

Introduction to the IBM i Performance Data Investigator

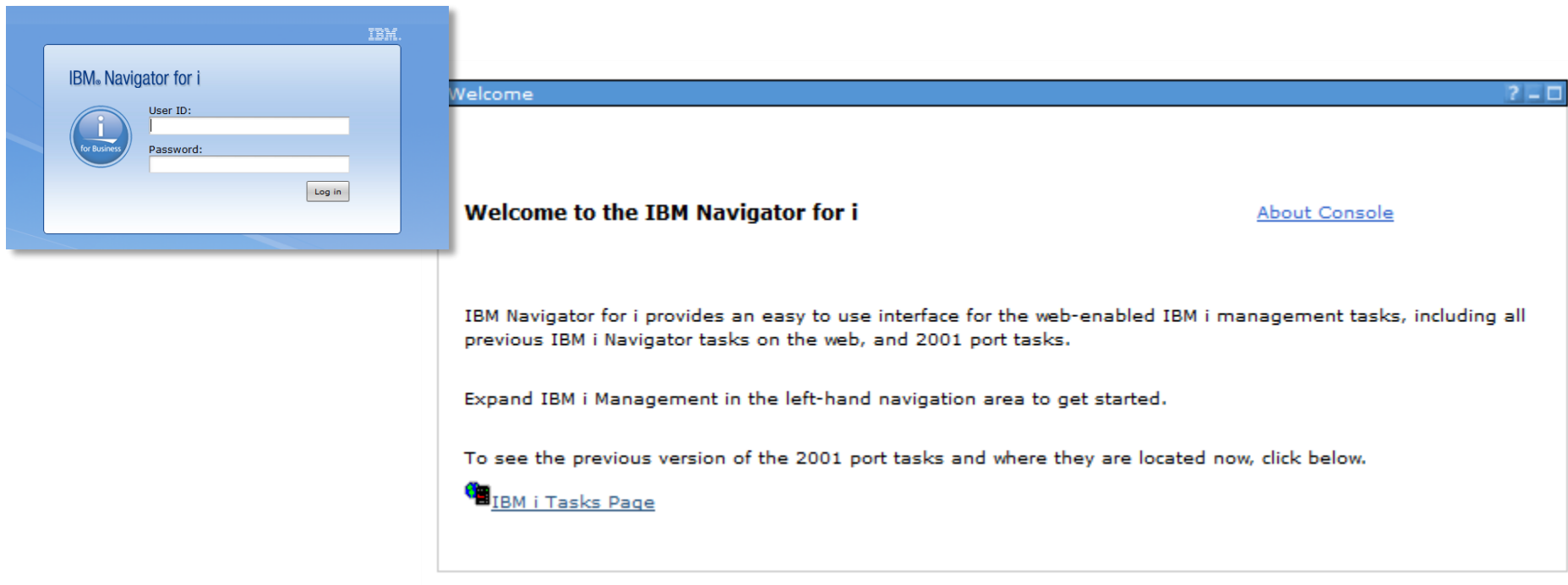
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@DawnMayiCan

Session: 540180
Agenda Key: 41RI



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`



The image shows two overlapping screenshots of the IBM Navigator for i web interface. The smaller screenshot on the left is the login page, titled "IBM. Navigator for i". It features a blue header with the IBM logo and a circular "i for Business" icon. Below the header are two input fields: "User ID:" and "Password:", each with a white text box. A "Log in" button is positioned at the bottom right of the login form. The larger screenshot on the right is the main console page, titled "Welcome". It has a blue header with the word "Welcome" and window control icons. The main content area is white and contains the following text: "Welcome to the IBM Navigator for i" followed by a blue link "About Console". Below this is a paragraph: "IBM Navigator for i provides an easy to use interface for the web-enabled IBM i management tasks, including all previous IBM i Navigator tasks on the web, and 2001 port tasks." This is followed by another paragraph: "Expand IBM i Management in the left-hand navigation area to get started." and a final paragraph: "To see the previous version of the 2001 port tasks and where they are located now, click below." At the bottom of the main content area is a link "IBM i Tasks Page" preceded by a small icon of a document with a red 'X'.

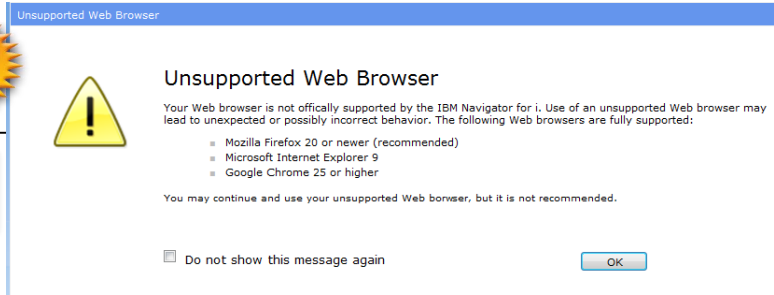
Updates to the Performance Data Investigator - PTFs

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





Browser Support



- Supported Browsers for the latest Navigator enhancements:



– Internet Explorer 9



– FireFox 20 or newer



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

- Browser tips:

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

- Clear your browser cache after installing the PTFs

- Review your browser security settings

- For details see the following web page:

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

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

- Good system tuning practices are essential
 - CPU
 - Memory
 - Disk

- PDI makes extensive use of SQL to gather data for charts and tables
- Navigator tasks run in the ADMIN2 job in the QHTTPSVR subsystem

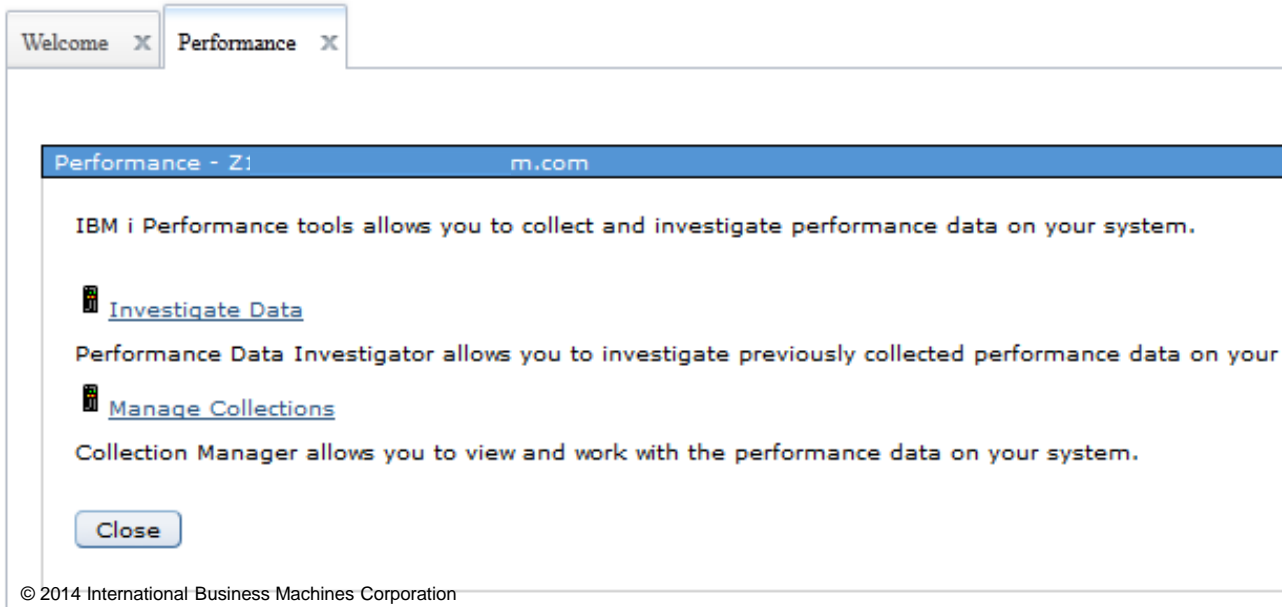
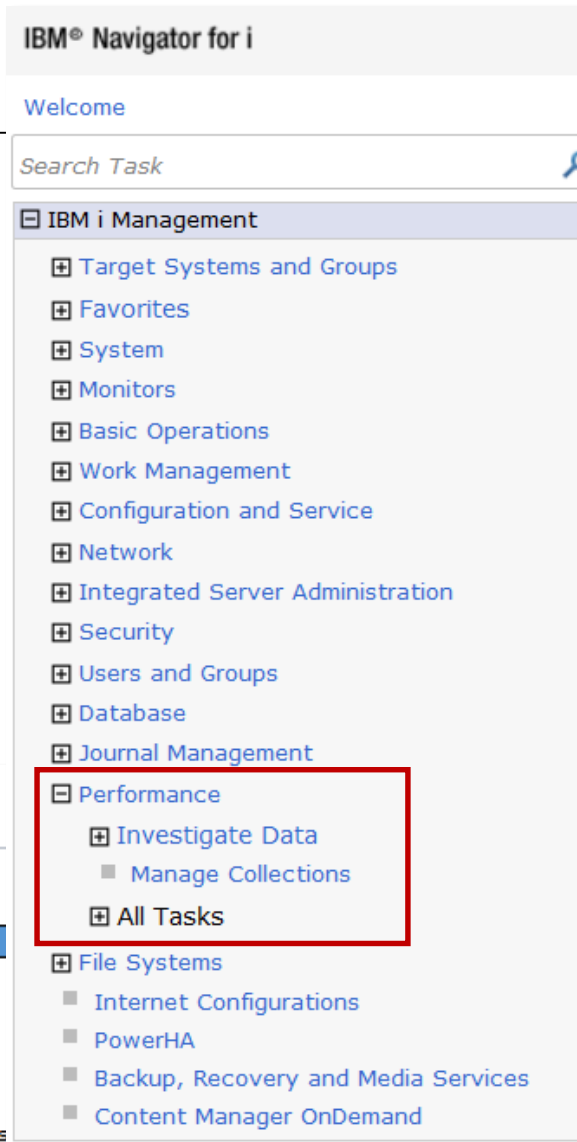
- Ensure no bad DNS entries on the system
 - http://www-912.ibm.com/s_dir/slkbase.nsf/1ac66549a21402188625680b0002037e/b9e677063f24f859862575ee006b1881

- 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/iseriess/v7r1m0/topic/rzaie/rzaieconwebperfadvisor.htm>

Performance Tasks

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



Packaging: Performance Tools Licensed Program Product

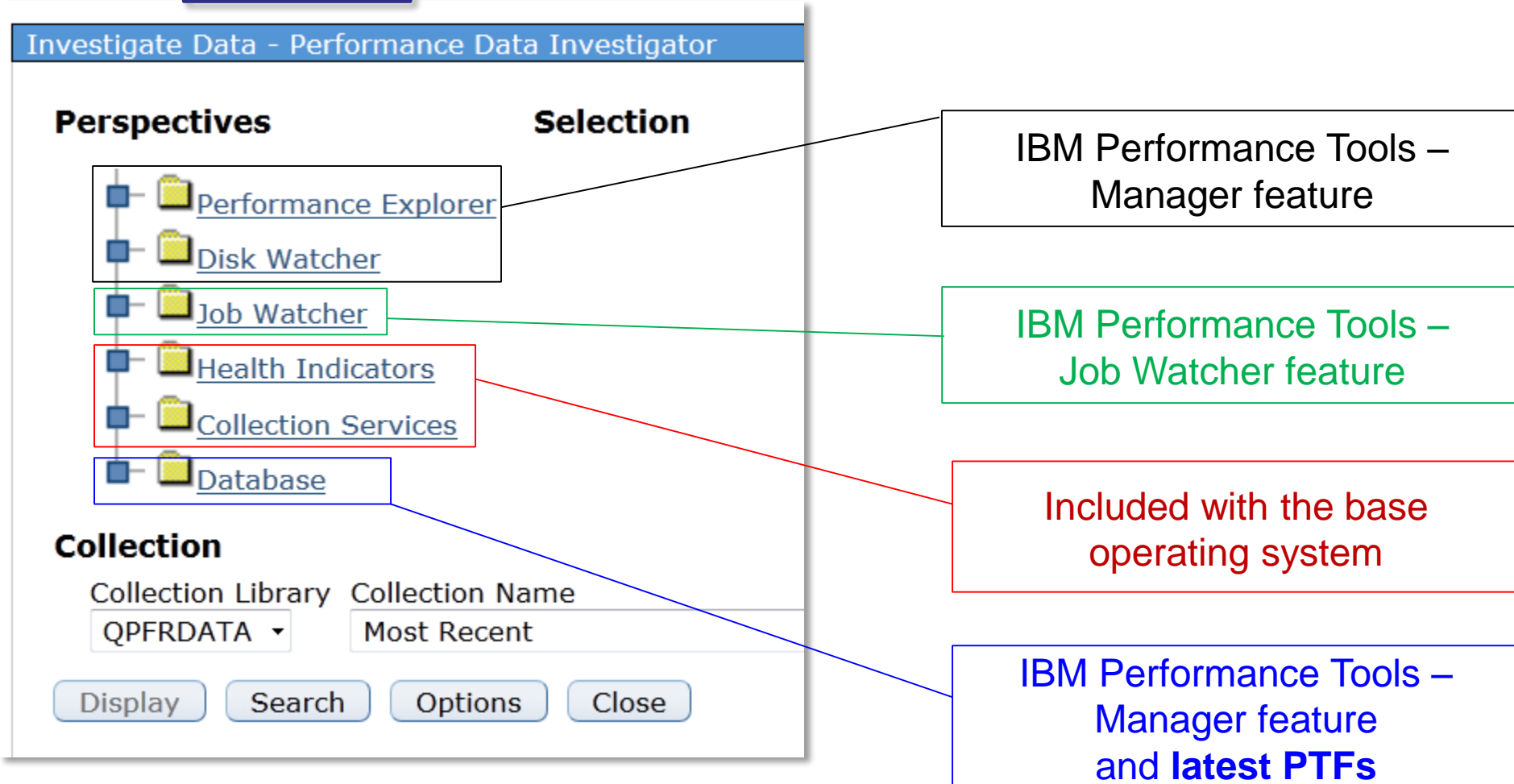
- IBM i for **Collection Services, Health Indicators, Monitors** 7.2

- Performance Tools Licensed Program Product
 - 5761PT1 for 6.1
 - 5770PT1 for 7.1 and 7.2

 - **Performance Tools - Manager Feature**
 - **Disk Watcher, Performance Explorer, Database, Batch Model** 7.2
 - Performance Tools - Agent Feature
 - **Performance Tools - Job Watcher**

Packaging: Performance Tools Licensed Program Product

6.1 and 7.1

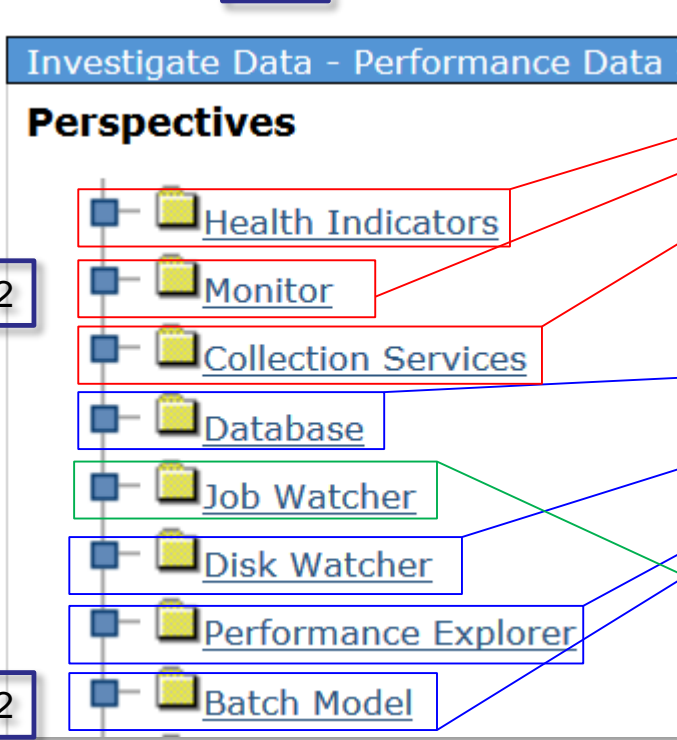


The screenshot shows the 'Investigate Data - Performance Data Investigator' window. It is divided into 'Perspectives' and 'Collection' sections. The 'Perspectives' section lists several tools: Performance Explorer, Disk Watcher, Job Watcher, Health Indicators, Collection Services, and Database. The 'Collection' section shows 'Collection Library' set to 'QPFRRDATA' and 'Collection Name' set to 'Most Recent'. Callout boxes provide the following information:

- Performance Explorer:** IBM Performance Tools – Manager feature
- Job Watcher:** IBM Performance Tools – Job Watcher feature
- Health Indicators and Collection Services:** Included with the base operating system
- Database:** IBM Performance Tools – Manager feature and latest PTFs

Packaging: Performance Tools Licensed Program Product

7.2



Included with the base operating system

7.2

IBM Performance Tools – Manager feature

7.2

IBM Performance Tools – Job Watcher feature

Prerequisites: Authorizing Users to PDI

- Users need to be authorized to use the investigate data and collection manager performance tasks

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

```

                                Edit Authorization List

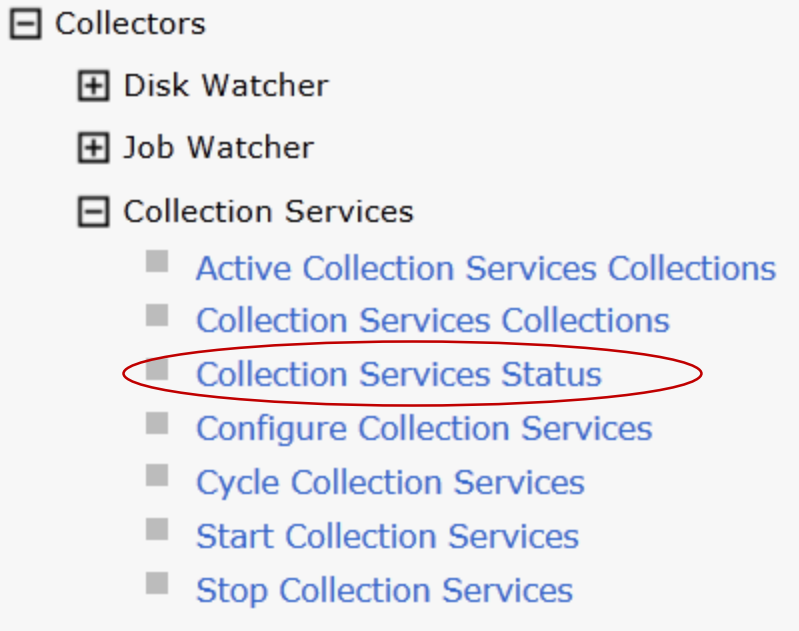
Object . . . . . : QPMCCDATA      Owner . . . . . : QSYS
  Library . . . . . : QSYS          Primary group . . . . . : *NONE

Type changes to current authorities, press Enter.

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

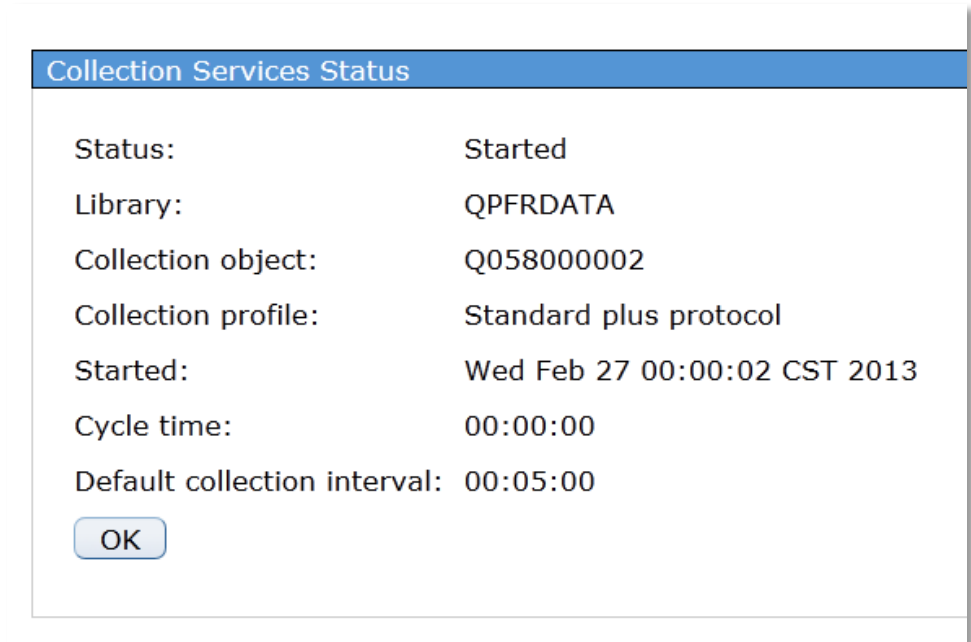
Verify Collection Services is Active

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



[-] Collectors

- [+] Disk Watcher
- [+] Job Watcher
- [-] Collection Services
 - Active Collection Services Collections
 - Collection Services Collections
 - **Collection Services Status**
 - Configure Collection Services
 - Cycle Collection Services
 - Start Collection Services
 - Stop Collection Services



Collection Services Status

Status:	Started
Library:	QPFRDATA
Collection object:	Q058000002
Collection profile:	Standard plus protocol
Started:	Wed Feb 27 00:00:02 CST 2013
Cycle time:	00:00:00
Default collection interval:	00:05:00

OK

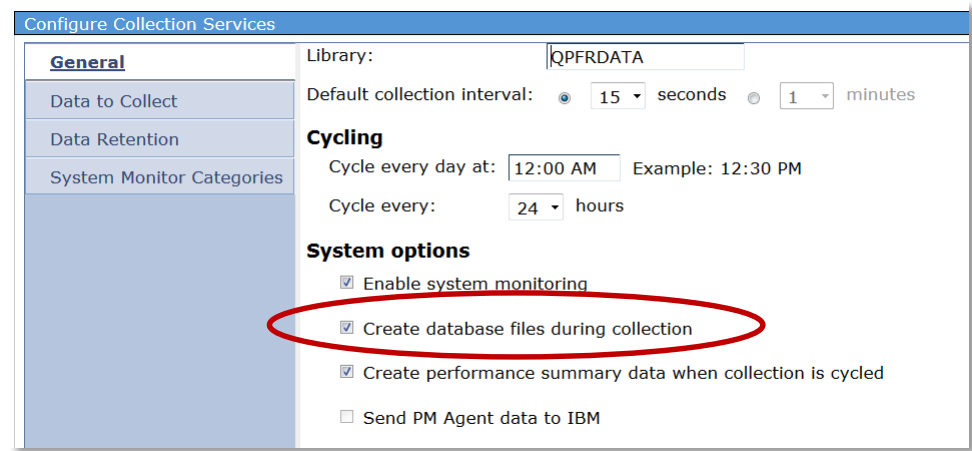
Prerequisites – Create Database Files During Collection

- **PDI requires data in the Collection Services DB2 files**
 - The default is to create the database files during performance data collection
 - If you have turned this off, you will not be able to view performance data with PDI until the data is created in the files
 - Recommended to leave this setting at the default

Command interface:

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

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



Configure Collection Services

General

Library: QPFRDATA

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

IBM Navigator for i Performance Investigate Data

[-] Performance

[-] Investigate Data

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

Performance -

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



[Investigate Data](#)

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




[Manage Collections](#)

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

Close

Investigate Data

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



The screenshot shows a software interface titled "Investigate Data - Performance Data". Below the title bar, the word "Perspectives" is highlighted with a red oval. A list of eight perspectives is displayed, each with a folder icon and a blue square icon to its left. A large red circle highlights the entire list of perspectives.

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

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

Investigate Data – Select Collection



Investigate Data - Performance Data

Perspectives

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

Investigate Data - Performance Data Investigator

Perspectives

- Health Indicators
- Monitor
- Collection Services
 - CPU Utilization and Waits Overview**
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
- Job Statistics Overviews
- Waits
- CPU
- Disk
- Physical Disk I/O
- Synchronous Disk I/O
- Memory
- Page Faults
- Logical Database I/O
- Virtual I/O
- Communications
- 5250 Display Transactions
- Physical System
- Java
- Timeline
- Workload Group
- Collection Services Database Files

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

Selection

Name
CPU Utilization and Waits Overview

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

View List
CPU Utilization and Waits Overview

Collection

Collection Library: QPFRDATA
Collection Name: Most Recent

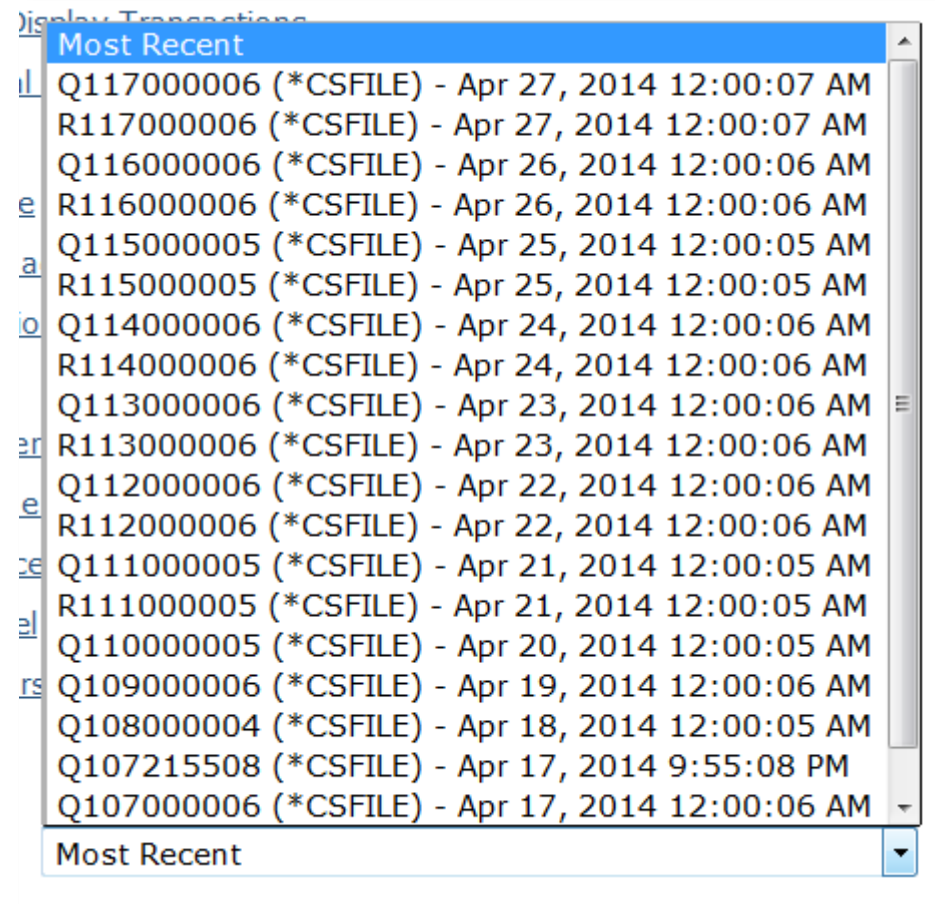
Display Search Save as Favorite Options Close

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

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

Selecting a Collection

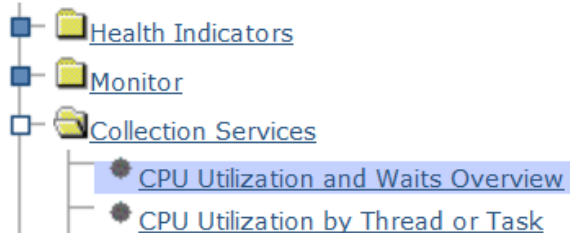
- Collections have the date and time to help you identify the one you are interested in
- Note Q* and R* collections
 - R* collections are new in 7.2
 - System monitor data



Starting Points

Investigate Data - Performance Data Investigator

Perspectives



Selection

Name

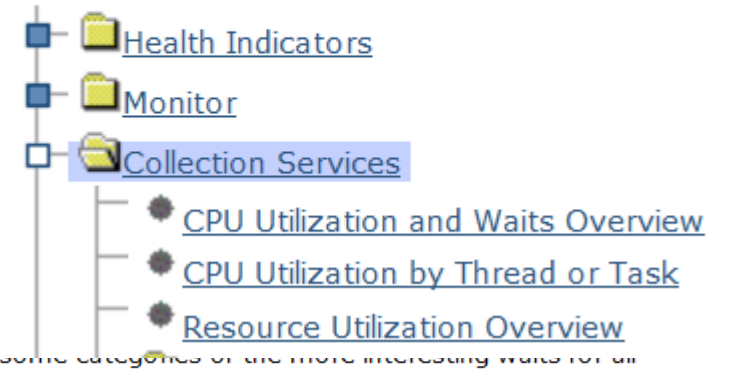
CPU Utilization and Waits Over

Description

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

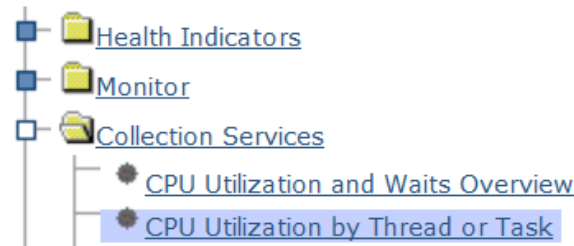
Investigate Data - Performance Data Investigator

Perspectives



Investigate Data - Performance Data Investigator

Perspectives



Selection

Name

CPU Utilization by Thread or Task

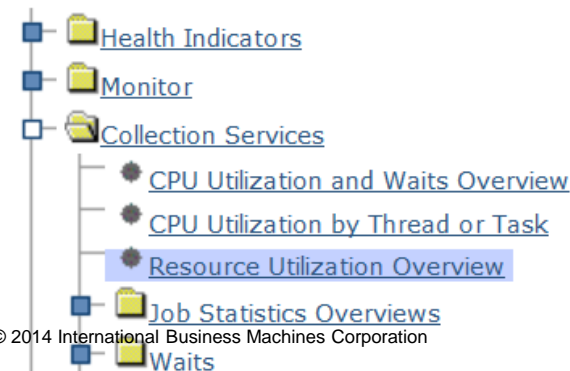
Description

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

View List

Investigate Data - Performance Data Investigator

Perspectives



Selection

Name

Resource Utilization Overview

Description

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

View List

Resource Utilization Percentages
Resource Utilization Rates

Resource Utilization Overview

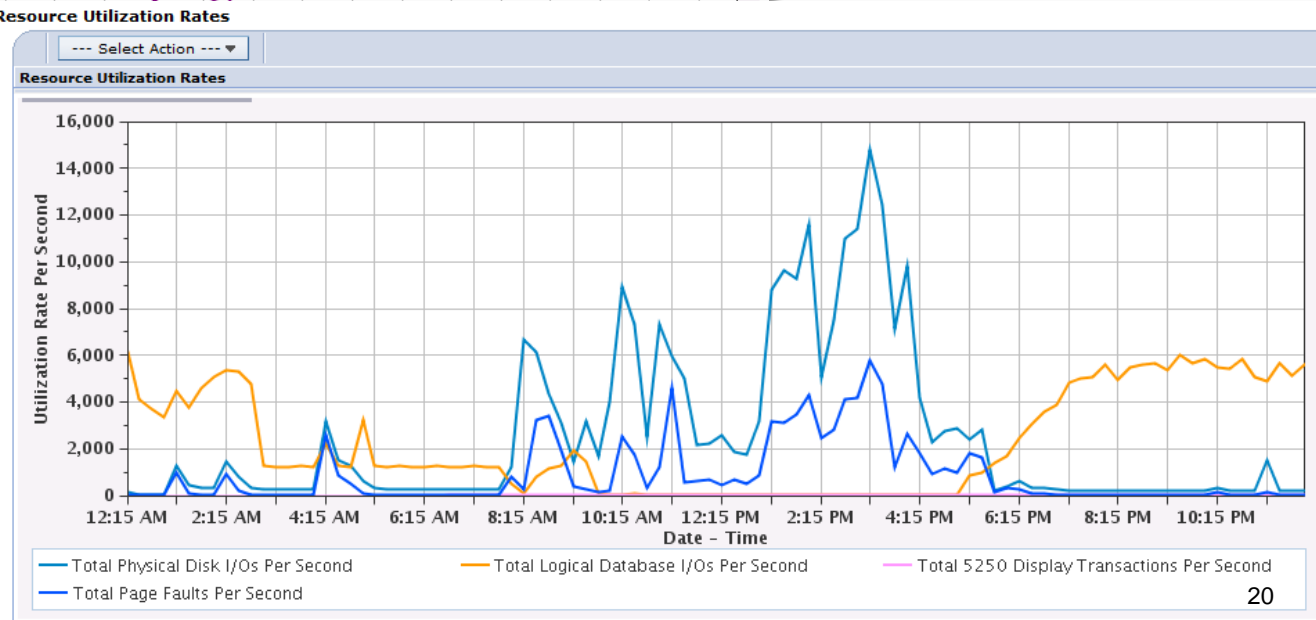
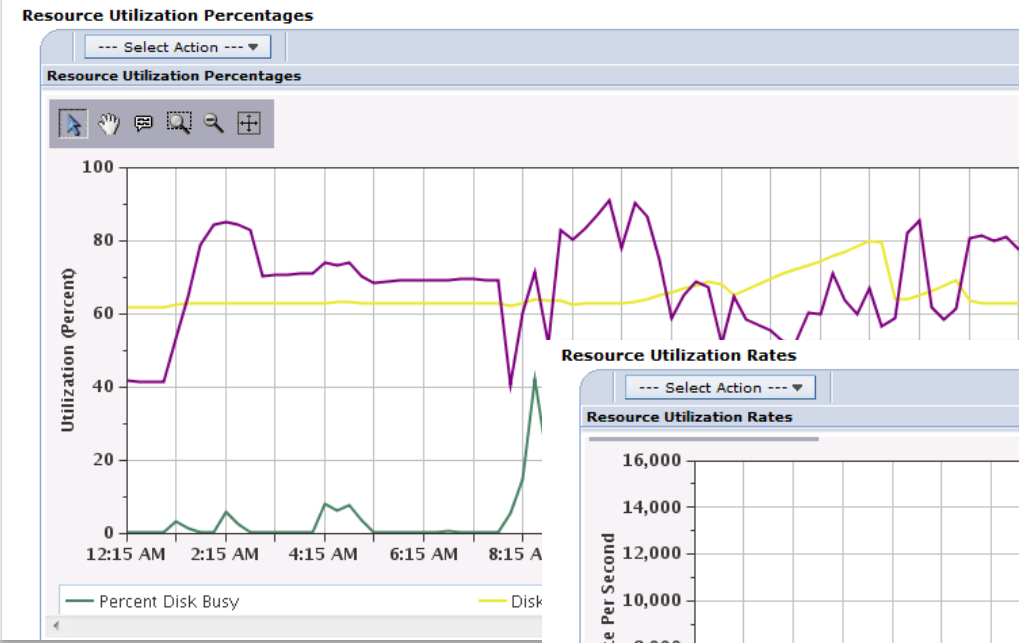
Summary for general overall health:

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

Resource Utilization Overview

Perspective Edit View History

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



CPU Utilization and Waits Overview



CPU Utilization and Waits Overview

Perspective View

Collection

Name(s): CS228229ND
 Library: COMMON
 Type: Collection Services File Based Collection
 File level: 28

Time

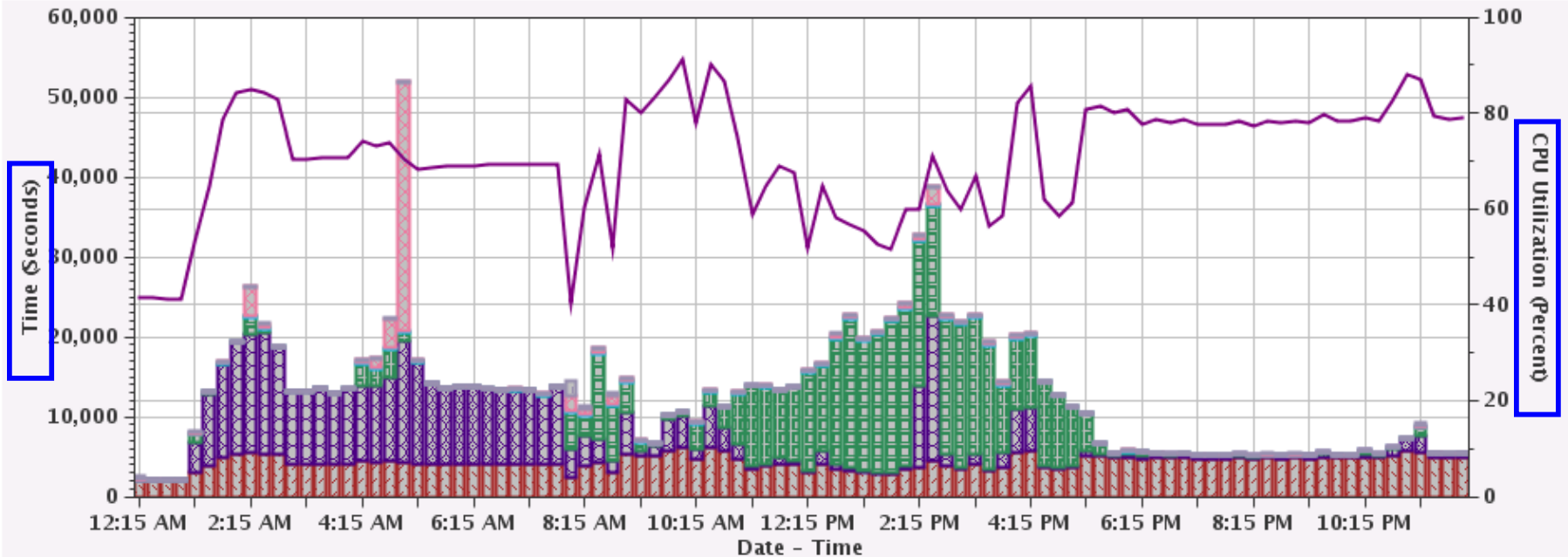
Start: Feb 28, 2008 12:00:02 AM
 End: Feb 29, 2008 12:00:00 AM

System

Name: RCHASTND
 Release: V6R1M0

--- Select Action ---

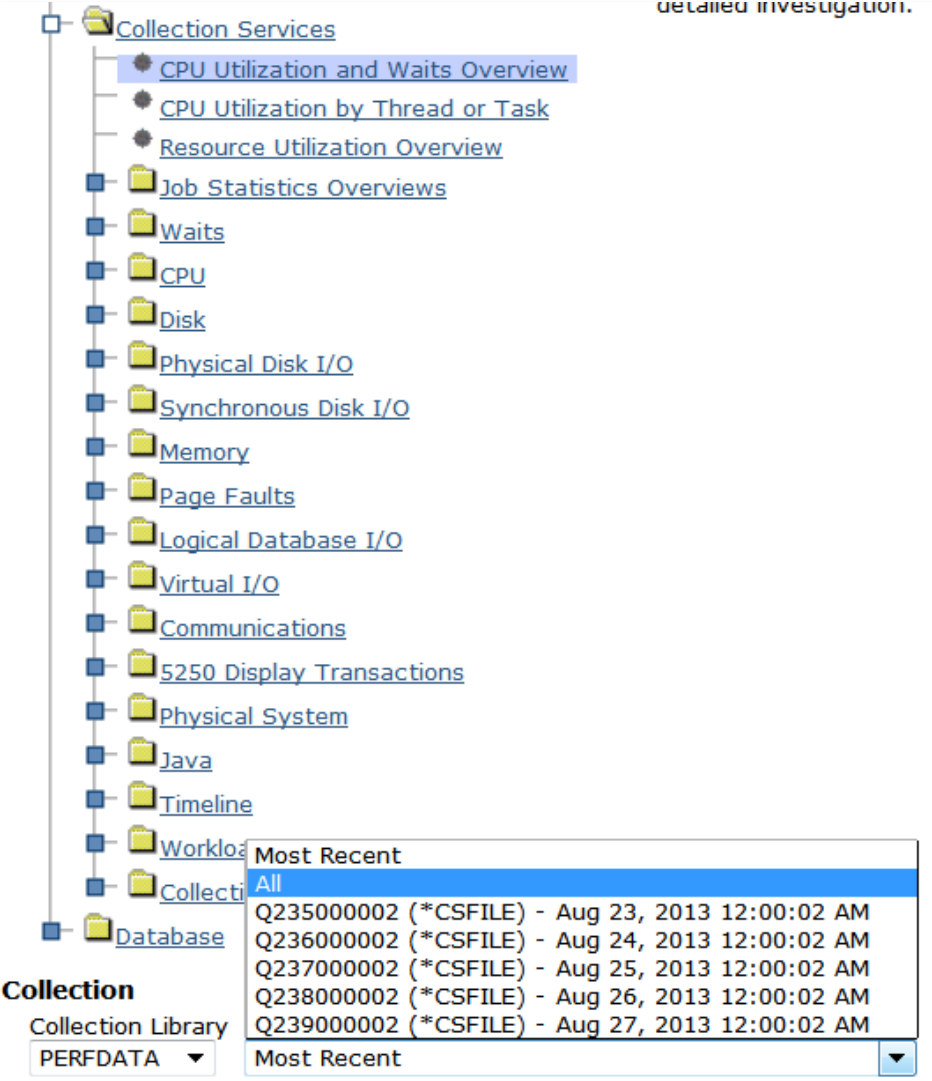
CPU Utilization and Waits Overview



- Dispatched CPU Time
- Journaling Time
- Ineligible Wait Time
- CPU Queuing Time
- Operating System Contention Time
- Partition CPU Utilization
- Disk Time
- Lock Contention Time

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 click the “Full Zoom Out” icon on the interactor bar to display all the data.



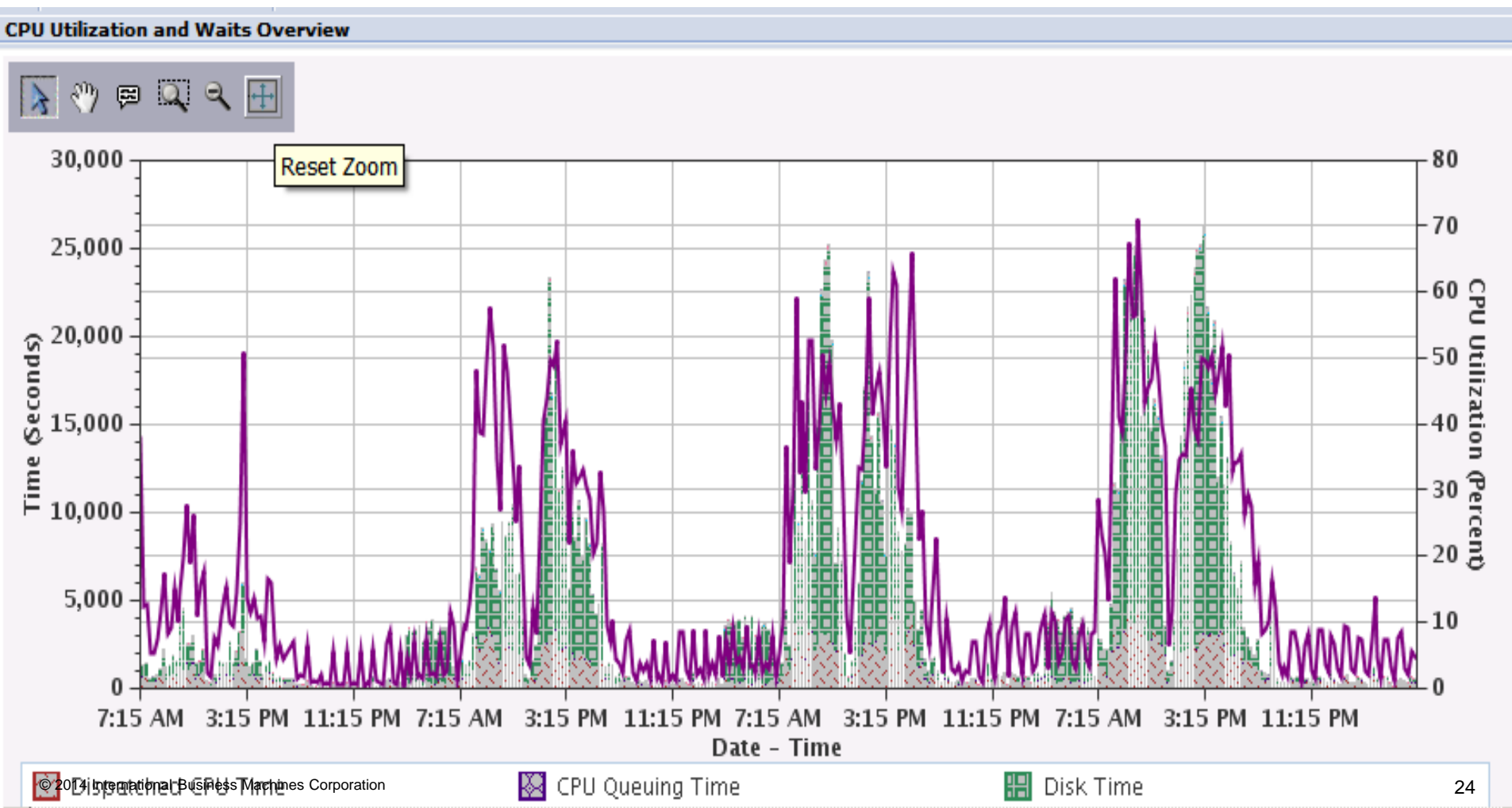
The screenshot shows the 'Collection Services' tree in the Performance Explorer. The 'All' option is highlighted in the 'Most Recent' dropdown menu. Below the tree, the 'Collection' section shows 'Collection Library' set to 'PERFDATA' and a 'Most Recent' dropdown menu.

Collection	Collection Library
Q235000002 (*CSFILE) - Aug 23, 2013 12:00:02 AM	PERFDATA
Q236000002 (*CSFILE) - Aug 24, 2013 12:00:02 AM	PERFDATA
Q237000002 (*CSFILE) - Aug 25, 2013 12:00:02 AM	PERFDATA
Q238000002 (*CSFILE) - Aug 26, 2013 12:00:02 AM	PERFDATA
Q239000002 (*CSFILE) - Aug 27, 2013 12:00:02 AM	PERFDATA

A More Interesting Example

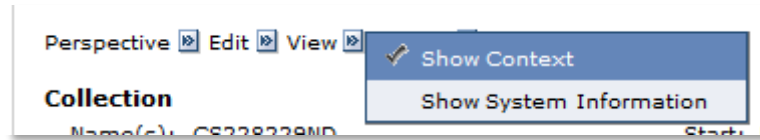
4 days of more interesting performance data.

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

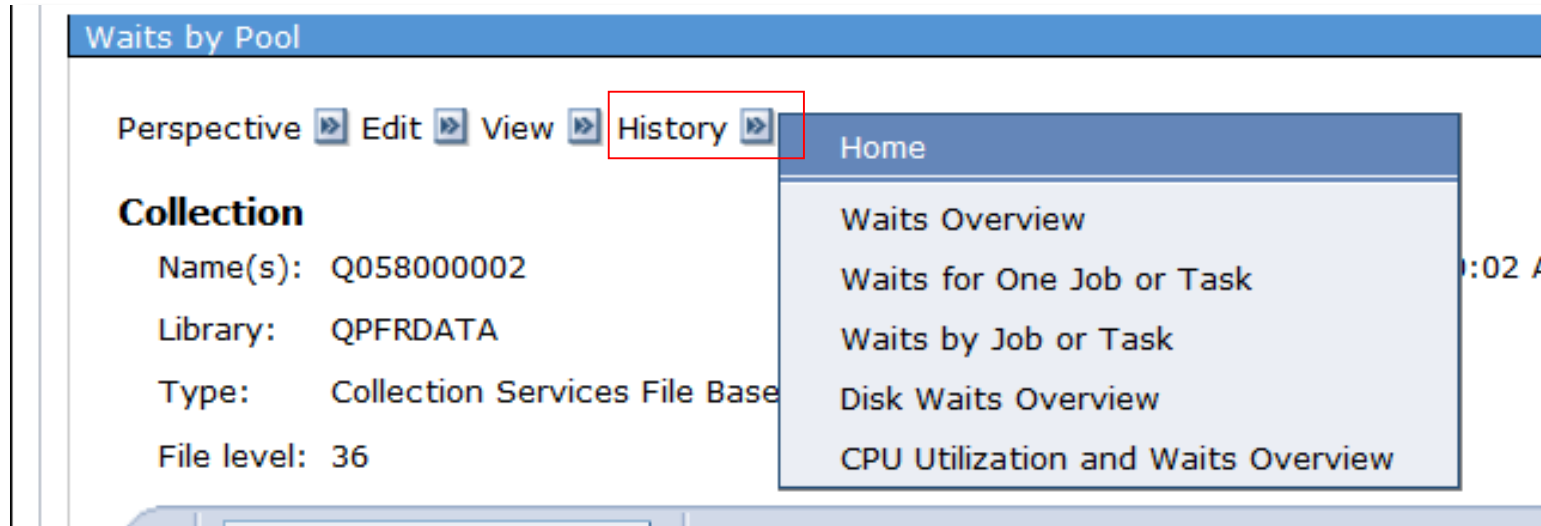
CPU Utilization and Waits Overview

Perspective Edit View History

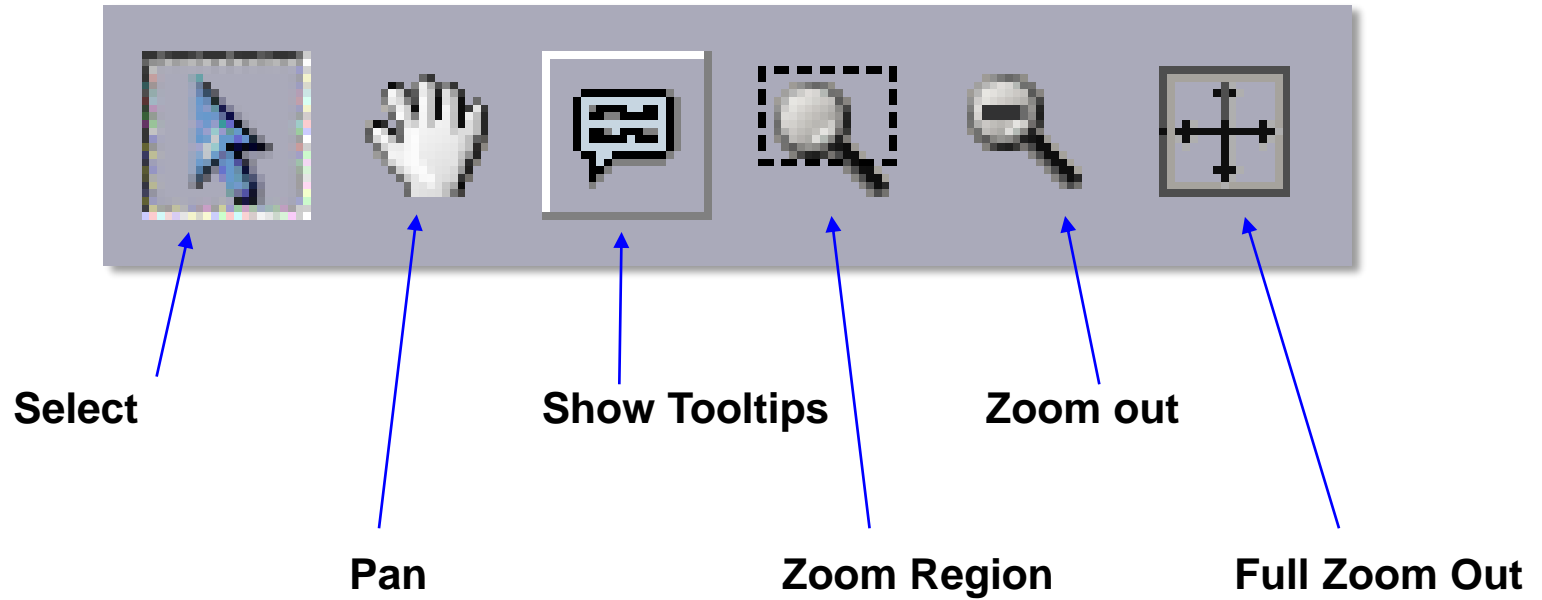
Collection	Time	System
Name(s): Q234000002	Start: Aug 22, 2013 12:00:02 AM	Name: ETC3T1
Library: QPFRDATA	End: Ongoing	Release: V7R1M0
Type: Collection Services File Based Collection		
File level: 36		
System Information		
Name: ETC3T1	Total Processors: Not Available	Interactive Threshold: 100%
Release: V7R1M0	Processors / Cores Active: 4	System ASP Capacity: 88.89 GB
Type: 7998	Available Processors: Not Available	Hypervisor Memory: 1,152 MB
Model: 61X	Virtual Processors: 1	Primary Partition: 0
Serial Number: 10-065FA	Installed Processor Count: 4	Partition ID: 21
Processor Feature Code: 52BE	Processor Units (allocated to partition): 0.5	Partition Count: 3
Processor Feature: 8400	Processor Sharing/Capped: Yes / No	Partition Memory: 8 GB
Generated On: ETC3T1		

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

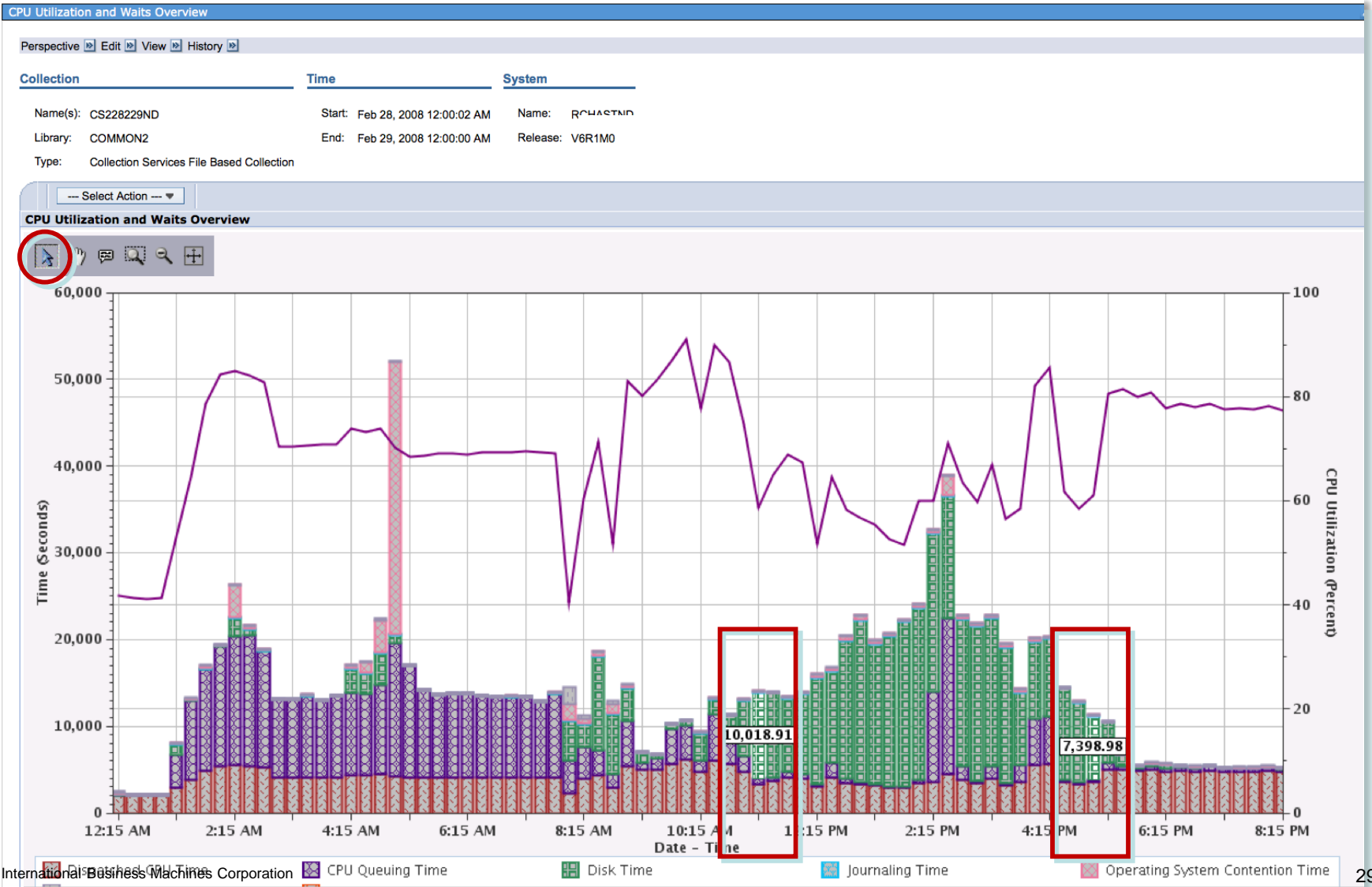
History – Navigation history and other easily-accessible options



Tools – Interact with the Charts



Selection




Pan

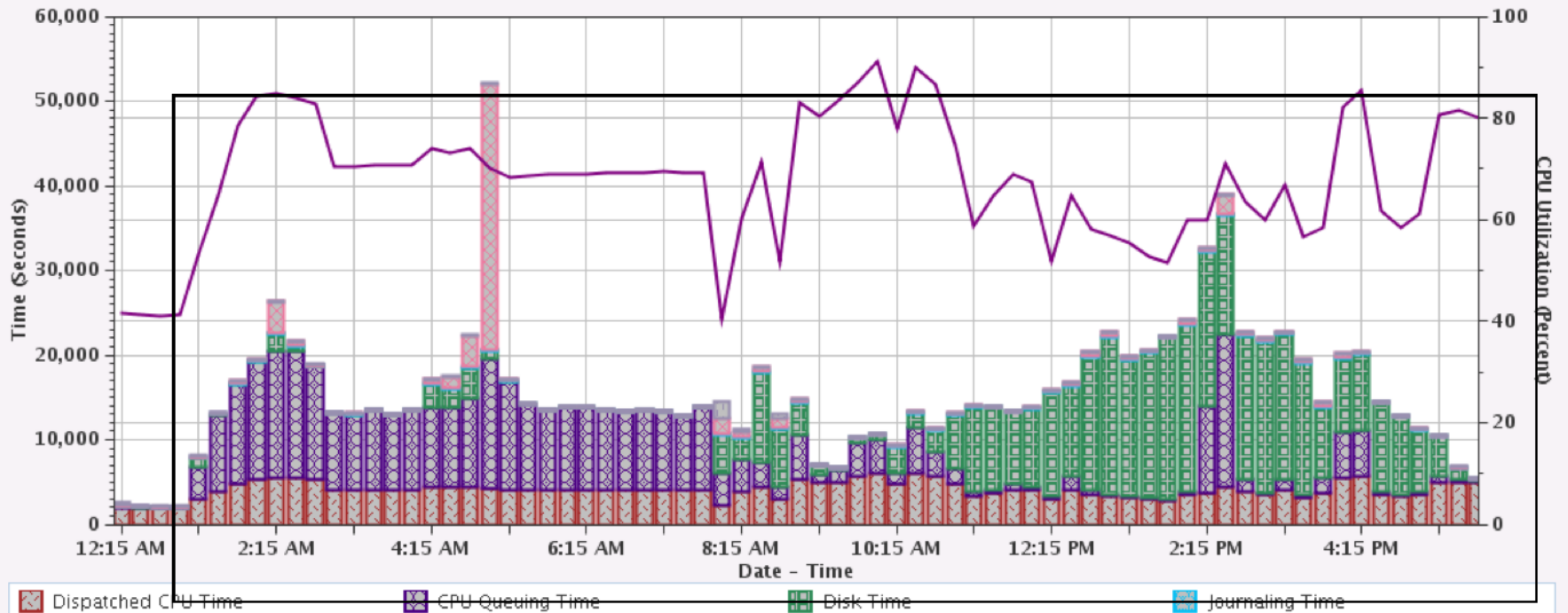
CPU Utilization and Waits Overview

Perspective  Edit  View  History 

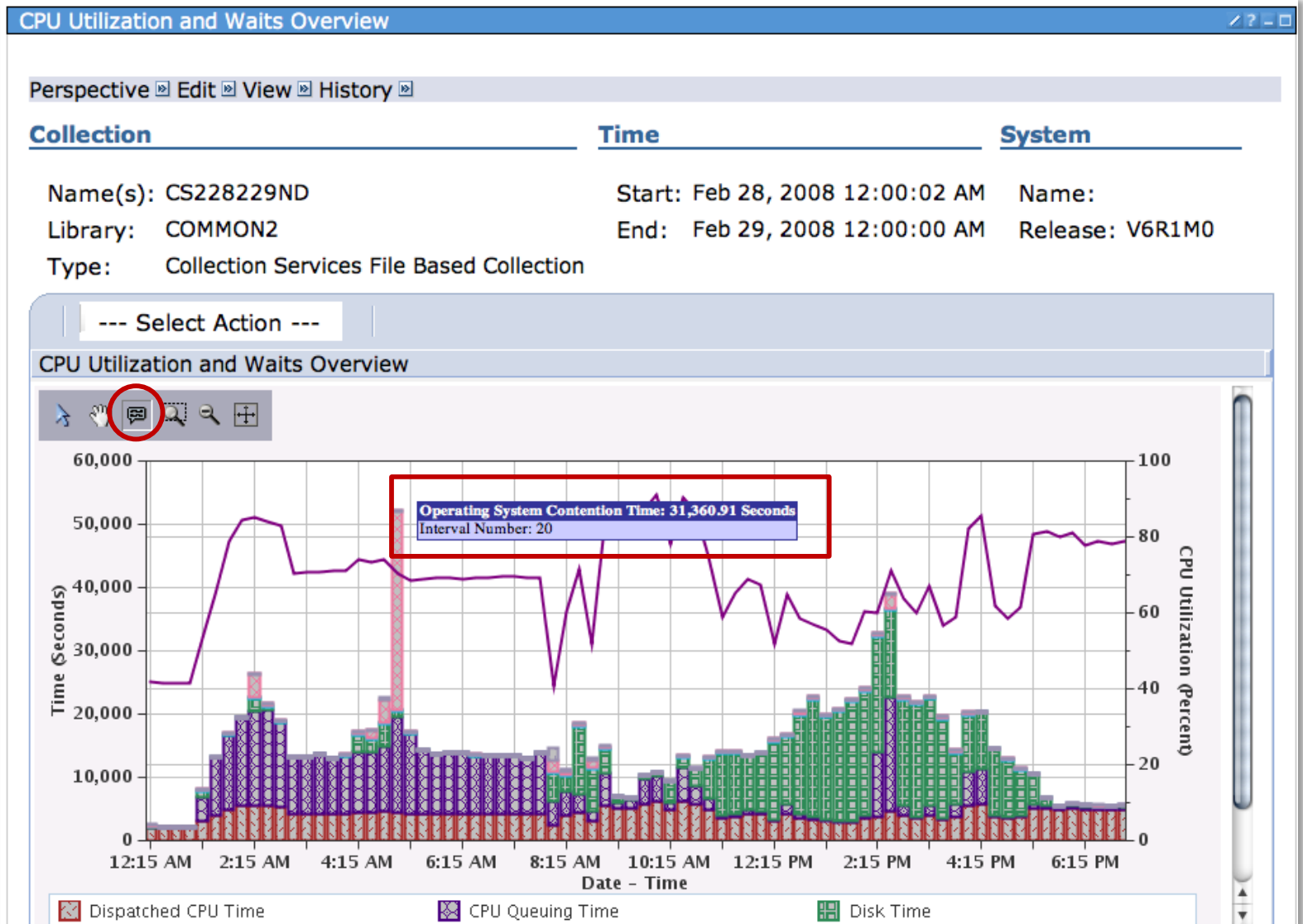
Collection	Time	System
Name(s): CS228229ND	Start: Feb 28, 2008 12:00:02 AM	Name:
Library: COMMON2	End: Feb 29, 2008 12:00:00 AM	Release: V6R1M0
Type: Collection Services File Based Collection		

-- Select Action -- 

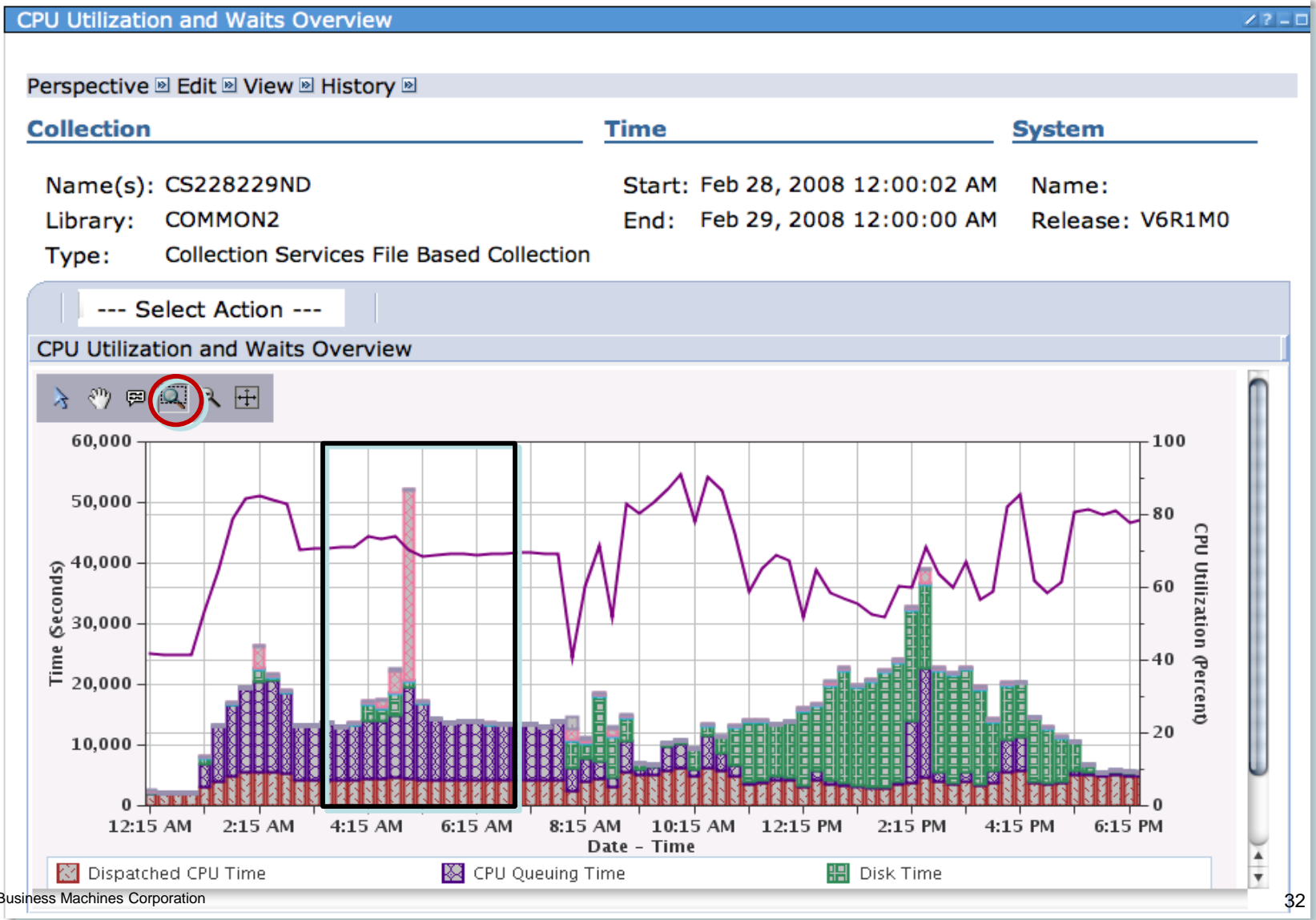
CPU Utilization and Waits Overview



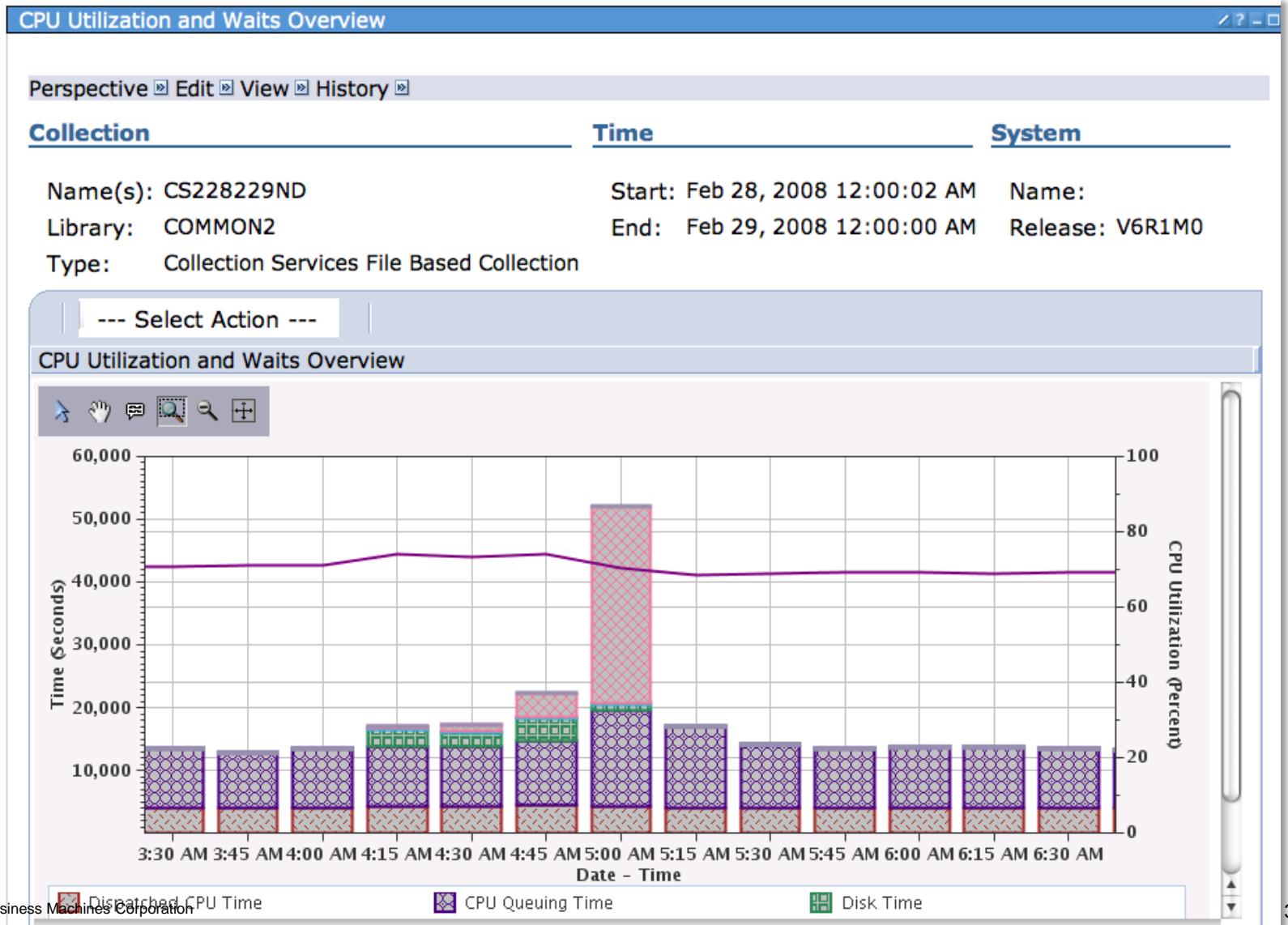
Tool Tips



Zoom Region



Zoom Region Results



Zoom Out



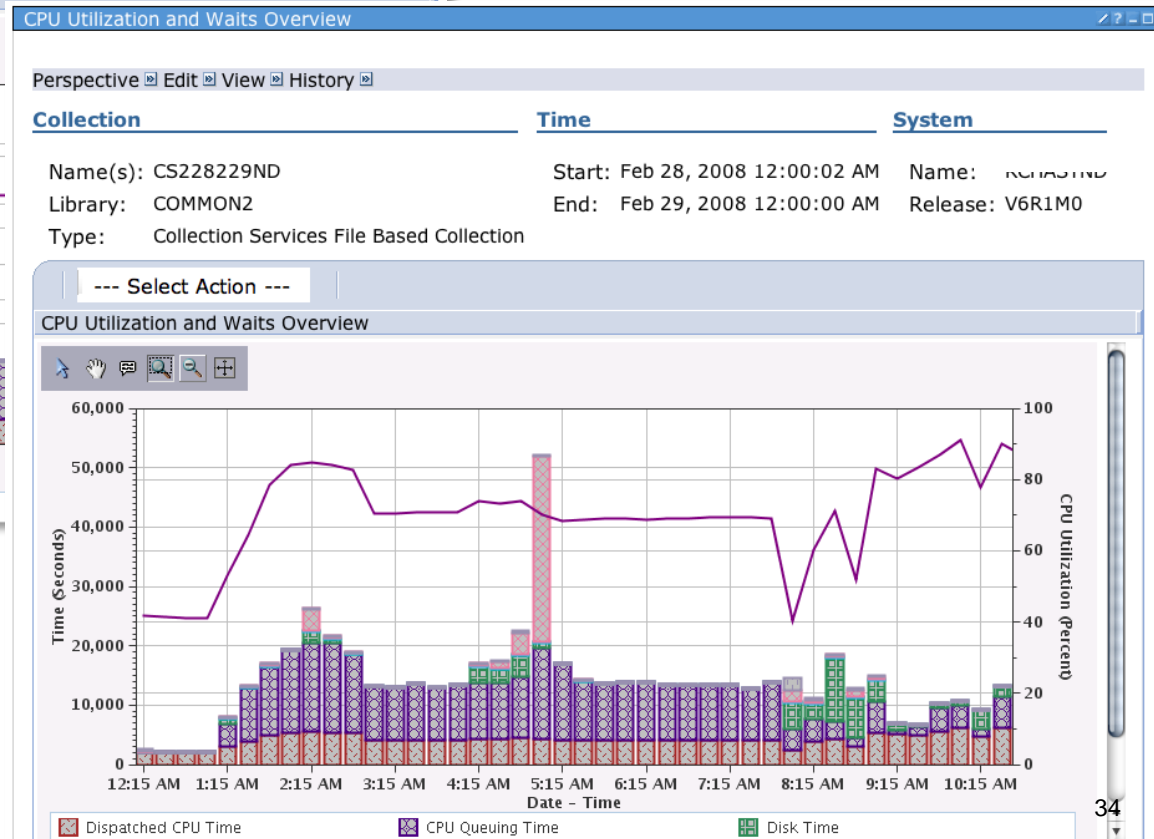
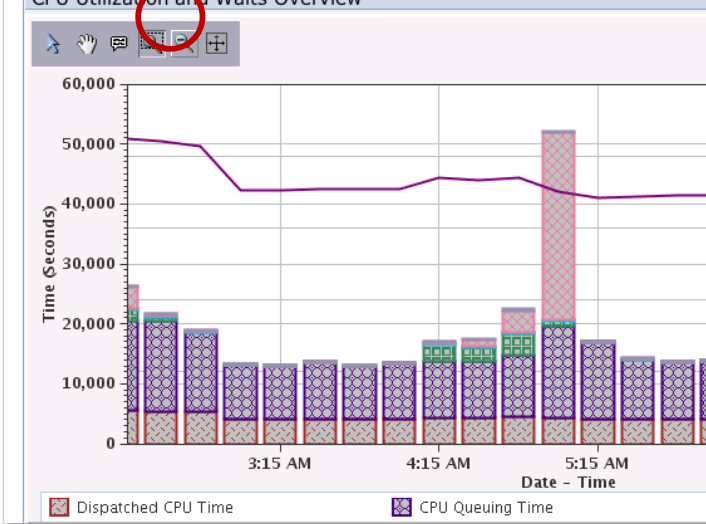
Zoom out expands the graph each time it is clicked

CPU Utilization and Waits Overview

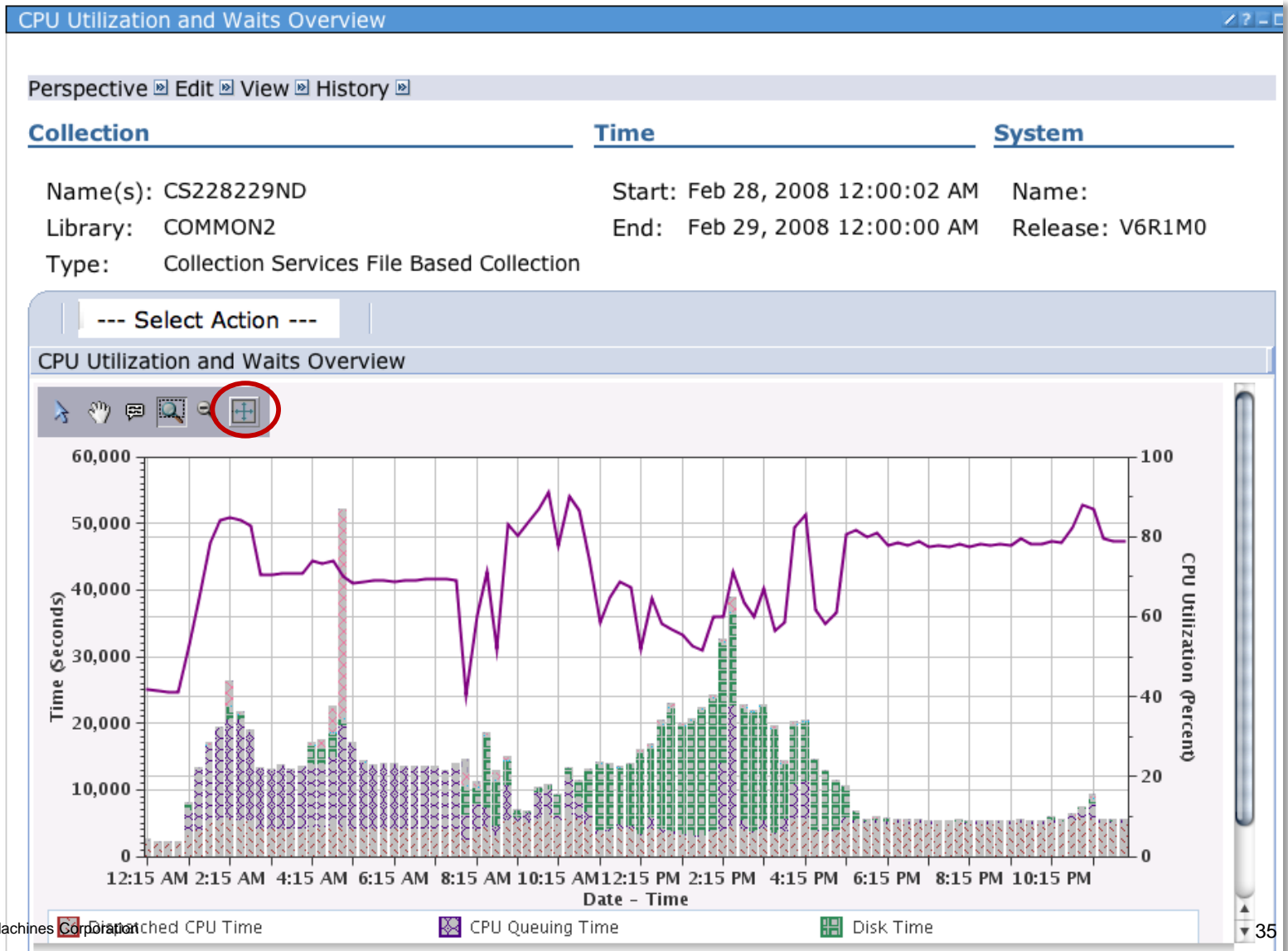
Perspective Edit View History

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

--- Select Action ---

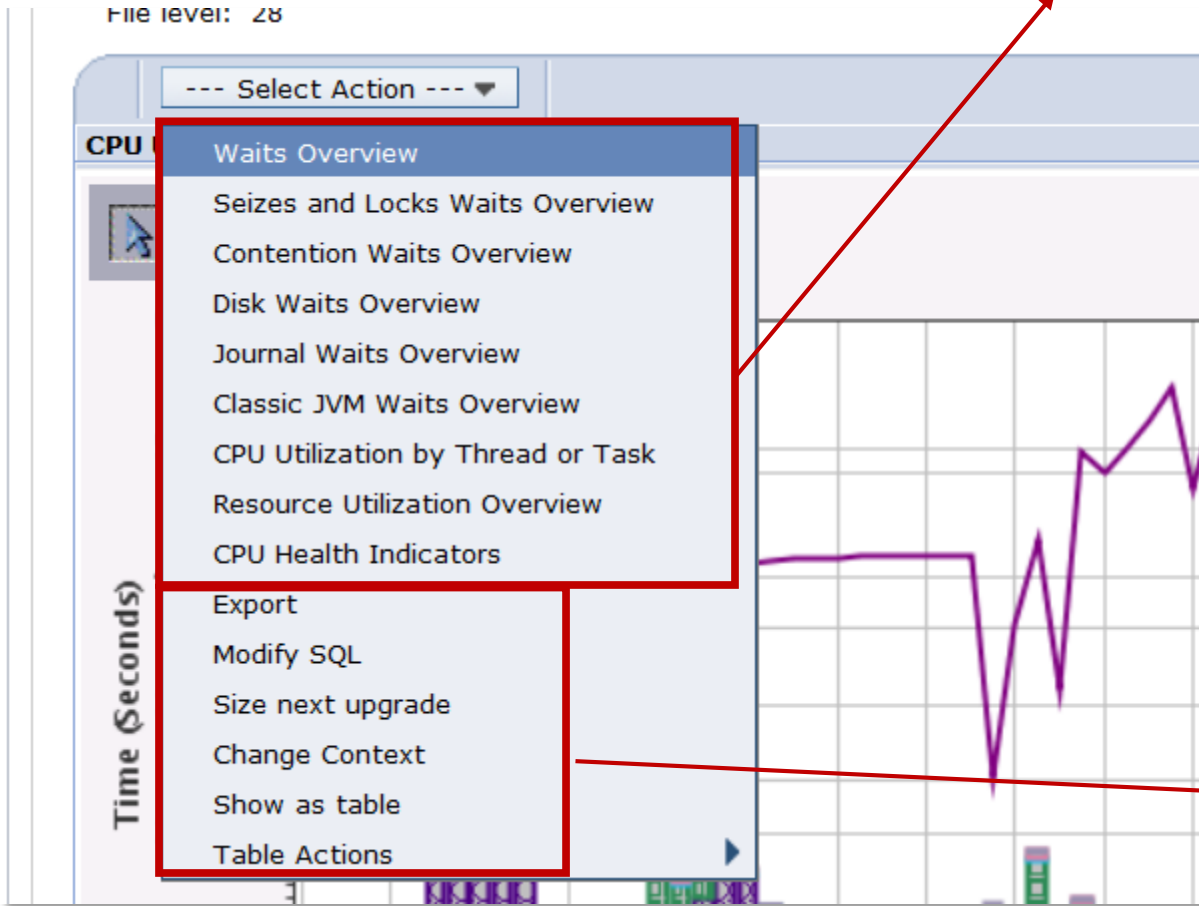


Full Zoom Out



Drill-down

Graph options for next step in analysis



Other options to work with data or refine graphs

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

Format

- Image (*.png)
- Image (*.png)
- Image (*.jpeg)
- Comma Delimited (*.csv)
- Tab Delimited (*.txt)
- Displayed data

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

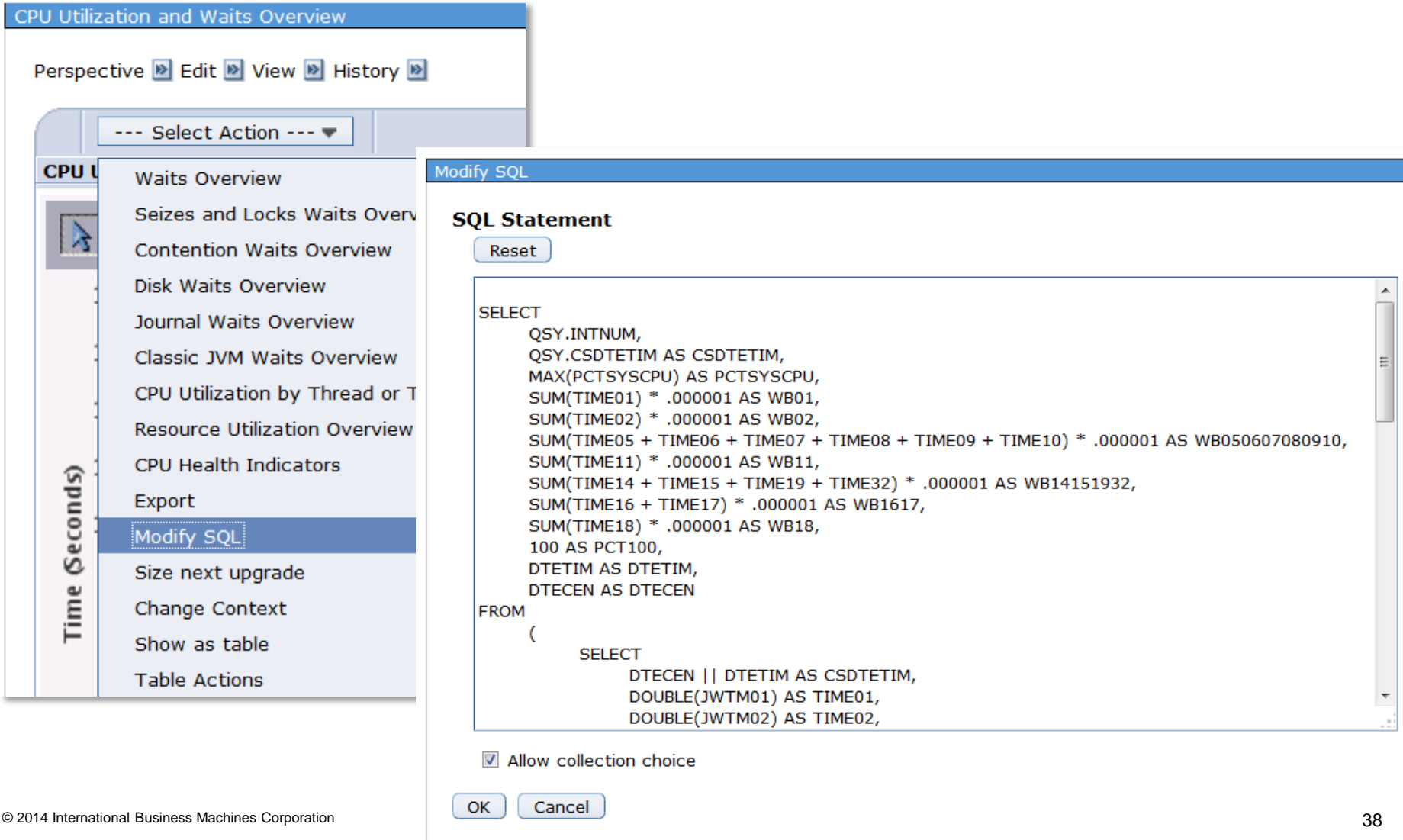
- Dispatched CPU Time
- CPU Queuing Time
- Disk Time
- Journaling Time
- Operating System Contention Time

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





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


OK Cancel

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 T
- Resource Utilization Overview
- CPU Health Indicators
- Export
- Modify SQL**
- Size next upgrade
- Change Context
- Show as table
- Table Actions

Modify SQL

SQL Statement

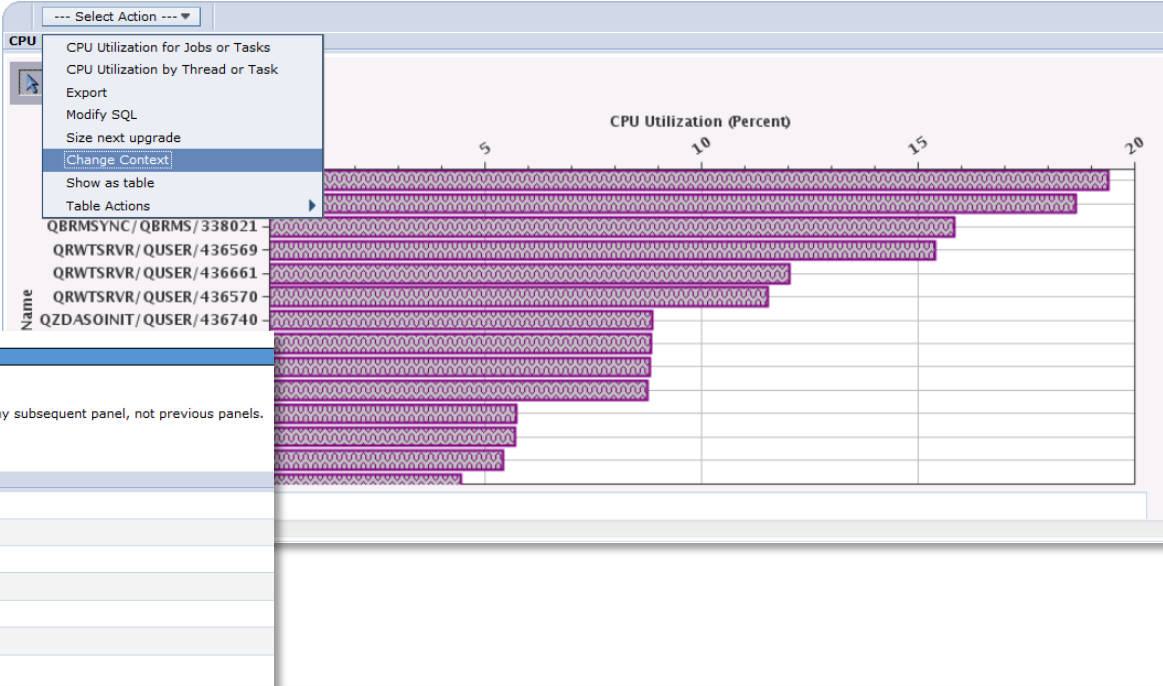
```

SELECT
  QSY.INTNUM,
  QSY.CSDTETIM AS CSDTETIM,
  MAX(PCTSYSCPU) AS PCTSYSCPU,
  SUM(TIME01) * .000001 AS WB01,
  SUM(TIME02) * .000001 AS WB02,
  SUM(TIME05 + TIME06 + TIME07 + TIME08 + TIME09 + TIME10) * .000001 AS WB050607080910,
  SUM(TIME11) * .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

Change Context

CPU Utilization by Job or Task



Change Context

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

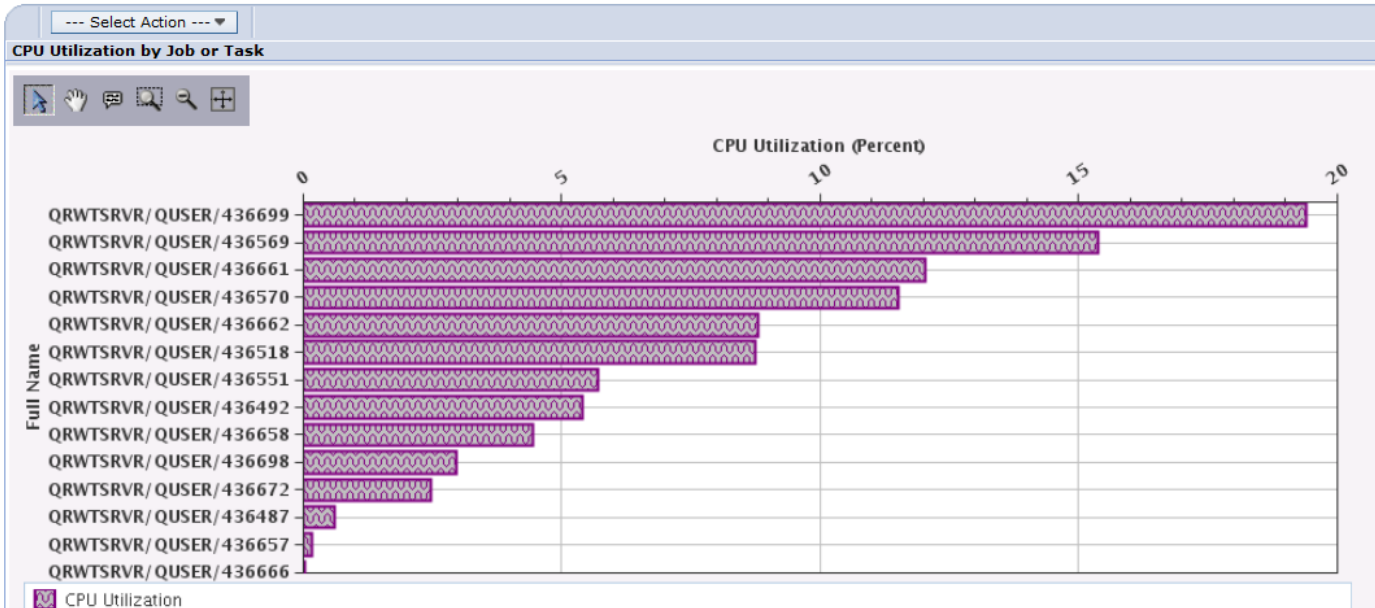
Variable
Variable

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

Page 1 of 1 | 1 | Go | Row

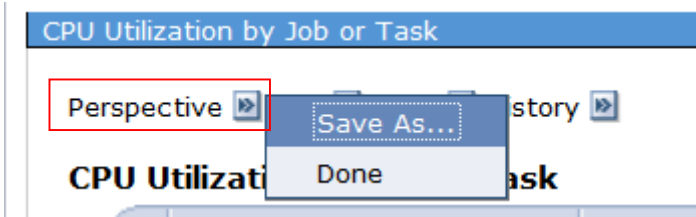
OK Cancel

CPU Utilization by Job or Task



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...”



Saving a custom perspective

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

Save Location

<p>Perspectives</p> <ul style="list-style-type: none">  Custom Perspectives - DMMAY └─ [Empty] 	<p>Selection</p> <p>Name Custom Perspectives - DMMAY</p> <p>Description Perspectives that have been saved by the user.</p>
--	---

Perspective

*Name:

Description:

Locked

Perspective → Save As

CPU Utilization by Job or Task

Perspective Edit View History



Save Complete

This perspective was saved successfully.

URL to saved perspective:

https://isz1p13.rch.stglabs.ibm.com:2005/ibm/action/launch?pageID=com.ibm.i5OS.webnav.navigationElement.WebnavBasePortlet&system=localhost&WnLocale=en_US&WnSTM=true&task=perf.invdt&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

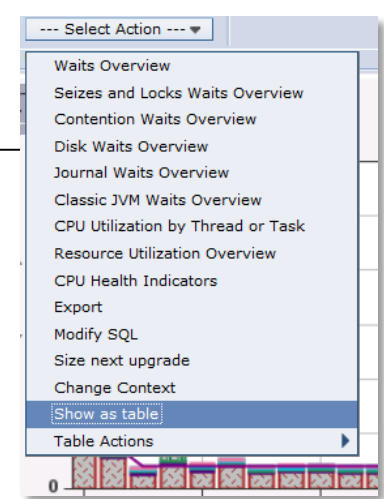
Description

Perspectives that have been saved by the user.

Collection

Collection Library: Collection Name:

Show as Table

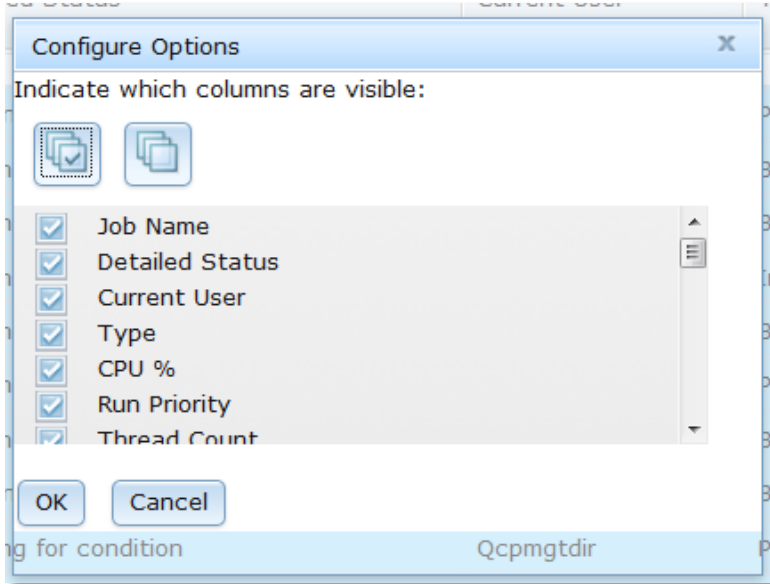


Select	Interval Number ^	Date - Time ^	Partition CPU Utilization (Percent) ^	Dispatched CPU Time (Seconds) ^	CPU Queuing Time (Seconds) ^	Disk Time (Seconds) ^	Journaling Time (Seconds) ^	Operating System Contention Time (Seconds) ^
<input type="checkbox"/>	1	Feb 28, 2008 12:15:00 AM	41.65	2125.7	12.25	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

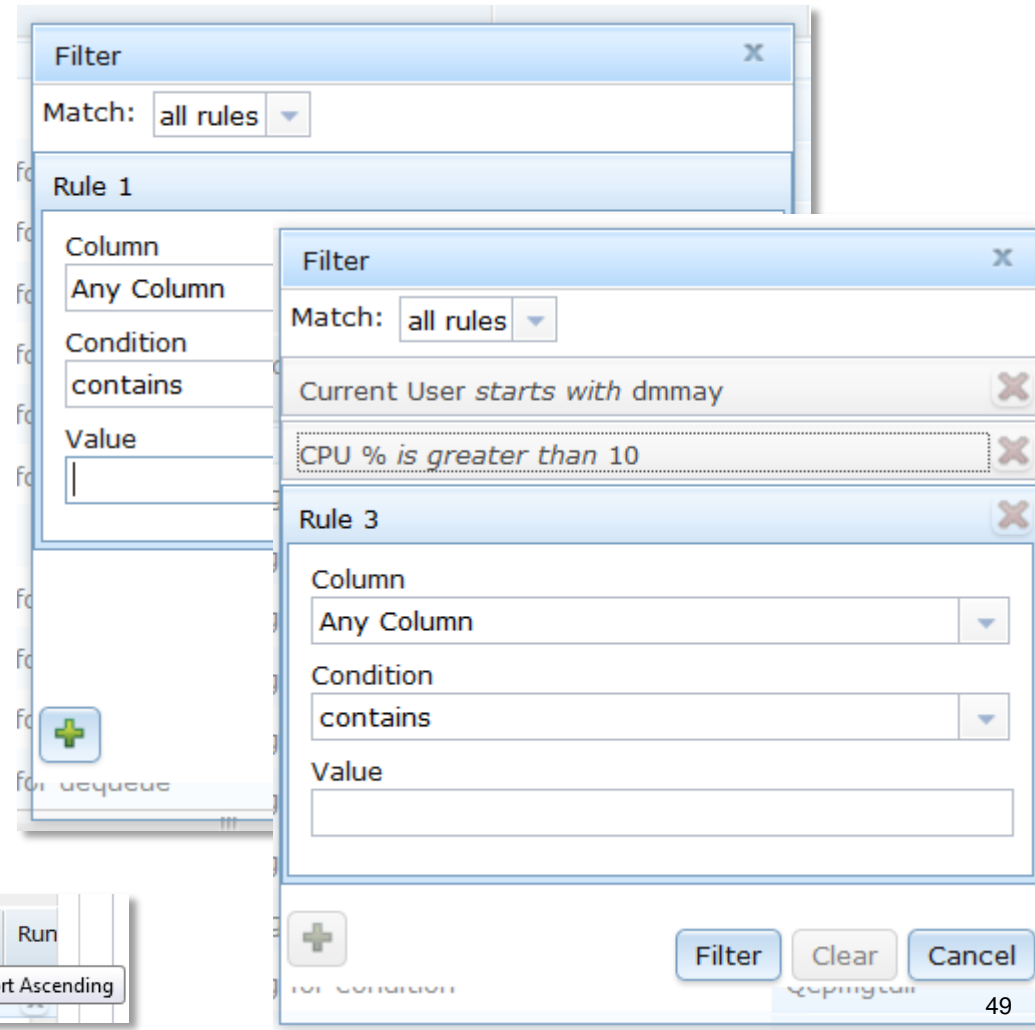
Total: 96 Filtered: 96

New Table Support – Same Features, New UI

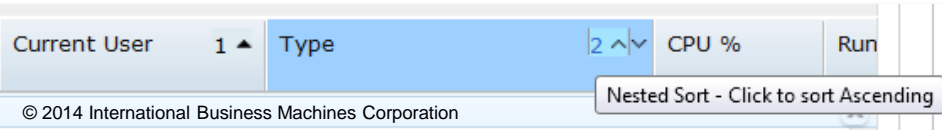
Configure Options for Columns



Filter column data

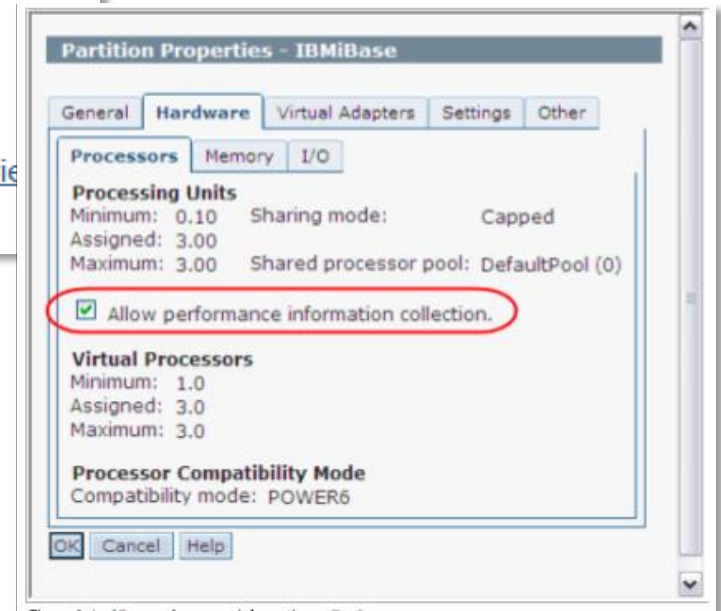
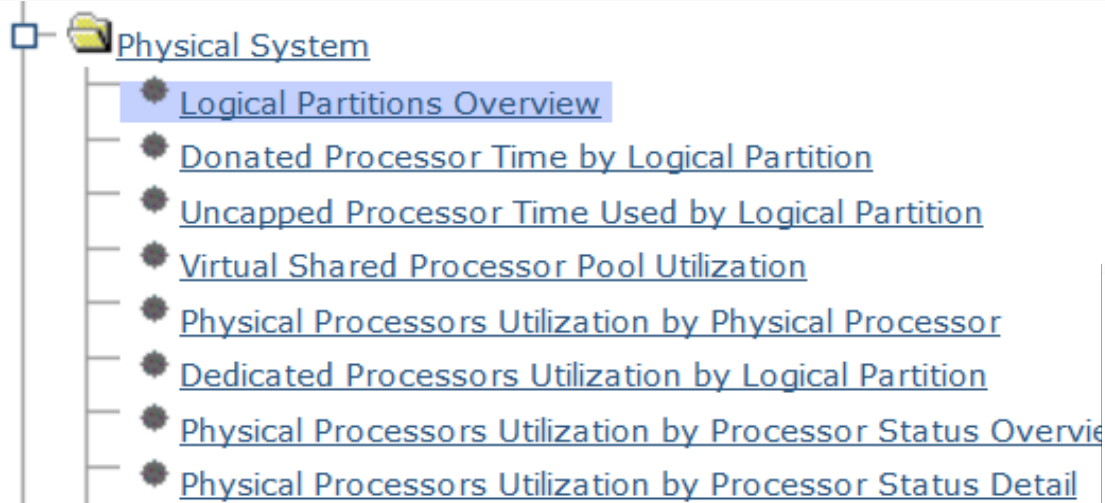


Sort Columns



Physical System Charts – Frame view of Performance!

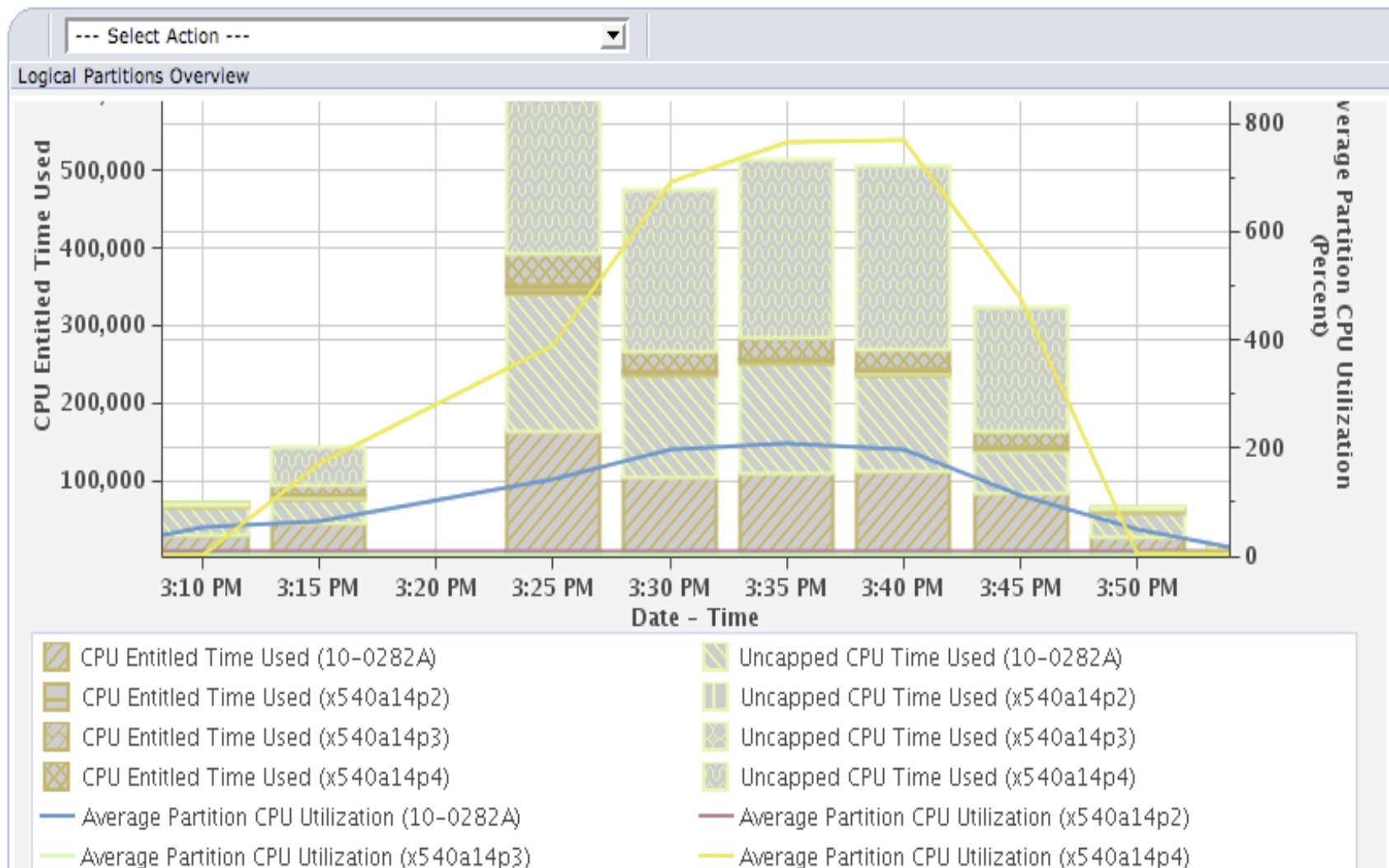
Collection Services has the ability to collect certain high-level cross-partition processor performance metrics for all logical partitions on the same single physical server regardless of operating system. This is available on Power 6 and above servers, with a minimum firmware level xx340_061. When this data is available, it can be viewed via several perspectives found under "Physical System".



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

Logical Partitions Overview

Requires Power 6 and IBM i 6.1 or later

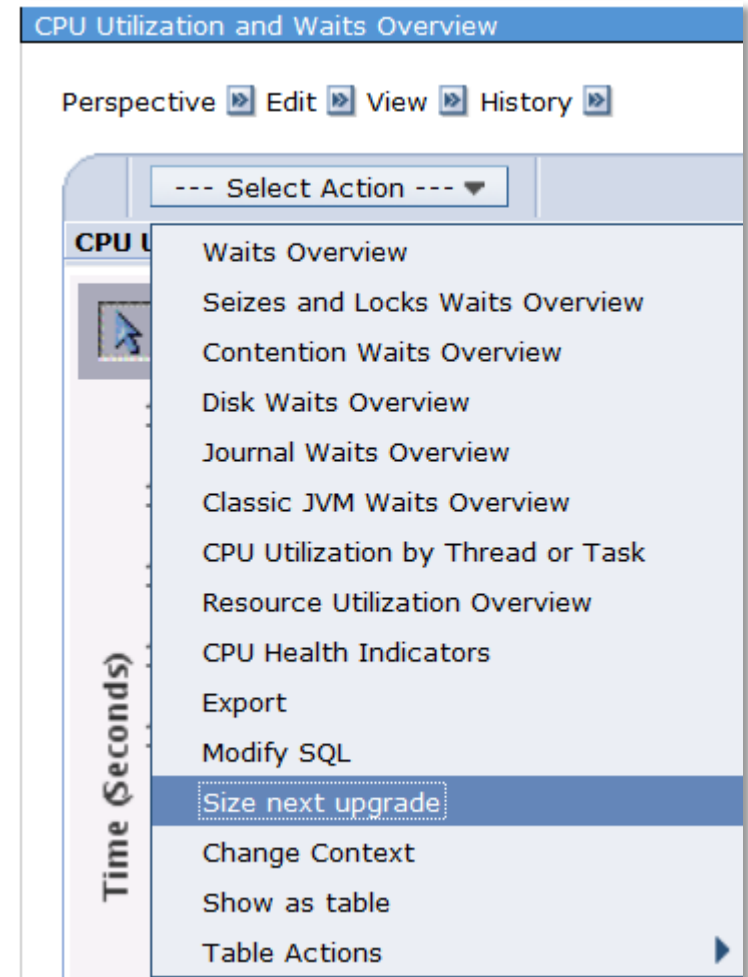


Size Next Upgrade

Send data directly to the IBM Workload Estimator

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

Intended for a one-time sizing activity



Search 7.2

“Investigate Data Search” added in 7.2

Investigate Data Search

Type at least 3 non-empty characters

Case Sensitive Whole Words Only

Search In:

Package Name

Description

Metrics

Perspective

View

SQL

Show Columns:

Metrics
 SQL

Package Name	Perspective	Description	View
Collection Services	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

Collection

Collection Library Collection Name

QPFRRDATA

Most Recent

Display

Search

Options

Refresh Perspectives

Close

Investigate Data - Performance Data Investigator

Metric Finder

Metric

Metric Name:

- Primary Affinity Domain ID
- SMAPP Evaluations Serviced
- SMAPP Index Build Time Estimations
- SMT Hardware Threads:
- SQL Cursor Count
- SQL Cursor Reuse
- 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):

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 Collection Name

QPFRRDATA

Most Recent

Display

List

Options

Refresh Perspectives

Close

Options

Collection

Collection Library: QPFRDATA Collection Name: Most Recent

Display Search Save as Favorite **Options** Close

Options

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

Default library

- Use Collection Services configured library
 - Use last visited library
 - Use library:
- Specify the default library that will be used when a collection is selected.

System Monitor

- Show thresholds Show thresholds in system monitor charts.

7.2











OK Cancel

Design Mode

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

Investigate Data - Performance Data Investigator

Perspectives

-   Health Indicators
-  Monitor
-  Collection Services
-  Database
-  Job Watcher
-  Disk Watcher
-  Performance Explorer
-  Batch Model
-  Custom Perspectives - PDITEST0

Selection

Name
Collection Services

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

Default Perspective
Resource Utilization Overview

Locked

New Folder...
New Perspective...

Edit
Advanced Edit
Delete

Move Up
Move Down

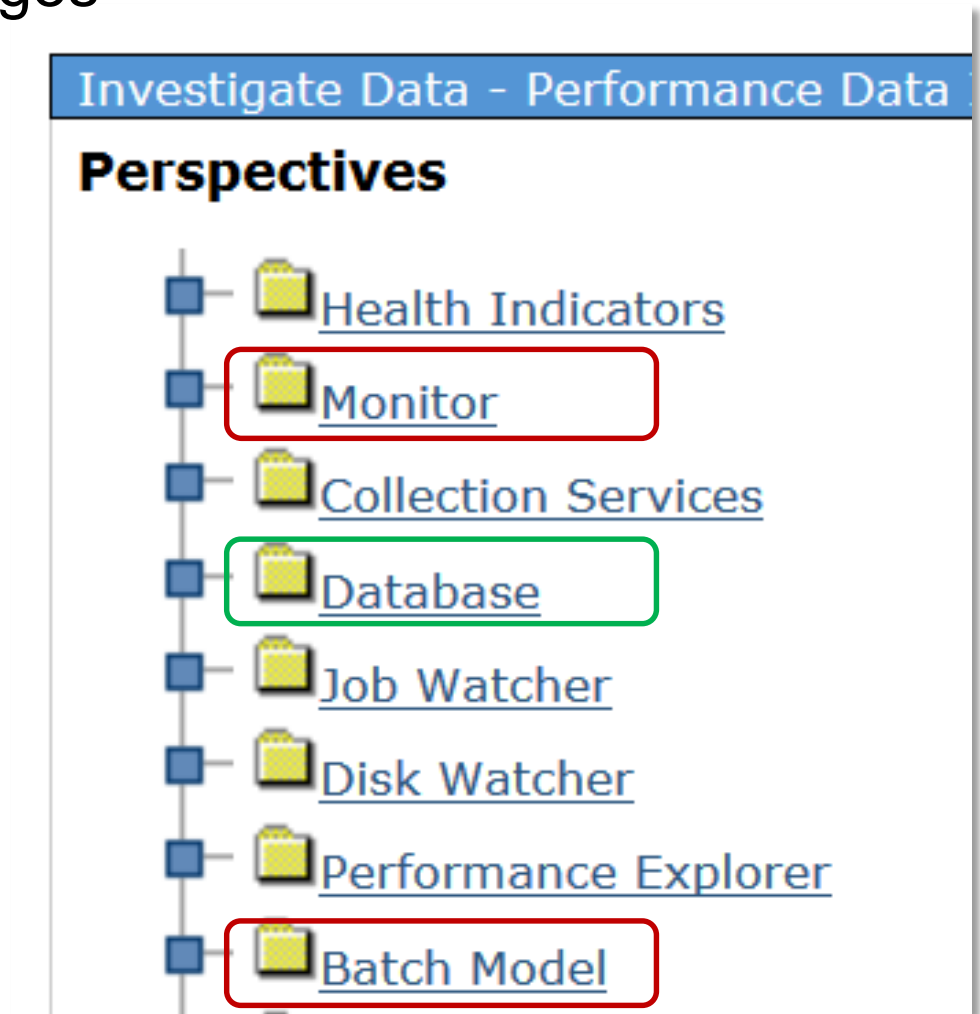
Collection

Collection Library: QPFRDATA Collection Name: Most Recent

Display
Search
Save as Favorite
Options
Refresh Perspectives
Close

Additional Content Packages

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





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

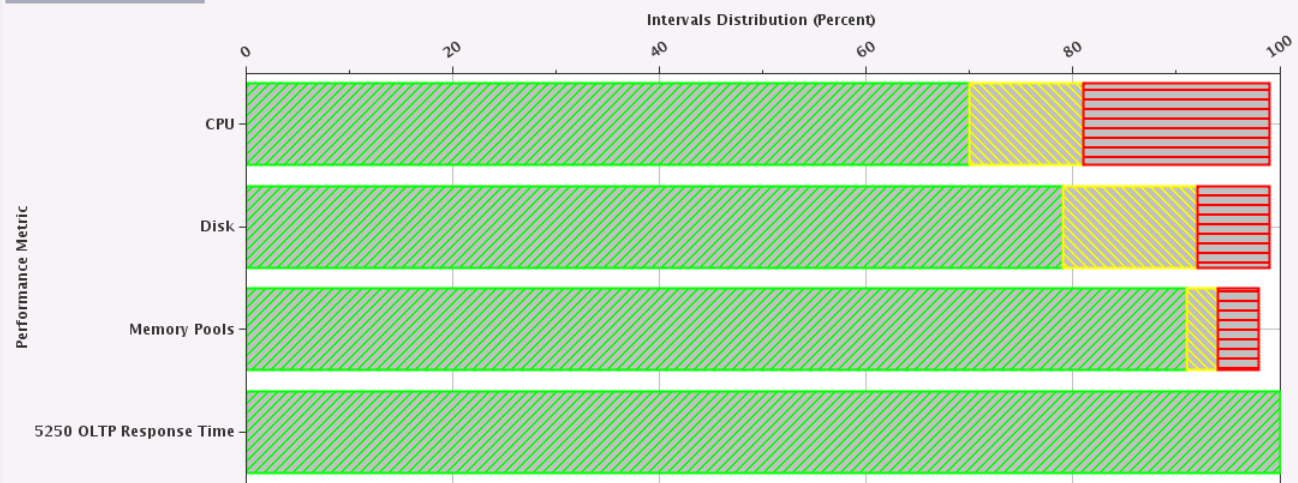
System Resources Health Indicators

Perspective | Edit | View | History

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

--- Select Action ---

System Resources Health Indicators



Intervals Distribution (Percent)

Performance Metric	Under Threshold (%)	Above Warning (%)	Above Action (%)
CPU	~75	~10	~15
Disk	~80	~15	~5
Memory Pools	~95	~3	~2
5250 OLTP Response Time	100	0	0

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

Database Health Indicators are new in 7.2

Define Health Indicators 7.1 screen captures

Select Action

- CPU Health Indicators
- Disk Health Indicators
- Memory Pools Health Indicators
- Response Time Health Indicators
- Define Health Indicators
- Edit View

Define Health Indicators

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

Define Health Indicators

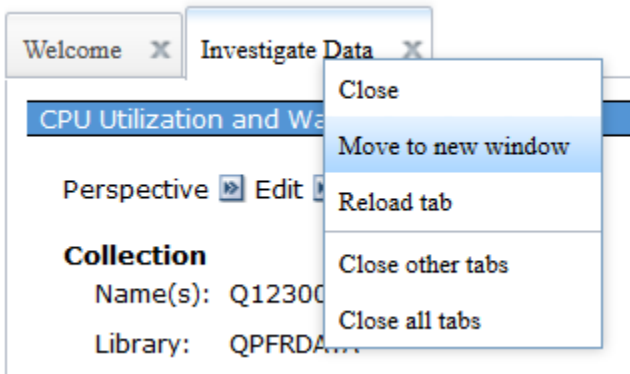
System Resources Health Indicators	Available Indicators		Selected Indicators	Current Threshold Values
CPU	[Empty]	Add >>	Average Disk Percent Busy	Warning <input type="text" value="20"/>
Disk		Remove <<	Average Disk Space Percent Used	Action <input type="text" value="30"/>
Memory Pools			Average Disk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

Define Health Indicators

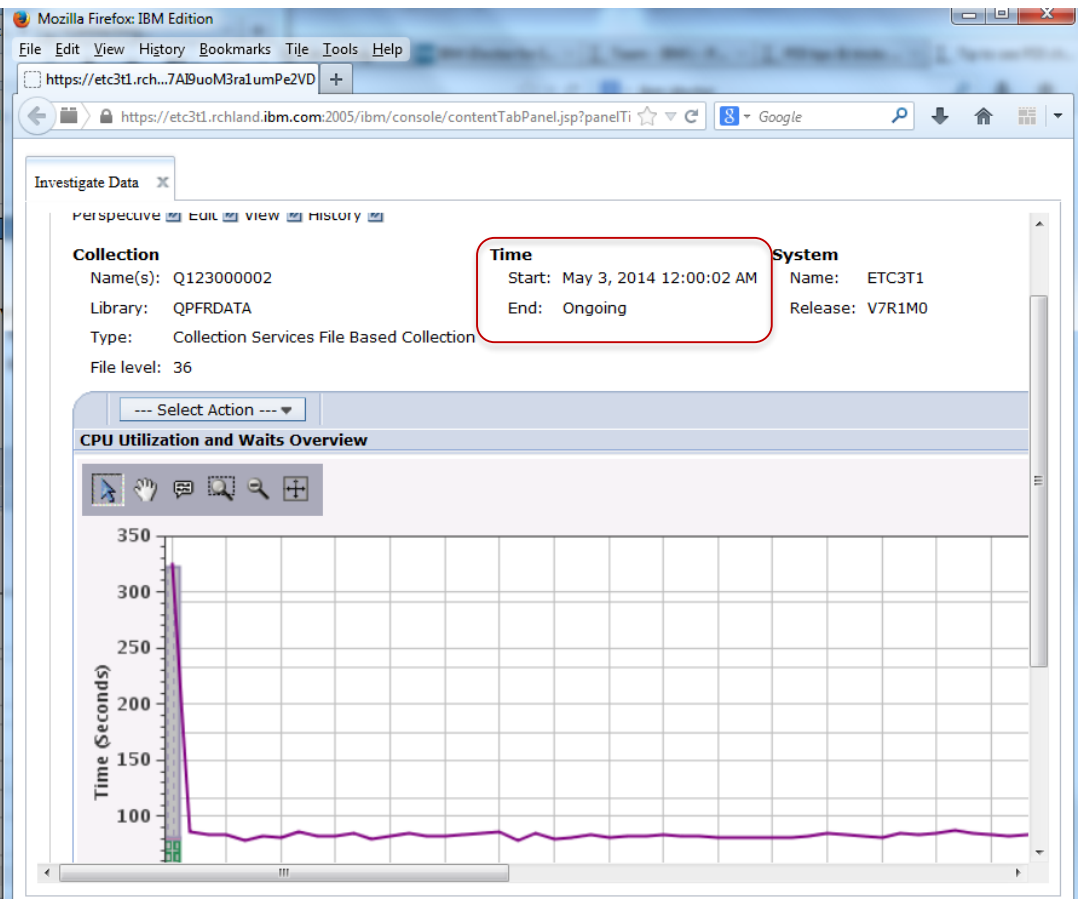
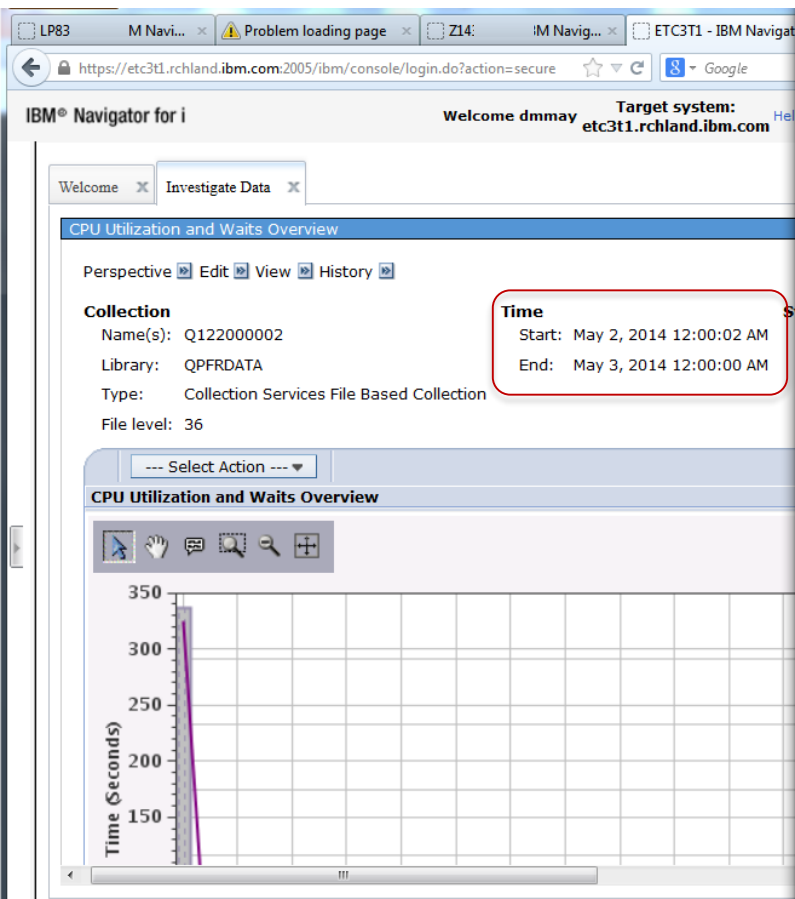
System Resources Health Indicators	Available Indicators		Selected Indicators	Current Threshold Values
CPU	[Empty]	Add >>	Page Faults Pending Per Second	Warning <input type="text" value="4000"/>
Disk		Remove <<	Page Faults Per Second	Action <input type="text" value="5000"/>
Memory Pools				
5250 OLTP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

Display Charts in Separate Window

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



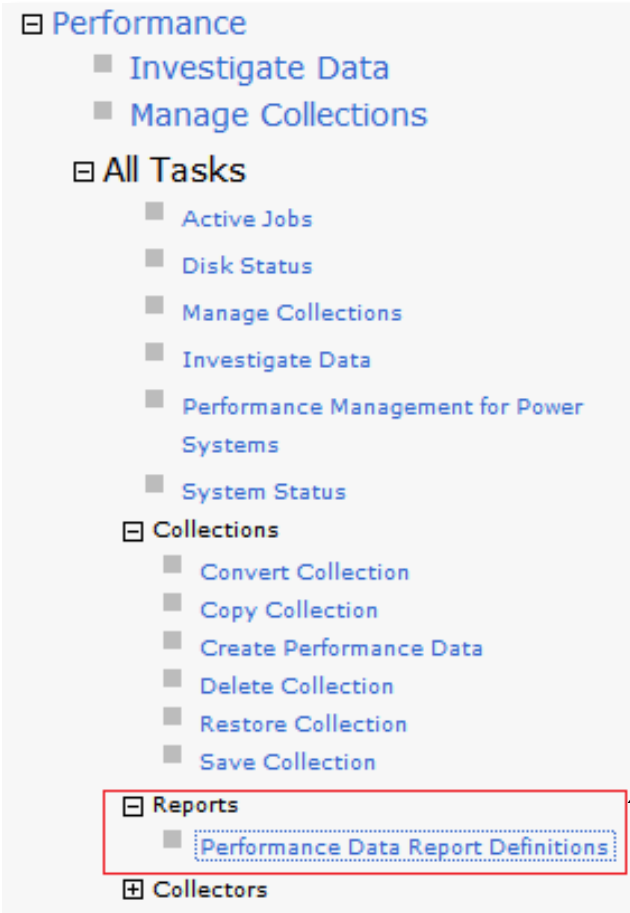
Two Different Charts from Two Different Days



Performance Data Reports

“Executive” Reports

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







Create Performance Data Report


Start here with Reports ->
Performance Data Report Definitions

Report Definitions

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




 Actions ▾



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

Create Performance Data Report

Report definition:

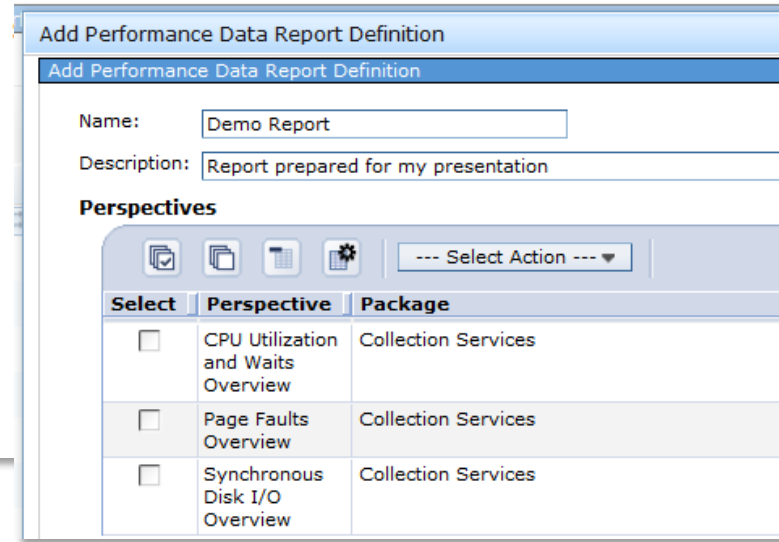
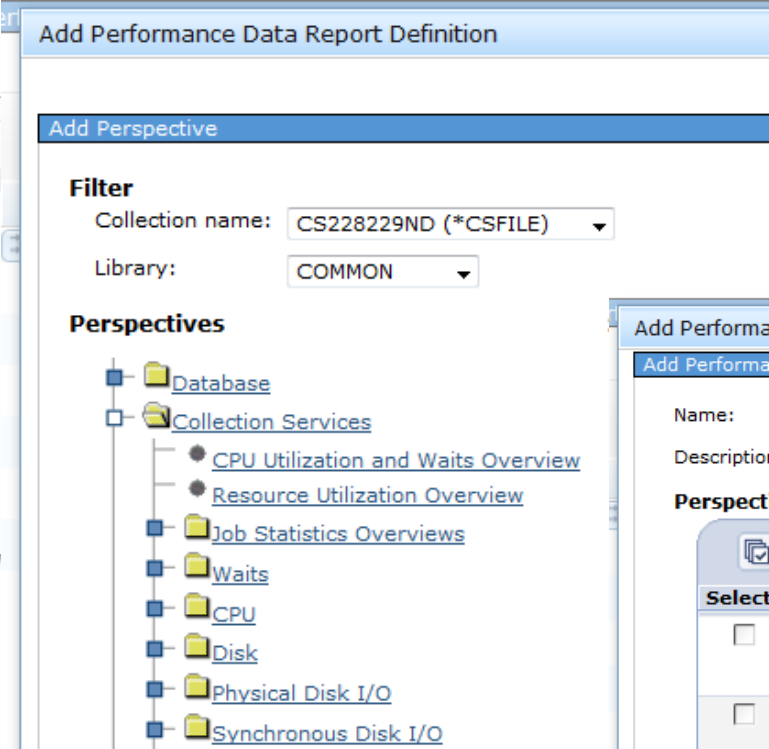
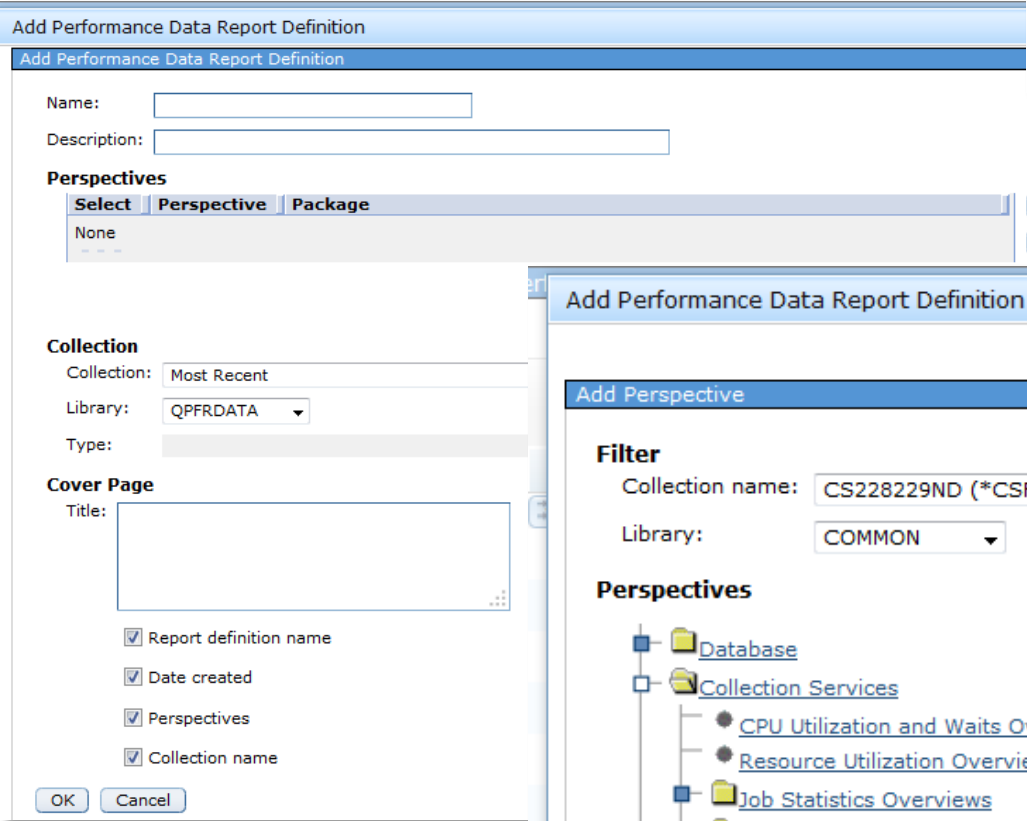
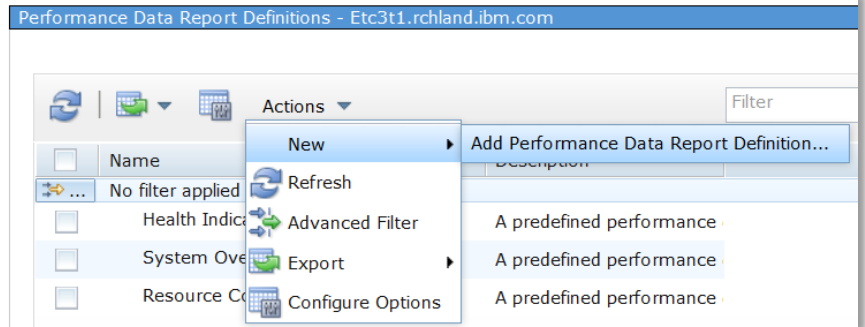
Output type:

Collection:

Library:




Type:

Create your own Report Definition



Create Performance Data Report

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




 Actions ▾

<input type="checkbox"/>	Name	Description
No filter applied		
<input type="checkbox"/>	Health Indicators	A predefined performance
<input checked="" type="checkbox"/>	System Overview	
<input type="checkbox"/>	Resource Consumption	

Create Performance Data Report...
 New based on...
 Delete...
 Properties...

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

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:

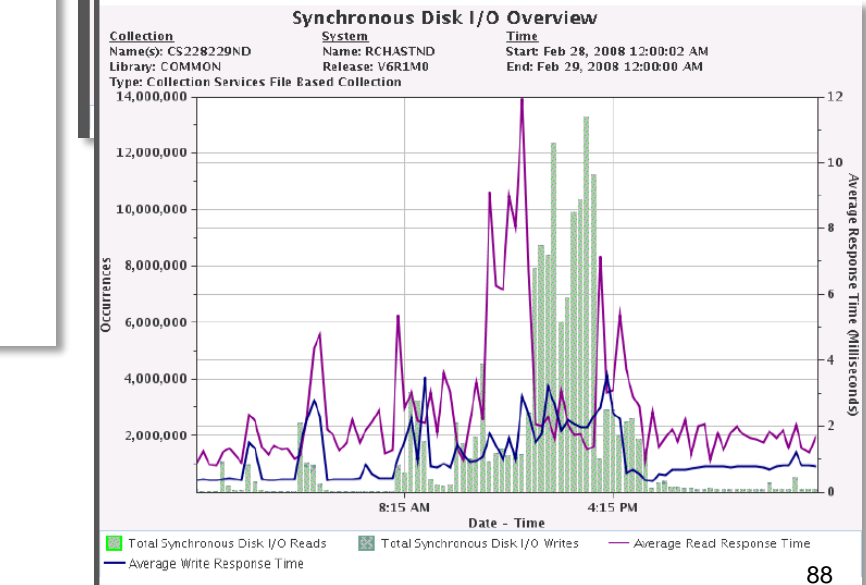
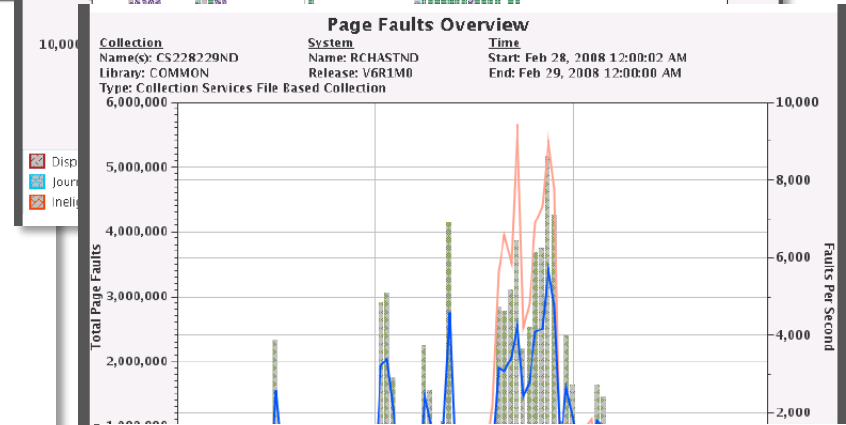
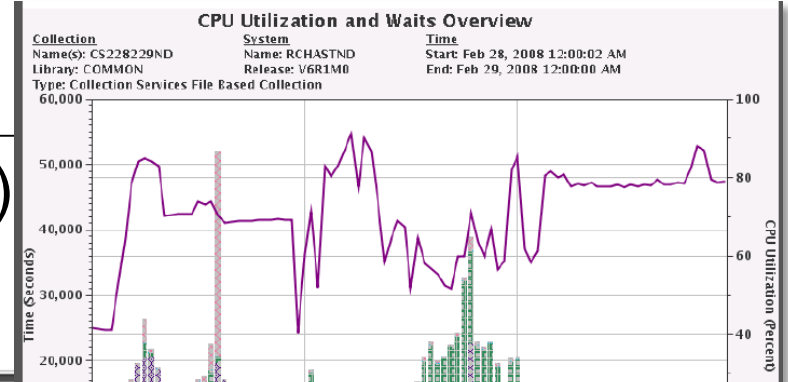
CPU Utilization and Waits Overview

Page Faults Overview

Synchronous Disk I/O Overview

Library/Collection used for report:

Common/Cs228229nd



Integration with Active Jobs

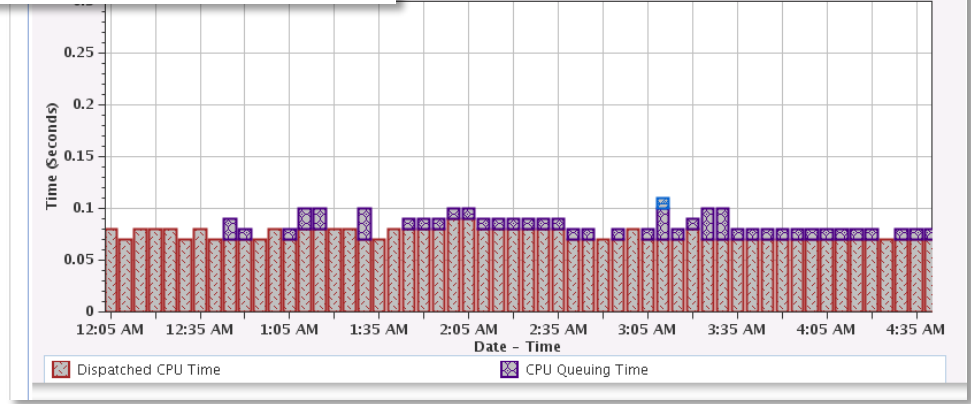
<input type="checkbox"/>	Qzdas01ML	Waiting for time interval	Qsecorr
<input checked="" type="checkbox"/>	Qzdas01ML	Waiting for time interval	Dmmay
<input type="checkbox"/>		Waiting for time interval	Dmmay
<input type="checkbox"/>		Waiting for time interval	Dmmay
<input type="checkbox"/>		Waiting for time interval	Qwqadmin
<input type="checkbox"/>		Waiting for time interval	Qwqadmin
<input type="checkbox"/>		Waiting for time interval	Qwqadmin
<input type="checkbox"/>		Waiting for time interval	Dmmay
<input type="checkbox"/>		Waiting for time interval	Dmmay

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

Active jobs – what’s happening *right now*

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

Job wait data – what happened *up to now*



Integration with System Status



System Status - €

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

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

System Resources Health Indicators

System Status - €

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

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

System Status - €

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

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

Disk Status

Storage System Values

Disk Health Indicators

System Status

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

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

CPU Health Indicators

Integration with Disk Status



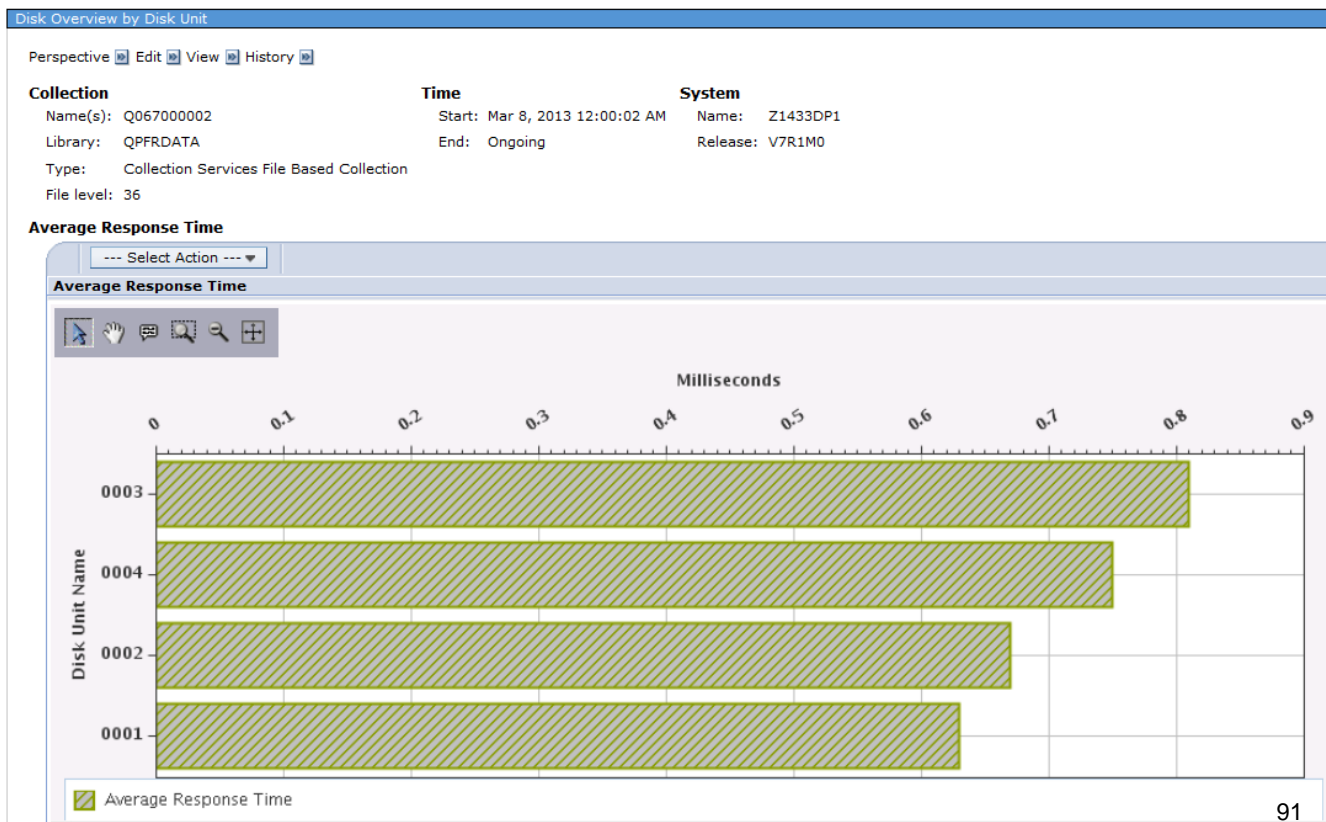
Disk Status - Z:

Refresh Elapsed time: 00:00:00

Actions

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

Unit	Size (MB)	% Used	% Busy
1	69.794	75.7	0



Set Target System

- [-] IBM i Management
 - [-] Target Systems and Groups
 - [-] Target Systems**
 - [+] System Groups

7.2 screen captures

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

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

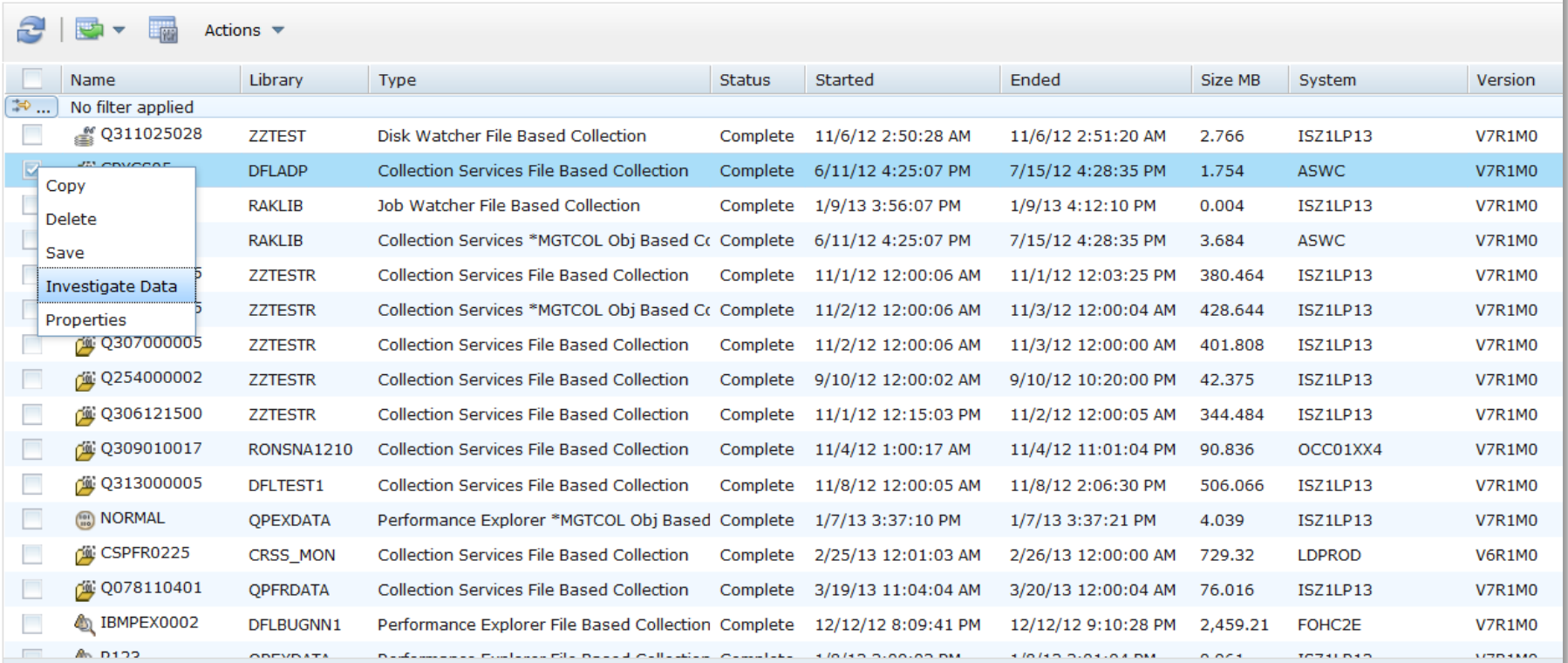
Not all features are available on all releases

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

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



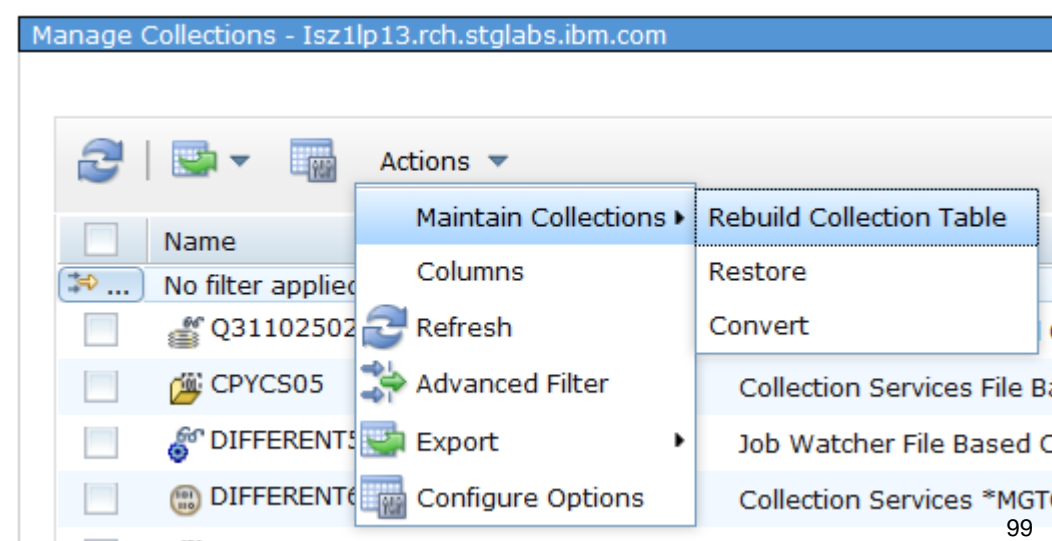
Name	Library	Type	Status	Started	Ended	Size MB	System	Version
Q311025028	ZZTEST	Disk Watcher File Based Collection	Complete	11/6/12 2:50:28 AM	11/6/12 2:51:20 AM	2.766	ISZ1LP13	V7R1M0
Q311025028	DFLADP	Collection Services File Based Collection	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	1.754	ASWC	V7R1M0
Q311025028	RAKLIB	Job Watcher File Based Collection	Complete	1/9/13 3:56:07 PM	1/9/13 4:12:10 PM	0.004	ISZ1LP13	V7R1M0
Q311025028	RAKLIB	Collection Services *MGTCOL Obj Based Cr	Complete	6/11/12 4:25:07 PM	7/15/12 4:28:35 PM	3.684	ASWC	V7R1M0
Q311025028	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:00:06 AM	11/1/12 12:03:25 PM	380.464	ISZ1LP13	V7R1M0
Q311025028	ZZTESTR	Collection Services *MGTCOL Obj Based Cr	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:04 AM	428.644	ISZ1LP13	V7R1M0
Q307000005	ZZTESTR	Collection Services File Based Collection	Complete	11/2/12 12:00:06 AM	11/3/12 12:00:00 AM	401.808	ISZ1LP13	V7R1M0
Q254000002	ZZTESTR	Collection Services File Based Collection	Complete	9/10/12 12:00:02 AM	9/10/12 10:20:00 PM	42.375	ISZ1LP13	V7R1M0
Q306121500	ZZTESTR	Collection Services File Based Collection	Complete	11/1/12 12:15:03 PM	11/2/12 12:00:05 AM	344.484	ISZ1LP13	V7R1M0
Q309010017	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	QPFRRDATA	Collection Services File Based Collection	Complete	3/19/13 11:04:04 AM	3/20/13 12:00:04 AM	76.016	ISZ1LP13	V7R1M0
IBMPEX0002	DFLBUGNN1	Performance Explorer File Based Collection	Complete	12/12/12 8:09:41 PM	12/12/12 9:10:28 PM	2,459.21	FOHC2E	V7R1M0
P122	QPEXDATA	Performance Explorer File Based Collection	Complete	1/6/13 3:00:02 PM	1/6/13 3:01:04 PM	0.061	ISZ1LP13	V7R1M0

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

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Manage Collections

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



Performance Data - Analysis

Performance Diagnostics with the Performance Data Investigator

Analyzing Performance Data Using PDI

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

Analyzing Performance Data Using PDI

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

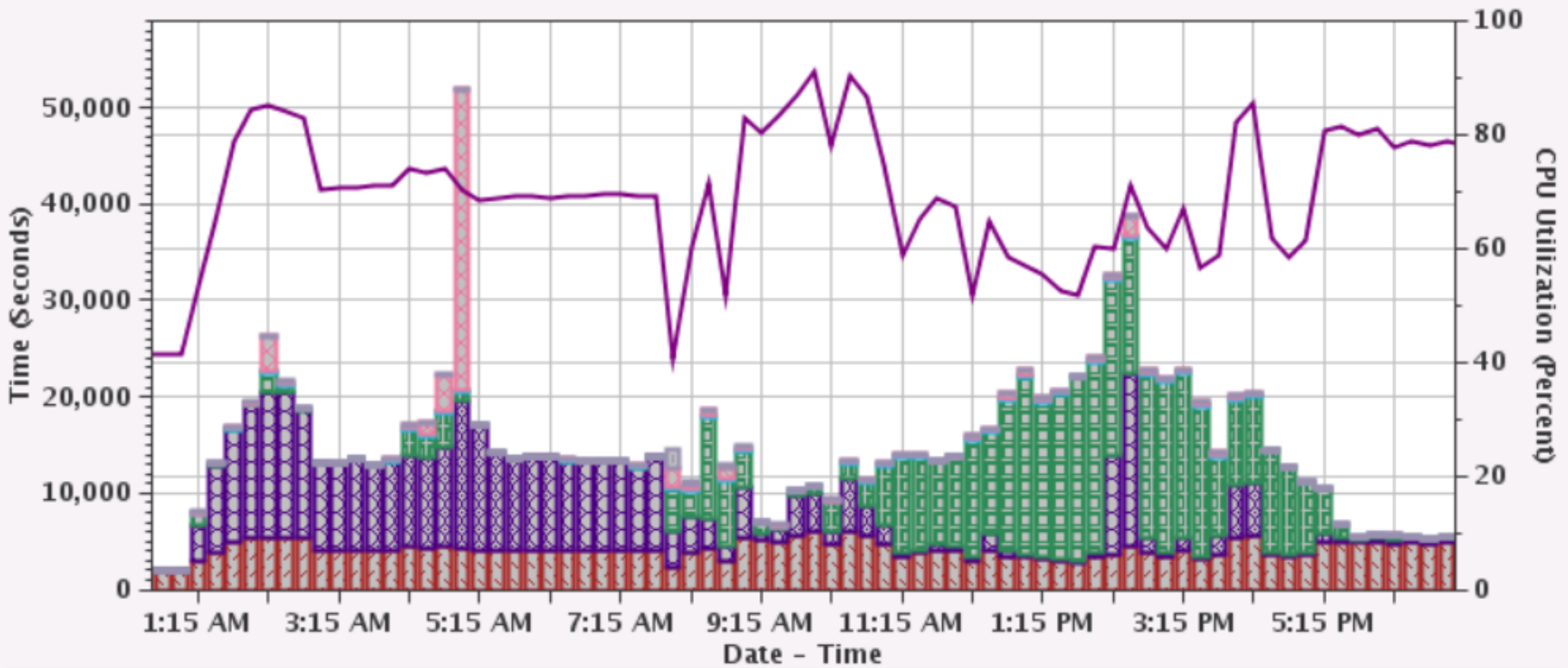
 - Have there been any recent changes?
 - New or changed workload?
 - Any application changes?
 - Any recent hardware configuration changes?








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

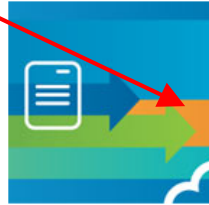
CPU Utilization and Waits Overview

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

CPU Utilization and Waits Overview



-  Dispatched CPU Time
-  CPU Queuing Time
-  Disk Time
-  Journaling Time
-  Operating System Contention Time
-  Lock Contention Time
-  Partition CPU Utilization



Leverage the latest enhancements
The IBM i operating system and related software products are frequently enhanced. Visit this wiki to learn more.

[Access technology updates](#)

IBM i Technology Updates - by IBM i product or subject matter

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



Performance Tools

Updated February 6, 2013 by ShaunaRollings | Tags: performance_tools

Page Actions

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

Performance Data Collectors

Collection Services, Disk Watcher, Job Watcher and Performance Explorer are the primary per IBM i. Other performance related tools include: Work with System Activity (WRKSYSACT), Durr and Analyze Command Performance (ANZCPDFR).

Performance on the Web

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

Performance Tools LPP (57xxPT1)

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

Additional IBM i Performance Tools Resources

Performance Tools GUI:

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

Getting Started:

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

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

PTFs:

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

Performance Task Enhancements (Release Date)	7.2 PTFs	7.1 PTFs - 5770SS1	6.1 PTFs	PTF Description	Notes
Spring 2014 (May 2014)	SF99713 level 3 or higher (includes but not limited to: <ul style="list-style-type: none"> • SI53522 • SI53521 • N/A) 7.2 GA Specifics	SF99368 level 29 or higher (includes but not limited to: <ul style="list-style-type: none"> • SI53389 • SI53383 • N/A) 	SF99115 level 40 (includes but not limited to: <ul style="list-style-type: none"> • SI53393 • SI53394 • SI53395) 	HTTP Group PTF (includes but not limited to: <ul style="list-style-type: none"> • Common PTF • Navigator for i • IBM i Navigator tasks on the Web PTF) 	The Navigator for i PTFs are shipped in the HTTP group, and it is recommended that you keep current on this PTF group.
Fall 2013 (Nov 2013)		SF99368 level 24 or higher (includes but not limited to: <ul style="list-style-type: none"> • SI53389 • SI53383 • N/A) 	SF99115 level 35 (includes but not limited to: <ul style="list-style-type: none"> • SI53393 • SI53394 • SI53395) 	HTTP Group PTF (includes but not limited to: <ul style="list-style-type: none"> • Common PTF • Navigator for i • IBM i Navigator tasks on the Web PTF) 	The Navigator for i PTFs are shipped in the HTTP group, and it is recommended that you keep current on this PTF group.



ithankyou

www.ibm.com/power/i

References

iDoctor versus Performance Data Investigator

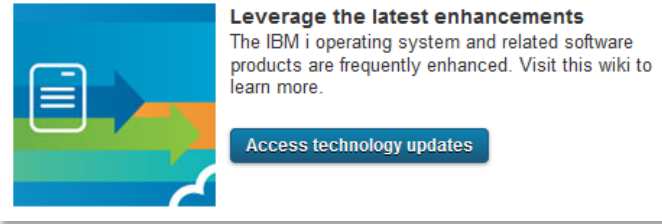
There are two graphical interfaces for performance data analysis...which should you use?

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

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

- Performance Tools

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



- Forum

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

- IBM i Performance Data Investigator

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

- IBM i Performance Data Investigator – Edit Perspectives

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

- IBM i Wait Accounting

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

- How to use the Batch Model performance tool

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



IBM i Performance FAQ – a MUST read!

http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=WH&infotype=SA&appname=STGE_PO_PO_USEN&htmlfid=POW03102USEN&attachment=POW03102USEN.PDF



IBM i on Power - Performance FAQ

May 29, 2014

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/health-indicators-in-the-performance-data-investig/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/ibm-i-storage-allocation-perspectives/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/ibm-i-performance-analysis/>

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

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/ibm-i-performance-frequently-asked-questions/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/commands-to-manage-performance-collections/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/performance-data-investigator/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/performance-data-collectors-in-ibm-i/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/performance-data-investigatorbetter-than-ever/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/job-performance-information/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/cpf1240-and-cpf1241-messages-contain-summary-perfo/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-find-all-my-performance-collections-in-one-p/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/lesser-known-features-of-work-with-system-activity/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/customizing-a-perspective-in-pdi/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/new-systems-director-navigator-service-packs/>

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<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-collect-more-performance-data-in-71/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-measure-disk-response-times/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-understand-scaled-cpu-time/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-use-power7-features-with-ibm-i-611/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-analyze-command-performance/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-tell-you-why-youre-waiting/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-display-cpu-utilization-for-all-partitions/>

<http://www.ibmssystemsmag.com/Blogs/i-Can/Archive/i-can-investigate-performance-data/>

IBM i Web Sites with Performance Information



~~IBM i Information Center~~ *** **Start using the Knowledge Center instead** ***

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



IBM Knowledge Center

- http://www-01.ibm.com/support/knowledgecenter/ssw_ibm_i_71/welcome.html
- http://www-01.ibm.com/support/knowledgecenter/ssw_ibm_i_72/rzahg/ic-homepage.htm



IBM i Performance Management

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

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

Performance Capabilities Reference

http://www-03.ibm.com/systems/resources/systems_power_software_i_perfmgmt_pcmr_jun2014.pdf

- Performance Management for Power Systems
<http://www-03.ibm.com/systems/power/support/pm/index.html>
- IBM Workload Estimator
<http://www.ibm.com/systems/support/tools/estimator>
- iDoctor
http://www-912.ibm.com/i_dir/idoctor.nsf
- Job Waits Whitepaper
[https://www-912.ibm.com/i_dir/idoctor.nsf/3B3C112F7FBE774C86256F4000757A8F/\\$FILE/Job_Waits_White_Paper_61_71.pdf](https://www-912.ibm.com/i_dir/idoctor.nsf/3B3C112F7FBE774C86256F4000757A8F/$FILE/Job_Waits_White_Paper_61_71.pdf)

Performance Management on IBM i Web Site

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

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

Performance management on IBM i

Overview

Tools

Performance Explorer

Resources

Find what you need

Performance Data Collectors

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

Performance Data Investigator (PDI)

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

iDoctor for IBM i

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

PM for Power Systems

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

Performance and Scalability Services

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

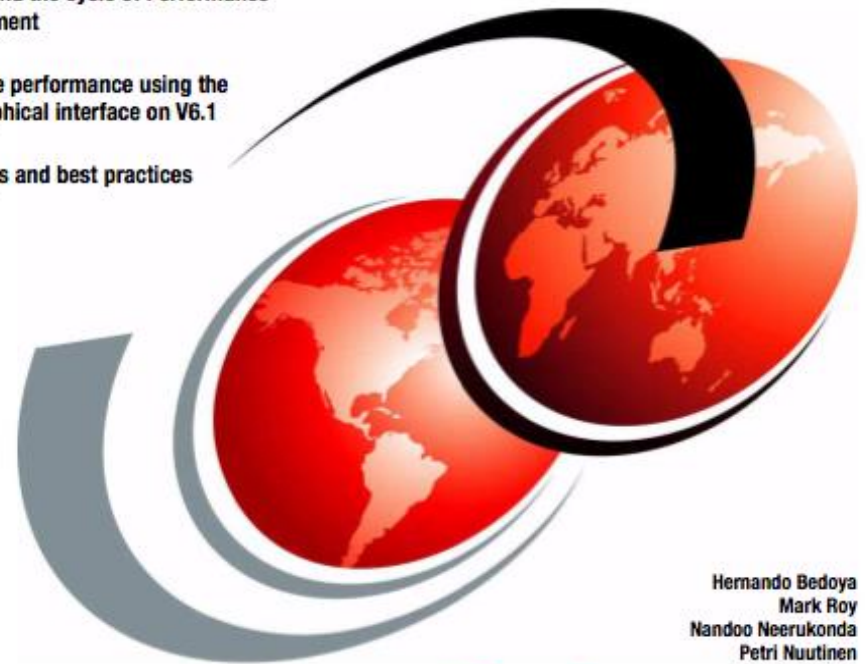
A **Red**books publication!

End to End Performance Management on IBM i

Understand the cycle of Performance Management

Maximize performance using the new graphical interface on V6.1

Learn tips and best practices



Hernando Bedoya
Mark Roy
Nandoo Neerukonda
Petri Nuutinen

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

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Redbooks

IBM i 7.1 Technical Overview with Technology Refresh Updates

Covers the 7.1 content through
Technology Refresh 7

Chapter 6 – Performance Tools

Chapter 17, Section 6 –
Performance in Navigator for i

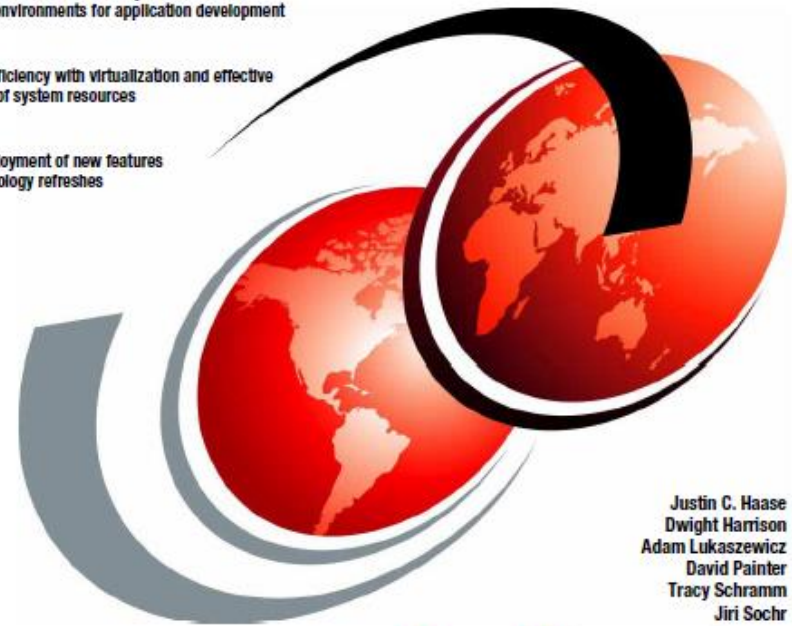
<http://www.redbooks.ibm.com/redpieces/abstracts/sg247858.html>

IBM i 7.1 Technical Overview with Technology Refresh Updates

Enriched database functionality and enhanced graphical environments for application development

Boosted efficiency with virtualization and effective utilization of system resources

Easier deployment of new features with technology refreshes



Justin C. Haase
Dwight Harrison
Adam Lukaszewicz
David Painter
Tracy Schramm
Jiri Sochr

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IBM i 7.2 Technical Overview Coming!

IBM Systems Lab Services

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

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

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- Learn more ibm.com/systems/services/labservices



IBM i Performance and Optimization Services

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

- Reducing batch processing times

- Resolving SQL query and native IO performance problems

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

- Removing bottlenecks, resolving intermittent issues

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

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

- Optimizing Solid State Drive (SSD) performance

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

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

Contact Eric Barsness at ericbar@us.ibm.com for more details.

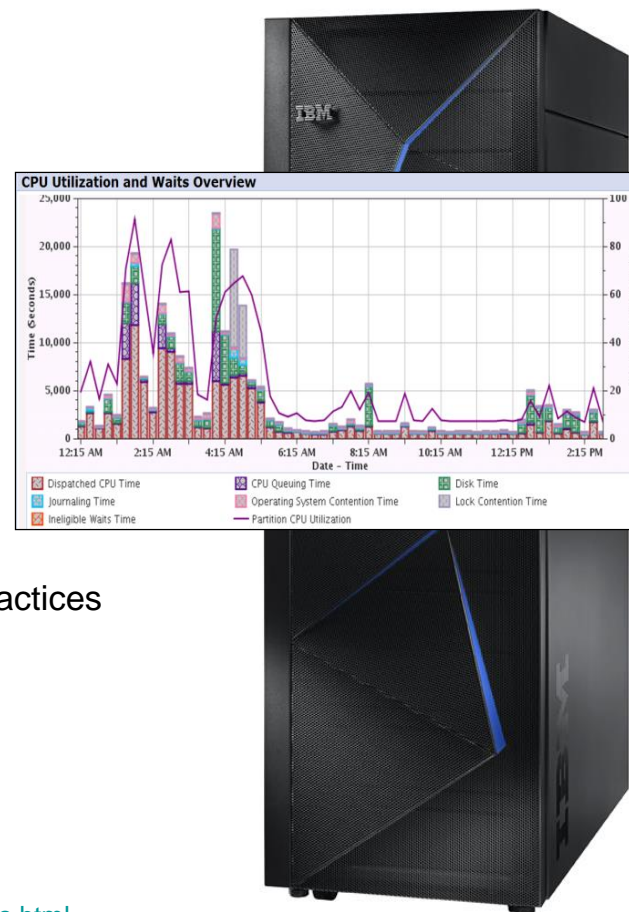
www.ibm.com/systems/services/labservices

IBM i Performance Analysis Workshop

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

Overview:

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



Workshop details:

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

Performance and Scalability Services

- The IBM i Performance and Scalability Services Center can provide facilities and hardware **IN ROCHESTER** to assist you in testing hardware or software changes
 - “Traditional” benchmarks
 - Release-to-release upgrades
 - Assess and tune application and database performance
 - Stress test your system
 - Determine impact of application changes
 - Proofs of Concept (e.g. HA alternatives; SSD analysis, external storage, etc.)
 - Evaluate application scalability
 - Capacity planning
- ... all with the availability of Lab Services IBM i experts and development personnel
- To request any of these services, submit at:
<http://www-03.ibm.com/systems/services/labservices/psscontact.html>

IBM i Solid State Drive Performance Services

Evaluate the benefits of SSD technologies with IBM i based applications

Features

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

Typical Benefits

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

Contact

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

Why IBM® Rochester?

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

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Redbooks and Redpapers on IBM i Performance Tools

- IBM i 7.1 Technical Overview with Technology Refresh Updates
<http://publib-b.boulder.ibm.com/abstracts/sg247858.html?Open>
- IBM Systems Director Navigator for IBM i (Chapter 9)
<http://www.redbooks.ibm.com/abstracts/sg247789.html?Open>
- IBM eServer iSeries Performance Management Tools
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/redp4026.html?Open>
- A Systems Management Guide to Performance Management for System i and System p servers
<http://www.redbooks.ibm.com/abstracts/sg247122.html?Open>
- Sizing IBM i5/OS Work on IBM System i5 Partitions
<http://www.redbooks.ibm.com/abstracts/sg246656.html?Open>
- Application and Program Performance Analysis Using PEX Statistics
<http://www.redbooks.ibm.com/abstracts/sg247457.html?Open>
- Managing OS/400 with Operations Navigator V5R1 Volume 5: Performance Management
<http://www.redbooks.ibm.com/abstracts/sg246565.html?Open>
- IBM iDoctor iSeries Job Watcher: Advanced Performance Tool (this is a bit outdated)
<http://www.redbooks.ibm.com/abstracts/sg246474.html?Open>
- Best Practices for Managing IBM i Jobs and Output (and a few other special tips)
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/redp4454.html?Open>
- i5/OS Diagnostic Tools for System Administrators: An A to Z Reference for Problem Determination
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg248253.html?Open>
- IBM eServer iSeries Systems Management Handbook
<http://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/redp4070.html?Open>

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<http://www.ibmssystemsmag.com/ibmi/november06/features/7129p1.aspx>

Articles on Job Watcher

- “Web Power”
<http://www.ibmssystemsmag.com/i5/november08/administrator/22431p1.aspx>
- Introduction to Job Watcher Green Screen Commands
<http://www.ibmssystemsmag.com/i5/november08/tipstechniques/22521p1.aspx>
- Top 10 Hidden iDoctor Gems
<http://www.ibmssystemsmag.com/ibmi/enewsletterexclusive/23868p1.aspx>
- Using iDoctor for iSeries Job Watcher to Determine Why Jobs Wait
<http://www.ibmssystemsmag.com/ibmi/october05/technicalcorner/8896p1.aspx>

Articles on Disk Performance

- A New Way to Look at Disk Performance
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- Analyzing Disk Watcher Data
<http://www.ibmssystemsmag.com/ibmi/tipstechniques/systemsmanagement/Analyzing-Disk-Watcher-Data/>
- Using Wait State Accounting to Determine Disk Performance
<http://iprodeveloper.com/systems-management/using-wait-state-accounting-determine-disk-performance>
- Understanding Disk Performance, Part 2: Disk Operation on i5/OS
<http://iprodeveloper.com/systems-management/understanding-disk-performance-part-2-disk-operation-i5os>
- Understanding Disk Performance Metrics
<http://iprodeveloper.com/systems-management/understanding-disk-performance-metrics>
- Planning for Solid State Drives
http://ibmsystemsmag.blogs.com/i_can/2012/01/planning-for-solid-state-drives.html
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- IBM Application Runtime Expert
<http://www-03.ibm.com/systems/power/software/i/are/index.html>
<http://www.ibm.com/developerworks/ibmi/library/i-applicationruntime/index.html>
- Uncovering Application Runtime Expert – IBM i 7.1
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