MetaSolv Solution Release#5.3

Template-Based Technologies

November 2003

Student Guide

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Before you begin...

What's in this course?

This course is designed to introduce you to MetaSolv Solution and teach you how to use the network templates. MetaSolv Solution is an inventory tracking application designed to help telecommunications and network engineers perform two major tasks: document the equipment used to provision data and voice communication, create facilities and assign customer circuits.

Who's it for?

This course is for the people who will be using MetaSolv Solution to create products, build and maintain networks, enter customer service requests and provision the customer service requests. Typically the groups of people that use MetaSolv Solution include: network planners, network engineers, network implementators and network provisioners.

What should you know?

Before taking this course, you should have general telecommunications knowledge. You should understand how to enter, modify and assign to equipment in the MetaSolv Solution.

What's the course plan?

The plan is to create networks, build products, enter customer service requests, and provision customer services.

PART 1—Part one will help you understand the basics of MetaSolv Solution. You will understand the layout and the graphical user interface before you begin using the functionality to manage your inventory.

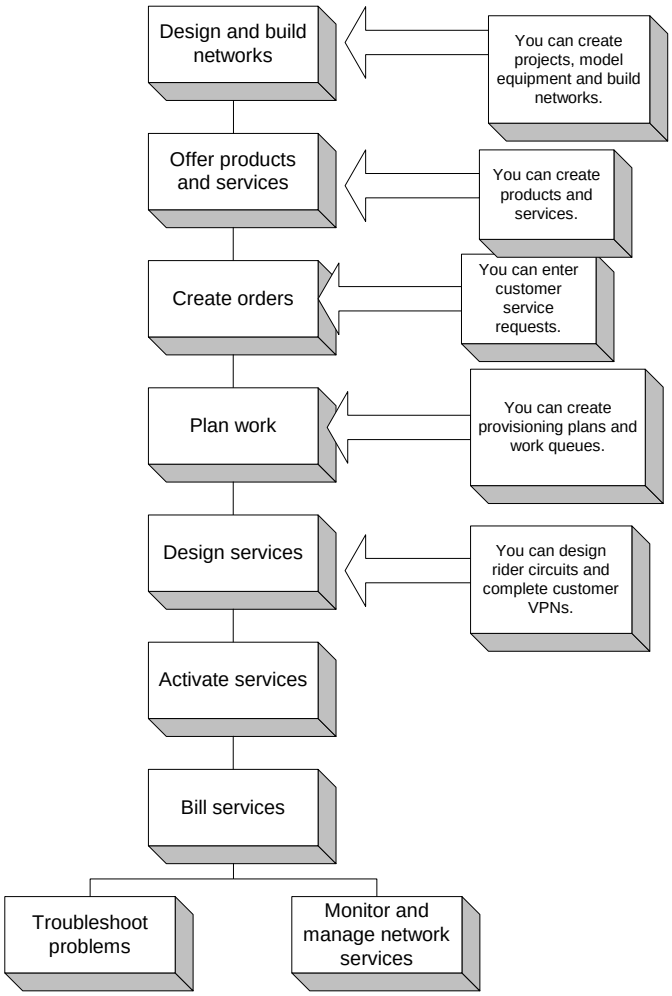
PART 2—In part two, you will install equipment, build networks, a product and provision a customer service request.

PART 3— In part three, you will build a virtual private network (VPN) product, enter a customer service request and then provision the customer VPN.

PART 4—The fourth part of this course consists of several labs to be performed by students. It also contains the answers to reviews and exercises throughout the course.

You are here

The diagram below depicts where Objectel fits into the end-to-end service activation process.



Part 1

Part one will help you understand the basics of MetaSolv Solution. You will understand the layout and the graphical user interface before you begin using the functionality to manage your inventory.

Chapter 1

Introduction

What you'll learn in this chapter

In this chapter, you will learn how to navigate through the graphical user interface and customize menus and toolbars.

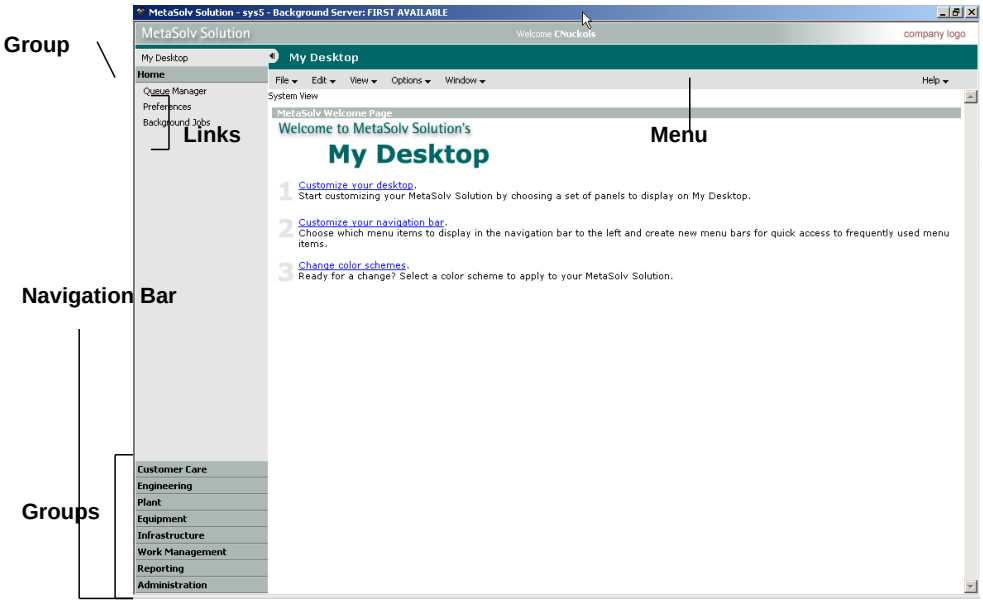
Objectives

At the end of this chapter, you will be able to:

- Customize your desktop
- Understand the available working windows

Desktop

When you first logon to MetaSolv Solution, you are brought to My Desktop and all available modules may be viewed. If there are specific areas of the software that you will be working in, you can customize your desktop to view only those areas.



Customize navigation bar

You can customize the navigation bar at the left side of the screen. You can add new groups, edit groups and change the order of groups. Groups contain a collection of links. You can also create separators. Separators are lines that separate links within a group.

Change color schemes

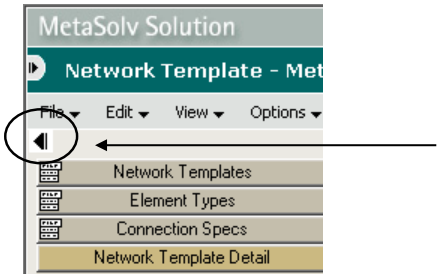
You can select from several color schemes to change the colors of the windows.

Basic navigation

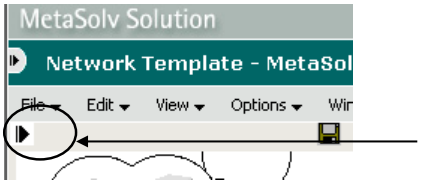
You can hide the navigation bar on the left side of the window by clicking the left arrow next to the words My Desktop.

To show the navigation bar again, click the right arrow underneath the MetaSolv Solution bar.

When you are working in the graphical canvas with templates or network designs, you can hide the panels by using the left arrow button above the panels.



To show the panels again, click the right arrow below the menu.



Chapter 2

Network Template Overview

What you'll learn in this chapter

This chapter is designed to provide high-level background information on the features and functionalities of network templates. It also provides some core definitions you will need to customize templates and design network systems. MetaSolv Solution 5.1 includes a template-based platform that includes predefined rules specifying how to design networks, order products, and provision service. These rules are not hard-coded into the software, but by customizing the templates, you can modify them to meet your specific business needs.

Objectives

At the end of this chapter, you will be able to:

- Define various terms supporting network templates.
- Navigate the graphical canvas.
- Describe the downstream effects of network templates.
- Identify processes for securing templates.

Network template terms

When you license a specific technology with MetaSolv, you receive a technology module that includes predefined template types, templates, and documentation about the contents of those templates. The templates include the rules that you use to build network systems and to provision across those networks. To change the rules, you modify the network templates.

Network templates

A template type can have multiple templates. For example, the ATM/FR template type has two main network templates: ATM/FR Network and Layer 2 VPN. These two templates have several other embedded templates, such as ATM Access and Frame Relay Access.

Most of the template types include core and access network templates. The core network template is generally used to represent the provider network that customers do not directly connect with. The access network template is generally used to represent the network that directly connects the customer to the provider network.

In this document, you will see the word "transport" used to reference a network template that includes both the access and core network templates.

Network templates include elements, connections, graphics, and rules for a specific technology. If you do not have the technology module or network system type, you will not be able to create templates based on that particular technology.

You can license the following technology modules:

Technology Module	Included Templates
ATM/Frame Relay	ATM/Frame Relay Transport Layer 2 VPN
DSL	DSL Transport
DLC	DLC Transport
IP	IP Transport IP/VPN
MPLS	MPLS Transport MPLS VPN
Optical	Optical Network Optical Sub-Network
SONET/SDH	SONET/SDH
Ethernet	Ethernet Transport
Unclass	PSTN

The template provides a graphical view in the Network Design function that you can customize to reflect the elements and connections types that make up your network systems. With network templates, network designers can quickly design network systems.

You can associate a template customized for a specific network system type with the products that your company offers over that network system type. This association prompts the ordering specialist to enter the appropriate data that is pertinent to the product type.

Element types

Element types are representations of nodes that can exist in a network system. Examples of element types include:

- Switch
- Router
- Another Network (cloud)
- Aggregator

Relationships

The MetaSolv Solution software has Connection Types, Connection Specifications, and Prioritized Paths. The physical connections can be grouped as prioritized paths for virtual connections to ride.

Connection relationship

The template relationship is a future connection between elements. It defines the types of elements that an element can be connected with. The connection relationship can be either of the following:

- **Intranetworking**—You can connect the element to another element in the same network.
- **Internetworking**—You can connect the element to another element in a different network.

Connection types & specifications

The connection specs are the specific connections you can click to connect elements. They fall into one of the following connection types:

- **Physical**—The bandwidth connections that are assigned to ports and connect elements.
- **Virtual**—The connections that traverse the ATM/FR transport networks. These logical connections ride physical, bandwidth circuits and are not assigned to port assignment positions. A logical path is defined through the network. Bandwidth is allocated to the path when the data is transmitted.
- **Group**—A group of physical connections aggregated to act as one connection.

Prioritized paths

Prioritized paths define the physical paths that a virtual connection can take through a network system when you use path analysis to provision a service.

Assignable connection specs

You can define the connection specifications that the virtual connection specification can relate to on other segments of the network template.

Custom attributes

Custom attributes (CAs) are what you use to add an attribute, property, or value to a building block. They are *custom* because your specific business processes and practices dictate their use.

Building blocks are the only areas of the software that you can associate with CAs. Templates, elements, connections, and connection allocations are the four building block types. The building blocks are predefined and are unchangeable.

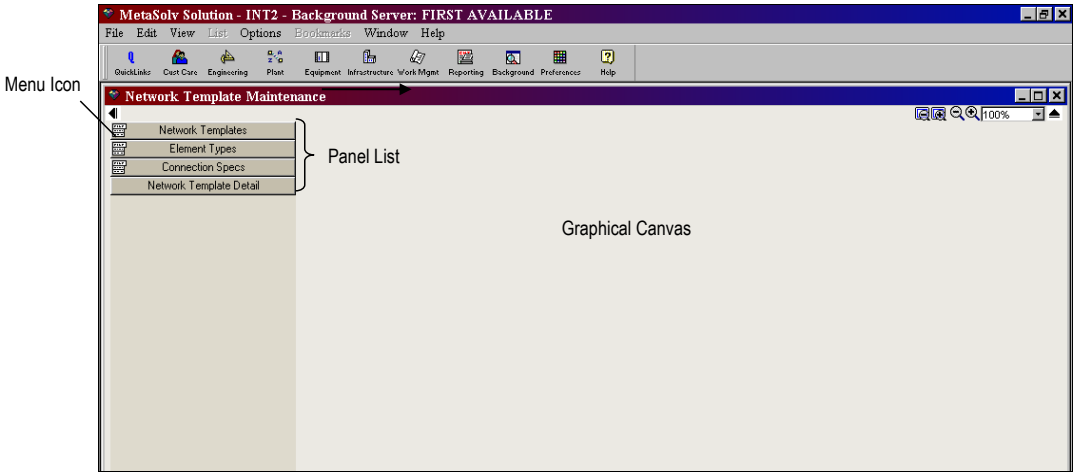
Approximately 80 CAs are included in the data that comes preloaded with M/5.1 and are available immediately so that you can associate them with building blocks.

Navigating the canvas

The primary areas in the Network System module of the software are the panel and the graphical canvas. The panels change, depending on whether you are in the Network Template Maintenance window or in the Network System Design window.

Many of the panels have a menu icon. When you click the menu icon, a list of software options appears. These options differ, depending on the panel you have chosen.

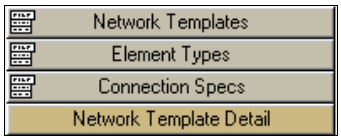
The graphical canvas is the tool that you use to view graphical representations of templates or networks. It provides a view of each element, as well as relationships between the elements. An example of the graphical canvas is shown below.



Template panels

A template panel provides a flexible means of defining what goes into the template canvas.

The panel lists the available network templates, element types, and connection specs for each available technology purchased. In MetaSolv Solution, you will find four different panels:



The Network Templates panel contains the network systems and the templates for every licensed technology.

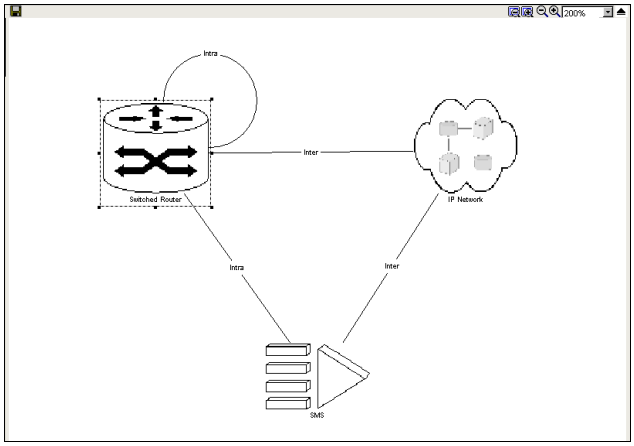
The Element Types panel lists all of the elements that are included with the licensed technology modules. You can use the menu icon to view elements in text format or in a graphical view.

The Connection Specs panel contains the details pertaining to each connection specification.

The Network Template Detail provides an at-a-glance look at which element types and relationships are available for a specific template.

Template canvas

Below is an example of a canvas for an Ethernet access network template.



The above canvas includes a switched router, an IP Network, and a subscriber management system (SMS).

It also reflects the possible future connections (or relationships allowed) between elements.

Navigation tips and tricks

To navigate throughout the canvas and panel, you can:

- Add, move, or delete elements and relationships.
- View properties.
- Expand or open clouds.
- Change the viewing size.
- To add an element, you select it from the panel on the left and drag it to the canvas. Or you can right-click and click **Add to Drawing**.
- To move an element on the canvas, click and hold down the mouse button on the element and drag it to the canvas.
- To delete an element, right click and click **Delete.** Then click **OK** to the message prompt.

Sometimes, you will not be able to delete an element because a relationship exists between that element and another. You will have to remove the relationship first, and then delete the element.

You can view the properties of a template, element, or connection by right-clicking on any of them and selecting **Properties**.

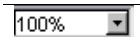
You can use the keyboard to navigate between the fields:

- **Ctrl-Arrow**—To move to the following or previous word in a field.
- **Home**—To advance to the beginning of the field.
- **End**—To advance to the end of the field.

You can expand and collapse clouds by double-clicking them. When you expand a cloud, the elements within the cloud appear.

Buttons and zoom features

The graphical canvas has the following buttons:

Button	Purpose
	To save your template or network system.
	To print the text specifics of your network. (Available only on Network System Design.)
	Click the minus or plus button and highlight the area you want to zoom by dragging the cursor across the canvas to create a stretch box.
	TO INCREASE OR DECREASE THE SIZE OF THE IMAGES ON THE CANVAS IN PRESET INCREMENTS.
	To set the size of the images by selecting a percentage from the drop-down. The default value is 100 percent.

Together—Navigate the canvas

1. To view element properties, right-click the frame relay switch and click **Properties**.

> **Note: Template Properties**
>
> A list of the template property definitions are in Appendix B.

2. To expand an embedded template, double-click the **IP Network** cloud.

> **Note: Collapsing Networks**
>
> Double-click a cloud again to collapse an embedded template.

3. To resize element types on the canvas, click **400%** from the size drop-down.
4. In the size list, click **50%.**
5. In the size list, click **Page.**
6. Click the **Click and Zoom In** tool  .
7. Use the mouse to draw a box around the SMS and the frame relay switch.

8. Click the **Zoom Out** tool  .
9. Right-click the canvas, and click **Close Template**.
10. Click **Yes** to save.
11. Double-click the **USER*nn* Frame Relay Access Network** template to open it.

    The network template should have the same view as when you saved the drawing with the IP Network expanded.
12. To add element types, click the **Element Types** panel.
13. Drag the **Other Provider Network** element onto the canvas area.
14. In the panel, right-click and click **Close Template**.
15. Click **Yes** to save.

Downstream effects

How you define the network element types and connection specs in your network templates will affect:

- Network design
- Orders
- Provisioning

Downstream effects—Network design

The element and connection relationships you use to design a network inherit the properties you defined for that element and connection relationship in the template.

For example, assume in the frame relay core template, you customize a bandwidth connection between two frame relay switches to have a transmission rate of OC-3. If you use that template to design a network, you will not be able to associate any bandwidth connections between frame relay switches that do not have the rate code of OC-3.

With the template, you do not need to redefine properties every time you add an element or connection to a system, and you cannot break any rules that underlie how your networks are to be designed.

Downstream effects—Orders

Network templates determine which systems, elements, and connections you can order on a product service request (PSR).

When you build product offerings, you associate them with network templates, and those templates drive what you can order.

For example, assume an order has been placed for a virtual private network (VPN), and you are the ordering specialist. You select the VPN item type from the product catalog. The template previously associated with the product determines the types of elements and connections you can add to the PSR from that point forward. As you add items to the PSR, the properties defined for those items in the template may prompt you for additional information.

Downstream effects—Provisioning

The rules, properties, and custom attributes of an ordered item (system, element, or connection) associated with a template control how you provision that item.

For example, assume you are the engineer on the VPN that was ordered in the preceding example. When you execute the NET DSGN task from your work queue, you will see the new network canvas. As you design each connection for the ordered VPN, the assignments you make will be driven by and will depend on the connection specs and equipment associated with the element types that you are making the assignment to.

Customize a template

From MetaSolv's standpoint, the purpose of a technology module is to provide you with all the tools you will need to design your networks, process orders, and provision across those networks.

When MetaSolv engineers designed the technology modules, they tried to consider every element and connection that might be needed to support the given technology.

You can modify element types, connection relationships and specifications, and prioritized paths.

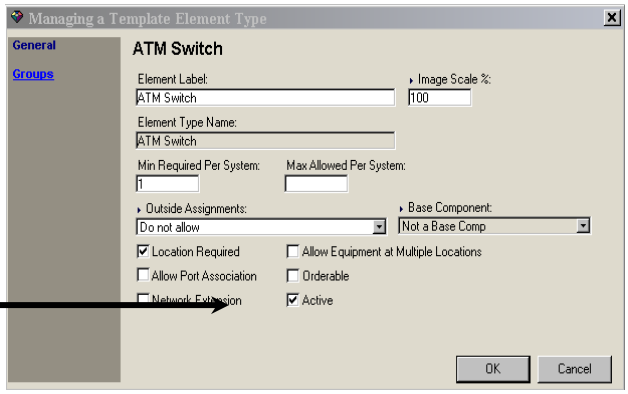
For example, you can set the properties on a connection to *Auto ID* so that if you have correctly set up the provisioning plans and tasks, the software will identify the connections automatically. Also, if a connection is to be customer ordered, you must set the connection properties to be orderable.

INACTIVATE AN ELEMENT

You can prevent elements from being used, either by inactivating it.

To inactivate an element, you remove the check from the Active check box in the element properties.

Uncheck this checkbox.



Remove locks

It is recommended that the security administrator secure the templates and limit the access to individuals who are familiar with the networks.

When a template is being modified, it is locked so that others see it in read-only mode and cannot modify it at the same time. Security administrators should have rights to this area of the software so that they can "unlock" templates.

Removing locks allows you to have access to a network template, element type, or connection specification currently open by another user. It also lets you unlock an object that—because of a server crash—was never closed.

Warning: Unlocking Templates

The system does not warn the person who is using the template, element type, or connection specification that you are going to unlock it. Removing Locks does not automatically save any changes made by the person who locked the object.

You should inform the person listed in the **Locked By** column that you intend to unlock the template, element type, or connection specification. Do not remove locks until you get that person's consent.

Steps to remove locks

1. Click **Engineering>Net Systems**.
2. From the primary toolbar, click **Options>Remove Locks**.

3. From the **Remove Locks** window, right-click an object you want to unlock and click **Remove Lock**.
4. Click **Apply**.

Note: No Remove Locks Option

To see the Remove Locks option from the menu, you must close out of any templates or network designs and return to the Network Systems window.

On Your Own

Please answer the following questions and complete the fill-in-the-blanks exercise on the following page.

1. In your own words, define the difference between a template and a template type.

_____

_____

~~2.~~ ~~What is the primary reason for including templates from each technology that you license into a holding template?~~

_____

_____

~~3.~~ ~~To create a reference template for the ATM/Frame TEM, what template or templates will you embed in the Holding template?~~

_____

_____

~~4.~~2. Open the FR Access Network Template. What is the name of the embedded network template that resides in this template?

_____

_____

~~5.~~3. Fill in the numbered blanks with the following terms: Element Type, Network Template, Relationship.

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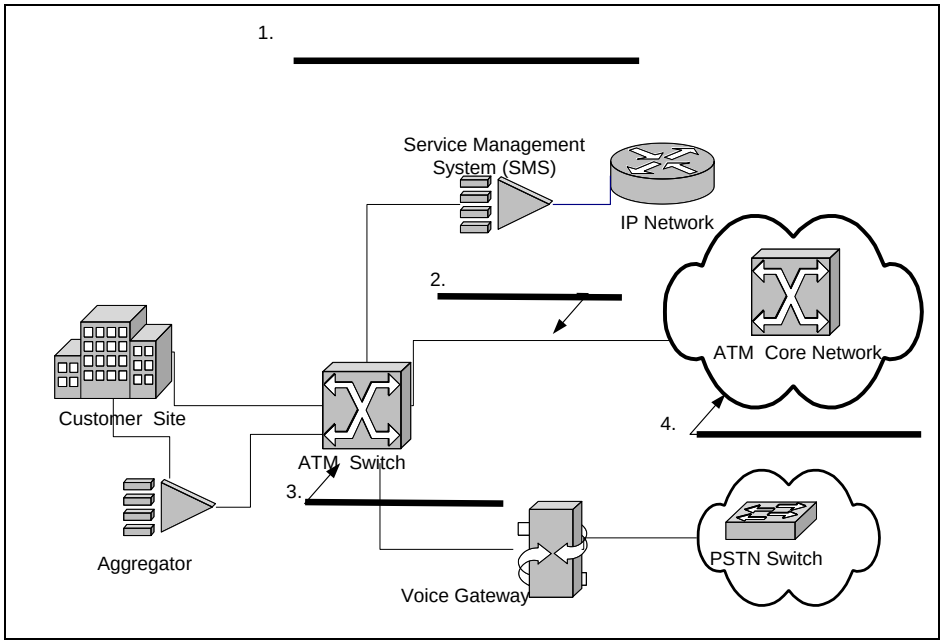


Chapter Review

IN this module, you learned how to navigate the template canvas, remove locks and customize templates.

Chapter 3

Identify Technology Module data

What you'll learn in this chapter

This chapter is designed to define the various data provided with MetaSolv Technology Modules. To learn about technology modules, you will review the ATM/Frame Relay technology module.

Objectives

At the end of this chapter, you will be able to:

- Identify technology module data.
- Identify the data included with the ATM/Frame Relay technology module.

Technology module data

Each technology module includes various data including rules, elements, connections and custom attributes. Different technology modules will include various network templates. Some modules such as ATM/Frame Relay include six network templates, whereas, the SONET/SDH module includes one network template. In this chapter, you will review the data included with the ATM/Frame Relay technology module.

ATM/Frame Relay technology module data

The data included with the ATM/Frame Relay technology module appears in the various ATM/Frame Relay network templates. The data includes element types, relationships, and custom attributes. You can customize data to implement your products with your network systems.

You can purchase various technology modules as software options. When MetaSolv Solution is delivered, the base data for the technology modules is included. The product key given to the

installation person is encoded to activate the purchased technology modules. After the product is installed, the technology module should be active.

ATM/FR network templates

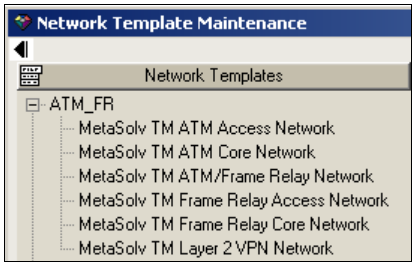
The ATM/FR technology module has six network templates.

You can use any combination of templates to build an ATM network, a frame relay network, or an Interworking network system.

You build or customize your access and core network templates first and then embed them into the MetaSolv TM ATM/Frame Relay Network template. The core network template does not have a customer access connection to the network. You must use the access network template if you want to offer service that can be ordered and provisioned to customers. Or you can customize the core network template to include customer access connections.

INCLUDED NETWORK TEMPLATES

The following network templates are included with the ATM/ Frame Relay technology module or ATM_FR template type:

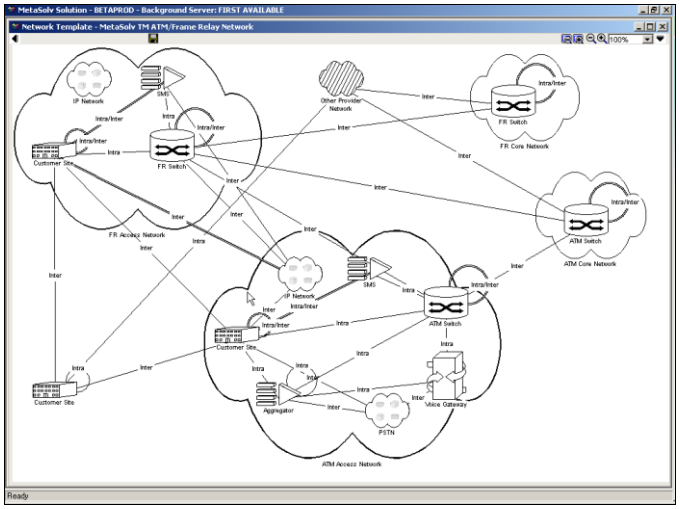


Element types

As with network systems, you can pick and choose the element types that meet your network requirements, or you can add new ones. Below are the element types included with the various network templates.

ATM/FRAME RELAY

The following diagram illustrates the data that is included with the MetaSolv TM ATM/Frame Relay network template. You can see four different clouds displayed on the graphic canvas. Each one of these clouds is considered an embedded template in the MetaSolv TM ATM/Frame Relay Network template.

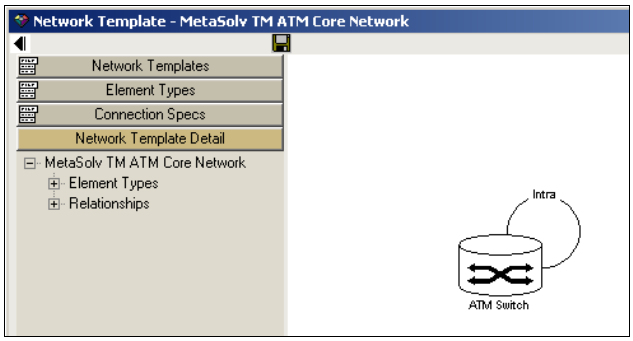


The customer site appears on the network template above. However, when you use this template for designing the transport network system, the customer site will not be an available element because it is not part of the provider's transport network. The customer site appears on the template so that you can order customer access and provision across the transport network.

ATM CORE

The ATM Core network template includes only the ATM switch as an element type.

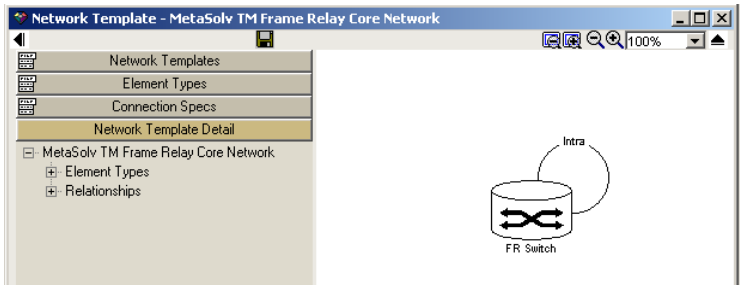
Below is an example of the ATM Core Network template.



The large loop around the switch means that you can connect to the same element type in a network system that you used this template to build.

FRAME RELAY CORE

The Frame Relay Core network template includes only the frame relay switch as a network element.

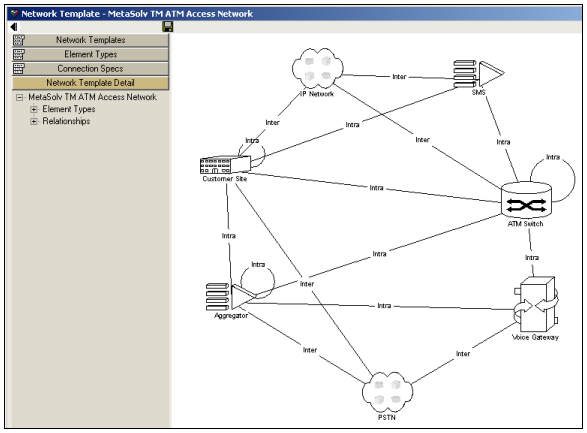


ATM ACCESS

The following element types are included with the ATM Access Network template:

- Customer Site
- Aggregator
- IP Network
- Public Switched Telephone Network
- Voice Gateway
- Subscriber Management System (SMS)
- ATM Switch

Below is the ATM Access Network template:



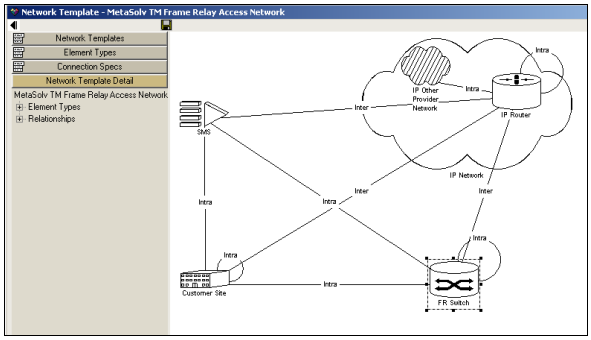
The PSTN and the IP Network are represented as clouds because they are considered embedded element types. To modify data for one of these element types, it would be necessary to open the corresponding network template to make the changes.

FRAME RELAY ACCESS

The following element types are included with the Frame Relay Access Network template:

- Customer Site
- IP Network
- Frame Switch
- SMS

Below is an example of the Frame Relay Access Network template:



As you can see, connections to element types appear inside the expanded (or embedded) cloud (IP Network). The IP Other Provider Network, as indicated by the cloud with the diagonal lines, cannot be expanded in this template or in the IP Network template. Other than a connection to the cloud, no direct association exists to any element within the IP Other Provider Network.

Connection specs

Several connection specifications are included with the ATM/FR technology module:

- **Assignable Bandwidth Links**—The physical connections between elements.
- **Unassignable Bandwidth Links**—The physical connections, such as DS1s, that are used with inverse multiplexing.
- **Inverse Multiplexing Group**—An aggregate group of connections used together to allocate more capacity.
- **Enterprise Connection**—A virtual connection that you use to connect one customer site to another customer site.
- **Internet Connection**—A virtual connection that connects a customer site to the Internet.
- **Switched Virtual Circuit**—A virtual connection that can connect a customer site to a switch. No set path exists through the network because the route is established on a call-by-call basis.
- **Voice Connection**—A virtual connection from a customer site to the Public Switch Telephone Network (PSTN).
- **V5.2 Facility Circuit**—A physical connection used to access the PSTN over E1 facilities.
- **GR-303 Group**—A group of GR-303 connections to access the PSTN.
- **V5.2 Group**—A group of 5.2 connections to access the PSTN.
- **GR-303 Facility Circuit**—A physical connection to access the PSTN.

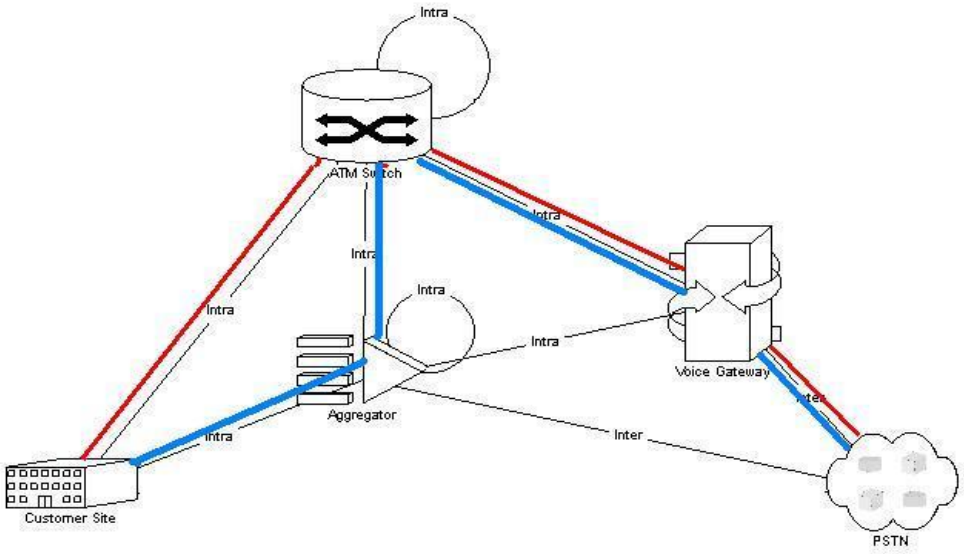
Demo—Look at relationships and specs

Watch as your instructor opens the Frame Relay Access network template and views the connection relationships and the associated specifications. The instructor will also show you how to add connection specs to a relationship.

Prioritized paths

Prioritized Paths are the physical paths that a virtual circuit can ride over a transport network. You can create multiple paths for virtual circuits and prioritize them.

The figure below shows two paths between the customer site and the PSTN. The thin lines represent the physical connections and the thicker lines represent two different virtual paths.



During service provisioning, a designer can manually provision service or have it done through path analysis. If the designer decides to let the software select the path used for provisioning, the highest priority path with available positions will be used to provision service.

Custom attributes

Numerous custom attributes are predefined for use with the ATM/Frame Relay technology module. Many of the items covered in the ATM/Frame Relay Overview in this module might appear as custom attributes throughout the process of ordering and provisioning ATM/Frame Relay services.

You will most likely see the following Custom Attributes:

- **Broadband Service Category**—To choose “Cell” for ATM or “frame relay” for frame relay transport.

- **Bit Rate**—To select the bit rate of a connection.
- **UNI/NNI**—To choose whether the connection is a User to Network Interface (UNI) or a Network to Network Interface (NNI).
- **Tagging Option**—To identify the customer's cell loss priority, related to discarded cells during congestion.
- **Service Parameters/QoS**—To identify parameters based on the Broadband Service Category selected.

Together—View the FR access template

1. Click **Engineering>Net Systems>Templates**.
2. Click the **Network Templates** panel.
3. Expand **ATM_FR** by clicking the "**+**."
4. Double-click **User*nn* FR Access Network**.
5. In the Network Template Detail panel, expand **Element Types** to view the element types available with this template.
6. In the Network Template Detail panel, expand **Relationships** to view the available connection types.
7. In the Network Template Detail panel, expand a relationship to view the connection specifications associated with the connection types.
8. Right-click the canvas and click **Close Template**.

Together—View prioritized paths

Open the ATM Access Network template and view the connection between the customer site and the PSTN.

1. Open the **ATM Access** template.
2. Right-click the relationship between the customer site and the PSTN and click **Properties**.
3. Click the **Connection Specs** link.
4. Double-click **Voice Connection**.
5. Click the **Assignable Connection Specs** link.
6. Various segments can connect the customer site to the PSTN. (You can add your own segments from this window.)
7. Click the **Prioritized Paths** link.

8. Double-click a **prioritized path** to open it.

   A path is shown between the customer site and the PSTN. You can change the paths, based on the assignable connection specs.

9. Open the **Layer 2 VPN** template.
10. Right-click the **connection** from Customer Edge Router to Customer Edge Router.
11. Click the **Connection Specs** link.
12. Double-click **Layer 2 VPN Connection**.
13. Click the **Assignable Connection Specs** link and view the available assignable connection specs.

Note: Layer 2 VPN Assignable Connection Specs

The Layer 2 VPN template is preloaded, with VPN Links as the only type of assignable connection specs. This template has been modified to include various assignable bandwidth connections between ATM/FR elements.

Because of this modification, you can provision the virtual connection over the VPN Links from the customer site and over the ATM/FR transport network. (You will see this provisioning in the Layer 2 VPN module.)

14. Close back to the Network Template window.

Together—View custom attributes

1. From the network template window, click the **Connection Spec** panel.
2. Expand **Virtual Connection**.
3. Double-click **Internet Connection**.
4. Click the **Custom Attributes** link.
5. Right-click the canvas and click **Close Template**.
6. Click **No** to not save the template changes.

On your own—Review and exercises

Open the Frame Relay Access Network template and answer the following questions:

1. What connection specs are associated with the relationship between the customer site and the frame relay switch?

   _____

   _____

2. What connection specs are associated between the SMS and the IP Network? In the current template configuration, what, if any, is the relationship from the customer site to the SMS?

   _____

   _____

Open the ATM/Frame Relay Network template and answer the following questions:

3. What connection specification is available to connect two customer sites?

   _____

   _____

4. List four element types included in the ATM Access Network template.

   _____

   _____

5. List the intermediate elements in the first prioritized path that connects one customer site to another customer site.

   _____

6. List three custom attributes associated with an Enterprise connection. Hint: Look at the panel list. Enterprise is a virtual connection.

   _____

Chapter 3

Equipment Overview

What you'll learn in this chapter

This chapter is designed to provide very high-level background information on equipment specifications and installing equipment.

Objectives

At the end of this chapter, you will be able to:

- Enter equipment specifications
- Install equipment

Equipment specifications

An equipment specification is a reusable definition of a specific equipment type. Equipment specifications identify the basic characteristics of a piece of equipment.

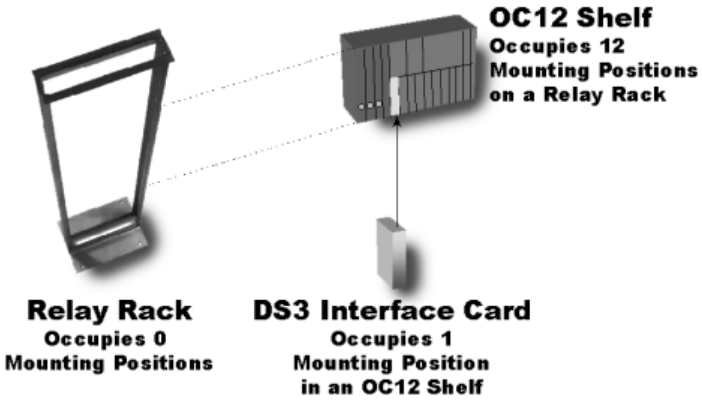
An equipment specification or spec can also be described as a generic template for a specific piece of equipment that will be re-used for installing equipment. For example, if you use the same type of shelf in multiple locations, you would have one equipment specification, but you would install it in the different locations. Once the equipment has been installed, you can add more specific information.

Equipment types

Equipment Types are the basic classification or category of equipment specifications. You can use equipment types to describe either a function or a grouping of specific equipment. MetaSolv Solution is preloaded with an extensive number of equipment types, or you can create your own equipment types.

Positions occupied

The value in the Positions Occupied field indicates how many positions a specific piece of equipment occupies on another type of equipment. For example, a relay rack occupies zero positions in another piece of equipment because a relay rack is generally mounted to the floor or a wall; therefore, it is not occupying space in additional equipment. An OC12 SONET shelf might occupy twelve positions on a relay rack, while a DS3 Interface card occupies one position on the OC12 SONET shelf.

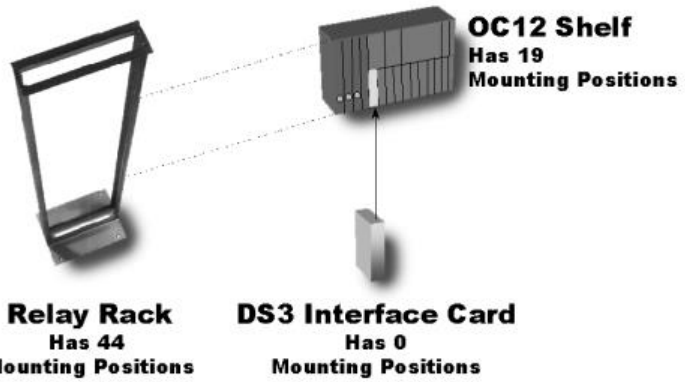


Note: Relay Racks and Zero Mounting Positions

Some equipment, such as a digital switch or a digital cross-connect system, can include a higher-level piece of equipment than a relay rack. For example, a Lucent 5ESS switch incorporates a piece of equipment called an "aisle," which contains several cabinets (similar to relay racks). In this case, the aisle occupies zero mounting positions, and the cabinet occupies one position.

Mounting positions

The value in the Mounting Positions field specifies the number of positions or spaces in which you can mount or attach additional pieces of equipment. A mounting position can contain transmission and non-transmission pieces of equipment. The mounting positions of a specific piece of equipment can also have different names. For example, you could refer to the mounting positions on a relay rack as "bolt holes" and the mounting positions on a shelf as "slots."



Port addresses

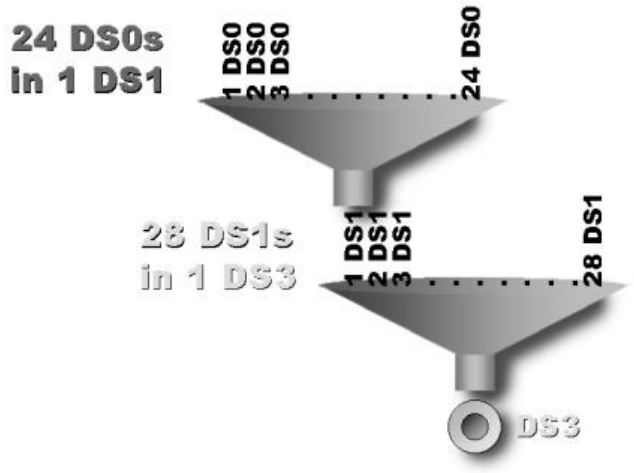
A port address is the physical location, such as a wire connection, on a piece of equipment where signals enter or leave. Each port address has an assigned rate code. The rate code specifies the type of connection that can attach to the piece of equipment. Generally, cards have a physical port address, but shelves can also have physical ports. For example, a di-group channel bank has two DS1 ports, and an M-1-3 has one DS3 port.

Line side – drop side

Each physical port can have either a line side designation or a drop side designation. Typically, the line side ports represent the high-speed or incoming signal toward your network. The drop side ports represent the low-speed signals, either dropping to other equipment or away from the network to end users.

Enabled port address

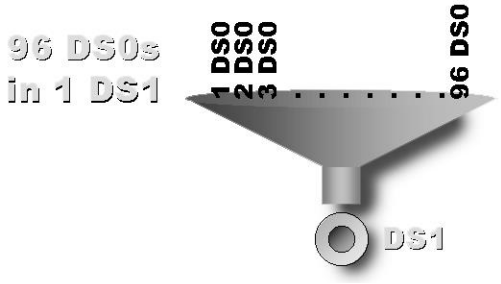
An enabled port address is a software address associated with the physical port address. A physical port can have one or more levels of enabled port addresses.



The example above shows a physical DS3 port on a card. The DS3 card enables 28 DS1 port addresses. Each DS1 signal enables 24 DS0 port addresses. Therefore, after a connection is assigned to this DS3 physical port, you can assign 28 DS1 connections and 24 DS0 connections to each DS1.

Virtual ports

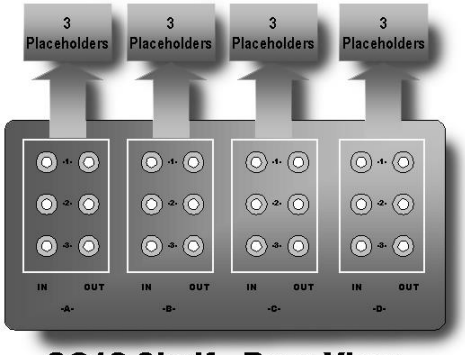
Virtual ports are conceptual ports on a piece of equipment that do not physically exist. You can use them to work with digital loop carrier (DLC) systems, where the capacity of the system is greater than the available transport channels. If you have enabled the IP Address Management software option, you can also use virtual ports to assign IP addresses generically to a piece of equipment.



For example, you can design a DS1 port with 96 DS0 virtual ports. After installing the equipment, you can assign 96 DS0 connections to the DS1, although the DS1 has only 24 DS0 positions.

Port address placeholders

Port address placeholders are associated with a specific mounting position on a shelf. They specify the number of ports and the associated rate code for the port on the cards installed in a mounting position.



OC12 Shelf - Rear View

With port address placeholders, you can specify cross-connections between the mounting positions on the shelf and other pieces of equipment before you actually install cards in the mounting positions.

For example, a typical OC12 add/drop multiplexer shelf has four groups of low-speed interface cards. When installed, the shelf will accept DS3, STS1, or OC3 cards. When you create an equipment specification for the OC12 shelf, you specify placeholders for the cards you will cross-connect after installation. Since each card has three ports, you specify three placeholders for each of the mounting positions.

Each placeholder has an associated rate code. However, when you install cards with different rate codes (such as DS3 and STS1), you can specify a rate code of *N/A* to cross-connect to ports of any rate code.

Software specifications

A software specification is a reusable definition of a specific software type. It defines the basic characteristics of the software associated with a piece of equipment.

Typically, you use software specifications with Internet equipment such as servers. Like equipment specifications, you categorize software specifications by software types. There are preloaded types, and you can create your own software types.

Equipment specifications tab

The Equipment Spec tab contains the basic required information about a piece of equipment, including the manufacturer's name, equipment part and model numbers, and the number of mounting positions the equipment occupies. You must complete all o f the required fields, which appear in blue on this tab. The non-required fields add detail to the spec.

Some companies require additional information to assist in equipment installation and for maintaining an equipment inventory. Below is a list of the fields on the Equipment Spec tab:

Field Name	Field Description
Type	Displays equipment categories. For example, all relay racks are categorized as type RELAY RACK, regardless of the manufacturer or part number.
Manufacturer	The name of the manufacturer of the piece of equipment.
Part Number	A part number or serial number that the manufacturer assigns to the piece of equipment.
Comm Code	Manufacturer or vendor code that identifies a unit of equipment beyond its part number. (AT&T frequently uses Comm codes.)
Issue Number	The manufacturer's issue number for the equipment. An issue number may simply identify a later version (or issue) of a piece of equipment.
Model Number	Displays the model number that the equipment manufacturer assigned to the equipment.
ACRONYM	Identifies an abbreviated name for a specific piece of equipment. The acronym can be up to ten characters and appears on the design lines, the CLR, and the DLR.
Mounting Type	A free-form text area to enter additional information about where and how this equipment is installed.
Description	A free-form text area to enter information that further describes an abbreviation or a code.
Notes	A free-form text area to enter comments describing the usage of the equipment.
Positions Occupied	Specifies the number of slots or mounting positions that this piece of equipment occupies in another piece of equipment. All base equipment must occupy zero mounting positions.
Height in Inches	Identifies the vertical dimensions of the equipment, measured in inches
Depth in Inches	Identifies the dimensions of the equipment from front to back, measured in inches.
Width in Inches	Identifies the dimensions of the equipment across the front, measured in inches.
Material Code	Identifies the material control code assigned to this equipment for inventory purposes.
CLEI (checkbox)	Common Language Equipment Identification; identifies a specific piece of equipment. Telcordia Technologies administers this standardized code.
Line Equipment Indicator (LEN)	Indicates that this is the last piece of equipment in a dedicated plant assignment block and can be used to terminate an outside plant at a central office.
CPE Capable (checkbox)	Customer Premise Equipment Capable; indicates that the equipment spec will be used for installation at the customer site.
Virtual Mapping Capable (checkbox)	Specifies that the equipment spec is for a device in the equipment hierarchy that supports cards with ports that can be pre-provisioned with the virtual path utility.
Dynamic Build Virtual Port	Indicates that you want to build the virtual ports after you install the equipment.
Active	Indicates that the status of an equipment or software specification is "Active." The number of equipment pieces using the spec appears beside this checkbox.

Configuration tab

The Configuration tab contains configuration information about a piece of equipment. Use this tab to specify power requirements, loss and resistance ranges, transmit and receive signal levels, and signal loss or gain information.

Filling in the Configuration tab is optional; however, if you want to automatically calculate analog transmission level points for channel units, you must fill out the fields on this tab.

Field Name	Field Description
Power Requirements	The amount of power that this equipment uses.
Loss Range	The amount of loss in dB that the equipment will tolerate on a cable pair.
Resistance Range	The maximum resistance in ohms that the equipment will tolerate on a cable pair.
Transmit In Level	The recommended input level in dB.
Transmit Loss or Gain	The recommended loss or gain in dB across the transmit side.
Transmit Out Level	The recommended dB value of the signal strength leaving the equipment on the transmit side.
Receive In Level	The recommended receive level in dB.
Receive Loss or Gain	The recommended loss or gain in dB across the receive side.
Receive Out Level	The recommended output level in dB on the receive side of the equipment.

Mounting positions tab

The Mounting Positions tab describes the physical view of mounting positions on a piece of equipment. For a shelf, the mounting positions represent where you install cards. A good practice is to specify the slot name for mounting positions on the shelf, whether the equipment has programmable or engineering capability or not.

On a relay rack, mounting positions represent where you install other pieces of equipment. The slot names are not critical to the functionality of the specification.

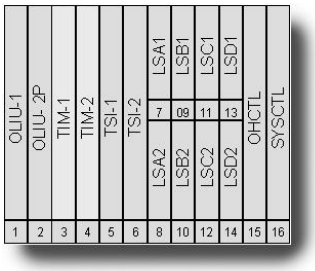
The Mounting Positions tab has the following fields:

Field Name	Field Description
Line	The system-generated line number assigned to each mounting position.
Position	A user-defined line number preference that identifies a specific mounting position on a piece of equipment. The number can start from 00 or 01.
Group	The user-defined group assigned to the mounting position.
Slot Name	The name for this slot on this piece of equipment.
Slot Node Address	The shelf mounting position of the node address.  **Note:** The Slot Node Address displays on an installed piece of equipment and in the

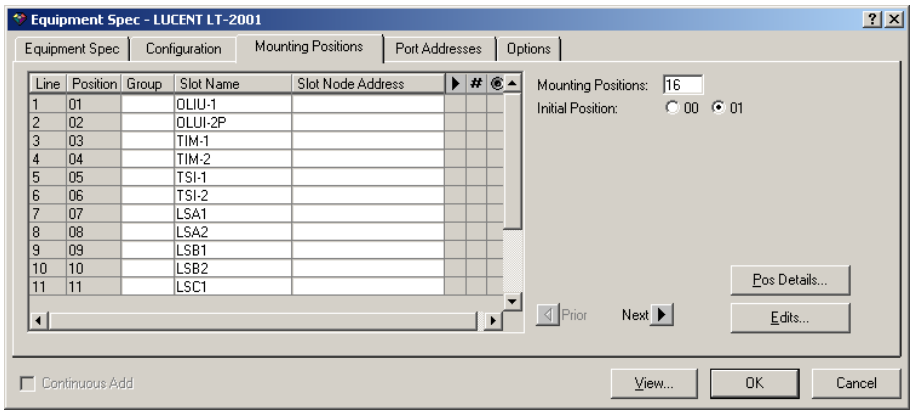
Field Name	Field Description
	miscellaneous column of the CLR and DLR.
Port Address Placeholders	The port address placeholders specify the rate code and the number of ports a mounting position will have after a piece of equipment is installed in that mounting position. The best practice is to create placeholders only for the ports that can be cross-connected. The ▶ (arrow) icon displays in the column after the slot node address and specifies that the slot has at least one port address placeholder.
Sequential Port Numbering	If a mounting position has a sequential port numbering scheme defined, a # (pound sign) displays in this field.
Related Mounting Positions	If a mounting position has a relationship to another mounting position, the port icon displays in this field.

Numbering mounting positions

Several shelves include multiple rows to which you can attach cards or modules. For these types of equipment specifications, you must decide how you want them represented in the software. For example, in the drawing below, mounting positions 07 through 14 appear on two rows within the shelf. Therefore, it is necessary to define how the shelf numbering will be represented in the software.



The SONET shelf above has sixteen card slots. You can see by the associated numbering in the graphic above and the software screenshot below how the card slots are represented in this example.



Port address tab

Physical ports, also referred to as port addresses, are assigned a rate code and represent where the signals enter or exit the respective equipment. The rate code assigned to a port implies the ability to attach a connection with a rate code of equal value.

The Port Addresses tab describes each port on a piece of equipment and has the following fields:

Field Name	Field Description
Line	System-generated number that uniquely identifies and sequences mounting positions and port addresses for an equipment spec or a piece of installed equipment.
Node Address	Concatenated node address for a port. Used to number a rack or shelf on the equipment spec or uniquely identify the rack or shelf at installation.
Group	User-defined field that indicates to which group a specific piece of equipment belongs. Groups within pieces of equipment allow for greater capacity.
Rate Code	Transmission rate code associated with a connection position or equipment port address.
Line/Drop	Identifies whether the port address is for the line side or the drop side of the equipment.
VC Limit	Maximum number of virtual connections allowed for the equipment port.
Address Levels	Number of pieces of equipment MetaSolv Solution takes into consideration when concatenating the node address for a port.
Enabled Port Address Arrow (Not Labeled)	Indicates that the corresponding port address has at least one enabled port address. If there is an enabled port address, it will be marked with an arrow in the column to the right of the virtual column.
Port Addresses	Total number of port addresses that this equipment provides.
Default Mapping Type	Specifies the default mapping scheme that a piece of equipment uses; VT1 to DS1 default mapping. The options are Lucent, Nortel, and straight.
Use Async/Sync Indicator	Specifies whether the port is asynchronous or synchronous.
Prior	View or create the previous level of enabled port addresses.

Field Name	Field Description
Next	View or create the next level of port addresses or enabled port addresses.
Virtual (checkbox)	Indicates whether the selected port is virtual, if checked, or is physical, if unchecked.

OPTIONS TAB

The Options tab establishes a comprehensive list of all software and hardware options associated with the equipment specification that the vendor provides. When you install this equipment, you can specify which options, if any, are present on the installed equipment.

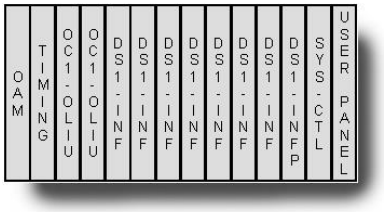
At installation, when you define options for an equipment spec, you can use the Options tab to assign the options to a specific piece of equipment. Equipment options that you assign to installed equipment display in the Notes section on the CLR/DLR.

The Options tab has the following fields:

Field Name	Field Description
Option	A code describing a specific option that is installed or can be installed in a piece of equipment.
Description	Information that further describes an abbreviation or code on a particular window. The description field displays the free-format description that was entered for the code.
New	Creates or adds a new record.
Delete	Removes an existing record.

Together—Enter equipment specification

You will enter an equipment specification for an OC1 SONET shelf that occupies 10 mounting positions in a relay rack. The Common Code of this OC1 shelf is 0, and this is the first issue of this shelf. The following graphic displays the cards to be installed and their mounting positions on the ACMETEL OC1 shelf.



The OC1 SONET shelf has 14 mounting positions in which cards will be installed or placed. Each of the seven DS1 interface cards has four DS1 port address placeholders. (The DS1 INFP protect card does not have any port address placeholders.)

COMPLETE THE EQUIPMENT SPEC TAB

1. Click **Equipment>Equip Spec**.
2. Click **New**.
3. In the Type list, click **SHELF-SONET**.
4. On the **Equipment Spec** tab, enter the information from the table below:

Field Name	Input Value
Manufacturer	ACMETEL
Part Number	ACM-01-*nn*
Comm Code	0
Issue Number	1
Model Number	ACM-01
Acronym	OC1 Shelf
Description	OC1 Shelf used for 28 DS1s
Positions Occupied	10
Active	Checked (default)

COMPLETE THE MOUNTING POSITIONS TAB

1. Click the **Mounting Positions** tab.
2. In the Mounting Positions field, type **14**.
3. Press the **Tab** key on your keyboard.
4. Enter information for the first four mounting positions as follows:

Position	Slot Name	Slot node Address
1	OAM	
2	Timing	
3	Main-1	M-1
4	Main-2	M-2

USE THE EQUIPMENT SPEC EDITS WINDOW TO ENTER MOUNTING POSITION DATA

You use the Edits tool for editing multiple lines of information at a time. You can select a range of line numbers and enter data that is common to all lines in that range.

1. Click the **Edits** button.
2. Complete the following fields on the Equipment Specs Edits window:

Field Name	Data
Line Number (Left)	5
Line Number (Right)	11
Slot Name	LS-
Placeholders	4
Rate Code	DS1

3. Click **Apply**.
4. Click **Close**.

   The Mounting Positions tab displays "LS-" in the Slot Name column for mounting positions 5 through 11. It also shows a port address placeholder arrow in the Port Address Placeholder column.

Note: Port Address Placeholders

For this spec, the DS1 "drop" ports are the only ports that will be cross-connected.

5. Manually add the numerals to each slot name for mounting positions 5 through 11, as shown below:

Position	Slot Names	Slot Node Address
5	LS-**1**	
6	LS-**2**	
7	LS-**3**	
8	LS-**4**	
9	LS-**5**	
10	LS-**6**	
11	LS-**7**	

6. Manually complete mounting positions 12 through 14, as shown below:

Position	Slot Names	Slot Node Address
12	LS-8 (P)	
13	SYS CTL	
14	USER PANEL	

7. Click **View**.

   The Equipment Spec View window displays a treeview of what your installed equipment will look like.

8. Click **Close**.
9. Click **OK**.
10. Close back to the primary toolbar.

Note: Port Address Placeholders

The mounting positions for the high-speed slots (Main 1 and Main 2) and the low-speed protection slot (LS-8(P)) do not have port address placeholders. For this spec, the DS1 "drop" ports are the only ports that will be cross-connected.

Together—Enter equipment specification

You will create an equipment specification for the OC1 Optical Line Interface Unit (OLIU) card, which will be installed in the high-speed (or main) slots of the OC1 SONET shelf. The OC1 OLIU card has a line side port address of OC1 and drop side enabled port addresses of STS1, VT1, and DS1. The card uses the following signal hierarchy:

- 1 OC1 = 1 STS1
- 1 STS1 = 28 VT1s
- 28 VT1s = 28 DS1s (1 DS1 signal for each VT1)

For a digital signal (DS1) to ride on an optical network (SONET), it must be broken down through an electrical signal (STS1) and compartmentalized into virtual tributaries (VT1).

COMPLETE THE EQUIPMENT SPEC TAB

1. Click **Equipment>Equip Spec**.
2. Click **New**.
3. In the type list, click **CARD-SONET**.
4. On the **Equipment Spec** tab, enter the information from the table below:

Field Name	Input Value
Manufacturer	ACMETEL
Part Number	ACM-02-*nn*
Comm Code	0
Issue Number	1
Model Number	ACM-02
Acronym	OC1 OLIU
Description	OC1 Optical Line Interface Unit

Field Name	Input Value
Positions Occupied	1
Active	Checked (default)

COMPLETE THE PORT ADDRESSES TAB

1. Select the **Port Addresses** tab.
2. In the Port Addresses field, type `1`.
3. Press the **Tab** key.

   The specified number of port addresses displays on the screen.
4. Complete the line 1 information as follows:

Field Name	Data
Node Address	*Leave blank*
Group	*Leave blank*
Rate Code	OC1
Line/Drop	Line
VC Limit	*Leave blank*
Address Level	Three

SPECIFY THE FIRST LEVEL OF ENABLED PORT ADDRESSES

The specification for accommodating subtending ring relationships includes three levels of enabled port addresses. The first level is for STS1. To specify the first level, perform the following steps:

1. Place the cursor on the line for the physical OC1 port address.
2. Click the **Next** (right arrow) button.

   A blank Port Addresses tab displays.
3. In the **Port Address** field, type `1`.
4. Press the **Tab** key.
5. Complete the line 1 information as follows:

Field Name	Data
Node Address	1
Group	*Leave blank*
Rate Code	STS1
Line/Drop	Drop
Address Level	Three

SPECIFY THE SECOND LEVEL OF ENABLED PORT ADDRESSES

The STS1 enabled port has 28 VT1 enabled ports. To specify the second level, perform the following steps:

1. Place the cursor on the line for the enabled STS1 port.
2. Click the **Next** (right arrow) button.

   A blank Port Addresses tab displays.
3. In the **Port Addresses** field, type *1*.
4. Press the **Tab** key.

   The Port Address tab displays 28 lines with the default DS0 rate code. You are now ready to edit the enabled port address information.

COMPLETE THE ENABLED PORT ADDRESS INFORMATION

Next, you will use the Equipment Specs Edits window to complete the enabled port address information:

1. Click the **Edits** button.
2. Complete the following fields on the Equipment Specs Edits window.

Field	Data
Line Number (Left)	1
Line Number (Right)	28
Group	*Leave blank*
Rate Code	VT1
Line/Drop	Drop
Address Level	Three

3. Click **Apply**.
4. Click **Close**.

SPECIFY THE THIRD LEVEL OF ENABLED PORT ADDRESSES

Each VT1 enabled port has one DS1 enabled port address. Perform the steps below to specify the third level of enabled port addresses:

1. Place the cursor in line 1 and click the **Next** (right arrow) button.

   A Port Addresses tab displays one line with a DS0 rate code.

2. In the **Port Addresses**, type `1`.
3. Press the **Tab** key.
4. In the Rate Code list, click **DS1**.
5. Click the **Prior** (left arrow) button.

   The second level of enabled port addresses displays. Notice that an arrow displays in the far right column to specify that the port has at least one enabled port.
6. Place the cursor on the next line and repeat steps 1 through 5 for the next two VT1 enabled ports. Then each VT1 enabled port will have one DS1 enabled port.

On Your Own—Enter equipment specification

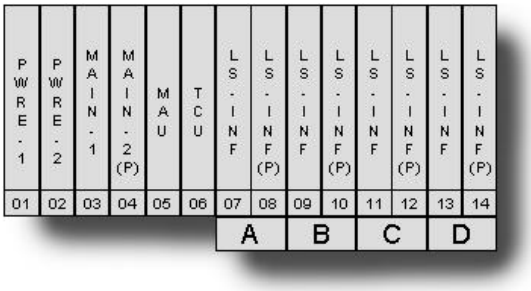
NewTel is growing rapidly and has purchased some DSL equipment from Alcatel, including a DSL shelf. Using the information provided below and on the following page, enter a new equipment specification in the equipment inventory.

This DSL shelf includes slots for two main or high-speed cards and four low-speed DS3 interface cards, as well as slots for the corresponding DS3 protection cards.

In addition, this shelf has mounting positions for the following:

- Common cards (including a monitoring and alarm unit)
- Power cards
- Timing cards and control units

Use the equipment specification graphic below and the data sheet on the next page to enter the equipment specification for this shelf.



Equipment Specification Data Sheet	
Type of Equipment	Shelf - DSL
Manufacturer	Alcatel
Part Number	7350 ASAM*nn*
Common Code	0
Issue Number	1
Model Number	7350 DSL
Acronym	DSL shelf
Positions Occupied	8
Description	Alcatel 7350 ASAM DSL Access Concentrator
Mounting Positions and Descriptions	
Mounting Positions	14 (Refer to the drawing on the previous page to see the layout of the mounting positions.)
PWRE (1 AND 2)	Power - Converts primary power to secondary power.
Main (1 and 2)	High-speed interface for Optical Line Interface Unit (OLIU) card (Include a slot node address of M-1 and M-2 respectively for the two main cards.)
MAU	Monitoring and Alarm Unit – Monitors and provides alarms for the near end and far end.
TCU	Timing and Control Unit – Provides a local clock for the system.
LS-INF	Low Speed Interface – Each position provides three DS3 port address placeholders. Hint: You may want to use the Edits function when entering the low-speed cards, and use the Groups field to enter Group information, as shown in the drawing. Remember, if you are entering the Group name on the Edits pop-up window, you will be able to enter only two lines at a time.
LS–INF (P)	Provides protection for the LS–INF working slot.

On Your Own—Enter equipment specification

In addition to the DSL shelf, NewTel also purchased a new ADSL line card to be installed in the low-speed (LS - INF) slot of the DSL shelf. Use the information provided on the Equipment Specification Data Sheet that follows to enter equipment specifications for the ADSL line card.

Equipment Specification Data Sheet	
Type of Equipment	Card – DSLAM
Manufacturer	Alcatel
Part Number	24A-*nn*
Common Code	0
Issue Number	1

Model Number	24 ADSL
Acronym	24 ADSL
Positions Occupied	1
Description	Alcatel 24 Port ADSL card fits 7350 ASAM
Port Address Description	
Port Addresses	1
Rate Code	DS0
Line/Drop	Drop
Address Levels	Three
Enabled Port Addresses	*Leave Blank* (For this exercise, you will not define enabled port addresses.)

Install equipment

Once you have entered your equipment specifications, you can use them to install equipment at network locations. When you click on the Equipment Install button in MetaSolv Solution, the Equipment Install Query window displays.

Because of the number of network locations stored in the MetaSolv Solution database, the query window forces you to enter at least the first letter of the network location you are querying. After entering the first letter of the network location, you can use the drop-down to search for the exact network location. To further narrow your search results, you can enter additional information in other fields.

You can install equipment in three different ways:

- Use an equipment specification.
- Copy equipment from a "template" network location.
- Use an equipment spec and associate it with a work order.

When you install equipment at a network location, you must follow a hierarchy. For example, you must install a relay rack (or a piece of equipment occupying 0 mounting positions) before you install a shelf, card, or jack panel. Furthermore, before you can install equipment at a network location, you must have already created the network locations in the Infrastructure subsystem.

Together—View installed equipment

1. From the primary toolbar, click **Equipment**.
2. On the secondary toolbar, click **Install**.

3. In the Network Location field, type `DLLSTX00`, and click **Retrieve**.
4. Double-click relay rack **01.01.02** to expand the equipment hierarchy and display the installed shelves.

ICONS ON THE EQUIPMENT INSTALL SCREENS

The Equipment Install window displays many different icons. When you view the installed equipment, the following two icons are the most important:

Icon	Description
	**Vacant Position** – No equipment has been installed at this mounting position.
	**Occupied Position** - Equipment occupies (or equipment is installed at) this position.

When you install a shelf on a relay rack, only the shelf's first mounting position displays the Vendor, Part Number, and Shelf name. The remaining positions that the shelf occupies display in the mounting position <occupied>.

To enter specific information, such as an Equipment Network Location or the name of a relay rack, for a specific piece of equipment after it has been installed, click the equipment mounting position and edit the equipment specification.

Icon	Description
4901 <TIMING - 1> 4902 <TIMING - 2>	**Default Position Numbering –** This default numbering example identifies the mounting position (49), that a shelf is mounted in the relay rack, and the first two shelf mounting positions are 01 and 02.
	**Line Side Port Assigned** - A connection is assigned at this line position. **Note**: The complete connection icon and connection identification display to the right of the icon. The "L" shown above the connection icon indicates that this port is a line side port. If a plus sign displays, then you can expand the view of the position to display enabled port addresses.
	**Line Side Port Unassigned -** No connection is assigned at this line position, indicated by the incomplete connection icon. "Unassigned" displays to the right of the icon.
	**Drop Side Port** - A "D" identifies a drop side port. The open connection means that this port is unassigned.
	**Mapped Position Indicator** - The tiny "M" to the right of the D indicates that the enabled port has been mapped to a connection.
	**Network Element Icon -** The "N" indicates that the piece of equipment (almost always a shelf) is part of a network element such as a SONET network, digital loop carrier system, or a digital cross-connect system.
 	**Cross-Connected Indicator** – The tiny "x" to the left of the connection icon indicates that the port has been hard-wired cross-connected to another port. A hard-wired cross-connection can exist for both an Assigned and an Unassigned position.

Together—Install equipment

You will install equipment using equipment specifications. The Houston NewTel office recently signed up a customer for a variety of dedicated line services. To accommodate this customer, NewTel will install one of its recently purchased OC1 SONET shelves (including OLIU cards) in the Houston office (HSTNTX*nn*).

Install OC1 SONET

1. On the primary toolbar, click **Equipment**.
2. On the secondary toolbar, click **Install**.
3. Enter **HSTNTX*nn*** in the Network Location field and click **Retrieve**.
4. Open the equipment hierarchy of relay rack **01.01.02** to display the occupied and vacant mounting positions.
5. Right-click mounting position **14** and click **Add**.
6. Enter the following information on the Equipment Spec tab:

Field Name	Input Value
Equipment type	Shelf – SONET
Equipment spec	ACMETEL OC1 Mux, ACM-01-XX
Network Location (Equipment)	HSTNTX*nn*H02
Node Address	S14
Notes	Terminal Mode

Install the OC1 OLIU Cards

1. Double-click the **OC1 SONET** shelf just installed in mounting position 14 of the relay rack to expand the equipment.
2. Right-click vacant mounting position **1403** and click **Add**.
3. Use the following information to install the OC1 OLIU cards in mounting positions **1403** on the OC1 Shelf:

Field Name	Input Value
Equipment type	Card – SONET
Equipment spec	ACMETEL OC1 Card, ACM-02-*nn*

4. Click **OK**.

   The ACMETEL OC1 OLIU card appears in mounting position 1403.
5. Right-click the card you installed in position **1403** of the OC1 SONET shelf and click **Copy**.
6. Right-click position **1404** of the relay rack and click **Copy To**.

The ACMETEL OC1 OLIU card appears in the 1404 position.

7. Close back to the Equipment Install window.

On Your Own—Install a DCS

NewTel is in the process of adding more equipment to its Houston office. You will install a digital cross-connect system (DCS) to your MetaSolv Solution inventory, which includes a relay rack, two DS1 shelves, and two DS1 interface cards. All of the equipment that you install will be added to your **HSTNTX*nn*** network location.

Installation Data Sheet					
Item No.	**Equipment**	**Relay Rack Mounting Position**	**Equip. Name**	**Network Location**	**Node Address**
01	Newton NWT-001 relay rack	NA	01.02.01	NA	R01
02	Lucent DS1 DACS IV 8901 (shelf-DCS)	01 (01.02.01)	NA	HSTNTXxxK01	S01
03	Lucent DS1 IV-2000-A (card-DCS)	1A and 2A of the DS1 shelf	NA	NA	NA
04	Lucent DS1 DACS IV 8901 (shelf-DCS)	17 (01.02.01)	NA	HSTNTXxxK01	S17
05	Lucent DS1 IV-2000-A (card-DCS)	1A and 2A of the DS1 shelf	NA	NA	NA

Chapter Review

In this module, you entered equipment specifications and installed equipment to network locations by adding the specifications hierarchically.

Chapter 3

Design Networks and Unordered Connections

What you'll learn in this chapter

In this chapter you will learn the basics involved in designing networks and connections in MetaSolv Solution.

At the end of this chapter, you will be able to:

- Describe the process for designing networks
- Navigate the graphical canvas
- Identify the design line tools for connection design

Process to design a network system

Designing a network system involves the following high-level steps:

- Select a network template and modify network properties
- Add elements
- Associate equipment or port addresses with the equipment
- Add relationships between the elements
- Design connections
- Set network to "In Service"

Navigate network systems

The area of the software on which you will design your networks is the Network System Design window, which is similar to the Template window.

The Network System Design window contains two panes. The left pane, which you can drag to expand, contains panels you can use to select templates, or elements, or network systems. On the right is the canvas that displays the network system design.

Graphical canvas

You can view and work with the graphical representation of your network system on the graphical canvas. You control what appears on the canvas by making selections in the panel list on the left pane of the window. You can hide the main tool bar and the panel list to enlarge the canvas work area.

To expand the canvas work area, click the hide/display buttons.

Network system panels

When you open the Network System Design window, the following panels display:

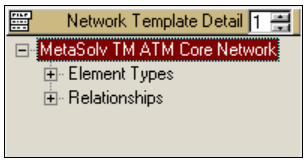
The **Network Template List** panel contains a complete list of the templates available for designing a network. If you are creating a new network system, use this list to open a template.

The **Network List** panel contains a complete list of all current network systems. The networks are sorted and presented by network system type. Use this list to open and display an existing network system that you want to view or modify.

Detail panels

When you select a network system to begin work, the panels change to show the details you need. When you are actively working on a network system on the canvas, the following panels display:

The **Network Template Detail** panel provides details about the template used for the current network system. This is the same panel seen in the Network Template Maintenance window.



The **Network Detail** panel provides details about the elements and relationships that appear in the network system that is displayed on the canvas.

Tool tips

Tool tips provide a brief description of an element when the cursor floats over it on the canvas. To show tool tips, right-click on the canvas and select **Show Tool Tips**. To turn off the tool tips, right click and select **Hide Tool Tips**.

Connection design

Below is the process for designing non-ordered connections:

- Create relationship between elements
- Create connection and assign the connection identification
- Save the network (?????) Will this change???
- Use the design tools to design the connection

Steps to create a relationship

To create a relationship:

1. Right-click an element and click **Connect**.
2. Drag the mouse to the second element you wish to connect and click the element.

   You will see a line connecting the elements.

Steps to create connection and assign the connection identification

1. Right-click the relationship between elements and click **Properties**.
2. In the **Template Connection Specs** pane, select the type of connection to create and drag it to the **Network Connection Specs** pane.
3. Right-click the connection type, and click **New Connection**.

   The connection identification window appears.
4. Enter the connection information and click **OK** until you are returned to the canvas.

Design tools

Below are the various tools that you can use to create your connection design.

Chapter 3

Design Optical and SONET Networks

What you'll learn in this chapter

This chapter covers both the Optical and the SONET technology modules to help clear up the differences in which module should be used for building networks. This chapter consists of a hands-on activity in which you will use the Optical template to build a network. You will also use the SONET template to build a SONET ring.

At the end of this chapter, you will be able to:

- Build a DWDM network
- Build a USPR network

The optical technology module supports dense wavelength division multiplexing (DWDM) and meshed SONET networks.

The SONET/SDH technology module supports ring validation for Unidirectional Path Switched Rings (UPSR) and Bidirectional Line Switched Rings (BLSR). You should use this template when building SONET rings so that MetaSolv Solution can validate the ring.

When building networks you have the following options:

- Inherent Protect—Set this to yes to create two paths through a network.
- Same channel indicator—Set this to yes so that the same channel assignment is used throughout the network. This does not apply to subnetworks. When no is selected, the first available position for every network segment is selected.

When building out SONET and Optical networks, you use the auto build feature to create the connection hierarchy for the underlying facilities.

Optical technology module data

The data included with the Optical technology module appears in the Optical network template. The data includes network elements, connections, and custom attributes. There are two templates: optical and optical sub-network. The subnetwork element is embedded within the optical template.

ELEMENTS

As with network systems, you can select the elements that meet your network requirements or add new ones. Below are the elements included in both optical templates:

- OADM—Optical Add/Drop Multiplexer. This network element offers access to traffic carried over optical wavelengths. Wavelengths are multiplexed together according to specifications administered by the ITU T-G. Wavelengths are added or dropped to or from a fiber, without requiring a SONET terminal.
- OXC—Optical Cross-Connect. Allows the connection of two different wavelengths of a DWDM network.
- Filter—Equipment designed to pass signals in one or more frequency bands while attenuating signals in other frequency bands.
- Optical Sub-Network—Used to embed smaller DWDM or meshed optical networks.
- SONET/SDH network—SONET rings that can be embedded into DWDM networks.

Optical template connection specs

In the Optical template, the following connection types are available:

- **Facility Circuit**—A facility that connects elements.

Together—build DWDM network

You will work with your instructor and on your own to build a DWDM network. You will add three nodes in Dallas, Boston, and Tulsa and connect them with OM04 facilities.

Add element and associate equipment

1. Select **Engineering** on the navigation bar, and click **Network Designs**.
2. Click **Network Template List**.
3. Expand **Optical**.
4. Right-click **MetaSolv TM Optical Template,** and click **Add Network Design**.
5. In the canvas, right-click and click **Properties**.
6. In the **Short Name** field, type `DWDMnn`, and click **OK**.

7. Expand **MetaSolv TM Optical Template>Element Types**.
8. Drag **OADM** to the canvas.
9. On the canvas, double-click **OADM**.
10. In the **Name** field, type `Dallas OADMnn`.
11. In the **Network Location** field, type `DLLSTXnn`????
12. In the **Status** list, click **In Service**.
13. Click the **Equipment Assoc** link.
14. Double-click **Add Equipment Association**.
15. Double-click Relay Rack _____.
16. Right-click **01 Cisco __------** and click **Associate to Element**, and click **Close**.
17. Click **OK**.

On Your Own—Add elements and associate equipment

Use the steps above to add elements for the following locations: BSTNMAnnHnn, TULSOKnnHnn. You will associate the Cisco 15808 shelves to each element.

Together—Add and design connection

You will add a connection between the Dallas and Boston elements and design the connections.

1. Right-click the **Dallas Node** and click **Connect**.
2. Drag the cursor and click the **Boston Node**.
3. Right-click the connection line from Dallas to Boston, and click **Properties**.
4. In the **Network Connection Specs** window, right-click **Facility Circuit**, and click **New Connection**.
5. Enter the following information:

Field Name	Input Value
Service Type Category	CLFI
Service Type Code	OM04
Jurisdiction	Interstate
Facility Designation	*nn*123
Notes	Terminal Mode

6. Click **OK,** and click **Yes** to have CLLI codes alphabetized.

Rename connection

1. Right-click the connection identification, click **Set Connection Name**, and click **OK**.
2. Click **Save**. (You must save new connections to the network before you design them).

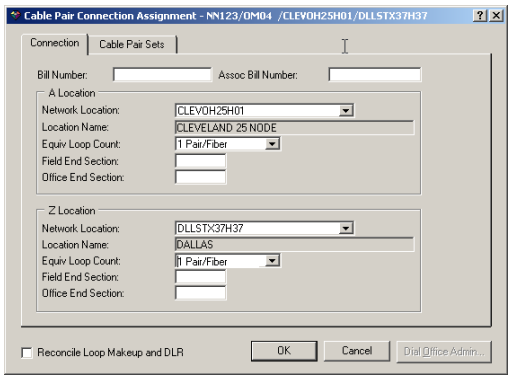
Design connection

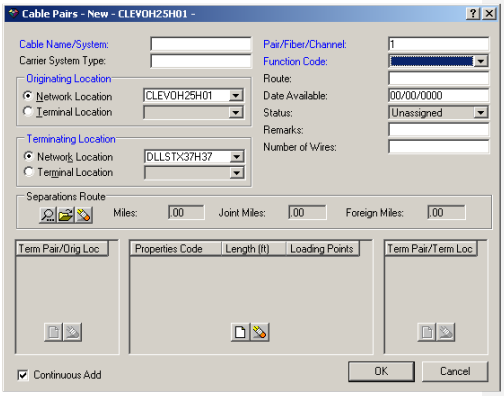
You will add fiber and the equipment assignments to connect the Dallas and Boston locations.

1. Right-click the Dallas/Boston connection, and click **Properties**.
2. Right-click the ***nn*123** connection, and click **Connection Maintenance**.
3. Click the **DLR Design** link.

ADD FIBER

1. Click the **Cable Pair** link.
2. (See Dave Campbell about what to enter here)





Do we add cable pair sets?
Functions: transmit, receive, S1, S2, X2, X4, none.

It appears I must put this in plant first. Is this typical?

ADD EQUIPMENT ASSIGNMENTS

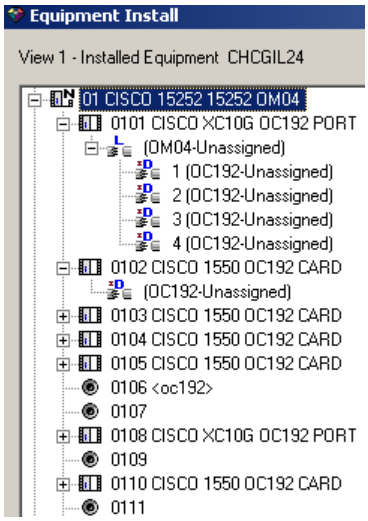
1. Click the **Equipment** link.
2. At the A Location, double-click the equipment until the Cisco XC10G shelf shows the OM04 port.
3. Right-click the **OM04 port** and click **Assign Connection**.

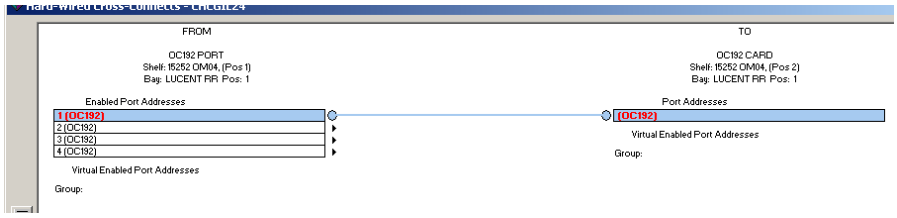
4. At the Z Location, double-click the equipment until the Cisco XC10G shelf shows the OM04 port.
5. Right-click the **OM04 port**, click **Assign Connection**, and click **Close**.
6. Click **Save**.

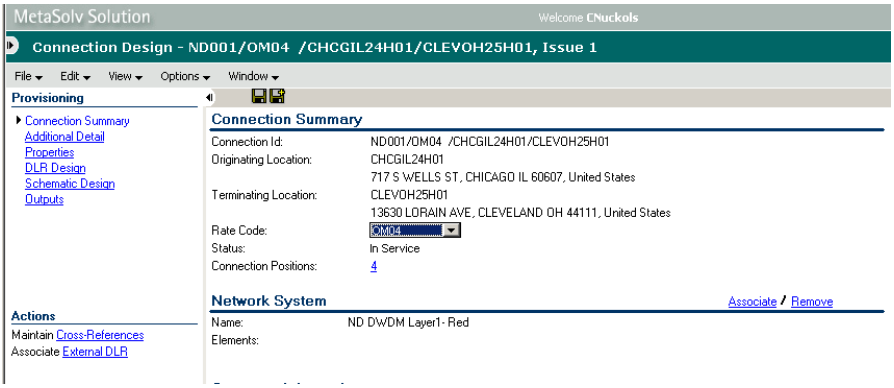
On your own—Add and design connections

Use the steps above to add a connection between Boston and Tulsa, and a connection between Tulsa and Dallas. Rename and design both connections.

DWDM







SONET/SDH technology module data

The data included with the SONET/SDH technology module appears in the SONET/SDH network template.

ELEMENTS

As with network systems, you can select the elements that meet your network requirements or add new ones. Below are the elements included in both optical templates:

- OADM—Optical Add/Drop Multiplexer. This network element offers access to traffic carried over optical wavelengths. Wavelengths are multiplexed together according to specifications administered by the ITU T-G. Wavelengths are added or dropped to or from a fiber, without requiring a SONET terminal.

SONET/SDH template connection specs

In the Optical template, the following connection types are available:

- **Facility Circuit**—A facility that connects to elements.

Build a SONET network

You will build an OC48 SONET network between Dallas, Plano and Denton. You will build a UPSR.

Together—Add elements and associate equipment

1. Select **Engineering** on the navigation bar, and click **Network Designs**.

2. Click **Network Template List**.
3. Expand **SONET/SDH**.
4. Right-click **MetaSolv TM SONET/SDH Template,** and click **Add Network Design**.
5. In the canvas, right-click and click **Network Properties**.
6. Enter the following information:

Field Name	Input Value
FNI	
Topology	Ring
Ring Type	Physical
Rate Code	OC48
Fiber Count	2
Protection Type	Path Switched SNCP
TSI Enabled	Unchecked
Status	Pending

7. Click **OK**.
8. Expand **MetaSolv TM SONET/SDH Template>Element Types**.
9. Drag **OADM** to the canvas.
10. On the canvas, double-click **OADM**.
11. Click the **Equipment Assoc** link.
12. Double-click **Add Equipment Association**.
13. Double-click the relay rack.
14. Right-click **01 Lucent LIN** and click **Associate**, and click **OK**.
15. Click **OK**.

On Your Own—Add elements and associate equipment

Use the steps above to add elements for the following locations: DNTNTXnnHnn, PLANTXnnHnn. You will associate the Lucent 15252 shelves to each element.

Together—Add connection

You will add a connection between the Dallas and Boston elements and design the connections.

1. Right-click the **Dallas Node** and click **Add Connection (from)**.

2. Right-click the **Plano Node** and click **Add Connection (to)**.
3. Click **Next**.
4. Click **Next**.
5. Click **Finish**.

On your own—Add connections

Use the steps above to add the connection from Denton to Plano and Denton to Dallas.

Together—Activate and validate network

1. From the menu, click **Options>Activate Pending Changes**.

   This changes all the connections from Pending to In Service.
2. From the menu, click **Options>Validate Topology**.

   A message appears that the topology is valid.
3. Click **OK**.

Step to add mileage (separations route)

You can add the connection mileage known as separations route to each connection in a ring. You can create a new separations route or associate a separations route with the connection.

1. Right-click a connection, and click **Open>Separations Route**.
2. Click **New** to enter a new separations route.

OR

3. Select an existing separations route from the lower pane of the window and click the **Up** arrow to add it to the connection.

Together—Build network facilities

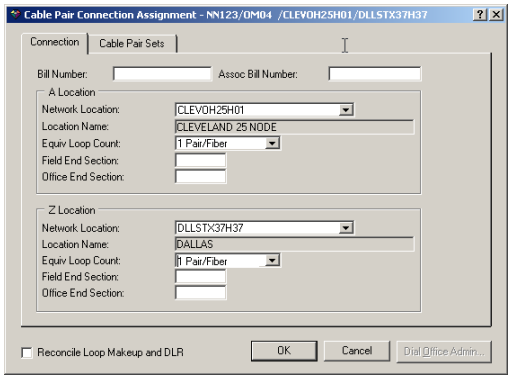
1. From the menu, click **Options>AutoBuild**.
2. Click **Next** through the dialog, and then click **Finish**.

   The defaults create an OC48 connection between each node, with 48 STS1 and virtual tributaries.
3. Click **Save**.

Together—Design connection

You will add fiber and the equipment assignments to connect the Dallas and Plano locations.

1. Right-click the Dallas/Plano connection, and click **Open>Circuit Design**.
2. Right-click the ***nn*123** connection, and click **Connection Maintenance**.
3. Click the **DLR Design** link.



ADD FIBER

4. Click the **Cable Pair** link.

Do we add cable pair sets?
Functions: transmit, receive, S1, S2, X2, X4, none.

It appears I must put this in plant first. Is this typical?

ADD EQUIPMENT ASSIGNMENTS

1. Click the **Equipment** link.
2. At the A Location, double-click the equipment until the OC48 port is available.
3. Right-click the **OM04 port** and click **Assign Connection**.
4. At the Z Location, double-click the equipment until the OC48 port is available.
5. Right-click the **oc48 port** and click **Assign Connection**, and click **Close**.
6. Click **Save**.

On your own—Add and design connections

Use the steps above to add a connection between Plano and Denton, and a connection between Denton and Dallas. Rename and design both connections.

Together—Put the network In Service

1. Right-click the canvas, and click **Network Properties**.
2. In the **Status** list, click **In Service**.
3. Click **OK** to clear the message.
4. Click **OK** to close the network properties window.

Chapter Review

In this chapter, you used the Optical Template to build a DWDM network, and you used the SONET/SDH template to create and validate an Unidirectional Path Switched Ring.

Chapter 5

Design ATM/FR Network

What you'll learn in this chapter

This chapter is designed to teach you how to use the network templates in MetaSolv Solution to build out your network systems. Then you will enter your locations, equipment, elements, and relationships. Finally, you will design your connections.

Objectives

At the end of this chapter, you will be able to:

- Design an ATM Core network.
- Design an ATM Access network.
- Design a Frame Relay Access network.
- Embed networks.

Scenario

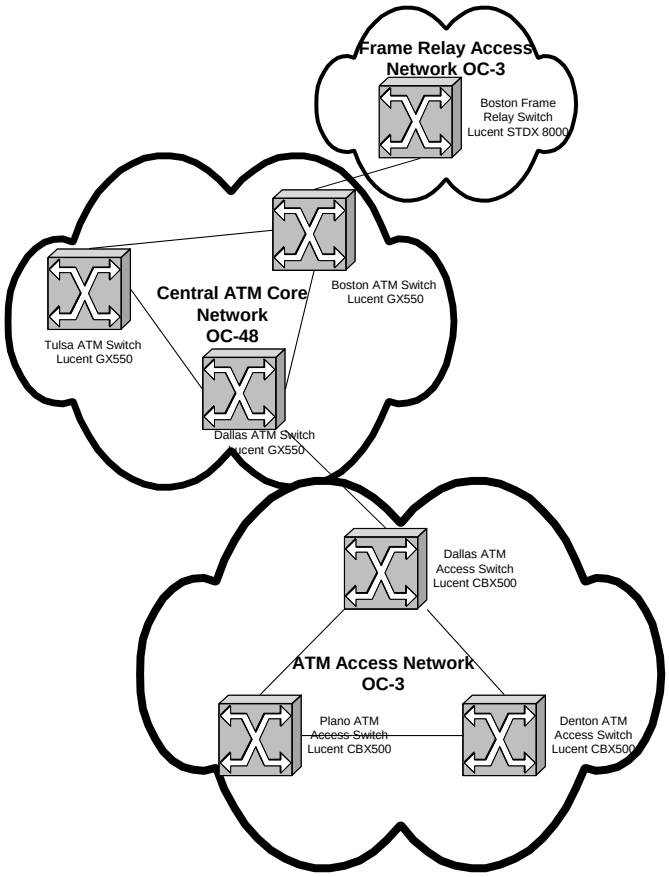
Based in Dallas, Texas, Zesty Communications is an integrated service provider that offers high-speed Internet access and data services primarily to medium- and large-sized organizations. In the Dallas market area, where it owns a great deal of local fiber, Zesty Communications has built out a substantial access network.

The company owns an ATM/Frame Relay transport network that comprises three metropolitan areas:

- Dallas
- Tulsa

- Boston

The Dallas ATM Access Network and the Boston Frame Relay Access Network are connected to the core network. The Dallas ATM Access Network consists of ATM access switches located in Denton, Dallas, and Plano. These three switches are connected with OC3 fiber. The Boston Frame Relay Switch connects to the core through an ATM switch that enables *Service Interworking*. The access networks are connected to the core with OC3 fiber.



Together—Design network

You need an OC48 ATM Core, with switches in Boston, Dallas, and Tulsa. To build this network, perform the following steps:

SELECT NETWORK TEMPLATE AND MODIFY PROPERTIES

1. Click **Engineering>Net Systems>NetDes**.
2. Click the **Network Template List** panel.
3. Click the "+" next to ATM_FR to expand the template listing.
4. Right-click **MetaSolv TM ATM Core Network** and click **Add Network Design**.
5. Right-click the canvas, and click **Properties**.
6. Type the following information:

Field	Value
Short Name	***nn*** ATM Core
Long Name	***nn*** Central ATM Core

7. In the **Status** list, click **In Service**.
8. Click **OK**.

DEFINE ELEMENT

One switch appears on the canvas because the template rules require a minimum of one switch.

1. Right-click **ATM Switch (1)** and click **Properties**.
2. Type the following information:

Field	Value
Name	***nn*** Dallas ATM Core Switch
Network Location	DLLSTX***nn***ATM

Note: Network Location

A network location is required because the network template rule requires a network location for this element type.

3. In the **Status** list, click **In Service**.

ASSOCIATE EQUIPMENT

1. Click the **Equipment Association** link.
2. Double-click **Add Equipment Association**.
3. Double-click the relay rack labeled **Newton RR Zesty TBND ATM CORE**.
4. Right-click the shelf labeled **Lucent GX550** and click **Associate to Element**.
5. Click **Close**.
6. Click **OK**.
7. Click **Save**.

ADD ELEMENT

1. Expand the **MetaSolv TM ATM Core Network>Element Types**.
2. Drag the **ATM Switch** to the canvas.
3. Drag another **ATM Switch** to the canvas.

Note: Spinner Control

You can change the spinner to add multiple elements to the canvas simultaneously. Before you can save the network, you must associate locations with all of the elements.

On Your Own—Define elements and associate equipment

Using the steps above, define the Boston and Tulsa switches. Then associate the equipment at the shelf level. Use the following information for the switch properties.

Field	Value
Name	*nn* Boston Core Switch
Network Location	BSTNMA*nn*ATM
Status	In Service
Equipment	Newton RR Zesty TBND ATM Core (relay rack) Lucent GX550 (shelf)

Use the following information for the Tulsa location:

Field	Input Data
Name	*nn* Tulsa Core Switch

Network Location	TULSOK*nn*ATM
Status	In Service
Equipment	Newton RR Zesty TBND ATM Core (relay rack) Lucent GX550 (shelf)

Together—Add relationship

1. Right-click the **Dallas switch** and click **Connect**.
2. Click the **Tulsa switch**.
3. Right-click the **ATM Switch Intranetworking** connection between Dallas and Tulsa and click **Properties**.
4. In the Template Connection Specs pane, drag **Assignable Bandwidth Link** to the Network Connection Specs pane.
5. Right-click Assignable Bandwidth Link and click New Connection.
6. Enter the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLFI
Service Type Code	OC48

7. Click **OK**.
8. Right-click the connection and click **Set Connection Name**.
9. Click **OK**.
10. Click the **Save** button.


Note

Save

You should save often. When items are added to the canvas, they are stored in memory and are not saved to the Oracle database tables until you click the save button.

After you enter a new connection identification, you must click the Save button before you can design the connection.

Together—Design connection

1. Right-click the connection between Dallas and Tulsa and click **Properties**.
2. Right-click the connection identifier and click **Connection Maintenance**.
3. Click the **Design Lines** tab.
4. Right-click the canvas area and click **Equipment**.
5. In View 1, right-click **01-OC48** and click **Assign Circuit**.
6. The port should change from"Unassigned" to "In Service."
7. In View 2, right-click **01-OC48** and click **Assign Circuit**.
8. Click **Close**.
9. Click the **Custom Attr** tab.
10. Type the following information:

Field	Value
Broadband Service Category	Cell
Bit Rate	2.4 Gbps
NNI/UNI	NNI

11. Add DWDM facility assignment.
12.
13. Click "**x**" to close window.
14. Click **Yes** to save the design lines.
15. Click **OK** to close back to the Network System Design window.

On Your Own—Add relationships and design connections

Use the steps above to add the following connection relationships:

- Dallas to Boston
- Boston to Tulsa

Also, use the steps above to design the two bandwidth links. You will use the same type of equipment and information that you used to design the link from Dallas to Tulsa.

On Your Own—Create a Frame Relay access network

The Frame Relay access network in Boston is very small and consists of only one switch. Use the instructions on the preceding pages to build the access network.

Define Network Properties

Use the Design Network steps. To view all of the network templates, use the menu icon to click the Network Template List. Then expand ATM/FR to find your FR Access network.

Field	Value
Short Name	***nn*** BSTN FR access
Status	In Service

Define elements and associate equipment

Next, define your network properties and the elements, and associate equipment.

Field	Value
Name	***nn*** BSTN FR Access
Network Location	BSTNMA***nn***FRM
Status	In Service
Equipment	Newton RR Zesty TBND Frame Access (relay rack) Lucent B-STDX8000 (shelf)

You will not be creating any connections at this time.

On Your Own—Create an ATM access network

You will now create an ATM access network that connects to the core network. (It will have lower rate cards to connect to customers.)

Modify network properties

Field	Value
Short Name	***nn*** DLLS ATM Access
Status	In Service

Define elements and associate equipment

Field	Value
Name	***nn*** Dallas access ATM Switch
Network Location	DLLSTX***nn***ATM
Status	In Service
Equipment	Newton RR Zesty TBND ATM Access Lucent CBX500

Field	Value
Name	***nn*** Denton access ATM switch
Network Location	DNTNTX***nn***ATM
Status	In Service
Equipment	Newton RR Zesty TBND ATM Access Lucent CBX500

Field	Value
Name	***nn*** Plano access ATM switch
Network Location	PLANTX***nn***ATM
Status	In Service
Equipment	Newton RR Zesty TBND ATM Access Lucent CBX500

On your own—Add relationships and design connections

Use the instruction labeled **Add Relationship** to add the relationship between your switches. Then create connection identifications.

DALLAS TO DENTON CONNECTION

Field	Value
Connection Spec	Assignable Bandwidth Link
Connection Type	OTS Format
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC03

Connection ID	*(default)*

DALLAS TO PLANO CONNECTION

Field	Value
Connection Spec	Assignable Bandwidth Link
Connection Type	OTS Format
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC03
Connection ID	*(default)*

PLANO TO DENTON CONNECTION

Field	Value
Connection Spec	Assignable Bandwidth Link
Connection Type	OTS Format
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC03
Connection ID	*(default)*

Design connections

Use the instructions labeled **Design Bandwidth Link Connection** to design the bandwidth connections you just identified.

Use the information below to design your connections to the first available OC3 port.

Field	Value
Equipment	Assign to first unassigned OC3 port located at: Newton RR Zesty TBND ATM Access (shelf) Lucent CBX500 (shelf) Lucent OC3/STM-1
Broadband Service Category	Cell
Bit Rate	155.52 Mbps
NNI/UNI	NNI

Embedded networks

In the MetaSolv Solution, a network system consists of elements, connections, and can also consist of other network systems or embedded networks. As mentioned before, the template rules govern how everything fits together so that you can model and design simple to complex network configurations with ease.

Essentially, you can build several small regional networks, name them, and put them in service. You can also create a large national network and embed all the regional networks as elements to support the national network.

In the case of Zesty Comm, you have built three networks:

- ATM Core
- Frame Access
- ATM Access

Now you have the opportunity to embed these networks to create one large ATM/Frame Relay Network for Zesty Comm.

Together—Embed networks

Once you have your access and core network built, you must connect them to create your "big" network.

1. Click the **Network Template List** panel.
2. Right-click **MetaSolv TM ATM/Frame Relay Network** and click **Add Network Design**.
3. Right-click the canvas and click **Properties**.
4. Type `nn Central ATM/FR` in the **Short Name** field.
5. In the **status** list, click **In Service**.
6. Click **OK**.
7. Click the **Network Detail** panel.
8. Click the **Menu** icon and click **Network List**.
9. Expand **ATM_FR**.
10. Use the mouse to drag **nn ATM Core** to the canvas.
11. Use the mouse to drag **nn DLLS ATM Access** to the canvas.
12. Use the mouse to drag **nn BSTN FR Access** to the canvas.

Add a relationship

1. Double-click **nn DLLS ATM Access>nn ATM Core** to expand .
2. Right-click the **Dallas switch** in the **core** network and click **Connect**.
3. Click the **Dallas switch** in the **access** network.
4. Right-click the **ATM Switch Intranetworking** connection between **Dallas core** and **Dallas access** and click **Properties**.
5. In the Template Connection Specs pane, drag Assignable Bandwidth Link to the Network Connection Specs pane.
6. Right-click **Assignable Bandwidth Link** and click **New Connection**.
7. Type the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLFI
Service Type Code	OC03
Freeformat Circuit	*(default)*

8. Click through the dialog and save.

On Your Own—Design connection

Use the instructions in the preceding pages to design the ATM OC3 connection.

On Your Own—Add relationships and design connections

Create a relationship between the Boston ATM switch in the core to the Boston frame relay switch in the access network. Use the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC3
Connection Name	*(default)*

Use the following information to design your bandwidth connection:

Field	Value
BSTNMA***nn***FRM	Assign to OC3 port on Lucent STDX8000 equipment.
BSTNMA***nn***ATM	Assign to OC3 port on Lucent GX550 equipment.
Broadband Service Category	Frame
Bit Rate	155.52 Mbps
UNI/NNI	NNI

Chapter 6

Build Product

What you'll learn in this chapter

An important part of implementing the MetaSolv Solution is to build the product catalog. Before you can build the catalog, you must build generic product specifications, which define the type of service or offering you can order through a product service request (PSR). Then you use the product specifications to build the product catalog to further specify the type of products.

You will associate network template types with both the product specifications and the product catalog items. By associating the network templates at the product level, the software prompts ordering or provisioning specialists to enter the required data during order entry or provisioning of the products.

You must also create a provisioning plan in Work Management so that you can generate tasks to send to the specific people or groups required to provision and turn up the ordered service.

Objectives

At the end of this chapter, you will be able to:

- Create product specifications and associate to network templates
- Create a product catalog and associate to network templates
- Create provisioning plans

Product overview

You need to build a product catalog and a provisioning plan to offer a product and provision the service. To build the product catalog, you will first need to identify item types and product specifications.

The item types are predefined in the MetaSolv Solution and have a hierarchal relationship. You use the service item types when you define your enter product specifications.

Product specifications include information about the products that your transport (internal) network supports. You should make the product specifications generic and flexible so that they can be used to create various product catalog items. Because you must associate your product specifications with the network templates, you must create or customize the templates before you can finish building your product specifications. This association ensures that orders are validated, based on the template rules.

Once the ordering specialist finishes a PSR, and it is validated against the template rules, the PSR needs to be sent to the appropriate personnel (work queues) to be provisioned.

In MetaSolv Solution, you build provisioning plans for products so that tasks are given deadlines and sent to the appropriate personnel to provision the service.

Item types

Item types are predefined data that you use to build product specifications. MetaSolv has defined relationships between many of the item types.

The new template-based item types include system, element, connector, and prdbundle. They have the following hierarchical relationships.

- **SYSTEM** - Network System. (MPLS VPN, for example).
- **ELEMENT** - Network Element. (Home Office or Branch Office, for example).
- **CONNECTOR** - Network Connection. (A virtual connection between a home office and a branch office, for example).
- **PRDBUNDLE** - Product Bundle. (DSL product bundle, for example).
- **CONNECTOR** - Standalone Connection. (An access connection from the IAD at the customer site to your DSLAM, for example).

The System and PRDBUNDLE are known as the top level or level 1 products of the hierarchy; the subordinate items are known as the child, or level 2, item types.

You can use these relationships to create product hierarchies in the software. Most products that a telecom company offers have subordinate items or options associated with them. To build the specifications for an entire product hierarchy, you need to identify which items are subordinate to other items.

Therefore, not only do you need to understand the processing associated with the MetaSolv Solution item types, but you also need to know which item types you can be associate with other item types. Think of item types as the building blocks that you use to structure a product hierarchy.

Also think of item types as predefined rules. The items and relationships are predefined for products and services. For example, line products can have lines, and system options, and features.

ELEMENT

The Element item type represents nodes, facilities, or equipment that you use in the provisioning of services. A given network element can represent a single piece of equipment or a collection of equipment with a common purpose.

CONNECTOR

The Connector item type represents all types of orderable circuits, including access circuits or WAN links, orderable Internet circuit, virtual circuits such as Enterprise PVCs, and Voice over DSL (VoDSL).

A given Network Connection can be a physical connection, a virtual connection, or a collection of logically grouped connections. Ordered Network Connections are associated with their originating locations during the ordering process

SYSTEM

The System item type represents a collection of Network Elements that are interconnected by Network Connections to provide services associated with the customer's network.

PRDBUNDLE

The Prdbundle item type is used to group customer connections with ordered features or options. They connect to the provider network but are not associated with a customer ordered network.

Product specifications

Product specifications are blueprints for the products your company offers. Product specifications are engineering rules that your technical staff and product management usually define. These are items that the network can support.

You create your product specifications based on the item types. Then you associate them with a network template.

By associating templates with the product specs and product catalog, you can use the ordering dialog (New Order Entry window in M/5.1) and the service provisioning dialog (New Virtual Connection Design window in M/5.1) to collect the appropriate data and design the service.

The PRDBUNDLE is the only template-based item type that is not associated with a template.

Relate specs

Once you have entered the product specifications, you should relate them hierarchically.

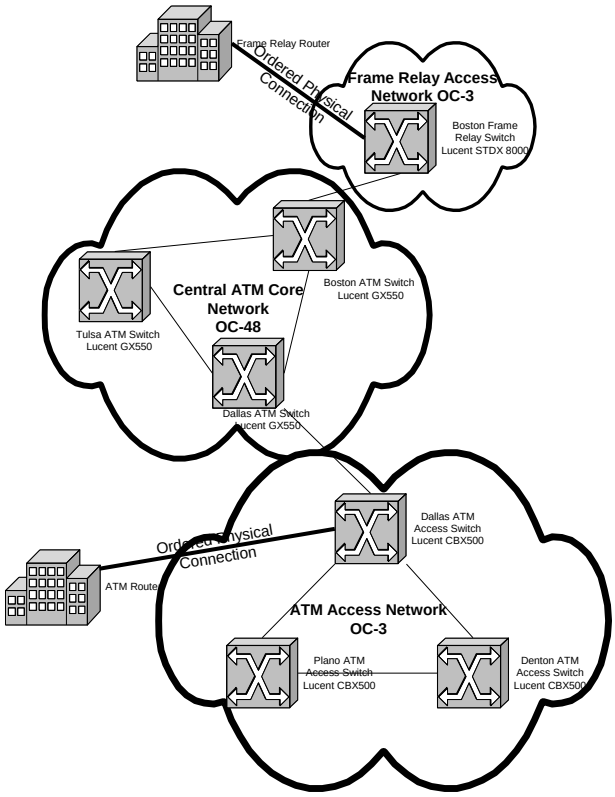
Because all items are displayed on the product specifications hierarchy at the same hierarchical level, you must identify subordinate items on the Related Items tab. The items available on this tab are based on the item type of the selected product specification.

Note: Associating Network Template Types

Before you can relate items, you must associate the network template types with the product specs.

Scenario

You should build your product catalog, based on your networks and the type of network traffic you can offer to customers. You have an ATM/Frame Relay network, and you want to offer service to customers from your access networks.



You want to offer access connections into your Dallas ATM access switch and into your Boston frame relay access switch. These switches are built with two different templates: Frame Relay Access

and ATM Access. When building the product specifications for the access connections you will need to associate both templates.

You will also offer the dedicated permanent virtual connection over the Zesty ATM/FR transport network. Therefore, you will associate this item with the ATM/FR template. You must also ensure that the customer site connects to the ATM Access template and that the other customer site connects to the FR Access template.

Together—Build product specs

To build product specifications for dedicated virtual connections, perform the steps below:

1. Click **Order Management>Order Management Setup**.
2. In the Retail Ordering section, click **Product Specifications**.
3. Right-click **Product Specifications**, and click **Add Item**.
4. In the **Type** list, click **Product Bundle**.
5. Type the following input values:

FIELD NAME	Input Value
Code	PRDB***nn***
Internal Alias	***nn*** Dedicated VC

6. Select the **Product/Package** check box.

Note: Indicator Check Boxes

With the new template-based products, you do not need to check any of the circuit or switch indicator checkboxes. These are required only for non-template products so that information entered in the order appears on the tech translation sheet.

7. Click **File>Save**.
8. Right-click and click **Add Item**.
9. In the **Type** list, click **Network Connection**.
10. Type the following input values:

FIELD NAME	Input Value
Code	***nn***Access
Internal Alias	***nn*** Access connection

11. Click **File>Save**.
12. Right-click and click **Add Item**.
13. In the **Type** list, click **Network Connection**.

14. Type the following input values:

FIELD NAME	Input Value
Code	***nn***Virtual
Internal Alias	***nn*** Virtual connection

15. Click **File>Save**.

Associate specs with network templates

In the Dallas network, you have an ATM switch in your access network. Your customer site should connect to an ATM switch in your ATM Access network.

To associate product specifications to network templates, perform the following steps:

1. In the Product Specification pane, click **nn Access Connection**.
2. Click the **Network Template Types** tab.
3. Scroll through the list to find the **MetaSolv ATM Access Network** Template Type. Then look for the following:

CONNECTION SPEC	Element A	Element B
Assignable Bandwidth	ATM Switch	Customer Site

4. Right-click **Assignable Bandwidth Link** and click **Associate**.

In your Boston network, you have a frame relay switch in your access network. Your customer site should connect to a frame relay switch in your Frame Relay Access Network.

5. Click the **Network Template Types** tab.
6. Scroll through the list to find the **MetaSolv Frame Relay Access Network** template type. Then look for the following:

CONNECTION SPEC	Element A	Element B
Assignable Bandwidth	FR Switch	Customer Site

7. Right-click **Assignable Bandwidth Link** and click **Associate**.
8. Click **File>Save**.

Because your dedicated connection from Dallas to Boston traverses your ATM/Frame Relay network, you will use the MetaSolv TM ATM/Frame Relay template. However, you will need to ensure that the Element A and Element B customer sites use the MetaSolv TM ATM Access and the MetaSolv TM Frame Relay Access templates.

9. In the Product Specification pane, click **nn Virtual Connection**.
10. Click the **Network Template Types** tab.
11. Scroll through the list to find the MetaSolv ATM/Frame Relay Network Template Type. Then look for the following:

CONNECTION SPEC	Element A	Element B
Enterprise	Customer Site in ATM Access Network	Customer Site in Frame Relay Access Network.

12. Right-click **Enterprise** and click **Associate**.

Relate Items

1. In the **Product Specification** pane, click **nn Dedicated PVC**.
2. Click the **Related Items** tab.
3. Right-click **nn Access Connection** and click **Add**.
4. Click **OK**.
5. Right-click **nn Virtual Connection** and click **Add**.
6. Click **OK**.
7. Click "**x**" to close the window.

Product catalog

The product catalog includes the marketing rules that product management usually defines. These rules address three primary marketing concerns: product availability (by location or by business/market segment), pricing, and packaging.

The product catalog contains all the information about products that ordering specialists need to know to place orders.

The high level steps to build the catalog are listed below:

- Describe the products.
- Distinguish business products from residential products.
- Designate geographic areas where products are available.
- Add pricing to products.

Together—Build a dedicated VC product

Zesty Communications owns an ATM transport network that connects Boston, Tulsa, and Dallas. You can have ATM connections in all three locations, plus a frame relay connection in Boston.

You want to offer business customers the ability to order dedicated virtual circuits and access connections at each location.

The product specifications have already been created for your use in building the catalog.

To build the dedicated virtual connection, perform the following steps:

1. Click **Order Management> Order Management Setup>Product Catalog**.
2. Right-click and click **Add Item**.
3. Click **nn Dedicated PVC**, and click **OK**.
4. In the **Marketing Description** field, type `nn Dedicated vc over ATM or FR.`
5. In the **Service Category** list, click **Business**.
6. In the **Offering Type** list, click **Retail**, and then click **File>Save.**
7. Right-click **nn Dedicated PVC** product and click **Add Item**.
8. Click **nn Access Connection**, and click **OK**.
9. Click the **Network Template Types** tab.
10. Right-click the **MetaSolv TM ATM Access** template and click **Associate**.
11. Right-click the **MetaSolv TM Frame Relay Access** template and click **Associate**.

On Your Own—Add virtual connection to the product

Now that you have added the physical connection to the product catalog, add the virtual connection and associate the network template.

Provisioning plan overview

Provisioning plans are required to manage the flow of work and information, from entering service requests to provisioning ordered services. Tasks are generated in the Order Management subsystem and are accessible through the Work Management subsystem. You can access tasks in the work queues and use equipment and facility information stored in the Service Provisioning subsystem and the Equipment Administration module to design connections.

Tasks are the actual work that needs to be done to provision a customer's order. You can complete some tasks in the software, but you use other tasks only to document time and completion of tasks that are performed outside of the software.

When you build a provisioning plan, you select the tasks that need to be performed, the work group responsible for each task, and the amount of time that each task should take.

You can use several types of tasks to provision service and bill the customer. In this module, you will use the minimum required tasks to provision service. If you need more detailed information about setting up work queues and provisioning plans, you can enroll in the Work Management course.

To create a provisioning plan, the following information is required:

Required Field	Definition
Plan Name	The name of the provisioning plan that the ordering specialist will select for a specific type of service.
Service Type Group	In this drop-down field, you can select a service type, which is built in the Infrastructure subsystem and represents various telecommunications and data service types.
Organization	In this drop-down field, you can select an organization from the available organizations that your company has set up.
Jurisdiction	In this drop-down field, you can select various jurisdictions.

After you enter this information, you can select the tasks and work groups to build the provisioning plan.

Disposition days

With the *Disposition Days* functionality, you can insert a user-defined number of disposition days between provisioning plan tasks. When setting up provisioning plans, you can designate a number of days between tasks when there is essentially no work to be completed. When a task is not required to be worked until a certain number of days after the completion of its predecessor, you can assign the task due dates accordingly.

In addition, for backward-dated tasks, you can assign task due dates, based on the completion date of their follower tasks. For example, if an organization's process dictates that a Trans Task must always be completed three days prior to the order completion task, the user can insert three disposition days between these two tasks. This step will assign a due date for the Trans task that is three days prior to the order completion task due date.

Tasks

MetaSolv Solution includes two task types:

SYSTEM TASKS

A system task is a task designated to complete itself automatically without any user intervention in the designated system work queue. The Task Server continually polls the tasks until any predecessor tasks and gateway events are completed and the system tasks are ready to be completed. Then the system tasks are completed automatically.

SMART TASKS

When you double-click a smart task the system takes you to another area of the software to perform work. Non-smart tasks are associated with a work group and a completion time, but they do not have required functions in the software.

Below are some of the more frequently used tasks.

APP TASK

The Application Date task identifies the date on which the customer gives an access service request (ASR) to the provider. Assign this task to a provisioning plan if you want the APP date on the Confirmation Notice to match the due date of the APP task.

BILLING TASK

The billing task sends service request billing data from MetaSolv's software to a specific billing system or a third-party vendor server, depending on the billing gateway and API version you are using.

CKTID TASK

The CKTID task is the Circuit Identification task for PSR circuits only. It is preloaded for customers who purchase the Product Service Request module.

You can also identify the connections at order time by right-clicking the product and selecting Assign Circuit. If you do this for all connections on the order, you will not need the CKTID task.

Double-clicking this task opens the Service Request Connection window, from which you can do the following:

- Create a connection ID for customers that are ordering a new circuit.
- Retrieve an existing connection ID for customers that are changing or disconnecting their existing circuit.
- Delete a connection ID.
- Update a connection ID.

DLRD/RID TASK

The DLRD task is the Design Layout Report Date task, which is a smart task that provides access to the connection design process. Double-clicking the DLRD task opens the Service Request Connection window, which lists all connections on a service request. Double-clicking a connection on the Service Request Connection window opens the Connection Design window - Administrative tab, from which you can design connections and issue the Design Layout Report (DLR) for the selected service request.

The DLRD task is recommended for all provisioning plans that are associated with ASRs or LSRs when a connection is provisioned. You can complete this task only if you have placed all the connections on the order in "DLR Issued" status. Because the DLRD task validates that the DLR is issued, you will get an error message if you try to complete the DLRD before you place the connection in "DLR Issued" status.

The RID task is recommended for all provisioning plans that are associated with PSRs or ISRs when a connection is provisioned. You can complete this task only if you have placed all the connections on

the order in "Record Issued" status. Because the RID task validates that the record on the connection was issued, you will receive an error message if you try to complete the RID task before you place the connection in “Record Issued” status.

NET DSGN TASK

The NET DSGN task is the Network Design task for designing customer-ordered networks, such as virtual private networks. This task launches the new drawing canvas so that you can provision the network system of an order. From the drawing canvas, you can:

- Install Equipment.
- Make associations with equipment.
- Identify connections.
- Add Network Systems specific information.

EQ INST TASK

Double-clicking the **EQ INST** task opens the Equipment Install window, from which you can install equipment from an order at an end user location.

TRANS TASK

Double-clicking the TRANS task opens the activation summary report for the provisioned service.

WOT

You can use the Wired Office Test (WOT) task to allot time to a work group to actually turn up the service.

PTD

You can use the Plant Test Date (PTD) task to allot time to a work group to test the provisioned service.

DD

The Due Date (DD) task is a non-smart task; however, when completed, it changes the status of connections and networks to “In Service.” Numerous validations can take place when this task is completed.

Provisioning plan examples

Your business processes should dictate your provisioning plans. Below are two provisioning plan examples. To provision a connection, you can install customer premise equipment and design the connections. Then Field Services can wire and test. To provision a customer network, you can use the NET DSGN task to do much of the provisioning.

CONNECTION PROVISIONING PLAN

- CKTID
- EQ INST
- RID
- TRANS
- WOT
- PTD
- DD
- BILLING

VPN PROVISIONING PLAN

- NETDSGN
- RID
- TRANS
- WOT
- PTD
- DD
- BILLING

Work queues

You create work queues in the software for every work group that will be performing tasks to work a customer order from beginning to end.

Individual workers are added to the work groups so that tasks can be assigned to individuals to be worked and completed.

If System Tasks are used, a System and Exception queue should also be created.

Together—Build a provisioning plan

You will use existing work groups and tasks to build a bare-minimum provisioning plan for the dedicated PVC product type.

To build this provisioning plan, perform the following steps:

1. Click **Application Setup>Work Mangement Setup>Provisioning Plans**.
2. Click the **Add New** link.
3. In the **Plan Name** field, type `Connection`.
4. In the **Service Type Group** list, click **Spcl Acc/Priv Line**.
5. In the **Organization** list, click **Zesty**.
6. In the **Jurisdiction** list, click **0=NA**.
7. Click the **Task Assignment** tab.
8. In the **Available Tasks**, click **CKTID** and click the **Up** Arrow button.
9. In the **Work Queue** list, click **Engineer**.
10. In the **Work Interval Business Day** list, type **1**.
11. Use Steps 7-9 to enter the following information:

TASK	Work Queue	Work Interval
EQ INST	Engineer	1
RID	Engineer	2
TRANS	Field Sv	1
WOT	Field Sv	5
PTD	Field Sv	1
DD	Engineer	1

12. Click the **File>Save** button.
13. Click "**x**" to exit the window.

On your own—Build provisioning plan

Using the same queues as those for the Connection provisioning plan, build a provisioning plan to be used when provisioning VPN services. Name the plan **VPN *nn***.

Note: VPN Tasks

You will use the NETDSGN task to identify connections, install equipment, and design the VPN access connections.

Use the following information to create the provisioning plan properties.

Field	Value

Service Type Group	Spcl Acc/Priv Line
Jurisdiction	0=NA
Organization	Zesty

Use the following information to add tasks to your provisioning plan.

Task	Work Queue	Work Interval
NETDSGN	Engineer	1
RID	Engineer	2
TRANS	Field Sv	1
WOT	Field Sv	5
PTD	Field Sv	1
DD	Engineer	1

Chapter Review

In this lesson, you created product specs, product catalog, associated templates to products and built a provisioning plan so that work on services can be tracked and provisioned.

Chapter 7

Enter Service Requests

What you'll learn in this chapter

When implementing new products, it is important that you test your product catalog and provisioning plan by entering customer orders and generating tasks.

Objectives

At the end of this chapter, you will be able to:

- Enter a product service request (PSR) for a dedicated permanent virtual connection.
- Generate tasks.

Template-based ordering

Template-based ordering is a streamlined process for using the MetaSolv Solution to order customer networks and connections. The specifications for the network and its connections and elements are based on templates.

The templates are closely tied to equipment specifications in your product catalog. When you select a product, the system will already *know* all of the information that you need to provision the service.

Templates and PSRs

Network templates determine which systems, elements, and connections you can include in a product service request (PSR).

When you built the product catalog, you associated a template. The template you chose determines the types of elements and connections you can add to the PSR from that point forward. As you add items to the PSR, the properties defined for those items in the template may prompt you for additional information.

The custom attributes associated with the network element types, connection spec types, and the network template types define what these prompts control.

Ordering dialog

The *ordering dialog* is a browser-based interface invoked during the ordering process that enables streamlined service configuration. The ordering dialog functions like an assistant, leading the user through a number of steps and questions. As a result, the ordering process is more user-friendly, quicker, and more accurate.

Again, the steps and questions are driven by the configuration of the product catalog and the associated templates. The ordering dialog interface is configured to *know* what information to request or require from the user.

You can access the ordering dialog when you enter orders for products that use the four new item types of System, Product Bundle, Element, and Connector. When you select one of these products to add to the order, the system will ask you if you want to configure the product. If you click YES, the ordering dialog is initiated.

Ordering equipment

When ordering equipment for other than a private network system, you must order that equipment outside of the ordering dialog. You would enter the equipment locations, order the equipment, and continue ordering the template-based products. Then the location information you entered will carry over to the ordering dialog, and you will not have to enter it a second time.

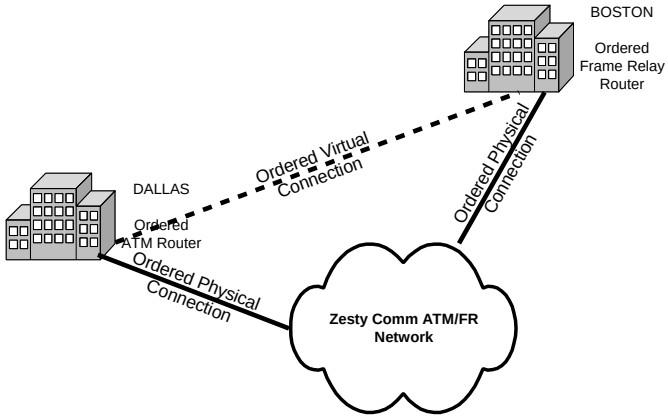
Connection identification

You can identify connections with the CKTID or NETDSGN tasks, or you can identify them on the order and skip entering them through a task.

To identify a connection during ordering, you right-click the ordered connection and select Assign Circuit, which takes you to the Connection Identification window.

Together—Enter order

Roberts & Associates, a large advertising firm, is changing service providers and orders a dedicated virtual connection between its Boston home office and its Dallas branch office. With this connection, the firm will be able to transport large graphics files and collaborate on developing ad campaigns. The firm will order a frame router for its Boston headquarters and an ATM router for is Dallas branch.


BOSTON
Ordered
Frame Relay
Router
Ordered Virtual
Connection
Ordered Physical
Connection
DALLAS
Ordered
ATM Router
Ordered Physical
Connection
Zesty Comm ATM/FR
Network

Customer Information

Customer Status	Service Type
☒ New ☐ Existing	☒ New ☐ Change ☐ Disconnect

Customer PO #	Sales Order #
	nn2508

Customer Acct. #	Organization	LD Provider	Prior LD Provider
	ZestyComm	*LLD*	

Customer Name	County	Community
nn *Roberts & Associates*		

Street Address	Customer Phone #	Customer Fax Phone #
*44**nn** Teaparty Lane*	*213/444-2222*	

City, State, & Zip	Email Address
Boston, MA 01234	*jsmith@mmc.com*

Contact Name	Comments
Rachel Banks	*Desired Due Date – Two weeks from today*
Title	Sales Order Date – Today's Date
Manager	Ordered: Dedicated T1 connection from Boston to Dallas.

Contact Phone #	Contact Fax #
213/444-5555	

Approvals

Sales Representative	Sales Office	Date

I have read and understand, and agree to the terms of this order. I understand that changes to this order must be in writing and may result in a new in-service date and additional charges.

Customer Signature	Date
Rachel Banks	*nn/nn/nnnn*

Query for the customer

To query for the customer, perform the following steps:

1. Click **Cust Care** on the primary toolbar.
2. Click **Customer** on the secondary toolbar.
3. In the **Company Name** field, type `Like nnRoberts%`.
4. Click **Retrieve**.
5. Click **Cust Profile**.

CREATE THE SERVICE REQUEST

To create the service request, perform the following steps:

1. Click the **Create** link next to **Orders** to create a new order.
2. Enter the following information on the **Service Order** tab.

Field	Value
Desired Due Date	Select a due date two weeks out.
Ordered by Last Name, First Name and Tel Nbr	*See the sales order.*
Organization	Zesty Communications
PON	***nn***2508
Expedite	*Check to expedite.*

ADD LOCATIONS

To add the locations, perform the steps below:

1. Select the **Service Items** tab.
2. Right-click **Order Number** and click **Add Location From Primary Billing Address**.
3. In the **Location Name** field, type `nn Roberts Boston`.
4. In the **TN Switch** list, type `BSTNMAnnDS1`.
5. Click **OK**.
6. Click **Select**.
7. Right-click Order Number and click **Add New Location**.
8. Enter the following address information:

Field	Value
Location Name	***nn*** Roberts Dallas
TN Switch	DLLSTX***nn***DS3

House Nbr	38*nn*
Street name	Fifth Street
State	TX
City	Dallas
Postal Code	75038

9. Click **OK**.
10. Click **Select**.

Order products

ORDER EQUIPMENT

1. Right-click **Service Location** (**nnRoberts Boston**) and click **Add New Item**.
2. Click **Zesty Comm CPE**.
3. Click **OK** to accept the default of one piece of equipment.
4. Click **OK**.
5. From the tree view of the order, click **Zesty Comm CPE-New**.
6. In the **Equipment Spec** list, click **Cisco 2611**.
7. Click **01Roberts Dallas**.
8. Click **Yes** to save changes.
9. Right-click **01Roberts Dallas** and click **Add New Item**.
10. Click **Zesty Comm CPE**.
11. Click **OK** to accept the default of one piece of equipment.
12. Click **OK**.
13. From the tree view of the order below 01Roberts Dallas, click **Zesty Comm CPE-New**.
14. In the **Equipment Spec** list, click **Cisco 1750**.

ORDER DEDICATED PVC PRODUCT

1. Click **Global**.
2. Click **Yes** to save changes.
3. Right-click **Global** and click **Add New Item**.
4. Click **Zesty Comm Dedicated PVC Product**.
5. Click **Yes** to configure the new product. (This is a new step for template-based products.)
6. Check both existing locations to include on the order.
7. Click **Next**.

8. Click **Next** to verify that all locations are correct.
9. Click the cell from Loc 1 to Loc 2 to represent the virtual connection between the Dallas branch office and the Boston home office.
10. Click the cell from Loc1 to the cloud to represent the bandwidth circuit from Boston to the ATM network.
11. Click the cell from Loc2 to the cloud to represent the bandwidth circuit from Dallas to the ATM network.

Note: Lightening Bolt

You can click the lightening bolt to select all connections. Or you can click the column headings to select all locations in that column.

12. Click **Next**.
13. In the **Connection Type** list, click F**rame Physical Connection...FR_SW, CUST Site**.
14. Check the **Boston** location because it needs a frame relay bandwidth connection, and click **Add**.
15. In the **Connection Type** list, click **ATM Physical Connection...ATM_SW, CUST_SITE**.
16. Check the **Dallas** location because it needs an ATM connection, and click **Add**.
17. In the **Connection Type** list, click **Virtual Connection...**.
18. Check the **Boston-to-Dallas** location, and click **Add**.
19. Click **Next**.
20. Enter the following custom attributes for the virtual enterprise connection:

Field	Value
Rate Code	DS1
Virtual Broadband Service Category	Use ATM and FR because the Boston location is frame access and the Dallas location is ATM access.
ATM Connection Type	Channel
Svc Category Send & Receive	B=CBR
PCR Send and Receive	999
PCR Priority Code Send and Receive	A=0
CIR Send and Receive	1.544 M

Note: Custom Attributes

These custom attributes appear in ordering because they are preloaded that way in the MetaSolv Solution Utility Application.

21. Click **Next Connection**.
22. Enter the following information for the frame physical connection:

Field	Value
Rate Code	DS1
Broadband Service Category	Frame
Bit Rate	1.544 M
NNI/UNI	UNI

23. Click **Next Connection**.
24. Enter the following information for the ATM physical connection:

Field	Value
Rate Code	DS1
Broadband Service Category	Cell
Bit Rate	1.544 M
NNI/UNI	UNI

25. Click **Done**.
26. Click **OK**.
27. Click **Finish**.
28. Click **Yes** to generate tasks.

GENERATE TASKS

1. From the **Provisioning Plan** drop-down, click **Connection nn**.
2. Click the **Queues** button.
3. Click the **Task List** tab.
4. Click the **CKTID** task.
5. In the **Work Queue** list, click **PROVnn**.
6. Click **Yes** to change all Engineer tasks to the same queue.
7. Click **OK**.

8. Close back to the primary toolbar.

Chapter Review

In this module, you entered an order for a new product item and you chose a provisioning plan to generate tasks to work queues.

Chapter 8

Provision Service

What you'll learn in this chapter

In this module, you will provision services ordered through the ordering dialog.

Objectives

At the end of this chapter, you will be able to:

- Identify connections.
- Install customer-ordered equipment.
- Provision ordered physical connections.
- Provision ordered virtual connections.

Design ordered connections

You must identify all of the connections before you can design them. Once you have identified them, you must use a Work Queue Manager task to design them. Since virtual connections are transported over bandwidth connections, you must design the physical connections before the software will allow you to design the virtual connections.

There is one connection design interface used for designing both physical and virtual connections. For physical connections, you can record issue or DLRD issue the connection, and view the design lines on the CLR/DLR design lines or the Schematic design lines. For virtual connections, you can record issue the connection and view the design lines in the GLR.

CONNECTION IDENTIFICATION

To identify connections that you order from the Customer Care subsystem, use the CKTID or NETDSGN tasks in the Work Management subsystem. Or have the software identify the connections for you by setting the connection specs in the template to **Auto ID**.

In this module, you will use CKTID task to identify the tasks manually.

INSTALL EQUIPMENT

For connections, you can install customer-ordered equipment with the EQ INST task. For virtual private networks, you can use the NET DSGN task. In either instance, the Service Request Equipment window lists all of the end-user locations and associated equipment specifications that have been ordered. Double-clicking one of the rows in the Service Request Equipment window opens the Equipment Install window so that you can install equipment ordered for the end-user location on the PSR.

PHYSICAL CONNECTIONS

You design the physical connection like you design connections during network design, but you will access the physical connection through a task instead of on the network design canvas.

An ordered physical connection connects the customer location with the provider network. You need to install ordered equipment to the customer location before designing the physical connection. If the customer does not order equipment, you will design only to the provider network equipment.

You use the RID task to design connections that are not part of a customer-ordered network system.

You use the NETDSGN task to design the physical connections that are part of a customer-ordered network system.

The customer location will default to the A location. You can enter the network location or CLLI code of the provider access network on the General tab. Or you can use the Network tab to locate the access network by the network template name, type, status, or by the element name, type, status, network element ID, or network location. The element type defaults, based on the template that you used to place the order.

When you make equipment assignments, the first available ports for the correct rate code will appear. At that point, you right-click and assign the circuit.

You must also fill in any required customer attributes for the connection.

Once the design is complete, you must “Record Issue” the connection, or “DLRD issue” it for a regulated order.

VIRTUAL CONNECTIONS

To design virtual connections, you use the Graphical Layout Record (GLR). As a reminder, the bandwidth connections must be designed before you can design the virtual connections.

A virtual connection is a path between two or more points that appears to be a fixed physical path. Actually, it is one path out of several possible physical paths that is available in the network. A virtual connection provides a connection between two or more points when needed without having to reserve or commit to a specific physical path in advance.

GRAPHICAL LAYOUT RECORD (GLR)

The *Graphical Layout Record* (GLR) is a generic term that refers to two items in the application: the GLR window and the GLR report. In provisioning, the GLR window displays a graphical and logical representation of a connection, showing its path through elements within network systems and also elements outside the confines of the network systems.

You provision virtual connections in the GLR window. The GLR report provides information about a specific virtual connection, such as administrative information, design lines, and a graphical view of design.

You use the graphical canvas, which is the white area of the screen to graphically design connections.

The GLR Buttons include the following:

 Hide Panel – To hide the left side panel to allow more room for the graphical canvas.

 Save –To save from the GLR.

 Print – To print from the GLR.

 Print Preview –To preview the print screen before you print it.

 Back/Next –To maneuver between tabs on the GLR.

 Mark as Record Issue – To mark your design as record issue without going through the print screen.

 Activation Summary Report – To view and print the Activation Summary Report.

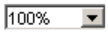
 Redesign – To redesign your connections.

 Select and Zoom Out – To zoom just the selected element.

 Select and Zoom In - To zoom just the selected element.

 Zoom Out – To zoom out on entire design.

 Zoom In – To zoom in on entire design.



Zoom Percentage – To resize your design.

Hide Toolbar – to hide the upper toolbar to allow more room for the graphical canvas.

USER PANEL

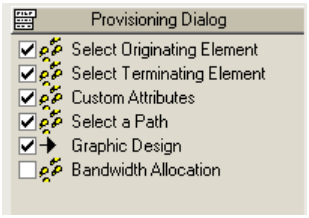
The user panel helps facilitate the provisioning process by leading you through the network assignments for a virtual connection. The panel contains four tabs to assist you with your connection design:

- **Provisioning Dialog** – Lists the steps for provisioning your connection. These steps will vary, depending on the design mode you choose. As you complete each step, a checkmark will appear in the checkbox next to that step.
- **Administrative Section** – Lists connection information, order information, tasks, contact information, and notes associated with your connection. The only fields you can change in this tab are the contact information and the notes.
- **Design Options** –Allows you to override the design mode selection that is set in Preferences. It also allows you to set the maximum number of hops. The three design modes include Manual Design, Path Analysis by Hops, and Path Analysis by Distance.
- **Available Connections** – Displays a tree view of all the available connections within a specified network that fit your connection criteria.

THE PROVISIONING DIALOG

The Provisioning Dialog panel has the following sections:

- **Select an Originating Element** – Auto-populates with the information from the order and from the connection ID.
- **Select a Terminating Element** – Auto-populates, but you may have to select the terminating element from a list.
- **Custom Attributes** – To capture dependencies and values about allocations and connections.
- **Bandwidth Allocation** – To validate bandwidth allocation and to specify the allocation values. Examples include VPI/VCI or DLCI.



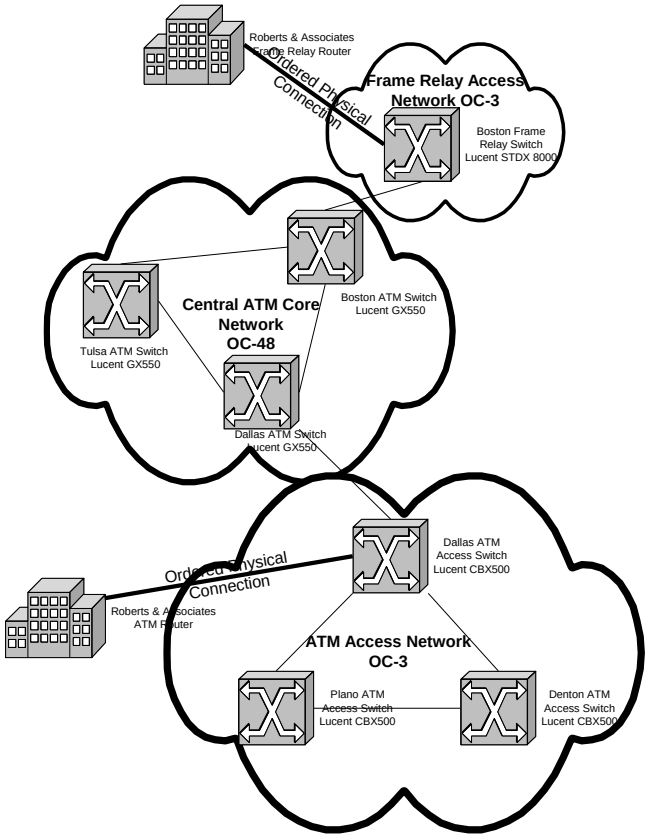
Depending on the design mode you are using, the Provisioning Dialog panel will also have one of the following sections:

- **Graphic Design** – While in manual design mode, you can use this tab to add connections between elements. When you right-click on the element, you can add a hard connection and specify a path between two elements. Or you can add a soft connection, for which there is no specific path between the two elements you are connecting. While in the path analysis design mode, you can view only the virtual path from the Graphic Design tab.

- **Select a Path** - Displays all paths and their available capacity through a network for a connection. This tab is available only while in the path analysis mode.

Scenario

Recall that Roberts & Associates ordered a dedicated virtual connection between Boston and Dallas. They will provision a frame relay connection in Boston and an ATM connection in Dallas. The transport network that Zesty Communications owns is ATM.



Together—Identify connections

You need to identify the two access connections and the virtual connection through the CKTID task. In previous modules, you identified connections without going through the Work Queue Manager. You will perform many of the same steps.

1. Click **Home>My Work Queue**.
2. In the **Work Queue** list, click **PROVnn**.
3. Double-click the **CKTID** task for PON **nn2508**.
4. Right-click the first bandwidth circuit and click **New**.
5. Enter the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	AS
Rate Code	DS1
Freeform Circuit Entry	*(Default)*

6. Click **OK**.
7. Right-click the second bandwidth circuit and click **New**.
8. Enter the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	YB
Rate Code	DS1
Freeform Circuit Entry	*(Default)*

9. Click **OK**.
10. Right-click the virtual circuit and click **New**.
11. Enter the following information:

Field	Value
Connection Type	OTS
Service Type Category	CLCI-SS LATA
Service Type Code	YG
Rate Code	DS1
Freeform Circuit Entry	*(Default)*

12. Click **OK**.
13. **Close** the window.
14. Right-click the **CKTID** task and click **Complete Task(s)**.
15. Click **YES** to complete.

Together—Install equipment

1. Double-click the **EQ INST** task.

2. Double-click **nn Roberts Boston**.
3. Right-click and click **Add**.
4. In the **Type** list, click **CPE**.
5. In the **Spec** list, click **Cisco 2611**.
6. Click **OK**.
7. Close back to the Service Request Equipment window.
8. Double-click **nn Roberts Dallas**.
9. Right-click and click **Add**.
10. In the **Type** list, click **CPE**.
11. In the **Spec** list, click **Cisco 1750**.
12. Click **OK**.
13. Close back to the Work Queue Manager window.
14. Right-click the **EQ INST** task and click **Complete task(s)**.
15. Click **Yes** to complete.

Together—Design the Boston bandwidth connection

DESIGN WITH A KNOWN CLLI LOCATION

To design the Boston bandwidth with a known CLLI Location, perform the following steps:

1. From your work queue, double-click the **RID** task for PON **nn2508**.
2. Double-click the connection identification for the Boston bandwidth connection labeled "**nnRoberts and...**."
3. Click **None** in the **Terminating Location** section.
4. At the bottom of the window, click **Network Location**.
5. In the **Network Location** field, type `BSTNMAnnFRM`, and click **Search**.
6. Click **OK**.
7. Click the **CLR/DLR Design** link, and click **Yes** to save the details.
8. In the Network System section, click the **Associate** link.
9. Search for the **Zestynn Bstn Access** and click **Search**.
10. Select the **Zestynn Bstn Access** System and click **OK**.

DESIGN CONNECTION

1. Click the **CLR/DLR Design** link.
2. Click the **Add and Equipment Assignment** link.
3. Double-click the **Cisco 2611**.
4. Right-click an **unassigned DS1 port** and click **Assign Connection**.
5. Click **Yes** to associate equipment with the customer site.
6. Right-click an **unassigned DS1 port** on a 4-port T1 card and click **Assign Connection**.
7. Click **Close**.

RECORD ISSUE THE CONNECTION

8. Click **Change Status>Record Issue**.

Note: Custom Attributes

The custom attributes entered with the order is carried over the Custom Attributes tab on the design lines.

9. **Close** the window.
10. Click **Yes** to save changes.

DESIGN WITH AN UNKNOWN CLLI LOCATION

To design the connection with an unknown CLLI location, perform the following steps:

1. Double-click the connection identification for the bandwidth connection in Dallas.
2. In the Network System section, click the **Associate** link.
3. In the **Network Location** field, type `Like DLLSTX%`, and then click **Search**.
4. Double-click the **ZESTYnn DLLS ATM AC** network, and click **OK**.
5. Click the **CLR/DLR Design** link.
6. Click the **Add and Equipment Assignment** link..
7. Double-click the **Cisco 1750**.
8. Right-click an **unassigned DS1 port** and click **Assign Connection**.
9. Click **Yes** to associate equipment with the customer site.
10. Right-click an **unassigned DS1 port** on a 4-port T1 card and click **Assign Connection**.
11. Click **Close**.

RECORD ISSUE THE CONNECTION

12. Click **Change Status>Record Issue**.

> **Note: Custom Attributes**
>
> The custom attributes entered with the order is carried over the Custom Attributes tab on the design lines.

13. **Close** the window.
14. Click **Yes** to save changes.

Together—Design virtual connection manually

With your instructor, use Path Analysis – Least Hops mode to design a virtual connection from an order:

1. Double-click the connection identification for the virtual connection.

   The originating element in Boston is selected automatically, and the terminating element in Dallas appears.
2. Click the **Schematic Design** link.
3. Click the **Auto Layout** link.
4. Right-click **nnRoberts Boston** customer site and click **Add Hard Connection**.

   The bandwidth connection is added to the canvas.
5. Right-click the **Boston Frame Switch** and click **Add Hard Connection**.
6. Click the **Zestynn Central Transport** network, and then click the connection to the switch, and click **OK**.
7. Right-click the **nn Boston Core Switch** and click **Add Hard Connection**.
8. Click the **Zestynn Central Transport** network, and then click the connection to the customer site, and click **OK**.
9.
10. Right-click the **nn Dallas ATM access switch** and click **Add Hard Connection**.
11. From the Available Connections panel, double-click **Zestynn DLLS ATM Access**.
12. Expand the **Assignable Bandwidth Link**.
13. Drag the **nn Roberts Dallas** connection to the graphical canvas.
14. Right-click the connection from Dallas Switch to the customer and click **Specify Virtual Channel**.
15. Type `16` and click **OK**.

The channel displays under the connection identification. An asterisk displays if the channel is defaulted from the next available and has NOT been saved yet.

16. Right-click the connection from Boston Switch to the customer and click **Specify Virtual Channel**.
17. Type **16** and click **OK**.

RECORD ISSUE THE CONNECTION

1. Click **Change Status>Record Issue**.

VIEW THE ACTIVATION SUMMARY REPORT

1. Click **Outputs>Activation Summary Report** button to view the Activation Report.
2. Click **Close**.
3. Close the window.
4. Click **YES** to save changes.
5. Close back to the work queue manager.
6. Right-click the **RID** task for PON **nn2508** and click **Complete Task(s)**.
7. Click **Yes** to complete.
8. Close back to the primary toolbar.

Chapter Review

In this lesson, you identified connections, installed customer ordered equipment, and designed physical and virtual connections using tasks in the work queue.

Chapter 9

Test and Troubleshoot

What you'll learn in this chapter

In this module, you will test the information you entered during this course while implementing a product over an ATM/Frame Relay transport network. You will also be able to troubleshoot your implementation.

Objectives

At the end of this chapter, you will be able to:

- Use the product catalog that you built in this course to enter a new order.
- Manually provision a dedicated PVC service over the network you previously designed.
- Improve your troubleshooting skills.

Troubleshoot

Whenever you cannot provision service, check the following items:

REVIEW SERVICE REQUEST

- Do the ordered connections match the network system? Example: If you have a frame access network in Boston, did you order a frame access connection?
- Did you order the correct type of physical link for the available network?
- Did you design both bandwidth circuits before you attempted to open the virtual circuit?
- Do the installed CPE equipment specification and issue match the CPE equipment specifications and issue selected on the service request?
- Do you have the correct network associated with the order on the Network tab?

REVIEW PRODUCT CATALOG

When offering customer premise equipment, ensure that the equipment specification associated with the product offering includes every specification that can be installed. (If equipment is installed but still shows as "Uninstalled," compare the equipment spec with that associated with the product specifications.)

If you cannot locate the originating terminating element when provisioning, do the Element A and Element B templates associated with the product specifications match the templates that you used to design the network system? Example: If designing to an ATM switch from a customer site, the network template that you used to design the network must include an access connection from the ATM switch to the customer site. Also, ensure that the network template in the product specs matches the network template that you used to build your networks.

When you associate multiple network templates with the product catalog, can you easily identify them during the order process? Example: You created an access connection that could be either frame relay or ATM. Can you distinguish between the two during order time?

REVIEW TEMPLATES AND NETWORKS

- If you cannot automatically provision service with path analysis, do you have a prioritized path in your template that matches the network route you have designed?
- If you cannot design a VPN virtual connection over the physical connection, does the virtual connection in the template list all of the physical connection specs used in the network system as *assignable* connection specs?
- If you cannot design to a customer, does the customer connection in the template have the "network extension" property?
- If you cannot provision, are all of your networks and elements "In Service"?

You can modify your network and product catalog at any time; however, you may need to supplement your order and use the new or modified products.

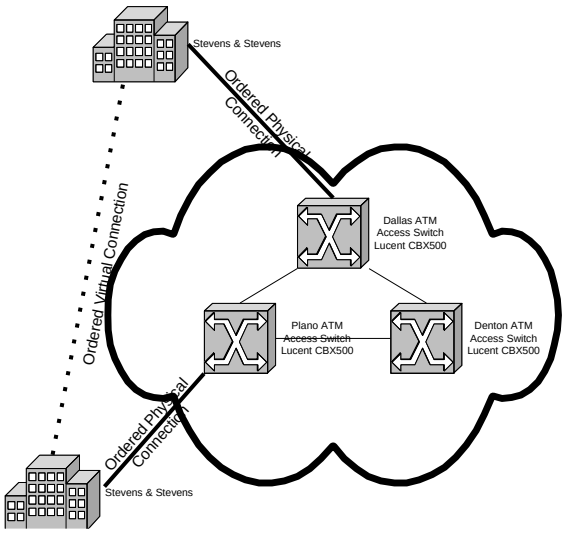
On Your Own—Test implementation

Use the steps in previous modules to enter an order. You will also use the product catalog and the provisioning plan you built. Then you will locate the design tasks in your work queue and provision the service over the network you previously built.

Stevens and Stevens law firm has requested a dedicated connection from its Plano office to its Dallas office. They already own ATM equipment at both locations, so you do not need to order equipment.

You will order an ATM physical connection from the Dallas customer site to the provider network. You will also order an ATM physical connection from the Plano customer site to the provider network.

Finally, you will order the ATM virtual connection to connect the customer sites.



You will find the information you need to complete this module on the following page.

Customer Information

Customer Status	Service Type
☒ New ☐ Existing	☒ New ☐ Change ☐ Disconnect

Customer PO #	Sales Order #
	nn9999

Customer Acct. #	Organization	LD Provider	Prior LD Provider
	ZestyComm		

Customer Name	County	Community
nn *Stevens & Stevens*		

Street Address	Customer Phone #	Customer Fax Phone #
*80**nn** Corporate Lane*	*972/405-1111*	

City, State, & Zip	Email Address
Plano, TX 75024	*tstevens@stevenslaw.com*

Contact Name	Comments
Sherri Walker	*Desired Due Date – Two weeks from today*
Title	Sales Order Date – Today's Date
IT Manager	Ordered: Dedicated T1 connection from Plano to Dallas.

Contact Phone #	Contact Fax #
972/405-1111	

Approvals

Sales Representative	Sales Office	Date

I have read and understand, and agree to the terms of this order. I understand that changes to this order must be in writing and may result in a new in-service date and additional charges. I acknowledge that the prices of the ordered products are those in effect on the date that I sign this sales order.

Customer Signature	Date
Sherri Walker	*nn/nn/nnnn*

Use the following information to enter your order:

Field	Value
Global product	***nn*** Dedicated PVC
Location 1	Use the location on the order form.
Location 2	Stevens Dallas Branch 96***nn*** Mockingbird Lane Dallas, TX 75038
Connectivity Matrix	Select all checkboxes to get two access connections from each location and a virtual connection between customer sites.
Connections	***nn*** access connection (Because an ATM access network is in this area, you will use the access connection from **ATM_SW, CUST SITE** for both access connections). ***nn*** virtual connection

Enter the following custom attributes for your virtual connection.

Field	Value
Rate Code	DS1
Virtual Broadband Service Category	ATM
ATM Connection Type	Path
Svc Category Send & Receive	B=CBR
PCR Send and Receive	968
PCR Priority Code Send and Receive	B=0+1

Enter the following custom attributes for both of your ATM connections.

Field	Value
Rate Code	DS1
Broadband Service Category	Cell
Bit Rate	1.544 M
NNI/UNI	UNI

Use the following information to generate tasks.

Field	Value
Provisioning Plan	Connection ***nn***
Work Queues for Engineering Tasks	Prov***nn***

Delete the EQ INST task because the customer is not ordering equipment.

WORK TASKS

Identify all connections through the CKTID task. Use the following for the access connections:

Field	Value
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	AS
Rate Code	DS1
Freeform Circuit Entry	*(Default)*

Enter the following for the virtual connection:

Field	Value
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	YG
Rate Code	DS1
Freeform Circuit Entry	*(Default)*

Then design your connections with the RID task.

On your detail tab for each access connection, you need to enter the network location. You will use DLLSTX***xx***ATM for the Dallas connection and PLANTX***xx***ATM.

If you have problems designing your service request, see the troubleshooting tips in this module or the completed GLR in Appendix A.

Chapter Review

In this module, you used the product catalog you built to manually provision dedicated PVC service on your network.

Chapter

10

Create Layer 2 VPN

What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the Layer 2 VPN template from the ATM/Frame Relay technology module to implement a product.

Objectives

At the end of this chapter, you will be able to:

- Identify a Layer 2 VPN.
- Identify the elements, connections, and custom attributes loaded with the Layer 2 VPN technology module.
- Create the product catalog for the VPN product.
- Enter a service request and provision a customer-ordered Layer 2 VPN.

Layer 2 VPN technology module data

The data included with the Layer 2 VPN technology module appears in the ATM/Frame Relay network template. The data includes, network elements, connections, and custom attributes.

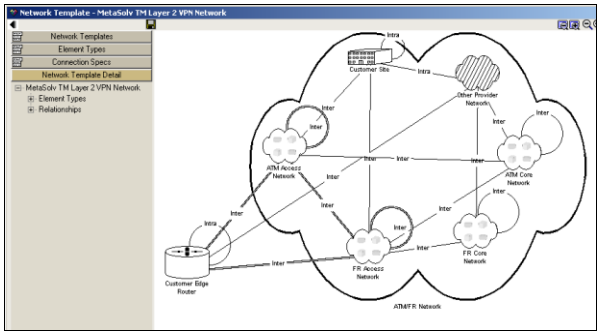
ELEMENTS

As with other network templates, you can select the elements that meet your network requirements, or you can add new ones. Below are the elements included with the Layer 2 VPN templates.

LAYER 2 ELEMENTS

The following elements are included with the ATM Access Network:

- Customer Edge Router
- ATM/FR Network



The ATM/FR Network is considered an embedded template (as represented by the cloud). Each of the clouds shown inside the ATM/FR Network is embedded templates in the ATM/FR Network. You will use the Layer 2 VPN template to build ordered VPN networks.

The customer edge (CE) router has a loop, which means that you can connect it to another CE router in the same network.

Layer 2 VPN template connection specs

The following connection types are available:

- **VPN Links**—The physical connections that connect the customer edge routers to other elements.
- **Layer 2 VPN Connection—**The virtual connections that connect one customer edge router to another customer edge router.
- **Internet Connection**—A virtual connection that connects a customer edge router to other elements for Internet connectivity.

PRIORITIZED PATHS

Prioritized Paths are the physical paths that a virtual circuit can ride over a transport backbone network. You can create multiple paths for virtual circuits and prioritize them.

You will not see prioritized paths for physical circuits.

CUSTOM ATTRIBUTES

Following are some of the predefined custom attributes included with Layer 2 VPN:

- **CE Manager**—This CA is a property of the CE router. You determine who manages the router (the customer or the provider).
- **SA Agent Status**—This CA is a property of the CE router, which determines the type of Service Assurance Agent status on the router. You can select *None*, *Regular*, or *Shadow*.

Selecting **None** indicates that the CE router does not employ the SA Agent feature.

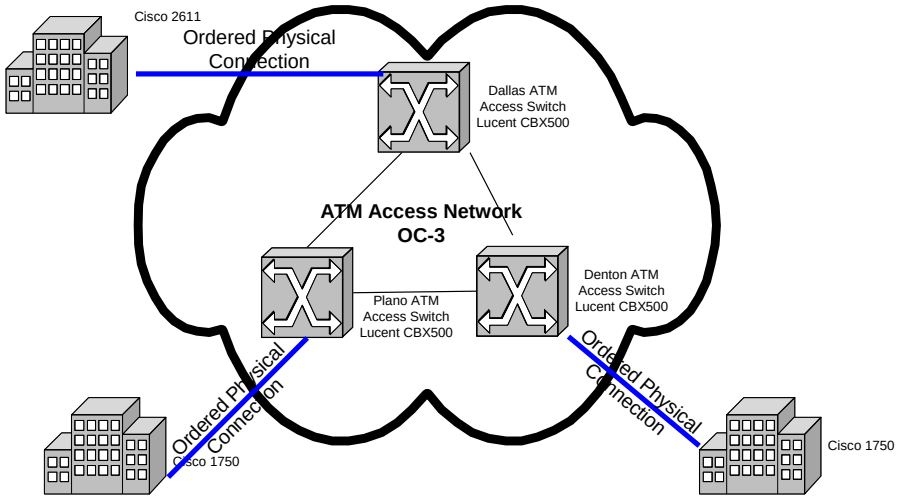
Selecting **Regular** indicates that the CE router has a dual function as a CE router and as an SA Agent router. That is, while device operating as an SA Agent device must also be a managed CE router.

Selecting functioning as a CE router in the VPN, it is also monitoring traffic response times between the CE routers in the same VPN.

Note that a CE **Shadow** indicates that the designated CE router is actually a provider edge (PE) router that is functioning as an SA Agent device.

Scenario

Metropolitan Medical Center orders a virtual private network to connect its Dallas-based hospital, the Denton outpatient facility, and the Plano research facility. This VPN will enable each location to share patient information, as well as provide a database of medical advances and treatments. Metropolitan Medical Center does not have routers installed at any of the locations and wants T1 connections.



Design a network system

A customer Layer 2 VPN will be transported on an ATM/Frame Relay transport network. Because several VPNs are customer ordered, you will design them through the Work Management subsystem as part of the provisioning process. You have already built out your ATM/Frame Relay transport network, and no further modifications to the network are necessary.

Together—Build product specs

1. Click **Infrastructure>List> Product Catalog>Product Specifications**.
2. Right-click and click **Add Item**.
3. In the **Type** list, click **Network System**.
4. Enter the following input values.

Field Name	Input Value
Code	***nn***atmvpn
Internal Alias	***nn*** ATM VPN

5. Select the **Product/Package** check box, and click **Save**.
6. Right-click and click **Add Item**.
7. In the **Type** list, click **Network Element**.
8. Enter the following input values.

Field Name	Input Value
Code	***nn***euloc
Internal Alias	***nn*** End User Location

9. Click **Save**.
10. Right-click and click **Add Item**.
11. In the **Type** list, click **Network Connection**.
12. Enter the following input values.

Field Name	Input Value
Code	***nn***VPNlink
Internal Alias	***nn*** VPN physical link

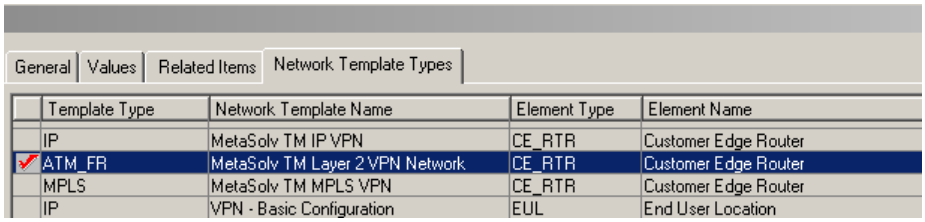
13. Click **Save**.
14. Right-click and click **Add Item**.
15. In the **Type** list, click **Network Connection**.
16. Enter the following input values.

FIELD NAME	INPUT VALUE
Code	***nn***vpnvirt
Internal Alias	***nn*** vpn virtual connection

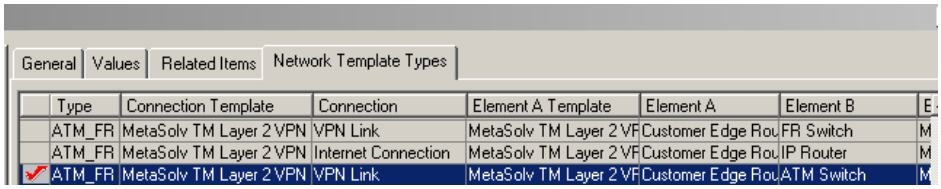
17. Click **Save**.

Associate specs with network templates

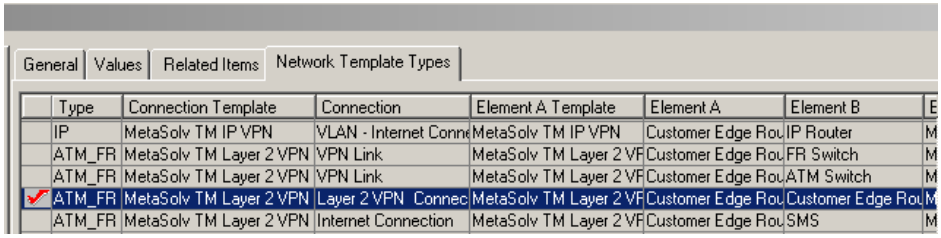
1. In the Product Specification pane, click **nn End User Location**.
2. Click the **Network Template Types** tab.
3. Scroll through the list to find the Network Template Name and Element Type shown below.



4. Right-click and click **Associate**.
5. Click the **Related Items** tab.
6. Right-click **Equipment** and click **Add**.
7. Click **Save**.
8. In the panel, click **Equipment spec**.
9. Click the **Equipment Spec** tab.
10. Ensure that the **Cisco 1750** and the **Cisco 2611** are displayed.
11. In the Product Specification pane, click **nn vpn physical link**.
12. Click the **Network Templates Types** tab.
13. Scroll through the list to find the Network Template Name, Connection Spec Type, and Elements shown below.



14. Right-click the **VPN Link** that goes from **Customer Edge Router** to **ATM Switch** and click **Associate**.
15. Click **Save**.
16. In the Product Specification pane, click **nn vpn virtual connection**.
17. Scroll through the list to find the Network Template Name, Connection, and the Element A and Element B types shown below.



18. Right-click the **Layer 2 VPN Connection** that goes from **Customer Edge Router** to **Customer Edge Router** and click **Associate**.
19. Click **Save**.
20. In the Product Specifications pane, click **nn ATM VPN**.
21. Click **Network Template Types** tab.
22. Right-click the **MetaSolv TM Layer 2 VPN Network** Template Type and click **Associate**.
23. Click the **Related Items** tab.
24. Right-click **nn vpn virtual connection** and click **Add**, and then click **OK**.
25. Right-click **nn vpn physical link** and click **Add**, and then click **OK**.
26. Right-click **nn End User Location** and click **Add**, and then click **OK**.
27. Click "**x**" to close the window.
28. Click **YES** to save changes.

Build product catalog

1. Click **Infrastructure>Product Catalog>Product Catalog**.
2. Right-click and click **Add Item**.
3. Click the **nn ATM VPN** product specification and click **OK**.
4. In the Marketing Description field, type `VPN for customers with ATM as Layer 2.`
5. In the **Service Category** list, click **Business**.
6. In the **Offering Type** list, click **Retail**.
7. Click the **Network Template Type** tab.
8. Right-click the **Layer 2 VPN** template and click **Associate**.
9. Click **Save**.

Add virtual connection

1. Right-click **nn ATM VPN** and click **Add Item**.
2. Click **nn vpn virtual connection**, and then click **OK**.

3. Click the **Network Template Type** tab.
4. Right-click the **VPN Link from Customer Edge Router to Customer Edge Router** and click **Associate**.
5. Click **Save**.

On your own—Add physical connection

Use the steps for adding a virtual connection to add the VPN Physical Link product specification to the product catalog. Then associate the template.

Together—Add network elements

1. Right-click **nn ATM VPN** and click **Add Item**.
2. In the **Product Spec Item** list, click **nn End User Location**.
3. Click **OK**.
4. In the **Item Alias** field, type `Branch Office`.
5. Click the **Network Template Type** tab.
6. Right-click the **CE_RTR** element type, and click **Associate**, and then click **Save**.
7. Right-click **Branch Office** and click **Add Item**.
8. In the **Product Spec Item** list, click **Equipment**, and then click **OK**.
9. Click **Yes** to save changes.
10. In the **Item Alias** field, type `CE Router`.
11. Click the **Equipment Spec** tab.
12. Right-click and click **Add**.
13. Click the **Cisco 1750**, and click **OK**.

On your own—Add network elements

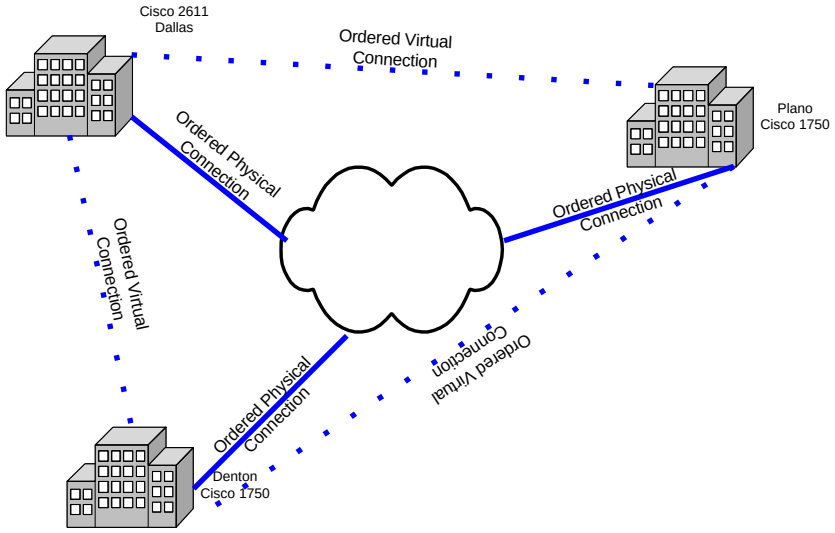
Use the previous steps to enter a CPE product that allows the customer to order a Cisco 2611 router for its home office.

Field Name	Input Value
End User Item Alias	Home Office
Equipment Item Alias	CE Router
Equipment Spec	Cisco 2611

Enter a service request

Scenario

You will enter a service request for a VPN. Order three physical connections from each site into the provider network, plus three virtual connections to connect all customer sites to each other. You will also order the equipment for each location.



Enter service request

ENTER CUSTOMER INFOMATION

1. Click **Customer Care>Service Requests**.
2. Click **Add New**.
3. Click **Product Service Request**, and click **OK**.
4. Enter the following information on the **Customer Account** tab:

FIELD	Value
Service Category	Business
Company Name	***nn***Metropolitan Medical

5. Click  and enter the following address:

   88***nn*** Hospital Blvd.

   Dallas, TX 75248

6. Click **OK**.
7. Click the Billing Cycle drop-down and select **Dallas**, and click **OK**.
8. In the **Order Information** section, enter the following information:

Field	Value
Desired Due Date:	*One week out*
Ordered by Last Name	Schmidt
Ordered by First Name	John
Ordered by Telephone Nbr	214 457-0099
Organization	Zesty
PON	***nn***4500

ORDER VPN

1. Click **Services**.
2. Click Add New Location.
3. Enter location information and click OK.
4. From the **Service Item Actions** section, click **Add New Item**.
5. Click **nn ATM VPN** and click **Yes** to configure the product.

   The ordering dialog appears.
6. In the **Short Name** field, type `nn Metro Medical` and click **Next**.

   The customer location you entered will appear.
7. Click **add a new customer location** link.
8. Edit the **Location Name** to read `nn Metropolitan Home`.
9. Enter the following information:

FIELD	VALUE
Location Name	***nn*** Metro Denton
Nbr	77***nn***
Street	Maple

City, State	Denton, TX
Zip	76205

10. Click **Add Another**.
11. Enter the following information:

FIELD	VALUE
Location Name	***nn*** Metro Plano
Nbr	66***nn***
Street	Park
City, State	Plano, TX
Zip	75026

12. Click **Next**.
13. Click **Next** to verify that the list of locations is correct.
14. In the **Network Element Type** field, click **Home Office, CE_RTR**.
15. Select the check box by **Location/Network Element**, and click **Add**.

    This will add network elements under both locations.
16. In the **Network Element Type** field, click **Branch Office, CE_RTR**.
17. Select the check boxes next to the Denton and Plano locations, and click **Add**.
18. Click **Next**.

Note: Instructions

By clicking the action at the top of the Network Element window, you can get a list of instructions for various actions. For example, if you click the "Delete Network Element" link, the instructions for deleting a network element will appear.

19. Enter the following information:

FIELD	VALUE
Name	Home Office Router
CE Manager	Provider
SA Agent	Regular

20. Click **Next Network Element**.
21. Enter the following information:

FIELD	VALUE
Name	Denton Branch Office Router

CE Manager	Provider
SA Agent	Regular

22. Click **Next Network Element**.
23. Enter the following information:

FIELD	VALUE
Name	Plano Branch Office Router
CE Manager	Provider
SA Agent	Regular

24. Click **Next**.
25. In the **Equipment Spec** list, click **CPE Router Cisco 1750**.
26. Select the check boxes next to the Denton and Plano locations, and click **Add**.
27. In the **Equipment Spec** list, click **CPE Router – Cisco 2611**.
28. Select the check box next to the Dallas location, and click **Add**.
29. Click **Next**.
30. Click the **lightning bolt** in the connectivity matrix to connect all locations physically to the provider network and virtually to each other, and click **Next**.
31. In the **Connection Type** list, click **nn VPN Physical Link, VPN Link CE_RTR, ATM_SW**.
32. Select all the available check boxes for Dallas, Denton, and Plano, and click **Add**.
33. In the **Connection Type** list, click **nn VPN Virtual Connection, Layer 2 VPN Connection CE_RTR, CE-RTR**.
34. Select all the available check boxes for Dallas, Denton, and Plano, and click **Add**.
35. Click **Next**.

Note: Custom Attributes

To go to the next connection, you need to complete the CAs for a connection and then click Next Connection. You have six connections in all: three virtual and three physical connections. Use the information in the next two tables to provide data for the appropriate connection type.

ENTER CUSTOM ATTRIBUTES

1. For the virtual connections, enter the following information:

FIELD	VALUE
Rate Code	DS1
Virtual Broadband Service Category	ATM

ATM Connection Type	Channel
Svc Category Send	A=ABR
PCR Send	768
PCR Receive	768
PCR Priority Code Send	B=0+1

2. For the VPN data link connections, enter the following information:

Rate Code	DS1
Virtual Broadband Service Category	Cell
Bit Rate	1.544 M
NNI/UNI	UNI

3. Click **Done**, and click **OK**.
4. Click **Validate Order**, and click **OK**
5. From the menu, click **Options>Finish order**.
6. Click Yes.
7. Click the **nn VPN** provisioning plan.
8. Click **Queues**.
9. Click the **NETDSGN** task.
10. In the **Work Queue** list, click **PROVnn**.
11. Click **YES** to change all Engineer tasks to the same queue.
12. Click **OK**.
13. Close back to the primary toolbar.

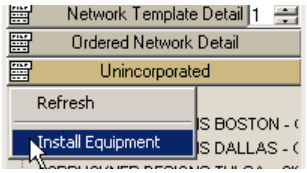
Provision service

1. Click **Work Mgmt>Queue Mgr**.
2. Click the **PROVnn** work queue.
3. Double-click the **NET DSGN** task.
4. Expand the **MetaSolv TM Layer 2 VPN Network**.
5. Double-click **nn Metro Medical**.

INSTALL ORDERED EQUIPMENT

1. Click the **Unincorporated** tab.

2. Click the menu icon and click **Install Equipment**.



3. Double-click the **nn Metropolitan Home**.
4. Right-click on the canvas area and click **Add**.
5. In the **Type** list, click **CPE**.
6. In the **Spec** list, click **Cisco 2611**.
7. Click **OK**.
8. Close the Equipment Install window.
9. Double-click the **nn Metro Denton**.
10. Right-click on the canvas area and click **Add**.
11. In the **Type** list, click **CPE**.
12. In the **Spec** list, click **Cisco 1750**.
13. Click **OK**.
14. Close the Equipment Install window.
15. Double-click **nn Metro Plano**.
16. Right-click on the canvas area and click **Add**.
17. In the **Type** list, click **CPE**.
18. In the **Spec** list, click **Cisco 1750**.
19. Click **OK**.
20. Close the Service Request Equipment window.
21. Click the menu icon on the Unincorporated tab and click **Refresh**.

    The status of each piece of equipment changes to "Installed."

ASSOCIATE CUSTOMER PREMISE EQUIPMENT WITH THE CUSTOMER LOCATION

1. Right-click on the Dallas Home Office element on the graphical canvas and click **Properties**.
2. In the **Name** field type `nn`.
3. In the **Status** list, click **In Service**.
4. Click the **Equipment Assoc** link.

5. Double-click **Add Equipment Association**.

   The Equipment Install window appears.

6. Right-click on **Cisco 2611** and click **Associate to Element**.

   The network element icon appears next to this piece of equipment.

7. Click **Close** on the Equipment Install window, and click **OK**.

   The validation runs, the Managing an Element window closes, and that piece of equipment disappears from the Unincorporated Items list.

On your own—Associate CPE with network

Use the previous steps to add the Cisco 1750 routers to the two branch offices. Then place the elements "In Service."

Assign Connection IDs

In the Network System Design window, you are designing only the physical connections for your network. However, you should assign IDs to both the physical and virtual connections.

1. Click the **Unprovisioned** tab.

   The tab opens, displaying all ordered physical connections for your network.

2. Click the menu icon and click **Connection Identification**.

   *The Service Request Connections window opens, displaying all of your physical and virtual ordered connections. Because **Auto ID** is checked on the template for these connection specs, the connections have been identified for you.*

3. Click the menu icon on the **Unprovisioned** tab and click **Refresh**.

   The connection IDs appear for all of the physical connections listed. (The virtual connections are not listed because you do not design them with this task.)

EMBED THE NETWORK

1. Click the **Network Template Detail** tab.
2. Expand the **MetaSolv TM Layer 2 VPN Network**.
3. Expand the **Element Types**.
4. Drag and drop the **ATM/FR** Network onto the canvas.
5. Right-click the **ATM/FR** cloud and click **Properties**.
6. Click the **Embedded Network Prop** link.
7. Click the **browse** link.

   The Network System Query window appears.
8. Enter "**like nn central%**" in the Short Name field.
9. Click **Retrieve**.

   A list of network systems appears in the query window.
10. Click the **nn central atm/fr** network.
11. Click **OK**.
12. Click **Yes** to update the element information.
13. Click **OK**.
14. Click **Save**.

ASSOCIATE CONNECTIONS WITH THE NETWORK

1. Double-click the **nn Central ATM/FR Network** to expand it.
2. Double-click the **nn Dallas ATM Access Network** to expand it.
3. Right-click on the **Dallas home office** on the graphical canvas and click **Connect**.
4. Drag your cursor to the **Dallas ATM Switch** element and release it on the element.
5. Right-click on the **Plano office** on the graphical canvas and click **Connect**.
6. Drag your cursor to the **Plano ATM Switch** element and release it on the element.
7. Right-click on the **Denton office** on the graphical canvas and click **Connect**.
8. Drag your cursor to the **Denton ATM Switch** element and release it on the element.
9. Click **Save**.

DESIGN THE PHYSICAL CONNECTIONS

1. Right-click the "**home office**" connection and click **Properties**.

   The Managing a Connection window appears.

2. Click the **(OPT) VPN Link** in the Template Connection Specs view and drag and drop it into the Network Connection Specs view.
3. Right-click **VPN Link** and click **Associate Ordered Connections**.
4. Click the "**nnMetropolitan Home**" connection and click **OK**.
5. Click **OK**.
6. Click **Save**.
7. Right-click on the same connection and click **Properties**.
8. Right-click the connection and click **Connection Maintenance**.
9. Click the **Design Lines** tab.
10. Click **Equipment** from the list on the right side of the Design Lines tab and drag and drop the hand into the design window.
11. Right-click the unassigned port on the Cisco router and click **Assign Circuit**.
12. Right-click the first unassigned DS1 port in the **DLLSTXnn** location and click **Assign Circuit**.
13. Click **Close**.
14. Enter the following custom attributes:

FIELD	VALUE
Broadband Service Category	Cell
NNI/UNI	UNI
Bit Rate	1.544 M

15. Click **Print** on the secondary toolbar.
16. Click **Yes**.
17. Uncheck the **Print CLR/DLR** checkbox.
18. Check the **Mark as Record Issued** checkbox.
19. Click **OK**.
20. Close back to the graphical canvas.
21. Click **No** to not save.
22. Click **OK**.
23. Click **Save** on the graphical canvas toolbar.

On Your Own—Add and design physical connections

Use the steps above to add and design the physical connections for the Denton and Plano sites.

Save and close the network system design window. Complete the NET DSGN task.

Together—Design virtual data connection

With your instructor, perform the following steps to design the Dallas to Denton virtual data connection:

1. Double-click the **RID** task.
2. Double-click the virtual connection from Dallas to Denton.

   The graphical layout record appears.
3. Click **Next** to access the Custom Attributes screen.
4. Click **Next** to get the Graphical Design window.
5. Right-click the **Dallas Home Router** and click **Add Hard Connection**.
6. Under Available Connections, expand the **nn Metro Medical**.
7. Expand the **VPN Link**.
8. Drag the **nn Metropolitan Home connection** to the canvas.
9. Right-click the **nn Dallas ATM Access Switch** and click **Add Hard Connection**.
10. Under Available Connections, expand the **nn DLLS ATM AC**.
11. Expand the **Assignable Bandwidth Link**.
12. Drag the **Dallas to Denton connection** to the canvas.
13. Right-click the **nn Denton ATM Access Switch** and click **Add Hard Connection**.
14. Under **Available Connections**, expand the **nn Metro Medical**.
15. Expand the **Assignable Bandwidth Link**.
16. Drag the **nn Dallas to Denton connection** to the canvas.
17. Click **Next**.
18. Click **OK** on the error message.
19. Enter the following information:

FIELD	VALUE
VPI/VCI	1/32
VPI/VCI	1/32

20. Click **Next**.
21. Check the N/A checkbox for both customer locations.
22. Click **Mark as Record**.
23. Close the window.

On Your Own—Design virtual data connections

Use the steps above to design the virtual data connections between Denton and Plano and Dallas and Plano.

After you have designed all of the virtual connections, complete the RID task.

Chapter Review

In this module, you: identified a Layer 2 VPN, identified the elements, connections, and customized attributes loaded with the Layer 2 VPN technology module. You also created the product catalog for the VPN product and entered a service request and provisioned a customer-ordered Layer 2 VPN.

DSL

Lab

DSL Lab

What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the DSL template to build a network, enter an order for DSL service and provision the service.

DSL technology module data

The data included with the DSL technology module appears in the DSL network template. The data includes network elements, connections, and custom attributes. (Only one network template is included with the DSL technology module.)

ELEMENTS

As with network systems, you can select the elements that meet your network requirements or add new ones. Below are the elements included with the DSL template:

- DSLAM
- Customer site
- ATM/FR network

Below is an example of the template:

DSL TEMPLATE CONNECTION SPECS

In the ATM/FR template, the following connection types are available:

- **Assignable Bandwidth Links**—The physical connections between elements.
- **Inverse Multiplexing Group** –An aggregate group of connections used together for more capacity.

- **DSL Link**—The physical connection between customer sites and the DSLAM.
- **Enterprise Connection**—A connection that connects to customer sites.
- **Switched Virtual Circuit (SVC)**—A virtual connection that can connect a customer to a switch. No set path runs through the network because the route is established on a call-by-call basis.
- **Internet Connection**—A virtual connection that ultimately connects a customer to the Internet.
- **Voice Connection**—A virtual connection from a customer to the Public Switch Telephone Network.

PRIORITIZED PATHS

Prioritized paths are the physical paths that a virtual circuit can ride over a transport backbone network. The following connections specs have numerous paths: Enterprise, SVC, Internet and Voice.

Prioritized paths do not exist for physical circuits.

During service provisioning, a designer can manually provision service or have it done automatically. If the designer decides to let the software select the path used for provisioning, the highest priority path with available positions will be used to provision service.

The Priority 1 path for an Internet connection in the ATM Access network is customer site to ATM switch to an SMS.

CUSTOM ATTRIBUTES

Numerous custom attributes are predefined in M/5.1, including the following:

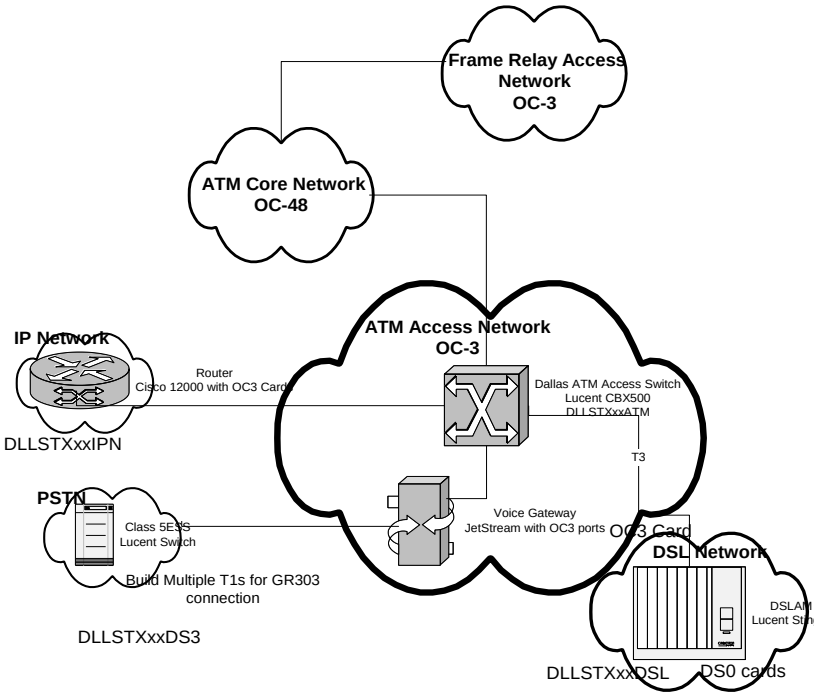
- Requested Downstream—The downstream bit rate requested by the customer.
- Requested Upstream—The upstream bit rate requested by the customer.
- In Service Downstream Bit Rate—The bit rate of the Internet connection that delivers data to the customer site.
- In Service Upstream Bit Rate—The bit rate of the Internet connection that delivers data from the customer site out to the Internet.
- Qualified Downstream Bit Rate—The qualified downstream bit rate values that reflect the actual measured rates.
- Qualified Upstream Bit Rate—The qualified upstream bit rate values that reflect the actual measured rates.
- Transport Type—The type of DSL service: ASDL, UADSL, and so forth.

Scenario

EGAD! Software, a small software development firm in Dallas, orders DSL service to accommodate two voice lines and to reduce the time it takes to research and download files from the Internet. They also order an IAD (Integrated Access Device) for their office.

Zesty Communications owns the local loop and all equipment in the Dallas area. You have a connection to one ISP and to the Public Switched Telephone Network.

Your network should look similar to the following network, except that you will have all switches in the ATM Access network:



Network design overview

Earlier in the course, you created the ***nn* Dallas ATM Access** network. Before you can add a new network design for your DSL network, you will need to modify the ***nn* Dallas ATM Access** network as shown in the graphic on the previous page. More details are included in the Modify Dallas ATM Access section.

After you have modified your ***nn* Dallas ATM Access** network, you will create the DSL network. More details are included in the **Build DSL Network** section.

Design network

Do the following to build out your networks to support your product:

- Modify your ***nn* DLLS ATM Access** Network to include the voice gateway. Embed the IP Network and PSTN.
- Add relationships and design connections in the ATM Access network.
- Create a new DSL network and embed the ATM/FR network.
- Add a relationship and design the connection between the ATM switch and the DSLAM.

The DSL template works in conjunction with the ATM/FR template. You need to embed the PSTN and the IP network, which you have already designed.

MODIFY DALLAS ATM ACCESS

To support Internet and telephone service, you need to add an IP network and a PSTN network to your Dallas ATM Access network. The IP network and a PSTN network have already been created and you will need to embed these networks using processes you've learned in class.

The IP network can be found under the IP Technology module and is called **Zesty*nn* IP Network**. The PSTN network is found under the **Unclass** technology module and is called **Zesty*nn* PSTN**.

Note

Embedded Networks

You will find the networks to embed in the

Ensure the embedded networks are In Service.

Use the directions **Embed Networks** with the following information to embed the PSTN and IP network:

FIELD	VALUE
Network List	***nn*** DLLS ATM Access

Element (IP)	ZESTY***nn*** IP Network
Status	In Service
Element (Unclass)	ZESTY***nn*** PSTN
Status	In Service

Use the instructions **Add and Define Elements** with the following information to add a voice gateway:

FIELD	VALUE
Element Type	Voice Gateway
Name	***nn*** Dallas Voice Gateway
Network Locations	DLLSTX***nn***DS3
Status	In Service
Equipment (Associate to shelf)	Newton RR Zesty TBND Voice Gateway Jetstream CPX-1000 (shelf)

Add relationships and identify connections

Connect the Dallas ATM switch to the Dallas IP router and identify the connection. (Make sure that you save after every connection you add.)

EQUIPMENT	LOCATION
Connection Spec	Assignable Bandwidth You need to remove the Inverse Multiplexing Spec.
Service	OTS
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC3
Freeform Circuit entry	*(default)*

ASSIGN IP ADDRESSES TO ROUTER

During provisioning, you will assign IP addresses to the customer so that the customer can access the public Internet.

In this case, you will assign a /24 to the router. When you assign an IP address to the customer, it will come from the same subnet as the IP address that you assign to the router.

To assign an IP address, perform the following steps:

1. Double-click the **Dallas IP router**.
2. Click **Equipment Association**.
3. Right-click the first unassigned OC3 port and click **IP address**.
4. Enter the following information:

FIELD	VALUE
Use Group	***nn***_Backbone
Use Code	***nn***_IP Router

5. Click **111.1nn.110.1/24**.
6. Click **Retrieve**.
7. Click **Close**.

Connect the ATM access switch to a voice gateway:

EQUIPMENT	LOCATION
Connection Spec	Assignable Bandwidth You need to remove the Inverse Multiplexing Spec.
Service	OTS
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC3
Freeform Circuit entry	*(default)*

Connect a voice gateway to the PSTN switch:

EQUIPMENT	LOCATION
Connection Spec	GR-303 Facility Circuit Remove the V5.2 Group connection specs.
Service	OTS

Service Type Category	CLFI
Service Type Code	T1
Rate Code	DS1
Freeform Circuit entry	*(default)*

Connect the Dallas ATM Switch to the IP Router:

FIELD	VALUE
Equipment	OC3 on Cisco 12008 and Lucent CBX500
Broadband Service Category	Cell
Bit Rate	155.52 Mbps
NNI/UNI	NNI

DESIGN CONNECTIONS

You need to design your connection from the ATM switch to the voice gateway and the voice gateway to the Class 5 switch. You also need to cross-connect the DS0s at the voice gateway and the Class 5 switch to show the GR303 virtual connections and to create a DS1 connection between the same two elements.

ATM to voice gateway:

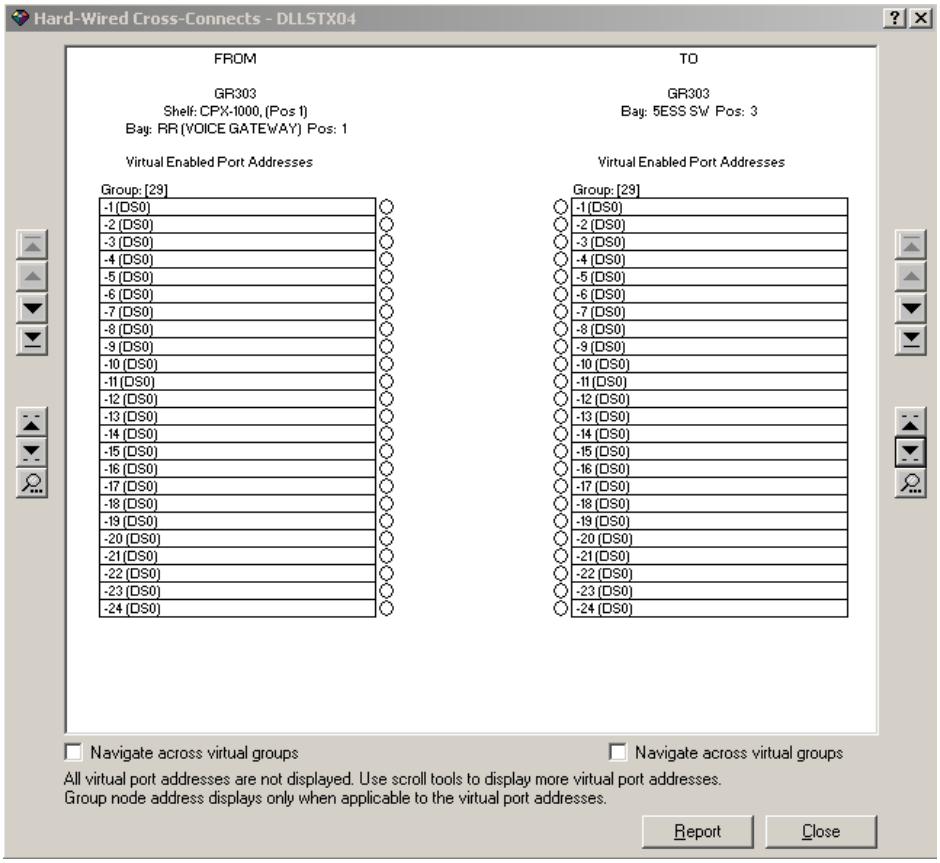
FIELD	VALUE
Equipment	OC3 assignment at Jetstream CPX-1000 (Voice Gateway) and Lucent CBX500
Broadband Service Category	Cell
Bit Rate	155.52 M
NNI/UNI	NNI

CROSS-CONNECT EQUIPMENT

To cross-connect the DS0s from the voice gateway to the digital switch and to design the DS1 connection, perform the following steps:

1. Right-click the connection from the voice gateway to the PSTN switch and click **Connection Maintenance**.
2. Click the **Design Lines** tab.
3. Right-click the canvas and click **Equipment**.
4. At the A location, scroll up to the first Lucent GR303 card on the Jetstream CPX-1000.

5. Click the button to collapse the 01 Lucent GR303 card.
6. At the Z location, scroll to find the **02** Lucent GR303 card on the Lucent 5ESS switch.
7. Right-click the 0101Lucent GR303 card on the Jetstream CPX-1000 shelf at the A location and click **Cross-Connect**.
8. Right-click the **02** Lucent GR303 card on the Lucent 5ESS switch and click **Cross-Connect To**.
9. On the Voice Gateway portion of the screen, click the button twice until you see the DS0 ports.
10. From the 5ESS portion of the screen, click the button twice until you see the DS0 ports. Your screen should look like the following:



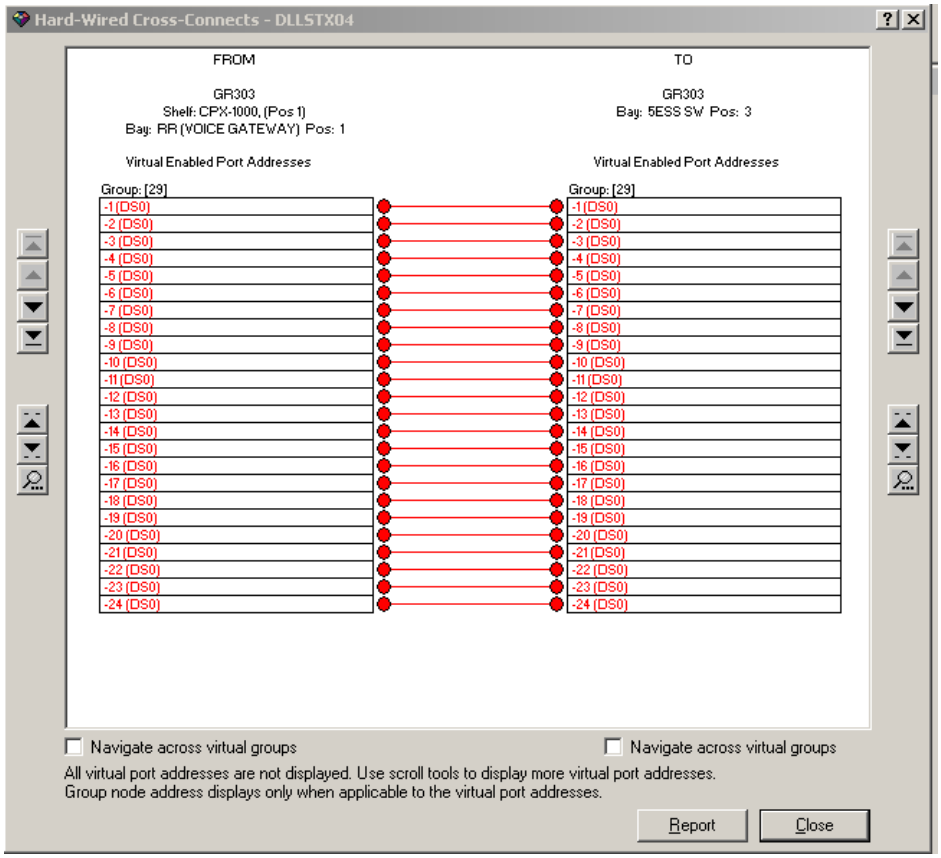
11. Click the first DS0 on the left side of the window.

12. Hold down the Shift key and click the last DS0 on the left side of the window.

    All DS0s should be selected.

13. Click the first DS0 on the right side of the window.

    All DS0s should be cross-connected, and your screen should look like the one below:



14. Click **Close**.
15. Expand the **0101 Lucent GR303** card at the voice gateway.
16. Expand the **02 Lucent GR303** card at the Lucent 5ESS switch.
17. At both locations, expand the first N/A-Unassigned ports.
18. Right-click the first unassigned DS1 port at both locations and click **Assign Circuit**.
19. Click **Close**.

20. Save the design lines.

Note

GR303 Connections

The connection from the digital switch to the voice gateway is a GR303 connection. The equipment specifications for this equipment is set up with virtual ports.

BUILD DSL NETWORK

Use the instructions **Design Network** and the information below to build the DSL.

FIELD	VALUE
Template List	DSL MetaSolv TM DSL
Short Name	***nn*** Dallas DSL
Status	In Service

ADD AND DEFINE ELEMENTS

Add a DSLAM to your DSL network:

FIELD	VALUE
Element Type	DSLAM
Name	***nn*** Dallas DSL
NETWORK LOCATIONS	DLLSTX***nn***DSL
Equipment (Associate to shelf)	Newton RR ZESTY TBND LAB DSL Lucent Stinger LS (shelf)
Status	In Service

EMBED NETWORK

Embed your ATM/FR network into your DSL network using the instructions from the Layer 2 VPN module:

FIELD	VALUE
Element Type	ATM/FRNetwork
Network List	***nn*** Central ATM/FR
Status	In Service

ADD RELATIONSHIP AND IDENTIFY CONNECTION

Add the relationship from the DSLAM to the ATM access switch:

EQUIPMENT	LOCATION
Connection Spec	Assignable Bandwidth Link Remove the Inverse Multiplexing Group connection specs.
Service	OTSFormat
Service Type Category	CLFI
Service Type Code	OC03
Rate Code	OC3
Freeform Circuit entry	*(default)*

DESIGN CONNECTION

Design the connection from the DSLAM to the ATM switch within the DSL network you created:

FIELD	VALUE
Equipment	OC3 on Stinger LS Trunk Module and on Lucent CBX500
Broadband Service Category	Cell
Bit Rate	155.52 Mbps
NNI/UNI	NNI

Create the product catalog

Now that you have built out your network, you need to build the products that the network supports. You will offer Internet and voice services.

You will use the Product Bundle to build the following product specs: DSL Product, DSL Physical Connection, DSL Voice Connection, and DSL Internet Connection.

You must build the two virtual connections separately because the voice connection requires a telephone number.

Relate the physical and virtual specs with network templates:

FIELD	VALUE
Type	Product Bundle
Code	***nn***DSL
Internal Alias	***nn*** DSL Product
Product/Package	*Checked*

FIELD	VALUE
Type	Network Connection
Code	***nn***DSLphys
Internal Alias	***nn*** DSL Physical Link
Network Template Type	DSL
Connection Spec	DSL Link

FIELD	VALUE
Type	Network Connection
Code	***nn***DSLvoi
Internal Alias	***nn*** DSL Voice Connection
Network Template Type	DSL
Connection Spec	Voice Connection

FIELD	VALUE
Type	Network Connection
Code	***nn***DSLint
Internal Alias	***nn*** DSL Internet Connection
Network Template Type	DSL
Connection Spec	Internet Connection
Elements	Customer site to IP router

Note

Relating Items

You cannot relate items until you associate the network templates.

RELATE ITEMS

Open your ***nn*** DSL Product and relate the ***nn*** DSL physical link, ***nn*** DSL voice connection, and the ***nn*** DSL Internet connection.

Make sure that you select "one" in the Telephone Numbers field so that you can assign telephone numbers to the voice connection.

BUILD PRODUCT CATALOG

Define your ***nn*** DSL Product and add the physical and virtual connections with the following information:

FIELD	VALUE
Item Alias	***nn*** DSL Business
Marketing Description	SDSL Product for Business Customers
Service Category	Business
Offering Type	Retail
Telephone/Trunk Product	*Check* (To assign telephone numbers for the Voice connection)
Auto-assign TN's	*Check* (So that the system automatically assigns telephone numbers when the item is added to an order)

Add your ***nn*** DSL physical link:

FIELD	VALUE
Marketing Description	This item provides a connection from the customer site to the DSLAM.
Network Template Types	MetaSolv TM DSL

Add your ***nn*** DSL Voice connection:

FIELD	VALUE
Item Alias	***nn*** DSL Voice over DSL
Marketing Description	This item provides a voice connection over DSL.
Send to E911	Check (With the E911 functionality, you can enter and maintain detailed information about a telephone number and its service location.)
Connection Template	MetaSolv TM DSL

Add your ***nn*** DSL Internet connection.

FIELD	VALUE
Item Alias	***nn*** DSL Internet
Marketing Description	This item allows the customer access to the Internet.
Connection Template	MetaSolv TM DSL

Enter the service request

Use the order form on the following page to complete the service request. Because this order includes a telephone product, you will need to enter the Telephone Number (TN) Switch. Use DLLSTX***nn***DS3 for the switch.

Customer Information			
Customer Status		**Service Type**	
☒ New ☐ Existing		☒ New ☐ Change ☐ Disconnect	
Customer PO #		**Sales Order #**	
		nn0806	
Customer Acct. #	**Organization**	**LD Provider**	**Prior LD Provider**
	ZestyComm	*LLD*	
Customer Name		**County**	**Community**
nnEGAD! Software			
Street Address		**Customer Phone #**	**Customer Fax Phone #**
98nn Market Blvd.		*214/5nn-6000*	
City, State, & Zip		**Email Address**	
Dallas, Texas 75221		*rbanks@egad.com*	
Contact Name		**Comments**	
Rachel Banks		*Desired Due Date – One week from today*	
Title		Sales Order Date – Today's Date	

Contact Phone #	Contact Fax #
214/5nn-7000	

Approvals		
Sales Representative	**Sales Office**	**Date**

I have read and understand, and agree to the terms of this order. I understand that changes to this order must be in writing and may result in a new in-service date and additional charges. I acknowledge that the prices of the ordered products are those in effect on the date that I sign this sales order.

Customer Signature	Date
	Nn/nn/nnnn

QUERY FOR CUSTOMER & CREATE SERVICE REQUEST

Use the instructions in the module **Enter Service Request** to query for ***nn***EGAD Software and begin entering the order.

FIELD	VALUE
Desired Due Date	Select a due date three weeks out.
Ordered by Last Name, First Name and Tel Nbr	*See the sales order.*
Organization	Zesty Communications
PON	***nn***SDSL
Expedite	*Check to expedite.*

ORDER PRODUCTS

Add the location from the primary billing address and use the following TN Switch: **DLLSTXnnDS3**.

Order the following products:

- Zesty Comm CPE – Lucent IAD Cellpipe
- 1 Access connection
- 2 Voice Lines
- 1 Internet Connection

Enter the following information about the DSL Link:

FIELD	VALUE

Broadband Service Category	Cell
NNI/UNI	UNI
Transport Type	SDSL
In Service Downstream Bit Rate	768K
In Service Upstream Bit Rate	768K

Enter the following information about the voice connections:

FIELD	VALUE
Virtual Broadband Service Category	ATM
ATM Connection Type	Channel
Svc Category Send & Receive	B=CBR
PCR Send and Receive	64
PCR Priority Code Send and Receive	A=0

Enter the following information about the Internet connection:

FIELD	VALUE
Virtual Broadband Service Category	ATM
ATM Connection Type	Channel
Svc Category Send & Receive	A=ABR
PCR Send and Receive	768
PCR Priority Code Send and Receive	B=0+1

Assign TNs to voice connections

Because you have voice connections, perform the following steps to assign telephone numbers to the customer:

1. From the Order Number Level, right-click and click **Assign Telephone Numbers**.
2. Check the **Auto Assign** checkbox at the top left of the window.
3. Click **Auto Assign TN**.

   The checkmarks move to the TN Assigned field.

4. Click **Close**.

Generate tasks

Use the plan you created (**Connection *nn*)** to assign tasks. Change the Engineering queue to PROV***nn***.

Provision service

To provision the services, you will install equipment at the customer site. You will also use the EQ INST and RID tasks to provision the physical and virtual connections.

CKTID

Use the following information to identify the access connection:

FIELD	VALUE
Network Connection Spec	Access
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	AS
Freeformat Circuit Entry	(*default)*

Use the following information to identify the Internet connection:

FIELD	VALUE
Network Connection Spec	Internet
Connection Type	OTS
Service Type Category	CLCI-SS IntraLATA
Service Type Code	AS
Freeformat Circuit Entry	(*Accept default.)*

EQ INSTALL

Add the Lucent Cellpipe to the location and then complete the task.

RID

Design the physical connection, the Internet, and both voice connections. The prioritized paths are set up so that you can design the virtual connections automatically by hops or by distance.

DSL Link/Physical Bandwidth

Design the DSL Link connection first.

On the **Detail** tab, select **N/A** as the rate code of the connection. On the **Network** tab, select the DSLAM network you designed. Then go to the **Design Lines** tab.

You will assign to the DSLAM line on the Lucent Cellpipe and then to the N/A port on the Lucent Stgr LIM card.

INTERNET CONNECTION

Select the **Design Options** panel and check the **Path Analysis by Hops** radio button. Continue through the provisioning dialog until you get to the window to select a path. Because you checked the Path Analysis by Hops radio button, the software will find a path through the network. You can expand the path to see the hops that the connection can traverse. Because there is only one path, it is automatically checked for you.

Make sure that you assign an IP address to the customer site. You should use an IP address in the same subnet as the IP router.

Enter the following bandwidth allocation information:

FIELD	VALUE
Customer Site VPI	0
Customer Site VPI	32
DSLAM VPI	1
DSLAM VCI	32
IP Router VPI	1
IP Router VCI	32

VOICE CONNECTIONS

Select the **Design Options** panel and select the **Path Analysis by Hops** radio button so that the software finds the path.

Enter the following bandwidth allocation information:

FIELD	VALUE
Voice Gateway VPI	2
Voice Gateway VCI	43

On the Port Assignment window, make a connection to a DS0 voice port at the customer's Lucent Cellpipe by checking the box next to the port.

Perform the same

steps for the second voice line.

Ethernet

Lab

Ethernet Lab

What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the Ethernet template to build a network, enter an order for LAN to LAN service and provision the service.

Ethernet technology module data

The Ethernet technology module has seven network templates. You can use any combination of these templates to build an Ethernet network system.

ELEMENTS

As with network systems, you can pick and choose the elements that meet your network requirements, or you can add new ones. Below are the elements included with the templates:

- Ethernet Core and Distribution Network System Elements

The Ethernet Core network includes only the switched router as a network element.

- Ethernet Access Network System Elements

The following elements are included with the Ethernet Access Network:

- Switched Router
- Subscriber Management System (SMS)

Because it is a network system, the IP network is embedded in a cloud.

- Ethernet VLAN Element

The Ethernet VLAN template includes a VLAN switched router.

- Other Elements

A provider network, customer site, and an IP network are included with the templates outside of the network clouds to depict off-net network elements.

Ethernet template connection specs

In the ATM/FR template, the following connection types are available:

- **VLAN**—The virtual LAN connection.
- **TLAN** –The virtual transparent LAN connection.
- **Ethernet Link**—The physical bandwidth connection.
- **VLAN Internet**—The virtual connection to the Internet that you can assign a tunneling protocol to.

PRIORITIZED PATHS

Prioritized paths are the physical paths that a virtual circuit can ride over a transport backbone network. You can create multiple paths for virtual circuits and prioritize them.

You will not see prioritized paths for physical circuits.

During service provisioning, a designer can manually provision service or have it done automatically. If the designer chooses to let the software select the path used for provisioning, the highest priority path with available positions will be used to provision service.

CUSTOM ATTRIBUTES

You will find numerous custom attributes predefined for use with Ethernet technology. Many of the items covered in the Ethernet Overview in this module can appear as custom attributes throughout the process of designing, ordering, and provisioning Ethernet services.

Following are some examples of the predefined custom attributes:

- VLAN ID—Used for Fast Ethernet and Gigabit Ethernet VLANs.
- IP Address—Used for policy-based LANs.
- VLAN Ports—Use for static LANs.
- VLAN type—Used to identify LANs by static, dynamic MAC, policy-based or protocol.
- IEEE Architecture—Used to identify either 802.1p (prioritize traffic) or 802.1q (queues) architecture.

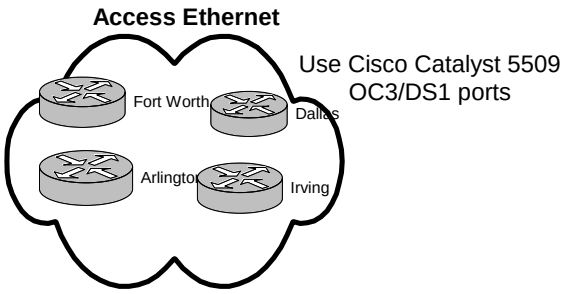
- Duplex—Used to specify full or half duplex.
- MAC address—Used when VLAN is dynamic MAC based.

Scenario

Harrington Community College ordered connections between all of its campuses in Arlington, Irving, and Dallas. This connection will allow staff members to share curricula and student records.

Design an Ethernet backbone

Zesty Comm needs to build an Access Ethernet Network that connects Arlington, Fort Worth, Irving, and Dallas with OC3 fiber. They will install Cisco Catalyst switched routers at each network location.



DESIGN NETWORK

Use the information below to create your new network:

FIELD	VALUE
Network Template	MetaSolv TM Ethernet Access Network
Short Name	***nn*** Dallas Ethernet
Status	In Service

DEFINE ELEMENTS AND ASSOCIATE EQUIPMENT

Define the elements for the four locations in the Ethernet Core.

FIELD	VALUE
Name	***nn*** Fort Worth Eth Access
Network Location	FTWOTX***nn***ETH

Status	In Service
Equipment (associate with shelf) Shelf	NEWTON RR ZESTY TBND LAB ETHERNET Catalyst 5509

FIELD	VALUE
Name	***nn*** Dallas Eth Access
Network Location	DLLSTX***nn***ETH
Status	In Service
Equipment (associate with shelf) Shelf	NEWTON RR ZESTY TBND LAB ETHERNET Catalyst 5509

FIELD	VALUE
Name	***nn*** Arlington Eth Access
Network Location	ARLNTX***nn***ETH
Status	In Service
Equipment (associate with shelf) Shelf	NEWTON RR ZESTY TBND LAB ETHERNET Catalyst 5509

FIELD	VALUE
Name	***nn*** Irving Eth Access
Network Location	IRNGTX***nn***ETH
Status	In Service
Equipment (associate with shelf) Shelf	NEWTON RR ZESTY TBND LAB ETHERNET Catalyst 5509

ADD RELATIONSHIPS AND IDENTIFY CONNECTIONS

Connect Ft. Worth to Dallas, Dallas to Irving, Irving to Arlington and Arlington to Ft. Worth. Use the following information to create and identify all the connections.

FIELD	VALUE
Network Connection Spec	Ethernet Link
Connection Type	OTS

Service Type Category	CLFI
Service Type Code	OC03
Freeformat Circuit Entry	*(default)*

DESIGN CONNECTIONS

Use the following information to design each of the Ethernet Link connections:

FIELD	VALUE
Equipment	Assign to first available OC3 port at each location.
Broadband Service Category	N or LAN
Bit Rate	155.52 M
Duplex Mode	Full Duplex

DESIGN NETWORK

Use the information below to create your Ethernet network:

FIELD	VALUE
Network Template	MetaSolv TM Ethernet Network
Short Name	***nn*** MAN
Status	In Service

EMBED NETWORK

Embed the ***nn*** Dallas Ethernet network into the Ethernet Network. You do not need to connect anything.

Note

Ethernet Network Template

This template was modified from the original so that only an access network is required. The original template is set up so that an access network and a core network are required.

Create a LAN-to-LAN product

Create a LAN-to-LAN service offering. Follow the guidelines below.

- LAN to LAN Service (PRDBUNDLE – Don't tie to a template)
- Access Link (Connector – Physical)
- Data Connection (Connector – Virtual)
- Switched Router (CPE - Cisco Catalyst 5002)

BUILD PRODUCT SPECS

Use the following information to build the LAN product bundle:

FIELD	VALUE
Type	Product Bundle
Code	***nn***ETH
Internal Alias	***nn*** LAN product
Product/Package	*Checked*

Use the following information to build the physical access link:

FIELD	VALUE
Type	Network Connection
Code	***nn***ETHphy
Internal Alias	***nn*** LAN physical link
Network Template Type`	Ethernet
Connection Spec	Ethernet Link
Element A	Customer Site
Element Z	Switched Router

Use the following information to build the virtual data connection:

FIELD	VALUE
Type	Network Connection
Code	***nn***ETHvirt
Internal Alias	***nn*** LAN virtual data connection
Network Template Type`	Ethernet
Connection Spec	Virtual LAN
Elements A and Z	Customer Site

RELATE ITEMS

Open your ***nn*** LAN product and relate the ***nn*** LAN physical link and the ***nn*** LAN virtual data connection.

BUILD PRODUCT CATALOG

Define your ***nn*** LAN product and add the physical and virtual connections with the following information:

FIELD	VALUE
Item Alias	***nn*** LAN Business
Marketing Description	LAN Enterprise Product for Business Customers
Service Category	Business
Offering Type	Retail

Add your ***nn*** LAN physical link:

FIELD	VALUE
Marketing Description	This item provides the Ethernet Link from the customer site to the switched router.
Network Template Type	Ethernet Customer Site to Switched Router

Add the ***nn*** LAN virtual data connection:

FIELD	VALUE
Item Alias	***nn*** LAN virtual data connection
Marketing Description	This item provides the virtual data connection between customer sites.
Network Type	Ethernet Customer Site to Customer Site

Enter a service request

You will enter Harrington Community College's request to connect their Arlington, Irving, and Dallas campuses.

QUERY FOR CUSTOMER AND CREATE SERVICE REQUEST

Use the instructions in the module **Enter Service Request** to query for ***nn*** Harrington Community College. Then enter the order.

FIELD	VALUE
Desired Due Date	Select a due date 3 weeks out.
Ordered by Last Name, First Name and Tel Nbr	Smith, Karen 817 867-5309
Organization	Zesty Communications
PON	***nn***LAN
Expedite	*Checked*

ORDER PRODUCTS

Add the location from the primary billing address, and add these additional locations:

nnHarrington Irving

84***nn*** Wild Horse

Irving, TX 75060

nn Harrington Dallas

37***nn*** Mockingbird

Dallas, TX75245

Order the following products:

- A Physical LAN Ethernet link to each campus location
- 3 virtual data connections

Enter the following information about the Virtual Data Connections:

FIELD	VALUE
Virtual Broadband Service Category	Ethernet

Enter the following information about the Physical Ethernet Links:

FIELD	VALUE
Broadband Service Category	N or LAN
Bit Rate	1.544 M
Duplex Mode	Full Duplex

GENERATE TASKS

Use the plan you created (**Connection *nn***) to assign tasks**.** Change the Engineering queue to PROV***nn***. Delete the EQ INST task.

Provision service

To provision the services, you provision the physical and virtual connections with the RID tasks.

Ethernet links

Design the Ethernet Links first.

On the **General** tab, select DS1 as the rate code of the connection. On the **Network** tab, select the Ethernet network you designed. Then go to the **Design Lines** tab.

You will not assign to the customer site since they did not order equipment that needs to be inventoried. Assign to the DS1 port on the Cisco Catalyst 5509.

Virtual connection

Select the Design Options panel and select the Path Analysis by Hops radio button. Continue through the provisioning dialog until you get to the window to select a path. Because you selected Path Analysis by Hops, the software will automatically find a path through the network. You can expand the path to see the hops that the connection will traverse. Because there is only one path, it is automatically checked for you.

MPLS

Lab

MPLS Lab

What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the MPLS template to build a network, enter an order for network service and provision the service.

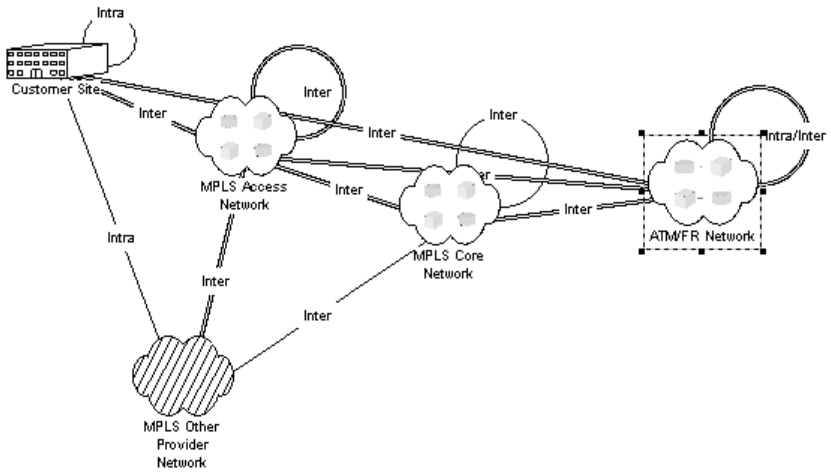
MPLS technology module data

The data included with the MPLS technology module appears in two templates: MPLS transport and MPLS VPN. The data includes network elements, connections, and custom attributes.

The MPLS template includes the following embedded templates:

- ATM/FR
- MPLS Core
- MPLS Access
- Customer Site
- MPLS Other Provider

Below is an example of the template:



ELEMENTS

As with network systems, you can select the elements that meet your network requirements or add new ones. Below are the elements included with the MPLS template:

- Label Switched Router—In the core network, it switches MPLS labels.
- Label Edge Router—Connects customers into the access network.
- SMS—Routes traffic to multiple IP provider routers.

MPLS TEMPLATE CONNECTION SPECS

In the MPLS template, the following connection types are available:

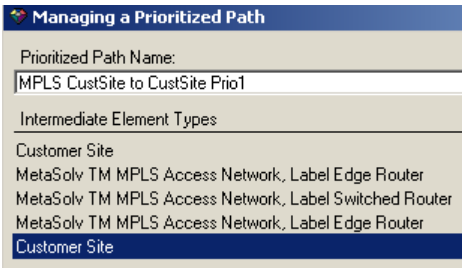
- **Assignable Bandwidth Links**—The physical connections between elements.
- **Inverse Multiplexing Group** –An aggregate group of connections used together for more capacity.
- **LSP (Label Switched Path)**—The physical connection between label edge routers and label switched routers.
- **Enterprise Connection**—A connection that connects customer sites.

- **Internet Connection**—A virtual connection that ultimately connects a customer to the Internet.

PRIORITIZED PATHS

Prioritized paths are the physical paths that a virtual circuit can ride over a transport backbone network. Enterprise and Internet connections have numerous paths.

In the figure below, notice the predefined Priority 1 path for the Enterprise connection.



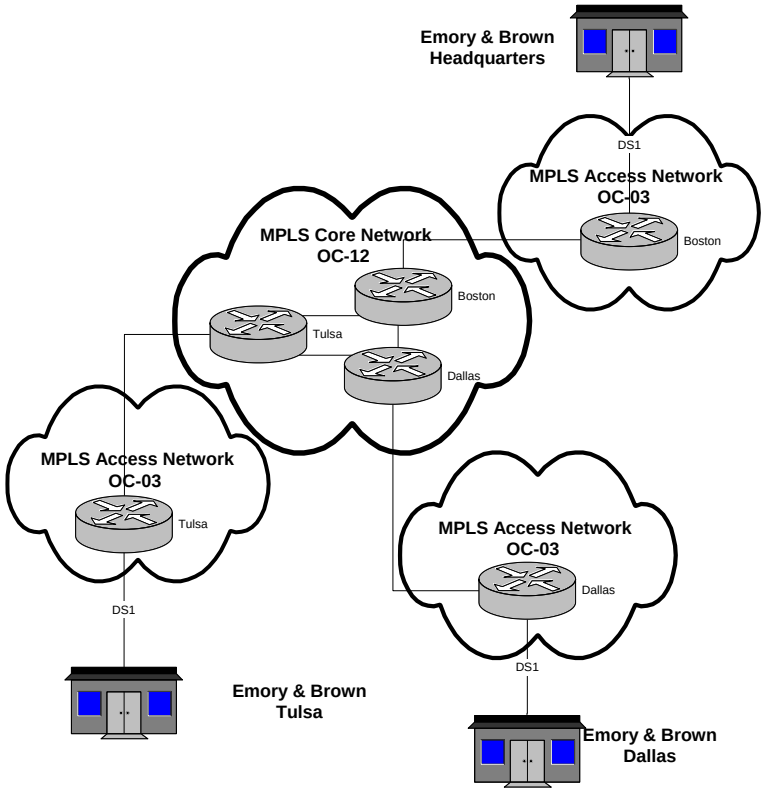
Custom attributes

Numerous custom attributes are predefined in M/5.1, including the following, which you may see when you use the MPLS templates:

- Broadband Service Category—The category of service such as MPLS, Cell, and so forth.
- VPN ID—The identification given to MPLS VPNs.
- CE Topology—The topology of a VPN, as a hub or a spoke.

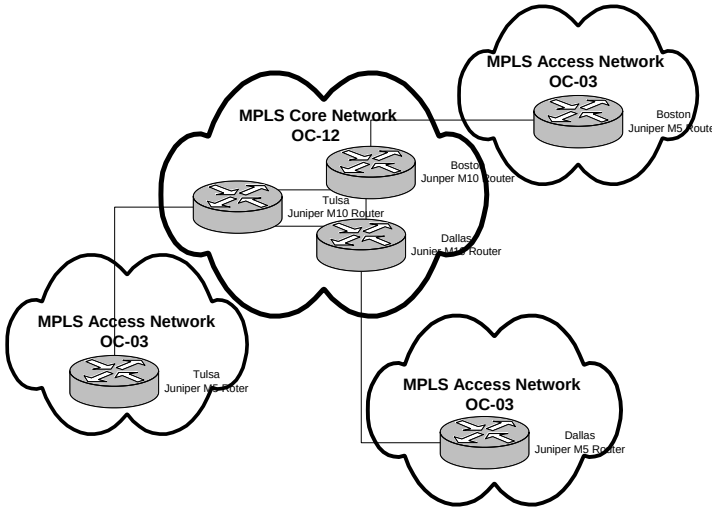
Scenario

Emory and Brown, an architectural firm headquartered in Boston, orders a private network to connect its headquarters to its Tulsa and Dallas offices. The firm frequently sends large graphics files containing confidential plans between its offices. It is concerned about the quality of the transmissions and data security. Emory and Brown does not currently have routers at any of its locations.



Design network

Zesty Comm has a Central MPLS OC12 core network that connects Boston, Dallas, and Tulsa. Each city has an OC3 access network, which should look like the following network:



DEFINE NETWORK PROPERTIES

Use the following information to define the properties of the core network:

NETWORK PROPERTIES	INPUT
Network Template	MetaSolv TM MPLS Core
Network Short Name	User ***nn*** MPLS Core
Status	In Service

DEFINE ELEMENTS AND ASSOCIATE EQUIPMENT

Use the following information to add and define the elements:

ELEMENT PROPERTIES	INPUT
MPLS Router Name	User nn Tulsa LSR
Network Location	TULSOK***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M10 Router
MPLS Router Name	User ***nn*** Boston LER

Network Location	BSTNMA***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M10 Router
MPLS Router Name	User ***nn*** Dallas IP Router
Network Location	DLLSTX***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M5 Router

ADD RELATIONSHIP AND DESIGN CONNECTION

Note

Inverse Multiplexing Spec

Remove the Inverse Multiplexing Group specification from the Network Connection Specs pane by right-clicking and selecting Remove Connection Spec.

Use the following information to add the relationship and design:

RELATIONSHIP PROPERTIES	INPUT
Network Connection Spec	Assignable Bandwidth Link
Connection Type	OTS Format
Service Type Category	CLFI
Service Type Code	OC12
Equipment	Use the first unassigned OC12 port.
Broadband Service Category	MPLS
Bit Rate	622.56 M

Use the following information to define the properties of the various access networks:

NETWORK PROPERTIES	INPUT
Network Template	MetaSolv TM MPLS Access
Network Short Name	User ***nn*** MPLS ***City name*** Access
Status	In Service

DEFINE ELEMENTS AND ASSOCIATE EQUIPMENT

Use the following information to add and define the elements for each individual access network:

ELEMENT PROPERTIES	INPUT
MPLS Router Name	User ***nn*** Tulsa LER
Network Location	TULSOK***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M5 Router
MPLS Router Name	User ***nn*** Boston LER
Network Location	BSTNMA***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M5 Router
MPLS Router Name	User ***nn*** Dallas LERr
Network Location	DLLSTX***nn***MPL
Status	In Service
Relay Rack	ZESTY TBND Lab MPLS
Shelf	Juniper M5 Router

DEFINE THE TRANSPORT NETWORK

Use the following information to define the properties of the transport network:

NETWORK PROPERTIES	INPUT
Network Template	MetaSolv TM MPLS
Network Short Name	User ***nn*** MPLS Transport
Status	In Service

EMBED NETWORKS

Use the instructions found in the Design Network module to embed all the access networks and the core network. Connect each access network to the corresponding state core router.

Create the product catalog

Use the steps in the Layer 2 VPN module to build your product catalog. You should include the following items:

- MPLS Private Network *(System)*
- Offices *(Element) with a* Cisco Router *(CPE - tied to a Cisco 2611 Spec)*
- Access Connection *(Connector - Physical)*
- Data Connection *(Connector - Virtual)*

BUILD PRODUCT SPECS

Use the following information to build the product specifications:

- MPLS VPN:

FIELD	VARIABLE
Type	Network System
Code	***nn***mplsvpn
Internal Alias	***nn*** mpls VPN
Product/Package	*Checked*

End User Locations:

FIELD	VARIABLE
Type	Network Element
Code	***nn***mplseu
Internal Alias	***nn*** MPLS End User Location

Physical Connections:

FIELD	VARIABLE
Type	Network Connection
Code	***nn***mplslink
Internal Alias	***nn*** MPLS VPN physical link

Virtual Connections:

FIELD NAME	INPUT VALUE
Type	Network Connection
Code	***nn***mplsvirt

Internal Alias	***nn*** mpls vpn virtual data connection

ASSOCIATE WITH NETWORK TEMPLATES

Use the information below to associate the product specifications to the network templates:

PRODUCT SPEC	NETWORK TEMPLATE
nn MPLS VPN	MetaSolv TM MPLS VPN
nn MPLS End User Location	MetaSolv TM MPLS VPN
nn MPLS VPN physical link	MetaSolv TM MPLS VPN/VPN Link/MetaSolv TM MPLS VPN/Customer Edge Router/Label Edge Router/MetaSolv TM MPLS Access Network
nn MPLS vpn virtual data connection	MetaSolv TM MPLS VPN/CE Community/MetaSolv TM MPLS VPN/Customer Edge/Customer Edge/MetaSolv TM MPLS VPN

RELATE ITEMS

Relate the following items:

- Type 1 and Type 2 product specifications
- The ***nn*** MPLS end user location, the ***nn*** MPLS VPN physical link, and the ***nn*** MPLS VPN virtual with the ***nn*** MPLS VPN
- Equipment with the ***nn*** MPLS end user location

Ensure that the Cisco Catalyst 5500 is associated with the equipment.

BUILD PRODUCT OFFERING

Use the following information to build the product catalog for the ***nn*** MPLS VPN:

FIELD	VARIABLE
Market Description	Customer Ordered VPN over MPLS Transport network
Service Category	Business
Offering Type	Retail
Network Template Type	MetaSolv TM MPLS VPN

End User Location:

FIELD	VARIABLE

Spec	***nn*** MPLS end user location
Item Alias	***nn*** Office
Network Template Type	MetaSolv TM MPLS VPN

You need to add equipment under your end user location. Also, add the Cisco Catalyst 5500 as the equipment specification.

Physical MPLS VPN Connection:

VARIABLE	INPUT
Spec	***nn*** MPLS vpn physical link
Item Alias	***nn*** MPLS VPN Physical link
Network Template Type	MetaSolv TM MPLS VPN

Virtual MPLS VPN Connection:

VARIABLE	INPUT
Spec	***nn*** MPLS vpn virtual
Item Alias	***nn*** MPLS VPN virtual
Network Template Type	MetaSolv TM MPLS VPN

ENTER THE SERVICE REQUEST

Use the following information to enter the service request.

Query for customer ***nn***Emory & Brown, open in the Customer Profile, and create a new order.

Use the information below to complete the Service Order tab:

FIELD	VALUE
Desired Due Date:	2 weeks out
Ordered by Last Name	Bland
Ordered by First Name	Paul
Ordered by Telephone Nbr	617 878-9099
Organization	Zesty Communications
PON	***nn*** MPLS VPN

Use the following information to order the ***nn*** IP VPN.

FIELD	VALUE
Orderable item	***nn*** MPLS VPN

Short Name	***nn*** E&B VPN
VPN ID	00034B
CE Topology	Hybrid

NETWORK ELEMENTS

Enter the following locations:

LOCATIONS	VALUE
Location Name	***nn*** E&B main office
Address	*Use the customer's primary billing address.*
Location Name	***nn*** Tulsa
Address	28***nn*** Violet Tulsa, OK 74121
Location Name	***nn*** Dallas
Address	68***nn*** Bluebonnet Dallas, TX 75023

Order the following routers for each location:

LOCATION	VALUE
nn 12 E&B	***nn*** Home Office, CE_RTR
nn Tulsa	***nn*** Branch Office, CE_RTR
nn	***nn*** Branch Office, CE_RTR

Name the routers and enter the following attributes:

FIELD	VALUE
Name	***nn*** E&B
CE Manager	Provider
SA Agent	Regular
Name	***nn*** Tulsa
CE Manager	Provider
SA Agent	Regular

Name	***nn*** Houston
CE Manager	Provider
SA Agent	Regular

Add the Cisco Catalyst 5500 to all locations.

ADD CONNECTIVITY

Connect all locations physically to the provider network and virtually to each other.

Use the following information for all three **virtual** connections:

FIELD	VALUE
Virtual Broadband Service Category	MPLS

Use the following information for all three **physical** connections:

FIELD	VALUE
Virtual Broadband Service Category	MPLS
Bit Rate	44.736 M
NNI/UNI	UNI

GENERATE TASKS

Use the ***nn*** **VPN** provisioning plan to generate tasks**.**

Provision service

Use the **NetDsgn** task to create the access connections to the three sites. You will also install Cisco Catalyst 5500 routers at each location.

Note

Auto ID

The physical connections are auto identified because the Auto ID checkbox on the VPN Link connection spec is checked in the network template.

Use the following information to identify the virtual connections:

CONNECTION FIELDS	VALUES
Connection Type	OTS Format
Service Type Category	CLCI—SS LATA Access
Service Type Code	HC
Freeform Circuit entry	*(Default)*

INSTALL ORDERED EQUIPMENT

Add the Cisco Catalyst 5500 router. It is listed under the Equipment Type CPE-Customer Premise Equipment.

ASSOCIATE CPE WITH THE LOCATIONS

Select each customer location and put it "In Service." Then associate the Cisco Catalyst 5500 router that you just installed.

EMBED THE NETWORK

You need to embed the IP network. To connect to the MPLS network, use the instructions in the Layer 2 VPN module, along with the following information:

FIELD	VALUES
Element Type to Add	MPLS Network
Network to embed	User ***nn*** MPLS

ASSOCIATE CONNECTIONS

Connect both Houston locations to the Houston router, and connect the Tulsa location to the Tulsa router. Design the Physical Connections

Select **VPN Links** as your connection spec, and use the ordered connections you have already identified.

To design the physical connections, use the instructions in the Layer 2 VPN module, along with the following information:

	VALUES
General Tab-Rate Code	DS1
Equipment on Design Lines	*Assign the **Cisco 5500 router** and the **Juniper M05 router** to the first available unassigned DS1 ports.*
Broadband Service Category	MPLS
NNI/UNI	UNI

Bit Rate	1.544 M

Complete the **NET DSGN** task.

DESIGN THE VIRTUAL CONNECTION

Open the **RID** task to design the virtual connections.

Set the Design Options to **Path Analysis by Hops**, or design the connection manually.

IP VPN

Lab

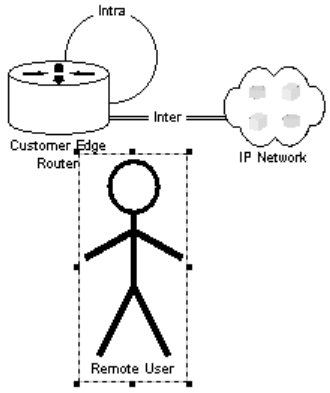
IP VPN Lab

What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the IP VPN template to build a network, enter an order for VPN service and provision the service.

IP VPN technology module data

The data included with the IP VPN technology module appears in the IP VPN template:



ELEMENTS

The following elements are included with the IP VPN technology module:

- IP Network

- Customer Edge Router
- Remote User

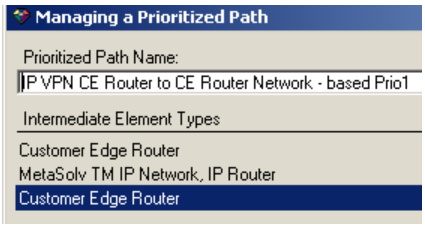
IP VPN CONNECTION SPECS

The following connection specs are included with the IP VPN technology module:

- **CPE-based VPN Connection**—The virtual connection that connects the customer equipment.
- **Network-Based VPN Connection**—The virtual connection that connects customer routers.
- **VPN Link**—The physical bandwidth connections that connect the customer routers to the transport network.
- **VLAN- Internet Connection**—The virtual connection that connects a customer to the IP router.

PRIORITIZED PATHS

Below is the predefined Priority 1 path to connect to customer routers.



CUSTOM ATTRIBUTES

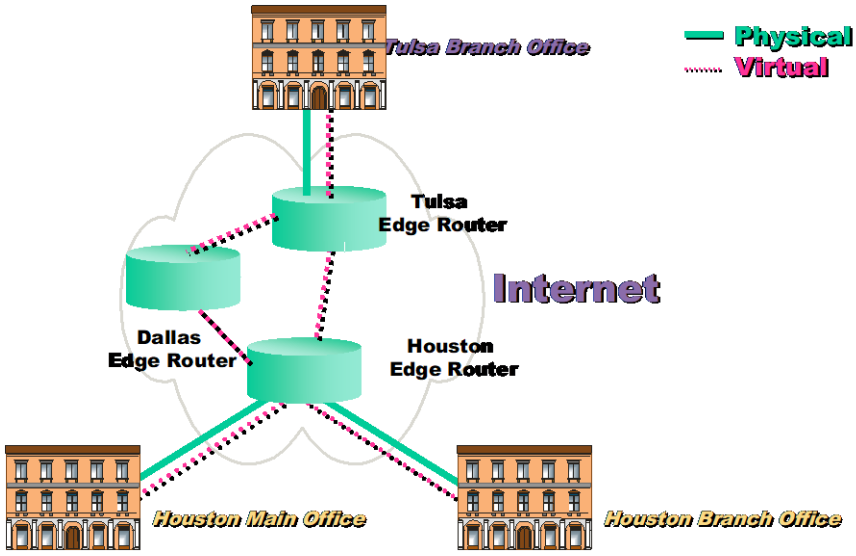
Custom attributes that you may see when creating IP VPNs include:

- **Tunneling Protocol**—Identifies the tunneling protocol associated with network-based VPNs.
- **Userid/Password**—Identifies the user ID and password associated with a remote user.
- **CE Topology**—The customer edge topology (either a hub or a spoke).
- **VPN ID**—The VPN identifier that identifies the organization providing the VPN.

Scenario

Good Faith Insurance orders a private network to connect its main office in Houston to its branch offices in Houston and Tulsa. This network will give the insurance firm the ability to share rates, quotes, and claim information. The firm has a router installed at its main office, but it needs to install routers at both branch locations.

Good Faith also has two traveling employees who need remote access connections.



Design network

Zesty Comm has an IP Core Network that consists of a Tulsa router, a Houston router, and a Dallas router. Each router connects the public Internet over OC48 fiber.

Use the following information to define the properties of the network:

NETWORK PROPERTIES	INPUT
Network Template	MetaSolv TM IP Network
Network Short Name	***nn*** IP
Status	In Service

DEFINE ELEMENTS AND ASSOCIATE EQUIPMENT

Use the following information to add and define the elements:

ELEMENT PROPERTIES	INPUT
IP Router Name	User nn Tulsa IP router
Network Location	TULSOK***nn***IPN
Status	In Service
Relay Rack	ZESTY TBND IP Network
Shelf	Cisco IP router
IP Router Name	User ***nn*** Houston IP router
Network Location	HSTNTX***nn***IPN
Status	In Service
Relay Rack	ZESTY TBND IP Network
Shelf	Cisco IP router
IP Router Name	User ***nn*** Dallas IP router
Network Location	DLLSTX***nn***IPN
Status	In Service
Relay Rack	ZESTY TBND IP Network
Shelf	Cisco IP router

ADD THE RELATIONSHIP AND DESIGN THE CONNECTION

Note

Remove Inverse Multiplexing Spec

The Inverse Multiplexing Spec already displays in the Connection Spec pane and needs to be removed.

Right-click Inverse Multiplexing Spec and select Remove Connection Spec.

Use the following information to add the relationship and design:

RELATIONSHIP PROPERTIES	INPUT
Network Connection Spec	Assignable Bandwidth Link
Connection Type	OTS Format
Service Type Category	CLFI
Service Type Code	OC48
Equipment	*Use the first Unassigned OC48 port.*
Broadband Service Category	IP
Bit Rate	2.4 Gbps

Create the product catalog

Use the steps in the Layer 2 VPN module to build your product catalog. You should include the following items:

- IP Private Network *(System)*
- Home Office (Element) with a Cisco Router (CPE - tied to a Cisco 2611 Spec)
- Branch Office (Element) with a Cisco Router (CPE - tied to a Cisco 2611 Spec)
- Access Connection (Connector - Physical)
- Data Connection (Connector - Virtual)

BUILD PRODUCT SPECS

Use the following information to build the product specifications:

IP VPN:

FIELD	VARIABLE
Type	Network System
Code	***nn***ipvpn
Internal Alias	***nn*** IP VPN
Product/Package	*Checked*

End User Locations:

FIELD	VARIABLE
Type	Network Element
Code	***nn***ipeuloc
Internal Alias	***nn*** IP End User Location

Physical Connections:

FIELD	VARIABLE
Type	Network Connection
Code	***nn***IPlink
Internal Alias	***nn*** IP VPN physical link

Virtual Connections:

FIELD NAME	INPUT VALUE
Type	Network Connection
Code	***nn***ipvirt
Internal Alias	***nn*** ip vpn virtual

ASSOCIATE WITH NETWORK TEMPLATES

Use the information below to associate the product specifications with the network templates:

PRODUCT SPEC	NETWORK TEMPLATE
nn IP VPN	MetaSolv TM IP VPN
nn IP End User Location	MetaSolv TM IP VPN
nn IP VPN physical link	MetaSolv TM IP VPN/VPN Link/MetaSolv TM IP VPN/Customer Edge Router/IP Router/MetaSolv TM IP Network
nn ip vpn virtual	MetaSolv TM IP VPN/Network-based VPN/MetaSolv TM IP VPN/Customer Edge/Customer Edge/MetaSolv TM IP VPN

RELATE THE ITEMS

Use the following information to relate the items:

- Type 1 and Type 2 product specifications
- The ***nn*** IP end user location, the ***nn*** IP VPN physical link, and the ***nn*** IP VPN virtual connection with the ***nn*** IP VPN
- Equipment with the ***nn*** IP end user location.

Ensure that the Cisco 2611is associated with the equipment.

BUILD PRODUCT CATALOG

Use the following information to build the product catalog for the ***nn*** IP VPN:

FIELD	VARIABLE
Market Description	Customer Ordered VPN over IP transport network
Service Category	Business
Offering Type	Retail
Network Template Type	MetaSolv TM IP VPN

Use the following information to build the product catalog:

End User Location for Home Office:

FIELD	VARIABLE
Spec	***nn*** ip end user location
Item Alias	***nn*** Home Office
Network Template Type	MetaSolv TM IP VPN

End user location for the branch office:

FIELD	VARIABLE
Spec	***nn*** ip end user location
Item Alias	***nn*** Branch Office
Network Template Type	MetaSolv TM IP VPN

Add the Equipment specification to each of the end user locations and add the Cisco 2611 on the Equipment Spec tab.

Physical IP VPN Connection:

FIELD	VARIABLE
Spec	***nn*** ip vpn physical link
Item Alias	***nn*** IP VPN Physical link
Network Template Type	MetaSolv TM IP VPN

Virtual IP VPN Connection:

FIELD	VARIABLE
Spec	***nn*** ip vpn virtual
Item Alias	***nn*** IP VPN virtual
Network Template Type	MetaSolv TM IP VPN

QUERY FOR THE CUSTOMER AND CREATE THE ORDER

Query for customer ***nn***Good Faith in the Customer Profile and create a new order.

Use the information below to complete the Service Order tab:

FIELD	VALUE
Desired Due Date:	2 weeks out
Ordered by Last Name	Wilson
Ordered by First Name	Sara
Ordered by Telephone Nbr	713 599-0099
Organization	Zesty Communications
PON	***nn*** IP VPN

Use the following information to order the ***nn*** IP VPN:

FIELD	VALUE
Orderable item	***nn*** IP VPN
Short Name	***nn*** GF Ins VPN
VPN ID	00038A
CE Topology	Hybrid

NETWORK ELEMENTS

Enter the following locations:

LOCATIONS	VALUE
Location Name	***nn*** GFI main office

Address	*Use the customer's primary billing address.*
Location Name	***nn*** Tulsa Claims Office
Address	35***nn*** Division Tulsa, OK 74119
Location Name	***nn*** Houston Claims Office
Address	36***nn*** Marine Blvd. Houston, TX 77204

Order the following routers for each location:

LOCATION	VALUE
nn GFI Main Office	***nn*** Home Office, CE_RTR
nn Tulsa Claims Office	***nn*** Branch Office, CE_RTR
nn Houston Claims Office	***nn*** Branch Office, CE_RTR

Name the routers and enter the following attributes:

FIELD	VALUE
Name	***nn*** Good Faith CER
CE Manager	Provider
SA Agent	Regular
Name	***nn*** Tulsa Claims CER
CE Manager	Provider
SA Agent	Regular
Name	***nn*** Houston Claims CER
CE Manager	Provider
SA Agent	Regular

Add the Cisco 2611 to all locations.

Add connectivity

Connect all locations physically to the provider network and virtually to each other.

Use the following information for all three **virtual** connections:

FIELD	VALUE
Virtual Broadband Service Category	IP
Tunneling Protocol	IP Sec

Use the following information for all three **physical** connections:

FIELD	VALUE
Virtual Broadband Service Category	IP
Bit Rate	44.736 M
NNI/UNI	UNI

GENERATE TASKS

Use the ***nn* VPN** provisioning plan to generate tasks. Change the Engineer queue to Prov***nn***.

Provision service

Use the NET DSGN task to identify connections, install equipment, and design the physical connections. Then use the RID task to design the virtual connections.

IDENTIFY THE CONNECTIONS

The VPN link for the Layer 2 VPN was set in the template as Auto Identifiable. Therefore, the software has already identified those connections for you.

Use the following information to identify the virtual connections:

CONNECTION FIELDS	VALUES
Connection Type	OTS Format
Service Type Category	CLCI—SS LATA Access
Service Type Code	HC
Freeform Circuit entry	*(default)*

INSTALL ORDERED EQUIPMENT

Add the Cisco 2611 router, which is listed under the Equipment Type CPE-Customer Premise Equipment.

ASSOCIATE THE CPE WITH LOCATIONS

Select every customer location and put them "In Service." Then associate the Cisco 2611 router that you just installed.

Embed the network

You need to embed the IP network. Use the instructions in the Layer 2 VPN module and the following information to connect to the IP network:

FIELD	VALUES
Element Type to Add	IP Network
Network to embed	User ***nn*** IP

ASSOCIATE CONNECTIONS WITH NETWORK

Connect both Houston locations to the Houston router. Also connect the Tulsa location to the Tulsa router.

DESIGN PHYSICAL CONNECTIONS

Select **VPN Links** as your connection spec and use the ordered connections you have already identified.

Use the instructions in the Layer 2 VPN module and the following information to design the physical connections:

	VALUES
Rate Code on General tab	DS3
Equipment on Design Lines	*Assign the **Cisco 2611** router and the **Cisco 12008** router to the first available unassigned DS3 ports.*
Broadband Service Category	IP
NNI/UNI	UNI
Bit Rate	44.736 M

ASSIGN AN IP ADDRESS

Use the IP addresses associated with the ***nn*_Backbone** use group to assign a /30 IP address to each customer equipment assignment and at each IP router assignment.

Complete the NET DSGN task.

DESIGN THE VIRTUAL CONNECTION

Open the RID task to design the virtual connections.

Set the Design Options to **Path Analysis by Hops** and select paths that have the fewest hops.

Complete the RID task.

Appendix A

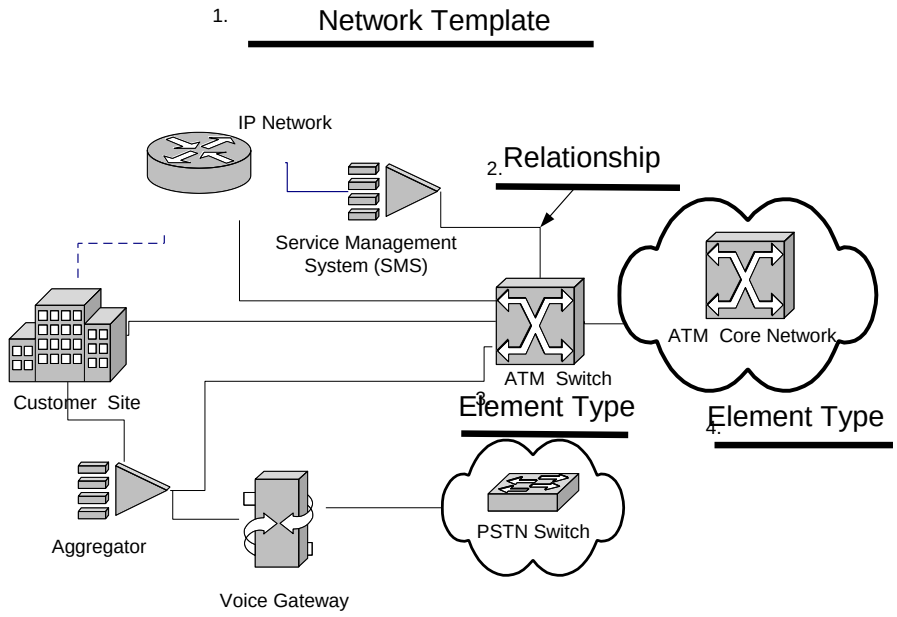
What you'll learn in this chapter

This module consists of a hands-on activity in which you will use the Ethernet template to build a network, enter an order for LAN to LAN service and provision the service.

Module Answers

Module 1—Network Template Overview

1. The template type is the transport technology or network system type, such as ATM or DLC. Templates are used to order and provision services over a transport technology. There can be multiple templates for a technology or template type such as Layer 2 VPN or Ethernet transport.
2. To retain the relationships between embedded templates.
3. Layer 2 VPN.
4. IP Network.
5. See figure below.

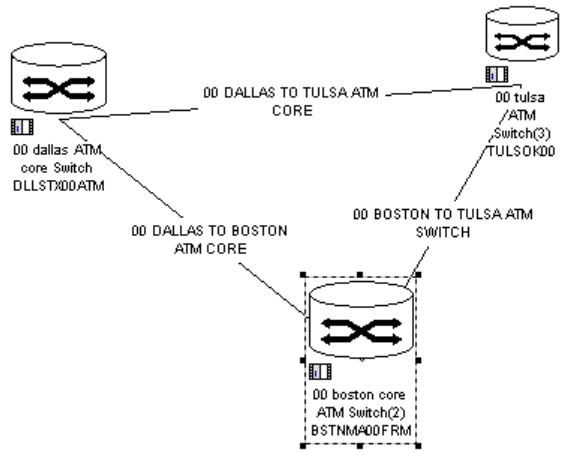


Module 2—Identify ATM/FR Technology Module Data

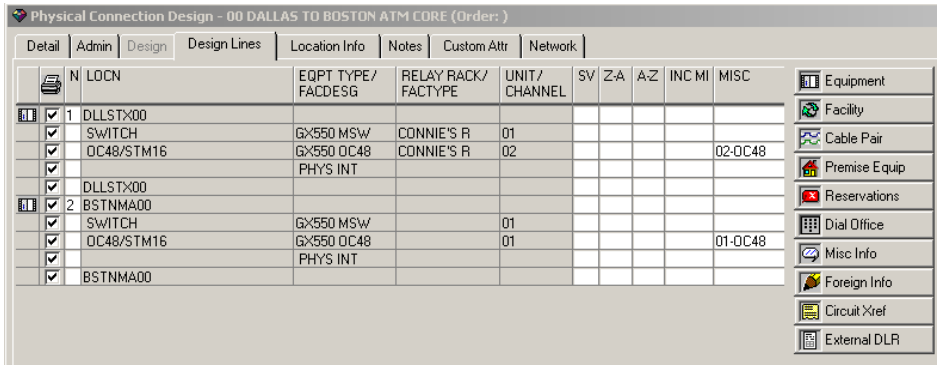
6. Assignable Bandwidth Link, Inverse Multiplexing Group and Unassignable Bandwidth Link.
7. Assignable Bandwidth Link, Inverse Multiplexing Group and Unassignable Bandwidth Link
8. No.
9. Enterprise.
10. IP Network, Customer Site, ATM Switch, SMS, PSTN, Aggregator, Voice Gateway.
11. Customer Site>Other Provider Network>ATM Core Switch>ATM Access Switch>ATM Core Switch>Other Provider Network>Customer Site.
12. ATM-VC Send and Receive Parameters, ATM address, ATM ConnectionType, Bc Send and Receive, Be + Bc Send and Receive, and so on.

Module 3—Design Network

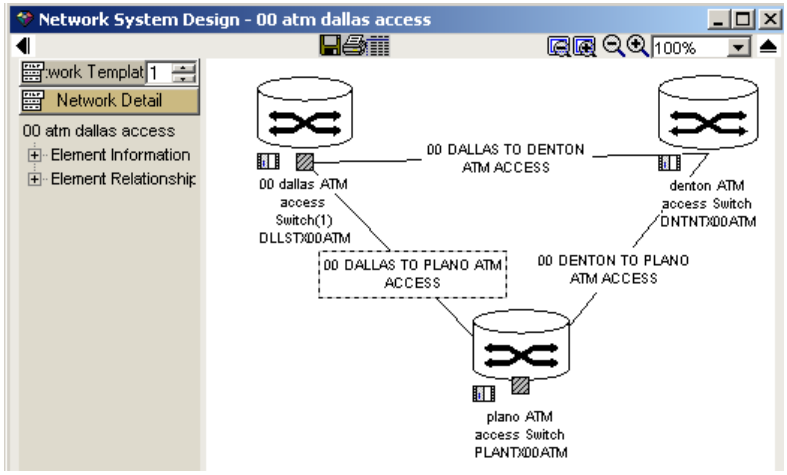
The ATM Core network should look similar to the one below.



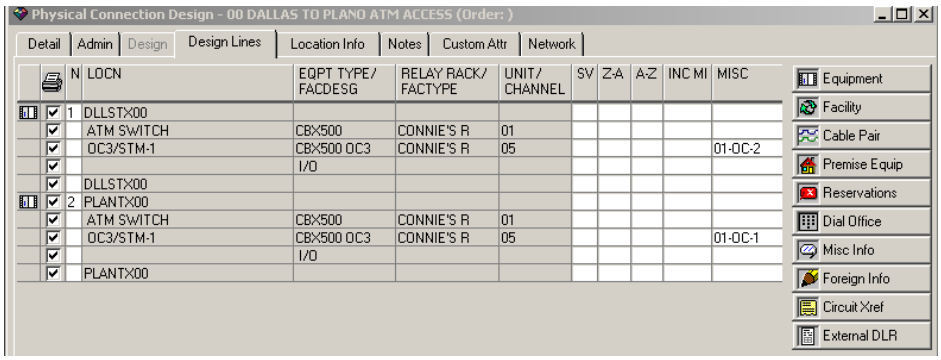
The Dallas to Boston connection design lines should look similar to the ones below:



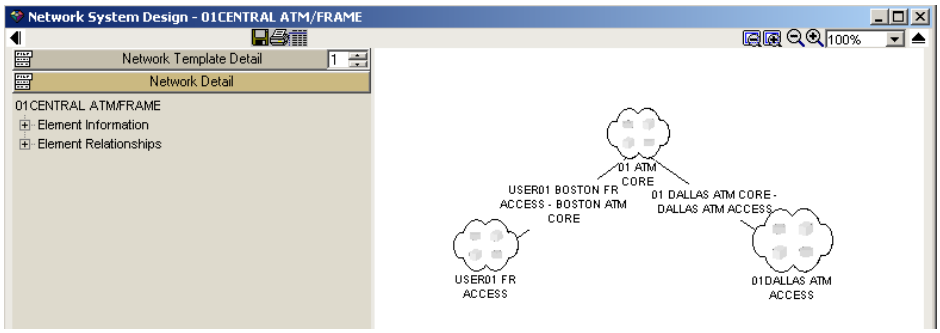
ATM Access Network



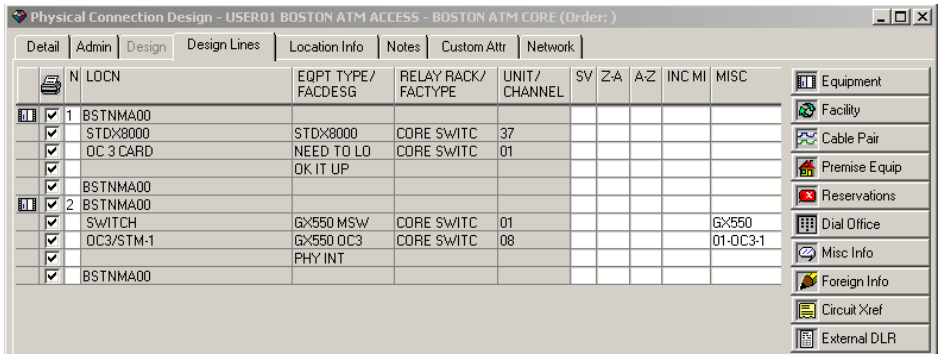
The design lines for the connection between Dallas and Plano should look similar to the one below:



Your Central ATM/Frame Relay network should look similar to the one below when the embedded networks are collapsed.

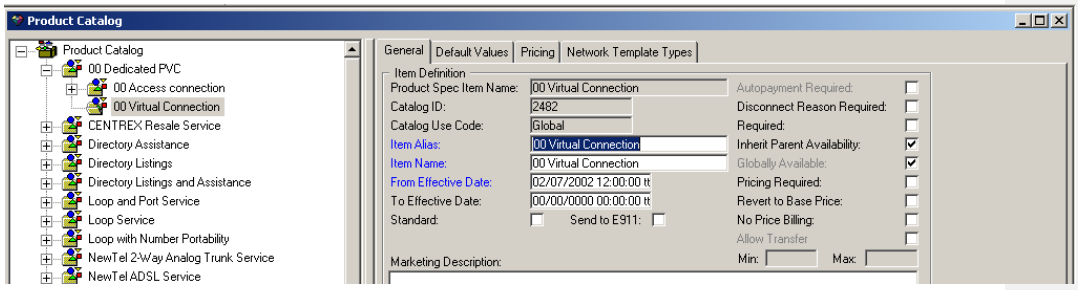


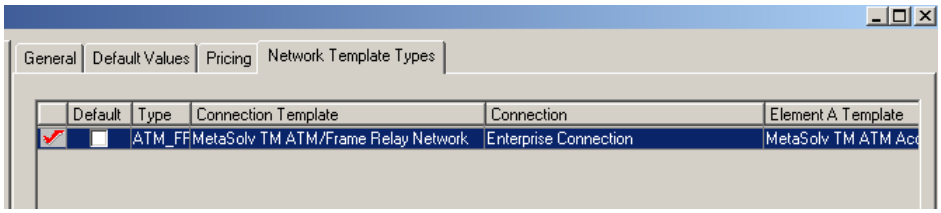
The design lines for the connection between the Boston ATM core switch and the Boston Frame Relay access network should look similar to the ones below:



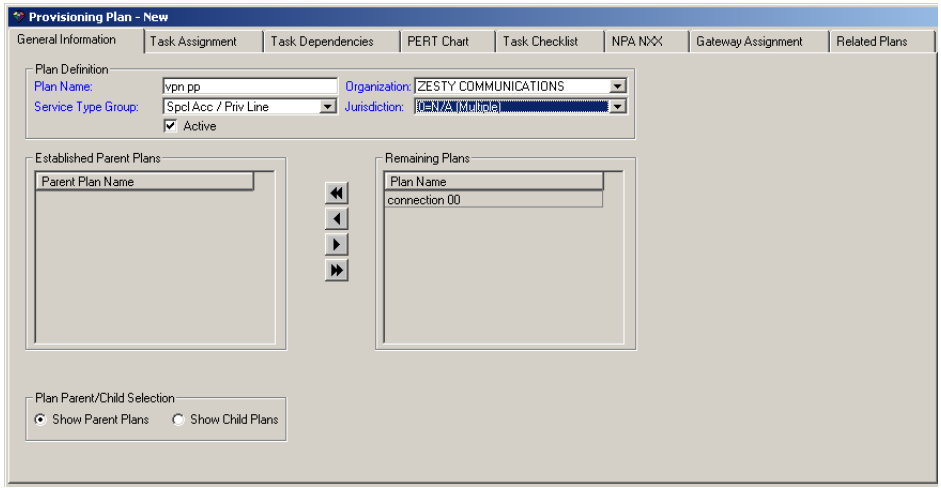
Module 4—Build Product

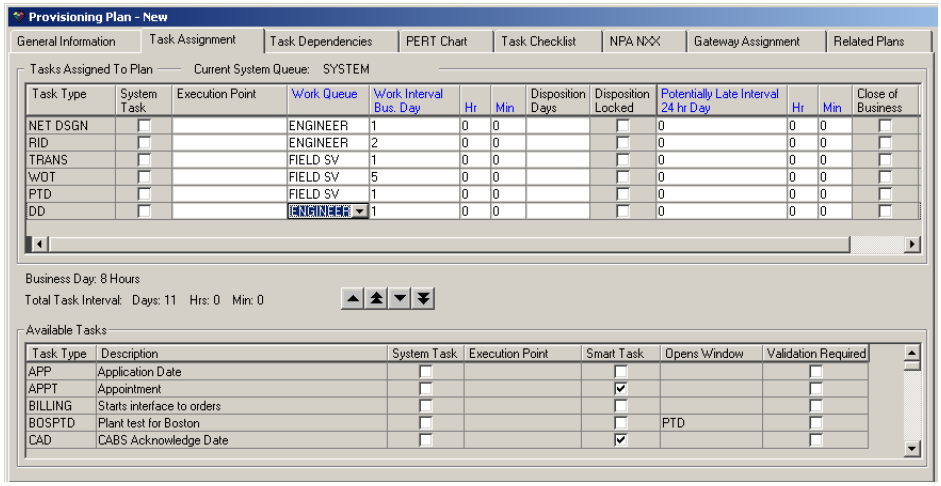
Below are screenshots of the Virtual Connection as part of the Dedicated PVC Product.

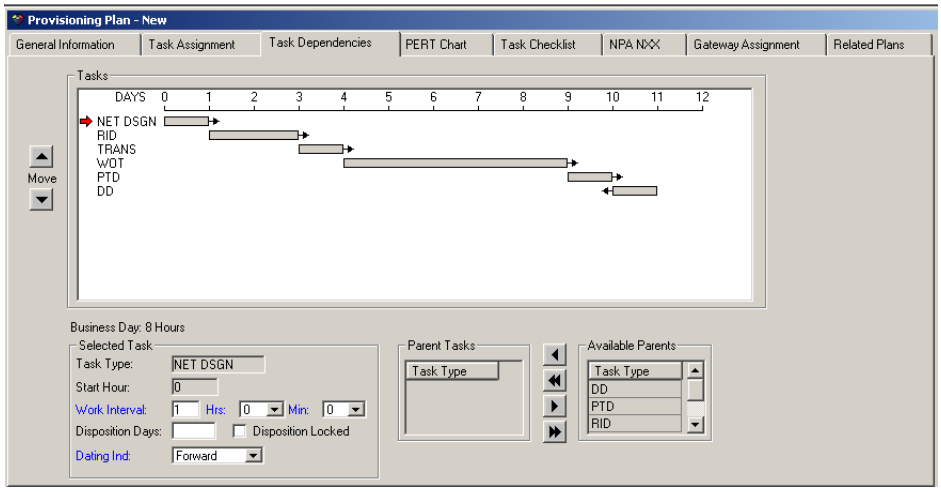




Below are screenshots of the VPN Provisioning Plan.

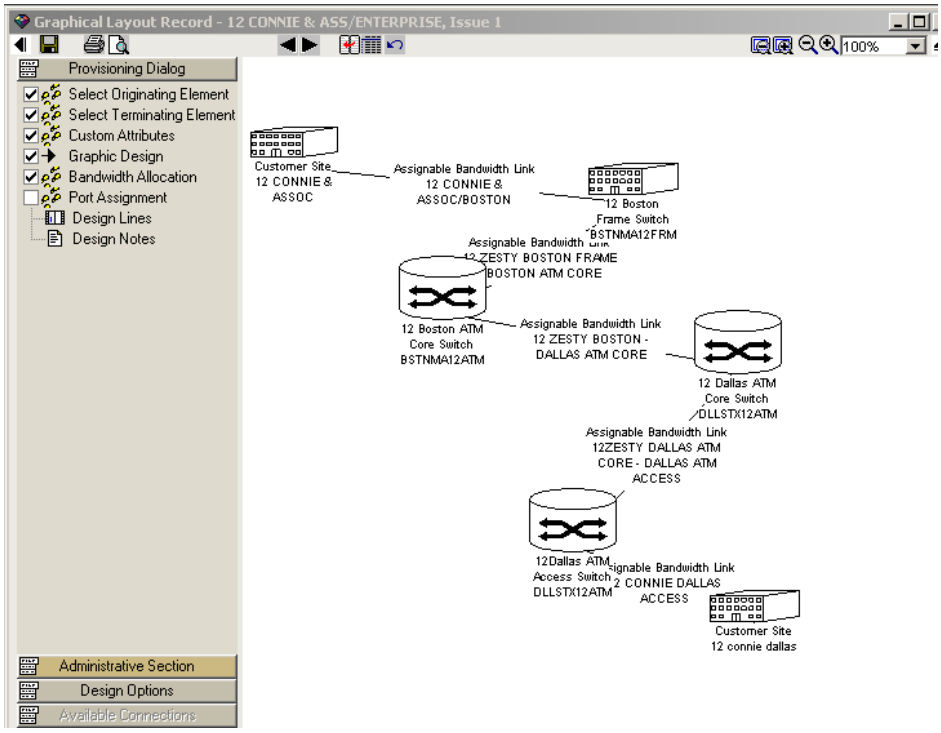



Provisioning Plan - New
General Information
Task Assignment
Task Dependencies
PERT Chart
Task Checklist
NPA NXX
Gateway Assignment
Related Plans
Tasks Assigned To Plan
Current System Queue: SYSTEM
Task Type
System Task
Execution Point
Work Queue
Work Interval Bus. Day
Hr
Min
Disposition Days
Disposition Locked
Potentially Late Interval 24 hr Day
Hr
Min
Close of Business
NET DSGN ENGINEER 1 0 0 0 0 0 0
RID ENGINEER 2 0 0 0 0 0 0
TRANS FIELD SV 1 0 0 0 0 0 0
WOT FIELD SV 5 0 0 0 0 0 0
PTD FIELD SV 1 0 0 0 0 0 0
DD ENGINEER 1 0 0 0 0 0 0
Business Day: 8 Hours
Total Task Interval: Days: 11 Hrs: 0 Min: 0
Available Tasks
Task Type
Description
System Task
Execution Point
Smart Task
Opens Window
Validation Required
APP Application Date
APPT Appointment
BILLING Starts interface to orders
BOSPTD Plant test for Boston PTD
CAD CABS Acknowledge Date


Provisioning Plan - New
General Information
Task Assignment
Task Dependencies
PERT Chart
Task Checklist
NPA NXX
Gateway Assignment
Related Plans
Tasks
DAYS 0 1 2 3 4 5 6 7 8 9 10 11 12
NET DSGN
RID
TRANS
WOT
PTD
DD
Move
Business Day: 8 Hours
Selected Task
Task Type: NET DSGN
Start Hour: 0
Work Interval: 1 Hrs: 0 Min: 0
Disposition Days:
Disposition Locked
Dating Ind: Forward
Parent Tasks
Task Type
Available Parents
Task Type
DD
PTD
RID

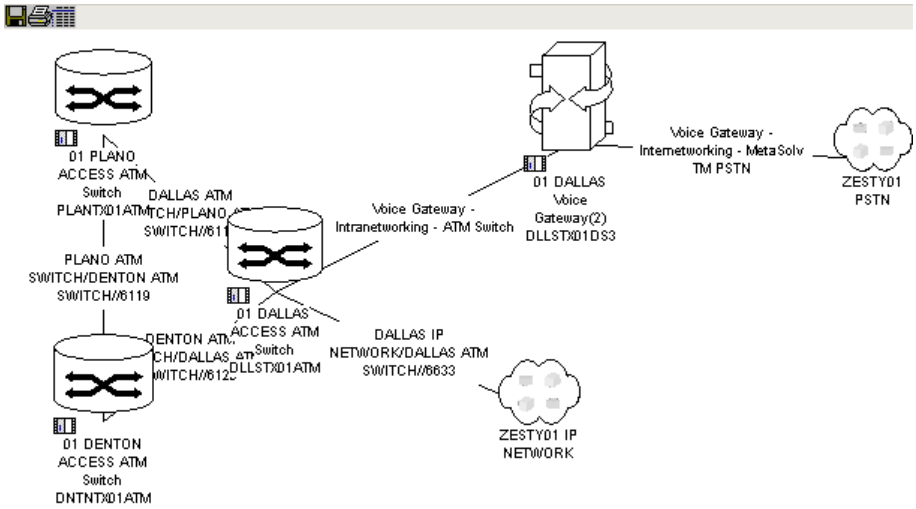
Module 6—Test Network

Your GLR should look similar to the one below:

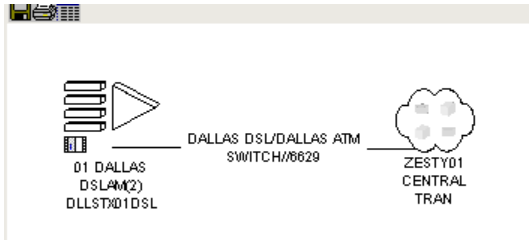


DSL Lab

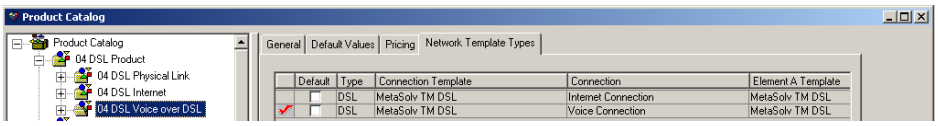
Your ATM access should have the same element types as the ones shown below:



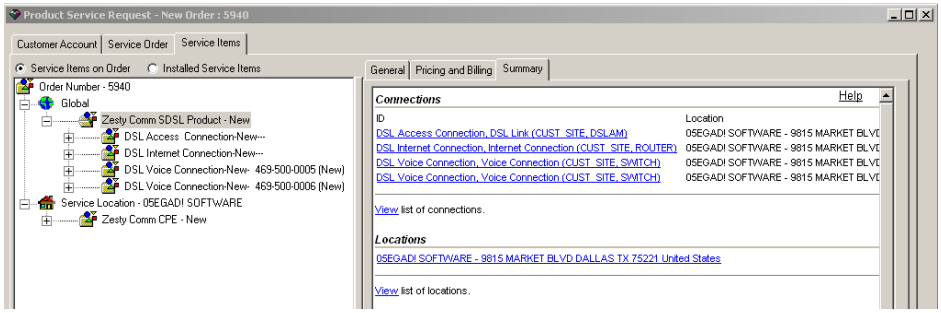
Your DSL network should look similar to the one shown below:



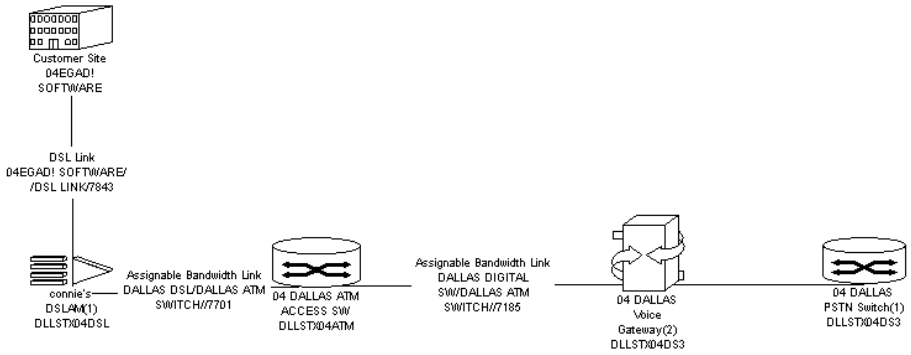
Your product catalog should look similar to the one below:



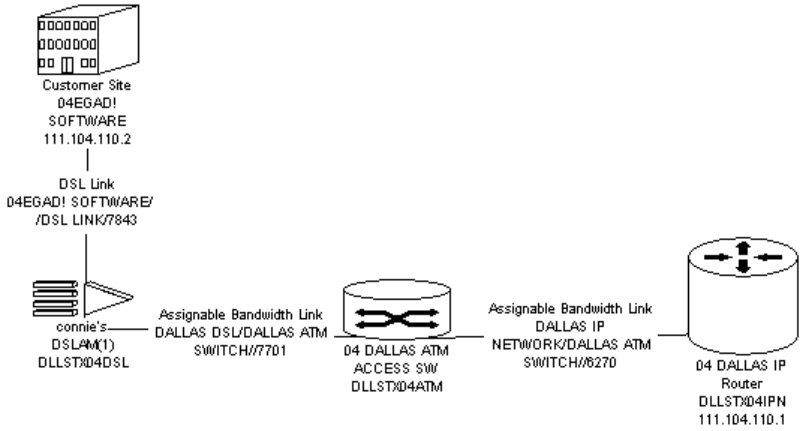
Your completed order should resemble the one below:



Your voice connection design should look similar to the one below:

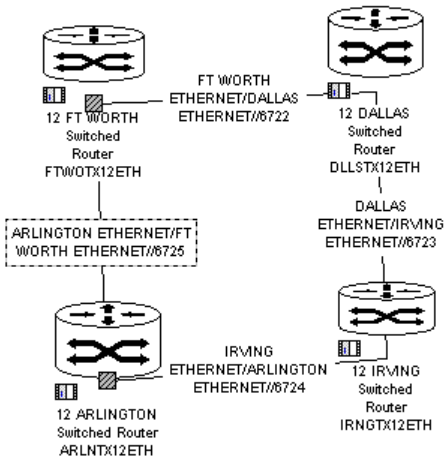


You Internet connection design should look similar to the following:



LAN to LAN Lab

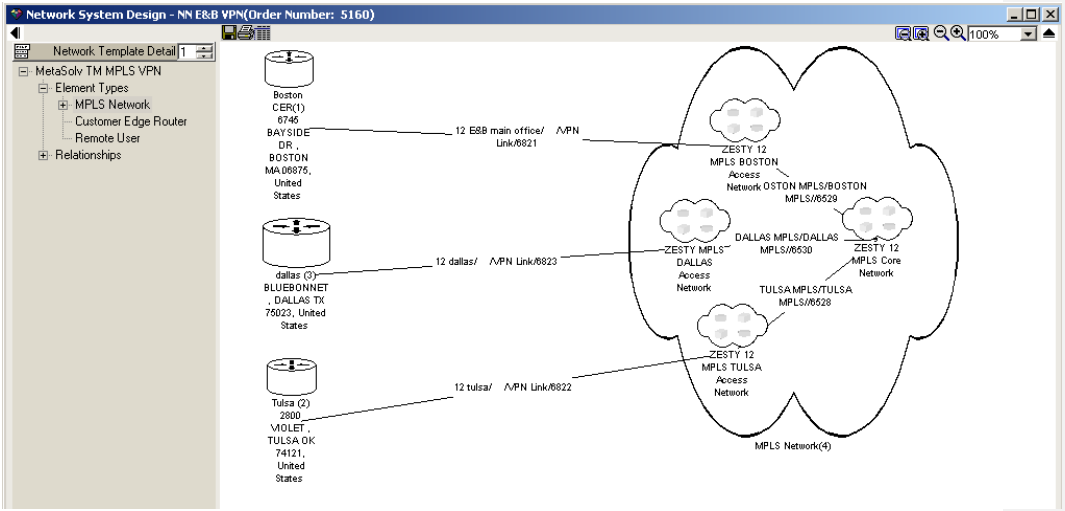
Your network should look similar to the one below:



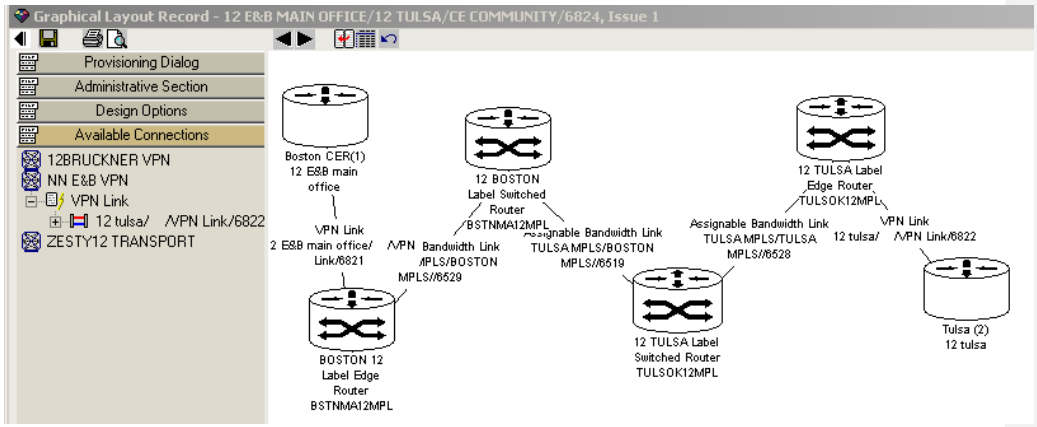
MPLS Lab

Your MPLS network system should look similar to the one shown below:

Your VPN should look similar to the one shown below:

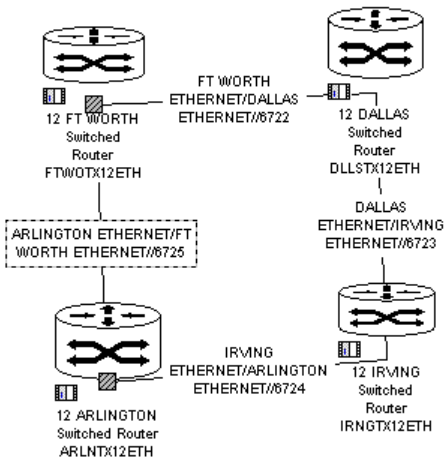


Your virtual connections should all look similar to the one below:



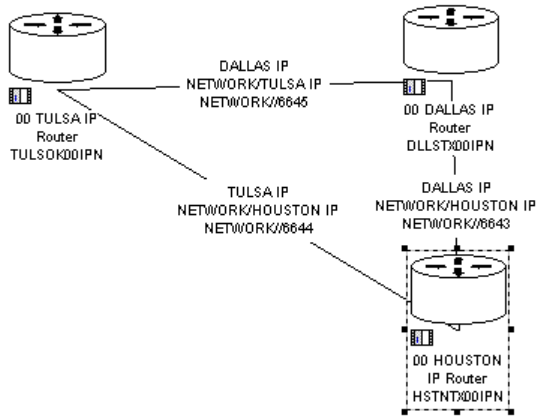
LAN to LAN Lab

Your network should look similar to the one below:

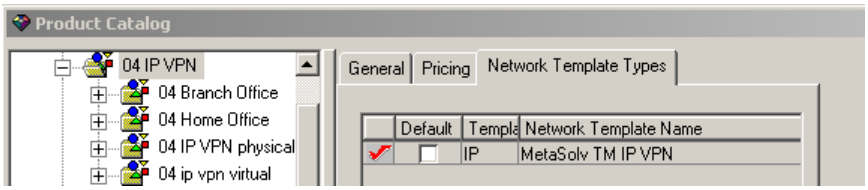


IP VPN

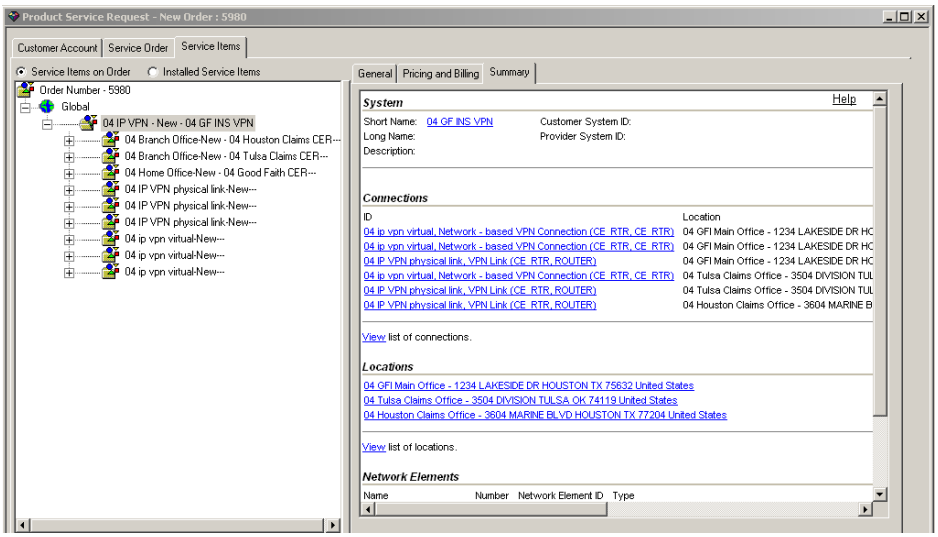
Your IP network should look similar to the one shown below:



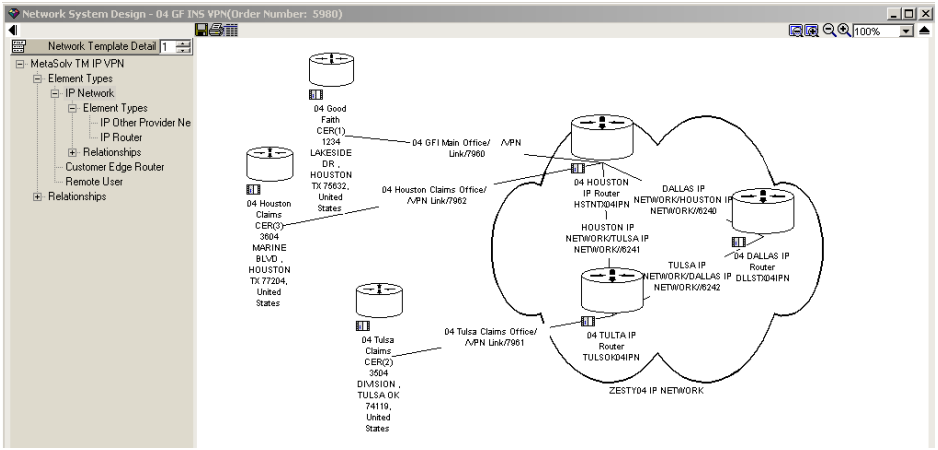
Your product catalog should look like the one below:



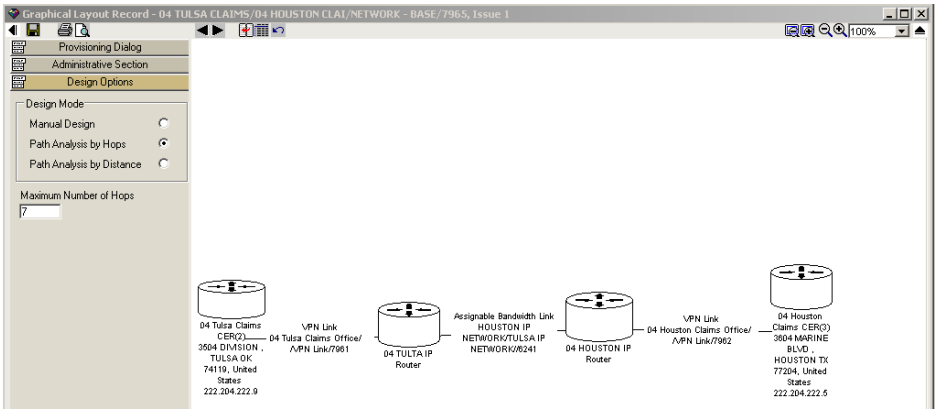
You order should look similar to the one below:



You NETDSGN task should look similar to the one shown below:



Below is an example of the virtual connection between the two claims' offices:


Graphical Layout Record - 04 TULSA CLAIMS/04 HOUSTON CLAI/NETWORK - BASE/7965, Issue 1
Provisioning Dialog
Administrative Section
Design Options
Design Mode
Manual Design
Path Analysis by Hops
Path Analysis by Distance
Maximum Number of Hops
7
100%
04 Tulsa Claims CER(2) 3504 DIVISION , TULSA OK 74119, United States 222.204.222.9
VPN Link
04 Tulsa Claims Office/ /VPN Link/7961
04 TULTA IP Router
Assignable Bandwidth Link HOUSTON IP NETWORK/TULSA IP NETWORK/6241
04 HOUSTON IP Router
VPN Link
04 Houston Claims Office/ /VPN Link/7962
04 Houston Claims CER(3) 3604 MARINE BLVD , HOUSTON TX 77204, United States 222.204.222.5

Appendix B

Equipment

Below are equipment definitions for various equipment types:

- **Aggregator**—The aggregator combines high-speed outputs onto a higher speed connection. Example: This can be used to aggregate multiple DS1s to DS3s or it can be used to aggregate traffic from multiple DSLAMs.
- **Authorization Server**—The server used to provide validations for Internet access.
- **Class 5 Switch**—The switch used for POTS (Plain Old Telephone Service).
- **DSLAM**—The Digital Subscriber Line Access Multiplexer combines many DSL services into one high-speed connection. It can also split the frequency band used for the data connection from the voice connection.
- **DSL Modem**—The modem typically used at a residential customer site to access the Internet over a DSL connection.
- **Integrated Access Device**—The equipment typically used by a business customer to deliver voice and data services via LAN ports
- **IP Router**—The router used to access an ISP (Internet Service Provider).
- **Label Switch Router (LSR)**—The switch router used at network edges to apply labels used for MPLS.
- **Subscriber Management System**—The device that aggregates DSL traffic and provide access to multiple ISPs.
- **Voice Gateway**—The equipment that converts voice from ATM to Digital Loop Carrier (DLC) technology. With DLC, the channels between the voice gateway and the Class 5 Switch are dynamically selected as calls are processed.

Bit Rate Equivalents

Below are bit rate equivalents for various transmission rates.

- OC1 = 51.84 Mbps
- OC3 = 155.52 Mbps
- OC12 = 622.08 Mbps
- OC48 = 2.4 Gbps
- OC192 = 9.9 Gbps
-

Peak Cell Rate Equivalents

Below are various cells per second for various transmission rates.

- T1 = 3,641 Cells Per Second (CPS)
- T3 = 107,868 Cps
- OC03 = 365,566 Cps

Field Descriptions—Managing a Template

The table below provides fields and descriptions for this window:

FIELD	DESCRIPTION
Template Type	Type of network template.
Network Template Name	Name of network template.
External/Internal	Specifies whether the template is internal (to the service provider) or external (for sale to a customer).
Active (checkbox)	Indicates that the network template type is currently active.
Custom Attributes	When modified in a utility tool, these specify values to building blocks. Customizable because your business processes and practices dictate how these will be used.

Field Descriptions—Managing a Template Element Type

The table below provides the fields and descriptions for this window in alphabetical order:

Field	Description
Element Label	User-defined element name.
Image Scale	Size of the element's graphical image, expressed as a percentage of the canvas default.
Element Type Name	The name of the element.
Min Required Per System	Minimum number of element types **required** in a network system.
Max Allowed Per System	Maximum number of element types allowed in an entire network system.
Outside Assignments	How the system handles assignments made outside of itself. (An outside assignment reduces the available capacity of a system.)
Base Component	Element type to which a service item is connected last. For example, an LDS is the last element type to which a circuit riding a DS0 connects. Intermediate element types can be COTs or RDTs or both. A secondary element type is DCS.
Location Required	Indicates that a service location is required when you use an element type in a system.
Allow Port Association	Indicates that you can associate port addresses with a specified element.
Network Extension	Indicates that an element is an extension of a service provider's network.
Allow Equipment at Multiple Locations	Indicates that you can associate equipment from multiple locations with an element.
Orderable	Indicates that the template element type can be included on an order.
Active	Indicates that the element type specification is currently active.

Field Descriptions—Managing a Template Relationship (General View)

The table below provides the fields and descriptions for this window in alphabetical order:

Field	Description
(Element Type 1) Role	Function of the element type at the top or left end of an element relationship in a network template. <Element Type 1> is a variable for different element types, such as ATM_SW, EUL, and DSLAM.
(Element Type 2) Role	Function of the element type at the bottom or right end of an element relationship in a network template. <Element Type 2> is a variable for different element types, such as ATM_SW, EUL, and DSLAM.
Intra/Inter Network	Specifies the element type relationship is between two element types in either the same network (intranetworking) or in different networks (internetworking).
Maximum Allowed	The maximum number of secondary elements you can connect to each primary element.
Minimum Required	The minimum number of secondary elements you must connect to each primary element.

Field Descriptions—Managing an Element Type

The table below provides the fields and descriptions for this window in alphabetical order:

Field	Description
Active	Indicates the element type is currently active.
Continuous Add	Indicates you can create new records without returning to the panel.
Element Type	Used as an abbreviation of the Element Type Name
Element Type Name	Name of the element type.
Image Name	Name of the image you associate with an element type.

Field Descriptions—Connection Type

The table below provides the fields and descriptions for this window in alphabetical order:

Field	Description
Active	Indicates the connection type is currently active.
BW/TDM	Specifies whether the connection is bandwidth or TDM.
Category	Category of connection specification type.
Connection Type	Type of connection that joins two network template element types or network system elements.
Continuous Add	Indicates you can create new records without returning to the panel.

FIELD	DESCRIPTION
Name	Name associated with the connection type.

Field Descriptions—Managing a Connection Spec (General View)

The table below provides the fields and descriptions for this window in alphabetical order:

FIELD	DESCRIPTION
Active	Indicates the connection specification is currently active.
Assignment Required	Indicates an assignment must be made to a connection.
Auto Id	Indicates the connection can be auto ID'ed.
Capacity Calculation	Specifies how to handle the transmission rate for segments of a multi-point connection. You can add the transmission parameter for each segment, or use the transmission parameters of the connection.
Connection Spec Name	Name of a connection specification.
Connection Type	Type of connection that joins two network template element types or network system elements.
Continuous Add	Indicates you can create new records without returning to the panel.
Max Connections Allowed Per Spec	Maximum number of connections per specification you can relate to a parent connection.
Max Specs Allowed Per System	Maximum number of connection specifications that can exist in an entire network system.
Min Connection Required Per Spec	Minimum number of connections per specification you must relate to the parent connection.
Min Specs Required Per System	Minimum number of connection specifications required in a network system.
Multipoint Type	The multipoint status of a connection. Either a connection is point to point or it is multipoint.

Glossary

A

Activation: This term, in the context of this document, is used to describe the process of translating an order into a usable service.
Addled: The state in which we sometimes find Celita, Fred, and Cathie, but never Susan, Laurie or Connie.

B

Backlog: This term will eventually refer to the number of courses we've been requested to write.
Battering Ram: The instrument occasionally used to make a successful suggestion to management.

C

Canvas: The area of the software used to view graphical representations of templates and networks.
Connector: The item type used to create product specifications for network connections and standalone connections, for example: a virtual connection to connect two branch offices, or an access connection from a customer to a DSLAM.
Custom Attributes: The information that describes a building block. They can be customized for the four following building block types: templates, elements, connections, and connection allocations.

D

Disposition Days: A user-defined number of days that can be inserted between tasks when no work is to be completed.
Doggie: The mammal with which a human being is most likely to experience unconditional love.

E

Element: The item type used to create product specifications for network elements, for example: a home office.
Element Type: Representations of nodes in a network system. Element types can be equipment or other network systems.

F

G

H

I

J

K

L

M

N

Network Template: The elements, rules and connections associated with a particular technology. There can be multiple network templates for one technology.

O

P

Prioritized Path: The various paths through a network that a virtual connection can traverse.
Prdbundle: The item type used to create product specifications for product bundles, for example: DSL.
Product Service Request (PSR): A customer request for service that includes customer and service information.
Product Specifications: Blueprints for products. These are items that are offered based on the networks.
Provisioning Plan: A set of tasks, work queues, and due dates required to manage the flow of work to provision service.

Q

R

Relationship: The representation of connections between elements. Relationships can be Intranetworking and connect elements within the same network, or they can be Internetworking and connect elements in different networks.

S

System: The item type used to create product specifications that represents network systems, for example: MPLS virtual private network.

T

Tasks: The actual work that needs to be done to provision customer service.

Technology Module: A network system type that includes predefined network templates that you use to build networks, build products and provision service. You receive a technology module when you license a specific technology.

V

W

Work queues: The various work groups responsible for performing tasks. For example, there may be an Engineer work queue that designs circuits and a Field Service work queue for wire office testing tasks.

X

Y

Z