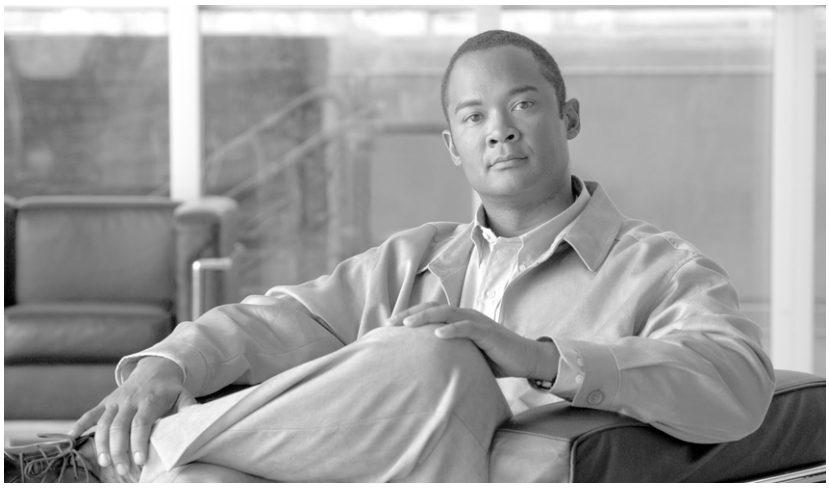

Cisco Network Planning Solution Readme

Release 2.1

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Cisco Network Planning Solution 2.1 Readme

This document summarizes the differences between Cisco Network Planning Solution (Cisco NPS) Release 2.1 and Release 2.0.1. Release 2.1 is a full release that replaces existing 2.0 installations. If you are updating to Release 2.1, you should review this document.

Contents

Installing Cisco Network Planning Solution 2.1

For detailed instructions on how to install the Release 2.1 software, refer to the instructions in the *Installation Guide for Cisco Network Planning Solution.* You can view an online version of this document at Cisco.com:

http://www.cisco.com/en/US/products/ps6363/prod_installation_guides_list.html

WARNING—If you are using Release 1.1 software or earlier, you must update to Release 2.0 before you update to Release 2.1. For details on updating from Release 1.1, see the *Installation Guide for Cisco Network Planning Solution* for Release 2.0 at the above URL.

Release 2.1 Description

Release 2.1 provides enhancements to the existing capabilities of Cisco Network Planning Solution. It also implements suggestions and fixes to software problems reported in earlier releases.

The following sections highlight the changes to Cisco Network Planning Solution that were introduced in Release 2.1.

Installation and License Enhancements

The following enhancements are available in 2.1:

License File Format Change

The format of the license file has been changed to hold additional information about each license. This change has the following effects:

- The 2.1 license server automatically converts pre-2.1 license files to the new format when it reads them. A 2.1 license server can serve licenses to any release of Cisco Network Planning Solution.
- After a pre-2.1 license file has been converted, pre-2.1 license servers cannot use it and should be replaced with 2.1 license servers.

If you need to run a mix of 2.1 and pre-2.1 applications, install a 2.1 license server (using the “Floating—serve licenses from this computer” option) and configure the applications to contact it.

Installation Utility Change

Cisco Network Planning Solution is now installed using the InstallAnywhere installation technology, which provides a Java-based graphical installer.

Note—Because these installers use a different technology, they generally take longer and require slightly more disk space during installation than installers from previous releases.

64-Bit Graphical User Interface

Previously, only simulations run from the command-line could access the additional memory of 64-bit operating systems. Starting in 2.1, the Cisco Network Planning Solution GUI supports 64-bit operating systems. Therefore, if you have a 64-bit operating system, running a simulation or an analysis takes advantage of the 64-bit operating system memory.

Note—
The 64-bit GUI is supported on Windows and Linux platforms only.
The 64-bit GUI is not available for Cisco Application Analysis Solution functionality in Release 2.1.

For Windows:
When Cisco Network Planning Solution is installed on a machine with a 64-bit operating system, the installation includes two shortcuts:

- Cisco Network Planning Solution 2.1
- Cisco Network Planning Solution 2.1 (64-bit)

Use the 64-bit shortcut to start Cisco Network Planning Solution and run using 64-bit memory. Use the other shortcut to start Cisco Network Planning Solution and run using 32-bit memory. The 64-bit option can be more efficient and scalable for running a simulation or an analysis on large networks.

For Linux:
When Cisco Network Planning Solution is installed on a machine with a 64-bit operating system, Cisco Network Planning Solution uses the 64-bit capability by default. For Cisco Network Planning Solution to use 32-bit, you must pass “-32bit” as a command-line argument. For example, to run a 32-bit simulation or analysis on a 64-bit machine, specify “cnps -32bit” on the command-line.

Additionally, note that the "GNU Libidn" library is required when running on the 64-bit Red Hat Linux platform.

Migration of Preference Values

When upgrading, your preference values are migrated to ensure a smooth transition.

The migration process occurs when Cisco Network Planning Solution is started for the first time. When the migration is complete, a dialog box informs you of the migration. Click the Show Details… button to view a detailed log of the migrated preferences. If the dialog box indicates, you may have to restart Cisco Network Planning Solution for the migrated preferences to become effective.

Note the following:

- The migration of preference values occurs when *all* of the following conditions are true:
  - — No preference file exists. (This is always true when Cisco Network Planning Solution is started for the first time after installation.)
  - — A previous release of Cisco Network Planning Solution is already installed.
- If more than one previous release is already installed, the migration process uses the most recent release.
- To bypass the migration process, use the “-skip_preferences_migration” command-line option when starting Cisco Network Planning Solution.

Network Topology, Configuration, and Traffic Import Enhancements

The following enhancements are available in 2.1:

Topology

The following sections describe enhancements to the topology import features.

Import from Cisco Virtual Network Data Server

The following sections describe enhancements to the import from Cisco Virtual Network Data Server features.

Enhanced Support for Importing and Analyzing Cisco IOS XR Devices

Cisco NPS now supports version 3.4.1 of Cisco IOS XR. This change adds support for many of the new features that were added to Cisco IOS XR since version 3.2, which was the highest supported version of Cisco IOS XR in previous releases.

The Cisco IOS XR enhancements add support for the following:

- Routing protocols: BGP, ISIS, OSPF, RPL, static and utility routing
- MPLS: LDP, RSVP, traffic engineering, VPN
- Quality of service
- IP addressing and services: access lists, ARP, HSRP, network stack IPv4, prefix lists, VRRP
- System security: AAA
- System management: terminal services, SNMP, logging service

Support for Importing and Analyzing Alcatel Service Provider Class Devices

Cisco NPS provides support for import from Cisco Virtual Network Data Server, Cisco NPS Flow Analysis, and Cisco NPS Network Validation for the following Alcatel-Lucent Service Provider class devices:

- 7750 Service Router
- 7450 Ethernet Service Switch

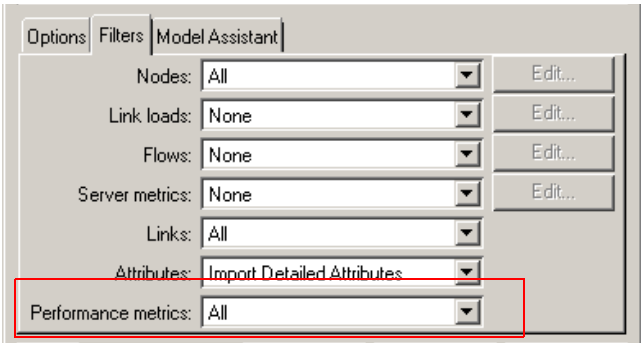
Support is provided as follows:

- Addressing (all supported interface types)
- ISIS
- OSPF
- BGP
- Static Routing
- MPLS-TE (RSVP, LDP)

Import of Measured Performance Data

You can import measured performance data from your network devices into Cisco Network Planning Solution from Cisco Virtual Network Data Server during initial or incremental imports, as shown in Figure 1. This measured performance data (delay, jitter, and packet loss) is then available for use in performing flow analysis studies.The imported information is stored in the Performance Metrics attribute on the node.

Figure 1 Import Measured Data from Cisco Virtual Network Data Server



Select the Filters tab of the Import from Cisco Virtual Network Data Server dialog box.

Choose All for Performance metrics to import the data.

Enhanced Support for Forwarding Table Import

Support for the import of forwarding tables has been significantly enhanced for this release. Forwarding tables are now imported as part of the vne.xml file rather than as separate files, expanding support to any devices for which forwarding tables are collected in Cisco Virtual Network Data Server. You no longer have to select the “Include collected configuration files” checkbox to import the forwarding tables.

Additionally, support has been added for VPN routing and forwarding (VRF) tables, protocol tables, and VRF protocol tables. The following new command support has been added:

- Cisco
  - show ip route vrf *vrf*
  - show ip route vrf *vrf protocol*
  - show ip route *protocol*
- Juniper
  - show route (also shows VRF tables)
  - show route protocol *protocol*

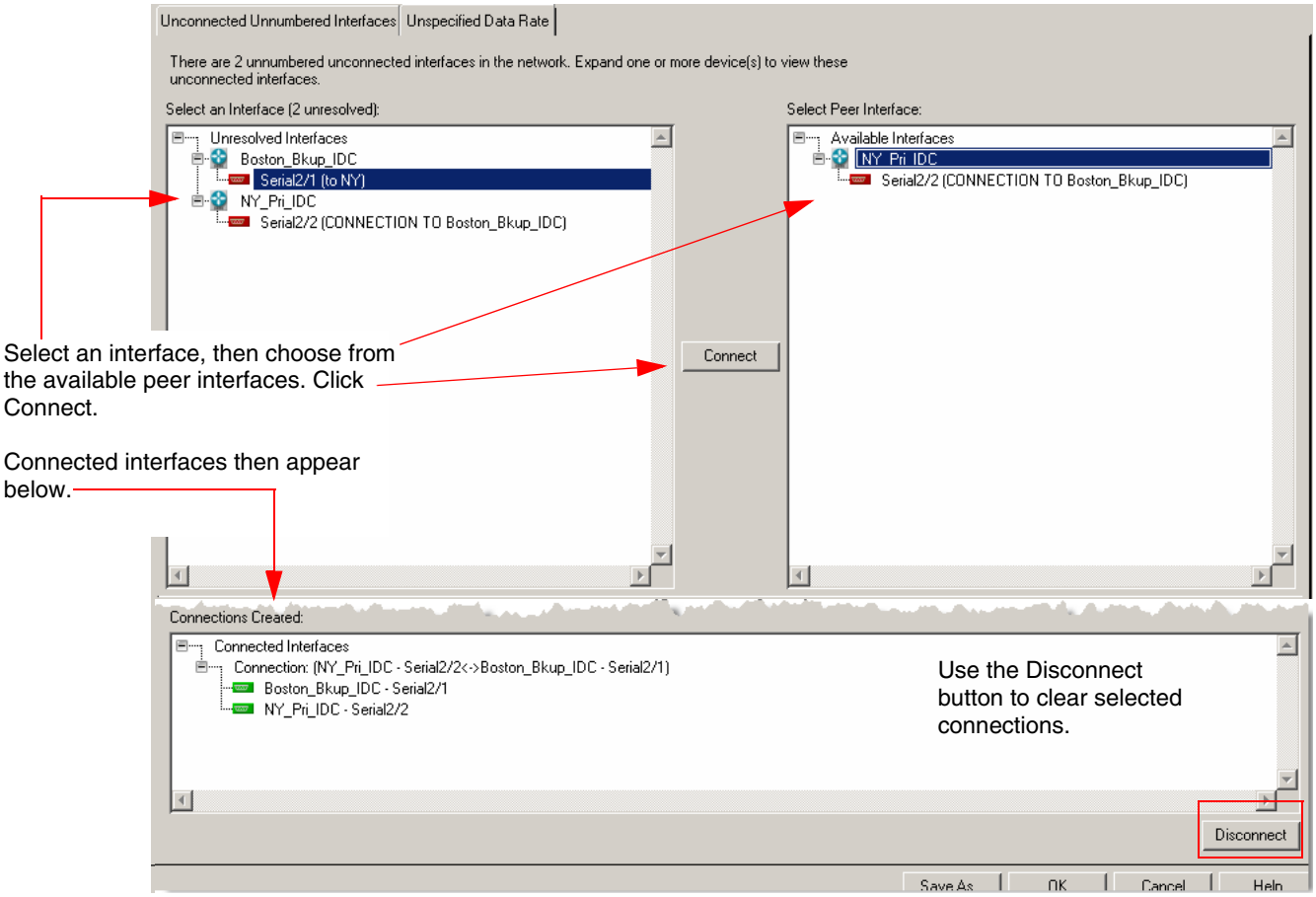
eXpress Data Import

The following sections describe enhancements to the eXpress Data Import import features.

Import Assistant

The Unconnected Unnumbered tab of the Import Assistant dialog box has been enhanced, as shown in Figure 2. When you select an unconnected unnumbered interface from the left panel, available interfaces to which you can connect appear in the right panel. A new lower panel of the dialog box displays Connections Created, which you can browse, select, and disconnect.

Figure 2 import Assistant Dialog Box Enhancement



Enhanced Support for Forwarding Table Import

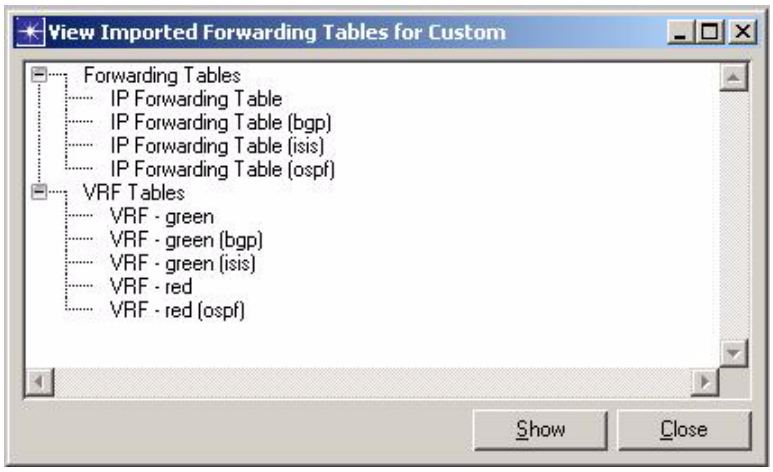
Support for the import of forwarding tables has been significantly enhanced for this release. The following new command support has been added to let you import the VPN routing and forwarding (VRF) tables, protocol tables, and VRF protocol tables:

- Cisco
  - show ip route vrf *vrf*
  - show ip route vrf *vrf protocol*
  - show ip route *protocol*
- Juniper
  - show route (also shows VRF tables)
  - show route protocol *protocol*

View Multiple Imported Forwarding Tables

When you import multiple forwarding tables, as described in Enhanced Support for Forwarding Table Import on page 7 and Enhanced Support for Forwarding Table Import on page 10, you can now select the forwarding table you want to see from the pop-up table, shown in Figure 3.

Figure 3 View Multiple Forwarding Tables



Clicking on any forwarding table lets you view more information for that forwarding table.

Enhanced Support for Juniper

In this release, import support for Juniper devices was expanded. Support of certain features was enhanced, while other features were added. The following features are now supported in Cisco Network Planning Solution:

- OSPF Domain ID
- BGP AS Loop path check
- Simple filters

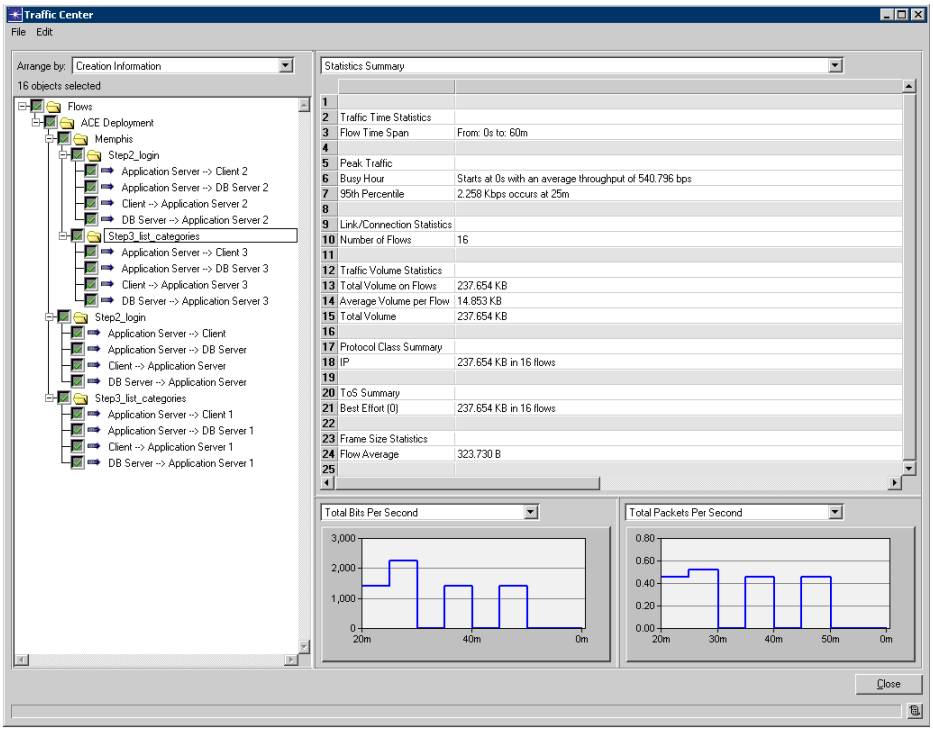
Existing support for Juniper devices in Cisco Network Planning Solution was enhanced for:

- BGP MED
- Static routes in routing tables

Traffic Center Enhancements

You can now isolate Cisco Application Analysis Solution deployed flows in the traffic center and group by creation information, as shown in the following figure.

Figure 4 Cisco Application Analysis Solution to Flows in Traffic Center



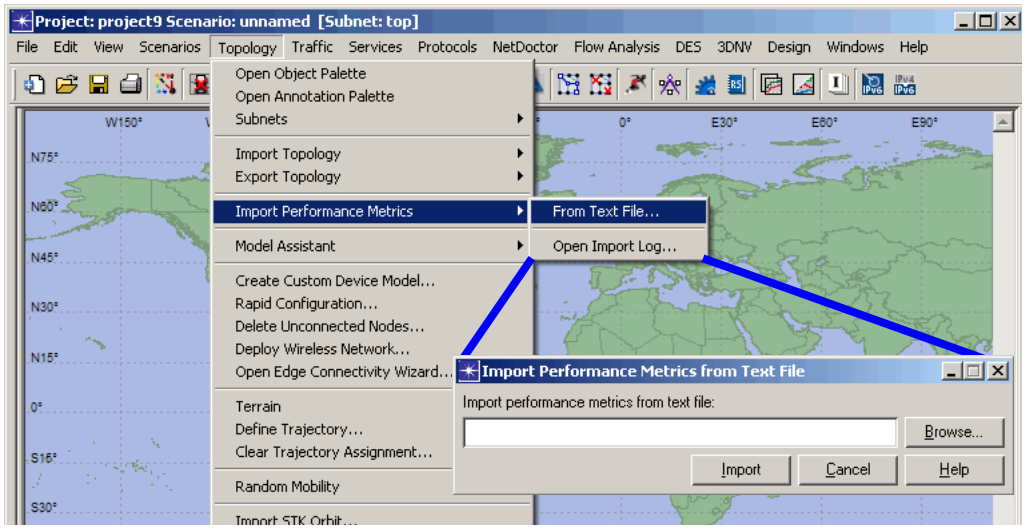
In the Traffic Center, flows can be grouped according to how they were generated under the 'Creation Information' arrange-by option.

In the case of Cisco Application Analysis Solution-to-Flows derived traffic, a new attribute called 'Deployment Data' is used to create an additional subgroup.

Performance Metrics Import

You can import measured performance data from your network devices into Cisco Network Planning Solution from text files, as shown in Figure 1. This measured performance data (delay, jitter, and packet loss) is then available for use in performing flow analysis studies.The imported information is stored in the Performance Metrics attribute on the node.

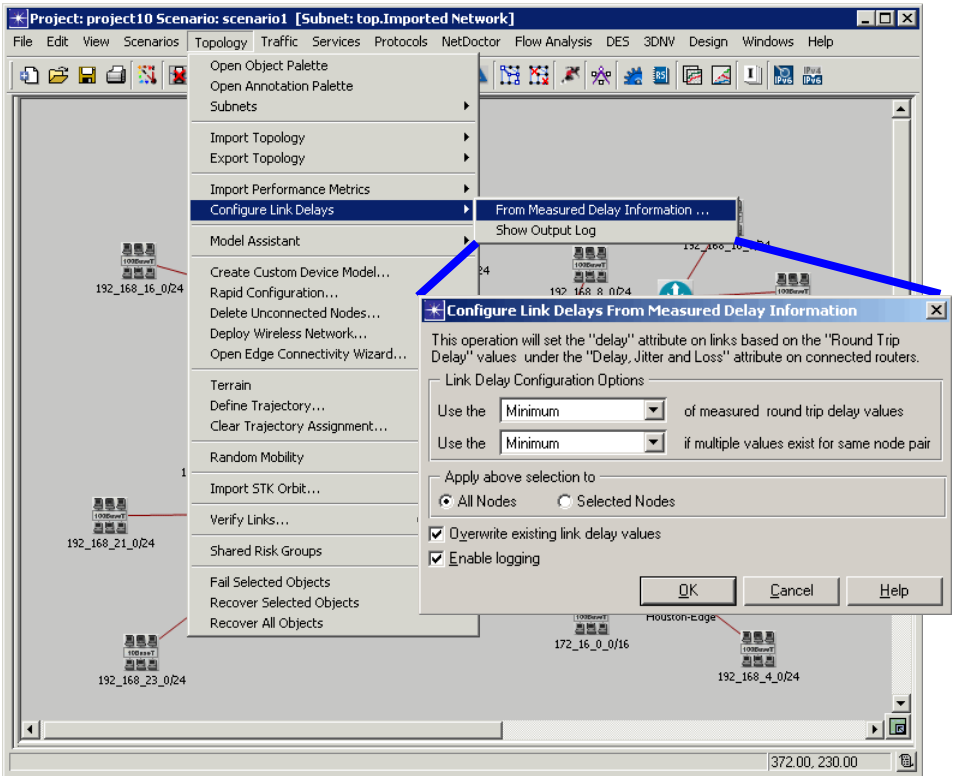
Figure 5 Import Performance Metrics



Configure Links Delays from Measured Delay Information

A new Topology menu option lets you configure link delays based on the measured delay information you imported from Cisco Virtual Network Data Server or from text files. This new feature lets you analyze end-to-end delay in your network model based on real-world information rather than on distance-based algorithms. Use the menu option Topology > Configure Link Delays > From Measured Delay Information…, as shown in the following figure.

Figure 6 Configure Link Delays from Measured Delay Information



Discrete Event Simulation Enhancements

The following discrete event simulation (DES) enhancements are available in 2.1:

Note—Cisco Advanced Capture Module is needed to use the discrete event simulation features in Cisco NPS.

Enhanced Support for Importing and Analyzing Cisco IOS XR Devices

Cisco NPS now supports version 3.4.1 of Cisco IOS XR. This change adds support for many of the new features that were added to Cisco IOS XR since version 3.2, which was the highest supported version of Cisco IOS XR in previous releases.

The Cisco IOS XR enhancements add support for the following:

- Routing protocols: BGP, ISIS, OSPF, RPL, and static routing
- MPLS: LDP, RSVP, traffic engineering, VPN
- Quality of service
- IP addressing and services: access lists, ARP, HSRP, network stack IPv4, prefix lists

Module-Centric Reports on Global Packet Statistics

The global packet statistics feature now has module-centric views in addition to the original node-centric views. The module-centric approach is useful for performing packet throughput analysis of a simulation. With it, you can easily determine which module is dropping the most packets, then examine the nodes containing a given module to see which ones are major contributors to the problem.

HAIPE Model Enhancements

The HAIPE (High Assurance Internet Protocol Encryptor) model has been enhanced to support the following:

- Dynamic security associations using HAIPE IKE
- Orphan SA Recovery using HAIPE IKE
- Transport mode transforms
- SA based statistics (provides the ability to view statistics on a per-SA basis and at the node level
- Ability to configure a security association to be used by multiple security policies
- Ability to configure a manual peer enclave prefix table entry using the peer HAIPE device's name rather than the CT (cipher text) IP address. As part of this enhancement, the HAIPE Parameters > Manual Peer Enclave Prefix Table (PEPT) > Peer CT Address attribute has been replaced by the HAIPE Parameters > Manual Peer Enclave Prefix Table (PEPT) > Peer HAIPE.

Circuit-Switched Model No Longer Included in Model Library

The circuit-switched model is no longer shipped as part of the model library. Although it is no longer maintained or supported, the model can be obtained from the Cisco Technical Assistance Center.

Global Packet Statistics

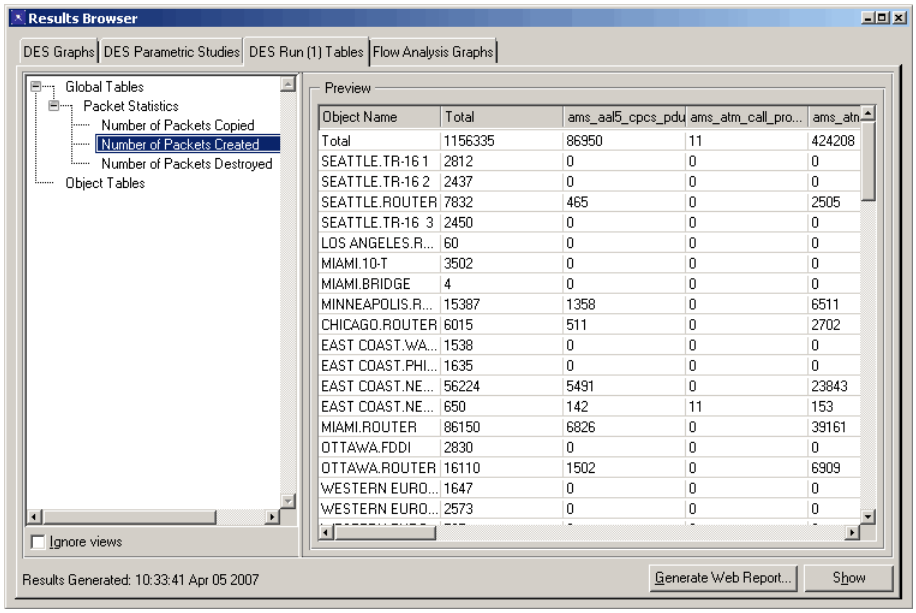
Global packet statistics represent an expansion of the Packet Info report formerly available in the simulation console and DES log. These statistics provide a “high-level” view of simulation behavior, letting you quickly get a sense of whether a simulation is performing as expected. You can use this information as a first step in debugging a model.

The global packet statistics feature introduces the following changes to the Packet Info report:

- The number of packets created, copied, and destroyed during the simulation are reported per packet format and per node.

- The checkbox used to control collection of these statistics has moved from the Execution > Advanced > Kernel Reports page of the Configure/Run DES dialog box to the new Outputs > Global Packet Statistics page.
- Statistic collection is enabled by default (but continues to be available only for sequential development kernels).
- The collected statistics are saved in an output table file with a name of the form `<project_name>-<scenario_name>-DES-<run_number>.ot`.
- The collected statistics can be viewed in the Results Browser under a tab corresponding to the output file name; for example, "DES Run (<run_number>) Tables".

Figure 1 Packet Statistics in Results Browser



Note—When the Packet Data Sharing Mode (sim_packet_sharing) preference is set to conservative or full, the content of "copied" packets is shared unless changes are needed. Regardless of this preference, the packet statistics count all packets that were copied or destroyed, as well as those that would have been copied or destroyed if the packet sharing optimization was disabled.

Compilation Behavior

When preparing for a discrete event simulation,
Cisco Network Planning Solution programs that compile files (such as op_mkso, op_mksim, and op_runsim) now systematically keep compiling files instead of stopping at the first error. You can kill the build process if needed; otherwise, all of the specified models are compiled to provide a general report of missing models, conflicting models, and so on.

Time-Precision Preference

The following DES-related preference has been added:

- log_time_precision—Specifies the number of decimal places recorded for simulation times in the DES log (the default is 12).

Compilation and Linking Preferences

New preferences let you define flags and libraries specific to 32-bit and 64-bit architectures. These preferences are:

- comp_flags_32bit
- bind_shobj_flags_32bit
- bind_shobj_flags_64bit
- bind_shobj_libs_32bit
- bind_shobj_libs_64bit
- bind_static_flags_32bit
- bind_static_flags_64bit
- bind_static_libs_32bit
- bind_static_libs_64bit

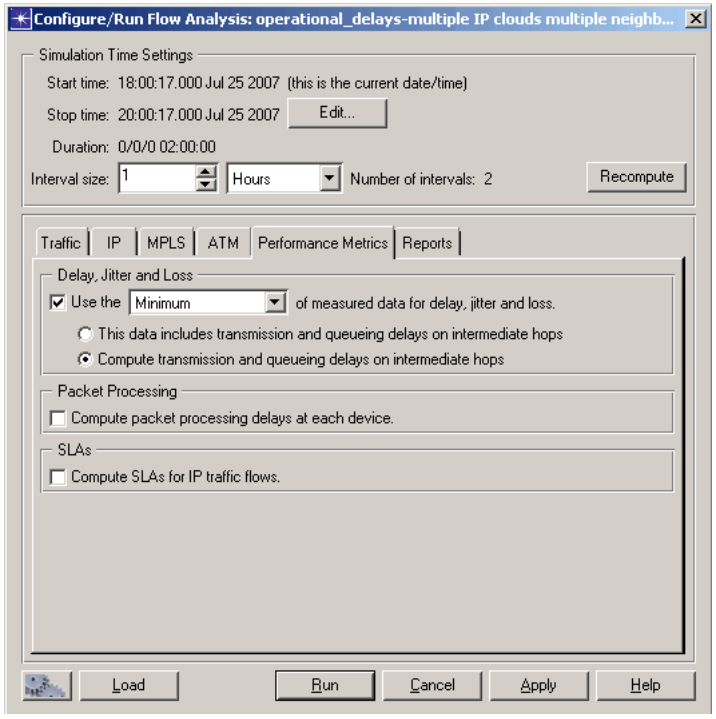
Cisco NPS Flow Analysis Enhancements

The following enhancements are available in 2.1:

Measured Performance Data Analysis

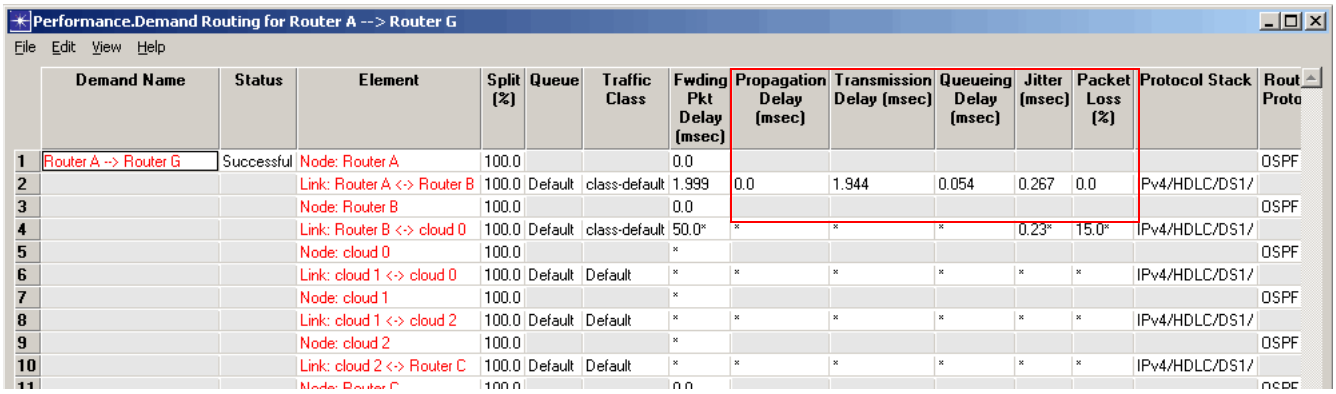
The Configure/Run Cisco NPS Flow Analysis dialog box has been enhanced to let you use measured performance data to do end-to-end performance analysis in your network model. You can import the data from either Cisco Virtual Network Data Server or text files. A new Performance Metrics tab appears in the Configure/Run Cisco NPS Flow Analysis dialog box, as shown in the following figure.

Figure 1 Performance Metrics Tab in Flow Analysis



After running a flow analysis using the measured data, you can view the Performance Demand Routing Report, shown in Figure 2, to see the specific delay information: average delay, end-to-end jitter, and maximum packet loss. For each route entry, you can see the detail of delay for all hops, defined by propagation, transmission, and queueing delays. The report shown here includes transmission and queuing delays imported from the operational network.

Figure 2 Performance Demand Routing Report - With Measured Performance Data



Performance.Demand Routing for Router A --> Router G

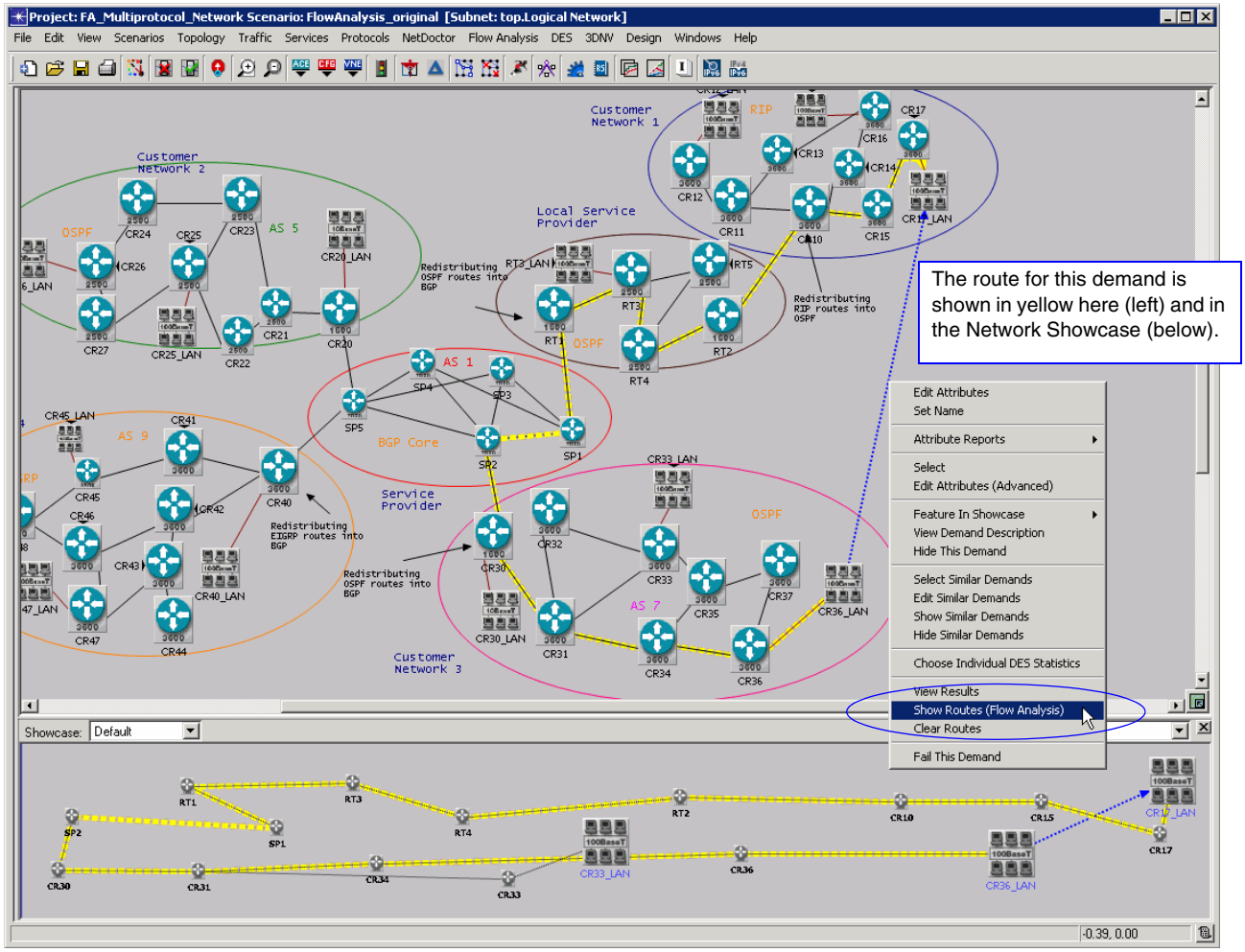
File Edit View Help

	Demand Name	Status	Element	Split (%)	Queue	Traffic Class	Fwding Pkt Delay (msec)	Propagation Delay (msec)	Transmission Delay (msec)	Queueing Delay (msec)	Jitter (msec)	Packet Loss (%)	Protocol Stack	Rout Proto
1	Router A --> Router G	Successful	Node: Router A	100.0			0.0							OSPF
2			Link: Router A <-> Router B	100.0	Default	class-default	1.999	0.0	1.944	0.054	0.267	0.0	Pv4/HDLC/DS1/	
3			Node: Router B	100.0			0.0							OSPF
4			Link: Router B <-> cloud 0	100.0	Default	class-default	50.0*	*	*	*	0.23*	15.0*	IPv4/HDLC/DS1/	
5			Node: cloud 0	100.0			*							OSPF
6			Link: cloud 1 <-> cloud 0	100.0	Default	Default	*	*	*	*	*	*	IPv4/HDLC/DS1/	
7			Node: cloud 1	100.0			*							OSPF
8			Link: cloud 1 <-> cloud 2	100.0	Default	Default	*	*	*	*	*	*	IPv4/HDLC/DS1/	
9			Node: cloud 2	100.0			*							OSPF
10			Link: cloud 2 <-> Router C	100.0	Default	Default	*	*	*	*	*	*	IPv4/HDLC/DS1/	
11			Node: Router C	100.0			0.0							OSPF

New Method for Viewing the Routes Computed for Demands

It is now easier to view the routes that were computed for a demand during a flow analysis. After running a flow analysis, you can display the routes for a demand in the Project Editor workspace. To do this, right-click on the demand (in the workspace or in the Network Browser) and select Show Routes (Flow Analysis) from the pop-up menu. This operation displays the route in the workspace and in the Network Showcase, as shown in the following figure.

Figure 3 Viewing the Routes for a Demand After a Flow Analysis



Enhanced Support for Importing and Analyzing Cisco IOS XR Devices

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- System security: AAA
- System management: terminal services, SNMP, logging service

Support for Importing and Analyzing Alcatel Service Provider Class Devices

Cisco Network Planning Solution provides support for import from Cisco Virtual Network Data Server, Cisco NPS Flow Analysis, and Cisco NPS Network Validation for the following Alcatel-Lucent Service Provider class devices:

- 7750 Service Router
- 7450 Ethernet Service Switch

Support is provided as follows:

- Addressing (all supported interface types)
- ISIS
- OSPF
- BGP
- Static Routing
- MPLS-TE (RSVP, LDP)

Support for Firewall Services Module

You can now perform a flow analysis that includes Cisco Firewall Services Modules (FWSM) in your Cisco 6500 Catalyst switches. Currently, support is limited to single-context Cisco FWSM.

Enhanced Support for Imported Forwarding Tables

Flow analysis can now use protocol tables (forwarding tables that have been filtered by protocol) from an operational network. No configuration changes are needed to use forwarding tables from an operational network in a flow analysis—the same procedure is used whether you are using the full IP forwarding table or protocol tables.

For information on importing these types of forwarding tables, see Enhanced Support for Forwarding Table Import on page 10.

Enhanced Support for Juniper

In this release, Cisco NPS Flow Analysis support for Juniper devices was expanded. Support of certain features was enhanced, while other features were added. The following features are now supported in Cisco Network Planning Solution:

- OSPF Domain ID
- BGP AS Loop path check
- Simple filters

Existing support for Juniper devices in Cisco Network Planning Solution was enhanced for:

- BGP MED

Cisco NPS Network Validation Enhancements

The following enhancements are available in 2.1:

Reporting

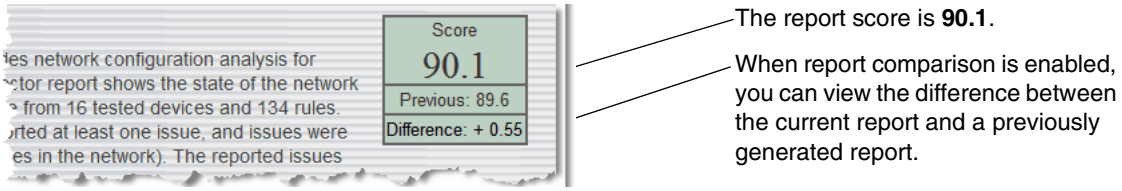
The following reporting enhancements are available in this release:

Scoring

Scores can now help you evaluate the results of your network analysis, as shown in Figure 1. The scores are available for the following:

- **Report**—average of all device scores in the report
- **Rules**—a single score for each rule run in the analysis
- **Devices**—a weighted average of the scores given by each rule in the analysis

Figure 1 Report Score in Executive Summary



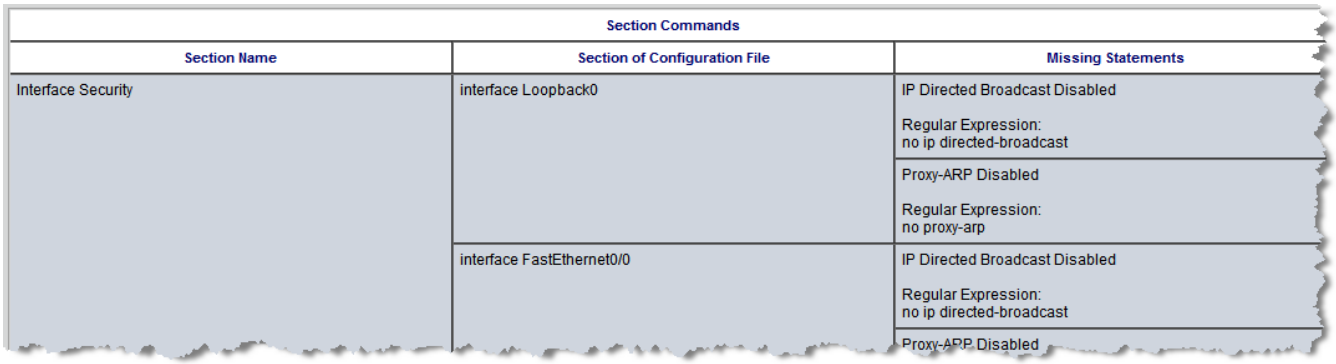
Device Configuration File Validation Reporting

Reporting for device configuration file validation is enhanced significantly to include the following:

- New tabular reporting
- Hierarchical presentation of violations
- Separate entries for match/no match commands
- Parametric control of table columns

The following figure shows an example of the new tabular format.

Figure 2 New Device File Configuration Validation Tabular Format



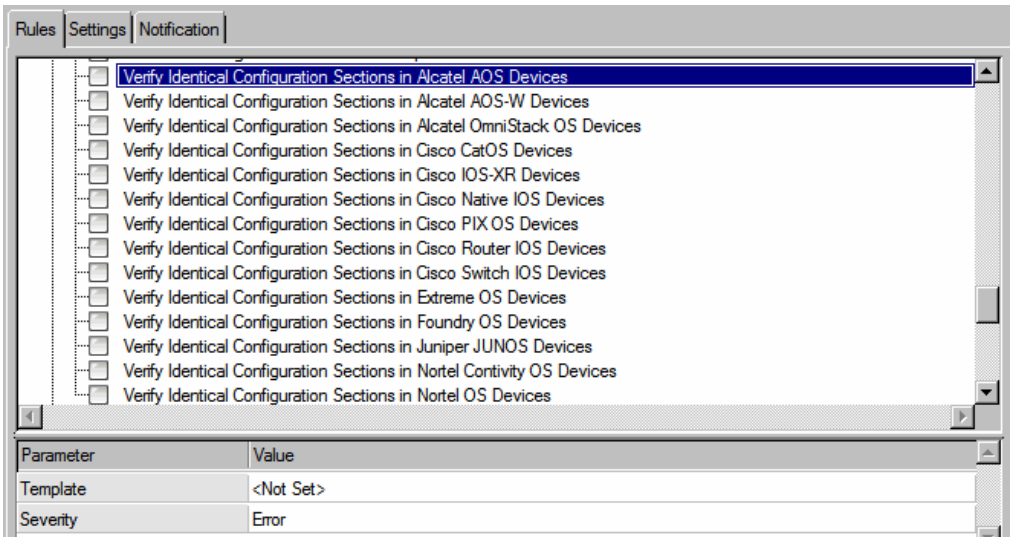
Section Commands		
Section Name	**Section of Configuration File**	**Missing Statements**
Interface Security	interface Loopback0	IP Directed Broadcast Disabled Regular Expression: no ip directed-broadcast
		Proxy-ARP Disabled Regular Expression: no proxy-arp
	interface FastEthernet0/0	IP Directed Broadcast Disabled Regular Expression: no ip directed-broadcast
		Proxy-ARP Disabled

Verifying Identical Configurations on Multiple Devices

The Organizational Policies rule suite provides the following new rules that report on problems with sections of device configuration files that should be configured identically for a specified set of devices:

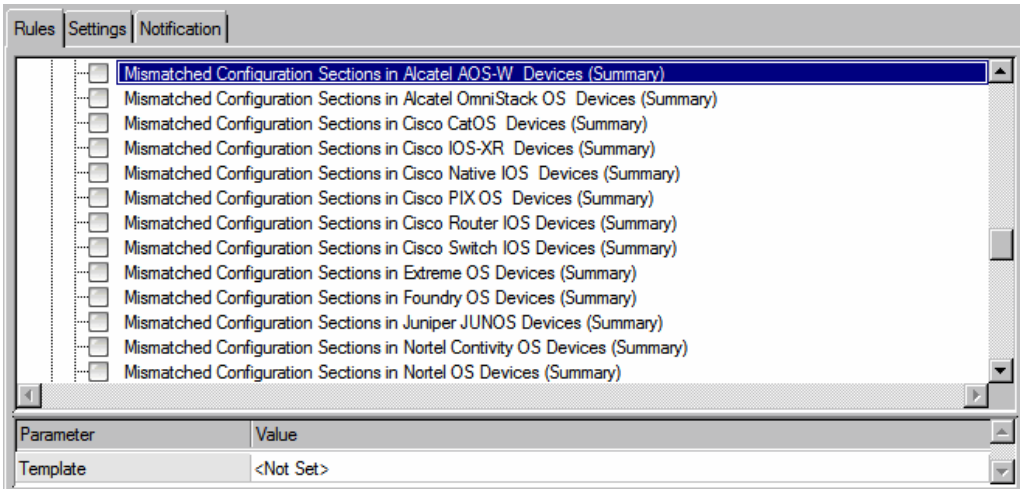
- **Verify Identical Configuration Sections—**reports the specified sections of the configuration files that are not configured identically for a device group. The following figure shows the verification rules by supported vendor in the Organizational Policies rules suite.

Figure 3 Verify Identical Configuration Rules



- **Mismatched Configuration Sections**—reports the identical and differing sections for all the specified configuration sections for the device group. When this rule runs along with the verification rule, you can pinpoint the configuration inconsistencies on the devices in the group. The following figure shows the rules by supported vendor in the Organizational Policies rules suite.

Figure 4 Mismatched Configuration Sections Rules



For more information, see Verifying Identical Configurations on Multiple Devices on page 57.

Rule Enhancements

The following rule support has been added or modified:

Security Compliance

The following rules provide enhanced or new rule support for security compliance:

- Administration
  - Verify Well-Known Passwords Not Used for Telnet Access
  - Verify OS Images
  - Verify Device OS Version (enhanced)
- AAA
  - Flood Guard Disabled
- Firewalls
  - Verify Fragmented Packets Not Allowed
  - Verify Timeout for Connection Timers
  - Verify Fixup Protocols
  - Anti-Spoofing Disabled on Interfaces (enhanced)
  - TCP Intercept Enabled on CBAC Enabled Interfaces
  - Verify CBAC Rules
  - Verify CBAC Settings
  - Verify Destinations Permitted by TCP Intercept
  - Verify Object Groups
  - Verify TCP Intercept Settings
- IPSec
  - Verify IKE Phase 1 Settings
  - Verify ISAKMP Identity
  - IKE Disabled

- IP Routing
  - SPD Disabled
  - Cisco Express Forwarding Not Enabled
  - Verify Scheduler Interval
  - Verify Scheduler Allocate
  - NetFlow Not Enabled
- QoS
  - Verify Committed Access Rate
- Route Maps and ACLs
  - Verify Access Control Lists (enhanced)
  - Verify Denied Source Addresses in Inbound Extended ACLs
  - Verify Explicit Deny Any in Extended ACLs
  - Verify ICMP Message Filters
  - Verify Inbound Traceroutes Denied
  - Verify Permitted Destinations in Inbound Established TCP Connections
  - Verify Permitted Source Addresses In Extended ACLs

Alcatel Enterprise-Class Devices

Organizational Policies

The following new rules provide support for Alcatel Enterprise-Class device configurations:

- Organizational Policies
  - Alcatel AOS Configuration Differs from Template File
  - Alcatel AOS Configuration Differs from Specified Commands
  - Alcatel AOS-W Configuration Differs from Template File
  - Alcatel AOS-W Configuration Differs from Specified Commands
  - Alcatel OmniStack OS Configuration Differs from Template File
  - Alcatel OmniStack OS Configuration Differs from Specified Commands

VRRP and Wireless LAN

The following new rules by rule suite integrate the Alcatel VRRP and Wireless LAN rules:

- VRRP
  - Duplicate Virtual Router ID
  - Ineffective Priority Difference
  - Insufficient Number of Routers
  - Mismatched Advertisement Interval
  - Mismatched Virtual IP Addresses
- Wireless LAN
  - Duplicate Access Point Location
  - Verify Access Point Encryption Mode
  - Verify Access Point Maximum Clients Limit
  - Verify SSID Broadcast Status

Cisco IOS XR

The following new rules provide support for version 3.4.1 of Cisco IOS XR.

- BGP
  - Router Configuration References Undefined Route Policy
- IS-IS
  - Redistribution References Undefined Route Policy
- Organizational Policies
  - Cisco IOS XR Configuration Differs from Template File
  - Cisco IOS XR Configuration Differs from Specified Commands
- OSPF
  - Redistribution References Undefined Route Policy

For more information about Cisco IOS XR support, see Enhanced Support for Importing and Analyzing Cisco IOS XR Devices on page 6.

NetScreen Firewalls

The following new rules support NetScreen Firewall devices:

- Organizational Policies
  - — Juniper ScreenOS Configuration Differs from Template File
  - — Juniper ScreenOS Configuration Differs from Specified Commands
- Policy-Based Routing (New Suite)
  - — Policy References Undefined Match Group
  - — Policy References Undefined Action Group
  - — Match Group References Undefined Extended ACL
  - — Zone References Undefined Policy
  - — Virtual Router References Undefined Policy
  - — Interface References Undefined Policy

Rule Development and API Enhancements

The following rule development and API enhancements have been added:

- Cisco IOS XR Route Policy (RPL) API on page 31
- IP Forwarding Table API on page 32

Cisco IOS XR Route Policy (RPL) API

The following new functions and an enumeration have been added to support the IOS XR Route Policy Language (RPL) API:

New functions:

- *lp.init_rpl_parser ()*
- *lp.get_rpl_route_policies ()*
- *lp.get_rpl_community_sets ()*
- *lp.get_rpl_route_policy_info ()*

New enumeration:

- *lp.Route_Policy_Information_Type Class*

IP Forwarding Table API

The following two enumerators have been added to the IP forwarding table API:

- *Ip.Route_Entry_Metric Class*
- *Ip.Route_Entry_Preference_Class*

Planning and Design Enhancements

The following enhancements are available in 2.1:

New Design Action: IGP Metric Configuration

This ipg_metric_configuration design action configures OSPF or IS-IS interfaces, based on one of the following properties:

- Physical length of the connected link
- Propagation delay between the two interfaces (specified by the “delay” attribute on the connected link)

Each IGP interface has a “metric” attribute that determines how likely traffic demands will use that interface when routing traffic: the higher the metric, the more likely that demands will avoid that interface. The objective is to configure the IGP interface metrics so that demands follow their mean shortest path—that is, to follow a route that has the minimum overall propagation delay.

New Design Action: IGP Metric Optimization

The igp_metric_optimization design action is used to perform traffic engineering by optimizing the IGP interface metrics. IGP metrics are most commonly defined by default settings, which often results in overutilized links. You can use igp_metric_optimization to configure IGP metrics so that individual links do not get overutilized.

Given current traffic demands and a maximum link utilization threshold, this design action works to configure the IGP interface metrics to handle the current traffic and ensure that utilization on any individual link does not exceed the specified threshold. Three modes of operation are supported:

- Inspect—Analyze the current network, then generate reports that describe the quality of the current solution and any violations of the specified requirements.
- Repair—Apply the optimization algorithm to produce a solution that satisfies the specified requirements.
- Optimize—Apply the optimization algorithm to improve the current solution for minimizing maximum link utilization (assuming that the current solution satisfies all requirements).

General Model Enhancements

The following enhancement is available in 2.1:

Alcatel Enterprise-Class Device Support

This release adds support for import of Alcatel enterprise-class devices from Cisco Virtual Network Data Server. The devices specifically supported include

- OmniSwitch 6600-9800 Series
- OmniAccess 4000 and 6000 Series
- OmniStack LS 6200 Series

Device information is collected on Cisco Virtual Network Data Server by the adapters Device Config File Collection and Device Config File Import.

Forwarding Table Comparison Enhancement

The Forwarding Table Comparison feature has been enhanced to support protocol tables (forwarding tables that have been filtered by protocol) from an operational network. No configuration changes are needed when using these types of forwarding tables—the same procedure is used whether you are using the full IP forwarding table or protocol tables.

For information on importing these types of forwarding tables, see Enhanced Support for Forwarding Table Import on page 10.

General GUI Enhancements

The following enhancements are available in 2.1:

Visualization Enhancement

The GUI now supports anti-aliasing, which *softens* edges, thus providing a smoother and sharper look.

Treeview Enhancements

Treeviews have been enhanced with new functionality and an updated look. The treeview enhancements include the following features:

- **Keyboard Shortcuts for Treeviews**

  Use the following shortcut keys to quickly navigate through a treeview.

Shortcut Key	Description
+ (plus)	Expands a treeview node.
- (minus)	Collapses a treeview node.
<Right Arrow>	Expands the treeview node and selects the first child node.
<Left Arrow>	Collapses the treeview node and selects the parent node.
<Backspace>	Selects the parent node

- **Type Ahead Searching—**You can now easily locate items in a treeview by typing the first one or more characters of the name. Type ahead searching starts with the selected item. If you repeat the same characters, the search cycles through the treeview. Note that the type ahead searching feature considers displayed (non-hidden) items only.
- **Treeview Appearance—**The enhanced treeviews have an updated three-dimensional look. Additionally, there are new preferences to define the font and the lines between treeview nodes.
  - — treeview_font—Specifies the default font used for treeviews.
  - — treeview_connector_style—Specifies the line style used in a treeview to show connections between nodes. Select from Dotted Lines, Solid Lines, or No Lines.

Project Editor Enhancements

The following enhancements are available in 2.1:

Easier Statistic Selection in Results Browser

You now can change the order in which results are listed in the results treeview of graph and parametric studies pages in the Results Browser. This lets you arrange the tree to group results by their parent objects, by name, by specific tags (which identify related statistics), or any other way that provides convenient access to the results in which you are interested. These arrangements can be saved and reused.

Network Difference Reporting

Configuring Network Difference Reports

Network Difference reports are now configured using the following two new options in the Configure/Run Network Differences dialog box:

- **Previous version of the current open scenario**—select this option when you want to compare one scenario to the next.
- **[Scenario base name](latest version)**—select this option when you want to compare the current scenario to another changing scenario or to a “gold standard” scenario.

Note—If you have an Automation license, you no longer need to configure a separate dialog box for automation tasks. After you click the automation task button Configure/Run Network Differences dialog box, you can save the current settings as a file for automation.

Network Difference Reporting Enhancements

The following areas of network difference reporting have been added or enhanced:

- Administration - IP Interfaces
- Hardware Modules
- HSRP
- Route Maps and ACLs

Edit Attribute Dialog Box Enhancements

The Edit Attribute dialog box enhancements are:

Filtered Search Feature

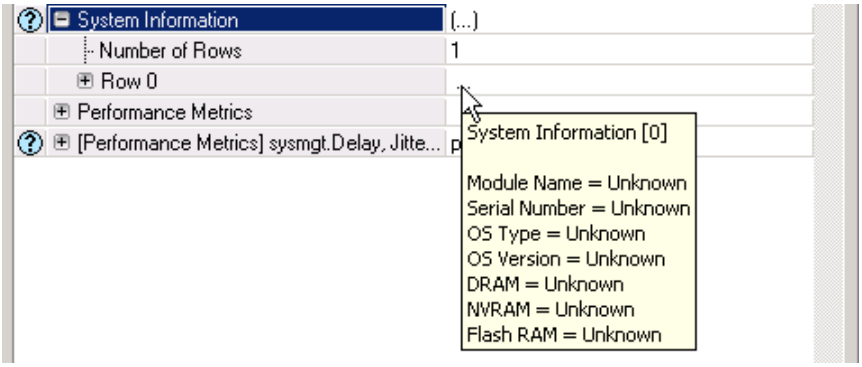
The search feature on the Edit Attributes dialog box has been enhanced so that you can more easily locate attributes. In previous releases, the search feature cycled through the Edit Attributes dialog box with the next attribute or value that matched the search criteria. In release 2.1, the search feature filters the attribute display.

When performing a filtered search from the Edit Attributes (Advanced) dialog box, you can specify whether filter criteria is a substring, an exact match, or a regular expression. Additionally, you can filter more precisely by specifying the items to compare against the filter criteria. Choose from attribute name, value, possible value (a value that you can choose from a pull-down menu), or tag. (A tag is a keyword that is associated with a model attribute, such as an interface type, vendor, or CLI command.)The results of a filtered search include built-in, hierarchical, and matching attributes/values.

Display of Compound Attributes

To make the display of compound attributes more friendly, the “row” attribute has been changed to “Number of Rows”. Additionally, when a compound attribute is collapsed, the defined values no longer appear in the values column. Instead, you can view the defined values in a tooltip by holding the mouse pointer over “…” in the Value column.

Figure 1 Compound Attribute Display in Attributes Dialog Box



Enhanced Usability of Compound Attribute Table Dialog Box

The Compound Attribute Table dialog box has been enhanced with the following new features:

- Row Number Display—In previous releases, the row number column would slide out of view as you moved the slider to view columns. In 2.1, when the new “Show row labels” checkbox is selected, the row number column is frozen as you move the slider bar to view additional columns.
- Column Sorting—You can sort the table by a column by clicking the column header. Click the column header again to reverse the sort order. Click the column header a third time to turn off the sort feature.

Subnet Enhancements

The following functionality and behavior enhancements have been made to subnets:

- **Create Subnets—**In addition to creating subnets from the Object Palette, you can now quickly and easily create subnets from the Topology menu.

  For more information, see Creating a Subnetwork from the Topology Menu.

- **Create and Populate Geographic Subnets—**The “Create and Populate Geographic Subnets” feature allows you to quickly create and populate subnets at specific geographic locations. This feature uses the latitude/longitude information stored in the default maps to create a tree of geographic regions (i.e., continents, countries, states/provinces, and cities).

  The “Create and Populate Geographic Subnets” feature is especially useful when you want to organize a large set of imported nodes into a geographic subnet hierarchy. After creating and populating the geographic subnets, you can save the subnet hierarchy to a model assistant file that can be re-applied the next time the nodes are imported.

  For more information, see Creating and Populating Geographic Subnets.

- **Cut, Copy, and Delete Links connected to Nodes in Other Subnets**—You can now cut, copy, and delete links that are attached to nodes in another subnet. However, before performing a cut, copy, or delete operation, be sure to select only the links on which you want to perform the operation.

Logical Object Selection Enhancements

The Logical Object Selection dialog box has been replaced by a new user interface and functionality. The new Define Selection dialog box enables you to:

- Find/select objects based on object type (such as mobile nodes or duplex links)
- Find/select objects that contain specific attributes (simple, top-level, or nested)
- Find/select objects based on specific attribute settings
  - String-based criteria include "Contains sub-string", "Matches string", and "Matches regular expression"
  - Numerical criteria include "=", "!=", "<", "<=", ">", and ">="
- Combine search criteria using AND, OR, and NOT operators
- Create composite search definitions based on previously defined definitions
- Categorize and save, and re-use search definition files for object searches and User-Defined Reports.

The new functionality provides much better support for nested attributes. You can create search definitions based on any attribute, in any network object in a scenario.

Zooming/Panning Enhancements

Zooming and panning in the Project Editor have been greatly enhanced.

- Zooming can now be performed with the scroll wheel on your mouse:
  - To zoom in, turn the scroll wheel forward or use the Page Down button.
  - To zoom out, push the scroll wheel backward or use the Page Up button.
- Panning can now be performed with the scroll wheel on your mouse
  - To pan, hold down the scroll wheel and drag the mouse pointer. Optionally, hold down the right and left mouse buttons and drag the mouse pointer.

Note that in previous releases, using the scroll wheel on your mouse moved the view up/down. In 2.1, to move the view up/down, hold down the Control key and turn the scroll wheel.

Map Improvements

The background maps have been replaced with maps that are easier to view, display more information, and include additional behavior.

- The default map colors have been changed to maximize visualization of objects and to be more aesthetically pleasing.
- Maps now display cities by population.

  The following preferences define the appearance of the new maps:

  — network_world_map.default_cities_style—Specifies the cities (by population size) to display on background maps.

  — network_world_map.default_ocean_style—Specifies whether to display bodies of water in blue on background maps.

  — network_world_map.default_region_style—Specifies whether to display land (with country, state, province borders) on background maps.
- Because the new maps replace old maps, some of the old maps are deprecated. The maps that are deprecated are the border maps (also known as the CDS maps) and a subset of the MIF maps. The deprecated MIF maps are: asia, australia, canada, europe, france, germany, italy, japan, mexico, ocean_background, south_korea, usa, world, and world_bright.

  The following preferences control the migration from the old *deprecated* maps to the *new* maps.

  — network_world_map.deprecated_border_map_behavior—Specifies whether to suppress deprecated border maps in subnets.

  — network_world_map.deprecated_mif_map_behavior—Specifies whether to show deprecated MIP maps in subnets.

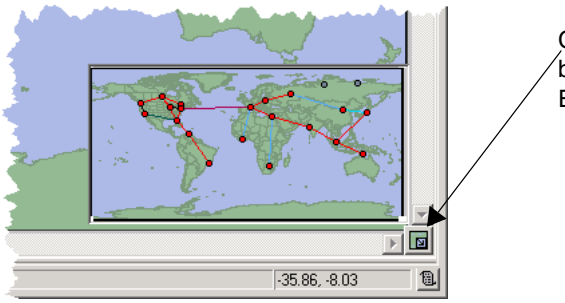
  — network_world_map.update_behavior—Specifies whether to replace deprecated maps with new maps. Replaced maps are retained, but they are not displayed.

Embedded Bird's-eye Viewer

The Bird's-eye Viewer is now embedded in the Project Editor workspace. An embedded viewer is easier to use than the floating viewer.

To toggle the display of the embedded bird's-eye viewer, click the Embedded Bird's-eye Viewer button. The button is located in the lower-right corner of the Project Editor, as shown in the following figure.

Figure 2 Embedded Bird's-eye Viewer



The embedded bird's-eye view includes the same functionality as the bird's-eye view displayed from the View menu. Use the Bird's-eye Viewer to zoom, pan, and locate items of interest.

Toggle Display of Links

Frequently, after an import, there is a need to move nodes/subnets in the workspace. However, if there are numerous links, the links may interfere with the dragging and repositioning of the network objects.

Starting in release 2.1, you can toggle the display of links in the Project Editor. When links are hidden, it is much easier to reposition nodes/subnets. When satisfied with the node layout, you can show the links.

- To hide the links, choose View > Links > Hide All
- To display the links, choose View > Links > Show All

Hiding and showing links does not change the link bundling display or settings.

When links are hidden, links are not listed in the Network Browser (unless you choose to display hidden objects), and links do not display in the Bird's-eye view. However, links do display in the Network Showcase between featured network objects.

Resolved Problems

Release 2.1 includes enhancements that address the following software problem reports (SPRs) from previous releases:

Table 1 SPRs Fixed in Cisco NPS Release 2.1

SPR ID	Problem Description
102178	Some Cisco NPS Network Validation rules generate a large number of Report Entries by default that may cause software to run out of memory.
102111	LACP (PAgP) should not disable port-group ports in Cisco switches, even though they could not be aggregated, if the port and its peer are in passive (auto) mode.
101016	Need support for match “as-path” option on Juniper policy configurations.
99741	Model difference report does not work for models derived from derived models, works for models derived from base models.
99012	Worst Case Failures table in Survivability Analysis report does not display correctly.
98399	Incorrect traceroute output in Virtual CLI.
98134	Discrete event simulation abort when trying to access many simulation attributes.
97580	Cannot specify months as units when importing and exporting traffic from/to spreadsheets.
93168	Traffic Center: The IP address displayed for an unmapped flow may be incorrect.
92943	When exporting graph data to spreadsheet, you cannot export more than 12 digits after the decimal.
87898	When there are two ospf processes on Juniper routers, import assigns a process tag of 1 to both processes.
83680	Importing baseline load is slow for large networks.
End of Table 1	

Known Issues

This release contains the known issues listed in Table 2.

Table 2 Known Issues in Cisco NPS Release 2.1

SPR ID	Problem Description
105903	Unable to run the product on Solaris machines that do not have libgcc.
106276	Remedy Web Service Notification plugin generates an error message when the test notification is created on Linux (32- and 64-bit) and Solaris, but the remedy ticket is created.
101786	IPv6 readiness assessment may cause a program abort if the collating results phase requires more than 1.2GB of memory.
105925	Importing live nGenius data is not supported on 64-bit platforms.
106053	Cannot import data from Cisco VNDS when VND Server is running in “secure” mode.
88050	Cisco NPS Network Validation may run out of memory on very large networks when using IP forwarding tables and when a large number of issues are found.
99495	Intermittent program abort while adding directory in the Traffic Flow Import dialog box.
107232	Cisco Application Analysis Solution traffic is not supported in 64-bit discrete event simulation.
End of Table 2	