CRIME SCENE INVESTIGATION

OPNETWORK 2010

PERFORMATICE

Session 1589

Introduction to Using the Joint Communication Simulation System (JCSS)

> R&D Solutions for Commercial and Defense Networks

Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
- Capacity Planning
- Views and Briefing
- Conclusion
- 5 labs
- Assumes knowledge of OPNET Modeler[®] or OPNET IT Guru[®]
 - Project Editor
 - Running Discrete Event Simulation



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JCSS

- Joint Chiefs of Staff J6 Communications modeling and simulation tool
 - GOTS Product
 - Developed by OPNET Technologies
 - Based on OPNET IT Guru
 - Available to U.S. DoD personnel upon request at no cost
- Enable C4 planners and analysts to
 - Conduct high-level planning
 - Conduct end-to-end performance assessments
 - Model military and commercial communication systems
 - Share a common modeling environment







Example Uses

- Utilized as a key component of the operational assessment of applications
 - MIP, VoIP, VTC, GCCS-COP
- Associated with major exercise support
 - USEUCOM's Combined Endeavor
 - MARFORPAC's Ulchi Focus Lens
- GIG Enterprise Wide System Engineering Support
 - BGP HPD Analysis
 - GIG QoS Analysis
- Utilized in communications studies
 - Joint Mobile Network Operations (JMNO)
 - Clean Earth Technology EPLRS
- Utilized by the Missile Defense Agency to assess the C2BMC architecture
- Provided communications effects into federated wargames
 - NAVAIR MASE
 - VTUAV
 - VRForces
- Utilized by communication device models developers
 - SPAWAR San Diego and Charleston
 - Air Force Communications Agency
- Utilized in Schoolhouse courses
 - FA24 Signal officer training
 - Naval Postgraduate School
 - United States Military Academy at West Point
- Shipped as the M&S component of the Joint Network Management System (JNMS)
- Foreign Military Organizations
 - Sweden
 - Australia



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JCSS Custom Capabilities

- Military model library
- Military hierarchy
 - Organization
 - Operational Facility (OPFAC)
- Wireless communications
 - Configuration wizards
 - Line Of Sight (LOS) and terrain
- Information Exchange Requirement (IER)
- DoDAF integration
- Capacity Planner
 - Analytical simulation
 - Routes over military device models



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JCSS Military Models



Data

- Workstation/Computer (SLIP/Ethernet), Cisco 2514, Cisco 4500, Cisco 7505, Cisco 7513, IP Cloud, ATM Cloud, FR Cloud, Accelerator 4000, IP Cisco switches, Hubs, Firewall, LAN, FoundryNetIron Switches, Multi-homed Server
- Tactical Voice, VTC and Circuit Switches
 - AN/TTC-39A(V)3, AN/TTC-39A(V)4, AN/TTC-39D, AN/TTC-39E (CDS), AN/TTC-42, AN/TTC-46 (LEN), AN/TTC-47 (NCS), AN/TTC-48(SEN), SB-3865, SMU, DNVT, DSVT, STU-III, Redcom HDX, Redcom IGX, SB-3865, DSS, CDS, MCU, VTC Terminal

Satellites & Earth Terminals

 AN/TSC-85B, AN/TSC-85C, AN/TSC-93B, AN/TSC-93C, AN/TSC-94A, AN/TSC-100A, AN/TSC-152, AN/USC-59, AN/USC-60A, AN/WSC-6(V)*, DSCS, CSCI, UHF Dama*, STEP, GBS, Generic Terminal & Space Segment, TCP Protocol Enhancing Proxy, UHF DAMA: w/SRAP, FDMA Satellite, TSSP, ETSSP, ETSSP3G (TDMA+FDMA), TSR-4 GBS, Joint IP Modem †

Transmission Devices

• AN/GRC-226, AN/GRC-239, AN/MRC-142, SRC-57, AN/TRC-170(V)2*, AN/TRC-170(V)3*, AN/TRC-173B, AN/TRC-175

Encryption Devices

- KG-82, KG-84, KG-84A, KG-84C, KG-94, KG-94A, KG-194, KG-194A, KIV-7, KIV-7HS, KIV-7HSB, KIV-19, KIV-19A, KG-75, KG-95-2, KG-175 (TACLANE), KY-57, Motorola NES, KG-235, KG-250, Red Eagle-1NE-100, KG-235 (Generic INE), KIV-19M, HAIPE
- *Model Developed by Service Organization (SPAWAR, AFCA)
- †Model new in JCSS 10.0
- **JCSS** maintains a Model Development Guide (MDG) to support custom model development while mitigating interoperability risks
- To contribute models to the JCSS program, email JCSS@disa.mil
- For more information on JCSS models, visit www.opnet.com/support/des_model_library/jcss_models.html



JCSS Military Models

- Multiplexers
 - AN/FCC-100(V)7, AN/FCC-100(V)9, IDNX-20, IDNX-90, Promina 100, Promina 200, Promina 400, Promina 800, Timeplex Link/2+*, SHM-1337
- Tactical Radios
 - SINCGARS, INC, EPLRS, HaveQuick, JTIDs*, AN/ARC-114*, AN/ARC-190*, AN/ARC-204*, AN/ARC-230*, Link 11, Generic UHF/VHF/HF Radios, Harris Megastar 155, Harris 7800rw †, Link 16* & JRE Gateway (SPAWAR), EPLRS Radio (HDR, CSMA, LDR needline support)
- Gateways
 - SCREAM, SHOUTip, Media Gateways, HAIPE Peer Discovery Model
- VoIP
 - SIP, H.323, H.323 Border Element, H.323 Gatekeeper, VoIP Phone, SIP Proxy Server, AS-SIP †
- ATM and Frame Relay
 - Alcatel 7270, Alcatel 7470, Alcatel 7750, Cabletron SS2200, Cabletron SS6000, Cabletron SS9000, Marconi PH6000, Marconi PH7000, Marconi PH8000, Omni Switches, FoundryNetIron Routers

- *Model Developed by Service Organization (SPAWAR, AFCA)
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OPNET COTS Capabilities for JCSS

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Included capabilities

- eXpress Data Import (XDI)
- Terrain Modeling[™] (TMM)
- Standard model library

Capabilities which will NOT work:

- ACETM / ACE Whiteboard Editors
- Windows only, 32-bit and 64-bit

Partial list of supported capabilities that require additional licenses

- Discrete Event Simulation (DES)
- 3D Network Visualizer (3DNV[™])
- High-Level Architecture[™] (HLA)
- NetDoctor[®]
- NetMapper[™]
- Flow Analysis[™] (Only COTS models)
- VNE Server[®] Import
- System in the Loop (SITL)
- TIREMTM
- Wireless
- IPv6
- Server Characterization Editor
- Mainframe Characterization Editor
- OPNET Development Kit[™] (ODK)



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JCSS and OPNET Modeler

- JCSS does not support editing node, link or process models
 - JCSS can use custom models
 - Use Modeler to create them
- JCSS supports
 - Device Creator
 - Deriving models



Session 1590 Modeling Tactical Military Communications Using JCSS



JCSS Modeler Integration

Embedded Modeler installation

- Installer option
- Shares application and configuration files with JCSS
- Guarantees version compatibility
- Shortcut in the Start > All Programs > JCSS menu
- Modeler license required

Open models in Modeler from JCSS

- Double-click in JCSS workspace
 - Node
 - Link
 - Demand
 - Path
- Embedded Modeler starts and opens model

nstallShield Wizard				×
Setup Type Choose the setup type that best suits your need	ds.		22	
Please specify the optional software componen	ts to install with	JCSS.		
ITS HF Propagation				
🗖 Adobe Acrobat				
HLA Commander				
OPNET Modeler 16.0 (License Required)				
nstalioniela	< Back	Next >	Cancel]

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Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
- Capacity Planning
- Views and Briefing
- Conclusion



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Signing In

- System Editor and Sign In dialog displayed at start
 - See disclaimer before using software
- Profiles
 - Not security privileges on machine
 - Used for tracking purposes in some features
 - Information stored in plaintext
 - Local Administrator
 - Default profile
 - Has special abilities
 - Create profiles for users
 - First and last name
 - Organization



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Scenario Builder

Customized Project Editor

- Main menu
- Right-click menus
- Wizards
- Enhancements to standard features

Scenarios not directly compatible with OPNET Modeler

- JCSS adds custom data and hierarchy
- Use import/export features



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OPFACs and Organizations

Operational Facility (OPFAC)

- Fundamental building block
- Collection of communications devices that are located and move together

Organization

- Hierarchy of military units
- Contains OPFACs and other Organizations
- May not contain devices
- Collectively called units
- Customized subnets





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Template OPFACs and Organizations

Reusable OPFACs and Organizations

- Can be added to multiple projects and scenarios
- Stored in files on disk
- Available from Library Treeview

Create custom templates using right-click menus

- Create Template OPFAC
- Create Template Organization





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Creating a New Project

- Classification
 - Not a security feature
 - Appears in the workspace at all times
- Launch New Project Wizard

K Create Project				
To create a new project, you must specify a name for the project and the first scenario. The classification setting will appear in the project editor at all times. If "Launch New Project Wizard" is checked, the new project wizard will start after you click OK.	4	Project Name: Scenario Name:	tutorial baseline	
	-	Classification:	Unclassified	Ī
🔽 Launch New Project Wizard			OK Cancel	



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New Project Wizard

Imports

- From various sources
- Most can also be done in an existing scenario

Import from JCSS Templates

- Map View
- Project Template

🛣 New Project Wizard: Initial	l To	pology	
You can start with an empty network and create your network or import directly from other data source.	1	Initial Topology Create empty scenario Import from JCSS/NETWARS Import from OPNET Modeler Import from Device Configurations Import from VNE Server Import from XML Import from JCSS Templates	
	-	<< Back Qui	, t



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New Project Wizard: Set Area of Operations

- Initial geographic focus
- Does not limit zooming
- Preview



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New Project Wizard: Top Level Units

Add top-level OPFACs and Organizations to scenario

- Name
- Type
- Location
- Optional unit templates

Save and reuse project templates

迷 New Project Wizard: Top Lev	ell	Jnit					\times
If desired, choose an existing project	•	Number of Top	Level Units: 5			Project Template: Deployed JTF	•
drop down list. If you choose a		Name	Туре	Latitude	Longitude	Unit Template	<u> </u>
template, the table will be filled in with		JTF	Organization	24.9500	51.1000	None	
the template.		ARFOR	Organization	33.1000	42.2500	None	
		MARFOR	Organization	31.4500	44.6500	None	
Otherwise, enter the number of units		AFFOR	Organization	26.0500	46.6500	None	
field, either by choosing a number from		NAVFOR	Organization	29.2000	49.4000	None	
the drop-down list or choosing "Edit"							$\overline{\mathbf{v}}$
and typing in the desired number.	•					Save New Project Temp	olate
						<< Back Next >> Finit	sh

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New Project Wizard: Last Steps

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Configure a custom palette for the new project

- Standard feature
- Last step of all wizard workflows

Final product



l	🕷 New Project Wizard: Select Eq	uip	ment Types		
	Select the types of equipment you will use	<u>^</u>	Equipment Type	Included	4
	in your project.		3Com	no	
	The equipment types table lists all existing		3DNV_Animations	no	
	device palettes. The devices within each		ACE	no	
	or the included palettes will be concatenated into a single new palette		Alcatel_Lucent	no	
	for this project. The new palette will be		applications	no	
	named <project_name>-<phase_name></phase_name></project_name>		Ascend	no	
	and will be the default palette. Note that		atm	no	
	other palettes.		atm_advanced	no	
		-	atm_lane	no	-
		_	<< <u>B</u> ack	Finish	



Security Classifications

Select Edit > Preferences > Security Classifications

- Affects all uses of classification
- Stored in an attribute definition model

🛣 Security	Classification	IS		×
Unclassified Classified Confidential			EFAULT	
Top Secret				
1				
<u>U</u> p	D <u>o</u> wn	Insert	<u>D</u> elete	Set Default
			<u>S</u> ave	<u>C</u> ancel



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Library Treeview

- Select Topology > Open Library Treeview
- Drag-and-drop templates onto the workspace
- Categories
 - New_Org/New_OPFAC
 - Empty templates
 - Can also create from right-click menu of the workspace
 - Custom
 - User-created templates
 - Pre-configured
 - Only Local Administrator can modify
- Satellite constellation templates
 - Automatically created at correct location



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Object Palettes

Several custom JCSS palettes

Automatic OPFAC creation

- Drag a node into an Organization
- OPFAC is automatically created to contain the node
- OPFAC has same icon as node



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MIL STD 2525 Icons

Joint symbols are default for JCSS devices

• Joint_Symbols_for_Tactical_Comms_Systems icon database



Network Browser Filters

- Filter by object type
 - Links
 - Circuits
 - IERs
 - Etc.
- Filter by device attribute
 - Security classification
 - Equipment type (phone, computer, etc.)
 - Etc.



Configuration OPFAC

- Contains most utility nodes
 - IER Firing Rules
 - IER Loader
 - Wireless Configuration
 - Failure Recovery
 - QoS
 - Profile Config
 - Application Config
- Always one per scenario
 - Automatically created with new scenarios
 - Default location in Alaska (60.00/-150.00)
 - Cannot delete







JCSS Attributes

- Many objects have two attribute dialogs
 - Edit Attributes → OPNET standard dialog
 - Edit JCSS Attributes → JCSS custom dialog
- Some overlapping contents
 - Name
 - Icon
 - Etc.
- JCSS custom dialogs
 - Additional attributes
 - Additional usability features

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MAR	dit Attributes	
h?ah	dit JCSS Attributes	z.
	Edit Position Attributes 🐴 🔳	전 영상 전 이 이 같이 같이 같이 같이 같이 같이 같이 같이 않는 것이 같이 없다.
	Create Template Organization	
	Delete Organization	
luraydal	Open Requirements Matrix	
	Expand Organization	
ad-Dawa	Expand to Leaf	
*	Enable Object LOS Range 👘 🧏	4. 3 m
	Display LOS Connectivity	Capital State
	A	
📧 Organizati	on Attributes	
Organization Nam	e: MARFOR	
Organization Type	unknown	T
Type Name:		
Echelon Size:	0	
Taska:	-	
I dSKS.		
Trajectory:	INUNE	_
Start Time (a)	Stop Time (c):	
ordire rime (s)		
Altitude: /	dt Unite	
	meters I Altitude	set by terrain
10.0000		
Icon Name:	red_dot	<u>E</u> dit Icon
Documentation	Sat Owner MikdC Attributes	Failure/Recovery
	Ter Owner Trump WithDrifes	
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		1

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Topology Imports

- XDI
- VNE Server Import
- Modeler scenario
- JCSS scenario
- JCSS XML
 - Different than OPNET XML
 - Incorporates elements from All-DOD Core Architecture Data Model (All_CADM)
 - Export as well
- Tactical Network Analysis and Planning System (TNAPS)
 - Converts TNAPS to JCSS XML
 - Import XML as second step



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Lab 1: Laying Down Units

- New Project Wizard
- Template OPFACs
- Object Palette and Devices



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Infrastructure Types

- Wired Links
- Wireless Connections
 - Radio
 - Broadcast Network
 - Satellite
 - SHF
 - UHF
 - GBS
 - Unlike IT Guru/Modeler, wireless connections are drawn in the workspace
- Generic Circuits -
 - Promina
 - TSSP
 - MUX
 - CTP, SCREAM, SHOUTip



falcons

Falcon_II_1

Falcon_II

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Falcon II 2

Wired Links

- Connect devices in same or different OPFACs
- Simple attributes
- Channel Attributes
 - Partition bandwidth between voice and data
 - Only appear for circuit-switch links

Other Attributes

- Optimization Attributes Capacity Planning
- Failure/Recovery Enable/disable link at scheduled times

🛣 Wired Link Attribut	es	
Name:	JFACC-Voice_Link0	
Туре:	wire_ptp	
Classification:	Unclassified 🗾	
Bandwidth:	256.00	Kbps
Promina.Src Port	Lpt_10 (P10)	
ttc-39.Dest Port	dtg pt 10 (P10)	
Number of Voice Channels:	2	
Channel Size for Voice:	64.00	Kbps
Remaining Data Bandwidth:	128.00	Kbps
	<u>R</u> ecompute	
Optimization Attributes	Eailure/Recovery	
	Include External Muxes	for SLD
Edit SLD Name	OK Ca	ncel



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Radio Links

- Connect terrestrial devices in different OPFACs
- Attributes similar to wired links except Frequency
- Simplex or duplex
 - Specify direction of simplex links
 - Redeploy to change simplex/duplex



🔣 Radio Link Attribute	s		×
Name:	TAA01001		
Туре:	troposcatter_lin	k 💌	
Classification:	Unclassified	•	
Start Time:	BEGIN		secs
Stop Time:	END		secs
Frequency:	1000.00		MHz
Data Rate:	256.00		Kbps
trc-170.Src Port	radio_tx_0		
trc-170.Dest Port	radio_tx_0		
Number of Voice Channels:	2		
Remaining Data Bandwidth:	224.00		Kbps
Channel Size for Voice:	16.00		Kbps
		<u>R</u> ecompute	
Optimization Attributes	noose Devices		
Simplex Link C DeviceA.PortA->DeviceB. C DeviceB.PortB->DeviceA.	.PortB PortA		
	Include E	xternal Muxes fo	or SLD
Edit SLD Name	ОК	Cano	el
DPNET Technologies, Inc.		N.C.	

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Broadcast Networks

- Connect radio system devices
 - That share a frequency or frequency hop group
 - In different OPFACs
- Workspace appearance
 - Network depicted as a diamond
 - OPFACs connected by blue links
 - Radio system device marked by symbol
- Create via Object Palette
 - Deploy nw_broadcast_network node
 - Connect with nw_broadcast_network_attachment links
- Create via the Broadcast Network Wizard
 - Select OPFACs containing tactical radios
 - Choose the Topology > Deploy Broadcast Network menu or press Ctrl+Shift+B.
 - Define the broadcast network name and attributes
 - Select OK to create network



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	Stop Time:	END	
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		25	
		16000	
	0.25 - 5	0.25	
		Disabled	
		Abstract	
	225 - 400	225	
	225 - 400	400	
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		20	
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SHF Satellite Links

Bidirectional, bent-pipe link between two terminals

- Various models available in the JCSS_Satellites palette
- TSSP or ETSSP supported by many terminals
 - Determines available data rates
- Generic SHF terminals
 - Do not support TSSP
 - Do not require circuit configuration

Create via...

- Link Deployment Wizard
- Object Palette
 - Use satellite_tssp link
 - Connect OPFACs

🔀 Satellite Bent Pipe Link Deployment	
Basic Advanced Help Diagram Help FAQs	
SatTerm A TSC_85_BwTSSP.TSC-85-BwTSSP (TSSP satellite terminal)	
SatTerm B TSC_85_BwTSSP_1.TSC-85-BwTSSP (TSSP satellite terminal)	
Pool of frequencies from which to choose determined by home satellite selection in the Basic tab.	
Downlink frequency and data rate values determined by uplink frequency and data rate selections respectively.	
" <port>:<direction> <chnl index=""> [<function>]" "<frequency> <bandwidth>" Data Rate (Kbps)</bandwidth></frequency></function></chnl></direction></port>	
A> A.sat_tx_0:Uplink [MUX]	-
> B B.sat_tx_0:Downlink 0 [deMUX 0] 🚽 16700 MHz 100000 KHz 1544 Kbps	
B> B.sat_tx_0:Uplink [MUX]	•
> A A.sat_tx_0:Downlink 0 [deMUX 0] 🔄 16800 MHz 100000 KHz 1544 Kbps	
<u></u> K	<u>C</u> ancel

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GBS Satellite & Terminal

- Generic Broadcast Satellite
 - Simplex uplink to satellite, or
 - Simplex downlink to terminal
 - Each down-linked terminal receives every transmission through the satellite

Deploy devices via Object Palette

- gbs_earth_terminal
- generic_broadcast_satellite
- Create link via Link Deployment Wizard






Deploying Links

- Two approaches to deploy a link
 - Link Deployment Wizard
 - Palette

Select OPFACs or devices but not Organizations when deploying



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Deploying Links via Wizard

Select two OPFACs or devices

Press Ctrl+L

- Choose devices if OPFACs contain more than one
- Select Port Group first •
- Select link type and ports

	op C	NETWORK SI:	(20 D
JFL JFA Ci	Select Devices CC_DATA.Src Device sco 4500 CC_Data.Dest Device sco 4500 Mext]]]	
🛣 Select Wired	Link Properties		
Select Port Group:	ethernet		
Select Link:	10BaseT	•	
Cisco 4500.Src Port	eth_port_tx_0_0	•	
Cisco 4500.Dest Po	rt eth_port_tx_0_0	•	
P and width:	10000.00	Kbps	
banuwium.			

SLD Names

- System Link Designator (SLD)
 - Naming convention specified by CJCSM 6231
- Automatically generated for link
- Select Next to modify SLD name in Link Deployment Wizard
- Modify SLD name later via Wire Link Attributes dialog

			op C	NETW SJ	I B	k zi D	
	武 Select	Wired Lin	k Proper	ties			
	Select Por	t Group:	ethernet		•		
	Select Lini	k:	10BaseT		•		
	Cisco 450	D.Src Port	eth_port_	tx_0_0	•		
	Cisco 450	0.Dest Port	eth_port_	.tx_0_0	•		
	Bandwidth		10000.00)	~	Kbps	
		Next		<u>F</u> inish	<u>C</u> anc	el	
		1		- 21. 			
Edit SLD Name					×		
SLD Codes:							
System/Link Type:		F - Cable ((FO)	•			
From User:		A - JTF		•			
fo User:		A - JTF		•			
System Number:		01					
Number of Channels Per	System:	001					
SLD Name:		FAA01001					
Help		ок		Cancel			
			-	e i	2		5 8 S

Deploying Links from Object Palette

- Bypasses Link Deployment Wizard
 Does not check port assignments and settings
- Drag link from palette
- Select OPFACs or devices in workspace
 Choose devices if OPFACs contain more than one



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Redeploying Links

Choose Re-Deploy Link from right-click menu of link

Circuit_Switch Modify • Type Edit Attributes SIPRNET_Émai Ports Edit NETWARS Attributes Set Name Collapse to Bundle PRNET Router View Link Description Choose Individual DES Statistics Quick and easy View Results Delete Link 🛣 Select Wired Link Properties Redefine Path **Re-Deploy Link** Select Port Group: T1 Select Link: • Promina.Src Port Lpt_0 pt_6_0 cisco4500.Dest Port -Kbps Bandwidth: ÖΚ Cancel

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Wireless Configuration Utility Node

- Found in Configuration OPFAC
- Timed failure/recovery for
 - Broadcast networks
 - Wireless links
- Pipeline stage configuration
 - BER
 - PER
 - ECC
 - Antenna patterns



🕷 (Wireless Configuration) Attributes



2



Wireless Configuration

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Cross Classification Check

- Identifies connected devices with different security classifications
 - Standard OPNET devices are assumed Unclassified
 - Handles encryption devices specially
- Special verification test in JCSS
 - Runs concurrently with link consistency verification
 - Displays separate summary dialog

₩	Cross Classification Check					×
File	e Edit View Help					
	Device	Classification	Device	Classification	Link Type	
1	Nw_Top.JFACC.Circuit_Switch.ttc-39	Unclassified	Nw_Top.JFACC.Promina.Promina	Secret	wired	
2	Nw_Top.CFH.Promina.Promina	Secret	Nw_Top.CFH.Circuit_Switch.ttc-39	Unclassified	wired	
3	Nw_Top.CFH.Promina.Promina	Secret	Nw_Top.CFH.Promina.tsc-85#2	Unclassified	wired	
4	Nw_Top.DISN.SIPRNET_Cloud.IP_cloud	Unclassified	Nw_Top.DISN.SIPRNET_Email.comput	Secret	wired	
5	Nw_Top.DISN.SIPRNET_Cloud.IP_cloud	Unclassified	Nw_Top.DISN.NIMA_Server.computer	Secret	wired	
						-



Generic Circuit API

- Allows different JCSS features to "understand" generic circuits
- Scenario Builder
 - Logical Views
 - Reports

Discrete Event Simulation (DES)

- Device Models
- IP Auto Addressing

Capacity Planner (CP)

- Graph Creation
- Routing Traffic

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- Supported devices
 - Promina
 - N.E.T. SCREAM and SHOUTip
 - Juniper CTP
 - TSSP Satellites
 - Multiplexers



Circuit Deployment Wizard

- Select two OPFACs
- Deploy a circuit using
 - Object palette
 - Topology > Deploy Circuit menu item
- Wizard defines the circuit based on
 - Circuit Configuration attributes of each device
 - Self-description machine type of each devices
 - Data Description XML file corresponding to the machine type

Help

😤 Circuit Deployment Wizard 🛛 🔀	🔀 Circuit Deployment Wizard
Circuit Type:	Circuit Type:
promina 💌	promina
Ports CCSD Attributes	Ports CCSD Attributes
JFLCC.Promina	CCSD Name CCMBAAAC
	Agency C - Joint Staff
JFACC.Promina	Purpose and Use CM - COMM Management
LpL0	Type of Service B - DSN Access Line
	From User A - JTF
	To User A - JTF
	Sequential Code USCENTCOM (AA - C9)
	₩ Use CCSD name
<u> </u>	<u> </u>



OPNETWORK 2010

Circuit Import/Export

- Available in Topology menu
 - Import > Circuits
 - Export > Circuits

Text file

- Excel-compatible, tab-delimited data
- Groups circuits by device type
- Extensible through Generic Circuit API

	A	В	C	D		E	F	G	H 🔪					
1	#Circuit export file for UserGu	iide_CP_Scenario-UserGuid	e_CP_So	enario										
2	#This file is tab-delimited and	contains a separate section	n for each	i file type	9.				4					
3									-					
4	circuit_type	Promina							2					
5	#Device A	Device B	Port A	Port B	Name	(Circuit Speed	Call priority	Preempt p					
6	Nw_Top.CFH.Promina	Nw_Top.MAGTF.Promina	I_pt_14	I_pt_10	Promina -	Promina 9	256	7						
7	Nw_Top.JFACC.Promina	Nw_Top.JFLCC.Promina	I_pt_1	I_pt_1	Promina -	Promina 10	512	7						
8	Nw_Top.JFLCC.Promina	Nw_Top.MAGTF.Promina	I_pt_12	I_pt_11	Promina -	Promina 16	64	7						
9	Nw_Top.CFH.Promina	Nw_Top.JFSOCC.Promina	l pt 10	I_pt_10	Promina -	Promina 5	256	7						
10	Nw_Top.CFH.Promina	Nw_Top.JFLCC.Promina	l_pt_12	I_pt_10	Promina -	Promina 7	256	7						
11	Nw_Top.CFH.Promina	Nw_Top.JFACC.Promina	l_pt_11	I_pt_10	Promina -	Promina 6	256	7						
12	Nw_Top.JFLCC.Promina	Nw_Top.MAGTF.Promi			i - -		i	i						
13	Nw_Top.JFACC.Promina	Nw_Top.JFLCC.Promin	Import	Circuit	Report									
14	Nw_Top.CFH.Promina	Nw_Top.MAGTF.Promi	Totale											
15	Nw Top.CFH.Promina	Nw Top.JFLCC.Promin	rotais						_					
16	Nw_Top.CFH.Promina	Nw_Top.JFMCC.Promit		Ac	ditions: 1		Replace	ments: 1		Removals: 1		Refre	esh	
				-										
		F	romina ciro	cuits										
		Ţ.	Action	De	vice A	Device B	Port A	Port B	Name	Circuit Speed	Call priority	Preempt priority	Terrestrial rou	ıti En 🔺
			Add	CFI	H.Promina	MAGTF.Promin	al_pt_14	Lpt_10	Promina - Pro	256	7	0	Do not care	Do
			Delete	CFI	H.Promina	JFMCC.Promina	i Lpt_13	Lpt_10	Promina - Pro	256	7	0	Do not care	Do
			Change	JFA	CC.Promina	JFLCC.Promina	Lpt_1	Lpt_1	Promina - Pro	512 (256)	7	0	Do not care	Do
			Same	JFL	.CC.Promina	MAGTF.Promin	alpt 12	l pt 11	Promina - Pro	64	7	0	Do not care	Do
			Same	CFI	H.Promina	JFSOCC.Promi.	Lpt_10	Lpt_10	Promina - Pro	256	7	0	Do not care	Do
			Same	CFI	H.Promina	JFLCC.Promina	l pt 12	l pt 10	Promina - Pro	256	7	0	Do not care	Do
			Same	CFI	H.Promina	JFACC.Promina	_,_ pt 11	l pt 10	Promina - Pro	256	7	0	Do not care	Do 🚽
			•											
		-											<u></u>	
													<u>UK</u>	<u>Uancel</u>

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OPNETWORK 2010

DST

OPNETWORK 2010

SLD and CCSD Reports

List all SLDs and CCSDs in scenario

• Hot-links to links and endpoints

*	SLD Summ	ary			
File	Edit Viev	v Help			
	SLD	Endpoint A Name & Port	Endpoint B Name & Port	Link Type	Data Rate (Kbps) 🔺
1	FAA01001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.DATA_Comm	wire_ptp	1152.00000C
2	FAA02001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.VOICE_Comm	wire_ptp	256.00000C
3	FAA03001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.VTC_Comm_U	PPP_DS1	1544.00000C
4	FAA04001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.DATA_Comm	wire_ptp	768.00000C
5	FAA05001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.VOICE_Comm	wire_ptp	256.00000C
6	FAA06001	NCTAMSPAC_Far_East.NCTAMSPAC	NCTAMSPAC_Far_East.VTC_Comm_U	wire_ptp	128.00000C
7	FAA10002	JTF_HQ.JTF.LWX_1.eth_port_tx_1_0	JTF_HQ.DATA_Command_HQ_2.Cisco	100BaseT	100000.00000C
8	FBB01001	NAVFOR.NAVFOR Transmission.FCC	NAVFOR.DATA Comm Unit.Cisco 450	wire ptp	768.000000

*	CCSD Summ	nary						
File	Edit View	Help						
	Name	Туре	Source Subscriber	Destination Subscriber	Source Device & Port	Destination Device & Port	Data Rate (Kbps) Direction	
1	CCMBAABP	Multiplexer	NAVFOR.VTC_Comm	NCTAMSPAC_Far_East	NAVFOR.NAVFOR_Trans	NCTAMSPAC_Far_East.NCTA	128.000000 Dual	
2	CCMBAABQ	Multiplexer	NAVFOR.DATA_Com	NCTAMSPAC_Far_East	NAVFOR.NAVFOR_Trans	NCTAMSPAC_Far_East.NCTA	768.000000 Dual	
3	CCMBAABR	Multiplexer	NAVFOR.VOICE_Co	NCTAMSPAC_Far_East	NAVFOR.NAVFOR_Trans	NCTAMSPAC_Far_East.NCTA	256.000000 Dual	
4	CCMBAAAA	Promina	ARFOR.ARFOR_Tran	JTF_HQ.JTF.LWX	ARFOR.ARFOR_Transmis	JTF_HQ.JTF.Promina-800.l_pt_0	256.000000 Dual	
5	CCMBAAAB	Promina	ARFOR.ARFOR_Tran	CAMP_HUMPHREYS.CA	ARFOR.ARFOR_Transmis	CAMP_HUMPHREYS.CAMP_H	576.000000 Dual	-

Other Wizards

- Cut-through Mechanism
 - Enabled/Disables all ports on selected devices to use the cut-through mechanism
 - Found in the Topology > Configuration Utilities > Cut-through menu
- UHF DAMA Wizard
 - Allows the user to properly configure the Service Plan file for UHF DAMA devices
 - Found in the Topology > Configuration Utilities > UHF DAMA SATCOM menu
- Link-16 Wizards
 - Allow the user to assign and clear Time Slot Blocks (TSBs) for Link-16 devices
 - Found in the Protocols > Link16 menu
- Refer to Session 1590 Modeling Tactical Military Communications Using JCSS for more information on these wizards



OPNETWORK 2010

DATE

Line of Sight (LOS)

- Requires terrain data
- Independent of device characteristics
- Longley-Rice propagation model
- To configure, select View > Show LOS > LOS Settings
- **To enable, right-click menu of OPFAC or Organization**





OPNETWORK 2010

LOS Connectivity

- Color-coded lines
 - Red No connectivity
 - Green Clear connections



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LOS Range and Terrain Shading

Range

- Denoted by a circle of fixed radius
- Simply indicates a distance

Terrain Shading

- Samples locations within the range
- Dots indicate no LOS at the location





OPNETWORK 2010

DSTAD

Lab 2: Deploying Links

- Link Deployment Wizard
- Broadcast Network Deployment Wizard
- Circuit Deployment Wizard
- LOS Connectivity





Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
- Capacity Planning
- Views and Briefing
- Conclusion



OPNETWORK 2010

Information Exchange Requirement (IER)

Military specific communications traffic

- Regular position updates
- Air support request
- Etc.

Modeled as a unidirectional demand

- Based on All-DOD Core Architecture Data Model (All_CADM)
- Demand can be used in Modeler
- Configuration wizards only available in JCSS
- Defines a message or call that can be transmitted repeatedly



OPNETWORK 201

IER Attribute Dialog

- Displayed by several features
 - Drag IER_demand from Object Palette
 - Traffic > IERs > Deploy IER
 - Traffic > IERs > Deploy IERs (Advanced)
 - Right-click menu of IER demand object

* IER				X	
Name	computer> computer				Sug. b
ID	USER105		•	-	
Туре	DATA*		-	·	
Equipment	Computer*		-	-	
Protocol	TCP			-	
Classification	Unclassified		•	-	
Priority	ROUTINE			-	
Perishability (sec)	15				
Message	Not Configured			-	
— Generation Par	ameters			_	
				- I	
Size (sec or byte	es)	constant(1000	00)		
Interarrival (sec)		exponential(30))		
Start Time		100			
Stop Time		END			
Reporting Optic	ons				
Becord Boute In	terval (sec) Never				
Application D	elay Fracking				
Export Repor	ts				-
☑ <u>V</u> alidate IER V	alues	<u>0</u> K	<u>C</u> ancel		A CONTRACT
gies, Inc. © 2010 OPNE	Γ Technologies, Inc.			55	5

IER Attributes

- Identify the IER
 - Name is default
 - ID may override name

Specify communication requirements

- Equipment required transmission equipment type
- Classification minimum equipment classification

Control simulation reporting

- Record Route Interval
- Application Delay Tracking
- Reports

		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	inter the state				
🛣 IER							
Name	computer> computer	computer> computer					
ID	USER105		-				
Туре	DATA*		_				
Equipment	Computer*		•				
Protocol	ТСР		_				
Classification	Unclassified		-				
Priority	ROUTINE		_				
Perishability (sec)	15						
Message	Not Configured		-				
Generation Par	ameters						
Size (sec or byte	es)	constant(1000	100)				
Interarrival (sec)		exponential(30)]				
Start Time		100					
Stop Time		END					
- Reporting Optic	ons						
Record Route In	terval (sec) Never 🖵						
Application D	elay Tracking						
Export Report	ts						
I							
I Validate IER V	alues	<u>0</u> K	Cancel				

OPNETWORK 2010

56

DST

IER Attributes

- Specify traffic characteristics
 - Type
 - Protocol
 - Priority
 - Number of transmission retries
 - Wait time between each attempt
 - Perishability useful lifetime of message
 - Size data size or call duration
 - Interarrival delay between message repetition
 - Start Time
 - Stop Time

			a second	
🛣 IER				X
Name	computer> computer			
ID	USER105			-
Туре	DATA*			•
Equipment	Computer [×]			•
Protocol	ТСР			•
Classification	Unclassified			-
Priority	ROUTINE			•
Perishability (sec)	15			
Message	Not Configured			-
Generation Par	ameters			
Size (sec or byte Interarrival (sec)	es) I	constant(100	000) M	_
Start Time	1	100	0,	
Stop Time		END		
Reporting Optio	ons			
Record Route In	nterval (sec) Never 🖃			
Application D	elay Tracking			
Export Report	its			
✓ Validate IER V	'alues	<u>0</u> K	Cance	
			A.	

OPNETWORK 2010

BS

Advanced IER Wizard

- Create multiple IERs in various topologies, or
- Create a single IER with multiple consumers
- Control device choices
 - Filter by properties
 - Select specific devices

🔣 IER Rapid Deployment Wizard	···· Computer ■·● JFLCC_DATA ···· (Auto Select)	
IER Properites Type DATA Equipment Computer	GrH_DATA_2 GrH_DATA_3 GrH_DATA_2 GrH_DATA_2	
Device Selection		
To all other devices from MAGTF_DATA (Auto Select) To all other devices to MAGTF_DATA (Auto Select) MAGTF_DATA (Auto Select) MAGTF_DATA (Auto Select)	₹	
✓ <u>S</u> elect other devices <u>R</u> efresh <u>N</u> ext <u>C</u> ancel	<u>B</u> ack <u>N</u> ext <u>C</u> a	ancel

OPNETWORK 2010

58

悉 IER Wizard: Choose Devices

JFMCC_DATA

Devices:

i . 💿

Nw Top

Operational Element (OE)

- Special device in each OPFAC
- Handles IER traffic and statistics
- Producer or consumer for IERs
 - Chooses comm. device during simulation
 - Depends on IER Firing Rules utility node





OPNETWORK 2010

IER Firing Rules

Classification Order

- Ranks classification values
- OE chooses device with same or higher classification

Decision Table

- Maps Traffic Type to Equipment
- Equipment listed by decreasing preference

Priority Table

- IER priority determines transmission attempts
- Number of retries
- Wait time between retries





	Priority	Num Retries	Wait Time
0	ROUTINE	2	300
1	PRIORITY	4	60
2	IMMEDIATE	6	20
3	FLASH	12	5
4	FLASH OVERRIDE	30	2



IER Table

- View all IERs in a scenario
- Edit attributes
- Cannot change producer and consumer
- Load calculations
 - Individual load for each IER
 - Aggregate loads for all IERs in table

🛣 IERs														
🗆 Aggregate Da	ata Traffic —			Aggregate Voice Traffic —										
Average Size	71.9444	KB		Average Call Duration		67.5 S	econds							
Total Data Loa	d 818 Kbp)S		Total Voice Load		414.66	7 Kbps (Bas	ed on a 16	K Voice Chanr	nel)				
Name		ID	Thr	Producer	Consumers	Туре	Equipment	Protocol	Classification	Priority	Perish	Size (sec or bytes)	Interarrival (sec)	Load 🔺
computer> c	omputer	USER113	Not	MAGTF_DATA.computer	CFH_DATA_2.computer	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(50000)	exponential(5)	80
computer> c	omputer 1	USER116	Not	MAGTF_DATA.computer	JFLCC_DATA.computer	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(25000)	exponential(30)	6.666
computer> c	omputer 2	USER117	Not	MAGTF_DATA.computer	JFMCC_DATA.computer	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(50000)	exponential(20)	20
0E> 0E		USER108	Not	JFMCC_DATA.OE	MAGTF_DATA.OE	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	0.133
OE> OE 1		USER112	Not	JFMCC_DATA.OE	CFH_DATA_2.0E	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	0.133
0E> 0E 2		USER115	Not	JFMCC_DATA.OE	JFACC_DATA.OE	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	0.133
computer> c	omputer	USER107	Not	JFLCC_DATA.computer	MAGTF_DATA.computer	DATA*	Computer*	TCP	Unclassified	ROUTINE	15	constant(640000)	exponential(30)	170.6 👻
•														F
Delete	J					34 IERs							🔽 Validate	e IER Values
<u>R</u> efresh Aggreg	jate Loads												<u>0</u> K	<u>C</u> ancel
														1

OPNETWORK 2010

DoDAF Editor

- Import/export for DoDAF views
 - OV-3
 - SV-6
- File formats
 - Text
 - Metastorm ProVision
 - Telelogic System Architect
- Creates/includes IERs
 - Only some DoDAF fields map to IER
 - Minimum required fields are Sending and Receiving Names
 - Values in unmapped fields
 - Retained if specified
 - Not used
- Automatically creates OPFACs and devices, if no match in network



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DSTA

Status	Needlin	Information	Sending Op Node	Sending	Receiving Op Node	Receiv
No Change	TBD	USER113	MAGTF_DATA	TBD	CFH_DATA_2	TBD
No Change	TBD	USER116	MAGTF_DATA	TBD	JFLCC_DATA	TBD
No Change	TBD	USER117	MAGTF_DATA	TBD	JFMCC_DATA	TBD
No Change	TBD	USER108	JFMCC_DATA	TBD	MAGTF_DATA	TBD
No Change	TBD	USER112	JFMCC_DATA	TBD	CFH_DATA_2	TBD
No Change	TBD	USER115	JFMCC_DATA	TBD	JFACC_DATA	TBD
No Change	TBD	USER107	JFLCC_DATA	TBD	MAGTF_DATA	TBD
No Change	TBD	USER111	JFLCC_DATA	TBD	CFH_DATA_3	TBD
•						
⊂ View Mo © DV-3 ⊂ SV-8		Import	Export	sert Row	Duplicate Row De	elete Ro

IER Report

Roundtrip export/import for IERs

- All IERs in scenario
- Same data as the IER table
- Excel-compatible, tab-delimited file
- In Traffic > IERs menu
 - Export IER Report
 - Import > From IER Report

🛣 Import IE	R Report																
- Totals																	
		Addi	tions: 1			Replacen	nents: 1			Remova	ıls: 1			Refresh			
Action	Name(s)	ld	Producer	Consumers	Туре	Equipment	Protocol	Classification	Priority	Perishability	Size	Interarrival	Start	Stop	Application De	Export Reports	Message 📥
Add	computer> c	USER113	MAGTF_DAT	CFH_DATA_2.	. DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(50000)	exponential(5)	100	END	Disabled	Disable	Not Confi
Delete	computer> c	USER116	MAGTF_DAT	JFLCC_DATA	. DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(25000)	exponential(30)	100	END	Disabled	Disable	Not Confi
Change	computer> c	USER117	MAGTF_DAT	JFMCC_DATA.	. DATA	Computer	TCP	Secret (Uncla	ROUTINE	15	constant(50000)	exponential(20)	100	END	Disabled	Disable	Not Confi
Same	0E> 0E	USER108	JFMCC_DATA	MAGTF_DAT	DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	100	END	Disabled	Disable	Not Confi
Same	OE> OE 1	USER112	JFMCC_DATA	CFH_DATA_2.	DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	100	END	Disabled	Disable	Not Confi
Same	OE> OE 2	USER115	JFMCC_DATA	JFACC_DATA	DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(1000)	exponential(60)	100	END	Disabled	Disable	Not Confi
Same	computer> c	USER107	JFLCC_DATA	MAGTF_DAT	DATA	Computer	TCP	Unclassified	ROUTINE	15	constant(6400	exponential(30)	100	END	Disabled	Disable	Not Confi
-					1							1					



OPNETWORK 2010

DSTA

IER DES Reports

Enable for IERs

- Individually in IER attributes
- Scenario-wide in DES configuration: OE.IER Reports
- View in DES Run Tables of Results Browser
 - IER instances
 - Summary Report

₩	IERs.Summ	ary Report							X
File	Edit View	Help							
	ID	Total Instances Fired	Total Instances Received	Total Instances Failed	Total Instances Preempted	Total Instances Undelivered	Total Instances Not Fired	Instances	
1	USER110	189	73	0	0	116	0	Hotlink to Report	
2	USER116	17	17	0	0	0	0	Hotlink to Report	_
3	USER101	113	71	0	0	42	0	Hotlink to Report	
4	USER002	4	3	1	0	0	0	Hotlink to Report	
5	USER115	10	10	0	0	0	0	Hotlink to Report	
6	USER007	9	1	8	0	0	0	Hotlink to Report	
7	USER107	13	13	0	0	0	0	Hotlink to Report	
8	USER114	8	8	0	0	0	0	Hotlink to Report	
9	USER111	6	6	0	0	0	0	Hotlink to Report	
10	USER104	40	40	0	0	0	0	Hotlink to Report	
11	USER106	31	31	0	0	0	0	Hotlink to Report	
12	USER008	4	0	4	0	0	0	Hotlink to Report	
13	USER009	7	3	1	0	3	0	Hotlink to Report	
14	USER014	57	18	35	0	4	0	Hotlink to Report	
15	USER004	3	0	3	0	0	0	Hotlink to Report	
16	USER012	17	7	10	0	0	0	Hotlink to Report	
17	USER100	15	15	0	0	0	0	Hotlink to Report	-



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Record IER DES Routes

Enable for Data IERs

- Individually in IER attributes
- Scenario-wide in DES configuration: OE.IER Record Route Interval
 - Default Use the individual IER settings
- Record routes
 - Once First instance
 - All Every instance
 - Numeric value At given interval of seconds
- Select View > IERs > Display Recorded Routes



Route Report for IER Routes	_ <u>D</u> eta	ailed	<u>B</u> un	<u>C</u> ancel	Apply	<u>H</u> elp
Sources	*	Time	Display	Status	Details	
Nw_Top.nw_ethernet_wkstn_2.nw_ethernet_wkstn		200.00	Yes	Complete		
Nw_Top.nw_ethernet_wkstn_3.nw_ethernet_wkstn		500.00	No	Complete		
nw_ethernet_wkstn -> nw_ethernet_wkstn3		800.00	No	Complete	11	
mw_ethernet_wkstn> nw_ethernet_wkstn2	_	1100.00	No	Complete		
mw_ethemet_wkstn -> hw_ethemet_wkstn1	1400.0		No	Complete		
		1700.00	No	Complete		
		2000.00	No	Complete		
		2400.00	No	Complete	110	
		2700.00	No	Complete		
		3000.00	No	Complete	161) 161	
		3300.00	No	Complete	11	
1						-

Duration: 1

Values per statistic: 100

🗏 0E

E SIE

(2)

Global attributes Reports

- IER Reports

Max Threads

Simulation Efficiency
 Traffic

-IER Timeout Interval

Application Tracking Directory

- IER Record Route Interval (sec)

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🗶 Configure/Run DES: UserGuide_CP_Scenario-UserG... 📘 🗖 🗙

-

<Primary Model Directory:

65

Value

Neve

Once

Defau

hour(s)

JCSS Applications and Profiles

- JCSS ships with several default profiles
 - Email, web, FTP and video
 - Represent various use patterns and numbers of users

🔤 (Profile Config) Attributes	
Type: Utilities	
Attribute	Value
🕐 🐺 name	Profile Config
🕐 🖻 Profile Configuration	()
- Number of Rows	23
Heavy_Email_50_User_LAN	
Normal_Email_50_User_LAN	
Heavy_Email_100_User_LAN	
Normal_Email_100_User_LAN	
Heavy_Email_200_User_LAN	
■ Normal_Email_200_User_LAN	
■ Heavy_Web_50_User_LAN	
■ Normal_Web_50_User_LAN	
■ Heavy_Web_100_User_LAN	
Normal_Web_100_User_LAN	
■ Heavy_Web_200_User_LAN	
Normal_Web_200_User_LAN	
FTP_2MB_File_Upload	
FTP_5MB_File_Upload	
FTP_10MB_File_Upload	
■ FTP_2MB_File_Download	
FTP_5MB_File_Download	
FTP_10MB_File_Download	
€ 64_Kbps_Video	
■ 128_Kbps_Video	
■ G.711_VolP	
■ G.723.1_VolP	
Free-text Questions	()
	☐ Ad <u>v</u> anced
	Apply to selected objects
Exact match	<u> </u>



Traffic Wizard

Deploy applications quickly

- Select two OPFACs
- Select Traffic > Traffic Wizard or Ctrl+W
- Select profile to be deployed
- Specify client and server devices
- Supports
 - Standard, custom and JCSS profiles
 - ACE 2-tier applications

🖁 Simple Traffic Wiz	ard	
Profile or ACE File		
Name: FTP_download_	over_WAN.atc.m	
Description of the traffic menu	option currently being displayed in	the
Devices		
Client:	Nw_Top.JFLCC_DATA.computer	
Server:	Nw_Top.JFACC_DATA.computer	
-	ОК	Cancel
Technologies Inc. @ 2010 ODNET T	cohnologias Inc	

Traffic Web Report

Current content of the scenario

- Link Loads
- IERs
- Flows
- Applications

Select Traffic > Generate Traffic Web Report

	Traffic Report		88
Project: UserGuide_CP_Scenario	Scenario: UserGuide_CP_Scenario	Date: 2010-0	07-22_16.04.27
Executive Summary			
Traffic by Type Scenari	o Traffic Executive Summary		
Link Loads			1
IERs	Traffic Type		Count
Flows Link Loads			7
COTS Applications IERs		Data	18
Traffic by Unit		Voice	16
OPFACs \ Devices		VTC	0
		Total	34
Flows			0
Applications		Applications	0
		Profiles	0



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Lab 3: Deploying Traffic

- **IER**
- Traffic Wizard



OPNETWORK 2010

Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
- Capacity Planning
- Views and Briefing
- Conclusion



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Capacity Planning

Relates to DES

- Use instead of or in addition to DES
- Less time consuming

Two modes

- Evaluation Snapshot of scenario performance
- Optimization Suggests network configuration changes
- Considers special properties of military devices
 - Circuits for Promina devices
 - Radio connections
 - Recent models not yet supported: AS-SIP, Harris 7800w, JIPM, Waveform Gateway



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Evaluation

- Calculates
 - Load produced by traffic
 - Utilization of connections
- Routing
 - Shortest-path
 - May overload links
 - Reports unroutable traffic
- Evaluate before DES
 - Sanity check
 - Quick indication of bottlenecks
 - Avoid investing time in repeated simulations





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DST
Evaluation Parameters

Time

- Multiple time periods
- Specified duration for periods
- Particular start time
- IP Load Balancing
 - Traffic will use multiple equal hop paths
- Appearance of device names in reports

Evaluation Settings		
Time Number of Time Steps:	1	
Length of Time Step:	3600 Hour(s)	-
Start Time:	0 Hour(s) 0 Min(s)	0 Sec(s)
Advanced Parameters		
Help	<u>R</u> un Apply	<u>C</u> ancel

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Evaluation Web Reports

- Automatically generated by Evaluation
- Executive Summary
 - Initial page
 - Statistics for
 - Link utilization
 - Traffic
 - Circuits
- Detailed Reports
 - Traffic routes
 - Link utilizations
 - Residual Bandwidth
 - Circuit Switch Link
 - Etc.

		Capac	ity Planning R	leport	t				
Project: UserGuide_C	P_Scenario	Scenar	io: UserGuide_CP_Sc	enario		1	Date: 201	0-07-22_	16.08.33
Legend									
Executive Summary	Capa	city Evaluation	on Executive S	umma	ary				
Overall Peak Result	ts								
Link Utilization	Period	of Evaluation: 0:	00:00 to 3600:00:	00 with	n 1 Time	Interval			
Link Reservation		·							
Overall Average Re	esults								_
Link Utilization	Total N	umber of Links	56						
Link Reservation	Maximu	m Utilization (%) (81.25
Select Time Interval		D.JFACC-JFLCC, Tramic)							
,									
0:00:00 - 3600:00:00	Traffic I	Dorformanco							
Traffic Route Report	Traince	Periormance	-						
Link Utilization Report	Unique	Traffic	34						
Residual Bandwidth Report	Total Tr	affic Instances							34
Transmission Link Report	Russon	ofully Poutod Troffic							
Data Link Report	Instanc	es							34
		Capacity	Planning Repo	rt					6
rt: UserGuide_CP_Scenario		Capacity Scenario: T	Planning Repo	rt			Date: 20	010-07-22_	16.08.33
rt: UserGuide_CP_Scenario d ive Summary Tr	ansmission	Capacity Scenario: T Link Report	Planning Repo	rt			Date: 20	010-07-22_) (s
rt: UserGuide_CP_Scenario d two Summary rall Peak Results	ansmission	Capacity Scenario: T Link Report	Planning Repo	rt			Date: 20	010-07-22_	16.08.33
rt: UserGuide_CP_Scenario d twe Summary rall Peak Results nization servation	ansmission a	Capacity Scenario: T Link Report Device A	Planning Repo JserGuide_CP_Scenario Device B	rt Data Rate (Khps)	A->B Circuit Reservation	B->A Circuit Reservation	Date: 20 A->B Data Utilization (%)	010-07-22_ B->A Data Utilization (%)) (3 16.08.31 <u>Voice</u> Utilization (%)
et: UserGuide_CP_Scenario d two Summary rall Peak Results iization eservation all Average Results	Name	Capacity Scenario: T Link Report Device A	Planning Repo JserGuide_CP_Scenario Device B	rt Data Rate (Kbps) 256,00	A->B Circuit Reservation (%)	B->A Circuit Reservation (%)	Date: 20 A->B Data Utilization (%) 40.62	B->A Data Utilization (%) 40.62	Voice Utilization (%)
et: UserGuide_CP_Scenario d Tr twe Summary Tr rall Peak Results izzation servetion rall Average Results izzation izzation (C)	Name	Capacity Scenario: T Link Report Device A Nw_Top JFACC.Promina	Planning Repo JserGuide_CP_Scenario Device B Nw_Top.JFLCC Promina	rt Data Rate (Kbps) 256.00	A->B Circuit Reservation (%) 100.00	B->A Circuit Reservation (%) 100.00	Date: 20 A->B Data Utilization (%) 40.62	B-2A Data Utilization (%) 40.62	Voice Utilization (%) 40.6
et: UserGuide_CP_Scenario d twe Summary Tr rall Peak Results iization servetion rall Average Results iizeron iservation NW iizeton NW NE	Name Name / TopJFACC-JFLCC ETWARS, Traffic) / Top.CFL-MAGTF (TWARS, Traffic)	Capacity Scenario: T Link Report Device A Nw_Top JFACC Promina Nw_Top.CFH.Promina	Planning Repo JserGuide_CP_Scenario Device B Nw_Top.JFLCC Promina Nw_Top.MAGTF.Promina	Data Rate (Khps) 256.00 1,024.00	A->B Circuit Reservation (%) 100.00 75.00	B->A Circuit Reservation (%) 100.00 75.00	Date: 20 <u>Data</u> <u>Utilization</u> <u>40.62</u> <u>36.51</u>	B-A Data Utilization (%) 40.62 24.40	Utilizatio (%) 40.6
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ct: UserGuide_CP_Scenario d tve Summary Tr all Peak. Results lization eservation izatl Average Results ization bervetion interval D0 - 3600:00:00 N	Name /_Top.JFACC-JFLCC EIVVARS, Irafle) /_Top.CFL-MAGTF (TVVARS, Irafle) /_Top.CFL-FLCC (TVVARS, Irafle) /_Top.CFLJFLCC (Capacity Scenario: T Link Report Device A Nw_Top.JFACC.Promina Nw_Top.CFH.Promina Nw_Top.CFH.Promina	Planning Repo JserGuide_CP_Scenario Device B Nw_Top.JFLCC.Promina Nw_Top.JAQTF.Promina Nw_Top.JFLCC.Promina	rt Data Rate (Kbps) 256.00 1,024.00 1,024.00 1,024.00	A->B Circuit Reservation (5) 100.00 75.00 87.50 87.50	B.>A Circuit Reservation (%) 100.00 75.00 87.50 87.50	Date: 20	B-2A Data Utilization (5) 40.62 24.40 23.26 24.74	Voice Utilization (%) 40.6 15.9 6.5 4.5
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tt: UserGuide_CP_Scenario d tve Summary Tr all Peak. Results dization eservation rall Average Results servation interval D 0 - 3600:00:00 Component LBendwidth Report With Endik Report Servation LBendwidth Report LBENdwidth Report Servation LBENdwidth	Name / Top.JFACC-JFLCC EIWARG, Iraffic) / Top.CFH-MAGTF (/ Top.CFH-MAGTF (/ Top.CFH-JFLCC (ITWARS, Iraffic) / Top.CFH-JFLCC (ITWARS, Iraffic) / Top.CFH-JFLCC (ITWARS, Iraffic) / Top.CFH-JFLCC (ITWARS, Iraffic) / Top.CFH-JFLCC (Capacity Scenario: T Link Report Device A Nw_Top JFACC.Promina Nw_Top.CFH.Promina Nw_Top.CFH.Promina Nw_Top.CFH.Promina Nw_Top.CFH.Promina	Planning Repo JserGuide_CP_Scenario Device B Nw_TopJFLCC.Promina Nw_TopJFLCC.Promina Nw_TopJFACC.Promina Nw_TopJFACC.Promina	Data Rate (Kbps) 256.00 1,024.00 1,024.00 1,024.00 1,024.00 1,024.00 1,024.00	A->B Circuit Reservation (5) 100.00 75.00 87.50 87.50 887.50 887.50 33.16	B->A Circuit Reservation (%) 100.00 75.00 87.50 87.50 87.50 88.75 33.16	Date: 20	B-2A Data Utilization (%) 40.62 24.40 23.26 24.74 9.79 12.33	Voice Utilizatio (%) 40.6 15.9 6.5 4.5 9.7 1.9

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OSIB

Lab 4: Evaluation and Simulation

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Capacity Planning EvaluationDES IER Reports



Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
- Capacity Planning
- Views and Briefing
- Conclusion



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Logical Views

- Select View > Show Logical Views menu item
- Create network showcases based on
 - Network layer
 - Security classification





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Logical View Selection

Filters

- Limit the included devices
- Security Classifications
 - Limit the included devices
- Time
 - Affect Capacity Planning graphs
 - Duration/Start Time control active traffic
 - Link Capacities may omit overloaded links

🛣 Logical View Selection	
Network Layer Filters	Security Classification Filters
Technology	E Cassification
<u>I</u> P▼	
🔿 UHE DAMA	
Service New	Top Secret
C Link 16	
NPG New	
Net ID New	
C Tactical Radio	
C Transmission Systems	
C Complete Network	
Charle Times 0	0 0
Consider Link Capacities	o sec(s)
Help	Create View Save Settings Close



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Logical Views: Logical Links

- Show indirect connectivity between devices
- Replace multiple physical links
- Select Edit Attributes from right-click menu to find which physical links are represented
- Same routing behavior as Capacity Planner



🗶 Logical Link	Attributes	
Name:	Promina - Promina 11	
Endpoint A:	Nw_Top.JFACC_DATA.cisco4500	
Endpoint B:	Nw_Top.JFMCC_DATA.cisco4500	
Data Rate:	256.00 Kbps	
Туре:	Logical_Link	
Logical Link Com	ponents	
JFACC-Data_Li	nk2	A
CFH-JFACC		
JFMCC-Data_Li	nk1	-
▲		•
☑ <u>S</u> how Hierarch	nical Names	<u>C</u> lose

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DoDAF Visio Reports

Export topology and IERs to Visio

- OV-2
 - OPFACs
 - IERs
- **SV-2**
 - Devices
 - Links
 - Circuits





Scenario Briefing

- Present scenario information at briefings
 - Export scenario information directly to PowerPoint
 - Requires PowerPoint to create slides
 - No need for JCSS to be installed on machine used for briefing
- File > Generate Scenario Briefing





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Standard Map Types

- Import all map types using the View > Background menu options
- Border Maps
 - Default maps
- Image Maps
 - Can be superimposed on a border map
 - Add geographical information in form of satellite or aerial images
 - TIFF or GEOTIFF files
- MapInfo Format (MIF) Maps
 - Add geographical information such as roadways, waterways, regions, and counties
- CADRG and CIB Maps
 - Compressed ARC Digitized Raster Graphics (CADRG)
 - Controlled Image Base (CIB)
 - Common map data format used by other programs, such as Falconview
- CADRG/CIB Workflow
 - Set the CADRG/CIB raster catalog directories
 - Select View > Background > Add CADRG/CIB Raster Catalog Directories...
 - Add one or more CADRG/CIB layers to the subnet
 - Select View > Background > Set Properties...
 - Click Edit CADRG/CIB properties...



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CADRG Example



Lab 5: Views and Briefing

- Logical Views
- DoDAF OV-2 and SV-2 views
- Scenario Briefing



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Agenda

- Introduction
- Unit Laydown
- Infrastructure Deployment
- Traffic Specification
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Roadmap

- **JCSS 10.0**
 - Released June 2010
- **JCSS 10.1**
 - DoDAF Visio Reports enhancements
 - Mobility-based IERs (JFCOM Phase 1)
 - Waveform Translation Gateway model
 - JTRS waveform models
 - WNW
 - SRW
 - Restricted release requires approval
 - Release September 2010
- JCSS 11.0
 - Reviewing new requirements
 - Early 2011



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Obtaining JCSS

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- Obtain JCSS from the JCSS Configuration Manager at DISA
 JCSS@disa.mil
- Available to U.S. DoD personnel upon request at no cost
 - Submit a Justification Form to JCSS PMO
 - JCSS Configuration Manager issues the software
 - For more information, visit the JCSS PMO website at:
 - www.disa.mil/jcss



Support Center

- Information and assistance
 - Tech Support Cases
 - SPRs
 - FAQs
 - User Forums
- Contacts
 - Web http://www.jcss.disa.mil
 - Email jcss@opnet.com
 - Voicemail 240-497-3000 x6699



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Package Files

- Package all files relating to a project
 - Run project on another machine
 - Report problems to Support Center

Use File > Package Project Files menu items

- Project
- Project for JCSS Support
- Custom OPFACs and Organizations



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Documentation References

- Available in Help > Documentation menu
- User Manual Workflow
- Technical Reference Manual Individual menu descriptions
- Model User Guides
- IT Guru Documentation
- Software Release Bulletin
 - New features
 - Reported problems



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CSTIDC

Related OPNETWORK Sessions

- 1582 Planning Tactical Mobile Network Deployments
- 1590 Modeling Tactical Military Communications Using JCSS
- 1376 Introduction to Importing and Modeling Network Traffic
- 1382 Customizing NetDoctor® Rules for Network Auditing and Change Validation
- 1384 Auditing, Troubleshooting, and Documentation using NetMapperTM Diagrams
- 1502 Debugging Simulation Models Introduction
- 1503 Debugging Simulation Models Advanced
- 1530 Modeling Custom Wireless Effects Introduction
- 1580 Modeling Custom Wireless Effects Advanced
- 1586 Building Realistic Application Models for Discrete Event Simulation
- 1587 Introduction to 3D Network Visualizer



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Take-Away Points

Model and analyze networks with military-specific devices

- Tactical radios
- Satellite/earth terminal equipment
- Encryption devices
- Much more
- Perform capacity planning analysis of military networks
 - IERs
 - Promina/IDNX multiplexer circuits
 - Other non-commercial network concepts
- Complete end-to-end assessments to support equipment and infrastructure acquisition activities
- Create briefings to military decision makers
 - Logical views
 - PowerPoint export



OPNETWORK 20