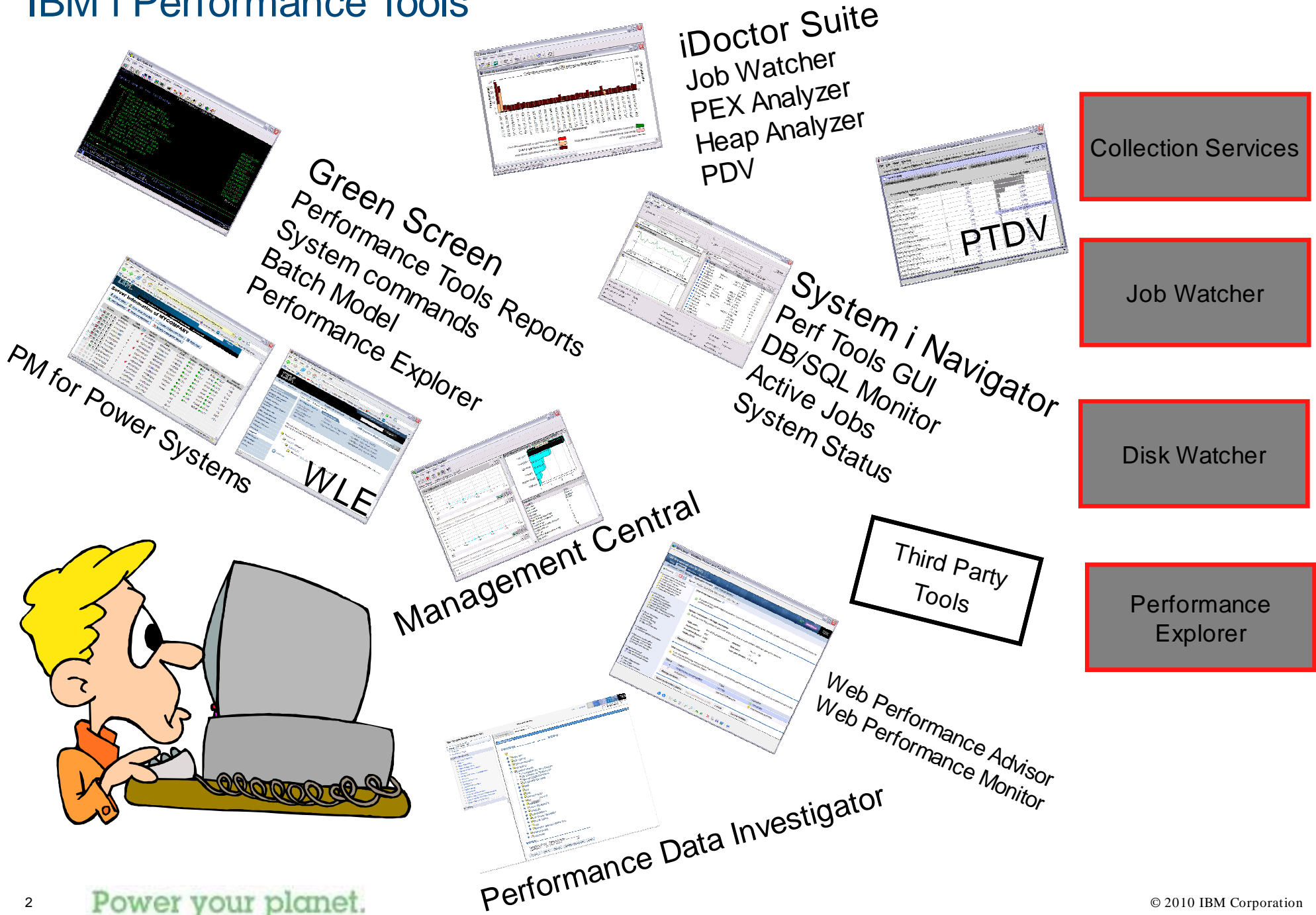


Navigating the World of Performance

Session 460178

Dawn May
dmmay@us.ibm.com

IBM i Performance Tools



Where Do I Start When Managing Performance?

Collect System-wide Performance Data

Collection Services

PM for Power Systems

Automated Monitoring – Your First Line of Defense

System i Navigator System Monitors

Guidelines for Setting Monitor Threshold Triggers

IBM System Director Monitors

Monitor Historical Performance Trends

System i Navigator Graph History

PM for Power Systems

IBM Systems Director



Where Do I Start When Analyzing Performance?

Basic Performance Analysis

Performance Tools System i Navigator Plug-in

Performance Data Investigator

WebSphere Performance Monitor / Advisor

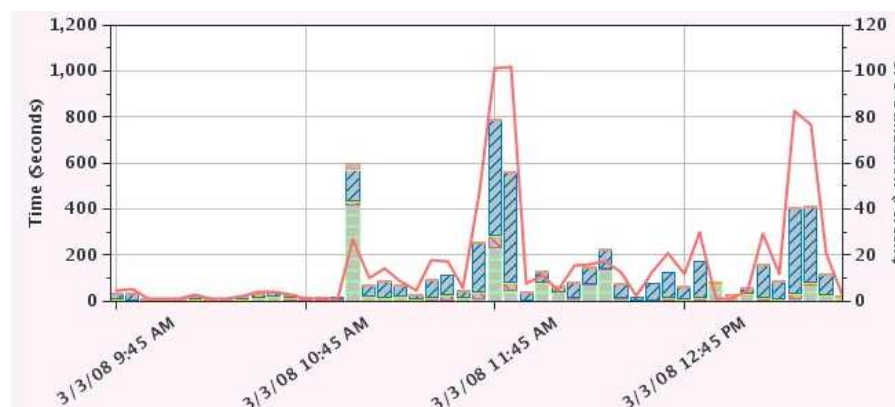
Advanced Performance Analysis

Job Watcher

Disk Watcher

Performance Trace Data Visualizer

iDoctor suite



Step 1:

Collect System-wide Performance Data

Collect System-wide Performance Data

Collect Performance Data 24/7

If something goes wrong, you have data that will help **analyze** the problem, **fix** it, and **prevent** it from happening in the future

If you can't solve the problem, you have information that makes it easier for IBM Support to **solve the problem faster**

To provide a **reliable baseline** so you can **understand the impact** that a software, network, or environmental **change** had on the performance of your system

To provide historical information that enables you to **plan for future growth** based on real trends, not guesses.

Run Collection Services 24/7 with the *Standard plus protocol* profile to ensure you have the information you need to:

Solve problems faster and prevent them from happening in the future

Understand the performance impact of changes to your system

Plan for future growth

What is Collection Services?

IBM i function that collects system and job level performance data

Collects data from many system resources including:

Jobs

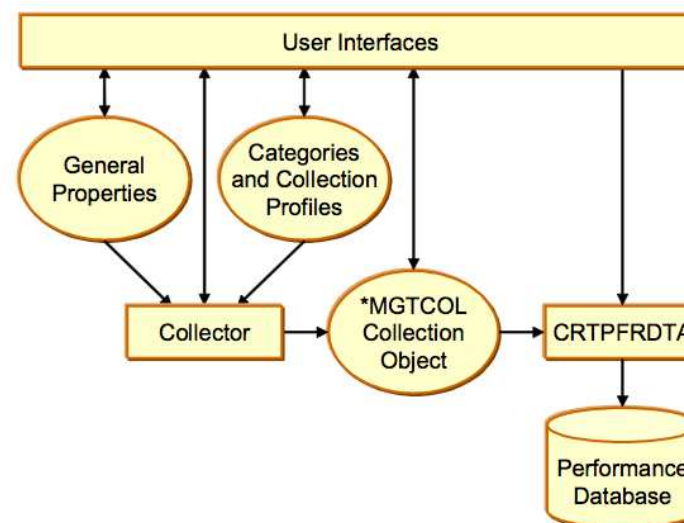
Disk Units

IOPs

Buses

Pools

Communication lines

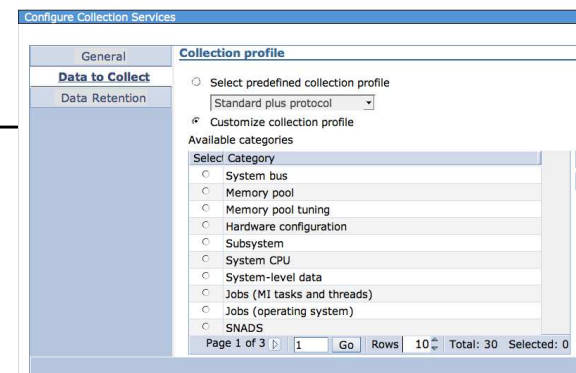


Collects data at regular intervals from 15 seconds to 1 hour

Produces database files used by Performance Tools for i, PM for Power Systems, Performance Data Investigator and others

Provides the data source for System i Navigator System Monitors

Collection Services Data Categories



System Bus

Memory Pool and Pool Tuning

Hardware Configuration

Subsystem

System CPU

System level data

Jobs – MI tasks and threads

Jobs – Operating System

Disk Storage

IOP

Local Response Time

Communication (Base, Station, SAP)

APPN

ARM

SNA

SNADS Transaction

TCP/IP Base

TCP/IP Interface

Integrated xSeries Server (IxS)

Extended Adaptive Cache

User-defined Transactions

Domino

HTTP Server (Powered by Apache)

Data Port Services

LPAR

WAS

JVM ***New in 6.1**

Removable Storage ***New in 7.1**

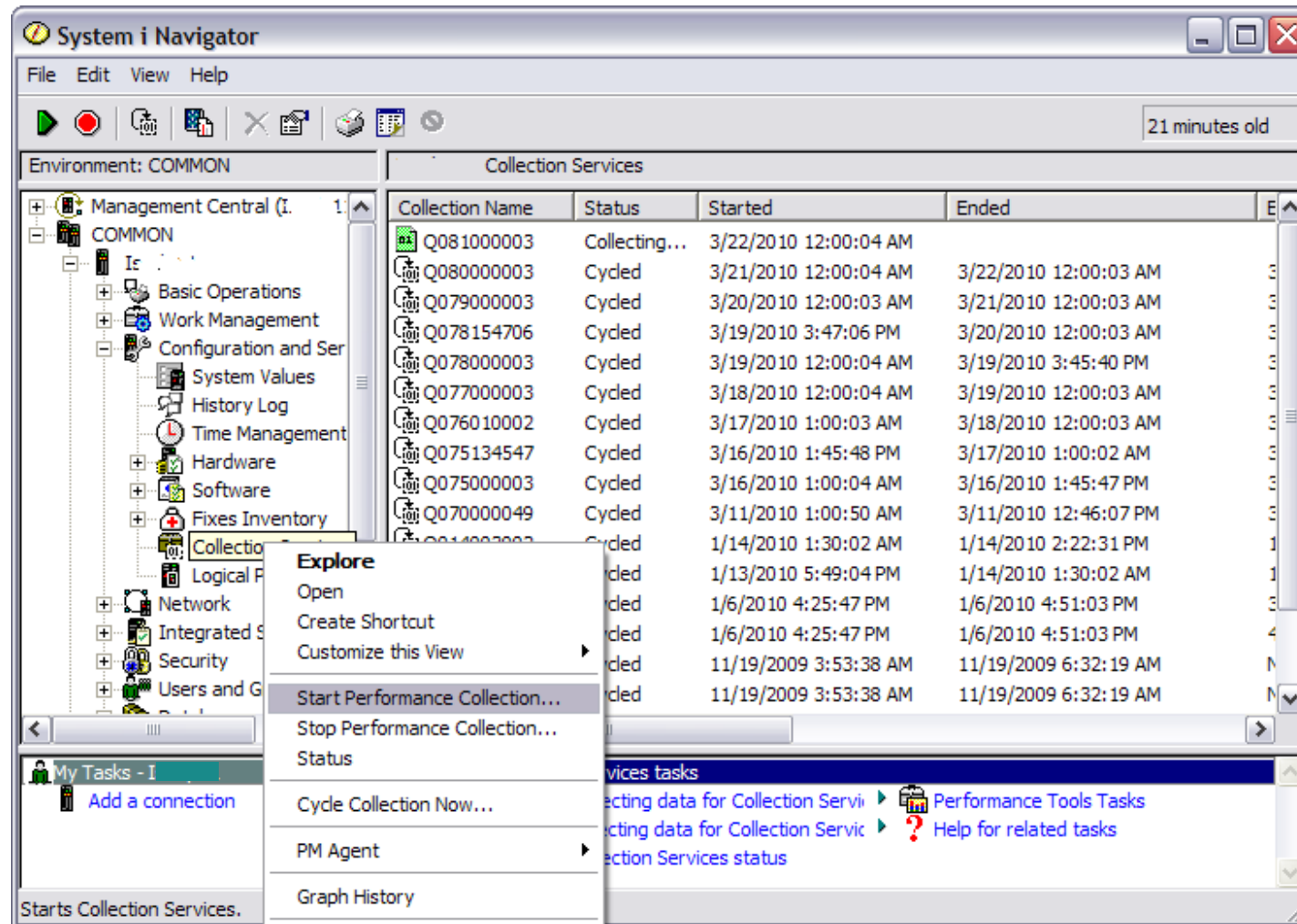
External Storage ***New in 7.1**

System Internal Data ***New in 7.1**

Each category can be turned on/off and interval times can be set

individually

Starting Collection Services with System i Navigator



Starting Collection Services will start a job named QYPSPFRCOL in QSYSWRK.

Selecting General Collection Properties

Collection Services Properties

General | Data to Collect

Status: Started

Location to store collections: /Qsys.lib/Qpfrdata.lib

Cycling

☒ Cycle everyday at 12:00:00 AM

☐ Cycle every 12 hours

Default collection interval for detailed data

☐ 15 seconds

☒ 15 minutes

Collection retention period

PM Agent status: Started

☐ Start PM Agent if needed

Detailed data: ☐ 1 hours ☒ 1 days ☐ Permanent

Graph data: ☐ 1 days

Graph history data: ☐ 1 months ☒ 1 years

☒ Create database files during collection

☒ Create graph data when collection is cycled

☒ Create graph history data when collection is cycled

OK Cancel Help

Recommend keeping at least 7 days of detailed data in case a problem occurs.

Check this box if you plan to use Performance Tools

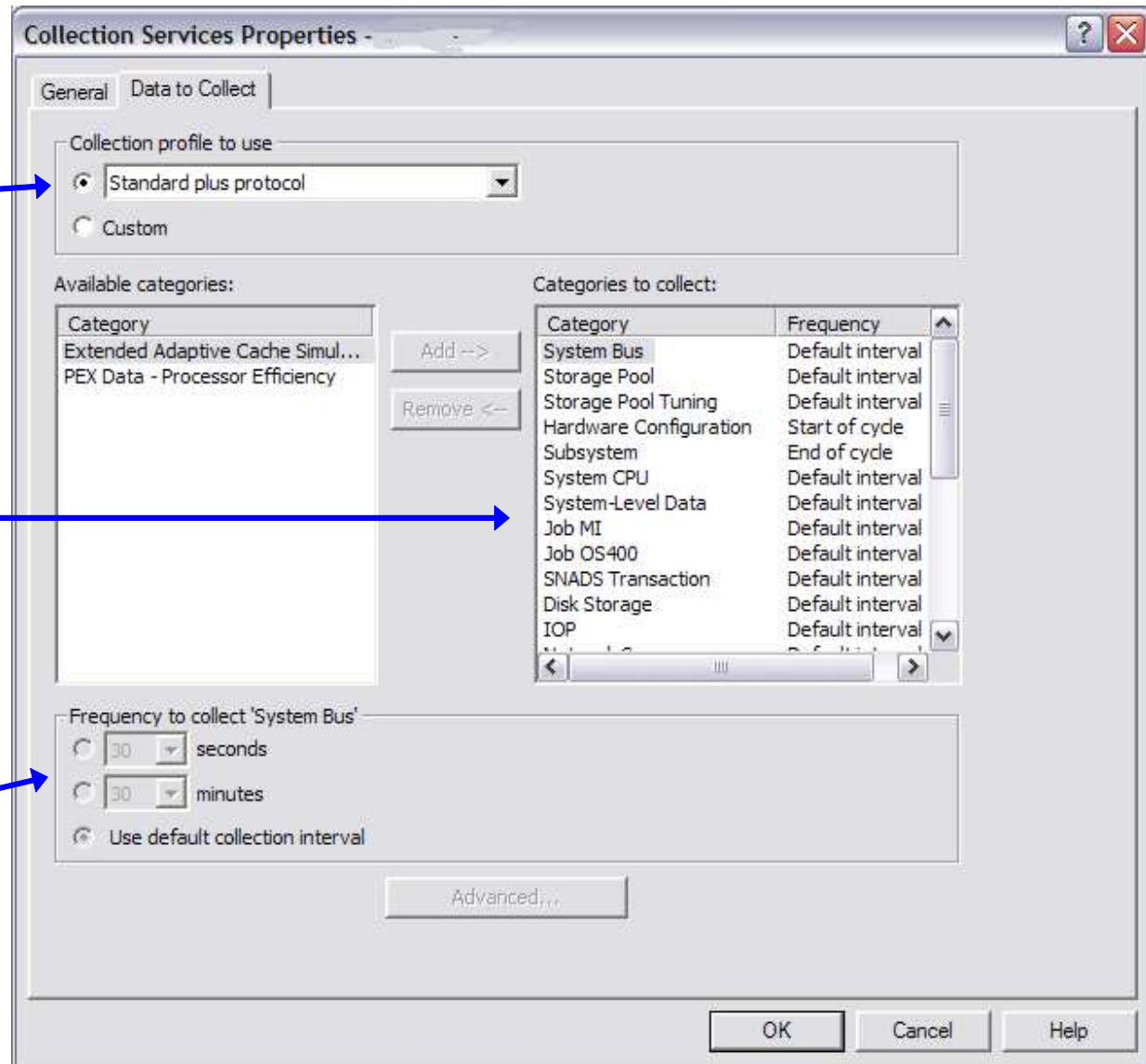
Check bottom 2 boxes if you plan to use Graph History

Selecting Data Categories

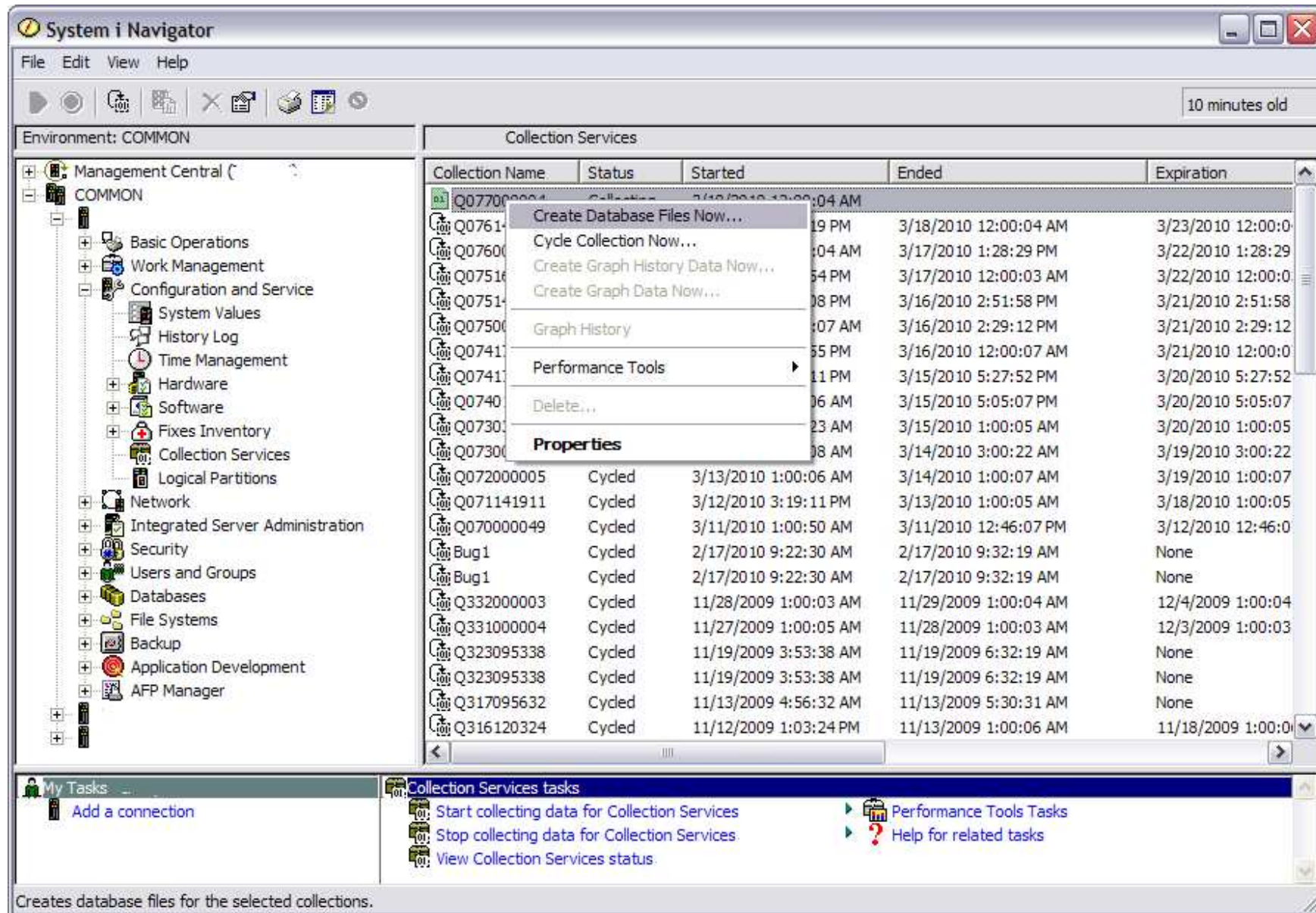
“Standard plus protocol” is recommended.
Use the Custom profile if you want to change the default time interval for individual categories.

Then select the category you want to change.

Then adjust the time.



Creating database files with System i Navigator



You can also create database files with CRTPFRTDTA command.

Creating database files with System i Navigator (cont.)

All categories in collection are selected by default. Select the categories with a mouse click if you want to create a subset of the files.

Files will be created for the duration of the entire collection. Adjust the time if you want files created for a shorter duration.

Default configured collection interval is selected. Increase this value if you want files created at a less frequent rate.

Create Database Files from 'Q113000007' - Rc

Member to create:

Path:

Data to include:

Category
<input checked="" type="checkbox"/> Domino
<input checked="" type="checkbox"/> IBM HTTP Server (powered by Apache)
<input checked="" type="checkbox"/> System Bus
<input checked="" type="checkbox"/> Storage Pool
<input checked="" type="checkbox"/> Storage Pool Tuning
<input checked="" type="checkbox"/> Hardware Configuration

Range of data

From:

To:

Sampling interval

☐ 30 seconds

☒ 5 minutes

IBM Systems Director Navigator for i Collection Services Configuration

IBM Systems Director Navigator for i5/OS® **Welcome**

Performance x Investigate... x

i5/OS Navigator Tasks

Tasks

Tasks
▼ Performance
Collections
▼ Collectors
Disk Watcher
Job Watcher
Collection Services

Page 1 of 1 Total

Cancel

- Active Collection Services Collec
- Collection Services Collections
- Collection Services Status
- Configure Collection Services**
- Cycle Collection Services
- Start Collection Services
- Stop Collection Services

IBM Systems Director Navigator for i5/OS® **Welcome**

Performance x System i Na... x

Configure Collection Services

General

Library: QPFRDATA

Default collection interval: 15 seconds 5 minutes

Cycling

Cycle every day at: 12:00 AM Example: 12:30 PM

Cycle every: 24 hours

System options

- ☒ Create database files during collection
- ☒ Create performance summary data when collection is cycled
- ☐ Send PM Agent data to IBM [View disclaimer](#)

OK Cancel

Commands for Performance Data Collections

STRPFRCOL - Start Performance Collection

ENDPFRCOL - End Performance Collection

CFGPFRCOL - Configure Performance Collection

CHKPFRCOL - Check Performance Collection

CVTPFRCOL – Convert Performance Collection

Added in 6.1:

DLTPFRCOL – Delete Performance Collection

SAVPFRCOL – Save Performance Collection

RSTPFRCOL – Restore Performance Collection



PM for Power Systems

If you don't want to manage the collection of performance data yourself, there is another option – PM for Power Systems

By default PM will be active and collect performance data

PM starts Collection Services on Version 5 releases

Beginning with 6.1, Collection Services is started by default without PM starting it

PM data can be sent to the IBM Workload Estimator

Activating PM does not mean that you have to transmit performance data to IBM

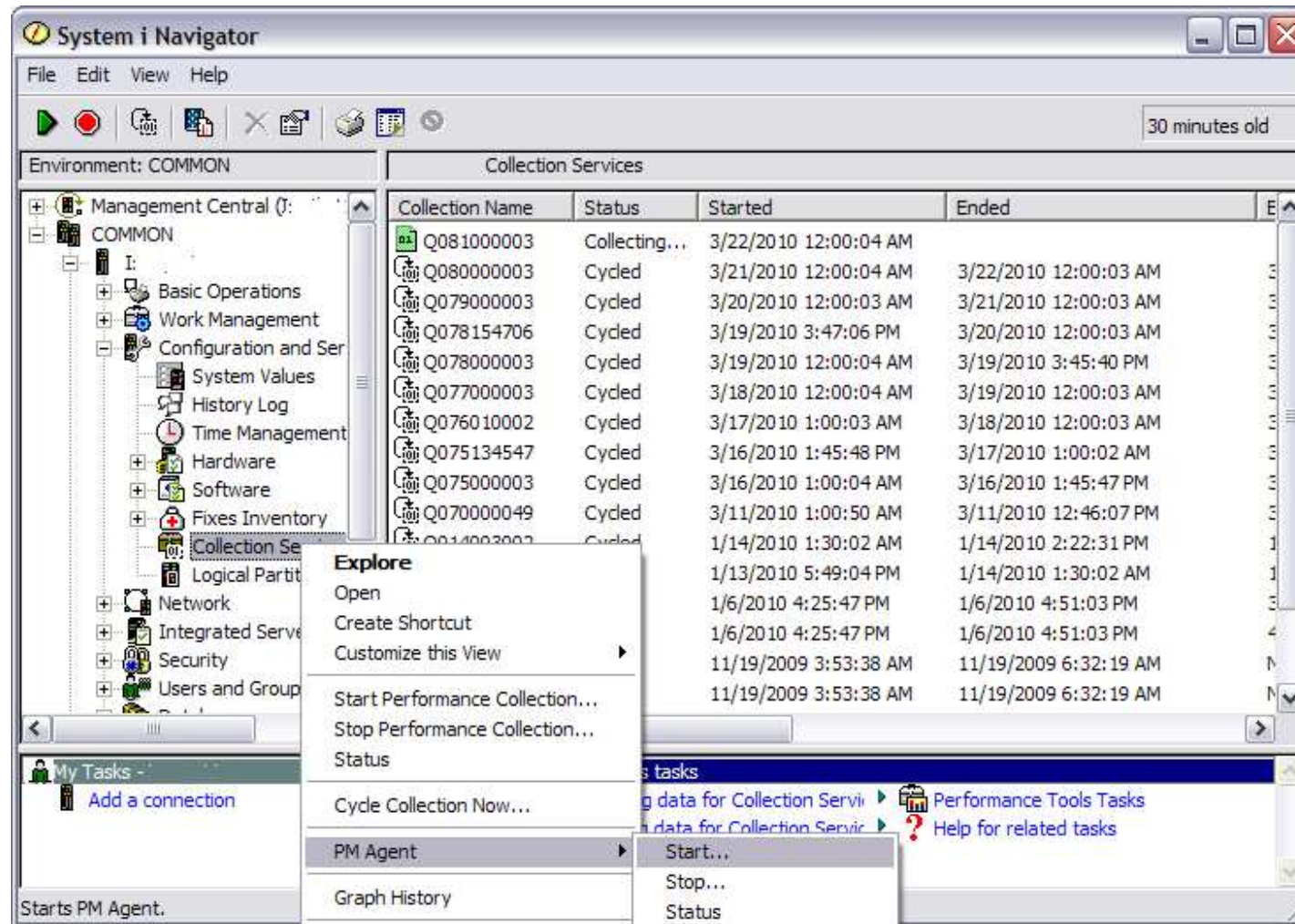
The data remains on your system unless you explicitly request that it be sent to IBM

However, there are many good reasons to transmit to IBM even if you don't purchase additional PM services

Easy to understand reports that help you manage performance

Trending information to help you plan for future upgrades

Starting Performance Management



Can be started with System i Navigator or the CFGPM400 CL Command

Transmission of data to IBM requires a Service Agent connection

Complete instructions located at:

http://publib.boulder.ibm.com/infocenter/systems/scope/i5os/topic/rzahx/rzahxplangrow1pm1.htm?tocNode=int_220143

Configuring Performance Management IBM Systems Director Navigator for i

The screenshot displays the IBM Systems Director Navigator for i interface. On the left, a tree view under 'Performance' shows 'Collections' and 'Collectors'. Under 'Collectors', 'Collection Services' is selected, and a context menu is open with 'Configure Collection Services' highlighted by a red circle. Below this, the 'Configure Collection Services' dialog box is shown. The 'General' tab is active, displaying the 'Library' as 'QPFRDATA' and the 'Default collection interval' as 15 seconds and 1 minute. The 'Cycling' section shows 'Cycle every day at' as 12:00 AM and 'Cycle every' as 24 hours. The 'System options' section has three checkboxes: 'Create database files during collection' (checked), 'Create performance summary data when collection is cycled' (unchecked), and 'Send PM Agent data to IBM' (unchecked), which is also highlighted by a red circle. A 'View disclaimer' button is next to the last checkbox. The 'Data to Collect' and 'Data Retention' sections are empty. The 'Close' button is visible in the top-left corner of the Navigator window.

IBM | Navigator Tasks

- Performance
 - Collections
 - Collectors
 - Disk Watcher
 - Job Watcher
 - Collection Services
 - Active Collection Services Collections
 - Collection Services Collections
 - Collection Services Status
 - Configure Collection Services**
 - Cycle Collection Services
 - Start Collection Services
 - Stop Collection Services

Close

Configure Collection Services

General

Library: QPFRDATA

Default collection interval: 15 seconds 1 minutes

Cycling

Cycle every day at: 12:00 AM Example: 12:30 PM

Cycle every: 24 hours

System options

- ☒ Create database files during collection
- ☐ Create performance summary data when collection is cycled
- ☐ Send PM Agent data to IBM [View disclaimer](#)

OK Cancel

Step 2:

Monitoring

Automated Monitoring with System Monitors

System Monitors gather and present real-time performance data that helps monitor the health of your system and identify potential performance problems before they become serious issues

System Monitors provide multiple levels of performance information

Level 1 – System wide performance metrics such as CPU Utilization, Disk Utilization, etc.

Level 2 – A list of items that are contributing most to the Level 1 metric

For CPU Utilization, it's a list of jobs that are consuming the most CPU

For Disk Utilization, it's a list of disk arms that are the busiest

Level 3 – A list of performance metrics and properties for the Level 2 items

Thresholds can be defined which will trigger an action when a system wide performance metric exceeds the defined “comfort level”

For example, when CPU Utilization exceeds 80%, send a message to notify the operator

As its name suggests, System Monitors provide powerful capabilities to monitor what is happening on your system, BUT finding out what caused the problem often requires other performance analysis tools

What Can You Monitor?

Over 2 dozen system performance metrics can be monitored

CPU Utilization (Average)

CPU Utilization (Interactive Jobs)

CPU Utilization (Interactive Feature)

CPU Utilization Basic (Average) Communications Line Utilization (Maximum)

CPU Utilization (Secondary Workloads)

CPU Utilization (Database Capability)

Interactive Response Time (Average)

Interactive Response Time (Maximum)

Transaction Rate (Average)

Transaction Rate (Interactive)

Batch Logical Database I/O

Disk Arm Utilization (Average)

Disk Arm Utilization (Maximum)

Communications IOP Utilization (Average)

Communications IOP Utilization (Maximum)

Communications Line Utilization (Average)

Communications Line Utilization (Maximum)

LAN Utilization (Average)

LAN Utilization (Maximum)

Machine Pool Faults

User Pool Faults (Average)

User Pool Faults (Maximum)

Disk Storage (Average)

Disk Storage (Maximum)

Disk IOP Utilization (Average)

Disk IOP Utilization (Maximum)

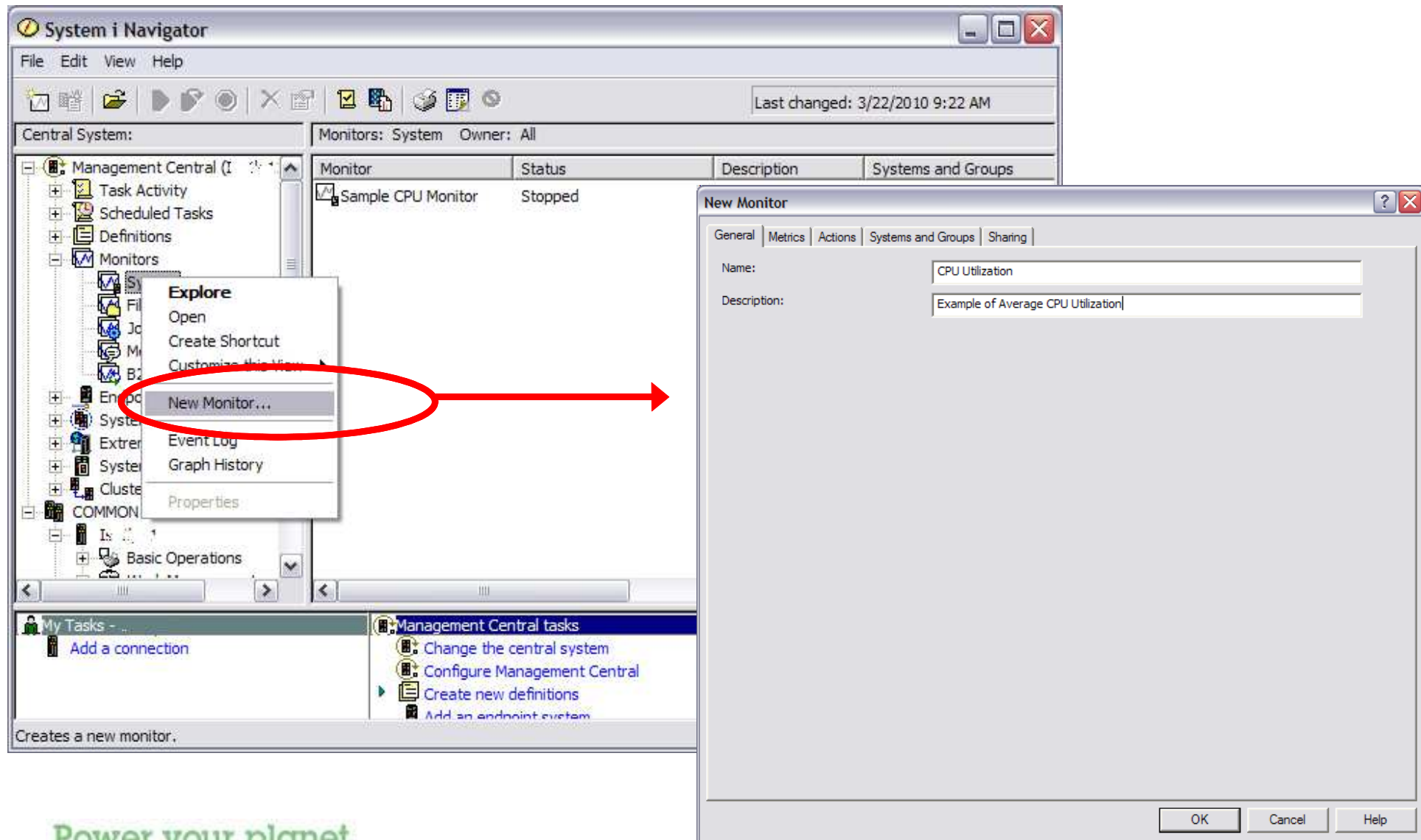
You can monitor one or many performance metrics in each monitor

System Monitors use Collection Services as their data source

Collection Services provides only the data that System Monitors need to graph the metrics that are included in the monitor

Define A Monitor

Select 'New Monitor...' and specify General properties



Define A Monitor

Select 'Metrics to monitor' and press OK to create

New Monitor

General | **Metrics** | Actions | Systems and Groups | Sharing

Available metrics:

- CPU Utilization (Interactive Jobs)
- CPU Utilization (Interactive Feature)
- CPU Utilization (Database Capability)
- CPU Utilization (Secondary Workloads)
- CPU Utilization Basic (Average)
- Interactive Response Time (Average)
- Interactive Response Time (Maximum)
- Transaction Rate (Average)
- Transaction Rate (Interactive)
- Batch Logical Database I/O

Metrics to monitor:

- CPU Utilization (Average)

CPU Utilization (Average)

General | Threshold 1 | Threshold 2

Collection interval: 1 minute

Maximum graphing value: 100 percent

Display time: 5 minutes

OK Cancel Help

What to monitor

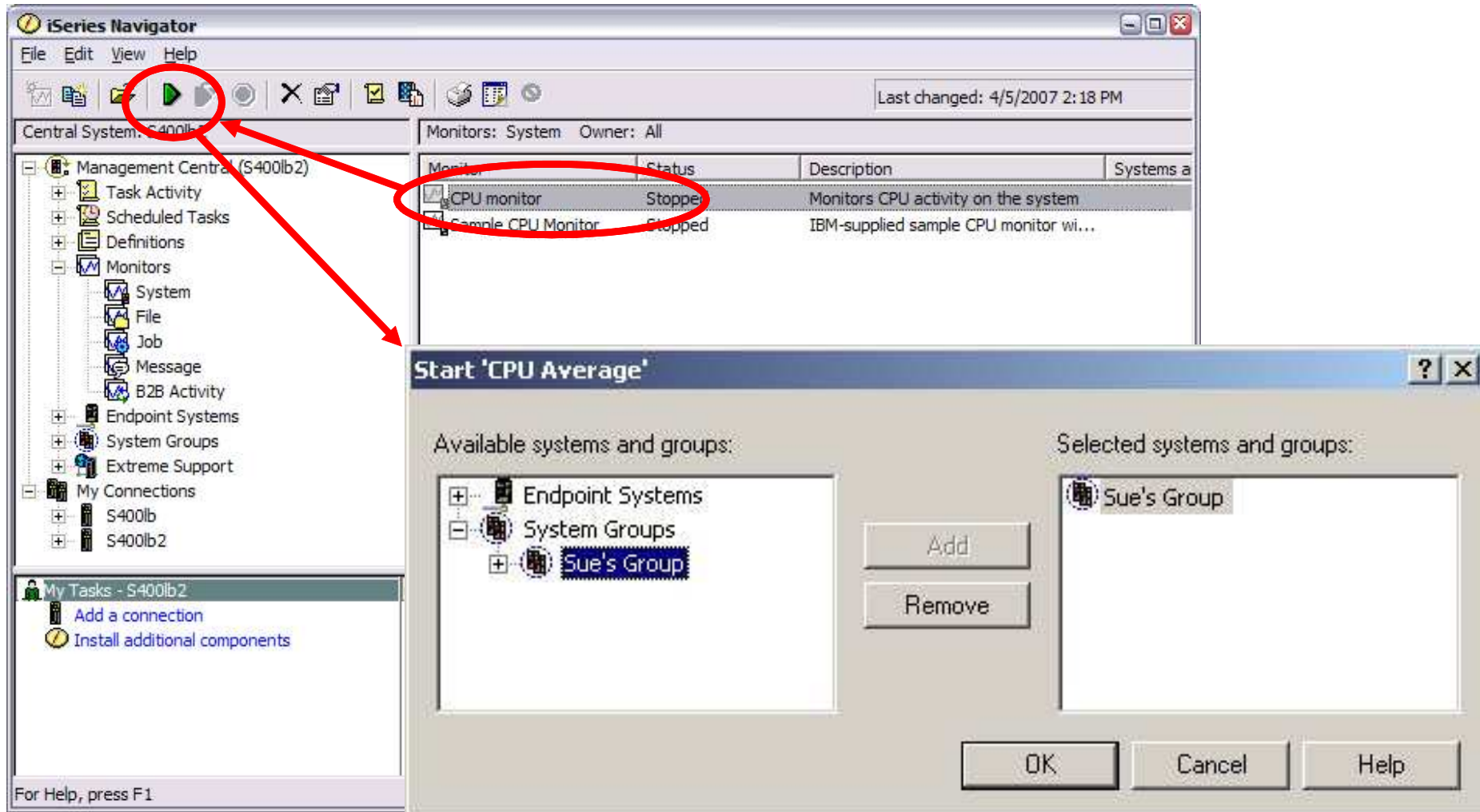
How often

Vertical
axis

Horizontal
axis

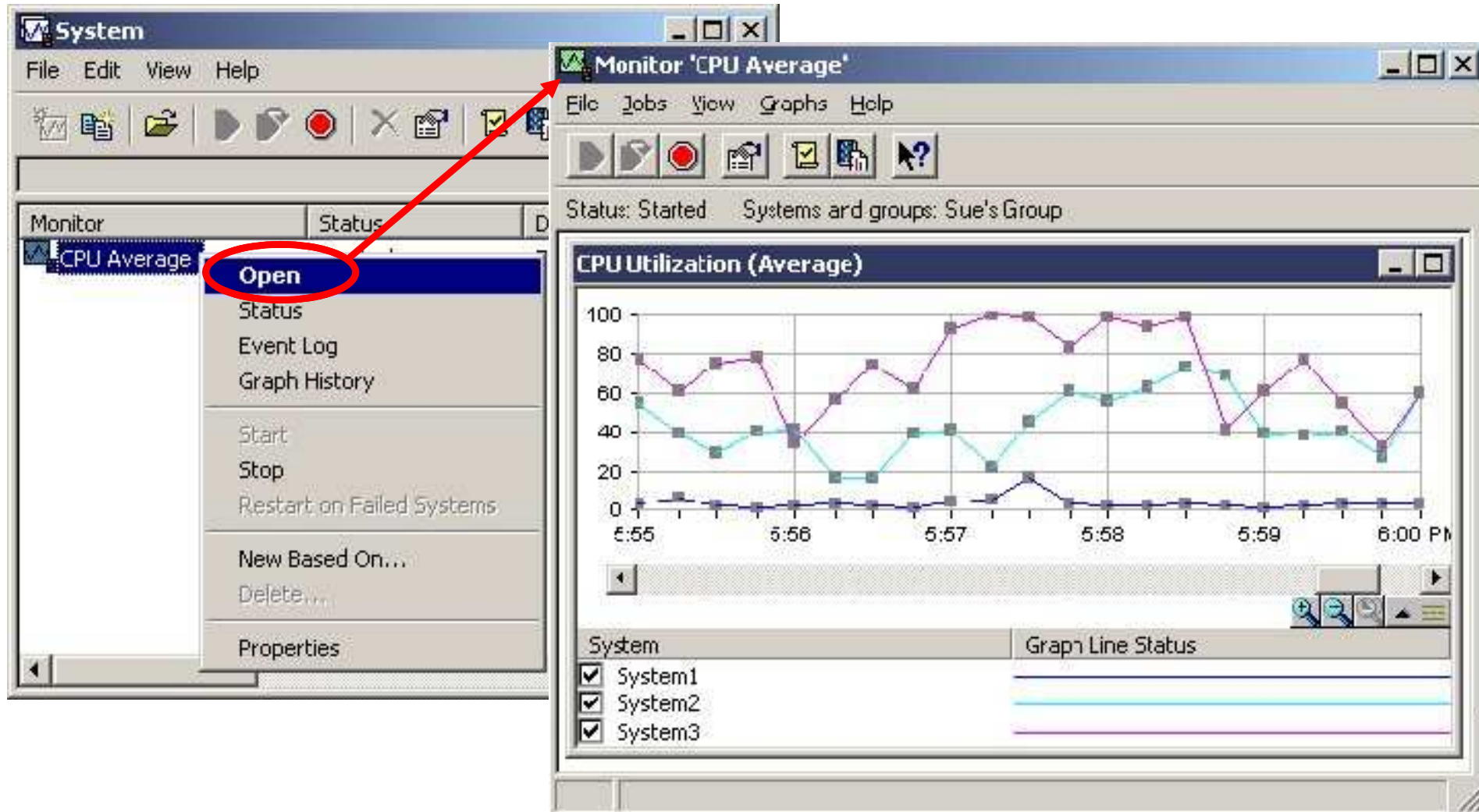
Start A Monitor

Select the monitor, then the start button to select systems/groups



View A Monitor

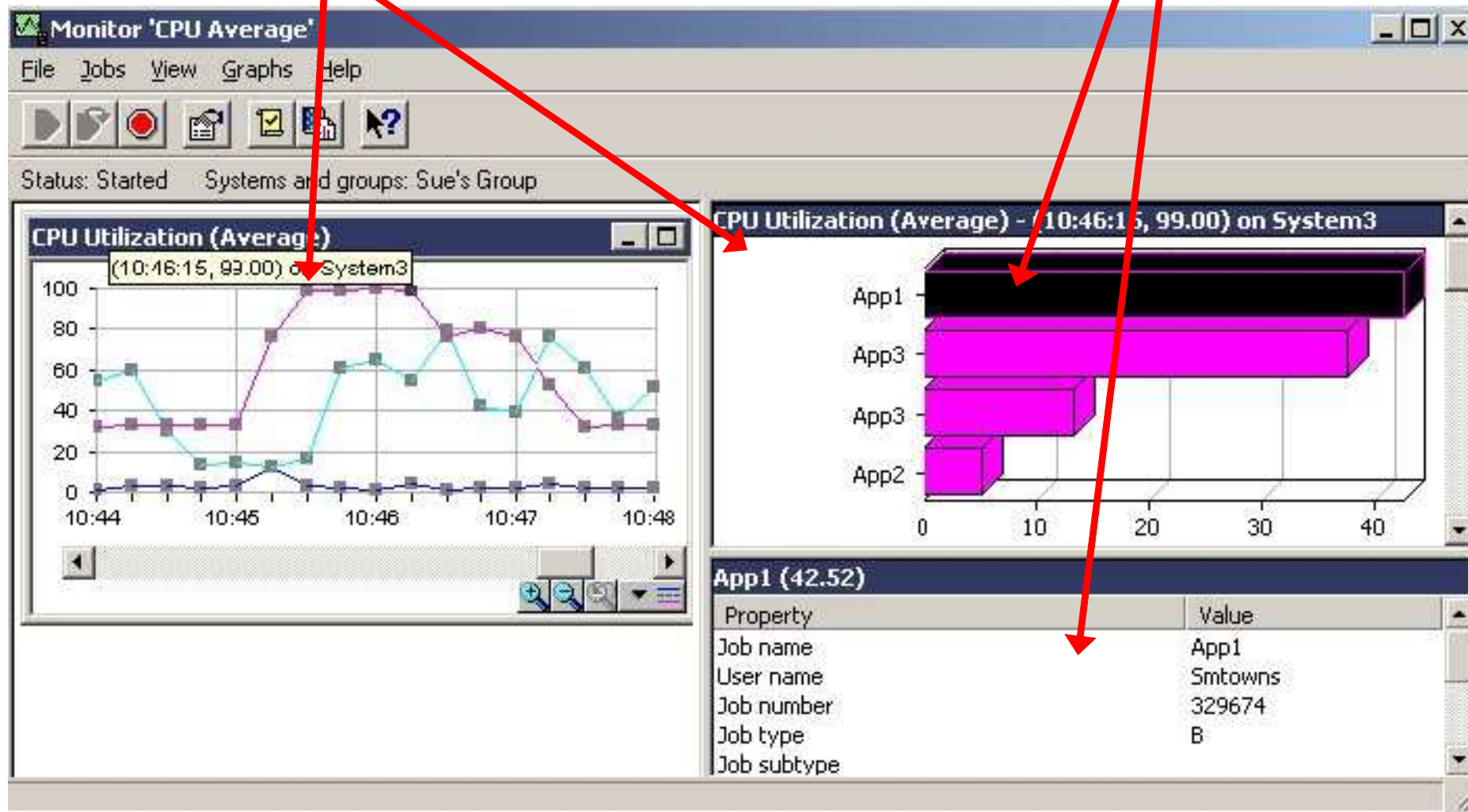
Metric data



View A Monitor

Click on graph point to see upper right pane

Click on object graph in upper right pane to see details in lower right



Setting Threshold

'CPU Average' Properties

General Metrics Actions Systems and Groups

Available metrics:

- CPU Utilization (Interactive Jobs)
- CPU Utilization (Interactive Feature)
- CPU Utilization (Database Capability)
- CPU Utilization (Secondary Workloads)
- CPU Utilization Basic (Average)
- Interactive Response Time (Average)
- Interactive Response Time (Maximum)
- Transaction Rate (Average)
- Transaction Rate (Interactive)
- Batch Logical Database I/O

Metrics to monitor:

- CPU Utilization (Average)

CPU Utilization (Average)

General Threshold 1 Threshold 2

☒ Enable threshold

Trigger: \geq 80 percent busy

Duration: 1 intervals

OS/400 command: SNDMSG MSG('There is a problem.') TOUSR(SMTOWNS) Prompt...

Reset: $<$ 70 percent busy

Duration: 1 intervals

OS/400 command: SNDMSG MSG('Problem fixed.') TOUSR(SMTOWNS) Prompt...

OK Cancel Apply Help

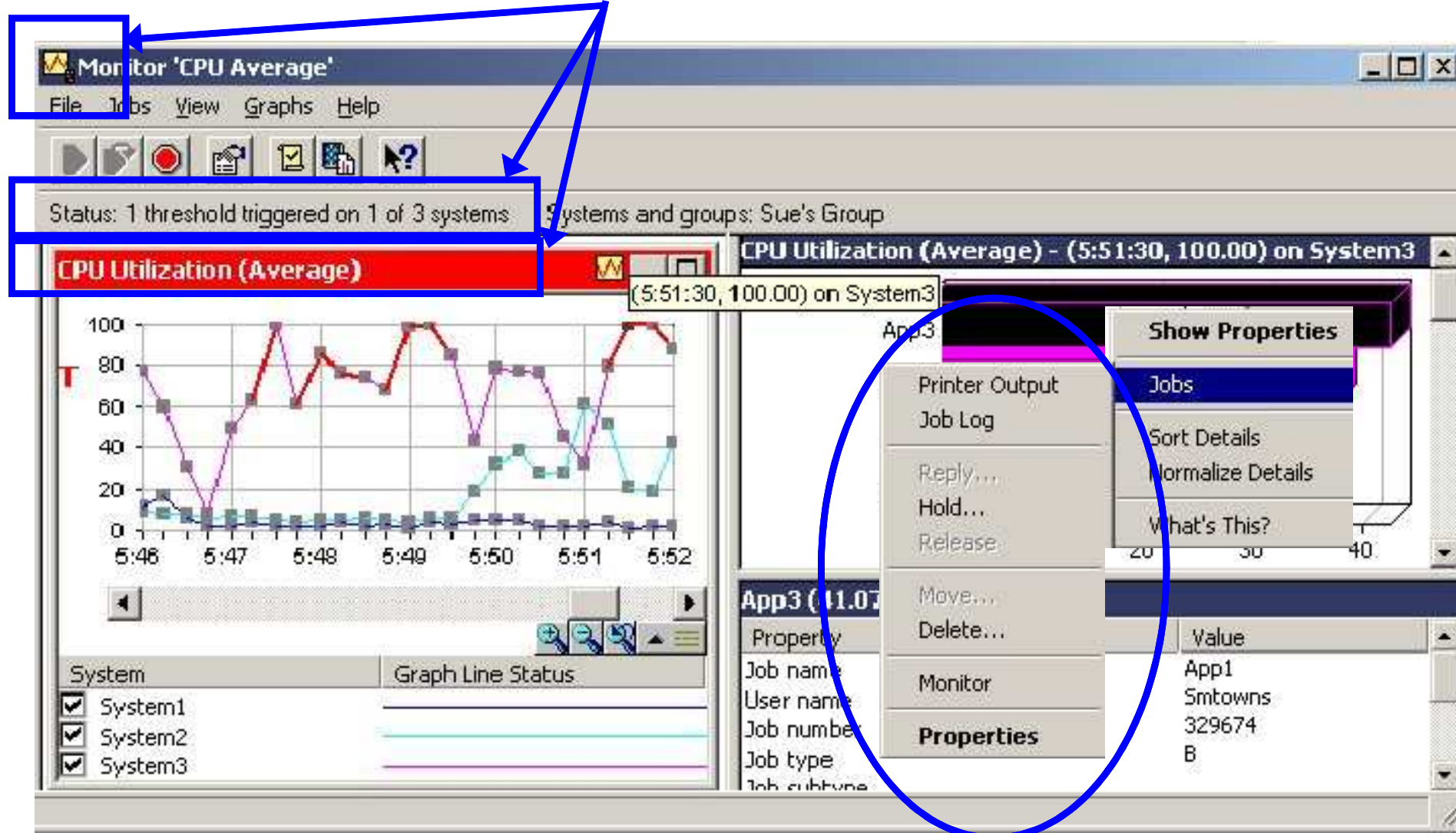
Condition
indicating
problem exists

Condition
indicating
problem resolved

Automation
will send
a message
if condition
occurs

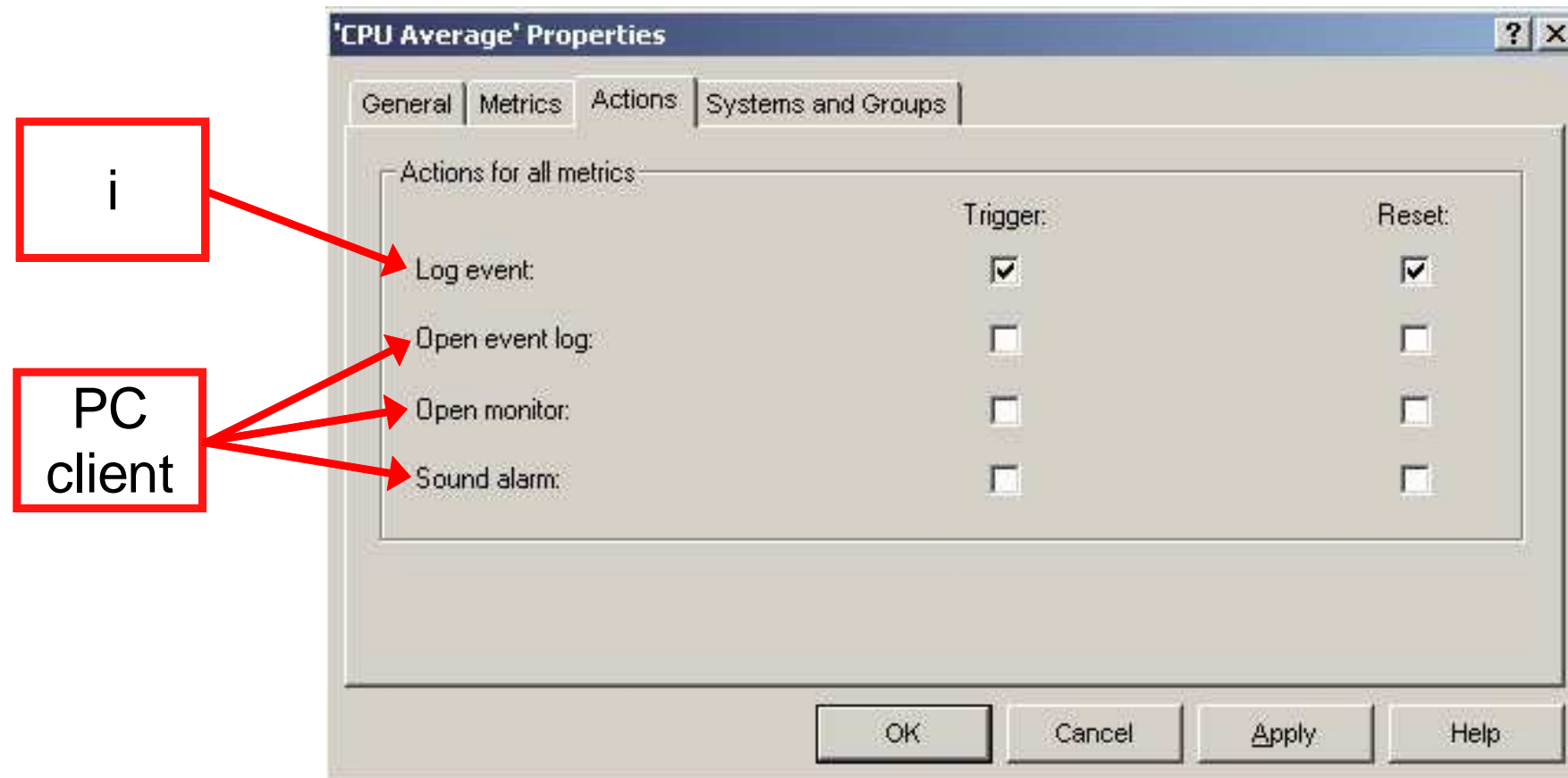
Viewing Thresholds

Threshold Indicators



Drill down with Actions

Threshold Actions



Monitoring with IBM Systems Director

IBM® Systems Director

View: All tasks

Welcome

My Startup Pages

Find a Task

Find a Resource

Navigate Resources

Automation

Availability

Inventory

Release Management

Security

System Configuration

System Status and Health

- Performance Summary
- Health Summary
- Monitors
- Thresholds
- Problems
- Active Status
- Event Log
- SNMP Browser

Task Management

Settings

Performance Summary

Select a target from the list or use Browse to select one or more targets. A target might be a server, virtual server or operating system.

iszid.ibm.comBrowse...

Select a monitor view to apply to the selected targets.

All MonitorsBrowse...

Processor

Memory

Network

Storage

File System

Shared Ethernet Adapter

Virtual Target Device

Shows processor performance summary results

Performance Summary
(isz1p13.rchland.ibm.com)

Select Column Monitors...ActionsSearch the table...Search

Select	Name	OS Type	Processors	CPU Computing ...	CPU Utilization %
<input type="checkbox"/>	isbm.com	IBM I	—	—	—

IBM Systems Director - Event Filters for IBM i Messages

Create Event Filter Wizard

✓ Welcome
✓ Filter Name
✓ Filter Type
✓ Event Type
➔ IBM i Event Type
Severity and Category
Event Sender
Event Text
Time Range
Summary

IBM i Event Type

Specify the IBM® System i™ event types that you want to include in the filter.

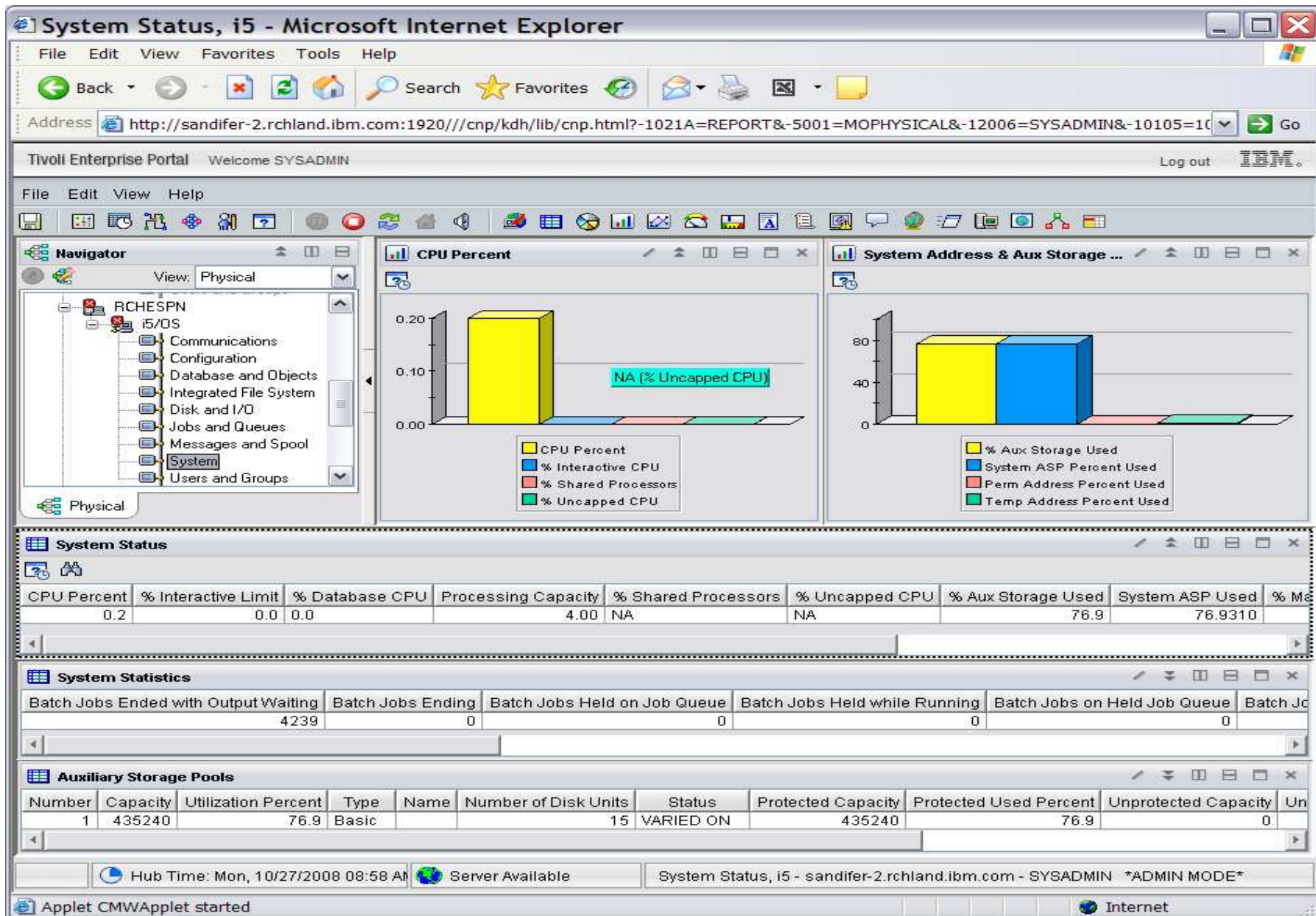
An IBM i event type represents messages sent by events that occur on an IBM System i operating system. The filter will look for IBM i event types that you define on this panel.

Type the library, message queue, and (optionally) the message ID of the IBM System i event type that you want to include.
Use the following format: library/message_queue.messageID
Then click Add to add the IBM System i event type to the list.

IBM i.Message Queue.

Selected IBM i event types:

IBM i.Message Queue.QSYS/QSYSOPR.CPF1804



Step 3:

Monitor Historical Performance Trends

Monitor Historical Performance Trends

The Graph History function in System i Navigator is an extension of the System Monitors support

System Monitors allow you to view performance over the last hour

Graph History allows you to view performance data over days, weeks, or months to identify trends and help plan for future needs

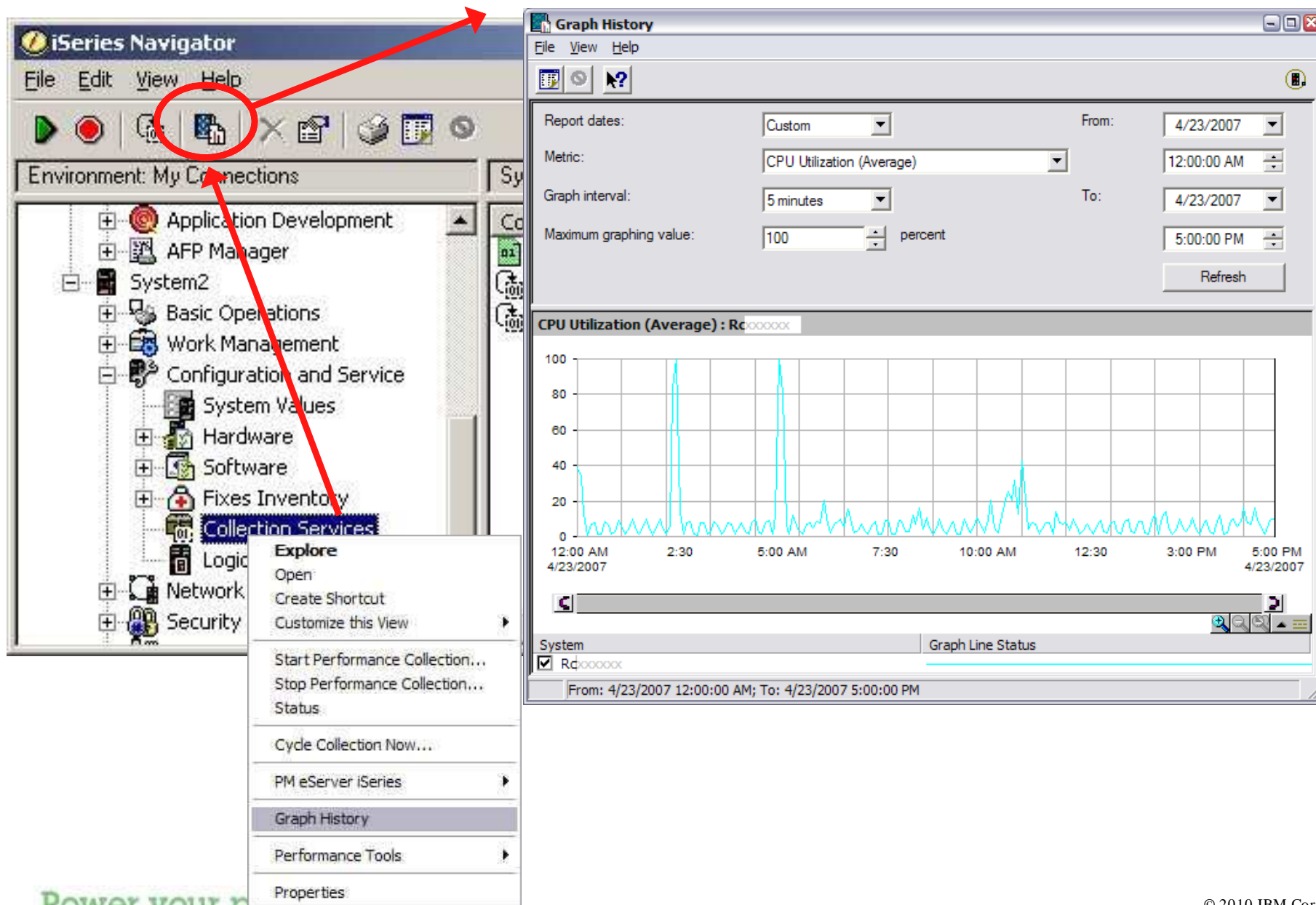
PM for Power Systems needs to be running to view Graph History data that is older than one week

You do not need to send PM data to IBM to use Graph History but the collection facility on your system needs to be running

If you send PM data to IBM, you will have access to performance graphs via the web to help you analyze performance

PM for Power Systems has additional detail not found in Graph History

Viewing Data Using Graph History



Options

The screenshot shows the 'Graph History' window with the following settings:

- Report dates: Custom
- Metric: CPU Utilization (Average)
- Graph interval: 5 minutes
- Maximum graphing value: 100 percent
- From: 4/23/2007 12:00:00 AM
- To: 4/23/2007 5:00:00 PM
- Refresh button

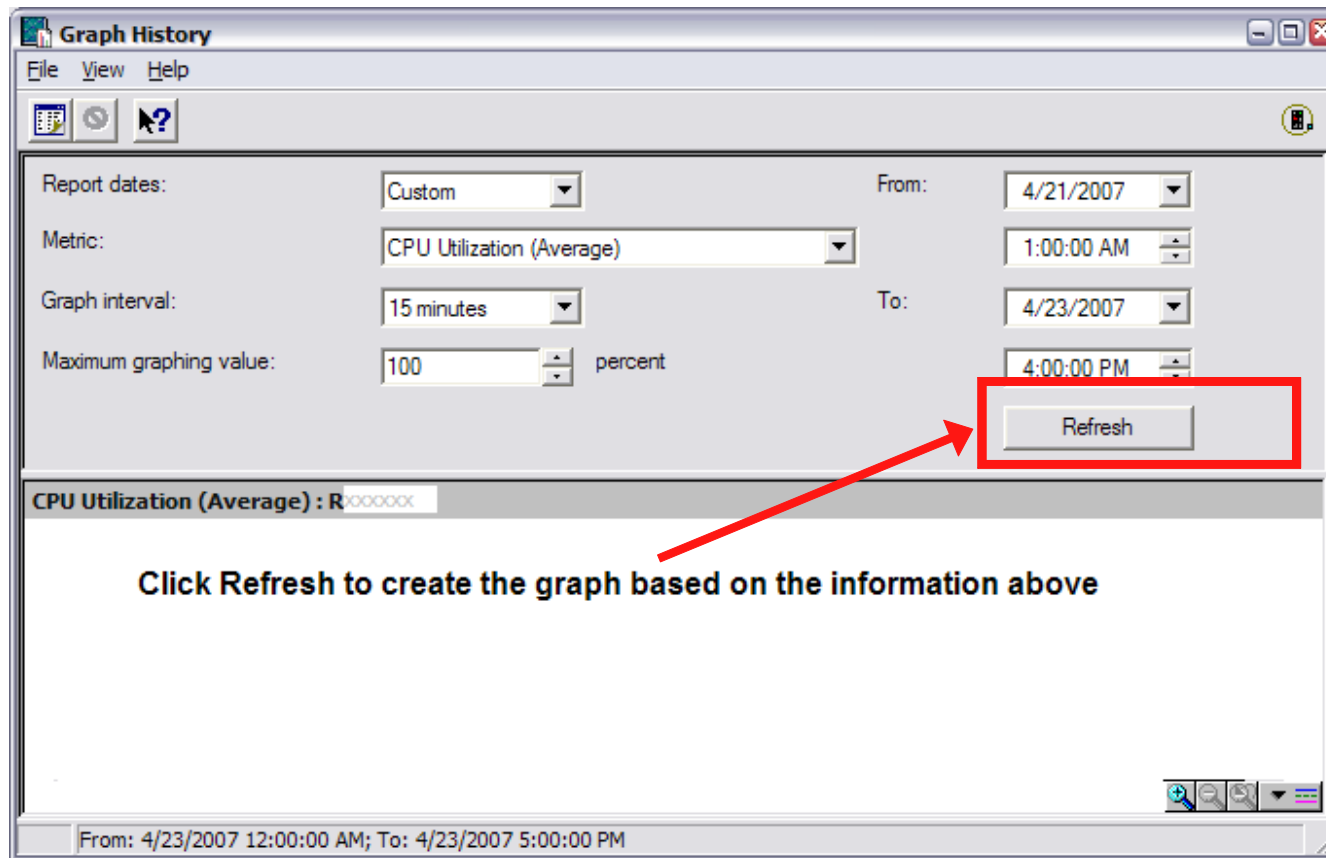
Two red boxes highlight the configuration areas. The left box, labeled 'What to view', encloses the Metric, Graph interval, and Maximum graphing value fields. The right box, labeled 'Length of time to view', encloses the From, To, and Refresh fields. A status bar at the bottom displays the selected time range: 'From: 4/23/2007 12:00:00 AM; To: 4/23/2007 5:00:00 PM'.

What to view

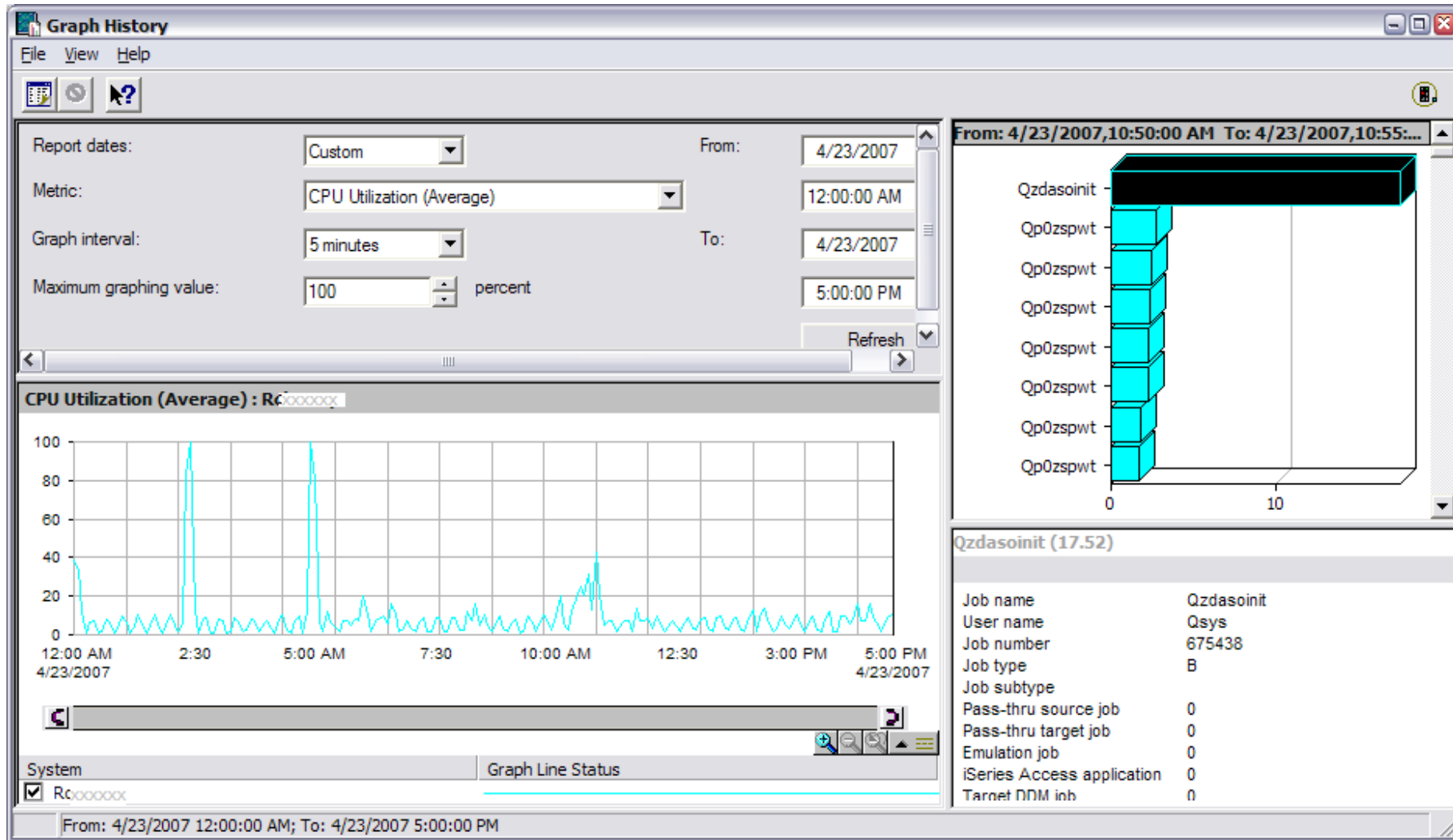
**Length of time
to view**

Viewing Data

Getting the data using refresh

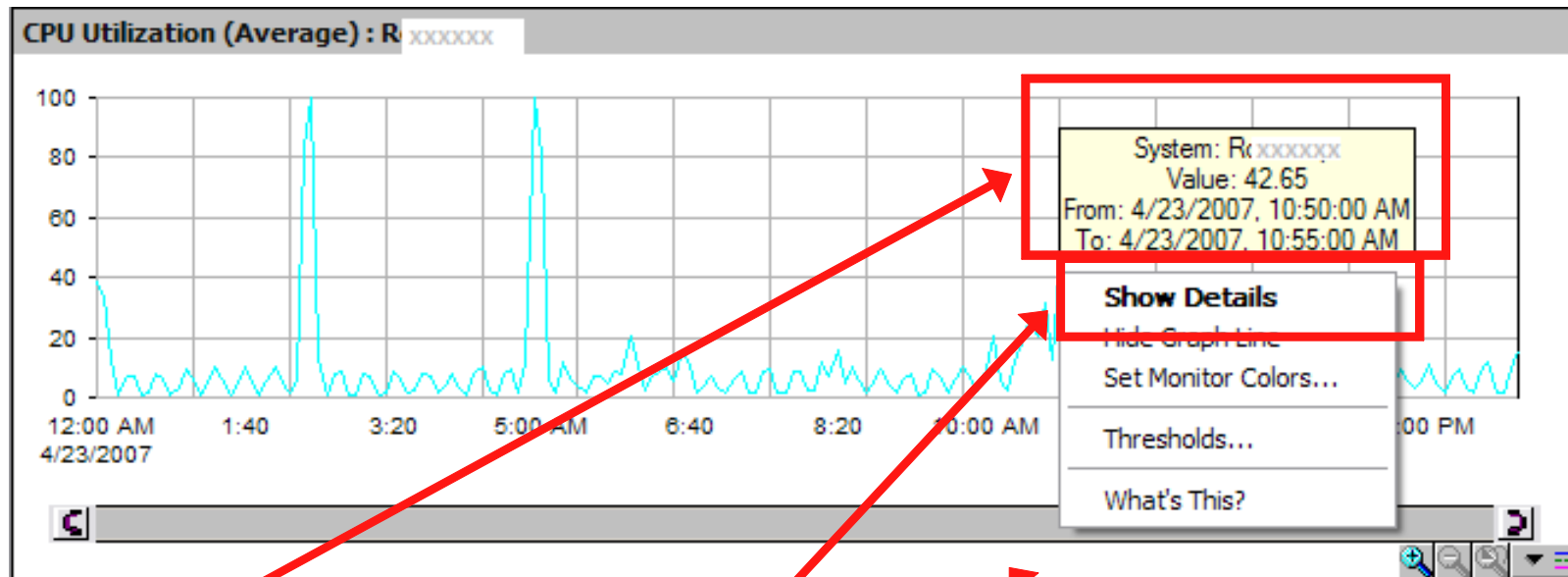


Layout



Viewing Data

Summarized information



Dynamic Help

Glide over a graph point

More information

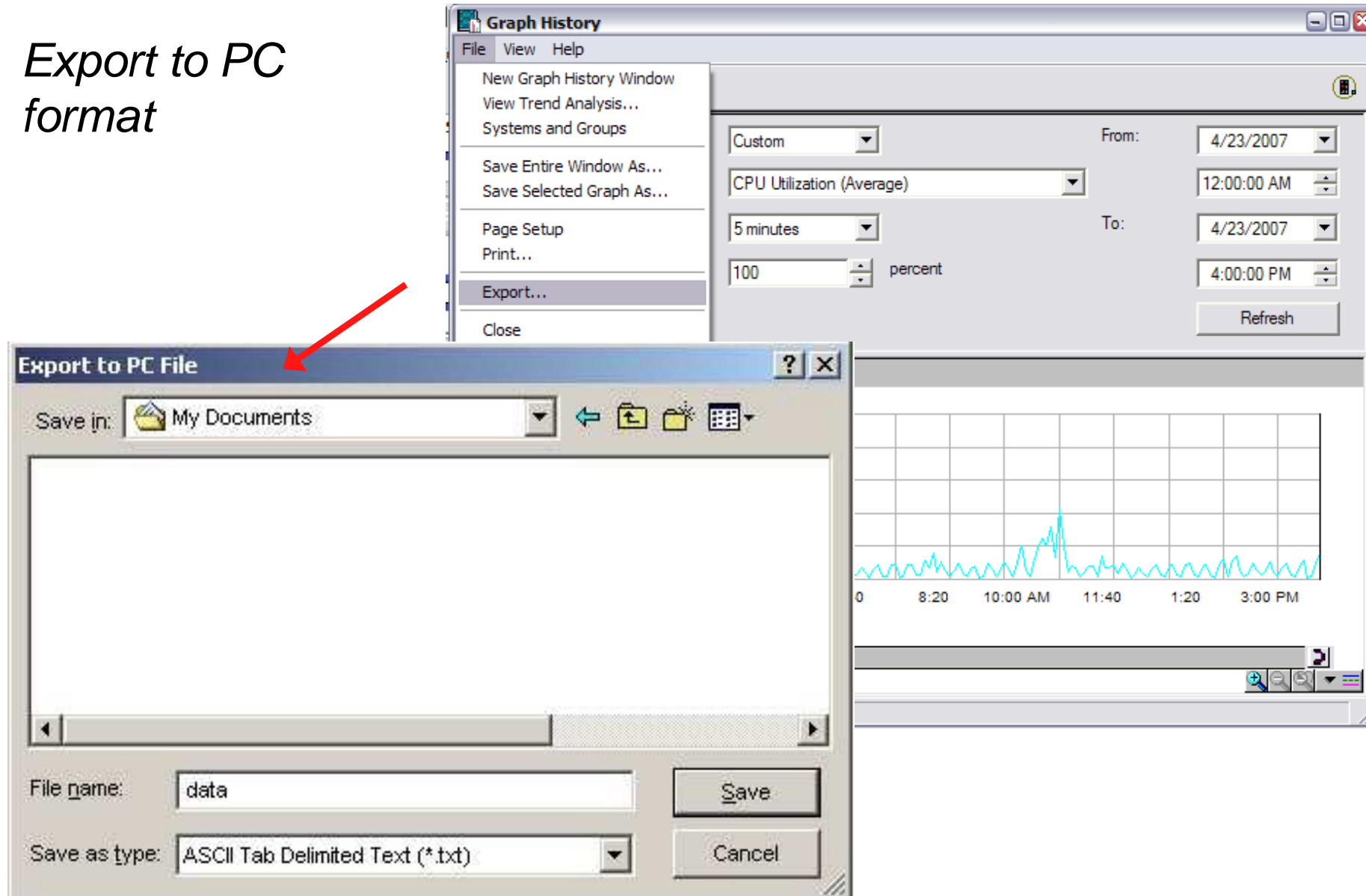
Right-click on graph data point

Zoom (in/out)


Slider bar

Exporting Data

*Export to PC
format*



<http://www-03.ibm.com/systems/power/support/pm/index.html>


United States [change]

Search

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[Services](#)
[Products](#)
[Support & downloads](#)
[My IBM](#)
Welcome [IBM Sign in] [Register]

Power Systems

- Advantages
- Hardware
- Software
- Solutions
- Support and Services
- Community
- Resources
- Success stories
- News
- Education

PM for Power Systems
IBM Performance Management for Power Systems

[Overview](#)
[Getting started](#)
[FAQ](#)
[Reference materials](#)
[News](#)

[Intro](#)
[Description](#)
[Benefits](#)
[Terms & conditions](#)
[Contact](#)

Your IBM Power™ Systems model (including the IBM System i®, the IBM System p® and the new POWER6™ models) can be one of your company's most valued assets. But it is an absolute requirement you understand the utilization and growth of your system to help with making better plans for reducing cost, improving service and managing risk. Building a dynamic infrastructure that accommodates the changing demands of your business in a planet becoming smarter is critical.

That is where IBM Performance Management for Power Systems (PM for Power Systems), which now includes the former PM for System i and PM for System p, fits in. Supporting IBM i and the AIX® operating systems, this easy to use yet powerful tool easily provides you with critical information on your system's current and long term utilization trends plus helps provide insight on where you are headed, what additional capability your system has and what upgrades you might need for that "next" application. Ongoing interactive access is provided to your historical performance data so that you can easily 'revisit' your utilization and capacity environment from up to 24 months prior.

Whether you are interested in server consolidation, visualizing your virtualization capabilities through the addition of your own new applications or an IBM middleware application like WebSphere® or Domino® or implementing a multi-partition, multi-OS environment, PM for Power Systems can be of great assistance in helping you understand the possibilities.

Click here for a [whitepaper \(PDF, 171KB\)](#) on how PM for Power Systems can help you visualize your system workloads on a new IBM Power System.

PM for Power Systems is available in both 'no additional charge' and 'nominal charge' options depending on the level of detail you wish to see on a routine basis. Visit the [description](#) and [terms and conditions](#) tabs for more information.

All of this is available with minimal initial [set up](#). After initial set up, the remaining process is automated, thereby helping relieve you of those tedious and expensive tasks involved with systems management. After set up, IBM will provide you with secure Internet access to your graphs.

In summary, PM for Power System's asset management and virtualization capabilities are an easy step in helping you build a dynamic infrastructure for tomorrow's challenges.

What releases and models are supported?
 PM for Power Systems provides support for current releases of IBM i and AIX and the hardware models they run on until the release goes to the 'End of Program Support' date.

Note: PM for Power Systems does not support IBM Blades or the IBM Power 575 model.


PM for Power Systems will attempt to process data sent from non-supported releases of IBM i and AIX 5.1 on an AS-IS basis but no guarantee is implied.

Please refer to the following for a complete list of End of Program Support Dates by operating system:

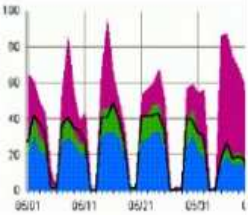
→ IBM i

We're here to help

Easy ways to get the answers you need.





 [Chat now](#)

Or call us at
 1-866-883-8901
 Priority code:
 6N8AF15W

PM for Power Systems reports


→ [View your online reports](#)

Quick links

-  [Using PM to Size a new Power System \(172KB\)](#)
-  [PM for Power Systems brochure \(590KB\)](#)
-  [AIX: download the collection agent 6.0.6.0](#)
- [View Readme](#)
- Note: IBM i users do not need to download the collection agent
-  [Get Adobe® Reader®](#)

Accessing PM for Power Systems Reports – Sign On

<https://pmeserver.rochester.ibm.com/PMiSeriesInternet/comboview/loginPage.jsp>

The screenshot shows a web browser window titled "PM - Login - Mozilla Firefox: IBM Edition". The address bar shows the URL "https://pmeserver.rochester.ibm.com/PMiSeriesInternet/comboview/loginPage.jsp". The page features the IBM logo and a navigation bar with links: Home, Products, Services & solutions, Support & downloads, and My account. The main heading is "Performance Management Login". Below this, a message states: "Please select user login type, Then enter Userid and Password:". There are four radio button options for login type: "Customers login with:" (selected), "Customers login with:", "Business Partners login with:", and "IBM Employees login with:". Each option has a list of login methods: "Machine Serial" and "Enterprise View ID" for the first "Customers login with:" option, "IBM Web ID" for the second "Customers login with:" option, "IBM Web ID" for the "Business Partners login with:" option, and "Intranet ID" for the "IBM Employees login with:" option. To the right of the login options is a "Help Text" box that reads: "Please select user login type then enter machine serial or enterprise view id, IBM Web ID, or IBM Intranet ID along with the password, to view your data. If you are a customer and cannot remember your password, click the 'Forgot Password' link." Below the login options are input fields for "Login ID:" and "Password:", a "Forgot password" link, and a "Sign in" button. A note at the bottom states: "Note: PM for System p users sending performance data to IBM: As of January 1, 2008, all AIX servers must use the PM for System p Collection Agent (6.0.6.0), available at ftp://ftp.software.ibm.com/aix/products/pmaix/". The footer contains links for "About IBM", "Privacy", and "Contact".

PM - Login - Mozilla Firefox: IBM Edition

File Edit View History Bookmarks Tools Help

IBM Systems Information Center PM - Login

United States [change] Terms of use

Search

Home Products Services & solutions Support & downloads My account

Performance Management Login

PM System i5 Home

Performance Management Login

Related links

- News and Announcements
- Performance Management for System i Report Descriptions
- Performance Management for System i FAQ
- Performance Management for System p Report Descriptions
- Performance Management for System p FAQ
- Country Contact Information
- PM for System i5 Redbook

Get Adobe® Reader®

Please select user login type, Then enter Userid and Password:

☒ Customers login with:

- ♦ Machine Serial
- ♦ Enterprise View ID

☐ Customers login with:

- ♦ IBM Web ID

☐ Business Partners login with:

- ♦ IBM Web ID

☐ IBM Employees login with:

- ♦ Intranet ID

Help Text

Please select user login type then enter machine serial or enterprise view id, IBM Web ID, or IBM Intranet ID along with the password, to view your data.

If you are a customer and cannot remember your password, click the "Forgot Password" link.

Login ID:

Password:

[Forgot password](#)

Note: PM for System p users sending performance data to IBM: As of January 1, 2008, all AIX servers must use the PM for System p Collection Agent (6.0.6.0), available at <ftp://ftp.software.ibm.com/aix/products/pmaix/>

About IBM Privacy Contact

PM for Power Systems Enterprise View

Use Add Machine to add each system/partition to the list shown here.

Use Create Enterprise View to build view of all systems and partitions that send data to IBM.

Server Information of IBMVIEW

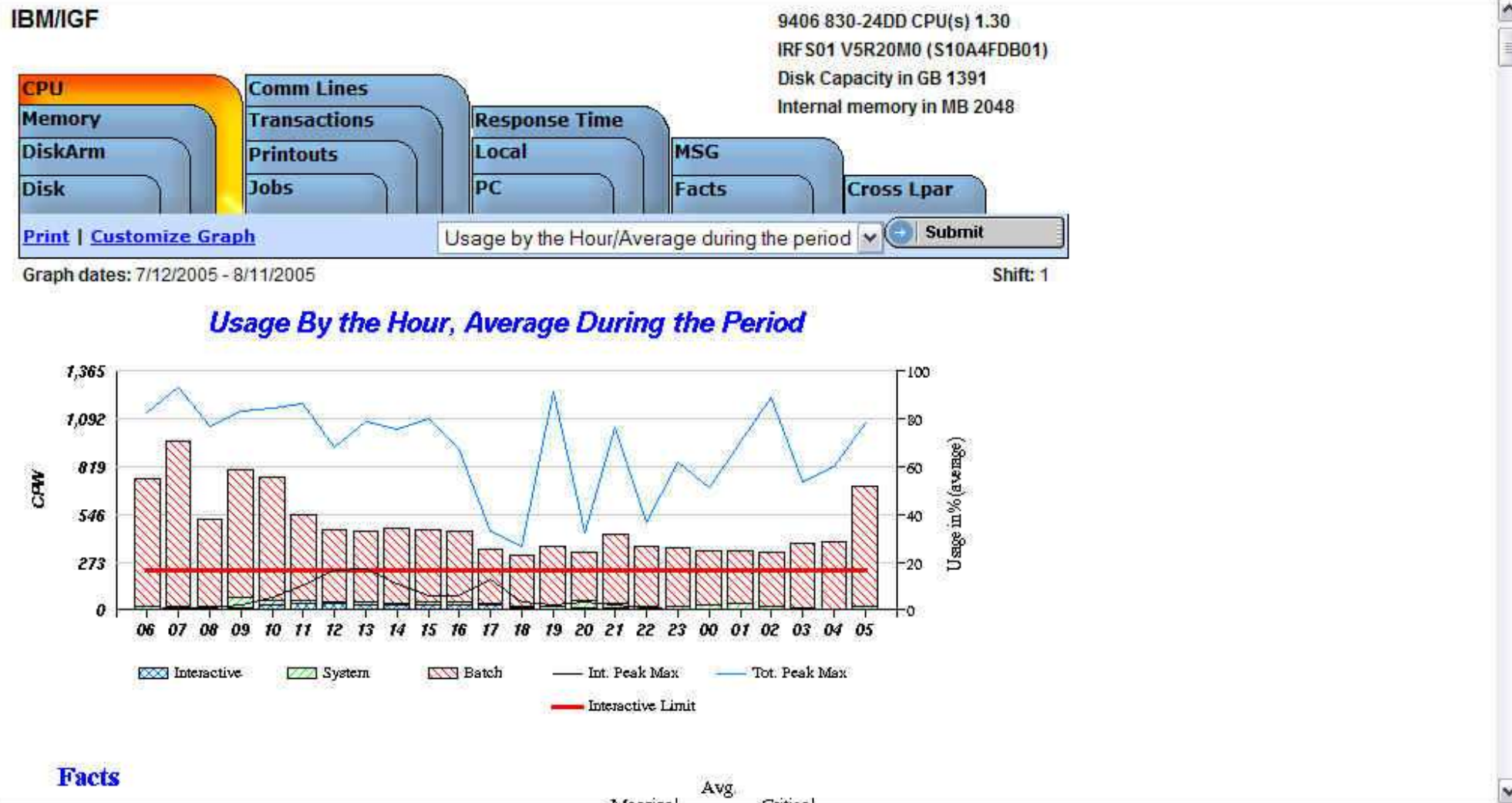
[Edit Profile](#)
[Size Next Upgrade](#)
[Create Enterprise View](#)
[Sign Out](#)

[Add Machine](#)
[Remove Machine](#)
[Delete Enterprise View](#)

Actions	Serial Number	Shift Number	Fee	System Name	Last Transmission Date	Last Report Date	CPU System	CPU Interac-tive	Memory	Disk	Average Re-sponse Time
	S10A4FDB00	1		IGFPRIME	02/13/2006	01/2006	3.42	0.00	768	60.86	3.35
	S10A4FDB00	2		IGFPRIME	02/12/2006	None	2.81	0.00	768	61.07	0.00
	S10A4FDB01	1		IRFS01	02/08/2006	01/2006	41.29	1.42	4096	51.25	0.27
	S10A4FDB01	2		IRFS01	02/08/2006	01/2006	29.87	0.85	4096	50.95	0.11
	S10A4FDB02	1		IRFS02	02/14/2006	01/2006	37.43	0.53	1536	56.74	0.48
	S10A4FDB02	2		IRFS02	02/13/2006	01/2006	30.82	0.61	1536	56.40	0.30
	S10A4FDB03	1		BETAS400	02/13/2006	01/2006	22.40	4.06	4096	54.11	1.77
	S10A4FDB03	2		BETAS400	02/13/2006	01/2006	19.95	0.21	4096	53.86	1.90
	S10A4FDB05	1		DEVAS400	02/11/2006	01/2006	22.61	0.93	2048	57.28	0.19
	S10A4FDB05	2		DEVAS400	02/08/2006	None	0.00	0.00	2048	0.00	0.00
	S10A4FDB06	1		IRFS03	02/13/2006	01/2006	25.68	2.67	4096	67.01	0.41
	S10A4FDB06	2		IRFS03	02/13/2006	01/2006	43.26	1.49	4096	66.12	0.40
	S1026BTM00	1		AS400PRI	02/13/2006	01/2006	6.28	0.01	1024	64.63	0.71
	S1026BTM00	2		AS400PRI	02/13/2006	01/2006	9.25	0.01	1024	64.65	0.71
	S1026BTM01	1		AS400COL	02/23/2006	01/2006	26.57	5.32	2048	84.58	0.38
	S1026BTM01	2		AS400COL	02/23/2006	01/2006	16.51	0.24	2048	83.64	0.34
	S1026BTM02	1		AS400ECU	02/14/2006	01/2006	17.10	5.01	2048	80.68	0.36
	S1026BTM02	2		AS400ECU	02/14/2006	01/2006	16.43	0.70	2048	80.39	0.34
	S1026BTM03	1		AS400PAN	02/11/2006	01/2006	34.73	6.75	1024	70.37	0.25

Click here for detailed performance reports for this system or partition

Viewing PM Reports



Step 4:

Basic Performance Analysis

Basic Performance Analysis

When a performance problem occurs you often need to use performance analysis tools to identify the cause of the problem to correct it

Beginning with 6.1, you now have two choices for basic performance analysis:

The Performance Tools plug-in in System i Navigator

IBM Systems Director Navigator for i – Performance tasks

Manage performance collections

Performance Data Investigator

Performance Tools plug-in in System i Navigator

The Performance Tools plug-in presents more detail than System Monitors which provides more capability to analyze the cause of a performance issue

Graphs are similar to System Monitor graphs

Multiple data views allow you to analyze performance in many ways

Summary statistics provide an overall view of system performance

Drill down to the time interval when a problem occurred and use the power of the GUI to sort performance data by any available metric

Beginning with 6.1, it is recommended to use the IBM Systems Director Navigator Performance tasks

- Wait data included

- Many more charts to look at the data

- Can view all charts in table format

- Extensive customization capabilities

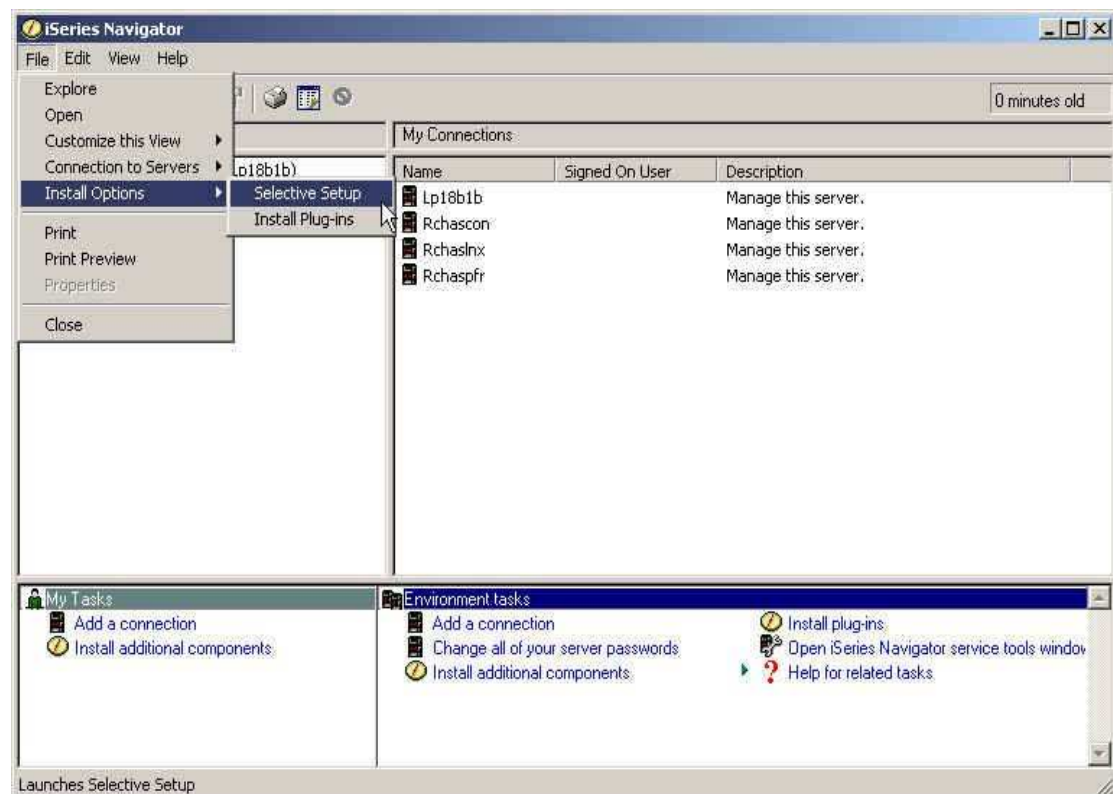
Install Tips

System i Navigator automatically detects if a plug-in is available on the server. If Performance Tools is on the server, Navigator will ask you if you want to install the plug-in on your client

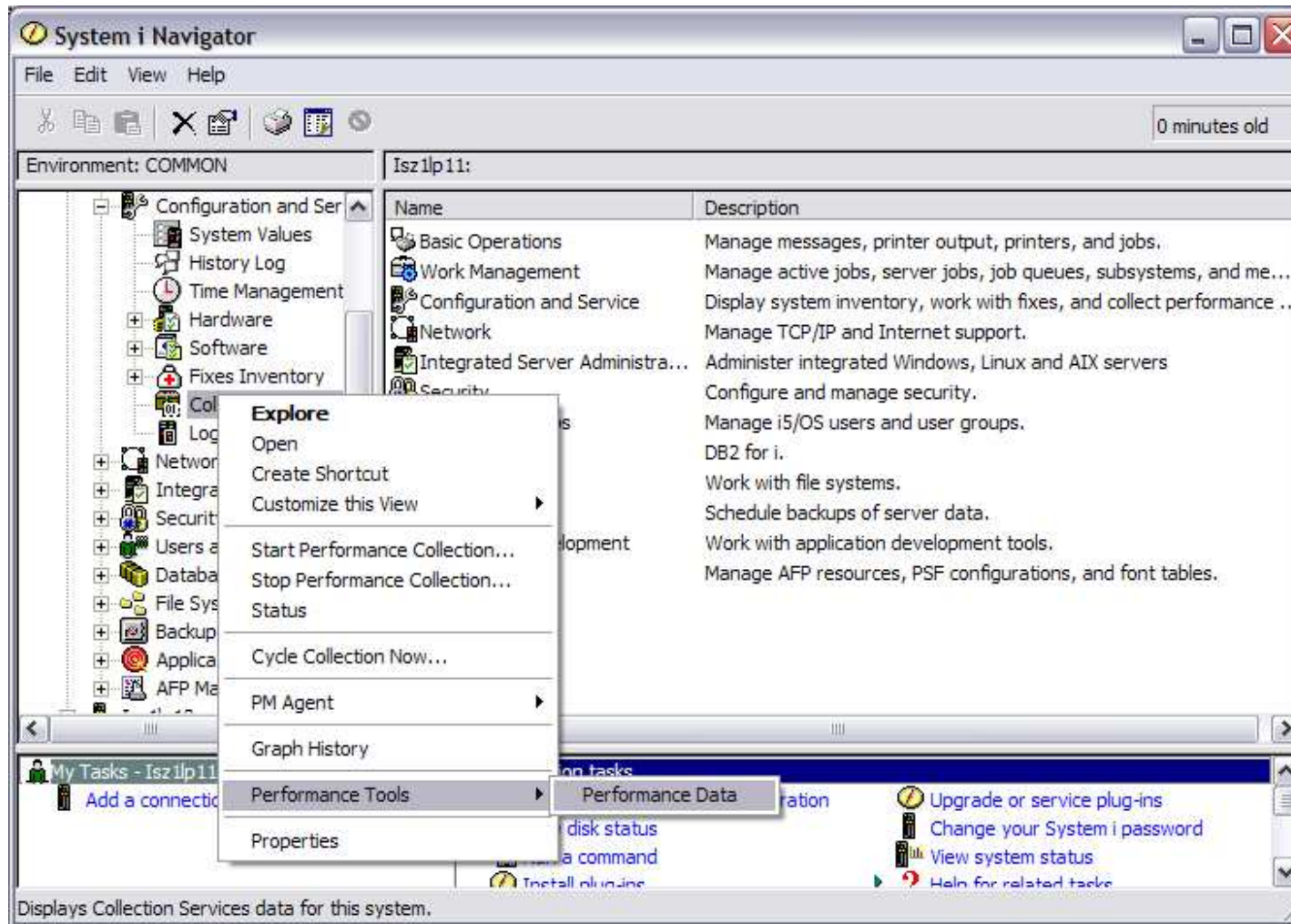
Install the plug in at that time

Or use Selective Setup later on

6.1 and later – use Windows add/remove programs



Starting the Performance Tools Plug-In



Viewing Performance Database Members

Performance Data - RXXXXXX

The following performance data was found. Select an entry to display, convert to the latest release, or delete the data.

Started	Ended	Member	Library	Collection Name	Collection Location	Orig
4/23/07 12:00:07 AM		Q113000007	Qmpgdata	Q113000007	Qmpgdata	Rch
4/22/07 12:00:07 AM	4/23/07 12:00:00 AM	Q112000007	Qmpgdata	Q112000007	Qmpgdata	Rch
4/21/07 12:00:08 AM	4/22/07 12:00:00 AM	Q111000008	Qmpgdata	Q111000008	Qmpgdata	Rch
4/20/07 11:35:01 AM	4/21/07 12:00:08 AM	Q110113501	Qmpgdata	Q110113501	Qmpgdata	Rch
4/20/07 6:01:09 AM	4/20/07 11:35:01 AM	Q110060109	Qmpgdata	Q110060109	Qmpgdata	Rch
4/19/07 6:01:07 AM	4/20/07 6:00:00 AM	Q109060107	Qmpgdata	Q109060107	Qmpgdata	Rch
4/19/07 12:00:10 AM	4/19/07 11:45:00 AM	Q109000009	PmXXXXXX	Q109000009	Qmpgdata	S10
4/19/07 12:00:07 AM	4/19/07 1:54:17 PM	Q109000006	PmXXXXXX	Q109000006	PmXXXXXX	S10
4/19/07 12:00:04 AM	4/19/07 10:10:00 AM	Q109000003	PmXXXXXX	Q109000003	Qmpgdata	S65
4/18/07 6:01:14 AM	4/19/07 6:00:00 AM	Q108060113	Qmpgdata	Q108060113	Qmpgdata	Rch
4/17/07 6:01:11 AM	4/18/07 6:00:00 AM	Q107060111	Qmpgdata	Q107060111	Qmpgdata	Rch
4/17/07 12:01:06 AM	4/18/07 12:00:00 AM	Q107000105	PmXXXXXX	Q107000105	Qmpgdata	Dor
4/16/07 6:01:05 AM	4/17/07 6:00:00 AM	Q106060105	Qmpgdata	Q106060105	Qmpgdata	Rch
4/15/07 6:01:06 AM	4/16/07 6:00:00 AM	Q105060106	Qmpgdata	Q105060106	Qmpgdata	Rch
4/14/07 6:01:05 AM	4/15/07 6:00:00 AM	Q104060105	Qmpgdata	Q104060105	Qmpgdata	Rch
4/13/07 6:01:11 AM	4/14/07 6:00:00 AM	Q103060111	Qmpgdata	Q103060111	Qmpgdata	Rch
4/12/07 6:01:11 AM	4/13/07 6:00:00 AM	Q102060111	Qmpgdata	Q102060111	Qmpgdata	Rch

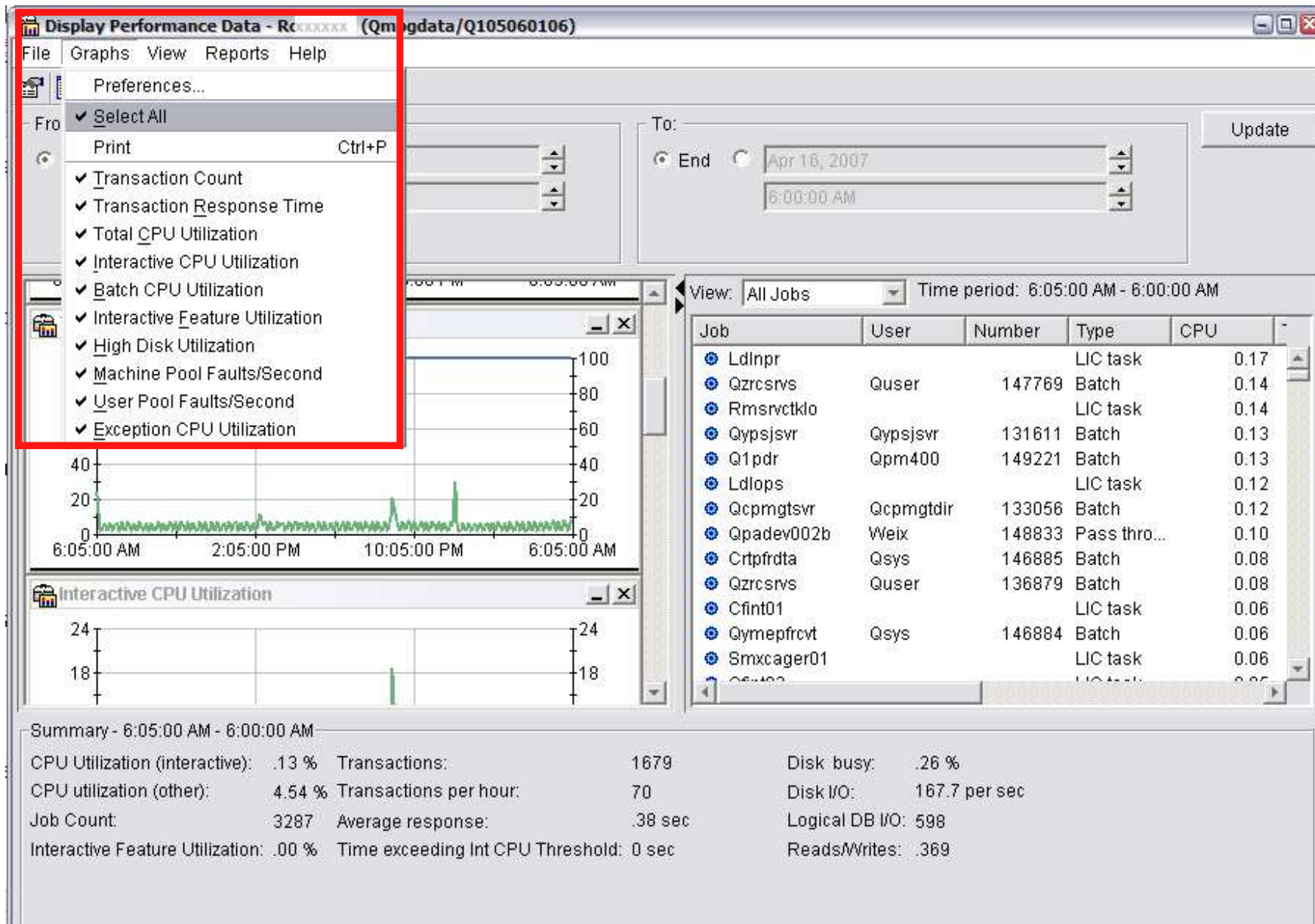
Buttons: Display, Convert..., Delete..., Refresh, Close, Help, ?

Annotations:

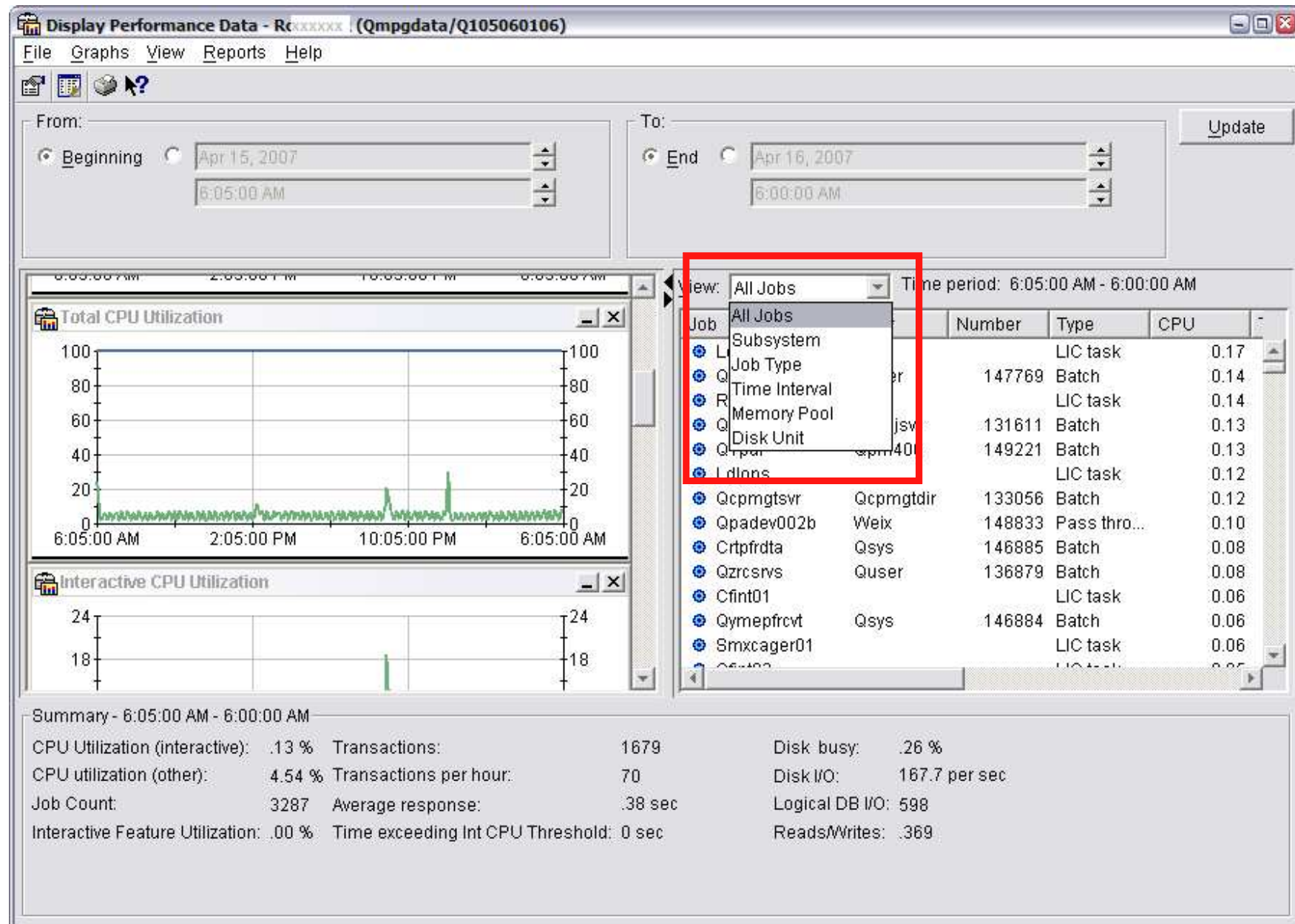
- Display data (points to Display button)
- Convert member to current release (points to Convert... button)
- Delete member (points to Delete... button)

Last updated: 4/23/07 6:18:17 PM

Performance Graphs

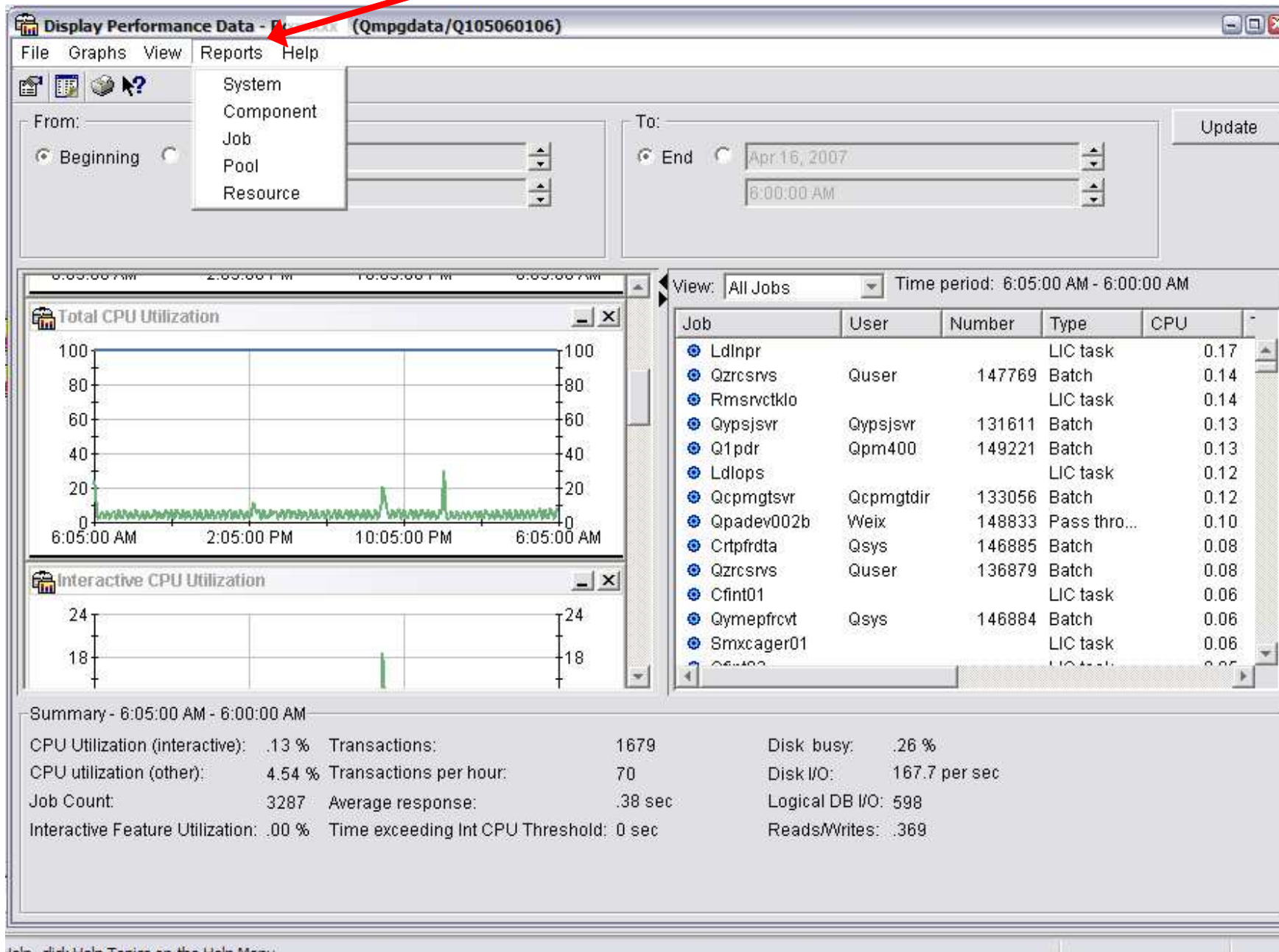


Data Views

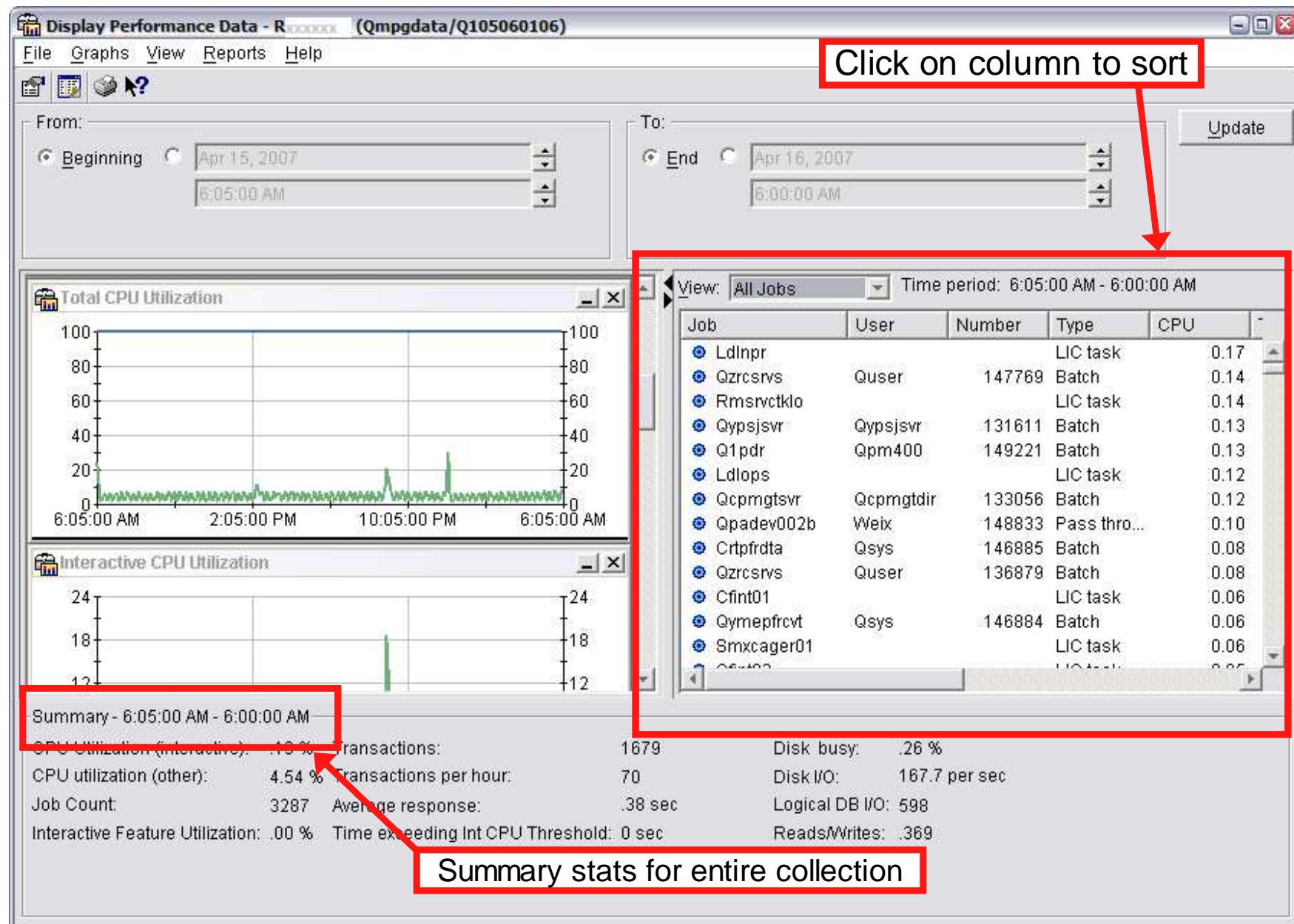


Performance Reports

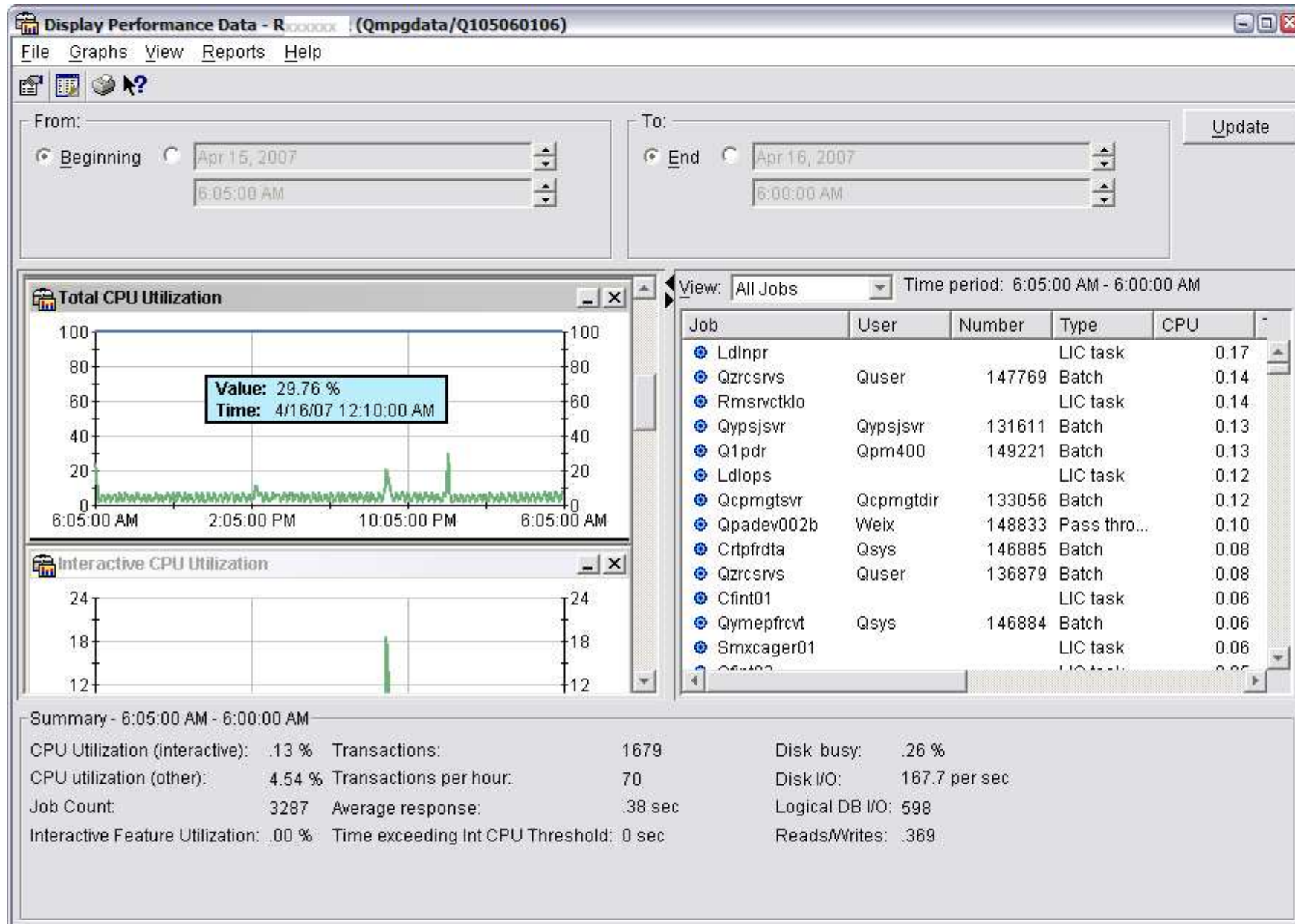
Select report you want to create



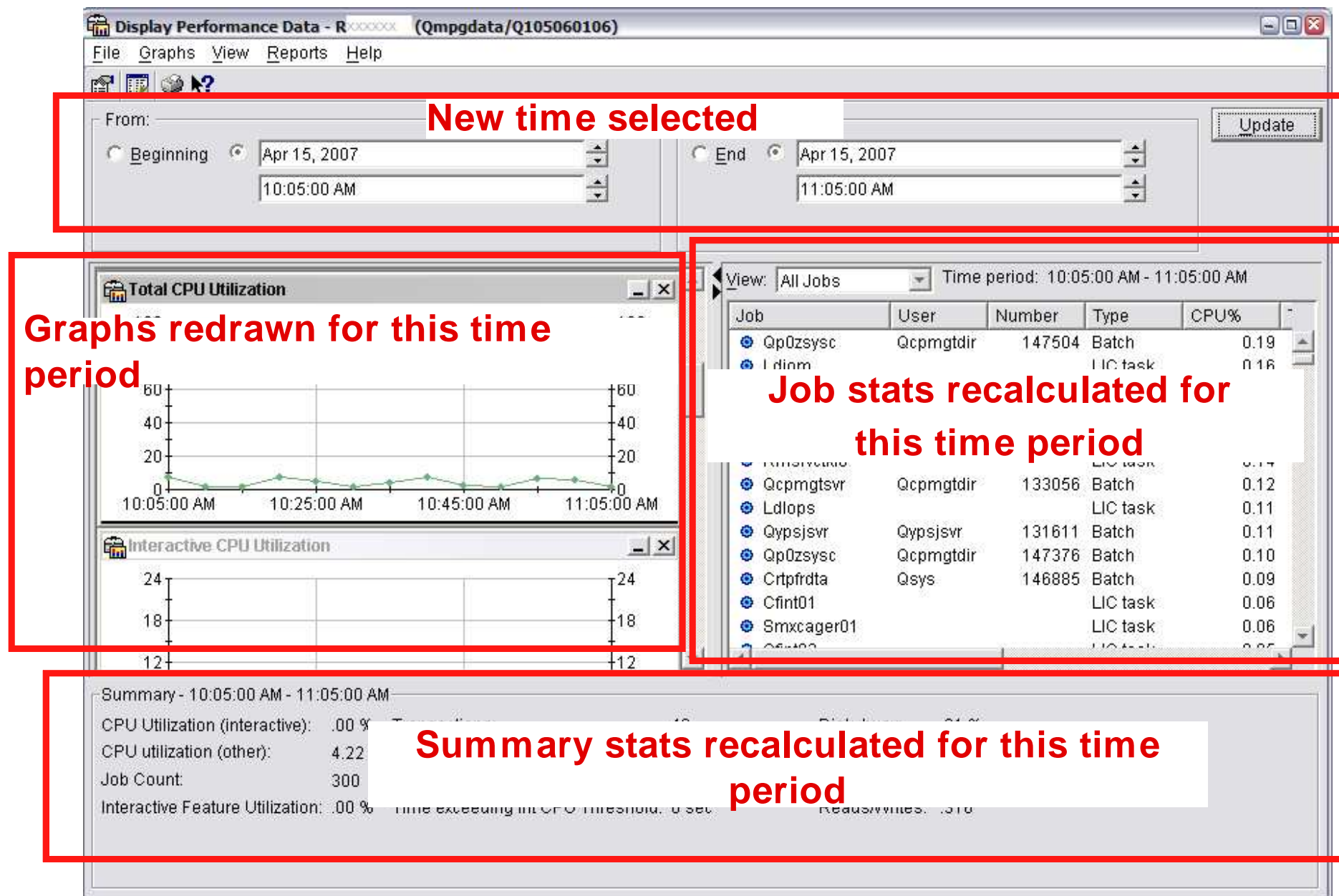
All Jobs View - Sort by Column of Interest



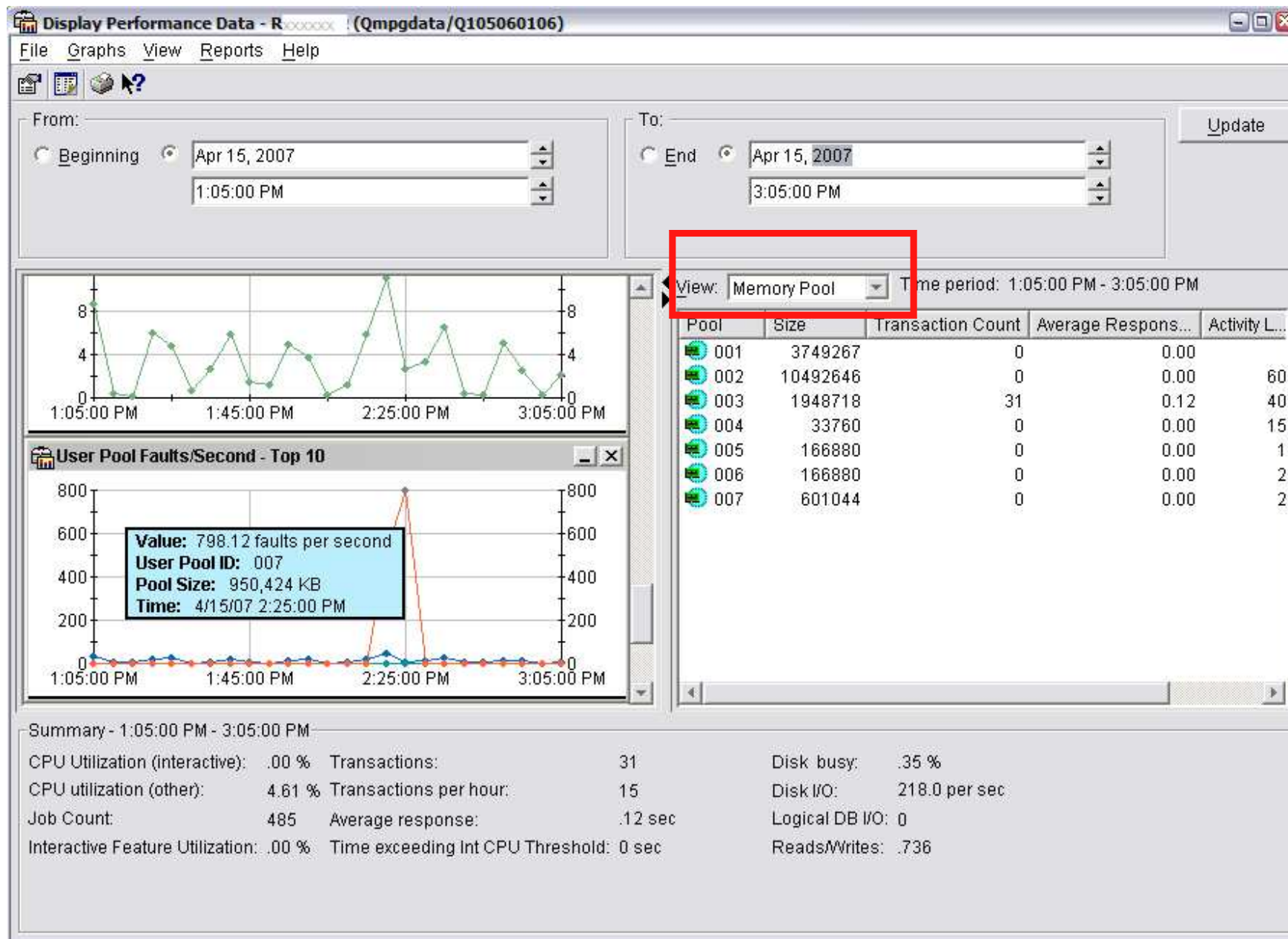
Data Point Details - CPU Utilization



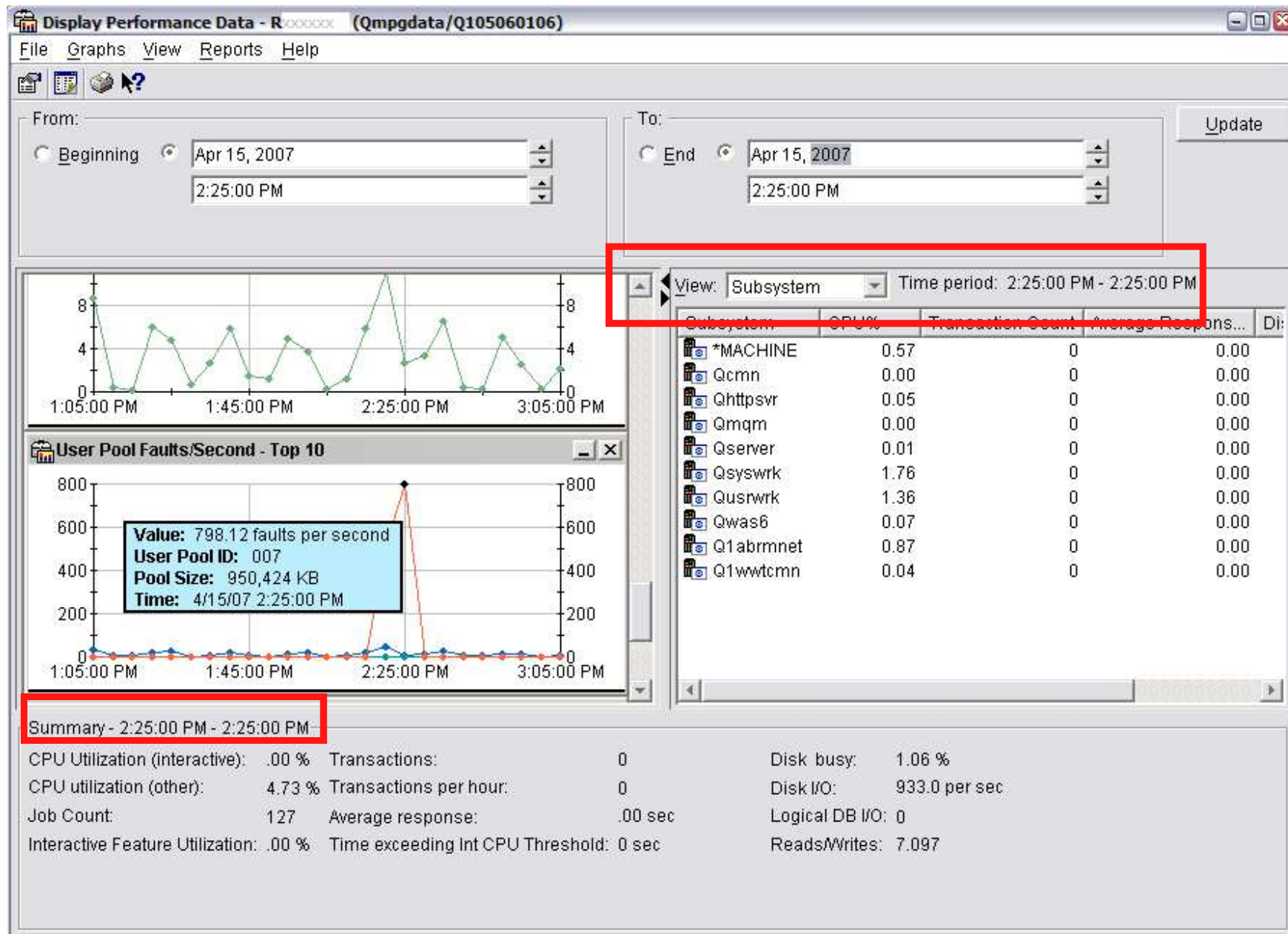
Drill-Down To Smaller Time Increments



User Pool Faults and Memory Pool View



Subsystem View at a Single Point In Time



IBM Systems Director Navigator for i Performance Tasks

Browser-based performance tasks

Manage performance data collections

Graphical user interface for collecting performance data

Graphically view and analyze performance data.

Collection Services

Health Indicators

Job Watcher

Disk Watcher

Performance Explorer

Investigate Data

IBM Systems Director Navigator for i5/OS®

View: All tasks ▾

- Welcome
- My Startup Pages
- i5/OS Management
 - System
 - Basic Operations
 - Work Management
 - Configuration and Service
 - Network
 - Integrated Server Administration
 - Security
 - Users and Groups
 - Databases
 - Journal Management
 - Performance
 - File Systems
 - Internet Configurations
 - Backup, Recovery and Media Services
 - High Availability Solutions Manager
 - Cluster Resource Services
- Settings

Welcome

Help | Logout

--- Select Action --- ▾

Performance x

Performance -

i5/OS Performance tools allows you to collect and investigate performance data on your system.

- [Investigate Data](#)
Allows you to investigate previously collected performance data on your system.
- [Collections](#)
Allows you to manage the performance

Show

Close

Investigate Data

Perspectives

- [Performance Explorer](#)
- [Disk Watcher](#)
- [Job Watcher](#)
- [Health Indicators](#)
- [Collection Services](#)

Collection

Collection Library	Collection Name
QPFRDATA ▾	Most Recent ▾

Display Search Options Close

Investigate Data – Collection Services

IBM Systems Director Navigator for i5/OS® Welcome Help Logout IBM

Performance Investigate... --- Select Action ---

Investigate Data

Perspectives

- Disk Watcher
 - Job Watcher
 - Collection Services
 - CPU Utilization and Waits Overview**
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Physical Disk I/O
 - Synchronous Disk I/O
 - Page Faults
 - Logical Database I/O
 - 5250 Display Transactions
 - Collection Services Database Files

Selection

CPU Utilization and Waits Overview

Description

This chart shows CPU utilization and some categories of the more interesting waits for all contributing jobs and tasks over time for the selected collections. Use this chart to select a time frame for further detailed investigation.

Collection

Collectio
QPF RD

Display **Close**

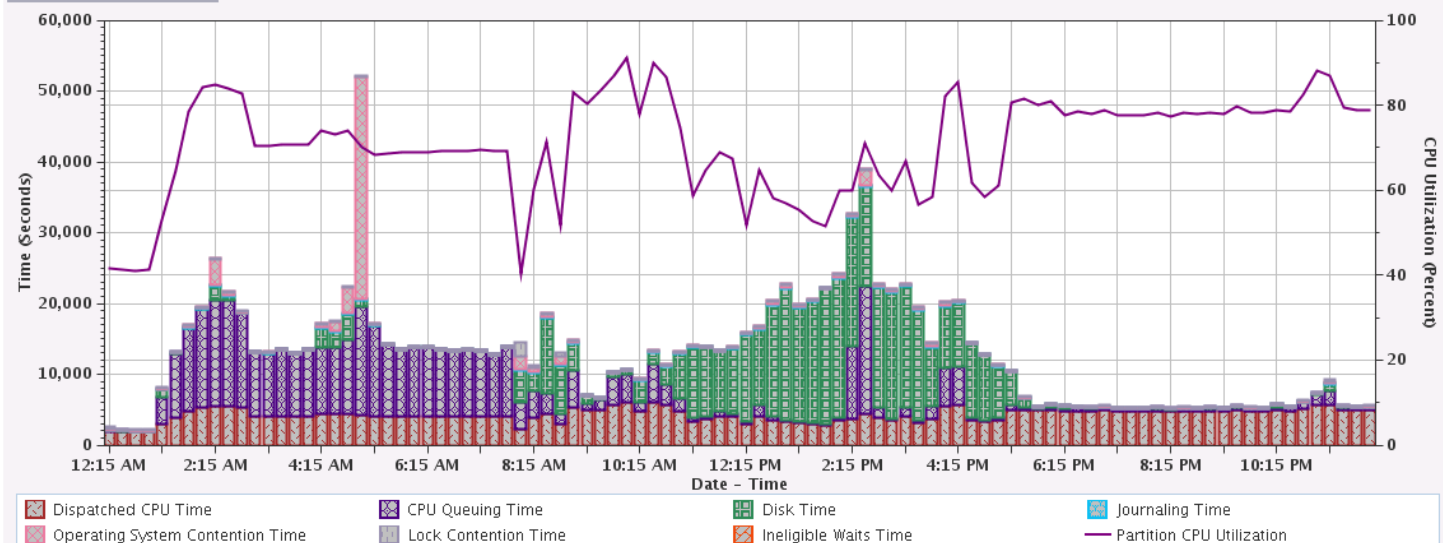
CPU Utilization and Waits Overview

Perspective Edit View History

Collection	Time	System
Name(s): CS228229ND	Start: Feb 28, 2008 12:00:02 AM	Name:
Library: COMMON2	End: Feb 29, 2008 12:00:00 AM	Release: V6R1M0
Type: Collection Services File Based Collection		

--- Select Action ---

CPU Utilization and Waits Overview



Collection Manager

IBM Systems Director Navigator for i5/OS*

Welcome

Help | Logout











Performance x

Investigate... x

Collections x

Collections -

Refresh

Select	Name ^	Library ^	Type ^	Status ^	Started ^	Ended ^	Size MB ^
	Filter	<input checked="" type="checkbox"/> COMMON	Filter	Filter	Filter	Filter	Filter
<input type="checkbox"/>	 CSOBJLOCKC	COMMON	Collection Services File Based Collection	Complete	Dec 8, 2007 12:00:03 AM	Dec 8, 2007 3:20:00 PM	159.816 MB
<input type="checkbox"/>	 CS228229ND	COMMON	Collection Services File Based Collection	Complete	Feb 28, 2008 12:00:02 AM	Feb 29, 2008 12:00:00 AM	841.359 MB
<input type="checkbox"/>	 Q071123119	COMMON	Collection Services File Based Collection	Complete	Mar 11, 2008 12:31:19 PM	Mar 11, 2008 7:30:00 PM	90.3046 MB
<input type="checkbox"/>	 DAWNDW	COMMON	Disk Watcher File Based Collection	Complete	Mar 11, 2008 2:02:16 PM	Mar 11, 2008 2:32:32 PM	0.02377 MB
<input type="checkbox"/>	 DAWNDWFULL	COMMON	Disk Watcher File Based Collection	Complete	Mar 11, 2008 5:00:45 PM	Mar 11, 2008 5:02:00 PM	0.1064 MB
<input type="checkbox"/>	 DAWNDWSTAT	COMMON	Disk Watcher File Based Collection	Complete	Mar 11, 2008 6:07:39 PM	Jan 1, 2001 12:00:00 AM	7.62939 MB
<input type="checkbox"/>	 DAWNFULL	COMMON	Disk Watcher File Based Collection	Complete	Mar 12, 2008 8:02:48 AM	Mar 12, 2008 8:08:36 AM	0.11625 MB
<input type="checkbox"/>	 DAWN JW2	COMMON	Job Watcher File Based Collection	Complete	Mar 12, 2008 8:42:26 AM	Mar 12, 2008 9:42:33 AM	0.54378 MB
<input type="checkbox"/>	 DAWN JW229	COMMON	Job Watcher File Based Collection	Complete	Feb 29, 2008 12:00:56 PM	Feb 29, 2008 1:00:52 PM	0.55239 MB
<input type="checkbox"/>	 JW OBJLOCKC	COMMON	Job Watcher File Based Collection	Complete	Dec 13, 2007 2:40:08 PM	Dec 13, 2007 2:55:21 PM	0.02621 MB
Page 1 of 1 Total: 223 Filtered: 10 Displayed: 10 Selected: 0							

Close

Web Performance Advisor / Monitor

WPA.bmp - Windows Picture and Fax Viewer

IBM Web Administration for i5/OS

Setup **Manage** Advanced | Related Links

All Servers | HTTP Servers **Application Servers** ASF Tomcat Servers

Running Server: WAS61SVR01/WAS61SVR01 - V6.1 ND

Web Performance Advisor

The overall Web performance evaluation cannot be determined at this time. See the system and Web environment sections below for additional details.

System Performance Attribute Information

Evaluation for this partition is unknown at this time. One or more system attributes cannot be retrieved.

Host name:	lp01ut10.rchland.ibm.com	Memory:	15.31 GB
System model:	890	Disk units:	11
Processor feature:	2AE9	Total disk storage:	112.40 GB
System CPW:	8900		

[Manage system attributes](#)

Web Environment:

Possible performance improvements may be realized by updating the performance attributes of the Web and application servers in this Web environment to acceptable values.

Select	Name	Type	Evaluation
<input checked="" type="radio"/>	WAS61SVR01/WAS61SVR01	V6.1 ND	Acceptable
<input type="radio"/>	WEBSERVER	Apache-HTTP/Apache	Improvements possible

[Manage attributes](#)

[Export performance profile](#) [Import performance profile](#) [Cancel](#) [General settings](#)

Step 5:

Advanced Performance Analysis

Advanced Performance Analysis

Advanced and detailed analysis is necessary to fully diagnose some performance problems

IBM i has sophisticated tools for this purpose

Job Watcher

Disk Watcher

Performance Explorer

Performance Trace Data Visualizer

iDoctor product

Job Watcher

Job Watcher collects more detailed performance data than collection services

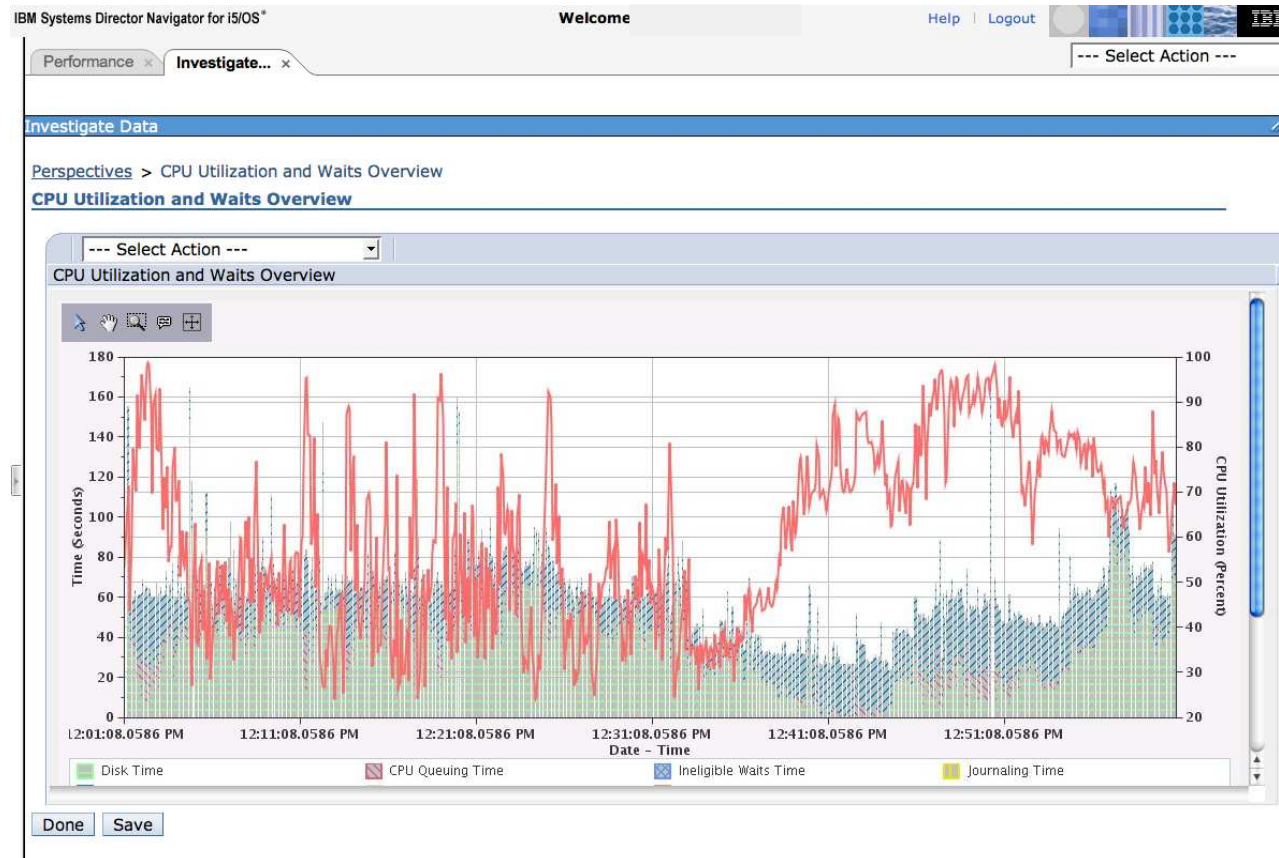
Call Stacks

Activation Group information

SQL Statements

Continuous sampling

Allows for deep performance diagnostics



Disk Watcher

Statistical Overview

Average response times and total I/Os for the entire collection

Good starting point to get an overview of the entire collection

Statistical Details

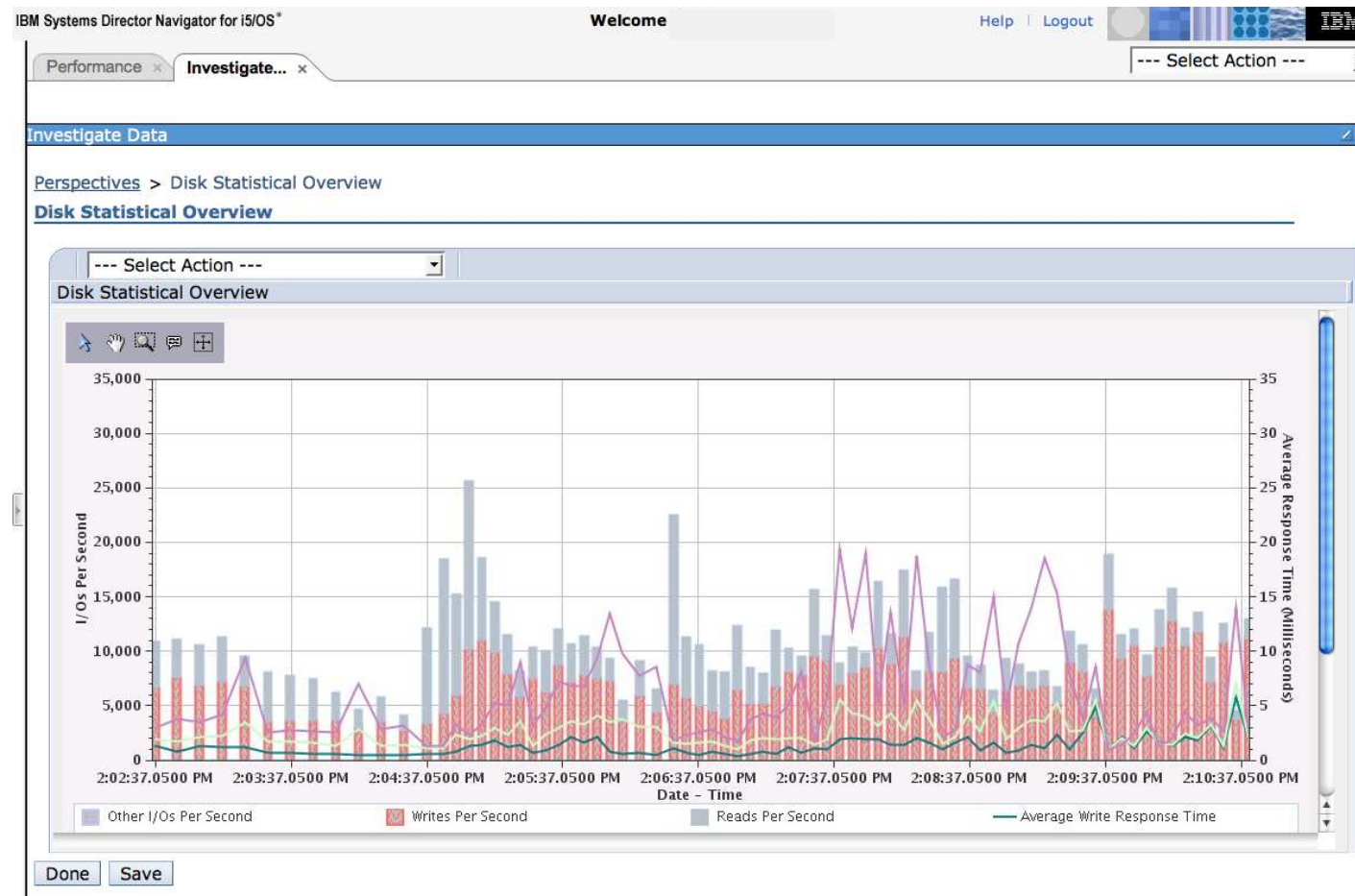
Detailed statistics

Trace

Detailed information on every I/O operation

Can identify thread/task associated with the I/O operation

Can identify program/procedure doing the I/O operation



Performance Explorer

Performance Explorer is the most sophisticated IBM I performance tool

- Can collect the details of every I/O operation, every task switch

- Hundreds of events collected

- Thus, most complex to use

- Generally used by IBM performance analysis experts

Performance Trace Data Visualizer

Performance Trace Data Visualizer is a graphical tool for analyzer Performance Explorer profile data

Data displayed in tree and table form

<http://www.alphaworks.ibm.com/tech/ptdv>

IBM iDoctor for i

Product developed by the IBM Rochester Support Center for deep, detailed performance analysis

Three major components

Job Watcher

- Job Watcher

- Collection Services Investigator

- Disk Watcher

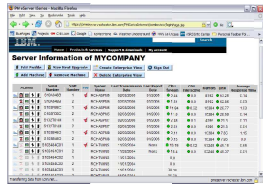
PEX Analyzer

Heap Analyzer

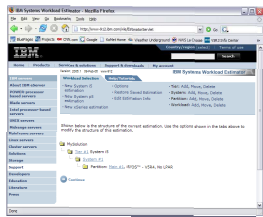


http://www-912.ibm.com/i_dir/idoctor.nsf

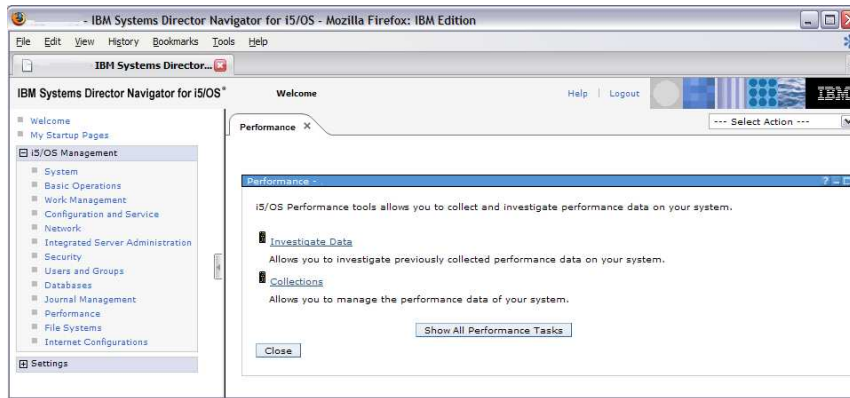
Web-based Solution



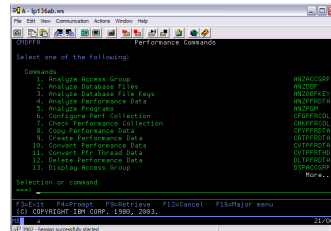
PM for
Power Systems



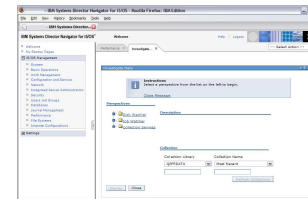
WorkLoad
Estimator



IBM Systems Director Navigator for i



Green Screen
Performance Explorer
Performance Tools Reports
System commands
Batch Model



Collection Services
Job Watcher
Disk Watcher

Collection
Services

Disk Watcher
Collector

Job Watcher
Collector

Performance
Explorer





A **Redbooks** publication!

End to End Performance Management on IBM i

Understand the cycle of Performance
Management

Maximize performance using the
new graphical interface on V6.1

Learn tips and best practices



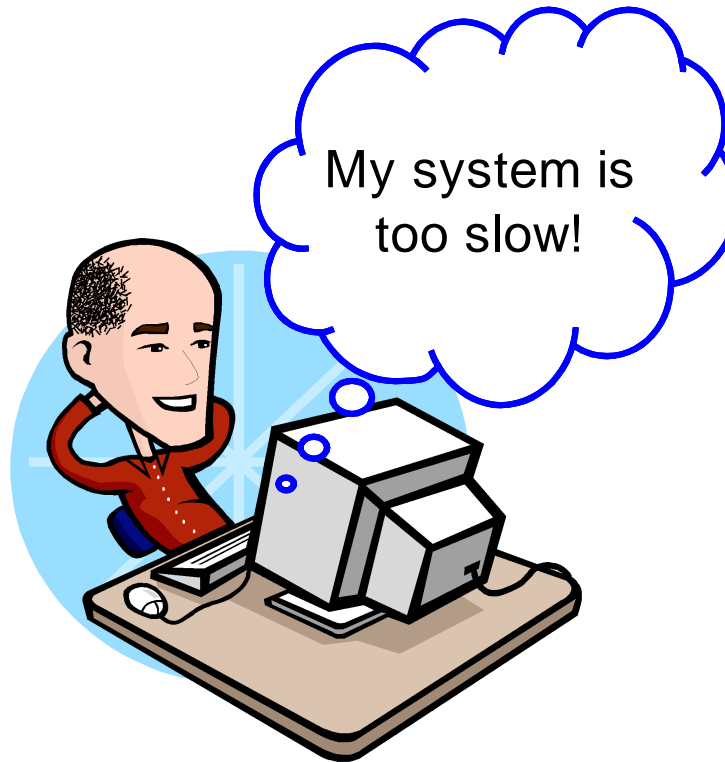
Hernando Bedoya
Mark Roy
Nandoo Neerukonda
Petri Nuutinen

<http://www.redbooks.ibm.com/redbooks/pdfs/sg247808.pdf>

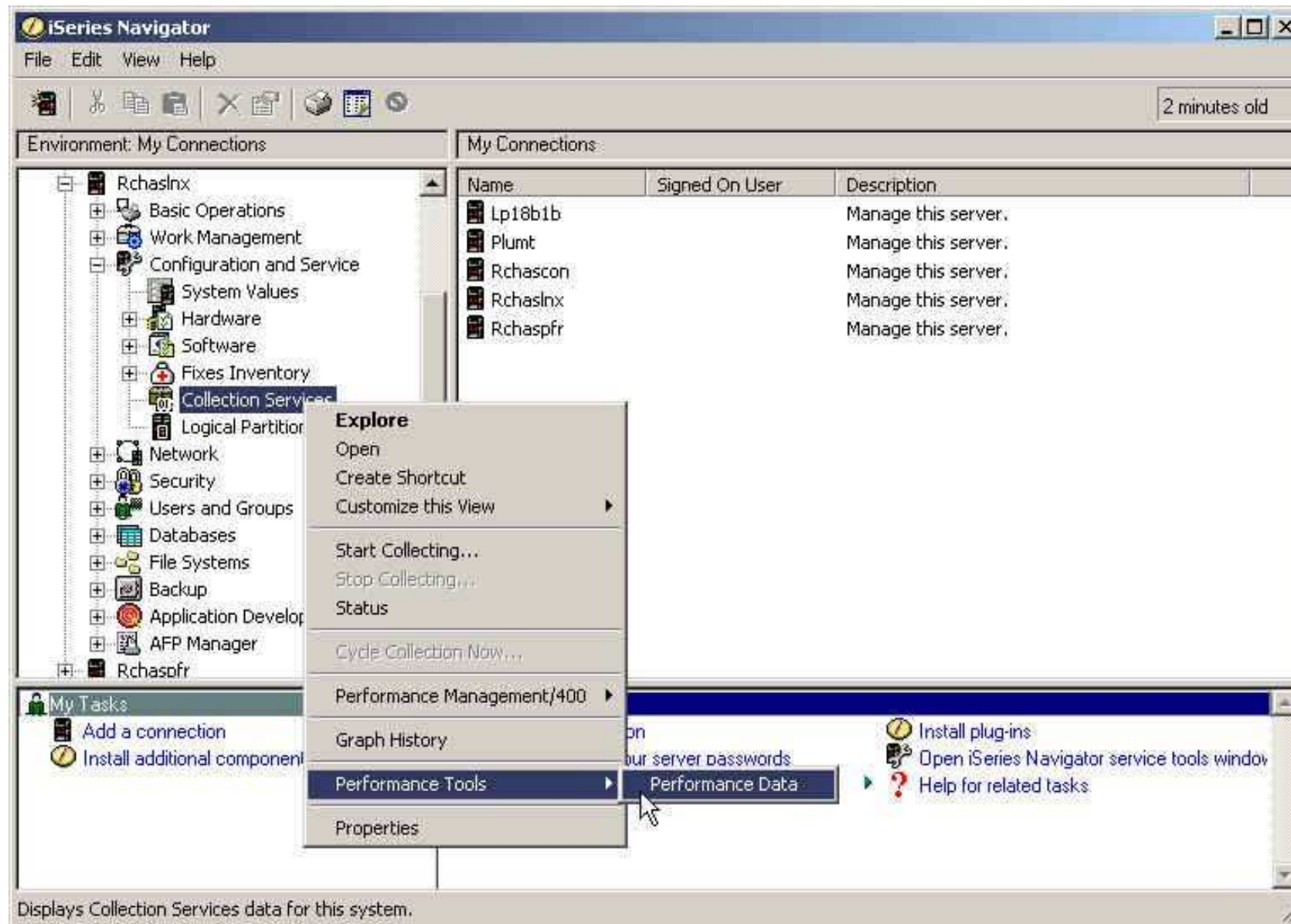
ibm.com/redbooks

Redbooks

A Real-World Scenario



View Performance Data



Display Performance Data for This Afternoon

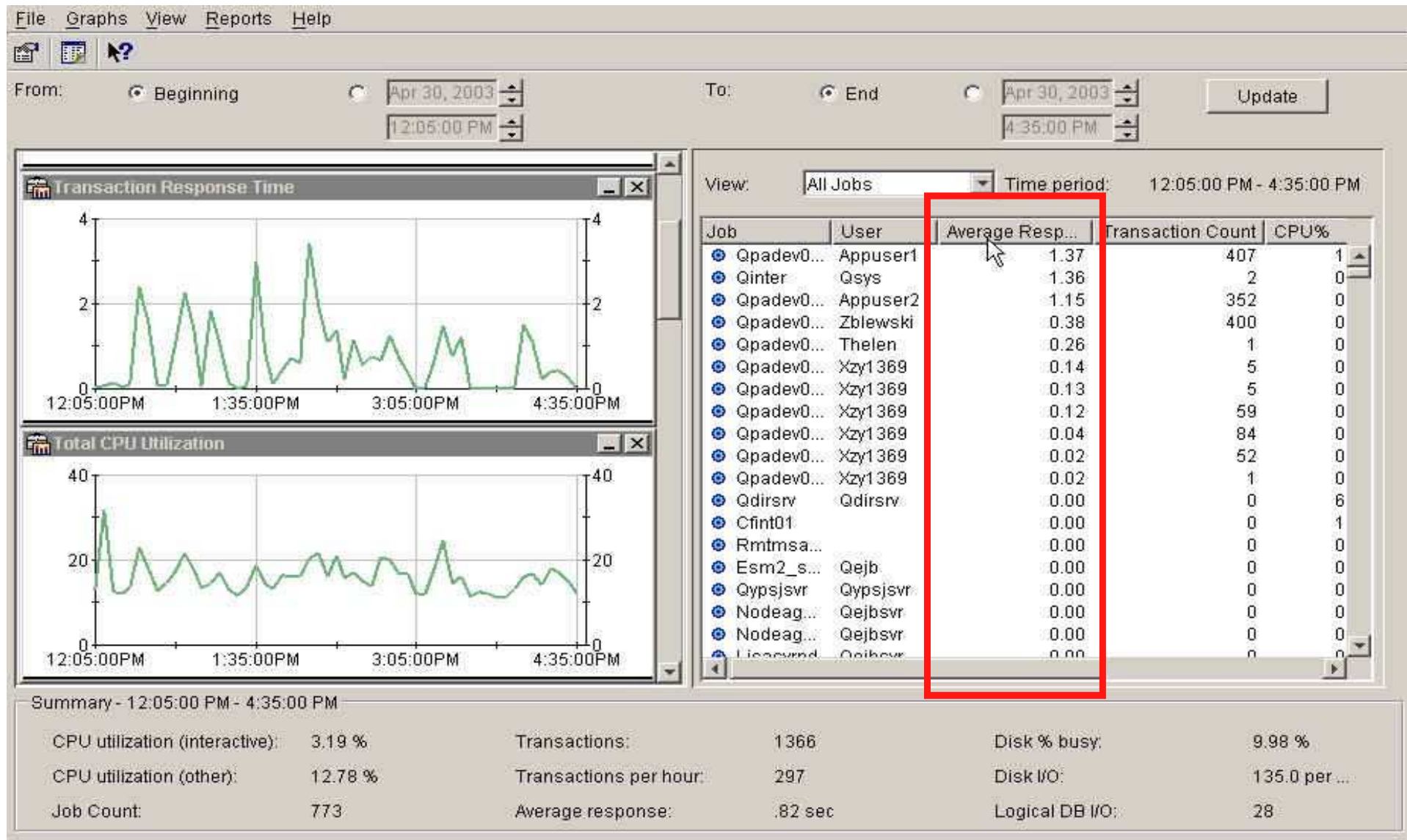
The following performance data was found. Select an entry to display, convert to the latest release, or delete the data.

Started	Ended	Member	Library	Collection Name
4/30/03 12:00:10 PM	4/30/03 4:01:00 PM	Q120pm	Zblewski	Q120120009
4/30/03 12:00:06 AM	4/30/03 12:00:09 PM	Q120000005	Zblewski	Q120000005
4/29/03 5:03:31 PM	4/30/03 12:00:05 AM	Q119170330	Qmpgdata	Q119170330
4/29/03 5:03:31 PM	4/30/03 12:00:05 AM	Q119170330	Zblewski	Q119170330
4/29/03 12:00:04 AM	4/29/03 5:03:30 PM	Q119000003	Zblewski	Q119000003
4/29/03 12:00:04 AM	4/29/03 5:03:30 PM	Q119000003	Zblewski2	Q119000003
4/27/03 12:00:09 AM	4/28/03 12:00:05 AM	Q117000007	Zblewski	Q117000007
4/26/03 12:00:00 PM	4/26/03 11:59:00 PM	Q116pm	Zblewski	Q116000004
4/26/03 12:00:05 AM	4/26/03 11:59:59 AM	Q116am	Zblewski	Q116000004
4/26/03 12:00:05 AM	4/27/03 12:00:07 AM	Q116000004	Zblewski	Q116000004
4/26/03 12:00:05 AM	4/27/03 12:00:07 AM	Q116000004	Zblewski2	Q116000004
4/25/03 5:11:56 PM	4/26/03 12:00:04 AM	Q115171156	Zblewski	Q115171156
4/25/03 5:11:56 PM	4/26/03 12:00:04 AM	Q115171156	Zblewski2	Q115171156
4/25/03 12:00:00 PM	4/25/03 5:00:00 PM	Q115pm	Zblewski	Q115000004
4/25/03 12:00:05 AM	4/25/03 11:59:59 AM	Q115am	Zblewski	Q115000004
4/25/03 12:00:04 AM	4/25/03 5:11:56 PM	Q115000004	Zblewski	Q115000004

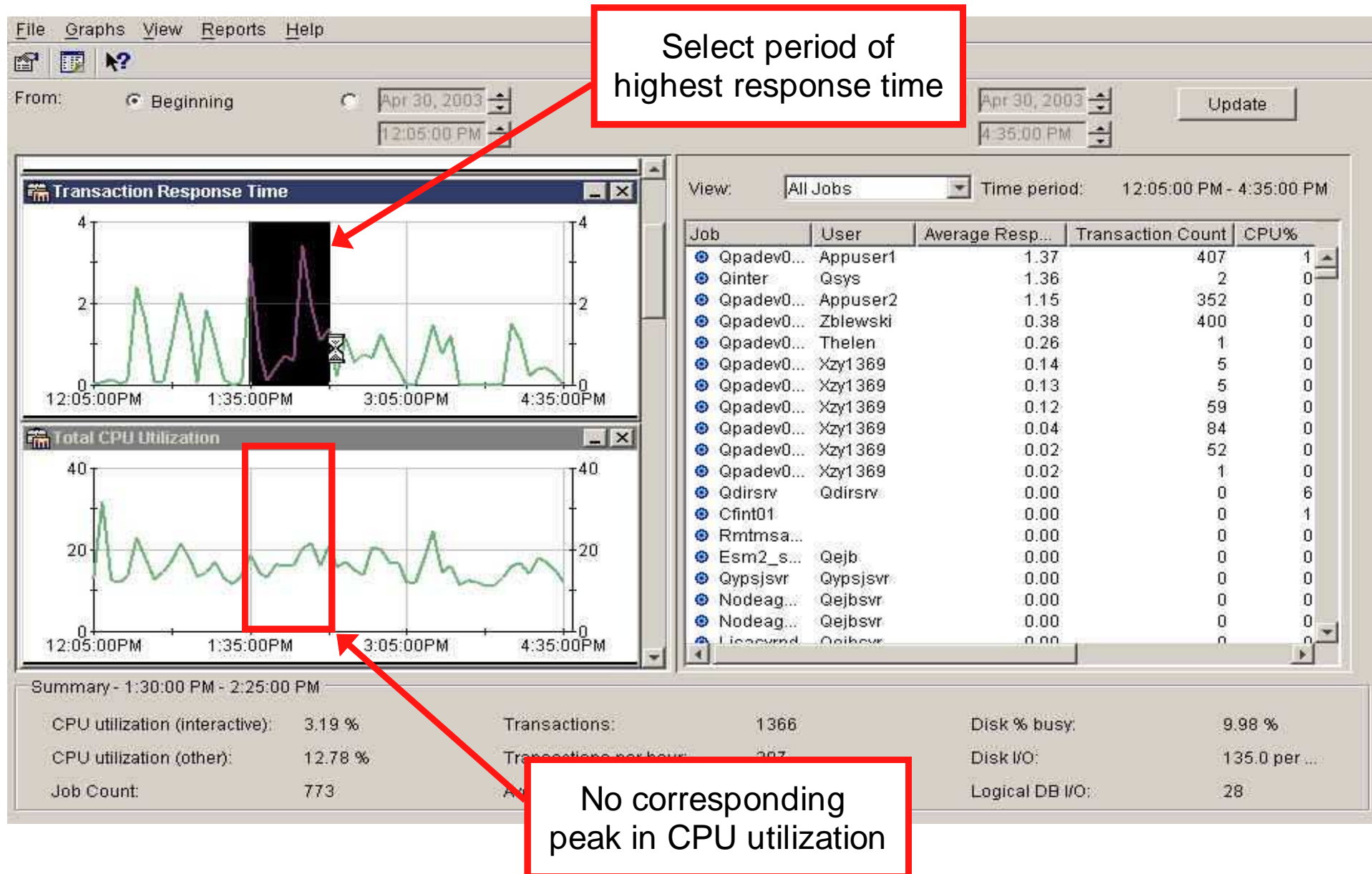
Buttons: Display, Convert..., Delete..., Refresh, Close, Help, ?

Last updated: 5/5/03 10:03:12 AM

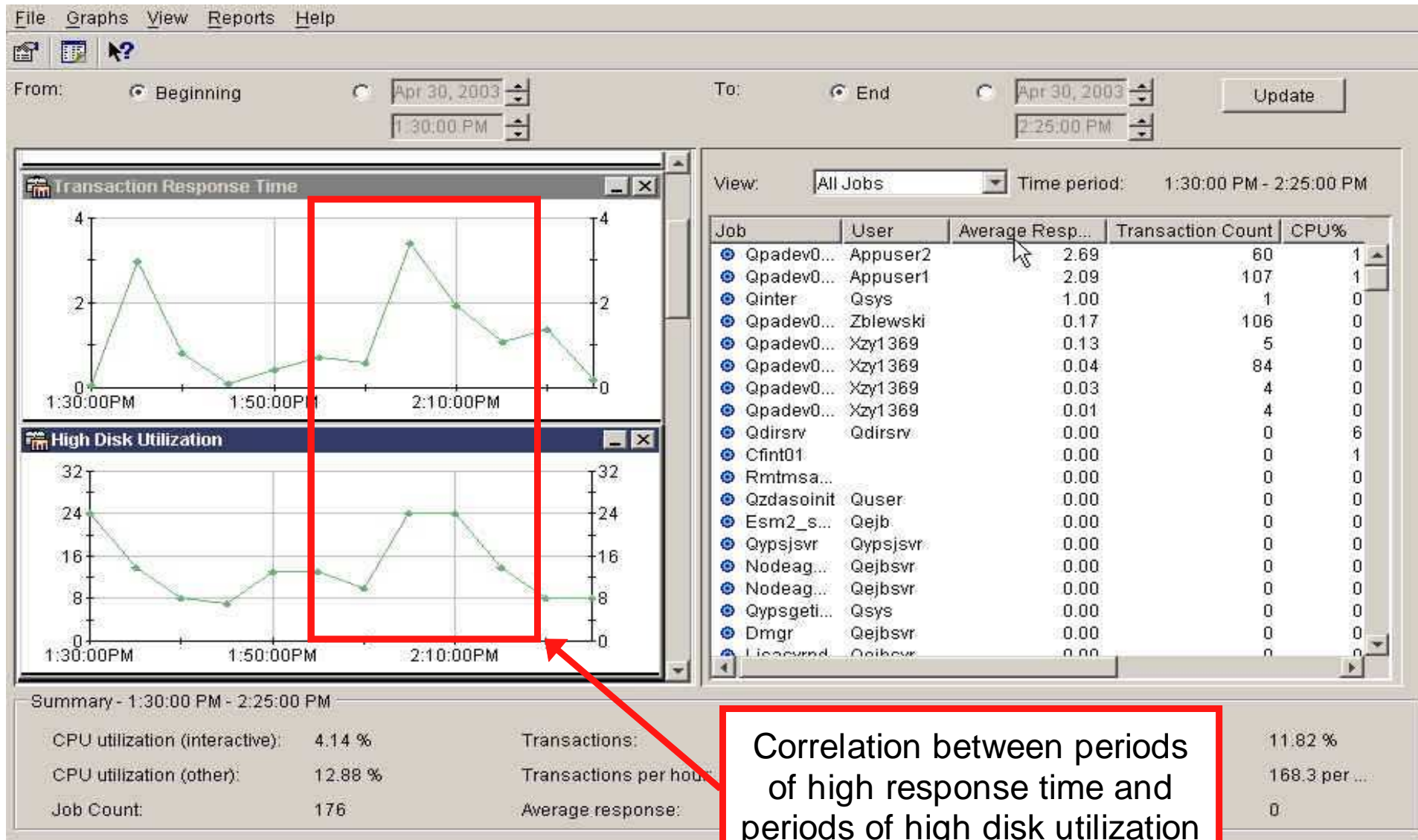
A View of Response Time - Sorting All Jobs



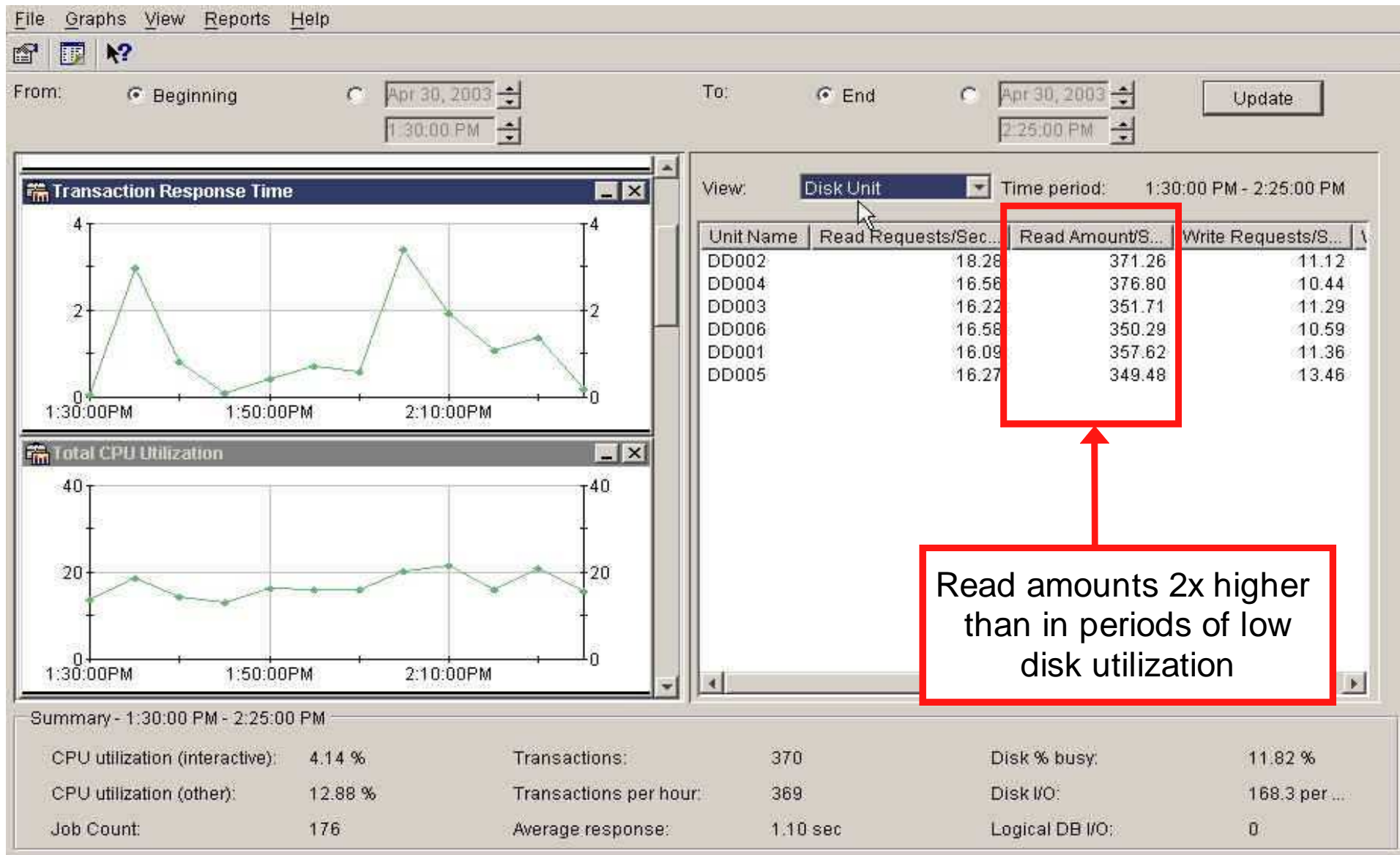
Zero-in on Poor Response Time



Sort By High Response Time Jobs and Check Disk Graph

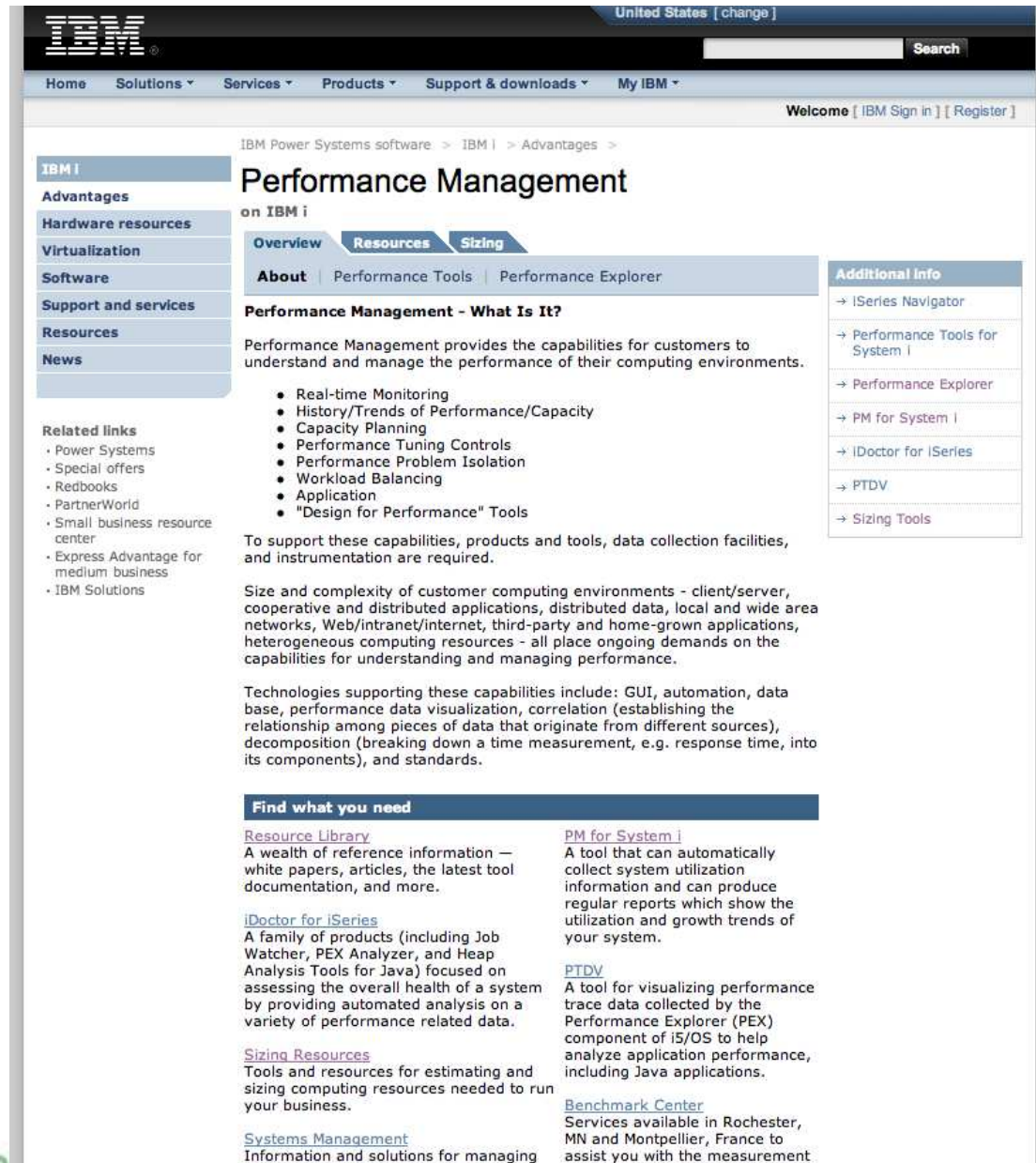


A View of Disk Activity



First Place To Go For Performance Tools Info

<http://www-03.ibm.com/systems/i/advantages/perfmgmt/>



The screenshot shows the IBM website's Performance Management page. The header includes the IBM logo, a search bar, and navigation links for Home, Solutions, Services, Products, Support & downloads, and My IBM. A welcome message with links to sign in or register is also present. The main content area is titled 'Performance Management on IBM i' and includes tabs for Overview, Resources, and Sizing. The 'Overview' tab is selected, showing a section titled 'Performance Management - What Is It?' which describes the capabilities for understanding and managing performance. A list of capabilities includes Real-time Monitoring, History/Trends of Performance/Capacity, Capacity Planning, Performance Tuning Controls, Performance Problem Isolation, Workload Balancing, Application, and 'Design for Performance' Tools. The page also features a 'Find what you need' section with links to Resource Library, iDoctor for iSeries, Sizing Resources, Systems Management, PM for System i, PTDV, and Benchmark Center. A sidebar on the left contains links to IBM i Advantages, Hardware resources, Virtualization, Software, Support and services, Resources, and News. A 'Related links' section at the bottom left lists various resources like Power Systems, Special offers, Redbooks, PartnerWorld, Small business resource center, Express Advantage for medium business, and IBM Solutions.

IBM i Advantages

- Hardware resources
- Virtualization
- Software
- Support and services
- Resources
- News

Related links

- Power Systems
- Special offers
- Redbooks
- PartnerWorld
- Small business resource center
- Express Advantage for medium business
- IBM Solutions

Performance Management on IBM i

Overview Resources Sizing

About Performance Tools Performance Explorer

Performance Management - What Is It?

Performance Management provides the capabilities for customers to understand and manage the performance of their computing environments.

- Real-time Monitoring
- History/Trends of Performance/Capacity
- Capacity Planning
- Performance Tuning Controls
- Performance Problem Isolation
- Workload Balancing
- Application
- "Design for Performance" Tools

To support these capabilities, products and tools, data collection facilities, and instrumentation are required.

Size and complexity of customer computing environments - client/server, cooperative and distributed applications, distributed data, local and wide area networks, Web/intranet/internet, third-party and home-grown applications, heterogeneous computing resources - all place ongoing demands on the capabilities for understanding and managing performance.

Technologies supporting these capabilities include: GUI, automation, data base, performance data visualization, correlation (establishing the relationship among pieces of data that originate from different sources), decomposition (breaking down a time measurement, e.g. response time, into its components), and standards.

Find what you need

Resource Library
A wealth of reference information — white papers, articles, the latest tool documentation, and more.

iDoctor for iSeries
A family of products (including Job Watcher, PEX Analyzer, and Heap Analysis Tools for Java) focused on assessing the overall health of a system by providing automated analysis on a variety of performance related data.

Sizing Resources
Tools and resources for estimating and sizing computing resources needed to run your business.

Systems Management
Information and solutions for managing

PM for System i
A tool that can automatically collect system utilization information and can produce regular reports which show the utilization and growth trends of your system.

PTDV
A tool for visualizing performance trace data collected by the Performance Explorer (PEX) component of i5/OS to help analyze application performance, including Java applications.

Benchmark Center
Services available in Rochester, MN and Montpellier, France to assist you with the measurement

Additional Info

- iSeries Navigator
- Performance Tools for System i
- Performance Explorer
- PM for System i
- iDoctor for iSeries
- PTDV
- Sizing Tools

Performance and Scalability Services

The IBM i Performance and Scalability Services Center can provide facilities and hardware **IN ROCHESTER** to assist you in testing hardware or software changes

“Traditional” benchmarks

Release-to-release upgrades

Assess application performance when migrating to a new release of IBM I

Stress test your system

Determine impact of application changes

Proofs of Concept (e.g. HA alternatives; SSD analysis, external storage, etc.)

Evaluate application scalability

Capacity planning

... all with the availability of Lab Services IBM i experts and development personnel

To request any of these services, submit at:

<http://www-03.ibm.com/systems/services/labservices/psscontact.html>

Or email Dawn May at dmmay@us.ibm.com

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System i Navigator Web Page

<http://www.ibm.com/servers/eserver/iseriess/navigator/>

Performance Database File Documentation in Information Center

<http://publib.boulder.ibm.com/infocenter/iseriess/v5r4/topic/rzahx/rzahxperfdatabfiles1a.htm>

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Revised September 26, 2006

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Revised February 9, 2010

Additional materials

Basic guidelines for system monitors

Monitor Threshold Guidelines – Average CPU

CPU Utilization (Average)

A system running at high CPU utilization may not be a problem

High CPU when transaction rates are high and response time is low usually means there are no bottlenecks

Need to look at historical performance data to identify CPU utilization when system was running well

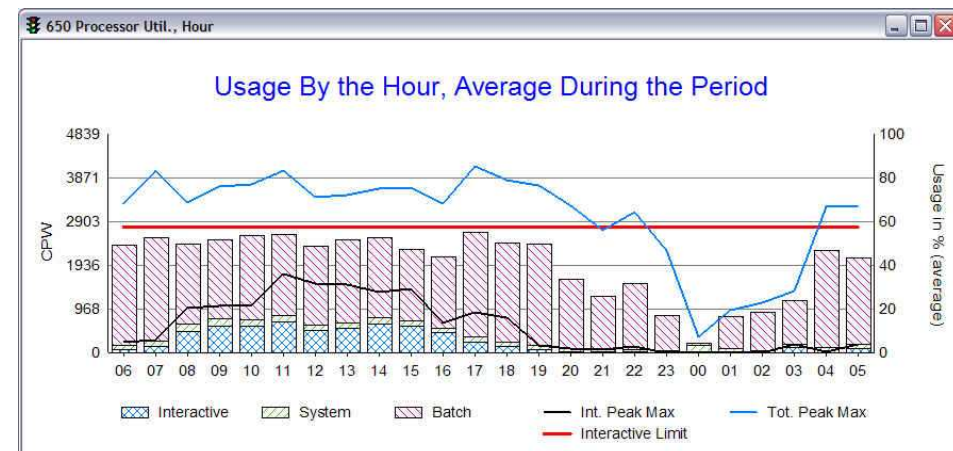
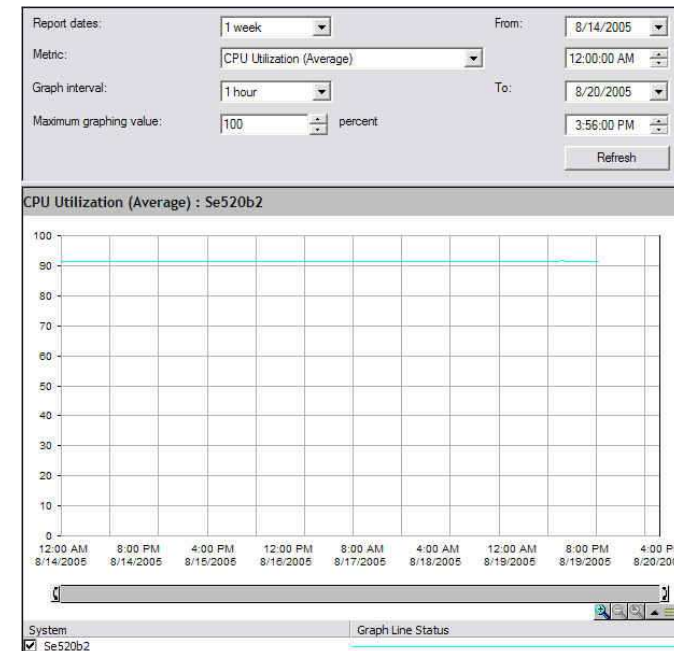
System i Navigator Graph History

PM System i Report 650 (CPU Usage / Hour)

Set threshold 5-10% above peak historical data

Might need different thresholds depending on time of day

Might need to adjust thresholds after new release upgrade or hardware upgrade



Monitor Threshold Guidelines – Interactive Feature Utilization

CPU Utilization (Interactive Feature)

If you have an Enterprise Edition system with 100% Interactive CPW, you don't need to monitor the Interactive Feature CPU

If you have limited 5250 Interactive CPW

Understand the percentage of the system you have available for interactive usage

Can find it at the top of the Performance Tools System Report (PRTSYSRPT)

Or DSPSYSVAL QPRCFEAT and look up Interactive CPW rating for your feature in Performance Capabilities

Reference Manual at <http://www.ibm.com/eserver/series/perfmgmt/resource.html>

Set the first threshold at around 75% of the Interactive CPW Capacity

If Interactive Threshold is 20% of the system/partition, set the threshold at 15% (75% of 20%)

Set the second threshold at around 90% of the Interactive CPW Capacity

```

File . . . . . : QPPTSYSR
Control . . . . . :
Find . . . . . :

Page/Line 1/1
Columns 1 - 130

System Report
Workload
System Performance Report
8/03/05 16:41:5
Page 000

Member . . . : Q064_5MIN Model/Serial . . : 520/10-6ADBD Main storage . . : 8576.0 MB Started . . . : 03/05/05 13:13:3
Library . . . : PFRDATA System name . . : SE520B2 Version/Release . . : 5/3.0 Stopped . . . : 03/05/05 14:15:0
Partition ID . : 002 Feature Code . . : 7457-8955 Int Threshold . . : 100.00
Virtual Processors: 1 Processor Units : 1.0
QPFRAJ . . . : 0 QDYNPTYSCD . . : 1 QDYNPTYADJ . . . : 1

Interactive Workload
Job Type Number Transactions Average Response Logical DB I/O Count Lines Printer Pages Communications I/O Count MRT Max Time
-----
PassThru 3,204 7.50 48,273,667 8,899 169 0
Total 3,204 7.50 48,273,667 8,899 169 0
Average 7.50

Non-Interactive Workload
Job Type Number Of Jobs Logical DB I/O Count Lines Printer Pages Communications I/O Count CPU Per Logical I/O /Second
-----
F3=Exit F12=Cancel F19=Left F20=Right F24=More keys

```


Monitor Threshold Guidelines – Average Interactive Response Time

Interactive Response Time (Average)

Some organizations have service level agreements that promise or guarantee a certain level of response time

If you are required to meet a service level agreement (SLA)

Set the first threshold to around 80-90% of the required agreement (warning)

Set the second threshold to around 90-100% of the required agreement (danger)

If not required to meet SLA

Look at historical performance data to identify response time on a day when system was performing poorly (your users were not happy)

System i Navigator Graph History

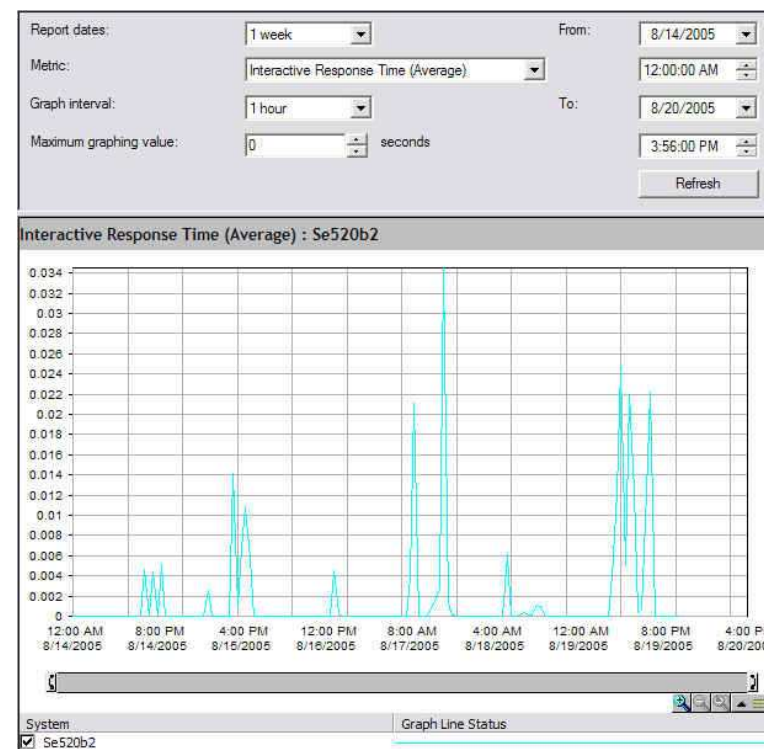
PM for Power Systems Report 250 (Response Time By Hour)

Set threshold below peak response time on the bad day

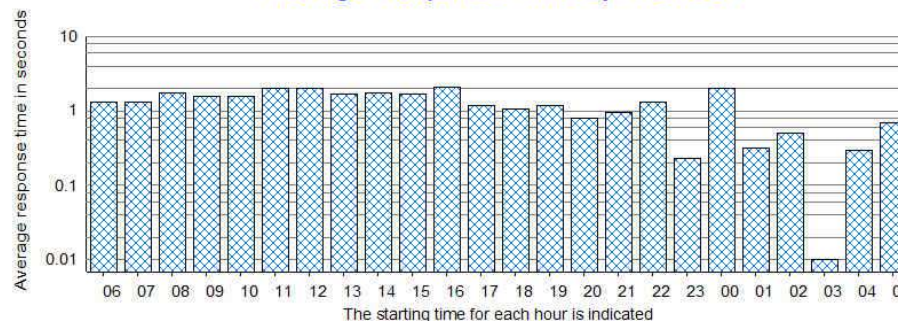
50-75% of bad day is good place to start

Might need different thresholds depending on time of day

Batch work might have longer response times



Average Response Time by the Hour



Monitor Threshold Guidelines – Disk Arm Utilization

Disk Arm Utilization (Average)

Disk Arm Utilization Threshold is based on the storage controllers used on your system

Current storage controllers can typically handle 30%+ arm utilization without degrading system performance

Set first threshold at 20-27% (warning)

Set second threshold at 27-32% (danger)

Can vary considerably depending on the application and the data access patterns of the application

Display Storage Resources					System: SE520D				
Type options, press Enter.					Display Associated Resources				
7=Display resource detail 9=Display associated resources					Type options, press Enter.				
					5=Display configuration descriptions 7=Display resource detail				
Oprt	Resource	Type	Status	Text	Oprt	Resource	Type-model	Status	Text
—	CMB01	2844	Operational	Combined function IO	—	DC03	5703-001	Operational	Storage Controller
—	DC01	5709	Operational	Storage Controller	—	DPH001	4326-072	Operational	Disk Unit
—	CMB02	2680	Operational	Combined function IO	—	DD016	4326-070	Operational	Disk Unit
—	DC02	6802	Operational	Storage Controller	—	DD015	4326-074	Operational	Disk Unit
—	CMB04	2844	Operational	Storage Controller	—	DD019	4326-074	Operational	Disk Unit
9	DC03	5703	Operational	Storage Controller	—	DD04	2889-001	Operational	Device Services
					—	DD009	4326-074	Operational	Disk Unit
					—	DD011	4326-074	Operational	Disk Unit
					—	DD013	4326-070	Operational	Disk Unit
					—	DD014	4326-070	Operational	Disk Unit
					—	DD018	4326-074	Operational	Disk Unit
					—	DD017	4326-074	Operational	Disk Unit
					—	DD03	2889-001	Operational	Device Services
					—	DD010	4326-074	Operational	Disk Unit
					—	DD012	4326-074	Operational	Disk Unit
F3=Exit F5=Refresh F6=Print F12=Cancel					F3=Exit F5=Refresh F6=Print F12=Cancel				
					Bottom				

Monitor Threshold Guidelines – User Pool Faults

User Pool Faults (Average)

From an overall system or partition perspective, the best known guideline for pool faults is 100 per second x Processor Units x CPU Utilization%

Example: Guideline for a partition that has 1.5 processor units and typically runs at 50% utilized would be:

$100 \times 1.5 \times 50\% = 75$ faults per second **per user pool**

When a system is partitioned, remember it is the number of processor units allocated to the partition that matters, not the number of physical processors

Can find Processor Units at the top of Performance Tools System Report (PRTSYSRPT)

A system with page faulting higher than the guideline does not indicate a performance problem, but faulting may be a contributing factor to poor response times. Detailed analysis is needed to determine an exact cause of high response times

```
File . . . . . : QPPTSYSR
Control . . . . . :
Find . . . . . :

Page/Line 1/1
Columns 1 - 130

System Report
Workload
8/03/05 16:41:5
Page 000

System Performance Report
Member . . . : Q064_5MIN Model/Serial . . : 520/10-6A060 Main storage . . : 8576.0 MB Started . . . : 03/05/05 13:13:3
Library . . : PFRDATA System name . . : SE520B2 Version/Release : 5/ 3.0 Stopped . . . : 03/05/05 14:15:0
Partition ID : 002 Feature Code . . : 7457-8955 Int Threshold . : 100.00 %
Virtual Processors: 1 Processor Units : 1.0
QPFRADJ . . . : 0 QDYNPTYSCD . . : 1 QDYNPTYADJ . . : 1
Interactive Workload

Job Type      Number Transactions  Average Response  Logical DB I/O Count  Printer Lines  Pages  Communications I/O Count  MRT Max Time
-----
PassThru      3,204                7.50             48,273,667           8,899          169           0
Total        3,204                7.50             48,273,667           8,899          169           0
Average

Non-Interactive Workload
Job Type      Number Of Jobs  Logical DB I/O Count  Printer Lines  Pages  Communications I/O Count  CPU Per Logical I/O  Logical I/O /Second
-----
F3=Exit F12=Cancel F19=Left F20=Right F24=More keys
```

Monitor Threshold Guidelines – Maximum Disk Storage

Disk Storage (Maximum)

Not much to consider when setting the Disk Storage threshold

Recommend using Maximum instead of Average

Set first threshold at around 75-85% (warning)

Leave room for temporary storage needed by the system and applications

Set second threshold at 85-92% (danger)

Remember that using up the entire System ASP will cause the system to CRASH!