



# CHAPTER 3

## Monitor

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The Cisco PVM monitor function provides near real-time and real-time access to resource data, as well as summary views of aggregated traffic data with drill-down capability, formatted into tables and graphs for troubleshooting and analyzing current network performance. Cisco PVM displays individual and aggregated NAM metrics, including displays for single NAM data sources, for multiple NAM data aggregated across the network, and for all NAMs. Additionally, the Monitor tab displays a snapshot of current network activity immediately upon access.

Using the Monitor function, you can display near real-time and dynamic traffic data for applications, hosts, conversations, DCSP groups, switches and routers, and VLAN data. You can view network resources based on these data sources and drill down to access details about a particular resource. Reports can be viewed, printed, and saved as PDF, Microsoft Excel, and Rich Text Format files.



### Note

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Reports generated under the Monitor tab are not archived.

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This chapter contains the following sections:

- [Monitor Navigation, page 3-1](#)
- [Generating Reports Using Monitor, page 3-5](#)
- [Drill-Down Capabilities, page 3-11](#)
- [Real-Time Charts, page 3-14](#)
- [Trend Reports, page 3-18](#)

For samples of individual reports and their field descriptions, see [Appendix B, “Report Samples for Monitor and Reports.”](#)

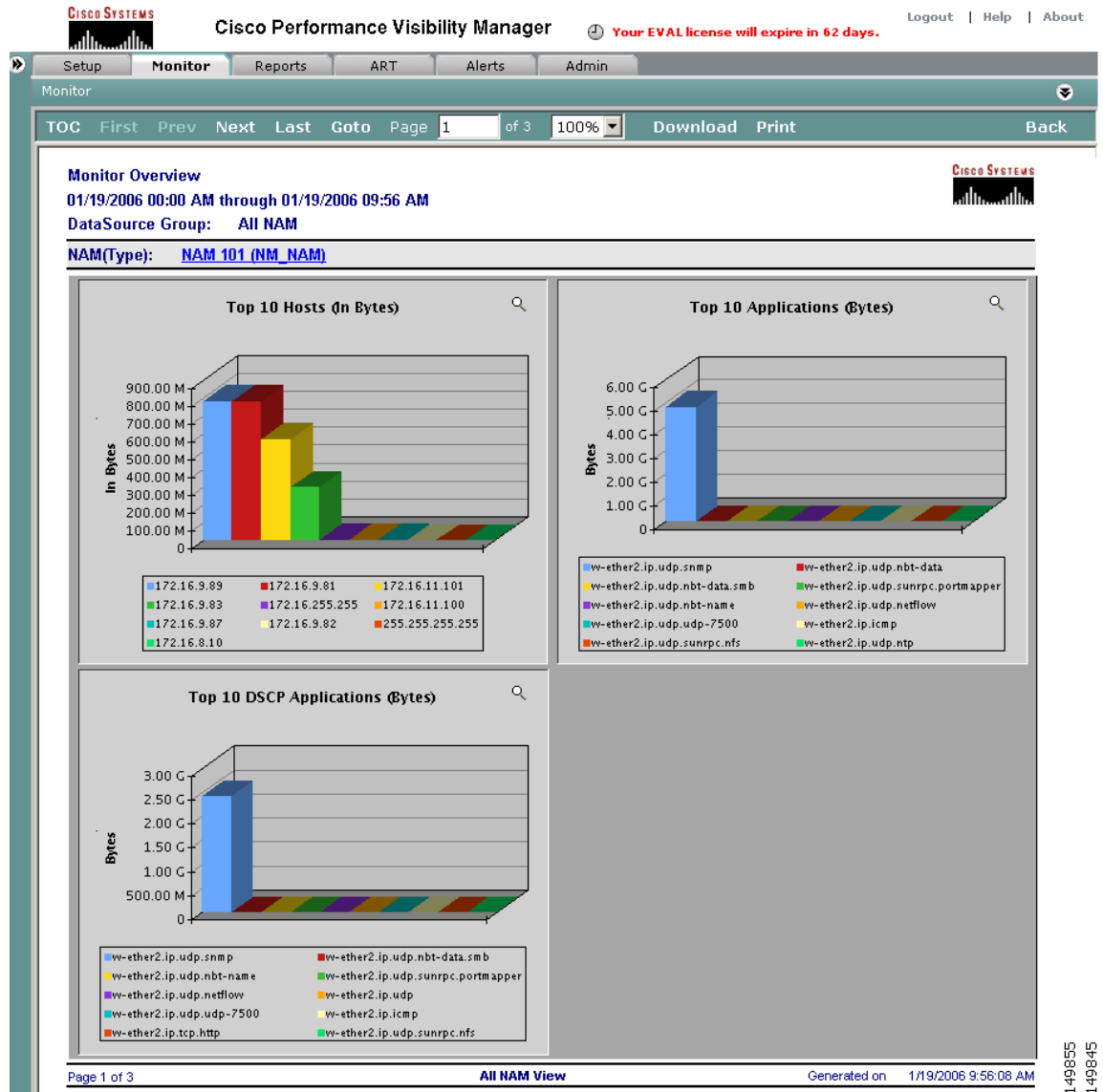
## Monitor Navigation

Navigating Cisco PVM monitor features employs an easy-to-use interface requiring minimal clicks to obtain the desired results. The Monitor tab opens immediately when you log in to the system, first displaying the progress indicator while loading data, then displaying the Monitor Overview report. The Monitor GUI provides three windows:

- Navigation Menu
- Parameters Pane
- Report Display Pane

Both the Navigation Menu and the Parameters Pane are hidden, however, when the Monitor Overview display first opens. Figure 3-1 displays the Monitor GUI as it appears when it first opens

**Figure 3-1** Monitor GUI—Parameters and Navigation Hidden (default)



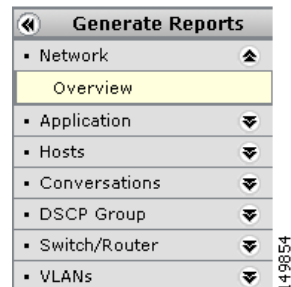
**Note**

To see a single TopN chart as a larger image in the Overview pane, click directly on the magnifying glass icon in the upper right corner of the desired chart. The individual TopN chart appears in the reports pane as an enlarged graph.

## Monitor Navigation Menu

The Cisco PVM Generate Reports navigation menu categorizes monitoring and reports into suites. When the Monitor GUI opens, the system automatically runs the Overview report but hides the Generate Reports menu. Clicking the expand icon at the far left side of the Monitor GUI opens the Generate Reports menu (Figure 3-2), defaulted to Overview, with the report suite names displayed next to individual suite expansion icons. Clicking either the suite name (such as “Hosts”) or the expansion icon expands the list of reports available for that suite and hides the others.

**Figure 3-2** Generate Reports Menu



## Report Suites

The report suites open when you click on either the suite name or the expansion icon in the navigation menu. Table 3-1 describes the available report suites.

**Table 3-1** Report Suites

Suite	Available Reports	Description
Overview	Overview	Displays, in graphic format, the TopN active hosts, DSCP applications, and active applications monitored for the selected Data Source Group. <b>Note</b> The value of N used in all Cisco PVM reports is configured under <b>Setup &gt; Preferences</b> .
Application	Applications	Provides the ability to see which applications are consuming network bandwidth, and reports on the number of packets and bytes for each application protocol.
Hosts	<ul style="list-style-type: none"> <li>Hosts IP</li> <li>Hosts MAC</li> </ul>	Provides an analysis of the traffic for each specific host. These reports display data on the host IP address, host name, in/out packets, in/out bytes, and non-unicast packets collected.
Conversations	Conversation	Displays data on the conversation traffic between various sources and destinations. Information displayed includes source IP address and name, destination IP address and name, protocol, packets, and bytes.
DSCP Group	<ul style="list-style-type: none"> <li>DSCP</li> <li>DSCP Application</li> <li>DSCP Host</li> </ul>	Displays data on specific encoded information related to how packets traverse the network. These reports display data on the Aggregation Profile and Group Names, packets, bytes, protocols, and host IP addresses and names.

Table 3-1 Report Suites (continued)

Suite	Available Reports	Description
Switch/Router	<ul style="list-style-type: none"> <li>Interface</li> <li>Ethernet Traffic</li> <li>Ethernet Error</li> </ul>	Displays the: <ul style="list-style-type: none"> <li>Port name, in/out bytes, in/out packets, in/out Non-Unicast packets, in/out discards, in/out errors, and percentage in/out utilization.</li> <li>Bytes, packets, broadcast packets, and multicast packets.</li> <li>Dropped events, CRC align errors, under- and oversize packets, fragments, jabbers, and collisions.</li> </ul>
VLANs	<ul style="list-style-type: none"> <li>VLAN ID</li> <li>VLAN Priority</li> </ul>	Displays data on the VLAN ID, errors, packets, bytes, non-unicast packets, and non-unicast bytes collected.

**Note**

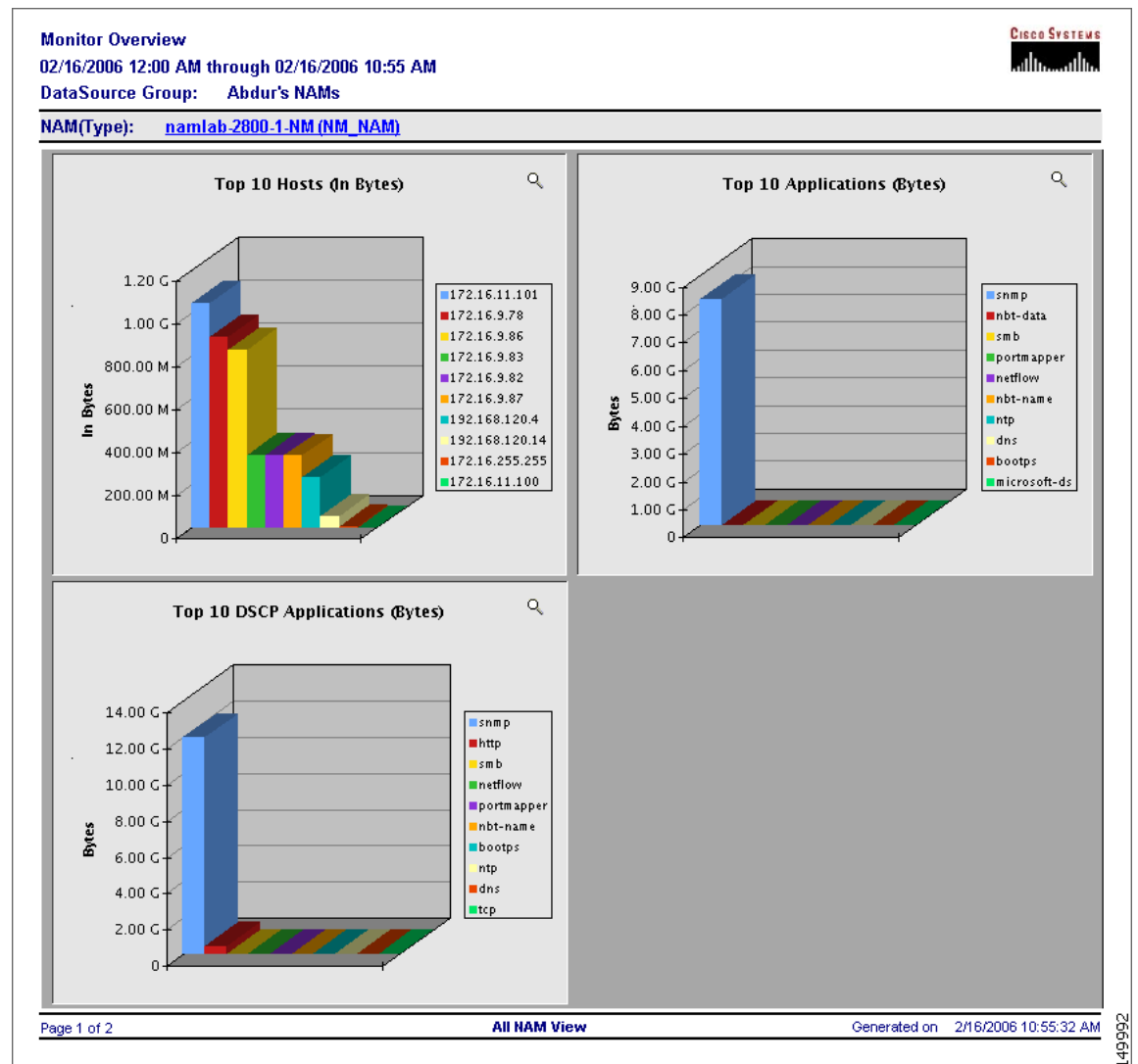
For samples and descriptions of individual reports, see [Appendix B, “Report Samples for Monitor and Reports.”](#)

## Overview

When the Monitor GUI opens, the display defaults to Overview, which automatically displays in graphic format the TopN hosts, DSCP applications, and active applications monitored for a given Data Source Group (DSG). The data view defaults to All NAM; you can choose another data view from the parameters pane and click **Run** to refresh the Overview display with the new view.

[Figure 3-3](#) displays a sample Overview report.

Figure 3-3 Monitor—Overview Report

**Note**

The value of N in TopN reports is configured, under **Setup > Preferences**, to values from 1 – 15. See [Editing Preferences, page 2-50](#) for details. Additionally, unlike other TopN reports, the Monitor Overview display allows you to drill down to detailed host, application, or DSCP reports by clicking on a bar in one of the graphs.

## Generating Reports Using Monitor

The report generation process in Cisco PVM requires minimal intervention. This section contains the following topics:

- [Report Generation Process, page 3-6](#)
- [Report Types, page 3-6](#)

- [Monitor Parameters Pane, page 3-7](#)
- [Running a Report, page 3-8](#)

## Report Generation Process

The Cisco PVM Monitor tab opens automatically after you log in to the system. To generate reports under the Monitor tab:

1. Log in to Cisco PVM.
2. Allow the system to display the Progress Indicator and then the Monitor Overview report.
3. Open a report suite and select a report.
4. Open the parameters pane.
5. Select the data source group, data view, desired data source (if applicable), and report type.
6. Select the time or date range (if desired).
7. Click **Run**.

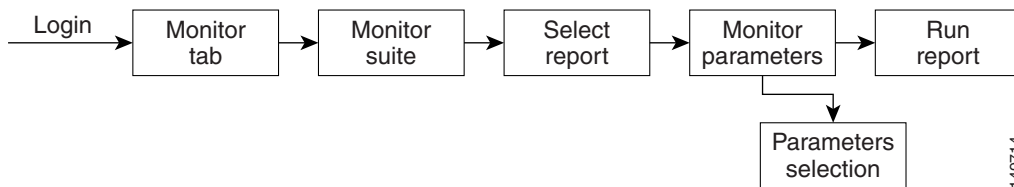


**Note**

If you have not loaded any NAMs into Cisco PVM, you have removed them for some reason, or there are no Data Source Groups available in the system, the Monitor Overview pane will display an error indicating that no data is available to display the report. See [Chapter 2, “Setup”](#) for details on importing NAMs and creating Data Source Groups.

[Figure 3-4](#) displays a graphic representation of the report generation process under the Monitor tab.

**Figure 3-4 Monitoring Report Generation Flow**



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## Report Types

The Report Type selection on the parameters window allows you to choose the data collection method to display:

- **Current Rates**—Displays the statistics collected over the selected time period.
- **Cumulative Rates**—Displays the statistics collected for the selected report element since the collection was created or within the selected time period.
- **TopN**—Displays the data collected for the TopN selected report elements, such as Hosts, VLANs, or Hosts, over the selected time period. See [Editing Preferences, page 2-50](#) for details on configuring the system-wide value of N for all TopN reports.

**Note**

For a complete explanation of available data views and report types, see [Understanding Data Views, page 1-13](#).

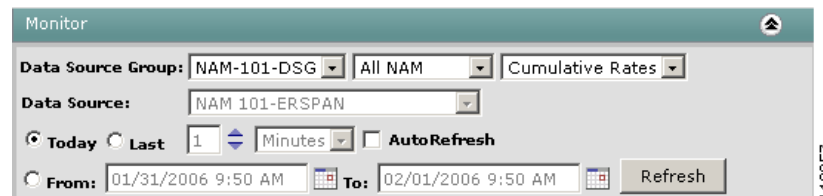
## Monitor Parameters Pane

Reports in Cisco PVM are generated with minimal input parameters: each report in the Cisco PVM Monitor GUI uses the parameters frame at the top of the window for parameter input. [Figure 3-5](#) shows the Monitor parameters pane.

**Note**

Each time you select a new report to run, the parameters pane retains the parameters from the previously run report. The available Data Views and Report Types depend on the specific report selected. See [Understanding Data Views, page 1-13](#) for more information.

**Figure 3-5** Monitor Parameters Pane



[Table 3-2](#) describes the fields in the Monitor parameters pane.

**Table 3-2** Monitor Parameters Pane Field Descriptions

Field	Type	Description
Data Source Group	Drop-down list	Allows you to select from a list of user-defined Data Source Groups. <b>Note</b> When you click the Monitor tab, the list defaults to the first group in the list. The Overview display that opens automatically is therefore reporting on the default Data Source Group.
Data View	Drop-down list next to Data Source Group	Allows you to select the data view: <ul style="list-style-type: none"> <li>Data Source</li> <li>All NAM [default]</li> <li>Aggregated</li> </ul> <b>Note</b> If you select Data Source as the data view, the adjacent Data Source field is enabled.
Report Type	Drop-down list next to Data View	Allows you to select the type of report to view: <ul style="list-style-type: none"> <li>Cumulative Rates</li> <li>Current Rates</li> <li>TopN [default]</li> </ul>

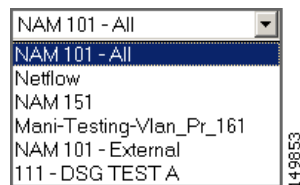
**Table 3-2** Monitor Parameters Pane Field Descriptions (continued)

Data Source	Drop-down list next to Data View	Allows you to select the specific data source for the report if the Data Source view has been selected.  <b>Note</b> The list defaults to the first data source available in the list for the NAM or switch selected in the Data Source Group list.
Today	Radio button	Runs the report for all data collected since midnight. [default]
Last	Radio button	Runs the report for the last <i>n</i> hours or minutes.  <b>Note</b> The historical limit for reporting is the last seven days, but to run reports going back greater than 24 hours, it is easier to use the From/To fields.
Auto Refresh	Check box	Refreshes the displayed report at the interval selected in the Last option.
From / To	Radio button with pop-up calendar icons	Allows selection of a specific set of dates using the calendar icons to open the pop-up calendar for date selection.  <b>Note</b> Reports can be run for up to the last seven days.
Refresh	Button	Refreshes the displayed report based on the selected parameters.
Expand/Collapse	Icon	Expands or collapses the Monitor parameters pane.

## Running a Report

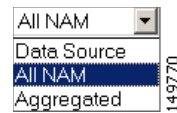
The following procedure uses the Applications report as an example. For samples and descriptions of individual reports, see the [Appendix B, “Report Samples for Monitor and Reports.”](#) appendix. For a complete explanation of available data views and report types, see [Understanding Data Views, page 1-13](#) in Cisco PVM Overview.

- 
- Step 1** Log in to Cisco PVM.  
The Overview report runs automatically and appears in the Monitor display pane.
- Step 2** Select a report to run by
- clicking a suite name in the navigation menu and
  - selecting the report name from the suite list.
- The selected report automatically runs based on the parameters used in the previously run report.
- Step 3** Expand the parameters pane by clicking the expansion icon at the right of the Monitor window header. The report parameters pane appears.
- Step 4** Select the Data Source Group you want to monitor from the drop-down list (see [Figure 3-6](#)).

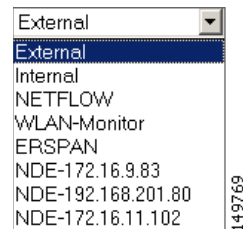
**Figure 3-6** Select Data Source Group

- Step 5** Select the data view you want to see from the drop-down list (see [Figure 3-7](#)).



**Figure 3-7 Data View Selection**

- Step 6** (Optional) If you have selected Data Source from the Data View list, select the specific data source you whose data you want to view in the report from the Data Source drop-down list (see [Figure 3-8](#)).

**Figure 3-8 Data Source Selection**

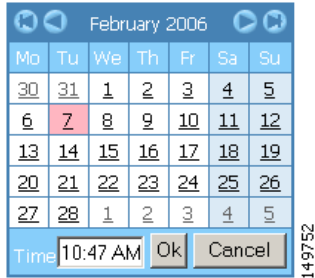
- Step 7** Select the desired Report Type from the drop-down list (see [Figure 3-9](#)).

**Figure 3-9 Report Type Selection**

**Note** The Report Types available in the drop-down list depend on the report you have selected to run.

- Step 8** Select the time point or range you want to view:
- To run the report for data collected since midnight, click the **Today** radio button.
  - To run the report for the last *n* minutes or hours:
    - Click the **Last** radio button.
    - Enter the number for N in the number box (or use the up and down arrows to change the value in the box).
    - Select **Minutes** or **Hours** from the drop-down list.
    - To have the report display refresh every collection cycle, check the **Auto Refresh** box.
  - To run the report for a specific date range, select the dates from the From and To pop-up calendars (see [Figure 3-10](#)).

Figure 3-10 Calendar Selection



**Step 9** Click **Refresh**. The system closes the parameters pane and displays the selected report.

Figure 3-11 shows a sample report as it appears in the Monitor window.

Figure 3-11 Sample Report—Applications

Monitor Applications - Cumulative Rates  
02/22/2006 12:00 AM through 02/22/2006 03:13 PM  
DataSource Group: All NAM  
NAM (Type) : NAM 151 (NM\_NAM)

Protocol	Packets	Bytes
I R bootps	111	38.56 K
I R icmp	40	22.81 K
I R ms-sql-mon	3	192
I R nbt-data	11.20 K	2.89 M
I R nbt-name	9.48 K	916.64 K
I R portmapper	8.92 K	1.30 M
I R smb	11.20 K	2.89 M
I R snmp	4.06 M	2.04 G
I R snmptrap	153	19.58 K
I R udp-1057	12	768
I R udp-5353	1.27 K	110.23 K
I R xdmcp	17	1.09 K

Page 1 of 10 All NAM View Generated on 2/22/2006 3:13:22 PM

# Drill-Down Capabilities

Cisco PVM reports display hyperlinks for linking one report to another. For example, from the Applications Report that displays a list of protocols in table rows, you can click on a Protocol hyperlink to access the Application Details report for that protocol. This section describes drill-down rules and design.

This section contains the following topics:

- [General Rules, page 3-11](#)
- [Drill-Down Link Formats, page 3-12](#)

## General Rules

Cisco PVM reports adhere to the following rules for hyperlink access among reports:

- Each time you see a Host IP address, you can drill down to the host details.
- Each application allows you to drill down to the application details.
- Each time you see a NAM name, you can click on the name to open a new window for the individual NAM GUI and automatically sign him in.
- Real-time charting drill-down: each time you see an “R” hyperlink, you can click on the “R” to open a new window to monitor this report row details graphed in real-time. Drill-down capability is available on both Data Source view and All NAM view, for all tabular reports.
- Trend Reports drill-down: each time you see a “T” hyperlink, you can click on the “T” to drill down to this report row details graphed against the selected time period. This drill-down capability is available for Data Source, All NAM, and Aggregated views for all tabular reports.

[Table 3-3](#) shows the Cisco PVM reports and the reports you can access through the available drill-down hyperlinks.

**Table 3-3 Reports Drill-Down Capability**

Report Name	Drill-Down Reports Available
Overview	<ul style="list-style-type: none"> <li>• Host Details</li> <li>• Application Details</li> <li>• DSCP Applications</li> </ul>
Applications	Application Details
Hosts (IP)	Host Details
Hosts (MAC)	N/A
Conversations	<ul style="list-style-type: none"> <li>• Source Host Details</li> <li>• Destination Host Details</li> </ul>
DSCP	N/A
DSCP Application	Application Details
DSCP Host	Host Details
Switch/Router	N/A

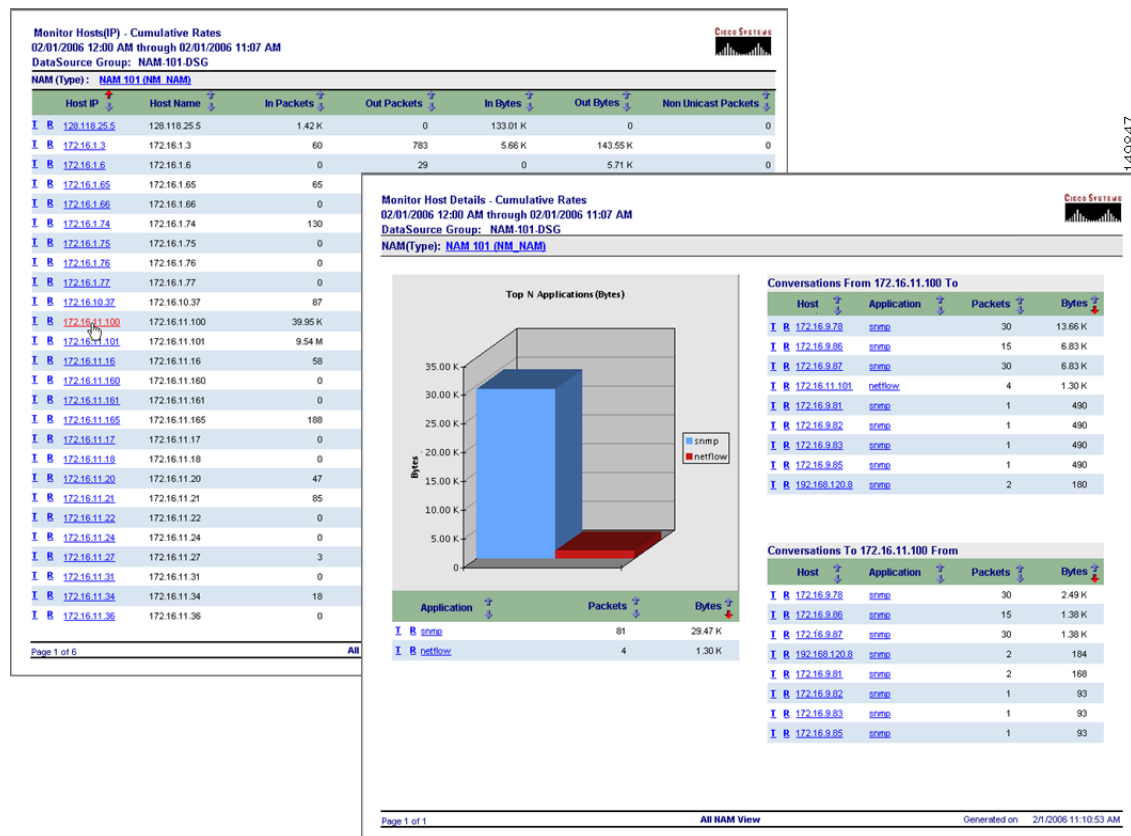
Table 3-3 Reports Drill-Down Capability (continued)

Report Name	Drill-Down Reports Available
VLAN ID	Applications
VLAN Priority	N/A

## Drill-Down Link Formats

Figure 3-12 depicts the drill-down from a Hosts report to the Host Details report.

Figure 3-12 Sample Drill-Down Format - Hosts to Host Details




The host IP address for which the user wants to see details appears as a red hyperlink in the report shown on the left, and its respective Host Details report, shown on the right, opens when that hyperlink is clicked. In the Cisco PVM GUI, the second report replaces the initial report in the report display pane. You can click **Back** in the report header to see the initial report.

## Using Report Drill-Down Links

Drill-down links are generally available in tabular reports only. Cisco PVM tabular reports include those run for cumulative and current rates; TopN reports do not normally allow drill-down to other reports. The exception is the Monitor Overview TopN display, which allows drill-down to specific reports when you click on a bar in one of the graphs.

To use a report drill-down links, complete the following steps:

- 
- Step 1** Open a tabular report by running a new report or opening an archived report.
- Step 2** In the table, find the linked resource about which you want more information, such as the Host ID or Protocol.
-  **Tip** You can use the sorting arrows in the column header to re-sort the resource or performance information, or use the pagination links in the report header to view different pages of the report.
- 
- Step 3** Click the desired resource name or application protocol hyperlink.
- The drill-down report opens and replaces the display of the original report.
- Step 4** Click additional resource name or application protocol hyperlinks available in the first drill-down report to display additional reports containing details for the desired resource or application.
- 

## Opening the NAM Traffic Analyzer

You can link directly to the Cisco NAM Traffic Analyzer for NAM configuration options from Cisco PVM reports. The traffic analyzer opens in a new window.



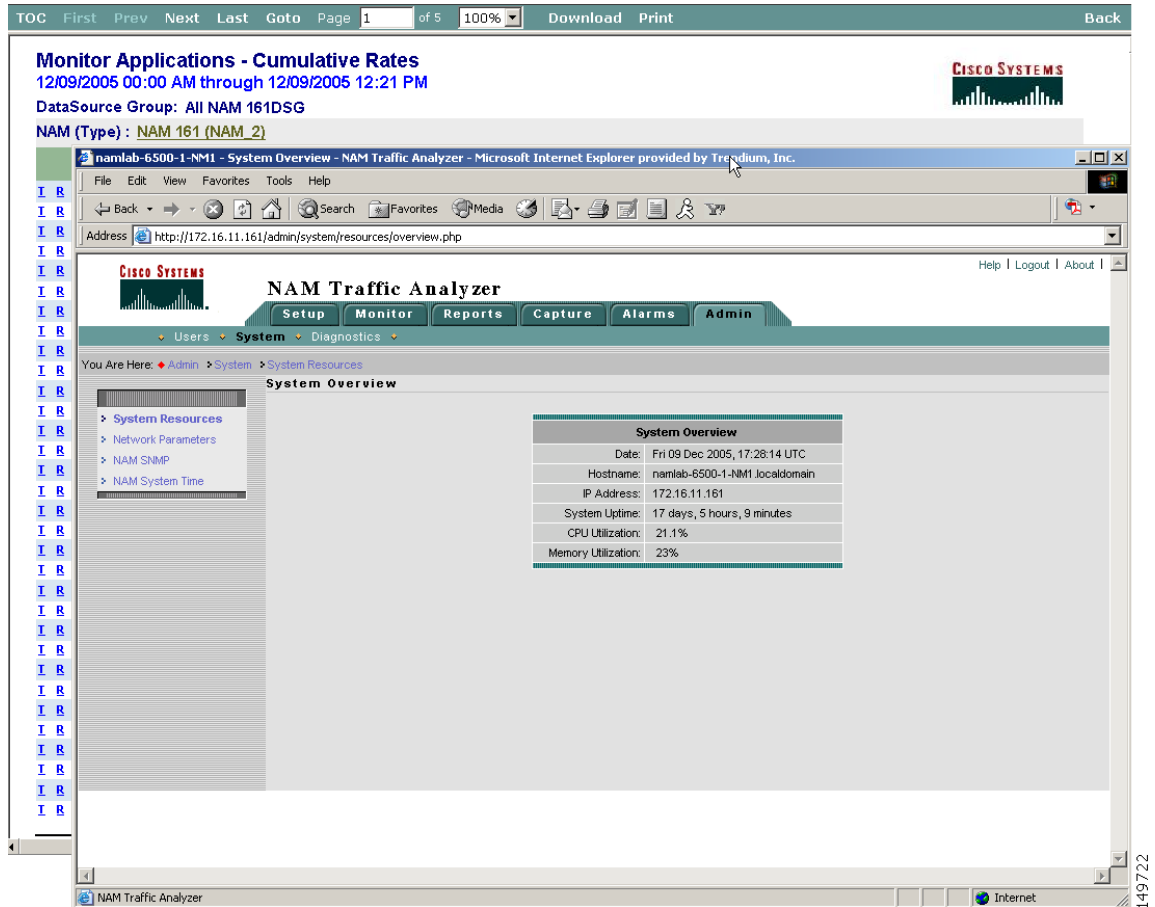
### Note

The traffic analyzer opens directly to a specific NAM only if that NAM has been set up in Cisco PVM with the correct user ID and password (**Setup > NAM** in the Cisco PVM GUI) or if the current Cisco PVM user credentials match the NAM credentials. If the traffic analyzer does not open for the desired NAM, log in to the NAM using the traffic analyzer's login window, or contact the Cisco PVM administrator to obtain traffic analyzer login information.

To open the NAM traffic analyzer, complete the following steps:

- 
- Step 1** Run a report for the desired statistic.
- Step 2** Click the “NAM (Type)” hyperlink at the top of the report display window.
- The NAM Traffic Analyzer opens in a new browser window, signed on automatically to the correct NAM if that NAM's logon information has been set up in Cisco PVM or if your user credentials allow you to access the NAM. [Figure 3-13](#) shows the NAM Traffic Analyzer window opened just beneath the “NAM (Type)” hyperlink.

Figure 3-13 NAM Traffic Analyzer Window



**Step 3** Review or change NAM or switch/router parameters in the traffic analyzer window.



**Note** Changes you make using the traffic analyzer affect future data aggregation and reports only.

**Step 4** Close the NAM Traffic Analyzer by clicking the close button in the upper right corner of the window.

## Real-Time Charts

Cisco PVM provides access to real-time data through links available in tabular reports. Reports contain a link in each table row that opens a chart pop-up for the corresponding report element, such as a host or protocol.

The Real-Time Chart pop-up allows you to troubleshoot a specific data source by displaying a continuously refreshed plot of its current performance. Monitoring begins as soon as the window opens. The chart will automatically refresh every 30 seconds and additional data points will be plotted. At any time, you can change the selected variable and click Submit to restart monitoring.

This section contains the following topics:

- [Variables Available for Real-Time Monitoring, page 3-15](#)
- [Displaying a Real-Time Chart, page 3-16](#)

## Variables Available for Real-Time Monitoring

Variables are displayed for individual statistics as *rates* in units per second (such as PACKETS/SEC). This rate reflects the *change* in the selected variable value over time. [Table 3-4](#) shows the real-time variables that you can monitor for the different statistics available in Cisco PVM tabular reports.

**Table 3-4 Available Variables for Real-Time Charts**

Statistic Type	Available Variables (units/sec)
Application Statistics	Packets Bytes
Hosts (IP) Statistics	In Packets In Bytes Out Packets Out Bytes Non-Unicast Packets
Hosts (MAC) Statistics	In Packets Out Packets In Bytes Out Bytes Multicast Packets Broadcast Packets
Conversation	Packets Bytes
DSCP Statistics	Application Packets Application Bytes
DSCP Application Statistics	Application Packets Application Bytes
DSCP Host Statistics	In Packets In Bytes Out Packets Out Bytes

**Table 3-4 Available Variables for Real-Time Charts (continued)**

Statistic Type	Available Variables (units/sec)
Switch/Router: Interface Statistics	In Packets In Bytes Out Packets Out Bytes Incoming Non-Unicast Packets Outgoing Non-Unicast Packets Discarded Ins Discarded Outs In Errors
Switch/Router: Ethernet Traffic Statistics	Bytes Packets Broadcast Packets Multicast Packets
Switch/Router: Ethernet Error Statistics	Drop Events CRC Errors Oversize Packets Undersize Packets Jabbers Fragment Counts Number of Collisions
VLAN ID Statistics	Packets Bytes Non-Unicast Packets Non-Unicast Bytes
VLAN Priority Statistics	Packets Bytes

## Displaying a Real-Time Chart

To display a real-time chart, complete the following steps:

- 
- Step 1** Run a tabular report using either Data Source or All NAM views, and look at the hyperlinks available on the left side of the report pane.
  - Step 2** Click the **R** hyperlink, next to the report element whose real-time data you want to view, as shown in [Figure 3-14](#).



**Figure 3-14 Real-Time Chart Hyperlink**

The Real-Time Chart pop-up opens and begins monitoring by displaying the Data Source and variable selected in the original report, as shown in Figure 3-15.

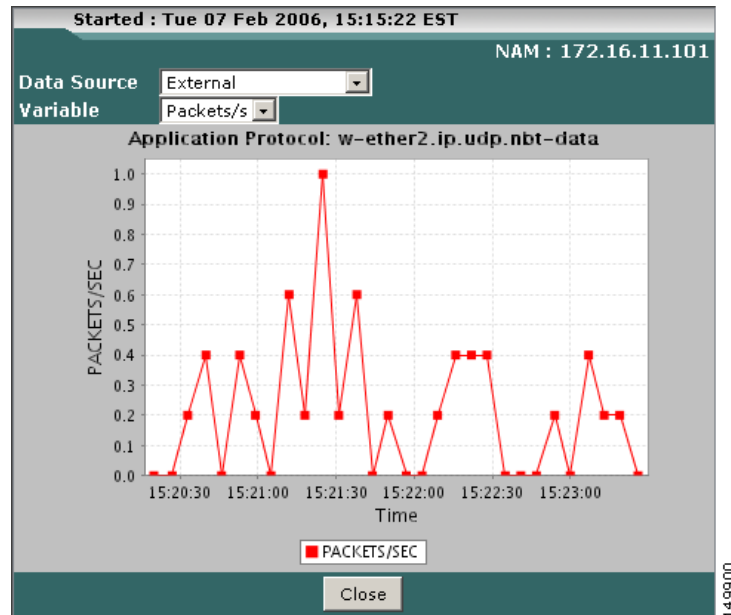
**Figure 3-15 Real-Time Chart Sample**

Table 3-5 describes the fields in a Real-Time Chart.

**Table 3-5 Real-Time Chart Field Description**

Element	Type	Description
Started	Fixed Text	Displays the date and time that the real-time display parameters were submitted for charting.
NAM	Fixed Text	Displays the name of the NAM whose data flow is being monitored.
Data Source	Drop-down List	Allows selection of the desired NAM Data Source for monitoring. <b>Note</b> The chart automatically refreshes and begins collecting new data points whenever you select a new Data Source.
Variable	Drop-down List	Allows selection of the data type to monitor, such as packets or bytes. <b>Note</b> The chart automatically refreshes and begins collecting new data points whenever you select a new Variable.
Chart Y-Axis	Fixed Text	Displays the variable selected within the chart for display, such as packets or bytes.
Chart X-Axis	Dynamic Data	Displays the current time of day in increments that continuously refresh as time passes.

**Table 3-5 Real-Time Chart Field Description (continued)**

Element	Type	Description
Chart Body	Dynamic Data	Displays a line graph with demarcated points that continuously refresh as the time increments pass.
Close	Button	Closes the chart pop-up window.



**Note** The chart refreshes and displays new data points every 30 seconds.

**Step 3** Change the data being monitored by:

- a. Selecting a desired Data Source from the drop-down list.
- b. Selecting a desired Variable from the drop-down list.

The chart refreshes automatically and begins to display a new set of data points based on the new Data Source or Variable selections.



**Note** Clicking **Close** terminates data refresh and closes the chart window.

## Trend Reports

Cisco PVM provides dynamic performance reporting capability within the Reports GUI by displaying a link to a Trend Report on each report pane. The report displays raw data for the selected network component (such as protocol, host, or interface) with a superimposed line showing the data trend over time, offering a magnified view of the data flow for analysis of abnormal or problematic patterns.

To see different statistics for the same report displayed as a Trend report, simply click a different metric within the report display (such as PACKETS or BYTES) and the chart automatically refreshes.

This section contains the following topics:

- [Trend Statistics, page 3-18](#)
- [Displaying a Trend Report, page 3-19](#)

## Trend Statistics

Trend reports are available from tabular reports (those showing Current Rates or Cumulative Data) for the following statistics:

- Applications
- Interface
- Ethernet Traffic
- Ethernet Errors
- Conversations

- DSCP
- DSCP Application
- DSCP Host
- Hosts (IP)
- Hosts (MAC)
- VLAN ID and
- VLAN Priority.

The various metrics for each statistics are viewable through links directly in the Trend Report. Drilling down from a tabular to a Trend Report depends on which Report View is currently displayed. The drill-down rules are summarized in [Table 3-6](#).

**Table 3-6** Trend Report Drill-Down Rules

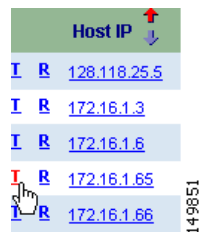
Current Tabular Report View	Trend Report Values
Aggregated	The metric value will be aggregated across the Data Source Group.
All NAM	The metric value will be aggregated for those data sources that are both part of the selected Data Source Group and the specific NAM selected for drill-down.
Data Source	The metric value will display for the data source specified in the original report.

## Displaying a Trend Report

Complete the following steps to display a trend report:

- Step 1** Generate a tabular report.
- Step 2** Click the **T** link next to the desired element in the report display, as shown in [Figure 3-16](#).

**Figure 3-16** Trend Report Hyperlink



The Trend Report displays in the Reports window, as shown in [Figure 3-17](#).

Figure 3-17 Trend Report Sample

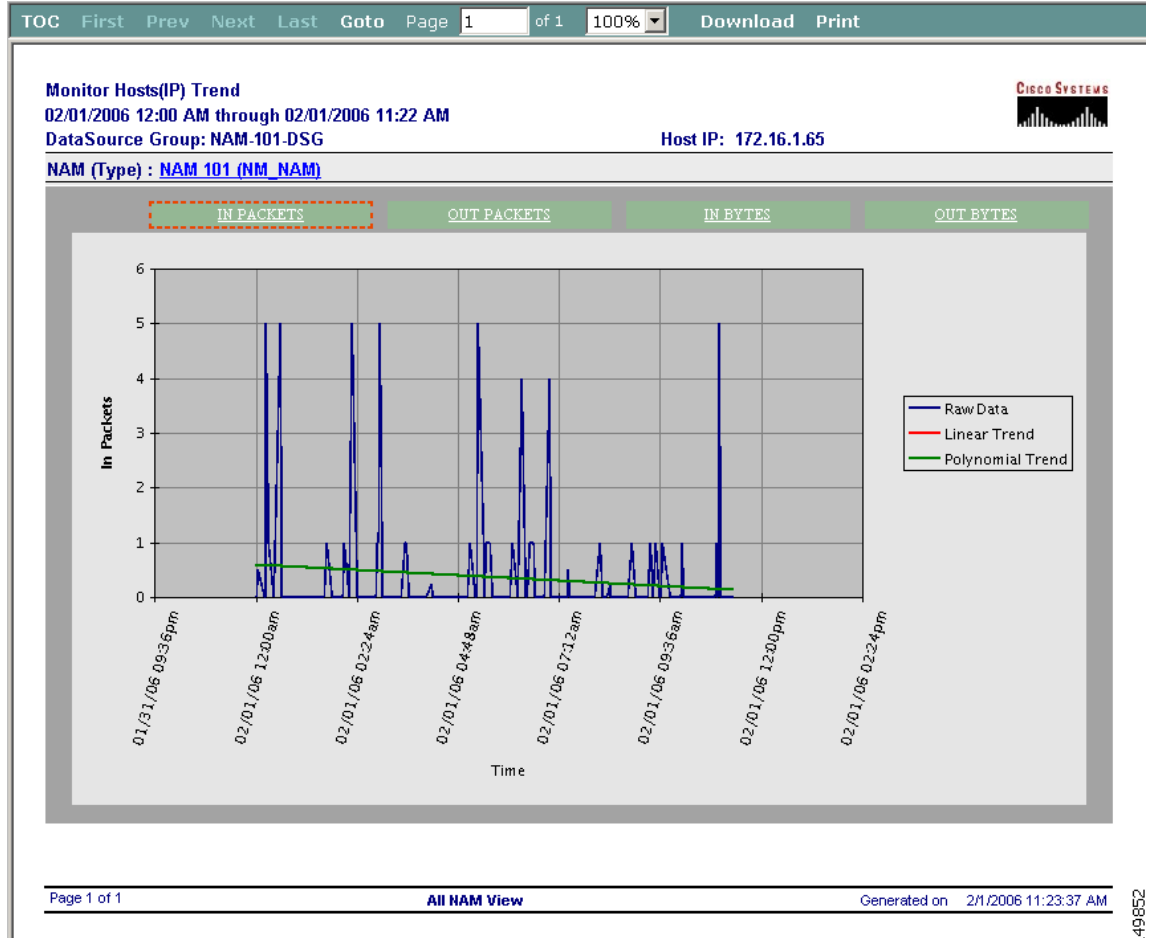


Table 3-7 describes the fields available in Trend reports.

Table 3-7 Trend Report Field Descriptions

Field	Description
Title	The report name from which the Trend Report was accessed (the original report accessed in Reports), with a label indicating that the display is a Trend Report.
Time Period	The time period selected to generate the original report.
NAM (TYPE)	The NAM supplying the data flow and the NAM type (NAM-1, NAM-2, or NM-NAM).
Data Entity Name	The name of the source being monitored, such as the VLAN ID name.
Chart Title	The Trend Report name and data variable being monitored (as selected in the original report).
Variable [link]	The variables (metrics) available for viewing in the Trend Report.
Y-Axis	The name and value of the data variable being monitored (such as packets or bytes).

**Table 3-7** *Trend Report Field Descriptions (continued)*

Field	Description
X-Axis	The incremental timestamps for the trending interval being monitored.
Chart Body	The trending line with data labels indicating the raw data value for the selected metric over time and the trend line.



**Tip** You can change the data type being displayed by clicking one of the green hyperlink boxes at the top of the report display.



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