Cisco Configuration Assurance Solution
Virtual Network Data Server
VNE Server User Guide

Software Release 3.0

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Virtual Network Data Server
VNE Server User Guide

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Documentation Conventions

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

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

Objects, Examples, and System I/O

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

  `opnet\release\models\std\ip`

- Function names in body text are in italics:

  op_dist_outcome()

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

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

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

  `<opnet_user_home>/op_admin/err_log`

Object Hierarchies, Notes, and Warnings

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

Open File > Print Setup > Properties...

Attribute hierarchies are represented by angled arrows (↘) that indicate that you must drill down to a lower level of the hierarchy:

Attribute level 1 ↘ Attribute level 2 ↘ Attribute level 3

Note—Notes are indicated by text with the word Note at the beginning of the paragraph. Notes advise you of important supplementary information.

WARNING—Warnings are indicated by text with the word WARNING at the beginning of the paragraph. Warnings advise you of vital information about an operation or system behavior.

Computer Commands

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

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

Lists and Procedures

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

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

Procedures are contained within procedure headings and footings that indicate the start and end of the procedure. Each step of a procedure is numbered to indicate the sequence in which you should do the steps. A step may be followed by a description of the results of that step; such descriptions are preceded by an arrow.

Procedure FM-1 Sample Procedure Format

1 Procedure step.

➥ Result of the procedure step.

2 Procedure step.

End of Procedure FM-1

For more information about using and maintaining OPNET documentation, see the OPNET VNE Server Documentation Guide.

Document Revision History

Release Date	Product Version	Chapter	Description of Change
April 2005	3.0 PL1	All	Updated to new formats and styles for PL1.
Jan 2005	3.0		Updated version to 3.0.
Jun 2004	2.1	All	Updated for the VNE Server 2.1 PL2 release.
Mar 2004	2.1	All	Partially updated for the VNE Server 2.1 PL1 release.
Nov 2003	2.0	All	Updated for the VNE Server 2.0 PL1 release.
Aug 2003	1.2	All	Updated for the VNE Server 1.2 PL3 release.
Apr 2003	1.2	User Interface	Corrections for the VNE Server 1.2 PL2 release.
Mar 2003	1.2	All	Issued for the VNE Server 1.2 PL1 release.

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1 Overview

Introduction

The Virtual Network Environment (VNE) Server provides you with a software environment that replicates the behavior of your entire network. VNE Server is the first network management solution to provide a continuously valid, complete, and integrated view of a network, consisting of the following:

- physical topology
- logical topology
- device configuration
- protocol configuration
- interface utilization
- traffic flow
- performance information

VNE Server provides an open architecture based on an extensible family of network information collection adapters. Specifically, VNE Server continuously, automatically, and on a scheduled basis

- collects disparate network information via an extensible set of adapters
- normalizes and archives the information collected
- infers physical and logical topology through powerful link and connection inference agents
- validates and fuses the information utilizing intelligent merge agents
- maintains itself by automatically updating new information and deleting stale information

OPNET analysis software connects to VNE Server as a client to obtain data that you can then use to analyze your network.

VNE Server is currently supported on Windows 2000, Windows 2000 Server, Windows XP Professional, and Windows 2003 Server.

VNE Server provides the ability to view the changes occurring in your network. Furthermore, VNE Server provides extensive, on-line reporting and network element browsing capabilities. VNE Server provides adapters for popular third-party network data sources and will also allow third parties to author their own adapters, ensuring applicability in all network environments.

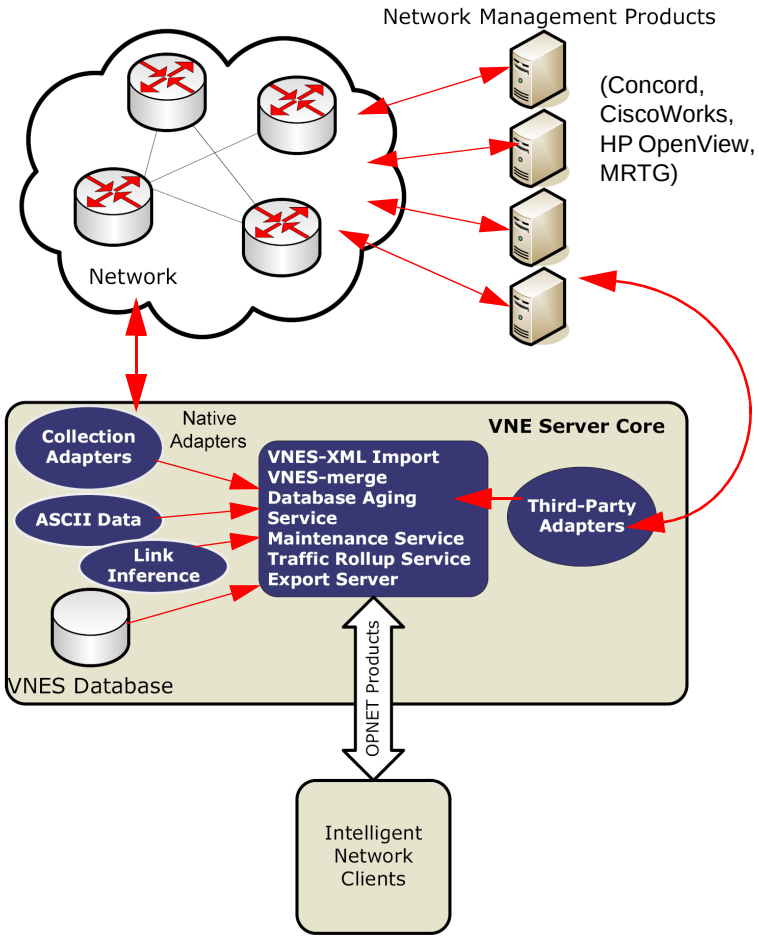
The VNE Server adapter set includes network data collection from

- network management applications
- performance management applications
- traffic measurement applications
- device configuration files
- device SNMP MIBs
- device console commands
- proprietary information sources
- simple ASCII csv files

Architecture

This section describes the VNE Server architecture and data flow to provide you with a better understanding of the product's ability to directly collect network data and to operate with third-party network management systems. The following figure shows how VNE Server fits into the network management environment.

Figure 1-1 VNE Server Architecture



VNE Server is composed of a comprehensive suite of adapters, a VNE Services framework, and a network database. The data collection adapters collect and translate network data into normalized eXtensible Markup Language (XML) files that can be imported into the network database. Adapters operate in a scheduled mode within an event service framework.

The VNE Server suite of adapters consists of native adapters and third-party network management system (NMS) adapters. The native adapters collect data directly from each device in the network. The third-party NMS adapters collect device data from other products such as CiscoWorks or Concord eHealth. These adapters do not access network devices directly but leverage data collected from existing NMS platforms in your network. This minimizes polling of your network.

VNE Server Services are composed of framework services such as XML import, intelligent merge, and scheduled services such as Database Aging, Maintenance, and Interface Utilization Rollup. The XML import and merge services add and merge data to the network database. The Database Aging and Interface Utilization Rollup services remove stale data from the network database and manage database growth resulting from traffic data collection. A Live Update Server provides information about network changes to interested clients. VNE Server Services also provides an Export Server that controls model export to OPNET analysis software.

The network database is an Oracle8i or Oracle9i database. You can configure VNE Server to operate with a local database or remote database. Communication with the database is standards-based to allow VNE Server to operate with other databases in the future.

User Interfaces

VNE Server provides several user interfaces for management of the product. These user interfaces let you configure VNE Server operating parameters, start data collection, monitor VNE Server adapter operation, and display reports related to network information that VNE Server has collected. With these tools, you can control VNE Server's activities and network usage, and can determine whether data collection is proceeding properly. The user interfaces provided by VNE Server are shown in Table 1-1:

Table 1-1 VNE Server User Interfaces (Part 1 of 2)

Interface Name	Description
VNE Server Console	Serves as the control panel for VNE Server. Displays status information about adapter and service operation. All VNE Server functions are launched from the Console.
VNE Server Event Viewer	Displays VNE Server data collection, import, and intelligent merge events.
VNE Server Management Console	Provides control over VNE Server operating parameters pertaining to adapter operation, NMS platforms and network devices.

Table 1-1 VNE Server User Interfaces (Part 2 of 2)

Interface Name	Description
VNE Server Network Browser	Provides a graphical tree-based view of network devices, their associated interfaces and sub-interfaces, along with configuration information. Links are visible in the browser. Change history of network elements is also available.
VNE Server Group Browser	Provides the ability to define, manage and view device group definitions - both those created as export groups and those used for blocking adapter import.
VNE Server Report Manager	Provides reports on collected data in the network database. Can be used to judge the correctness of VNE Server operation and produce reports about the target network.
End of Table 1-1	

You can find more information about the VNE Server Console, Event Viewer, Management Console, Network Browser, and Report Manager in the User Interface chapter.

Adapters and Services

Data collection in VNE Server is performed by a set of agents called adapters. Each adapter is designed to acquire or translate a specific type of network information. The VNE Server platform comprises an event service and scheduling framework that coordinates the operation of each adapter and service. The information collected by each adapter is stored in an underlying relational database. A powerful merge engine consolidates all acquired network information into a comprehensive network model. The Database Aging Service provides for self-maintenance by alerting you to aging information and eventually removing stale information. Other services are available to process information in the database and to manage the VNE Server environment.

VNE Server supports the adapters and services listed in Table 1-2. These agents are discussed in more detail in the Adapters and Services chapter.

Table 1-2 VNE Server Adapters and Services (Part 1 of 3)

Adapter or Service Name	Description
Device Config File Collection	Directly connects to devices, executes show commands, and collects the output into files. Supports telnet and secure shell (SSH) as well as TACACS+ managed devices.
Remote File Collection	Transfers files from another host to the VNE Server working environment. Currently uses FTP for retrieval.
Device Config File Import Device ifIndex Import Device FR Map Import Device Version Import Device IP Route Import Device CDP Import Device ARP Table Import Device Interface Import Device Module Import Device VTP Status Import Device CAM Table Import Device VLAN Database Import Nortel EPIC Output Import	Parses, translates, normalizes, and imports the output of the device console commands. These adapters are normally used to import configuration files collected by the Device Config File Collection adapter.
Device MIB Configuration Import	Uses SNMP to retrieve device information from supported MIBs.
CiscoWorks Config File Collection	Connects to the CiscoWorks server and collects device configuration files that the CiscoWorks server has collected.
CiscoWorks Config File Import	Parses, translates, normalizes, and imports the configurations files retrieved from CiscoWorks.
CiscoWorks RME Database Import	Connects directly to the CiscoWorks RME database to retrieve basic information about managed devices including information contained in the System MIB, IF MIB, and entity MIB.
CiscoWorks ANI Database Import	Connects directly to the CiscoWorks ANI database to retrieve information useful for determining connectivity between devices, and imports this information into the VNE database.
Cisco WAN Manager Import	Connects to a Cisco WAN Manager database to retrieve information.
HP OpenView NNM Import	Connects to an HP OpenView Network Node Manager server, collects, and imports topology and configuration information.

Table 1-2 VNE Server Adapters and Services (Part 2 of 3)

Adapter or Service Name	Description
DNS Alias Import	Performs a reverse DNS lookup using interface addresses to populate device and interface alias information in the database.
Link and Connection Inference	Infers physical and logical connectivity based upon collected device and interface information.
Trace Route Link Inference	Analyzes network connectivity and uses device traceroute commands to collect additional information about the network. This information is used to add devices and links to tie together isolated portions of a network in order to create a fuller network model.
MIB-Based Interface Utilization Import	Uses SNMP to poll known devices and collect interface utilization information.
Concord eHealth Network Utilization Import	Collects interface utilization information from Concord eHealth/Network systems. Uses telnet and FTP for access and retrieval.
StatScout Interface Utilization Import	Collects interface utilization information from a StatScout server.
MRTG Interface Utilization Import	Collects interface utilization information from a MRTG server. Both log and RRD files are supported.
InfoVista Network Utilization Import	Collects interface utilization information from an InfoVista server.
VistaMart Interface Utilization Import	Collects interface utilization information from a VistaMart server
Cisco Netflow Collection	Collects traffic flow information from a Cisco Netflow Collector server.
NetScout nGenius Import	Collects traffic flow information from a NetScout nGenius server,
Cflowd Import	Collects traffic flow information from a Cflowd server.
Demand Traffic Processing Service	Processes traffic flow data to perform endpoint mapping, Categorizes traffic flow based upon source and destination.
ASCII Generic Data Import	Imports user-generated network information that overrides, or supplements information in the network model. Commonly used to provide geographic location data for devices.
Post Processor	Processes model attributes so that missing attributes, such as sysLocation, can be populated from related information in other attributes.
Database Aging Service	Identifies and removes stale, or inconsistent network information.
Maintenance Service	Removes outdated data files and temporary files in order to manage disk space utilization.
Change Records Maintenance Service	Manages the growth of change records in the network database.
Report Export Service	Provides scheduled export of VNE Server reports.

Table 1-2 VNE Server Adapters and Services (Part 3 of 3)

Adapter or Service Name	Description
Interface Utilization Rollup Service	Consolidates collected traffic data in order to manage network database growth.
External Adapter	Provides the ability to run external scripts and tools under control of the VNE Server scheduler.
Demand Traffic Rollup Service	Consolidates collected traffic flow data in order to manage network database growth.
Export Service	Provides scheduled export of a VNE Server network model.
End of Table 1-2	

Documentation Roadmap

Depending upon the information you need, you can continue along several paths through the documentation.

- To learn more about the VNE Server user interfaces, continue with the User Interface chapter.
- To learn more about the VNE Server adapters, continue with the Adapters and Services chapter.
- To learn more about configuring and operating VNE Server, continue with the Operation chapter.
- To learn more about VNE Server administration, continue with the Administration chapter.
- To learn more about VNE Server troubleshooting, continue with the Troubleshooting appendix.
- To learn more about supported device configuration commands, continue with the Device Configuration Commands appendix.

2 User Interface

Introduction

This chapter describes the VNE Server user interface (UI). The UI supports configuration of operating parameters, starting and stopping data collection, monitoring adapter operation, and displaying reports about the network. Through the UI, you can control VNE Server's activities and network usage, and can determine whether data collection is proceeding properly. The VNE Server user interfaces use a combination of standard UI features such as menus, dialog boxes and buttons. The VNE Server UI also uses expandable treeviews of configuration properties.

VNE Server provides the following user interfaces:

Table 2-1 VNE Server User Interfaces

User Interface	Description
Console	Provides a high-level view of adapter and service activity. From the Console, you can start or stop VNE services and open other user interfaces. The Console serves as the control panel for VNE Server.
Event Viewer	Displays VNE Server events, and functions as a system logger. The Event Viewer provides a lower-level view of adapter and service activity to complement the high-level view provided by the Console.
Management Console	Provides control over VNE Server operating parameters pertaining to device access, adapter operation, and display presentation.
Report Manager	Provides reports on data collected in the network database. Can be used to judge the correctness of VNE Server operation and produce reports about the target network.
Network Browser	Provides a graphical tree-based view of network devices, links, and the information collected about them. VNE services must be running in order to use the Live Network Browser. An offline Network Browser is also available for viewing the network when VNE services are not running. The offline Network Browser displays a subset of the information available through the Live Network Browser.

The VNE Server Program Group

VNE Server is launched from the OPNET VNE Server 3.0 program group. This program group provides the selections shown in the following table:

Note—You must be logged in as Administrator for the VNE Server program group to be visible.

Table 2-2 VNE Server Program Group Selections

Selection	Function
OPNET VNE Server	Opens the VNE Server Console.
Open File Log Viewer	Opens the VNE Server File Log Viewer.
Open Licensing Web Page	Opens a web browser to the OPNET License Registration page.
OPNET VNE Server Documentation	Opens the VNE Server documentation menu in Acrobat Reader.
Remove current project from database	Removes all the data related to the current data collection project from the network database.
Remove temp dir and current project from database	Removes the temporary directory (which is usually *C:\op_admin\tmp\vne*), and all the data related to the current data collection project from the network database.
End of Table 2-2	

Starting VNE Server

Procedure 2-1 describes how to start VNE Server from the program group.

Procedure 2-1 Starting VNE Server

1. Select **Start > Programs.**
2. Locate the **OPNET VNE Server 3.0** program group.
3. Select **OPNET VNE Server** from the OPNET VNE Server 3.0 program group.

   ➥ Within a minute, the VNE Server Console opens.

End of Procedure 2-1

Deleting the Current Project

Procedure 2-2 describes how to remove the current project from the VNE Server database. This erases all data about the current network and is a good step to take when starting a new project.

Procedure 2-2 Removing the Current Project

1 Select **Start > Programs**.

2 Locate the **OPNET VNE Server 3.0** program group.

3 Select the **Remove current project from database** item from the OPNET VNE Server program group.

WARNING—Removing the current project from the database erases all data about the current network. Data stored under other projects remains in the database.

➥ A window opens and shows a number of *INFO* messages. The window closes when this task is complete.

End of Procedure 2-2

Deleting the Temporary Directory and Current Project

Procedure 2-3 describes how to remove the current project and the temporary directory (temp dir) from the VNE Server database. This includes the removal of working files in the temp dir.

Procedure 2-3 Removing the Current Project and Temp Dir

1 Select **Start > Programs**.

2 Locate the **OPNET VNE Server 3.0** program group.

3 Select the **Remove temp dir and current project from database** item from the OPNET VNE Server program group.

WARNING—This task removes all data about the current network from the database. Data stored under other projects remains in the database.

➥ A window opens and shows a number of *INFO* messages. The window closes when this task is complete.

End of Procedure 2-3

Viewing VNE Server Documentation

To open the VNE Server documentation set, follow the steps in Procedure 2-4:

Procedure 2-4 Open VNE Server Documentation

1. Select **Start > Programs**.
2. Locate the **OPNET VNE Server 3.0** program group.
3. Select the **OPNET VNE Server documentation** item from the OPNET VNE Server program group.

   ➥ Acrobat Reader opens and shows the VNE Server documentation menu.

End of Procedure 2-4

Viewing Event Log Files

Procedure 2-5 describes how to view the VNE Server event log file.

Procedure 2-5 Viewing the VNE Server Event Log:

1. Select **Start > Programs**.
2. Locate the **OPNET VNE Server 3.0** program group.
3. Select the **Open File Log Viewer** item from the OPNET VNE Server program group.

   ➥ A file selection browser opens and displays a list of event log files that exist in the VNE Server environment.
4. Select the event log file to open, and press **Select**.

   ➥ An Event Viewer window opens and displays the contents of the event log file.

End of Procedure 2-5

Opening the OPNET Licensing Web Page

You can open the OPNET licensing web page directly from the program group using the steps in Procedure 2-6.

Procedure 2-6 Opening the OPNET LIcensing Web Page

1. Select **Start > Programs**.
2. Locate the **OPNET VNE Server 3.0** program group.

3 Select the **Open Licensing Web Page** item from the OPNET VNE Server program group.

➥ The default web browser opens and displays the OPNET License Registration web page.

End of Procedure 2-6

VNE Server Commands on Solaris

For VNE Server on a Solaris Platform, the major functions described in the previous section are executed as follows.

Starting VNE Server

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to start VNE Server:

```
vnes.sh -r Oracle9i EV
```

Deleting the Current Project

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to delete the current project within the database:

```
vnes.sh -r Oracle9i CLEANDB
```

WARNING—This command permanently removes all data for the current project from the database.

Deleting All Projects and Tables

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to delete all the projects and tables in the database:

```
vnes.sh -r Oracle9i CLEANALLDB
```

This command leaves the user account and tablespace files intact but removes all tables, synonyms, and projects owned by this user from the database. Use the `CLEANALLDB` command when upgrading to a new build that changes the table schema. Running `CLEANALLDB` allows the new build to reinitialize the database without re-running the `setup_accounts` SQL script.

This command target also exists for Windows users.

WARNING—This command permanently removes ALL data for ALL VNE Server projects from the database.

Deleting the Temporary Directory and Current Project

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to delete the temp dir and the current project in the database:

```
vnes.sh -r Oracle9i CLEANALL
```

WARNING—This command will permanently remove all data for the current project from the database.

Viewing VNE Server Documentation

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to view documentation:

```
vnes.sh -r Oracle9i HELP
```

Viewing Event Log Files

Change your working directory to the VNE Server installation directory on Solaris. Enter the following command to view an event log file:

```
vnes.sh -r Oracle9i FV
```

Performing License Operations

Refer to the Product Licensing on page VNE-5-11 section of the Administration chapter for command line licensing procedures for VNE Server on Solaris.

Console

The Console is the most visible component of VNE Server and is the UI that you see after starting the product. The Console acts as the VNE Server control panel. From the Console, you can start and stop data collection services, monitor the status of adapter and service execution, and open the other UIs provided by VNE Server. You can access the following UIs from the Console:

- Event Viewer
- Management Console

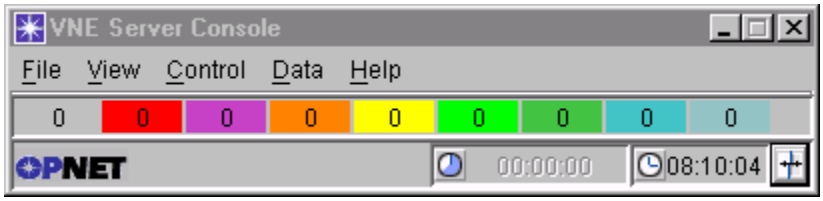
- Report Manager
- Network Browser
- Help

The Console has two display modes: detail view and summary view.

Console Summary View

The Summary View of the Console provides a small footprint UI that only shows the event totals, by severity, and provides a menu bar. Clicking on the button in the bottom, right corner of the Console window toggles the view between Detail and Summary. Use the Summary View when you need to recover some desktop area for other work. The Console Summary View is shown below.

Figure 2-1 Console Summary View



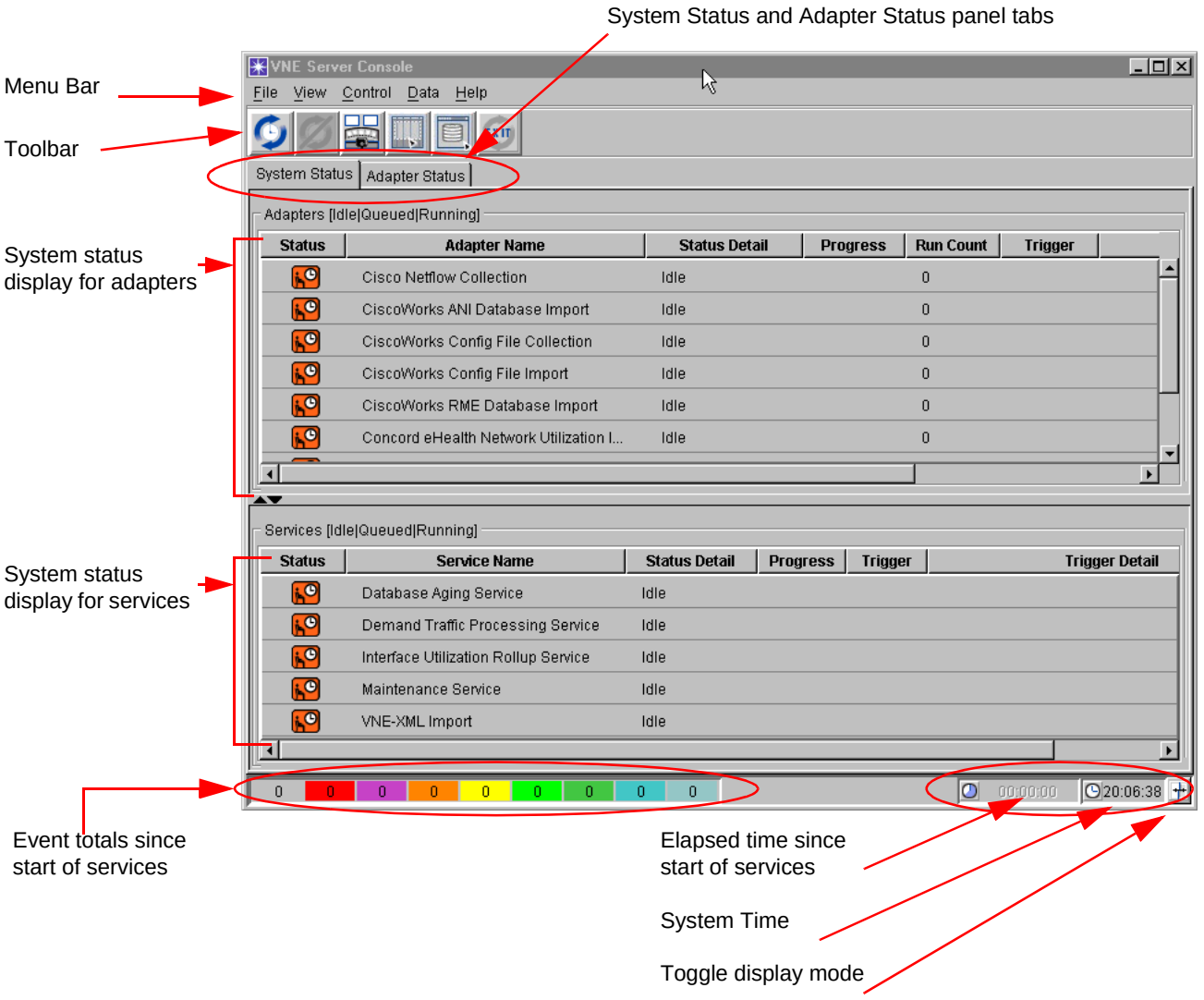
Console Detail View

The Detail View provides a standard window containing the following elements:

- System Status panel
- Adapter Status panel
- Menu bar
  - — Console File Menu
  - — Console Control Menu
  - — Console Data Menu
  - — Console Help Menu
- Tool button bars
- Event totals color coded by severity
- Elapsed time and system time clocks

When you start VNE Server, the Console opens in Detail View mode. An anatomy of the Console Detail View is shown below.

Figure 2-2 Console Detail View



Note—When the Console is opened before any adapter configuration occurs, the Adapters section of the System Status area is empty, and the Services section only has a VNE-XML Import entry.

System Status Panel

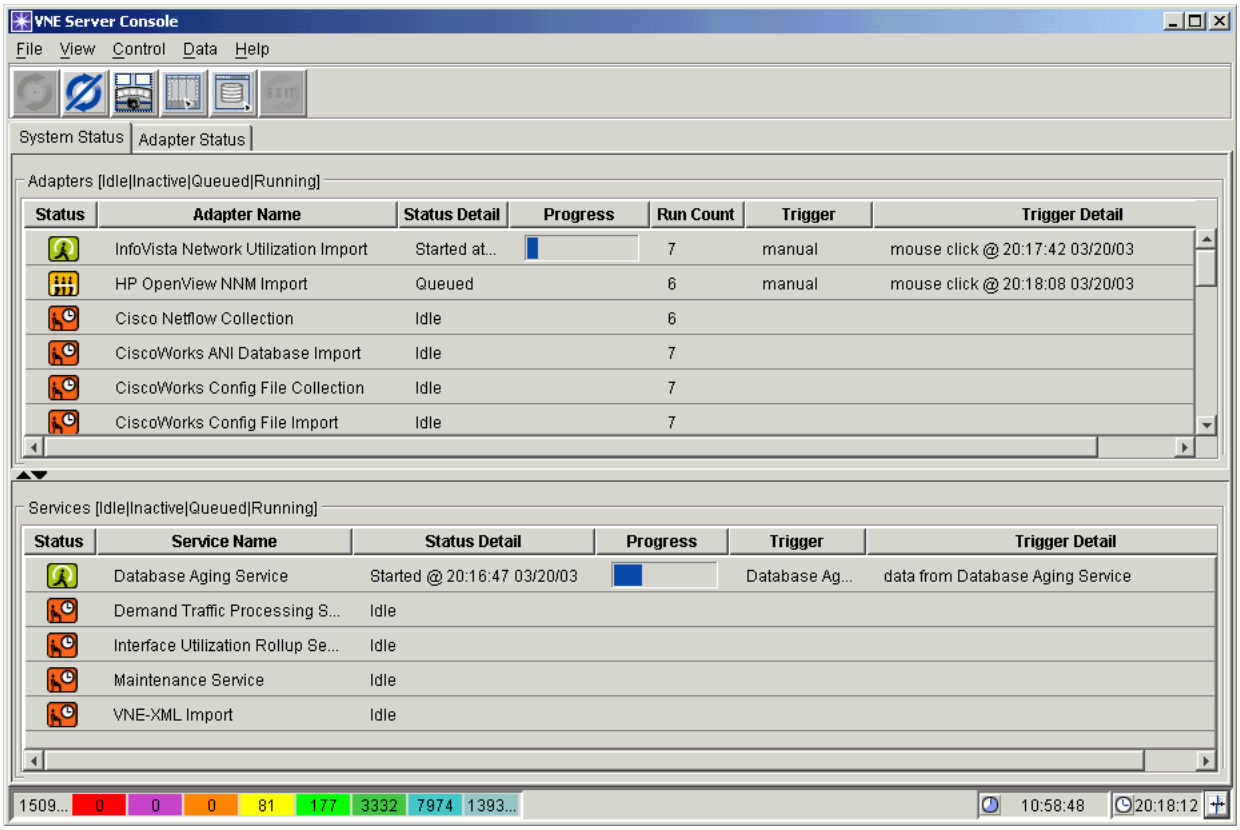
The main viewing area of the Console contains tabbed panels, System Status and Adapter Status, that show status information about operation of the adapters and services. The System Status panel is divided into two sections: Adapters and Services. Each section displays the following information:

- Adapter or service execution state (Inactive, Idle, Queued, or Running)
- Execution progress bar
- Event that triggered adapter or service execution

The purpose of the System Status panel is to provide a high-level view of VNE Server activity. This panel shows which adapter or service, if any, is currently running. When XML data is being imported by the VNE-XML Import service, this panel also shows which adapter's data is being imported. The System Status panel answers, at a glance, questions about VNE Server's current activities.

An example of this panel is shown in Figure 2-3. In this example, the InfoVista Network Utilization Import adapter is running and was triggered manually. A progress bar indicates how much work remains. The HP OpenView NNM Import adapter is queued and waiting to run. This adapter was also triggered manually. The Services section of the System Status panel shows that the Database Aging Service is running.

Figure 2-3 System Status Panel Showing Adapter and Service Execution



Both sections of the System Status panel provide horizontal and vertical scroll bars when the data to be displayed exceeds the panel space. In both the System Status and Adapter Status panels, columns can be resized by dragging the borders and can be repositioned by dragging the column header.

Adapters and services that are in a Running or Queued state move to the top of the status sections.

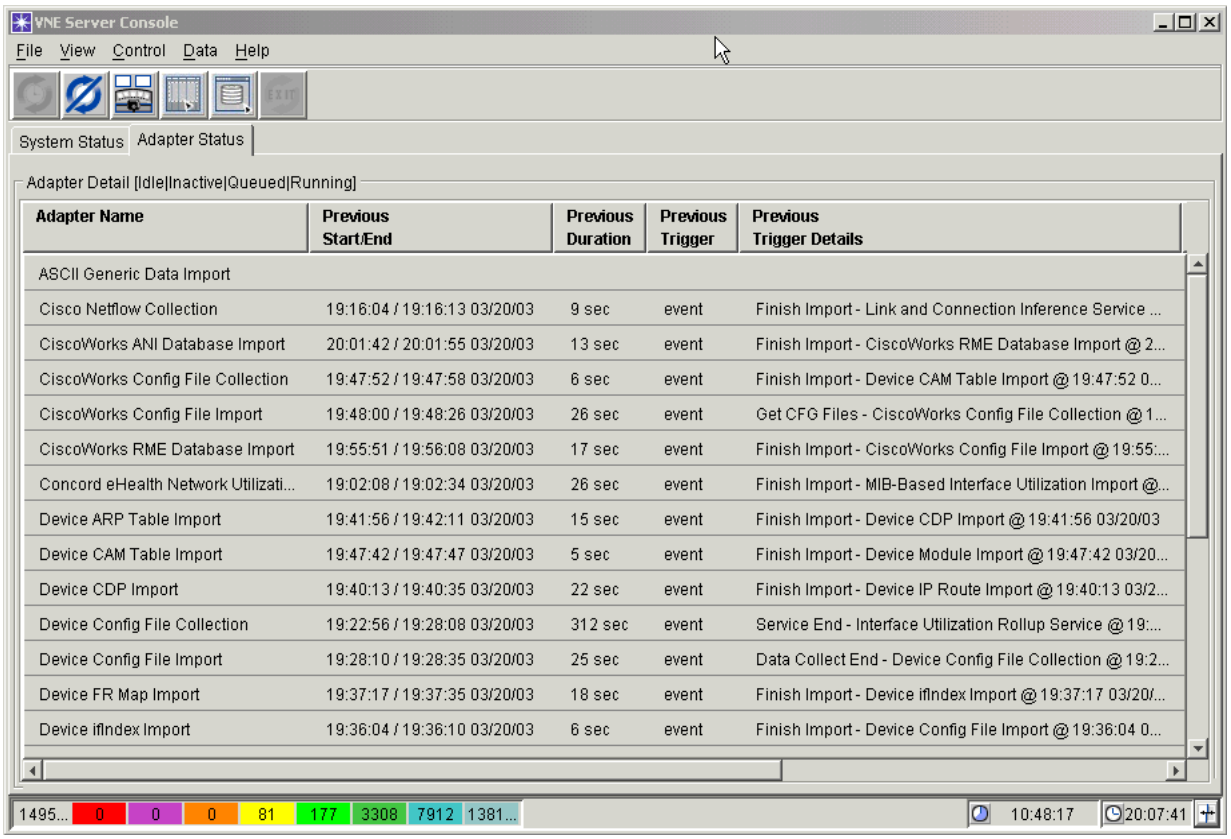
Adapter Status Panel

The Adapter Status panel provides more details about adapter operation to complement the high-level view provided by the System Status panel. The Adapter Status panel provides the following information about adapter operation:

- Start time, end time and duration of previous adapter run
- Trigger event and details of previous adapter run
- Trigger event and details of the next adapter run

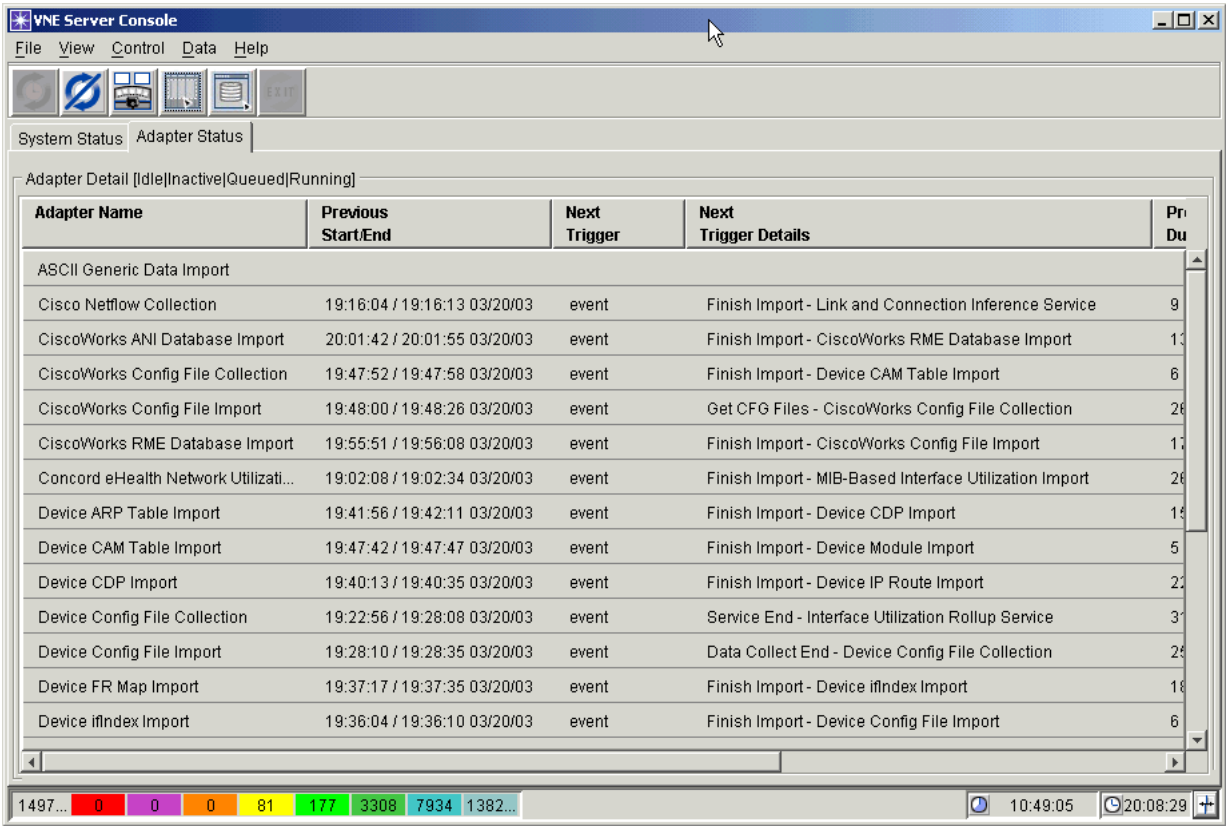
VNE Server allows adapters to be scheduled to run at specified times or in response to another adapter's operation. In Figure 2-4, the panel clearly shows how an adapter is scheduled to run.

Figure 2-4 Adapter Status Panel Showing Details of Adapter Execution



The Previous Trigger and Next Trigger fields show whether the adapter is triggered to run based upon a time schedule (schedule) or a system event (event). The Trigger Details fields show why the adapter runs. When an adapter is triggered to run based upon a completion event raised by another adapter, as shown in Figure 2-5, the Trigger Details fields show the triggering adapter and event.

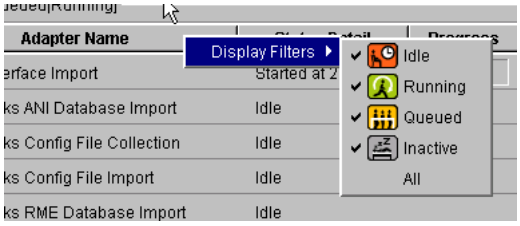
Figure 2-5 Adapter Status Panel Showing Details of Next Adapter Trigger



Status Display Filter

The Console provides a display filter that allows you to filter out panel entries based upon execution state. To access the filter, right-click the mouse on the table header in either the System Status or Adapter Status panels. A Display Filters menu appears. Check each execution state that you want to be displayed in the Status panels.

Figure 2-6 Status Panel Display Filter



Console File Menu

The Console File Menu provides the selections shown in Table 2-3.

Table 2-3 File Menu Summary

Menu Item	Description
New Log Viewer	Opens an Event Viewer window. Choose between Live Log and File Log options.
Exit	Closes and exits the VNE Server application.
End of Table 2-3	

The New Log Viewer selection opens a menu that has two choices: Live Log and File Log.

- The Live Log selection opens an Event Viewer that shows new events as they are created by the system.
- The File Log selection prompts you for an event log file and opens an Event Viewer window that shows the events in the selected log file. A File Log Event Viewer window is only used to view past events and is your primary tool for viewing past events.

The Exit selection terminates VNE Server. If VNE Server services are running when you choose Exit, you are prompted to stop services.

Console View Menu

The Console View menu provides the selections shown in Table 2-4. This menu contains all of the Console view control options.

Table 2-4 View Menu Summary

Menu Item	Description
Detailed View	Expands the Console to show the System and Adapter Status display. See also Console Detail View on page VNE-2-7.
Summary View	Collapses the Console display to only show the menu bar and event summary area. See also Console Summary View on page VNE-2-7.
Display Filters	Opens the Display Filters selection dialog. See also Status Display Filter on page VNE-2-11.
Adapter Statistics	Opens the Adapter Statistics report.
Event Refresh...	Controls the event refresh rate used by the Console.
End of Table 2-4	

Adapter Statistics

The View menu contains an Adapter Statistics selection. The Adapter Statistics menu choice provides valuable information about the results of each adapter session. These statistics include

- Adapter name, start and stop time, and total duration
- Information about files collected or processed
- Device access statistics such as collection attempts, successes, failures
- Statistics about devices, interfaces and links that have been created or removed

While viewing System Status in the Console is a good way to get information about current system activity, Adapter Statistics is the quickest way to get a good summary of system operation.

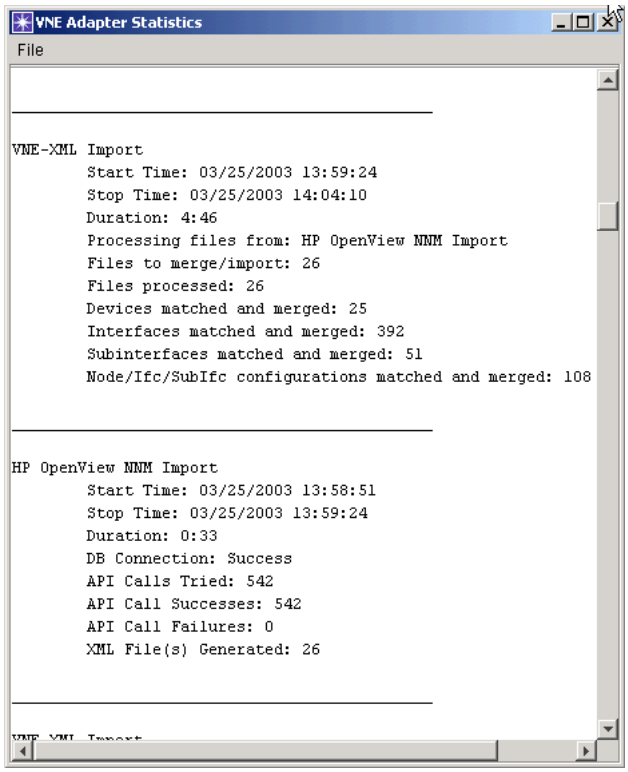
- You can see If adapters are running as scheduled.
- You can see if access failures consistently occur.
- You can monitor VNE Server operation.

The Adapter Statistics display is limited to a fixed number of entries that represent the most recent activity. The information displayed in Adapter Statistics is saved in a text file named *adapterStats.txt* that is located at *<temp dir>\adapterStats*. This file contains all the Adapter Statistics entries for the current installation of VNE Server, and can be read in any text editor. Starting and stopping services does not affect the contents of the file, so it provides an extended history of adapter operation. For this reason, *adapterStats.txt* is a good file to include with Tech Support problem reports. For more on filing support calls, see Filing an OPNET Technical Support Case on page VNE-A-21.

Procedure 2-7 Open Adapter Statistics

1 Select **View > Adapter Statistics** from the Console menu bar.

➥ VNE Adapter Statistics opens as shown below.



2 Choose any of the following options from the File menu.

Open Adapter Statistics File—Displays the entire stat file contents.

Clear—Clears the window display. The adapterStats file remains intact.

Close—Closes the Adapter Statistics window.

End of Procedure 2-7

Console Control Menu

The Console Control menu provides the selections shown in Table 2-5. The Start and Stop selections allow you to control activation of VNE Server services. Adapter data collection occurs while the framework services are running.

From this menu, you can also open the Management Console. The Management Console provides the configuration environment for VNE Server. The Management Console allows you to configure adapters, schedule them, and maintain device access information.

Table 2-5 Control Menu Summary

Menu Item	Description
Start VNE Services	Starts the VNE Server service framework.
Stop VNE Services	Stops the VNE Server service framework.
Management Console...	Opens the Management Console.
End of Table 2-5	

Starting VNE Services

Start VNE services from the Control menu as follows:

Procedure 2-8 Start VNE Services

1 Select **Control > Start VNE Services** from the Console menu bar.

➥ A progress box appears, which will display initialization information about service start-up. If services fail to start, a message box appears with failure information.

Note—When service initialization is complete, the Console elapsed time clock starts counting. As system events occur, depending upon adapter scheduling, they will be displayed by the Console.

End of Procedure 2-8

Stopping VNE Services

Stop VNE services from the Control menu as follows:

Procedure 2-9 Stop VNE Services

1 Select **Control > Stop VNE Services** from the Console menu bar.

➥ A confirmation box prompts you for whether or not you want to stop services.

2 Press **Yes** to stop services.

End of Procedure 2-9

Starting the Management Console

Start the management console from the Control menu as follows:

Procedure 2-10 Start the Management Console

1 Select **Control > Management Console** from the Console menu bar.

➥ The Management Console appears.

End of Procedure 2-10

Console Data Menu

The Console Data menu provides the selections shown in Table 2-6. The user interfaces for the utilities listed are covered later in this chapter.

Table 2-6 Data Menu Summary

Menu Item	Description
Report Manager...	Opens the Report Manager. The Report Manager is available regardless of whether VNE services are running.
Network Browser	Opens the Network Browser.
End of Table 2-6	

Start the report manager or network browser from the Console Data menu as follows:

Procedure 2-11 Start the Report Manager

1 Select **Data > Report Manager** from the Console menu bar.

➥ The Report Manager appears.

End of Procedure 2-11

Procedure 2-12 Start the Network Browser

1 Select **Data > Network Browser** from the Console menu bar.

➥ The Network Browser appears.

End of Procedure 2-12

Console Help Menu

The Console Help menu provides the selections shown in the menu summary table. From the Help menu, you can open the documentation package in Acrobat. The *About VNE Server* selection provides release information, a legal statement, and build manifest information for this product.

Table 2-7 Help Menu Summary

Menu Item	Description
VNE Server Help...	Opens the VNE Server documentation menu.
About VNE Server...	Opens information panels regarding VNE Server.
End of Table 2-7	

Event Viewer

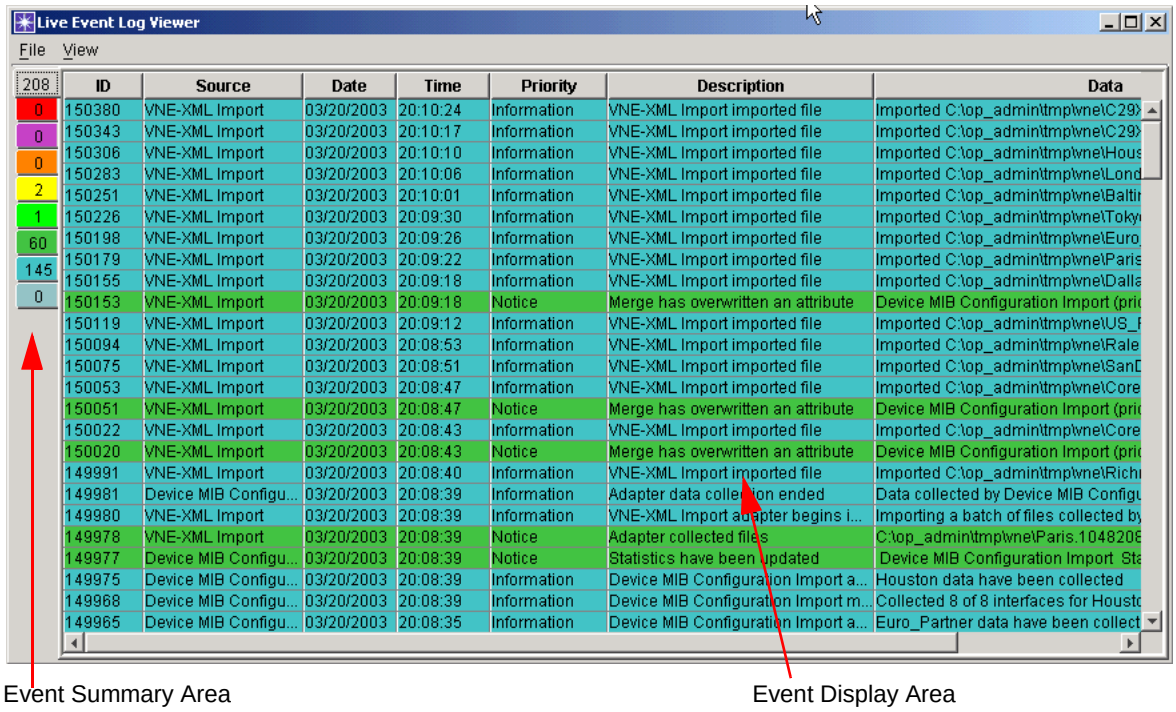
The VNE Server Console provides a high-level view of adapter and service operation. As each adapter or service runs, system events are generated that log low-level operations. To view these event logs, use the Event Viewer.

The event logs show adapter startup and work in progress events, and mark adapter completion. Some examples of logged events are

- Device login progress via telnet, Secure Shell, or other methods
- Device or third-party NMS access problems
- Adapter progress as collected files are parsed and converted to XML
- VNE-XML Import progress and network merge activities
- Device, interface, and link creation
- Deletion of network attributes from database by the Database Aging Service
- Event-based scheduling activity
- Network export activity

Events are assigned a color-coded severity ranging from *Emergency* to *Debug*. The Event Viewer gives you the ability to configure and filter the events to be shown. An example of the Event Viewer is shown below.

Figure 2-7 Event Viewer



Event Information

During VNE Server operation, the Event Viewer shows service framework and adapter events in the event display area. Each event has a severity ranging from *Emergency* to *Debug* level that has a corresponding color code. The color-coded event summary area along the left side of the Event Viewer window shows the total number of events of each severity that lie within the viewer's event buffer.

Table 2-8 Event Color Codes (Part 1 of 2)

Event Level	Color
Emergency	Red
Alert	Violet
Critical	Orange
Error	Yellow
Warning	Bright Green

Table 2-8 Event Color Codes (Part 2 of 2)

Event Level	Color
Notice	Dark Green
Information	Turquoise
Debug	Teal
End of Table 2-8	

Each event appearing in the display area is also written to an ASCII log file that is located in the VNE Server log directory. Each event provides the following information:

- **ID**—an event ID number
- **Source**—the source adapter for the event
- **Date**—the event date
- **Time**—the event time
- **Priority**—the event severity
- **Description**—a brief description of the event
- **Data**—additional data about the event

Event Selection and Navigation

Events can be viewed in a number of ways:

- Use a scroll bar on the right side of the Event Viewer window to scroll through the event display area.
- Click on an event severity category in the event summary area to only show events of a specific severity in the event display area.
- Use the event filter to select events for display based upon time, source and severity.
- Double-click on an event in the display area to open an Event Detail window.

You can display events of a specific severity by clicking the mouse on the severity color in the event summary display. When doing so, only events of the selected severity appear in the display area. This display mode is useful for looking at *Error* or *Critical* severity events. Click on the total event count block at the top of the event summary display to restore display of all events in the display area.

The Event Viewer View menu provides a Filter Events dialog that is used to select events for display based upon source, time, and severity. The event filter is the best way to view all the events from specific adapters. This dialog lets you specify a time interval and event severity for the events that are shown.

Procedure 2-13 Filter Events in Display Area

1. Select **View > Filter Events** from the Console menu bar.

   ➥ The Filter Options dialog opens.

2. Use the time selection controls to apply a start time, end time, or both, to the events shown.

3. Use the event source checkboxes to select the events to be shown.

4. Use the event severity checkboxes to select the severity class to be shown.

5. Press the **Apply** button to apply the event filter to the display area.

   Note—Press cancel to exit without applying any event filter changes.

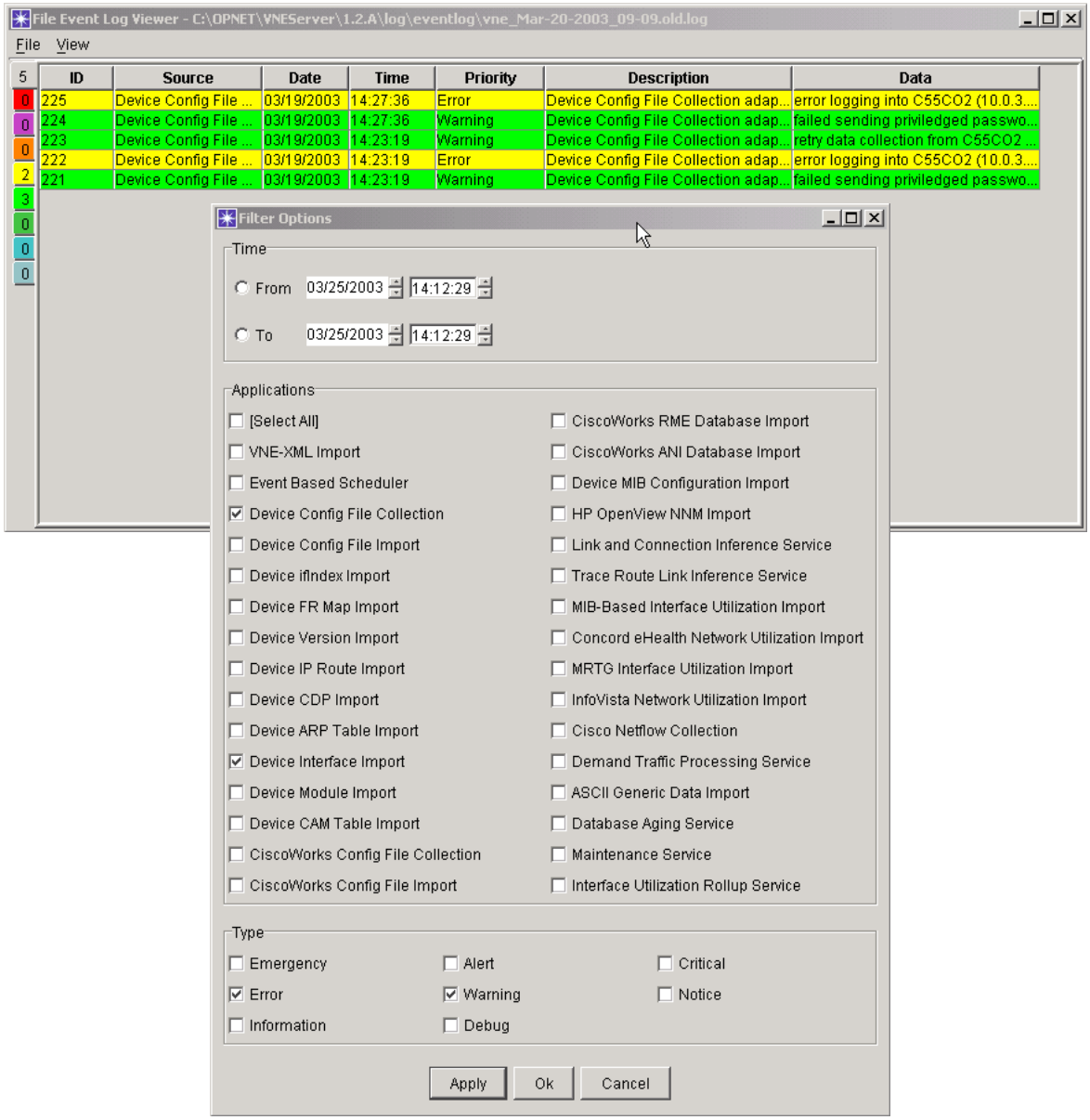
6. Press **OK** to exit the Filter Options dialog.

   Note—To remove any filtering from the events displayed in the Console, check all adapters and all severities (except Debug). Press **OK**.

End of Procedure 2-13

An event filtering example is illustrated in Figure 2-8. In this example, the Filter Options panel settings filter the events shown in the Console to those of *Warning* or *Error* severity that were generated by the Device Config File Collection adapter. In this example, no time settings were specified for the event filter.

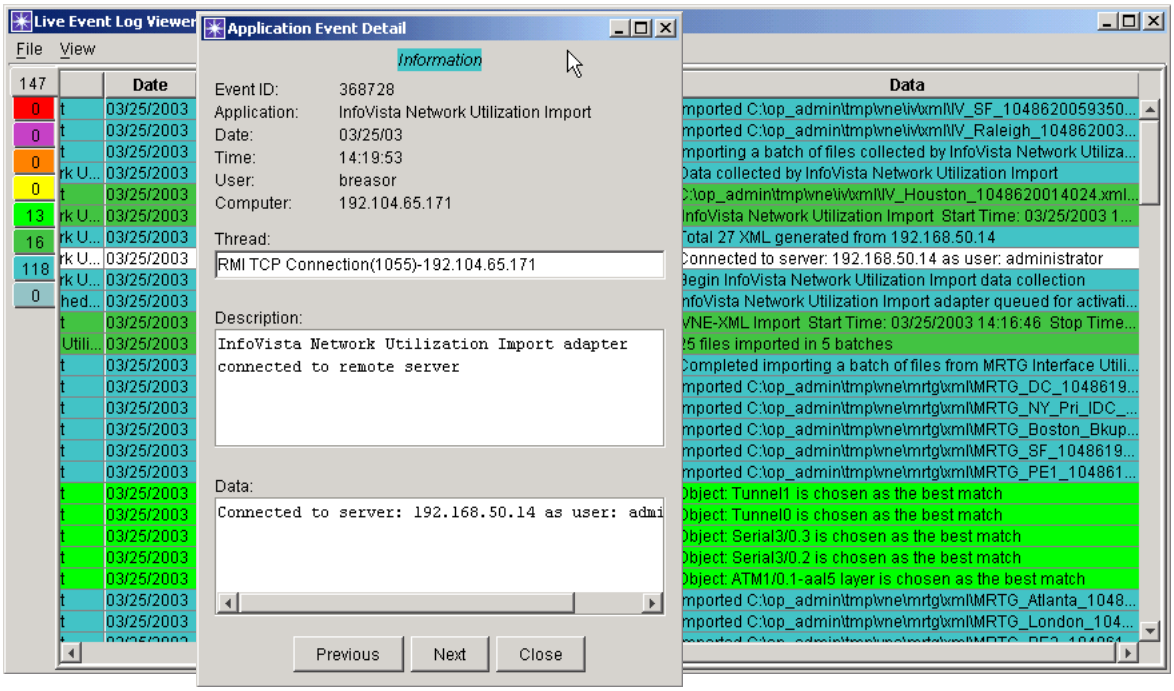
Figure 2-8 Filtering the Event Viewer Display



Procedure 2-14 View Events in Event Detail Window

1 Select the event you wish to see in a detail window by double-clicking on the event in the display area.

➥ The Event Detail window opens.



2 You can use the **Previous** and **Next** buttons to display surrounding events in the Event Detail window.

3 Press **Close** to exit the Event Detail window.

End of Procedure 2-14

Event Viewer File Menu

The File Menu provides the selections shown in the menu summary table.

Table 2-9 Event Viewer File Menu Summary

Menu Item	Description
New Console...	Opens a new Event Viewer window. Choose between Live Log and File Log options.
Save As	Saves the currently displayed events into a user specified file.
Close	Closes the current Event Viewer session.
End of Table 2-9	

- The New Console selection opens a new Event Viewer window. This selection has two choices: Live Log and File Log.
  - — The Live Log selection opens an Event Viewer that shows new events as they are created by the system.
  - — The File Log selection prompts you for an event log file, and opens an Event Viewer window that shows the events in the selected log file. A File Log viewer window is only used to view past events.
- The Save As selection lets you save events currently shown in the Event Viewer to a log file. This log file can be read by a Event Viewer File Log viewer.

Note—When combined with the event filter, the Save As option is the best way to capture events related to a problem for use by OPNET Technical Support. For more information on filing a case with OPNET Technical Support, see Filing an OPNET Technical Support Case on page VNE-A-21.

- The Close selection closes the Event Viewer window.

Event Viewer View Menu

The Event Viewer View menu provides the selections shown in Table 2-10. This menu contains all of the Event Viewer view control options.

Table 2-10 View Menu Summary

Menu Item	Description
All Events	Displays all VNE Server events in the Event Viewer.
Filter Events...	Opens a dialog window that allows you to filter the events to be displayed based upon time, event source, and severity.
Newest First	Displays the most recent events at the top of the event display.
Oldest First	Displays the oldest events at the top of the event display.
Rows...	Selects the number of events to be displayed by the Event Viewer.
Columns...	Selects the columns to be displayed by the Event Viewer.
Event Refresh...	Controls the event refresh rate used by the Event Viewer.
Clear	Clears the Event Viewer event display.
Refresh	Repaints the current Event Viewer display.
End of Table 2-10	

Using the Console to Monitor VNE Server

The VNE Server Console provides several UIs that allow you to monitor product operation. This section summarizes the benefits provided by each UI.

Console Status Panels

Use the System Status and Adapter Status panels provided by the Console to see which adapter or service is currently running. With these panels, you can determine which adapters and services have recently run, and which ones are about to run. These panels also show scheduling details about each adapter and service. The Status panels provide you with a high-level view of VNE Server operation.

Event Viewer

Use the Event Viewer to monitor event-level adapter and service operation. With the Event Viewer, you can see problems with adapter data collection or with the VNE Server environment. The Event Viewer provides you with a low-level view of VNE Server operation.

Adapter Statistics

Use the Adapter Statistics summary to monitor the outcome of each adapter session. This summary shows the sequence, duration, and key statistics of each adapter. Adapter Statistics provides you with a summary view of VNE Server operation.

Management Console

The Management Console gives you control over VNE Server system properties and configuration and is the interface used to configure the product. With the Management Console, you can do the following tasks:

- Define a project name to be used with the database
- Change the database account information
- Configure adapter properties
- Configure adapter schedules
- Manually run adapters
- Manage adapter merge priority
- Manage device access information
- Manage log file size and event log retention policy

User Interface Elements

The Management Console is organized as tabbed panels that group together related properties. The panels provided by the Management Console are

Table 2-11 Management Console Panels

Panel	Description
Project Properties	Contains global properties.
Database Properties	Contains database access properties.
Device Info File	Contains the location of the device file used by the Device and Platform Info panel to store device information.
Device and Platform Info	Contains device access information.
Adapter Schedule	Contains adapter schedules.
Adapter Priority	Contains adapter priority properties.
Adapter Resources	Contains adapter configuration properties.
Font Properties	Contains UI appearance properties.
Merge Rules	Contains the merge rules for nodes, links and groups.
End of Table 2-11	

Viewing and Editing Properties

The Management Console supports complex and simple properties. Complex properties are composed of other properties, both compound and simple. Simple properties have no children, which means that these properties are leaf nodes in the property tree. The properties in each panel are organized in an expandable, collapsible treeview. When you click on a property, it is highlighted and becomes the *focused* property. Complex properties are displayed with a file handle.

- To expand a complex property, click on the file handle when it shows a “+”.
- To collapse a complex property, click on the file handle when it shows a “-”.

To change a simple property, click on the property. Depending upon the type of data represented by the property, a pull-down menu, text field, file or directory selector will appear for you to specify changes to the property. After you have edited the property, click on a nearby property to shift focus away from the property just changed. The changes just made to the edited property are now visible.

The properties supported by the Management Console are stored in resource files located in the <*install dir*>*lib**xml**res* directory. When you save changes to properties in the Management Console, these files are updated with the new value of the property. Changes to properties in the *Adapter Resource* panel are used the next time that the affected adapter runs. Changes to other properties take affect when VNE Server services are stopped and restarted.

The bottom of each Management Console panel has the following control buttons.

- **Apply**—Saves changes to the resource files.
- **OK**—Saves changes to the resource files and closes the console.
- **Cancel**—Closes the console without saving property changes.

Advanced Editing

The Management Console provides the ability to clone, copy, paste, and delete both complex and simple properties. The following buttons are provided in the panels that support this capability:

Table 2-12 Buttons Used When Editing Properties

Button	Description	Details
New Child	Creates a child property under a complex property.	The New Child button is only available when a complex property has focus. Clicking on this button opens a dialog from which you choose whether the new property is simple or complex. The newly created property is a child of the property under focus when the New Child button was pressed.
New Sibling	Copies the property to a new, adjacent property.	The New Sibling button is used with both simple and complex properties. This button clones the property under focus when New Sibling is pressed. The new property is placed at the same level, and adjacent to the focused property. A good example of the use of this button is to add an additional MRTG server to the configuration for the MRTG adapter.
Copy	Copies a property to a paste buffer.	The Copy button is used to copy simple or complex properties to the paste buffer.
Paste	Creates a new property from the paste buffer.	The Paste button is used to paste the properties in the paste buffer to a child position under a complex property.
Delete	Deletes the property under focus.	The Delete button simply deletes the property which has focus. A confirmation box asks if you really want to delete the property.
End of Table 2-12		

After you create a new child or sibling property, you can click on the property name to get focus on the name, and then change the name. This is useful when creating new Concord, MRTG, or ASCII import properties because you can give a meaningful name to the new property.

WARNING—When you use New Sibling, New Child, or Paste to create a new, complex property, press the **Apply** button to save the new property before doing any further edits to the property. Doing so ensures that the changes are saved properly to the underlying resource file. After the new property is saved, you can rename the property or do additional editing.

Note—When you add properties to a tree, they always go to the end of the list.

The ability to clone and copy properties and customize them is required in several circumstances:

- Adding a new device type to the Device Config File Collection setup.
- Extending the collection dialog in Device Config File Collection setup.
- Adding additional Concord, InfoVista or MRTG servers.
- Adding additional ASCII Generic Data Import override files.

The remaining sections discuss each Management Console panel and its properties.

Project Properties

The *Project Properties* panel contains global properties that describe the VNE Server operating environment. The properties supported by this panel are shown below.

Table 2-13 Project Properties

Property	Description
projectName	The project name used for data storage.
rootTempDir	The location of the temp file directory (Not supported).
rootLockDir	The location of the lock file directory.
deviceMap	The location of the device map file.
port number to application type map	The location of the port definitions file.
adapterStatsDir	The location of the adapter statistics log.
VNESfeatures	Used to configure database archiving and RMID logging. See VNESfeatures Property Tree for more information.
debug	Used to enable debug mode and set debug level.
End of Table 2-13	

Note—Properties in this panel that are not described in more detail here are fixed properties that require no user action. They are set during installation based upon the install path.

Refer to Managing Projects on page VNE-5-5 in the Administration chapter for more information about choosing a project name.

VNESfeatures Property Tree

The VNESfeatures property tree supports the following features:

- **archiving**—Controls archiving of element history (TRUE/FALSE).
- **logging**—Manages the RMID log file.

When the **archiving** property is set to TRUE, element history is maintained in the database. This allows reports and the network browser to show details about the original, previous, current, and most recently observed values of a network attribute. When archiving is set to FALSE, no element history is maintained.

The **logging** properties control logging of RMID events. The **shouldLogToFile** property turns on logging when set to TRUE. The other properties set the file name, location, and maximum size.

Device Info File

The *Device Info File* panel contains properties that describe the device info file. This is the file used to populate the device info table in the *Device and Platform Info* panel. The device info file provides access information (addresses and login information) for the devices that VNE Server polls. The properties supported by this panel are shown below.

- **Device Info File Location**—Points to the device info file. The default location and name of the device info file is: *<install dir>\input\DeviceInfo\deviceInfo.txt*. The device info file can be named anything, and be located anywhere as long as this property points to the file. The *Device and Platform Info* panel uses the properties in this panel to access the device file.
- **delimiter**—Field separation delimiter for the device file. The default field delimiter for the device info file is a tab. The other choices from the delimiter pull-down menu are: *comma*, *semicolon* and *space*.

Note—Consider placing the device info files for your networks outside of the VNE Server installation directory. Doing so eliminates the need to copy device info files from an old installation directory to a new directory following a software upgrade.

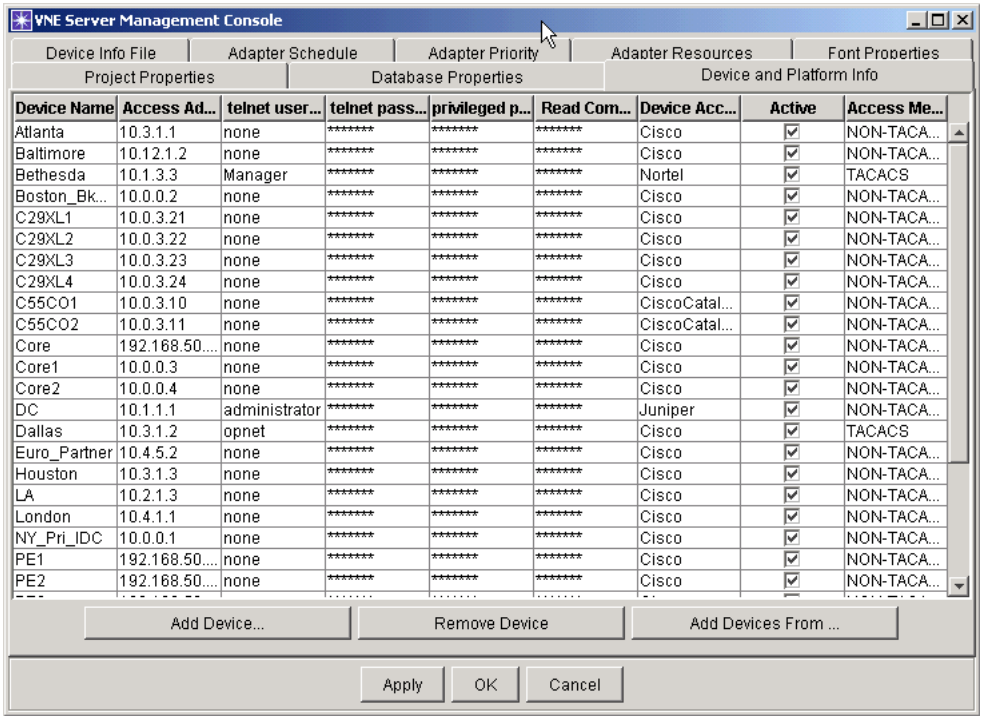
Device and Platform Info

The *Device and Platform Info* panel is used to manage the device access information that VNE Server uses to poll devices in your network. This panel supports the following tasks:

- Importing device access information from CiscoWorks, Concord or HP OpenView files.
- Importing device access information from the VNE Database.
- Adding new devices to the device access list.
- Removing devices from the device access list.
- Changing access information for an existing device.
- Enabling or disabling of data collection for devices.

An example of the *Device and Platform Info* panel is shown below.

Figure 2-9 Device and Platform Info



The visible fields in each device entry are

Table 2-14 Fields for Device and Platform Info Panel

Field	Description
Device Name	Specifies the hostname of the device.
Access Address	Specifies the network address used to access the device.
telnet username	Specifies the username for telnet or SSH access.
telnet password	Specifies the password for the telnet or SSH account.
privileged password	Specifies the password for the privileged exec mode.
Read Community	Specifies the SNMP read community string.
Device Access Script	Specifies the sequence of expected prompts and commands (login and show commands) for this device type.
Active	Activates or inactivates direct collection for the device.
Access Method	Specifies non-TACACS, TACACS, or SSH.
End of Table 2-14	

The password and community string fields are encrypted both at the file level and in the Device and Platform Info display.

Note—The device type and vendor subtypes defined for the Device Config File Collection adapter in the Adapter Resources panel are used to populate the Device Access Script field.

Format of the Device Info File

The device info file can also be constructed off-line in an editor such as Wordpad or in a spreadsheet program. When doing so, note the fields and order shown below. Except for the hidden fields, the fields match the display order.

- **Device Name**—hostname of the device
- **Access Address**—network address used to access the device
- **telnet username**—username used to login to the device
- **telnet password**—password used to login to the device
- **privileged password**—password for privileged exec mode
- **Read Community**—SNMP community string
- **Device Access Script**—access script for device vendor or vendor subtype
- **Active**—activates all collection types for the device
- **hidden field**—an obsolete field that must be present. Set to false.
- **hidden field**—an obsolete field that must be present. Set to false.
- **hidden field**—an obsolete field that must be present. Set to false.
- **Access Method**—non-TACACS, TACACS, or SSH

Valid field delimiters are: *tab*, *comma*, *semicolon,* and *space*.

Adding a Device to the Device Info File

Procedure 2-15 Adding a Device

1 From the *Device and Platform Info* panel, press **Add Device**.

➥ The New Device dialog opens. An example is shown.

2 Fill in each field with access information about the new device.

Note—For the Device Vendor and Access Method fields, use the pull-down menu to select the correct value for the field.

3 Press **Apply** to save the changes.

Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-15

Removing a Device from the Device Info File

Procedure 2-16 Remove a Device

1 Select the device entry by clicking on the entry.

➥ The device entry is highlighted.

2 Press **Remove Device**.

➥ The device entry is removed from the table.

3 Press **Apply** to save the changes.

Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-16

Using a CiscoWorks inventory File to Create a Device Info File

Procedure 2-17 Adding Devices from CiscoWorks Inventory File

Note—To obtain a CiscoWorks inventory file for use in this procedure, refer to Collecting a CiscoWorks Inventory File on page VNE-5-39 in the Administration chapter.

1 Press **Add Devices from...**

➥ A menu with a list of import sources opens.

2 Select **CiscoWorks Inventory File**.

➥ A standard file selection dialog opens.

3 Use the file selection dialog to select the CiscoWorks inventory file to be imported, and press **Select**.

➥ New devices appear in the device list that have been created from the CiscoWorks inventory file.

Note—Devices created from CiscoWorks inventory file are missing information from some fields. Fill in the empty fields before you save the changes.

4 Press **Apply** to save the changes.

Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-17

Using a Concord dci file to Create a Device Info File

Procedure 2-18 Create a Device Info File from a Concord dci File

1 Press **Add Devices from...**

➥ A menu with a list of import sources opens.

2 Select **Concord Config File**.

➥ A standard file selection dialog opens.

3 Use the file selection dialog to select the Concord dci file to be imported. Press **Select**.

➥ New devices appear in the device list that have been created from the Concord dci file.

Note—Devices created from Concord dci files are missing information from the following fields: telnet username, Device Type, Access, and Access Method. Fill in these fields before you save the changes.

4 Press **Apply** to save the changes.

Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-18

Using HP OpenView NNM Server to Create a Device Info File

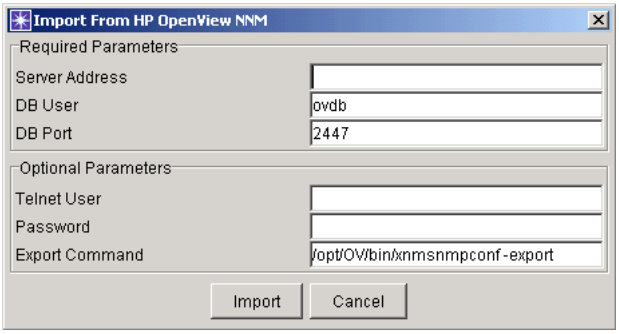
Procedure 2-19 Create a Device Info File Using HP OpenView NNM

1 Press **Add Devices from...**

➥ A menu with a list of import sources opens.

2 Select **HP OpenView NNM Server**.

➥ An import dialog opens as shown.



3 Fill in the server access fields and press **Import**.

➥ New devices appear in the device list that have been created from the HP OpenView NNM Server.

Note—Devices created from HP OpenView are missing information from some fields. Fill in the empty fields before you save the changes.

4 Press **Apply** to save the changes.

Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-19

Using the Contents of the VNE Database to Create a Device Info File

Procedure 2-20 Create a Device Info File from VNE Server Database

1. Press **Add Devices from...**

   ➥ A menu with a list of import sources opens.

2. Select **VNE Database**.

   ➥ Devices in the database are added to the device list in the Device and Platform Info panel. Devices are inactive, by default.

3. Click on the checkbox in the Active field to enable collection from a device.

4. Check each field in the entry and correct or add data as needed to complete the entry.

   Note—Cisco devices are populated as using a Device Access Script named Cisco Systems. For these devices, change the Device Access Script to Cisco.

   Note—Device entry changes do not take effect until VNE Server services have been stopped and restarted.

End of Procedure 2-20

Using the Active Checkbox to Control Device Data Collection

The Active field in the Device and Platform Info table controls whether data collection occurs for a given device. When checked, adapters such as Device Config File Collection and Device MIB Configuration Import attempt to collect data from the device. When unchecked, the device is skipped during data collection.

The main use of the Active field is to change collection status of a device for troubleshooting purposes. This can be done on a device by device basis, or for each device in the table.

- To enable or disable collection for all devices in the table, right-click in the Active field heading to open a menu. The menu choices are: *all active* and *all inactive*. Choose one to change the state of all devices to the desired state.
- To work with a small number of devices, *disable all* using the Active menu, and click in the Active check boxes to enable the devices you want to test. When done, use the Active menu to enable all devices for operational data collection.

Backup the Device Info File

When device access configuration is complete for your network, you should save the device info file somewhere outside of the VNE Server environment. Should the operational file within the VNE Server environment become corrupt for some reason, recovery is easier if you work from a backup copy. You can also recover by populating a new file from the VNE Database, as previously described.

Adapter Schedule

The *Adapter Schedule* panel controls the scheduling policy for each adapter. With this panel, you can enable or disable each adapter, create one or more schedules for each adapter, or manually run an adapter.

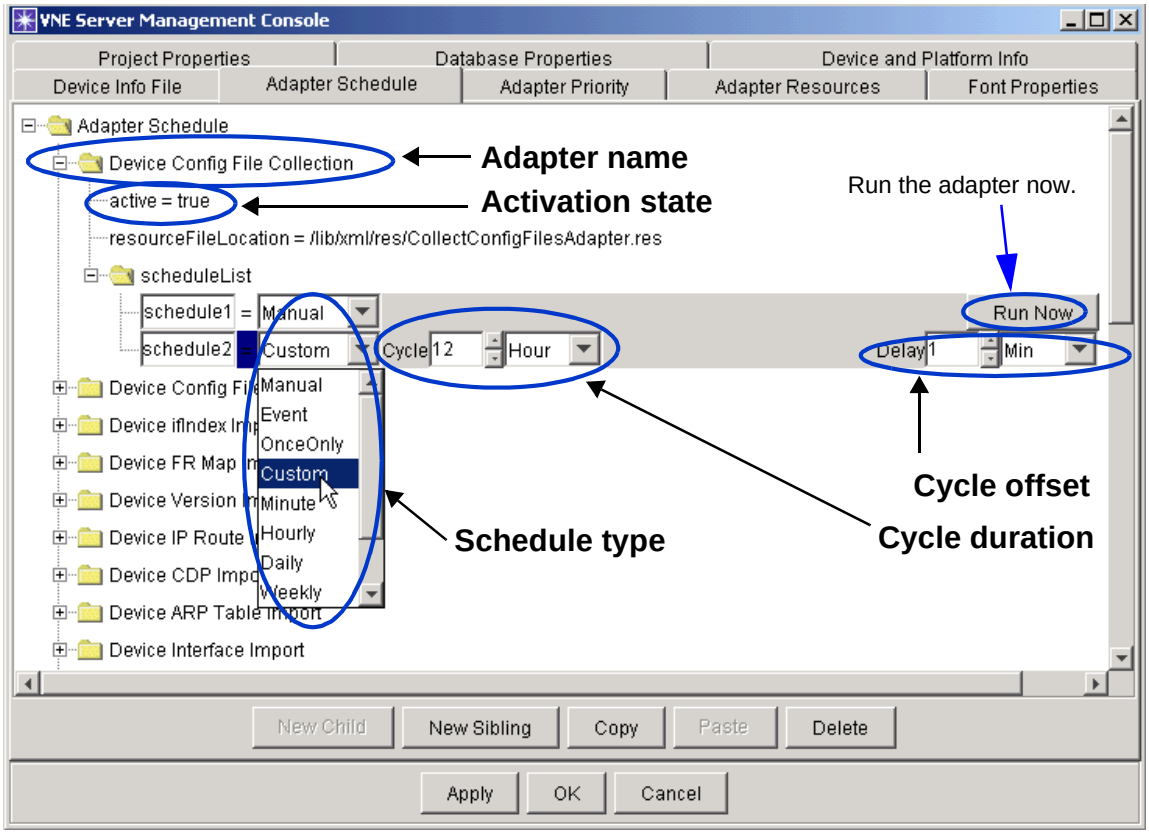
VNE Server provides complete flexibility with adapter scheduling. Both time-based and event-based scheduling are supported.

- With time-based scheduling, adapters are set up to run at specified times or intervals.
- With event-based scheduling, an adapter is triggered to run by an event raised from another adapter. Event-based scheduling allows you to chain adapters together in a sequence.

More than one schedule can be created for an adapter (using **New Sibling**) with all the schedules being jointly active.

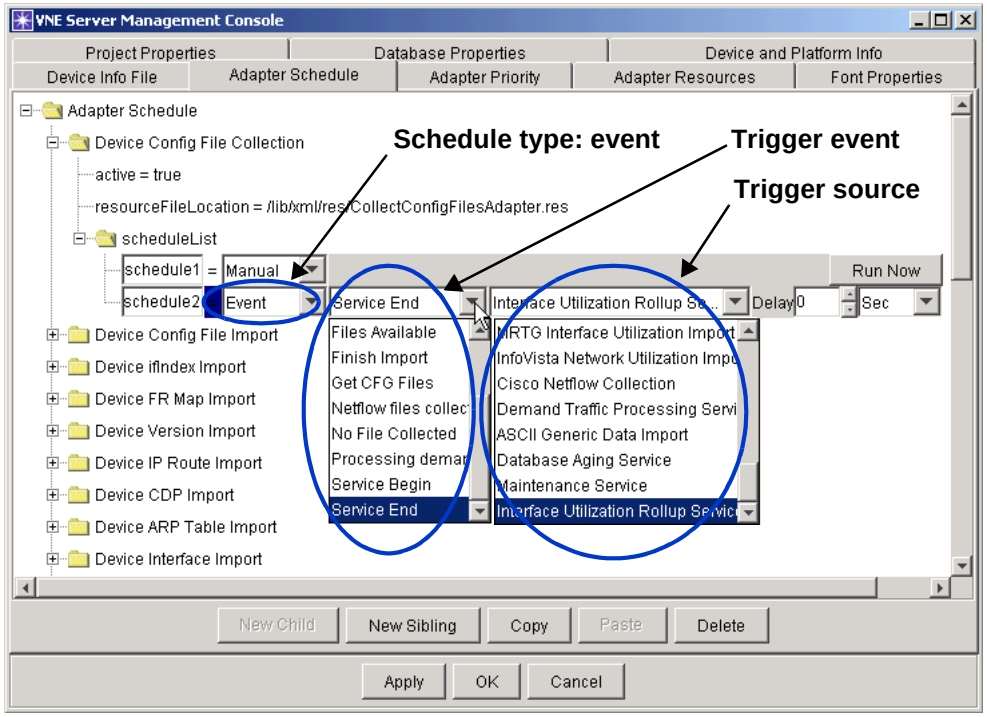
Additionally, an adapter can also be manually run at any time by pressing the **Run Now** button for the Manual schedule. An example of this panel is shown in Figure 2-10. In this example, the Device Config File Collection adapter is enabled. The Custom schedule provides a 1 minute delay between the start of VNE Server services and first execution of this adapter. A 12 hour cycle time means that this adapter runs every 12 hours.

Figure 2-10 Time-Based Scheduling



An example of event-based scheduling is shown in Figure 2-11. In this example, the Device Config File Collection adapter is enabled and will be triggered by the Service End event from the Interface Utilization Rollup Service. Whenever the Interface Utilization Rollup Service finishes running, it raises a Service End event. The VNE Server scheduler uses this event to trigger the Device Config File Collection adapter to run.

Figure 2-11 Event-Based Scheduling



Adapter Priority

The *Adapter Priority* panel gives you the ability to configure the adapter merge priority for each network attribute. Since the data collected by an adapter can overlap with data collected from another adapter, VNE Server uses a priority scheme to determine which adapter's data is used in the network model. The goal is to always use the most trustworthy data for each network attribute. The default settings for adapter priority should produce the most accurate network model. The *Adapter Priority* panel provides the ability to configure merge priorities, should you need to alter merge priorities.

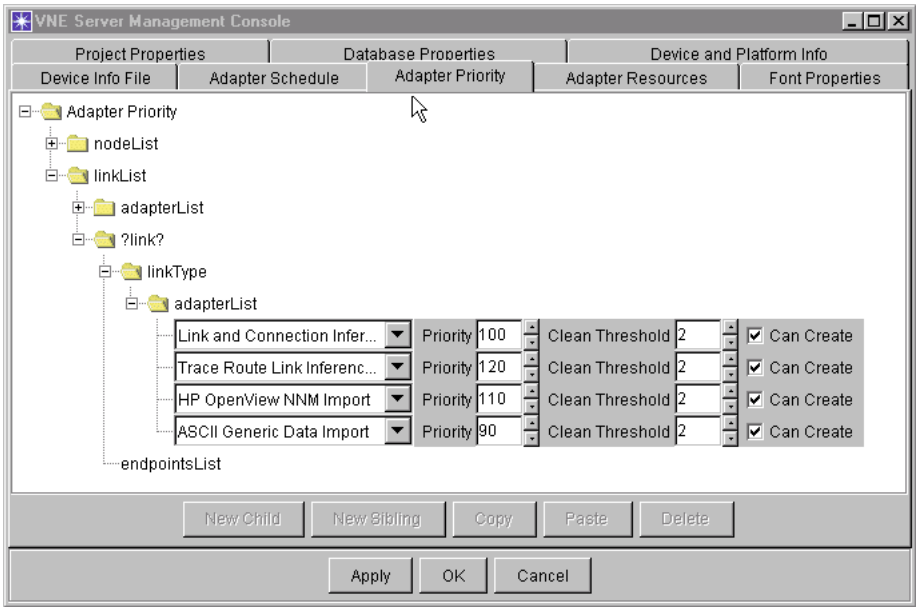
For each network attribute listed in this panel, you can

- Set a merge priority from 1..n for each adapter's data
- Set a clean threshold from 1..n for each adapter's data
- Control whether the adapter can create a new device, interface or subinterface
- The **lowest merge priority** number represents the most trustworthy data. That is, data from an adapter with a merge priority of 1 will replace data from an adapter with a merge priority of 2 or greater.

- The **clean threshold** represents the number of times an adapter runs, without seeing a network attribute that it introduced, before the Database Aging Service removes the attribute from the network model.
- The **Can Create** property controls whether an adapter is allowed to introduce a new node, interface or subinterface to the network model. This property is useful for preventing stale data from being introduced to the network model from third-party NMS platforms.

An example of the Adapter Priority panel is shown in Figure 2-12. In this example, the linkList linkType attribute is expanded to show which adapters can contribute link data to the network model. The ASCII Generic Data Import adapter has the most trustworthy data, since you create it, and is assigned a merge priority of 90. The Link and Connection Inference adapter has the next most trustworthy data, and is assigned a merge priority of 100. The HP OpenView NNM Import adapter and Trace Route Link Inference Service can also create links, but have lower priorities since their data is less trustworthy. Each adapter has a clean threshold of 2 and is allowed to create a link.

Figure 2-12 Adapter Priority Panel



Adapter Resources

The *Adapter Resources* panel contains the configuration properties for each adapter and service offered by VNE Server. Each time an adapter runs, it initializes itself from the properties contained in this panel. Some examples of adapter properties are

- Timeout and retry values governing device access by the adapter
- Vendor specific configuration collection commands

- Platform and database access properties for third-party NMS platforms
- The location of working directories or control files

The Adapter Resources panel uses the same expandable property treeview that is used throughout the Management Console. Each adapter has its own property tree. For more information about each adapter and its configurable properties, refer to the Adapters and Services chapter.

Font Properties

The *Font Properties* panel gives you control over the visual appearance of menu labels, menu items, table headers and tooltips. In this panel, you can change the font name, style and size for each property. The changes effect menu appearance in the Console, Network Browser and Report Manager. Property changes take effect after you exit and re-enter VNE Server.

Merge Rules

The *Merge Rules* panel gives you the ability to configure the rules used to match and merge nodes, interfaces, links and groups into the network model. Each category supports multiple rules. Each rule can be set active or inactive and has a weight property that determines which data merge rule takes precedence.

Report Manager

The *Report Manager* gives you the ability to view predefined reports about the network information collected by VNE Server. A wide selection of reports are available, ranging from node, interface, and link summaries to device level access lists and routing tables. Report Manager gets the information from the network database and formats it for display. Once displayed, the report can be searched, sorted, detached, printed, or exported to text, HTML, or CSV formats.

Report Summary

The Report Manager provides access to reports from the following categories:

- Configuration—Reports containing network configuration information.
- Inventory—Reports containing network inventory information.
- Utilization - Reports containing interface utilization information.
- Demands—Reports containing traffic demand information.
- Troubleshooting—Reports containing troubleshooting information about data collection, import and the content of the network model.

A summary of the reports by category is provided in the following tables.

Table 2-15 Configuration Reports

Report Title	Description
Access List Statistics	Displays access list statistics such as the number of access lists, average lists per device and lines per list.
Access List Summary	Displays the Access Lists on each device.
Adapter Discrepancy	Displays network attributes for which data sources show differing values.
Configuration Summary	Displays a network-wide total of the number of devices and interfaces configured for each protocol.
Group Membership Configuration	Displays the device groups defined for the network, group members and subgroups contained in groups.
Import Blocker Summary	Displays devices and attributes for which import blocking has been configured,
Interface (Port) Status Summary by Group	Displays interface (or port) status for each device in a defined group.
Interface (Port) Status Summary by Group - Detailed	Displays more details on interface status across groups and devices broken out by interface type.
IP Routing Table	Displays the IP routing table for each device.
LAN Interface (Port) Status Summary by Group	Displays LAN interface (or port) status for each device in a defined group.
LAN Interface (Port) Status Summary by Group - Detailed	Displays more details on LAN interface status across groups and devices broken out by interface type.
Neighbor Discovery Protocol Configuration	Displays whether a neighbor discovery protocol such as CDP is enabled for each device interface in the network.
Network Summary	Displays summary statistics of network content - devices by vendor, interfaces and links by type.
Router Protocols	Displays the protocols for each device and interface.
Router Protocol Summary - OSPF	Displays OSPF areas and statistics about the number of devices and interface types in each area.
Router Protocol Summary - EIGRP	Displays EIGRP processes and statistics about the number of devices and interface types in each process.
(Report Group) System Change - Last (time period)	Displays a summary of detected system changes over the time interval specified in the report title.
End of Table 2-15	

Table 2-16 Inventory Reports (Part 1 of 2)

Report Title	Description
Adapter Collection	Displays the adapters that have collected data on the devices and interfaces in the network.
Adapter Discovery	Displays the network elements that have only been detected by a single adapter.
Alias Summary	Shows the alias name (a network address) associated with each device in the network.
Asset Inventory	Displays the hardware configuration of each device in the network.
ATM PVC Summary	Displays ATM PVCs by link type for each device.
ATM SVC Summary	Displays ATM SVCs by link type for each device.
ATM-FR PVC Summary	Displays ATM-FR PVCs by link type for each device.
Autonomous System Summary	Displays the devices in each Autonomous System in the network.
Chassis Module Summary	Displays the modules in each device chassis.
Connected Components	Displays the connected component to which each device belongs.
Device Address	Displays interface, address, and chassis information for each device in the network.
Device and Vendor Summary (System Object ID)	Displays a network-wide total of the number of devices by vendor, and model (sysoid for chassis).
Device and Vendor Summary (System Description)	Displays a network-wide total of the number of devices by vendor, and model (sys descr for chassis).
Discovered Neighbors	Displays the discovered neighbors for each device.
DNS Alias Summary	Displays DNS alias for each device interface.
FR PVC Summary	Displays the Frame Relay PVCs in the network.
Interface (Port) Status	Displays totals for interface types by vendor.
Interface Summary	Displays interface details for each device.
IP Subnets	Displays the IP subnets and device addresses on each subnet for the network.
IP Static Routes	Displays the static routes for each device.
Link Summary	Displays the links found in the network.
Node Connections	Displays device connections to other devices.

Table 2-16 Inventory Reports (Part 2 of 2)

Report Title	Description
Node Summary	Displays the devices found in the network.
Physical Link Summary	Displays the physical links in the network.
Routing Module Summary	Displays the routing modules and their host device chassis,
Software Version Summary	Displays a network-wide total of the number of devices at a specific software version.
VC Summary	Displays a virtual circuit summary across all technologies.
Traffic Rollup Summary	Displays statistics on the utilization rollup by source and category.
Voice Connection Summary	Displays voice connections by link type, device and interface.
End of Table 2-16	

Table 2-17 Utilization Reports

Report Title	Description
(Report Group) ATM and FR PVC Utilization	Displays ATM and Frame Relay PVC utilization statistics by collector type (eHealth, MRTG etc.)
Interface Util - MIB - Based - Top 5	Displays interface utilization statistics obtained from VNE Server's MIB-Based Interface Utilization Import adapter.
Interface Util - eHealth - Top 5	Displays interface utilization statistics obtained from a Concord eHealth system.
Interface Util - MRTG - Top 5	Displays interface utilization statistics obtained from a MRTG server.
Interface Util - StatScout - Top 5	Displays interface utilization statistics obtained from a StatScout server.
Interface Util - InfoVista - Top 5	Displays interface utilization statistics obtained from an InfoVista server.
Interface Util - All Collectors/All Samples	Displays interface utilization statistics obtained from all adapters. Shows all samples.
Physical Link Utilization - eHealth	Displays utilization for the network's physical links.
End of Table 2-17	

Table 2-18 Demands Reports

Report Title	Description
Demands - Source/Destination Pairs - Last Hour	Displays the last hour of DetailCallRecords for each source, destination pair.
Demands - Subnet Traffic - Last Hour	Displays the last hour of DetailCallRecords for each subnet.
Demands - Application Types - Last Hour	Displays the last hour of DetailCallRecords by application type.
Demands - Summary of Mapped and Unmapped Demand Endpoints	Displays the number of mapped and unmapped demand endpoints.
Demands - All Demand Records	Displays all traffic demand records.
End of Table 2-18	

Table 2-19 Troubleshooting Reports (Part 1 of 2)

Report Title	Description
Adapter Merge Warnings (Devices merged)	
Adapter Merge Warnings (Interfaces merged)	
Chassis -- missing routing modules	Displays device chassis in the network that do not appear to contain routing modules.
Device Config File Collection Errors	Displays a list of devices for the latest config file collection cycle that had file collection problems.
Device MIB Configuration Import Errors	Displays a list of devices for the latest MIB collection cycle that had collection problems.
Duplicate IP Address	Displays devices in the network with duplicate IP addresses.
Duplicate Interface Indexes	Displays devices in the network with duplicate interface indexes.
Duplicate MAC Address	Displays devices in the network with duplicate MAC addresses.
Duplicate Serial Numbers	Displays devices in the network with duplicate module serial numbers.
Duplicate sysNames	Displays devices in the network with duplicate sysNames.
Invalid Files	Displays information about collected config files that are viewed as invalid and cannot be processed.
Isolated Node Summary	Displays a list of devices that are not connected to anything else in the network.

Table 2-19 Troubleshooting Reports (Part 2 of 2)

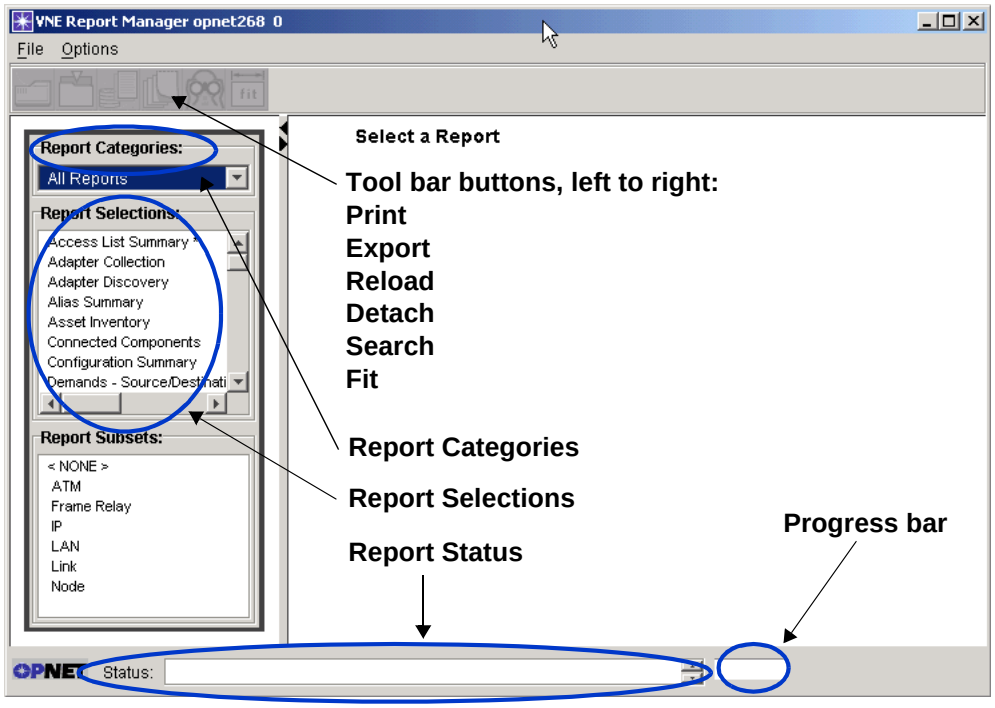
Report Title	Description
Neighbors Not Found in Model	Displays a list of devices that are not in the network model, but are seen as neighbors to devices in the network model (via CDP and equivalent protocols).
Network Troubleshooting Snapshot	Displays a snapshot summary of network troubleshooting information. Contains connectivity summary, collection error summary and more.
Routing Modules -- missing chassis	Displays a list of routing modules that appear to not have a parent chassis.
SysName Not Set	Displays a list of devices for which the sysName has not been set.
SysName-Prompt Mismatch	Displays a list of devices where the sysName and prompt do not match.
End of Table 2-19	

Starting the Report Manager

Procedure 2-21 Starting the Report Manager

1 Select **Data > Report Manager** from the Console menu bar.

➥ After a brief delay, the Report Manager window opens. An example is shown below.



End of Procedure 2-21

In addition to a standard menu bar, the Report Manager consists of a tool bar, a Report Categories menu, a Report Selections menu, a Report Subsets menu, a report display area, a status line, and a progress bar.

Selecting Reports

The Report Manager provides a growing list of reports. To make it easier to find the report you want, the report list can be grouped by subject. The left panel of the Report Manager window is divided into the following areas: *Report Categories*, *Report Selections,* and *Report Subsets*. The selections made in the Report Categories and Report Subsets areas determine what reports are displayed in the Report Selections area. To view a report, choose a selection from the Report Selections area.

The Report Categories are: *All Reports*, *Configuration*, *Inventory*, *Utilization*, and *Demands*. When you select a category in the list, the list updates the report choices displayed in the Report Selections area, grouping them by category.

The Report Subsets are: *None*, *ATM*, *Frame Relay*, *IP*, *LAN*, *Link* and *Node*. When you select a subset in this list, the list updates the report choices displayed in the Report Selections area, grouping them by subset.

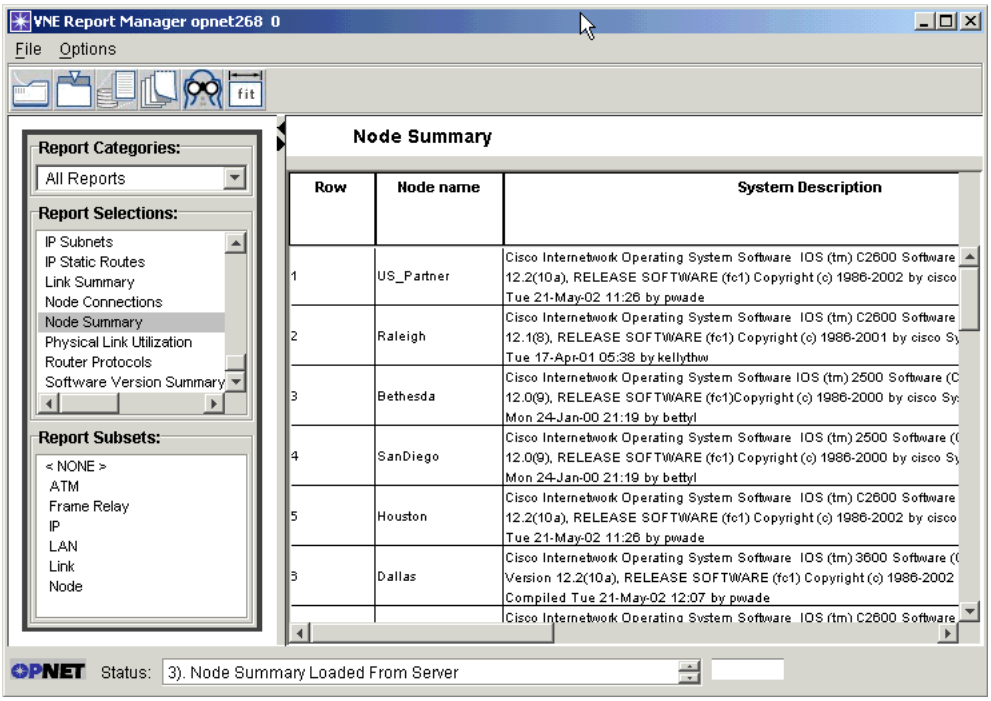
Viewing a Report

Procedure 2-22 Viewing a Report

1. (Optional) Use Report Category and Report Subset selections to prune the list of reports displayed in the Report Selections area.

2 Select the report that you want to view from the reports listed in the Report Selections area.

➥ The report progress bar indicates that the report is being retrieved. When retrieval is done, the selected report is displayed in the display area. An example is shown.



Note—The report status line indicates any errors that occur during report generation.

End of Procedure 2-22

Altering the Appearance of a Report

Once a report is displayed, you can alter its appearance. You can resize the Report Manager window or individual columns. You can also rearrange columns by dragging them to a new location. To do this, click on the column, hold down the mouse button, and drag the column to its new location in the report display area.The bar that divides the left and right display areas is movable so you can create more display room in one of the areas.

Printing and Exporting a Report

Once a report is displayed, you can print it, or export it to a file. To print the report, select **File > Print** from the menu bar. To export a report, select **File > Export** from the menu bar. An *Export Report* dialog opens. Use this dialog to choose between ASCII or HTML file formats. Select a file name for the exported report. For ASCII formats, choose between *Space*, *Tab,* and *Other* for the field delimiter. Press **OK** to export the report.

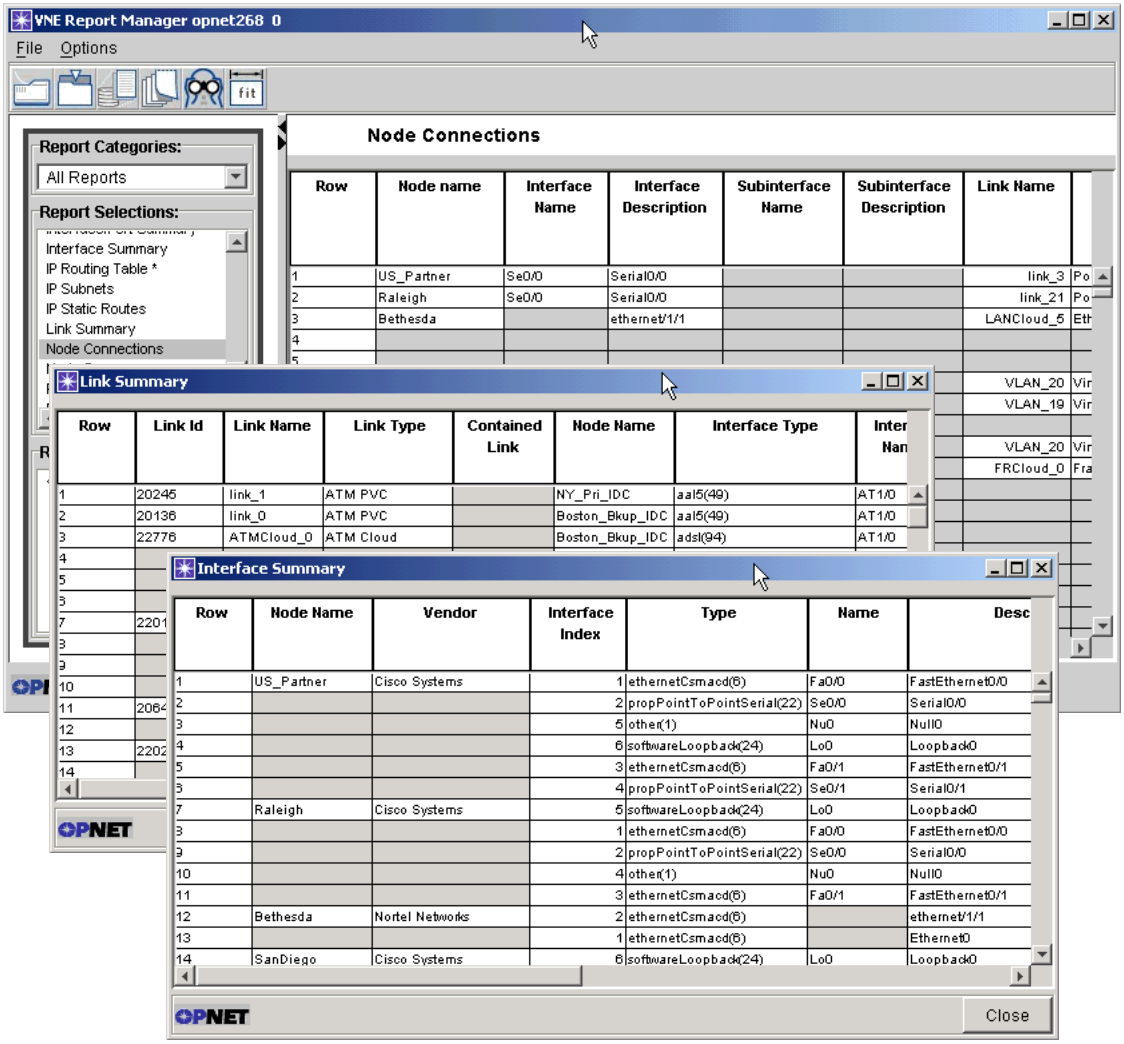
Searching a Report

Once a report is displayed, you can search the report by pressing the **Search** button on the tool bar. A *Search* dialog box opens. Enter the search string in the *Find:* text-field, and press **Find Next** or **Find All**. The Find Next button locates and highlights the next search match. The Find All button locates and highlights all matches in the report. Other search options allow you to ignore case, match a word, or to search backward.

Comparing Reports

The Report Manager provides a tool bar button for detaching a report from the main Report Manager window. The detach feature is useful for looking at several reports and comparing data between them. A detached report is displayed in a “tear-away” report window which has no menus or buttons. To detach the report currently being displayed in the Report Manager window, press the **Detach** button. An example of detached reports is shown below.

Figure 2-13 Detached Reports



Viewing Element History

Some report fields contain *element history*. This is defined on a report by report basis for each field. Element history for a network attribute shows which adapters have seen the attribute and when they collected the data.

Procedure 2-23 Viewing Element History

1. Select and view the report of interest.

   ➥ The selected report opens in the Report Manager display area.

2. Click on the network attribute

   ➥ The selected report field is highlighted.

3. Right-click the mouse to open an options menu.

   ➥ An options menu opens.

4. Select *element history* from the options menu.

   ➥ A window opens and shows element history for the selected attribute.

End of Procedure 2-23

The following two windows show how to display element history for an interface.

Figure 2-14 Selecting Element History for an Interface

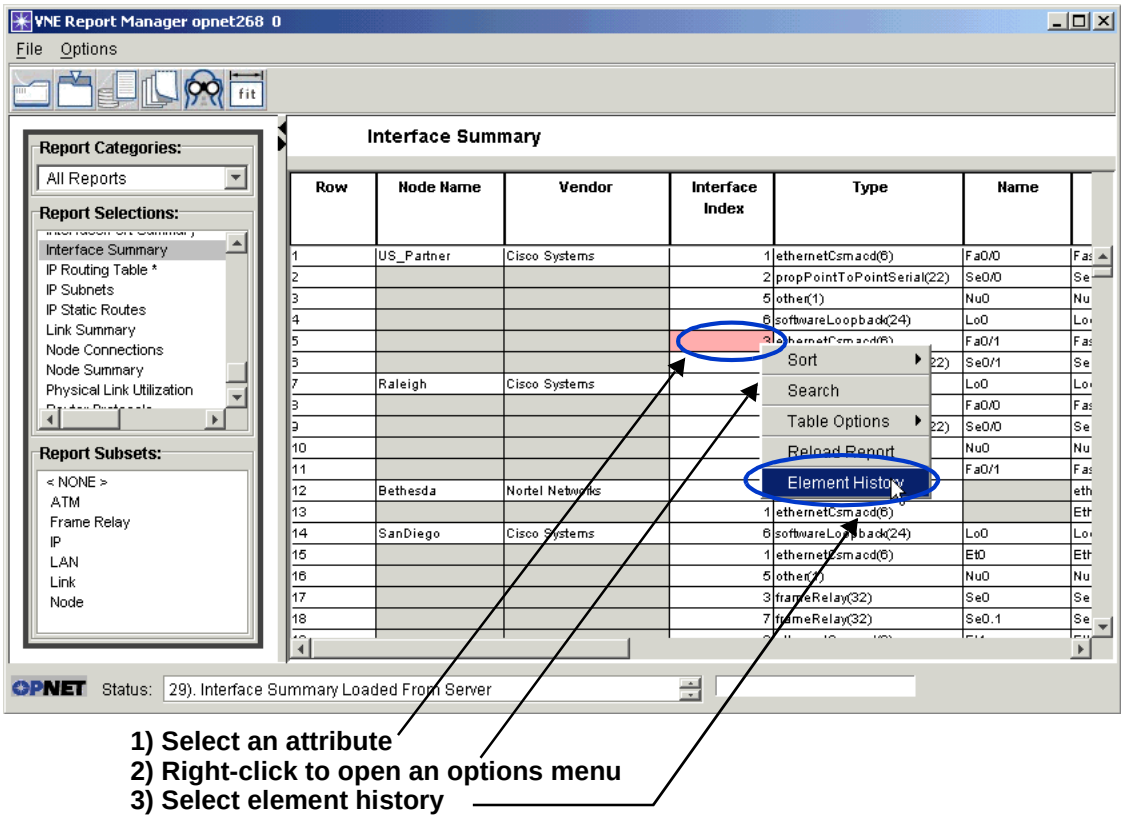
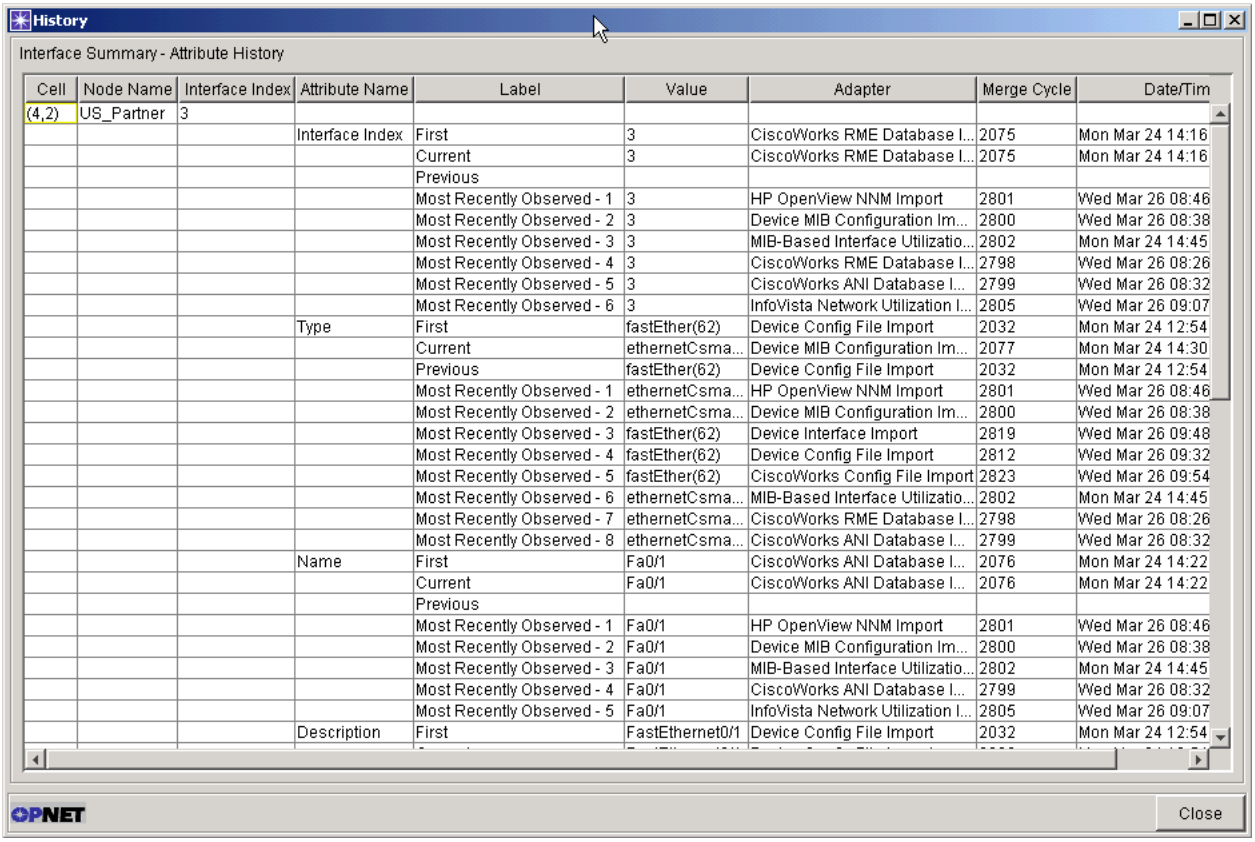


Figure 2-15 Element History for an Interface



Cell	Node Name	Interface Index	Attribute Name	Label	Value	Adapter	Merge Cycle	Date/Tim
(4,2)	US_Partner	3						
			Interface Index	First	3	CiscoWorks RME Database I...	2075	Mon Mar 24 14:16
				Current	3	CiscoWorks RME Database I...	2075	Mon Mar 24 14:16
				Previous				
				Most Recently Observed - 1	3	HP OpenView NNM Import	2801	Wed Mar 26 08:46
				Most Recently Observed - 2	3	Device MIB Configuration Im...	2800	Wed Mar 26 08:38
				Most Recently Observed - 3	3	MIB-Based Interface Utilizatio...	2802	Mon Mar 24 14:45
				Most Recently Observed - 4	3	CiscoWorks RME Database I...	2798	Wed Mar 26 08:26
				Most Recently Observed - 5	3	CiscoWorks ANI Database I...	2799	Wed Mar 26 08:32
				Most Recently Observed - 6	3	InfoVista Network Utilization I...	2805	Wed Mar 26 09:07
			Type	First	fastEther(62)	Device Config File Import	2032	Mon Mar 24 12:54
				Current	ethernetCsma...	Device MIB Configuration Im...	2077	Mon Mar 24 14:30
				Previous	fastEther(62)	Device Config File Import	2032	Mon Mar 24 12:54
				Most Recently Observed - 1	ethernetCsma...	HP OpenView NNM Import	2801	Wed Mar 26 08:46
				Most Recently Observed - 2	ethernetCsma...	Device MIB Configuration Im...	2800	Wed Mar 26 08:38
				Most Recently Observed - 3	fastEther(62)	Device Interface Import	2819	Wed Mar 26 09:48
				Most Recently Observed - 4	fastEther(62)	Device Config File Import	2812	Wed Mar 26 09:32
				Most Recently Observed - 5	fastEther(62)	CiscoWorks Config File Import	2823	Wed Mar 26 09:54
				Most Recently Observed - 6	ethernetCsma...	MIB-Based Interface Utilizatio...	2802	Mon Mar 24 14:45
				Most Recently Observed - 7	ethernetCsma...	CiscoWorks RME Database I...	2798	Wed Mar 26 08:26
				Most Recently Observed - 8	ethernetCsma...	CiscoWorks ANI Database I...	2799	Wed Mar 26 08:32
			Name	First	Fa0/1	CiscoWorks ANI Database I...	2076	Mon Mar 24 14:22
				Current	Fa0/1	CiscoWorks ANI Database I...	2076	Mon Mar 24 14:22
				Previous				
				Most Recently Observed - 1	Fa0/1	HP OpenView NNM Import	2801	Wed Mar 26 08:46
				Most Recently Observed - 2	Fa0/1	Device MIB Configuration Im...	2800	Wed Mar 26 08:38
				Most Recently Observed - 3	Fa0/1	MIB-Based Interface Utilizatio...	2802	Mon Mar 24 14:45
				Most Recently Observed - 4	Fa0/1	CiscoWorks ANI Database I...	2799	Wed Mar 26 08:32
				Most Recently Observed - 5	Fa0/1	InfoVista Network Utilization I...	2805	Wed Mar 26 09:07
			Description	First	FastEthernet0/1	Device Config File Import	2032	Mon Mar 24 12:54

Report Manager File Menu

The Report Manager File menu provides the selections shown in the menu summary table.

Table 2-20 File Menu Summary

Menu Item	Description
Reload	Reloads the current report.
Export...	Exports the current report to ASCII text or HTML file.
Print...	Prints the current report.
Close	Closes the Report Manager.
End of Table 2-20	

Report Manager Options Menu

The Report Manager Options menu provides the selections shown in the menu summary table.

Table 2-21 Options Menu Summary

Menu Item	Description
Cache	Not supported in VNE Server.
Table Options	Use to fill or clear empty cells.
Sort	Use to sort report columns in ascending or descending order. Sorting only works on single-level reports.
Show	Use to show or hide the Report Category and Report Subset selection areas.
End of Table 2-21	

Network Browser

The Network Browser provides a Windows Explorer style UI for viewing your network. The browser is updated dynamically as network data changes occur. The browser window is divided into 2 panels: navigation and display.

The navigation panel provides an expandable treeview of your network. At the top level of the view is the network. The network consists of devices, which contain interfaces, interface properties, protocol configuration, and many other properties. The network also contains links, VLANS and clouds. Network elements selected in the navigation panel are shown in the display panel.

You can also use the Network Browser to delete selected items from the network model and to also block import of model attributes and even entire devices from one or more sources.

Starting the Network Browser

Procedure 2-24 To start the Network Browser, do the following steps.

1 Select **Data > Network Browser** from the Console menu bar.

➥ After a brief delay, the Network Browser window opens.

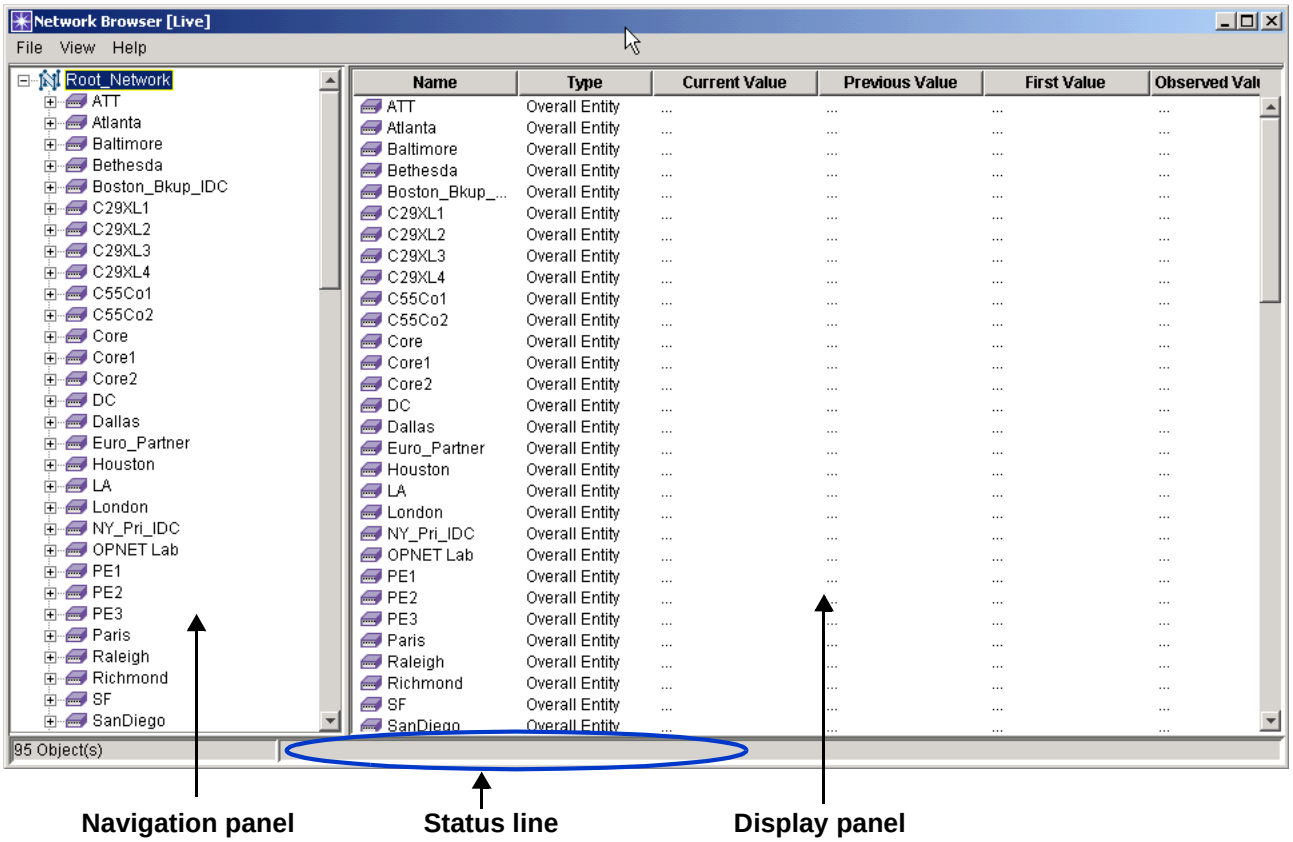
Note—When the Network Browser first opens, only the top level Root_Network is visible. Click on the expansion handle, or double-click on the Root_Network to expand the view to show all network devices and links. Repeat this process to expand any property in the network tree which contains other properties.

End of Procedure 2-24

Once the browser is open and a network element is selected, data pertaining to the element appears in the display panel with the following fields:

- Name—The name of the displayed element.
- Type—The type of element: Interface, Configuration, Attribute, etc.
- Current Value—The current value of the element.
- Previous Value—The previous value of the element.
- First Value—The first observed value of the element.
- Observed Value—A list of observed values from each source adapter.

Figure 2-16 Network Browser



In the navigation panel, you can right-click on an entry to open a menu with a Refresh selection. Clicking on Refresh results in a forced refresh and redisplay of the element's data from the VNE database.

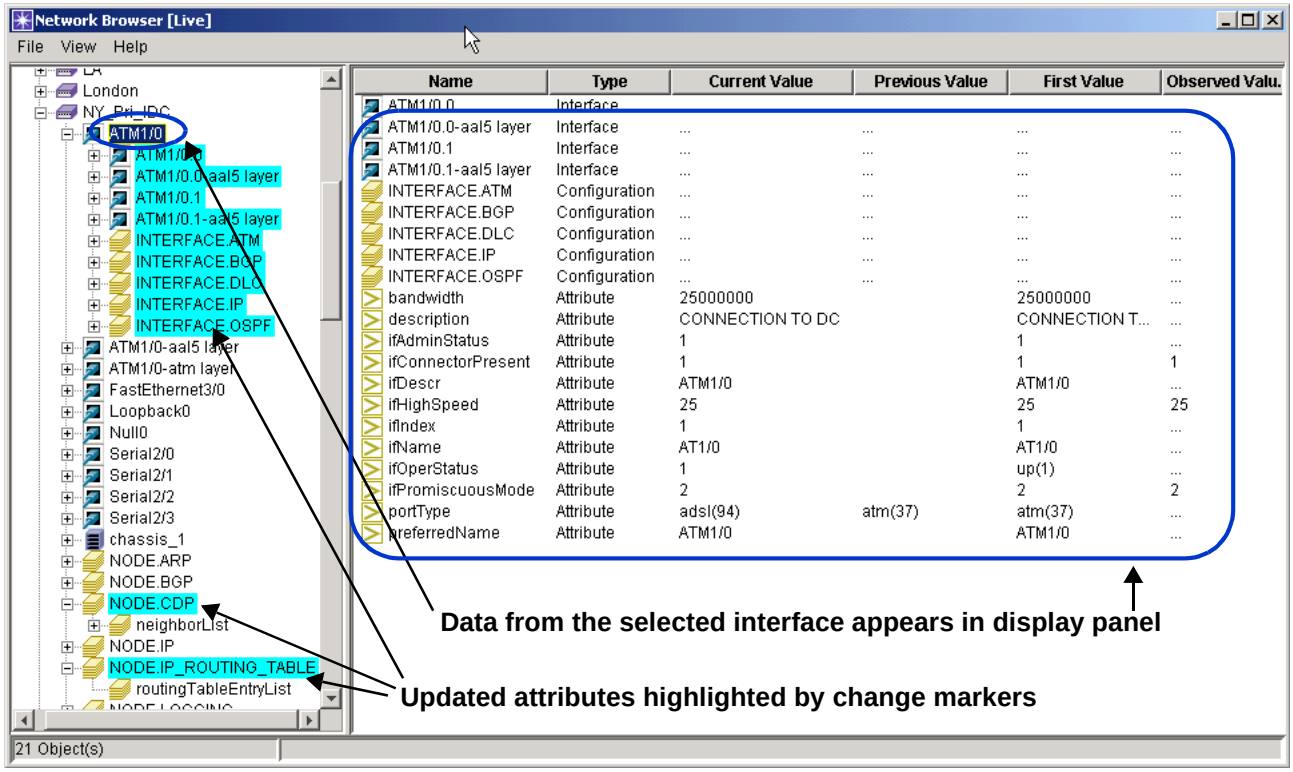
In the display panel, you can right-click on an entry and open a menu with the following selections:

- View Text—Displays the element in a text field viewer
- History Detail—Displays the element history in a window. You can also double-click on an entry in order to display history details.

If Change Markers are enabled in the View menu, elements which are updated by the browser are highlighted. Note that this does not mean that the element changed value, just that its value is updated.

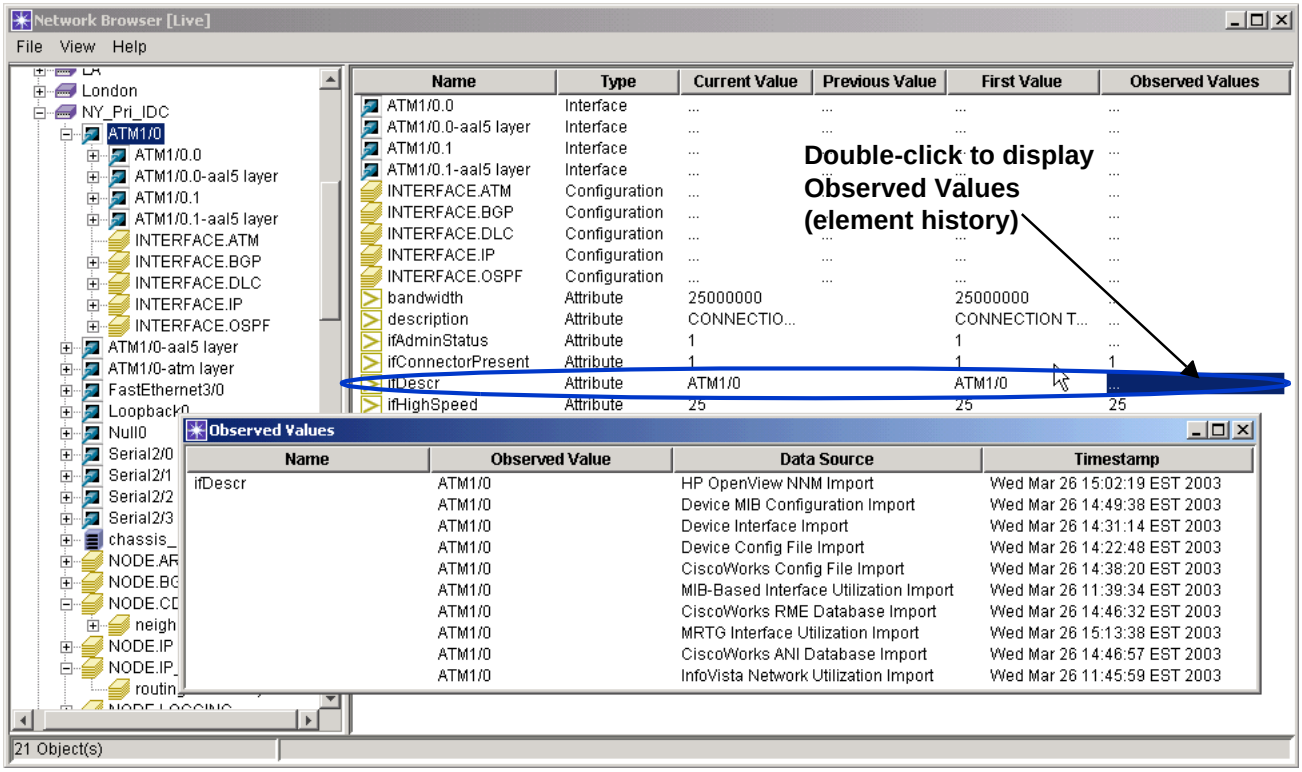
An example of the data for an interface is shown.

Figure 2-17 Expanded Interface Data in the Network Browser



The following figure shows an example of element history for the ifDescr field of an interface. In the Observed Values window, the value, source adapter, and timestamp are shown for ifDescr.

Figure 2-18 Using Network Browser to View Element History



Viewing element history is a good way to spot whether all the adapters that see an element are bringing in the same value. For example, an interface *ifSpeed* may not get the same value from all adapters. An adapter that gathers incorrect data from an incorrectly configured third-party NMS platform can degrade model accuracy. Element history provides a powerful tool for diagnosing this type of problem.

You can also use the Adapter Discrepancy report in the Report Manager for this purpose.

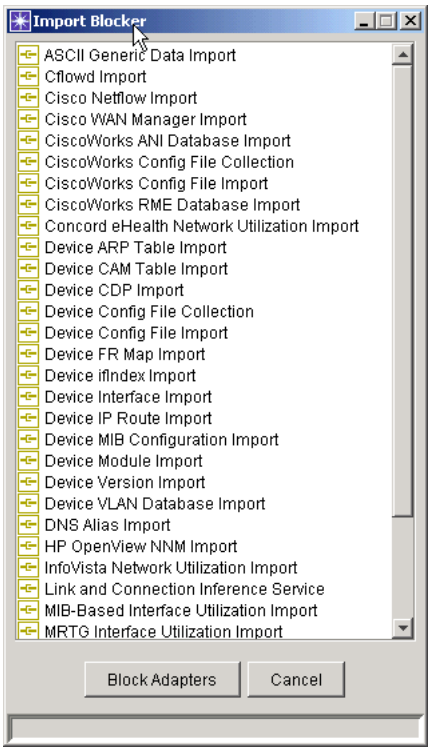
Deleting Network Elements and Blocking Import

You can use the Network Browser to delete devices or device attributes from the network model. You can also mark devices or their attributes so they cannot be imported by specific adapters.

To delete a device or device attribute from the database, select the item in the display view and right-click to open a menu. Select **Delete** from the menu. When the deletion request is imported by VNE Server, the selected item is removed from the database.

To block import of a device or device attribute, select the item in the display view and right-click to open a menu. Select **Import Blocker** from the menu. A dialog box opens as shown below.

Figure 2-19 Import Blocker Dialog



Select the adapter you wish to block as data sources for this item and press **Block Adapters**. You can use the shift key to select contiguous groups of adapters. Use the CTRL key to select multiple adapters that are not listed together.

if you wish to delete a device or attribute and then block import from a given source, block import first and then delete the item.

Note—Unless you use the Network Browser to delete an item after you block it from future import, the device or attribute will persist in the network model until the Database Aging Service removes it after the configured number of merge cycles.

Network Browser Menus

The Network Browser has the following menus: File, View, and Help.

- The File menu provides a Close selection that is used to exit the browser.
- The View menu provides the selections shown in the following table.

Table 2-22 View Menu Summary

Menu Item	Description
Historical Data	Enable or disable display of attribute history.
Change Markers	Enable or disable display of attribute change (update) markers.
Nodes	Enable or disable display of devices (nodes).
Links	Enable or disable display of links.
Clear Change Markers	Clear any attribute change markers.
End of Table 2-22	

The Help menu gives you a Request Monitor selection that opens a window displaying the dialog between the Live Network Browser and the internal Live Update Server. The Request Monitor is useful for collecting information for OPNET Technical Support.

For normal operation, leave the Request Monitor closed. To use the Request Monitor, VNE Server must be running in debug mode. This mode is set by the debug property in the Project Properties panel of the Management Console.

WARNING—Do not leave the Request Monitor window open for extended periods of time. Doing so will result in the use of excessive memory resources.

Group Browser

VNE Server provides the ability to define, view and maintain groups of devices with the Group Browser. These device groups are used for the following purposes:

- Exporting a portion of the network model
- Blocking import from specified adapters for one or more devices

By grouping devices, you can reduce the network portions you import into OPNET analysis software, based on what you wish to study. With device grouping, you can define your network boundary (i.e., the device list) to create groups that define an area of study. Defining groups within VNE Server merely tags devices within the database as to their group association. No underlying reorganization of the database is performed, so there is no performance penalty from grouping devices.

Some attributes of device grouping are

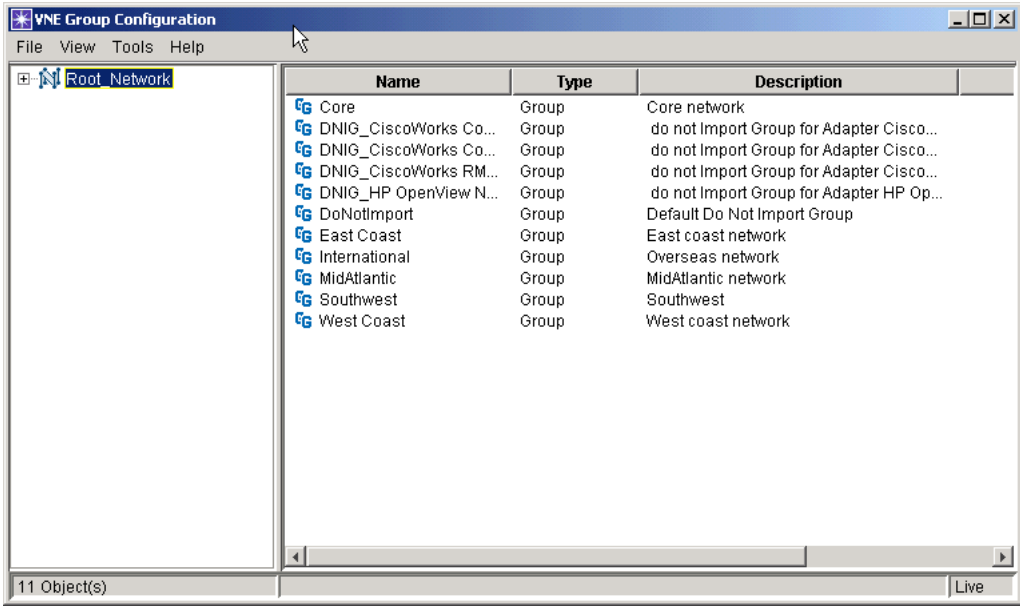
- Devices can appear in more than one group.
- Grouping can be done while VNE Server services are running.
- Groups can be used to build larger groups.
- A group can be composed of both subgroups and individual devices.

Using the Group Browser

Procedure 2-25 Starting the Group Browser

1 Select **Control > Group Configuration** from the Console menu bar.

➥ After a brief delay, the Group Browser window opens.



Note—When the Group Browser first opens, only the top level Root_Network is visible. Click on the expansion handle, or double click on the Root_Network to expand the view to show all groups.

End of Procedure 2-25

Procedure 2-26 Create and Populate New Groups

1 Open Group Browser, as described in Procedure 2-25.

2 Right-click on the **Root_Network** object in the left panel of the browser.

➥ A menu appears.

3 Select **Create New Group in Root_Network**.

➥ A dialog box appears.

4 Fill in the Group Name and Group Description fields, and press **Create**.

Once a group is created, populate the group with the devices and groups that compose the group.

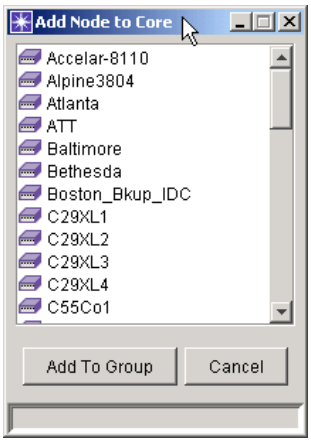
5 Select the group name in the right panel.

6 Right-click to open a menu.

7 Select **Add Node** or **Add Sub-Group** from the menu.

8 Select the devices or groups to be added to the current group, and press **Add to Group**.

➥ A dialog box opens as shown below.



End of Procedure 2-26

Note—Changes made to groups via the Group Browser do not take effect until the resulting XML files are imported by VNE Server. After making a group change, use the VNE Server Console to monitor import status.

Note—A special group exists which is named **DoNotImport**. This group contains a list of devices and attributes that are blocked from being imported by the selected source. The group also may contain groups and subgroups.

Once groups are defined and imported into the database, they are visible to OPNET analysis software (10.0 PL2 or later) for selection during model import. The Import from VNE Server dialog in the OPNET analysis software provides panels that are used to select the groups to be imported from VNE Server. Refer to the Importing a VNE Server Network Model into the OPNET analysis software section in the Operation chapter for more information.

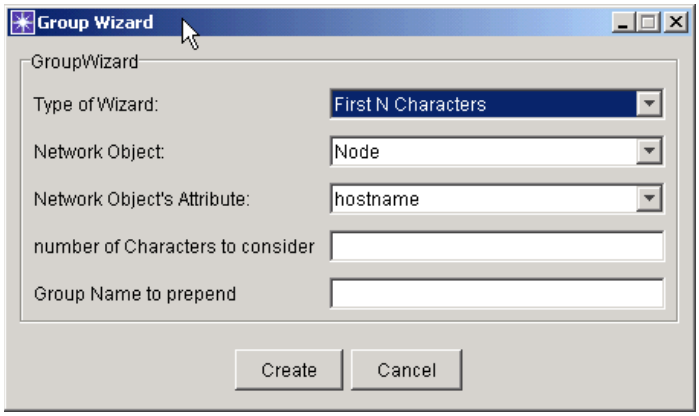
While group creation and maintenance is easy, manual group creation can be tedious for a large network with many groups. Depending upon the device naming conventions used in you network, you may be able to use the Group Wizard to ease this task. The Group Wizard allows you to automatically create and populate groups based upon the number of common leading characters in device names. If you use common device naming prefixes based upon location, network hierarchy, or function, you can use the Group Wizard to automate group creation.

Using the Group Wizard

Procedure 2-27 Starting the Group Wizard

1 Select **Tools > Group Wizard** from the Group Browser menu bar.

➥ After a brief delay, the Group Wizard window opens.



2 Fill in the **number of Characters** field with the number of common characters in your device naming convention.

3 Fill in the **Group Name to Prepend** field with any text that you wish to have prepended to group names created by the wizard. This field may be left blank.

4 Press **Create**.

End of Procedure 2-27

Preferences

VNE Server adds the following preferences to OPNET.

vne_import_dbox_start_function

Specifies the name of the function to invoke to start the VNES import wizard.

Type	string
Default Value	“Vne_Import_Dbox_Start”

vne_import_ior_file

Specifies the IOR file that stores information about connecting to VNE Server.

Type	string
Default Value	“”

vne_import_post_operation_function

Specifies the name of the function used to perform operations after a VNES import.

Type	string
Default Value	“Vne_Import_Post_Operation”

vne_import_post_operation_library

Specifies the name of the library containing the post-operation function specified by vne_import_post_operation_function.

Type	string
Default Value	“vne_import_postproc”

vne_import_postproc_function

Specifies the name of the function to invoke for VNES import post-processing.

Type	string
Default Value	“Vne_Import_Postproc_Default”

vne_import_process_library

Specifies the name of the library containing the VNES import post-processing function specified by vne_import_postproc_function.

Type	string
Default Value	“vne_import_postproc”

vne_import_ssm_directory

Specifies the name of the directory used to store server modeling (ssm) import files after VNES import.

Type	string
Default Value	“”

vne_import_state_destroy_function

Specifies the name of the function used to destroy the VNES state.

Type	string
Default Value	“Vne_Import_State_Destroy”

vne_import_state_library

Specifies the name of the library containing the functions used to register and destroy the VNES state.

Type	string
Default Value	“vne_import_postproc”

vne_import_state_register_function

Specifies the name of the function used to register the VNES state.

Type	string
Default Value	“Vne_Import_State_Register”

3 Adapters and Services

Introduction

As described in the Overview chapter, VNE Server provides a comprehensive selection of data collection adapters and framework services. This chapter describes how to configure each adapter and service provided by VNE Server.

Device Config File Collection

The Device Config File Collection adapter collects current configuration information from specified network devices by means of telnet or secure shell (SSH) access. A user generated device access information file, called the *Device Info File*, directs the adapter to each device in the network. The Device Info File contains all the information that VNE Server requires to log on to each device and obtain configuration information. The information includes hostname, IP address, passwords, and vendor. The Device Info File is discussed in more detail in section Device and Platform Info on page VNE-2-29 of the User Interface chapter.

When the Device Config File Collection adapter remotely connects to a device, it issues the vendor-specific commands for collecting the configuration information for the device. The adapter captures the output from these commands and stores it in files at a default location within the VNE Server temporary directory. The vendor devices currently supported by VNE Server are: Cisco routers (IOS and Integrated IOS), Cisco Catalyst devices (IOS and CatOS), Juniper routers (JUNOS), Nortel Networks routers (BayRS), and Nortel Networks Passport 8000 series devices.

The commands used to collect configuration data for each vendor device type are provided in Table 3-1:

Table 3-1 Configuration File Collection Commands by Vendor (Part 1 of 2)

Device Type	Supported Commands
Cisco routers (IOS-based)	show running-config show frame-relay map show version show vtp status show ip route show cdp neighbors detail show arp show interfaces show vlan show mac-address-table dynamic
Cisco Catalyst devices (IOS- and CatOS-based)	show config all or show running-config show frame-relay map show version show ifindex (Catalyst 4000: show port ifindex) show arp show module show cam dynamic show mac-address-table dynamic (Catalyst 6000) show cdp neighbors detail show vlan show vtp status
Juniper routers (JUNOS-based)	show configuration
Nortel routers (BayRS-based, supporting the Bay Command Console or BCC)	show config -all

Table 3-1 Configuration File Collection Commands by Vendor (Part 2 of 2)

Device Type	Supported Commands
Nortel Passport devices	show config verbose show vlan info all show ports info all
Extreme devices	show config detail show edp show iparp show fdb show iproute
Foundry devices	show running-config show fdp neighbors detail show interfaces
End of Table 3-1	

You can schedule the Device Config File Collection adapter to run at intervals that you specify during VNE Server configuration. Each time the adapter runs and connects to a specific device, it uses the command sequences you specified in the configuration properties to collect data.

The top-level hierarchy for the configuration properties supported by this adapter are described in Table 3-2.

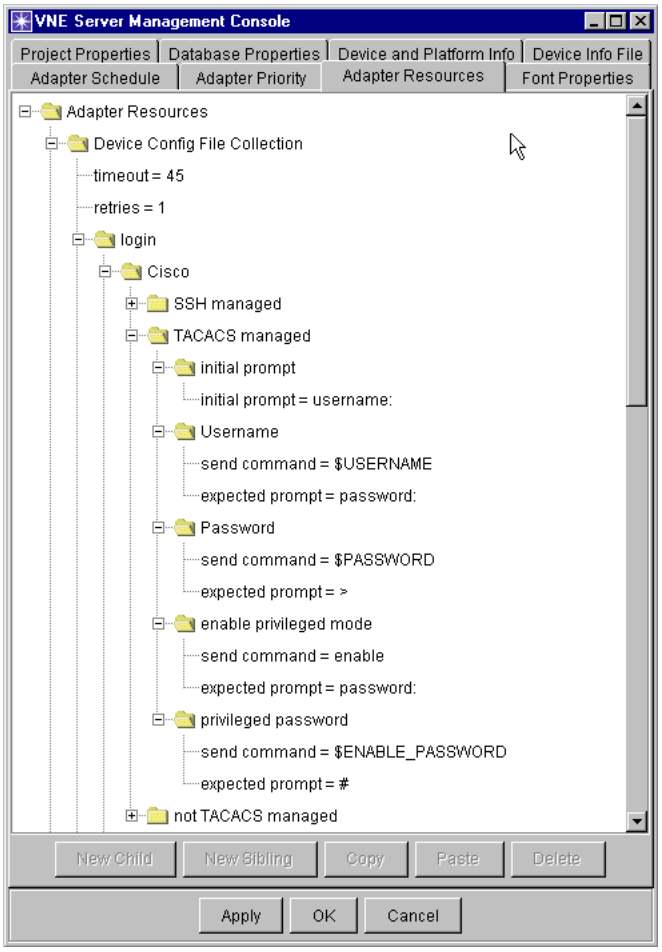
Table 3-2 Device Config File Collection Properties (Part 1 of 2)

Adapter Property	Schema	Description
timeout	integer	Specifies the timeout per command (in seconds) used to collect configuration data.
retries	integer	Specifies the number of retries to attempt during collection of configuration data.
session time limit	integer	Specifies the timeout (in seconds) for the entire collection session.
login	property tree	Contains the properties that control how this adapter connects to each device.
login - Cisco	property tree	Contains the properties that control how this adapter connects to Cisco devices.
login - Juniper	property tree	Contains the properties that control how this adapter connects to Juniper devices.
login - Nortel	property tree	Contains the properties that control how this adapter connects to Nortel devices.

Table 3-2 Device Config File Collection Properties (Part 2 of 2)

Adapter Property	Schema	Description
login - CiscoCatalyst	property tree	Contains the properties that control how this adapter connects to Cisco Catalyst devices.
login - NortelPassport8000	property tree	Contains the properties that control how this adapter connects to Nortel Passport 8000 devices.
show commands	property tree	Contains the properties that specify the commands used to collect device configuration.
show commands - Configuration	property tree	Contains the properties that specify the commands used to collect “running” config data.
show commands - Frame-Relay Map	property tree	Contains the properties that specify the commands used to collect Frame Relay PVC config data.
show commands - Version	property tree	Contains the properties that specify the commands used to collect software, firmware and hardware version data.
show commands - ifIndex	property tree	Contains the properties that specify the commands used to collect interface index data.
show commands - Module	property tree	Contains the properties that specify the commands used to collect hardware module information.
show commands - CAM Table	property tree	Contains the properties that specify the commands used to collect a device’s CAM (Content Addressable Memory) table.
show commands - IP Route	property tree	Contains the properties that specify the commands used to collect IP Route config data.
show commands - CDP	property tree	Contains the properties that specify the commands used to collect Cisco Discovery Protocol neighbor data.
show commands - ARP Table	property tree	Contains the properties that specify the commands used to collect a device’s ARP (Address Resolution Protocol) table.
show commands - Interface	property tree	Contains the properties that specify the commands used to collect interface data.
show commands - VLAN	property tree	Contains the properties that specify the commands used to collect VLAN data.
End of Table 3-2		

Figure 3-1 TACACS+ Login Sequence for Cisco Devices



Configuring Device Login Properties

Table 3-2 shows the top-level hierarchy for this adapter's properties. All the properties are organized under *login* and *show commands* property trees. Under the login tree, a property tree exists for each vendor. This tree contains properties that hold the vendor specific commands and expected responses used to access and retrieve data from the device. Under each configuration command in the *show commands* tree, vendor specific property trees hold the commands and responses used to collect configuration data.

Figure 3-1 window shows an example of the command and response sequence used to access TACACS+ managed Cisco devices. Each access method—SSH, TACACS+, and others—has a command sequence defined for each vendor. Notice that the login command sequence contains references to *$USERNAME*, *$PASSWORD*, and *$ENABLE_PASSWORD* variables. When a specific device in the network is accessed, these variables are filled in with information for this device that is taken from the device info file. Refer to Device and Platform Info on page VNE-2-29 in the User Interface chapter for more information about the device info file.

After successful login to a device, the adapter should be at the command level in the device where a vendor specific command, such as *show running-config* for Cisco devices, can be issued to obtain configuration data. For the adapter to login to the device, each response property, such as *initial prompt* and *expected prompt,* must match the text string that is returned by the device. Otherwise login fails, and the VNE Server Event Viewer shows error messages about the failure.

Configuring Show Command Properties

Once this adapter has logged into a device, it is ready to submit “show” commands to collect all the specified configuration data. All the configuration commands to be issued against a device are sent during the same telnet or SSH session. The results of each command are stored in a file for each type of “show” command. Each type of show command has its own directory in the VNE Server temp directory under <*temp dir*>*Collect*. The show command storage directories are

- <temp dir>\Collect\ARP
- <temp dir>\Collect\CAM
- <temp dir>\Collect\CDP
- <temp dir>\Collect\Configs
- <temp dir>\Collect\FRMap
- <temp dir>\Collect\ifIndex
- <temp dir>\Collect\Interface
- <temp dir>\Collect\IPRoute
- <temp dir>\Collect\Module
- <temp dir>\Collect\Version
- <temp dir>\Collect\Vlan

The next two figures show the command and response sequence for the configuration command for Cisco and Nortel devices. These screenshots illustrate the programmable nature of the dialog between adapter and device. As with the login sequence, the *expected prompt* device responses must match the values stored in the *expected prompt* properties, or data collection fails. The VNE Server Console displays error messages about the failure.

Figure 3-2 Show Config Commands for Cisco Devices

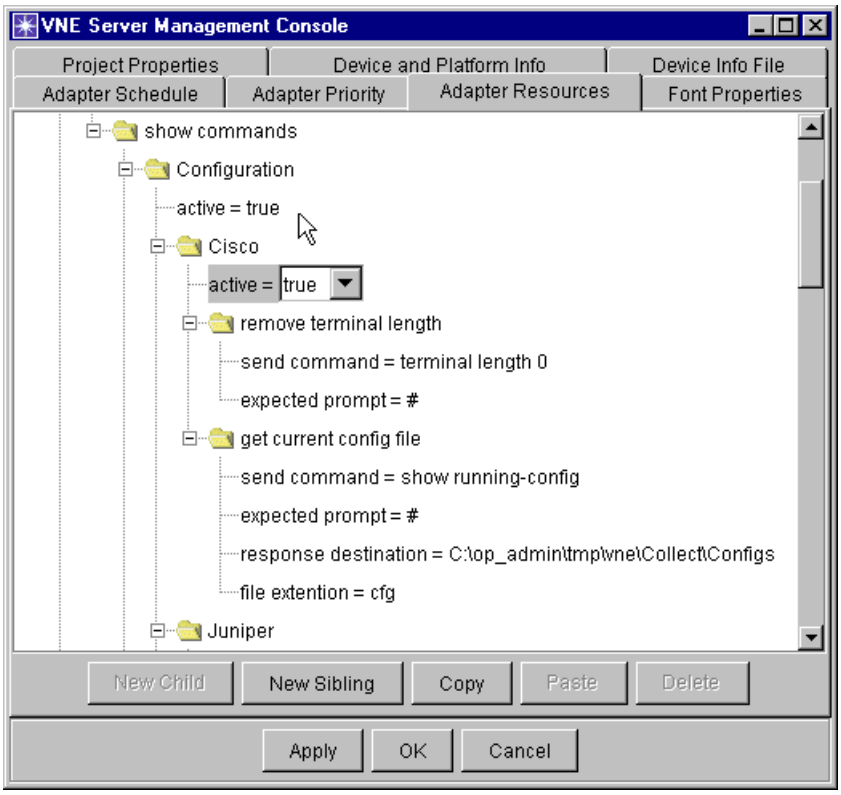
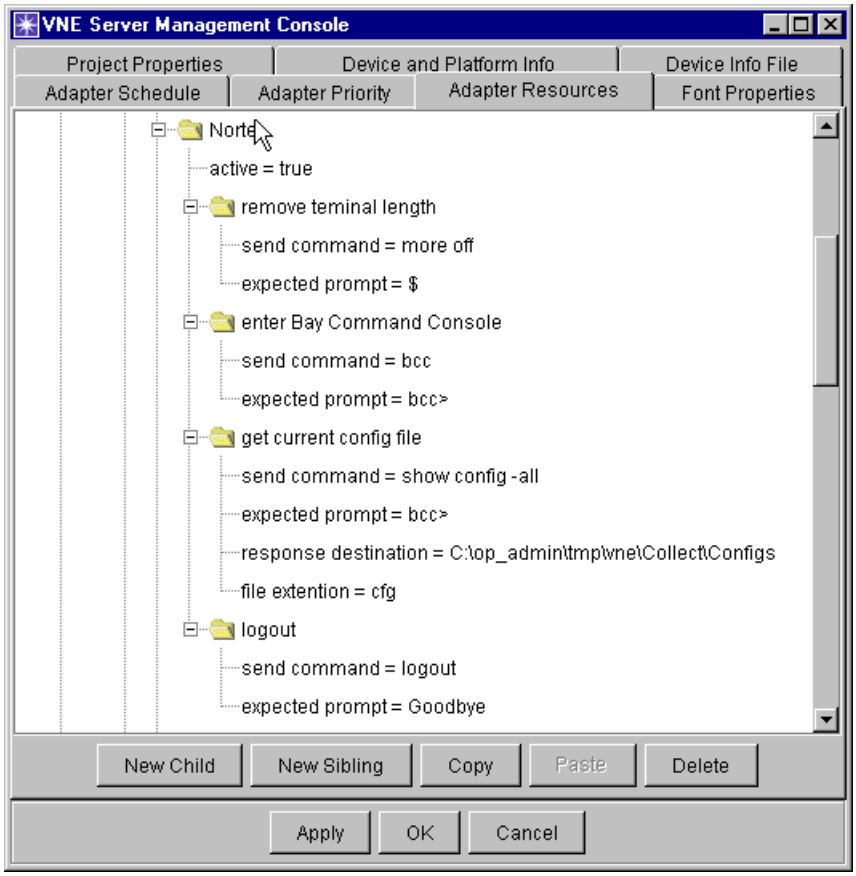


Figure 3-3 Show Config Commands for Nortel Networks Devices



Changing Adapter Login and Show Command Properties

WARNING—The default setup for device login and config data retrieval works for most customers. However, if you have customized any of your devices so that the default command and response sequences do not match device behavior, you must change the adapter properties. Refer to Viewing and Editing Properties on page VNE-2-25 and Advanced Editing on page VNE-2-26 in the User Interface chapter for information about editing properties in the Management Console.

If your setup for a specific vendor differs from the default command sequence, but is uniform across all devices for that vendor, then modify the *login* and *show commands* property trees to specify a matching command sequence.

If you have a mixed command sequence for devices of a specific vendor, then you must create a new device type. The default device types (Cisco, Juniper, etc) encompass more than just the vendor. They really denote a vendor and a specific command sequence. In both the *login* and *show commands* property trees, select the device type for the existing vendor that has a mixed command

sequence. Clone each property tree by pressing the **New Sibling** button. Modify the new property tree to match the device command sequence. Press the **Apply** button to save the changes. After this is done, go to the Management Console. Use the Device and Platform Info panel to change the device type for all the affected devices to the name of the newly created device type.

Device Configuration Import Adapters

The Device Config File Collection adapter executes multiple configuration collection commands for each device it accesses. The resulting configuration files are written to the VNE Server temp dir environment. An import adapter exists for each file type. These import adapters are

- Device Config File Import
- Device ifIndex Import
- Device FR Map Import
- Device Version Import
- Device IP Route Import
- Device CDP Import
- Device ARP Table Import
- Device Interface Import
- Device Module Import
- Device VTP Status Import
- Device CAM Table Import
- Device VLAN Database Import
- Nortel EPIC Output Import

Although each adapter has its own set of configuration properties, the properties are the same across all the configuration import adapters. These properties are shown in the following table.

Table 3-3 Device Configuration Import Properties

Adapter Property	Schema	Description
inputFileDir	text	Points to the temp dir that holds files collected by the Device Config File Collection adapter. The default is <temp dir>\Collect\<file type> where <file type> = Configs, ifIndex, FRMap, Version, IPRoute, CDP etc.
renameDeviceConsoleConfigFiles	true, false	Controls whether XML files are renamed after they are imported. The default is true.
renameExtension	text	The file extension to add to imported files. The default is ".IMPORTED".
logFileDir	text	Points to the directory where parser log files are located. The default is <install dir>\log\<file type> where <file type> = Configs, ifIndex, FRMap, Version, IPRoute, CDP etc.
logExtension	text	The parser log file extension. The default is ".log".
End of Table 3-3		

Device Config File Import

The Device Config File Import adapter is responsible for parsing the collected device configuration files, and producing a normalized XML file for each device that represents the device's configuration information. Each device's XML file contains a normalized version of configuration information that conforms to VNE Server's data model. VNE Server supports a significant portion of each vendor's command set. A list of supported commands for the currently supported devices is available in the Device Configuration Commands appendix.

The XML file generated for each device is stored in the VNE Server temp directory (defaults to: *C:\op_admin\tmp\vne*). As with the other adapters, the Device Config File Import adapter is scheduled to run at regular intervals and will overwrite any previously existing file from the same device.

Device ifIndex Import

The Device Ifindex Import adapter is responsible for parsing the collected interface index information and producing a normalized XML file for each device representing the device's interfaces and corresponding interface indices.

Device FR Map Import

The Device FR Map Import adapter is responsible for parsing the collected Frame Relay Map information and producing a normalized XML file for each device representing the device's frame relay PVC configuration information.

Device Version Import

The Device Version Import adapter is responsible for parsing the collected device version information and producing a normalized XML file for each device representing the device's systems description, chassis type, software version, and device identifier.

Device IP Route Import

The Device IP Route Import adapter is responsible for parsing the collected IP routing table information and producing a normalized XML file for each device representing the device's IP routing table.

Device CDP Import

The Device CDP Import adapter is responsible for parsing the collected Cisco Discovery Protocol neighbor information and producing a normalized XML file for each device representing the device's neighbors as determined by the Cisco discovery protocol.

Device ARP Table Import

The Device ARP Table Import adapter is responsible for parsing the collected ARP table information and producing a normalized XML file for each device representing the device's ARP table.

Device Interface Import

The Device Interface Import adapter is responsible for parsing the collected interface information and producing a normalized XML file for each device representing the device's interface information.

Device Module Import

The Device Module Import adapter is responsible for parsing the collected module information and producing a normalized XML file for each device representing the device's module information.

Device VTP Status Import

The Device VTP Status Import adapter is responsible for parsing the collected VTP status information and producing a normalized XML file for each device representing the device's VTP status information.

Device CAM Table Import

The Device CAM Table Import adapter is responsible for parsing the collected CAM table information and producing a normalized XML file for each device representing the device's CAM table.

Device VLAN Database Import

The Device VLAN Database Import adapter is responsible for parsing the collected VLAN information and producing a normalized XML file for each device representing the device's VLAN database.

Nortel EPIC Output Import

The Nortel EPIC Output Import adapter is responsible for parsing collected EPIC files and producing a normalized XML file containing information about each device.

Remote File Collection

The Remote File Collection adapter uses FTP to collect files from other hosts. This adapter is mainly used to collect files for processing by other adapters. Some use cases are

- Retrieve config files from a custom archive environment
- Retrieve interface utilization or traffic flow files from an archive environment

The Remote File Collection adapter supports file filtering based upon file name prefix and file name extension. When filtering is configured, the only files retrieved are those matching the filter specification.

Files can be retrieved from more than one remote directory. You can use the Management Console to add as many remote directory property trees as you need for your environment. Files can also be retrieved from subdirectories under any specified remote directory. Note that when this feature is enabled, directory hierarchy is not preserved. All collected files are written to the specified storage directory. When specifying directory paths, always provide the full path.

*Key Concept—*The Remote File Collection adapter is typically used to copy files from other hosts that have been collected by third-party or "home grown" applications. Configure this adapter to copy the data files to the import file directory of the adapter that will process the files. For example, if you are collecting files for Device Config File Import and the other show command adapters, copy them to the appropriate <tempdir>\Collect directories. You can schedule this adapter to run based upon time or event triggers. Use event triggering and the Finish Import event raised by this adapter to trigger adapters to run and process data files collected by this adapter.

The configuration properties for this adapter are described in the following table.

Table 3-4 Remote File Collection Properties

Adapter Property	Schema	Description
sourceList	property tree	Contains list of remote file servers.
sourceList server1	property tree	Contains the properties for server1.
server1 - active	yes, no	Controls whether files are collected from this server.
server1 - ftp	property tree	Contains the FTP access properties for server1.
ftp - hostName	text	Specifies the name or address of the file server.
ftp - userName	text	Specifies the user name used to login to the server.
ftp - password	text	Specifies the password used to login to the server.
ftp - timeout(mSec)	text	Specifies the FTP connection timeout value.
ftp - retries	integer	Specifies the FTP connection retry value.
server1 - Remote Directory List	property tree	Contains a list of remote directories to be accessed.
Remote Directory List - dir1	property tree	Contains properties that describe a remote directory.
dir1 - Remote Directory Full Path	text	Specifies the path on the remote host from which files are collected.
dir1 - FilenamePrefix	text	Specifies a prefix string used to filter files by name. Only files matching the prefix string are copied from the remote server.
dir1 - FilenameExtension	text	Specifies a file extension used to filter files by name. Only files matching the extension are copied from the remote server.
dir1 - Include Subdirectory	yes, no	Specifies whether files are also retrieved from subdirectories.
dir1 - Storage	text	Specifies the directory to which retrieved files are written.
sourceList server2	property tree	Contains the settings for server2.
End of Table 3-4		

CiscoWorks Config File Collection

The CiscoWorks Config File Collection adapter collects device configuration information from CiscoWorks. CiscoWorks collects and archives configuration information from each device it knows about. The information collected by CiscoWorks is a subset of the command set used by the Device Config File Collection adapter.

Note—The CiscoWorks server must be configured to accept rsh/rcp sessions from the VNE Server host. Refer to Configuring CiscoWorks on page VNE-5-37 in the Administration chapter.

The configuration properties for this adapter are described in the following table.

Table 3-5 CiscoWorks Config File Collection Properties (Part 1 of 2)

Adapter Property	Schema	Description
outputDir	text	Points to the directory where this adapter stores its collected config files. The default is <temp dir>\Collect\Configs_CiscoWorks.
userDbConnection	yes, no	Controls whether this adapter uses a database connection to collect config files, or uses remote shell and remote copy. The default is yes.
rsh executable	text	Specifies the name of the remote shell executable.
rcp executable	text	Specifies the name of the remote copy executable.
copy executable	text	Specifies the name of the local (VNE Server host) copy executable.
CiscoWorks Server Rsh Parameters	property tree	Contains the properties that describe how to access the CiscoWorks host.
Server Rsh Parameters - hostName	text	Specifies the name or address of the CiscoWorks host.
Server Rsh Parameters - platform	WINDOWS, UNIX	Specifies the type of platform which hosts CiscoWorks. The default is Windows.
Server Rsh Parameters - userName	text	The user name used for remote shell login.

Table 3-5 CiscoWorks Config File Collection Properties (Part 2 of 2)

Adapter Property	Schema	Description
Server Rsh Parameters - remoteCfgDir	text	Points to the directory path on the CiscoWorks host where configuration files are located.
Server Rsh Parameters - timeout	integer	The timeout value, in milliseconds, for connection to the CiscoWorks host.
Server Rsh Parameters - configFileExtension	text	A file extension used for collected config files. The default is “running.cfg”.
End of Table 3-5		

CiscoWorks Config File Import

The CiscoWorks Config File Import adapter parses each configuration file collected by the CiscoWorks Config File Collection adapter. From these files, this adapter produces a normalized XML file for each device representing the device’s configuration information.

The XML file generated for each device is stored in the VNE Server temp directory (defaults to: *C:\op_admin\tmp\vne*). As with the other adapters, the CiscoWorks Config File Import adapter is scheduled to run at regular intervals and will overwrite any previously existing file from the same device.

The configuration properties for this adapter are described in the following table.

Table 3-6 CiscoWorks Config File Import Properties

Adapter Property	Schema	Description
inputFileDir	text	Points to the temp dir that holds files collected by the CiscoWorks Config File Collection adapter. The default is <temp dir>\Collect\Configs_CiscoWorks.
renameDeviceConsoleConfigFiles	true, false	Controls whether XML files are renamed after they are imported. The default is true.
renameExtension	text	The file extension to add to imported files. The default is “.IMPORTED”.
logFileDir	text	Points to the directory where parser log files are located. The default is <install dir>\log\Configs_CiscoWorks.
logExtension	text	The parser log file extension. The default is “.log”.
End of Table 3-6		

CiscoWorks RME Database Import

The CiscoWorks Resource Manager Essentials (RME) adapter collects MIB data from a CiscoWorks RME database. The data is collected from the following MIBs: System, IF, and Physical Entity.

The configuration properties for this adapter are described in the following table.

Table 3-7 CiscoWorks RME Database Import Properties

Adapter Property	Schema	Description
outputDir	text	Points to the directory where this adapter stores its processed XML files. The default is <temp dir>\CW\RME\XML.
CiscoWorks RME Database	property tree	Contains the properties that describe how to access the RME database.
RME Database - vendor	text	Specifies the database vendor for the RME database. The default is Sybase.
RME Database - serverName	text	Specifies the name or address of the RME database host.
RME Database - portNumber	integer	Specifies the port number used to contact the RME database. Defaults to 43442.
RME Database - dbName	text	Specifies the name of the RME database. Defaults to rme.
RME Database - userName	text	Specifies the user name that is used to access the RME database. Defaults to dba.
RME Database - password	text	Specifies the password that is used to access the RME database.
End of Table 3-7		

Note—Refer to Collecting CiscoWorks Server Information on page VNE-5-38 in the Administration chapter for instructions on how to collect from the CiscoWorks environment the server information needed for adapter configuration.

CiscoWorks ANI Database Import

The CiscoWorks Asynchronous Network Interface (ANI) adapter collects MIB data from a CiscoWorks ANI database. The data is collected from the following MIBs: System, IF (partial), and CDP.

The configuration properties for this adapter are described in the following table.

Table 3-8 CiscoWorks ANI Database Import Properties

Adapter Property	Schema	Description
outputDir	text	Points to the directory where this adapter stores its processed XML files. The default is <temp dir>\CW\ANI\XML.
CiscoWorks ANI Database	property tree	Contains the properties that describe how to access the ANI database.
ANI Database - vendor	text	Specifies the database vendor for the ANI database. The default is Sybase.
ANI Database - serverName	text	Specifies the name or address of the ANI database host.
ANI Database - portNumber	integer	Specifies the port number used to contact the ANI database. Defaults to 43443.
ANI Database - dbName	text	Specifies the name of the ANI database. Defaults to ani.
ANI Database - userName	text	Specifies the user name that is used to access the ANI database. Defaults to cwsiSA.
ANI Database - password	text	Specifies the password that is used to access the ANI database.
ANI Database - jdbc_driver	text	Specifies the name of the jdbc driver used for database access. The default is com.sybase.jdbc2.jdbc.SybDriver.
End of Table 3-8		

Note—Refer to Collecting CiscoWorks Server Information on page VNE-5-38 in the Administration chapter for instructions on how to collect from the CiscoWorks environment the server information needed for adapter configuration.

Cisco WAN Manager Import

The Cisco WAN Manager import adapter collects data from the Cisco WAN Manager product about your WAN configuration. Contact OPNET for more information about how to set up and use this adapter.

Device MIB Configuration Import

The Device MIB Configuration Import adapter performs targeted SNMP requests to supported MIBs on each known device to obtain additional information beyond that obtained from the configuration files. The MIBs currently supported by this adapter include

- RFC1213-MIB
- ENTITY-MIB
- IF-MIB (RFC1573)
- CISCO-PRODUCTS-MIB
- OLD-CISCO-CHASSIS-MIB
- CISCO-STACK-MIB
- CISCO-CDP-MIB
- JUNIPER-MIB
- WellFleet-CCT-NAME-MIB
- BRIDGE-MIB

Information collected by this adapter is processed into XML and placed in the VNE Server temp directory for processing by the VNE-XML Import adapter.

The configuration properties for this adapter are described in the following table.

Table 3-9 Device MIB Configuration Import Properties

Adapter Property	Schema	Description
timeout	integer	The timeout value, in seconds, used by the SNMP engine.
retries	integer	The number of retries used by the SNMP engine.
End of Table 3-9		

HP OpenView NNM Import

The HP OpenView Network Node Manager (NNM) Import adapter collects device and topology information from HP OpenView. The information collected includes System group and IF MIB data. This adapter provides devices links and connections to VNE Server. The HP OpenView NNM adapter uses the ovdb application programming interface to connect and retrieve data from HP OpenView.

Note—The HP OpenView NNM server must be configured to allow access to VNE Server. Refer to Configuring HP OpenView on page VNE-5-36 in the Administration chapter.

Note—When connecting to HP OpenView NNM version 6.2, or later, set the dbPort number property to 2447. If the HP OpenView NNM version is 6.1, use 9999 for the dbPort number.

The configuration properties for this adapter are described in the following table.

Table 3-10 HP OpenView NNM Import Properties

Adapter Property	Schema	Description
outputDir	text	Points to the directory where this adapter stores its collected files. The default is <temp dir>\hpov.
HP OV NNM Server Parameters	property tree	Contains the properties that describe how to connect to the HP OpenView server.
Server Parameters - hostName	text	Specifies the name or address of the HP OpenView host.
Server Parameters - dbUser	text	Specifies the user name that is used to access the HP OpenView database. Defaults to ovdb.
Server Parameters - dbPort	integer	Specifies the port number used to contact the HP OpenView database. Defaults to 2447.
End of Table 3-10		

DNS Alias Import

The DNS Alias Import adapter performs a reverse DNS lookup on IP interfaces in the database. For any matches found, the DNS alias is saved in the network model. This adapter can be thought of as a utility adapter. It collects information that can aid other adapters in doing interface and node level matching required in order to import their data into the network model. Contact OPNET for advice on whether you need to use this adapter based upon the adapter mix you plan to use to build your network model.

Link and Connection Inference Service

The Link and Connection Inference Service uses device and interface information collected by other adapters to deduce the links that exist in the network. This service supplies network topology to the VNE Server network model. The Link and Connection Inference service is scheduled to run on a regular basis and produces an XML file of inferred link data in the VNE Server temp directory environment. The VNE-XML Import adapter processes the link inference XML file, and commits link data to the network database.

Note—Links can also be inferred based upon ARP cache and CAM table data. ARP and CAM data is disabled, by default, as link sources. Set the importViaArp and importViaCam properties to true if you want to use this data for link inference.

The configuration properties for this adapter are described in the following table.

Table 3-11 Link and Connection Inference Service Properties

Adapter Property	Schema	Description
importViaCdp	true, false	Controls whether links inferred from CDP data are imported. The default is true.
importViaArp	true, false	Controls whether links inferred from ARP cache data are imported. **The default is false.**
importViaCam	true, false	Controls whether links inferred from CAM table data are imported. **The default is false.**
importViaIpAddresses	true, false	Controls whether links inferred from IP addresses are imported. The default is true.
importFrameRelay	true, false	Controls whether links inferred from Frame Relay map data are imported. The default is true.
frameRelayFullMesh	true, false	Controls whether full mesh connectivity is automatically created between Frame Relay connections. The default is false.
importAtm	true, false	Controls whether links inferred from ATM PVC configuration data are imported. The default is true.
atmFullMesh	true, false	Controls whether full mesh connectivity is automatically created between ATM connections. The default is false.
importAtmFrameRelay	true, false	Controls whether links inferred from hybrid ATM, Frame Relay configuration data are imported. The default is true.

Table 3-11 Link and Connection Inference Service Properties

Adapter Property	Schema	Description
atmFrameRelayFullMesh	true, false	Controls whether full mesh connectivity is automatically created between hybrid ATM, Frame Relay connections. The default is false.
importMpls	true, false	Controls whether links inferred from MPLS LSP configuration data are imported. The default is true.
ignoreIfcOperStatus	true, false	Controls whether ifOperStatus for an interface is ignored during link inference. The default is true.
compareCamIfcType	true, false	Controls whether CAM interface type is used for link inference. The default is true.
importPassportTrunks	true, false	Controls whether Passport trunks are used for link inference. The default is false.
importPassportPnniLinks	true, false	Controls whether Passport PNNI links are used for link inference. The default is false.
ipAddressExclusionFile	text	Specifies the path to a file containing a list of IP addresses to be excluded from use for link inference.
End of Table 3-11		

Trace Route Link Inference Service

The Trace Route Link Inference Service is a lowest common denominator means of determining connectivity and intervening Layer-3 devices between network devices that already exist in the model. This service provides a convenient, automated means of ensuring that your network model is complete from a connectivity standpoint.

Generally, the Trace Route service should only be used as a means to determine the intervening devices. Once the intervening devices are determined, one of the adapters that provides richer detail (if available) should be used to gain information from the device.

Generally, the Trace Route service may be used under two different scenarios:

1) The Trace Route service is used as an automated assistant to determine missing devices.

   The end result of running this service should be the complete set of devices and IP addresses to populate the Device Information File which is used by other adapters for obtaining device and configuration detail.

2) The Trace Route service is used as a means for determining intervening devices and establishing Layer-3 connectivity between connected components of your network when the intervening devices may not be accessible or supported but the current adapter set (i.e., a router to which you do not have management access to or a firewall or router for which an adapter does not currently exist).

Table 3-12 Trace Route Link Inference Service Properties (Part 1 of 2)

Adapter Property	Schema	Description
renameTraceRouteFiles	true, false	Controls whether XML files are renamed after they are imported. The default is true.
renameExtension	text	The file extension to add to imported files. The default is ".IMPORTED".
maxFailedCmdPerNode	integer	Specifies the number of failed commands at a given device before Trace Route gives up and terminates the connection.
session time limit (sec)	integer	Specifies the maximum session time at a given device before Trace Route gives up and terminates the connection.
total traceroute time limit (minutes)	integer	Specifies he total time allotted to running this adapter.
traceRouteVendorList	property tree	Contains the trace route properties for each device type.
traceRouteVendorList - Cisco	property tree	Contains the properties that define the trace route commands used with Cisco devices.
Cisco - expected prompt	text	Specifies the command line prompt string that appears after successful login to the device.
Cisco - traceroute command	text	Specifies the trace route command to use on this device.
traceRouteVendorList - Nortel	property tree	Contains the properties that define the trace route commands used with Nortel devices.
Nortel - expected prompt	text	Specifies the command line prompt string that appears after successful login to the device.
Nortel - traceroute command	text	Specifies the trace route command to use on this device.

Table 3-12 Trace Route Link Inference Service Properties (Part 2 of 2)

Adapter Property	Schema	Description
traceRouteVendorList - Juniper	property tree	Contains the properties that define the trace route commands used with Juniper devices.
Juniper - expected prompt	text	Specifies the command line prompt string that appears after successful login to the device.
Juniper - traceroute command	text	Specifies the trace route command to use on this device.
End of Table 3-12		

MIB-Based Interface Utilization Import

The MIB-Based Interface Utilization Import adapter uses SNMP to poll interface utilization statistics from network devices. This scheduled adapter gathers similar information to that provided by the Concord and MRTG adapters, but does so in a direct manner without relying upon an external system. The data collected by this adapter is placed in XML files in the *Baseliner/xml* subdirectory within the VNE Server temp directory environment. Each file name includes a timestamp, and the files include traffic data for all nodes visible to VNE Server. The VNE-XML Import adapter processes this XML, and commits traffic data to the network database.

Note—The first time that this adapter is run after the service framework starts, SNMP polling begins and a polling sweep occurs. A new polling sweep happens each time the sample interval defined by the *sampleInterval* property is reached. Polling sweeps continue at this sample interval for as long as product services are running. Each sweep generates XML files in the temp dir. These XML files are imported into the database whenever this adapter is scheduled to run in the Management Console Adapter Schedule panel.

The configuration properties for this adapter are described in the following table.

Table 3-13 MIB-Based Interface Utilization Import Properties

Adapter Property	Schema	Description
outputFileDir	text	The temp dir that contains output XML files that are ready for import. The default is <temp dir>\Baseliner\xml.
sampleNumber	integer	Set to 0 when continuously running this adapter in a scheduled mode. When set to a non-zero value, determines the number of samples to take when manually running this adapter. The default is 0.
sampleInterval	integer	The interval between samples in seconds. The default is 300.
retries	integer	The retry count used by the SNMP engine.
End of Table 3-13		

Concord eHealth Network Utilization Import

The Concord eHealth Network Utilization Import adapter imports interface utilization statistics collected from one or more Concord systems. VNE Server uses telnet to connect to the Concord system. Once connected, Concord commands are issued to display the traffic group data specified by the adapter properties. The output of the traffic report commands is saved in the adapter temp directory as *dci* and *ddo* files. Each traffic group specified in the adapter properties produces a timestamped *dci/ddo* file pair after a Concord collection session. The *dci* files contain setup information about the interfaces in each traffic group. The *ddo* files contain the interface utilization statistics for each interface in the traffic group. The *dci/ddo* files are saved in the VNE Server temp *cnh/input* subdirectory.

The Concord adapter processes the *dci/ddo* files for each traffic group. The adapter converts the traffic data for each device into timestamped XML files in the *cnh/xml* subdirectory. Each device has an XML file that contains traffic data for its interfaces. These files are imported by the VNE-XML Import adapter.

To configure this adapter, set up the Concord login properties, and modify the groupNames list to contain the names of the traffic groups you wish to collect. Work with the Concord administrator to determine the traffic groups you need. If you have more than one Concord system, clone and configure the “live” property tree for each system.

The configuration properties for this adapter are described in the following table.

Table 3-14 Concord eHealth Network Utilization Import Properties (Part 1 of 2)

Adapter Property	Schema	Description
sourceList	property tree	Contains property trees for live, local and remote Concord data sources.
sourceList - live	property tree	Contains the property tree that describes how to collect data from a live Concord system.
live - active	yes, no	Controls whether VNE Server collects data from this server.
live - dataSource	live, local, remote f	Specifies the source of Concord data. For operational environments, use *live*. For testing, use *local* or *remote*.
live - login	property tree	Contains the login properties for a Concord system.
live - login - platform	UNIX, Windows	Specifies the type of platform that hosts the Concord system.
live - login - hostName	text	Specifies the name or address of the system.
live - hostTimeZone	time zone menu	Specifies the time zone in which the Concord server lies.
live - login - loginPrompt	text	Specifies the login prompt string used by the Concord host. The default is *login:*
live - login - userName	text	Specifies the user name used to login to the system.
live - login - password	text	Specifies the password used to login to the system.
live - login - additionalParams	property tree	Contains two placeholder property trees that you can configure to issue additonal login and navigation commands.
live - login - commandPrompt	text	Specifies the host command line prompt string that will appear after a successful login.
live - login - timeout	integer	Specifies the timeout, in milliseconds, to wait for the command prompt. The default is 60000 (60 secs).
live - cnhExport	property tree	Contains the properties governing traffic group data collection.
live - cnhExport - timeout	integer	Specifies the timeout, in milliseconds, to wait for traffic group data. The default is 3600000.
live - cnhExport - trafficRange	time menu	Specifies the time span used when requesting traffic data for a group. Varies from prevHour to prev4Weeks
live - groupNames	property tree	Contains properties for each traffic group to be collected by the adapter.
live - groupNames - group1	text	Specifies the name of a traffic group.

Table 3-14 Concord eHealth Network Utilization Import Properties (Part 2 of 2)

Adapter Property	Schema	Description
live - groupNames - group2	text	Specifies the name of a traffic group.
live - groupNames - group3	text	Specifies the name of a traffic group.
sourceList - local files	property tree	Specifies the location of data files on the local host. Generally used only for adapter testing.
sourceList - remote files	property tree	Specifies the location of data files on a remote host. Used when the Concord server is configured to export traffic files on a scheduled basis.
End of Table 3-14		

StatScout Interface Utilization Import

The StatScout Interface Utilization Import adapter imports interface utilization data collected from a StatScout sever. Configuration is similar in nature to the other interface utilization adapters.

MRTG Interface Utilization Import

The MRTG Interface Utilization Import adapter imports interface utilization data collected from one or more MRTG servers. Both log file and RRD file formats are supported. VNE Server uses ftp to collect data from a MRTG server. Once connected, FTP commands are issued to copy the configuration and traffic files specified in the adapter properties. These files are saved in the adapter temp directory. By default, they have *cfg, rrd* and *log* extensions. The *cfg* files contain device and interface information that this adapter uses to extract utilization data from the *log* and *rrd* files. A *log* and *rrd* files are collected for each interface that is visible to MRTG. The cfg/log/rrd files are saved in the VNE Server temp *mrtg/input* subdirectory.

The MRTG adapter processes the *cfg/log/rrd* files. The adapter converts the utilization data for each device into timestamped XML files in the *mrtg/xm*l subdirectory. Each device has an XML file that contains utilization data for its interfaces. These files are imported by the VNE-XML Import adapter.

To configure this adapter, set up the MRTG login properties, and modify the file filters and directories for the data you wish to collect. Work with the MRTG administrator to determine the name and location of the MRTG data files. If you have more than one MRTG server, clone and configure the server property tree for each system.

The configuration properties for this adapter are described in the following table.

Table 3-15 MRTG Interface Utilization Import Properties

Adapter Property	Schema	Description
inputFileDir	text	Points to the directory where this adapter stores collected traffic data. The default is <temp dir>\mrtg\input.
outputFileDir	text	Points to the directory where this adapter stores its output data files. The default is <temp dir>\mrtg\xml.
mrtgServerList	property tree	Contains a list of MRTG servers to be polled by VNE Server.
mrtgServerList server1	property tree	Contains the properties for server1.
server1 - active	yes, no	Controls whether VNE Server collects data from this server.
server1 - hostName	text	Specifies the name or address of the MRTG server.
server1 - RRD Integrated	yes, no	Specifies whether the server data uses RRD format.
server1 ftp - userName	text	Specifies the user name used to login to the server.
server1 ftp - password	text	Specifies the password used to login to the server.
server1 ftp - timeout	integer	Specifies the ftp timeout in milliseconds.
server1 ftp - retries	integer	Specifies the number of retries to copy files from the MRTG server. The default is 3.
server1 - workDir	text	Specifies the location of the working dir when MRTG is setup so that all working files are in the same directory.
server1 - cfgDir	text	Specifies the location of the MRTG configuration files.
server1 - logDir	text	Specifies the location of the MRTG data files.
server1 - cfgFileFilter	text	Specifies the name filter used to identify the MRTG configuration file. The default is *.cfg.
server1 - logFileExtension	text	Specifies the extension used for the interface utilization files. The default is *.log.
server1 - trafficRange	time menu	Specifies the time span used when extracting traffic data from the collected log files. Varies from prevHour to prev4Weeks.
mrtgServerList server 2	property tree	Server2 contains properties for telnet access in addition to the same properties as in server1. This server template is setup for RRD files.
End of Table 3-15		

InfoVista Network Utilization Import

The InfoVista Network Utilization Import adapter imports interface utilization data collected from one or more InfoVista servers. VNE Server uses an API supplied by InfoVista to collect data from each server.

The InfoVista adapter converts the utilization data that it collects into timestamped XML files in the *iv/xml* subdirectory. Each device has an XML file that contains utilization data for its interfaces. These files are imported by the VNE-XML Import adapter.

To configure this adapter, set up the InfoVista login properties, and specify the time interval for the data you wish to collect. If you have more than one InfoVista server, clone and configure the server property tree for each system.

The configuration properties for this adapter are described in the following table.

Table 3-16 InfoVista Network Utilization Import Properties

Adapter Property	Schema	Description
outputFileDir	text	Points to the directory where this adapter stores its output data files. The default is <temp dir>\iv\xml.
serverList	property tree	Contains a list of InfoVista servers to be polled by VNE Server.
serverList server1	property tree	Contains the properties for server1.
server1 - active	yes, no	Controls whether VNE Server collects data from this server.
server1 - hostName	text	Specifies the name or address of the InfoVista server.
server1 - userName	text	Specifies the user name used to login to the server.
server1 - password	text	Specifies the password used to login to the server.
server1 - trafficRange	time menu	Specifies the time span used when extracting traffic data from the collected log files. Varies from “Since Last Run” through 1, 2, 3, 4, 6, 8, 12, 18 and 24 hour intervals.
serverList server 2	property tree	Server2 contains the same properties as in server1.
End of Table 3-16		

Cisco Netflow Import

The Cisco Netflow Import adapter connects to one or more servers running a Netflow Collector daemon and collects traffic flow statistic files. After these files are collected, the traffic flow information is imported into the VNE database. Since flow data can be quite large, this adapter provides front end capabilities to filter and aggregate flow data.

Table 3-17 Cisco Netflow Import Properties (Part 1 of 3)

Adapter Property	Schema	Description
output directory	text	Points to the directory where this adapter stores its output data files. The default is <temp dir>\netflow.
Netflow data sources	property tree	Contains the data sources properties.
Netflow data sources - server1	property tree	Contains the server1 properties.
server1 - active	yes, no	Controls whether VNE Server collects data from this server.
server1 - hostname	text	Specifies the name or address of the system.
server1 - username	text	Specifies the user name used to login to the system.
server1 - password	text	Specifies the password used to login to the system.
server1 - retries	integer	Specifies the number of retries to connect to the server. The default is 3.
Netflow home directory	text	Specifies the location of the Netflow files on the collector server.
traffic collection parameters	property tree	Contains traffic collection properties.
traffic collection parameters - time window	property tree	Specifies the time interval over which to collect Netflow statistics.
traffic collection parameters - collection devices	property tree	Specifies the collection devices.
traffic collection parameters - aggregation types	property tree	Specifies the aggregation types.
Netflow data sources - server2	property tree	Same as server1.
Netflow data sources - existing files	property tree	Contains the properties for collection from test files.
existing files - active	yes, no	Enables test file based collection.
existing files - Netflow data directory	text	Specifies the directory containing files to collect.
existing files - read subdirectories	yes, no	Enables file collection from subdirectories.

Table 3-17 Cisco Netflow Import Properties (Part 2 of 3)

Adapter Property	Schema	Description
aggregation and filtering	property tree	Contains the properties for demand aggregation and filtering.
aggregation and filtering - aggregation	property tree	Contains the properties for aggregation and filtering.
aggregation and filtering - aggregation - aggregate demands by...	property tree	Contains the aggregation properties.
aggregate demands by... IP addresses	yes, no	Aggregate by IP address.
aggregate demands by... AS numbers	yes, no	Aggregate by AS numbers.
aggregate demands by... ports	yes, no	Aggregate by ports.
aggregate demands by... protocol	yes, no	Aggregate by protocol.
aggregate demands by... type of service (TOS)	yes, no	Aggregate by TOS.
aggregate demands by... interface indices	yes, no	Aggregate by interface indices.
aggregation and filtering - rebucketization	property tree	Contains the rebucketization properties.
aggregation and filtering - rebucketization - time bucket size (minutes)	integer	Specify the bucket size interval for rebucketization.
aggregation and filtering - filtering	property tree	Contains the filtering properties.
aggregation and filtering - filtering - filter byte flows less than (bytes per sec)	integer	Specify the threshold below which byte flow data is not kept.

Table 3-17 Cisco Netflow Import Properties (Part 3 of 3)

Adapter Property	Schema	Description
aggregation and filtering - filtering - filter packet flows less than (packets per sec)	integer	Specify the threshold below which packet flow data is not kept.
aggregation and filtering - filtering - percentage of byte volume to keep	integer	Specify the percentage of the byte volume to keep.
aggregation and filtering - filtering - filtered log file		Specify the path to the filtering log file.
End of Table 3-17		

NetScout nGenius Import

The NetScout nGenius Import adapter connects to one or more NetScout servers to collects traffic flow statistic files. After these files are collected, the traffic flow information is imported into the VNE database. Since flow data can be quite large, this adapter provides front end capabilities to filter and aggregate flow data. Configuration of this adapter is similar in nature to the Cisco Netflow Import adapter.

Cflowd Import

The Cflowd Import adapter connects to one or more Cflowd servers to collects traffic flow statistic files. After these files are collected, the traffic flow information is imported into the VNE database. Since flow data can be quite large, this adapter provides front end capabilities to filter and aggregate flow data. Configuration of this adapter is similar in nature to the Cisco Netflow Import adapter.

Demand Traffic Processing Service

The Demand Traffic Processing Service processes demand traffic statistics stored in the VNE database to map endpoint IP addresses to network subnets and categorize traffic flow based upon source and destination.

Table 3-18 Demand Traffic Processing Service Properties

Service Property	Schema	Description
map demand endpoints to network model	property tree	Contains mapping properties.
map demand endpoints - map demand endpoint IP addresses to network model subnets	yes, no	Enables demand endpoint mapping.
demand aggregation	property tree	Contains aggregation properties
demand aggregation - aggregation options	text	Not configurable at this time. Set to none.
End of Table 3-18		

Post Processor Service

The Post Processor service operates upon the database to fill in missing device attributes based upon other information in the network model. Contact OPNET for assistance and additional information about this adapter.

ASCII Generic Data Import

The ASCII Generic Data Import (GDI) adapter allows the user to supplement network information collected by the other adapters and to override incorrect information. The geographic location of a device (latitude, longitude) is an example of information supplied by ASCII Import that may not be reliably obtained by other means. This adapter allows the following information to be added or overridden:

- Geographic location
- Interface and sub-interface properties
- Interface and sub-interface addressing
- Link information
- Physical Entity chassis
- Device module chassis information

- Node groups and sub-groups
- Node group member lists
- Device config property information
- Device deletion
- Interface deletion

As with the other data collection adapters, this adapter is scheduled to run periodically, reads any configured ASCII override information, and places its XML output files in the VNE Server temp dir for processing by VNE-XML Import.

ASCII import files are manually generated, as described below. The default directory for these files lies within the installation directory at *<install dir>**input*\AsciiData and can be changed using the VNE Server Management Console.

The Management Console *Adapter Resources* panel is used to point to the ASCII Import files for your network. To do so, expand the *ASCII Generic Data Import* property, and then expand the *location*, *ifc*, *ifcaddr* or *linkinfo* property. Change the **inputFileDir** property to point to the desired override file.

The format for ASCII Import geographic data, and an example, is shown below. Note that the fields are delimited by commas.

```
Hostname    City            Country     Latitude    Longitude       NPANXX

SF-Access,  SanFrancisco,   USA,        37.37,      -122.23,        415238
```

The format for ASCII Import link info data, and an example, is shown below:

```
Link_Type;, Endpt_Name*Interface; Endpt_Name*Interface

&VNE.TYPES.LINK.PTTOPT;,Chicago-Core*Serial0/1;DC-Core*Serial0/0
```

These files are manually created in a text editor and placed in their target directories.

Note—The default “sample” file for each type of ASCII data document the file format. Use the default inputFile location to find the sample files.

Refer to VNE Server Management Console on page VNE-2-24 in the User Interface chapter for a description of property editing in the Management Console.

The configuration properties for this adapter are described in the following table.

Table 3-19 ASCII Generic Data Import Properties

Adapter Property	Schema	Description
location	property tree	Contains properties that point to the location ASCII data file and its associated template file.
location - inputFile	text	Specifies the path to the location file. The default is <install dir>\inputs\AsciiData\location.txt.
location - templateFile	text	Specifies the path to a ASCII GDI template file. The default is <install dir>\lib\xml\templates\node_location.res.
ifc	property tree	Contains properties that point to the interface ASCII data file and its associated template file.
ifc - inputFile	text	Specifies the path to the interface file. The default is <install dir>\inputs\AsciiData\ifc.txt.
ifc - templateFile	text	Specifies the path to a ASCII GDI template file. The default is <install dir>\lib\xml\templates\ifc.res.
ifcaddr	property tree	Contains properties that point to the interface address ASCII data file and its associated template file.
ifcaddr - inputFile	text	Specifies the path to the interface address file. The default is <install dir>\inputs\AsciiData\ifcaddr.txt.
ifcaddr - templateFile	text	Specifies the path to a ASCII GDI template file. The default is <install dir>\lib\xml\templates\ifc_address.res.
linkinfo	property tree	Contains properties that point to the link info ASCII data file and its associated template file.
linkinfo - inputFile	text	Specifies the path to the interface address file. The default is <install dir>\inputs\AsciiData\linkinfo.txt.
linkinfo - templateFile	text	Specifies the path to a ASCII GDI template file. The default is <install dir>\lib\xml\templates\link_speed.res.
PEchassis	property tree	Contains properties that point to the Physical Entity chassis ASCII data file and its associated template file.
groupCreate	property tree	Contains properties that point to the node group creation ASCII data file and its associated template file.
addNodeToGroup	property tree	Contains properties that point to the node group addition ASCII data file and its associated template file.
End of Table 3-19		

Database Aging Service

The Database Aging Service works in conjunction with VNE Server's data merge framework to identify and remove stale or inconsistent network data from the VNE database. This capability is a key component of VNE Server's ability to maintain an accurate and current view of the target network. There are no configuration properties for this service in the *Adapter Resources* panel. However, the clean threshold properties in the *Adapter Priority* panel control how quickly the Database Aging Service removes stale data from the database.

Maintenance Service

The Maintenance Service removes used files from the VNE Server temp dir environment and limits log file growth. This service should be scheduled to run as often as needed to conserve disk space on the VNE Server host. OPNET recommends that this service be scheduled to run once during every data cycle, or a least once daily. The properties that configure this service are organized under WorkingTempDir and EventLogDir categories.

The WorkingTempDir properties identify temp dir directories that are processed by this service. The extensions properties define file name extensions for the files to be processed. The Maintenance Service deletes any temp dir files with these extensions. The default extensions are IMPORTED, USED, INVALID, and INCOMPLETE.

The EventLogDir properties identify the extensions assigned to event log files that are no longer current. The "older than" properties define the retention period for log files. After the retention period has passed for a file, Maintenance Service deletes the file. The event logs contain the event data that is displayed in the VNE Server Console. While they provide a valuable history of VNE Server activity, they can consume tens of megabytes of disk space. The Maintenance Service manages the disk space consumed by event logs.

The configuration properties for this service are described in the following table.

Table 3-20 Maintenance Service Properties (Part 1 of 2)

Service Property	Schema	Description
WorkingTempDir	property tree	Contains the properties that describe the subdirectories and files processed by this adapter.
WorkingTempDir - name	text	Points to the temp dir. The default is the temp dir specified at installation.
WorkingTempDir - removeFiles	true, false	Controls whether eligible files are removed from the temp dir. The default is true.
WorkingTempDir - includeSubDirectory	true, false	Controls whether eligible files are removed from the temp dir sub directories. The default is true.

Table 3-20 Maintenance Service Properties (Part 2 of 2)

Service Property	Schema	Description
WorkingTempDir - extensions - e1	text	A file extension for files to be deleted. The source adapter for the files renames the files when they are no longer needed. The default is IMPORTED.
WorkingTempDir - extensions - e2	text	A file extension for files to be deleted. The source adapter for the files renames the files when they are no longer needed. The default is USED.
WorkingTempDir - extensions - e3	text	A file extension for files to be deleted. The source adapter for the files renames the files when they are no longer needed. The default is INVALID.
WorkingTempDir - extensions - e4	text	A file extension for files to be deleted. The source adapter for the files renames the files when they are no longer needed. The default is INCOMPLETE.
EventLogDir	property tree	Contains the properties that control the event log retention.
EventLogDir - name	text	Points to the event log directory. The default is the <install dir>\log\eventlog directory.
EventLogDir - removeFiles	true, false	Controls whether eligible log files are removed from the event log directory. The default is true.
EventLogDir extensions - e1	text	A file extension for event log files to be deleted. The default is old.log.
EventLogDir - old than - timeCount	integer	The time interval for event log retention. The default is 1.
EventLogDir - old than - timeUnit	Hour, Day, Week, Month, Year	The time units for event log retention. The default unit is a Week.
End of Table 3-20		

Change Records Maintenance Service

The Change Records Maintenance Service manages database growth that results when network change history is saved in the database. VNE Server provides the ability to archive all detected network changes. When enabled, this information is used to populate the System Change reports. This service is used to remove any network change records that are older than the defined threshold.

The configuration properties for this service are described in the following table.

Table 3-21 Change Records Maintenance Service Properties

Service Property	Schema	Description
numHoursToKeep	Integer	The number of hours of network change data to keep. The default is 168 hours.
numMinutesToKeep	Integer	The number of minutes (in addition to the hour interval) of network change data to keep. The default is 0 minutes.
End of Table 3-21		

Report Export Service

The Report Export Service provides the ability to export reports to various formats (html, csv) at scheduled intervals. The reports to be exported and their location are configurable. The default location lies within the VNE Server temp dir. The default settings for the Maintenance Service will not remove these reports. The names of the reports do not include timestamps, so successive runs of the service overwrite existing reports. For this reason, it is recommended that scheduled scripts be written to move reports to an archive location.

The configuration properties for this service are described in the following table.

Table 3-22 Report Export Service Properties

Service Property	Schema	Description
outputFileDir	text	Specifies the directory to which reports are written. The default is *<temp dir>\vne\Reports*.
exportFormat	html, csv	Specifies the report format.
reportList	property tree	Contains a list of the reports. For each report, select *true* to enable the report, and *false* to disable the report.
End of Table 3-22		

Interface Utilization Rollup Service

The Interface Utilization Rollup Service manages database growth resulting from the continuous import of interface utilization data. With this service, utilization data is managed with respect to the following time periods:

- Interval over which raw utilization data is kept
- Interval over which utilization data is aggregated (rolled up) into fewer samples in the database
- Interval beyond which utilization data is removed from the database

The configuration properties for this service are described in the following table.

Table 3-23 Interface Utilization Rollup Service Properties (Part 1 of 2)

Service Property	Schema	Description
configurations	property tree	Contains the property trees for each utilization source.
configurations - Hourly - concord	property tree	Contains the rollup properties for the Concord eHealth utilization source.
configurations - Hourly - concord - Applies To Data Collected By=	baseline, concord, mrtg, InfoVista	Specifies the utilization source to which this roll up configuration applies.
configurations - Hourly - concord - Applies to Description=	text	
configurations - Hourly - concord - Roll Up Description=	hourly	Name of the roll up configuration.
configurations - Hourly - concord - Roll Up Interval	time	The DD:HH:MM interval used to aggregate (roll up) data that is older than the raw data threshold.
configurations - Hourly - concord - Amount of Raw Data To Keep=	time	The DD:HH:MM interval over which raw data is kept.
configurations - Hourly - concord - Amount of Roll Up Data To Keep=	time	The DD:HH:MM interval beyond the raw data threshold for which rolled up data is kept.
configurations - Hourly - concord - Is Enabled	true, false	Specifies whether rollup is enabled for this utilization source.
configurations - Hourly - baseline	property tree	Contains the rollup properties for the MIB-Based Interface Utilization source.
configurations - Hourly - mrtg	property tree	Contains the rollup properties for the MRTG utilization source.
configurations - Hourly - InfoVista	property tree	Contains the rollup properties for the InfoVista utilization source.

Table 3-23 Interface Utilization Rollup Service Properties (Part 2 of 2)

Service Property	Schema	Description
configurations - Hourly - StatScout	property tree	Contains the rollup properties for the StatScout utilization source.
configurations - Daily	property tree	Contains the Daily rollup properties for all sources.
configurations - Weekly	property tree	Contains the Weekly rollup properties for all sources.
End of Table 3-23		

External Adapter

The External Adapter provides a means to integrate outside tools and scripts into the schedule of adapters and services that you wish to run. Some use cases are

- Copy exported model files to an archive environment
- Copy exported reports to an archive environment
- Move config files or data files collected by other tools to the temp dir
- Run scripts and tools to manage the VNE Server environment

This adapter can run one or more external commands. By default, the shell of one external command is provided and disabled. Use the Management Console Adapter Resources panel for this adapter to fill in the details of the number of commands to run and their setup properties.

Note—As with all adapters and services, the External Adapter can only appear at one point in the product schedule. More than one schedule rule can be active, so a mix of event and time based scheduling can be done

The configuration properties for this adapter are described in the following table.

Table 3-24 External Adapter Properties (Part 1 of 2)

Service Property	Schema	Description
cmd1	property tree	Contains the setup properties for cmd1.
cmd1 - process_name	text	Name of the external command for use in event logs.
cmd1 - cmd	text	The tool or script that you wish to run as an external command.
cmd1 - workingDir	text	The path to the external command tool or script.

Table 3-24 External Adapter Properties (Part 2 of 2)

Service Property	Schema	Description
cmd1 - args	property tree	Contains the arguments for external commands.
cmd1 - args - values	text	Contains the external command arguments.
cmd1 - env - v1..v4	property tree	Contains optional environment variable data for the external command.
cnd1 - enabled	true, false	Set to true to enable the command, false otherwise.
End of Table 3-24		

To configure this adapter, select cmd1 and use the **New Sibling** button to create a copy of the cmd1 shell for each command you wish to run. Press the **Apply** button after each command is created and before any other editing takes place. The term command used here can refer to an executable or script. Examples are Windows bat files, Solaris shell scripts, Perl scripts, Java, C, C++ executables and more. For each command you create, do the following:

1) Enter a display name for the command into the *process_name* property.

2) Enter the command you wish to run into the *cmd* property. Do not directly run shell commands such as dir or copy. Run them from a script. Consider these examples.
   - For Perl scripts, cmd = perl.
   - For executables, cmd = <executable name>.

3) Enter the path to the command you wish to run into the *workingDir* property.

4) If the command has arguments, enter them into the *args - values* text field. Some notes:
   - If you have no arguments, leave the text field empty.
   - If you have more than one argument, separate each by one or more spaces in the text field.
   - Use full path names to any files or directories in the argument list.

5) If the command is a vnes.bat or vnes.sh target, keep the *env v1-v4* properties. They default to product installation paths. Otherwise, select and delete each *env* variable *v1-v4.* Do not delete the *env* parent property.

6) Set the *enabled* property to true.

WARNING—Terminate bat or shell scripts with an “exit” or equivalent statement. Failure to do so will cause the External Adapter to hang when it runs the script.

Some setup examples follow.

To run a Perl script:

```
process_name = Save_Reports

cmd = perl

workingDir = C:\Perl\bin

args = C:\vnes\tools\saveReports.pl C:\op_admin\tmp\vne\Reports C:\vnes\reports

env =
```

To run an executable:

```
process_name = Collect_Demand_Data

cmd = collectDemandData.exe

workingDir = C:\vnes\tools

args = C:\op_admin\tmp\vne\netflow\collectedFiles

env =
```

Demand Traffic Rollup Service

The Demand Traffic Rollup Service manages database growth resulting from the continuous import of demand flow data. At this time, the service deletes demand data from the database that is older than the specified time period.

Export Service

The Export Service provides scheduled export of a full network model. The configuration properties in the Management Console for this service also specify what interface utilization and demand data is included in the network model.

The configuration properties for this service are described in the following table.

Table 3-25 Export Service Properties

Service Property	Schema	Description
ScheduledExport	property tree	Contains the properties that control scheduled network model export.
ScheduledExport - exportDir	text	Specifies the directory to which network models are exported.
ScheduledExport - maxNumExportFiles	integer	Specifies the maximum number of archived network model files to retain. Once the limit is reached, the oldest file is deleted.
ScheduledExport - allowWhiteSpace	true, false	Specifies whether the XML network model file contains whitespace formatting. A formatted file is larger than one that is not formatted, but is much easier to read in a text editor.
Utilization Priority	property tree	Contains the properties that control default export of interface utilization data.
Utilization Priority - ALL	yes, no	Specifies whether the exported network model contains utilization data from all sources. When set to *no*, the priority scheme defined for each source governs its inclusion in the model.
Utilization Priority - Concord	property tree	Specifies Concord export properties.
prefix	text label	A fixed text label that is used to match the data source.
priority	integer	The order in which data from this source will be
Utilization Priority - MRTG	property tree	Specifies MRTG export properties.
Utilization Priority - InfoVista	property tree	Specifies InfoVista export properties.
Utilization Priority - MIB	property tree	Specifies MIB export properties.
Utilization Priority - StatScout	property tree	Specifies StatScout export properties.
Default Demand Export Filter	property tree	Contains the properties that control default export of demand data.
Default Demand Export Filter - demand type	menu	Specifies the default demand type to export.
Default Demand Export Filter - time window	menu	Specifies the default demand time period to export.
End of Table 3-25		

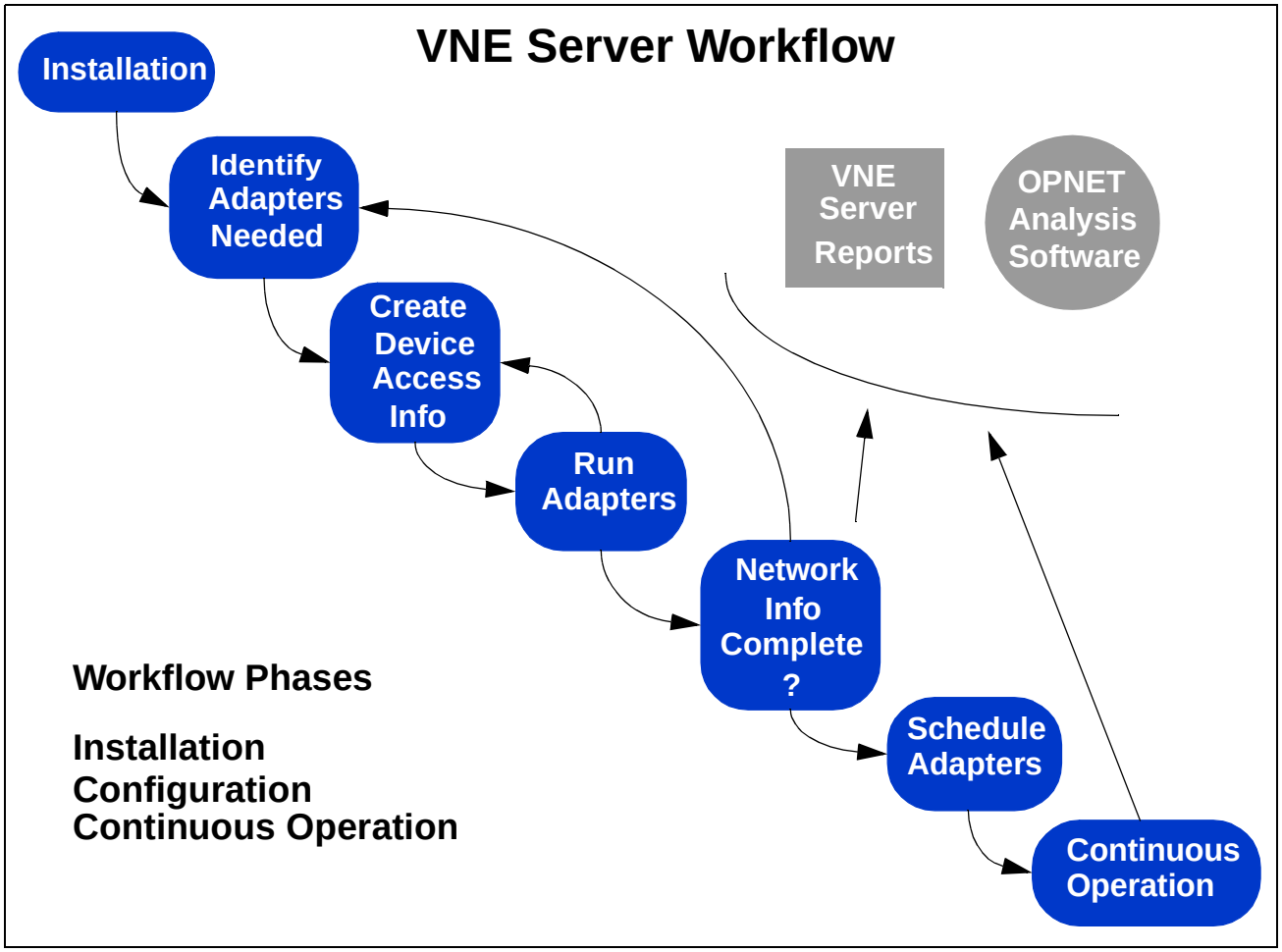
4 Operation

Introduction

VNE Server is designed to operate autonomously as a network model server. After installation, an iterative setup process configures and tunes VNE Server for data collection from a particular target network. Once configuration is complete, continuous data collection is started and monitored through the VNE Server Console. The following sections describe the VNE Server configuration process, and how to manage network data collection.

VNE Server Workflow

The workflow used with VNE Server is divided into several distinct phases: *Installation*, *Configuration*, and *Continuous Operation*. The configuration decisions and activities at each phase are discussed in more detail in the following sections. A diagram illustrating VNE Server workflow is shown below.



Installation

During installation, your main decision is whether to install VNE Server and its network database on the same host platform or to install the VNE Server remotely from the database. The best reason to use a remote database is to take advantage of an existing database elsewhere in your organization. For very large networks, better performance will also be achieved if the database is located on a separate host than VNE Server. VNE Server can support either installation scenario.

Configuration

After installation, the next phase is the configuration of VNE Server for continuous operation, including adapter selection and configuration. This portion of the setup process is iterative and consists of the following stages:

- Create the device access information used to guide VNE Server data collection.
- Identify the adapters needed based upon your network management environment. Use VNE Server's third-party NMS adapters to leverage your other network management products as much as possible. Doing so minimizes the additional traffic required on your network to deliver a complete network model.
- Configure and run each adapter individually. Evaluate data collection results. Reconfigure and retest until you are satisfied with the results.
- Use VNE Server's Report Manager and Network Browser to determine the completeness of the network that is created.
- Import a network model into the OPNET analysis software to assess accuracy and completeness of the network model.
- Design a data collection schedule for the adapters. Consider how often adapters should run in order to maintain a current picture of your network.

The remainder of this chapter describes each configuration step in more detail.

Continuous Operation

Once adapter configuration and scheduling is defined, and any data collection problems are solved, you are ready to continuously run VNE Server as a network model server. In this role, VNE Server will build and maintain a complete view of your network. Anyone using the OPNET analysis software for network analysis can import a current network model whenever one is needed.

During continuous operation, you should monitor the VNE Server Event Viewer for any Critical or Emergency events that require investigation. The Report Manager and Network Browser are excellent tools to view device configuration, as well as global information about the network.

Starting VNE Server

VNE Server is started from the OPNET VNE Server 3.0 program group. This program group provides the selections shown in the following table:

Note—You must be logged in as Administrator for the VNE Server program group to be visible.

Table 4-1 OPNET VNE Server Program Group Selections

Program Group Selections	Function
OPNET VNE Server	Opens the VNE Server Console.
Open File Log Viewer	Opens the VNE Server File Log Viewer.
Open Licensing Web Page	Opens the OPNET License Registration web page in a browser.
OPNET VNE Server Documentation	Opens the VNE Server documentation menu in Acrobat Reader.
Remove current project from database	Removes all the data related to the current data collection project from the network database.
Remove temp dir and current project from database	Removes the temporary directory (*C:\op_admin\tmp\vne*) and all the data related to the current data collection project from the network database.
End of Table 4-1	

Procedure 4-1 Start VNE Server

1 Select **Start > Programs**.

2 Locate the **OPNET VNE Server 3.0** program group.

3 Select **OPNET VNE Server** from the OPNET VNE Server 3.0 program group.

➥ Within a minute, the VNE Server Console opens.

End of Procedure 4-1

Refer to VNE Server Commands on Solaris on page VNE-2-5 in the User Interface chapter for Solaris operation.

Configuring VNE Server

Setting up VNE Server for continuous operation involves decisions about the adapters you need, their setup, and scheduling. Creating device access information for a large network can be a tedious task. Working through device access problems encountered during adapter testing involves troubleshooting. The following sections guide you through the configuration process.

Creating Device Access Information

The VNE Server adapters that directly access devices in your network require a device file that contains access information about each device that you choose to include in the network model.

The device information file contains the hostnames, access addresses, and login information that VNE Server needs to collect configuration and MIB data from each device. By default, this file is located in the *<install dir>\input\DeviceInfo* directory as *deviceInfo.txt*, but it can have any name or location. The *Device Info File* panel in the Management Console has a property that points to this file. Refer to Device Info File on page VNE-2-29 and Device and Platform Info on page VNE-2-29 sections of the User Interface chapter for more information about the device file format and editing tools.

You can create the device info file in the following ways:

- Offline using device access data and scripts or spreadsheets
- Online within the Management Console
- By a combination of offline and online methods

Create a Device Info File Offline

Offline methods work best for creating an initial device information file for a large network. This is especially true if you already have files that list device names and their access addresses. You can use a spreadsheet to create the device file. To do so, do the following steps.

1) Import your device name and address file into a spreadsheet.
2) Use the spreadsheet's editing tools to fill in missing data. Refer to Device and Platform Info on page VNE-2-29 section of the User Interface chapter for details on the file format.
3) Copy the file to the device file location configured in the *Device Info File* panel in the Management Console.
4) Open the *Device and Platform Info* panel to view the contents of the device file.

If the device data does not display as expected, verify that the field order and delimiter is correct. Correct any problems found.

Create a Device Info File Online

The *Device and Platform Info* panel is where you do online, interactive editing to create or maintain a device file. While you can use this panel to create access information for your entire network, it is less tedious to create large device files offline. The best use of this panel is to maintain an existing device file. Adding, removing, or changing device information for a small number of devices is easy.

This panel also provides the ability to import device information from the following sources.

- **CiscoWorks inventory files**—refer toUsing a CiscoWorks inventory File to Create a Device Info File on page VNE-2-33 in the User Interface chapter.
- **Concord dci files**—refer to Using a Concord dci file to Create a Device Info File on page VNE-2-33 in the User Interface chapter.
- **HP OpenView NNM Server**—refer to Using HP OpenView NNM Server to Create a Device Info File on page VNE-2-34 in the User Interface chapter.
- **VNE Database**—refer to Using the Contents of the VNE Database to Create a Device Info File on page VNE-2-35 in the User Interface chapter.

The device files from these sources are still partial files. Once the device file is created, import it into a spreadsheet and fill in the missing fields. When done, export the file back to text format. Make sure you use a field delimiter that matches the one specified by the *delimiter* property in the *Device Info File* panel.

Note—Some types of devices need to be separated into multiple entries in the device info file. For example, Cisco Catalyst devices consist of 2 switching cores and additional routing modules. In this case, each addressable module should appear as an entry in the device info file. Interface and port modules do not need to be handled in this fashion. Systems from other vendors may require similar treatment.

Once you have created a device info file, you are ready to select, configure and test the adapters.

Choosing Adapters

VNE Server offers a comprehensive selection of data collection adapters. Some adapters collect data directly from each device in the network. Others collect data from other NMS platforms such as CiscoWorks, HP OpenView, or Concord.

The adapters that you choose to use depend mainly upon the following considerations:

- Other NMS platforms used in the network
- Device vendor mix
- Policy restrictions regarding SNMP use
- ASCII data requirements

The presence of other network management systems in your network have the biggest effect on adapter selection. For each of your third-party NMS platforms, use the corresponding VNE Server adapter to collect their data. For more information on particular adapters, refer to the Adapters and Services chapter of this manual.

CiscoWorks Adapters

For CiscoWorks, the choices are more varied. VNE Server provides separate adapters to collect configuration files from CiscoWorks and to access the RME and ANI databases. Use the adapters that correspond to your CiscoWorks components.

Since the VNE Server device configuration adapters collects more information than CiscoWorks, consider running the following adapters to maximize the data collected from each device:

- Device Config File Collection
- Device ifIndex Import
- Device FR Map Import
- Device Version Import
- Device IP Route Import
- Device CDP Import
- Device ARP Table Import
- Device Interface Import
- Device Module Import
- Device VTP Status Import

- Device CAM Table Import
- Device VLAN Database Import

Note—Refer to Device Config File Collection on page VNE-3-1 in the Adapters and Services chapter for a list of the commands used to gather device configuration data for each supported vendor.

The device vendors present in your network also affect the adapters to use. In a network consisting only of Cisco devices with a full CiscoWorks implementation, you may be able to omit the following adapters and still obtain a complete network model:

- Device Config File Collection
- Device Config File (ifIndex, FR Map, Version, IP Route, CDP, ARP Table, Interface, Module, VTP Status, CAM Table, VLAN Database) Import
- Device MIB Configuration Import

In a mixed vendor network, run all of these adapters to build a complete network. For such a scenario, the device file can omit Cisco devices since CiscoWorks supplies all configuration data for these devices.

Collecting Utilization Data

VNE Server supports several adapters that import interface utilization data.

- **Concord eHealth and MRTG**—If you use some combination of Concord eHealth and MRTG, use the corresponding VNE Server adapters to import the data. You do not need to use the MIB-Based Interface Utilization Import adapter. You only need this adapter if there is no other source of interface utilization data.
- **SNMP Polling Policies**—Network management policies regarding SNMP polling also affect your adapter choices. If your organization tightly restricts SNMP polling, consider whether the data collected by the Device MIB Configuration Import and MIB-Based Interface Utilization Import adapters is worth the additional traffic on your network.
- **Geographic Data Import**—VNE Server provides the ASCII Generic Data Import adapter to support import of geographic location and link override data. Consider whether you need this adapter to build a complete network.
- **Network Link Information**—Always use the Link and Connection Inference Service. If you do not use HP OpenView, this service is the only way to create links for your network. For HP OpenView users, VNE Server can infer additional network links based upon the broader set of data available to VNE Server. Do not rely solely upon HP OpenView for creation of network links.

- **Framework Services**—Always use the framework services: Database Aging Service, Maintenance Service, Demand Traffic Rollup Service, Interface Utilization Rollup Service and the Change Records Maintenance Service. These services perform essential housekeeping for VNE Server.
  - — The Database Aging Service removes stale data from the database.
  - — The Maintenance Service removes outdated files from the file system.
  - — The Demand Traffic Rollup and Interface Utilization Rollup services remove old demand and interface utilization data from the database.
  - — If you have enabled archival of network changes, use the Change Records Maintenance Service to manage the growth of network change history in the database.

Once you have chosen the adapters that best fit your network management environment and modeling needs, you are ready to configure and test each adapter.

Configuring Adapters

Once you have created device access information about your network, and have chosen adapters, you must configure each adapter for operation. Most of the default settings for adapter properties can remain unchanged. Use the *Adapter Resources* panel in the Management Console to evaluate each adapter property. Change adapter properties, as needed, to configure adapters for your network.

Note—Before you configure adapters, review Management Console on page VNE-2-24 in the User Interface chapter to learn more about user interfaces in the Management Console. For each adapter that you need, review its description in the Adapters and Services chapter.

The following sections discuss configuration issues for each adapter.

Device Config File Collection Adapter

In the Management Console, open the *Adapter Resources* panel. Expand the property tree for the Device Config File Collection adapter.

1) Review and adjust the *timeout* and *retries* properties to values appropriate for your network.

2) Review the *login* properties for each device vendor in your network.

   The login command and response sequence programmed in the *login* properties should match the sequence configured for your devices.

   Check the command sequence for all supported access methods (SSH, TACACS+, etc.) under each vendor.

3) Review the *show commands* properties for each command and vendor.

   The command sequence should match the sequence configured for your devices.

If you have mixed login or show command sequences for a specific device type in your network, you must create new device types so that all the command sequences are defined. Each device in the device info file should have the *Device Access Script* field set to a device type (vendor or vendor subtype).

Device Configuration Import Adapters

In the *Adapter Resources* panel, expand the property tree for each of the device configuration import adapters. Review each property and change the settings as needed. The default settings for these adapters are suitable for normal operation.

CiscoWorks Adapters

Since the CiscoWorks adapters connect to CiscoWorks databases to collect data, most of the adapter properties specify database connection attributes. In the *Adapter Resources* panel, expand the property tree for the CiscoWorks adapters. Review each property and change the settings as needed. Work with the CiscoWorks administrator to get the hostname, database name, user info, port numbers and other information needed to access the CiscoWorks databases.

Note—Some configuration is required on the CiscoWorks host to permit access from the VNE Server host. Refer to Configuring CiscoWorks on page VNE-5-37 in the Administration chapter for instructions on how to configure CiscoWorks to work with VNE Server.

Device MIB Configuration Import Adapter

In the *Adapter Resources* panel, expand the property tree for the Device MIB Configuration Import adapter. Review each property and change the settings as needed. With this adapter, the timeout used by the SNMP engine may need to be increased. If you have other network management products that use SNMP to poll the network, start with timeout settings that are known to work in your network.

HP OpenView NNM Import Adapter

In the *Adapter Resources* panel, expand the property tree for the HP OpenView NNM Import adapter. Review each property and change the settings as needed. For this adapter, change the HP OpenView access properties to match those used in your network.

Note—If VNE Server is located on a different host machine than HP OpenView, some configuration is required in the HP OpenView environment to permit access from the VNE Server host. Refer to Configuring HP OpenView on page VNE-5-36 in the Administration chapter for instructions on how to configure HP OpenView to work with VNE Server.

Link and Connection Inference Service

In the *Adapter Resources* panel, expand the property tree for the Link and Connection Inference Service. Review each property and change the settings as needed. The properties for this service allow you to disable link inference based upon a specific information source. Link creation based upon ARP and CAM data is disabled by default. Consider whether you should enable these properties.

Trace Route Link Inference Service

In the *Adapter Resources* panel, expand the property tree for the Trace Route Link Inference Service. Review each property and change the settings as needed. Review the traceRouteVendorList settings to ensure that the expected prompts match the configured setting.

MIB-Based Interface Utilization Import Adapter

In the *Adapter Resources* panel, expand the property tree for the MIB-Based Interface Utilization Import adapter. Review each property and change the settings as needed. Change the `sampleInterval` property to the desired polling interval (seconds). Consider whether the retry count should be increased. This adapter requires you to configure source list.

Concord eHealth Network Utilization Import Adapter

VNE Server supports data collection from one or more Concord servers. Each server has its own set of configuration properties. In the *Adapter Resources* panel, expand the property tree for the Concord eHealth Network Utilization Import adapter. Review each property and change the settings as needed.

- This adapter requires you to configure the “live” source. If you have multiple Concord systems, use **New Sibling** to make copies of “live”. Configure each server instance. Change the access properties (platform, hostName, userName, etc.) to match the server.

- The **additionalParams** property is used for any extra access commands that are needed to navigate to Concord data. Edit the prompt and reply properties with these commands. If no extra commands are required, then delete the **param1**, **param2** nodes under **additionalParams**. Adjust the **timeout** property as needed.
- Change the **commandPrompt** property to reflect the command line prompt displayed by the Concord host.
- Expand the **cnhExport** property tree. Adjust the **timeout** property as needed. Change **trafficRange** to the setting that reflects the amount of traffic to import from Concord.
- Expand the groupNames property. Add, change or remove groups to match those setup on the Concord server.
- Set the **active** property to *yes*. Configuration is complete.

Refer to Configuring Concord eHealth on page VNE-5-40 in the Administration chapter for more information about how to configure Concord to work with VNE Server.

MRTG Interface Utilization Import Adapter

VNE Server supports data collection from one or more MRTG servers. Each server has its own set of configuration properties. By default, two servers are provided. Both servers are disabled. One is configured for a MRTG server that has the same path for its working, cfg, and log directories. The other provides properties to define separate paths for each directory.

In the *Adapter Resources* panel, expand the property tree for the MRTG Interface Utilization Import adapter. Review each property and change the settings as needed. This adapter requires you to configure the server list property.

Note the following:

- If you have one MRTG server, and its working directory configuration matches one of the default servers, edit the access properties (**hostName**, **userName**, etc.) for the matching server entry. Set the working directory paths. Set the **active** property to *yes*. Configuration is complete.
- If neither MRTG server entry matches your server setup, alter the closest setup by adding and changing properties until you are done. Configure the access properties, set the working directory paths and set the **active** property to *yes*.
- If one of the existing MRTG servers matches your server setup, but you have more than one server with this setup, then use the **New Sibling** button to clone the matching setup for each of server. Configure the access properties, set the working directory paths and set the **active** property to *yes* for each server.

Refer to Configuring MRTG on page VNE-5-40 in the Administration chapter for more information about how to configure MRTG to work with VNE Server.

InfoVista Network Utilization Import Adapter

VNE Server supports data collection from one or more InfoVista servers. Each server has its own set of configuration properties. By default, two servers are provided, with both servers disabled.

In the *Adapter Resources* panel, expand the property tree for the InfoVista Network Utilization Import adapter. Review each property and change the settings as needed. This adapter requires that you configure the server list property.

For server1, edit the access properties (**hostName**, **userName**, etc.) for the matching server entry. Set the **active** property to *yes*. If you have a second server, configure the server2 properties. If you have more than 2 servers, use the **New Sibling** button to clone additional servers. Fill in each new server's properties. Configuration is complete.

Refer to Configuring InfoVista on page VNE-5-41 in the Administration chapter for more information about how to configure InfoVista to work with VNE Server.

Cisco Netflow Collection

In the *Adapter Resources* panel, expand the property tree for the Cisco Netflow Collection adapter. Review each property and change the settings as needed. Configure the access information for the Netflow Collector servers in your network. Use this adapter together with the Demand Traffic Processing Service.

Demand Traffic Processing Service

In the *Adapter Resources* panel, expand the property tree for the Demand Traffic Processing Service. Review each property and change the settings as needed. Use this service to map and process traffic demands collected by the Cisco Netflow Collection adapter.

ASCII Generic Data Import Adapter

In the *Adapter Resources* panel, expand the property tree for the ASCII Generic Data Import adapter. Review each property and change the settings as needed. By default, this adapter has properties defined that point to a sample override file.

For more details about creating a data file with geographic location or link override information, refer to ASCII Generic Data Import on page VNE-3-32 in the Adapters and Services chapter. This section also describes how to add additional override properties for this adapter.

Maintenance Service

In the *Adapter Resources* panel, expand the property tree for the Maintenance Service. Review each property and change the settings as needed. The main item to review is the event log retention period. Expand the **EventLogDir** property and then expand the **old than** property. Change the **timeCount** and **timeUnit** properties to the desired values.

Depending upon the size of the network and adapter scheduling, a week of event logs can use 100-200 MBytes of disk space. Keeping event logs for several days is useful for troubleshooting purposes. Keeping logs longer than a week is of less value.

Interface Utilization Rollup Service

In the *Adapter Resources* panel, expand the property tree for the Interface Utilization Rollup Service. Change the traffic retention intervals to the desired setting for each utilization source.

WARNING—If you use any of the interface utilization adapters, you must run the Interface Utilization Rollup Service in order to control the growth of traffic data in the VNE database.

At this point, VNE Server adapter configuration is completed. The next step is to test each adapter and correct any problems with adapter operation.

Report Export Service

In the *Adapter Resources* panel, expand the property tree for the Report Export Service. Configure the desired output directory for the reports and their format. Expand the reportList and enable each report that you wish to export.

Testing Adapters

After adapter configuration is complete, test each adapter to verify device and platform access information, connectivity, and the ability to import adapter data. Some of the problems found during adapter testing are

- Incorrect device info: address, login information, access methods
- Device or NMS platform unreachable from the VNE Server host
- NMS platform data inaccessible

When you test run an adapter, monitor the event messages that appear in the VNE Server Event Viewer. The Event Viewer events show whether the problem device is reachable or whether a login error occurs. Event Viewer events also show if login is successful but data retrieval failed.

If you have problems accessing a device or NMS platform, verify access information and reachability by trying the following:

- Ping devices and NMS platforms to verify reachability.
- If a problem device is reachable, telnet to the device and login.
- If you can successfully login, run the adapter commands used to get the device configuration. Note any problems.

Correct any device access information problems in the *Device and Platform Info* panel of the Management Console. Stop and restart VNE Server services to reinitialize device data. Retest the adapter.

Correct any network reachability problems. If needed, add static routes to the VNE Server host. Retest the adapter.

Correct any adapter setup problems such as incorrect access information for a NMS platform. Retest the adapter.

Continue to work through each of the adapters in this manner.

Evaluating the Network Model

After all adapters have been tested and setup problems corrected, use the VNE Server Report Manager and Network Browser to examine the network. Import the network into an OPNET analysis software project. Examine the topology, configuration and traffic imported into the OPNET analysis software model from VNE Server. As you evaluate the network model created by VNE Server, you may find

- Missing devices
- Unexpected devices
- Missing links or a disconnected topology
- Incorrect interface speeds

Investigate anything that appears incorrect based upon your knowledge of the network.

- Missing devices generally result from an incomplete device info file.
- Unexpected devices can be created due to configuration problems or stale data from NMS platforms. ASCII data files created by the user for the ASCII Generic Data Import adapter may have devices that do not belong in the network.

- Missing links can mean that the adapters in use do not provide enough information to infer the link. Consider whether running adapters that are not being used will populate additional data that can aid link inference. Missing links may also be due to portions of the network being isolated by firewalls or other unmodeled devices.
- Incorrect interface speeds may be the result of ambiguous configuration data.

Manually run the Trace Route Link Inference Service to fill in missing devices and links. This service discovers “hidden” devices in your network and adds them to the device info file. Fill in empty fields for these new devices so that other adapters can collect data from them to produce a richer network model.

Correct all problems found in both adapter setup and NMS platforms. Rerun adapters. Use the Report Manager and Network Browser to examine network data. You can usually see whether a problem has been fixed with these tools. Try another model import into an OPNET analysis software project. Iterate until the network model is the best that can be obtained, and the causes of missing devices, links or data are understood.

Once you have finalized adapter configuration, you are ready to configure the adapter schedules.

Scheduling Adapters

The last configuration step before putting VNE Server into continuous operation is to configure adapter schedules. VNE Server provides complete flexibility in scheduling adapter operation. You can schedule adapters to run on a regular basis, or you can schedule adapters to run based upon events raised by other adapters. In practice, you will likely use a mix of both scheduling methods.

Since the VNE-XML Import service imports all the data supplied by adapters into the network database, it is important to not over-schedule the adapters. Doing so overloads the VNE-XML Import service, which causes it to fall behind. Using event-based scheduling, as much as possible, results in the most efficient operation for VNE Server and the most current network model.

When scheduling adapters, consider the following questions.

- How often does the network configuration change?
- How large is the network?
- How often should each adapter poll the network?
- Do you want some adapters to poll more than once in a data cycle?
- How often do the third-party NMS products poll the network?

The answers to these questions help determine how you schedule the adapters. For example, if you have a daily maintenance window for changing your network configuration, scheduling all adapters to run 4 times a day will add little to no value.

The size of your network also affects scheduling decisions. If all the adapters that you want to run need 4 hours to poll the network and import data into the database, then 4 hours is the shortest polling interval that can be used if you are using time-based scheduling.

The polling behavior of third-party NMS products affect your adapter scheduling decisions. If a third-party NMS product polls the network every 4 hours, there is no value in scheduling the corresponding VNE Server adapter to run any sooner than this interval.

MIB-Based Interface Utilization Import Adapter

The MIB-Based Interface Utilization Import adapter presents a special case. This adapter polls the network based upon its sampleInterval property, not the scheduled adapter time. The scheduled time refers to when the adapter processes its collected data and produces XML data files for import by the VNE-XML Import adapter. With this adapter, you have the option to poll and collect data more often than you import the data. You do not need to import data after each polling cycle, but should not let more than about 6 to 12 polling cycles of data accumulate before the XML data is imported.

Chaining Adapters

The best way to schedule the VNE Server adapters is to use time-based scheduling for the third-party NMS adapters based upon the polling schedule of the corresponding NMS product.

Use event-based scheduling to chain together all the other adapters with the time-based ones. The following table shows the events you should use to chain to each adapter.

Table 4-2 Events to Use for Chaining Adapters and Services (Part 1 of 2)

Adapter or Service	Event
Device Config File Collection	Finish Import
Remote File Collection	Finish Import
Device Config File Import, ifIndex, FR Map, Version, IP Route, CDP, ARP Table, Interface, Module, VTP Status, CAM Table Import VLAN Database Import	Finish Import
CiscoWorks Config File Collection	Finish Import
CiscoWorks Config File Import	Finish Import
CiscoWorks RME Database Import	Finish Import
CiscoWorks ANI Database Import	Finish Import
Cisco WAN Manager Import	Finish Import
Device MIB Configuration Import	Finish Import
HP OpenView NNM Import	Finish Import
Link and Connection Inference	Finish Import
Trace Route Link Inference	NA
MIB-Based Interface Utilization Import	Finish Import
Concord eHealth Network Utilization Import	Finish Import
StatScout Interface Utilization Import	Finish Import
MRTG Interface Utilization Import	Finish Import
InfoVista Network Utilization Import	Finish Import
VistaMart Interface Utilization Import	Finish Import
Cisco Netflow Collection	Finish Import
NetScout nGenius Import	Finish Import
Cflowd Import	Finish Import
Demand Traffic Processing Service	Service End
ASCII Generic Data Import	Finish Import

Table 4-2 Events to Use for Chaining Adapters and Services (Part 2 of 2)

Adapter or Service	Event
Post Processor	Finish Import
Database Aging Service	Service End
Maintenance Service	Service End
Change Records Maintenance Service	Service End
Report Export Service	Service End
Interface Utilization Rollup Service	Service End
External Adapter	Adapter End
Demand Traffic Rollup Service	Service End
Export Service	Service End
End of Table 4-2	

The configuration file collection and import adapters should always be chained together via event-based scheduling. Chain the following adapters:

- Device Config File Collection, Device Config File Import, ifIndex, FR Map, Version, IP Route, CDP, ARP Table, Interface, Module, VTP Status, CAM Table Import, VLAN Database Import.
- CiscoWorks Config File Collection, CiscoWorks Config File Import (also chain the RME and ANI adapters if your installation has these databases).
- Cisco Netflow Collection, Demand Traffic Processing Service.

To configure the adapter schedules, use the Management Console *Adapter Schedule* panel. For unused adapters, set the active property for the adapter to *false*. Set this property to *true* for all other adapters. For each adapter using time-based scheduling, set the cycle and delay properties to your chosen value. For each adapter using event-based scheduling, select Event from the schedule type menu. Choose the triggering event and source adapter in the other pull-down menus for the schedule.

Refer toAdapter Schedule on page VNE-2-36 section in the User Interface chapter for more information about adapter scheduling.

Continuous Operation

Once configuration activities are complete, you are ready to transition VNE Server to continuous operation. The following sections describe how to start data collection and monitor operation using the Console, Event Viewer, Report Manager, and Network Browser.

Using the VNE Server Console to Start and Monitor Data Collection

The VNE Server Console is used to start data collection and to monitor system events during initial data collection. You can also use the Console to verify that all the enabled adapters activate and that no problems exist with data collection. For more information about the VNE Server Console, refer to Console on page VNE-2-6 section in the User Interfacechapter.

Starting Data Collection

During the configuration process, the network database was populated with test data. Before running VNE Server in an operational mode, delete the test database by performing the following steps.

1) Stop VNE Server services, if they are running, and exit VNE Server.

2) Use the Program Group menu for VNE Server to remove the database and temp dir files. Refer to Deleting the Temporary Directory and Current Project on page VNE-2-3 in the User Interface chapter.

3) Restart VNE Server using the procedureStarting VNE Server on page VNE-2-2 in the User Interface chapter.

To monitor VNE Server more closely during initial data collection, switch the Console to Detail View mode so you can monitor adapter execution. Open a Live Event Log Viewer so start-up events are visible.

Start VNE Server data collection using the procedure Starting VNE Services on page VNE-2-15 in the User Interface chapter.

When services start, a Progress Status box opens and displays start-up progress information. After adapters are triggered to run, the Console shows adapters operating, and the Event Viewer shows adapter events.

If you need to stop data collection, refer to Stopping VNE Services on page VNE-2-15 in the User Interfacechapter. Note that when you stop data collection, any data in the network database is retained. You can restart data collection at any time.

Monitoring Data Collection

After you start data collection, closely monitor the progress of initial data collection. Continue to monitor adapter activity throughout the remainder of the first data collection pass. Use the Console System Status panel to verify adapters are running as intended.

- Verify that each adapter and service runs when scheduled.
- Verify that adapter and service operation is mostly sequential.
- Verify that VNE-XML Import is processing and importing data.

As system events begin to appear in the Event Viewer, verify that

- Few device access errors occur
- Third-party NMS products are successfully accessed
- No Emergency or Critical events occur

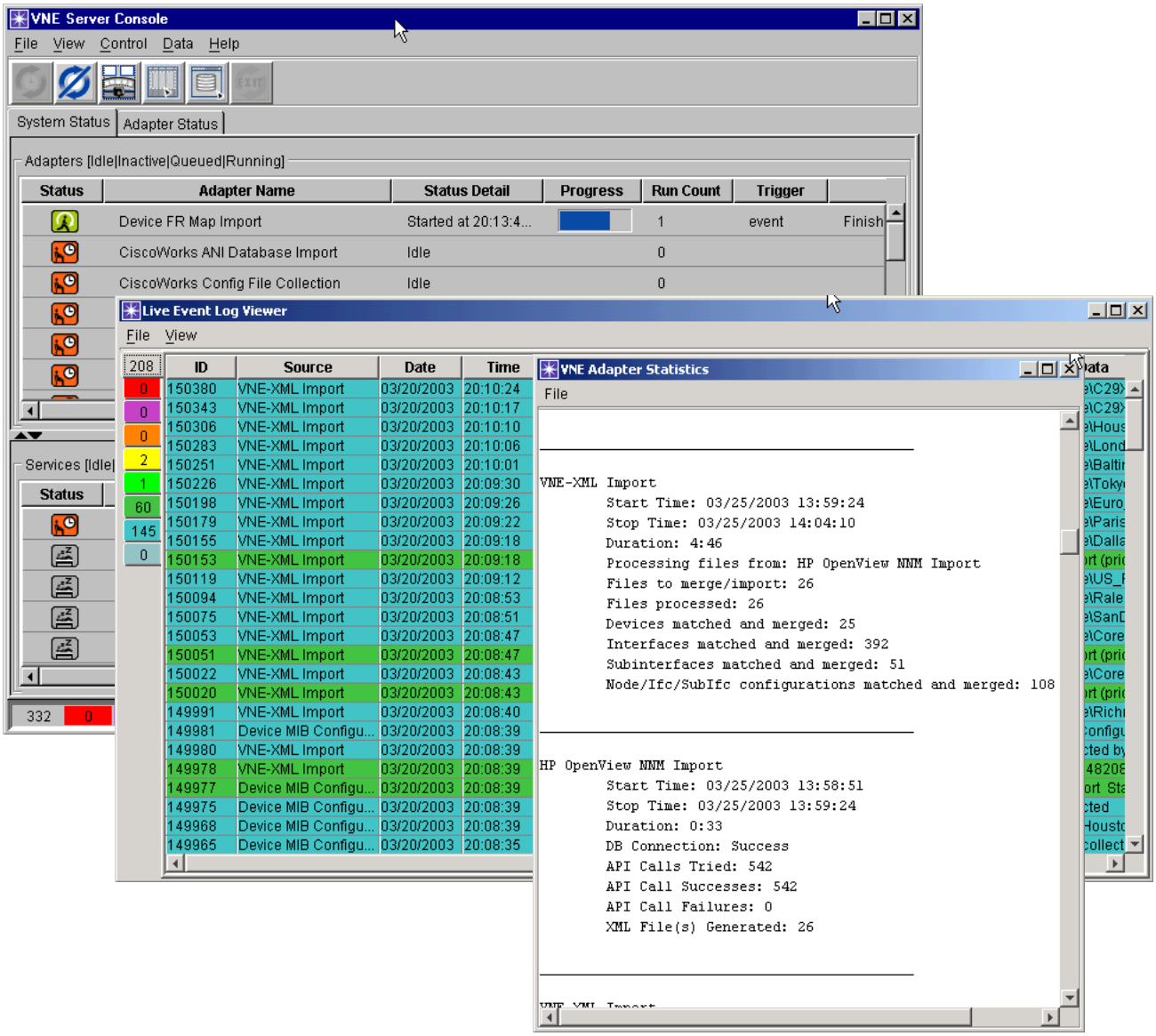
Throughout VNE Server operation, use the Adapter Statistics view to examine adapter execution statistics. To open Adapter Statistics, select **View > Adapter Statistics** from the Console menu bar. Using Adapter Statistics, verify that

- All adapters are running
- Devices are accessed successfully
- Files are collected from third-party NMS products
- Links are created

Determine proper operation of VNE Server by monitoring system events and by using the Report Manager and Network Browser. These same tools can be used at any time to verify that VNE Server is operating as intended or to view information about the network.

An example of the VNE Server Console window during data collection is shown below.

Figure 4-1 Using the Console to Monitor Operation



Using the Report Manager

The VNE Server Console gives you a window into system operation as the adapters collect and import network data. The Report Manager lets you retrieve collected network data from the database in order to examine the merged, unified view of the network. For this reason, Report Manager is the best VNE Server tool to verify correctness of operation. While the VNE Server Console shows that all adapters are running, the Report Manager verifies that data is merged properly and imported into the network database. For more information on the Report Manager, refer to Report Manager on page VNE-2-40 in the User Interface chapter.

To verify that VNE Server is creating a correct view of your network, display the following reports. Verify that each report's content makes sense based upon your knowledge of the network.

- **Node Summary**—*Are all devices present?*
- **Interface Summary**—*Does interface information appear?*
- **Link Summary**—*Do the inferred links appear correct?*
- **Asset Inventory**—*Do hardware assets appear?*
- **Router Protocols**—*Do the routing protocols match those used?*
- **Interface Utilization**—*Does traffic activity appear?*
- **Adapter Collection**—*Are all adapters collecting data?*
- **Adapter Discovery**—*Is any data only seen by just one adapter?*
- **Adapter Discrepancy**—*Any discrepancies between data sources?*

Other reports provide helpful summary information about your network. These reports are

- **Network Summary**—Shows the number of devices by each vendor, interfaces and links by type.
- **Access List Summary**—Shows device access lists.
- **Configuration Summary**—Shows the number of devices using each protocol.
- **Device and Vendor Summary**—Breaks down network composition by device and vendor.
- **Interface/Port Summary**—Shows the number of ports in operation across the network.
- **Software Version Summary**—Breaks down network composition by vendor and device software version.

Examples of several key reports are shown below.

Figure 4-2 Node Summary Report

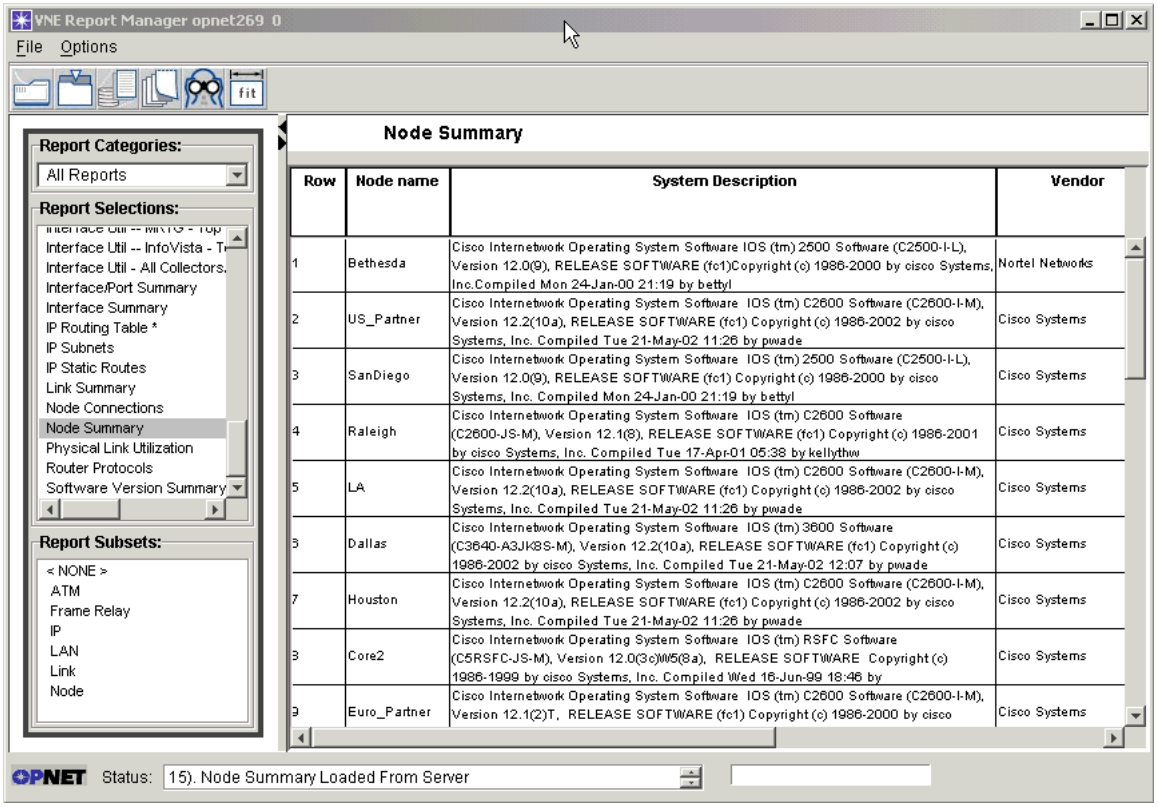


Figure 4-3 Interface Summary Report

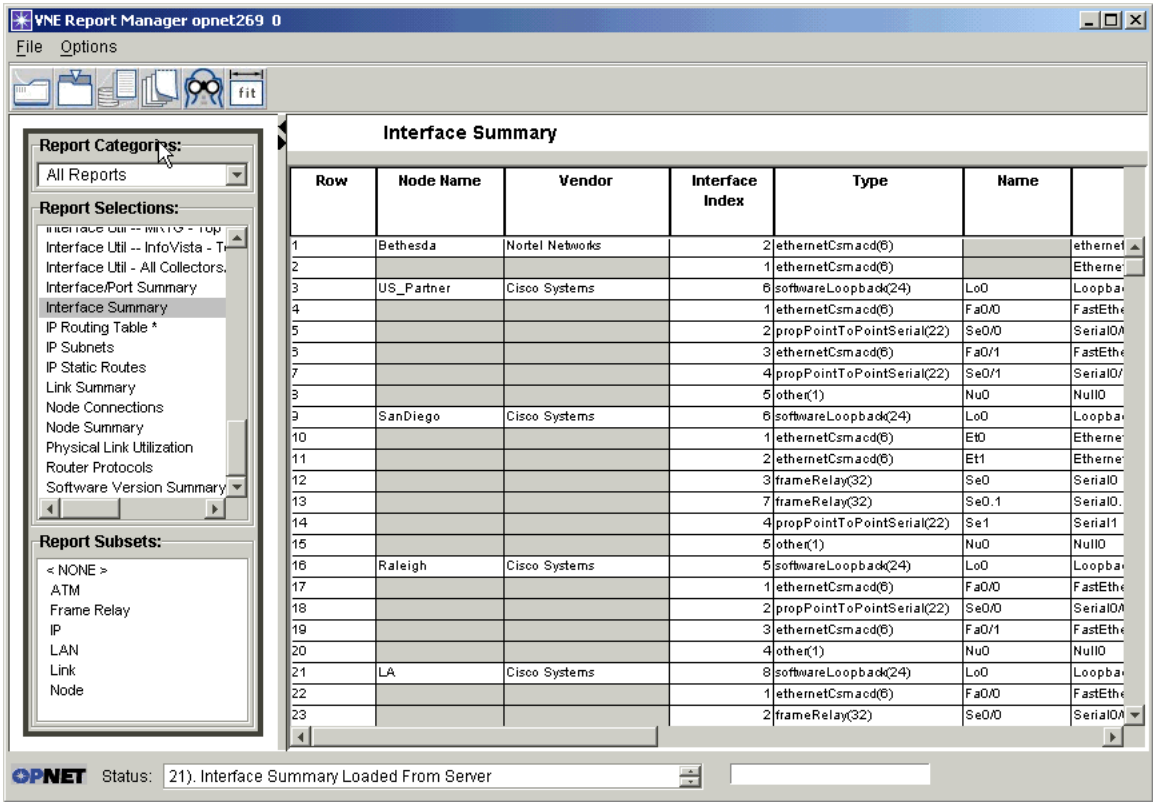
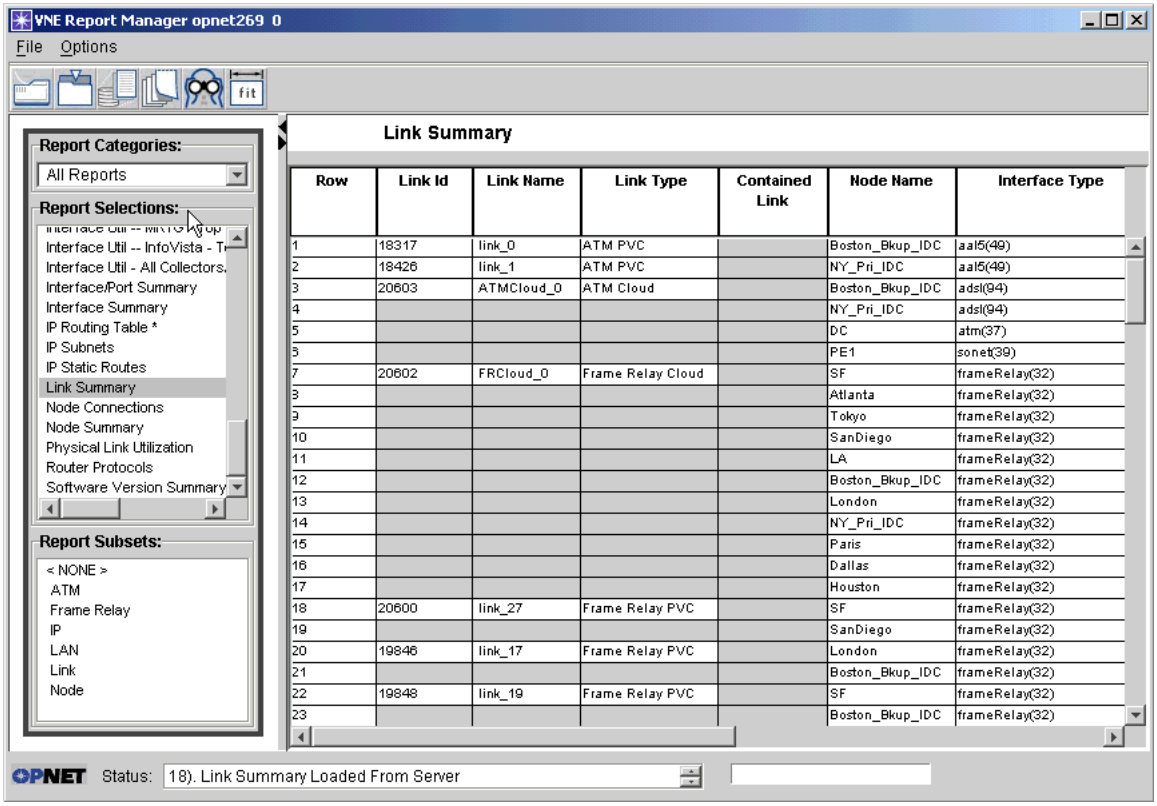


Figure 4-4 Link Summary Report



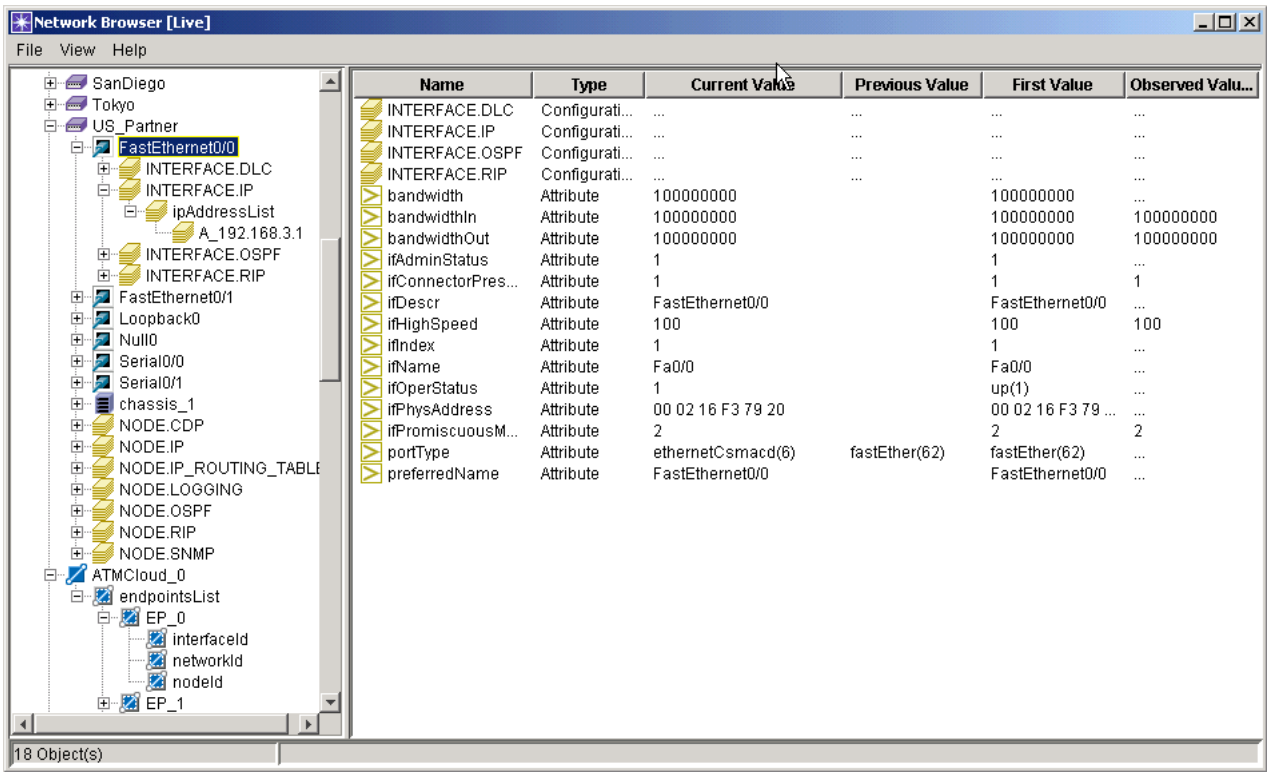
Using the Network Browser

Another tool that you can use to examine the network is the Network Browser. This tool provides a graphical treeview of the network and the data properties of each device in the network. Many of the properties available are retrieved from device configuration files. You can also view additional properties from other sources, such as ASCII data and the Device MIB Configuration Import adapter.

For more information about the Network Browser, refer to Network Browser on page VNE-2-53 in the User Interfacechapter.

Spot check the information for several devices in the network, comparing the displayed configuration information to that collected from the device configuration files. An example of the Network Browser window with some expanded device data is shown below:

Figure 4-5 The Network Browser



The VNE Server Console, Report Manager, and Network Browser provide good tools for monitoring VNE Server operation and for examining the network model. The next section describes how to import a VNE Server network model into the OPNET analysis software where the model is used for analysis projects.

Importing a VNE Server Network Model into the OPNET analysis software

After VNE Server has been running long enough to build a complete and accurate network model, you can import the model into an OPNET analysis software project. Model import from VNE Server into intelligent network management clients is automatic. The VNE Server Console displays events that show an export request (export from VNE Server's perspective) being processed.

Note—No action is required by the VNE Server administrator to support a specific model export request.

Note—VNE Server can support multiple, simultaneous export operations to its OPNET analysis software clients.

Connecting an OPNET analysis software Client to VNE Server

To successfully import a network model from VNE Server, the OPNET analysis software client must be provided a valid *vneserver.ior* file. The *vneserver.ior* file is created by VNE Server when services are started, and placed in the temp directory on the VNE Server host. This file contains the information that the OPNET analysis software client needs to request a model from VNE Server.

WARNING—Whenever VNE Server data collection is halted and restarted, a new *vneserver.ior* file is created. If the OPNET analysis software client resides on the same host as VNE Server, this does not present a problem. However, if the two applications reside on separate hosts, the OPNET analysis software client no longer sees a valid *ior* file. Subsequent attempts to import a model will fail. The new *ior* file must be visible at the *vne_import_ior_file* path (set in OPNET analysis software preferences), or model import into OPNET analysis software fails. New *ior* files can be copied manually to the OPNET analysis software host.

WARNING—Whenever VNE Server data collection is halted and restarted, the CORBA connection ports change. If you are connecting to VNE Server through a firewall, the new ports must be opened so that the OPNET analysis software client can communicate with VNE Server. Refer to Tech Support FAQ 1155 for information on decoding the port numbers from the *vneserver.ior* file.

The simplest way to ensure that the OPNET analysis software client maintains access to a valid *ior* file is to make the VNE Server temp directory shareable and setup a network drive mapping so the *vne_import_ior_file* OPNET analysis software preference points directly to the *ior* file.

Importing a Model

When importing a network model from VNE Server, the following import features are available:

- Full import of the current network model
- Full import of an archived network model
- Import of topology with no background utilization or demand data
- Partial model import through selection of a device group
- Full or partial topology import with background utilization selection by source and time
- Full or partial topology import with demand flow selection by demand type and time

---

Procedure 4-2 Import from VNE Server

1. Create a new project in OPNET analysis software by selecting **File > New** from the main menu.

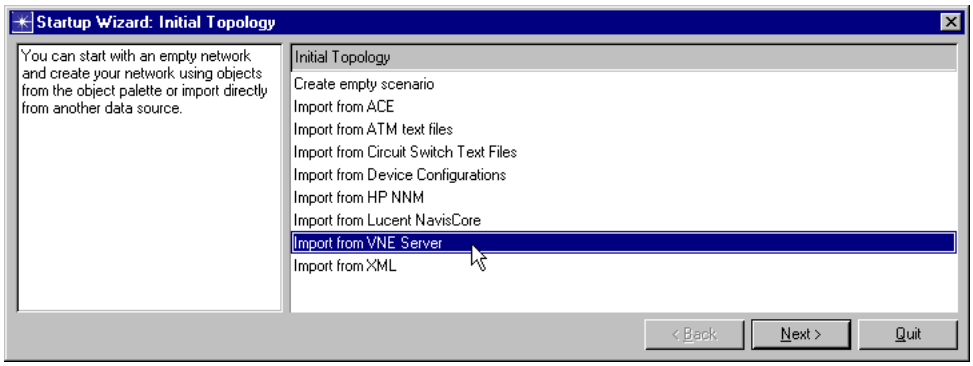
   ➥ A dialog box labeled **New** opens.

2. Select **Project** from the menu. Press **OK**.

   ➥ An dialog box labeled **Enter Name** opens.

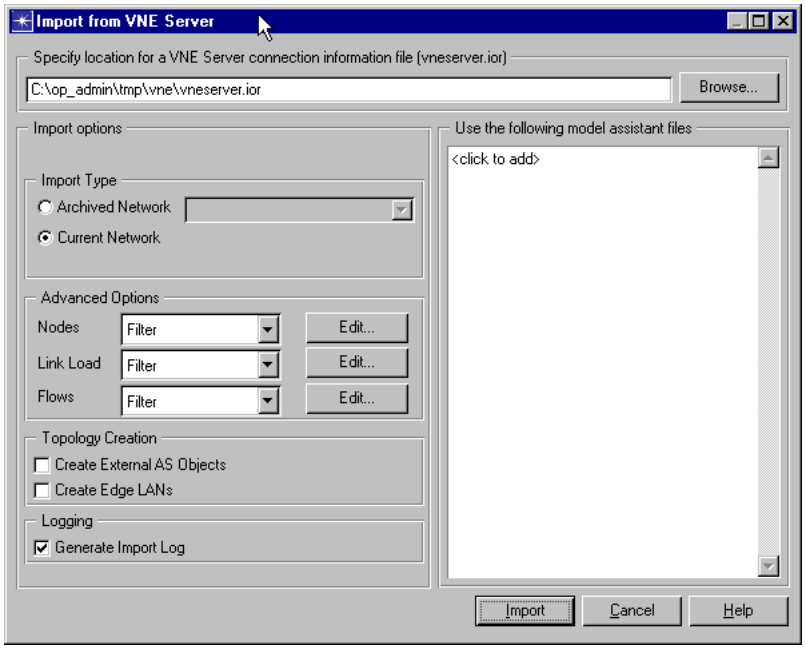
3. Enter the project and scenario names that you want to use into the text fields of the *Enter Name* dialog box. Press **OK**.

   ➥ The **Startup Wizard: Initial Topology** dialog box opens.



4 Select **Import From VNE Server.** Press **Next**.

➥ An **Import From VNE Server** options dialog box opens.

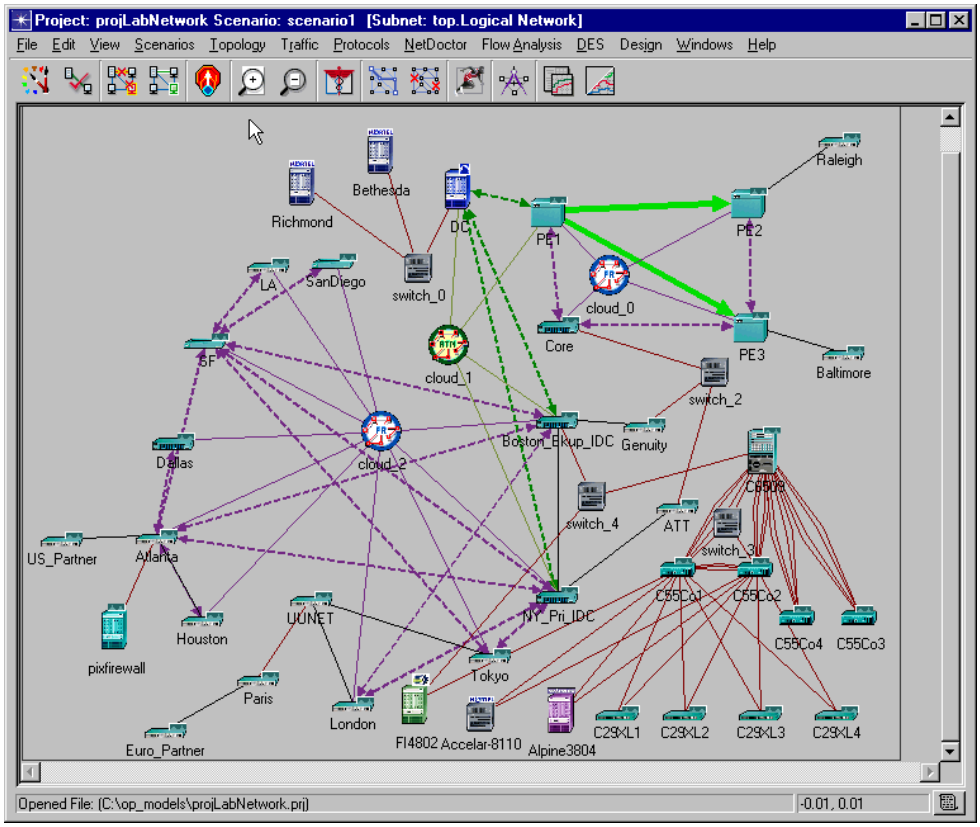


5 Select an Import Type. To import an network model from the list of archived models, select **Archived Network**. To import the current model in VNE Server or to filter by device groups, background utilization, or demand flows, select **Current Network.**

6 Use the **Advanced Options** dialog to make your choices, if you wish to import a portion of the VNE Server model or filter background utilization or demand flows

7 Press **Import**, when done selecting import options.

➥ An import progress box opens. Model import takes several minutes. During this time, progress messages appear in the progress box. When import is done, the network model appears in the main project window.



End of Procedure 4-2

5 Administration

Introduction

This chapter describes the VNE Server environment and common administrative tasks. VNE Server does not require extensive administration. However, you need a basic understanding of the installation and temporary directory environment for effective troubleshooting and administration. Since VNE Server relies upon an Oracle database, some basic knowledge of Oracle administration is also presented in this chapter.

VNE Server Administration

This section describes the VNE Server installation and temporary directory environment. Administrative procedures in the following areas are also covered.

- Managing projects
- Reconfiguring VNE Server
- Managing logs and traffic data
- Software upgrades
- License operations
- Configuring OPNET analysis software

Important Files

To create the full installation path for VNE Server, the system appends *VNEServer*\3.0 to the path chosen during installation. The VNE Server installation directory has the following main subdirectories:

- **doc**—Contains VNE Server documentation
- **input**—Contains device access information and ASCII data files
- **lib**—Contains XML control files, MIBs, ASCII data templates
- **log**—Contains product log files

The VNE Server startup scripts, database scripts, and libraries are located in the installation directory.

Table 5-1 lists some important files within the VNE Server environment.

Table 5-1 Important VNE Server Files

Description	Files
File used by OPNET analysis software to import data from VNE Server	<temp_dir>\vneserver.ior
VNE Server project lock file	<temp_dir>\lock\<project_name>.lck
Console event log file	<install_dir>\log\eventLog\vne.log
RMID log file	<install_dir>\log\vne_rmid_log.log
Adapter Statistics log file	<install_dir>\log\adapterStats\adapterStats_<project_name>.txt
Product startup script	<install_dir>\vnes.bat (Windows) <install_dir>\vnes.sh (Solaris)
Product definition files	<install_dir>\lib\xml\dtd
Product resource files	<install_dir>\lib\xml\res
Database setup scripts	<install_dir>\setup_accounts.sql <install_dir>\drop_accounts.sql
Installation log files	<install_dir>\InstallLogs\installer_debug_initial.log
End of Table 5-1	

Temporary Directory

The VNE Server temporary directory, *temp dir,* is the working directory where adapter data files are collected and processed. By default, this directory is *C:\op_admin\tmp\vne* and contains subdirectories that are organized by adapter. Configuration and traffic data files collected by the adapters are stored throughout the temp dir. The XML files produced by each adapter are also staged in the temp dir before they are imported into the network database. Adapters rename their temporary files after they are processed, so the Maintenance Service can identify and remove old files.

Note—You specify the location of the temp dir during VNE Server installation and cannot change it after installation is complete.

Table 5-2 shows the organization of the VNE Server temp dir environment.

Table 5-2 VNE Server Temp Dir Organization (Part 1 of 2)

Directory	Contents
temp dir root (C:\op_admin\tmp\vne)	Contains subdirectories and XML import files.
Baseliner	Contains xml traffic data produced by the MIB-Based Interface Utilization Import adapter.
cflowd	Contains demand XML from processed Cflowd data.
Cnh	
Cnh\input	Contains traffic files collected from Concord.
Cnh\xml	Contains XML from processed Concord data.
Collect	
Collect\ARP	Contains ARP files.
Collect\CAM	Contains CAM files.
Collect\Cdp	Contains CDP files.
Collect\Configs	Contains config files.
Collect\Configs_CiscoWorks	Contains config files collected from CiscoWorks.
Collect\FRMap	Contains frame relay map files.
Collect\ftp	Contains any files collected by the Remote File Collection adapter.
Collect\ifIndex	Contains ifIndex files.
Collect\Interface	Contains Interface files.
Collect\IPRoute	Contains IP Route files.
Collect\Module	Contains Module files.
Collect\Version	Contains Version files.
Collect\Vlan	Contains VLAN files.
Collect\VTP	Contains VTP status files.
Cw	
Cw\Ani\Xml	Contains XML from processed CW ANI data.
Cw\cache	Contains a cache of collected CW files.
Cw\Rme\Xml	Contains XML from processed CW RME data.

Table 5-2 VNE Server Temp Dir Organization (Part 2 of 2)

Directory	Contents
Device_MIB_Collection	Contains XML from Device MIB Configuration Import adapter.
dns	Contains XML from processed reverse DNS lookups.
export	Contains exported XML files of the network model.
hpov	Contains XML from processed HP OpenView data.
iv	
iv\xml	Contains XML from processed InfoVista data.
lock	Contains the VNE Server lock file.
mrtg	
mrtg\input	Contains traffic files collected from MRTG.
mrtg\xml	Contains XML from processed MRTG data.
netflow	
netflow\collectedFiles	Contains collected Netflow data. Organized by date, source and flow type. Processed demand XML resides in this directory tree.
netflow\filteredDemands	Contains log file showing low traffic demands.
netflow\xml	Not used.
NetScout	Contains XML from processed NetScout nGenius demand data.
Reports	Contains the exported reports.
ss	
ss\input	Contains StatScout input files, organized by device.
ss\xml	Contains XML from processed StatScout data.
End of Table 5-2	

Managing Projects

Managing VNE Server involves making decisions about project naming that affect workflow and data retention across an upgrade. This section describes the impact of various project naming conventions.

Choosing a Project Name

A VNE Server project represents a model of the network defined by the devices in the project's device information, *Device Info*, file. VNE Server uses the project name, assigned in the Management Console *Project Properties* panel, to name the underlying database tables that store network data. For this reason, the project naming convention that you use will affect workflow and upgrade strategy.

When you setup VNE Server, choose among these project naming conventions:

- Use the same name for all projects across all VNE Server releases.
- Use a project name that is specific to each network and release.

If you use the same project name for each target network and release, administration is simplified, but you may not be able to migrate the database across releases. VNE Server does not currently migrate database data to a new release when the underlying data schema changes. If you choose this naming convention, you must delete your project data and repopulate the database to handle schema changes or to model a different network. On the other hand, this naming approach results in a smaller database than other approaches.

If you use a project name per network and release, you can model different portions of your network and maintain the data for each network in the database at the same time. When you migrate to a release that changes the data schema, you must still populate the database with the new project name. However, the network model created by the previous release remains in the database and can still be accessed by the previous release. This approach provides the greatest operational flexibility with VNE Server but consumes the most database space.

The naming convention that works best for you depends upon the following factors:

- The size of your network and available database storage
- Your need to switch VNE Server among different networks
- Your need to retain network models from older releases

Reconfiguring VNE Server Data Collection

Normally, VNE Server is in continuous operation against a given network. The network that VNE Server sees may be your entire network or just a portion of the network. For example, you may be using VNE Server to model only your core network. The following procedure describes how to switch data collection over to another network.

Procedure 5-1 Switching Data Collection to Another Network

1. Open the VNE Server Management Console.
2. Create a Device Info file for the new network.
3. Create any ASCII data files required for the new network.
4. Stop VNE Server data collection for the current network by selecting **Control > Stop VNE Services** from the Console menu bar.
5. Use the Management Console *Project Properties* panel to assign a new project name.
6. Use the *Device Info File* panel to point to the new device file.
7. Adjust adapter settings for the new network.
   - **7.1** Reconfigure adapters as needed from the *Adapter Resources* panel.

   Note—You may need to reconfigure the adapters that access network management platforms such as Concord.

   - **7.2** Review the *Adapter Scheduling* panel, and make any changes required for the new network.
8. Exit the Management Console by pressing **OK**.
9. Exit VNE Server by selecting **File > Exit** from the Console menu bar.
10. Open the OPNET VNE Server Program Group menu.
11. Start VNE Server services by selecting **Control > Start VNE Services**.

End of Procedure 5-1

Monitor data collection and evaluate the resulting network model as described in the Operation chapter.

Managing Logs and Traffic Data

During operation, VNE Server produces log files that contain Console events and internal system activity. These files can consume hundreds of megabytes of disk space. If you are using VNE Server to collect interface utilization data, the traffic data that is written to the database can also require a significant amount of storage. This section describes the tools that VNE Server provides for managing logs and traffic data.

Managing Log File Growth

VNE Server provides the following types of logs:

- Console event logs that are located at: <*install dir*>*log**eventlog*
- RMID logs that are located at: <*install dir*>*log*

The events displayed by the VNE Server Console are stored in multiple log files. The log file that contains events currently displayed in the console is named *vne.log*. Once the maximum event display count is reached in the Console, this file is capped, renamed to a *vne_<date_time>.old.log* file name, and a new *vne.log* file is opened.

The RMID log provides a history of adapter operation that shows the sequence of adapter operation and any warnings, failures, errors or exceptions that occur during adapter operation. This log file is named *vne_rmid_log.log*, and its size is capped at a default size of 10 MB. When the log file grows to this size, it is renamed to *vne_rmid_log.log.archive.*<*timestamp*>, and a new file started. By default, the last 10 files are retained. After the maximum number of log files is reached, the oldest file is deleted.

If you want to change the retention period for log files, use Procedure 5-2.

Procedure 5-2 Set the Retention Period for Log Files

1. Open the Management Console by selecting **Control > Management Console** from the Console menu bar.

   ➥ The Management Console opens.

2. Select the *Adapter Resources* panel in the Management Console.

   ➥ The *Adapter Resources* panel becomes visible.

3. Expand the Maintenance Service property tree.
4. Expand the **EventLogDir** property tree that is located in **Maintenance Service**.
5. Expand the **old than** property tree that is located in **EventLogDir**.
6. Change the **timeCount** and **timeUnit** properties to the desired settings.

7 Save the changes by pressing the **Apply** button.

End of Procedure 5-2

Procedure 5-3 Setting Up the Maximum Size for the RMID Log File

1 Open the Management Console by selecting **Control > Management Console** from the Console menu bar.

➥ The Management Console opens.

2 Select the *Project Properties* panel in the Management Console.

➥ The *Project Properties* panel becomes visible.

3 Expand the VNESfeatures property tree.

4 Expand the logging property tree that is located in VNESfeatures.

5 Change the **maxLogFileSize_In_KB** property to the desired setting.

6 Save the changes by pressing the **Apply** button.

End of Procedure 5-3

Managing Traffic Data Growth

The traffic data imported from the interface utilization adapters by VNE Server is stored in the network database. If nothing is done to manage the growth of traffic data, all available storage space in the database will eventually be exhausted. VNE Server uses the Interface Utilization Rollup Service to remove any traffic from the database that is older than a user-specified threshold setting.

You can change the retention period for traffic data by using Procedure 5-4.

Procedure 5-4 Set the Retention Period for Traffic Data

1 Open the Management Console by selecting **Control > Management Console** from the Console menu bar.

➥ The Management Console opens.

2 Select the **Adapter Resources** panel in the Management Console.

➥ The Adapter Resources panel opens.

3 Expand the Interface Utilization Rollup Service property tree.

4 Change the properties for each utilization collector that you use to the desired settings.

5 Save the changes by pressing the **Apply** button.

End of Procedure 5-4

Exporting Reports to Files

The preferred way to export reports is through the Report Export Service. The Report Export Service is used for scheduled export of reports. In addition, VNE Server provides a script, `export_reports.bat`, that exports all reports to files. You can run this script while VNE services are operating. Use Procedure 5-5 to export reports to files.

Procedure 5-5 Export Reports to Files

1 Open a command prompt window, and navigate to the VNE Server installation directory by typing

```
cd <install path>\VNEServer\3.0
```

2 Run the export script.

- If you use Oracle8i, type

```
export_reports.bat -o <output directory path> -e <report format>
```

- If you use Oracle9i, type

```
export_reports.bat /Oracle9i -o <output directory path> -e <report format>
```

Where *<output directory path>* is the location to which report files are written, and *<report format>* is

- 0 for HTML formatted report files
- 1 for XML formatted report files
- 2 for CSV formatted report files
- 3 for ASCII formatted report files

➥ Progress messages appear in the command window. When export is complete, a “Completed exporting...” message appears.

End of Procedure 5-5

VNE Server provides a script, `run_report.bat`, that exports a selected report to file. You can run this script while VNE services are operating using Procedure 5-6.

Procedure 5-6 Export a Selected Report to File

1 Open a command prompt window and navigate to the VNE Server installation directory by typing

```
cd <install path>\VNEServer\3.0
```

2 To get a list of report IDs, type

```
run_report.bat -l
```

➥ A list of report names and their ID numbers is displayed in the command window. Note the ID number of the report you want to export.

3 Run the export script.

- If you use Oracle8i, type:

```
run_report.bat -f <output filename> -r <report id> -e
<report format>
```

- If you use Oracle9i, type:

```
run_report.bat /Oracle9i -f <output filename> -r <report id>
-e <report format>
```

Where <*output filename*> is the file to which the report is written, and <*report ID*> is the ID number of the report you want to export, and <*report format*> is

- 0 for HTML formatted report files
- 1 for XML formatted report files
- 2 for CSV formatted report files
- 3 for ASCII formatted report files

➥ Progress messages appear in the command window. When export is complete, a “Completed exporting...” message appears.

End of Procedure 5-6

Software Upgrades

VNE Server releases use a major release, minor release naming convention that is reflected in the installation path name. A major release denotes significant new features or framework enhancements in the product. A minor release contains incremental improvements and bug fixes.

The product installer appends *VNEServer*\<*major release*> to the chosen installation path. For example, if *C:**OPNET* is the chosen installation path for the 3.0 release, the complete path is *C:**OPNET**VNEServer*\3.0. Minor releases are called *patch levels* and are denoted as PL1, PL2, and so on.

The general workflow when doing a software upgrade for VNE Server consists of the following steps.

1) Stop data collection, and exit the existing VNE Server installation.

2) If you have a local license server running, execute the following procedures, based upon your platform, to stop the server.

   - Windows: Procedure 5-7
   - Solaris: Procedure 5-9

3) If upgrading to a new build in the same release, rename the existing installation directory to preserve the current release. For example, rename a 2.1 PL2 release to *2.1.2_<bld#>*.

4) Install the new VNE Server release.

5) Migrate the Device Info and ASCII data files to the new installation.

6) Change the project name to something that reflects the network.

7) Configure the adapters for the newly installed release.

8) Start data collection in the newly installed release.

Note—At this time, VNE Server does not migrate database data schema or adapter configuration data from one release to another.

WARNING—Always follow the installation instructions in the Installation Card and the Release Notes for a new release. The general workflow described in this section may not match the workflow for a specific release.

Product Licensing

VNE Server is integrated into the OPNET licensing system and supports the following license scenarios:

- Remote: obtain a license from a license server on a remote host.
- Local: obtain a license from a license server on the VNE Server host.

Licenses for VNE Server can be administered from any OPNET License Manager running on remote hosts that can communicate with the VNE Server host. Licenses can also be administered from a license manager running on the same host as VNE Server.

The OPNET License Manager application provides the most convenient means to monitor and manage VNE Server licenses. The License Manager provides a GUI to support license operations. The OPNET Administrator Guide describes how to use the License Manager. When a local license server is installed with VNE Server, a command line license management application is provided for managing licenses. You only need to use this command line license manager if you do not have a GUI based License Manager anywhere in your environment that can see the local license server.

Deployment Scenarios

When you install VNE Server, you must choose whether to obtain licenses from a local or remote license server. Some reasons to choose to obtain licenses from a remote license server are

- Leverage an existing license server within your organization
- Use a GUI-based License Manager application to manage licenses
- The VNE Server host and license server host can communicate

Some reasons to chose to obtain licenses from a local license server are

- VNE Server host cannot see a remote license server due to firewalls
- More robust licensing to support 24x7 VNE Server operation

If you choose to work with a remote license server, the GUI-based License Manager is more convenient to use than the command line license manager deployed with the local license server, installed with VNE Server. Since VNE Server is intended for use as a 24x7 application, persisting network problems or host downtime with the remote license server can cause VNE Server to shut down if problems are not resolved within the license grace period.

if you choose to work with a local license server, 24x7 operations are more robust since license operations are all local. Network problems cannot affect license operations. If the VNE Server host is separated from other license servers by a firewall, you must use the command line license manager utility for all license management. If the VNE Server host can see another host running OPNET analysis software, the GUI-based License Manager on those hosts can manage licenses maintained by the license server on the VNE Server host.

Restrictions and Limitations

VNE Server has the following restrictions regarding product licensing.

- The license server used by VNE Server must be from the OPNET 10.5.A release or higher.
- Standalone licensing is not supported by VNE Server.
- Loanable licenses are not supported for VNE Server.

- Only one local license server can be installed on the VNE Server host.
- The license manager utility (LS_UTIL) included with VNE Server does not support Express Method license operations.
- A license server installed with VNE Server on a host with no OPNET analysis software installed will default to listen on port_a.
- A license server installed with VNE Server on a host with OPNET analysis software installed (configured for remote licensing) will use the port specified in the licensing.ef file in the OPNET analysis software installation at \sys\configs\global_prefs.

If a license server already exists on the VNE Server host as a part of a previous OPNET analysis software installation, and you wish to use this local license server for VNE Server, install VNE Server to use a “remote” license server. During VNE Server installation, do the following:

- Enter the hostname of the local host as the license server host.
- Enter the port (a,b,c) used by the local license server.

License Resources

The following resources provide more information about OPNET licensing.

- The OPNET Administrator Guide (OPNET doc package).
- The OPNET License Registration web page at: http://ds1.opnet.com/4dcgi/licw4d_cl_content.

Command Line Utilities

VNE Server provides the following command line utilities for license related work.

- LS—Starts a local license server
- LS_KILL—Stops a local license server
- LS_UTIL—A command line license manager utility

When using these command line utilities, the /lic_host and /lic_port options MUST be used in the vnes.bat command line on a Windows system. For Solaris systems, the required options are -l (host) and -p (port).

The full command line for each utility on a Windows system is shown.

- `vnes.bat /Oracle9i /lic_host <license server host> /lic_port <port> LS`

- `vnes.bat /Oracle9i /lic_host <license server host> /lic_port <port> LS_KILL`
- `vnes.bat /Oracle9i /lic_host <license server host> /lic_port <port> LS_UTIL`

Where <*license server host*> is replaced with the hostname of the system running the license server used to obtain a license.

Where <*port*> is the communication port used by the license server. Valid entries are port_a, port_b or port_c.

Note—If you are using an Oracle8i database, the /Oracle9i switch is omitted from the commands listed above.

The full command line for each utility on a Solaris system is shown.

- `vnes.sh -r Oracle9i -l <license server host> -p <port> LS`
- `vnes.sh -r Oracle9i -l <license server host> -p <port> LS_KILL`
- `vnes.sh -r Oracle9i -l <license server host> -p <port> LS_UTIL`

License Procedures

The following procedures describe common licensing operations.

Procedure 5-7 Starting and Stopping a Local License Server using Windows Service Manager

1. Open the Windows Service manager.
   - Open **Start > Settings > Control Panel > Administrative Tools > Services**
2. In the Services window, scroll down and select the OPNET License Server.
3. Start or stop the server as needed.
   - **3.1** To start the server, right-click on OPNET License Server, and select Start from the menu.

➥ The OPNET License Server status changes to “Started”.

3.2 To stop the server, right-click on OPNET License Server, and select Stop from the menu.

➥ The OPNET License Server stops. The service status field is cleared.

End of Procedure 5-7

Procedure 5-8 Starting a Local License Server using Command Line Utilities

1 Open a command window and “cd” to the VNE Server installation directory.

2 Type: **hostname**

➥ Note the hostname displayed by this command. It is used (exact case match) with the /lic_host (or -l) option in the following command.

3 Start the license server.

- On a Windows system using Oracle9i, type:

  vnes.bat /Oracle9i /lic_host <local hostname> /lic_port <server port> LS

- On a Windows system using Oracle8i, type:

  vnes.bat /lic_host <local hostname> /lic_port <server port> LS

- On a Solaris system, type:

  vnes.sh -r Oracle9i -l <local hostname> -p <server port> LS

  For the /lic_port (-p on Solaris) option, specify the port used by this server. It will be one of port_a, port_b, port_c.

End of Procedure 5-8

Procedure 5-9 Stopping a Local License Server using Command Line Utilities

1 Open a command window and “cd” to the VNE Server installation directory.

2 Type: **hostname**

➥ Note the hostname displayed by this command. It is used (exact case match) with the /lic_host option in the following command.

3 Stop the license server.

- On a Windows system using Oracle9i, type

  vnes.bat /Oracle9i /lic_host <local hostname> /lic_port <server port> LS_KILL

- On a Windows system using Oracle8i, type

  vnes.bat /lic_host <local hostname> /lic_port <server port> LS_KILL

- On a Solaris system, type

vnes.sh -r Oracle9i -l <local hostname> -p <server port> LS_KILL

For the /lic_port (-p on Solaris) option, specify the port used by this server. It will be one of port_a, port_b, port_c.

➥ A “Success: license server stopped” message appears on the command line.

End of Procedure 5-9

Procedure 5-10 Changing the Settings used to Communicate with a Remote License Server

Note—Use this procedure to change the host or port settings for the remote license server used by VNE Server to obtain a license.

1. If VNE Server is operating, stop services and exit the Console.
2. Open a command window and “cd” to the VNE Server installation directory.
3. Enter the license manager utility.
   - On a Windows system using Oracle9i, type

     vnes.bat /Oracle9i /lic_host <hostname> /lic_port <server port> LS_UTIL
   - On a Windows system using Oracle8i, type

     vnes.bat /lic_host <hostname> /lic_port <server port> LS_UTIL
   - On a Solaris system, type

     vnes.sh -r Oracle9i -l <local hostname> -p <server port> LS_UTIL

   For the host option, specify the hostname for the license server to be used.

   For the port option, specify the port used by the remote license server.
4. To leave LS_UTIL, type: exit

   Note—Entering and exiting LS_UTIL with the correct host and port settings changes the settings to their new values.

End of Procedure 5-10

Procedure 5-11 Changing the Settings used by a Local License Server

Note—Use this procedure to change the host or port settings for the local license server used by VNE Server to obtain a license.

Note—You MUST use this procedure to sync-up the local license server port setting if the local host already has an OPNET installation that points to a license server (local or remote) using port_b or port_c.

1. If VNE Server is operating, stop services and exit the Console.

2 Execute procedure Procedure 5-9 to stop the local license server.

3 Enter the license manager utility.

- On a Windows system using Oracle9i, type

  vnes.bat /Oracle9i /lic_host <local hostname> /lic_port <server port> LS_UTIL

- On a Windows system using Oracle8i, type

  vnes.bat /lic_host <local hostname> /lic_port <server port> LS_UTIL

- On a Solaris system, type

  vnes.sh -r Oracle9i -l <local hostname> -p <server port> LS_UTIL

For the host option, specify the hostname (exact case) of the local host.

For the port option, specify the port to be used by this server. If you are doing this procedure to sync-up the port to the one used for an existing OPNET analysis software installation, choose port_b or port_c to match the setting for the OPNET analysis software installation.

4 To leave LS_UTIL, type: exit

Note—Entering and exiting LS_UTIL with the correct host and port settings changes the settings to their new values.

5 Execute procedure Procedure 5-8 to restart the local license server.

End of Procedure 5-11

Procedure 5-12 Add a License Using the Browser Method

Note—If you have access to an OPNET analysis software installation on a host that can access the license server host used for the VNE Server license, use the OPNET License Manager for all license operations. Follow standard OPNET licensing practice as described on the web site. You only need to use this procedure when administering a license on a VNE Server host that is isolated (by firewalls, etc.) from OPNET analysis software.

1 Open a command window and “cd” to the VNE Server installation directory.

2 Type: **hostname**

➥ Note the hostname displayed by this command. It is used (exact case match) with the /lic_host (-l on Solaris) option in the following command.

3 Enter the license manager utility.

- On a Windows system using Oracle9i, type

  vnes.bat /Oracle9i /lic_host <local hostname> /lic_port <server port> LS_UTIL

- On a Windows system using Oracle8i, type

  vnes.bat /lic_host <local hostname> /lic_port <server port> LS_UTIL

- On a Solaris system, type

  vnes.sh -r Oracle9i -l <local hostname> -p <server port> LS_UTIL

For the /lic_port option, specify the port used by this server. It will be one of port_a, port_b, port_c.

➥ A “Floating License Manager” banner appears followed by a “manager>” prompt.

4 Type: **add**

➥ A license transaction code is displayed, followed by an “Approval code>” prompt. DO NOT press Enter until an approval code has been entered.

5 Open the OPNET License Registration web page in a browser.

- On a Windows host, use Start > Programs > OPNET VNE Server 2.1 > Open Licensing Web Page to open the licensing web page in a browser.
- On a Solaris host, use a browser to go to the following URL:

  http://ds1.opnet.com/4dcgi/licw4d_cl_content

6 On the License Registration web page, select “Perform license operations”.

7 Enter your group ID into the Group ID text field.

8 Select the “Add License” radio button. Press Next.

➥ An “Enter Transaction Code” page appears.

9 Cut and paste the transaction code from the command window to the transaction code textfield on the web page.

10 Enter the hostname (case must match) into the hostname textfield. Press Next.

➥ A license selection web page appears.

11 Select a single license or a range of licenses as needed and permitted for your group account. Press Select.

➥ A confirmation page appears with your selected license information.

12 Press “Get Approval Code”.

➥ A page appears that displays the license approval code.

13 Cut and paste the approval code from the web page into the command window at the waiting “Approval code>” prompt. Check to make sure you have entered the code correctly. Press Enter.

➥ The command window displays a message that “The license operation succeeded.”

Note—If the operation fails, try again to enter the approval code. You get several tries. If you cannot add the license, exit the browser and LS_UTIL and try this procedure again.

14 Confirm that the license is installed. In the command window, type: **permit**.

➥ You should see the license, that you just added, in the license list.

15 To exit LS_UTIL, type: **exit**. Exit the browser.

End of Procedure 5-12

Procedure 5-13 Deregister a License or Change Expiration Dates using the Browser Method

Note—If you have access to an OPNET analysis software installation on a host that can access the license server host used for the VNE Server license, use the OPNET License Manager for all license operations. Follow standard OPNET licensing practice as described on the web site. You only need to use this procedure when administering a license on a VNE Server host that is isolated (by firewalls etc) from OPNET analysis software.

Note—Follow the steps in procedure Procedure 5-12 to enter the command line LS_UTIL utility and use the Browser Method to perform the license operation. For each operation, use the following LS_UTIL commands:

- Deregister license: **delete**
- Change license expiration: **ch_exp**
- Change maintenance expiration: **ch_mtn**

In the browser, select the proper radio button for the desired license operation (deregistration, expiration changes).

End of Procedure 5-13

Configuring OPNET analysis software to Import from VNE Server

Before OPNET analysis software can import network models from VNE Server, you must configure some preferences. The steps required depend upon whether OPNET analysis software is installed on the same system as VNE Server or elsewhere in the network. Normally OPNET analysis software is installed on another system. If OPNET analysis software and VNE Server are on the same system, use Procedure 5-14. If OPNET analysis software and VNE Server are not on the same system, use Procedure 5-15.

OPNET analysis software Configuration When VNE Server Resides on the Same System

Procedure 5-14 Configuring OPNET analysis software for Import from VNE Server when Both are on the Same System

1 Start OPNET analysis software. After the control panel appears, select **Edit > Preferences** to open the Preferences window.

2 Search for the string *vne* to find the preferences for VNE Server.

3 Edit the *vne_import_ior_file* preference to point to the VNE Server *vneserver.ior* file. The ior file provides connectivity information that OPNET analysis software needs to import network data from VNE Server. The ior file is in the VNE Server temp directory which, by default, is *C:\op_admin\tmp\vne*. For this example, set *vne_import_ior_file* to *C:\op_admin\tmp\vne\vneserver.ior.* Press **OK** to save the changes.

End of Procedure 5-14

After completing these steps, OPNET analysis software is ready to import a network model from a local VNE Server.

OPNET analysis software Configuration when VNE Server Resides on Another System

Procedure 5-15 Configuring OPNET analysis software for Import from VNE Server on a Different System

1 On the host system for OPNET analysis software, create a directory to store VNE Server import information. A recommended choice is *C:\op_admin\tmp\vne*.

2 Copy the *vneserver.ior* file from the VNE Server temp directory on the system hosting VNE Server into the directory just created. This file contains the information that OPNET analysis software needs to communicate with a remote VNE Server. This file is generated by VNE Server at start-up of data collection, and is host-specific.

Note—If data collection is stopped and restarted on VNE Server, the ior file becomes invalid. After data collection is restarted, a new copy of vneserver.ior must be placed in the import directory.

Note—If possible, a better way to access the vneserver.ior file is by network drive mapping. If the host running OPNET analysis software can map a network drive from the VNE Server host, make the VNE Server temp directory shareable. On the host running OPNET analysis software, setup a network drive mapping to the VNE Server temp directory. Set the vne_import_ior_file preference to point directly across the network to the vneserver.ior file in the VNE Server temp directory.

3 Start OPNET analysis software. After the control panel appears, select **Edit > Preferences** to open the Preferences window.

4 Search for the string *vne* to find the preferences related to VNE Server.

5 Edit the *vne_import_ior_file* preference to point to the *vneserver.ior* file in the VNE Server import directory created in step 1. Press **OK** to save the changes.

End of Procedure 5-15

After completing these steps, OPNET analysis software is ready to import a network model from a remote VNE Server installation.

Oracle Administration

This section describes the Oracle environment, as it relates to VNE Server, and contains some simple procedures for managing and monitoring this environment. VNE Server can work with both Oracle8i and Oracle9i databases. An Oracle database server can support multiple databases, each with multiple users and tablespaces that store data. The user account and tablespace for the VNE Server network database is located within a single database instance.

Important Files

The Oracle installation directory has the following main sub-directories.

- **admin**—Has a subdirectory per database to hold admin files
- **ora81, ora92**—Holds the Oracle code, libraries and much more
- **oradata**—Has a subdirectory per database to hold data files

The *admin* directory contains initialization, log and trace files for each database within the Oracle server. The *ora81* directory (*ora92* for Oracle9i) contains the application code and libs for all the Oracle components. Control files for the TNS Listener service, which VNE Server uses for database connectivity, are located under the *ora81* (*ora92* for Oracle9i) directory tree. The *oradata* directory contains the control and storage files for each database.

Some important files within the Oracle environment are listed below.

The initialization control file for Oracle is

- <Oracle install dir>\admin\<db name>\pfile\init.ora

The database files for VNE Server are

- <Oracle install dir>\oradata\<db name>\FS1DAT1.ORA
- <Oracle install dir>\oradata\<db name>\FS1IDX1.ORA
- <Oracle install dir>\oradata\<db name>\FS1TMP1.ORA
- <Oracle install dir>\oradata\<db name>\VNELARGE.ORA
- <Oracle install dir>\oradata\<db name>\VNELGIDX.ORA

Some important Oracle Net Services files are

- <Oracle install dir>\<ora81 or ora92>\network\Admin\tnsnames.ora
- <Oracle install dir>\<ora81 or ora92>\network\log\listener.log

The Oracle installation logs are located here:

- C:\Program Files\Oracle\Inventory\logs\installActions.log

Oracle Net Services

VNE Server uses a database's Oracle Net service name for connection to the database. This is true whether VNE Server uses a local or remote database. The database service name is located in the *tnsnames.ora* file. This file is located in the <*oracle install dir*>\<*ora81 or ora92*>*network\Admin* directory. A sample file is shown below.

In this sample file, there are three entries. The O92AML14.OPNET.COM entry (highlighted) represents the database service name. Each entry has a <*net service name*> = *()* structure. The text string preceding the "=" is the service name. In this example, you use O92AML14.OPNET.COM as the service name for VNE Server installation.

Note that this file has entries for other Oracle Net services and may contain entries for more than one database. If the Oracle installation you are using supports other products, contact the database administrator for the service name you should use.

Figure 5-1 Sample tnsnames.ora File

```
# TNSNAMES.ORA Network Configuration File:
# Generated by Oracle configuration tools.

O92AML14.OPNET.COM =
 (DESCRIPTION =
  (ADDRESS_LIST =
   (ADDRESS = (PROTOCOL = TCP)(HOST = mlpc14)(PORT = 1521))
  )
  (CONNECT_DATA =
   (SERVICE_NAME = o92aml14)
  )
 )

EXTPROC_CONNECTION_DATA.OPNET.COM =
 (DESCRIPTION =
  (ADDRESS_LIST =
   (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC0))
  )
  (CONNECT_DATA =
   (SID = PLSExtProc)
   (PRESENTATION = RO)
  )
 )

INST1_HTTP.OPNET.COM =
 (DESCRIPTION =
  (ADDRESS_LIST =
   (ADDRESS = (PROTOCOL = TCP)(HOST = mlpc14)(PORT = 1521))
  )
  (CONNECT_DATA =
   (SERVER = SHARED)
   (SERVICE_NAME = o92aml14)
   (PRESENTATION = http://admin)
  )
 )
```

Account Management

The procedures in this section describe how to setup, verify, and remove the VNE Server tablespace and user account from the Oracle database.

Setting Up VNE Server Database Accounts within Oracle

This procedure is normally performed following VNE Server installation when VNE Server is initially setup to access the Oracle database. If you have removed the VNE Server database tablespace and account from Oracle to recover from a problem, use this procedure to recreate the tablespace and a user account.

Note—The `setup_accounts.sql` script used in this procedure removes the existing tablespace and account before creating a fresh tablespace and account. All network model data is lost.

Procedure 5-16 Configure the Oracle Database for Use by VNE Server

1. Open a command prompt window and navigate to the VNE Server installation directory by typing

   `cd <`*`install path`*`>\VNEServer\3.0`

2. Type **sqlplus system/<system password>** in the command prompt window.

3. At the sqlplus prompt, type: **`@setup_accounts.sql`**

   ➥ A list of DBIDs and database instance names are displayed. If you only have a database dedicated to VNE Server, one entry will appear. If more than one database is available, contact your database administrator to find out which database name is used with VNE Server.

   Note—Note the correct database instance name for use in the next step.

4. The script prompts you for a database name.

   Enter the database instance name obtained in step 3 (use lowercase letters).

5. The script prompts for the database User password.

   Enter the same Oracle database password that was specified during VNE Server installation.

   Note—When running this script after `drop_accounts.sql` has been run, SQL error messages will be displayed and can be ignored. These messages result from the script removing VNE Server table and user accounts that have already been removed by the `drop_accounts.sql` script.

   This SQL script configures database storage for VNE Server use and sets up the Oracle user account for VNE Server. After this script finishes, the Oracle account for VNE Server uses the user name and password entered during VNE Server installation.

6 Type **quit** to exit sqlplus.

End of Procedure 5-16

Verifying the Oracle Configuration

This procedure verifies that the VNE Server database account is setup correctly.

Procedure 5-17 To verify that the Oracle database is correctly configured for use by VNE Server, do the following:

1 Type **`sqlplus <user name>/<password>`** in the command prompt window. Enter the user name and password you entered during VNE Server installation.

If Oracle configuration was successful, an Oracle banner, and a **`Connected To:`** message appears. Type **`quit`** at the **`SQL>`** prompt to exit.

If Oracle configuration failed, error messages appear stating that login has been denied. Should this happen, execute Setting Up VNE Server Database Accounts within Oracle on page VNE-5-24 again, and re-execute this procedure to check the outcome. If configuration problems persist, contact OPNET Technical Support.

2 Type **`quit`** to exit sqlplus.

End of Procedure 5-17

Removing VNE Server Database Accounts within Oracle

This procedure removes the VNE Server tablespace and user account from the Oracle database used by VNE Server. Run this procedure if you want to remove VNE Server content from an Oracle database you no long plan to use for VNE Server.

WARNING—This procedure removes VNE Server's database. All network model data will be lost.

Procedure 5-18 Remove the VNE Server Tablespace and User Account from the Oracle Database

1 Open a command prompt window and navigate to the VNE Server installation directory by typing

```
cd <install path>\VNEServer\3.0
```

2 Within this window, type **sqlplus system/<system password>** to enter sqlplus.

3 Type **@drop_accounts.sql <database name>.**

➥ Progress messages appear in the command prompt window as the VNE Server user account and tablespace is removed from Oracle.

4 Type **quit** to exit sqlplus.

End of Procedure 5-18

Monitoring the Database

The Oracle DBA Studio application is used to monitor the database for Oracle8i. For Oracle9i, use the Enterprise Manager Console. With these tools, you can monitor the following items:

- Tablespace utilization within the database
- Active user sessions within the database

Use the following procedures to enter DBA Studio or the Enterprise Manager Console and perform some routine tasks to monitor the database.

- Entering DBA Studio or Enterprise Manager Console and connecting to the database.
- Getting database instance information.
- Checking database tablespace size.
- Extending the database tablespace size.
- Checking the active database sessions.

These procedures are described in detail throughout the remainder of this section.

Note—For Oracle9i users, enter the Enterprise Manager Console to perform the DBA Studio procedures listed below. Once inside the Console, the steps are the same as for DBA Studio.

Procedure 5-19 Enter DBA Studio and Connect to Oracle8i Database

1 Start Oracle DBA Studio by selecting **Start > Programs > Oracle > Database Administration > DBA Studio**.

➥ The Oracle Enterprise Manager Login panel opens.

2 Select the Launch DBA Studio Standalone radio button and press **OK**.

➥ DBA Studio opens.

3 Expand the property tree for the database used with VNE Server.

➥ A Database Connect Information dialog box opens.

4 Enter the user name and password that you use for the VNE Server account and press **OK**.

➥ The database property tree expands.

End of Procedure 5-19

Procedure 5-20 Enter Enterprise Manager Console and Connect to Oracle9i Database

1 Start Enterprise Manager Console by selecting **Start > Programs > Oracle > Enterprise Manager Console**.

➥ The Oracle Enterprise Manager Login panel opens.

2 Select the Launch Standalone radio button and press **OK**.

➥ Enterprise Manager Console opens.

3 Expand the property tree for the database used with VNE Server.

➥ A Database Connect Information dialog box opens.

4 Enter the user name and password that you use for the VNE Server account.

5 Select SYSDBA from the Connect As menu and press **OK**.

➥ The database property tree expands.

End of Procedure 5-20

At this point, you can navigate anywhere in the property tree for this database.

Procedure 5-21 Obtain Oracle8i Database Instance Information

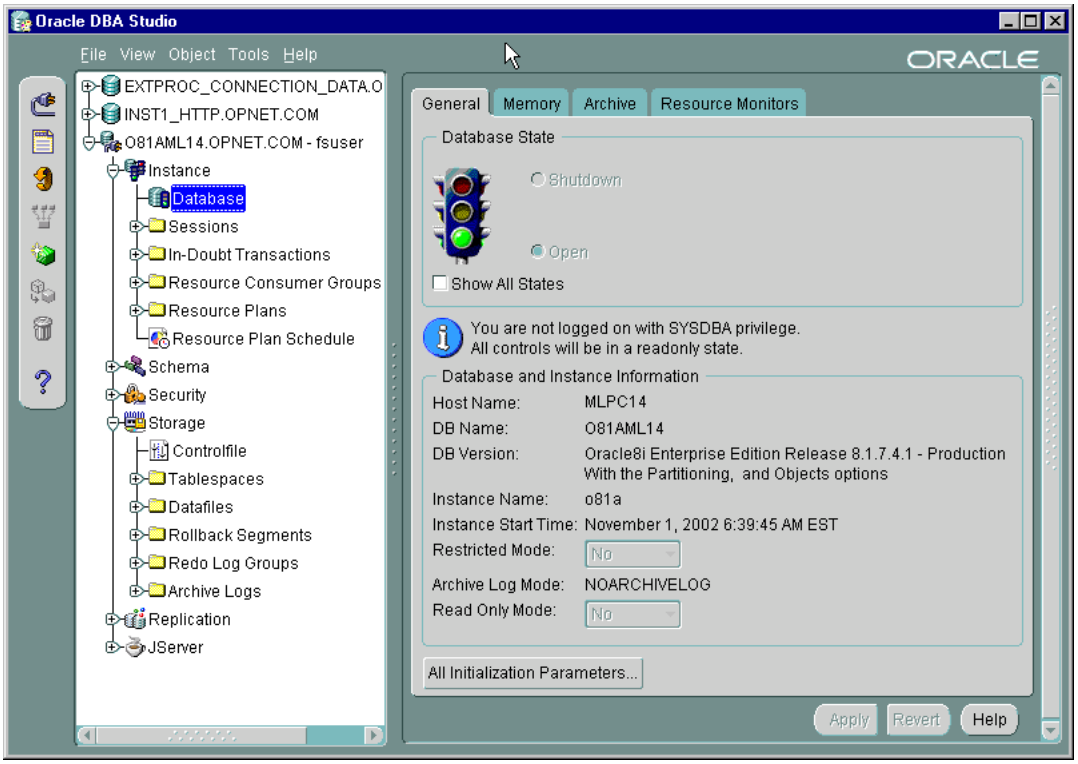
1 Follow Procedure 5-19 to enter Oracle DBA Studio and connect to your database.

➥ DBA Studio is open with an expanded database property tree.

2 Expand the Instance property tree.

3 Click on the Database property.

➥ The property details panel, on the right, shows information about the database. An example is shown below.



End of Procedure 5-21

Procedure 5-22 Obtain Oracle9i Database Instance Information

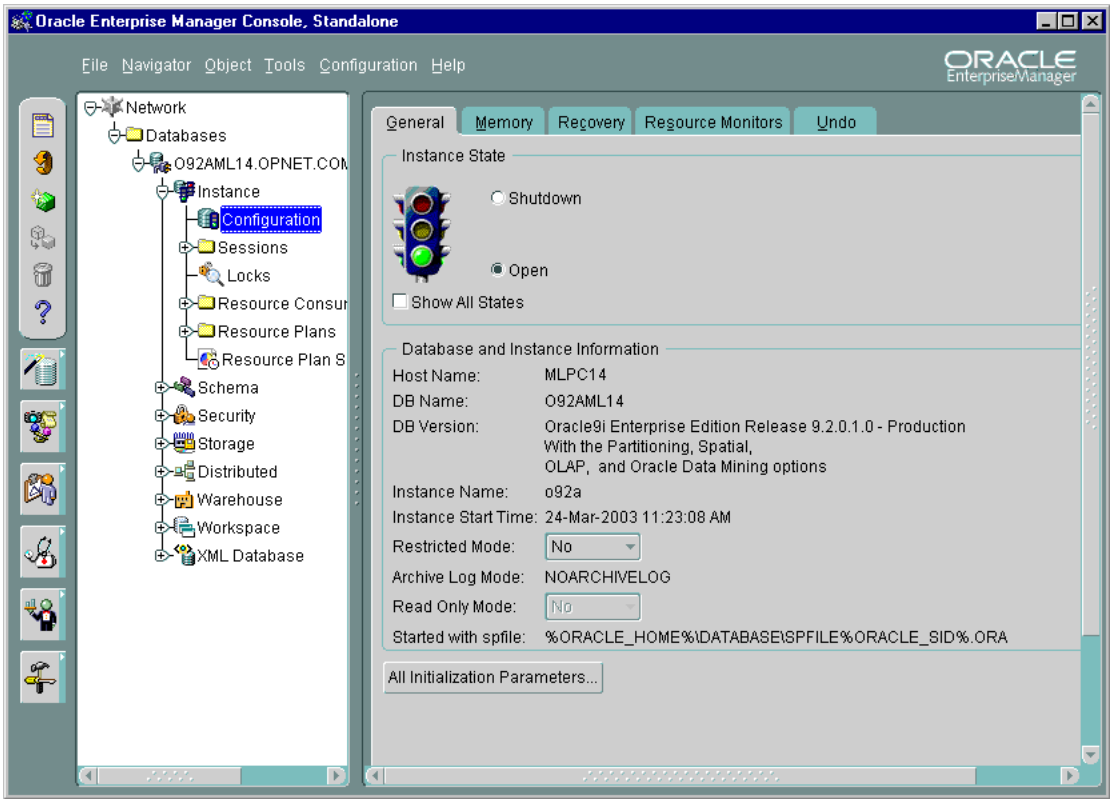
1 Follow Procedure 5-20 to enter Oracle Enterprise Manager Console and connect to your database.

➥ The Enterprise Manager Console is open with an expanded database property tree.

2 Expand the Instance property tree.

3 Click on the Configuration property.

➥ The property details panel, on the right, shows information about the database. An example is shown below.



End of Procedure 5-22

Procedure 5-23 Check the Oracle8i Database Tablespace Size

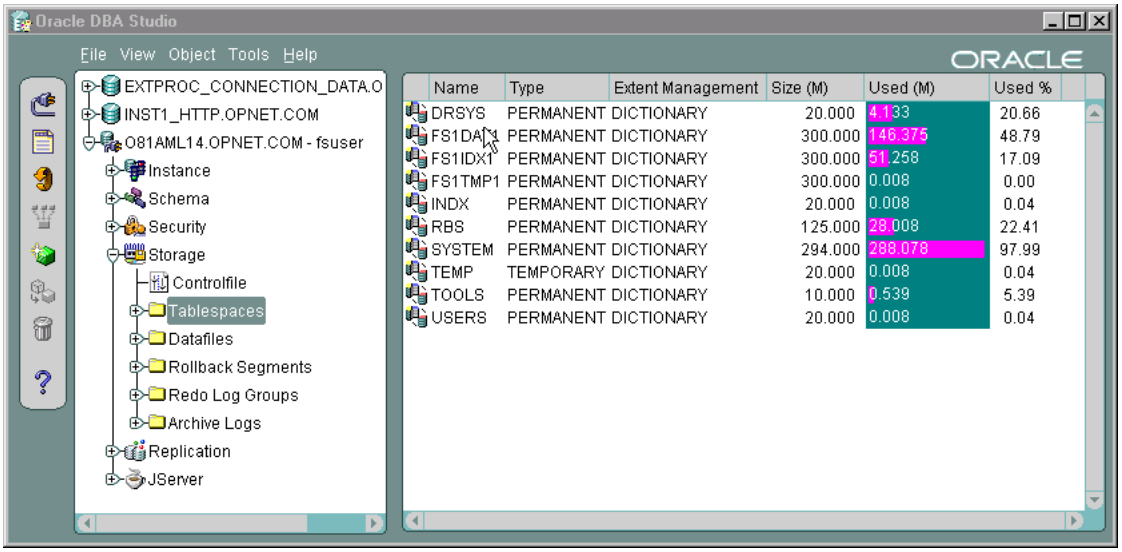
1 Follow Procedure 5-19 to enter Oracle DBA Studio and connect to your database.

➥ DBA Studio is open with an expanded database property tree.

2 Expand the Storage property tree.

3 Select the Tablespaces property tree.

➥ The property details panel, on the right, shows each database file, the file size, and percentage of the file's maximum allotted size. An example is shown below.



Note—The FS1DAT1, FS1IDX1, FS1TMP1, VNELARGE, and VNELGIDX files contain the tablespace for the VNE Server network database.

End of Procedure 5-23

Procedure 5-24 Check the Oracle9i Database Tablespace Size

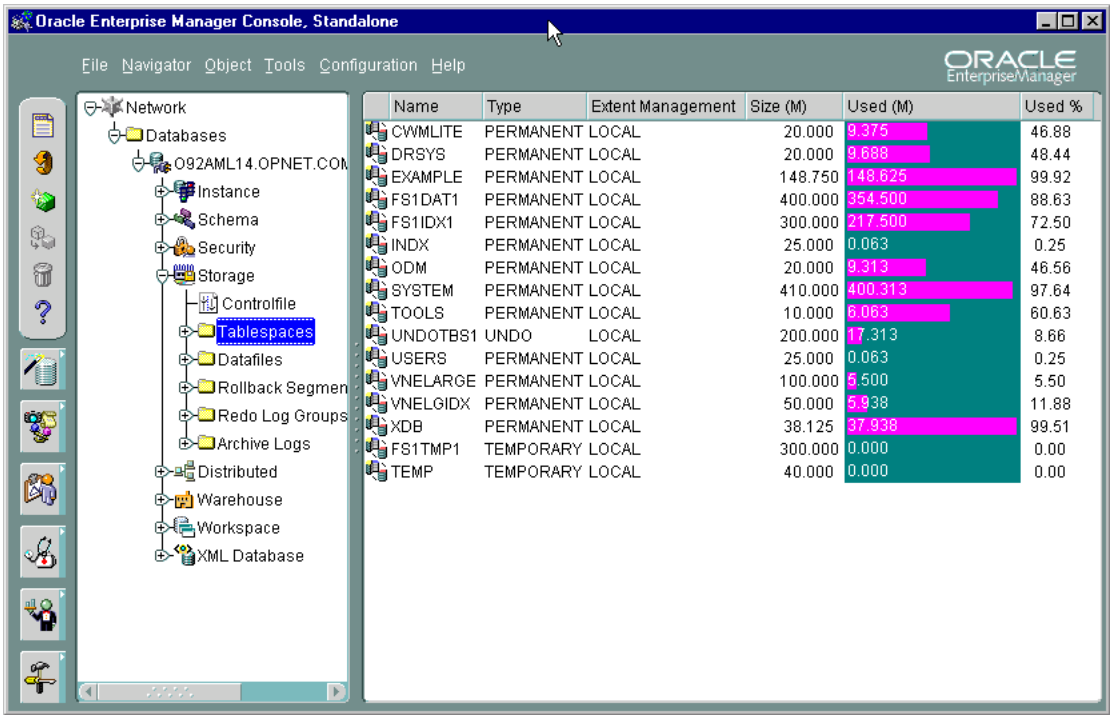
1 Follow Procedure 5-20 to enter Oracle Enterprise Manager Console and connect to your database.

➥ Enterprise Manager Console is open with an expanded database property tree.

2 Expand the Storage property tree.

3 Select the Tablespaces property tree.

➥ The property details panel, on the right, shows each database file, the file size, and percentage of the file's maximum allotted size. An example is shown below.



Note—The FS1DAT1, FS1IDX1, FS1TMP1, VNELARGE, and VNELGIDX files contain the tablespace for the VNE Server network database.

End of Procedure 5-24

Procedure 5-25 Extend the Size of an Oracle8i Database Storage File

Note—When you log into the database during the first step of this procedure, use the sys or system accounts. The VNE Server user account does not have sufficient privileges to extend database storage.

1 Follow Procedure 5-19 to enter Oracle DBA Studio and connect to your database.

➥ DBA Studio is open with an expanded database property tree.

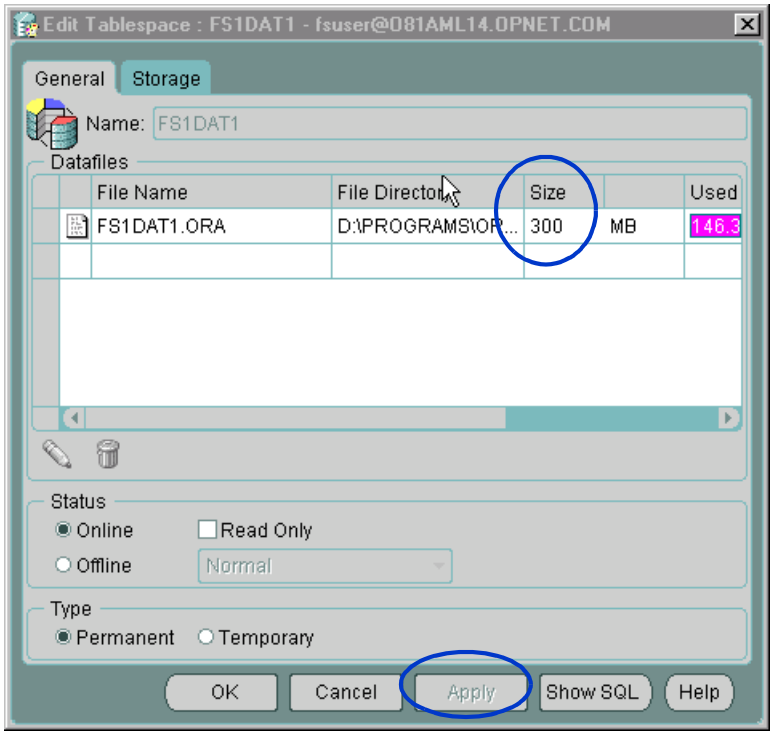
2 Expand the Storage property tree.

3 Select the Tablespaces property tree.

➥ The property details panel, on the right, shows each database file, the file size, and percentage of the file's maximum allotted size.

4 Double-click on the entry for the tablespace file that you are expanding.

➥ An Edit Tablespace window opens for this database tablespace file. An example is shown below.



5 Change the value in the size field to the new tablespace size. Press **Apply.**

➥ The tablespace file size, shown in the DBA Studio property details panel, takes on the new value.

Note—When the VNE Server tablespace files are created using the setup_accounts.sql script, a maximum file size is set. During VNE Server operation, the tablespace files are automatically extended up to the maximum size. Once the maximum auto-extend size is reached, you must manually extend the files.

6 Press **OK** to exit the Edit Tablespace window.

End of Procedure 5-25

Procedure 5-26 Extend the Size of an Oracle9i Database Storage File

Note—When you log into the database during the first step of this procedure, use the system account. The VNE Server user account does not have sufficient privileges to extend database storage.

1 Follow Procedure 5-20 to enter Oracle Enterprise Manager Console and connect to your database.

➥ Enterprise Manager Console is open with an expanded database property tree.

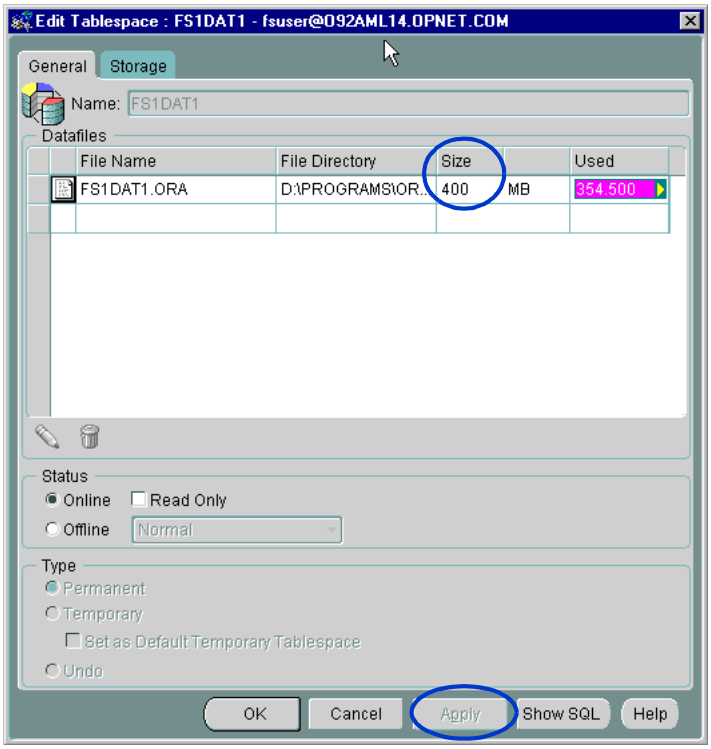
2 Expand the Storage property tree.

3 Select the Tablespaces property tree.

➥ The property details panel, on the right, shows each database file, the file size, and percentage of the file's maximum allotted size.

4 Double-click on the entry for the tablespace file that you are expanding.

➥ An Edit Tablespace window opens for this database tablespace file. An example is shown below.



5 Change the value in the size field to the new tablespace size. Press **Apply**.

➥ The tablespace file size, shown in the Enterprise Manager Console property details panel, takes on the new value.

Note—When the VNE Server tablespace files are created using the setup_accounts.sql script, a maximum file size is set. During VNE Server operation, the tablespace files are automatically extended up to the maximum size. Once the maximum auto-extend size is reached, you must manually extend the files.

6 Press **OK** to exit the Edit Tablespace window.

End of Procedure 5-26

Procedure 5-27 Check the Active Sessions Against the Database

1 Follow Procedure 5-19 to enter Oracle DBA Studio (Oracle8i) or Procedure 5-20 to enter Enterprise Manager Console (Oracle9i) and connect to your database.

➥ DBA Studio or Enterprise Manager Console opens with an expanded database property tree.

2 Expand the Instance property tree.

3 Select the Sessions property tree.

➥ The property details panel, on the right, displays details about each database session.

End of Procedure 5-27

Backup and Recovery

Most database applications require periodic backup of the database. Due to the nature of the VNE Server product, database backup is not essential. Using a restored database with VNE Server presents two problems.

- If the database was backed up under an older version of VNE Server, data schema changes may have occurred in the current release such that the recovered database is no longer usable.
- The other problem relates to the age of the backup. If the network configuration has changed significantly since the backup was created, VNE Server will take as much time to update the database to the current state of the network as it would take to populate a fresh database. For most networks, VNE Server can completely populate a network database in a matter of hours.

If you decide to keep backups of your network database, follow Oracle's procedures for performing backup and recovery operations. VNE Server provides scripts that can be used to backup and restore the user environment and tablespaces that constitute the VNE database. Refer to the following procedures.

Note—The following procedures can be used to backup and restore a local VNE database but not a remote one.

Procedure 5-28 Backup the VNE database using the vnes_db_export.bat Script

1 Stop VNE services and exit VNE Server.

2 Open a command prompt window and navigate to the VNE Server installation directory by typing:

cd <install path>\VNEServer\3.0

3 Type: **vnes_db_export.bat <DB username>/<DB password>**

Where *DB username* and *DB password* are used by VNE Server to access the database.

➥ Numerous progress messages appear that contain backup details.

➥ When complete, the following files are created:

- vnes_db.dmp - backup file of the VNE database
- vnes_db_export.log - log file of the export session

End of Procedure 5-28

Procedure 5-29 Restore the VNE database using the vnes_db_import.bat Script

WARNING—The database information saved in vnes_db.dmp should only be restored for the same VNE Server release that was used to create the backup database.

1 If VNE Server is operating, stop services and exit.

2 Open a command prompt window and navigate to the VNE Server installation directory by typing:

cd <install path>\VNEServer\3.0

3 Run the **setup_accounts.sql** script per Procedure 5-16, to recreate the VNE database.

WARNING—This step will remove all data that is currently in the VNE database.

4 Copy the vnes_db.dmp file that contains the backed up database to the VNE Server installation directory. If you have renamed the file to something more descriptive (i.e. something with a timestamp), rename it to vnes_db.dmp.

5 Type

vnes_db_import.bat <source DB username> <dest DB username> <dest DB password>

Where the *source DB username* is for the database account from which the backup file originated; and *dest DB username* and *dest DB password* are for the account to which the database is restored.

➥ Numerous progress messages appear that contain restore details.

➥ An “Import terminated successfully...” message appears when done.

End of Procedure 5-29

Network Management System Administration

Some of the VNE Server adapters connect to third-party network management systems to retrieve data. This section describes configuration work required on these network management systems to provide VNE Server access to the system's network data.

Configuring HP OpenView

When VNE Server and HP OpenView are located on separate hosts, HP OpenView must be configured to grant VNE Server access.

Procedure 5-30 Configure HP OpenView to Grant Access to VNE Server

1 If you are using UNIX, go to the */etc/opt/OV/share/conf* directory on the HP OpenView host. If you are using Windows, go to the *<drive>:\OpenView\conf* directory on the host.

➥ Within this directory, there will be three authorization files: *ovw.auth*, *ovwdb.auth*, and *ovspmd.auth*. These authorization files determine which users and what machines will be able to log into the HP OpenView host.

2 Open each authorization file in a text editor. Each authorization file is divided into two sections: a header section that explains how to use and configure the file, and a section where the remote client machines and users are specified.

3 In the section where the client machines and users are specified, add any client machine name or user name using the following formats:

- For a particular client machine with a particular user logged on:

<machine name> <space> <user name>

- For any user on a particular client machine:

<machine name> <space> +

- For any client machine with a particular user:

+ <space> <user name>

- For any user on any client machine:

+ <space> +

For example, if your user name is **Administrator** and the client machine name is **vnesPC**, add the following line:

vnesPC Administrator

to each authorization file.

Note—Minus signs (-) can be used in place of plus signs (+) to deny a particular client machine or user access to the HP OpenView host machine.

4 Save the changes made to each authorization file, and then close the file.

Note—If you edited the .auth files while HP OpenView NNM was running, you MUST restart NNM for the changes to take place.

End of Procedure 5-30

Configuring CiscoWorks

For VNE Server to retrieve configuration files from CiscoWorks, the CiscoWorks host machine must be running a remote shell (rsh/rcp) service. Both Windows and UNIX host machines require configuration in order to accept rcp requests from VNE Server.

CiscoWorks on a Windows Host

When CiscoWorks is located on a Windows host, the *CMF rsh/rcp service* must be running. Find the Services tool in the Windows Control Panel, and open the Services window to display services. If *CMF rsh/rcp service* is present but stopped, start it. If the service is not present, install it by running <*CiscoWorks install dir*>*RemoteNetsysNT\rcmf.exe*. After installation is complete, start the service from the Control Panel Services window.

Procedure 5-31 Permit VNE Server Access when *CMF rsh/rcp service* is Installed on CiscoWorks Host

1 Open a command window. Use *cd* to set the working directory to the bin directory that holds *crmrsh.exe*. This directory should be at: *C:\Program Files\CSCOpx\bin*.

2 Type **`crmrsh addrhost <hostname> <user name>`**

where <*hostname*> is the IP address or hostname of the VNE Server host, and <*user name*> is the account in which VNE Server runs.

Note—When entering the hostname, use a lowercase, Fully Qualified Domain Name for the VNE Server host.

3 Type **`net stop crmrsh`**

4 Type **`net start crmrsh`**

5 Test the access changes by doing the following:

5.1 On the VNE Server host, open a command window.

5.2 Type **`rsh <hostname> -l <user name> dir`**

where <*hostname*> is the IP address or hostname of the CiscoWorks host, and <*user name*> is the name of the account in which VNE Server runs on its host.

➥ If the test is successful, you will see the contents of a directory on the CiscoWorks host displayed in the command window.

End of Procedure 5-31

After completing these changes, VNE Server can access CiscoWorks on a Windows host machine via rcp to retrieve data.

CiscoWorks on a UNIX Host

Procedure 5-32 Permit VNE Server Access when CiscoWorks is on UNIX

1. Add the name of the VNE Server host to the */etc/hosts.equiv* file on the CiscoWorks host.

2. Add an account to the CiscoWorks host that has the same name as the user account from which VNE Server is run on the VNE Server host.

3. Add the name of the VNE Server host machine and user account to the *.rhosts* file in the user account just created on the CiscoWorks host. The *.rhosts* file is located in the login directory of the user account and has the following format:

   hostname <space> username

   For example, if the user name of the account from which VNE Server is run is **Administrator,** and the VNE Server host name is **vnesPC**, add the following line:

   vnesPC Administrator

   to the *.rhosts* file.

End of Procedure 5-32

After completing these changes, VNE Server can access CiscoWorks on a UNIX host machine via rcp to retrieve data.

Collecting CiscoWorks Server Information

The VNE Server adapters that connect to CiscoWorks databases require connection information about the database. The following procedure describes how to collect this information from CiscoWorks.

If you have access to the CiscoWorks server, the easiest way to get database information is to look in the following files.

- For the RME DB: <CiscoWorks install dir>\databases\rme\orig\odbc.tmp1
- For the ANI DB: <CiscoWorks install dir>\databases\ani\orig\odbc.tmp1

If you cannot find these files, use the following procedure to get this information through the CiscoWorks web interface.

Procedure 5-33 Collecting CiscoWorks Server Information

1. Open a web browser and go to the URL for CiscoWorks. An example is: *http://CWpc.acme.com:1741* (include the database port number in the URL).
2. Login as an administrative user, press return.
3. Press the **Server Configuration** button in the lower left browser panel.
   ➥ A list of Server Configuration properties is displayed.
4. Press **Diagnostics > Collect Server Info**.
   ➥ The right browser panel displays a Collect Server Information window.
5. Press the **Create** button in the Collect Server Information window,
   ➥ Within a few minutes a report link appears in the Collect Server Information window.
6. Press the report link and select the **ODBC Configuration** link.
   ➥ A web page is opened that contains CiscoWorks ODBC connection information.
7. Write down the *UID, DatabaseName, Commlinks ServerPort,* and *PWD* (password) values for use in configuring the CiscoWorks adapters.

End of Procedure 5-33

Collecting a CiscoWorks Inventory File

A device inventory file from CiscoWorks can be used to create the VNE Server device info file. The following procedure describes how to get this file from CiscoWorks.

Procedure 5-34 Collecting a CiscoWorks Inventory File

1. Open a web browser and go to the URL for CiscoWorks. An example is: *http://CWpc.acme.com:1741* (include the database port number in the URL).
2. Login as an administrative user, press return.
3. Press the **Resource Manager Essentials** button in the lower left browser panel.
   ➥ A list of Resource Manager Essentials properties is displayed.
4. Press **Administration > Inventory > Export to File**.
   ➥ An Export to File window appears in the right browser panel.

5 Enter a file name to use for the inventory file in the Output File window. Do not include a path in the name.

6 Choose an Output File Format and Output File Version. Any choice will work.

7 Press the **Next** button.

➥ A Data Export Results window appears that shows the location of the inventory file that has just been created.

8 Press the **OK** button.

9 Copy the file to a directory that VNE Server can read.

End of Procedure 5-34

Configuring Concord eHealth

VNE Server supports three ways to access Concord eHealth utilization data:

- **live**—VNE Server directly accesses data from Concord
- **local files**—Concord places data files on VNE Server host
- **remote files**—Concord places data files on a remote host

To support live access, Concord data groups must be setup for VNE Server to reference during data retrieval. Use the Concord eHealth/Network facility *Reports > Edit Groups* to define these groups for your Concord installation.

To support file access (either local or remote), Concord must be configured to save configuration and utilization data to a location accessible to VNE Server. Schedule the data export to occur with the same frequency as you run the Concord eHealth Network Utilization Import adapter.

Refer to Concord eHealth documentation for more information about traffic group setup, data file creation, and scheduling the export of utilization data.

Configuring MRTG

VNE Server can retrieve and use MRTG utilization data when it is stored as either “flat” log files or as RRD files. Each MRTG server must be configured to store the utilization files in one directory. VNE Server can be configured to collect utilization data from multiple MRTG servers.

Note—All the log or RRD files that a server maintains must be placed in a single directory, or VNE Server will not be able to retrieve the full file set.

Configuring InfoVista

The InfoVista username that VNE Server uses to access the InfoVista server must have write privileges on the InfoVista server. Refer to the InfoVista product documentation for more information about server configuration.

App A Troubleshooting

Introduction

This chapter describes troubleshooting steps you can take to investigate and solve problems that can occur during VNE Server operation. With any problem you encounter, verify that the product setup is correct. If the problem involves a data collection failure, verify access to the problem device, as well. If the suggested troubleshooting steps do not solve the problem, collect all the requested information before you contact OPNET Technical Support.

If you cannot solve the problem using the documentation, gather the following information before you contact OPNET Technical Support.

1) Fill out a Technical Support Request, and document the problem scenario. Refer to Filing an OPNET Technical Support Case on page VNE-A-21 for more instructions.

2) If the VNE Server Event Viewer shows events relevant to the problem, use **File > Save** to save these events to a log file.

3) Send any event log files you create, the *adapterStats* file, and the *vne_rmid_log* file to Technical Support.

Note—The *adapterStats* file is located in *<temp dir>\adapterStats*. The *vne_rmid_log* file is located in the *<install dir>\log* directory.

Common Operations

This section describes how to find information commonly required during troubleshooting.

Locating VNE Server Release Information

You must always provide VNE Server product release information when contacting OPNET Technical Support. To locate VNE Server release information, select **Help > About VNE Server** on the Console menu bar to display a release information panel.

The major release (i.e., 2.1.A), patch level (i.e., PL1), and build number (i.e., 475) appear near the bottom of the *About* panel. An example of the version information is shown below:

```
Version: 2.1.A PL1 (Build 475)
```

Locating Oracle Release Information

If you need to locate Oracle release information, you must run sqlplus, using the following procedure:

Procedure A-1 Locate Oracle Release Information

1. Open a command window.
2. Type **`sqlplus`** to enter sqlplus.
3. Enter the username for the VNE Server account at the username prompt.
4. Enter the password for the VNE Server account at the password prompt.

   ➥ The sqlplus login banner appears, containing Oracle edition and version information as shown below.

```
Connected to:
Oracle8i Enterprise Edition Release 8.1.7.4.1 - Production
With the Partitioning option
JServer Release 8.1.7.4.1 - Production
```

5. Note the information, and type **`quit`** to exit sqlplus.
6. Close the command window.

End of Procedure A-1

Determining the Oracle Database Used by VNE Server

If you need to identify the database instance name used by VNE Server, do the following:

1) Locate the installation directory for Oracle.

   The Oracle Database Administrator (DBA) will know Oracle's location. You can also use the Windows Find utility to locate Oracle. Use "oracle" for a search string.

2) Go to the *..oracle**oradata* directory. This directory contains directories for each Oracle database instance.

3) Look in each directory for the following file: *Fs1dat1.ora*.

   The name of the directory that contains this file is the name of VNE Server's Oracle database.

4) Note the names of the database instances.

Determining the Oracle Net Service Names Known to the VNE Server Host

You may need to locate the Oracle Net service names during troubleshooting. The *tnsnames.ora* file contains these names. The file is located here:

```
<oracle_install_dir>\<ora81 or ora92>\network\Admin\tnsnames.ora
```

You can read this file in text editors such as Notepad or Wordpad. The Net service name entries have the following structure:

```
<net_service_name> = (service_definitions)
```

The text string before the "=" is the Net service name.

Problem Scenarios

For each problem scenario, verify the correct configuration of VNE Server, verify access to the target network, and perform any indicated troubleshooting steps. If the problem persists, collect the specified information for OPNET Technical Support before initiating a support case.

Installation Problems

The problem scenarios in this section involve problems that can arise during installation and product startup.

VNE Server Installation Fails

Scenario: The VNE Server installer fails to run. Alternately, the installer runs to completion but tells you that the installation failed.

Possible Causes: The following failures can occur. For each cause, take corrective action, or collect the specified information.

1) There is not enough free disk space for installation.

   If you do not have enough disk space to install VNE Server, the installer displays a message box informing you of this problem. Remove files from the target disk to free enough space so installation can continue. The installer monitors available disk space and automatically continues when you have enough free space.

2) The installer aborts during installation.

   Collect installer console information. Perform the following steps.

   a) Press and hold the **CTRL** key during installer initialization to open an installer console window. A status box with a progress bar displays during initialization. At the end of initialization the console opens. After the console window opens, release the **CTRL** key.

b) Change the console window properties to provide a 2000 line screen buffer.

Press **OK**, and choose **Modify shortcut which started this window**. This change ensures that you have enough window buffer space to capture all the installer console activity.

c) Close the installer console. The installer terminates.

d) Run the installer again.

Once again, press and hold the **CTRL** key during installer initialization to open an installer console window. After the console window opens, release the **CTRL** key.

e) Continue the installation to the point at which the failure occurred. Cut and paste the installation console text into a text file. Forward this file to OPNET Technical Support.

3) The installation completes with a failed status.

The most likely causes of this failure are that the installer failed to copy files, failed post-installation editing, or failed to execute a command. Forward the installation logs to OPNET Technical Support. The files are:

- `<install_dir>\InstallLogs\installer_debug.log`
- `<install_dir>\InstallLogs\OPNET_VNE_Server_InstallLog.log`

Collect Debug Information: Forward installation logs, installer console information, or screenshots to OPNET Technical Support.

Cannot Run the Oracle Installer

Scenario: The Oracle8i installer terminates immediately after it is started.

Recovery: To work around this problem, perform the following steps:

1) Create a temporary directory on your Oracle host.

2) Copy the contents of the Oracle RDBMS Server CD to the temporary directory created in step 1.

3) Search the directory structure created in step 1 for the existence of the filename `symcjit.dll`.

4) Rename each copy of the `symcjit.dll` to `symcjit.old`.

5) Run **setup.exe** from the directory you created in step 1, and install Oracle 8.1.x.

Note—For more information about this problem, refer to Oracle Metalink Doc ID: Note:131299.1. The following URL also contains information about this problem: http://www.orafaq.com/msgboard/windows/messages/1040.htm.

Cannot Start VNE Server

Scenario: The VNE Server Console does not appear after starting the product.

Symptoms: You clicked on the VNE Server desktop icon or used the Program Group menu to start VNE Server, but the Console never opens.

Possible Causes: This problem may involve an installation error. This can occur if, during startup, VNE Server cannot resolve a product definition or cannot find a referenced file. This problem can also occur if the product .jar files or XML control files become corrupted.

Recovery: If this is a new installation or upgrade, delete the newly installed VNE Server directory tree, and try the installation again.

If the problem persists, startup VNE Server in a debug window, as follows:

1) Open a command prompt window, and set the working directory to the installation directory: `<install dir>\VNEServer\3.0.1.`

2) Type **vnes.bat /debug ev** to start VNE Server (Oracle8i). A window opens and displays startup messages (INFO).

Note—If using an Oracle9i database, type: **vnes.bat /Oracle9i /debug ev**.

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3) Cut and paste the contents of the startup window into a file for Technical Support.

   The messages displayed in this window may contain error information or exceptions that help identify the cause of the startup problem.

Collect Debug Information: Forward the startup window message file, from step 3, and the installation logs to OPNET Technical Support. The installation logs are

- <install dir>\InstallLogs\installer_debug.log
- <install dir>\InstallLogs\OPNET_VNE_Server_InstallLog.log

Cannot Start VNE Server Services

Scenario: The VNE Server services fail to start.

Symptoms: The Console opens, but the service framework fails to start when you start VNE Server services. Alternately, the progress box that appears when services are started may display messages about a process failing to start.

Recovery: Try to start VNE Server services as follows:

1) Exit VNE Server.
2) Restart VNE Server. After the Console appears, start services.
3) If services still do not startup, exit VNE Server.
4) Use the Windows Task Manager to terminate any *rmid.exe* and *javaw.exe* processes running on the system.
5) Start VNE Server, and try starting services again. If the problem still occurs, delete the *log* directory from the VNE Server installation directory, terminate any *rmid.exe* and *javaw.exe* processes and try again.

Collect Debug Information: If you cannot successfully start VNE Server services using the methods described above, collect debug information for Technical Support as follows:

1) Start VNE Server. After the Console opens, select **Control > Management Console** from the Console menu bar.
2) Select the Management Console *Project Properties* panel.
3) Expand the **debug** property. Set the **state** property to true.
4) Press **OK** to exit the Management Console.
5) Exit VNE Server.
6) Open a command prompt window, and set the working directory to the installation directory at `<install dir>\VNEServer\3.0.1.`
7) Type **vnes.bat /debug ev** to start VNE Server (Oracle8i). A window opens and displays startup messages (INFO).

Note—If using an Oracle9i database, type: **vnes.bat /Oracle9i /debug ev**.

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8) After the Console opens, start VNE Server services.

Note—Services may still fail to startup.

9) Select **Help > Display Process Output Message** from the Console menu bar.

   A series of overlaid windows open. A window opens for each VNE Server process with each window displaying initialization messages (INFO) about its process.

10) Copy and paste the contents of the `vnes.bat /debug ev` window into a file, and forward to OPNET Technical Support.

11) Look at each of the process windows. Take screenshots, or write down any error messages, and forward to OPNET Technical Support.

12) Take a screenshot of the startup progress box, or write down the failure message, and forward to OPNET Technical Support.

VNE Server Cannot Connect to the Database

Scenario: When you start VNE Server, the Console does not appear. A message box appears and informs you that a database connection cannot be established.

Possible Causes: Either the database is not reachable, or the database name entered during installation of VNE Server does not match an entry in the Oracle *tnsnames.ora* file.

Recovery: •

- Verify that the Oracle database you are using (local or remote host) is in service. If it is not in service, restore the database to service.
- If the database is on another host and is in service, verify that it is reachable.

  Type **`tnsping <database name>`**. If you get a *TNS: no listener* response, the database is not reachable. Correct the network problem.

- The most likely cause of this problem is that the database name entered during VNE Server installation does not match any known Oracle Net Services name.
  - — Edit the *<install dir>\lib\xml\dtd\props_Oracle8i.dtd* file (*props_Oracle9i.dtd* for Oracle9i installations). Search for a line in the file that contains “fs.db.name”. The quoted database name in this line should match an entry in the Oracle *tnsnames.ora* file. Refer to Oracle Net Services on page VNE-5-22 for information about the *tnsnames.ora* file format.
  - — Open the *<oracle install dir>\ora81\network\ADMIN\tnsnames.ora* file for Oracle8i.

    Or open the *<oracle install dir>\ora92\network\ADMIN\tnsnames.ora* file for Oracle9i.
  - — You may see that the name used in the *props_Oraclexx.dtd* file matches an entry in tnsnames.ora, but is misspelled. Correct the error in the dtd file. Save and exit the file.
- Another common cause of this problem is that a fully-qualified hostname (i.e., *vnesdb.opnet.com)* was entered for the database name during VNE Server installation, when the entry in *tnsnames.ora* is actually *vnesdb*. Correct errors of this nature in the dtd file.

Try, once again, to start VNE Server. If the problem persists, contact OPNET Technical Support.

Collect Debug Information: Take a screenshot of the error dialog box, or write down the error message. Forward the information and the following two files to OPNET Technical Support:

- Oracle8i: *<install dir>\lib\xml\dtd\props_Oracle8i.dtd*

  Oracle9i: *<install dir>\lib\xml\dtd\props_Oracle9i.dtd*.
- Oracle8i: *<oracle install dir>\ora81\network\ADMIN\tnsnames.ora*

  Oracle9i: *<oracle install dir>\ora92\network\ADMIN\tnsnames.ora*

Configuration Problems

The problem scenarios in this section involve problems that can arise during product configuration.

Cannot Communicate with the Target Network

Scenario: Config file collection and SNMP-based MIB data collection fails for all the network devices immediately after data collection starts. The Event Viewer shows numerous events of Error severity that describe device access problems.

Possible Causes: There may be an error in your VNE Server setup, or the target devices may be inaccessible.

Verify Setup: Verify configuration of the host platform, VNE Server, and the target network, by checking the following items:

1) Use the **route print** command in a Command Prompt window to verify that the host PC has a route to the gateway of the target network. If no route exists, create a route.

2) Check the VNE Server device access information for the target network to ensure that device IP addresses, login information, and community strings are correct. Correct any problems.

3) Verify that devices in the target network have telnet enabled. Enable telnet on devices that have telnet disabled.

Verify Access: Verify access to the target network.

1) **Ping** the gateway that provides access into the target network. Ping interfaces on several devices in the target network. Run **tracert** to inaccessible addresses.

2) If you can ping device interfaces in the target network, verify that you can use **telnet** to access several different devices.

If access to the target network is the problem, fix any configuration or network problems.

Collect Debug Information: If the problem persists after you have verified VNE Server setup and access to the target network, collect the standard SPR Report information, as detailed in Filing an OPNET Technical Support Case on page VNE-A-21, and contact OPNET Technical Support.

No Network Data is Written to the Oracle Database

Scenario: The VNE Server Event Viewer indicates that the adapters are running and that data is being collected, but the Report Manager reports contain no data. Additionally, the Event Viewer may contain events of Critical severity that describe database problems.

Verify Setup: Verify that Oracle services are running, the database is accessible, and the VNE Server accounts are setup correctly.

1) Verify that the Oracle TNSListener and OracleService services are running, using the path specific to your operating system. Start these services, if they are not running:

   Windows NT: **Start > Settings > Control Panel > Services**

   Windows 2000: **Start > Settings > Control Panel > Administrative Tools > Services**

2) Use Oracle DBA Studio (Oracle8i) to verify that the database used by VNE Server is available and is setup correctly. Verify that the *global database name* (GDN) entered during Oracle installation is visible in DBA Studio. If the database is not visible, create the database.

   For Oracle9i, use the Enterprise Manager Console for this step.

3) If the VNE Server database is visible, expand its display. Make sure that the view is **By Schema** (using **View > By Schema**). Expand Schema and verify that the VNE Server account entry exists. (This is the Oracle account name entered during VNE Server installation). If it does not exist, rerun *setup_accounts.sql* within sqlplus. See Setting Up VNE Server Database Accounts within Oracle on page VNE-5-24*,* for instructions.

Collect Debug Information: If the problem persists after you correct any of the database problems above, collect the following files before calling OPNET Technical Support:

- In the directory *...**Oracle**admin*\<*database instance name*>*create*, collect the *createdb.log* and *dbSilentCreate.log* files.
- In the directory *...**Oracle**admin*\<*database instance name*>*pfile*, collect *init.ora.*

Send these files with the standard SPR Report information to OPNET Technical Support.

The Oracle Database Does Not Restart Correctly After PC startup

Scenario: The VNE Server Console indicates that adapters are running and that data is being collected, but the Report Manager reports contain no data. The Event Viewer may contain events of Critical severity that describe database problems.

Verify Setup: Verify correct Oracle setup per No Network Data is Written to the Oracle Database on page VNE-A-10.

If Oracle services are running and the database has been configured correctly for VNE Server, use the Windows Task Manager to view Oracle memory usage. A database dedicated to VNE Server will use more than 70 MB of memory, if Oracle starts up properly. If the displayed memory usage is much lower than normal, Oracle has probably not started up properly.

Recovery: If Oracle memory usage is much less than 70 MB, perform the following steps to restart.

For Oracle8i:

1) In a command window, type: **`svrmgrl`**.
2) At the svrmgrl prompt (svrmgrl>), type: **`connect internal`**.
3) Type **`shutdown`**.
4) Type **`startup`**.
5) Type **`quit`**.

For Oracle9i:

1) In a command window, type: **`sqlplus "/ as sysdba"`**.
2) Type **`startup open <database name> parallel`**.
3) Type **`quit`**.

When Oracle is running, check its memory usage again. If Oracle memory usage is much higher now (tens of MB), Oracle is ready for operation with VNE Server.

Collect Debug Information: If the problem persists after you correct the database problems above, collect the following files:

- In the directory ...*Oracle**admin*\<*database instance name*>*create*, collect the *createdb.log* and *dbSilentCreate.log* files.
- In the directory ...*Oracle**admin*\<*database instance name*>*pfile*, collect *init.ora.*

Send these files with the standard SPR Report information to OPNET Technical Support.

Adapters Do Not Run as Intended

Scenario: The VNE Server Console does not show one or more adapters running. The Report Manager does not show the data collected by one or more adapters.

Verify Setup: Use the Management Console *Adapter Schedule* panel to verify that the problem adapters have been enabled. Enable any adapters that are disabled, if these adapters are supposed to be running.

Collect Debug Information: If the problem adapters are enabled but the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

Configuration Files are Not Collected or Imported

Scenario: The config file import adapters (Device Config File Import or CiscoWorks Config File Import) cannot locate any configuration files. The output file directories for the config file collection adapters are empty.

Note—The Device Config File Collection adapter collects files that are imported by the following adapters: Device Config File Import, Device ifIndex Import, Device FR Map Import, Device Version Import, Device IP Route Import, Device CDP Import, Device ARP Table Import, Device Interface Import, Device Module Import, Device CAM Table Import, and Device VLAN Database Import.

Note—The CiscoWorks Config File Collection adapter collects files that are imported by the CiscoWorks Config File Import adapter.

Verify Setup: Check the following items:

1) Examine the Event Viewer for events of Error severity that describe device access problems.

2) Use the Management Console *Adapter Schedule* panel to verify that the proper config file collection adapter is enabled. View the Console Adapter Statistics to determine whether the adapter has ever run. Enable the adapter, if it is currently disabled.

3) Use the Management Console *Adapter Resources* panel to verify that the output file directory of the proper config file collection adapter matches the input file directory of the associated config file import adapter. Correct any directory mismatches.

4) Check the output file directory of the config file collection adapter to ensure there are configuration files.

Verify Access: Verify there is access to target devices and that login information is correct. For Cisco routers, verify that Privileged Exec mode is accessible.

Collect Debug Information: If you cannot solve the problem using the steps listed above, collect the standard SPR Report information, and contact OPNET Technical Support.

Configuration Files are Not Collected for a Specific Device

Scenario: Configuration files are not collected for a device. The Network Browser and Report Manager do not show information for the device.

Verify Setup: View the device access entry in the *Device and Platform Info* panel of the Management Console. Verify that the device login information is correct. Correct any problems.

Verify Access: Ping the target device to verify access. Telnet to the target device to verify that it is accessible. Verify access to Privileged Exec mode. Correct any problems.

Collect Debug Information: If the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

MIB Data is Not Collected for a Specific Device

Scenario: The Report Manager does not show any data obtained from MIBs for a specific device. The Event Viewer shows events of Error severity that describe access problems with the problem device.

Verify Setup: View the device access entry in the *Device and Platform Info* panel of the Management Console. Verify that the SNMP community string is correct. Correct any problems.

Verify Access: If you have access to other products that can do SNMP queries (HP OpenView, AdventNet, etc.), collect System group information from the target device to verify both access and the community string.

Verify SNMP: Verify that the device's SNMP agent is running.

Collect Debug Information: If the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

Operation Problems

The problem scenarios in this section involve problems that can arise during continuous operation.

Oracle ORA-4031 Shared Pool Memory Allocation Errors

Scenario: The VNE Server Event Viewer displays Critical events informing the user of database problems.

Verify Setup: This problem is common with Oracle 8.1.7.0 installations. VNE Server requires an Oracle 8.1.7.4.1 database for operation. Verify that the 8.1.7.4.1 patch is installed. Install the patch if you are running Oracle 8.1.7.0. The patch fixes shared pool memory problems in Oracle.

Verify proper Oracle setup per No Network Data is Written to the Oracle Database on page VNE-A-10. If Oracle services are running and the database has been configured properly for VNE Server, check the *rmid* logs. This log file is located at <*install dir*>*log**vne_rmid_log.log*.

To view the log file, make a copy of the file and open it using a text editor. Search for "ORA-", "ORA-4031", "error", and "exception".

Recovery: If ORA-4031 errors are present in the rmid log, do the following steps to correct the problem.

1) Stop VNE Server data collection by selecting **Control > Stop VNE Services** from the Console menu bar.

2) Exit VNE Server by selecting **File > Exit** from the Console menu bar.

3) Shutdown and restart Oracle, using the appropriate path for your operating system and selecting the service *OracleServiceO81A*:

   Windows: **Start > Settings > Control Panel > Administrative Tools > Services**.

4) After Oracle has restarted, start VNE Server using the **OPNET VNE Server** selection within the OPNET VNE Server program group.

5) Start VNE Server data collection by selecting **Control > Start VNE Services** from the Console menu bar.

6) Monitor operation for an hour or more. No Critical events regarding the database should appear in the Event Viewer.

Collect Debug Information: If the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

Services Halt and Database Error Events Appear in the Event Viewer

Scenario: The VNE Server Event Viewer shows events of Emergency and Critical severity that describe database problems. The service framework shuts down.

Causes: Any kind of a database access error can cause this problem. If there is no free tablespace for the database, this problem will also occur. This problem may also occur if data written to the database does not match the underlying schema.

Recovery: If the database is out of service, restore it to service. If connectivity to a remote database is lost, restore connectivity. Exit VNE Server, re-enter and restart services to recover.

If the problem is caused by data that violates the underlying database schema, turn off the “auto shutdown” feature as follows:

1) Open the VNE Server Management Console.

2) Open the *Project Properties* panel.

3) Set the *stopServicesOnDatabaseFailures* property to false.

4) Press the **Apply** button to save the changes.

5) Start services and start your data collection schedule.

Collect Debug Information: Forward the rmid and Event Viewer event logs to OPNET Technical Support. If possible, zip the temp dir and forward that to OPNET Technical Support, as well. If you cannot provide this data, for security reasons, save the temp dir in a location accessible to you for joint troubleshooting with OPNET Technical Support.

Removing and Recreating VNE Server User Account and Database from Oracle

Scenario: A serious problem has developed with the network database that can only be corrected by removing and recreating the VNE Server account and database.

WARNING—Never perform this procedure unless advised to do so by OPNET Technical Support. All VNE Server data in the Oracle database is removed by this procedure.

Recovery: To remove the VNE Server user account and database from Oracle, and recreate a fresh account and database, perform the steps in Setting Up VNE Server Database Accounts within Oracle on page VNE-5-24.

Collect Debug Information: If the database cannot be removed and recreated, forward any screen output captured during this procedure to OPNET Technical Support.

Unexpected Devices are Present in the Network Database

Scenario: The Report Manager and Network Browser show devices that are not expected to be in the target network.

Verify Setup: Check the following items:

1) Verify that the ASCII Import files reference only devices that are in the target network. Incorrect setup of the ASCII Import adapter can result in extra devices appearing in the network database. Correct any problems.

2) View the device access information in the *Device and Platform Info* panel of the Management Console. Verify that the device access information only includes devices in the target network. Correct any problems.

3) Make sure adapters that gather information from other data collection systems (such as Concord eHealth) are configured correctly. If the Concord adapter is incorrectly configured to communicate with a Concord system in a different target network, extra devices can be included in the network database. Correct any problems.

Collect Debug Information: If the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

Device Asset Information is Not Collected for a Device

Scenario: The Report Manager Asset Inventory report does not show device hardware configuration information for a device. Other MIB data, such as the System Description, is present in reports.

Possible Causes: The device may not support the ENTITY-MIB. VNE Server collects hardware configuration information from this MIB.

Collect Debug Information: If the device supports the ENTITY-MIB, collect the standard SPR Report information, and contact OPNET Technical Support.

Failure to Connect to the CiscoWorks RME Database

Scenario: The CiscoWorks RME Database Import adapter fails to connect to the database. The VNE Server Event Viewer shows connection failure events.

Verify Setup: Use the Management Console *Adapter Resources* panel to verify that the RME database connection properties for this adapter are correct. Correct any problems found.

Recovery: This problem may also occur due to the RME database getting into a state where it no longer accepts connections. Perform the following steps to clear this problem by resetting the RME database.

1) Open a web browser and go to the URL for the CiscoWorks RME database. An example is: *http://CWpc.acme.com:1741* (include the database port number in the URL).

2) Login as an administrative user, and press return.

3) Press the **Server Configuration** button in the lower left browser panel.

4) Select the **Administration, Process Management,** and **Stop Process** choices in the Server Configuration panel.

   The right browser panel displays a *Stop Process* dialog box.

5) Select the **Process** radio button in the stop field of the Stop Process dialog box.

6) Select the *EssentialsDbEngine* process from the Process Name pull-down menu and press **Finish**.

   A message appears stating that the process is stopped.

7) Press Start Process in the Server Configuration panel.

   The right browser panel displays a *Start Process* dialog box.

8) Select the **Process** radio button in the start field of the Start Process dialog box.

9) Select the *EssentialsDbEngine* process from the Process Name drop-down menu and press **Finish**.

   A message appears stating that the process is started.

10) Press **Logout** to leave the CiscoWorks RME database management environment.

Collect Debug Information: If the problem persists, collect the standard SPR Report information, and contact OPNET Technical Support.

Failure to Connect to the CiscoWorks ANI Database

Scenario: The CiscoWorks ANI Database Import adapter fails to connect to the database. The VNE Server Event Viewer shows connection failure events.

Verify Setup: Use the Management Console *Adapter Resources* panel to verify that the ANI database connection properties for this adapter are correct. Correct any problems found.

Recovery: This problem may also occur due to the ANI database getting into a state where it no longer accepts connections. If this is the case, perform the following steps to clear this problem by resetting the ANI database.

1) Open a web browser and go to the URL for the CiscoWorks ANI database. An example is: *http://CWpc.acme.com:1741* (include the database port number in the URL).

2) Login as an administrative user, and press return.

3) Press the **Server Configuration** button in the lower left browser panel.

4) Select the **Administration, Process Management,** and **Stop Process** choices in the Server Configuration panel.

   The right browser panel displays a *Stop Process* dialog box.

5) Select the **Process** radio button in the stop field of the Stop Process dialog box.

6) Select the *ANIDbEngine* process from the Process Name pull-down menu, and press **Finish**.

   A message appears stating that the process is stopped.

7) Press Start Process in the Server Configuration panel.

   The right browser panel displays a *Start Process* dialog box.

8) Select the **Process** radio button in the start field of the Start Process dialog box.

9) Select the *ANIDbEngine* process from the Process Name pull-down menu and press **Finish.**

   A message appears stating that the process is started.

10) Press **Logout** to leave the CiscoWorks ANI database management environment.

Collect Debug Information: If the problem persists, collect the standard SPR Report information and contact OPNET Technical Support.

Cannot Import a VNE Server Network Model into the OPNET analysis software

Scenario: Import of VNE Server network model fails when creating a new OPNET analysis software project.

Verify Setup: Check the following items:

1) In the OPNET analysis software control panel, select **Edit > Preferences** to open the Preferences window. Search for the string *vne* to find the preferences related to VNE Server.

2) Verify that the *vne_import_ior_file* preference points to the *vneserver.ior* file. Correct any problems.

   a) If VNE Server resides on the same system as OPNET analysis software, this preference must point to the *vneserver.ior* file in the VNE Server temp directory. This temp directory defaults to *C:\op_admin\tmp\vne*, but you can change the directory during VNE Server installation.

   b) If the two products reside on different systems, verify that this preference points to the *ior* file based upon your setup scenario.

      If you have mapped a network drive so the OPNET analysis software host can directly access the *ior* file on the VNE Server host, verify that the path is correct. Verify that you can still view the file from the OPNET analysis software host.

      If you have copied the *ior* file to a directory on the OPNET analysis software host, verify that this preference points to the correct path.

3) Verify that the *vneserver.ior* file remains valid. If VNE Server data collection is stopped, the *ior* file is removed from the temp directory. Make sure that VNE Server is operating and that this file is present in the temp directory.

   If the two products reside on different systems, the *ior* file can become stale, if VNE Server data collection is stopped and restarted. If this happens, copy the current *ior* file from the VNE Server host to the VNE Server temp directory on the OPNET analysis software host.

4) Verify that the *vne_import_postproc_function* preference is set to *Vne_Import_Postproc_Default*.

5) Verify that the *vne_import_postproc_library* preference is set to *vne_import_postproc*.

Verify Access: If VNE Server and OPNET analysis software reside on different systems, verify access by pinging the VNE Server system from the OPNET analysis software system.

Try again: VNE Server (in release 1.1) only supports one model import request at a time. Once an import session is in progress, new import requests will fail. Try again to import a model from VNE Server. VNE Server 1.2 and up support multiple, simultaneous import sessions.

Collect Debug Information: If the problem persists, collect the OPNET analysis software error logs and the standard SPR Report information. Contact OPNET Technical Support.

Licensing Problems

The problem scenarios in this section involve problems that can arise with respect to product licensing.

Cannot Obtain a License When Starting VNE Server

Scenario: Services fail to start in the VNE Server Console. An Emergency level event appears in the Event Viewer about a failure to obtain a license.

Recovery: If this problem occurs, perform the following steps to recover.

1) Verify that the License Server is in service and accessible if located on another host.

2) Verify that a license is available for VNE Server.

3) Exit the VNE Server Console. Verify that the *op_monitor* process is not running. Kill the process, if it is running.

4) Check the VNE Server installation directory for an *opmonlock* directory. If the directory exists, delete it.

Work through these steps to correct any problems found. After completing them, you should be able to open the VNE Server Console, start service, and obtain a license.

Collect Debug Information: If the recovery steps do not correct your licensing problems, collect the following file, and contact OPNET Technical Support:

<install dir>\VNEServer\3.0\log\VNE_Event_Viewer.log.

Services Shut Down Due to License Problems

Scenario: VNE Server has been operating for an extended period of time (hours, days, weeks) when services stop, and an Emergency level event appears in the Event Viewer about a failure to keep a license.

Recovery: If this problem occurs, exit the VNE Server Console. Re-enter the Console and start services. Services should start up. If they do not, execute the recovery steps in Cannot Obtain a License When Starting VNE Server on page VNE-A-20.

Collect Debug Information: If the recovery steps do not correct your licensing problems, collect the following file, and contact OPNET Technical Support:

<install dir>\VNEServer\3.0\log\VNE_Event_Viewer.log.

Filing an OPNET Technical Support Case

To file a Technical Support case, proceed as follows:

1) Use a web browser to connect to the OPNET Technical Support web site:

   http://www.opnet.com/support/home.html

2) Locate the *Enter/Update a Tech Support Case* section on the web page.

3) Click on the *New Case* link.

   A Tech Support Request Form appears.

4) Fill in all the fields in the form, and press **Submit TS Request**.

Coordinate with OPNET Technical Support to transfer any data captured during troubleshooting.

App B Device Configuration Commands

The device configuration commands supported by VNE Server for each vendor are listed in the following sections:

- Cisco Commands
- Cisco Catalyst Commands
- Cisco PIX Firewall Commands
- Juniper Commands
- Nortel Networks Commands
- Nortel Networks Passport 8000 Commands
- Nortel Networks Passport 7480, 15000, 20000 Commands
- Extreme Commands
- Foundry Commands

Cisco Commands

Last updated for release: 1.2 PL3.

Cisco commands include the following:

- Cicso Global Commands
- Cisco Interface Commands
- Cisco MPLS Commands
- Cisco Tunnel Commands
- Cisco RIP Commands
- Cisco IGRP Commands
- Cisco EIGRP Commands
- Cisco OSPF Commands
- Cisco BGP Commands
- Cisco IS-IS Commands
- Cisco Route-Map Commands
- Cisco System Management Commands

Cicso Global Commands

- hostname <name>
- hostname <name> alt hostname <name>
- version <version>
- ip domain-name <name>
- ip default-network <address>
- ip default-gateway <address>
- ip local policy route-map <map-tag>
- ip vrf vrf-name
- ip vrf forwarding vrf-name
- ip route [vrf <name>] <dest addr> <mask> <next hop> [metric] [name <name>] [tag <number>] [permanent]
- ip route vrf <vrf value> <dest addr> <mask> <next hop> [metric] [name <name>] [tag <number>] [permanent]

- ip route <dest addr> <mask> <next hop> [metric] [name <name>] [tag <number>] [permanent]
- access-list <list number>
- ip access-group {access-list-number | name} {in | out}
- ip as-path access-list <list number> <permit|deny> <reg expression>
- ip prefix-list <list name> [seq <number>] <permit|deny <network/length>> [ge <number>] [le <number>]
- ip prefix-list <list name> <permit|deny <network/length>> [ge <number>] [le <number>]
- ip prefix-list <list name> [seq <number>] <permit|deny <network/length>>
- ip prefix-list <list name> <permit|deny <network/length>>
- ip community-list <list number> <permit|deny> <community> [<community>...]
- ip community-list <standard | expanded> <list number> <permit|deny> <community> [<community>...
- ip access-list <standard|extended> <name>
- ip explicit-path <name <name> | identifier <number>>
- ip explicit-path <name <name> | identifier <number>> <enable|disable>
- ip explicit-path {name WORD | identifier number} [{<enable|disable>}]
- ip policy route-map <map-tag>
- ip authentication mode eigrp <as-number> md5
- ip authentication key-chain eigrp <as-number> <key-chain>
- next-address <ip address>
- next-address <loose|strict> <ip address>
- index <number> next-address <ip address>
- index <number> next-address <loose|strict> <ip address>

Cisco Interface Commands

- interface <name/number> [multipoint|point-to-point|<other>]
- no ip address
- ip address <address> <mask> secondary
- ip address <address> <mask>

- network <address>
- clockrate <bps>
- bandwidth <kbps>
- channel-group <number>
- ring-speed <speed>
- delay <tens of microsecs>
- description <text>
- mtu <bytes>
- ip mtu <value>
- ip route-cache [cbus|flow|distributed]
- no ip route-cache [cbus|flow|distributed]
- encapsulation frame-relay
- encapsulation frame-relay <cisco|ietf>
- ip unnumbered <interface name>
- shutdown
- frame-relay interface-dlci <dlci>
- frame-relay interface-dlci <dlci> <cisco|ietf>
- frame-relay map ip <addr> <dlci>
- frame-relay map ip <addr> <dlci> [broadcast] [cisco|ietf]
- atm pvc <vcd> <vpi> <vci> aal5snap
- atm pvc <vcd> <vpi> <vci> aal5snap [<peak> <average> [burst]] [inarp minutes]
- abr
- ubr
- ubr+
- vbr-nt
- protocol ip <ip address>
- protocol ip <ip address> [[no] broadcast]
- pvc <vpi/vci> [qsaal|ilmi|smds]

- pvc <name> <vpi/vci> [qsaal|ilmi|smds]
- pvc <vpi/vci>
- pvc <name> <vpi/vci>
- ip rsvp bandwidth <interface kbps> <single flow kbps>
- ip rsvp bandwidth <interface kbps>
- standby [<group number>] ip [<ip address> [secondary]]
- standby [<group number>] mac-address <mac address>
- standby mac-refresh <seconds>
- standby name <group name>
- standby [<group number>] preempt priority <priority>
- standby [<group number>] preempt delay [<delay>] [minimum <delay>] [sync <delay>]
- standby [<group number>] preempt
- standby [<group number>] priority <priority>
- standby [<group number>] timers [msec] <hello time> [msec] <hold time> [advertise <advertisement interval>]
- standby [<group number>] track <interface name> [<interface priority>]
- standby [<group number>] use-bia [scope interface]
- standby [group-number] authentication <string>
- standby delay [minimum <delay>] [reload <delay>]
- no standby redirects unknown
- standby redirects timers <advertisement-interval> <holddown-interval>
- encapsulation dot1Q <vlan-id> [native]
- switchport access vlan <vlan-id>
- spanning-tree vlan <vlan-id> [<vlan-id>...] cost <cost>
- spanning-tree vlan <vlan-id> [<vlan-id>...] port-priority <priority>
- spanning-tree portfast
- spanning-tree cost <cost>
- spanning-tree port-priority <priority>

Cisco MPLS Commands

- mpls traffic-eng tunnels
- mpls traffic-eng <level>
- mpls traffic-eng administrative-weight <weight>
- mpls traffic-eng attribute-flags <0x0 - 0xFFFFFFFF>
- mpls traffic-eng bandwidth <bandwidth>
- mpls traffic-eng isis-level <level>
- mpls traffic-eng backup-path lsp-name
- mpls label protocol ldp
- mpls ip
- mpls ldp holdtime
- mpls ldp advertise-labels [for prefix-access-list]
- mpls ldp discovery { hello { holdtime | interval } seconds | targeted-hello { holdtime | interval } seconds | accept [from acl] }
- tag-switching ip

Cisco Tunnel Commands

- tunnel source <ip address | interface name>
- tunnel destination <ip address|hostname>
- tunnel mode mpls traffic-eng
- tunnel mpls traffic-eng fast-reroute
- tunnel mpls traffic-eng affintiy <properties> mask <mask>
- tunnel mpls traffic-eng affintiy <properties>
- tunnel mpls traffic-eng autoroute announce
- no tunnel mpls traffic-eng autoroute announce
- tunnel mpls traffic-eng autoroute metric [absolute|relative] <metric>
- tunnel mpls traffic-eng autoroute metric <metric>
- tunnel mpls traffic-eng path-option <number> <dynamic|explicit name <path name|path number>>
- tunnel mpls traffic-eng path-option <number> <dynamic|explicit name <path name|path number>> lockdown

- tunnel mpls traffic-eng priority <setup>
- tunnel mpls traffic-eng priority <setup> <hold>

Cisco RIP Commands

- router rip
- network <address>
- neighbor {ip-address}
- timers basic {update} {invalid} {holddown} {flush}
- version {1|2}
- auto-summary
- no auto summary
- default-metric <value>
- distance <distance> [<address> <mask> [<access-list>]]
- distribute-list <access-list> <in|out>
- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- maximum-paths <value>
- passive-interface <interface>
- no passive-interface <interface>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- ip rip send version
- ip rip send version [1]
- ip rip send version [1] [2]
- ip rip receive version
- ip rip receive version [1]
- ip rip receive version [1] [2]

- ip rip triggered
- ip summary-address rip {ip-address} {ip-network-mask}

Cisco IGRP Commands

- router igrp <process id>
- network <address>
- neighbor {ip-address}
- timers basic {update} {invalid} {holddown} {flush}
- timers basic {update} {invalid} {holddown} {flush} [sleeptime]
- metric holddown
- traffic-share {balanced | min}
- default-metric <value>
- distance <distance> [<address> <mask> [<access-list>]]
- distribute-list <access-list> <in|out>
- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- maximum-paths <value>
- metric maximum-hops <value>
- passive-interface <interface>
- no passive-interface <interface>
- no passive-interface <interface>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- metric weights <tos> <k1> <k2> <k3> <k4> <k5>
- variance <variance>

Cisco EIGRP Commands

- router eigrp <process id>
- network <address>
- network <address> <mask>
- neighbor {ip-address}
- traffic-share {balanced | min}
- metric holddown
- metric maximum-hops {value}
- default-metric <value>
- distance <distance> [<address> <mask> [<access-list>]]
- distance eigrp <internal dist> <external dist>
- distribute-list <access-list> <in|out>
- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- maximum-paths <value>
- passive-interface <interface>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- metric weights <tos> <k1> <k2> <k3> <k4> <k5>
- variance <variance>
- no auto-summary
- ip split-horizon
- no ip split-horizon
- ip bandwidth-percent eigrp {as-number} {percent}
- ip hello-interval eigrp {as-number} {seconds}
- ip hold-time eigrp {as-number} {seconds}
- ip split-horizon eigrp <process id>

- no ip split-horizon eigrp <process id>
- ip summary-address eigrp <as number> <address> <mask> <admin dist>
- ip summary-address eigrp <as number> <address> <mask>
- timers active-time
- no timers active-time
- eigrp stub
- offset-list <access-list> in|out <offset> [<interface>]

Cisco OSPF Commands

- router ospf <process id>
- network <address> <wildcard mask> area <area id>
- default-metric <value>
- distance <distance> [<address> <mask> [<access-list>]]
- distance ospf [external <dist>] [inter-area <dist>] [intra-area <dist>]
- distribute-list <access-list> <in|out>
- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- maximum-paths <value>
- passive-interface <interface>
- no passive-interface <interface>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- auto-cost
- auto-cost [reference-bandwidth <value>]
- ospf auto-cost [reference-bandwidth <value>]
- area <area id>
- summary-address {address-mask} {prefix-mask} [not-advertise] [tag {tag}]

- timers spf {spf-delay} {spf-holdtime}
- neighbor {ip-address} database-filter all out
- neighbor {ip-address} [priority {number}] [poll-interval {seconds}] [cost {numbers}] [database-filter [all]]
- default-information originate [always] [metric metric-value] [metric-type type-value] [route-map map-name]
- ip ospf cost <cost>
- ip ospf network {broadcast|non-broadcast|{point-to-multipoint [non-broadcast]}|point-to-point}
- ip ospf dead-interval {seconds}
- ip ospf hello-interval {seconds}
- ip ospf priority {priority}
- ip ospf retransmit-interval {seconds}
- ip ospf transmit-delay {seconds}

Cisco BGP Commands

- router bgp <as>
- auto-summary, no auto-summary
- address-family vpnv4
- address-family vpnv4 [unicast | multicast]
- address-family ipv4 vrf vrf-name
- address-family ipv4 [unicast] vrf vrf-name
- bgp client-to-client reflection, no bgp client-to-client reflection
- bgp cluster-id {cluster-id}
- bgp confederation identifier {autonomous-system}
- bgp confederation peers as-number [... as-number]
- synchronization, no synchronization
- timers bgp {keepalive} {holdtime}
- network {address} {mask} weight {weight} [route-map {map-name}]
- network <address> mask <mask>
- network <address>

- passive-interface <interface>, no passive-interface <interface>
- bgp always-compare-med
- bgp default local-preference <value>
- default-metric <value>
- distance bgp <external> <internal> <local>
- distribute-list <access-list> <in|out>
- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- neighbor
- neighbor <ip address> active
- neighbor <peer group name> peer-group
- neighbor <ip address> peer-group <peer group name>
- maximum-paths <value>
- aggregate-address <address> <mask> [as-set] [summary-only] [suppress-map <map-name>] [advertise-map <map-name>] [attribute-map <map-name>]
- bgp fast-external-fallover, no bgp fast-external-fallover
- bgp router-id <ip address>

Cisco IS-IS Commands

- router isis
- is-type {level-1, level-2-only, level-1-2}
- ip router isis <process tag>
- ip router isis
- clns router isis [tag]
- isis metric <def metric> [<delay> [<expense> [<error> [level-1|level-2] |level-1|level-2] |level-1|level2] |level-1|level-3]

- isis metric <def metric>
- isis circuit-type {level-1|level-2-only|level-1-2}
- isis csnp-interval {seconds} {level-1|level-2}
- isis hello-interval {seconds} {level-1|level-2}
- isis hello-multiplier {seconds} {level-1|level-2}
- isis priority {priority} {level-1|level-2}
- isis lsp-interval {milliseconds}
- isis retransmit-interval {milliseconds}
- isis retransmit-throttle-interval {milliseconds}
- set-overload-bit
- spf-interval [level-1|level-2] {seconds}
- lsp-mtu {bytes}
- max-lsp-lifetime {lifetime}
- summary-address {prefix} {mask} [level-1|level-2|level-1-2]
- summary-address address mask {level-1 | level-1-2 | level-2}
- hello-padding {multi-point|point-to-point}
- no hello-padding {multi-point|point-to-point}
- isis password <password> [level-1 | level-2]
- spf-interval [level-1|level-2] <min-interval> [<initial wait> [<min wait>]]
- lsp-refresh-interval <seconds>
- partition avoidance [<area-tag>]
- prc-interval <min-interval> [<initial wait> [<min wait>]]
- lsp-gen-interval [level-1|level-2] <min-interval> [<initial wait> [<min wait>]]
- max-area-addresses <num-addresses>
- area-password <password>
- domain-password <password>
- net <net>
- distance <distance> [<address> <mask> [<access-list>]]
- distribute-list <access-list> <in|out>

- distribute-list <access-list> <in|out> [<interface|<proto [as num]>]
- maximum-paths <value>
- metric-style wide
- passive-interface <interface>
- no passive-interface <interface>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute isis ip <level> into <level> [distribute-list <number> | metric-style wide>]
- mpls traffic-eng <level>
- mpls traffic-eng isis-level <level>

Cisco Route-Map Commands

- route-map <name> [permit|deny] [<sequence number>]
- match as-path <path number>
- match community-list <list number>
- match community-list <list number> exact
- match community-list <list number> exact-match
- match ip address <access-list number>
- match route-type <route type>
- match interface {list of interface names}
- match tag {tag-id}
- match metric {metric-value}
- match ip next-hop <access-list> [<access-list> ...]
- set tag {tag}
- set next-hop {next-hop}
- set ip next-hop <address> [<...address>] [peer-address]

- set as-path prepend
- set as-path prepend <text>
- set as-path tag
- set community
- set communty <number>
- set community <number> additive
- set community none
- set comm-list <community list> delete
- set weight <weight>
- set origin <origin>
- set origin <origin> <as-num>
- set local-preference <number>
- set metric <metric>
- set metric <bandwidth> <delay> <reliability> <loading> <mtu>
- set metric-type <metric type>
- rd route-distinguisher
- route-target {import | export | both} route-target-ext-community
- import map route-map
- export map route-map
- set comm-list <community list> delete
- set ip default next-hop <address> [<...address>] [peer-address]
- set default interface <interface> [<...interface>]

Cisco System Management Commands

- snmp-server community <string> [view <view-name>] [ro|rw] [<access-list number>]
- snmp-server view <view-name> <oid-tree> {included|excluded}
- snmp-server host <host-addr> [traps|informs] [version {1 | 2c | 3 [auth | noauth | priv]}] <community-string> [udp-port <port>] [<notification-type>]
- snmp-server enable traps [<notification-type>]

- snmp-server queue-length <length>
- snmp-server packetsize <byte-count>
- snmp-server manager session-timeout <seconds>
- snmp-server trap-source <interface>
- no snmp-server system-shutdown
- snmp-server system-shutdown
- no snmp-server manager
- snmp-server manager
- snmp-server chassis-id <text>
- snmp-server location <text>
- snmp-server contact <text>
- logging <host-name>
- logging buffered [<buffer-size> | <level>]
- no logging console
- logging console <level>
- logging facility <facility-type>
- logging monitor <severity-level>
- no logging on
- logging on
- logging source-interface <interface-type interface-number>
- logging trap <level>
- service timestamps <message-type> [uptime]
- service timestamps <message-type> datetime [msec] [localtime] [show-timezone]

Cisco Catalyst Commands

Last updated for release: 1.2 PL3.

- #version <version>
- #module <module number> <description>
- #vlan <vlan number>
- #vlan(defaults)
- set system location <location string>
- set system name <name>
- set arp <ip address> <hardware address>
- set interface sc0|sl0 up|down
- set interface sl0 <slip address> <dest address>
- set interface sc0 [vlan <vlan number>|ip address [netmask [broadcast]]]
- set module enable|disable <module number>
- set module name <module number> <module name>
- set module name <module number/port number> <module name>
- set vlan <vlan number> <module number/port number ...>
- set vlan <vlan number> [name <name>] [type <type>] [mtu <mtu>] [said <said>] [state <state>] [ring <ring number>] [parent <vlan number>] [stp <stp type>] [translation <vlan number>]
- set port enable|disable <module number/port number>
- set port duplex <module number/port number> full|auto|half
- set port speed <module number/port number> 10|100|auto
- set spantree enable|disable <vlan>
- set spantree enable|disable
- set spantree fwddelay <delay> <vlan>
- set spantree fwddelay <delay>
- set spantree hello <interval> <vlan>
- set spantree hello <interval>
- set spantree maxage <age> <vlan>
- set spantree maxage <age>

- set spantree portcost <module number/port number> <cost>
- set spantree portpri <module number/port number> <priority>
- set spantree portvlanpri <module number/port number> <prioity><vlan>
- set spantree portvlanpri <module number/port number> <priority>
- set spantree backbonefast <enable|disable>
- set spantree guard <none|root|loop> <mod/port list>
- set spantree portfast bpdu-filter <enable|disable>
- set spantree portfast bpdu-guard <enable|disable>
- set spantree portcost <module number/port number list> <enable|disable>
- set spantree portcost <module number/port number list> <cost>
- set spantree portvlanpri <module number/port number> cost <cost>
- set spantree portvlancost <module number/port number> cost <cost> <vlan_ids>
- set spantree portpri <module number/port number list> <priority>
- set spantree portvlanpri <module number/port number> <priority> <vlan>
- set spantree portvlanpri <module number/port number> <priority>
- set spantree priority <bridge priority> <vlan>
- set spantree priority <bridge priority>
- set spantree priority <bridge priority>
- set spantree root secondary dia [<diameter>] [hello <hello_time>]
- set spantree root <vlan list> dia [<diameter>] [hello <hello_time>]
- set spantree root secondary <vlan list> dia [<diameter>] [hello <hello_time>]
- set spantree uplinkfast <enable|disable> [rate <rate>] [all-protocol <on|off>]
- set trunk <module number/port number> [on|off|desirable|auto|nonegotiate] [vlan_range] {isl|dot1q|dot10|lane|negotiate]
- set spantree priority <bridge priority> <vlan>
- set spantree priority <bridge priority>
- set cam dynamic|static|permanent <mac> <mod/ports>
- set cam dynamic|static|permanent <mac> <mod/ports> <vlan>

Cisco PIX Firewall Commands

Last updated for release: 2.0 PL1.

- access-group {access-list-number | name} in interface <interface_name>
- domain-name <name>
- hostname <name>
- PIX Version <version>
- nameif {hardware_id|vlan_id} if_name security_level
- interface <hardware-id>
- interface <hardware-id> <hardware speed tag>
- interface <hardware-id> <vlan-name>
- interface <hardware-id> <vlan-name> <logical|physical>
- interface <hardware-id> <vlan-name> <logical|physical> shutdown
- ip address if_name <ip_address|name>
- ip address if_name <ip_address|name> <netmask|name>
- ip address if_name <ip_address|name> <netmask|name> pppoe
- ip address if_name <ip_address|name> <netmask|name> pppoe setroute
- mtu <if-name> bytes
- snmp-server community <string>
- snmp-server host [<if_name>] <host-addr> [traps|poll]
- snmp-server enable traps
- no snmp-server enable traps
- snmp-server location <text>
- no snmp-server location
- snmp-server contact <text>
- no snmp-server contact
- logging <host-name>
- logging buffered <level>
- no logging buffer
- no logging console

- logging console <level>
- logging facility <facility-type>
- logging monitor <severity-level>
- no logging on
- logging on
- logging source-interface <interface-type interface-number>
- logging trap <level>
- service resetoutside
- service resetoutside
- names
- description <description text>
- object-group icmp-type <group_id>
- icmp-object <icmp_type>
- object-group network <group_id>
- network-object host <host_addr or name>
- network-object <addr> <mask>
- object-group protocol <group_id>
- protocol-object <protocol>
- object-group service <group_id> {tcp|udp|tcp-udp}
- port-object eq <service>
- port-object range <begin-service> <end-service>
- current object-group
- current ICMP type object-group
- current network object-group
- current protocol object-group
- current service object-group
- rip <if_name> default|passive [version [1|2]] [authentication [text|md5 key (key_id)]]
- router ospf <process id>

- network <address> <wildcard mask> area <area id>
- distance <distance> [<address> <mask> [<access-list>]]
- distance ospf [external <dist>] [inter-area <dist>] [intra-area <dist>]
- redistribute <static|connected>
- redistribute ospf <process id>
- redistribute <static_connected> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute ospf [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- area <area id>
- area <area id>
- summary-address {address-mask} {prefix-mask} [not-advertise] [tag {tag}]
- timers spf {spf-delay} {spf-holdtime}
- timers lsa-group-pacing <seconds>
- router-id <id>
- default-information originate
- default-information originate [always] [metric metric-value] [metric-type type-value] [route-map map-name]
- routing interface if_name ;
- ospf cost <cost>
- ospf authentication message-digest | null
- ospf authentication-key <key>
- ospf database-filter all out
- ospf mtu-ignore
- ospf message-digest-key <key-id> md5 <key>
- ospf dead-interval {seconds}
- ospf hello-interval {seconds}
- ospf priority {priority}
- ospf retransmit-interval {seconds}
- ospf transmit-delay {seconds}

- access-list <list id> remark <text string>
- access-list id {deny|permit}{protocol | object-group protocol_obj_grp_id {source_addr | local_addr} {source_mask | local_mask} | object-group network_obj_grp_id [operator port [port] | interface if_name | object-group service_obj_grp_id] {destination_addr | remote_addr} {destination_mask | remote_mask} | object-group network_obj_grp_id [operator port [port] | object-group service_obj_grp_id]} [log [[disable | default] | [level]]] [interval secs]]
- access-list id {deny | permit} icmp {source_addr | local_addr} {source_mask | local_mask} | interface if_name | object-group network_obj_grp_id {destination_addr | remote_addr} {destination_mask | remote_mask} | interface if_name | object-group network_obj_grp_id [icmp_type | object-group icmp_type_obj_grp_id] [log [[disable | default] | [level]]] [interval secs]]
- prefix-list <list name> seq <number> <permit|deny <network/length>> [ge <number>] [le <number>]
- prefix-list <list name> <permit|deny <network/length>> [ge <number>] [le <number>]
- prefix-list <list name> [seq <number>] <permit|deny <network/length>>
- prefix-list <list name> <permit|deny <network/length>>
- route-map <name> [permit|deny] [<sequence number>]
- match ip address <access-list number list>
- match route-type <route type>
- match nssa-external <type-1 | type-2>
- match interface {interface name}
- match ip route-source {list of access-list name|number}
- match metric {metric-value}
- match ip next-hop <access-list> [<access-list> ...]
- set next-hop {next-hop}
- set ip next-hop <address> [<...address>] [peer-address]
- set metric <metric>
- set metric-type <metric type>

Juniper Commands

Last updated for release: 1.2 PL3.

Juniper commands include the following:

- Juniper Global Commands
- Juniper Interface Commands
- Juniper RIP Commands
- Juniper OSPF Commands
- Juniper BGP Commands
- Juniper IS-IS Commands
- Juniper MPLS Commands
- Juniper RSVP Commands
- Juniper LDP Commands
- Juniper Policy Option Commands
- Juniper Routing Option Commands
- Juniper Routing Instances

Juniper Global Commands

```
version <value>;
system {
    host-name <value>;
    location {
        country-code <value>;
        latitude <value>;
        longitude <value>;
        npa-nxx <value>;
    }
}
```

Juniper Interface Commands

```
<interface-name> {
    disable;
    enable;
    encapsulation atm-pvc;
    encapsulation frame-relay;
    link-mode full-duplex;
    link-mode half-duplex;
    speed (10m | 100m);
    mtu <bytes>;
    description <text>;
    unit <logical-unit-number> {
        disable;
        enable;
        encapsulation atm-pvc;
        encapsulation frame-relay;
        dlci <value>;
        shaping {
          cbr <rate>;
          vbr peak <rate> sustained <rate> burst <length>;
        }
        vci <vpi-identifier.vci-identifier>;
        family iso;
        family mpls;
        family inet {
            mtu <bytes>;
            primary;
            address <value>;
            address <value> {
                destination <value>;
                multipoint-destination <destination-address> dlci <dlci-identifier>;
                multipoint-destination <destination-address> vci <vci-identifier>;
                multipoint-destination <destination-address> {
                }
                preferred;
                primary;
            } # address
        } # family
```

```
family iso {
        mtu <bytes>;
        primary;
        address <value> {
            preferred;
            primary;
        }
    }
    point-to-point;
    multipoint;
  } # unit
} # interface-name
```

Juniper RIP Commands

```
rip {
    import [lsb | <value> | rsb];
    metric-in <value>;
    send [broadcast | multicast | none | version1];
    receive [both | none | version1 | version2];
    disable;
    group <value> {
        export [lsb | <value> | rsb];
        neighbor <value>;
        neighbor <value> {
            metric-in <value>;
            receive [both | none | version1 | version2];
            send [broadcast | multicast | none | version-1];
        } # neighbor
    } # group
} # rip
```

Juniper OSPF Commands

```
ospf {
    export [lsb | <value> | rsb];
    reference-bandwidth <value>;
    area <area-id> {
      interface <interface-name>;
      interface <interface-name> {
        disable;   passive;
        dead-interval <seconds>;
        hello-interval <seconds>;
        interface-type [p2mp | nbma];
        metric <value>;
        neighbor <value>;
        neighbor <value> eligible;
        priority <value>;
        retransmit-interval <seconds>;
        transit-delay <seconds>;
      } # interface
      label-switched-path <value> metric <value>;
      virtual-link neighbor-id <value> transit-area <value>;
      area-range <addr_with_mask>;
      area-range <addr_with_mask> restrict;
      stub [default-metric <value> | no-summaries | summaries];
      nssa {
        area-range <value>;   area-range <value> restrict;
        default-metric <value>;
        (no-summaries | summaries);
      }
      virtual-link neighbor-id <router-id> transit-area <area-id> {
        dead-interval <seconds>;   hello-interval <seconds>;
        retransmit-interval <seconds>;
        transit-delay <seconds>;
      }
    } # area
    traffic-engineering {
```

Juniper BGP Commands

```
bgp {
    local-as <autonomous-system>;
    cluster <cluster-identifier>;
    description <text-description>;
    disable;
    export [lsb | <value> | rsb];
    family inet {
        any {
            prefix-limit {
                maximum <value>;
                teardown <percentage>;
            }
            unicast {
            }
            multicast {
            }
        }
    }
    hold-time <seconds>;
    import [policy-name];
    local-preference <local-preference>;
    metric-out <metric>;
    multihop <ttl-value>;
    no-client-reflect;
    out-delay <seconds>;
    path-selection (cisco-non-deterministic | always-compare-med);
    peer-as <autonomous-system>;
    preference <value>;
```

```
group <group-name> {
        description <text-description>;
        export [lsb | <value> | rsb];
        family inet {
            (any | unicast | multicast) {
                prefix-limit {
                    maximum <number>;
                    teardown <percentage>;
                }
            }
            unicast {
            }
            multicast {
            }
        }
        hold-time <seconds>;
        import [policy-name];
        multihop <ttl-value>;
        no-client-reflect;
        out-delay <seconds>;
        local-address <value>;
        passive;
        local-as <value>;
        local-as <value> private;
        local-preference <value>;
        metric-out <value>;
        peer-as <autonomous-system>;
        preference <value>;
```

```
family inet-vpn {
        }
        neighbor <address>;
        neighbor <address> {
            description <text-description>;
            export [lsb | <value> | rsb];
            family inet {
            any {
                prefix-limit {
                    maximum <number>;
                    teardown <percentage>;
                }
            }
            unicast {
            }
            multicast {
            }
            hold-time <seconds>;
            import [ policy-name ];
            multihop <ttl-value>;
            no-client-reflect;
            out-delay <seconds>;
            peer-as <autonomous-system>;
            preference <value>;
        }  # neighbor
    } # group
} # bgp
```

Juniper IS-IS Commands

```
isis {
    export [lsb | <value> | rsb];
    label-switched-path <value> level <value> metric <value>;
    traffic-engineering {
        shortcuts;
    }
    level <level-number> {
        wide-metrics-only;
    }
    lsp-lifetime <seconds>;
    overload;
    overload timeout <seconds>;
    interface <interface-name>;
    interface <interface-name> {
        disable;
        passive;
        csnp-interval (<seconds> | disable);
        lsp-interval <milliseconds>;
        mesh-group (<value> | blocked);
        level <value> [metric <value>];
        hello-interval <seconds>;
        hold-time <seconds>;
        priority <value>;
        te-metric <value>;
        level <value> {
            hello-interval <seconds>;
            hold-time <seconds>;
            metric <value>;
            priority<value> ;
            te-metric <value>;
            passive;
            disable;
        } # level
    } # interface
} # isis
```

Juniper MPLS Commands

```
}
        secondary <value> {
        }
        class-of-service <value>;
        fast-reroute {
            bandwidth <value>;
            exclude noexclude;
            exclude <value>;
            hop-limit <value>;
            include no-include <value>;
            include <value>;
        }
        preference <value>;
        retry-limit <value>;
        retry-timer <value>;
    }
    interface <value>;
    interface <value> {
        disable;
        admin-group [<value>];
        admin-group {
            <value>
        }
    }
} # mpls
```

Juniper RSVP Commands

```
rsvp {
    keep-multiplier <value>;
    refresh-time <value>;
    preemption [normal | aggressive | disabled];
    interface <value> {
        subscription <value>;
    }
}
```

Juniper LDP Commands

```
ldp {
    import <value>;
    export <value>;
    keepalive-interval <value>;
    keepalive-timeout <value>;
    interface <value> {
        hello-interval <value>;
        hold-time <value>;
    }
 }
```

Juniper Policy Option Commands

```
policy-options {
    as-path <name> regular-expression;
    community <name> [members | <community-ids>];
    policy-statement <policy-name> {
        term <term-name> {
            from {
                match-conditions;
                route-filter <destination-prefix> match-type actions;
            }
            to {
                match-conditions;
            }
            then actions;
        }
    }
}
```

COMMENTS for policy-options:

match-conditions can be any of the following statments:

area <area-id>; as-path <name>;
color <preference>; color2 <preference>;
community [< names>]; external [type <metric-type>]; family <name>;
instance <name>; interface <interface-name>;
level <level>; local-preference <value>;
metric <metric>; metric2 <metric>; metric3 <metric>; metric4 <metric>;
neighbor <address>; next-hop <address>;
origin <value>; policy <policy-name>;
preference <preference>; preference2 <preference>;
protocol <protocol>; rib <routing-table>;
tag <string>; tag2 <string>;

match-type can be any of the following statments:

exact
longer
orlonger
prefix-length-range range1 - range2
through <destination-prefix>
upto <prefix-length2>

actions can be any of the following statments:

accept; reject; next term; next policy; as-path-prepend as-path;
as-path-expand last-as count n; class class-name ; color preference ;
color2 preference ; color (add | subtract) number;
color2 (add | subtract) number;
community (+ | add) [names] ; community (- | delete) [names];
community (= | set) [names] ;
damping name; destination-class destination-class-name;
external type metric; install-nexthop lsp lsp-name;
load-balance per-packet;
local-preference value; local-preference (add | subtract) number;
metric metric; metric2 metric; metric3 metric; metric4 metric;
metric (add | subtract) number; metric2 (add | subtract) number;
metric3 (add | subtract) number; metric4 (add | subtract) number;
metric (igp | minimum-igp) site-offset;
next-hop (address | peer-address) ;
origin value ;
preference preference; preference2 preference;
preference (add | subtract) number; preference2 (add | subtract) number;
tag tag; tag2 tag;
tag (add | subtract) number;
tag2 (add | subtract) number;

Juniper Routing Option Commands

```
routing-options {
   autonomous-system <autonomous-system>;
   autonomous-system <autonomous-system> loops <number>;
   confederation <confederation-autonomous-system> members <autonomous-system>;
   router-id address;
   static {
      defaults {
      }
      route <value> next-hop <value>;
      route <addr_with_mask> next-hop <value>;
      route <value> {
         static-options;
      }
      route destination-prefix {
         next-hop;
         static-options;
      }
   }
}
```

COMMENTS for routing-options:

static-options can be any of the following:

```
(active | passive);
* as-path <as-path> <origin (egp | igp | incomplete)> <atomic-aggregate>
<aggregator as-number in-address>;
* community [ community-ids ]
(install | no-install);
(metric | metric2 | metric3 | metric4) value <type type>;
(preference | preference2 | color | color2) preference <type type>;
(readvertise | no-readvertise);
(resolve | no-resolve);
(no-retain | retain);
(tag | tag2) string;
```

Juniper Routing Instances

```
routing-instances {
    <value> {
        description <value>;
        instance-type vrf;
        interface <value>;
        route-distinguisher <value>;
        vrf-import <value>;
        vrf-export <value>;
        routing-options {
            static {
                route addrwmask {
                    next-hop <value>;
                }
            }
        }
        protocols {
            bgp {
                group <value> {
                    peer-as <value>;
                    neighbor <value>;
                }
            }
        }
    }
}
```

Nortel Networks Commands

Last updated for release: 1.2 PL3.

Nortel Network commands include the following:

- Nortel Global Commands
- Nortel Interface Commands
- Nortel RIP Commands
- Juniper OSPF Commands
- Juniper BGP Commands
- Nortel BGP/EGP

Nortel Global Commands

- box
- stack
- system-name <name>
- ip
- static-router address <dest addr> mask <dest mask> next-hop-address <next hop>

Nortel Interface Commands

- <interface type> module <module number> slot <slot number> connector <connector number>
- <interface type> slot <slot number> connector <connector number>
- ip address <addr> mask <mask>
- mtu <size>
- mtu-mismatch-detect <state>
- type [broadcast | nbma | pointtopoint | ietf | pmp | passive]
- serial [ethernet | hssi | token-ring module <number> slot <number> connector <number>]
- slot <number> connector <number>

Nortel RIP Commands

- rip
- external-clock-speed <speed>
- frame-relay
- pvc dlci <dlci>
- rip-diameter <max_hops>
- state [enabled | disabled]
- version [rip1 | rip2 | aggr]
- authentication-type [none | simple-password]
- authentication [<number> | <value>]
- supply [enabled | disabled]
- mode [poisoned | actual | split]
- triggered-updates [enabled | disabled]
- ttl <hops>
- listen [enabled | disabled]
- default-supply [enabled | disabled | generated]
- default-listen [enabled | disabled]
- broadcast-timer <seconds>
- timeout-timer <seconds>
- holddown-timer <seconds>
- frsvc [enabled | disabled]
- accept <policy_name>
- announce <policy_name>
- action [ignore | announce | accept | advertise | block]
- preference <number>
- precedence <number>
- match
- modify
- network [addr_mask_and_flag | addr_mask_and_flag]

- rip-gateway [<ip address> | <ip address>]
- rip-interface
- mask <ip address>
- external-source [any | direct | static | rip | ospf | egp | bgp]
- ospf-type [any | type1 | type2 | external | internal]
- protocol-source [any | direct | static | rip | ospf | egp | bgp]

Nortel OSPF Commands

- ospf
- ospf router-id <router id>
- area area-id <area id>
- ospf area <area>
- metric <metric>
- ospf-router-id ip_address_list
- ospf-tag as_number_list
- outbound-interface ip_address_list
- advertise [<network ID> | <network ID>]
- router-id <ip_address>
- slot-mask [<number> | <value> | <value>]
- as-boundary-router [true | false]
- ase-metric-support <state>
- as-default-tag [default | automatic | proprietary]
- holddown <value>
- lsa-refresh-max <value>
- lsa-refresh-delay <seconds>
- log-mask <mask>
- area <area-id>
- area <ip_address>
- priority <priority>
- transit-delay <delay>

- retransmission-interval <interval>
- hello-interval <interval>
- dead-interval <interval>
- poll-interval <interval>
- neighbor <ip_address>
- summary network
- summary network <ip_address> mask <ip_mask>
- area-type stub
- area-type nssa
- stub-metric <cost>
- import-summaries false
- nssa-default-ase-path [type1 | type2]
- nssa-default-originate <state>
- nssa-default-propagate <state>
- nssa-translate-to-5 <state>
- nssa-range <network ID>
- ase-tag <value>
- ase-tag number_list
- virtual-link <ip_address>
- authentication-key <value> [retransmit-interval <number>]
- retransmit-interval <interval>
- ase-type [any | default | type1 | type2]
- auto-tag [enabled | disabled | proprietary]
- nssa-propagate <param>

Nortel BGP/EGP

- bgp-as [<number> | <number>]
- bgp-next-hop ip_address_list
- bgp-peer ip_address_list
- egp-as as_number_list

- egp-gateway ip_address_list
- egp-peer ip_address_list
- inbound-interface ip_address_list
- local-as <local-as>
- intra-as-routing <state>
- redistribute-protocols [bgp | all]
- igp-interaction [none | ospf | rip]
- igp-interaction [<value> | ospf | rip | <value>]
- inject-time <value>
- redundant-connection <state>
- max-redundant-routes <number>
- multi-hop <state>
- subnet-aggregation <state>
- black-hole-punching [disabled | drop | reject]
- med-comparison <state>
- confederation-id <id number>
- confederation-peers <as_numbers>
- peer <network ID> as <number>
- local-pref-calculation <state>
- damping-template name <value>
- cutoff-threshold <number>
- reuse-threshold <number>
- reachable-decay <number>
- unreachable-decay <number>
- max-hold-down <number>
- memory-limit <number>
- as-weight-class <value>
- bgp4-preference <number>
- route-damping <state>

- route-damping-template <value>
- as-path-pattern [<value> | <value>]
- origin [any | igp | egp | incomplete | none]
- aggregator-as <list of as numbers>
- aggregator-router <list of ip addresses>
- as <list of as numbers>
- community [no-export | no-advertise | no-export-subconfed]
- community [<value> | <value>]
- network <list of ip addresses>
- originating-as <list of as numbers>
- peer <list of addresses>
- as-path-prepend
- local-pref-override <state>
- local-preference <number>
- med-method [none | specified | originating]
- med <number>
- community-method [as-is | remove | append | replace]
- inject <list of ip addresses>
- inbound-as <list of as numbers>
- inbound-peer <list of ip addresses>
- next-hop <list of ip addresses>
- outbound-as <list of as numbers>
- outbound-peer <list of ip addresses>
- as-path [<value> | <number> | <value> | <number>]
- atomic-aggregate [default | force | ignore]
- local-pref-override <state>
- peer local <local_address> remote <remote_address> as <as_number>
- retry <interval>
- min-version [bgp3 | bgp4]

- max_version [bgp3 | bgp4]
- keepalive <seconds>
- advertise-time <seconds>
- min-originate-time <seconds>
- max-update-size <bytes>
- next-hop-self <state>
- route-echo <state>
- detect-as-loop <state>
- tcp-authentication <state>
- tcp-md5-key <key>
- tcp-md5-key-storage [clear-text | encrypted]
- advertise <ip_address_list>

Nortel Networks Passport 8000 Commands

Last updated for release: 1.2 PL3.

- cli prompt <name>
- box type : <node type>
- sys set location <location string>
- ethernet <ifc num> perform-tagging <enable|disable>
- ethernet <ifc num> qos-level <level>
- ethernet <ifc num> name <name>
- ethernet <ifc num> state <enable|disable>
- ethernet <ifc num> speed <value>
- ethernet <ifc num> duplex <half|full>
- ethernet <ifc num> auto-negotiate <enable|disable>
- ethernet <ifc num> lock <true|false>
- ethernet <ifc num> linktrap <enable|disable>
- ethernet <ifc num> ip dhcp-relay <enable|disable>
- ethernet <ifc num> stg <number> stp <enable|disable>
- ethernet <ifc num> stg <number> faststart <enable|disable>
- ethernet <ifc num> stg <number> change-detection <enable|disable>
- ethernet <ifc num> stg <number> pathcost <cost>
- ethernet <ifc num> stg <number> priority <priority>
- ethernet <ifc num> ip ospf metric <metric>
- ethernet <ifc num> ip ospf advertise-when-down <enable|disable>
- ethernet <ifc num> ip ospf area <ipaddr>
- ethernet <ifc num> ip ospf <enable|disable>
- ethernet <ifc num> ip ospf interface_type
- ethernet <ifc num> ip ospf dead-interval <seconds>
- ethernet <ifc num> ip ospf hello-interval <seconds>
- ethernet <ifc num> ip ospf priority <priority>
- ethernet <ifc num> ip rip advertise-when-down <enable|disable>

- ethernet <ifc num> ip rip auto-aggr <enable|disable>
- ethernet <ifc num> ip rip default-listen <enable|disable>
- ethernet <ifc num> ip rip default-supply <enable|disable>
- ethernet <ifc num> ip rip cost <cost>
- ethernet <ifc num> ip rip <enable|disable>
- ethernet <ifc num> ip rip listen <enable|disable>
- ethernet <ifc num> ip rip in-policy <policy name>
- ethernet <ifc num> ip rip out-policy <policy name>
- ethernet <ifc num> ip rip poison <enable|disable>
- ethernet <ifc num> ip rip supply <enable|disable>
- ethernet <ifc num> ip rip trigger <enable|disable>
- mlt <mid> create
- mlt <mid> name <name>
- mlt <mid> perform-tagging <enable|disable>
- mlt <mid> add ports <ports>
- mlt <mid> add vlan <vid>
- vlan <vid> create byport <sid> [name <name>] [color <color>]
- vlan <vid> create byport <sid>
- vlan <vid> ports remove <ports> member portmember
- vlan <vid> ports add <ports> member portmember
- vlan <vid> ip create <ip address/mask> mac_offset <value>
- vlan <vid> add-mlt <mid>
- vlan ip ospf metric <metric>
- vlan <ifc num> ip ospf advertise-when-down <enable|disable>
- vlan <ifc num> ip ospf area <ipaddr>
- vlan <ifc num> ip ospf <enable|disable>
- vlan <ifc num> ip ospf dead-interval <seconds>
- vlan <ifc num> ip ospf hello-interval <seconds>
- vlan <ifc num> ip ospf priority <priority>

- vlan <ifc num> ip ospf poll-interval <seconds>
- vlan <ifc num> ip rip advertise-when-down <enable|disable>
- vlan <ifc num> ip rip auto-aggr <enable|disable>
- vlan <ifc num> ip rip default-listen <enable|disable>
- vlan <ifc num> ip rip default-supply <enable|disable>
- vlan <ifc num> ip rip cost <cost>
- vlan <ifc num> ip rip <enable|disable>
- vlan <ifc num> ip rip listen <enable|disable>
- vlan <ifc num> ip rip in-policy <policy name>
- vlan <ifc num> ip rip out-policy <policy name>
- vlan <ifc num> vlan <ifc num> ip rip poison <enable|disable>
- vlan <ifc num> ip rip supply <enable|disable>
- vlan <ifc num> ip rip trigger <enable|disable>
- stg <value> create <ports>
- stg <value> add ports <ports>
- stg <value> forward-delay <timeval>
- stg <value> hello-interval <timeval>
- stg <value> max-age <timeval>
- stg <value> priority <priority>
- stg <value> group-stp <enable|disable>
- ip static-route create <ip address/mask> next-hop <value> [cost <value>] [preference <value>]
- ip ospf admin-state <enable|disable>
- ip ospf <enable|disable>
- ip ospf router-id <value>
- ip ospf as-boundary-router <enable|disable>
- ip ospf auto-vlink <enable|disable>
- ip ospf default-metric [ethernet <value>] [fast-ethernet <value>] [gig-ethernet <value>]
- ip ospf holddown <seconds>

- ip ospf trap <enable|disable>
- ip ospf area <area> create
- ip ospf area <area> stub <true|false>
- ip ospf area <area> import-summaries <true|false>
- ip ospf area <area> nssa <true|false>
- ip ospf area <area> stub-metric <value>
- ip ospf area <area> range <ip address/mask> create advertise-mode <mode> lsa-type <type>
- ip ospf area <area> range <ip address/mask> advertise-mode <mode>
- ip ospf area <area> range <ip address/mask> advertise-metric <metric>
- ip ospf interface <ip address> area <area>
- ip ospf interface <ip address> admin-status <enable|disable>
- ip ospf interface <ip address> interface_type <broadcast|nbma|passive>
- ip ospf interface <ip address> create <broadcast|nbma|passive>
- ip ospf interface <ip address> dead-interval <seconds>
- ip ospf interface <ip address> hello-interval <seconds>
- ip ospf interface <ip address> metric <metric>
- ip ospf interface <ip address> priority <priority>
- ip ospf interface <ip address> retransmit-interval <seconds>
- ip ospf interface <ip address> transit-delay <seconds>
- ip rip <enable|disable>
- ip rip default-import-metric <metric>
- ip rip holddown <seconds>
- ip rip updatetime <seconds>
- ip rip interface <ipaddr> <enable|disable>
- ip rip interface <ipaddr> auto-aggr <enable|disable>
- ip rip interface <ipaddr> cost <cost>
- ip rip interface <ipaddr> default-listen <enable|disable>
- ip rip interface <ipaddr> default-supply <enable|disable>

- ip rip interface <ipaddr> in-policy <policy name>
- ip rip interface <ipaddr> listen <enable|disable>
- ip rip interface <ipaddr> out-policy <policy name>
- ip rip interface <ipaddr> poison <enable|disable>
- ip rip interface <ipaddr> receive-mode <mode>
- ip rip interface <ipaddr> send-mode <mode>
- ip rip interface <ipaddr> supply <enable|disable>
- ip rip interface <ipaddr> trigger <enable|disable>

Nortel Networks Passport 7480, 15000, 20000 Commands

Last updated for release: 2.0 PL1.

- set mod
- set shelf card
- set lp maincard shelf card
- set lp ima
- set lp e1 chan
- set lp sdh vc4
- set lp sdh path
- set atmif customeridentifier
- set trk atm
- add vr
- set vr
- set atmmpe ac atmconnection
- set la framer
- set lp enet
- add atmif vcc vcd tm
- set atmif vcc vcd tm
- set atmif ca
- add atmif vpc vpd tm
- set atmif vpc vpd tm
- set atmif vpc nrp
- set atmif vcc nrp
- add atmif vpt vpd tm
- add atmif vpt vcc vcd tm
- set atmif vpt vpd tm
- set atmif vpt vcc vcd tm
- set vm if
- set atmif vcc src mdtl

- set atmif vcc src
- set artg pnni mdtl hop
- set artg pnni node
- set artg pnni nodeaddressprefix
- set atmif pnni

Extreme Commands

Last updated for release: 2.0 PL1.

- create vlan <vlan name>
- delete vlan <vlan name>
- config vlan <vlan name> add ports <portlist> tagged/untagged
- config vlan <vlan name> add ports <portlist> stpd <spantree name>
- config vlan <vlan name> add ports <portlist> stpd <spantree name> <port_mode>
- config vlan <old name> name <new name>
- config vlan <vlan name> tag <vlan id>
- tagged
- untagged
- create stpd <spantree name>
- delete stpd <spantree name>
- enable stpd <spantree name>
- enable stpd <spantree name>
- enable stpd <spantree name> ports <portlist>
- disable stpd <spantree name>
- config stpd <spantree name> add vlan <vlan_list>
- config stpd <spantree name> delete vlan <vlan_list>
- config stpd <spantree name> add vlan <vlan name> ports <port list>
- config stpd <spantree name> add vlan <vlan name> ports <port list> <port_mode>
- config stpd <spantree name> delete vlan <vlan name> ports <port list>
- config stpd <spantree name> forwarddelay <seconds>
- config stpd <spantree name> hellotime <seconds>
- config stpd <spantree name> maxage <seconds>
- config stpd <spantree name> ports cost <cost> <portlist>
- config stpd <spantree name> ports mode <port_mode> <portlist>

- config stpd <spantree name> ports priority <priority> <portlist>
- config stpd <spantree name> priority <seconds>
- config vlan <vlan name> ipaddress <ipaddress>
- unconfig vlan <vlan name> ipaddress <ipaddress>
- disable ipfowarding
- disable ipfowarding vlan <vlan name>
- enable ipfowarding
- enable ipfowarding vlan <vlan name>
- config iproute add <ip address> <mask> <gateway> <metric>
- config iproute delete <ip address> <mask> <gateway>
- config iproute add default <gateway>
- config iproute add default <gateway> <metric>
- config iproute delete default <gateway>
- enable rip
- disable rip
- enable rip aggregation
- disable rip aggregation
- enable rip splithorizon
- disable rip splithorizon
- enable rip poisonreverse
- disable rip poisonreverse
- enable rip triggerupdate
- disable rip triggerupdate
- config rip add vlan <vlan name>
- config rip delete vlan <vlan name>
- config rip add vlan all
- config rip delete vlan all
- config rip garbagetime <seconds>
- config rip routetimeout <seconds>

- config rip rxmode <none|v1only|v2only|any>
- config rip rxmode <none|v1only|v2only|any> vlan <vlan name>
- config rip txmode <none|v1only|v1comp|v2only>
- config rip txmode <none|v1only|v1comp|v2only> vlan <vlan name>
- config rip updatetime <seconds>
- config rip vlan <vlan name> cost <cost>
- config rip vlan all cost <cost>
- enable ospf
- disable ospf
- create ospf area <area id>
- delete ospf area <area id>
- config ospf area <area id> cost <cost>
- config ospf area <area id> priority <priority>
- config ospf area <area id> timer <seconds>
- config ospf vlan <vlan name> area <area id>
- config ospf vlan <vlan name> neighbor add <neighbor ipaddr>
- config ospf vlan <vlan name> cost <cost>
- config ospf vlan <vlan name> priority <priority>
- config ospf vlan <vlan name> timer <timer_params>
- config ospf vlan all area <area id>
- config ospf vlan all cost <cost>
- config ospf vlan all priority <priority>
- config ospf vlan all timer <timer_params>
- config ospf add vlan <vlan name> area <area_id>
- config ospf add vlan <vlan name> area <area_id> passive
- config ospf add vlan all area <area_id>
- config ospf add vlan all area <area_id> passive
- config ospf add vlan <vlan name> area <area_id> link_type <auto|broadcast|point-to-point>

- config ospf add vlan <vlan name> area <area_id> link_type <auto|broadcast|point-to-point> passive
- config ospf add vlan all area <area_id> link_type <auto|broadcast|point-to-point>
- config ospf add vlan all area <area_id> link_type <auto|broadcast|point-to-point> passive
- config ospf add virtual-link <routeid> <area_id>
- config ospf add virtual-link <routeid> <area_id>
- config snmp sysContact <sys contact>
- config snmp sysLocation <sys location>
- config snmp sysName <sys name>
- Software Version <version info>

Foundry Commands

Last updated for release: 2.0 PL1.

- interface <name/number> [multipoint|point-to-point|<other>]
- no ip address
- ip address <address> <mask> [ospf-ignore | ospf-passive | secondary]
- multilink-group <number>
- link-aggregate configure [system-priority <number>] | [port-priority <num>\ | [key <num>]
- ip rip v1-only
- ip rip v2-only
- ip rip v1-compatible-v2
- ip rip poison-reverse
- ip rip learn-default
- ip rip filter in <i j k ...>
- ip rip filter out <i j k...>
- bandwidth <kbps>
- speed-duplex <10-full | 10-half | 100-full | 100-half | auto>
- mtu <bytes>
- ip mtu <value>
- ip route-cache [cbus|flow|distributed]
- no ip route-cache [cbus|flow|distributed]
- ip router isis
- no ip router isis
- ip access-group {access-list-number | name} {in | out}
- isis metric <num>
- isis priority <num>
- isis password <password, can have blank space>
- isis circuit-type {level-1|level-2-only|level-1-2}
- ip ospf cost <cost>

- ip ospf network [point-to-multipoint]
- ip ospf network
- ip ospf dead-interval {seconds}
- ip ospf hello-interval {seconds}
- ip ospf priority {priority}
- ip ospf retransmit-interval {seconds}
- ip ospf transmit-delay {seconds}
- atm pvc <vpi> <vci> cbr <pcr>
- atm pvc <vpi> <vci> vbr <pcr> <sbr> <mbs>
- atm pvc <vpi> <vci> ubr
- encapsulation frame-relay
- encapsulation frame-relay <ietf>
- frame-relay interface-dlci <dlci>
- frame-relay lmi-type {ansi|ccitt|lmi}
- frame-relay interface-dlci <dlci> lmi-type {ansi|ccitt|lmi}
- port-name <name string>
- ip tunnel <ip address> {pim|dvmrp|any}
- tunnel source <ip address|interface name>
- tunnel mpls traffic-eng affinity <properties> mask <mask>
- tunnel mpls traffic-eng affinity <properties>
- tunnel mpls traffic-eng autoroute announce
- no tunnel mpls traffic-eng autoroute announce
- tunnel mpls traffic-eng autoroute metric [absolute|relative] <metric>
- tunnel mpls traffic-eng autoroute metric <metric>
- tunnel mpls traffic-eng path-option <number> <dynamic|explicit name <path name|path number>>
- tunnel mpls traffic-eng path-option <number> <dynamic|explicit name <path name|path number>> lockdown
- tunnel mpls traffic-eng priority <setup>
- tunnel mpls traffic-eng priority <setup> <hold>

- tunnel mpls traffic-eng fast-reroute
- mpls traffic-eng tunnels
- tunnel mode mpls traffic-eng
- ip rsvp bandwidth <interface kbps> <single flow kbps>
- ip rsvp bandwidth <interface kbps>
- mpls traffic-eng administrative-weight <weight>
- mpls traffic-eng attribute-flags <0x0 - 0xFFFFFFFF>
- mpls traffic-eng backup-path lsp-name
- mpls label protocol ldp
- mpls ip
- tag-switching ip
- mpls traffic-eng bandwidth <bandwidth>
- ip unnumbered <interface name>
- ip explicit-path {name WORD | identifier number} [{enable | disable}]
- next-address A.B.C.D
- shutdown
- standby [<group number>] ip [<ip address> [secondary]]
- standby [<group number>] mac-address <mac address>
- standby mac-refresh <seconds>
- standby name <group name>
- standby [<group number>] preempt priority <priority>
- standby [<group number>] preempt delay [<delay>] [minimum <delay>] [sync <delay>]
- standby [<group number>] preempt
- standby [<group number>] priority <priority>
- standby [<group number>] timers [msec] <hello time> [msec] <hold time> [advertise <advertisement interval>]
- standby [<group number>] track <interface name> [<interface priority>]
- standby [<group number>] use-bia [scope interface]
- standby [group-number] authentication <string>

- standby delay [minimum <delay>] [reload <delay>]
- no standby redirects unknown
- standby redirects timers <advertisement-interval> <holddown-interval>
- ip policy route-map <map-tag>
- ip authentication mode eigrp <as-number> md5
- ip authentication key-chain eigrp <as-number> <key-chain>
- encapsulation dot1Q <vlan-id> [native]
- switchport\n
- switchport access vlan <vlan-id>
- switchport nonegotiate
- switchport broadcast <level>
- switchport protocol {ip | ipx | appletalk | other} {on | off | auto}
- switchport mode access
- switchport mode trunk
- switchport mode dynamic auto
- switchport mode dynamic desirable
- switchport trunk encapsulation {isl | dot1q | negotiate}
- switchport trunk native vlan <vlan-id>}
- switchport trunk allowed vlan <vlan-list>}
- switchport trunk pruning vlan <vlan-list>}
- spanning-tree
- no spanning-tree
- pvst-mode
- for "ip address <ip> <mask> [secondary |ospf-ignore | ospf-passive]"
- for "link-aggregate configure [system-priority <number>] | [port-priority <num>] | [key <num>]"
- ip policy prefer-direct-route
- no ip policy prefer-direct-route
- ip policy route-map <map-tag>

- ip default-network <address>
- ip default-gateway <address>
- ip router-id <address>|<any string>
- ip route <dest addr> <mask> <next hop> [metric] [name <name>] [tag <number>] [permanent]
- ip route <dest addr> <mask> <next hop> [metric] [name <name>] [tag <number>] [permanent]
- access-list <list number> <various param-list>
- ip as-path access-list <list number> <permit|deny> <reg expression>
- ip prefix-list <list name> [seq <number>] <permit|deny <network/length>> [ge <number>] [le <number>]
- ip prefix-list <list name> <permit|deny <network/length>> [ge <number>] [le <number>]
- ip prefix-list <list name> [seq <number>] <permit|deny <network/length>>
- ip prefix-list <list name> <permit|deny <network/length>>
- ip community-list <list number> <permit|deny> <community> [<community>...]
- ip community-list <standard|expanded> <list number> <permit|deny> <community> [<community>...]
- ip access-list <standard|extended> <name>
- icmp src-addr dest-addr [icmp-type [icmp-code] | icmp-message] [precedence <p>] [tos <tos>] [log | log-input] [time-range <name>] [fragments]
- igmp src-addr dest-addr [igmp-type] [precedence <p>] [tos <tos>] [log | log-input] [time-range <name>] [fragments]
- tcp src-addr [operator [port]] dest-addr [operator [port]] [established] [precedence <p>] [tos <tos>] [log | log-input] [time-range <name>] [fragments]
- udp src-addr [operator [port]] dest-addr [operator [port]] [precedence <p>] [tos <tos>] [log | log-input] [time-range <name>] [fragments]
- route-map <name> [permit|deny] [<sequence number>]
- match as-path <path number>
- match community-list <list number>
- match community-list <list number> exact|exact-match

- match community <list number>
- match community <list number> exact-match
- match community <list number>
- match community <list number> exact-match
- match ip address <access-list number>
- match route-type <route type>
- match interface {list of interface names}
- match ip route-source {list of access-list name|number}
- match tag <tag-id> [<tag-id>, ...]
- match length <min> <max>
- match metric {metric-value}
- match ip next-hop <access-list> [<access-list> ...]
- match ip next-hop prefix-list <prefix1> [<prefix2> ...]
- set tag {tag}
- set next-hop {next-hop}
- set ip next-hop <address> [<...address>] [peer-address]
- set ip tos <tos 0-15>
- set ip tos max-reliability
- set ip tos max-throughput
- set ip tos min-delay
- set ip tos min-monetary-cost
- set ip tos normal
- set as-path prepend
- set as-path prepend <text>
- set as-path tag
- set community <comm-list>
- set extcommunity
- set weight <weight>
- set origin <origin>

- set origin <origin> <as-num>
- set local-preference <number>
- set metric <metric>
- set metric <bandwidth> <delay> <reliability> <loading> <mtu>
- set metric-type <metric type>
- set comm-list <community list> delete
- set ip default next-hop <address> [<...address>] [peer-address]
- set default interface <interface> [<...interface>]
- set automatic-tag
- set interface <interface-type><interface-number> [<interface-type><interface-number> ...]
- set level {level-1|level-2|level-1-2|backbone|stub-area}
- set traffic-index <bucket number>
- set clns next-hop <prefix> [prefix ...]
- ip explicit-path <name <name> | identifier <number>>
- ip explicit-path <name <name> | identifier <number>> <enable|disable>
- next-address <ip address>
- index <number> next-address <ip address>
- next-address <loose|strict> <ip address>
- index <number> next-address <loose|strict> <ip address>
- ip vrf vrf-name
- mpls ldp advertise-labels [for prefix-access-list]
- mpls ldp discovery {hello {holdtime | interval} seconds | targeted-hello {holdtime | interval} seconds | accept [from acl]}
- mpls ldp holdtime
- mpls label protocol ldp
- rd route-distinguisher
- route-target {import | export | both} route-target-ext-community
- import map route-map
- export map route-map

- router rip
- neighbor {ip-address}
- update-time <0-1000>
- timers basic {update} {invalid} {holddown} {flush}
- redistribution
- permit|deny redistribute <filter-num> <all|bgp|ospf|static> address <ip-addr> <ip-mask> [match-metric <value>|set-metric-value]
- router ospf <process id>
- default-metric <value>
- distance ospf [external <dist>] [inter-area <dist>] [intra-area <dist>]
- distribute-list <access-list> <in|out>
- max-routes <value>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- auto-cost [reference-bandwidth <value>]
- area <area id>
- area <area id>
- summary-address {address-mask} {prefix-mask} [not-advertise] [tag {tag}]
- timers spf {spf-delay} {spf-holdtime}
- timers lsa-group-pacing <seconds>
- default-information originate [always] [metric metric-value] [metric-type type-value] [route-map map-name]
- router bgp
- local-as <as-number>
- address-family vpnv4 [unicast | multicast]
- no auto-summary
- auto-summary

- no client-to-client-reflection
- client-to-client-reflection
- cluster-id {cluster-id | ip address}
- confederation identifier {autonomous-system}
- confederation peers as-number [... as-number]
- synchronization
- no synchronization
- timers bgp keepalive <decimal> holdtime <decimal>
- network <address> [mask <mask>] [weight <weight>] [route-map <map-name>]
- network <address> mask <mask>
- network <address>
- always-compare-med
- bgp default local-preference <value>
- default-metric <value>
- distance bgp <external> <internal> <local>
- distribute-list <access-list> <in|out>
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- neighbor <ip addr|peer group name> <params.....>
- neighbor <peer group name>
- maximum-paths <value>
- max-routes <value>
- aggregate-address <address> <mask> [as-set] [summary-only] [suppress-map <map-name>] [advertise-map <map-name>] [attribute-map <map-name>]
- no fast-external-failover

- bgp fast-external-failover
- router-id <ip address>
- router isis
- is-type {level-1, level-2-only, level-1-2}
- set-overload-bit
- lsp-mtu {bytes}
- max-lsp-lifetime {lifetime}
- summary-address address mask {level-1 | level-1-2 | level-2}
- no hello-padding [multi-point|point-to-point]
- hello-padding {multi-point|point-to-point}
- net <net>
- distance <distance> [<address> <mask> [<access-list>]]
- maximum-paths <value>
- metric-style wide
- metric-style wide [level-1 | level-2-only]
- redistribute <protocol>
- redistribute <protocol> [<process id>]
- redistribute <protocol> [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute <protocol> [<process id>] [metric <value>] [route-map <name>] [match <external|internal>] ...
- redistribute isis ip <level> into <level> [distribute-list <number> | metric-style wide>]
- mpls traffic-eng isis-level <level>
- mpls traffic-eng <level>
- mpls traffic-eng <level>
- spf-interval <min-interval>
- lsp-refresh-interval <seconds>
- lsp-gen-interval <min-interval>
- max-area-addresses <num-addresses>

- area-password <password>
- domain-password <password>
- hostname <name>
- mpls traffic-eng tunnels
- ver <version>
- snmp-server community <string> [view <view-name>] [ro|rw] [<access-list number>]
- snmp-server view <view-name> <oid-tree> {included|excluded}
- snmp-server host <host-addr> [traps|informs] [version {1 | 2c | 3 [auth | noauth | priv]}] <community-string> [udp-port <port>] [<notification-type>]
- snmp-server enable traps [<notification-type>]
- snmp-server queue-length <length>
- snmp-server packetsize <byte-count>
- snmp-server manager session-timeout <seconds>
- snmp-server trap-source <interface>
- no snmp-server system-shutdown
- snmp-server system-shutdown
- no snmp-server manager
- snmp-server manager
- snmp-server chassis-id <text>
- snmp-server location <text>
- snmp-server contact <text>
- logging <host-name>
- logging buffered [<buffer-size> | <level>]
- no logging console
- logging console <level>
- logging facility <facility-type>
- logging monitor <severity-level>
- no logging on
- logging on

- logging source-interface <interface-type interface-number>
- logging trap <level>
- spanning-tree [forward delay <num>] [hello-time <num>] [priority <num>] (global cmd)
- vlan <num> name <name> by port
- vlan <num> by port
- super-span
- tagged ethernet|pos|atm <portnumber> [to <num> [ethernet|pos|atm <num> [....]]]
- untagged ethernet|pos|atm <portnumber> [to <num> [ethernet|pos|atm <num> [....]]]
- priority
- router-interface ve <num>
- spanning-tree [forward delay <num>] [hello-time <num>] [priority <num>] [max-age <num>] (vlan cmd)
- spanning-tree single [forward delay <num>] [hello-time <num>] [priority <num>] [max-age <num>] (vlan cmd)
- spanning-tree single 802-1.w [forward delay <num>] [hello-time <num>] [priority <num>] [max-age <num>] (vlan cmd)
- spanning-tree 802-1.w [forward delay <num>] [hello-time <num>] [priority <num>] [max-age <num>] (vlan cmd)
- spanning-tree single rstp [forward delay <num>] [hello-time <num>] [priority <num>] [max-age <num>] (vlan cmd)

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