

# The Best of the IBM i Performance Data Investigator

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# IBM Navigator for i

- IBM Navigator for i is the Web console for managing IBM i
  - Has much of the function as System i Navigator
    - but with a browser user interface
  - Simply point your browser to `http://systemname:2001`

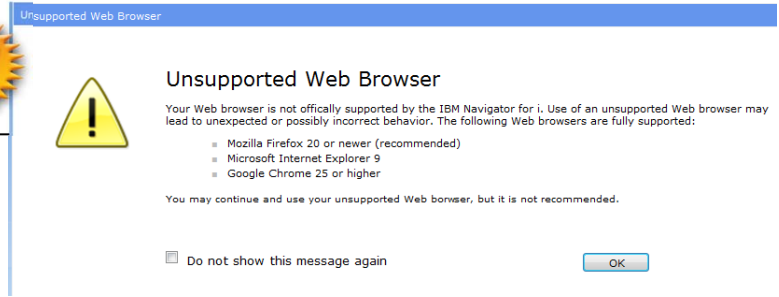


## Updates to the Performance Data Investigator - PTFs

- Major enhancements have been made to **Navigator for i** and the **Performance Tasks**
  - IBM i 7.2!
  - For 7.1 - install the latest level of:
    - HTTP Server group PTF SF99368
    - Java group PTF SF99572
    - Database group PTF SF99701
    - Performance Tools group PTF SF99145
  - For 6.1 - install the latest level of:
    - HTTP Server group PTF SF99115
    - Java group PTF SF99562
    - Database group PTF SF99601
    - Performance Tools group PTF SF99114



# Browser Support



- Supported Browsers for the latest Navigator enhancements:



– Internet Explorer 9



– FireFox 20 or newer



– Google Chrome 25 or higher (with IBM i 7.2 *for now...*)

- Browser tips:

- Unexpected results could be browser related. Example problems are....
  - Hung charts
  - Empty tables

- Clear your browser cache after installing the PTFs

- Review your browser security settings

- For details see the following web page:

<https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20i%20T%20echnology%20Updates/page/Browser%20Tips>

## Tips for Best Performance for Navigator (and the Performance tasks)


- Good system tuning practices are essential
  - CPU
  - Memory
  - Disk
- PDI makes extensive use of SQL to gather data for charts and tables
- Navigator tasks run in the ADMIN2 job in the QHTTSPSVR subsystem
- Ensure no bad DNS entries on the system
  - [http://www-912.ibm.com/s\\_dir/slkbase.nsf/1ac66549a21402188625680b0002037e/b9e677063f24f859862575ee006b1881](http://www-912.ibm.com/s_dir/slkbase.nsf/1ac66549a21402188625680b0002037e/b9e677063f24f859862575ee006b1881)
- Use Application Runtime Expert to validate your environment
  - <http://www.ibm.com/developerworks/ibmi/library/i-applicationruntime/index.html>
  - **Network health checker** can be run from QShell:  
`/QIBM/ProdData/OS/OSGi/templates/bin/areVerify.sh -network`  
[http://ibmsystemsmag.blogs.com/i\\_can/2013/09/application-runtime-expert-network-health-checker.html](http://ibmsystemsmag.blogs.com/i_can/2013/09/application-runtime-expert-network-health-checker.html)
- Use the Web Performance Advisor to validate your Web Performance
  - <http://pic.dhe.ibm.com/infocenter/iserics/v7r1m0/topic/rzaie/rzaieconwebperfadvisor.htm>

# IBM Navigator for i Performance Investigate Data


- [-] Performance
  - [-] Investigate Data
    - Investigate Data Search
    - [+] Health Indicators
    - [+] Monitor
    - [+] Collection Services
    - [+] Database
    - [+] Job Watcher
    - [+] Disk Watcher
    - [+] Performance Explorer
    - [+] Batch Model

Performance -

IBM i Performance tools allows you to collect and investigate performance data on your system.

 [Investigate Data](#)

Performance Data Investigator allows you to investigate previously collected performance data on your system.

 [Manage Collections](#)

Collection Manager allows you to view and work with the performance data on your system.

Close

## Packaging

### Performance Tools Licensed Program Product

- IBM i for **Collection Services, Health Indicators, Monitors** 7.2
  
- Performance Tools Licensed Program Product
  - 5761PT1 for 6.1
  - 5770PT1 for 7.1 and 7.2
  
  - **Performance Tools - Manager Feature**
    - **Disk Watcher, Performance Explorer, Database, Batch Model** 7.2
  - Performance Tools - Agent Feature
  - **Performance Tools - Job Watcher**

# Packaging: Performance Tools Licensed Program Product

6.1 and 7.1

## Investigate Data - Performance Data Investigator

### Perspectives

- Performance Explorer
- Disk Watcher
- Job Watcher
- Health Indicators
- Collection Services
- Database

### Selection

IBM Performance Tools – Manager feature

IBM Performance Tools – Job Watcher feature

Included with the base operating system

IBM Performance Tools – Manager feature and latest PTFs

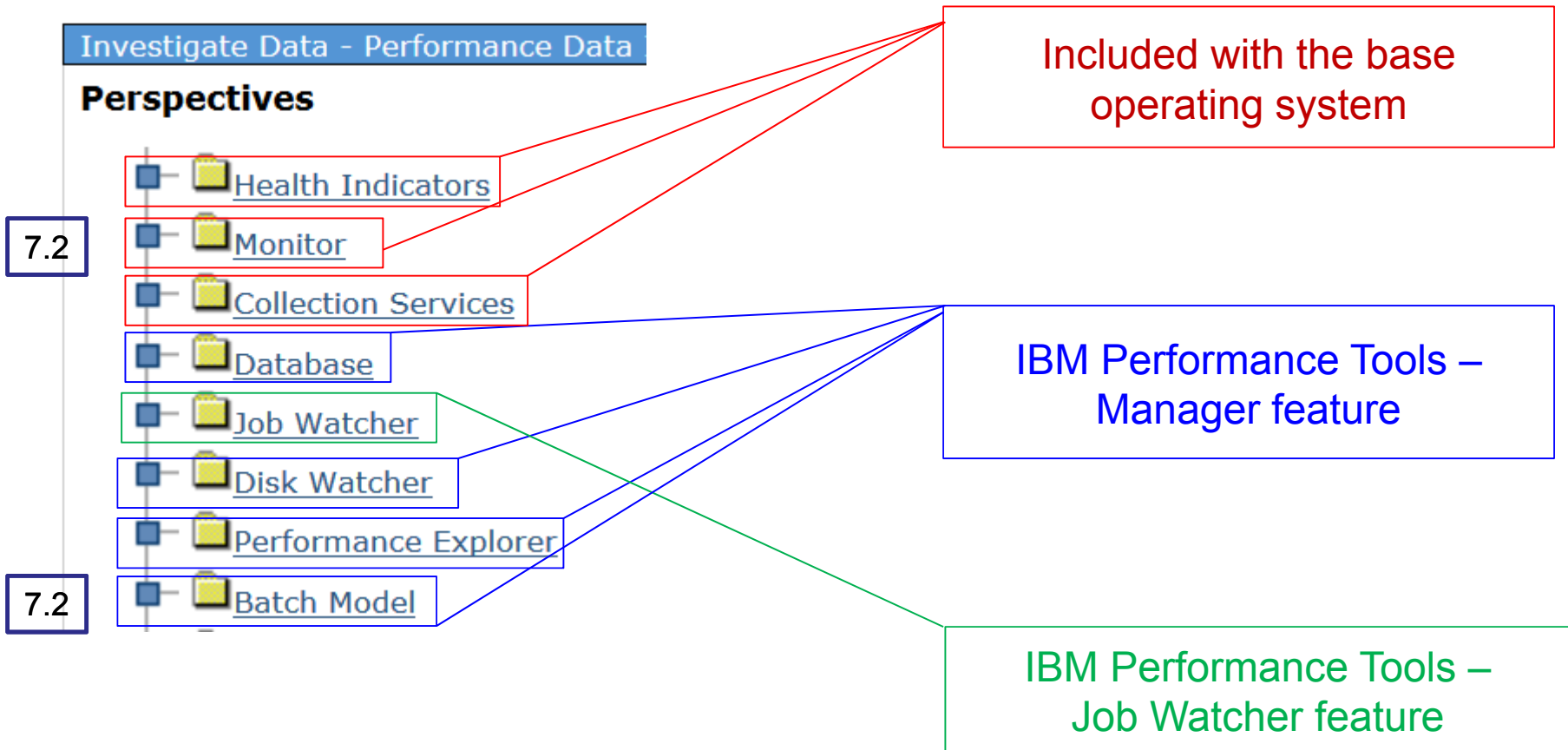
### Collection

Collection Library: QPFRDATA  
Collection Name: Most Recent

- Display
- Search
- Options
- Close



# Packaging: Performance Tools Licensed Program Product 7.2



## Prerequisites: Authorizing Users to PDI

- Users need to be authorized to use the investigate data and collection manager performance tasks
- Include users on the QPMCCDATA and QPMCCFDN authorization lists
  - *Can be done via GUI or green screen*

```

                                Edit Authorization List

Object . . . . . : QPMCCDATA      Owner . . . . . : QSYS
Library . . . . . : QSYS          Primary group . . . : *NONE

Type changes to current authorities, press Enter.

User      Object      List
Authority Authority Mgt
*PUBLIC   *EXCLUDE
QSYS      *ALL           X
PDI01     *USE
PDI02     *USE
PDI03     *USE
PDI04     *USE
PDI05     *USE
PDI06     *USE
PDI07     *USE
PDI08     *USE
PDI09     *USE
    
```

More...

# Investigate Data – Select Collection



Investigate Data - Performance Data

### Perspectives

- Health Indicators
- Monitor
- Collection Services**
- Database
- Job Watcher
- Disk Watcher
- Performance Explorer
- Batch Model

Investigate Data - Performance Data Investigator

### Perspectives

- Health Indicators
- Monitor
- 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
- Memory
- Page Faults
- Logical Database I/O
- Virtual I/O
- Communications
- 5250 Display Transactions
- Physical System
- Java
- Timeline
- Workload Group
- Collection Services Database Files

- Database
- Job Watcher
- Disk Watcher
- Performance Explorer
- Batch Model
- Custom Perspectives - PDITEST0

### Selection

**Name**  
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.

**View List**  
CPU Utilization and Waits Overview

### Collection

Collection Library: QPFRDATA  
Collection Name: Most Recent

Display Search Save as Favorite Options Close

The Collection boxes allow you to specify which collection you want to work with.

Only collections valid for the type of chart you select will be displayed.

# Resource Utilization Overview

## Summary for general overall health:

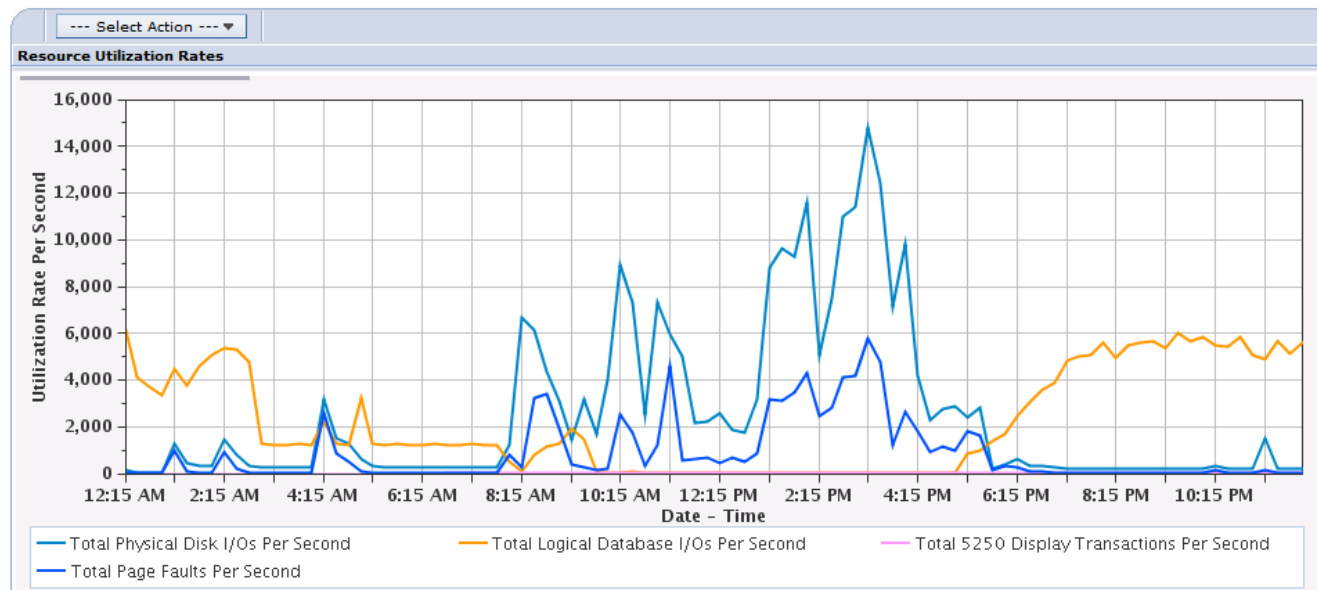
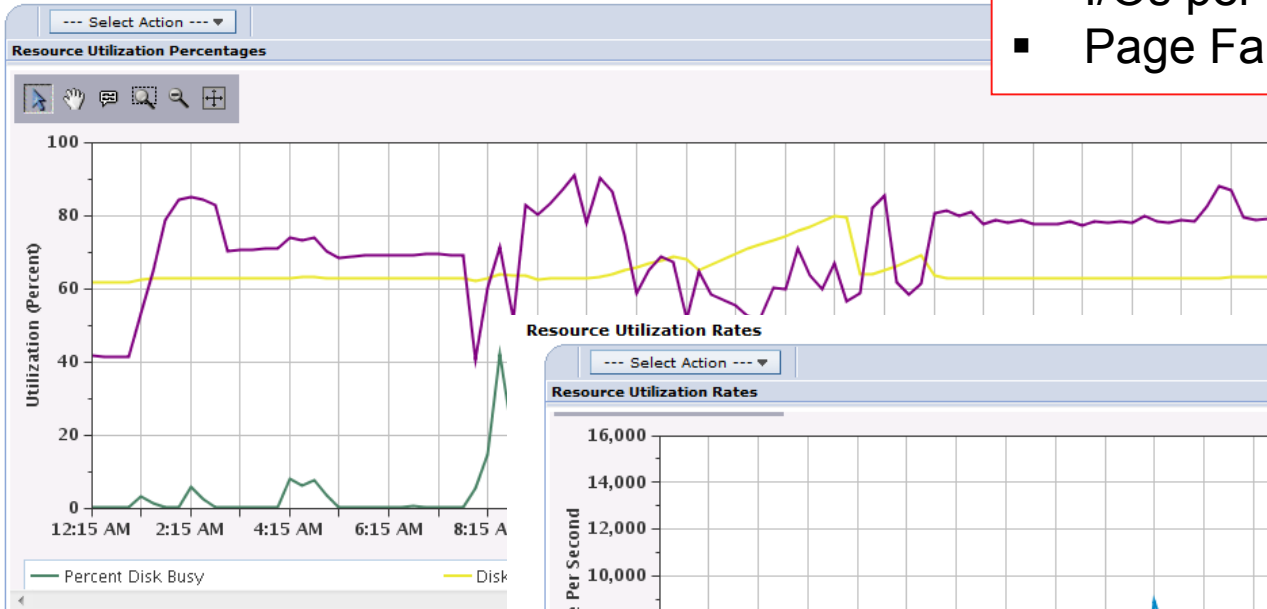
- CPU Utilization
- Disk Utilization
- Disk Busy
- 5250 Transactions
- I/Os per Second
- Page Faults

Resource Utilization Overview

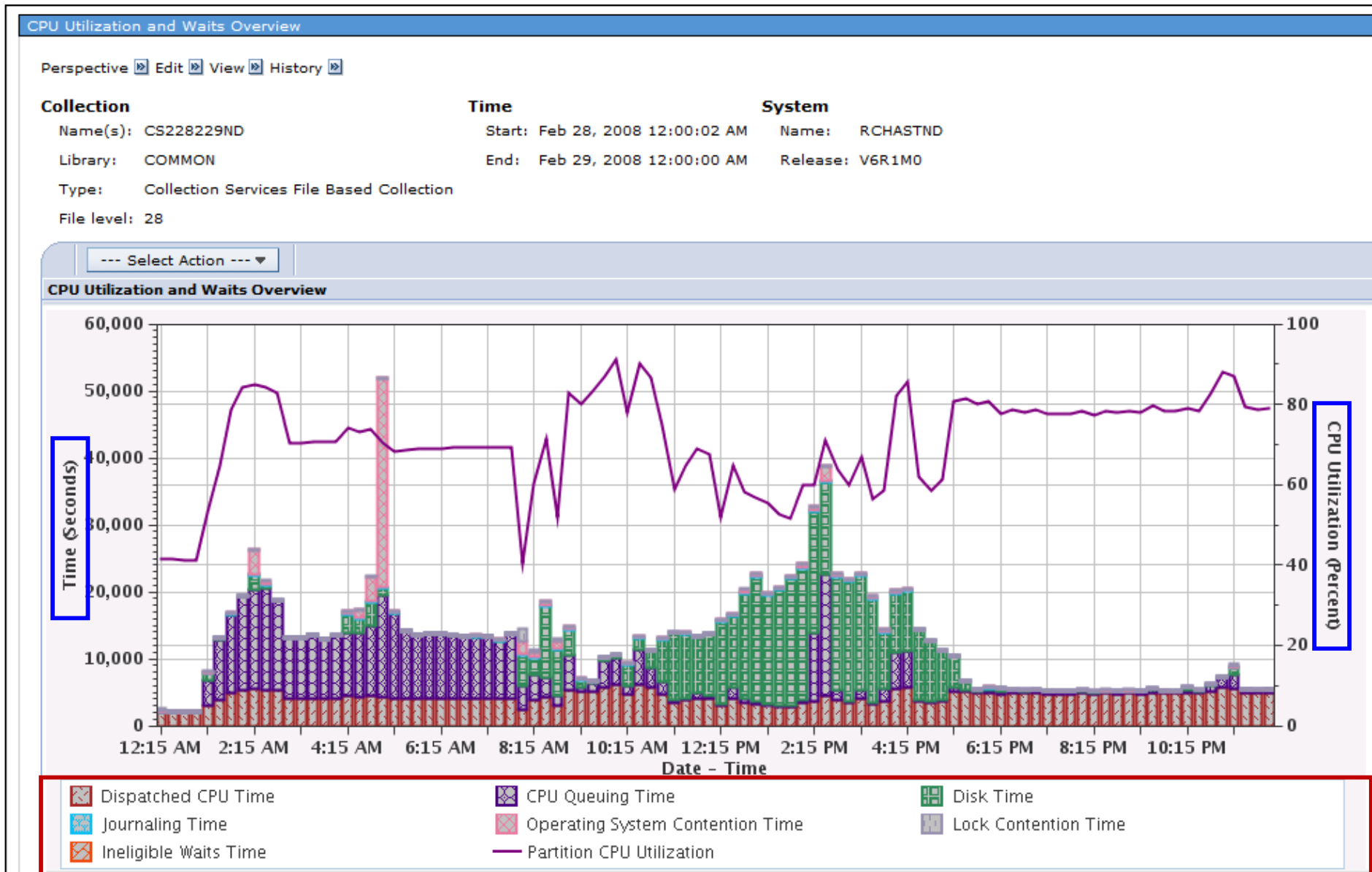
Perspective  Edit  View  History

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

### Resource Utilization Percentages

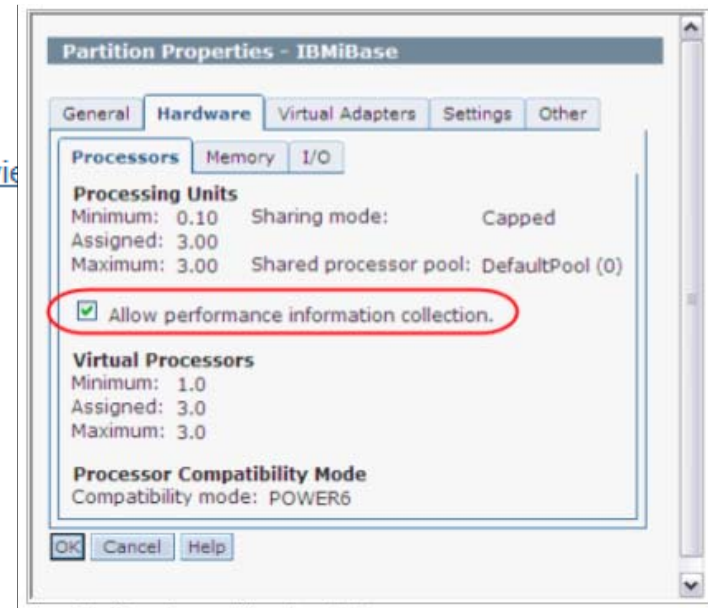


# CPU Utilization and Waits Overview



# Physical System Charts – Frame view of Performance!

Collection Services has the ability to collect certain high-level cross-partition processor performance metrics for all logical partitions on the same single physical server regardless of operating system. This is available on Power 6 and above servers, with a minimum firmware level xx340\_061. When this data is available, it can be viewed via several perspectives found under "Physical System".

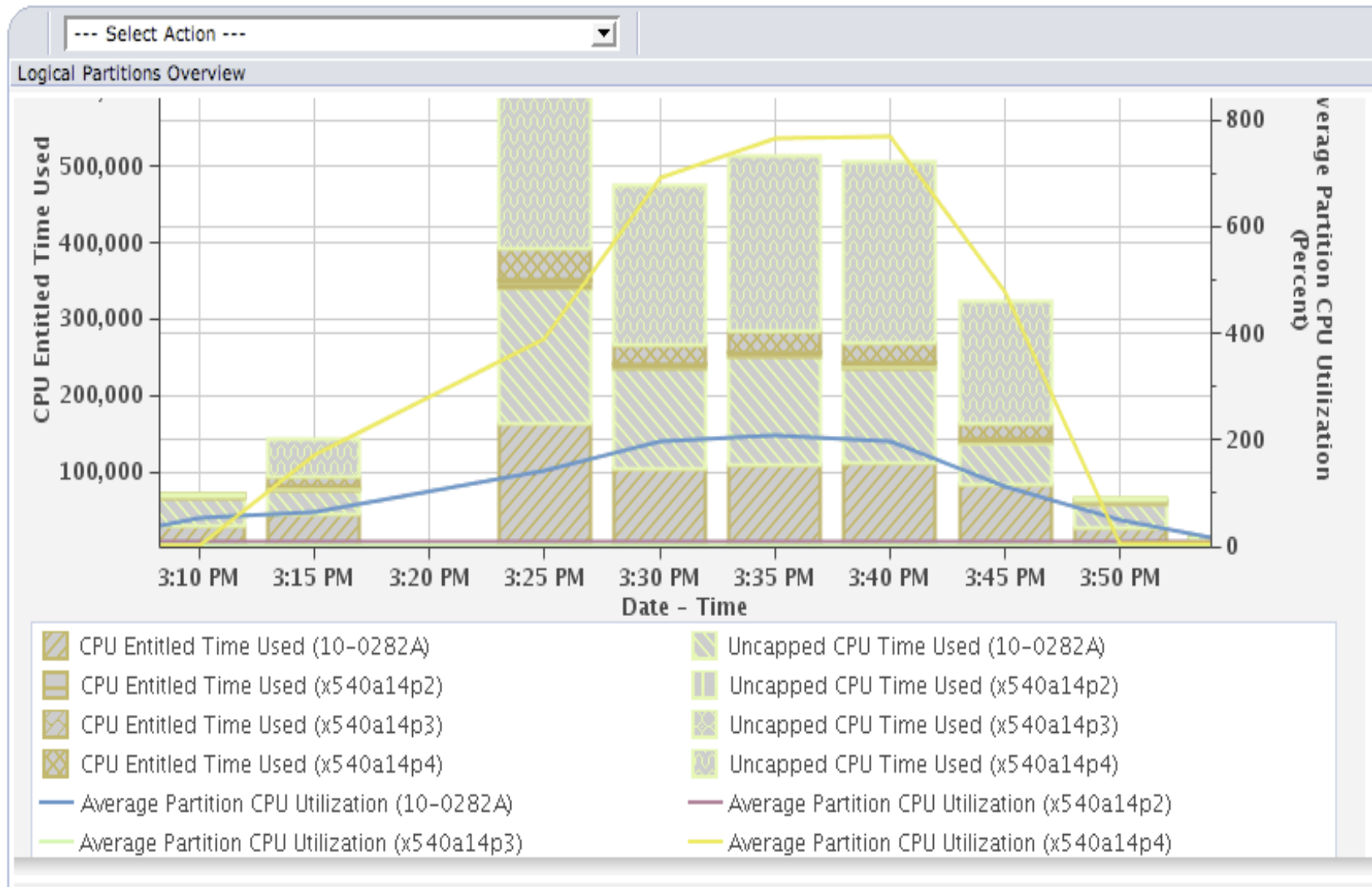


HMC option to enable performance collection must be turned on for the IBM i partition to collect the data

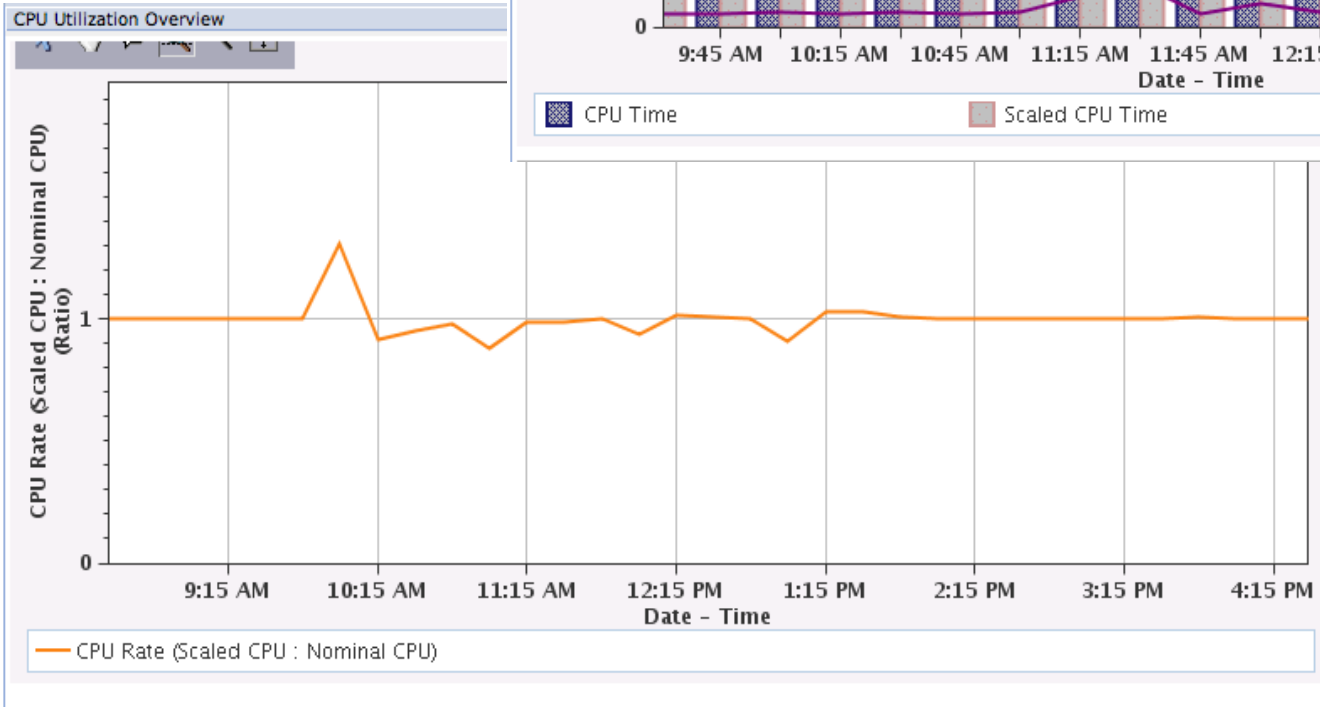
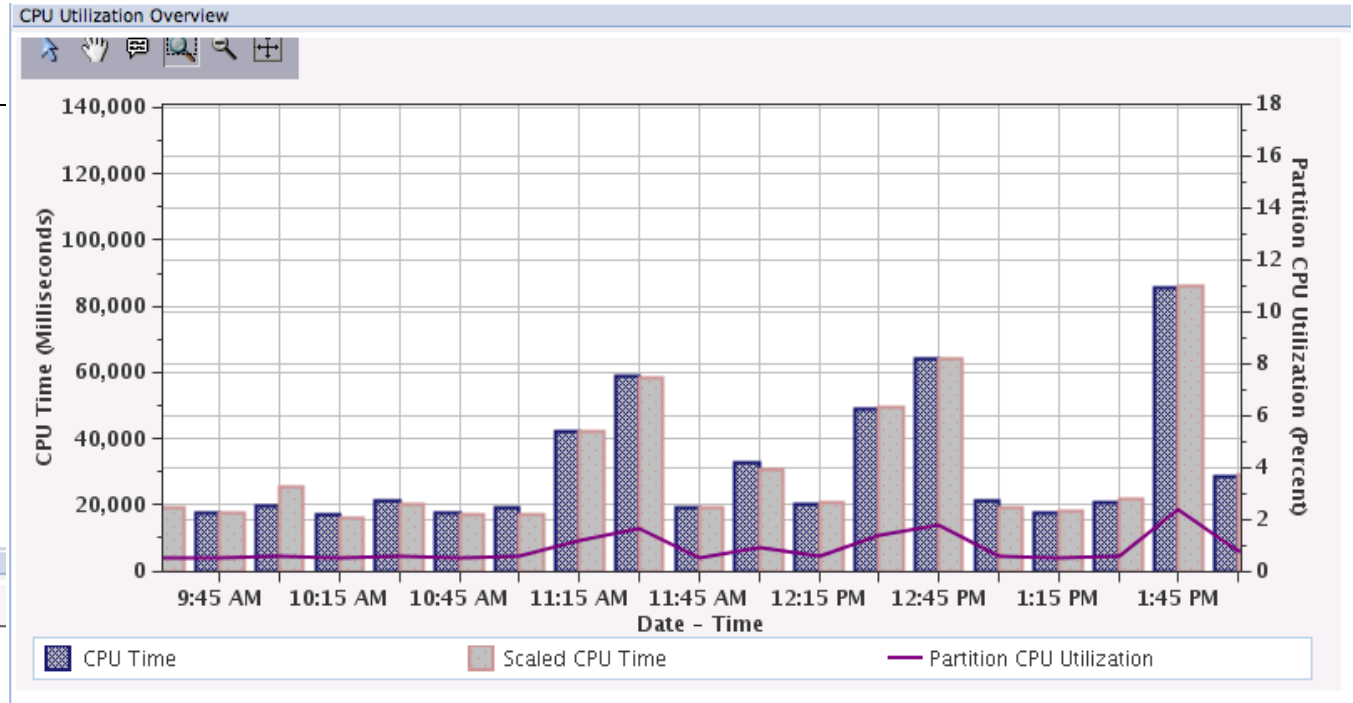
[http://ibmsystemsmag.blogs.com/i\\_can/2009/10/i-can-display-cpu-utilization-for-all-partitions.html](http://ibmsystemsmag.blogs.com/i_can/2009/10/i-can-display-cpu-utilization-for-all-partitions.html)

# Logical Partitions Overview

## Requires Power 6 and IBM i 6.1 or later




# Scaled CPU

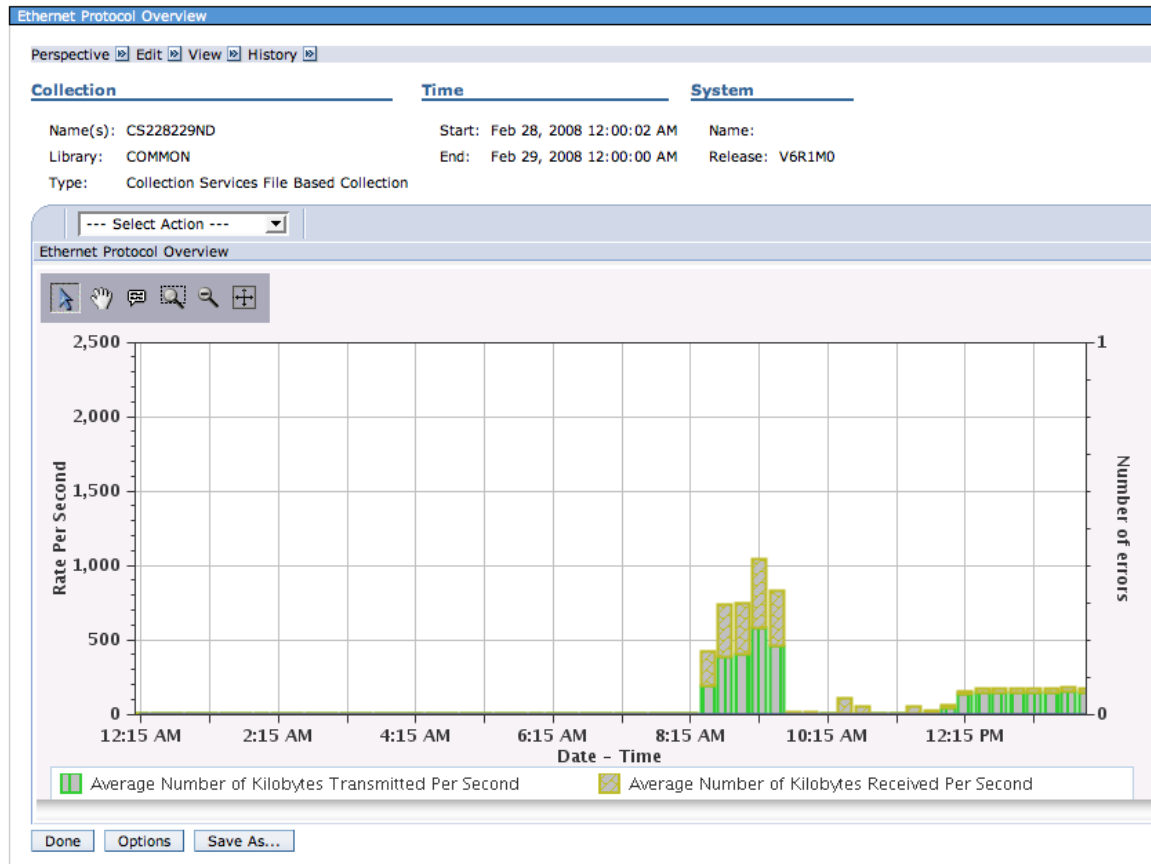


[http://ibmsystemsmag.blogs.com/i\\_can/2010/03/i-can-understand-scaled-cpu-time.html](http://ibmsystemsmag.blogs.com/i_can/2010/03/i-can-understand-scaled-cpu-time.html)



# Communications Perspectives

- ☐  **Communications**
  - [Asynchronous Protocol Overview](#)
  - [Binary Synchronous Protocol Overview](#)
  - [DDI Protocol Overview](#)
  - [Token-ring Protocol Overview](#)
  - [Ethernet Protocol Overview](#)
  - [Frame Relay Protocol Overview](#)
  - [SDLC Protocol Overview](#)
  - [IDLC Protocol Overview](#)
  - [LAPD Protocol Overview](#)
  - [PPP Protocol Overview](#)
  - [X.25 Protocol Overview](#)

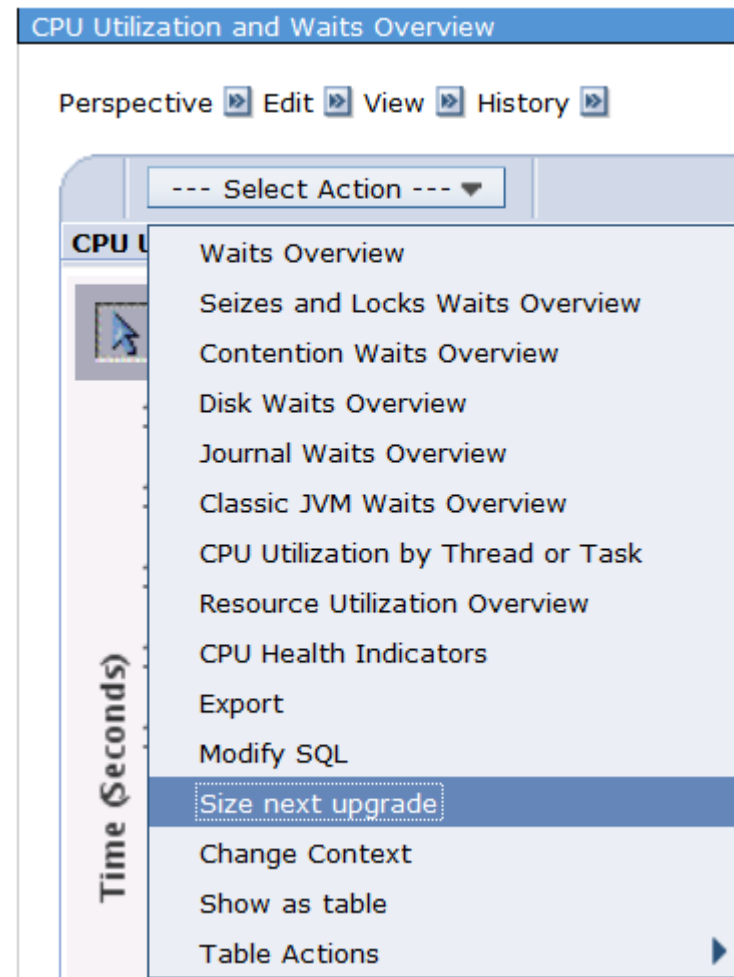


# Size Next Upgrade

## Send data directly to the IBM Workload Estimator

Takes the measured data from Collection Services and inputs it to the IBM Workload Estimator (WLE)

Intended for a one-time sizing activity



# Search 7.2

“Investigate Data Search” added in 7.2

Investigate Data Search

*Type at least 3 non-empty characters*

Case Sensitive     Whole Words Only

Search In:

Package Name

Description

Metrics

Perspective

View

SQL

Show Columns:

Metrics

SQL

Package Name	Perspective	Description	View
Collection Services	<a href="#">Storage Allocation/Deallocation by Thread or Task</a>	This chart shows allocation and deallocation of the temporary and permanent storage, net frames requested by thread or task. Use this chart to select a thread or task for viewing its storage statistics over time.	<a href="#">Storage Allocation/Deallocation by Thread or Task Sorted by Allocation</a>
Collection Services	<a href="#">Storage Allocation/Deallocation Overview</a>	This chart shows allocation and deallocation of the temporary and permanent storage for all contributors over time for the selected collections. Use this chart to select a time frame for further detailed investigation.	<a href="#">Storage Allocation/Deallocation Overview</a>
Monitor	<a href="#">Disk Storage Utilization (Average)</a>	Charts show the disk storage utilization (average) metric of the performance data monitored, as well as the metric breakdown details by ASP.	<a href="#">Disk Storage Utilization (Average)</a>

# Metric Finder

## Collection

Collection Library: QPFRDATA    Collection Name: Most Recent

### Metric Finder

#### Metric

Metric Name:

- Primary Affinity Domain ID
- SMAPP Evaluations Serviced
- SMAPP Index Build Time Estimations
- SMT Hardware Threads:
- SQL Cursor Count
- SQL Cursor Reuse
- STRPFRMON Trace Type:
- Samples Taken
- SaveDocument URLs Received
- Scaled CPU Microseconds
- Scaled CPU Time**
- Scaled CPU Time Microseconds
- Scaled CPU Time Used
- Scaled CPU Utilization
- Search String Commands
- Second Most Frequent Journal Entry Type
- Secondary Affinity Domain ID
- Secondary Control Unit
- Secondary Line Description
- Secondary Thread Flag
- Secondary Thread Thresh (ms):

### Metric Finder

#### Metric

Metric Name:

Scaled CPU Time

#### Perspective

Select	Perspective
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization Overview
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Generic Job or Task
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Job Current User Profile
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Job User Profile
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Job or Task
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Pool
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Server Type
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Subsystem
<input type="radio"/>	Collection Services --> CPU --> CPU Utilization by Thread or Task
<input type="radio"/>	Collection Services --> CPU Utilization by Thread or Task

Page 1 of 1

1

Go

Rows 10

Total:

## Collection

Collection Library: QPFRDATA    Collection Name: Most Recent

# Options

## Collection

Collection Library: QPFRDATA  
Collection Name: Most Recent

Display Search Save as Favorite **Options** Close

## Options

- Use patterns Use patterns where applicable in charts.
- Show charts Whenever possible, show charts instead of tables.
- Enable design mode Enable advanced features allowing design and development of new content.
- Show help Show help messages for many tasks.
- Show SQL error messages Show SQL error messages to user.
- Set table size Rows: 15 Columns: 8 Specify the number of visible rows and columns shown for tables.

## Default library

- Use Collection Services configured library
- Use last visited library
- Use library:

## System Monitor

- Show thresholds Show thresholds in system monitor charts.

7.2

OK Cancel

# Option – Show SQL Error Messages

**Options**

Use patterns Use patterns where applicable in charts.

Show charts Whenever possible, show charts instead of tables.

Enable design mode Enable advanced features allowing design and development of new co

Show help Show help messages for many tasks.

Show SQL error messages Show SQL error messages to user.

Set table size Rows:  Columns:  Specify the number of visible rows shown for tables.

**Default library** Specify the default library that will when a collection is selected.

Use Collection Services configured library

Use last visited library





Use library:


OK Cancel


“Show SQL error messages” -

Modify SQL window will provide error message to help solve SQL errors.

CPU Utilization and Waits Overview

Perspective  Edit  View  History 

--- Select Action --- 

- Waits Overview
- Seizes and Locks Waits Overview
- Contention Waits Overview
- Disk Waits Overview
- Journal Waits Overview
- Classic JVM Waits Overview
- CPU Utilization by Thread or Task
- Resource Utilization Overview
- CPU Health Indicators
- Export
- Modify SQL**
- Size next upgrade
- Change Context
- Show as table
- Table Actions 

Time (Seconds)

# Show SQL Error Messages

Modify SQL

**SQL Statement**

```

SELECT
  QSY.INTNUM,
  QSY.CSDTETIM AS CSDTETIM,
  MAX(PCTSYSCPU) AS PCTSYSCPU,
  SUM(TIME01) * .000001 AS WB01,
  SUM(TIME02) * .000001 AS WB02,
  SUM(TIME05 + TIME06 + TIME07 + TIME08 + TIME09 + TIME10) * .000001 AS WB050607080910,
  SUM(TIME11) * .000
  SUM(TIME14 + TIME
  SUM(TIME16 + TIME
  SUM(TIME18) * .000
  100 AS PCT100,
  DTETIM AS DTETIM,
  DTECEN AS DTECEN
FROM
  (
    SELECT
      DTECEN
      DOUBLE(
      DOUBLE(

```

Allow collection choice

Modify SQL

The query you entered can not be understood by this application. Please correct and try again.

(LRPOWELL) - SQLQuery.executeQuery() - Select String: SELECT QSY.CSDTETIM AS CSDTETIM, QSY.PARTCPUUTIL, QDK.PCTDSKFULL, QDK.PCTDSKBUSY, QSY.INTNUM, QSY.DTETIM AS DTETIM, QSY.DTECE AS DTECEN FROM ( SELECT DTETIM, DTECEN AS DTECEN, INTNUM, DTECEN || DTETIM AS CSDTETIM, DOUBLE(SYSPTU)/DOUBLE(SYSCTA) \* 100 AS PARTCPUUTIL FROM QTEMP.QPFRDATAQAPMSYSTEMQ146000002 QSY) QSY INNER JOIN ( SELECT CSDTETIM, CASE WHEN SUM(DSCAP) <> 0 THEN (SUM(DSCAP - DSAVL) / SUM(DSCAP)) \* 100 ELSE 0 END AS PCTDSKFULL, AVG(PCTDSKBUSY) AS PCTDSKBUSY FROM ( SELECT QSY.DTECEN || QSY.DTETIM AS CSDTETIM, DOUBLE(MAX(DSCAP)) AS DSCAP, DOUBLE(MIN(DSAVL)) AS DSAVL, AVG(CASE WHEN DSSMPL <> 0 THEN DOUBLE(DSSMPL - DSNBSY) / DOUBLE(DSSMPL) \* 100 ELSE 0 END) AS PCTDSKBUSY FROM QTEMP.QPFRDATAQAPMSYSTEMQ146000002 QSY LEFT OUTER JOIN QTEMP.QPFRDATAQAPMDISKQ146000002 QDS ON QSY.INTNUM = QDS.INTNUM WHERE ((DSASP = '1')) GROUP BY QSY.DTETIM, QSY.DTECEN, DSARM, DMFLAG) A GROUP BY CSDTETIM) QDK ON QSY.CSDTETIM = QDK.CSDTETIM ORDER BY CSDTETIM

[SQL0205] Column DTECE not in table QSY in \*N.


Modify SQL window  
Now easier to see  
SQL errors

# Design Mode

Once you “Enable Design Mode” additional options become available to create and edit your own charts and tables.

Investigate Data - Performance Data Investigator

### Perspectives

-  (circled in red)
- Health Indicators
- Monitor
- Collection Services
- Database
- Job Watcher
- Disk Watcher
- Performance Explorer
- Batch Model
- Custom Perspectives - PDITEST0

### Selection

**Name**  
Collection Services

**Description**  
Chart and table views over a variety of performance statistics from Collection Services performance data.

**Default Perspective**  
[Resource Utilization Overview](#)

Locked

[New Folder...](#) [New Perspective...](#)

[Edit](#) [Advanced Edit](#) [Delete](#)

[Move Up](#) [Move Down](#)

### Collection

Collection Library: [QPFRDATA](#) | Collection Name: [Most Recent](#)

[Display](#) [Search](#) [Save as Favorite](#) [Options](#) [Refresh Perspectives](#) [Close](#)

[http://ibmsystemsmag.blogs.com/i\\_can/2011/08/customizing-a-perspective-in-pdi.html](http://ibmsystemsmag.blogs.com/i_can/2011/08/customizing-a-perspective-in-pdi.html)

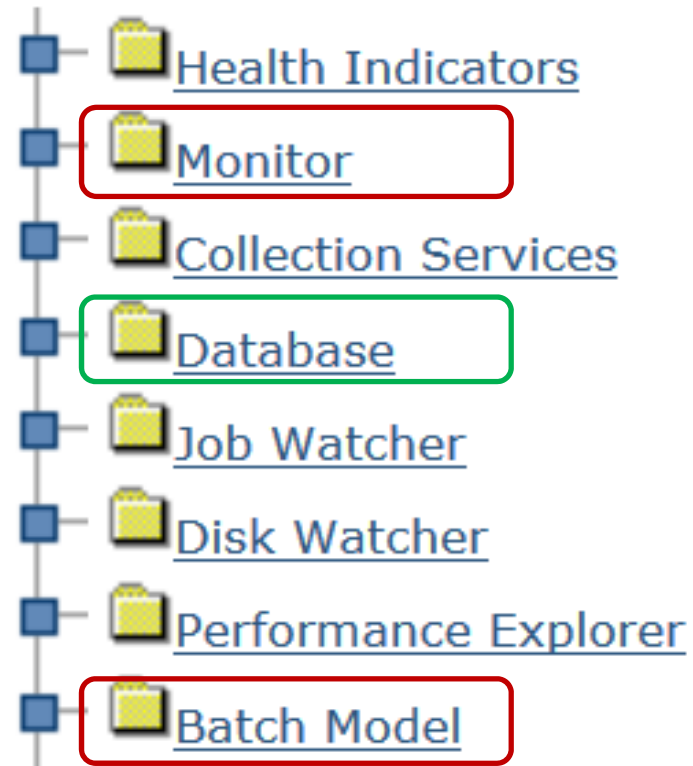


## Additional Content Packages

- 6.1 and 7.1:
  - Health Indicators
  - Database
  - Job Watcher
  - Disk Watcher
  - Performance Explorer
- New in 7.2:
  - Monitor
  - Batch Model

### Investigate Data - Performance Data

#### Perspectives

- 
- Health Indicators
  - Monitor
  - Collection Services
  - Database
  - Job Watcher
  - Disk Watcher
  - Performance Explorer
  - Batch Model



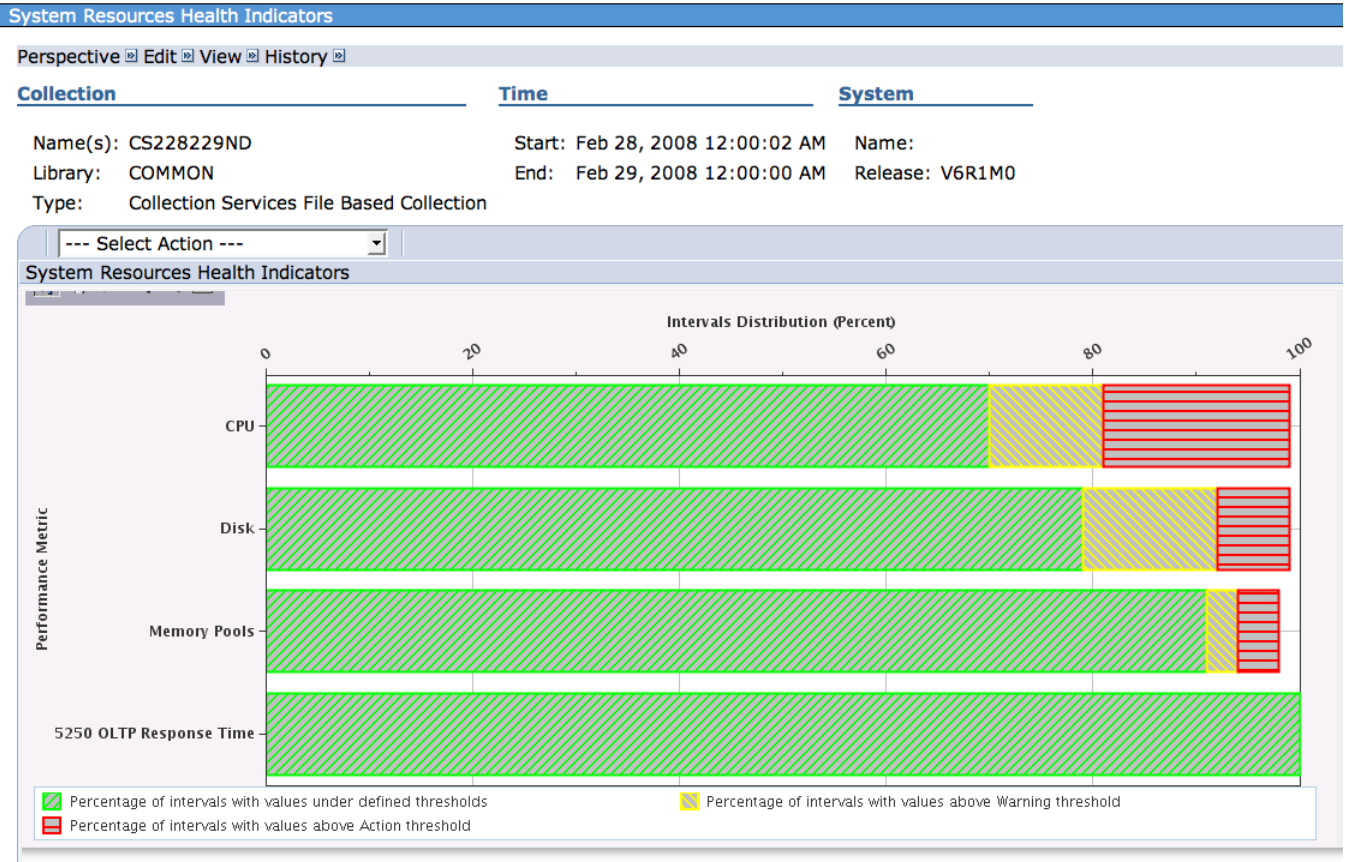
# Health Indicators

Investigate Data - Performance Data Investigator

## Perspectives

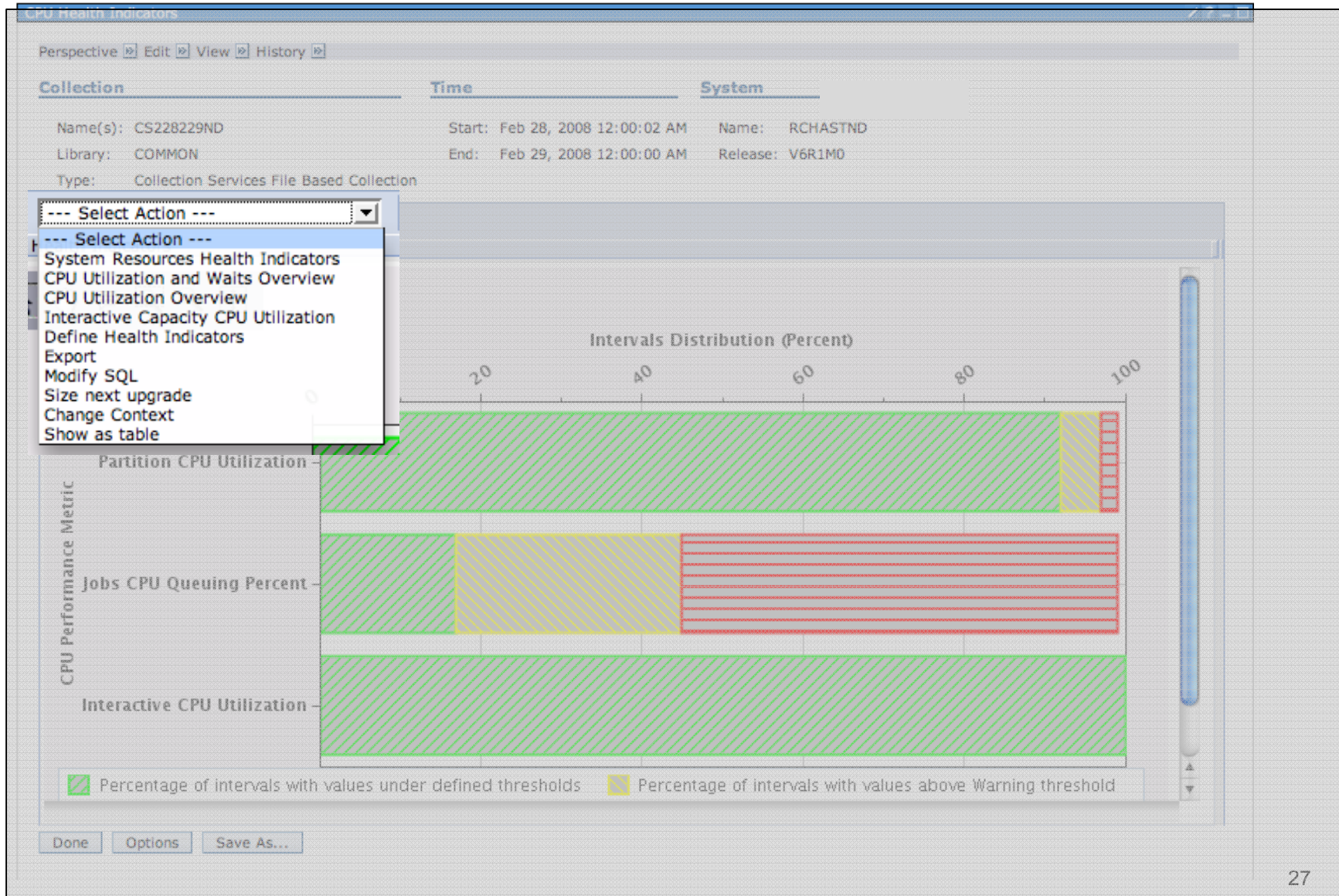
- Health Indicators
  - System Resources Health Indicators
  - CPU Health Indicators
  - Disk Health Indicators
  - Memory Pools Health Indicators
  - Response Time Health Indicators
  - Database Health Indicators

## System Resource Health Indicators



Database Health Indicators are new in 7.2

# CPU Health Indicators



# Define Health Indicators 7.1 screen captures

- SELECT ACTION ▾
- CPU Health Indicators
- Disk Health Indicators
- Memory Pools Health Indicators
- Response Time Health Indicators
- Define Health Indicators**
- Edit View

**Define Health Indicators**

System Resources Health Indicators	Available Indicators		Selected Indicators	Current Threshold Values
<b>CPU</b>	[Empty]	<b>Add &gt;&gt;</b>	Interactive CPU Utilization	Warning <input type="text" value="70"/>
Disk		<b>Remove &lt;&lt;</b>	Jobs CPU Queuing Percent	Action <input type="text" value="90"/>
Memory Pools			Partition CPU Utilization	
5250 OLTP Response Time				

**Define Health Indicators**

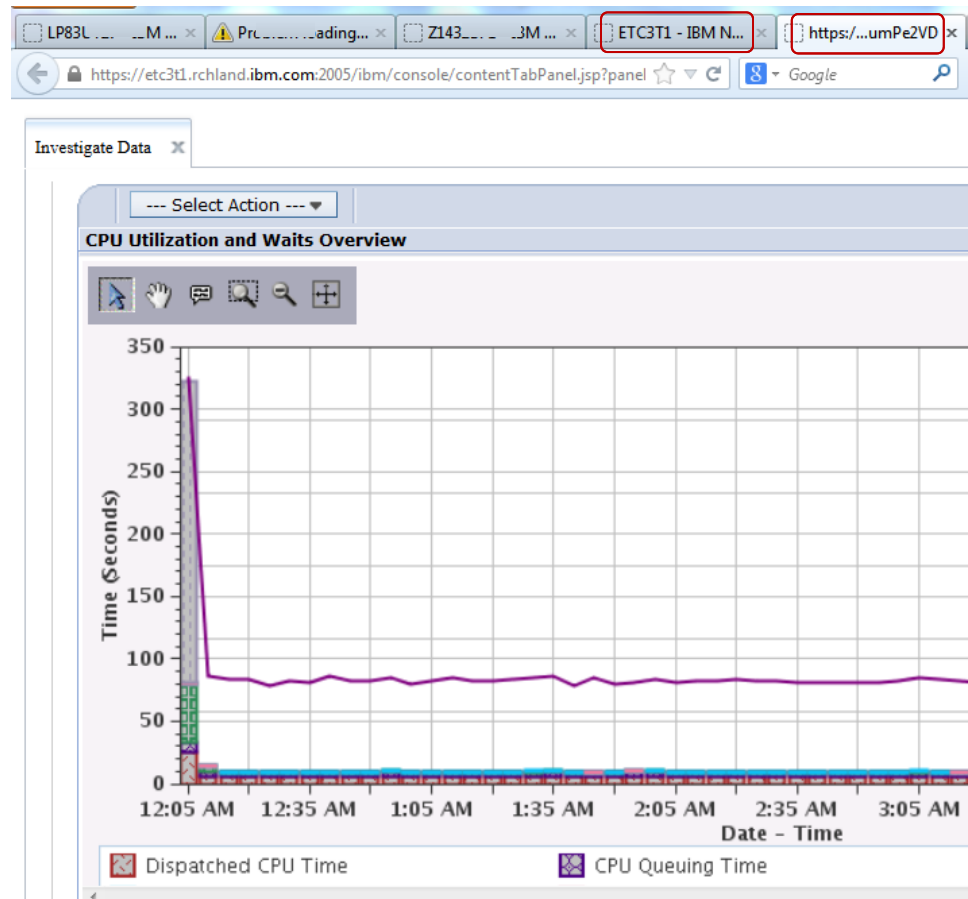
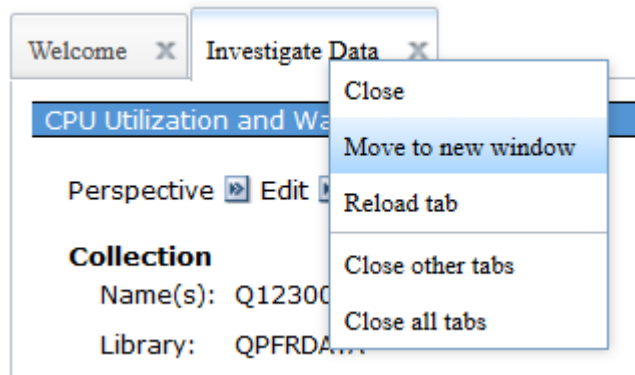
System Resources Health Indicators	Available Indicators		Selected Indicators	Current Threshold Values
CPU	[Empty]	<b>Add &gt;&gt;</b>	Average Disk Percent Busy	Warning <input type="text" value="20"/>
<b>Disk</b>		<b>Remove &lt;&lt;</b>	Average Disk Space Percent Used	Action <input type="text" value="30"/>
Memory Pools			Average Disk Response Time	
5250 OLTP Response Time				

**Define Health Indicators**

System Resources Health Indicators	Available Indicators		Selected Indicators	Current Threshold Values
CPU	[Empty]	<b>Add &gt;&gt;</b>	Page Faults Pending Per Second	Warning <input type="text" value="4000"/>
Disk		<b>Remove &lt;&lt;</b>	Page Faults Per Second	Action <input type="text" value="5000"/>
<b>Memory Pools</b>				
5250 OLTP Response Time				

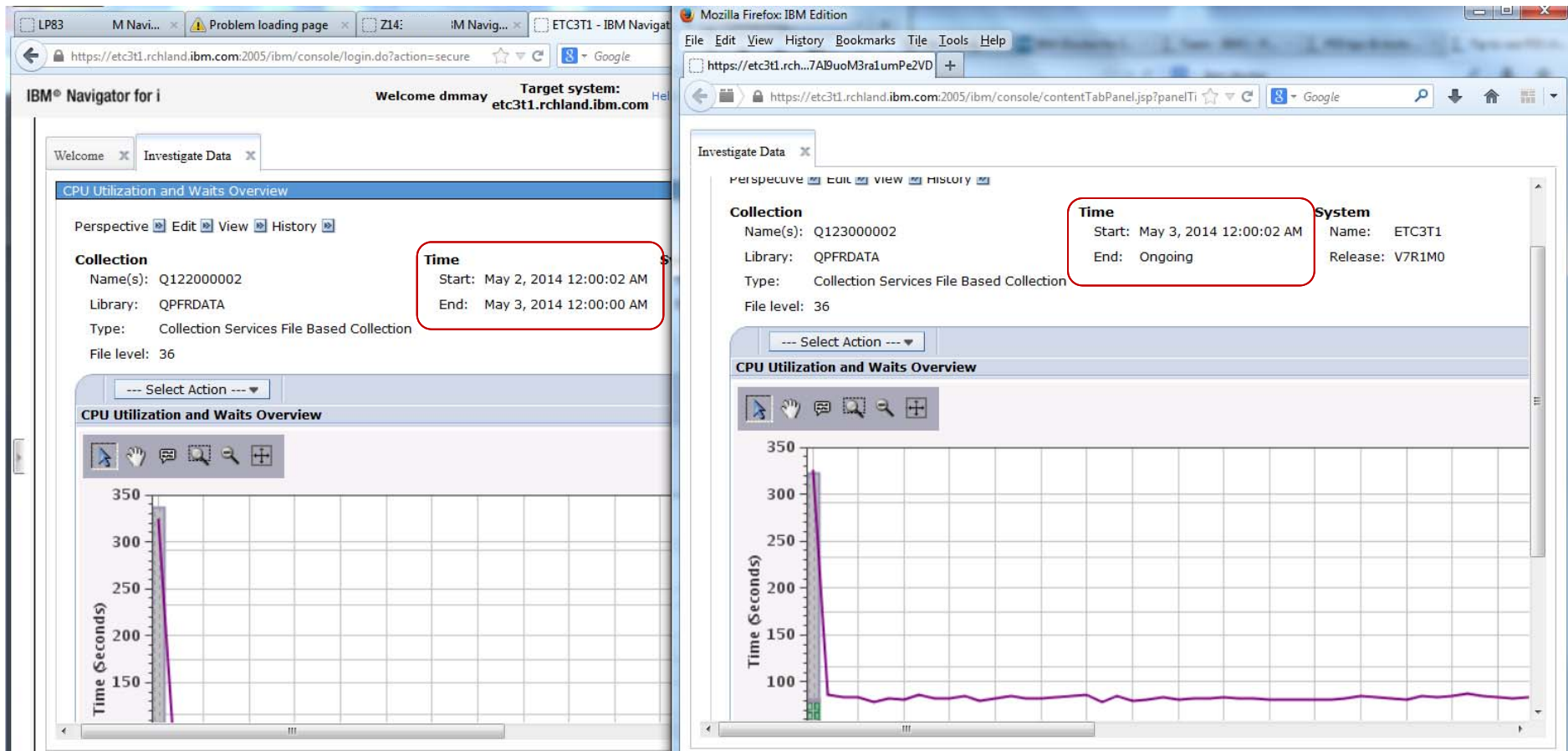
# Display Charts in Separate Window

It's useful to compare two graphs side-by-side





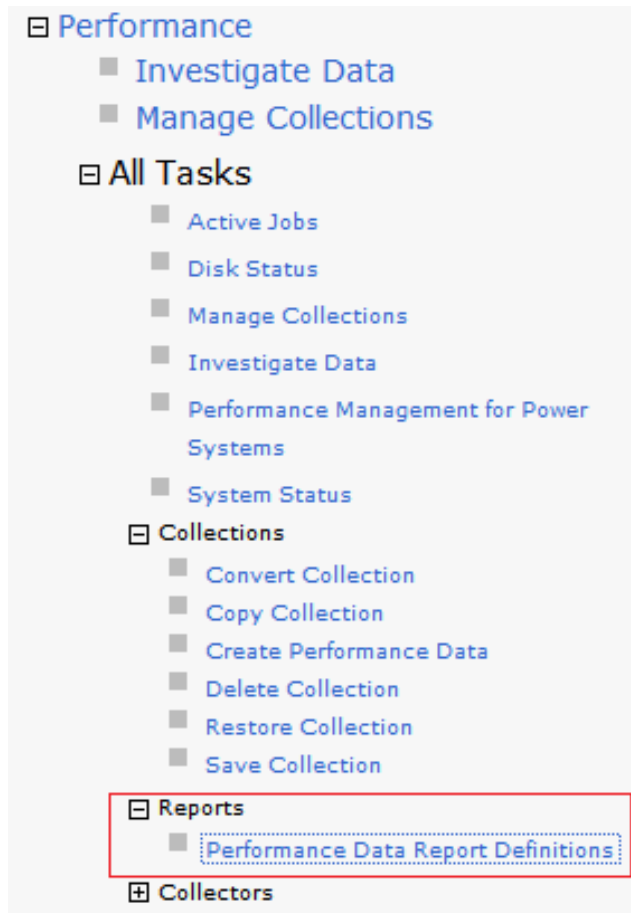
# Two Different Charts from Two Different Days



# Performance Data Reports

## “Executive” Reports

- Create a group of printed or online graphs of performance perspectives.
- Generate a PDF or zip file containing the requested graphs for the collection
- Use for weekly reports








Create Performance Data Report

Start here with Reports ->  
Performance Data Report Definitions

# Report Definitions

Performance Data Report Definitions - Etc3t1.rchland.ibm.com




 Actions ▾
 


<input type="checkbox"/>	Name	Description
 ...	No filter applied <span style="float: right;">✕</span>	
<input type="checkbox"/>	Health Indicators	A predefined performance
<input type="checkbox"/>	System Overview	A predefined performance
<input type="checkbox"/>	Resource Consumption	A predefined performance

Create Performance Data Report

Report definition:

Output type:

Collection:

Library:

Type:



# Create your own Report Definition

**Add Performance Data Report Definition**

**Add Performance Data Report Definition**

Name:

Description:

**Perspectives**

Select Perspective Package Add Remove

None

---

**Collection**

Collection: Most Recent

Library: QPFRDATA

Type:

**Cover Page**

Title:

Report definition name

Date created

Perspectives

Collection name

OK Cancel

Performance Data Report Definitions - Etc3t1.rchland.ibm.com

Actions

- New
  - Add Performance Data Report Definition...
- Refresh
- Advanced Filter
- Export
  - A predefined performance
- Configure Options

Name	Description
No filter applied	
Health Indicators	A predefined performance
System Overview	A predefined performance
Resource Consumption	A predefined performance

**Add Performance Data Report Definition**

**Add Perspective**

**Filter**

Collection name: CS228229ND (\*CSFILE)

Library: COMMON

**Perspectives**

- Database
- Collection Services
  - CPU Utilization and Waits Overview
  - Resource Utilization Overview
  - Job Statistics Overviews
  - Waits
  - CPU
  - Disk
  - Physical Disk I/O
  - Synchronous Disk I/O

**Add Performance Data Report Definition**

**Add Performance Data Report Definition**

Name: Demo Report

Description: Report prepared for my presentation

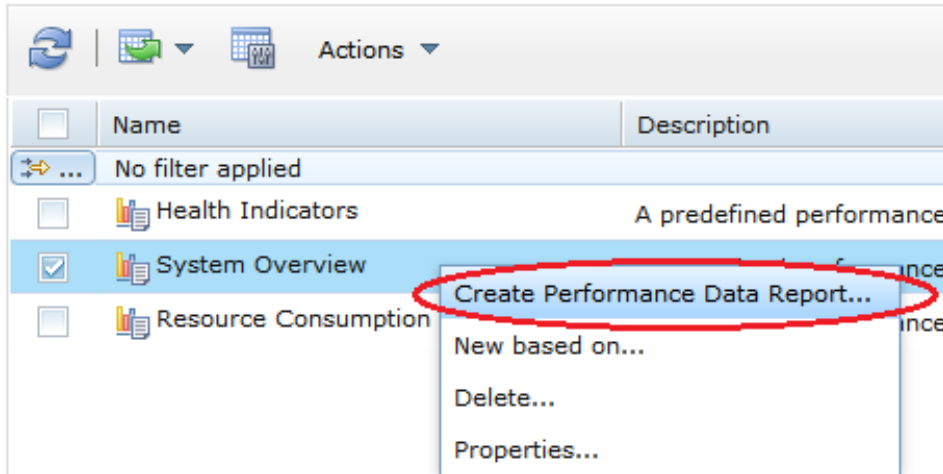
**Perspectives**

--- Select Action ---

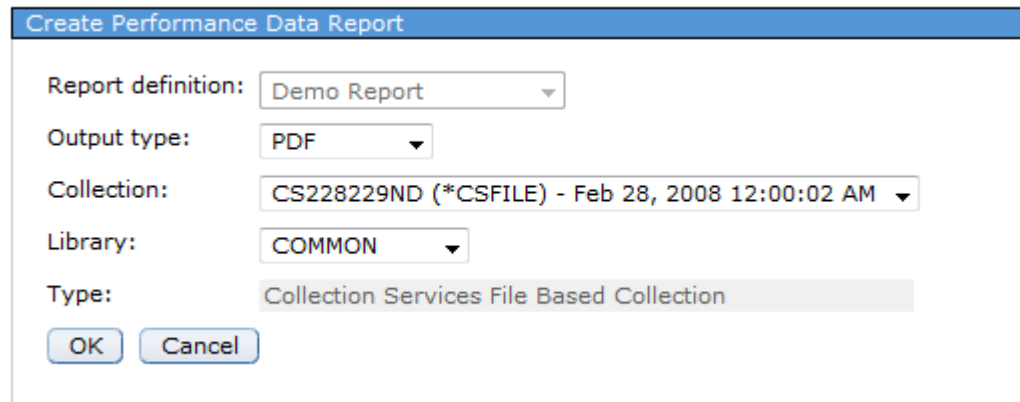
Select	Perspective	Package
<input type="checkbox"/>	CPU Utilization and Waits Overview	Collection Services
<input type="checkbox"/>	Page Faults Overview	Collection Services
<input type="checkbox"/>	Synchronous Disk I/O Overview	Collection Services

# Create Performance Data Report

Report Definitions - Rchviks.rch.stglabs.ibm.com



The screenshot shows a web interface for 'Report Definitions'. At the top, there are icons for refresh, save, and a calendar, followed by an 'Actions' dropdown menu. Below this is a table with two columns: 'Name' and 'Description'. The table contains three rows: 'Health Indicators' (description: 'A predefined performance...'), 'System Overview' (description: '...'), and 'Resource Consumption' (description: '...'). The 'System Overview' row is selected, and a context menu is open over it, listing options: 'Create Performance Data Report...', 'New based on...', 'Delete...', and 'Properties...'. The 'Create Performance Data Report...' option is circled in red.



The screenshot shows a dialog box titled 'Create Performance Data Report'. It contains several fields with dropdown menus and a text field:

- Report definition: Demo Report
- Output type: PDF
- Collection: CS228229ND (\*CSFILE) - Feb 28, 2008 12:00:02 AM
- Library: COMMON
- Type: Collection Services File Based Collection

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

# Resulting Report (PDF example)

Feb 28, 2013 10:03:43 AM

## Performance data report definition:

Demo Report

## Report title:

Example Report based upon COMMON performance collection

## Perspectives included in report:

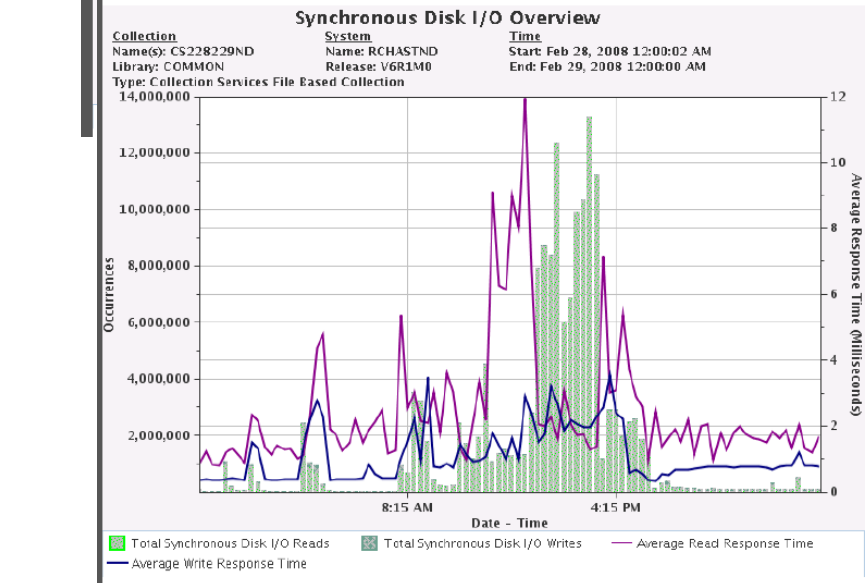
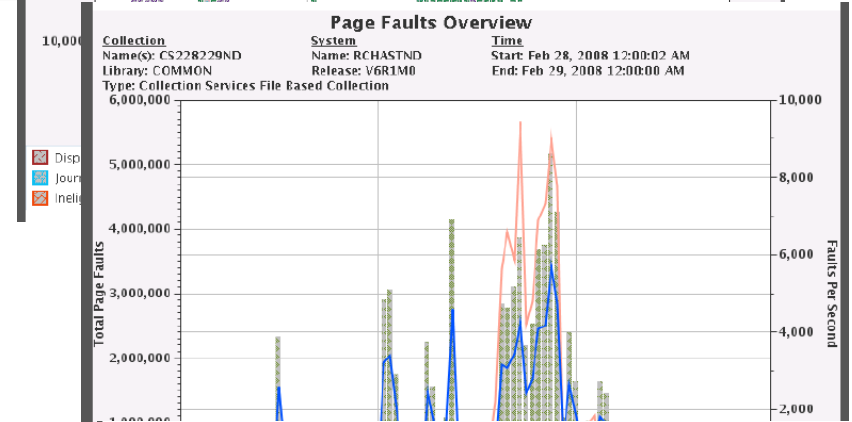
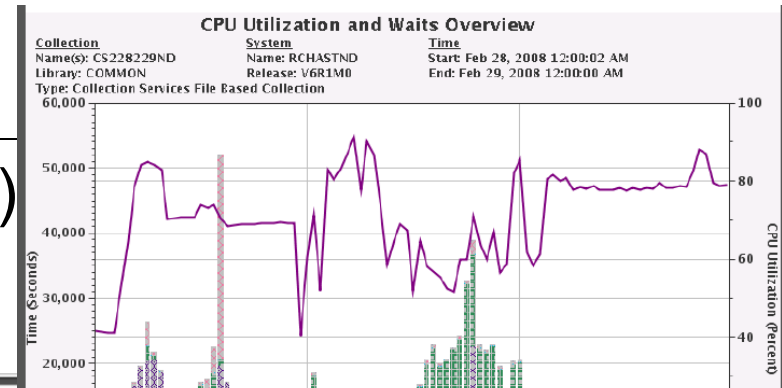
CPU Utilization and Waits Overview

Page Faults Overview

Synchronous Disk I/O Overview

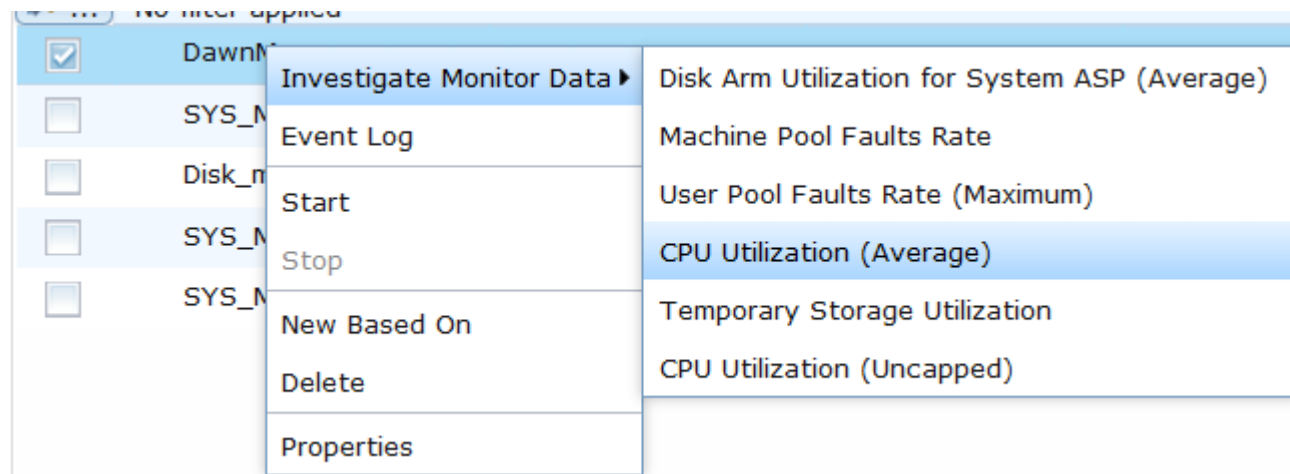
## Library/Collection used for report:

Common/Cs228229nd



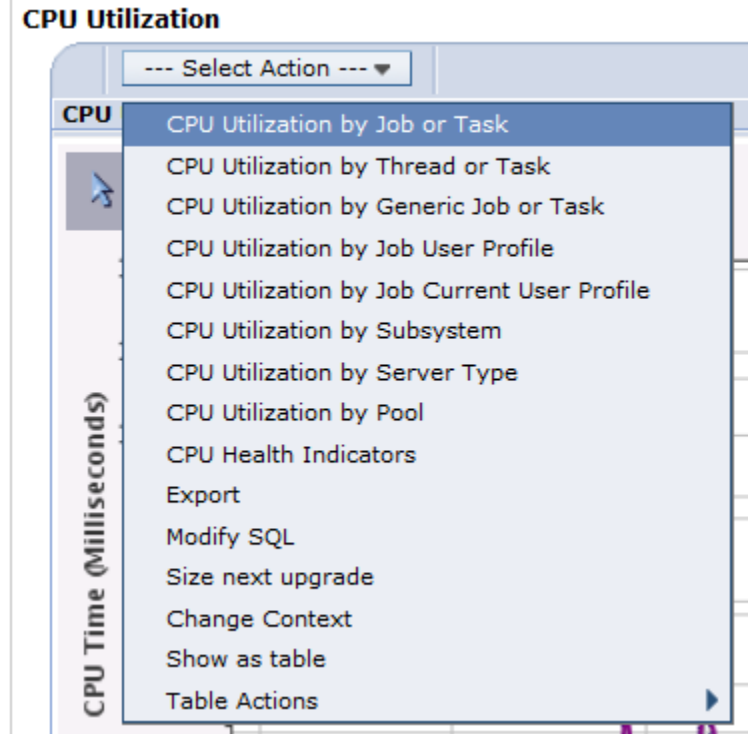
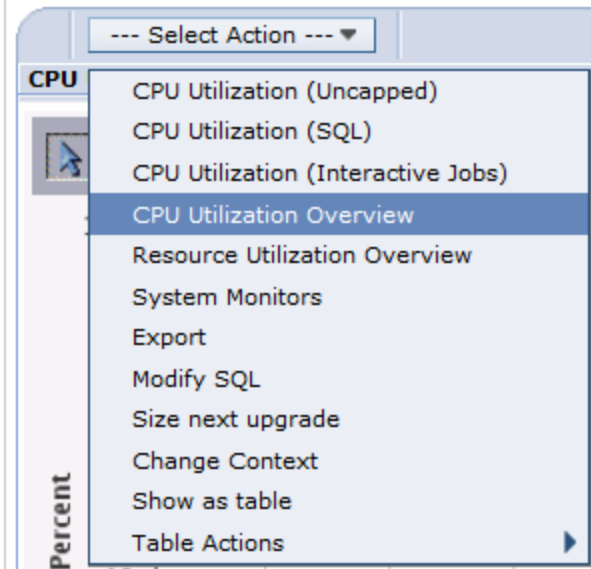
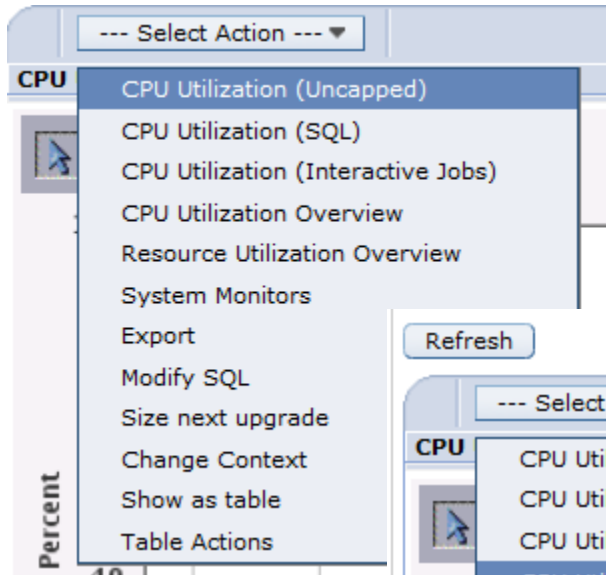
## 7.2 System Monitors

- System Monitors are new with Navigator in 7.2
  - Similar capability to Management Central System Monitors
- System Monitor data comes from Collection Services
- You view System Monitor data with the Performance Data Investigator



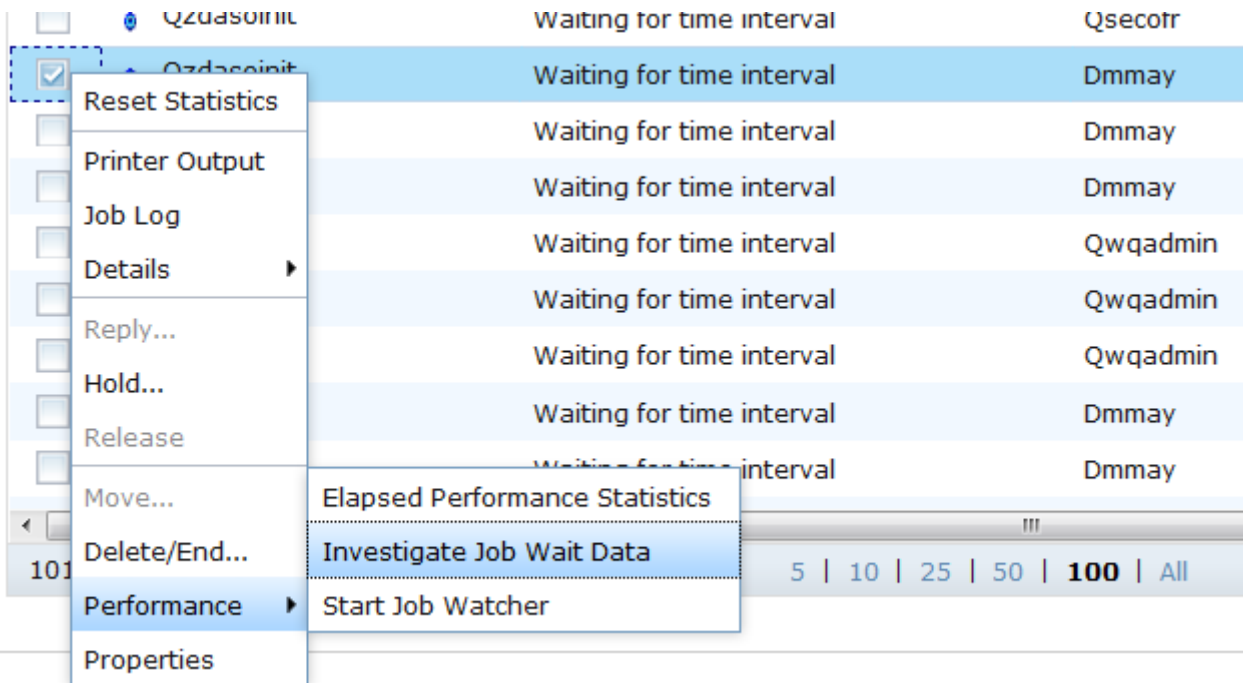
# Monitor Drill-down Actions

With Navigator System Monitors, you use the Performance Data Investigator to view the graphs.  
 Drill-down to find contributing jobs



# Investigate Data for an Active Job

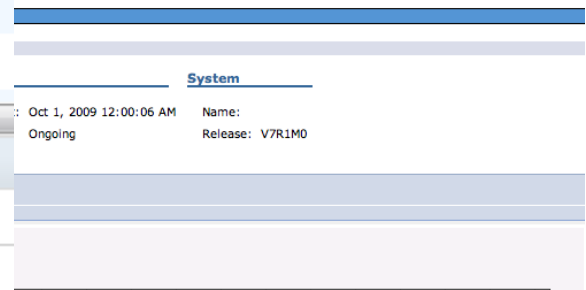
Active jobs – what's happening *right now*



Job Name	Status	Queue
Qzdasoinit	Waiting for time interval	Qsecorr
Qzdascinit	Waiting for time interval	Dmmay
	Waiting for time interval	Dmmay
	Waiting for time interval	Dmmay
	Waiting for time interval	Qwqadmin
	Waiting for time interval	Qwqadmin
	Waiting for time interval	Qwqadmin
	Waiting for time interval	Dmmay
	Waiting for time interval	Dmmay

Context Menu for Qzdascinit:

- Reset Statistics
- Printer Output
- Job Log
- Details
- Reply...
- Hold...
- Release
- Move...
- Delete/End...
- Performance
  - Elapsed Performance Statistics
  - Investigate Job Wait Data
  - Start Job Watcher
- Properties

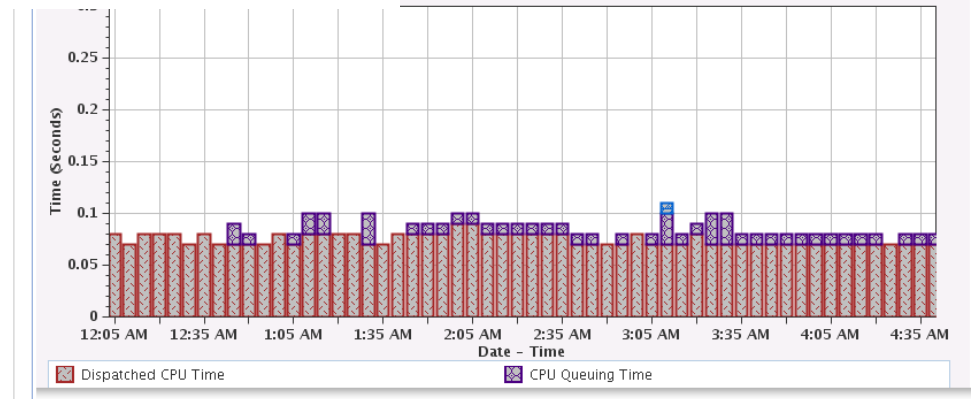


System

Oct 1, 2009 12:00:06 AM Name:  
Ongoing Release: V7R1M0

Job wait data  
Collection Services job data

How did I get to here?



# Integration with System Status

Power Systems



System Status - €

Last refresh: 3/8/13 12:46:53 PM

<b>General</b>	<b>Jobs</b>
Jobs	Total: 4,537
Processors	Active: 262
Memory	<b>Addresses used</b>
Disk Space	Permanent: 0.010 %
Addresses	Temporary: 0.022 %
	Total disk space: 95.44 GB
	<b>System disk pool</b>
	Capacity: 95.44 GB
	Usage: 79.118 %

[System Resources Health Indicators](#)

System Status - €

Last refresh: 3/8/13 12:46:53 PM

General	Total memory: 4,096.00 MB
Jobs	<a href="#">Active Memory Pools</a>
Processors	<a href="#">Memory Pools Health Indicators</a>
<b>Memory</b>	
Disk Space	
Addresses	

System Status - €

Last refresh: 3/8/13 12:46:53 PM

General	Total disk space: 95.44 GB
Jobs	<b>System disk pool</b>
Processors	Capacity: 95.44 GB
Memory	Usage: 79.118 %
<b>Disk Space</b>	<b>Temporary storage used</b>
Addresses	Current: 8,407 MB
	Maximum since last system restart: 8,435 MB

[Disk Status](#)

[Storage System Values](#)

[Disk Health Indicators](#)

System Status

Last refresh: 3/8/13 12:46:53 PM

General	CPU usage (elapsed):	0.0 %
Jobs	Type of processors:	Shared - uncapped
<b>Processors</b>	Processing power:	0.20 processing units
Memory	Virtual processors:	2
Disk Space	Interactive performance:	0 %
Addresses	Shared processor pool usage (elapsed):	0.0 %
	Uncapped CPU capacity pool usage (elapsed):	0.0 %

[CPU Health Indicators](#)

# Integration with Disk Status

Power Systems



Disk Status - Z1

Refresh Elapsed time: 00:00:00

Actions

- Investigate Disk Data
- Start Disk Watcher
- Reset Statistics
- Columns...
- Refresh
- Advanced
- Export
- Configure

Unit	Size (MB)	% Used	% Busy
69.794	75.7	0	

1  
2  
3  
4

Collection

Name(s): Q067000002      Time: Start: Mar 8, 2013 12:00:02 AM      System: Name: Z1433DP1  
Library: QPFRDATA      End: Ongoing      Release: V7R1M0  
Type: Collection Services File Based Collection  
File level: 36

Average Response Time

Disk Unit Name	Average Response Time (ms)
0003	0.82
0004	0.75
0002	0.68
0001	0.62

Legend: Average Response Time



# Set Target System












## 7.2 screen captures



You can connect to one partition, but manage a different partition.

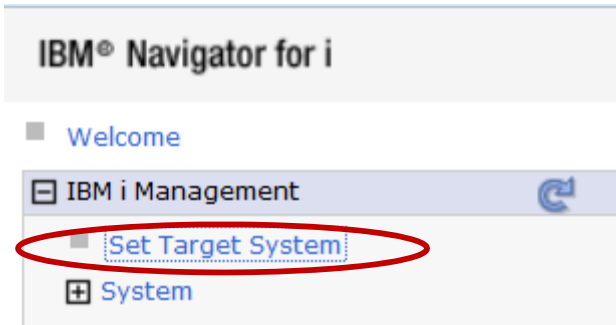
You can manage IBM i 5.4, 6.1, 7.1, and 7.2

Not all features are available on all releases

Target Systems				
<span>Add Target System</span> <span>Set As Target System</span> <span>Properties</span> <span>Delete</span> <span>Refresh System Status</span>				
	System Name	Release	User	System Description
 ...	No filter applied			
	 Etc3t2.rchland.ibm.com	v7r2m0	Dmmay	
	 Etc3t1.rchland.ibm.com	v7r1m0	Dmmay	
	 Ctcweb54.rchland.ibm.com	v5r4m0	Dmmay	
	 Itcgen3.rchland.ibm.com	v7r1m0	Dmmay	
	 Isz1lp11.rch.stglabs.ibm.com	v6r1m0	Dmmay	IBM i 6.1

# Set Target System

## 7.1 screen captures








You can connect to one partition, but manage a different partition.

**Set Target System** ?

Your target system can be the local system where you are running IBM Navigator for i, or you can specify a different system to manage.

Select the system you want to manage, then press OK.

Select	System Name	Release	User
<input checked="" type="radio"/>	 Etc3t1.rchland.ibm.com	v7r1m0	Dmmay
<input type="radio"/>	 MySystem1.rchland.ibm.com	v7r1m0	Dmmay
<input type="radio"/>	 Etc3t2.rchland.ibm.com	v7r2m0	Dmmay
<input type="radio"/>	 Icz1ln11.rchustlabs.ibm.com	v6r1m0	Dmmay
<input type="radio"/>	 Obwut04.rchland.ibm.com	v5r4m0	Dmmay

Page 1 of 1 |   | Rows  | Total: 5 Selected: 1

# Set Target System

Target System

HTTP Server runs on the system you initially log into.



You can manage a second system; no web server is required on the second system; the Host Servers are used

# Investigate Data Database

Requires the latest PTF groups, including the database group  
Must have the Performance Tools LPP, Manager feature, installed

Available on IBM i 6.1 and 7.1 with PTFs  
Included with IBM i 7.2

## Integration with Database





- Leverage the capabilities of PDI with valuable data gathered from database
- PDI charting of
  - SQL Plan Cache Snapshots and Event Monitors
  - SQL Performance Monitor files
- Collection Services collection of job-level SQL metrics
- Visual charts and/or tables in PDI that are focused on database related metrics
- Navigation between database and performance tasks

# Database Perspectives

Investigate Data - Performance Data Investigator

## Perspectives

## Selection

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

## Collection

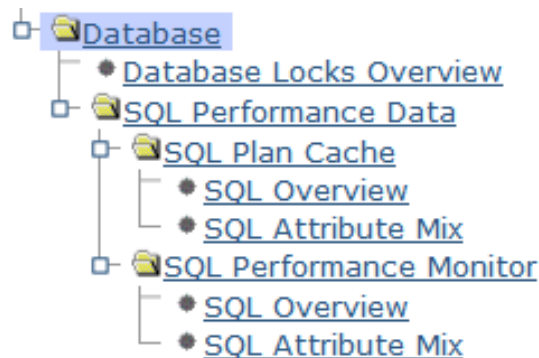
Collection Library	Collection Name
<input type="text" value="QPFRRDATA"/>	<input type="text" value="Most Recent"/>

Must have the Performance Tools LPP, Manager Feature, installed

## Integration with Database – package overview

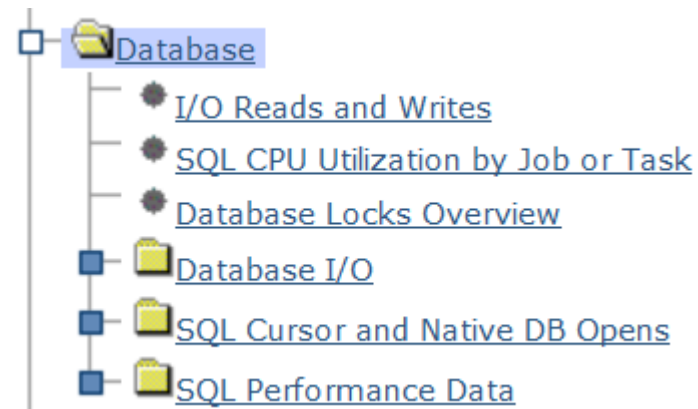
### Database Package for 6.1

- Database Locks Overview
- SQL Performance Data
  - SQL Plan Cache Snapshots and Event Monitors
  - SQL Performance Monitor



### Database Package for 7.1, 7.2

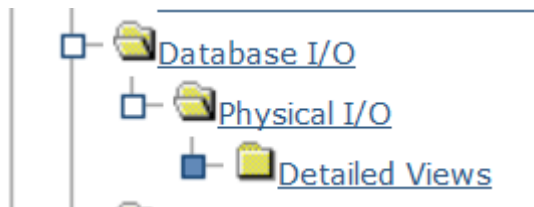
- I/O Reads and Writes
- SQL CPU
- Database Locks Overview
- Database I/O
  - Utilizes Job Level SQL Metrics
- SQL Cursor and Native DB Opens
- SQL Performance Data
  - SQL Plan Cache Snapshots and Event Monitors
  - SQL Performance Monitor



## Integration with Database – 7.1 versus 7.2

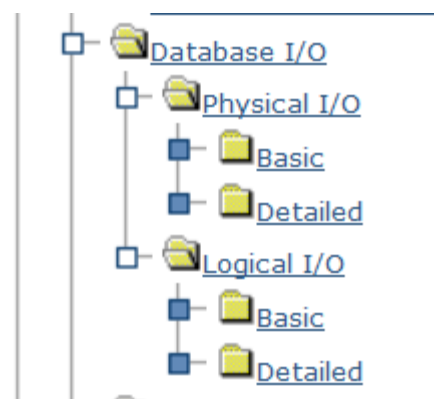
### Database Package for 7.1

- Database I/O

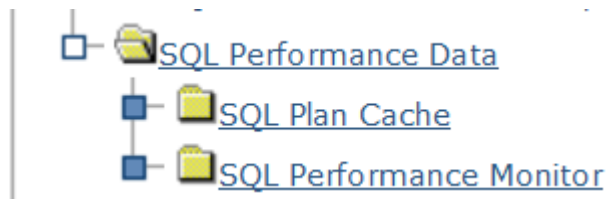


### Database Package for 7.2

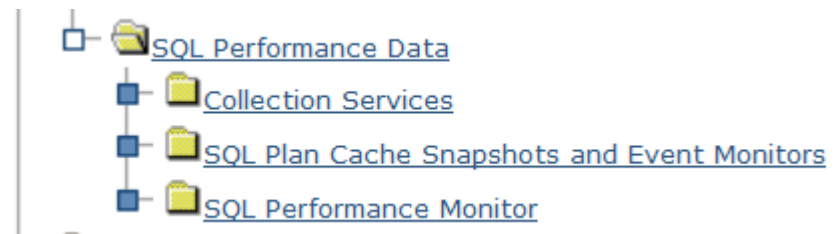
- Database I/O



- SQL Performance Data



- SQL Performance Data





# Integration with Database

Launch “Investigate Performance Data” from various database tasks

SQL Performance Monitors - Z1433dp1

Database: Zh22dp1

Name	Type	Status
No filter applied		
amonitor2	Detailed	Ended
<input checked="" type="checkbox"/> amonitor3	Detailed	Ended
as		Imported
asmalltest		
asum		

Context menu for amonitor3:

- End
- Analyze...
- Investigate Performance Data...

SQL Plan Cache Event Monitors - Z1433dp1

Database: Zh22dp1

Name	Status	Schema
No filter applied		
myeventmon1	Ended	FLANAGAN
<input checked="" type="checkbox"/> SQL Plan Cache Event		PDITESTLIB
SQL Plan Cache PDI		ZZLIB

Context menu for SQL Plan Cache Event:

- End
- Analyze...
- Investigate Performance Data...

SQL Plan Cache Snapshots - Z1433dp1

Database: Zh22dp1

Name	Schema
No filter applied	
asmalltest2	QGPL
<input checked="" type="checkbox"/> kxkSnapshot	ZZLIB
lrp1	LRP
my snap1	

Context menu for kxkSnapshot:

- Analyze...
- Investigate Performance Data...

# SQL Overview

Several graphs:

- Query time summary
- Open summary
- Open type summary
- Statement usage summary
- Index used summary
- Index create summary
- Index advised
- Statistics advised
- MQT use
- Access plan use
- Parallel degree usage

Investigate Data - Performance Data Investigator

**Perspectives**

- Performance Explorer
- Disk Watcher
- Job Watcher
- Health Indicators
- Collection Services
- Database
  - Database I/O
  - SQL Performance Data
    - SQL Plan Cache
      - SQL Overview**
      - SQL Attribute Mix
    - SQL Performance Monitor

**Selection**

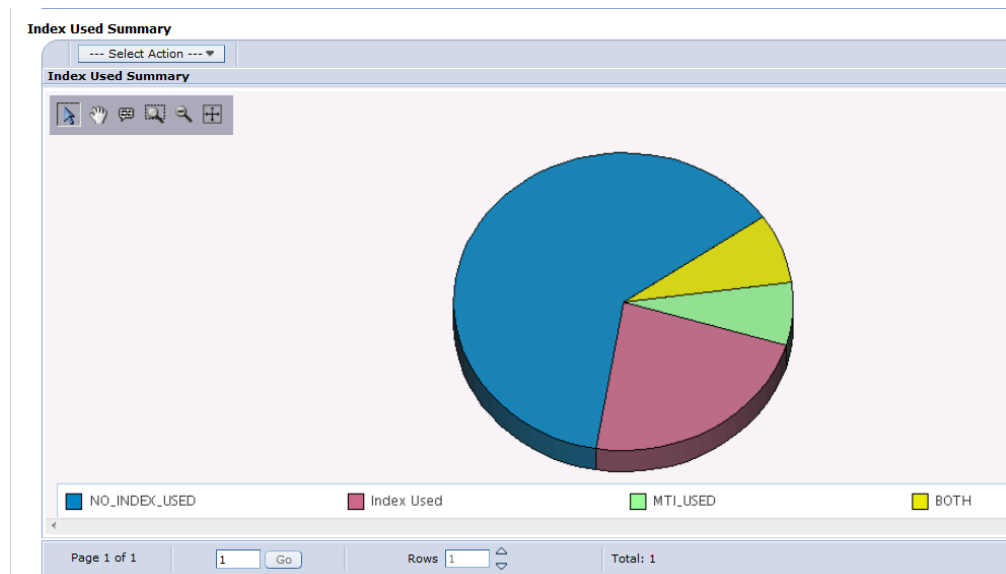
**Name**  
SQL Overview

**Description**  
This perspective gives a comprehensive picture of how queries are running overall.

**Collection**

Collection Library: DMMLIB    Collection Name: Plan Cache Snapshot for PDI (SQL Plan Cache Snapshot)

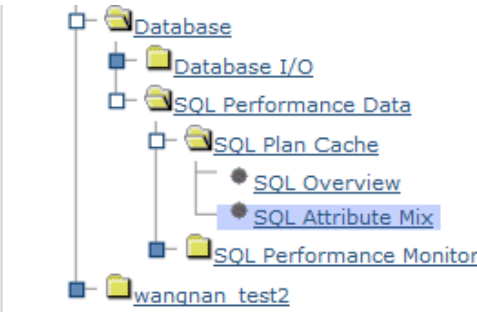
Display   Search   Options   Close



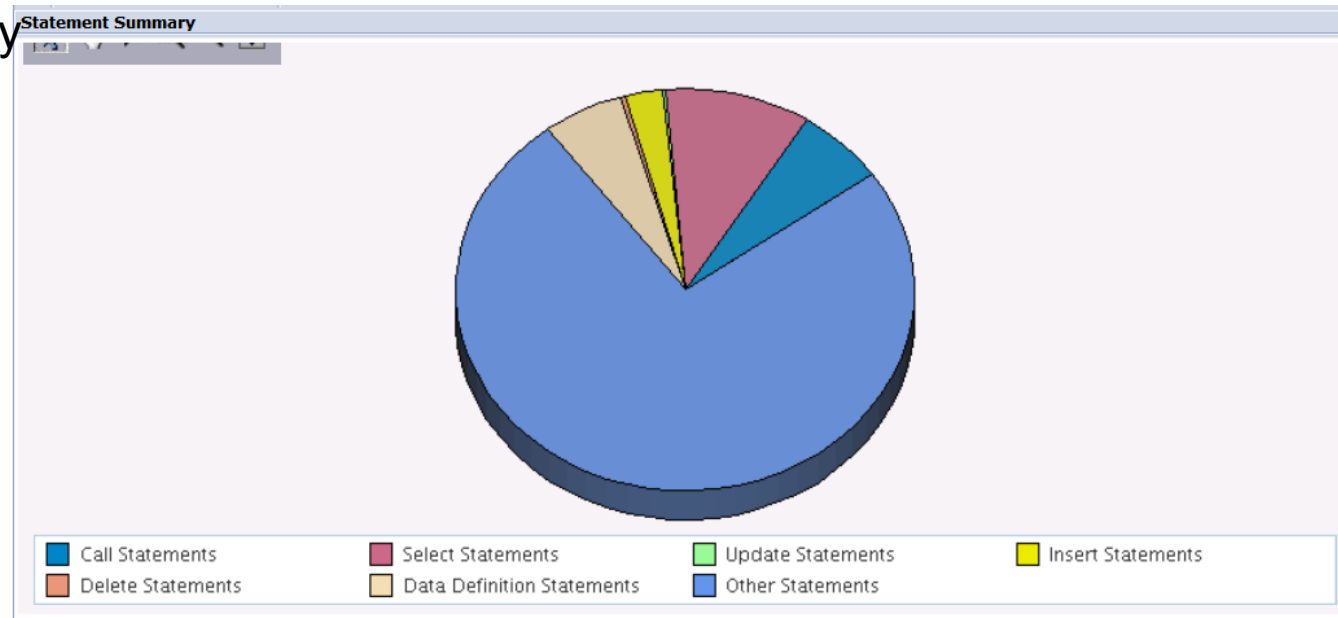
# SQL Attribute Mix

Several graphs:

- Statement summary
- Statement type summary
- Isolation level summary
- Allow copy data summary
- Sort sequence summary
- Close cursor summary
- Naming summary
- Optimization goal
- Blocking summary



The screenshot shows a tree view of database performance data. The path is: Database > SQL Performance Data > SQL Plan Cache > SQL Attribute Mix. Below the tree, the 'Collection' section shows 'Collection Library' set to 'SCOTT' and 'Collection Name' set to 'snap of 33 (SQL Plan Cache Snapshot)'. Buttons for 'Display', 'Search', 'Options', and 'Close' are visible.



## Investigate Data

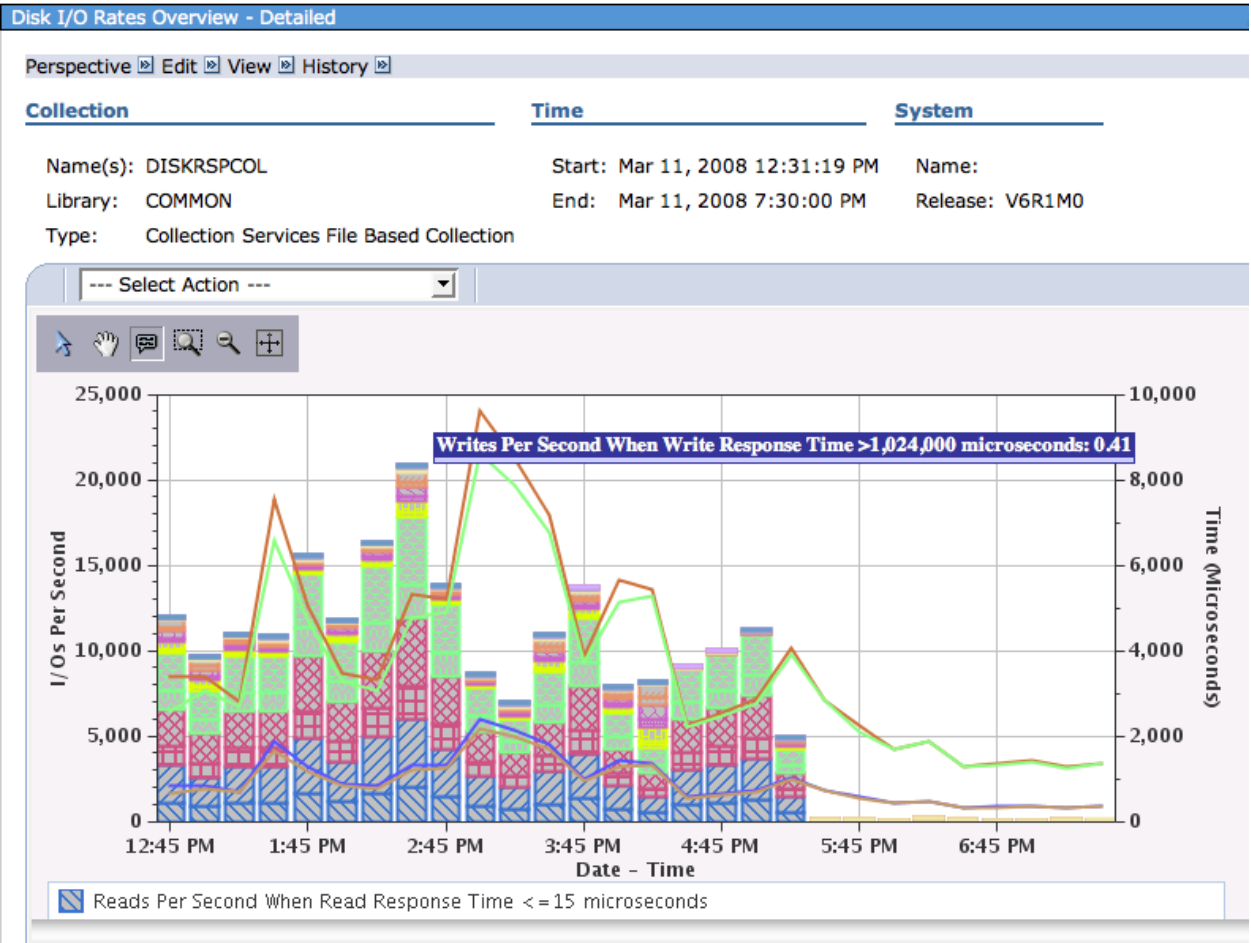
# Dawn's Favorite Collection Services Perspectives

*(PDI is more than Performance)*

**(not available on 6.1)**

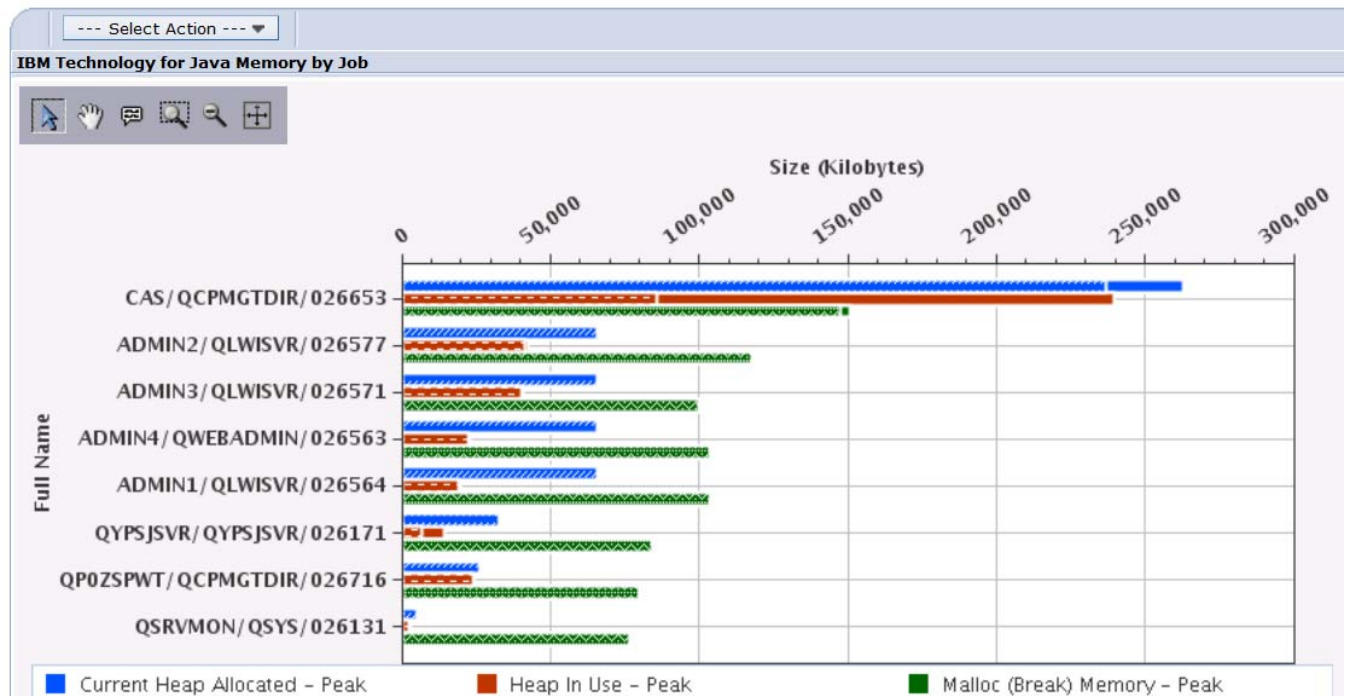
# Disk Response Time Charts

- [-] Disk
  - [-] Disk Response Time
    - [-] Detailed
      - Disk I/O Rates Overview - Detailed
      - Disk I/O Rates Overview With Cache
      - Disk I/O Average Response Time Overview
      - Disk I/O Total Response Time Overview
      - Disk I/O Total Service Time Overview
    - Disk I/O Rates Overview
    - Disk I/O Rates Overview With Cache Statistics
    - Disk I/O Average Response Time Overview
    - Disk I/O Total Response Time Overview
    - Disk I/O Total Service Time Overview

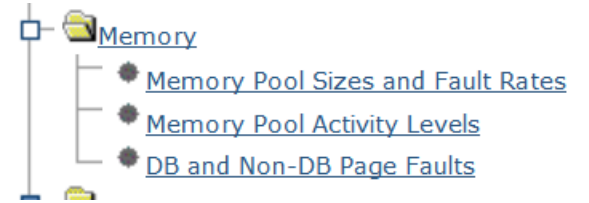


A very easy interface to see if you have slow disk operations

# Java Perspectives



Find that job using a lot of heap...



# Memory

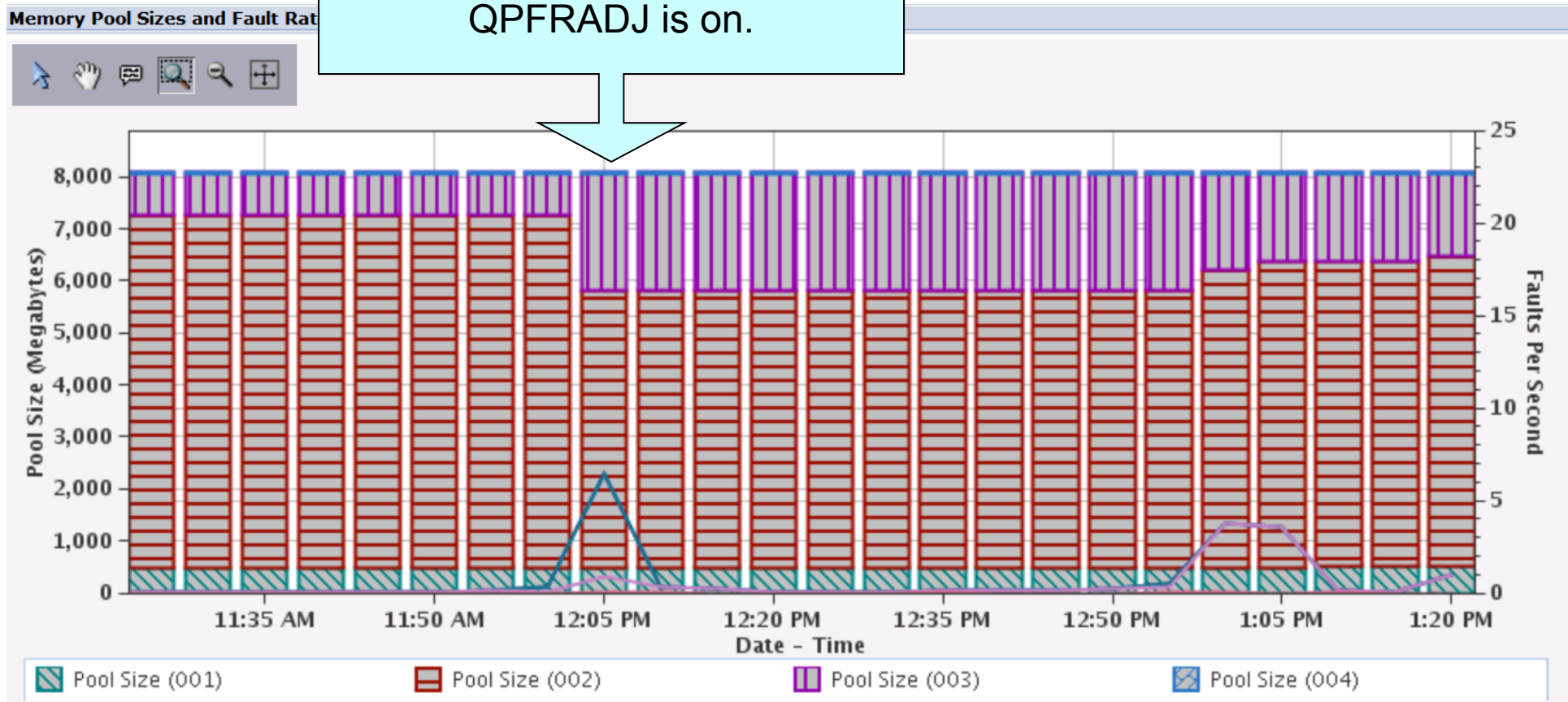
- Memory perspectives are now available
- Similar information from what you get on WRKSYSSTS....

System Pool	Pool Size (M)	Reserved Size (M)	Max Active	-----DB----- Fault	Pages	---Non-DB--- Fault	Pages
1	<u>490.59</u>	247.83	+++++	.0	.0	.0	.0
2	<u>5344.71</u>	6.07	<u>149</u>	.0	.0	.0	.0
3	<u>2283.44</u>	.00	<u>203</u>	.0	.0	12.3	29.0
4	<u>.25</u>	.00	<u>5</u>	.0	.0	.0	.0

# Memory

In a graphical view!

Note the change in pool sizes.  
QPFRADJ is on.



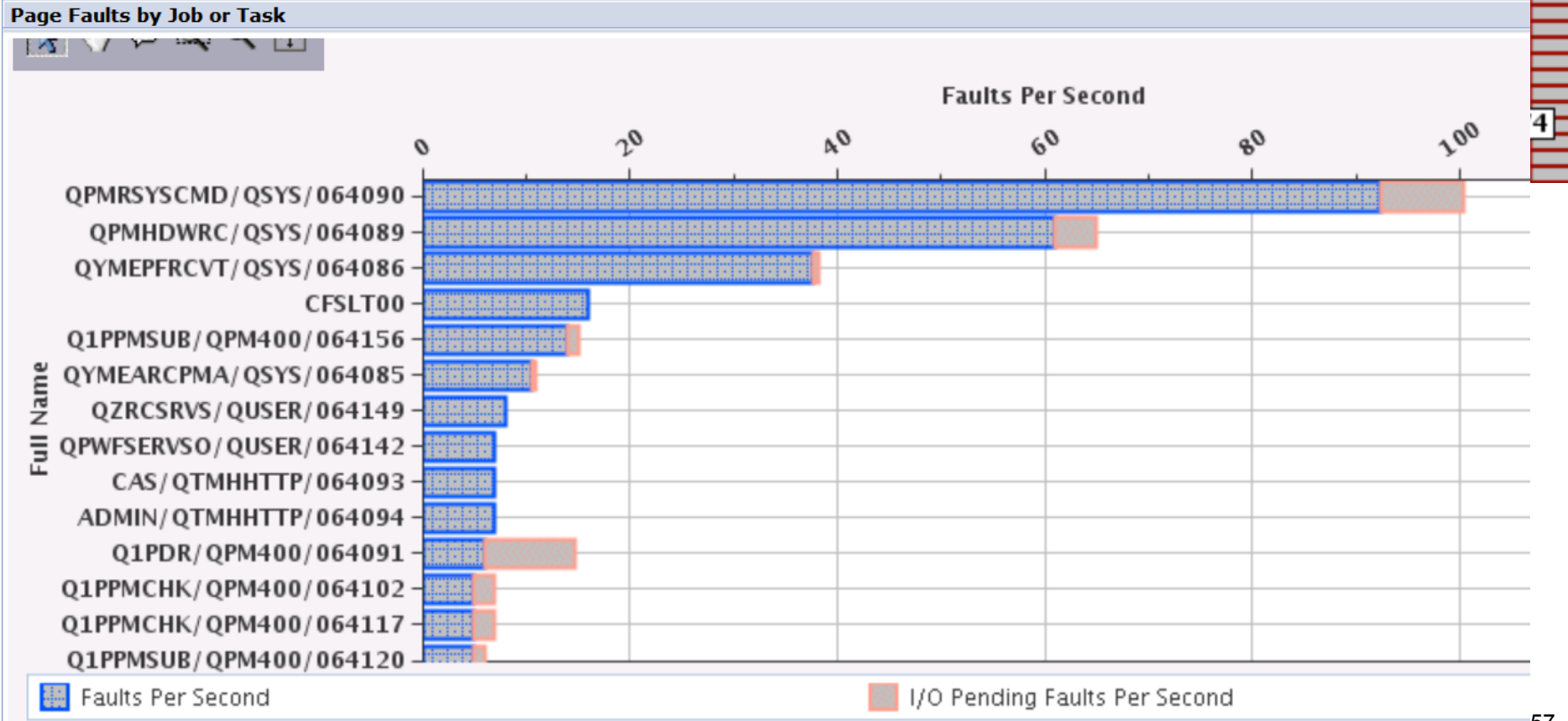


# Memory - Drilldown

Find that jobs that are faulting...

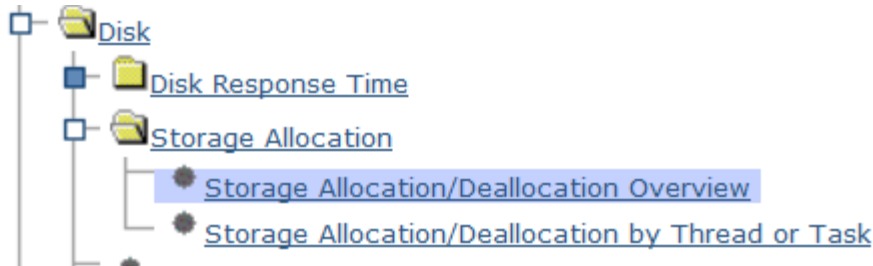
--- Select Action --- ▼

- Memory Metrics for One Pool
- Memory Pool Activity Levels
- DB and Non-DB Page Faults
- Page Faults by Job or Task**
- Waits by Pool
- Disk Waits Overview
- Memory Pools Health Indicators
- Export



# Storage Allocation Perspectives

Power Systems



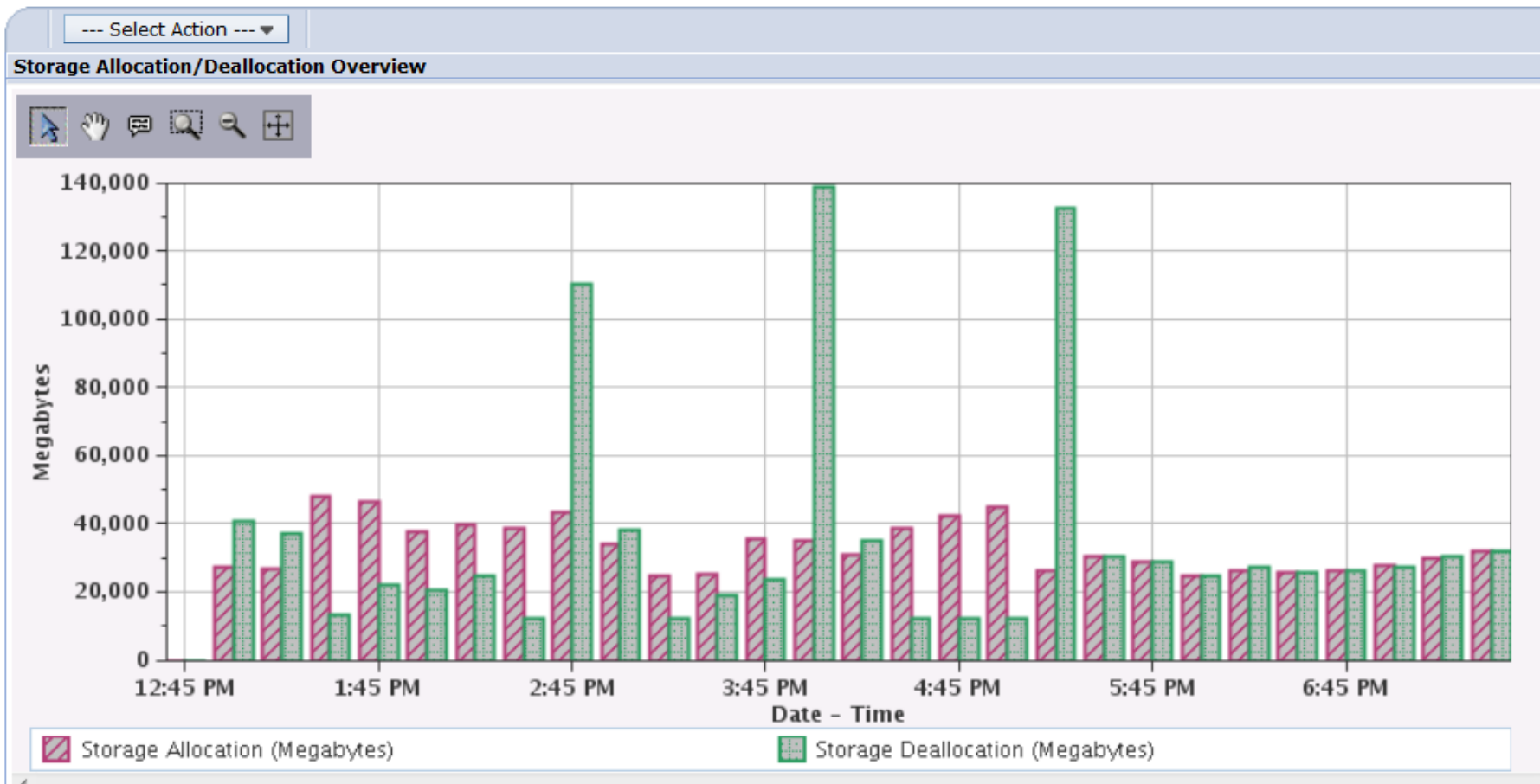
## Selection

### Name

Storage Allocation/Deallocation Overview

### Description

This chart shows allocation and deallocation of the temporary and permanent storage for all contributors over time for the selected collections. Use this chart to select a time frame for further detailed investigation.



# Storage Allocation by Thread or Task

Power Systems



## Selection

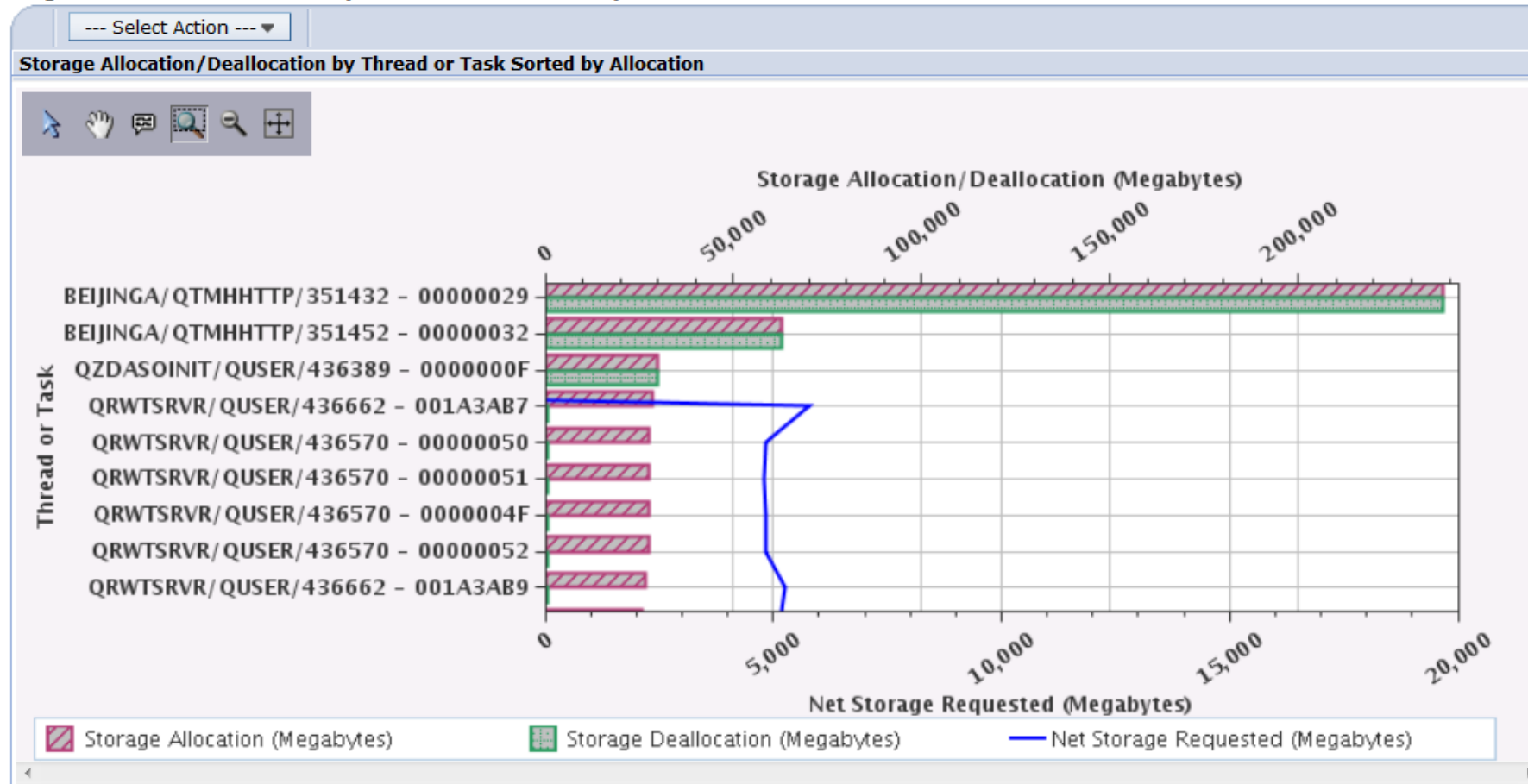
### Name

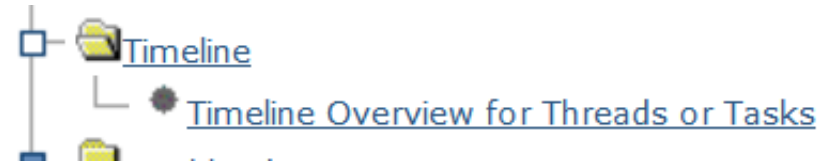
Storage Allocation/Deallocation by Thread or Task

### Description

This chart shows allocation and deallocation of the temporary and permanent storage, net frames requested by thread or task. Use this chart to select a thread or task for viewing its storage statistics over time.

## Storage Allocation/Deallocation by Thread or Task Sorted by Allocation





# Timeline Perspective

The timeline bars on the chart represent the elapsed time of threads or tasks

- Dispatched CPU Time
- CPU Queuing Time
- Other Waits Time

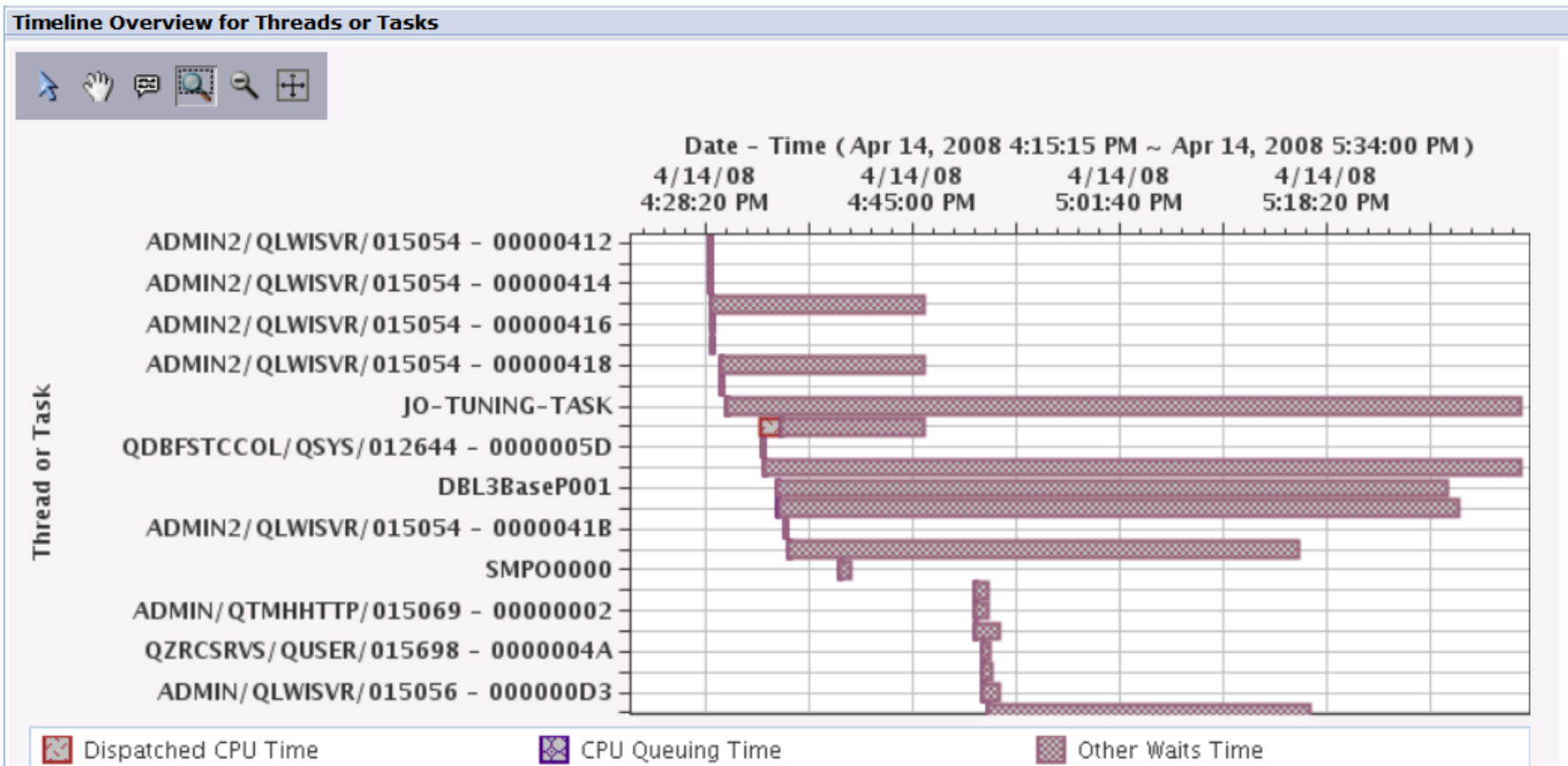
### Selection

#### Name

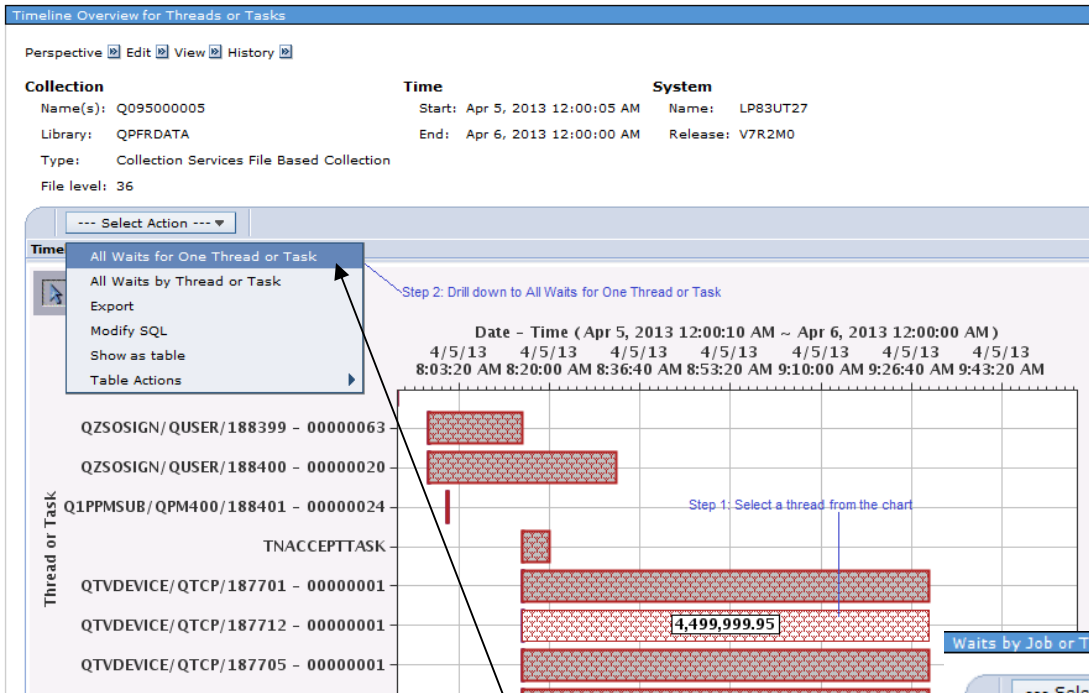
Timeline Overview for Threads or Tasks

#### Description

This chart shows the timeline overview for threads or tasks. Use this chart to select a thread or task for viewing its detailed run and wait contributions.



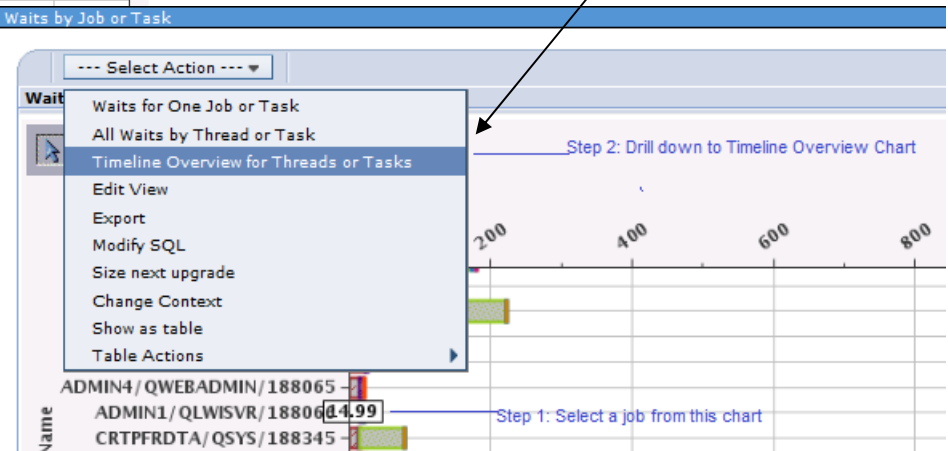
# Timeline Overview for Threads or Tasks



Drilldown to this new chart from existing charts

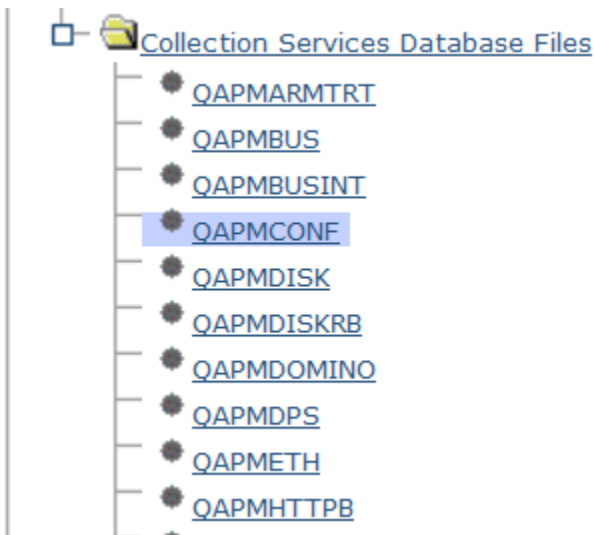
- Waits by Job or Task
- All Waits by Thread or Task

Select one thread or task and drill down to "All Waits for One Thread or Task" or "All Waits by Thread or Task"



# Display Collection Services Database Files .... QAPMCONF

**Navigation:**  
Collection Services → Collection Services Database Files → QAPMCONF



**QAPMCONF**

Perspective Edit View History

Collection	Time	System
Name(s): Q067000002	Start: Mar 8, 2013 12:00:02 AM	Name: ETC3T1
Library: QPFRDATA	End: Ongoing	Release: V7R1M0
Type: Collection Services File Based Collection		
File level: 36		

**QAPMCONF Panel View**

Library Name:	QPFRDATA	Processor Firmware Time:	No
Member Name:	Q067000002	Task Threshold Value (ms):	1,000
Start Time:	Mar 8, 2013 12:00:02 AM	Secondary Thread Thresh (ms):	1,000
Model Number:	61X	Disk Response Time Boundary 1 (us):	15
System Type:	7998	Disk Response Time Boundary 2 (us):	250
Partition Memory (KB):	4194304	Disk Response Time Boundary 3 (us):	1,000
Comm Data Collected:	Y	Disk Response Time Boundary 4 (us):	4,000
Machine Serial Number:	10-065FA	Disk Response Time Boundary 5 (us):	8,000
Response Time Boundary 1 (ms):	1000	Disk Response Time Boundary 6 (us):	16,000
Response Time Boundary 2 (ms):	2000	Disk Response Time Boundary 7 (us):	64,000
Response Time Boundary 3 (ms):	4000	Disk Response Time Boundary 8 (us):	256,000
Response Time Boundary 4 (ms):	8000	Disk Response Time Boundary 9 (us):	500,000
System ASP Capacity (KB):	93,206,752	Disk Response Time Boundary 10 (us):	1,024,000
Checksum Protection On:	N	Hypervisor Memory (MB):	640
Virtual Processors:	2	SMT Hardware Threads:	0
Installed Processors:	4	Time Interval (minutes):	5
Remote Response Boundary 1 (ms):	-	Interactive Limit (%):	100.00
Remote Response Boundary 2 (ms):	-	Time Interval (seconds):	300
Remote Response Boundary 3 (ms):	-	Interactive Threshold (%):	100.00
System ASP Capacity (KB):	93,206,752	Processor Multi-tasking Capability:	System Controlled
Perm 16MB Addr Remaining:	274,848,547,584	Output File System:	ETC3T1
Temp 16MB Addr Remaining:	274,814,995,200	Partition Count:	3
Disk Resp Time Boundary 1 (ms):	1	Processor Folding Support:	No
Disk Resp Time Boundary 2 (ms):	16	Partition ID:	2
Disk Resp Time Boundary 3 (ms):	64	Primary Partition ID:	0
Disk Resp Time Boundary 4 (ms):	256	Processor Units:	0.2
Disk Resp Time Boundary 5 (ms):	1,024	System Version:	7
Collection Data:	Consistent with *SYS	System Release:	1.0
Collect Internal Data:	N	System Name:	ETC3T1
*CSMGTCOL Collection Library:	QPFRDATA	Performance Monitor Select Job:	
*CSMGTCOL Collection Name:	Q067000002	Shared Processor Pool:	Yes
Database Consistency:		Partition Sharing Capped:	Uncapped
Database Limit (% of CPU):	100.0	Variable Processor Speed Capability:	1
		QPFRADJ System Value:	2

# QAPMCONF ... a closer look....

## QAPMCONF Panel View

Library Name: QPFRDATA  
 Member Name: Q258000002  
 Start Time: Sep 15, 2014 12:00:02 AM  
 Model Number: FHB  
 System Type: 9119  
 Partition Memory (KB): 1048576000  
 Comm Data Collected: Y  
 Machine Serial Number: 02-88C55

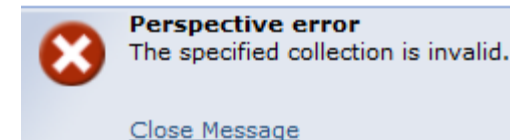
Partition Count: 109  
 Processor Folding Support: Yes  
 Partition ID: 89  
 Primary Partition ID: 0  
 Processor Units: 32.00  
 System Version: 7  
 System Release: 2.0  
 System Name: LP89UT27

Virtual Processors: 32  
 Installed Processors: 128



## Considerations for Viewing Prior Release Performance data

- Performance data from earlier releases can be viewed with the Performance Data Investigator at the latest release
  - **Note:** Not all graphs and charts will be available after conversion due to changes in data content and format
- If prior release data has not been converted, you may get errors when trying to display charts



- Use the Convert Performance Collection (CVTPFRCOL) command
  - Supports Collection Services, Job Watcher, Disk Watcher, and Performance Explorer data
  - Data from 6.1 can be converted and viewed with PDI on 7.1 or 7.2
  - Data from 7.1 can be converted and viewed with PDI on 7.2



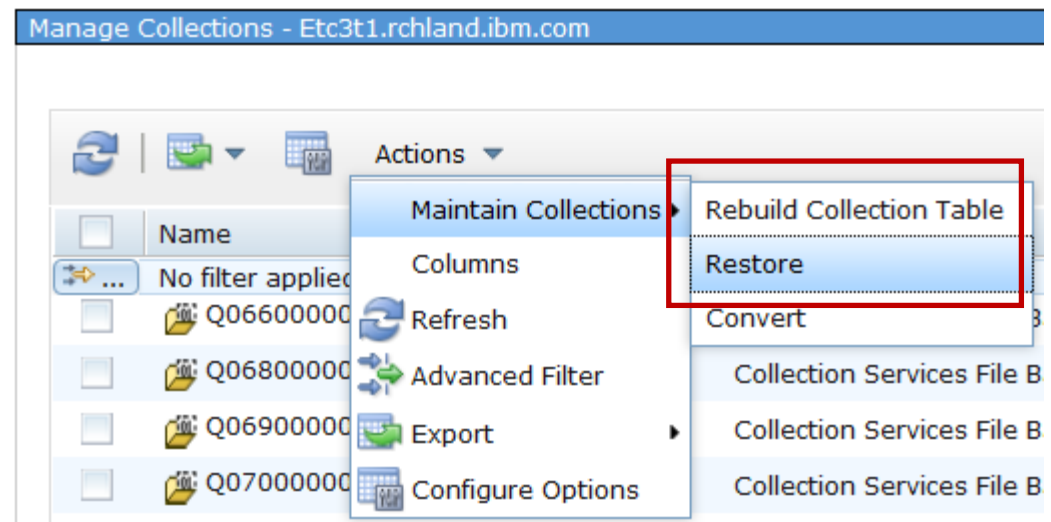
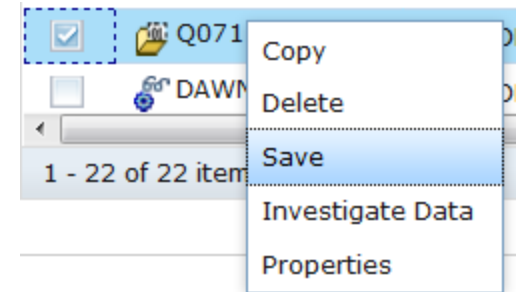
## Considerations for Viewing Prior Release Performance data

- Convert the performance data to the current release format (commands)
  - For Collection Services data
    - The preferred approach is to save the Management Collection object to a save file
      - `SAVOBJ OBJ(MYMGTCOL) LIB(MYLIB) DEV(*SAVF) SAVF(MYLIB/MYSAVF)`
      - FTP the save file to the 7.1 or 7.2 partition
      - Use the Restore Performance Collection command (RSTPFRCOL) to restore the \*CSMGTCOL collection
      - Use the Create Performance Data (CRTPFRDTA) command to get the data into database files
        - » Create Performance Data will create the data at the current release format
      - Note: the library in which the performance data is restored into needs to be at the current release level
    - For Job Watcher, Disk Watcher, or Performance Explorer collections
      - Save the performance data using the Save Performance Collection (SAVPFRCOL) command
      - FTP the save file to the 7.1 or 7.2 partition
      - Use the Restore Performance Collection (RSTPFRCOL) command to restore the data on the 7.1 or 7.2 partition.
      - Use the Convert Performance Collection (CVTPFRCOL) command to convert the prior release database files to the current release.

## Considerations for Viewing Prior Release Performance data

- Convert the performance data to the current release format via the GUI

- The steps are similar to the prior slide:
  - Save the performance collection
  - FTP the save file to the desired partition
  - Restore the collection via the Collection Manager
- Convert the collection to the current release format



# Manage Collections

- The Manager Collections tasks allows you to see and manage all of your performance data from one central location
- Various tasks can be launched from the Manage Collections task, including the Performance Data Investigator

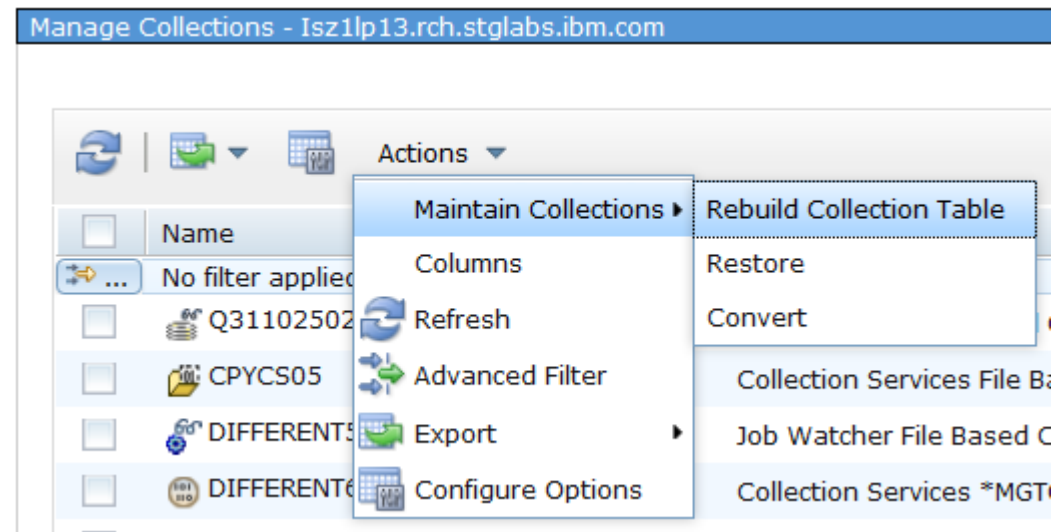
Manage Collections - Isz1p13.rch.stglabs.ibm.com

Name	Library	Type	Status	Started	Ended	Size MB	System	Version	
No filter applied									
Q311025028	ZZTEST	Disk Watcher File Based Collection	Complete	11/6/12 2:50:28 AM	11/6/12 2:51:20 AM	2.766	ISZ1LP13	V7R1M0	
Q311025028	DFLADP	Collection Services File Based Collection	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	1.754	ASWC	V7R1M0	
Q311025028	RAKLIB	Job Watcher File Based Collection	Complete	1/9/13 3:56:07 PM	1/9/13 4:12:10 PM	0.004	ISZ1LP13	V7R1M0	
Q311025028	RAKLIB	Collection Services *MGTCOL Obj Based Cr	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	3.684	ASWC	V7R1M0	
Q311025028	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:00:06 AM	11/1/12 12:03:25 PM	380.464	ISZ1LP13	V7R1M0	
Q311025028	ZZTESTR	Collection Services *MGTCOL Obj Based Cr	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:04 AM	428.644	ISZ1LP13	V7R1M0	
Q307000005	ZZTESTR	Collection Services File Based Collection	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:00 AM	401.808	ISZ1LP13	V7R1M0	
Q254000002	ZZTESTR	Collection Services File Based Collection	Complete	9/10/12 12:00:02 AM	9/10/12 10:20:00 PM	42.375	ISZ1LP13	V7R1M0	
Q306121500	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:15:03 PM	11/2/12 12:00:05 AM	344.484	ISZ1LP13	V7R1M0	
Q309010017	RONRNA1210	Collection Services File Based Collection	Complete	11/4/12 1:00:17 AM	11/4/12 11:01:04 PM	90.836	OCC01XX4	V7R1M0	
Q313000005	DFLTEST1	Collection Services File Based Collection	Complete	11/8/12 12:00:05 AM	11/8/12 2:06:30 PM	506.066	ISZ1LP13	V7R1M0	
NORMAL	QPEXDATA	Performance Explorer *MGTCOL Obj Based	Complete	1/7/13 3:37:10 PM	1/7/13 3:37:21 PM	4.039	ISZ1LP13	V7R1M0	
CSPFR0225	CRSS_MON	Collection Services File Based Collection	Complete	2/25/13 12:01:03 AM	2/26/13 12:00:00 AM	729.32	LDPROD	V6R1M0	
Q078110401	QPFRRDATA	Collection Services File Based Collection	Complete	3/19/13 11:04:04 AM	3/20/13 12:00:04 AM	76.016	ISZ1LP13	V7R1M0	
IBMPEX0002	DFLBUGNN1	Performance Explorer File Based Collection	Complete	12/12/12 8:09:41 PM	12/12/12 9:10:28 PM	2,459.21	FOHC2E	V7R1M0	
P122	QPEXDATA	Performance Explorer File Based Collection	Complete	1/6/13 3:00:02 PM	1/6/13 3:01:04 PM	0.061	ISZ1LP13	V7R1M0	

1 - 100 of 312 items      5 | 10 | 25 | 50 | 100 | All

## Manage Collections

- If you restore performance data without using the Restore Performance Collection interface, collections may not display in the Manage Collections view.
- The “Rebuild Collection Table” option will rebuild the meta-data used for the Manage Collections task and then your performance data should be visible.



# Performance Data - Analysis

## Performance Diagnostics with the Performance Data Investigator

## Analyzing Performance Data Using PDI

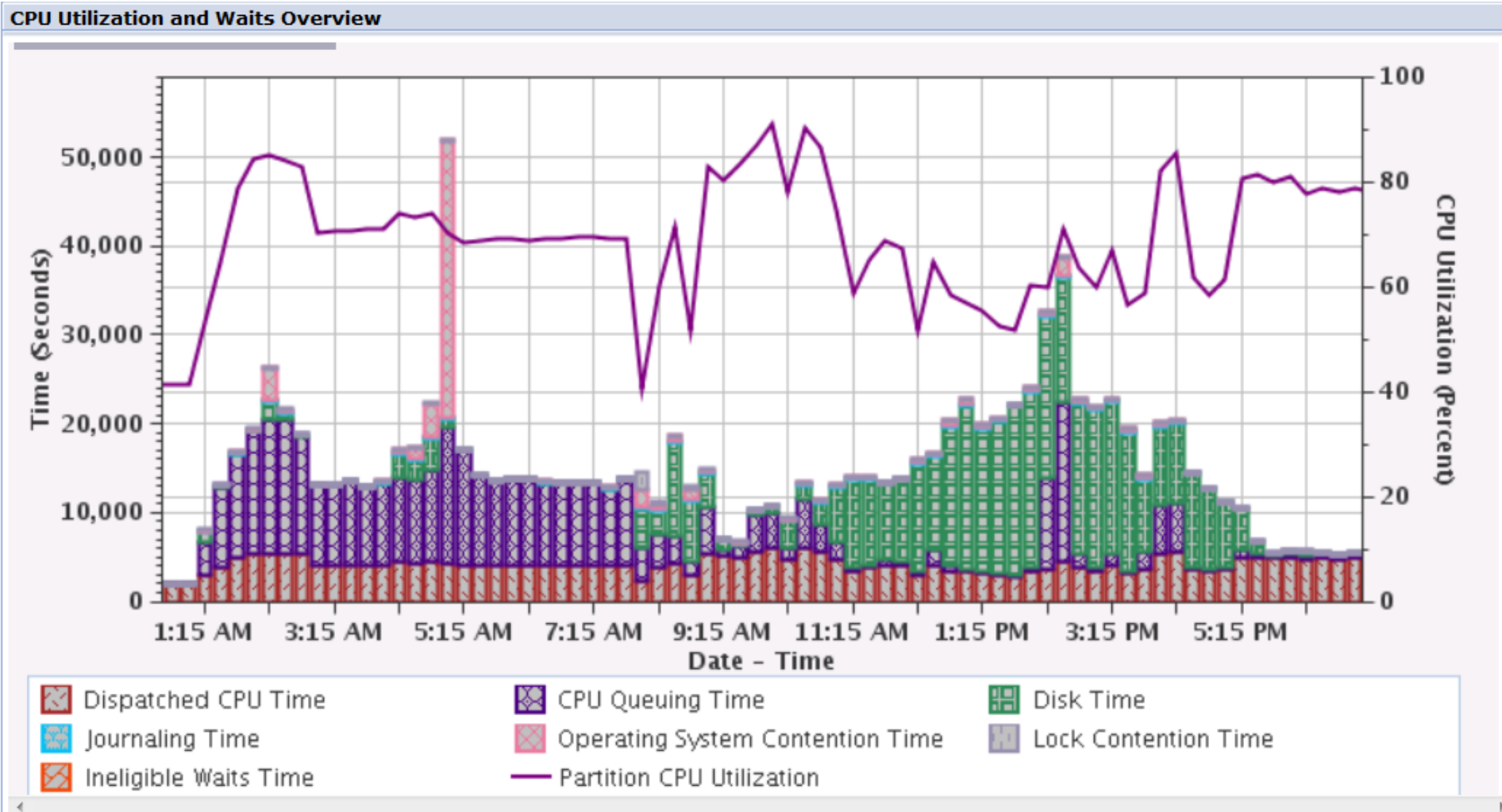
- Now that you know all that PDI can do....
  - How do you really use it to analyze performance data?
  - There are no specific steps – it all depends upon what you see in the performance data
  - If you look at your performance data on a regular basis, you will learn your “normal” pattern which makes it easier to identify something unusual
  - Experience is the best teacher.

## Analyzing Performance Data Using PDI

- Start by asking questions:
  - What was the symptom of the problem?
  - Who reported the problem?
  
  - What time did it occur?
  - How long did it last?
  
  - Have there been any recent changes?
    - New or changed workload?
    - Any application changes?
    - Any recent hardware configuration changes?
  
  - What was the scope?
    - Did it impact the entire system?
    - Did it impact some subset of work?
      - Specific users?
      - Specific applications?

# CPU Utilization and Waits Overview

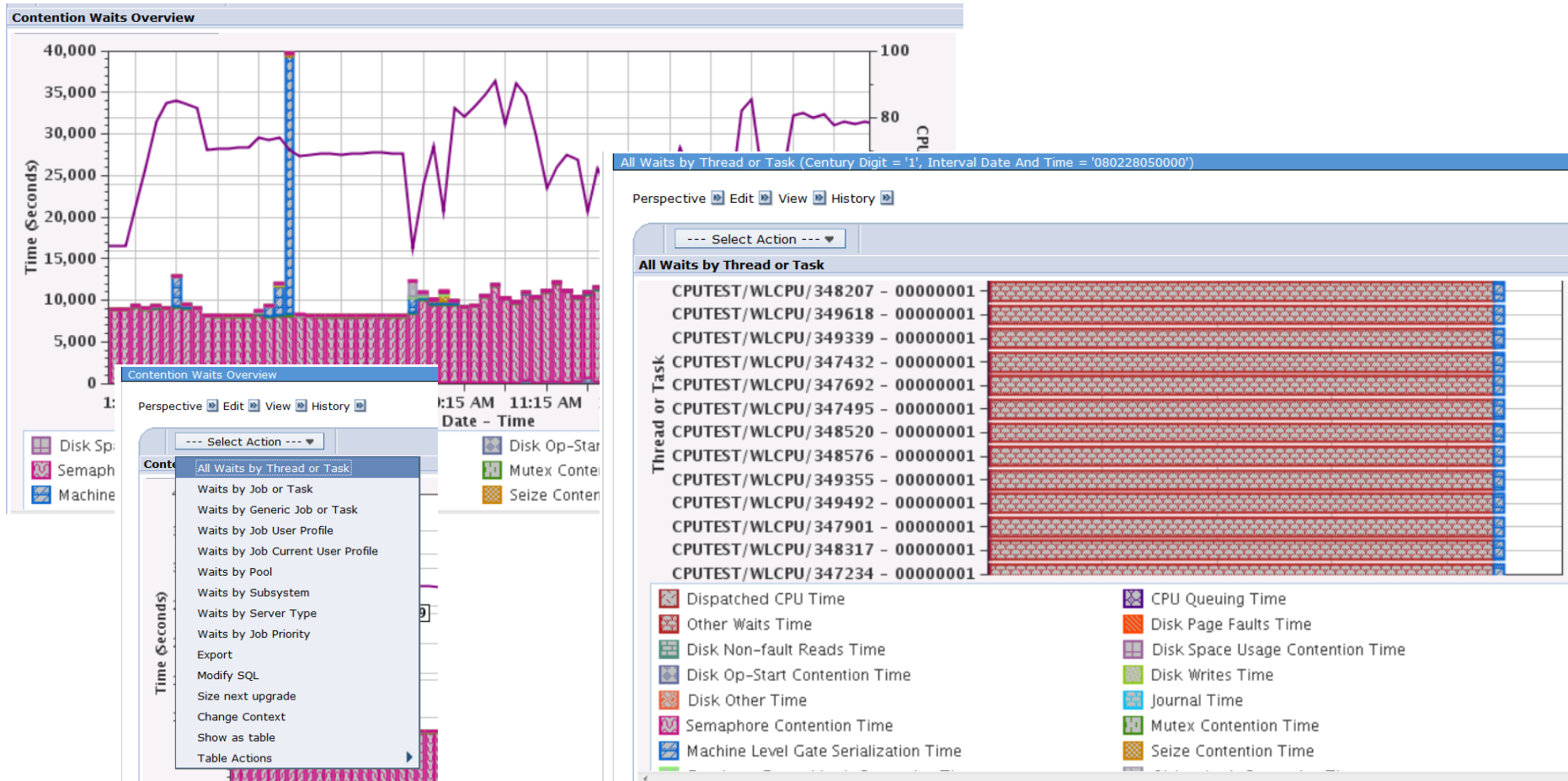
I generally start with CPU Utilization and Waits Overview and look for *interesting* points  
 Next steps will depend upon the answer to the prior questions, along with what you see.





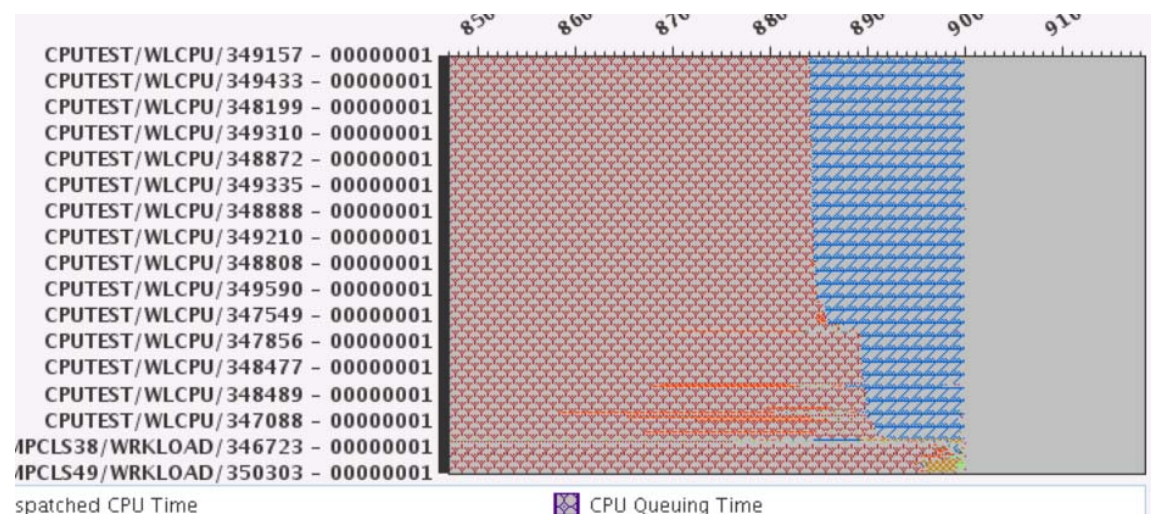
# Using PDI, you can learn how to navigate through your data

Collection Services data may not be able to resolve your problem, but it may very well help to identify areas where more detailed analysis is needed.



## Drill-down based upon what you see

- While no one job was causing the spike in contention, we can find out many jobs were affected during that interval.
- This is an example where Collection Services can show us something is going on, but Job Watcher data is necessary to identify the root cause.



# Some questions and examples

# What has the performance adjuster been doing to my pools?

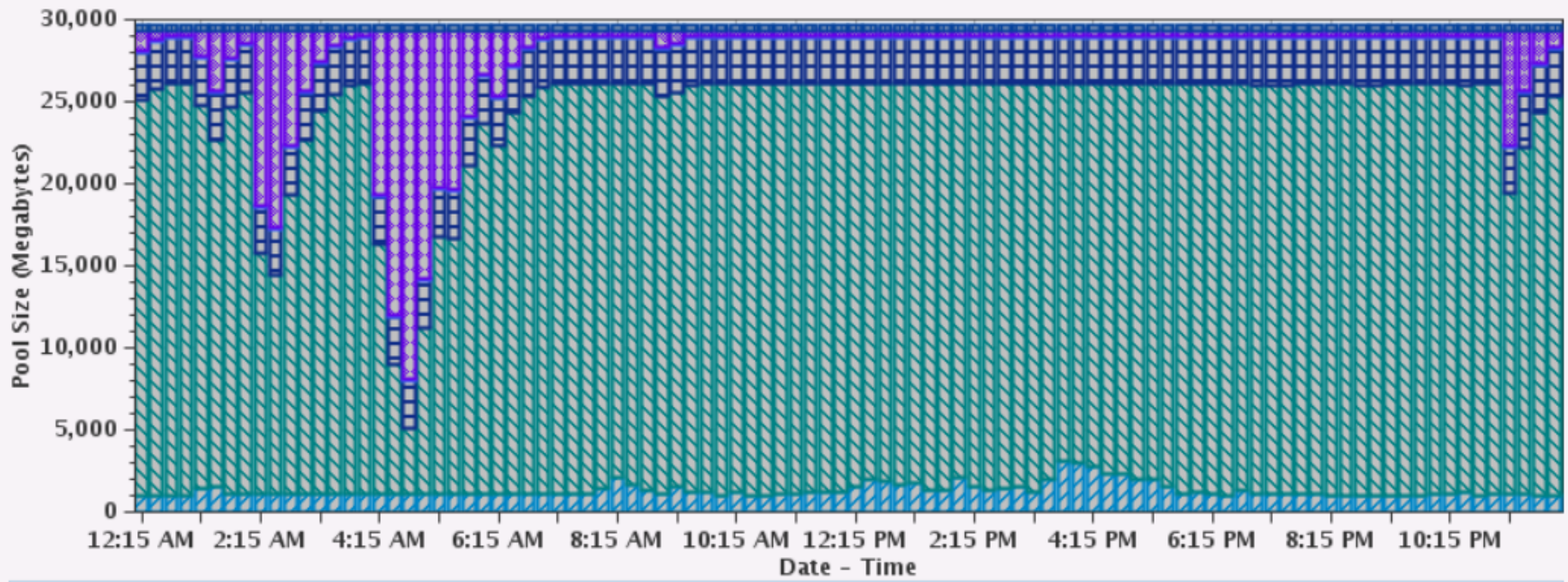
- Collection Services allows you to look *backward in time*



QPFRAJ System Value:

2

Memory Pool Sizes (All Pools)

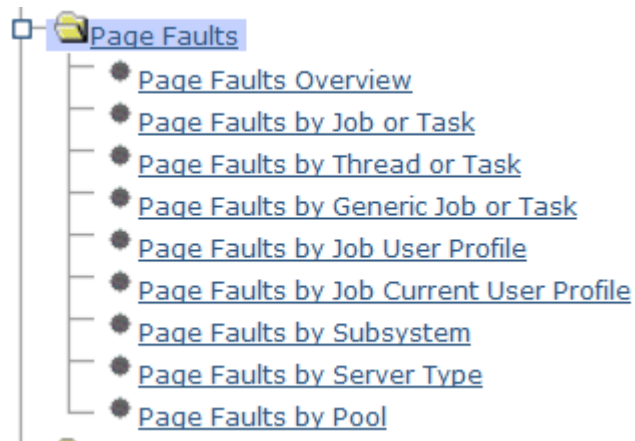






## Who was the guilty party in that faulting??

- You can drill down into job statistics from the prior charts
- Or you can start directly with page faulting perspectives

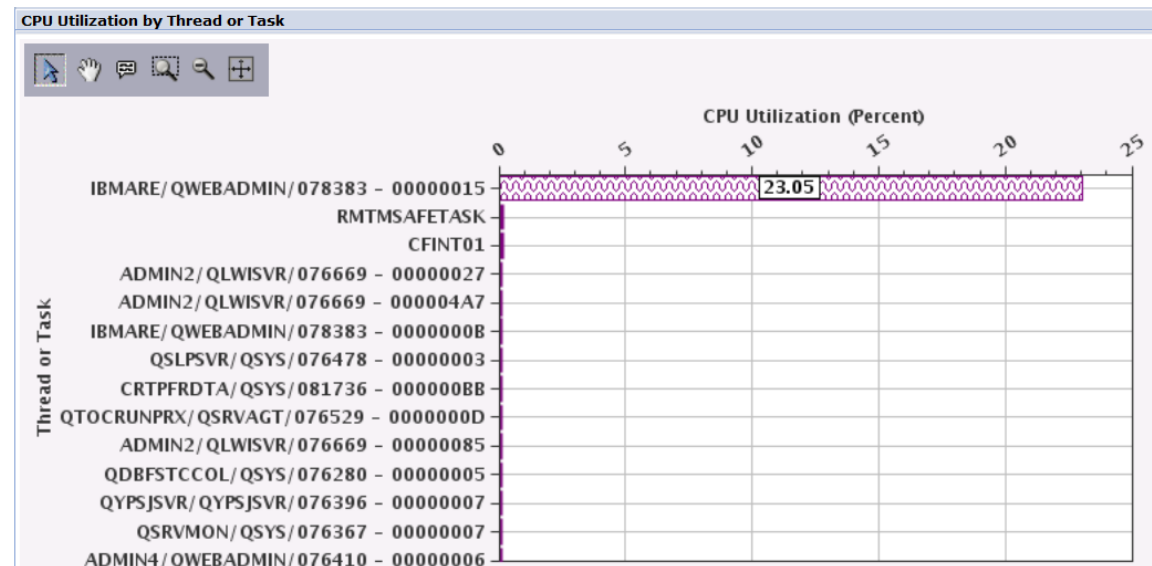


## I had a System Slowdown at 4:00 PM yesterday. Why?

- Common places to start:
  - Health Indicators
  - CPU Utilization and Waits Overview
  - Timeline overview for Threads and Tasks

# I had a System Slowdown at 4:00 PM yesterday. Why?

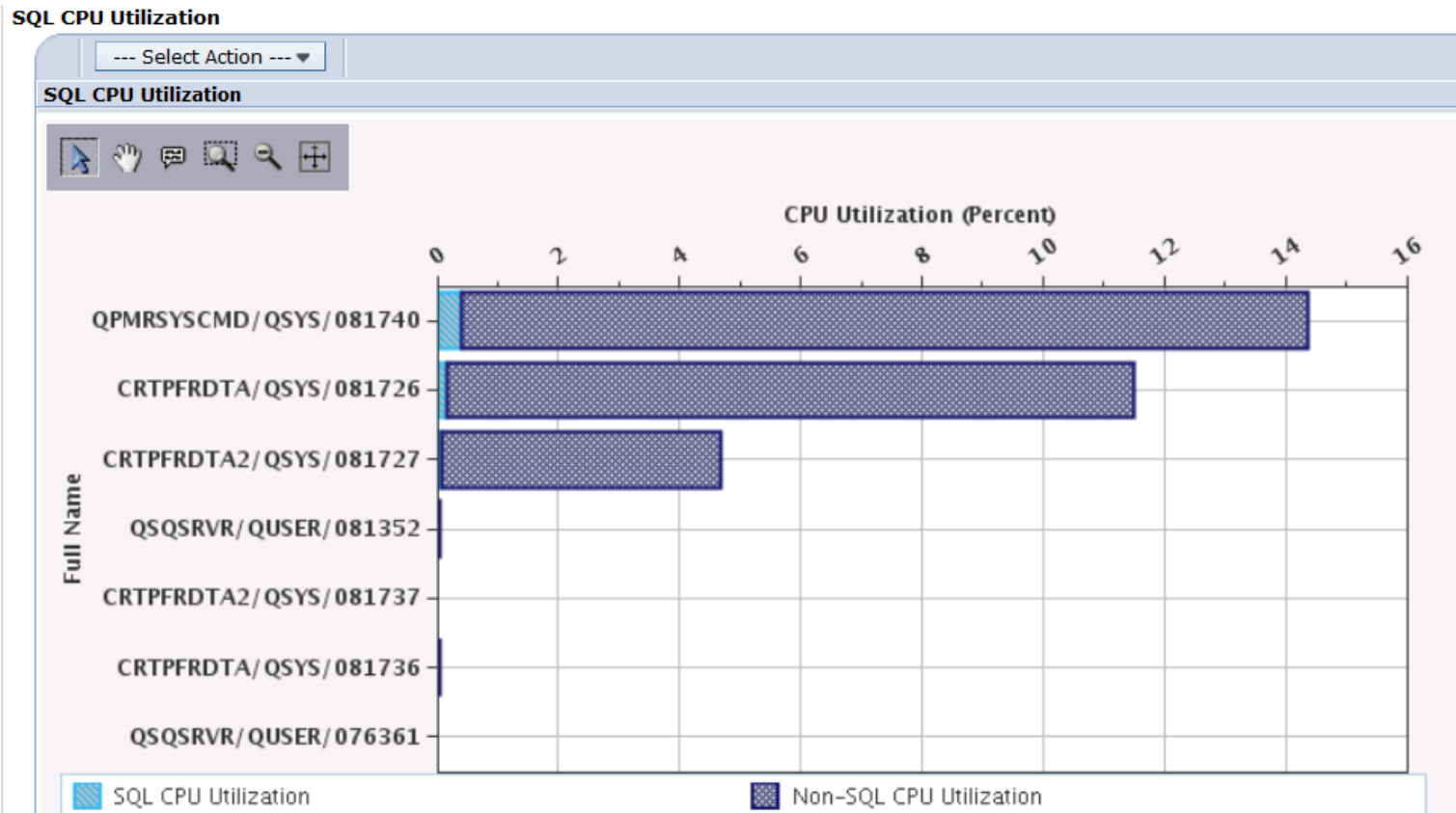
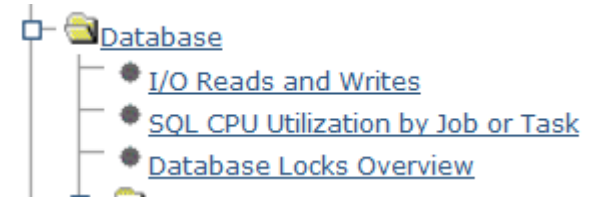
- Start with a system-wide view –
  - CPU Utilization and waits overview
- Select the starting and ending times
- Drill-down into the desired metric
  - CPU Utilization by Thread or Task
- Does one particular job stand out?





# Was my CPU usage related to SQL?

## SQL CPU Utilization by Job or Task



---

# End of questions and examples

## IBM i developerWorks

- IBM i developerWorks is the web site to go to find out about
  - Latest function delivered via Technology Refreshes
  - Enhancements delivered via PTFs
- <http://www.ibm.com/developerworks/ibmi/>



## PDI Enhancements via PTFs



1. IBM i developerWorks

<http://www.ibm.com/developerworks/ibmi/>

2. Technology Updates

<https://www.ibm.com/developerworks/ibmi/techupdates>

IBM i Technology Updates



3. Performance Tools

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/Performance%20Tools>

4. Performance on the Web

<https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/Performance%20on%20the%20web>

You will find a list of enhancements by timeframe with links to the details.

## IBM i Technology Updates



- [Backup Recovery and Media Services \(BRMS\)](#)
- [Collaboration and Social for i \(Lotus\)](#)
- [DB2 for i \(Database\)](#)
- [General IBM i operating system](#)
- [Hardware and Firmware \(including Technology Refresh content\)](#)
- [IBM i Access Client Solutions](#)
- [IBM Integrated Web Services for i](#)
- [Integration with BladeCenter and System x](#)
- [Java on IBM i](#)
- [Navigator](#)
- [Performance Tools](#)**
- [PowerHA SystemMirror for i](#)
- [Systems Director for i](#)
- [Web Integration on i](#)

### Performance Tools

Updated February 6, 2013 by ShaunaRollings | Tags: performance\_tools

Page Actions ▾

This section contains information about the most recent enhancements to IBM i Performance Tools. This topic includes Performance data collection tools, the performance components of IBM Systems Director Navigator for i and the Performance Tools LPP (Licensed program 57xxPT1).

#### Performance Data Collectors

Collection Services, Disk Watcher, Job Watcher and Performance Explorer are the primary performance data collection tools supported on IBM i. Other performance related tools include: Work with System Activity (WRKSYSACT), Dump Main V and Analyze Command Performance (ANZCMDPRF).

#### Performance on the Web

The Performance components of IBM Navigator for i include the **Investigate Data** task which is used to **Investigator (PDI)** and the **Manage Collections** task used to manage performance collections. Other web-based GUI interface for Collection Services, Job Watcher and Disk Watcher.

#### Performance Tools LPP (57xxPT1)

Performance Tools is a licensed program product that contains additional performance tools. The most Tools Reports. More information on this licensed program is contained in the [IBM i information center - i](#)

#### Additional IBM i Performance Tools Resources

### Performance on the web

Updated December 6, 2013 by mmilvin | Tags: collection\_manager, pdi, performance\_data\_investigator

Page Actions ▾

#### Performance Tools GUI:

The performance components in **IBM Navigator for i** include **Performance Data Investigator (PDI)**, **Performance Collection Manager** and web-based GUI interfaces for Collection Services, Job Watcher and Disk Watcher.

#### Getting Started:

The main page for Performance Tools and this sub-page "Performance on the web" provide enhancement information.

The [Resources](#) sub-page contains a significant resource list. A good place to start for learning PDI is to document titled "Getting started with the Performance Data Investigator".

#### PTFs:

PTFs for these functions are part of the set of PTFs for IBM Navigator for i. They are listed in the table below, grouped by date of release. Check against the PTFs listed for [IBM Navigator for i](#).

Performance Task Enhancements	Release Date	7.1 PTFs - 5770SS1	6.1 PTFs	PTF Description	Notes
<a href="#">Fall 2013</a>	Nov 2013	SF99368 level 24 or higher (includes but not limited to: <ul style="list-style-type: none"> <li>• SI50752</li> <li>• SI50753</li> <li>• N/A )</li> </ul>	SF99115 level 35 (includes but not limited to: <ul style="list-style-type: none"> <li>• SI50848</li> <li>• SI50847</li> <li>• SI50846 )</li> </ul>	HTTP Group PTF (includes but not limited to: <ul style="list-style-type: none"> <li>• Common PTF</li> <li>• Navigator for i</li> <li>• IBM i Navigator tasks on the Web PTF )</li> </ul>	The Navigator for i PTFs are shipped in the HTTP group, and it is recommended that you keep current on this PTF group.



**i**thankyou

[www.ibm.com/power/i](http://www.ibm.com/power/i)

---

# References

# iDoctor versus Performance Data Investigator

There are two graphical interfaces for performance data analysis...which should you use?


Feature	iDoctor	PDI
Interface	Windows client	Browser
Wait Analysis	Yes	Yes
Collection Services	Yes	Yes
Job Watcher	Yes	Yes
Disk Watcher	Yes	Yes
Performance Explorer	Yes	Profile collections only
Database	Yes	Yes
Job Watcher Monitors	Yes	No
Customizable	Yes	Yes
User Defined graphs and queries	Yes	Yes
Update Frequency	Monthly Experimental features	Twice Yearly
Support	Defect only	Standard SWMA
Chargeable	Yearly license	<ul style="list-style-type: none"> <li>•Collection Services at no additional charge with i</li> <li>•Disk Watcher, Database, and Performance Explorer included with base PT1 product</li> <li>•Job Watcher is an additional option of PT1 and has an additional charge</li> </ul>
Experimental Features	Yes (e.g., VIOS Investigator)	No
Multinational language support	No	Yes



- developerWorks - <http://www.ibm.com/developerworks/ibmi/>

- Performance Tools

- [Additional performance tools resources](#)
- [Performance on the Web](#)
- [Performance Data Collectors](#)



IBM i Technology Updates



- Forum

<https://www.ibm.com/developerworks/forums/forum.jspa?forumID=2751>

- IBM i Performance Data Investigator

<http://www.ibm.com/developerworks/ibmi/library/i-pdi/index.html>

- IBM i Performance Data Investigator – Edit Perspectives

<http://www.ibm.com/developerworks/ibmi/library/i-pdiedit/index.html>

- IBM i Wait Accounting

<http://www.ibm.com/developerworks/ibmi/library/i-ibmi-wait-accounting/>

- How to use the Batch Model performance tool



<https://www.ibm.com/developerworks/ibmi/library/i-how-to-use-the-batch-model-performance-tool/>

## IBM i Performance FAQ – a MUST read!

[http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=WH&infotype=SA&appname=STGE\\_PO\\_PO\\_USEN&htmlfid=POW03102USEN&attachment=POW03102USEN.PDF](http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=WH&infotype=SA&appname=STGE_PO_PO_USEN&htmlfid=POW03102USEN&attachment=POW03102USEN.PDF)



# IBM i on Power - Performance FAQ

*May 29, 2014*

# Performance Management on IBM i Web Site

<http://www-03.ibm.com/systems/power/software/i/management/performance/index.html>

IBM Systems > Power Systems > Software > IBM i > System management >

## Performance management on IBM i

**Overview**   Tools   Performance Explorer   Resources

### Find what you need

#### Performance Data Collectors

There are four collectors on IBM i that collect performance related data and store the information in database files, each having their own unique characteristics: Collection Services, IBM i Job Watcher, IBM i Disk Watcher, and Performance Explorer.

#### Performance Data Investigator (PDI)

Use the Investigate Data task found in the web-based IBM Systems Director Navigator for i to view and analyze the data collected from any of the four data collectors found on IBM i. This powerful tool allows you the ability to work with the data interactively in chart or table form.

#### iDoctor for IBM i

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.

#### PM for Power Systems

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

#### Performance and Scalability Services

Plan and prepare for changes in the data center when using the IBM i operating system on Power Systems hardware with help from IBM Systems Lab Services and Training. Whether

A **Red**books 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



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

Hernando Bedoya  
Mark Roy  
Nandoo Neerukonda  
Petri Nuutinen

[ibm.com/redbooks](http://ibm.com/redbooks)

**Redbooks**

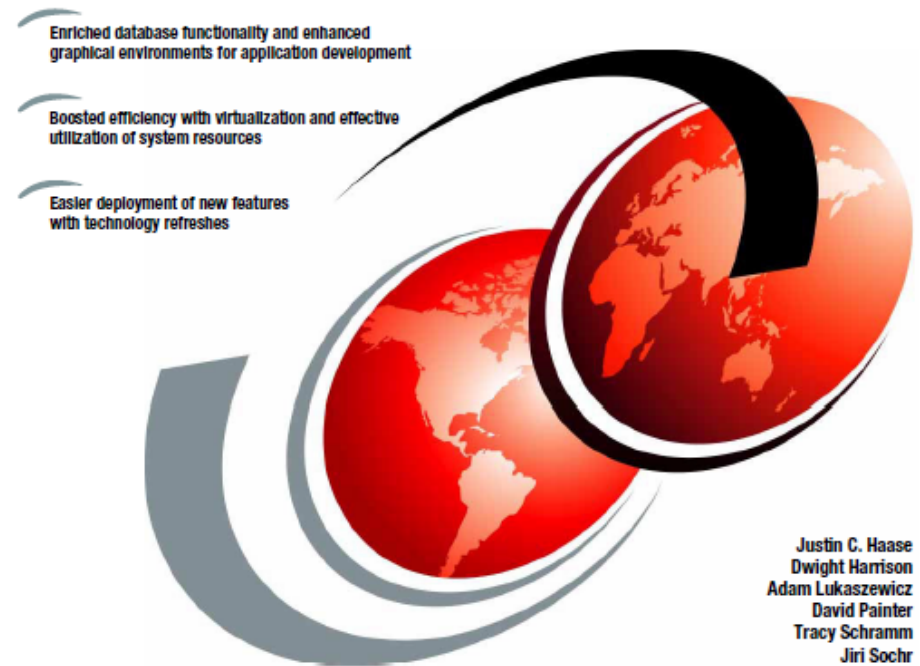
# IBM i 7.1 Technical Overview with Technology Refresh Updates

Covers the 7.1 content through  
Technology Refresh 7

Chapter 6 – Performance Tools

Chapter 17, Section 6 –  
Performance in Navigator for i

# IBM i 7.1 Technical Overview with Technology Refresh Updates



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# IBM i 7.2 Technical Overview .... Coming!

# IBM Systems Lab Services

Leverage the skills and expertise of IBM's technical consultants to implement projects that achieve faster business value

- ✓ Ensure a smooth upgrade
- ✓ Improve your availability
- ✓ Design for efficient virtualization
- ✓ Reduce management complexity
- ✓ Assess your system security
- ✓ Optimize database performance
- ✓ Modernize applications for iPad
- ✓ Deliver customized workshops
- ✓ Leverage training & events

## How to contact us

- email us at [stgls@us.ibm.com](mailto:stgls@us.ibm.com)
- Follow us at [@IBMSLST](https://twitter.com/IBMSLST) 
- Learn more [ibm.com/systems/services/labservices](http://ibm.com/systems/services/labservices)



## IBM i Performance and Optimization Services

The IBM i Performance and Optimization team specializes in resolving a wide variety of performance problems. Our team of experts can help you tune your partition and applications, including:

- Reducing batch processing times

- Resolving SQL query and native IO performance problems

- Tuning RPG, COBOL, C, and Java (including WebSphere Application Server) programs

- Removing bottlenecks, resolving intermittent issues

- Resolving memory leaks, temporary storage growth problems, etc.

- Tuning memory pools, disk subsystems, system values, and LPAR settings for best performance

- Optimizing Solid State Drive (SSD) performance

- Tuning client interfaces such as ODBC, JDBC, .Net and more

Skills transfer and training for performance tools and analysis also available!

**Contact Eric Barsness at [ericbar@us.ibm.com](mailto:ericbar@us.ibm.com) for more details.**

[www.ibm.com/systems/services/labservices](http://www.ibm.com/systems/services/labservices)

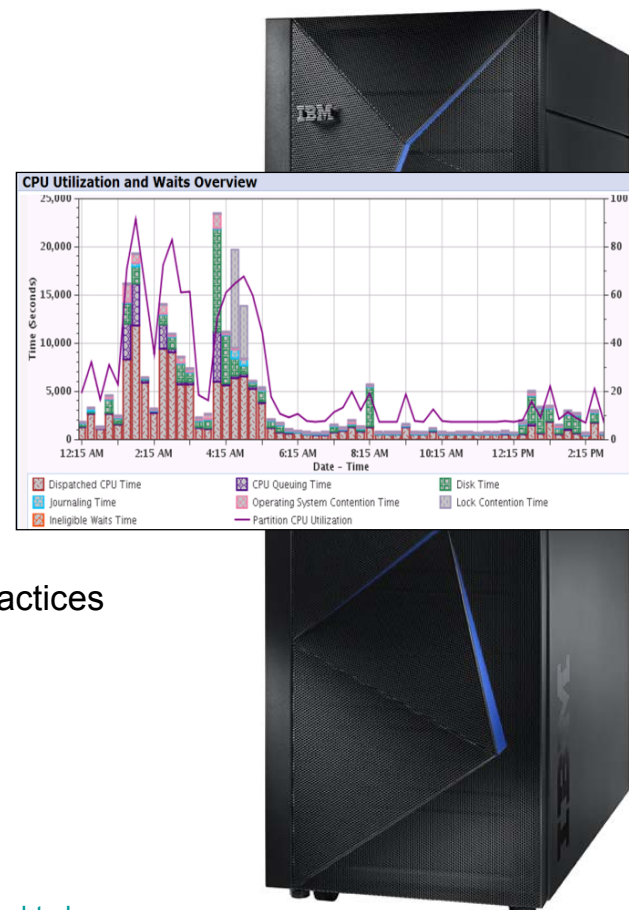


## IBM i Performance Analysis Workshop

Managing and analyzing the data can be quite complex. During this workshop, the IBM Systems Lab Services IBM i team will share useful techniques for analyzing performance data on key IBM i resources, and will cover strategies for solving performance problems. It will aid in building a future foundation of performance methodology you can apply in your environment.

### Overview:

- Topics covered include:
  - Key performance analysis concepts
  - Performance tools
  - Performance data collectors (Job Watcher, Disk Watcher, etc.)
  - Wait accounting
- Core methodology and analysis of:
  - Locks
  - Memory
  - I/O subsystem
  - CPU
- Concept reinforcement through case studies and lab exercises
- May include discussions on theory, problem solving, prevention and best practices



### Workshop details:

- Intermediate IBM i skill level
- 3 day workshop, public or private (on-site)
  - For public workshop availability and enrollment:  
<http://www-03.ibm.com/systems/power/software/i/support/workshops/performance-analysis.html>
  - For additional information regarding private workshops, please contact Mike Gordon, STG Lab Services, at [mgordo@us.ibm.com](mailto:mgordo@us.ibm.com)

## 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 and tune application and database performance
  - 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>

# IBM i Solid State Drive Performance Services

*Evaluate the benefits of SSD technologies with IBM i based applications*

## Features

- Three options to best meet client needs:
  1. Data collection on the client system with analytical services to determine the benefit SSDs will provide. The analysis also identifies which specific objects should be stored on SSDs to optimize benefits.
  2. Remote access to a fixed Power IBM i configuration to load and test client workloads on both SSDs and traditional disk drives (HDDs). Assessment is made of the delta between workload performance on SSDs and HDDs.
  3. Hardware configured to client specifications with client workloads run on a system in the Performance and Scalability Services Center in Rochester, MN. Client has onsite access to state of the art test center. Optimal SSD configuration for current and future workload requirements is determined from analysis of workload runs.

## Typical Benefits

- “Real data” available to assess if SSDs are for you.
- Multiple offerings provide flexibility in the scope and depth of the analysis you choose to perform.
- With the assistance of our Lab Services experts, clients will learn how to optimize the use of SSDs to meet their processing and business requirements.

## Contact

- To initiate these services, submit a request form at url:  
<http://www.ibm.com/systems/services/labservices/psscontact.html>

### Why IBM® Rochester?

- **Deep skills in IBM i implementation and integration**
- **Experience in system, database, and application performance gleaned from hundreds of engagements with clients across most industries**
- **Ability to deliver skills transfer as part of your service engagement**

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[http://ibmsystemsmag.blogs.com/i\\_can/](http://ibmsystemsmag.blogs.com/i_can/)  
[http://ibmsystemsmag.blogs.com/i\\_can/performance/](http://ibmsystemsmag.blogs.com/i_can/performance/)



[http://ibmsystemsmag.blogs.com/i\\_can/2014/04/health-indicators-in-the-performance-data-investigator.html](http://ibmsystemsmag.blogs.com/i_can/2014/04/health-indicators-in-the-performance-data-investigator.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2014/03/ibm-i-storage-allocation-perspectives.html](http://ibmsystemsmag.blogs.com/i_can/2014/03/ibm-i-storage-allocation-perspectives.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2014/03/ibm-i-performance-analysis.html](http://ibmsystemsmag.blogs.com/i_can/2014/03/ibm-i-performance-analysis.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2014/01/ibm-power-virtualization-performance-powervp.html](http://ibmsystemsmag.blogs.com/i_can/2014/01/ibm-power-virtualization-performance-powervp.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2013/11/view-memory-pools-and-faulting-with-the-performance-data-investigator.html](http://ibmsystemsmag.blogs.com/i_can/2013/11/view-memory-pools-and-faulting-with-the-performance-data-investigator.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2013/09/ibm-i-wait-accounting.html](http://ibmsystemsmag.blogs.com/i_can/2013/09/ibm-i-wait-accounting.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2013/07/viewing-job-level-sql-metrics-with-the-performance-data-investigator.html](http://ibmsystemsmag.blogs.com/i_can/2013/07/viewing-job-level-sql-metrics-with-the-performance-data-investigator.html)  
[http://ibmsystemsmag.blogs.com/i\\_can/2013/07/anticipating-the-future.html](http://ibmsystemsmag.blogs.com/i_can/2013/07/anticipating-the-future.html)  
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IBM i Information Center \*\*\* Start using the Knowledge Center instead \*\*\*

<http://publib.boulder.ibm.com/series/>

– Systems Management → Performance



IBM Knowledge Center

– [http://www-01.ibm.com/support/knowledgecenter/ssw\\_ibm\\_i\\_71/welcome.html](http://www-01.ibm.com/support/knowledgecenter/ssw_ibm_i_71/welcome.html)

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IBM i Performance Management

This web site has a lot of GREAT references and papers – see the resources tab

<http://www-03.ibm.com/systems/power/software/i/management/performance/index.html>

Performance Capabilities Reference

[http://www-03.ibm.com/systems/resources/systems\\_power\\_software\\_i\\_perfmgmt\\_pcm\\_jun2014.pdf](http://www-03.ibm.com/systems/resources/systems_power_software_i_perfmgmt_pcm_jun2014.pdf)

- Performance Management for Power Systems

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

- IBM Workload Estimator

<http://www.ibm.com/systems/support/tools/estimator>

- iDoctor

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- Job Waits Whitepaper

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- IBM eServer iSeries Performance Management Tools  
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- Managing OS/400 with Operations Navigator V5R1 Volume 5: Performance Management  
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- IBM iDoctor iSeries Job Watcher: Advanced Performance Tool (this is a bit outdated)  
<http://www.redbooks.ibm.com/abstracts/sg246474.html?Open>
- Best Practices for Managing IBM i Jobs and Output (and a few other special tips)  
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- IBM Tivoli Monitoring Agent for IBM i  
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