength	Allows you to filter the report to include only services using the specified wavelength.
Alarm	Allows you to filter the report to include only services flagged with a green, yellow, orange, or red indicator.
P/F	Allows you to filter the report to include only present services, only forecast services, or both.
Virtual	Allows you to filter the report to include or exclude virtual channels in the Optical Results Table.

Step 5   Choose one of the following, as needed:

- Click **Run Query**. The window closes, and the query results appear in the Link Availability tab (Figure 2-30). The parameters of the query appear in the horizontal area just below the button bar.

- Click **Reset Query** to clear your selections in the Query Dialog.

- Click **Close** to close the window without running a query.

Figure 2-30   Link Availability Report

Each row in the tab shows the performance of one optical path. Table 2-16 describes the information in the columns.

Table 2-16   Link Availability Tab Columns

Column Label	Description
Group	Categorizes each demand type (Point-to-Point, P-ring, and ROADM). Click the plus (+) sign by a demand type to expand and show the optical channels.
Serv. Circuit	Displays the optical channel label; for example, Site1-Site2.
P/F	Identifies whether the channel is present and forecast (P/F) or forecast (F).
DWDM Card Type	Identifies the type of transponder or line card used for the optical channel.
Protection	Displays the protection type of the demand; for example, P-ring or Y-cable.
Cl. Serv. Type	Displays the client service type of the demand; for example, OC-48.
Source	Displays the site name for the optical channel source.
Destination	Displays the site name for the optical channel destination.
L.A. (% Complete)	Displays the link availability percentage. Link availability is calculated based on the failure rate and time to repair.

Step 6   To close the Link Availability report, click the **X** in the upper right corner of the tab.

2.5.8 Viewing Optical Results

Use the following procedure to view the optical results of the network that you created and analyzed:

Step 1 Complete one of the following:

- To view the Optical Results report for a network, click the **Networks Mgmt Tree** tab and click the network.

- To view the Optical Results report for a site, click the **NtView Net#** tab and click the site.

Step 2 In the Tasks Pane, click **Optical Results**. The Optical Results tab appears.

Step 3 Click **New Query** to open the Query Dialog (Figure 2-26 on page 2-44). The Query Dialog allows you to filter the optical results using a variety of parameters and templates.

Step 4 To perform a query using individual parameters, select the desired parameters from the drop-down lists in the Query Definition area. The selected parameters appear in the Query Preview area at the bottom of the screen. Table 2-17 describes the fields in the Query Dialog.

Table 2-17   Query Dialog Fields

Column Label	Description
Group	Allows you to filter the report to include only the data in the selected group. You can also view groups in the Project Explorer view under the network folder.
Demand	Allows you to filter the report to include only the data in the selected demand. The demand field is available only when you select a specific traffic group.
DWDM Card Type	Allows you to filter the report to include only the data in the selected DWDM card type.
Source	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific source site.
Destination	Allows you to filter the report to include only the results of incoming/outgoing services to or from a specific destination site.
Wavelength	Allows you to filter the report to include only services using the specified wavelength.
Alarm	Allows you to filter the report to include only services flagged with a green, yellow, orange, or red indicator.
P/F	Allows you to filter the report to include only present services, only forecast services, or both.
Virtual	Allows you to filter the report to include or exclude virtual channels in the Optical Results Table.

Step 5 Choose one of the following, as needed:

- Click **Run Query**. The window closes, and the query results appear in the Optical Results tab (Figure 2-31). The parameters of the query appear in the horizontal area just below the button bar.

- Click **Reset Query** to clear your selections in the Query Dialog.

- Click **Close** to close the window without running a query.

Figure 2-31 Optical Results Tab

Each row in the tab shows the performance of one optical path. Table 2-18 describes the information in the columns.

Table 2-18 Optical Results Tab Columns

Column Label	Description
Name	Displays the identification number automatically given to each path in the order that the channels were entered into the design.
Group	Identifies the demand group for the optical channel.
Protect	Displays the protection type of the channel. For a protected channel, both paths are shown. The path leaving the east side of the source is shown first.
SOL	Displays the results of the start of life analysis. The indicator shows the optical performance for the path. Green indicates success, yellow indicates success with a marginal failure risk (between 0 and 16 percent), orange indicates that the channel has a higher risk of failure (between 16 and 50 percent), and red indicates failure.
EOL	Displays the end of life analysis. The indicator shows the optical performance for the path at the end of the fiber's life. Green indicates success, yellow indicates success with a marginal failure risk (between 0 and 16 percent), orange indicates that the channel has a higher risk of failure (between 16 and 50 percent), and red indicates failure.
SE	Displays an indicator to identify if a system error or untested configuration prevents the connection from working properly. Green indicates no errors and red indicates failure.
Wavelength	Displays the assigned wavelength of the optical path.
P/F	Displays the present/forecast services indication.
Source	Displays the name of the source site and source interface; for example, Site 1-E.
Destination	Displays the name of the destination site.
Span (km)	Displays the total span length (source -> destination) for this path in kilometers.
Tx Type	Displays the type of transceiver.

Table 2-18   Optical Results Tab Columns (continued)

| Column Label	Description
BER target	Displays the bit error rate (BER) target for this channel based on the capability of the channel's optical interface. It is 1.0E-15 for the interfaces using forward error correction (FEC) and 1.0E-12 for interfaces without FEC.
SOL OSNR (dB)	Displays the start of life average optical signal-to-noise ratio (OSNR) value at the receiver. OSNR refers to the selected resolution bandwidth (RBW) bandwidth.
EOL OSNR (dB)	Displays the end of life average OSNR value at the receiver. OSNR refers to the selected RBW bandwidth.
SOL OSNR Margin (dB)	Displays the SOL OSNR margin calculation, which is the difference between the OSNR value at a certain power of the working point of the receiver client and the working area boundary.
EOL OSNR Margin (dB)	Displays the EOL OSNR margin calculation, , which is the difference between the OSNR value at a certain power of the working point of the receiver client and the working area boundary.
SOL RX (dBm)	Displays the SOL received average power at the destination site in dBm.
EOL RX (dBm)	Displays the EOL received average power at the destination site in dBm.
SOL Power margin (dB)	Displays the SOL power budget margin at the receiver in decibels. It is defined as the offset between the receiver working point and the BER curve with margin. A positive value indicates no power problems.
EOL Power margin (dB)	Displays the EOL power budget margin at the receiver in decibels. It is defined as the offset between the receiver working point and the BER curve with margin. A positive value indicates no power problems.
SOL Overload (dB)	Displays the SOL overload margin at the receiver in decibels. A positive value indicates no overload problems.
EOL Overload (dB)	Displays the EOL overload margin at the receiver in decibels. A positive value indicates no overload problems.
RX atten	Displays the attenuation at the input of the receiver.
PMD (ps)	Displays the calculated total PMD for each circuit. If the overall PMD for the link overcomes the maximum allowed, the PMD value is colored red. The maximum allowed value depends on the client interface. For these special cases, the network must be manually resolved by contacting a Cisco optical sales engineer.
Latency	Displays the latency time for the current circuit.
Chr. Disp. check	Displays the status of the chromatic dispersion check. Green indicates that the dispersion check passed. Red indicates that the dispersion check failed.

Step 6   To close the Optical Results report, click the **X** in the upper right corner of the tab.

2.5.9 Viewing Wavelength Routing

Use the following procedure to view the wavelength routing map for an analyzed network:

Step 1   Click the **Networks Mgmt Tree** tab, and click the analyzed network.

Step 2   In the Tasks Pane, click **Wavelength Routing**. The Wavelength Routing tab appears (Figure 2-32).

Figure 2-32   Wavelength Routing Tab
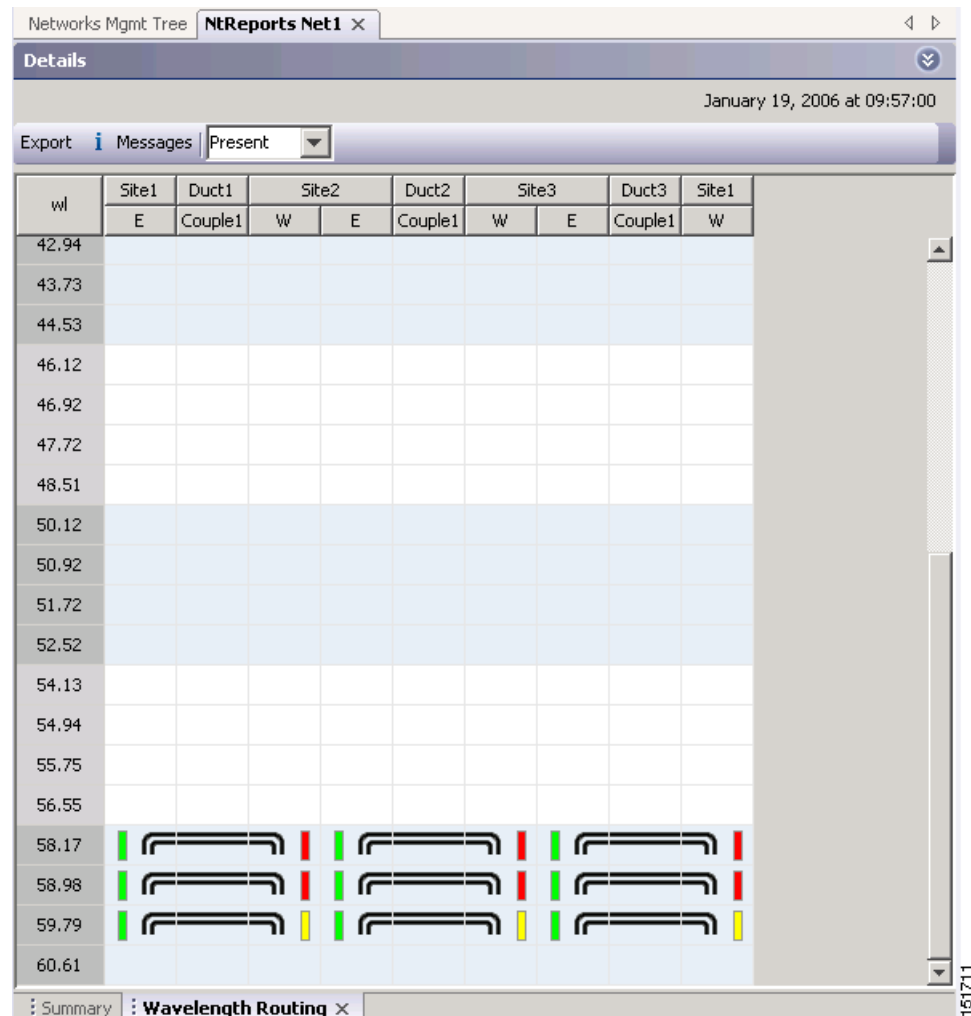
Step 3   Choose one of the following from the drop-down list: **Any** (to view both forecast and present routing), **Present** (to view only the present routing), or **Forecast** (to view only the forecast routing).

Table 2-19 describes the information in the columns.

Table 2-19   Wavelength Routing Tab Columns

Column Label	Description
wl	Lists the wavelengths supported by the platform.
Site #	Represents a site in the network.
Duct #	Represents a duct in the network.
W	Represents the west side of a site.
E	Represents the east side of a site.
Couple	Represents a pair of fibers at a site.

Step 4   To export the graphical representation of the layout in JPEG format, click **Export**. In the Wavelength Routing export dialog box, type the name of the file and navigate to the desired folder. Click **Save**.

Step 5   To close the Wavelength Routing report, click the **X** in the upper right corner of the window.

2.5.10 Viewing Report Differences

You can compare the BoM, Internal Connections, and Installation Parameters reports for two networks. This is useful to see the differences between a baseline network and an Install or Upgrade network.

- The BoM Diff report lists the units that were added and/or removed from the BoM.

- The Internal Connection Diff report lists changed connections. If at least one of the two end points of an internal connection is different, Cisco MetroPlanner reports that the internal connection has changed. The report shows all internal connections that were present in the baseline network but are not present in the final network, and all internal connections not present in the baseline network but present in the final network.

- The Installation Parameters Diff report lists changed parameters between the baseline network and the final network.

Use the following procedure to compare networks:

Step 1   Click the Reports Diff icon. For more information about Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts." The Reports Diff dialog box appears . Figure 2-33 shows the Reports Diff dialog box as it appears when at least two analyzed networks exist in a project.

Figure 2-33   Reports Diff Dialog Box
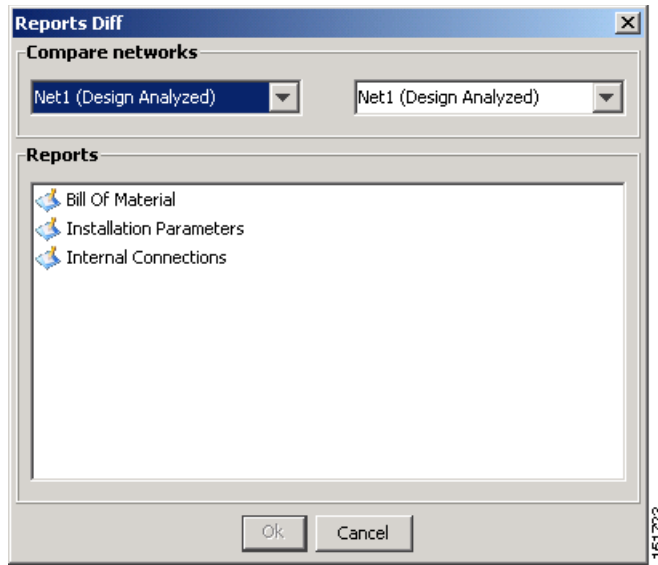
Step 2 In the Compare networks area, choose the baseline network from the drop-down list on the left. Choose the network to compare from the drop-down list on the right.

Step 3 Click the report you would like to view. If you chose one non-analyzed network, you can view only the Bill of Material differences report.

- Bill of Material—(Figure 2-34 on page 2-57) For a description of the columns, see Table 2-20 on page 2-58.

- Installation Parameters—(Figure 2-35 on page 2-59) For a description of the columns, see Table 2-21 on page 2-59.

- Internal Connections—(Figure 2-36 on page 2-60) For a description of the columns, see Table 2-22 on page 2-61.

Step 4 Click **Ok**.

Figure 2-34 shows the BoM Diff report.

Figure 2-34   BOM Diff Report

The upper section of the BoM Diff Report tab displays the following information for each network:

- BoM total discounted—Displays the price for the overall network (without spare parts) for each item in the BoM. If Use global discount is checked, the total includes the discount from the Global discount percentage field.

- Spare total discounted—Displays the price for all of the recommended spare parts in all of the maintenance centers for the overall network. It is the sum of each spare item using the discounted price. The total appears after you check the Spare Part Report check box.

- BoM + Spare total discounted—Displays the sum of the BoM total discounted price and spare total discounted price.

- Price List—Displays the name of the price list database selected for the project.

- Price List last update—Displays the date that the selected price list was last updated.

- Currency—Displays the value of the currency used for each of the price values as specified within the selected price list database.

Table 2-20 describes the information in the BoM Diff report columns. Click a column to sort the table information by that column.

Table 2-20   BoM Diff Report Columns

Column Label	Description
Name	Displays the name of the equipment.
(Diff Summary)	Indicates a difference exists between the two network BoMs: = (equal sign)—Indicates that no difference exists between the two networks. ≢ (crossed-out equal sign)—Indicates that the item is present on both networks, but the number per network is different. 1—Indicates that this item is present in the first network but not in the second network. 2—Indicates that this item is present in the second network but not in the first network.
PID	Displays the ID string of the product.
Quantity	Displays the number of specific products in the BoM. If the networks have a different quantity, Cisco MetroPlanner displays both numbers in red in the following format: *first network Quantity/second network Quantity*.
Unit Price	Displays the price for each unit.
Total Price	Displays the total price of the products before applying the discount. If the networks have a different quantity, Cisco MetroPlanner displays both numbers in red in the following format: *first network Total Price/second network Total Price*.
Discounted Total Price	Displays the total price of the products after applying the discount. If the networks have a different quantity, Cisco MetroPlanner displays both numbers in red in the following format: *first network Discounted Total Price/second network Discounted Total Price*.

Figure 2-35 shows the Installation Parameters Diff report.

Figure 2-35   Installation Parameters Diff Report

Table 2-21 describes the columns on Installation Parameters Diff report. Click a column to sort the table information by that column.

Differences between networks appear in red and in the following format: *baseline network value/final network value*.

Table 2-21   Installation Parameters Diff Report Columns

Category	Description
Name	Displays the name of the site.
(Diff Summary)	Indicates a difference exists between the two network BoMs:
	= (equal sign)—Indicates that no difference exists between the two networks.
	≠ (crossed-out equal sign)—Indicates that the item is present on both networks, but the number per network is different.
	1—Indicates that this item is present in the first network but not in the second network.
	2—Indicates that this item is present in the second network but not in the first network.
Side	Displays the node interface: T (terminal), E (east), or W (west).
Position	Displays the rack, shelf, and slot position of the card from which the patchcord originates.
Unit	Displays the name of the card.
Port #	Displays the port number from which the patchcord originates.
Port ID	Displays the port ID.
Port Label	Displays the name of the port.
Parameter	Displays the name of the parameter to be set, such as RX Power Low.
Value	Displays the name of the value to be set.

Table 2-21   Installation Parameters Diff Report Columns (continued)

Category	Description
Measurement Unit	Displays the measurement unit for the related installation parameter value, such as dBm.
Manual Set	Indicates with a Yes or No which parameters must be manually set using the CTC interface.

Figure 2-25 shows the Internal Connections Diff report.

Figure 2-36   Internal Connections Diff Report

Table 2-22 lists the columns in the Internal Connections Diff report and their descriptions. Click a column to sort the table information by that column.

Differences between networks appear in red and in the following format: *baseline network value/final network value*.

Table 2-22   Internal Connections Tab Columns

Column Name	Description
Name	Displays the name of the site. On the SW provisioning view subtab, this column indicates whether the connection should be manually set using the CTC interface or removed.
(Diff Summary)	Indicates a difference exists between the two network BoMs: = (equal sign)—Indicates that no difference exists between the two networks. ≠ (crossed-out equal sign)—Indicates that the item is present on both networks, but the number per network is different. 1—Indicates that this item is present in the first network but not in the second network. 2—Indicates that this item is present in the second network but not in the first network.
Position	Displays the rack, shelf, and slot position of the card from which the patchcord originates.
Unit	Displays the name of the card.
Port label	Displays the name of the port.
Attenuator	When indicated, this is the product ID of the bulk attenuator to be equipped on this connection. It also reports when an internal attenuator must be placed between the DC-TX and DC-RX ports on the preamplifier (when no DCU is equipped).
Position	Displays the rack, shelf, and slot position of the card where the patchcord terminates.
Unit	Displays the name of the card.
Port Label	Displays the name of the port.
P/F	Displays whether the connection relates to a present (P/F) or forecast (F) circuit.

2.6 Editing a Project

Cisco MetroPlanner allows you to edit the a project either before or after network analysis. Error messages that occur during network analysis often cannot be resolved until you edit one or more network components.

To complete the procedures in this section, you must have a project open and the network(s) loaded. See the "2.1.1 Opening a Project" section on page 2-3 and the "2.1.2 Loading and Unloading Networks" section on page 2-3.

2.6.1 Editing Project Parameters

Use the following procedure to edit project parameters:

Step 1   Click **Project** in the Project Explorer.

Step 2   In the Properties pane, complete the following as needed:

- Customer—Type the name of the customer (128 character maximum) requiring this network design.

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

- Units—Choose the span measurement unit: **Km** (kilometers) or **Miles**.

- Price List—Choose the price database from the drop-down list.

- Layout—Choose **ANSI** (the North American standard) or **ETSI** (the international standard) from the drop-down list to indicate the platform type. ANSI networks will not allow you to define SDH (ETSI) service demands. ETSI networks will not allow you to define SONET (ANSI) service demands.

2.6.2 Editing Network Parameters

Use the following procedure to edit network parameters:

Step 1   Click a network in the Project Explorer or Networks Mgmt Tree.

Step 2   In the Properties pane, complete the following as needed:

- Name—Type the network name (128 character maximum).

- Position—Type the object location in pixels.

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

- Status—Displays the state of the network (Design, Design-Analyzed, Install, etc.).

- Use Bundles—Check to use the Multishelf Management Integrated Kit bundle when generating the BoM instead of the single items.

- Use Maintenance Center—Check to determine the spare parts required by the network. If the network is in the Upgrade state, the parts required to support the implemented services and the newly added present services are included. To generate a spare parts report, you must associate the sites in a network with a maintenance center before network analysis.

- Use Global Discount—Check to use the global discount for the entire network. The global discount is applied to all components in the BoM.

- Global Discount—Enter a new global discount in the form of a percentage.

- Include SW Licenses—Check to include software licenses in the BoM.

- Include Paper Documentation—Check to include paper documentation in the BoM.

- Include CD Documentation—Check to include CD documentation in the BoM.

- Hide Bom/price discount—Check to hide the global discount in the Unit Price column of the BoM.

- Dimension—Type the network size in pixels.

- Background color—Click to choose a color for the network background.

- Background image—Displays the JPEG or GIF filename used as a background, if any. To choose a JPEG or GIF file as a background graphic for the network, click the down arrow and navigate to the desired directory.

2.6.3 Editing Site Parameters

Editing the site parameters allows you to make changes to the current site configuration. A site folder in the Project Explorer displays the interface node information. Figure 2-37 shows a site in the Project Explorer before network analysis.

Figure 2-37   Site in the Project Explorer
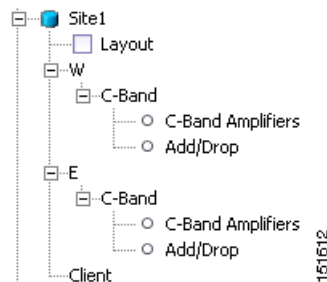
A site folder for an analyzed network design also contains the following items, many of which you can edit:

- E, W, T—For a Line or Line+ site, two interface nodes appear in the Project Explorer under the Site folder, labeled W (West) and E (East). For a Terminal or Terminal+ site, only one interface node (T) appears.
- C-Band or L-Band—Displays the supported band for the side (E, W, or T interface).
- Amplifiers—Lists the amplifiers and all related cards for each band and for each side (E, W, or T interface).
- Add/Drop—Displays all of the add/drop and related cards for the band and side (E, W, or T interface).
- Site Type Parameters—When selected, shows the site functionality and type in the Properties pane.
- Band Parameters—When selected, shows the output power in the Properties pane.
- Client—Lists the client cards.

Use the following procedure to edit site parameters:

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   Click the desired Site folder. The site parameters appear in the Properties pane.

Step 3   Complete the following to modify the site parameters in the Properties pane, as needed:

- Label—(Display only) Displays the site label, such as Site 1.
- Name—Enter the desired site name.
- Position—Enter the desired site pixel position; for example, an entry of 0,0 positions the Site icon in the upper left corner of the NtView Net# tab.

- Topology—Choose the topology type from the drop-down list:

    – Line—Two pairs of fibers are terminated at the node.

    – Terminal—A single pair of fibers is terminated at the node.

    – Line+—Two pairs of fibers are terminated at the node but the number of fibers can be increased if an MMU card (topology upgrade) is installed.

    – Terminal+—A single pair of fibers is terminated at the node but the number of fibers can be increased in if an MMU card (topology upgrade) is installed.

- Maintenance Center—Choose the name of the maintenance center from the drop-down list. To create a maintenance center, see the "2.6.5 Creating a Maintenance Center" section on page 2-67.

- IP Address—Type the IP address of the node.

- Shelf Config—Choose the shelf configuration type from the drop-down list:

    – Multi Shelf Integrated Switch—A multishelf node configuration using an Ethernet Adapter Panel (EAP).

    – Multi Shelf External Switch—A multishelf node configuration using a Cisco Catalyst 2950.

    – Individual Shelf—A node in single-shelf mode.

- Node Protection—Choose the node protection type from the drop-down list: Same Shelf or Separated Shelves.

- DCC Chain—When checked, indicates that a TXP(P)_MR_2.5G card is in Slot 12 on each shelf at each site.

- Osmine Layout Compliance—When checked, indicates that all the nodes in the network design have transponder and line cards compliant with OSMINE.

- Hybrid Layout—When checked, indicates that all the nodes are configured as hybrid MSTP/MSPP nodes.

- Max Shelf Num—Choose the maximum number (from 1 to 4) of ANSI or ETSI shelves (that equip optical cards or transponder/muxponder [TXP/MXP] cards) that can be placed in each rack in the site when generating the site layout.

- Functionality—Choose the site functionality from the drop-down list. Table 2-23 summarizes the site design rules. The site icon changes depending on the functionality. For a description of the site icons, see Appendix A, "GUI Information and Shortcuts."

    – Auto—Allows the highest degree of flexibility in creating the network. Cisco MetroPlanner generates a design for the site with the lowest possible cost given the other constraints.

    – Pass Through—Indicates that no equipment will be located at this site.

    – Line amplifier—Prevents any add/drop traffic at this site.

    – OSC site—Indicates that site is designated for network communication, providing the possibility to access the optical service channel (OSC) for management of the MSTP network. By default, no amplifiers are included in this site. However, if Cisco MetroPlanner determines that an amplifier is required in the network, it can automatically place it at this location. Cisco MetroPlanner allows you to set (force) preamplifier and booster amplifiers for each direction on a OSC Site node.

    – Add/Drop—Indicates that this site has add/drop capability. Only point-to-point and P-ring circuits can be added/dropped at this site.

    – Hub—Indicates that this site is equipped with filters for adding and dropping all the channels (on both West and East sides). All express paths are open in hub configurations.

- **Gain equalizer**—Indicates that this site uses WSS cards to control the generated tilt and extend unregenerated distances. The site is realized as an ROADM site without demultiplexer cards.

- **R-OADM**—Indicates that this site supports Any-to-Any and also Fixed (point-to-point and P-ring) traffic types.

- **Type**—Choose the site type from the drop-down list (see Table 2-23):

  - **Auto**—Allows the highest degree of flexibility in creating the network. Cisco MetroPlanner generates a design for the site with the lowest possible cost given the other set of constraints.

  - **Glass Through**—Indicates a low-priority amplification site.

  - **Line**—Indicates a high-priority amplification site.

  - **OADM**—Indicates that it is a site with add/drop channels using discrete channel filters (1, 2, 4-ch 1, 4-band).

  - **WSS**—Indicates that it is a site equipped with 32DMX or 32DMX-O.

  - **Mux/Demux**—Indicates that this is a full multiplexer/demultiplexer (FMD) site that adds and drops all 32MUX-O and 32DMX-O channels on both sides.

- **Anti ASE**—Choose **Yes** to configure the site so that all the express channels on the site are optically dropped and reinserted. In addition, all the patchcords between the West and East sections are removed. Choose **Auto** to allow Cisco MetroPlanner to decide if the site should be configured as anti-amplified spontaneous emissions (Anti-ASE). See Table 2-23 for a summary of the site design rules.

Table 2-23   Site Design Rules

Topology	Functionality	Type	Card Options	C-Band 32/16 Ch. 100 GHz	C-Band 8 Ch. 100 GHz	C-Band 64 Ch. 50 GHz	L-Band 32 Ch. 100 GHz
Line	Pass Through	—	—	Yes	Yes	Yes	Yes
	Line amplifier	Line amplifier	In line at 1	Yes	Yes	Yes	Yes
		Glass Through	—	Yes	Yes	Yes	Yes
	OSC Site	—	—	Yes	Yes	Yes	Yes
	Add/Drop	OADM (Anti-ASE)	OADM cards	Yes	Yes	No	No
		Mux/Demux	—	Yes	Yes	No	No
	Hub	Mux/Demux	—	Yes	Yes	No	No
		WSS	32DMX-O	Yes	Yes	Yes	No
		WSS	32DMX	Yes	Yes	Yes	Yes
	Gain equalizer	WSS	32DMX	Yes	No	Yes	Yes
	ROADM	WSS	32DMX-O	Yes	No	Yes	No
		WSS	32DMX	Yes	No	Yes	Yes
Line+	ROADM	WSS	32DMX-O	Yes	No	No	No
		WSS	32DMX	Yes	No	No	Yes
	Hub	WSS	32DMX-O	Yes	No	No	No
		WSS	32DMX	Yes	No	No	Yes

Table 2-23   Site Design Rules (continued)

Topology	Functionality	Type	Card Options	C-Band 32/16 Ch. 100 GHz	C-Band 8 Ch. 100 GHz	C-Band 64 Ch. 50 GHz	L-Band 32 Ch. 100 GHz
Terminal	Add/Drop	OADM-xc (Anti-ASE)	OADM cards	Yes	Yes	No	No
		Mux/Demux	—	Yes	Yes	No	No
	ROADM	WSS	32DMX-O	Yes	Yes	Yes	No
			32DMX	Yes	Yes	Yes	Yes
Terminal+	ROADM	WSS	32DMX-O	Yes	No	No	No
			32DMX	Yes	No	No	Yes

Step 4   To modify the band parameters, click **C-Band** or **L-Band** in the Project Explorer for the desired site interface. In the Properties pane, enter the desired Output power.

Step 5   To modify amplifier parameters, click **C-Band Amplifiers** or **L-Band Amplifiers** in the Project Explorer for the desired site interface.

    a.   In the Properties pane From Fibre area, complete the following as needed:

- PRE—Choose the desired preamplifier from the drop-down list (**None**, **Auto**, or **OPT-PRE**).
- DCU 1/2—Choose the desired DCU from the drop-down lists.
- Attenuator—Choose the desired attenuator from the drop-down list.
- Output power—Enter the desired output power.
- Tilt—Enter the desired tilt value.

    b.   In the Properties pane To Fibre area, complete the following as needed:

- BST—Choose the desired booster from the drop-down list (**None**, **Auto**, **OPT-BST**, or **OPT-BST-E**).
- Output power—Enter the desired output power.
- Tilt—Enter the desired tilt value.

    c.   In the Properties pane General area, choose the OSC from the drop-down list (**OSC-CSM** or **OSCM**).

Step 6   To modify OADM parameters, click **Add/Drop** in the Project Explorer for the desired site interface. In the Properties pane, complete the following as needed:

- In the Line/OADM area, choose the desired attenuator from the drop-down list.
- In the Mux/Demux WSS area, complete the following as needed:
  - Patch Panel—Choose the patch panel from this drop-down list.
  - Demux—Choose the demultiplexer from this drop-down list.
  - Mux—Choose the multiplexer from this drop-down list.

2.6.4 Deleting a Site

Use the following procedure to delete an existing site from the network design:

Step 1   Delete any traffic demands used by the site. See the "2.6.9 Deleting a Traffic Demand" section on page 2-71.

Step 2   Right-click the site in the NtView Net# tab and choose **Delete** from the shortcut menu. As an alternative, you can click **Delete** in the Tasks Pane. A confirmation message appears, asking you to confirm the deletion of the site.

Step 3   Click **Yes** to delete the site.

2.6.5 Creating a Maintenance Center

Use the following procedure to add maintenance centers that will supply your network with spare parts in the event of a failure. This feature helps your customer determine the quantity of spares that should be purchased, depending on the number of maintenance centers and their availability. Maintenance centers appear in the Maintenance Center folder under a site in the Project Explorer.

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   Scroll down the Project Explorer, right-click the **Maintenance Center** folder, and choose **New Maintenance Center** from the shortcut menu.

Step 3   Highlight the new maintenance center in the Project Explorer.

Step 4   In the Properties pane, complete the following as needed:

- Availability percentage—Choose the percentage that represents the required confidence level for finding needed spare parts in the maintenance center: **50**, **75**, **95**, or **99** percent.
- Mean repair time—Enter the time (including transportation) required to restock the part in the maintenance center.

Step 5   To associate a maintenance center with a site, see the "2.6.3 Editing Site Parameters" section on page 2-63.

2.6.6 Editing a Point-to-Point Demand

Use the following procedure to edit a point-to-point demand:

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   In the Project Explorer, right-click the point-to-point demand and choose **Edit** from the shortcut menu. The Edit Point to Point Demand dialog box appears (Figure 2-38).

Figure 2-38   Edit Point to Point Demand Dialog Box
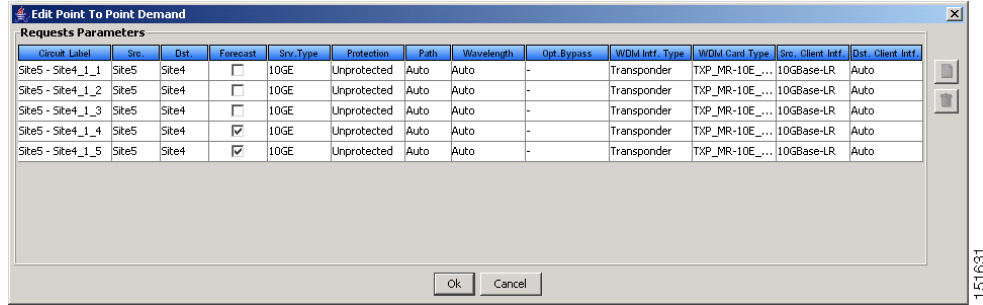
Step 3   To modify the information for each channel, complete the following as needed:

- Forecast—Check to change a present channel to a forecast channels.

- Srv. Type—Choose the desired service type from the drop-down list. Changing the service type for one channel automatically changes the service type for all channels.

- Protection—Choose the desired protection type from the drop-down list. Changing the protection type for one channel automatically changes the protection for all channels.

- Path—Choose **W** (west-to-east) or **E** (east-to-west) from the drop-down list.

- Wavelength—Choose the desired wavelength type from the drop-down list. If you choose Auto, Cisco MetroPlanner assigns wavelength to the channels with the lowest possible cost given the other constraints.

- Optical Bypass—Choose the site for optical bypass from the drop-down menu.

- WDM Intf. Type—Choose the desired card interface type from the drop-down list.

- WDM Card Type—Choose the desired card type from the drop-down list. The available options depend on the card interface type that is selected. Changing the card type for one channel automatically changes the card type for all channels.

- Src. Client Intf.—Choose the desired source client interface from the drop-down list. The available options depend on the card type that is selected.

- Dst. Client Intf.—Choose the desired destination client interface from the drop-down list. The available options depend on the card type that is selected.

Step 4   To add a new channel, click the Create a new circuit icon on the right of the Edit Point to Point Demand dialog box. A new row appears. Repeat Step 3 as needed to complete the parameters for the new channel.

Step 5   To delete an existing channel, select the row and click the Remove the selected circuit icon on the right of the Edit Point to Point Demand dialog box.

Step 6   Click **Ok** to save the changes to the channels and close the Edit Point to Point Demand dialog box, or **Cancel** to close the dialog box without saving the changes.

2.6.7 Editing a P-Ring Demand

Use the following procedure to change the distribution of services in a P-ring service demand:

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   In the Project Explorer, right-click the P-ring demand and choose **Edit** from the shortcut menu. The Edit P-Ring Demand dialog box appears (Figure 2-39).

Figure 2-39   Edit P-Ring Demand Dialog Box
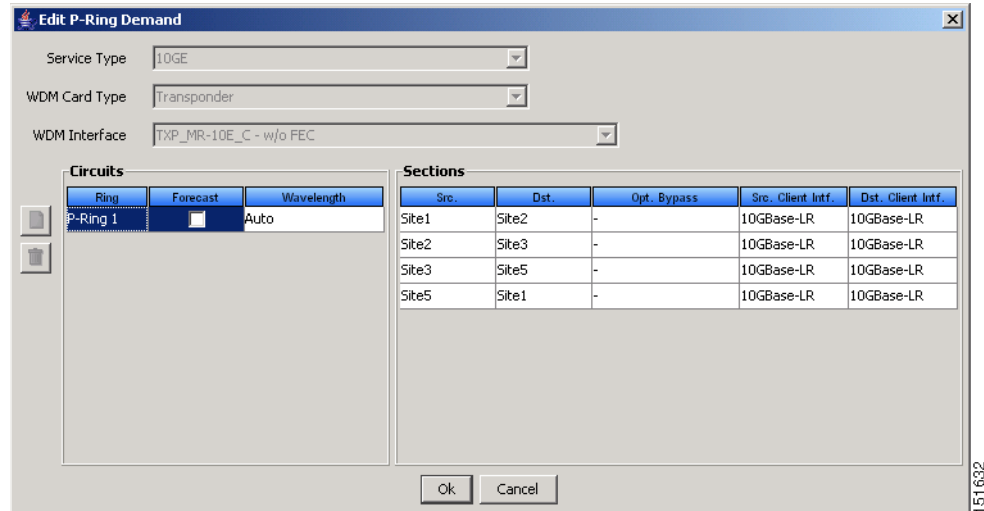
Step 3   Complete the following as needed in the Edit P-Ring Demand dialog box to modify the P-ring:

- Service Type—Choose the desired service type from the drop-down list.
- WDM Card Type—Choose the desired card type from the drop-down list. The available options depend on the service type selected.
- WDM Interface—Choose the desired card interface type from the drop-down list. The available options depend on the card type selected.

In the Circuits area of the Edit P-Ring Demand dialog box, complete the following as needed:

- Ring—(Display only) Displays the name of the P-ring.
- Forecast—Check to change the present channels to forecast channels.
- Wavelength—Choose the desired wavelength type from the drop-down list. If you choose Auto, Cisco MetroPlanner assigns wavelengths to the channels with the lowest possible cost given the other constraints.

In the Sections area of the Edit P-Ring Demand dialog box, complete the following as needed:

- Src—(Display only) Displays the source site name for a section.
- Dst—(Display only) Displays the destination site name for a section.
- Opt. Bypass—Choose the sites from the drop-down list where the channels for the current demand will be optically dropped. Only the sites between the source and destination sites along the path of this section are available as options.
- Src. Client Intf.—Choose the desired source client interface from the drop-down list. The available options depend on the card type selected.
- Dst. Client Intf.—Choose the desired destination client interface from the drop-down list. The available options depend on the card type selected.

Step 4   To add a new P-ring channel, click the Create a new P-Ring circuit icon on the left of the Edit Point to Point Demand dialog box. A new row appears. Repeat Step 3 as needed to complete the parameters for the new P-Ring.

Step 5 To delete an existing channel from the P-ring, select the row and click the Remove the selected P-Ring circuit icon on the left of the Edit P-Ring Demand dialog box.

Step 6 Click **Ok** to save the changes to the channels and close the Edit P-Ring Demand dialog box, or **Cancel** to close the dialog box without saving the changes.

2.6.8 Editing a ROADM Demand

Use the following procedure to change the distribution of services in a ROADM service demand:

Step 1 In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2 Right-click the ROADM traffic group and choose **Edit** from the shortcut menu. The Edit ROADM Demand dialog box appears (Figure 2-40).

Figure 2-40   Edit ROADM Demand Dialog Box

Step 3 Select a traffic pattern type (**Hub** or **Meshed**) from the drop-down list. If you select Hub, the First Site drop-down button becomes available. If you selected Meshed, go to Step 5.

Step 4 For Hub traffic types, select the originating site from the First Site drop-down list.

Step 5 Select a connectivity type from the Connectivity type drop-down list. The choices are **Protected**, **Unprotected Minimum Hop**, **Unprotected Optimum Path**, and **Unprotected Subnet**. Refer to the "1.5.3 ROADM Traffic Groups" section on page 1-9 for more information about the connectivity type choices.

Step 6 In the Service types pane, check the boxes for one or more client service types for the ROADM demand. The client interfaces that support each service type appear in the right pane.

Step 7 To further refine the client interfaces, complete the following options for each row in the right pane. Check boxes in gray are not available for the client interface selection.

- Yes/No—Check to select this card to implement the service type.
- Client Interface—Displays the card type for the selected service type.

- Y Protected—Check to select Y-cable protection if the connectivity type is Protected.
- 1+1 Protected—Check to select 1+1 protection if the connectivity type is Protected.
- Fiber Switched—Check to select fiber-switching protection if the connectivity type is Protected.
- Supported Service—Displays the service types supported for the card.

You can select more than one client interface to support the same service type. By default, Cisco MetroPlanner checks the best client interface to support each service.

Step 8   Click **Ok** to save the changes to the demand.

2.6.9 Deleting a Traffic Demand

A traffic demand must be in the Unlocked state before you can delete it. Use the following procedure to delete a traffic demand:

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   Verify that the demand is in the Unlocked state. For more information, see the "2.7.4 Unlocking Parameters in the Network Design" section on page 2-80.

Step 3   Right-click the demand that you want to delete in the Project Explorer and choose **Delete** from the shortcut menu. As an alternative, you can click **Delete** in the Tasks Pane.

2.6.10 Editing Fiber Span Parameters

Using the Properties pane, you can manage a fiber span, a fiber pair, and individual fibers. A fiber pair consists of two different fibers (clockwise and counter-clockwise). Table 2-24 lists the properties that you can modify for a fiber span, pair, or fiber.

Table 2-24   Editable Fiber Properties

Property	Fiber Span	Fiber Pair	Fiber
Name	Yes	Yes	No
Ageing loss	Yes	No	No
Ageing factor	Yes	No	No
Fiber type	Yes	Yes	No
Fiber length	Yes	Yes	Yes
Length-based loss	Yes	Yes	Yes
Connector loss (per site)	Yes	Yes	Yes
Absolute loss without connectors	Yes	Yes	No
CD factor	Yes	Yes	No
PMD factor	Yes	Yes	No
Loss	Yes	Yes	Yes

Use the following procedure to edit fiber span parameters:

Step 1   In the Project Explorer, right-click the **Fibers** folder and choose **Expand** from the shortcut menu.

Step 2   In the Project Explorer tree, click one of the following. The options available for editing in the Properties pane change depending on your selection.

- To edit a fiber span, click the duct identifier.
- To edit a fiber pair, click the fiber pair identifier.
- To edit an individual fiber, click the fiber identifier.

Step 3   In the Properties pane, edit the following parameters, as necessary. See Table 2-24 for the properties that you can change for a fiber span, fiber pair, or individual fiber.

- Name—Type the desired name for the fiber span, pair, or fiber.
- Ageing loss—Type 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). If you set the ageing factor, you do not need to set the ageing loss.
- Ageing factor—Type the number to factor fiber aging. This factor is multiplied by the SOL total span loss without connectors. If you set the ageing loss, you do not need to set the ageing factor.
- Type—Choose the type of fiber for each span in the network: **G652-SMF**, **E-LEAF**, or **True Wave**.
- Length—Type the span length. The displayed unit of measure is retrieved from the Span Measurements Units field.
- Length Based Loss—Check to define if the fiber loss is specified as an absolute value or leave unchecked if fiber loss is derived from the span length.
- Connector loss [Site 1]—Type the concentrated connector loss at the end of the span.
- Connector loss [Site 2]—Type the concentrated connector loss at the end of the span.
- Abs loss w/o conn [dB]—Type the start of life link fiber loss for each span, without the connector concentrated loss. The total SOL loss without connectors is equal to the loss factor multiplied by the length. In the Length Based model, this value is calculated automatically.
- CD—Type the fiber CD factor. The default value is dependent on the selected fiber type. Any value that you enter is lost whenever you change the fiber type. Chromatic dispersion is always entered in ps/nm/km. Fiber chromatic dispersion is defined for the middle of the wavelength band. C band is defined at 1545.3 nm; L band is defined at 1590.4 nm.
- PMD—Type the PMD factor. The default value is dependent on the selected fiber type. Any value that you enter is lost whenever you change the fiber type. PMD is always entered in ps/nm/km.
- Loss—Type 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 4   As needed, view the following totals for a fiber span, fiber pair, or individual fiber on the Properties pane:

- Loss BOL—(Display only) Displays the total loss beginning of life (BOL) calculation.

> **Note**   BOL is also referred to as SOL.

- Loss EOL—(Display only) Displays the total loss EOL calculation.
- CD—(Display only) Displays the total chromatic dispersion.

   • PMD—(Display only) Displays the total polarization mode dispersion.

2.6.11 Deleting a Fiber Span

Use the following procedure to delete a fiber span from the network design:

Step 1   In the Project Explorer, right-click the network folder and choose **Expand** from the shortcut menu.

Step 2   In the Project Explorer, right-click the duct that you want to delete and choose **Delete** from the shortcut menu. As an alternative, you can click **Delete** in the Tasks Pane.

Step 3   Click **Yes** to confirm the fiber deletion.

2.6.12 Arranging Sites

Sites can be arranged into four different configurations. Use the following procedure to arrange the sites into a configuration or to move all of the sites so that they appear in the Cisco MetroPlanner window:

Step 1   Click the **NtView Net#** tab.

Step 2   Click the Arrange Sites drop-down list, and choose one of the following:

   • Fit to visible rectangle view—Zooms to display all sites in the NtView Net# tab.

   • Arrange to an ellipse—Rearranges all sites in an ellipse form (Figure 2-41).

Figure 2-41   Ellipse Shape
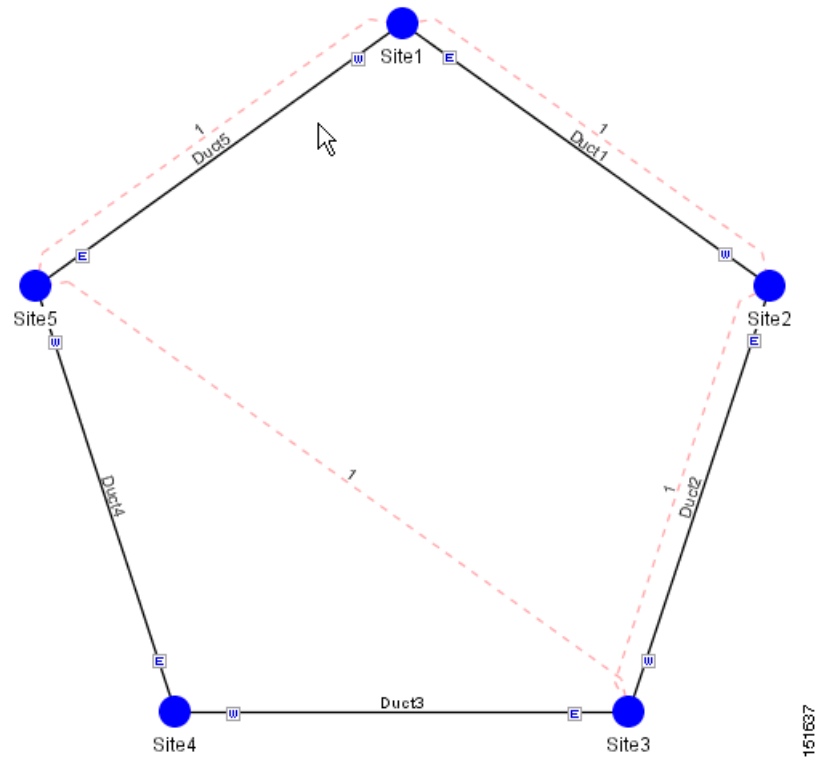
- Arrange to a square—Rearranges all sites in a square form so that the sites appear clockwise around the square (Figure 2-42). To complete a full square, this arrangement requires at least four sites.

Figure 2-42   Square Shape
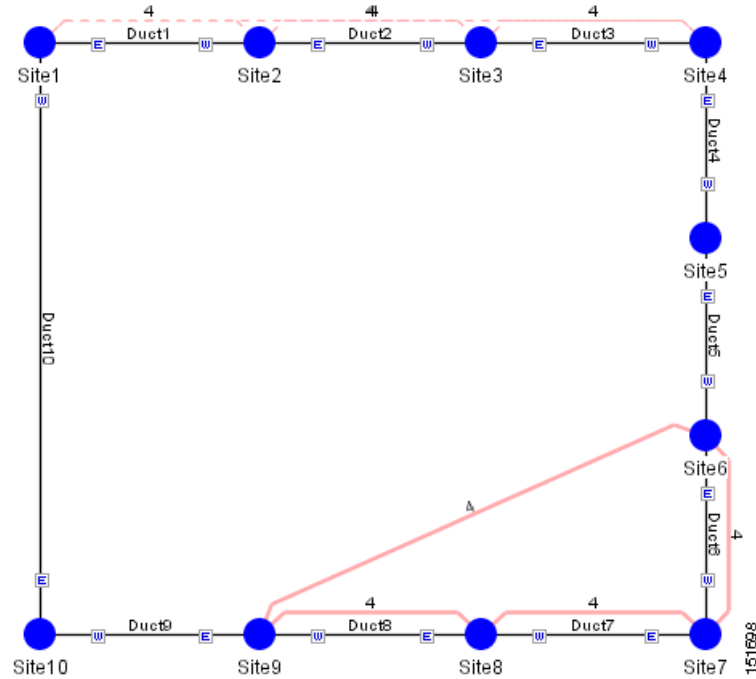
- Arrange to a snake—Rearranges all sites so that they cross the NtVw Net# tab from right to left and then left to right in a serpentine, linear format (Figure 2-43).

Figure 2-43   Snake Shape
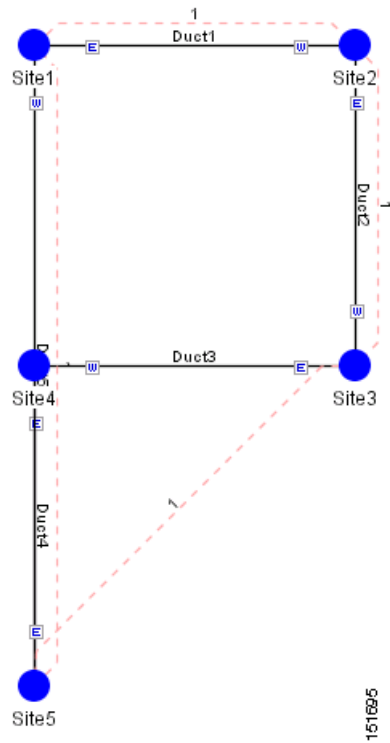
- Arrange to a double ring—Rearranges the sites into a dual ring format (Figure 2-44).

Figure 2-44   Double Ring Shape
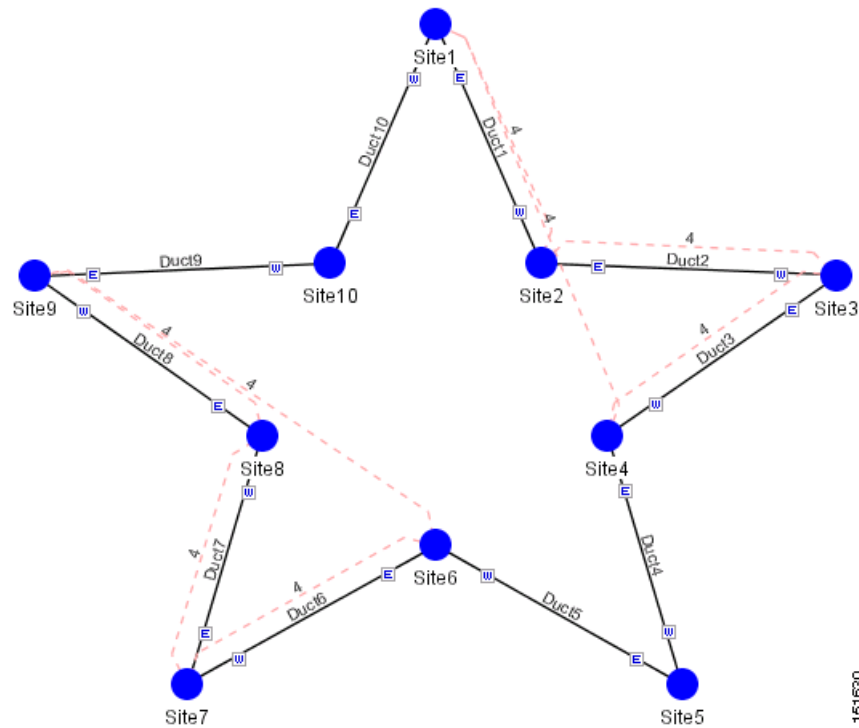
2.7 Managing the Network Design

After creating and analyzing a network design, you must prepare the design for installation at a customer site. After a network has been installed, you can reanalyze to correct any problems.

Network designs have several possible states:

- Design—The initial state for any new network design. You can add, delete, or change any aspect of the network design. In the Design state, no locks exist. After analyzing a design, you can put it back into the Design state to modify it by choosing Design in the Tasks Pane.

- Design-Analyzed—The state of the network design after you run the network analyzer. All reports are available and updated. You cannot change any aspect of the network design. You can modify the BoM, such as changing global discounts and spare parts. You can return to the Design state after analyzing the network by choosing Design in the Tasks Pane.

- Copy—A copy of a network. You can create a copy of a network in any state. A copy is useful for testing different design options. You can copy a network before or after analyzing it. A copied network inherits the set of project options defined in the original network. For more information, see the .

- Install—A network is initially designed with theoretical fiber values (such as loss, length, etc.). When a network is installed in the field, you can move the network into the Install state so that you can enter and check the real fiber parameter values. You can create an Install network from a network in the Design-Analyzed or Upgrade-Analyzed state. A network in the Install state inherits the set of project options defined in the analyzed network. All sites in an Install network are locked. You

cannot modify any aspect of the network design except the span parameters and (on unlocked sites) amplifiers. You can, however, modify the BoM. All routed circuits are fixed, and cannot be changed while in this state. For more information, see the "2.7.2 Creating a Network in the Install State" section on page 2-78.

- Install-Analyzed—The state of the Install network design after you run the network analyzer. All reports are available and updated. Cisco MetroPlanner locks all sites, spans, demands, and equipment when a network is in the Install-Analyzed state.

- Upgrade—During network design, you define a number of the channels to be implemented at the present time and a number of channels to be implemented in the future (forecast). After installing the network, you might decide to implement the forecast circuits. To do this, you create an Upgrade network and then select the forecast or traffic demand services that you want to implement. You can create an Upgrade network from a network in the Design-Analyzed or Install-Analyzed state. You can unlock specified parameters to alter the design to include forecasted channels and traffic demands. A network in the Upgrade state inherits the set of project options defined in the analyzed network. For more information, see the "2.7.3 Creating an Upgrade Network" section on page 2-79.

- Upgrade-Analyzed—The state of the Upgrade network design after you run the network analyzer. All reports are available and updated. Cisco MetroPlanner locks all sites, spans, demands, and equipment when a network is in the Upgrade state.

To complete the procedures in this section, you must have a project open and the network(s) loaded. See the "2.1.1 Opening a Project" section on page 2-3 and the "2.1.2 Loading and Unloading Networks" section on page 2-3.

2.7.1 Creating a Copy of the Network

To create a copy of a network in any state, right-click the network and choose **Copy** from the shortcut menu. A new copy appears in the Network Mgmt Tree tab.

2.7.2 Creating a Network in the Install State

Use the following procedure to create a network in the Install state:

Step 1   If the network is not analyzed, complete the "2.4 Analyzing the Network" section on page 2-36.

Step 2   Click the **Networks Mgmt Tree** tab.

Step 3   Right-click the network and choose **Install** from the shortcut menu. A new network appears in the Networks Mgmt Tree in the Install state. All results from the analyzed network are imported into the Install network and are placed in the Locked mode.

Step 4   Make the necessary changes to the Install network. You can edit the following fiber parameters: fiber loss value, fiber CD, fiber PMD, and fiber length. See the "2.6.10 Editing Fiber Span Parameters" section on page 2-71. Cisco MetroPlanner also allows you to unlock site parameters for modification. To change site parameters, see the "2.6.3 Editing Site Parameters" section on page 2-63.

Step 5   In the Networks Mgmt Tree view, click the **Analyze Network** icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts." The MetroPlanner Analyzer status window appears to indicate the progress. As an alternative, click **Analyze** in the Tasks Pane. The Cisco MetroPlanner analysis status bar indicates when the network analysis is complete. The network now appears in the Install-Analyzed state.

> **Note**   If you have changed parameters that are inconsistent with the present network layout (for example, if you set an output tilt value that the amplifier cannot reach), during network analysis an error message on the Analyzer Messages pane identifies which parameter is causing the problem.

Step 6   When you have analyzed the network and are satisfied with the results, import the new generated installation parameters to each site of the network. For more information, see the "2.5.2 Saving the NE Update File" section on page 2-39.

2.7.3 Creating an Upgrade Network

In an Upgrade network, you can perform the following tasks:

- Modify the fiber span properties (such as length, dispersion, PMD coefficient, excess losses, and aging).
- Add or delete traffic.
- Convert forecasted traffic to present traffic.
- Convert ROADM traffic to present traffic.
- Modify the type of a node.
- Force the presence or the absence of a card or a module (this includes amplifiers, OSC modules, OADM cards, and DCU modules).

In an Upgrade network, you can force certain installation parameters:

- Amplifier per-channel output power setpoint
- Amplifier output tilt setpoint
- OADM card aggregate output power setpoint
- Full multiplexer/demultiplexer or ROADM output power setpoint

You cannot change the following parameters when in Upgrade state:

- Node input channel fail threshold
- Node OSC channel fail threshold
- Preamplifier input power threshold
- OADM card aggregate input power setpoint
- Full muxponder/demuxponder or ROADM input power setpoint
- Channels drop power

Use the following procedure to put a network in the Upgrade state:

Step 1   If the network is not analyzed, complete the "2.4 Analyzing the Network" section on page 2-36.

Step 2   Click the **Networks Mgmt Tree** tab.

Step 3   Right-click the analyzed network and choose **Upgrade** from the shortcut menu. A new Upgrade network appears in the Networks Mgmt Tree tab. All results from the analyzed network are imported into the Upgrade network.

Step 4 Make the necessary changes to the Upgrade network. For more information, see the "2.6.10 Editing Fiber Span Parameters" section on page 2-71 and the "2.6.3 Editing Site Parameters" section on page 2-63.

Step 5 In the Networks Mgmt Tree view, click the **Analyze Network** icon in the toolbar. For more information about the Cisco MetroPlanner icons, see Appendix A, "GUI Information and Shortcuts." The MetroPlanner Analyzer status window appears to indicate the progress. As an alternative, click **Analyze** in the Tasks Pane in any view. The Cisco MetroPlanner analysis status bar indicates when the network analysis is complete. The network now appears in the Upgrade-Analyzed state.

> **Note** If you have changed parameters that are inconsistent with the present network layout (for example, if you set an output tilt value that the amplifier cannot reach), during network analysis an error message on the Analyzer Messages pane identifies which parameter is causing the problem.

2.7.4 Unlocking Parameters in the Network Design

The Locked state occurs when you did not set (force) any value for a parameter and instead chose Auto. During network analysis, Cisco MetroPlanner assigns a value for each parameter set with Auto and puts them in the Locked state. The Locked state indicates that the next time the network is analyzed, the analyzer cannot change the value. Locking a site forces the presence or absence of all preamplifiers, boosters, add/drop filters, and DCU cards required by the site/network as a result of running the analyzer previously. Locked elements are indicated by a closed padlock icon in the Project Explorer (Figure 2-45).

Figure 2-45   Locked Sites in the Project Explorer View

To unlock network components to edit parameters, right-click the desired element in the Project Explorer and choose **Unlock** from the shortcut menu.

2.8 Generating a BoM

You can generate a BoM when a network is in the Install or Upgrade state, or after you have successfully analyzed your network design. The price database selected during project creation is used to generate the BoM.

To complete the procedures in this section, you must have a project open and the network(s) loaded. See the "2.1.1 Opening a Project" section on page 2-3 and the "2.1.2 Loading and Unloading Networks" section on page 2-3.

2.8.1 Viewing BoM Report Totals

Use the following procedure to view the BoM report totals:

Step 1   Click the **Networks Mgmt Tree** tab and click the network.

Step 2   In the Tasks Pane, click **Bill of Material**. The Bill of Material tab appears.

The upper section of the BoM tab (in the Net view, Site view, and Spare subtabs) displays the following information:

- BoM total discounted—Displays the price for the overall network (without spare parts) for each item in the BoM. If Use global discount is checked, the total includes the discount from the Global discount percentage field.

- Spare total discounted—Displays the price for all of the recommended spare parts in all of the maintenance centers for the overall network. It is the sum of each spare item using the discounted price. The total appears after you check the Spare Part Report check box.

- BoM + Spare total discounted—Displays the sum of the BoM total discounted price and spare total discounted price.

- Price List—Displays the name of the price list database selected for the project.

- Price List last update—Displays the date that the selected price list was last updated.

- Currency—Displays the value of the currency used for each of the price values as specified within the selected price list database.

Step 3   To use the Multishelf Management Integrated Kit bundle when generating the BoM instead of the single items, check **Use bundle**.

Step 4   Check **Spare Part Report** to include the spare parts in the report totals.

Step 5   The Global discount percentage field shows the percentage from the Global Discount Percentage option in the Default Project Options window. To change the global discount for the entire network, check **Use global discount** and enter a new global discount in the form of a percentage in the **Global discount percentage** field. The global discount is applied to all components in the BoM.

2.8.2 Generating a Network BoM

Use the following procedure to generate a BoM for the network:

Step 1   Click the **Networks Mgmt Tree** tab and click the network.

Step 2   In the Tasks Pane, click **Bill of Material**. The Bill of Material tab (Figure 2-46) appears. The Net View subtab is selected by default. Items that do not appear in the price list appear in red.

Figure 2-46   Bill of Material Tab, Net View Subtab

Table 2-25 describes the Net view subtab columns. See the "2.8.1 Viewing BoM Report Totals" section on page 2-81 for for a description of the data, check boxes, and fields at the top of the window.

Table 2-25   BoM Net View Columns

Column Label	Description
Product ID	Displays the ID string of the product.
Description	Displays a description of the product.
Quantity	Displays the number of specific products in the BoM.
Unit price	Displays the price for each unit. If the price does not appear, one of the following will: • Invalid—Appears when the price list reports "NaN" (Not a Number) for the item. This occurs when a price list has never been updated. Invalid items appear in the list in orange. • Not Found in Price List—Appears when the price list does not contain any entry with the PID. These items appear in the list in red.
Unit Discount	Displays the per-unit discount amount that you assigned in the Global Discount Percentage field. If you leave the field blank, the discount amount is zero.
Total price	Displays the total price of the products before applying the discount.
Discounted Total Price	Displays the total price of the products after applying the discount.
Site #	Displays the number of products to be assigned to a particular site. The number of Site columns is the same as the number of sites in the network.

Step 3   To close the Bill of Material report, click the **X** in the upper right corner of the Bill of Material tab.

2.8.3 Generating a Site BoM

A site BoM lists all of the hardware and software parts required for the system to work as designed at a given site. Use the following procedure to generate a BoM for a site:

Step 1   Click the **NtView Net#** tab and click the site.

Step 2   In the Tasks Pane, click **Bill of Material**. The Site view subtab is selected by default (Figure 2-47). Items that do not appear in the price list appear in red.

Figure 2-47   Bill of Material Tab, Site View Subtab

Table 2-26 describes the Site view subtab columns. See the "2.8.1 Viewing BoM Report Totals" section on page 2-81 for for a description of the data, check boxes, and fields at the top of the window.

Table 2-26   BoM Site View Columns

Column Label	Description
Name	Displays the name of the item at the site.
PID	Displays the ID string of the product.
Quantity	Displays the number of that specific item in the BoM.

Table 2-26   BoM Site View Columns (continued)

Column Label	Description
Unit Price	Displays the price per unit. If the price does not display, one of the following will: • Invalid—Appears when the price list reports NaN (Not a Number) for the item. This occurs when a price list has never been updated. Invalid items appear in the list in orange. • Not Found in Price List—Appears when the price list does not contain any entry with the PID. These items appear in the list in red.
Unit Discount	Displays the per-unit discount amount that you assigned in the Global Discount Percentage field. If you leave the field blank, the discount amount is zero.
Total Price	Displays the total price of the products before applying the discount.
Discounted Total Price	Displays the total price of the products after applying the discount.

Step 3   To close the Bill of Material report, click the **X** in the upper right corner of the Bill of Material tab.

2.8.4 Generating a Spare Parts Report

After you generate the BoM, use the following procedure to determine the spare parts required by the network. If the network is in the Upgrade state, the report includes the parts required to support the implemented services and the new additional present services. To generate a spare parts report, you must associate a site with a maintenance center before network analysis. For more information, see the "2.6.3 Editing Site Parameters" section on page 2-63.

Step 1   Click the **Networks Mgmt Tree** tab and click the network.

Step 2   In the Tasks Pane, click **Bill of Material**. Click the **Spare** subtab (Figure 2-48).

Figure 2-48   Bill of Material Tab, Spare Subtab

Table 2-27 describes the Spare subtab columns. See the "2.8.1 Viewing BoM Report Totals" section on page 2-81 for for a description of the data, check boxes, and fields at the top of the window.

Table 2-27   BoM Spare Subtab Columns

Column Label	Description
Name	Displays the name of the item at the site. Right-click the maintenance center and choose **Expand All** from the shortcut menu to view all spare parts.
PID	Displays the ID string of the product.
Quantity	Displays the number of specific items in the BoM.
Unit Price	Displays the price per unit. If the price does not appear, one of the following will: • Invalid—Appears when the price list reports NaN (Not a Number) for the item. This occurs when a price list has never been updated. Invalid items appear in the list in orange. • Not Found in Price List—Appears when the price list does not contain any entry with the PID. These items appear in the list in red.
Unit Discount	Displays the per-unit discount amount that you assigned in the Global Discount Percentage field. If you leave the field blank, the discount amount is zero.

Table 2-27   BoM Spare Subtab Columns (continued)

Column Label	Description
Total Price	Displays the total price of the parts before applying the discount.
Discounted Total Price	Displays the total price of the parts after applying the discount.

Step 3 To close the Bill of Material report, click the **X** in the upper right corner of the Bill of Material tab.

2.8.5 Exporting a BoM

Use the following procedure to export the BoM to an external file in XML, Excel spreadsheet, HTML, or text format:

Step 1 Click the **Networks Mgmt Tree** tab and click the network.

Step 2 In the Tasks Pane, click **Bill of Material**. The Bill of Material tab appears.

Step 3 Click **Export**. The BoM export dialog box appears.

Step 4 In the BoM export dialog box, type the name of the file, choose the file type (**.xml**, **.xls**, **.html**, or **.txt**) from the drop-down list, and navigate to the desired folder. Click **Save**.

2.9 Managing the Price List

A price list is defined for each project and is used to generate a BoM. Cisco MetroPlanner can manage multiple price lists. You can even change a project price list after a project has been established. The Master Price list is the Global Price List in US dollars. You can download new price lists from Cisco Connection Online (CCO).

Only the selected price value is saved with a project; the actual price database is not saved with the project. When opening a saved project (for example, a project received from another designer), the associated price database might not be available. If this is the case, Cisco MetroPlanner notifies you that the Master Price list will be used.

To save memory, Cisco MetroPlanner automatically loads only the price list selected for the current project.

2.9.1 Creating a New Price List

Use the following procedure to download a price list from CCO:

Step 1 From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears (Figure 2-49).

Figure 2-49   Price Manager Dialog Box
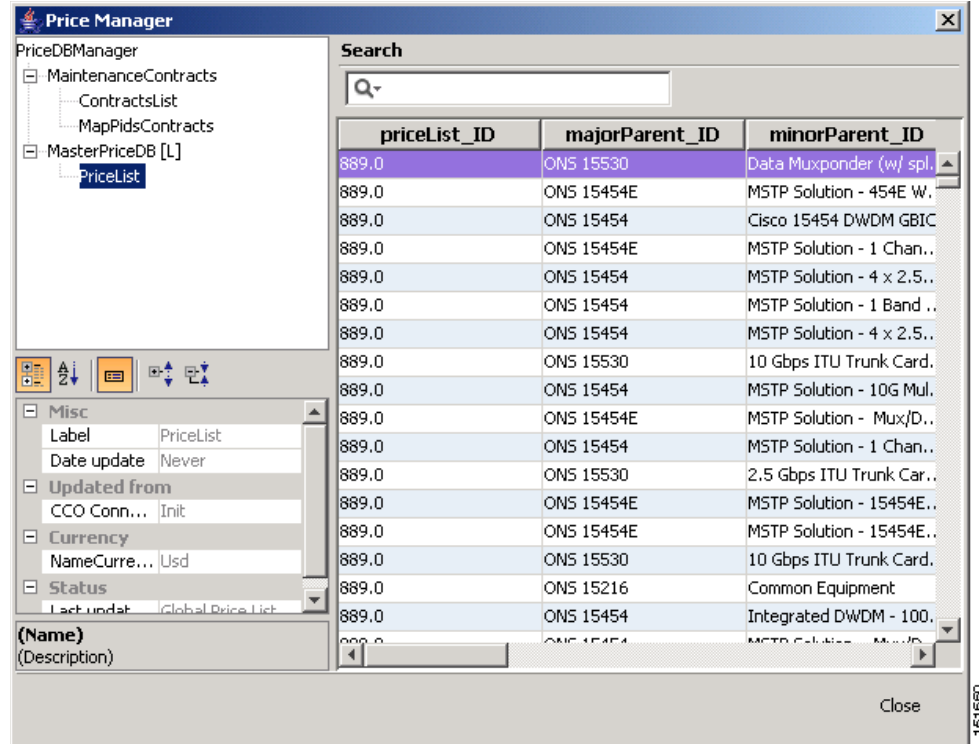
Step 2   In the Price Manager dialog box, right click **PriceDBManager** and choose **New Price DB** from the shortcut menu.

Step 3   In the Create a New Price DB dialog box, enter the price list name.

Step 4   From the drop-down list, choose the desired CCO price list.

Step 5   Click **OK**.

Step 6   Click **OK** to update from CCO.

Step 7   In the CCO User Name/Password dialog box, type your user name and password, and click **OK**. Cisco MetroPlanner downloads the CCO price list.

Step 8   When the update is complete, click **OK** to close the confirmation dialog box. The new price list appears in the PriceDBManager tree.

Step 9   Click **Close** to close the Price Manager dialog box.

2.9.2 Viewing a Price List

Use the following procedure to view and filter a price list:

Step 1   From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears (Figure 2-49 on page 2-87).

The PriceDB Manager tree lists all of the created price lists. To save memory, Cisco MetroPlanner automatically loads only the price list selected for the current project (unless the user requests otherwise). An L indicates that the price list is loaded in memory and is available. A U indicates that a price list is currently not loaded in memory and is not available.

Step 2   To load or unload a price list, right-click a price list and choose **Load** or **Unload** from the shortcut menu.

Step 3   Click **PriceList** under the desired price list identifier in the PriceDBManager tree. The list displays in the right pane of the Price Manager dialog box. The properties of the price list appear in the bottom left corner of the Price Manager dialog box:

- Label—Identifies the name of the price list.
- Date update—Indicates the date of the last download from CCO for this price list. If Never appears, this indicates that the user created a price list without downloading from CCO.
- NameCurrency—Identifies the currency used in the price list.
- Last updated by—Identifies the way in which the price list was updated.

The price list displays the following columns:

- priceList_ID—For internal use.
- majorParent_ID—Lists the platform.
- minorParent_ID—Lists the equipment type.
- product_ID—Identifies the part number.
- description—Provides detail about the item.
- serviceCategory—For internal use.
- listPrice—Indicates the price of the item. If NaN (Not a Number) appears in the field, the list has not been updated.
- major_ID—For internal use.
- minor_ID— For internal use.
- updateStatus—Identifies how the last update was made to an item:
    - Never—Indicates that the price list has never been updated.
    - local_file—Indicates that the price list has been updated from a local file.
    - CCO—Indicates that the price list has been updated from CCO.
    - user—Indicates that the price list has been manually updated by the user who directly edited the price list.
- discount—If a discount applies, identifies the discount percentage. To modify this field, enter the new percentage.

Step 4   To search for a specific item in a price list, type the desired item in the Search field at the top of the list. As you type, Cisco MetroPlanner filters the list items to match your search entry. To choose Search options, click the Search Tool icon to the left of the Search field and choose one of the following:

- Column name—Searches only the specified column for the search string.
- Case sensitive—Matches the case of the search string.
- Case insensitive—Disregards the case of the search string.
- Match from start—Searches only for the search string if it appears at the beginning of column text.
- Match any where—Searches for the search string if it appears anywhere in the price list.

Step 5   To sort the items in the price list, double-click on a column to sort by that column.

Step 6   Click **Close** to close the Price Manager dialog box.

2.9.3 Loading and Unloading Price Lists

To save memory, Cisco MetroPlanner automatically loads only the price list selected for the current project. An "L" by a price list in the Price Manager dialog box indicates that the price list is loaded; a "U" in the Price Manager dialog box indicates that the price list is not loaded. Use the following procedure to load or unload price lists in Cisco MetroPlanner:

Step 1   From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears ().

Step 2   Right-click the price list and choose **Load** or **Unload** from the shortcut menu.

2.9.4 Updating a Price List from CCO

Use the following procedure to update a specified price list from CCO or from a local file. You can also update all price lists, even the lists that are not currently loaded.

Step 1   From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears ().

Step 2   Right-click the desired price list identifier in the PriceDBManager tree and choose **Expand** from the shortcut menu.

Step 3   Right-click the desired price list in the expanded tree and choose **UpdateFromCCO** from the shortcut menu.

Step 4   In the Update from CCO dialog box, choose **Update single price list** to download data for the specified list or **Update all price lists** to download the latest data for all price lists.

Step 5   In the CCO User Name/Password dialog box, type your user name and password and click **OK**. Cisco MetroPlanner downloads the price list.

Step 6   When the update is complete, click **OK** to close the confirmation dialog box.

Step 7   Click **Close** to close the Price Manager dialog box.

2.9.5 Copying a Price List

Use the following procedure to create a new price list by copying from an existing one. The new price list will have all of the attributes and values of the original price list (such as Updated By, Last Update, unit price, discounts, etc.).

Step 1   From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears ().

Step 2 Right-click the desired price list in the PriceDBManager tree and choose **Copy** from the shortcut menu.

Step 3 Type the name for the new price list and click **Ok**. The new price list appears in the PriceDBManager tree.

Step 4 Click **Close** to close the Price Manager dialog box.

2.9.6 Deleting a Price List

Use the following procedure to delete a price list. You cannot delete the Master Price List or a price list that is in use by a project.

Step 1 From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears (Figure 2-49 on page 2-87).

Step 2 Right-click the desired price list in the PriceDBManager tree and choose **Delete** from the shortcut menu.

Step 3 Click **Close** to close the Price Manager dialog box.

2.9.7 Viewing Maintenance Contracts

Use the following procedure to view maintenance contracts:

Step 1 From the Tools menu, choose **Price List Mgmt**. The Price Manager dialog box appears (Figure 2-49 on page 2-87).

Step 2 Right-click **Maintenance Contracts** and choose **Expand** from the shortcut menu.

Step 3 Click **ContractsList**. The Contract PID column lists the service contract identifiers for the hardware and software parts used by Cisco MetroPlanner. The Contract Category column describes the service programs.

Step 4 Click **MapPidsContracts**. The PID column lists the product identifiers. The Contracts column lists the service contract identifier.

Step 5 Click **Close** to close the Price Manager dialog box.

Modeled Network Examples

This chapter provides examples of typical optical networks you can model using Cisco MetroPlanner.

This chapter contains the following sections:

3.1 Supported Cisco MetroPlanner Topologies

Cisco MetroPlanner supports the following topologies:

- Bus (single span, point-to-point, and linear)
- Open (or hubbed) ring
- Closed (or meshed) ring

An example of each topology is given in this chapter.

3.2 Bus Topologies

Bus topologies comprise three types of topologies: single span, point-to-point, and linear.

3.2.1 Single-Span Topology

Figure 3-1 shows an example of a single-span topology. Single-span topologies are characterized by a single span link. The single-span configuration only supports two terminal sites (full terminal or flexible channel-count terminal) without any intermediate line amplifier or optical add/drop multiplexing (OADM) sites.

Figure 3-1   Single-Span Topology Example
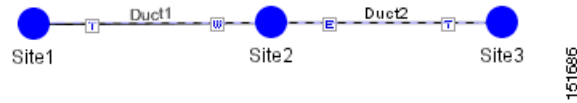
3.2.2 Point-to-Point Topology

Figure 3-2 shows an example of a point-to-point topology. In a point-to-point topology, all the wavelengths are terminated at the same point in the chain. In the point-to-point configuration, no channels are added or dropped in intermediate sites.

Figure 3-2   Point-to-Point Topology Example

3.2.3 Linear Topology

Figure 3-3 shows an example of a linear topology. Linear configurations are characterized by the presence of two terminal sites (full terminal or flexible channel-count terminal). Between the two terminal sites, OADM or line amplifiers nodes can be inserted. In a linear configuration, specific wavelengths are terminated at different points in the chain and only unprotected traffic can be provisioned.

Figure 3-3   Linear Topology Example

3.3 Hubbed Ring Topology

Figure 3-4 shows an example of a hubbed ring topology. In this configuration, at least one of the sites must be a hub site, where all channels are terminated.

Figure 3-4   Hubbed Ring Topology Example
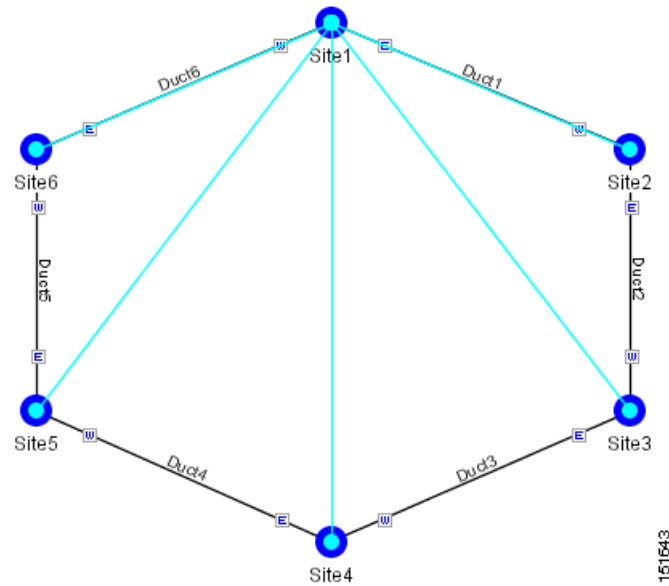
3.4 Meshed Topology

Figure 3-5 provides an example of a meshed ring topology. A meshed ring is characterized by the absence of a hub node.

Figure 3-5   Meshed Ring Topology Example
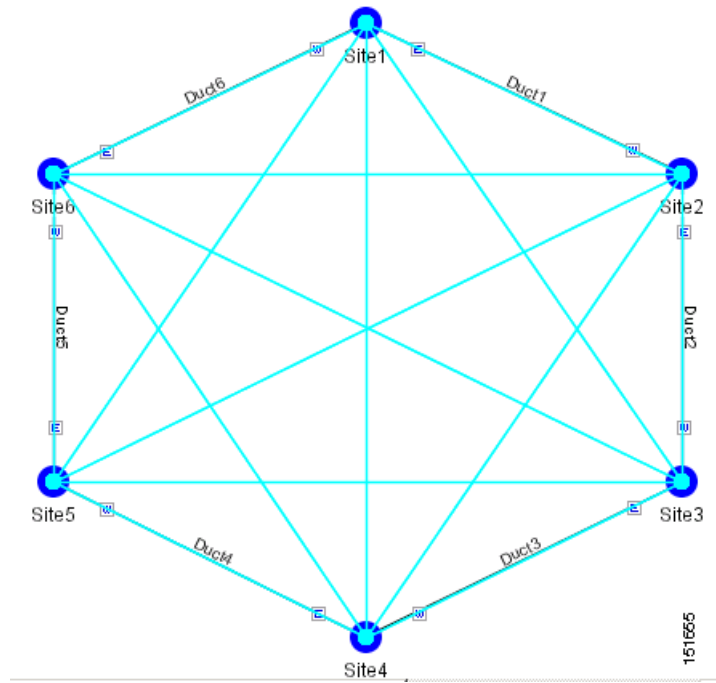
GUI Information and Shortcuts

This appendix describes the Cisco MetroPlanner views, menus, tools, and shortcuts options. For more information about Cisco MetroPlanner, refer to Chapter 1, "Overview."

Manage the Cisco MetroPlanner Window

The Cisco MetroPlanner window provides a menu bar, toolbar, a Project Explorer pane, a Properties pane, an Analyzer pane, and a Task Pane to allow you to manage a network design (Figure A-1). The Networks Mgmt Tree tab displays the networks that you have created for a project. The NtVw Net# tab displays the sites for a network (identified by the Net# on the tab).

Figure A-1   Cisco MetroPlanner Window with Network Tree
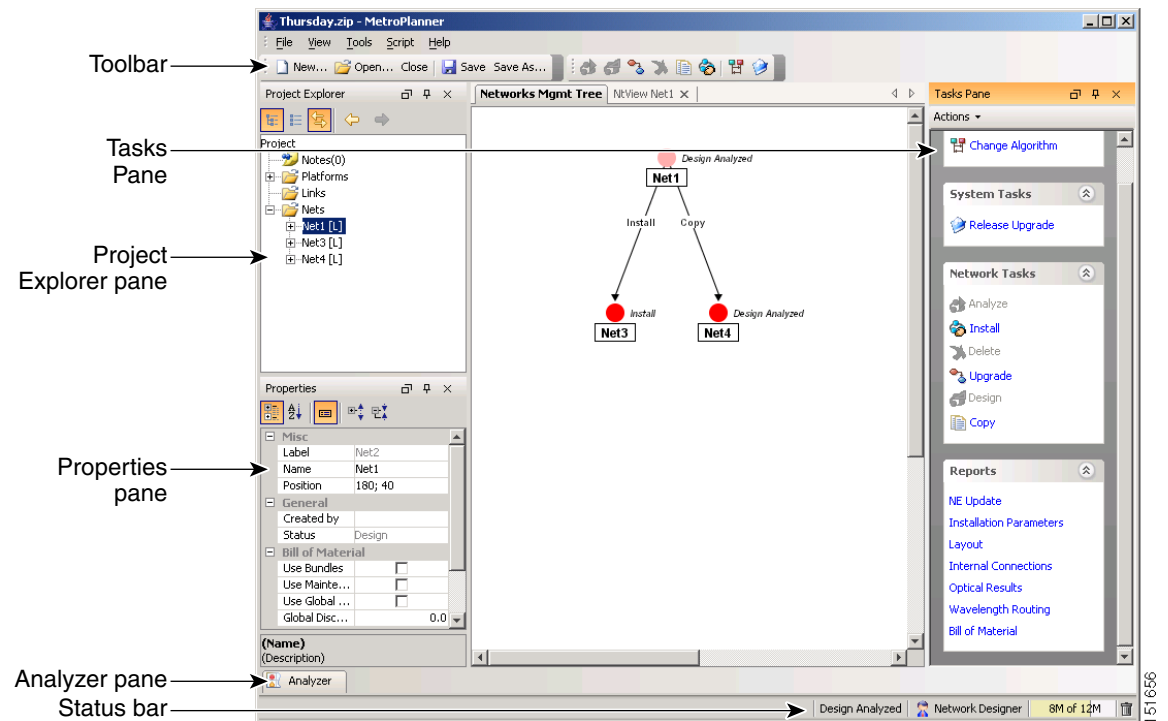
Menu and Toolbar Options

The Cisco MetroPlanner window menu bar and toolbar provide primary Cisco MetroPlanner functions. Table A-1 shows the actions that are available from the menu and toolbar.

Table A-1   Menu and Toolbar Options

Menu	Menu Option	Toolbar	Description
File	New	New...	Creates a new Cisco MetroPlanner project. See the "2.3 Creating a Project" section on page 2-21.
	Open	Open...	Opens an existing Cisco MetroPlanner project. See the "2.1.1 Opening a Project" section on page 2-3.
	Close	Close	Closes the current project without closing the Cisco MetroPlanner session. If you have not saved the current project, Cisco MetroPlanner will prompt you to save before closing. See the "2.1.5 Closing a Project" section on page 2-5.
	Save	Save	Saves the current project. See the "2.1.3 Saving a Project" section on page 2-4.
	Save As	Save As...	Allows you to save the current project with a new file name. See the "2.1.3 Saving a Project" section on page 2-4.
	Clear History	—	Clears the file history from Cisco MetroPlanner. Cisco MetroPlanner maintains a list of the last ten open projects in the File menu.
	Exit	—	Exits the Cisco MetroPlanner software.
View	My Default Layout	—	Changes the Cisco MetroPlanner display to the user default layout. Cisco MetroPlanner allows you to define the default value for Platform Options, Project Options, and General Options. The defined value are used as default for each new created project. See the "2.2 Setting Cisco MetroPlanner Options" section on page 2-5.
	Default Layout	—	Returns the Cisco MetroPlanner display to the system default layout.
	Tasks Pane	—	Displays the commands available for the selected entity (network, site, duct, etc.).
	Project Explorer	—	Displays the Project Explorer pane, which includes folders for project notes, networks, sites, fibers, traffic demand groups, subnets, maintenance centers, restricted equipment list, and reports. Clicking the plus (+) sign by each folder expands the folder. Clicking the minus (–) sign by each folder hides the folder. contents. You can also right-click a folder and choose **Expand** from the shortcut menu to show folder contents. The default location of the Project Explorer pane is the upper left section of the Cisco MetroPlanner window.
	Properties	—	Displays the Properties pane, which shows parameter settings for the selected entity in the Project Explorer, Networks Mgmt Tree tab, or NtVw Net# tab. The default location of the Properties pane is the lower left section of the Cisco MetroPlanner window.
	Analyzer Messages	—	Displays the Analyzer Messages pane at the bottom of the Cisco MetroPlanner window. The Analyzer Messages pane displays any error messages that occur during network analysis.

Table A-1   Menu and Toolbar Options (continued)

Menu	Menu Option	Toolbar	Description
Tools	Options	—	Opens the Options Explorer dialog box, where you can change the user default settings. See the "2.2 Setting Cisco MetroPlanner Options" section on page 2-5.
	DB Parts Mgmt	—	Opens the PartsTreePanel dialog box, where you can view the list of available parts for each release. See the "2.2.4 Setting the Fiber Type Default Values" section on page 2-9.
	Price List Mgmt	—	Opens the Price Manager dialog box, where you can view maintenance contracts and add price databases. See the "2.9 Managing the Price List" section on page 2-86.
	Plug In	—	Opens the PlugIn Registry dialog box, which allows you to customize Cisco MetroPlanner with plug-ins released by Cisco. See the "2.2.10 Adding Plug-ins" section on page 2-18 and the "2.2.11 Managing Plug-ins" section on page 2-19.
	Export	—	Opens the Export dialog box, which allows you to export user options, price lists, maintenance contracts, and parts database files. See the "2.2.7 Exporting a File" section on page 2-16.
	Import	—	Opens the Import dialog box, which allows you to import user options, price lists, maintenance contracts, and parts database files. See the "2.2.8 Importing a File" section on page 2-17.
Script	Run Script	—	Opens the Choose a script to run dialog box, which allows you to run a script that Cisco provides. See the "2.2.13 Running a Script" section on page 2-21.
Help	Manual	—	Opens the Cisco MetroPlanner online help.
	Tips Of The Day	—	Opens the Tip of the Day dialog box, which provides helpful hints about using Cisco MetroPlanner. Click the **Next** button to view the next tip and the **Back** button to view a previous tip. Check **Show Tips on Startup** to display the Tip of the Day dialog box when you launch Cisco MetroPlanner.
	About	—	Displays Cisco MetroPlanner version information.
—	Create a new site		Opens the Site Creation wizard when you click this icon and then click in the Cisco MetroPlanner window. See the "2.3.1 Adding Sites" section on page 2-27.
—	Create a new duct		Allows you to create a new duct between sites. See the "2.3.3 Adding Fiber Spans" section on page 2-28.
—	Create a new P2P demand		Opens the Point to Point Demand Creation Wizard when you click this icon and then click two sites. See the "2.3.4 Creating a Point-to-Point Demand" section on page 2-29.
—	Create a new P-ring demand		Opens the P-Ring Creation Wizard. See the "2.3.5 Creating a Protected Ring Demand" section on page 2-31.
—	Zoom in		Zooms in on the NtVw Net# tab.

Table A-1   Menu and Toolbar Options (continued)

Menu	Menu Option	Toolbar	Description
—	Zoom out		Zoom out from the NtVw Net# tab.
—	Normal viewing		Returns the NtVw Net# tab to normal viewing (1:1).
—	Fit to window		Resizes the view so that all sites fit inside the NtVw Net# tab window.
—	Analyze Network		Analyzes the selected network. See the "2.4 Analyzing the Network" section on page 2-36.
—	Enter design mode		Puts the selected Design-Analyzed network back into the design mode for further changes. See the "2.4 Analyzing the Network" section on page 2-36.
—	Put current network in upgrade mode		Creates a copy of the selected Design-Analyzed network in the Upgrade state. See the "2.7.3 Creating an Upgrade Network" section on page 2-79.
—	Delete current network		Deletes the selected network. See the "2.3.7 Deleting a Network" section on page 2-35.
—	Copy current network		Copies the selected network. See the "2.7.1 Creating a Copy of the Network" section on page 2-78.
—	Put current network in install mode		Creates a copy of the selected Design-Analyzed network in the Install state. See the "2.7.2 Creating a Network in the Install State" section on page 2-78.
—	Reports Diff		Opens the Reports Diff dialog box, which allows you to create a report that shows the differences between networks.
—	Run the Garbage Collector		Deletes unloaded networks from memory.

Cisco MetroPlanner Panes

Cisco MetroPlanner provides four panes that help you manage a network design: Project Explorer, Properties, Analysis, and Tasks Pane.

Project Explorer Pane

The Project Explorer pane provides a management tree for the entire project. Each network appears as a folder that contains the sites, fibers, traffic groups, subnets, maintenance centers, restricted equipment lists, and reports for that network. If you have made changes to a network design, that network folder and the changed item folder appear in blue italics in the pane.

By default, the Project Explorer pane is located in the upper left section of the Cisco MetroPlanner window. Table A-2 shows the actions that are available from the Project Explorer toolbar.

Table A-2   Project Explorer Toolbar Options

Toolbar	Description
	Displays the Project Explorer as a single pane.
	Displays the Project Explorer as split panes. The upper pane contains the main project tree; the lower pane shows only the folders for the network that is selected in the upper pane.
	Auto scrolls to the selected object in the Project Explorer tree. For example, if you click on a site in the NtView Net# tab but it is not in view in the Project Explorer tree, Cisco MetroPlanner will automatically scroll the Project Explorer pane until the selected site is in view.
	Moves backward through the list of previously selected items in the Project Explorer.
	Moves forward through the list of previously selected items in the Project Explorer.
	Moves (undocks) the Project Explorer pane from the default location in the upper left corner so that you can move it around your desktop area as an individual window.
	Moves the Project Explorer back to the default location.
	Hides the Project Explorer. To view again, move the mouse over the Prop tab that appears in the upper left corner of the Cisco MetroPlanner window.
	When in hidden mode, reopens the Project Explorer in the default location.
	Closes the Project Explorer pane. To reopen, choose **Project Explorer** from the View menu.

Properties Pane

The Properties pane shows all of the parameters set for a selected item (either in the Project Explorer, the Network Mgmt Tree tab, or the NtVw Net# tab). Many items are editable in the Properties pane. By default, the Properties pane is located in the lower left section of the Cisco MetroPlanner window.

Table A-3 shows the actions that are available from the Properties Pane toolbar.

Table A-3   Properties Pane Toolbar Options

Toolbar	Description
	Categorizes the properties by type.
	Organizes the properties in alphabetical order.
	Shows or hides the description area at the bottom of the Properties pane.
	Expands the property categories (if collapsed).
	Collapses the property categories (if expanded).
	Moves (undocks) the Properties pane from the default location in the lower left corner so that you can move it around your desktop area as an individual window.
	Moves the Properties pane back to the default location.
	Hides the Property pane. To view again, move the mouse over the Prop tab that appears in the upper left corner of the Cisco MetroPlanner window.
	When in hidden mode, reopens the Properties pane so that it appears in the default location.
	Closes the Properties Pane. To reopen, choose **Properties** from the View menu.

Analyzer Pane

The Analyzer tab at the bottom of the Cisco MetroPlanner window appears after you have analyzed a network design. Clicking the Analyzer tab opens the Analyzer pane. Table A-5 shows the actions that are available from the Analyzer pane.

Table A-4   Analyzer Toolbar Options

| Toolbar	Description
⇩	Moves down through the Analyzer messages.
⇧	Moves up through the Analyzer messages.
⇶	Opens the Apply Filters dialog box, which allows you to filter the messages to show or hide Exceptions, Errors, Warnings, and/or Info.
⊞	Expands the Analyzer message categories (if collapsed).
⊟	Collapses the Analyzer message categories (if expanded).
⬓	Moves (undocks) the Analyzer pane from the default location in the lower left corner so that you can move it around your desktop area as an individual window.
⬓	Moves the Analyzer pane back to the default location.
⊓	Hides the Analyzer pane. To view again, move the mouse over the Analyzer tab that appears in the bottom of the Cisco MetroPlanner window.
⊟	Opens the Analyzer pane so that it remains open in the bottom section of the Cisco MetroPlanner window.
✕	Closes the Analyzer pane. To reopen, choose **Analyzer messages** from the View menu.

Tasks Pane

The Tasks Pane lists the available commands and reports for a selected item. The commands change based on the selected item. For example, a selected site will have different commands available than a selected fiber span. By default, the Tasks Pane is located in the upper right section of the Cisco MetroPlanner window. Table A-5 shows the actions that are available from the Tasks Pane toolbar.

Table A-5   Tasks Pane Toolbar Options

Toolbar	Description
⬓	Moves (undocks) the Tasks Pane from the default location in the lower left corner so that you can move it around your desktop area as an individual window.
⬓	Moves the Tasks Pane back to the default location.

Table A-5   Tasks Pane Toolbar Options (continued)

Toolbar	Description
⊓	Hides the Tasks Pane. To view again, move the mouse over the Tasks tab that appears in the upper right corner of the Cisco MetroPlanner window.
⊐	When in hidden mode, reopens the Tasks Pane so that it appears in the default location.
✕	Closes the Tasks Pane. To reopen, choose **Tasks Pane** from the View menu.

Shortcuts

Cisco MetroPlanner provides the following mouse shortcuts:

- Double-clicking a network icon in the Network Mgmt Tree tab opens the NtVw Net# tab, which shows the sites for that network.

- Right-clicking a report table column displays a shortcut menu that allows you to view or hide the columns in a report.

- Right-clicking an item in the Network Mgmt Tree tab or NtVw Net# tabs opens a shortcut menu that allows you to choose actions to perform on the selected item. The shortcut menu options differ based on the item selected and the network state. (Many commands are not available until a network is analyzed.) Table A-6 lists the shortcut menu actions that are available for each item.

Table A-6   Shortcut Menu Actions

Item	Available Shortcut Actions
Networks in the following states: Design, Install, and Upgrade	• Unload/Load—Unloads or loads the network. See the "2.1.2 Loading and Unloading Networks" section on page 2-3. • Edit Note—Allows you to create a note for the network. See the "2.3.8 Adding Notes to a Project" section on page 2-35. • Delete—Removes the network from the project. See the "2.3.7 Deleting a Network" section on page 2-35. • Copy—Creates a copy of the network. See the "2.7.1 Creating a Copy of the Network" section on page 2-78. • Arrange Sites—Allows you to rearrange sites in the Cisco MetroPlanner window. See the "2.6.12 Arranging Sites" section on page 2-73.
Analyzed networks	• Unload/Load—Unloads or loads the network. See the "2.1.2 Loading and Unloading Networks" section on page 2-3. • Edit Note—Allows you to create a note for that item. See the "2.3.8 Adding Notes to a Project" section on page 2-35. • Install—Creates a copy of the network in the Install state. See the "2.7.2 Creating a Network in the Install State" section on page 2-78. • Delete—Removes the network from the project. See the "2.3.7 Deleting a Network" section on page 2-35. • Upgrade—Creates a copy of the network in the Upgrade state. See the "2.7.3 Creating an Upgrade Network" section on page 2-79. • Copy—Creates a copy of the network. See the "2.7.1 Creating a Copy of the Network" section on page 2-78. • Layout—Opens the Layout tab. See the "2.5.6 Displaying the Layout" section on page 2-46. • Internal Connections—Opens the Internal Connections tab. See the "2.5.4 Viewing Internal Connections" section on page 2-42. • Optical Results—Opens the Optical Results tab. See the "2.5.8 Viewing Optical Results" section on page 2-51. • Wavelength Routing—Opens the Wavelength Routing tab. See the "2.5.9 Viewing Wavelength Routing" section on page 2-54. • Bill of Material—Opens the Bill of Materials tab. See the "2.8.2 Generating a Network BoM" section on page 2-81. • Installation—Opens a submenu with the following options: – NE Update—Creates a configuration file for each site in the network See the "2.5.2 Saving the NE Update File" section on page 2-39. – Installation Parameters—Opens the Installation Parameters tab. See the "2.5.3 Viewing the Installation Parameters" section on page 2-40. • Arrange Sites—Allows you to rearrange sites in the Cisco MetroPlanner window. See the "2.6.12 Arranging Sites" section on page 2-73.

Table A-6   Shortcut Menu Actions (continued)

Item	Available Shortcut Actions
Sites	• Edit Note—Allows you to create a note for that item. See the "2.3.8 Adding Notes to a Project" section on page 2-35.
	• Delete—Removes the site from the project. See the "2.6.4 Deleting a Site" section on page 2-67.
	If the network is analyzed, the following actions are also available:
	• Layout—Opens the Layout tab. See the "2.5.6 Displaying the Layout" section on page 2-46.
	• Internal Connections—Opens the Internal Connections tab. See the "2.5.4 Viewing Internal Connections" section on page 2-42.
	• Optical Results—Opens the Optical Results tab. See the "2.5.8 Viewing Optical Results" section on page 2-51.
	• Wavelength Routing—Opens the Wavelength Routing tab. See the "2.5.9 Viewing Wavelength Routing" section on page 2-54.
	• Bill of Material—Opens the Bill of Materials tab. See the "2.8.2 Generating a Network BoM" section on page 2-81.

	• Installation—Opens a submenu with the following options:
	  – NE Update—Creates a configuration file for each site in the network. See the "2.5.2 Saving the NE Update File" section on page 2-39.
	  – Installation Parameters—Opens the Installation Parameters tab. See the "2.5.3 Viewing the Installation Parameters" section on page 2-40.

	• Unlock—Unlocks the site. See the "2.7.4 Unlocking Parameters in the Network Design" section on page 2-80.
Fiber spans	• Edit Note—Allows you to create a note for that item. See the "2.3.8 Adding Notes to a Project" section on page 2-35.
	If the network is analyzed, the Unlock command is also available. See the "2.7.4 Unlocking Parameters in the Network Design" section on page 2-80.
Traffic demands	• Edit Note—Allows you to create a note for that item. See the "2.3.8 Adding Notes to a Project" section on page 2-35.
	• Edit—Allows you to edit the demand. See the "2.6.6 Editing a Point-to-Point Demand" section on page 2-67, "2.6.7 Editing a P-Ring Demand" section on page 2-68, or "2.6.8 Editing a ROADM Demand" section on page 2-70.
	• Delete—Removes the demand from the project. See the "2.6.9 Deleting a Traffic Demand" section on page 2-71.
	If the network is analyzed, the Unlock command is also available. See the "2.7.4 Unlocking Parameters in the Network Design" section on page 2-80.

Site Icons

A site icon indicates the functionality of site. Table A-7 lists the site icons.

Table A-7   Site Icons

Site Name	Site Icon	Description
Add/Drop		Indicates that this site has add/drop capability. Only point-to-point and P-ring circuits can be added/dropped at this site.
Gain equalizer		Indicates that this site uses WSS cards to control the generated tilt and extend unregenerated distances. The site is realized as an ROADM site without demultiplexer cards.
Hub		Indicates that this site is equipped with filters for adding and dropping all the channels (on both West and East sides). All express paths are open in hub configurations.
Line amplifier		Indicates that any add/drop traffic is prevented at this site.
OSC site		Indicates that site is designated for network communication, providing the possibility to access the optical service channel (OSC) for management of the MSTP network. By default, no amplifiers are included in this site. However, if Cisco MetroPlanner determines that an amplifier is required in the network, it can automatically place it at this location. Cisco MetroPlanner allows you to set (force) preamplifier and booster amplifiers for each direction on a OSC Site node.
Pass Through		Indicates that no equipment will be located at this site.
R-OADM		Indicates that this site supports Any-to-Any and also Fixed (point-to-point and P-ring) traffic types.

Card Types

This appendix provides a list of interface and card types supported in Cisco MetroPlanner, as well as the corresponding Cisco product ID (Tables B-1 to B-29).

Table B-1 *OC-192/STM-64 (9.953 Gbps)*

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with EFEC	Client 1+1 Y-Cable	15454-10E-L1-xx.y= (C band) 15454-10E-L1-xx.y= (L band)
Transponder	TXP_MR_10E with FEC	Client 1+1 Y-Cable	15454-10E-L1-xx.y= (C band) 15454-10E-L1-xx.y= (L band)
Transponder	TXP_MR_10E without FEC	Client 1+1 Y-Cable	15454-10E-L1-xx.y= (C band) 15454-10E-L1-xx.y= (L band)
Transponder	TXP_MR_10G with FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=
Transponder	TXP_MR_10G without FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=
LineCard	OC-192 LR STM-64 LR	Client 1+1	15454-192L-1-xx.y= (ANSI) 15454E-64L-xx.y= (ETSI)

Table B-2   OC-48/STM-16 (2.488 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	MXP_2.5_10E_C and MXP_2.5_10E_L with EFEC	Client 1+1 Y-Cable	15454-10ME-L1-C= (C band) 15454-10ME-L1-L= (L band)
Transponder	MXP_2.5_10E_C and MXP_2.5_10E_L with FEC	Client 1+1 Y-Cable	15454-10ME-L1-C= (C band) 15454-10ME-L1-L= (L band)
Transponder	MXP_2.5_10E with EFEC	Client 1+1 Y-Cable	15454-10ME-xx.y=
Transponder	MXP_2.5_10ET with FEC	Client 1+1 Y-Cable	15454-10ME-xx.y=
Transponder	MXP_2.5_10G with FEC	Client 1+1 Y-Cable	15454-10M-L1-xx.y=
Transponder	MXP_2.5_10G without FEC	Client 1+1 Y-Cable	15454-10M-L1-xx.y=
LineCard	OC48ELR / SMT-16ELR	Client 1+1	15454-O48E-1-xx.y (ANSI) 15454E-EL16HSxxyy= (ETSI)

Table B-3   OC-12/STM-4 (622 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-4   OC-3/STM-1 (155 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-5   10GE WAN PHY (9.953 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10G with FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=
Transponder	TXP_MR_10G without FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=

Table B-6   10GE LAN PHY (10.3 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)

Table B-6   10GE LAN PHY (10.3 Gbps) (continued)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_10E_C and TXP_MR_10E_L without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10G with FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=
Transponder	TXP_MR_10G without FEC	Client 1+1 Y-Cable	15454-10T-L1-xx.y=

Table B-7   GE (1.25Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Pluggable	GE DWDM GBIC	Client 1+1	15454-GBIC-xx.y=

Table B-8   Fast Ethernet (100 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-9   FC-10G (10.5 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E_C and TXP_MR_10E_L without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with EFEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E with FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)
Transponder	TXP_MR_10E without FEC	Client 1+1 Y-Cable	15454-10E-L1-C= (C band) 15454-10E-L1-L= (L band)

Table B-10   FC-4G (4.25 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)

Table B-11   FC-2G (2.125 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-12   FC-1G (1.062 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-13   FICON-2G (2.125 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-14   FICON-1G (1.062 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G with FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G without FEC	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

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Table B-15   ESCON (200 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_2.5G MXPP_MR_2.5G	Client 1+1 Y-Cable Fiber-Switched	15454-DM-L1-xx.y= (Unprot) 15454-DMP-L1-xx.y= (Prot)
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-16   ISC-Compat (1.062 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G without FEC	Client 1+1	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)
Transponder	MXP_MR_10DME with EFEC	Client 1+1	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1	15454-10DME-C= (C band) 15454-10DME-L= (L band)

Table B-17   ISC-Peer 2R

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G 2R	Client 1+1	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-18   ISC-3 Peer-1G (1.062 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)

Table B-19   ISC-3 Peer-2G (2.125 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	MXP_MR_10DME with EFEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME with FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)
Transponder	MXP_MR_10DME without FEC	Client 1+1 Y-Cable	15454-10DME-C= (C band) 15454-10DME-L= (L band)

Table B-20   Sysplex ETR (8 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G 2R	Client 1+1	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-21   Sysplex CLO (8 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G 2R	Client 1+1	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-22   SDI

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-23   DVB-ASI

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-24   D1-Video (270 Mbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-25   HDTV (1.48 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-26   DV-6000 (2.38 Gbps)

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-27   2R Any Rate

Interface Type	Card Type	Protection Type	Product ID
Transponder	TXP_MR_2.5G TXPP_MR_2.5G 2R	Client 1+1 Y-Cable Fiber-Switched	15454-MR-L1-xx.y= (Unprot) 15454-MRP-L1-xx.y= (Prot)

Table B-28   ONS 15530 2.5G ITU-T

Interface Type	Card Type	Protection Type	Product ID
TXP	MR MM TXP MR SM TXP MR MM TXP with splitter MR SM TXP with splitter	Client 1+1 Fiber-Switched	15530-TSP1-xx21 (MM Unprot) 15530-TSP1-xx22 (SM Unprot) 15530-TSP1-xx11 (MM Prot) 15530-TSP1-xx12 (SM Prot)
LC	2.5-Gbps Aggregation 2.5-Gbps Aggregation with splitter	Client 1+1 Fiber-Switched	15530-ITU3-xx20 (Unprot) 15530-ITU3-xx10 (Prot)

Table B-29   ONS 15530 10G ITU-T

Interface Type	Card Type	Protection Type	Product ID
LC	10-Gbps Aggregation	Client 1+1	15530-ITU2-xx20 (Unprot)
	10-Gbps Aggregation with splitter	Fiber-Switched	15530-ITU2-xx10 (Prot)
MXP	Data Muxponder	Client 1+1	15530-MSMP-xx22 (Unprot)
	Data Muxponder with splitter	Fiber-Switched	15530-MSMP-xx12 (Prot)