

How healthy is your ?

Presented by Steve Bradshaw

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What is he talking about?



- ▶ In this session we discuss
 - ▶ How you can check if your system is working well
 - ▶ How you can reduce the risk of unexpected downtime
 - ▶ How you can improve the performance of your server
 - ▶ How you can reduce the cost of running your server
 - ▶ How you can more easily monitor your system
 - ▶ How you can look back in time to find the cause of problems
- ▶ **All without paying any extra for third party tools or services**

But first a Disclaimer

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IBM		

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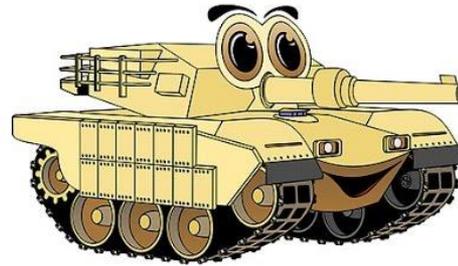
This is mine

- I try ever so hard to get it right
- *“Opinions are like buttocks – Everyone has them!”*
 - You are hearing mine, not Rowton’s, not Common’s, not IBM’s
 - My opinions are not necessarily right – But then again neither are yours



- ***All material presented is done so on an “as is” basis and is mostly correct at the time of presenting them, I hope. This is only intended as a guide to get you going.***

Is IBM i bulletproof ?



Yes - but it still needs a little TLC

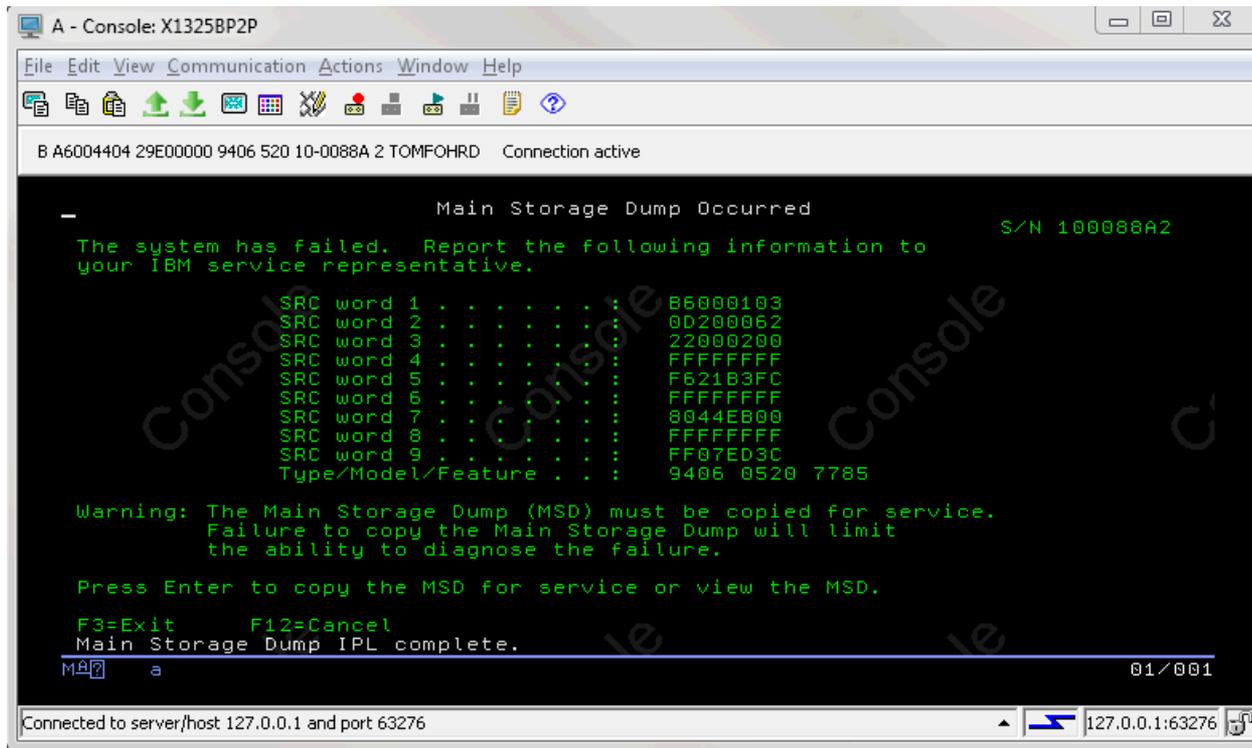
There is a time & place for everything

Example: If you are boarding a plane,
what is the last thing you want to see?



There is a time & place for everything

Example: If you are running your Year End, what is the last thing you want to see?



A screenshot of an IBM console window titled "A - Console: X1325BP2P". The window displays a "Main Storage Dump Occurred" message. The message includes the following text:

```

Main Storage Dump Occurred
S/N 100088A2
The system has failed. Report the following information to
your IBM service representative.
SRC word 1 . . . . . : B6000103
SRC word 2 . . . . . : 0D200062
SRC word 3 . . . . . : 22000200
SRC word 4 . . . . . : FFFFFFFF
SRC word 5 . . . . . : F621B3FC
SRC word 6 . . . . . : FFFFFFFF
SRC word 7 . . . . . : 8044EB00
SRC word 8 . . . . . : FFFFFFFF
SRC word 9 . . . . . : FF07ED3C
Type/Model/Feature . . : 9406 0520 7785

Warning: The Main Storage Dump (MSD) must be copied for service.
Failure to copy the Main Storage Dump will limit
the ability to diagnose the failure.

Press Enter to copy the MSD for service or view the MSD.

F3=Exit      F12=Cancel
Main Storage Dump IPL complete.
MA a
01/001

```

The console window also shows a menu bar with "File", "Edit", "View", "Communication", "Actions", "Window", and "Help". At the bottom, it indicates "Connected to server/host 127.0.0.1 and port 63276".

TLC – Tender Loving Care for

Good News:

It is not difficult

It does not take long

You can do it yourself for free!

Make a little time for your IBM i

What is the number 1 cause of downtime?

Cabling – Both Network and Power

Keep it tidy

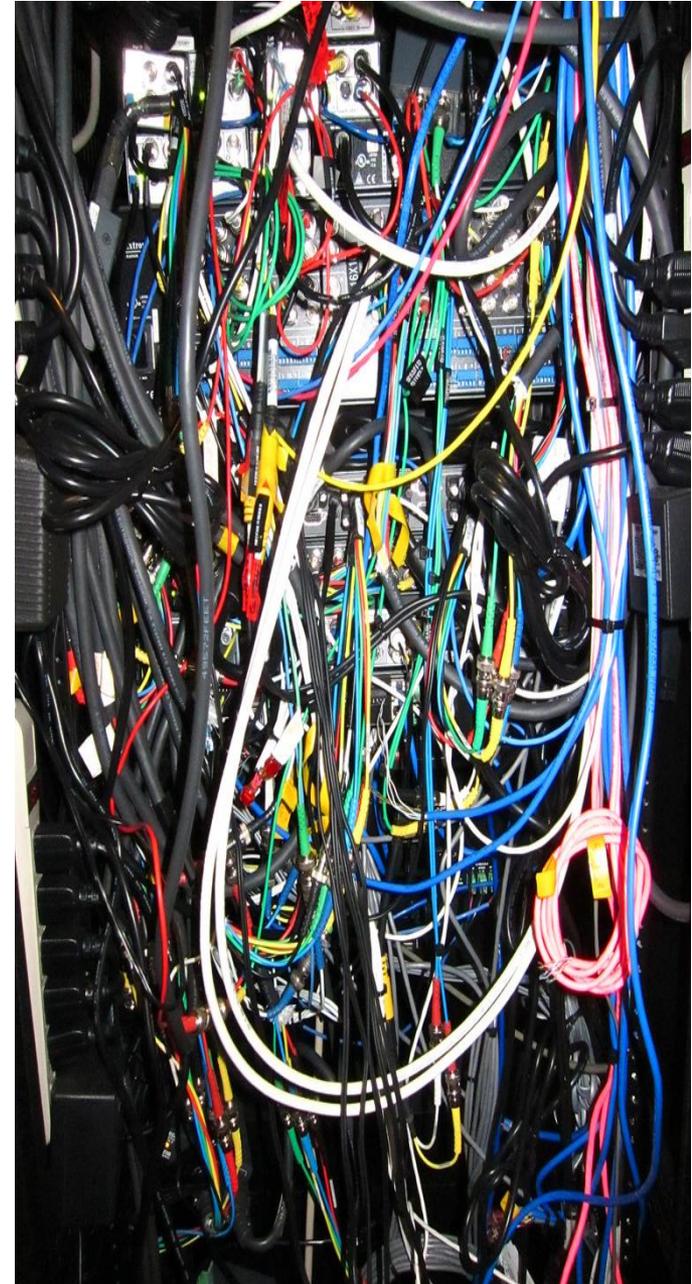
Keep it off the floor

Your server needs to breath

You need access to the server

You need to be able to trace the cable

Your messy cabling may work today
But it is a disaster waiting to happen



Minimize Electrical Problems

No Electrical Power = No



Your server has dual power supplies

Connect these to alternate power feeds

If in a data center then use alternate PDUs

If on premise use UPS and utility mains

If you have a UPS make sure you test it

Does the battery last as long as you think?

Typical battery life halves over 2 years

Does the serial cable signal a shut down?

Minimize Network Problems

No Network = No



Since POWER5 all servers have dual ethernet

Since IBM i 5.4 we have had virtual ethernet

Since IBM i 7.1 we have had aggregated ethernet

Yet so many IBM i Servers still use a single NIC port

Both Virtual and Aggregated Ethernet are Free

Either can protect you from single point of failure in your ethernet cables or switches

Environment

Physical Environment is important

Operating temperature range 5–35°C / 41–95°F

Recommended temperature range 18–24°C / 65-75°F

Pro tip: Check your thermostats:

You might be paying too much for Air conditioning

You can run your servers at 20–24°C / 68-75°F

Using Power10 eBMC to check health

There are 147 Sensors that can report health issues

IBM ASMI | RIT-Starke-P10-9105-41B-7843771 9105-41B 7843771

Overview
Operations
Resource management
Hardware status
Inventory and LEDs
Sensors
Hardware deconfiguration
PCIe hardware topology
Logs
Settings
Security and access
Notices

Sensors

This page might take a few minutes to load

Search for sensors 147 items Filter

<input type="checkbox"/>	Name	Status	Current value
<input type="checkbox"/>	Altitude	OK	54.257 m
<input type="checkbox"/>	avdd rail iout	OK	-- A
<input type="checkbox"/>	avdd rail iout peak	OK	-- A
<input type="checkbox"/>	flett slot c10 rail iout	OK	-- A

Using Power10 eBMC to check health

Use Filter to help find what you are looking for

Sensors

 This page might take a few minutes to load

59 of 147 items

 Filter

<input type="checkbox"/>	◆ Name	◆ Status	Current value
<input type="checkbox"/>	Ambient 0 Temp	✔ OK	27.312 Cel
<input type="checkbox"/>	Ambient 1 Temp	✔ OK	27.593 Cel
<input type="checkbox"/>	Ambient 2 Temp	✔ OK	27.059 Cel
<input type="checkbox"/>	NVMe 1 Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe 2 Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe JBOF Card C10 Local Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe JBOF Card C10 Temp	✔ OK	-- Cel
<input type="checkbox"/>	PCIE 0 Temp	✔ OK	30 Cel

Using Power10 eBMC to check health

Use Filter to help find what you are looking for

Sensors

 This page might take a few minutes to load

59 of 147 items

 Filter

<input type="checkbox"/>	◆ Name	◆ Status	Current value
<input type="checkbox"/>	Ambient 0 Temp	✔ OK	27.312 Cel
<input type="checkbox"/>	Ambient 1 Temp	✔ OK	27.593 Cel
<input type="checkbox"/>	Ambient 2 Temp	✔ OK	27.059 Cel
<input type="checkbox"/>	NVMe 1 Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe 2 Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe JBOF Card C10 Local Temp	✔ OK	-- Cel
<input type="checkbox"/>	NVMe JBOF Card C10 Temp	✔ OK	-- Cel
<input type="checkbox"/>	PCIE 0 Temp	✔ OK	30 Cel

Power10 eBMCE Health Monitor

Using your BMC to check temperature via HMC

- Overview
- Operations
- Resource management
- Hardware status
 - Inventory and LEDs
 - Sensors
 - Hardware deconfiguration
 - PCIe hardware topology
- Logs
- Settings
- Security and access
- Notices

Overview

BMC date and time
2023-06-13 05:36:42 UTC

[Host console](#) →

System information

Server information [View more](#)

Model	9105-41B	Operating mode	Manual
Serial number	7843771	Service login	Disabled
Asset tag 🔗	RIT-Starke-P10-9105-41B-7843771		

Firmware information [View more](#)

Running	fw1030.20-30-1030.2317.20230429a-prod (ML1030_060)	Access key expiration	2025-12-19
Backup	fw1030.01-1-1030.2251.20221217a-prod (ML1030_030)		

Power10 eBMCE Health Monitor

Using your BMC to check temperature via HMC

IBM ASMI | RIT-Starke-P10-9105-41B-7843771 9105-41B 7843771 Health

- Overview
- Operations
- Resource management
- Hardware status
- Inventory and LEDs
- Sensors
- Hardware deconfiguration
- PCIe hardware topology
- Logs

Event logs

Search logs 23 items

From date: YYYY-MM-DD To date: YYYY-MM-DD

[Filter](#) [Delete all](#) [Download all](#)

<input type="checkbox"/>	ID	Severity	Date	Description	Status
<input type="checkbox"/>	292	Critical	2022-10-31 14:12:48 UTC	110015F6 event in subsystem: Power Supply	Resolved

Power10 eBMCE Health Monitor

Using your eBMC to check Electrical Power Supplies

5-41B-7843771 9105-41B 7843771

Health Power

Sensors

This page might take a few minutes to load

ps

14 of 147 items

Filter

<input type="checkbox"/>	Name	Status	Current value
<input type="checkbox"/>	ps2 output current	OK	0 A
<input type="checkbox"/>	ps3 output current	OK	0 A
<input type="checkbox"/>	ps2 input power	OK	23.438 W
<input type="checkbox"/>	ps3 input power	OK	23.156 W

Using your BMC to check temperature via HMC

If you don't have a Power10 but do have a Power HMC

BMC System Management

 **baloo**
192.168.2.205

Server health >
 **Good**

FILTER BY SEVERITY

All Critical Warning Normal

Sensors (36)	Low critical	Low warning	Current	High warning	High critical
Temperature Ambient Temp	NaN° C	NaN° C	26.375° C	NaN° C	NaN° C
Temperature Onboard0 Temp	NaN° C	NaN° C	32.25° C	NaN° C	NaN° C
Temperature Onboard1 Temp	NaN° C	NaN° C	30.5° C	NaN° C	NaN° C
Temperature Vcs Temp	0° C	0° C	26° C	100° C	105° C
Temperature Vdd Temp	0° C	0° C	28° C	100° C	105° C
Temperature Vddr Temp	0° C	0° C	28° C	100° C	105° C
Temperature Vdn Temp	0° C	0° C	29° C	100° C	105° C

Server overview

Server health

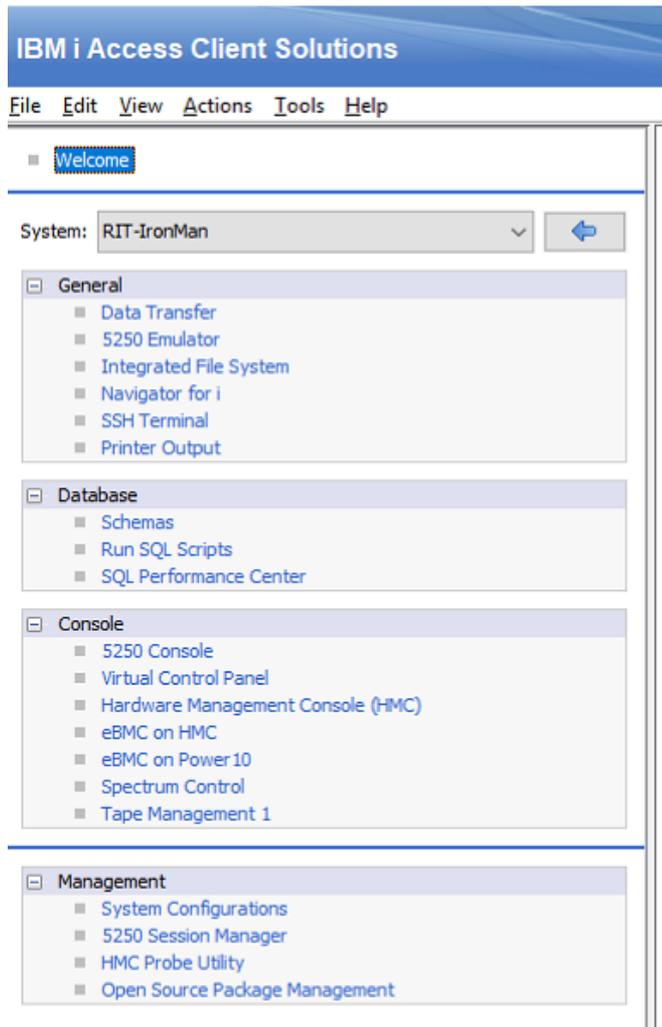
Server control

Server configuration

Access control

Using your BMC to check temperature via HMC

How to find this information? - Use ACS



Environment

Other Physical Factors

Humidity – Computers hate humidity

Dust – Dust is the enemy, your server is a hoover!

Pro Tip:

You best way of cleaning is an Air Duster



Use the Navigator Dashboard



iUG1 - Active



OS Release: V7R5M0
CPU: 1.46
Active jobs: 197
System ASP %: 65.30

iUG2 - Active



OS Release: V7R5M0
CPU: 0.97
Active jobs: 189
System ASP %: 89.42

Nancy - Active

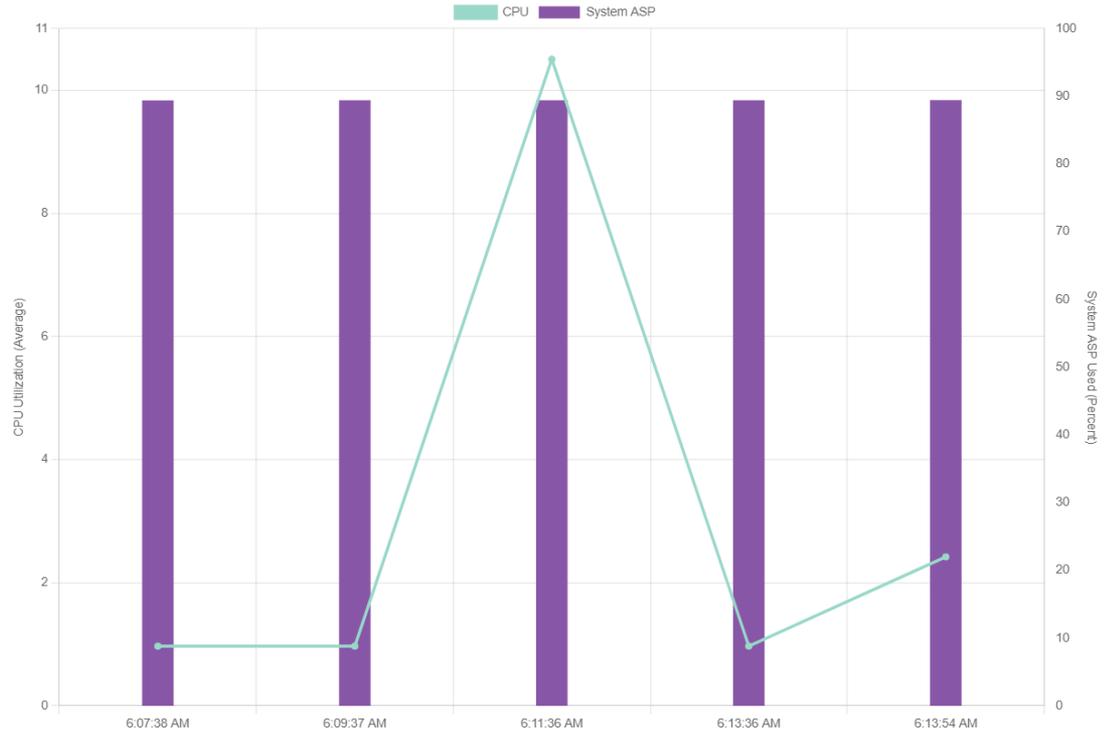


OS Release: V7R4M0
CPU: 0.58
Active jobs: 233
System ASP %: 52.56



iUG2
Active

OS Release: V7R5M0
CPU %: 2.42
Active jobs: 192
System ASP %: 89.44

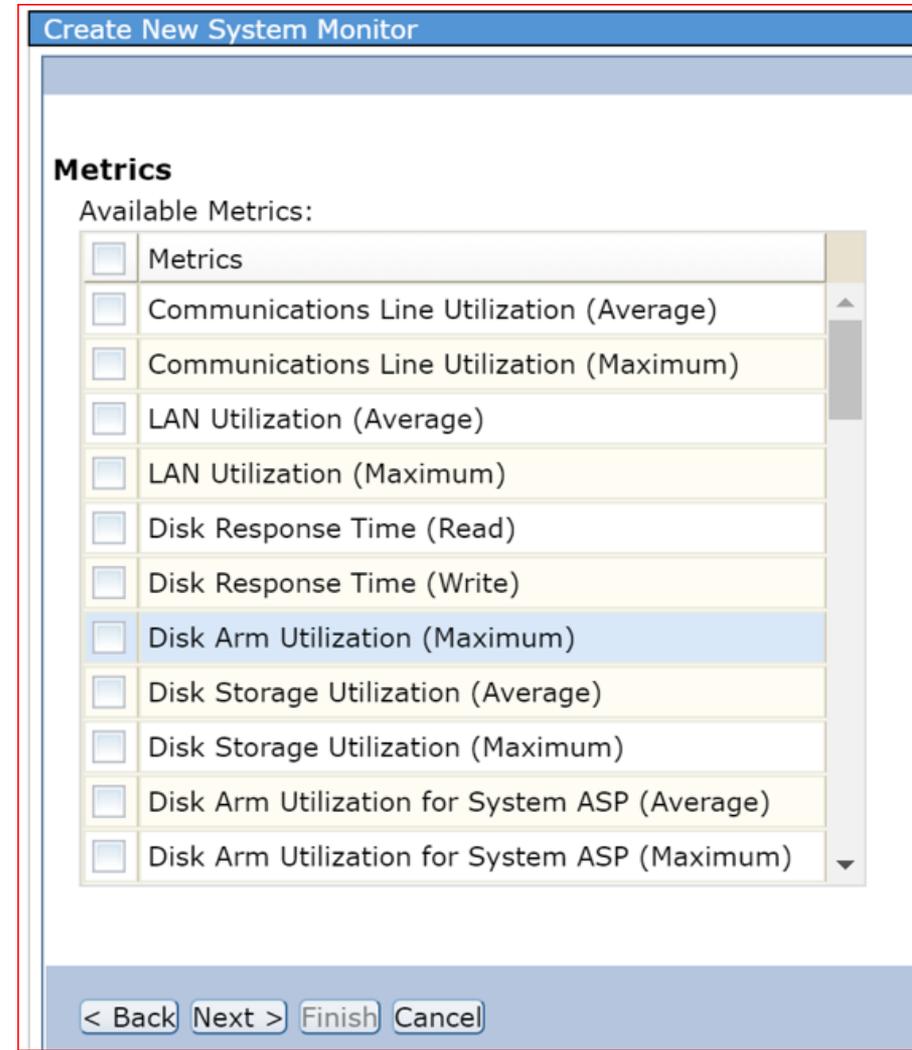


Use System Monitors

Wide variety of monitors available

Monitors can trigger programs

You can set thresholds for triggers



The screenshot shows a dialog box titled "Create New System Monitor". It features a section labeled "Metrics" with the heading "Available Metrics:". Below this heading is a list of 13 metrics, each with a checkbox to its left. The metrics are: "Metrics", "Communications Line Utilization (Average)", "Communications Line Utilization (Maximum)", "LAN Utilization (Average)", "LAN Utilization (Maximum)", "Disk Response Time (Read)", "Disk Response Time (Write)", "Disk Arm Utilization (Maximum)", "Disk Storage Utilization (Average)", "Disk Storage Utilization (Maximum)", "Disk Arm Utilization for System ASP (Average)", and "Disk Arm Utilization for System ASP (Maximum)". The "Disk Arm Utilization (Maximum)" metric is currently selected, indicated by a blue highlight. At the bottom of the dialog box, there are four buttons: "< Back", "Next >", "Finish", and "Cancel".

Checkbox	Metric Name
<input type="checkbox"/>	Metrics
<input type="checkbox"/>	Communications Line Utilization (Average)
<input type="checkbox"/>	Communications Line Utilization (Maximum)
<input type="checkbox"/>	LAN Utilization (Average)
<input type="checkbox"/>	LAN Utilization (Maximum)
<input type="checkbox"/>	Disk Response Time (Read)
<input type="checkbox"/>	Disk Response Time (Write)
<input checked="" type="checkbox"/>	Disk Arm Utilization (Maximum)
<input type="checkbox"/>	Disk Storage Utilization (Average)
<input type="checkbox"/>	Disk Storage Utilization (Maximum)
<input type="checkbox"/>	Disk Arm Utilization for System ASP (Average)
<input type="checkbox"/>	Disk Arm Utilization for System ASP (Maximum)

Setup a Monitor for Disk Busy Usage > 15%

The image shows a sequence of three overlapping screenshots from the Nagios web interface, illustrating the process of creating a new system monitor.

Top Screenshot: Create New System Monitor - General

- Name:** DiskBusy15
- Description:** Disk Busy GT 15% 2 mins

Middle Screenshot: Configure Metric

- Metric:** Disk Arm Utilization (Average)
- Collection Interval:** 60 Seconds
- Threshold1:** Enable Threshold

Bottom Screenshot: Summary and System Monitors List

Summary - General

- Name:** DiskBusy15
- Description:** Disk Busy GT 15% 2 mins

System Monitors - 192.168.100.17

Monitor	Status	Metrics	Description	Creation Date/Time	Status Changed	Owner
<input checked="" type="checkbox"/> Monitor	Stopped	Disk Arm Utilization (A	Disk Busy GT 15% 2 r	2017-11-14 08:55:39	2017-11-14 08:55:39	QSECOFR

A context menu is open over the 'Monitor' column of the table, showing the following options:

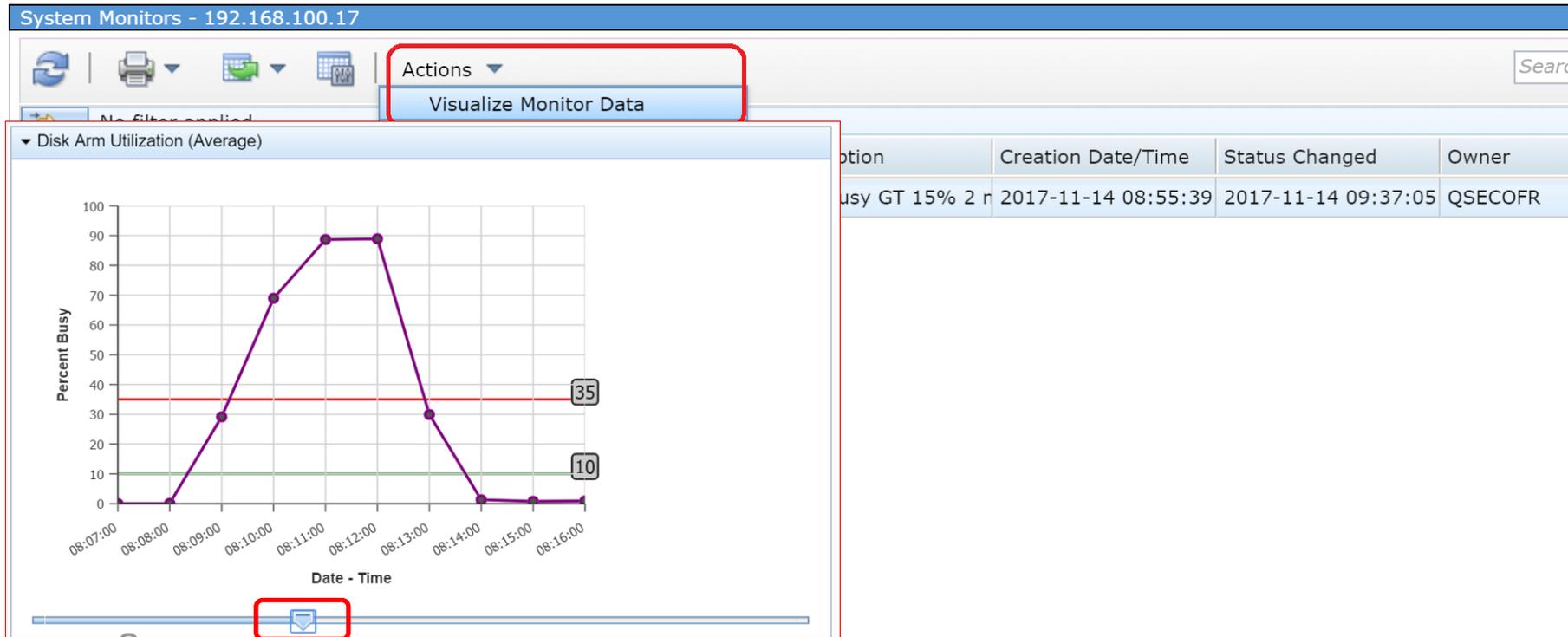
- Visualize Monitor Data
- Investigate Monitor Data
- Event Log
- Start**
- Stop
- New Based On
- Delete
- Properties

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

Use Visualise Monitor Data

Select System Monitors

Right click DiskBusy35, select Visualise Monitor Data



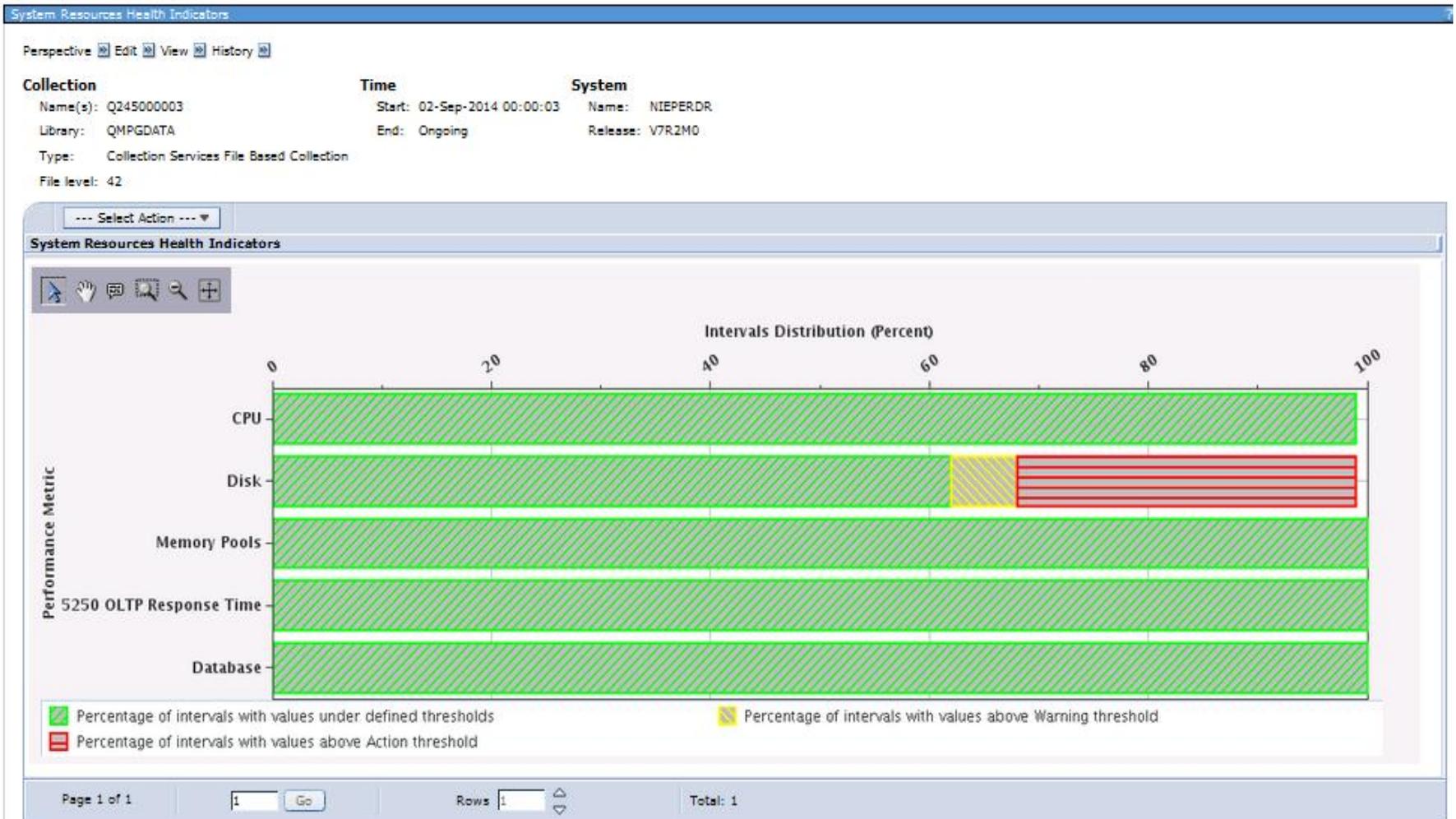
Scroll Back Through time with slider at the bottom

Protip: You can jump to PDI for problem job details

Health Indicators

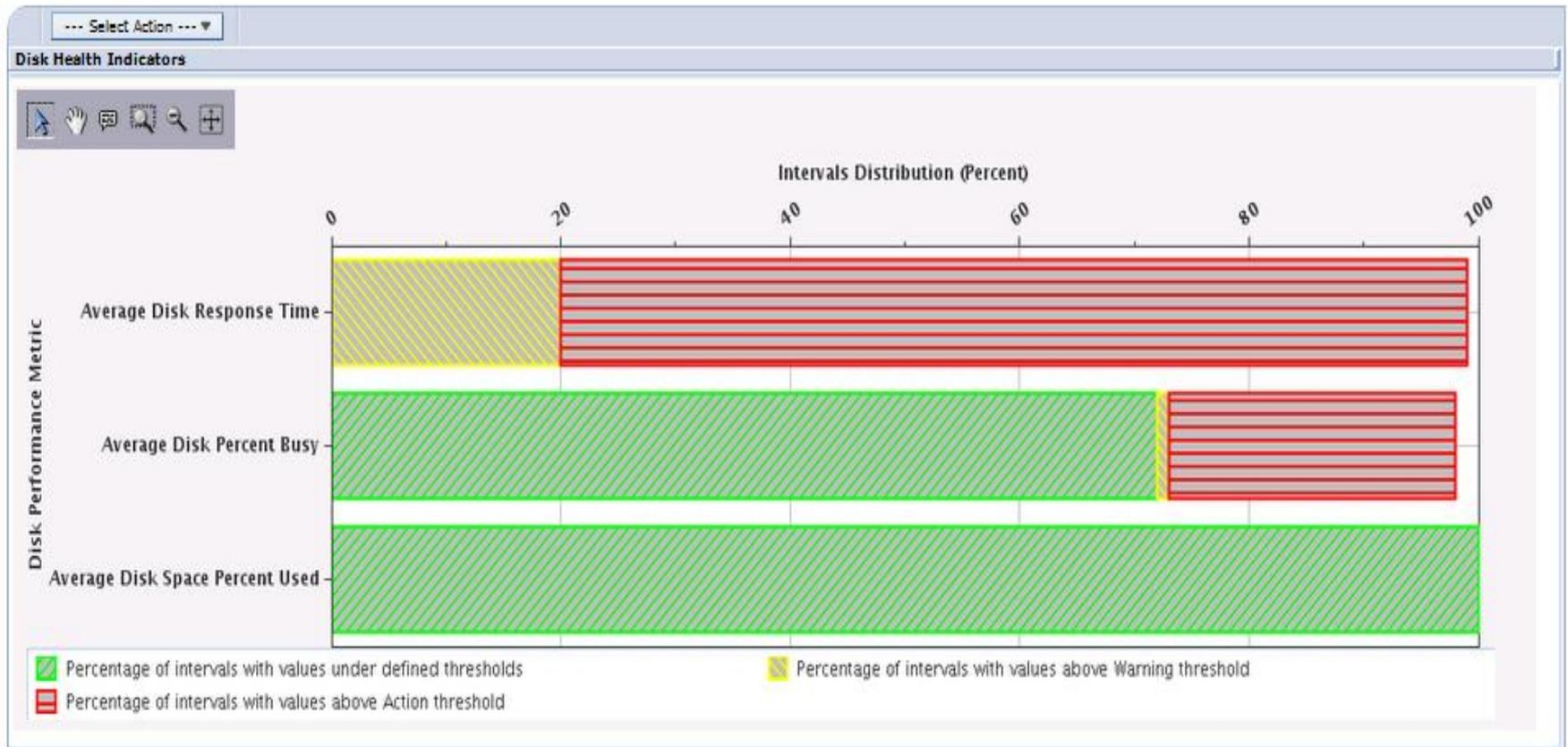
Regularly check your health indicator graphs

They will show you when issues start to appear



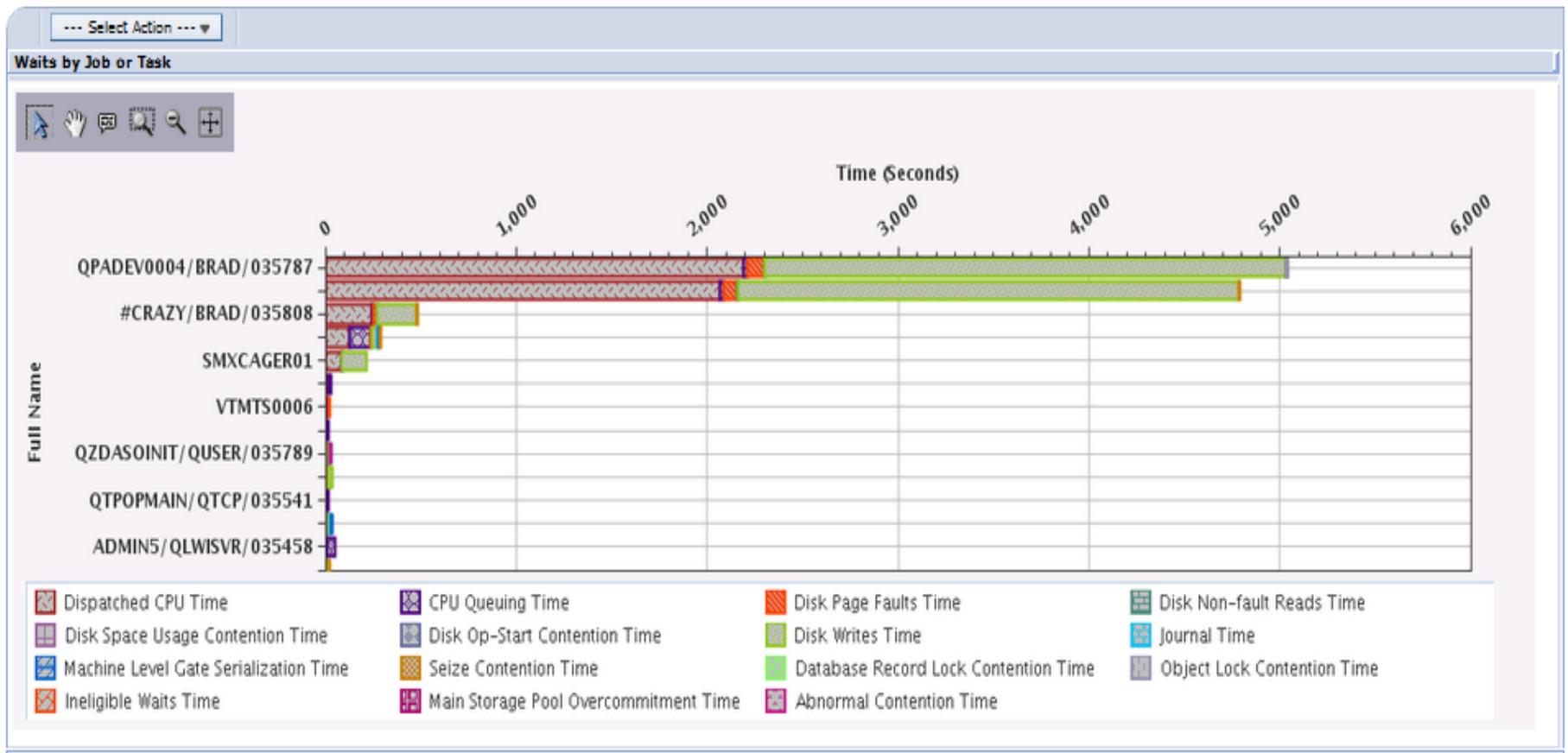
Health Indicators

- If the top level Health Indicator shows a problem
- Then Drill down to the next level



Enhanced Performance Tools

- Keep drilling down until you find the problem job or jobs. Then you can work out a solution



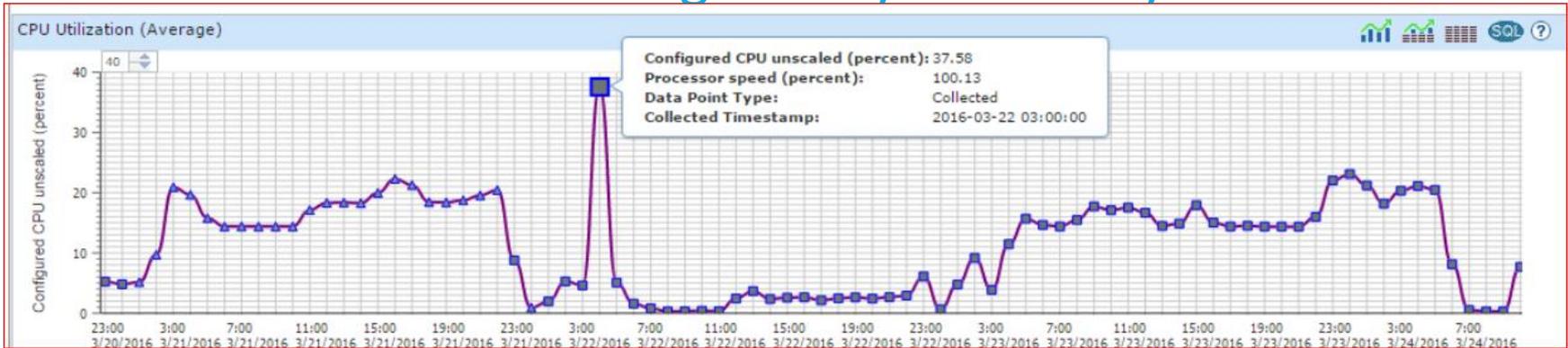
Establishing a baseline



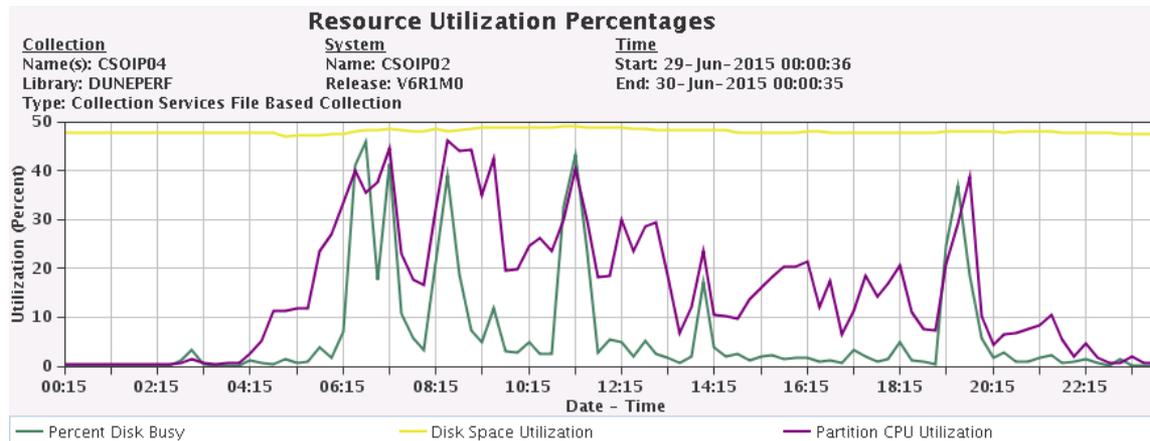
- Best Practise is to know your system
 - Record how a system looks when working well
 - This gives you a base line to compare against
 - It helps to illuminate false positives
 - And it nearly always shows you something you were not expecting!
- **Protip: Check out 5733ARE – now its free!**

Establishing a baseline

If you have 7.3 (or newer) then use the Graph History
This shows rolling history for 30 days



If you are running 7.1 (or newer) then use PDI
This shows one graph per day



NVMe Health Monitor

NVMe Health Monitor also available in the New Navigator for i

The screenshot shows the IBM Navigator for i interface. At the top, there is a search bar with the text "Search" and a magnifying glass icon, and a user identifier "RCHWACO.rch.stgl". Below the search bar, the page title "NVMe Devices" is displayed. A navigation menu is open on the left side, listing various system components. The "NVMe Devices" option is highlighted, and a tooltip points to it with the text "View and work with NVMe devices".

Resource Name ↑↓	Hardware Model ↑↓	Life Remaining (%) ↑↓	Spare Capacity (%) ↑↓	Spare Capacity Threshold (%) ↑↓	Number Media Errors ↑↓	Number Unsafe Shutdowns ↑↓	Co Te (C
System		Filter	Filter	Filter	Filter	Filter	F
System Status		100%	100%	10%	0	1	36
System Operator Messages		100%	100%	10%	0	1	34
History Log		100%	100%	10%	0	1	37
Disk Status		100%	100%	10%	0	1	34
NVMe Devices		100%	100%	10%	0	1	34
SSD Status		100%	100%	10%	0	1	34
Watch Sessions							
Exit Programs							
SQL Services							

Navigation: << < 1 > >> 100 ▾

Total Rows: 4

NVMe Health Monitor

IBM i / 7.5 /

K

Display NVMe health

Last Updated: 2022-05-03

Select this function to show the NVMe device health data associated with the NVMe devices that exist on the IBM® i partition.

1. Select **Work with disk units** on the Use System Service Tools (SST) display.
2. Select **Work with disk configuration** on the Work with Disk Units display.
3. Select **Work with NVMe Devices** on the Work with Disk Configuration display.
4. Select **Display NVMe health** on the Work with NVMe Devices display.
5. Select the NVMe device.

```

-                               Display NVMe Lifetime Remaining
Serial Number      Type  Model  Resource Name  Lifetime Remaining  Power On Hours
YOYAF1YBYOBS     58FE  000   DC05           100 %              11762

Press Enter to continue.
```

IBM i 7.5 only

Cache Batteries



- On average they make your disk writes 10x faster
- But like all batteries, they will eventually fail
- Your system will warn you before this occurs
- Change your batteries before they fail
- If you don't, your data is safe but your disk is 10x slower
- Check your cache batteries with **CALL QSMBTTCC**

```

Display Spooled File
File . . . . . : QPCSMPT                      Page/Line  1/18
Control . . . . :                               Columns   1 - 78
Find . . . . . :
* . . . . 1 . . . . 2 . . . . 3 . . . . 4 . . . . 5 . . . . 6 . . . . 7 . . . .
RESOURCE SERIAL      TYPE      FRAME    CARD     MAINTAINABLE  SAFELY
NAME      NUMBER      MODEL    ID        POSITION  BATTERY PACK  REPLACED
DC01      1C-7014093    2780-001 3C02     C02      YES           NO
DC02      1C-7032002    5708-001 3C02     C03      YES           NO
DC06      0C-5331149    2780-001 3C01     C02      YES           NO
DC07      0C-5311129    5708-001 3C01     C03      YES           NO
RUNNING MACRO: BATTERYINFO                    -LIST -WARN
***LIST OF ALL RESOURCES THAT HAVE CACHE
WITH THE ESTIMATED TIME TO WARNING IN DAYS***

RESOURCE SERIAL      TYPE      FRAME    CARD     EST. TIME  EST. TIME
NAME      NUMBER      MODEL    ID        POSITION  TO WARNING TO ERROR
(In Days) (In Days)
DC01      1C-7014093    2780-001 3C02     C02      942       1033
DC02      1C-7032002    5708-001 3C02     C03      942       1033
DC06      0C-5331149    2780-001 3C01     C02      942       1033
DC07      0C-5311129    5708-001 3C01     C03      2         8.0
More...

F3=Exit  F12=Cancel  F19=Left  F20=Right  F24=More keys
    
```

Cache Batteries

- **ProTip:**
Before you do your concurrent cache battery swap
Use CHGSRVA to limit who receives the error message

```
Change Service Attributes (CHGSRVA)
Type choices, press Enter.
Critical messages to user . . . *SYSOPR      Name, *SAME, *SYSOPR.
                               *SECOFR
                               *SECADM
                               *PGMR
+ for more values             *USER
```

Use Expert Cache

- This operating system function will use your systems intelligence to work out what data to page in.
- This is great for systems with plenty of spare CPU
- This is ideal for read intensive processes
- It is free and can be turned on or off in real time
- **WRKSYSSTS then F11 (Advanced Assistance Level)**

```
% CPU used . . . . . : .3      System ASP . . . . . : 1702 G
Elapsed time . . . . . : 00:00:01 % system ASP used . . . . . : 57.1487
Jobs in system . . . . . : 1298   Total aux stg . . . . . : 1702 G
% perm addresses . . . . . : .007   Current temporary used . . . . . : 10254 M
% temp addresses . . . . . : .248   Peak temporary used . . . . . : 17109 M
```


Sys Pool	Pool Size M	Reserved Size M	Max Act	Pool	Subsystem	Library	Paging Option
1	<u>2807.51</u>	1448.30	+++++	*MACHINE			*FIXED
2	<u>51874.10</u>	4.72	<u>760</u>	*BASE			*CALC
3	<u>6143.98</u>	.00	<u>1536</u>	*INTERACT			*CALC
4	<u>614.39</u>	.00	<u>15</u>	*SPOOL			*CALC

Check for Damaged Objects

- Often these lie hidden on your system
- They tend to appear on infrequently run processes
Especially Go Save 21, or Application Upgrades
- You can check for them using the free ARE disk checker
- Start from QShell command line (STRQSH)
/QIBM/ProdData/OS/OSGi/templates/bin/areVerify.sh -storage
diskUnits=*ALL

```
QSH Command Entry

[21:00] Storage dump complete. 3m 39s
[21:00] Verifying storage...
[21:00] Querying total segment count...483124
[21:00] Query segments...
[21:00] Processing...
[21:02] 18% (90000/483124). Error=0. Time left=8m 14s
[21:08] Task generator finish.
[21:08] 100% (483124/483124). Error=0
[21:08] No storage error found.
[21:08] Storage verification complete. 8m 10s
[21:08] Completion date = Tue Aug 23 21:08:19 UTC 2016
[21:08] Total time = 11m 51s
[21:08] Complete.
$

==>

F3=Exit  F6=Print  F9=Retrieve  F12=Disconnect
F13=Clear F17=Top   F18=Bottom  F21=CL command entry
```

- **Protip: This process is disk intensive, do not run at busy times**

Check for Network Issues

- Often you do not realise you have them
- They make your system slower / intermittently fail
- Typical example, your http admin server is slow
- You can check for them using the free ARE disk checker
- Start from QSHELL command line (STRQSH)
/QIBM/ProdData/OS/OSGi/templates/bin/areVerify.sh -network

```
QSH Command Entry

Running plugin Network Verifier

Running plugin Network Configuration Checker

Running plugin Product Verifier

Network verification completed

Summary report written to //network.summary
Detailed report written to //network.out
$
==> _____

Running plugin Network Configuration Checker
Info: The FQDN is not the first entry for the associated IP address

Running plugin Product Verifier
> Total number of product items checked: 1

-----
Administration Runtime Expert completed with:
  Plugins run: 4
  Items checked: 1
  Error: 1
  Warning: 0
  Info: 1
```

Protip: If your Navigator for i runs slowly, run this tool!

Keep your clocks in sync

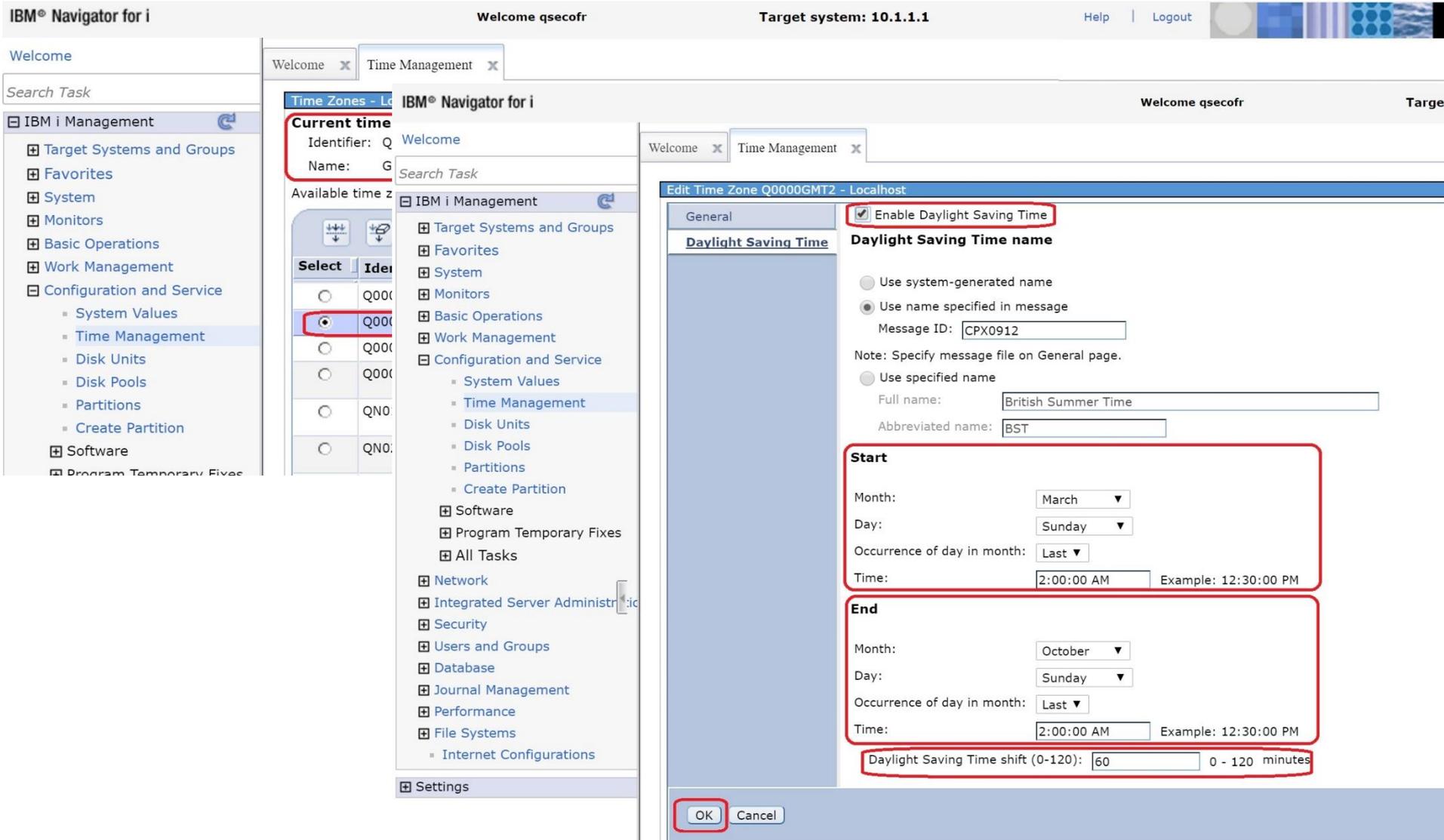
- Log files become more useful
- Communication between systems is easier
- Remove problems with time based authentication
- It's free and easy to setup

```
Change SNTP Attributes (CHGNTPA)
Type choices, press Enter.
Remote system . . . . . '192.168.100.152'
+ for more values      'uk.ntp.pool.org'
Client autostart . . . . . *YES_          *SAME, *NO, *YES
Client poll interval . . . . . 60          1-1440 minutes, *SAME
Client minimum adjustment . . . . . 20      0-300000 milliseconds...
Client maximum adjustment . . . . . 20      1-120 minutes, *SAME
Client adjustment threshold . . . . . *MAXADJ 1-7200 seconds, *SAME, *MAXADJ
Client activity log . . . . . *CHANGE   *SAME, *NONE, *CHANGE, *POLL
Server autostart . . . . . *NO         *SAME, *NO, *YES
Server activity log . . . . . *NONE      *SAME, *NONE, *ALL, *ERROR
Synchronization required . . . . . *NO    *SAME, *NO, *YES
```

Protip: You can use your Windows Domain Controller as remote NTPS

Automate Daylight Saving Adjustment

- Let your system change the clock for daylight saving



Check number of jobs in system

- Having too many jobs can slow your system down
- Record the normal level in use, track changes
- As the number increases it can slow your system
- If the number gets too high it can stop your system
- Step 1 – Check number of jobs in job tables DSPJOB_TBL
- Step 2 – Make sure QTOTJOB is more than normal level
- Step 3 – Set QADLTOTJ to be at least 10% of QTOTJOB

```
Permanent job structures:
Initial . . . . . : 5000
Additional . . . . : 500
Available . . . . . : 2523
Total . . . . . : 9000
Maximum . . . . . : 163520

Temporary job structures:
Initial . . . . . : 200
Additional . . . . : 50
Available . . . . . : 41
Storage used . . . : 64.71 M

-----Entries-----
Table      Size      Total  Available  In-use  Other
   1      9245440    9000    2523      6476    1
```

Turn on Auditing

- If you don't use the System Audit Journal – Start now!
- If you don't audit you are blind to how your system is used
- Detect Hacking events
- Detect badly configured applications
- If you're not using the System Audit Journal start here:
https://www.ibm.com/support/knowledgecenter/en/ssw_ibm_i_73/rzarl/rzarlusesecjnl.htm
- CHGSECAUD / DSPSECAUD are your friends

```
Change Security Auditing (CHGSECAUD)

Type choices, press Enter.

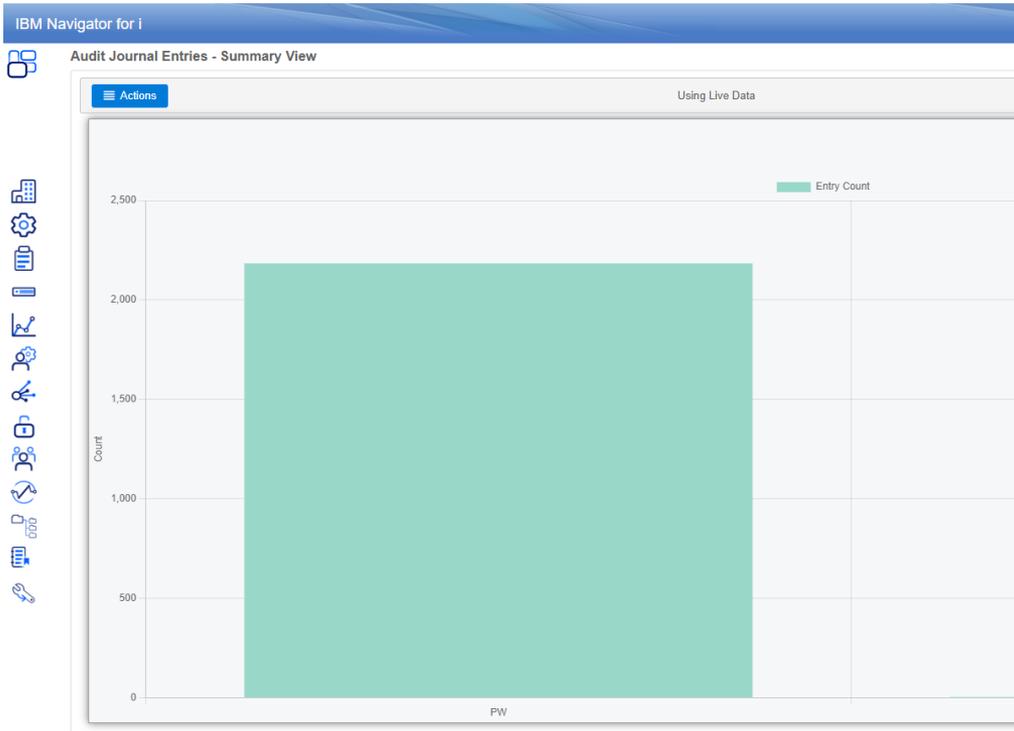
QAUDCTL system value . . . . . *AUDLVL      *SAME, *ALL, *NONE...
      + for more values
Auditing values . . . . . *CREATE      *SAME, *ALL, *DFTSET...
      + for more values
      *DELETE
      *OBJMGT
      *SAVRST
      *SECURITY
Initial journal receiver . . . . AUDRCV0001   Name
      Library . . . . . QGPL           Name, *CURLIB

F3=Exit   F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
F24=More keys
```

Bottom

Audit Journal Helpers

Ever wondered if you are being hacked?



View Configuration

Use live data or the data mart
 Live Data Data Mart

Select view
 Chart View Detail View

Select audit journal entries

- Authority Failure (AF)
- Authority Changes (CA)
- Ownership Change (OW)
- Password (PW)
- Command String (CD)
- Create Object (CO)
- User Profile Changes (CP)
- Delete Object (DO)

Select chart mode
 Daily View Weekly View

From: 05/15/2024 To: 12:00 AM
From: 05/09/2024 To: 05/15/2024

Note: The underlying audit journal receivers must be present for the chosen date range.

Filter by user
Username:

OK Cancel

Remove old Spool files

- This is usually the most effective way of reducing the number of jobs in a system
- Use WRKOUTQ / CLROUTQ for Bulk removal
- Download Free DLTOLDSPLF tool for targeted removal

```
DELETED OLD SPOOLED FILES (DLTOLDSPLF)

Type choices, press Enter.

User Profile Name: . . . . . > QSECOFR      Name, *ALL
Output Queue: . . . . . > *ALL           Name, *ALL
Library Name: . . . . . > _____      Name, *LIBL, *CURLIB...
Last Deletion Date: . . . . . > 300416    Date
```

General Tips for removing Crud

- Check QGPL for Save Files
- Check /tmp for temporary objects
- Check the number of Audit Journal Receivers you have
- Look for obvious duplicate libraries e.g. SBLIB & SBLIB1
- Check for old Image Catalogues (WRKIMGCLG)
- Permanently Apply PTFs (APYPTF *ALL *PERM)
- Check for old Network Storage Space (WRKNWSSTG)

Name	Server	Seq	Link Type	Access
<u>GBLVTEST00</u>				
GBLVTEST01	GBLVTEST	2	*DYN	*UPDATE
GBLVTEST02	GBLVTEST	3	*DYN	*UPDATE
GBLVTEST03	GBLVTEST	4	*DYN	*UPDATE
GBLVTEST04	GBLVTEST	5	*DYN	*UPDATE
GBLVTEST05	GBLVTEST	6	*DYN	*UPDATE

Tidy up your disks

- Remove unwanted / obsolete or duplicate objects
- Use RTVDSKINF / PRTDSKINF for Library Objects

```

Print Disk Information (PRTDSKINF)

Type choices, press Enter.

Type of report . . . . . > *LIB          *LIB, *FLR, *OWN, *OBJ, *SYS
ASP device . . . . .          *SYSBAS    Name, *SYSBAS
Libraries . . . . .          *ALL      Name, generic*, *ALL
Objects . . . . .            *NONE      Name, generic*, *ALL, *NONE
Object types . . . . .       *ALL       *ALL, *ALRTBL, *AUTL...
                               + for more values
Smallest size . . . . .      100000     Size in 1000 bytes
Sort by . . . . .            *SIZE     *SIZE, *OWNER, *LSTCHG...
  
```

```

Display Spooled File
File . . . . . : QPEZDISK          Page/Line 4/1
Control . . . . : +1              Columns 1 - 78
Find . . . . . :
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
Disk Space Report
5770SS1 V7R2M0 140418

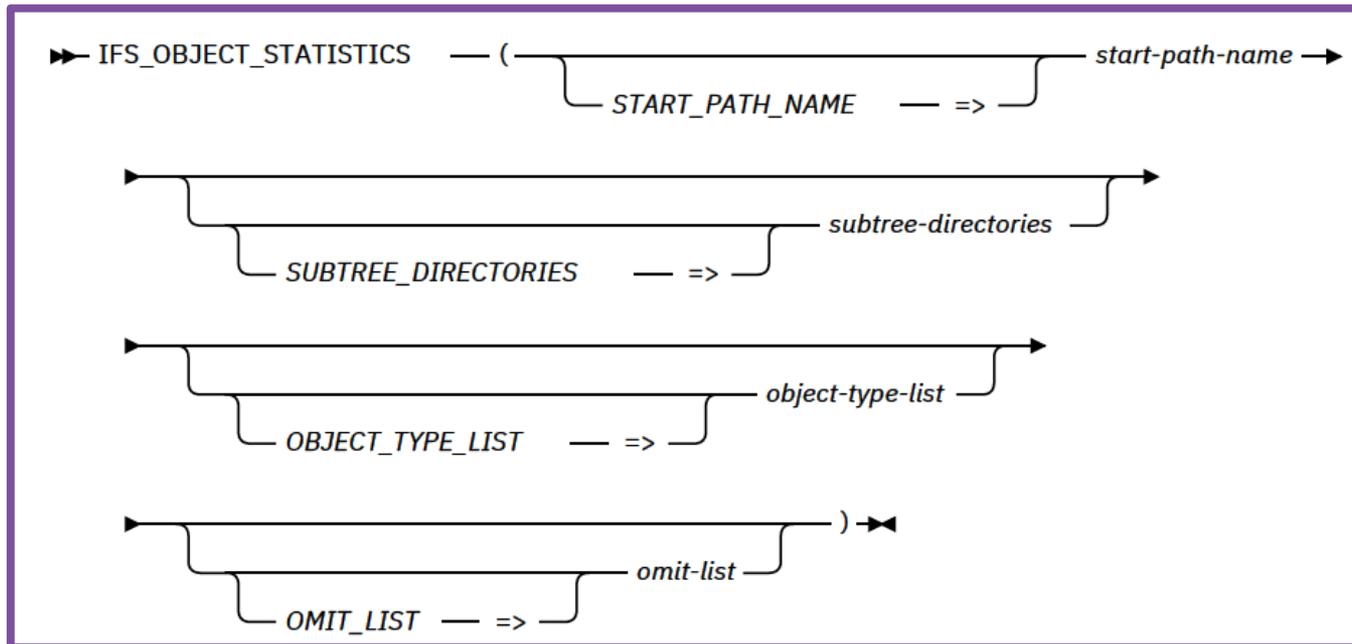
Library Information
Library      Owner      % of      Size in      Library      Last
              QPGMR      Disk      1000 bytes  Change      Use
CHORUSEADB   QPGMR      23.30     396780720.1  10/11/17    11/11/17
CHORUSETDB   QPGMR      5.86      99720958.0   21/04/17    27/06/17
CHORUSSVF    QPGMR      5.41      92082135.0   10/11/17
CHGDG#KFF    QPGMR      4.15      70659203.1   10/11/17    11/11/17
CHGDG#TEST   QPGMR      3.22      54865272.8   16/05/17    27/06/17
CHGDG#TOLD   QPGMR      2.58      43875450.9   19/11/16
CHXAP        QPGMR      2.58      43847073.8   10/11/17    11/11/17
#MMXJRN@R    KINGSLEY   1.04      17680969.7   12/11/17    11/11/17
BGTEMP       QPGMR      .47       8014577.7    19/11/16
CHSKFFDTF    QPGMR      .42       7094497.3    01/11/17    11/11/17
MIMIX        MIMIXOWN   .39       6646358.0    12/11/17    12/11/17
  
```


Tidy up your IFS

STOP PRESS – Breaking news – Use IBM i Services to view IFS usage

IFS_OBJECT_STATISTICS

- SQL Alternative to RTVDIRINF, WRKLNK, readdir, opendir, etc...
- 87 columns of data returned



Largest files under an IFS tree

```
select path_name, object_type, data_size, object_owner
  from table(qsys2.IFS_OBJECT_STATISTICS(
            start_path_name => '/usr',
            subtree_directories => 'YES'))
 order by 3 desc
 limit 10;
```

PATH_NAME	OBJECT_TYPE	DATA_SIZE	OBJECT_OWNER
/usr/scottf/guard-itap-10.0.0_r79963_trunk_1-aix-5.3-aix-powerpc.sh	*STMF	22990848	SCOTTFF
/usr/local/guardium/libprotobuf.a	*STMF	11376527	SCOTTFF
/usr/local/guardium/istap	*STMF	7620568	SCOTTFF
/usr/local/guardium/just_send	*STMF	3962332	SCOTTFF
/usr/bin	*DIR	73728	QSYS
/usr	*DIR	24576	QSYS
/usr/scottf	*DIR	12288	SCOTTFF
/usr/local/guardium/iso-swid	*DIR	12288	SCOTTFF
/usr/local	*DIR	8192	SCOTTFF
/usr/local/guardium	*DIR	8192	SCOTTFF

IFS Storage Management by User

```
with ifsobj (path, type) as (  
  select path_name, object_type  
  from table(qsys2.object_ownership('SCOTTFF')) a  
  where path_name is not null  
)  
select i.*, data_size, z.*  
  from ifsobj i, lateral (  
  select * from  
  table(qsys2.ifs_object_statistics(  
    start_path_name => path,  
    subtree_directories => 'NO')) z  
order by data_size desc;
```

PATH	TYPE	DATA_SIZE
/usr/scottf	*DIR	22990848
/usr/scottf/guard-itap-10.0.0_r7...	*STMF	22990848
/usr/local/guardium/libprotobuf.a	*STMF	11376527
/usr/local/guardium/libprotobuf.a	*STMF	11376527

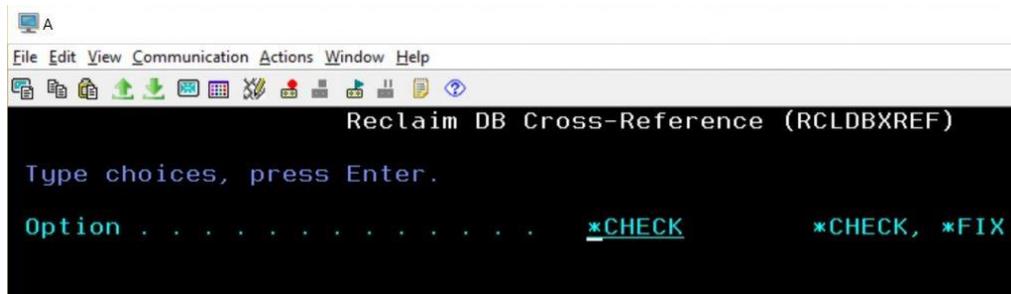
IFS Directories – Data size probe

```
select path_name, object_type, data_size, object_owner,  
       create_timestamp, access_timestamp,  
       data_change_timestamp, object_change_timestamp  
from table (  
    qsys2.ifs_object_statistics(  
        start_path_name => ' / ',  
        subtree_directories => 'YES',  
        object_type_list => '*ALLDIR *NOQSYS'))  
where data_size is not null and  
       object_owner not in ('QSYS')  
order by 3 desc limit 10;
```

PATH_NAME	OBJECT_TYPE	DATA_SIZE	OBJECT_OWNER	CREATE_TIMESTAMP
/QOPT/HMC-9.1.910.0	*DDIR	2147483647	QDFTOWN	2018-02-21
/home/jdbctest/ct/out/compare	*DIR	3825664	EBERHARD	2018-07-15
/home/jdbctest/test	*DIR	2646016	EBERHARD	2016-04-28
/tmp/SQE/CLRAMLER_991432	*DIR	909312	CLRAMLER	2019-03-26
/home/jdbctest/stp/locator/evn	*DIR	606320	EBERHARD	2016-04-28

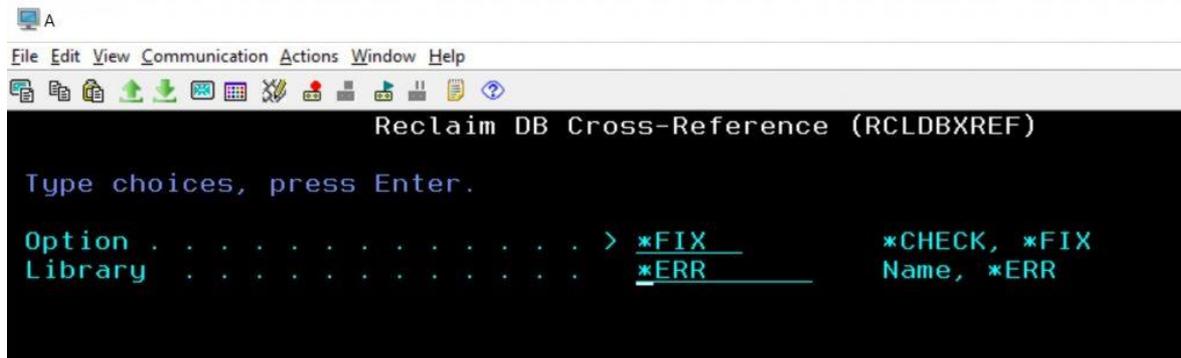
Check Database Cross Reference

- IBM i has a cross reference table for long & short table names
- When this goes wrong, your applications go wrong
- Using RCLSTG *DBXREF to detect and fix - needs downtime
- Use the RCLDBXREF command to check whilst in use
- To check you can use RCLDBXREF OPTION(*CHECK)



```
A
File Edit View Communication Actions Window Help
Reclaim DB Cross-Reference (RCLDBXREF)
Type choices, press Enter.
Option . . . . . *CHECK *CHECK, *FIX
```

To check you can use RCLDBXREF OPTION(*CHECK)



```
A
File Edit View Communication Actions Window Help
Reclaim DB Cross-Reference (RCLDBXREF)
Type choices, press Enter.
Option . . . . . > *FIX *CHECK, *FIX
Library . . . . . *ERR Name, *ERR
```

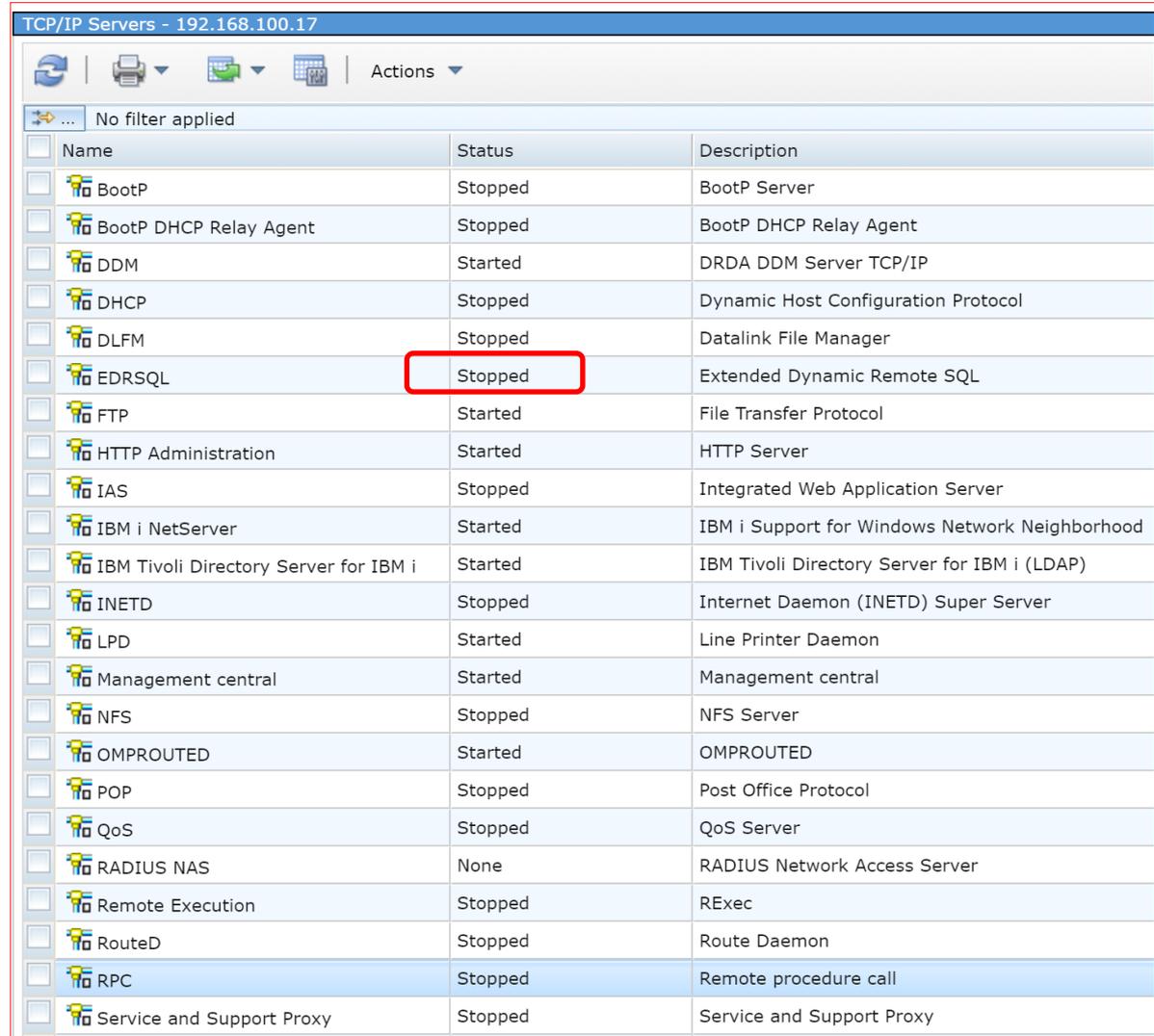
What Services are you using?

If you don't use it, disable it

For example:

If you move to sFTP

Why not Disable FTP



TCP/IP Servers - 192.168.100.17

Name	Status	Description
BootP	Stopped	BootP Server
BootP DHCP Relay Agent	Stopped	BootP DHCP Relay Agent
DDM	Started	DRDA DDM Server TCP/IP
DHCP	Stopped	Dynamic Host Configuration Protocol
DLFM	Stopped	Datalink File Manager
EDRSQL	Stopped	Extended Dynamic Remote SQL
FTP	Started	File Transfer Protocol
HTTP Administration	Started	HTTP Server
IAS	Stopped	Integrated Web Application Server
IBM i NetServer	Started	IBM i Support for Windows Network Neighborhood
IBM Tivoli Directory Server for IBM i	Started	IBM Tivoli Directory Server for IBM i (LDAP)
INETD	Stopped	Internet Daemon (INETD) Super Server
LPD	Started	Line Printer Daemon
Management central	Started	Management central
NFS	Stopped	NFS Server
OMPROUTED	Started	OMPROUTED
POP	Stopped	Post Office Protocol
QoS	Stopped	QoS Server
RADIUS NAS	None	RADIUS Network Access Server
Remote Execution	Stopped	RExec
RouteD	Stopped	Route Daemon
RPC	Stopped	Remote procedure call
Service and Support Proxy	Stopped	Service and Support Proxy

Move from FTP to sFTP

- Free of charge 5733SC1 Licensed Program
- Supports End to End Encryption
- Supports login with PKE (Public Key Encryption)
- Open Standard supported across platforms
- Can be scripted in CL / RPG just like FTP
- More secure than FTPS

Display Installed Licensed Programs

System: KFF810

Licensed Program	Installed Status	Description
5770JV1	*COMPATIBLE	Java SE 6 64 bit
5770JV1	*COMPATIBLE	Java SE 7 32 bit
5770JV1	*COMPATIBLE	Java SE 7 64 bit
5770PT1	*COMPATIBLE	IBM Performance Tools for i
5770PT1	*COMPATIBLE	Performance Tools - Manager Feature
5770PT1	*COMPATIBLE	Performance Tools - Job Watcher
5770QU1	*COMPATIBLE	IBM Query for i
5733SC1	*INSTALLED	IBM Portable Utilities for i
5733SC1	*INSTALLED	OpenSSH, OpenSSL, zlib
5770ST1	*COMPATIBLE	DB2 Query Mgr and SQL DevKit
5770TC1	*COMPATIBLE	IBM TCP/IP Connectivity Utilities for i

Review Users

- Check for users that have not signed on for a long time
- Check for users with default passwords
- Check for users with special authorities
- Start with the Go SecTools menu

```
SECTOOLS                               Security Tools
```

```
Select one of the following:
```

```
  Work with profiles
```

1. Analyze default passwords
2. Display active profile list
3. Change active profile list
4. Analyze profile activity
5. Display activation schedule
6. Change activation schedule entry
7. Display expiration schedule
8. Change expiration schedule entry
9. Print profile internals

```
Selection or command
```

Review Users

Protip: SecTools is a starting point but not a silver bullet solution

- **For example** - PRTUSRPRF TYPE(*AUTINFO)
SPCAUT(*ALLOBJ)

User	Group	*ALL	*AUD	SYS	*JOB	*SAV	*SEC	*SER	*SPL	User
Profile	Profiles	OBJ	IT	CFG	CTL	SYS	ADM	VICE	CTL	Class
QLPAUTO	*NONE	X		X	X	X	X			*SYSOPR
QLPINSTALL	*NONE	X		X	X	X	X			*SYSOPR
QSECOFR	*NONE	X	X	X	X	X	X	X	X	*SECOFR
QSECOFR1	*NONE	X	X	X	X	X	X	X	X	*SECOFR
QSYS	*NONE	X	X	X	X	X	X	X	X	*SECOFR
ROWTON	*NONE	X	X	X	X	X	X	X	X	*SECOFR
ZENDADMIN	*NONE	X	X	X	X	X	X	X	X	*SECOFR

AUTHORIZATION_NAME	STATUS	NO_PASSWORD_INDICATOR	PREVIOUS_SIGNON	TEXT_DESCRIPTION
QLPAUTO	*ENABLED	NO	-	IBM-supplied User Profile
QLPINSTALL	*ENABLED	NO	-	IBM-supplied User Profile
QSECOFR	*ENABLED	YES	2015-09-20 13:05:04.000000	Security Officer
QSECOFR1	*ENABLED	YES	2015-09-20 14:29:08.000000	Security Officer
QSYS	*ENABLED	NO	-	Internal System User Profile
ROWTON	*ENABLED	YES	2015-09-20 13:56:51.000000	Rowton Support
SURPRISE	*ENABLED	YES	2015-09-20 14:29:52.000000	Has AllObj because Rowton is Group Profile
ZENDADMIN	*ENABLED	NO	-	Zend Server Administrator

IBM i Services gives you a better answer. In this case, user SURPRISE inherits its *ALLOBJ super powers from its Group Profile ROWTON. It does not have *ALLOBJ specified in its own right, so does not show up on the PRTUSRPRF That doesn't stop this user from having full access to every object on the system!

Apply PTFs Perm

- If you are happy with your PTFs, apply them Permanently
- This will save disk space
- Speed up the next PTF install
- Improved Roll Back position if you don't like your next PTF install

Apply Program Temporary Fix (APYPTF)

Type choices, press Enter.

```
Product . . . . . > *ALL_____ F4 for list
Release . . . . . *ONLY_____ *ONLY, VxRyMz, vvrrmm
PTF numbers to select . . . . . *ALL_____ Character value, *ALL
      + for more values _____
PTF numbers to omit . . . . . _____ Character value
      + for more values _____
Extent of change . . . . . *perm_____ *TEMP, *PERM
Delayed PTFs . . . . . *NO_____ *NO, *YES, *IMMDLY
IPL apply options:
  Apply at unattended IPL . . . *YES_____ *NO, *YES
  Prerequisite lic int code . . *APYPERM_____ *APYPERM, *NOAPY
Apply requisite PTFs . . . . . *NO_____ *NO, *YES
```

- **ProTip: But do wait for at least a month after you install new PTFs**

Remember
your IBM i needs
you too !

Questions?



Thank You

Other items to Consider

- Journal Index limit
- Journal performance
- Check HMC to unused Processor and Memory
- Ansync bring
- Index Advisor
- Symetric MultiProc
- WRKPTFGRP SQL to check for PTFs not applied
- System Limits?
- SQL for Failed Password Logins
- SQL for disabled netserver users
- SQL for UnEncrypted IBM i Connections