HP OpenView Performance Insight

Report Pack for Device Resources

Software Version 3.0

Reporting and Network Solutions

May 2004

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Overview

This chapter covers the following topics:

- OVPI and device resources
- Enhancements in Device Resources 3.0
- Integration with Network Node Manager
- Ways to customize reports
- Sources for additional information

OVPI and Device Resources

HP OpenView Performance Insight, commonly known as OVPI, is the operating environment for reporting solutions. Each reporting solution consists of a report pack and at least one datapipe. When you install the datapipe, you configure OVPI for data collection; when you install the report pack, you configure OVPI for data summarization and aggregation. Using the processing directives supplied by the datapipe and the report pack, OVPI manipulates the data, performs various calculations, and populates report templates with trending analysis.

The Device Resources Report Pack monitors CPU, memory, and buffer resources in switches and routers. CPU, memory, and buffer resources tend to function independently. If a buffer is overutilized, the CPU that moves data in and out of the buffer could be underutilized. If the CPU is overutilized, buffer and memory could be underutilized. Device Resources does not monitor server resources. To monitor server resources, use the System Resources Report Pack.

If you run the Device Resources Report Pack and the Interface Reporting concurrently, there are synergies to exploit. If Interface Reporting is showing high discards or high errors, Device Resources will tell you whether or not overutilization of a resource might be causing the problem. Conversely, if Device Resources indicates that network response time is spiking, Interface Reporting will tell you whether interface utilization levels may be contributing to the problem.

Enhancements in Version 3.0

Device Resources 2.0 was released October 2003. Version 2.0 included the following enhancements:

- New backplane utilization reports
    — Historical Summary
    — QuickView
    — Snapshot
    — Near Real Time QuickView
    — Near Real Time Snapshot
- Update Thresholds form (for easier, faster changes to threshold values)

Device Resources 3.0 was released March 2004. The enhancements are as follows:

- Installs on OVPI 5.0 as well as OVPI 4.6
- If installed on OVPI 5.0, supports Oracle as well as Sybase
- Collects data from Cabletron devices (using the Dev Res Cabletron Datapipe)
- Upgrade package for customers running version 2.0 on Sybase

Folders and the Reports Inside

The Device Resources Report Pack contains 20 reports and the following folders:

- Customer
- Device
- Location
- Backplane

The following table shows what each folder contains.

Report Type	Customer	Device	Location	Backplane
Exceptions Summary		X		
Card Historical Summary		X		
Historical Summary		X		X
Historical Summary Snapshot		X		
QuickView				X
Snapshot				X
NRT QuickView		X		X
NRT Snapshot		X		X
Forecast	X	X	X	
Service Level Management		X		
Summary	X		X	
Top Ten	X	X	X	

Collecting Data and Property Information

Some datapipes are vendor-specific and some are based on standards. The following vendor-specific datapipes collect data for the Device Resource package:

- Dev Res 3COM Router Datapipe
- Dev Res Alcatel Xylan Switch Datapipe
- Dev Res Enterasys Router Datapipe
- Dev Res Enterasys Switch Datapipe
- Dev Res Cisco Switch Datapipe
- Dev Res Cisco Router Datapipe
- Dev Res Extreme Devices Datapipe
- Dev Res Foundry Datapipe
- Dev Res Dev Res HP ProCurve Datapipe
- Dev Res Nortel Bay Datapipe

In addition to performance data, reports contain the following kinds of property information:

- IP addresses and host names
- Customers
- Locations

Property information comes from tables maintained by the Common Property Tables package. If you are already running the previous version of Common Property Tables, you can preserve your existing property data by installing the upgrade package. This easy step is spelled out in detail in the next chapter.

If you are installing Common Property Tables 3.0 for the first time, you will not see customers or locations in reports until you import this data using either the batch-oriented import utility or the "create new" forms. The utility and the forms belong to the Common Property Tables package. For information about using the utility and the forms, see the *Common Property Tables 3.0 User Guide*.

Integration with Network Node Manager

If you have already used the NNM/Performance Insight Integration Module to integrate NNM and OVPI, the reports in the Device Resources package will blend smoothly with the fault management capabilities of Network Node Manager. The NNM operator will see Device Resource reports in the Report Launchpad. The Report Launchpad window can be opened from NNM ovw, Home Base Dynamic Views, and the NNM alarm browser.

Device Resources 3.0 includes an optional thresholds sub-package. If you install it, the OVPI server will send threshold traps to the NNM server. A trap from the OPVI server will show up as an alarm in the NNM Alarm Browser. By selecting the alarm, the NNM operator can display a report containing data about the node that caused the alarm.

If you install the optional thresholds sub-package, the Package Manager install wizard will automatically install the Threshold and Event Generation Module, also known as the Thresholds Module. If desired, you may configure the Thresholds Module. For product details, including information about the latest enhancements, refer to the *Thresholds Module 5.0 User Guide*.

Ways to Customize Reports

The contents of a report can be customized by applying group filters, by editing parameters, by editing tables and graphs, and by importing node names, customers, and locations. If you apply a group filter, your goal is to change how the entire package appears to a particular group of users. When you edit a report, you are making a temporary change. For more about editing tables and graphs, see Chapter 9, Editing Tables and Graphs.

Group Filters

If you intend to share your reports with customers, or let divisions within your enterprise see division-specific performance data, you will want these reports to be customer-specific, containing data limited to one customer. Creating customer-specific reports is an administrator task that involves the following steps:

• Importing customer names and device locations using Common Property Tables

• Creating a group account for all of the users affiliated with a particular customer

• Creating a group filter for the group account

For more information about creating filters for group accounts, refer to the *OpenView Performance Insight 5.0 Administration Guide*.

Report Parameters

If you edit a parameter, you are applying a constraint to the report with the intention of eliminating data you do not want to see. For example, if you edit the Customer Name parameter, data for every customer except the customer you typed in the Customer Name field will drop from the report. If you edit the Source Location, data for all locations except the location you typed in the Source Location field will drop from the report.

Constraining the contents of a report by editing parameters is completely optional and you may apply multiple constraints at once. Device Resources supports the following parameters:

• Customer Name

• Customer ID

• Location Name

• Location ID

• Device Name

• Make

• Model

Some reports support every parameter in this list, while most reports support a subset of this list. To edit parameters, click the **Edit Parameters** icon at the bottom right-hand corner of the report. When the **Edit Parameters** window opens, type the constraint in the field and then click **Submit**.

Sources for Additional Information

The following user guides are related to this manual:

- *Common Property Tables 3.0 User Guide*
- *PI/NNM Integration Module 2.0 User Guide*
- *System Resources Report Pack 4.0 User Guide*
- *Thresholds Module 5.0 User Guide*

The following release statements are related to this manual:

- *Device Resources Report Pack 3.0 Release Statement*
- *Dev Res 3COM Router Datapipe Release Statement*
- *Dev Res Alcatel Xylan Switch Datapipe Release Statement*
- *Dev Res Cabletron Datapipe Release Statement*
- *Dev Res Cisco Switch Datapipe Release Statement*
- *Dev Res Cisco Router Datapipe Release Statement*
- *Dev Res Extreme Devices Datapipe Release Statement*
- *Dev Res Foundry Datapipe Release Statement*
- *Dev Res Nortel Bay Datapipe Release Statement*
- *Dev Res HP ProCurve Datapipe Release Statement*

Manuals for the core product, OVPI, and manuals for the reporting solutions that run on OVPI, are posted to the following website:

http://support.openview.hp.com/support

Select **Technical Support** > **Product Manuals** to reach the **Product Manuals Search** page. The user guides for the core product, Performance Insight, are listed under **Performance Insight**. The user guides for report packs, datapipes, preprocessors, and SPIs for NNM are listed under **Reporting and Network Solutions**.

Each manual listed under **Reporting and Network Solutions** indicates the month and year of publication. Because revised user guides are posted to this site on a regular basis, from time to time you should check this site for updates. If your PDF has been superseded, download the latest PDF.

2

Package Installation

This chapter covers the following topics:

- Guidelines for a smooth installation
- Using Package Manager to install Device Resources
- Removing the Device Resources package

Guidelines for a Smooth Installation

The RNS 5.0 CD includes NNM components as well as OVPI components. Once you select OVPI report packs for extraction, the install script copies every OVPI package on the CD to the Packages directory on your system. If the OVPI packages on the RNS 5.0 CD have already been extracted, you may install Device Resources 3.0 by launching the Package Manager install wizard and following the familiar on-screen directions.

If you are currently running Device Resources 2.0, you may upgrade to version 3.0 by installing the upgrade package for Device Resources 2.0. However, in addition to installing the upgrade package for Device Resources 2.0, you also need to upgrade Common Property Tables, remove old datapipes, and install new datapipes. Follow these steps to upgrade from Device Resources 2.0 to Device Resources 3.0:

1 Install the upgrade package for Common Property Tables; deploy reports.

2 Remove existing datapipes.

3 Install the upgrade package for Device Resources 3.0; deploy reports.

4 Install new datapipes.

Software Prerequisites

Version 3.0 of Device Resources has the following prerequisites:

- OVPI 4.6, with all available Service Packs; or
- OVPI 5.0, with all available Service Packs
- Common Property Tables 3.0

If you are not currently running any version of Common Property Tables, let Package Manager install version 3.0 for you. If you are running the previous version of Common Property Tables, upgrade from version 2.2 to version 3.0. Installing the upgrade package for Common Property Tables is easy. However, if you need assistance or if you want to know more about how this package operates, refer to the user guide.

Datapipes

The datapipes that collect data for this report pack are not prerequisites. You may install the datapipes when you install the report pack or you may install the datapipes after you install the report pack. The following datapipes are available:

- Dev Res 3COM Datapipe
- Dev Res Alcatel Datapipe
- Dev Res Cabletron Datapipe
- Dev Res Cisco Switch Datapipe
- Dev Res Cisco Router Datapipe
- Dev Res Enterasys Router Datapipe
- Dev Res Enterasys Switch Datapipe
- Dev Res Extreme Devices Datapipe
- Dev Res Foundry Datapipe
- Dev Res Nortel Bay Datapipe
- Dev Res HP ProCurve Datapipe

Installing at least one datapipe is mandatory. There are no upgrade packages for datapipes, so you should always remove an existing datapipe before installing the latest version of the same datapipe.

Thresholding and Integration with Network Node Manager

If you have already integrated OVPI with NNM, you may install the thresholds sub-package, Device_Resource_Thresholds. This optional package contains customized thresholds. If you install it, the threshold traps generated by OVPI will display as alarms in the NNM alarm browser.

If you select the thresholds sub-package for installation, Package Manager will install the Thresholds Module for you, automatically. The Thresholds Module controls the actions taken in response to a threshold breach. For details about the latest enhancements to the Thresholds Module, refer to the *Thresholds Module 5.0 User Guide*.

Distributed Environments

If you intend to run Device Resources in a distributed environment, the installation is more complex. Here is an overview of the steps:

1   Make sure that every server is running the same version of OVPI.

2   Make sure that every server is running all available Service Packs for OVPI.

3   Disable trendcopy on the central server.

4   Install the following packages on the central server:

- Device Resources; deploy reports
- Thresholds sub-package
- Common Property Tables 3.0; deploy reports

5   Install the following packages on each satellite server:

- Device Resources; deploy reports
- Common Property Tables 3.0
- At least one datapipe

6   Re-enable trendcopy on the central server.

After installing Device Resources in a distributed environment, use the Management Console to set up connections between the central server and satellite server databases. In addition, you must edit a file that controls how the central server pulls data from each satellite server. These tasks are covered in Chapter 3, Package Configuration.

Installing Device Resources

Insert the RNS 5.0 CD. On Windows, a menu with installation options appears automatically; on UNIX, mount the CD, navigate to the top level directory on the CD, and run the `./setup` command. When the menu appears, select **OVPI Report Packs** for installation.

After the install script has copied every package to the Packages directory on your system, you will be prompted to start the Package Manager install wizard. If you just extracted OVPI packages from the CD and the Package Manager install wizard is running, begin the following procedure at step 5; otherwise, begin at step 1.

1   Log in to the system. On UNIX, log in as root.

2   Stop OVPI Timer and wait for processes to terminate.

   Windows NT: Select **Settings > Control Panel** > **Administrative Tools > Services**

   UNIX: As root, type one of the following:

   HP-UX: `sh /sbin/ovpi_timer stop`

   Sun: `sh /etc/init.d/ovpi_timer stop`

3   Select **HP OpenView > Performance Insight > Management Console**.

4   Select **Tools** > **Package Manager**. The Package Manager welcome window opens.

5   Click **Next.** The Package Location window opens.

6   Click the **Install** radio button. Approve the default destination directory or browse to a different directory if necessary.

7   Click **Next**. The Report Deployment window opens.

8   If you are deploying reports, type your OVPI username and password.

9   Click **Next**. The Package Selection window opens. Click the check box for at least one datapipe; click the check box for the following packages:

> *Device Resource 3.0*
>
> *Device Resource Thresholds* [optional]
>
> *Device Resources Demo Package* [optional]

10 Click **Next**. The Type Discovery window opens. To run Type Discovery immediately after package installation, accept the default and click **Next**. The Selection Summary window opens.

11 Click **Install**. The Installation Progress window opens and the install begins. When the install finishes, a package installation complete message appears.

12 Click **Done** to return to the Management Console.

13 Restart OVPI Timer.

> *Windows NT*: Select **Settings > Control Panel** > **Administrative Tools > Services**
>
> *UNIX*: As root, type one of the following:
>
> > HP-UX: `sh /sbin/ovpi_timer start`
> >
> > Sun: `sh /etc/init.d/ovpi_timer start`

The reports in the demo package are static—the data will not change from day to day—but the linking between tables and graphs works and you can experiment with view options (also known as edit options) for individual tables and graphs.

Options for Viewing Reports

Before reports can be viewed using a web browser, they must be deployed. When you installed Device Resource, you enabled the Deploy Reports option. As a result, Device Resource reports are deployed to the Application Server and are available for viewing on the web.

If the client component of OVPI was installed on your system, you have access to Report Viewer, Report Builder, and the Management Console. If the client component was not installed on your system, web access to reports is your only means of access.

For more information about the client component, refer to the *HP OpenView Performance Insight 4.6 Installation Guide*. For more information about the Management Console, including how to use the Object Manager to launch reports specific to selected objects, refer to the *Performance Insight 5.0 Administration Guide*.

Seeing Performance Data

Some reports populate with data sooner than others. The first report to populate with data is the Near Real Time report. You will begin to see data in this report immediately after the first data collection completes.

Any report that begins with an analysis of yesterday's performance will need at least one full day's worth of data before results are viewable. You will begin to see forecast data soon, within a few days. However, reliable forecast data will not be available until the rolling baseline is complete, and that will take about six weeks.

Removing the Device Resources Package

When you uninstall a report pack, the tables associated with the report pack, as well as all the data in those tables, are deleted. If you want to preserve the data in those tables, archive the data before uninstalling the package.

Removing Device Resources automatically removes any datapipe that depends on Device Resources. Follow these steps to uninstall the Device Resources package.

1   Log in to the system. On UNIX systems, log in as root.

2   Stop OVPI Timer and wait for processes to terminate.

3   Select **HP OpenView > Performance Insight > Package Manager**. The Package Manager welcome window opens. Follow the on-screen directions for uninstalling packages. When the uninstall process finishes, a package removal complete message appears.

4   Click **Done** to return to the Management Console.

5   Restart OVPI Timer.

Package Configuration

This chapter covers the following topics:

- Configuring servers in a distributed system
- Default thresholds for exceptions
- Using the change form to modify thresholds

Skip the next section if:

- You are running Device Resources on a stand-alone system
- You were running version 2.0 as a distributed system and you upgraded to version 3.0

Configuring Servers in a Distributed System

If you intend to run Device Resources 3.0 as a distributed system, you need to install packages on the central server, install packages on each satellite server, configure the central server, and configure each satellite server. If you followed the advice in Chapter 2, Installation, you installed the following packages on the central server —

- Device Resources
- Thresholds sub-package [optional]
- Thresholds Module [optional]
- Common Property Tables

— and you installed the following packages on each satellite server:

- Device Resources
- Thresholds sub-package [optional]
- Thresholds Module [optional]
- Common Property Tables
- At least one datapipe

Configuring the Central Server

Perform these tasks to configure the central server:

- Task 1: Set up connections with satellite server databases
- Task 2: Configure trendcopy pull commands for hourly data
- Task 3: Configure trendcopy pull commands for rate data (optional)

> These tasks apply to new installations only. If you just upgraded to Service Assurance 3.0, and your servers were already configured to operate as a distributed system, those settings are still in effect.

Task 1: Set up connections with satellite server databases

1   Select **HP OpenView > Performance Insight > Management Console**.

2   Click the **Systems** icon on the lower left. The **System/Network Administration** pane opens.

3   Right-click the **Databases** folder. When prompted, select **Add OVPI Database**. The Add Database Wizard opens.

4   Click **Next**.

5   Type the hostname and port number for the database you want to add; click **Next**.

6   Review the Summary. Repeat Steps 4 and 5 for each additional database.

7   Click **Finish** when you are done.

Task 2: Configure trendcopy pull commands for hourly data

1   Open the following file:

    $DPIPE_HOME/scripts/DeviceResourceReporting_hourly.pro

2   Uncomment the copy commands in the hourly_copy block.

3   Modify the copy commands in the hourly_copy block as follows:

- Replace *SATELLITE_SERVER_1_DATABASE* with the satellite server name
- Replace *THIS_MACHINE_DATABASE* with the central server name

4   If there is more than one satellite server, create and configure new hourly copy commands for each additional machine.

Task 3: Configure trendcopy pull commands for rate data (optional)

If you want to view Near Real Time reports on the central server, rate data must be available on the central server. Follow these steps to pull rate data from satellite servers:

1   Add more trendcopy commands by replicating the existing trendcopy commands.

2   Make the following modifications to replicated trendcopy commands:

- Change *SHDevRes_Device* to *SR**DevRes_Device*
- Change *SHDevRes_DeviceMem* to *SR**DevRes_DeviceMem*
- Change *SHDevRes_DeviceCard* to *SR**DevRes_DeviceCard*

3   Comment out the hourly trendsums in the DeviceResourceReporting_Hourly.pro file.

4   Open the following file:

    $DPIPE_HOME/scripts/DeviceResourceReporting_hourly.pro

5   Uncomment the copy commands in the rate_copy block

6 Modify the copy commands in the rate_copy block as follows:

- Replace *SATELLITE_SERVER_1_DATABASE* with the satellite server name

- Replace *THIS_MACHINE_DATABASE* with the central server name

7 If there is more than one satellite server, create and configure new hourly copy commands for each additional machine.

> Copying rate data from satellite servers every hour has two unpleasant side-effects: it increases traffic between servers, and it increases the load on the central server.

Configuring Satellite Servers

Follow these steps to configure a satellite server.

> This steps are not applicable to you if (1) the satellite server is performing local reporting, or (2) the thresholds sub-package is not installed on the satellite server.

1 Disable daily aggregations:

- Open the *$DPIPE_HOME/lib/trendtimer.sched* file.

- Comment out lines referencing *DeviceResourceReporting_Daily.pro*

2 Change the default that determines when hourly processing begins; make hourly processing begin sooner:

- Open the *$DPIPE_HOME/lib/trendtimer.sched* file.

- Locate the OVPI timer entry in the *DeviceResourceReporting_Hourly.pro* file. By default, hourly processing begins at 40 minutes after the hour.

- To make sure the satellite server completes hourly summarizations before the central server begins hourly summarizations, change the start time from 1:00+40 to 1:00+25.

3 Configure datapipe polling policies; make sure that each network device is polled by one satellite server only.

4 If the satellite server has two or more pollers, create separate polling policies for each poller and use views and types to separate the devices.

5 If remote pollers are being used, be sure to avoid duplicate polling across the pollers and duplicate polling between the satellite and the pollers.

6 Verify that the system clock on the satellite server is synchronized with the system clock on the central server.

Default Thresholds for Exceptions

The Device_Resource_Thresholds sub-package imposes an exception threshold on CPU utilization, memory utilization, and buffer utilization. When performance reaches one of these defaults, the thresholds sub-package sends a trap to the network management system.

The following table describes the condition behind each threshold breach and the severity of the alarm sent in response to the breach.

Metric	Threshold	Severity
CPU	85%	Medium
Memory	85%	Medium
Buffer	85%	Medium

No intervention on your part is necessary to enable the exception threshold values in the preceding table. However, if you want to enable multiple types of traps, or set up multiple trap destinations, you need to configure the Thresholds Module. For details, refer to the *Thresholds Module User Guide.*

Using the Change Form

Device Resources 3.0 provides a form for modifying default thresholds. Follow these steps to launch the Update Thresholds form:

1 Click the **Objects** icon in the panel on the left side of the Management Console window. The Object/Property Management view opens.

Object Manager shows a list of objects. The type of object presented depends on which Object Manager View is open:

- The Device view (the default) shows a list of devices

- The Customer view shows a list of customers

- The Location view shows a list of locations

2 To change the view, select **View** > **Change View** and use the pop-up window to select a different view.

3 Once you see the type of object you are interested in updating, select the particular object you would like to update. **Object Specific Tasks** appears in the window on the right.

4 Double-click the task to open the Update Thresholds form, shown below.

Top 10 Reports

Device Resources contains three Top Ten reports:

- Customer Top Ten
- Device Top Ten
- Location Top Ten

Use these reports to identify which customers, locations, and devices rank worst in terms of CPU, memory, and buffer utilization. The customer report aggregates statistics for groups of devices belonging to one customer, while the location report aggregates statistics for groups of devices at various locations belonging to one customer. The device report does not aggregate data. It displays statistics for the individual devices belonging to one customer.

In addition to ranking customers, locations, or devices, each Top Ten report also sorts items by highest F90 value, the utilization level that OVPI predicts will be in effect 90 days from today. Note that left and right tables are independent and that an item appearing in the worst performing table on the left may not appear in the forecast table on the right. If the same item appears in both tables, you can assume that yesterday's performance is part of a longer-term trend that may call for corrective action.

The tables on the left provide statistics for yesterday's average utilization and yesterday's busy hour. Table entries sort according to average utilization, highest to lowest. The tables on the right provide statistics for baseline, F30, F60, and F90; table entries sort by F90 value, highest to lowest. Baseline here means *average busy hour*.

The Device Top Ten begins with a customer summary table that sorts customers by resource utilization, highest to lowest. The Customer Top Ten and the Location Top Ten begin with a customer exception count table that sorts customers by yesterday's total exception count, highest to lowest.

See below for samples of all three Top Ten reports.

Device Resource
Customer Top Ten

![HP invent logo]

The Customer Top Ten Report provides the network manager and other members of the network management staff a list of the top ten customers based on various criteria.

Highest Average CPU Utilization
Wed Apr 02 2003

Customer	Average CPU Util	Busy Hour CPU Util
NetRadix	60.94	71.38
Trinagy	59.49	74.75

CPU Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Customer	Baseline	30th Day	60th Day	90th Day
Trinagy	85.00	67.42	59.59	51.75
NetRadix	84.25	67.49	58.78	50.08

Highest Average Memory Utilization
Wed Apr 02 2003

Customer	Average Memory Util	Busy Hour Memory Util
NetRadix	52.38	81.47
Trinagy	44.37	66.70

Memory Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Customer	Baseline	30th Day	60th Day	90th Day
NetRadix	89.16	97.16	113.20	129.23
Trinagy	89.42	72.44	67.36	62.28

Highest Average Buffer Utilization
Wed Apr 02 2003

Customer	Average Buffer Util	Busy Hour Buffer Util
NetRadix	96.53	97.47
Trinagy	96.12	96.46

Buffer Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Customer	Baseline	30th Day	60th Day	90th Day
NetRadix	97.58	97.38	97.56	97.74
Trinagy	98.00	95.96	94.91	93.86

Device Resource Top Ten

The Device Resource Top Ten Report provides the network manager and other members of the network management staff a list of the top ten devices based on various criteria.

Customer Summary
Wed Apr 02 2003

Customer	Average CPU Util	Average Memory Util	Average Buffer Util
Trinagy	59.49	44.37	96.12
NetRadix	60.94	52.38	96.53

Highest Average CPU Utilization
Wed Apr 02 2003

Device	Average CPU Util	Busy Hour CPU Util
Cisco_01	62.28	74.75
Cisco_02	56.70	75.50

CPU Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Device	Baseline	30th Day	60th Day	90th Day
Cisco_02	90.00	79.33	76.60	73.87
Cisco_01	90.25	70.61	62.01	53.42

Highest Average Memory Utilization
Wed Apr 02 2003

Device	Average Memory Util	Busy Hour Memory Util
Cisco_01	55.16	90.34
Cisco_02	33.57	62.22

Memory Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Device	Baseline	30th Day	60th Day	90th Day
Cisco_01	98.41	99.02	106.80	114.58
Cisco_02	98.35	76.41	67.16	57.90

Highest Average Buffer Utilization
Wed Apr 02 2003

Device	Average Buffer Util	Busy Hour Buffer Util
Cisco_01	96.26	97.07
Cisco_02	95.97	96.50

Buffer Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Device	Baseline	30th Day	60th Day	90th Day
Cisco_01	97.95	96.99	96.54	96.09
Cisco_02	98.22	95.80	94.38	92.95

Device Resource
Location Top Ten

The Location Top Ten Report provides the network manager and other members of the network management staff a list of the top ten locations based on various criteria.

Customer Exception Counts
Select a Customer for the Top Ten Locations
Wed Apr 02 2003

Customer	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
NetRadix	46	4	4	38
Trinagy	44	2	4	38

Highest Average CPU Utilization
Wed Apr 02 2003

Location	Average CPU Util	Busy Hour CPU Util
Bethesda	63.32	81.25
Alexandria	58.55	72.00

CPU Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Location	Baseline	30th Day	60th Day	90th Day
Bethesda	90.25	95.05	104.05	113.05
Alexandria	92.75	58.08	38.45	18.82

Highest Average Memory Utilization
Wed Apr 02 2003

Location	Average Memory Util	Busy Hour Memory Util
Bethesda	53.75	89.64
Alexandria	51.00	78.45

Memory Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Location	Baseline	30th Day	60th Day	90th Day
Bethesda	95.92	92.48	94.94	97.39
Alexandria	97.76	61.12	40.96	20.80

Highest Average Buffer Utilization
Wed Apr 02 2003

Location	Average Buffer Util	Busy Hour Buffer Util
Alexandria	96.69	98.12
Bethesda	96.37	97.17

Buffer Utilization Forecast
Sorted by Highest 90 Day Forecasted Value

Location	Baseline	30th Day	60th Day	90th Day
Alexandria	98.41	98.15	98.58	99.00
Bethesda	98.32	97.68	97.68	97.68

5

Summary Reports

Summary reports focus on groups of devices rather than individual devices. If a graph monitors utilization for all the devices belonging to one customer, or all the devices in one location, you are looking at a summary report. If a graph provides hourly and daily data, and the samples that constitute the hourly value and the daily value are based on averages, again you are looking at a summary report.

The **customer summary** report focuses initially on the threshold exception count for specific customers. Customers sort by the number of exceptions, highest to lowest. The graphs below track CPU, memory, and buffer utilization. A bar chart displays the exception count hour-by-hour and day-by-day, while the Grade of Service chart provides an overall score for the customer, hour-by-hour and day-by-day. Use the Customer Summary to look at resource utilization customer by customer.

The **location summary** is exactly the same as the customer summary, except for the location selection table providing an exception count for all the locations belonging to one customer. The graphs look at resource utilization for all the devices in one specific location. A bar chart displays the exception count hour-by-hour and day-by-day for this location, while the Grade of Service chart provides an overall score for this location on an hourly and daily basis.

The **historical summary** reports focus initially on busy hour and then provides detailed analysis, in the form of hourly and daily aggregations, for individual devices or individual cards on one device. The first table sorts customers by aggregated busy hour, highest to lowest, allowing you to easily compare one customer to another. Select a customer to populate a table of devices belonging to that customer, sorted by resource utilization, highest to lowest. Select a device to populate a frequency distribution pie chart and graphs that track average and maximum utilization for CPU, memory, and buffer. Here, maximum utilization is a single sample, specifically, the highest sample for the hour or for the day, not an average of multiple samples.

Like the historical summaries, the **exception summary** is device-specific. This report focuses initially on exception counts per customer. Select a customer to populate a table showing which devices were responsible for those exception counts. Use the hourly graphs to find out exactly when those exceptions took place. Compare the hourly graph to the daily graph to find out whether yesterdays exception count is an isolated incident or part of a longer-standing trend.

See below for samples of all six summary reports, including the **backplane historical summary**.

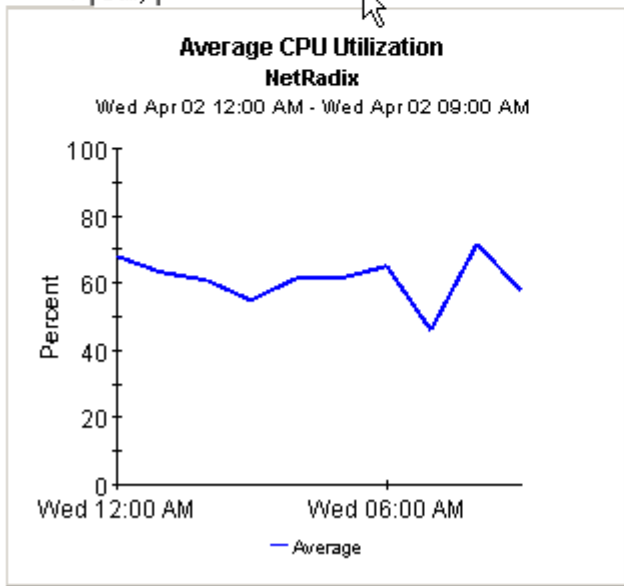# Device Resource
Customer Summary

The Customer Summary Report provides CFOs, CIOs, and managers, an overview of the performance of corporate devices in the critical areas of CPU, Memory, and Buffer utilization. Each chart shows key metrics aggregated for all devices for a given customer.
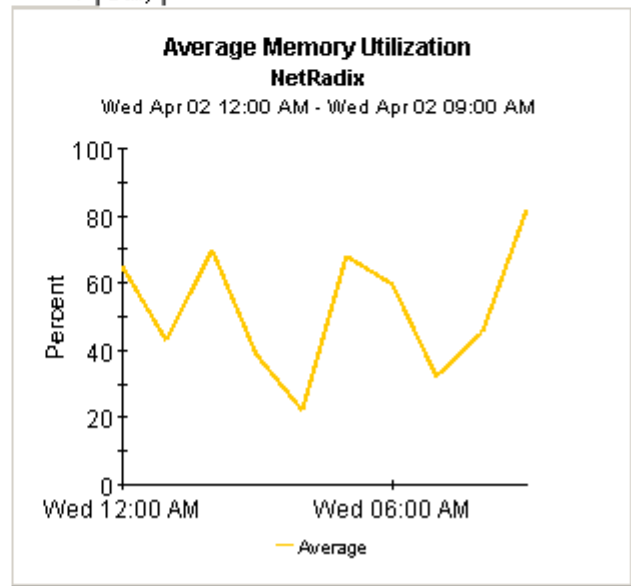
Customer Exception Counts
Wed Apr 02 2003

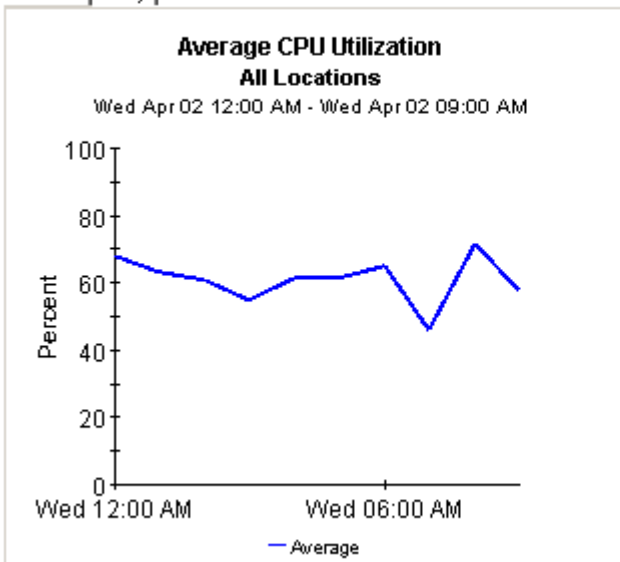| Customer	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
NetRadix	46	4	4	38
Trinagy	44	2	4	38

Hourly | Daily

Average CPU Utilization
NetRadix
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily

Average Memory Utilization
NetRadix
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

Average Buffer Utilization
NetRadix
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

— Average

Hourly | Daily |

CPU, Memory, and Buffer Exceptions
NetRadix
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

■ CPU Util
■ Memory Util
■ Buffer Util

Hourly | Daily |

Grade of Service
NetRadix
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

■ CPU Util
■ Memory Util
■ Buffer Util

Device Resource Location Summary

The Location Summary Report provides CFOs, CIOs, and managers an overview of the performance of corporate devices in the critical areas of CPU, Memory, and Buffer utilization by location.

Customer Exception Count
Select a Customer for a List of Locations
Wed Apr 02 2003

Customer	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
NetRadix	46	4	4	38
Trinagy	44	2	4	38

Location Exceptions Report
NetRadix
Wed Apr 02 2003

Location	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
All Locations	46	4	4	38
Bethesda	24	3	2	19
Alexandria	22	1	2	19

Hourly | Daily |
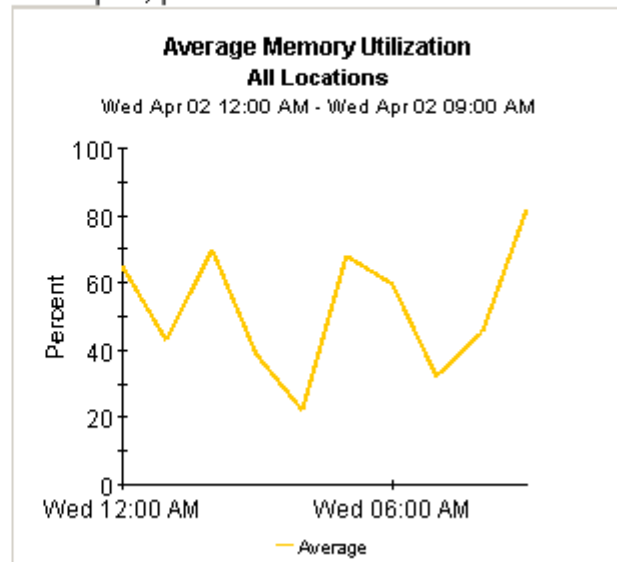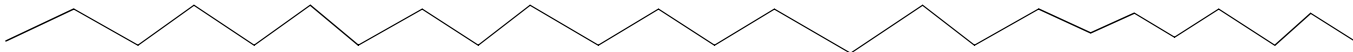
Average CPU Utilization
All Locations
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

Average Memory Utilization
All Locations
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

Average Buffer Utilization
All Locations
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

CPU, Memory, and Buffer Exceptions
All Locations
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

- CPU Util
- Memory Util
- Buffer Util

Hourly | Daily |

Grade of Service
All Locations
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Time of Day

- CPU Util
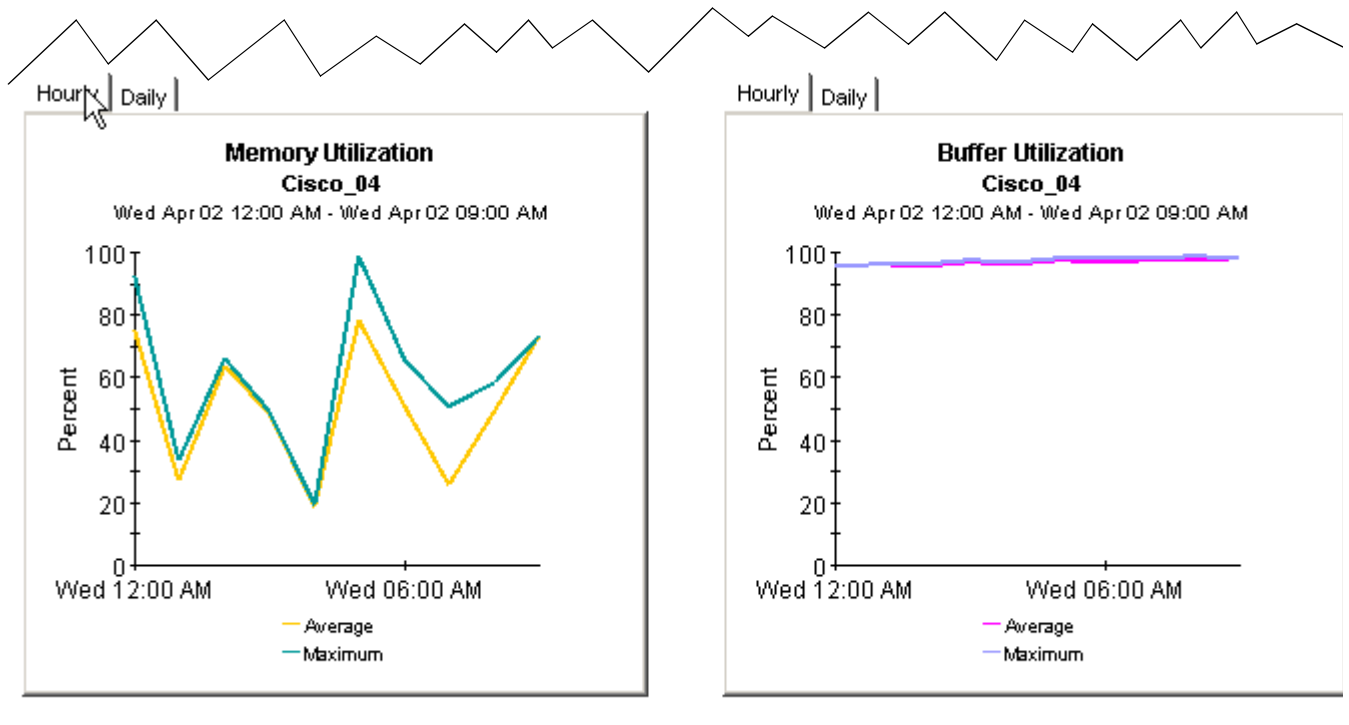- Memory Util
- Buffer Util
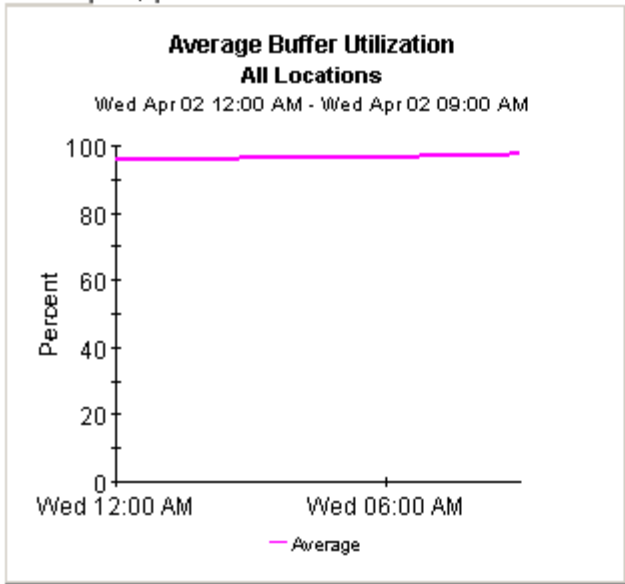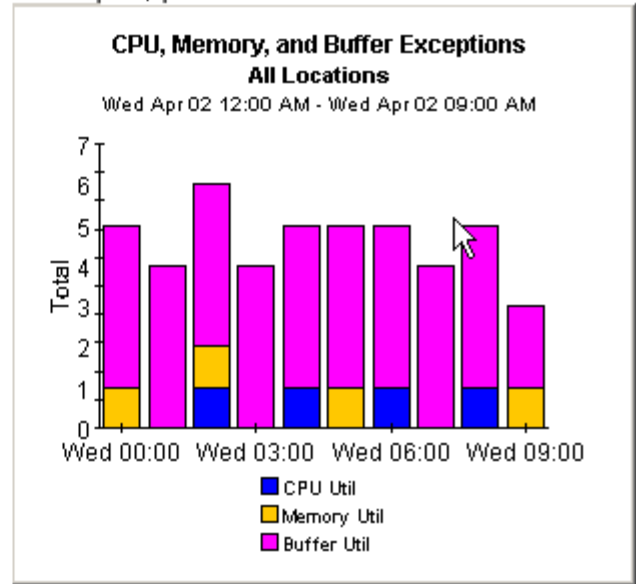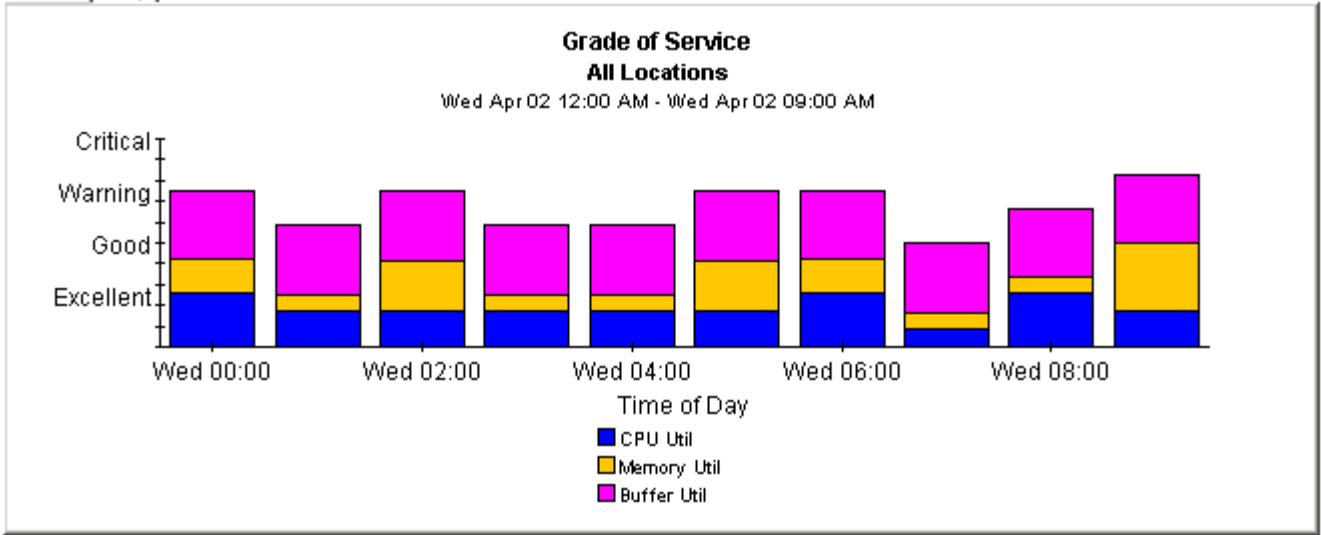
Device Resource Historical Summary

The Device Resource Historical Summary Report provides the network management staff with detailed information on key metrics for individual devices with the highest CPU, Buffer, and Memory Utilization.

Customer Summary
Wed Apr 02 2003

Customer	Busy Hour CPU Util	Busy Hour Memory Util	Busy Hour Buffer Util
NetRadix	71.38	81.47	97.47
Trinagy	74.75	66.70	96.46

NetRadix Device Summary
Wed Apr 02 2003

Device	Busy Hour CPU Util	Busy Hour Buffer Util	Busy Hour Memory Util
Cisco_04	72.00	98.12	78.45
Cisco_03	81.25	97.17	89.64

CPU | Memory | Buffer
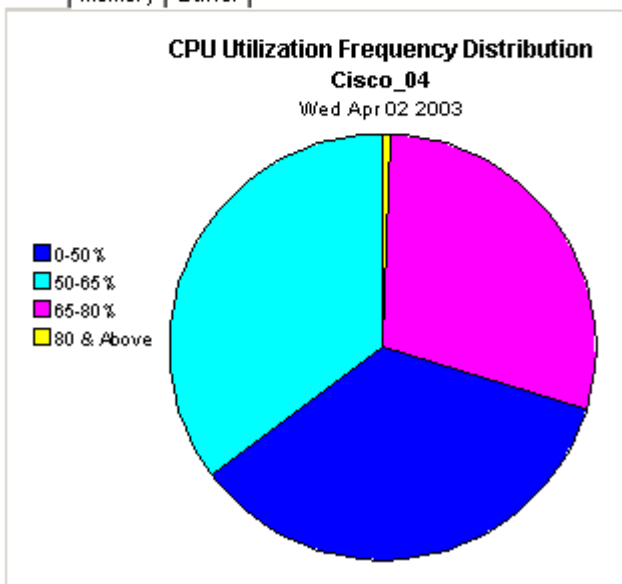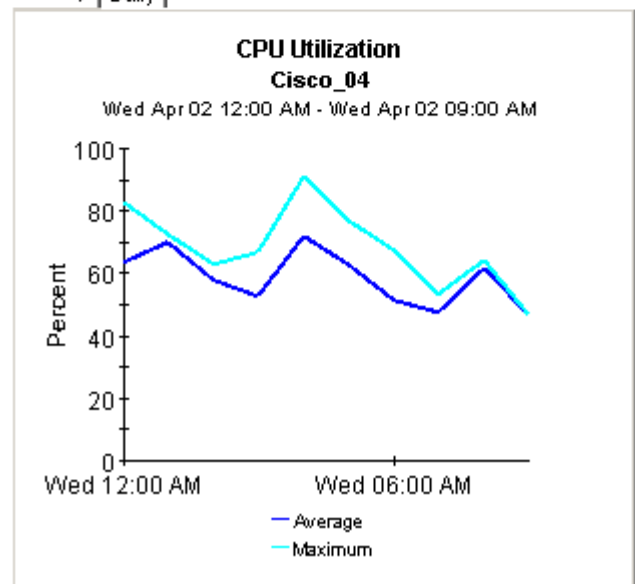
CPU Utilization Frequency Distribution
Cisco_04
Wed Apr 02 2003

- 0-50%
- 50-65%
- 65-80%
- 80 & Above

Hourly | Daily

CPU Utilization
Cisco_04
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

- Average
- Maximum

Hourly | Daily |

Memory Utilization
Cisco_04
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

Buffer Utilization
Cisco_04
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Device Resource
Card Historical Summary

The Device Resource Card Historical Summary Report provides the network management staff with detailed information on key metrics for individual devices by card or slot with the highest of CPU, Buffer, and Memory Utilization.

Customer Summary
Wed Apr 02 2003

Customer	Busy Hour CPU Util	Busy Hour Memory Util	Busy Hour Buffer Util
NetRadix	71.38	81.47	97.47
Trinagy	74.75	66.70	96.46

Device Summary
Wed Apr 02 12:00 AM

Device	Busy Hour CPU Util	Busy Hour Memory Util	Busy Hour Buffer Util
Cisco_04	72.00	78.45	98.12
Cisco_03	81.25	89.64	97.17

Card Summary
Wed Apr 02 2003

Card	Busy Hour CPU Util	Busy Hour Memory Util	Busy Hour Buffer Util
0	72.00	78.45	98.12

CPU | Memory | Buffer

CPU Utilization Frequency Distribution
Card 0
Wed Apr 02 2003

- 0-50 %
- 50-65 %
- 65-80 %
- 80 & above
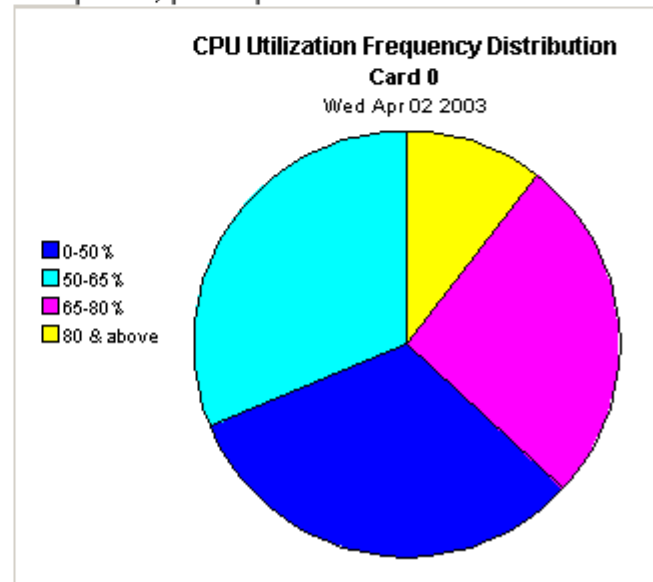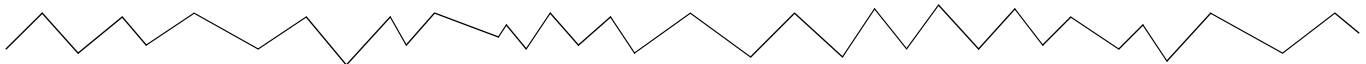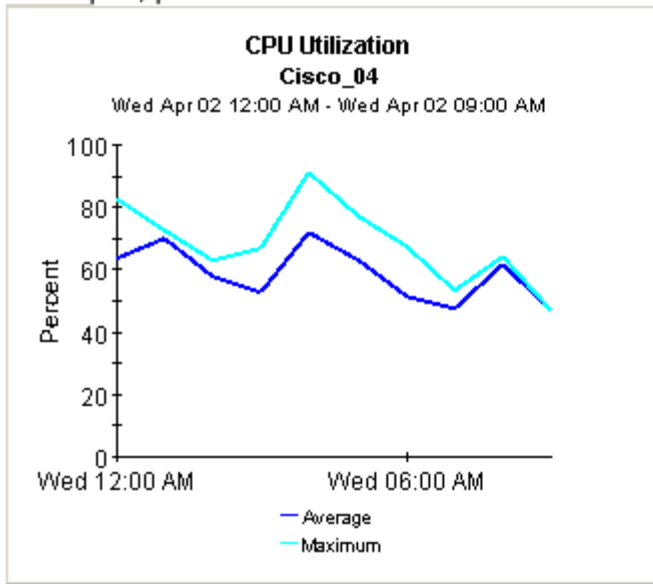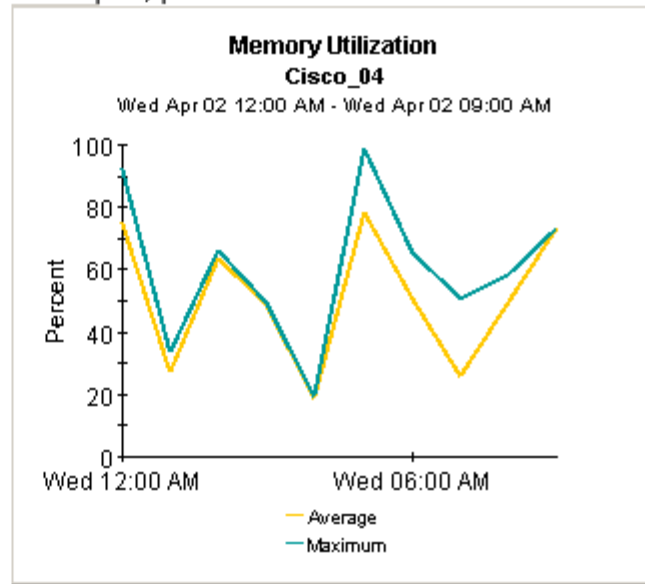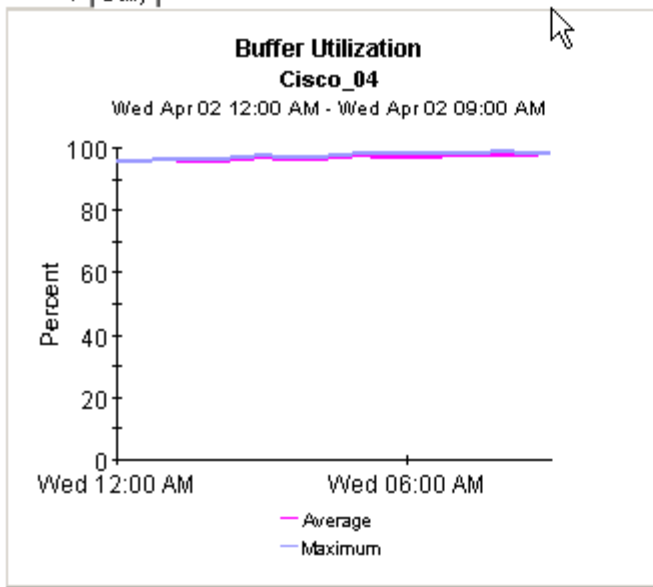
Device Resource Exceptions Summary

The Device Resource Exceptions Report provides the network manager and other members of the network management staff a list of devices that have exceeded threshold conditions.

Customer Exception Counts
Wed Apr 02 2003

Customer	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
NetRadix	46	4	4	38
Trinagy	44	2	4	38

Device Exception Counts
NetRadix
Wed Apr 02 2003

Device	Total Exceptions	CPU Util Exceptions	Memory Util Exceptions	Buffer Util Exceptions
Cisco_03	24	3	2	19
Cisco_04	22	1	2	19

Hourly | Daily |

Average Memory Utilization
Cisco_03
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

Average Buffer Utilization
Cisco_03
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM

Hourly | Daily |

CPU, Memory, and Buffer Exceptions
Cisco_03
Wed Apr 02 12:00 AM - Wed Apr 02 09:00 AM
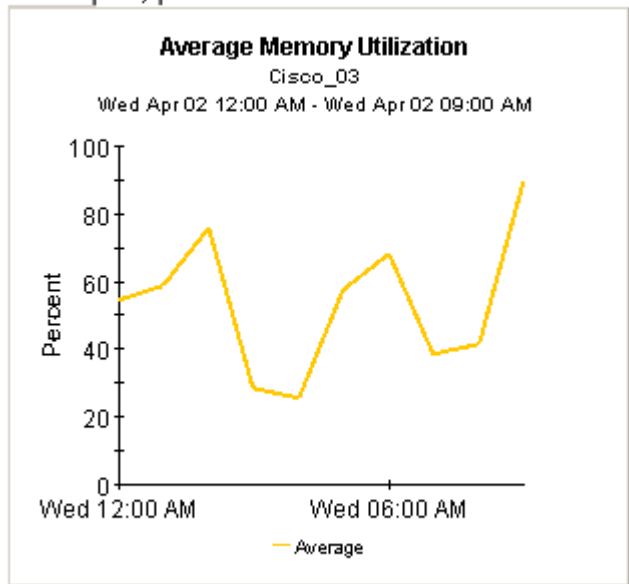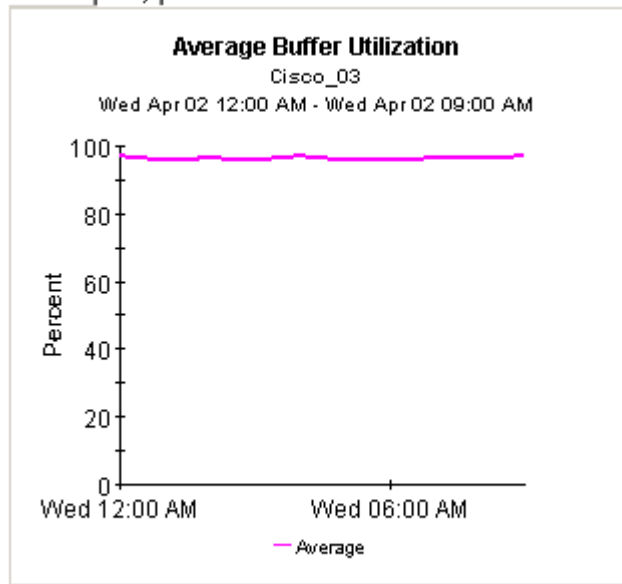
■ CPU Util
■ Memory Util
■ Buffer Util
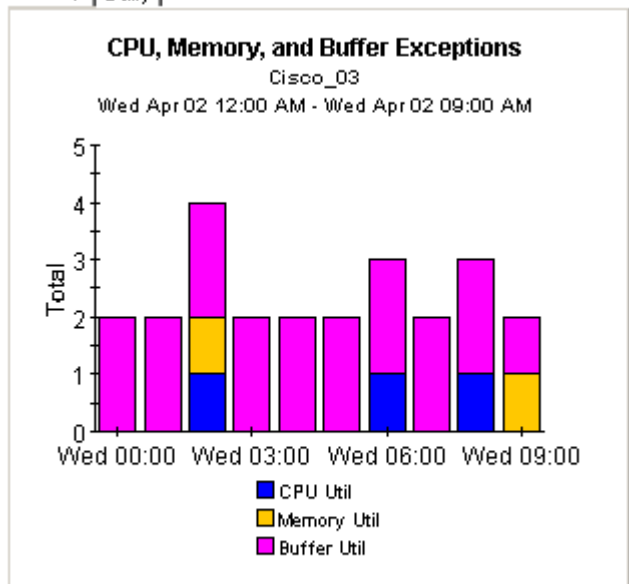
Exception Detail Table Sorted by Time Period
Cisco_03
Wed Apr 02 2003

Time Period	CPU Util	Memory Util	Buffer Util
Wed Apr 02 12:00 AM	72.25	54.59	96.96*
Wed Apr 02 01:00 AM	56.5	58.68	95.97*
Wed Apr 02 02:00 AM	64.25	75.94	96.45*
Wed Apr 02 03:00 AM	57.75	28.14	95.91*
Wed Apr 02 04:00 AM	50.5	25.30	97.17*
Wed Apr 02 05:00 AM	59.25	57.47	95.88*
Wed Apr 02 06:00 AM	78.75	67.97	95.82*
Wed Apr 02 07:00 AM	43.75	38.33	96.23*
Wed Apr 02 08:00 AM	81.25	41.41	96.39*
Wed Apr 02 09:00 AM	69.0	89.64*	96.82*

Device Resource Reporting - Backplane

Historical Summary

The Device Resource Backplane Historical Summary Report provides the network management staff with detailed information on key metrics for individual devices with the highest Backplane, CPU, Buffer, and Memory Utilization.
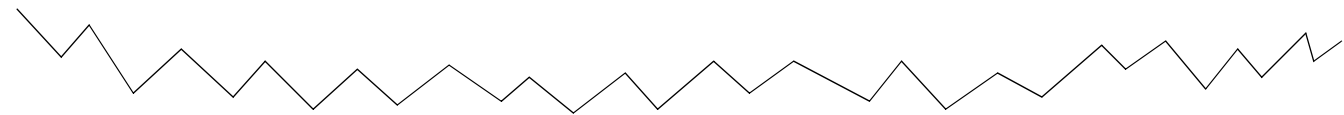
Switch Summary
Tue May 20 2003

Device	Avg Bkpl Util
15.1.53.129	24.27
15.13.104.6	0.07
15.3.208.119	0.04
15.2.144.2	0.04
15.9.72.23	0.01
15.9.72.28	0.01
15.9.72.6	0.01
15.129.22.187	0.00
15.25.40.19	0.00
15.25.40.21	0.00
15.25.40.23	0.00
15.25.40.25	0.00
15.25.40.27	0.00

CPU, Buffer, and Memory Utilization
Tue May 20 2003

Device	Busy Hour CPU Util	Busy Hour Buffer Util	Busy Hour Memory Util
15.13.104.6	10.25		71.44

Device	Make	Model	Bkpl Type	Customer	Location
15.13.104.6	Cisco	WS-C6506	16 Gigabit Switch	Customer Unassigned	Location Unassigned

Hourly | Daily |

Backplane Utilization
15.13.104.6
Tue May 20 12:00 AM - Wed May 21 12:00 AM

- Average
- Maximum
- Minimum

Hourly   Daily |

Average and Busy Hour CPU Utilization
15.13.104.6
Wed May 14 2003 - Tue May 20 2003

- Average
- Busy Hour

Hourly   Daily |

Average and Busy Hour Utilization
15.13.104.6
Wed May 14 2003 - Tue May 20 2003

- Average
- Busy Hour

Hourly   Daily |

Average and Busy Hour Buffer Utilization
15.13.104.6
Wed May 14 2003 - Tue May 20 2003
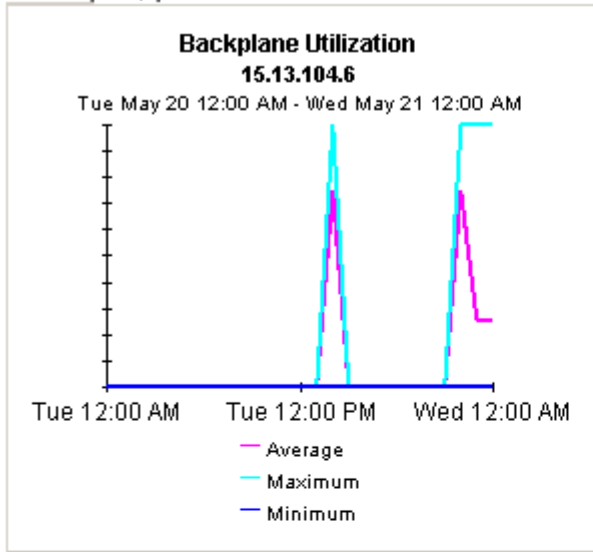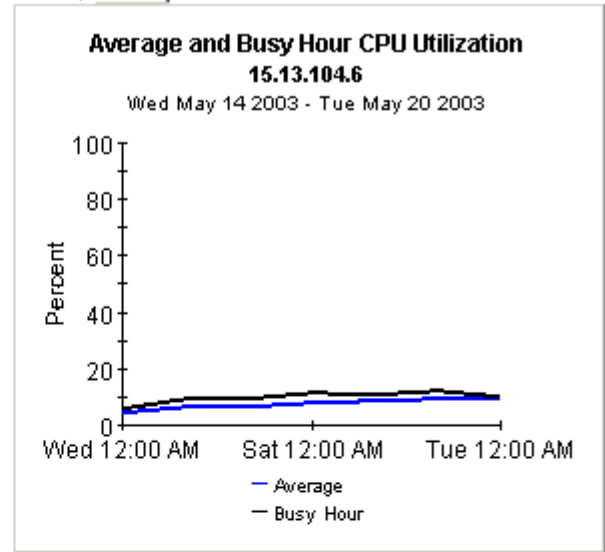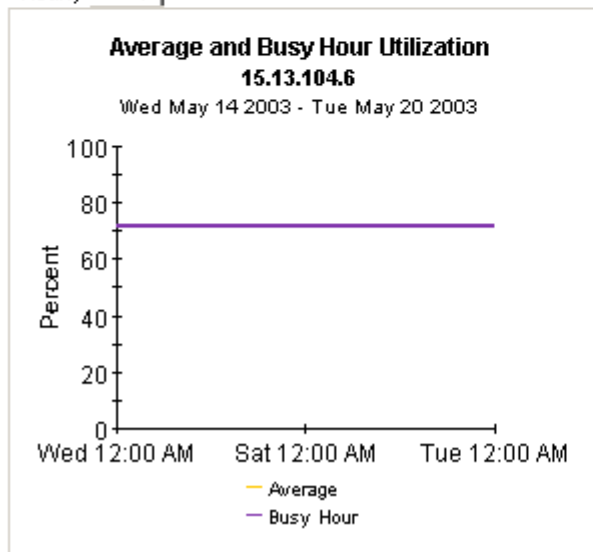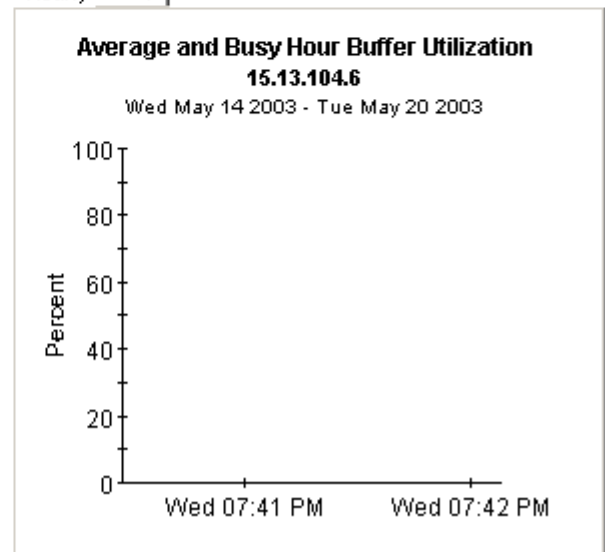
Forecast Reports

The three forecast reports in Device Resources focus on Days to Threshold (DTT) and provide estimates for future utilization. The threshold is 90% utilization, and the value for DTT indicates how close the device is to reaching 90% utilization.

The customer and location reports are actually summary reports, aggregating data by customer or by location. The DTT values in these reports are actually *averages* across all devices for that customer, or all devices in that location. For example, if the memory utilization DTT is 17 for a customer, many devices could be closer to the threshold while many devices could be further away from the threshold.

If you want to see which customer is closest to a threshold, or which location is closest to a threshold, start with the summary reports. If a customer or device looks suspicious, use the device report to pinpoint the devices that appear to be causing the problem. The device report provides DTT and forecasts for specific devices; the data is not aggregated.

All three reports use the same criterion for inclusion: a customer, location, or device appears in the report if CPU, buffer, or memory utilization is expected to exceed the exception threshold sometime within the next 90 days. The three graphs under the DTT data allow you to find out which resource is contributing to the problem. Each graph has three tabs:

- Standard
- Day of Week
- History

Use the standard graph to compare the baseline (*average busy hour* during the baseline period) to F30, F60, and F90. Use the day of week graph to compare the baseline to F30, F60, and F90 on a day of week basis and to find out whether resource usage is correlating with a particular day of the week. Use the history graph to compare average utilization to busy hour utilization over the baseline period. In the hourly graph, "average utilization" is based on four samples. In the daily graph "average utilization" is based on 96 samples (4 samples per hour, 24 hours per day).

The F30, F60, and F90 values are produced by applying linear regression to busy hour values recorded over the baseline period. Busy hour is the highest average utilization for the day. During that hour, actual utilization may have been considerably higher for at least a portion of the hour. Busy hour reflects a persistent event, not a momentary spike. When busy hour is high, you want average utilization to be low. If average utilization is high, you know that resource utilization has been high for an extended period of time.
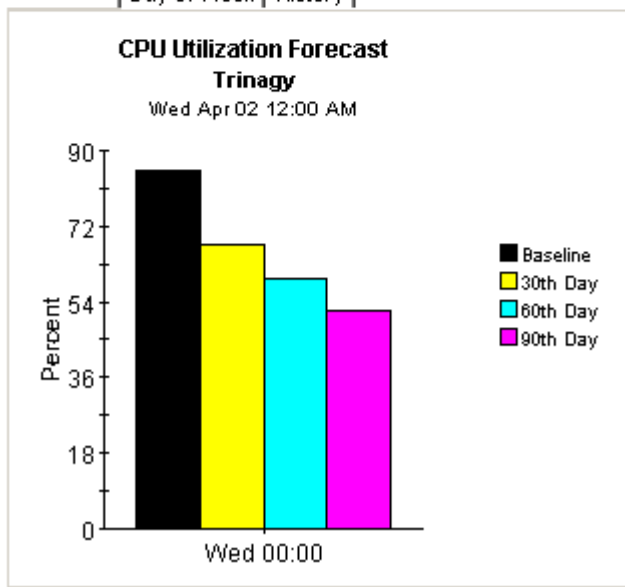
Device Resource
Customer Forecast

The Customer Forecast Report lists customers that are forecasted to reach CPU, memory, or buffer utilizations greater than 90% within the next 90 days based on all reported devices for the selected customer.

Customer CPU, Buffer, and Memory Utilization
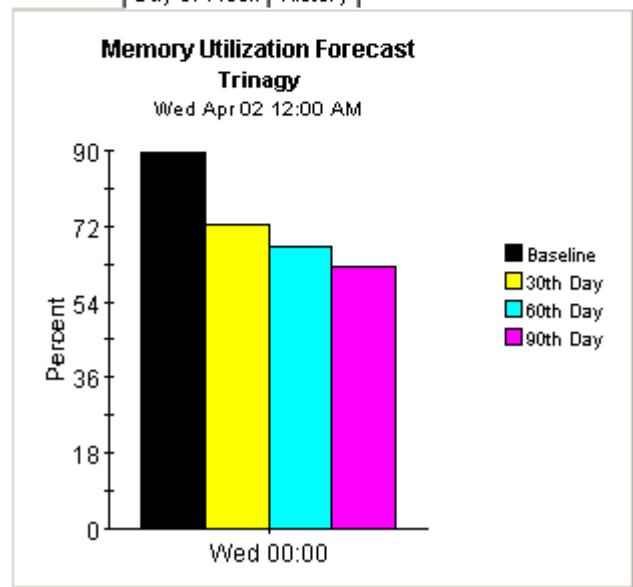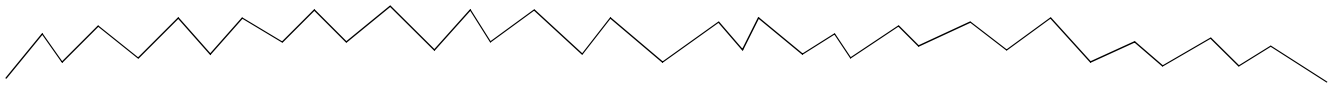### Projected to Exceed 90% Utilization within 90 Days
Wed Apr 02 12:00 AM

Customer	CPU Util DTT	Memory Util DTT	Buffer Util DTT
Trinagy			
NetRadix		17	0

Standard | Day of Week | History |

CPU Utilization Forecast
Trinagy
Wed Apr 02 12:00 AM

Standard | Day of Week | History |

Memory Utilization Forecast
Trinagy
Wed Apr 02 12:00 AM

Standard | Day of Week | History |

Buffer Utilization Forecast
Trinagy
Wed Apr 02 12:00 AM
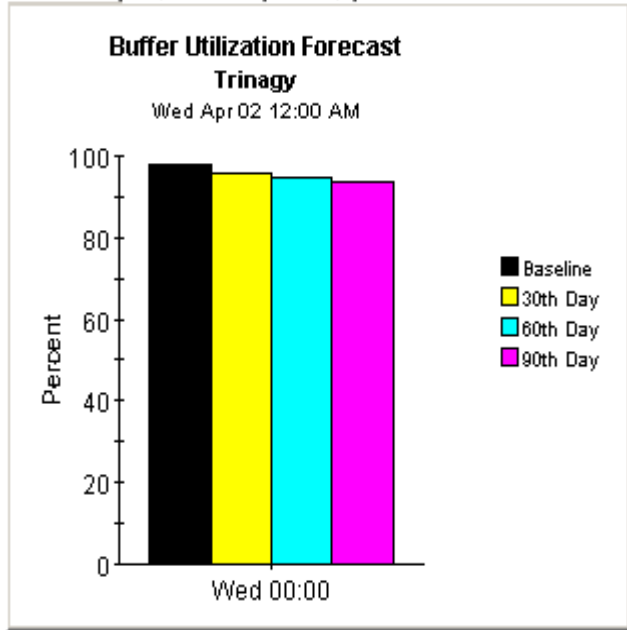
Device Resource Forecast

The Device Resource Forecast Report lists devices that are reaching CPU, memory, or buffer utilization thresholds within the next 90 days indicating where near-term correction can prevent service degradation.
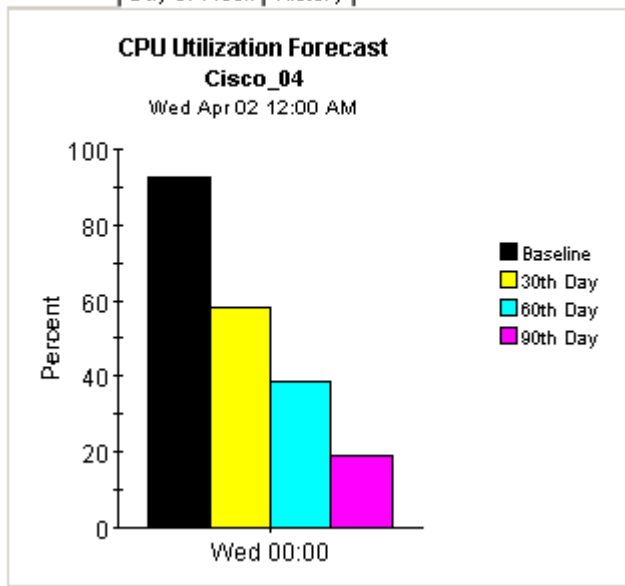
Customer Selection List

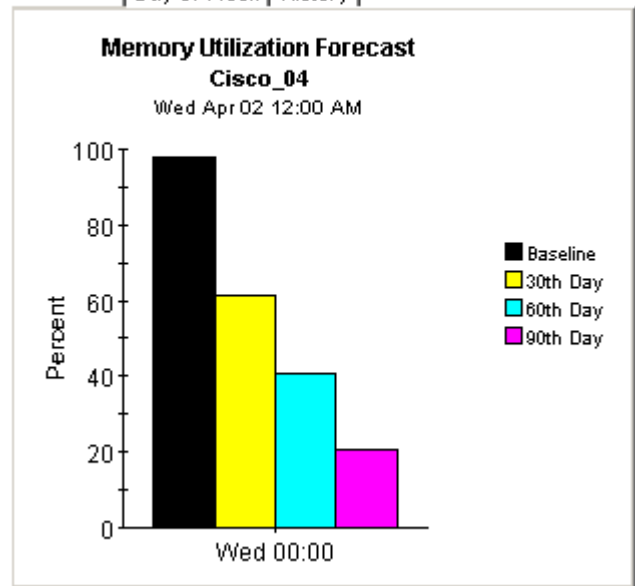| Customer |
|---|
| NetRadix |
| Trinagy |

Device Estimated Days toThreshold
Projected to Exceed 90% Utilization within 90 Days
NetRadix Devices

Device	CPU Util DTT	Memory Util DTT	Buffer Util DTT
Cisco_04			0
Cisco_03	14	0	

Standard | Day of Week | History

CPU Utilization Forecast
Cisco_04
Wed Apr 02 12:00 AM

Standard | Day of Week | History

Memory Utilization Forecast
Cisco_04
Wed Apr 02 12:00 AM

Standard | Day of Week | History |

Buffer Utilization Forecast
All Locations
Wed Apr 02 12:00 AM

Percent

100 —

80 —

60 —

40 —

20 —

0 —

Wed 00:00

■ Baseline
□ 30th Day
□ 60th Day
□ 90th Day
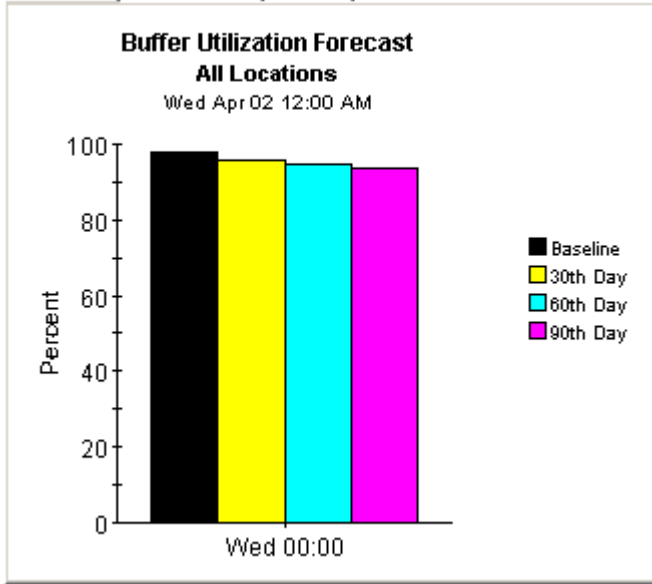
Device Resource
Location Forecast

The Location Forecast Report lists locations by customer that are forecasted to each CPU, memory, or buffer utilization greater than 90% within the next 90 days based on all reported devices for the selected location.

CPU, Buffer, and Memory Utilization by Customer
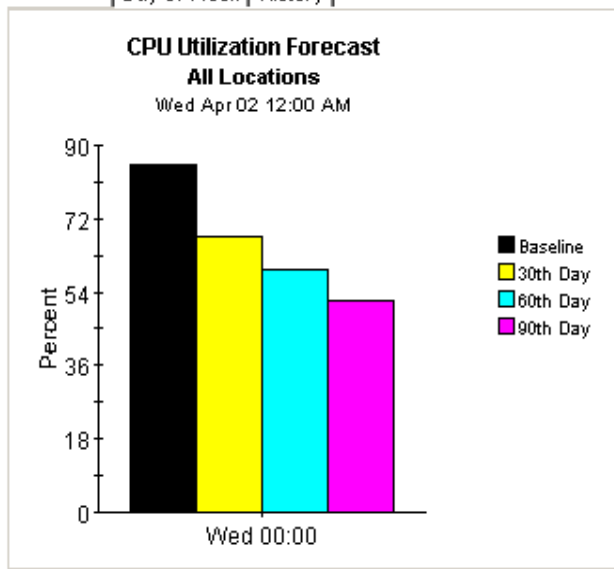### Select a Customer for a List of Locations

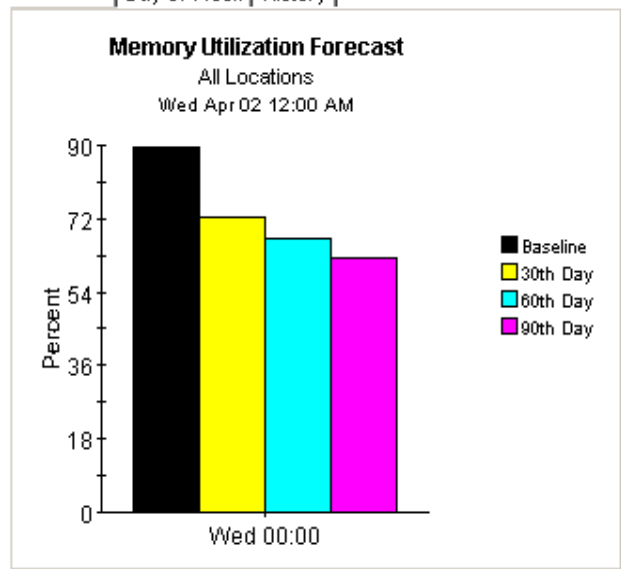| Customer	CPU Util DTT	Memory Util DTT	Buffer Util DTT
Trinagy			
NetRadix		17	0

CPU, Buffer and Memory Utilization by Location
Projected to Exceed 90% Utilization within 90 Days
Trinagy

Location	CPU Util DTT	Memory Util DTT	Buffer Util DTT
All Locations			
Ashburn			
Reston		0	

Standard | Day of Week | History |

CPU Utilization Forecast
All Locations
Wed Apr 02 12:00 AM

- Baseline
- 30th Day
- 60th Day
- 90th Day

Percent

Wed 00:00

Standard | Day of Week | History |

Memory Utilization Forecast
All Locations
Wed Apr 02 12:00 AM

- Baseline
- 30th Day
- 60th Day
- 90th Day

Percent

Wed 00:00

Standard | Day of Week | History |

Buffer Utilization Forecast
All Locations
Wed Apr 02 12:00 AM

- ■ Baseline
- □ 30th Day
- □ 60th Day
- □ 90th Day

7
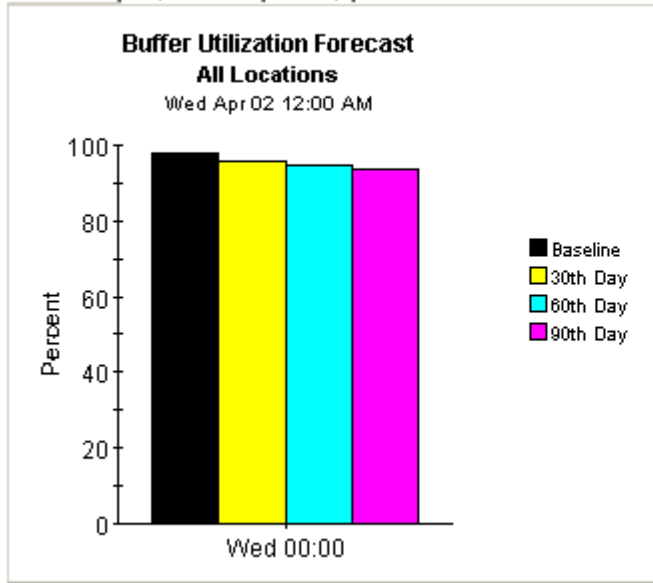
Service Level Management

The Service Level Management report focuses on the availability of individual devices and network response time. Use this report to see if availability and network response time are meeting levels guaranteed by service level agreements.

An available device is a device that returns a request from the polling agent. The calculation that determines availability has limitations. Although it can compensate for network issues that may prevent the device from responding to a polling request, it cannot tell the difference between a device that is down and a device that is busy and not able to respond. Given this limitation, you may want to use the availability statistics in this report as one indicator of device availability, not your only indicator of device availability.

Network response time is defined as the length of time that elapses from the moment a request is sent by the datapipe to the moment the answer is received by the datapipe. This perspective on response time is different from the user's perspective. Since the perspectives are different, you should interpret response time increases as an indicator that traffic may be congested and that the delay experienced by users may be comparable.

Selecting a customer from the customer list populates two tables:

- Devices sorted by availability
- Devices sorted by network response time

The first table sorts devices by availability, highest to lowest. The second table sorts devices by busy hour, highest to lowest.

Selecting a device populates two graphs:

- Device availability, hourly and daily
- Average network response time vs. busy hour network response time

The hourly view of device availability covers a 24-hour period, midnight to midnight. The daily view begins with yesterday and covers the previous two weeks. If you see low availability, or high response time, compare yesterday's performance with performance over the past two weeks to see whether yesterday's performance is in line with recent history or different from recent history.

Device Resource
Service Level Management

The Device Resource Service Level Management report informs executives, network managers, end users, and customers which devices may not be meeting required availability or network response time values.

Customer Summary
Wed Apr 02 2003 - Wed Apr 02 2003

Customer
NetRadix
Trinagy

Device Availabilty	Network Response Time
NetRadix	NetRadix
Wed Apr 02 2003	Wed Apr 02 2003

Device	Availability
Cisco_03	75.35
Cisco_04	75.17

Device	Average Response Time	Busy Hour Response Time
Cisco_03	0.84	1.35
Cisco_04	0.80	1.25

Daily | Hourly

Availability
Cisco_03
Wed Mar 19 2003 - Wed Apr 02 2003

Daily | Hourly

Network Response Time
Cisco_03
Wed Mar 19 2003 - Wed Apr 02 2003

8
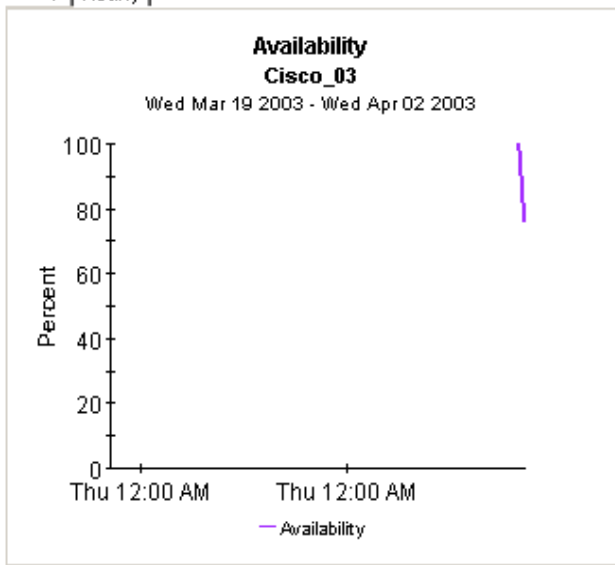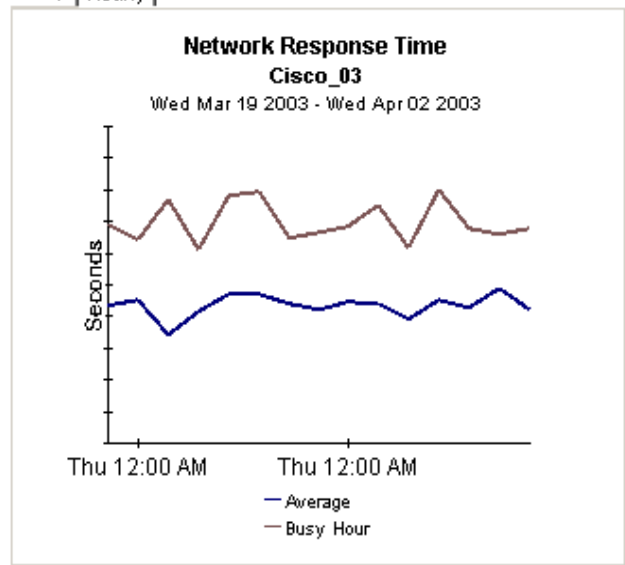
Near Real Time Reports

The two Near Real Reports in Device Resources—the QuickView and the Snapshot version of the QuickView—shed light on resource utilization over the last six hours and the last 24 hours. The selection table at the top of the report focuses on the last six hours and sorts devices by resource utilization, highest to lowest. It displays average utilization for CPU, memory, and buffer, using for input all the samples taken during the last six hours. In practice, this means approximately 24 samples. If samples are taken every 15 minutes, then the most recent sample in this average is only several minutes old.

While the table at the top of the report provides averages for the previous six hours, the CPU, memory, and buffer graphs monitor activity over the previous 24 hours. In OVPI speak, you are looking at *rate data*, that is, the actual samples, not hourly averages. You also have a grade of service chart that ranks service quality over the last six hours. Since the Near Real Time report is recalculated after every poll, you can use this chart to find out whether a situation you are watching closely is improving or getting worse.

Because the table at the top highlights devices with the *worst* utilization, you can use the NRT QuickView to identify which devices are in trouble—or confirm that no devices are in trouble. In addition, if an average in the table seems abnormal, you can compare the average in the table to the previous 24 hours to see if the current average represents an existing condition or a completely new condition. If a summary report for yesterday points to a situation that could become problematic, the Near Real Time report will tell you whether that condition is improving, worsening, or staying about the same. The good news is that you have some advance warning and you should be able to correct the problem before it becomes a serious issue for users.

Due to space limitations, the time period in the three rate data graphs may be partially concealed. You can easily improve your view of the data by right-clicking the graph, selecting **View in New Frame**, and resizing the window. Once resized, every hour will be clearly visible.

The Snapshot version of the Near Real Time QuickView operates just like the Snapshot version of the Historical Summary. Launch it, then respond to the prompts that ask you which device or devices you want to include in the report. If a summary, top ten, or forecast report has already alerted you to a device with resource problems, and this device is not appearing in the NRT QuickView, you can launch the Snapshot version to see where utilization levels are right now and what has happened since yesterday.

Samples of QuickView NRT, QuickView NRT Snapshot, and Backplane NRT follow.

Device Resource
Near Real Time QuickView

The Device Resource Near Real Time report gives the network management staff an up to date view of the performance of individual devices. By selecting a device from the selection list, current device performance up to the most recent data collection can be investigated in detail.

Device Near Real Time
Averages Over the Last Six Hours
Select a Device

Device	Average CPU Util	Average Memory Util	Average Buffer Util

CPU Utilization

Thu Apr 03 03:13 PM - Thu Apr 03 03:13 PM

No Data

Memory Utilization

Thu Apr 03 03:13 PM - Thu Apr 03 03:13 PM

No Data

Buffer Utilization

Thu Apr 03 03:13 PM - Thu Apr 03 03:13 PM

Grade of Service

Thu Apr 03 03:13 PM - Thu Apr 03 03:13 PM

Device Resource
Near Real Time Snapshot

The Device Resource Near Real Time report gives the network management staff an up to date view of the performance of individual devices. By selecting a device from the selection list, current device performance up to the most recent data collection can be investigated in detail.

Device Near Real Time
Averages over the Last Six Hours
Select a Device

Device	Average CPU Util	Average Memory Util	Average Buffer Util

CPU Utilization

Thu Apr 03 03:16 PM - Thu Apr 03 03:16 PM

No Data

Memory Utilization

Thu Apr 03 03:16 PM - Thu Apr 03 03:16 PM

No Data

Buffer Utilization

Thu Apr 03 03:16 PM - Thu Apr 03 03:16 PM

Grade of Service

Thu Apr 03 03:16 PM - Thu Apr 03 03:16 PM

Device Resource Reporting – Backplane Near Real Time Report

The Near Real Time report provides a detailed look at the performance of individual blackplanes being utilized in the last polling cycle. Select a switch and view the bus(es) for that switch. Watch the tabbed areas for a detailed look into the performance of that switch or bus.
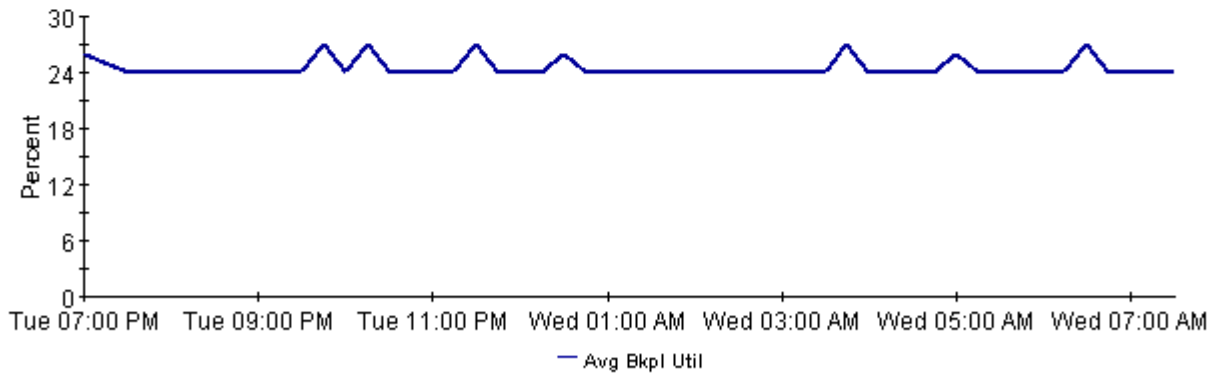
Switch Near Real Time
Select a Switch

| Time Period	Device	Make	Model	Backplane Type	Avg Bkpl Util
Wed May 21 07:00 PM	15.1.53.129	Cisco	WS-C1400	FDDI	25.00
Wed May 21 07:00 PM	15.13.104.6	Cisco	WS-C6506	16 Gigabit Switch	0.00
Wed May 21 07:00 PM	15.129.22.187	Cisco	WS-C5509	3.6 Gigabit Switch Enhanced	0.00
Wed May 21 07:00 PM	15.25.40.19	Cisco	WS-C4003	12 Gigabit Switch	0.00
Wed May 21 07:00 PM	15.25.40.21	Cisco	WS-C4003	12 Gigabit Switch	0.00
Wed May 21 07:00 PM	15.25.40.23	Cisco	WS-C4003	12 Gigabit Switch	0.00

Switch Backplane Utilization
15.1.53.129
Tue May 20 07:00 PM - Wed May 21 07:30 AM

— Avg Bkpl Util

Switch Backplane Utilization per Bus Near Real Time
Select a Bus

Time Period	Device	Make	Model	Bus Type	Avg Bkpl Util
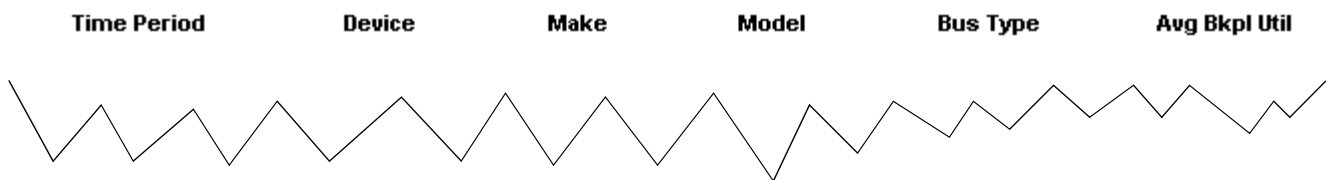
Bus Utilization
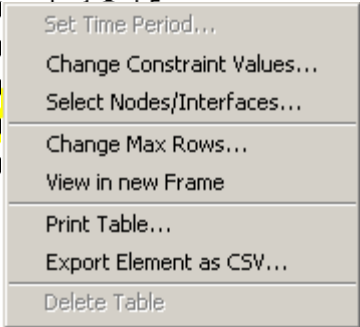
Wed May 21 07:35 PM - Wed May 21 07:35 PM

No Data

Editing Tables and Graphs

Any table or graph can be viewed in several ways. While the default view is usually fine, you can easily change to a different view. If you are using Report Viewer, change the default view by right-clicking the object and selecting a different view. If you are viewing the report on the Web, click the **Edit Table** or **Edit Graph** icons.

View Options for Tables

Right-clicking a table, or selecting **Edit Table**, opens a list of table view options.

Device	Interface	F/H	Customer	Descr.	Baseline Avg.
24.13.17.1	5	F	Concert	Cable5/0	In:2 Out:5
24.13.17.1	5	F	Concert	Cable5/0	In:2 Out:5
24.13.17.1	5	F	Concert	Cable5/0	In:3 Out:5
24.13.17.1	5	F	Concert	Cable5/0	In:2 Out:5
24.13.17.1	5	F	Concert	Cable5/0	In:2 Out:4
24.13.17.1	6	F	Concert	Cable6/0	
24.13.17.1	5	F	Concert	Cable5/0	
24.13.17.1	6	F	Concert	Cable6/0	
24.13.17.1	6	F	Concert	Cable6/0	
24.13.17.1	6	F	Concert	Cable6/0	

Menu options:
- Set Time Period...
- Change Constraint Values...
- Select Nodes/Interfaces...
- Change Max Rows...
- View in new Frame
- Print Table...
- Export Element as CSV...
- Delete Table

Select **Set Time Period** to alter the relative time period (relative to now) or set an absolute time period. The Set Time Period window opens.

You may shorten the period of time covered by the table from, for example, 42 days to 30 days or to 7 days. If you are interested in a specific period of time that starts in the past and stops *before* yesterday, click **Use Absolute Time** and select a Start Time and an End Time.

Select **Change Constraint Values** to loosen or tighten a constraint, thereby raising or lowering the number of elements that conform to the constraint. The Change Constraint Values window opens. To loosen a constraint, set the value lower; to tighten a constraint, set the value higher.

The **Select Nodes/Interfaces** allows you to change the scope of the table by limiting the table to specific nodes, specific interfaces, or a specific group of nodes or interfaces. The Select Node Selection Type window opens.

Change Max Rows increases or decreases the number of rows in a table. The default is 50. If you expand the default, the table may take more time to open. If you are trending a large network, using the default ensures that the table opens as quickly as possible.

 View in new Frame opens the table in a Table Viewer window, shown below. If necessary, make the data in the table more legible by resizing the window.

III Table Viewer

Polled IP QoS Statistics Data - Input
Over Previous 6 Hours

Direction	IpPrecedence	Switched Bytes	Switched Pkts	Time Period
Input	0	105,688	675	Tue Oct 29 07:00 AM
Input	1	0	0	Tue Oct 29 07:00 AM
Input	2	0	0	Tue Oct 29 07:00 AM
Input	3	0	0	Tue Oct 29 07:00 AM
Input	4	0	0	Tue Oct 29 07:00 AM
Input	5	0	0	Tue Oct 29 07:00 AM
Input	6	600	5	Tue Oct 29 07:00 AM
Input	7	0	0	Tue Oct 29 07:00 AM
Input	0	98,334	638	Tue Oct 29 06:45 AM
Input	1	0	0	Tue Oct 29 06:45 AM
Input	2	0	0	Tue Oct 29 06:45 AM
Input	3	0	0	Tue Oct 29 06:45 AM
Input	4	0	0	Tue Oct 29 06:45 AM
Input	5	0	0	Tue Oct 29 06:45 AM
Input	6	0	0	Tue Oct 29 06:45 AM
Input	7	0	0	Tue Oct 29 06:45 AM
Input	0	97,539	648	Tue Oct 29 06:30 AM
Input	1	0	0	Tue Oct 29 06:30 AM
Input	2	0	0	Tue Oct 29 06:30 AM
Input	3	0	0	Tue Oct 29 06:30 AM
Input	4	0	0	Tue Oct 29 06:30 AM
Input	5	0	0	Tue Oct 29 06:30 AM
Input	6	120	1	Tue Oct 29 06:30 AM
Input	7	0	0	Tue Oct 29 06:30 AM
Input	0	90,744	564	Tue Oct 29 06:15 AM
Input	1	0	0	Tue Oct 29 06:15 AM
Input	2	0	0	Tue Oct 29 06:15 AM
Input	3	0	0	Tue Oct 29 06:15 AM
Input	4	0	0	Tue Oct 29 06:15 AM
Input	5	0	0	Tue Oct 29 06:15 AM
Input	6	0	0	Tue Oct 29 06:15 AM
Input	7	0	0	Tue Oct 29 06:15 AM
Input	0	103,775	656	Tue Oct 29 06:00 AM
Input	1	0	0	Tue Oct 29 06:00 AM
Input	2	0	0	Tue Oct 29 06:00 AM
Input	3	0	0	Tue Oct 29 06:00 AM
Input	4	0	0	Tue Oct 29 06:00 AM
Input	5	0	0	Tue Oct 29 06:00 AM

View Options for Graphs

Right-click any graph to open a list of view options.
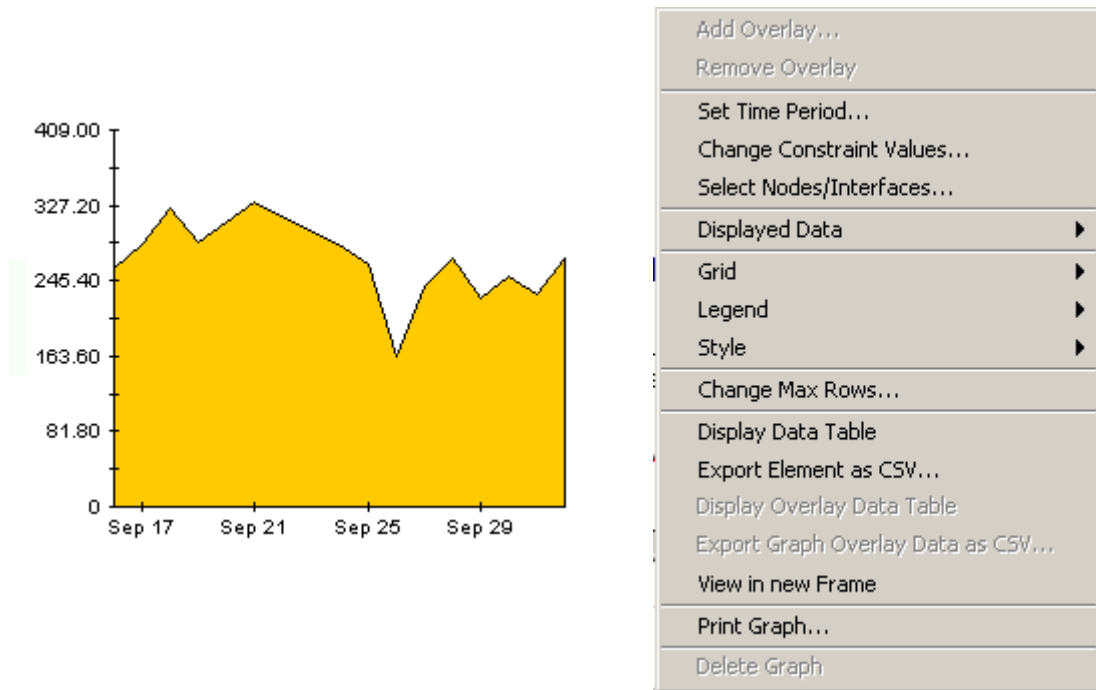
The following table provides a few details about each option.

Option	Function
Set Time Period	Same as the table option shown above.
Change Constraint Values	Same as the table option shown above.
Select Nodes/Interfaces	Same as the table option shown above.
Displayed Data	For every point on a graph display data in a spreadsheet.
Grid	Add these to the graph: X axis grid lines Y axis grid lines X and Y axis grid lines
Legend	Delete or reposition the legend.
Style	See the illustrations below.
Change Max Rows...	Same as the table option shown above.
Display Data Table	See below.
Export Element as CSV...	Same as the table option shown above.

Option	Function
View in New Frame	Opens graph in a Graph Viewer window.
Print Graph	Same as the table option shown above.

Style Options

Select **Style** to display a list of seven view options for graphs.
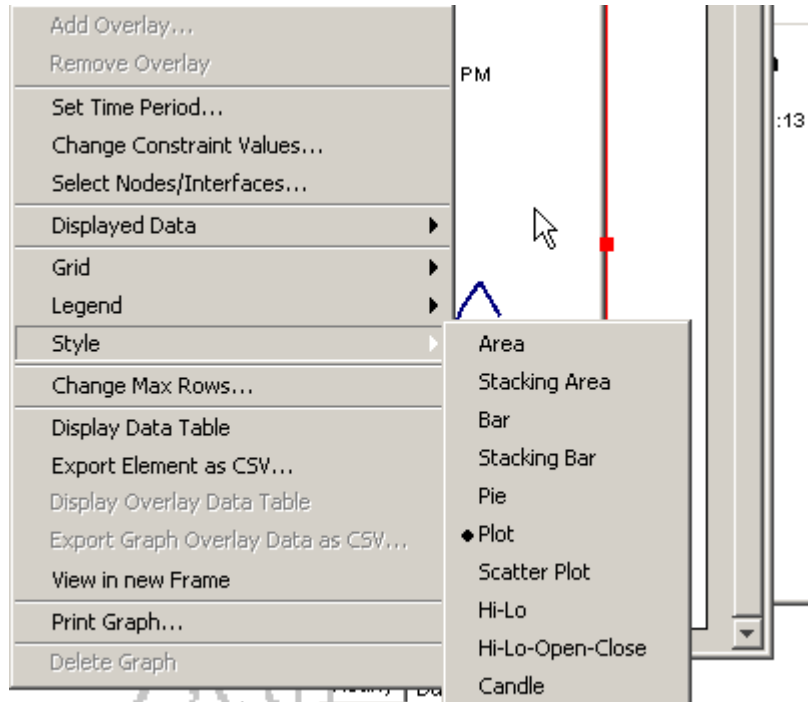
Style > Area

The plot or bar chart changes to an area graph. While relative values and total values are easy to view in this format, absolute values for smaller data types may be hard to see. Click anywhere within a band of color to display the exact value for that location
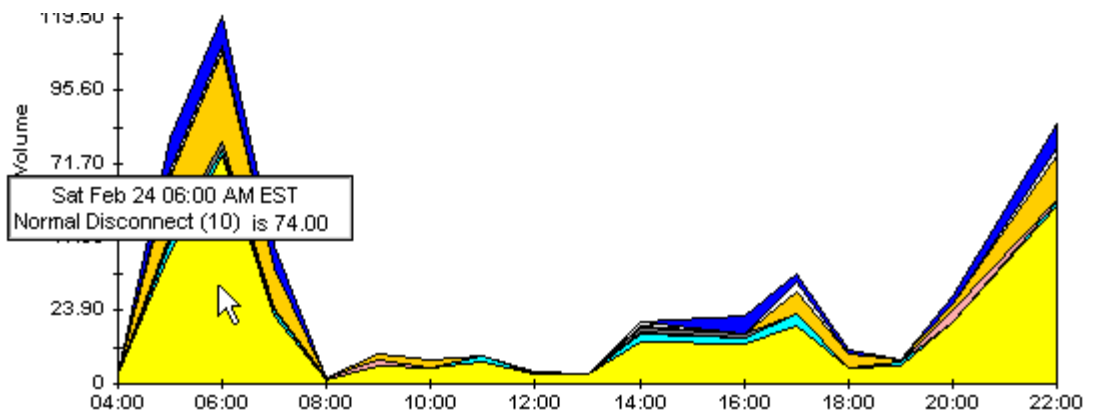
To shorten the time span of a graph, press SHIFT+ALT and use the left mouse button to highlight the time span you want to focus on. Release the mouse button to display the selected time span.

Style > Stacking Area

The area or plot graph changes to a stacking area graph. This view is suitable for displaying a small number of variables.
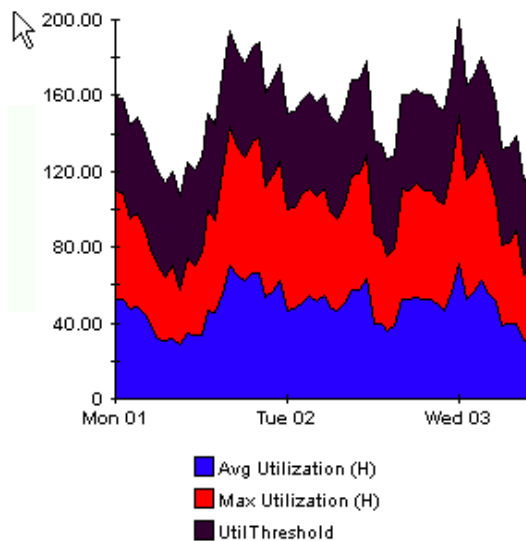

Style > Bar

The graph changes to a bar chart. This view is suitable for displaying relatively equal values for a small number of variables. There are three variables in the graph below.
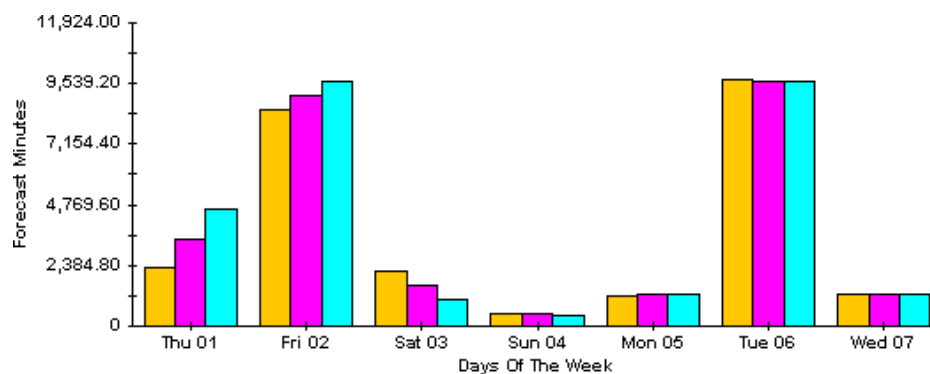
Style > Stacking Bar

The plot or area graph changes to a stacking bar chart. If you increase the width of the frame, the time scale becomes hourly. If you increase the height of the frame, the call volume shows in units of ten.
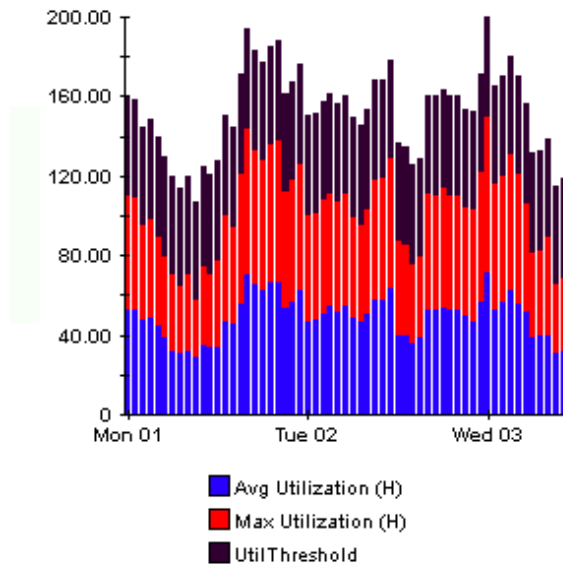

Style > Plot

Bands of color in an area graph change to lines. If you adjust the frame width, you can make the data points align with hour; if you adjust the frame height, you can turn call volume into whole numbers.
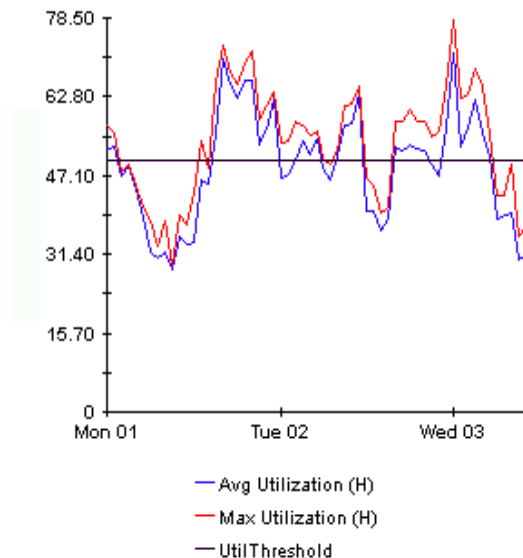
Style > Pie

An area graph becomes a pie chart. Bands in an area graph convert to slices of a pie and the pie constitutes a 24-hour period. This view is helpful when a small number of data values are represented and you are looking at data for one day.
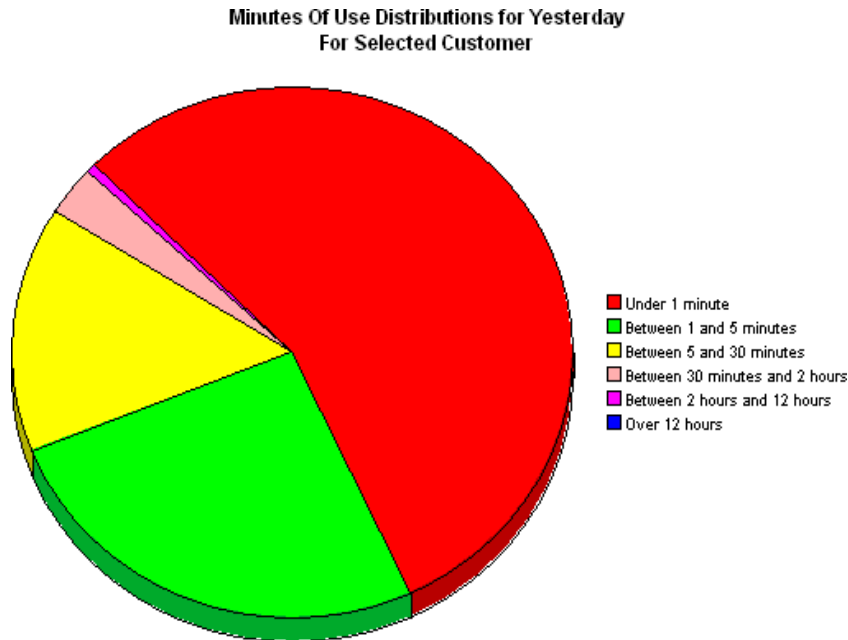
If you look at data for more than one day, you will see multiple pie graphs, one for each day.
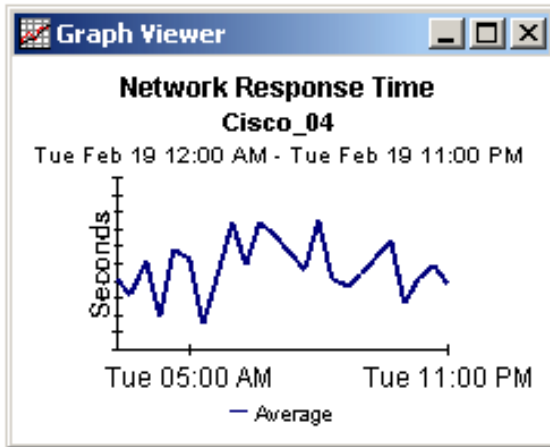
Display Data Table

This option changes a graph into a spreadsheet.

View in New Frame

The graph opens in a Graph Viewer window. Make this graph easier to see, and display more details along the *x* axis, by resizing the window.

Availability

The percentage of time the device is operational. This measurement accounts for outages indicated by the sysUpTime variable; however, it does not account for periods of time the device could not be reached by OVPI.

Average utilization

In an hourly graph, this value is an average of four samples taken over a one-hour period. In a daily graph, this value is an average of 96 samples taken over a 24-hour period.

Baseline

The average busy hour over the baseline period. Rate of growth, a statistic that appears in forecast reports, is calculated by dividing F30 by the average busy hour.

Baseline period

The previous 91 days. Forecasts for F30, F60, and F90 are based on performance during the baseline period.

Buffer utilization exception

Recorded when buffer utilization exceeds the allowable threshold.

Buffer utilization threshold

When buffer utilization is above this value, an exception is raised. The default value for the threshold is 85%.

Busy Hour

The definition varies depending on what is being measured. Busy hour is either a busy hour *total*, or a busy hour *average*. A busy hour total points to the hour of the day that recorded the highest number of events, for example, the highest number of discards or the highest number of errors. In Device Resources, busy hour is the highest hourly average for the day. Busy hour is a relatively persistent event. Do not confuse busy hour with peak, a momentary event. Since busy hour is an average, you may assume that actual utilization could have been significantly higher or lower during the course of that hour. *Busy hour average* refers to the highest average hour among 24 hourly averages; this term is synonymous with *busy hour*. *Average busy hour* refers to an average of all busy hour values over the baseline period and is synonymous with *baseline*.

Card

Whether or not performance information at the card level is available depends on the make and model of the device. Some vendors maintain a distinction between CPU and card and some do not.

Vendors who do maintain the distinction may not maintain it uniformly across all equipment. The card selection table in the card historical summary report may contain just one entry or it may contain multiple entries. If you see just one entry, it is possible that the device contains just one card, or it could indicate that the device is not able to report multiple cards. If the device cannot report multiple cards, the statistics that display at the card level are exactly the same as the statistics that display at the device level.

Common Property Tables

Customer names can appear in reports if you import customer names using the Common Property Tables package. As explained in the Common Property Tables User Guide, two methods of property import are available, a batch-oriented property import utility, and a series of forms for creating and updating customer, locations, and nodes. If you do not import customer names, data from every customer will roll up under *All Customers* If you do no import locations, data for all locations will roll up under *All Locations*.

CPE utilization exception

Recorded when CPU utilization exceeds the allowable threshold.

CPU utilization threshold

When CPU utilization exceeds this value, an exception is raised. The default value for the threshold is 85%.

Daily

A view of performance that compares average utilization to busy hour utilization. The number of days that you can see in this view depends on the number of days that data has been collected. The maximum number of days is the rolling baseline, 91 days. Note that daily views also include performance data from yesterday, the same data currently visible in the hourly view, rolled up as one average and one busy hour.

Days to Threshold (DTT)

The number of days that will elapse before utilization is expected to reach 90%. Device Resources calculates DTT for CPU utilization, memory utilization, and buffer utilization.

Device

A router or a switch; not a server. In selection tables, devices are listed by IP address or hostname.

Grade of Service

A total score based on a combination of contributing scores, sometimes equally weighted, sometimes not. In Device Resources the GOS is equally-weighted and it combines scores for memory, buffer, and CPU as follows:

$$\text{GOS} = \frac{1}{3} \text{ GOS memory} + \frac{1}{3} \text{ GOS buffer} + \frac{1}{3} \text{ GOS CPU}$$

Hourly

An average derived from four collections taken once every 15 minutes; also a graph showing yesterday's hourly increases and decreases.

Memory utilization exception

Recorded when memory utilization exceeds the allowable threshold.

Memory Utilization threshold

When memory utilization exceeds this value, an exception is raised. The default value is 85%.

Near Real Time

An average for performance over the previous six hours, ending with the most recent poll. If polling takes place 4 times an hour, the NRT average is derived from 24 samples. The NRT average is a rolling average and it is recalculated at the conclusion of each poll.

Network response time

The time that elapses from the moment the poller sends an SNMP request to a device to the moment the poller receives a response from the device.

Summary

An aggregation of multiple samples. In an hourly graph, an average based on multiple samples collected during one hour; in a daily graph, an average based on multiple samples collected over the course of each day. In customer and location reports, an aggregation of multiple averages for multiple devices across the same hour, the same day, or the same month.

Utilization

Utilization for a time period, measured as a percentage; the value of the metric in use divided by the total available resources for that metric, multiplied by 100.

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