



Cisco Network Planning Solution - SPM Reference SP Guru Release Notes

Software Release 11.5

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Cisco Network Planning Solution - SPM

Reference

SP Guru Release Notes

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OPNET SP Guru 11.5

Release Notes

These release notes give an overview of the differences between OPNET SP Guru Release 11.5 and the previous release. If you are upgrading from a previous release, you should review this document.

Because release notes are sometimes updated after the product documentation is distributed, visit the OPNET website (www.opnet.com/support) often to check for the newest version of these release notes and previous release notes.

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This information is subject to all restrictions set forth in the SP Guru documentation.

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Release 11.5 Description

OPNET SP Guru 11.5 is a significant software update to the OPNET 11.0 software release. This release contains many new features and enhancements to existing capabilities. This release also implements suggestions and fixes many software problems reported in earlier releases.

System Requirements

Be sure to check the latest system requirements on the OPNET website:

www.opnet.com/support

GUI Enhancements

Object Palette Enhancements

The Object Palette has been enhanced to present all available network object models in a tree. You can drag objects directly from the tree view in the same way that you drag objects from the icon view of the Object Palette. However, the Object Palette tree view offers the following additional features:

- View multiple palettes in the same window
- Configure palettes using right-click menu operations
- Display logical groupings of models for quick selection
- Access Device Creator to create custom models

This tree view is now the default style of the Object Palette. You can switch between the tree view and the icon view. Also, you can set the icon view to be the default style by changing the value of a preference. For details, see `network_palette.style` on page SPR-2-62 of the *Reference Guide*.

For more information about the Object Palette, see Object Palettes on page SPU-6-10 of the *User Guide*.

Network Browser Enhancements

The Network Browser has been enhanced to expand its ease-of-use. The new features are as follows:

- When you open the Network Browser, your previous option selections are “remembered”. This enhancement allows you to continue using the settings that you previously defined. (Note that search strings and selected objects are not “remembered”.)

- The checkbox options on the Network Browser can be hidden to save space. To display or hide the checkbox options, click the Settings button. By default, the checkbox options are hidden. Additionally, a new checkbox option has been added—Expand Tree. Using this checkbox expands the Network Browser tree to display nodes and links.
- The view filter includes new options that organize networks logically, rather than hierarchically. The following arrangements are available:
 - BGP AS numbers—Arranges nodes by Autonomous System Number.
 - Device types—Arranges nodes by device type.
 - IP subnetworks—Arranges nodes by IP subnetwork.
 - OSPF areas—Arranges nodes by OSPF address.

When arranged by IP subnetworks or OSPF areas, nodes are identified by IP address, node name, and interface name. When you select a node, all interfaces for that node are selected.
 - Routing protocols—Arranges nodes by routing protocol.
 - Vendor and chassis types—Arranges nodes first by vendor, then by chassis type.
- After importing nodes (for example, device configuration imports (DCI) or VNE Server imports (VNESI)), the Network Browser can be set to open automatically depending on the total number of nodes in the project. Having the Network Browser open after an import can help you find specific nodes, especially if the network is large. The minimum number of nodes for which to automatically open the Network Browser is specified with a preference. For details about this preference, see `show_network_browser_threshold` on page SPR-2-71 of the *Reference Guide*.

For more information about the Network Browser, see Network Browser on page SPU-7-26 of the *User Guide*.

Flexible Map Visualization for Pacific Region

Subnets can now span the International Date Line. A subnet can be defined with a left edge that is west of 180 degrees longitude and with a right edge that is east of 180 degrees longitude. This enhancement is set using a preference. For details about this preference, see `allow_rotated_world_coordinates` on page SPR-2-48 of the *Reference Guide*.

Easier Node Model Selection

Editing the “model” attribute of a node is now easier. Previously, when you edited the model attribute of a node, a long list of models appeared. Now, a dialog box appears that is similar to the Object Palette Tree View. By default, the model being edited is selected in the dialog box. The dialog box makes it easier to find and select the model you want. Additionally, you can access model details and create custom models.

Create Custom Model Enhancement

The Create Custom Model procedure has been streamlined. You can now select a device and define parameters in the same dialog box. For more information about creating a custom model, see *Creating Custom Models with Device Creator* on page SPU-6-73 of the *User Guide*.

Convert Loads to Flows Enhancement

The Convert Loads to Flows operation now provides a graphical interface for defining constraint information to use in the Loads to Flows process. Adding constraint information can produce more accurate conversion results.

Group Nodes into Subnets and Model Assistant Enhancements

The Group Nodes Into Subnets operation has been replaced with a more powerful operation. The new operation includes the following new capabilities:

- Arrange nodes in multi-level subnet hierarchies
- Choose from an expanded list of grouping options, including the ability to group by:
 - AS number
 - OSPF area
 - names (using regular expressions or sub-strings)
- Specify layout and aspect ratio of subnets
- Preview grouping before applying it to your project
- Save the grouping settings to a file and later load the file for re-use
- Apply saved grouping settings to a network using the Model Assistant operation. (This capability is especially useful when a re-imported network includes new nodes.)

For more information, see *Group Nodes into Subnets* on page SPU-6-60 and *Model Assistant* on page SPU-6-50 of the *User Guide*.

Selecting Objects in a Treeview

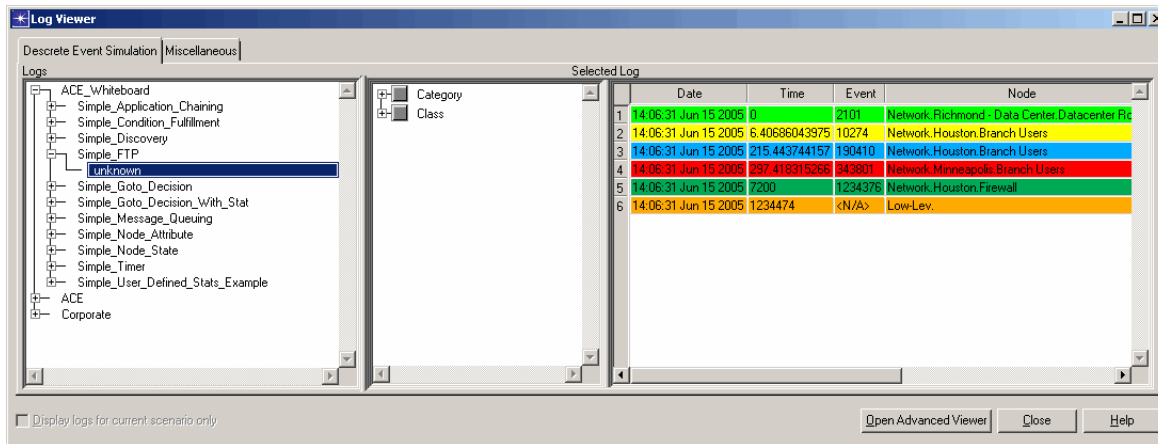
Selecting multiple objects in a treeview has been enhanced to conform to common user interface conventions. To select consecutive objects, click the first object, hold down the Shift key, and then click the last item. All objects between the first and last objects, inclusive, will be selected.

General Enhancements

Log Viewer

A new log viewer provides a central place from which to view SP Guru logs. It replaces the individual viewers formerly used for system and error logs, simulation logs, import logs, and so on.

Figure 11.5-1 Log Viewer



The new log viewer has a set of tabs that let you select the type of log you want to see. A treeview on the left-hand side of the viewer window lists all available logs of the selected type. You can choose to list all logs or only those for the current scenario in the treeview.

The log viewer can display two kinds of logs:

- Text-based logs. These logs open in a single pane.
- Event-based logs. These logs open in two panes (as shown in Figure 11.5-1). The right-hand pane contains the log data, one event per row. Each row has several columns with different information about the event. Using the filter treeview in the left-hand log pane (in the center of the viewer window), you can restrict the displayed events to only those with specific column values.

You can open the log viewer in three ways:

- From the System window:

Choose Help > Show All Logs. (All available logs are listed.)

- From a Project Editor:

Choose Help > Show All Logs. (Only logs for the current scenario are listed.)

- From a specific menu:

Choose the “show logs” operation from a menu such as DES or Flow Analysis. (The corresponding tab is preselected and only logs for the current scenario are listed.)

You can open the current log in an advanced log viewer, which provides additional capabilities. With event-based logs, for example, you can do the following:

- Change which column is used to color-code the log entries and what color is used for each unique value in that column.
- Save the current viewer settings.
- Export the log to a text, comma-separated ASCII, HTML, or XML file.

With text-based logs, the advanced viewer provides all the capabilities of a text-edit pad, including text searches and saving the log to a different file.

Improved MIF Map Imports

The MIF import parser has been improved to support more MIF file versions. Expanded error reporting and an import problem log have also been added. For details, refer to MIF Maps on page SPU-7-7 of the *User Guide*.

License Server Reporting

A new utility lets a license server track license usage statistics and produce statistical reports upon request. When tracking is enabled on the license server, you can generate reports on any client using two new commands in the `op_license_util` application. Both commands let you specify the number of days on which to report.

- `fldb_stats`—Produces license server statistics, including maximum number of concurrent users, maximum number of concurrent licenses in use, and average number of concurrent licenses in use.
- `license_stats`—Produces license file statistics, including license ID (license number, contract number and program name), total time in use, average checkout time, number of checkouts, number of unique users who accessed the file, and user IDs of those who accessed the file.

The report displays on the screen, and a time-stamped `.csv` copy of the file is placed in your `<rel_dir>\op_admin\tmp` directory.

Low Memory Warnings

Guru can now provide warnings when available RAM is growing short. A warning is triggered when an attempt to allocate memory fails. When this happens, the simulation frees any unneeded memory and displays a warning.

Exporting to Visio

Visio files that are exported from OPNET can only be opened in Visio 2002 and Visio 2003. Support for Visio 2000 has been discontinued.

Preferences

The following preferences have been added to SP Guru.

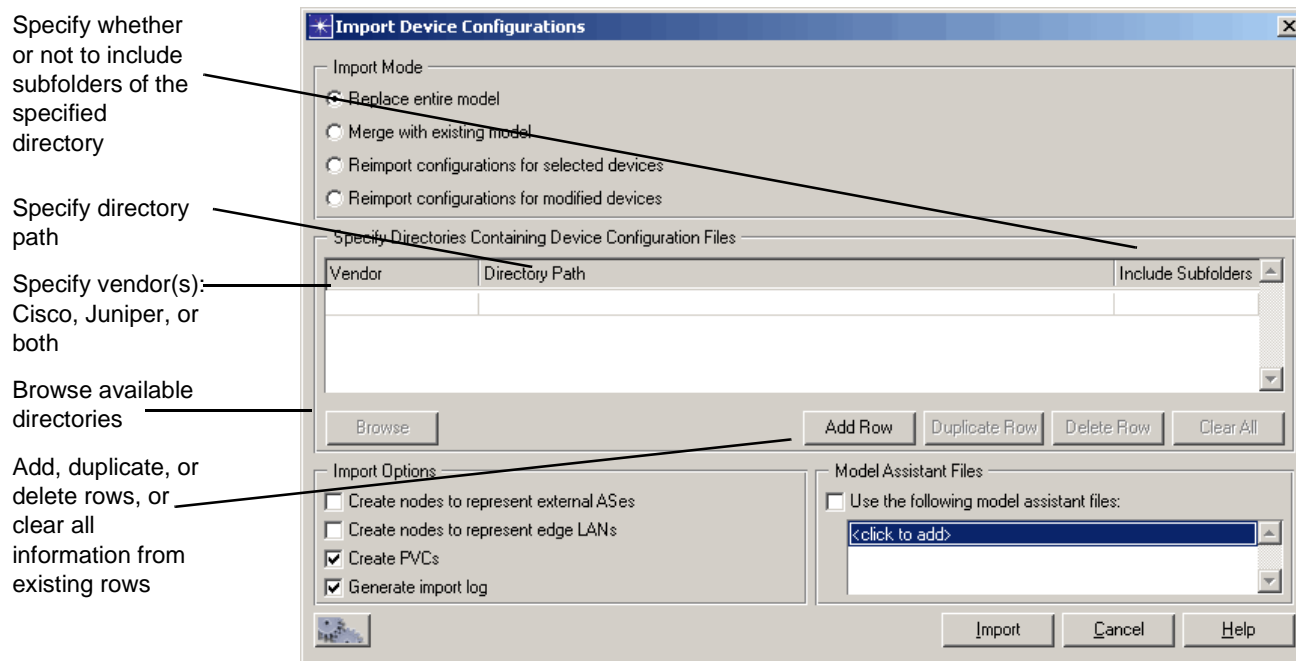
- `allow_rotated_world_coordinates`—Specifies whether subnets with units and 360 degree spans should wrap in the x direction. In other words, this preference allows units to span the International Date Line.
- `flow_spreadsheet_import_filename`—Specifies the default file name used when importing spreadsheet traffic.
- `flow_spreadsheet_import_overwrite`—Specifies the default choice for overwriting traffic when importing spreadsheet traffic.
- `network_palette.style`—Specifies the default style for the Object Palette: Tree View or Icon View. The Object Palette Tree View presents network object models in a tree and allows access multiple palettes simultaneously. The Object Palette Icon View presents network object models with icons and allows access to one palette at a time.
- `show_network_browser_threshold`—Specifies the minimum number of nodes in a project after an import for which the Network Browser automatically displays.

Device Configuration Import Enhancements

Multiple Directory Support

In previous versions of Guru, you could specify one configuration file directory per vendor (Cisco or Juniper). All files for a given vendor had to be placed in the specified directory. With this release, you can specify multiple directories per vendor, giving you greater flexibility for import. With the new dialog box, shown in Figure 11.5-2, you can add, duplicate, or delete rows in the list, or you can clear the information in all rows by using the new buttons provided. A Browse button lets you select your directories from a directory chooser.

Figure 11.5-2 Device Configuration Import Dialog Box



Incremental Device Configuration Import over Import from VNE Server

With this release, you can perform an incremental import of device configuration files to a network model that was originally imported from VNE Server. This gives you the ability to perform “what if” analyses on device configuration files by following this workflow:

- 1) Import your network from VNE Server and include the device configuration files.
- 2) Edit the imported device configurations and save them to new files.

- 3) Import the changed device configuration files using incremental DCI with either the “Reimport configurations for selected devices” or “Reimport configurations for modified devices” option. The attributes for affected devices are reset to default and new attribute values are applied based on information in the configuration files.

Note—During incremental DCI over a model previously imported from VNE Server, no changes affecting topology (such as links and interfaces) are applied. The network preserves the links provided by VNE Server during the initial import.

Enhanced Dual MSFC Support

See Dual MSFCs on page RN-11.5-32 for enhanced support for dual Multilayer Switch Feature Cards (MSFC) on Cisco 6500 multi-layer switches. For more information, see Importing Dual MultiLayer Switch Feature Cards on page SPU-10-76 of the *User Guide*.

New Supported Show Commands

The following commands are now supported:

- PIX
 - show version
- Cisco Catalyst Switches
 - show vlan

Preferences

The following new device configuration import preferences are available.

- device_import.collapse_clouds—Specifies whether or not imported clouds are viewed as a single cloud by collapsing all subnets or as subnet clouds collapsed by protocol. The choices are as follows:
 - Don't Collapse—Default behavior that imports clouds with different IP subnets as separate clouds.
 - Collapse All—Imports all clouds into a single subnet called “Network Cloud”.
 - Collapse per Protocol—Creates cloud nodes in subnets by protocol. ATM clouds are collapsed into a subnet called “ATM Cloud”. Frame Relay and serial clouds are collapsed into a subnet called “Serial Cloud”.

- `device_import.create_serial_cloud`—Specifies whether or not to convert a cloud that is a mixture of Frame Relay, ATM, and serial into a serial cloud. Possible selections are as follows:
 - TRUE: The following mix of interfaces is converted to a serial cloud—ATM + Frame Relay, ATM + Frame Relay + Serial, ATM + Serial, or Frame Relay + Serial.
 - FALSE: ATM + Frame Relay is imported as a combined FR/ATM switch. Other connectivity is not inferred.
 - PARTIAL: ATM + Frame Relay + Serial, ATM + Serial, or Frame Relay + Serial are converted to a serial cloud. ATM + Frame Relay is imported as a FR/ATM switch with no conversion necessary.If Ethernet interfaces are present, no cloud is inferred.
- `device_import.tunnel_cloud_import`—Specifies whether or not to infer Layer-3 IP clouds. Possible selections are as follows:
 - TRUE—This is the default value, which will infer Layer-3 IP clouds based on the tunnel interface information in the import file.
 - FALSE—This option will not infer Layer-3 IP Clouds. Tunnel interfaces will not be connected in the network model when there is no information about Layer-2 connectivity between the interfaces.
- `device_import.import_voip_configuration`—Specifies whether a VoIP device is imported as a multi-service switch or as a router. Possible selections are as follows:
 - ENABLED: (default) If the preference is set to ENABLED, the VoIP device is imported as a multi-services switch. All VoIP configurations are imported, and attributes are set as expected.
 - DISABLED: If the preference is set to DISABLED, the VoIP device is imported as a router. All VoIP configurations are ignored, and a message is created in the import log.

VNE Server Import Enhancements

Dual MSFC Support

See Dual MSFCs on page RN-11.5-32 for enhanced support for dual Multilayer Switch Feature Cards (MSFC) on Cisco 6500 multi-layer switches. For more information, see Importing Dual MultiLayer Switch Feature Cards on page SPU-10-76 of the *User Guide*.

Check Point FireWall-1 Modeling

Check Point FireWall-1 devices can now be imported from VNE Server. Included in this release are the following:

- New device type—“Check Point (Nokia Appliance)”

- Support for Check Point global properties including implied rules, stateful inspection, NAT, and Log and Alert
- Rules in security rule base are mapped to individual access lists in device model
- Support for network address translation (NAT) tables
- Support for automatic ARP configuration in NAT
- Support for bi-directional NAT configuration
- Support for anti-spoofing rules
- Routing configuration for RIP and OSPF are set according to the IPSO configuration for Nokia appliances
- Nokia IPSO access lists are imported as packet filters
- Translation tables support NAT usage in simulations using either Flow Analysis or DES

For more information about importing Check Point FireWall-1 devices, see Importing Check Point FireWall-1 on page SPU-10-53 of the *User Guide*.

Nortel Contivity Support

This version includes limited support for Nortel Contivity VPN gateways. Supported features include the following:

- Routing and network addressing
- Branch-office VPN tunnels
- IPSec
- WAN services, including PPP and Frame Relay

Features that are not supported in this release include stateful firewall, QoS, and user tunnels.

Preferences

Three new or modified preferences support VNE Server import:

- `vne_import.tunnel_cloud_import`
- `vne_import.import_voip_configuration`
- `vne_import.create_serial_cloud`

For details, see the descriptions of the similarly named DCI Preferences on page RN-11.5-11.

Network Difference Report Enhancements

SP Guru includes a new Network Difference Report. Use the new network difference report to identify real-world network differences between two network scenarios, such as network protocol and device configuration. Network difference reports are useful when you want to know exactly how a network has evolved from one scenario to the next or how networks imported from different sources vary. Specifically, the new network difference report identifies the following:

- Device configuration settings for routers, switches, and firewalls
- Logical groups, such as BGP Autonomous System, EIGRP Autonomous Systems, and OSPF Areas

You can access the new network difference report by choosing Scenarios > Network Difference Report. The previously available network difference report and live network difference report have been renamed “Object/Attribute Difference Report” and “Live Object Attribute Difference”, respectively, and are available from the Scenarios menu.

Don't confuse the Network Difference Report and the Object/Attribute Difference Report.

- A Network Difference Report identifies only those differences that are likely to affect network behavior, such as differences in network topology and device configurations.
- An Object/Attribute Difference Report identifies all differences in objects and attributes, regardless of whether those differences affect network behavior.

Note—If using Report Server 2.0 or earlier, Object/Attribute Difference reports will be listed only under the product-specific folder. On the Report Server web page, click on View by Products and then the product name.

Note—When using the Automation module, any 11.0 or earlier automation files created for the Network Difference Report (renamed Object/Attribute Difference Report in 11.5) will still work as expected. In 11.5, the user interface will display the old files under the new name. However, to avoid confusion, the label in the task scheduler dialog box has been changed. Older network difference automation files are converted to the new format automatically and are labeled “Generate Object/Attribute Difference Report”. (Previously, these were labeled “Generate Network Difference Report”.)

For more information about the new network difference report, see Network Difference Reports on page SPU-15-17 of the *User Guide*.

For more information about the Object/Attribute Difference Report (formerly the Network Difference Report) operation, see Object/Attribute Difference Reports on page SPU-15-19 of the *User Guide*.

For more information about the Live Object/Attribute Difference (formerly the Live Network Difference) operation, see Live Object/Attribute Differences on page SPU-7-37 of the *User Guide*.

Traffic Import Enhancements

Unmapped Traffic Flows

With this release, you can assign unmapped traffic flows at any time after the initial import. In prior releases, you had to match unmapped traffic flows to specific nodes using the Unrecognized Traffic Assistant and then reimport the traffic. Unmapped traffic flows are now saved with the network model.

Note—Unmapped traffic flows do not affect design, analysis, or validation results. They must be assigned to specific nodes to have an effect.

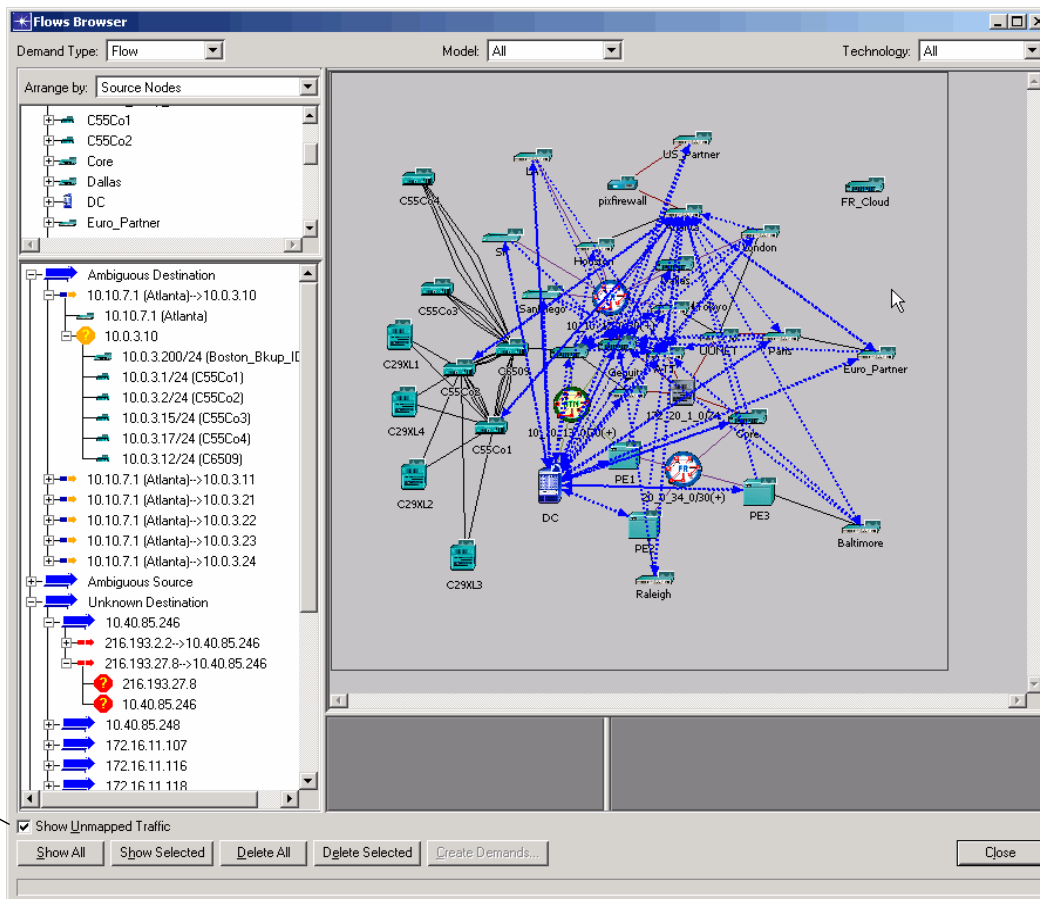
New Unmapped Traffic Workflow

Any time after the initial import, you can view the unmapped traffic in the Flows Browser. By selecting the Show Unmapped Traffic checkbox in the Flows Browser (see Figure 11.5-3), you can assign the unmapped traffic. This release no longer supports auto-assigning unrecognized traffic.

Figure 11.5-3 Unmapped Traffic in Flows Browser

When there is unmapped traffic after an import, the Flows Browser displays the ambiguous and unknown sources and destinations.

Select the Show Unmapped Traffic checkbox any time after the import to assign unmapped traffic flows.



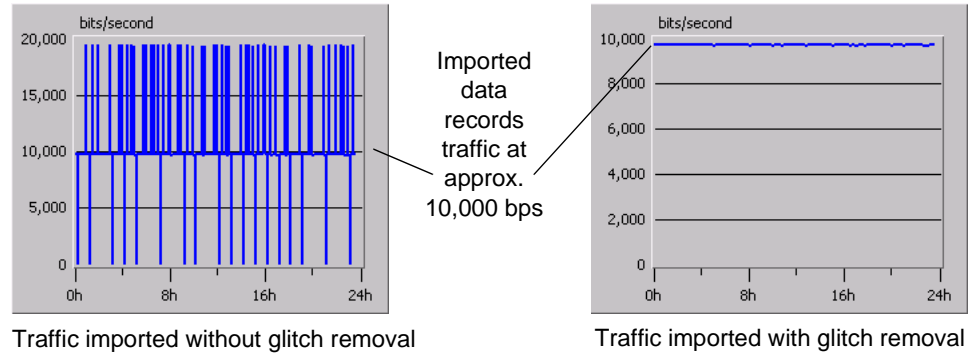
For more information about working with unmapped traffic, see Unmapped Traffic on page SPU-11-21 of the *User Guide*.

ToS Aggregation of Flows from NetScout nGenius

Traffic-flow imports now support ToS aggregation. The Import Traffic Flows dialog box (Traffic > Import Traffic Flows > From NetScout nGenius) includes an “Include Type of Service in Aggregation” option. If this option is enabled, the import engine divides traffic into separate flows based on ToS levels.

Glitch Removal of Imported Traffic/Link-Load Data

The traffic import engine now accounts for possible glitches in traffic data due to clocking issues. In previous releases, clocking inconsistencies could result in intermittent fluctuations in traffic levels. The current release factors out these fluctuations without affecting actual changes in traffic levels.

Figure 11.5-4 Effects of Glitch Removal on the Same Traffic Data

Guru applies glitch removal only to data in which the traffic was recorded at uniform intervals (for example, every 10 seconds). Specifically, Guru applies glitch removal to the following types of data:

- Traffic flows from NetScout nGenius
- Link loads from Concord, InfoVista, HPOV Performance Insight, and MRTG

Two preferences are included to control the glitch-removal behavior:

- `traffic_import_glitch_removal` (boolean)—If TRUE, the import engine performs glitch removal on imported traffic. This preference is TRUE by default; there is no reason to set this to FALSE unless you want to see how turning off this behavior affects the imported traffic, or to match the import behavior in previous releases of Guru.
- `traffic_import_glitch_removal_multiple` (double)—The multiple used when rounding the time values during glitch removal. In most cases, you can leave this preference at its default setting. If the clock used when capturing the traffic was very inconsistent, however, you might need to set this to a higher value. (In general, larger clock inconsistencies result in larger glitches when the data is imported into Guru.)

Discrete Event Simulation

Radio Transceiver Pipeline Changes

The default radio transmitter antenna gain (`dra_tagain`) and radio receiver antenna gain (`dra_ragain`) stages have been modified to work with both right-handed and left-handed reference frames. In addition, support for an ellipsoid earth model has been added. For details, see Default Transmitter Antenna Gain Model (`dra_tagain`) on page WM-10-52 of the *Wireless Module User Guide*.

Dual MSFC Devices

See Dual MSFCs on page RN-11.5-32 for discrete event simulation (DES) support for Cisco 6500 dual Multilayer Switch Feature Cards (MSFC).

AODV Hello Efficiency

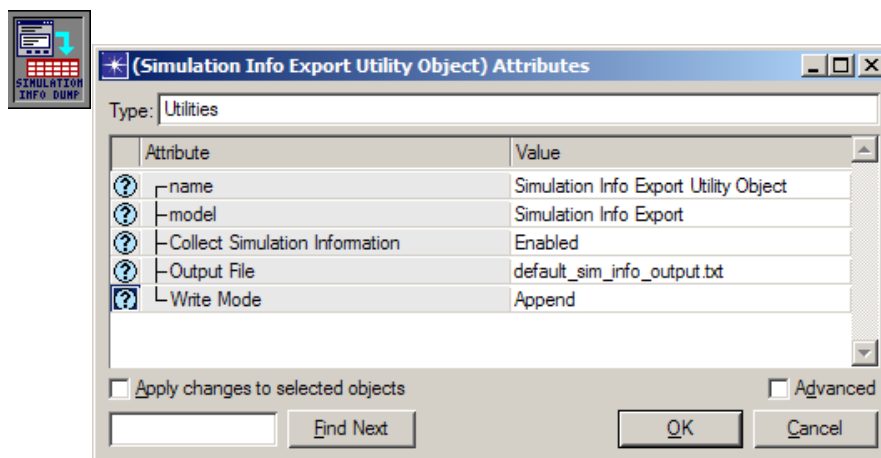
The default value for the DES global attribute, “AODV Hello Efficiency”, has changed to “disabled”. This attribute is used in MANET models using the AODV routing protocol to control the exchange of hello messages between neighbors. If the value is set to “disabled”, the neighbors may exchange periodic hello messages, allowing for the detection of link failures. Therefore, you may notice increased AODV control traffic and simulation run-time due to increased traffic between neighbors.

Simulation Information Reporting

A new utility object lets you save the details of a discrete event simulation to a text file, which can be opened in a spreadsheet program (recommended) or text editor. The output file records the following information about a simulation:

- Number of seconds needed to run
- Number of events
- Amount of memory used
- Simulation duration
- Project and scenario name
- Build of core software used
- Location of output file
- Time that simulation was run

Figure 11.5-5 Simulation Info Export Utility



By default, the output file is named `default_sim_info_output.txt`, but you can specify a different file name. The output file is always stored in the same directory as the project. You have the option of creating a new file each time you run a simulation or appending the information from new simulation runs to an existing file. The following table briefly describes the configuration options available for this feature.

Table 11.5-1 Attributes of the Simulation Info Export Utility Object

Attribute	Description
Collect Simulation Information	Turns this export feature on or off.
Output File	Name of the file that stores the simulation information. If the file does not yet exist, it is created at the end of the next simulation. The output file is created in the same directory as the project file.
Write Mode	Specifies whether or not information from previous simulations is retained in the output file. <ul style="list-style-type: none"> • <i>Overwrite</i> discards the existing output file (if available) and creates a new file that contains information from the latest simulation only. • <i>Append</i> adds the information from the latest simulation to a new row at the end of the existing file. A new file is created if one does not already exist.
End of Table 11.5-1	

If you use the default settings for this utility in all your simulations, a single output file is used to store the simulation information from all scenarios in the same model directory. Using the default settings results in larger output file sizes over time, but lets you store information from many simulation runs—and across multiple scenarios—in a central location.

Flow Analysis Enhancements

Standard and Specialized Model Suites

The Flow Analysis module has been enhanced to support new features in the following model suites. Details can be found in the Model Library Enhancements section of this document.

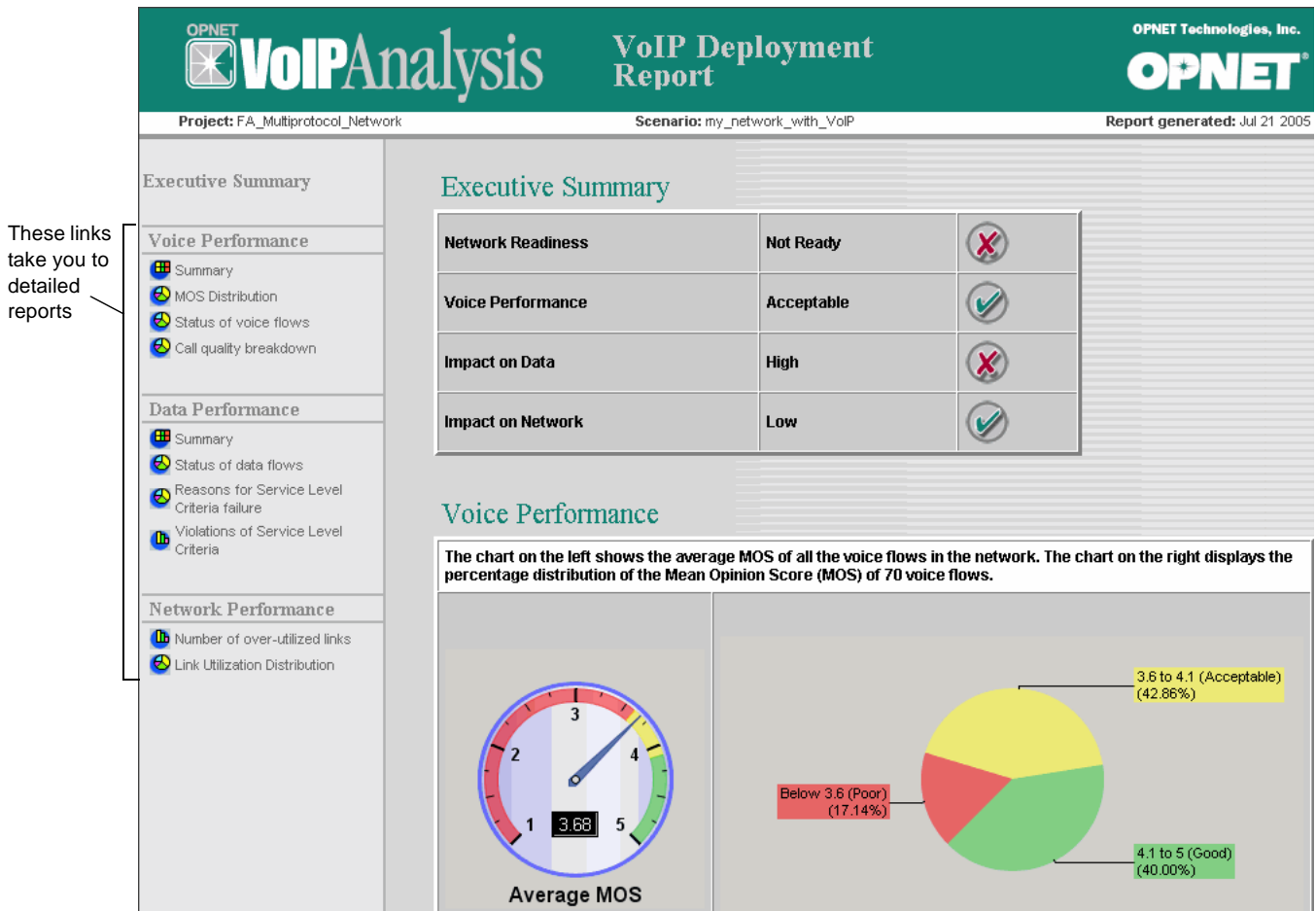
- ATM Enhancements on page RN-11.5-32
- Dual MSFCs on page RN-11.5-32
- IP Model Enhancements on page RN-11.5-34
- IP QoS Enhancements on page RN-11.5-34
- MPLS Model Enhancements on page RN-11.5-35

VoIP Readiness Assessment

The Flow Analysis module now includes a utility that lets you analyze the impact of voice over IP (VoIP) traffic on an existing network.

The VoIP Readiness Assessment workflow uses an easy-to-use interface that guides you through the set up and configuration of VoIP traffic in a network. You can deploy new (proposed) flows or analyze only the existing VoIP flows in the network. The assessment uses several iterations of flow analysis and one or more design actions to generate a comprehensive web report on the network's readiness for VoIP traffic deployment.

Figure 11.5-6 Web Report VoIP Readiness Assessment



In addition to the web report, you can also view the results of the flow analysis and design action runs.

For additional information, see Chapter 5 Using VoIP Readiness Assessment on page FA-5-1 of the *Flow Analysis User Guide*.

New Module: ACE Advanced Console

The ACE Advanced Console enables you to perform “continuous captures” of application traffic. Continuous captures are useful when you are troubleshooting an intermittent problem in your network or application: you cannot predict when the problem will occur, and therefore do not know exactly when to start or stop a capture in order to catch the problem. To address this case, you can configure agents to perform continuous captures. When the problem of interest occurs, you can examine the captured traffic in ACE, find traffic that relates to the problem, and download a capture file that includes only the relevant traffic.

For more information, see Chapter 5 Continuous Captures with the ACE Advanced Console on page ACE-5-1 of the *ACE User Guide*.

ACE Module Enhancements

Visualization Enhancements

ACE includes a new Visualization operation (View > Visualization) that enables you to apply different coloring and labeling schemes to the Data Exchange Chart. You can apply different visualization schemes to highlight different types of information in a transaction. This release includes four different visualization schemes:

- Size—Color packets/messages by application payload size (the visualization used in previous versions of ACE)
- Size and Retransmissions—Color packets/messages by application payload size; label retransmitted packets in the Network chart
- TCP—Color network packets based on retransmissions, dataful packets, and SYN/FIN/ACK messages; label retransmitted packets in the Network chart
- HTTP—Color packets/messages based on HTTP response-code type, Get/Put message, and transmitted data.

You can configure the HTTP visualization to label specific packets/message of interest (choose View > Configure Current Visualization with the HTTP visualization selected).

ACE Decode Module (ADM) Enhancements

Updated Decode Engine

ACE now uses Ethereal to provide detailed protocol decodes of over 700 protocols. New decodes include FIX, VoIP, and SSL.

HTTP Decode Enhancements

The HTTP decoder includes the following enhancements:

- Enhanced decode summaries—In some cases, the decode summary shows additional information (such as “[Chunked],” “[Incomplete Chunk Data],” “[Partial Entity Body],” or “[Incomplete Entity Body]”) that shows how a packet was transmitted.
- Enhanced decode details—Decode details show additional information, especially about chunking behavior.
- Normalized HTTP headers in decode details—This means that header names always appear in lowercase, colons (:) are used for nonstandard name/value separators, and extra spaces are removed.
- HTTP pipelining support—The HTTP decoder and transaction analyzer now support pipelined HTTP messages. This means that
 - Decode summaries indicate packets that contain multiple requests or responses.
 - The same application messages might appear in more than one transaction.
 - The decode details include additional information about each request or response.

QuickView Enhancements

The QuickView window now includes an enhanced set of protocol-filtering options and a time slider. This makes it easier to filter out packets that are outside the time window of interest or do not contain a specific protocol.

Capture-Agent Enhancements

The 3.1 versions of the capture agents are now available for Windows and Solaris. These agents support encrypted captures and include many problem fixes. In addition, 3.1 agents are available as beta releases for the following platforms:

- HP/UX
- Mac OS X
- Linux 2.4 and 2.6 kernel (PathProbe is not supported for the 2.6 kernel)

To obtain a beta agent, contact OPNET Technical Support (e-mail support@opnet.com or go to <http://www.opnet.com/support>).

Japanese Language Reports

ACE can now generate Japanese-language versions of ACE MS Word reports, ACE Multiple-Transaction reports, and ACE Comparison reports. ACE also includes an open reporting architecture that enables you to add custom support for other languages.

Miscellaneous Enhancements

This release also include the following enhancements:

- Estimating tier locations estimate during import—The Specify Tier Locations dialog box now includes an Estimate Locations button. When you click this button, the import engine estimates whether each tier is local or remote to the capture agent (based on the delay times of ACK messages). This feature helps automate the import workflow and makes it easier to create accurate ACE files.
- Go to Frame operation—The Find Packets (Edit > Find Packets) dialog box now includes a Go to Frame field that you can use to view packets in the Protocol Decode Viewer.
- Excluding/deleting other packets/messages in the Protocol Decode Viewer—You can now exclude and delete other packets/messages when the “Group by” option is set to Frames.

Automation Module Enhancements

Automated Import of Traffic Flows from Spreadsheet Files

With an Automation module license, importing traffic flows from a spreadsheet file can now be automated by creating an automation task. To create an automation task, choose Traffic > Import Traffic Flows > From Spreadsheet... For more information, see Viewing and Editing Traffic Flows in a Spreadsheet on page SPU-11-31 of the *User Guide*.

This enhancement includes the following new spreadsheet import preferences:

- flow_spreadsheet_import_filename—Specifies the default file name used when importing spreadsheet traffic.
- flow_spreadsheet_import_overwrite—Specifies the default choice for overwriting traffic when importing spreadsheet traffic.

NetDoctor Enhancements

Reporting Enhancements

Device-Centric Reports

This release now supports device-centric reporting for all report types. You have the option to view device-centric information from a tab on a web report or to select and view a device-centric MS Word report (in concise or detailed formats) as an output format. Device-centric reports display the list of rules that are violated for each device. See Table 11.5-2 for a list of the available report types and formats by release.

Table 11.5-2 Available Report Types and Formats

Report Type	Format	Available in Release
Rule-Centric Detailed	MS Word	10.0 or later
	Web	10.0 or later
Rule-Centric Concise	MS Word	New in 11.5
	Web	11.0 or later
Device-Centric Detailed	MS Word	New in 11.5
	Web	New in 11.5
Device-Centric Concise	MS Word	New in 11.5
	Web	New in 11.5
End of Table 11.5-2		

Enhanced Visual Display for Pie Graphs and Bar Charts

NetDoctor supports a new charting package for enhanced visual display for both pie and bar charts.

Internationalization

NetDoctor now supports both Web and MS Word reports in languages other than English. Download the available language libraries from the OPNET Support Center (www.opnet.com/support). Check for the latest versions of the libraries after new releases of the OPNET software. The most up-to-date language libraries may lag the most recent OPNET software release.

Report Comparison

NetDoctor Report Comparison in this release is not valid for reports generated from previous releases. If you enable Report Comparison using a report generated from a previous release, the resulting report shows all rule output as different. Enable Report Comparison only for reports generated by this release.

Notification Plug-ins

The Notification plug-ins no longer require an Automation module license.

This release provides three new notification plug-ins (see Table 11.5-3).

Table 11.5-3 Available Notification Plug-ins

Notification Plug-in	Available in Release
Email (SMTP)	10.5 or later
SNMP Trap	New in 11.5
Syslog	New in 11.5
Trouble Ticket (Remedy)	New in 11.5
End of Table 11.5-3	

If you want NetDoctor to send other types of notifications, you can write your own plug-in using the open notification architecture. Notification settings appear on the Notification tab in the Configure/Run NetDoctor dialog box.

This release has a new advanced checkbox in the Notification tab of the Configure/Run dialog box. When you select this checkbox, additional parameters are available to edit.

NetDoctor Rules

Device Configuration File Validation Rules

Device configuration file validation rules now support matching commands in specific sections of configuration files. For example, you can now specify match or no match commands for specific types of interfaces in your network.

Rule Removed

The Organizational Policies: Missing Prefix Filters rule has been removed. If you are currently using this rule, please contact OPNET Technical Support (e-mail support@opnet.com) for more information.

Customizing NetDoctor

Charting

NetDoctor supports a new charting package with enhanced visual display for both bar graphs and pie charts. NetDoctor utility functions for creating bar graphs and pie charts have been updated to use the new package.

API Enhancements

This release supports the following new functions and methods:

- *Ip.default_redist_metric_exists()*
- *Ip.get_default_redist_metric()*
- *Node.get_machine_type()*
- *Node.vendor_model()*

The API documentation has been reorganized into four general categories: Model Access, IP Graph, Reporting, and Simulation.

Planning and Design Enhancements

New Design Action: IP QoS Configuration

You can use the `ip_qos_configuration` design action to configure IP QoS parameters on routers in the network model. You can define QoS configuration templates and apply them to specific nodes and interfaces. QoS definitions in the design action (of traffic classes, traffic policies, queue profiles, and interface QoS schemes) are added to, but do not replace, existing definitions in the network. The only exception is if two definitions have the same name; in this case, the design action overwrites the existing definition.

New Design Action: IP QoS Queue Sizing

You can use `ip_qos_queue_sizing` design action to size the queue bandwidths or weights on IP interfaces based on the queue load and queue configuration rules. This design action uses Flow Analysis to compute the offered load to each queue based on the traffic flow. The design action attributes control how different queues are sized.

New Design Action: MPLS Differentiated-Service-Aware Traffic Engineering

The `mpls_ds_te` design action is an enhanced version of `mpls_te`. In `mpls_ds_te`, the LSP bandwidth request is specified with a bandwidth class type. Each interface defines the amount of bandwidth available for each class type. The node defines a bandwidth model that controls the rules for allocating bandwidth to each class type. The `mpls_ds_te` design action determines primary and (optionally) secondary explicit routes that conform to the constraints specified by the relevant class type.

Enhanced Export for `mpls_er_configlet_generation`

In previous releases, this design action exported only the MPLS commands that directly related to explicit route information. In this release, you can now choose to export MPLS commands related to bandwidth requests and LSP destination addresses as well. To specify the information you want to export, set the `Commands` attribute.

New Design Action: Project Pricing Reporter

You can use the `project_pricing_reporter` design action to generate detailed cost reports for proposed upgrades, build-outs, and other project plans. You can create highly detailed cost models, then apply a cost model to the links and nodes in a scenario. The `project_pricing_reporter` design action then generates a detailed report based on the cost model and the current network.

For more information, see Chapter 13 Project Pricing Reporter on page DA-13-1 in the *Planning and Design User Guide*.

Viewing Results and Log Messages from Previous Runs

In previous releases, you could view results and log messages for the last run only. Now you can view results and log messages for different design action runs from the current Guru session or from previous sessions. The names of both the result files and the log files include the project-scenario and the design action. This means that you can view results/logs for different design action runs (if you run the same design action multiple times in the same scenario, however, only the last run is saved).

To support this enhancement, the Design > Results submenu has options for viewing the latest results/logs (View Latest Log and View Latest Results) and for viewing results from previous runs on the current project/scenario (View Logs and View Reports).

For more information about the operations available on the Design > Results submenu, see Design Menu on page DA-1-3 of the *Planning and Design User Guide*.

Format for `link_pricer_custom_db`

The format for the `link_pricer_custom_db` file is now documented in the `link_pricer_custom_db_example.gdf` file. To view this file, do the following:

- 1) Choose File > Open.
- 2) From the “Files of type” pull-down menu, select Generic Data File.
- 3) Select the Show all files of type “Generic Data File” checkbox to list all `.gdf` files.
- 4) Select the `link_pricer_custom_db_example.gdf` file and click the Open button.

Additionally, the product ships with a sample project (Greenfield_Design) that demonstrates the use of the link pricer custom database.

SWIM (SP Guru/WDM Guru Integrated Modeling) Enhancements

Multi-Layered Failure Analysis

This release integrates SP Guru and WDM Guru Failure Analysis so you can now generate more robust, multi-layered (layer-1/layer-2/layer-3) failure scenarios. You can model failures of transport-layer entities, and generate reports that show which layer-2/3 traffic demands were failed, delay-impacted, and rerouted as a result of the specified failures.

Transport Link Pricer

This upgrade includes a new `transport_link_pricer` design action, which calculates the financial cost of SP Guru links that are mapped to WDM Guru connections. This design action considers the routes taken by connections in the WDMG network and transport-layer costs such as cables, fibers, amplifiers/regenerators, and trunk/tributary ports. As a result, you can generate more accurate cost estimates for SP Guru links.

Terrain Modeling Module

Several enhancements have been made to TMM.

Improved Simulation Performance

Simulation performance when using detailed terrain data (for example, 10-meter resolution) has been significantly improved.

Updated Longley-Rice Algorithm

The algorithm used for the Longley-Rice propagation model has been updated from version 1.2.1 to 1.2.2.

CADRG/CIB Map Support

TMM enables you to display CADRG (Compress ARC Digitized Raster Graphics) and CIB (Controlled Base Image) data in the Project Editor. A background display based on actual geographical data can enhance the visual appearance of networks and make it easier to place objects in the correct geographic locations.

For more information, see *Displaying CADRG and CIB Maps* on page TMM-2-12 of the *Terrain Modeling Module User Guide*.

TIREM Module

The TIREM module now contains the TIREM4 propagation model in addition to TIREM3. TIREM4 is an optimized version of TIREM3 that provides faster computation of path loss values, especially for detailed terrain profiles. Owners of the TIREM module will have access to both TIREM3 and TIREM4 wherever a propagation model can be selected.

For more information about TIREM, see TIREM Propagation Model on page TMM-2-4 of the *Terrain Modeling Module User Guide*.

Wireless Module

A new preference—`network_visualization.hide_trajectories`—controls display of trajectories in the GUI.

3DNV Module Enhancements

Simplified Entity Mapping

Adding the 3DNV mapping extended attribute to nodes and subnetworks is now as simple as choosing Topology > 3DNV > Add '3DNV' Mapping Attribute to Selected Nodes. For details, refer to Default OPNET/3DNV Mapping on page AV-5-3 of the *Animation Viewers Reference Manual*.

Visualization of Site Trajectories

In Planning Mode, you can now use 3D Network Visualizer to view the trajectories assigned to network sites. This lets you see the trajectory a site will follow in direct relation to the terrain being traversed. A trajectory displayed in 3D Network Visualizer is automatically updated when the site is moved or the trajectory is edited in Guru. For details, refer to Visualizing Trajectories in the 3D Network Visualizer on page AV-5-7 of the *Animation Viewers Reference Manual*.

Faster Entity Attachments

When using 3DNV in Planning Mode, you can quickly switch the Visualizer window to a specified entity by right-clicking on the corresponding object in Guru and selecting the new “Attach to Entity in 3D Visualizer” operation.

Preferences

The following new 3DNV preferences are available in Guru:

- `3dnv.max_request_rate`—Specifies the maximum number of animation requests per second sent to 3D Network Visualizer. This setting can help prevent 3DNV from becoming overloaded by too many messages in a short period of time.
- `3dnv.show_opnet_overlay`—Specifies whether SP Guru-specific overlay information (such as the network name) should be shown in the 3D Network Visualizer window.
- `3dnv.trajectory_sampling_distance`—Specifies the size of the line segments used to draw trajectories whose altitude is relative to terrain altitude.
- `3dnv.trajectory_thickness`—Specifies the thickness (in pixels) of the lines used to represent a trajectory.

Model Library Behavior Changes

Default Metrics for Redistribution

Most imported and manually created projects will generate different results because of new values for the default metrics used for redistribution. For example, flows that were routable in previous releases might no longer be routable.

Unless metrics have been explicitly defined in the device configuration files for imported devices or manually in the Redistribution attribute, the following metrics are used for redistribution. In Table 11.5-5, “None” indicates that redistribution does not occur—even if redistribution is enabled.

**Table 11.5-4 Default Redistribution Metrics for all Routers (Except Juniper)
(Part 1 of 2)**

	Redistribution Into				
	BGP	EIGRP/IGRP	ISIS	OSPF	RIP
BGP	n/a	none	0	1	none
EIGRP/IGRP	same as RP ¹	native metric	0	20	none
ISIS	same as RP ¹	none	same as RP ¹	20	none
OSPF	same as RP ¹	none	0	same as RP ¹	none
RIP	same as RP ¹	none	0	20	same as RP ¹
Connected	0	formula ²	0	20	0

**Table 11.5-4 Default Redistribution Metrics for all Routers (Except Juniper)
(Part 2 of 2)**

	Redistribution Into				
	BGP	EIGRP/IGRP	ISIS	OSPF	RIP
Static	0	256/1	0	20	0
End of Table 11.5-4					

¹ Same as redistributed protocol.

² There is a factor of 256 between IGRP and EIGRP in the composite metric computation.

Table 11.5-5 Default Redistribution Metrics for Juniper Models

	Redistribution Into				
	BGP	EIGRP IGRP	ISIS	OSPF	RIP
BGP	n/a	n/a	10	same as RP ¹	1
EIGRP/IGRP	n/a	n/a	n/a	n/a	n/a
ISIS	same as IGP ²	n/a	same as RP ^y [tblFootnote] >	same as RP ^y [tblFootnote] >	1
OSPF	same as IGP ^y [tblFootnote] >	n/a	same as RP ³	same as RP ^y [tblFootnote] >	1
RIP	same as IGP ^y [tblFootnote] >	n/a	same as RP ^y [tblFootnote] >	same as RP ^y [tblFootnote] >	same as RP ^y [tblFootnote] >
Connected	0	n/a	10	0	1
Static	0	n/a	10	0	1
End of Table 11.5-5					

¹ Same as redistributed protocol.

² Same as IGP route metric.

³ Same as redistributed protocol (max 63)

Default Interface Information for Cisco Routers

The following parameters (bandwidth, delay, MTU, reliability, load) are used to compute the default metric when redistributing directly connected interfaces into EIGRP/IGRP. Bandwidth and delay are dependant on the interface type.

**Table 11.5-6 Default Values for Calculating Redistribution Into EIGRP/IGRP
(Part 1 of 2)**

	Bandwidth (Mbps)	Delay (µsec)	MTU (bytes)	Reliability	Load
Eth/Fasteth/Giga	10/100/1,000	1,000/100/10	1,500	255	255
FDDI	100	100	4,470	255	255

Table 11.5-6 Default Values for Calculating Redistribution Into EIGRP/IGRP (Part 2 of 2)

	Bandwidth (Mbps)	Delay (µsec)	MTU (bytes)	Reliability	Load
Token Ring	4/16	100	4,464	255	255
ATM	25	80	4,470	255	255
FR	1.544	20,000	1,500	255	255
IP	1.544	20,000	1,500	255	255
Loopback	8,000	5,000	1,514	255	255
Tunnel	0.9	500,000	1,514	255	255
VLAN	10	1000	1,500	255	255
End of Table 11.5-6					

Send-Community Attribute for BGP-MPLS VPNs

In this release, discrete event simulation now explicitly checks the BGP send-community attribute to determine whether to keep or strip the route target extended communities from BGP updates on BGP-MPLS VPNs. This behavior in the model is the same as the behavior on production networks.

Model Assistant File Conversion

If you have a model assistant file containing networks imported through device configuration import (DCI) from previous versions of Logger, you must convert your file prior to using it in 11.5. A new conversion utility, `op_ma_conv`, is included in 11.5. The following flags are available to convert individual files, a list of files, or all files:

Table 11.5-7 Flags for op_ma_conv Utility

Flag	Usage
-all	(default) Converts all model assistant files in the model directory. If no flag is provided, the utility converts all files.
-m <model name>, <model name>, ...	Provide individual filename or a list of filenames separated by commas. Enter the filename without the .ma extension.
End of Table 11.5-7	

WARNING—If you do not convert your pre-11.5 model assistant files containing networks imported through DCI, they will not work in 11.5.

Model Library Enhancements

ATM Enhancements

The ATM model suite now includes the following features for flow analysis (no change to supported features for discrete event simulation).

- Slot-port support
- Per-class load balancing for Nortel devices
- New reports on delays for PVCs

Dual MSFCs

Support for Cisco Catalyst 6500 multi-layer switches with dual Multilayer Switch Feature Cards (MSFCs) is enhanced for device configuration import (DCI), Virtual Network Environment (VNE) Server, discrete event simulation (DES), and flow analysis. These multi-layer switches are imported as a multi-module switch type device and are used in DES and Flow Analysis.

Two new “show” commands are supported that allow you to model dual MSFCs:

- show module
- show redundancy

Redundancy information and configuration attributes of the non-designated MSFC in the dual configuration are now stored in the new MSFC compound attribute.

DES and Flow Analysis

DES and Flow analysis support dual MSFCs with the following requirements:

- “Config-sync” is enabled.
- MSFC failover in the network model is not supported; both MSFCs are assumed to be up or both MSFCs are down.
- Routing simulates a network that has either both MSFCs running (with no failover) or both MSFCs down (device failure).

IP routing:

- Both MSFCs can serve as sources/destinations to simulate the following:
 - ICMP (ping)
 - IP traffic flows

For HSRP:

- One HSRP process runs on the device using the MSFC with the higher interface priority.
- HSRP uses the preemption status and delay of the MSFC with the higher interface priority (DES only).
- The HSRP traffic sent from the dual MSFC is half the traffic seen in the live network (DES only).

For BGP:

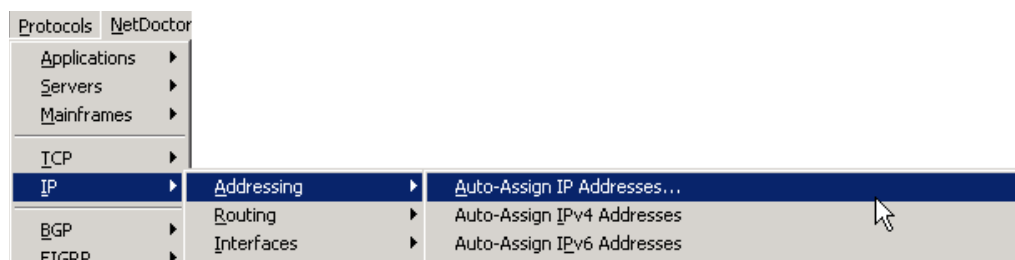
- There is one incoming and one outgoing BGP connection on the designated MSFC for each BGP neighbor.
- No BGP process runs on the non-designated MSFC.
- The BGP control traffic is less than the traffic seen in the live network (DES only).
- The simulation uses the policies configured on the designated MSFC for both BGP neighbors.

IP Model Enhancements

The IP model now supports the following enhancements:

- Ability to compare forwarding tables generated from the following sources: operation network, flow analysis, and discrete event simulation. The reports generated by the comparison let you organize the changes (mis-matches, additions, and deletions) from a prefix perspective or a device perspective. To compare forwarding tables, choose IP > Routing > Forwarding Table Comparison.
- New menu operations for auto-addressing IPv4 and IPv6 interfaces under Protocols > IP > Addressing.

Figure 11.5-7 IP Automatic Addressing Options



For additional information on these features, see Chapter 9 IP Model User Guide on page STM-9-1 of the *Standard Models User Guide*.

IP QoS Enhancements

The IP QoS (Quality of Service) model suite now supports flow analysis. In previous releases, this model supported only discrete event simulations. If you have already configured QoS in a network model, no additional configuration is needed to run flow analysis instead of discrete event simulation.

For additional information about the current model, see Chapter 11 IP QoS Model User Guide on page STM-11-1 of the *Standard Models User Guide*.

IPv6 Model Enhancements

The IPv6 model includes the following enhancements:

- Ability to automatically assign IPv6 link-local and global addresses to the physical and loopback interfaces of all nodes in network
- Ability to configure traffic demands between IPv6 interfaces
- Support for OSPFv3 as a routing protocol for IPv6 networks
- New visualization options:
 - Ability to view the interfaces running IPv6 in the Project Editor workspace
 - Ability to view the IPv6 tunnels configured in the network in the Project Editor workspace
- New menu operations under Protocols > IP > IPv6 to simplify IPv6 configuration:
 - Auto-Assign IPv6 Addresses
 - Clear IPv6 Addresses
 - Configure Interface Status
 - Enable IPv6 on All Interfaces
 - Enable IPv6 on All Interfaces

For additional information on these features, see Chapter 3 IPv6 Model User Guide on page SPM-3-1 of the *Specialized Models User Guide*.

MANET Model Enhancements

The MANET model has been enhanced to support the following:

- Support for OLSR in IPv6 networks

MPLS Model Enhancements

The MPLS model has been enhanced to support the following:

- DiffServ-aware traffic engineering

- Improved workflow for deploying MPLS VPNs
- Inter-domain routing (flow analysis only)
 - Inter-area LSPs (for Cisco routers)
 - Inter-AS LSPs (for Juniper routers)
 - Cross-connect circuits, CCCs (for Juniper routers)

For additional information on these features, see Chapter 5 MPLS Model User Guide on page SPM-5-1 of the *Specialized Models User Guide*.

SMART MAC

The new SMART MAC model provides an abstraction to the Wireless MAC and PHY layers. The model includes the following features:

- Medium access contention delays due to:
 - Retransmissions caused by interference, radio frames collision and other physical layer effects
 - Backoff effects
- Packet drops due to:
 - Retransmission threshold
 - Buffer overflow
 - Collisions due to hidden nodes
- Reachability changes due to node mobility and node transmission ranges.

For additional information about the SMART MAC model, see Chapter 23 SMART MAC Model User Guide on page STM-23-1 of the *Standard Models User Guide*.

OSPF Model Enhancements

The OSPF model suite now supports OSPFv3. OSPFv3 is the version of OSPF used in IPv6 networks. Previously, the model supported only OSPFv2, which is the version of OSPF used in IPv4 networks. Like the IPv6 model suite, OSPFv3 is supported for discrete event simulations only. Flow analysis does not support OSPFv3 at this time.

The following OSPFv3 features are supported:

- Point-to-Point, Broadcast, Point-to-Multipoint, and Non-broadcast interface types
- Multiple areas

- Area summarization
- Link-state database export

Use the following steps to configure an IPv6 interface to use OSPFv3:

- 1) Enable OSPFv3 for the IP > IPv6 Parameters > Interface Information > Routing Protocols attribute for the interface.
- 2) Set the OSPF version to “v3” for the OSPF process running on the interface. The version attribute is located under IP Routing Parameters > OSPF Parameters > Processes > Version.
- 3) For routers that use IPv6 only (no IPv4 interfaces), specify the Router ID attribute.

For additional information about the OSPFv3 model, see Chapter 18 OSPF Model User Guide on page STM-18-1 of the *Standard Models User Guide*.

Wireless LAN Model Enhancements

The Wireless LAN model has been enhanced to support the following:

- HCF EDCA. The HCF EDCA mechanism of IEEE 802.11e is now supported. You can configure HCF parameters in the new Wireless LAN Parameters > HCF Parameters attribute. Many of the Wireless LAN global and node statistics can now be collected according to HCF access categories. These statistics appear in a new statistic group, WLAN (Per HCF Access Category).
- QoS. The QoS facility of IEEE 802.11e is now supported.
- WLAN Beacon Transmission Count. The WLAN Beacon Efficiency Mode simulation attribute has been replaced by the WLAN Beacon Transmission Count simulation attribute. The new attribute still lets you disable beacons in Wireless LAN networks. This is useful in an infrastructure BSS, where periodic beacons are not needed. To enable this efficiency feature (and limit the number of regular beacons), set this attribute to the number of beacons to transmit during the simulation. A value of “Periodic” disables this efficiency mode and corresponds to a value of “Disabled” for the old attribute.

The attribute and statistic changes mentioned here are reflected in architectural changes (process models, packet formats, and so on) in the model suite. For more information about the current model, see Chapter 31 Wireless LAN Model User Guide on page STM-31-1 of the *Standard Models User Guide*.

