

# JCSS User's Manual

7.0 Final (OPNET 2.6.4)

Contract DASW01 03 D 0008



**Disclaimer:** As of October 2007, NETWARS was redesignated by the Program Manager Office as the Joint Communications Simulation System (JCSSL). JCSSL was selected as the new industry name to better reflect the inherent joint communication capabilities of the software. Users should be aware that no software updates were conducted as part of the software name change.

November 30, 2007

Prepared for:  
Defense Contracting Command -  
Washington  
Washington, DC 20310-5200

Prepared by:  
OPNET Technologies, Inc.  
7255 Woodmont Avenue  
Bethesda, MD 20814-7904



---

## Identification

---

### Document Identification

Document Title: JCSS User's Manual  
Version: 7.0 Final

### Software Identification

Product Name: JCSS  
Product Release: 7.0

---

## Documentation Conventions

---

This documentation uses specific formatting and typographic conventions to present the following types of information:

- Objects, examples, and system I/O
- Object hierarchies
- Computer commands
- Lists and procedures

### Objects, Examples, and System I/O

- Directory paths and file names are in standard Courier typeface:

```
C:\Netwars\User_Data\Projects
```

- Function names in body text are in italics:

```
op_dist_outcome()
```

- The names of functions of interest in example code are in bolded Courier typeface:

```
/* determine the object ID of packet's creation module */  
src_mod_objid = op_pk_creation_mod_get (pkptr);
```

- Variables are enclosed in angle brackets (< >):

```
<NETWARS path>\Scenario_Builder\op_admin\err_log
```

### Object Hierarchies

Menu hierarchies are indicated by right angle brackets (>); for example:

```
Edit > Preferences > Advanced
```

## Computer Commands

These conventions apply to Windows systems and navigation methods that use the standard graphical-user-interface (GUI) terminology such as click, drag, and dialog box.

- Key combinations appear in the form “press **<button>+x**”; this means press the **<button>** and **x** keys *at the same time* to do the operation.
- The mouse operations *left-click* (or *click*) and *right-click* indicate that you should press the left mouse button or right mouse button, respectively.

## Lists and Procedures

Information is often itemized in bulleted (unordered) or numbered (ordered) lists:

- In bulleted lists, the sequence of items is not important.
- In numbered lists, the sequence of items is important.

Procedures are contained within procedure headings and footings that indicate the start and end of the procedure. Each step of a procedure is numbered to indicate the sequence in which you should do the steps.

## Document Revision History

Release Date	Product Version	Chapter	Description of Change
November 30, 2007	7.0 Final	All	- Began introduction of product name change to JCSS from NETWARS.
		2	- Updated figure 2-26 Logical View Selection dialog box, and removed refs to Frame Relay, VTC, etc., in this section.
		3	- Added note that Modeler will not launch from JCSS without a Modeler license.
October 31, 2007	2007 Final	2	- Added sentence to Procedure 2-17 that Network Layer Filters shown are only those which apply to the deployed network.
		3	- Removed "Scenario Treeview" references from document, and updated procedures for deploying satellite links and defining broadcast networks. - Added "Save As Link Type" section.
		4	- Updated procedures for creating threads and creating relationships.
October 17, 2007	2007 Draft	2	- Updated figures and text to reflect change to NETWARS v2007. - Updated figure 2-11 list of pre-configured organizations. - Changed Scenarios > Reports > Mission Analysis Questions to Scenarios > Reports > Mission Analysis. - Added reference to CADRG/CIB Raster Catalog Directories and MrSID images to "Adding Background Images" section. - Updated figure 2-26 with new Logical View options.
		3	Updated figures with new options/lists: - 3-3 Organization Attributes dialog box - 3-4 OPFAC Attributes dialog box - 3-5 Edit Objects Using Template dialog box - 3-25 TSSP Group Config (Circuit Deployment) dialog box - 3-38 Satellite Link Attributes dialog box - 3-43 and 3-44 changed 'Phase' to 'Scenario' - 3-48 LOS Settings dialog box  - Added "Opening Node Models in Modeler" section. - Updated "Defining Broadcast Networks" section to include new wizard. - Added procedure to "Add Broadcast Networks via the Right-Click Menu." - Updated "Configuring Utility Nodes" section to reflect new Circuit Deployment Wizard. - Added Protocols > Link 16 and Protocols > IPv6 submenus. - Added View > Visualize Protocol Configuration > IP Address Types.

Release Date	Product Version	Chapter	Description of Change
		4	<ul style="list-style-type: none"> <li>- Added note to "Create a Thread" procedure re: right-click "View Threads" option.</li> <li>- Added note to "Create a Relationship" procedure re: right-click "Deploy Relationship" option.</li> </ul>
		6	<ul style="list-style-type: none"> <li>- Added figure 6-2 Probe Model window.</li> <li>- Updated figure 6-3 list of Attributes in Configure/Run DES dialog box.</li> </ul>
		7	<ul style="list-style-type: none"> <li>- Updated figure 7-1 Results Browser.</li> </ul>
December 6, 2006	6.2 Final	3	<ul style="list-style-type: none"> <li>- Revised ref to "the three OPFACs" in Step 4 of Procedure 3-25 to read "the two OPFACs that contain the endpoint earth terminals and the OPFAC that contains the home satellite."</li> <li>- Updated Figure 3-33, Satellite Bent Pipe Link Deployment.</li> <li>- Removed Defining Application Profiles section (refer instead to Traffic Wizard in chapter 4.)</li> </ul>
		4	<ul style="list-style-type: none"> <li>- Moved Creating Relationships section to after Creating IERs and Creating Threads sections (Relationships are no longer needed for IERs.)</li> </ul>
		5	<ul style="list-style-type: none"> <li>- Updated figure 5-1 and accompanying text to reflect changes to Specifying Alternate Link Capacities procedure. Moved section to after Optimizing a Network section.</li> <li>- Expanded descriptions of dialog box options in Evaluating a Network section.</li> </ul>
		6	<ul style="list-style-type: none"> <li>- Updated figure 6-6 and accompanying text to reflect new Log Viewer feature.</li> </ul>
November 3, 2006	6.2 Final	1	<ul style="list-style-type: none"> <li>- Updated Task Assistant figures 1-1, 1-2, and 1-3.</li> </ul>
		2	<ul style="list-style-type: none"> <li>- Updated Mission Analysis Questions figure 2-19.</li> <li>- Changed Map &gt; Set Area of Interest to View &gt; Set Area of Interest, and Map &gt; Background &gt; (options) to View &gt; Background &gt; (options).</li> <li>- Updated Logical View Selection figure 2-26 (removed Type of View drop-down list, and Re-use/Re-create options.)</li> </ul>
		3	<ul style="list-style-type: none"> <li>- Updated Adding Units via the Library Treeview figure 3-2.</li> <li>- Updated figures 3-18 and 3-22 to reflect new toolbar buttons.</li> <li>- Updated Satellite Bent Pipe Link Deployment dialog box figure 3-20.</li> <li>- Changed Terrain &gt; View Terrain Profile to Topology &gt; Terrain &gt; View Terrain Profile.</li> <li>- Changed Map &gt; LOS Settings to View &gt; Show LOS &gt; LOS Settings.</li> </ul>
		4	<ul style="list-style-type: none"> <li>- Added Ctrl+W shortcut keys to Traffic Wizard section.</li> </ul>

Release Date	Product Version	Chapter	Description of Change
October 20, 2006	6.2 Draft	1	- Removed references to separate IER Editor (functionality now accessible via System Editor's IER Database menu.)
		2	- Updated System Editor and Sign-in figures to reflect version 6.2. - Updated Create a New Project to reflect use of File > New Project command in System Editor. - Added Zoom to Window and Zoom to All procedures. - Changed View > Network Views > Logical to View > Show Logical Views, and updated Logical View Selection dialog box.
		3	- Updated all Object Palette figures. - Updated Create a Device Model procedure to reflect new Create Custom Device dialog box and procedure. - Updated references to Scenario menu to reflect name change to Scenarios menu. - Updated Protocols menu items table.
		4	- Updated Traffic Wizard dialog box.
		6	- Updated Choose Results dialog box. - Updated Perform a Network Simulation procedure to reflect simple and detailed modes and new dialog boxes.
		7	- Updated Results Browser and graph shortcut menu figures. - Removed DES > Results > Compare Results.
		Glossary	- Removed references to the Scenario Conversion Module.
		March 30, 2006	6.1 Final
March 3, 2006	6.1 Draft	1	- Updated text to reflect name change from "Icon Editor" to "Icon Database".
		2	- Updated System Editor and Sign-in figures to reflect version 6.1.
		3	- Updated Procedure 3-18, "Deploy a Satellite Link", to reflect new tabbed design of dialog boxes.
		4	- Removed "Converting Flows to IERs" section.
November 14, 2005	5.2 Final	Front material	- Changed refs in Documentation Conventions section to be NETWARS-specific rather than OPNET-specific (i.e, changed <opnet_user_home>\... ref to <NETWARS path>\Scenario_Builder\...)
		2	- Updated Logical View Selection figure.
		3	- Added 'Editing Attributes for Many Objects' section. - Added Object Palette Tree view to 'Adding a Device to an OPFAC' section. - Added 'Deploy a Satellite Link' procedure. - Updated NETWARS Standard Models object palette figure.
		4	- Removed Convert Link Loads to Flows procedure. - Removed Advanced Traffic Wizard procedure. - Updated Traffic Wizard figure.

Release Date	Product Version	Chapter	Description of Change
October 14, 2005	5.2 Draft	All	- Updated document footers and applicable screenshots to reflect new NETWARS version number.
		1	- Added (optional) Server Characterization and Mainframe Characterization options to System Editor (File > Open Editor.)
		2	- Added 'Selecting the User Level' section. - Added New Project Wizard to 'Creating a New Project' section. - Added detail to 'Answering Mission Analysis Questions' section. - Updated 'Setting the Area of Interest' section (changed from 'Setting Area of Operation'.) - Removed JMTK Data Maps and updated procedures in 'Adding Background Images' section. - Changed 'Zooming In/Out' to 'Zooming/Unzooming', and updated procedures. - Updated and added detail to 'Viewing Scenarios' section.
		3	- Revised 'Add Units via the Treeview' section to reflect use of the Library Treeview. - Added 'Add Units via the Scenario Treeview' section. - Renamed Topology > Device Creator as Topology > Create Custom Device Model. - Removed 'Redeploying Links' section. - Removed 'Remove a Scenario' section. - Added 'Manage Scenarios' section. - Added Protocols > LDP, Protocols > RSVP, Protocols > VLAN, and Protocols > STP. - Removed Protocols > MPLS and Protocols > DPT. - Added detail to 'Enabling Line-of-Sight (LOS) Connectivity and Range' section.
		4	- Revised 'Creating Relationships' and 'Creating Threads' sections to reflect use of the Scenario Treeview. - Updated Figure 4-2 (Relationship Attributes dialog box) to reflect addition of Specify Start/Stop Time button. - Removed 'Creating Demands' and 'Converting Applications into Demands' sections. - Renamed Scenario > Convert Applications to Flows to Traffic > Convert Traffic > Applications to Flows. - Added 'Converting Link Loads into Flows' and 'Converting Flows into IERs' sections. - Added Traffic Wizard section.
April 1, 2005	5.1 Final	Cover	Changed release date to April 1, 2005, and removed OPNET contact info from Identification section.



Release Date	Product Version	Chapter	Description of Change
March 21, 2005	5.1 Final	1	-Added ACE to ACE Whiteboard section.
		2	- Added Procedure 2-13, Zoom to Selection. - Updated Figure 2-8 to reflect new button placement.
		3	- Added SLD info to 'Deploying Links' section, and added steps for editing SLDs to Procedure 3-14. - In 'Defining Additional Scenarios' section, replaced 'Copy a Scenario' procedure with 'Create a New Scenario' and 'Duplicate a Scenario'. Also added 'Remove a Scenario' procedure. - Changed Terrain>LOS Settings to Map>LOS Settings in Procedure 3-35.
		4	- Updated Figure 4-6 to reflect removal of time step info, and Figures 4-3 and 4-4 to reflect new button placement.
		5	- Updated Figures 5-2 and 5-7 to reflect new button placement.
February 21, 2005	5.1 Final		No changes.
February 7, 2005	5.1 Draft	All	<p>Ported existing Word document (NETWARS v 4.2) into Adobe FrameMaker 7.1, and applied commercial OPNET product documentation style template to improve quality and update manual. Reformatted text as needed to fit new format and style.</p> <p>Content changes:</p> <ul style="list-style-type: none"> <li>- Updated applicable screenshots to reflect new NETWARS version number.</li> <li>- Added reference to ACE in chapter 1.</li> <li>- Noted that annotations are now saved as part of a template OPFAC/organization, and are also deployed with the template.</li> <li>- Removed Alternate Link Cost field from Capacity Optimization Settings Advanced Parameters dialog box.</li> </ul>



# Contents

	<i>Identification</i> .....	UM-FM-iii
	<i>Documentation Conventions</i> .....	UM-FM-iii
	<i>Document Revision History</i> .....	UM-FM-v
	<i>List of Figures</i> .....	UM-FM-xv
	<i>List of Tables</i> .....	UM-FM-xviii
	<i>List of Procedures</i> .....	UM-FM-xix
<hr/>		
<b>1</b>	<b>Introduction</b>	<b>UM-1-1</b>
	JCSS Overview .....	UM-1-1
	Sample Workflows .....	UM-1-2
	Crisis Action Planner's Workflow .....	UM-1-2
	Operational Planner's Workflow .....	UM-1-3
	Analyst's Workflow .....	UM-1-4
	JCSS Interfaces .....	UM-1-4
	System Editor .....	UM-1-4
	Scenario Builder .....	UM-1-4
	Icon Database .....	UM-1-5
	(Optional) ACE and ACE Whiteboard .....	UM-1-5
	(Optional) Server Characterization .....	UM-1-5
	(Optional) Mainframe Characterization .....	UM-1-5
	System Architecture .....	UM-1-6
<hr/>		
<b>2</b>	<b>Getting Started</b>	<b>UM-2-1</b>
	Launching JCSS .....	UM-2-1
	Signing In and Creating a New User Profile .....	UM-2-2
	Selecting the User Level .....	UM-2-3
	Using the Task Assistant .....	UM-2-4
	Creating a New Project .....	UM-2-5
	Setting Scenario Classification .....	UM-2-12
	Answering Mission Analysis Questions .....	UM-2-13
	Setting the Area of Interest .....	UM-2-15
	Adding Background Images .....	UM-2-16
	Border Maps .....	UM-2-16
	Image Maps .....	UM-2-16
	MIF Maps .....	UM-2-16
	Zooming/Unzooming .....	UM-2-18
	Viewing Scenarios .....	UM-2-21
<hr/>		
<b>3</b>	<b>Topology Building</b>	<b>UM-3-1</b>
	Adding Units (Organizations and OPFACS) .....	UM-3-1
	Modifying Units .....	UM-3-2
	Organization Attributes .....	UM-3-2
	OPFAC Attributes .....	UM-3-3

	Editing Attributes for Many Objects . . . . .	UM-3-5
	Creating Template Organizations and OPFACs . . . . .	UM-3-10
	Drilling Down into Units . . . . .	UM-3-11
	Adding Devices to OPFACs . . . . .	UM-3-11
	Cutting, Copying and Pasting Objects . . . . .	UM-3-13
	Creating Custom Models with Device Creator . . . . .	UM-3-15
	Opening Node Models in Modeler . . . . .	UM-3-17
	Connecting Device Models . . . . .	UM-3-18
	Internal Connectivity Links . . . . .	UM-3-19
	Deploying Links . . . . .	UM-3-20
	Deploying Satellite Links . . . . .	UM-3-21
	Verifying Device Connectivity . . . . .	UM-3-27
	Save As Link Type . . . . .	UM-3-27
	Defining Planning Links . . . . .	UM-3-28
	Defining External Connectivity Links . . . . .	UM-3-29
	Defining Broadcast Networks . . . . .	UM-3-30
	Verifying Link Consistency . . . . .	UM-3-34
	Configuring Utility Nodes . . . . .	UM-3-35
	Reviewing the Requirements Matrix . . . . .	UM-3-37
	Defining Additional Scenarios . . . . .	UM-3-38
	Configuring Protocols . . . . .	UM-3-41
	Visualizing Protocol Configuration . . . . .	UM-3-43
	Viewing a Terrain Profile . . . . .	UM-3-45
	Enabling Line-of-Sight (LOS) Connectivity and Range . . . . .	UM-3-46
	Displaying Line-of-Sight (LOS) Connectivity . . . . .	UM-3-49
	Displaying Line-of-Sight (LOS) Range . . . . .	UM-3-50
	Displaying Terrain Effects Shading . . . . .	UM-3-51
<hr/>		
<b>4</b>	<b>Traffic Specification</b>	<b>UM-4-1</b>
	Creating IERs . . . . .	UM-4-1
	Creating Threads . . . . .	UM-4-2
	Creating Relationships . . . . .	UM-4-4
	Converting Applications into Flows . . . . .	UM-4-5
	Deploying Traffic Using the Traffic Wizard . . . . .	UM-4-6
<hr/>		
<b>5</b>	<b>Capacity Planning</b>	<b>UM-5-1</b>
	Evaluating a Network . . . . .	UM-5-1
	Optimizing a Network . . . . .	UM-5-3
	Specifying Alternate Link Capacities . . . . .	UM-5-4
	Displaying Web Reports . . . . .	UM-5-6
	Saving Optimization Settings . . . . .	UM-5-7
	Managing Optimization Results . . . . .	UM-5-8
	Examining Top Solutions . . . . .	UM-5-10
<hr/>		
<b>6</b>	<b>Simulation Execution</b>	<b>UM-6-1</b>
	Choosing Device and Link Statistics . . . . .	UM-6-1
	Running a Simulation . . . . .	UM-6-3

---

	Viewing the Simulation Log File . . . . .	UM-6-6
	Viewing Web Reports . . . . .	UM-6-7
<b>7</b>	<b>Results Analysis</b>	<b>UM-7-1</b>
	Viewing Measures of Performance . . . . .	UM-7-1
	Interacting with MOP Graphs . . . . .	UM-7-2
	Finding Top Statistics . . . . .	UM-7-3
<b>8</b>	<b>Error Handling</b>	<b>UM-8-1</b>
	Technical Support . . . . .	UM-8-1
	Log Files . . . . .	UM-8-1
	Contact Information . . . . .	UM-8-1
	<b>Glossary</b>	<b>UM-GLOS-1</b>
	<b>Index</b>	<b>UM-IX-1</b>

---



## List of Figures

Figure 1-1	Crisis Action Planner's Workflow	UM-1-3
Figure 1-2	Operational Planner's Workflow	UM-1-3
Figure 1-3	Analyst's Workflow	UM-1-4
Figure 1-4	System Architecture	UM-1-6
Figure 2-1	System Editor	UM-2-1
Figure 2-2	Sign In dialog box	UM-2-1
Figure 2-3	Adding a New User Profile	UM-2-2
Figure 2-4	Signing In	UM-2-3
Figure 2-5	Checking the Show At Startup Checkbox	UM-2-4
Figure 2-6	Following Sequential Tasks in the Workflows Panel	UM-2-5
Figure 2-7	Creating a new project	UM-2-6
Figure 2-8	New Project Wizard: Set Area of Operations dialog box	UM-2-7
Figure 2-9	New Project Wizard: Specify Top-Level Units dialog box	UM-2-7
Figure 2-10	New Project Wizard: Unit Locations and Templates dialog box	UM-2-8
Figure 2-11	Choose Unit Template dialog box	UM-2-8
Figure 2-12	New Project Wizard: Specify Equipment Lists dialog box	UM-2-9
Figure 2-13	Equipment List dialog box	UM-2-9
Figure 2-14	New Project Wizard: Specify Owners dialog box	UM-2-10
Figure 2-15	Set Owner dialog box	UM-2-10
Figure 2-16	New Project Wizard: Top Level Unit Summary dialog box	UM-2-11
Figure 2-17	New Project Wizard: Select Equipment Types dialog box	UM-2-12
Figure 2-18	Setting the Scenario Classification	UM-2-13
Figure 2-19	Answering Mission Analysis Questions (5 Sections)	UM-2-14
Figure 2-20	Setting the Area of Operations	UM-2-15
Figure 2-21	Selecting a Border Map	UM-2-17
Figure 2-22	Add Map dialog box	UM-2-17
Figure 2-23	MIF Menu	UM-2-18
Figure 2-24	Zooming In	UM-2-19
Figure 2-25	Zooming Out	UM-2-20
Figure 2-26	Logical View Selection dialog box	UM-2-22
Figure 3-1	Adding Units via the Library Treeview	UM-3-1
Figure 3-2	Organization Attributes	UM-3-4
Figure 3-3	OPFAC Attributes	UM-3-5
Figure 3-4	Edit Objects Using Template dialog box	UM-3-6
Figure 3-5	Table of Generated Attributes	UM-3-7
Figure 3-6	Edit Attribute Template dialog box	UM-3-8
Figure 3-7	Preview of Table to be Generated from Template	UM-3-9
Figure 3-8	Template Organizations and OPFACs Saved to Object Palettes	UM-3-10
Figure 3-9	Drilling Down into Units	UM-3-11
Figure 3-10	Object Palette by Tree View	UM-3-12
Figure 3-11	Adding Devices to an OPFAC via Object Palette	UM-3-13
Figure 3-12	Selecting a Device Category for a New Device Model	UM-3-16
Figure 3-13	Open Node Editor Message Dialog	UM-3-17
Figure 3-14	Opening a Node Model in OPNET Modeler	UM-3-18
Figure 3-15	Adding Links to OPFAC Devices via Object Palette	UM-3-19

Figure 3-16	Select Devices dialog box	UM-3-20
Figure 3-17	Select Link dialog box	UM-3-20
Figure 3-18	Edit SLD Name dialog box	UM-3-21
Figure 3-19	Selecting Satellites for Link Deployment	UM-3-22
Figure 3-20	Select Devices dialog box	UM-3-22
Figure 3-21	Satellite Bent Pipe Link Deployment dialog box ~ Basic	UM-3-23
Figure 3-22	Satellite Bent Pipe Link Deployment dialog box ~ Advanced	UM-3-23
Figure 3-23	Defining Satellite Link Attributes (GBS)	UM-3-24
Figure 3-24	Deploying Satellite Links	UM-3-25
Figure 3-25	TSSP Group Config (Circuit Deployment) dialog box	UM-3-26
Figure 3-26	Successfully Created Circuit message box	UM-3-26
Figure 3-27	Inconsistent Links	UM-3-27
Figure 3-28	Link Errors and Failure Reasons Display	UM-3-27
Figure 3-29	Planning Links Drawn as Green Dashed Lines	UM-3-28
Figure 3-30	External Links Drawn as Green Solid Lines	UM-3-29
Figure 3-31	Broadcast Network Object Palette Icons	UM-3-30
Figure 3-32	Broadcast Network	UM-3-30
Figure 3-33	Defining Broadcast Network Radio Attributes	UM-3-31
Figure 3-34	Defining Broadcast Network Devices	UM-3-32
Figure 3-35	Defining Broadcast Network Optimization Attributes	UM-3-33
Figure 3-36	Circuit Deployment Wizard Ports Tab	UM-3-35
Figure 3-37	Circuit Deployment Wizard CCSD Tab	UM-3-36
Figure 3-38	Circuit Deployment Wizard Attributes Tab	UM-3-36
Figure 3-39	Answering Requirements Matrix Questions	UM-3-38
Figure 3-40	Creating a New Scenario	UM-3-39
Figure 3-41	Duplicating a Scenario	UM-3-39
Figure 3-42	Manage Scenarios dialog box	UM-3-40
Figure 3-43	Viewing IP QoS Configuration on Links	UM-3-44
Figure 3-44	Viewing a Terrain Profile	UM-3-45
Figure 3-45	Enabling LOS Connectivity and Range	UM-3-46
Figure 3-46	Displaying LOS Connectivity	UM-3-49
Figure 3-47	Displaying LOS Range	UM-3-50
Figure 3-48	Displaying Terrain Effects Shading	UM-3-51
Figure 4-1	Specifying IER Attributes	UM-4-1
Figure 4-2	Creating Threads	UM-4-3
Figure 4-3	Creating a Relationship	UM-4-4
Figure 4-4	Converting Applications into Flows	UM-4-5
Figure 4-5	Traffic Wizard	UM-4-6
Figure 5-1	Setting Evaluation Parameters	UM-5-1
Figure 5-2	Setting Advanced Evaluation Parameters	UM-5-2
Figure 5-3	Setting Optimization Parameters	UM-5-3
Figure 5-4	Setting Advanced Optimization Parameters	UM-5-4
Figure 5-5	Specifying Alternate Link Capacities	UM-5-5
Figure 5-6	Changing Web Report Settings	UM-5-6
Figure 5-7	Saving Optimization Settings	UM-5-7
Figure 5-8	Managing Optimization Results	UM-5-8
Figure 5-9	Comparing Parameters	UM-5-9



---

Figure 5-10	Comparing Bandwidths . . . . .	UM-5-9
Figure 5-11	Examining Top Solutions . . . . .	UM-5-10
Figure 6-1	Choosing Device Statistics . . . . .	UM-6-1
Figure 6-2	Choosing Advanced Device Statistics . . . . .	UM-6-2
Figure 6-3	Setting Simulation Parameters - Simple Mode . . . . .	UM-6-3
Figure 6-4	Setting Simulation Parameters - Reports . . . . .	UM-6-4
Figure 6-5	Setting Simulation Parameters - Detailed Mode . . . . .	UM-6-5
Figure 6-6	Summary of Results . . . . .	UM-6-5
Figure 6-7	Viewing the Simulation Log . . . . .	UM-6-6
Figure 7-1	Viewing MOPs . . . . .	UM-7-1
Figure 7-2	Sample Filtered Graphs . . . . .	UM-7-2
Figure 7-3	Example Graph Tool Tip . . . . .	UM-7-2
Figure 7-4	Zooming In on a Trace . . . . .	UM-7-2
Figure 7-5	Accessing Graph Panel Shortcut Menus . . . . .	UM-7-3
Figure 7-6	Selecting a Statistic of Interest . . . . .	UM-7-4
Figure 7-7	Finding Top Results . . . . .	UM-7-4

---

## List of Tables

---

Table 3-1	Planning Links vs. Connectivity Links . . . . .	UM-3-29
Table 3-2	Protocols Menu Items . . . . .	UM-3-41

## List of Procedures

---

Procedure 2-1	Launch JCSS	UM-2-1
Procedure 2-2	Create a User Profile	UM-2-2
Procedure 2-3	Select the User Level	UM-2-3
Procedure 2-4	Open a Workflow using the Task Assistant	UM-2-4
Procedure 2-5	Create a New Project	UM-2-6
Procedure 2-6	Set Scenario Classification	UM-2-12
Procedure 2-7	Answer Mission Analysis Questions for a Project	UM-2-14
Procedure 2-8	Set the Area of Interest	UM-2-15
Procedure 2-9	Add a Border Map	UM-2-16
Procedure 2-10	Add an Image Map	UM-2-17
Procedure 2-11	Add a MIF Map	UM-2-18
Procedure 2-12	Zoom to Rectangle	UM-2-18
Procedure 2-13	Zoom To Selection	UM-2-19
Procedure 2-14	Zoom To Window	UM-2-19
Procedure 2-15	Unzoom	UM-2-20
Procedure 2-16	Zoom To All	UM-2-20
Procedure 2-17	Selecting Settings for the Logical View of a Scenario	UM-2-22
Procedure 3-1	Add Units via the Library Treeview	UM-3-1
Procedure 3-2	Add Units via the Shortcut Menu	UM-3-2
Procedure 3-3	Edit Unit Attributes	UM-3-4
Procedure 3-4	Edit Attributes For Many Objects Using a Template	UM-3-6
Procedure 3-5	Define or Edit an Attribute Template	UM-3-8
Procedure 3-6	Create a Template OPFAC or Organization	UM-3-10
Procedure 3-7	Drill Down into a Unit	UM-3-11
Procedure 3-8	Add a Device to an OPFAC	UM-3-12
Procedure 3-9	Cut or Copy an Object	UM-3-14
Procedure 3-10	Paste an Object	UM-3-14
Procedure 3-11	Undo Editing Operations	UM-3-15
Procedure 3-12	Redo Editing Operations	UM-3-15
Procedure 3-13	Create a Device Model	UM-3-16
Procedure 3-14	Open a Node Model in Modeler	UM-3-17
Procedure 3-15	Link Devices via Object Palette	UM-3-19
Procedure 3-16	Deploy a Link	UM-3-20
Procedure 3-17	Deploy a Satellite Link	UM-3-22
Procedure 3-18	Verify a Link	UM-3-27
Procedure 3-19	Saving As Link Type	UM-3-27
Procedure 3-20	Add Planning Links via Object Palette	UM-3-28
Procedure 3-21	Add External Connectivity Links via Object Palette	UM-3-29
Procedure 3-22	Add Broadcast Networks via Object Palette	UM-3-30
Procedure 3-23	Deploy Broadcast Networks via the Topology Menu	UM-3-31
Procedure 3-24	Configure Promina Devices	UM-3-35
Procedure 3-25	Provide Requirements Matrix Information	UM-3-38
Procedure 3-26	Create a New Scenario	UM-3-39
Procedure 3-27	Duplicate a Scenario	UM-3-39
Procedure 3-28	Switch Between Scenarios	UM-3-40

---

Procedure 3-29	Manage Scenarios .....	UM-3-40
Procedure 3-30	Run a Routing Protocol Visualization .....	UM-3-43
Procedure 3-31	View a Terrain Profile .....	UM-3-45
Procedure 3-32	Enable LOS Connectivity and Range .....	UM-3-46
Procedure 3-33	Display LOS Connectivity .....	UM-3-49
Procedure 3-34	Display LOS Range .....	UM-3-50
Procedure 3-35	Display Terrain Effect Shading .....	UM-3-51
Procedure 4-1	Create an IER .....	UM-4-1
Procedure 4-2	Create a Thread .....	UM-4-2
Procedure 4-3	Create a Relationship .....	UM-4-4
Procedure 4-4	Convert Applications into Flows .....	UM-4-5
Procedure 4-5	Deploy Traffic using the Traffic Wizard .....	UM-4-6
Procedure 5-1	Perform a Network Evaluation .....	UM-5-1
Procedure 5-2	Perform a Network Capacity Optimization .....	UM-5-3
Procedure 5-3	Specify Alternate Link Capacities .....	UM-5-4
Procedure 5-4	Display Web Reports .....	UM-5-6
Procedure 5-5	Save Optimization Settings .....	UM-5-7
Procedure 5-6	Compare Optimization Results .....	UM-5-8
Procedure 5-7	Examine Top Solutions .....	UM-5-10
Procedure 6-1	Specify Statistics for Collection During Simulation .....	UM-6-1
Procedure 6-2	Specify Advanced Statistics for Collection During Simulation .....	UM-6-2
Procedure 6-3	Perform a Network Simulation .....	UM-6-3
Procedure 6-4	Display DES Simulation Log File .....	UM-6-6
Procedure 6-5	Generate Web Report .....	UM-6-7
Procedure 7-1	Display MOP Graphs .....	UM-7-1
Procedure 7-2	Change MOP Graph View Properties .....	UM-7-2
Procedure 7-3	Find Top Statistics .....	UM-7-3

---

# 1 Introduction

---

The *JCSS User's Manual* is a guide that covers basic aspects of JCSS operation and use. It contains figures that provide visual examples of the JCSS interfaces, step-by-step procedures, and other important JCSS features and concepts.

Organization of the chapter topics is based on a JCSS workflow for creating a communications plan. By following the chapter topics in sequence, users will be able to:

- Gain a high level-conceptual understanding of what the JCSS software is and what products it can deliver that are of use to military planners' goals.
- Acquire a set of rudimentary skills that enable military planners to create or modify JCSS scenarios, run simulations, and analyze the results.

---

**Note**—This manual contains frequent references to the *JCSS Technical Reference Manual*, which explains JCSS features, concepts, and methodologies in greater detail.

---

---

## JCSS Overview

Military planners are challenged by several problems when considering communications needs for theater operations. You need to be able to visualize and describe the networks for which you are responsible. Where are the main communications nodes for the military units? Where are the main communications pipes linking these units? What interoperable communications devices are the units employing? Given the general message load demands of an impending major military operation, you need to anticipate where bottlenecks are likely to develop in the communications network infrastructure. Faced with the certainty that during the conduct of an operation, time critical messages must flow rapidly from one military unit to another, you must be able to anticipate whether all will arrive on time in order not to jeopardize mission accomplishment.

JCSS is a tool that helps military planners to solve these kinds of problems. It does this by enabling you to construct a computer representation of the communications network infrastructure coordinated to a map, and to use the computer to simulate the operational dynamics of message (or *traffic*) flow through this structure depending upon the scheduled loads you choose to input.

JCSS is designed to be used in two phases:

- Phase 1 – Building network topology and setting traffic scenarios, and
- Phase 2 – Analyzing network performance using Capacity Planning for analytical analyses or/and using Simulation Domain for detailed analyses.

The framework for initiating a JCSS analysis is based on building a **scenario**. A scenario consists of one or more OPERational FACilities (OPFAC) and their associated communications equipment placed at specific geographic coordinates, a specific simulation start and end time, the operating parameters of the communications equipment, the movement (potentially dynamically determined) of these elements over time, and the associated communications traffic (e.g., Information Exchange Requirements or IERs). OPFACs are the basic building block of a JCSS scenario. OPFACs are user-defined groupings of communication equipment that can move together like the communications assets of a tank or a plane. OPFACs can be grouped into organizations, to provide military hierarchical relationships and context.

**Traffic**, or the conveyance of messages through the communications infrastructure, is utilized during simulation and optimization. You define the traffic flow for a given operational scenario, and the JCSS simulation runs it through the constructed communications infrastructure. You then examine the output for unacceptable delays of critical messages.

In order to assist you with the sequence of tasks along the way to achieving your goals with the JCSS tool, three workflows are presented below, and as wizards on the computer screen. These workflows are ordered by increasing complexity and precision, depending upon the time available for the work: first (1) the short term, high level **Crisis Action Planner**, which composes a network of nodes and links and loads it with traffic; then (2) the **Operational Planner**, which specifies actual communications devices located in OPFACs and is used in support of an OPLAN (Operations Plan); and finally (3) the **Analyst**, which specifies detailed IERs and makes use of detailed Measures of Performance (MOPs), such as Speed of Service, from the simulation results.

---

## Sample Workflows

### Crisis Action Planner's Workflow

Sample workflows are provided via the JCSS Task Assistant. The Crisis Action Planner's workflow, shown below, helps a Crisis Action Planner to develop, evaluate, and optimize a network to produce a communications plan. This workflow provides new or novice users with a checklist of sequenced tasks needed to perform this task following specific JCSS procedures.

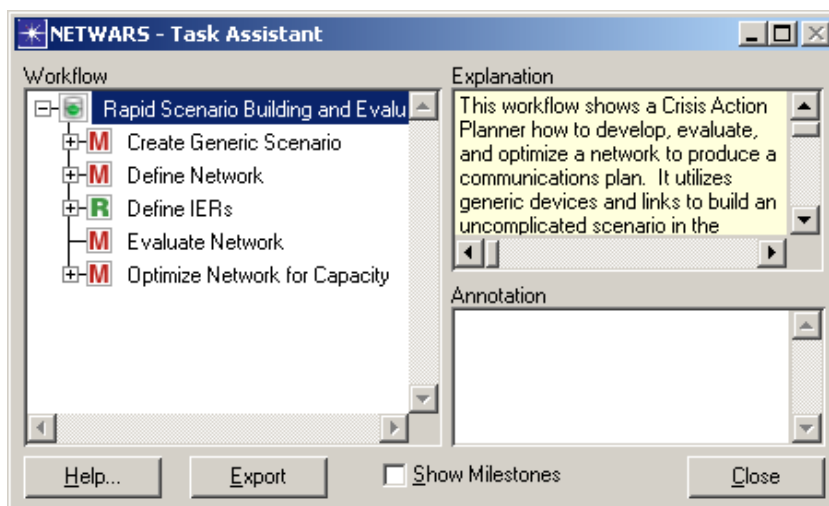


Figure 1-1 Crisis Action Planner's Workflow

### Operational Planner's Workflow

Sample workflows are provided via the JCSS Task Assistant. The Operational Planner's workflow, shown below, helps an Operational Planner to develop a communications plan in a semi-collaborative Joint Planner Environment. This workflow provides new or novice users with a checklist of sequenced tasks needed to perform this task following specific JCSS procedures.

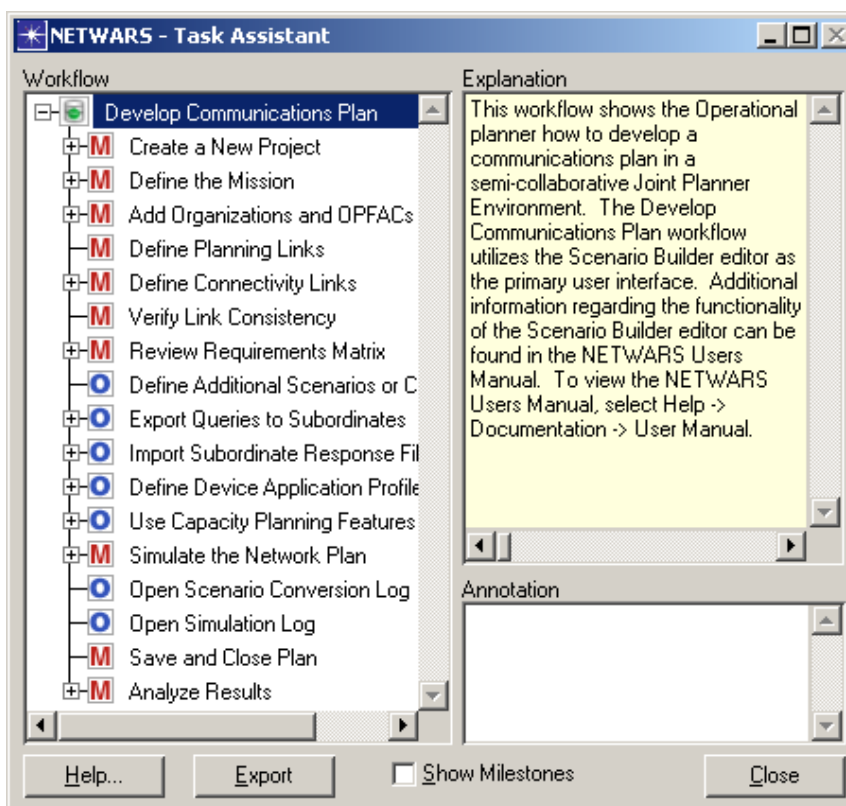


Figure 1-2 Operational Planner's Workflow

## Analyst's Workflow

Sample workflows are provided via the JCSS Task Assistant. The Analyst's workflow, shown below, helps an Analyst to develop and analyze a communications network. This workflow provides new or novice users with a checklist of sequenced tasks needed to perform this task following specific JCSS procedures.

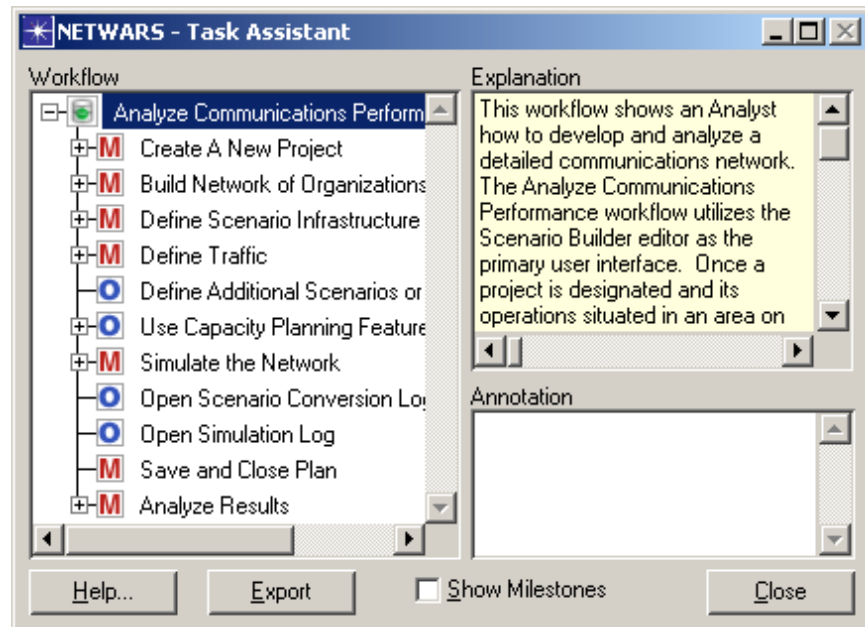


Figure 1-3 Analyst's Workflow

## JCSS Interfaces

The capabilities of the JCSS software are organized into multiple editors: System Editor, Scenario Builder, Icon Database, (Optional) ACE and ACE Whiteboard, (Optional) Server Characterization, and (Optional) Mainframe Characterization. A description of each editor is provided below.

### System Editor

The System Editor acts as an entry point to the remaining editors. It allows you to access user and profile information as well as the task assistant interface.

### Scenario Builder

The Scenario Builder allows you to build template OPFACs and organizations, define infrastructure and Information Exchange Requirements (IERs) between OPFACs and organizations, specify movement and geographical context for OPFACs and organizations, and run discrete-event simulations for their developed scenarios. You can open and work with multiple projects simultaneously, and easily cut, copy and paste supported objects (Organizations, OPFACs, devices, links, etc.) between them.



Additionally, the Scenario Builder provides you with the option of deploying a communications infrastructure using a top-down approach. More specifically, the Lead Planner sets up the planning view and sends the initial scenario to the Subordinate Planners. The Subordinate Planners modify their portion of the initial plan and then send it back to the Lead Planner who integrates them into a complete plan.

The Scenario Builder allows you to optimize link and broadcast network capacities as well as traffic load. The optimization of the link and broadcast network capacities is implemented by changing the size of links and broadcast networks while the optimization of the traffic load is implemented by changing the load caused by the IERs.

This editor also allows you to view results of the simulation. After the simulation is complete, the Simulation Domain creates text files that capture the results of the simulation. JCSS reads these files and displays the results graphically as Measures of Performance (MOPs). The MOPs focus on the ability of selected communication equipment to send and receive information (e.g., file transfers, situation awareness updates, e-mail messages, etc.)

## **Icon Database**

The Icon Database allows you to create new icons for OPFACs and organizations displayed within the Scenario Builder.

## **(Optional) ACE and ACE Whiteboard**

The Application Characterization Environment (ACE) and the ACE Whiteboard, which require a separate license, allow you to perform network performance analysis and troubleshooting. Use ACE to analyze traces obtained from a live network. However, if you want to simulate the behavior of an application that does not exist yet, use the ACE Whiteboard to create a model of the application and then run analyses on it. To learn more about ACE and the ACE Whiteboard, refer to the *ACE User's Guide*.

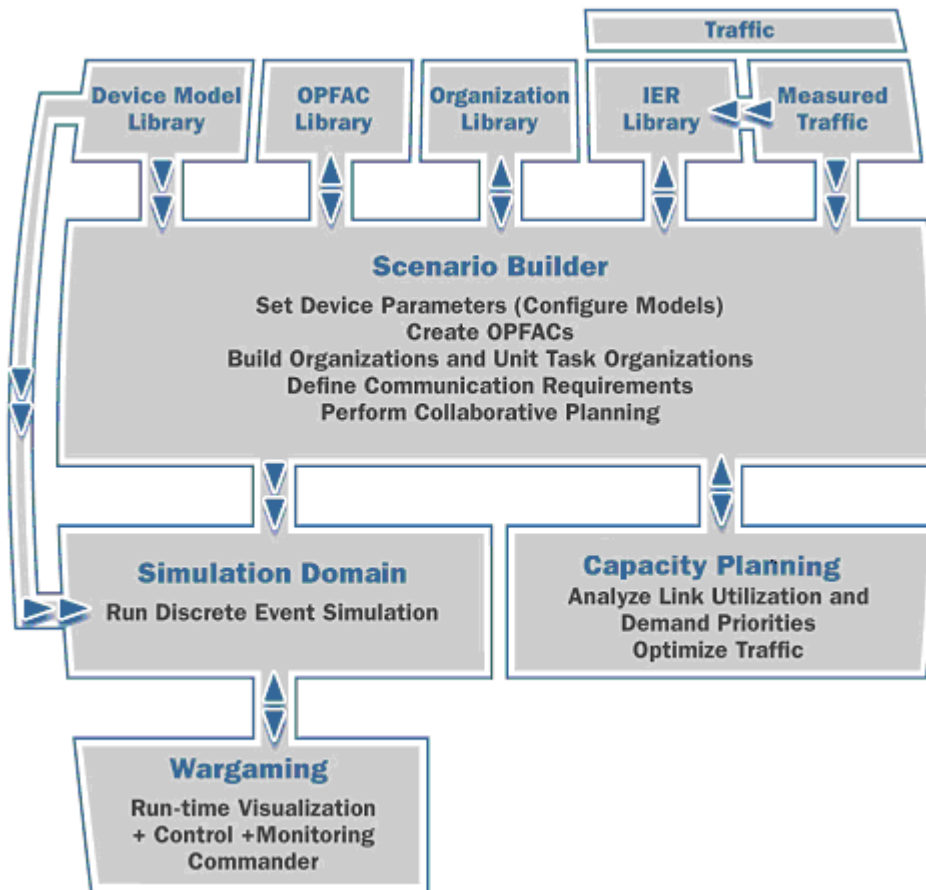
## **(Optional) Server Characterization**

The Server Characterization Editor (SCE) is an optional module that allows you to import server performance information for analysis of the processes and applications, and characterization into workloads used as the basis for simulation modeling. To learn more about the SCE, refer to the IT Guru documentation suite.

## **(Optional) Mainframe Characterization**

The Mainframe Characterization Editor (MCE) is an optional module that allows you to import measured performance data, and analyze it to create workloads suitable for the mainframe models. To learn more about the MCE, refer to the MCE tutorials.

## System Architecture



**Figure 1-4 JCSS System Architecture**

JCSS is launched via the System Editor, which is considered a supporting interface.

In JCSS, organizations and OPFACS are built and modified inside the Scenario Builder, the primary interface.

The Simulation Domain allows the Scenario Builder to provide its output to a COTS Simulation Engine (e.g., OPNET Modeler) in a file structure expected by the Simulation Engine.

After a simulation is run, the results are viewed in the form of graphs called Measures of Performance (MOPs). Scenarios can also be further analyzed and then optimized for network performance.

Graphical presentations of JCSS objects, such as device models and military units, can assume various forms via the Icon Database. This editor is a supporting interface.

## 2 Getting Started

### Launching JCSS

Launch JCSS to access the desktop software application.

#### Procedure 2-1 Launch JCSS

- 1 Select **Start > Programs > NETWARS > NETWARS v2007**. The System Editor and the Sign In dialog box automatically display.



Figure 2-1 System Editor



Figure 2-2 Sign In dialog box

End of Procedure 2-1

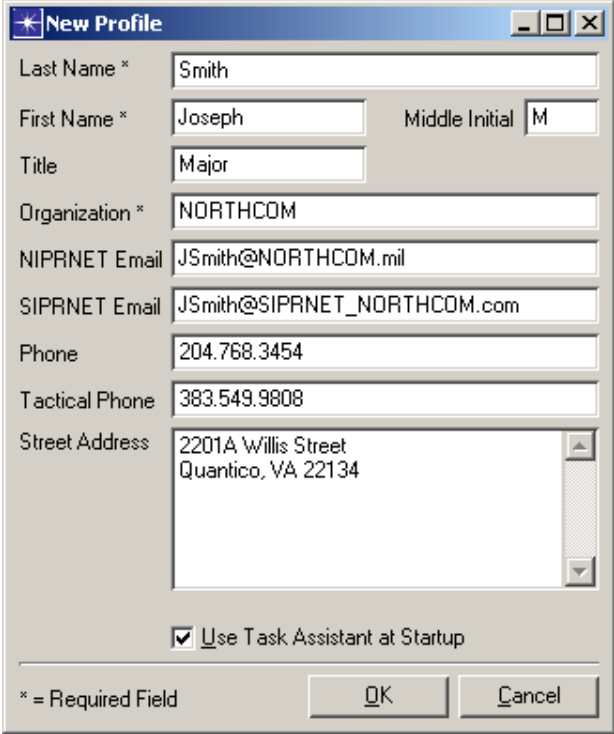
## Signing In and Creating a New User Profile

Create a new user profile, which will allow you to sign into JCSS under your own account. Note that only one user at a time can be signed in.

---

### Procedure 2-2 Create a User Profile

- 1 Click the **New** button on the Sign In dialog box to create a new user profile. The New Profile window displays.



The screenshot shows a 'New Profile' dialog box with the following fields and values:

Field	Value
Last Name *	Smith
First Name *	Joseph
Middle Initial	M
Title	Major
Organization *	NORTHCOM
NIPRNET Email	JSmith@NORTHCOM.mil
SIPRNET Email	JSmith@SIPRNET_NORTHCOM.com
Phone	204.768.3454
Tactical Phone	383.549.9808
Street Address	2201A Willis Street Quantico, VA 22134

At the bottom of the dialog box, there is a checked checkbox labeled 'Use Task Assistant at Startup', a legend '\* = Required Field', and 'OK' and 'Cancel' buttons.

**Figure 2-3 Adding a New User Profile**

- 2 Enter required information and any optional information. Click **OK**.
- 3 The Sign In dialog box displays again with the new user name in the Profile field. Click **Sign In** to sign in.

(Returning users can select their previously created profile name from the Profile drop-down menu and then click **Sign In**).



**Figure 2-4** Signing In

**End of Procedure 2-2**

---

## Selecting the User Level

Switch between JCSS interfaces (simple to complex) by selecting one of the available User Level options. JCSS menus change to reflect the selected User Level. Higher User Levels display more menu items and menu headers. You can switch between User Levels at any time, so that all menu items can be available if you so choose. Switching the User Level affects all open editors.

---

### Procedure 2-3 Select the User Level

- 1 From the System Editor, select **Edit > User Level > Beginner** to access a simplified JCSS interface. The Beginner interface hides access to many of the functionalities of the system without removing the capabilities themselves. This results in an interface that is reduced in complexity, and is easier to navigate for beginner JCSS users.
- 2 Select **Edit > User Level > Intermediate** if you want to access a JCSS interface that exposes more functionalities of the system than the Beginner level, but less than the Advanced level. This results in an interface that is reduced in complexity, and is easier to navigate for intermediate users.
- 3 Select **Edit > User Level > Advanced** if you want to access the full-featured JCSS interface. The Advanced interface exposes all of the functionalities of the system. This results in an interface that is more complex, and best utilized by more experienced JCSS users.

**End of Procedure 2-3**

---

## Using the Task Assistant

The Task Assistant is a tool that guides you through the steps necessary to plan, analyze, and simulate a communications data/voice network. It presents workflows that provide new or novice users with a checklist of sequenced tasks needed to perform certain JCSS procedures.

The Task Assistant workflows are located in a unique window that can be moved or minimized on the screen. The checklist of tasks displays in the Workflow pane on the left side of the Task Assistant; a corresponding detailed explanation displays in the Explanation pane on the right along with a pane for entering user annotations. The contents of the Explanation pane provide step-by-step instructions for completing the associated task.

Not all of the tasks in the workflow are required; milestone tasks are marked with a red “M” and can be optional or required; required tasks are marked on the left with a green “R”, and optional tasks are marked with a blue “O”. After you complete a task, double-click it to check it off. More help is available through the [Help](#) button on the bottom left of the Task Assistant workflow window.

Some tasks, marked with a plus (+) sign to the left, are made up of multiple sub-tasks. Clicking on the plus sign expands the task to show all of the sub-tasks in that task.

---

### Procedure 2-4 Open a Workflow using the Task Assistant

#### Open Task Assistant

- 1 From the System Editor, select [Help > Task Assistant](#) to launch the Task Assistant. Keep in mind that from the Scenario Builder you can click the [Open Task Assistant](#) button.
- 2 To configure the Task Assistant to automatically display at startup, check the [Show At Startup](#) checkbox at the bottom of the Task Assistant.

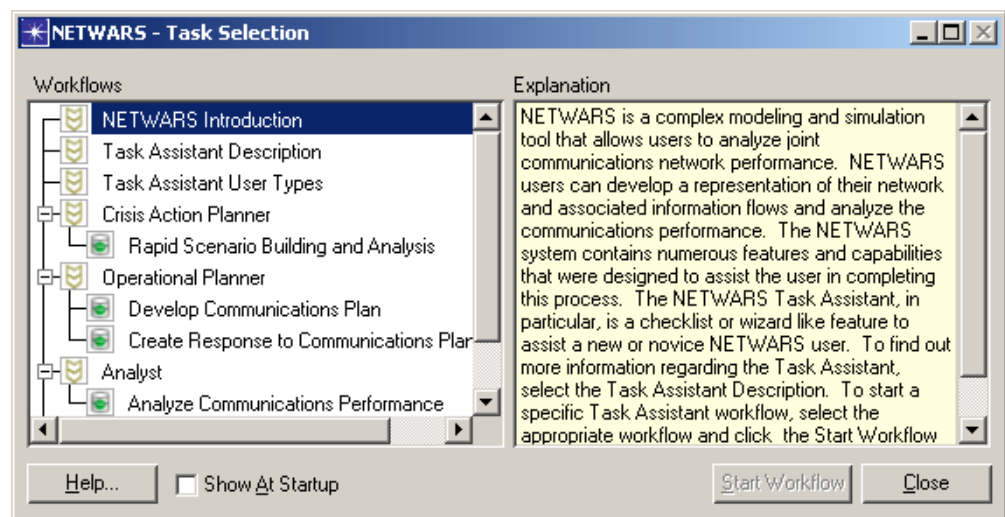


Figure 2-5 Checking the Show At Startup Checkbox

- 3 Select the **Develop Communications Plan** workflow from the Workflows pane. A description of this workflow displays in the Explanation pane.
- 4 Click the **Open Workflow** button (double-clicking on **Develop Communications Plan** also initiates the workflow). This launches the Scenario Builder and the selected workflow in the Task Assistant.
- 5 Follow the sequential tasks in the Workflows pane until completion.

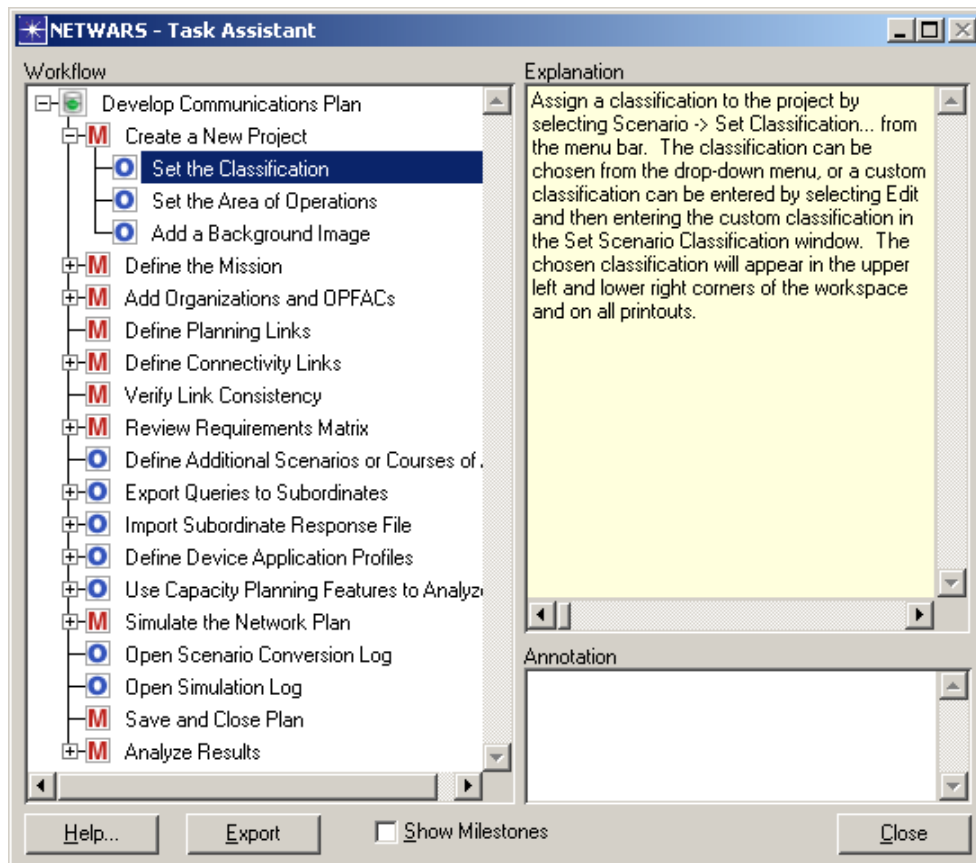


Figure 2-6 Following Sequential Tasks in the Workflows Panel

End of Procedure 2-4

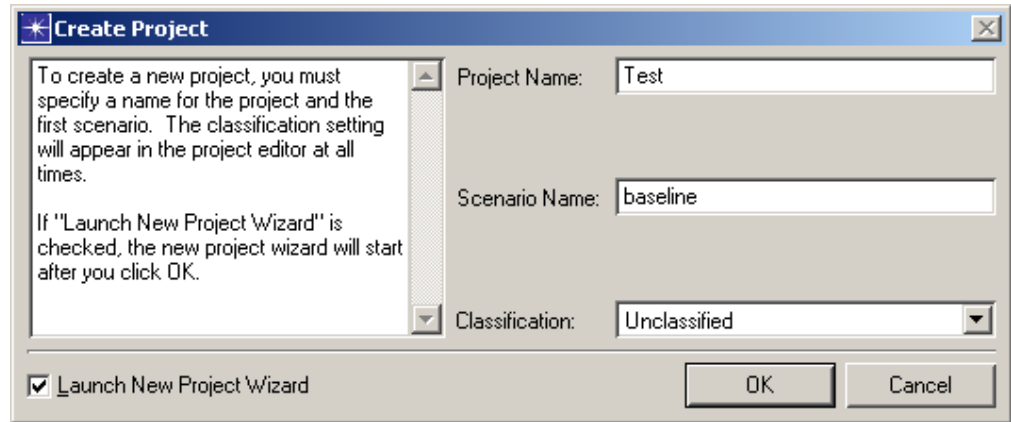
## Creating a New Project

The first step in the planning process is to create a new project in the Scenario Builder. Projects are files that contain scenarios (time phases or courses of action). A scenario or groupings of related scenarios can be saved under one project.

You can simply name and launch a generic project, or use the New Project Wizard to select and set the area of operation, top-level units (including their locations and templates), an equipment list for each organization, an owner for each unit, and the types of equipment to use in the new project.

**Procedure 2-5 Create a New Project****Create a New Project**

- 1 From the System Editor, select **File > New Project** to open the Create Project dialog box, or click the **Create a New Project** button.

**Figure 2-7 Creating a new project**

- 2 Specify the names for the project and the initial scenario in the Create Project dialog box.  
**Note**—The names for both the project and the scenario cannot contain any spaces or special characters. In addition, the scenario name cannot be the same as any existing OPFAC; it must be unique.
- 3 Select a classification level for the project in the Create Project dialog box.
- 4 Click **OK**. If **Launch New Project Wizard** is not checked, then JCSS creates a generic project using the names you have designated. If **Launch New Project Wizard** is checked, then JCSS displays a sequence of dialog boxes that enable you to make selections specific to your new project.
- 5 If you selected to launch the New Project Wizard, perform the following steps to make selections specific to your new project:



5.1 Set the geographical context for your project in the New Project Wizard: Set Area of Operations dialog box.

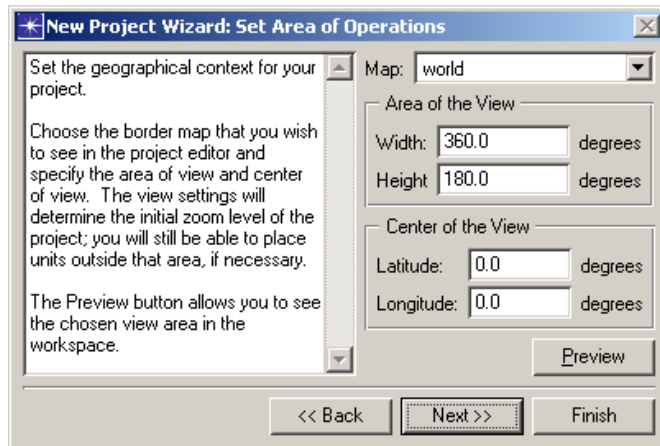


Figure 2-8 New Project Wizard: Set Area of Operations dialog box

- Choose the border map that you want to see in the Project Editor from the **Map** drop-down list, and specify the area of view and center of view. The view settings determine the initial zoom level of the project. You will still be able to place units outside that area if needed.
- Click **Preview** to display the chosen view area in the workspace.
- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

5.2 Specify top level units in the New Project Wizard: Specify Top-Level Units dialog box.



Figure 2-9 New Project Wizard: Specify Top-Level Units dialog box

- Choose a project template from the Project Template drop-down list with which to fill in the units table, or select the number of units from the **Number of Top Level Units** field drop-down list.

- For each top-level unit in the table, type the name of the unit in the Name column, and select whether the unit is an organization or an OPFAC in the Type column.
- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

### 5.3 Specify top level units in the New Project Wizard: Unit Locations and Templates dialog box.

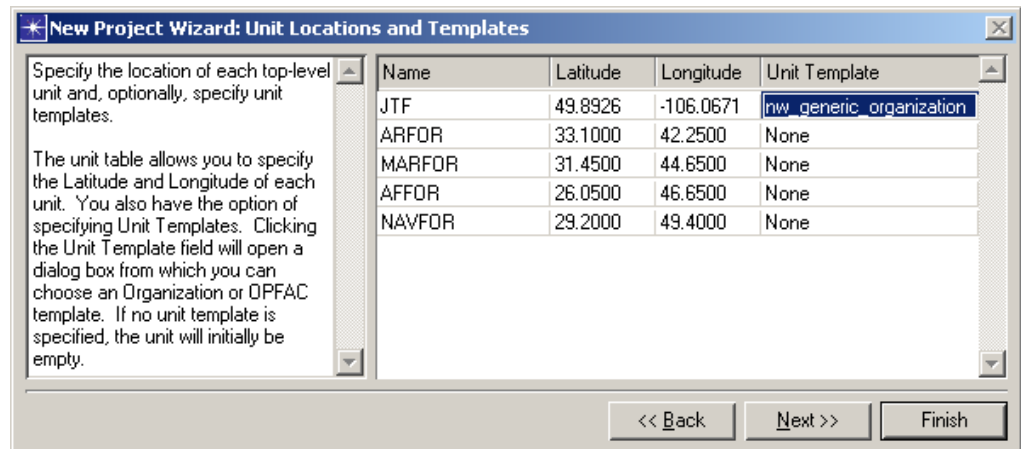


Figure 2-10 New Project Wizard: Unit Locations and Templates dialog box

- Specify the location of each top-level unit in the units table by specifying the Latitude and Longitude of each unit.
- If you want, you can specify a unit template for each unit (organization or OPFAC template) by clicking in the Unit Template column and launching the Choose Unit Template dialog box.

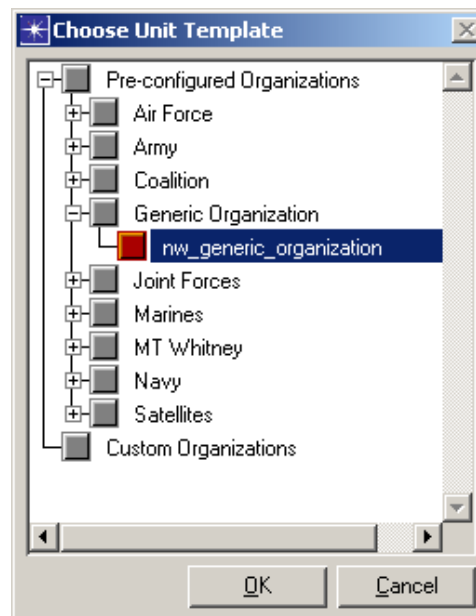
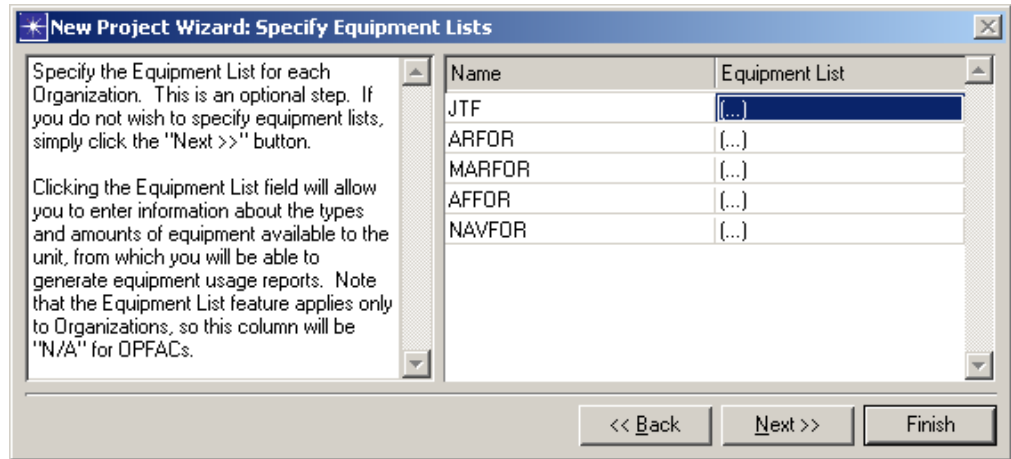


Figure 2-11 Choose Unit Template dialog box

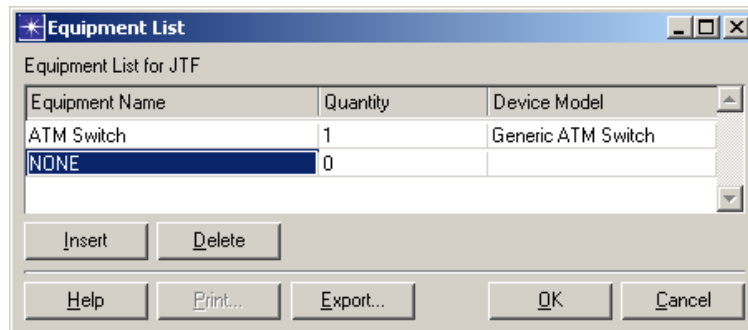
- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

**5.4 (Optional) Specify the equipment list for each organization in the New Project Wizard: Specify Equipment Lists dialog box.**



**Figure 2-12 New Project Wizard: Specify Equipment Lists dialog box**

- Click in the Equipment List column for each unit to launch the Equipment List dialog box and create an equipment list.



**Figure 2-13 Equipment List dialog box**

The table has three columns: Equipment Name, Quantity, and Device Model. The Equipment Name can be typed in by clicking on the cell. This name must be unique within this organization's equipment list. When the Quantity cell is clicked, a separate Quantities dialog box displays from which the quantity can be edited. Clicking the Device Model cell displays a popup list of all available device models. When a device model is chosen, the model name is automatically placed in the Equipment Name field if that field is currently empty.

Click **Insert** and/or **Delete** to add a new row after the currently selected row or delete the currently selected row, respectively.

Click **Export** to export the information in this table to a comma-separated file and open the file in Excel. Click **Print** to send the data directly to the printer.

Click **OK** to save the changes that have been made. If the organization is a template organization, this new information is immediately saved to disk.

- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

### 5.5 (Optional) Specify the owner for each unit in the New Project Wizard: Specify Owners dialog box.

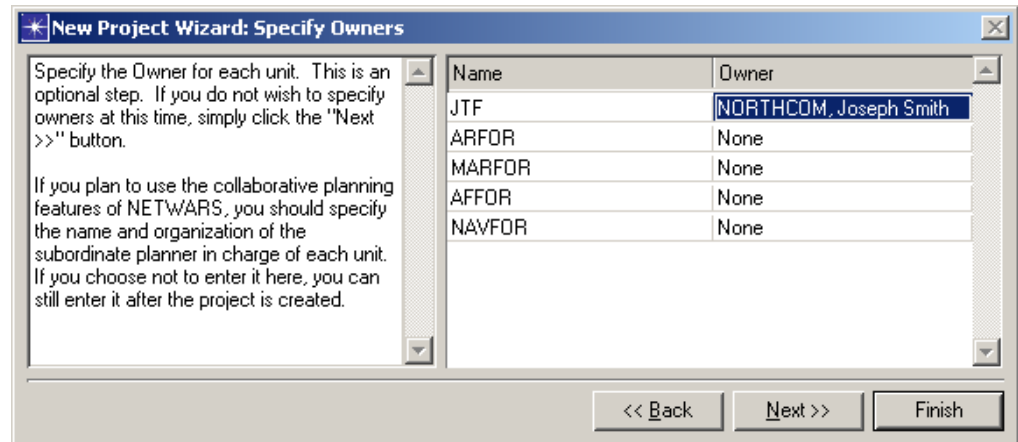


Figure 2-14 New Project Wizard: Specify Owners dialog box

- Click in the Owner column for each unit to launch the Set Owner dialog box and specify an owner.

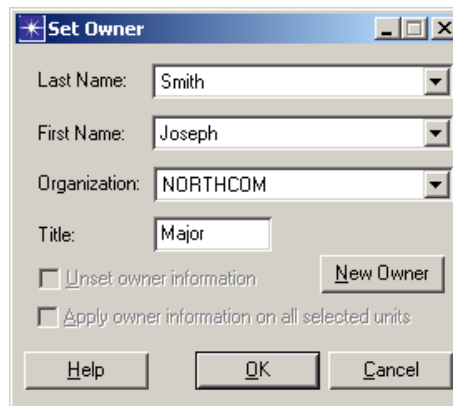


Figure 2-15 Set Owner dialog box

Owner information contains a list of attributes: Last Name, First Name, Organization and Title. Title is the only optional field. If the desired owner is not listed in the popup menu, click **New Owner** to add owner information.

To unset the owner information, enable the **Unset owner information** checkbox.

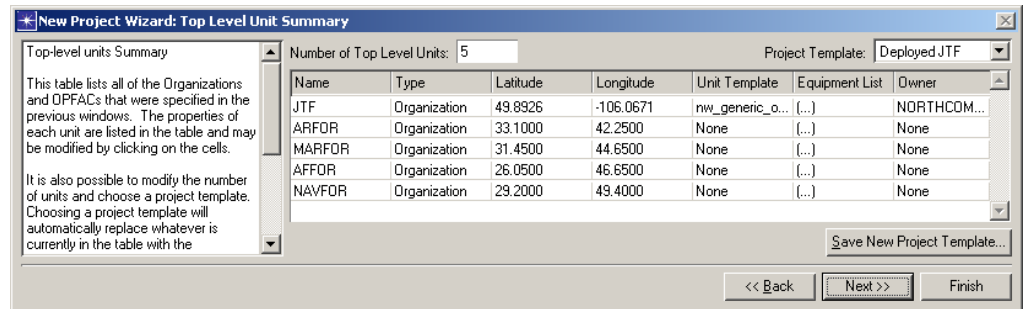
If there are multiple units selected, enabling the **Apply owner information to selected units** will apply changes to all selected units.

Once the owner is set, the unit is marked. If the unit is an organization, all its children are also set with the same owner. Subordinate planners are able to edit units if the organization name in the owner information is the same as the subordinate planners' organization.

This dialog box could be disabled due to one of the following reasons:

- \* The owner information was set from the parent. Perform an unset on the parent before you can set the owner on the current unit.
- \* A subordinate query file had already been exported on the current unit.
- \* At least one of the current organization's children has already exported a subordinate query.
- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

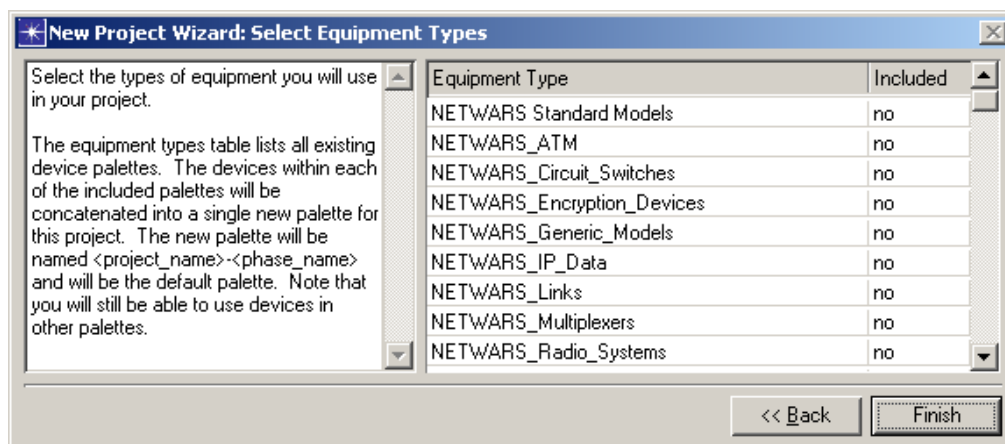
**5.6 Review top level units in the New Project Wizard: Top Level Unit Summary dialog box.**



**Figure 2-16 New Project Wizard: Top Level Unit Summary dialog box**

- This table lists all of the organizations and OPFACs that were specified in the previous dialog boxes. The properties of each unit are listed in the table and may be modified by clicking on the cells.
- You can also modify the number of units and choose a project template. Choosing a project template automatically replaces what is currently in the table with the information in the template.
- After reviewing all the information in the unit table, you can save it as a new project template by clicking **Save New Project Template...** and specifying a name for the template in the Specify Project Template Name dialog box. You should do this if you often create projects with the same or similar top-level units.
- Click **Next** to continue to the next setting, or **Finish** to create the new project using the settings you have chosen, along with other setting defaults.

### 5.7 Select the types of equipment you will use in your project in the New Project Wizard: Select Equipment Types dialog box.



**Figure 2-17 New Project Wizard: Select Equipment Types dialog box**

- This table lists all existing device palettes. The devices within each of the included palettes will be concatenated into a single new palette for this project. The new palette will be named `<project_name>-<phase_name>` and will be the default palette. Note that you will still be able to use devices in other palettes.
- Click **Finish** to create the new project using the settings you have chosen. Scenario Builder displays your new project in the workspace, and displays the project name and active scenario name in the title bar.

#### End of Procedure 2-5

---

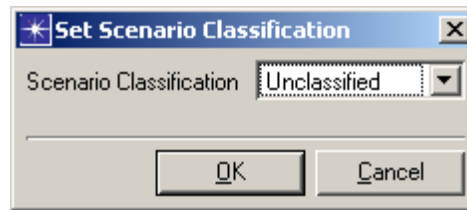
## Setting Scenario Classification

Now that the project is created, you can specify initial scenario information such as the scenario classification. This information applies to the entire scenario. Providing initial scenario information is optional in JCSS; if the information is not provided, default values will be used. The default scenario classification is **Unclassified**.

#### Procedure 2-6 Set Scenario Classification

- 1 Select **Scenarios > Set Classification** to open the Set Scenario Classification dialog box.
- 2 Select the desired classification from the Scenario Classification drop-down menu.

- 3 Click **OK**. The scenario classification displays in the upper-left and lower-right corners of the Scenario Builder.



**Figure 2-18** Setting the Scenario Classification

**End of Procedure 2-6**

---

## Answering Mission Analysis Questions

Every project has a default set of mission analysis questions that is automatically included when the project is created. The questions are grouped into five sections that correspond to a 5-paragraph operations order:

- Situation,
- Mission,
- Execution,
- Admin & Logistics, and
- Command & Control.

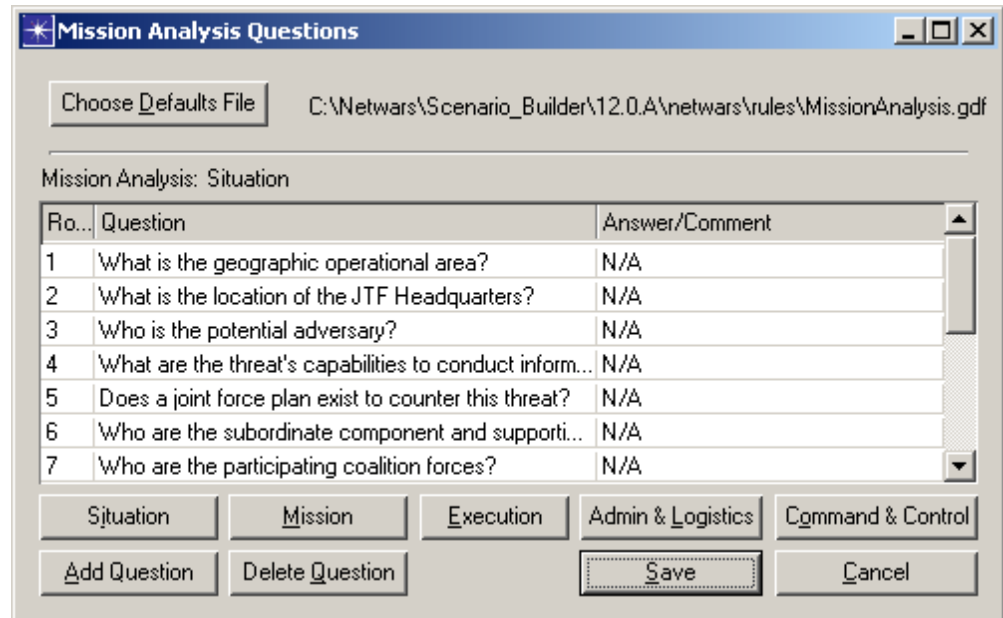
The questions are filled in by the Lead Planner and used by Subordinate Planners when entering requirements.

If you want to modify the mission analysis questions inherited by a specific scenario, you can do so via **Scenarios > Reports > Mission Analysis**. Changes made here affect only the selected scenario; they do not affect your project defaults.

If you want to modify the default mission analysis questions to be used for any newly created projects, you can do that via **Edit > Project Defaults > Mission Analysis**. Any newly created projects/scenarios will inherit these questions. Existing ones will remain unchanged.

### Procedure 2-7 Answer Mission Analysis Questions for a Project

- 1 Select **Edit > Project Defaults > Mission Analysis**. The Mission Analysis Questions dialog box displays.



**Figure 2-19 Answering Mission Analysis Questions (5 Sections)**

When the Mission Analysis Questions dialog box is launched, questions under the Situation section are displayed. The planner can view questions in the other sections by clicking on the appropriate button below the table. The label on top of the table represents the current section.

- 2 Click in either the **Question** or **Answer/Comment** cell to enter the desired text. Click the **OK** button to populate the question/answer back into the table.
- 3 Add or delete questions, as needed, using the **Add Question** or **Delete Question** buttons.
- 4 The content of the Mission Analysis Questions table can be exported to an Excel file or to an HTML file by clicking the **Export to File** or **Export to HTML** buttons, respectively. Specify the target location on disk to store the exported file.
- 5 Print the contents of the Mission Analysis Questions table to the default printer by clicking **Print**. The printout contains all mission analysis questions and answers including the last edited by information divided by each section.
- 6 In addition to manually typing in Mission Analysis Questions for each project, you may also import additional Mission Analysis Questions into the Mission Analysis Questions table. Import this information by clicking **Import**. A file chooser dialog box launches; select a desired text file and click **Open**.

**Note**—The text file must be tab-delimited and must follow the same format as the Mission Analysis defaults file, i.e., `MissionAnalysis.gdf`.



Once you have selected the file from which the additional Mission Analysis Questions are to be loaded, the table will be updated to display this newly appended information. Duplicate Mission Analysis Questions will not be appended to the dialog box.

- 7 Click **OK** to save the data in the Mission Analysis Questions table. Saving the changes will modify the `MissionAnalysis.gdf` file located in the Rules directory. To change the default file, click the **Choose Defaults File** button. Selecting this button launches a file chooser dialog box. Select the desired default file; the contents of the alternate file import into the Mission Analysis Defaults dialog box.

**Note**—The **Choose Defaults File** button is not available when the Mission Analysis Questions dialog box is launched from **Scenarios > Reports > Mission Analysis** to make changes to a selected scenario.

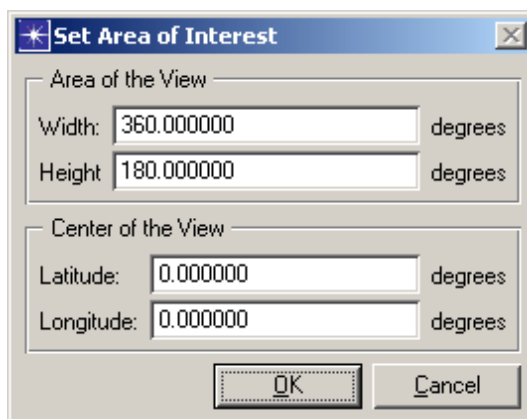
**End of Procedure 2-7**

## Setting the Area of Interest

The area of interest gives geographical context to the scenario.

**Procedure 2-8 Set the Area of Interest**

- 1 Select **View > Set Area of Interest** from the Scenario Builder. The Set Area of Interest dialog box displays.



**Figure 2-20 Setting the Area of Operations**

The geographic focus can be specified by entering values for the **Area of the View** and the **Center of the View**. These attributes determine the location and size of the displayed view of the map. For example, if the center of view is (0,0) and the area of view is (width = 100, height = 50), then the portion of the map that would be displayed will be from (50W, 25N) to (50E, 25S).

The geographic focus also determines the relative range at which OPFACs (and their devices) are located from each other. This is of significance when exchanging IERs/traffic during a simulation. While TSC-85 radios and wire links have no range limitations, TRC-170 radios and tactical broadcast networks only work within a limited range of each other. For example, if two TRC-170 radios are more than 150 miles apart, then all packets transmitted between them will be dropped, resulting in failed IERs.

- 2 Select desired options for displaying grid.
- 3 Click **OK**. The settings reflect in the Scenario Builder.

---

**End of Procedure 2-8**

---

## Adding Background Images

You can provide further geographical context to a scenario through the use of various maps and images.

JCSS recognizes several different types of maps, including: border maps, image maps, MapInfo (MIF) maps, CADRG/CIB Raster Catalog Directories, and MrSID images.

### Border Maps

Border maps use stylized lines to define political and geographical areas. JCSS comes with a library of border maps that represent a geographic area described by latitude and longitude.

### Image Maps

Image maps are TIFF or GEOTIFF files that provide additional geographical information on a border map, such as a satellite or aerial image.

### MIF Maps

MIF maps are files that provide additional geographical information on a border map, such as roadways, waterways, regions, and counties. Several MIF maps come standard with JCSS.

---

**Procedure 2-9 Add a Border Map**

- 1 Select **View > Background > Set Border Map** from the Scenario Builder. The Choose Border Map dialog box displays.

- 2 Choose a border map from the drop-down menu. Note that the border map list is a finite list and may not be modified.



**Figure 2-21 Selecting a Border Map**

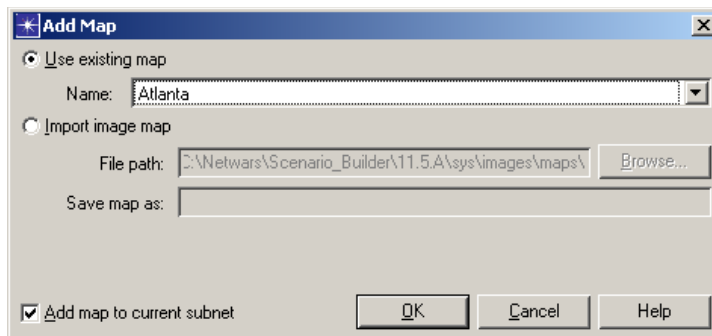
- 3 If the desired map is not in the list, select the world map and zoom in to the desired location.

**End of Procedure 2-9**

---

**Procedure 2-10 Add an Image Map**

- 1 Select **View > Background > Add Image Map** from the Scenario Builder to open the Add Map dialog box.



**Figure 2-22 Add Map dialog box**

- 2 Choose an option of importing an existing map or specifying the file path to an image map located on the hard drive; select desired map.
- 3 Click **OK**.

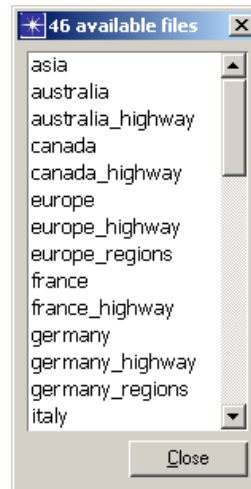
**End of Procedure 2-10**

---

---

**Procedure 2-11 Add a MIF Map**

- 1 To import a MIF map, select **View > Background > Add MIF Map** from the Scenario Builder to open the MIF menu.



**Figure 2-23 MIF Menu**

- 2 Select the desired MIF map from the menu.
- 3 Click **Close**. The MIF map automatically imports.

**Note**—When image maps are imported, the maps can be deleted, resized, or dragged and dropped to a different location while in Map Edit mode. To enter/exit Map Edit mode, select **View > Background > Map Edit Mode**.

**End of Procedure 2-11**

---

---

## Zooming/Unzooming

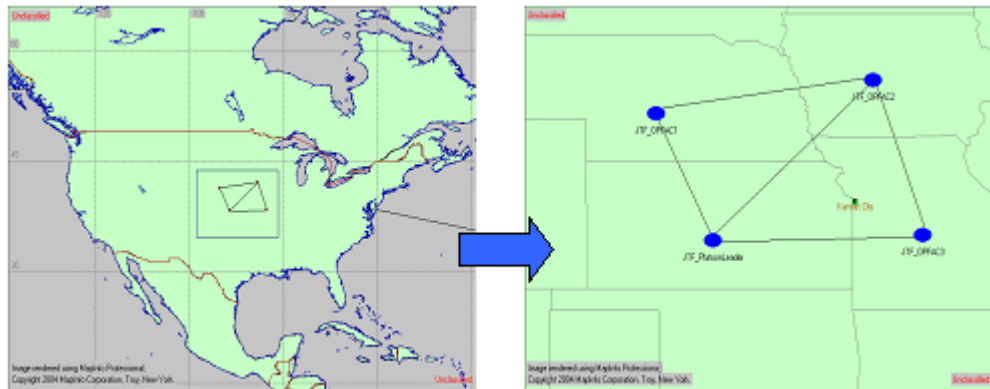
Get a close-up view of a JCSS object or area in the workspace or restore the workspace view to the previous zoom level.

---

**Procedure 2-12 Zoom to Rectangle**

- 1 To get a close-up view of the object in question in the workspace, first select **View > Zoom > To Rectangle**, or press **<Ctrl>+<I>**, or use the **Zoom In** option from the shortcut menu, or click the **Zoom In** toolbar button.

- 2 Next, drag the cursor to define a rectangular shaped region to be magnified; the defined area magnifies in the workspace.



**Figure 2-24 Zooming In**

Apply this option multiple times to obtain an ever-closer view.

**End of Procedure 2-12**

---

**Procedure 2-13 Zoom To Selection**

- 1 First, drag the cursor to define a rectangular shaped region to be magnified.
- 2 Next, select **View > Zoom > To Selection**, or press **<Ctrl>+<Shift>+<Z>**. The defined area magnifies in the workspace.

**End of Procedure 2-13**

---

**Procedure 2-14 Zoom To Window**

- 1 Select **View > Zoom > To Window**. The entire area magnifies in the workspace so it shows completely in the window.

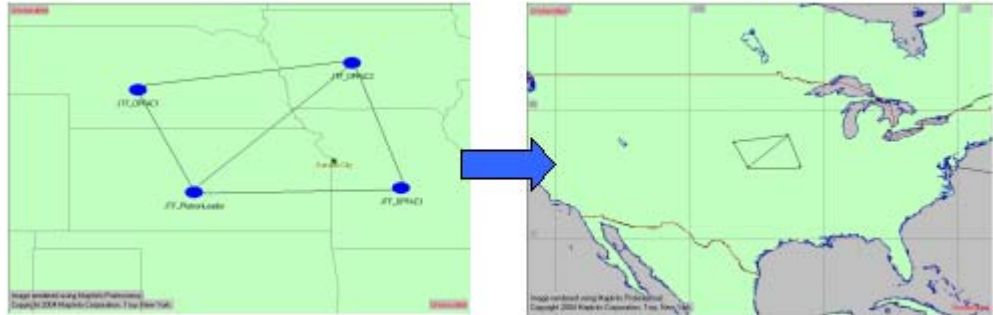
**End of Procedure 2-14**

---

---

**Procedure 2-15 Unzoom****Zoom Out**

- 1 To restore the workspace view to the previous zoom level, select **View > Zoom > Unzoom**, or press **<Ctrl>+<U>**, or use the **Zoom Out** option from the shortcut menu, or click the **Zoom Out** toolbar button

**Figure 2-25 Zooming Out****End of Procedure 2-15**

---

---

**Procedure 2-16 Zoom To All**

- 1 Select **View > Zoom > To All**, or press **<Ctrl>+<Alt>+<Z>**. The active areas in the workspace are magnified so they show in the window.

**End of Procedure 2-16**

---

## Viewing Scenarios

JCSS offers a number of different views of a scenario, accessible by selecting a view option from **View > Network Views > (option)**:

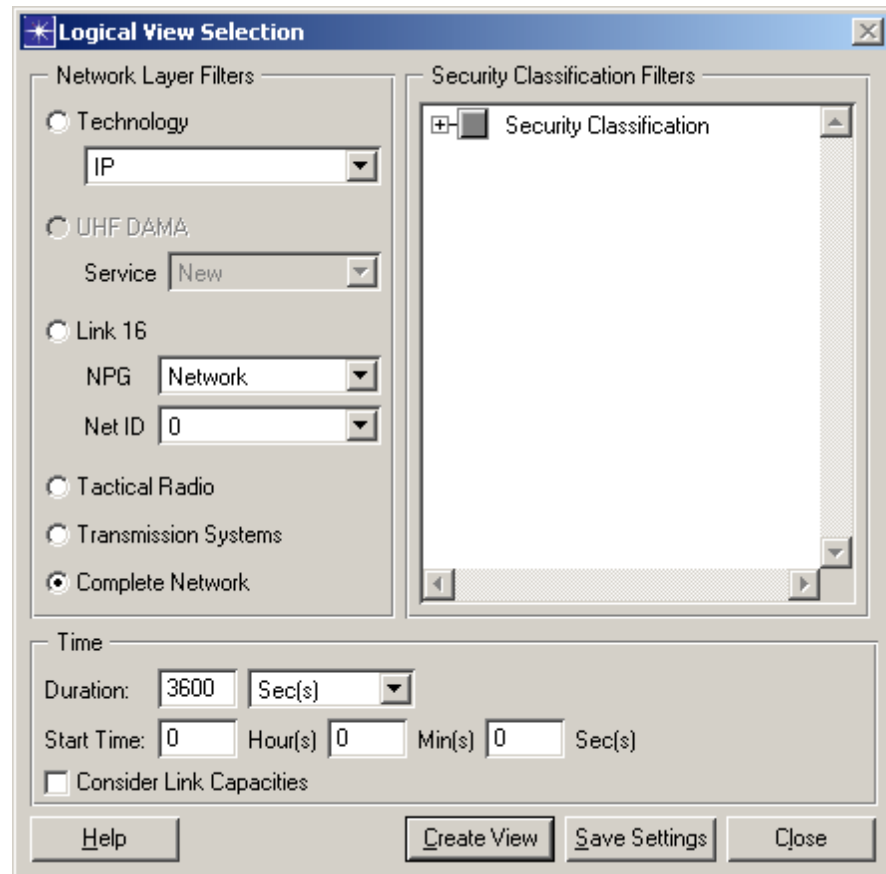
- **Planning** – This view is useful for someone working in a collaborative planning environment. Using this view, the planner can display only the planning portions of the scenario and hide all others. Organizations, OPFACs and planning links are all part of the planning view. Devices and connectivity links are hidden in this view.
- **Connectivity** – If a planner is not interested in the planning links and just wants to view the connectivity links in the network, he or she can choose this view option. Planning links and OPFACs without any devices are hidden in this view.
- **Planning and Connectivity** – The planner can use this view option to return to the default view, which includes the planning and connectivity elements in the scenario.
- **Operational** – Selecting this view option switches from a Systems or Logical View back to the default view of the scenario, the same view that loads when you first open the scenario in Scenario Builder.
- **OPFAC Systems** – Selecting this view option switches from the current view, the Operational View or some other type of Systems View, to the OPFAC Systems View. The OPFAC Systems View expands the contents of the organizations, collapses the contents of the OPFACs, and redraws the links to connect to their respective devices.

You can also choose **View > Show Logical Views...** which displays similar objects in an abstract manner, without geographical context. Selecting this view option launches the Logical View Selection dialog box that you may use to specify settings for filtering the logical views.

Each of these views offers the user a different perspective of the network.

### Procedure 2-17 Selecting Settings for the Logical View of a Scenario

- 1 Select **View > Show Logical Views....** The Logical View Selection dialog box displays.



**Figure 2-26 Logical View Selection dialog box**

- 2 Select a **Network Layer Filter** with which to filter your logical view. This filtering parameter enables you to hide all devices except for those of a particular layer of the network. [Note that this doesn't necessarily mean OSI network layer, but instead, it means the various devices that use a particular protocol.] Network Layer Filters shown are only those which apply to the deployed network.
- 3 Select a **Security Classification Filter** with which to filter your logical view. This treeview enables you to filter elements of the network based on their security classifications. Any custom classifications added in the Operational view will be available here as well for filtering.
- 4 Specify the **Duration** and **Start Time** parameters to get the Capacity Planner graphs that are used for filtering for various layers.



- 5 Check the **Consider Link Capacities** checkbox if you want to use this parameter to get the Capacity Planner graphs. A link capacity considered filter will result in the Capacity Planner creating a graph that may not show complete physical connectivity of the devices due to link load. A link capacity ignored filter will result in a graph that shows complete physical connectivity of the devices regardless of link load.
- 6 Click **Create View** to create and load the type of view that you specified if you are not already in this view. The filter specifications are applied to the logical view model.
- 7 Click **Save Settings** to save the settings instead of creating a logical view network with the specified settings at this time.
- 8 Click **Cancel** to close the Logical View Selection dialog box without making any changes to the model.

---

**End of Procedure 2-17**

---

## 3 Topology Building

---

### Adding Units (Organizations and OPFACs)

To develop a JCSS scenario, add organizations and OPFACs that represent a communications plan. Build it from scratch by adding an empty unit from the shortcut menu or the Organization and OPFACs Library Treeview (via drag-and-drop), or select a pre-configured unit complete with specific attributes and devices.

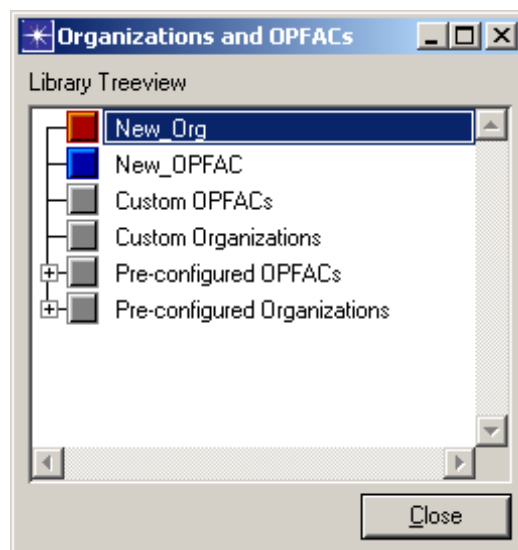
**Organizations** are groupings of sub-organizations and OPFACs that can represent military organizations or a physical location.

**Operational Facilities (OPFACs)** are the fundamental building blocks of JCSS. They are collections of communications devices that are assigned to military units, which are used to construct Organizations.

---

#### Procedure 3-1 Add Units via the Library Treeview

- 1 Select **Topology > Open Library Treeview** to display the Organizations and OPFACs Library Treeview.



**Figure 3-1 Adding Units via the Library Treeview**

- 2 Select the unit you want to add in the treeview, and drag-and-drop it to the desired location on the Scenario Builder workspace.

#### End of Procedure 3-1

---

---

**Procedure 3-2 Add Units via the Shortcut Menu**

- 1 Right-click in the workspace to open the shortcut menu.
- 2 Select **Create New Organization** or **Create New OPFAC**.

**End of Procedure 3-2**

---

---

## Modifying Units

Units have attributes that define functionality, behavior, and physical characteristics.

### Organization Attributes

- **Organization Name** – This field uniquely identifies an instance of an Organization.
- **Organization Type** – This attribute specifies the type of the Organization.
- **Type Name** – This attribute specifies the type name. This attribute does not affect the simulation at this time and maybe ignored or left blank.
- **Echelon Size** – This attribute specifies the echelon size. This attribute does not affect the simulation at this time and maybe ignored or left blank.
- **Tasks** – This attribute specifies the tasks for this organization. This attribute does not affect the simulation at this time and maybe ignored or left blank.
- **Trajectory** – Specify the trajectory for the organization from a selection menu that displays all the saved trajectories (Scenario Builder Editor Feature).
- **Dissociate Subordinate Organization and OPFAC Movement** – Check this option to separate the subordinate organization from the movement of the OPFAC.
- **Start Time(s), Stop Time(s)** – These are start and stop time(s) for the simulation (Scenario Builder Editor Feature).
- **Altitude, Alt. Units, Altitude set by terrain** – These attributes specify the location of the Organization (Scenario Builder Editor Feature).
- **Icon Name** – Click the **Edit Icon** button to select an icon for the organization; the name displays in the Icon Name field.
- **Documentation** – Access a free-form text box to enter organization purpose and topology notes to be stored with the scenario for documentation purposes.

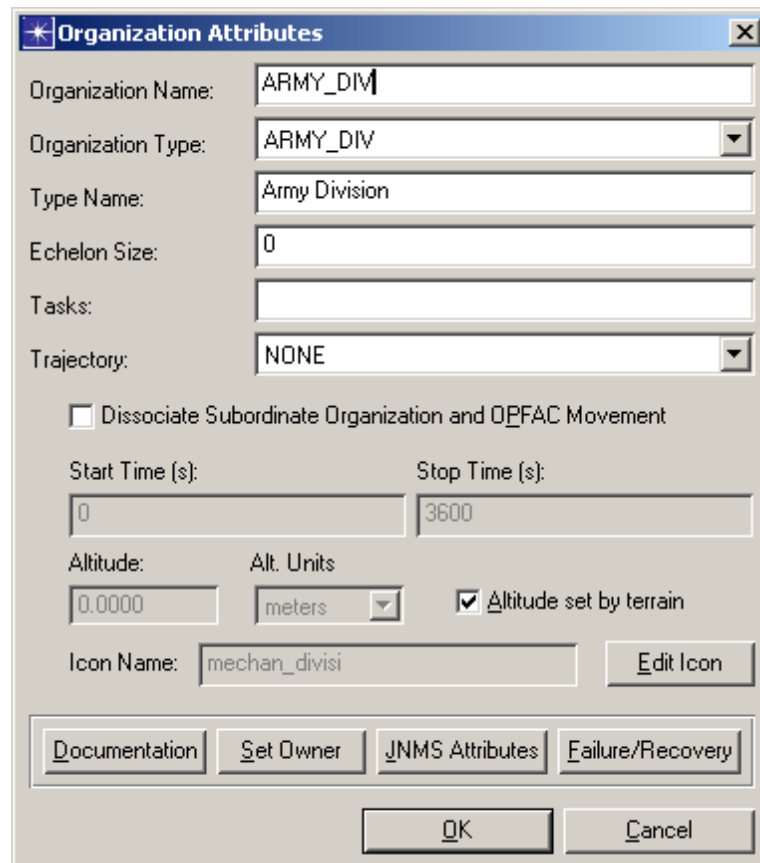
- **Set Owner** – Mark organizations for subordinate input by setting ownership information.
- **JNMS Attributes** – Set JNMS attributes for export to Network Engineer.
- **Failure/Recovery** – Specify a time interval or period of time for which the organization is inoperable.

## OPFAC Attributes

- **OPFAC Name** – This field uniquely identifies an instance of an OPFAC.
- **OPFAC Functional Profile** – Click the **Edit** button to select a profile for the OPFAC; the name displays in the OPFAC Functional Profile field.
- **OPFAC Type** – This is the name of the OPFAC model stored on disk. If you modify this, Infrastructure Re-assignment dialog boxes may be launched.
- **Trajectory** – Specify the trajectory for the OPFAC from a selection menu that displays all the saved trajectories (Scenario Builder Editor Feature).
- **Start Time(s), Stop Time(s)** – These are start and stop time(s) for the simulation (Scenario Builder Editor Feature)
- **Altitude, Alt. Units, Altitude set by terrain** – These attributes specify the location of the OPFAC (Scenario Builder Editor Feature).
- **Icon Name** – Click the **Edit Icon** button to select an icon for the organization; the name displays in the Icon Name field.
- **Devices** – This is a table that provides a list of all devices contained in an OPFAC.
- **JNMS Attributes** – Set JNMS attributes for export to Network Engineer.
- **Failure/Recovery** – Specify a time interval or period of time for which the OPFAC is inoperable.
- **Set Owner** – Mark OPFACs for subordinate input by setting ownership information.

**Procedure 3-3 Edit Unit Attributes**

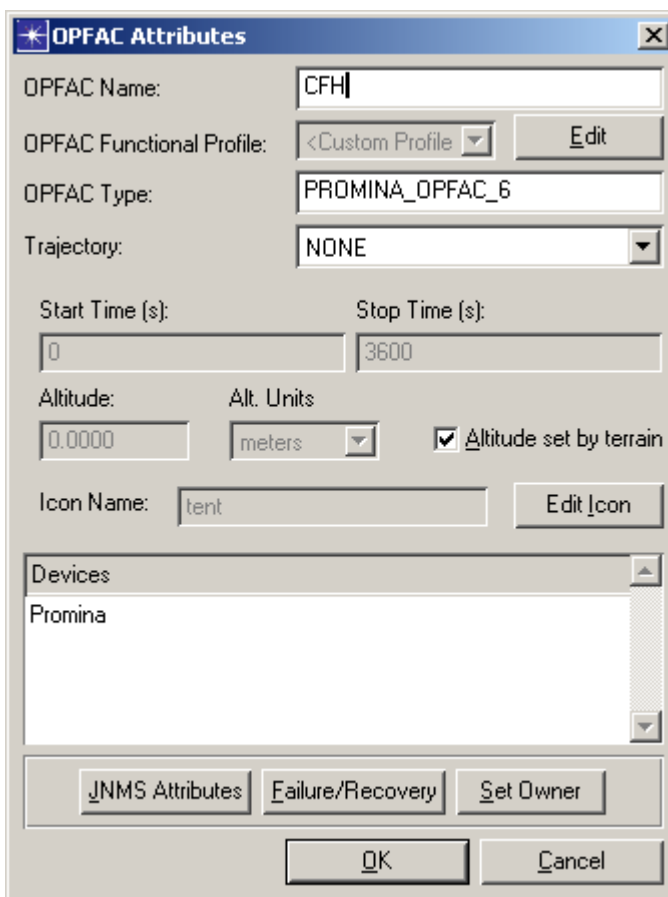
- 1 To edit unit attributes, right-click on the unit to open the shortcut menu.
- 2 Select **Edit NETWARS Attributes** to open the corresponding Organization Attributes or OPFAC Attributes dialog box.



The screenshot shows the "Organization Attributes" dialog box. The fields are as follows:

- Organization Name: ARMY\_DIV
- Organization Type: ARMY\_DIV (dropdown)
- Type Name: Army Division
- Echelon Size: 0
- Tasks: (empty text box)
- Trajectory: NONE (dropdown)
- Dissociate Subordinate Organization and OPFAC Movement
- Start Time (s): 0
- Stop Time (s): 3600
- Altitude: 0.0000
- Alt. Units: meters (dropdown)
- Altitude set by terrain
- Icon Name: mechan\_divisi
- Buttons: Edit Icon, Documentation, Set Owner, JNMS Attributes, Failure/Recovery, OK, Cancel

**Figure 3-2 Organization Attributes**



**Figure 3-3 OPFAC Attributes**

- 3 Edit attributes as needed and then click **OK**.

**End of Procedure 3-3**

---

**Editing Attributes for Many Objects**

You might need to set values for the same attributes on several objects in a network model. JCSS provides several alternate methods for quickly changing attributes on many objects, one of which is using the **Edit Objects Using Template** command on the **Edit** menu.

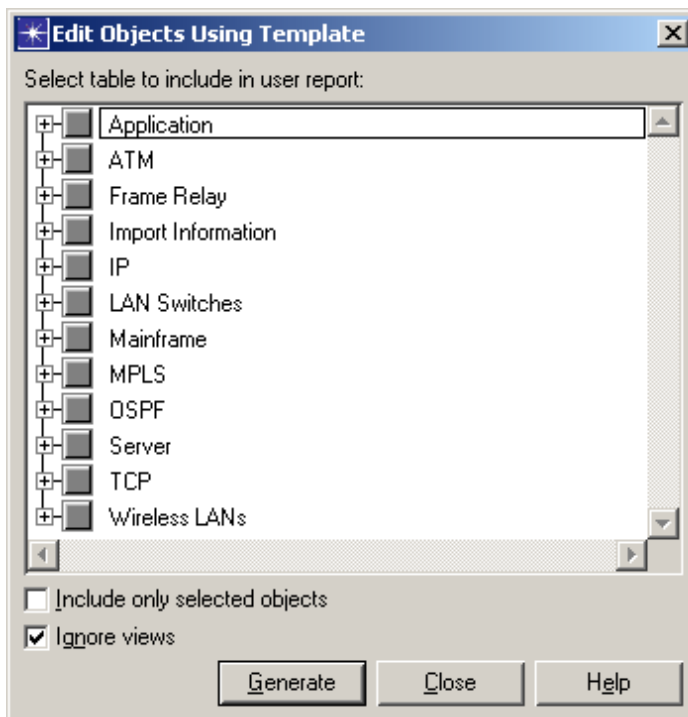
JCSS allows you to edit attributes for multiple objects in one window, using an attribute table similar to a User Defined Report. You can create your own *attribute templates* (as described in Procedure 3-6) to generate tables of specific attribute values for one or more objects in a network. An attribute template specifies the following information about an attribute table:

- Table category and name—Every attribute table belongs to a category, such as “IP” or “Application”, and has a name that identifies it.

- Object types to include—A table can include all network objects, a specific type of network object, or objects selected by custom criteria that you specify.
- Attributes to include—Each row of an attribute template specifies the title and contents of a column that will appear in the attribute table.

### Procedure 3-4 Edit Attributes For Many Objects Using a Template

- 1 Select **Edit > Edit Objects Using Template**. The Edit Objects Using Template dialog box displays.



**Figure 3-4** Edit Objects Using Template dialog box

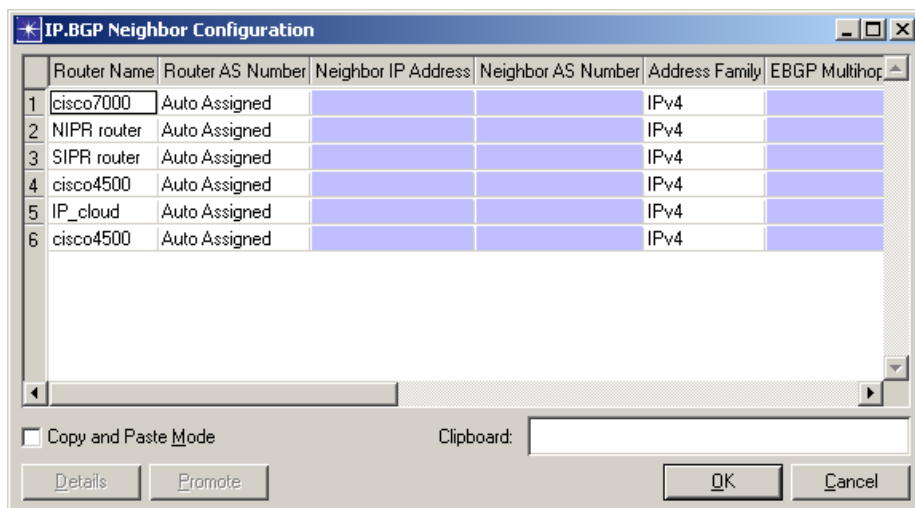
- 2 Select an attribute template in the Select table to include in user report list box from which to generate an editable table of attribute values.

To select an entire category of tables, click on the top-level category entries. To select an individual table, expand the top-level category subtree and click on the table entry. Selected tables and categories show a green checkmark. Categories with some but not all of its tables selected will display a green dot instead.

**Note**—If you want to define a custom template, click **Close**, define a template as described in Procedure 2-3, then begin this procedure again.

- 3 Select the **Include only selected objects** checkbox if you want to collect table data only for objects that are currently selected in the network.
- 4 Select the **Ignore views** checkbox if you want to collect table data even for objects that are not in the current view or views of the network.

- 5 Select the **Send reports to the Report Server (host)** checkbox if you want to send reports to the Report Server. This option is active only when a Report Server license is available.
  - 5.1 Specify a name for the report in the Report Server text field.
- 6 Click **Generate** to generate the table data for all of the selected tables. The corresponding dialog box displays.



**Figure 3-5 Table of Generated Attributes**

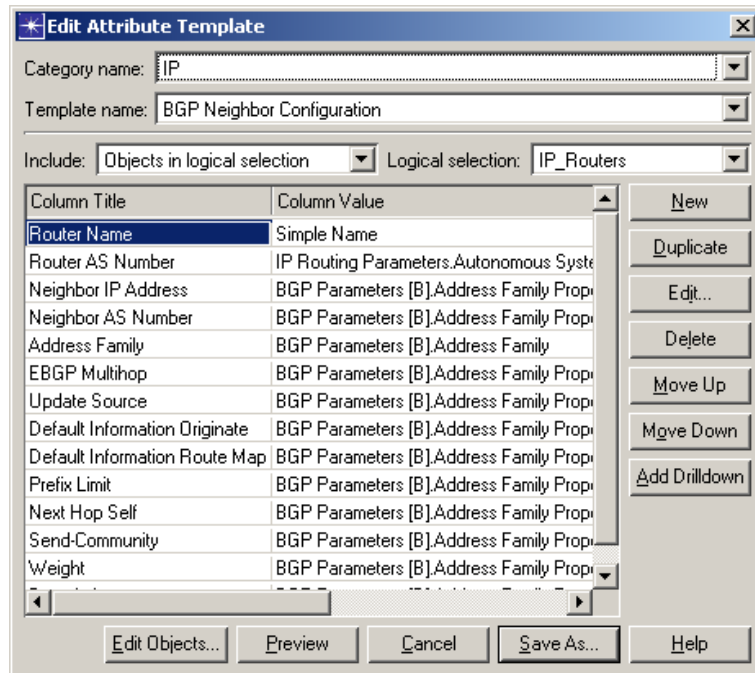
- 7 Edit the attributes as needed. There are two editing modes:
  - 7.1 Standard Mode—Click on any attribute value and edit it as you would in the Attributes dialog box.
  - 7.2 Copy and Paste Mode—Copy an attribute value and paste it to one or more similar attributes. This mode disables the standard methods for changing attribute values (edit fields, pull-down lists, and so on).
    - Select the **Copy and Paste Mode** checkbox.
    - Select an attribute value and press **<Ctrl>+<C>**.
    - Select the attribute value or a range of contiguous values and press **<Ctrl>+<V>**.

You can paste only into the same attribute column from which you copied.
- 8 When you are finished editing attribute values, click **OK** to make the changes.



### Procedure 3-5 Define or Edit an Attribute Template

- 1 Select **Edit > Edit Attribute Template**. The Edit Attribute Template dialog box displays.



**Figure 3-6 Edit Attribute Template dialog box**

Each table row corresponds to an attribute column in tables generated from this template. At first, the only column defined is for an object name.

- 2 Choose whether to define a new template or edit an existing one:
  - 2.1 To define a new template, leave the category and template names set to “unnamed”. (You will specify these names when you save the template.)
  - 2.2 To edit an existing template, select its category and name from the pull-down menus.
- 3 Choose what object types to include in the table:
  - 3.1 Select an object type from the Include pull-down menu.
  - 3.2 If you selected “Objects in logical selection”, use the Logical selection pull-down menu to specify a selection criterion.
- 4 Choose what attributes to include in table columns:
  - 4.1 To add a new undefined column, click **New**.
  - 4.2 To add a new column based on an existing one, select the desired attribute row and click **Duplicate**.
  - 4.3 To edit a column definition, select a row and click **Edit**. (Alternatively, you can double-click the Column Value field.) This opens a dialog box for specifying the contents and format of the table column.

- 4.4 To delete a column, select its row and click **Delete**.
- 4.5 To add a drilldown, select a row and click **Add Drilldown**. A drilldown is a child table that you open by following a link in the parent table. Drilldowns are useful when you want to show a set of related attributes in a separate window. For example, you might want to create a drilldown table for IP port attributes on a router.

This operation creates a drilldown table definition, which is initially equivalent to the current table definition. To edit the drilldown table, select the row and click **Edit**.

- 5 Move attributes around as needed to modify the appearance of tables generated from the template:
  - 5.1 To change the sequence of attributes, select an attribute row and click **Move Up** or **Move Down** (thus moving the resulting table column left or right, respectively).
  - 5.2 To see what the generated table will look like, click **Preview**. A dialog box displays a preview of the table to be generated using the current template.

	Router Name	Router AS Number	Neighbor IP Address	Neighbor AS Number	Address Family	EBGP Multihop	Update Source	Default Information Originate	De Info Rou
1	cisco7000	Auto Assigned			IPv4			Disabled	
2	NIPR router	Auto Assigned			IPv4			Disabled	
3	SIPR router	Auto Assigned			IPv4			Disabled	
4	cisco4500	Auto Assigned			IPv4			Disabled	
5	IP_cloud	Auto Assigned			IPv4			Disabled	
6	cisco4500	Auto Assigned			IPv4			Disabled	

Figure 3-7 Preview of Table to be Generated from Template

- 6 Click **Save As** in the Edit Attribute Template dialog box.
  - 6.1 If you are defining a new template, enter names for the category and table. The category can be one of the existing categories or a new one.
  - 6.2 If you are editing a template, you can either keep the original category and table names (to replace the original template) or change the table name (to create a new version of the original).

The template is saved with the extension `.urep.xml`. New templates are saved in your default model directory; edited templates are saved in the same directory as the original template.

- 7 Click **Cancel** to close the dialog box.

**End of Procedure 3-5**

## Creating Template Organizations and OPFACs

Reusable templates of organizations and OPFACs created in JCSS can be saved to object palettes. This provides a quick and easy way to add duplicate organizations and OPFACs to a workspace without having to configure them from scratch. All devices, links, and attributes (including annotations) of a template organization or OPFAC are captured.

A change to a template will not replicate that change to instantiated organizations or OPFACs throughout the topology.

---

### Procedure 3-6 Create a Template OPFAC or Organization

- 1 Right-click on a unit to open the shortcut menu.
- 2 Select **Create Template OPFAC** or **Create Template Organization**.
- 3 (**OPFACs Only**) In the dialog box that displays, enter a **cost for the OPFAC devices** (if known) in the Cost field, and enter a **description of the OPFAC** in the Description field.
- 4 Click **OK**. The Save OPFAC/Organization dialog box displays.
- 5 Specify a folder/object palette to save the template in. Click **Open**.
- 6 Click **Save**. The template is saved and is available on the specified object palette.

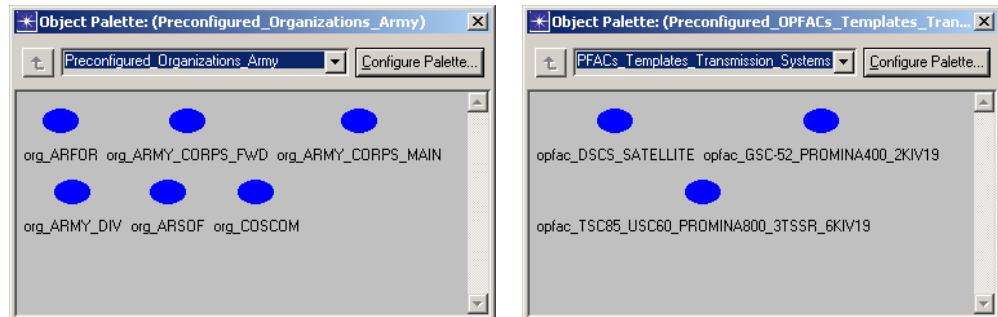


Figure 3-8 Template Organizations and OPFACs Saved to Object Palettes

End of Procedure 3-6

---

## Drilling Down into Units

“Drilling down” is a term that describes accessing the contents of organizations and OPFACs. For example, organizations may contain sub-organizations and OPFACs, while OPFACs contain devices.

---

### Procedure 3-7 Drill Down into a Unit

- 1 Double-click on a unit icon to drill into/view its contents.

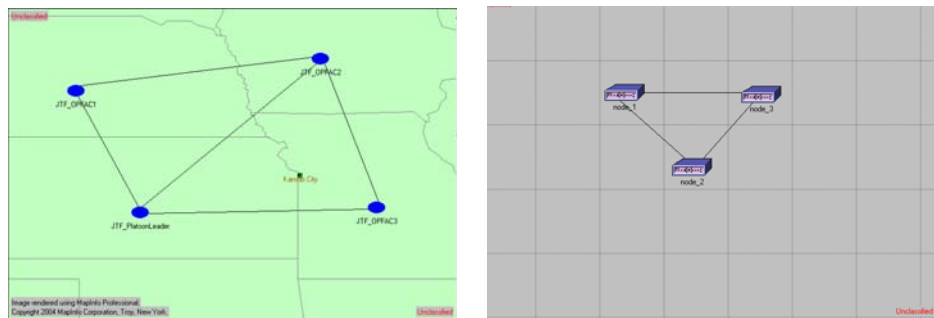


Figure 3-9 Drilling Down into Units

End of Procedure 3-7

---

## Adding Devices to OPFACs

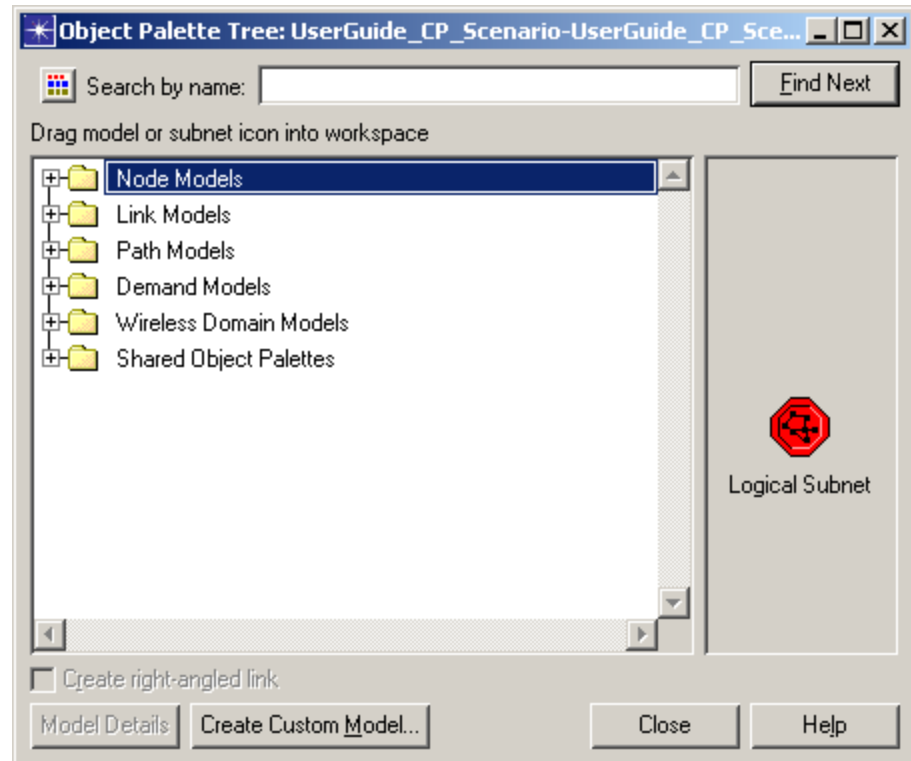
Place devices inside OPFACs. Devices are pieces of communications equipment that represent specific models. Examples include routers, computers, phones, and satellites. We suggest using the NETWARS\_Standard\_Models palette to build OPFACs because the palette includes all of the updated device models and link models for connecting the devices.

OPFACs are automatically created for single devices that are added to the workspace or an organization (i.e., not placed directly in an OPFAC). The OPFAC will have the same icon as the device and both the OPFAC and device right-click menu options will be made available.

JCSS provides a variety of different object palettes containing nodes, devices, links, and paths (circuits.) All of these objects are easily added to a workspace using drag-and-drop or point-and-click techniques.

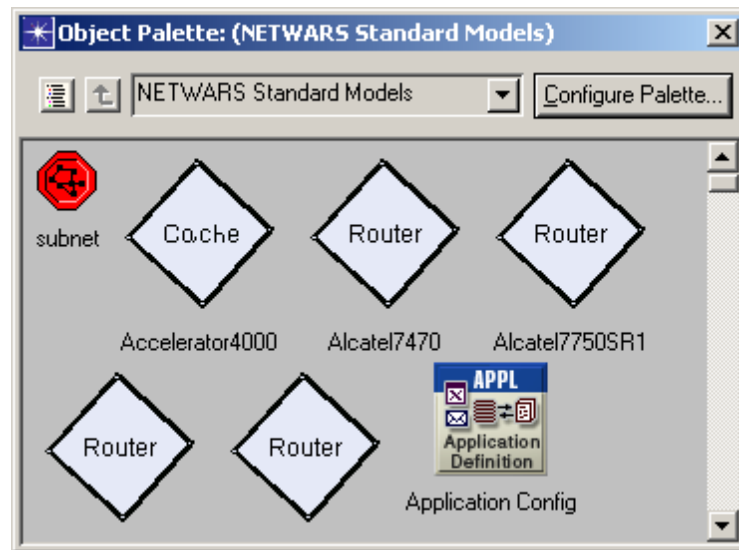
**Procedure 3-8 Add a Device to an OPFAC****Open Object Palette**

- 1 Click the **Open Object Palette** button, or select **Topology > Open Object Palette**. The object palettes display in either a Tree view style or an Icon view style, depending upon how your environment preferences are set.

**Figure 3-10 Object Palette by Tree View**

**Note**—The view style in which the object palettes display changes based on the value specified for the **network\_palette.style** environment preference. You may set the object palette view style preference via **Edit > Preferences > Advanced**.

- In the Object Palette Tree view, click the **Open Palette In Icon View** icon button (upper left corner) to replace this dialog box with the Object Palette Icon view that displays only a single palette file at a time.



**Figure 3-11 Adding Devices to an OPFAC via Object Palette**

The palette file initially displayed will be either the default palette of the scenario or, if the tree selection is within a particular palette file tree element, the palette that contains the current tree selection.

- Select the **NETWARS Standard Models** object palette or other palette.
- Left-click the desired device in the object palette.
- Drag-and-drop device from the object palette to the workspace.
- Right-click to exit Device Creation mode.

**Note**—Consult the *JCSS Technical Reference Manual* for instructions on configuring custom object palettes.

**End of Procedure 3-8**

---

## Cutting, Copying and Pasting Objects

Cut, copy, or paste selected supported objects on the workspace to or from the Windows clipboard. Supported objects include:

- Organizations
- OPFACs
- Devices
- Links (External and Internal links)
- Satellite links
- Broadcast Networks
- OPNET demand objects

Objects which are not supported include radio links, relationships, IERs/demands, and Configuration OPFACs. If unsupported objects are attached to a supported object, then the unsupported objects are also removed from the workspace but not maintained on the clipboard.

When copying, cutting or pasting an Organization and/or OPFAC, all supported children are also copied, cut, or pasted.

When undoing cut, copy, or paste operations, some actions may prevent certain, or all, prior actions from being undone (for example, saving a project file.) Immediately following a save to disk, there will be no undoable actions. There is no limit on the number of actions that can be undone; however, the actions can only be undone in the reverse order in which they were performed.

When redoing undone cut, copy, or paste operations, the actions can only be redone in the reverse order in which they were undone, which means that the last undone action will be the first one to be redone.

Any action (editing operation which includes add, delete, move, modify) performed after performing **Undo** will clear the **Redo** feature, and the undone operation cannot be redone.

---

### Procedure 3-9 Cut or Copy an Object

- 1 Select the object on your workspace that you want to cut or copy.
- 2 Select **Edit > Cut** (or press the **Ctrl+X** short-cut keys after the object has been selected) to remove the selected supported object to the Windows clipboard,

**Or**

Select **Edit > Copy** (or press the **Ctrl+C** short-cut keys after the object has been selected) to copy the selected supported object to the Windows clipboard.

**End of Procedure 3-9**

---

---

### Procedure 3-10 Paste an Object

- 1 Select **Edit > Paste** (or press the **Ctrl+V** short-cut keys after the objects have been selected) to copy the object back from the clipboard into the workspace.

**End of Procedure 3-10**

---

---

**Procedure 3-11 Undo Editing Operations**

- 1 Select **Edit > Undo** (or press the **Ctrl+Z** short-cut keys) to undo the previous editing operation. Only the following actions can be undone:
  - Adding a unit (includes OPFAC and organization), device, or association (includes intra OPFAC link, inter OPFAC link, satellite link, broadcast network, relationship and circuit) from the palette or library.
  - Moving a unit, device, association, or any group of these objects in the workspace.
  - Deleting a unit, device, association, or any group of these objects in the workspace or using Scenario Builder treeview.
  - Modifying attributes on devices; all attribute changes made while the Edit Attributes dialog box is open will be considered a single action.

**End of Procedure 3-11**

---

---

**Procedure 3-12 Redo Editing Operations**

- 1 Select **Edit > Redo** (or press the **Ctrl+Y** short-cut keys) to redo the last undone operation. The actions can only be redone in the reverse order in which they were undone, which means that the last undone action will be the first one to be redone.

**End of Procedure 3-12**

---

---

## Creating Custom Models with Device Creator

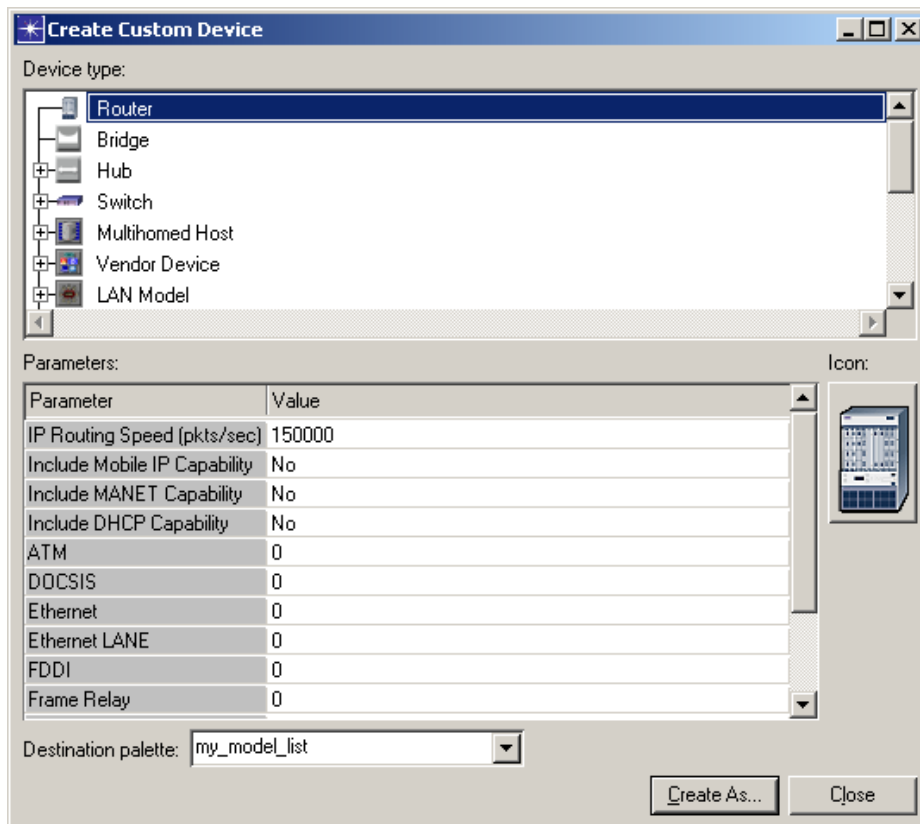
In addition to using the built-in model objects provided by JCSS and creating derived models, you can create your own new device models using the Device Creator. Device Creator allows you to create several different types of network components, including routers, bridges, hubs, workstations, switches, LANs, and vendor devices. Models created with Device Creator have the following characteristics:

- They can be easily configured for specialized needs and then integrated into a network model.
- They support inheritance, so that changes to the original (parent) model can automatically affect all models derived from it.



### Procedure 3-13 Create a Device Model

- 1 Choose **Topology > Create Custom Device Model**. The Create Custom Device dialog box displays. This dialog box presents a treeview of the different device categories.



**Figure 3-12** Selecting a Device Category for a New Device Model

- 2 Select the desired device category in the upper window. A corresponding list of parameters will immediately display in the lower window.
- 3 Set each parameter's value appropriately in the lower window.
- 4 Select the model list from the **Destination palette** drop-down list in which you want the new device model to reside.
- 5 After you have specified all the required parameters for the desired model and selected a model list, click the **Create As** button to create the model. A dialog box displays prompting you to name your new device model.
- 6 Name your new device model. Once you have done so, your new device model displays in the model list you specified.

### End of Procedure 3-13

## Opening Node Models in Modeler

If you have an OPNET Modeler license, you can easily open node models in Modeler via JCSS.

**Note**—For derived models, you must open the parent instead.

### Procedure 3-14 Open a Node Model in Modeler

- 1 Double-click on a node model. The Open Node Editor message dialog displays.

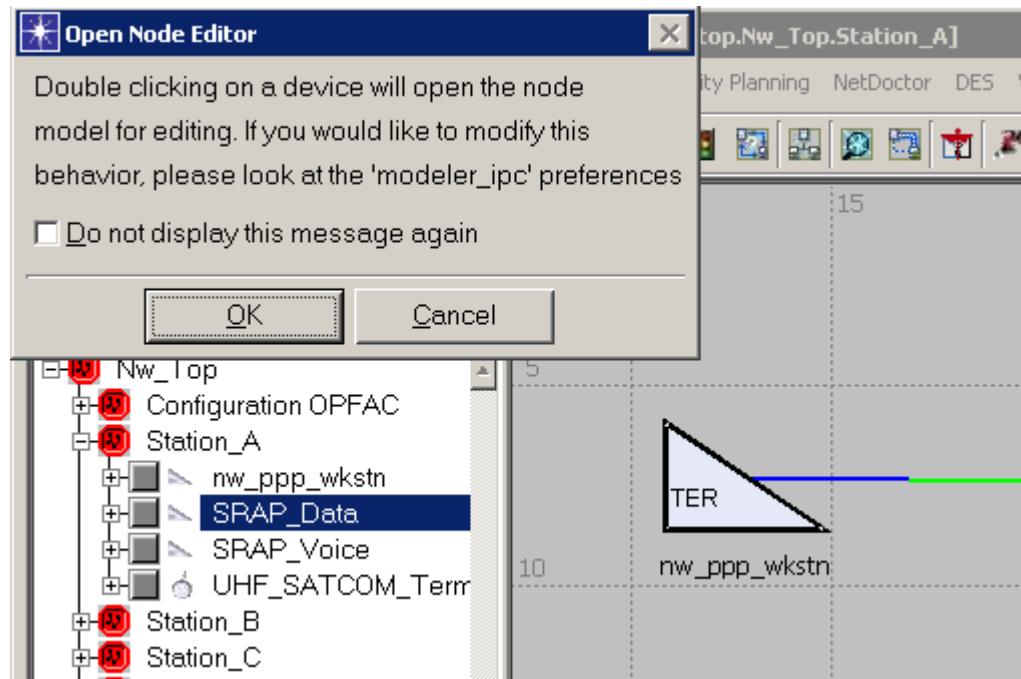
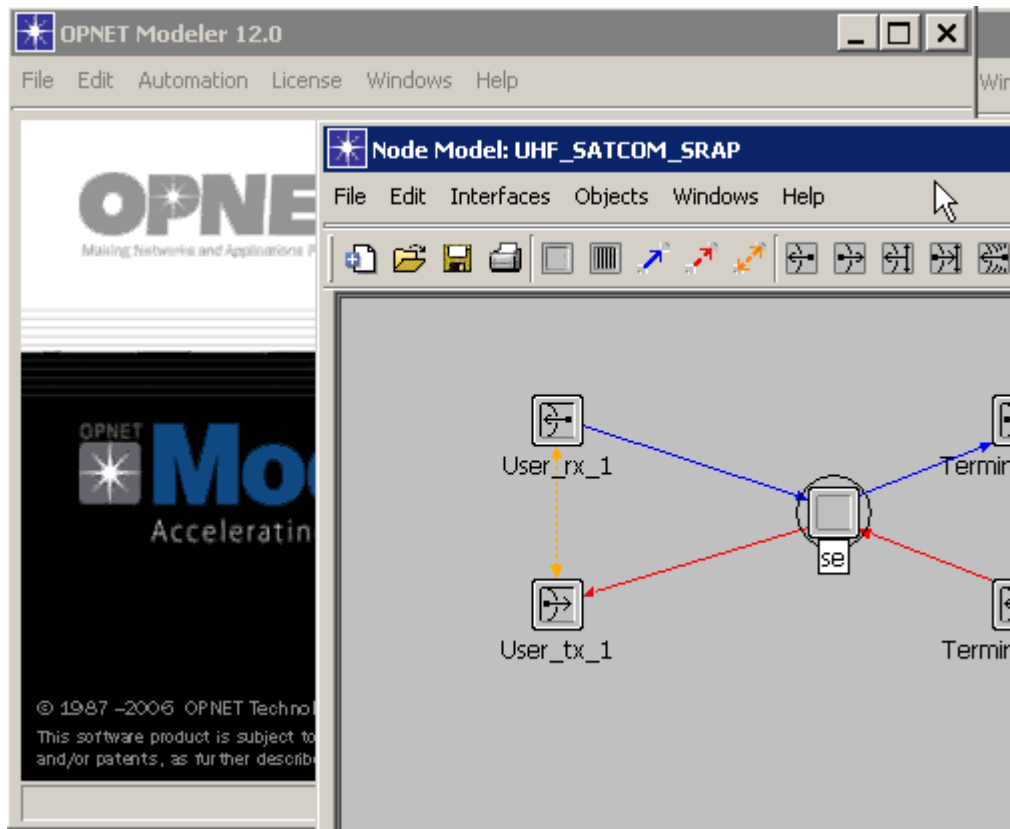


Figure 3-13 Open Node Editor Message Dialog

- 2 Click **OK**. OPNET Modeler launches and displays the node model.

**Note**—Modeler will not launch if you do not have a license for it.



**Figure 3-14** Opening a Node Model in OPNET Modeler

- 3 Consult the documentation for OPNET Modeler for instructions on using Modeler with node models.

**End of Procedure 3-14**

## Connecting Device Models

Connect communications devices. There are many different kinds of links in JCSS available from a variety of object palettes. Most links are available on the NETWARS\_Standard\_Models or NETWARS\_Links palettes.

## Internal Connectivity Links

Internal Connectivity Links connect devices to other devices within the same OPFAC, and define actual physical links that show the specific type of connectivity; they are drawn as black solid lines.

### Procedure 3-15 Link Devices via Object Palette

- 1 From the object palette drop-down menu, select the desired link palette.

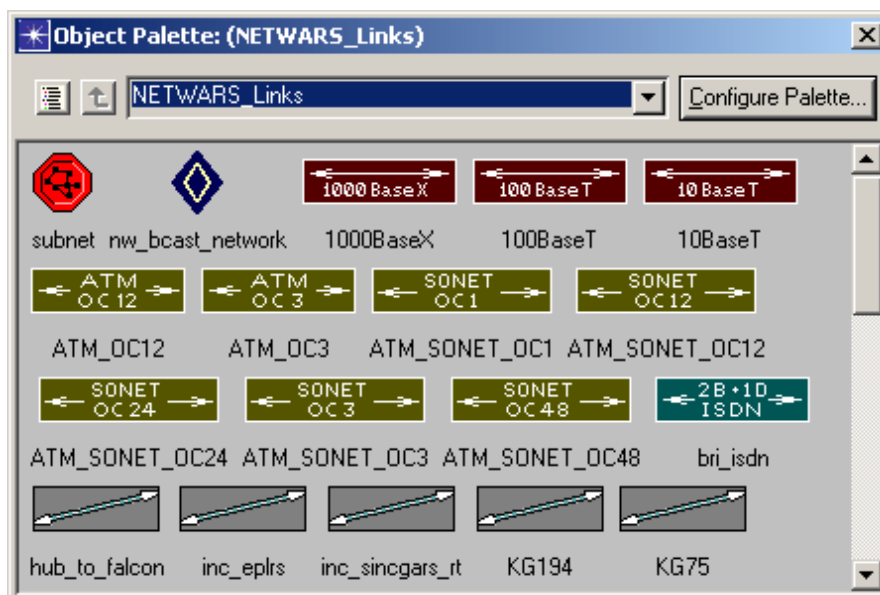


Figure 3-15 Adding Links to OPFAC Devices via Object Palette

- 2 Select desired link icon.
- 3 Left-click endpoint 1 (device) to identify it as the source, and then left-click on endpoint 2 (device) to identify it as the destination.
- 4 Right-click to exit Device Creation mode.

### End of Procedure 3-15

## Deploying Links

Quickly define valid links between devices using a wizard-like feature, instead of creating links using an object palette.

### Procedure 3-16 Deploy a Link

- 1 Select two devices (in the workspace or the Network Browser) and then select **Topology >> Link Operations > Deploy Link**.
- 2 If more than one device is present in an OPFAC, the Select Devices dialog box displays. Select the desired devices to connect and then click **Next**.

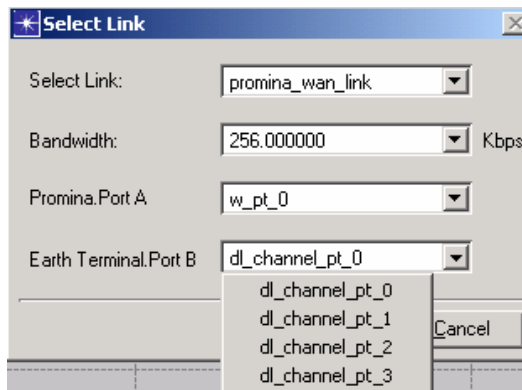


**Figure 3-16 Select Devices dialog box**

If a selected OPFAC has only one device, then the device is selected by default and the Select Devices dialog box is skipped. If the OPFAC doesn't have a device, an error is flagged.

This feature will be only applicable to the fixed nodes (only wired ports will be considered for selection).

The best default link available and a list of the other applicable link types displays.



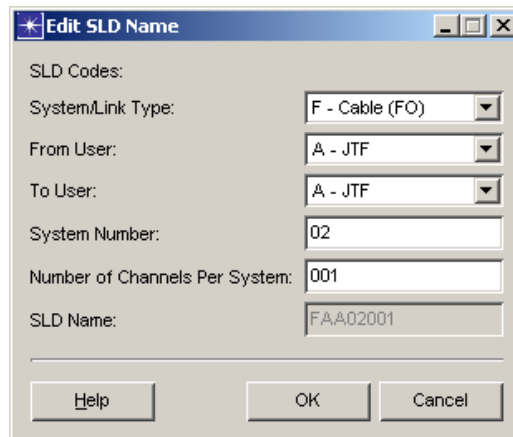
**Figure 3-17 Select Link dialog box**

A series of the most common default bandwidths for the selected link type is also provided as well as the first available ports applicable to the chosen link as default ports.

- 3 Use the default values or select the desired values from the drop-down lists in the Select Link dialog box.

- 4 When you create a satellite, external, or radio link, instead of providing long link names like SIPRNET\_Router-GCCS\_COP, JCSS supports the use of a System Link Designator (SLD) name. SLDs follow an eight-character alphanumeric code to identify the transmission systems that they connect.

If you want to specify the SLD codes that will make up the SLD Name for this link, click **Next**. The Edit SLD Name dialog box displays.



**Figure 3-18 Edit SLD Name dialog box**

- 4.1 To specify the SLD Name, choose a System/Link Type, From User, and To User from the drop-down lists and then enter a System Number and Number of Channels Per System. The full SLD Name will then be generated automatically based on what you have entered.
  - 4.2 Click **OK** to complete the SLD creation, or click **Cancel** to cancel the process. The Select Link dialog box re-displays.
- 5 Click **Finish**. An inter-OPFAC link or internal link will be created with the user-defined attributes between the two devices, depending on whether the selected devices are within one OPFAC or different OPFACs.

**End of Procedure 3-16**

---

## Deploying Satellite Links

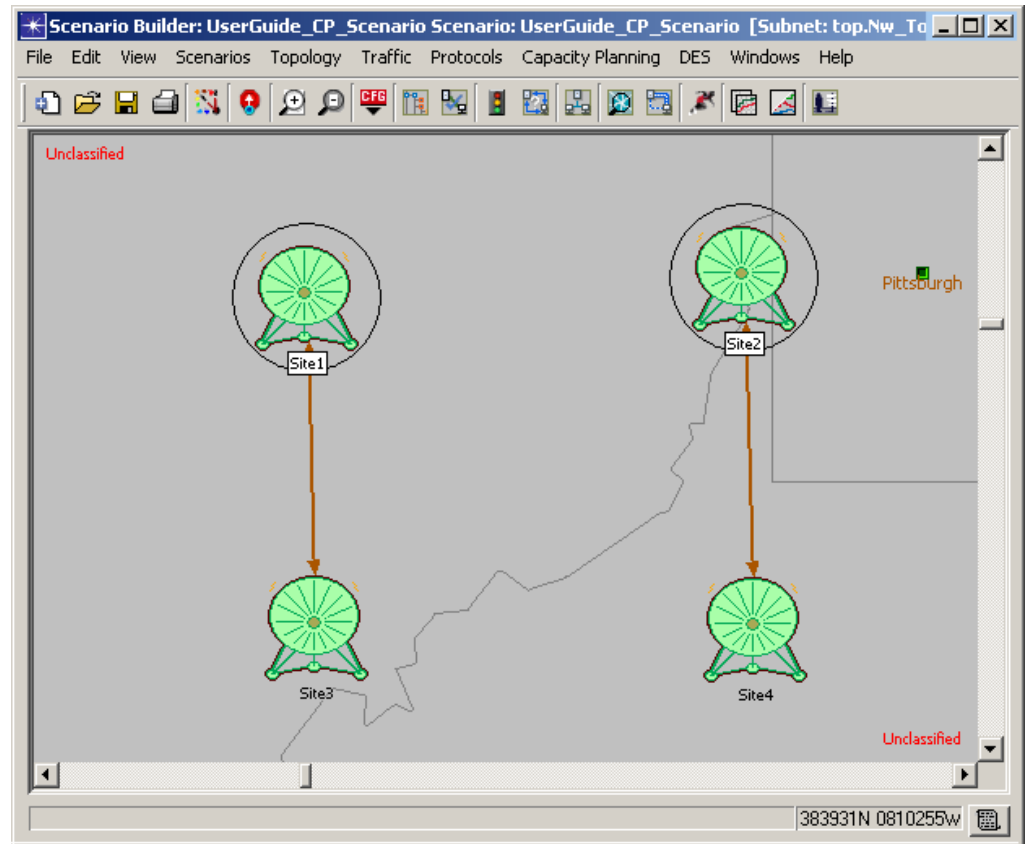
JCSS supports two types of satellite links—bentpipe and broadcast links.

To create a bentpipe satellite link, the scenario must contain two earth terminals that are the endpoints of the satellite link and a home satellite through which the earth terminals communicate.

To create a generic broadcast satellite (GBS) link, the scenario must contain an earth terminal to act as one endpoint of the satellite link and a satellite to act as the other endpoint.

### Procedure 3-17 Deploy a Satellite Link

- 1 Select two OPFACs or devices and then select **Topology > Link Operations > Deploy Link** (or press **<Ctrl> + L.**)



**Figure 3-19 Selecting Satellites for Link Deployment**

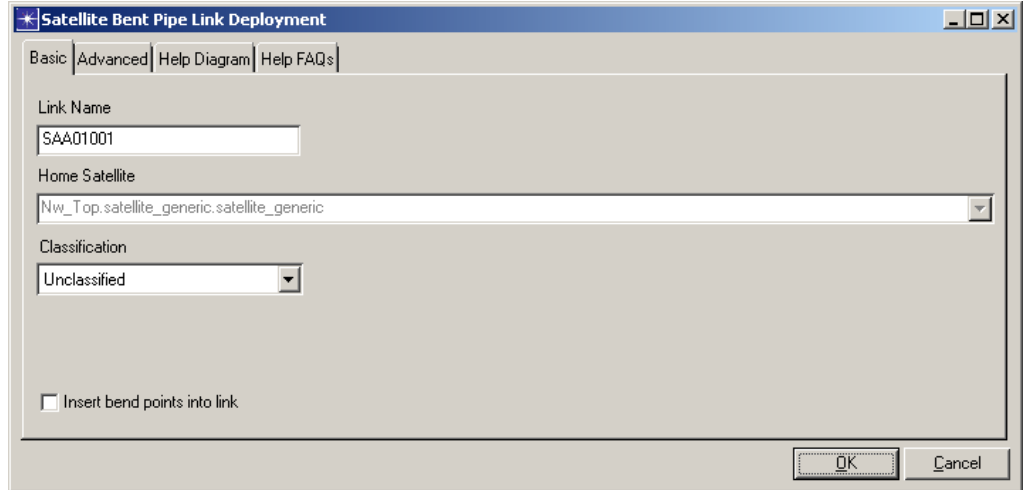
- 2 If more than one device is present in an OPFAC, the Select Devices dialog box displays. Select the desired devices to connect and then click **Next**.



**Figure 3-20 Select Devices dialog box**

If a selected OPFAC has only one device, then the device will be selected by default and the Select Devices dialog box will be skipped. If the OPFAC doesn't have a device, an error will be flagged.

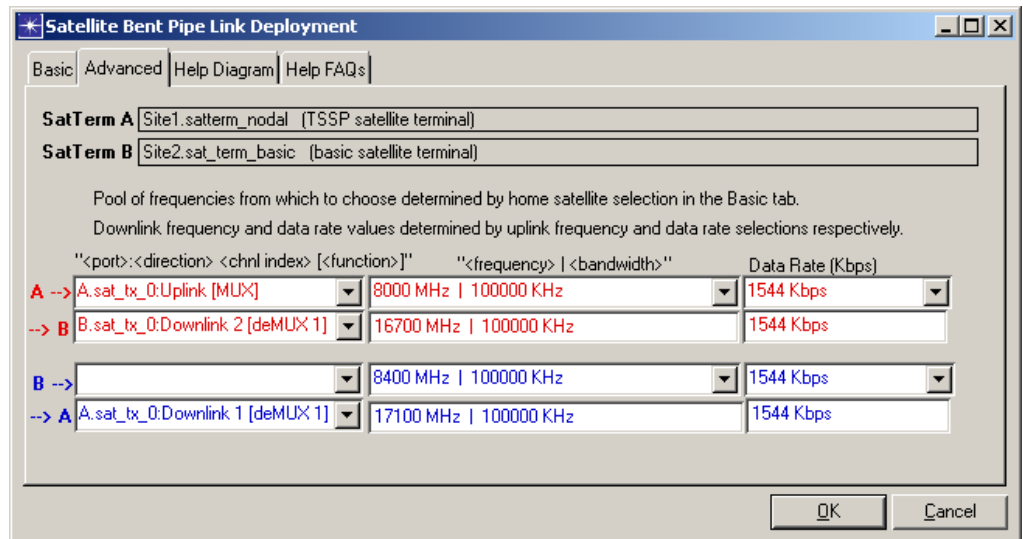
The Satellite Bent Pipe Link Deployment dialog box displays.



**Figure 3-21 Satellite Bent Pipe Link Deployment dialog box ~ Basic**

The Basic tab displays the default Link Name, and allows you to select the Home Satellite which provides the available frequencies. The Help Diagram tab displays a diagram which explains the function of this dialog box. The Help FAQs tab lists helpful answers to frequently asked questions.

3 If you click the Advanced Tab, the following screen displays.



**Figure 3-22 Satellite Bent Pipe Link Deployment dialog box ~ Advanced**

Based on the frequencies provided by the chosen Home Satellite, this screen allows you to configure the frequencies uplink and downlink (in each direction) to establish a satellite link between the two selected satellite terminals.

The fields of this screen are pre-populated for you with the best available default link.



- 4 If you are creating a GBS link, the Satellite Link Attributes dialog box displays (instead of the Satellite Bent Pipe Link Deployment dialog box shown previously in this procedure.)

**Satellite Link Attributes**

Name: SAA01001  Include External Muxes for SLD

Type: GBS

Home Satellite: generic\_broadcast\_satellite.generic\_broadcast\_satell

Direction: Send to Satellite

Data Rate: 16.00 Kbps

Channel Size for Voice: 0.00 Kbps

Number of Voice Channels: 0

Start Time: Start of Sim secs

Stop Time: End of Sim secs

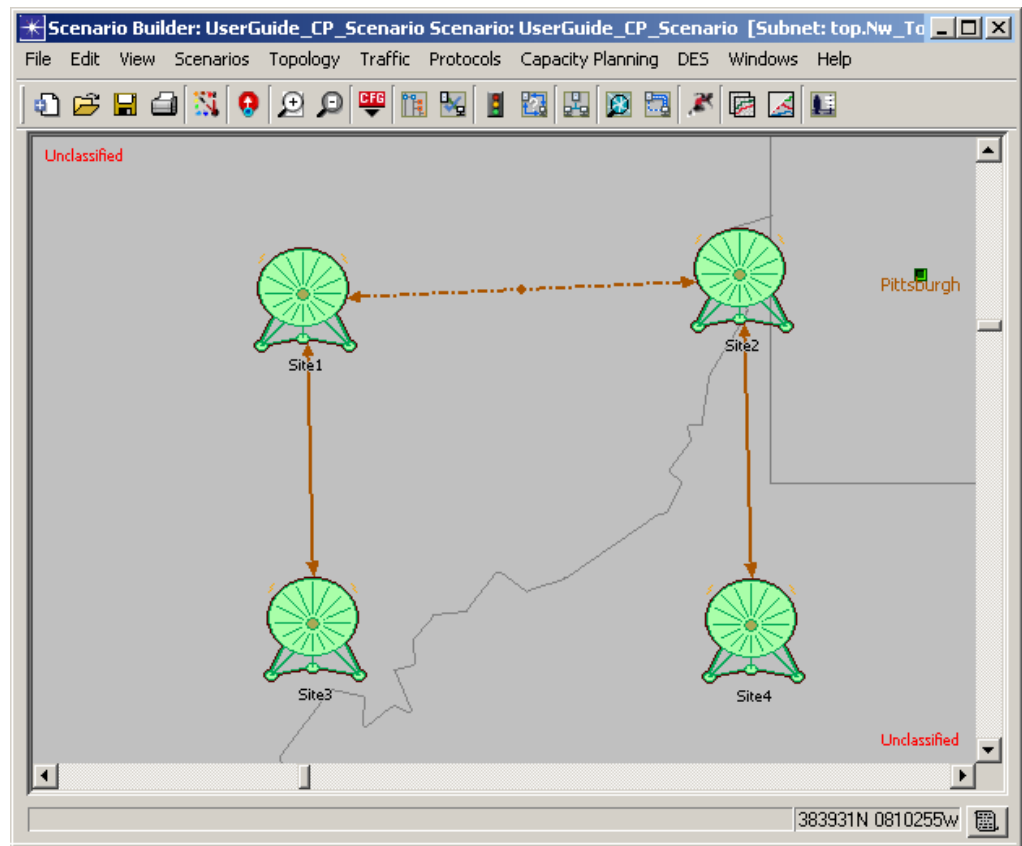
Earth Terminals:

OPFAC	Device	Port	Transponder
GBS_earth_terminal	GBS_earth_ter...	dl_channel_pt_0	0

Optimization Attributes

**Figure 3-23 Defining Satellite Link Attributes (GBS)**

- 5 Use the default values or select the desired values, and then click **OK**. The newly deployed satellite link displays in the workspace.

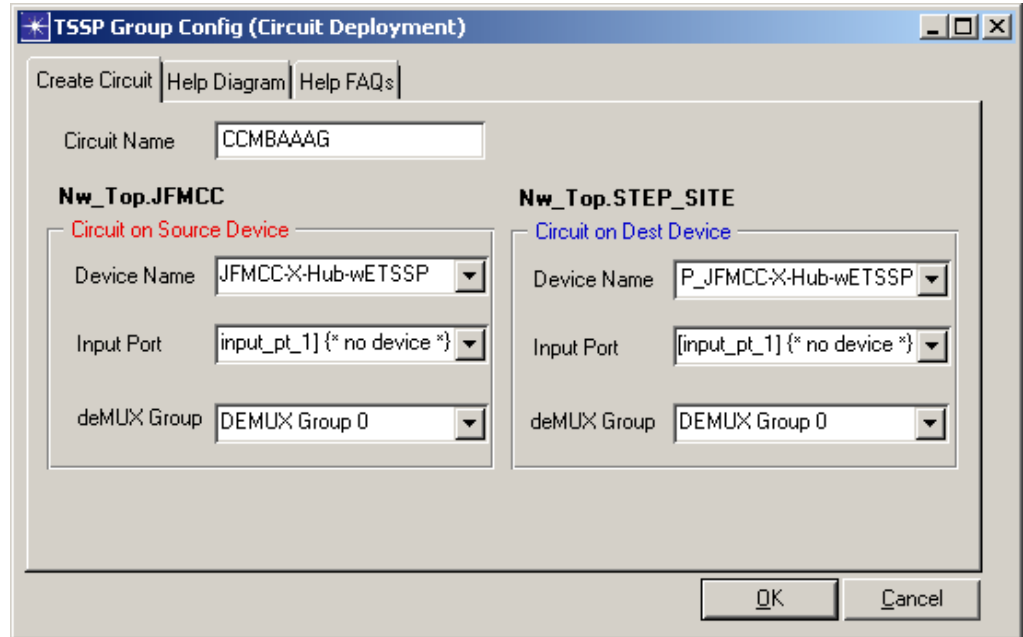


**Figure 3-24 Deploying Satellite Links**

After you have deployed a satellite link, you can create a TSSP circuit by selecting exactly two objects (devices or OPFACs) and configuring the circuit via the TSSP Group Config (Circuit Deployment) dialog box.

**Note**—The process for configuring multiplexer circuits is the same as the process for configuring TSSP circuits. You can create a multiplexer circuit by selecting exactly two devices and configuring the circuit via the Circuit Deployment dialog box. Select **Topology > Configuration Utilities > Multiplexer > Configure Multiplexer Circuits**. Shortcut keys are also provided for launching the Circuit Deployment dialog box for multiplexer circuits. Simply press **Ctrl + Alt + M**.

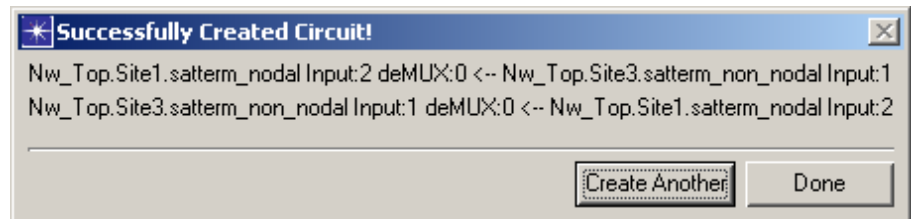
- 6 Select **Topology > Configuration Utilities > TSSP > Configure TSSP Groups (Circuits)**. The TSSP Group Config (Circuit Deployment) dialog box displays.



**Figure 3-25 TSSP Group Config (Circuit Deployment) dialog box**

**Note**—Shortcut keys are provided for launching the Circuit Deployment dialog box for TSSP circuits. Simply press **Ctrl + Alt + T**.

- 7 Use the default values provided on the Create Circuit tab in the TSSP Group Config (Circuit Deployment) dialog box (or select the desired values), and then click **OK**.
- A message box displays to tell you that the circuit was successfully created.
- 8 Click **Create Another** to re-display the TSSP Group Config (Circuit Deployment) dialog box, or click **Done** to close the dialog box.



**Figure 3-26 Successfully Created Circuit message box**

**End of Procedure 3-17**

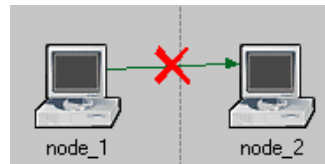
## Verifying Device Connectivity

Verify that devices are connected properly.

---

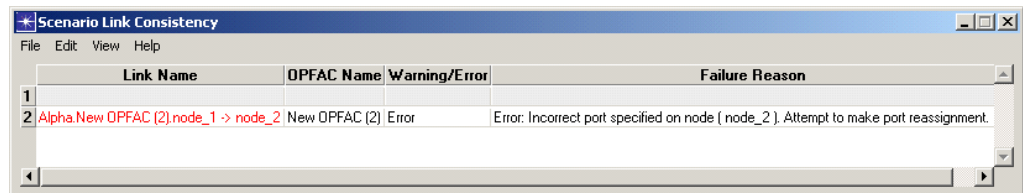
### Procedure 3-18 Verify a Link

- 1 Select **Topology > Link Operations > Verify Links**, or click the **Verify Link Consistency** button. Inconsistent links (e.g., links not connected to the right ports on the end points of the link) will be marked with a red X in the workspace.



**Figure 3-27 Inconsistent Links**

In addition, the results of the link consistency check will be displayed in the Scenario Link Consistency dialog box.



**Figure 3-28 Link Errors and Failure Reasons Display**

- 2 The Scenario Link Consistency dialog box lists the link errors and failure reason. Troubleshooting solutions are provided, where possible in the text of the failure reason.

**Note**—In most cases, one or more of the link's attributes may be the source of the failure. In the Attributes dialog box, carefully review the attributes. Pay particular attention to the model, port assignments, and data rate.

### End of Procedure 3-18

---

## Save As Link Type

You can save inter-OPFAC links to a new link.

---

### Procedure 3-19 Saving As Link Type

- 1 Right-click on a link in the workspace, and select **Save As Link Type**.

- 2 The status bar at the bottom left corner of the Scenario Builder window displays the following message, "New Link type '<selected link name>' saved."

---

**End of Procedure 3-19**

---

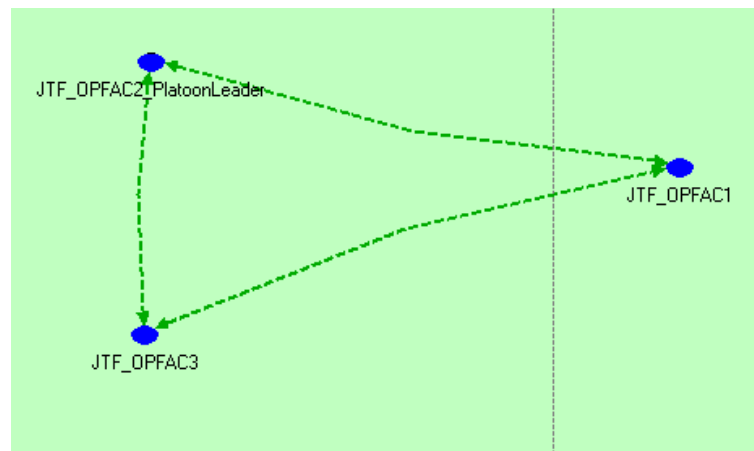
## Defining Planning Links

Set placeholders for the connectivity links that will be created based on the subscriber requirements. These links can have organizations or OPFACs as terminating points, and show the anticipated bandwidth. Planning links are drawn as green dashed lines. Planning links cannot be used for discrete event simulation and capacity planning analyses.

---

**Procedure 3-20 Add Planning Links via Object Palette**

- 1 From the object palette drop-down menu, select the **NETWARS\_Links** palette.
- 2 Select the **Planning Link** icon.
- 3 Left-click endpoint 1 (OPFAC, organization) to identify it as the source, and then left-click on endpoint 2 (OPFAC, organization) to identify it as the destination.



**Figure 3-29 Planning Links Drawn as Green Dashed Lines**

---

**End of Procedure 3-20**

---

## Defining External Connectivity Links

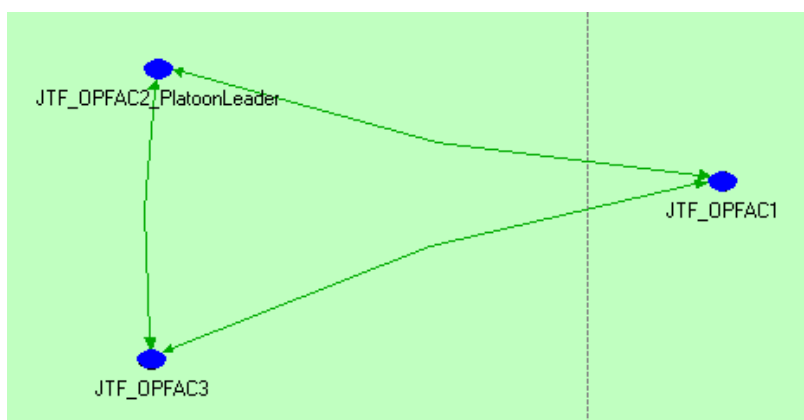
Connect OPFAC devices to devices in other OPFACs. These links define actual physical links that show the specific type of connectivity. Organizations are not valid terminating points for connectivity links. External links are drawn as green solid lines and show the actual bandwidth.

**Table 3-1 Planning Links vs. Connectivity Links**

Planning Link	Connectivity Link
High level link	Actual physical link
Shows general connectivity	Shows the specific type of connectivity
Shows anticipated bandwidth	Shows actual bandwidth
Can connect organizations and OPFACs	Can only connect OPFACs
Drawn as dashed green line	Drawn as solid green line

### Procedure 3-21 Add External Connectivity Links via Object Palette

- 1 From the object palette drop-down menu, select the **NETWARS\_Standard\_Models** or **NETWARS\_Links** palette.
- 2 Select the desired link icon (10BaseT, T3, wire point-to-point, etc.).
- 3 Left-click endpoint 1 (OPFAC) to identify it as the source, and then left-click on endpoint 2 (OPFAC) to identify it as the destination.



**Figure 3-30 External Links Drawn as Green Solid Lines**

**End of Procedure 3-21**

## Defining Broadcast Networks

Connect radio system devices that are tuned to the same frequency and/or belong to the same frequency hop group. Only OPFACs can be included as members of a broadcast network. Broadcast networks are drawn as a broadcast network object with members connected by blue links.

### Procedure 3-22 Add Broadcast Networks via Object Palette

- 1 From the object palette drop-down menu, select **NETWARS\_Links** palette.

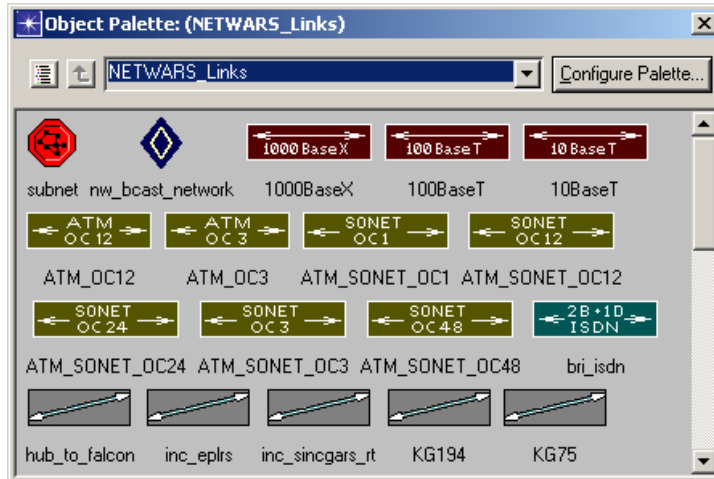


Figure 3-31 Broadcast Network Object Palette Icons

- 2 Click the **nw\_bcast\_network** icon and drop it to the desired location.
- 3 Click the **nw\_bcast\_network\_attachment**.
- 4 Left-click on an **OPFAC** to be added, and then left-click the **nw\_bcast\_network** icon on the workspace to add the member to the network.

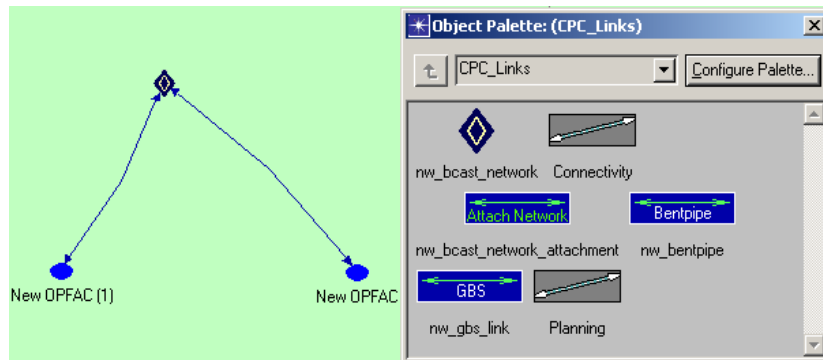
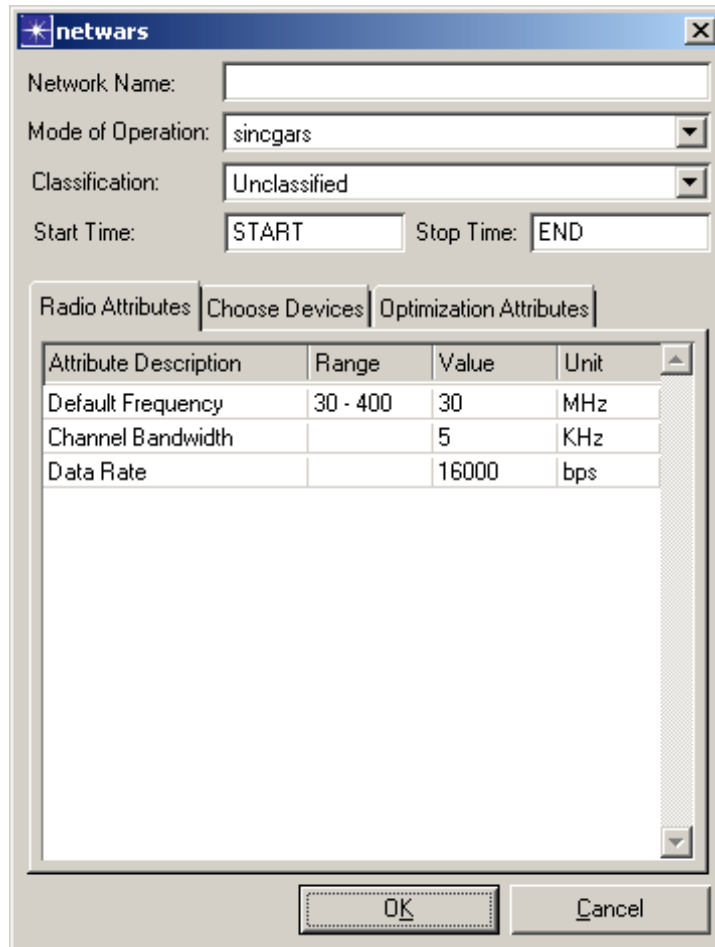


Figure 3-32 Broadcast Network

End of Procedure 3-22

**Procedure 3-23 Deploy Broadcast Networks via the Topology Menu**

- 1 Select the source and destination OPFACs or organizations in the workspace.
- 2 Select **Topology > Deploy Broadcast Network** (or press **Ctrl + Shift + B**). The Network Attributes dialog box displays.



**Figure 3-33 Defining Broadcast Network Radio Attributes**

- 3 Type a name for the broadcast network in the Network Name field.
- 4 On the Radio Attributes tab, enter the desired attributes for default frequency, channel bandwidth, and data rate.



- 5 On the Choose Devices tab, select devices for the corresponding OPFACs or organizations.

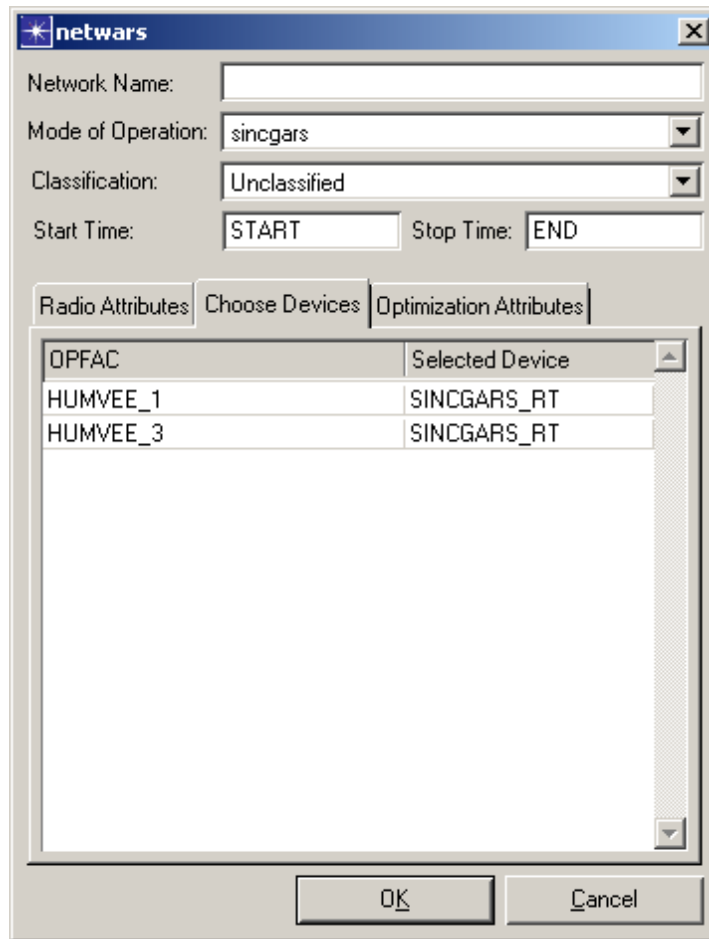
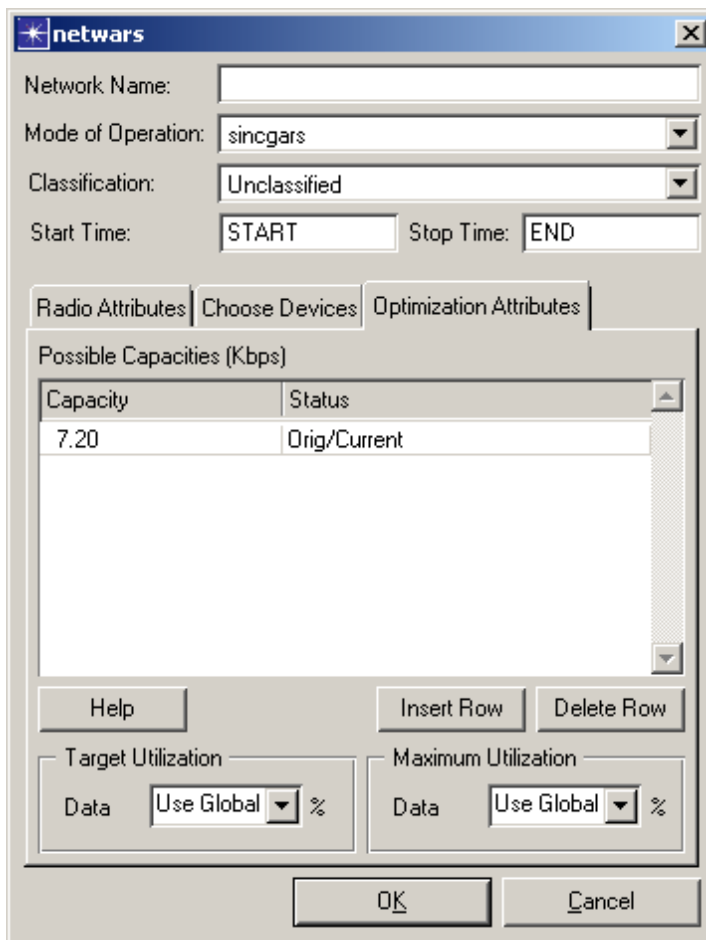


Figure 3-34 Defining Broadcast Network Devices

- 6 On the Optimization Attributes tab, enter the desired attributes for possible capacities, and target and maximum utilization.



**Figure 3-35 Defining Broadcast Network Optimization Attributes**

- 6.1 Possible Capacities table: Specifies all of the capacities that the optimization engine can use when mutating solutions. For example, if there are two capacities specified, then the engine will be able to set either of them as the suggested capacity for this network. The Capacity column is where the capacity is specified. The Status column is used to mark the “original” capacity and the “current” capacity (or “Orig/Current” if the current capacity is also the original capacity.)
- 6.2 **Insert Row** button: To add a new capacity, click this button and type the new capacity into the Capacity column of the new row.
- 6.3 **Delete Row** button: To remove a capacity, select a cell in the row and click this button.
- 6.4 Target Utilization: Specifies the target utilization to be achieved on this network. The default value is to use the global values specified in the Capacity Optimization Settings dialog. You can override this just on this network by specifying a new value.

**6.5** Maximum Utilization: Specifies the maximum utilization that is allowed on this network. The default maximum utilization is set to use the global values specified in the Capacity Optimization Settings dialog. You can override this just on this network by specifying a new value.

7 Click **OK** to create the newly defined broadcast network.

**End of Procedure 3-23**

---

---

## Verifying Link Consistency

Verify that links are connected consistently. This feature is identical to Device Connectivity covered in the *Verifying Device Connectivity* section in this manual. Clicking the **Verify Link Consistency** button prompts JCSS to simultaneously check all links (external, internal, etc.) in the scenario.

## Configuring Utility Nodes

Utility nodes contain information/attributes pertaining to multiple nodes in the scenario. They provide a convenient way of configuring information that is conceptually shared.

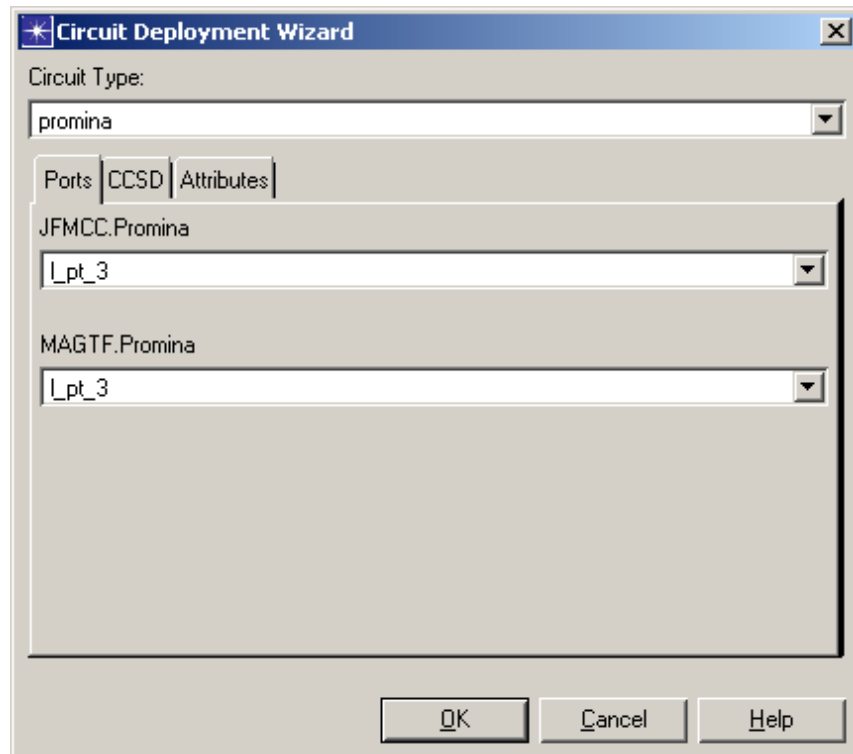
The Circuit Deployment Wizard provides step-by-step guidance for configuring Promina utility nodes.

---

### Procedure 3-24 Configure Promina Devices

- 1 Select **Topology > Deploy Circuit** to start the wizard. You must select at least two compatible circuit devices or OPFACs that contain circuit devices; otherwise, an error will be prompted and the wizard is terminated.

The Circuit Deployment Wizard dialog box displays.

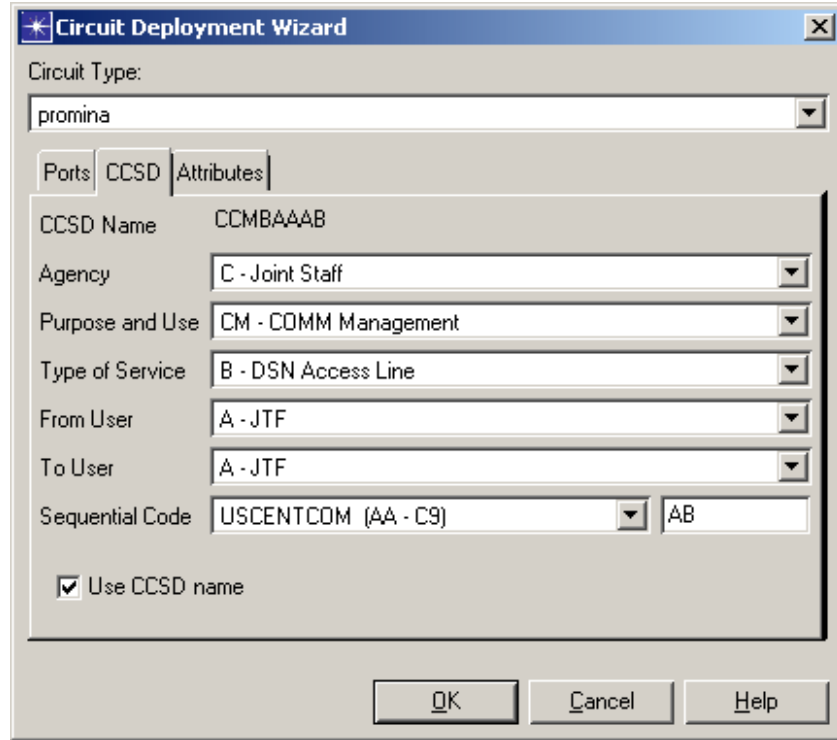


**Figure 3-36 Circuit Deployment Wizard Ports Tab**

**Note**—Click the **Help** button for information on the current dialog box, and the **Cancel** button at any time to terminate the wizard.

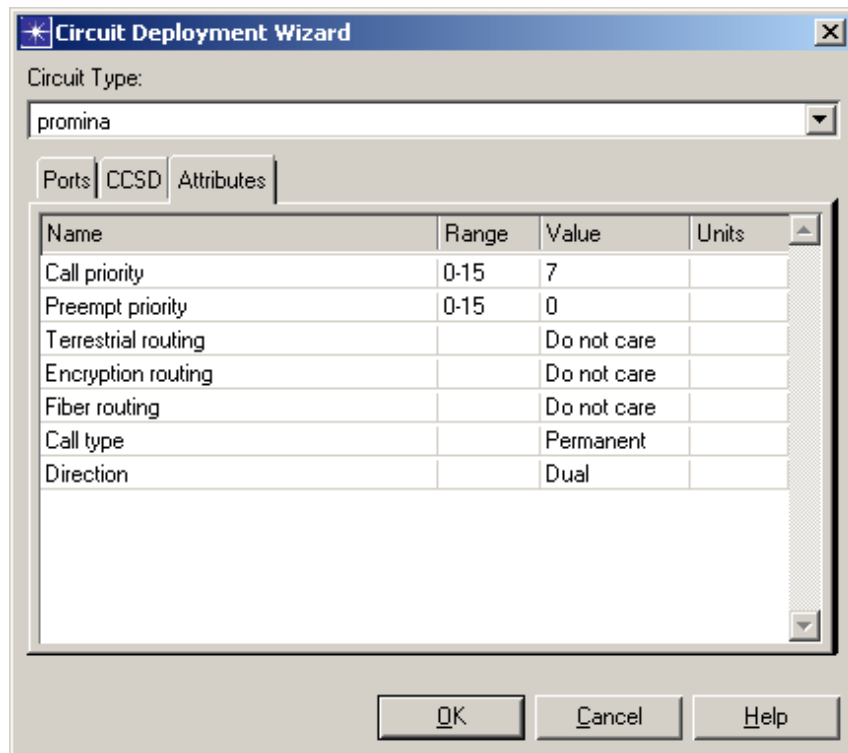
- 2 On the Ports tab, specify the ports for the selected source and destination Promina devices in the scenario.

- On the CCSD tab, configure the CCSD codes for the Promina circuit.



**Figure 3-37 Circuit Deployment Wizard CCSD Tab**

- On the Attributes tab, configure the circuit's attribute values.



**Figure 3-38 Circuit Deployment Wizard Attributes Tab**

The following attributes can be set for the Promina circuit:

- **Call priority** – Specify the range and value for call priority.
- **Preempt priority** – Specify the range and value for pre-empt priority.
- **Terrestrial routing** – **Do not care** leaves the attribute set to the default value
- **Encryption routing** – **Do not care** leaves the attribute set to the default value
- **Fiber routing** – **Do not care** leaves the attribute set to the default value.
- **Call type** – A **permanent** call will be set up at the beginning of simulation and never torn down; a **demand** call will be set up whenever demanded by the connected end devices and torn down if inactive.
- **Direction** – The direction of the circuit; some ports can only receive and some only send. **Dual** represents a full duplex circuit.

- 5 Click the **OK** button to complete the Promina circuit configuration and deploy the circuit.

#### End of Procedure 3-24

---

## Reviewing the Requirements Matrix

Answer a series of questions designed to help identify the requirements for a particular organization or OPFAC. Each new organization and OPFAC added to the project contains these default questions. The questions, which can be modified or deleted, are divided into five functional areas:

- Voice Services
- Data Services
- VTC Services
- Message Services
- Joint Digital Network

The collaborative planning features of JCSS allow lead planners to designate portions of the planning process/topology building to subordinate planners. To assist the subordinate planner in completing the assigned tasks, the lead planner should provide background information on the scenario using the requirements matrix.

A filter in the upper-right of the requirements matrix controls the type of requirements that display—either approved or requested.

Approved Requirements:

- Filled by the upper-level planners
- Requirements specified on organizations and OPFACs
- Values are not aggregated

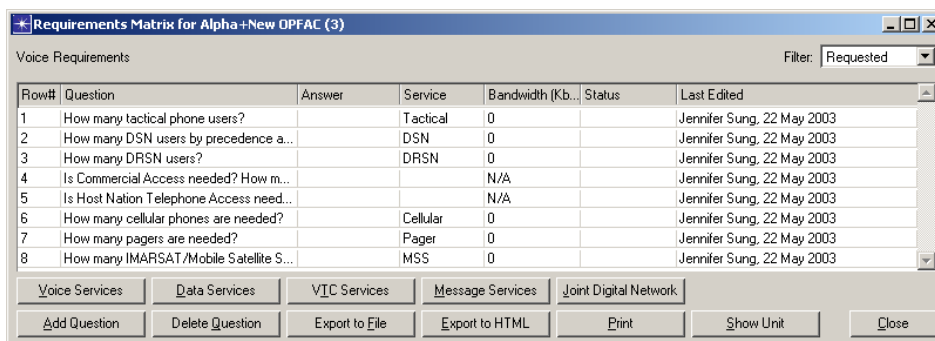
## Requested Requirements:

- Filled by the subordinate planners
- Requirements specified on organizations, OPFACs, and devices
- Values are aggregated from the lower up

---

**Procedure 3-25 Provide Requirements Matrix Information**

- 1 Right-click on the desired unit to open the shortcut menu, and then select **Open Requirements Matrix**. The Requirements Matrix dialog displays.



**Figure 3-39 Answering Requirements Matrix Questions**

- 2 Select either Approved or Requested in the Filter drop-down list in the upper-right of the Requirements Matrix to control the type of requirements that display.
- 3 Click the buttons below the table to view questions for each functional area.
- 4 Answer questions by clicking in the **Answer** cell and entering text in the dialog box that displays.
- 5 Click **Close** when complete.

**End of Procedure 3-25**

---

## Defining Additional Scenarios

When a project is created, there is only one scenario (a 'baseline' scenario) in the project. You may want to define additional scenarios to use to define specific points in time in the project, such as pre-deployment, deployment, and execution. JCSS allows you to define additional scenarios by either creating a new blank scenario, or creating an exact duplicate of an existing scenario under a new name.

You can switch easily from one scenario to another by selecting from a menu of available scenarios in the project.

A convenient way to manage all of the scenarios in a project is via the Manage Scenarios dialog box. Using this feature, you can view each scenario in the project and its status. Buttons and drop-down menus enable you to do the following:

- Add new scenarios,
- Duplicate scenarios,
- Delete scenarios,
- Run a simulation,
- Change the simulation duration,
- Delete results, and
- Reorder scenarios in the list.

---

#### Procedure 3-26 Create a New Scenario

- 1 Select **Scenarios > New Scenario**, or press **<Ctrl>+<Shift>+<N>**.
- 2 Enter a name for the scenario in the New Scenario Name field, and then click **OK**.

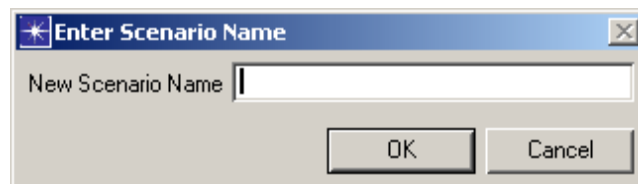


Figure 3-40 Creating a New Scenario

The new scenario is blank and contains no data. The Scenario Builder indicates in the title bar the current open scenario.

#### End of Procedure 3-26

---

#### Procedure 3-27 Duplicate a Scenario

- 1 Select **Scenarios > Duplicate Scenario**, or press **<Ctrl>+<Shift>+<D>**.
- 2 Enter a name for the scenario in the Duplicate Scenario Name field, and then click **OK**.

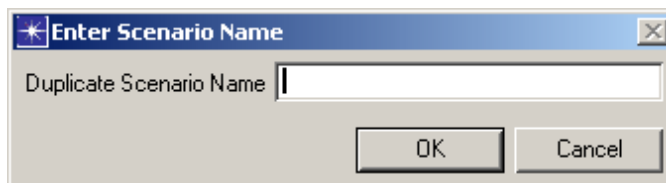


Figure 3-41 Duplicating a Scenario



The new scenario is an exact copy of the current scenario, which can serve as the baseline scenario. The Scenario Builder indicates the current open scenario in the title bar.

### End of Procedure 3-27

### Procedure 3-28 Switch Between Scenarios

- 1 Select **Scenarios > Switch To Scenario**; a menu displays the current scenarios in the project. A black bullet indicates the current scenario open in the Scenario Builder.
- 2 Select the name of the scenario that you want to display.

### End of Procedure 3-28

### Procedure 3-29 Manage Scenarios

- 1 Select **Scenarios > Manage Scenarios**. The Manage Scenarios dialog box displays.

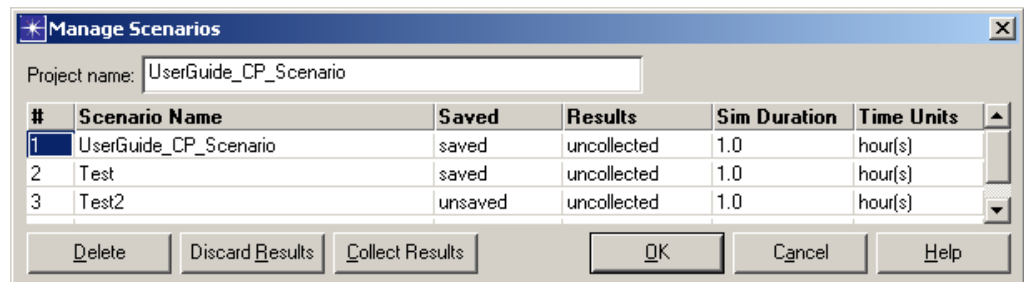


Figure 3-42 Manage Scenarios dialog box

- 2 Click in each table cell to edit its contents. Brackets indicate a change to the scenario is requested, and will be applied when you click **OK**.
  - **#**: Changes the order of the scenarios in the table.
  - **Scenario Name**: Lists the name of each scenario.
  - **Saved**: Shows if a scenario is saved or unsaved. Clicking within a cell also lets you delete a scenario.
  - **Results**: Shows the state of the results of each scenario simulation. “Uncollected” means that a probe file exists, but you have not run a simulation. “Out of date” means that the set of chosen results, simulation configuration, or network model has changed since the results file was created.
  - **Sim Duration**: Specifies the length of time to run the simulation. Use it with the Time Units column.
  - **Time Units**: Specifies the time units that apply to the simulation exam: seconds, minutes, hours, days, or weeks. Used with the Sim Duration column.

- 3 If you want to save the project under a new name, type the name in the **Project Name** field. This is similar to the **File > Save Project As...** feature.
- 4 If you want to delete a scenario from the project, select it in the list and then click **Delete**.
- 5 If you want to delete results from a scenario, select it in the list and then click **Discard Results**.
- 6 If you want to run a simulation and collect the specified statistics for a scenario, select it in the list and then click **Collect Results**.
- 7 Click **OK** to close the Manage Scenarios dialog box, and run any simulations that are waiting.
- 8 Click **Cancel** to close the Manage Scenarios dialog box without making changes.

**End of Procedure 3-29**

---

## Configuring Protocols

The Protocols menu contains operations related to the various protocols supported in the standard and specialized model libraries. The protocols are not documented in this manual; please refer to the OPNET documentation listed for each menu option below (consult the IT Guru documentation set, available via [Help > Documentation > IT Guru Documentation](#)):

**Table 3-2 Protocols Menu Items**

Menu Item	Description	Reference
Applications	Adds ACE application models to the existing network and configures application traffic.	<i>Model User's Guide</i>
Servers	Manages server models.	<i>Model User's Guide</i>
Mainframes	Manages mainframe models.	<i>Model User's Guide</i>
TCP	Configures TCP.	<i>Model User's Guide</i>
IP	Configures IP addresses, dynamic routing protocols, type of service characteristics for conversation pair traffic, autonomous system numbers on routers, and ping traffic.	<i>Model User's Guide</i>
Link16	Configures/assigns Time Slot Blocks (TSBs) on terminals in the network.	<i>Model User's Guide</i>

**Table 3-2 Protocols Menu Items**

<b>Menu Item</b>	<b>Description</b>	<b>Reference</b>
IPv6	Configures IPv6 addresses, routing protocols, interface status, and runs readiness assessment and migration planner.	<i>Model User's Guide</i>
BGP	Configures BGP start time, autonomous system numbers, and route re-distribution from other protocols into BGP.	<i>Model User's Guide</i>
EIGRP	Configures EIGRP start time and route re-distribution from other protocols into EIGRP.	<i>Model User's Guide</i>
IGRP	Configures IGRP start time and route re-distribution from other protocols into IGRP.	<i>Model User's Guide</i>
IS-IS	Configures interface metrics, interface circuit types, system types, metric styles, and SPF calculation parameters.	<i>Model User's Guide</i>
OSPF	Configures interface cost, OSPF start time, areas, and route re-distribution.	<i>Model User's Guide</i>
RIP	Configures RIP start time and route re-distribution from other protocols into RIP.	<i>Model User's Guide</i>
MPLS	Configures MPLS.	<i>Model User's Guide</i>
LDP	Enables/disables LDP protocol status on all/selected routers.	
RSVP	Enables/disables RSVP protocol status across connected interfaces on all/selected links.	<i>Model User's Guide</i>
ATM	Configures over-subscription on a per-service class basis for all or selected nodes in the network.	<i>Model User's Guide</i>
Frame Relay	Configures PVCs between nodes in the network.	<i>Model User's Guide</i>
Ethernet	Configures Ethernet.	<i>Model User's Guide</i>
FDDI	Configures FDDI.	<i>Model User's Guide</i>
VLAN	Configures virtual LANs (VLANs) for selected nodes and links.	<i>Model User's Guide</i>

**Table 3-2 Protocols Menu Items**

Menu Item	Description	Reference
STP	Applies STP visualization to the current scenario.	
MANET	Configures MANET.	<i>DSR Model User's Guide</i>
UMTS	Configures UMTS.	<i>Model User's Guide</i>
Wireless LAN	Configures Wireless LAN.	<i>Model User's Guide</i>

## Visualizing Protocol Configuration

To determine which routing protocols are running on your network, run the routing protocol visualization feature.

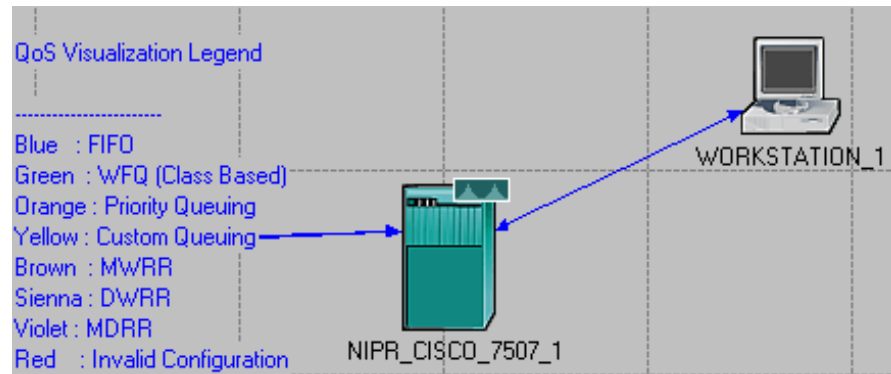
### Procedure 3-30 Run a Routing Protocol Visualization

- 1 Select **View > Visualize Protocol Configuration > (option)**.

Control the display of protocol configuration using the following options:

- **IP Interface Status** – Shows whether the connected interface is active or shutdown. A green up arrow indicates that interface is active whereas a red down arrow indicates that the interface is shutdown.
- **IP Routing Domains** – Shows the routing protocols that are configured on the router interfaces.
- **IP Address Types** – Shows the IP address types on the network by color, along with a legend to explain the color-coding.
- **IP QoS Configuration** – Shows the IP QoS configuration on the links.
- **IP Security Configuration** – Shows the packet filtering security configured on the links.
- **IP Tunnel Configuration** – Shows the router tunneling configured on the links.
- **BGP Peers** – Shows the BGP peering (neighbor) relationships in the network. EBGP confederation peers are shown in dark green, EBGP peers are shown in blue, all other colors indicate IBGP peers. You can view the tool tip of each peering visualization for more information about the peers. For networks using route reflection, the visualization also indicates if a router is a reflector or a client.
- **OSPF Area Configuration** – Shows the OSPF areas configured on the router interfaces.
- **ATM Routing Domains** – Shows which ATM routing protocols that are configured on the switch ports.
- **VLAN Configuration** – Shows the VLANs configured in the network.

- **Clear Visualization** – Removes all protocol configuration visualizations from the workspace.



**Figure 3-43 Viewing IP QoS Configuration on Links**

**End of Procedure 3-30**

---

## Viewing a Terrain Profile

The JCSS license includes a license for the Terrain Modeling Module GUI (TMMGUI). The terrain profile feature is always available in JCSS if the Terrain Data is available.

Use this feature to visualize the physics of a radio link by displaying a cross-section of the path between a transmitter and receiver, as well as an optional plot of signal strength variations along that path.

JCSS supports the following terrain data formats:

- DTED Level 0,
- DTED Level 1,
- 15-minute DEM data,
- 2-arc-second DEM data, and
- 1-degree-DEM data.

### Procedure 3-31 View a Terrain Profile

- 1 Select **Topology > Terrain > View Terrain Profile**.
- 2 In the workspace, click on the location of the transmitter, and then click on the location of the receiver. The View Terrain Profile dialog box opens, showing the terrain profile for the specified path.

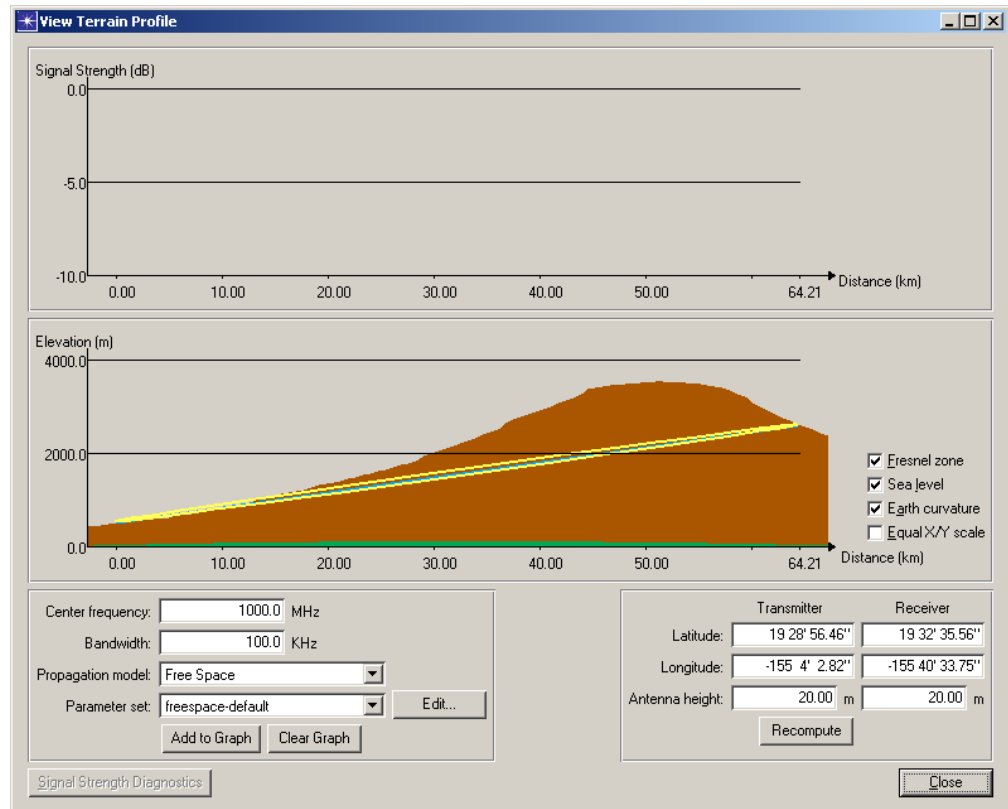


Figure 3-44 Viewing a Terrain Profile

- 3 Customize the signal path to match your situation by changing any of the parameters and clicking the **Recompute** button.
- 4 Control what is shown in the profile by selecting or deselecting any of the check boxes to the right of the profile. From the pull-down menus, select the propagation model and parameter set to use for the path loss calculations.
- 5 Click the **Add to Graph** button to generate the signal strength plot.
- 6 To see any messages generated by the path loss calculations, click the **Signal Strength Diagnostics** button.
- 7 To add additional plots to the graph, change the configuration as desired (for example, different frequency, propagation model, or parameter set) and click the **Add to Graph** button.

#### End of Procedure 3-31

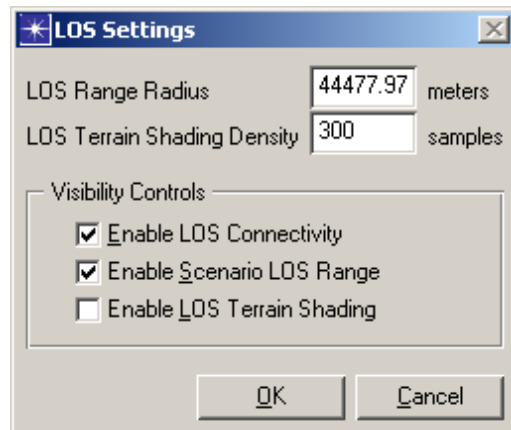
---

## Enabling Line-of-Sight (LOS) Connectivity and Range

Indicate whether a particular radio transmitter could communicate successfully with a radio receiver at a given location. This option requires terrain data; it computes LOS connectivity between multiple OPFACs and LOS range for selected OPFACs.

#### Procedure 3-32 Enable LOS Connectivity and Range

- 1 Select **View > Show LOS > LOS Settings**. The LOS Settings dialog box displays.



**Figure 3-45 Enabling LOS Connectivity and Range**

Measured in meters, the value in the **LOS Range Radius** field specifies the size of the circle that may appear around an organization or OPFAC. It is a nominal range, and this single setting affects all LOS Visualization in the editor. For reference, 10,000 meters is the typical transmission limit when terrain elevation data is not available. Transmitters assisted by elevation could transmit many times this distance.

The value in the **LOS Terrain Shading Density** field specifies the number of samples to check within the LOS Range Radius for determining LOS Terrain Effects Shading. More samples give a more accurate representation, but can also slow display as more information must be considered to update Terrain Effects Shading.

- 2 Select the **Enable LOS Connectivity** checkbox if you want to allow the editor to display LOS Connectivity links when selected for organizations or OPFACs. This options is enabled by default.

LOS Connectivity is a thick, dashed, double-headed arrow. The color of the arrow indicates whether the two objects could communicate. Connectivity is bi-directional and independent of specific device characteristics. Connectivity is based on signal loss between the transmitter and receiver positions as determined by the Longley-Rice signal propagation model.

LOS Connectivity exists between OPFACs. Organizations that contain OPFACs may display LOS Connectivity links when they are collapsed. Enabling LOS Connectivity on an organization enables LOS Connectivity on all subordinate organizations and OPFACs. An organization that contains no subordinate OPFACs will not display any LOS Connectivity links (it would not be able to join a broadcast network or connect via point-to-point links either).

LOS Connectivity works through broadcast networks and point-to-point transmission links to determine all of the OPFACs to which a selected Organization or OPFAC could possibly communicate and designates the state of that communication link. LOS Connectivity links are attributes of their end points. The existence of LOS Connectivity links indicates that one or both of the objects at an end of the link has LOS Connectivity enabled. LOS Connectivity links disappear when neither end point has LOS Connectivity enabled, in either the top-level organization or any subordinate organization or OPFAC. LOS Connectivity link coloration is automatically updated when either end point moves for any reason, including mouse dragging, attribute changes, or animation, to reflect the LOS closure state at the new location.

- 3 Select the **Enable Scenario LOS Range** checkbox if you want to allow the editor to display LOS Range circles and Terrain Effects Shading for selected organizations or OPFACs. This option is enabled by default.

LOS Range is a circle of a fixed radius placed around the organization or OPFAC in question. The circle represents a ground distance and is used as a reference for the distance from a particular object. There is a single setting for the range that pertains to all LOS Ranges displayed in the entire scenario. The LOS Range is a nominal indicator, having no direct connection to a particular device's transmission range. The LOS Range does indicate the limit of the area within which locations may be sampled for determining LOS Terrain Shading.

Any organization or OPFAC may display an LOS Range without regard for the type of device contained within or even if an OPFAC or device is contained. The LOS range simply indicates a distance.

- 4 Select the **Enable LOS Terrain Shading** checkbox if you want to allow the editor to display Terrain Effects Shading if LOS Range is also enabled. This option is disabled by default.



Terrain Effects Shading indicates portions of the area around an organization or OPFAC where a radio receiver could not receive a hypothetical transmission from the object.

Since the LOS Range defines the limit of the area where LOS Terrain Shading is tested, LOS Range must be enabled to view LOS Terrain Shading. Disabling LOS Range on an object also disables LOS Terrain Shading.

Like LOS Range, LOS Terrain Shading does not indicate anything about the specific OPFACs or devices contained within the designated object. It simply indicates that if the object contained a radio transmitter, that radio transmitter would or would not be able to communicate with a generic radio device at a particular location.

LOS Terrain Shading works by testing for LOS closure at a predetermined number of sample locations evenly spaced throughout the circle formed by the LOS Range. You can select the number of samples to take.

LOS Terrain Shading updates when the selected object moves for any reason, whether by mouse dragging, attribute change, or animation.

- 5 Click **OK** to accept the settings in the LOS Settings dialog box.

---

**End of Procedure 3-32**

---

## Displaying Line-of-Sight (LOS) Connectivity

Indicate whether the two objects could communicate. Connectivity is bi-directional and independent of specific device characteristics. Connectivity is based on signal loss between the transmitter and receiver positions as determined by the Longley-Rice signal propagation model.

---

### Procedure 3-33 Display LOS Connectivity

- 1 Select OPFAC(s) of interest in workspace. To use this feature, a broadcast network must connect the OPFACs.
- 2 Right-click to open the shortcut menu, and then select **Enable LOS Connectivity**.
- 3 Invalid connections are indicated by red links, clear connections are indicated by green links.

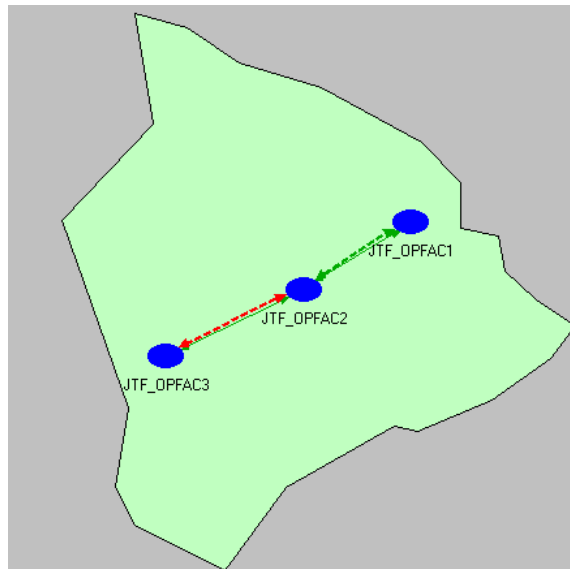


Figure 3-46 Displaying LOS Connectivity

End of Procedure 3-33

---

## Displaying Line-of-Sight (LOS) Range

Indicate LOS range, a circle of fixed radius placed around the organization or OPFAC in question. The circle represents a ground distance and is used as a reference for the distance from a particular object.

---

### Procedure 3-34 Display LOS Range

- 1 Select unit(s) of interest in workspace.
- 2 Right-click to open the shortcut menu, and then select **Enable Object LOS Range**.
- 3 LOS Range displays as a circle around the unit.

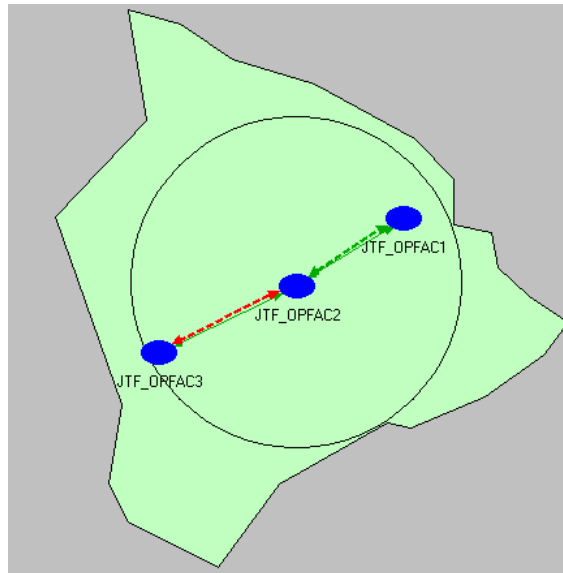


Figure 3-47 Displaying LOS Range

End of Procedure 3-34

---

## Displaying Terrain Effects Shading

Indicate portions of an area around a unit where a radio receiver could not receive a hypothetical transmission from the object.

---

### Procedure 3-35 Display Terrain Effect Shading

- 1 Make sure **Enable LOS Terrain Shading** is selecting in the LOS Settings dialog box.
- 2 After enabling LOS Range for an object, right-click to open the shortcut menu.
- 3 Select **Display Terrain Effects**.

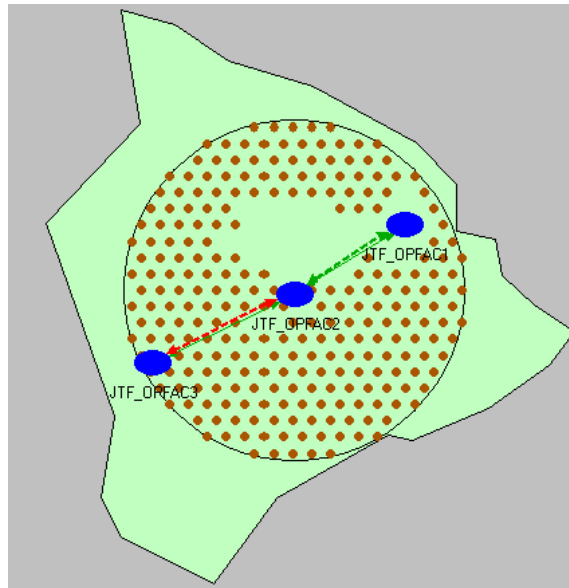


Figure 3-48 Displaying Terrain Effects Shading

End of Procedure 3-35

---

# 4 Traffic Specification

## Creating IERs

Specify the conveyance of messages/data through your communications system. IERs are Information Exchange Requirements.

### Procedure 4-1 Create an IER

- 1 Right-click on an OPFAC to open the shortcut menu, and then select **View Traffic**; the Edit IER Parameters table displays.

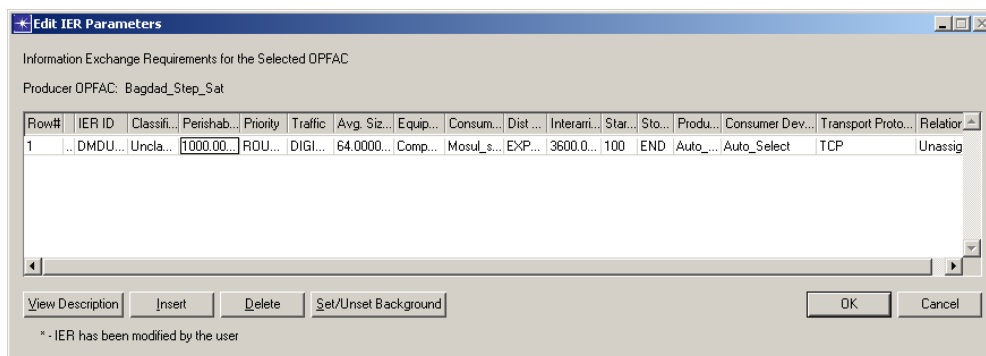


Figure 4-1 Specifying IER Attributes

- 2 Click the **Insert** button. A new IER containing default settings is created in row 1.
- 3 Modify IER attributes by clicking in the desired cell and entering new parameters:
  - 3.1 **IER ID** – Identifies an IER in the database. IDs for IERs that are created by a user start with the prefix USER, as not to conflict with IER IDs in the database. Background IERs start with the prefix BKGD.
  - 3.2 **Classification** – Specifies the security classification of an IER. The security classification of an IER is one criterion that determines the system element through which the IER is transmitted.
  - 3.3 **Perishability** – Specifies the time in seconds for which the IER is alive.
  - 3.4 **Priority** – Determines the number of transmission retries and the wait time between successive retries.
  - 3.5 **Traffic** – Specifies the type of IER traffic.
  - 3.6 **Average Size** – Indicates the average size of the IER in bytes.
  - 3.7 **Equipment** – Specifies the system element on which the IER can be transmitted.
  - 3.8 **Consumer** – Identifies OPFAC consumer of the traffic.
  - 3.9 **Distribution Type** – Indicates the inter-arrival distribution for the IERs.
  - 3.10 **Interarrival** – Represents the time, in seconds, between IER firings.

**3.11 Start Time** – Identifies the time, in seconds, in which the IER will begin firing after a simulation begins.

**3.12 Stop Time** – Identifies the time, in seconds, in which the IER will stop firing after the simulation begins.

**3.13 Producer Device** and **Consumer Device** – Indicates the devices transmitting and receiving the IER.

**3.14 Transport Protocol** – Identifies the protocol used for transporting the IER.

**3.15 Relationships** – Defines start and stop times for specific relationship types. IERs will only be allowed to pass if they fall within the active time window of the infrastructure.

4 Click **OK**.

**Note**—IERs can also be imported from the IER Database or text files. Consult the *JCSS Technical Reference Manual* for import instructions.

#### End of Procedure 4-1

---

---

## Creating Threads

Threads are groups of IERs that are fired in segments. For example, an OPFAC can fire an IER to their platoon leader OPFAC, which in turn can fire an IER to the company commander OPFAC. Threads can be configured to fire traffic only when certain conditions are met.

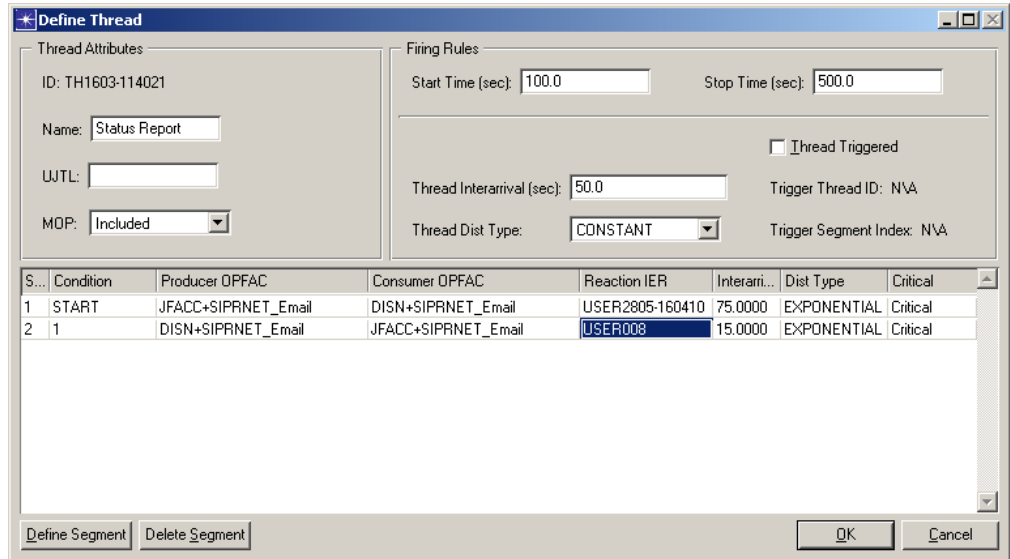
---

#### Procedure 4-2 Create a Thread

- 1 Right-click on the OPFAC to be the starting point of the thread, and then select **View Threads** from the shortcut menu; the View Threads dialog box displays.
- 2 Click **Define Thread** to open the Define Thread dialog box. Set the desired attributes for the thread in the dialog box fields.
- 3 Click **Define Segment** to add the desired IERs and define their attributes and segment information.
- 4 Click **OK**; a summary of the newly created thread displays in the View Threads dialog box.

5 Click **OK** to save the thread.

**Note**—Threads can also be imported from outside COTS applications. Consult the *JCSS Technical Reference Manual* for import instructions.



**Figure 4-2** Creating Threads

**End of Procedure 4-2**

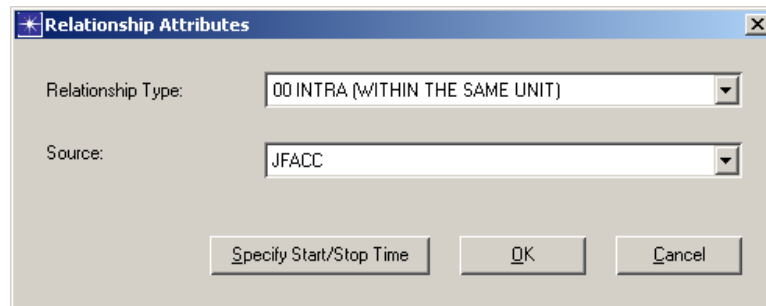
## Creating Relationships

Define the association or connection between two or more OPFACs. Relationships can be used to visualize command structure and to facilitate traffic flow for JCSS' capacity planning features.

---

### Procedure 4-3 Create a Relationship

- 1 Select the OPFACs that you want to associate in the workspace.
- 2 Select **Topology > Deploy Relationship**. The Relationship Attributes dialog box displays.



**Figure 4-3 Creating a Relationship**

- 3 Select the type of relationship from the Relationship Type drop-down menu.
- 4 Select the source OPFAC from the Source drop-down menu.
- 5 Click **OK**. The relationship between the selected OPFACs is created.

### End of Procedure 4-3

---



## Converting Applications into Flows

Automatically convert standard OPNET application and profile configuration parameters into IP flow objects. This process turns the discrete application traffic into background flows for use in simulation or traffic visualization. After creating the flows, the application and profile configuration objects are cleared of all traffic information in order to prevent duplication of traffic during simulation. It is recommended that a duplicate scenario be created prior to using this feature if you want to keep the application and profile configurations for later use.

### Procedure 4-4 Convert Applications into Flows

- 1 Select **Traffic > Convert Traffic > Applications to Flows**. The Convert Applications to Flows dialog box displays.

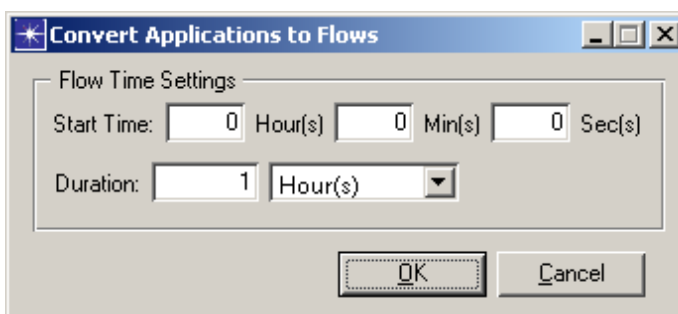


Figure 4-4 Converting Applications into Flows

- 2 Enter flow generation parameters as needed, and then click **OK**.
  - 2.1 Enter the start time of the flow objects in the **Start-Time (Hours, Minutes, Seconds)** fields. This will effectively act to truncate all flow traffic recorded prior to the value provided. The flow's bps and pps values during this time will be set to 0.0. The input values must be integers.
  - 2.2 Enter the duration of the simulated calculation window in the **Duration (Length, Units)** field. This method corresponds to the Capacity Planning Optimization feature. The input value must be an integer.

Flows will be aggregated for any source/destination pair. Thus, any number of applications that contribute to traffic between a given client and server will be aggregated into two flows with one for each direction of travel.

### End of Procedure 4-4

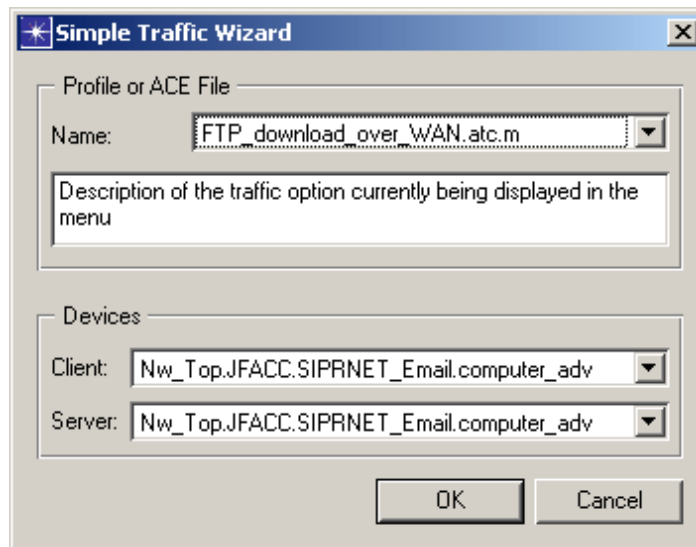
## Deploying Traffic Using the Traffic Wizard

Deploying traffic between a single client-server pair within JCSS can be performed easily via the Traffic Wizard. Select two OPFACs, and then the Traffic Wizard walks you through selecting the end devices (and the profile to deploy between the client and server devices), and deploying a link between them.

---

### Procedure 4-5 Deploy Traffic using the Traffic Wizard

- 1 Select **Traffic > Traffic Wizard** (or press **<Ctrl> + W**) to launch the Traffic Wizard.



**Figure 4-5** Traffic Wizard

**Note**—The Traffic Wizard will launch only if you have selected two OPFACs between which the traffic is to be deployed.

- 2 Select a profile to deploy, specify client and server devices, and then click **OK**.

### End of Procedure 4-5

---

# 5 Capacity Planning

## Evaluating a Network

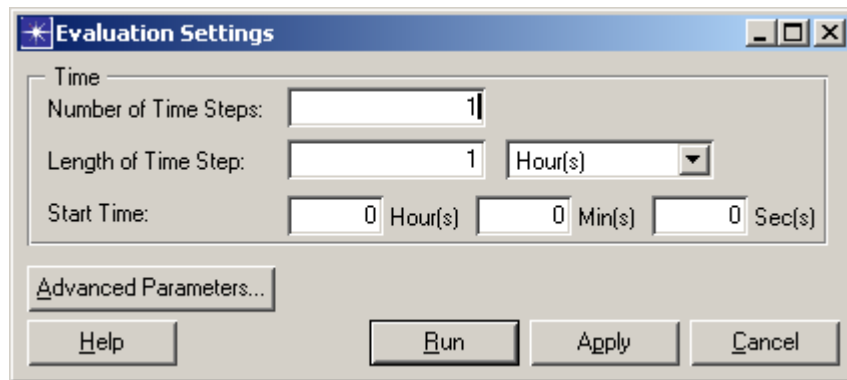
Evaluate a scenario in its current state during the specified time interval or intervals. This is different from running an optimization in that it evaluates the scenario with the current capacities for links and networks. It does not mutate the capacities of the links and networks. It routes the demands through the links and broadcast networks, and provides a summary of the scenario's current condition.

The Evaluation Settings dialog box allows you to set the number of time steps, length of each time step, and the start time. For example, if you know that your peak usage occurs from 9 A.M. to noon, you could evaluate that time period by setting number of time steps to 3, length of time step to 1 hour, and start time to 9 hours 0 minutes 0 seconds.

### Procedure 5-1 Perform a Network Evaluation

**Evaluate Current Network**

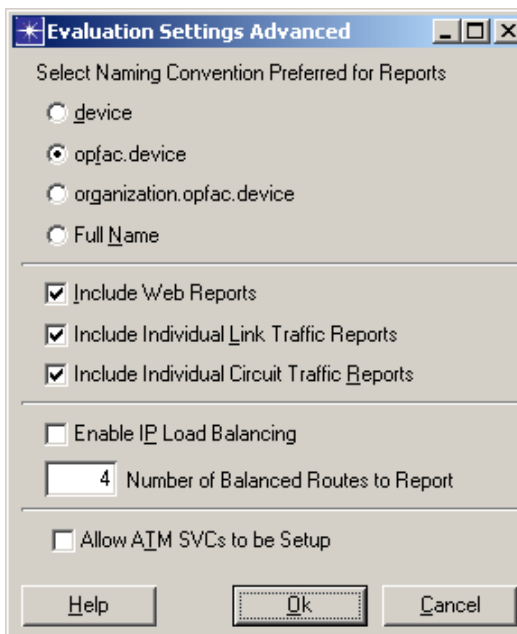
- 1 Select **Capacity Planning > Evaluate** or click the **Evaluate Current Network** button.
- 2 Set parameters as needed for the evaluation.



**Figure 5-1 Setting Evaluation Parameters**

- 2.1 **Number of Time Steps:** A Capacity Planning Evaluation can be done for multiple time steps by setting this value to an integer greater than one. Reports will be created for the evaluation at each time step as well as reports reflecting results over the entire time of evaluation. Must be an integer greater than zero.
- 2.2 **Length and Units of Time Steps:** The length and units of the time steps used in the evaluation. The value selected must be an integer greater than zero. Units can be seconds, minutes, hours, days or weeks.
- 2.3 **Start Time:** The start time used for the evaluation in hours, minutes and seconds. All values must be integers greater than or equal to 0.

- 3 To provide finer control of the evaluation process, click the **Advanced Parameters** button (optional).



**Figure 5-2** Setting Advanced Evaluation Parameters

- 4 Edit advanced parameters as needed, and then click **OK**.
  - 4.1 **Naming Convention**: The names of all the devices and links that are in the report will use the naming convention selected here.
  - 4.2 **Include Web Reports**: If this option is selected, the link and circuit traffic reports are also selected. Unchecking this will disable the options for the individual reports.
  - 4.3 **Include Individual Link Traffic Reports**: If this option is selected, individual reports will be included in the web report for each link in the scenario. The reports will include all the traffic going directly over the link as well as any circuits that are going over the link. The reports will take longer to generate if this option is selected.
  - 4.4 **Include Individual Circuit Traffic Reports**: If this option is selected, individual reports will be included in the web report for each routable circuit. The reports will include all the traffic using the circuit. The reports may take longer to generate if this option is selected.
  - 4.5 **Enable IP Load Balancing**: If this checkbox is selected, IP load balancing will be done during the evaluation so that traffic will use multiple equal hop length paths.
  - 4.6 **Number of Balanced Routes to Report**: If IP load balancing is selected, then the number of balanced routes to report can be selected. The entry must be an integer greater than 0. This number of route reports will be reported in the web reports
  - 4.7 **Allow ATM SVCs to be Setup**: If this checkbox is selected, ATM SVCs will be setup during the evaluation when applicable.

- 5 After specifying the evaluation parameters, click the **Run** button in the Evaluation Settings dialog box to start the evaluation.
- 6 After the evaluation is complete, the evaluation web reports launch automatically.

**End of Procedure 5-1**

## Optimizing a Network

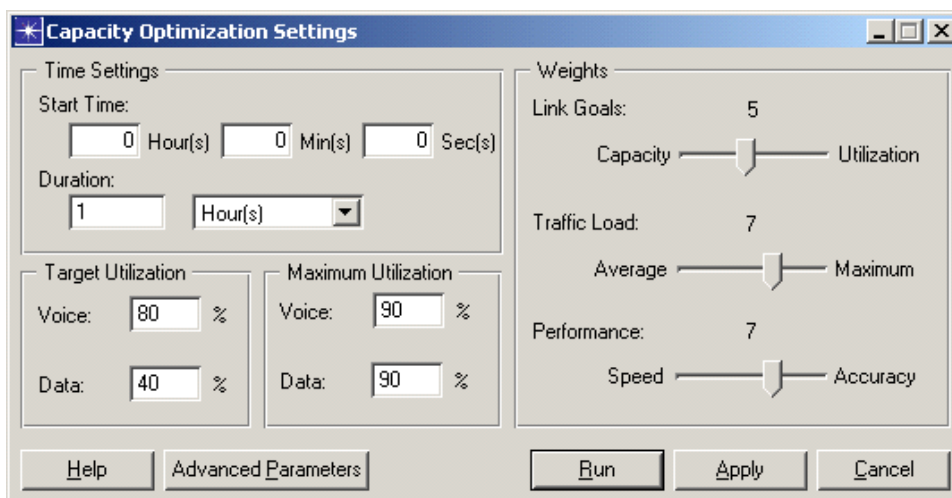
Given a network and its demands, the optimization process provides suggestions for optimal link and network capacities. If a link is over-utilized, optimization will suggest an alternate capacity that will support the demands and keep the cost of the link down to the required minimum. If a link is under-utilized, optimization will decrease the capacity for that link.

Before a capacity optimization is run, specify parameters that control how optimal solutions for the scenario are computed. Use the optimization parameters to search for an optimal solution with the smallest objective value cost. The Simulated Annealing Engine will try different configurations, increasing or decreasing the size of the links and networks, computing an objective cost for each.

### Procedure 5-2 Perform a Network Capacity Optimization

**Start Capacity Optimization**

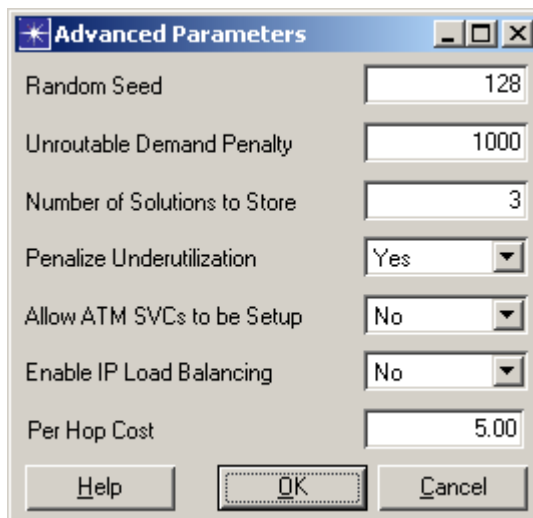
- 1 Click the **Start Capacity Optimization** button or select **Capacity Planning > Capacity Optimization > Start Optimization**. The Capacity Optimization Settings dialog box displays.



**Figure 5-3 Setting Optimization Parameters**

- 2 Specify the start time and the duration for the optimization process.
- 3 Specify Voice and Data Target and Maximum Utilizations.

- 4 Specify weights for Link Goals, Traffic Load, and Performance by setting the corresponding slider bar.
- 5 To provide finer control of the optimization process, click the **Advanced Parameters** button (optional).



**Figure 5-4** Setting Advanced Optimization Parameters

- 6 Edit advanced parameters as needed, and then click **OK**.

**Note**—Consult the *JCSS Technical Reference Manual* for descriptions of all optimization settings and advanced optimization settings.

- 7 After specifying the optimization parameters, click the **Run** button in the Capacity Optimization Settings dialog box to start the optimization.

JCSS computes the routes for the demands and then starts the optimization.

#### End of Procedure 5-2

---

## Specifying Alternate Link Capacities

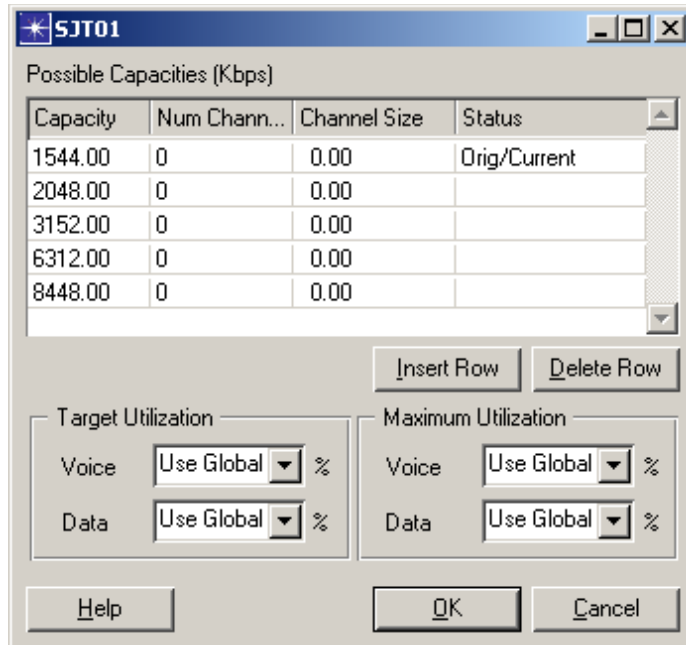
Suggest alternate link capacities that might improve the ability of the network architecture to support the mission plan. These settings are used to feed the optimization engine with an avenue of recourse; if capacity is exhausted in one link, available capacity alternatives are suggested during the optimization process.

---

#### Procedure 5-3 Specify Alternate Link Capacities

- 1 Right-click on a link and choose **Edit NETWARS Attributes**.
- 2 From the Link Attributes dialog box, click the **Optimization Attributes** button.

3 Specify possible alternate capacities for the link, and then click **OK**.



**Figure 5-5 Specifying Alternate Link Capacities**

**3.1 Possible Capacities table:** Use to specify all of the capacities that the optimization engine can use when mutating solutions. For example, if there are two capacities specified, then the engine will be able to set either of them as the suggested capacity for this link.

The first column in the table is the total capacity (voice capacity plus data capacity), the second is the number of voice channels, and the third is the voice channel size. Note that total capacity must be greater than or equal to the number of voice channels times the voice channel size. Anything left over is the capacity that is available for data. Any of these parameters can be modified by clicking on the appropriate cell and typing in a new value.

The fourth column in the table is status. This column is used to mark the “original” capacity and the “current” capacity (or “orig/current” if the current capacity is also the original capacity).

- 3.2** To add a new capacity, click **Insert Row** and then type the values into the cells of the new row.
- 3.3** Select a cell in the row to remove, and then click **Delete Row** to remove the capacity.
- 3.4 Target Utilization fields:** Use to specify the voice and data target utilization to be achieved on this link. The default value is to use the global values specified in the Capacity Optimization Settings dialog box. You can override this just on this link by specifying a new value.
- 3.5 Maximum Utilization fields:** Use to specify the voice and data maximum utilization that is allowed on this link. When you run the optimization with an emphasis on minimizing capacity (Link Goals slider < 4) or getting the utilization close to the target (Link Goals slider > 7), a new capacity is considered only if it will keep the link utilization under the specified maximum utilization.

The default maximum utilization is set to use the global values specified in the Capacity Optimization Settings dialog box. You can override this just on this link by specifying a new value.

### End of Procedure 5-3

---

## Displaying Web Reports

Display web reports after a Capacity Planning Evaluation or Optimization. Web reports include the following reports for the overall evaluation: Executive Summary, Overall Peak Results, and Overall Average Results.

Additionally there are a group of reports which are generated for each time step: Traffic Report, Link Utilization Report, Link Subscription Report, Promina Circuit Report, CellXpress & ATM Circuit Report, Frame Relay Circuit Report, and an FCC-100 Circuit Report.

There are also Route Reports for each routed circuit and traffic demand, and Unroutable Reports for each unroutable circuit and traffic demand. Each Individual Link also has a group of tables that show the circuit and traffic demands which flow over it specifically.

---

### Procedure 5-4 Display Web Reports

- 1 To open a report, select the desired option from the **Capacity Planning > Reports** menu.
- 2 To change settings used in the web reports, select **Capacity Planning > Reports > Settings**.

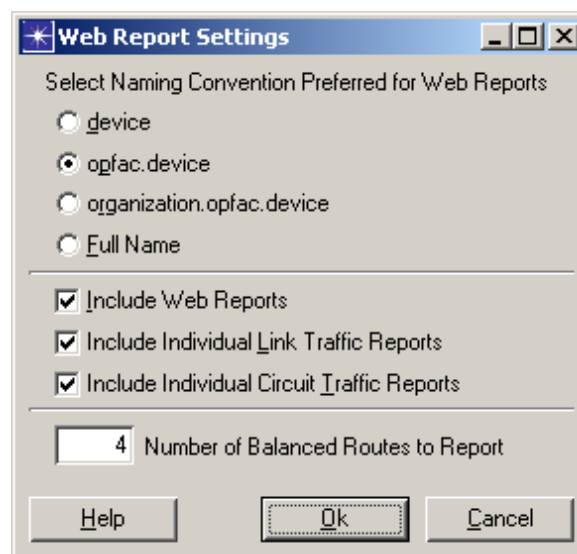


Figure 5-6 Changing Web Report Settings



- 3 Edit web report settings as needed, and then click **OK**.
  - 3.1 **Naming Convention**: The names of all the devices and links that are in the report will use the naming convention selected here.
  - 3.2 **Include Web Reports**: If this option is selected, the link and circuit traffic reports are also selected. Unchecking this will disable the options for the individual reports.
  - 3.3 **Include Individual Link Traffic Reports**: If this option is selected, individual reports will be included in the web report for each link in the scenario. The reports will include all the traffic going directly over the link as well as any circuits that are going over the link. The reports will take longer to generate if this option is selected.
  - 3.4 **Include Individual Circuit Traffic Reports**: If this option is selected, individual reports will be included in the web report for each routable circuit. The reports will include all the traffic using the circuit. The reports may take longer to generate if this option is selected.
  - 3.5 **Number of Balanced Routes to Report**: If IP load balancing is selected, then the number of balanced routes to report can be selected. The entry must be an integer greater than 0. This number of route reports will be reported in the web reports

**End of Procedure 5-4**

---

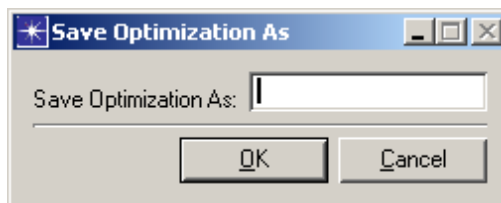
## Saving Optimization Settings

Save the results of multiple optimization runs and the effects of changing certain parameters on the optimization; saved optimization runs can be compared.

---

### Procedure 5-5 Save Optimization Settings

- 1 When the optimization is complete, save the results of the optimization by selecting **Capacity Planning > Capacity Optimization > Save Optimization As**.
- 2 Enter a name for the optimization run in the Save Optimization As dialog box, and then click **OK**.



**Figure 5-7 Saving Optimization Settings**

**End of Procedure 5-5**

---

## Managing Optimization Results

Compare saved optimization results as follows:

- Compare Parameters
- Compare Bandwidths

---

### Procedure 5-6 Compare Optimization Results

- 1 Select **Capacity Planning > Capacity Optimization > Manage Optimization Results**. The Manage Capacity Optimization Results dialog box displays.

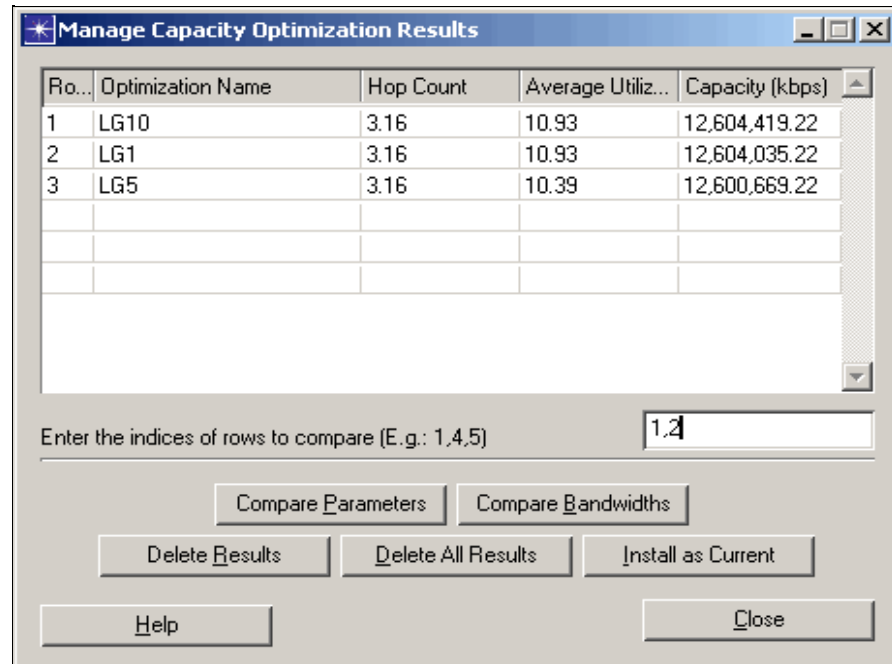


Figure 5-8 Managing Optimization Results

- 2 Select the row numbers for the optimizations to compare and click either **Compare Parameters** or **Compare Bandwidths** to compare the optimizations.

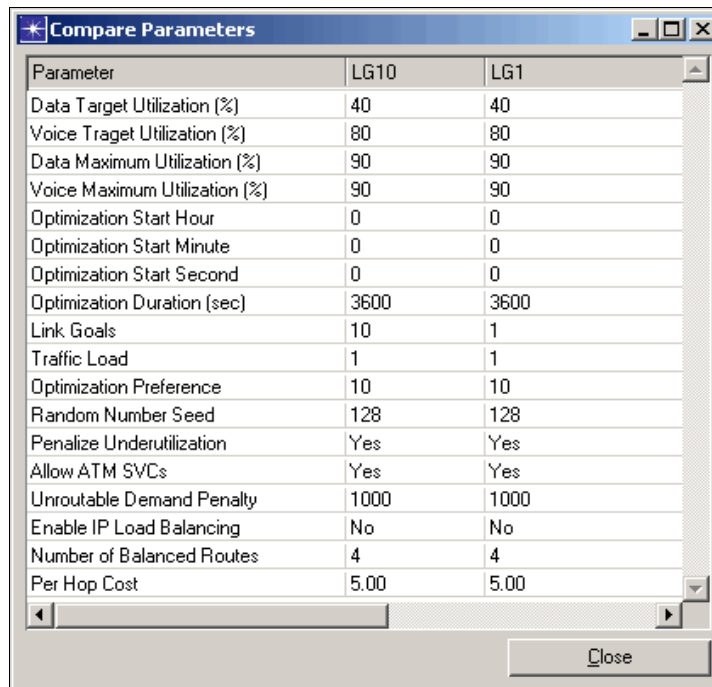


Figure 5-9 Comparing Parameters

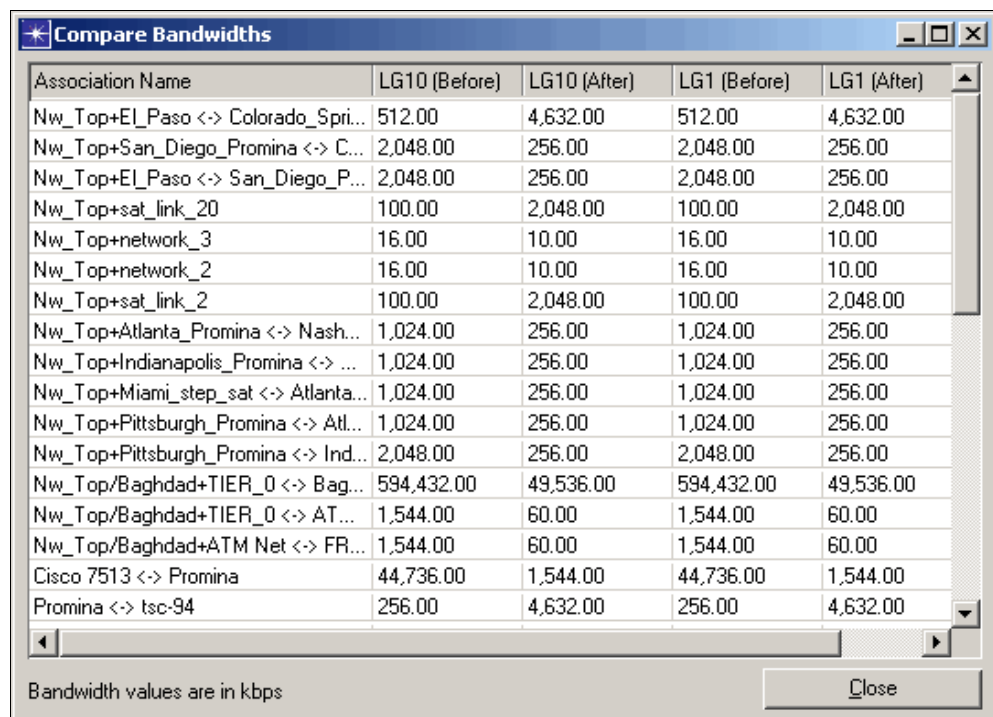


Figure 5-10 Comparing Bandwidths

End of Procedure 5-6

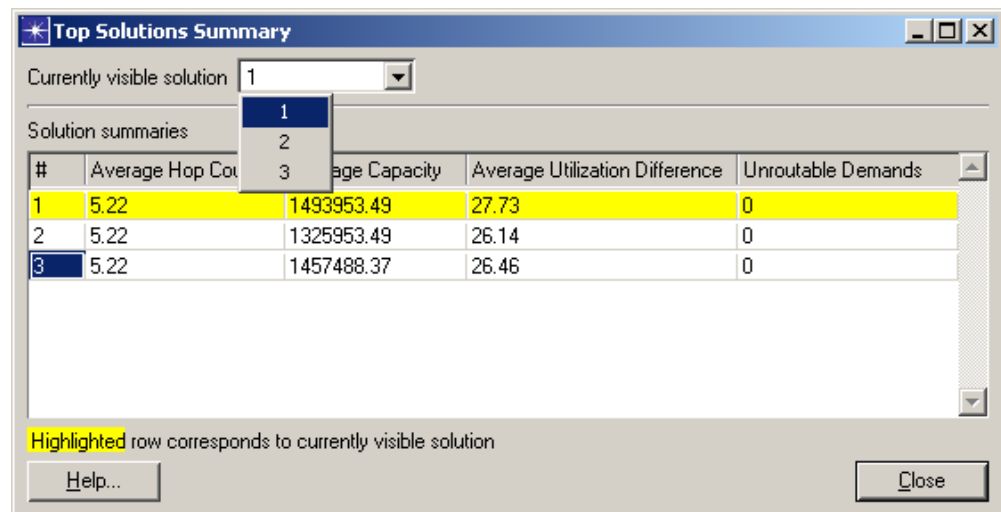
## Examining Top Solutions

Review top solutions and use the one you think is best.

---

### Procedure 5-7 Examine Top Solutions

- 1 Specify the number of solutions the engine must keep track of in the Advanced Parameters of the Configuration Settings dialog box before the optimization is run.
- 2 When the optimization is complete, select **Capacity Planning > Capacity Optimization > Examine Top Solutions**.
- 3 Use the Currently Visible Solution drop-down menu to view a desired solution.



**Figure 5-11 Examine Top Solutions**

**End of Procedure 5-7**

---

## 6 Simulation Execution

### Choosing Device and Link Statistics

Choose statistics on devices, external links, and internal links to be collected during simulation.

#### Procedure 6-1 Specify Statistics for Collection During Simulation

- 1 Select the object in the workspace for which the statistics will be collected.
- 2 Select **DES > Choose Individual Statistics** or select **Choose Individual Statistics** from the shortcut menu.
- 3 Select statistics to be collected during a simulation by clicking the checkboxes next to the desired statistics.
- 4 Right-click on the individual statistic and select **Change Collection Mode**, as needed. The **all values mode** will collect all of the data points in a simulation for a particular statistic. In the **bucket mode**, a representative data point (e.g., max value, etc.) will be collected to represent all the other data points in that bucket.

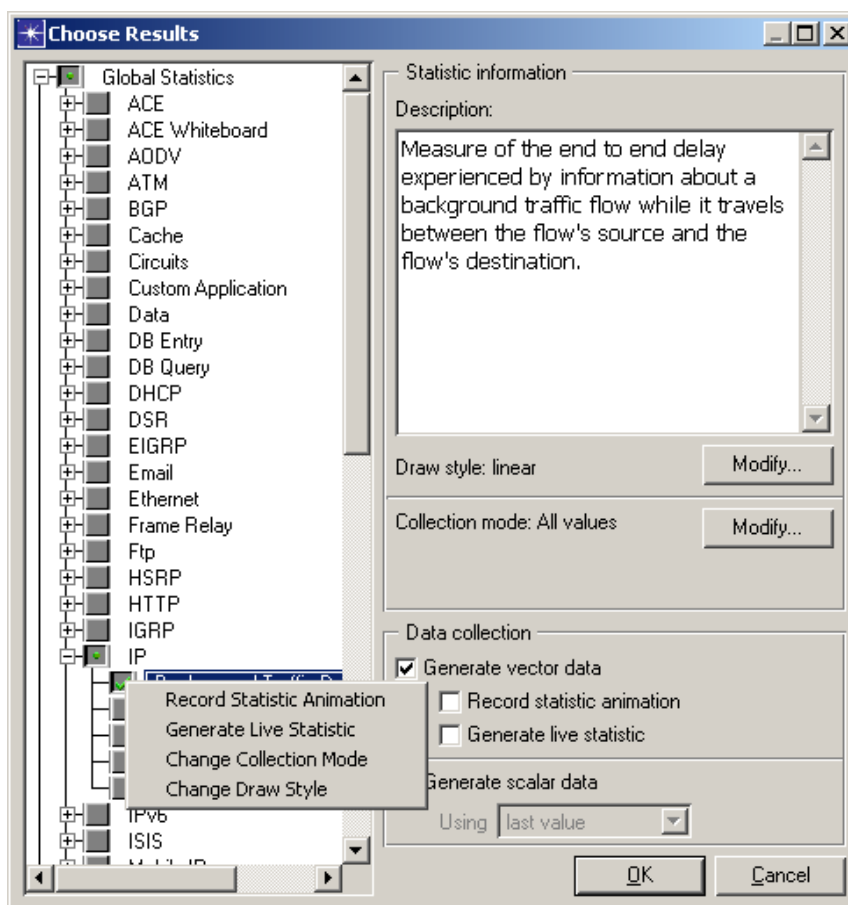


Figure 6-1 Choosing Device Statistics

- 5 Click **OK**.

### End of Procedure 6-1

---

### Procedure 6-2 Specify Advanced Statistics for Collection During Simulation

- 1 Select the object in the workspace for which the statistics will be collected.
- 2 Select **DES > Choose Statistics (Advanced)**. The Probe Model window displays advanced statistics on devices, inter-OPFAC, and intra-OPFAC links to be collected during simulation.

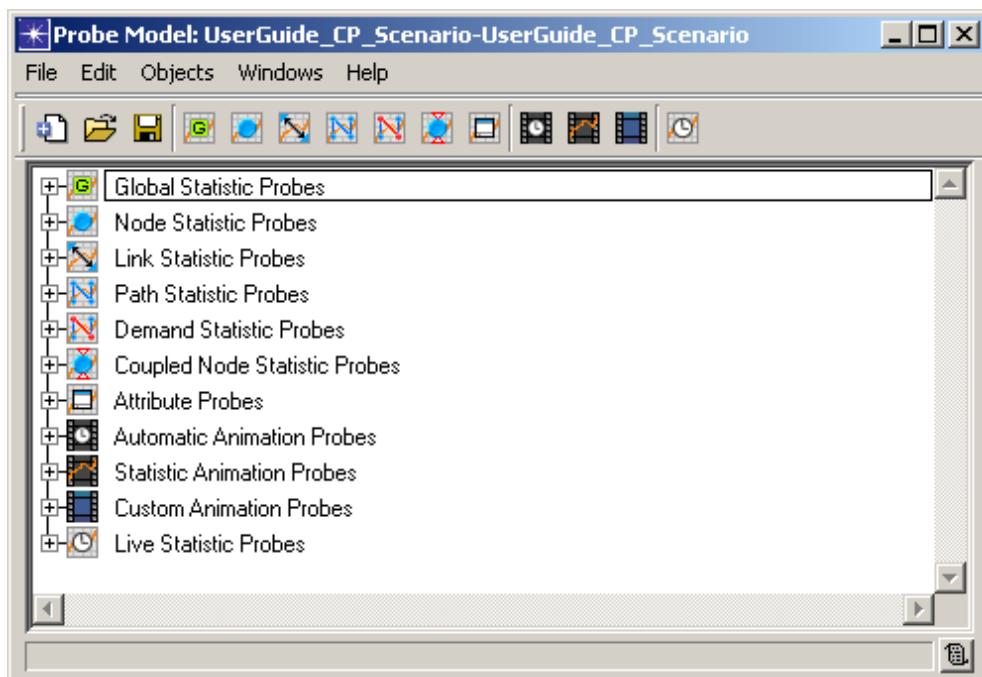


Figure 6-2 Choosing Advanced Device Statistics

### End of Procedure 6-2

---

## Running a Simulation

Evaluate your scenario's network performance through the use of simulations. Simulations model communications behavior of the network and provide detail down to the packet and protocol level. You can choose to use a "simple" configuration mode or a "detailed" configuration mode. The simple mode presents fewer controls to configure, thereby simplifying the configuration and execution of DES.

### Procedure 6-3 Perform a Network Simulation

#### Configure/Run Simulation

- 1) Click the **Configure/Run Simulation** button or select **DES > Configure/Run Discrete Event Simulation**. The Configure/Run DES dialog box displays in simple mode. This dialog box has a set of commonly used dialog box controls, and two tabbed windows to configure DES inputs (Global attributes) and outputs (Reports.)

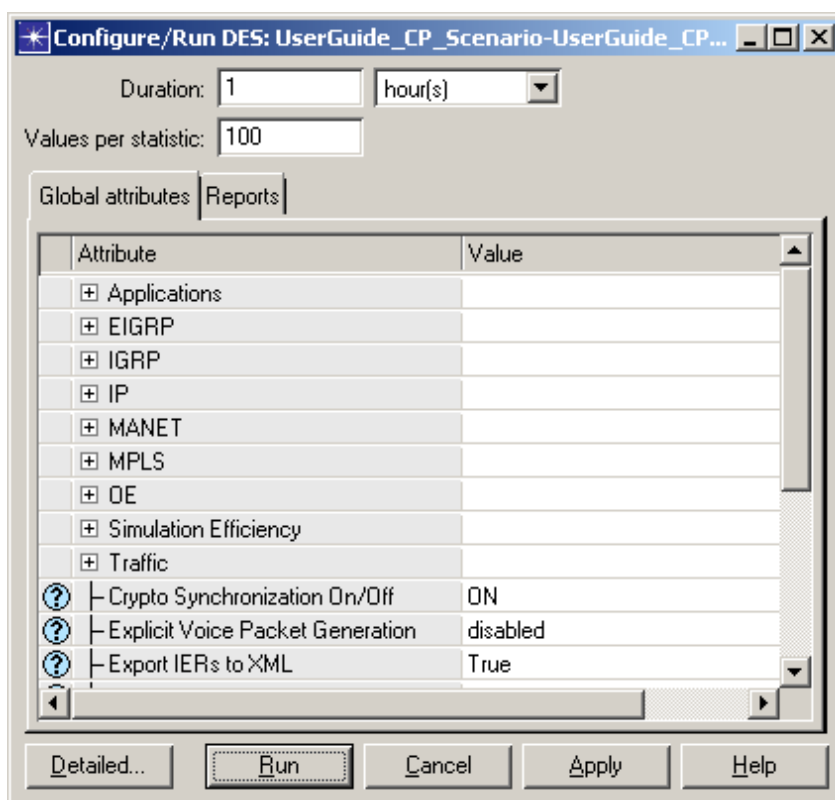


Figure 6-3 Setting Simulation Parameters - Simple Mode

- 1 Set the duration of the simulation in the **Duration** field. The units are specified by the pull-down menu next to this field. This sets the *duration* simulation preference.
- 2 Set the number of values collected for each statistic in the **Values per statistic** field. This sets the *num\_collect\_values* simulation preference.

- 3 Set the simulation attributes in the Global attributes window to the desired values. The Attribute table displays all simulation attributes declared by models involved in the scenario to be simulated and the values assigned to each attribute. Click on a question mark icon to display information about the corresponding attribute. Click on an Attribute Value to change it.
- 2) Click the Reports tab to select Statistics and Service Level Agreement (SLA) reports for the simulation to collect. Reports are predefined sets of statistic probes.

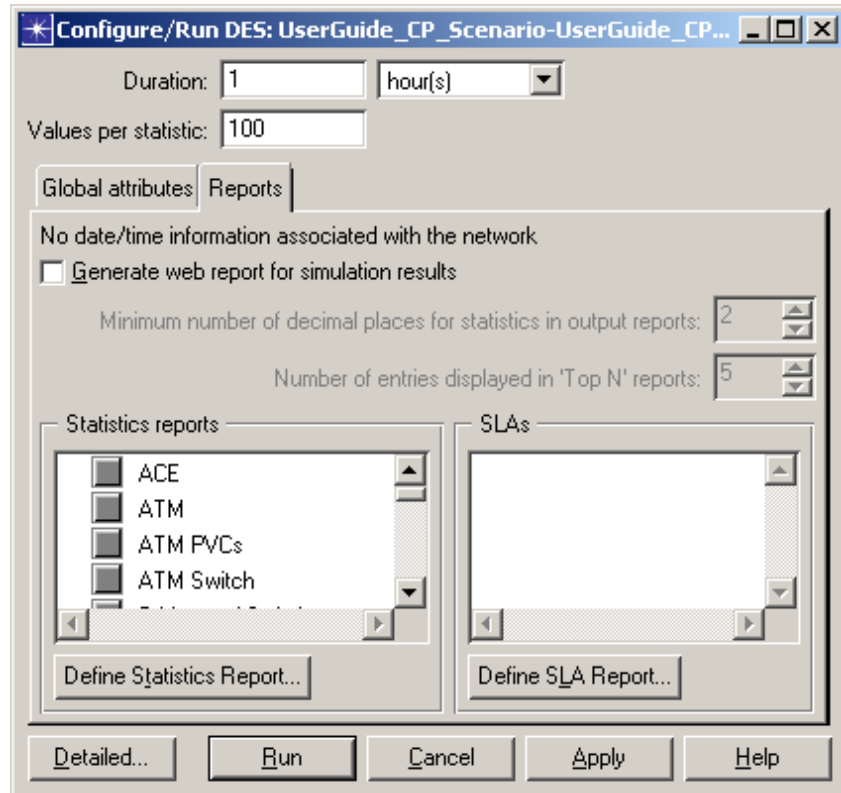
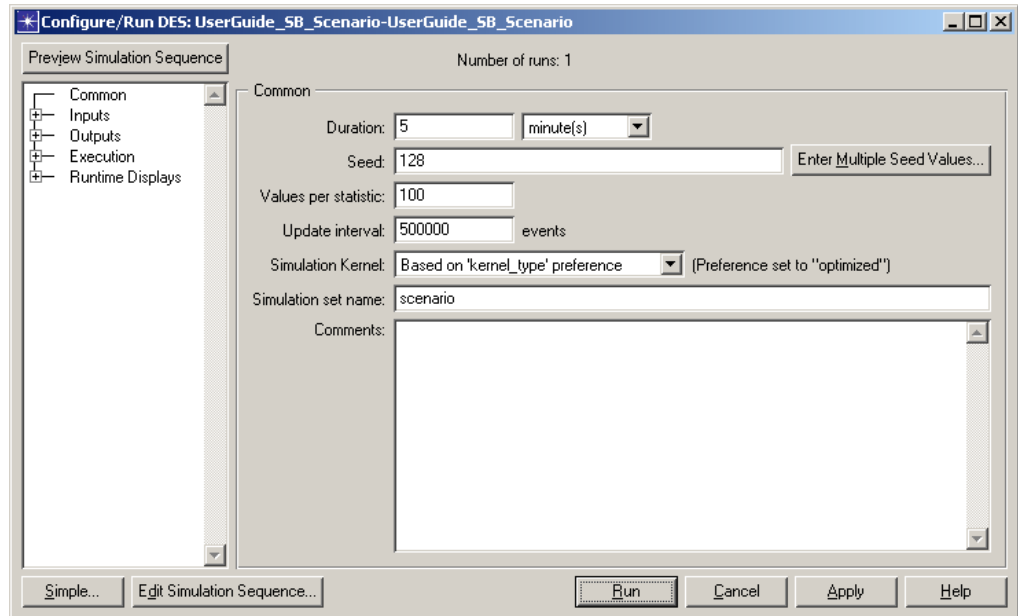


Figure 6-4 Setting Simulation Parameters - Reports

- **Record the following date and time in results** label—Displays the date and time associated with the network model, if any.
- **Generate web report for simulation results** checkbox—When selected, simulation results are included in a report viewed from a web browser.
- **Minimum number of decimal places for statistics in output reports** counter—Sets the number of decimal places to use in number formatting. If you expect values to differ in minute amounts, use a large number of decimal places.
- **Number of entries displayed in 'Top N' reports** counter—Sets the value of 'N'.
- **Statistics reports** pane—Specifies the statistics reports to generate at the end of the simulation. Each selected value is added to the *reports* simulation preference.
- **Define Statistics Report** button—Opens a dialog box used to define new statistics reports.



- **SLAs** pane—Specifies the SLA reports to generate at the end of the simulation. Each selected value is added to the *sla\_reports* simulation preference.
  - **Define SLA Report** button—Opens a dialog box used to define new SLA reports.
- 3) Click **Detailed** if you want to open the dialog box in “detailed” mode. Detailed mode lets you configure all the parameters of DES, some of which are not available in simple mode. This dialog box contains a treeview of information categories for configuring different aspects of the simulation.



**Figure 6-5 Setting Simulation Parameters - Detailed Mode**

- Set the attributes on the Common page to the desired values. Changes affect only the current scenario.
  - If you need to set additional attributes, go to the appropriate pages by selecting them in the tree view and setting the desired values. For further details on the individual fields that can be configured for each page, refer to the *JCSS Technical Reference Manual*.
- 4) Click **Apply** to save the current settings and keep the dialog box open, or click **Run** to save the current settings, close the dialog box, and run the simulation immediately. The simulation runs for set duration, displaying frequent progress updates in the viewing window until completion.
- 5) Upon completion, a summary of results displays.

```
Simulation Completed - Collating Results.
Events: Total (1,721,717). Average Speed (11,453 events/sec)
Time: Elapsed (2 min. 30 sec.), Simulated (3 min. 0 sec.)
Simulation Log: 200 entries
```

**Figure 6-6 Summary of Results**

If fatal errors are present in the scenario when a simulation is run, the simulation process quits. A pop-up dialog box will instruct you to access the Scenario Conversion Log file, which details errors that correspond to incorrect scenario elements requiring adjustment *prior* to a successful simulation. You can display the log file, which resides on the same level as the nt.m file, using any text editor tools.

When the simulation is complete, a file named <project name>-<phase name>.ov is saved in the same location as the nt.m file. This file will be used for results analysis.

**Note**—Before a simulation is executed, certain parameters that influence the behavior of the simulation can be configured. These parameters, which specify the behavior of traffic during simulation, are configured through the Priority Table, Decision Table, and System Element Table. Consult the *JCSS Technical Reference Manual* for instructions.

### End of Procedure 6-3

## Viewing the Simulation Log File

Display a list of errors compiled during the simulation. JCSS encounters two major classes of errors. The first class is in building the scenario, including capacity planning analysis. The second class is in executing a discrete event simulation. The following section applies to the discrete event simulation only. Please refer to section 8 for Scenario Builder error handling.

### Procedure 6-4 Display DES Simulation Log File

- 1 After a simulation execution, select **DES > Open DES Log** to display the log of errors and significant simulation events maintained by JCSS during discrete event simulation. The DES log is written to a tab-delimited ASCII file. Because there may be many events in a DES log, a Log Viewer is provided so that you can view only those events of interest to you.

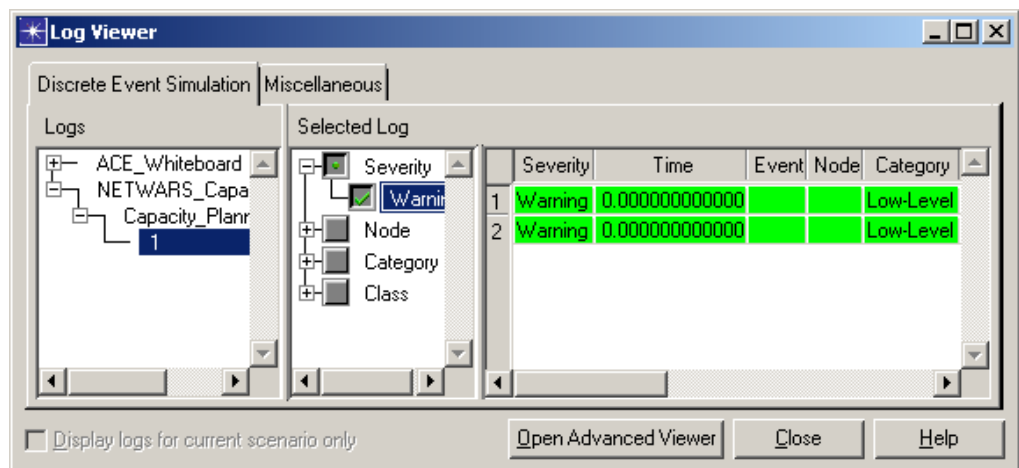


Figure 6-7 Viewing the Simulation Log

- 2 Click the module tabs to move between modules for which logs are available. The Miscellaneous tab gives you access to session and error logs.
- 3 Use the treeview provided in the Logs pane to select from the available logs associated with the selected module.
- 4 For text-based logs, the Selected Log pane displays a single pane with simple text descriptions of events. For event-based logs, it displays two panes. The first pane displays sections of the log. Select the section(s) that you want displayed. The second pane displays the log data, one event per row.
  - 4.1 Click and drag the vertical lines in the header row to resize columns.
  - 4.2 Click on an entry in the **Message** column to open an edit pad containing the full text of the message.
- 5 Check (or uncheck) the **Display logs for current scenario only** checkbox to specify whether the treeview (in the Logs pane) should list all logs or only those for the current scenario.
- 6 Click the **Open Advanced Viewer** button to open an advanced log viewer that provides additional capabilities using a menu bar. The additional capabilities include: changing which column is used to color-code a log entry, changing which columns are visible or filterable, saving the current viewer settings, and exporting the log information to a file.
- 7 Click the **Close** button to close the Log Viewer dialog box.

---

**End of Procedure 6-4**

---

## Viewing Web Reports

Generates a Web report that contains one or more of the reports available in the Results Viewer.

---

**Procedure 6-5 Generate Web Report**

- 1 From the Select Tables for Web Report dialog box, choose the results you want to include in the Web report.
- 2 Select the Include Network Diagram checkbox if you want the web report to include a graphic of the network topology.
- 3 Click **Generate**.
- 4 Select a directory for the HTML files and click **OK**.
- 5 The web report is created and opens in the default Web browser.

---

**End of Procedure 6-5**

---

# 7 Results Analysis

## Viewing Measures of Performance

View the results of a simulation, represented by Measures of Performance (MOPs). MOPs are statistics, displayed in graphs, which reflect the ability of selected communications equipment to satisfactorily send and/or receive information.

### Procedure 7-1 Display MOP Graphs

- 1 Select **DES > Results > View Results**; the View Results window displays. You can also right-click in the workspace and select **View Results** from the shortcut menu, or click the **View Results** toolbar button.
- 2 Select the checkbox(es) of desired MOP(s) in the treeview. A graphical preview of the MOP(s) displays in the Preview pane. Preview mode does not allow graph interaction.
- 3 Use the graph options/filters drop-down menus to display the MOP graphs in a variety of layouts.

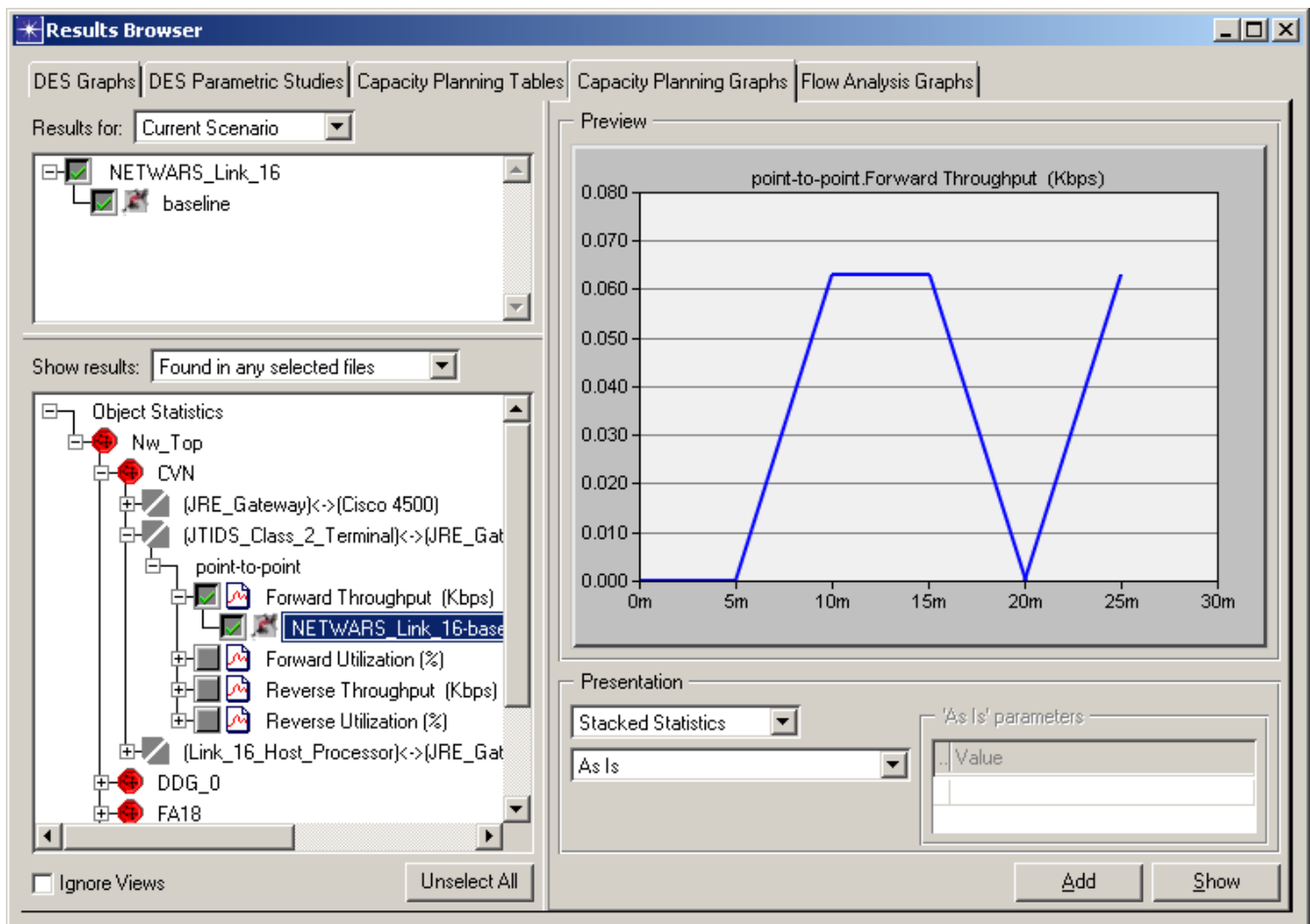
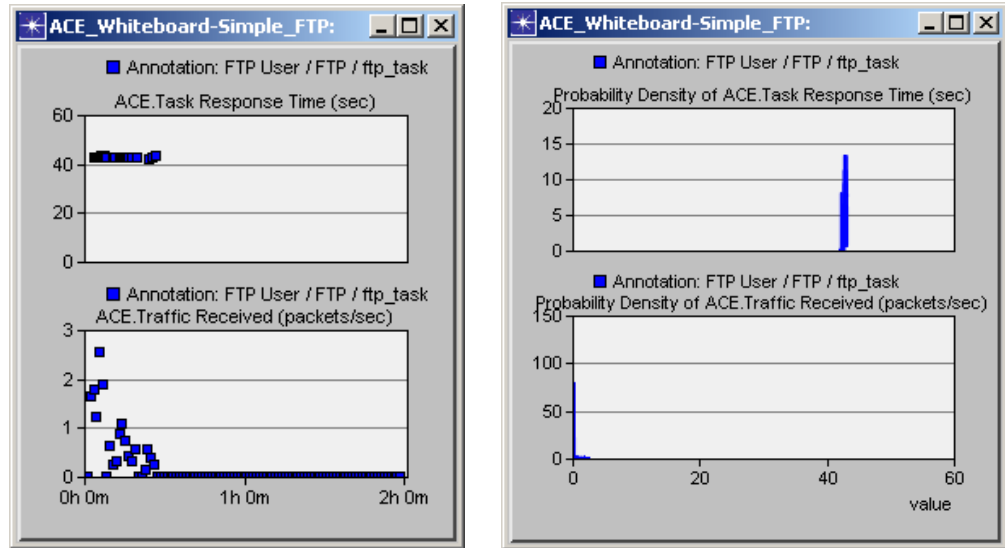


Figure 7-1 Viewing MOPs

- 4 To view the graph(s) in full detail, click **Show**.



**Figure 7-2 Sample Filtered Graphs**

**End of Procedure 7-1**

---

## Interacting with MOP Graphs

Modify the look and style of a graph or manipulate properties as outlined below.

---

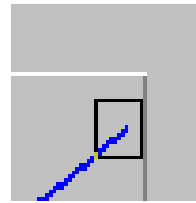
### Procedure 7-2 Change MOP Graph View Properties

- 1 Examine statistics by placing the cursor over a segment of the trace; a tool tip displays the coordinates of the graph.

Y: 99.6688741722
X: 10h 26m 46s
Nearest Point:
Y: 99.4466700622
X: 10h 26m 40s

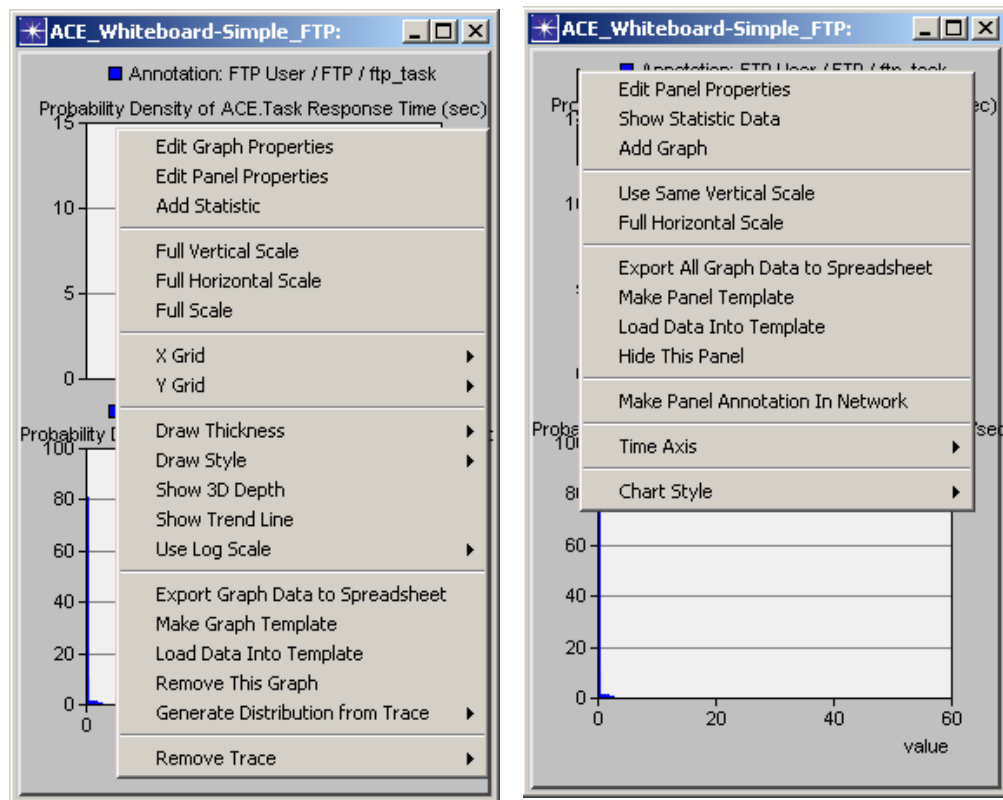
**Figure 7-3 Example Graph Tool Tip**

- 2 Zoom in on any segment of the trace by drawing a small box around the segment with the cursor.



**Figure 7-4 Zooming In on a Trace**

- 3 Resize the graph window as needed.
- 4 Right-click on the *inner panel* of an MOP graph to open a shortcut menu that allows manipulation of graph properties. Right-click on the *outer panel* of an MOP graph opens a shortcut menu with different graph-manipulation options.



**Figure 7-5 Accessing Graph Panel Shortcut Menus**

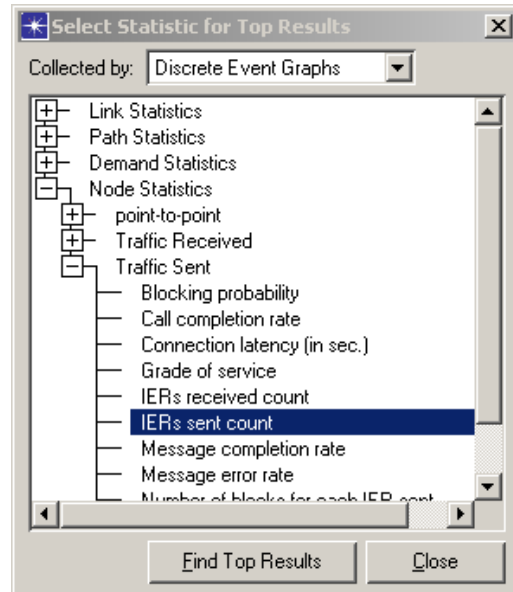
**End of Procedure 7-2**

## Finding Top Statistics

Sort statistics and find bottlenecks by using the Find Top Statistics feature.

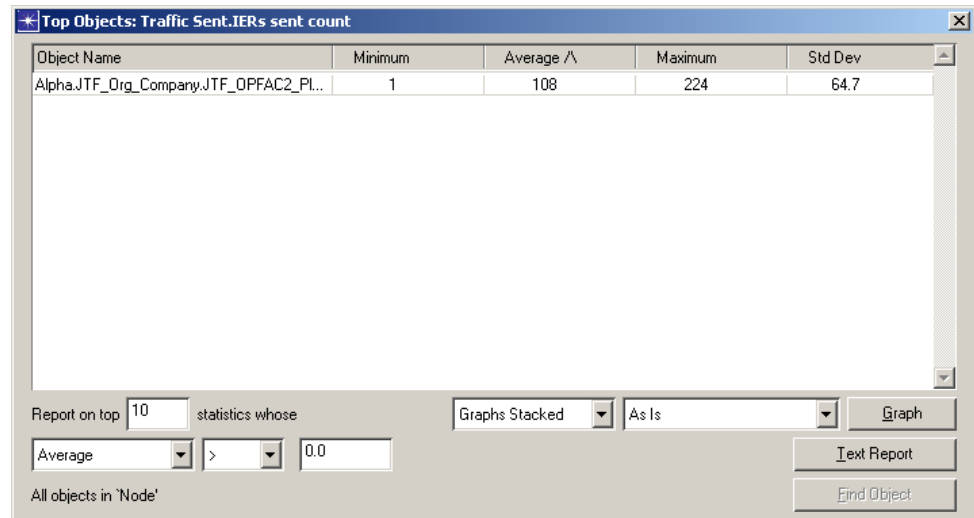
### Procedure 7-3 Find Top Statistics

- 1 Select **Results > Find Top Statistics** from the main menu.
- 2 Select the statistic of interest from the Select Statistic for Top Results dialog box.



**Figure 7-6 Selecting a Statistic of Interest**

- 3 Click the **Find Top Statistics** button. The top objects display in the Top Objects dialog box.



**Figure 7-7 Finding Top Results**

**End of Procedure 7-3**

## 8 Error Handling

---

### Technical Support

#### Log Files

JCSS encounters two major classes of errors. The first class is in building the scenario including capacity planning analysis. The second class is in executing a discrete event simulation. The following section applies to the Scenario Builder only.

Sometimes program crashes cannot be consistently reproduced. Without a reproducible set of steps to follow, fixing them is difficult. In such cases, to help identify and fix these crashes, the following information is needed from the software installation where the error occurred:

- The OPNET error log file – This file is called `err_log` and is located in the `<Scenario_Builder>\op_admin` folder. This file contains the function calls stacks recorded by NetBiz when there is a recoverable error or a program crash. Error messages are always appended to this file.
- The JCSS function log file – This file is called `nw_function_log` and is located in the `<Scenario_Builder>\op_admin` folder. This file contains the list of functions that were executed just before the program crashed. This file also contains the following version information:
  - JCSS software (major release and update)
  - NetBiz software (major release and patch level)
  - Windows Operating System

The contents of this file are overwritten when there is a program crash.

- The JCSS error log file – This file is called `nw_message_log.txt` and is located in the `<Scenario_Builder>\op_admin` folder. This file contains error messages that were recorded by JCSS during program execution.
- The project, scenario, and associated files in use when the error occurred.

All of this information automatically packages into a zip file. The zip file is called `exception_data-<time_stamp>.zip`. `<time_stamp>` is the time at which the crash occurred. In the event of a program crash, you should send this zip file to NETWARS Technical Support. The information contained in this zip file will help the developers in debugging the problem.

#### Contact Information

For issues regarding using the software, please contact us either at [netwars@opnet.com](mailto:netwars@opnet.com) or at 240.497.3000 x2699. Note that email and voice mail to the NETWARS Help Desk are checked once a day, Monday through Friday.



---

# Glossary

---

## B

**Broadcast Networks** Network of radio system devices that are tuned to same frequency and belong to same frequency hop group. All the radio devices belonging to same broadcast network hear transmission by one radio device.

## C

**Connectivity Links** Created based on the subscriber requirements. Connectivity links are different from planning links in that they are connected to actual devices instead of organizations.

**Courses of Action** Define specific conditions or situations, such as when an enemy uses chemical, biological, or nuclear weapons. It is important to note that time phases and courses of action perform exactly the same way in JCSS. You simply have the option of calling your scenario subdivisions time phases or courses of action.

## I

**IERs** The acronym for **Information Exchange Requirement**. IERs are the primary traffic representation in JCSS. A relationship between OPFACs is needed to create an IER.

## K

**Kernel Procedure** An OPNET provided function that supports the development of protocols and algorithms. All Kernel Procedures start with op\_.

## M

**Mainframe Characterization Module** MCE is an optional module that allows you to import measured performance data, and analyze it to create workloads suitable for the mainframe models.

**Mod\_Dirs** An environment attribute that tells OPNET which folders to look in for locating files. The mod\_dirs attribute is found under [Edit > Preferences](#).

**MOPs** The acronym for **Measures of Performance**. Analyze the results of a simulation session to produce a set of MOPs. Manipulate the set of MOPs using data filters and produce graphs of the data. The MOPs explain various communication burdens, latency, and other critical performance measures associated with communication infrastructures.

**O**

**Online Documentation** An Adobe Acrobat manual that has information about the OPNET models, kernel procedures, modeling concepts etc. The manual can be launched from Modeler by choosing the Online Documentation option under the Help menu.

**OPFACs** The acronym for **Operational Facility**. OPFACs are the fundamental building blocks of JCSS. They are collections of communications devices that are assigned to military units, which are used to construct Organizations.

**Organizations** Hierarchies of military units. An organization is a container that can hold OPFACs and other organizations (sub-organizations).

**P**

**Planning Links** Placeholders for the connectivity links that will be created based on the subscriber requirements. These links can have organizations or OPFACs as terminating points, and show the anticipated bandwidth. Planning links cannot be used for discrete even simulation and capacity planning analyses.

**Process Registry** It is a model-wide registry where any process model can register itself and any process model can obtain information about other process models that are registered. For a list of kernel procedures available for using the process registry, refer to the OPNET Modeler online documentation, *General Model's Manual*, OPNET Model Support chapter, Process Registry section (consult the IT Guru documentation set, available via [Help > Documentation > IT Guru Documentation](#)).

**Projects** Projects are containers for scenarios, time phases or courses of action. Related scenarios can be grouped under one project. JCSS enables you to open and work with multiple projects simultaneously.

**S**

**Scenarios** Scenarios are instances of C4I communications architectures that consist of associated OPFACs and Organizations, Information Exchange Requirements (IERs) and links. Scenarios are stored as part of a project created within the Scenario Builder. Thus, projects act as containers for scenarios and a single project may include several scenarios, i.e., instances of C4I communications architecture.

**Server Characterization Editor** SCE is an optional module that allows you to import server performance information for analysis of the processes and applications, and characterization into workloads used as the basis for simulation modeling.

**Simulation Engine** The COTS OPNET Modeler tool. It processes the simulation events and provides the output to the Scenario Builder.

## U

**Unified Modeling Language** UML is an industry standard set of graphical notations to describe a system from an object-oriented approach. Diagrams include a set of static notations (class diagrams, use case diagrams) and a set of dynamic notations (state diagrams and sequence diagrams). UML does not require a specific design process and does not require implementation with any specific object-oriented languages or tools. The state diagrams, for example, are consistent with OPNET Modeler's Process Model notation.

# Index

---

## A

ACE, [UM-1-5](#)  
 ACE Whiteboard, [UM-1-5](#)  
 Advanced Optimization Parameters, [UM-5-4](#)  
 Alternate Link Capacities, [UM-5-5](#)  
 Analyst  
   workflow, [UM-1-4](#)  
 Architecture, [UM-1-6](#)  
 Area of operations, [UM-2-15](#)  
 Attributes  
   OPFACs, [UM-3-3](#)  
   organizations, [UM-3-2](#)

## B

Background images, [UM-2-16](#)  
 Bandwidths  
   comparing, [UM-5-8](#)  
 Border maps, [UM-2-16](#)  
 Broadcast networks , [UM-3-30](#)

## C

Capacity Planning, [UM-5-1](#)  
 Circuit Wizard, [UM-3-35](#)  
 Classification, [UM-2-12](#)  
 Comparing  
   bandwidths, [UM-5-8](#)  
   parameters, [UM-5-8](#)  
 Connectivity links  
   external, [UM-3-29](#)  
   internal, [UM-3-19](#)  
 Copy, [UM-3-13](#)  
 Crisis Action Planner  
   workflow, [UM-1-2](#)  
 Cut, [UM-3-13](#)

## D

Device Creator, [UM-3-15](#)  
 Devices  
   adding, [UM-3-11](#)  
   creating, [UM-3-16](#)  
   linking, [UM-3-18](#)  
   verifying links, [UM-3-27](#)

## E

Editor  
   interfaces, [UM-1-4](#)

Evaluating  
   network, [UM-5-1](#)

## F

Find Top Statistics, [UM-7-3](#)

## G

GBS  
   satellite links, [UM-3-21](#)

## I

Icon Database, [UM-1-5](#)  
 icon  
   red X, [UM-3-27](#)  
 IERs, [UM-1-2](#)  
   creating, [UM-4-1](#)  
 Image maps, [UM-2-16](#) to [UM-2-17](#)  
 Interfaces  
   editors, [UM-1-4](#)

## J

JCSS Architecture, [UM-1-6](#)  
 JCSS  
   Help Desk, [UM-8-1](#)  
   overview, [UM-1-1](#)  
   Technical Support, [UM-8-1](#)

## K

Kernel Procedure, [UM-GLOS-1](#)

## L

Launching  
   JCSS, [UM-2-1](#)  
 Link Consistency, [UM-3-34](#)  
 Links  
   alternate capacities, [UM-5-4](#)  
   deploying, [UM-3-21](#)  
   errors, [UM-3-27](#)  
   verifying, [UM-3-27](#)  
 Log Files, [UM-8-1](#)  
 LOS  
   enabling connectivity, [UM-3- 47](#)  
   range radius, [UM-3- 46](#)  
   terrain shading density, [UM-3- 47](#)

**M**

Mainframe Characterization, [UM-1-5](#)  
 MIF maps, [UM-2-16](#), [UM-2-18](#)  
 Mission Analysis Questions, [UM-2-13](#)  
 Mod\_Dirs, [UM-GLOS-1](#)  
 MOPs, [UM-1-2](#), [UM-1-5](#)  
   displaying graphs, [UM-7-1](#)  
   modifying graphs, [UM-7-2](#)

**N**

New Project Wizard, [UM-2-5](#)  
 Node Model  
   opening in Modeler, [UM-3- 17](#)

**O**

Operational Planner  
   workflow, [UM-1-3](#)  
 OPFACs, [UM-1-2](#)  
   adding, [UM-3-1](#)  
   drilling down, [UM-3-11](#)  
   modifying, [UM-3-3](#)  
   template, [UM-3-10](#)  
 Optimization runs  
   saving, [UM-5-7](#)  
 Optimization  
   capacity, [UM-5-3](#)  
   parameters, [UM-5-3](#)  
 Organizations, [UM-1-2](#)  
   adding, [UM-3-1](#)  
   drilling down, [UM-3-11](#)  
   modifying, [UM-3-2](#)  
   template, [UM-3-10](#)

**P**

Parameters  
   comparing, [UM-5-8](#)  
 Paste, [UM-3-13](#)  
 Planning links, [UM-3-28](#), [UM-GLOS-2](#)  
 Process registry, [UM-GLOS-2](#)  
 Project  
   new, [UM-2-5](#)  
 Promina devices  
   configuring, [UM-3-35](#)  
 Protocols  
   running a visualization, [UM-3-43](#)  
   supported, [UM-3-41](#)

**R**

Range radius, [UM-3- 46](#)  
 Redo, [UM-3-15](#)  
 Relationships  
   creating, [UM-4-4](#)  
 Reports  
   web, [UM-5-2](#), [UM-5-7](#)  
 Requirements matrix, [UM-3-37](#)

**S**

Scenario Builder, [UM-1-4](#)  
 Scenario classification, [UM-2-12](#)  
 Scenarios, [UM-1-2](#)  
   creating, [UM-3-39](#)  
   duplicating, [UM-3-39](#)  
   managing, [UM-3-40](#)  
   switching, [UM-3-40](#)  
 Server Characterization, [UM-1-5](#)  
 Signing in, [UM-2-2](#)  
 Simulation Domain, [UM-1-6](#)  
 Simulation engine, [UM-GLOS-3](#)  
 Simulations  
   log file, [UM-6-6](#)  
   results, [UM-6-5](#)  
   running, [UM-6-3](#)  
   specifying statistics, [UM-6-1](#)  
 System Editor, [UM-1-4](#)

**T**

Task Assistant, [UM-2-4](#)  
 Technical support, [UM-8-1](#)  
 Template  
   OPFACs, [UM-3-10](#)  
   organizations, [UM-3-10](#)  
 Terrain effects shading, [UM-3-51](#)  
 Terrain modeling module, [UM-3- 45](#)  
 Terrain profile, [UM-3-45](#)  
 Terrain shading density, [UM-3- 47](#)  
 Terrain  
   supported formats, [UM-3- 45](#)  
 Threads  
   creating, [UM-4-2](#)  
 Time step, [UM-5-1](#)  
 TMMGUI, [UM-3- 45](#)  
 Top Solutions, [UM-5-10](#)  
 Traffic, [UM-1-2](#)  
   creating relationships, [UM-4-1](#)  
 Traffic Wizard, [UM-4-6](#)

**U**

Undo, [UM-3-15](#)

Unified Modeling Language, [UM-GLOS-3](#)

Unzooming, [UM-2-18](#)

User Level

beginner, [UM-2-3](#)

advanced, [UM-2-3](#)

intermediate, [UM-2-3](#)

User profile

creating, [UM-2-2](#)

Utility nodes, [UM-3-35](#)

**V**

Verify

device connectivity, [UM-3-27](#)

link consistency, [UM-3-34](#)

**W**

Web Reports

capacity planning, [UM-5-6](#)

Workflow

Analyst, [UM-1-4](#)

Crisis Action Planner, [UM-1-2](#)

Operational Planner, [UM-1-3](#)

Workflows

sample, [UM-1-2](#)

**Z**

Zooming in/out, [UM-2-18](#)