

Introduction to IBM i Performance Data Investigator (PDI) Tool

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July 2013



IBM i Performance Data Investigator Tool

A new tool for detailed IBM i performance analysis – similar to IBM i iDoctor and Job Watcher tools

Available as of IBM i 6.1 within IBM Director Navigator for i GUI

No installation required

Start automatically with IBM i HTTP TCP/IP server

Still a work in progress – enhancements delivered twice a year via a set of PTFs

IBM i Performance Data Investigator Tool

Work on IBM i performance database files (QAPM* files) generated from Management Central Collection Services object (*MGTCOL object)

Graph display area in the GUI is limited – using large screen 17” or larger with more screen resolution (1280 x 720 pixels or higher) yields better view of the graph

For good response time of PDI GUI, apply PTFs available in early 2013

Performance Data Investigator Tool PTF Information

Apply the latest PTF for Performance on the Web:

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

Google: “ibm i performance on web”

[IBM i Technology Updates - Performance on the web](https://www.ibm.com/.../home#.../IBM%20i%20Technology%20Updates...) 

<https://www.ibm.com/.../home#.../IBM%20i%20Technology%20Updates...>

Performance on the web. This page has not been liked. | Updated 6/24/13 4:19 PM by mmlitvin|Tags: collection_manager ;; pdi ;; performance_data_investigator ...

- IBM i Technology Updates
 - DB2 for i - Technology Updates
 - General IBM i operating system
 - Hardware and Firmware
 - Integration with BladeCenter and System x
 - Java on IBM i
 - Performance Tools
 - Performance Data Collectors
 - Performance on the web
 - Resources
 - Web Integration on i
 - Systems Director for IBM i
 - Navigator


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Performance on the web

 | Updated 6/25/13 by [mmlitvin](#) | Tags:

- [collection_manager](#),
- [pdi](#),
- [performance_data_investigator](#)

Page Actions ▾

Performance Tools GUI:

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

Getting Started:

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

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

PTFs:

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

Performance Task Enhancements	Release Date	7.1 PTFs - 5770SS1	6.1 PTFs	PTF Description
Spring 2013	June 2013	SF99368 level 20 or	SF99115 level 31	HTTP Group PTF

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PTFs:

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Performance Task Enhancements	Release Date	7.1 PTFs - 5770SS1	6.1 PTFs	PTF Description
Spring 2013	June 2013	SF99368 level 20 or higher (includes but not limited to: <ul style="list-style-type: none"> • SI49568 • SI49569 • N/A) 	SF99115 level 31 (includes but not limited to: <ul style="list-style-type: none"> • SI49570 • SI49571 • SI49572) 	HTTP Group PTF (includes but not limited to: <ul style="list-style-type: none"> • Common PTF • Navigator for i • IBM i Navigator for the Web PTF)
		SF99701 level 24 SF99572 level 13	SF99601 level 29 SF99562	Database Group PTF Java group PTF
Winter 2013 Infrastructure and component internal fixes	Feb 2013	SF99368 level 17 or higher (includes but not limited to: <ul style="list-style-type: none"> • SI49028 • SI49029 • N/A) 	SF99115 level 29 (includes but not limited to: <ul style="list-style-type: none"> • SI49030 • SI49031 • SI49032) 	HTTP Group PTF (includes but not limited to: <ul style="list-style-type: none"> • Common PTF • Navigator for i • IBM i Navigator for the Web PTF)

Using IBM i Performance Data Investigator Tool

Authority for an IBM i User Profile to use PDI Tool

If an IBM i user profile does not have *ALLOBJ special authority, that user profile needs to be added with *USE authority into QPMCCDATA and QPMCCFCN authorization lists

```
ADDAUTLE AUTL(QPMCCDATA) USER(<usrprf>) AUT(*USE)
ADDAUTLE AUTL(QPMCCFCN) USER(<usrprf>) AUT(*USE)
```

For the use of Design Mode to create new custom perspectives, *ALLOBJ is needed for that user profile. This may be refined in the future to eliminate the need for *ALLOBJ.

Accessing with a browser : <http://<Server host name or IP address>:2001>



Specify port number 2001 to log on to Navigator for i

IBM. Navigator for i

User ID:
sitthl

Password:
●●●●●●

Log in

New sign-on screen

Sign on to Navigator for i tool, expand “IBM i Management” and “Performance” in the left panel and then click “Investigate Data” to proceed

IBM Systems Director Navigator for i5/OS®

Welcome sitthl Target system: Help | Logout

Welcome

IBM i Management

- Set Target System
- System
- Basic Operations
- Work Management
- Configuration and Service
- Network
- Integrated Server Administration
- Security
- Users and Groups
- Database
- Journal Management
- Performance
 - Investigate Data
 - Manage Collections
- All Tasks
- File Systems
 - Internet Configurations
 - Backup, Recovery and Media Services

Settings

Welcome to the IBM Navigator for i [About Console](#)

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.

Expand IBM i Management in the left-hand navigation area to get started.

To see the previous version of the 2001 port tasks and where they are located now, click below.

[IBM i Tasks Page](#)

New menu structure slightly different from the old one

Select time period to display the performance data

The screenshot shows the IBM Systems Director Navigator interface. On the left is a navigation tree with categories like 'IBM i Management', 'Performance', and 'Settings'. The main area displays the 'Performance Data Investigator' window. This window has two tabs: 'Perspectives' and 'Selection'. Under 'Perspectives', there is a tree view showing folders like 'Performance Explorer', 'Disk Watcher', 'Job Watcher', 'Collection Services', 'Health Indicators', and 'Database'. Under 'Collection', there is a table with columns for 'Collection Library' and 'Collection'. The 'Collection Library' dropdown is set to 'QPFRDATA'. The table lists various collection entries with their IDs and timestamps. A red dashed box highlights the 'Most Recent' entry, and a red text box with the instruction 'Select a *CSFILE entry or Most Recent' is overlaid on the table.

Collection Library	Collection	Timestamp
QPFRDATA	Most Recent	
	Q200200248 (*CSMGTCOL)	Jul 19, 2013 8:02:49 PM
	Q200210027 (*CSMGTCOL)	Jul 19, 2013 10:00:27 PM
	Q200222259 (*CSMGTCOL)	Jul 19, 2013 11:22:59 PM
	Q200222910 (*CSMGTCOL)	Jul 19, 2013 11:29:10 PM
	Q201000002 (*CSMGTCOL)	Jul 20, 2013 1:00:02 AM
	Q201015939 (*CSMGTCOL)	Jul 20, 2013 2:59:39 AM
	Q201070002 (*CSMGTCOL)	Jul 20, 2013 7:00:02 AM
	Q201184115 (*CSFILE)	Jul 20, 2013 6:41:15 PM
	Q201184115 (*CSMGTCOL)	Jul 20, 2013 6:41:15 PM
	Q201190010 (*CSMGTCOL)	Jul 20, 2013 7:00:10 PM
	Q201200047 (*CSMGTCOL)	Jul 20, 2013 8:00:47 PM
	Q202070002 (*CSFILE)	Jul 21, 2013 7:00:02 AM
	Q202070002 (*CSMGTCOL)	Jul 21, 2013 7:00:02 AM
	Q203070002 (*CSFILE)	Jul 22, 2013 7:00:02 AM
	Q203070002 (*CSMGTCOL)	Jul 22, 2013 7:00:02 AM
	Q203105202 (*CSFILE)	Jul 22, 2013 10:52:02 AM
	Q203105202 (*CSMGTCOL)	Jul 22, 2013 10:52:02 AM
	Q203153157 (*CSMGTCOL)	Jul 22, 2013 3:31:57 PM
	Q203185218 (*CSFILE)	Jul 22, 2013 6:52:18 PM

Setup Options:

The screenshot shows the IBM Systems Director Navigator for i5/OS interface. The main window is titled "Investigate Data - Performance Data Investigator". It features a tree view under "Perspectives" with the following items: Performance Explorer, Disk Watcher, Job Watcher, Collection Services, Health Indicators, and Database. Below this is a "Collection" section with two dropdown menus: "Collection Library" set to "QPFRRDATA" and "Collection Name" set to "Most Recent". At the bottom of the window are five buttons: "Display", "Search", "Options", "Refresh Perspectives", and "Close". A yellow arrow points to the "Options" button.

Setup Options:

The screenshot shows the IBM Systems Director Navigator for i5/OS interface. The main window is titled "Investigate Data" and displays the "Options" section. The "Options" section includes the following settings:

- 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.
- Set Table Size: Rows: Columns: Specify the number of visible rows and columns shown for tables.

The "Default library" section includes the following options:

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

At the bottom of the dialog box, there are "OK" and "Cancel" buttons. A yellow arrow points to the "OK" button, and a green text overlay reads "Click OK when done here".

View: All tasks

- Welcome
- My Startup Pages
- IBM i Management
 - Set Target System
 - System
 - Basic Operations
 - Work Management
 - Configuration and Service
 - Network
 - Integrated Server Administration
 - Security
 - Users and Groups
 - Databases
 - Journal Management
 - Performance
 - File Systems
 - Internet Configurations
 - Backup, Recovery and Media Services

Settings

Click here to close the left panel

Performance(1) X Investigate... X

--- Select Action ---

Perspectives

Selection

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Physical Disk I/O
 - Synchronous Disk I/O
 - Page Faults
 - Logical Database I/O
 - Virtual I/O
 - Communications
 - 5250 Display Transactions
 - Physical System
 - Collection Services Database Files

Name

Health Indicators

Description

Chart views for several performance general health indicators.

Default Perspective

System Resources Health Indicators

Expand a "folder" (or "package") to work with various performance matrices

Collection

Collection Library: QPFRDATA
Collection Name: Q029070008 (*CSFILE)

Display Search Options Close



Performance(1) X

Investigate... X

--- Select Action ---

- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Disk Overview for System Disk Pool
 - Disk Throughput Overview for Disk Pools
 - Disk Overview by IOP Name
 - Disk Overview by Adapter Name
 - Disk Overview by Disk Pool
 - Disk Overview by Disk Unit
 - Disk Overview by Disk Path
 - Disk Details by IOP Name
 - Disk Details by Adapter Name
 - Disk Details by Disk Pool
 - Disk Details by Disk Unit
 - Disk Details by Disk Path
 - Disk Overview for IOPs
 - Disk Overview for Adapters
 - Disk Overview for Disk Pools
 - Disk Overview for Disk Units
 - Disk Overview for Disk Paths
 - Disk Details for IOPs
 - Disk Details for Adapters
 - Disk Details for Disk Pools
 - Disk Details for Disk Units
 - Disk Details for Disk Paths

Charts that show average response time, average service time, average wait time, and percent disk busy. Detail views show tables with detailed disk statistics.

Default Perspective

[Disk Overview for System Disk Pool](#)

Overview = Graph

Details are mostly displayed as table data



--- Select Action ---

- 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
 - Basic Views
 - Physical Disk I/O Overview - Basic**
 - Physical Disk I/O by Job or Task - Basic
 - Physical Disk I/O by Thread or Task - Basic
 - Physical Disk I/O by Generic Job or Task - Basic
 - Physical Disk I/O by Job User Profile - Basic
 - Physical Disk I/O by Job Current User Profile - Basic
 - Physical Disk I/O by Subsystem - Basic
 - Physical Disk I/O by Server Type - Basic
 - Detailed Views
 - Advanced Views
 - Synchronous Disk I/O
 - Page Faults

This chart shows the breakdown of physical disk I/O requests by read and write rates per second over time. Use this chart to select a time frame for further detailed investigation.

Help text explaining the selected menu item automatically appears



- Performance Explorer
- Disk Watcher
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Physical Disk I/O
 - Synchronous Disk I/O
 - Page Faults
 - Logical Database I/O
 - Virtual I/O
 - Communications
 - 5250 Display Transactions
 - Physical System
 - Collecto
- Health Indica

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.

When there are 5 data members or less in the performance database files (QAPM*), PDI allows you to display "All" performance data in one graph.

Most Recent

All

Q203070003 (*CSFILE) - Jul 22, 2013 7:00:03 AM

Q204070003 (*CSFILE) - Jul 23, 2013 7:00:03 AM

Q205070003 (*CSFILE) - Jul 24, 2013 7:00:03 AM

Q206070003 (*CSFILE) - Jul 25, 2013 7:00:03 AM

Q207070003 (*CSFILE) - Jul 26, 2013 7:00:04 AM

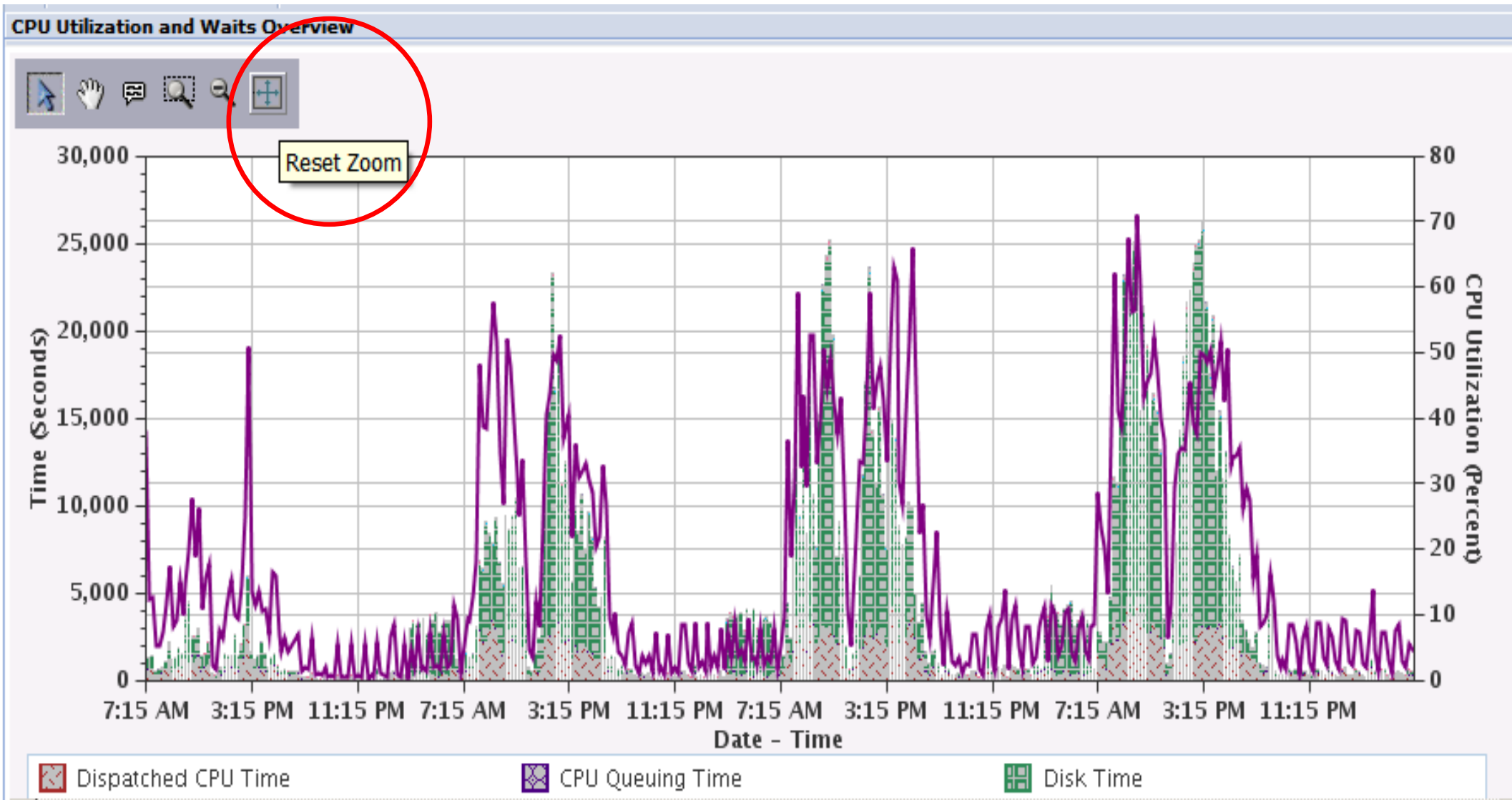
Most Recent

Collection

Collection Library

QMPGDATA

- Display Search Options Close



- A graph of 4-day performance data - must click “Reset Zoom”
- Can generally take longer time to build a graph than working on one performance data member at a time

Perspectives

Selection

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

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.

When there are more than 5 performance data members, the "All" option disappears. You can display only one data member per graph

Collection

Collection Library

QMPGDATA

- Most Recent
- Q202070003 (*CSFILE) - Jul 21, 2013 7:00:03 AM
- Q203070003 (*CSFILE) - Jul 22, 2013 7:00:03 AM
- Q204070003 (*CSFILE) - Jul 23, 2013 7:00:03 AM
- Q205070003 (*CSFILE) - Jul 24, 2013 7:00:03 AM
- Q206070003 (*CSFILE) - Jul 25, 2013 7:00:03 AM
- Q207070003 (*CSFILE) - Jul 26, 2013 7:00:04 AM

Most Recent

Create performance DB member for PDI to work with

The screenshot displays the IBM Systems Director Navigator for i5/OS interface. The top navigation bar includes the user name 'Welcome sitthl', the target system '172.23.136.87', and links for 'Help' and 'Logout'. The left sidebar shows a tree view of system management functions, with 'Performance' expanded to show 'Investigate Data' and 'Manage Collections'. The main content area shows a dialog box titled 'Performance - 172.23.136.87' with the following text:

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.

A yellow arrow points to the 'Manage Collections' link. A 'Close' button is located at the bottom of the dialog box.

Click Manage Collection function

Create performance DB member for PDI to work with

- Adjust the column width for a proper view
- Right-click an *MGTCOL object from which you want to create IBM i performance DB member
- Select Create Data. Can select only one at a time.

Manage Collections - 172.23.136.87

Name	Library	Type	Status	Started	Ended	Size MB	Syst
No filter applied							
Q201000002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/20/13 1:00:02 AM	7/20/13 2:59:39 AM	21.723	BO
Q201184115	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/20/13 6:41:15 PM	7/21/13 7:00:02 AM	92.973	BO
Q201015939	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/20/13 2:59:39 AM	7/20/13 8:00:10 PM	20.473	BO
Q201184115	QPFRDATA	Collection Services File Based Collection	Complete	7/20/13 6:41:15 PM	7/21/13 7:00:02 AM	127.945	BO
Q201190010	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/20/13 7:00:10 PM	7/20/13 8:00:47 PM	3.434	BO
Q201200047	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/20/13 8:00:47 PM	7/20/13 8:00:59 PM	3.434	BO
Q200200248	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/19/13 8:02:49 PM	7/20/13 7:00:02 AM	73.16	BO
Q202070002	QPFRDATA	Collection Services File Based Collection	Complete	7/21/13 7:00:02 AM	7/22/13 7:00:00 AM	229.285	BO
Q203070002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Inactive	7/22/13 7:00:02 AM		3.445	BO
Q203070002	QPFRDATA	Collection Services File Based Collection	Complete	7/22/13 7:00:02 AM	7/22/13 10:41:28 AM	42.285	BO
Q203105202	QPFRDATA	Collection Services *MGTCOL Obj Based C	Inactive	7/22/13 10:52:02 AM		1.434	BO

1 - 46 of 46 items 5 | 10 | 25 | 50 | **100** | All

Create performance DB member for PDI to work with

Create Performance Data

From:
 Management collection: Q201200047
 Library: QPFRDATA

Member to create:
 *Name: From MGTCOL
 *Library: From MGTCOL

Data to include:
 All data
 Customize

Category
IBM HTTP Server (powered by Apache)
Domino
System Bus
Storage Pool
Storage Pool Tuning
Hardware Configuration
Subsystem
System CPU
System-level Data
Job MI

Range of data:
 All data
 Customize
 From: 7/20/2013 8:00:47 PM Example: 12:30:00 PM
 To: 7/20/2013 8:00:59 PM Example: 12:30:00 PM

Sampling interval:
 Default
 Customize
 15 seconds
 1 minutes

- Specify performance DB member name and its library
- Adjust Range of Data and Sampling Interval as you need
- Click OK to create performance DB member

Delete performance DB member

- Select more than one “File Based Collection” by pressing Ctrl key while clicking the line items
- Right-click and select Delete
- You can also delete *MGTCOL objects.

Manage Collections - 172.23.136.87

Actions

	Name	Library	Type	Status	Started	Ended	Size MB	Syst
	No filter applied							
<input type="checkbox"/>	Q207070002	QPFRDATA	Collection Services File Based Collection	Complete	7/26/13 7:00:02 AM	7/27/13 7:00:00 AM	294.097	AS
<input type="checkbox"/>	Q208070002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/27/13 7:00:02 AM	7/28/13 7:00:02 AM	208.847	AS
<input checked="" type="checkbox"/>	Q208070002	QPFRDATA	Collection Services File Based Collection	Complete	7/27/13 7:00:02 AM	7/28/13 7:00:00 AM	294.097	AS
<input type="checkbox"/>	Q209070002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/28/13 7:00:02 AM	7/29/13 7:00:02 AM	208.847	AS
<input checked="" type="checkbox"/>	Q209070002	QPFRDATA	Collection Services File Based Collection	Complete	7/28/13 7:00:02 AM	7/29/13 7:00:00 AM	294.097	AS
<input type="checkbox"/>	Q210070002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/29/13 7:00:02 AM	7/29/13 6:30:54 PM	117.472	AS
<input checked="" type="checkbox"/>	Q210070002	QPFRDATA	Collection Services File Based Collection	Complete	7/29/13 7:00:02 AM	7/29/13 6:30:54 PM	160.867	AS
<input type="checkbox"/>	Q210183054	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/29/13 6:30:55 PM	7/30/13 7:00:02 AM	124.472	AS
<input checked="" type="checkbox"/>	Q210183054	QPFRDATA	Collection Services File Based Collection	Complete	7/29/13 6:30:55 PM	7/30/13 7:00:02 AM	171.515	AS
<input type="checkbox"/>	Q211070002	QPFRDATA	Collection Services *MGTCOL Obj Based C	Complete	7/29/13 7:00:02 AM		19.582	AS
<input type="checkbox"/>	Q211070002	QPFRDATA	Collection Services File Based Collection	Complete	7/29/13 7:00:02 AM		3.523	AS

1 - 46 of 46 items 5 | 10 | 25 | 50 | 100

Investigate Data
Properties

Delete performance DB member

Delete Collection

Delete Collection

Collection name:

Library:

Collection type:

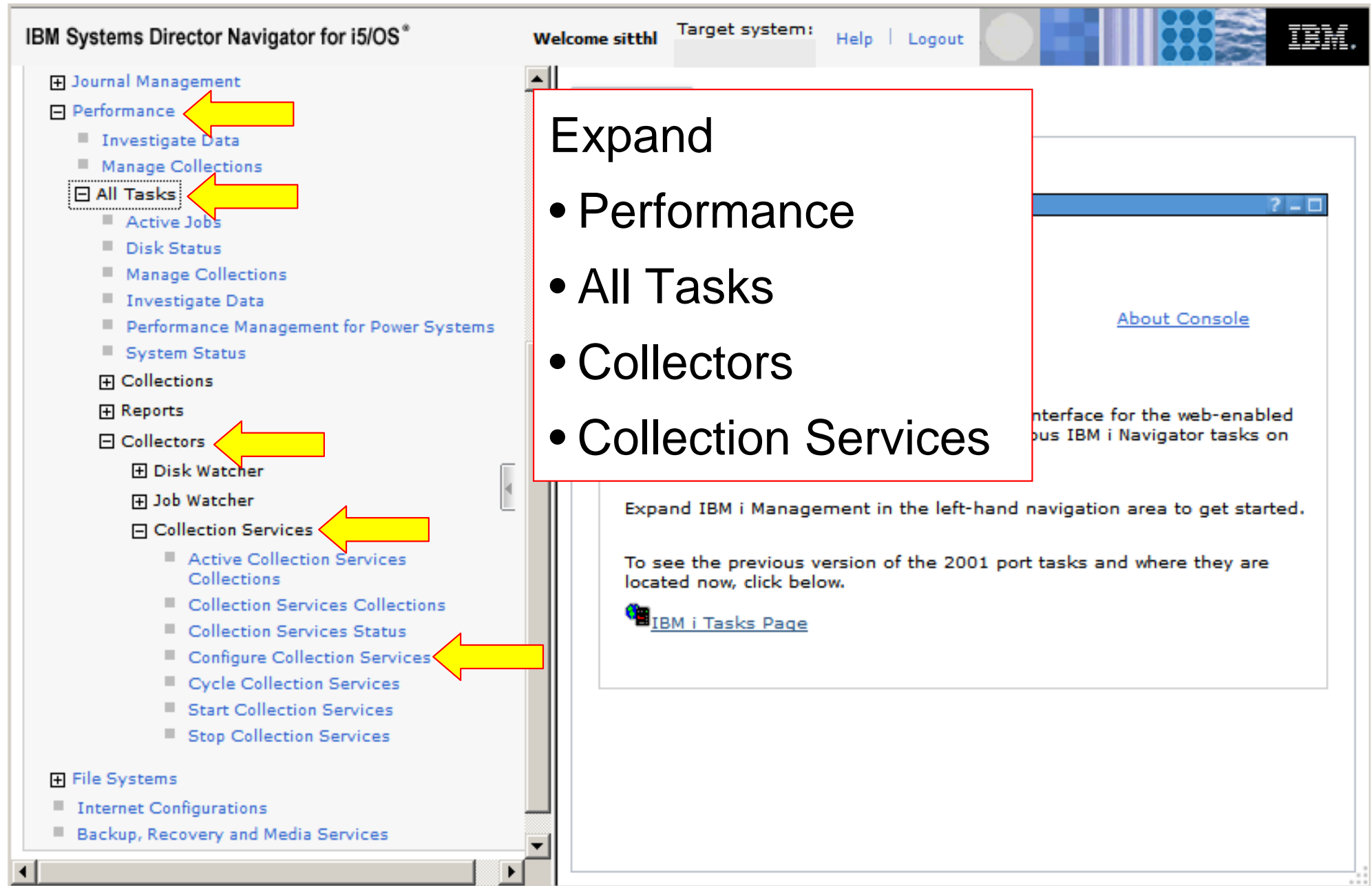
Collections to delete:

Select	Collection Name	Library	Type
<input checked="" type="checkbox"/>	Q208070002	QPFRDATA	Colle
<input checked="" type="checkbox"/>	Q209070002	QPFRDATA	Colle
<input checked="" type="checkbox"/>	Q210070002	QPFRDATA	Colle
<input checked="" type="checkbox"/>	Q210183054	QPFRDATA	Colle

Page 1 of 1 | Rows

Click OK to delete

Configure IBM i Collection Services



IBM Systems Director Navigator for i5/OS®

Welcome sitthl Target system: Help | Logout

- Journal Management
- Performance ←
- Investigate Data
- Manage Collections
- All Tasks ←
- Active Jobs
- Disk Status
- Manage Collections
- Investigate Data
- Performance Management for Power Systems
- System Status
- Collections
- Reports
- 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
- File Systems
- Internet Configurations
- Backup, Recovery and Media Services

Expand

- Performance
- All Tasks
- Collectors
- Collection Services

About Console

interface for the web-enabled
ous IBM i Navigator tasks on

Expand IBM i Management in the left-hand navigation area to get started.

To see the previous version of the 2001 port tasks and where they are located now, click below.

[IBM i Tasks Page](#)

Configure IBM i Collection Services

IBM Systems Director Navigator for i5/OS®

Welcome sithl Target system: 172 23 136 87 Help | Logout

Welcome x Configure Collection Services x

Configure Collection Services

General

Library: QPFRDATA

Default collection interval: 15 seconds 5 minutes

Cycling

Cycle every day at: 7:00 AM Example: 12:30 PM

Cycle every: 24 hours

System options

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

OK Cancel

Configure IBM i Collection Services

IBM Systems Director Navigator for i5/OS®

Welcome sitthl Target system: 172 23 136 87 Help | Logout

Welcome x Configure Collection Services x

Configure Collection Services

General

Data to Collect

Data Retention

Collection object
Save data for: 21 days Make permanent

Standard data
Save data for: 20 days Make permanent

OK Cancel

Samples of Useful Performance Perspectives

Action Steps to See a Performance Graph

1. Expand the perspective group of your interest (Under “Collection Service” perspective)
2. Click to highlight the performance matrix item of your interest
3. Scroll down and select Collection Library that contain the performance data (QPFRDATA by default)
4. Then select the time period (Collection Name field – default value is “Most Recent”)
5. Click Display button to see the graph

Welcome X Investigate Data X

time for the selected collections. Use time frame for further detailed invest

Locked

New Folder... New Perspective...

Edit Advanced Edit Delete

Move Up Move Down

Collection

Collection Library Collection Name

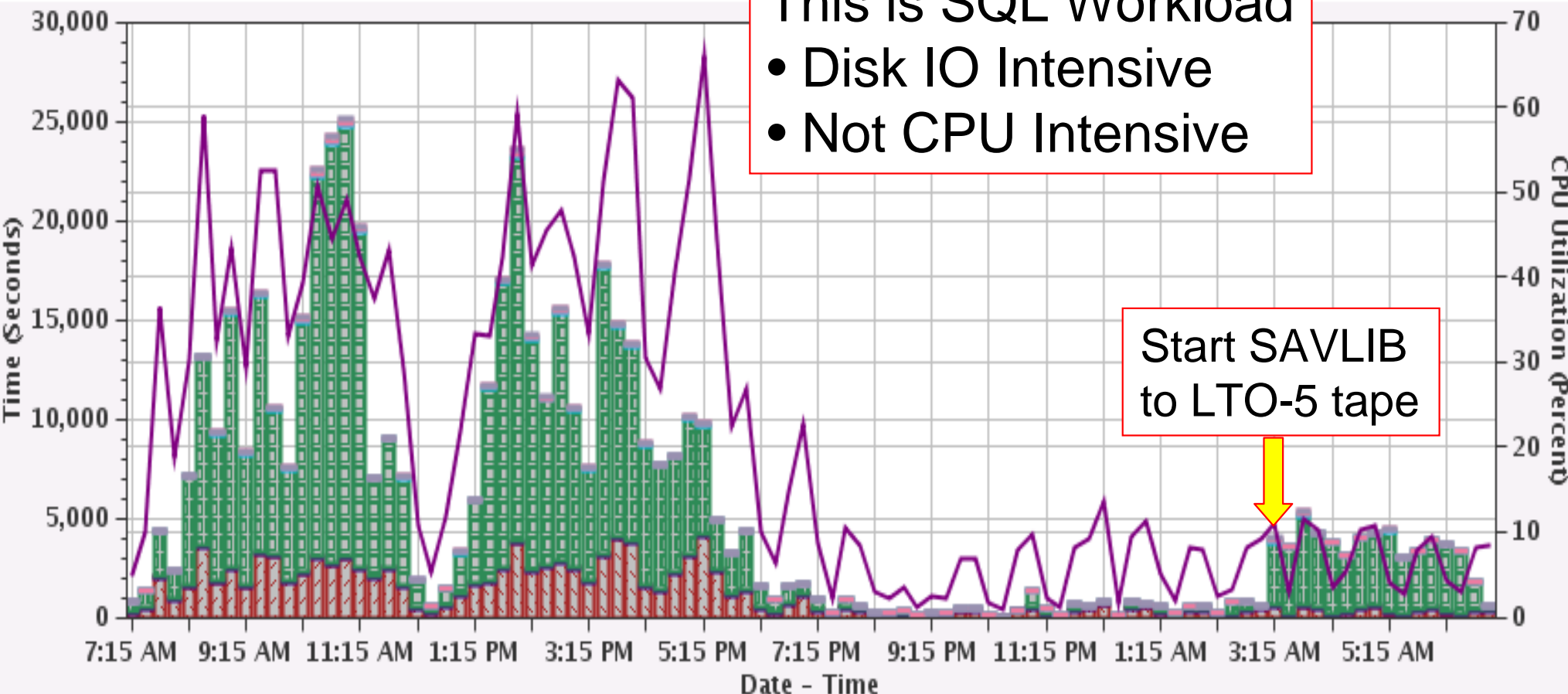
QPFRRDATA Q206070003 (*CSFILE) - Jul 25, 2013 7:00:03 AM

Display Search Options Refresh Perspectives Close

Sample 1

Collection	Time	System
Name(s): Q206070003	Start: Jul 25, 2013 7:00:03 AM	Name: AS4PRO
Library: QMPGDATA	End: Jul 26, 2013 7:00:03 AM	Release: V6R1M0
Type: Collection Services File Based Collection		

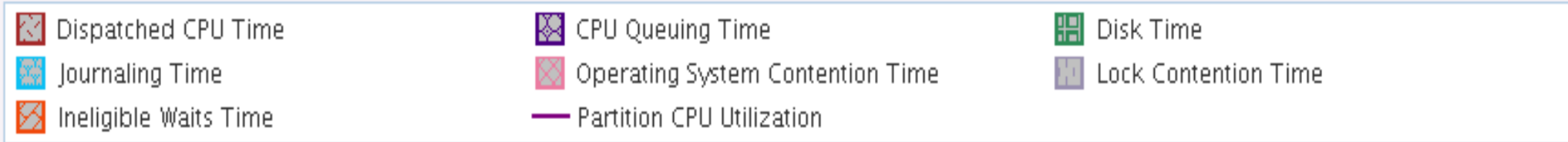
CPU Utilization and Waits Overview



This is SQL Workload

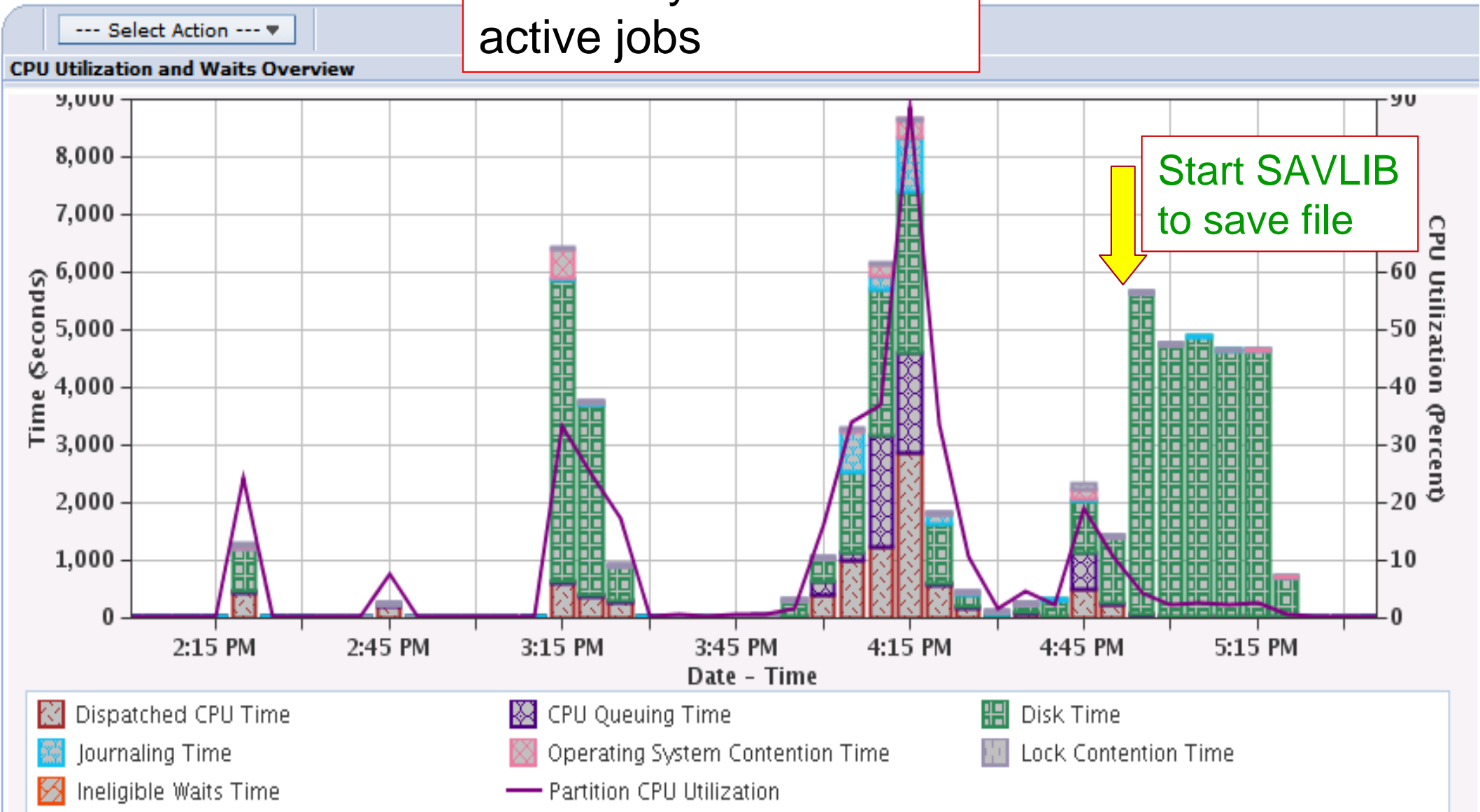
- Disk IO Intensive
- Not CPU Intensive

Start SAVLIB to LTO-5 tape



This is RPG Workload with many concurrent active jobs

Sample 2



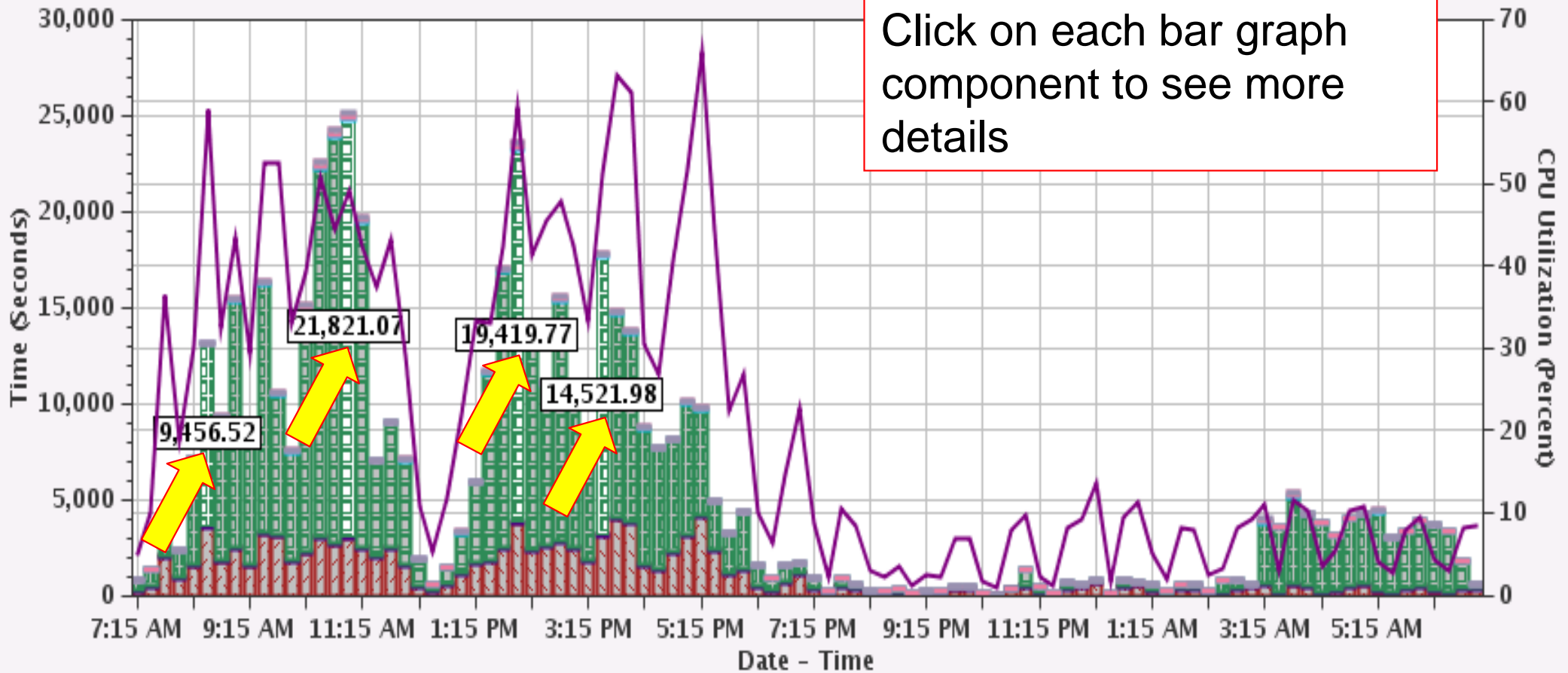
Each bar graph shows accumulated times from all active jobs in the system at that moment of IBM i Collection Services sampling period

Each bar graph is evaluated in relation to other bar graph (each bar = each sampling point)

Each bar graph is active: click a bar graph component of your interest to see more details of that component



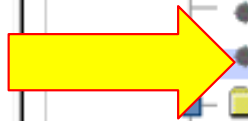
CPU Utilization and Waits Overview



Click on each bar graph component to see more details

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

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



Name

Resource Utilization Overview

Description

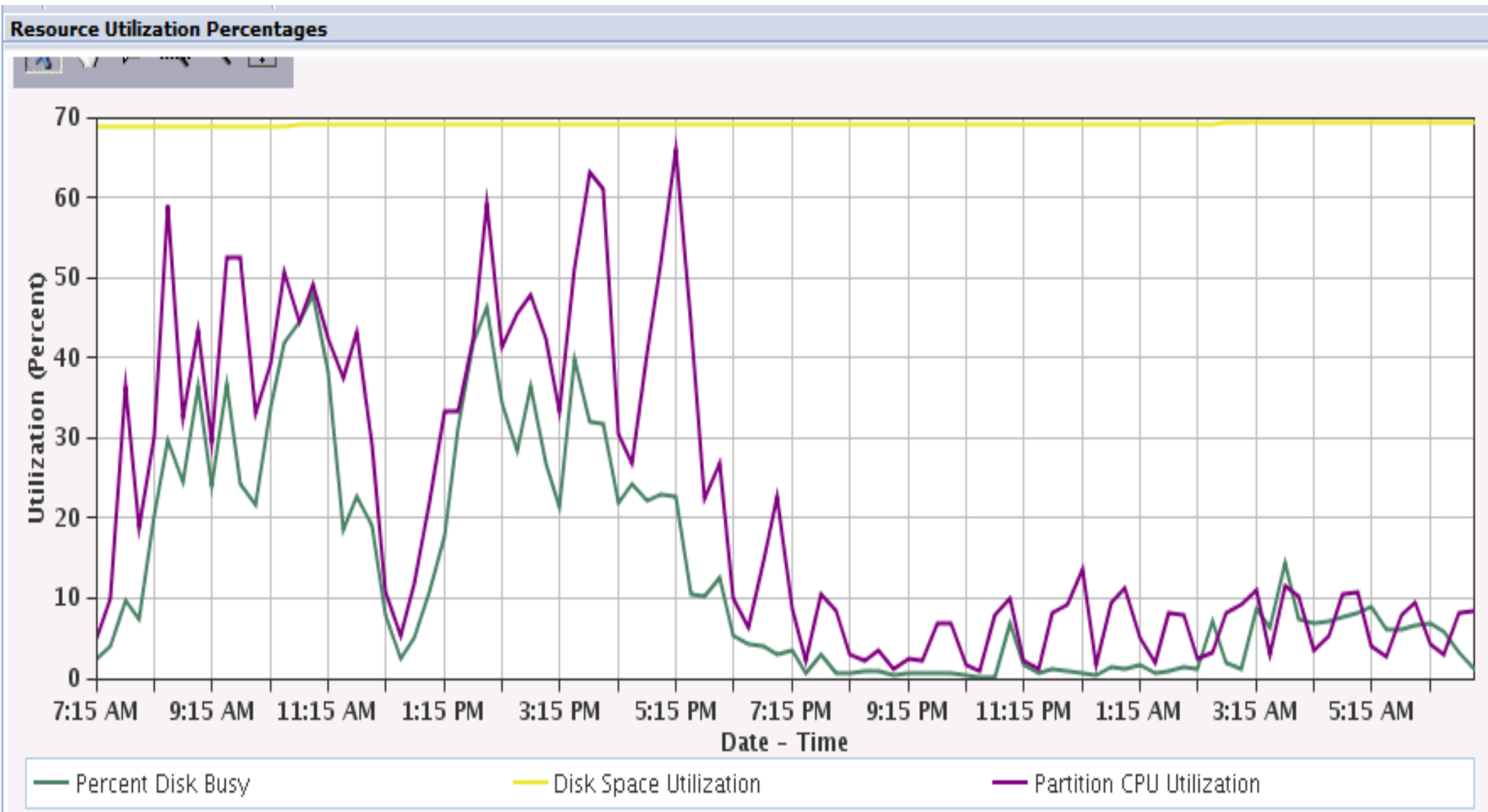
Charts that show utilizations and rates for some of the more common collection metrics on an interval by interval basis. Use this information to find and compare relationships and select a time frame for more detailed investigation.

Collection

Collection Library: Collection Name:

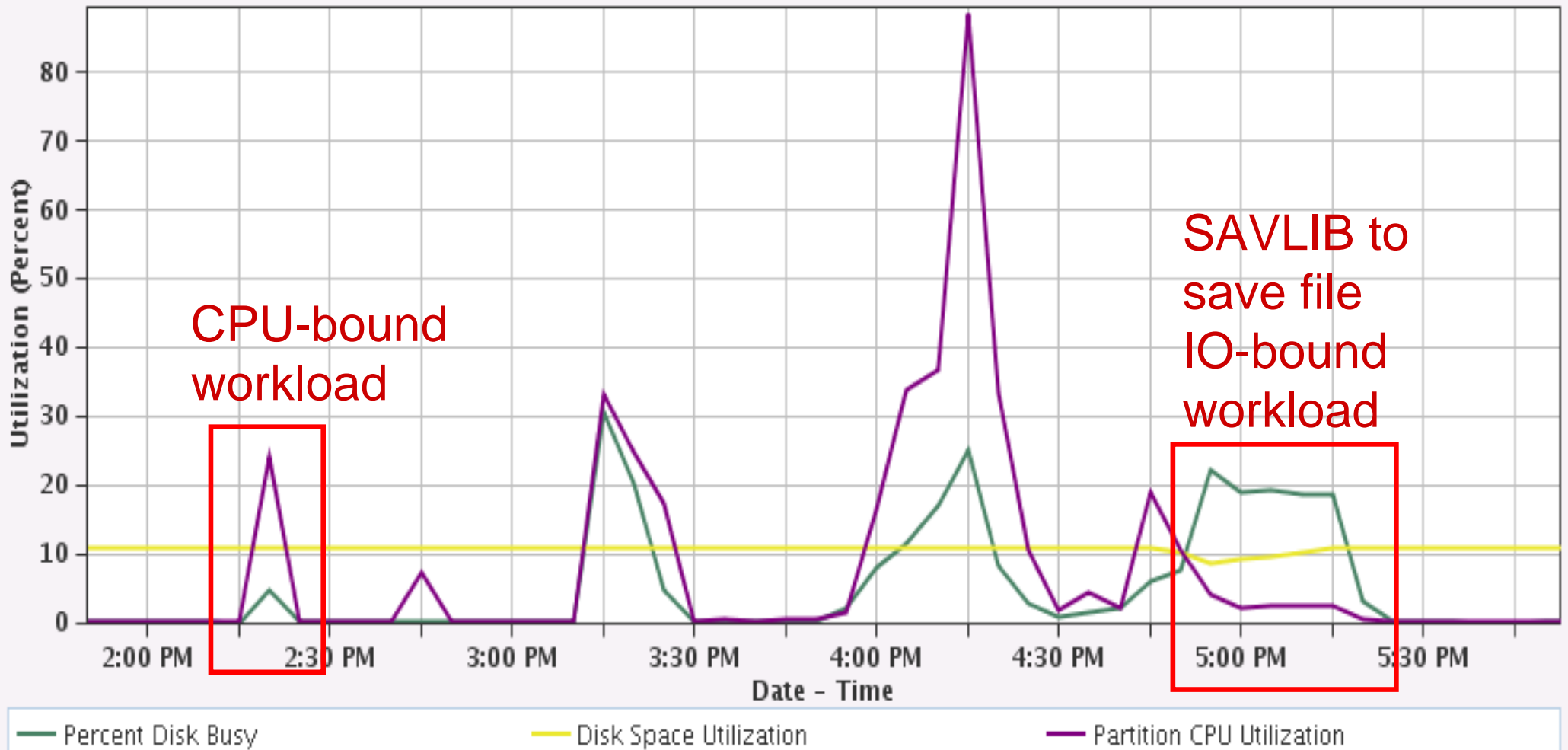
Display Search Options Close

Sample 1



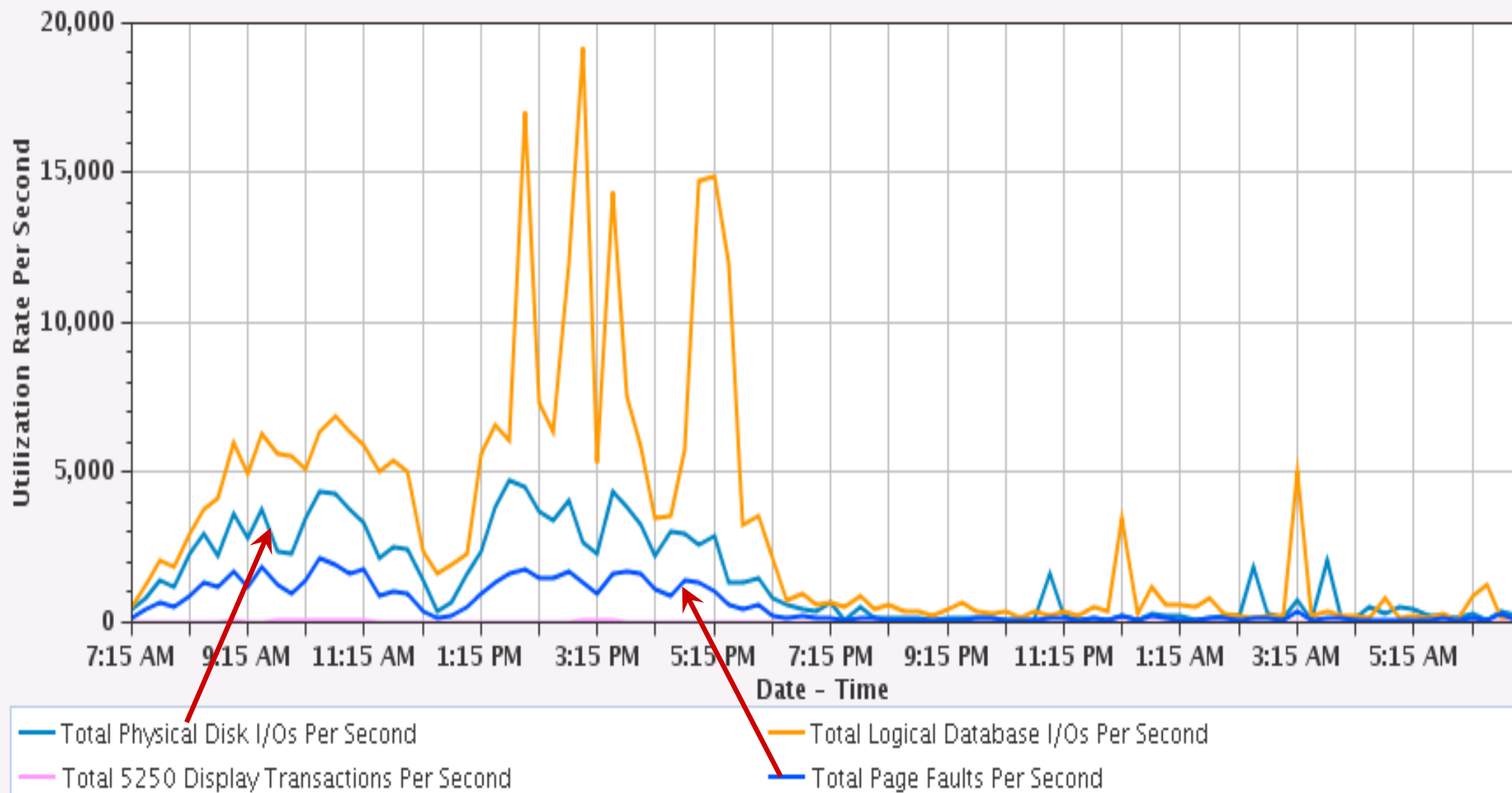
Sample 2

Resource Utilization Percentages



Sample 1

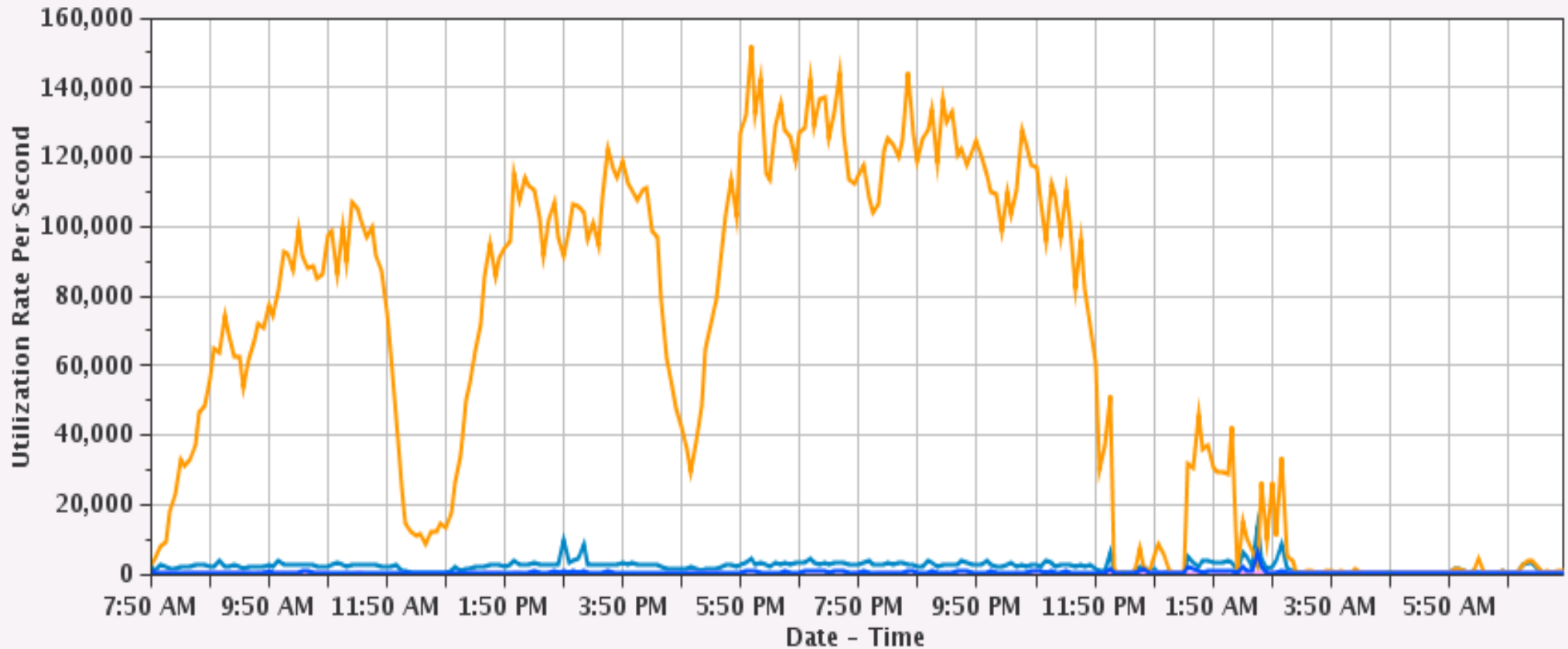
Resource Utilization Rates



Sample 2

Resource Utilization Rates

Very high DB IO rate but low physical disk IO rate = desirable



— Total Physical Disk I/Os Per Second
 — Total 5250 Display Transactions Per Second

— Total Logical Database I/Os Per Second
 — Total Page Faults Per Second

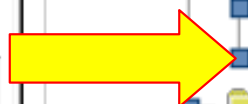
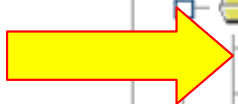


Performance(1) x

Investigate... x

--- Select Action ---

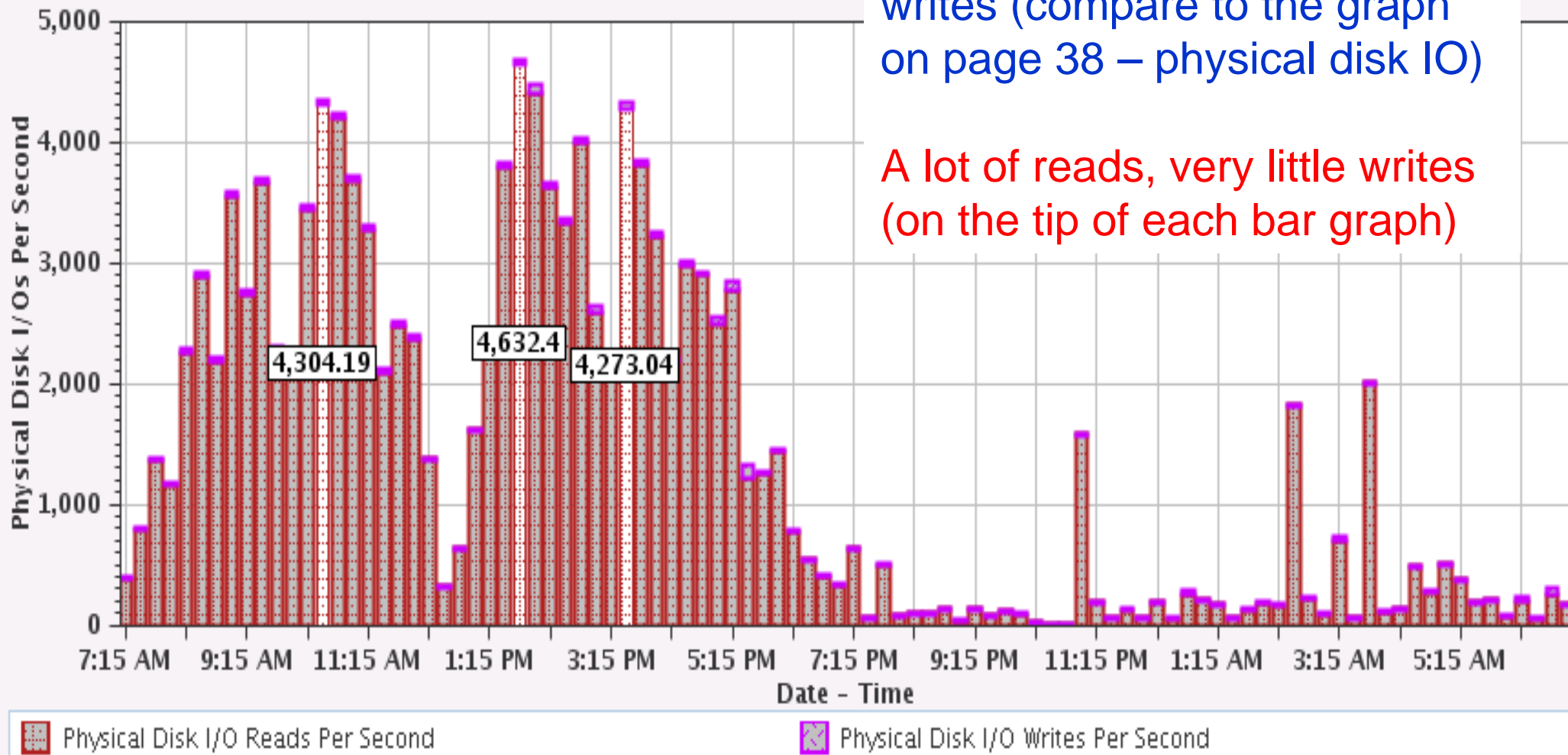
- [-] Disk
 - [-] Physical Disk I/O
 - [-] Basic Views
 - Physical Disk I/O Overview - Basic
 - Physical Disk I/O by Job or Task - Basic
 - Physical Disk I/O by Thread or Task - Basic
 - Physical Disk I/O by Generic Job or Task - Basic
 - Physical Disk I/O by Job User Profile - Basic
 - Physical Disk I/O by Job Current User Profile - Basic
 - Physical Disk I/O by Subsystem - Basic
 - Physical Disk I/O by Server Type - Basic
 - [-] Detailed Views
 - [-] Advanced Views
 - [-] Synchronous Disk I/O
 - [-] Page Faults
 - [-] Logical Database I/O
 - [-] Virtual I/O
 - [-] Communications
 - [-] 5250 Display Transactions
 - [-] Physical System
 - [-] Collection Services Database Files



Collection

Basic View - Sample 1

Physical Disk I/O Overview - Basic

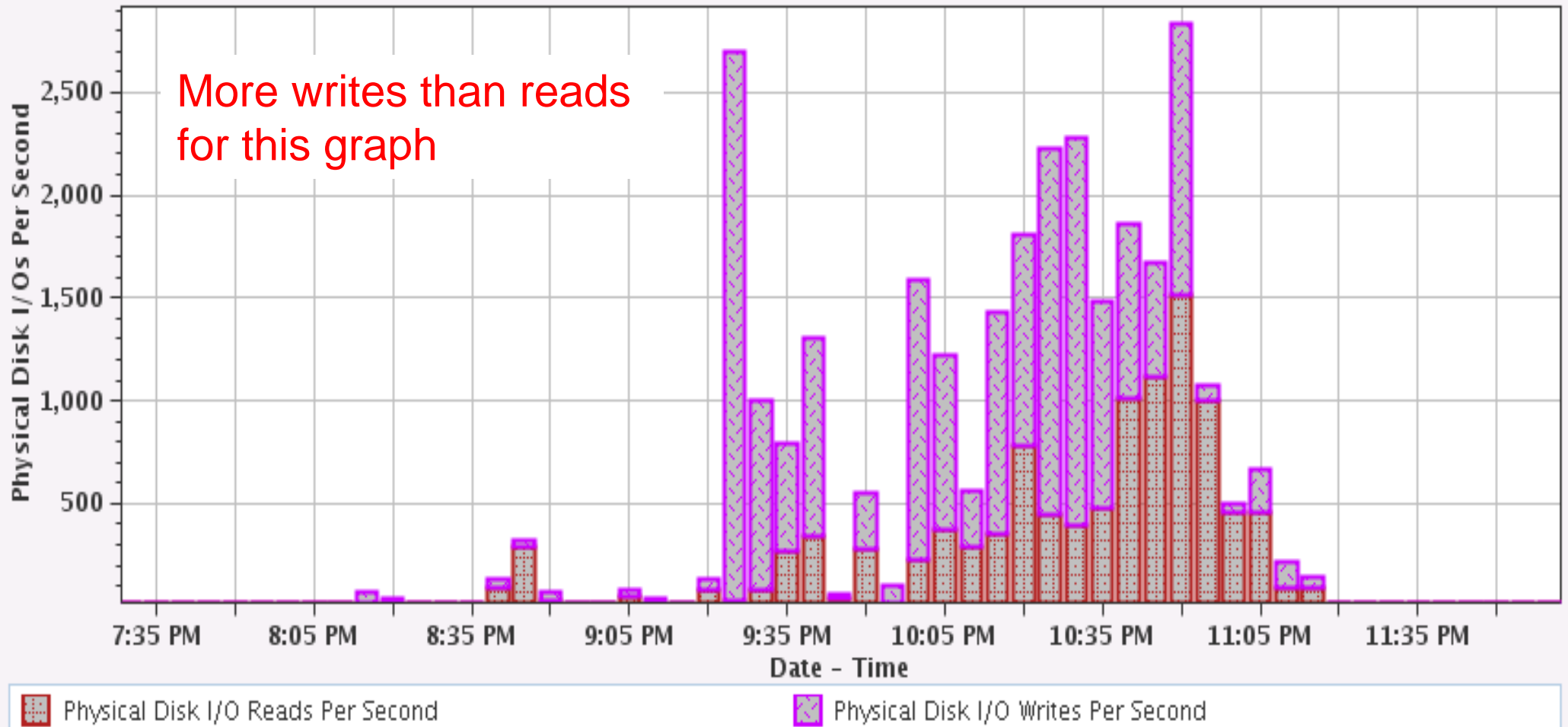


Display disk IOPS in reads and writes (compare to the graph on page 38 – physical disk IO)

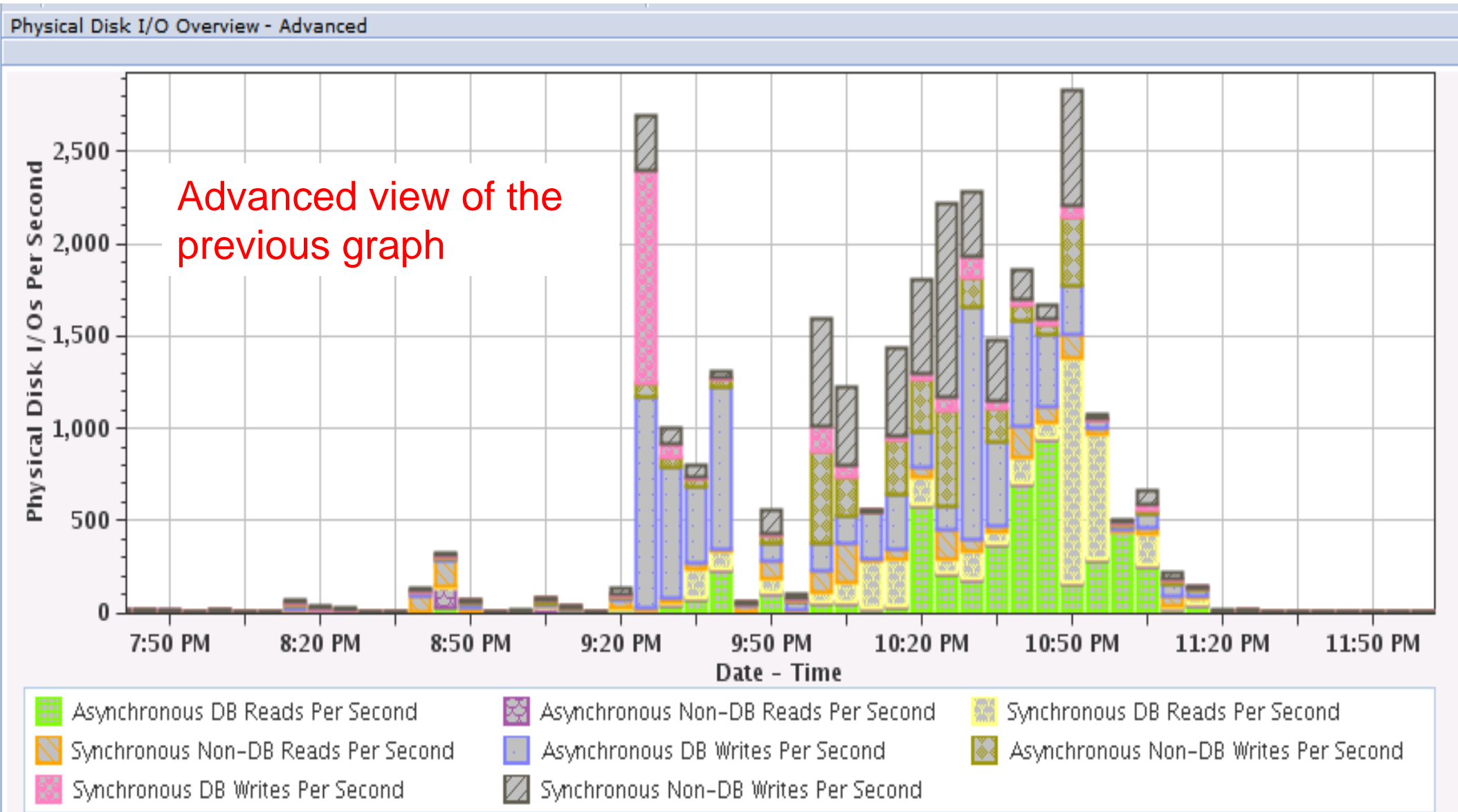
A lot of reads, very little writes (on the tip of each bar graph)

Basic View - Sample 2

Physical Disk I/O Overview - Basic



Advanced View - Sample



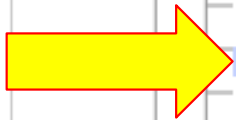


Performance(1) x

Investigate... x

--- Select Action ---

- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Disk Overview for System Disk Pool
 - Disk Throughput Overview for Disk Pools**
 - Disk Overview by IOP Name
 - Disk Overview by Adapter Name
 - Disk Overview by Disk Pool
 - Disk Overview by Disk Unit
 - Disk Overview by Disk Path
 - Disk Details by IOP Name
 - Disk Details by Adapter Name
 - Disk Details by Disk Pool
 - Disk Details by Disk Unit
 - Disk Details by Disk Path
 - Disk Overview for IOPs
 - Disk Overview for Adapters
 - Disk Overview for Disk Pools
 - Disk Overview for Disk Units
 - Disk Overview for Disk Paths



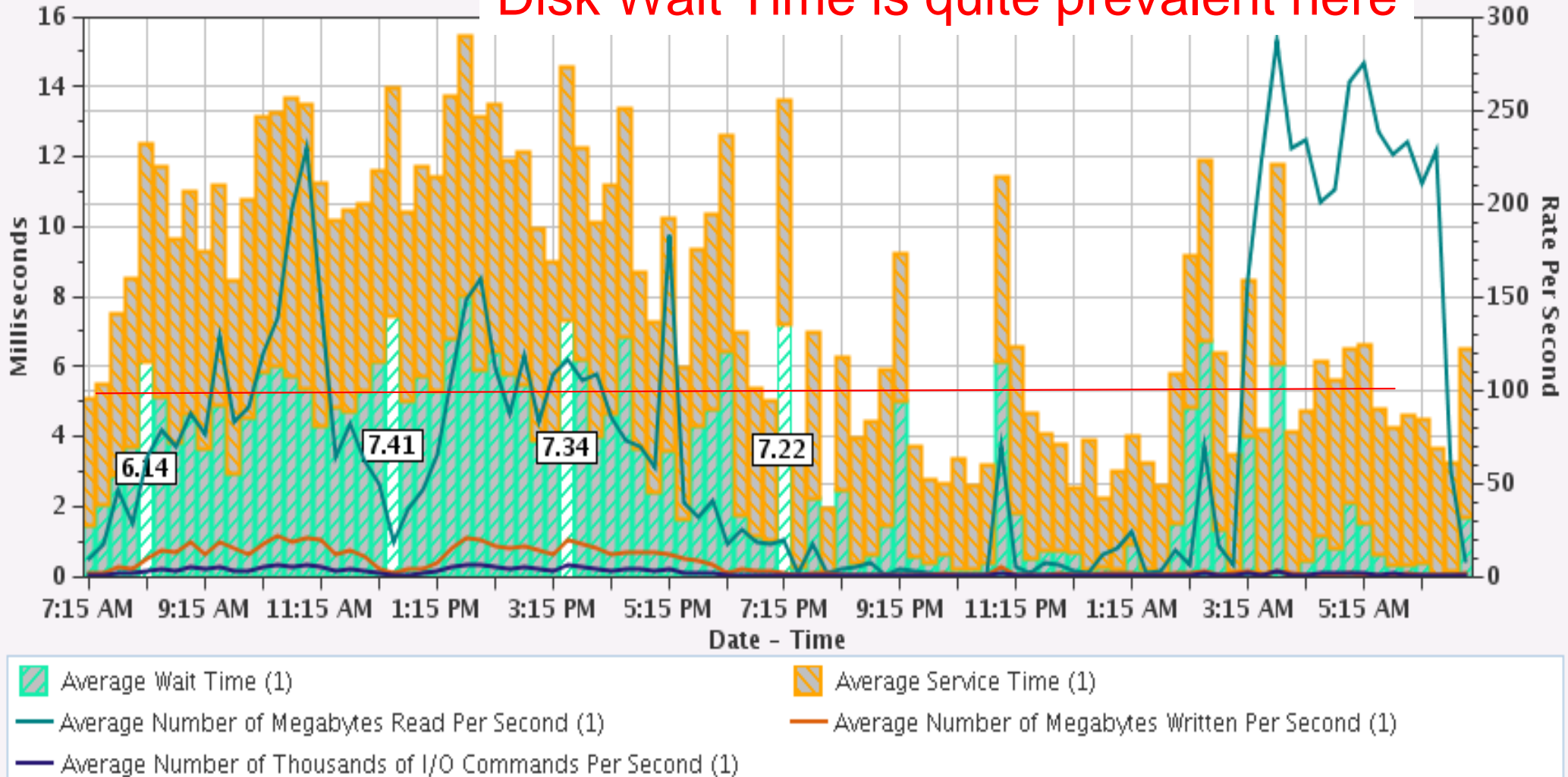
Description

This chart shows read MB per second, write MB per second, thousand I/O commands per second, average service time and average wait time for disk pools over time.

Sample 1

Disk Throughput Overview for Disk Pools

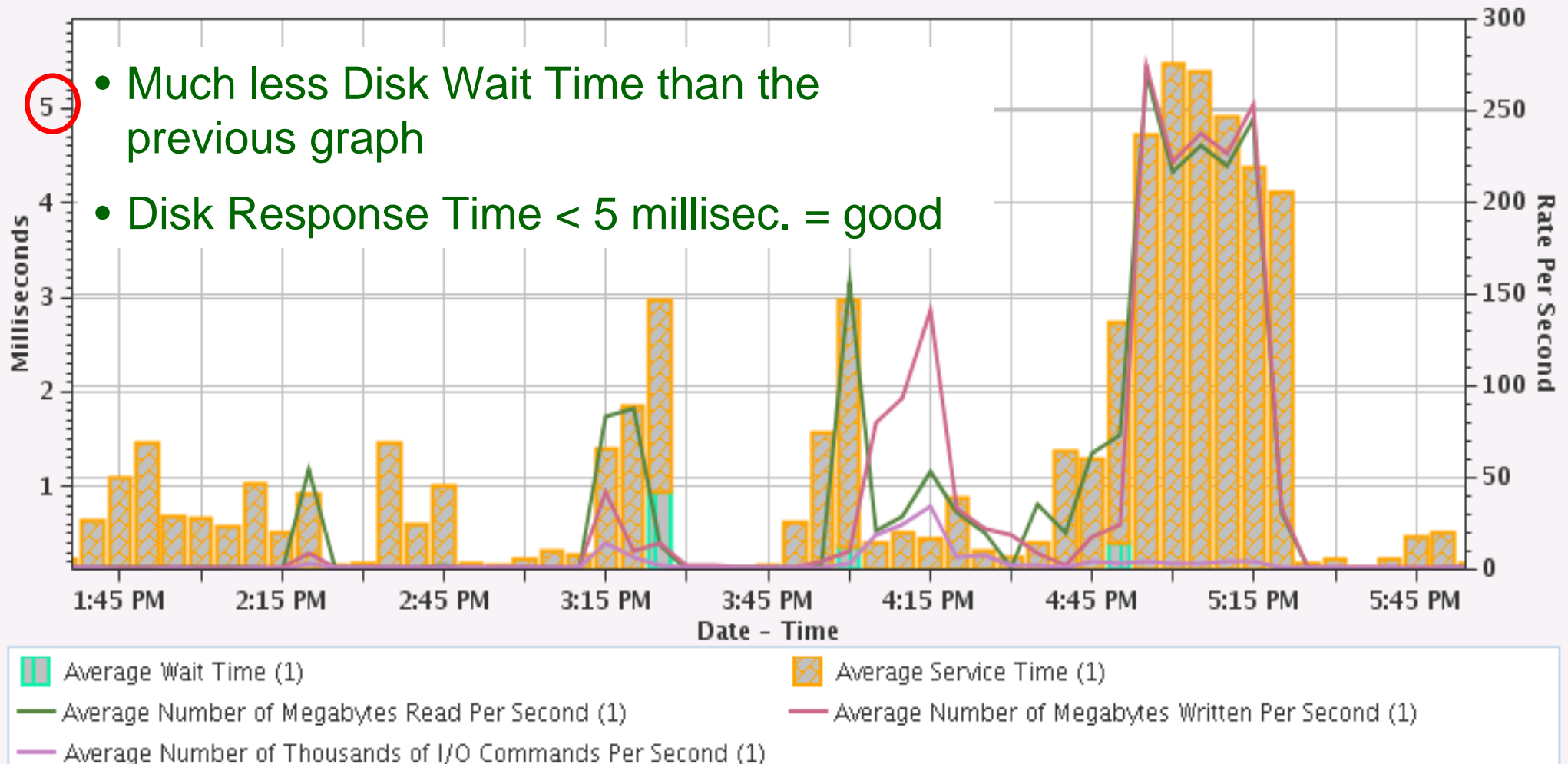
Disk Wait Time is quite prevalent here



This 720 system has 2 x 5908 Disk Controllers + 32 Disk Units

Sample 2

Disk Throughput Overview for Disk Pools



This 740 system has 4 x 5908 Disk Controllers + 48 Disk Units

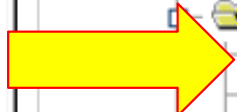


Performance(1) x

Investigate... x

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - Waits Overview
 - Seizes and Locks Waits Overview
 - Contention Waits Overview
 - Disk Waits Overview
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem
 - Waits by Server Type
 - Waits by Job Priority
- CPU
- Disk



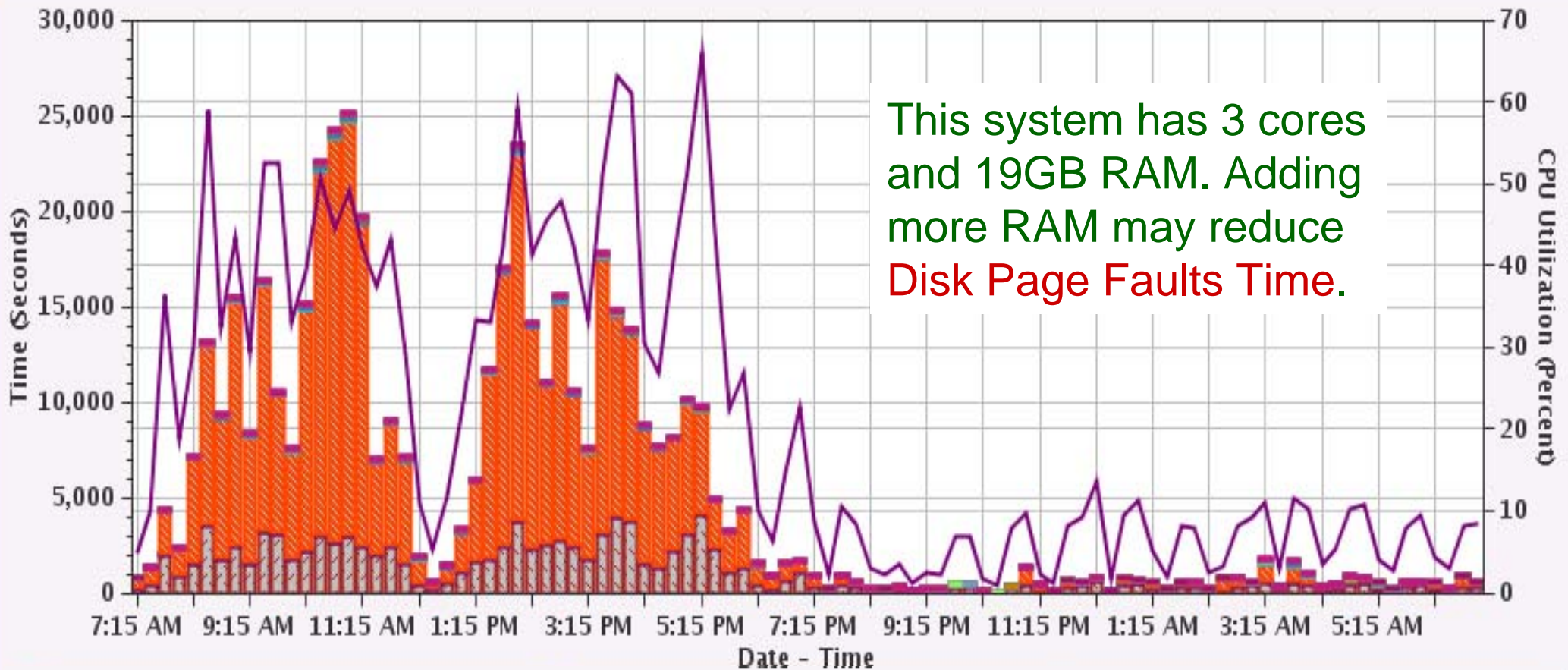
Waits Overview

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 collection or collections. Use this chart to select a time frame for further detailed investigation. Interesting waits include waits for synchronous disk operations, CPU queuing, conflicts, blocks and serialization. Uninteresting waits are those which represent idle waits such as waiting for work to arrive. While some degree of waiting is normal and to be expected when systems become very busy, this chart is designed to show the relationship between CPU consumption and some waits that when excessive can become problematic over time. Being able to identify the time frame and the category of wait can enhance the investigation process.

Sample 1

Waits Overview

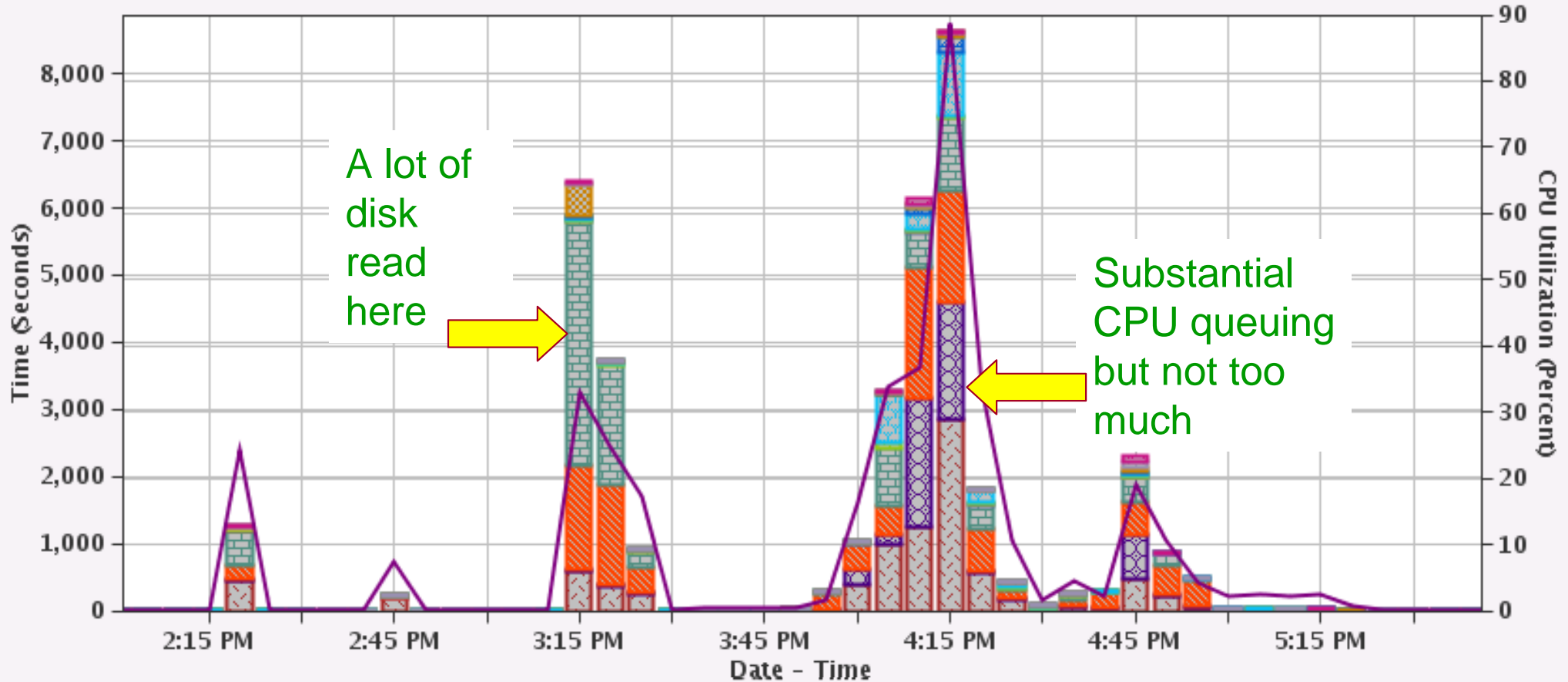


This system has 3 cores and 19GB RAM. Adding more RAM may reduce **Disk Page Faults Time**.

- | | | |
|---------------------------|---------------------------------------|---------------------------------------|
| Dispatched CPU Time | CPU Queuing Time | Disk Page Faults Time |
| Disk Non-fault Reads Time | Disk Space Usage Contention Time | Disk Op-Start Contention Time |
| Disk Writes Time | Journal Time | Machine Level Gate Serialization Time |
| Seize Contention Time | Database Record Lock Contention Time | Object Lock Contention Time |
| Ineligible Waits Time | Main Storage Pool Overcommitment Time | Abnormal Contention Time |
| Partition CPU Utilization | | |

Sample 2

Waits Overview



- Dispatched CPU Time
- CPU Queuing Time
- Disk Page Faults Time
- Disk Non-fault Reads Time
- Disk Space Usage Contention Time
- Disk Op-Start Contention Time
- Disk Writes Time
- Journal Time
- Machine Level Gate Serialization Time
- Seize Contention Time
- Database Record Lock Contention Time
- Object Lock Contention Time
- Ineligible Waits Time
- Main Storage Pool Overcommitment Time
- Abnormal Contention Time
- Partition CPU Utilization



Performance(1) x

Investigate... x

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - Waits Overview
 - Seizes and Locks Waits Overview**
 - Contention Waits Overview
 - Disk Waits Overview
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem
 - Waits by Server Type
 - Waits by Job Priority
- CPU



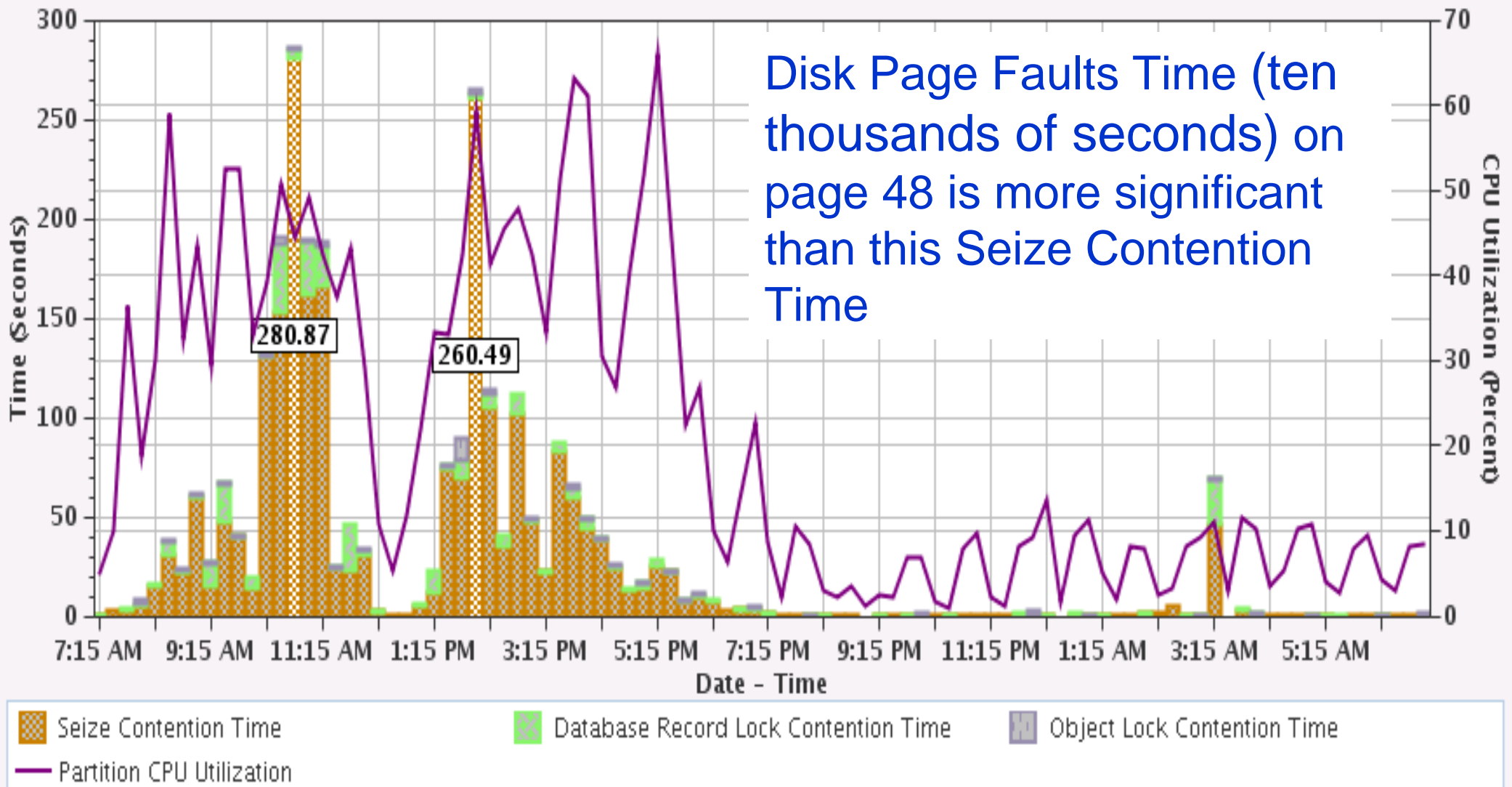
Name

Seizes and Locks Waits Overview

Description

This chart shows the waits related to seizures and locks for all contributing jobs and tasks over time for the selected collection or collections. Use this chart to select a time frame for further detailed investigation. Seizes and locks waits include seize contention time, database record lock contention time, and object lock contention time.

Seizes and Locks Waits Overview



This is a subset to Wait Overview displayed on page 48



Performance(1) x

Investigate... x

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - Waits Overview
 - Seizes and Locks Waits Overview
 - Contention Waits Overview
 - Disk Waits Overview**
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem
 - Waits by Server Type
 - Waits by Job Priority
- CPU



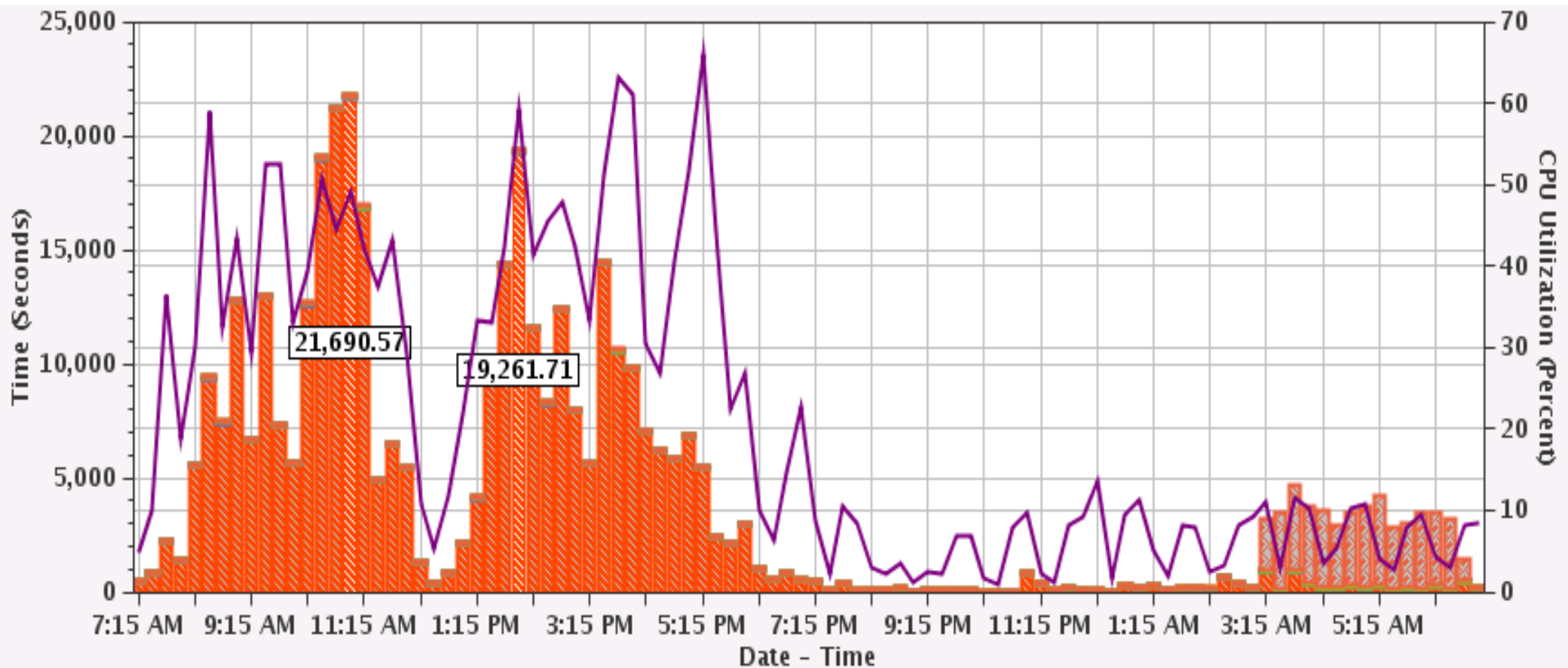
Name

Disk Waits Overview

Description

This chart shows the waits related to disk processing for all contributing jobs and tasks over time for the selected collection or collections. Use this chart to select a time frame for further detailed investigation. Disk waits include disk page faults, disk non-fault reads, disk space usage contention, disk op-start contention, disk writes, and disk other time.

Disk Waits Overview



- Disk Page Faults Time
- Disk Non-fault Reads Time
- Disk Space Usage Contention Time
- Disk Op-Start Contention Time
- Disk Writes Time
- Disk Other Time
- Partition CPU Utilization

This is a subset to Wait Overview displayed on page 48

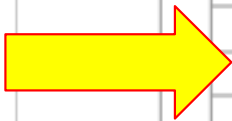


Performance(1) x

Investigate... x

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - Waits Overview
 - Seizes and Locks Waits Overview
 - Contention Waits Overview
 - Disk Waits Overview
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem
 - Waits by Server Type
 - Waits by Job Priority
- CPU



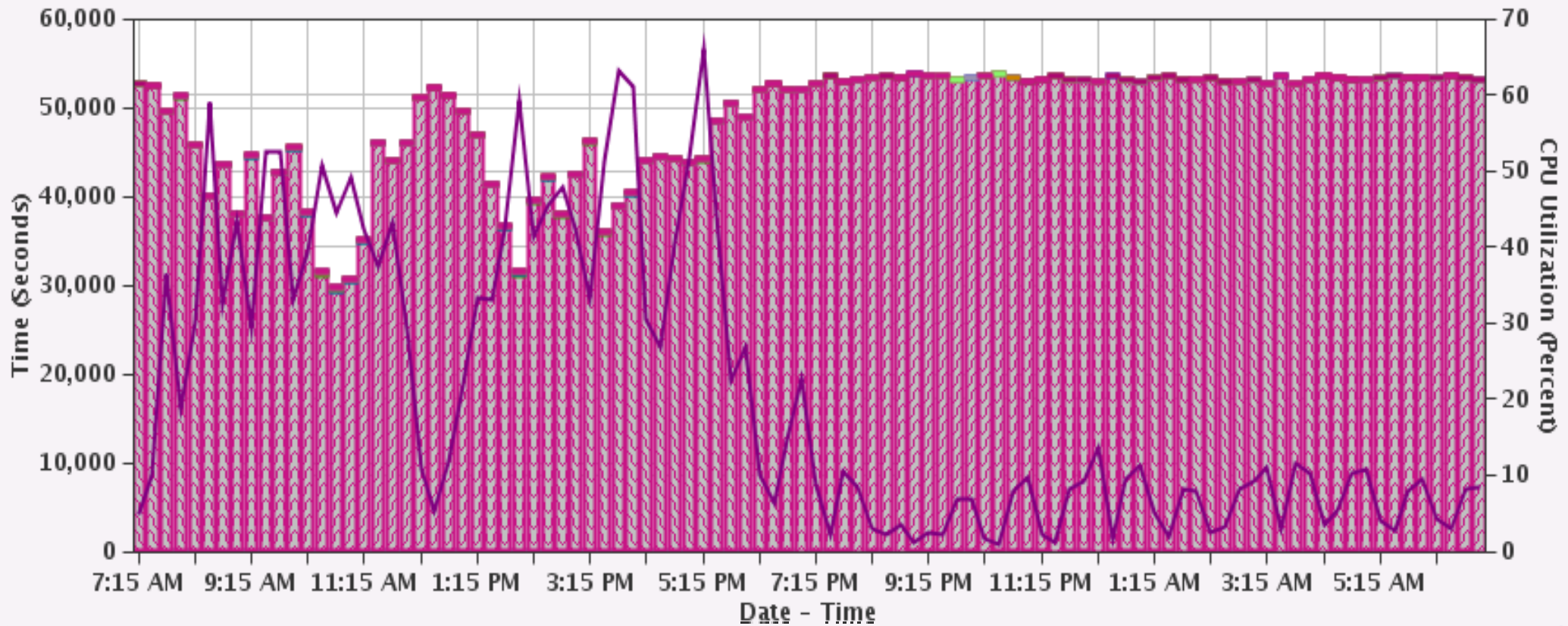
Name

Contention Waits Overview

Description

This chart shows the waits related to contention for all contributing jobs and tasks over time for the selected collection or collections. Use this chart to select a time frame for further detailed investigation. Contention waits include disk space usage contention, disk op-start contention, semaphore contention, mutex contention, machine level gate serialization time, seize contention, database record lock contention, object lock contention, ineligible waits, synchronization token contention, and abnormal contention.

Contention Waits Overview



- | | | |
|---------------------------------------|--|---------------------------|
| Disk Space Usage Contention Time | Disk Op-Start Contention Time | Semaphore Contention Time |
| Mutex Contention Time | Machine Level Gate Serialization Time | Seize Contention Time |
| Database Record Lock Contention Time | Object Lock Contention Time | Ineligible Waits Time |
| Main Storage Pool Overcommitment Time | Synchronization Tokens Contention Time | Abnormal Contention Time |
| Partition CPU Utilization | | |

Welcome X Investigate Data X

Investigate Data - Performance Data Investigator

Perspectives

- Performance Explorer
- Disk Watcher
- Job Watcher
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
- Job Statistics Overviews
- Waits
 - Waits Overview
 - Seizes and Locks Waits Overview
 - Contention Waits Overview
 - Disk Waits Overview
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task**
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem

Selection

Name
Waits by Job or Task

Description
This chart summarizes the components of a job or task group's elapsed run time in terms of dispatched CPU and some of the interesting wait categories for the selected time frame. The chart is ranked by the largest contributor to dispatched CPU. Use this chart to select a job or task group for viewing its run and wait contributions over time.

Locked

New Folder... New Perspective...

Edit Advanced Edit Delete

Move Up Move Down

Collection

Name(s): Q204103732
 Library: QPFRDATA
 Type: Collection Services File Based Collection
 File level: 28

Time

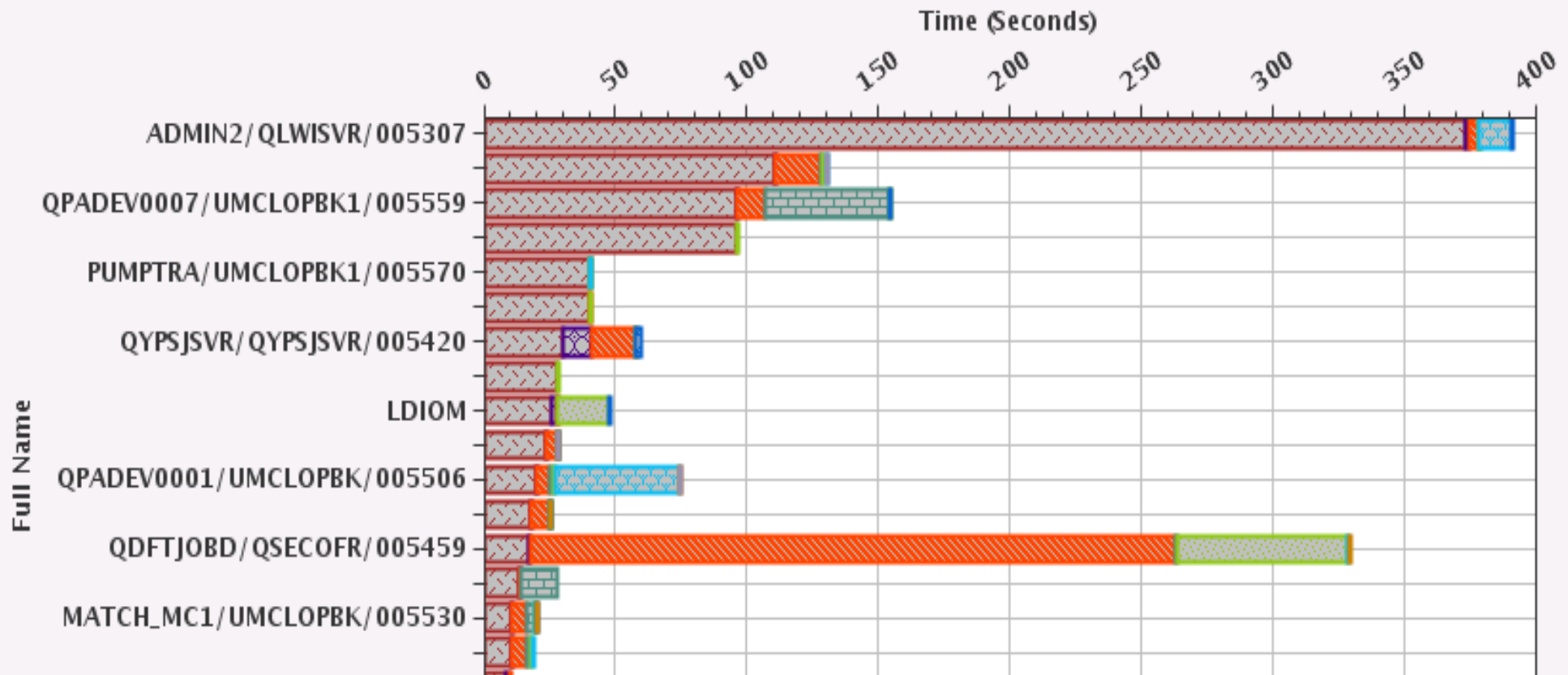
Start: Jul 23, 2013 10:37:32 AM
 End: Ongoing

System

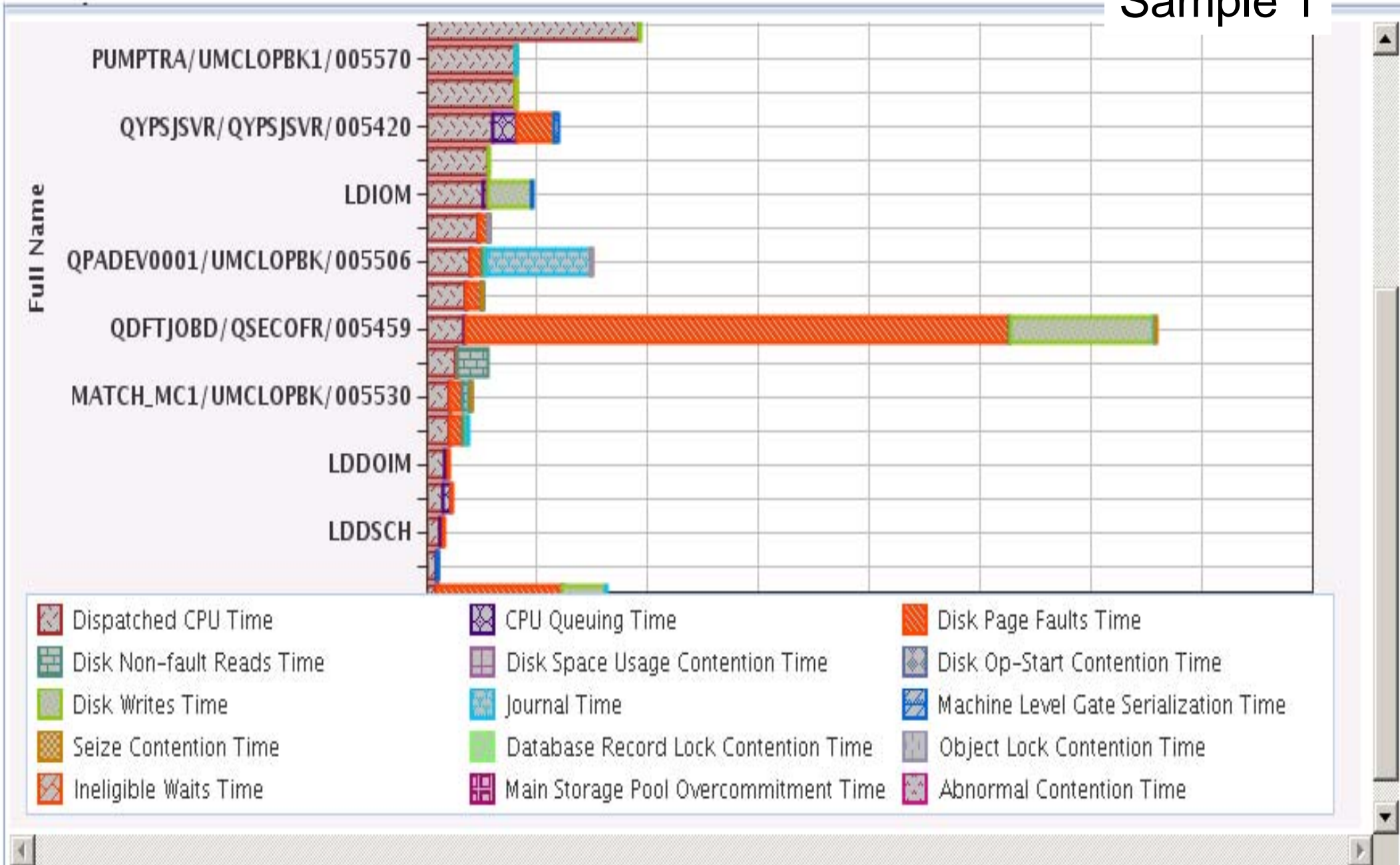
Name: ASDEV01
 Release: V6R1M0

--- Select Action ---

Waits by Job or Task

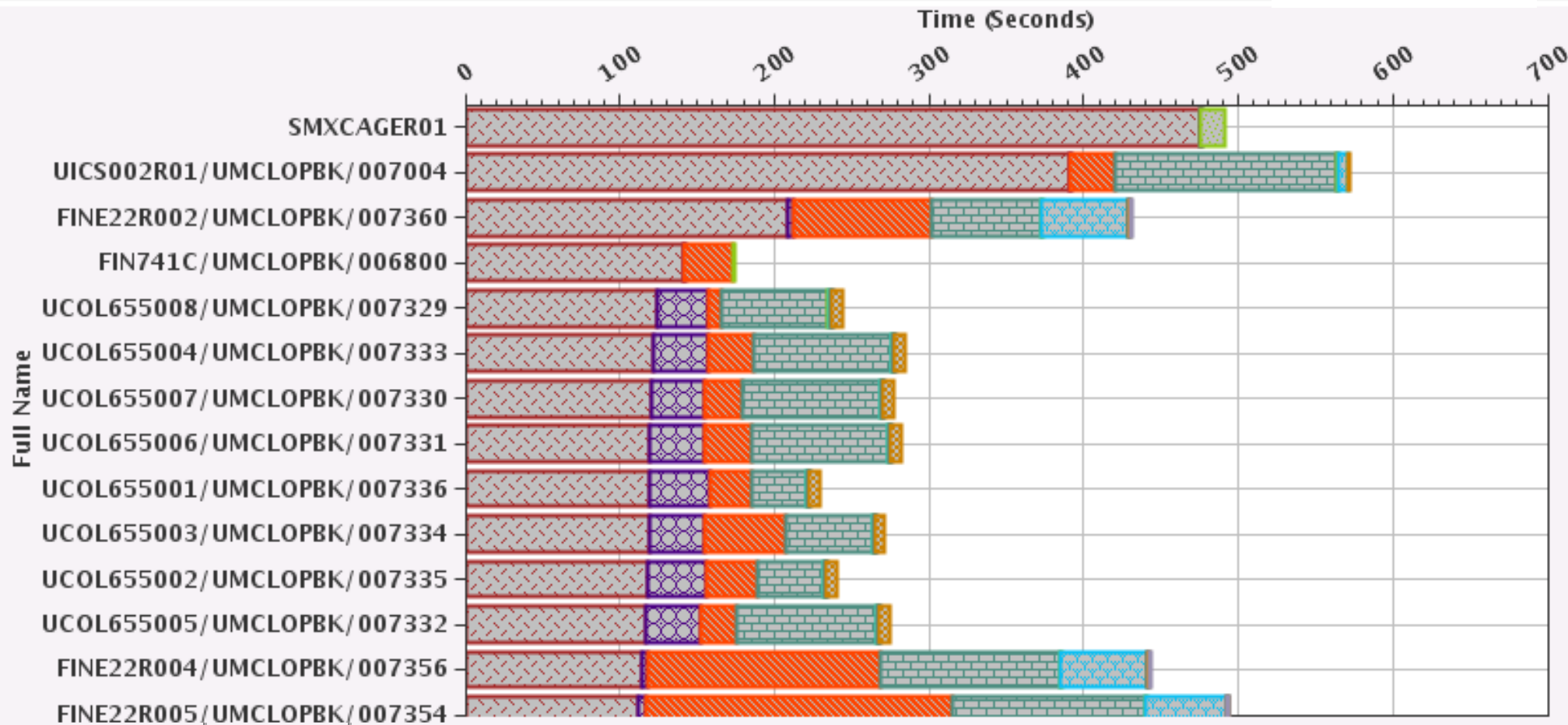


Sample 1



Sample 2

Waits by Job or Task



- Dispatched CPU Time
- CPU Queuing Time
- Disk Page Faults Time
- Disk Non-fault Reads Time
- Disk Space Usage Contention Time
- Disk Op-Start Contention Time
- Disk Writes Time
- Journal Time
- Machine Level Gate Serialization Time
- Seize Contention Time
- Database Record Lock Contention Time
- Object Lock Contention Time
- Ineligible Waits Time
- Main Storage Pool Overcommitment Time
- Abnormal Contention Time

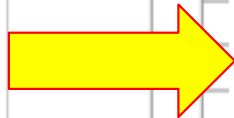


Performance(1) x

Investigate... x

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Health Indicators
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - Waits Overview
 - Seizes and Locks Waits Overview
 - Contention Waits Overview
 - Disk Waits Overview
 - Journal Waits Overview
 - Classic JVM Waits Overview
 - All Waits by Thread or Task
 - Waits by Job or Task
 - Waits by Generic Job or Task
 - Waits by Job User Profile
 - Waits by Job Current User Profile
 - Waits by Pool
 - Waits by Subsystem
 - Waits by Server Type
 - Waits by Job Priority
- CPU



Name

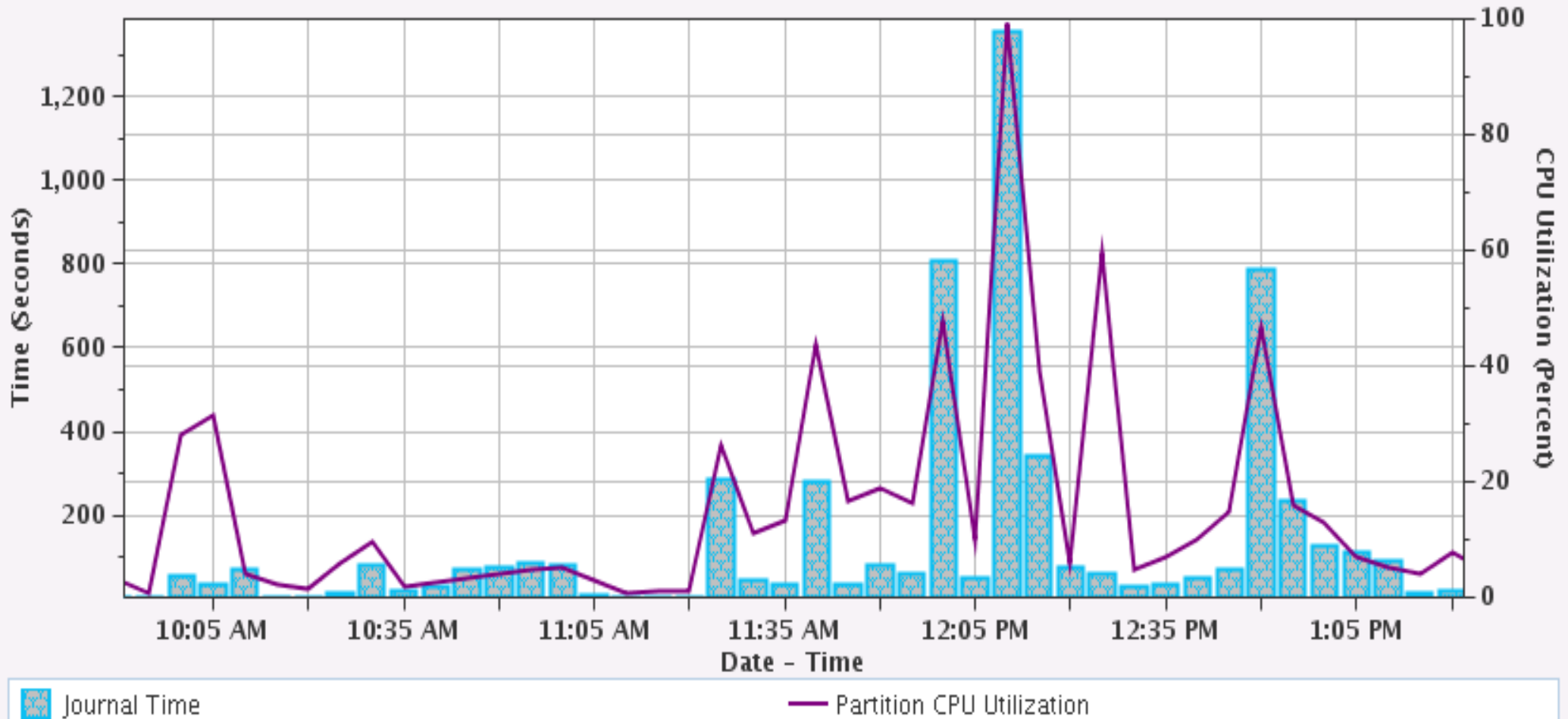
Seizes and Locks Waits Overview

Description

This chart shows the waits related to seizures and locks for all contributing jobs and tasks over time for the selected collection or collections. Use this chart to select a time frame for further detailed investigation. Seizes and locks waits include seize contention time, database record lock contention time, and object lock contention time.

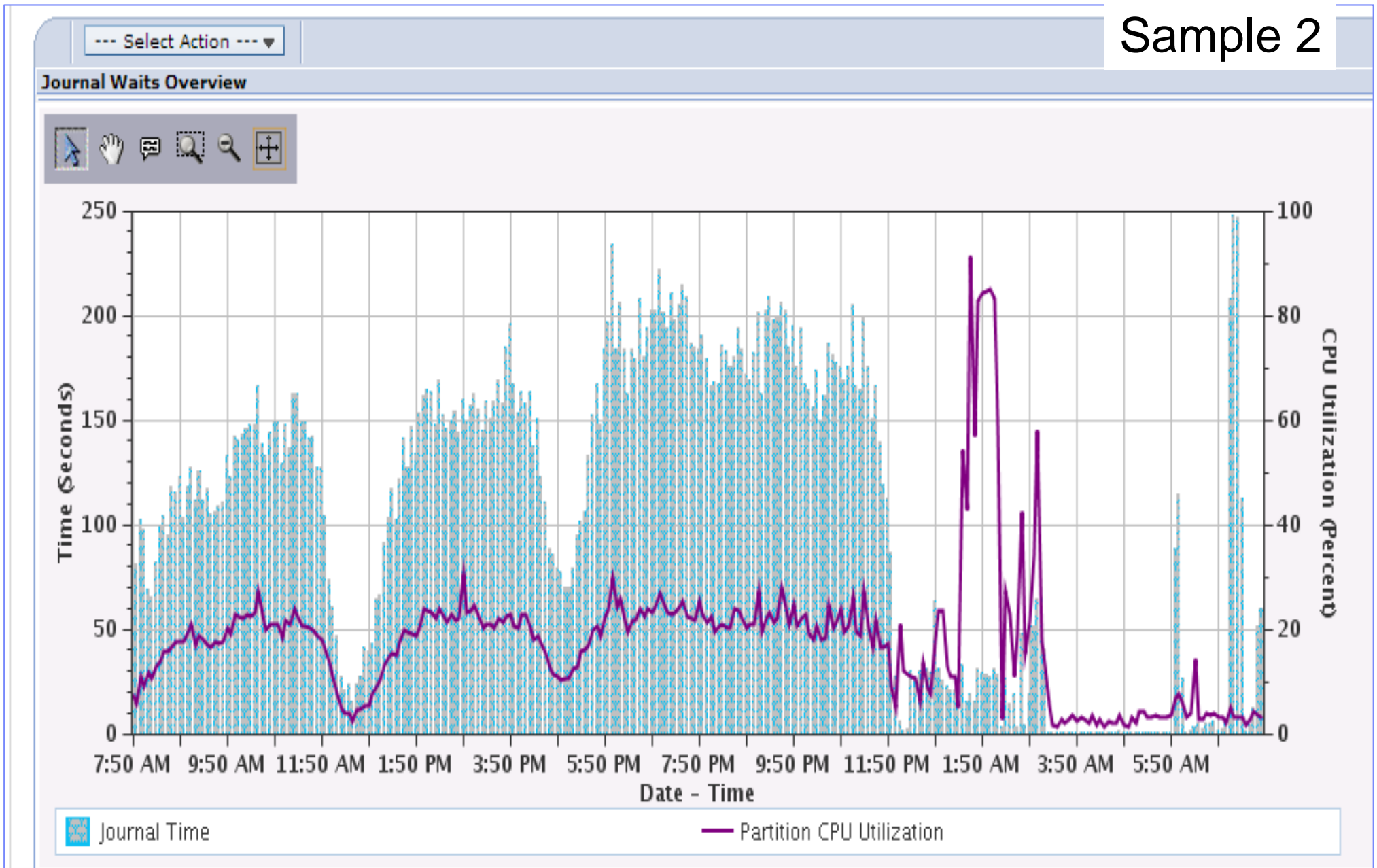
Journal Waits Overview

Sample 1



Journal Cache is not used here - using it can reduce journal time

Sample 2

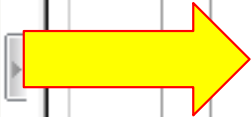


Journal Cache is not used here - using it can reduce journal time

IBM Systems Director Navigator for i5/OS® Welcome satid [Help](#) | [Logout](#)

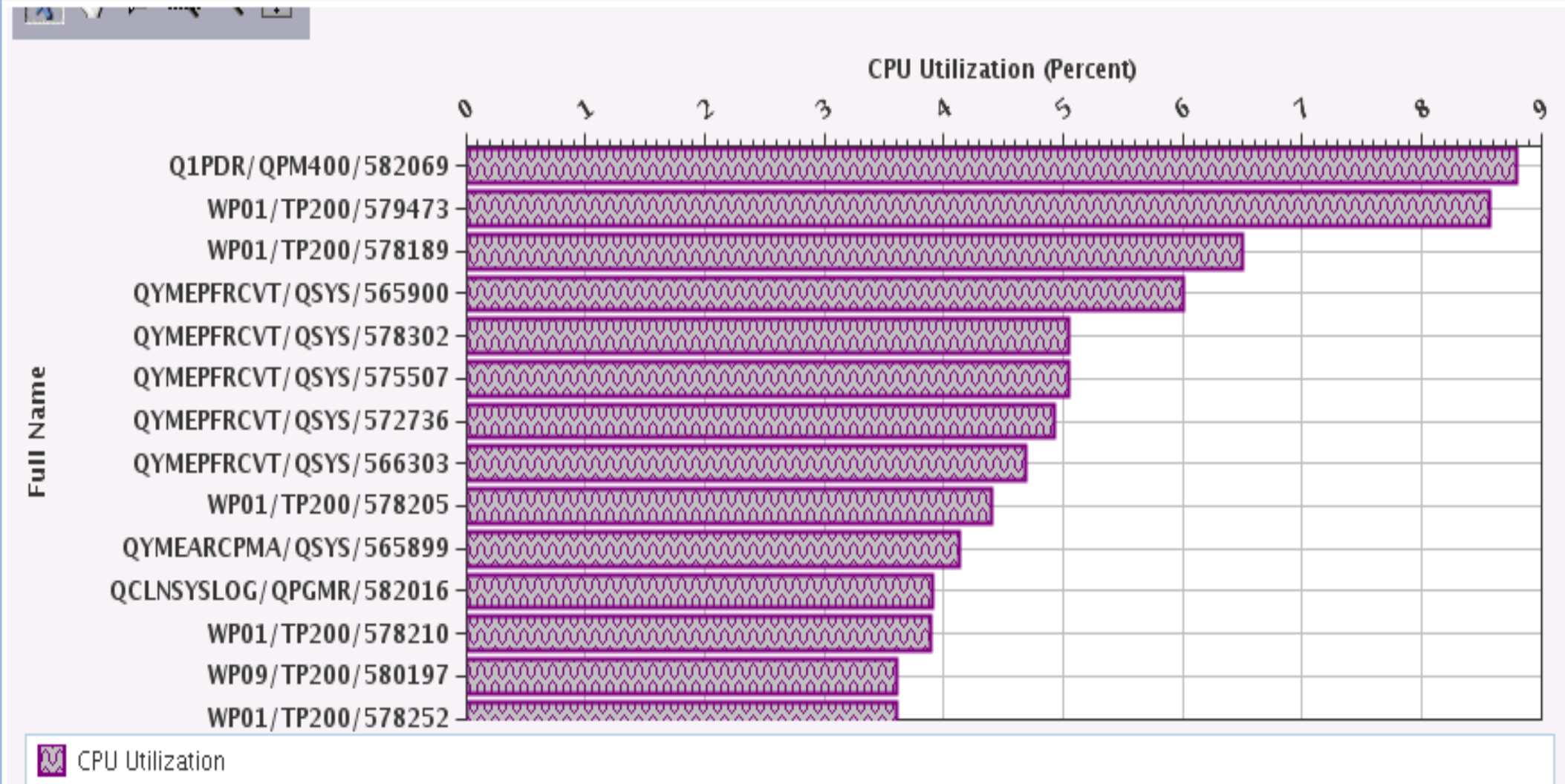
Performance(1) X Investigate... X --- Select Action ---

Perspectives	Selection
<ul style="list-style-type: none"> [-] Performance Explorer [-] Disk Watcher [-] Collection Services <ul style="list-style-type: none"> ● CPU Utilization and Waits Overview ● CPU Utilization by Thread or Task ● Resource Utilization Overview [-] Job Statistics Overviews [-] Waits [-] CPU <ul style="list-style-type: none"> ● CPU Utilization Overview ● Interactive Capacity CPU Utilization ● CPU Utilization by Job or Task ● CPU Utilization by Thread or Task ● CPU Utilization by Generic Job or Task ● CPU Utilization by Job User Profile ● CPU Utilization by Job Current User Profile ● CPU Utilization by Subsystem ● CPU Utilization by Server Type ● CPU Utilization by Pool [-] Disk <ul style="list-style-type: none"> [-] Physical Disk I/O [-] Synchronous Disk I/O [-] Page Faults [-] Logical Database I/O 	<p><u>Name</u></p> <p>CPU Utilization by Job or Task</p> <p><u>Description</u></p> <p>This chart shows CPU usage by job or task and ranked by the largest contributors. Use this chart to select contributors for further detailed investigation.</p>



Sample 1

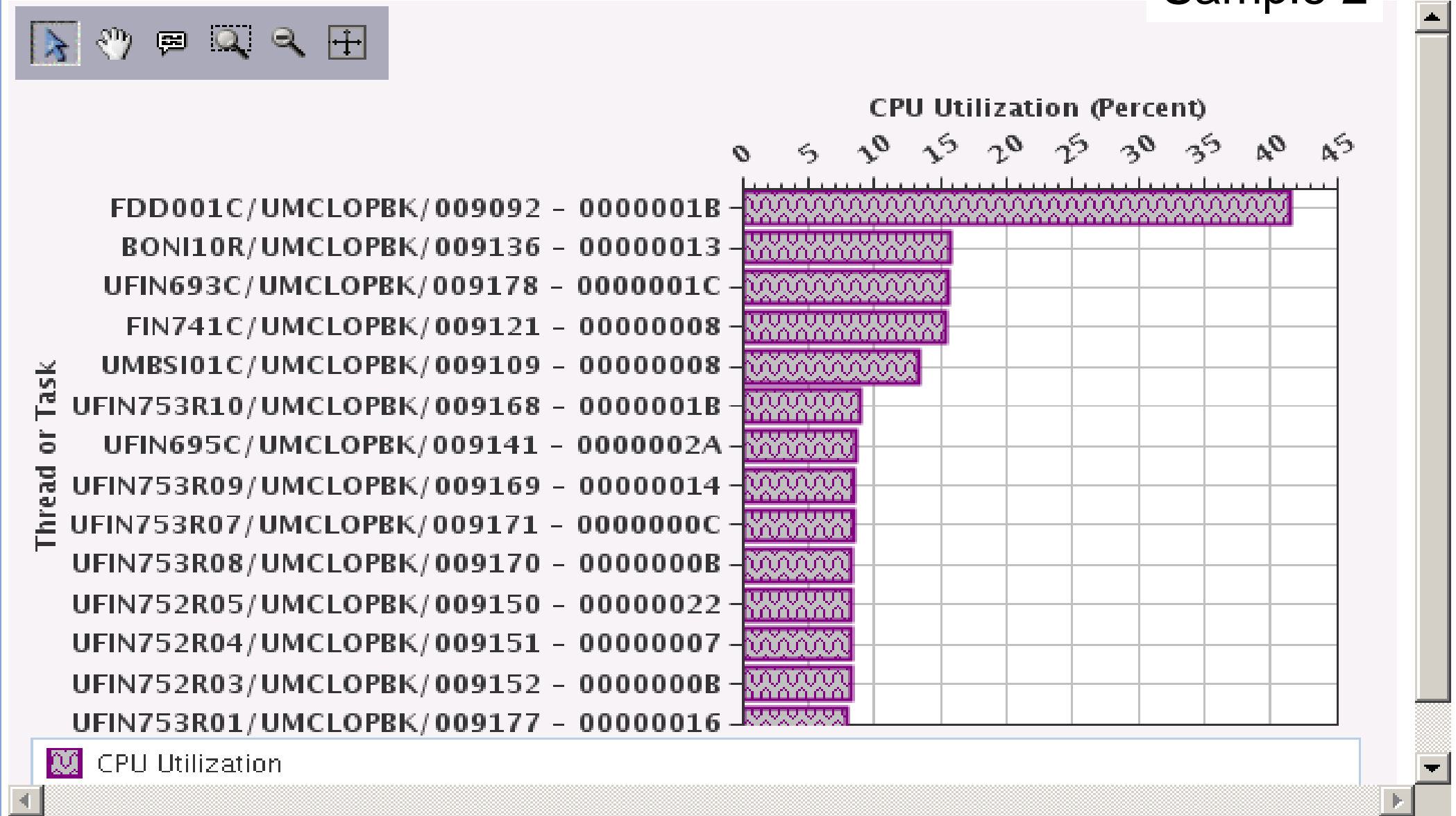
CPU Utilization by Job or Task



Use this to identify CPU cycle “hogs” – should be none here since CPU % is low for each job

CPU Utilization by Thread or Task

Sample 2



Use this to identify CPU cycle “hogs” – there’s a high CPU here



Performance(1) X

Investigate... X

--- Select Action ---

Perspectives

Selection

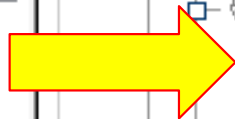
- [Performance Explorer](#)
- [Disk Watcher](#)
- [Collection Services](#)
 - [CPU Utilization and Waits Overview](#)
 - [CPU Utilization by Thread or Task](#)
 - [Resource Utilization Overview](#)
 - [Job Statistics Overviews](#)
 - [Waits](#)
 - [CPU](#)
 - [Disk](#)
 - [Physical Disk I/O](#)
 - [Synchronous Disk I/O](#)
 - [Page Faults](#)
 - [Page Faults Overview](#)
 - [Page Faults by Job or Task](#)
 - [Page Faults by Thread or Task](#)
 - [Page Faults by Generic Job or Task](#)
 - [Page Faults by Job User Profile](#)
 - [Page Faults by Job Current User Profile](#)
 - [Page Faults by Subsystem](#)
 - [Page Faults by Server Type](#)
 - [Page Faults by Pool](#)
 - [Logical Database I/O](#)
 - [Virtual I/O](#)
 - [Communications](#)
 - [5250 Display Transactions](#)

Name

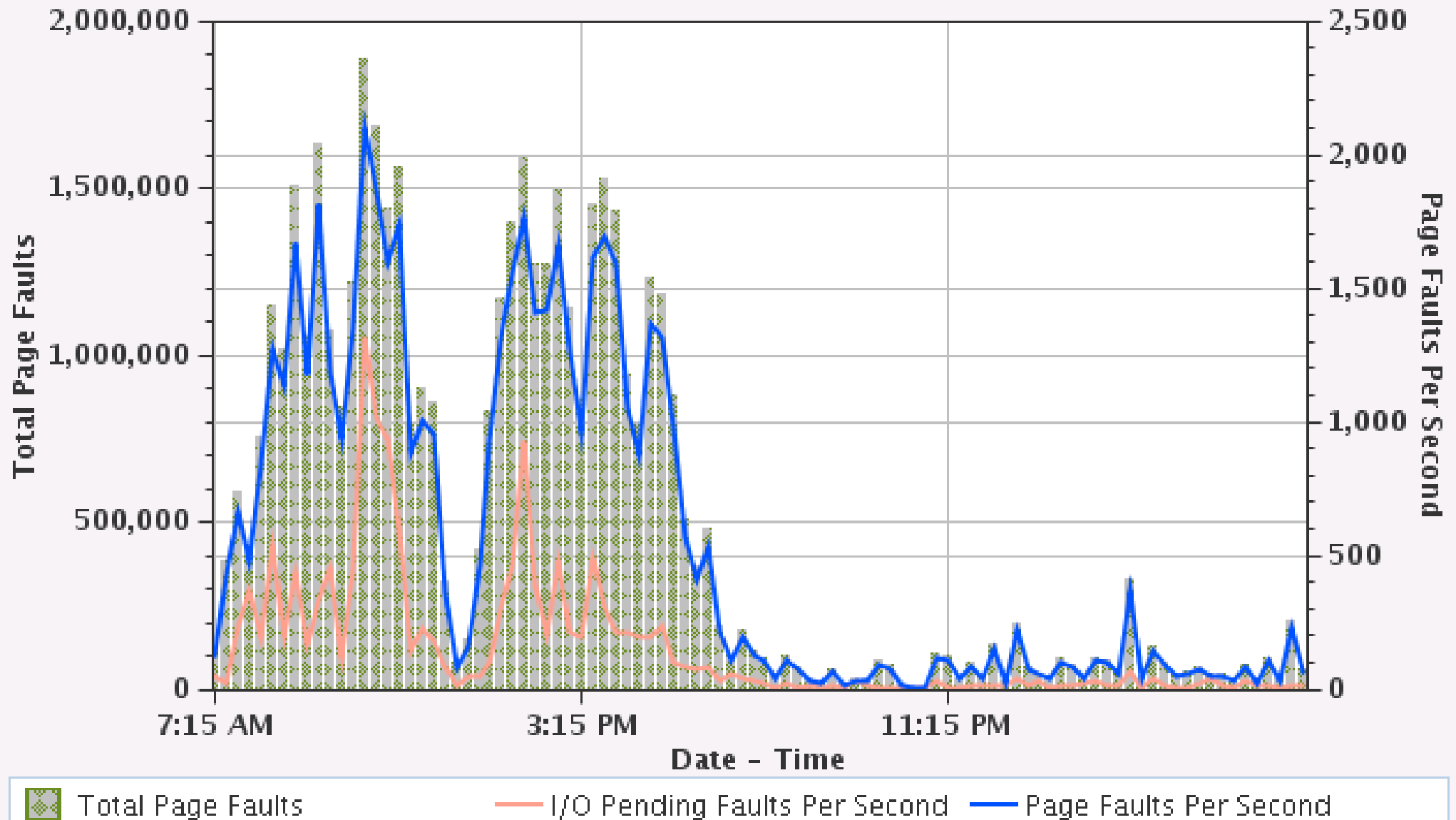
Page Faults Overview

Description

This chart shows I/O pending and page fault rates per second for all contributors over time. Use this chart to select a time frame for further detailed investigation.



Page Faults Overview





Performance(1) X

Investigate... X

--- Select Action ---

- Performance Explorer
- Disk Watcher
- Collection Services
 - CPU Utilization and Waits Overview
 - CPU Utilization by Thread or Task
 - Resource Utilization Overview
 - Job Statistics Overviews
 - Waits
 - CPU
 - Disk
 - Physical Disk I/O
 - Synchronous Disk I/O
 - Page Faults
 - Page Faults Overview
 - Page Faults by Job or Task
 - Page Faults by Thread or Task
 - Page Faults by Generic Job or Task
 - Page Faults by Job User Profile
 - Page Faults by Job Current User Profile
 - Page Faults by Subsystem
 - Page Faults by Server Type
 - Page Faults by Pool
 - Logical Database I/O
 - Virtual I/O
 - Communications
 - 5250 Display Transactions

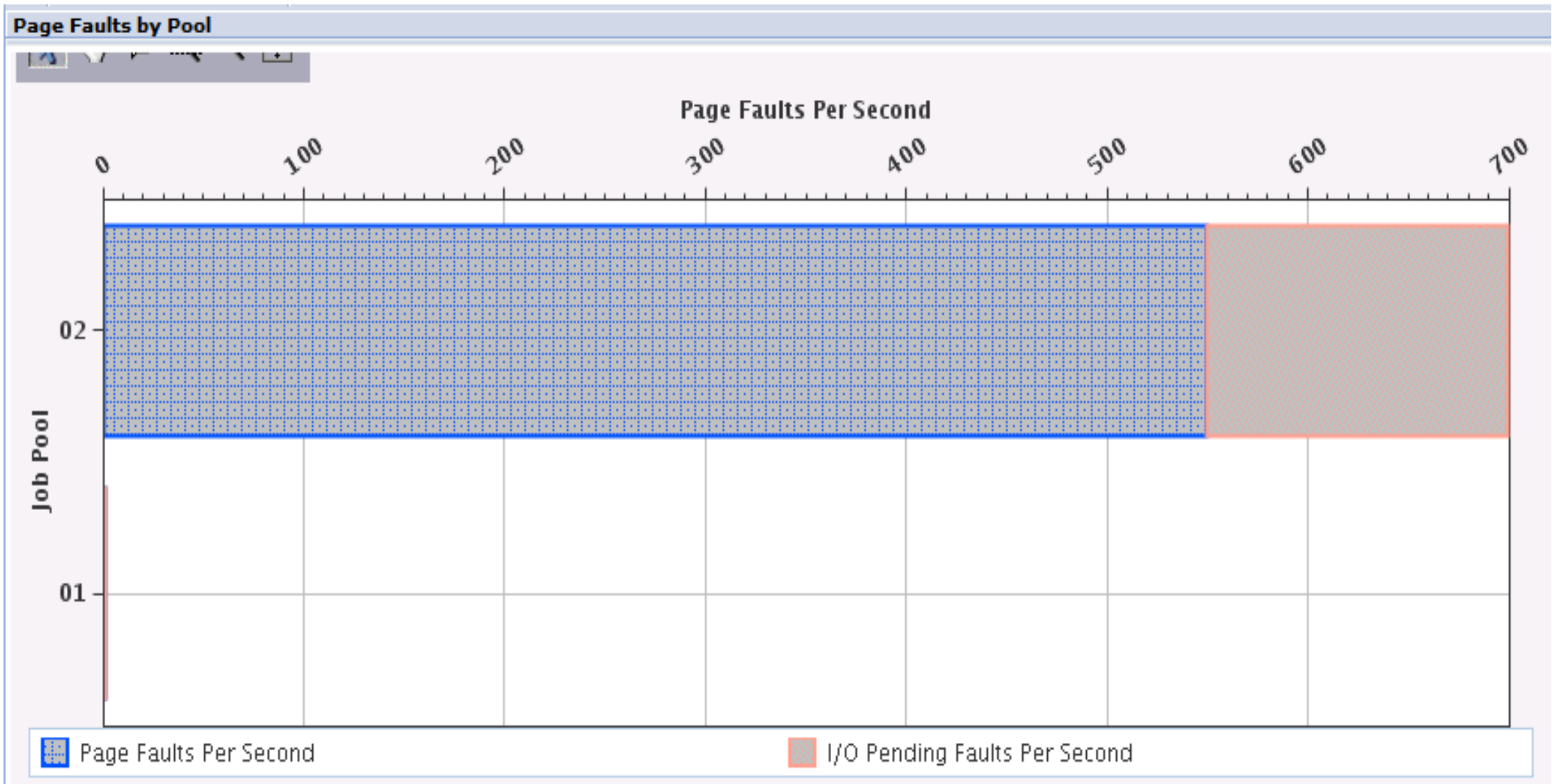


name

Page Faults by Pool

Description

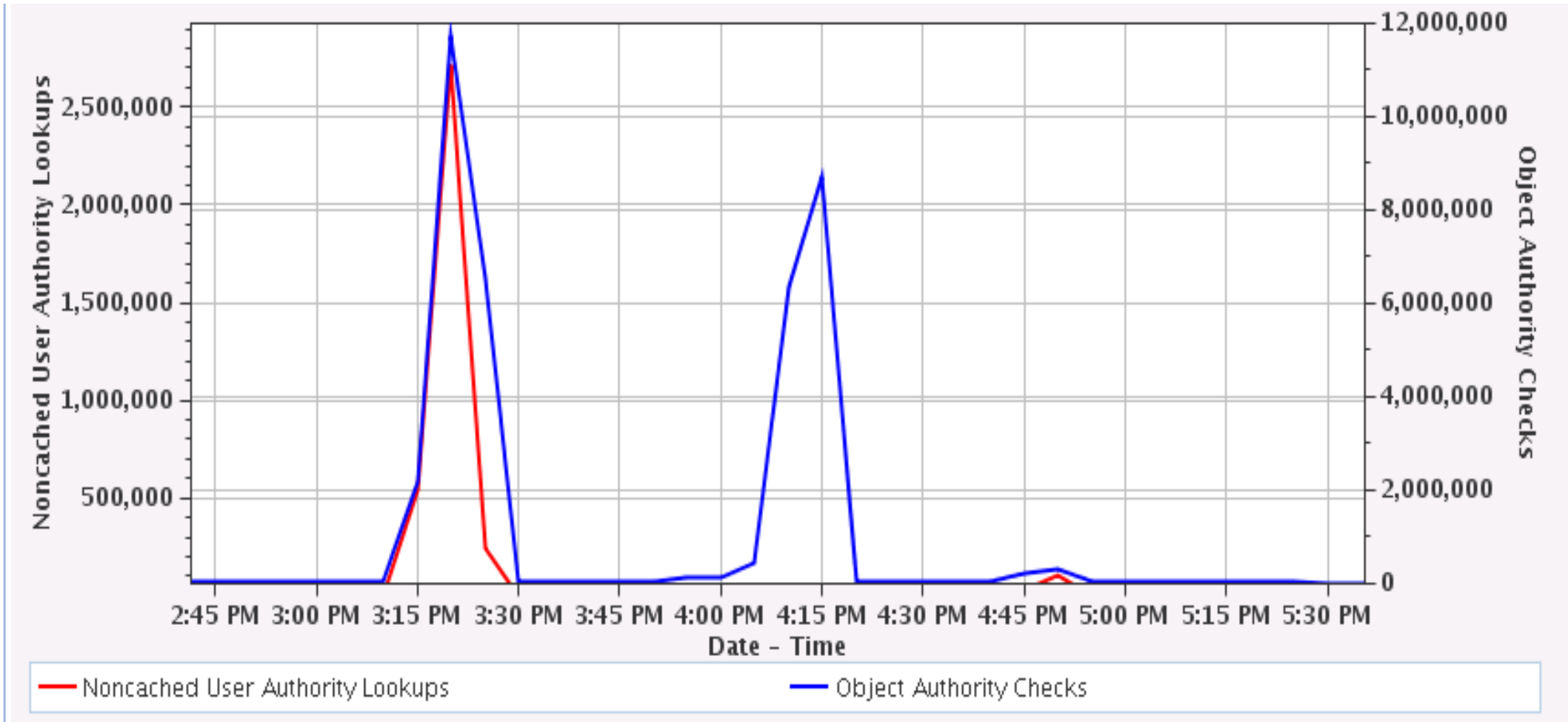
This chart shows I/O pending and page faults as an I/O rate per second grouped by job pool and ranked by the largest contributors. Use this chart to select contributing groups for further detailed investigation.



There are only 2 main memory pools in this system

Object authority lookup overhead

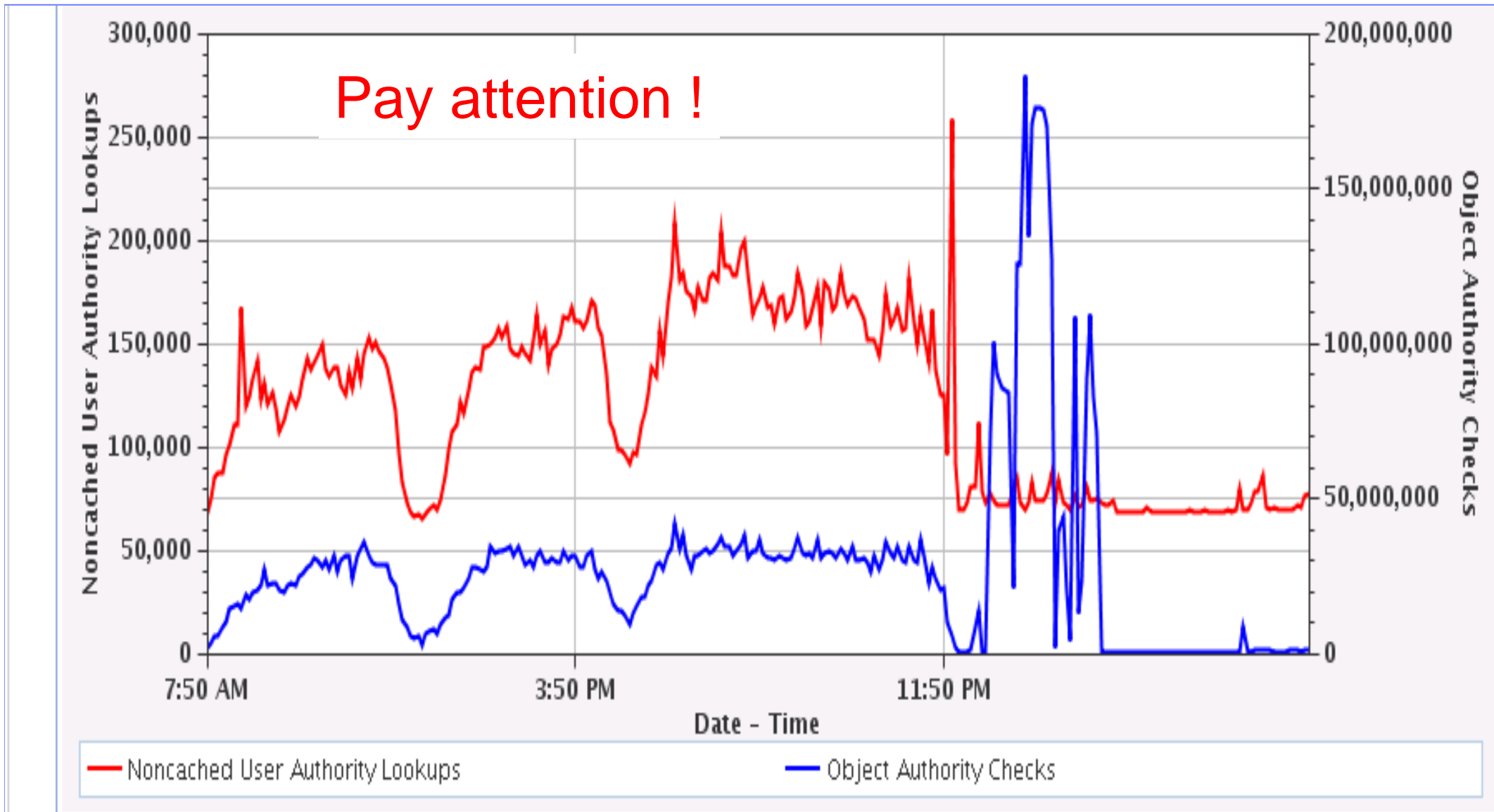
Sample 1



This chart is a custom perspective – Design Mode

Object authority lookup overhead

Sample 2



This chart is a custom perspective – Design Mode

Tools for Working With the Graphs

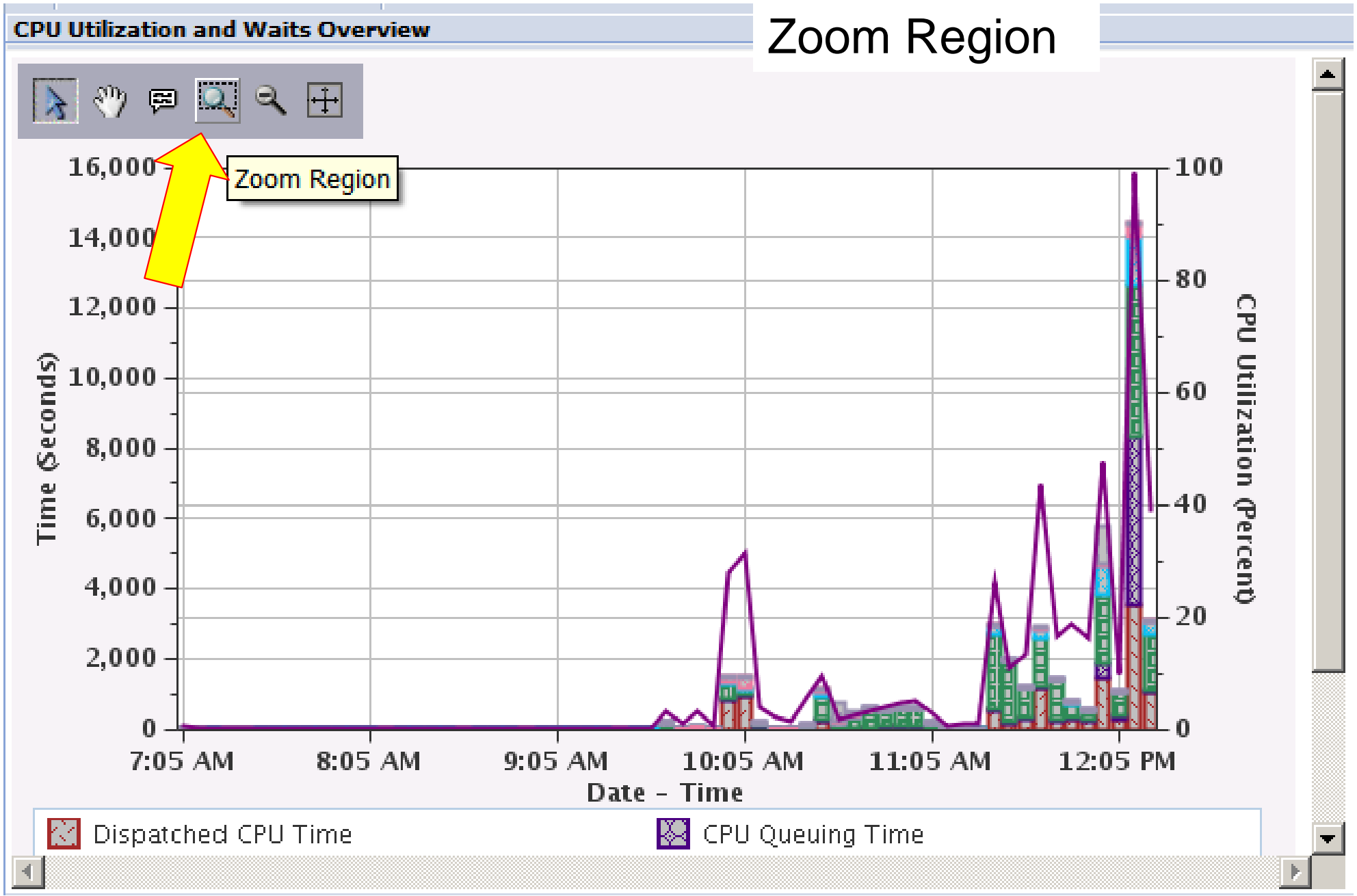


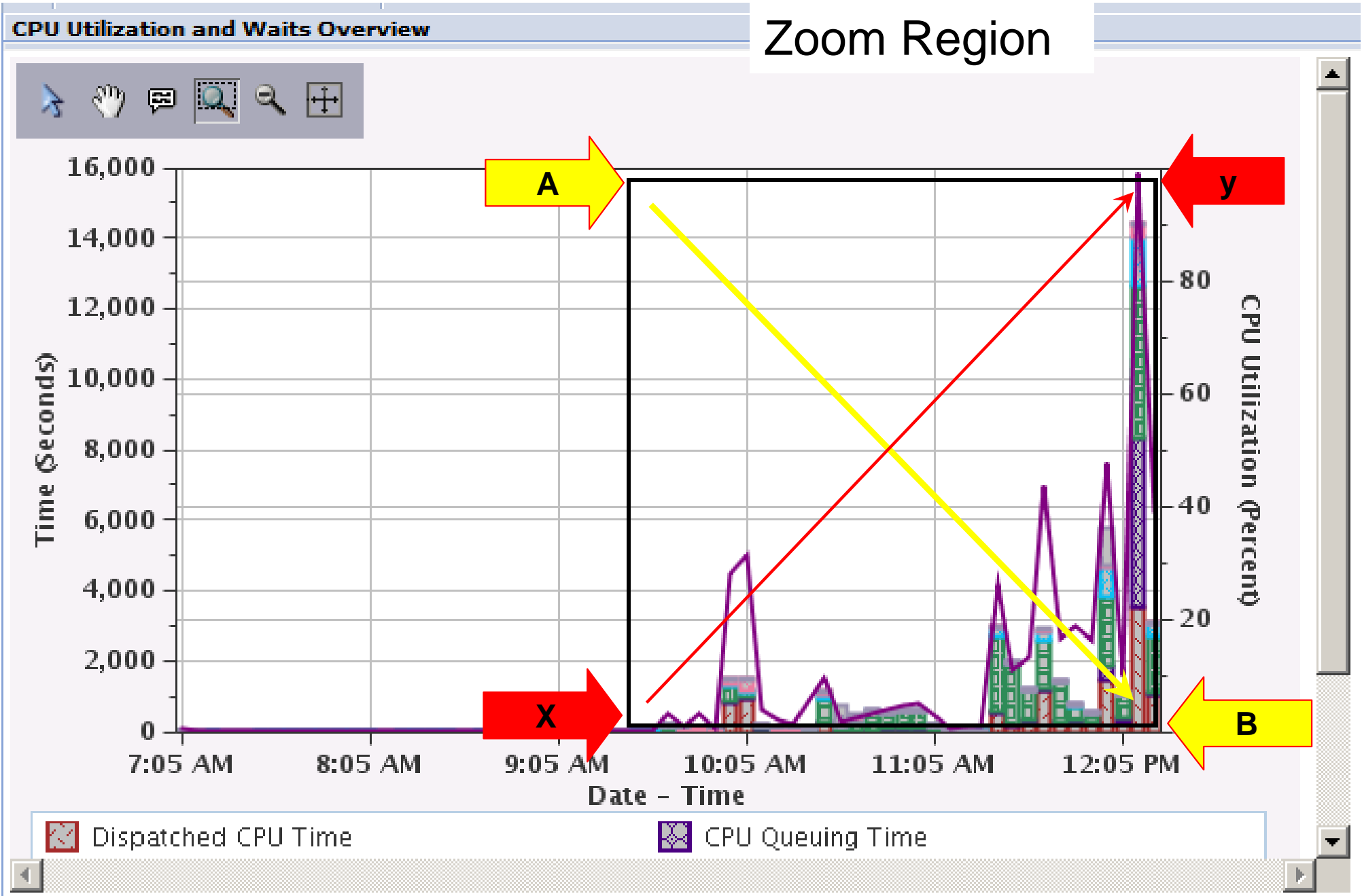
- Select Data Point
- Pan Chart
- Show Tooltips
- Zoom region
- Zoom Out
- Reset Zoom

How to focus on specific time period in the large graph

1. While in a graph, click the icon “Zoom Region”
2. Move the mouse pointer into the graph and click-and-hold on the “left top corner” of the area you want to zoom in
3. Then drag the mouse pointer diagonally to the “right bottom corner” of the area you want to zoom in and release the mouse click and click once more
4. You then see a rotating hourglass icon and the zoomed in graph is displayed

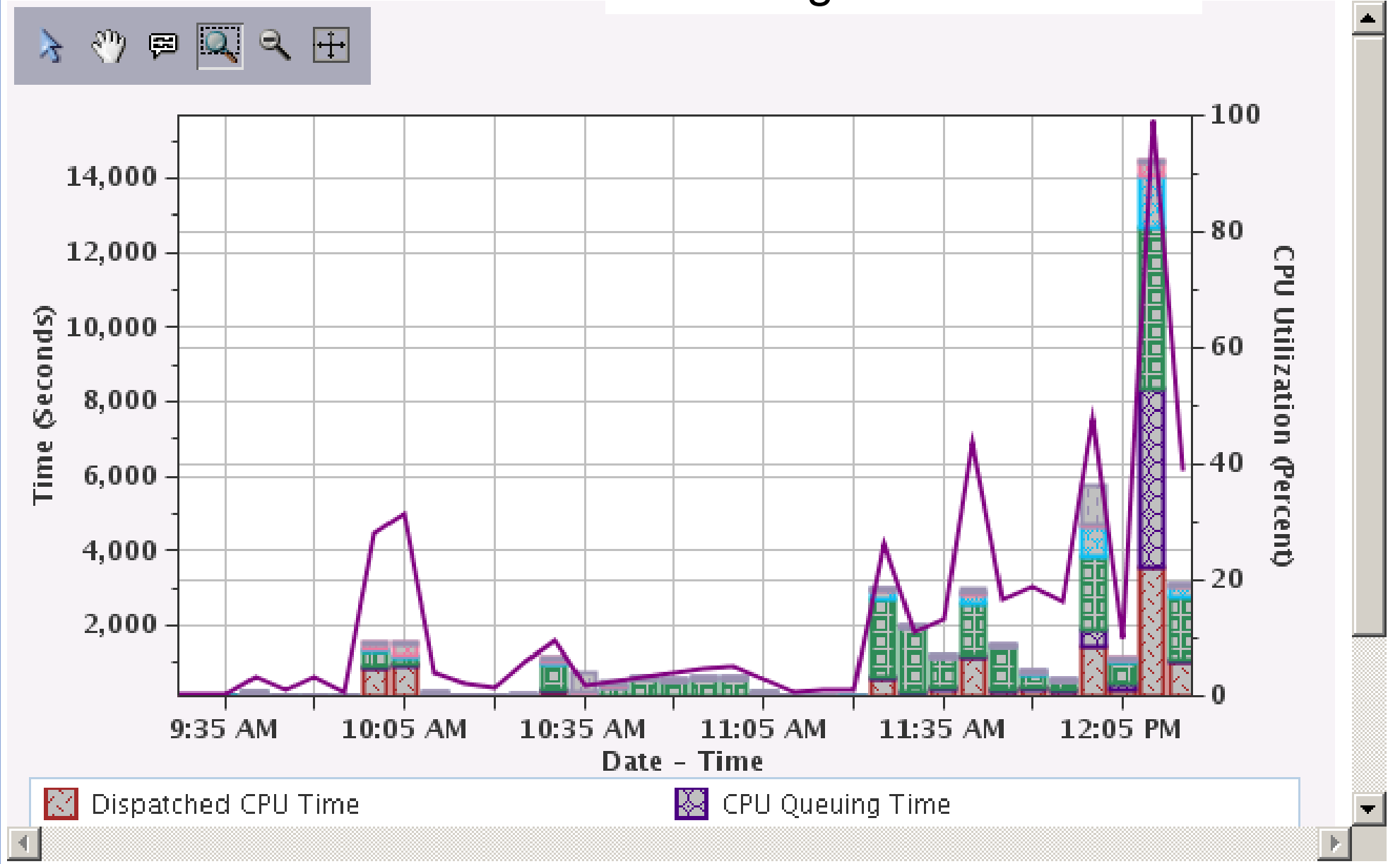
See next 3 pages





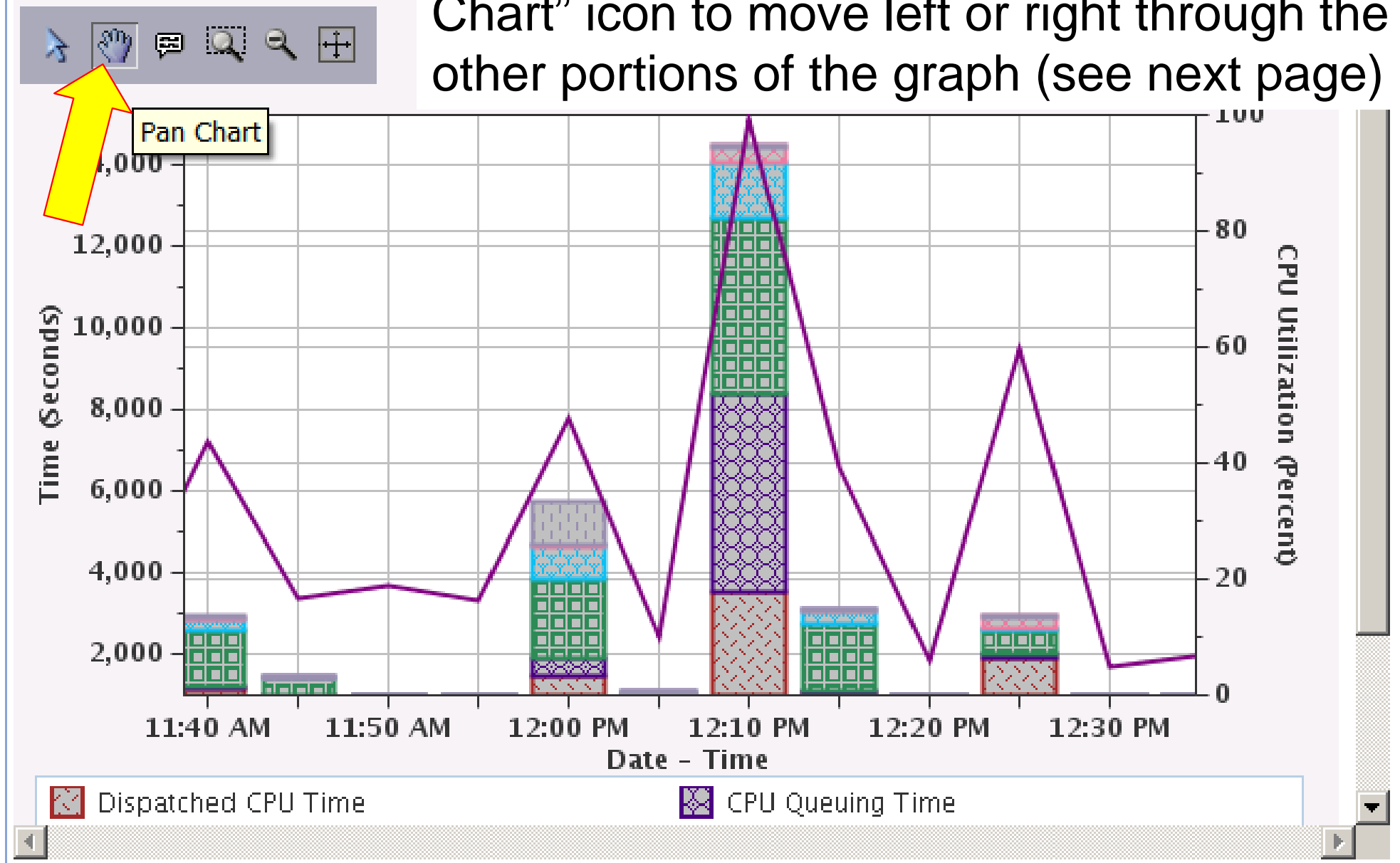
CPU Utilization and Waits Overview

Zoom region result view



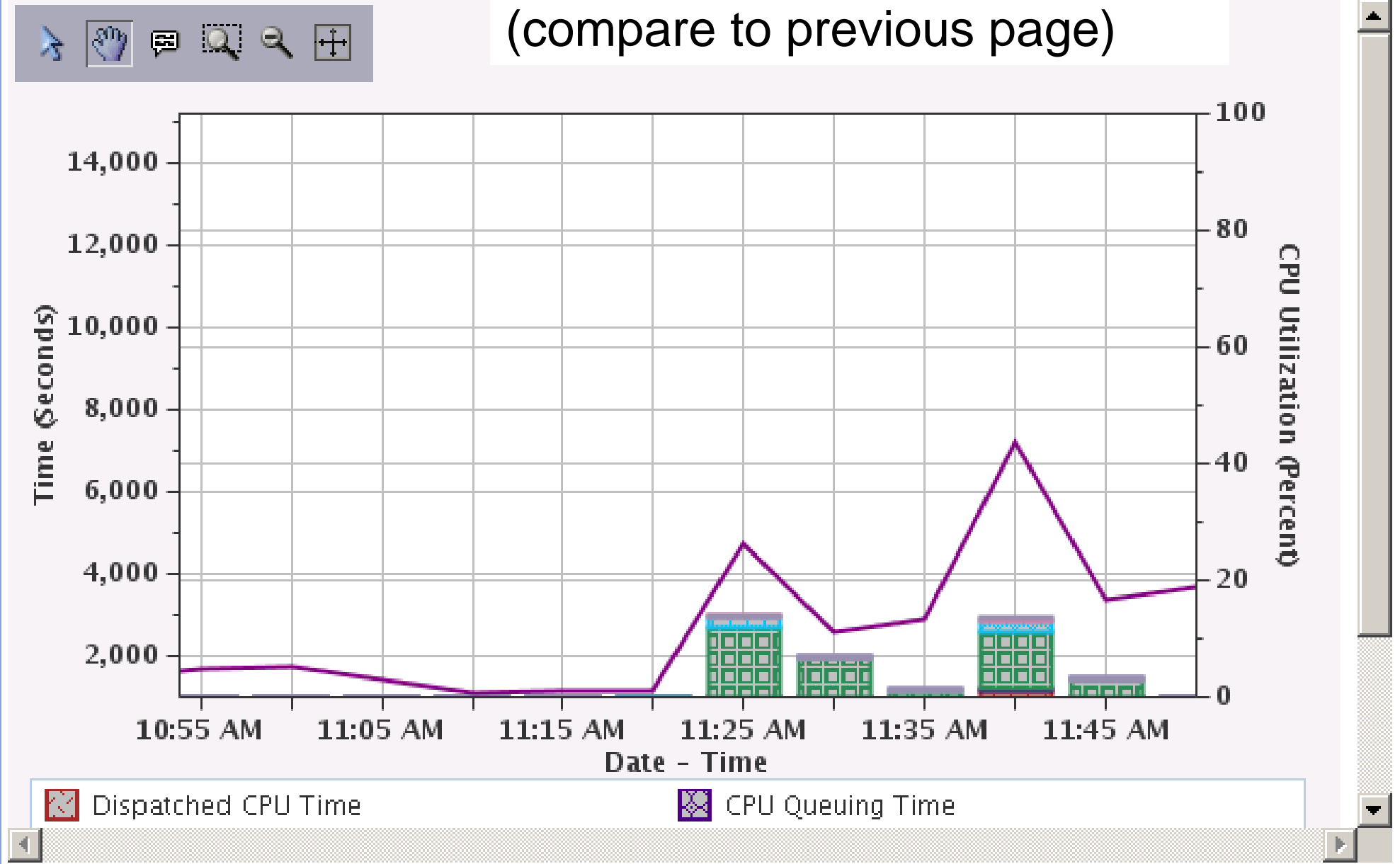
CPU Utilization and Waits Overview

When in Zoom Region mode, click “Pan Chart” icon to move left or right through the other portions of the graph (see next page)



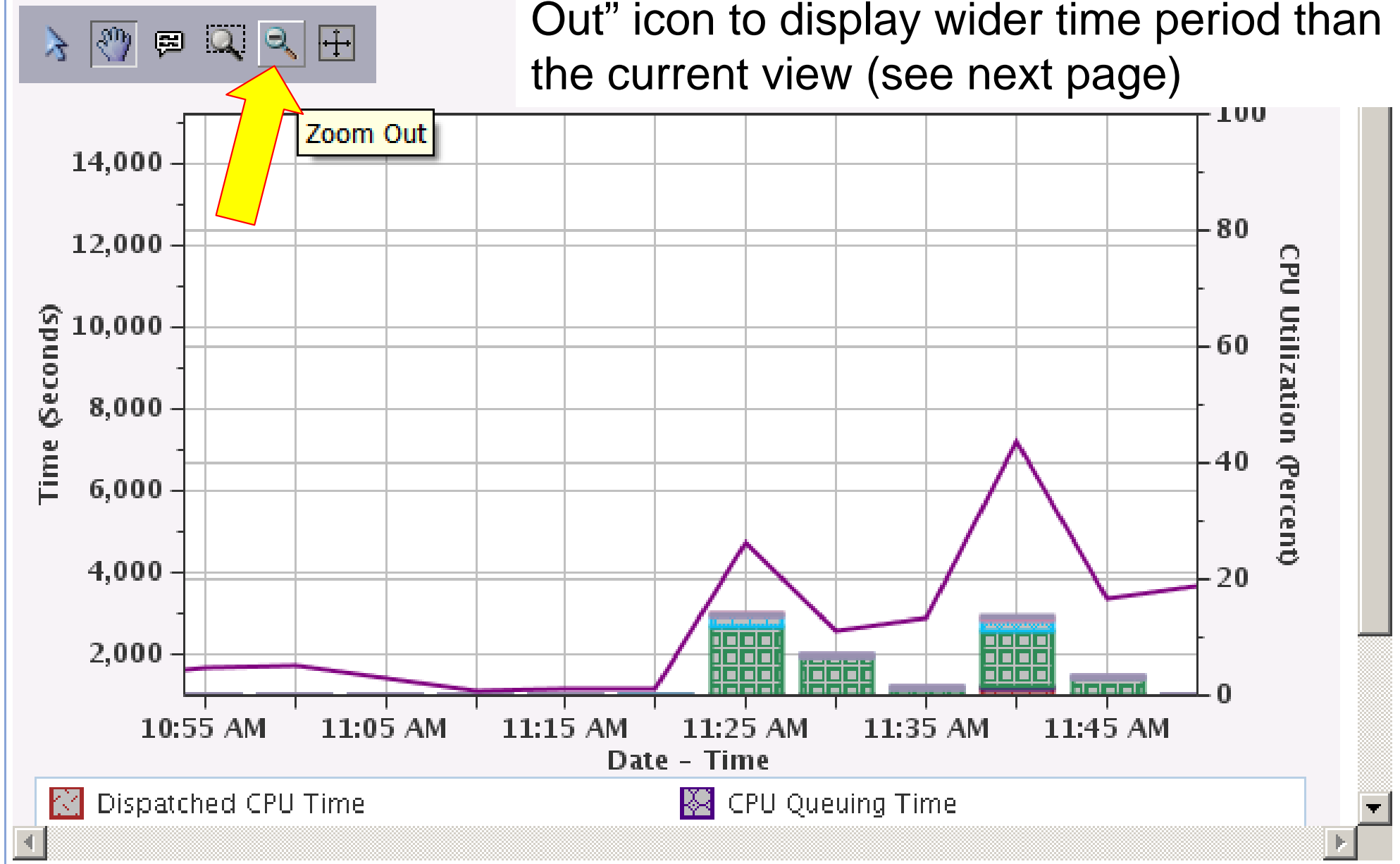
CPU Utilization and Waits Overview

Pan Chart – move to left
(compare to previous page)

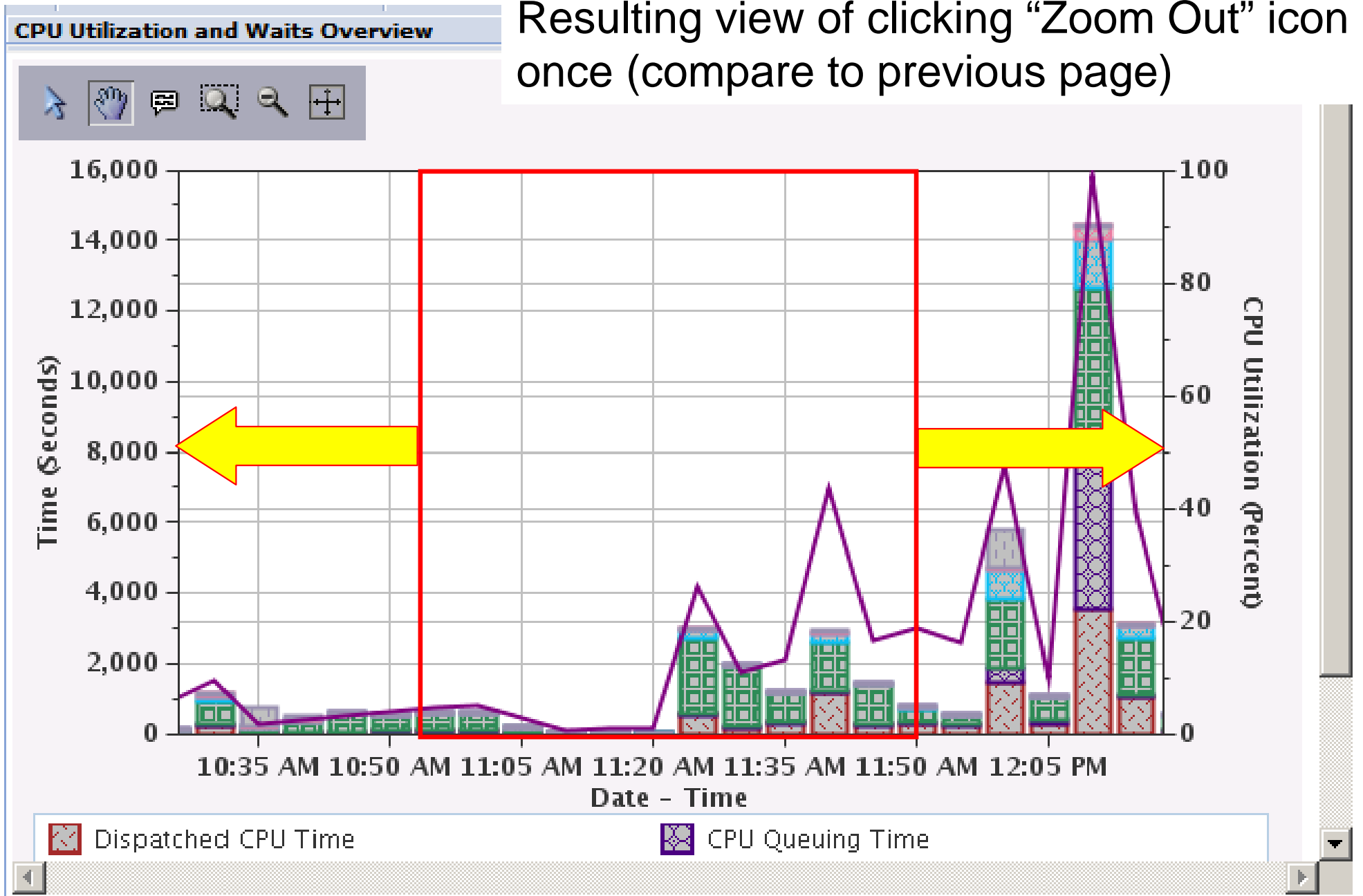


CPU Utilization and Waits Overview

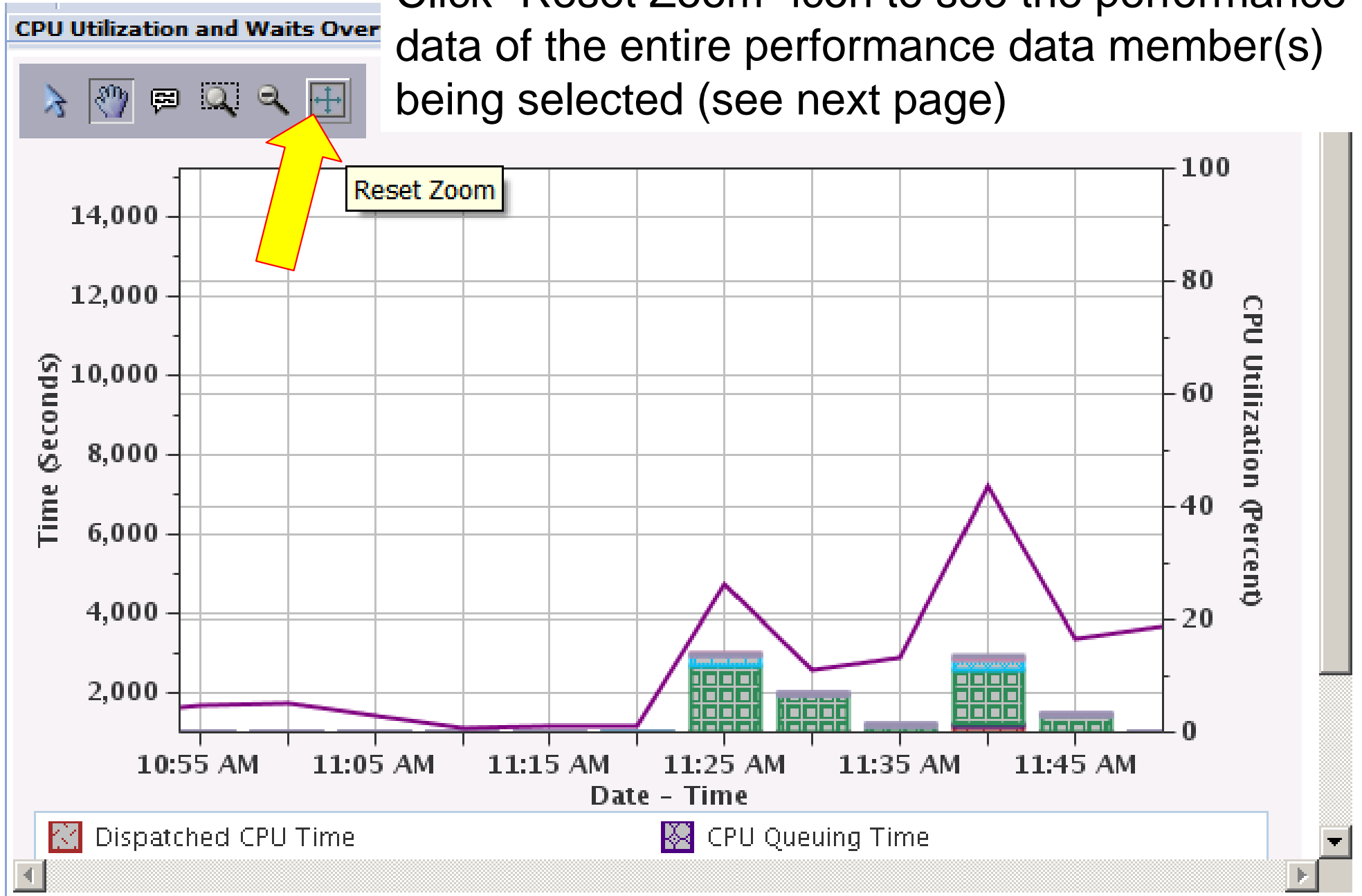
When in Zoom Region mode, click “Zoom Out” icon to display wider time period than the current view (see next page)



Resulting view of clicking "Zoom Out" icon once (compare to previous page)

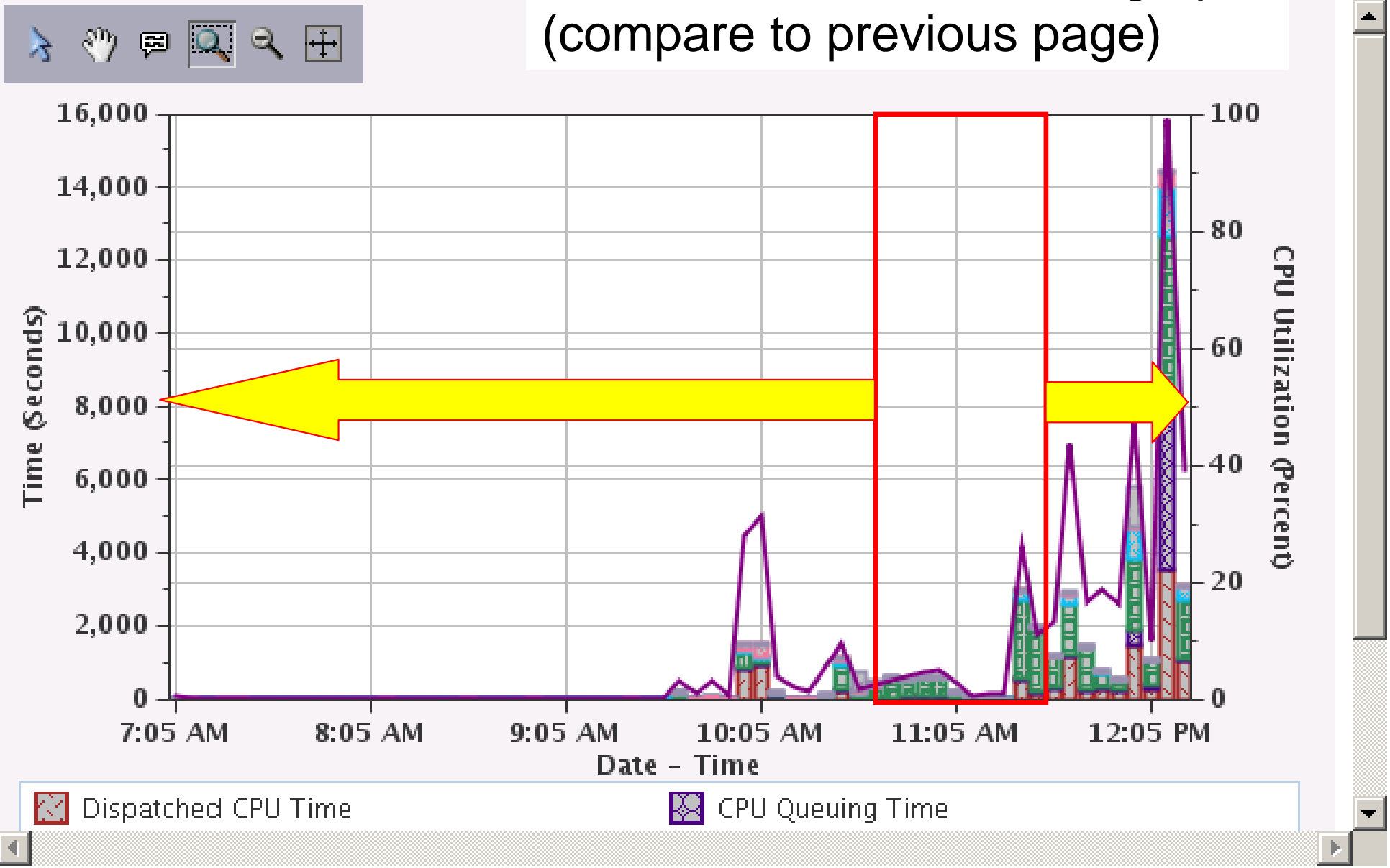


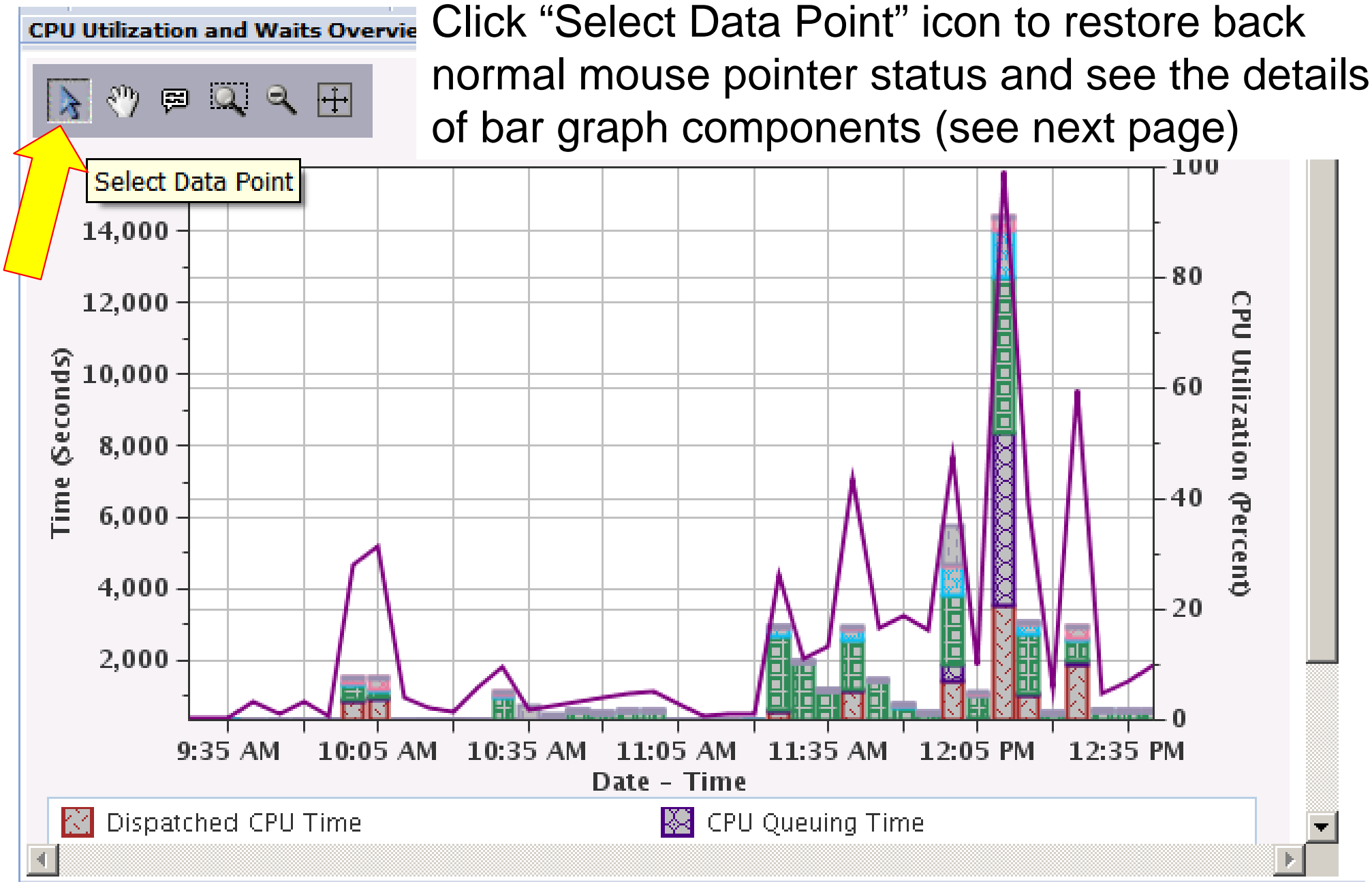
Click "Reset Zoom" icon to see the performance data of the entire performance data member(s) being selected (see next page)



CPU Utilization and Waits Overview

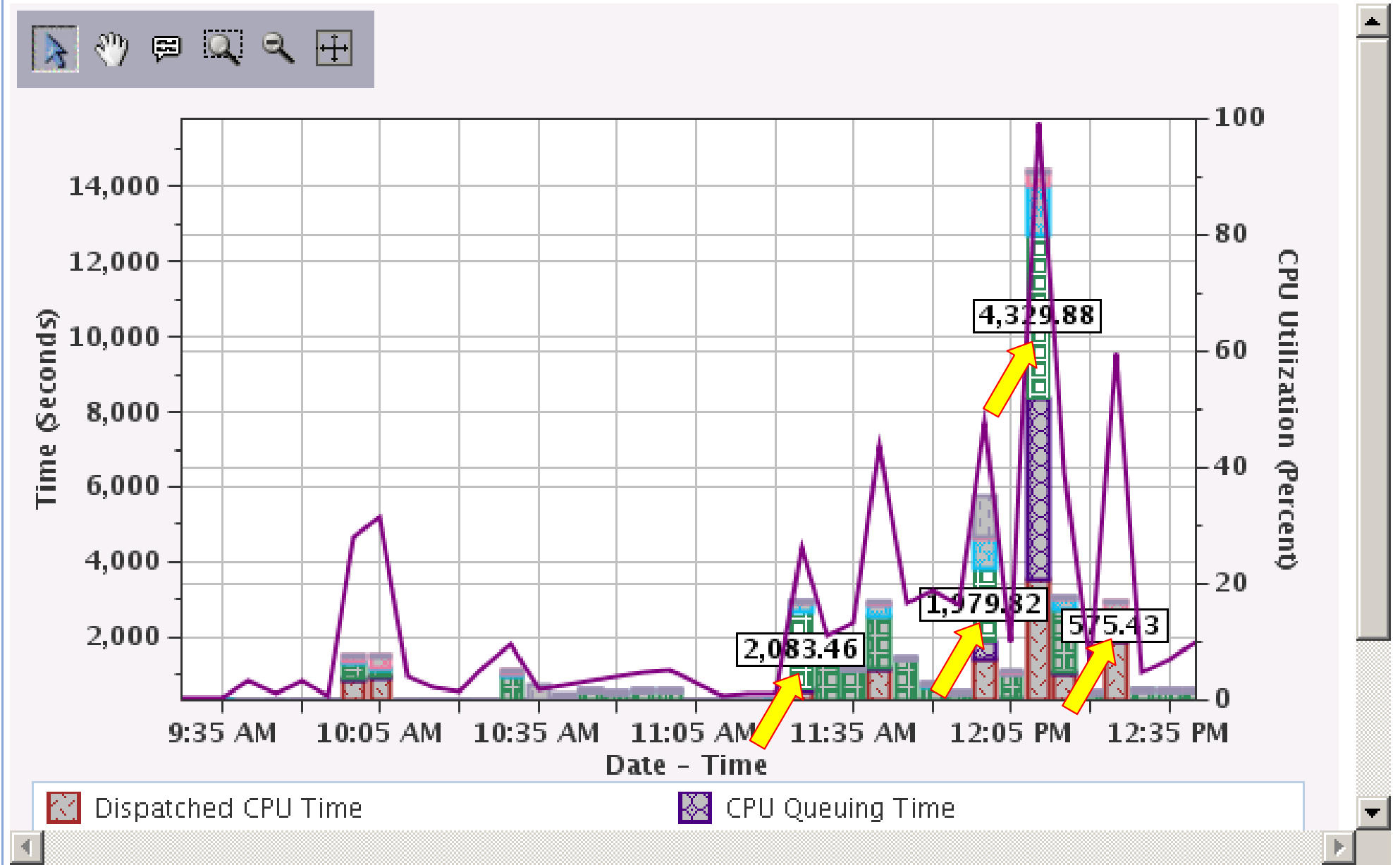
“Reset Zoom” view of the graph
(compare to previous page)

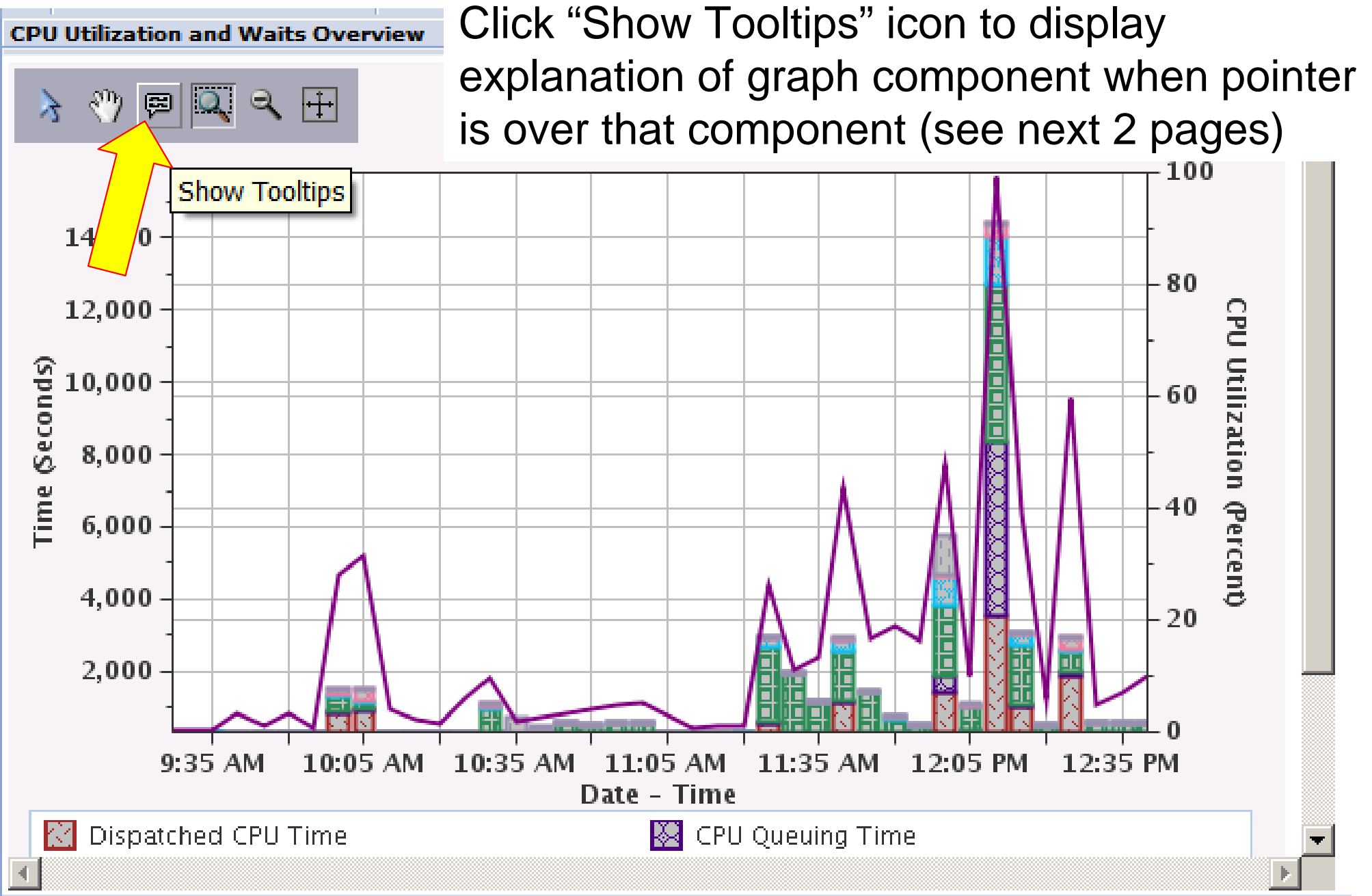




Select data Point

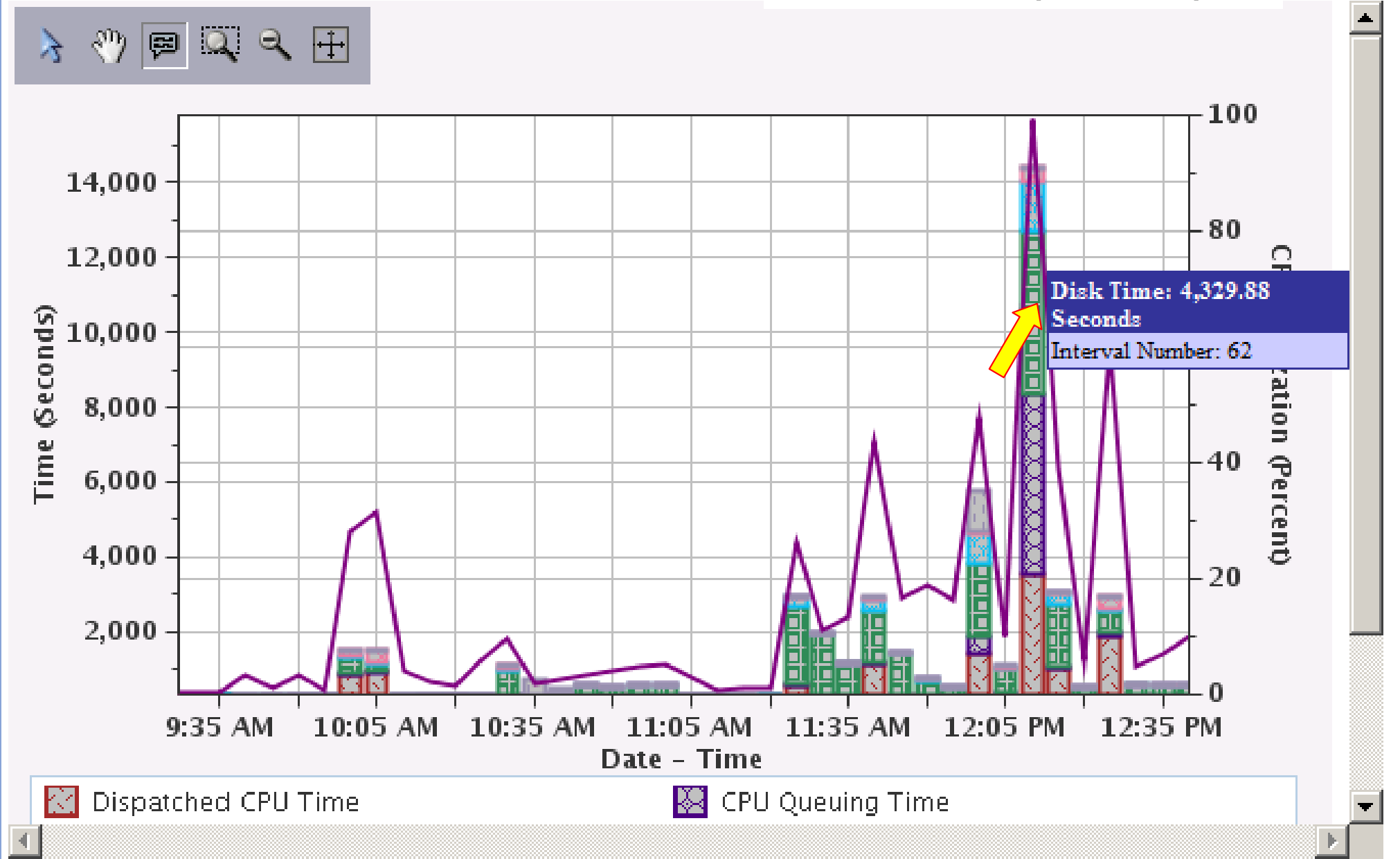
CPU Utilization and Waits Overview





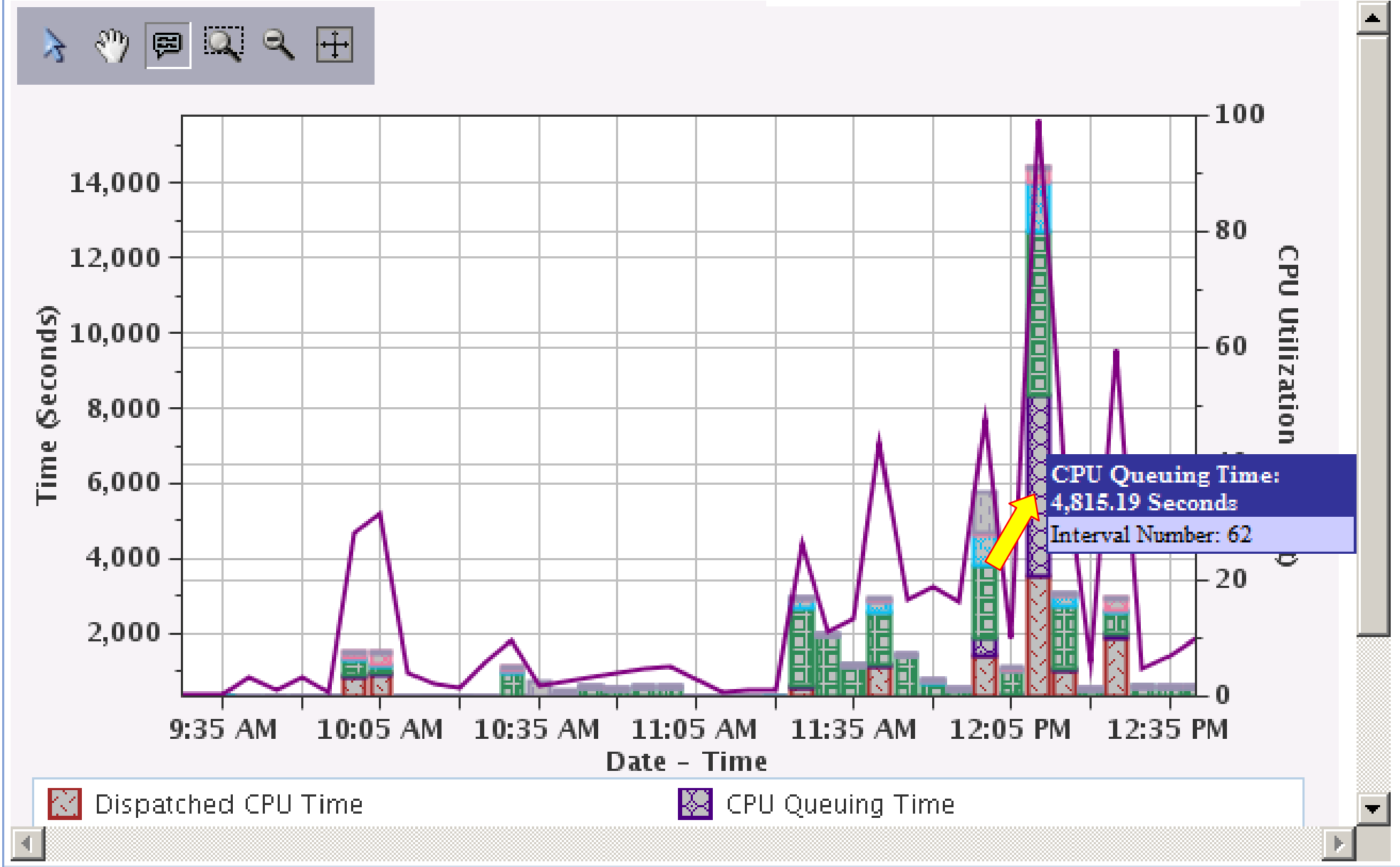
CPU Utilization and Waits Overview

Show Tooltips sample



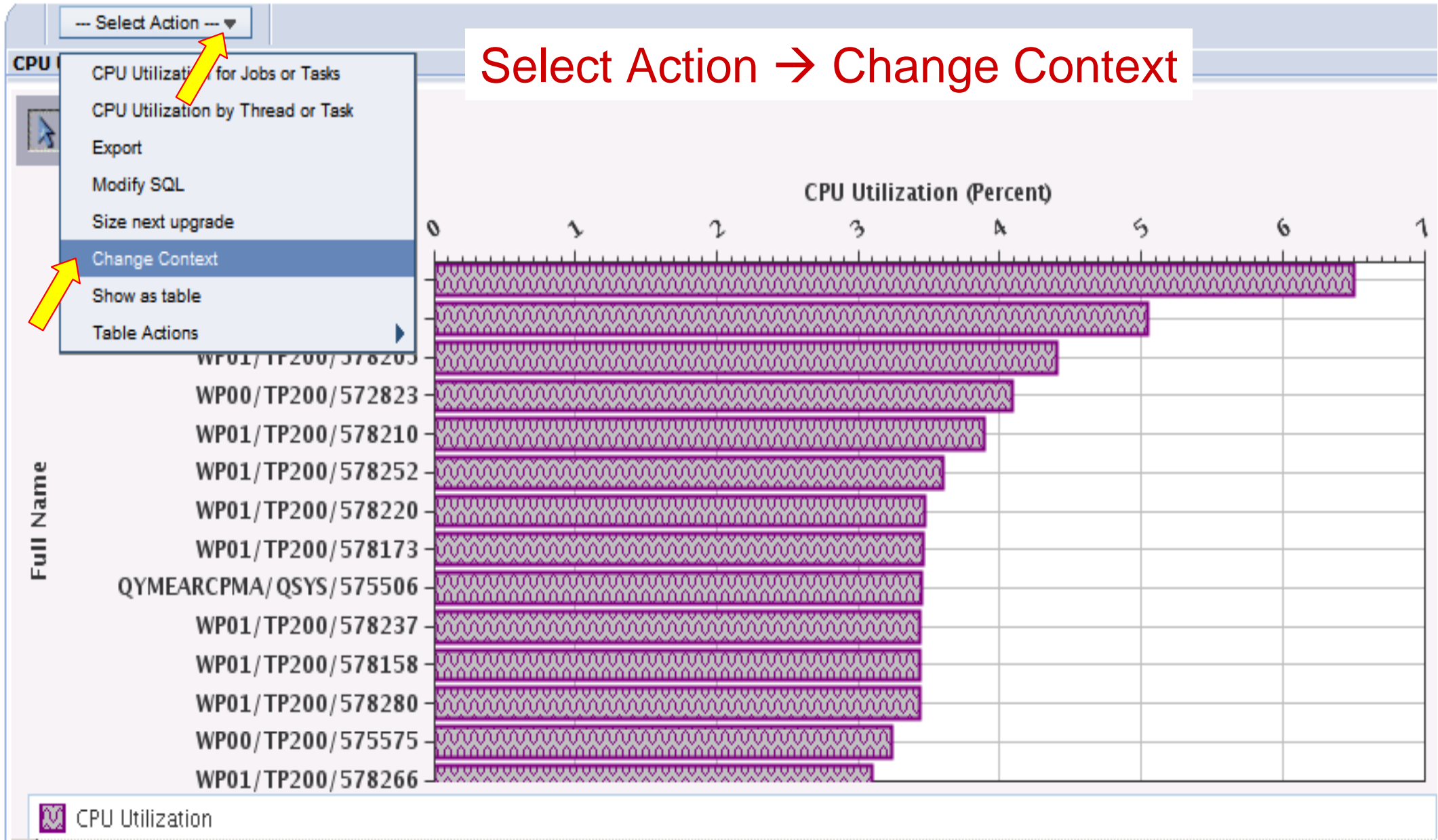
CPU Utilization and Waits Overview

Show Tooltips sample



Change Context = Data Filtering Capability

Select Action → Change Context



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	WP04	No
JBNBR	Job Number		No
JBUSER	Job User	TP200	No
MINDTECEN	Century Digit		No
MINDTETIM	Interval Date And Time		No
MAXDTECEN	Century Digit		No
MAXDTETIM	Interval Date And Time		No
Collection Library		QMPPGDATA	Yes
Collection Name		Q206070003	Yes

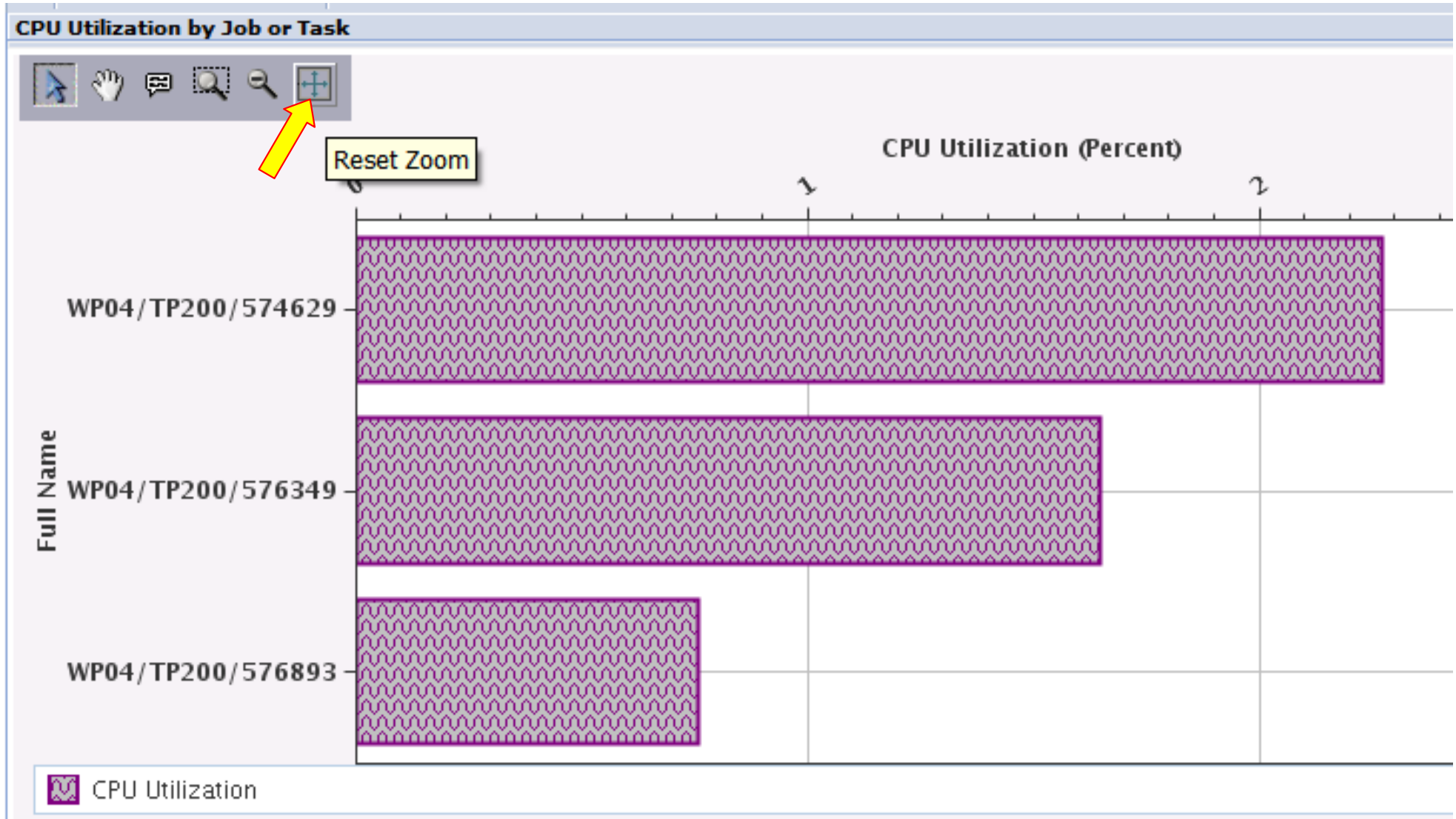
Page 1 of 1 | 1 | Go | Rows 11 | Total: 11

- Type in filtering information and click OK
- Must type exact text, no wildcard text
- Case Sensitive

OK

Cancel

Change Context Sample Result



More information on PDI Tool

Many blog posts in iCan blog by Dawn May at http://ibmsystemsmag.blogs.com/i_can/performance

Articles on PDI:

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

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

http://www.ibm.com/developerworks/ibmi/administrator/performance/PDI_perspectives/

IBM DeveloperWorks – IBM i Performance Resources

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



*Thank
You*