Introduction to the IBM i Performance Data Investigator

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Agenda Key: 23CV
Introduction to the IBM i Performance Data Investigator

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

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

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

  - A lot... A LOT... A LOT!
Why PDI?

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

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

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

- Or…..you could let PDI give you clues…….
Why PDI?

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

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

- You could simply choose to ignore performance data……

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

- Integrated and free!
- Easy to use
- Simplifies analysis

*i PDI, do you?*
Let’s get started using PDI……..
IBM Navigator for i

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

• Major enhancements have been made to Navigator for i and the Performance Data Investigator
  – IBM i 7.3!
    o HTTP Server group PTF SF99722
    o Java group PTF SF99725
    o Database group PTF SF99703
    o Performance Tools group PTF SF99723
  – For 7.2 - install the latest level of:
    o HTTP Server group PTF SF99713
    o Java group PTF SF99716
    o Database group PTF SF99702
    o Performance Tools group PTF SF99714
  – For 7.1 - install the latest level of:
    o HTTP Server group PTF SF99368
    o Java group PTF SF99572
    o Database group PTF SF99701
    o Performance Tools group PTF SF99145
Java 64-bit Requirement

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

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

• Product install requirements:
Browser Support

- IBM Navigator for i supports the latest versions of the following browsers:
  - Mozilla Firefox
  - Google Chrome 25 or higher
    - Google Chrome Certificate Authority instructions for Google Chrome releases 44 and later with the 2015 IBM Navigator for i PTFs.
  - Support for Apple Safari & Microsoft Edge is new

Recommend most current versions

- Browser tips:
  - Unexpected results could be browser related. Example problems are….
    - Hung charts
    - Empty tables

- Clear your browser cache after installing the PTFs
- Review your browser security settings
  - For details see the following web page:
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

• Use Application Runtime Expert to validate your environment
  – Network health checker can be run from QShell:
    /QIBM/ProdData/OS/OSGi/templates/bin/areVerify.sh –network

• Use the Web Performance Advisor to validate your Web Performance
  – http://pic.dhe.ibm.com/infocenter/iseries/v7r1m0/topic/rzaie/rzaieconwebperfadvisor.htm
Performance Tasks

- “Performance” is a major function in Navigator
  - Investigate Data
  - Manage Collections
  - And much more!
Packaging: Performance Tools Licensed Program Product

- IBM i for **Collection Services, Health Indicators, Monitors** 7.2 and **Graph History** 7.3

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

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

- **Performance Tools - Agent Feature**

- **Performance Tools - Job Watcher**
Packaging: Performance Tools Licensed Program Product

IBM Performance Tools – Manager feature

IBM Performance Tools – Job Watcher feature

Included with the base operating system

IBM Performance Tools – Manager feature and latest PTFs
Packaging: Performance Tools Licensed Program Product

7.2 and 7.3

- Included with the base operating system
- IBM Performance Tools – Manager feature
- IBM Performance Tools – Job Watcher feature
Prerequisites: Authorizing Users to PDI

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

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

```
Edit Authorization List

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

Type changes to current authorities, press Enter.  

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

More...
```
Verify Collection Services is Active

- Collection Services is the foundation for many performance tasks
  - Make sure Collection Services is active (it is started by default)
Prerequisites – Create Database Files During Collection

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

**Command interface:**

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

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

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

**Invesitgate Data - Performance Data Investigator**

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

**Collection**

- **Collection Library**: QPFRDATA
- **Collection Name**: Most Recent

- [Display]
- [Search]
- [Save as Favorite]
- [Options]
- [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.

Content Package is a set of perspectives that share a commonality (major theme).
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 were added in 7.2
    • System monitor data
Suggested Starting Points

Investigate Data - Performance Data Investigator

**Perspectives**

- Health Indicators
- Monitor
- Collection Services
  - CPU Utilization and Waits Overview
  - CPU Utilization by Thread or Task

**Selection**

**Name**
- CPU Utilization and Waits 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.

**Perspectives**

- Health Indicators
- Monitor
- Collection Services
  - CPU Utilization and Waits Overview
  - CPU Utilization by Thread or Task

**Selection**

**Name**
- CPU Utilization by Thread or Task

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

**Perspectives**

- Health Indicators
- Monitor
- Collection Services
  - CPU Utilization and Waits Overview
  - CPU Utilization by Thread or Task
  - Resource Utilization Overview

**Selection**

**Name**
- Resource Utilization Overview

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

**View List**

- Resource Utilization Percentages
- Resource Utilization Rates
CPU Utilization by Thread or Task

Collection
Name(s): CS228229ND
Library: COMMON
Type: Collection Services File Based Collection
File level: 48

System
Name: RCHASTND
Release: V6R1M0

CPU Utilization by Thread or Task - Top 50 Contributors

Thread or Task
RMNODETASKMOVER
QRWTSRVR/QUSER/351073 - 00000005
QJVACMDSRV/TPOIRIER/351425 - 00000006
QP0ZSYSC/QCPMGTDIR/351069 - 00000003
QP0ZSYSC/QCPMGTDIR/351055 - 00000002
QP0ZSYSC/QCPMGTDIR/346601 - 00000008

CPU Utilization (Percent)
Resource Utilization Overview

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

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

Show/hide Context
Show/hide System Information

Provides quick access to system information from Collection Services QAPMCONF file for the Collection being viewed.
This one is a large partition on a big Power box

QPFRADJ System Value setting is new in 7.2
**Navigation History**

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

- Select
- Show Tooltips
- Pan
- Zoom Region
- Zoom out
- Reset Zoom
Selection
Select data points

Future drill-downs will respect timeframe selected
Pan

Shift chart right or left, up or down
Tool Tips  See metric details for an interval

### CPU Utilization and Waits Overview

**Collection**
- Name(s): CS226229ND
- Library: COMMON2
- Type: Collection Services File Based Collection

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

**System**
- Name:
- Release: V6R1M0

--- Select Action ---

**Operating System Contention Time:** 31,360.91 Seconds
**Interval Number:** 20
Zoom Region  Zoom in on a range of data
Zoom Region Results

CPU Utilization and Waits Overview

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

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

**System**
- Name: Release: V6R1M0

--- Select Action ---

CPU Utilization and Waits Overview

![Diagram showing CPU utilization and waiting times over time]
Zoom out expands the graph each time it is clicked.
A way to quickly view entire collection characteristics
Drill-down

Graph options for next step in analysis

Other options to work with data or refine graphs
Export - *\.png, *\.jpeg, *\.csv, *\.txt
Modify SQL – customize the queries

```
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,
```
When a table or chart is modified, you can save that table or chart for your own custom perspective using “Save As…”
CPU Utilization by Job or Task

Save Complete
This perspective was saved successfully.

URL to saved perspective:

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

Collection
Collection Library: QPFRDATA
Collection Name: Most Recent

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### CPU Utilization and Wait Overview

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Total: 96  Filtered: 96
Table Features

- Select All
- Deselect All
- Show Filter Row
- Clear All Filters
- Edit Sort
- Clear All Sorts
### Filter

**Show Filter Row**

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**Condition**

- All numbers
- Numbers less than
- Numbers less than or equal to
- Numbers greater than
- Numbers greater than or equal to
- Numbers equal to
- Numbers not equal to
- Numbers between
- Numbers between and including

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### Power Systems

**Sort**

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### Table

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Columns ...
Show find toolbar / Hide find toolbar
Search the table

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<th>Interval Number</th>
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<th>Partition CPU Utilization (Percent)</th>
<th>Dispatched CPU Time (Seconds)</th>
<th>CPU Q Time (</th>
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</thead>
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<td></td>
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<tr>
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<td>0.02</td>
<td>5.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Enhanced Table Support – Same Features, New UI

Configure Options for Columns

Filter column data

Sort Columns
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 WB05060708
FROM
  (SELECT
   DTECEN || DTETIM AS CSDTETIM,
   DOUBLE(JWTM01) AS TIME01,
   DOUBLE(JWTM02) AS TIME02,
   )
```

CPU Utilization and Waits Overview

--- 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

- Size next upgrade
- Change Context
- Show as table
- Table Actions
Size Next Upgrade
Send data directly to the IBM Workload Estimator

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

Intended for a one-time sizing activity
Investigate Data Search

**Type at least 3 non-empty characters**

**Search In:**
- Package Name
- Description
- Metrics
- Perspective
- View

**Show Columns:**
- Metrics
- SQL

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Perspective</th>
<th>Description</th>
<th>View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection Services</td>
<td>Storage Allocation/Deallocation by Thread or Task</td>
<td>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.</td>
<td>Storage Allocation/Deallocation by Thread or Task Sorted by Allocation</td>
</tr>
<tr>
<td>Collection Services</td>
<td>Storage Allocation/Deallocation Overview</td>
<td>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.</td>
<td>Storage Allocation/Deallocation Overview</td>
</tr>
<tr>
<td>Monitor</td>
<td>Disk Storage Utilization (Average)</td>
<td>Charts show the disk storage utilization (average) metric of the performance data monitored, as well as the metric breakdown details by ASP.</td>
<td>Disk Storage Utilization (Average)</td>
</tr>
</tbody>
</table>
Options

- Use patterns
- Show charts
- Enable design mode
- Show help
- Show SQL error messages
- Set table size: Rows: 15, Columns: 8

Default library
- Use Collection Services configured library
- Use last visited library
- Use library: [empty]

System Monitor
- Show thresholds

OK Cancel
Options – Show SQL Error Messages

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

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

Creating Custom Content Packages
Advanced Edit – Edit the markup language directly

Performance Markup Language (PML) Text:

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

CPU Utilization and Waits Overview

Collection

Name(s): Q067000052
Library: QPFREAD
Type: Collection Services File Based Collection
File level: 35

--- 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

Edit View

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

View

Name: CPU Utilization and Waits Overview
Type: • Table • Chart

Data Set

Modify SQL

Drilldown

Collection Services

CPU Utilization and Waits Overview
CPU Utilization by Thread or Task
Resource Utilization Overview
Job Statistics Overview

Waits

Waits Overview
Seizes and Locks Waits Overview
Contention Waits Overview
Disk Waits Overview
Journal Waits Overview
Classic JVM Waits Overview
All Waits by Thread or Task
Waits by Job or Task
Waits by Generic Job or Task
Waits by Job User Profile
Waits by Job Current User Profile
Waits by Pool
Waits by Subsystem
Design Mode – Edit View

Chart Properties
- Transpose Axes

Data Series
- Group0
  - Partition CPU Utilization
  - Add...
  - Edit...
  - Delete
  - Move Up
  - Move Down

Thresholds
- [Empty]
  - Add...
  - Edit...
  - Delete

Add Data Series
- Domain: Date - Time
- Range: Available
  - Interval Number
  - 100 Percent Utilization
- Selected
  - Add >>
  - Select: Name Color Background Color Pattern
  - Remove <<
  - None

Type: Line (poly)
Breakdown: None
Tooltip fields: Interval Number
  - Date - Time
  - Partition CPU Utilization
  - Dispatched CPU Time
  - CPU Queuing Time

Add Threshold
- Name
- Field: Lock Contention Time
- Color: Random
- Current Value: Seconds
- Default Value: Seconds
- Reset to Default Value
- Update to Current Value

OK Cancel
Example use of Design Mode

Add Data Series

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

Example use of Design Mode - Edit View:

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

Start with ...

Disk → Disk Overview for Disk Pools

The next set of slides walks you through the steps to do this customization.
Disk Overview for Disk Pools gives us two charts. We want this in one chart...
Select Edit View from the Average Response Time chart's action drop-down.

Scroll down and find the “Data Series” Box and take “Add...”
Select the new Range “Percent Disk Busy”, then click on “Add”.

Select Random for the pattern, use a bar Type graph, and turn on Tooltips for “Percent Disk Busy”.

Add Data Series

Domain: Interval Date And Time
Range: Available
- Interval Number
- Drive Capacity
- Percent Disk Capacity Full
- Reads Per Second
- Percent Disk Busy
- Writes Per Second

Selected
- Bar Type

Type: Bar (clustered)

Breakdown: Disk Pool Identifier

Tooltip fields: None

OK Cancel
Modify the View title and click OK
You now have the customized chart
Custom Content Packages – PML Location

• Custom content packages are stored in the following directory:

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

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

• Added in 7.2:
  - Monitor
  - Batch Model
Database Health Indicators were introduced in 7.2
CPU Health Indicators

Partition CPU Utilization

Jobs CPU Queuing Percent

CPU Performance Metric

Interactive CPU Utilization

Intervals Distribution (Percent)

- Percentage of intervals with values under defined thresholds
- Percentage of intervals with values above Warning threshold
Define Health Indicators

Important to evaluate shipped threshold values with specific business environment and goals.
Display Charts in Separate Window

• It’s useful to compare two graphs side-by-side
Two Different Charts from Two Different Days

- Chart 1:
  - Time:
    - Start: May 2, 2014 12:00:02 AM
    - End: May 3, 2014 12:00:00 AM

- Chart 2:
  - Time:
    - Start: May 3, 2014 12:00:02 AM
    - End: Ongoing

- System: ETC3T1
- Release: V7R1M0
Graphing Multiple Collections

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

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

- **Hint**: when the graph appears, you need to use the “reset zoom” tool to display all the data.
Graphing Multiple Collections

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

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

4 days of more interesting performance data

Observe the pattern…
Job Watcher

**Investigate Data**

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

**Selection**
- Job Watcher

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

**Default Perspective**
- Resource Utilization Overview

**Collection**

<table>
<thead>
<tr>
<th>Collection Library</th>
<th>Collection Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMON</td>
<td>DAWNJW2 (*JWFILE)</td>
</tr>
<tr>
<td></td>
<td>Most Recent</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>JWOBJLOCKC (*JWFILE)</td>
</tr>
<tr>
<td></td>
<td>DAWNJW229 (*JWFILE)</td>
</tr>
<tr>
<td></td>
<td>DAWNJW2 (*JWFILE)</td>
</tr>
</tbody>
</table>
Job Watcher - CPU Utilization and Waits Overview

Collection
Name(s): DAWNW2
Library: COMMON
Type: Job Watcher File Based Collection
File level: 3

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

System
Name: 
Release: V5R1M0

CPU Utilization and Waits Overview

- Dispatched CPU Time
- CPU Queuing Time
- Operating System Contention Time
- Lock Contention Time
- Disk Time
- Ineligible Waits Time
- Journaling Time
- Partition CPU Utilization
Job Watcher – Interval Details

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

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

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

**Thread or Task Details**

- Job information: QZDASQINIT/QUSER/128963 - 000000000000004
- Current thread profile: LISAWS
- Object waited on: None detected this interval
- Wait duration: 542 milliseconds
- Holding job or task: None detected this interval

**Call Stack**

<table>
<thead>
<tr>
<th>Call Level</th>
<th>Program</th>
<th>Module</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>quitde_block_tra</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>longWaitBlock__23QuSingleTaskBlockerCodeFP2</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>sleep__17LoMThreadSleeperFQ2_4Rmp18Inter</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>sleep__14LoSleepManagerFQ2_4Rmp18Interu</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>recv__8LoSocketFR15LoSocketManagerPctT3</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>recv__FIPcN21P7timeval15LoAddressForm</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>recvHandler__FIP16LoSocketRecvData</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>socket</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>#cfm</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>syscall_A_port</td>
</tr>
<tr>
<td>12</td>
<td>QSOSRV1</td>
<td>QSOSYS</td>
<td>re</td>
</tr>
</tbody>
</table>

Total: 20
Disk Watcher

Investigate Data

Perspectives

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

Selection

Statistical Overviews

Description

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

Default Perspective

Disk Statistical Overview

Collection

Collection Library Collection Name
COMMON

Most Recent
Most Recent
All
DAWNDW (*DWFILE)
DAWNDWFULL (*DWFILE)
DAWNDWSTAT (*DWFILE)
DAWNFULL (*DWFILE)
Disk Watcher – Statistical Overviews

Disk Statistical Overview

Collection
- Name(s): DAWNFULL
- Library: COMMON
- Type: Disk Watcher File Based Collection

Time
- Start: Mar 12, 2008 08:02:49 AM
- End: Mar 12, 2008 08:08:35 AM

System
- Name: I
- Release: V5R1M0

Average Response Time (Milliseconds)
- Range: 0 - 120

I/Os Per Second
- Range: 0 - 3500

Graph showing I/Os Per Second, Reads Per Second, and Other I/Os Per Second from 08:03 AM to 08:08 AM.
The Profile Perspectives provide function similar to what Performance Data Trace Visualizer offers.
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.

Start here with Report Definitions

### Report Definitions

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Indicators</td>
<td>A predefined performance</td>
</tr>
<tr>
<td>System Overview</td>
<td>A predefined performance</td>
</tr>
<tr>
<td>Resource Consumption</td>
<td>A predefined performance</td>
</tr>
</tbody>
</table>

**Create Performance Data Report**

- **Report definition:** System Overview
- **Output type:** PDF
- **Collection:** Most Recent
- **Library:** QPFRDATA
- **Type:** Collection Services File Based Collection

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Create your own Report Definition

Add Performance Data Report Definition

Add Perspective

Filter

Collection name: CS228229ND (*CSFILE)
Library: COMMON

Perspectives

Database

Collection Services

CPU Utilization and Waits Overview

Resource Utilization Overview

Job Statistics Overviews

Waits

CPU

Disk

Physical Disk I/O

Synchronous Disk I/O

Add Performance Data Report Definition

Name: Demo Report
Description: Report prepared for my presentation

Perspectives
Create Performance Data Report

- Select the "Health Indicators" or "System Overview" from the list.
- Click on "Create Performance Data Report..." to proceed.

In the Create Performance Data Report window:
- Select the "Demo Report" from the Report definition dropdown.
- Choose "PDF" for the Output type.
- Select the Collection: "CS228229ND (*CSFILE) - Feb 28, 2008 12:00:02 AM".
- Leave Library as "COMMON".
- The Type: Collection Services File Based Collection.
- Click "OK" to create the report.
Resulting Report (PDF example)

Feb 28, 2013 10:03:43 AM

Performance data report definition:
Demo Report

Report title:
Example Report based upon COMMON performance collection

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

Library/Collection used for report:
Common/Cs228229nd
Integration with Active Jobs

Active jobs – what’s happening right now

Collection Services data with job wait data – what happened up to now
Integration with System Status

**System Status**

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

**Jobs**
- Total: 4,537
- Active: 262

**Addresses used**
- Permanent: 0.010 %
- Temporary: 0.022 %

**System disk pool**
- Capacity: 95.44 GB
- Usage: 79.118 %

**System Resources Health Indicators**

**CPU usage (elapsed):** 0.0 %

**Type of processors:** Shared - uncapped

**Processing power:** 0.20 processing units

**Virtual processors:** 2

**Interactive performance:** 0 %

**Shared processor pool usage (elapsed):** 0.0 %

**Uncapped CPU capacity pool usage (elapsed):** 0.0 %

**Memory Pools Health Indicators**

**Total memory:** 4,096.00 MB

**Active Memory Pools**

**System disk pool**
- Capacity: 95.44 GB
- Usage: 79.118 %

**Temporary storage used**
- Current: 8,407 MB
- Maximum since last system restart: 8,435 MB

**Disk Status**

**Storage System Values**

**Disk Health Indicators**
Integration with Disk Status

Disk Status - Z1

- Investigate Disk Data
- Refresh
- Elapsed time: 00:00:00

Disk Overview by Disk Unit

Collection
- Name(s): C002000001
- Library: C002000001
- Type: Collection Services File Based Collection
- File level: 36

Time
- Start: Mar 8, 2013 12:09:02 AM
- End: Ongoing

System
- Name: Z1433D1P1
- Release: V7R1M0

Average Response Time
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.
You can connect to one partition, but manage a different partition.
HTTP Server runs on the system you initially log into.

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

Database

- Requires 2015 PTF groups, including the database group
- Must have the Performance Tools LPP Manager feature installed
- Available on IBM i 6.1 and 7.1 with PTFs
  - Included with IBM i 7.2 and later
Integration with Database

• Leverage the capabilities of PDI with valuable data gathered from database

• PDI charting of
  – SQL Plan Cache Snapshots and Event Monitors
  – SQL Performance Monitor files

• Collection Services collection of job-level SQL metrics

• Visual charts and/or tables in PDI that are focused on database related metrics

• Navigation between database and performance tasks
Database Perspectives
Integration with Database – package overview

• Database Package for 7.1 and later
  – I/O Reads and Writes
  – SQL CPU
  – Database Locks Overview
  – Database I/O
    o Utilizes Job Level SQL Metrics
  – SQL Cursor and Native DB Opens
  – SQL Performance Data
    o SQL Plan Cache Snapshots and Event Monitors
    o SQL Performance Monitor
Integration with Database

Launch “Investigate Performance Data” from various database tasks
Launch PDI from System i Navigator client

7.1 examples
SQL Overview

Several graphs:
- Query time summary
- Open summary
- Open type summary
- Statement usage summary
- Index used summary
- Index create summary
- Index advised
- Statistics advised
- MQT use
- Access plan use
- Parallel degree usage
SQL Attribute Mix

Several graphs:

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

PDI Fan Club Favorite Collection Services Perspectives

(PDI is more than Performance)
Physical System Charts – Frame view of Performance!

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

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

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

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

One perspective with several key charts, such as:

• Read and Write response times and rates
• Disk hardware information
Database - SQL CPU Utilization Overview

Allows you to see how much of your CPU utilization is due to SQL work.

Partition level

Job level
Power Systems

Scaled CPU

CPU Utilization Overview

CPU Rate (Scaled CPU : Nominal CPU) (Ratio)

CPU Time

Scaled CPU Time

Partition CPU Utilization

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

- Asynchronous Protocol Overview
- Binary Synchronous Protocol Overview
- DDI Protocol Overview
- Token-ring Protocol Overview
- Ethernet Protocol Overview
- Frame Relay Protocol Overview
- SDLC Protocol Overview
- HDLC Protocol Overview
- LAPD Protocol Overview
- PPP Protocol Overview
- X.25 Protocol Overview

Ethernet Protocol Overview

- Name(s): CS2202224MD
- Start: Feb 28, 2008 12:00:02 AM
- End: Feb 29, 2008 12:00:00 AM
- Library: COMMON
- Release: V6R1MD
- Type: Collection Services File Based Collection

Graph showing data over time.
Disk Response Time Charts

A very easy interface to see if you have slow disk operations
Find that job using a lot of heap...
Memory

- Memory perspectives are now available

- Similar information from what you get on WRKSYSSTS....
In a graphical view!

Note the change in pool sizes. QPFRADJ is on.
Performance Data Investigator

Storage Allocation Perspectives

Expand Collection Services

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

Generally, allocations and deallocations following a similar pattern
Temporary Storage Allocation by *Job Current User Profile*
Timeline Perspective

The timeline bars on the chart represent the elapsed time of threads or tasks:
- Dispatched CPU Time
- CPU Queuing Time
- Other Waits Time

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

- Drill down to this new chart from existing charts
  - Waits by Job or Task
  - All Waits by Thread or Task

Select one thread or task and drill down to
“All Waits for One Thread or Task”
or
“All Waits by Thread or Task”
Database Full Opens

Full Opens are expensive resource-wise

General recommendation is to keep Native Full Opens per second < 1000

Drill down to find the jobs doing full opens...
12X Bus Utilization

• Collection Services collects utilization data for 12X buses
  – PDI has integrated charts that show views of how resources at the bus level like 12X loops and PCIe cards are performing
  – Enable Performance information collection on the HMC
### QAPMCONF Panel View

<table>
<thead>
<tr>
<th>Library Name:</th>
<th>QPFRDATA</th>
<th>Processor Firmware Time:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member Name:</td>
<td>QO67000002</td>
<td>Task Threshold Value (ms):</td>
<td>1,000</td>
</tr>
<tr>
<td>Start Time:</td>
<td>Mar-8-2013 12:00:02 AM</td>
<td>Secondary Thread Thresh (ms):</td>
<td>1,000</td>
</tr>
<tr>
<td>Model Number:</td>
<td>61X</td>
<td>Disk Response Time Boundary 1 (us):</td>
<td>15</td>
</tr>
<tr>
<td>System Type:</td>
<td>7998</td>
<td>Disk Response Time Boundary 2 (us):</td>
<td>250</td>
</tr>
<tr>
<td>Partition Memory (KB):</td>
<td>4194304</td>
<td>Disk Response Time Boundary 3 (us):</td>
<td>1,000</td>
</tr>
<tr>
<td>Comm Data Collected:</td>
<td>Y</td>
<td>Disk Response Time Boundary 4 (us):</td>
<td>4,000</td>
</tr>
<tr>
<td>Machine Serial Number:</td>
<td>10-065FA</td>
<td>Disk Response Time Boundary 5 (us):</td>
<td>8,000</td>
</tr>
<tr>
<td>Response Time Boundary 1 (ms):</td>
<td>1000</td>
<td>Disk Response Time Boundary 6 (us):</td>
<td>16,000</td>
</tr>
<tr>
<td>Response Time Boundary 2 (ms):</td>
<td>2000</td>
<td>Disk Response Time Boundary 7 (us):</td>
<td>64,000</td>
</tr>
<tr>
<td>Response Time Boundary 3 (ms):</td>
<td>4000</td>
<td>Disk Response Time Boundary 8 (us):</td>
<td>256,000</td>
</tr>
<tr>
<td>Response Time Boundary 4 (ms):</td>
<td>8000</td>
<td>Disk Response Time Boundary 9 (us):</td>
<td>500,000</td>
</tr>
<tr>
<td>System ASP Capacity (KB):</td>
<td>93,206,752</td>
<td>Disk Response Time Boundary 10 (us):</td>
<td>1,024,000</td>
</tr>
<tr>
<td>Checksum Protection On:</td>
<td>N</td>
<td>Hypervisor Memory (MB):</td>
<td>640</td>
</tr>
<tr>
<td>Virtual Processors:</td>
<td>2</td>
<td>SMT Hardware Threads:</td>
<td>0</td>
</tr>
<tr>
<td>Installed Processors:</td>
<td>4</td>
<td>Time Interval (minutes):</td>
<td>5</td>
</tr>
<tr>
<td>Remote Response Boundary 1 (ms):</td>
<td>-</td>
<td>Interactive Limit (%):</td>
<td>100.00</td>
</tr>
<tr>
<td>Remote Response Boundary 2 (ms):</td>
<td>-</td>
<td>Time Interval (seconds):</td>
<td>300</td>
</tr>
<tr>
<td>Remote Response Boundary 3 (ms):</td>
<td>-</td>
<td>Interactive Threshold (%):</td>
<td>100.00</td>
</tr>
<tr>
<td>Remote Response Boundary 4 (ms):</td>
<td>-</td>
<td>Processor Multi-tasking Capability:</td>
<td>System Controlled</td>
</tr>
<tr>
<td>System ASP Capacity (KB):</td>
<td>93,206,752</td>
<td>Output File System:</td>
<td>ETC3T1</td>
</tr>
<tr>
<td>Perm 16MB Addr Remaining:</td>
<td>274,848,547,584</td>
<td>Partition Count:</td>
<td>3</td>
</tr>
<tr>
<td>Temp 16MB Addr Remaining:</td>
<td>274,814,995,200</td>
<td>Processor Folding Support:</td>
<td>No</td>
</tr>
<tr>
<td>Disk Resp Time Boundary 1 (ms):</td>
<td>1</td>
<td>Partition ID:</td>
<td>2</td>
</tr>
<tr>
<td>Disk Resp Time Boundary 2 (ms):</td>
<td>16</td>
<td>Primary Partition ID:</td>
<td>0</td>
</tr>
<tr>
<td>Disk Resp Time Boundary 3 (ms):</td>
<td>64</td>
<td>Processor Units:</td>
<td>0.2</td>
</tr>
<tr>
<td>Disk Resp Time Boundary 5 (ms):</td>
<td>1,024</td>
<td>System Release:</td>
<td>1.0</td>
</tr>
<tr>
<td>Collection Data:</td>
<td>Consistent with *SYS</td>
<td>System Name:</td>
<td>ETC3T1</td>
</tr>
<tr>
<td>Collect Internal Data:</td>
<td>N</td>
<td>Performance Monitor Select Job:</td>
<td>Yes</td>
</tr>
<tr>
<td>*CSMGTCOL Collection Library:</td>
<td>QPFRDATA</td>
<td>Shared Processor Pool:</td>
<td>Uncapped</td>
</tr>
<tr>
<td>*CSMGTCOL Collection Name:</td>
<td>QO67000002</td>
<td>Partition Sharing Capped:</td>
<td>No</td>
</tr>
<tr>
<td>Database Consistency:</td>
<td></td>
<td>Processor Speed Capability:</td>
<td>1</td>
</tr>
<tr>
<td>Database Limit (% of CPU):</td>
<td>100.0</td>
<td>QPFRA0 System Value:</td>
<td>2</td>
</tr>
</tbody>
</table>
Considerations for Viewing Prior Release Performance data

• Performance data from earlier releases can be viewed with the Performance Data Investigator at the latest release
  – **Note**: Not all graphs and charts will be available after conversion due to changes in data content and format

• If prior release data has not been converted, you may get errors when trying to display charts

  ▪ Use the Convert Performance Collection (CVTPFRCOL) command
    – Supports Collection Services, Job Watcher, Disk Watcher, and Performance Explorer data
  
    – Data from 6.1 can be converted and viewed with PDI on 7.1 or 7.2
    – Data from 7.1 can be converted and viewed with PDI on 7.2
Considerations for Viewing Prior Release Performance data

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

• Convert the performance data to the current release format via the GUI
  – The steps are similar to the prior slide:
    – Save the performance collection
    – FTP the save file to the desired partition
    – Restore the collection via the Collection Manager
    – Convert the collection to the current release format
**Manage Collections**

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

• If you restore performance data without using the Restore Performance Collection interface, collections may not display in the Manage Collections view.

• The “Rebuild Collection Table” option will rebuild the meta-data used for the Manage Collections task and then your performance data should be visible.
Performance Data – Analysis

Performance Diagnostics with the Performance Data Investigator
Analyzing Performance Data Using PDI

• Now that you know all that PDI can do….

  – How do you really use it to analyze performance data?

  – There are no specific steps – it all depends upon what you see in the performance data

  – If you look at your performance data on a regular basis, you will learn your “normal” pattern which makes it easier to identify something unusual

  – Experience is the best teacher
Analyzing Performance Data Using PDI

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

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

  – What was the scope?
    o Did it impact the entire system?
    o Did it impact some subset of work?
      – Specific users?
      – Specific applications?
CPU Utilization and Waits Overview is an excellent starting place. Look for interesting points. Next steps will depend upon the answer to the prior questions, along with what you see.
Using PDI, you can learn how to navigate through your data

Collection Services data may not be able to resolve your problem, but it may very well help to identify areas where more detailed analysis is needed.
Drill-down based upon what you see

• While no one job was causing the spike in contention, we can find out many jobs were affected during that interval.

• This is an example where Collection Services can show us something is going on, but Job Watcher data is necessary to identify the root cause.
Recommendations

• If you are not using PDI, give it a try!
  
  – *Remember, all partitions (even at IBM i 6.1!) can access the majority of the charts shown in this presentation – without installing/purchasing anything additional!!*

• Stay current on PTFs

• Become familiar with your system’s performance “signature” – it will make it easier to spot changes

• Keep baseline performance data
IBM i developerWorks

- IBM i developerWorks is the web site to go to find out about
  - Latest function delivered via Technology Refreshes
  - Enhancements delivered via PTFs

Performance Tools

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

Performance Data Collectors

Collection Services, Disk Watcher, Job Watcher, and Performance Explorer are the primary performance data collection tools supporting IBM i. Other performance related tools include: Batch Model, Work with System Activity (WRKSYSACT), Dump Main Memory Information (DMPMEMIN), and Analyze Command Performance (ANZCMDPFR).

Performance on the Web

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

Performance Tools LPP (57xxPT1)

Performance Tools is a licensed program product that contains additional performance tools. The most common is known as Performance Tools Reports. More information on this licensed program is contained in the IBM Knowledge Center - IBM Performance Tools for i.
Performance on the Web on developerWorks

**Getting Started:**

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

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

**PTFs:**

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

<table>
<thead>
<tr>
<th>Performance Task Enhancements (Release Date)</th>
<th>7.3 PTFs</th>
<th>7.2 PTFs</th>
<th>7.1 PTFs - 5770SS1</th>
<th>6.1 PTFs</th>
<th>PTF Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring SP Updates</td>
<td>IBM Navigator for i PTFs</td>
<td>SF99723 level 1</td>
<td>SF99714 level</td>
<td>SF99145 level</td>
<td>Performance Tools Group PTF</td>
<td>Install latest for these groups when putting on new Navigator for i PTFs</td>
</tr>
<tr>
<td>7.3 GA Performance Updates</td>
<td>IBM Navigator for i PTFs</td>
<td>SF99713 level 11+ or higher</td>
<td>SF939368 level 36+ or higher</td>
<td>SF99115 level 46</td>
<td>S1/57001 S1/57002</td>
<td>HTTP Group PTF Includes for Navigator: Common PTF Navigator for i</td>
</tr>
<tr>
<td>December 1 2015</td>
<td>Get PTF numbers from IBM Navigator for i PTFs</td>
<td>SF56747 SF56748</td>
<td>IBM Navigator for i PTFs</td>
<td>S1/57001 S1/57002</td>
<td>6.1 Stabilized at this level</td>
<td>The Navigator for i PTFs are shipped in the HTTP group, and it is recommended that you keep current on this PTF group.</td>
</tr>
</tbody>
</table>
# iDoctor versus Performance Data Investigator

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>iDoctor</th>
<th>PDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Windows client</td>
<td>Browser</td>
</tr>
<tr>
<td>Wait Analysis</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Collection Services</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Job Watcher</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Disk Watcher</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Performance Explorer</td>
<td>Yes</td>
<td>Profile collections only</td>
</tr>
<tr>
<td>Database</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Job Watcher Monitors</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Customizable</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>User Defined graphs and queries</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Update Frequency</td>
<td>Monthly Experimental features</td>
<td>Twice Yearly</td>
</tr>
<tr>
<td>Support</td>
<td>Defect only</td>
<td>Standard SWMA</td>
</tr>
<tr>
<td>Chargeable</td>
<td>Yearly license</td>
<td>• Collection Services at no additional charge with i</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disk Watcher, Database, and Performance Explorer included with base PT1 product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Job Watcher is an additional option of PT1 and has an additional charge</td>
</tr>
<tr>
<td>Experimental Features</td>
<td>Yes (e.g., VIOS Investigator)</td>
<td>No</td>
</tr>
<tr>
<td>Multinational language support</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
IBM i on Power - Performance FAQ

October 3, 2016
IBM i Performance on developerWorks

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

- Performance Tools

- Forum

- IBM i Performance Data Investigator

- IBM i Performance Data Investigator – Edit Perspectives

- IBM i Wait Accounting

- How to use the Batch Model performance tool
IBM i Web Sites with Performance Information

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

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

- Performance Management for Power Systems
  http://www-03.ibm.com/systems/power/support/pm/index.html

- IBM Workload Estimator
  http://www.ibm.com/systems/support/tools/estimator

- iDoctor

- Job Waits Whitepaper
For a simple list of all blogs on one page:

"i Can" Blog of Blogs

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:

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- 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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