

FORTRA

Fortra IBMi Solutions

Batch Automation

Performance Analysis

Capacity Planning

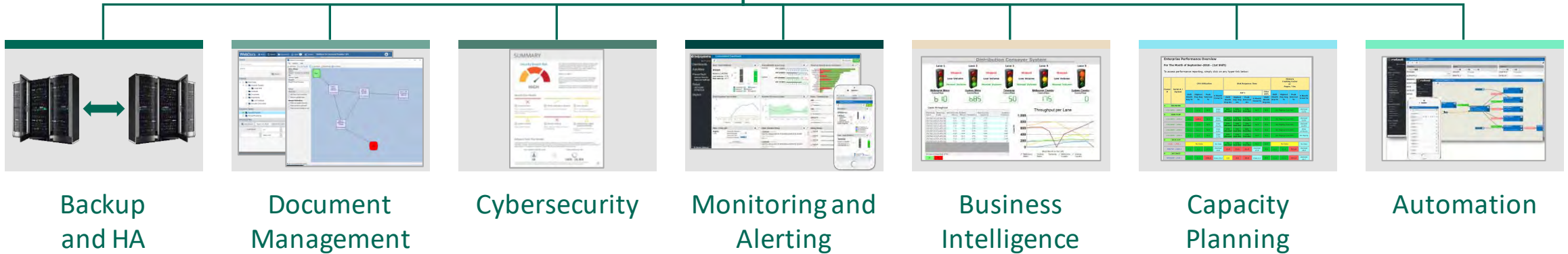
Security



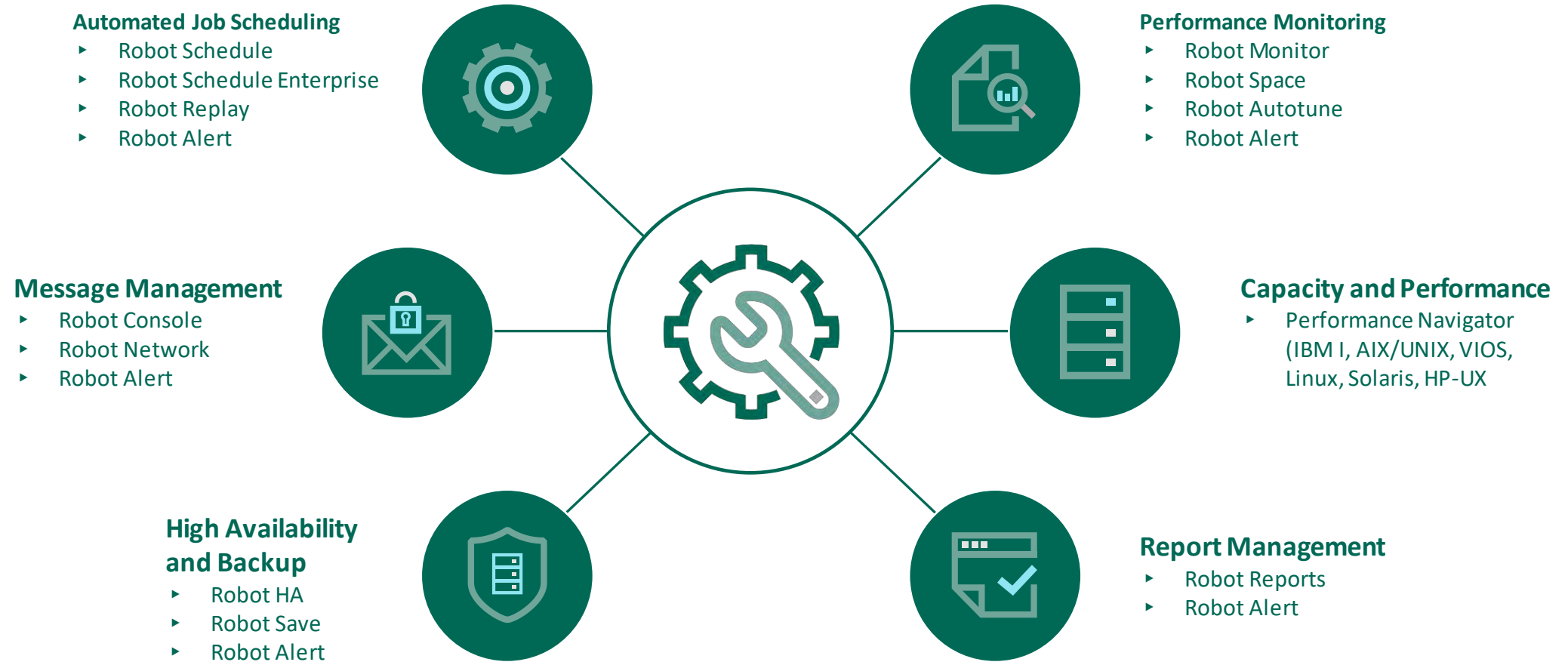
Agenda

- 1. Introductions**
- 2. ITM/IBMi End-of-Day Automation**
- 3. Security on IBM i**
- 4. Performance Reporting & Tuning for IBM i**
- 5. Q&A**

Solutions for IBM i



IT Operations Management Robot Solutions



Automation Requirements

Challenges

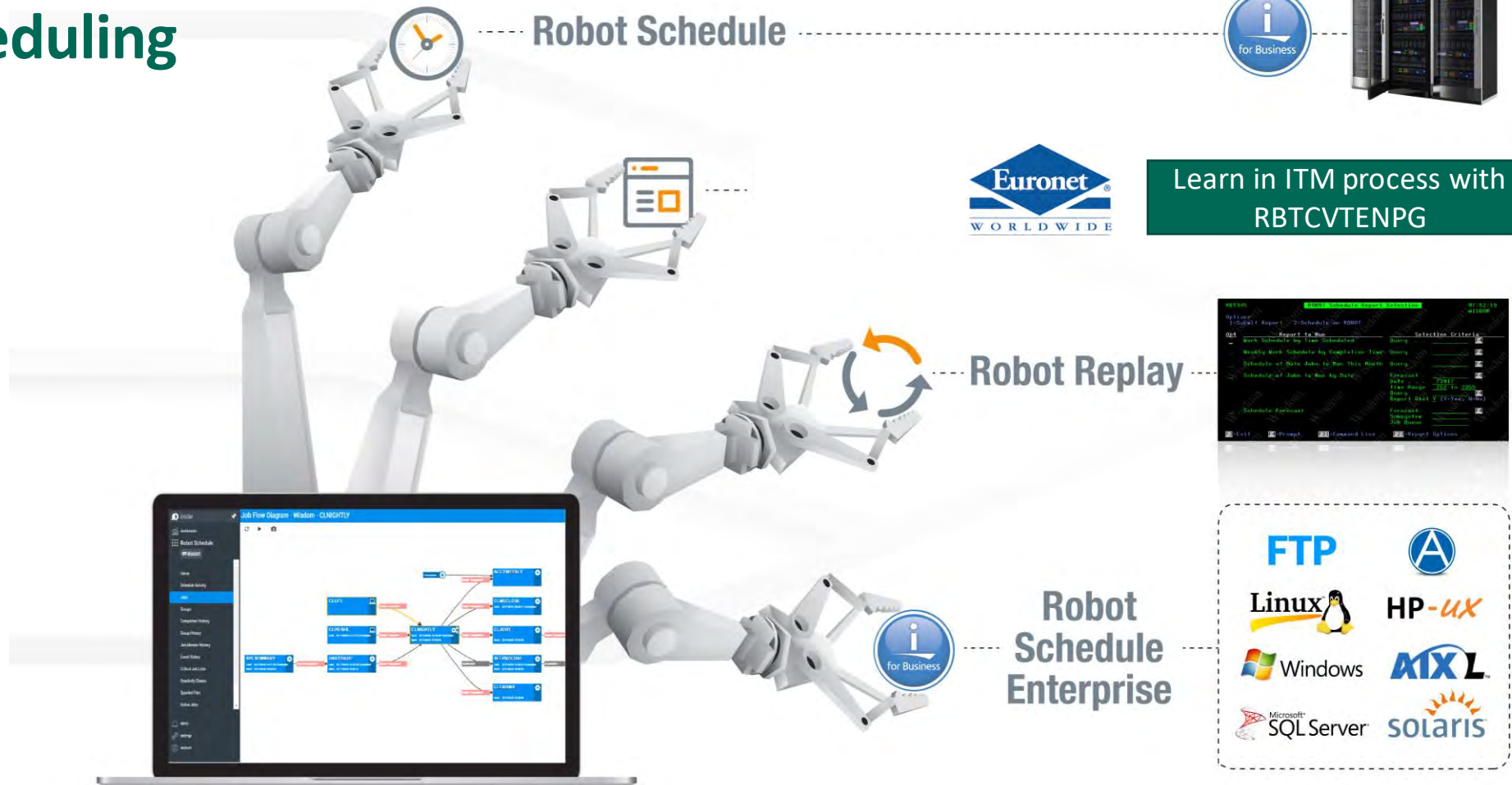
- Manual runbook for operators today - Euronet ITM
- Limited scheduling parameters
- No cross-platform dependency processing
- Lack of visibility into job schedule history and auditing
- Need to automate and email spool files

Solution

- Integration with Euronet ITM
- Modifying end of day/month parameters
- Integration with non-IBM i processes
- Delivering output automatically to end users

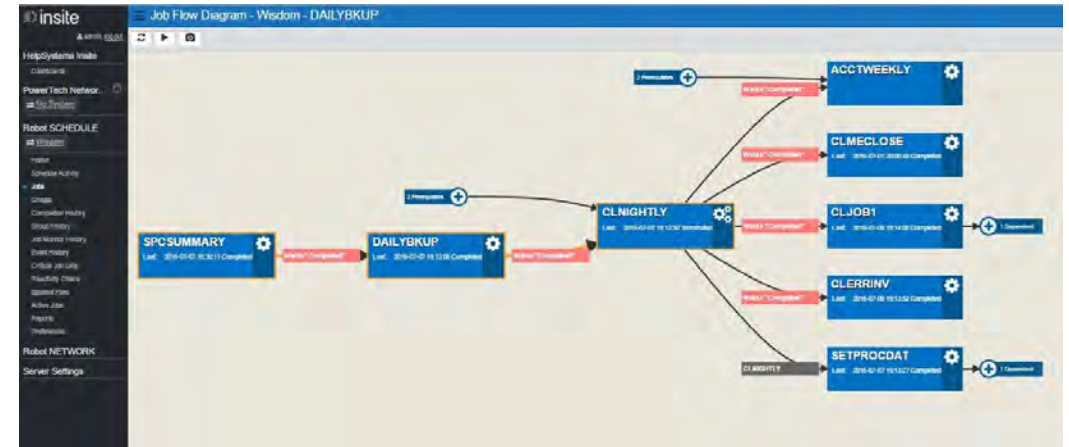


Automated Job Scheduling



Auditing, Tracking and Reporting Tools

1. Audit trail of job changes, run history, and events
2. Job flow diagrams; mobile/browser interface
3. Management reporting (i.e., audit, history, and events)
4. Forecasted workflow and critical job monitoring
5. Job overrun, underrun, and late start (SLA) monitoring, plus reporting and notification
6. Built-in documentation for each task



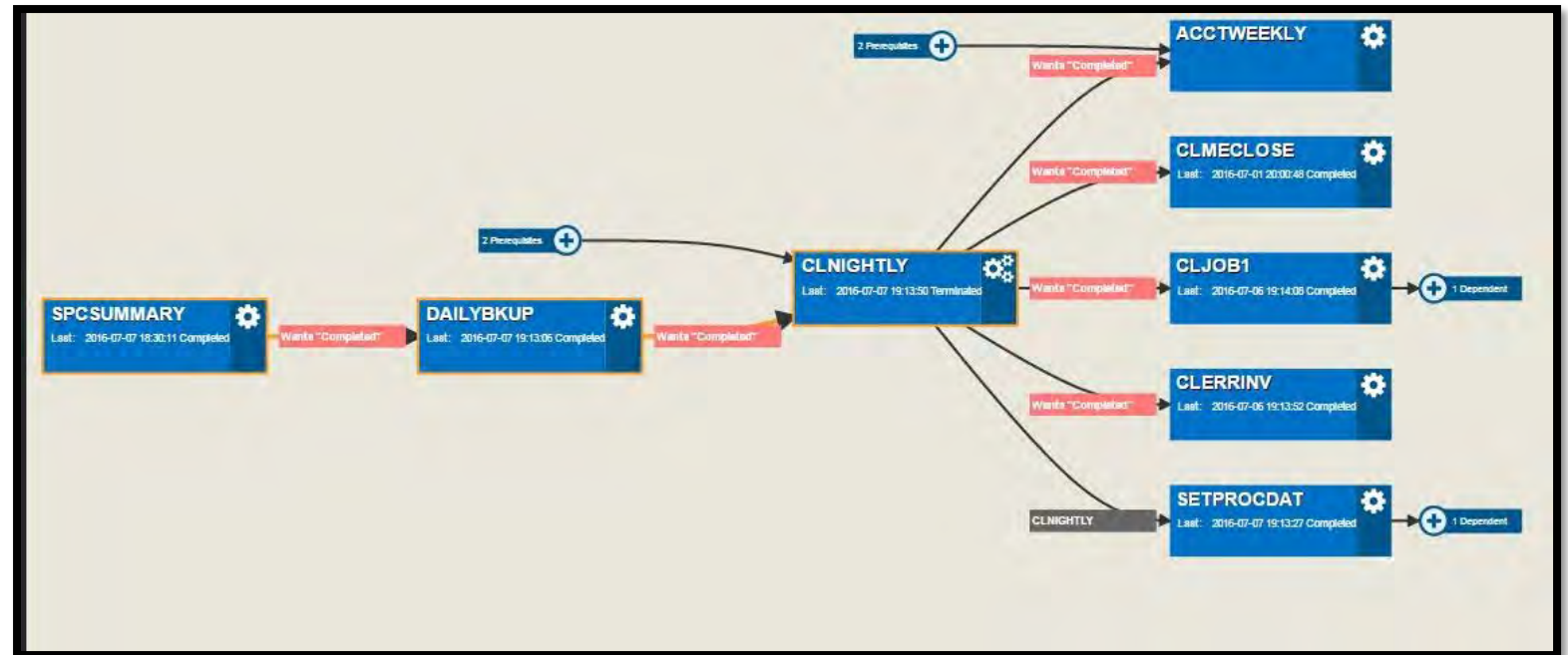
Forecasted (66)				Running (2) / Waiting (0) / Delayed (0)				Completed (33) / Failed (0)			
Type	Job #	Start	Override	Status	Job #	Start	End	Status	Job #	Start	End
SEQ_DRY...	11/20/2018 02:00...				KSNEWHOUR	11/20/2018 08:00:1...			PTABSWITCH	11/20/2018 08:00:1...	
MONDISK...	11/20/2018 02:31...								PTABSWITCH	11/20/2018 08:00:1...	
RBAPURGE	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBNACK	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBT655	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
RSPBRND...	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
SEQ_UPD...	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBNDLTST	11/20/2018 05:00...								PTABSWITCH	11/20/2018 08:00:1...	
CLOPGM...	11/20/2018 06:00...								PTABSWITCH	11/20/2018 08:00:1...	
LAST12HRS	11/20/2018 06:00...								PTABSWITCH	11/20/2018 08:00:1...	
SPCDAILY	11/20/2018 06:00...								PTABSWITCH	11/20/2018 08:00:1...	
SPC409	11/20/2018 06:00...								PTABSWITCH	11/20/2018 08:00:1...	
CLSTRPOS	11/20/2018 07:00...								PTABSWITCH	11/20/2018 08:00:1...	
ARCAGFN...	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBSGROUP	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBSRLSE...	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBT6502	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
REP29301	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
TLPGRP1	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
TLPDATE	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
AGEOUTQ	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBS436	11/20/2018 08:00...								PTABSWITCH	11/20/2018 08:00:1...	
RBS1500	11/20/2018 08:01...								PTABSWITCH	11/20/2018 08:00:1...	
RBS34001	11/20/2018 08:01...								PTABSWITCH	11/20/2018 08:00:1...	



Dependencies

1. What Can You React Upon?

- ▶ Robot Job
- ▶ Group Job
- ▶ Remote Job
- ▶ User Job
- ▶ *Agent Event*
- ▶ *Event*
- ▶ Or all of the Above



Defining Terms



Security

safe or free from danger

Defining Terms

Compliance

comparing actual to desired



Defining Terms

Regulation

A mandated compliance
standard for (basic) security



Who Is Multi-Lingual?

4.3.2 Privileged
account access should...



Restrict use of ***ALLOBJ**
to user profiles that...

Businesses rely on **auditors** to be regulatory translators

Aim High!

Make **Security** your end goal and **Compliance** will take care of itself along the way.



Common Myths & Reasons for not doing anything !

- ▶ We are not connected to the internet
- ▶ We do not allow users to map drives
- ▶ We are a read-only environment
- ▶ We are hosted
- ▶ We have high availability
- ▶ We have AV on the network
- ▶ We do not use the IFS (IBM i)
- ▶ We do not use command line
- ▶ We haven't had a security breach
- ▶ We were told it's the most "secured" system.
- ▶ We never heard of virus attack on IBM Power server.

Viruses on Power Servers?

Stories and Screenshots

A customer has experienced a [#ransomwareattack](#) attack. [#Fortra](#) Powertech Antivirus on the IBMi detected this and stopped access to the Netserver shares preventing any real damage. The customer only just installed the product recently. Money well spent. The attack also dropped a [#trojanhorse](#) into the IFS which has been picked up by a Powertech Antivirus scan. [#IBM](#) [#IBMi](#) [#itsecurity](#) [#ransomware](#)

Stories and Screenshots



```
AVMSGQ                                *DSPMSG
STANDGUARD                             *HOLD
00

#AVUPDATE 003703.
Virus definitions successfully updated to version 10591.

Virus definitions successfully updated to version 10592.
User ISERIES has been detected by the anti-ransomware software.
User ISERIES has been blocked by the anti-ransomware software.

Virus definitions successfully updated to version 10593.

F3
F1
+ A                                08/001
```

Stories and Screenshots

```

Browse : /StandGuard/./LOGS/System virus scan task.log
Record : 747947 of 747960 by 14 Column :
Control :
.....+.....1.....+.....2.....+.....3.....+.....4.....+.....5.....+.....
Skipped . . . : 0
Errors . . . : 105
Infected . . . : 248095

Cleaned . . . : 0
Moved . . . : 248095
Deleted . . . : 0

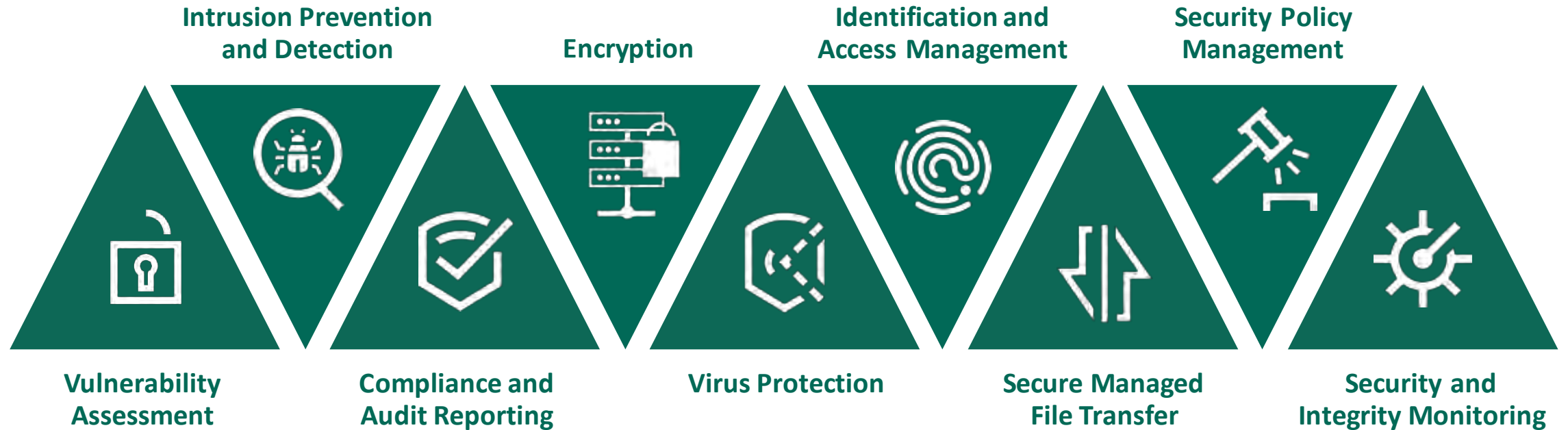
1 File is locked or cannot be opened.
104 Caller denied engine access to either scan or repair.

Completed at Saturday, Aug 01 08:55 PM
2282743 files processed in 78947 seconds (28.91 files/sec)
Task 'System virus scan task' completed with errors. 24809
*****End of Data*****

F3=Exit F10=Display Hex F12=Exit F15=Services F16=R
F19=Left F20=Right
1 records folded.
  
```

Customer had a user with *ALLOBJ authority and a mapped drive to the root directory of their IFS. On the afternoon of Friday, July 24, 2015 that user received an email with an attachment that was infected with CryptoWall and unknowingly opened it. The CryptoWall ransomware started running and doing its thing, meantime the oblivious user went home for the weekend, leaving his pc on and the malware free to do its damage. By Sunday morning, another employee realized that their backups hadn't completed so tried signing on to the system to check, but was unable to. She ended up having to sign on to the console and discovered that 500,000+ objects in the IFS were encrypted, including many of their TCP/IP configuration files, WebSphere directories and files used for batch jobs. She called us that week and I helped them install SGAV and setup a scan. The screen shot is the result of that first scan. They spent the better part of a month cleaning up and restoring their files.

Best of Breed Security Solutions



Best of Breed Security Products

Compliance Reporting

Compliance Monitor for IBM i



Privileged Access Management

Authority Broker for IBM i



Self-Service Password Reset

Password Self Help for IBM i



Database Monitoring

Database Monitor for IBM i



User Provisioning

Identity Manager for IBM i



Multi-Factor Authentication

Multi-Factor Authentication for IBM i

SecurID Agent for IBM i



Native Encryption

Encryption for IBM i



Free Security Snapshot

Powertech Security Scan

Solution View



Perimeter Access Control

Exit Point Manager for IBM i



Command Monitoring

Command Security for IBM i



Automated Risk Audit

Risk Assessor for IBM i



Security Information and Event Management

SIEM Agent for IBM i

Event Manager



Native Virus Protection

Antivirus for IBM i, AIX, Linux, Linux on Z and LinuxONE



InfoSec Policy Control

Policy Minder for IBM i



Secure Managed File Transfer

GoAnywhere



**Fortra
Security
Services**

Return On Security Investment (ROSI)

The day *before* a breach, the ROI of security is ZERO.

The day *afterwards*, it becomes INFINITE.



Daily Checks to include:

- Real time Monitoring
- Check application and system messages
- Escalation via SMS/E-Mail
- Job Waiting messages - monitored & passed to apps team
- System Messages - Disk failure type Messages are passed/escalated to IBM
- Monitor CPU/Memory etc

Recommended Solutions

➤ **Robot Monitor**

Real time performance and systems monitoring

➤ **Performance Navigator**

Deep dive performance analysis & Capacity Planning

➤ **Halcyon Operations Suite**

IBM i systems , message monitoring & automation

Robot Monitor Real-Time Performance Monitoring & Reporting

- Application Monitoring
- SQL Monitoring
- History Analysis & Forecasting
- System Monitoring
- PTF Accuracy Check
- Enterprise Interface
- Multi-System View
- Exception Notifications
- MQ Monitoring
- PowerHA Monitoring



- MIMIX Monitoring
- Library & IFS Analysis
- Detailed Performance Analysis
- Disk Monitoring
- Job & Subsystem Monitoring
- JDBC/ODBC Monitoring
- Customized Graphical Reports
- Job Accounting
- BRMS Monitoring
- Robot HA Monitoring

VIOS Monitoring

AIX/Linux Monitoring

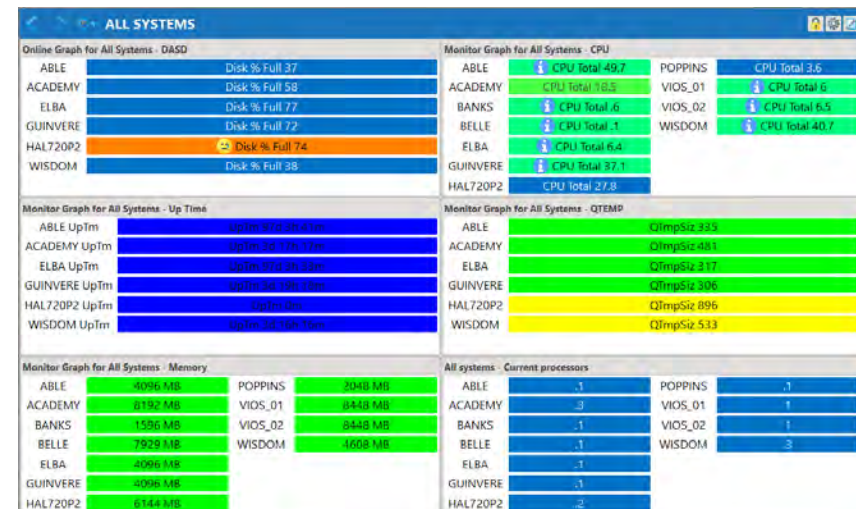
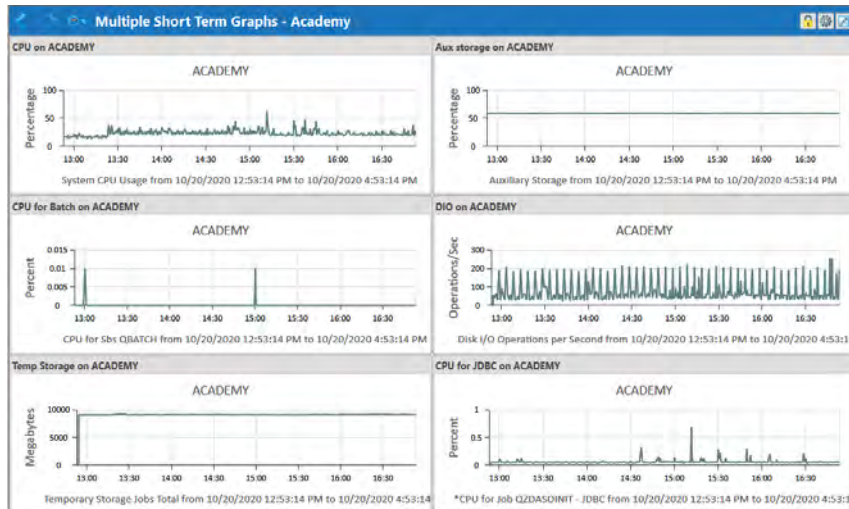
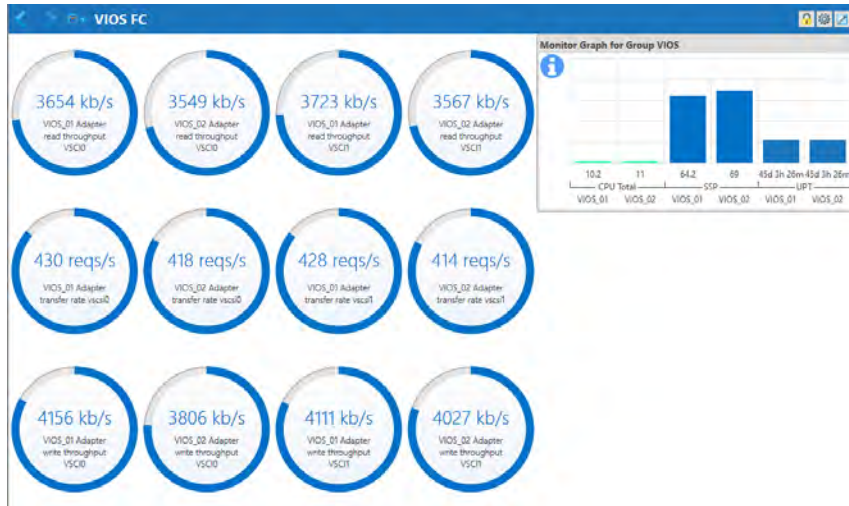
Robot HA Monitoring

Robot Monitor IBM i Metrics

Built In	Active Batch Jobs	Data Queue Entries	MQ Channel Avg Time on Transmit Queue	Power HA Cluster Node Status
Active Interactive Jobs	Active Interactive Jobs	Data Queue Percentage	MQ Channel Bytes Received per Second	Power HA Cluster Resource Group
Active to Ineligible Transitions	ASP Busy	Database CPU Usage	MQ Channel Bytes Sent per Second	Power HA Cluster Status
Active-to-Wait job state transitions	ASP Busy Unit#	Device Status	MQ Channel Compression Ratio	Processors Used
Auto Restart when Power Restored	ASP Busy Unit%	Disk I/O	MQ Channel Compression Time	QTemp Count
Auxiliary Storage	ASP Space Free	Distribution Queue Entries	MQ Channel Exit Program Processing Time	QTemp Size
CPU Seconds per Transaction	ASP Space Used	Distribution Queue Status	MQ Channel Message Count	Remote Journal Lag
CPU Usage	ASP Status	Faults per Second	MQ Channel Network Time	Response Time
Current Interactive Percent	ASP Usage	File Deleted Record Count	MQ Channel Status	Spool File Count
Current Memory	Batch Jobs Held on Job Queue	File Deleted Record Percentage	MQ Listener Status	Subsystem Status
Current Processors	Batch Jobs on Held Job Queue	File Record Count	MQ Queue Age of Oldest Message	Subsystem Transactions/Hour
Damaged Main Storage Units	Batch Jobs on Job Queue without Subsystem	Interactive Capacity Used	MQ Queue Application Status	System Overhead
Database CPU Usage	Batch Jobs on Output Queue	Interactive CPU Usage	MQ Queue Average Queue Time	TCP Ping
Disks Busy	Batch Jobs Waiting to Run	Interactive Jobs on Output Queue	MQ Queue Depth	TCP Port Status
Front Panel Battery Status	Built In	IOP Utilization	MQ Queue Depth/Maximum	Temporary Addresses Used
Front Panel Status	Cache Battery Life	IOP Utilization (Communications Only)	MQ Queue Depth/Trigger	Temporary Storage per Job
Interactive CPU Usage	CFInt Overhead	IOP Utilization (Disk Only)	MQ Queue Manager Channel Initiator Status	Temporary Storage Total
Interactive Jobs	Check Job CPU and Hinder	IP Interface Status	MQ Queue Manager Command Server Status	Thread Count per Job
Jobs Running in the System (excluding subsystem monitors)	Communications (Ethernet) More than 16 Retries	Job Count	MQ Queue Manager Connection Count	Thread Count Total
Key Position	Communications (Ethernet) More than One Retry	Job Queue Active Job Count	MQ Queue Manager Status	Total Job CPU
Last Termination Cause	Communications (Ethernet) One Retry	Job Queue Average Wait Time	MQ Queue Open Count - Input	Total Jobs in System (Count)
Machine Pool Faults	Communications Error Count	Job Queue Count	MQ Queue Open Count - Output	Total Jobs in System (Percentage)
Next IPL Type	Communications Throughput Receive	Job Queue Max Wait Time	MQ Queue Uncommitted Message Count	Total Jobs on Output Queue
Non-Database Faults	Communications Throughput Transmit	Job Queue Status	Network Interface Status	User Supplied Decimal
Processors Not Working	Communications Utilization	Job Status	Network Server Status	User Supplied Integer
Processors Partly OK	Controller Status	Journal Receiver Size	Object Count	User Supplied Percentage
Ptf Status	CPU Seconds per Transaction	Journal Status	Output Queue Status	User Supplied Text
Remote Power On Enabled	CPW Available	Largest Library	Permanent Addresses Used	
Response Time	CPW Percentage of Available	Largest Object		
Running on UPS	CPW Percentage of Configured	Line Status		
Transactions per Hour	CPW Used	Lock Wait Time		
Unallocated Disk Units		Maximum Job Run Time		
UPS Battery Status		Microcode Overhead		
UPS Bypass				
Wait to Ineligible Transitions				

Robot Monitor for Mimix on IBM i

- Mimix Audit Compliance Status
- Mimix Collector Services Status
- Mimix Connector Send Status
- Mimix Database Apply A Status
- Mimix Database Apply A Threshold Status
- Mimix Database Read Status
- Mimix Database Send Status
- Mimix Database Source Status
- Mimix Database Target Status
- Mimix Journal Manager Status
- Mimix Master Monitor Status
- Mimix Monitor Processes Status
- Mimix Monitor Status
- Mimix Number Of DA/DQ Objects Not Journalled On System 1
- Mimix Number Of Files Not Journalled On System 1
- Mimix Number Of IFS Files Not Journalled On System 1
- Mimix Number Of Objects In Error
- Mimix Object Apply Status
- Mimix Object Apply Threshold Status
- Mimix Object Retrieve Status
- Mimix Object Send Status
- Mimix Object Source Status
- Mimix Object Target Status
- Mimix RJ Link Status
- Mimix Rollup Data Group Status



Robot Monitor Drilldown

Robot.ALERT@HELPSYSTEMS.COM
 ALR-05978 CHUCK ACADEMY

To: Chuck Losinski

Threshold event for CPU Usage JDBC CPU on system
 WISDOM: CPU is 93.740.

Hide Chart History of Highest CPU Jobs for WISDOM, at Monday, November 19 2018, 14:58:42.

R	CPU	DCP	Dis...	Rsp	Txns	Nmbr	User	Job Name	Cmt User	Function	Type	Prt	Started
1	93.14	0.00	0	0.00	0	712	CHUCK	QPADEV...	CHUCK	Scale CPU Percentage	Interactive	20	11/19/2018 8:16:03 AM
2	8.84	0.00	7	0.00	0	712	RBTADMIN	RBTFSEM	RBTAI	Show Worst Response Times		50	11/19/2018 11:46:49 AM
3	4.82	0.00	0	0.00	0	742	QUSER	QZDASOI	INSITE	Show Highest DCP Jobs		50	11/19/2018 8:27:30 AM
4	1.30	0.00	2	0.00	0	713	PTUSER	PTNSGM	PTUSI	Show Highest I/O Jobs		50	11/19/2018 8:18:59 AM
5	0.70	0.00	15	0.00	0	712	RBTNETPT	NETHOST3	RBTN	Work with Job		50	11/19/2018 8:18:58 AM
6	0.70	0.00	0	0.00	0	712	RBTUSER	ROBOTS	RBTU	WrkJob for User		20	11/18/2018 9:57:37 PM
7	0.46	0.00	0	0.00	0	713	PTIAOWN	IAAJMON	PTIAO	WrkJob for Name		5	11/19/2018 8:25:38 AM
8	0.44	0.00	0	0.00	0	627	QUSER	QZDASOI	INSITE	Who's This?		20	11/19/2018 2:49:27 PM
9	0.38	0.00	3	0.00	0	713	MSMDEMO	WISDOM	MSMD				
10	0.38	0.00	2	0.00	0	768	QUSER	QZSOSIGN	QUSE				



CPU Usage from 11/19/2018 2:36:12 PM to 11/19/2018 3:06:12 PM

WISDOM: Job Details for 758548/QUSER/QZDASOINIT

General Library List Call Stack Open Files SQL Information

SQL Statement

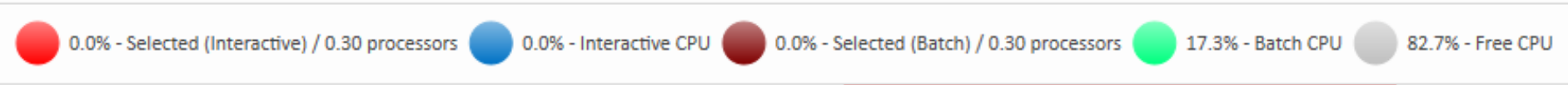
Current SQL Statement

```
INSERT INTO QTEMP.ACCOUNTS_BIG (account_id, account_balance) WITH acct_IDS(account_id) AS ( VALUES(?) UNION ALL SELECT account_id+? FROM acct_IDS WHERE account_ID < ? ) SELECT account_ID, (? + RAND()*?) FROM acct_IDS
```

SQL Details

Status of SQL Statement: **The SQL statement is running currently.**
 Client Address: 10.60.48.61
 Server Mode for SQL: **The SQL statements will not run in a separate server job.**
 Relational Database Name: WISDOM
 Number of SQL Open Cursors: 3

Robot Monitor Top Jobs



Hide Chart

History of Highest CPU Jobs for WISDOM, at **Tuesday, October 20 2020, 10:44:15.**

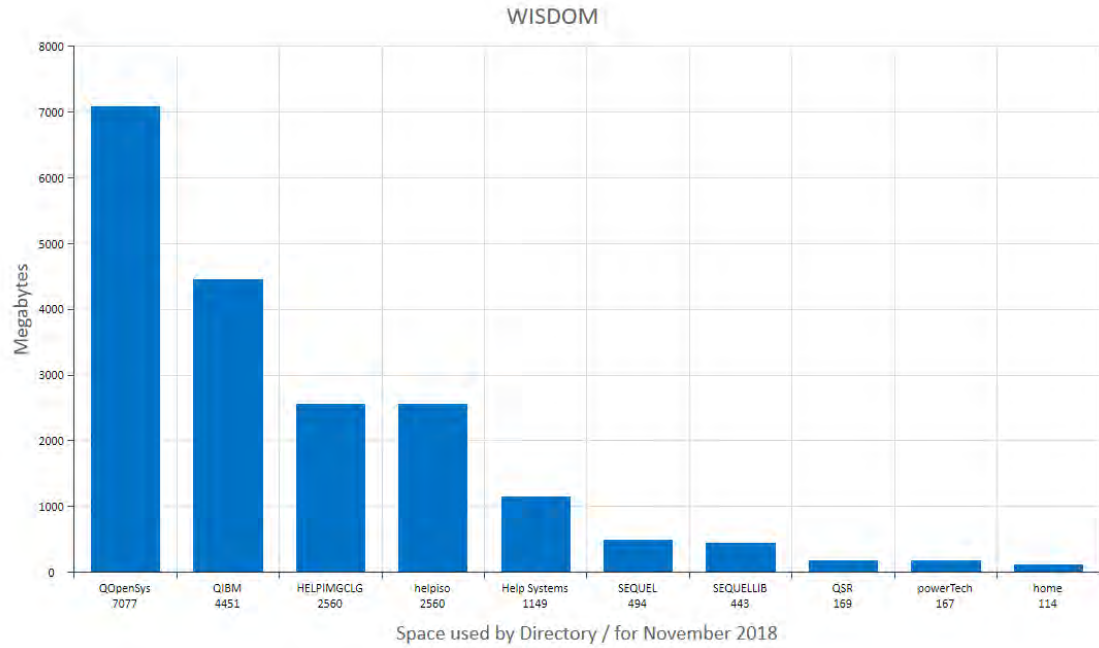
Rank	CPU	DCP	Disk I...	Rsp	Txns	Nmbr	User	Job Name	Cmt User	Function	Type	Pty	Started	Total CPU	Ovrl CP...
1	0.89	0.00	31	0.00	0	074826	SKYBOTUSR	SKYAGENT1	SKYBOTUSR	Jvm-com.helpsy	Batch Immediate	50	10/17/2020 12:38:46 AM	103.00	0.03
2	0.64	0.00	4	0.00	0	087490	MSM	WISDOM	MSM	Pgm-MON020B	Batch	5	10/19/2020 12:20:15 PM	469.00	0.58
3	0.63	0.00	9	0.00	0	075017	RBTADMIN	RBTFSM	RBTADMIN	Pgm-RBT1642	Batch	50	10/17/2020 12:44:04 AM	1874.00	0.63
4	0.26	0.00	8	0.00	0	091429	QSYS	CRTPFRDT...	QSYS	Pgm-QPMRTDATAJ	Batch	50	10/20/2020 12:01:19 AM	95.00	0.25
5	0.19	0.00	8	0.00	0	075042	PTUSER	PPLEVTMON	PTUSER	Pgm-PPL5100	Batch	50	10/17/2020 12:47:17 AM	430.00	0.15
6	0.18	0.00	2	0.00	0	087531	ATERUEL	MON.USRD...	ATERUEL	Pgm-MONDSQL	Batch	50	10/19/2020 12:20:39 PM	110.00	0.14
7	0.12	0.00	0	0.00	0	087500	MSM	MONDOBJS	MSM	Pgm-MONUDCLCT	Batch	20	10/19/2020 12:20:38 PM	137.00	0.17
8	0.12	0.00	2	0.00	0	085383	HKATH	QP0ZSPWP	HKATH	Jvm-com.linoma	Batch Immediate	25	10/19/2020 6:00:05 AM	123.00	0.12
9	0.11	0.00	0	0.00	0	087503	MSM	MONSOHDR	MSM	Pgm-MONUDCLCT	Batch	20	10/19/2020 12:20:38 PM	85.00	0.11
10	0.10	0.00	2	0.00	0	094664	QUSER	QSQSRVR	QUSER	-	Prestart	20	10/20/2020 10:08:47 AM	0.00	0.00

- Scale CPU Percentage
- Show Worst Response Times
- Show Highest I/O Jobs
- Show High CPU Users using SQL
- Work with Job
- WrkJob for User
- WrkJob for Name

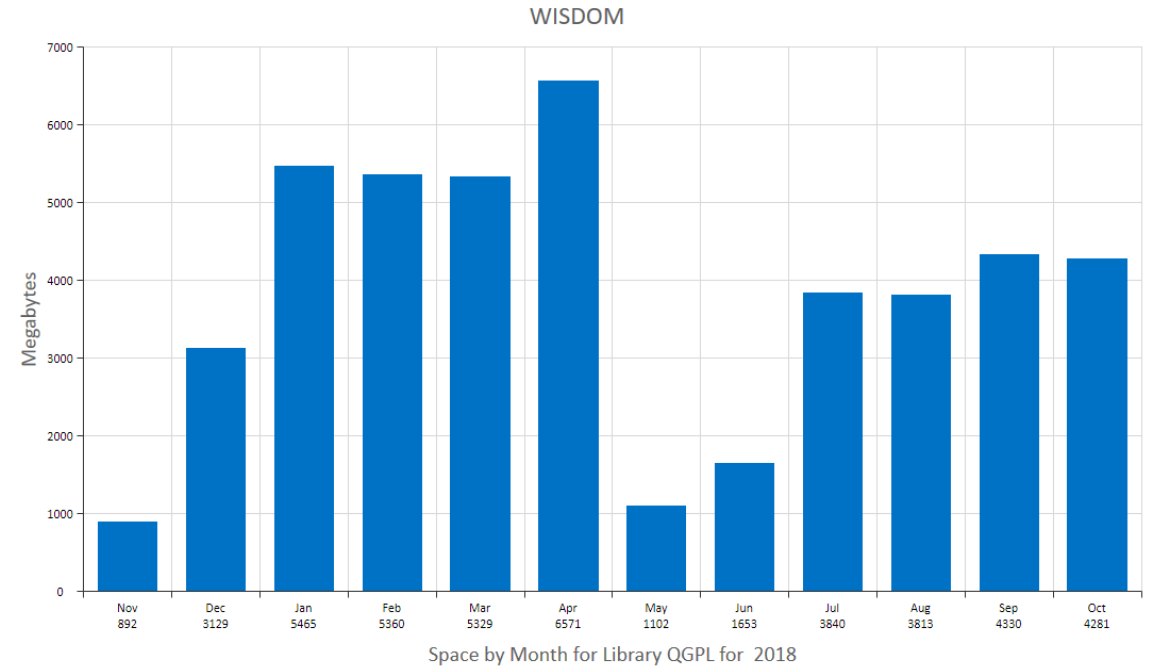
<<

>>

Disk Summary –



Single library or directory over time




Top-consuming libraries and directories

Robot Monitor Summarization

←

- Tools
- Automated Reports
- Dashboard Slideshow Settings
- Print**
- Export
- Options
- Help
- Backup/Restore Settings
- Exit




Print

Print

Copies:

Printer




HP OfficeJet 4650 series (Network) (red)

Ready

Printer Properties


Settings



Print All Pages


Print the entire document

From: To:




Collated

1,2,3 1,2,3 1,2,3



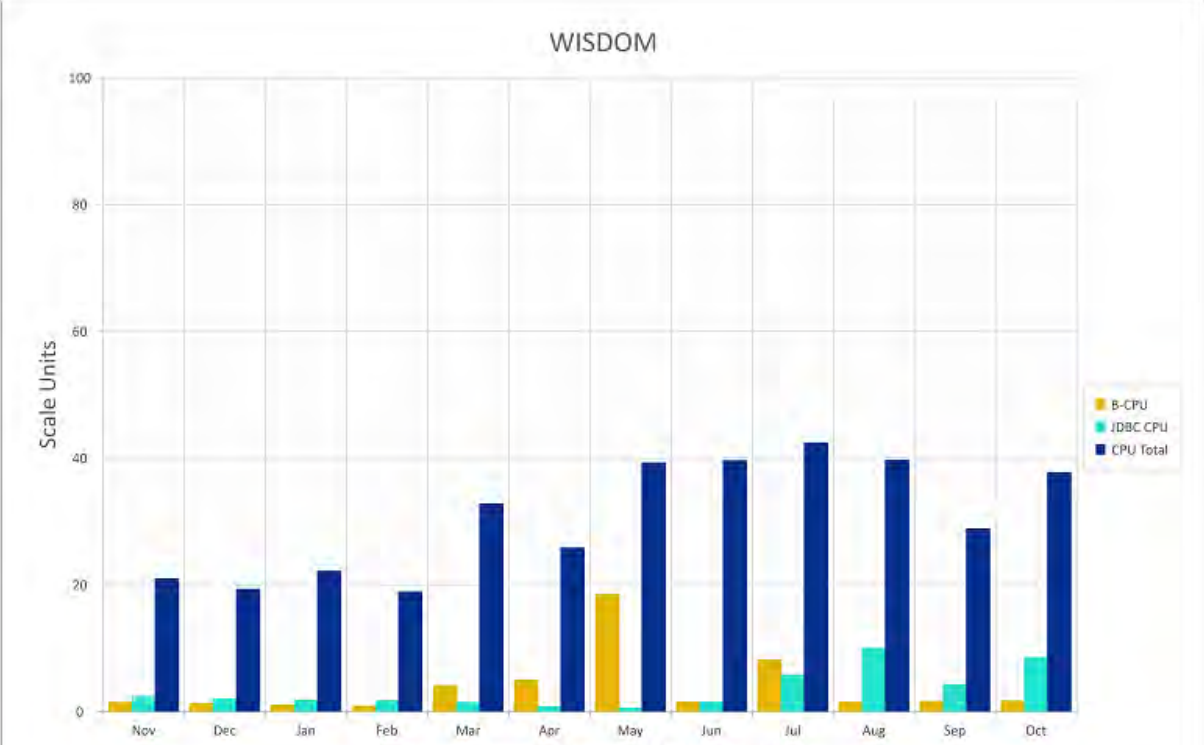
Landscape Orientation



Letter

21,59 cm x 27,94 cm

WISDOM



Multiple Elements for Nov 2019 - Oct 2020

Month	B-CPU	JDBC CPU	CPU Total
Nov	2	2	20
Dec	2	2	19
Jan	2	2	21
Feb	2	2	19
Mar	5	2	32
Apr	5	2	26
May	18	2	39
Jun	2	2	39
Jul	8	5	42
Aug	2	10	39
Sep	2	5	29
Oct	2	8	37

Halcyon



Monitoring



Automation



Reporting

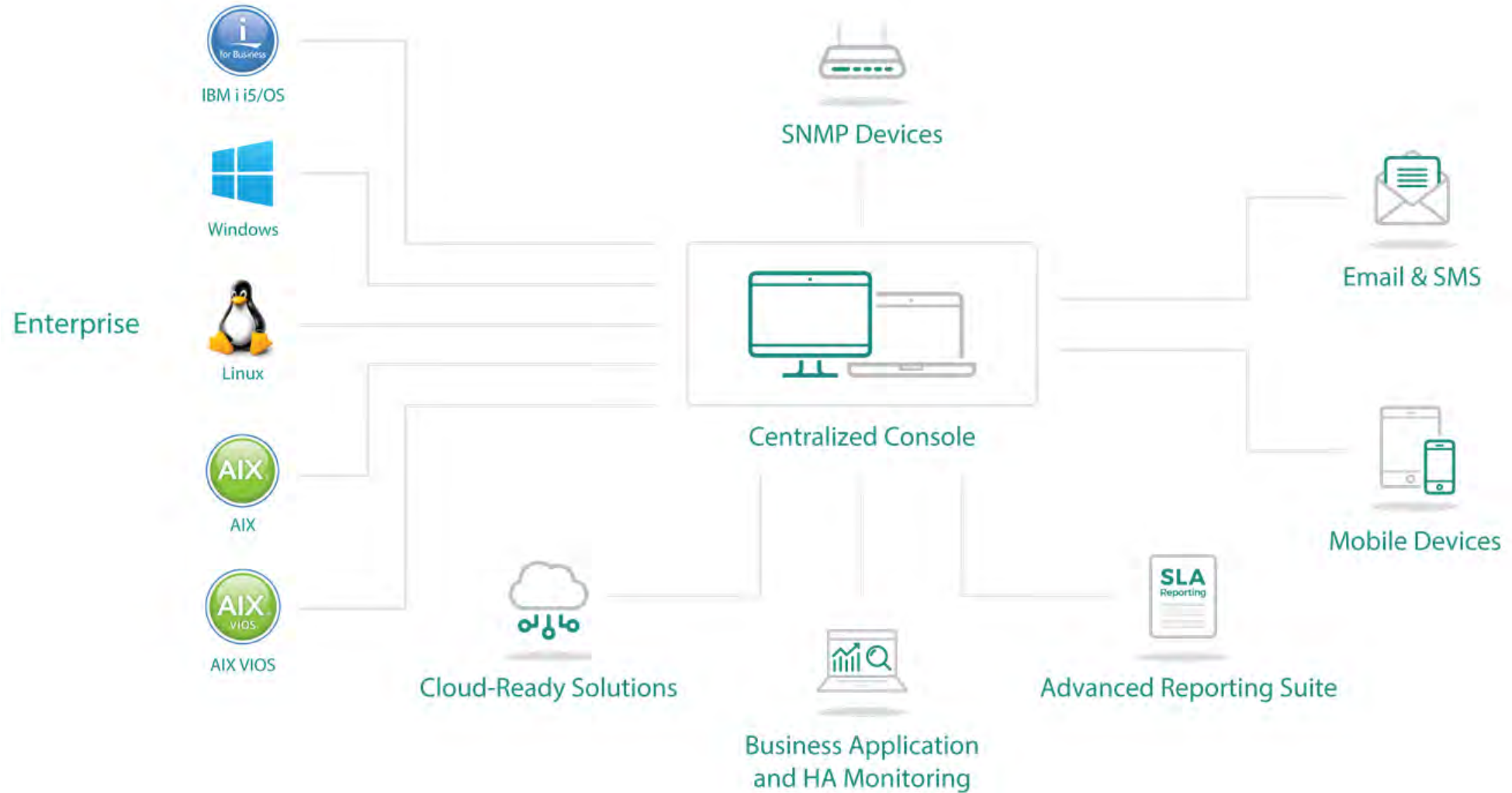
IBM i Monitoring & Automation

Multi-Platform Monitoring & Automation

Business Application & HA Monitoring

Halcyon Landscape

"The Hub"



IBM i Server Suites



Message Management Suite (Level 1)

- ✓ Message Monitoring



Systems Operations Suite (Level 2)

- ✓ Object Monitoring
- ✓ Performance Monitoring
- ✓ SLA Reporting
- ✓ Audit Journal Management
- ✓ Restricted Tasks Management
- ✓ Message Monitoring



Advanced Automation Suite (Level 3)

- ✓ Performance Analysis
- ✓ Log File Monitoring
- ✓ Rules Correlation
- ✓ Disk Space Management
- ✓ Spooled File Management
- ✓ Object Monitoring
- ✓ Performance Monitoring
- ✓ SLA Reporting
- ✓ Audit Journal Management
- ✓ Restricted Tasks Management
- ✓ Message Monitoring



Operations Center Suite (Level 4)

- ✓ Advanced Job Scheduling
- ✓ Performance Analysis
- ✓ Log File Monitoring
- ✓ Rules Correlation
- ✓ Disk Space Management
- ✓ Spooled File Management
- ✓ Object Monitoring
- ✓ Performance Monitoring
- ✓ SLA Reporting
- ✓ Audit Journal Management
- ✓ Restricted Tasks Management
- ✓ Message Monitoring

Performance Navigator – What its used for ?

1. Management Reporting and Analytics

1. Problem Determination

1. Capacity Planning



IBM i

Monthly Performance Summary

System Analyzed: **ENDER**

December-2019

Report Date: 02-Jan-20

Time: 1140

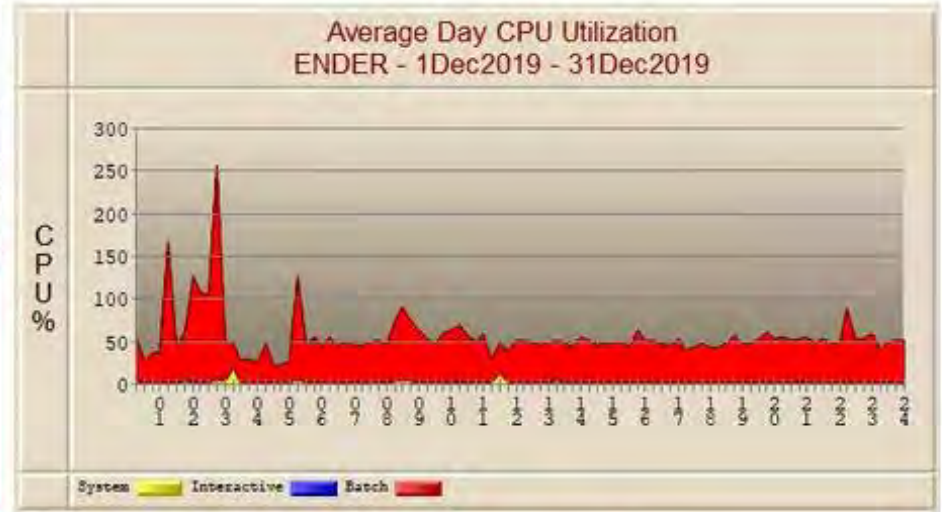
Average CPU Utilization - ENDER

Current Month Average CPU %

Metric	%
24 Hour (00:00 - 23:59)	55.8
Max CPU (Busiest Interval)	256.7

In December-19, the maximum CPU was 256.7%, and it occurred at 02:45.

Best Practice Guideline: The goal is to have the CPU utilization under the recommended 65.0% guideline.



Frame / System Specifications - ENDER

Frame Specs	
Model	42A
Feature Code	8286-EPXF
Serial Number	78-24BBX
OS Release	V7R3
P-Group / MHz	P20 / 4150
Total Processors	16
Total Partitions	104
CPW Rating	89580/164470 (54%)
Total Frame Memory (GB)	0.000

LPAR 48 Properties	
Processing Units	0.20
Virtuals	4
CPW Rating	2056
LPAR is uncapped / shared	
Total DASD (GB)	477
Total ASPs	2 (1,33,33)
Total Arms	12
Disk Space Utilization (ASP 1)	58.5%
Used GB	251
Total GB Installed	429
Disk Space Utilization (Other ASPs)	58.5
Avg Used GB Per ASP	502
Total (GB) Installed	859
LPAR Memory (GB)	5.75
Virtual Shared Pool ID	N/A
# of Cores In Shared Pool	N/A
Collection Interval	15 Min

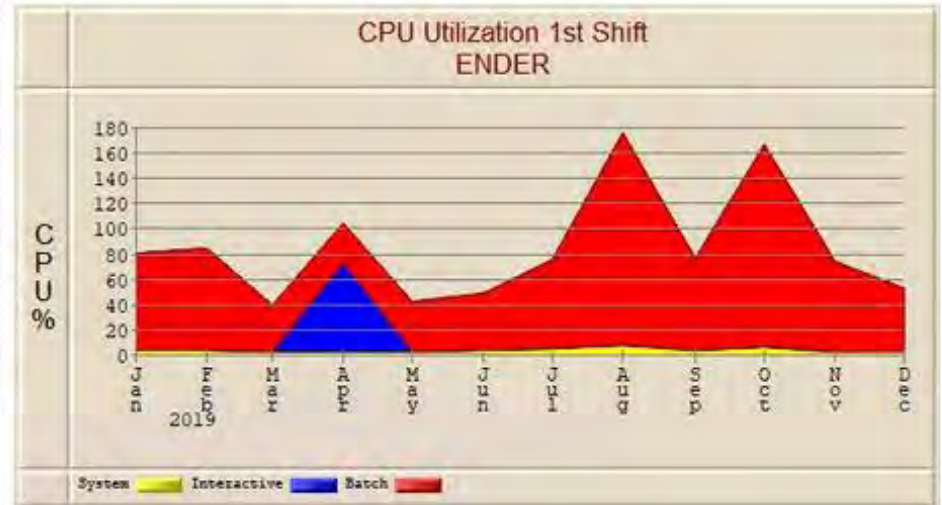
User Licensing Information*	
Unique Interactive Users	5
Unique Other Users	11
Total Unique	16
Max Interactive Concurrent Users	4
Max Other Concurrent Users	12
Max Concurrent Users	14
HTTP Active (Ext lic may be required)	Inactive
Domino Active (Add Lic may be required)	Inactive
* Additional licenses may be required.	

Historical CPU % (1st Shift)

Month	%	Month	%
December-19	52.7	June-19	49.3
November-19	73.6	May-19	42.5
October-19	167.0	April-19	105.0
September-19	76.7	March-19	39.1
August-19	176.7	February-19	85.1
July-19	74.9	January-19	80.4

In December-19, the average CPU utilization was 52.7%.

Based on the current trend (12 months), the CPU grew 42.5%.



View of Performance by IBM Power Server Frame

Performance Navigator for IBM i

Enterprise Performance Overview

For The Month of September-2018 - (1st Shift)

To access performance reporting, simply click on any hyper-link below:

Frame #	Serial # / System	CPU Utilization				Disk Response Time					Memory Faulting Factor or Pages / Sec			
		Shift Month Avg %	Highest Day Avg %	Peak Interval %	6 Month Trend %	ASP 1				Other ASPs Shift Month Avg ms	Shift Month Avg %	Highest Day Avg %	Peak Interval %	6 Month Trend %
						Shift Month Avg ms	Highest Day Avg ms	Peak Interval ms	6 Month Trend %					
1	0678C9R													
	ATLV05P1 - LPAR 2	5.0%	17.0	N/A	Grew 5.0%	96% Allocated	59% Used Alloc	57% Total Alloc	N/A	N/A	No Paging Occurred		Declined 0.0%	
2	06D733P													
	ATLV00P1 - LPAR 2	58.2	104.7	N/A	Grew 38.8%	100% Allocated	92% Used Alloc	82% Total Alloc	N/A	N/A	No Paging Occurred		Declined 0.0%	
	ATLV00P2 - LPAR 3	3.2	10.9	N/A	Grew 14.3%	50% Allocated	30% Used Alloc	15% Total Alloc	N/A	N/A	No Paging Occurred		Declined 12.8%	
	ATLV00P3 - LPAR 4	58.3	60.7	N/A	Grew 2.9%	97% Allocated	70% Used Alloc	68% Total Alloc	N/A	N/A	No Paging Occurred		Grew 2778.2%	
	ATLV00P4 - LPAR 5	1.1	3.8	N/A	Grew 7.7%	58% Allocated	25% Used Alloc	15% Total Alloc	N/A	N/A	No Paging Occurred		No Paging	
3	102C2CP													
	VIOS1 - LPAR 1	No Data			No Data	5% Allocated	27% Used Alloc	1% Total Alloc	N/A	N/A	No Data		No Data	
	MPG720 - LPAR 3	1.2	2.1	22.5	Declined 13.0	14.8	19.6	91.8	Declined 27.9	N/A	15.0	31.6	401.0	Declined 38.4
4	1033ACE													
	MPG520P - LPAR 1	10.9	35.6	138.8	Grew 25.0	2.8	4.6	10.9	Grew 2.1	N/A	13.2	22.5	343.4	Declined 22.7

What-If Recommendations for Next Server Purchase

Performance Navigator for IBM i

Old server vs. new server predictions

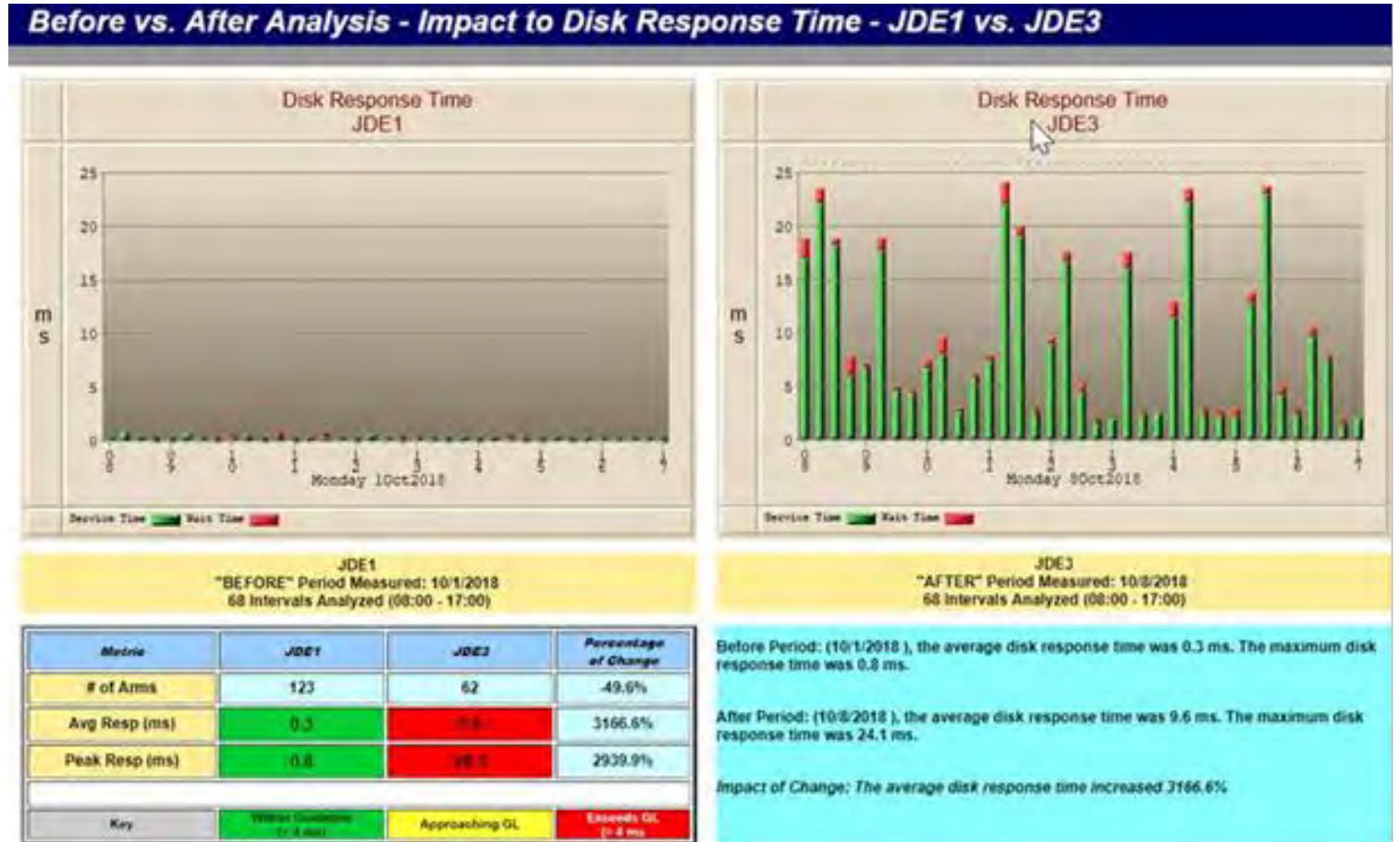
Historical IBM Collection Services and NMON data is used for trending and prediction



Deep Performance Analysis on Power Servers

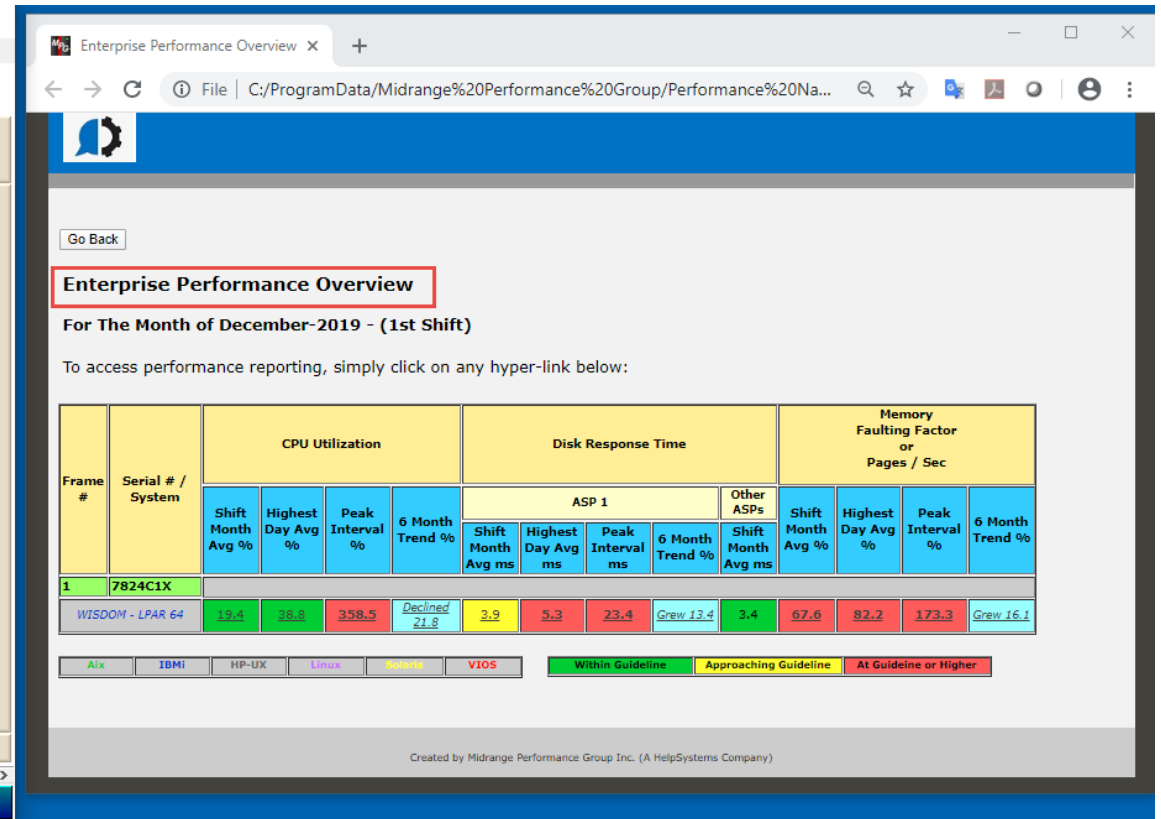
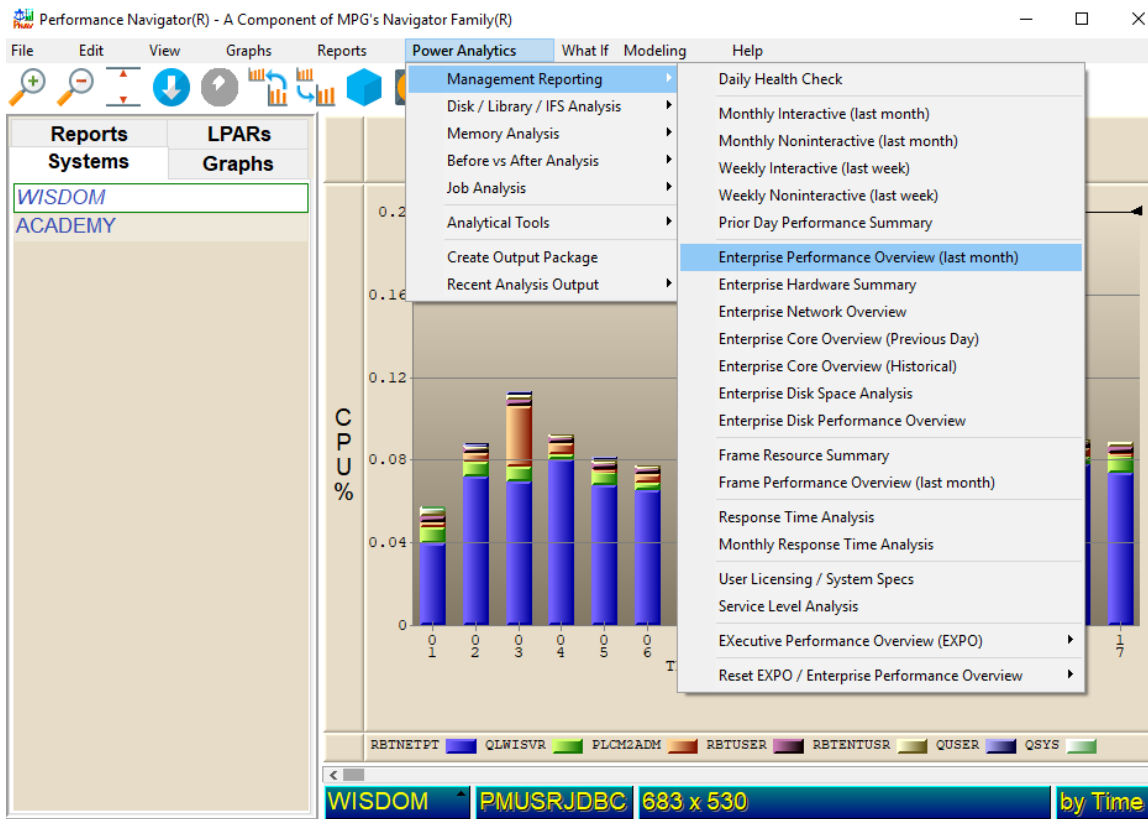
Performance Navigator for IBM i

- ▶ Hardware performance analysis
- ▶ Application performance analysis
- ▶ Comparison charts with recommendations



Performance Navigator Power Analytics

Capacity planning and performance analysis



Capacity Planning Services

Deliverables

- ▶ Enterprise hardware, performance summary
- ▶ External disk analysis (optional)
- ▶ State of the Union Analysis (per LPAR, optional)
- ▶ What-If Analysis
 - ▶ Required CPU core count based on given model
 - ▶ Multiple virtual shared pool analysis
 - ▶ PowerVM desired CPU setting recommendation
 - ▶ Recommended load balancing across enterprise
 - ▶ Recommended disk configuration (internal or external)

FORTRΔ

Thank You

www.fortra.com

info@fortra.com

