Power Systems

IBM

Introduction to the IBM i Performance Data Investigator

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Session: 540180
Agenda Key: 23CV

i for Business

Introduction to the IBM i Performance Data Investigator

Session Abstract

IBM Navigator for i has 'Performance' tasks that include many traditional i performance capabilities. It also has the ability to manage your performance data collections. The most exciting feature is the 'Investigate Data' task, which provides the ability to graphically view your i performance data through a browser interface; Collection Services, Disk Watcher, Job Watcher, and Performance Explorer data can all be 'investigated' through this interface.

This session will go through all the capabilities of the Performance Data Investigator, including an overview of many exciting enhancements that have been been added in the 7.2 and 7.3 releases. You will learn how to look at your performance data through the Performance Data Investigator, discover various IBM-supplied views of your performance data, and how you can use the Performance Data Investigator for performance reporting.
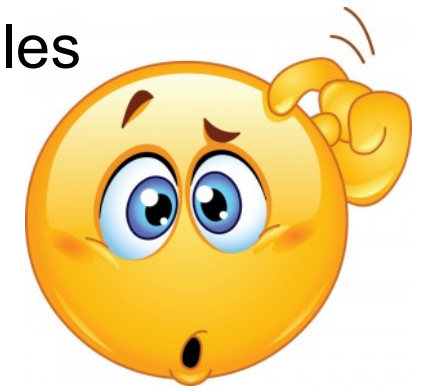
Why PDI?

- IBM i does a fantastic job of collecting **a lot** of useful performance metrics.

  - *A lot…* *A LOT…* A LOT!

Why PDI?

- You could write your own SQL over the database files produced to get the data you need…..

- Or…..you could let PDI do the hard work for you…..

```
SELECT
    QSY.INTNUM,
    QSY.CSDTETIM AS CSDTETIM,
    MAX(PCTSYSCPU) AS PCTSYSCPU,
    SUM(TIME01) * .000001 AS WBSEC01,
    SUM(TIME02) * .000001 AS WBSEC02,
    SUM(TIME05 + TIME06 + TIME07 + TIME08 + TIME09 + TIME10) * .000001 AS WB050607080910,
    SUM(TIME11) * .000001 AS WBSEC11,
    SUM(TIME14 + TIME15 + TIME19 + TIME32) * .000001 AS WB14151932,
    SUM(TIME16 + TIME17) * .000001 AS WB1617,
    SUM(TIME18) * .000001 AS WBSEC18,
    100 AS PCT100,
    DTETIM AS DTETIM,
    DTECEN AS DTECEN
FROM
    (
        SELECT
            DTECEN || DTETIM AS CSDTETIM,
            DOUBLE(JWTM01) AS TIME01,
            DOUBLE(JWTM02) AS TIME02
```
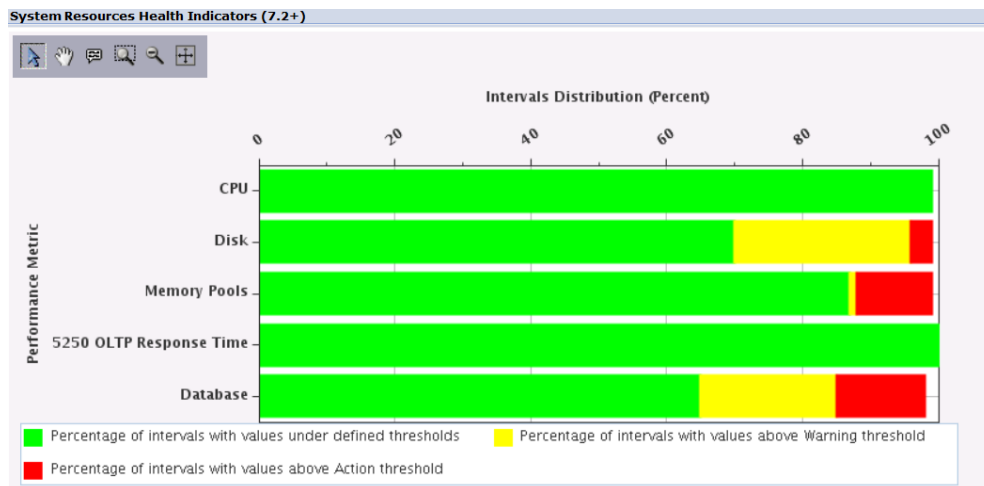
Why PDI?

- You could pour through raw performance data reports to spot problem areas…….


```
                                                       Int
O                                                      Feat    --High--   Pool Fault      Excp
p                          -Transaction-  -CPU Util--  Util    Dsk Unit   Mch  Usr ID     Util
t   Date    Time           Count    Rsp   Tot Int Bch
_   07/31   05:15          2595     .06    8   3   5    2       3  0022     4   59  02        0
_   07/31   05:30          2925     .04    4   1   3    1       1  0022     5    9  04        0
_   07/31   05:45          2447     .05    4   1   3    1       1  0022     4   11  04        0
_   07/31   06:00          2173     .06    8   1   7    1       2  0004     6   18  02        0
_   07/31   06:15          2551     .06   14   1  13    1       4  0004     4   75  02        0
_   07/31   06:30          2529     .05    6   1   5    1       1  0022     6    7  04        0
_   07/31   06:45          3558     .05   13   5   8    3       2  0021    10   10  02        0
_   07/31   07:00          2968     .06    8   3   5    3       1  0003     3   15  04        0
_   07/31   07:15          4341     .11   36   4  32    3       4  0020     4   60  02        0
_   07/31   07:30          3378     .07   70   7  63    4       4  0022     3   23  02        0
                                                                                        More...
```
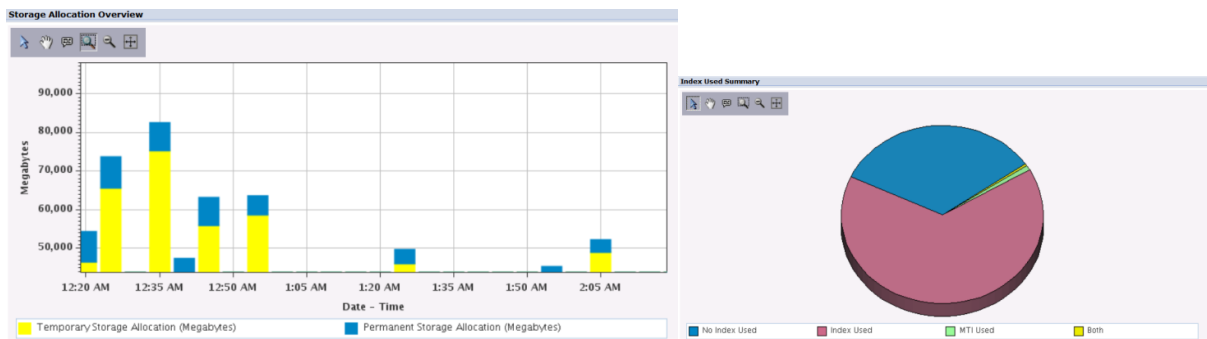
- Or…..you could let PDI give you clues…….

Why PDI?

- You could busy yourself figuring out complex data, putting it in spreadsheets, creating your own charts, producing reports, etc…(not to mention keeping up with new metrics!)

- Or, you could simplify…..and let PDI do all the hard work…...

Why PDI?

- You could simply choose to ignore performance data…..

- Or, you could become a superstar and use PDI to proactively monitor your system to ward off potential issues before they impact productivity…...

Why PDI?

- Integrated and free!

- Easy to use

- Simplifies analysis

i PDI, do you?

Let's get started using PDI……..

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
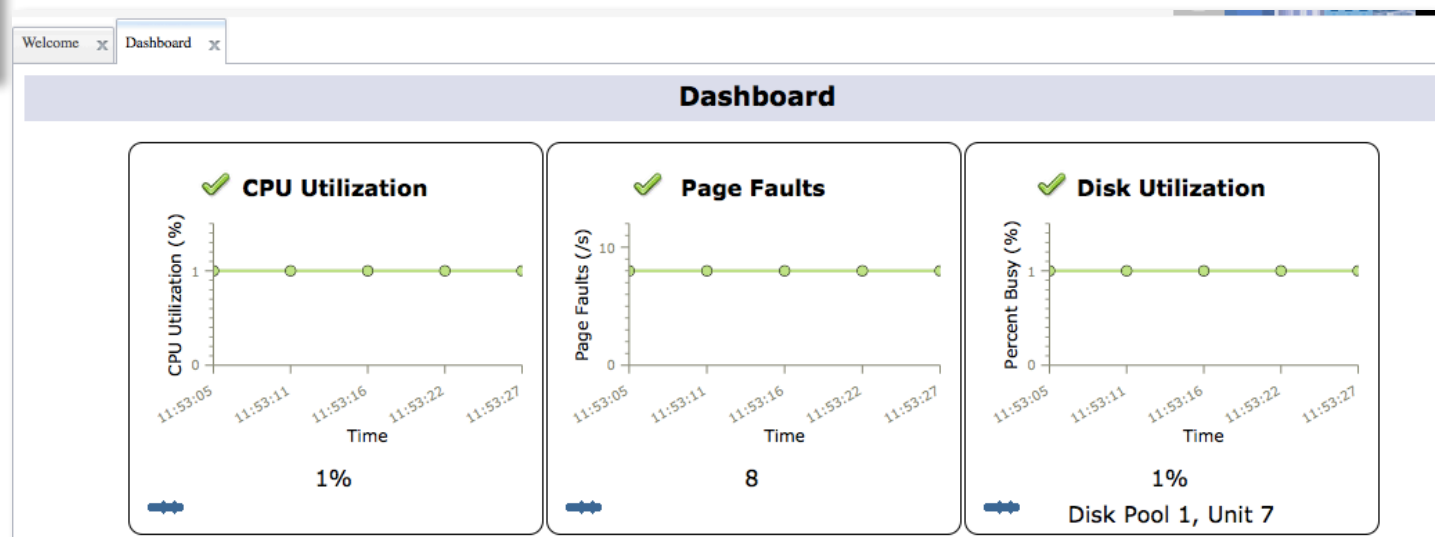
Updates to the Performance Data Investigator - PTFs

- Major enhancements have been made to **Navigator for i** and the **Performance Data Investigator**

  - IBM i **7.3**!
    - o HTTP Server group PTF SF99722
    - o Java group PTF SF99725
    - o Database group PTF SF99703
    - o Performance Tools group PTF SF99723

  - For **7.2** - install the latest level of:
    - o HTTP Server group PTF SF99713
    - o Java group PTF SF99716
    - o Database group PTF SF99702
    - o Performance Tools group PTF SF99714

  - For **7.1** - install the latest level of:
    - o HTTP Server group PTF SF99368
    - o Java group PTF SF99572
    - o Database group PTF SF99701
    - o Performance Tools group PTF SF99145

Navigator Enhancements become single source and many functions are supported on all releases

Java 64-bit Requirement

- Admin2 server was updated to use JDK 64bit in the December 2015 DG1 group (HTTP server for i)

- Java SE 6 or 7 64-bit must be installed in order for Admin2 server to function properly

- Product install requirements:
  https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/IBM%20i%20Technology%20Updates/page/Product%20Install%20Requirements

Unsupported Web Browser

IBM Navigator for i supports the latest version of Mozilla Firefox, Google Chrome, Apple Safari, and Microsoft Edge. We recommend that you update to the most current versions.

- Mozilla Firefox 20 or newer (recommended)
- Google Chrome 25 or higher
- Apple Safari 9 or higher

You may continue and use your unsupported Web browser, but it is not recommended.

☐ Do not show this message again   [OK]

Browser Support

- IBM Navigator for i supports the latest versions of the following browsers:

  – Mozilla Firefox

  – Google Chrome 25 or higher

    o Google Chrome Certificate Authority instructions for Google Chrome releases 44 and later with the 2015 IBM Navigator for i PTFs.

  – Support for Apple Safari & Microsoft Edge is new

    Recommend most current versions

- Browser tips:

  – Unexpected results could be browser related. Example problems are….

    o Hung charts

    o 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%20Technology%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 QHTTPSVR subsystem
- Ensure no bad DNS entries on the system

  - http://www-01.ibm.com/support/docview.wss?uid=nas8N1012842
- 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

- Use the Web Performance Advisor to validate your Web Performance

  - http://pic.dhe.ibm.com/infocenter/iseries/v7r1m0/topic/rzaie/rzaieconwebperfadvisor.htm

Performance Tasks

- "Performance" is a major function in Navigator

  – Investigate Data

  – Manage Collections

  – And much more!

☐ Performance
  ⊞ Investigate Data
  ⊞ Manage Collections
    ▪ Configure Collection Services
  ⊞ Graph History
  ☐ All Tasks
    ▪ Active Jobs
    ▪ Disk Status
    ▪ Investigate Data Search
    ▪ Investigate Data
    ▪ Manage Collections
    ▪ Performance Management for Power Systems
    ▪ System Status
  ⊞ Collections
  ⊞ Performance Data Reports
  ☐ Collectors
    ⊞ Disk Watcher
    ⊞ Job Watcher
    ⊞ Collection Services
  ⊞ Graph History
  ⊞ Sizing
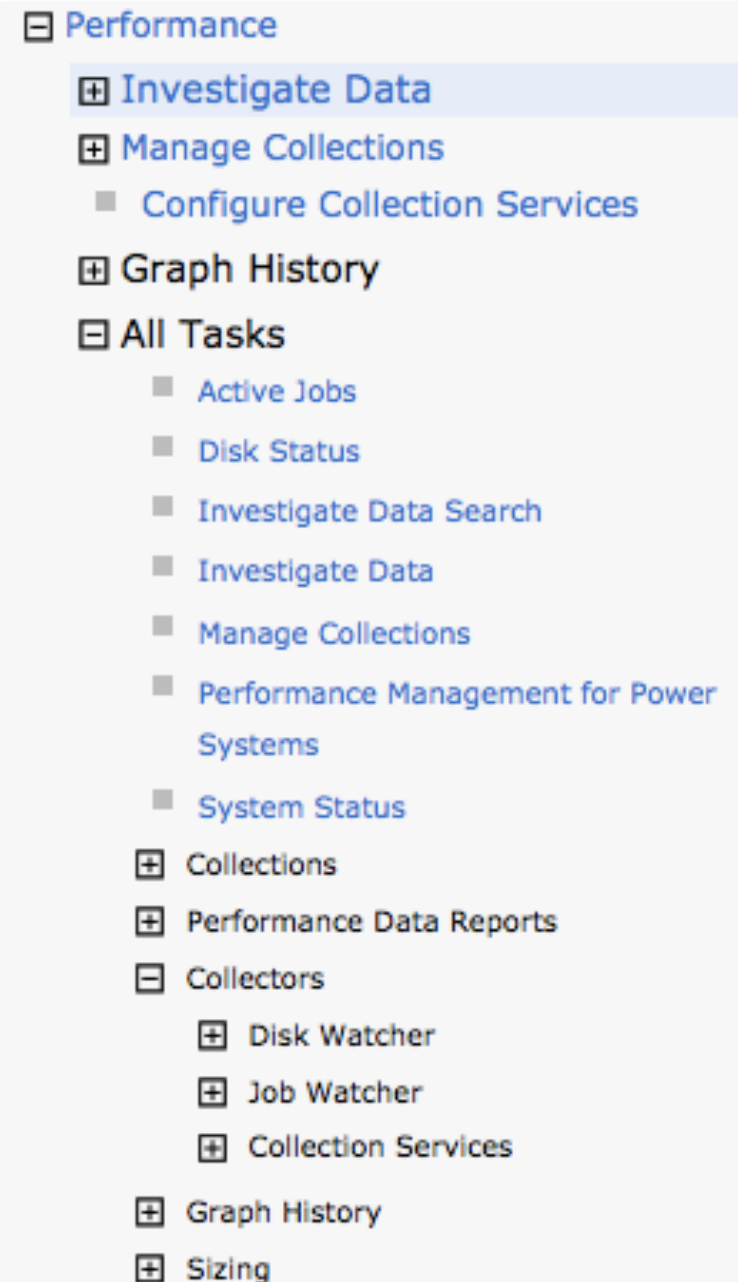
Packaging: Performance Tools Licensed Program Product
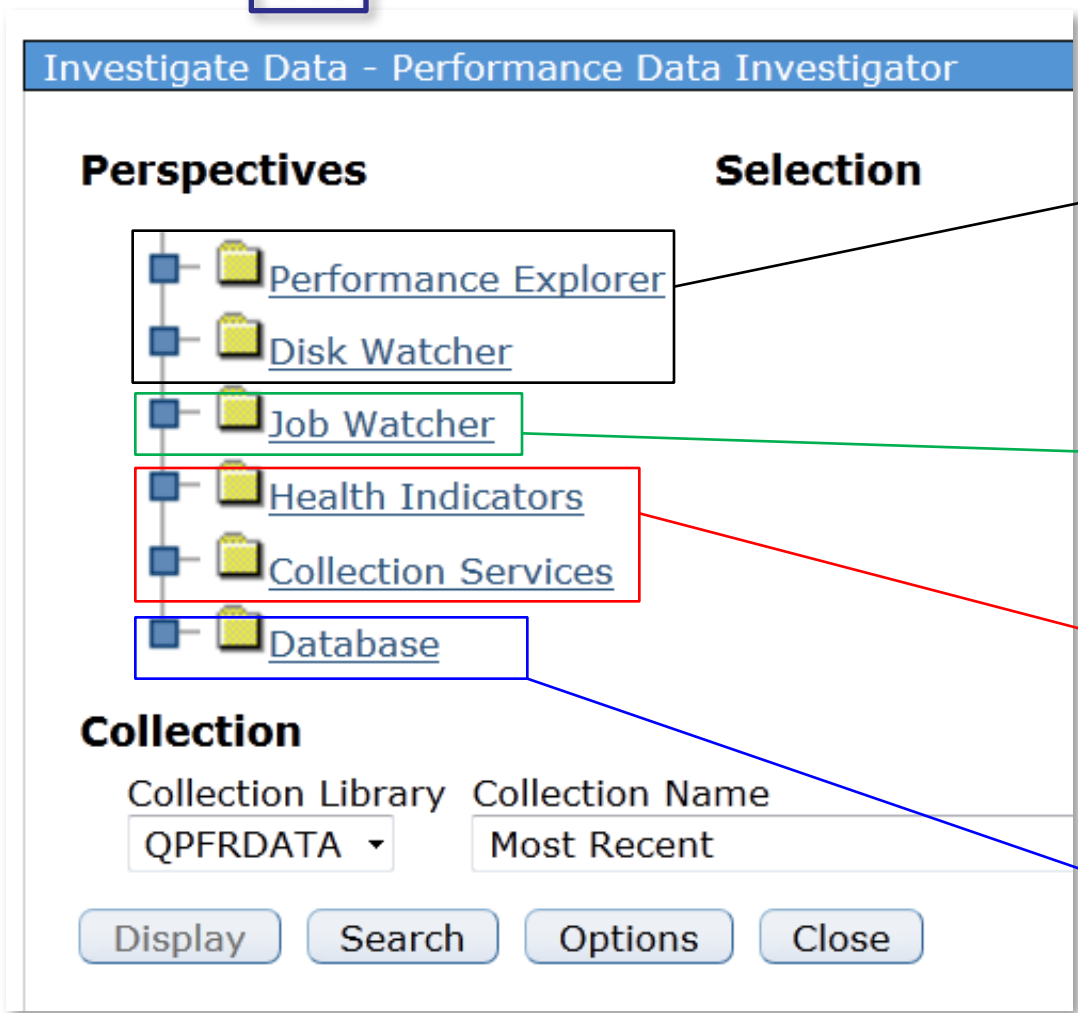
- IBM i for Collection Services, Health Indicators, Monitors 7.2 and Graph History 7.3

- Performance Tools Licensed Program Product
  - 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

7.1

Investigate Data - Performance Data Investigator

Perspectives   **Selection**

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

Collection

Collection Library   Collection Name

QPFRDATA ▾   Most Recent

[Display]   [Search]   [Options]   [Close]

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**

Packaging: Performance Tools Licensed Program Product

7.2 and 7.3
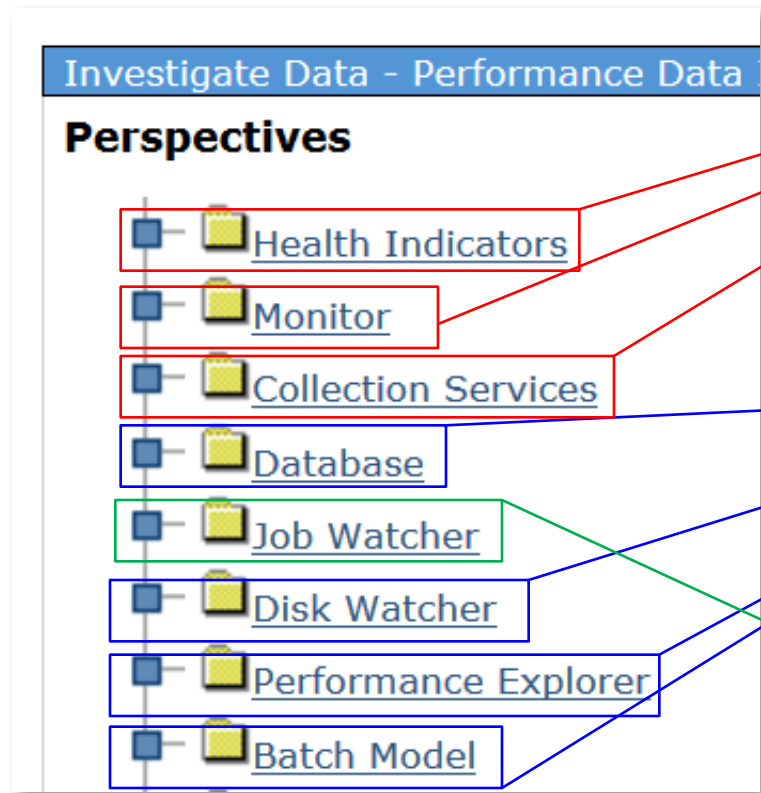
Investigate Data - Performance Data

Perspectives

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

Included with the base operating system

IBM Performance Tools – Manager feature

IBM Performance Tools – Job Watcher feature

Prerequisites: Authorizing Users to PDI

- Users need to be authorized to use the **Investigate Data** and **Manage Collections** performance tasks

- Include users on the **QPMCCDATA** and **QPMCCFCN** authorization lists
  - *Can be done via GUI or green screen*
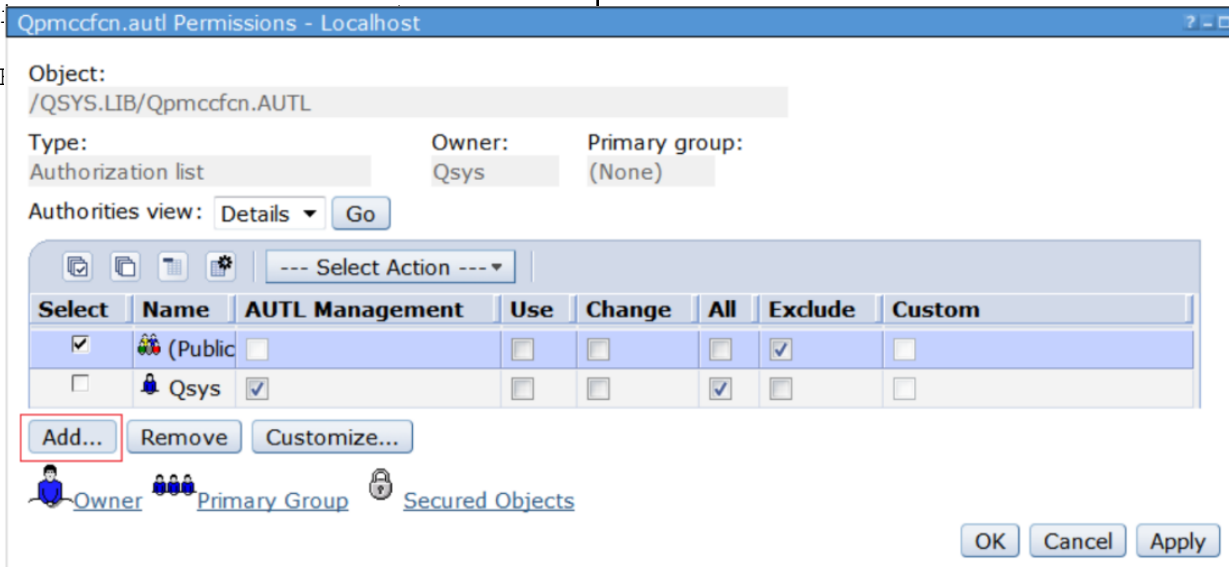
```
                    Edit Authorization List

Object . . . . . . . :    QPMCCDATA        Owner  . . . . . . . . :    QSYS
  Library . . . . . :      QSYS            Pr

Type changes to current authorities, press

                Object      List
User            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
```

Qpmccfcn.autl Permissions - Localhost   ? - □

Object:
/QSYS.LIB/Qpmccfcn.AUTL

Type:		Owner:	Primary group:
Authorization list		Qsys	(None)

Authorities view: Details ▼ Go

--- Select Action --- ▼

Select	Name	AUTL Management	Use	Change	All	Exclude	Custom
☑	(Public	☐	☐	☐	☐	☑	☐
☐	Qsys	☑	☐	☐	☑	☐	☐

Add...   Remove   Customize...

Owner   Primary Group   Secured Objects

OK   Cancel   Apply

Verify Collection Services is Active

- Collection Services is the foundation for many performance tasks
  - Make sure Collection Services is active (it is started by default)

Prerequisites – Create Database Files During Collection

- **PDI requires data in the Collection Services DB2 files**

  - The default is to create the database files during performance data collection

  - If you have turned this off, you will not be able to view performance data with PDI until the data is created in the files

  - Recommended to leave this setting at the default

Command interface:

The "Create Database files" option for the performance collection should be *YES

`CFGPFRCOL` command - `CRTDBF(*YES)`

Configure Collection Services

General	Library: QPFRDATA
Data to Collect	Default collection interval: ◉ 15 ▾ seconds ○ 1 ▾ minutes
Data Retention	**Cycling**
System Monitor Categories	Cycle every day at: 12:00 AM Example: 12:30 PM
	Cycle every: 24 ▾ hours

System options

- ☑ Enable system monitoring
- ☑ Create database files during collection
- ☑ Create performance summary data when collection is cycled
- ☐ Send PM Agent data to IBM

Investigate Data

Performance

Investigate Data

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

Welcome	Dashboard	Investigate Data

Investigate Data - Performance Data Investigator

Perspectives   **Selection**

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

Collection

Collection Library   Collection Name

QPFRDATA   Most Recent

[Display] [Search] [Save as Favorite] [Options] [Close]

Investigate Data

Investigate Data - Performance Data

Perspectives

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

Perspectives are a logical grouping of similar or related views that benefit from being rendered side-by-side for reference or context.

Content Package is a set of perspectives that share a commonality (major theme)

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   Collection Name
QPFRDATA ▼   Most Recent ▼

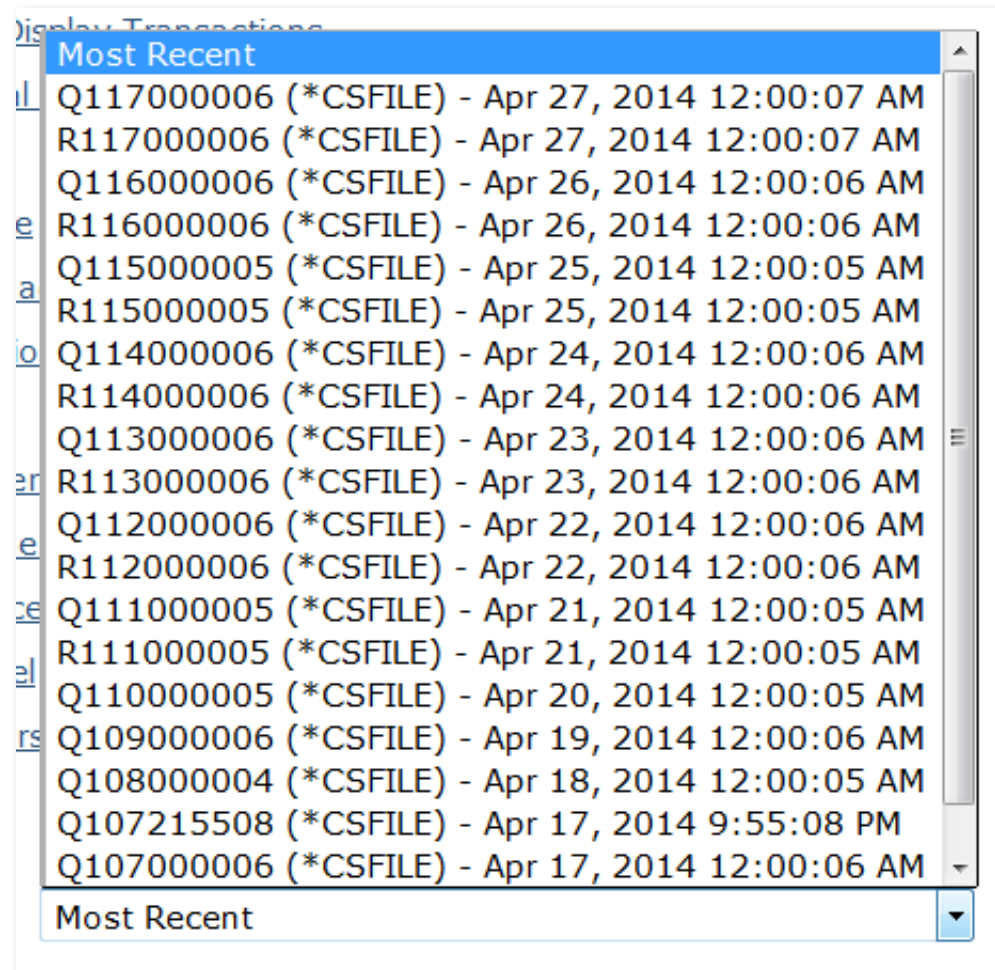[Display] [Search] [Save as Favorite] [Options] [Close]

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.

24

Selecting a Collection

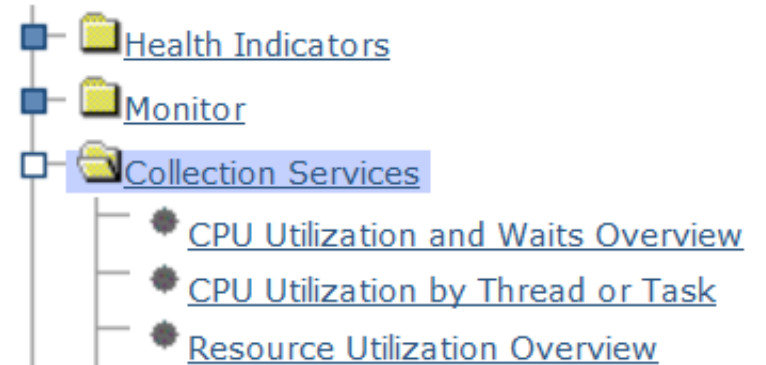- Collections have the date and time to help you identify the one you are interested in

- Note Q* and R* collections
  - R* collections were added in 7.2
    - ○ System monitor data

Display Transactions

Most Recent

Q117000006 (*CSFILE) - Apr 27, 2014 12:00:07 AM
R117000006 (*CSFILE) - Apr 27, 2014 12:00:07 AM
Q116000006 (*CSFILE) - Apr 26, 2014 12:00:06 AM
R116000006 (*CSFILE) - Apr 26, 2014 12:00:06 AM
Q115000005 (*CSFILE) - Apr 25, 2014 12:00:05 AM
R115000005 (*CSFILE) - Apr 25, 2014 12:00:05 AM
Q114000006 (*CSFILE) - Apr 24, 2014 12:00:06 AM
R114000006 (*CSFILE) - Apr 24, 2014 12:00:06 AM
Q113000006 (*CSFILE) - Apr 23, 2014 12:00:06 AM
R113000006 (*CSFILE) - Apr 23, 2014 12:00:06 AM
Q112000006 (*CSFILE) - Apr 22, 2014 12:00:06 AM
R112000006 (*CSFILE) - Apr 22, 2014 12:00:06 AM
Q111000005 (*CSFILE) - Apr 21, 2014 12:00:05 AM
R111000005 (*CSFILE) - Apr 21, 2014 12:00:05 AM
Q110000005 (*CSFILE) - Apr 20, 2014 12:00:05 AM
Q109000006 (*CSFILE) - Apr 19, 2014 12:00:06 AM
Q108000004 (*CSFILE) - Apr 18, 2014 12:00:05 AM
Q107215508 (*CSFILE) - Apr 17, 2014 9:55:08 PM
Q107000006 (*CSFILE) - Apr 17, 2014 12:00:06 AM

Most Recent

Suggested Starting Points

Investigate Data - Performance Data Investigator

Perspectives

- 📁 Health Indicators
- 📁 Monitor
- 📂 Collection Services
  - ● CPU Utilization and Waits Overview
  - ● CPU Utilization by Thread or Task
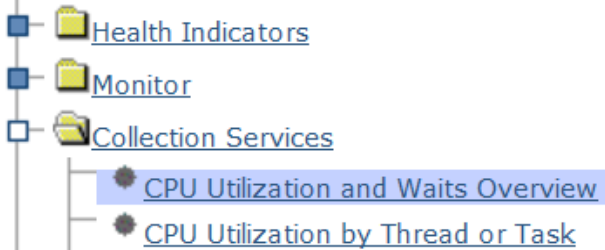
Selection

Name

CPU Utilization and Waits Over

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.

Investigate Data - Performance Data Investigator

Perspectives

- 📁 Health Indicators
- 📁 Monitor
- 📂 Collection Services
  - ● CPU Utilization and Waits Overview
  - ● CPU Utilization by Thread or Task
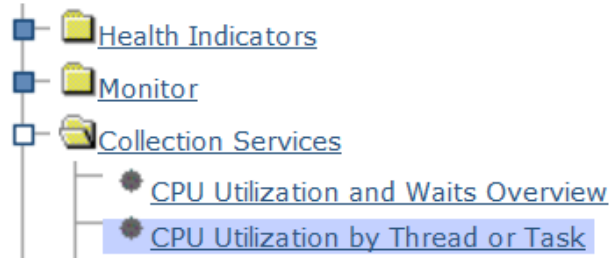
Selection

Name

CPU Utilization by Thread or Task

Description

Charts that show CPU usage by thread or task and ranked by the largest contributors. Use this chart to select contributors for further detailed investigation.

View List

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

Selection

Name

Resource Utilization Overview

Description

Charts that show utilizations and rates for some of the more common collection metrics on an interval by interval basis. Use this information to find and compare relationships and select a time frame for more detailed investigation.

View List

Resource Utilization Percentages
Resource Utilization Rates

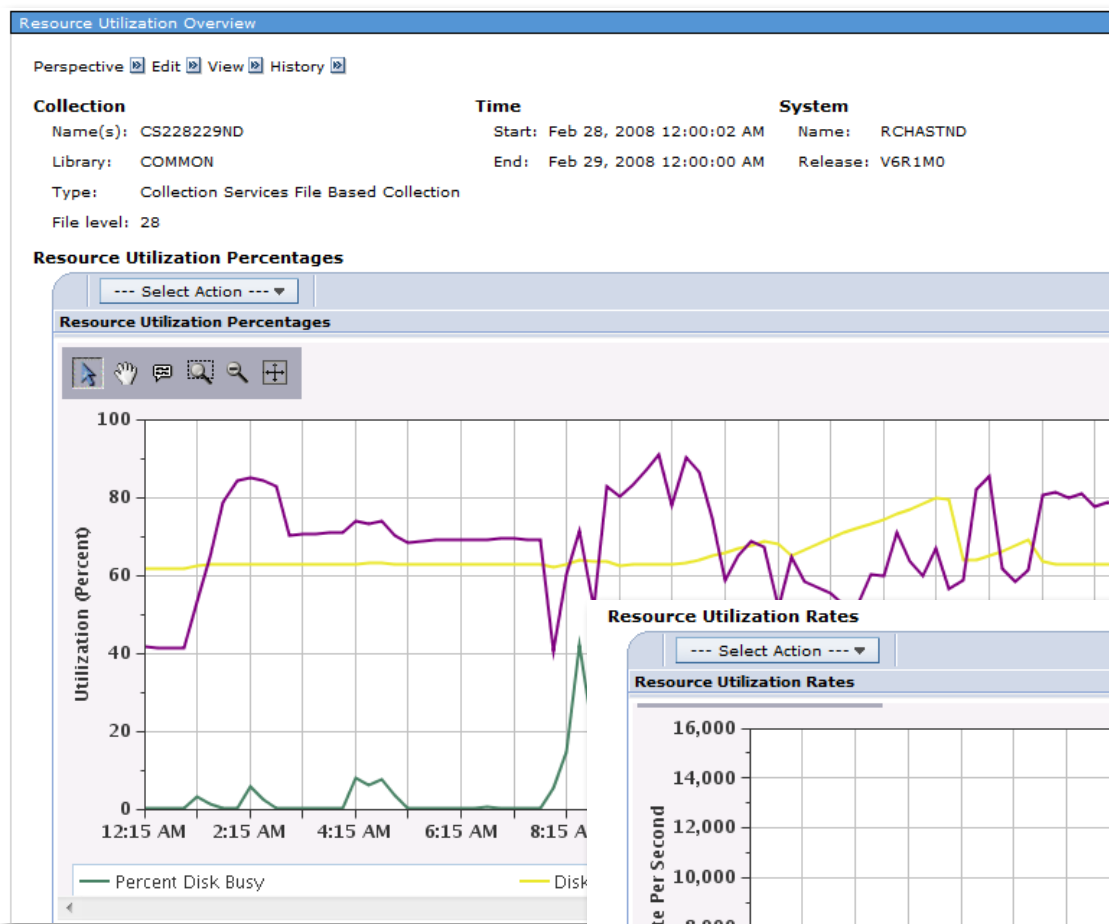# CPU Utilization and Waits Overview
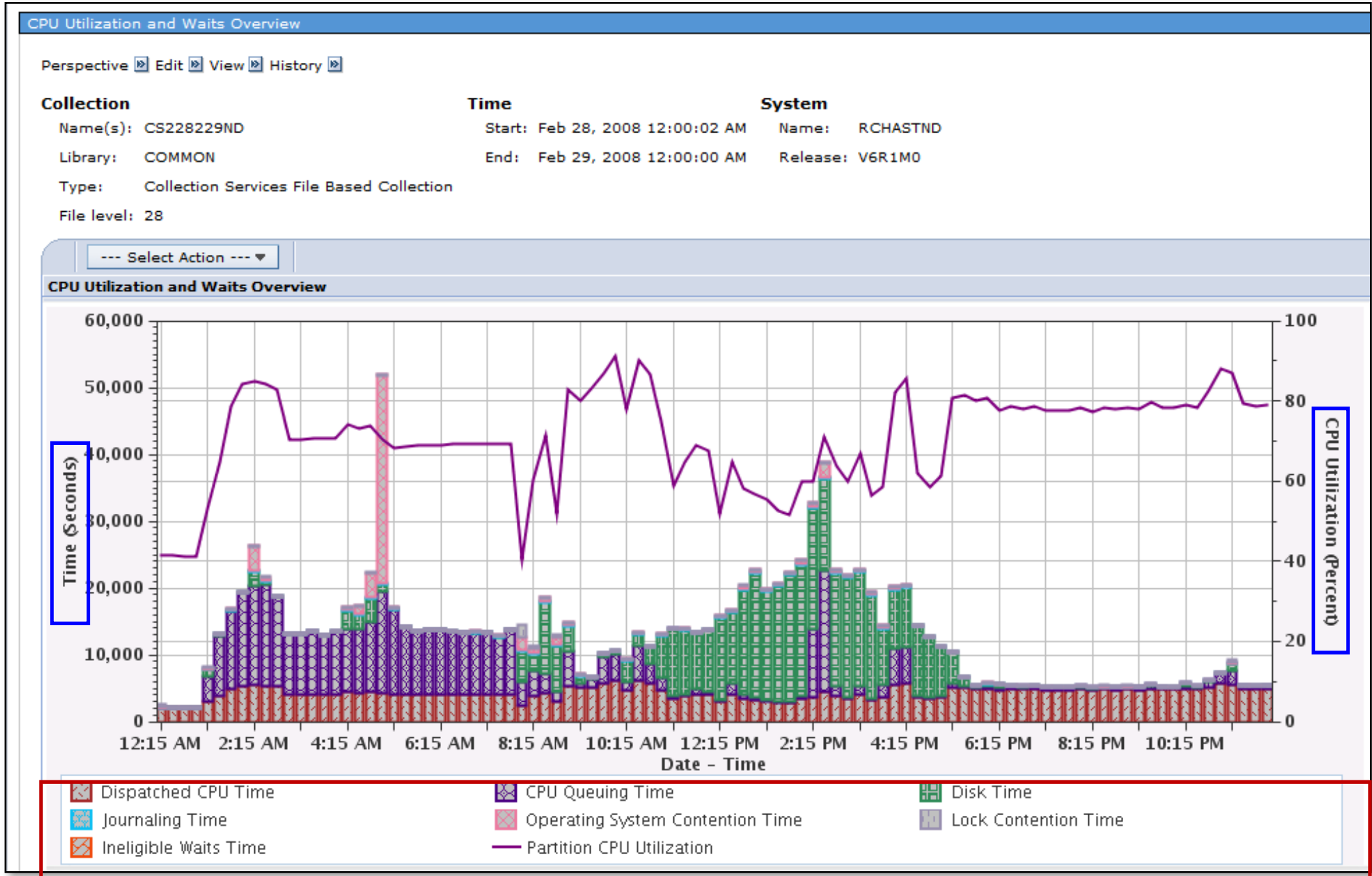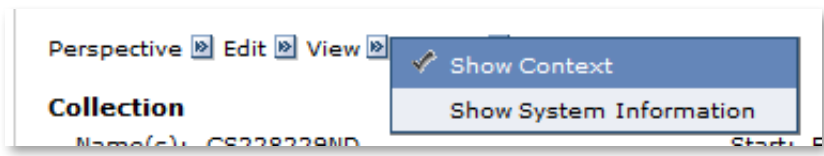
CPU Utilization by Thread or Task
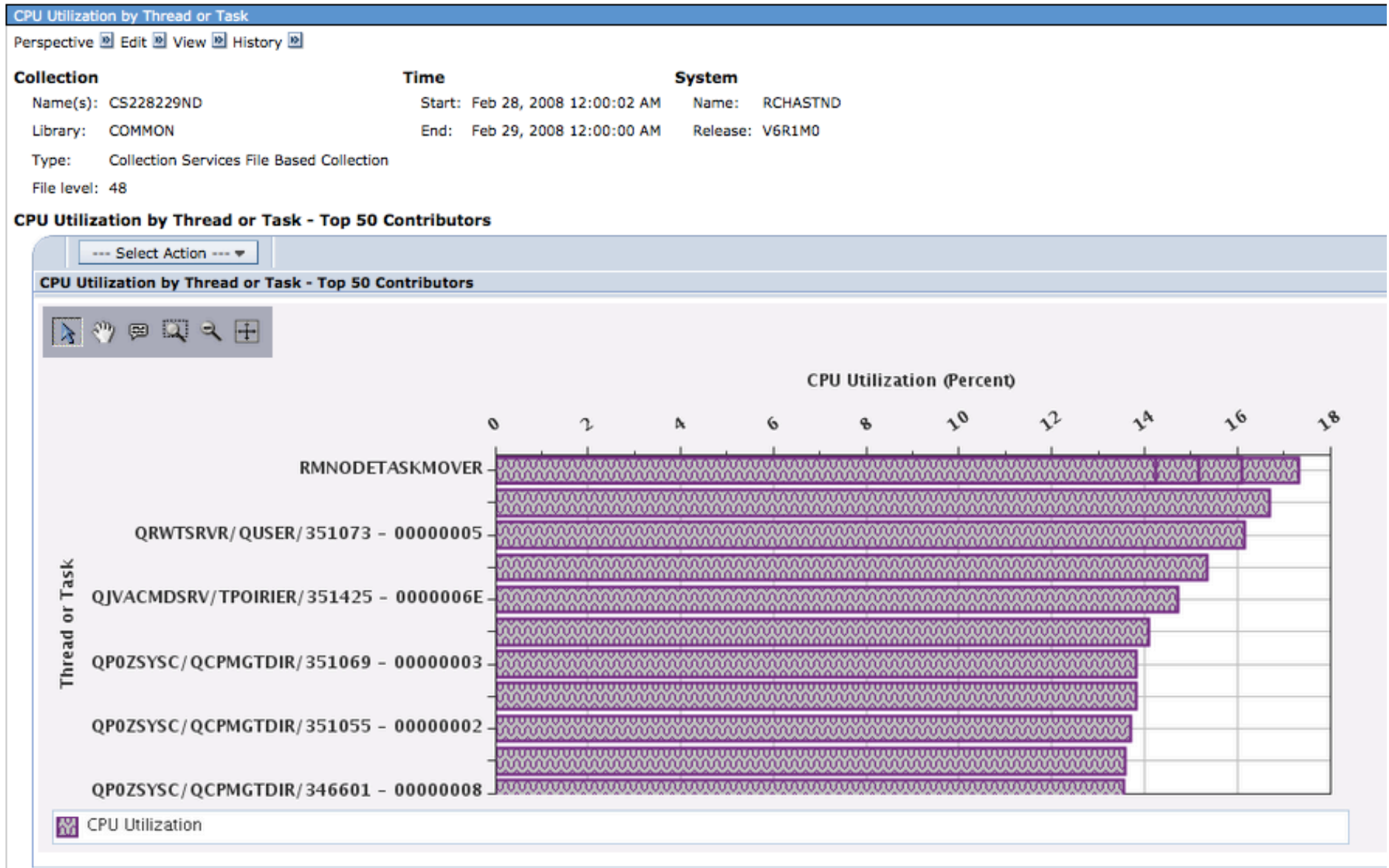
Resource Utilization Overview

Summary for general overall health:
- CPU Utilization
- Disk Utilization
- Disk Busy
- 5250 Transactions
- I/Os per Second
- Page Faults
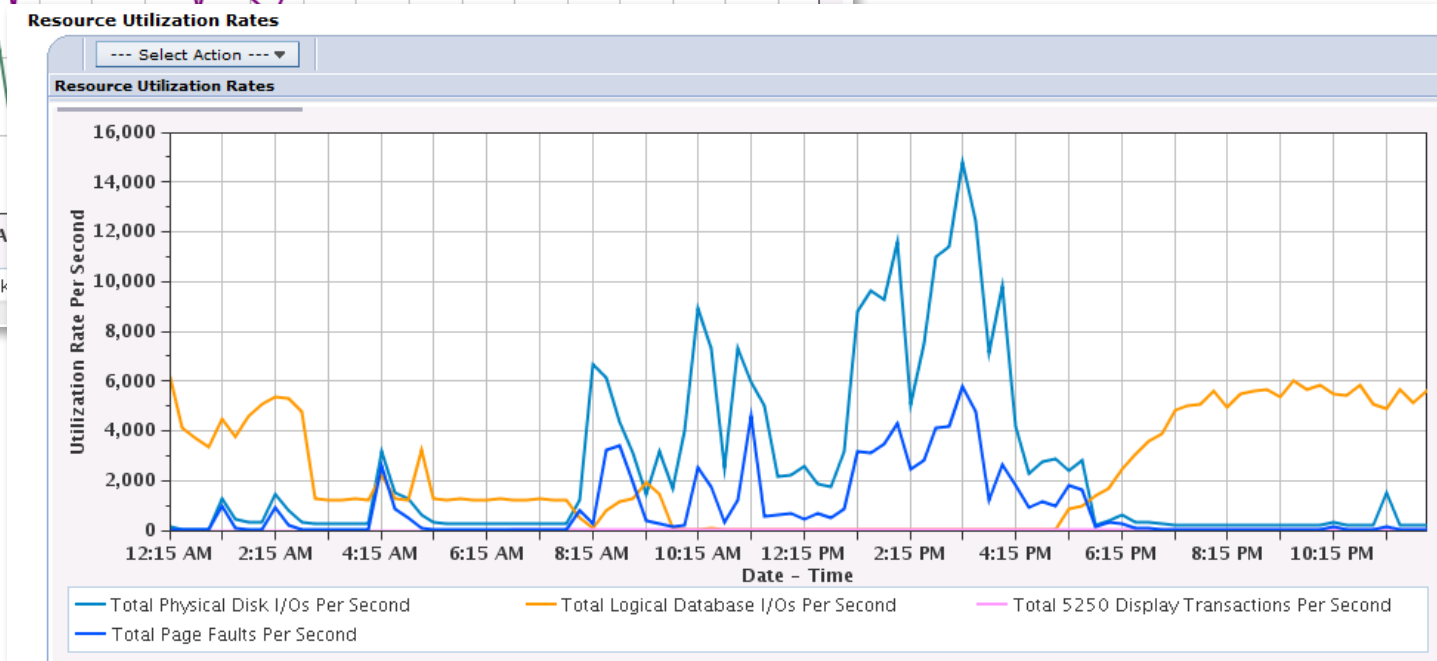
View Collection and System Details

Toggle on/off the detailed information regarding the collection or the system from which the collection originated

Perspective » Edit » View »
✓ Show Context
Show System Information

Collection
Name(s): CS228229ND

Start:

CPU Utilization and Waits Overview

Perspective » Edit » View » History »

Collection
Name(s): Q234000002
Library: QPFRDATA
Type: Collection Services File Based Collection
File level: 36

Time
Start: Aug 22, 2013 12:00:02 AM
End: Ongoing

System
Name: ETC3T1
Release: V7R1M0

System Information

Name:	ETC3T1	Total Processors:	Not Available	Interactive Threshold:	100%
Release:	V7R1M0	Processors / Cores Active:	4	System ASP Capacity	88.89 GB
Type:	7998	Available Processors:	Not Available	Hypervisor Memory:	1,152 MB
Model:	61X	Virtual Processors:	1	Primary Partition:	0
Serial Number:	10-065FA	Installed Processor Count:	4	Partition ID:	21
Processor Feature Code:	52BE	Processor Units (allocated to partition):	0.5	Partition Count:	3
Processor Feature:	8400	Processor Sharing/Capped:	Yes / No	Partition Memory:	8 GB
Generated On:	ETC3T1				

Show/hide Context

Show/hide System Information

Provides quick access to system information from Collection Services QAPMCONF file for the Collection being viewed

This one is a large partition on a big Power box

CPU Utilization and Waits Overview

Perspective » Edit » View » History »

Collection

Name(s):	Q116130121
Library:	QPFRDATA
Type:	Collection Services File Based Collection
File level:	42

Time

Start:	Apr 26, 2014 1:01:21 PM
End:	Ongoing

System

Name:	LP8!
Release:	V7R2M0

System Information

Name:	LP8!	Total Processors:	256	Interactive Threshold:	100%
Release:	V7R2M0	Processors / Cores Active:	128	System ASP Capacity	
Type:	9119	Available Processors:	128	Hypervisor Memory:	63,744 MB
Model:	FHB	Virtual Processors:	32	Primary Partition:	0
Serial Number:	02-88C55	Installed Processor Count:	128	Partition ID:	89
Processor Feature Code:	4700	Processor Units (allocated to partition):	32	Partition Count:	109
Processor Feature:	4700	Processor Sharing/Capped:	Yes / No	Partition Memory:	1,000 GB
Generated On:	LP8____7	QPFRADJ System Value:	0		

QPFRADJ System Value setting is new in 7.2

Navigation History

- Keeps track of where you have visited, easy to "back-track"
- Quick way to get back to "Home" (main navigation tree)
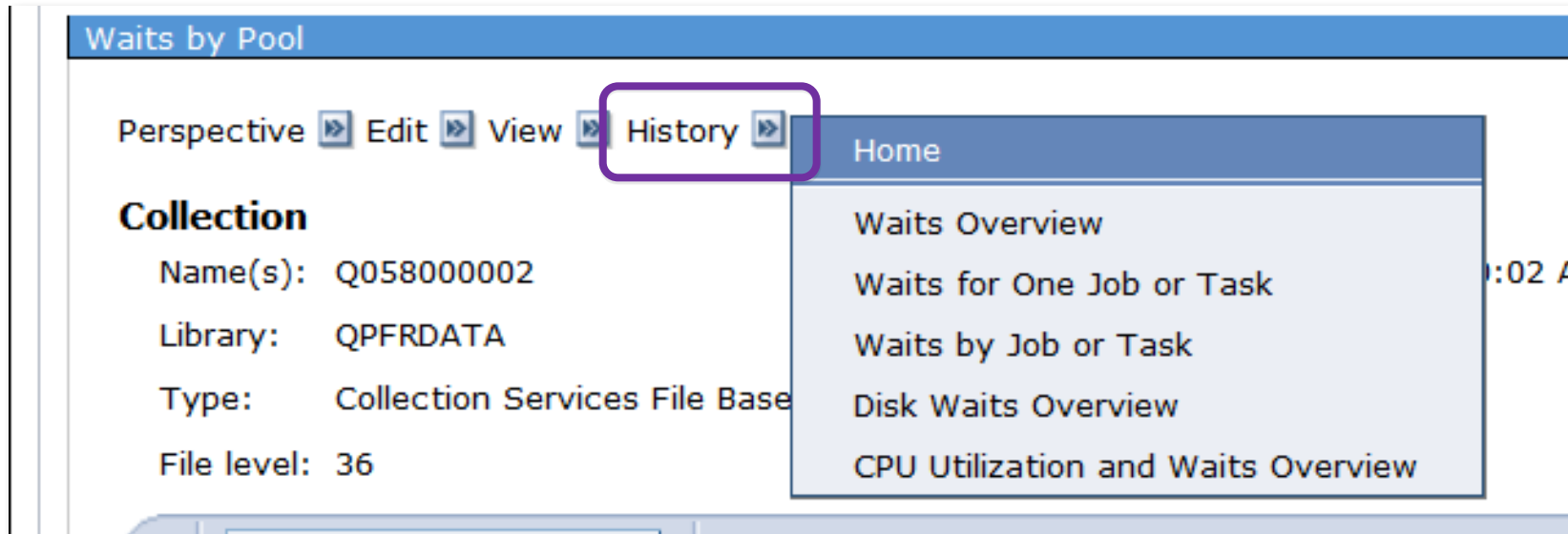
Tools to Interact with the Charts
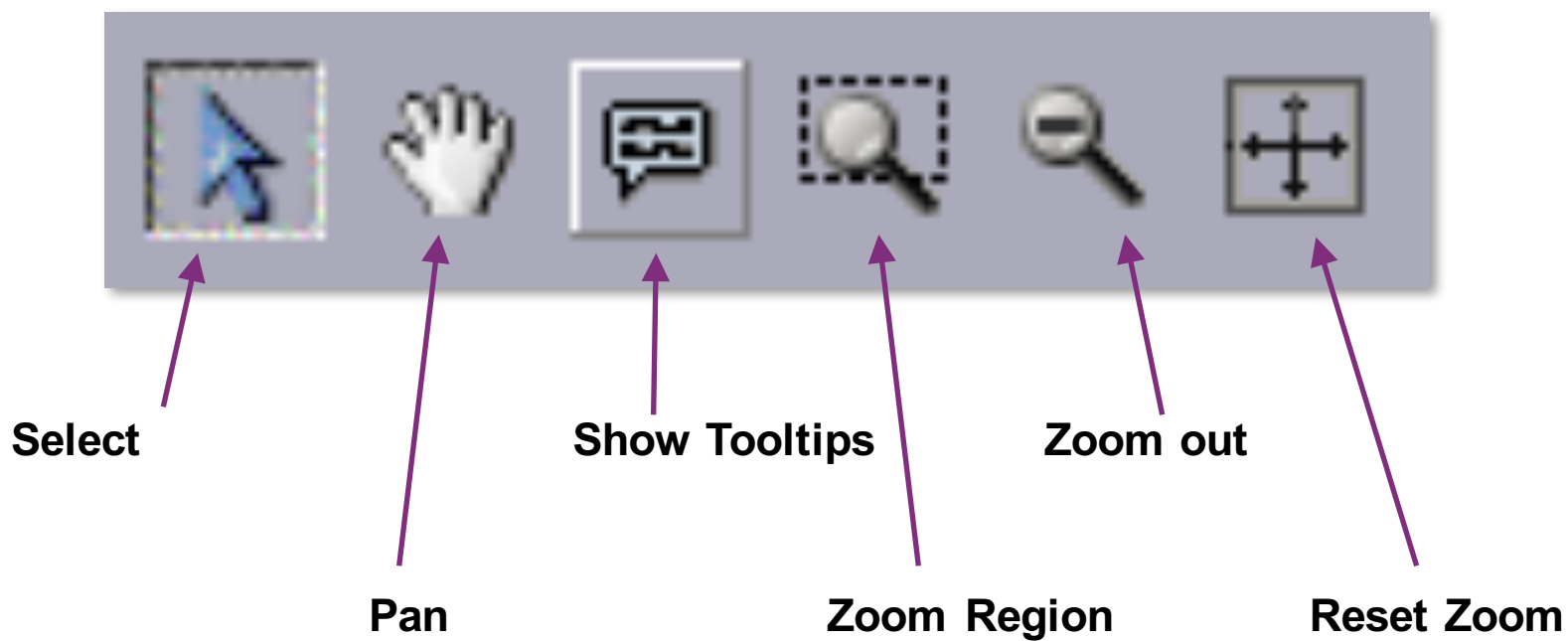
Select

Pan

Show Tooltips

Zoom Region

Zoom out

Reset Zoom
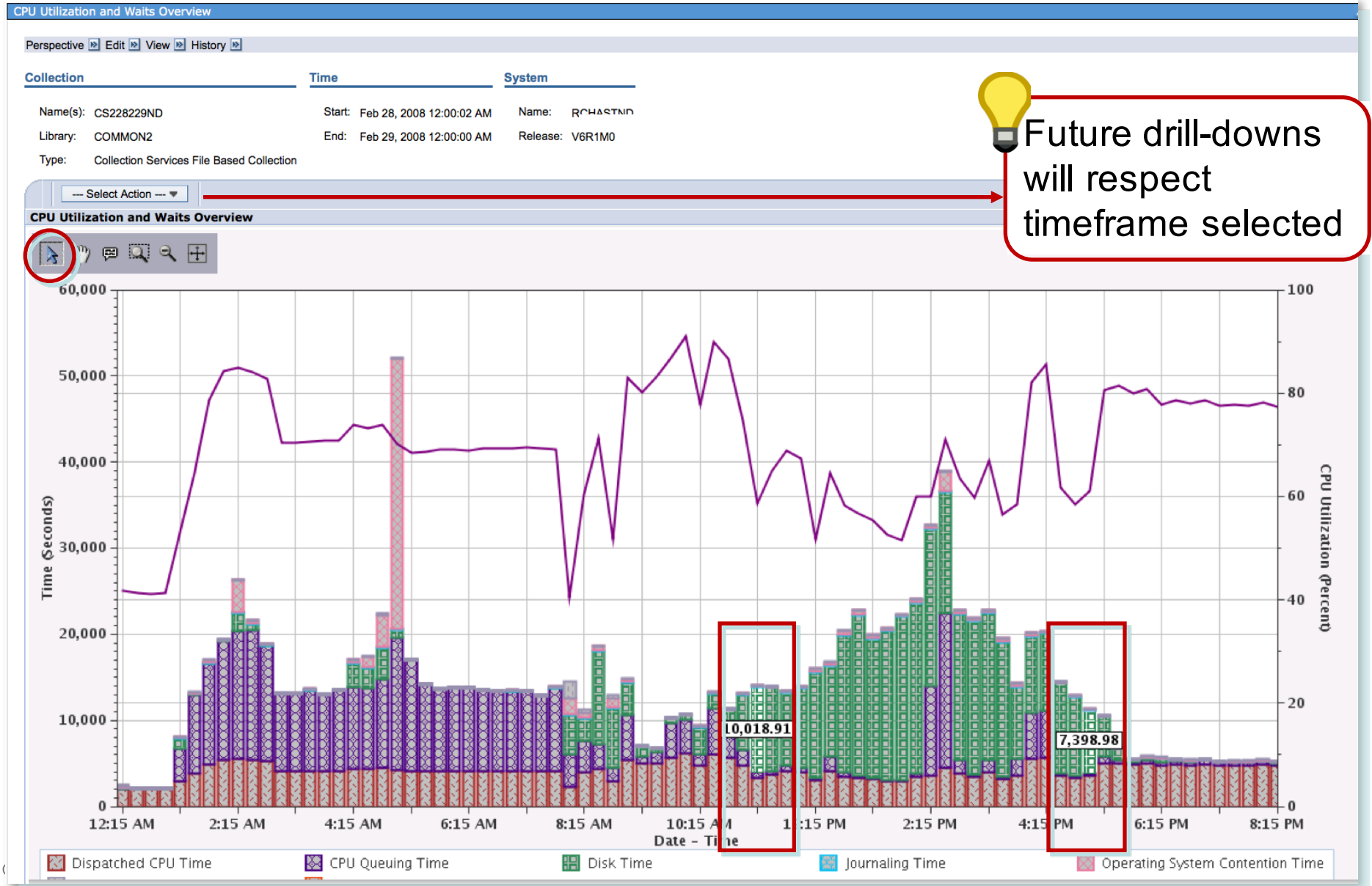
Pan

Shift chart right or left, up or down
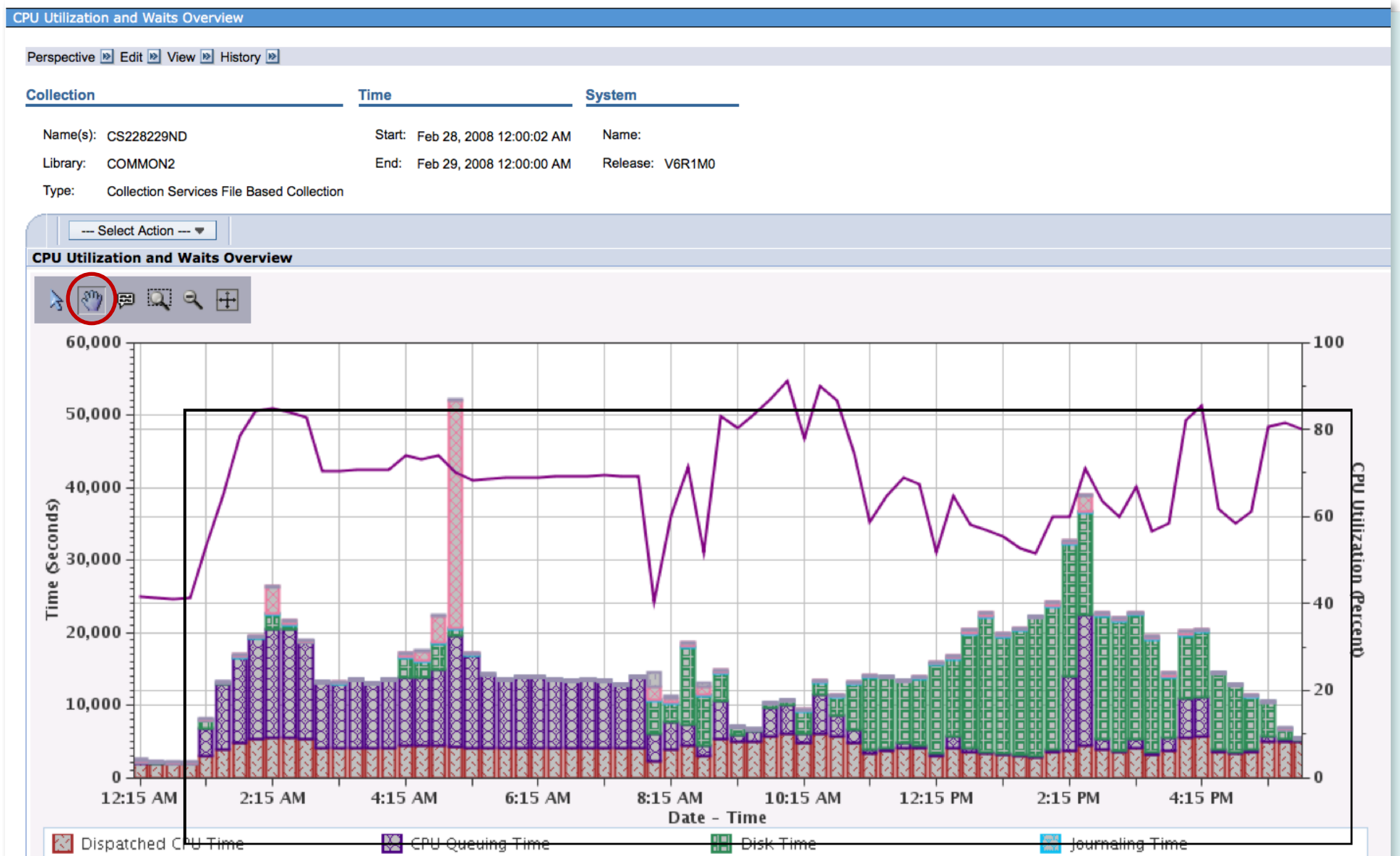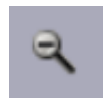
Tool Tips 💬 See metric details for an interval
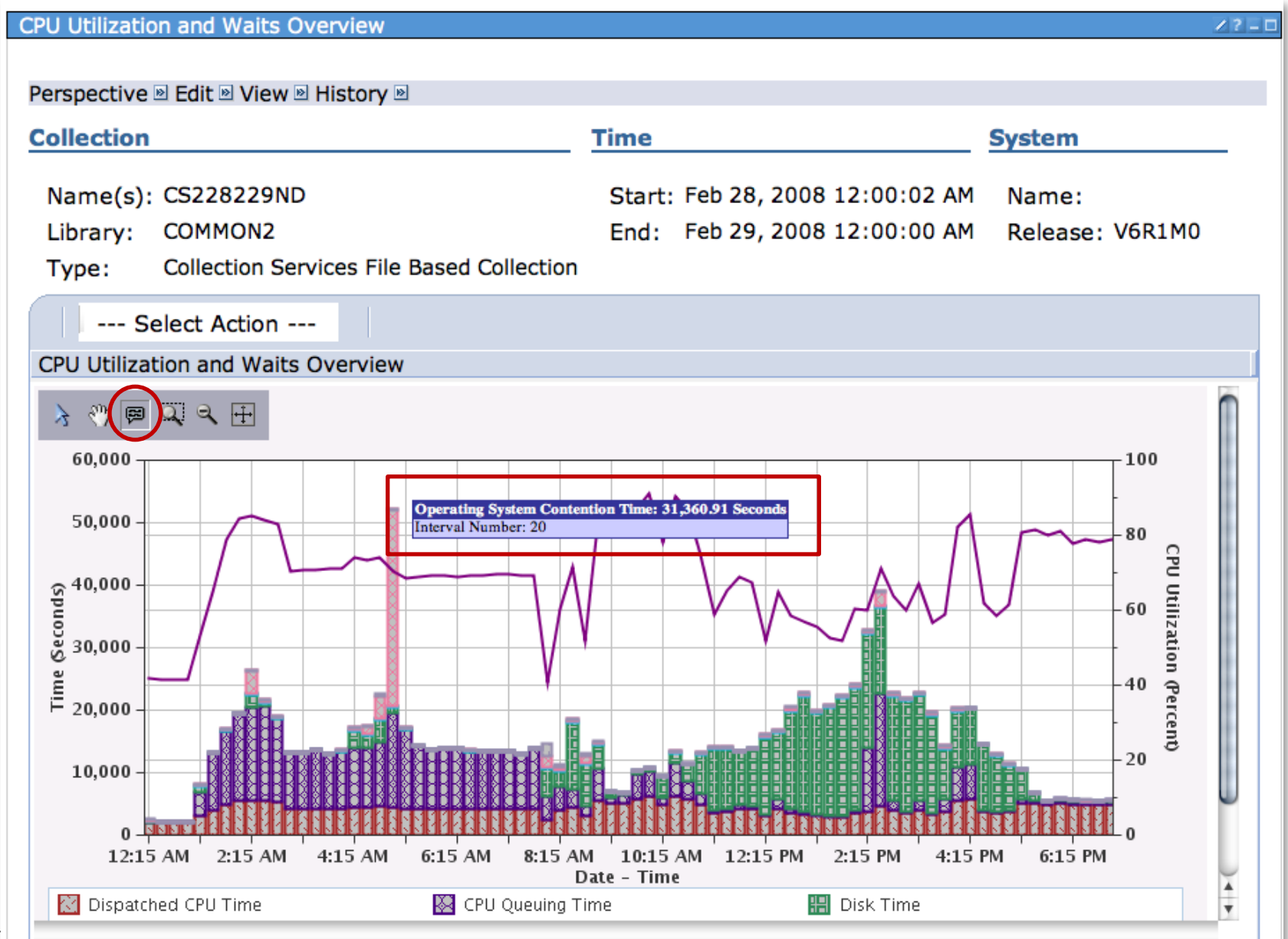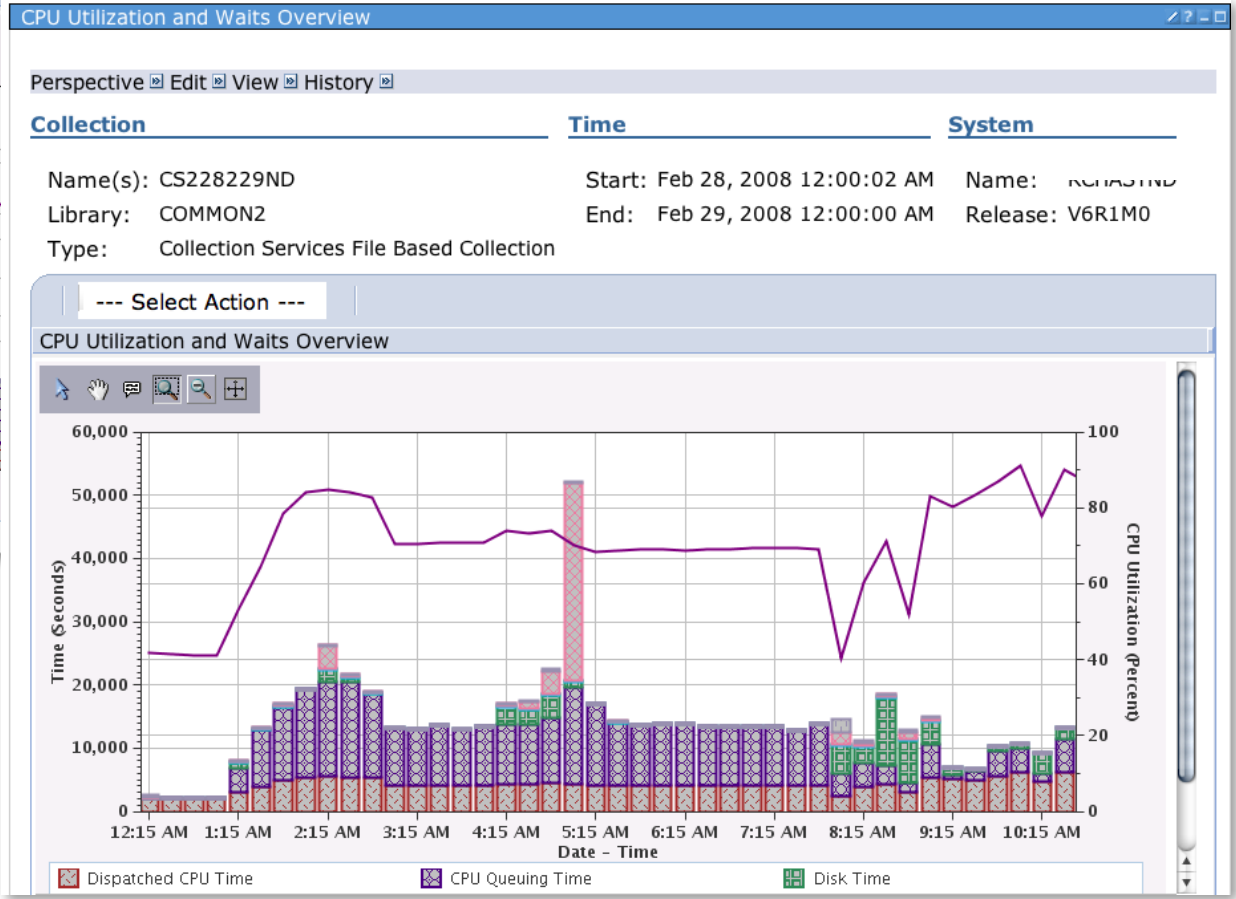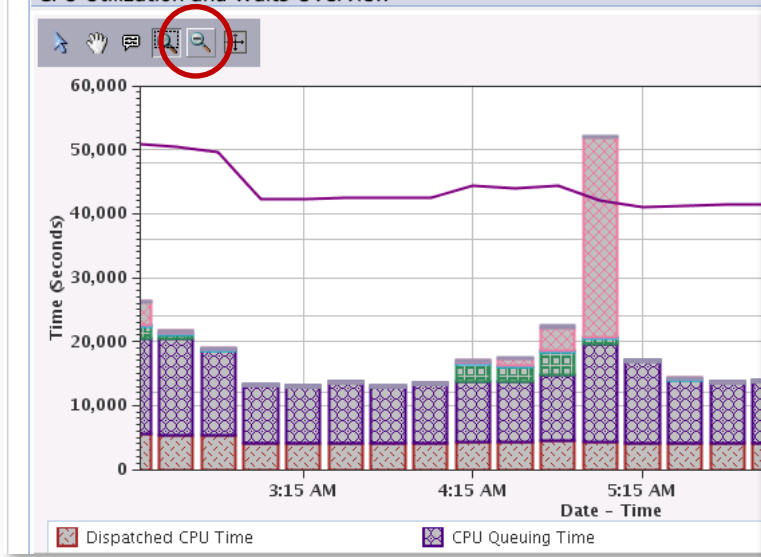
# Zoom Region ⌕ Zoom in on a range of data

Zoom Region Results

CPU Utilization and Waits Overview

Perspective » Edit » View » History »

Collection

Name(s): CS228229ND
Library: COMMON2
Type: Collection Services File Based Collection

Time

Start: Feb 28, 2008 12:00:02 AM
End: Feb 29, 2008 12:00:00 AM

System

Name:
Release: V6R1M0

--- Select Action ---

CPU Utilization and Waits Overview

Legend: Dispatched CPU Time · CPU Queuing Time · Disk Time
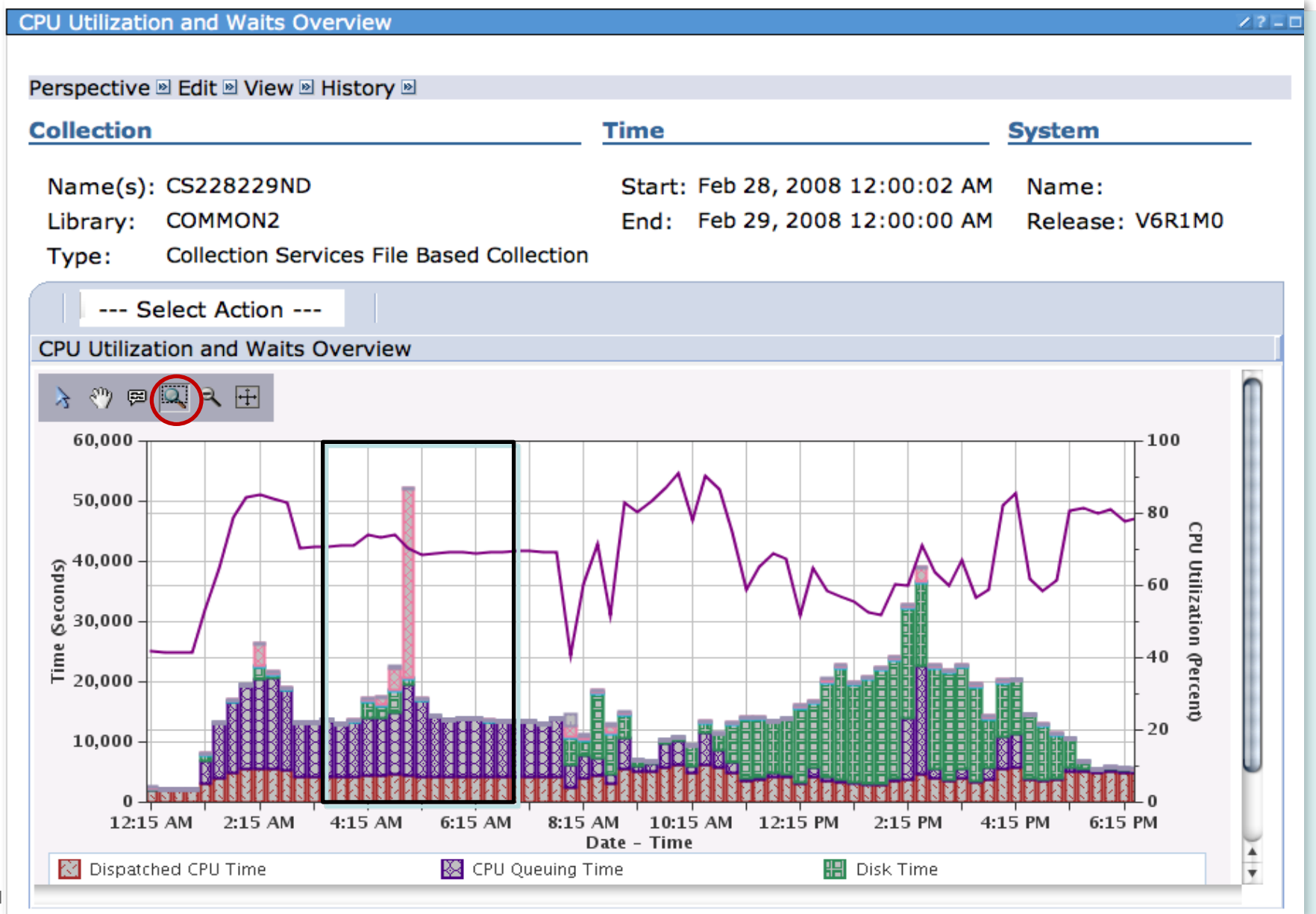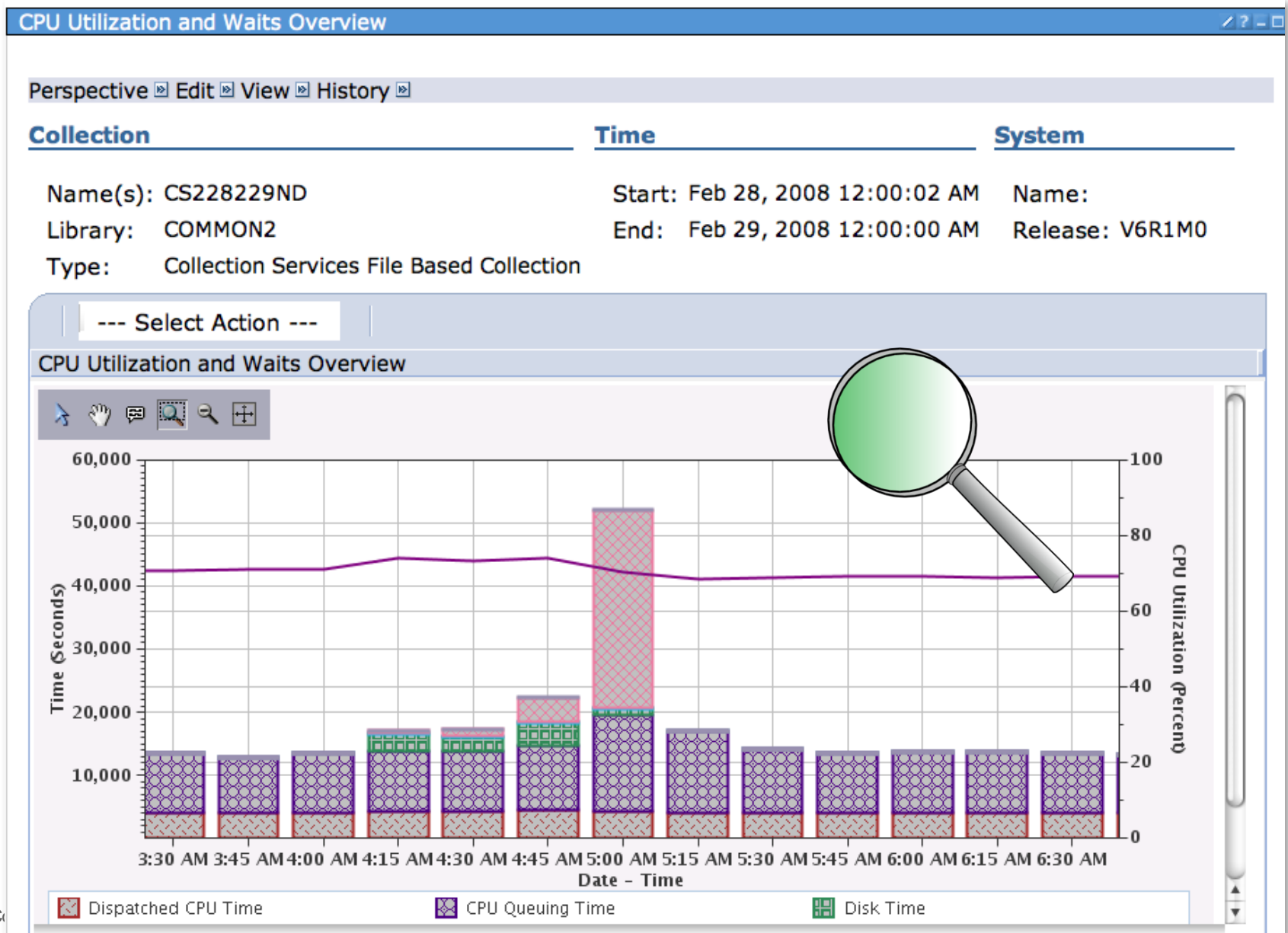
Zoom Out

Zoom out expands the graph each time it is clicked

© 2016 IBM Corporation

Full Zoom Out

A way to quickly view entire collection characteristics
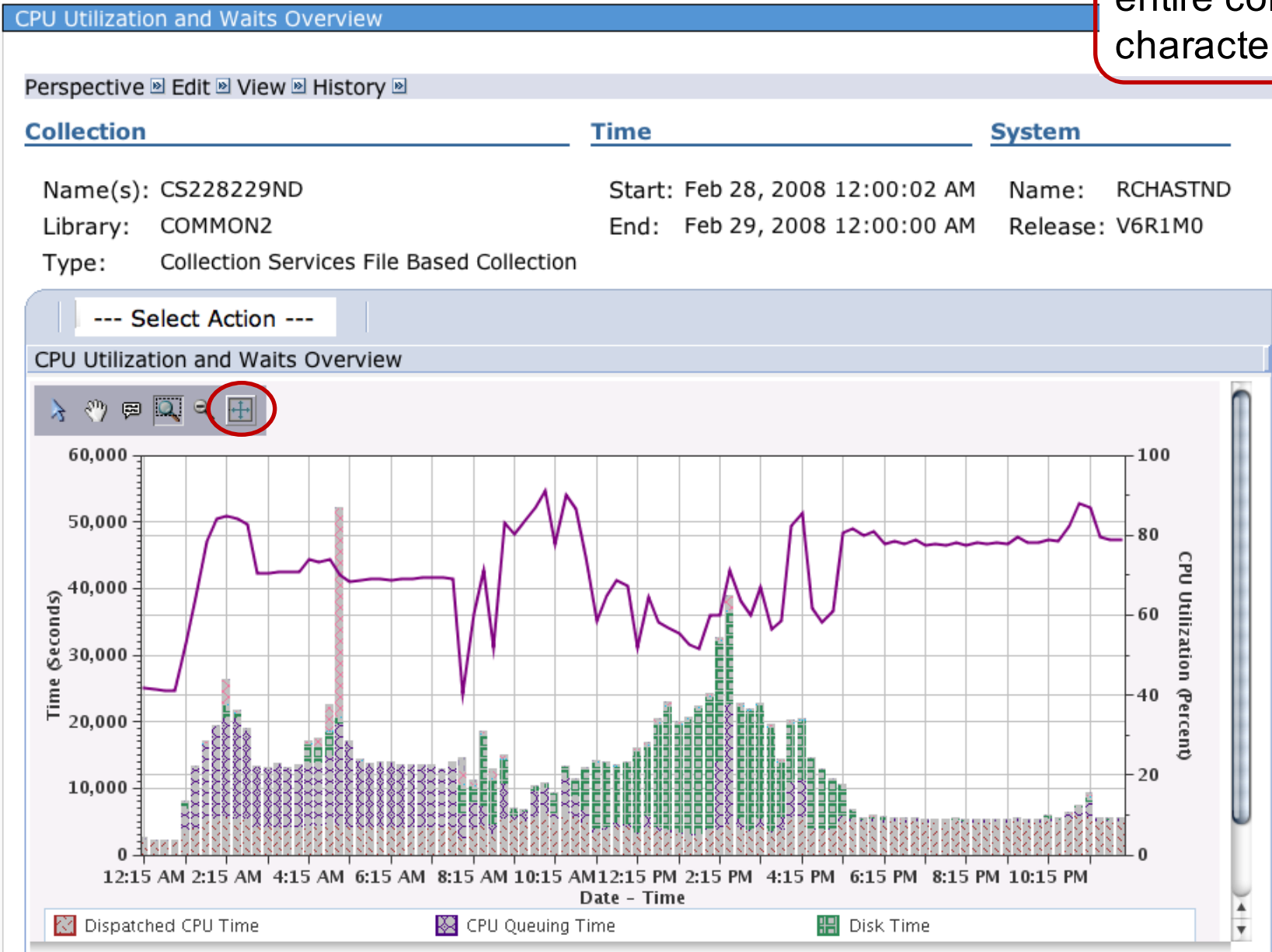
Drill-down

Graph options for next step in analysis

File level: 28

--- Select Action --- ▼

CPU

| 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
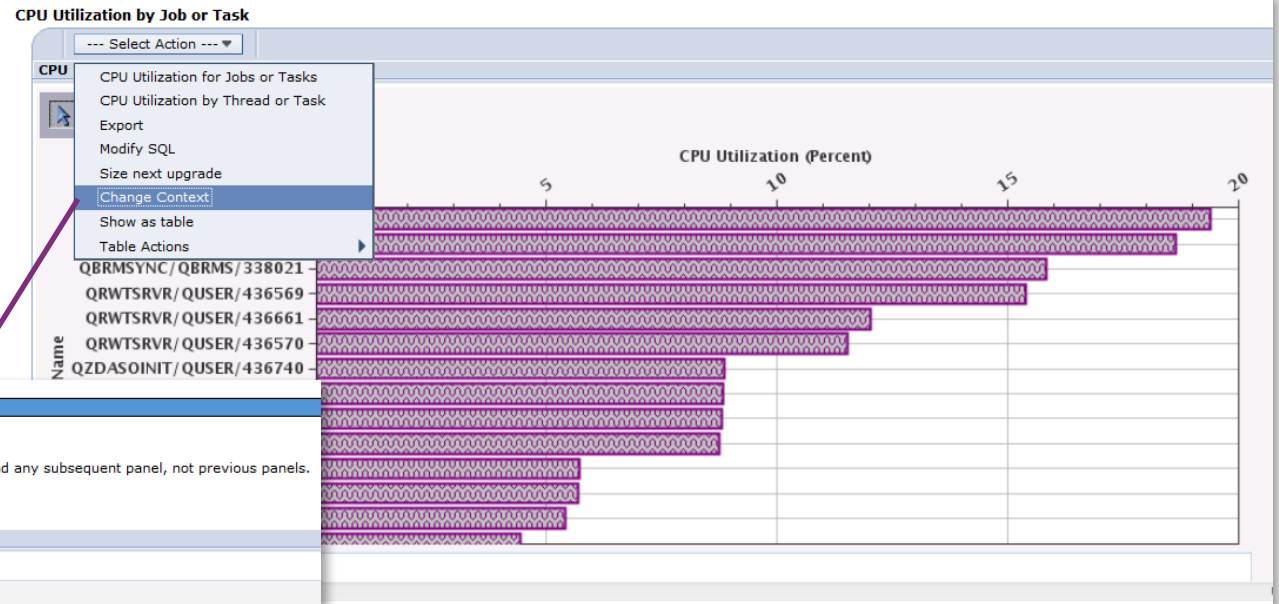Change Context
Show as table
Table Actions ▶

Time (Seconds)
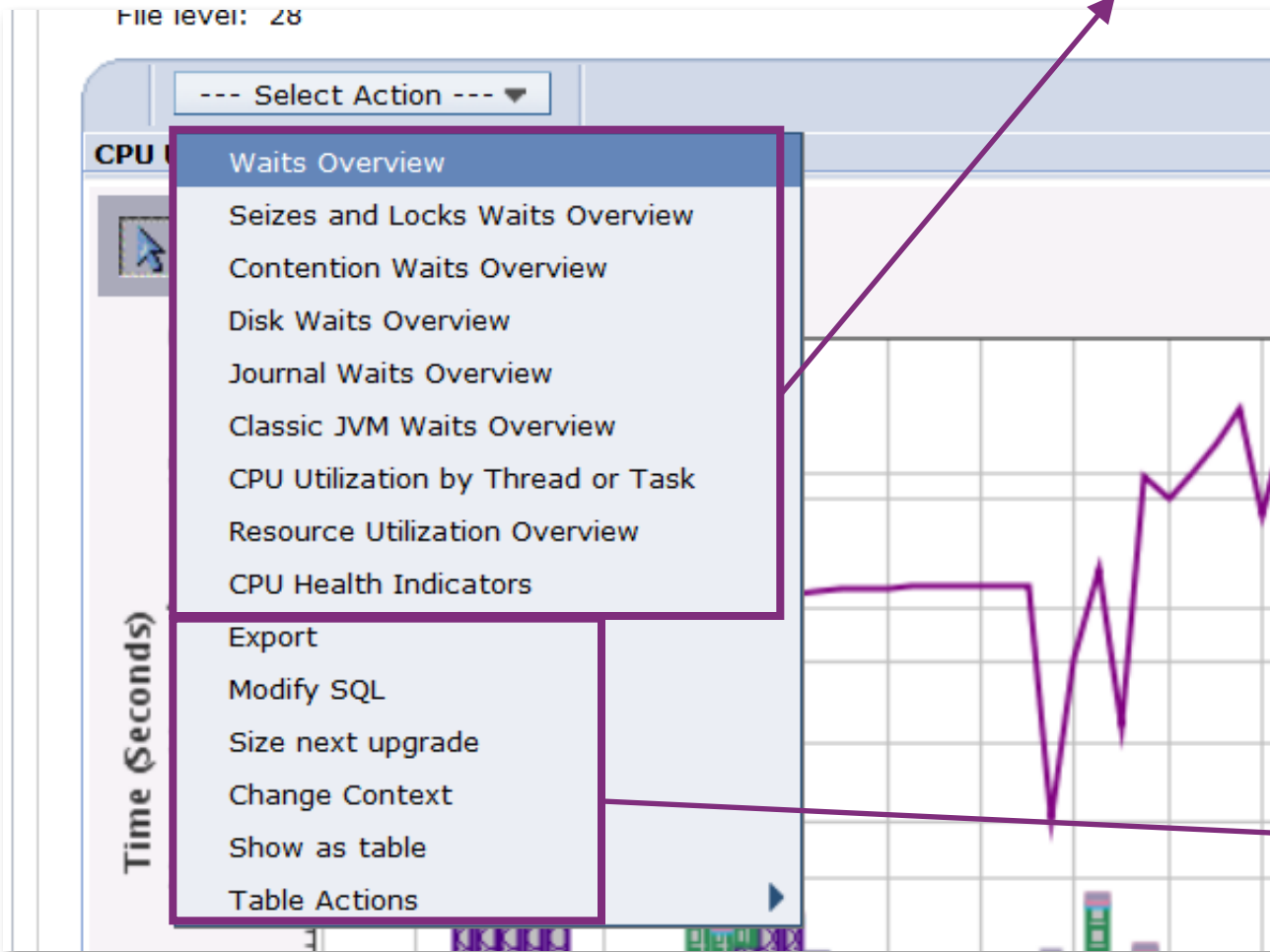
Other options to work with data or refine graphs

Export – *.png, *.jpeg, *.csv, *.txt

Format

Image (*.png) ▾

| Image (*.png) |
| Image (*.jpeg) |
| Comma Delimited (*.csv) |
| Tab Delimited (*.txt) |

CPU Utilization and Waits Overview

Perspective » Edit » View » History »

--- Select Action --- ▾

CPU U

- 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)

Export

Title

CPU Utilization and Waits Overview

Format

Image (*.png) ▾

Data Range
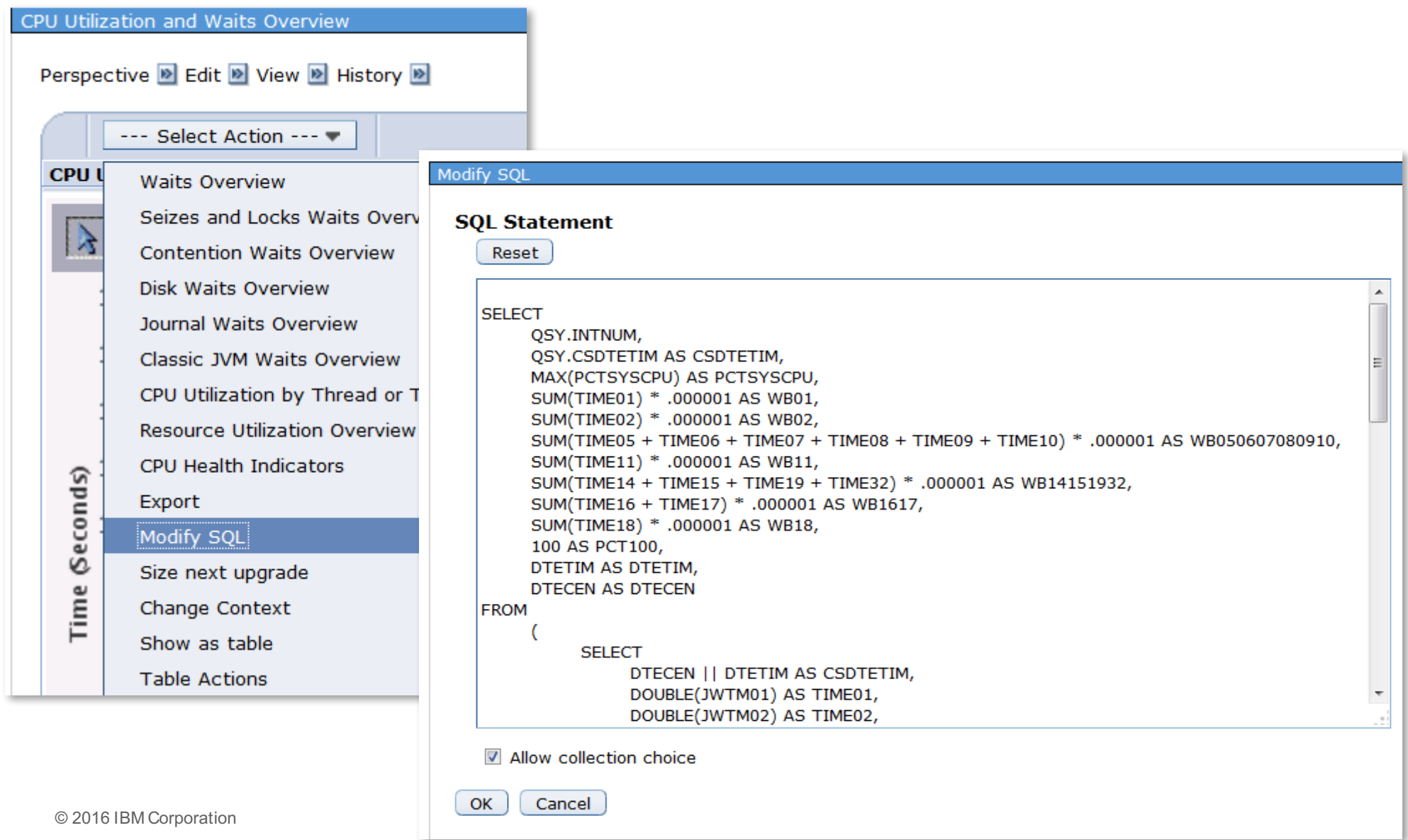
○ All data

● Displayed data

○ User-defined range:

Data Series

| Dispatched CPU Time |
| CPU Queuing Time |
| Disk Time |
| Journaling Time |
| Operating System Contention Time |

First Record Number 1   1,2,3...28

Last Record Number 28   1,2,3...28

OK   Cancel

Modify SQL – customize the queries

CPU Utilization and Waits Overview

Perspective » Edit » View » History »

--- Select Action --- ▼

CPU U

Waits Overview

Seizes and Locks Waits Over...

Contention Waits Overview

Disk Waits Overview

Journal Waits Overview

Classic JVM Waits Overview

CPU Utilization by Thread or T...

Resource Utilization Overview

CPU Health Indicators

Export

Modify SQL

Size next upgrade

Change Context

Show as table

Table Actions

Modify SQL

SQL Statement

Reset

```
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) * .000001 AS WB11,
    SUM(TIME14 + TIME15 + TIME19 + TIME32) * .000001 AS WB14151932,
    SUM(TIME16 + TIME17) * .000001 AS WB1617,
    SUM(TIME18) * .000001 AS WB18,
    100 AS PCT100,
    DTETIM AS DTETIM,
    DTECEN AS DTECEN
FROM
    (
        SELECT
            DTECEN || DTETIM AS CSDTETIM,
            DOUBLE(JWTM01) AS TIME01,
            DOUBLE(JWTM02) AS TIME02,
```

☑ Allow collection choice

OK   Cancel

Change Context

Power Systems

CPU Utilization by Job or Task

--- Select Action --- ▼

- CPU Utilization for Jobs or Tasks
- CPU Utilization by Thread or Task
- Export
- Modify SQL
- Size next upgrade
- **Change Context**
- Show as table
- Table Actions ▶

CPU Utilization (Percent)

QBRMSYNC/QBRMS/338021
QRWTSRVR/QUSER/436569
QRWTSRVR/QUSER/436661
QRWTSRVR/QUSER/436570
QZDASOINIT/QUSER/436740

Change Context

Details

Use the fields below to adjust your current context. These changes will only affect this panel and any subsequent panel, not previous panels.

Variable

Variable

Variable	Description	Value	Required
▼ Set 1			
▼ Case 1			
JBNAME	Name	QRWTSRVR	No
JBNBR	Job Number		No
JBUSER	Job User		No
MINDTECEN	Century Digit		No
MINDTETIM	Interval Date And Time		No
MAXDTECEN	Century Digit		
MAXDTETIM	Interval Date And Time		
Collection Library		PDIDEMO	
Collection Name		Q071123119	

Page 1 of 1 [1] Go   Row

OK   Cancel

CPU Utilization by Job or Task

--- Select Action --- ▼

CPU Utilization by Job or Task

CPU Utilization (Percent)

0   5   10   15   20

QRWTSRVR/QUSER/436699
QRWTSRVR/QUSER/436569
QRWTSRVR/QUSER/436661
QRWTSRVR/QUSER/436570
QRWTSRVR/QUSER/436662
QRWTSRVR/QUSER/436518
QRWTSRVR/QUSER/436551
QRWTSRVR/QUSER/436492
QRWTSRVR/QUSER/436658
QRWTSRVR/QUSER/436698
QRWTSRVR/QUSER/436672
QRWTSRVR/QUSER/436487
QRWTSRVR/QUSER/436657
QRWTSRVR/QUSER/436666

Full Name

CPU Utilization

Perspective → Save As

When a table or chart is modified, you can save that table or chart for your own custom perspective using "**Save As...**"

CPU Utilization by Job or Task

Perspective ⮞ ....story ⮞
    Save As...
    Done

CPU Utilizati **ask**
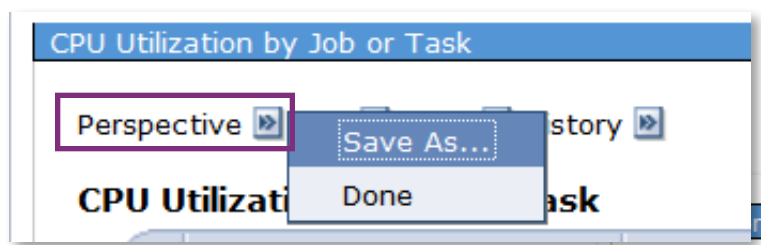
...rspective

Saving a custom perspective

Original Location
Collection Services > CPU > CPU Utilization by Job or Task

Save Location
Perspectives   **Selection**

                                                         Name
        📁 Custom Perspectives - DMMAY   Custom Perspectives - DMMAY
        └ [Empty]
                                                         Description
                                                         Perspectives that have been saved by the user.

Perspective
    *Name: CPU Utilization by Job or Task - QRWTSRVR

    Description: This chart shows CPU usage by job or task and ranked by the largest
                 contributors, limited to QRWTSRVR jobs. Use this chart to select contributors for
                 further detailed investigation.

    ☑ Locked

    [Save] [Cancel]

Perspective → Save As

CPU Utilization by Job or Task

Perspective ▶ Edit ▶ View ▶ History ▶
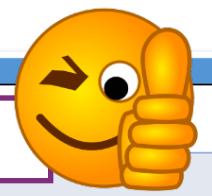
> **Save Complete**
> This perspective was saved successfully.
>
> URL to saved perspective:
> https://isz1lp13.rch.stglabs.ibm.com:2005/ibm/action/launch?pageID=com.ibm.i5OS.webnav.navigationElement.WebnavBasePortlet&system=localhost&WnLocale=en_US&WnSTM=true&task=perf.invdta&packid=ccp_DMMAY&persid=perspective_ID_213976_ccp&collection=PDIDEMO.Q071123119
>
> Close Message

Bookmark!

Investigate Data - Performance Data Investigator

Perspectives

- 📁 Performance Explorer
- 📁 Disk Watcher
- 📁 Job Watcher
- 📁 Collection Services
- 📁 Health Indicators
- 📁 Custom Perspectives - DMMAY
  - ● CPU Utilization by Job or Task - QRWTSRVR

Selection

Name
Custom Perspectives - DMMAY

Description
Perspectives that have been saved by the user.

Collection

Collection Library   Collection Name
QPFRDATA ▾   Most Recent   ▾

[Display] [Search] [Options] [Close]

Show as Table

--- 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 ▶

CPU Utilization and Waits Overview

Perspective ▣ Edit ▣ View ▣ History ▣

--- Select Action --- ▼

Select	Interval Number ^	Date - Time	Partition CPU Utilization (Percent) ^	Dispatched CPU Time (Seconds) ^	CPU Queuing Time (Seconds) ^	Disk Time (Seconds) ^	Journaling Time (Seconds) ^	Operating System Contention Time (Seconds) ^
☐	1	Feb 28, 2008 12:15:00 AM	41.65	2125.7	12.25	64.4	35.71	22.6
☐	2	Feb 28, 2008 12:30:00 AM	41.4	2110.42	12.16	10.72	34.68	3.62
☐	3	Feb 28, 2008 12:45:00 AM	41.14	2096.73	12.38	5.32	35.3	3.5
☐	4	Feb 28, 2008 1:00:00 AM	41.23	2104.27	11.71	5.67	35.35	3.29
☐	5	Feb 28, 2008 1:15:00 AM	52.99	2959.23	3759.2	1180.33	47.49	141.01
☐	6	Feb 28, 2008 1:30:00 AM	64.62	3847.86	9061.6	217.47	32.11	113.34
☐	7	Feb 28, 2008 1:45:00 AM	78.58	4853.43	11796.74	41.63	41.27	308.02
☐	8	Feb 28, 2008 2:00:00 AM	84.22	5367.69	13984.72	23.12	52.58	35.85
☐	9	Feb 28, 2008 2:15:00 AM	84.89	5469.88	14931.39	2163.59	69.93	3686.04
☐	10	Feb 28, 2008 2:30:00 AM	84.07	5406.56	15063.64	697.16	72.47	399.18
☐	11	Feb 28, 2008 2:45:00 AM	82.82	5272.46	13472.69	57.49	48.64	46.06
☐	12	Feb 28, 2008 3:00:00 AM	70.36	4141.47	9068.85	20.63	1.19	22.3

Total: 96   Filtered: 96

Table Features
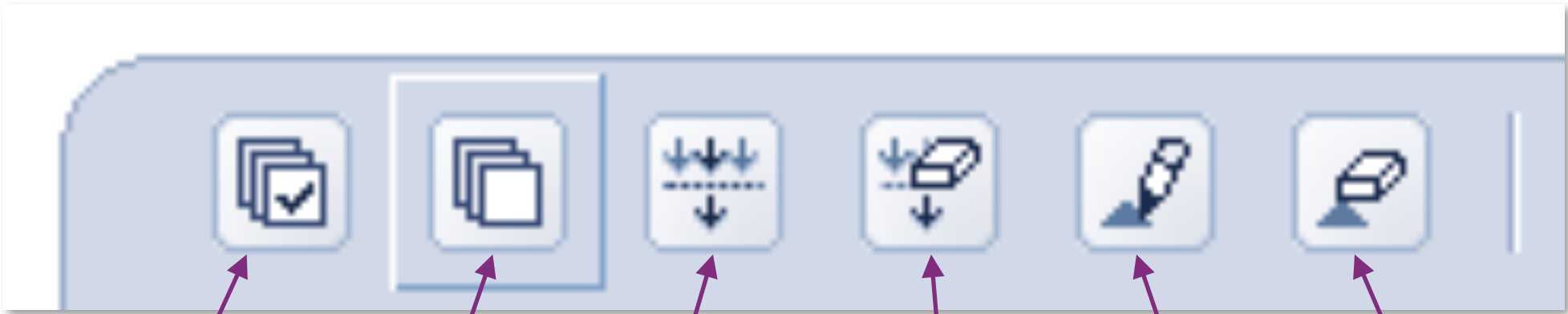
Select All

Deselect All

Show Filter Row
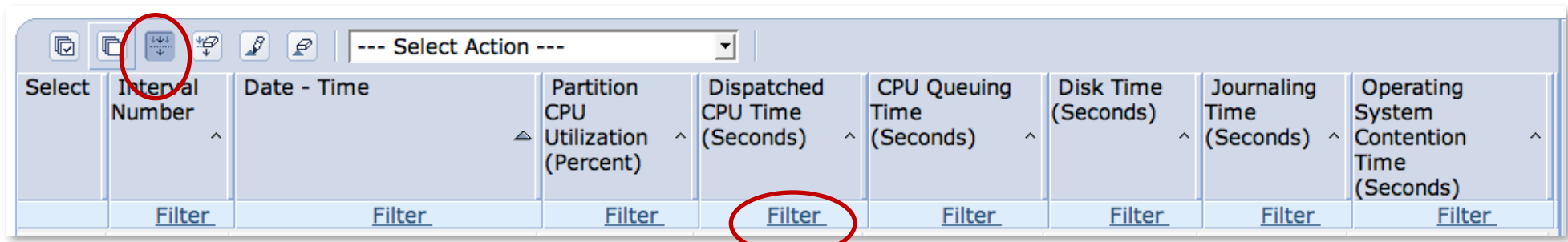
Clear All Filters

Edit Sort
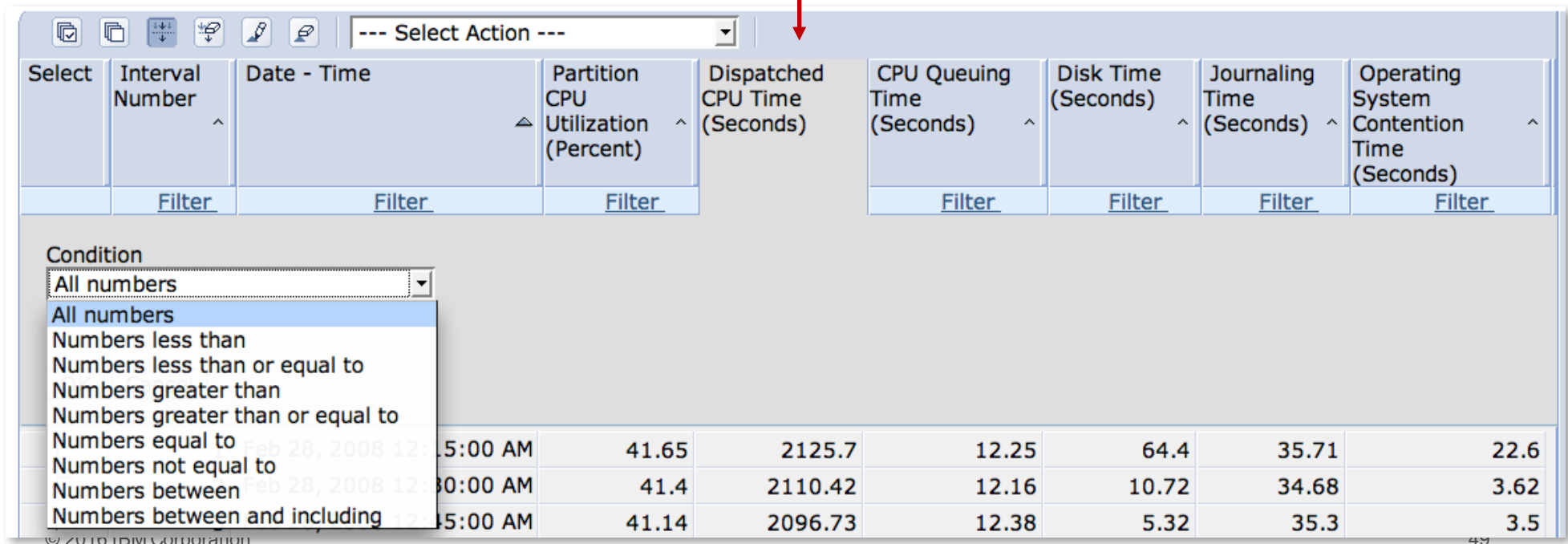
Clear All Sorts

Filter

Show Filter Row

Sort

Columns ...

Show find toolbar / Hide find toolbar
Search the table

--- Select Action --- ▼

Menu
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 chart
Columns...
Show find toolbar
Table Actions ▶

Columns...
Hide find toolbar

CPU Utilization and Waits Overview

Perspective ⏩ Edit ⏩ View ⏩ History ⏩

Collection
Name(s):   Q067000002
Library: QPFRDATA
Type: Collection Services File Based Collection
File level: 36

Time
Start: Mar 8, 2013 12:00:02 AM
End: Ongoing

System
Name:
Release: V7R1M0

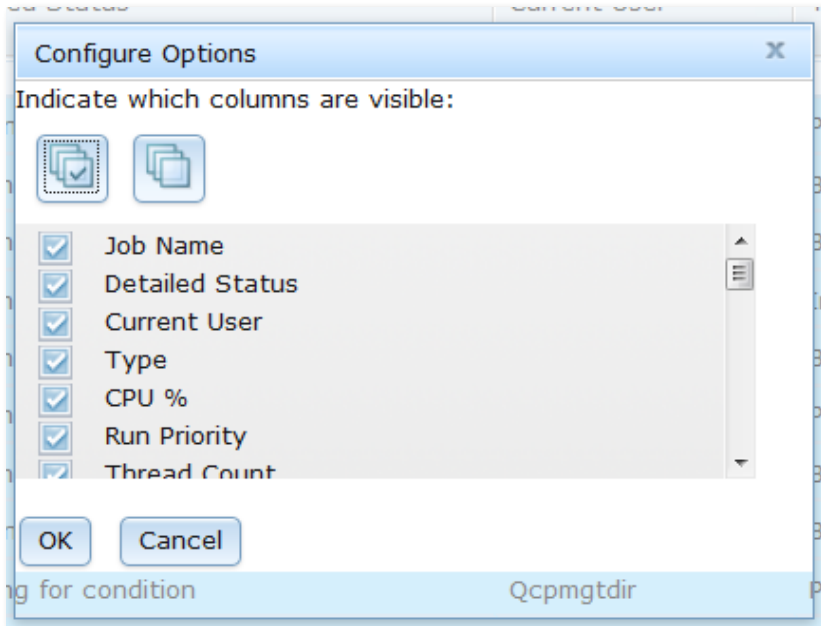Search for: [_____]   Condition: Contains ▼   Column: All columns ▼   Direction: Down ▼
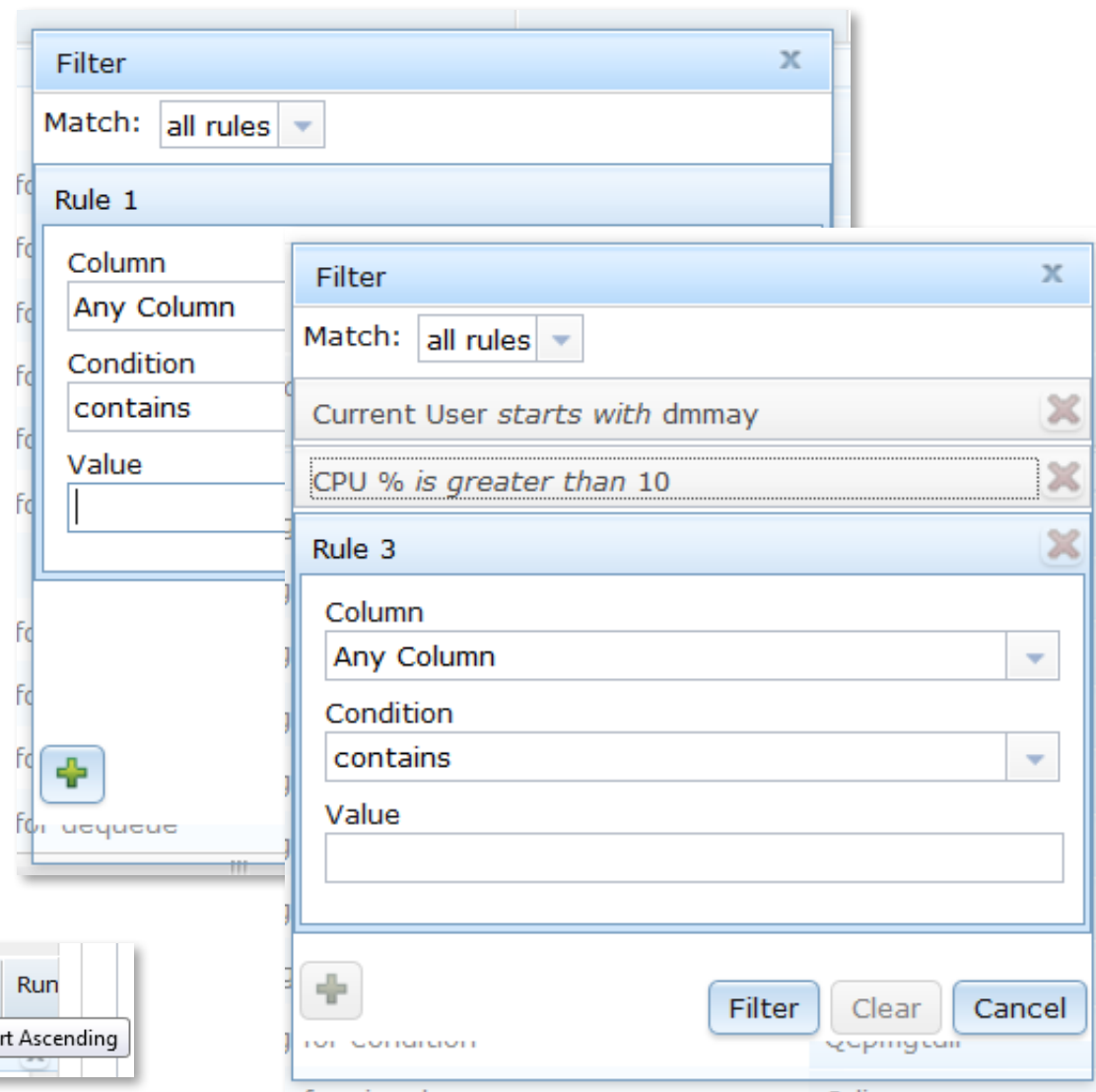
Find   Match case ☐

--- Select Action --- ▼

Select	Interval Number ^	Date - Time △	Partition CPU Utilization (Percent) ^	Dispatched CPU Time (Seconds) ^	CPU Q Time (
☐	1	Mar 8, 2013 12:15:00 AM	0.13	32.95	
☐	2	Mar 8, 2013 12:30:00 AM	0.02	5.61	

Enhanced Table Support – Same Features, New UI

Configure Options for Columns

Configure Options ✕

Indicate which columns are visible:

- ☑ Job Name
- ☑ Detailed Status
- ☑ Current User
- ☑ Type
- ☑ CPU %
- ☑ Run Priority
- ☑ Thread Count

OK   Cancel

ng for condition   Qcpmgtdir

Filter column data

Filter ✕

Match: all rules ▼

Rule 1

Column
Any Column

Condition
contains

Value

✚

Filter ✕

Match: all rules ▼

Current User *starts with* dmmay   ✖

CPU % *is greater than* 10   ✖

Rule 3   ✖

Column
Any Column ▼

Condition
contains ▼

Value

✚   Filter   Clear   Cancel

Sort Columns

| Current User | 1 ▲ | Type | 2 ∧∨ | CPU % | Run |

Nested Sort - Click to sort Ascending

Modify SQL

Modify SQL

SQL Statement

Reset

```
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 WB0506070806
      SUM(TIME11) * .000001 AS WB11,
      SUM(TIME14 + TIME15 + TIME19 + TIME32) * .000001 AS WB14151932,
      SUM(TIME16 + TIME17) * .000001 AS WB1617,
      SUM(TIME18) * .000001 AS WB18,
      100 AS PCT100,
      DTETIM AS DTETIM,
      DTECEN AS DTECEN
FROM
      (
          SELECT
              DTECEN || DTETIM AS CSDTETIM,
              DOUBLE(JWTM01) AS TIME01,
              DOUBLE(JWTM02) AS TIME02,
```

☑ Allow collection choice

OK   Cancel

CPU Utilization and Waits Overview

Perspective ⏵ Edit ⏵ View ⏵ History ⏵

--- Select Action --- ▼

CPU U

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 ▶

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

CPU Utilization and Waits Overview

Perspective ▶ Edit ▶ View ▶ History ▶

--- Select Action --- ▼

CPU U

- 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)

Power Systems

Search

Metric Finder

Power Systems

Collection

Collection Library   Collection Name

| QPFRDATA ▼ | Most Recent ▼ |

[Display] [**Search**] [Options] [Refresh Perspectives] [Close]

Investigate Data - Performance Data Investigator

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): |

P

Coll

Co

Q

Disp

Investigate Data - Performance Data Investigator

Metric Finder

Metric

Metric Name:

| Scaled CPU Time |

Perspective

Select	Perspective
○	Collection Services --> CPU --> CPU Utilization Overview
○	Collection Services --> CPU --> CPU Utilization by Generic Job or Task
○	Collection Services --> CPU --> CPU Utilization by Job Current User Profile
○	Collection Services --> CPU --> CPU Utilization by Job User Profile
○	Collection Services --> CPU --> CPU Utilization by Job or Task
○	Collection Services --> CPU --> CPU Utilization by Pool
○	Collection Services --> CPU --> CPU Utilization by Server Type
○	Collection Services --> CPU --> CPU Utilization by Subsystem
○	Collection Services --> CPU --> CPU Utilization by Thread or Task
○	Collection Services --> CPU Utilization by Thread or Task

| Page 1 of 1 | 1 [Go] | Rows 10 ▲▼ | Total: |

Collection

Collection Library   Collection Name

| QPFRDATA ▼ | Most Recent ▼ |

[Display] [List] [Options] [Refresh Perspectives] [Close]

Options

Collection

Collection Library | Collection Name
QPFRDATA ▼ | Most Recent ▼

[Display] [Search] [Save as Favorite] [**Options**] [Close]

Investigate Data - Performance Data Investigator

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   Specify the default library that will be used when a collection is selected.

◉ Use Collection Services configured library

◯ Use last visited library

◯ Use library: [   ]
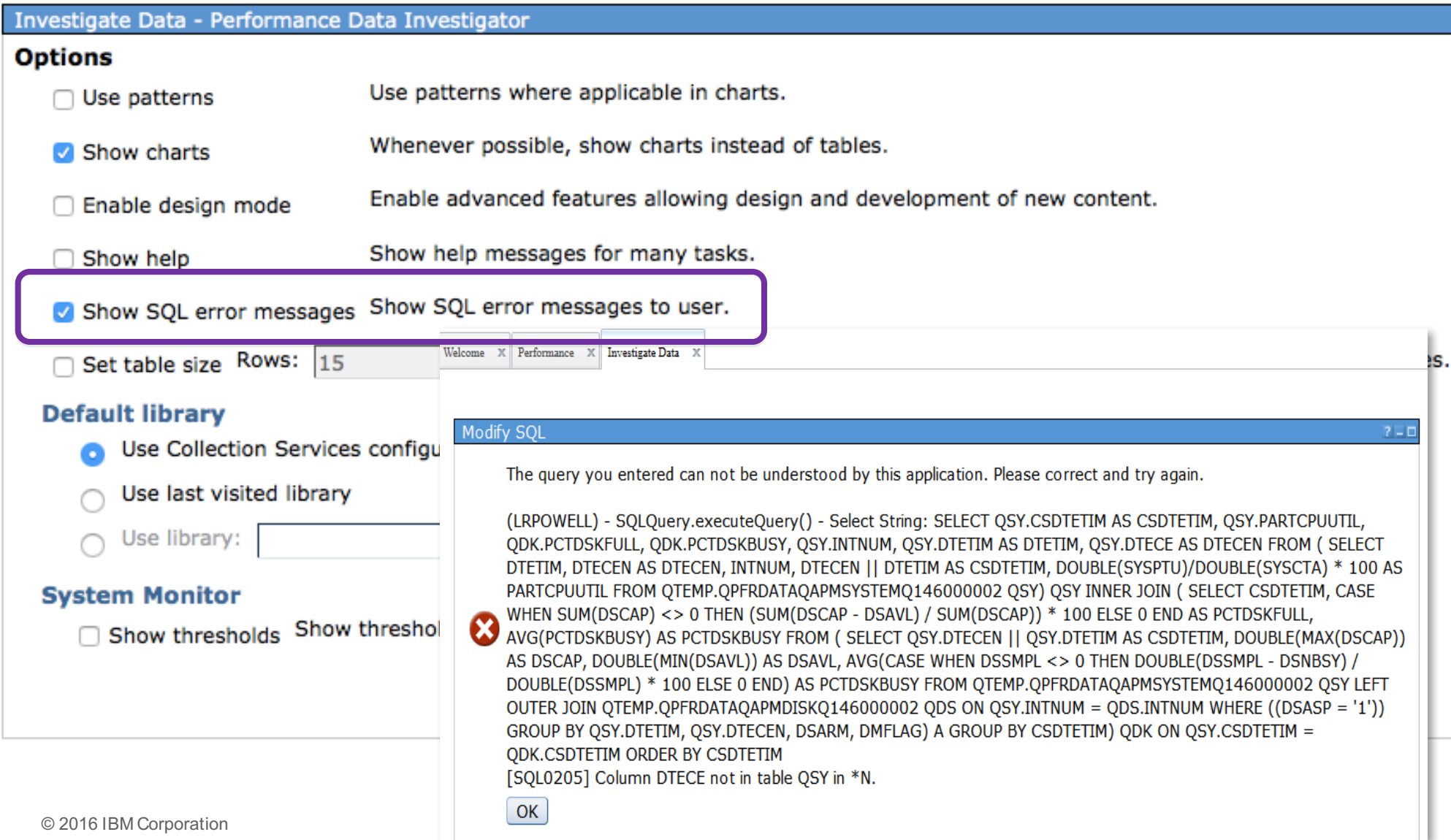
System Monitor

☐ Show thresholds Show thresholds in system monitor charts.

7.2

[OK] [Cancel]

Options – Show SQL Error Messages

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

Investigate Data - Performance Data Investigator

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

Default library

◉ Use Collection Services config...

◯ Use last visited library

◯ Use library:

System Monitor

☐ Show thresholds   Show threshol...

| Welcome X | Performance X | Investigate Data X |

Modify SQL

The query you entered can not be understood by this application. Please correct and try again.
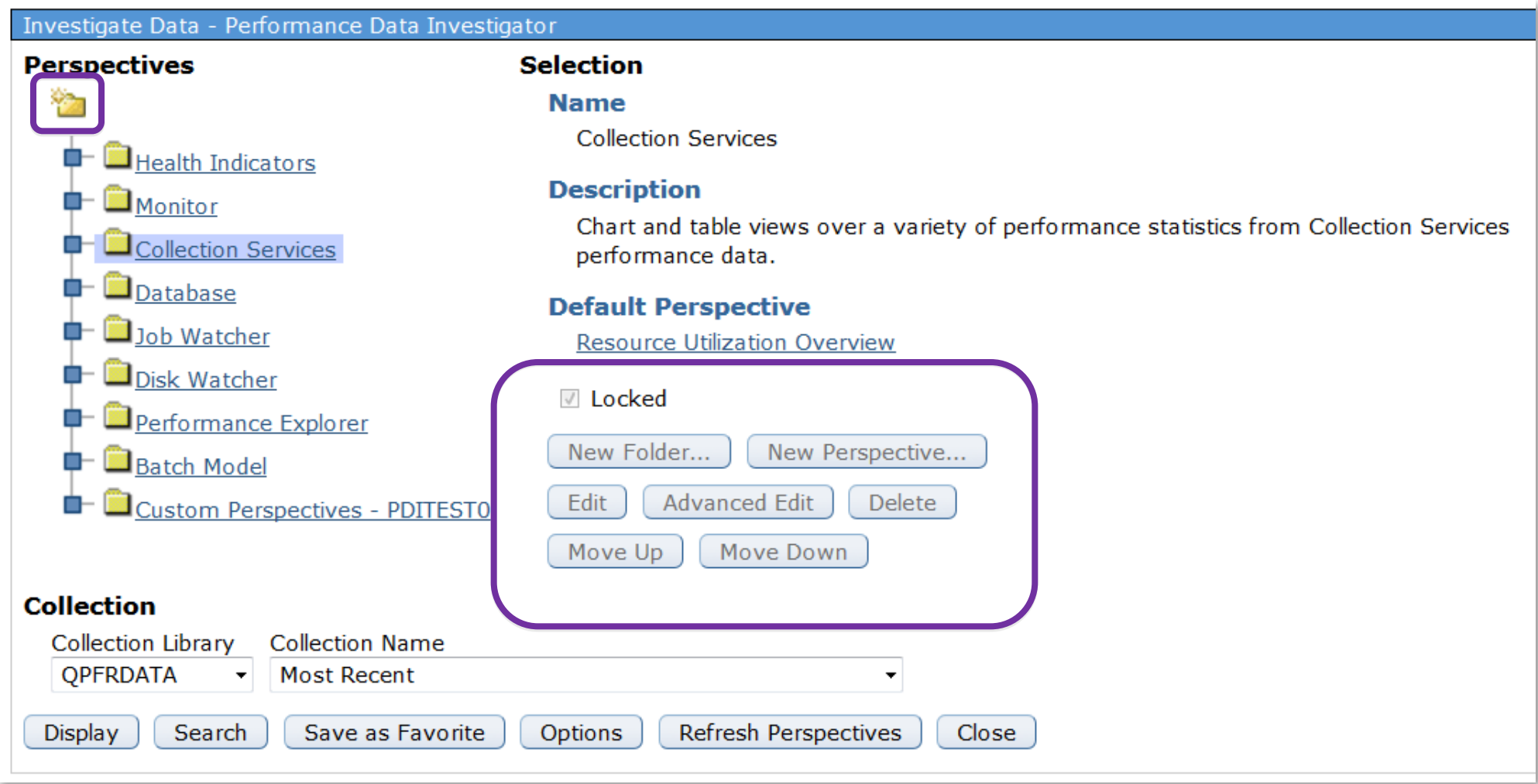
(LRPOWELL) - SQLQuery.executeQuery() - Select String: SELECT QSY.CSDTETIM AS CSDTETIM, QSY.PARTCPUUTIL, QDK.PCTDSKFULL, QDK.PCTDSKBUSY, QSY.INTNUM, QSY.DTETIM AS DTETIM, QSY.DTECE AS DTECEN FROM (SELECT DTETIM, DTECEN AS DTECEN, INTNUM, DTECEN || DTETIM AS CSDTETIM, DOUBLE(SYSPTU)/DOUBLE(SYSCTA) * 100 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.QPFRDATAQAPMDISKQ146000002 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.

OK

Design Mode

"Enable Design Mode" provides additional options to create and edit your own charts and tables.

Creating Custom Content Packages

New Package

Name *

Description

OK   Cancel

Add View

View

Name: Dawn May

Type: ○ Table   ● Chart

Data Set

Modify SQL

Drilldown

☐ 📁 Health Indicators
☐ 📁 Collection Services
☐ 📁 Dawn May

Chart Properties

☐ Transpose Axes

Data Series

[Empty]   Add...
Edit...
Delete
Move Up
Move Down

Thresholds

[Empty]   Add...
Edit...
Delete

OK   Cancel
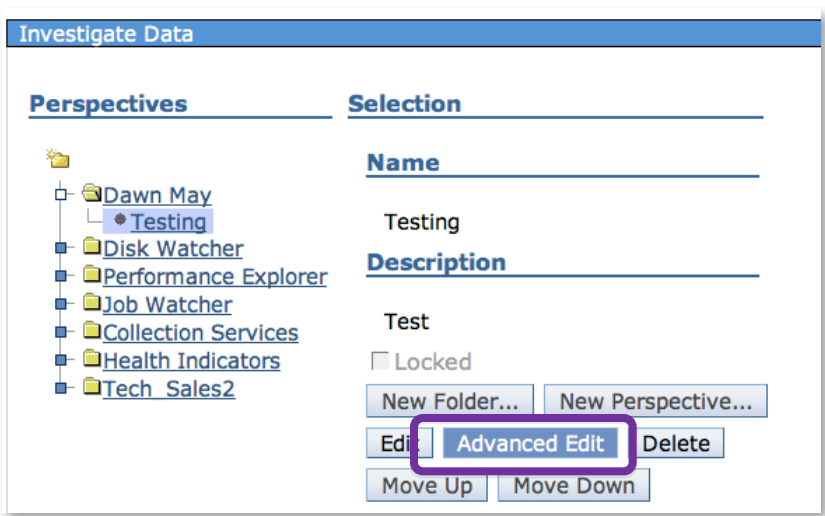
Investigate Data

Perspectives   **Selection**

📁 Dawn May
📁 Disk Watcher
📁 Performance Explorer
📁 Job Watcher
📁 Collection Services
📁 Health Indicators
📁 Tech_Sales2

Advanced Edit – Edit the markup language directly

Investigate Data

Perspectives   **Selection**

                          Name

📁
 ▪ 📁Dawn May   Testing
   └ ▪Testing   **Description**
 ▪ 📁Disk Watcher
 ▪ 📁Performance Explorer   Test
 ▪ 📁Job Watcher
 ▪ 📁Collection Services   ☐ Locked
 ▪ 📁Health Indicators
 ▪ 📁Tech_Sales2   [New Folder...] [New Perspective...]

                       [Edit] [**Advanced Edit**] [Delete]
                       [Move Up] [Move Down]

Edit PML

Performance Markup Language (PML) Text:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<perspective description="Test" id="perspective_ID_504772_ccp"
    label="Testing" locked="false">
  <view class="com.ibm.as400.pt.viewer.views.ChartView"
      id="view_ID_504773_ccp" label="Custom Chart">
    <chartProperties transposeAxes="false">
      <dataSeries chartType="line" renderMode="clustered">
        <domain>
          <field value="INTNUM"/>
        </domain>
        <range>
          <field backgroundColor="RANDOM" color="RANDOM"
              pattern="RANDOM" value="JBLWT"/>
        </range>
      </dataSeries>
    </chartProperties>
    <dataSet>
      <from>
        <value>
          <collection file="QAPMJOBOS"/>
        </value>
      </from>
      <select>
        <field value="INTNUM"/>
        <field value="DTETIM"/>
        <field value="INTSEC"/>
        <field value="DTECEN"/>
        <field value="JBNAME"/>
        <field value="JBUSER"/>
        <field value="JBNBR"/>
```

Design Mode – Edit View

CPU Utilization and Waits Overview
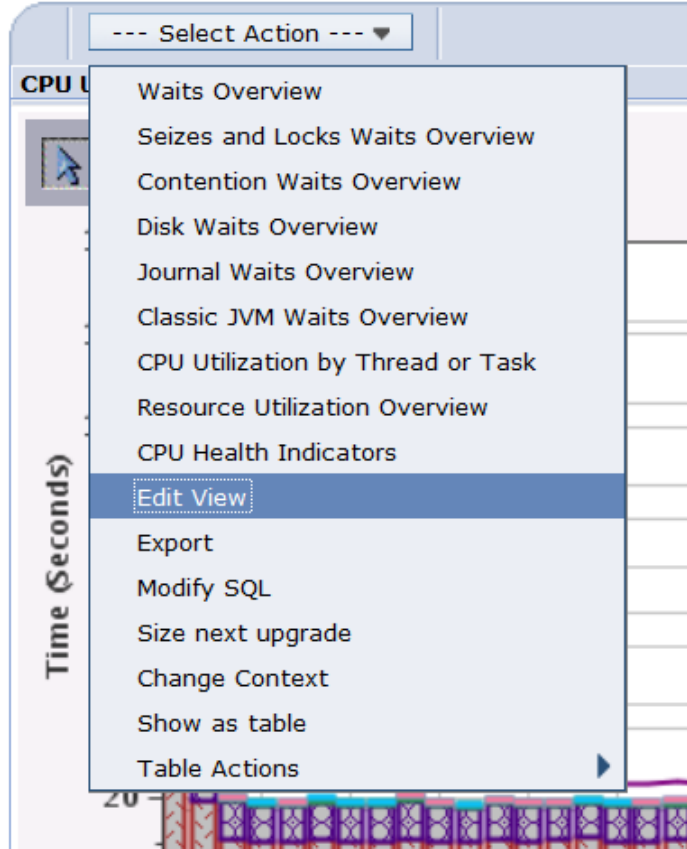
Perspective ⏩ Edit ⏩ View ⏩ History ⏩

Collection

Name(s):	Q067000002
Library:	QPFRDATA
Type:	Collection Services File Based Collection
File level:	36

--- Select Action --- ▼

CPU U

- 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
- **Edit View**
- Export
- Modify SQL
- Size next upgrade
- Change Context
- Show as table
- Table Actions ▶

Time (Seconds)

Edit View

View

Name: CPU Utilization and Waits Overview

Type: ○ Table   ● Chart

Data Set

Modify SQL

Drilldown

☐-☑ 📁 Collection Services
- ☐ ✳ CPU Utilization and Waits Overview
- ☑ ✳ CPU Utilization by Thread or Task
- ☑ ✳ Resource Utilization Overview
- ☐ 📁 Job Statistics Overviews
- ☐-☑ 📁 Waits
  - ☑ ✳ Waits Overview
  - ☑ ✳ Seizes and Locks Waits Overview
  - ☑ ✳ Contention Waits Overview
  - ☑ ✳ Disk Waits Overview
  - ☑ ✳ Journal Waits Overview
  - ☑ ✳ Classic JVM Waits Overview
  - ☐ ✳ All Waits by Thread or Task
  - ☐ ✳ Waits by Job or Task
  - ☐ ✳ Waits by Generic Job or Task
  - ☐ ✳ Waits by Job User Profile
  - ☐ ✳ Waits by Job Current User Profile
  - ☐ ✳ Waits by Pool
  - ☐ ✳ Waits by Subsystem

Design Mode – Edit View
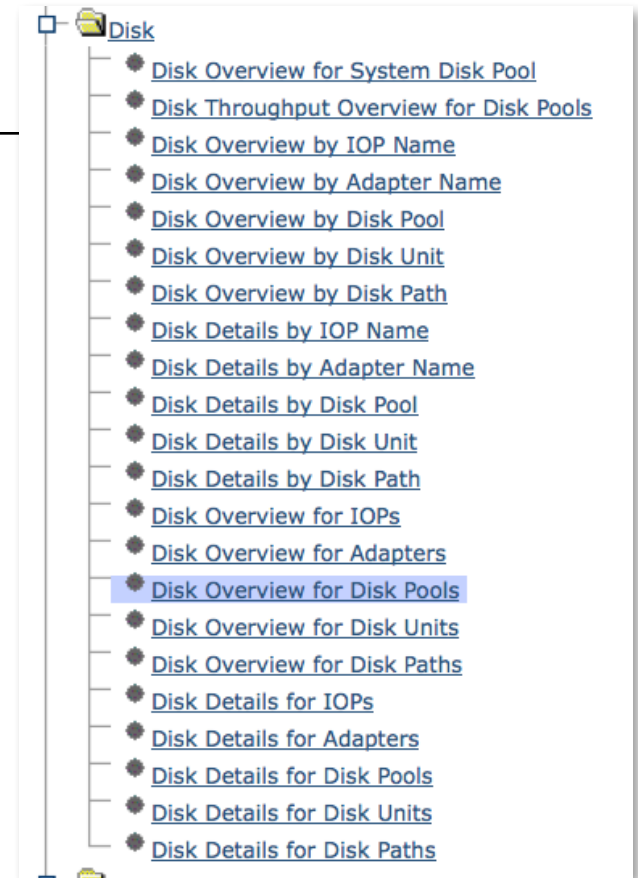
Example use of Design Mode Add Data Series

The Add Data Series option allows you to add additional data to your graphs

Example use of Design Mode - *Edit View:*

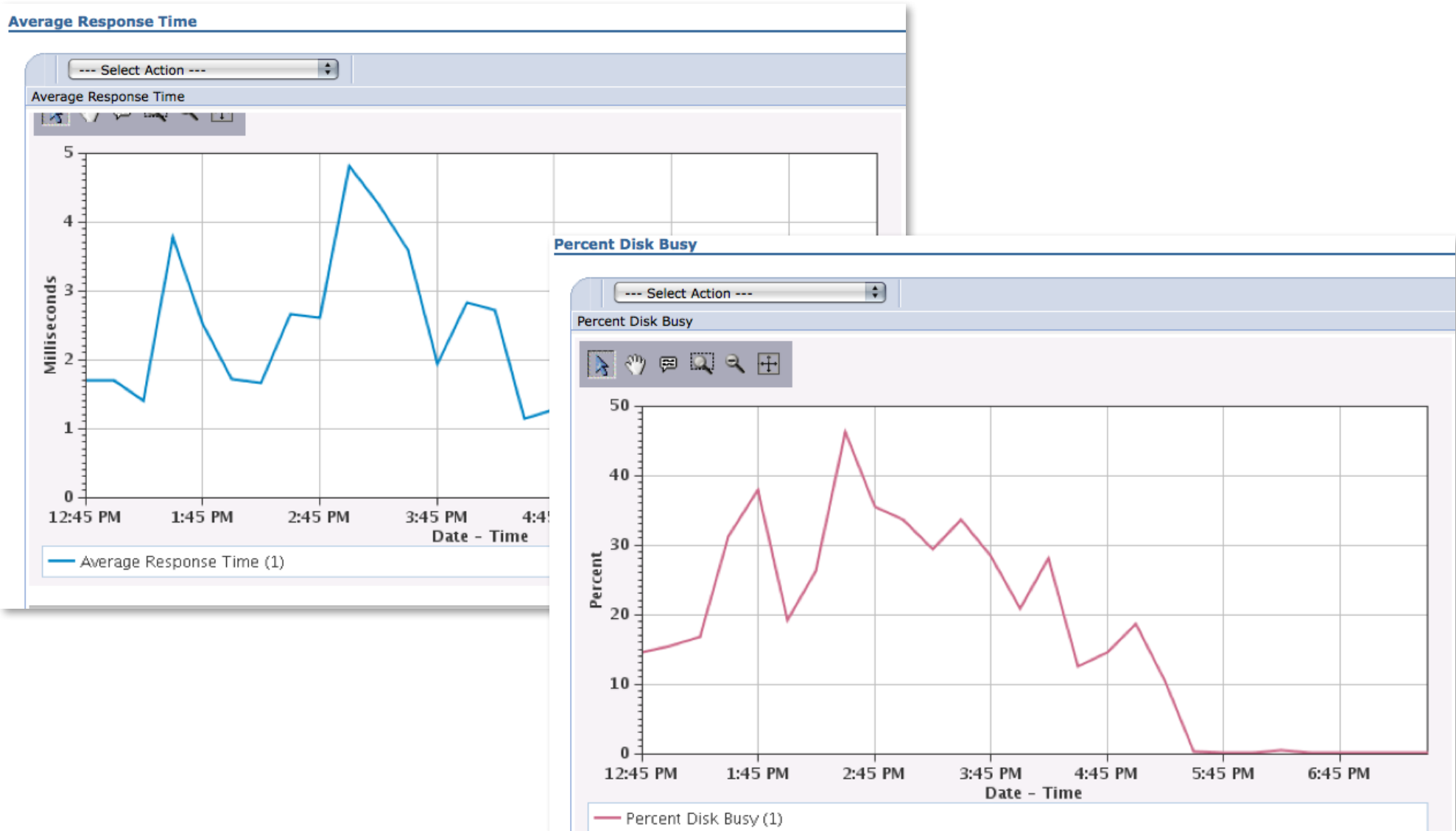Combine the **Average Response Time** and **Percent Disk Busy** metrics on one chart

Start with ...
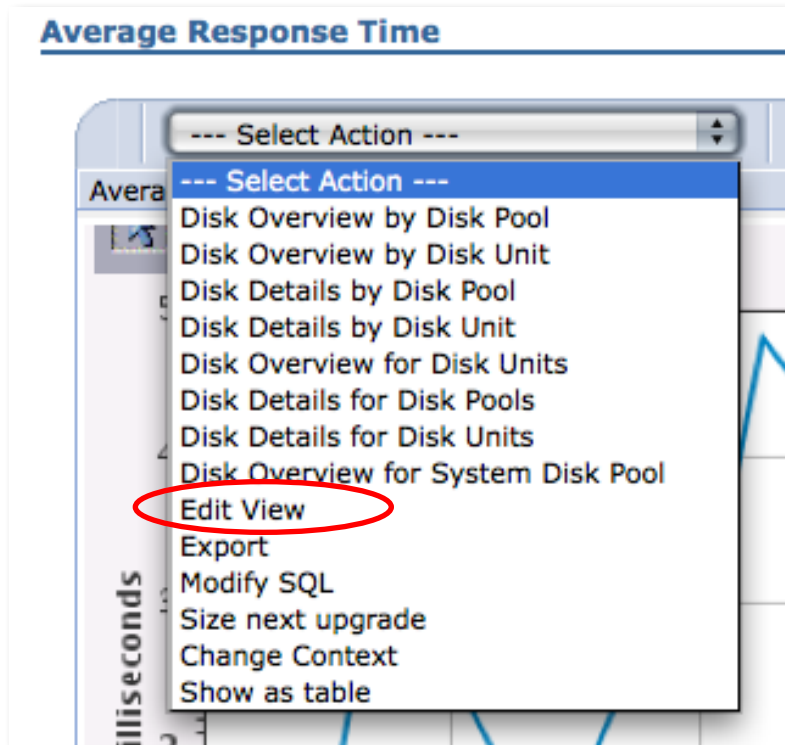   Disk → Disk Overview for Disk Pools

The next set of slides walks you through the steps to do this customization

Disk
- Disk Overview for System Disk Pool
- Disk Throughput Overview for Disk Pools
- Disk Overview by IOP Name
- Disk Overview by Adapter Name
- Disk Overview by Disk Pool
- Disk Overview by Disk Unit
- Disk Overview by Disk Path
- Disk Details by IOP Name
- Disk Details by Adapter Name
- Disk Details by Disk Pool
- Disk Details by Disk Unit
- Disk Details by Disk Path
- Disk Overview for IOPs
- Disk Overview for Adapters
- Disk Overview for Disk Pools
- Disk Overview for Disk Units
- Disk Overview for Disk Paths
- Disk Details for IOPs
- Disk Details for Adapters
- Disk Details for Disk Pools
- Disk Details for Disk Units
- Disk Details for Disk Paths

Disk Overview for Disk Pools gives us two charts
We want this in one chart…

Average Response Time

--- Select Action ---

Average Response Time

Percent Disk Busy

--- Select Action ---

Percent Disk Busy

Select Edit View

from the Average Response Time chart's action drop-down

Average Response Time

--- Select Action ---

--- Select Action ---
Disk Overview by Disk Pool
Disk Overview by Disk Unit
Disk Details by Disk Pool
Disk Details by Disk Unit
Disk Overview for Disk Units
Disk Details for Disk Pools
Disk Details for Disk Units
Disk Overview for System Disk Pool
Edit View
Export
Modify SQL
Size next upgrade
Change Context
Show as table

Scroll down and find the "Data Series" Box and take "Add..."

Chart Properties

☐ Transpose Axes

Data Series

Average Response Time

Add...

Edit...

Delete

Move Up

Move Down

Thresholds
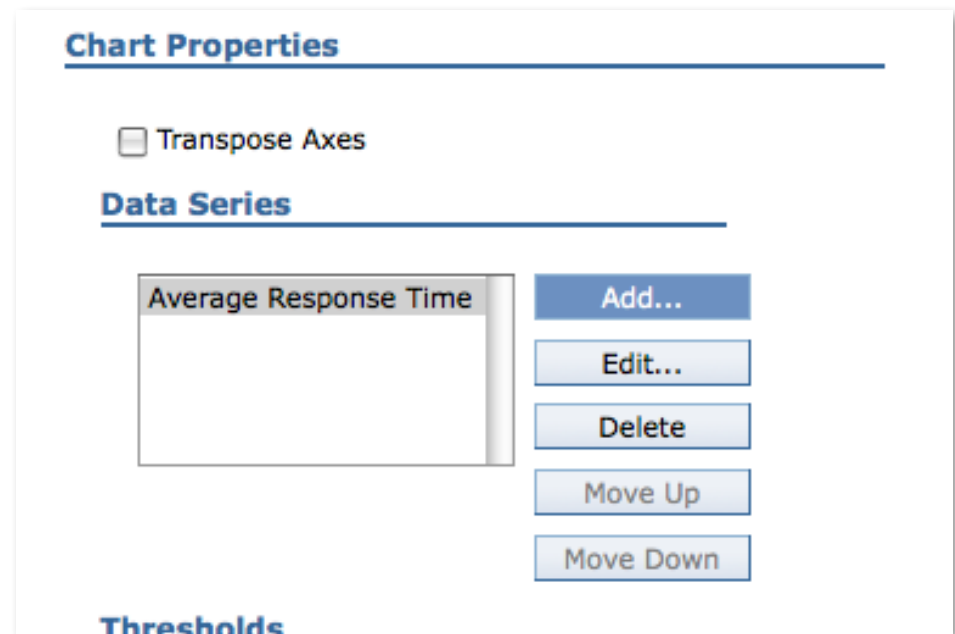
Select the new Range "Percent Disk Busy", then click on "Add"

Select Random for the pattern, use a bar Type graph, and turn on Toolstips for "Percent Disk Busy"

Edit View

Information
The data series has been added.

Close Message

View

Name: Average Response Time and Percent Disk Busy

Type: ○ Table ⦿ C

Modify the View title and click OK

You now have the customized chart

Average Response Time and Percent Disk Busy

--- Select Action ---

Average Response Time and Percent Disk Busy

── Average Response Time (1)   ▦ Percent Disk Busy (1)

69
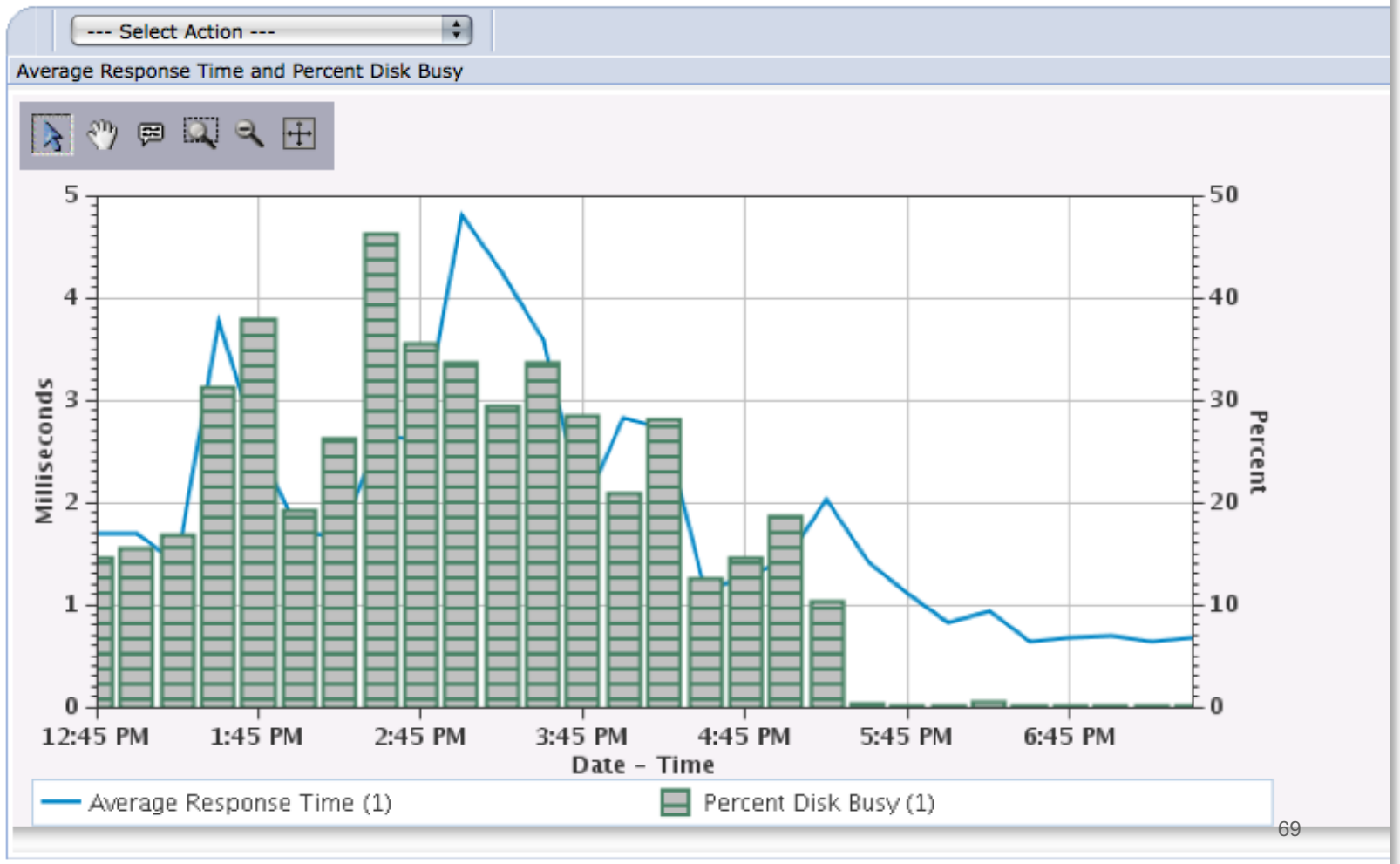
Custom Content Packages – PML Location

- Custom content packages are stored in the following directory:

  \QIBM\UserData\OS400\Navigator\config\PML\CCP
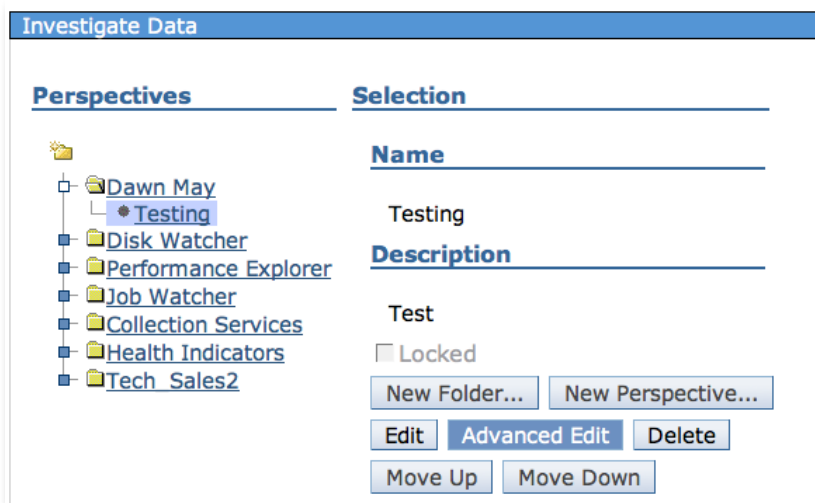
Additional Content Packages

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

- Added 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
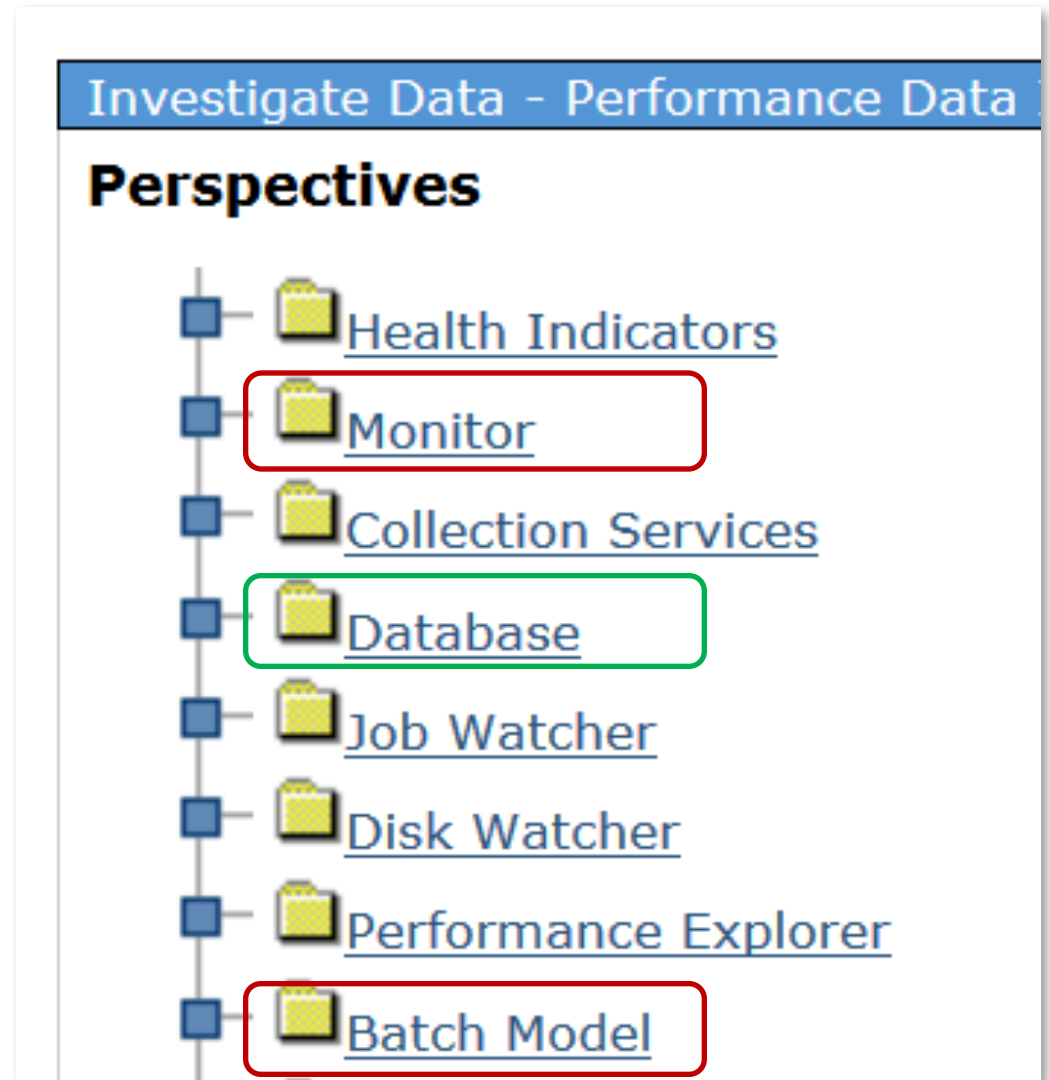
Health Indicators

System Resource Health Indicators

Investigate Data - Performance Data Investigator

Perspectives

Health Indicators
- System Resources Health Indicators
- CPU Health Indica...
- Disk Health Indica...
- Memory Pools He...
- Response Time He...
- Database Health I...

Database Health Indicators were introduced in 7.2

System Resources Health Indicators

Perspective ▸ Edit ▸ View ▸ History ▸

Collection
Name(s): CS228229ND
Library: COMMON
Type: Collection Services File Based Collection

Time
Start: Feb 28, 2008 12:00:02 AM
End: Feb 29, 2008 12:00:00 AM

System
Name:
Release: V6R1M0

--- Select Action ---

System Resources Health Indicators

Intervals Distribution (Percent)

Performance Metric: CPU, Disk, Memory Pools, 5250 OLTP Response Time

Percentage of intervals with values under defined thresholds
Percentage of intervals with values above Warning threshold
Percentage of intervals with values above Action threshold

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CPU Health Indicators

Display Charts in Separate Window

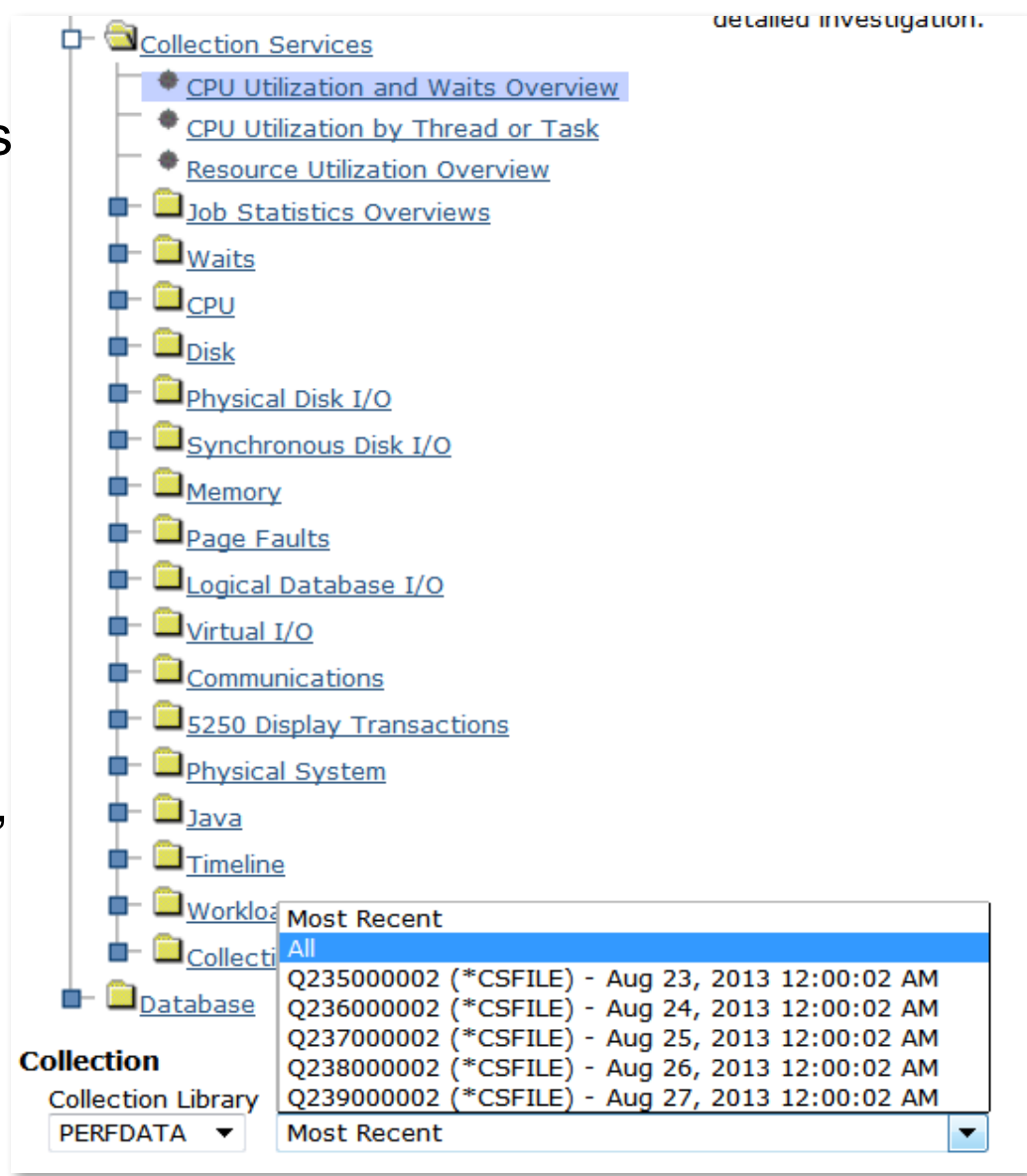- It's useful to compare two graphs side-by-side
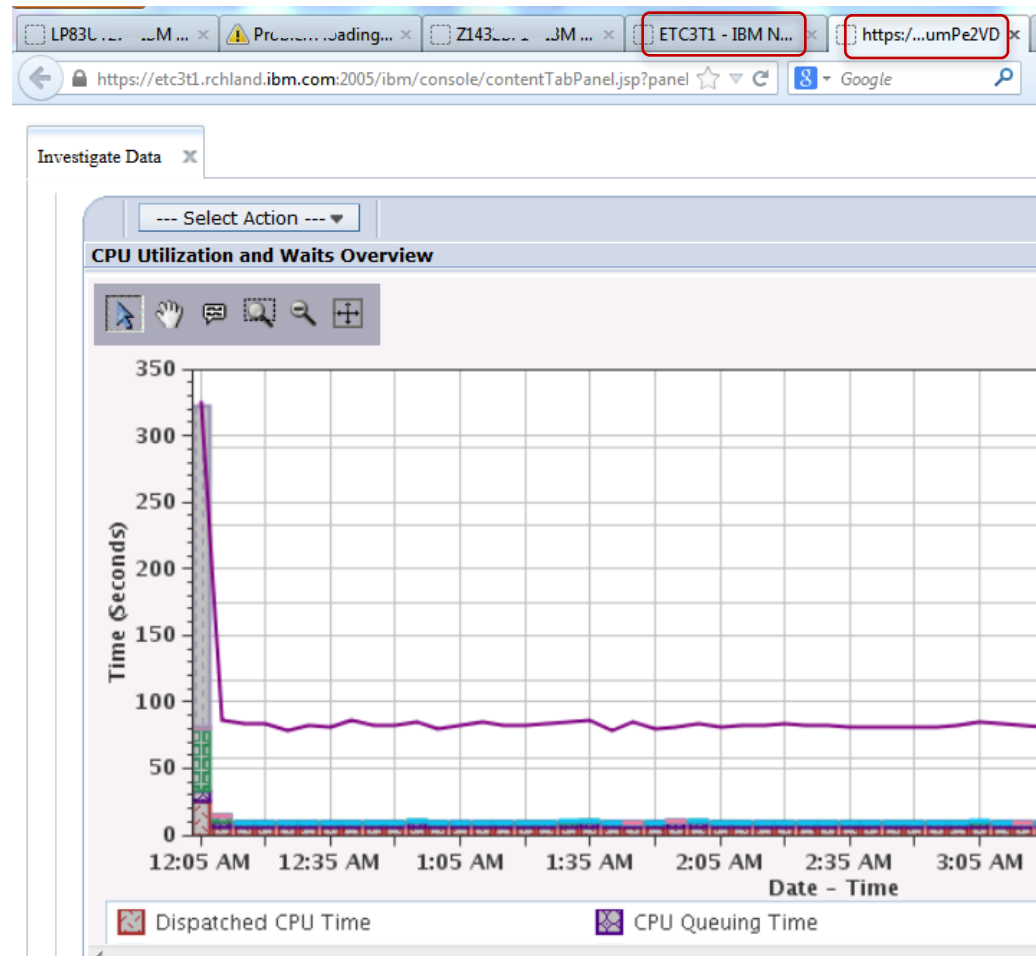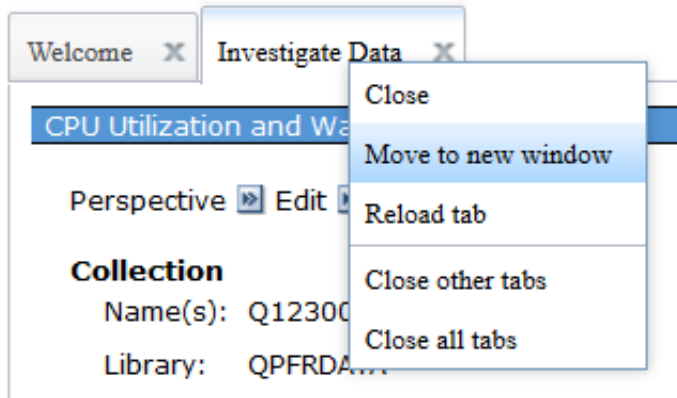
Two Different Charts from Two Different Days
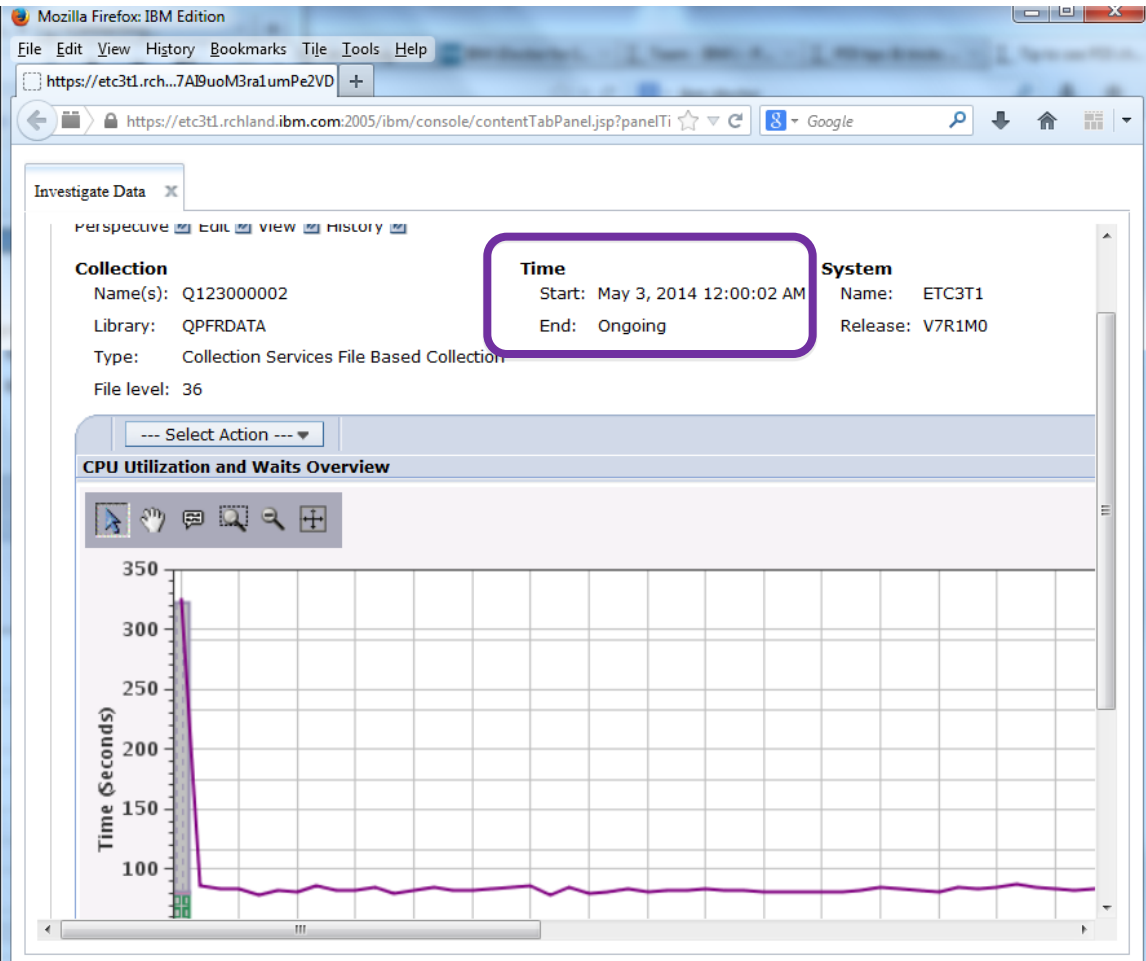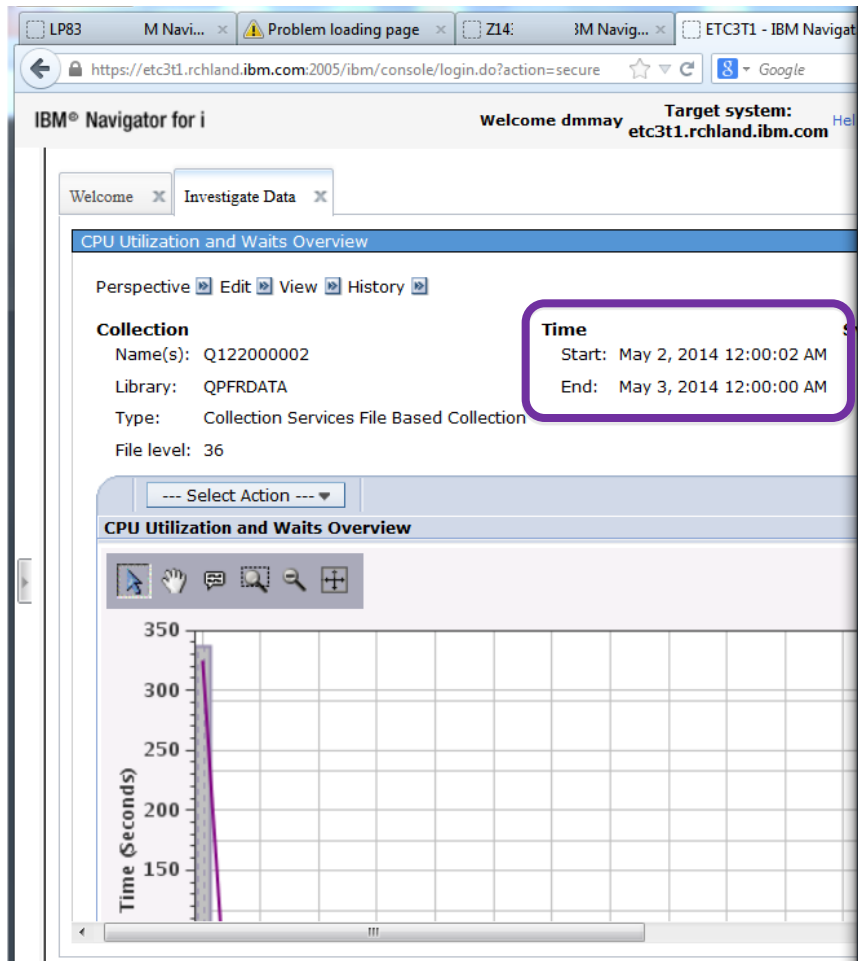
Graphing Multiple Collections

- If your collection library has **5 or fewer** collections, an **All** option is available to display all the collections in one graph

- It will take longer to display the graph
  - Multiple collections means larger queries!

- **Hint**: when the graph appears, you need to use the "reset zoom" tool to display all the data.

detailed investigation.

☐ 📁 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
■─ 📁 Worklo
■─ 📁 Collecti
■─ 📁 Database

Most Recent
All
Q235000002 (*CSFILE) - Aug 23, 2013 12:00:02 AM
Q236000002 (*CSFILE) - Aug 24, 2013 12:00:02 AM
Q237000002 (*CSFILE) - Aug 25, 2013 12:00:02 AM
Q238000002 (*CSFILE) - Aug 26, 2013 12:00:02 AM
Q239000002 (*CSFILE) - Aug 27, 2013 12:00:02 AM

Collection

Collection Library
PERFDATA ▼　　Most Recent ▼
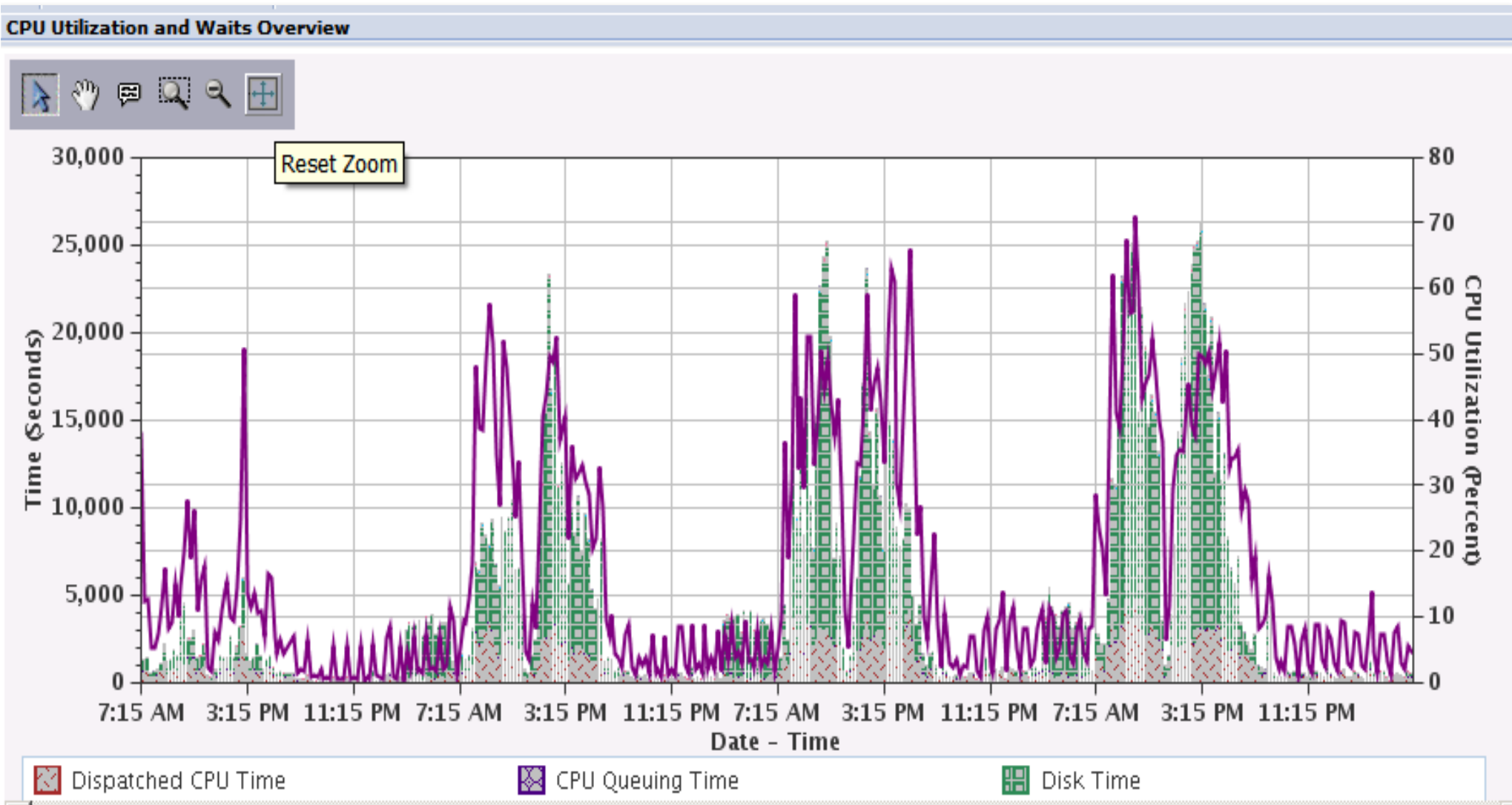
Graphing Multiple Collections

This example shows five days of (uninteresting) Collection Services data

– *Do you know what ran each day at midnight?*
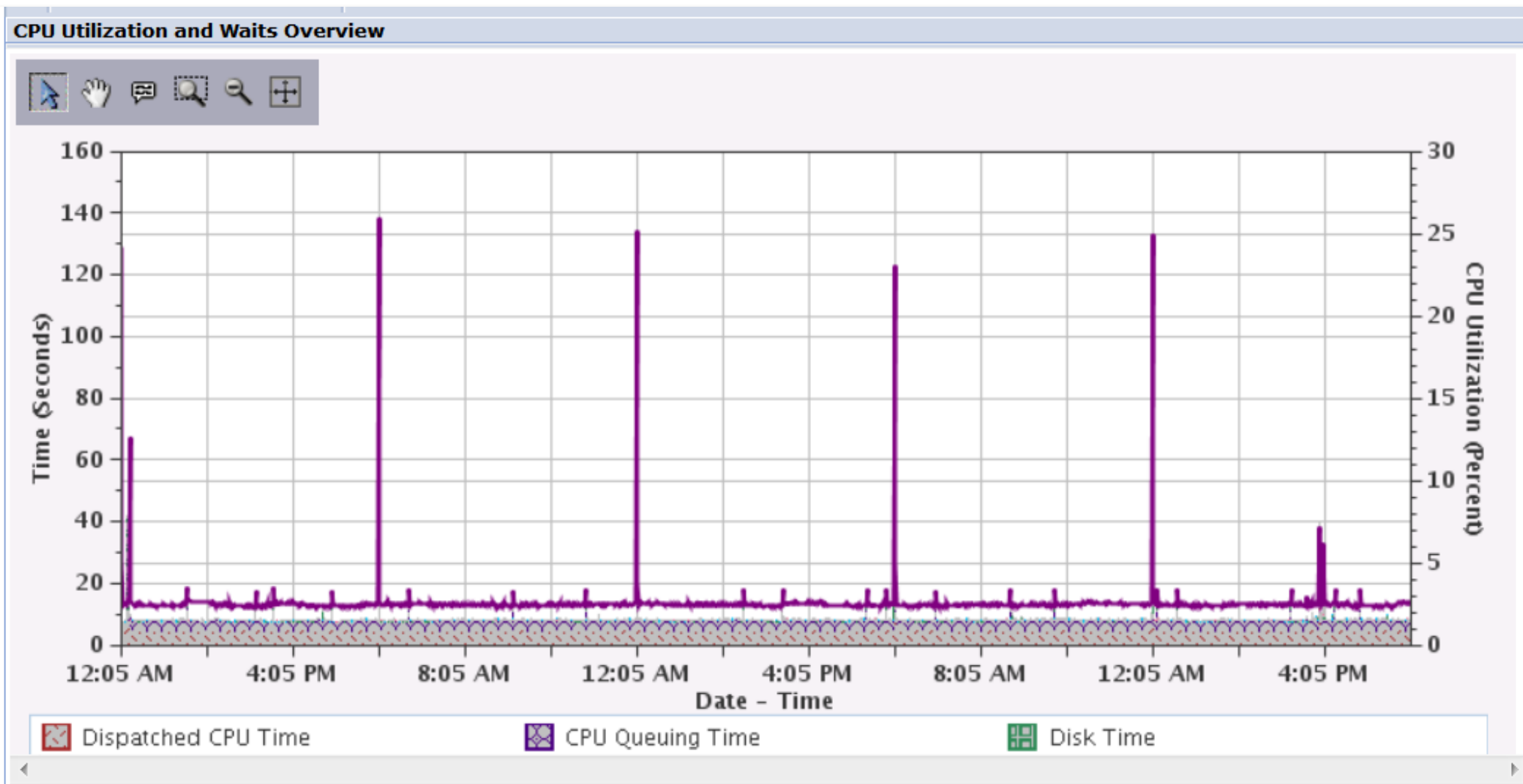
A More Interesting Example

4 days of more interesting performance data

Observe the pattern…

Job Watcher

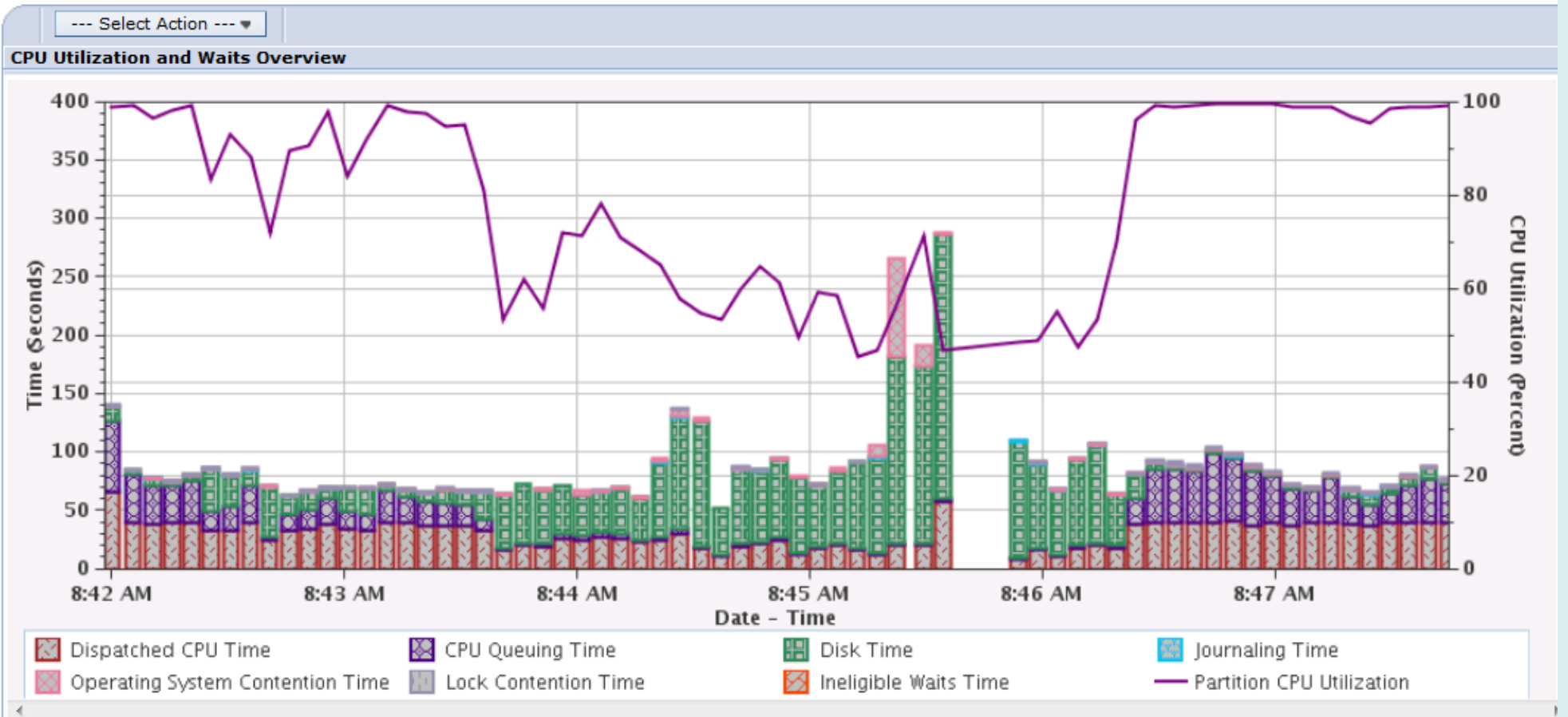# Job Watcher - CPU Utilization and Waits Overview

Collection
Name(s): DAWNJW2
Library: COMMON
Type: Job Watcher File Based Collection
File level: 3

Time
Start: Mar 12, 2008 8:42:26 AM
End: Mar 12, 2008 9:42:33 AM

System
Name: I
Release: V6R1M0

--- Select Action --- ▼

CPU Utilization and Waits Overview

Legend:
- Dispatched CPU Time
- CPU Queuing Time
- Disk Time
- Journaling Time
- Operating System Contention Time
- Lock Contention Time
- Ineligible Waits Time
- Partition CPU Utilization

Job Watcher – Interval Details

- Object level information, holder information, call stacks, sql statement (if applicable)
- Can move to the next interval or specify an interval number

Thread or Task Details

Job information:	QZDASOINIT/QUSER/128962 - 0000000000000005	Priority	20
Current user profile:	LISAW	Pool:	2
Object waited on:	INVENTORY INVENTORY	T,,_ _-----,------:	PHYSICAL FILE MBR - DATA PART
Wait duration:	581 milliseconds	Segment type description:	DB PHYSICAL FILE MEMBER RECORDS
Current or last wait:	DB record lock: update	Wait object library:	None detected this interval
Holding job or task:	QZDASOINIT/QUSER/128890	Interval timestamp:	Jan 3, 2014 2:36:28 PM
SQL client job:	None detected this interval	Interval (1 to 684):	< 174 >

Show Holder

Call Stack

--- Select Action --- ▼

Call Level	Program	Module	Procedure
1			qutde_block_tra
2			longWaitReceive__9QuCounterFR12RmprReceiverPv
3			DBLockConflict__15RmslDBHashClassFR11RmslPlm
4			rmslDBHLock__FR11RmslPlmpLad
5			getLockWithWait__18DbpmUpdateResourcede
6			getLock__18DbpmUpdateResourcead
7			getRowLock__18DbpmUpdateResourceFCUlRC9Dbp
8			execute__18DbpmUpdateLockNodeFR13DbpmQuer
9			vPositionNextAndExecute__18DbpmUpdateLockNod
10			positionNextEntryAndFetchOutline__17DbpmReadO

SQL Statement

☑ Include Host Variables

SELECT QUANTITY FROM WAREHSE42.INVENTORY WHERE ID=*DATA FORMAT ERRORTITY FROM WAREHSE42.INVENTORY WHERE ID=? FOR UPDATE

Job Watcher – Show Holder

- When clicking the "Show Holder" button, the holding job or task info will be displayed.

Interval Details for One Thread or Task (Interval Number = '9', Initial Thread Task Count = '42663')

Perspective ►► Edit ►► View ►►

Thread or Task Details

Job information:	QZDASOINIT/QUSER/128963 - 0000000000000004	Priority	20
Current user profile:	LISAW	Pool:	2
Object waited on:	None detected this interval	Type description:	None detected this interval
Wait duration:	542 milliseconds	Segment type description:	LIC HEAP (MWS) AREA DATA
Holding job or task:	None detected this interval	Interval timestamp:	Jan 3, 2014 2:33:38 PM
Show Holder		Interval Number (1 to 684):	`<` 9 `>`

Call Stack

--- Select Action --- ▼

Call Level	Program	Module	Procedure
1			qutde_block_tra
2			longWaitBlock__23QuSingleTaskBlockerCodeFP2
3			sleep__17LoMiThreadSleeperFQ2_4Rmpr18Interr
4			sleep__14LoSleepManagerFiQ2_4Rmpr18Interrup
5			
6			recv__8LoSocketFR15LoSocketManagerPctT3
7			recv__FtPcN21P7timeval15LoAddressForm
8			recvHandler__FP16LoSocketRecvDa
9			socket
10			#cfm
11			syscall_A_port
12	QSOSRV1	QSOSYS	re
		Total: 20	

Disk Watcher

Investigate Data

Perspectives

- 🗀 Disk Watcher
  - 🗀 **Statistical Overviews**
    - ◆ Disk Statistical Overview
    - ◆ Disk Statistical Overview by Disk Pool
    - ◆ Disk Statistical Overview by Disk Unit
    - ◆ Disk Statistical Overview by Disk Path
  - 🗀 Statistical Details
    - ◆ Disk Statistical Details by Disk Pool
    - ◆ Disk Statistical Details by Disk Unit
    - ◆ Disk Statistical Details by Disk Path
  - 🗀 Trace
  - 🗀 Disk Watcher Database Files
- 🗀 Job Watcher
- 🗀 Collection Services

Selection

Statistical Overviews

Description

Charts that show a variety of performance statistics from Disk Watcher statistical data.

Default Perspective

Disk Statistical Overview

Collection

Collection Library   Collection Name

| COMMON ▾ | Most Recent ▾ |

Most Recent
All
DAWNDW (*DWFILE)
DAWNDWFULL (*DWFILE)
DAWNDWSTAT (*DWFILE)
DAWNFULL (*DWFILE)

[Display] [Close]

Disk Watcher – Statistical Overviews
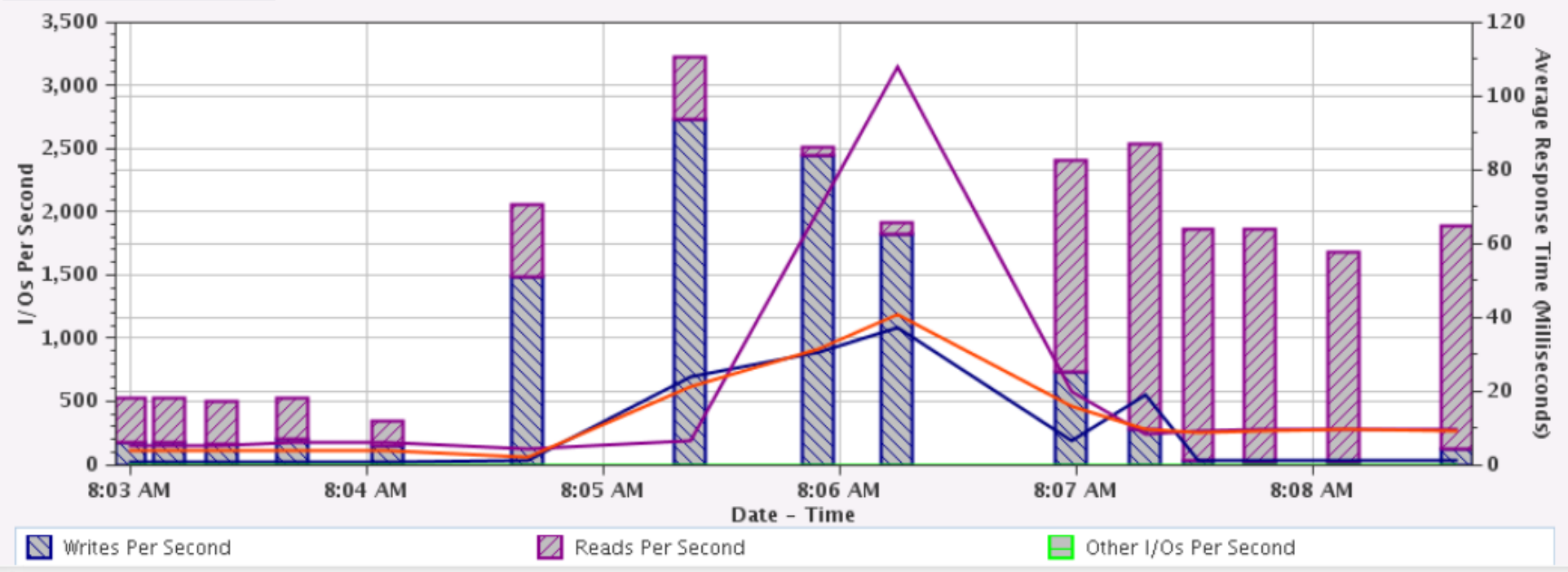
Performance Explorer
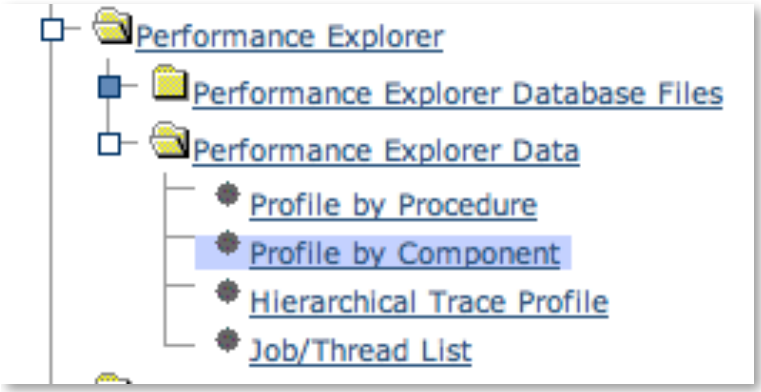
The Profile Perspectives provide function similar to what Performance Data Trace Visualizer offers

Performance Explorer
 ■ Performance Explorer Database Files
 □ Performance Explorer Data
    ● Profile by Procedure
    ● Profile by Component
    ● Hierarchical Trace Profile
    ● Job/Thread List

Profile by Component

Perspective ❯❯ Edit ❯❯ View ❯❯ History ❯❯

Collection

		Time		**System**	
Name(s):	MYTPROF	Start:	Sep 25, 1997 2:16:32 PM	Name:	
Library:	PEXTPTST	End:	Sep 25, 1997 2:18:16 PM	Release:	V5R3M0
Type:	Performance Explorer File Based Collection				

Profile by Component

--- Select Action --- ▾

Select		Total	Component	Procedure Name	Hit Count
☐	▾	Total			24112(100%)
☐	▸		SLIC Database		5228(21.68%)
☐	▸		SLIC Index		4354(18.06%)
☐	▸		SLIC Common Functions		1525(6.32%)
☐	▸		SLIC Storage Management		1404(5.82%)
☐	▸		SLIC Activation/Invocation		1170(4.85%)
☐	▸		Unknown		1058(4.39%)
☐	▸		XPF Message Handler		990(4.11%)
☐	▸		XPF DB2/400 Query Optimizer		805(3.34%)
☐	▸		SLIC String Functions		799(3.31%)
☐	▸		XPF Database Other		783(3.25%)
☐	▸		SLIC Seize/Release		757(3.14%)

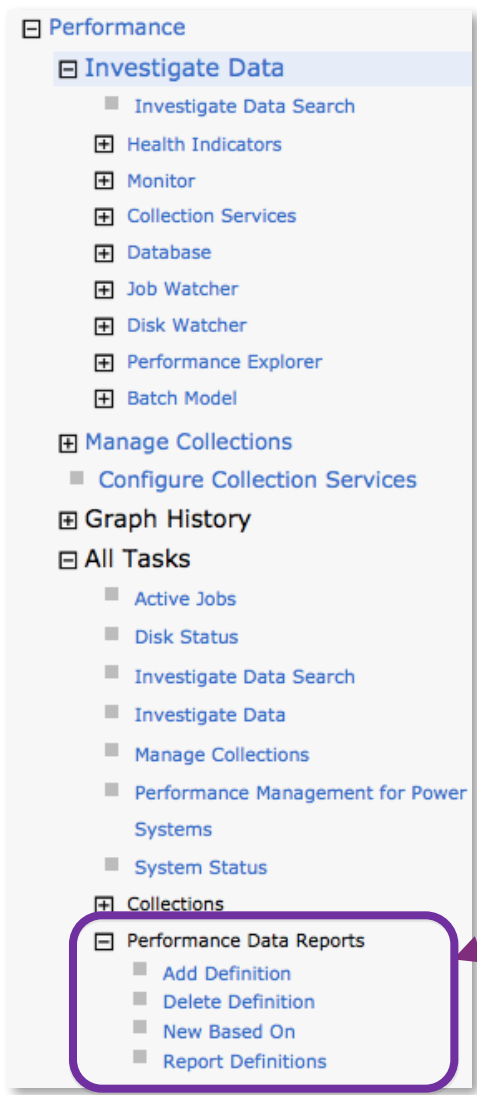Page 1 of 6 ▷ | 1 | Go   Total: 71   Displayed: 12

Done   Options   Save As...

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 Report Definitions

Report Definitions

Performance Data Reports
- Add Definition
- Delete Definition
- New Based On
- Report Definitions

Performance Data Report Definitions - Etc3t1.rchland.ibm.com ? _ □

Actions ▼   Filter

	Name	Description	
⇉ ...	No filter applied		x
☐	Health Indicators	A predefined performance	
☐	System Overview	A predefined performance	
☐	Resource Consumption	A predefined performance	

Create Performance Data Report

Report definition: System Overview ▼

Output type: PDF ▼

Collection: Most Recent ▼

Library: QPFRDATA ▼

Type: Collection Services File Based Collection

OK   Cancel

Create your own Report Definition

Create Performance Data Report

Resulting Report (PDF example)

Power Systems

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

CPU Utilization and Waits Overview

Collection — Name(s): CS228229ND, Library: COMMON, Type: Collection Services File Based Collection

System — Name: RCHASTND, Release: V6R1M0

Time — Start: Feb 28, 2008 12:00:02 AM, End: Feb 29, 2008 12:00:00 AM

Page Faults Overview

Collection — Name(s): CS228229ND, Library: COMMON, Type: Collection Services File Based Collection

System — Name: RCHASTND, Release: V6R1M0

Time — Start: Feb 28, 2008 12:00:02 AM, End: Feb 29, 2008 12:00:00 AM

Synchronous Disk I/O Overview

Collection — Name(s): CS228229ND, Library: COMMON, Type: Collection Services File Based Collection

System — Name: RCHASTND, Release: V6R1M0

Time — Start: Feb 28, 2008 12:00:02 AM, End: Feb 29, 2008 12:00:00 AM

Total Synchronous Disk I/O Reads — Total Synchronous Disk I/O Writes — Average Read Response Time — Average Write Response Time

Integration with Active Jobs

Qzdasoinit	Waiting for time interval	Qsecofr
Qzdasoinit	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

Reset Statistics

Printer Output

Job Log

Details ▶

Reply…

Hold…

Release

Move…

Delete/End…

Performance ▶

Properties

Elapsed Performance Statistics

Investigate Job Wait Data

Start Job Watcher

5 | 10 | 25 | 50 | **100** | All

101

System

Oct 1, 2009 12:00:06 AM   Name:

Ongoing   Release: V7R1M0

Active jobs – what's happening *right now*

Collection Services data with job wait data – what happened *up to now*

Dispatched CPU Time   CPU Queuing Time
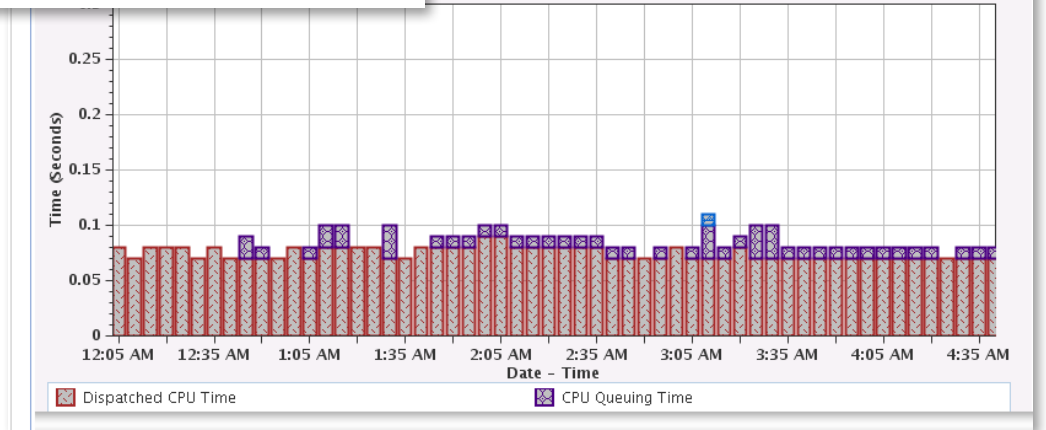
Integration with System Status

System Status - e...

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

General	**Jobs**
Jobs	Total: 4,537
Processors	Active: 262
Memory	**Addresses used**
Disk Space	Permanent: 0.010 %
Addresses	Temporary: 0.022 %

Total disk space: 95.44 GB

System disk pool

Capacity: 95.44 GB

Usage: 79.118 %

System Resources Health Indicators

System Status - e...

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

General	Total memory: 4,096.00 MB
Jobs	Active Memory Pools
Processors	Memory Pools Health Indicators
Memory	
Disk Space	
Addresses	

System Status - e...

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

General	Total disk space: 95.44 GB
Jobs	**System disk pool**
Processors	Capacity: 95.44 GB
Memory	Usage: 79.118 %
Disk Space	**Temporary storage used**
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
Processors	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

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Integration with Disk Status

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Power Systems
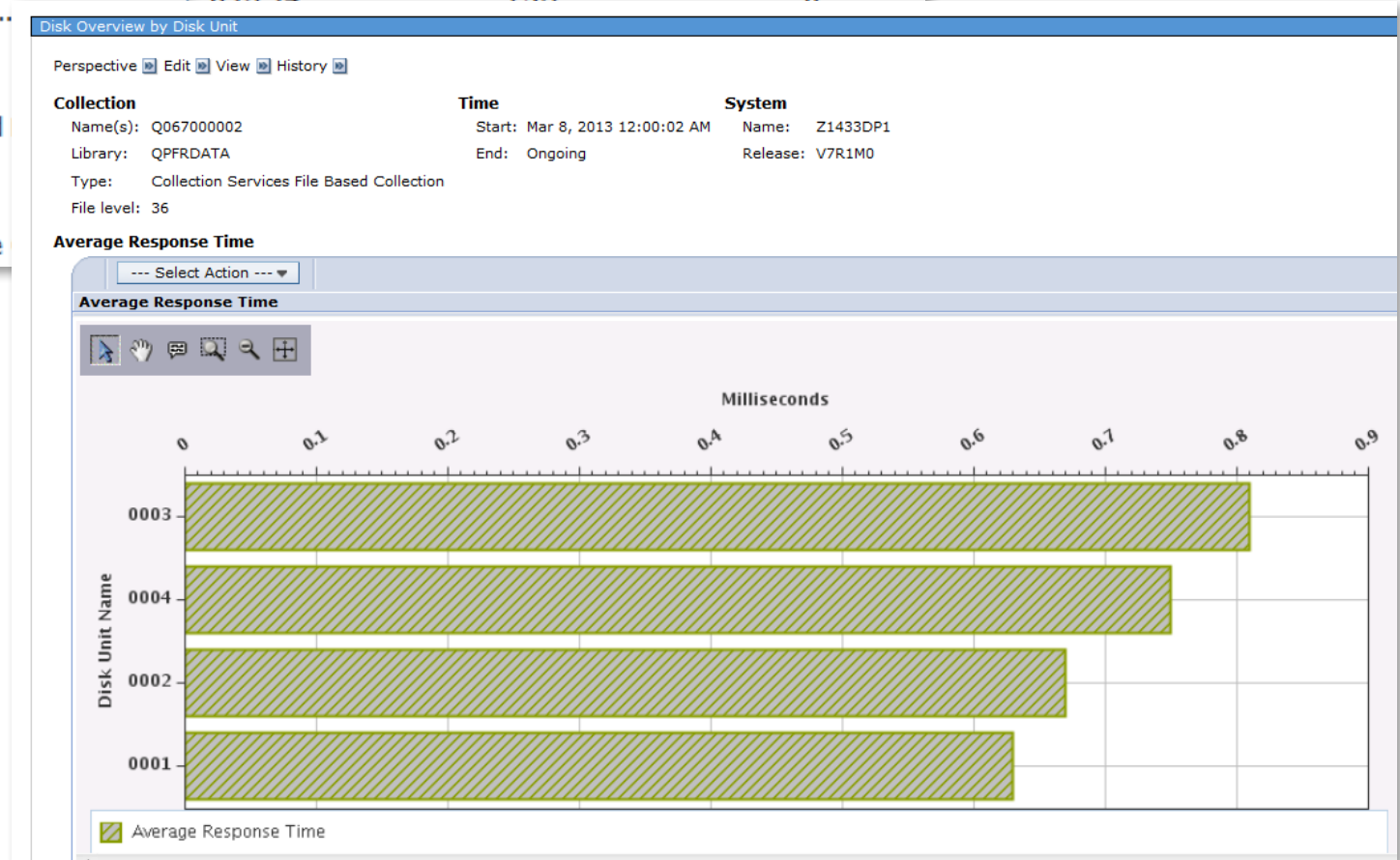
Set Target System

- IBM i Management
  - Target Systems and Groups
    - Target Systems
      - System Groups

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

Add Target System | Set As Target System | Properties | Delete | Refresh System Status

	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

Power Systems

Set Target System

7.1 screen captures

IBM® Navigator for i

- Welcome
- IBM i Management
  - Set Target System
  - System

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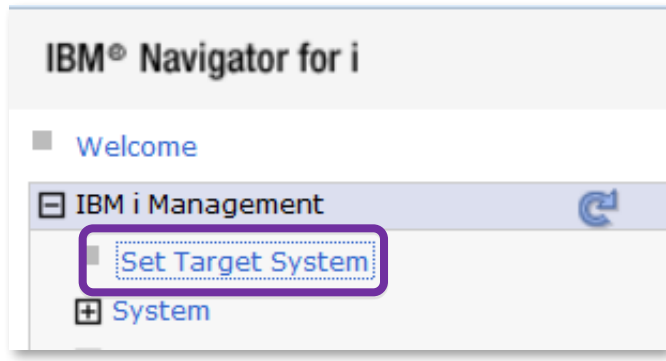
Set Target System

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
●	Etc3t1.rchland.ibm.com	v7r1m0	Dmmay
○	Ivzsyste3mndydsrtglabibs.ibm.com	v7r1m0	Dmmay
○	Etc3t2.rchland.ibm.com	v7r2m0	Dmmay
○	Isz1ld11erchstglabss.ibm.com	v6r1m0	Dmmay
○	Ctewcbu54ushelstserdsbm.com	v5r4m0	Dmmay

Add
Remove
Change

Page 1 of 1   1   Go   Rows 5   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
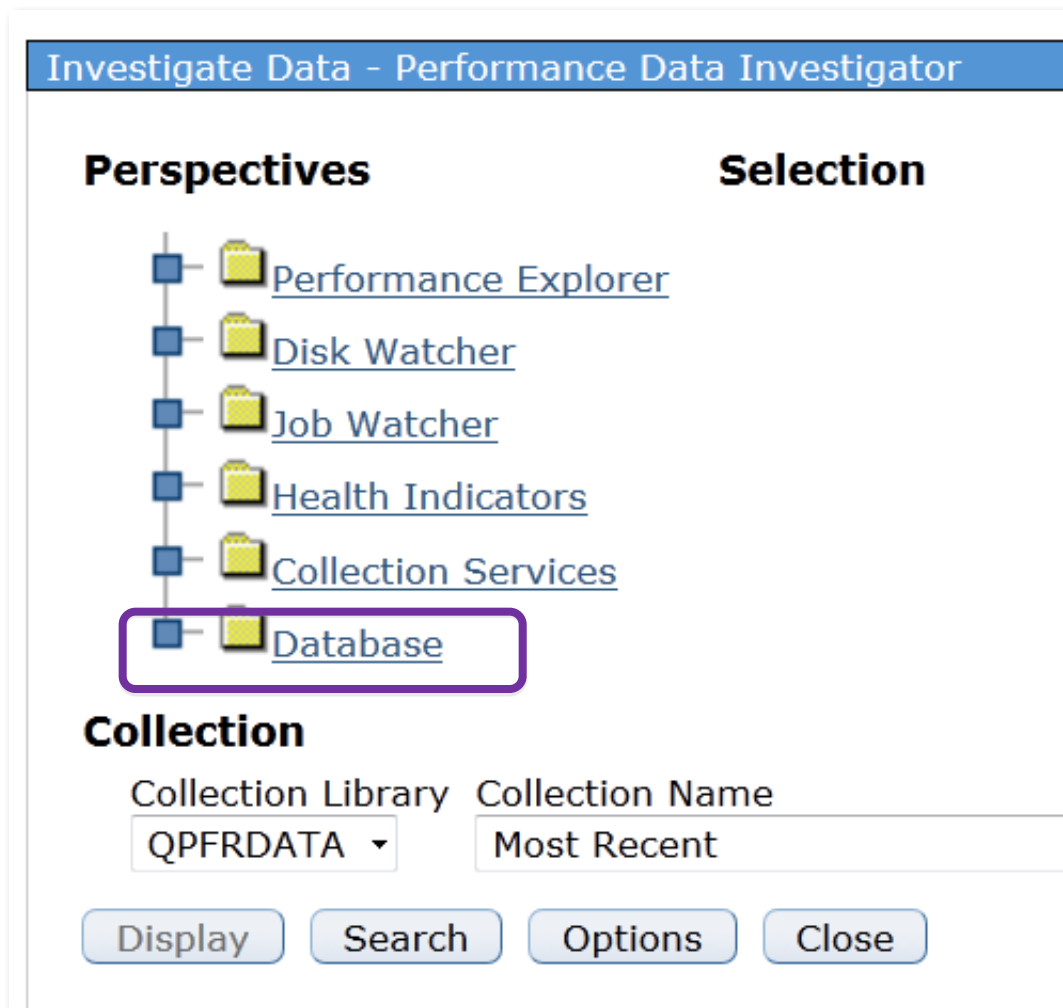
Database

- Requires 2015 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 and later

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

QPFRDATA ▾   Most Recent

[Display] [Search] [Options] [Close]

Integration with Database – package overview

- Database Package for 7.1 and later
  - 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
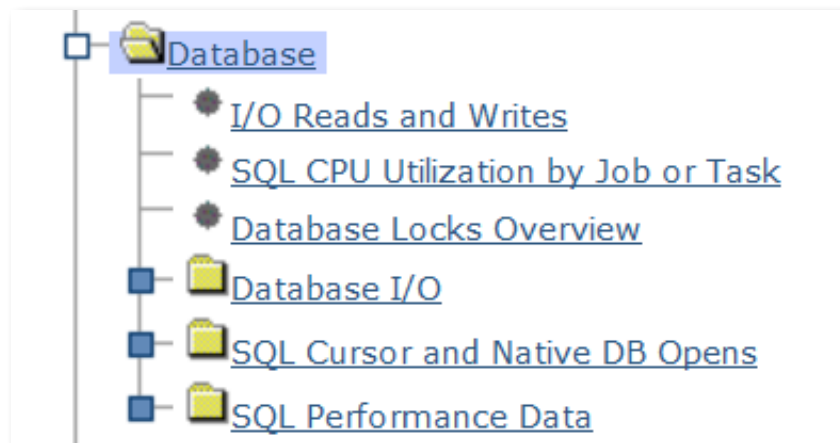
Integration with Database

Launch "Investigate Performance Data" from various database tasks

Launch PDI from System i Navigator client 7.1 examples
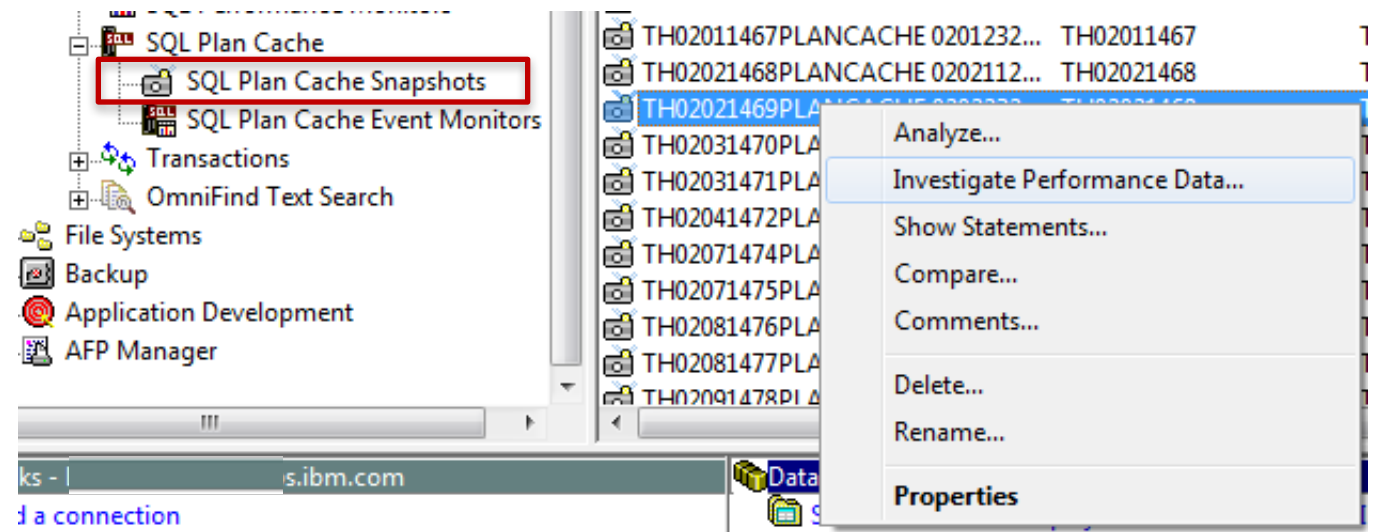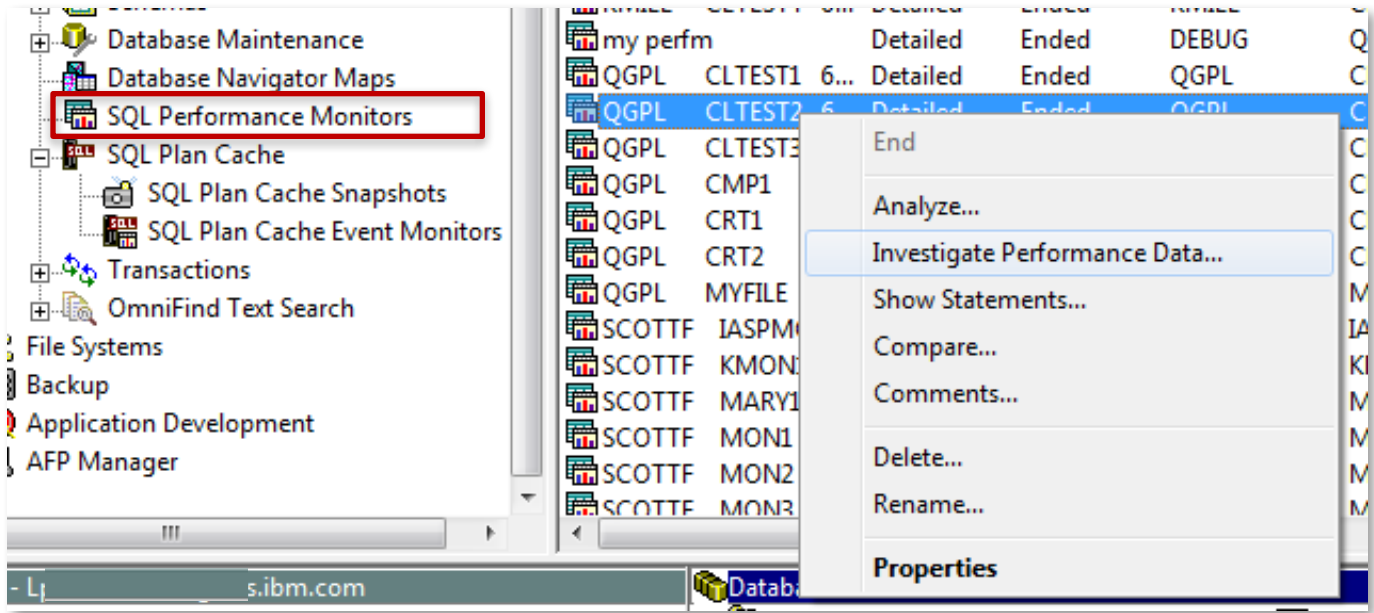
SQL Overview

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

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

Database
  Database I/O
  SQL Performance Data
    SQL Plan Cache
      SQL Overview
      SQL Attribute Mix
    SQL Performance Monitor
  wangnan_test2

Collection

Collection Library
SCOTTF

Collection Name
snap of 33 (SQL Plan Cache Snapshot)

Display   Search   Options   Close

Statement Summary

Call Statements
Delete Statements
Select Statements
Data Definition Statements
Update Statements
Other Statements
Insert Statements

Investigate Data

PDI Fan Club Favorite
Collection Services Perspectives

(PDI is more than Performance)

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. When this data is available, it can be viewed via several perspectives found under "Physical System".
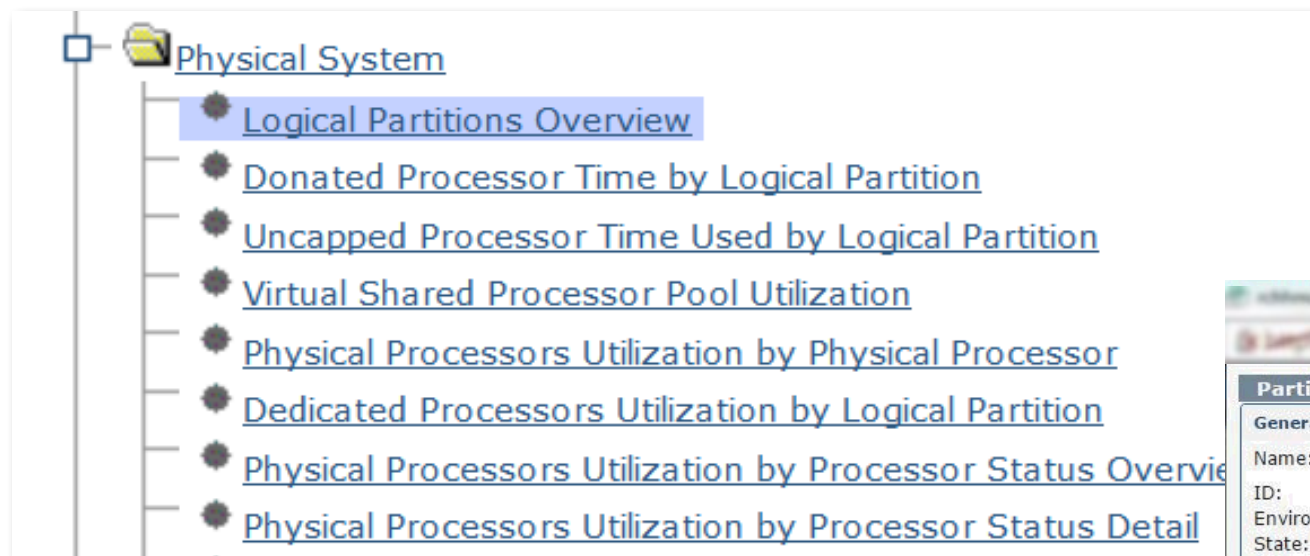
HMC option to enable performance collection must be turned on for the IBM i partition to collect the data

Logical Partitions Overview

Logical Partitions Overview

Uncapped CPU Time Used (DENVER): 5,579
Date - Time: Jan 27, 2016 12:06:00 AM
Interval Number: 5
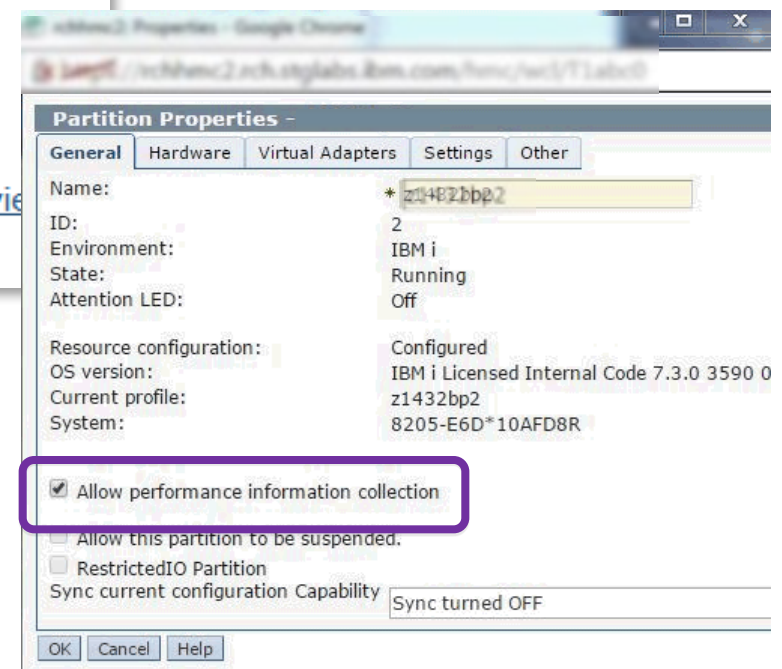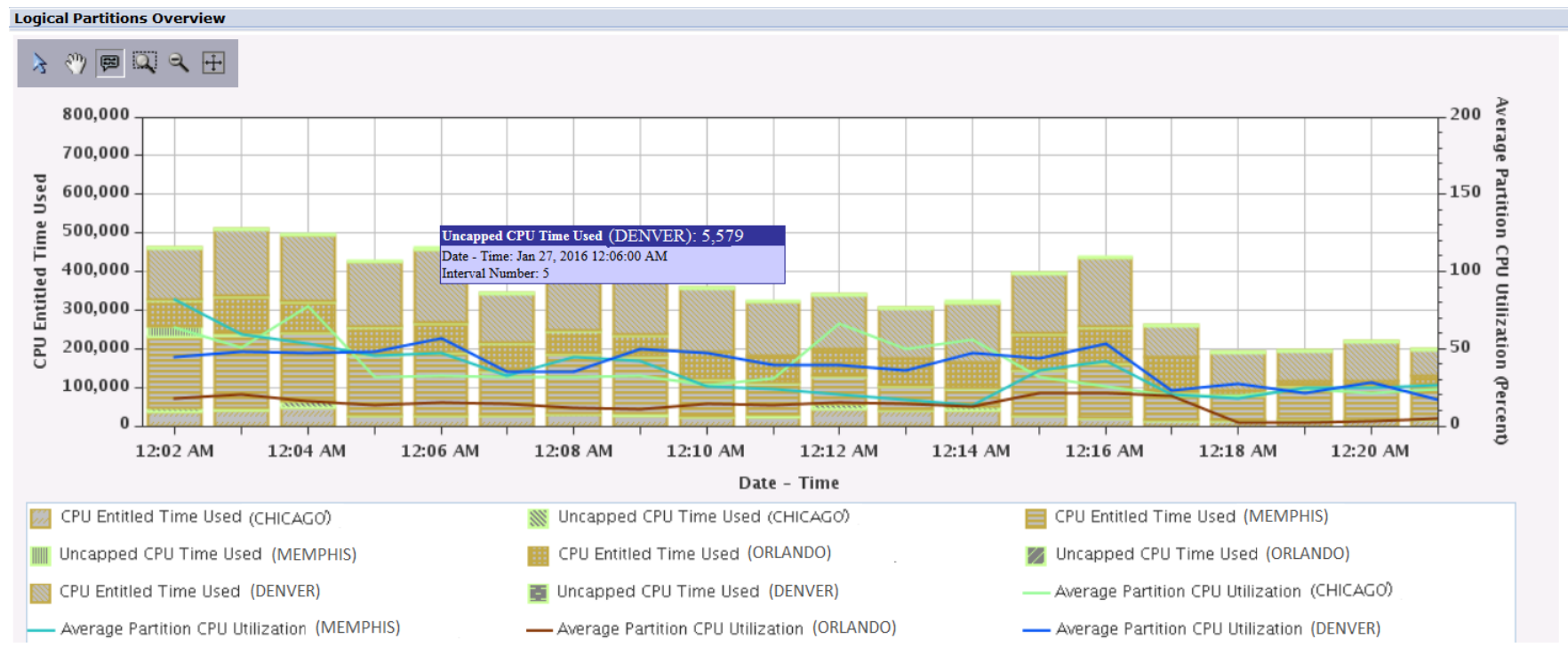
- 4 IBM partitions on system - all running IBM i (shared/uncapped)
- On a single chart, we can see:
  - Average CPU utilization for each partition
  - CPU Entitled Time Used
  - Uncapped CPU Time Used
  - Leverage tooltips and Table data

Logical Partition Operating System	Virtual Processors	Current Processing Capacity	Current Configured Memory	Average Partition CPU Utilization (Percent)	CPU Entitled Time Used	Uncapped CPU Time Used	Donated Processor Time
i5/OS	2	1	36864	63.4	37431	9440	0
i5/OS	6	4	77824	81.67	185079	24971	0
i5/OS	6	5	55296	17.44	70026	205	0
i5/OS	5	4	116736	44.31	133502	1352	0
i5/OS	2	1	36864	50.45	39497	6295	0
i5/OS	6	4	77824	59.62	188516	7904	0
i5/OS	6	5	55296	20.5	96609	355	0
i5/OS	5	4	116736	47.66	170108	1665	0

Collection Services – Disk Reads and Writes Detail

- Disk
  - Disk Response Time
    - Detailed
      - Disk I/O Rates Overview
      - Disk I/O Rates Overview With Cache S
      - Disk I/O Average Response Time Overv
      - Disk I/O Total Response Time Overview
      - Disk I/O Total Service Time Overview
    - Disk Reads and Writes Detail
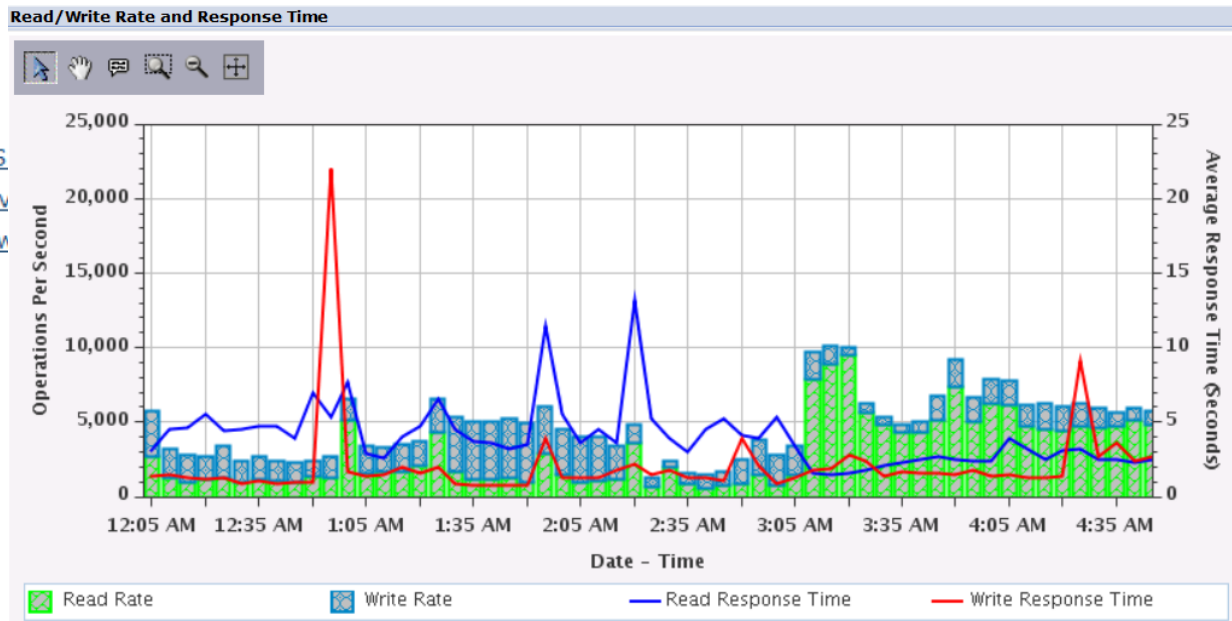
One perspective with several key charts, such as:
- Read and Write response times and rates
- Disk hardware information

Read/Write Rate and Response Time

Read Rate   Write Rate   Read Response Time   Write Response Time

Performance Data Investigator IBM I Model DSS

Select	Serial	SmfModel	ServerType	LogicalCapacity (GB)	LunCount	MeasureDateTime
☐	Internal	433A	i	2837	11	2016/10/12 00:05:00
☐	Internal	433A	i	2837	11	2016/10/12 00:10:00
☐	Internal	433A	i	2837	11	2016/10/12 00:15:00
☐	Internal	433A	i	2837	11	2016/10/12 00:20:00
☐	Internal	433A	i	2837	11	2016/10/12 00:25:00

Installed Disk Hardware

Select	ASP Number	Disk Unit Type	Feature Code	RAID Type	Unit Count	ASP Capacity (GB)	Disk Used	Average Unit Size
☐	1	15K SAS HDD	N/A	RAID-5	11	2837.4	54.21	257.9

Database - SQL CPU Utilization Overview

Database
- I/O Reads and Writes
- SQL CPU Utilization Overview
- Database Locks Overview
- Database I/O
- SQL Cursor and Native DB Opens
- SQL Performance Data
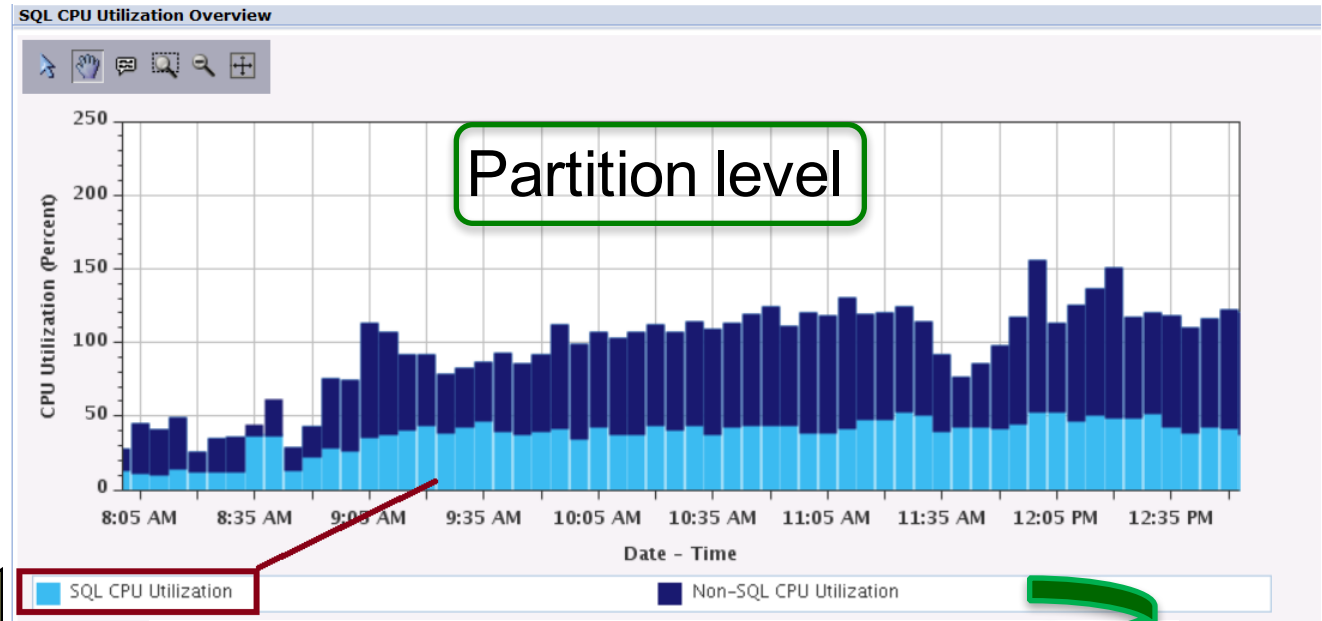
Allows you to see how much of your CPU utilization is due to SQL work

Partition level

Job level

Scaled CPU

http://ibmsystemsmag.blogs.com/i_can/2010/03/i-can-understand-scaled-cpu-time.html
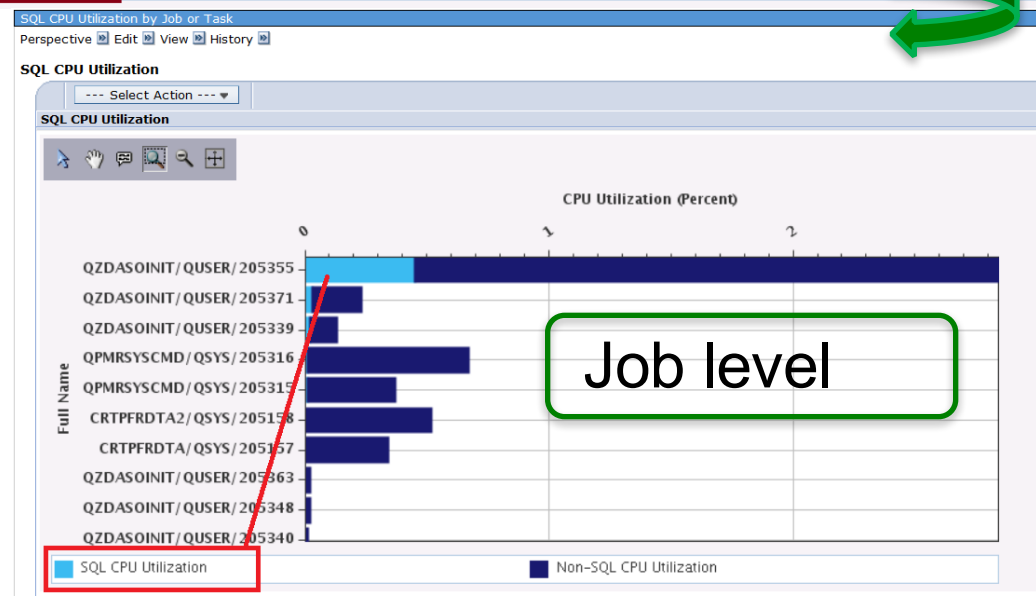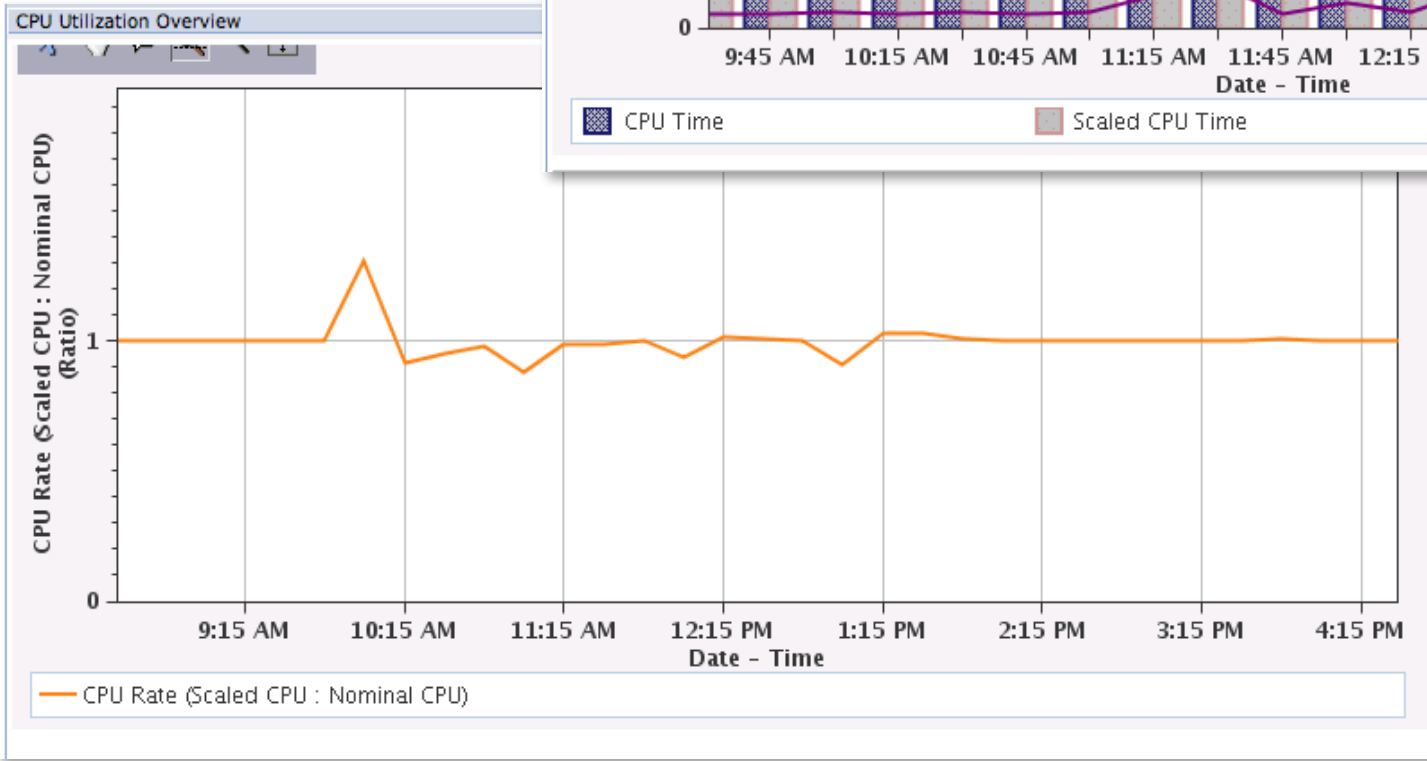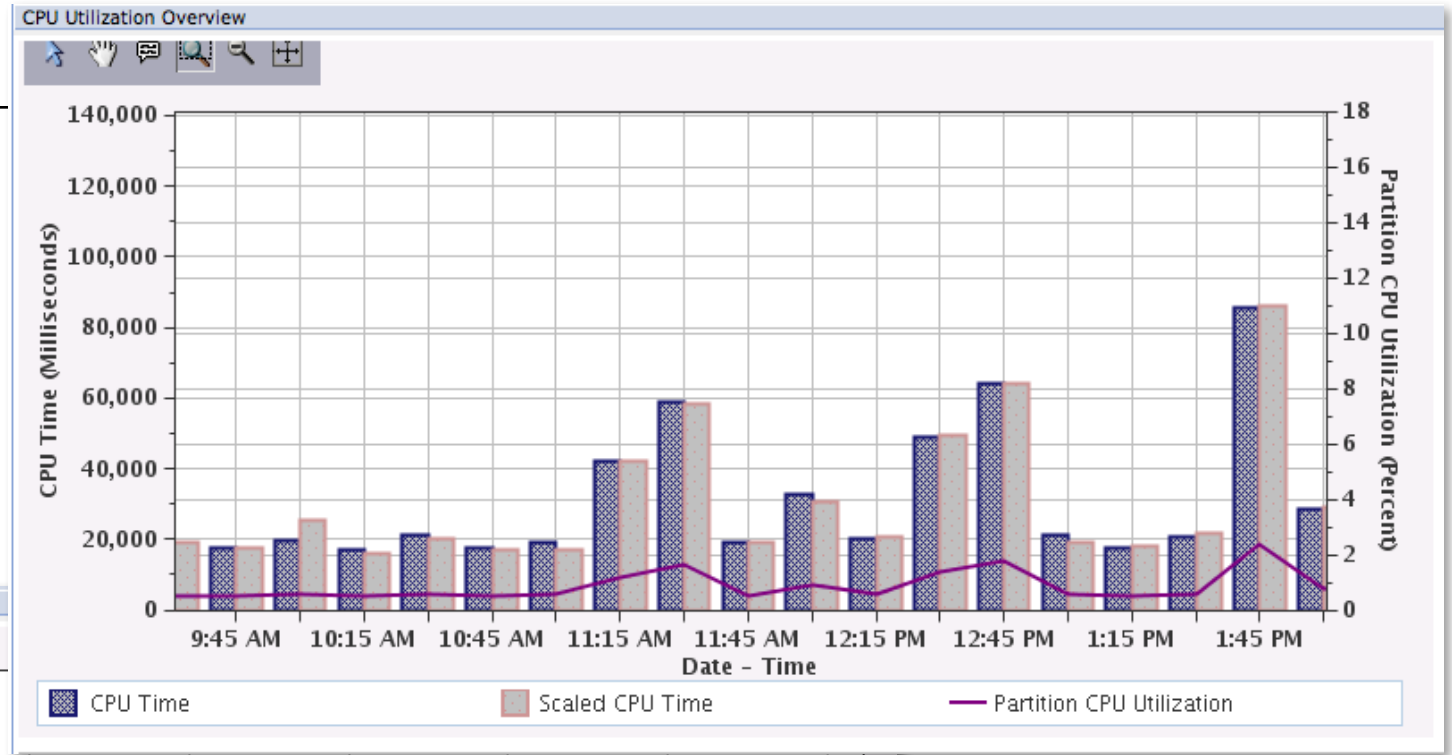
Communications Perspectives

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

Ethernet Protocol Overview

Perspective ≫ Edit ≫ View ≫ History ≫

Collection

Name(s): CS228229ND
Library: COMMON
Type: Collection Services File Based Collection

Time

Start: Feb 28, 2008 12:00:02 AM
End: Feb 29, 2008 12:00:00 AM

System

Name:
Release: V6R1M0

--- Select Action ---

Ethernet Protocol Overview

Average Number of Kilobytes Transmitted Per Second
Average Number of Kilobytes Received Per Second

Done   Options   Save As...

Disk Response Time Charts

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

Power Systems

Java Perspectives

Java
- ● IBM Technology for Java Memory Overview
- ● IBM Technology for Java Memory by Job

--- Select Action --- ▼

IBM Technology for Java Memory Overview

IBM Technology for Java Memory by Job

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	DB Pages	Non-DB Fault	Non-DB Pages
1	490.59	247.83	+++++	.0	.0	.0	.0
2	5344.71	6.07	149	.0	.0	.0	.0
3	2283.44	.00	203	.0	.0	12.3	29.0
4	.25	.00	5	.0	.0	.0	.0

Power Systems

Memory - Drilldown

Memory Pool Sizes and Fault Rates (001-004)

--- 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

Page Faults by Job or Task

Faults Per Second

Full Name	
QPMRSYSCMD/QSYS/064090	
QPMHDWRC/QSYS/064089	
QYMEPFRCVT/QSYS/064086	
CFSLT00	
Q1PPMSUB/QPM400/064156	
QYMEARCPMA/QSYS/064085	
QZRCSRVS/QUSER/064149	
QPWFSERVSO/QUSER/064142	
CAS/QTMHHTTP/064093	
ADMIN/QTMHHTTP/064094	
Q1PDR/QPM400/064091	
Q1PPMCHK/QPM400/064102	
Q1PPMCHK/QPM400/064117	
Q1PPMSUB/QPM400/064120	

Faults Per Second   I/O Pending Faults Per Second

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Power Systems

IBM

Performance Data Investigator
Storage Allocation Perspectives

Expand Collection Services

- 🗀 Storage Allocation
  - ● Storage Allocation/Deallocation Overview
  - ● Storage Allocation/Deallocation by Thread or Task
- 🗀 Temporary Storage
  - ● Temporary Storage Allocation Accounting
  - ● Temporary Storage Allocation/Deallocation Overview
  - ● Temporary Storage Allocation/Deallocation by Job or Task
  - ● Temporary Storage Allocation/Deallocation by Thread or Task
  - ● Temporary Storage Allocation/Deallocation by Generic Job or Task
  - ● Temporary Storage Allocation/Deallocation by Job User Profile
  - ● Temporary Storage Allocation/Deallocation by Job Current User Profile
  - ● Temporary Storage Allocation/Deallocation by Subsystem
  - ● Temporary Storage Allocation/Deallocation by Server Type

---

Selection

Name

Temporary Storage Allocation Accounting

Description

This chart shows the amount of temporary storage charged to active and ended jobs, the amount of user temporary storage, and the amount of temporary storage used for database and non database operations by the IBM i operating system across the system over time for the selected collections. Use this chart to select a time frame for further detailed investigation.

View List

Temporary Storage Allocation Accounting and SQL Statements
Temporary Storage Allocation Accounting and Disk Average Response

---

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Temporary Storage Allocation / Deallocation Overview

Generally, allocations and deallocations following a similar pattern

Temporary Storage Allocation by *Job Current User Profile*

--- Select Action --- ▼

Temp

| Temporary Storage Allocation/Deallocation by Job or Task |
| Temporary Storage Allocation/Deallocation by Thread or Task |
| Temporary Storage Allocation/Deallocation by Generic Job or Task |
| Temporary Storage Allocation/Deallocation by Job User Profile |
| Temporary Storage Allocation/Deallocation by Job Current User Profile |
| Temporary Storage Allocation/Deallocation by Subsystem |
| Temporary Storage Allocation/Deallocation by Server Type |

Temporary Storage Allocation by Job Current User Profile

Temporary Storage (Megabytes)

Current User: QSYS, QBRMS, QSECOFR, DMMAY, QUSER, QDIRSRV, QLWISVR, QYPSJSVR

X-axis: 0, 2,000, 4,000, 6,000, 8,000, 10,000

Temporary Storage Allocation (Megabytes)   Temporary Storage Deallocation (Megabytes)
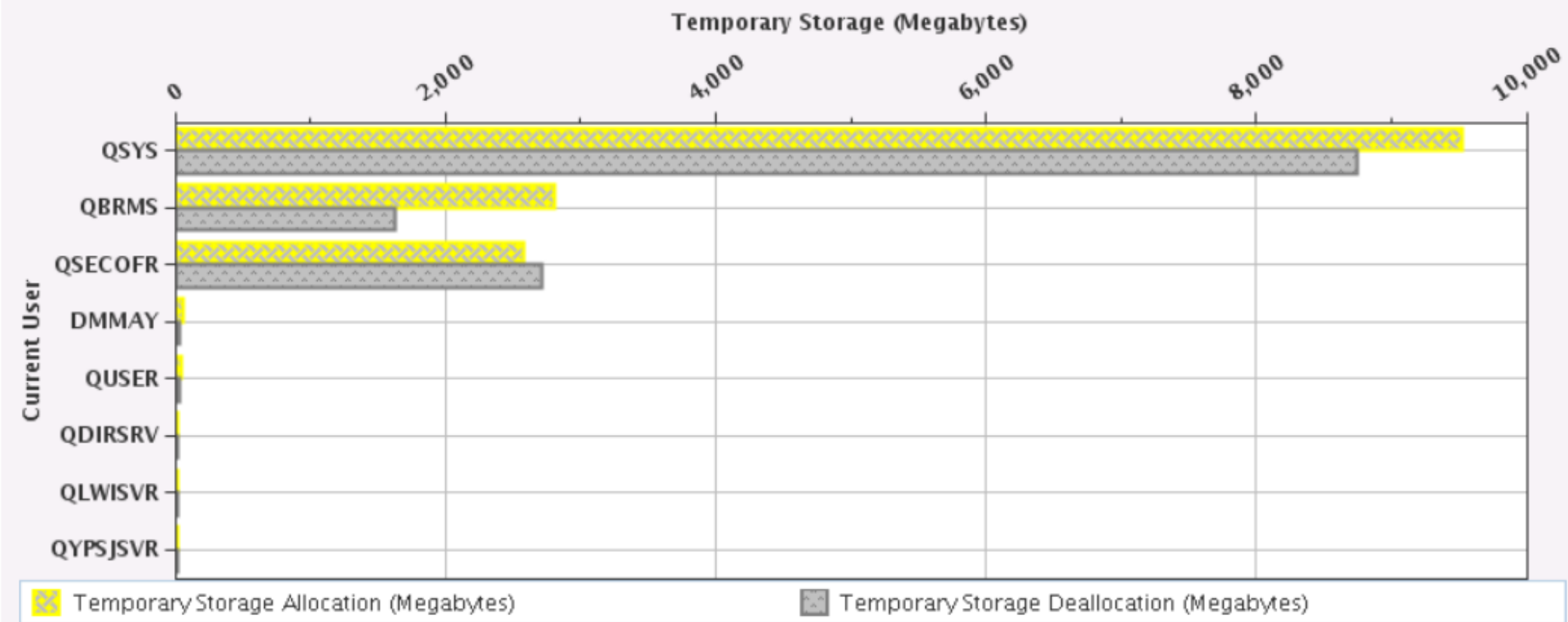
Timeline Perspective
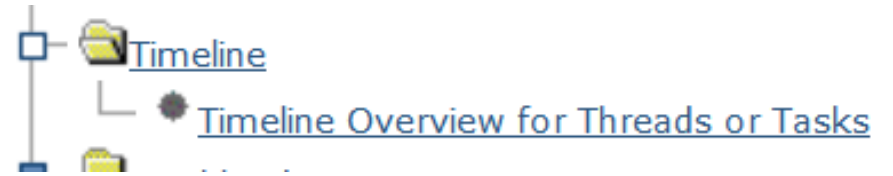
The timeline bars on the chart represent the elapsed time of threads or tasks

- – 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

Timeline Overview for Threads or Tasks

Drilldown to this new chart from existing charts
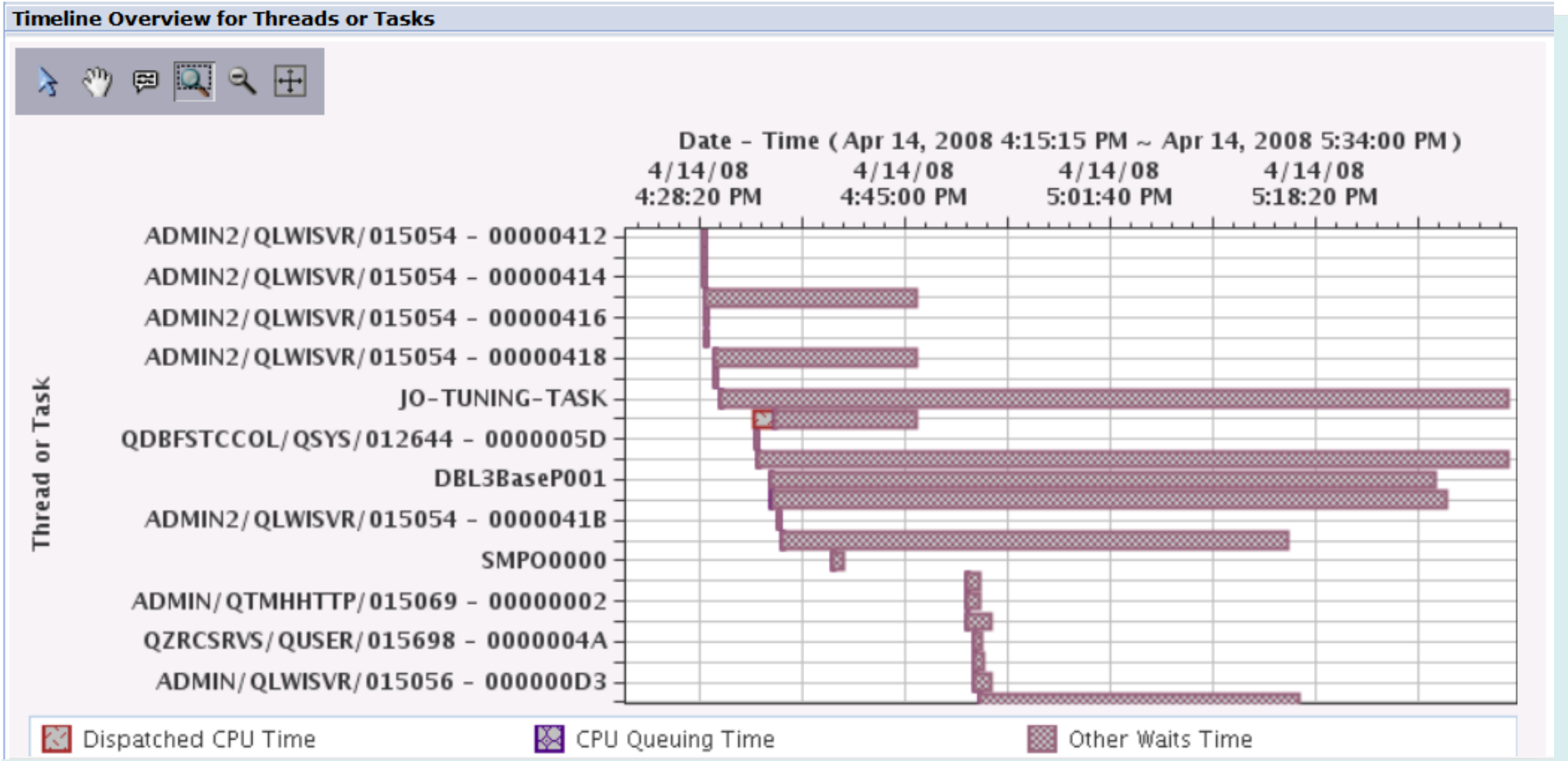
- Waits by Job or Task

- All Waits by Thread or Task
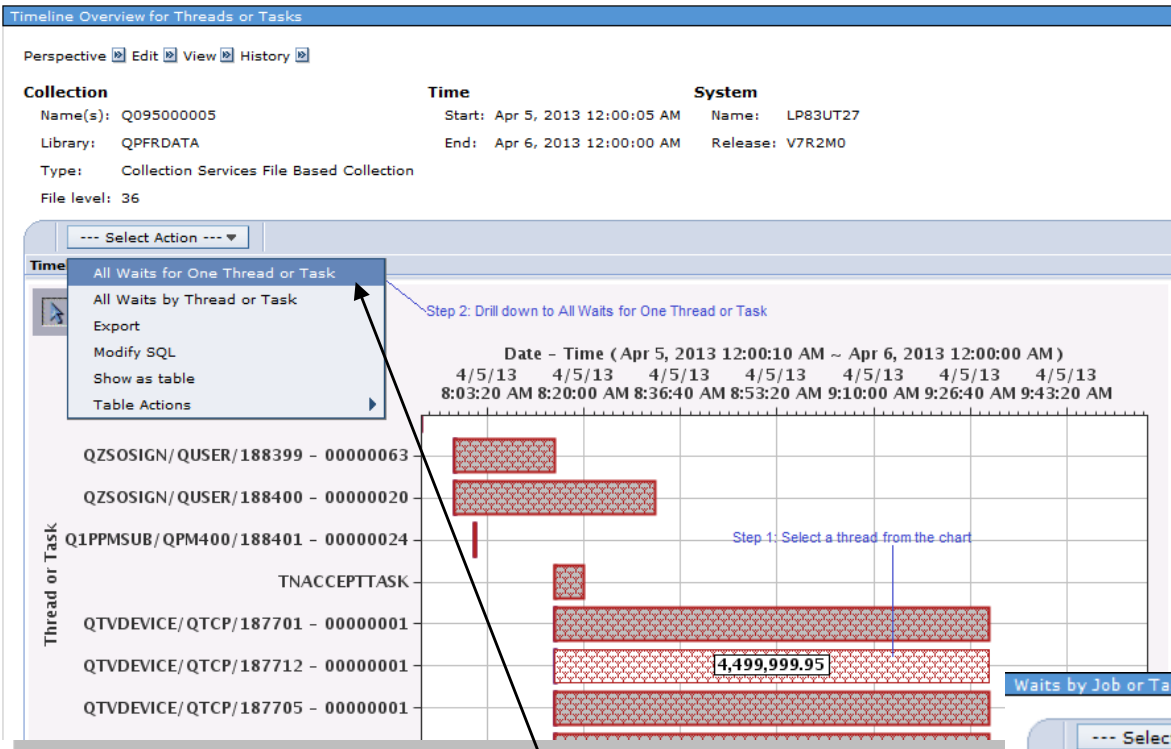
Select one thread or task and drill down to

"All Waits for One Thread or Task"

or

"All Waits by Thread or Task"
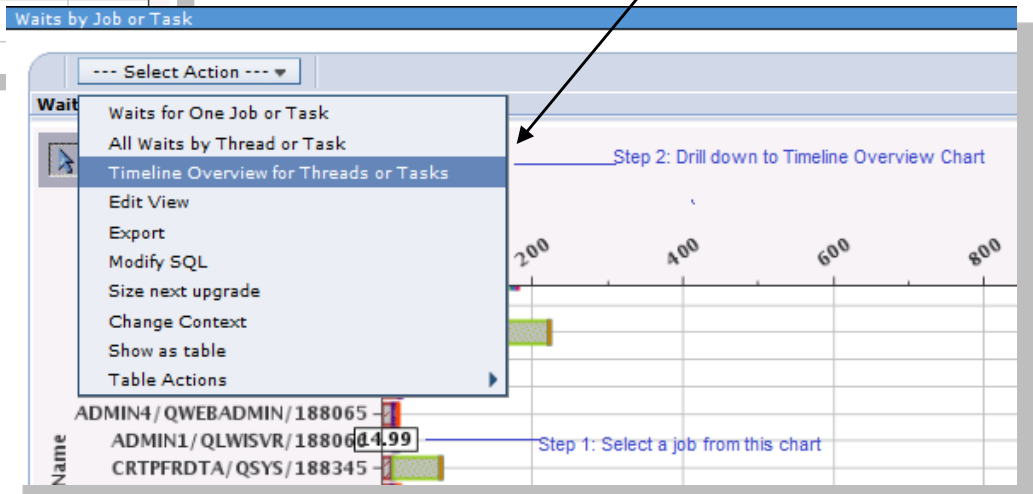
Database Full Opens

Full Opens are expensive resource-wise
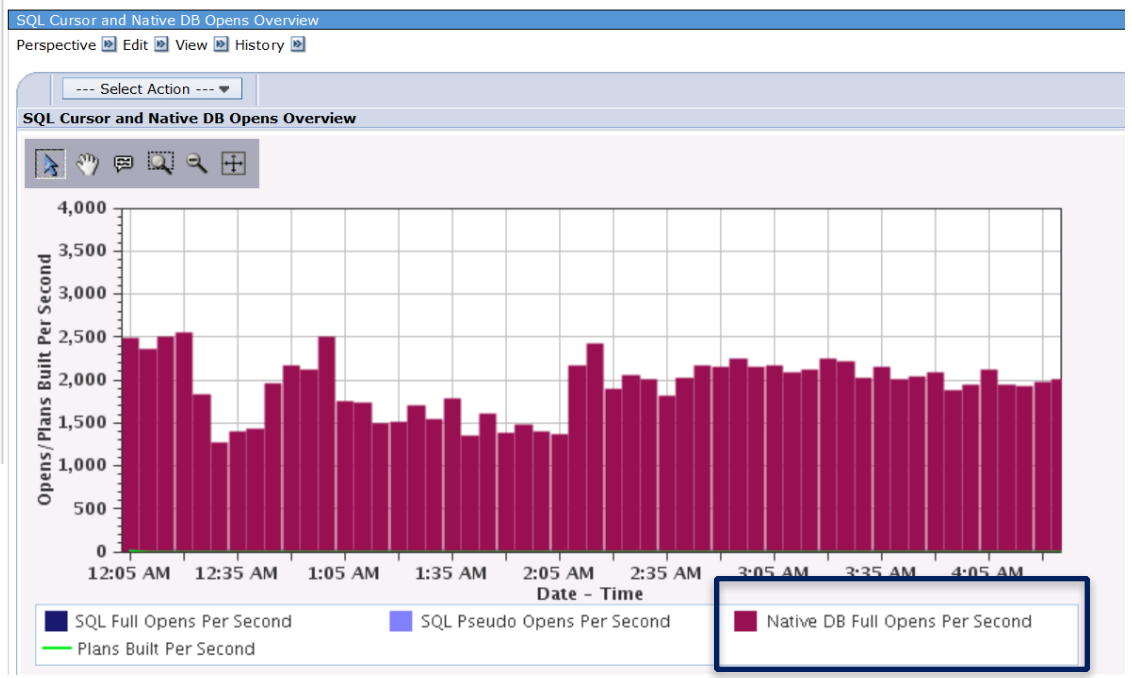
⭐ General recommendation is to keep Native Full Opens per second < 1000

> Drill down to find the jobs doing full opens…

12X Bus Utilization

- Collection Services collects utilization data for 12X buses
  - PDI has integrated charts that show views of how resources at the **bus level** like 12X loops and PCIe cards are performing

  - Enable Performance information collection on the HMC

Power Systems

Display Collection Services
DB Files
.... QAPMCONF

Collection Services Database Files
- QAPMARMTRT
- QAPMBUS
- QAPMBUSINT
- QAPMCONF
- QAPMDISK
- QAPMDISKRB
- QAPMDOMINO
- QAPMDPS
- QAPMETH
- QAPMHTTPB

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

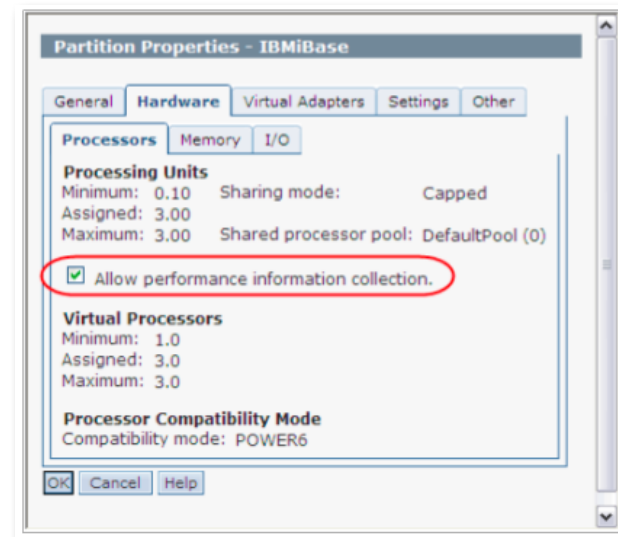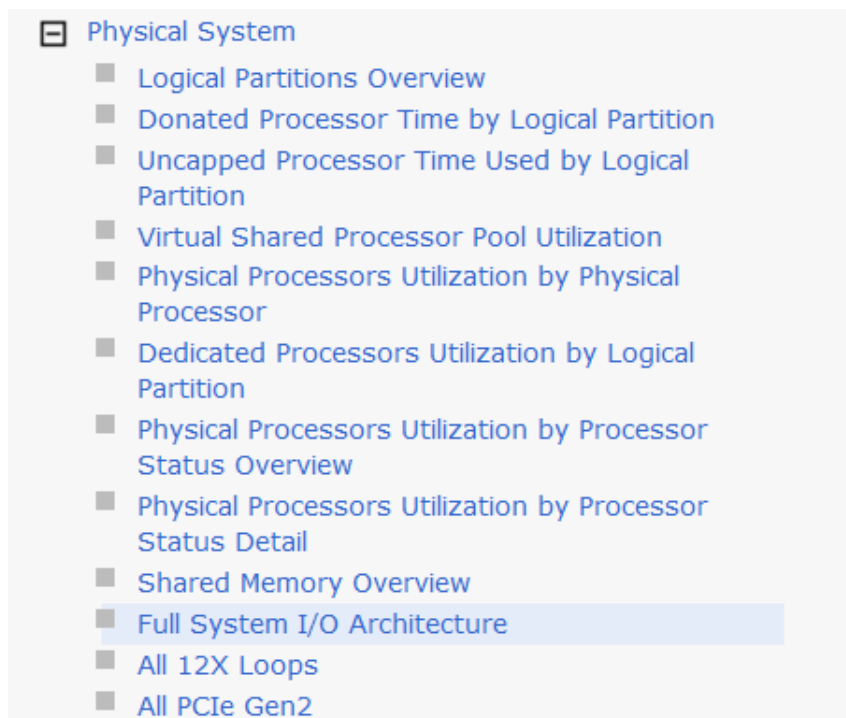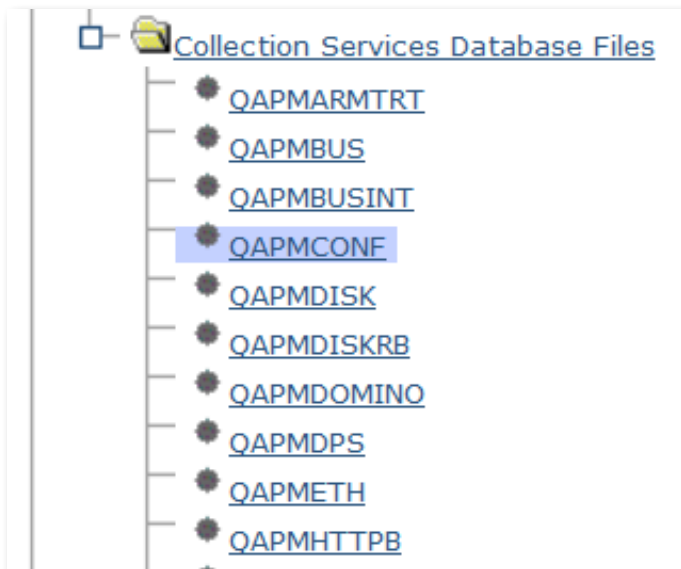|			
Library Name:	QPFRDATA	Processor Firmware Time:	No
Member Name:	Q067000002	Task Threshold Value (ms):	1,000
Start Time:	Mar 8, 2013 12:00:02 AM	Secondary Thread Thresh (ms):	1,000
		Disk Response Time Boundary 1 (us):	15
Model Number:	61X	Disk Response Time Boundary 2 (us):	250
System Type:	7998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

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
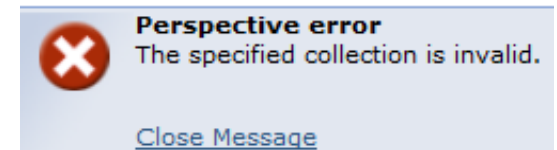
Considerations for Viewing Prior Release Performance data

- 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
    - o Save the performance data using the Save Performance Collection (SAVPFRCOL) command
    - o FTP the save file to the 7.1 or 7.2 partition
    - o Use the Restore Performance Collection (RSTPFRCOL) command to restore the data on the 7.1 or 7.2 partition.
    - o Use the Convert Performance Collection (CVTPFRCOL) command to convert the prior release database files to the current release.
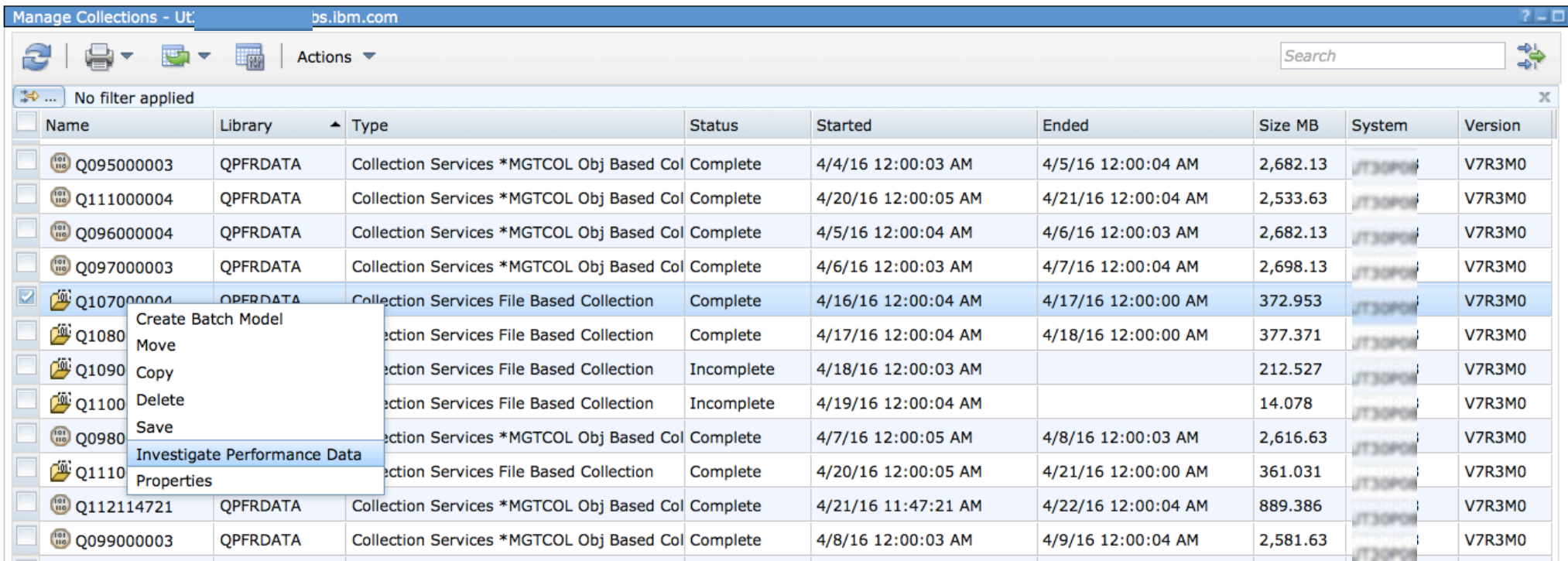
Considerations for Viewing Prior Release Performance data

- 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
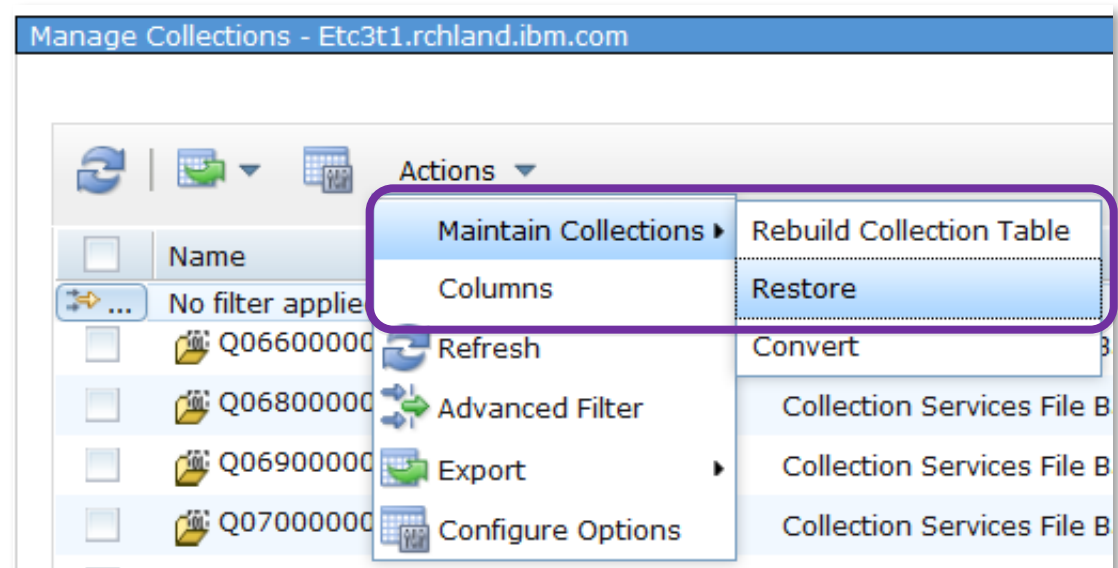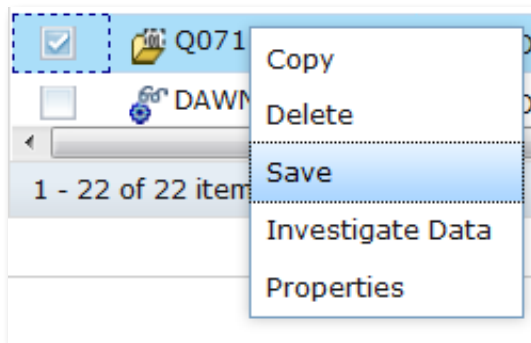
⊟ Manage Collections
  ▪ Batch Models
  ▪ Collection Services Collections
  ▪ Disk Watcher Collections
  ▪ Job Watcher Collections

- 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

- 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.
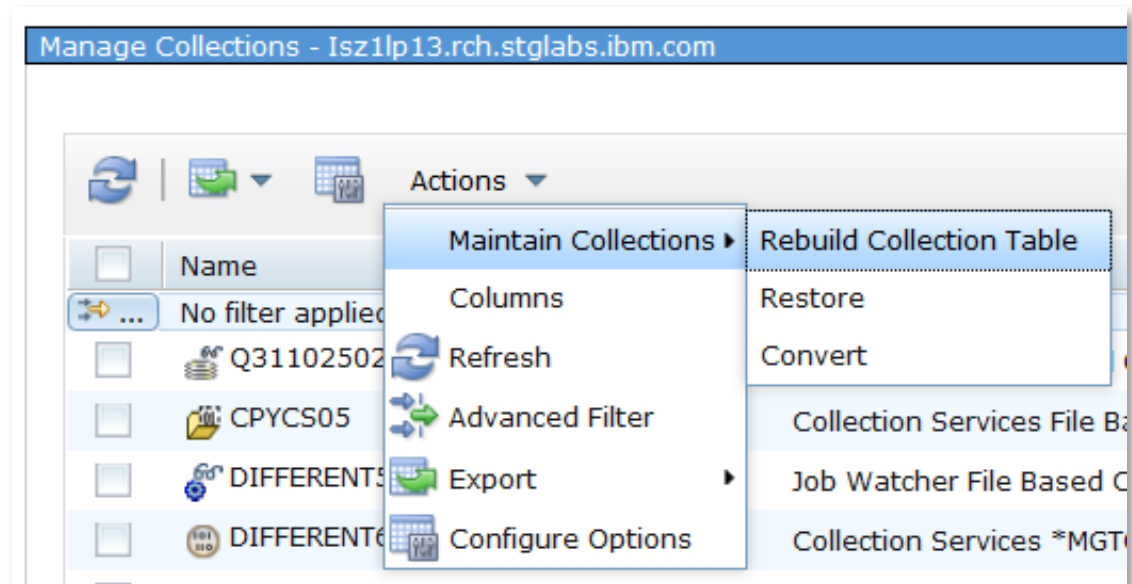
Performance Data – Analysis

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?
    - o New or changed workload?
    - o Any application changes?
    - o Any recent hardware configuration changes?

  - What was the scope?
    - o Did it impact the entire system?
    - o Did it impact some subset of work?
      - Specific users?
      - Specific applications?

CPU Utilization and Waits Overview

CPU Utilization and Waits Overview is an excellent starting place. Look for *interesting* points. Next steps will depend upon the answer to the prior questions, along with what you see.

CPU Utilization and Waits Overview
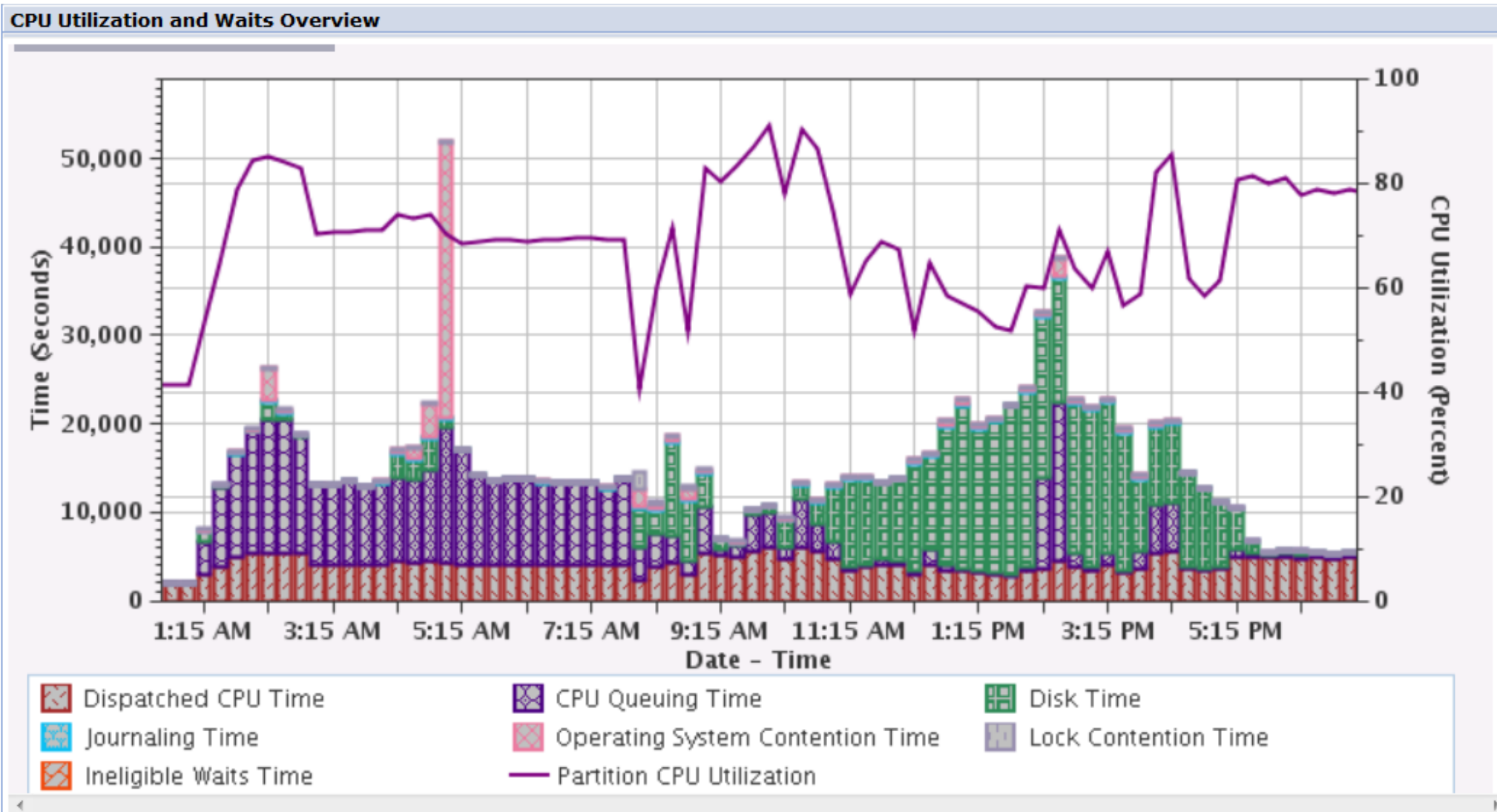
Using PDI, you can learn how to navigate through your data

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.
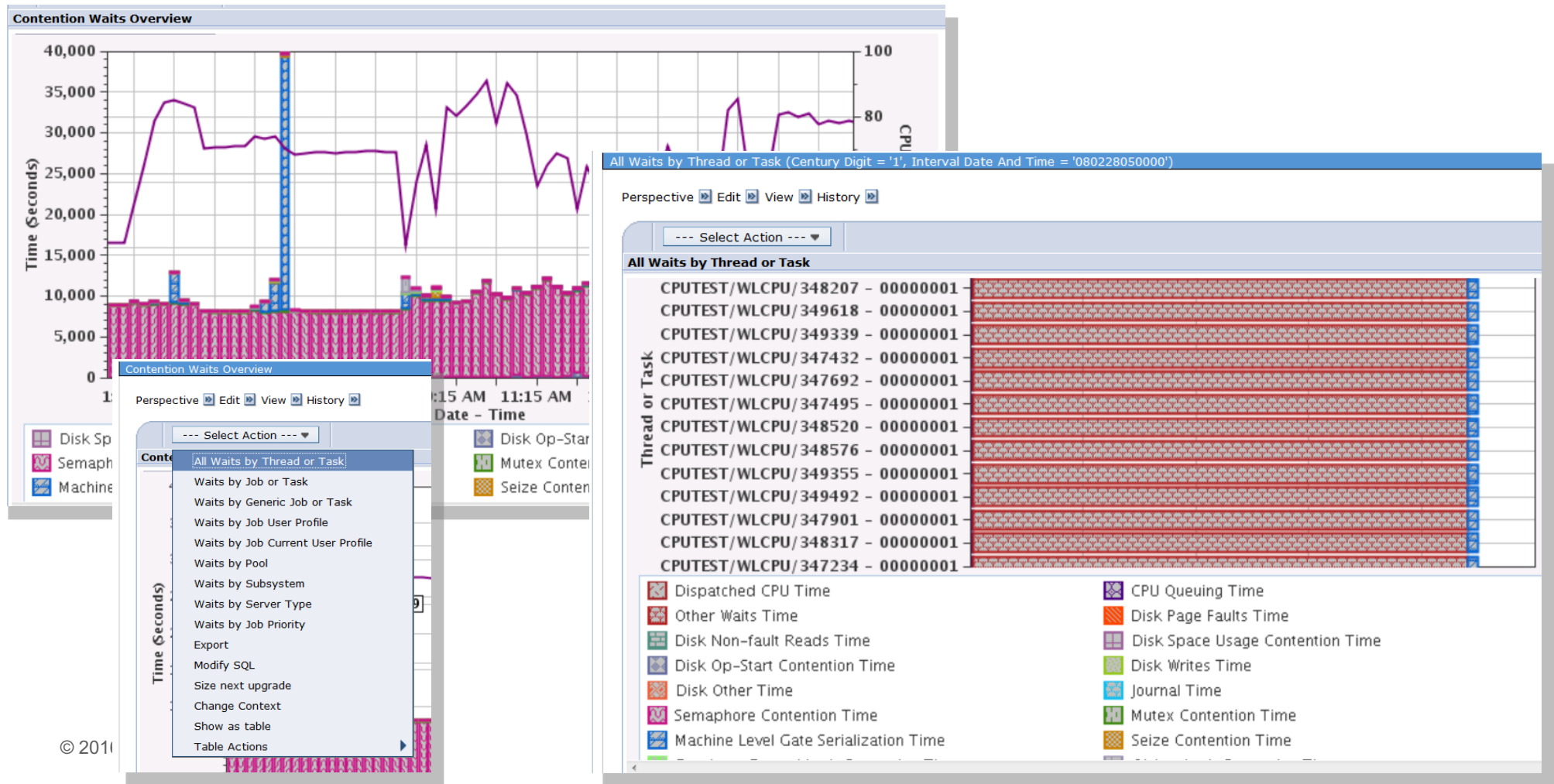
Drill-down based upon what you see

- 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.
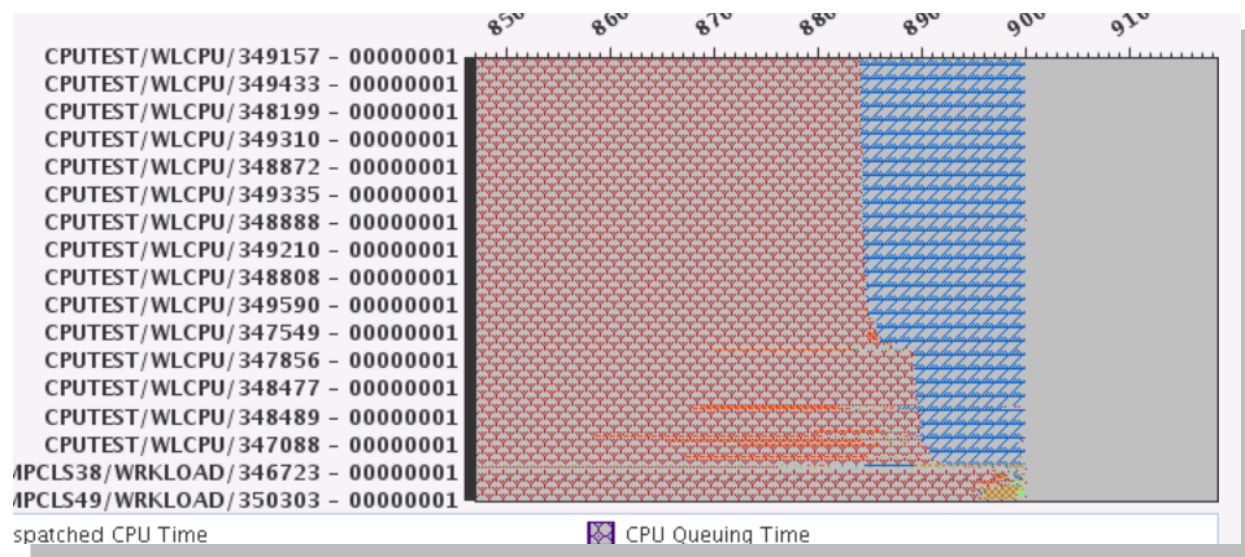
Recommendations

- If you are not using PDI, give it a try!

  - *Remember, all partitions* (even at IBM i 6.1!) *can access the majority of the charts shown in this presentation – without installing/purchasing anything additional!!*

- Stay current on PTFs

- Become familiar with your system's performance "signature" – it will make it easier to spot changes

- Keep baseline performance data

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/

https://www.ibm.com/developerworks/learn/ibmi

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Tutorials & training | Tools & code | Communities

Tutorials & training | **Tools & code** | Comm

Featured

IBM wiki

IBM i Technology Updates

IBM i operating system (OS) levels and related software products are frequently enhanced via Program Temporary Fixes (PTFs). This wiki contains a centralized list of all enhancements for IBM i.

Find updates

IBM i Technology Updates

☐ 17 | Updated Oct 11, 2016 at 10:16 AM by Timmr | Tags: db2, enhancements, firmware, hardware, i, ibm, operating, system, technology, updates

Page Actions ▾

IBM i operating system (OS) levels and related software products are frequently enhanced via PTFs.
Prior to the existence of this wiki, IBM did not provide a single point for clients to learn about all IBM i enhancements.

	Enhancement Landing Pages
IBM i 7.3	TR1 - Base Enhancements
IBM i 7.2	TR5 - TR4 - TR3 - TR2 - TR1 - Base Enhan
IBM i 7.1	TR11 - TR10 - TR9 - TR8

The following links take you to landing pages for various products and subjects.
Each subject area contains extended details about existing and new support.

IBM i Technology Updates - by IBM i product or subject matter
Backup Recovery and Media Services (BRMS)
Collaboration and Social for i (Lotus)
DB2 for i (Database)
IBM Cloud Storage Solutions for i
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
Open Source Technologies
Performance Tools
PowerHA SystemMirror for i
Systems Management
SQL Services
Web Integration on i

Performance Tools

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Page Actions ▾

This section contains information about the most recent enhancements to IBM i Performance Tools. This topic includes Performance collection tools, the performance components of IBM 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 supp IBM i. Other performance related tools include: Batch Model, Work with System Activity (WRKSYSACT), Dump Main Memory Information (DMPMEMINF), and Analyze Command Performance (ANZCMDPFR).

Performance on the Web

The Performance components of IBM Navigator for i include the **Investigate Data** task which is used to start **Performance Data Investigator (PDI)** and the **Manage Collections** task used to manage performance collections. Other tasks provide access to the 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 common is known as Performance Tools Reports. More information on this licensed program is contained in the IBM Knowledge Center - IBM Performance Tools for i.

Performance on the Web on developerWorks

Getting Started:

The main page for Performance Tools and this sub-page "Performance on the web" provide enhancement information. For specific enhancement by topic, see Enhancements and New Perspectives

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 listed IBM Navigator for i PTFs.

Performance Task Enhancements (Release Date)	7.3 PTFs	7.2 PTFs	7.1 PTFs - 5770SS1	6.1 PTFs	PTF Description	Notes
Spring SP Updates	IBM Navigator for i PTFs					
	SF99723 level 1	SF99714 level	SF99145 level		Performance Tools Group PTF	Install latest for these groups when putting on new Navigator for i PTFs
7.3 GA Performance Updates	IBM Navigator for i PTFs					
December 1 2015		Get PTF numbers from IBM Navigator for i PTFs				
October 19, 2015 Get PTF numbers from IBM Navigator for i PTFs		SF99713 level 11+ or higher SI56747 SI56748	SF99368 level 36+ or higher IBM Navigator for i PTFs	SF99115 level 46 SI57001 SI57002 6.1 Stabilized at this level	HTTP Group PTF *Includes for Navigator:* • *Common PTF* • *Navigator for i*	The Navigator for i PTFs are shipped in the HTTP group, and it is recommended that you keep current on this PTF group.

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	•Collection Services at no additional charge with i •Disk Watcher, Database, and Performance Explorer included with base PT1 product •Job Watcher is an additional option of PT1 and has an additional charge
Experimental Features	Yes (e.g., VIOS Investigator)	No
Multinational language support	No	Yes

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

IBM Power Systems Performance

IBM

IBM i on Power - Performance FAQ
October 3, 2016

IBM i Performance on developerWorks

- developerWorks
  http://www.ibm.com/developerworks/ibmi/
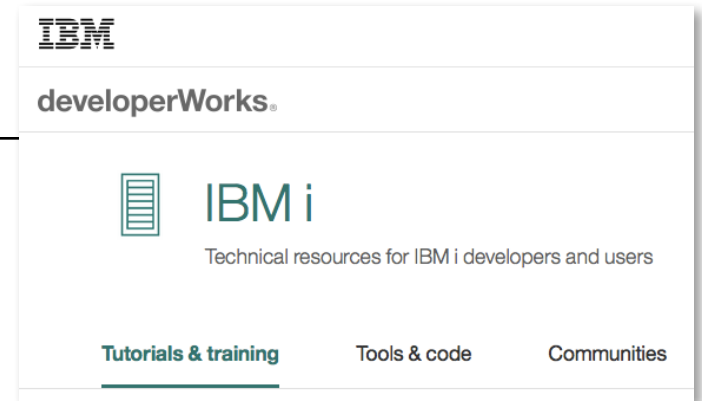
- Performance Tools
  https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM_i_Technology_Updates/page/Performance_Tools

- 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/

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developerWorks.

IBM i
Technical resources for IBM i developers and users

Tutorials & training   Tools & code   Communities

IBM i Web Sites with Performance Information

- **IBM i Knowledge Center**
  http://www.ibm.com/support/knowledgecenter/ssw_ibm_i/welcome

- **IBM i Performance Management**
  http://www-03.ibm.com/systems/power/software/i/management/#tab2

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

- **Job Waits Whitepaper**
  https://www-912.ibm.com/i_dir/idoctor.nsf/3B3C112F7FBE774C86256F4000757A8F/$FILE/Job_Waits_White_Paper_61_71.pdf

i Can

http://www.ibmsystemsmag.com/Blogs/i-Can/

For a simple list of all blogs on one page:

"i Can" Blog of Blogs

https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Power_Systems/page/iCan_Blog_of_Blogs

IBM i 7.3 System Monitor Enhancements
IBM i 7.3 Enhancement With Binder Language Export Source
Workload Group Configuration with IBM i 7.3
IBM i 7.3 - Network Connection Auditing
IBM i Performance Frequently Asked Questions Revisited
IBM i 7.3 Enhancements for Display Job Log (DSPJOBLOG)
Route More Work to Subsystems by User Profile
Graph History: New in 7.3 IBM Navigator for i
Using ALLCHGRCV or ALLDTCRCV Control Group Entries to Save Journal Receivers
IBM i 7.3 - Qshell Jobs and the Inactive Job Time Out
IBM i 7.2 Improved Temporary Storage Tracking (Part 7)
IBM i 7.3 Adds Authority Collection Feature
IBM i Services for Function Usage Information
PowerHA for SMB
Visualizing Database Performance Data With the Performance Data Investigator
Collecting Database Performance Data With IBM i Performance Data Investigator
IBM i Configuration Defaults
Single Object Restore Performance Enhancement
Why You Should be Using Expert Cache
Leveraging SSDs and IASPs with BRMS Migration
SQL CPU Utilization
January 2016 IBM i Large User Group Meeting
IBM i Job Accounting and Prestart Server Jobs
Route Remote Command Requests to a Specific Subsystem
Copy Spooled Files to PDFs using the UIM Exit Point for WRKSPLF
IBM i Job Accounting and Prestart Jobs
IBM i Access Client Solutions and Performance FAQ Updates
Everything is Design: The Work of Paul Rand

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 for more details.

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
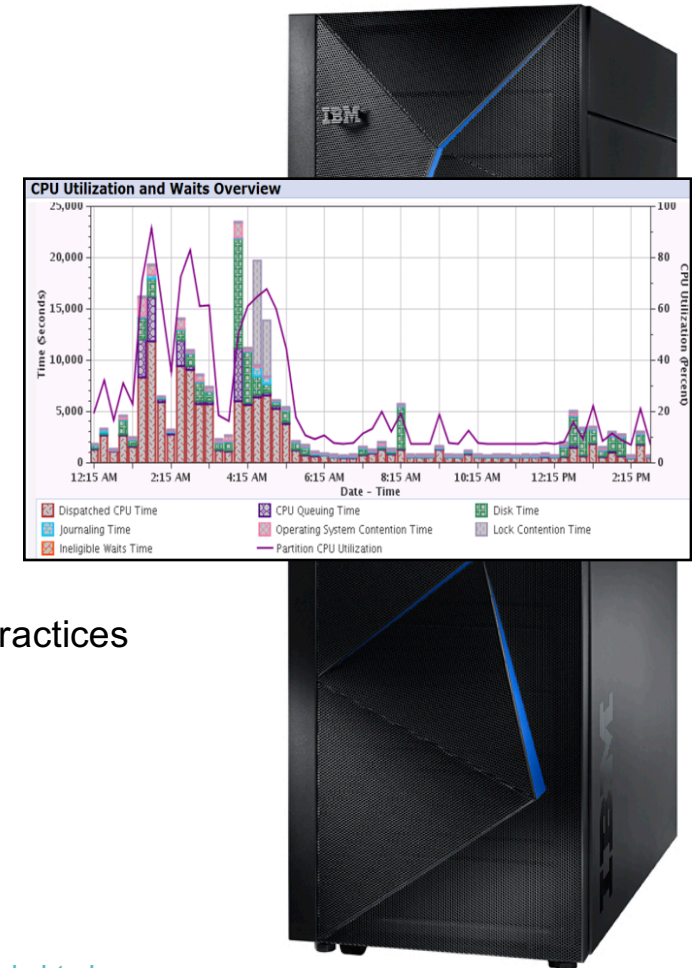
Workshop details:

– 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

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

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- **Ability to deliver skills transfer as part of your service engagement**

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Revised September 26, 2006

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