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S05 – Introduction to Performance Data Investigator

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Agenda

- Why PDI?
- Using PDI (and Tips)
- Suggested starting points
- PDI Navigation and Features
- Introduction to performance analysis using PDI
- References

Why PDI?



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

– *A LOT...*

– **A LOT!**

Jobs CPU I/O Storage Database
Java Memory SQL
5250 Workload Groups Communications SQL Waits
Transactions

Why PDI?

- Now, 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 WB50607080910,
  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?

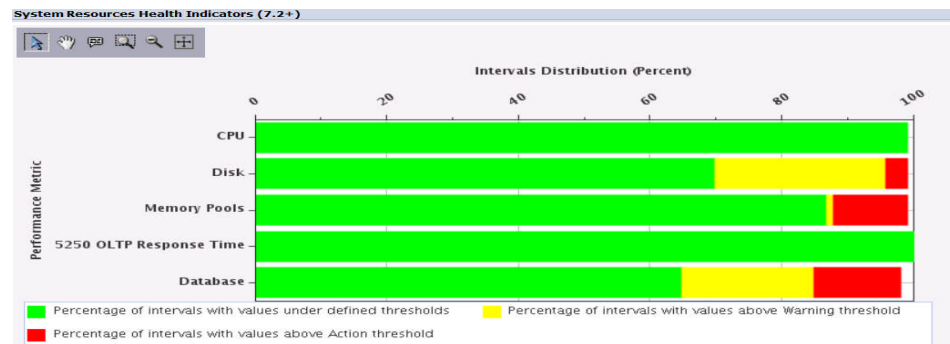
- You could pour through raw performance data reports to spot problem areas.....

```

1. SELECT
rpo
Date      Time      -Transaction- -CPU Util-- Int  --High-- Pool  Fault  Excp
Count    Rsp    Tot  Int  Bch  Util  Dsk  Unit  Mch  Usr  ID  Util
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    05:00    2173  .06    8    1    3    1    2  0004  6    15  02    0
07/31    05:15    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...

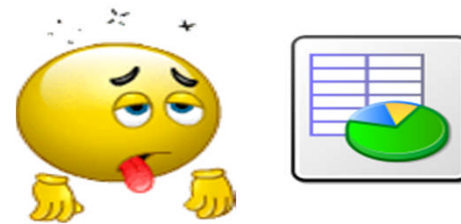
```

- Or.....you could let PDI give you clues.....

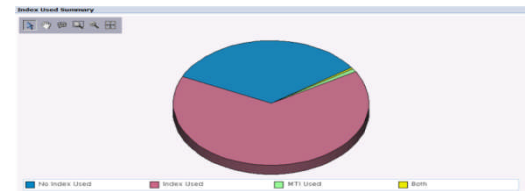
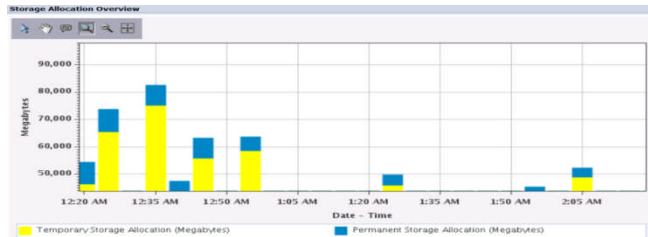


Why PDI?

- 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.
- Easy to use.
- Simplifies analysis.

i PDI, do you????

Let's get started using PDI.....




PDI is found in IBM Navigator for i

- IBM Navigator for i is the strategic console for managing IBM i
 - Has much of the function as System i Navigator **+ more**
 - But with a browser user interface
 - Integrated
 - Part of Base Operating System (SS1 Option 3)
 - Simply point your browser to <http://systemname:2001>



IBM Navigator for i – Browser support

Latest versions of:

- Mozilla Firefox 
- Google Chrome 
- Apple Safari 
- Microsoft Edge 

Note: Internet Explorer no longer supported

For additional browser information, refer to:

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

Browser Support tips (1 of 2)

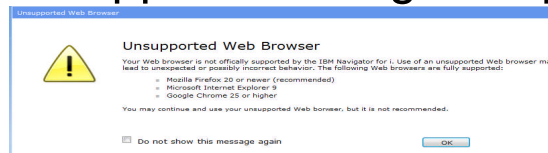
Unexpected results could be browser related. Example problems are....

- Hung charts
- Empty tables

- Clear your browser cache after installing the PTFs
 - Then close/restart browser

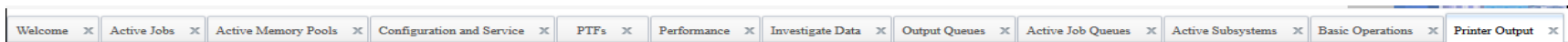
- Review your browser security settings to allow pop-up exceptions
 - For details see the following web page:
<https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20i%20Technology%20Updates/page/Browser%20Tips>

- In 7.2, a warning will appear if using unsupported browser:



Browser Support tips (2 of 2)

- Close unneeded tabs in Navigator session
 - Tasks in tabs consume resources and may cause performance degradation if too many are open



- Do **not** use PF-5 to Refresh a panel, instead use Refresh button found on Navigator panels

Pre-requisites for Navigator (1 of 2)

Everything is included on the V6R1 and later IBM i operating system!



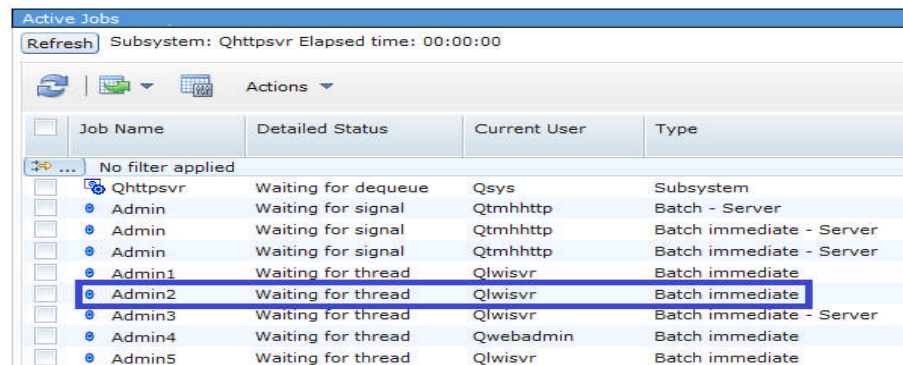
✓ Product install requirements:

	IBM i 7.3	IBM i 7.2	IBM i 7.1	IBM i 6.1
HTTP Server	5770DG1	5770DG1	5770DG1	5761DG1
-JDK	5770JV1	5770JV1	5770JV132 bit	5761JV1 option 8
Java ** Note new requirement for 64-bit JDK (Spring 2016) -JSE	5770JV1 option 15 (Java SE 7 64-bit) <i>- not Java SE 8 at this time</i>	5761JV1 option 12 (Java SE 6 64-bit) or 5761JV1 option 15 (Java SE 7 64-bit)		
- IBM Toolbox for Java		5770SS1 option 3	5770SS1 option 3	5761JC1
Performance Tools group	5770PT1	5770PT1	5770PT1	5761PT1
Database				
Host Servers	5770SS1 option 12	5770SS1 option 12	5770SS1 option 12	5761SS1 option 12
Qshell	5770SS1 option 30	5770SS1 option 30	5770SS1 option 30	5761SS1 option 30
PASE (Portable App Solutions Env)	5760SS1 option 33	5760SS1 option 33	5770SS1 option 33	5761SS1 option 33
Domain Name System	5770SS1 option 31	5770SS1 option 31	5770SS1 option 31	
Digital Certificate Manager	5770SS1 option 34	5770SS1 option 34	5770SS1 option 34	

Pre-requisites for Navigator (2 of 2)

- ✓ Ensure the HTTP Admin server is running (Qhttpsvr subsystem) :

Navigator runs in Admin2 server job



Job Name	Detailed Status	Current User	Type
Qhttpsvr	Waiting for dequeue	Qsys	Subsystem
Admin	Waiting for signal	Qtmhttp	Batch - Server
Admin	Waiting for signal	Qtmhttp	Batch immediate - Server
Admin	Waiting for signal	Qtmhttp	Batch immediate - Server
Admin1	Waiting for thread	Qlwisvr	Batch immediate
Admin2	Waiting for thread	Qlwisvr	Batch immediate
Admin3	Waiting for thread	Qlwisvr	Batch immediate - Server
Admin4	Waiting for thread	Qwebadmin	Batch immediate
Admin5	Waiting for thread	Qlwisvr	Batch immediate

(STRTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN))

- ✓ Recent HTTP Group PTF
 - PTFs for all components in Navigator are packaged and delivered as part of the HTTP PTF Groups.
 - In addition there are a number of other groups that are needed to ensure that all parts of the navigator interface function properly.

Navigator related Group PTFs

- Fixes and major enhancements to **Navigator for i** are available in:

- IBM i **7.3**

- HTTP Server group - SF99722
- Java group - SF99725
- Database group - SF99703
- Performance Tools group - SF99723

- IBM i **7.2**

- HTTP Server group - SF99713
- Java group - SF99716
- Database group - SF99702
- Performance Tools group - SF99714

- IBM i **7.1**

- HTTP Server group - SF99368
- Java group - SF99572
- Database group - SF99701
- Performance Tools group - SF99145



Navigator Enhancements are often taken back to previous releases via PTFs



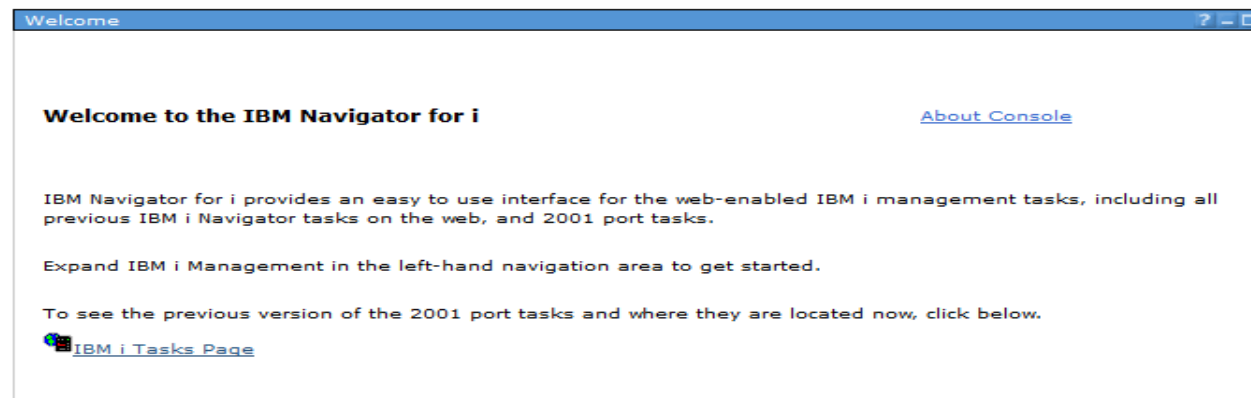
Tips for Best Performance for Navigator

Note: Navigator will not run fast on a system that is already slow!

- ✓ Ensure no bad DNS entries on the system
 - http://www-912.ibm.com/s_dir/slkbase.nsf/1ac66549a21402188625680b0002037e/b9e677063f24f859862575ee006b1881
- ✓ Use Application Runtime Expert to validate your environment
 - <http://www.ibm.com/developerworks/ibmi/library/i-applicationruntime/index.html>
 - **Network health checker** can be run from QShell:
`/QIBM/ProdData/OS/OSGi/templates/bin/areVerify.sh -network`
http://ibmsystemsmag.blogs.com/i_can/2013/09/application-runtime-expert-network-health-checker.html
- ✓ Use the Web Performance Advisor to validate your Web Performance
 - <http://pic.dhe.ibm.com/infocenter/series/v7r1m0/topic/rzaie/rzaieconwebperfadvisor.htm>
- ✓ Keep current on Group PTFs

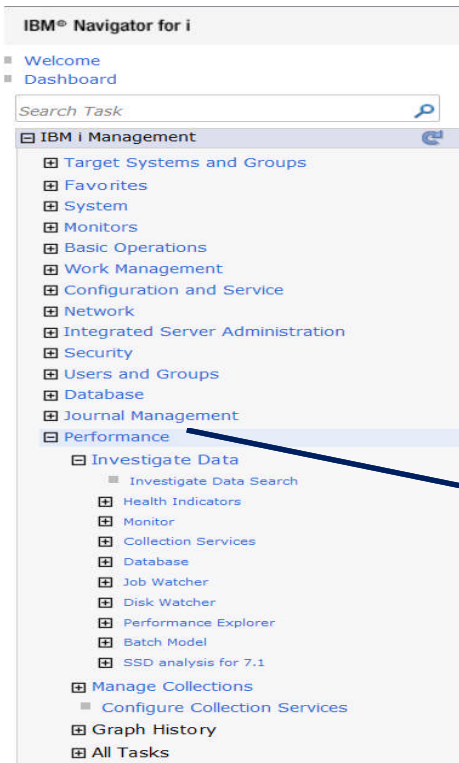
IBM Navigator for i

- 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>

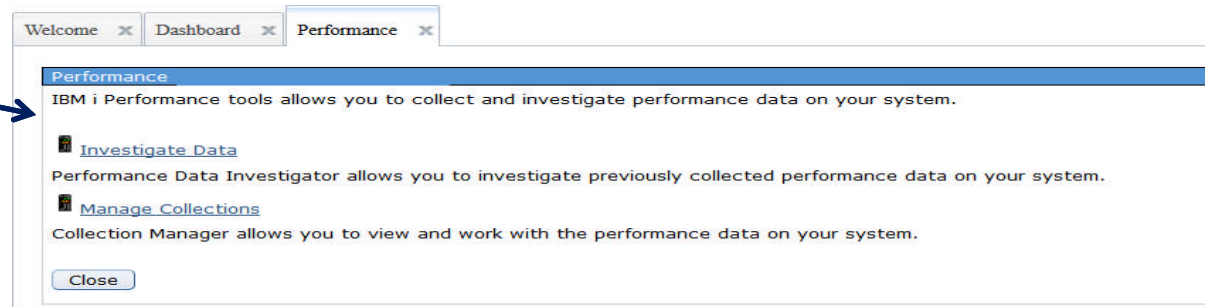


Note: After the release of the **December 2016 HTTP Group PTF** the 2001 port is no longer redirecting to port 2005 by default. Instead 2001 will now only redirect to the **non-secure 2004 port**.

Performance Tasks



- **“Performance”** is a major function in Navigator
 - Investigate Data = *“Performance Data Investigator”*
 - Manage Collections
 - And much more!





Packaging: Performance Tools Licensed Program Product

7.2

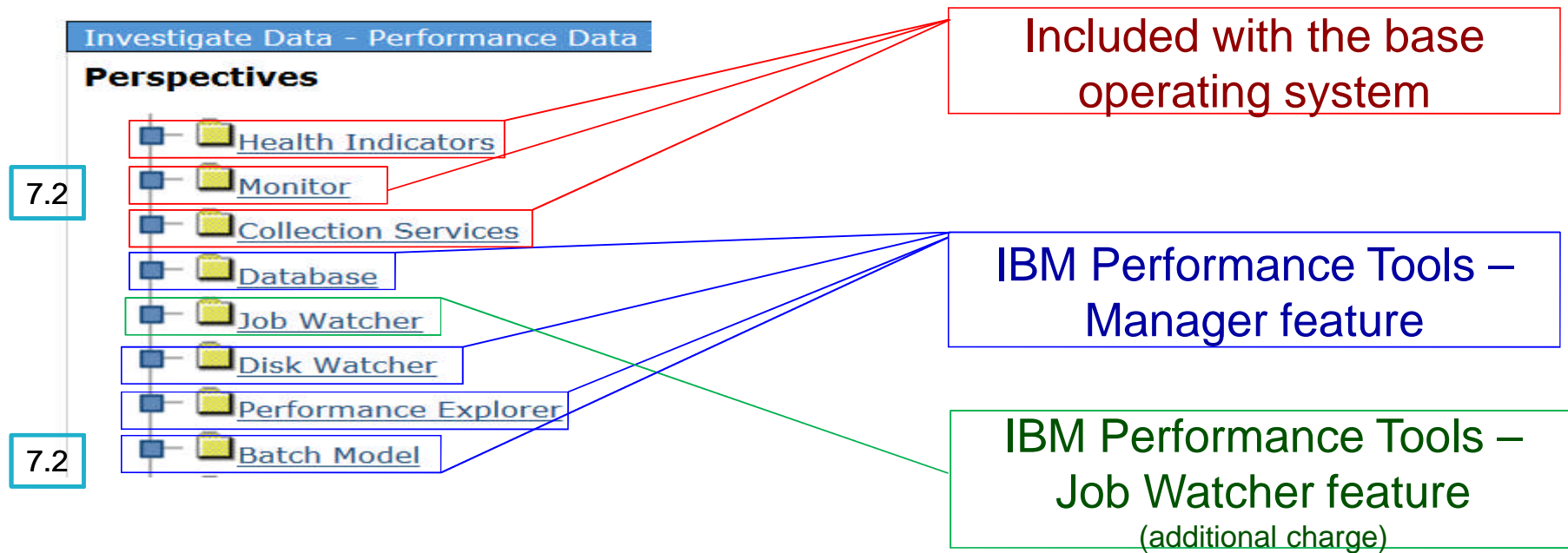
7.3

- IBM i for [Collection Services](#), [Health Indicators](#), [Monitors](#), [Graph History](#)
- Performance Tools Licensed Program Product (5770PT1 for 7.1, 7.2, 7.3)

- **Performance Tools - Manager Feature (option 1)** 7.2
 - [Disk Watcher](#), [Performance Explorer](#), [Database](#), [Batch Model](#)
- Performance Tools - Agent Feature
- **Performance Tools - Job Watcher (option 3)**
 - [Job Watcher](#)

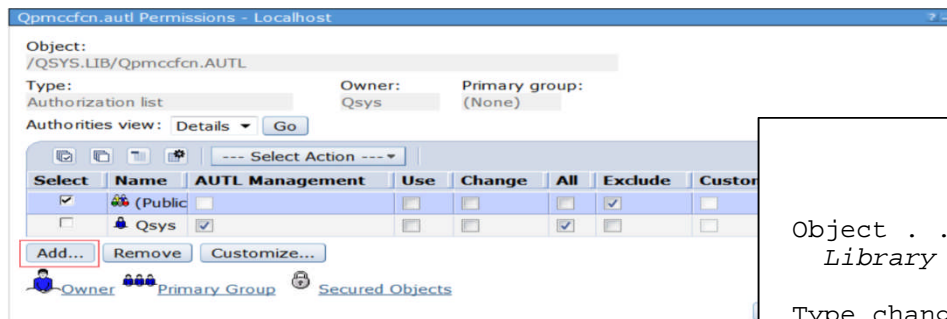
Product ID	Product Option	Release	Description
 5770PT1	0000	V7R3M0	IBM Performance Tools for i - Base
 5770PT1	0001	V7R3M0	Performance Tools - Manager Feature
 5770PT1	0002	V7R3M0	Performance Tools - Agent Feature
 5770PT1	0003	V7R3M0	Performance Tools - Job Watcher

Packaging view in PDI - 7.2 & 7.3



Prerequisites: Authority

- 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          Primary group . *NONE

Type changes to current authorities, press Enter.

      User          Object      List
      *PUBLIC       *EXCLUDE
      QSYS          *ALL          X
      PDI01         *USE
      PDI02         *USE
      PDI03         *USE
More...
  
```

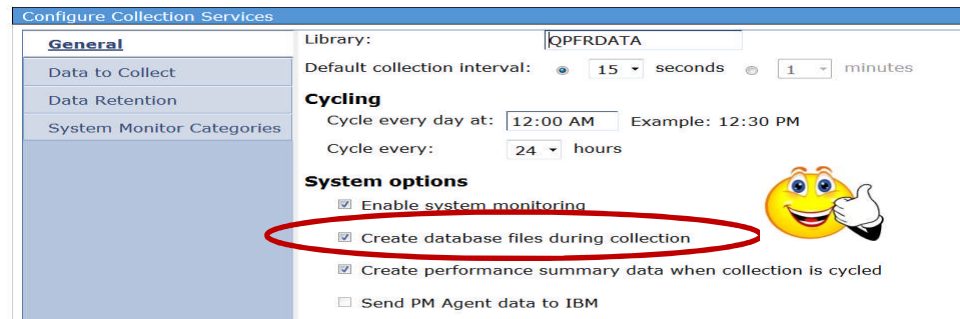
Prerequisites: Create Database Files

- **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

Library: QPFRDATA

Default collection interval: 15 seconds 1 minutes

Cycling

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

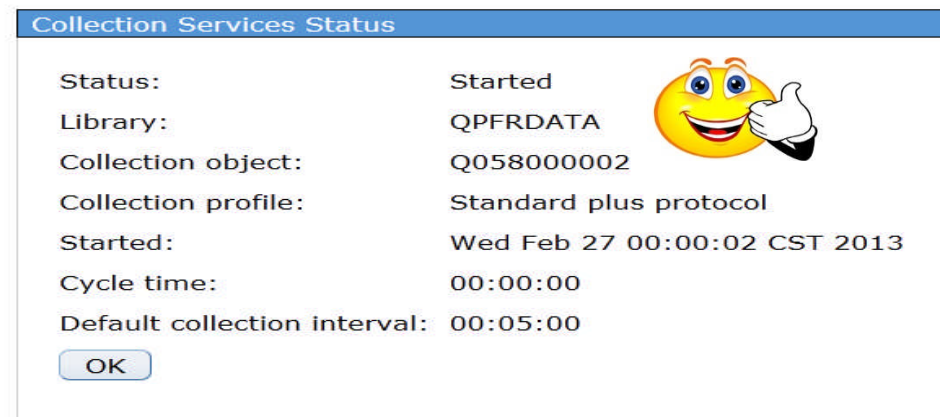
Cycle every: 24 hours

System options

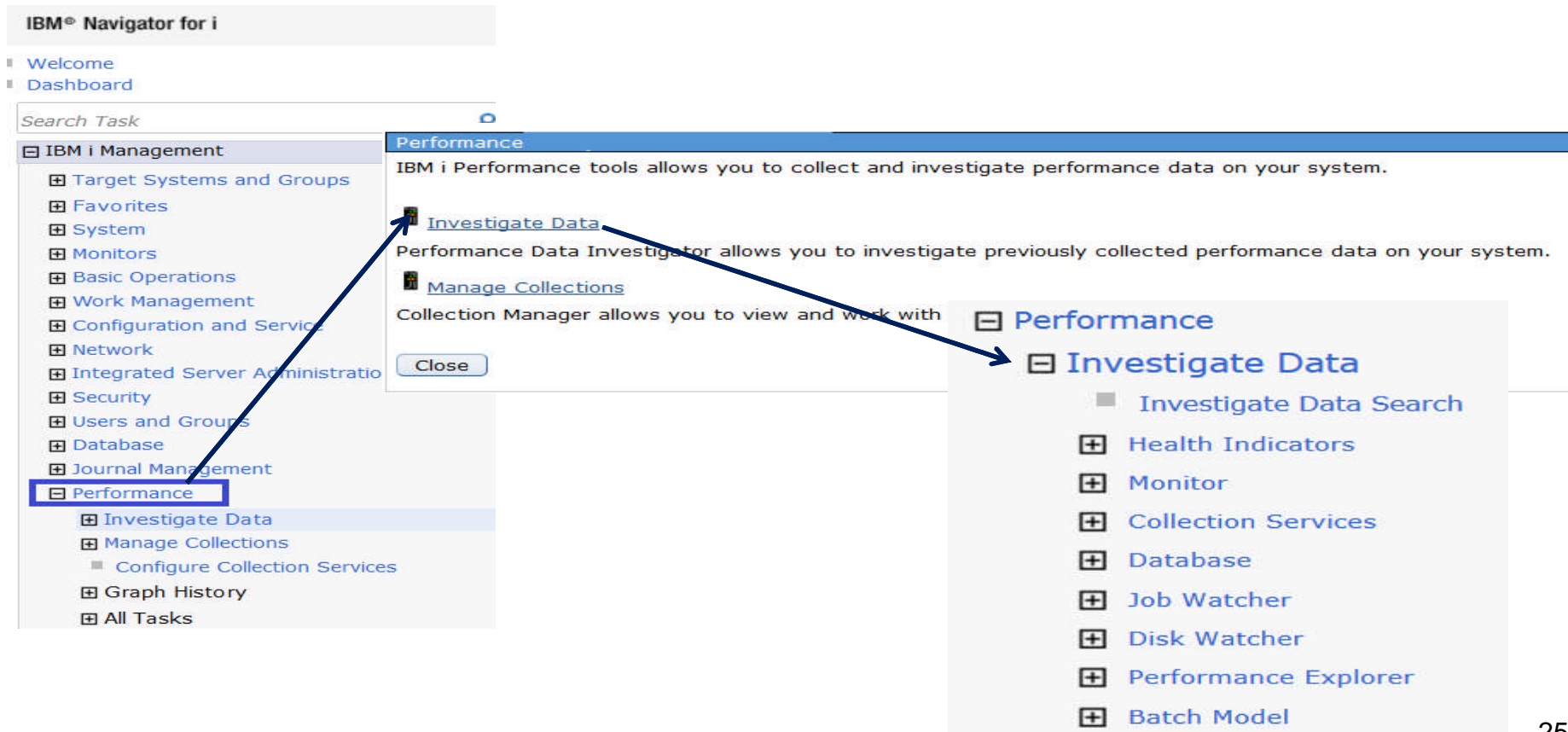
- Enable system monitoring
- Create database files during collection
- Create performance summary data when collection is cycled
- Send PM Agent data to IBM

Prerequisites: Verify Collection Services is Active

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



Investigate Data – Navigation Example



The screenshot illustrates the navigation path within the IBM Navigator for i interface. On the left, the 'Performance' menu item is highlighted in the main navigation pane. A blue box highlights this item, and a blue arrow points from it to the 'Investigate Data' link in the 'Performance' pop-up window. A second blue arrow points from the 'Investigate Data' link in the pop-up window to the 'Investigate Data' sub-menu item in the expanded 'Performance' view on the right. The expanded view lists several sub-items, including 'Investigate Data Search', 'Health Indicators', 'Monitor', 'Collection Services', 'Database', 'Job Watcher', 'Disk Watcher', 'Performance Explorer', and 'Batch Model'.

IBM® Navigator for i

- Welcome
- Dashboard

Search Task

IBM i Management

- Target Systems and Groups
- Favorites
- System
- Monitors
- Basic Operations
- Work Management
- Configuration and Service
- Network
- Integrated Server Administratio
- Security
- Users and Groups
- Database
- Journal Management
- Performance**
 - Investigate Data
 - Manage Collections
 - Configure Collection Services
 - Graph History
 - All Tasks

Performance

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

- Investigate Data**
Performance Data Investigator allows you to investigate previously collected performance data on your system.
- Manage Collections
Collection Manager allows you to view and work with

Close

Performance

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

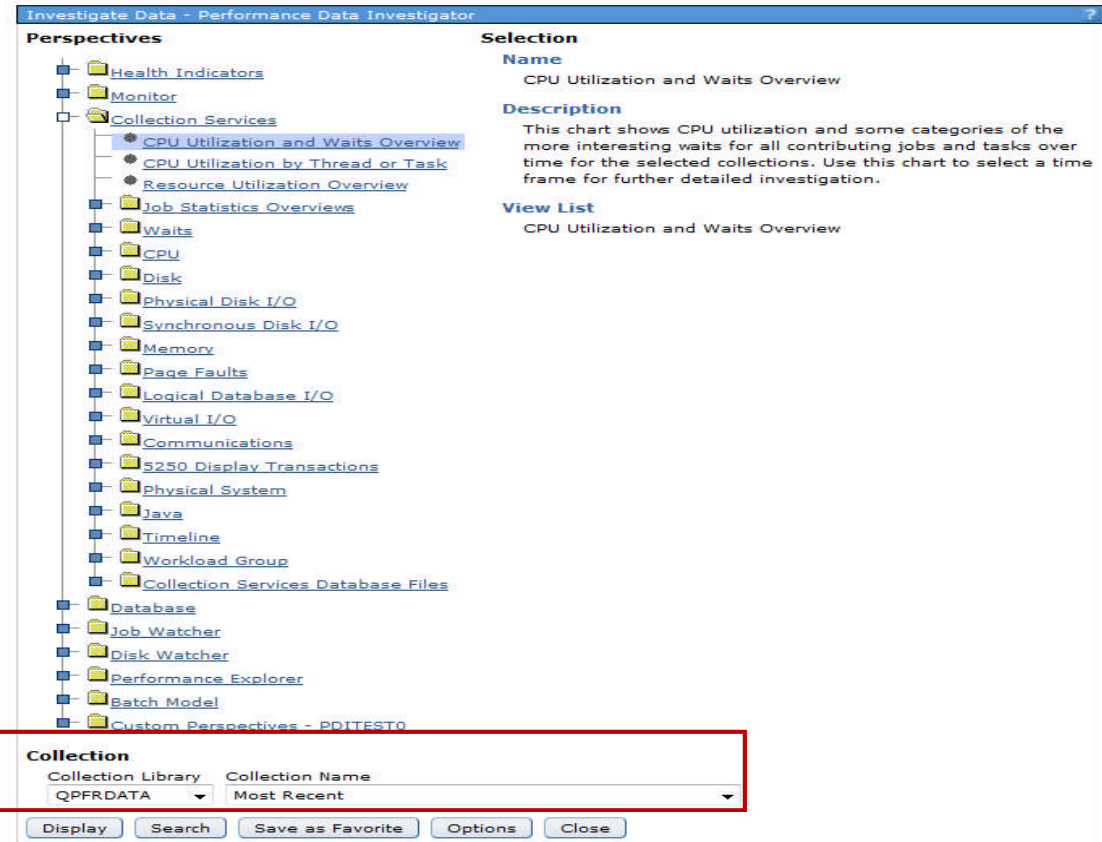
Investigate Data Terminology



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 – Select Collection

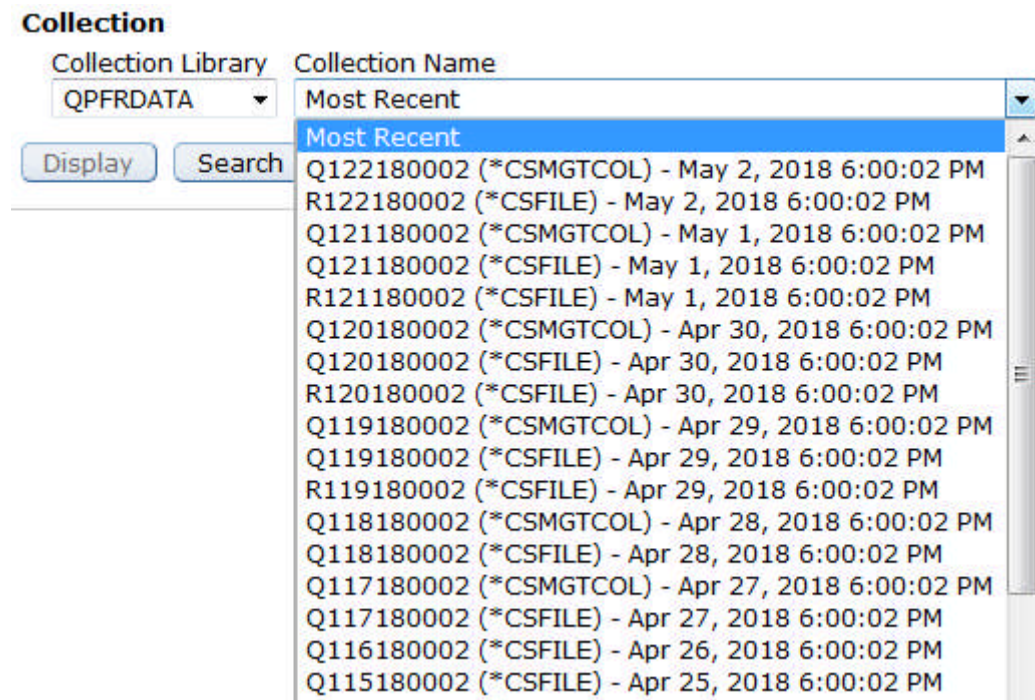


The Collection boxes allow you to specify which collection you want to work with.

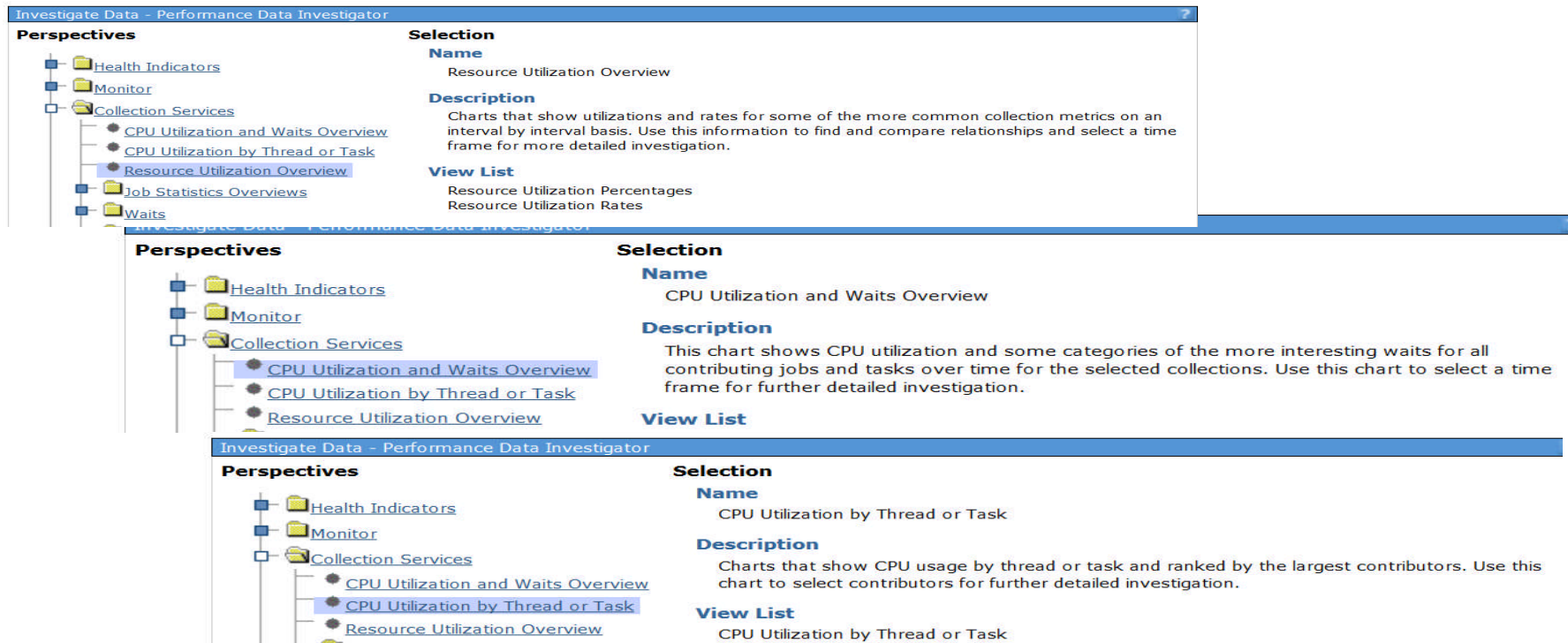
Only collections valid for the type of chart you select will be displayed.

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 are *new* in 7.2
 - System monitor data



Suggested Starting Points



The image displays three sequential screenshots of the Performance Data Investigator (PDI) interface, illustrating different starting points for investigation. Each screenshot shows a tree view on the left and a detailed view on the right.

Screenshot 1: The 'Resource Utilization Overview' perspective is selected. The right pane shows:

- 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

Screenshot 2: The 'CPU Utilization and Waits Overview' perspective is selected. The right pane shows:

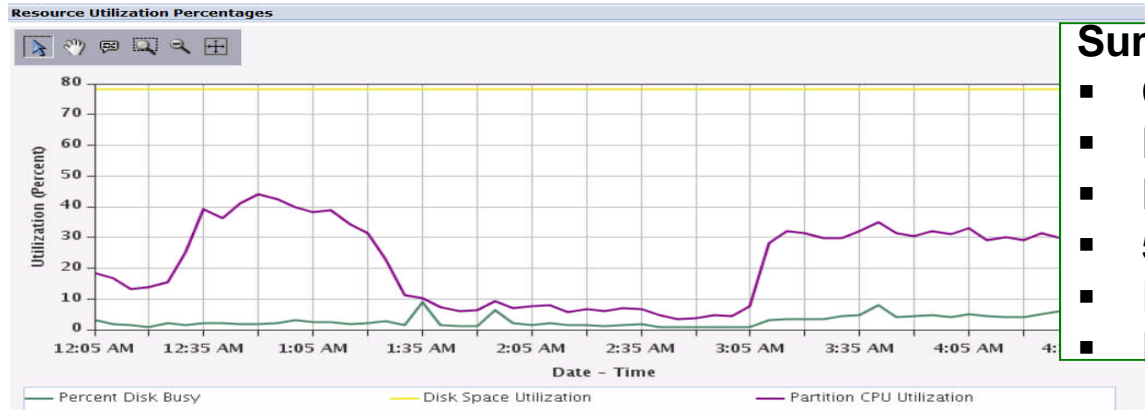
- Name:** CPU Utilization and Waits Overview
- Description:** This chart shows CPU utilization and some categories of the more interesting waits for all contributing jobs and tasks over time for the selected collections. Use this chart to select a time frame for further detailed investigation.
- View List:** (Empty)

Screenshot 3: The 'CPU Utilization by Thread or Task' perspective is selected. The right pane shows:

- 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:** CPU Utilization by Thread or Task

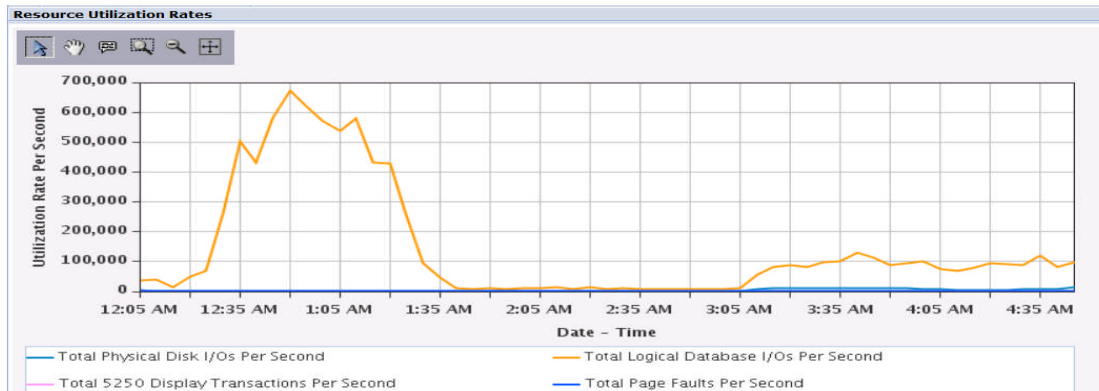
Starting points can depend on goal (monitoring versus problem determination...)

Resource Utilization Overview

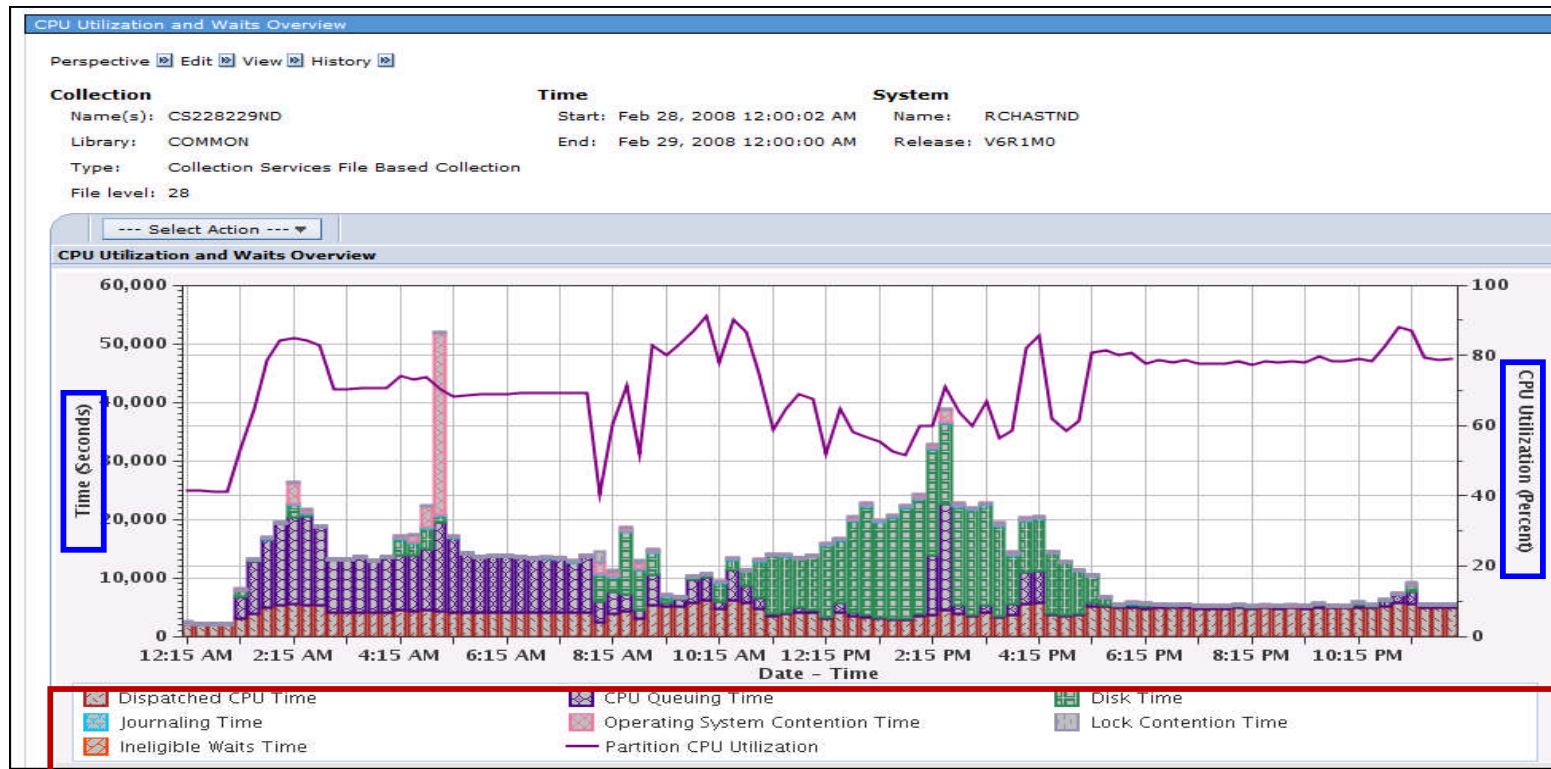


Summary for general overall health:

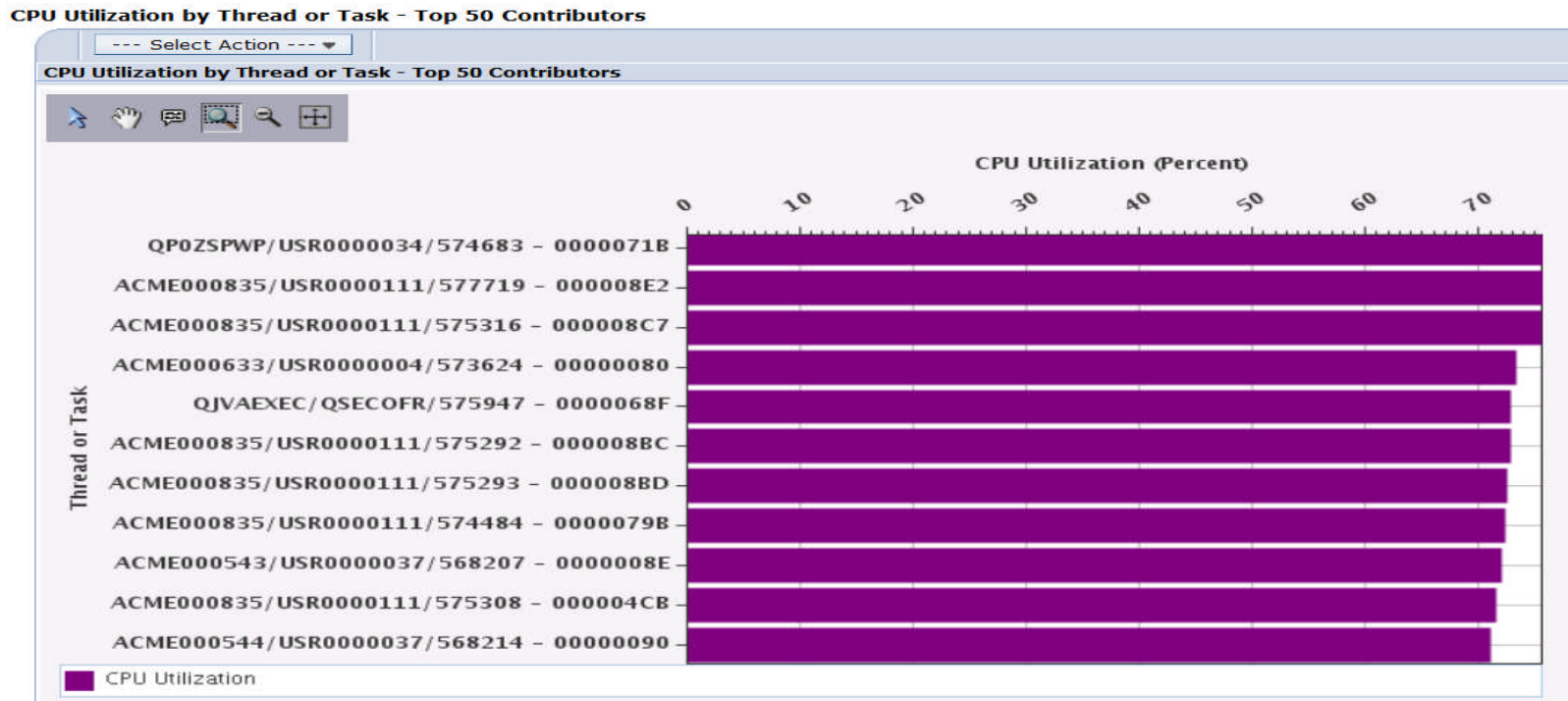
- CPU Utilization
- Disk Space Utilization
- Disk Busy
- 5250 Transactions per second
- I/Os per Second (logical and physical)
- Page Faults per second



CPU Utilization and Waits Overview

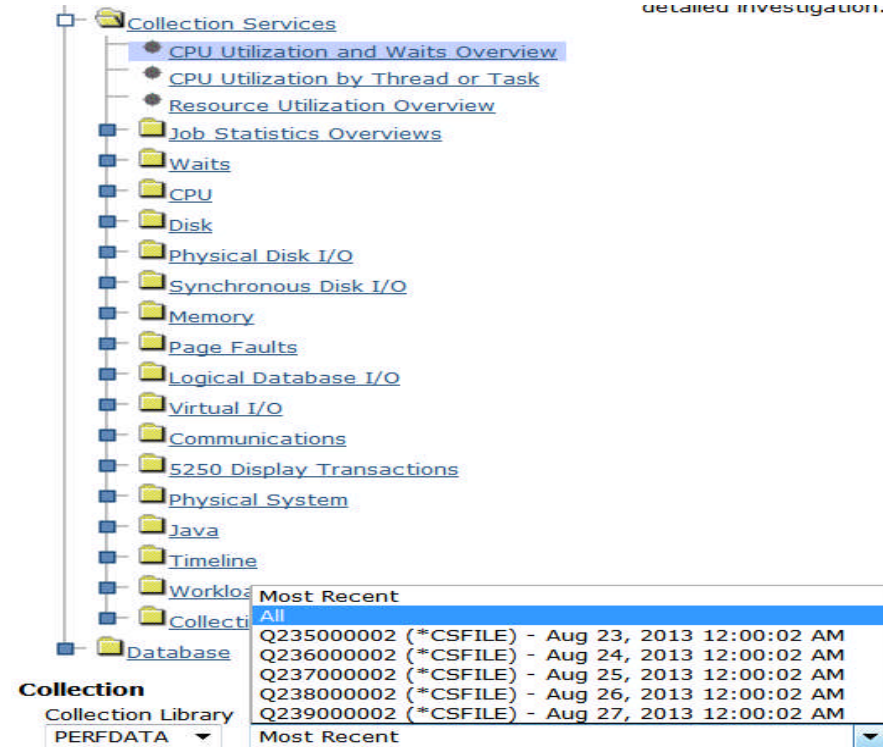


CPU Utilization by Thread or Task



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.



The screenshot shows a tree view of 'Collection Services' with various sub-items like 'CPU Utilization and Waits Overview', 'Job Statistics Overviews', 'Waits', 'CPU', 'Disk', etc. Below the tree is a 'Collection' dropdown menu with the following options:

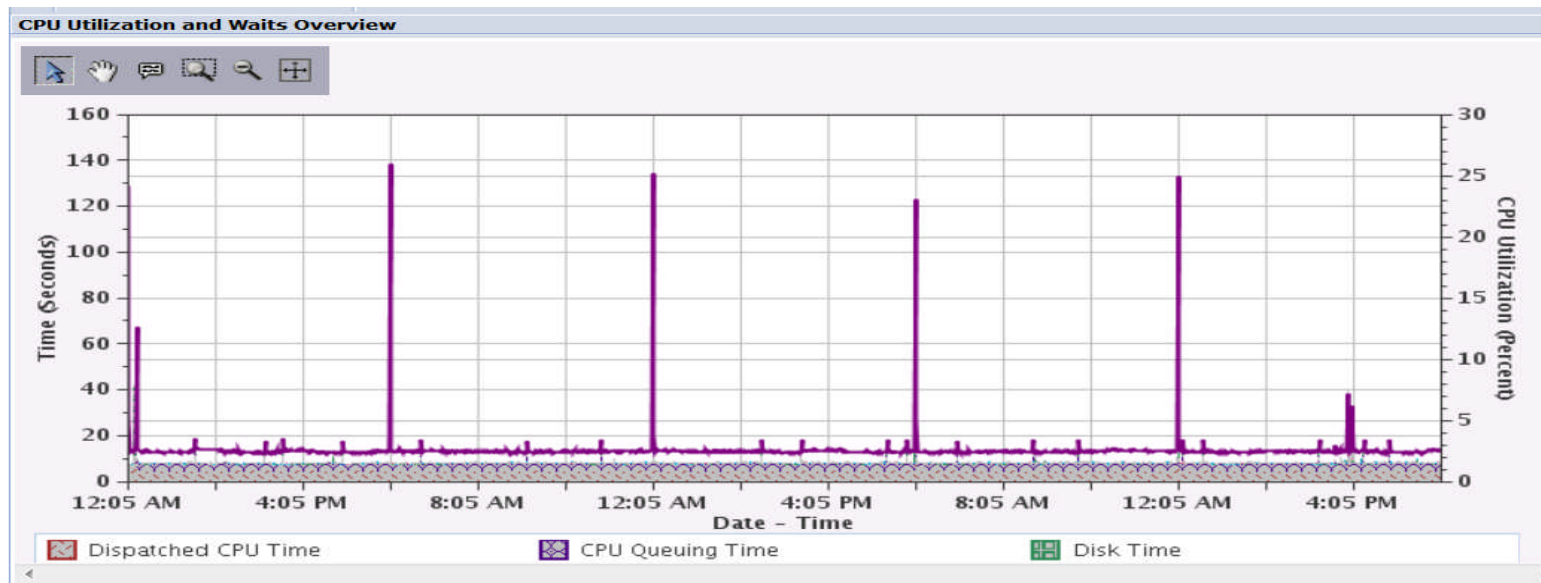
Collection ID	File Type	Timestamp
Q235000002	(*CSFILE)	Aug 23, 2013 12:00:02 AM
Q236000002	(*CSFILE)	Aug 24, 2013 12:00:02 AM
Q237000002	(*CSFILE)	Aug 25, 2013 12:00:02 AM
Q238000002	(*CSFILE)	Aug 26, 2013 12:00:02 AM
Q239000002	(*CSFILE)	Aug 27, 2013 12:00:02 AM

The 'All' option is highlighted in the dropdown menu. The 'Collection Library' is set to 'PERFDATA'.

Graphing Multiple Collections

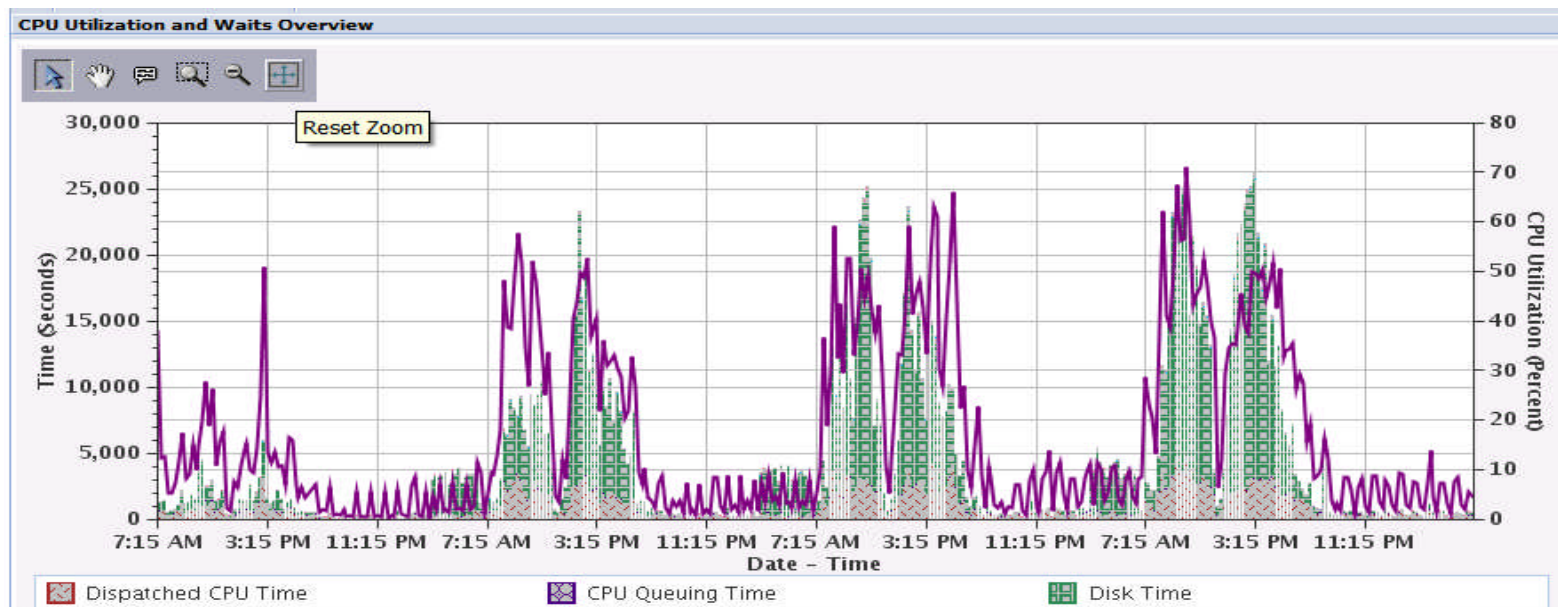
This example shows five days of (fairly uninteresting) Collection Services data

- *Do you know what ran each day at midnight?*



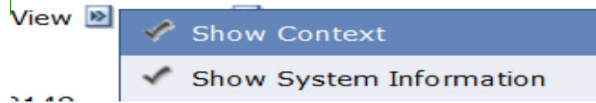
A More Interesting Example...

4 days of more interesting performance data.
Observe the pattern...



View Collection and System Details

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



Show/hide Context

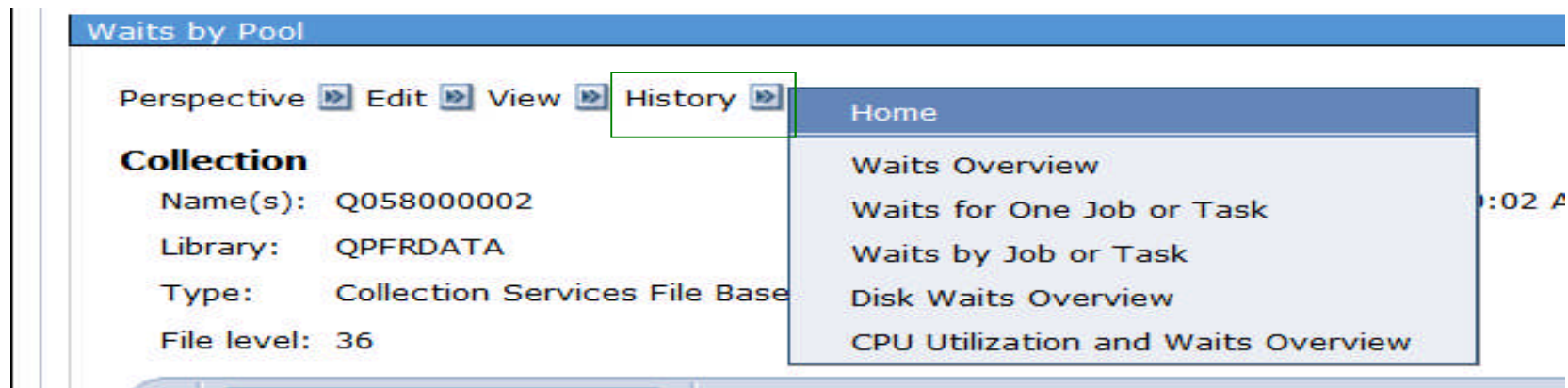
Show/hide System Information

Collection		Time	System		
Name(s):	Q016000149	Start:	Jan 16, 2013 12:01:49 AM	Name:	ROCHMN
Library:	PMR17037	End:	Jan 17, 2013 12:01:57 AM	Release:	V7R1M0
Type:	Collection Services File Based Collection				
File level:	36				
System Information					
Name:	ROCHMN	Total Processors:	16	Interactive Threshold:	100%
Release:	V7R1M0	Processors / Cores Active:	10	System ASP Capacity	4,680 GB
Type:	9117	Available Processors:	6	Hypervisor Memory:	9,728 MB
Model:	MMA	Virtual Processors:	10	Primary Partition:	0
Serial Number:	10-3709C	Installed Processor Count:	12	Partition ID:	15
Processor Feature Code:	7380	Processor Units (allocated to partition):	3.05	Partition Count:	15
Processor Feature:	7380	Processor Sharing/Capped:	Yes / No	Partition Memory:	100 GB
Generated On:	ROCHMN	QPFRAJ System Value:	3		

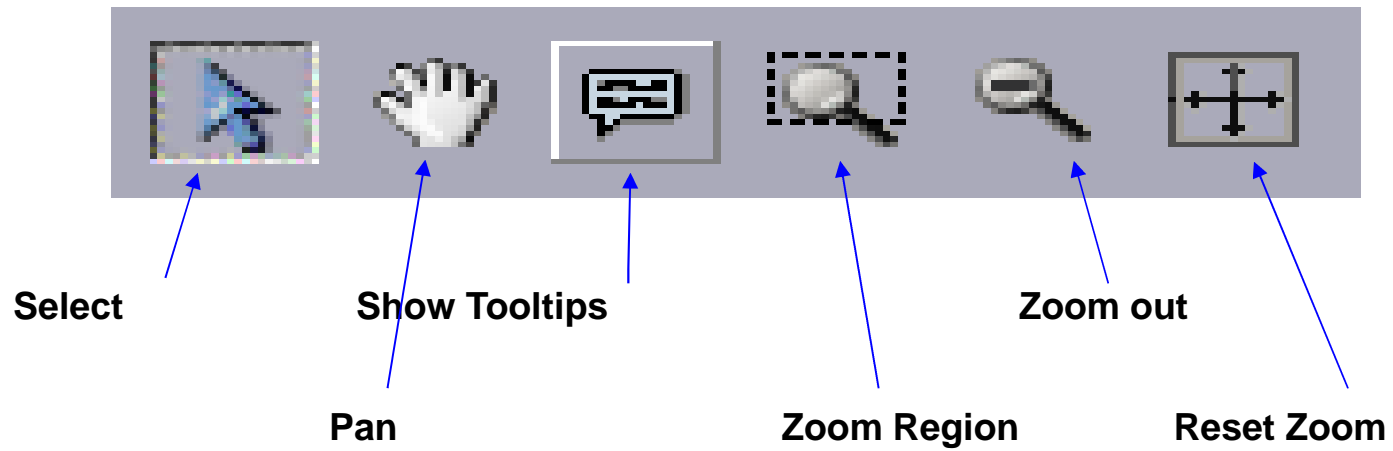
Provides quick access to system information from Collection Services QAPMCONF file for the Collection being viewed

Navigation History

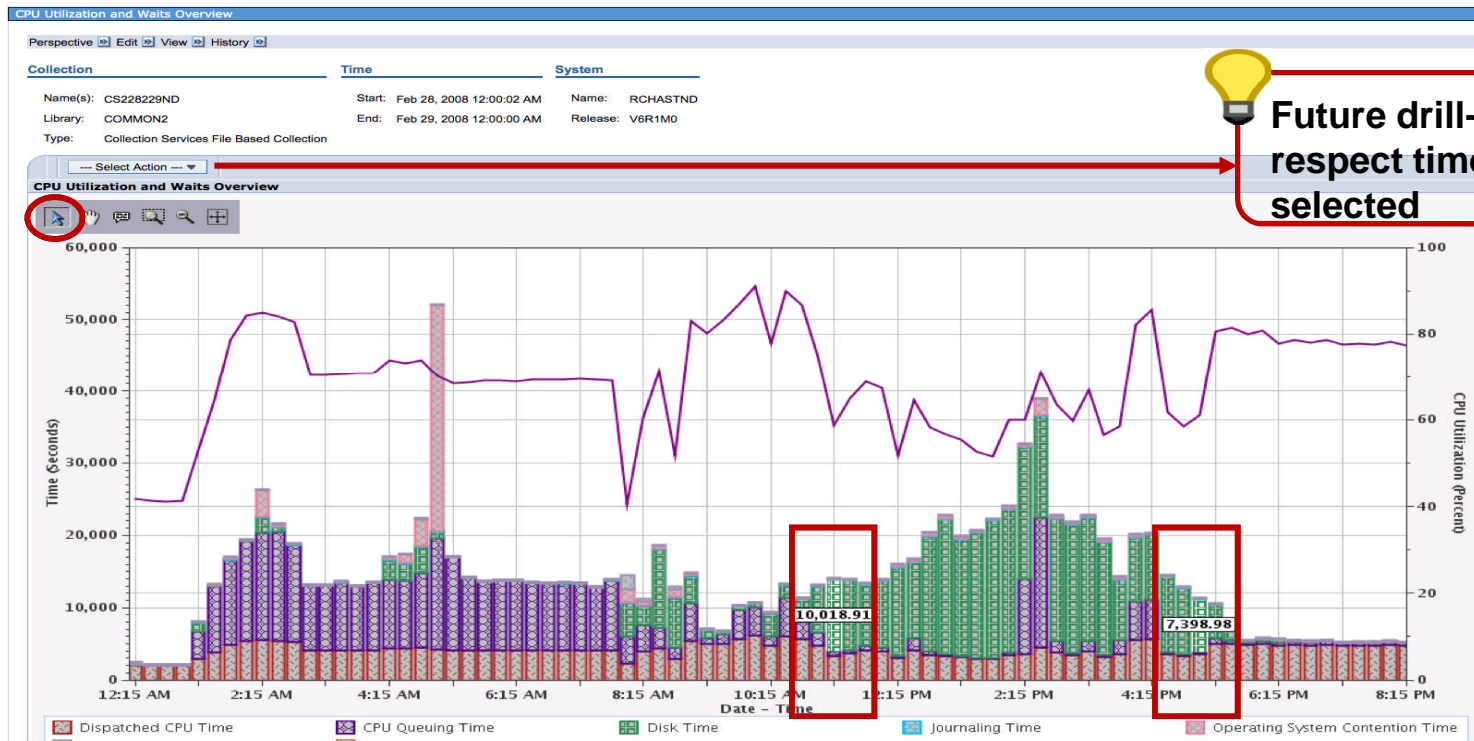
- Keeps track of where you have visited, easy to “back-track”
- Quick way to get back to “Home” (main navigation tree)



Tools to Interact with the Charts

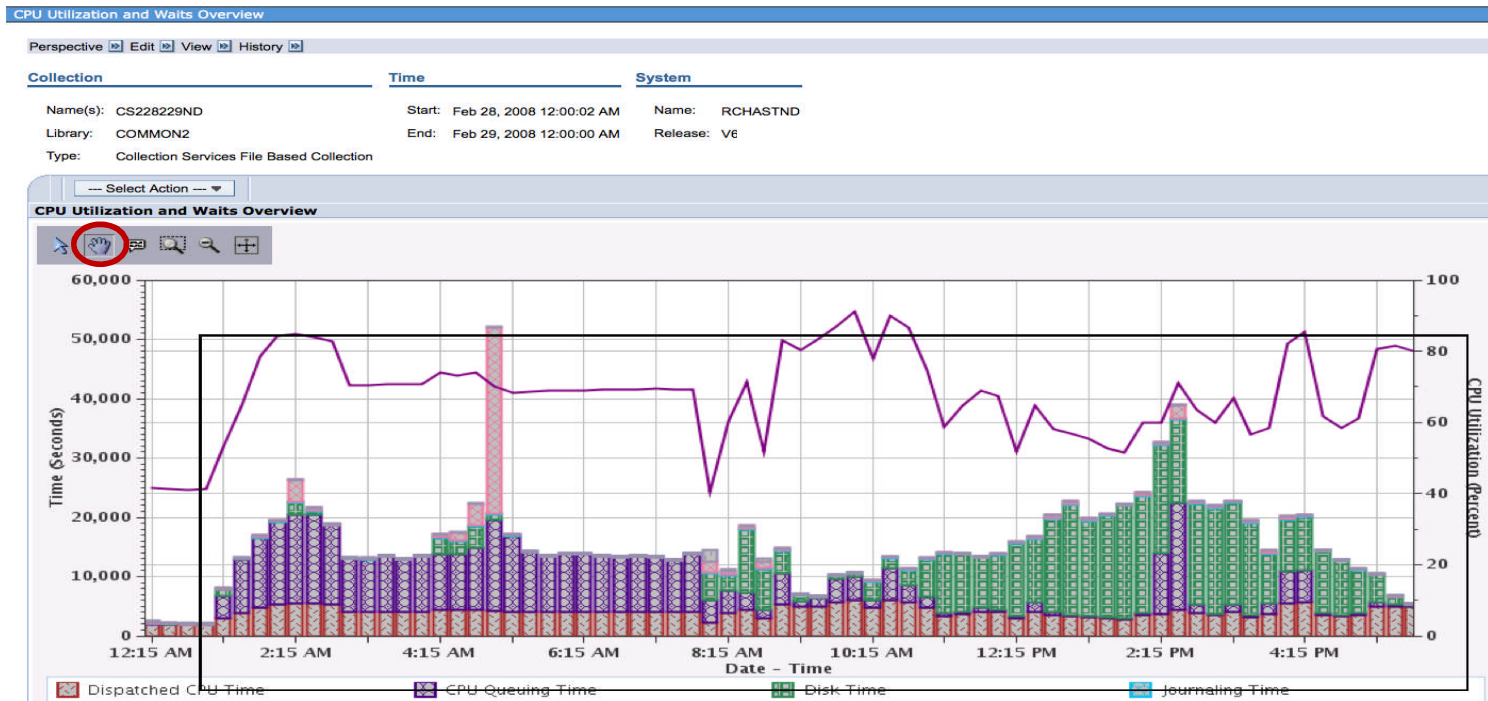


Selection



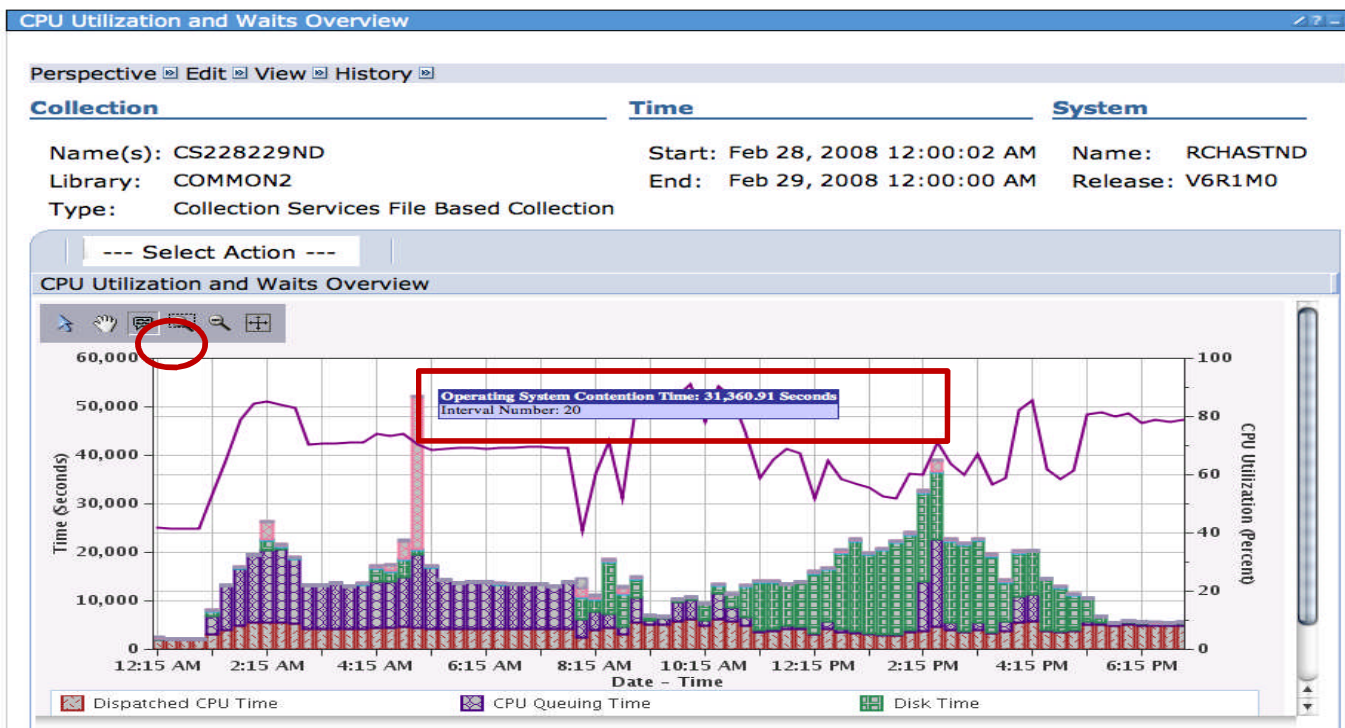
Use to select data point(s).

Pan



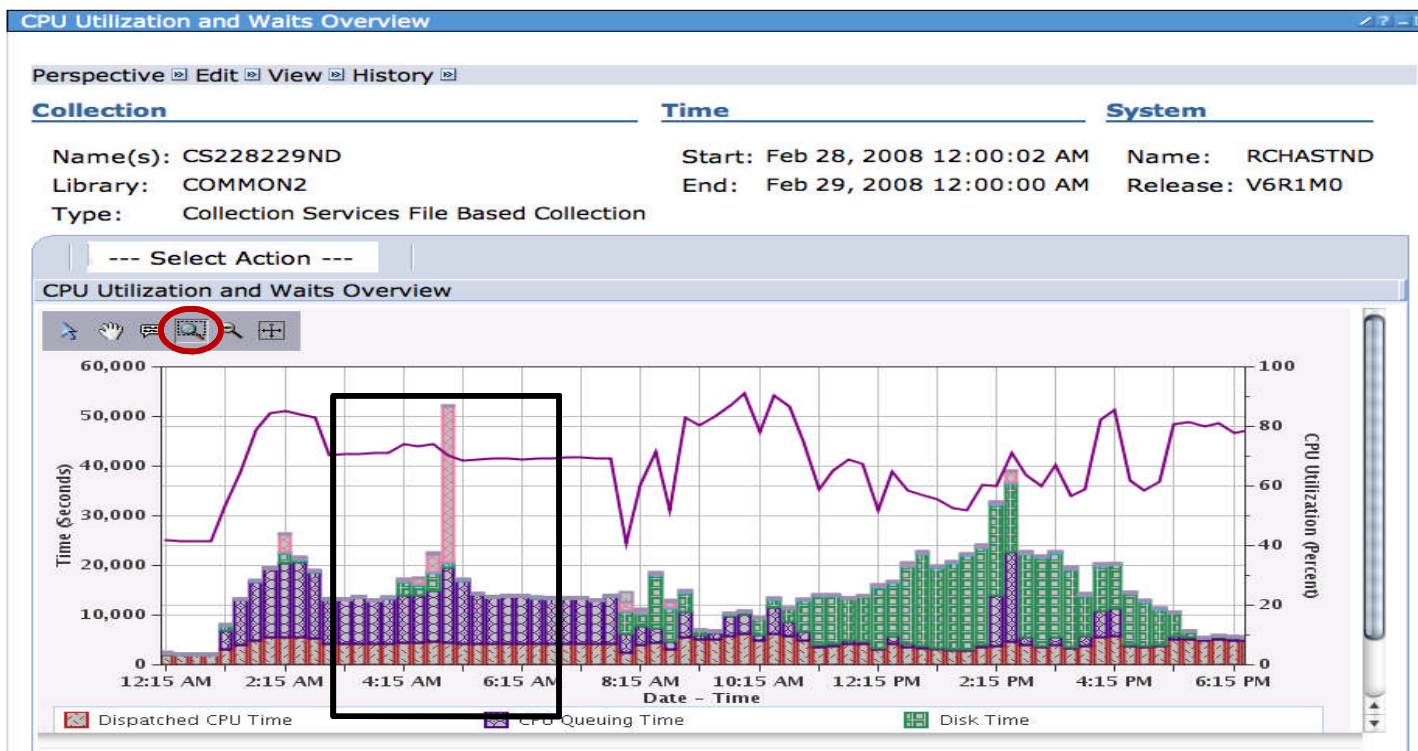
Use to shift chart right or left, up or down.

Tool Tips



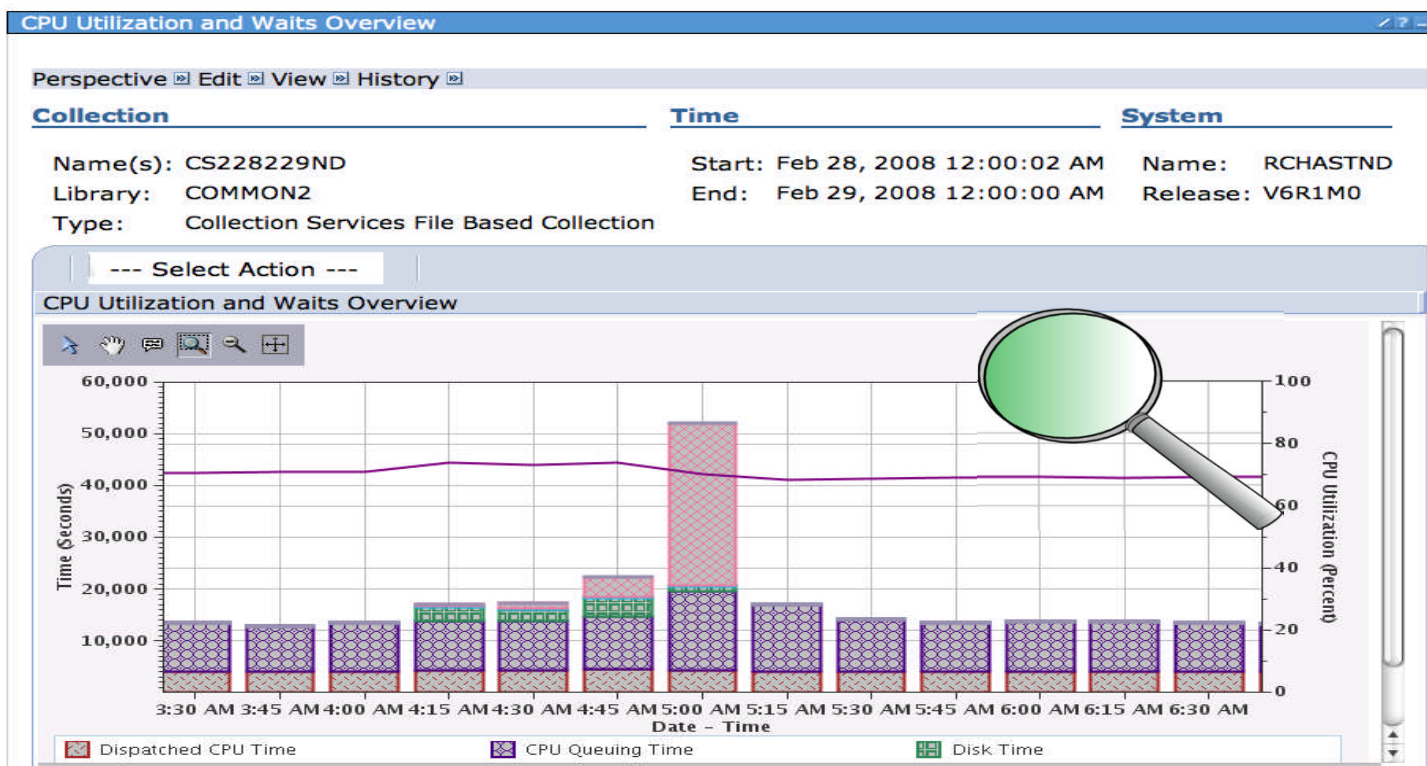
Use to see metric details for interval.

Zoom Region



Use to zoom in on a range of data.

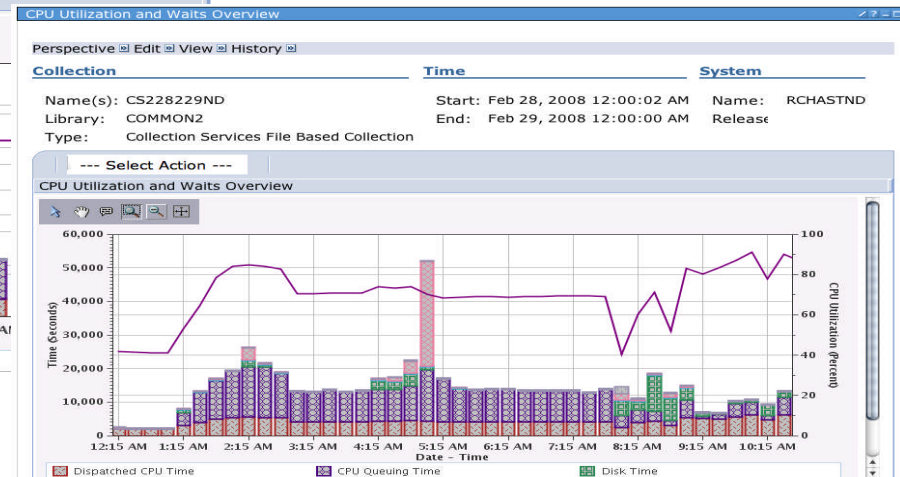
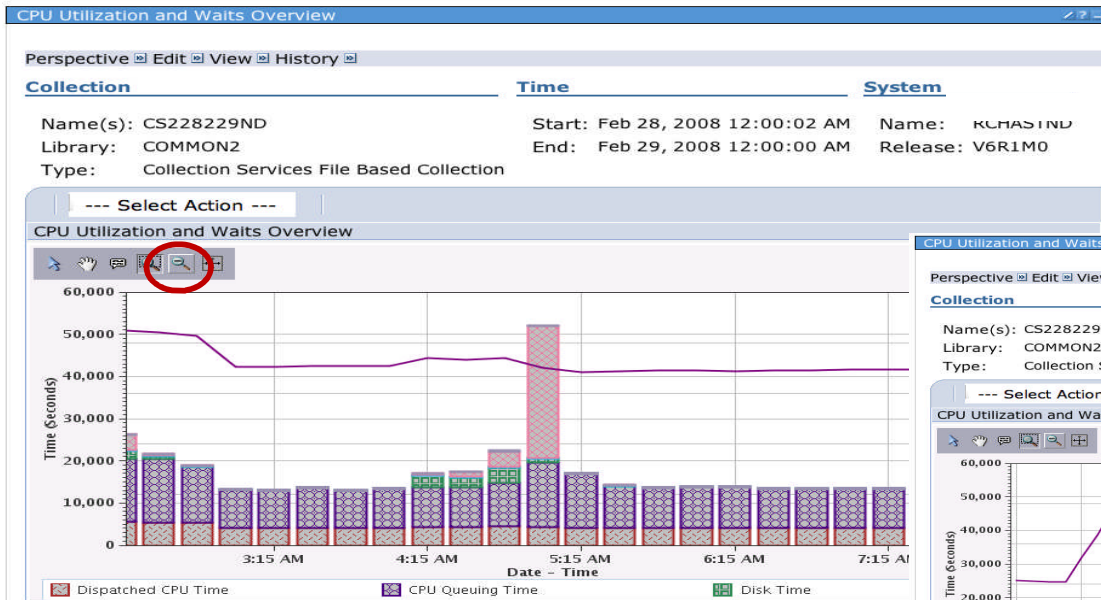
Zoom Region Results



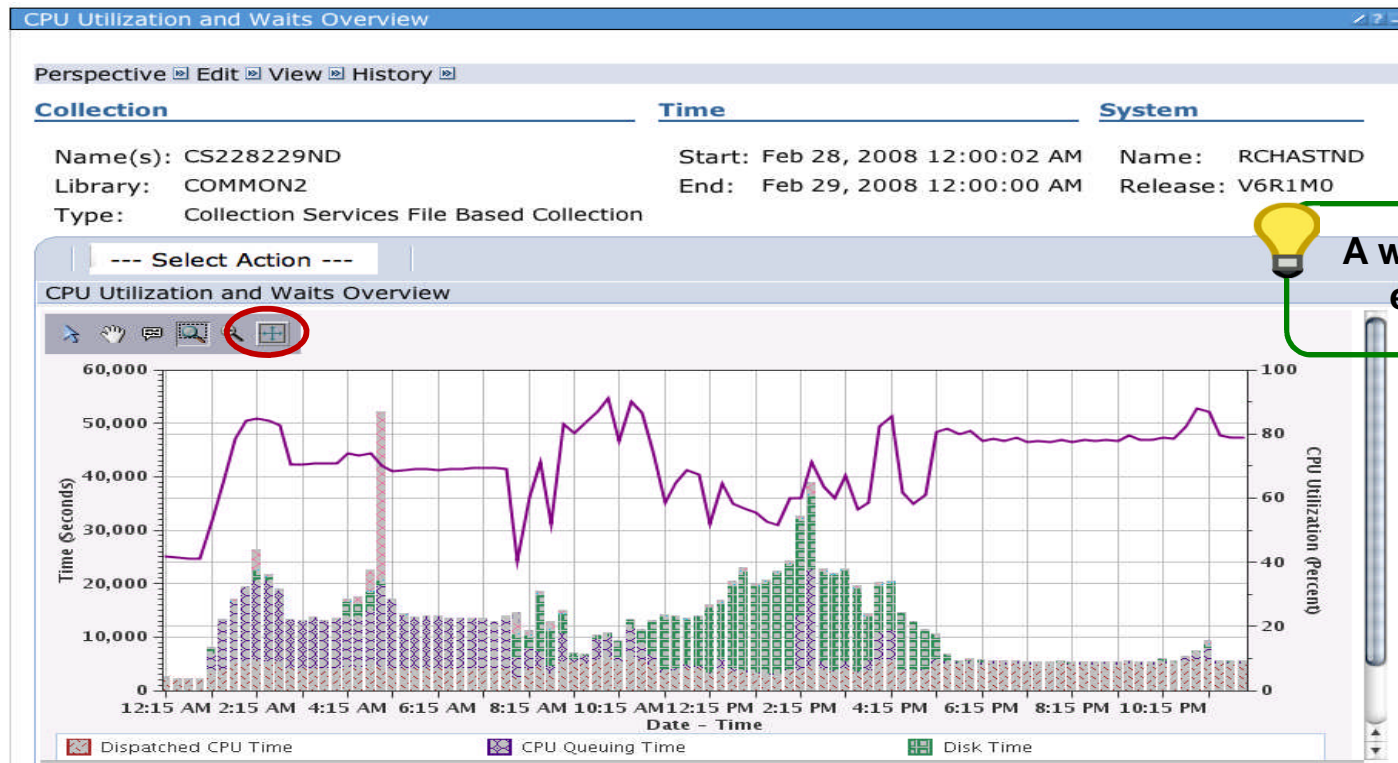
Zoom Out



Zoom out expands the graph each time it is clicked

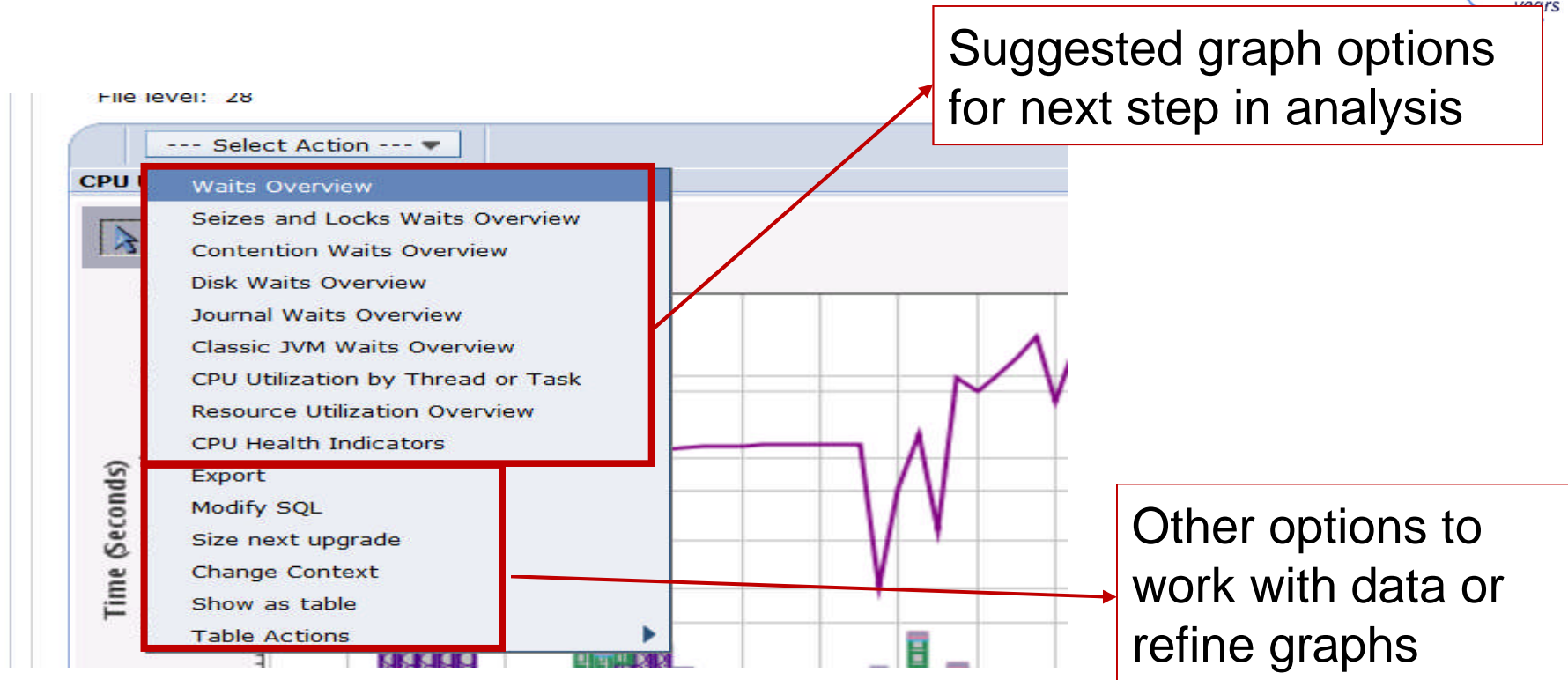


Full Zoom Out



A way to quickly view entire collection characteristics

Drill-down



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)

Suggested graph options for next step in analysis

Other options to work with data or refine graphs

Export - *.png, *.jpeg, *.csv, *.txt



CPU Utilization and Waits Overview

Perspective Edit View History

--- Select Action ---

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

Time (Seconds)

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

Format

Image (*.png)

Image (*.png)

Image (*.jpeg)

Comma Delimited (*.csv)

Tab Delimited (*.txt)

Modify SQL – customize the queries



CPU Utilization and Waits Overview

Perspective Edit View History

--- Select Action ---

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

Time (Seconds)

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



Change Context

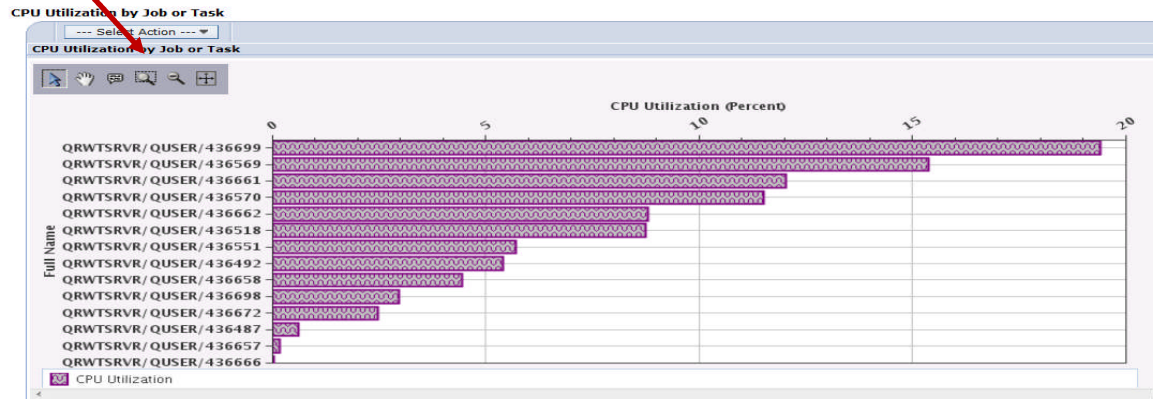
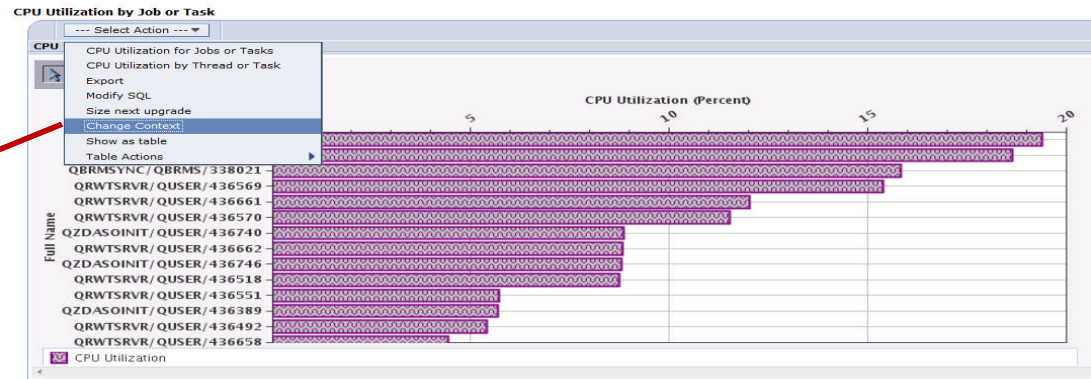
Details
Use the fields below to adjust your current context. These changes will only affect this panel and any sub-

Variable

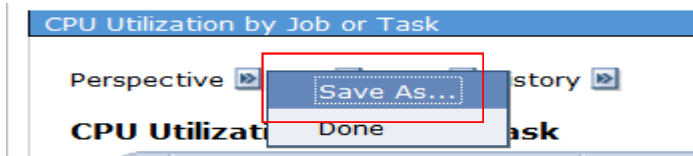
Variable	Description	Value	Required
▼ Set 1			
JBNM	Name	QRWTSRVR	No
JBNR	Job Number		No
JBUSER	Job User		No
MINDTECEN	Century Digit		No
MINDTETIM	Interval Date And Time		No
MAXDTECEN	Century Digit		No
MAXDTETIM	Interval Date And Time		No
Collection Library		PDIDEMO	Yes
Collection Name		Q071123119	Yes

Page 1 of 1 1 Go Rows 11

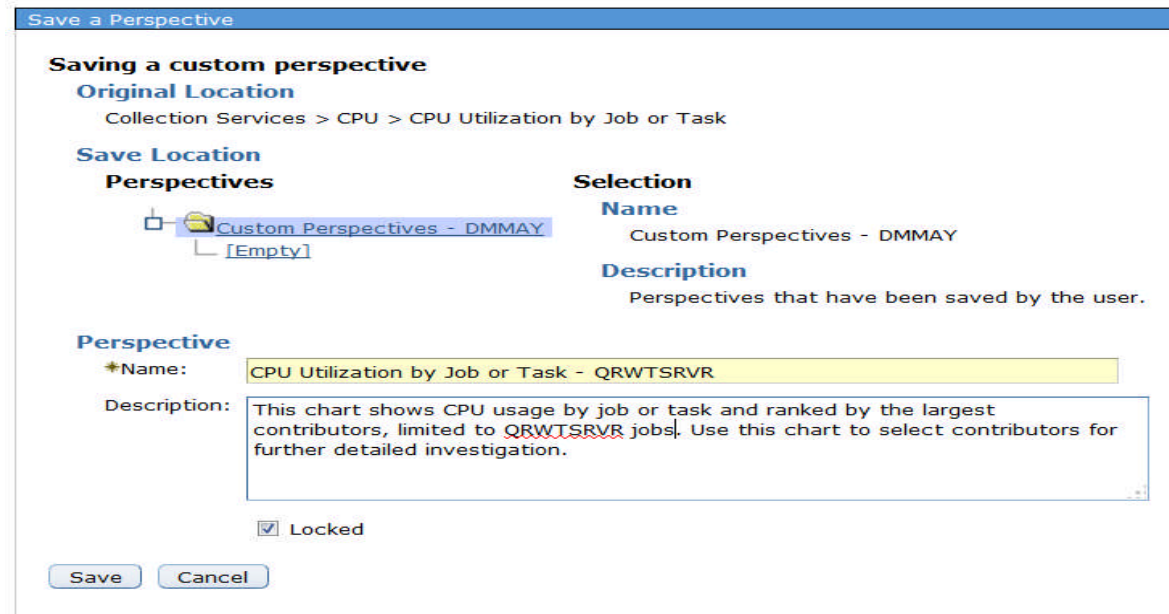
OK Cancel



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...**”



Save a Perspective

Saving a custom perspective

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

Save Location

Perspectives

- Custom Perspectives - DMMAY
 - [Empty]

Selection

Name
Custom Perspectives - DMMAY

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



Bookmark!

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

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: QPFRDATA
Collection Name: 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

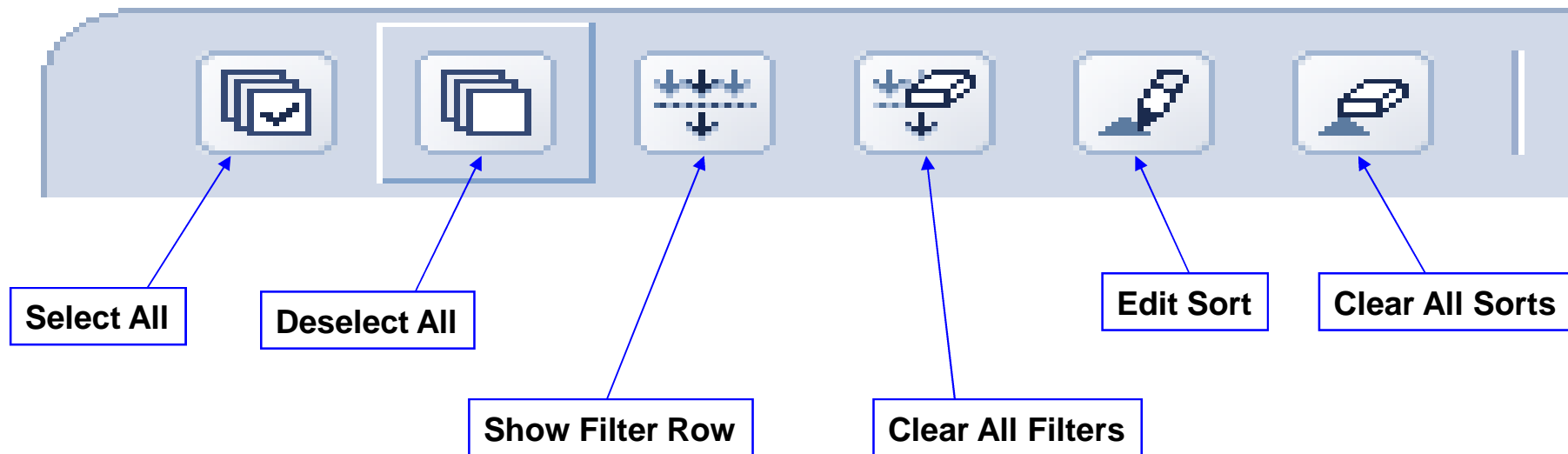
CPU Utilization and Waits Overview

Perspective Edit View History

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



Sorting



--- 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)
			41.65	2125.7	12.25	64.4	35.71	
			41.4	2110.42	12.16	10.72	34.68	
			41.14	2096.73	12.38	5.32	35.3	
			41.23	2104.27	11.71	5.67	35.35	
			52.99	2959.23	3759.2	1180.33	47.49	
			64.62	3847.86	9061.6	217.47	32.11	
			78.58	4853.43	11796.74	41.63	41.27	
			84.22	5367.69	13984.72	23.12	52.58	

First Sort: Date - Time, Ascending
 Second Sort: Ascending
 Third Sort: Ascending

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)
 Lock Contention Time (Seconds)
 Ineligible Waits Time (Seconds)
 100 Percent Utilization (Percent)
 Interval Date And Time
 Century Digit

Columns....



--- 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 chart
- Columns...**
- Show find toolbar
- Table Actions

Columns

Available Columns:

- Title
- 100 Percent Utilization
- Interval Date And Time
- Century Digit

Buttons: Add >, < Remove, Add All >>, Move Up, Move Down

Current Columns:

- Title
- Interval Number
- Date - Time
- Partition CPU Utilization
- Dispatched CPU Time
- CPU Queuing Time
- Disk Time
- Journal Time
- Operating System Contention Time
- Lock Contention Time
- Ineligible Waits Time

OK Cancel Help

Show find toolbar / Hide find toolbar & Search the 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 chart
- Columns...
- Show find toolbar
- Table Actions

Columns...

- Hide find toolbar

Waits by Job: Current User Profile

Perspective Edit View History

Search for: stacyb Condition: Contains Column: All columns Direction: Down

Find Match case

Select	Current User	Dispatched CPU Active Time (Seconds)	Dispatched CPU Waiting Time (Seconds)	Dispatched CPU Transferred Time (Seconds)	Dispatched CPU Time (Seconds)
<input type="checkbox"/>	QEJBSVR	343.26	297.91	0	641.17
<input type="checkbox"/>	WEAVE	312.5	239.11	0	551.61
<input type="checkbox"/>	QSYS	48.97	41.96	0	90.94
<input type="checkbox"/>	QLWISVR	41.47	45.95	0	87.42
<input type="checkbox"/>	QBRMS	32.67	25.78	0	58.45
<input type="checkbox"/>	QSECOFR	23.31	21.57	0	44.88
<input type="checkbox"/>	QPM400	20	15.75	0	35.75
<input type="checkbox"/>	QTCP	8.47	7.8	0	16.27
<input type="checkbox"/>	HOSTPUB	3.37	3.64	0	7.02
<input type="checkbox"/>	QTMHHTTP	1.66	2.52	0	4.17
<input type="checkbox"/>	QWEBADMIN	1.52	2.26	0	3.78
<input type="checkbox"/>	QYPSJSVR	1.47	2.21	0	3.68
<input type="checkbox"/>	QDIRSRV	0.86	1.17	0	2.03
<input type="checkbox"/>	QIJS	0.55	0.43	0	0.98
<input type="checkbox"/>	QUSER	0.43	0.35	0	0.77
<input type="checkbox"/>	DRLEWIS	0.21	0.16	0	0.37
<input type="checkbox"/>	QSVMSS	0.15	0.13	0	0.28
<input type="checkbox"/>	GIBBONS	0.05	0.04	0	0.09
<input type="checkbox"/>	STACYB	0.04	0.03	0	0.08

New Table Support



- Improved table support (7.2 and PTF'ed back to 6.1)
 - Collection manager and PDI Reports use the new table support
 - “Show as table” still uses the old table support

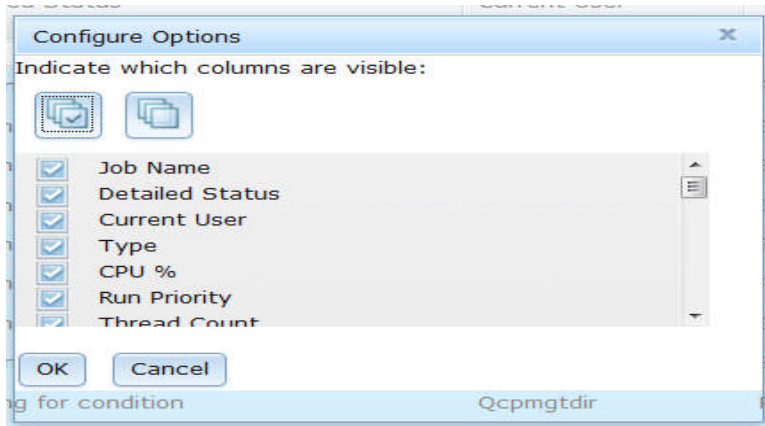
Manage Collections - Etc3t1.rchland.ibm.com

Name	Library	Type	Status	Started	Ended	Size MB	System
No filter applied							
Q081000002	QPFRDATA	Collection Services File Based Collection	Complete	3/22/13 1:00:02 AM	3/23/13 1:00:00 AM	218.023	ETC3
Q082000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Complete	3/23/13 1:00:02 AM	3/24/13 1:00:02 AM	151.332	ETC3
Q082000002	QPFRDATA	Collection Services File Based Collection	Complete	3/23/13 1:00:02 AM	3/24/13 1:00:00 AM	217.023	ETC3
Q083000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Complete	3/24/13 1:00:02 AM	3/25/13 1:00:02 AM	156.332	ETC3
Q083000002	QPFRDATA	Collection Services File Based Collection	Complete	3/24/13 1:00:02 AM	3/25/13 1:00:00 AM	220.023	ETC3
Q084000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Complete	3/25/13 1:00:02 AM	3/26/13 1:00:02 AM	156.332	ETC3
Q084000002	QPFRDATA	Collection Services File Based Collection	Complete	3/25/13 1:00:02 AM	3/26/13 1:00:00 AM	219.523	ETC3
Q066000002	QPFRDATA	Collection Services File Based Collection	Complete	3/7/13 12:00:02 AM	3/8/13 12:00:00 AM	233.281	ETC3
Q085000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Complete	3/26/13 1:00:02 AM	3/27/13 1:00:02 AM	160.332	ETC3
Q085000002	QPFRDATA	Collection Services File Based Collection	Complete	3/26/13 1:00:02 AM	3/27/13 1:00:00 AM	225.652	ETC3
Q086000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Complete	3/27/13 1:00:02 AM	3/28/13 1:00:02 AM	158.332	ETC3
Q086000002	QPFRDATA	Collection Services File Based Collection	Complete	3/27/13 1:00:02 AM	3/28/13 1:00:00 AM	225.523	ETC3
Q087000002	QPFRDATA	Collection Services *MGTCOL Obj Based Co	Active	3/28/13 1:00:02 AM		2.094	ETC3
Q087000002	QPFRDATA	Collection Services File Based Collection	Active	3/28/13 1:00:02 AM		3.602	ETC3
Q073000002	QPFRDATA	Collection Services File Based Collection	Complete	3/14/13 1:00:02 AM	3/15/13 1:00:00 AM	220.515	ETC3

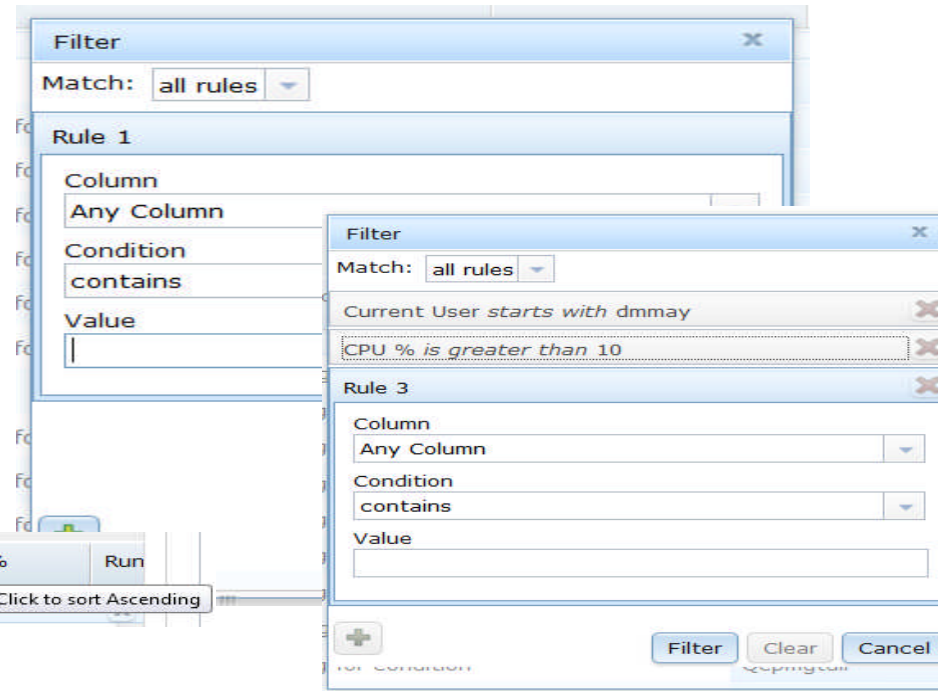
1 - 22 of 22 items 5 | 10 | 25 | 50 | 100 | All

New Table Support – Same Features, New UI

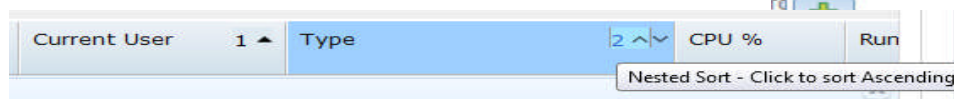
Configure Options for Columns



Filter column data



Sort Columns

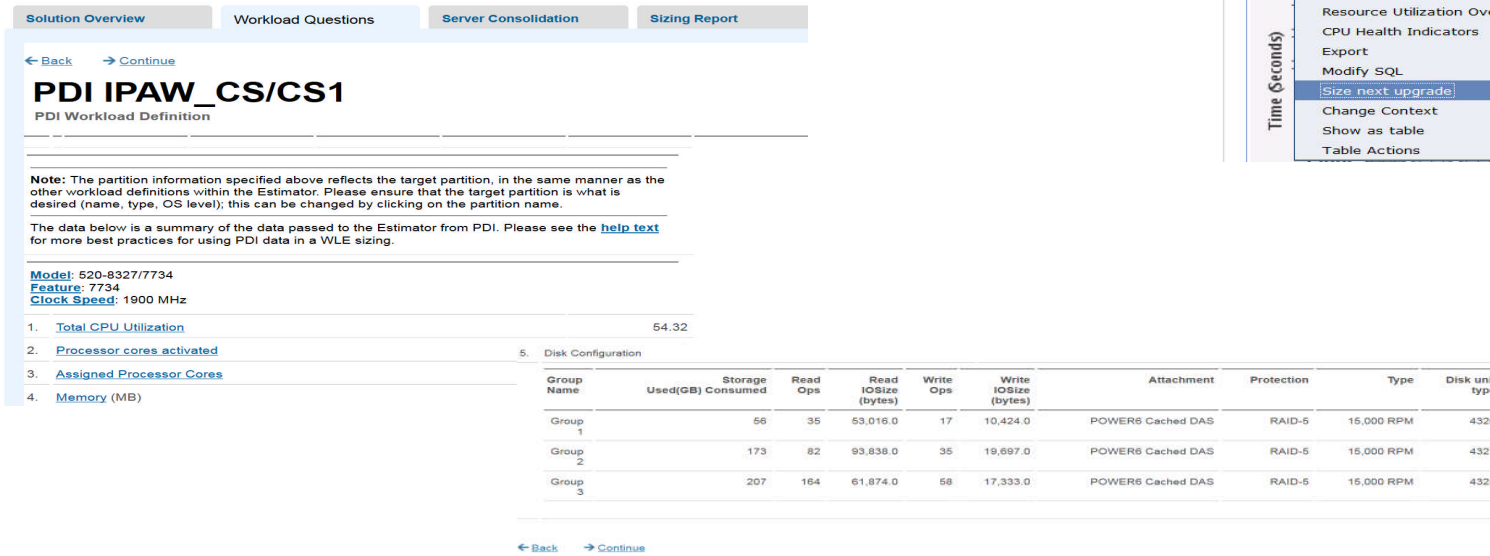


Size Next Upgrade

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

Intended for a one-time sizing activity

IBM Workload Estimator v2015.3



PDI IPAW_CS/CS1
PDI Workload Definition

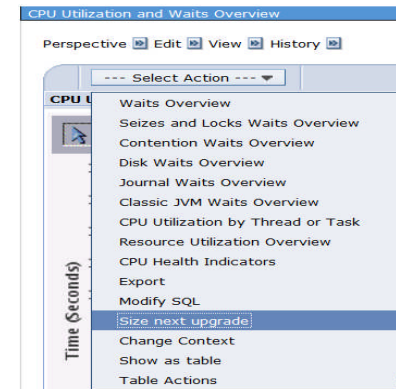
Note: The partition information specified above reflects the target partition, in the same manner as the other workload definitions within the Estimator. Please ensure that the target partition is what is desired (name, type, OS level); this can be changed by clicking on the partition name.

The data below is a summary of the data passed to the Estimator from PDI. Please see the [help text](#) for more best practices for using PDI data in a WLE sizing.

Model: 520-8327/7734
Feature: 7734
Clock Speed: 1900 MHz

1. Total CPU Utilization	54.32
2. Processor cores activated	
3. Assigned Processor Cores	
4. Memory (MB)	
5. Disk Configuration	

Group Name	Used(GB)	Storage Consumed	Read Ops	Read IO Size (bytes)	Write Ops	Write IO Size (bytes)	Attachment	Protection	Type	Disk unit type
Group 1		56	35	53,016.0	17	10,424.0	POWER6 Cached DAS	RAID-5	15,000 RPM	4326
Group 2		173	82	93,838.0	35	19,697.0	POWER6 Cached DAS	RAID-5	15,000 RPM	4327
Group 3		207	164	61,874.0	58	17,333.0	POWER6 Cached DAS	RAID-5	15,000 RPM	4328



CPU Utilization and Waits Overview

Perspective Edit View History

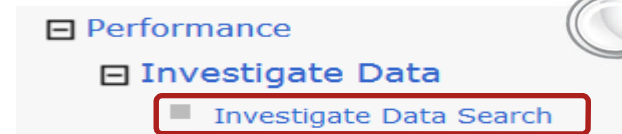
--- Select Action ---

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



Investigate Data Search

“Investigate Data Search” added in 7.2



Investigate Data Search

Storage Case Sensitive Whole Words Only
Type at least 3 non-empty characters

Search In: Package Name Description Metrics Perspective View SQL

Show Columns: Metrics SQL

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

Metric Finder

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
- STRPFMON 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):

Collection

Collection Library: QPFRDATA Collection Name: Most Recent

Display **Search** Options Refresh Perspectives Close

Investigate Data - Performance Data Investigator

Metric Finder

Metric

Metric Name: Scaled CPU Time

Perspective

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

Page 1 of 1 1 Go Rows 10 Total:

Collection

Collection Library: QPFRDATA Collection Name: Most Recent

Display List Options Refresh Perspectives Close

Options



Collection

Collection Library: QPFRDATA Collection Name: Most Recent

Display Search Save as Favorite **Options** Close

Investigate Data - Performance 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:

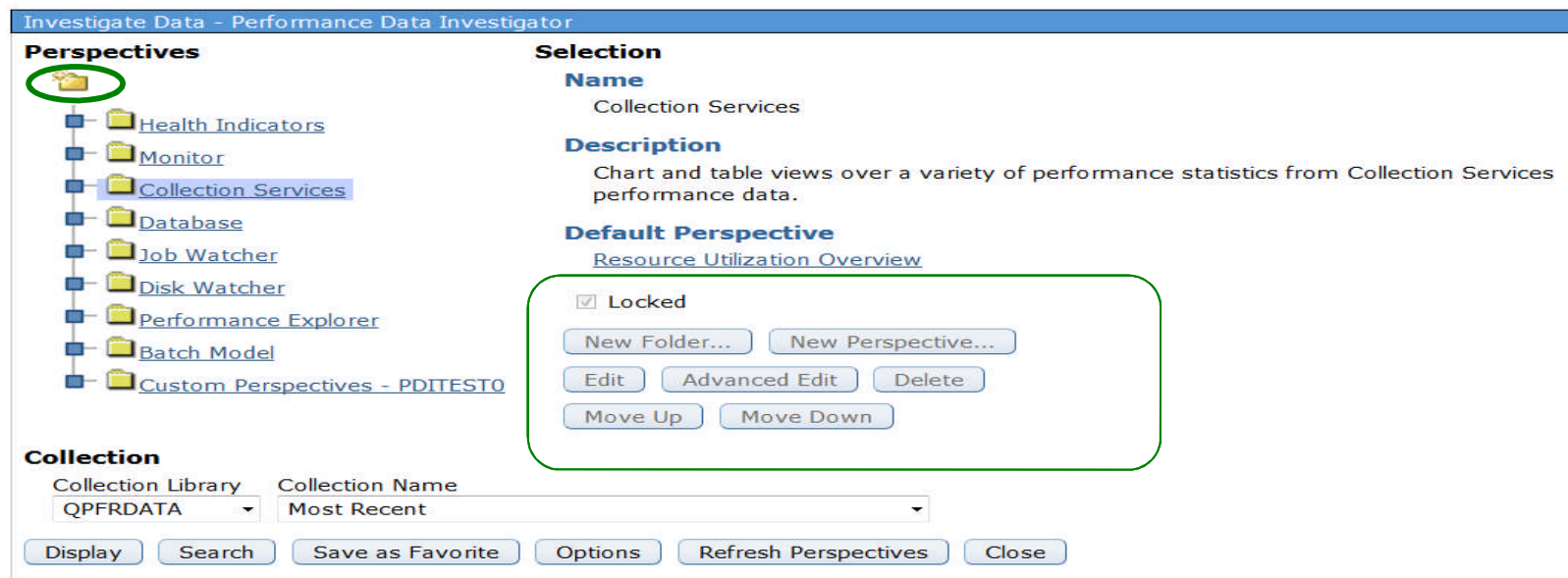
System Monitor 7.2

- Show thresholds Show thresholds in system monitor charts.

OK Cancel

Design Mode

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



The screenshot shows the Performance Data Investigator (PDI) interface in Design Mode. The title bar reads "Investigate Data - Performance Data Investigator". On the left, a tree view under "Perspectives" shows a folder icon circled in green, indicating Design Mode is active. The tree includes folders for Health Indicators, Monitor, Collection Services (selected), Database, Job Watcher, Disk Watcher, Performance Explorer, Batch Model, and Custom Perspectives - PDITEST0. The right pane shows details for the selected "Collection Services" perspective, including its name, description, and default perspective. A green box highlights the "Locked" checkbox (checked) and a set of buttons: "New Folder...", "New Perspective...", "Edit", "Advanced Edit", "Delete", "Move Up", and "Move Down". At the bottom, the "Collection" section shows "Collection Library" set to "QPFRDATA" and "Collection Name" set to "Most Recent". A row of buttons at the very bottom includes "Display", "Search", "Save as Favorite", "Options", "Refresh Perspectives", and "Close".

http://ibmsystemsmag.blogs.com/i_can/2011/08/customizing-a-perspective-in-pdi.html

Health Indicators



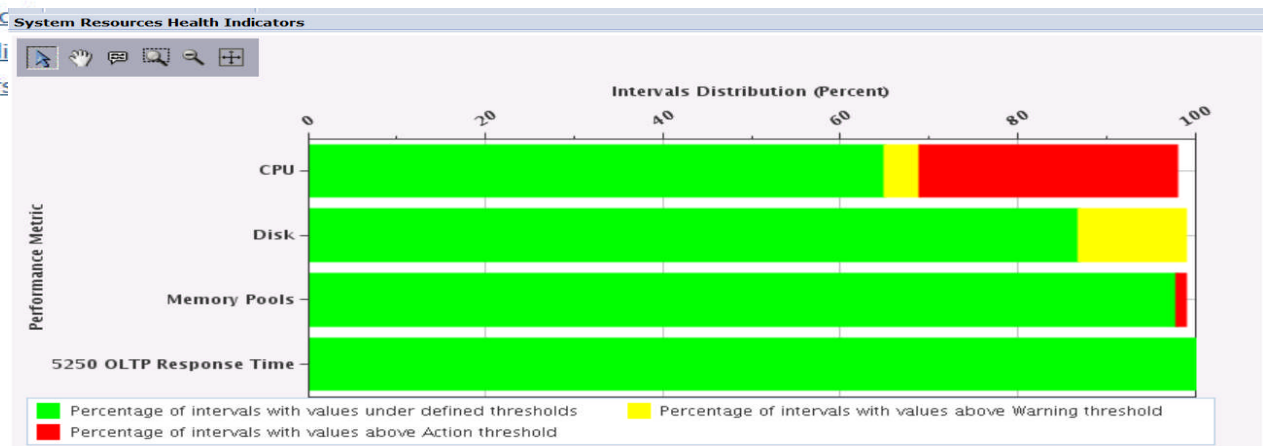
System Resource Health Indicators

Investigate Data - Performance Data Investigator

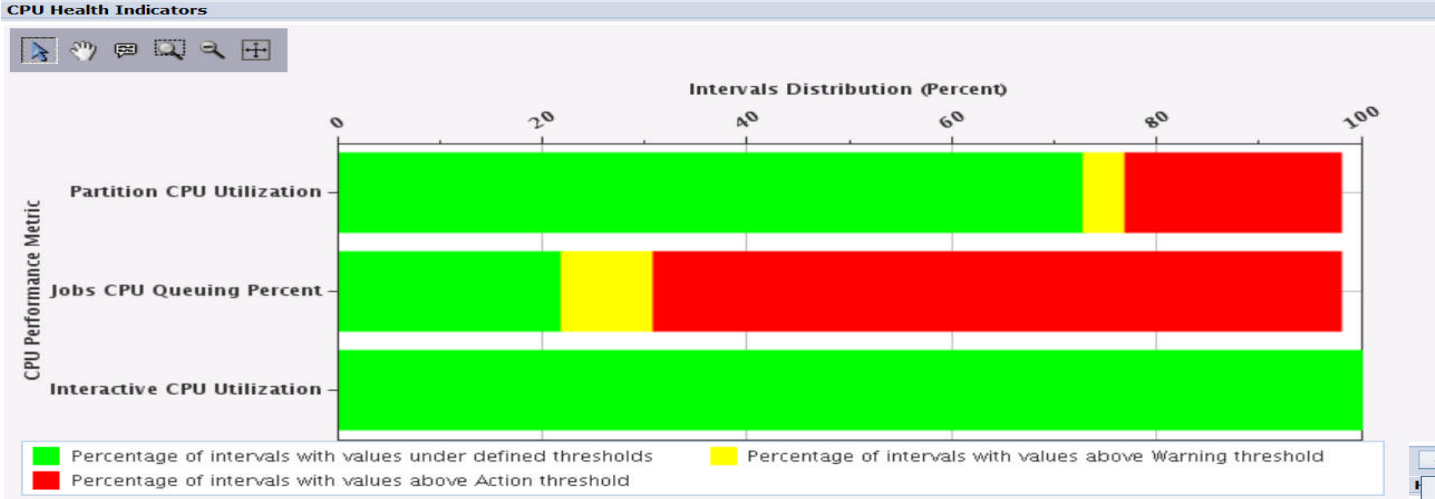
Perspectives

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

Database Health Indicators are new in 7.2



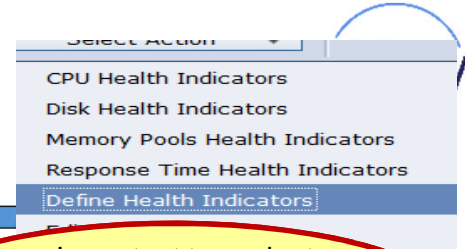
CPU Health Indicators



Drill-downs available →

- Select Action ---
- System Resources Health Indicators
- CPU Utilization and Waits Overview
- CPU Utilization Overview**
- Interactive Capacity CPU Utilization
- Define Health Indicators
- Edit View
- Export
- Modify SQL
- Size next upgrade
- Change Context
- Show as table
- Table Actions

Define Health Indicators



Important to evaluate shipped threshold values with specific business environment and goals

Define Health Indicators

System Resources Health Indicators	Available Indicators	Selected Indicators	Current Threshold Values
CPU	[Empty]	Interactive CPU Utilization Jobs CPU Queuing Percent Partition CPU Utilization	Warning <input type="checkbox"/> Action <input type="checkbox"/>
Disk			
Memory Pools			
5250 OLTP Response Time			

Define Health Indicators

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

Define Health Indicators

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

Job Watcher



Investigate Data

Perspectives

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

Selection

Job Watcher

Description

Chart and table views over a variety of performance statistics from Job Watcher performance data.

Default Perspective

Resource Utilization Overview

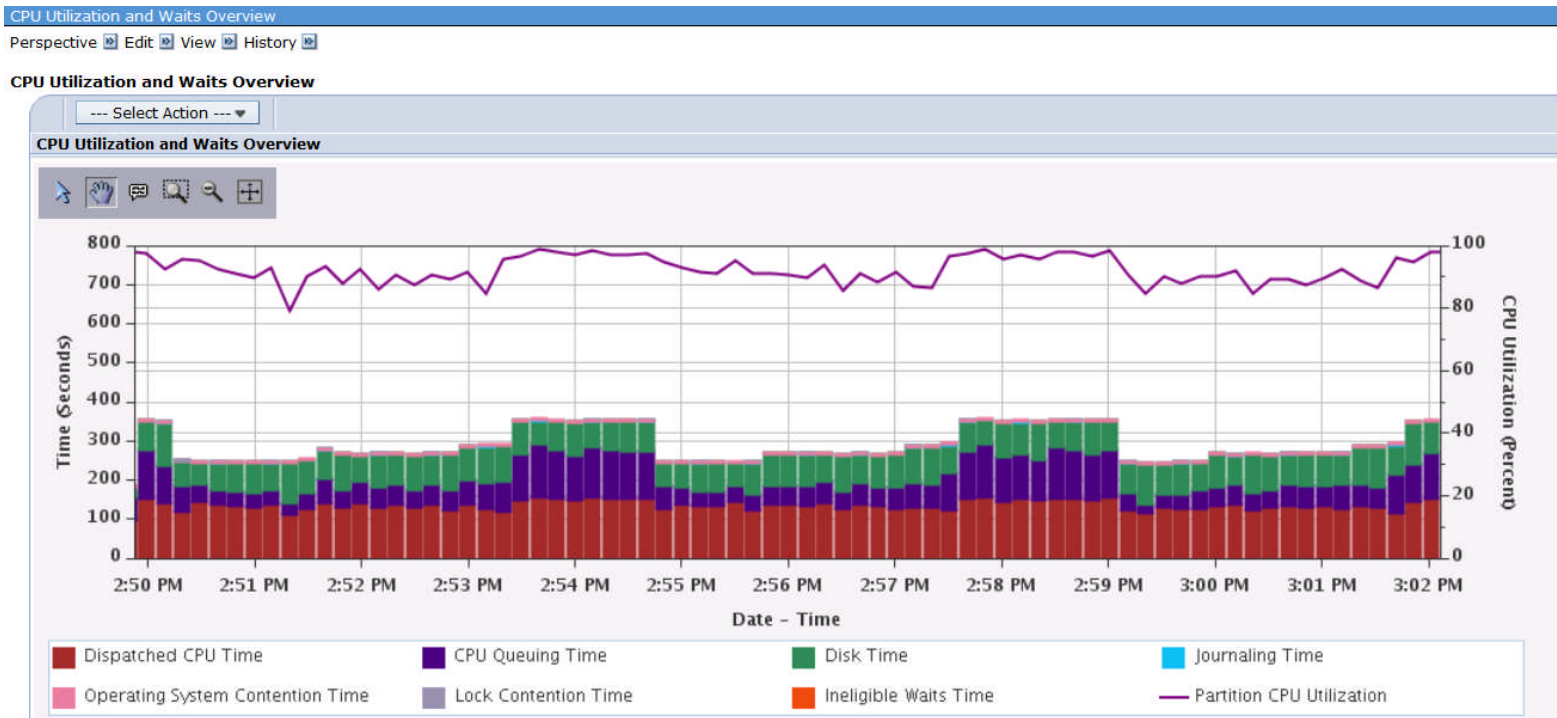
Collection

Collection Library	Collection Name
COMMON	DAWNJW2 (*JWFILE)

- Most Recent
- All
- JWOBJLOCKC (*JWFILE)
- DAWNJW229 (*JWFILE)
- DAWNJW2 (*JWFILE)

Display Close

Job Watcher - CPU Utilization and Waits Overview



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

Current user profile: LISAW

Object waited on: INVENTORY INVENTORY

Wait duration: 581 milliseconds

Current or last wait: DB record lock: update

Holding job or task: QZDASOINIT/QUSER/128890

SQL statement: None detected this interval

Priority: 20

Pool: 2

Transaction: PHYSICAL FILE MBR - DATA PART

Segment type description: DB PHYSICAL FILE MEMBER RECORDS

Wait object library: None detected this interval

Interval timestamp: Jan 3, 2014 2:36:28 PM

Interval (1 to 684): < 174 >

Show Holder

Call Stack

Call Level	Program	Module	Procedure
1			qutde_block_tra
2			longWaitReceive__9QuCounterFR12RmprReceiverP
3			DBLockConflict__15RmsIDBHashClassFR11RmsIPIm
4			rmsIDBHLock__FR11RmsIPImpLad
5			getLockWithWait__18DbpmUpdateResource
6			getLock__18DbpmUpdateResource
7			getRowLock__18DbpmUpdateResourceFCUIRC9Dbp
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

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
<input type="button" value="Show Holder"/>		Interval Number (1 to 684):	<input type="button" value="<"/> <input type="text" value="9"/> <input type="button" value=">"/>

Call Stack

Call Level	Program	Module	Procedure
1			qutde_block_tra
2			longWaitBlock__23QuSingleTaskBlockerCodeFP2
3			sleep__17LoMiThreadSleeperFQ2_4Rmpr18Interr
4			sleep__14LoSleepManagerFiQ2_4Rmpr18Interru
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

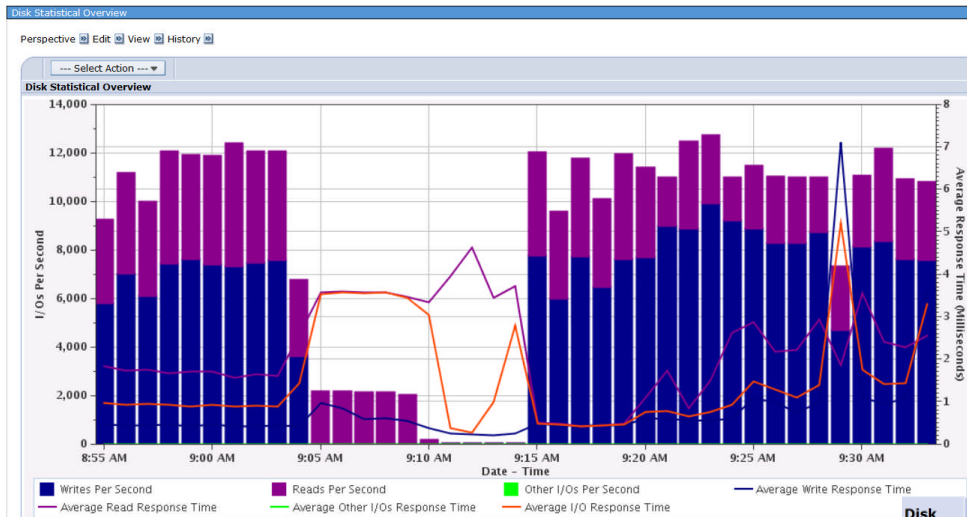
Collection

Collection Library	Collection Name
COMMON	Most Recent

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

Display Close

Disk Watcher – Statistical Overviews



Disk Statistical Details
by Disk Unit →

Disk Unit	Writes Per Second	Total Writes Time (Microseconds)	Total Writes	Average Write Response Time (Milliseconds)	Reads Per Second	Total Reads Time (Microseconds)	Total Reads
20	80.56	175950662	185018	0.95	49.71	282724690	114151
17	89.22	191215563	204939	0.93	40.68	264619450	93431
13	81.02	179679328	186452	0.96	48.84	274793662	112391
19	80.7	167715597	185126	0.91	49.57	284330764	113711
23	82.14	171587291	188592	0.91	49.25	282287097	113081
14	81.32	174688160	186611	0.94	48.63	271365018	111601
18	86.36	183961541	198247	0.93	43.92	263163367	100821
24	77.6	166812672	178266	0.94	53.79	280611909	123561
21	86.23	182932893	198541	0.92	44.63	263267334	102771
15	75.49	169810668	173437	0.98	53.44	264217243	122791
22	83.29	182276882	191257	0.95	47.69	241121731	109501
16	81.63	168328084	186885	0.9	48.91	248662038	111981
5	75.44	169945071	173097	0.98	52.43	232447562	120291
12	81.86	177664449	187639	0.95	47.6	211450426	109101
6	74.9	161260837	171746	0.94	52.59	221205441	120581

Disk Watcher – Trace Data



I/O Counts by IOP, I/O Type, Pool, Object, Object Type, Module, Procedure

Select	Total I/Os	IOP Name	I/O Type	Pool Number	Object Name	Object Type	Object Subtype	Module Name
<input type="checkbox"/>	1401057	CMB01	SRd	3	CUSTO0000B	90		#dbbring
<input type="checkbox"/>	564279	CMB01	SRd	2	DAILY0000C0B	90		DbpmDspAcco
<input type="checkbox"/>	251838	CMB01	SFt	3	CUSTO0000B	90		DbDsCursor
<input type="checkbox"/>	142494	CMB01	SFt	3	CUSTO0000B	90		stringHighUse
<input type="checkbox"/>	110125	CMB01	SRd	3	DAILY0000C0B			
<input type="checkbox"/>	107883	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	107111	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	106897	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	106614	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	106074	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	89348	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	89031	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	88506	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	88149	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	87653	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	86029	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	85626	CMB01	SWt	3	Q04079N00B			
<input type="checkbox"/>	85401	CMB01	SWt	3	Q04079N00B			

← Total I/O Counts - what object the I/O is for, along with the module and procedure that did the I/O on that object.

Total Page Faults

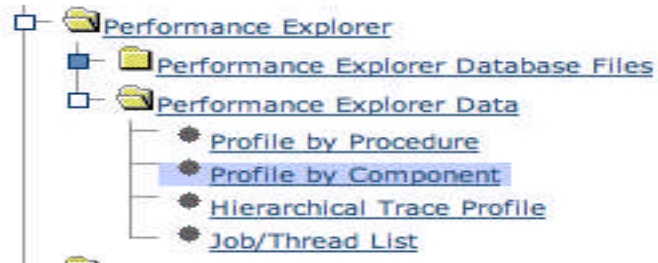
Select	Total Page Faults	IOP Name	Qualified Job Name or Task Name	I/O Type	Pool Number	Object Name	Object Type	Object Sub
<input type="checkbox"/>	5978	CMB01	USRJOB002AEDGE045406	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5937	CMB01	USRJOB001AEDGE045405	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5871	CMB01	USRJOB005AEDGE045409	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5870	CMB01	USRJOB004AEDGE045408	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5800	CMB01	USRJOB003AEDGE045407	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5755	CMB01	USRJOB010BEDGE045414	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5691	CMB01	USRJOB009BEDGE045413	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5629	CMB01	USRJOB008BEDGE045412	SFt	3	CUSTO00001CUSTO00001	0B	90
<input type="checkbox"/>	5623	CMB01	USRJOB007BEDGE045411	SFt	3	CUSTO00001CUSTO00001	0B	90

I/O type

- **SFt = Segment address range fault**
- **SRd = Segment address range read**
- **SWt = Segment address range write**

External Object Types: <http://pic.dhe.ibm.com/infocenter/iseries/v7r1m0/topic/rbam6/rbam6objecttypes.htm>

Performance Explorer



Profile by Component

Select	Total	Component	Procedure Name	Hit Count
<input type="checkbox"/>	Total			683(100%)
<input type="checkbox"/>		SLIC Common Functions		335 (49.05%)
<input type="checkbox"/>		SLIC Database		118 (17.28%)
<input type="checkbox"/>			#dbrsqmn.#dbrsqmn	85(12.45%)
<input type="checkbox"/>			sExecute__42VariableLeng	6(0.88%)
<input type="checkbox"/>			sExecute__14HashOperatic	3(0.44%)
<input type="checkbox"/>			sExecute__17PackedDivide	2(0.29%)
<input type="checkbox"/>			sSad__19VariableLengthFie	2(0.29%)
<input type="checkbox"/>			vPositionNextAndExecute__	2(0.29%)

Profile by Procedure

Perspective Edit View History

Program Name	Module Name	Procedure Name	Component	Hit Count
CFTSMPI		#cftsmapi	SLIC Common Functions	332(48.61%)
STRHU		do_copyMemoryLarge	SLIC String Functions	94(13.76%)
DBRSQMN		#dbrsqmn	SLIC Database	85(12.45%)
CUSTOMER CUSTOMER		#DBXFMP2	MI Other	45(6.59%)
READER	READER	READER	MI Other	27(3.95%)
DBPM2010		sExecute__42VariableLeng	SLIC Database	6(0.88%)
SMMUTLH		trimRangeForRead__14Sn	SLIC Storage Management	6(0.88%)
HvString		HvString	SLIC Hypervisor	4(0.59%)
SMMSSUBH		findStealablePage__20Sm	SLIC Storage Management	4(0.59%)
QDBGTEM	QDBGTEM	QDBGTEM	XPF Database Other	4(0.59%)

Performance Data Reports

“Executive” Reports



- [-] Performance
 - [-] Investigate Data
 - [-] Manage Collections
- [-] All Tasks
 - [-] Active Jobs
 - [-] Disk Status
 - [-] Manage Collections
 - [-] Investigate Data
 - [-] Performance Management for Power Systems
 - [-] System Status
- [-] Collections
 - [-] Convert Collection
 - [-] Copy Collection
 - [-] Create Performance Data
 - [-] Delete Collection
 - [-] Restore Collection
 - [-] Save Collection
- [-] Reports
 - [-] Performance Data Report Definitions
- [-] Collectors

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

Create Performance Data Report

Start here with Reports ->
Performance Data Report Definitions

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/performance-reports-with-the-performance-data-inve/>

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	
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

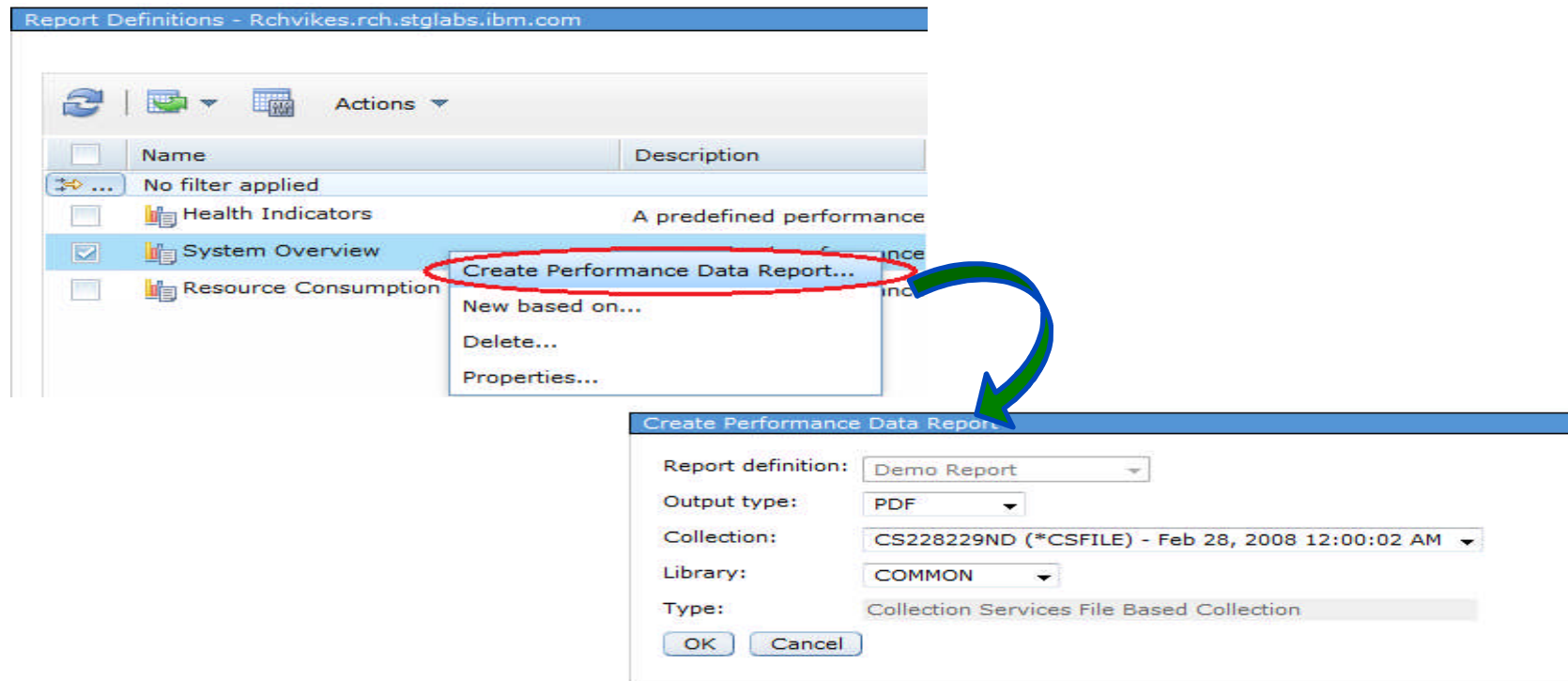


The screenshot illustrates the process of creating a new Performance Data Report Definition in the IBM Performance Data Report Definitions tool. It shows three overlapping windows:

- Top Left Window:** "Add Performance Data Report Definition". It contains fields for Name and Description, a "Perspectives" table with a "None" entry, and a "Collection" section with "Most Recent" selected. The "Cover Page" section has checkboxes for "Report definition name", "Date created", "Perspectives", and "Collection name".
- Top Right Window:** "Performance Data Report Definitions - Etc3t1.rchland.ibm.com". It shows a tree view of report definitions and an "Actions" menu with options like "New", "Refresh", "Advanced Filter", "Export", and "Configure Options".
- Bottom Middle Window:** "Add Performance Data Report Definition" (Add Perspective). It shows a "Filter" section with "Collection name: CS228229ND (*CSFILE)" and "Library: COMMON". Below is a tree view of perspectives under "Collection Services", including "CPU Utilization and Waits Overview", "Resource Utilization Overview", "Job Statistics Overviews", "Waits", "CPU", "Disk", "Physical Disk I/O", and "Synchronous Disk I/O".
- Bottom Right Window:** "Add Performance Data Report Definition" (Final Step). It shows the "Name" field filled with "Demo Report" and the "Description" field filled with "Report prepared for my presentation". The "Perspectives" table is populated with three entries:

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

Create Performance Data Report



The screenshot shows the 'Report Definitions' window for 'Rchviks.rch.stglabs.ibm.com'. The 'System Overview' report is selected, and a context menu is open with 'Create Performance Data Report...' highlighted. A green arrow points from this menu item to a dialog box titled 'Create Performance Data Report'.

Create Performance Data Report

Report definition: Demo Report

Output type: PDF

Collection: CS228229ND (*CSFILE) - Feb 28, 2008 12:00:02 AM

Library: COMMON

Type: Collection Services File Based Collection

OK Cancel

Resulting Report (PDF example)



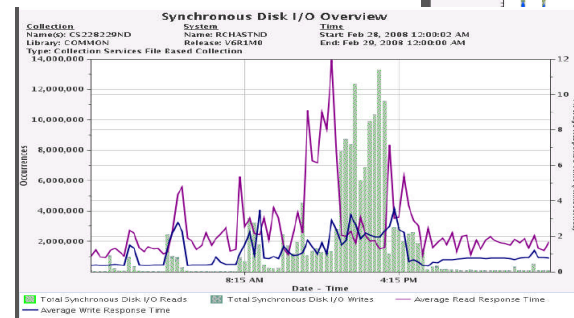
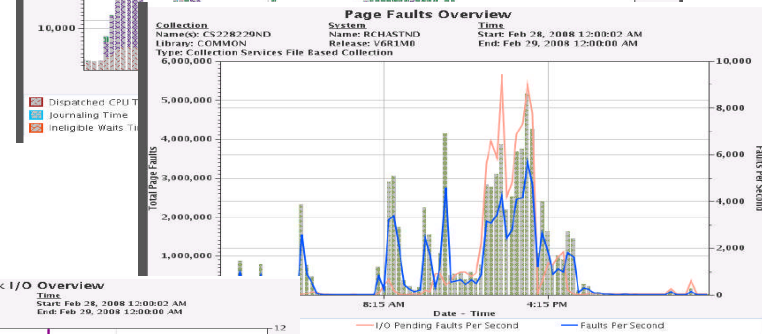
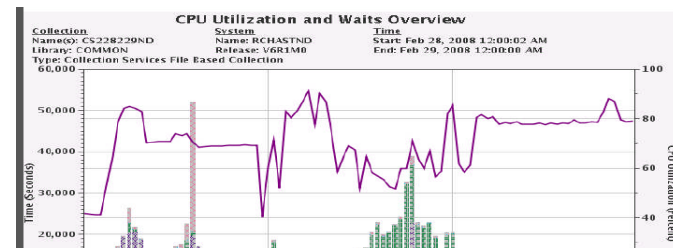
Feb 28, 2013 10:03:43 AM

Performance data report definition:
Demo Report

Report title:
Example Report based upon COMMON performance collection

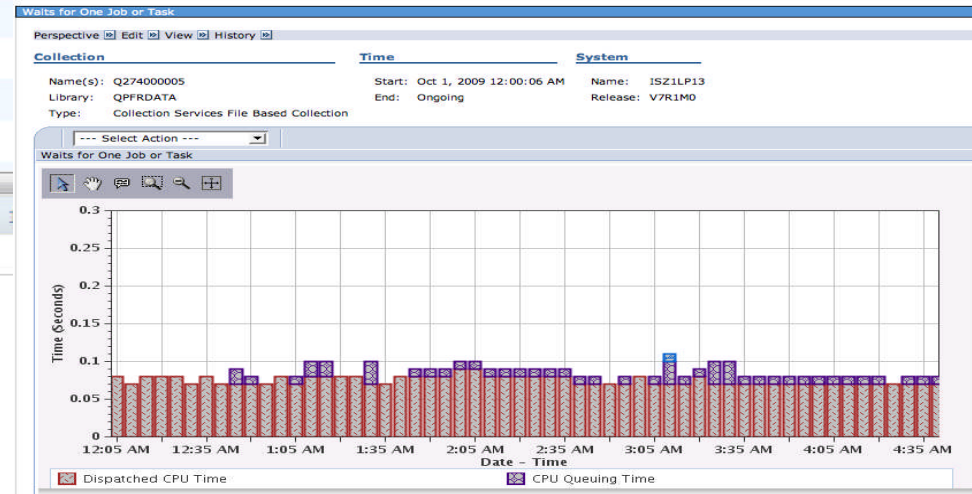
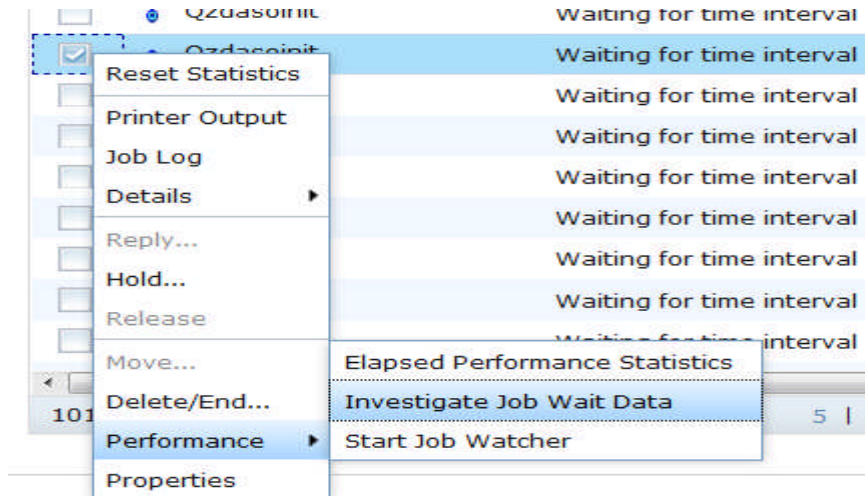
Perspectives included in report:
CPU Utilization and Waits Overview
Page Faults Overview
Synchronous Disk I/O Overview

Library/Collection used for report:
Common/Cs228229nd



Integration with Active Jobs

Active jobs – what's happening *right now*



Collection Services data → Job wait data – what happened *up to now*

Integration with System Status



System Status -

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

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

System Resources Health Indicators

System Status

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

General	Total memory: 4,096.00 MB
---------	---------------------------

Active Memory Pools

Memory Pools 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

System Status - etc3t1.rchland.ibm.com

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

General	Total disk space: 95.44 GB
---------	----------------------------

System disk pool

Capacity: 95.44 GB

Usage: 79.118 %

Temporary storage used

Current: 8,407 MB

Maximum since last system restart: 8,435 MB

Disk Status

Storage System Values

Disk Health Indicators

Integration with Disk Status



Disk Status - ... n

Refresh Elapsed time: 00:00:00

Actions

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

Unit	Size (MB)	% Used	% Busy
1			
2			
3			
4			

Disk Overview by Disk Unit

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: Z1433DP1
Release: V7R1M0

Average Response Time

Select Action

Average Response Time

Milliseconds

Disk Unit Name	Average Response Time (Milliseconds)
0003	0.8
0004	0.75
0002	0.65
0001	0.6

Average Response Time



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 7.2/7.3



Integration with Database

- Leverage the capabilities of PDI with valuable data gathered from database
- PDI charting of
 - SQL Plan Cache Snapshots
 - 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
<input type="checkbox"/> Performance Explorer	
<input type="checkbox"/> Disk Watcher	
<input type="checkbox"/> Job Watcher	
<input type="checkbox"/> Health Indicators	
<input type="checkbox"/> Collection Services	
<input checked="" type="checkbox"/> Database	

Collection

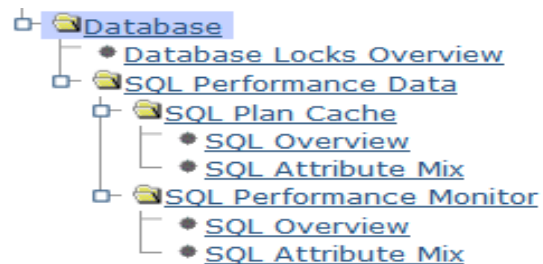
Collection Library: QPFRDATA
Collection Name: Most Recent

Display Search Options Close

Integration with Database – package overview

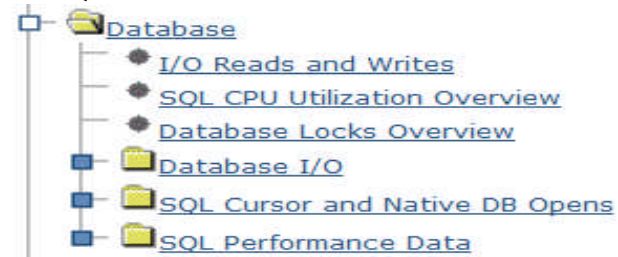
Database Package for 6.1

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



Database Package for 7.1+

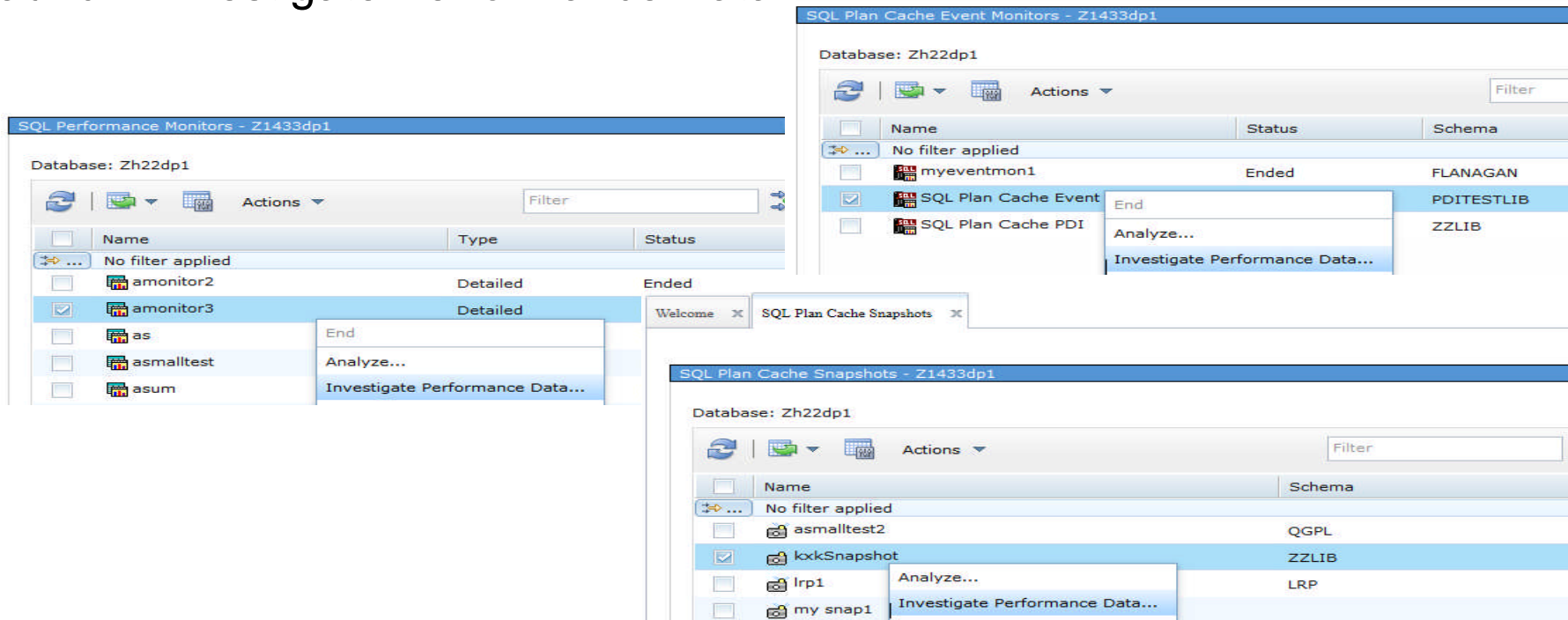
- I/O Reads and Writes
- SQL CPU Utilization Overview
- Database Locks Overview
- Database I/O
 - Utilizes Job Level SQL Metrics
- SQL Cursor and Native DB Opens
- SQL Performance Data



Monitors

Integration with Database

Launch “Investigate Performance Data” from various Database tasks



The image displays three screenshots of Oracle Enterprise Manager (OEM) database performance monitoring tools, all connected to a database named 'Zh22dp1'.

Top Left Screenshot: SQL Performance Monitors - Z1433dp1
 This window shows a list of performance monitors. The 'amonitor3' monitor is selected, and a context menu is open over it. The menu options are: 'End', 'Analyze...', and 'Investigate Performance Data...'. The 'Investigate Performance Data...' option is highlighted.

Name	Type	Status
amonitor2	Detailed	Ended
amonitor3	Detailed	Ended
as		
asmalltest		
asum		

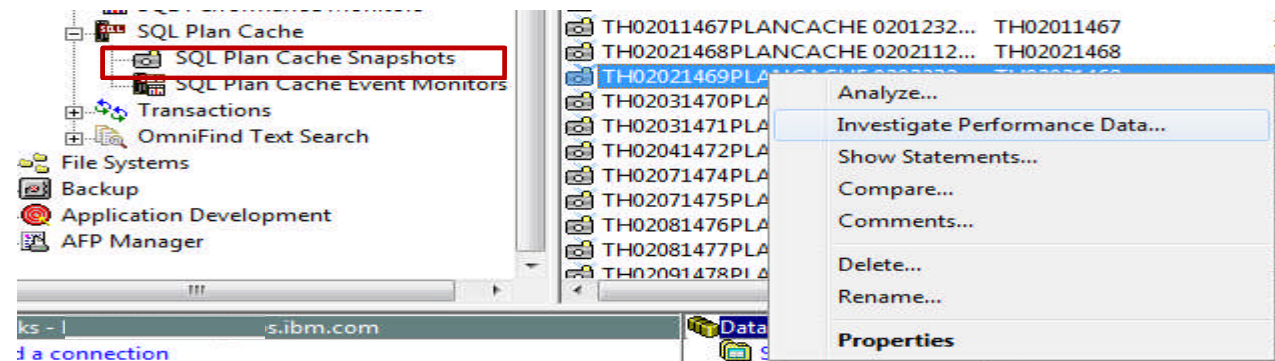
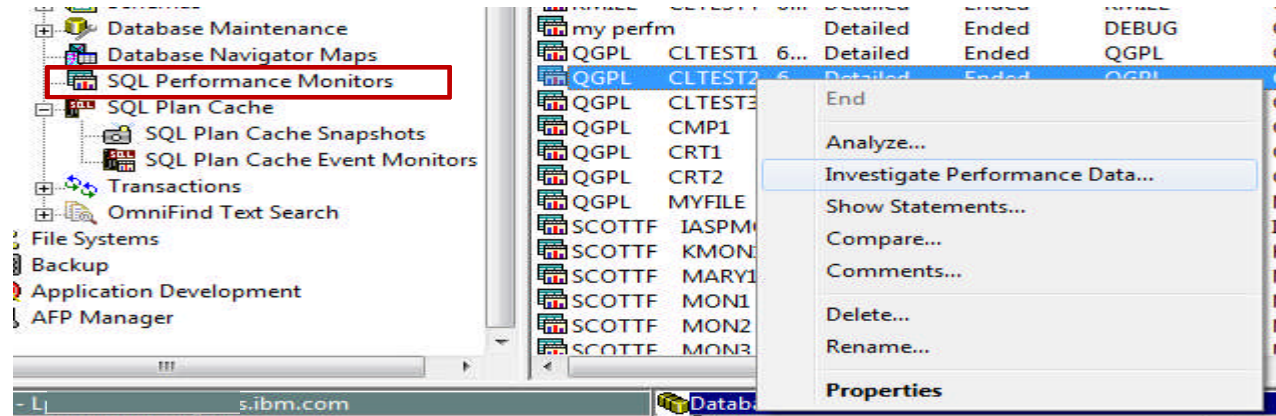
Top Right Screenshot: SQL Plan Cache Event Monitors - Z1433dp1
 This window shows a list of event monitors. The 'SQL Plan Cache Event' monitor is selected, and a context menu is open over it. The menu options are: 'End', 'Analyze...', and 'Investigate Performance Data...'. The 'Investigate Performance Data...' option is highlighted.

Name	Status	Schema
myeventmon1	Ended	FLANAGAN
SQL Plan Cache Event		PDITESTLIB
SQL Plan Cache PDI		ZZLIB

Bottom Screenshot: SQL Plan Cache Snapshots - Z1433dp1
 This window shows a list of plan cache snapshots. The 'kxkSnapshot' snapshot is selected, and a context menu is open over it. The menu options are: 'Analyze...' and 'Investigate Performance Data...'. The 'Investigate Performance Data...' option is highlighted.

Name	Schema
asmalltest2	QGPL
kxkSnapshot	ZZLIB
lrp1	LRP
my snap1	

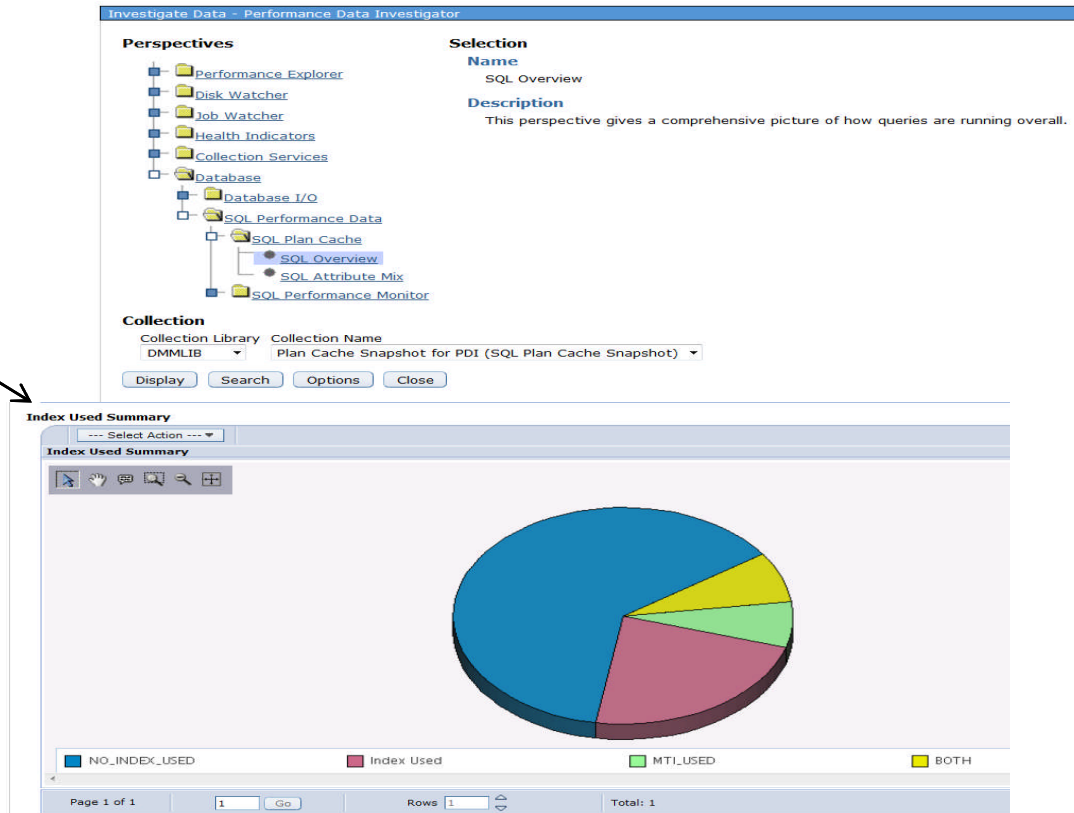
Launch PDI from System i Navigator client



SQL Overview

Several graphs:

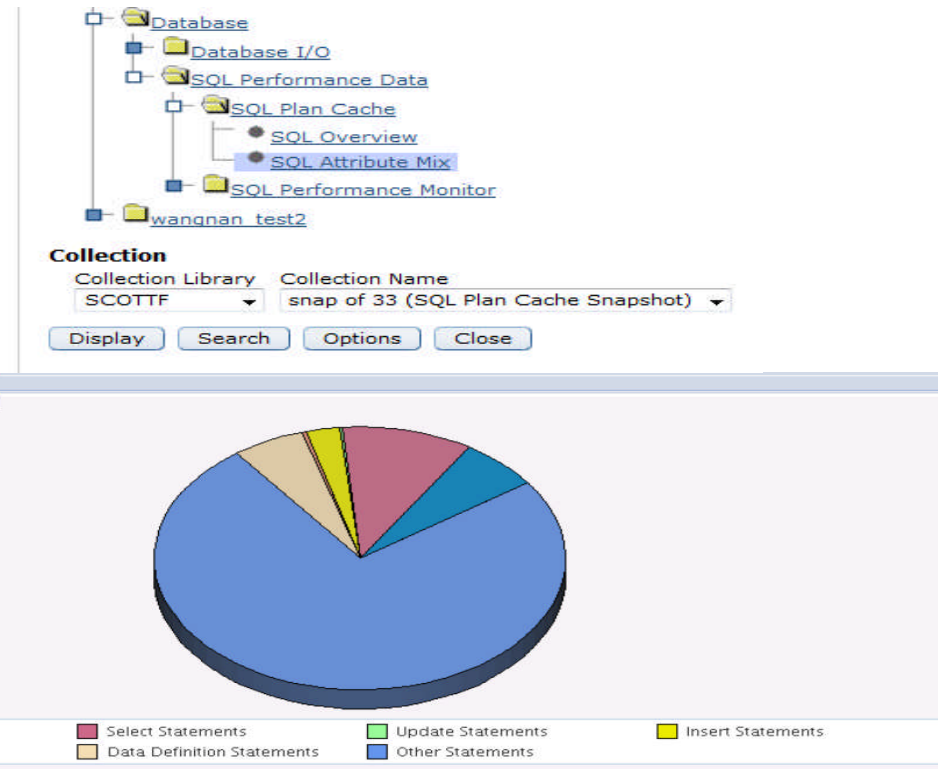
- Query time summary
- Open summary
- Open type summary
- Statement usage summary
- Index used summary
- Index create summary
- Index advised
- Statistics advised
- MQT use
- Access plan use
- Parallel degree usage



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



Investigate Data



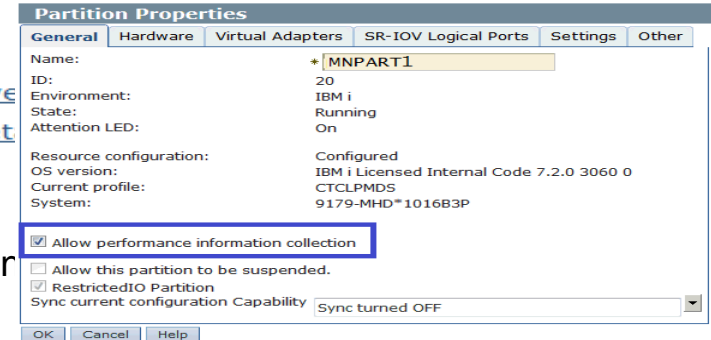
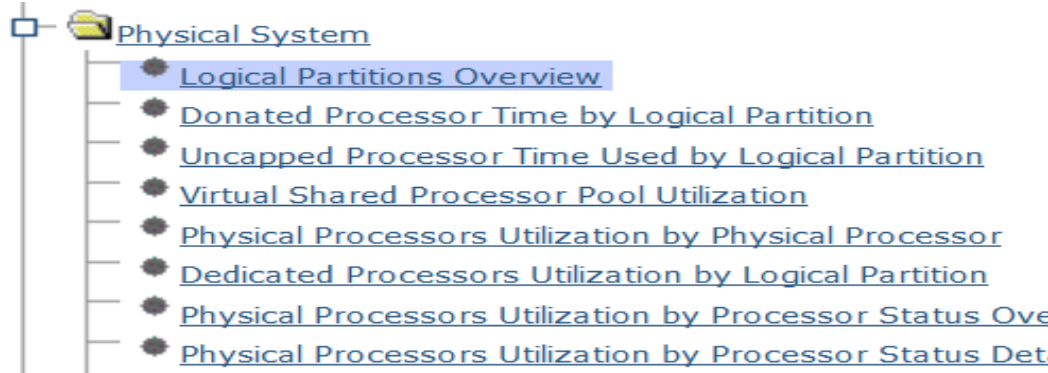
PDI Fan Club Favorites

(some not available on 6.1 & 7.1)



Physical System Charts – Frame view of Performance

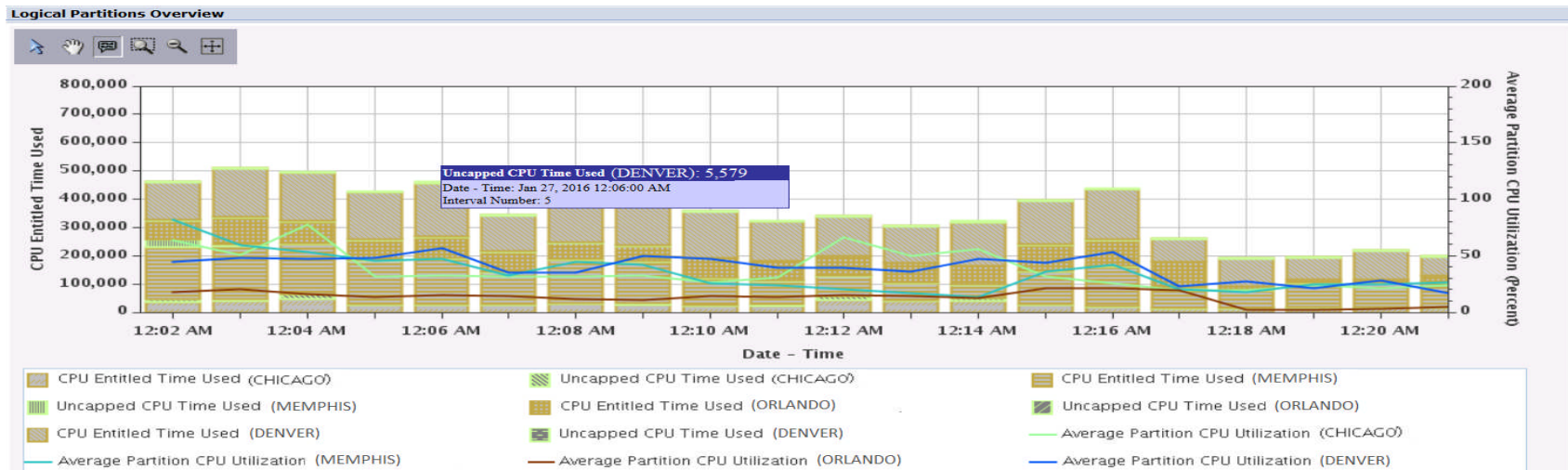
Collection Services has the ability to collect certain high-level cross-partition processor performance metrics for all logical partitions on the same single physical server *regardless of operating system*. This is available on Power 6 and above servers. When this data is available, it can be viewed 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 →

http://ibmsystemsmag.com/i_can/2009/10/i-can-display-cpu-utilization-for-all-partitions.html

Logical Partitions Overview



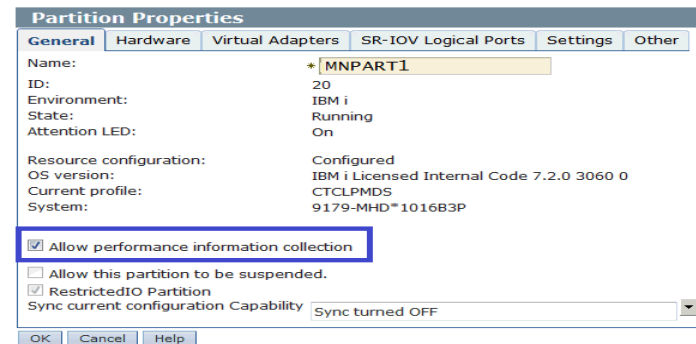
- 4 IBM partitions on system - all running IBM i (shared/uncapped)
- On a single chart, we can see:
 - Average CPU utilization for each partition
 - CPU Entitled Time Used
 - Uncapped CPU Time Used
 - Leverage tooltips and Table data

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

12X Bus Utilization

- (Spring 2014) PDI now has integrated charts that show views of how resources at the **bus level** like 12X loops and PCIe cards are performing

- ☐ Physical System
 - Logical Partitions Overview
 - Donated Processor Time by Logical Partition
 - Uncapped Processor Time Used by Logical Partition
 - Virtual Shared Processor Pool Utilization
 - Physical Processors Utilization by Physical Processor
 - Dedicated Processors Utilization by Logical Partition
 - Physical Processors Utilization by Processor Status Overview
 - Physical Processors Utilization by Processor Status Detail
 - Shared Memory Overview
 - Full System I/O Architecture
 - All 12X Loops
 - All PCIe Gen2



The image shows a 'Partition Properties' dialog box with several tabs: General, Hardware, Virtual Adapters, SR-IOV Logical Ports, Settings, and Other. The 'General' tab is active, displaying the following information:

Name:	* [MNPART1]
ID:	20
Environment:	IBM i
State:	Running
Attention LED:	On
Resource configuration:	Configured
OS version:	IBM i Licensed Internal Code 7.2.0 3060 0
Current profile:	CTCLPMS
System:	9179-MHD*1016B3P

Below the table, there are several checkboxes and a dropdown menu:

- Allow performance information collection
- Allow this partition to be suspended.
- RestrictedIO Partition
- Sync current configuration Capability: Sync turned OFF

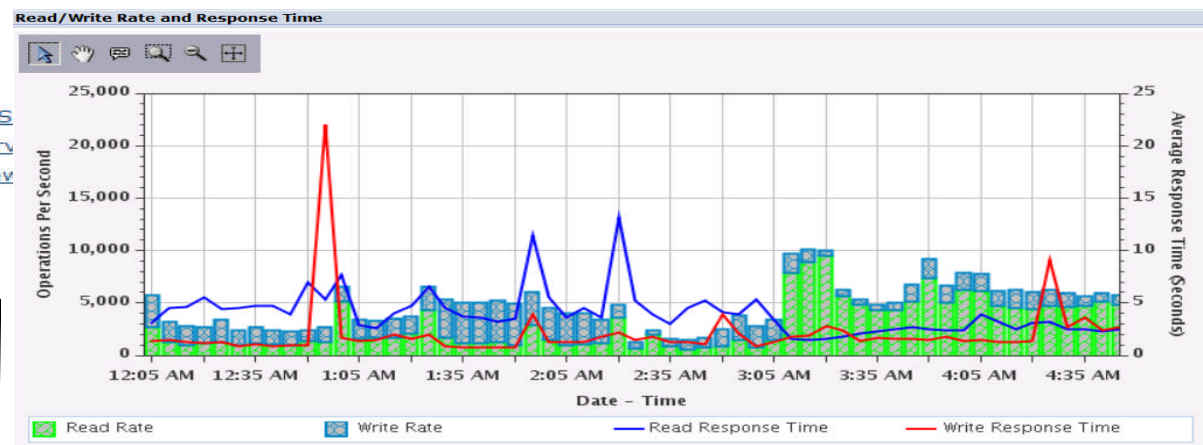
At the bottom, there are 'OK', 'Cancel', and 'Help' buttons.

Collection Services - Disk Reads and Writes Detail

- 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



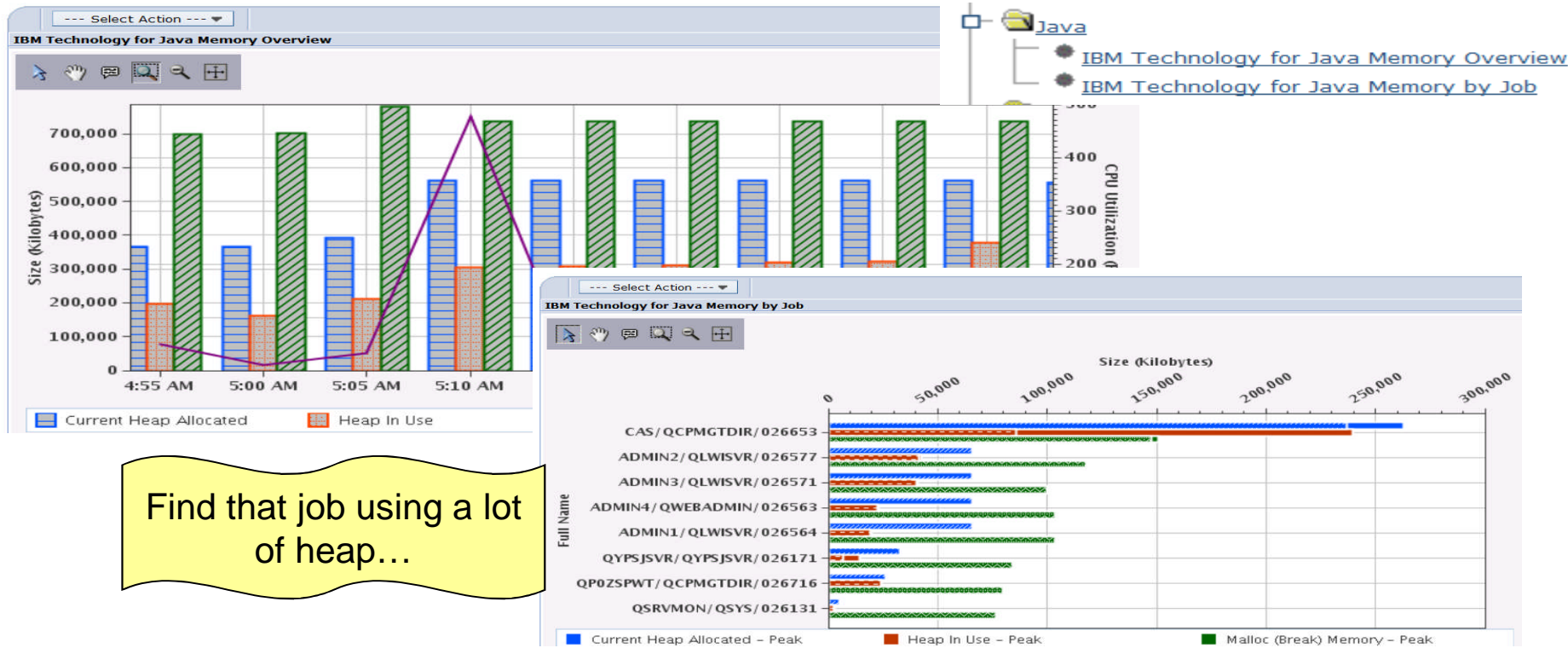
Performance Data Investigator IBM I Model DSS

Select	Serial	SmfModel	ServerType	LogicalCapacity (GB)	LunCount	MeasureDateTime
<input type="checkbox"/>	Internal	433A	i	2837	2837	11 2016/10/12 00:05:00
<input type="checkbox"/>	Internal	433A	i	2837	2837	11 2016/10/12 00:10:00
<input type="checkbox"/>	Internal	433A	i	2837	2837	11 2016/10/12 00:15:00
<input type="checkbox"/>	Internal	433A	i	2837	2837	11 2016/10/12 00:20:00
<input type="checkbox"/>	Internal	433A	i	2837	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
<input type="checkbox"/>	1	15K SAS HDD	N/A	RAID-5	11	2837.4	54.21	257.9

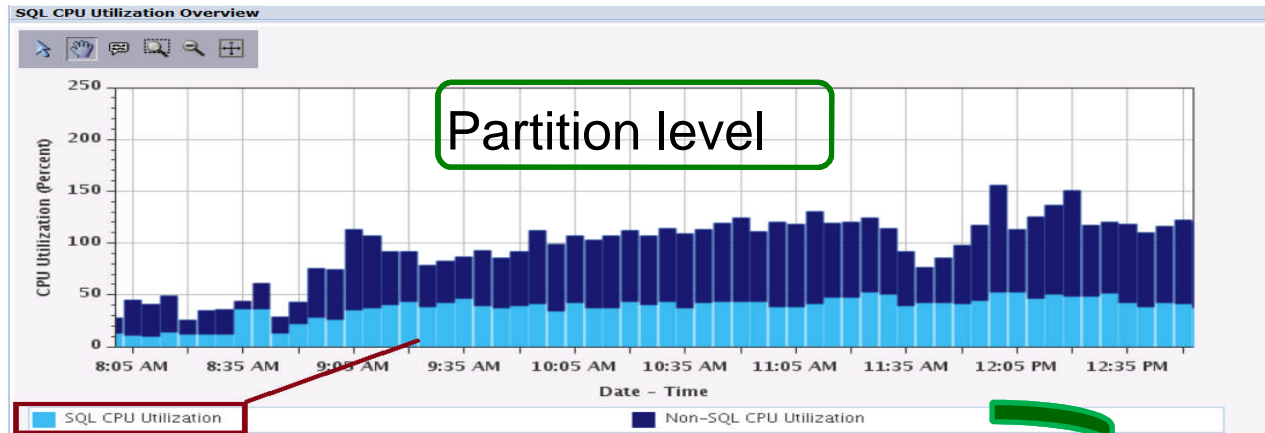
Collection Services - Java Perspectives



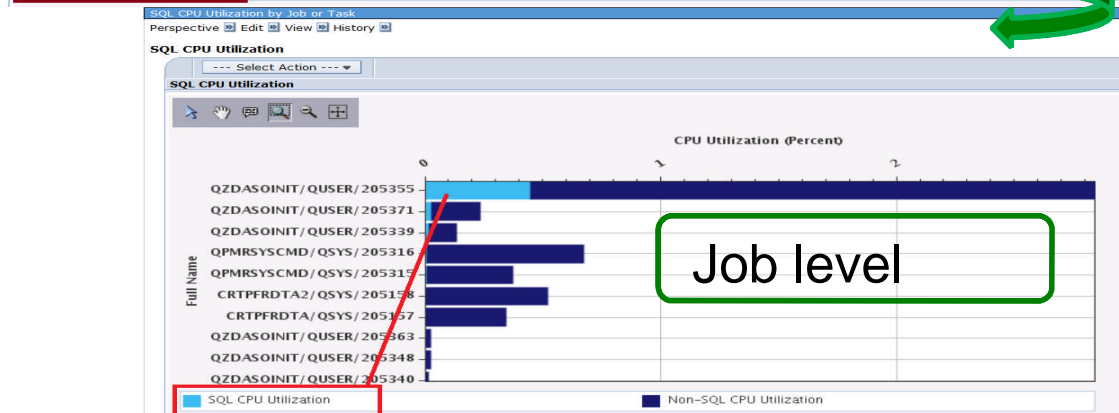
Find that job using a lot of heap...

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

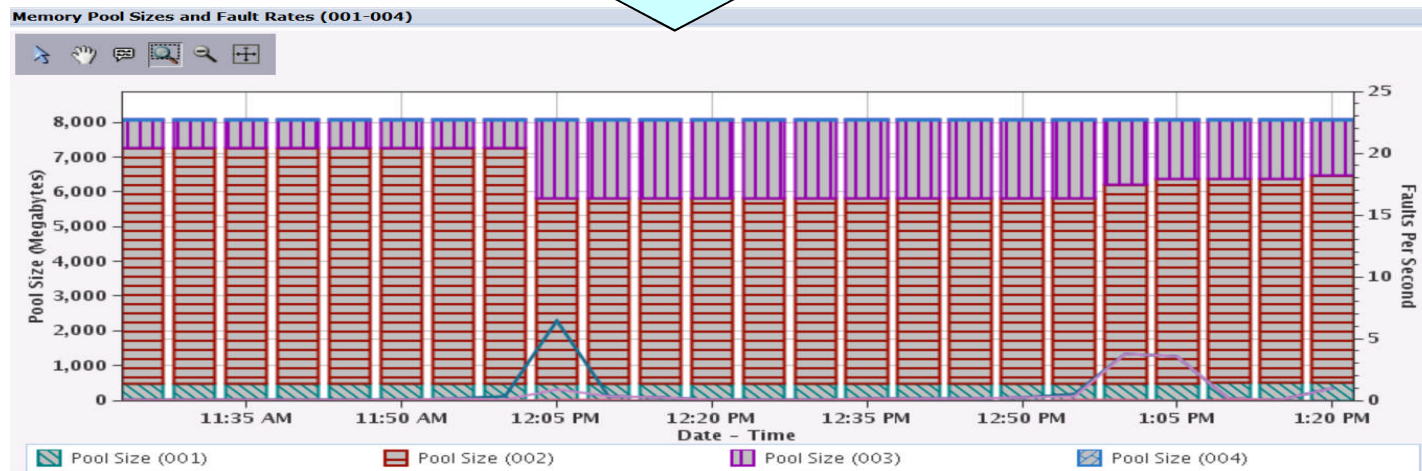
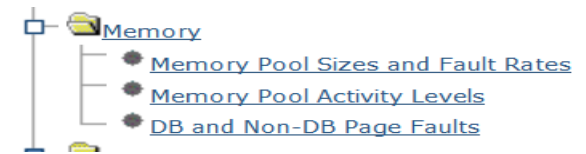


Collection Services - Memory

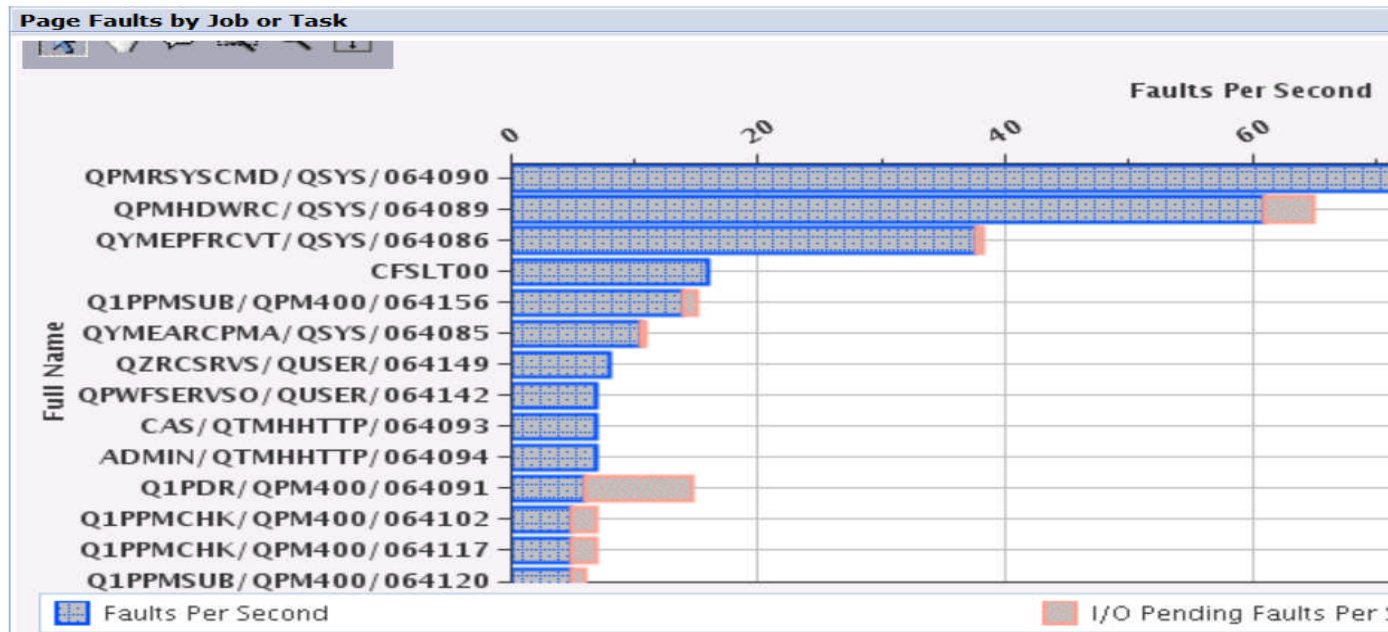


Pool size changes over time in a graphical view!

Note the change in pool sizes.
QPFRADJ is on.



Collection Services - Memory → Drilldown



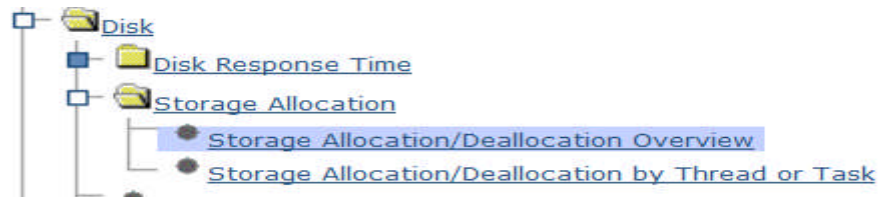
Memory Pool Sizes and Fault Rates (001-004)

--- 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
- Modify SQL
- Size next upgrade
- Change Context
- Show as table
- Table Actions

Size (Megabytes) 74

Collection Services - Storage Allocation Perspectives



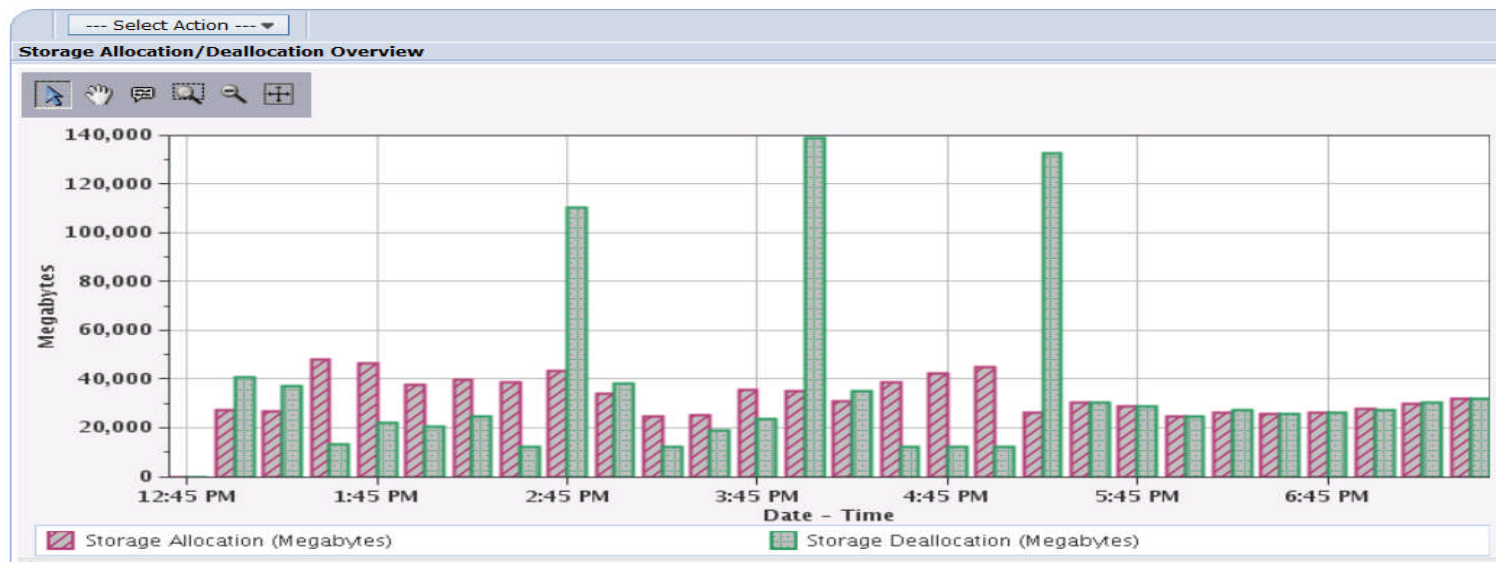
Selection

Name

Storage Allocation/Deallocation Overview

Description

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



Collection Services - Storage Allocation by Thread or Task

Selection

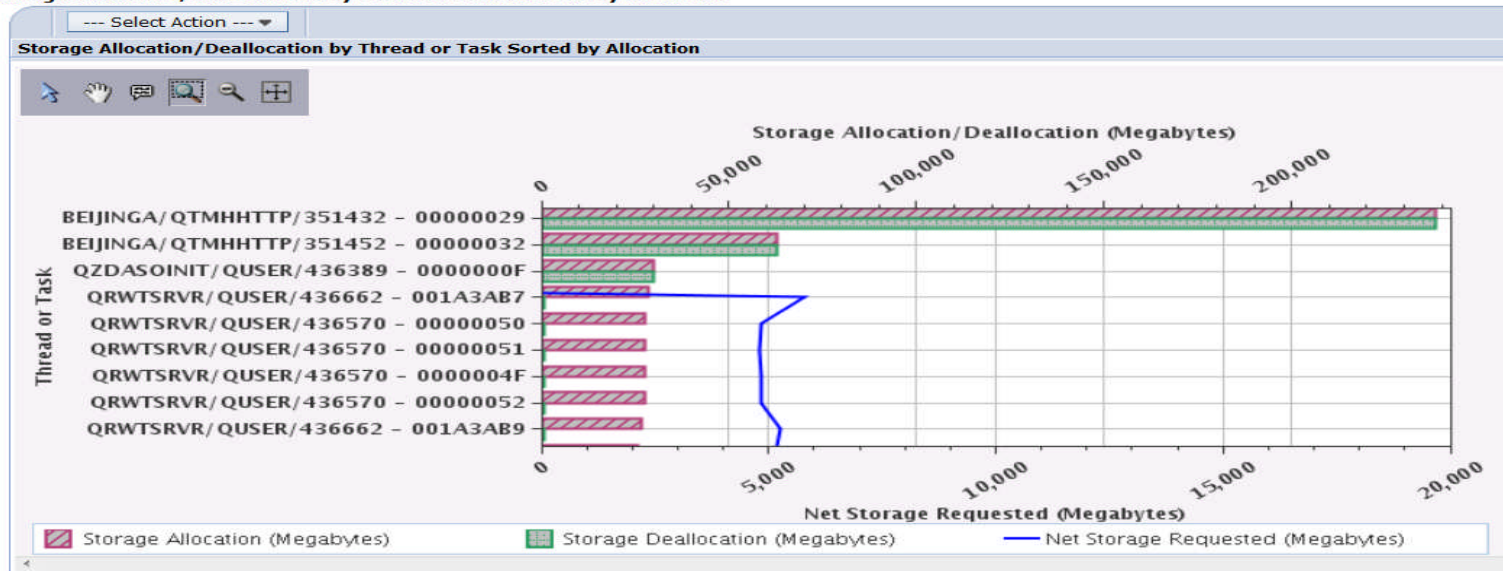
Name

Storage Allocation/Deallocation by Thread or Task

Description

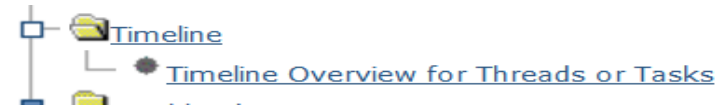
This chart shows allocation and deallocation of the temporary and permanent storage, net frames requested by thread or task. Use this chart to select a thread or task for viewing its storage statistics over time.

Storage Allocation/Deallocation by Thread or Task Sorted by Allocation



Collection Services - 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

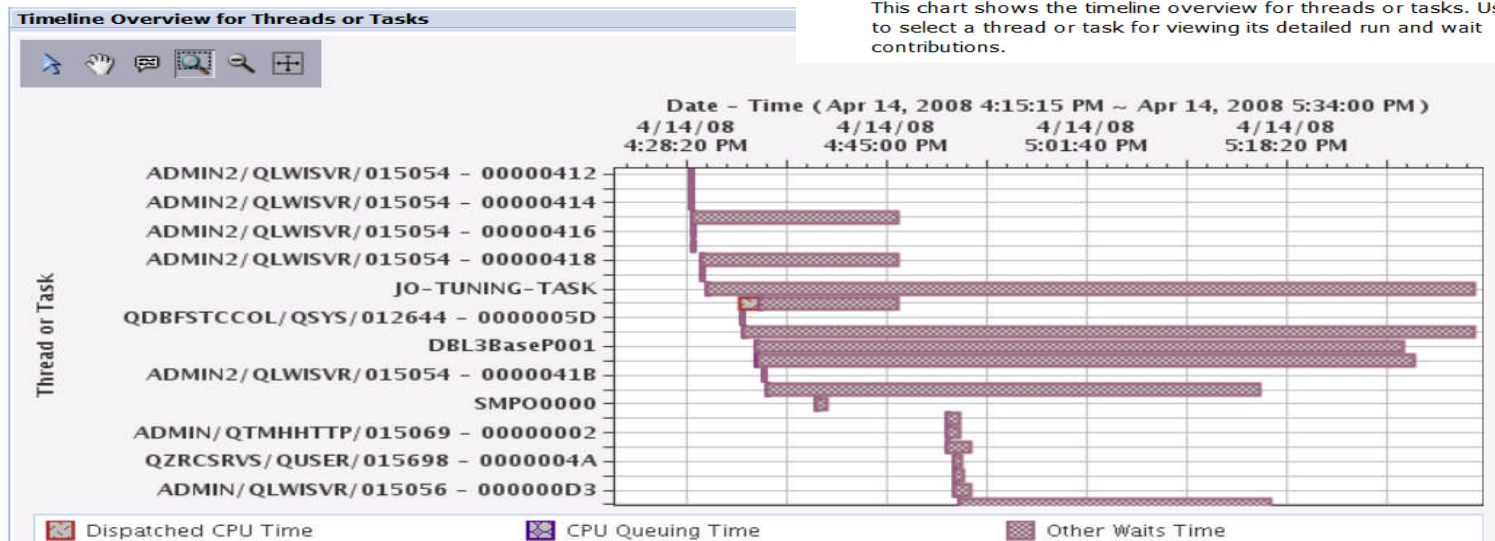


Selection Name

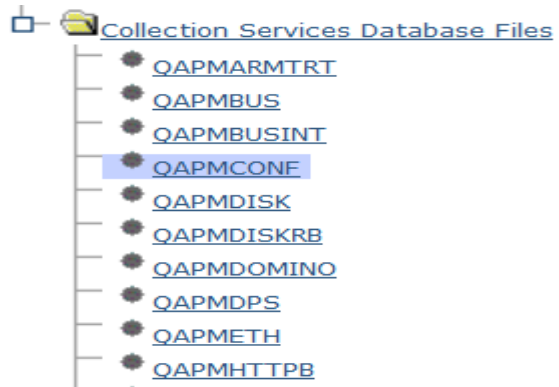
Timeline Overview for Threads or Tasks

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.



Collection Services Database Files...QAPMCONF



QAPMCONF			
Perspective	Edit	View	History
Collection	Time	System	
Name(s): Q067000002	Start: Mar 8, 2013 12:00:02 AM	Name: ETC3T1	
Library: QPFRDATA	End: Ongoing	Release: V7R1M0	
Type: Collection Services File Based Collection			
File level: 36			
QAPMCONF Panel View			
Library Name:	QPFRDATA	Processor Firmware Time:	No
Member Name:	Q067000002	Task Threshold Value (ms):	1,000
Start Time:	Mar 8, 2013 12:00:02 AM	Secondary Thread Thresh (ms):	1,000
Model Number:	61X	Disk Response Time Boundary 1 (us):	15
System Type:	7998	Disk Response Time Boundary 2 (us):	250
Partition Memory (KB):	4194304	Disk Response Time Boundary 3 (us):	1,000
Comm Data Collected:	Y	Disk Response Time Boundary 4 (us):	4,000
Machine Serial Number:	10-065FA	Disk Response Time Boundary 5 (us):	8,000
Response Time Boundary 1 (ms):	1000	Disk Response Time Boundary 6 (us):	16,000
Response Time Boundary 2 (ms):	2000	Disk Response Time Boundary 7 (us):	64,000
Response Time Boundary 3 (ms):	4000	Disk Response Time Boundary 8 (us):	256,000
Response Time Boundary 4 (ms):	8000	Disk Response Time Boundary 9 (us):	500,000
System ASP Capacity (KB):	93,206,752	Disk Response Time Boundary 10 (us):	1,024,000
Checksum Protection On:	N	Hypervisor Memory (MB):	640
Virtual Processors:	2	SMT Hardware Threads:	0
Installed Processors:	4	Time Interval (minutes):	5
Remote Response Boundary 1 (ms):	-	Interactive Limit (%):	100.00
Remote Response Boundary 2 (ms):	-	Time Interval (seconds):	300
Remote Response Boundary 3 (ms):	-	Interactive Threshold (%):	100.00
System ASP Capacity (KB):	93,206,752	Processor Multi-tasking Capability:	System Controlled
Perm 16MB Addr Remaining:	274,848,547,584	Output File System:	ETC3T1
Temp 16MB Addr Remaining:	274,814,995,200	Partition Count:	3
Disk Resp Time Boundary 1 (ms):	1	Processor Folding Support:	No
Disk Resp Time Boundary 2 (ms):	16	Partition ID:	2
Disk Resp Time Boundary 3 (ms):	64	Primary Partition ID:	0
Disk Resp Time Boundary 4 (ms):	256	Processor Units:	0.2
Disk Resp Time Boundary 5 (ms):	1,024	System Version:	7
Collection Data:	Consistent with *SYS	System Release:	1.0
Collect Internal Data:	N	System Name:	ETC3T1
*CSMGTCOL Collection Library:	QPFRDATA	Performance Monitor Select Job:	
*CSMGTCOL Collection Name:	Q067000002	Shared Processor Pool:	Yes
Database Consistency:		Partition Sharing Capped:	Uncapped
Database Limit (% of CPU):	100.0	Variable Processor Speed Capability:	1
		QPFRADJ System Value:	2



Key Information about your system

Manage Collections

- [-] Performance
- [-] Investigate Data
- [-] Manage Collections



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

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

Name	Library	Type	Status	Started	Ended	Size MB	System	Version	
No filter applied									
Q311025028	ZZTEST	Disk Watcher File Based Collection	Complete	11/6/12 2:50:28 AM	11/6/12 2:51:20 AM	2.766	ISZ1LP13	V7R1M0	
Q311025028	DFLADP	Collection Services File Based Collection	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	1.754	ASWC	V7R1M0	
Q311025028	RAKLIB	Job Watcher File Based Collection	Complete	1/9/13 3:56:07 PM	1/9/13 4:12:10 PM	0.004	ISZ1LP13	V7R1M0	
Q311025028	RAKLIB	Collection Services *MGTCOL Obj Based Co	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	3.684	ASWC	V7R1M0	
Q311025028	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:00:06 AM	11/1/12 12:03:25 PM	380.464	ISZ1LP13	V7R1M0	
Q311025028	ZZTESTR	Collection Services *MGTCOL Obj Based Co	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:04 AM	428.644	ISZ1LP13	V7R1M0	
Q307000005	ZZTESTR	Collection Services File Based Collection	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:00 AM	401.808	ISZ1LP13	V7R1M0	
Q254000002	ZZTESTR	Collection Services File Based Collection	Complete	9/10/12 12:00:02 AM	9/10/12 10:20:00 PM	42.375	ISZ1LP13	V7R1M0	
Q306121500	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:15:03 PM	11/2/12 12:00:05 AM	344.484	ISZ1LP13	V7R1M0	
Q309010017	RONNSA1210	Collection Services File Based Collection	Complete	11/4/12 1:00:17 AM	11/4/12 11:01:04 PM	90.836	OCC01XX4	V7R1M0	
Q313000005	DFLTEST1	Collection Services File Based Collection	Complete	11/8/12 12:00:05 AM	11/8/12 2:06:30 PM	506.066	ISZ1LP13	V7R1M0	
NORMAL	QPEXDATA	Performance Explorer *MGTCOL Obj Based	Complete	1/7/13 3:37:10 PM	1/7/13 3:37:21 PM	4.039	ISZ1LP13	V7R1M0	
CSPFR0225	CRSS_MON	Collection Services File Based Collection	Complete	2/25/13 12:01:03 AM	2/26/13 12:00:00 AM	729.32	LDPROD	V6R1M0	
Q078110401	QPFRDATA	Collection Services File Based Collection	Complete	3/19/13 11:04:04 AM	3/20/13 12:00:04 AM	76.016	ISZ1LP13	V7R1M0	
IBMPGX0002	DFLBUGNN1	Performance Explorer File Based Collection	Complete	12/12/12 8:09:41 PM	12/12/12 9:10:28 PM	2,459.21	FOHC2E	V7R1M0	
B123	QPEXDATA	Performance Explorer File Based Collection	Complete	1/6/13 2:00:03 PM	1/6/13 2:01:04 PM	0.061	ISZ1LP13	V7R1M0	

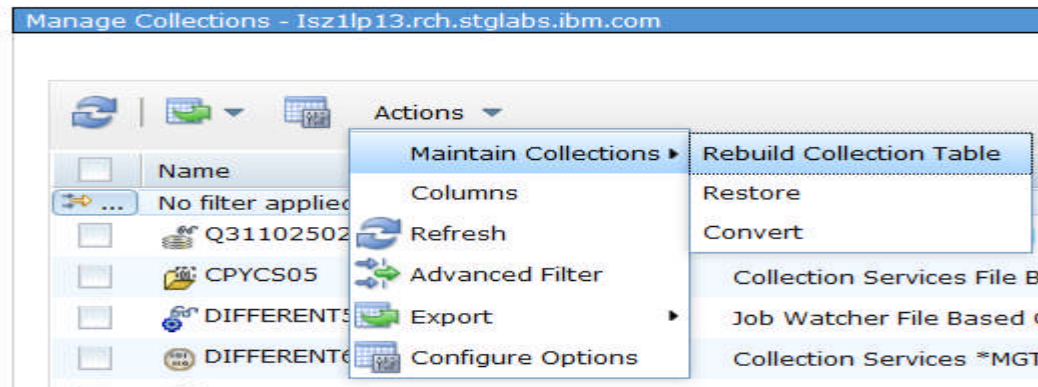
1 - 100 of 312 items 5 | 10 | 25 | 50 | 100 | All

Manage Collections

- If you restore performance data without using the Restore Performance Collection interface (or RSTPFRCOL), collections may not display in the Manage Collections view.

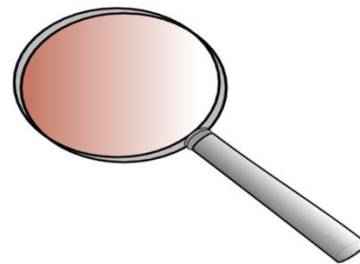


- The “Rebuild Collection Table” option will rebuild the meta-data used for the Manage Collections task and then your



Performance Data – Analysis

*Performance Diagnostics with the Performance
Data Investigator*





Analyzing Performance Data Using PDI

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

Analyzing Performance Data Using PDI

- Start by asking questions:
 - What was the symptom of the problem?
 - Who reported the problem
 - What time did it occur?
 - How long did it last?

 - Have there been any recent **changes**?
 - New or changed workload?
 - Any application changes?
 - Any recent hardware configuration changes?

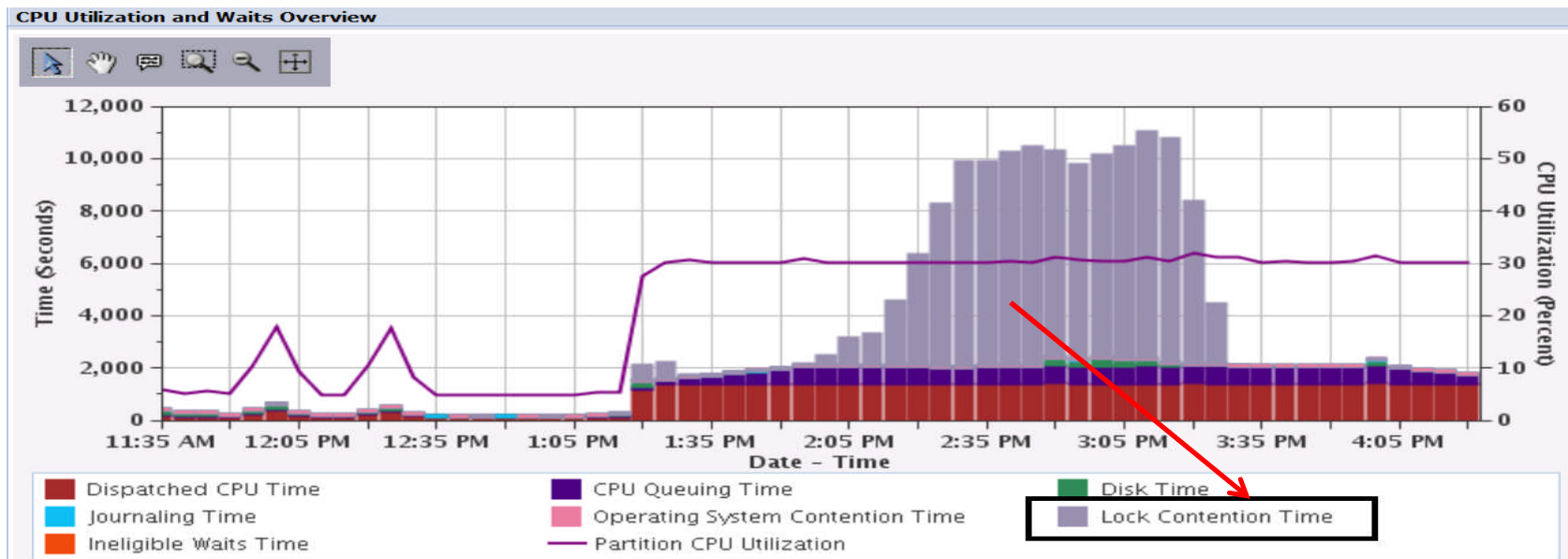
 - What was the **scope**?
 - Did it impact the entire system?
 - Did it impact some subset of work?
 - Specific users?
 - Specific applications?



CPU Utilization and Waits Overview

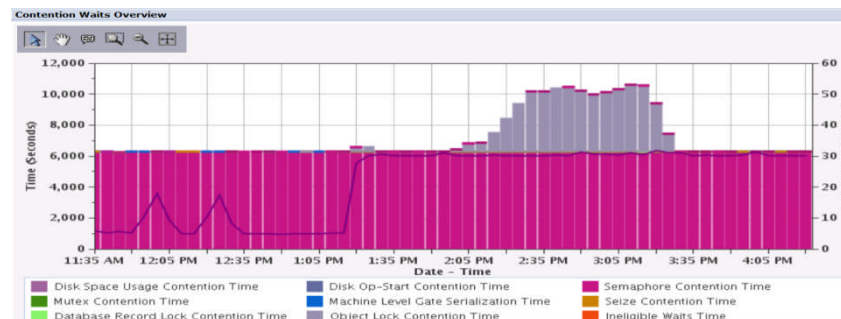


CPU Utilization and Waits Overview is an excellent starting place. Look for *interesting* points
Next steps will depend upon the answer to the prior questions, along with what you see.

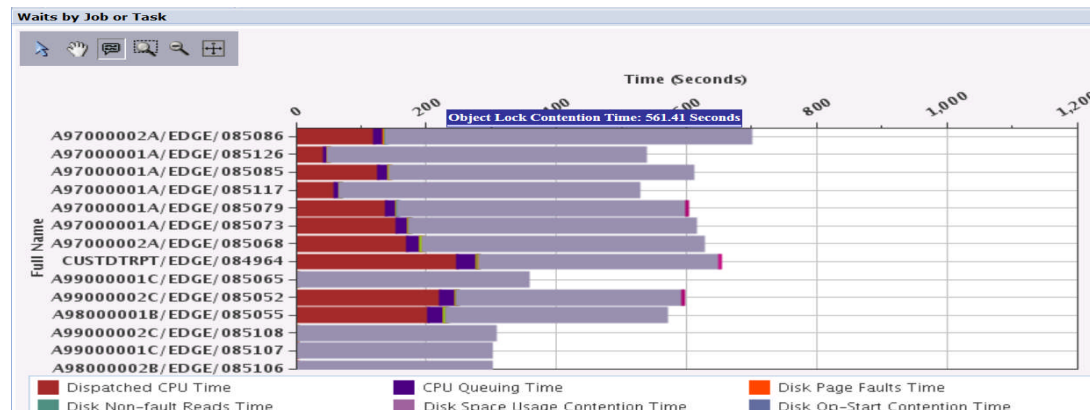
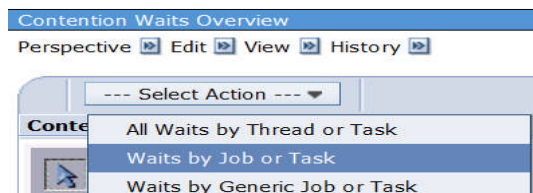


Using PDI, you can learn how to navigate through your data


Take a closer look at what type of contention waits are occurring:

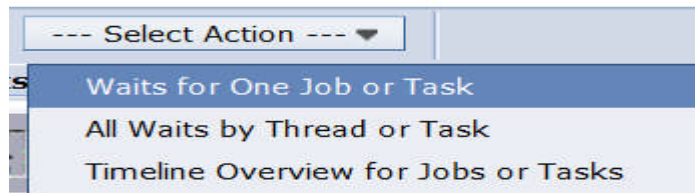


Which jobs/threads/tasks are affected by the wait time?

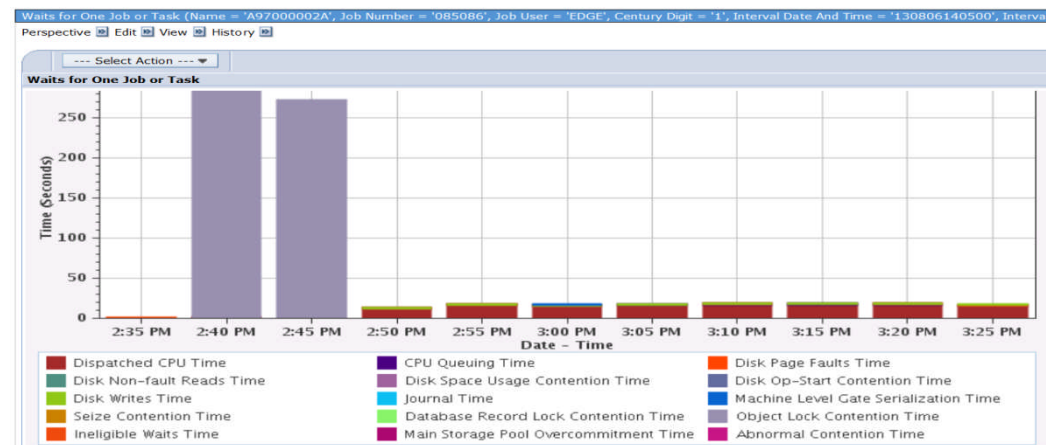


Drill-down based upon what you see

- Next, it may be interesting to see if the object lock wait time for a specific job occurred over several intervals, or just a few. Using select interactor , click on a job of interest, then select Waits for One Job or Task.



You may not be able to solve all performance problems with Collection Services data. However, you likely will gain valuable clues. Job Watcher is a good next step for this issue.



Recommendations

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

Remember, all partitions IBM i 6.1 and later 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
- See you at "i Can Find Your Performance Bottlenecks" session!





References



IBM i Performance FAQ a MUST read!

October 2017 update (*watch for a Spring 2018 soon!*):

<https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=POW03102USEN>

IBM Power Systems Performance



IBM i on Power - Performance FAQ

October 9, 2017

IBM i Web Sites with Performance Information



- IBM Knowledge Center:
 - [7.2 Performance](#)
 - [7.3 Performance](#)
- IBM i Performance Management:
 - [i Performance Management](#)
- developerWorks:
 - IBM i Performance Tools: [developerWorks Performance Tools](#)
 - IBM i Performance Data Investigator: [developerWorks PDI](#)
- IBM iDoctor for IBM i: [iDoctor](#)
- IBM i Wait Accounting information:
 - [Job Waits Whitepaper](#)
 - [KnowledgeCenter: The basics of Wait Accounting](#)
 - [developerWorks: IBM i Wait Accounting](#)

A **Redbooks** publication!



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Understand the cycle of Performance Management

Maximize performance using the new graphical interface on V6.1

Learn tips and best practices



Hemando Bedoya
Mark Roy
Nandoo Neerukonda
Petri Nuutinen

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

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Redbooks

IBM i 7.2 Technology Refresh Updates



Covers the 7.2 content through
Technology Refresh 1

Section 2.8 – Performance

Section 8.6.7 – Job level SQL stats in
Collection Services

Draft Document for Review December 10, 2014 2:51 pm



IBM i 7.2 Technical Overview with Technology Refresh Updates

- Covers new functions and enhancements through IBM i 7.2 TR1
- Easy to use web-based system management
- Integrated Data-Centric approach



Learn the science and art of performance analysis, methodology and problem solving

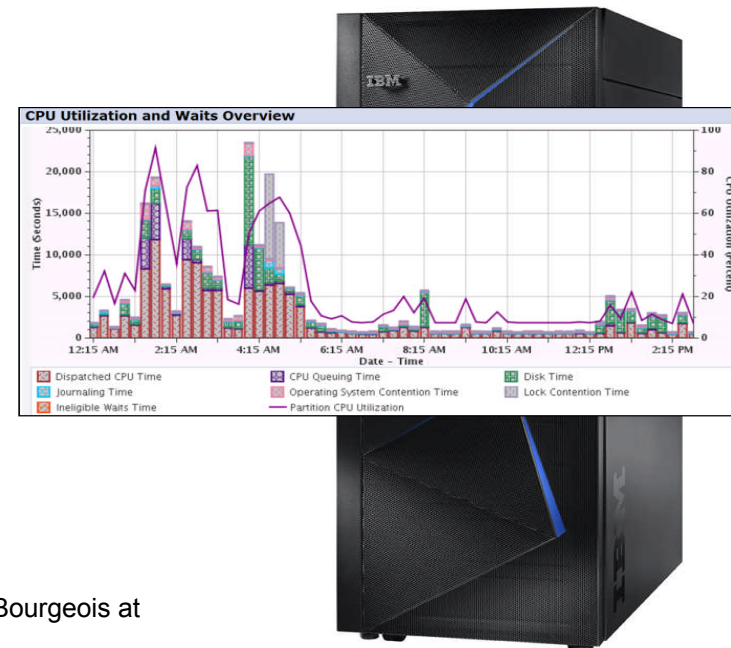
Managing and analyzing the data can be quite complex. During this workshop, the IBM Systems Lab Services IBM i team will share useful techniques for analyzing performance data on key IBM i resources, and will cover strategies for solving performance problems. It will aid in building a future foundation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

Overview:

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

Workshop details:

- Intermediate IBM i skill level
- 3-4 day workshop, public or private (on-site)
 - For general public workshop availability and enrollment: [IBM i Performance Analysis Workshop](#)
 - For public workshop availability and enrollment in France, please contact Philippe Bourgeois at pbourgeois@fr.ibm.com or Françoise Laurens at f_laurens@fr.ibm.com
 - For additional information, including private workshops, please contact Eric Barsness at ericbar@us.ibm.com or Stacy Benfield at stacylb@us.ibm.com, members of Systems Lab Services



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

And finally.....





Thank you

**Don't forget to fill-in the
feedback form!**



ithankyou

www.ibm.com/power/i



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