

JCSS

JCSS User Manual

10.0 Final (OPNET 2.5.4)

Contract HC1047-09-C-4020



Disclaimer: As of October 2007, NETWARS was redesignated by the Program Manager Office as the Joint Communication 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.

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

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

Copyright and Contacts

Document Copyright

Document Title: JCSS User Manual
Version: 1

© 2010 OPNET Technologies, Inc.

All Rights Reserved. Reproduction, adaptation, or translation without prior written permission is prohibited, except as allowed under the copyright laws.

Software Copyright

Product Name: JCSS

Product Release: 10.0

© 2010 OPNET Technologies, Inc.

All Rights Reserved.

Copyright, Contacts, and Legal Notices

Title: JCSS User Manual

Version: 10.0

4/1/10

TRADEMARKS

ACE, ACE LIVE, APPDOCTOR, DISTRIBUTED AGENT CONTROLLER, FLOW ANALYSIS, IT GURU, IT SENTINEL, MULTI-VENDOR IMPORT, NETBIZ, NETDOCTOR, NETMAPPER, NETWORK PHYSICS, ODK, OPNET, OPNET 3DNV, OPNET LOADSCALER, OPNET MODELER, OPNET NCOMPASS, OPNET PANORAMA, OPNET TECHNOLOGIES, INC., OPNET TESTCREATOR, OPNETWORK, QUICKPREDICT, QUICKRECODE, REPORT SERVER, SERVICE PROVIDER GURU, SLA COMMANDER, SP GURU, SP SENTINEL, VNESERVER, WDM GURU, "APPLICATION PERFORMANCE INSIGHT AND NETSENSORY - THE MISSING LINK IN APPLICATION PERFORMANCE", "IT'S NOT THE APP", "IT'S THE USER EXPERIENCE", "IT'S NOT THE NETWORK", "MAKING NETWORK AND APPLICATIONS PERFORM", and "OPNET OPTIMUM NETWORK PERFORMANCE" ARE TRADEMARKS OF OPNET TECHNOLOGIES, INC. ALL RIGHTS RESERVED.

Java and all Java based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. All trademarks are the property of their respective owners.

PATENTS

Protected by U.S. Patents 7,277,843; 7,337,206; and 7,443,870.

Identification

Document Identification

Document Title: JCSS User's Manual
Version: 10.0 Final

Software Identification

Product Name: JCSS
Product Release: 10.0

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:\JCSS\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 (< >):

```
<JCSS 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

Table FM-1 Document Revision History

Release Date	Product Version	Chapter	Description of Change
April 2010	10.0 Final	All	<ul style="list-style-type: none"> • Updated references from 9.0 to 10.0 • Updated references from 15.0 to 16.0 • Changed from Draft to Final version
		1	<ul style="list-style-type: none"> • Added note about support deprecation for Traffic Assistant • Updated Circuit Deployment Wizard screenshots • Updated Protocols menu items
		3	<ul style="list-style-type: none"> • Updated screenshots to include FHSS Modeling in “Defining Broadcast Networks” • Updated Circuit Deployment Wizard screenshots • Updated Protocols menu items • Updated Figure 3-31
		4	<ul style="list-style-type: none"> • Added information about ier_configs file in relation to default IER properties • Revised Priority definition • Added information about Export Reports checkbox functionality
		6	<ul style="list-style-type: none"> • Added note about requirements for running a simulation
March 2010	10.0 Draft	All	Converted PDF files of JCSS User Manual and JCSS Technical Reference into Adobe FrameMaker 7.0. and applied commercial OPNET product documentation style template to improve quality and update manual. Reformatted text as needed to fit new format and style.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
		4	<ul style="list-style-type: none"> Revised “Creating IERs” section to include dialog box changes and new Record Routes feature Added “Creating Threads from ACE Analyst” Revised Integrating DoDAF Views Updated Procedure 4-21: Create IERs from DoDAF Editor Added Procedure 4-22: Create and Deploy Standard Applications from the DoDAF Editor Added Procedure 4-23: Creating Threads from DoDAF Editor Added section “Generating DoDAF Visio Reports” Added descriptions of new DoDAF views available for Visio output
		6	<ul style="list-style-type: none"> Updated “Running a Simulation” to include Record IER Route feature Revised Procedure 6-5 for clarity Added “Viewing Recorded IER Routes”
		Glossary	<ul style="list-style-type: none"> Added note and revised documentation references for Process Registry
March 2009	9.0 Final	1	<ul style="list-style-type: none"> Updated JCSS System Architecture figure.
		2	<ul style="list-style-type: none"> Added a disclosure that the Task Assistant is no longer maintained and some of the steps may no longer be valid. Removed View > Zoom > To Window.
		3	<ul style="list-style-type: none"> Added Protocols > IPv4 submenu. Added Netmapper section Added Importing from VNE Server section.
		4	<ul style="list-style-type: none"> Updated IERs section. Updated Threads section. Added Integrating DoDAF section.
		8	<ul style="list-style-type: none"> Added JCSS@disa.mil as a PMO Contact Address.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
January 30, 2009	9.0 Draft	Front matter	<ul style="list-style-type: none"> Updated JCSS Logo and text to reflect name change from Joint
		All	<ul style="list-style-type: none"> Communications Simulation System to Joint Communication Simulation System. Updated document footers and applicable figures to reflect new JCSS version 9.0. Changed applicable figures to reflect update from env_db14.5 to env_db15.0, and file path names from 14.5.A to 15.0.A.
		2	<ul style="list-style-type: none"> Updated New Project Wizard steps in Creating a New Project section.
		4	<ul style="list-style-type: none"> Updated Creating IERs and Creating Threads sections
August 1, 2008	8.0 Final	2	<ul style="list-style-type: none"> Updated Figure 2-1 to remove IER Database menu from System Editor.
		3	<ul style="list-style-type: none"> Updated Figure 3-17, Select Wired Link Properties dialog box.
		4	<ul style="list-style-type: none"> Removed reference to IER Database.
		7	<ul style="list-style-type: none"> Added note to Procedure 7-1, step 1. Added note that statistics can be exported to Excel.
July 11, 2008	8.0 Draft	All	<ul style="list-style-type: none"> Updated figures to reflect product name change to JCSS from NETWARS.
		2	<ul style="list-style-type: none"> Removed "Answering Mission Analysis Questions" section. Removed Specify Equipment Lists step from New Project Wizard.
		3	<ul style="list-style-type: none"> Updated procedure for TSSP/Multiplexer circuit deployment.
November 30, 2007	7.0 Final	All	<ul style="list-style-type: none"> Began introduction of product name change to JCSS from NETWARS.
		2	<ul style="list-style-type: none"> Updated figure 2-26 Logical View Selection dialog box, and removed refs to Frame Relay, VTC, etc., in this section.
		3	<ul style="list-style-type: none"> Added note that Modeler will not launch from JCSS without a Modeler license.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
October 31, 2007	2007 Final	2	<ul style="list-style-type: none">• Added sentence to Procedure 2-17 that Network Layer Filters shown are only those which apply to the deployed network.
		3	<ul style="list-style-type: none">• Removed “Scenario Treeview” references from document, and updated procedures for deploying satellite links and defining broadcast networks.• Added “Save As Link Type” section.
		4	<ul style="list-style-type: none">• Updated procedures for creating threads and creating relationships.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
October 17, 2007	2007 Draft	2	<ul style="list-style-type: none"> • 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	<p>Updated figures with new options/lists:</p> <ul style="list-style-type: none"> • 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. • Added Protocols > Link 16 and Protocols > IPv6 submenus. • Added View > Visualize Protocol Configuration > IP Address Types.
		4	<ul style="list-style-type: none"> • Added note to “Create a Thread” procedure re: right-click “View Threads” option. • Added note to “Create a Relationship” procedure re: right-click “Deploy Relationship” option.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
		6	<ul style="list-style-type: none"> Added figure 6-2 Probe Model window. Updated figure 6-3 list of Attributes in Configure/Run DES dialog box
		7	<ul style="list-style-type: none"> Updated figure 7-1 Results Browser.
December 6, 2006	6.2 Final	3	<ul style="list-style-type: none"> 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.” Updated Figure 3-33, Satellite Bent Pipe Link Deployment.
		4	<ul style="list-style-type: none"> Removed Defining Application Profiles section (refer instead to Traffic Wizard in chapter 4.) Moved Creating Relationships section to after Creating IERs and Creating Threads sections (Relationships are no longer needed for IERs.)
		5	<ul style="list-style-type: none"> Updated figure 5-1 and accompanying text to reflect changes to Specifying Alternate Link Capacities procedure. Moved section to after Optimizing a Network section. Expanded descriptions of dialog box options in Evaluating a Network section.\
		6	<ul style="list-style-type: none"> Updated figure 6-6 and accompanying text to reflect new Log Viewer feature.
November 3, 2006	6.2 Final	1	<ul style="list-style-type: none"> Updated Task Assistant figures 1-1, 1-2, and 1-3.
		2	<ul style="list-style-type: none"> Updated Mission Analysis Questions figure 2-19. Changed Map > Set Area of Interest to View > Set Area of Interest, and Map > Background > (options) to View > Background > (options). Updated Logical View Selection figure 2-26 (removed Type of View drop-down list, and Re-use/Re-create options.)
		3	<ul style="list-style-type: none"> Updated Adding Units via the Library Treeview figure 3-2. Updated figures 3-18 and 3-22 to reflect new toolbar buttons. Updated Satellite Bent Pipe Link Deployment dialog box figure 3-20. Changed Terrain > View Terrain Profile to Topology > Terrain > View Terrain Profile. Changed Map > LOS Settings to View > Show LOS > LOS Settings.

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
		4	<ul style="list-style-type: none"> Added Ctrl+W shortcut keys to Traffic Wizard section
October 20, 2006	6.2 Draft	1	<ul style="list-style-type: none"> Removed references to separate IER Editor (functionality now accessible via System Editor's IER Database menu.)
		2	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Updated Traffic Wizard dialog box.
		6	<ul style="list-style-type: none"> Updated Choose Results dialog box. Updated Perform a Network Simulation procedure to reflect simple and detailed modes and new dialog boxes.
		7	<ul style="list-style-type: none"> Updated Results Browser and graph shortcut menu figures. Removed DES > Results > Compare Results.
		Glossary	<ul style="list-style-type: none"> Removed references to the Scenario Conversion Module.
March 30, 2006	6.1 Final	3	<ul style="list-style-type: none"> Added references to Help Diagram and Help FAQs tabs on Satellite Bent Pipe Link Deployment dialog box. Added shortcut keys to TSSP circuit configuration, and added multiplexer circuit configuration. Removed references to Multiplexer utility node.
March 3, 2006	6.1 Draft	1	<ul style="list-style-type: none"> Updated text to reflect name change from "Icon Editor" to "Icon Database".

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
		2	<ul style="list-style-type: none"> Updated System Editor and Sign-in figures to reflect version 6.1.
		3	<ul style="list-style-type: none"> Updated Procedure 3-18, “Deploy a Satellite Link”, to reflect new tabbed design of dialog boxes.
		4	<ul style="list-style-type: none"> Removed “Converting Flows to IERs” section.
November 14, 2005	5.2 Final	Front material	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Removed Convert Link Loads to Flows procedure. Removed Advanced Traffic Wizard procedure. Updated Traffic Wizard figure.
October 14, 2005	5.2 Draft	All	<ul style="list-style-type: none"> Updated document footers and applicable screenshots to reflect new NETWARS version number.
		1	<ul style="list-style-type: none"> Added (optional) Server Characterization and Mainframe Characterization options to System Editor (File > Open Editor.)

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
		2	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

Table FM-1 Document Revision History (Continued)

Release Date	Product Version	Chapter	Description of Change
April 1, 2005	5.1 Final	Cover	<ul style="list-style-type: none"> Changed release date to April 1, 2005, and removed OPNET contact info from Identification section
March 21, 2005	5.1 Final	1	<ul style="list-style-type: none"> Added ACE to ACE Whiteboard section.
		2	<ul style="list-style-type: none"> Added Procedure 2-13, Zoom to Selection. Updated Figure 2-8 to reflect new button placement
		3	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Updated Figure 4-6 to reflect removal of time step info, and Figures 4-3 and 4-4 to reflect new button placement.
		5	<ul style="list-style-type: none"> 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"> Updated applicable screenshots to reflect new NETWARS version number. Added reference to ACE in chapter 1. Noted that annotations are now saved as part of a template OPFAC/organization, and are also deployed with the template. Removed Alternate Link Cost field from Capacity Optimization Settings Advanced Parameters dialog box.

Contents

	<i>Copyright and Contacts</i>	JCSS-FM-iii
<hr/>		
	Identification	JCSS-FM-iv
	Document Identification	JCSS-FM-iv
	Software Identification	JCSS-FM-iv
	Documentation Conventions	JCSS-FM-iv
	Objects, Examples, and System I/O	JCSS-FM-iv
	Object Hierarchies	JCSS-FM-iv
	Computer Commands	JCSS-FM-v
	Lists and Procedures	JCSS-FM-v
<hr/>		
	Document Revision History	JCSS-FM-vi
	<i>List of Figures</i>	JCSS-FM-xix
	<i>List of Tables</i>	JCSS-FM-xxii
	<i>List of Procedures</i>	JCSS-FM-xxiii
<hr/>		
1	Introduction	JCSS-1-1
	JCSS Overview	JCSS-1-1
	Sample Workflows	JCSS-1-2
	Crisis Action Planner's Workflow	JCSS-1-2
	Operational Planner's Workflow	JCSS-1-3
	Analyst's Workflow	JCSS-1-4
	JCSS Interfaces	JCSS-1-5
	System Editor	JCSS-1-5
	Scenario Builder	JCSS-1-5
	Icon Database	JCSS-1-5
	(Optional) ACE and ACE Whiteboard	JCSS-1-6
	(Optional) Server Characterization	JCSS-1-6
	(Optional) Mainframe Characterization	JCSS-1-6
	System Architecture	JCSS-1-7
<hr/>		
2	Getting Started	JCSS-2-1
	Launching JCSS	JCSS-2-1
	Signing In and Creating a New User Profile	JCSS-2-2
	Selecting the User Level	JCSS-2-3
	Using the Task Assistant	JCSS-2-3
	Creating a New Project	JCSS-2-5
	Setting Scenario Classification	JCSS-2-10
	Setting the Area of Interest	JCSS-2-11
	Adding Background Images	JCSS-2-11
	Border Maps	JCSS-2-12
	Image Maps	JCSS-2-12
	MIF Maps	JCSS-2-13

	Zooming/Unzooming	JCSS-2-14
	Viewing Scenarios	JCSS-2-16
3	Topology Building	JCSS-3-1
	Adding Units (Organizations and OPFACs)	JCSS-3-1
	Modifying Units	JCSS-3-2
	Organization Attributes	JCSS-3-2
	OPFAC Attributes	JCSS-3-3
	Editing Attributes for Many Objects	JCSS-3-5
	Creating Template Organizations and OPFACs	JCSS-3-9
	Drilling Down into Units	JCSS-3-10
	Adding Devices to OPFACs	JCSS-3-10
	Cutting, Copying, and Pasting Objects	JCSS-3-12
	Creating Custom Models with Device Creator	JCSS-3-15
	Opening Node Models in Modeler	JCSS-3-16
	Connecting Device Models	JCSS-3-17
	Internal Connectivity Links	JCSS-3-17
	Deploying Links	JCSS-3-18
	Deploying Satellite Links	JCSS-3-20
	Deploying Circuits	JCSS-3-24
	Import Circuits	JCSS-3-24
	Export Circuits	JCSS-3-24
	Verifying Device Connectivity	JCSS-3-25
	Save as Link Type	JCSS-3-25
	Defining Planning Links	JCSS-3-26
	Defining External Connectivity Links	JCSS-3-27
	Defining Broadcast Networks	JCSS-3-28
	Verifying Link Consistency	JCSS-3-32
	Configuring Utility Nodes	JCSS-3-32
	Reviewing the Requirements Matrix	JCSS-3-34
	Defining Additional Scenarios	JCSS-3-35
	Configuring Protocols	JCSS-3-39
	Visualizing Protocol Configuration	JCSS-3-41
	Viewing a Terrain Profile	JCSS-3-42
	Enabling Line-of-Sight (LOS) Connectivity and Range	JCSS-3-44
	Displaying Line-of-Sight (LOS) Connectivity	JCSS-3-46
	Displaying Line-of-Sight (LOS) Range	JCSS-3-47
	Displaying Terrain Effects Shading	JCSS-3-47
	Importing from VNE Server	JCSS-3-48
4	Traffic Specification	JCSS-4-1
	Creating IERs	JCSS-4-1
	Creating Threads	JCSS-4-11
	Creating Threads from ACE Analyst	JCSS-4-14
	Creating Relationships	JCSS-4-19

	Converting Applications into Flows	JCSS-4-19
	Deploying Traffic Using the Traffic Wizard	JCSS-4-20
	Integrating DoDAF Views	JCSS-4-21
	Generating DoDAF Visio Reports	JCSS-4-29
<hr/>		
5	Capacity Planning	JCSS-5-1
	Evaluating a Network	JCSS-5-1
	Optimizing a Network	JCSS-5-3
	Specifying Alternate Link Capacities	JCSS-5-4
	Displaying Web Reports	JCSS-5-6
	Saving Optimization Settings	JCSS-5-7
	Managing Optimization Results	JCSS-5-8
	Examining Top Solutions	JCSS-5-10
<hr/>		
6	Simulation Execution	JCSS-6-1
	Choosing Device and Link Statistics	JCSS-6-1
	Running a Simulation	JCSS-6-3
	Viewing the Simulation Log File	JCSS-6-6
	Viewing Web Reports	JCSS-6-8
	Viewing Recorded IER Routes	JCSS-6-9
<hr/>		
7	Results Analysis	JCSS-7-1
	Viewing Measures of Performance (MOP)	JCSS-7-1
	Interacting with MOP Graphs	JCSS-7-2
	Finding Top Statistics	JCSS-7-3
<hr/>		
8	Error Handling	JCSS-8-1
	Technical Support Log Files	JCSS-8-1
	JCSS Help Desk Contact Information	JCSS-8-1
<hr/>		
App A	Glossary	JCSS-A-1
<hr/>		
	Index	JCSS-IX-i

List of Figures

Figure 1-1	Crisis Action Planner's Workflow	JCSS-1-3
Figure 1-2	Operational Planner's Workflow	JCSS-1-3
Figure 1-3	Analyst's Workflow	JCSS-1-4
Figure 1-4	JCSS System Architecture	JCSS-1-7
Figure 2-1	System Editor	JCSS-2-1
Figure 2-2	Sign In Dialog Box	JCSS-2-1
Figure 2-3	Adding a New User Profile	JCSS-2-2
Figure 2-4	Task Selection	JCSS-2-4
Figure 2-5	Following Sequential Tasks in the Workflows Panel	JCSS-2-5
Figure 2-6	Creating a New Project	JCSS-2-6
Figure 2-7	Initial Topology Dialog Box	JCSS-2-6
Figure 2-8	Select Equipment Types Dialog Box	JCSS-2-7
Figure 2-9	Import Device Configurations Dialog Box	JCSS-2-7
Figure 2-10	Set Area of Operations Dialog Box	JCSS-2-9
Figure 2-11	Top Level Unit Dialog Box	JCSS-2-9
Figure 2-12	Setting the Scenario Classification	JCSS-2-10
Figure 2-13	Setting the Area of Interest	JCSS-2-11
Figure 2-14	Selecting a Border Map	JCSS-2-12
Figure 2-15	Add Map Dialog Box	JCSS-2-13
Figure 2-16	MIF Menu	JCSS-2-13
Figure 2-17	Zooming In	JCSS-2-14
Figure 2-18	Zooming Out	JCSS-2-15
Figure 2-19	Logical View Selection Dialog Box	JCSS-2-17
Figure 3-1	Adding Units via the Library Treeview	JCSS-3-1
Figure 3-2	Organization Attributes	JCSS-3-4
Figure 3-3	OPFAC Attributes	JCSS-3-4
Figure 3-4	Edit Objects Using Template Dialog Box	JCSS-3-5
Figure 3-5	Table of Generated Attributes	JCSS-3-6
Figure 3-6	Edit Attribute Template Dialog Box	JCSS-3-7
Figure 3-7	Preview of Table to be Generated from Template	JCSS-3-8
Figure 3-8	Template Organizations and OPFACs Saved to Object Palettes	JCSS-3-10
Figure 3-9	Drilling Down into Units	JCSS-3-10
Figure 3-10	Object Palette by Tree View	JCSS-3-11
Figure 3-11	Adding Devices to an OPFAC via Object Palette	JCSS-3-12
Figure 3-12	Selecting a Device Category for a New Device Model	JCSS-3-15
Figure 3-13	Open Node Editor Message Dialog	JCSS-3-16
Figure 3-14	Opening a Node Model in OPNET Modeler	JCSS-3-17
Figure 3-15	Adding Links to OPFAC Devices via Object Palette	JCSS-3-18
Figure 3-16	Select Devices Dialog Box	JCSS-3-19
Figure 3-17	Select Wired Link Properties Dialog Box	JCSS-3-19
Figure 3-18	Edit SLD Name Dialog Box	JCSS-3-20
Figure 3-19	Selecting Satellites for Link Deployment	JCSS-3-21
Figure 3-20	Select Devices Dialog Box	JCSS-3-21
Figure 3-21	Satellite Bent Pipe Link Deployment Dialog Box—Basic	JCSS-3-22
Figure 3-22	Satellite Bent Pipe Link Deployment Dialog Box—Advanced	JCSS-3-22

Figure 3-23	Defining Satellite Link Attributes (GBS)	JCSS-3-23
Figure 3-24	Deploying Satellite Links	JCSS-3-23
Figure 3-25	Inconsistent Links.	JCSS-3-25
Figure 3-26	Link Errors and Failure Reasons Display.	JCSS-3-25
Figure 3-27	Planning Links Drawn as Green Dashed Lines	JCSS-3-26
Figure 3-28	External Links Drawn as Green Solid Lines.	JCSS-3-27
Figure 3-29	Broadcast Network Object Palette Icons	JCSS-3-28
Figure 3-30	Broadcast Network.	JCSS-3-28
Figure 3-31	Defining Broadcast Network Radio Attributes	JCSS-3-29
Figure 3-32	Defining Broadcast Network Devices.	JCSS-3-30
Figure 3-33	Defining Broadcast Network Optimization Attributes	JCSS-3-31
Figure 3-34	Circuit Deployment Wizard Ports Tab	JCSS-3-32
Figure 3-35	Circuit Deployment Wizard CCSD Tab	JCSS-3-33
Figure 3-36	Circuit Deployment Wizard Attributes Tab	JCSS-3-33
Figure 3-37	Answering Requirements Matrix Questions	JCSS-3-35
Figure 3-38	Creating a New Scenario	JCSS-3-36
Figure 3-39	Duplicating a Scenario	JCSS-3-37
Figure 3-40	Manage Scenarios Dialog Box.	JCSS-3-37
Figure 3-41	Viewing IP QoS Configuration on Links	JCSS-3-42
Figure 3-42	Viewing a Terrain Profile	JCSS-3-43
Figure 3-43	Enabling LOS Connectivity and Range	JCSS-3-44
Figure 3-44	Displaying LOS Connectivity	JCSS-3-46
Figure 3-45	Displaying LOS Range.	JCSS-3-47
Figure 3-46	Displaying Terrain Effects Shading	JCSS-3-48
Figure 3-47	Import from VNE Server Dialog Box	JCSS-3-48
Figure 4-1	IERs in the Object Palette	JCSS-4-2
Figure 4-2	Deploy IER: Choose Devices Dialog Box	JCSS-4-2
Figure 4-3	IER Dialog Box.	JCSS-4-3
Figure 4-4	IER Rapid Deployment Wizard	JCSS-4-5
Figure 4-5	IER Wizard: Choose Devices Dialog Box	JCSS-4-6
Figure 4-6	IER Dialog Box.	JCSS-4-7
Figure 4-7	IERs Dialog Box.	JCSS-4-8
Figure 4-8	Traffic Flow Thresholds Dialog Box	JCSS-4-9
Figure 4-9	Create IER Report Dialog Box	JCSS-4-10
Figure 4-10	Thread Dialog Box	JCSS-4-11
Figure 4-11	Import Threads from ACE Analyst Wizard	JCSS-4-15
Figure 4-12	ACE to Threaded IER Conversion: Specify Application Transactions	JCSS-4-15
Figure 4-13	Application Turn Aggregation Parameters	JCSS-4-16
Figure 4-14	Assign Producers and Consumers to Application Tiers.	JCSS-4-17
Figure 4-15	Advanced Options for a Tier Group	JCSS-4-18
Figure 4-16	Pre-Deployment Editor.	JCSS-4-18
Figure 4-17	Creating a Relationship	JCSS-4-19
Figure 4-18	Converting Applications into Flows	JCSS-4-20
Figure 4-19	Traffic Wizard	JCSS-4-21
Figure 4-20	DoDAF Editor Dialog Box.	JCSS-4-22
Figure 4-21	DoDAF Import Format Dialog Box	JCSS-4-22
Figure 4-22	DoDAF Editor	JCSS-4-23

Figure 4-23 DoDAF Editor Summary Dialog BoxJCSS-4-24

Figure 4-24 DoDAF Editor Dialog Box.....JCSS-4-25

Figure 4-25 DoDAF Import Format Dialog Box.....JCSS-4-25

Figure 4-26 DoDAF Editor.....JCSS-4-25

Figure 4-27 Setting Application Size.....JCSS-4-26

Figure 4-28 Setting Application Repeatability.....JCSS-4-26

Figure 4-29 DoDAF Editor Dialog Box.....JCSS-4-27

Figure 4-30 DoDAF Import Format Dialog Box.....JCSS-4-27

Figure 4-31 Import Dialog Box for Creating Threads.....JCSS-4-28

Figure 4-32 Example Imported Scenario for Creating Threads.....JCSS-4-29

Figure 4-33 Generate Visio Reports Dialog Box.....JCSS-4-30

Figure 4-34 DoDAF Diagram Options Dialog Box.....JCSS-4-31

Figure 4-35 DoDAF Diagram Options View Tab—OV2 View.....JCSS-4-31

Figure 4-36 Sample OV2 Visio Diagram.....JCSS-4-32

Figure 5-1 Setting Evaluation Parameters.....JCSS-5-1

Figure 5-2 Setting Advanced Evaluation Parameters.....JCSS-5-2

Figure 5-3 Setting Optimization Parameters.....JCSS-5-3

Figure 5-4 Setting Advanced Optimization Parameters.....JCSS-5-4

Figure 5-5 Specifying Alternate Link Capacities.....JCSS-5-5

Figure 5-6 Changing Web Report Settings.....JCSS-5-6

Figure 5-7 Saving Optimization Settings.....JCSS-5-7

Figure 5-8 Managing Optimization Results.....JCSS-5-8

Figure 5-9 Comparing Parameters.....JCSS-5-9

Figure 5-10 Comparing Bandwidths.....JCSS-5-9

Figure 5-11 Examining Top Solutions.....JCSS-5-10

Figure 6-1 Choosing Device Statistics.....JCSS-6-1

Figure 6-2 Choosing Advanced Device Statistics.....JCSS-6-2

Figure 6-3 Setting Simulation Parameters—Simple Mode.....JCSS-6-3

Figure 6-4 Setting Simulation Parameters—Reports.....JCSS-6-4

Figure 6-5 Setting Simulation Parameters—Detailed Mode.....JCSS-6-5

Figure 6-6 Summary of Results.....JCSS-6-5

Figure 6-7 Viewing the Simulation Log.....JCSS-6-7

Figure 6-8 Path Object Showing IER Route.....JCSS-6-9

Figure 6-9 Route Report for IER Routes.....JCSS-6-10

Figure 7-1 Viewing MOPs.....JCSS-7-1

Figure 7-2 Sample Filtered Graphs.....JCSS-7-2

Figure 7-3 Example Graph Tool Tip.....JCSS-7-2

Figure 7-4 Zooming In on a Trace.....JCSS-7-3

Figure 7-5 Accessing Graph Panel Shortcut Menus.....JCSS-7-3

Figure 7-6 Selecting a Statistic of Interest.....JCSS-7-4

Figure 7-7 Finding Top Results.....JCSS-7-4

List of Tables

Table FM-1	Document Revision History	JCSS-FM-vi
Table 2-1	VNE Server Import Modes	JCSS-2-8
Table 3-1	Planning Links vs. Connectivity Links	JCSS-3-27
Table 3-2	Protocols Menu Items	JCSS-3-39

List of Procedures

Procedure 2-1	Launch JCSS	JCSS-2-1
Procedure 2-2	Create a User Profile	JCSS-2-2
Procedure 2-3	Select the User Level	JCSS-2-3
Procedure 2-4	Open a Workflow Using the Task Assistant.	JCSS-2-4
Procedure 2-5	Create a New Project	JCSS-2-5
Procedure 2-6	Set Scenario Classification	JCSS-2-10
Procedure 2-7	Set the Area of Interest	JCSS-2-11
Procedure 2-8	Add a Border Map	JCSS-2-12
Procedure 2-9	Add an Image Map	JCSS-2-12
Procedure 2-10	Add a MIF Map	JCSS-2-13
Procedure 2-11	Zoom to Rectangle	JCSS-2-14
Procedure 2-12	Zoom To Selection	JCSS-2-14
Procedure 2-13	Zooming Out	JCSS-2-15
Procedure 2-14	Zoom To All	JCSS-2-15
Procedure 2-15	Selecting Settings for the Logical View of a Scenario	JCSS-2-16
Procedure 3-1	Add Units via the Library Treeview	JCSS-3-1
Procedure 3-2	Add Units via the Shortcut Menu	JCSS-3-2
Procedure 3-3	Edit Unit Attributes.	JCSS-3-3
Procedure 3-4	Edit Attributes For Many Objects Using a Template	JCSS-3-5
Procedure 3-5	Define or Edit an Attribute Template	JCSS-3-7
Procedure 3-6	Create a Template OPFAC or Organization	JCSS-3-9
Procedure 3-7	Drill Down into a Unit	JCSS-3-10
Procedure 3-8	Add a Device to an OPFAC.	JCSS-3-11
Procedure 3-9	Cut or Copy an Object	JCSS-3-13
Procedure 3-10	Paste an Object.	JCSS-3-14
Procedure 3-11	Undo Editing Operations	JCSS-3-14
Procedure 3-12	Redo Editing Operations	JCSS-3-14
Procedure 3-13	Create a Device Model	JCSS-3-15
Procedure 3-14	Open a Node Model in Modeler.	JCSS-3-16
Procedure 3-15	Link Devices via Object Palette	JCSS-3-17
Procedure 3-16	Deploy a Link.	JCSS-3-18
Procedure 3-17	Deploy a Satellite Link	JCSS-3-20
Procedure 3-18	Verify a Link.	JCSS-3-25
Procedure 3-19	Save As Link Type.	JCSS-3-26
Procedure 3-20	Add Planning Links via Object Palette.	JCSS-3-26
Procedure 3-21	Add External Connectivity Links via Object Palette.	JCSS-3-27
Procedure 3-22	Add Broadcast Networks via Object Palette	JCSS-3-28
Procedure 3-23	Deploy Broadcast Networks via the Topology Menu.	JCSS-3-29
Procedure 3-24	Configure Promina Devices.	JCSS-3-32
Procedure 3-25	Provide Requirements Matrix Information	JCSS-3-35
Procedure 3-26	Create a New Scenario	JCSS-3-36
Procedure 3-27	Duplicate a Scenario	JCSS-3-36
Procedure 3-28	Switch Between Scenarios	JCSS-3-37
Procedure 3-29	Manage Scenarios.	JCSS-3-37
Procedure 3-30	Run a Routing Protocol Visualization	JCSS-3-41

Procedure 3-31	View a Terrain Profile	JCSS-3-42
Procedure 3-32	Enable LOS Connectivity and Range	JCSS-3-44
Procedure 3-33	Display LOS Connectivity	JCSS-3-46
Procedure 3-34	Display LOS Range	JCSS-3-47
Procedure 3-35	Display Terrain Effect Shading	JCSS-3-47
Procedure 3-36	Import from VNE Server	JCSS-3-48
Procedure 4-1	Deploy IERs using the Object Palette	JCSS-4-1
Procedure 4-2	Deploy IERs using the IER Wizard	JCSS-4-2
Procedure 4-3	Deploy IERs (Advanced)	JCSS-4-4
Procedure 4-4	Record IER Routes	JCSS-4-6
Procedure 4-5	Edit IERs	JCSS-4-7
Procedure 4-6	Import an IER Text File	JCSS-4-8
Procedure 4-7	View IERs	JCSS-4-9
Procedure 4-8	Color IERs by Aggregate Load	JCSS-4-9
Procedure 4-9	Set IER Color Thresholds	JCSS-4-9
Procedure 4-10	Export an IER Report	JCSS-4-10
Procedure 4-11	Import an IER Report	JCSS-4-10
Procedure 4-12	Create a Thread	JCSS-4-11
Procedure 4-13	Create a Thread from Existing IERs via "Edit Thread"	JCSS-4-12
Procedure 4-14	Create a Thread from Existing IERs via "Create Thread"	JCSS-4-12
Procedure 4-15	Create a Thread without Existing IERs	JCSS-4-13
Procedure 4-16	Edit Threads	JCSS-4-14
Procedure 4-17	Creating Threads from ACE Analyst	JCSS-4-14
Procedure 4-18	Create a Relationship	JCSS-4-19
Procedure 4-19	Convert Applications into Flows	JCSS-4-20
Procedure 4-20	Deploy Traffic using the Traffic Wizard	JCSS-4-20
Procedure 4-21	Create IERs from DoDAF Editor	JCSS-4-22
Procedure 4-22	Create and Deploy Standard Applications from the DoDAF Editor	JCSS-4-24
Procedure 4-23	Create Threads Using DoDAF Editor	JCSS-4-27
Procedure 4-24	Generating Visio Reports	JCSS-4-30
Procedure 5-1	Perform a Network Evaluation	JCSS-5-1
Procedure 5-2	Perform a Network Capacity Optimization	JCSS-5-3
Procedure 5-3	Specify Alternate Link Capacities	JCSS-5-4
Procedure 5-4	Display Web Reports	JCSS-5-6
Procedure 5-5	Save Optimization Settings	JCSS-5-7
Procedure 5-6	Compare Optimization Results	JCSS-5-8
Procedure 5-7	Examine Top Solutions	JCSS-5-10
Procedure 6-1	Specify Statistics for Collection During Simulation	JCSS-6-1
Procedure 6-2	Specify Advanced Statistics for Collection During Simulation	JCSS-6-2
Procedure 6-3	Running a Simulation	JCSS-6-3
Procedure 6-4	Display DES Simulation Log File	JCSS-6-6
Procedure 6-5	Generate Web Report	JCSS-6-8
Procedure 6-6	View Recorded IER Routes	JCSS-6-9
Procedure 7-1	Display MOP Graphs	JCSS-7-1
Procedure 7-2	Change MOP Graph View Properties	JCSS-7-2
Procedure 7-3	Find Top Statistics	JCSS-7-3

1 Introduction

The JCSS User 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 descriptions of 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, you will be able to do the following:

- Gain a high level-conceptual understanding of what the JCSS software is and what features it can deliver that are of use to the goals of military planners
- 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 must 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 as not to jeopardize mission completion.

JCSS is a tool that helps you to solve these kinds of problems. It does this by letting you construct a computer representation of the communications network infrastructure coordinated to a map and letting you 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 One—Building network topology and setting traffic scenarios, and
- Phase Two—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 blocks 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 used 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.

To assist you with the sequence of tasks, three workflows are presented below, and are also presented as wizards in the JCSS software. These workflows are in order of increasing complexity and precision, depending upon the time available for the work:

- 1) The short term, high level Crisis Action Planner, which comprises a network of nodes and links and loads it with traffic
- 2) The Operational Planner, which specifies actual communications devices located in OPFACs and is used in support of an OPLAN (Operations Plan)
- 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

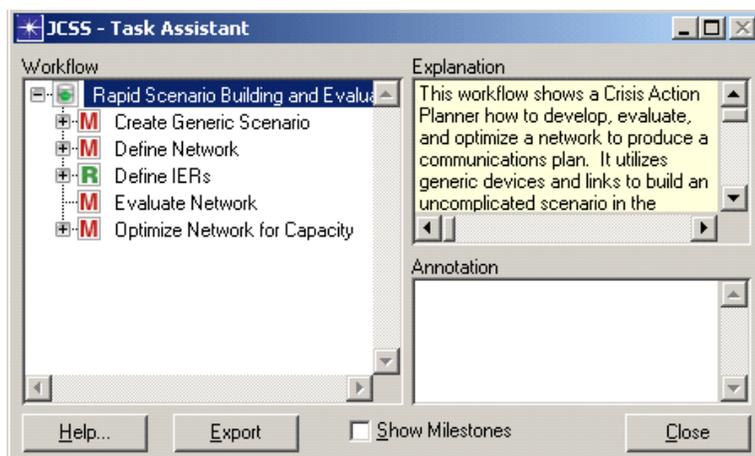
Crisis Action Planner's Workflow

Sample workflows are provided via the JCSS Task Assistant.

Note—The Task Assistant feature is no longer maintained, and some of the following information may no longer be valid. This section is provided only for reference purposes.

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.

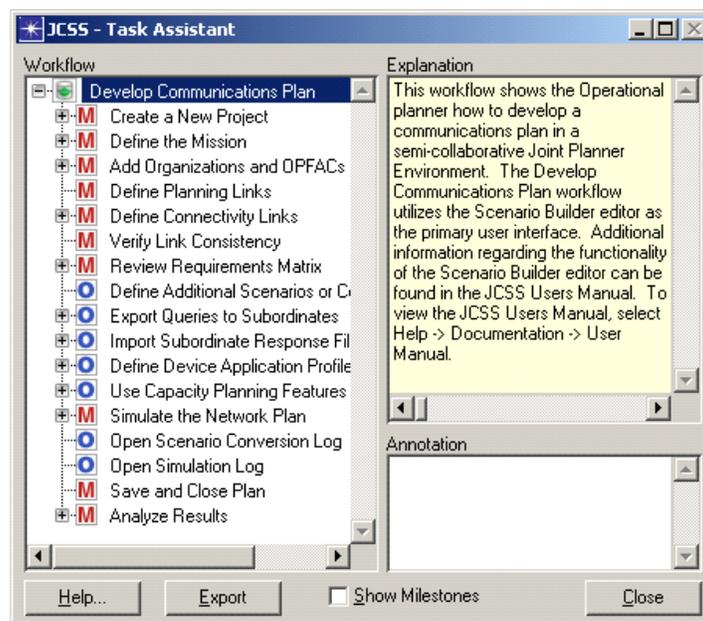
Figure 1-1 Crisis Action Planner's Workflow



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.

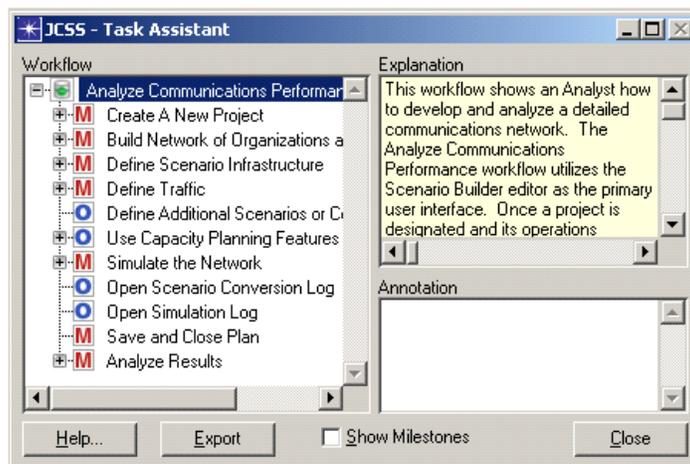
Figure 1-2 Operational Planner's Workflow



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 Guide.

(Optional) Server Characterization

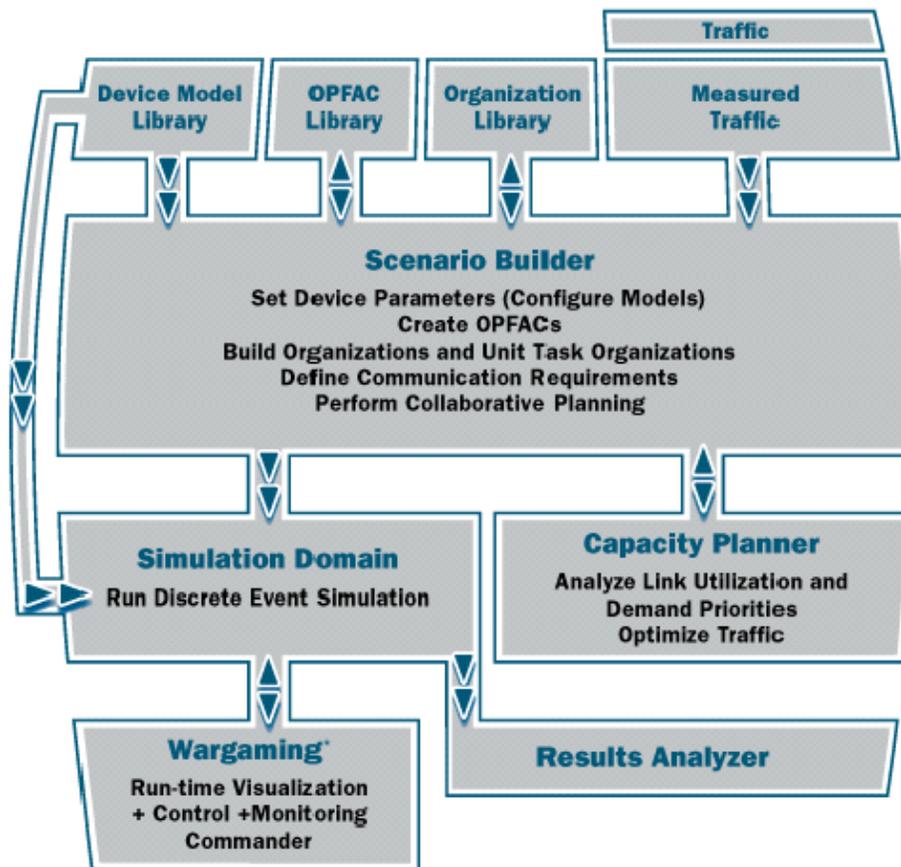
The Server Characterization Editor (SCE) is an optional module that allows you to import server performance information for analysis of the processes and applications, and characterization into workloads used as the basis for simulation modeling. To learn more about the SCE, refer to the IT Guru User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

(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 as described in the following procedure.

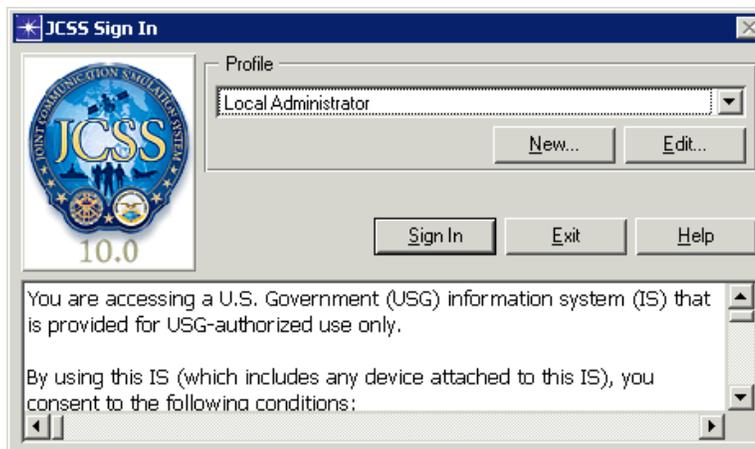
Procedure 2-1 Launch JCSS

- 1 Select Start > Programs > JCSS > JCSS v10.0.
 - ➔ 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, using the following procedure. 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.

Figure 2-3 Adding a New User Profile

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 for 'Use Task Assistant at Startup', a legend '* - Required Field', and 'OK' and 'Cancel' buttons.

- 2 Enter required information and any optional information. Click OK.
➔ The Sign In dialog box displays again with the new username in the Profile field.
- 3 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).

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, as described in the following procedure. 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 Select one of the user levels, as follows:
 - 1.1 (Option 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.
 - 1.2 (Option 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.
 - 1.3 (Option 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

Note—The Task Assistant feature is no longer maintained, and some of the following steps may no longer be valid. This section is provided only for reference purposes.

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.

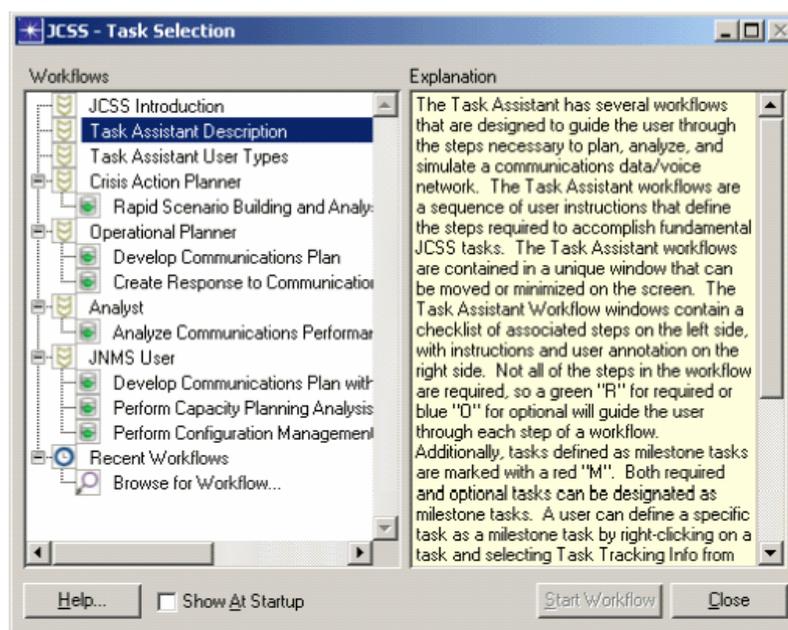
Not all of the tasks in the workflow are required. Milestone tasks are marked with a red "M" and can be optional or required, required tasks are marked on the left with a green "R", and optional tasks are marked with a blue "O". After you complete a task, double-click it to check it off. More help is 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.

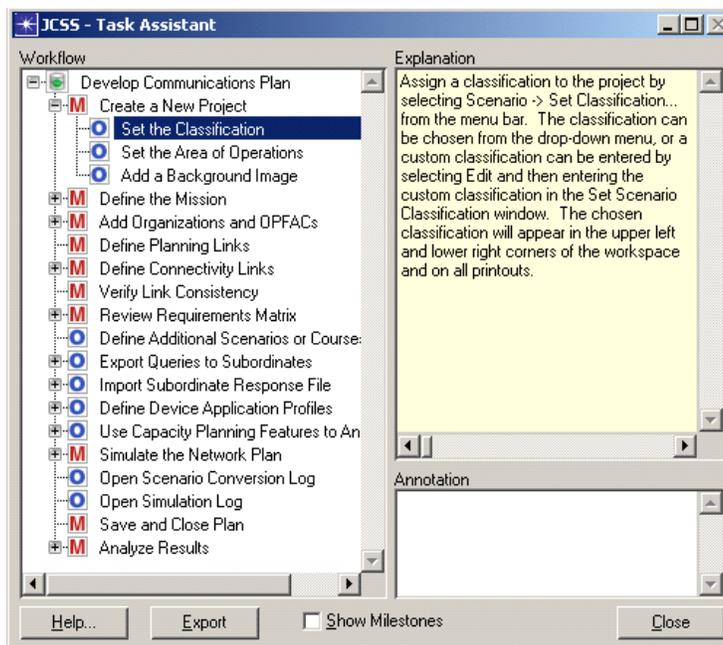
Procedure 2-4 Open a Workflow Using the Task Assistant

- 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.

Figure 2-4 Task Selection



- 2 Select the Develop Communications Plan workflow from the Workflows pane.
 - A description of this workflow displays in the Explanation pane.
- 3 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.
- 4 Follow the sequential tasks in the Workflows pane until completion.

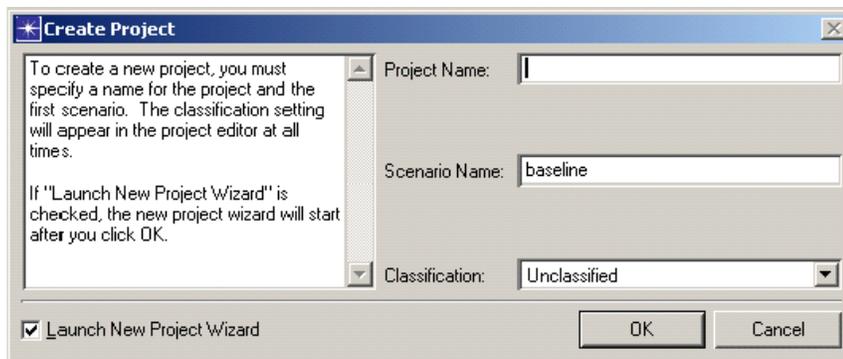
Figure 2-5 Following Sequential Tasks in the Workflows Panel**End of Procedure 2-4****Creating a New Project**

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 set equipment types, area of operations, and top-level units and locations to use in the new project.

Procedure 2-5 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 2-6 Creating a New Project

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.

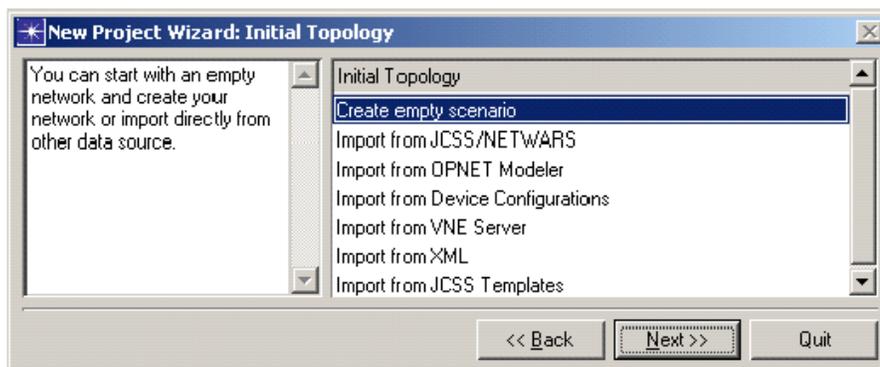
- 2 Select a classification level for the project in the Create Project dialog box.
- 3 Click OK.

If Launch New Project Wizard is not checked, then JCSS creates a generic project using the names you have designated. You can skip the remaining steps in this procedure.

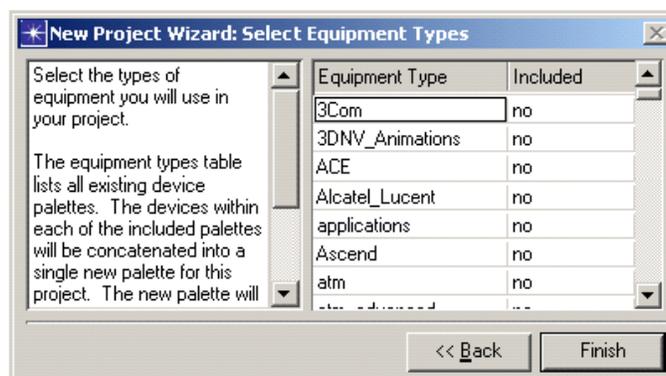
OR

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.

- 4 If you selected to launch the New Project Wizard, then the Initial Topology dialog box displays.

Figure 2-7 Initial Topology Dialog Box

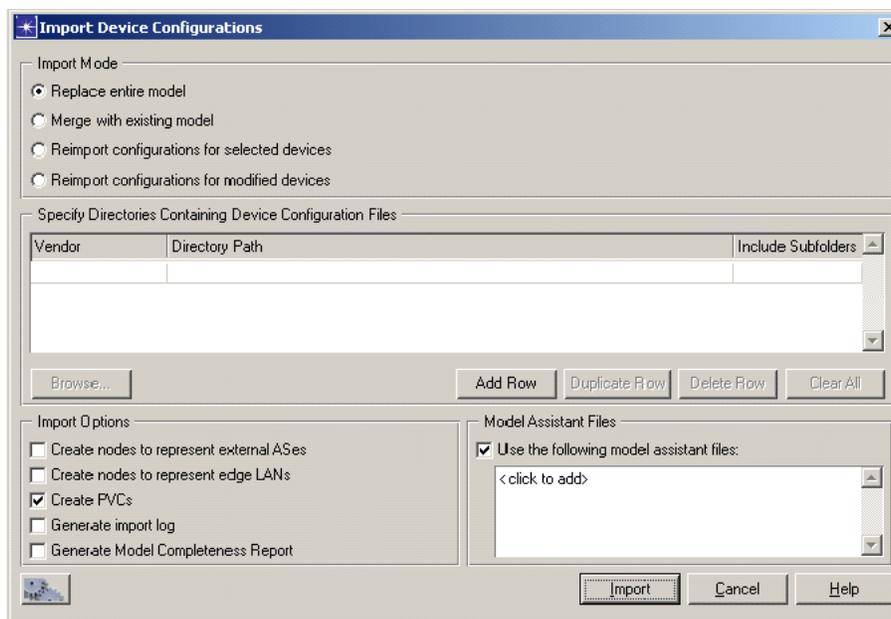
- 5 Choose to create an empty scenario or import from one of the various data sources, and then click Next.
 - 5.1 If you choose Create empty scenario, a blank scenario is created.
 - ➔ The Select Equipment Types dialog box displays.

Figure 2-8 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.

5.2 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.

- If you choose Import from JCSS/NETWARS, a file chooser dialog box displays. Select the appropriate nt.m file.
- If you choose Import from OPNET Modeler, a file chooser dialog box displays. Select the appropriate nt.m file.
- If you choose Import from Device Configurations, the Import Device Configurations dialog box displays.

Figure 2-9 Import Device Configurations Dialog Box

Specify the location of the device configuration files and how these files should be integrated into the existing topology (if it already exists), and then click Import.

- If you choose Import from VNE Server, the process begins. Import from VNE Server is a COTS feature which allows you to create a network model based on information imported from VNE Server. You can import both topology and traffic information using imported VNE Server data.

Enter your VNE Server hostname in the Import from VNE Server dialog box, and then click OK.

A second Import from VNE Server dialog box displays. Specify the import mode you want to use, based on the following table, and then click Import.

Table 2-1 VNE Server Import Modes

Import Mode	Usage	Description
Create/Replace network using the most recent VNE Server data	Use when starting a new scenario or when you want to erase all existing information in the current model to replace with VNE Server data.	If checked, the current VNE Server data is used to create a network model. “Create” appears if you are in a new scenario; “Replace” appears if you are in an existing scenario.
Incrementally update network using the most recent VNE Server data	Use when you want to update the current model with any changes that have occurred in VNE Server since the last import.	If checked, VNE Server updates the current network model with all recorded changes in VNE Server since the original import.
Replace network using an existing archive ¹	Use when you want to replace the current model with information contained in a VNE Server archive file.	If checked, a network model is created using the archived network specified in the drop-down menu. This menu is populated based on available archives from VNE Server.

1. This option does not allow you to import collected configuration files.

- If you choose Import from XML, a file chooser dialog box displays. Select the appropriate xml file.

5.3 If you choose Import from JCSS Templates, the Set Area of Operations dialog box displays.

Figure 2-10 Set Area of Operations Dialog Box



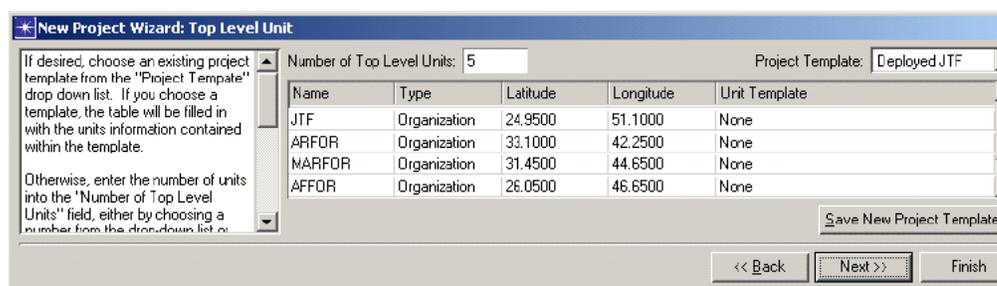
Note—The Set Area of Operations dialog box provides the coordinates where the template Organizations/OPFACs will reside inside the scenario. The Area of the View and Center of the View are updated depending on the selected View. The Top-Level Units and Location utilize this information to provide base coordinates for any imported Organizations/OPFACs.

- 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.

5.4 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.

➔ If you clicked Next, then the Top Level Unit dialog box displays.

Figure 2-11 Top Level Unit Dialog Box



5.5 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.

5.6 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.

- 5.7 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.
- 6 At the end of the import, the Select Equipment Types dialog box displays. Select the types of equipment that you will use in your project, and then click Finish.
 - The new project is created 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, as described in the following procedure. 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 2-12 Setting the Scenario Classification



End of Procedure 2-6

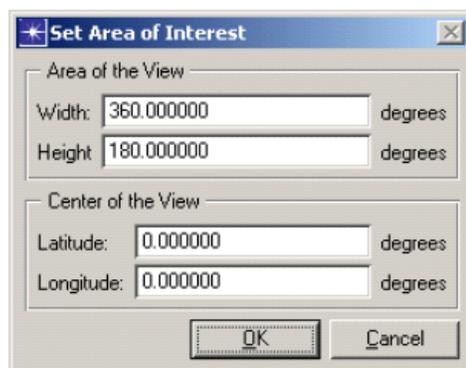
Setting the Area of Interest

The area of interest gives geographical context to the scenario. Use the following procedure to set the area of interest.

Procedure 2-7 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 2-13 Setting the Area of Interest



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 2-7

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. Add a border map using the following procedure.

Procedure 2-8 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 2-14 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.

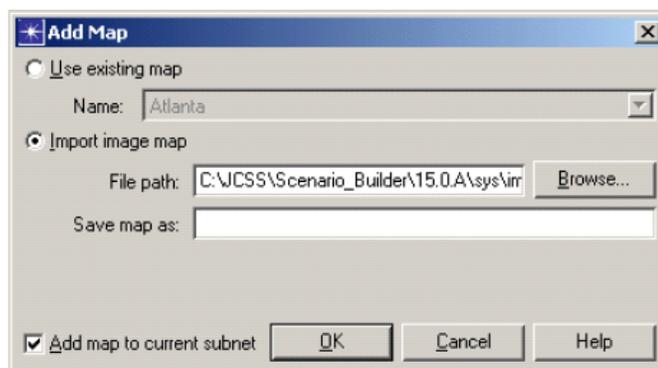
End of Procedure 2-8

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. Add an image map using the following procedure.

Procedure 2-9 Add an Image Map

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

Figure 2-15 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 2-9**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. Add a MIF map using the following procedure.

Procedure 2-10 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 2-16 MIF Menu

- 2 Select the desired MIF map from the menu.

3 Click Close.

➔ The MIF map automatically imports.

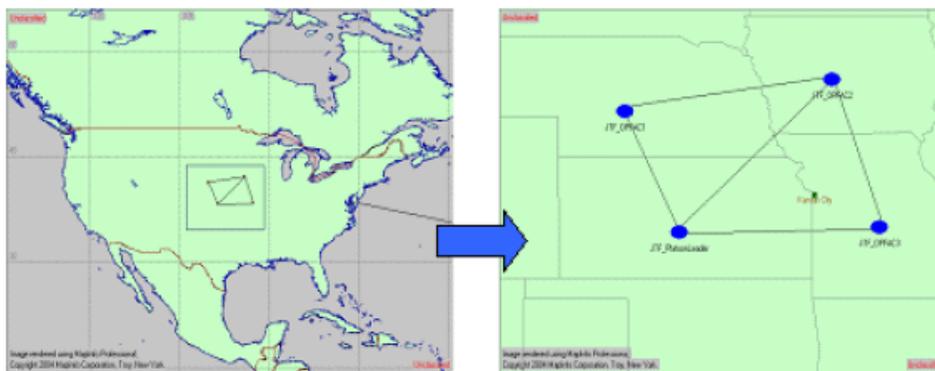
Note—When image maps are imported, the maps can be deleted, resized, or dragged and dropped to a different location while in Map Edit mode. To enter/exit Map Edit mode, select View > Background > Map Edit Mode.

End of Procedure 2-10**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. Use the following procedure to zoom to rectangle.

Procedure 2-11 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 Drag the cursor to define a rectangular shaped region to be magnified.
 - ➔ The defined area magnifies in the workspace.

Figure 2-17 Zooming In

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

End of Procedure 2-11

Use the following procedure to zoom to selection.

Procedure 2-12 Zoom To Selection

- 1 Drag the cursor to define a rectangular shaped region to be magnified.

- 2 Select View > Zoom > To Selection, or press <Ctrl>+<Shift>+<Z>.

➔ The defined area magnifies in the workspace.

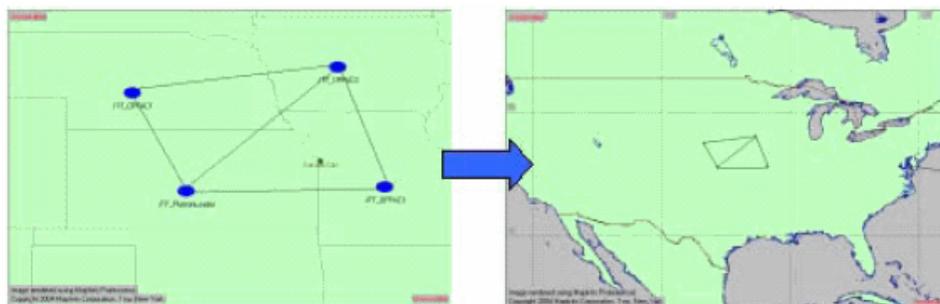
End of Procedure 2-12

Use the following procedure to zoom out.

Procedure 2-13 Zooming 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 2-18 Zooming Out



End of Procedure 2-13

Use the following procedure to zoom to all active areas in the workspace.

Procedure 2-14 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 2-14

Viewing Scenarios

JCSS offers a number of different views of a scenario, accessible by selecting a view option from View > Network Views > (option), choosing from one of the following options:

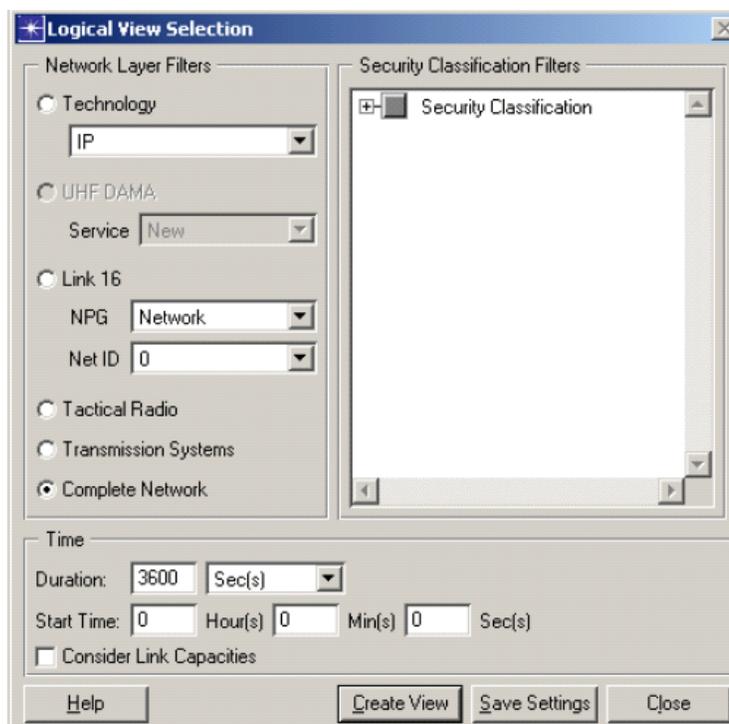
- **Planning**—This view is useful for someone working in a collaborative planning environment. Using this view, the planner can display only the planning portions of the scenario and hide all others. Organizations, OPFACs, and planning links are all part of the planning view. Devices and connectivity 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 2-15 Selecting Settings for the Logical View of a Scenario

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

Figure 2-19 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 2-15

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.

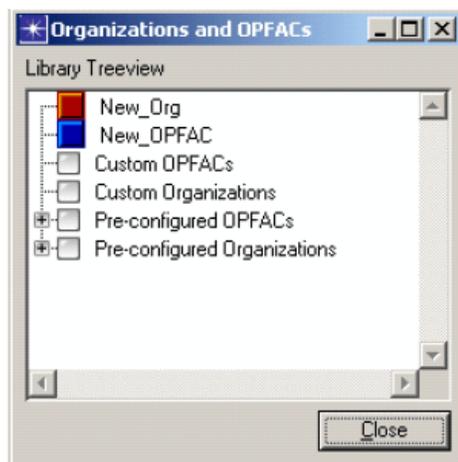
Organizations are groupings of sub-organizations and OPFACs that can represent military organizations or a physical location.

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. Use the following procedure to add units to the scenario.

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.

Use the following procedure to edit unit attributes.

Procedure 3-3 Edit Unit Attributes

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

Figure 3-2 Organization Attributes

Organization Name: ARMY_DIV

Organization Type: ARMY_DIV

Type Name: Army Division

Echelon Size: 0

Tasks:

Trajectory: NONE

Start Time (s): 0 Stop Time (s): 3600

Altitude: 0.0000 Alt. Units: meters Altitude set by terrain

Icon Name: red_dot Edit Icon

Documentation Set Owner JNMS Attributes Failure/Recovery

OK Cancel

Figure 3-3 OPFAC Attributes

OPFAC Name: CFH

OPFAC Functional Profile: <Custom Profile Edit

OPFAC Type: PROMINA_OPFAC_6

Trajectory: NONE

Start Time (s): 0 Stop Time (s): 3600

Altitude: 0.0000 Alt. Units: meters Altitude set by terrain

Icon Name: tent Edit Icon

Devices

Promina

JNMS Attributes Failure/Recovery Set Owner

OK Cancel

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:

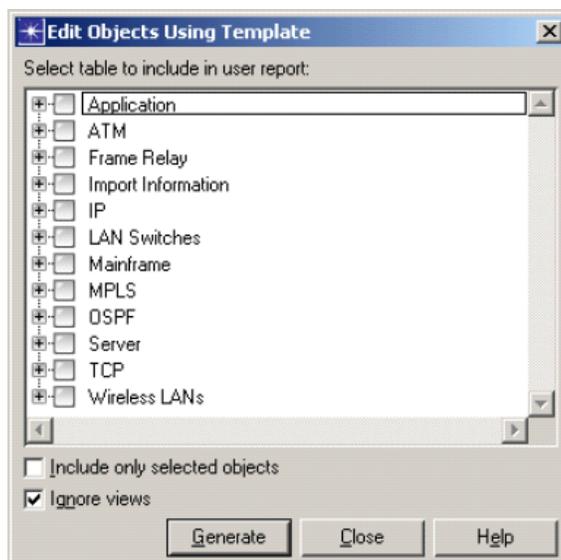
- Table category and name—Every attribute table belongs to a category, such as "IP" or "Application", and has a name that identifies it.
- Object types to include—A table can include all network objects, a specific type of network object, or objects selected by custom criteria that you specify.
- Attributes to include—Each row of an attribute template specifies the title and contents of a column that will appear in the attribute table.

Use the following procedure to edit attributes for many objects at once.

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

The screenshot shows a dialog box titled "IP.DGP Neighbor Configuration". It contains a table with the following data:

	Router Name	Router AS Number	Neighbor IP Address	Neighbor AS Number	Address Family	EBGP Multihop
1	cisco7000	Auto Assigned			IPv4	
2	NIPF router	Auto Assigned			IPv4	
3	SIPF router	Auto Assigned			IPv4	
4	cisco4500	Auto Assigned			IPv4	
5	IP_cloud	Auto Assigned			IPv4	
6	cisco4500	Auto Assigned			IPv4	

Below the table, there is a checkbox for "Copy and Paste Mode" which is currently unchecked. To its right is a "Clipboard:" text field. At the bottom of the dialog are buttons for "Details", "Promote", "OK", and "Cancel".

- 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.

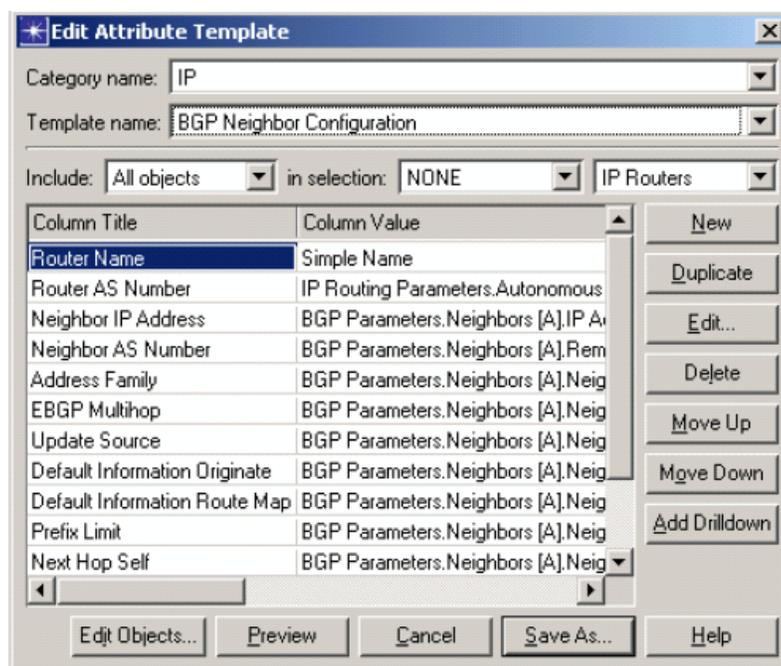
End of Procedure 3-4

Use the following procedure to define or edit an attribute template.

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 drop-down menus.
- 3 Choose what object types to include in the table:
 - 3.1 Select an object type from the Include drop-down menus.
- 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.)
 - ➔ A dialog box for specifying the contents and format of the table column opens.
- 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.

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

	Router Name	Router AS Number	Neighbor IP Address	Neighbor AS Number	Address Family	EBGP Multihop	Update Source	Default Information Originate	De... Info Row
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	

- 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

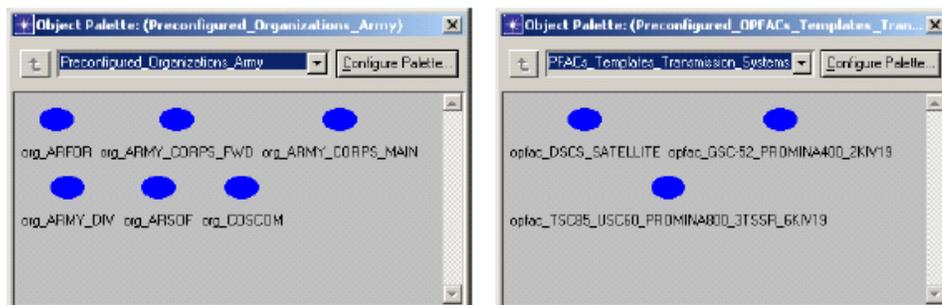
Creating Template Organizations and OPFACs

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. Use the following procedure to create a template OPFAC or organization.

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 in which to save the template. 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

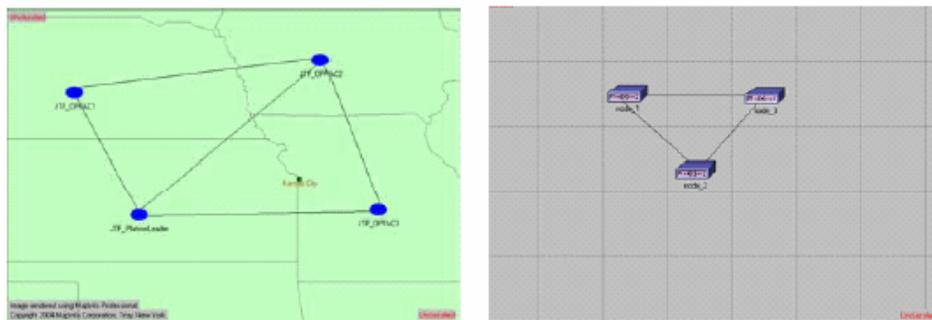
End of Procedure 3-6

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 JCSS_Standard_Models palette to build OPFACs, because the palette includes all of the updated device models and link models for connecting the devices.

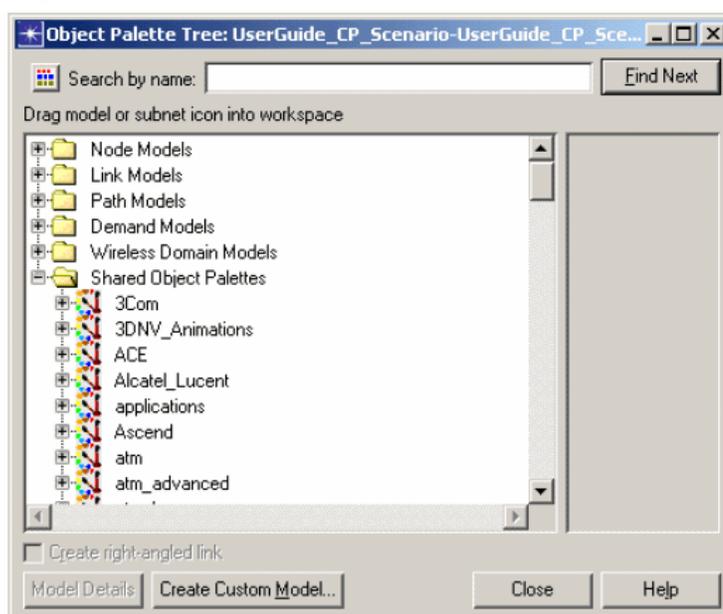
OPFACs are automatically created for single devices that are added to the workspace or an organization (i.e., not placed directly in an OPFAC). The OPFAC will have the same icon as the device, and both the OPFAC and device right-click menu options will be made available.

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

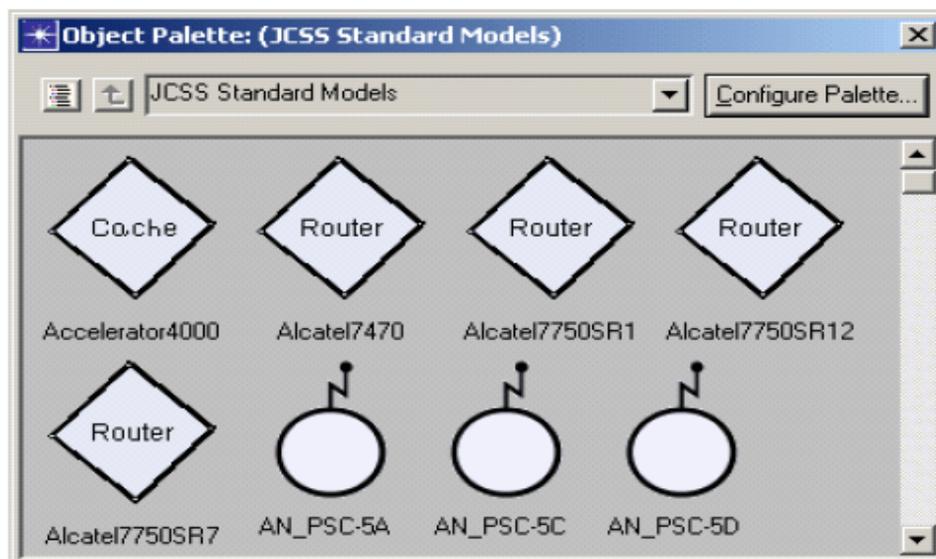
- 1 Click the Open Object Palette button, or select Topology > Open Object Palette.
 - The object palettes display in either a Tree view style or an Icon view style, depending upon how your environment preferences are set.

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.

- 2 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.

- 3 Select the JCSS Standard Models object palette or other palette.
- 4 Left-click the desired device in the object palette.
- 5 Drag-and-drop device from the object palette to the workspace.
- 6 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 the following:

- 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 and the supported object is cut, 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.

Use the following procedures to cut, copy, or paste an object.

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

Use the following procedures to undo or redo an edit operation.

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:

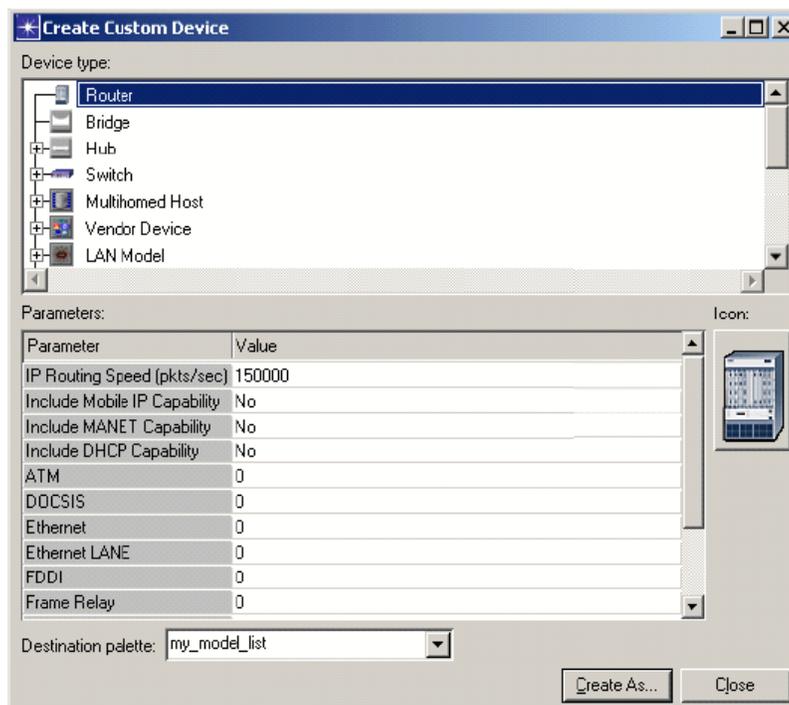
- They can be easily configured for specialized needs and then integrated into a network model.
- They support inheritance, so that changes to the original (parent) model can automatically affect all models derived from it.

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 treewiew 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

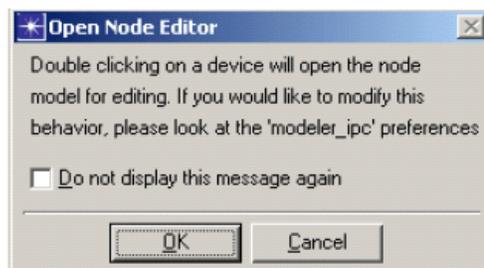
If you have an OPNET Modeler license, you can easily open node models in Modeler via JCSS.

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

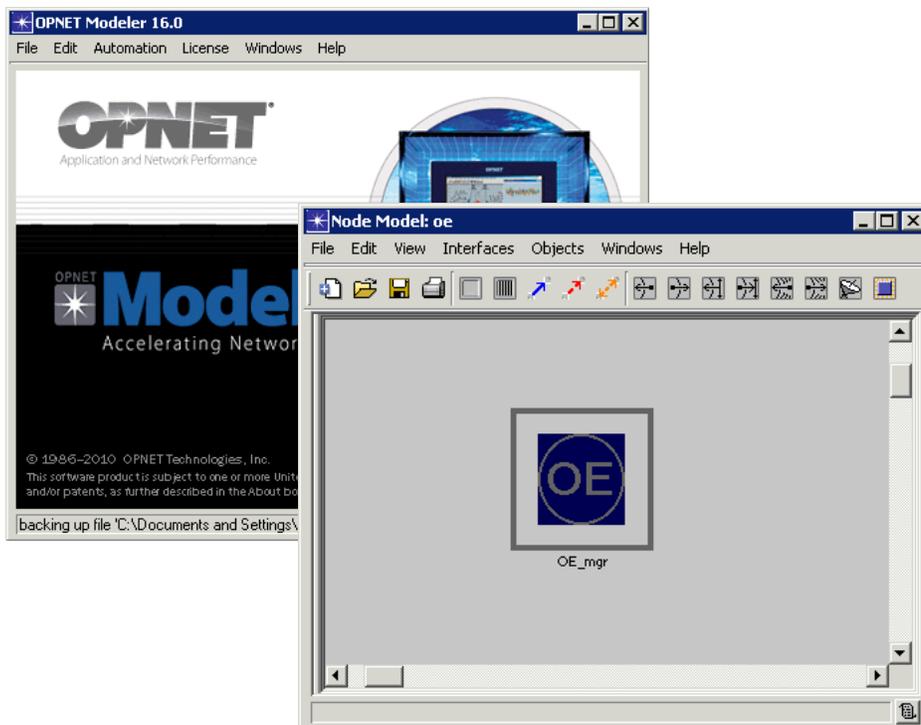
Procedure 3-14 Open a Node Model in Modeler

- 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 JCSS_Standard_Models or JCSS_Links palettes.

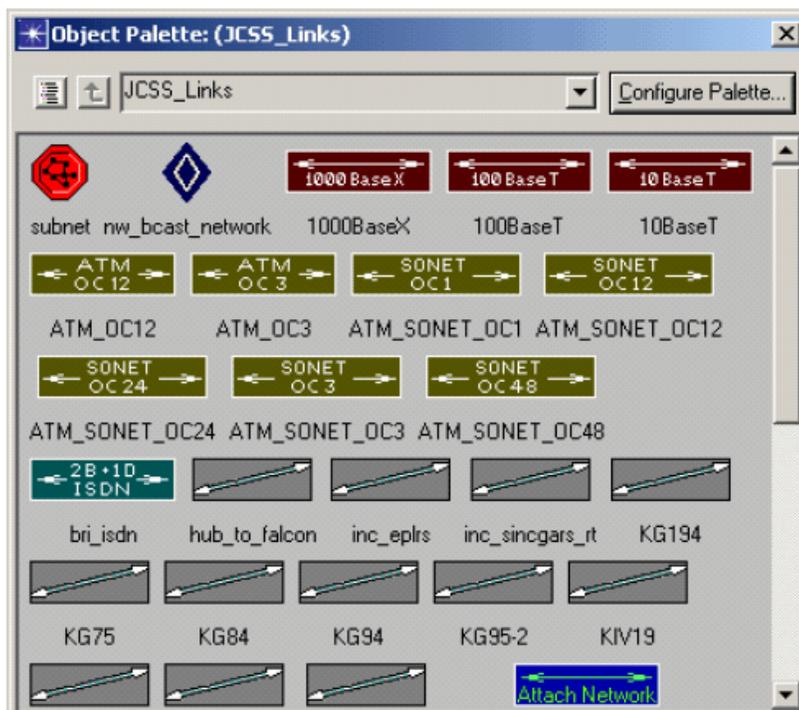
Internal Connectivity Links

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.

Use the following procedure to link devices from the object palette.

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

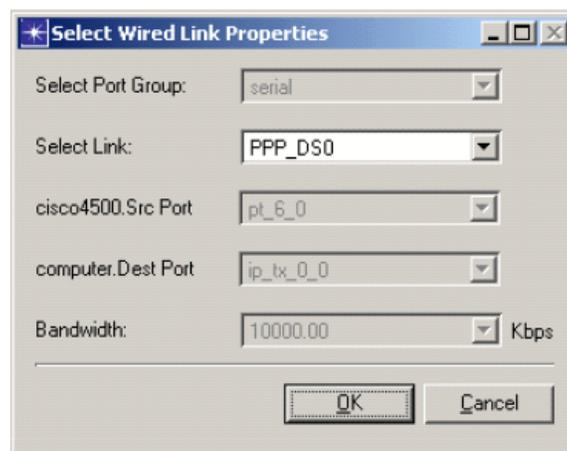
- 1 Select two devices (in the workspace or the Network Browser), and then select Topology > Link Operations > Deploy Link.
- 2 If more than one device is present in an OPFAC, the Select Devices dialog box displays. Select the desired devices to connect and then click Next.

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 is 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 Wired Link Properties 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 Wired Link Properties 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

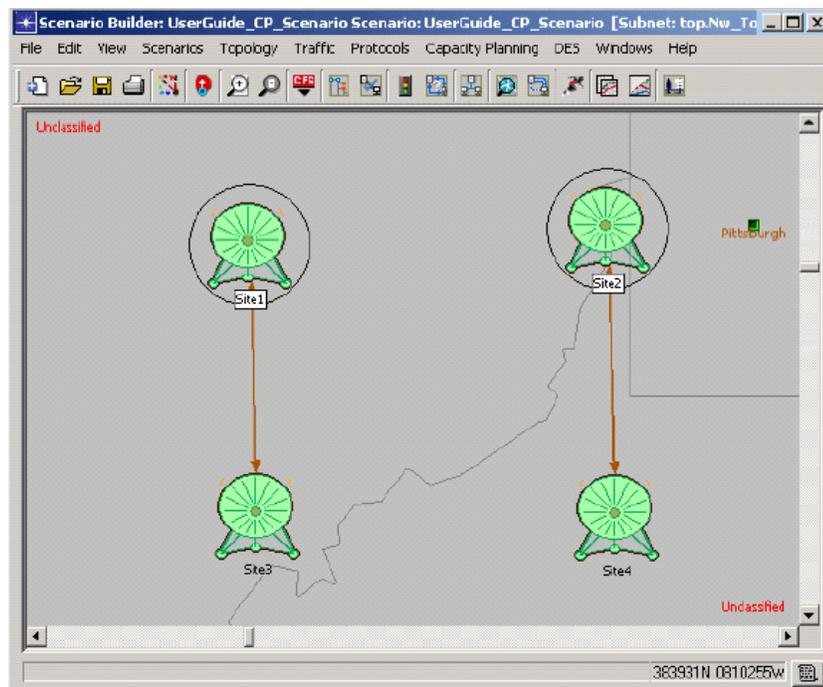
JCSS supports two types of satellite links: bentpipe and broadcast links.

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.)

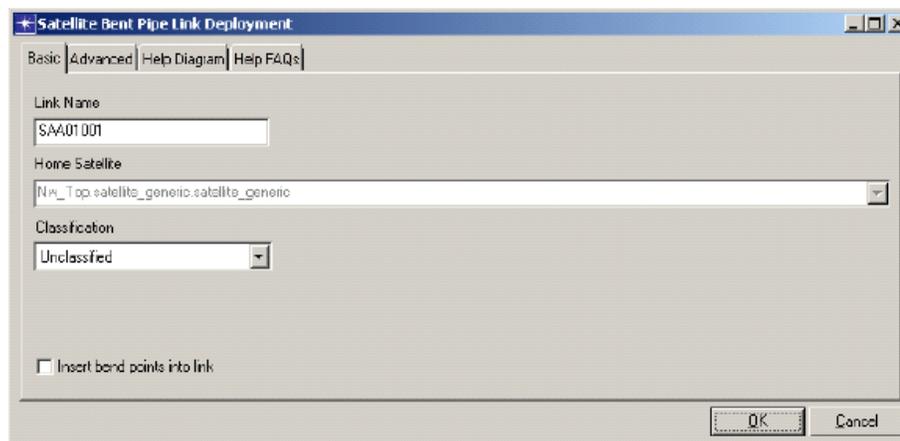
Figure 3-19 Selecting Satellites for Link Deployment

- 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

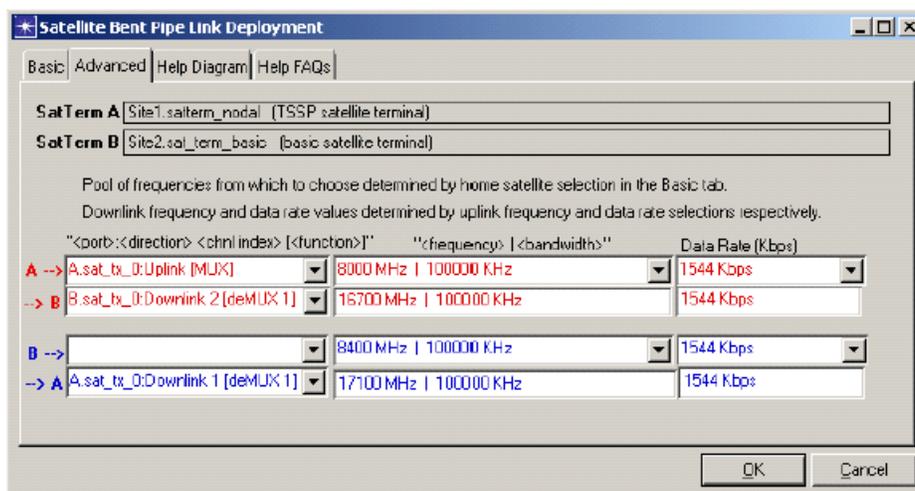
If a selected OPFAC has only one device, then the device will be selected by default and the Select Devices dialog box will be skipped. If the OPFAC doesn't have a device, an error will be flagged.

- 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.)

Figure 3-23 Defining Satellite Link Attributes (GBS)

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

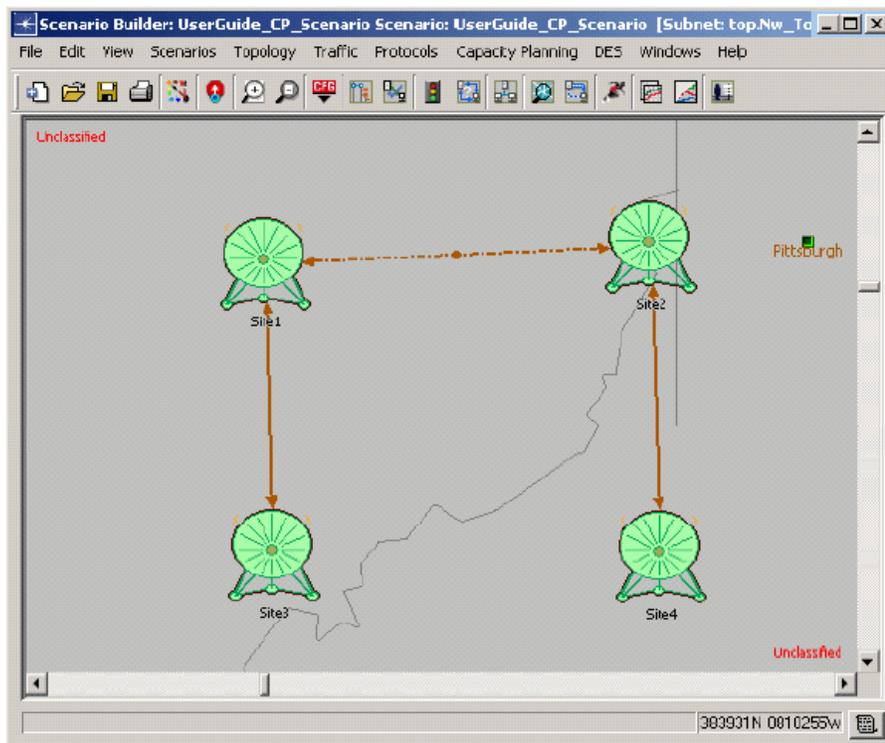
Stop Time: End of Sim secs

Earth Terminals:

OPFAC	Device	Port	Transponder
CBS_eorth_terminal	CBS_eorth_ter...	dl_channel_pt_0_0	

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 Circuit Deployment wizard.

- 6 Select Topology > Deploy Circuit to start the wizard.

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 wizard.

End of Procedure 3-17

Deploying Circuits

You can import circuit information from or export to a tab-delimited text file.

Import Circuits

Import circuit information from a tab-delimited text file. Depending on the information contained in the file, the import process may do one of the following:

- Reject rows containing invalid values
- Add new circuits not already contained in the scenario
- Delete circuits from the scenario not found in the file
- Modify circuits in the scenario based on the information in the imported file

- 1) Select Topology > Import > Circuits. A file chooser dialog box appears.
- 2) Select the tab-delimited file you want to import. An Import Circuit Report dialog box which provides a summary of the validated entries appears. If any lines in the imported file had errors, a dialog box listing the errors will appear first.
- 3) Modify the Action field to change lines for additions, deletions, or modifications. Circuit entries that failed validation will not appear in the report.
- 4) Click OK to import the entries.

Export Circuits

Export information about all circuits in the scenario to a tab-delimited file by choosing Topology > Export > Circuits. JCSS examines all devices in the scenario that have circuits defined and writes the circuit information to a text file in the project directory with the following naming convention:
<project>-<scenario>-circuits.txt.

Each section of the text file starts with a `circuit_type` field, followed by a field listing the name of the circuit type. The sections of the file are sorted by circuit type.

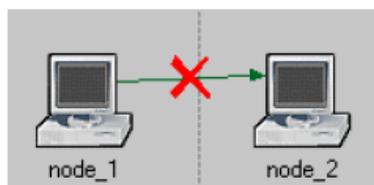
Verifying Device Connectivity

Verify that devices are connected properly.

Procedure 3-18 Verify a Link

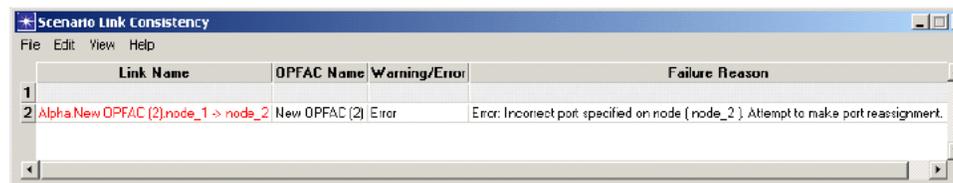
- 1 Select **Topology > Link Operations > Verify Links**, or click the **Verify Link Consistency** button. Inconsistent links (e.g., links not connected to the right ports on the end points of the link) will be marked with a red X in the workspace.

Figure 3-25 Inconsistent Links



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

Figure 3-26 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, using the following procedure.

Procedure 3-19 Save As Link Type

- 1 Right-click on a link in the workspace, and select Save As Link Type.
 - ➔ The status bar at the bottom left corner of the Scenario Builder window displays the following message, "New Link type '<selected link name>' saved."

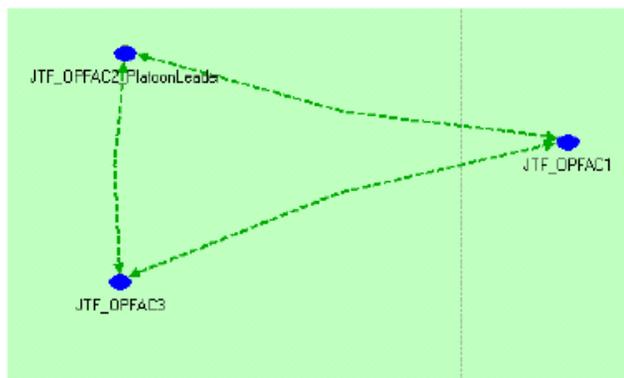
End of Procedure 3-19

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. Use the following procedure to deploy planning links from the object palette.

Procedure 3-20 Add Planning Links via Object Palette

- 1 From the object palette drop-down menu, select the JCSS_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 3-27 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

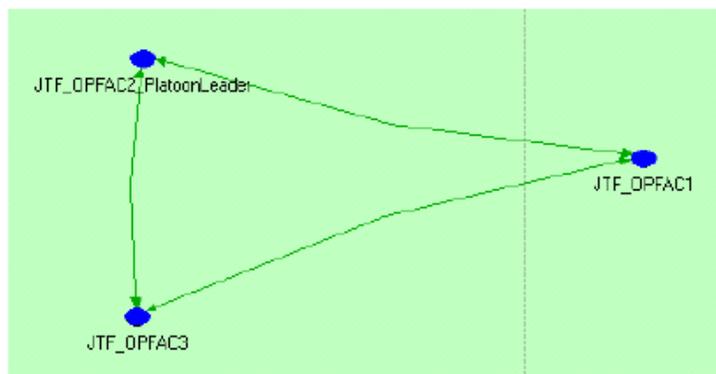
Planning Link	Connectivity Link
High-level link	Actual physical link
Shows general connectivity	Shows the specific type of connectivity
Shows anticipated bandwidth	Shows actual bandwidth
Can connect organizations and OPFACs	Can only connect OPFACs
Drawn as dashed green line	Drawn as solid green line

Use the following procedure to add external connectivity links from the object palette.

Procedure 3-21 Add External Connectivity Links via Object Palette

- 1 From the object palette drop-down menu, select the JCSS_Standard_Models, or JCSS_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 3-28 External Links Drawn as Green Solid Lines



End of Procedure 3-21

Defining Broadcast Networks

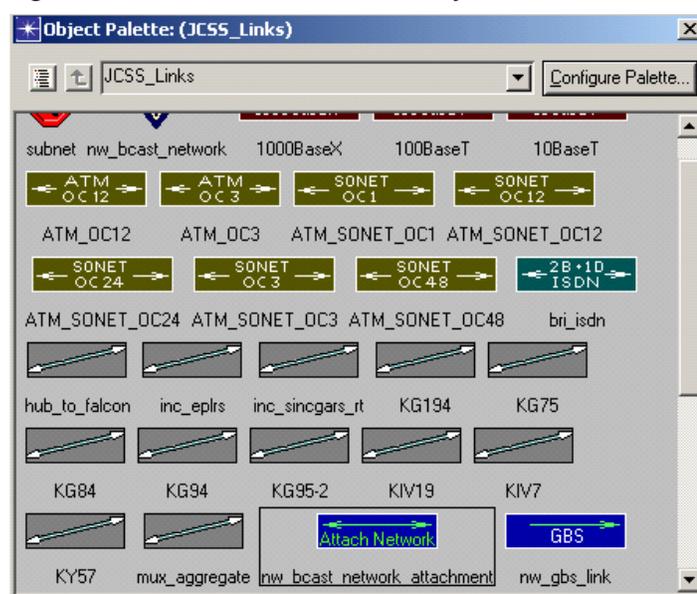
Connect radio system devices that are tuned to the same frequency and/or belong to the same frequency hop group. Only OPFACs can be included as members of a broadcast network. Broadcast networks are drawn as a broadcast network object with members connected by blue links.

Use the following procedure to add broadcast networks from the object palette.

Procedure 3-22 Add Broadcast Networks via Object Palette

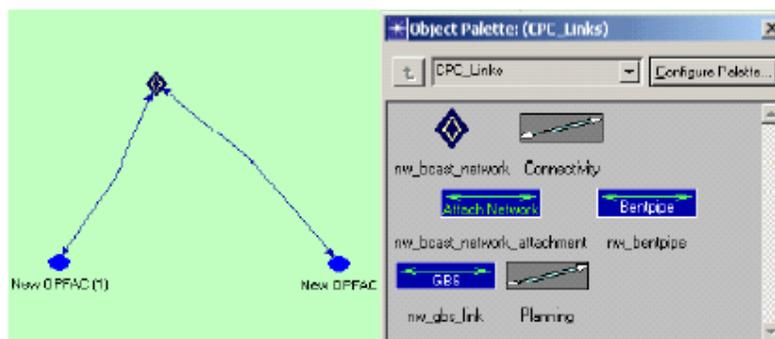
- 1 From the object palette drop-down menu, select JCSS_Links palette.

Figure 3-29 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 3-30 Broadcast Network



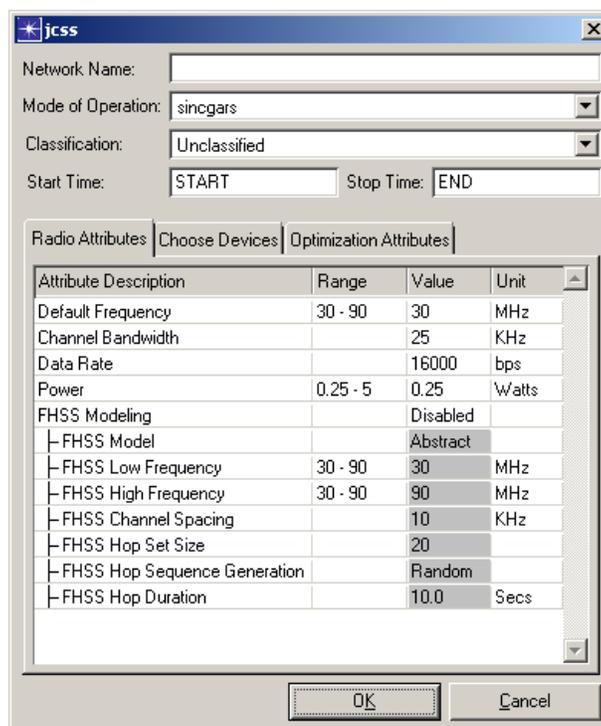
End of Procedure 3-22

Use the following procedure to deploy broadcast networks from the Topology menu.

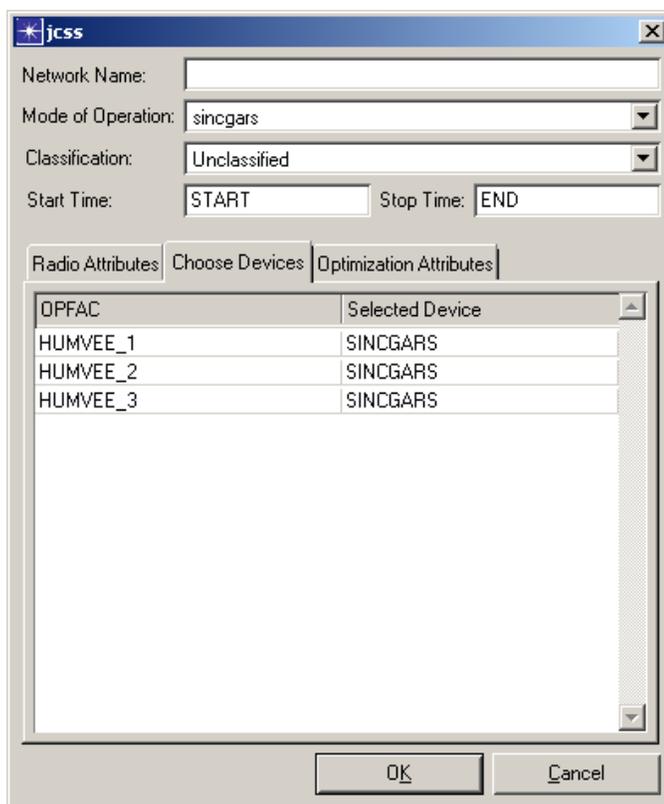
Procedure 3-23 Deploy Broadcast Networks via the Topology Menu

- 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 3-31 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. In addition, if the radio supports Frequency Hopping, additional attributes for frequency hopping spread spectrum (FHSS) will appear which can also be configured.
- 5 On the Choose Devices tab, select devices for the corresponding OPFACs or organizations.

Figure 3-32 Defining Broadcast Network Devices

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

Figure 3-33 Defining Broadcast Network Optimization Attributes

jcSS

Network Name:

Mode of Operation:

Classification:

Start Time: Stop Time:

Radio Attributes | Choose Devices | Optimization Attributes

Possible Capacities (Kbps)

Capacity	Status
7.20	

Help Insert Row Delete Row

Target Utilization Maximum Utilization

Data % Data %

OK Cancel

- 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.

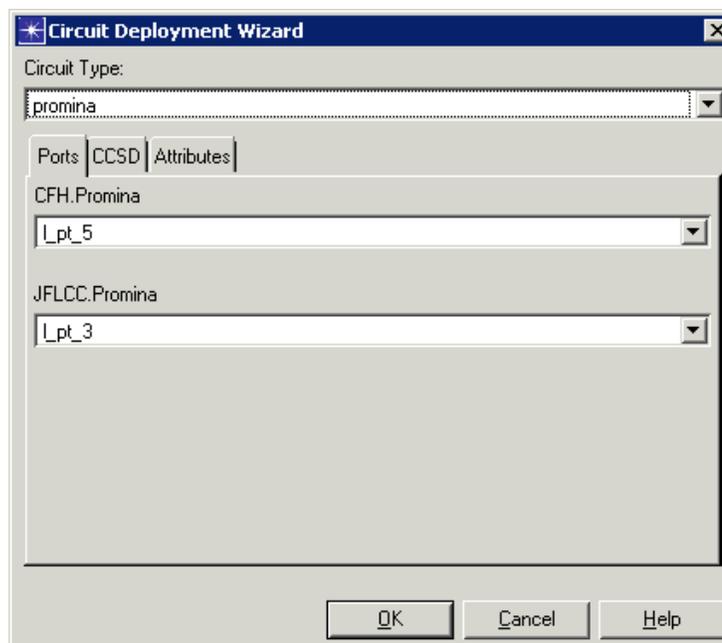
The Circuit Deployment Wizard provides step-by-step guidance for configuring Promina utility nodes. Use the following procedure to configure Promina devices.

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 3-34 Circuit Deployment Wizard Ports Tab



Note—Click the Help button for information on the current dialog box; click 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.
- 3 On the CCSD tab, configure the CCSD codes for the Promina circuit.

Figure 3-35 Circuit Deployment Wizard CCSD Tab

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

Figure 3-36 Circuit Deployment Wizard Attributes Tab

Name	Range	Value	Units
Circuit Speed		Auto-Sense	Kbps
Call priority	0-15	7	
Preempt priority	0-15	0	
Terrestrial routing		Do not care	
Encryption routing		Do not care	
Fiber routing		Do not care	
Call type		Permanent	
Direction		Dual	

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 preempt 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 corner 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

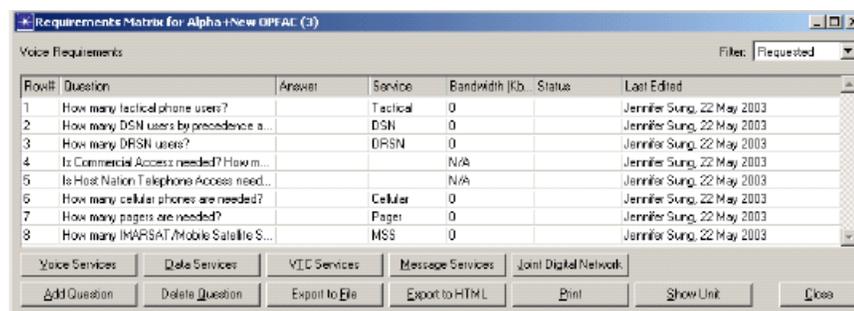
Requested Requirements:

- 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 3-37 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
- Reorder scenarios in the list

Use the following procedure to create a new scenario.

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 3-38 Creating a New Scenario

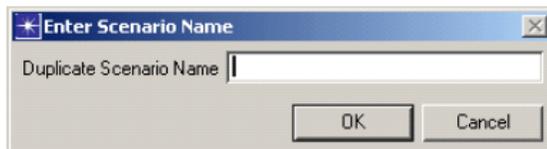
➔ The new scenario is blank and contains no data. The Scenario Builder indicates in the title bar the current open scenario.

End of Procedure 3-26

Use the following procedure to duplicate a scenario.

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 3-39 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

Use the following procedure to switch between scenarios.

Procedure 3-28 Switch Between Scenarios

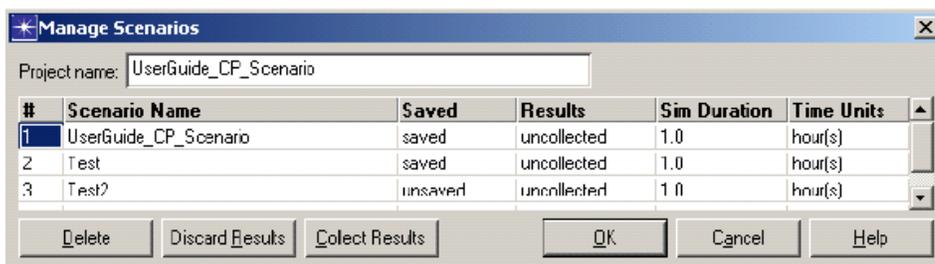
- 1 Select Scenarios > Switch To Scenario.
 - ➔ A menu displays the current scenarios in the project. A black bullet indicates the current scenario open in the Scenario Builder.
- 2 Select the name of the scenario that you want to display.

End of Procedure 3-28

Use the following procedure to manage scenarios.

Procedure 3-29 Manage Scenarios

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

Figure 3-40 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. The column functions are as follows:
 - #—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 user guide, 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.	Model User Guide
Servers	Manages server models	Model User Guide
Mainframes	Manages mainframe models	Model User Guide
TCP	Configures TCP	Model User Guide
IP	Configures IP addresses, dynamic routing protocols, type of service characteristics for conversation pair traffic, autonomous system numbers on routers, and ping traffic.	Model User Guide
Link16	Configures/assigns Time Slot Blocks (TSBs) on terminals in the network.	Model User Guide
IPv6	Configures IPv6 addresses, routing protocols, interface status, and runs readiness assessment and migration planner.	Model User Guide
BGP	Configures BGP start time, autonomous system numbers, and route redistribution from other protocols into BGP.	Model User Guide
EIGRP	Configures EIGRP start time and route redistribution from other protocols into EIGRP.	Model User Guide
IGRP	Configures IGRP start time and route redistribution from other protocols into IGRP.	Model User Guide

Table 3-2 Protocols Menu Items (Continued)

Menu Item	Description	Reference
IS-IS	Configures interface metrics, interface circuit types, system types, metric styles, and SPF calculation parameters.	Model User Guide
OSPF	Configures interface cost, OSPF start time, areas, and route redistribution.	Model User Guide
RIP	Configures RIP start time and route redistribution from other protocols into RIP.	Model User Guide
MPLS	Configure MPLS	Model User Guide
LDP	Enables/disables LDP protocol status on all/selected routers.	MPLS Model User Guide
RSVP	Enables/disables RSVP protocol status across connected interfaces on all/selected links.	Model User Guide
ATM	Configures oversubscription on a per-service class basis for all or selected nodes in the network.	Model User Guide
Frame Relay	Configures PVCs between nodes in the network	Model User Guide
Ethernet	Configures Ethernet	Model User Guide
FDDI	Configures FDDI	Model User Guide
VLAN	Configures virtual LANs (VLANs) for selected nodes and links.	Model User Guide
STP	Applies STP visualization to the current scenario.	VLAN Model User Guide
MANET	Configures MANET	DSR Model User Guide

Table 3-2 Protocols Menu Items (Continued)

Menu Item	Description	Reference
SIP	Allows visualization of SIP signaling routes after running Discrete Event Simulation	Model User Guide
UMTS	Configures UMTS	Model User Guide
Wireless LAN	Configures wireless LAN	Model User Guide
ZigBee™	Configures ZigBee™	Model User Guide

Visualizing Protocol Configuration

To determine which routing protocols are running on your network, run the routing protocol visualization feature, as described in the following procedure.

Procedure 3-30 Run a Routing Protocol Visualization

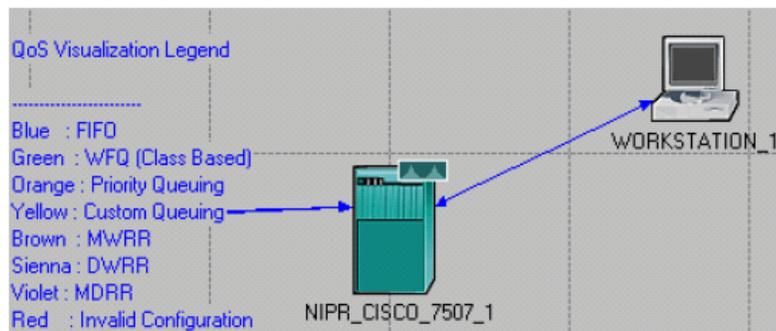
- 1 Select View > Visualize Protocol Configuration > (option).

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.
- IPv4 Interface Metrics—Displays metric legend for IGP, OSPF, ISIS, IGRP, EIGRP, and MPLS TE.
- ATM Routing Domains—Shows which ATM routing protocols that are configured on the switch ports.

- VLAN Configuration—Shows the VLANs configured in the network.
- HA/PE Versions—Shows the HA/PE devices configured in the network.
- Clear Visualization—Removes all protocol configuration visualizations from the workspace.

Figure 3-41 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
- 1-degree-DEM data

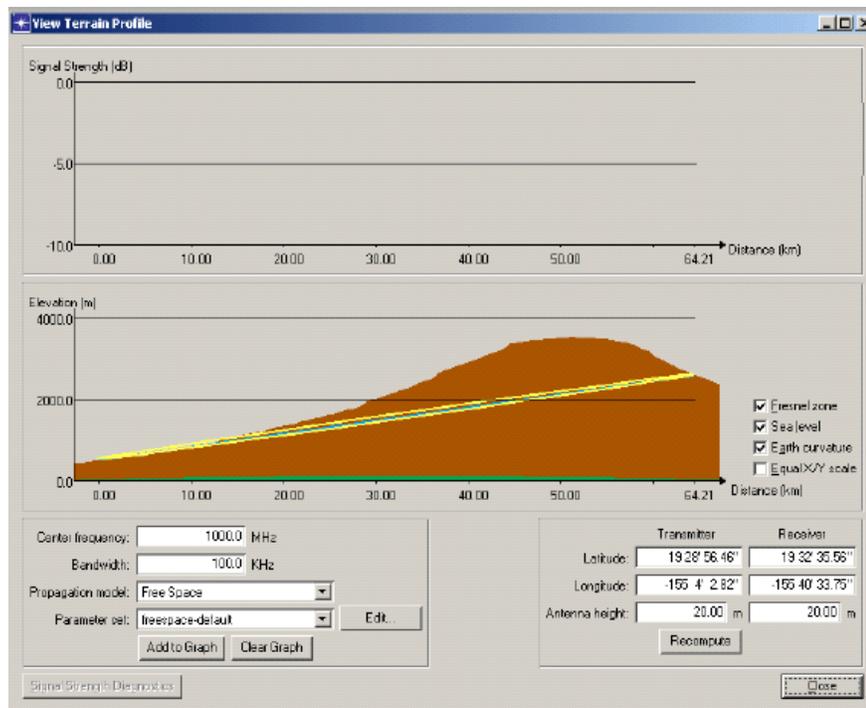
Use the following procedure to view a terrain profile.

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 3-42 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 checkboxes to the right of the profile. From the drop-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

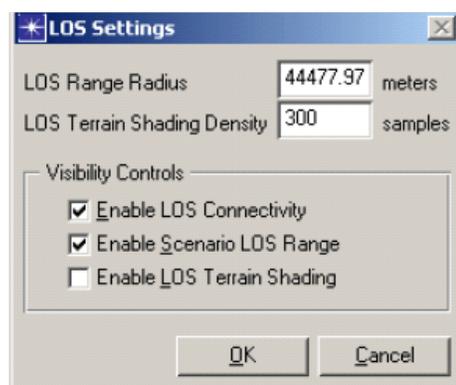
Enabling Line-of-Sight (LOS) Connectivity and Range

You can 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. Use the following procedure to enable LOS connectivity and range.

Procedure 3-32 Enable LOS Connectivity and Range

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

Figure 3-43 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

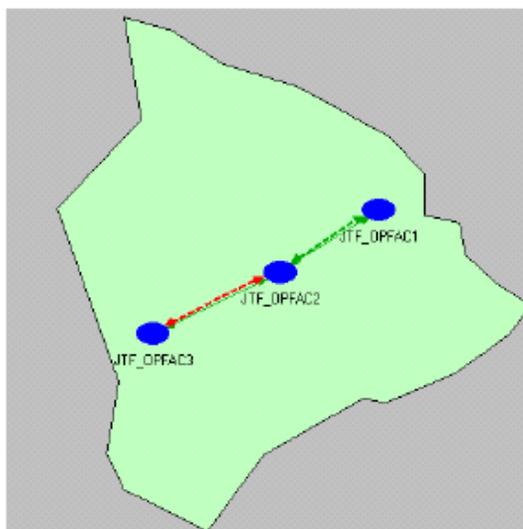
Displaying Line-of-Sight (LOS) Connectivity

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. Use the following procedure to display LOS connectivity.

Procedure 3-33 Display LOS Connectivity

- 1 Select OPFAC(s) of interest in the 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.
 - Invalid connections are indicated by red links, clear connections are indicated by green links.

Figure 3-44 Displaying LOS Connectivity



End of Procedure 3-33

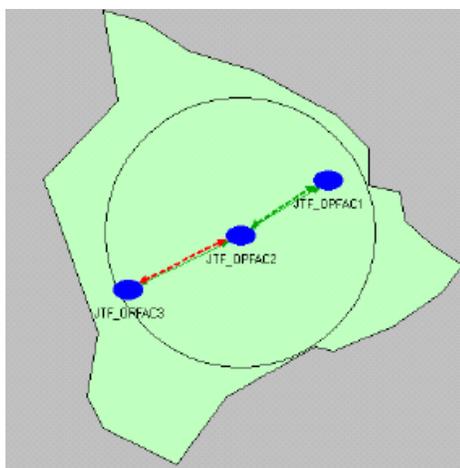
Displaying Line-of-Sight (LOS) Range

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. Use the following procedure to display the LOS range.

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.
➔ LOS Range displays as a circle around the unit.

Figure 3-45 Displaying LOS Range



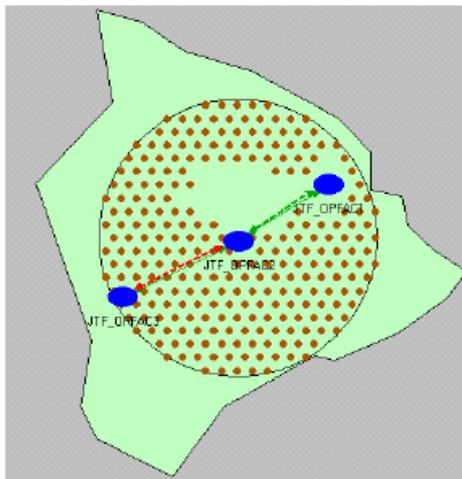
End of Procedure 3-34

Displaying Terrain Effects Shading

Use the following procedure to 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 selected 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 3-46 Displaying Terrain Effects Shading

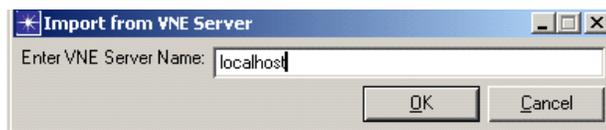
End of Procedure 3-35

Importing from VNE Server

JCSS lets you create a network model based on information imported from VNE Server. Use the following procedure to create a network topology using data imported from VNE Server.

Procedure 3-36 Import from VNE Server

- 1 Choose Topology > Import > From VNE Server.
 - ➔ The Import from VNE Server dialog box displays.

Figure 3-47 Import from VNE Server Dialog Box

- 2 Specify the name of the VNE Server from which you want to import, and then click OK.
 - ➔ A second Import from VNE Server dialog box displays.
- 3 In the VNE Server Name field, specify the hostname or IP address and port for the VNE Server.
 - 3.1 If you are running import on the same machine as the VNE Server, use "localhost" as the server name. If the VNE Server is in the same domain in which you are running import, enter the hostname without domain extension or enter the IP address of the VNE Server. If the VNE Server is in a different domain, enter the server name as hostname.domain (i.e., vneserver.opnet.com), or enter the IP address of the VNE Server.

-
- 6.3 Create nodes to represent external ASes—Creates dummy objects to represent missing external BGP (EBGP) neighbors.
 - 6.4 Create nodes to represent edge LANs—Creates LAN objects for active router interfaces that are not connected. By connecting these interfaces to LAN objects, no active router interfaces are left unconnected after the import.
 - 6.5 Filters—Specify the amount of data to include in the import.
- 7 On the Traffic tab, traffic that is available from the VNE Server is displayed, such as link loads or flows. Specify traffic-related import options as follows:
 - 7.1 Include?—Click on the value in this column to enable or disable the inclusion of the available traffic data.
 - 7.2 Traffic type—Displays the available traffic type you can configure in this row.
 - 7.3 Traffic information—Displays the available traffic information gathered from the VNE Server.
 - 7.4 Modify?—Click on "Edit..." in this field to open the Rollup Configuration dialog box. Customize the way in which you want to rollup the available information, depending on what exists in VNE Server.
 - 8 On the Metrics tab, performance metrics, CPU utilization, and RAM utilization data for the following device types are available and can be configured when the data is collected on the VNE Server:
 - Acme Packet Net-Net 4000 Session Border Controllers (SBC)
 - Cisco devices using IOS and IOS XR
 - 9 Click Import.

End of Procedure 3-36

4 Traffic Specification

Creating IERs

You can specify the conveyance of messages/data through your communications system. IERs are *Information Exchange Requirements*. Create an IER either by deploying a demand from the Object Palette or by using the IER Wizard.

When you deploy demands from the Object Palette, the demands must be deployed between nodes (devices), not subnets (OPFACs), and may be attached either to equipment devices or to an OE node. The demands may then be edited via the IERs dialog box. The IERs dialog box displays immediately after a demand is deployed from either the Object Palette or the IER Wizard. The IERs dialog box allows you to specify all attributes except those related to threads.

The IER Wizard, described in [Procedure 4-2](#) on page JCSS-4-2, enhances the deployment of individual IER demands. You can create a demand between sites by selecting exactly two nodes or OPFACs in the workspace or in the Network Browser. The IER Wizard also allows you to specify which node is the *producer* of the IER. Only one node may be the producer and one other node will be made the *consumer*. Use this wizard is to deploy single IERs quickly between two nodes. In most cases, this will be your main IER wizard.

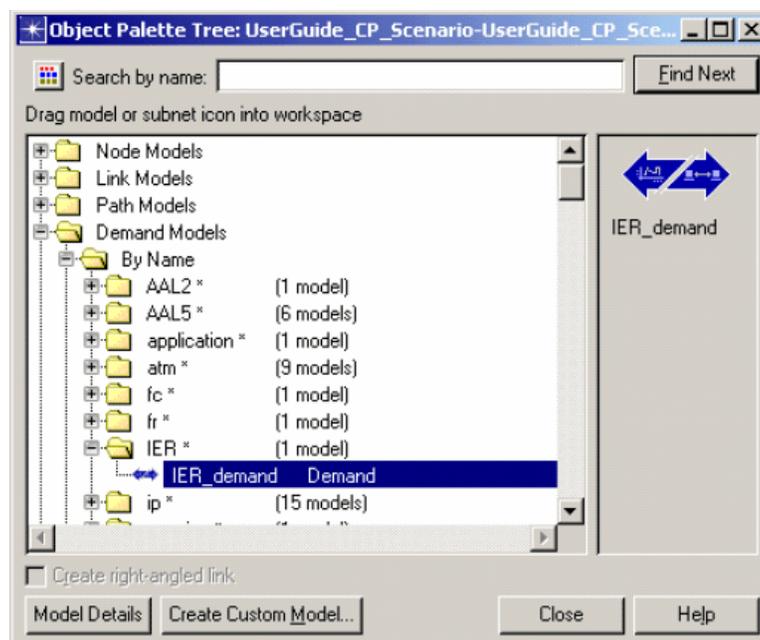
Use the IER Rapid Deployment Wizard, described in [Procedure 4-3](#) on page JCSS-4-4, to create multiple IERs in a full-mesh, one-to-many, or many-to-one deployment, or to create individual multiple-consumer IERs. For the one-to-many, many-to-one, and full mesh options, individual IERs are created. For multiple-consumer IERs, a single entity is created. Even though a multiple-consumer IER is conceptually a single entity, it is represented by multiple demands.

The IER Wizard allows you to specify which OPFAC is the producer or consumer based on the deployment method (i.e., one-to-many, many-to-one, etc.) In addition, when you edit the attributes of one demand of a multiple-consumer IER, the changes are applied to all demands of that IER.

Use the following procedure to deploy IERs from the object palette.

Procedure 4-1 Deploy IERs using the Object Palette

- 1 Choose Topology > Object Palette.
 - The Object Palette displays.

Figure 4-1 IERs in the Object Palette

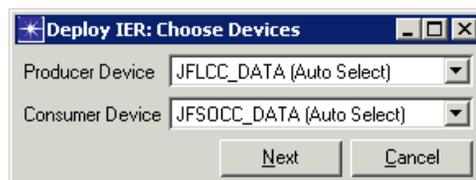
- 2 Drag an IER demand from the Object Palette to the workspace.
- 3 Click a source node and a destination node for the IER you want to create.
 - ➔ The IER dialog box displays.
- 4 Edit the demand via the IERs dialog box. Specify all attributes except those related to threads.

End of Procedure 4-1

Use the following procedure to deploy an IER between one producer and one consumer using the IER wizard.

Procedure 4-2 Deploy IERs using the IER Wizard

- 1 Choose two devices or OPFACs in the workspace.
- 2 Choose Traffic > IERs > Deploy IER....
 - ➔ The Deploy IER Choose Devices dialog box displays.

Figure 4-2 Deploy IER: Choose Devices Dialog Box

- 3 Verify the selection of the OPFAC or device for the IER you want to create:
 - Producer Device—When creating IERs, the producing OPFAC or device is selected in this drop-down menu. Only one OPFAC or device may be selected at a time.
 - Consumer Device—When creating IERs, the consuming OPFAC or device is selected in this drop-down menu. Only one OPFAC or device may be selected at a time.
- 4 Click Next.
 - ➔ The IER dialog box displays.

Figure 4-3 IER Dialog Box

Generation Parameters	
Size (sec or bytes)	constant(1000)
Interarrival (sec)	exponential(60)
Start Time	100
Stop Time	END

Note—The "ier_configs" file, which is located in the <JCSS Installation Directory>\Scenario_Builder\16.0.A\netwars\rules directory, is used to provide the IER Properties defaults for the IER wizard. You can modify this file appropriately to provide different default values.

- 5 Specify attributes for the IER:
 - Name—Name of the IER.
 - ID—Identifies an IER in the database. IDs for IERs that are user-specified start with the prefix USER, as not to conflict with IER IDs in the database. Background IERs start with the prefix BKGD.
 - Type—This is the type of IER: voice, VTC, or data.
 - Equipment—This is the type of equipment that will be used to transmit this IER.

- Protocol—Defines the underlying transport layer protocol that traffic (IERs) will use for transmission. Typical transport layer protocols include TCP and UDP.
- 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. The default classification is "Unclassified."
- Priority—Determines the precedence that an IER receives in the network. Network devices may give resources differently to higher priority IERs during actual traffic routing. Priority also determines the number of transmission retries and the wait time between successive retries when firing the IERs.
- Perishability (sec)—Specifies the time in seconds for which the IER is alive. If the time taken by the IER to reach the destination from the source is greater than the perishability, the IER is recorded as "failed."
- Message—This field can be set to any value (usually in a <tag>=<value> format). Custom models can then parse this information and use it during the simulation. Multiple portions of information are separated by the ';' character.
- Size—This is the size of the IER. For data IERs, the size is specified in bytes. For voice or VTC IERs, the size is specified in number of seconds.
- Interarrival(s)—Represents the time, in seconds, between IER firings.
- Start Time—Identifies the time, in seconds, in which the IER will begin firing after a simulation begins.
- Stop Time—Identifies the time, in seconds, in which the IER will stop firing after the simulation begins.
- Record Route Interval (sec)—Set the interval at which you wish to record IER routes during a simulation: Never (default), All (record all IER firings), Once (record only the first firing), or enter an integer in seconds.
- Application Delay Tracking—If this checkbox is selected, enables application delay tracking.
- Export Reports—If this checkbox is selected, the IER OT Reports will be collected during the simulation so that you can view them after the simulation is completed. To view IER OT Reports, use the Results Browser located in the "DES > Results > View Results..." menu.
- Validate IER Values—If this checkbox is selected, performs a continuous validation of IER values

6 Click OK to create the specified IER.

End of Procedure 4-2

Use the following procedure to deploy IERs between multiple end-points.

Procedure 4-3 Deploy IERs (Advanced)

- 1 Choose Traffic > IERs > Deploy IERs (Advanced).
 - ➔ The IER Rapid Deployment Wizard appears.

Figure 4-4 IER Rapid Deployment Wizard

2 Specify traffic type, equipment type, and classification to be used for the IERs to be created.

These properties are used to filter the list of possible producer and consumer devices. The set of possible values for these properties is obtained directly from the IER demand object, and the Decision Table entries are used to filter the Equipment list based on the chosen Traffic Type.

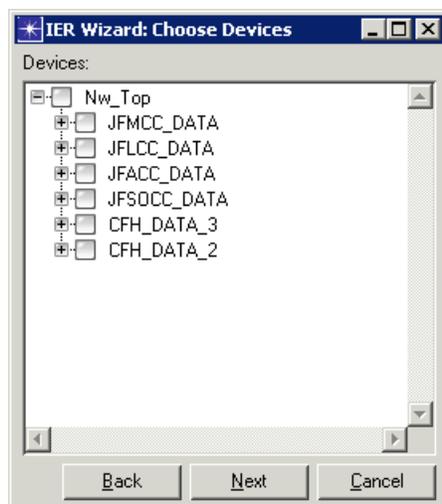
3 Define the scope of the deployment, choosing from the following options:

- Full Mesh: Creates a mesh of bi-directional IER pairs among all devices that support the specified IER Type, Equipment, and Classification.

Note—A mesh is not created for intra-OPFAC IERs.

- To all other devices from a selected device: Creates individual IERs between the selected producer and all other devices that support the specified IER configuration and are not in the same OPFAC as the producer.
- From all other devices to a selected device: Creates individual IERs between all devices that support the specified IER configuration and the selected consumer, provided that they are not in the same OPFAC as the consumer.
- Multi-consumer IER: Creates a single multi-consumer IER between the selected producer device and all other devices in the scenario that support the specified IER configuration and are not in the same OPFAC as the producer.

3.1 If you choose the Select Other Devices checkbox and click Next, the following dialog box appears. The tree is filtered to show only devices that support IERs with the specified type, equipment, and classification settings. Select as many devices from this tree as desired and click Next. Those devices will be used when creating IERs according to the deployment scope you chose.

Figure 4-5 IER Wizard: Choose Devices Dialog Box

- 4 When you click Next, either on the initial wizard screen or on the Choose Devices dialog box, you will go to the IER dialog box shown in [step 5](#) of [Procedure 4-2](#) on page JCSS-4-2. Follow the instructions that accompany that figure to complete the IER deployment.
- 5 Click OK to complete the IER deployment.

End of Procedure 4-3

Use the following procedure to record routes for IERs.

Procedure 4-4 Record IER Routes

- 1 Right-click on an IER in the workspace.
 - The IER dialog box appears.

Figure 4-6 IER Dialog Box

Set IER route recording using this drop-down menu.

- 2 Using the Record Route Interval (sec) drop-down menu, choose Never, Once, or All, or enter a numeric value by typing it into the box. For example, you can enter “600” if you want to record IER routes for every 10 minutes of simulation time. By default this value is set to “Never”, meaning that route recording is disabled. You must set a value for route recording to be enabled.
- 3 Click OK to accept changes in this dialog box.

End of Procedure 4-4

Use the following procedure to display and edit all IERs in a scenario.

Procedure 4-5 Edit IERs

- 1 Choose Traffic > IERs > Edit All IERs.
 - The IERs dialog box displays.

Figure 4-7 IERs Dialog Box

Name	ID	Thread ID	Producer	Consumers	Type	Equipment	Protocol (Appl...	Classification	Priority	Perishability (s)
computer -> c...	USER105	Not Configured	JFACU_DATA...	JPLUC_DATA...	DATA	Computer	TLP	Unclassified	HUU TIME	15

1 IER

Note—To display a list containing all IERs associated with any subnet, node or demand that is selected in the workspace or Network Browser, choose Traffic > IERs > Edit IERs for Selected Objects.

- Average Data Traffic and Voice Traffic—These fields display the average size or duration and total load values for the Data and Voice categories
- IERs—This list box allows you to edit attributes of IERs

- 2 Click Delete to delete a selected IER.
- 3 Click Refresh Aggregate Loads to update aggregate loads in the view.
- 4 Click OK to save your IER edits.

End of Procedure 4-5

Use the following procedure to import an IER text file.

Procedure 4-6 Import an IER Text File

- 1 Choose Traffic > IERs > Import IER Text File.
 - ➔ The Import IER Text File dialog box displays.
- 2 Select an IER Text File (*.txt) to import, and then click OK.

End of Procedure 4-6

Use the following procedure to view IERs in the workspace.

Procedure 4-7 View IERs

- 1 Choose View > IERs > Show All to show all IERs in the view, or choose View > IERs > Show Only Selected to show selected IERs in the view.

Note—To hide all IERs from the view, choose View > IERs > Hide All.

End of Procedure 4-7

Use the following procedure to color IERs by aggregate load.

Procedure 4-8 Color IERs by Aggregate Load

- 1 Choose View > IERs > Color by Aggregate Load to color IERs in the view by aggregate load.

Note—To hide aggregate load coloring, choose View > IERs > Hide Aggregate Load Coloring.

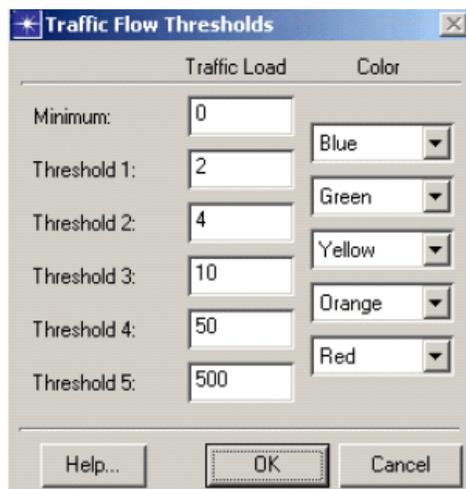
End of Procedure 4-8

Use the following procedure to set IER color thresholds.

Procedure 4-9 Set IER Color Thresholds

- 1 Choose View > IERs > Set IER Color Thresholds to set IER color thresholds.
➔ The Traffic Flow Thresholds dialog box displays.

Figure 4-8 Traffic Flow Thresholds Dialog Box



- 2 Set IER color thresholds, and then click OK.

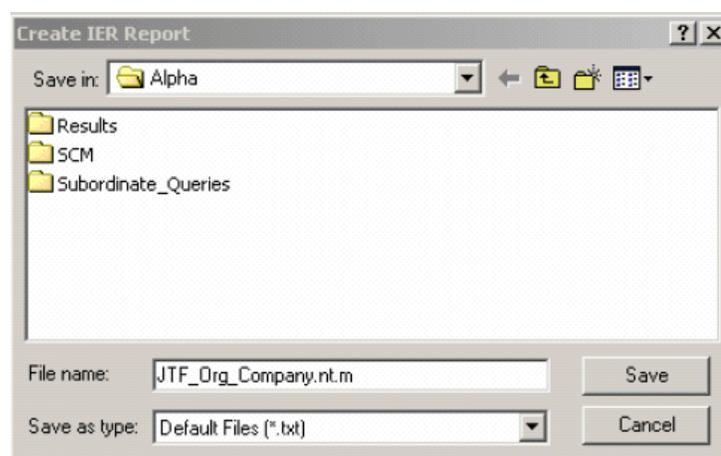
End of Procedure 4-9

Use the following procedure to export an IER report to a text file.

Procedure 4-10 Export an IER Report

- 1 To export all IERs in the scenario (excluding threads) to a text file, choose Traffic > IERs > Export IER Report.
➔ The Create IER Report dialog box displays.

Figure 4-9 Create IER Report Dialog Box



- 2 Select a location and enter a name for the file, and then click Save.

End of Procedure 4-10

Use the following procedure to import an IER report from a file.

Procedure 4-11 Import an IER Report

- 1 To import an IER Report, choose Traffic > IERs > Import IER Report.
➔ The Import IER Report dialog box displays.
- 2 Select an IER Report File (*.txt) to import, and then click OK.

During import, you are provided with a detailed comparison of the report contents versus the scenario contents. You may review and reject individual differences, such as a value change in an IER attribute.

End of Procedure 4-11

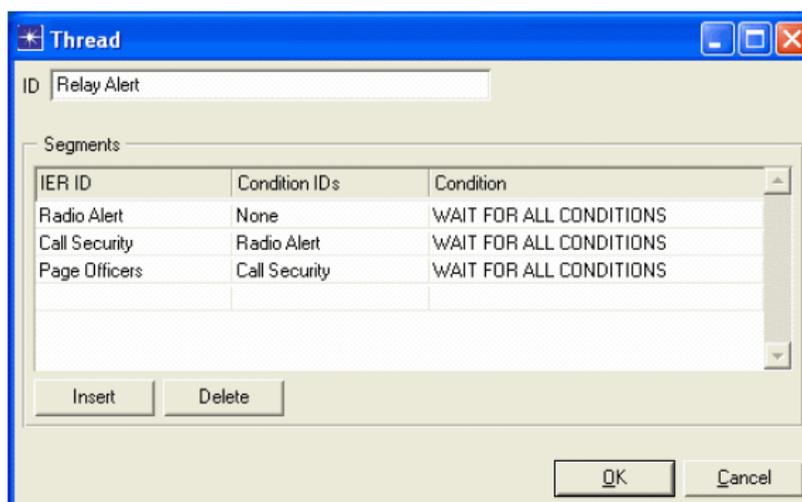
Creating Threads

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. Use the following procedure to create a thread manually.

Procedure 4-12 Create a Thread

- 1 Select one or more IERs in the workspace or Network Browser.
- 2 Right-click an IER and select Edit Thread, or choose Traffic > IERs > Create Thread.
 - ➔ The Thread dialog box displays.

Figure 4-10 Thread Dialog Box



- 3 Specify the ID, and segments of the thread in the Segments table:
 - 3.1 Click Insert to add segments to the thread. If one or more cells are selected in the table, clicking Insert adds a default segment in the row above the selected highest cell. If no cells are selected, the segment is added at the end of the thread. You can also simply edit a cell in the last row of the table to add a segment to the end of the thread.
 - 3.2 Click Delete to remove segments from the thread. Delete is active only when cells are selected in the table. Clicking Delete removes all rows with selected cells.
- 4 Click OK to save the thread.

End of Procedure 4-12

Use the following procedure to create a thread manually from existing IERs using “Edit Thread.”

Procedure 4-13 Create a Thread from Existing IERs via "Edit Thread"

Note—This example workflow assumes that you have created all of the IERs that will be part of the thread and that none of those IERs contain values in any thread attributes.

- 1 Right-click an IER and select Edit Thread.
 - The Thread dialog box displays. The Segments table is initialized with one row. The IER ID cell of the first segment contains the chosen IER. The Condition IDs cell contains None.
- 2 Click Insert or select a value in the second row of the table to create a new segment.
 - The IER ID cell of the new segment lists all of the IERs that may be triggered by the segment before it and all of the IERs that may be "start" segments for the thread.
 - The Condition IDs cell of the new segment lists the IER of the first segment and the value None, which is valid only for "start" segments.
- 3 Insert another segment at the end of the table, as in the previous step.
 - The IER ID cell has the same behavior.
 - The Condition IDs cell lists the IERs of all segments above the new segment that could trigger it, and None.
- 4 Continue inserting segments until the thread is complete.

End of Procedure 4-13

Use the following procedure to create a thread manually from existing IERs using “Create Thread.”

Procedure 4-14 Create a Thread from Existing IERs via "Create Thread"

Note—This example workflow assumes that you have created all of the IERs that will be part of the thread and that none of those IERs contain values in any thread attributes.

- 1 Select one or more IERs in the workspace or Network Browser.
- 2 Choose Traffic > IERs > Create Thread.
 - The Thread dialog box displays. The Segments table is initialized with one row. The IER ID cell of the first segment list all selected IERs and one is arbitrarily chosen as the initial value. The Condition IDs cell contains None.
- 3 Choose a different IER for the first segment, if desired.

- 4 Continue with step 2 of the Edit Thread workflow.
Alternately, you may begin without selecting IERs in the workspace.
- 5 Choose Traffic > IERs > Create Thread.
 - ➔ The Thread dialog box displays. The Segments table is initialized with one row. The IER ID cell of the first segment is blank. The Condition IDs cell contains None.
- 6 Choose the special value Select an IER in the IER ID cell of the first segment.
 - ➔ A child dialog launches and instructs you to select an IER in the workspace.
 - 6.1 Select an IER.
 - 6.2 Click the Continue button on the child dialog.
 - ➔ The selected IER is set in the IER ID cell of the first segment.
 - 6.3 Choose a different IER for the first segment, if desired.
- 7 Continue with step 2 of the Edit Thread workflow.

End of Procedure 4-14

Use the following procedure to create a thread manually without using existing IERs.

Procedure 4-15 Create a Thread without Existing IERs

Note—This example workflow assumes that you have not created any IERs that will be part of the thread. Other IERs may exist in the scenario, but will not be used in this workflow.

- 1 Choose Traffic > IERs > Create Thread.
 - ➔ The Thread dialog box displays. The Segments table is initialized with one row. The IER ID cell of the first segment is blank. The Condition IDs cell contains None.
- 2 Choose the special value “Create an IER” in the IER ID cell of the first segment.
 - ➔ A child dialog launches and instructs you to select one or more subnets and/or nodes in the workspace.
 - 2.1 Select one or more subnets and/or nodes in the workspace.
 - 2.2 Click the Continue button on the child dialog.
 - ➔ The IER Wizard launches to create an IER. The new IER is set in the IER ID cell of the first segment.
- 3 Insert a new segment at the end of the table.
 - ➔ The IER ID cell of the new segment is blank. The Condition IDs cell behaves as in the Edit Thread workflow.

- 4 Repeat step 2 for the new segment.
- 5 Continue inserting segments and creating IERs until the thread is complete.

End of Procedure 4-15

Use the following procedure to edit threads.

Procedure 4-16 Edit Threads

- 1 To display a table containing all of the threads in a scenario, choose Traffic > IERs > Edit All Threads.
 - ➔ The Threads dialog box displays.
- 2 To display a list containing all threads associated with any subnet, node or demand that is selected in the workspace or Network Browser, choose Traffic > IERs > Edit Threads for Selected Objects.

End of Procedure 4-16

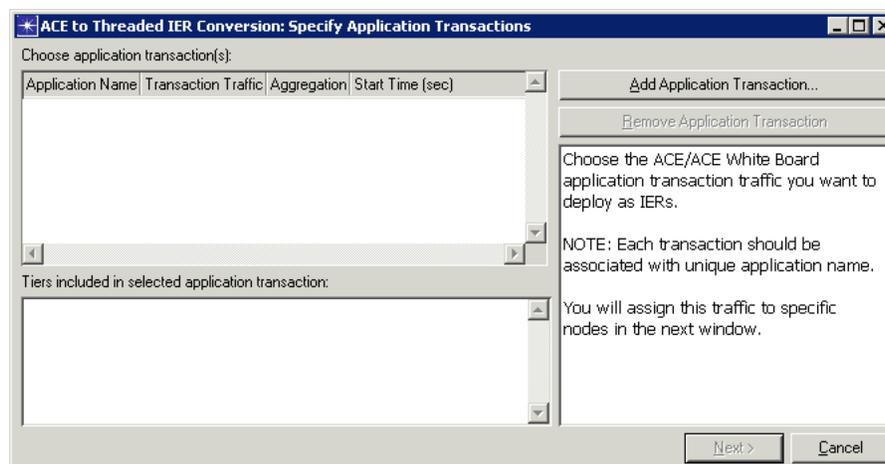
Creating Threads from ACE Analyst

You can import captured application traffic in ACE files and specified application traffic in ACE Whiteboard into threaded IERs through the ACE to Threaded IERs wizard. Each file imported will be converted into a single threaded IER per a specified tier group. The wizard has an aggregation feature that intelligently groups some application messages into a single IER, thereby improving performance.

You can specify the aggregation parameters which define the intelligence during aggregation for each file. You can further specify the aggregation parameters for each ACE/ACE Whiteboard file and tier group combination. Use the following procedure to deploy threads from ACE.

Procedure 4-17 Creating Threads from ACE Analyst

- 1 Choose Traffic > IERs > Import > Threads from ACE Analyst.
 - ➔ The ACE to Threaded IER Conversion Wizard opens.

Figure 4-11 Import Threads from ACE Analyst Wizard

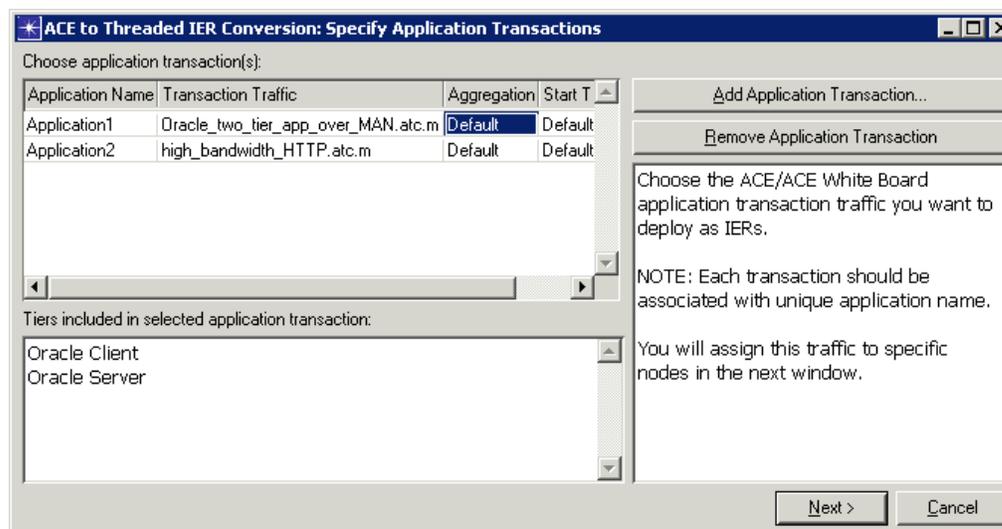
2 Add an ACE or ACE Whiteboard file.

2.1 Click the Add Application Transaction... button to identify an ACE (atc.m) or ACE Whiteboard (aed.m) file to convert.

➔ A file chooser window opens.

2.2 Select a file and click Open.

➔ The selected file appears under the Transaction Traffic column of the table

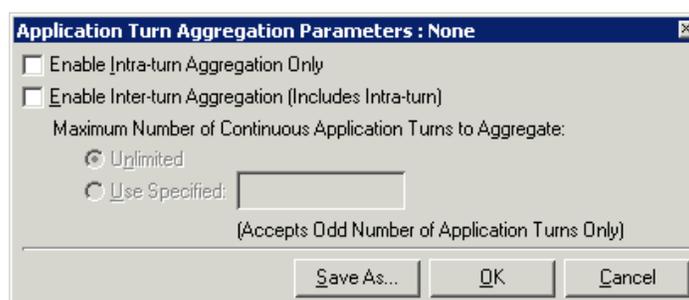
Figure 4-12 ACE to Threaded IER Conversion: Specify Application Transactions

- **Application Name**—Contains unique name *<ApplicationN>*, in which *N* is a number appended to make the name unique, is created for each application.
- **Transaction Traffic**—Contains the name of the ACE or ACE Whiteboard file you selected.

- **Aggregation**—Specifies the aggregation parameter values used while converting the traffic into IER threads. Aggregation parameters are defined in terms of application turns. An application turn is defined as a change in the flow of the application message. For example two consecutive application messages from a source to destination and vice versa defines a single application turn.

By default, if the selected file is an ACE file, then the corresponding Aggregation column value is set to Default. If the selected file is an ACE Whiteboard file, the corresponding Aggregation column value is set to None. You can change the Aggregation value by clicking in the column and selecting Default, None, or Edit... If you choose Edit..., another dialog box appears, which lets you specify how aggregation is to be handled. When finished, click OK to return to the previous dialog box.

Figure 4-13 Application Turn Aggregation Parameters



If you make any edits to the aggregation parameters, you will be asked whether to apply the changes and continue or go back to Save As a file for later re-use.

Enable Intra-turn Aggregation Only aggregates all the contiguous messages that flow from same source to the same destination. Each of the contiguous set of messages within an application turn is converted into a single IER of size and processing delay equal to the sum of the constituent messages.

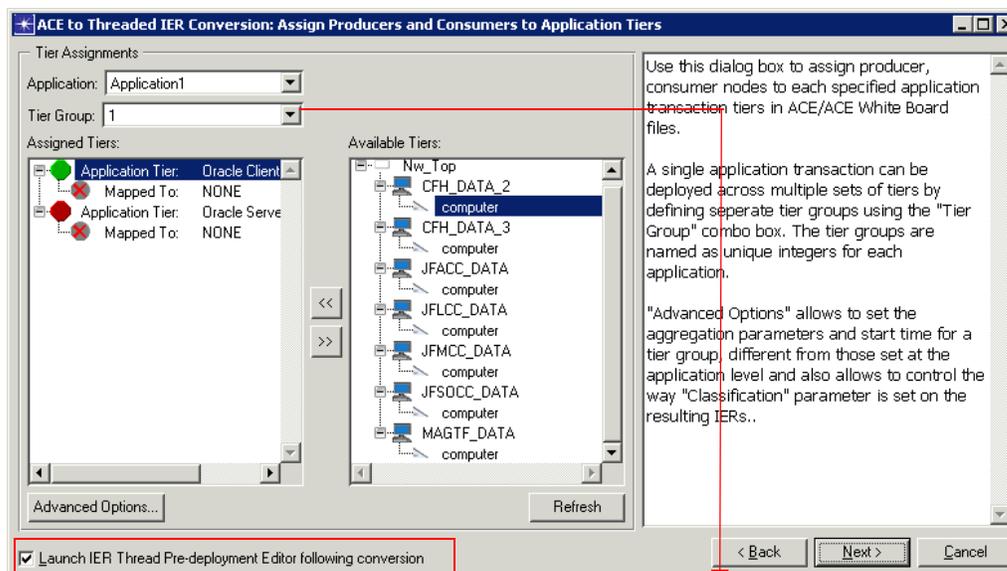
Enable Inter-turn Aggregation (includes intra-turn) implicitly enables and applies intra-turn aggregation to the application messages. The resulting intra-turn aggregated application messages are further aggregated across multiple contiguous application turns as specified by the inter-turn aggregation parameters. You can include an unlimited number of turns to aggregate, or you can specify an odd number of turns to aggregate.

- **Start Time**—Specifies the thread start time. This value is set to Default, but you can change this value to an integer in seconds. The Default value corresponds to the default value of the Generation Parameters > Start Time attribute of the IER_demand Traffic Flow model. If you specify a value under this column, the value is then set to the Generation Parameters > Start Time attribute of the start segment/IER of the IER thread.

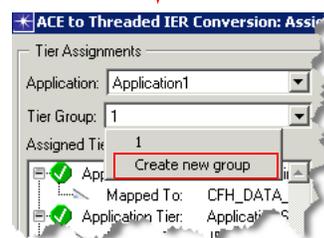
3 Click Next.

➔ The Assign Producers and Consumers to Application Tiers dialog box appears.

Figure 4-14 Assign Producers and Consumers to Application Tiers



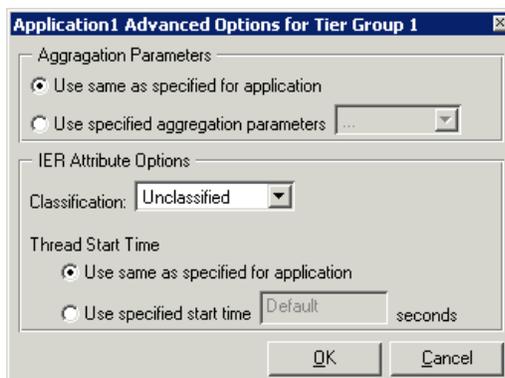
If you need to create a new tier group for application mapping, use the drop-down Tier Group menu option, as shown.



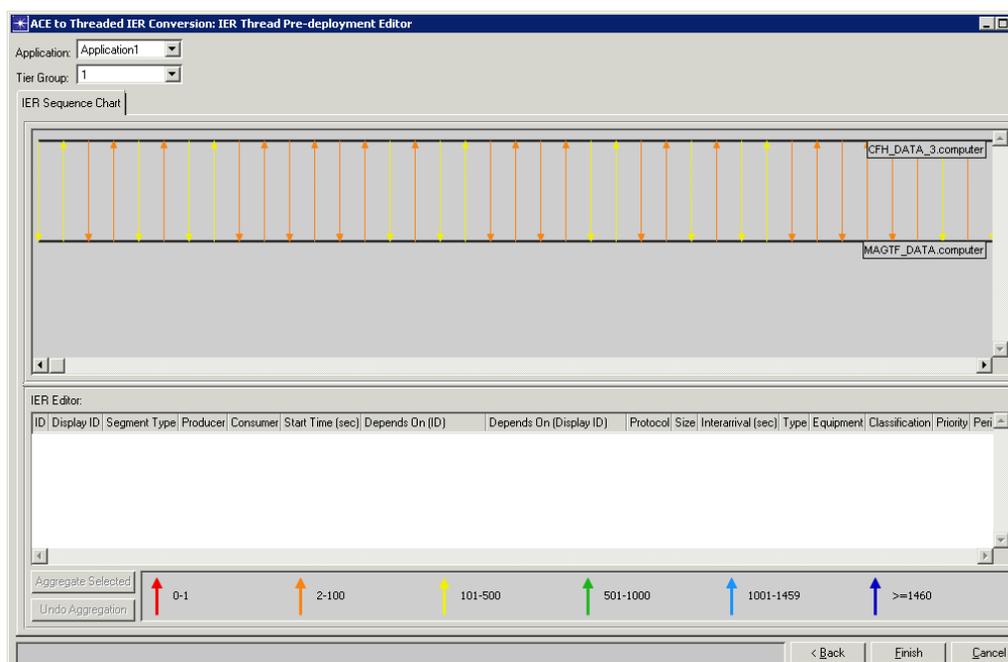
- 4 Assign producers and consumers for each threaded IER. You can add new devices or OPFACs in the workspace and return to the Assign Producers and Consumers dialog box. If you do so, click the Refresh button to refresh the listing.

For each application, the wizard creates one tier group, which you must define. A Tier Group is the collection of devices to which the ACE or ACE Whiteboard file will be mapped. If the application needs to be deployed across multiple collections of the devices, then you should use the "Create new group" option from the Tier Group selection drop-down menu. Select a Tier in the left-side pane and select a tier in the right-side pane. Use the << or >> button to make the connection.

- 4.1 Select the "Launch IER Thread Pre-deployment Editor following conversion" if you want to visualize the IERs prior to final deployment into the workspace. Use the pre-deployment editor to validate the conversion for simple application transactions, edit the appropriate IER attributes, and/or manually select and aggregate the application messages/IERs.
- 4.2 Use the Advanced Options... button to further specify aggregation or IER attribute options for a tier group prior to deployment. Click OK when finished.

Figure 4-15 Advanced Options for a Tier Group

- (Optional) Review the IERs in the Pre-Deployment Editor. Make changes as necessary.

Figure 4-16 Pre-Deployment Editor

- Click Finish to deploy the IERs.

End of Procedure 4-17

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. Use the following procedure to create a relationship.

Procedure 4-18 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 4-17 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 4-18

Converting Applications into Flows

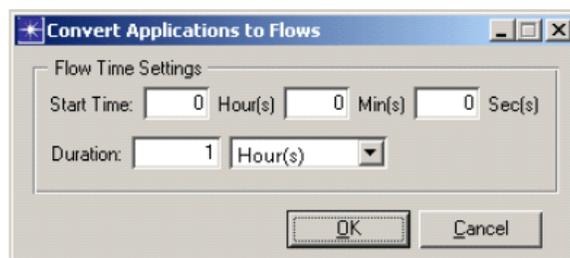
Automatically convert standard OPNET application and profile configuration parameters into IP flow objects. This process turns the discrete application traffic into background flows for use in simulation or traffic visualization. After creating the flows, the application and profile configuration objects are cleared of all traffic information 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.

Use the following procedure to convert applications into flows.

Procedure 4-19 Convert Applications into Flows

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

Figure 4-18 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 4-19

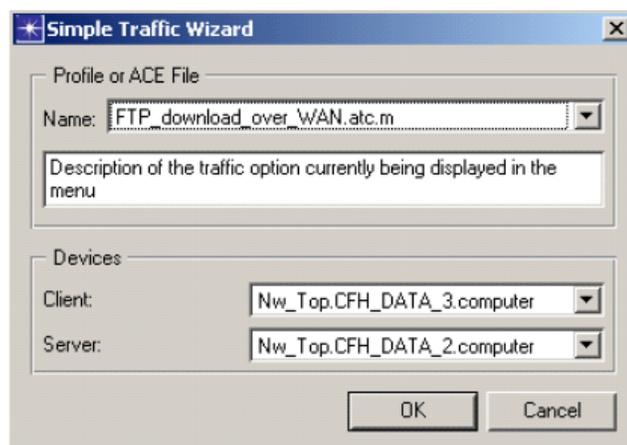
Deploying Traffic Using the Traffic Wizard

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.

Use the following procedure to deploy traffic with the Traffic Wizard.

Procedure 4-20 Deploy Traffic using the Traffic Wizard

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

Figure 4-19 Traffic Wizard

➔ 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 4-20

Integrating DoDAF Views

JCSS enables you to integrate select Department of Defense Architecture Framework (DoDAF) views:

- OV-3 Operational Information Exchange Matrix—Information exchanged between nodes and the relevant attributes of that exchange such as media, quality, quantity, and the level of interoperability required.
- SV-6 Systems/Services Data Exchange Matrix—Specifies the characteristics of the system data exchanged between systems. This product focuses on automated information exchanges (from OV-3) that are implemented in systems. Non-automated information exchanges, such as verbal orders, are captured in the OV products only.

You can import the traffic (IERs) defined by either of the two views and use it in simulations. You can also modify the IERs and export the new traffic as OV-3 and SV-6 views. The following procedures describe how to:

- Create and deploy IERs (see [Procedure 4-21](#))
- Create and deploy standard applications (i.e., FTP, Email, etc.) (see [Procedure 4-22](#))
- Create and deploy threads (see [Procedure 4-23](#))

Procedure 4-21 Create IERs from DoDAF Editor

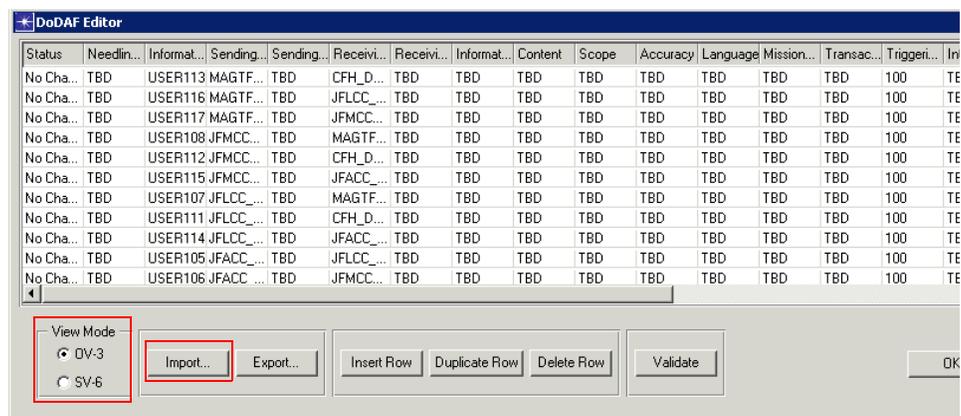
- 1 Create a network model in JCSS that represents the topology (not the traffic) of the network to be modeled. The model should contain all the devices and OPFACs that will be used by the OV-3 and SV-6 views. This information should be manually created based on OV-3 and SV-6 views in DoDAF. OPFACs or end devices that are not found in the scenario are created at the end of this workflow.

Note—You can still manually create any IERs which would not be imported from DoDAF documents.

- 2 Select Scenarios > DoDAF Integration > DoDAF Editor....

➔ The DoDAF editor dialog box opens.

Figure 4-20 DoDAF Editor Dialog Box

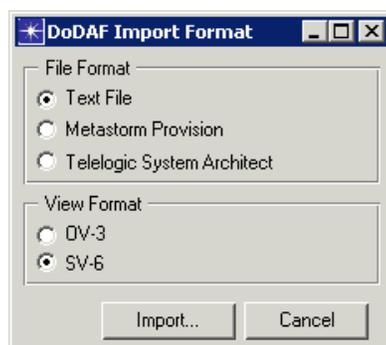


- 3 Select the SV-6 radio button in the View Mode.

- 4 Click the Import button.

➔ The DoDAF Import Format dialog box opens.

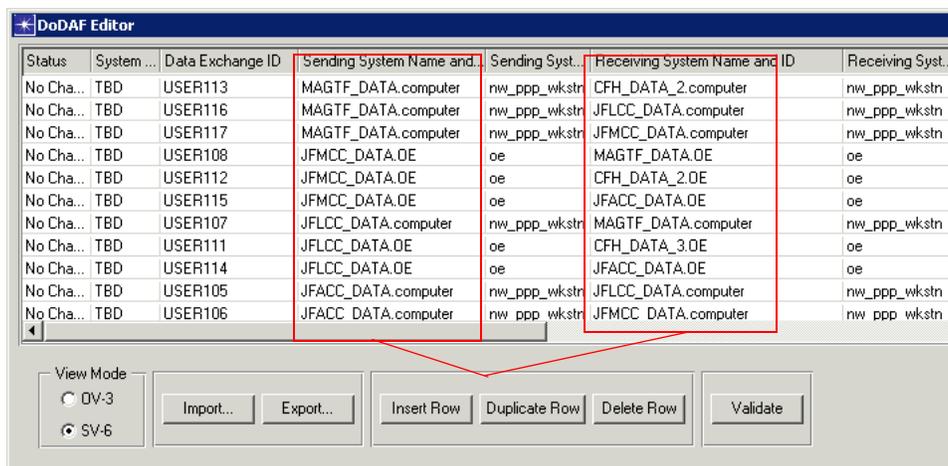
Figure 4-21 DoDAF Import Format Dialog Box



- 5 Select the file format of the file you want to import, and select SV-6 as the View Format. Click Import. A file chooser window appears. Select the SV-6 file you want to import and click Open.

➔ The IERs are imported and appear in the DoDAF Editor dialog box.

Figure 4-22 DoDAF Editor

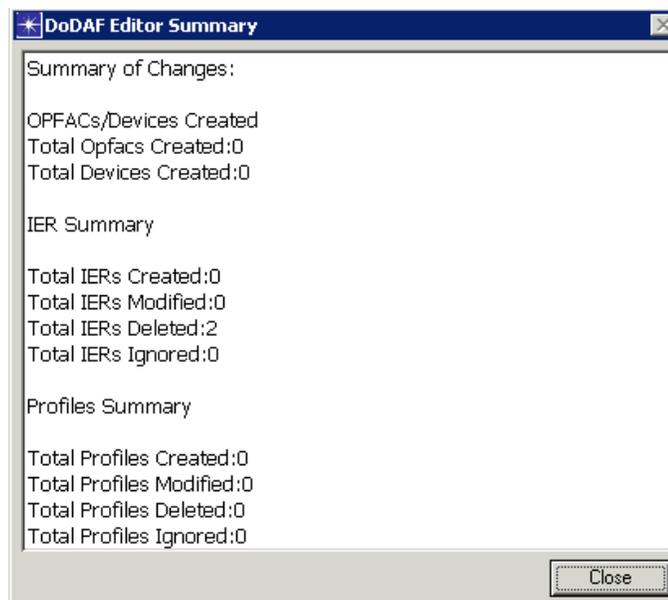


Note—If no model type is specified in Sending/Receiving Op Node Activity Name and ID, and end devices must be automatically created, a model type will be used that corresponds to the traffic type of the IER. See [step 7](#) for more information about automatic device or OPFAC creation from this dialog box.

- 6 Verify existing or specify new end system device names in the *Sending System Name and ID* or *Receiving System Name and ID* fields; device names are specified in the hierarchical *opfac_name.device_name* format. You can insert new IERs by using the Insert Row or Duplicate Row button, or you can remove an IER by using the Delete Row button.

Note—You can specify multiple consumers for an IER by entering full hierarchical names for each consumer in a comma-separated fashion in the *Receiving System Name and ID* field. If you specify multiple consumers, you must also specify the corresponding OPNET domain-specific model type for each consumer in a comma-separated fashion in the *Receiving System Function Name and ID* field.

- 7 When finished editing, click OK to deploy the IERs and create any new devices and OPFACs in the scenario.
 - The DoDAF Editor Summary window appears, providing a summary of changes made to the scenario.

Figure 4-23 DoDAF Editor Summary Dialog Box**End of Procedure 4-21**

Use the following procedure to create or modify standard applications in the scenario.

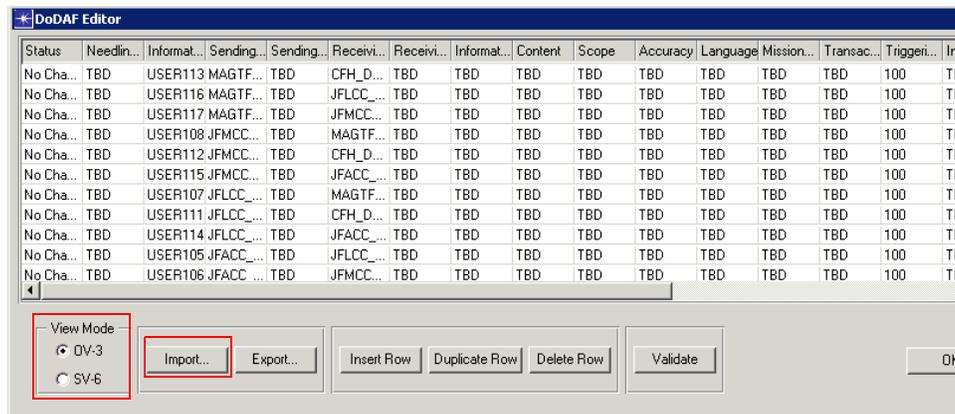
Procedure 4-22 Create and Deploy Standard Applications from the DoDAF Editor

- 1 Create a network model in JCSS that represents the topology (not the traffic) of the network to be modeled. The model should contain all the devices and OPFACs that will be used by the OV-3 and SV-6 views. This information should be manually created based on OV-3 and SV-6 views in DoDAF. OPFACs or end devices that are not found in the scenario are created at the end of this workflow.

Note—You can still manually create any IERs which would not be imported from DoDAF documents.

- 2 Select Scenarios > DoDAF Integration > DoDAF Editor....
 - ➔ The DoDAF editor dialog box opens.

Figure 4-24 DoDAF Editor Dialog Box

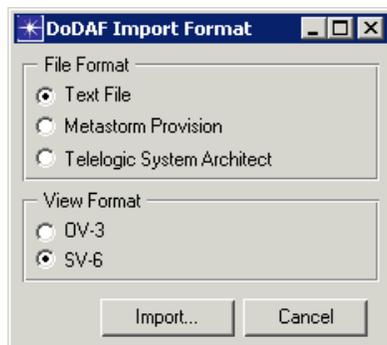


3 Select the SV-6 radio button in the View Mode.

4 Click the Import button.

➔ The DoDAF Import Format dialog box opens.

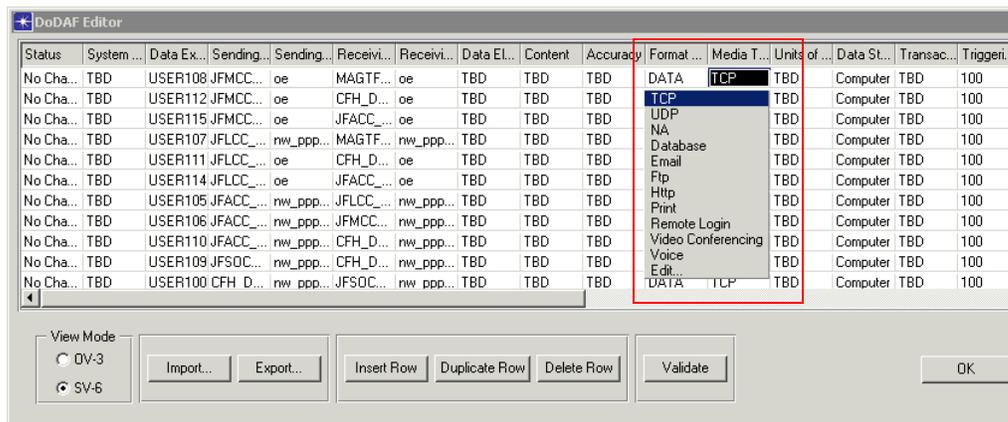
Figure 4-25 DoDAF Import Format Dialog Box



5 Select the file format of the file you want to import, and select SV-6 as the View Format. Click Import. A file chooser window appears. Select the SV-6 file you want to import and click Open.

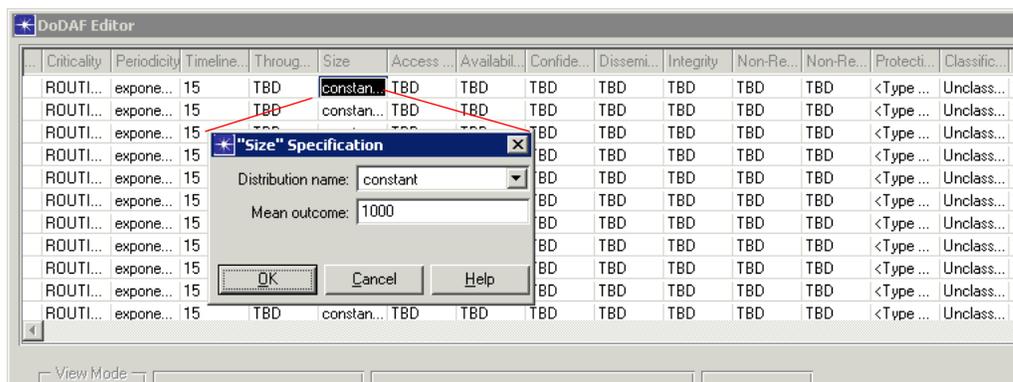
➔ The IERs are imported and appear in the DoDAF Editor dialog box.

Figure 4-26 DoDAF Editor



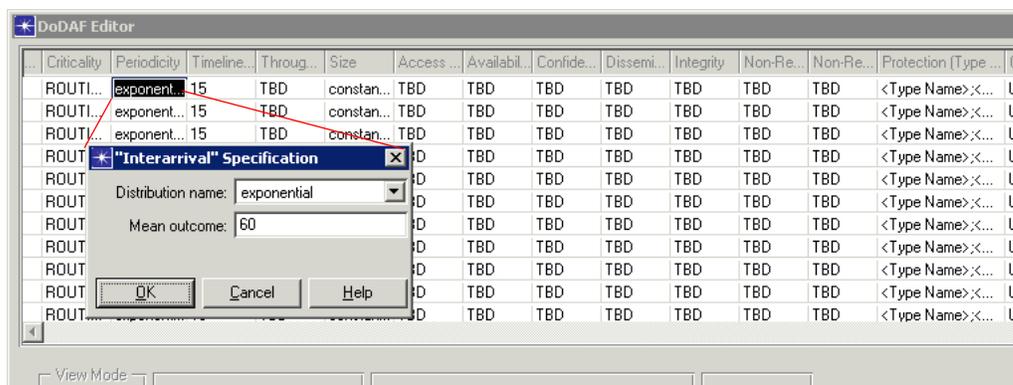
- 6 Set the Media Type field, as desired.
 - If you want to deploy IERs, select TCP or UDP in the drop-down menu.
 - If you want to deploy standard applications, select the application from the drop-down menu.
- 7 For a standard application, set the Size field to specify the size of the application. Click OK.

Figure 4-27 Setting Application Size



- 8 For a standard application, set the Periodicity field to specify the repeatability of the application. Click OK.

Figure 4-28 Setting Application Repeatability



- 9 Click OK.
 - ➔ JCSS creates one application definition and one profile definition for each. JCSS also assigns the profile to the source and destination devices as specified in the DoDAF Editor.

End of Procedure 4-22

Use the following procedure to create and deploy threaded IERs.

Procedure 4-23 Create Threads Using DoDAF Editor

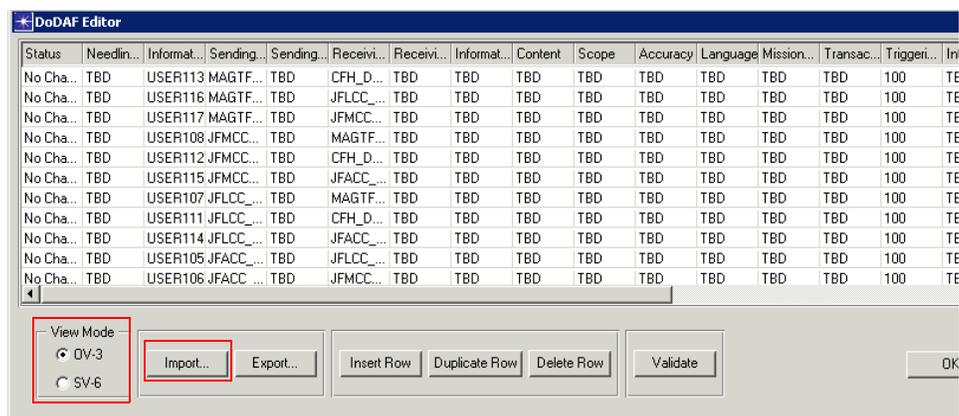
- 1 Create a network model in JCSS that represents the topology (not the traffic) of the network to be modeled. The model should contain all the devices and OPFACs that will be used by the OV-3 and SV-6 views. This information should be manually created based on OV-3 and SV-6 views in DoDAF. OPFACs or end devices that are not found in the scenario are created at the end of this workflow.

Note—You can still manually create any IERs which would not be imported from DoDAF documents.

- 2 Select Scenarios > DoDAF Integration > DoDAF Editor....

➔ The DoDAF editor dialog box opens.

Figure 4-29 DoDAF Editor Dialog Box

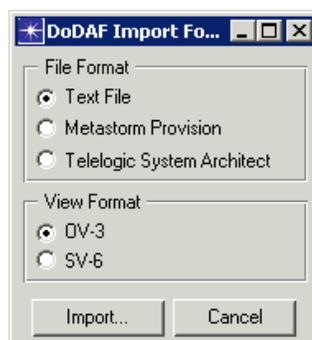


- 3 Select the OV-3 or SV-6 radio button in the View Mode.

- 4 Click the Import button.

➔ The DoDAF Import Format dialog box opens.

Figure 4-30 DoDAF Import Format Dialog Box



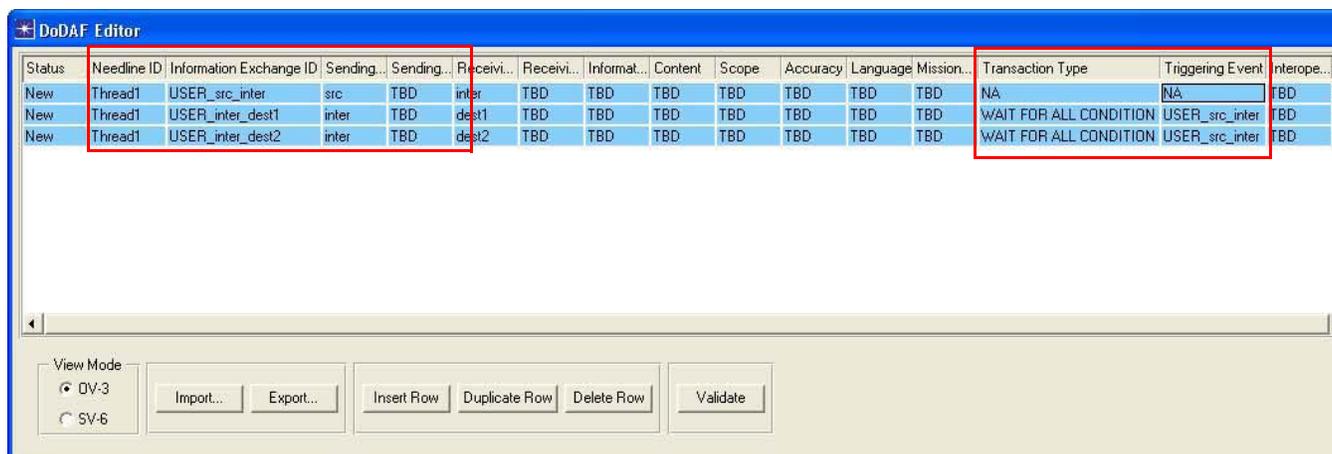
- 5 Select the file format of the file you want to import, and select OV-3 or SV-6 as the View Format. Click Import. A file chooser window appears. Select the file you want to import and click Open.

➔ The IERs are imported and appear in the DoDAF Editor dialog box.

- 6 Set the parameters for the thread in the DoDAF Editor.

- 6.1 Use the Needline field to specify the thread to which to add the IER. In the example shown below, three IERs are assigned to Thread1.

Figure 4-31 Import Dialog Box for Creating Threads



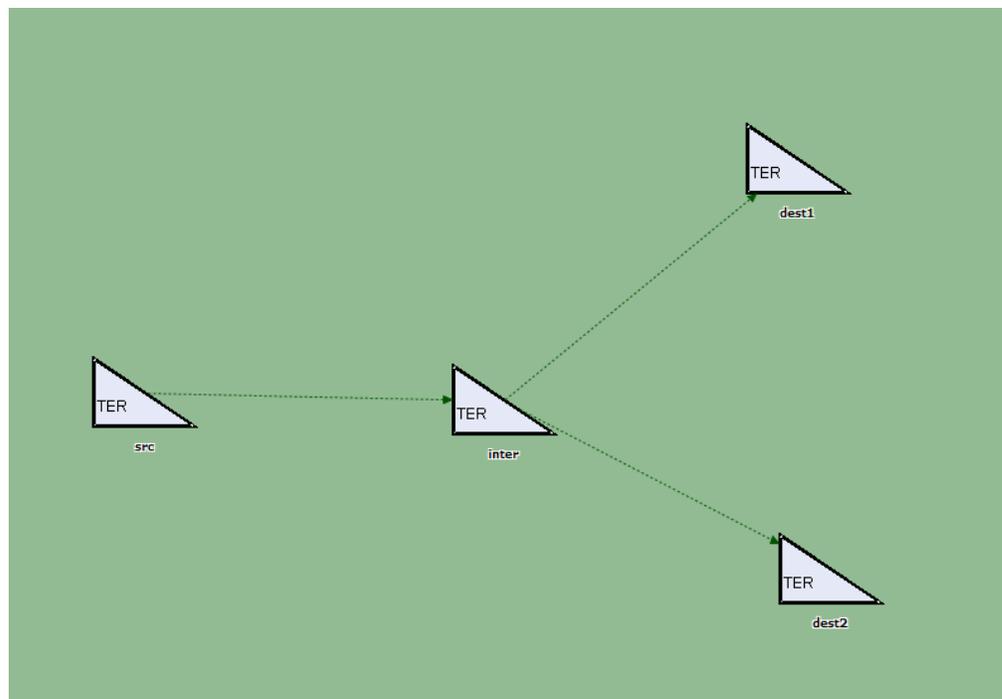
- 6.2 Set the thread source and destination OPFACs and Devices using the Sending Op Node/System Name and ID or Receiving Op Node/System Name and ID columns.

In the example shown, the thread is sending an IER with an ID of "USER_src"inter" to the "inter" OPFAC from the "src" OPFAC. On reception of this IER at "inter" OPFAC, the "inter" OPFAC will then send one IER with ID "USER_inter_dest1" to the "dest1" OPFAC and another IER with ID "USER_inter_dest2" to the "dest2" OPFAC.

- 6.3 Set the Triggering Events. The Triggering Events specify the IER(s) which should be received before firing the given IER for that row.
- 6.4 Set the Transaction Type. The Transaction Type specifies whether the defined IER (in the row) should have to wait for all or only one of the Triggering Events.

- 7 Click OK when finished editing threads.

➔ The threads are deployed in the scenario. An example of deployed threads is shown.

Figure 4-32 Example Imported Scenario for Creating Threads

End of Procedure 4-23

Generating DoDAF Visio Reports

You can create a Visio drawing that represents traffic (IER) flow in the scenario using the Scenarios > DoDAF Integration > Generate Visio Reports... menu option. Four views are supported:

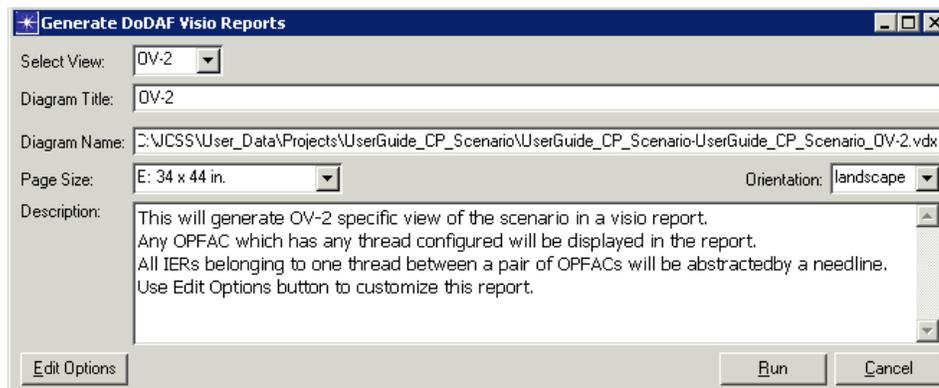
- **OV-6c**—The OV-6c view provides a time-ordered examination of the information exchanges between participating operational nodes as a result of a particular scenario.
- **SV-10c**—The SV-10c view provides a time-ordered examination of the system data elements exchanged between participating systems (external and internal), system functions, or human roles as a result of a particular scenario.
- **OV-2**—The OV-2 view graphically depicts the operational nodes (or organizations) with needlines between those nodes that indicate a need to exchange information. The graphic includes internal operational nodes (internal to the architecture) as well as external nodes.
- **SV-2**—The SV-2 view depicts pertinent information about communications systems, communications links, and communications networks. SV-2 documents the kinds of communications media that support the systems and implements their interfaces as described in SV-1. Thus, SV-2 shows the communications details of SV-1 interfaces that automate aspects of the needlines represented in OV-2.

The following procedure describes the workflow for generating reports.

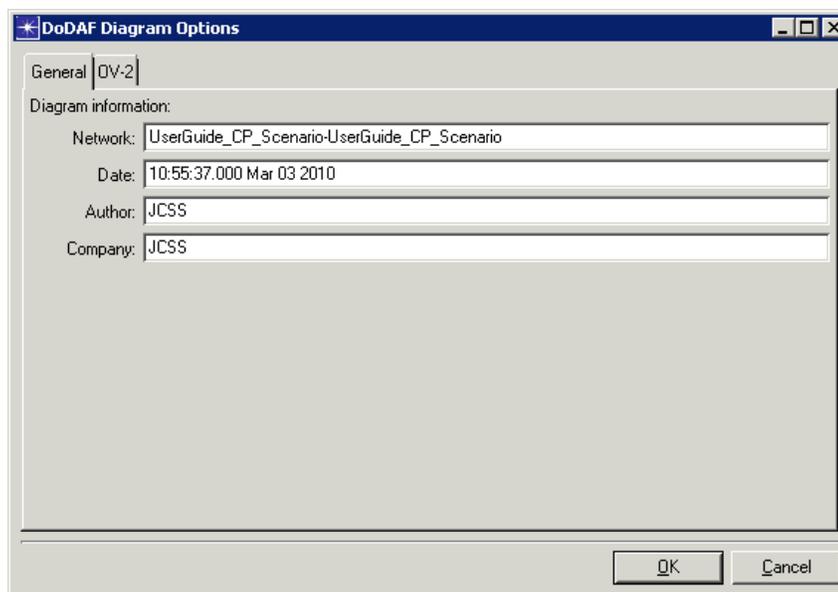
Procedure 4-24 Generating Visio Reports

- 1 Choose Scenarios > DoDAF Integration > Generate Visio Reports....
 - ➔ The Generate Visio Reports dialog box opens.

Figure 4-33 Generate Visio Reports Dialog Box

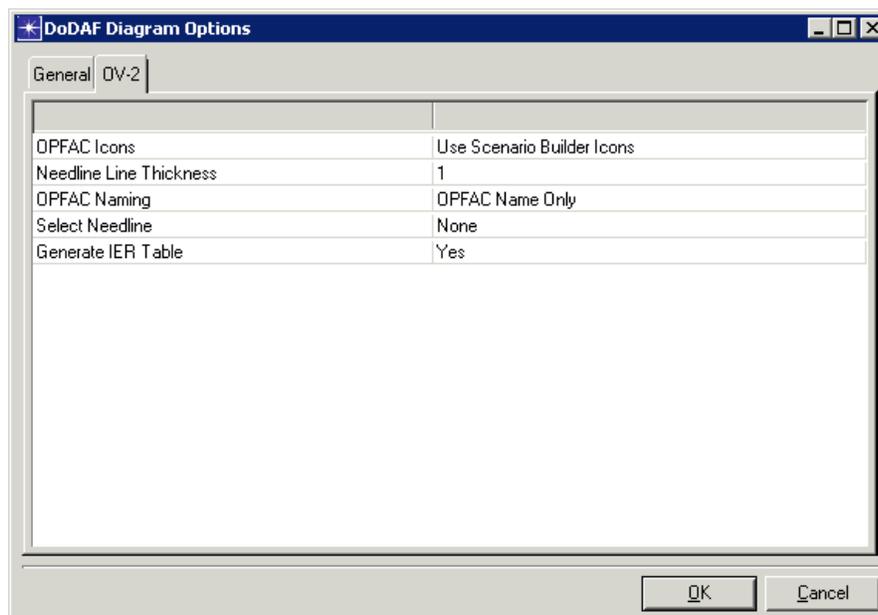


- 2 Select the desired view: OV-2, SV-2, OV-6C, or SV-10C.
- 3 (Optional) Change the default Diagram Title, if desired.
- 4 (Optional) Change the default Diagram Name and location, if desired.
- 5 (Optional) Change the default Page Size output, if desired.
- 6 (Optional) Change the default page Orientation, if desired.
- 7 (Optional) Click the Edit Options button.
 - ➔ The DoDAF Diagram Options dialog box appears.

Figure 4-34 DoDAF Diagram Options Dialog Box

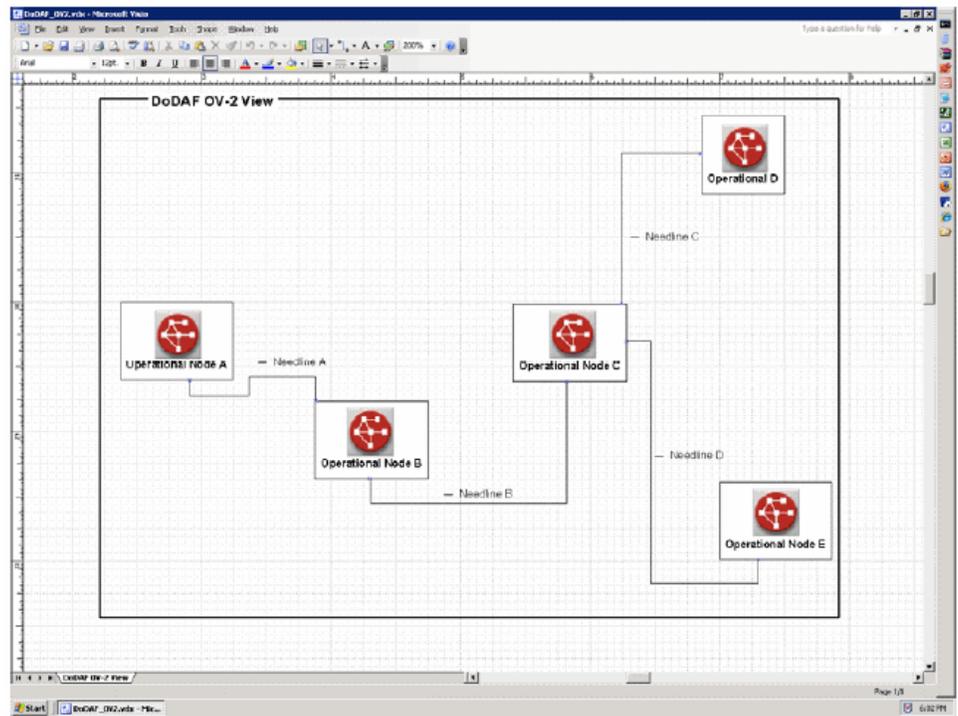
- Change settings on the General tab.
- Change the Date of the report, if desired.
- Change the Author and Company that will appear in the diagram, if desired.

7.1 Click the view tab (i.e., OV2). Set the view-specific options for the diagram, if desired. Each view will have its own view-specific properties that you can specify.

Figure 4-35 DoDAF Diagram Options View Tab—OV2 View

7.2 Click OK to apply changes.

- 8 Click Run to generate the Visio diagram.

Figure 4-36 Sample OV2 Visio Diagram

End of Procedure 4-24

5 Capacity Planning

Evaluating a Network

This section describes how to evaluate a scenario in its current state during a 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, rather 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 lets you 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, the length of the time step to 1 hour, and the start time to 9 hours 0 minutes 0 seconds.

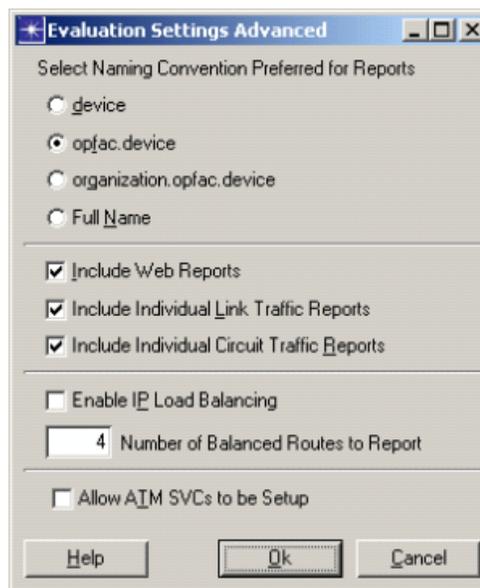
Procedure 5-1 Perform a Network Evaluation

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

Figure 5-2 Setting Advanced Evaluation Parameters

Edit advanced parameters as needed, and then click OK. Descriptions of the parameters are listed below:

- **Naming Convention.** The names of all the devices and links that are in the report will use the naming convention selected here.
- **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.
- **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.
- **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.
- **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.
- **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 zero. This number of route reports will be reported in the web reports
- **Allow ATM SVCs to be Setup.** If this checkbox is selected, ATM SVCs will be set up during the evaluation when applicable.

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

End of Procedure 5-1

Optimizing a Network

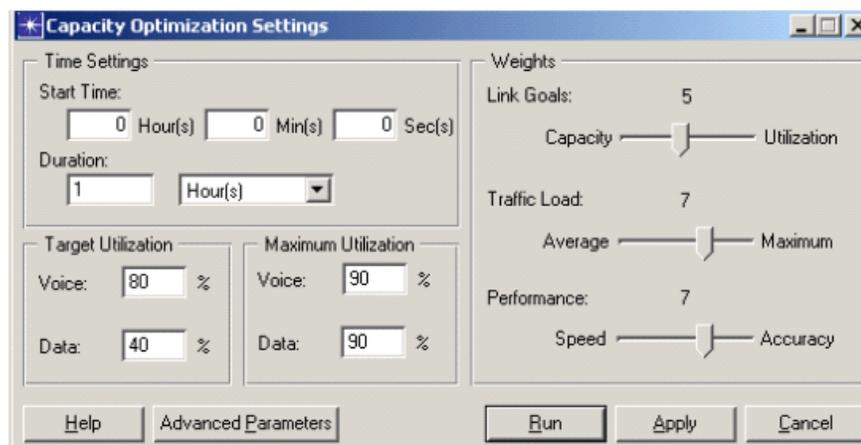
Given a network and its demands, the optimization process provides suggestions for optimal link and network capacities. If a link is overutilized, optimization will suggest an alternate capacity that will support the demands and keep the cost of the link down to the required minimum. If a link is underutilized,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

Before a capacity optimization is run, as described in the following procedure, you must 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

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

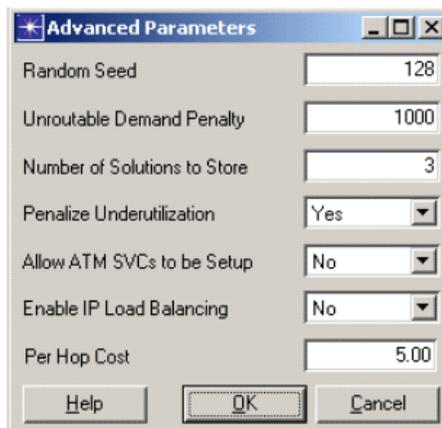
Figure 5-3 Setting Optimization Parameters



- 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 (Optional) To provide finer control of the optimization process, click the Advanced Parameters button.

Figure 5-4 Setting Advanced Optimization Parameters



5.1 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.

- 6 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 JCSS Attributes.
- 2 From the Link Attributes dialog box, click the Optimization Attributes button.
- 3 Specify possible alternate capacities for the link.

Figure 5-5 Specifying Alternate Link Capacities

The screenshot shows a dialog box titled "MAGTF-Voice_Link0". It contains a table titled "Possible Capacities (Kbps)" with the following data:

Capacity	Num Chann...	Channel Size	Status
128.00	2	64.00	
256.00	2	64.00	Orig/Current
512.00	2	64.00	

Below the table are buttons for "Insert Row" and "Delete Row". There are also sections for "Target Utilization" and "Maximum Utilization", each with "Voice" and "Data" fields set to "Use Global" with a percentage sign. At the bottom are "Help", "OK", and "Cancel" buttons.

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.

3.6 Click OK.

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.

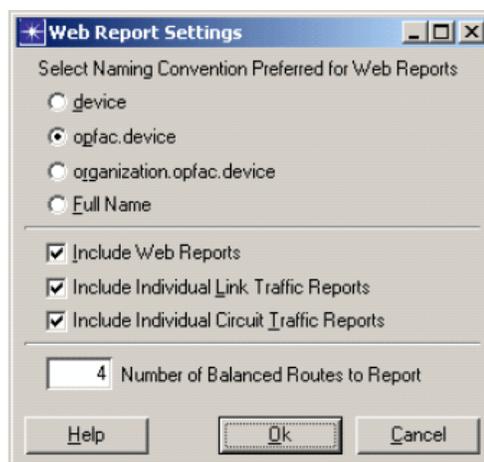
Additionally there are a group of reports which are generated for each time step: Traffic Report, Link Utilization Report, Link Subscription Report, Promina Circuit Report, CellXpress & ATM Circuit Report, Frame Relay Circuit Report, and an FCC-100 Circuit Report.

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.
 - 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 zero. This number of route reports will be reported in the web reports
 - 3.6 Click OK.

End of Procedure 5-4

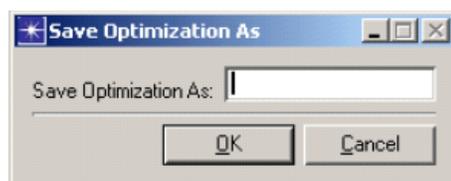
Saving Optimization Settings

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

You can compare saved optimization results as follows:

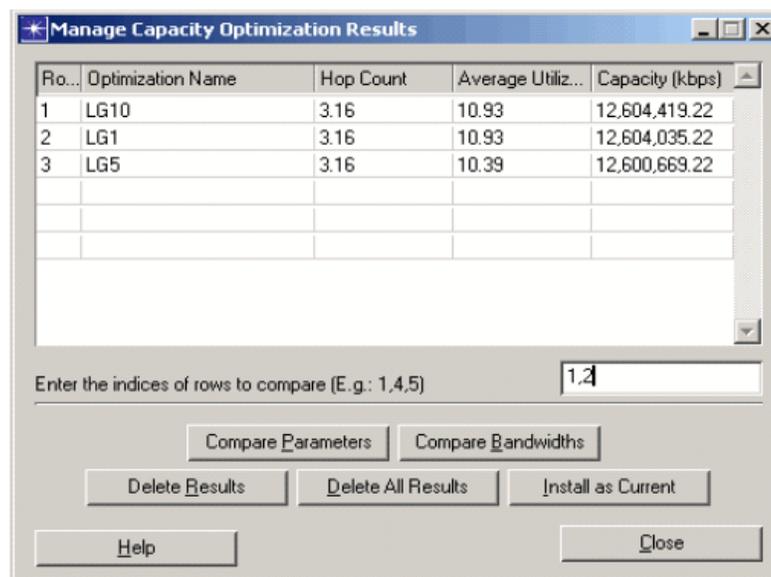
- Compare Parameters
- Compare Bandwidths

Both types of comparison are described in the following procedure.

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

Parameter	LG10	LG1
Data Target Utilization (%)	40	40
Voice Target Utilization (%)	80	80
Data Maximum Utilization (%)	90	90
Voice Maximum Utilization (%)	90	90
Optimization Start Hour	0	0
Optimization Start Minute	0	0
Optimization Start Second	0	0
Optimization Duration (sec)	3600	3600
Link Goals	10	1
Traffic Load	1	1
Optimization Preference	10	10
Random Number Seed	128	128
Penalize Underutilization	Yes	Yes
Allow ATM SVCs	Yes	Yes
Unrouteable Demand Penalty	1000	1000
Enable IP Load Balancing	No	No
Number of Balanced Routes	4	4
Per Hop Cost	5.00	5.00

Figure 5-10 Comparing Bandwidths

Association Name	LG10 (Before)	LG10 (After)	LG1 (Before)	LG1 (After)
Nw_Top+El_Paso <-> Colorado_Spri...	512.00	4,632.00	512.00	4,632.00
Nw_Top+San_Diego_Promina <-> C...	2,048.00	256.00	2,048.00	256.00
Nw_Top+El_Paso <-> San_Diego_P...	2,048.00	256.00	2,048.00	256.00
Nw_Top+sat_link_20	100.00	2,048.00	100.00	2,048.00
Nw_Top+network_3	16.00	10.00	16.00	10.00
Nw_Top+network_2	16.00	10.00	16.00	10.00
Nw_Top+sat_link_2	100.00	2,048.00	100.00	2,048.00
Nw_Top+Atlanta_Promina <-> Nash...	1,024.00	256.00	1,024.00	256.00
Nw_Top+Indianapolis_Promina <-> ...	1,024.00	256.00	1,024.00	256.00
Nw_Top+Miami_step_sat <-> Atlanta...	1,024.00	256.00	1,024.00	256.00
Nw_Top+Pittsburgh_Promina <-> Atl...	1,024.00	256.00	1,024.00	256.00
Nw_Top+Pittsburgh_Promina <-> Ind...	2,048.00	256.00	2,048.00	256.00
Nw_Top/Baghdad+TIER_0 <-> Bag...	594,432.00	49,536.00	594,432.00	49,536.00
Nw_Top/Baghdad+TIER_0 <-> AT...	1,544.00	60.00	1,544.00	60.00
Nw_Top/Baghdad+ATM Net <-> FR...	1,544.00	60.00	1,544.00	60.00
Cisco 7513 <-> Promina	44,736.00	1,544.00	44,736.00	1,544.00
Promina <-> tsc-94	256.00	4,632.00	256.00	4,632.00

Bandwidth values are in kbps

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 Examining Top Solutions

#	Average Hop Cost	Page Capacity	Average Utilization Difference	Unroutable Demands
1	5.22	1493953.49	27.73	0
2	5.22	1325953.49	26.14	0
3	5.22	1457488.37	26.46	0

Highlighted row corresponds to currently visible solution

End of Procedure 5-7

6 Simulation Execution

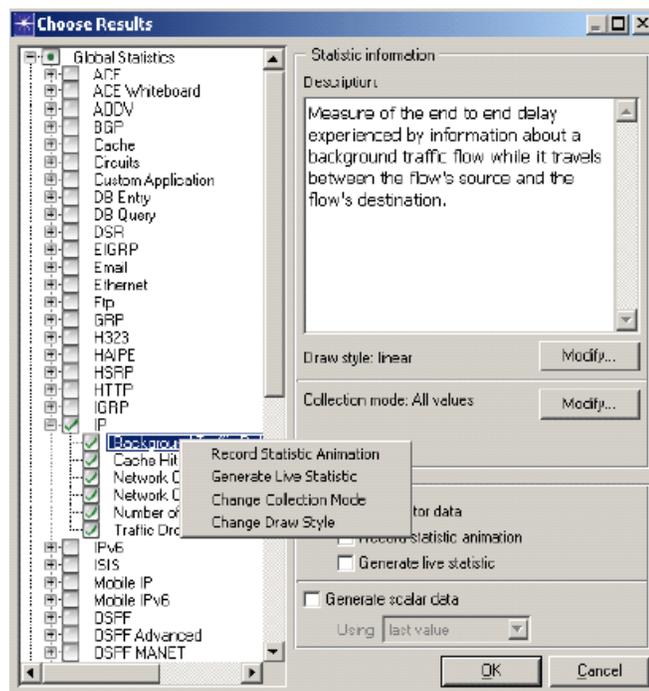
Choosing Device and Link Statistics

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

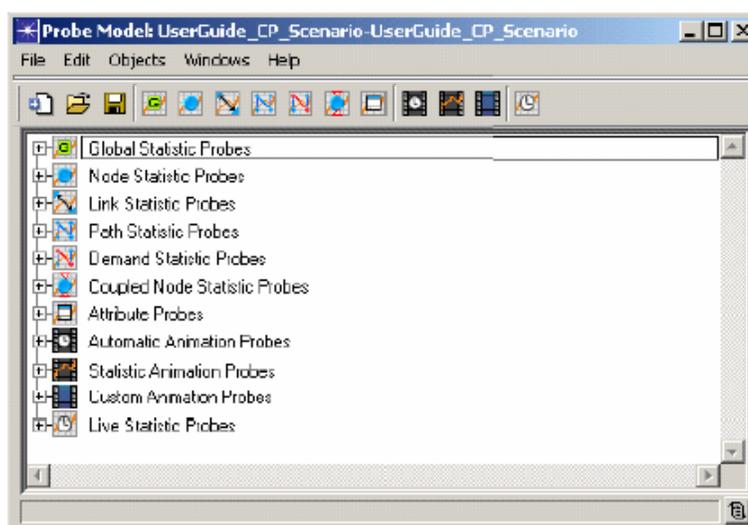


- 5 Click OK.

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

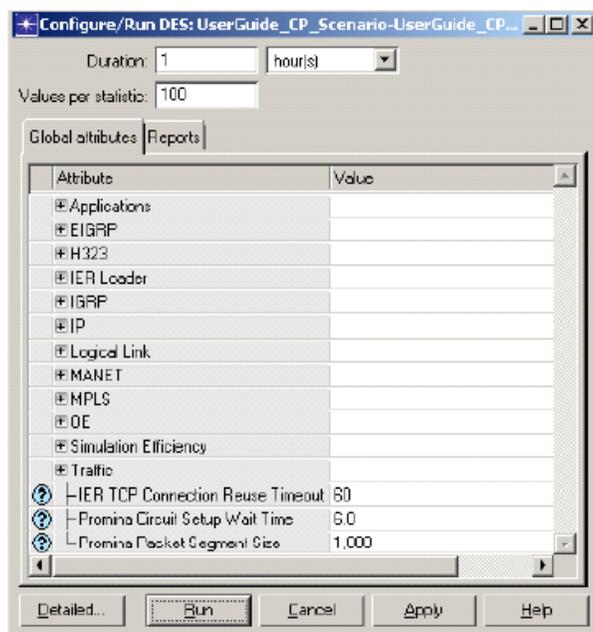
You can evaluate the network performance of your scenario by using simulations. Simulations model communications behavior of the network and provide detail down to the packet and protocol level. You can choose to use a "simple" configuration mode or a "detailed" configuration mode. The simple mode presents fewer controls to configure, thereby simplifying the configuration and execution of a discrete event simulation (DES).

Note—To run DES with JCSS, you must have both an OPNET Modeler or IT Guru license, as well as a Simulation Runtime License.

Procedure 6-3 Running a Simulation

- 1 Select DES > Configure/Run Discrete Event Simulation, or click on the Configure/Run Discrete Event Simulation toolbar icon.

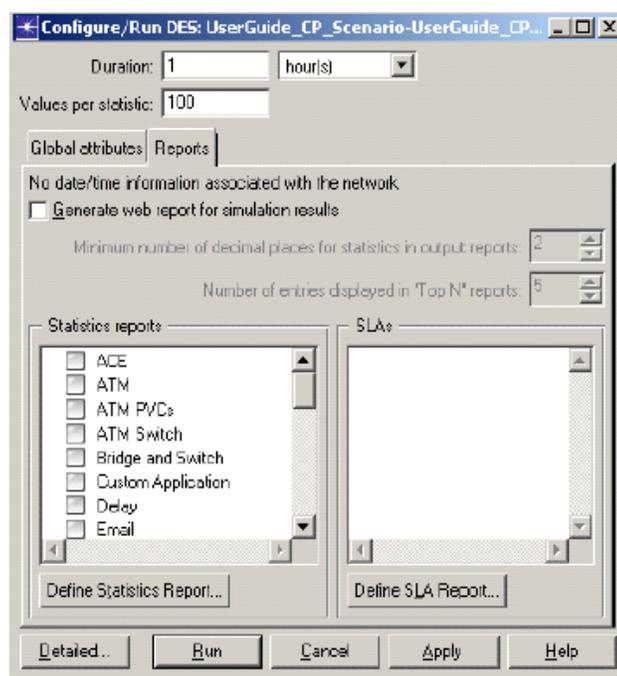
Figure 6-3 Setting Simulation Parameters—Simple Mode



- 2 Set the duration of the simulation in the Duration field.using the drop-down menu next to this field. This sets the **duration** simulation preference.
- 3 Set the number of values collected for each statistic in the Values per statistic field. This sets the **num_collect_values** simulation preference.
- 4 Control the recording of IER routes during the simulation by setting the attribute OE > IER Record Route Interval (sec) as desired:
 - Never—Disables the recording of IER routes for the entire scenario. Overrides the configuration of all IERs.
 - All—Enables the recording of all IER routes for the entire scenario. Overrides the configuration of individual IERs.

- Once—Records the route the first time the IER fires. Overrides the configuration of all IERs.
 - Default—Causes DES to respect recording settings on individual IERs.
 - Edit...—Lets you set a numeric value. Overrides the configuration of all IERs.
- 5 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.
 - 6 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.

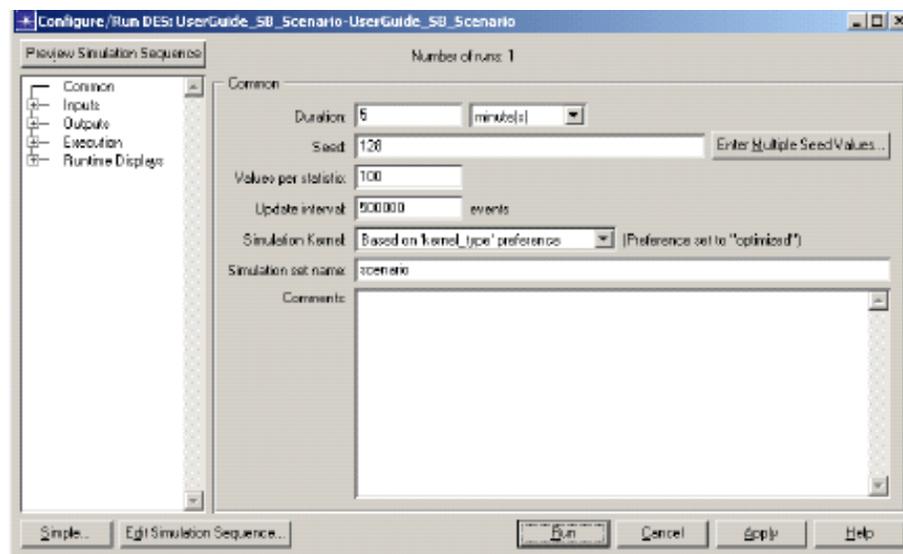
Figure 6-4 Setting Simulation Parameters—Reports



- 7 Set the following simulation parameters as necessary.
 - **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**—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**—Sets the value of 'N'
 - **Statistics reports**—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**—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
- 8 Click Detailed, if you want to open the dialog box in "detailed" mode. Detailed mode lets you configure all DES parameters, 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



- 8.1 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 treeview 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.

- 9 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. Upon completion, a summary of results displays.

Figure 6-6 Summary of Results

```
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
```

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

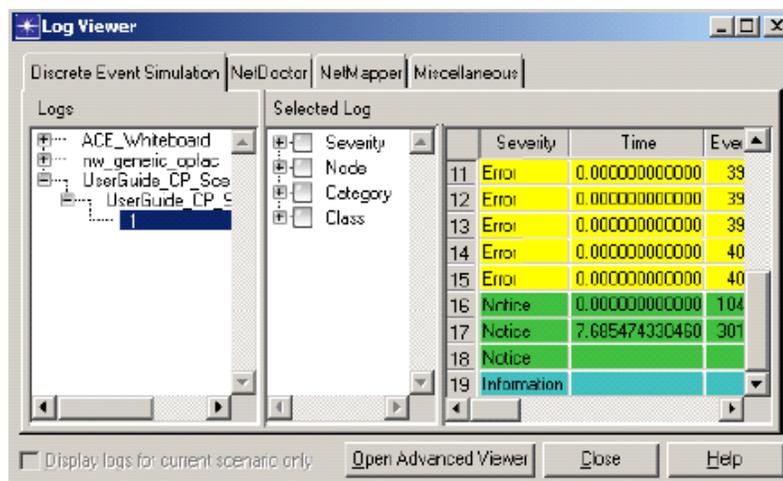
Viewing the Simulation Log File

You can display a list of errors compiled during the simulation. JCSS encounters two major types of errors. The first can occur during scenario building, including capacity planning analysis. The second can occur during a discrete event simulation. The following section applies to the discrete event simulation only. Please refer to [Error Handling](#) on page JCSS-8-1 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.

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.

- 3.1 Click and drag the vertical lines in the header row to resize columns.
- 3.2 Click on an entry in the Message column to open an edit pad containing the full text of the message.
- 4 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.
- 5 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.
- 6 Click the Close button to close the Log Viewer dialog box.

End of Procedure 6-4

Viewing Web Reports

Use the following procedure to generate a web report that contains one or more of the reports available in the Results Viewer.

Procedure 6-5 Generate Web Report

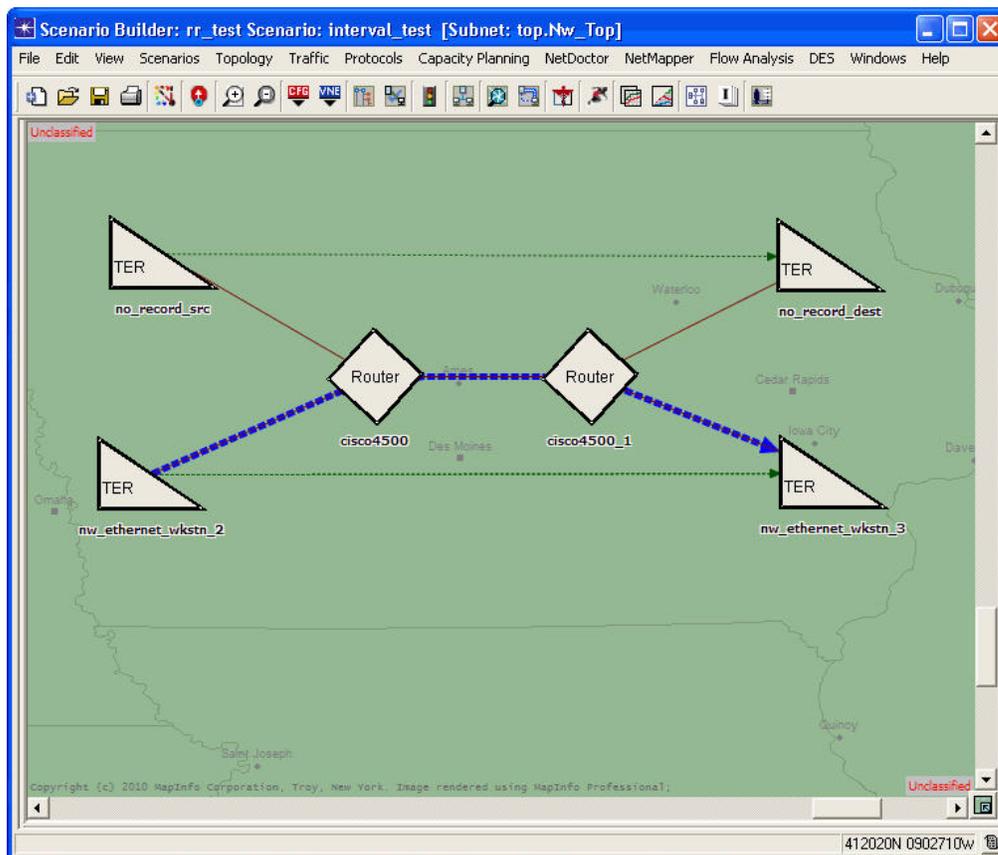
- 1 Right-click in the scenario and choose View Results to open the Results Browser.
- 2 Click on the DES Run (#) Tables tab.
- 3 Click the Generate Web Report button and select the results you want to generate from the Select Tables for Web Report dialog box.
- 4 Select the Include Network Diagram checkbox, if you want the web report to include a graphic of the network topology.
- 5 Click Generate.
- 6 Select a directory for the HTML files and click OK.
 - ➔ The web report is created and opens in the default Web browser.

End of Procedure 6-5

Viewing Recorded IER Routes

If you have recorded IER routes during a simulation, you can view the results as described in this section. Note that when you view the recorded routes, a path object is deployed in the workspace showing the route, shown as a blue dashed line in the figure below.

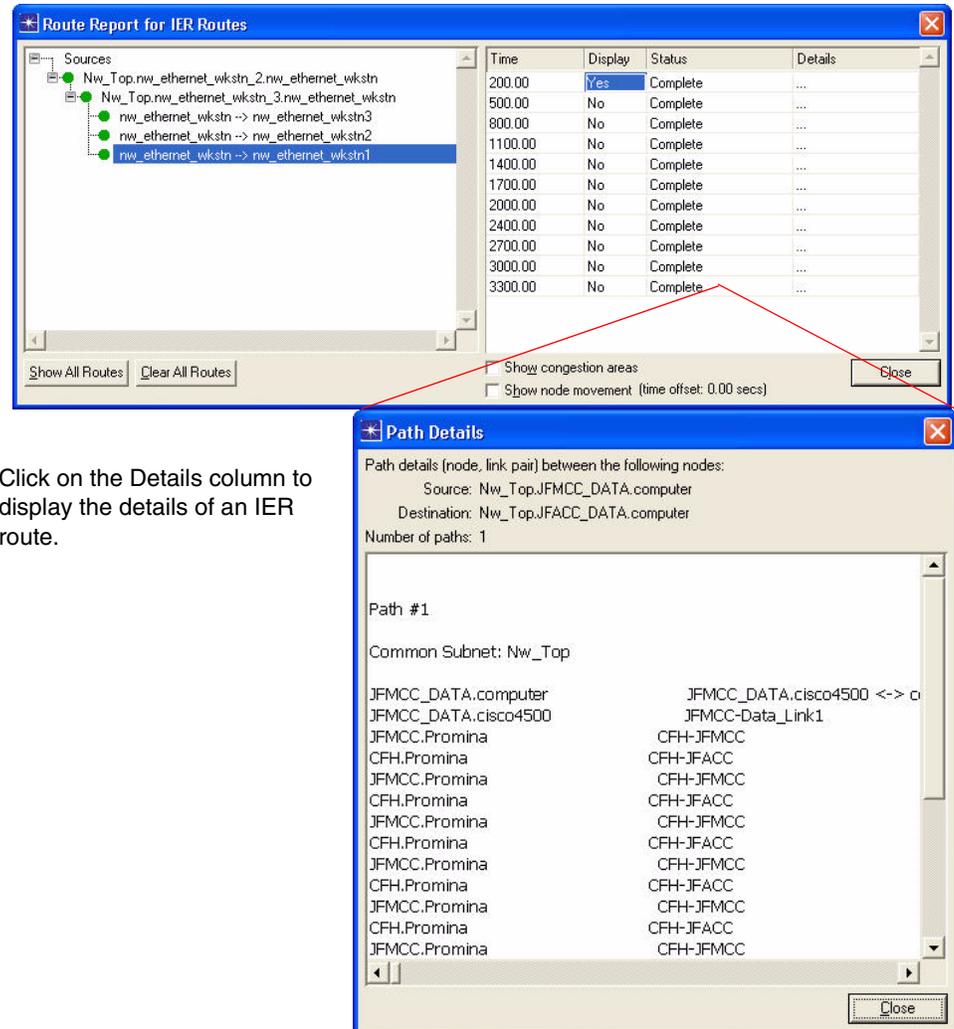
Figure 6-8 Path Object Showing IER Route



Procedure 6-6 View Recorded IER Routes

- 1 Select View > IERs > Display Recorded Routes (DES).
 - ➔ The Route Report for IER Routes window displays.

Figure 6-9 Route Report for IER Routes



Click on the Details column to display the details of an IER route.

- Show All Routes (button)—Shows all routes in the workspace.
- Clear All Routes (button)—Clears all routes from the workspace.
- Time—Simulation time of the firing.
- Display—Specifies if the route is displayed. This field is a toggle. Click on the field to change between Yes or No.
- Status—Specifies if the firing completed.
- Details—Shows a list of devices and links traversed by the route. See the figure above for an example.

End of Procedure 6-6

7 Results Analysis

Viewing Measures of Performance (MOP)

You can 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. Use the following procedure to display the MOPs.

Procedure 7-1 Display MOP Graphs

- 1 Select DES > Results > View Results. You can also right-click in the workspace and select View Results from the shortcut menu, or click the View Results toolbar button.

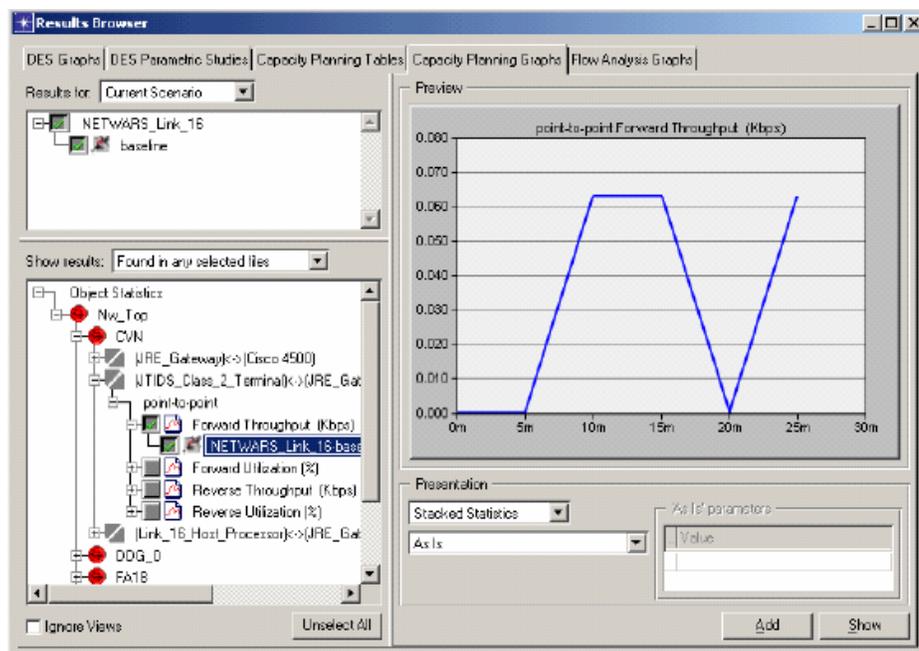
➔ The View Results window displays.

Note—To view results for a specific link, right-click on the link and select View Results from the shortcut menu.

- 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.

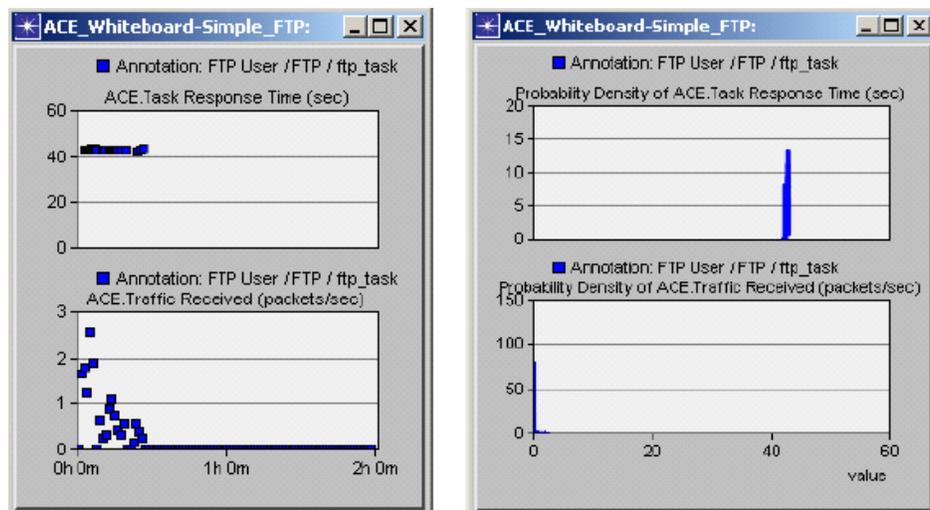
Figure 7-1 Viewing MOPs



- 3 Use the graph options/filters drop-down menus to display the MOP graphs in a variety of layouts.

- 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 described in the following procedure.

Procedure 7-2 Change MOP Graph View Properties

- 1 Examine statistics by placing the cursor over a segment of the trace.
 - ➔ A tooltip displays the coordinates of the graph.

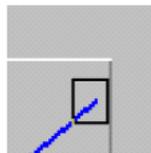
Figure 7-3 Example Graph Tool Tip

```

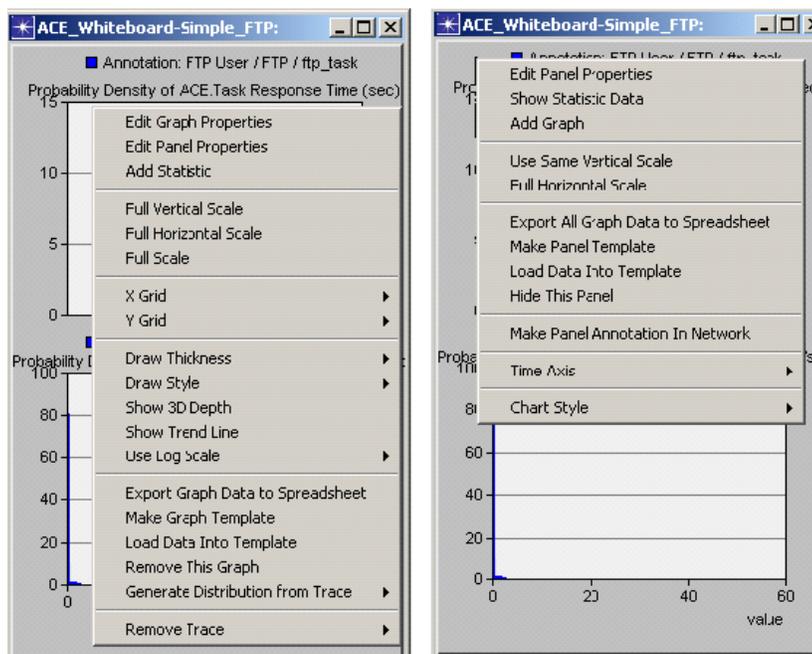
Y: 99.6688741722
X: 10h 26m 46s
Nearest Point:
Y: 99.4466700622
X: 10h 26m 40s

```

- 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 a MOP graph to open a pop-up menu that allows manipulation of graph properties. Right-click on the outer panel of a MOP graph to open a pop-up menu with different graph-manipulation options.

Figure 7-5 Accessing Graph Panel Shortcut Menus

End of Procedure 7-2

Finding Top Statistics

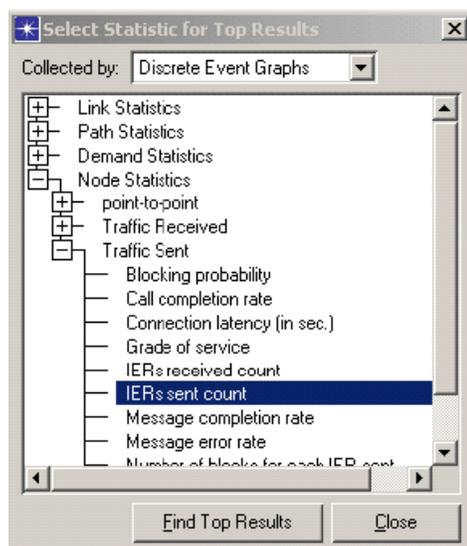
Sort statistics and find bottlenecks by using the Find Top Statistics feature. Statistics can be exported to an Excel spreadsheet for post analysis, as described in the following procedure.

Procedure 7-3 Find Top Statistics

- 1 Select Results > Find Top Statistics from the main menu.

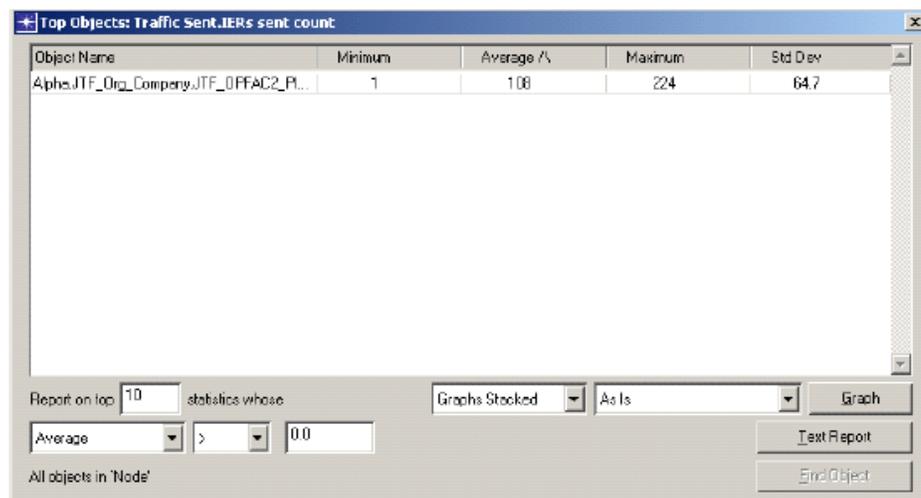
- 2 Select the statistic of interest from the Select Statistic for Top Results dialog box.

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 types of errors. The first occurs during scenario building, including capacity planning analysis. The second occurs while 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, resolution is difficult. In such cases, the following information, gathered from the software installation where the error occurred, can be helpful.

- **OPNET Error Log File**—This file, called `err_log`, is located in the `\op_admin` folder. It contains the function call stacks recorded by JCSS when there is a recoverable error or a program abort. Error messages are always appended to this file.
- **JCSS Function Log File**—This file, called `nw_function_log`, is located in the `\op_admin` folder. It contains the list of functions that were executed just before the program aborted. This file also contains the following version information:
 - JCSS software (major release and update)
 - Windows Operating System: The contents of this file are overwritten when there is a program abort.
- **JCSS Error Log File**—This file, called `nw_message_log.txt`, is located in the `\op_admin` folder. It 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 is automatically packaged into a zip file. The zip file is called `exception_data-<time_stamp>.zip`, where `<time_stamp>` is the time at which the crash occurred. In the event of a program abort, you should send this zip file to JCSS Technical Support. The information contained in this zip file will assist the developers in debugging the problem.

JCSS Help Desk Contact Information

For issues regarding the use of the software, please contact the JCSS Help Desk by email at JCSS@opnet.com or by phone at 240.497.3000 x2699. Note that email and voice mail to the JCSS Help Desk are checked once a day, Monday through Friday.

The PMO Contact email is JCSS@disa.mil.

App A Glossary

B Broadcast Networks Network of radio system devices that are tuned to the same frequency and belong to the same frequency hop group. All radio devices belonging to same broadcast network hear transmissions by a given 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 to 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 either 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 specifies the folders in which files (i.e., project files) are located. 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. You can then 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 OPNET Modeler by choosing the Online Documentation option from 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 A model-wide registry in which 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 use in the process registry, refer to the OPNET Modeler online documentation for more information.

Note—The OPNET Modeler documentation is not included with JCSS.

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, that is, 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 characterize these into workloads used as the basis for simulation modeling.

Index

A

ACE Analyst
 creating threads from, [JCSS-4-14](#)
 add broadcast networks via object palette, [JCSS-3-28](#)
 add device to OPFAC, [JCSS-3-11](#)
 add external connectivity links via object palette, [JCSS-3-27](#)
 add map dialog box, [JCSS-2-13](#)
 add planning links via object palette, [JCSS-3-26](#)
 add units via library treeview, [JCSS-3-1](#)
 add units via the shortcut menu, [JCSS-3-2](#)
 adding background images, [JCSS-2-11](#)
 adding broadcast networks
 from object palette, [JCSS-3-28](#)
 adding devices to OPFACs, [JCSS-3-10](#)
 adding new user profile, [JCSS-2-2](#)
 adding units (Organizations and OPFACs), [JCSS-3-1](#)
 advanced statistics
 specify for collection during simulation, [JCSS-6-2](#)
 aggregate load
 color IERs by, [JCSS-4-9](#)
 alternate link capacities
 specify, [JCSS-5-4](#)
 specifying, [JCSS-5-4](#)
 applications
 convert into flows, [JCSS-4-20](#)
 area of interest
 set, [JCSS-2-11](#)
 setting the, [JCSS-2-11](#)
 area of operations
 setting
 dialog box, [JCSS-2-9](#)
 attribute template
 define, [JCSS-3-7](#)
 edit, [JCSS-3-7](#)
 attributes
 edit
 for multiple objects
 using template, [JCSS-3-5](#)
 using template, [JCSS-3-5](#)
 editing
 multiple objects, [JCSS-3-5](#)
 OPFAC, [JCSS-3-3](#)
 organization, [JCSS-3-2](#)
 unit
 editing/edit unit attributes, [JCSS-3-3](#)

B

background images
 adding, [JCSS-2-11](#)
 border map, add a, [JCSS-2-12](#)
 border maps, [JCSS-2-12](#)

 selecting, [JCSS-2-12](#)
 broadcast networks
 adding from object palette, [JCSS-3-28](#)
 defined, [JCSS-A-1](#)
 defining, [JCSS-3-28](#)
 deploy
 with topology menu, [JCSS-3-29](#)

C

capacity optimization
 network
 perform a, [JCSS-5-3](#)
 capacity planning, [JCSS-5-1](#)
 cdeploy IERs (advanced), [JCSS-4-4](#)
 change MOP graph view properties, [JCSS-7-2](#)
 choosing device and link statistics, [JCSS-6-1](#)
 circuits
 deploying, [JCSS-3-24](#)
 export, [JCSS-3-24](#)
 import, [JCSS-3-24](#)
 displaying web reports, [JCSS-5-6](#)
 color by aggregate load, [JCSS-4-9](#)
 color IERs by aggregate load, [JCSS-4-9](#)
 compare optimization results, [JCSS-5-8](#)
 configuring protocols, [JCSS-3-39](#)
 configuring utility nodes, [JCSS-3-32](#)
 connecting device models, [JCSS-3-17](#)
 connectivity links
 defined, [JCSS-A-1](#)
 convert applications into flows, [JCSS-4-20](#)
 courses of action
 defined, [JCSS-A-1](#)
 create a new project, [JCSS-2-5](#)
 create a relationship, [JCSS-4-19](#)
 create a user profile, [JCSS-2-2](#)
 create and deploy standard applications from DoDAF Editor, [JCSS-4-24](#)
 create device model, [JCSS-3-15](#)
 create IERs from DoDAF Editor, [JCSS-4-22](#)
 Create Thread
 create a thread
 from existing IERs, [JCSS-4-12](#)
 create thread from existing IERs via Create Thread, [JCSS-4-12](#)
 create thread from existing IERs via Edit Thread, [JCSS-4-12](#)
 create thread without existing IERs, [JCSS-4-13](#)
 create threads using, [JCSS-4-27](#)
 create threads using DoDAF Editor, [JCSS-4-27](#)
 creating a new project, [JCSS-2-5](#)
 creating a template OPFAC or Organization, [JCSS-3-9](#)
 creating custom models with Device Creator, [JCSS-3-15](#)

creating IERs, [JCSS-4-1](#)
 creating new scenario, [JCSS-3-36](#)
 creating relationships, [JCSS-4-19](#)
 creating threads, [JCSS-4-11](#)
 from ACE Analyst, [JCSS-4-14](#)
 creating threads from ACE Analyst, [JCSS-4-14](#)
 custom models
 creating
 with Device Creator, [JCSS-3-15](#)
 cutting, copying, and pasting objects, [JCSS-3-12](#)

D

define or edit attribute template, [JCSS-3-7](#)
 defining
 external connectivity links, [JCSS-3-27](#)
 planning links, [JCSS-3-26](#)
 defining additional scenarios, [JCSS-3-35](#)
 defining broadcast networks, [JCSS-3-28](#)
 deploy
 broadcast networks
 via topology menu, [JCSS-3-29](#)
 circuits, [JCSS-3-24](#)
 link, [JCSS-3-18](#)
 satellite, [JCSS-3-20](#)
 links
 satellite, [JCSS-3-20](#)
 deploy a link, [JCSS-3-18](#)
 deploy a satellite link, [JCSS-3-20](#)
 deploy broadcast networks via topology menu, [JCSS-3-29](#)
 deploy IERs using IER wizard, [JCSS-4-2](#)
 deploy traffic using traffic wizard, [JCSS-4-20](#)
 deploying circuits, [JCSS-3-24](#)
 deploying links, [JCSS-3-18](#)
 deploying satellite links, [JCSS-3-20](#)
 DES simulation log file
 display, [JCSS-6-6](#)
 device and link statistics
 choosing, [JCSS-6-1](#)
 device connectivity
 verify, [JCSS-3-25](#)
 device models
 connecting, [JCSS-3-17](#)
 creating, [JCSS-3-15](#)
 devices
 link
 via object palette, [JCSS-3-17](#)
 display
 MOP graphs, [JCSS-7-1](#)
 display DES simulation log file, [JCSS-6-6](#)
 display LOS connectivity, [JCSS-3-46](#)
 display LOS range, [JCSS-3-47](#)
 display terrain effect shading, [JCSS-3-47](#)
 display web reports, [JCSS-5-6](#)
 displaying line-of-sight (LOS) connectivity, [JCSS-3-46](#)
 displaying line-of-sight (LOS) range, [JCSS-3-47](#)

displaying terrain effects shading, [JCSS-3-47](#)
 DoDAF Editor, [JCSS-4-27](#)
 create and deploy standard applications from, [JCSS-4-24](#)
 create IERs from, [JCSS-4-22](#)
 DoDAF views
 integrating, [JCSS-4-21](#)
 drill down into a unit, [JCSS-3-10](#)
 drilling down into units, [JCSS-3-10](#)
 duplicate a scenario, [JCSS-3-36](#)

E

edit attributes for many objects using template, [JCSS-3-5](#)
 edit IERs, [JCSS-4-7](#)
 Edit Thread
 create a thread from existing IERs, [JCSS-4-12](#)
 edit threads, [JCSS-4-14](#)
 editing attributes for many objects, [JCSS-3-5](#)
 editing operationa
 redo, [JCSS-3-14](#)
 editing operations
 undo, [JCSS-3-14](#)
 enable LOS connectivity and range, [JCSS-3-44](#)
 enabling line-of-sight (LOS) connectivity and range,
 [JCSS-3-44](#)
 equipment types
 selection
 dialog box, [JCSS-2-7](#)
 error handling, [JCSS-8-1](#)
 evaluating a network, [JCSS-5-1](#)
 evaluation
 network
 perform a, [JCSS-5-1](#)
 examine top solutions, [JCSS-5-10](#)
 examining top solutions, [JCSS-5-10](#)
 export
 circuits, [JCSS-3-24](#)
 export circuits, [JCSS-3-24](#)
 export IER report, [JCSS-4-10](#)
 external connectivity links
 adding from object palette, [JCSS-3-27](#)
 defining, [JCSS-3-27](#)

F

find top statistics, [JCSS-7-3](#)
 finding top statistics, [JCSS-7-3](#)
 flows
 convert applications into, [JCSS-4-20](#)

G

generate web report, [JCSS-6-8](#)
 generating DoDAF Visio reports, [JCSS-4-29](#)
 generating Visio reports, [JCSS-4-30](#)
 getting started, [JCSS-2-1](#)
 glossary, [JCSS-A-1](#)

I

IER

- color threshold
 - set, [JCSS-4-9](#)
- report
 - export, [JCSS-4-10](#)
 - import, [JCSS-4-10](#)
- text file
 - import, [JCSS-4-8](#)
- IER color threshold
 - set, [JCSS-4-9](#)
- IER report
 - import, [JCSS-4-10](#)
- IER routes
 - record, [JCSS-4-6](#)
 - view recorded, [JCSS-6-9](#)
 - viewing recorded, [JCSS-6-9](#)
- IER text file
 - import, [JCSS-4-8](#)
- IERS
 - deploy
 - using IER wizard, [JCSS-4-2](#)
- IERs, [JCSS-4-9](#)
 - create
 - from DoDAF Editor, [JCSS-4-22](#)
 - create a thread from existing
 - using Create Thread, [JCSS-4-12](#)
 - using Edit Thread, [JCSS-4-12](#)
 - create a thread without existing, [JCSS-4-13](#)
 - creating, [JCSS-4-1](#)
 - defined, [JCSS-A-1](#)
 - deploy, [JCSS-4-1](#)
 - deploy (advanced), [JCSS-4-4](#)
 - edit, [JCSS-4-7](#)
 - view, [JCSS-4-9](#)
- image map, add, [JCSS-2-12](#)
- image maps, [JCSS-2-12](#)
- import
 - circuits, [JCSS-3-24](#)
 - from VNE Server, [JCSS-3-48](#)
- import circuits, [JCSS-3-24](#)
- import device configurations dialog box, [JCSS-2-7](#)
- import from VNE Server, [JCSS-3-48](#)
- import IER report, [JCSS-4-10](#)
- import IER text file, [JCSS-4-8](#)
- importing from VNE Server
 - import modes, [JCSS-2-8](#)
- initial topology dialog box, [JCSS-2-6](#)
- integrating DoDAF views, [JCSS-4-21](#)
- Interacting with MOP graphs, [JCSS-7-2](#)
- internal connectivity links, [JCSS-3-17](#)

J

JCSS

- introduction, [JCSS-1-1](#)

login

- sign in dialog box, [JCSS-2-1](#)
- signing In and creating new user profile, [JCSS-2-2](#)
- overview, [JCSS-1-1](#)
- JCSS Help Desk
 - contact information, [JCSS-8-1](#)
- JCSS interfaces, [JCSS-1-5](#)
 - ACE and ACE Whiteboard, [JCSS-1-6](#)
 - icon database, [JCSS-1-5](#)
 - mainframe characterization, [JCSS-1-6](#)
 - scenario builder, [JCSS-1-5](#)
 - server characterization, [JCSS-1-6](#)
 - system editor, [JCSS-1-5](#)

K

kernel procedure

- defined, [JCSS-A-1](#)

L

- launch JCSS, [JCSS-2-1](#)
- launching JCSS, [JCSS-2-1](#)
 - how to, [JCSS-2-1](#)
 - system editor window, [JCSS-2-1](#)
- library treeview
 - add units from, [JCSS-3-1](#)
- line-of-sight
 - connectivity
 - enabling, [JCSS-3-44](#)
 - range
 - enabling, [JCSS-3-44](#)
- line-of-sight (LOS)
 - connectivity and range
 - enabling, [JCSS-3-44](#)
- line-of-sight (LOS) connectivity
 - displaying, [JCSS-3-46](#)
- line-of-sight (LOS) range
 - displaying, [JCSS-3-47](#)
- link
 - capacities
 - specify alternate, [JCSS-5-4](#)
 - specifying alternate, [JCSS-5-4](#)
 - deploy, [JCSS-3-18](#)
 - satellite
 - deploy, [JCSS-3-20](#)
 - verify, [JCSS-3-25](#)
- link consistency
 - verify, [JCSS-3-32](#)
- link devices via object palette, [JCSS-3-17](#)
- link type
 - save as, [JCSS-3-26](#)
- links
 - deploying, [JCSS-3-18](#)
 - satellite, [JCSS-3-20](#)
 - internal connectivity, [JCSS-3-17](#)
 - planning versus connectivity, [JCSS-3-27](#)

- log file
 - DES simulation
 - display, [JCSS-6-6](#)
- log files
 - technical support, [JCSS-8-1](#)
- logical view
 - scenarios
 - setting, [JCSS-2-16](#)
- logical view selection dialog box, [JCSS-2-17](#)
- login and create new user profile, [JCSS-2-2](#)
- LOS connectivity
 - display, [JCSS-3-46](#)
 - enable, [JCSS-3-44](#)
- LOS connectivity and range
 - enable, [JCSS-3-44](#)
- LOS range
 - display, [JCSS-3-47](#)
 - enable, [JCSS-3-44](#)

M

- mainframe characterization module
 - defined, [JCSS-A-1](#)
- manage scenarios, [JCSS-3-37](#)
- managing optimization results, [JCSS-5-8](#)
- maps
 - add, [JCSS-2-13](#)
 - border, [JCSS-2-12](#)
 - add a border map, [JCSS-2-12](#)
 - selecting a, [JCSS-2-12](#)
 - image, [JCSS-2-12](#)
 - add, [JCSS-2-12](#)
 - MIF, [JCSS-2-13](#)
 - add, [JCSS-2-13](#)
 - menu, [JCSS-2-13](#)
- measures of performance (MOP)
 - viewing, [JCSS-7-1](#)
- MIF map, add a, [JCSS-2-13](#)
- MIF maps, [JCSS-2-13](#)
 - MIF menu, [JCSS-2-13](#)
- mod_dirs
 - defined, [JCSS-A-1](#)
- model
 - node
 - open in Modeler, [JCSS-3-16](#)
 - opening in Modeler, [JCSS-3-16](#)
- models
 - custom
 - creating with Device Creator, [JCSS-3-15](#)
- modifying units, [JCSS-3-2](#)
- MOP
 - viewing, [JCSS-7-1](#)
- MOP graph
 - display, [JCSS-7-1](#)
 - interacting with, [JCSS-7-2](#)
 - view properties
 - change, [JCSS-7-2](#)

- MOP graph view properties
 - change, [JCSS-7-2](#)
- MOPs
 - defined, [JCSS-A-1](#)

N

- network
 - evaluating a, [JCSS-5-1](#)
 - optimizing a, [JCSS-5-3](#)
- network capacity optimization
 - perform a, [JCSS-5-3](#)
- network evaluation
 - perform a, [JCSS-5-1](#)
- node model
 - open in Modeler, [JCSS-3-16](#)
- node models
 - opening in Modeler, [JCSS-3-16](#)

O

- object
 - copy, [JCSS-3-13](#)
 - cut, [JCSS-3-13](#)
 - cut or copy, [JCSS-3-13](#)
 - paste, [JCSS-3-14](#)
- object palette
 - add broadcast networks from, [JCSS-3-28](#)
 - add planning links from, [JCSS-3-26](#)
 - adding planning links from, [JCSS-3-26](#)
 - deploy IERs using, [JCSS-4-1](#)
 - link devices via, [JCSS-3-17](#)
- objectpalette
 - add external connectivity links from, [JCSS-3-27](#)
- objects
 - cutting, copying, and pasting, [JCSS-3-12](#)
- online documentation
 - defined, [JCSS-A-1](#)
- open node model in Modeler, [JCSS-3-16](#)
- opening node models in Modeler, [JCSS-3-16](#)
- OPFAC
 - adding devices to, [JCSS-3-10](#) to [JCSS-3-11](#)
 - device
 - add to, [JCSS-3-11](#)
- OPFAC attributes, [JCSS-3-3](#)
- OPFACs
 - defined, [JCSS-A-2](#)
- optimization
 - compare results, [JCSS-5-8](#)
- optimization results
 - compare, [JCSS-5-8](#)
 - managing, [JCSS-5-8](#)
- optimization settings
 - save, [JCSS-5-7](#)
 - saving, [JCSS-5-7](#)
- optimizing a network, [JCSS-5-3](#)

organization attributes, [JCSS-3-2](#)
 organizations
 defined, [JCSS-A-2](#)

P

paste an object, [JCSS-3-14](#)
 perform a network capacity optimization, [JCSS-5-3](#)
 perform a network evaluation, [JCSS-5-1](#)
 planning links
 defined, [JCSS-A-2](#)
 defining, [JCSS-3-26](#)
 planning links vs. connectivity links, [JCSS-3-27](#)
 process registry
 defined, [JCSS-A-2](#)
 profile
 terrain
 view, [JCSS-3-42](#)
 project
 creating
 importing from device configurations, [JCSS-2-7](#)
 creating a
 set area of operations dialog box, [JCSS-2-9](#)
 creating a new
 importing
 from VNE Server
 import modes, [JCSS-2-8](#)
 top level unit dialog box, [JCSS-2-9](#)
 creating new, [JCSS-2-5](#)
 new
 select equipment types dialog box, [JCSS-2-7](#)
 projects
 defined, [JCSS-A-2](#)
 Promina devices
 configuring
 configure Promina devices, [JCSS-3-32](#)
 protocol configuration
 visualizing, [JCSS-3-41](#)
 protocols
 configuring, [JCSS-3-39](#)
 menu items, [JCSS-3-39](#)
 protocols menu items , [JCSS-3-39](#)
 provide requirements matrix information, [JCSS-3-35](#)

R

record IER routes, [JCSS-4-6](#)
 redo editing operations, [JCSS-3-14](#)
 relationship
 create a, [JCSS-4-19](#)
 relationships
 creating, [JCSS-4-19](#)
 report
 IER
 export, [JCSS-4-10](#)
 web
 generate, [JCSS-6-8](#)

viewing, [JCSS-6-8](#)
 reports
 DoDAF
 generating in Visio, [JCSS-4-29](#)
 web
 display, [JCSS-5-6](#)
 displaying, [JCSS-5-6](#)
 requirements matrix
 reviewing, [JCSS-3-34](#)
 requirements matrix information
 provide, [JCSS-3-35](#)
 results
 optimization
 managing, [JCSS-5-8](#)
 results analysis, [JCSS-7-1](#)
 reviewing the requirements matrix, [JCSS-3-34](#)
 routing protocol visualization
 run a, [JCSS-3-41](#)
 run routing protocol visualization, [JCSS-3-41](#)
 running a simulation, [JCSS-6-3](#)

S

sample workflows, [JCSS-1-2](#)
 analyst's workflow, [JCSS-1-4](#)
 crisis action planner's workflow, [JCSS-1-2](#)
 operational planner's workflow, [JCSS-1-3](#)
 satellite link
 deploy, [JCSS-3-20](#)
 save as
 link type, [JCSS-3-26](#)
 save as link type, [JCSS-3-26](#)
 save optimization settings, [JCSS-5-7](#)
 saving optimization settings, [JCSS-5-7](#)
 scenario
 creating new, [JCSS-3-36](#)
 duplicating a, [JCSS-3-36](#)
 logical view
 selection dialog box, [JCSS-2-17](#)
 viewing
 zoom
 to all, [JCSS-2-15](#)
 to rectangle, [JCSS-2-14](#)
 to selection, [JCSS-2-14](#)
 zooming in, [JCSS-2-14](#)
 zooming out, [JCSS-2-15](#)
 zooming/unzooming, [JCSS-2-14](#)
 scenario classification
 set, [JCSS-2-10](#)
 setting the, [JCSS-2-10](#)
 scenarios
 defined, [JCSS-A-2](#)
 defining additional, [JCSS-3-35](#)
 manage, [JCSS-3-37](#)
 switch between, [JCSS-3-37](#)
 viewing, [JCSS-2-16](#)

- scenarios
 - viewing
 - selecting settings for logical view of, [JCSS-2-16](#)
- server characterization editor
 - defined, [JCSS-A-2](#)
- set area of interest, [JCSS-2-11](#)
- set IER color thresholds, [JCSS-4-9](#)
- set scenario classification, [JCSS-2-10](#)
- setting area of interest, [JCSS-2-11](#)
- setting scenario classification, [JCSS-2-10](#)
- setting the scenario classification, [JCSS-2-10](#)
- shortcut menu
 - add units from, [JCSS-3-2](#)
- simulation
 - running a, [JCSS-6-3](#)
- simulation execution, [JCSS-6-1](#)
- simulation log file
 - viewing the, [JCSS-6-6](#)
- solutions
 - examine top, [JCSS-5-10](#)
 - examining top, [JCSS-5-10](#)
- specify advanced statistics for collection during simulation, [JCSS-6-2](#)
- specify alternate link capacities, [JCSS-5-4](#)
- specify statistics for collection during simulation, [JCSS-6-1](#)
- specifying alternate link capacities, [JCSS-5-4](#)
- standard applications
 - create and deploy from DoDAF Editor, [JCSS-4-24](#)
- statistics
 - advanced
 - specifying for collection during simulation, [JCSS-6-2](#)
 - device and link
 - choosing, [JCSS-6-1](#)
 - find top, [JCSS-7-3](#)
 - finding top, [JCSS-7-3](#)
 - specifying for collection during simulation, [JCSS-6-1](#)
- switch between scenarios, [JCSS-3-37](#)
- system architecture, [JCSS-1-7](#)
- system editor window, [JCSS-2-1](#)

T

- task assistant
 - open a workflow using, [JCSS-2-4](#)
 - task selection dialog box, [JCSS-2-4](#)
 - using the, [JCSS-2-3](#)
- technical support log files, [JCSS-8-1](#)
- template OPFAC
 - creating, [JCSS-3-9](#)
- template organization
 - creating, [JCSS-3-9](#)
- terrain effect shading
 - display, [JCSS-3-47](#)
- terrain effects shading
 - displaying, [JCSS-3-47](#)
- terrain profile

- view, [JCSS-3-42](#)
- thread
 - create
 - create a thread, [JCSS-4-11](#)
- threads
 - create
 - using DoDAF Editor, [JCSS-4-27](#)
 - creating, [JCSS-4-11](#)
 - from ACE Analyst, [JCSS-4-14](#)
 - edit, [JCSS-4-14](#)
- top statistics
 - find, [JCSS-7-3](#)
 - finding, [JCSS-7-3](#)
- topology
 - building, [JCSS-3-1](#)
 - deploy
 - broadcast networks, [JCSS-3-29](#)
 - import
 - from device configurations, [JCSS-2-7](#)
 - initial topology dialog box, [JCSS-2-6](#)
- topology building, [JCSS-3-1](#)
- traffic
 - deploy
 - using traffic wizard, [JCSS-4-20](#)
 - specification, [JCSS-4-1](#)
- traffic specification, [JCSS-4-1](#)
- traffic wizard
 - deploying traffic using, [JCSS-4-20](#)

U

- undo editing operations, [JCSS-3-14](#)
- unit
 - drill down into, [JCSS-3-10](#)
- units
 - adding, [JCSS-3-1](#)
 - drilling down into, [JCSS-3-10](#)
 - modifying, [JCSS-3-2](#)
- user level
 - selecting
 - select the user level, [JCSS-2-3](#)
 - selecting the, [JCSS-2-3](#)
- user profile
 - adding new, [JCSS-2-2](#)
 - create new, [JCSS-2-2](#)
 - creating, [JCSS-2-2](#)
- using object palette
 - deploy IERs using object palette, [JCSS-4-1](#)
- using the task assistant, [JCSS-2-3](#)
- utility nodes
 - configuring, [JCSS-3-32](#)

V

- verify a link, [JCSS-3-25](#)
- verifying device connectivity, [JCSS-3-25](#)
- verifying link consistency, [JCSS-3-32](#)

view
 recorded IER routes, [JCSS-6-9](#)
 view a terrain profile, [JCSS-3-42](#)
 view IERs, [JCSS-4-9](#)
 viewing
 recorded IER routes, [JCSS-6-9](#)
 simulation log file, [JCSS-6-6](#)
 web reports, [JCSS-6-8](#)
 viewing measures of performance (MOP), [JCSS-7-1](#)
 viewing scenarios, [JCSS-2-16](#)
 views
 DoDAF
 integrating, [JCSS-4-21](#)
 Visio
 generating DoDAF reports in, [JCSS-4-29](#)
 reports
 generating, [JCSS-4-30](#)
 Visio reports
 generating, [JCSS-4-30](#)
 visualization
 protocol configuration, [JCSS-3-41](#)
 routing protocol

 run, [JCSS-3-41](#)
 visualizing protocol configuration, [JCSS-3-41](#)
 VNE Server
 import from, [JCSS-3-48](#)
 importing from, [JCSS-3-48](#)

W

web report
 generate, [JCSS-6-8](#)
 web reports
 display, [JCSS-5-6](#)
 displaying, [JCSS-5-6](#)
 viewing, [JCSS-6-8](#)
 workflow panel, following sequential tasks in, [JCSS-2-5](#)

Z

zoom to all, [JCSS-2-15](#)
 zoom to rectangle, [JCSS-2-14](#)
 zoom to selection, [JCSS-2-14](#)
 zooming in, [JCSS-2-14](#)
 zooming out, [JCSS-2-15](#)
 zooming/unzooming, [JCSS-2-14](#)