



May 3rd, 2018

IBM i Latest & Greatest 7.3 Focus

Fabian Michel – IBM Client Technical Architect

Credits to: Steve Will - IBM i Chief Architect

IBM i Releases



IBM i System Support

Systems	¹ IBM i 7.2	IBM i 7.3
POWER8 S814, S822 (VIOS only), S824, E870, E880	✓	✓
POWER7/7+ Servers Power 710, 720, 730, 740, 750, 760, 770, 780, 795	✓	✓
POWER7/7+ Blades and Compute Nodes PS700/701/702/730/704, PureFlex p260/460	✓	
POWER6+ 520, 550, 560, JS23/43 POWER6 520, 550, 570, 595, JS12/22	✓ 1	

Note 1 – no IOP or HSL support

<http://www-01.ibm.com/support/docview.wss?uid=ssm1platformibmi>

7.2 Major Enhancements

- Db2
 - Row & Column Access Control – “Need to Know” built into Db2
 - “In-Memory” highlight & new functions
- Managing the System
 - Any device: Mobile, Web or PC/Mac/Linux
 - Fully Cloud Capable OS, with PowerVM & PowerVC
- Solution Development
 - Free-Form RPG for rapid learning and lower maintenance costs
 - PHP, Perl, Ruby, node.js etc. options in Application Development





IBM i 7.3 Overview

Steve Will - IBM i Chief Architect

IBM i 7.3 now lets you:



**Deepen your
data insight.**



**Forecast
trends with more
advanced analytics.**



**Enhance Security
Management.**

IBM i 7.3 – Simplifying Insights and Intelligent Security

- ★ • **DB2 for i Temporal Support** allows clients to conduct accurate analysis of data within a specific historical time period and contrast that against current data sets
- ★ • New **OLAP capability** added to the SQL language on IBM i allows clients to perform more advanced analytics on their data
- ★ • **Security Authority Collection** provides guidance for establishing security levels based on usage of data and
 - Planned and unplanned downtime from hours to minutes with **PowerHA V7.2 for IBM i HyperSwap Cluster**.
 - New version of **DB2 WebQuery for IBM i** expands options for data sources including some Open Source data environments such as Postgres and Maria DB



- Git and Orion application environments are being added to the **IBM i Open Source** suite of products, providing clients with more choice for their business solutions on IBM i.
- New enhancements to **RPG** streamline and simplify development allowing developers to innovate more easily and manage their applications more efficiently.
- The more modern GUI interface of **IBM i Navigator** improves ease of use for system management tools and for monitoring performance.
- Much, much more

[Steve Will's You and i blog on IBM i 7.3 announcement](#)

[IBM DeveloperWorks Wiki : IBM i 7.3 - Base Enhancements](#)



i4HiFashion



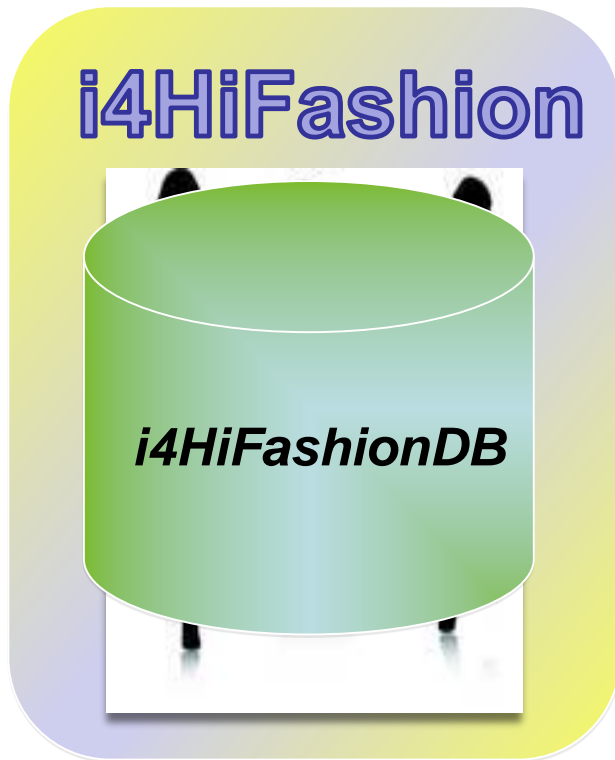
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New Business Requirements

- Learn from history
- Ask new kinds of questions
- Ensure intelligent security
- Know who did what and when

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New Business Requirements



Learn from history

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Learning from History

What Did My Business Look Like Last Month?

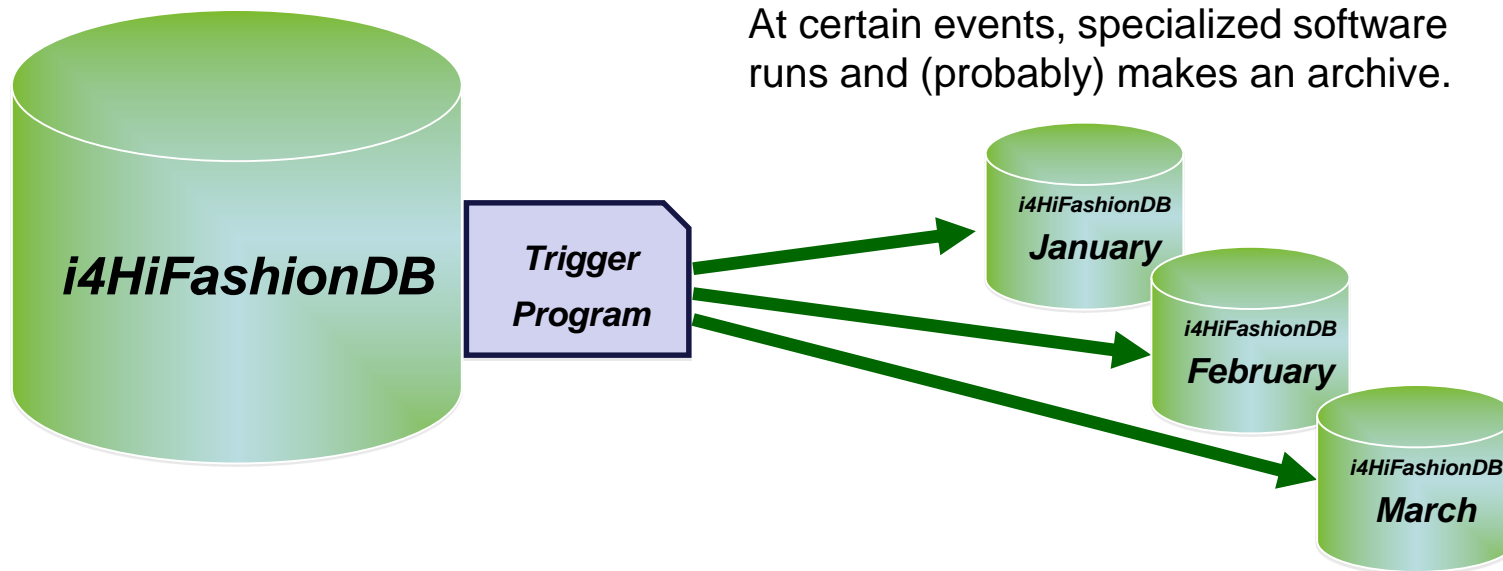


Before 7.3 Db2 Temporal Support

- Save/Restore? Maybe once ...
 - Cumbersome, slow, costly
- Journal Examination? Rarely.
 - Too much data & data reconstruction
- Snapshots?
 - Labor Intensive
- Trigger programs?
 - Best option before Temporal
 - ... but let's look at what happens

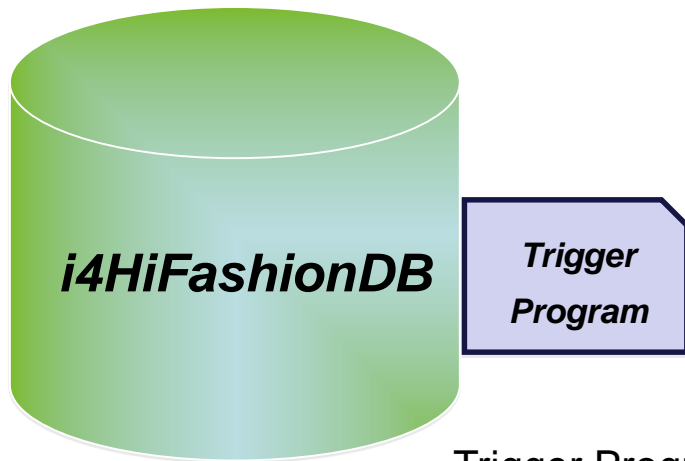
What Did My Business Look Like Last Month?

Trigger Program approach



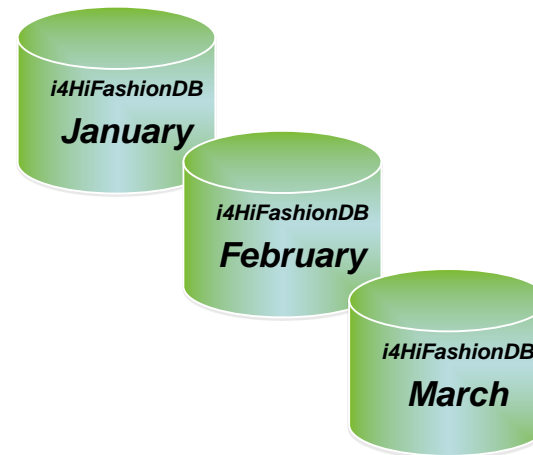
What Did My Business Look Like Last Month?

Trigger Program approach?



Trigger programs

- Data exists in multiple places
- Archives take space
- Management required

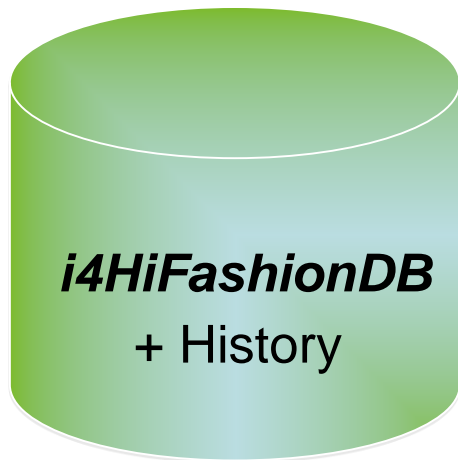


Trigger Programs must be

- Written
- Maintained
- Updated as requirements change
 - Will “monthly” always be the requirement?

What Did My Business Look Like Last Month?

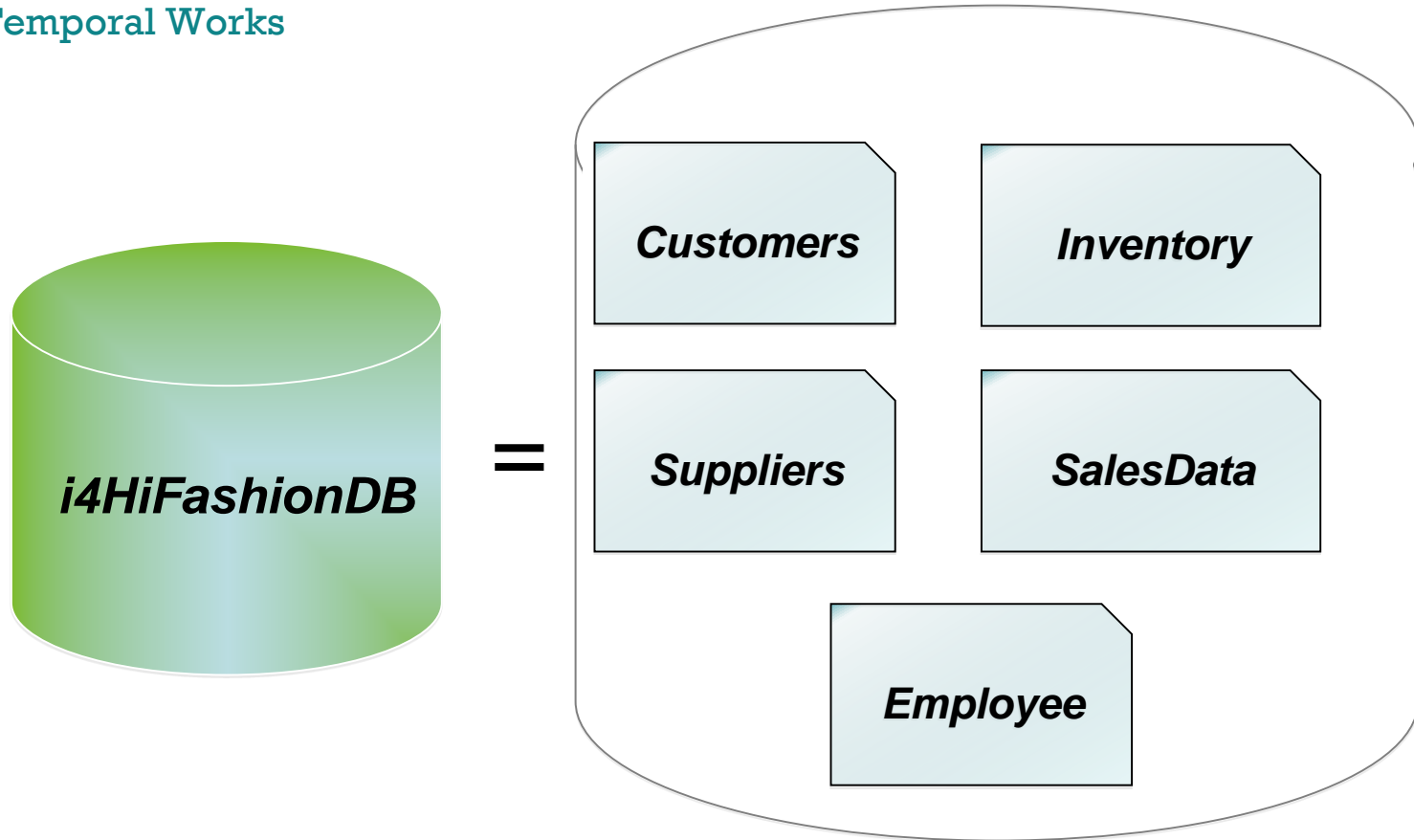
Db2 Temporal Tables



With 7.3 Temporal Table Support

- Simple SQL Query
- Historical Data Stored in Business Data
- Data-centric
- Flexible
- History Table associated, so no need for
 - Copies
 - Archives
 - Special programs

How Temporal Works



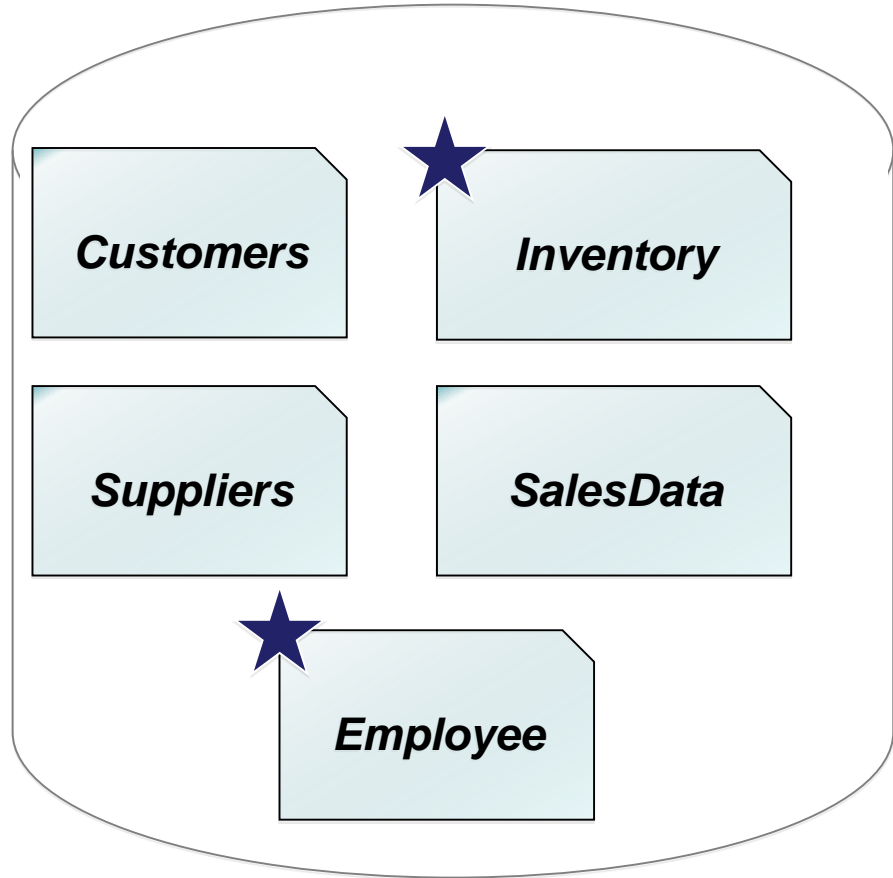
How Temporal Works



Choose the tables which will have stored history.



=



Adding History to a Table

Production Table



Add enabling columns to table.

Adding History to a Table

Production Table

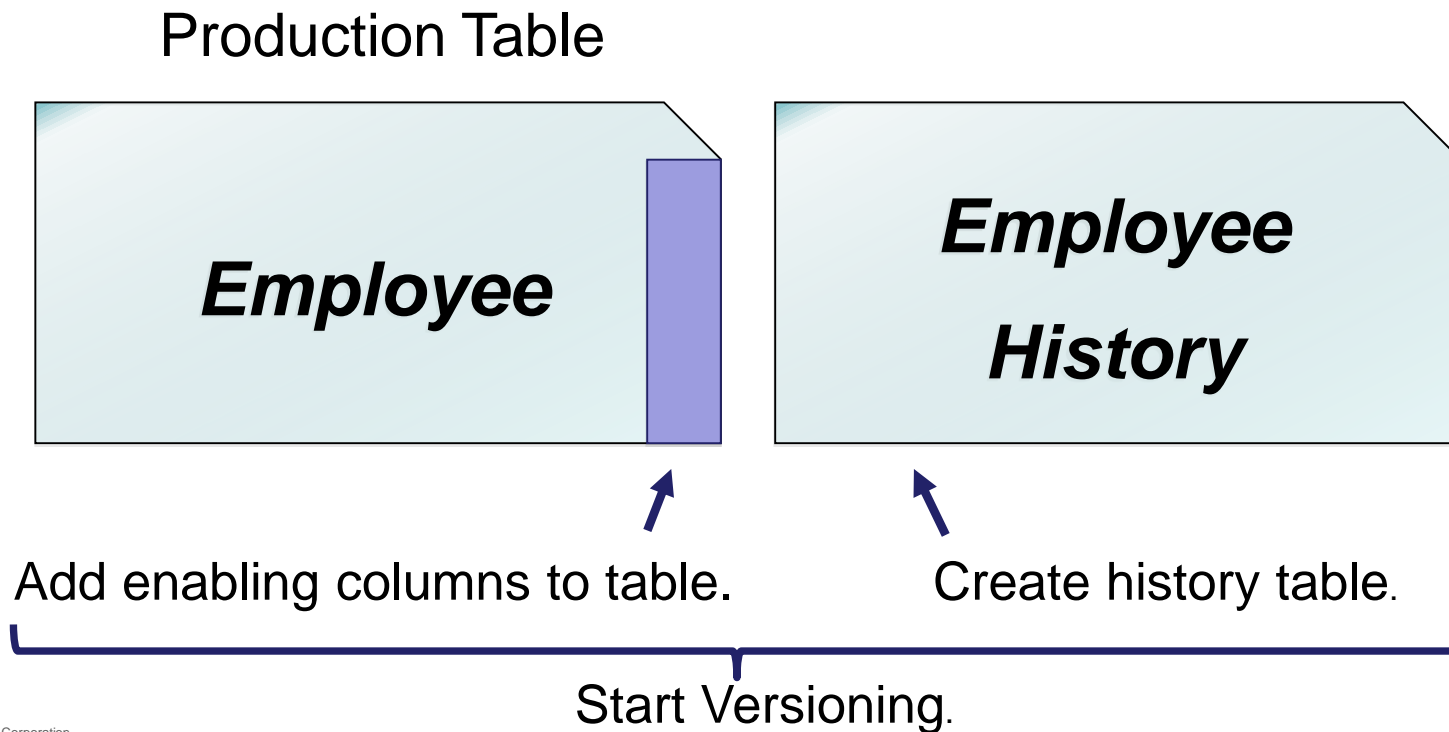


↑
Add enabling columns to table.



↑
Create history table.

Adding History to a Table



Temporal construction for data-centric history

```
ALTER TABLE employee
ADD COLUMN instance_begin
TIMESTAMP(12) NOT NULL GENERATED ALWAYS AS ROW BEGIN

ADD COLUMN instance_end
TIMESTAMP(12) NOT NULL GENERATED ALWAYS AS ROW END

ADD COLUMN transaction_id
TIMESTAMP(12) GENERATED ALWAYS AS TRANSACTION START ID

ADD PERIOD SYSTEM_TIME (instance_begin, instance_end)
```

Establish birth/death of a row

```
CREATE TABLE employee_history LIKE employee
```

Create history table

```
ALTER TABLE employee ADD VERSIONING USE HISTORY TABLE
employee_history
```

Enable Temporal tracking

Accessing a Temporal Table

- **SQL statements just reference the current table**
- **New clauses on the SELECT statement**
 - FOR SYSTEM TIME AS OF <value>
 - FOR SYSTEM TIME FROM <value> TO <value>
 - FOR SYSTEM TIME BETWEEN <value> AND <value>
- **New special register**
 - CURRENT TEMPORAL SYSTEM_TIME



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- Learn from history
- ★ Ask new kinds of questions
- Ensure intelligent security
- Know who did what and when

Ask New Kinds of Questions



Business questions:

- Do we make more sales when we spend more on marketing?
- If so -- Can we predict sales based on the amount spent on marketing?

Ask New Kinds of Questions



Before 7.3 & Db2 OLAP

- This type of analysis simply did not happen.

OR

- Extract the data off IBM i and run the analysis on copied data. (ETL approach) Copied data is “stale” data.

OR

- BI tools like Db2 Web Query or Cognos Analytics

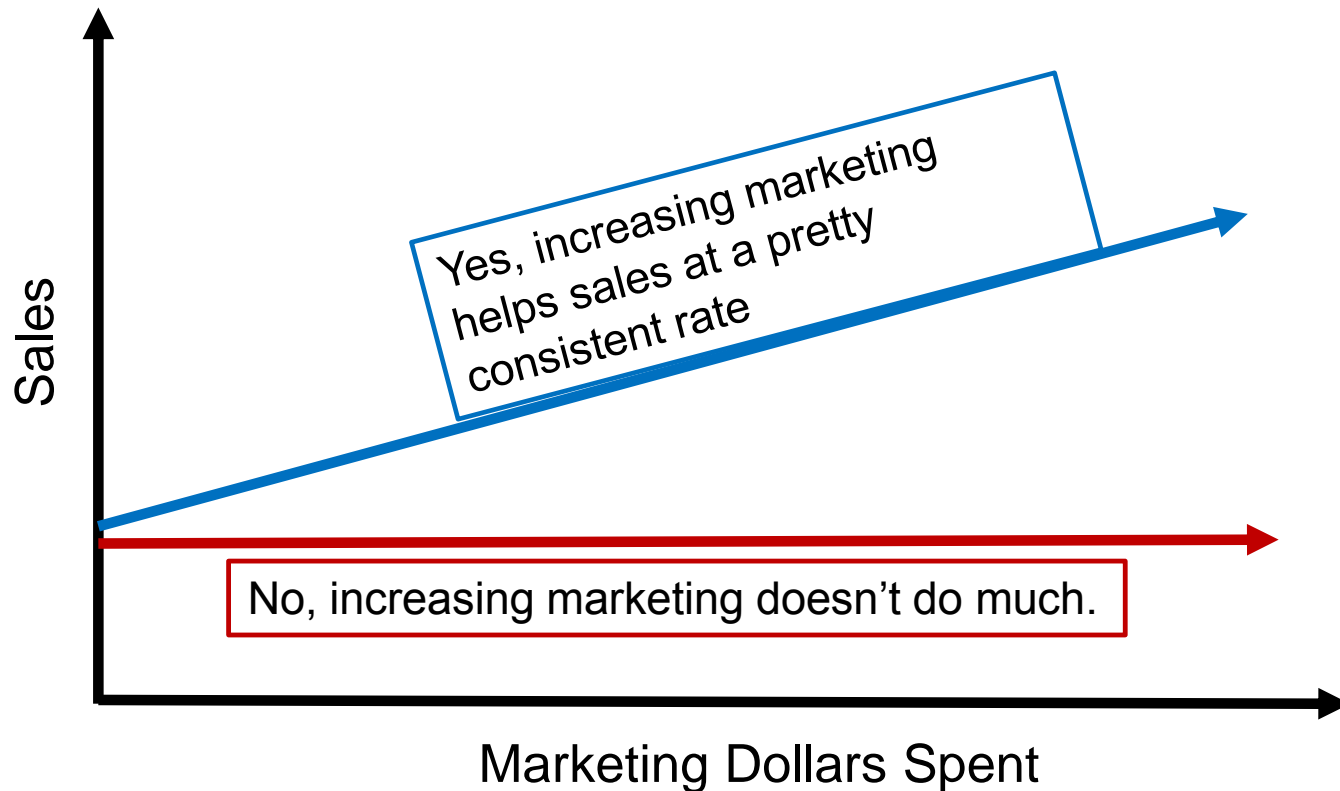
Ask New Kinds of Questions – with Db2 OLAP



With 7.3 & Db2 OLAP

- Integrated analytics functions
- Data remains on IBM i - not a copy
- BI tools like Db2 Web Query and Cognos Analytics get benefits!

Do we make more sales when we spend more on marketing?



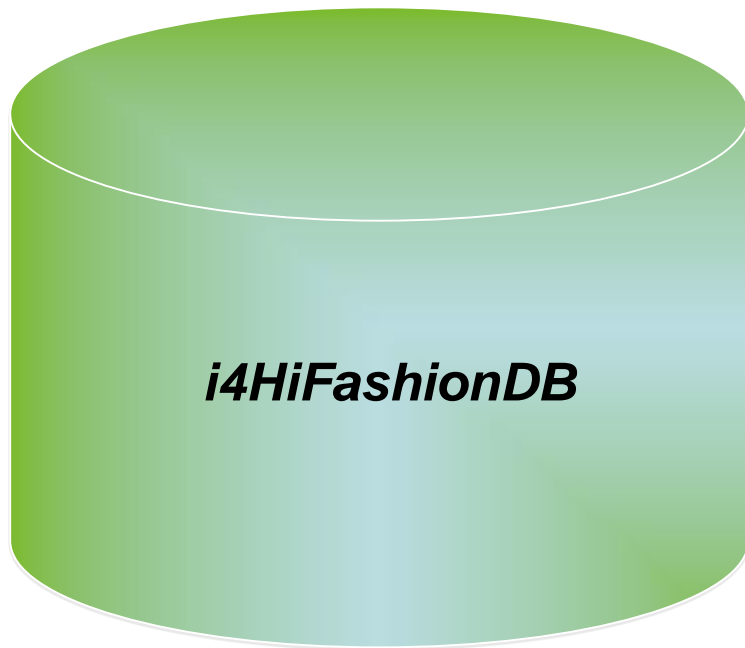
SQL Query Engine and OLAP Specification Extensions

Business questions – Math versions:

- Is there a correlation between the amount spent on marketing and sales for a product?
- Is the correlation weak or strong?
- Can we predict sales based on the amount spent on marketing?



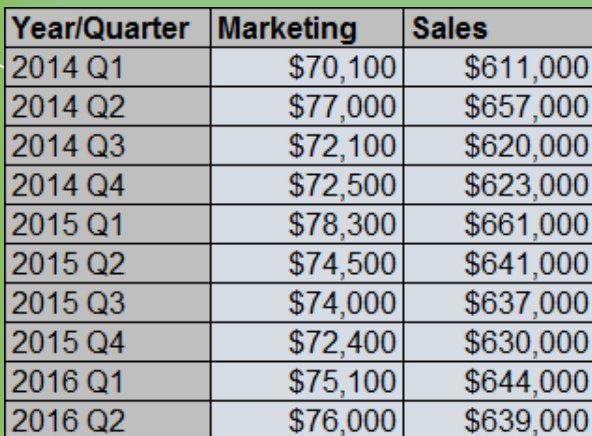
SQL Query Engine and OLAP Specification Extensions



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SQL Query Engine and OLAP Specification Extensions

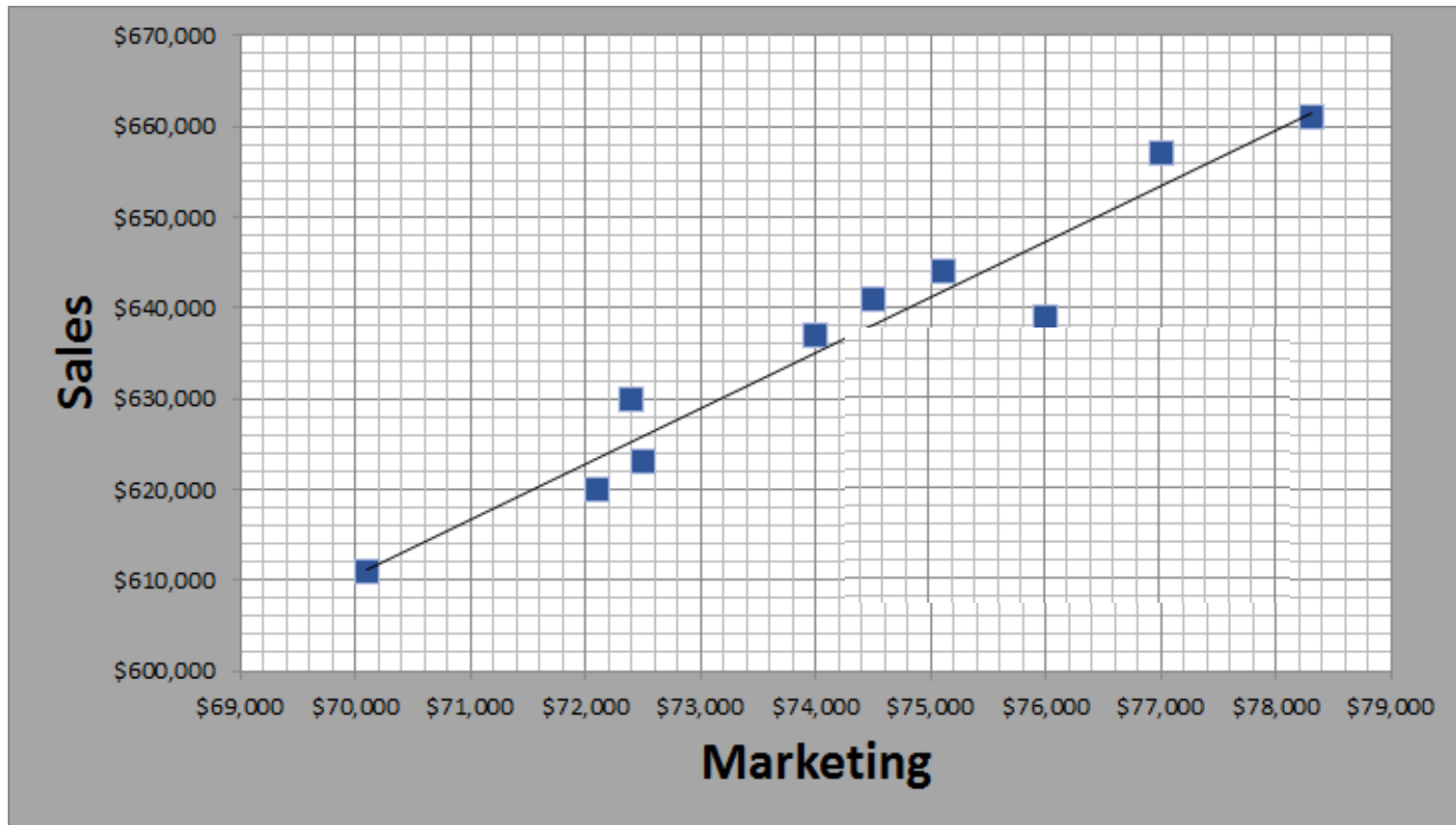


Year/Quarter	Marketing	Sales
2014 Q1	\$70,100	\$611,000
2014 Q2	\$77,000	\$657,000
2014 Q3	\$72,100	\$620,000
2014 Q4	\$72,500	\$623,000
2015 Q1	\$78,300	\$661,000
2015 Q2	\$74,500	\$641,000
2015 Q3	\$74,000	\$637,000
2015 Q4	\$72,400	\$630,000
2016 Q1	\$75,100	\$644,000
2016 Q2	\$76,000	\$639,000

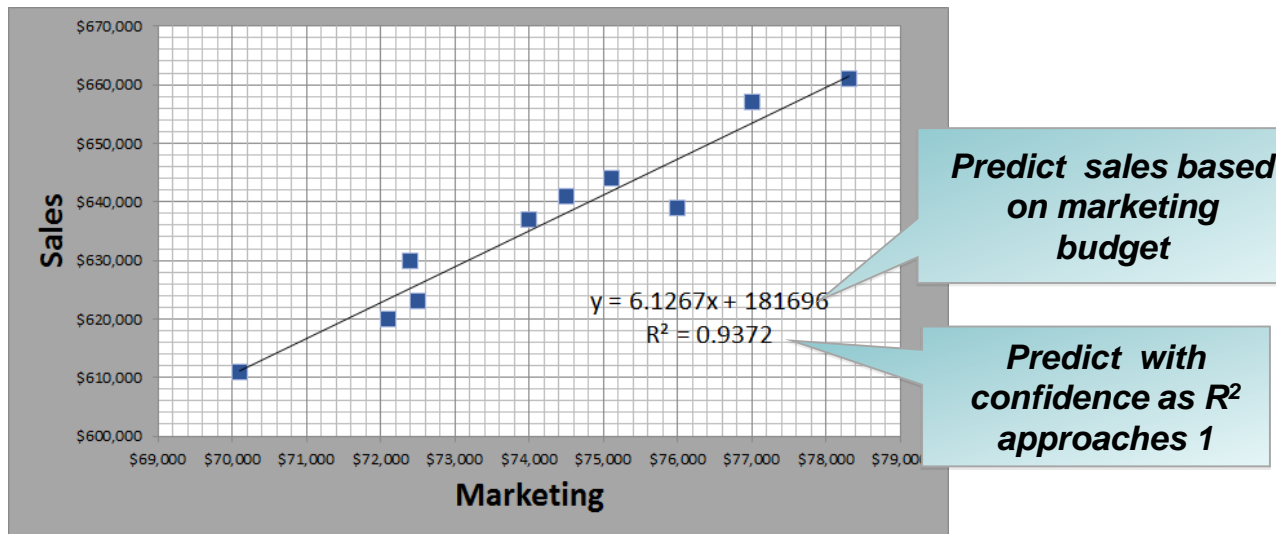
Business questions – Math versions:

- Is there a correlation between the amount spent on marketing and sales for a product?
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- Can we predict sales based on the amount spent on marketing?

We have the data; how do we answer the question?



SQL Query Engine and OLAP Specification Extensions



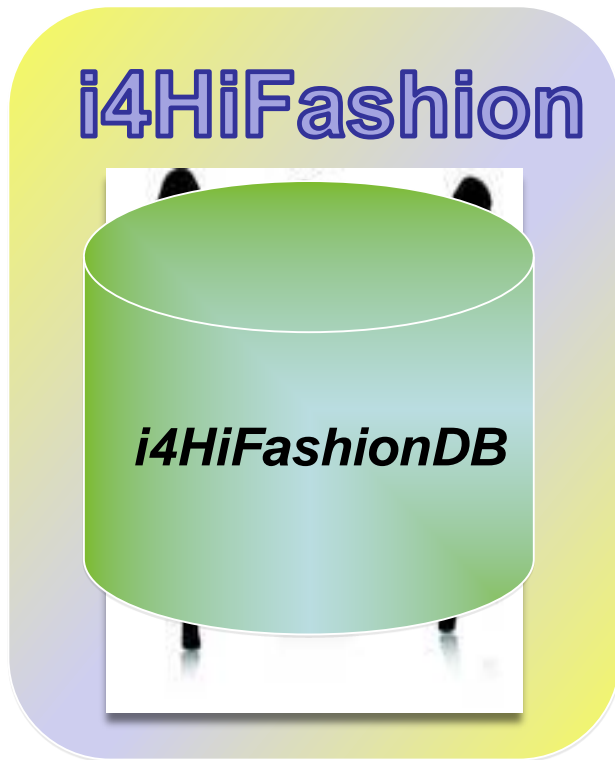
Business results:

- `SELECT REGR_SLOPE (sales, mktg), REGR_INTERCEPT (sales, mktg)
FROM salesdata ;`
- `SELECT POWER (CORRELATION (sales, mktg), 2)
FROM salesdata ;`

SQL Query Engine and OLAP Specification Extensions – part 1

Option	Description
CORRELATION	Returns the coefficient of correlation of a set of number pairs
COVARIANCE	Returns the (population) covariance of a set of number pairs..
COVARIANCE_SAMP	Returns function returns the unbiased sample covariance (n-1) of a set of number pairs.
PERCENTILE_CONT	Is an inverse distribution function that assumes a continuous distribution model. It takes a percentile value and a sort specification, and returns an interpolated value that would fall into that percentile value with respect to the sort specification.
PERCENTILE_DISC	Is an inverse distribution function that assumes a discrete distribution model. It takes a percentile value and a sort specification and returns an element from the set.
MEDIAN	Takes a numeric or datetime value and returns the middle value or an interpolated value that would be the middle value once the values are sorted. Median is a form of PERCENTFILE_CONT.

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- Learn from history
- Ask new kinds of questions
- ★ Ensure intelligent security
- Know who did what and when

Ensure Intelligent Security



Business reality:

- Good security policy dictates what authorities ***should be***.
- Excess authority can negate security intent.
- Yet excess authority is often granted.
- Determining the authority currently being used can be difficult or impossible.

Ensure Intelligent Security



Business questions:

- Do my employees have more authority than they need?
- What authority do they currently have?
- What authority do they really need to do their jobs?

Solution: Authority Collection

A utility that captures pertinent data associated with an authority check

- Covers all native IBM i file systems
- Capture unique instances of the authority check



The collection will include one key piece of information...

“What authority does the OS require for this authority check?”

Authority Collection Usage Overview

- Turn on the authority collection for a given user
 - or set of users
- Collect authority info for the user
- Examine the results via SQL or Navigator



How to Use Authority Collection

Four Basic commands

- Focus the search to limit data
 - Users, Libraries, Objects, Object Types, File System Objects, ...
 - Exclude OS Programs, internal objects, ...
- Discover
 - Authority being used
 - Source of that authority
 - Minimum authority required to get the job done

☐ Authority Collection

- Start Authority Collection
- End Authority Collection
- Display Authority Collection
- Delete Authority Collection

Start Authority Collection

Start Authority Collection

User:

Libraries to search:

Objects to search:

Object types:

Authority Collection – Interrogate the collected data

Leverage Navigator to do **basic** data investigation

Welcome x Users x Display Authority Collection - Tlk x

Display Authority Collection - Ut28p09.rch.stglabs.ibm.com

Actions Filter

	Authorizaiton Name	Check Timestamp	System Object Name	System Object Library	System Object Type	Required Authority	Current Authority	Autl
...	No filter applied							
<input type="checkbox"/>	Tlk	2015-08-17 11:41:48	Qmsf	QSYS	*USRPRF	*ALL	*ALL	U
<input type="checkbox"/>	Tlk	2015-08-17 11:41:48	Qmsf	QSYS	*USRPRF		*ALL	U
<input type="checkbox"/>	Tlk	2015-08-17 11:42:03	Syslimtbl	QSYS2	*FILE		*ALL	U

Use SQL to get more details

```
16
17 SELECT SYSTEM_OBJECT_NAME, DETAILED_REQUIRED_AUTHORITY, DETAILED_CURRENT_AUTHORITY FROM QSYS2.AUTHORITY_COLLECTION A
18 WHERE AUTHORIZATION_NAME = 'SCOTT' AND SYSTEM_OBJECT_SCHEMA = 'TOYSTORE'
19 GROUP BY SYSTEM_OBJECT_NAME, DETAILED_REQUIRED_AUTHORITY, DETAILED_CURRENT_AUTHORITY
20 ORDER BY 1,2,3;
21
```

PLUS Vendor Tools are being created.

IT / Application Questions Related to Authority

- Does User 'Joe' really need to have *ALLOBJ to run an application?
- All my objects have PUBLIC *ALL authority! Is it needed?
- What is the minimum authority required on the objects it uses for the application to work correctly?
- We have little detailed knowledge of the applications... where is the data?
 - Yes, the data is in Db2 and/or IFS ... **but where?**



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New Business Requirements

- Learn from history
- Ask new kinds of questions
- Ensure intelligent security



Know who did what and when

Know Who Did What and When – Db2 Generated Columns



Business questions:

- When was this row last updated?
- Who did it?
- From which IP address?

Enhanced data-centric auditing – with generated columns

- **Generated columns direct Db2 to capture detail in each row**
 - When was this row last updated? (existing *row-change-timestamp-clause*)
 - Generated expressions (**New in IBM i 7.3**)
- **Generated expressions include:**
 - DATA CHANGE OPERATION (I/U/D)
 - Special register
 - Built-in Global Variable

Enhanced data-centric auditing – with generated columns

ALTER TABLE FACT_table

★ ADD COLUMN audit_type_change CHAR(1)
GENERATED ALWAYS AS (**DATA CHANGE OPERATION**)

★ ADD COLUMN audit_user VARCHAR(128)
GENERATED ALWAYS AS (**SESSION_USER**)

★ ADD COLUMN audit_client_IP VARCHAR(128)
GENERATED ALWAYS AS (**SYSIBM.CLIENT_IPADDR**)

ADD COLUMN audit_job_name VARCHAR(28)
GENERATED ALWAYS AS (**QSYS2.JOB_NAME**)

```
special-register
|--+--CURRENT CLIENT ACCTNG-----+
+--CURRENT CLIENT APPLNAME-----+
+--CURRENT CLIENT PROGRAMID-----+
+--CURRENT CLIENT USERID-----+
+--CURRENT CLIENT WRKSTNNAME-----+
+--CURRENT SERVER-----+
'+--SESSION USER-----+'
'-USER-----'
```

```
built-in-global-variable
|--+--QSYS2.JOB_NAME-----+
+--QSYS2.SERVER_MODE_JOB_NAME-----+
+--SYSIBM.CLIENT_HOST-----+
+--SYSIBM.CLIENT_IPADDR-----+
+--SYSIBM.CLIENT_PORT-----+
+--SYSIBM.PACKAGE_NAME-----+
+--SYSIBM.PACKAGE_SCHEMA-----+
+--SYSIBM.PACKAGE_VERSION-----+
+--SYSIBM.ROUTINE_SCHEMA-----+
+--SYSIBM.ROUTINE_SPECIFIC_NAME-----+
'-SYSIBM.ROUTINE_TYPE-----'
```

IBM i 7.3 Networking Security Enhancement

Network Auditing Enhancements (New QAUDLVL values)

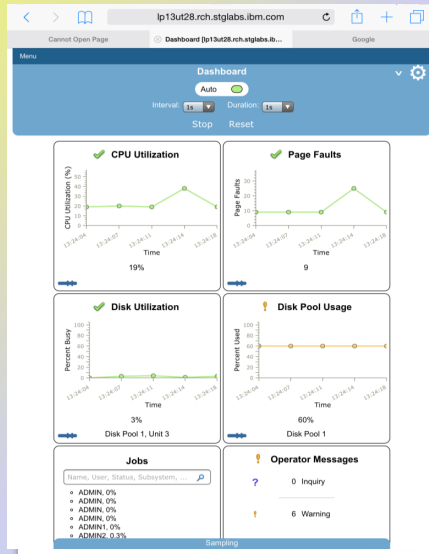
- *NETTELSVR
 - Generate audit records for Telnet Server TCP connections.
- *NETUDP
 - Generate audit records for inbound and outbound UDP packets.
- *NETSECURE
 - Generate audit records for successful and failed System SSL handshakes.
 - Generate audit records for successful VPN negotiations.
 - Generate audit records for IPsec.



i4HiFashion – Infrastructure Requirements



i4HiFashion



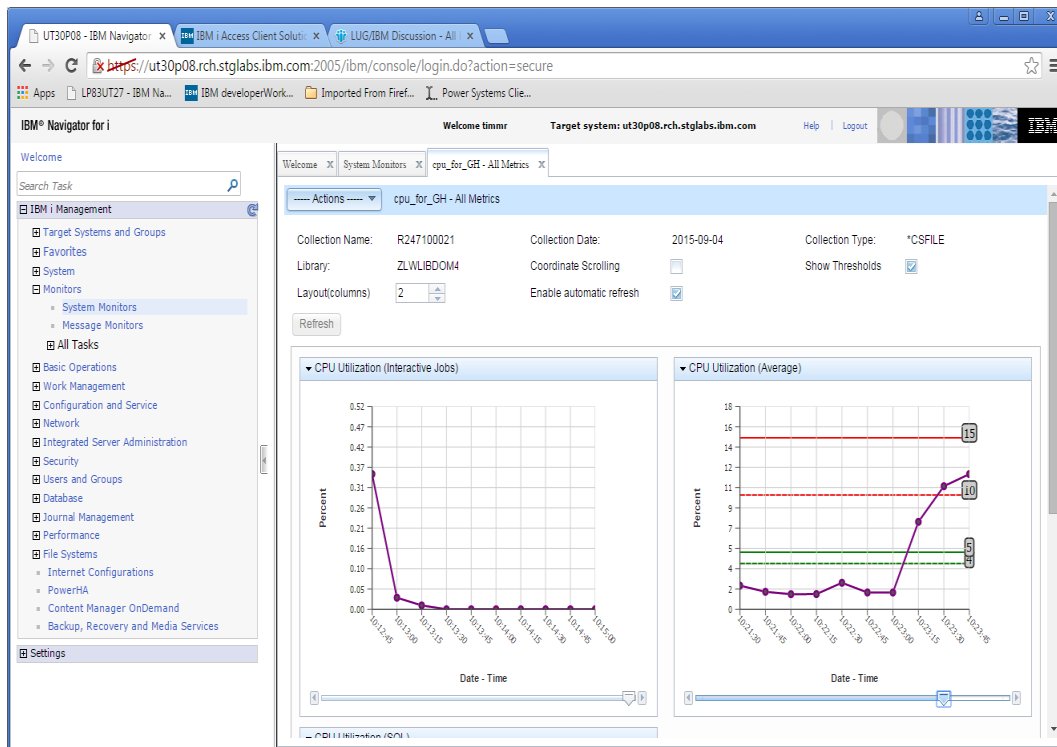
Operating an infrastructure means

- Monitoring performance easily
- Learning from (performance) history
- Identifying top resource consumers
- Access from anywhere

Visualize Performance Metrics in Navigator

Navigator

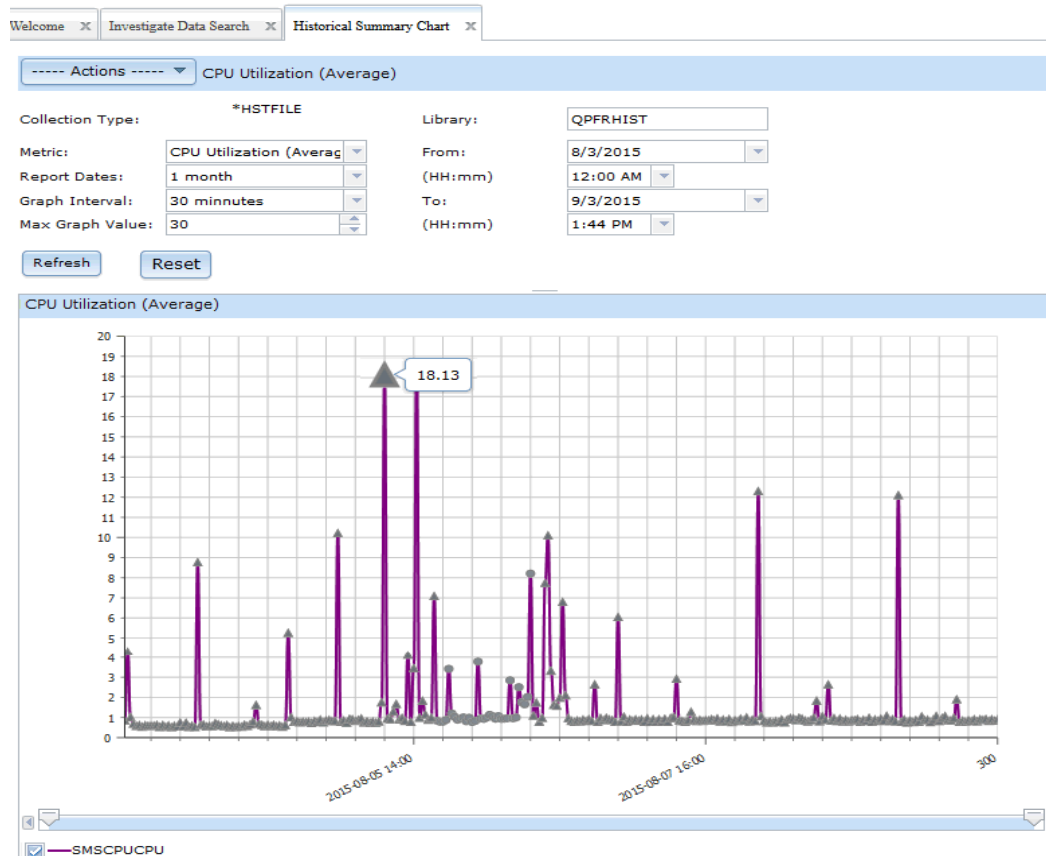
- Monitor Performance Metrics
- Set Thresholds to take actions
- Visualize the collected results
- View Many Metrics at Once



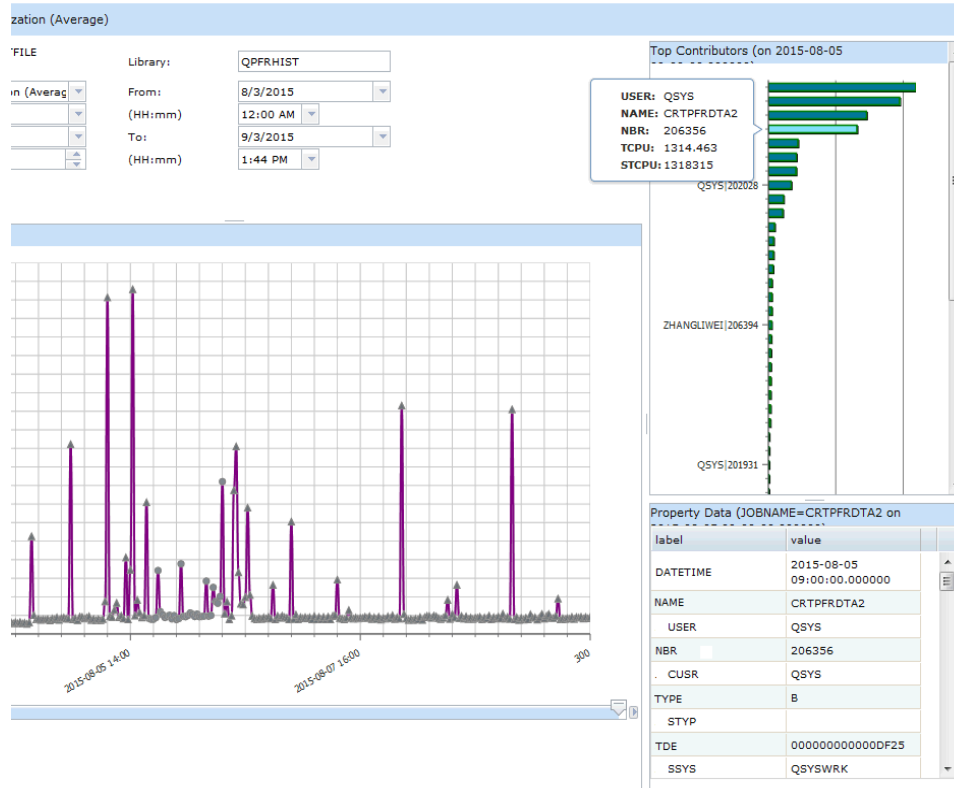
Understand the Past – View Historical Performance Data

Navigator

- View key performance metrics consolidated over long time intervals
- Weeks, Months, Years
- CPU, Disk Utilization



Monitor Your System– Visualize Performance Metrics in Navigator



Navigator – Historical View

- Click to see the top resource consumers.
- Detailed information about all top consumers.
- Advanced information about the selected top consumer.

Mobile Dashboard

iAccess Mobile

- Watch several Key Metrics with 'Live' data
- Set thresholds to quickly visualize issues on your system
- Watch from your favorite Mobile Device
 - Phone
 - Tablet
- Visual notification when a threshold is exceeded



i4HiFashion – Productivity Requirements



Productivity means

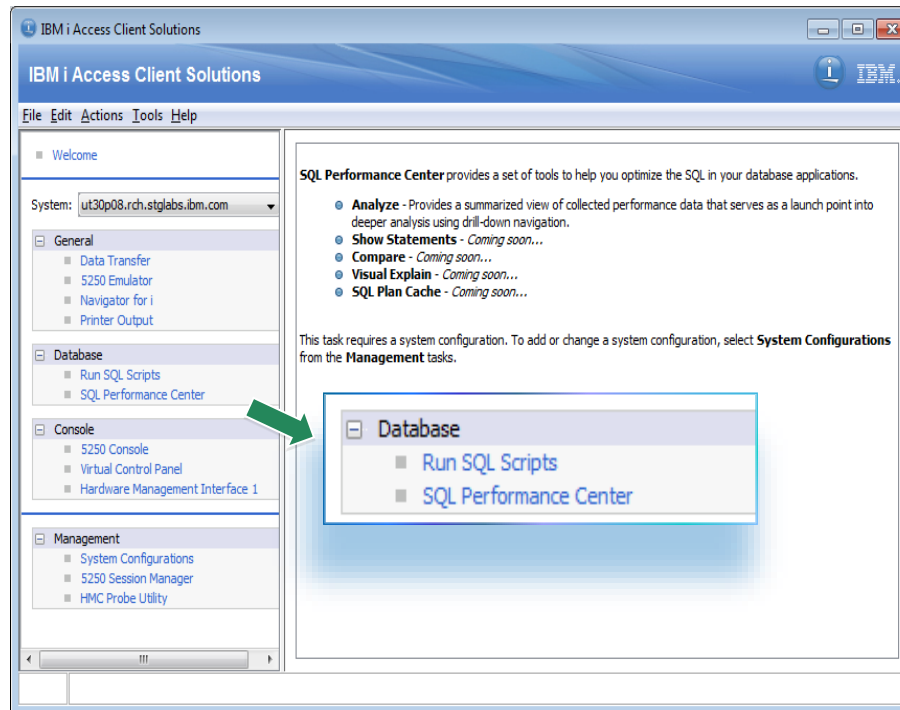
- Mobile, Web, Windows & Linux devices
- Quick answers with SQL Scripts
- Managing Availability – BRMS & PowerHA
- Live Data Dashboards – Db2 WebQuery

Manage and Access your System

Access Client Solution – 5733XJ1



- Run SQL Scripts
- SQL Performance Center
- Direct Connect to Navigator
- Improved 5250 Emulator
- Full Windows 10 Support
 - Plus Mac & Linux



Access Client Solutions Product Page

<http://www-03.ibm.com/systems/power/software/i/access/solutions.html>

IBM Systems > Power Systems > Software > IBM i >

IBM i Access

Overview

Client Solutions

Windows

Linux

Web

Mobile

Overview

Support



Resources

IBM i Access Client Solutions is the newest member of the IBM i Access family. It provides a Java based, platform-independent interface that runs on most operating systems that support Java, including Linux, Mac, and Windows™.


IBM i Access Client Solutions consolidates the most commonly used tasks for managing your IBM i into one simplified location. The latest version of IBM i Access Client Solutions is available to customers with an IBM i software maintenance contract.

[→ Download IBM i Access Client Solutions base package](#)
[→ QuickStartGuide](#)
[→ GettingStarted](#)
[↓ Updates](#)

Access videos

-  Introduction to IBM i Access Client Solutions (00:01:17)
-  All IBM i Access videos







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Browse Power Systems

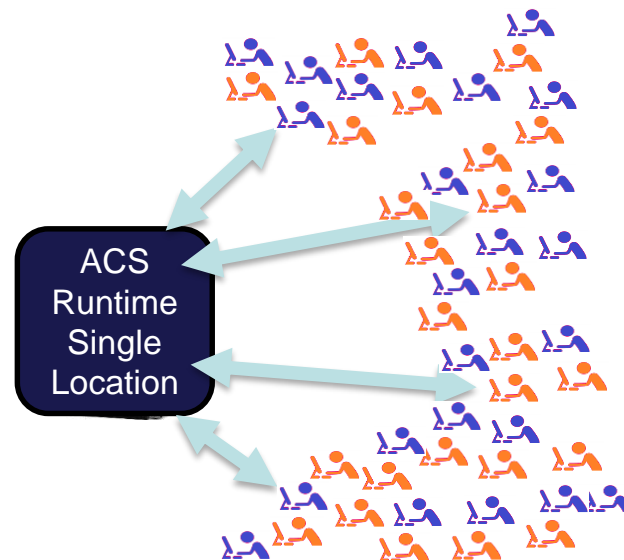
 Hardware	 Solutions
 Operating systems	 Migrate to Power
 System software	 Advantages

No ESS!!! Download direct from the Web site!!!

Central System Deployment

New Deployment Wizard to Simplify and Improve ACS Deploy

- Administrator Options for Multi User Deployment
- Create Desktop Shortcut to Runtime location
 - Local or Network location
- Create File Associations
 - Old .ws files
 - New .hod files
 - Data Transfer
- Customization of Available Function
 - Control what functions display



ACS & Navigator

No extra sign-on!

The screenshot displays the IBM i Access Client Solutions (ACS) web interface. On the left, a sidebar menu shows various system management tasks under categories like General, Database, Console, and Management. The main content area is titled 'Navigator Requests' and shows a table of connection information. A 'Signon to IBM i' dialog box is overlaid, prompting for system, user, and password. The 'Signon to IBM i' dialog box contains the following information:

- System: ut30p08.rch.stglabs.ibm.com
- User: timmr
- Password:

The 'Signon to IBM i' dialog box also includes a 'Signon information' section with a server icon. Below the dialog box, the 'IBM® Navigator for i' interface is visible, showing a 'Welcome' message and a 'Search Task' bar. The 'Target system' is identified as 'ut30p08.rch.stglabs.ibm.com'. The 'Welcome' message states: 'Welcome to the IBM Navigator for i' and 'IBM Navigator for i provides an easy to use interface for the web-enabled IBM i management tasks, including all previous IBM i Navigator tasks on the web, and 2001 port tasks. Expand IBM i Management in the left-hand navigation area to get started. To see the previous version of the 2001 port tasks and where they are located now, click below.' A link to 'IBM i Tasks Page' is provided.

System	Status
ut30p08.rch.stglab...	Listening for requests
172.29.5.56	Stopped
common1.frankeni...	Stopped
common1.iintheadou...	Stopped

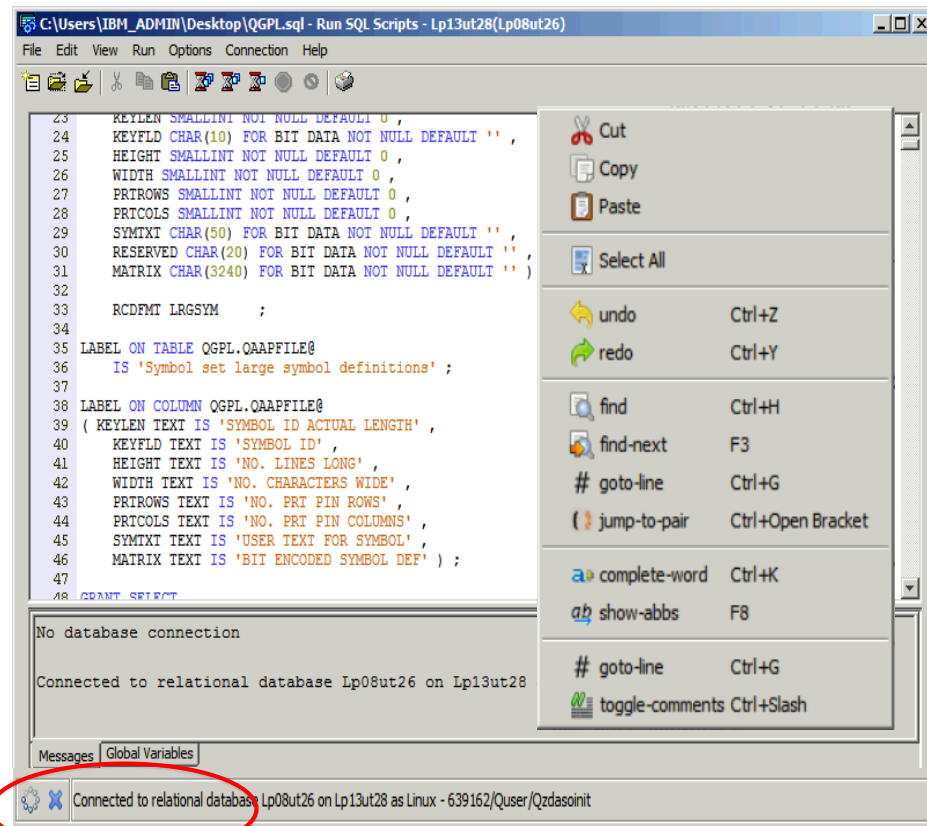
- Target Systems and Groups
- Favorites
- System
- Monitors
- Basic Operations
- Work Management
- Configuration and Service
- Network
- Integrated Server Administra
- Security
- Users and Groups
- Database
- Journal Management
- Performance
- File Systems

Work with Your Data

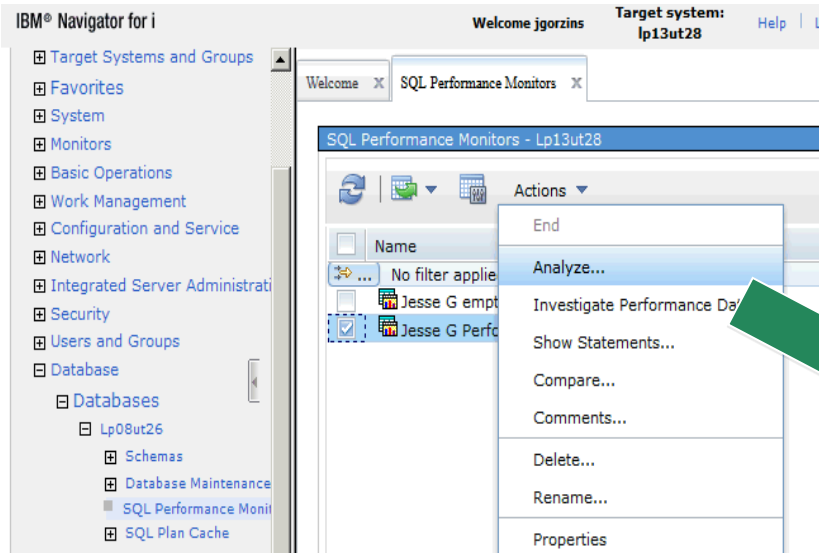
Works on Windows, Mac & Linux!!!

Run SQL Scripts

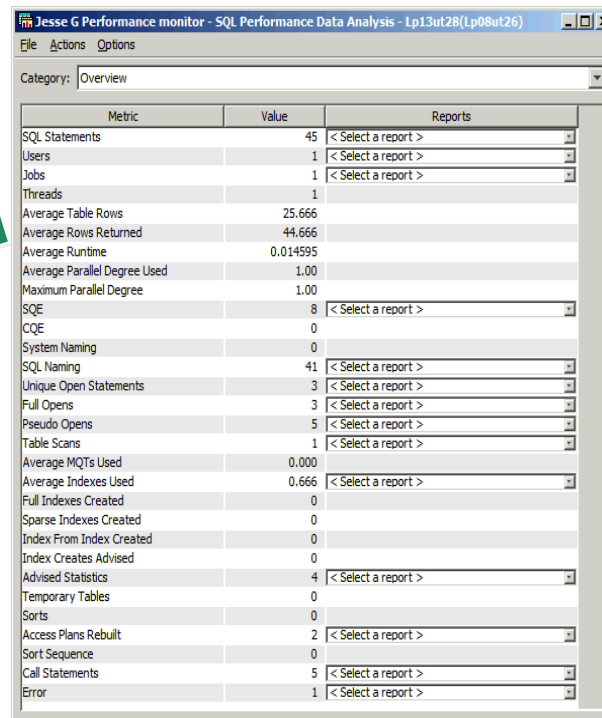
- Faster Startup Time
- Line Numbers
- Highlighting
- Color Coding
- Improved Usability
- Status Bar
- Stop Runaway Queries
- Find (supports Regex)
- Lots of Editor features
- Save Results .xlsx



Work with Your Data – SQL Performance Center



Navigator and ACS Working together



Jesse G Performance monitor - SQL Performance Data Analysis - Lp13ut28(Lp08ut26)

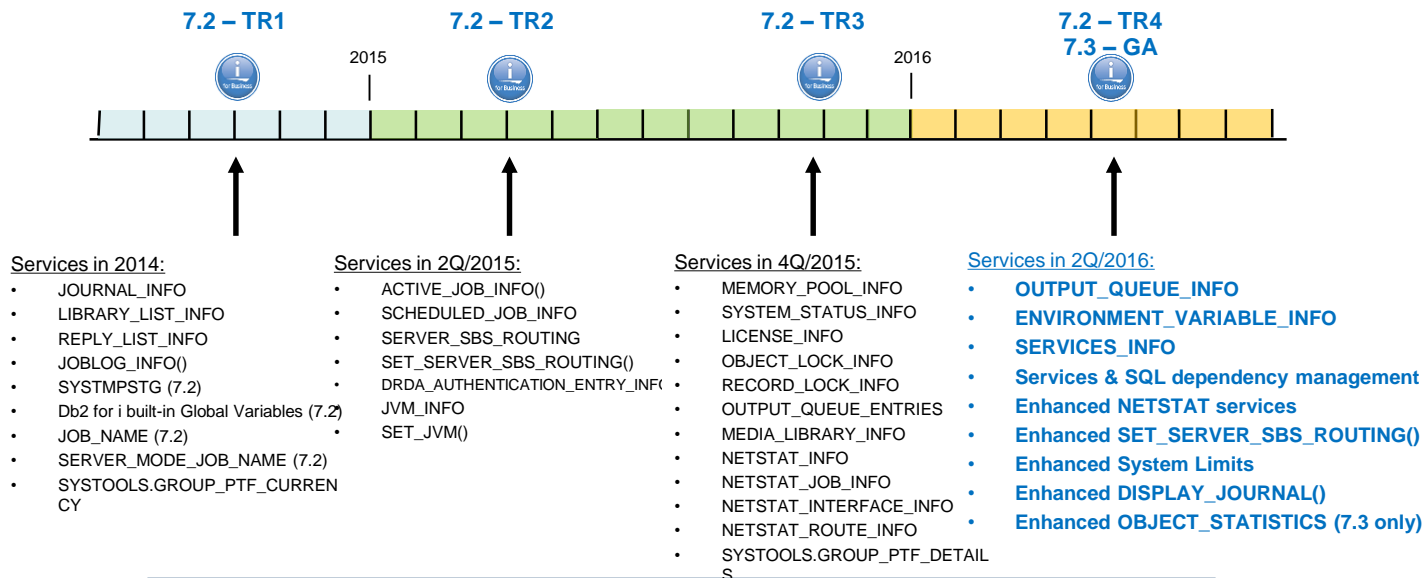
File Actions Options

Category: Overview

Metric	Value	Reports
SQL Statements	45	< Select a report >
Users	1	< Select a report >
Jobs	1	< Select a report >
Threads	1	
Average Table Rows	25.666	
Average Rows Returned	44.666	
Average Runtime	0.014595	
Average Parallel Degree Used	1.00	
Maximum Parallel Degree	1.00	
SQE	8	< Select a report >
CQE	0	
System Naming	0	
SQL Naming	41	< Select a report >
Unique Open Statements	3	< Select a report >
Full Opens	3	< Select a report >
Pseudo Opens	5	< Select a report >
Table Scans	1	< Select a report >
Average MQTs Used	0.000	
Average Indexes Used	0.666	< Select a report >
Full Indexes Created	0	
Sparse Indexes Created	0	
Index From Index Created	0	
Index Creates Advised	0	
Advised Statistics	4	< Select a report >
Temporary Tables	0	
Sorts	0	
Access Plans Rebuilt	2	< Select a report >
Sort Sequence	0	
Call Statements	5	< Select a report >
Error	1	< Select a report >

SQL Performance Center
Understand how your SQL is running
Tune your SQL to run better

IBM i Services for SQL users



<http://ibm.biz/Db2foriServices>

BRMS 7.3 Enhancements

- BRMS Web Client
 - Multi-task navigational tree added to the main panel
- BRMS Server
 - Modernization of Storage Tiering using BRMS Migration
 - IFS lists supported
 - Movement back and forth between SSD & HDD tiers
 - I-ASP support
 - Including help text



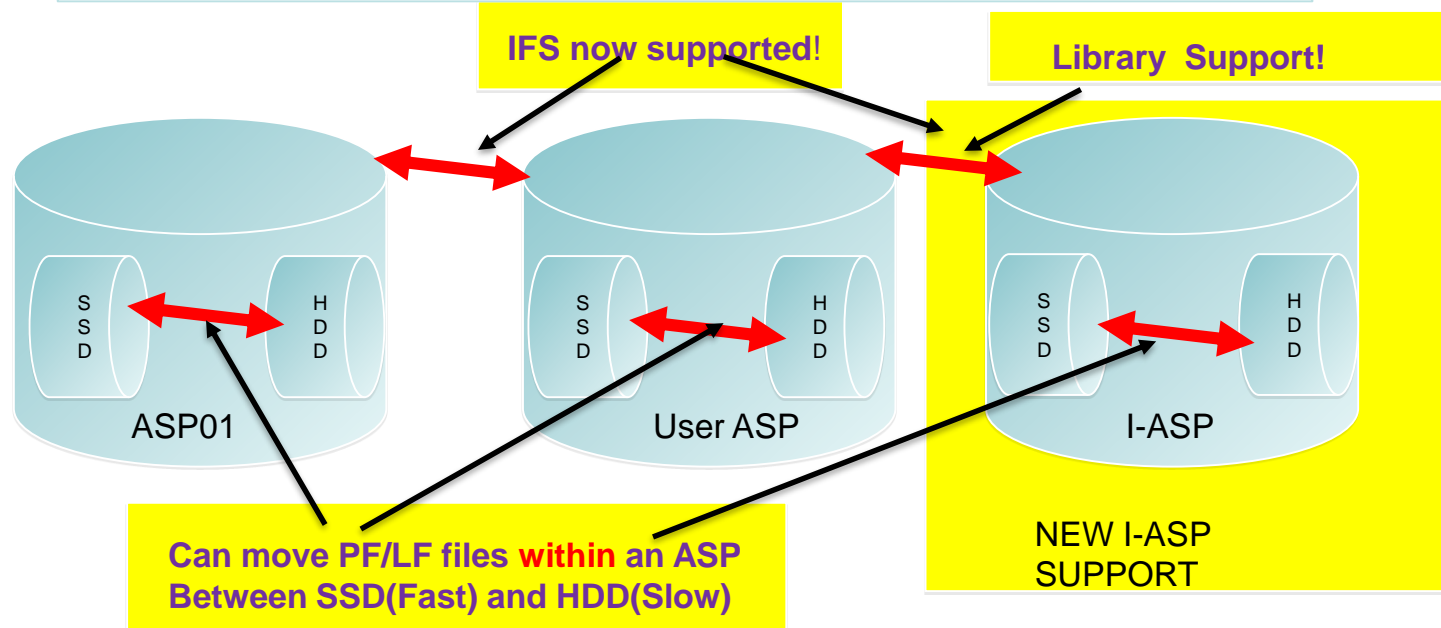
Example of the multi-task navigation in 7.3

7.3

- Internet Configurations
- PowerHA
- Backup, Recovery and Media Services
 - Enterprise Services
 - Archive Control Groups
 - Backup Control Groups
 - Media Policies
 - Move Policies
 - Volumes
 - Media Pools
 - Tasks

More efficient access to a specific BRMS function.

Leveraging SSDs and IASPs with BRMS Migration



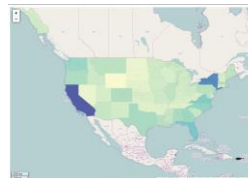
PowerHA for i – HyperSwap for DS8000 IASPs



- IASP replication plus HyperSwap
- HyperSwap for 'near-zero' downtime storage planned and unplanned outages
- PowerHA vary off/on of IASP for OS planned/unplanned outage, disaster recovery
- Available via 7.2 PTF --- PowerHA skip-shipping 7.3

Db2 Web Query for i Family

- Take Reports and Dashboards Mobile
- Geographical Mapping Capabilities
- Jump Start Reports and Dashboards with *Wizard Analytics*
- DataMigrator ETL Automates Data Replication/Transformation
- Version 2.2 Adds Additional Data Sources (Oracle, MySQL, etc.) and much more!



"Db2 Web Query is putting a modern face on our data and our analysts love it. It is the best way to provide BI on a budget."



Les Turner / Warehouse Architect & Developer
David Parsons / I.T. Director
Manhattan Insurance Group Houston, Texas

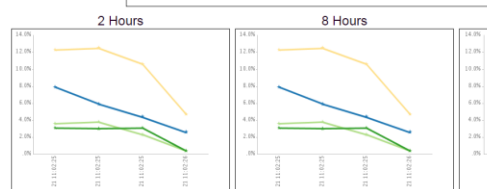
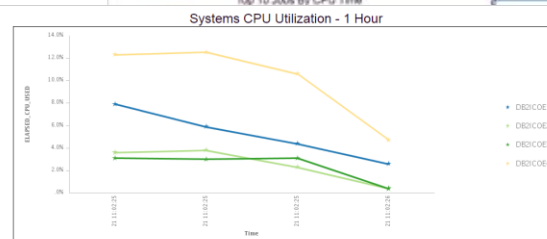
Db2 Web Query Update: Version 2.2
Announce 4/12/16; GA 4/15/16
Required version for IBM i 7.3

Db2 Web Query for the System Administrator

- A dozen or so sample Db2 Web Query reports and dashboards shipped with EZ-Install
- Built over IBM i SQL Services
 - Best to be at 7.2 or up
- Utilization and/or Top xx in nature
- Can use out of the box or edit/add using the as samples
- System Utilization across multiple LPARs
 - Auto Refresh
- Top Jobs by CPU or I/O or Temp Storage
- PTF Currency Report

System(s) Status

Host Name	Total Jobs in System	Active Jobs in System	Interactive Jobs in System	Active Threads in System	Elapsed Time	Elapsed CPU Used	Current CPU Capacity	Average CPU Utilization	Minimum CPU Utilization	Maximum CPU Utilization	System ASP Storage	Auxiliary Storage	System ASP Used	Current Temporary Storage	Maximum Temporary Storage
DB2C0E1	585	190	.00	632	1	10	2.00	.07	.00	32.00	1488922	1488922	76.58	4705	47
DB2C0E2	4688	244	.00	1062	1	30	2.00	.16	.00	32.00	954437	954437	44.66	8668	87
DB2C0E3	5321	286	.00	1178	1	10	4.00	.23	.00	32.00	8242936	8242936	20.14	8358	95
DB2C0E4	2184	241	.00	888	1	3.70	2.00	.58	.00	32.00	8242936	8242936	9.00	6811	68



PTF Currency Report

Status	PTF Group ID	PTF Name	Installed Level	Level Available	Date of last IBM Update
NOT INSTALLED LEVEL (CURRENT)	SP93564	710 WebSphere App Server V5.1	6	6	02/01/2016
	SP93480	720 WebSphere App Server for IBM i V1.1.2	9	9	12/12/2013
	SP99747	720 DB2 Web Query for IBM i V2.1.0	14	14	03/09/2016
	SP99706	720 Print PTFs	3	3	01/07/2015
	SP99145	710 Performance Tools	9	11	05/17/2016
	SP93363	710 WebSphere App Server V7.0	16	19	04/11/2016
	SP93368	710 IBM i Integration with BladeCenter and System x	13	16	12/18/2014
	SP93380	710 WebSphere App Server V8.0	11	15	02/01/2016
	SP93381	710 WebSphere App Server V8.5	10	16	08/14/2016
	SP93481	720 WebSphere App Server V5.5	9	9	08/14/2015
CURRENT AVAILABLE	SP99647	710 DB2 Web Query for i V2.1.0	13	14	03/09/2016
	SP99658	720 DB2 Web Query for i V2.1.1	2	3	03/09/2016
	SP99701	710 DB2 for IBM i	40	40	04/09/2016
	SP99702	720 DB2 for IBM i	12	13	07/14/2016
	SP99710	Current Cumulative PTF Media Documentation	14283	16120	05/19/2016
	SP99713	720 IBM HTTP Server for i	15	15	07/01/2016
	SP99714	720 Performance Tools	2	4	05/17/2016
	SP99716	720 Java	9	10	05/12/2016
	SP99717	720 Technology Refresh	3	4	05/16/2016
	SP99718	720 Group Security	29	36	08/09/2016
	SP99719	720 Group Hiper	60	71	08/23/2016
	SP99720	Current Cumulative PTF Media Documentation	15311	16127	05/20/2016
	SP99767	720 720 TCP/IP PTF	2	3	06/25/2016
	SP99775	720 Hardware and Related PTFs	14	17	04/25/2016
	SP99778	720 High Availability for IBM i	3	5	07/22/2016

Try It and Buy It

- Point customers to ibm.biz/db2wqezinstall-info for more information
- To request the package, send email to QU2@us.ibm.com
 - Include:
 - Name
 - Company Name
 - Serial Number of system where this will be installed



Db2 Web Query Update: Version 2.2



- **Db2 Web Query (5733-WQx) enhancements just keep on coming!**
 - New Version 2.2 : Announce 4/12, GA 4/15
 - No charge upgrade from previous versions (with SW Maintenance)
 - New orders will get V2.2. Upgrade from any previous Db2 Web Query version
 - **Required for IBM i 7.3!!**
 - Supports all IBM i 7.x releases
 - Previous versions of Web Query are not supported on IBM i 7.3
 - Note: Support for V1.1 ends in September 2016
- **Expands Heterogeneous database access**
 - Support for MySQL, Postgres, or generic JDBC Driver to get data from Oracle and others
 - Requires Db2 Web Query Standard Edition
- **New Developer Workbench Client**
 - No charge upgrade for licensed owners
 - Many new usability enhancements for working with meta data, dashboards or BI Applications
- **Responsive Dashboards**
 - Auto adjust dashboard views based on window size or perspective
 - Target specific browsers for testing to eliminate surprises
 - Design for MOBILE devices with new Mobile Layout canvas and enhancements
- **Learn More about Why upgrade to Version 2 at** <https://ibm.biz/Bd4dbK>

Utilizing Db2 Web Query has taken my company out of the green screen “stone ages”. We’re able to provide real-time data on different outputs to our clients. I am thrilled to use the Map feature and cannot wait to integrate this to our site.

– Emerald Ganpath, USW Dealer Solutions

One of our biggest uses of WebQuery is for customer history reports. These can now be handled by our clerks right at our point-of-sale. No need for customers to contact our office and wait to be mailed a printout. This has saved many hours for our office staff!

– Teri James, Stillwater Mill

Db2 Web Query Update: Data Migrator ETL Extension

▪ DataMigrator ETL (Extract, Transform, Load) Tool

- Db2 Web Query family product (5733-WQM)
- Replicate data, build data warehouses, data marts, or for analytics
- Data Replication supports both Journal Receivers and SQL processes
- Data transforms, data profiling, job scheduling built in

▪ NEW with V2.2



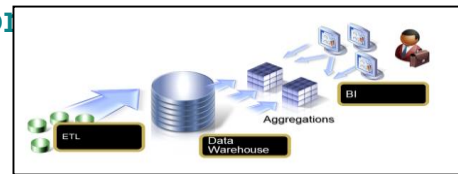
- Support for MySQL, Postgres, or generic JDBC for others (e.g., Oracle)
 - Requires Db2 Web Query Standard Edition

▪ Why?

- Consolidate data from multiple systems/databases
- Isolate and optimize analytics workloads from production systems
- Cleanse and transform data for accurate, speedy, self service analytics

▪ Considerations:

- Replace sunsetted Data Propagator with DataMigrator
- Complete Data Warehouse Solution for [as low as \\$15K \(U.S. List price\)](#)
- NOTE: NOT a replacement for HA tools




"One of the biggest obstacles we have faced to providing timely reporting was in trying to glean meaningful information using Query/400 and Crystal Reports over our production data. The combination of the Db2 database in a modern data warehouse and Db2 Web Query will allow us to have instantaneous access to our data to help us detect fraud, spot trends, adapt to changes, and provide the information needed to guide the business.

Db2 Web Query is putting a modern face on our data and our analysts love it. It is the best way to provide BI on a budget. "

- Les Turner / Warehouse Architect & Developer
David Parsons / I.T. Director
Manhattan Insurance Group

Introducing the Db2 Web Query EZ-Install Package – The EASY Button

- An EASILY acquired, EASILY installed package of **trial** code...and more
 - A single downloadable image that you can request that includes:
 - Db2 Web Query Version 2.2 (**LATEST Group PTF Already Installed**)
 - Express and Standard Editions (job scheduling. Non Db2 database access)
 - Optionally install **Data Migrator ETL** and/or Developer Workbench
 - Sample Reports for the System Administrator
 - Db2 Web Query Auditing/Monitoring Reports
 - Query/400 Discovery Tool
 - Everything set up ready to run 14 chapters of self guided report writing tutorials
 - (we also include all the completed tutorial reports)
 - Requirements
 - 7.1 and up (7.2 or 7.3 preferred for the System Administrator reports)
 - 70 Day Trial Period. Apply License Keys to get permanent usage

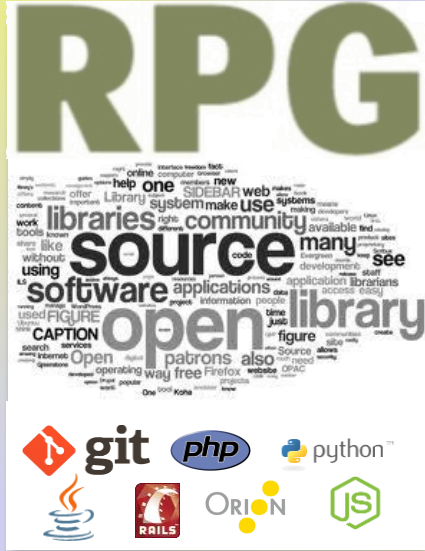


2.2 in less
Than 2 hours!

i4HiFashion – Application Development Requirements



i4HiFashion



Applications enable business transformation

- Existing applications need enhancement
- New solutions require new languages
- Talent pool has diverse skills
- Traditional and Open Source required
- Need efficient development tools

Modern RPG

- Full Free Format Language
- Removal of the 8-80 column restriction
- Major enhancement to Rational Developer for i

Open Source

- Latest Zend PHP engine
- Node.JS, Python, gcc
- And more!



RPG IV - A Modern Business Language

- Interoperability
 - Java
 - XML
 - SQL
- Readability
 - Free form
 - Blank lines
 - Comments
- Functionality
 - Procedures
 - Data areas
 - Data structures
 - More data types
 - Extended file support
- Modern Tools
 - RD i, RTC, ARCAD Power Pack

Free format C specs

```
read file;                // Get next record
dow not %eof(file);       // Keep looping with record
  if %error;
    dsply 'The read failed';
    leave;
  else;
    chain(n) name database data;
    time = hours * num_employees
           + overtime_saved;
    pos = %scan ('\,' : name);
    name = %xlate(upper : lower : name);
    exsr handle_record;
    read file;
  endif;
enddo;
begsr handle_record;
  eval(h) time = time + total_hours_array (empno);
  temp_hours = total_hours - excess_hours;
  record_transaction();
endsr;
```


Remove 8-80 Column Restriction

Without Free-Form column 1-8 are reserved (goes back to the punch card days)

Max Column for content is 80 (again....punch card)

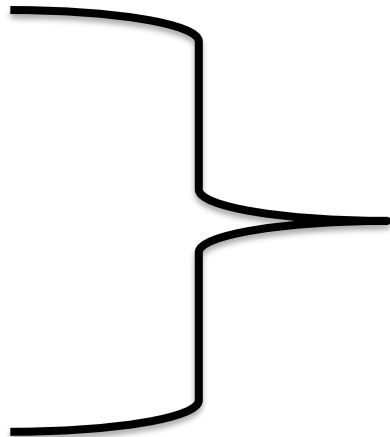
```

    dou wasFound;
    //Look up the custId in the file
    custName = %LOOKUP('custKey' : custArray
                      : 1
                      : %SIZE(custArray));
    custAddress = %SUBST(fullAddress :1 :50);
C    custAddress MOVEA fullAddress
    CHAIN custId custFile;
enddo;
```

- If column 1 of a source line contains '**FREE', the following lines contain free-form RPG code beginning in column 1
- If **FREE has not appeared in the source file, or if column 1 of a source line contains **END-FREE, the following lines have RPG code in columns 6 - 80. If columns 6 and 7 are blank, the code is free-form.

2016 options added to 5733OPS

- Option 1 – Node.JS 2.x
- Option 2 – Python 3.4
- Option 3 – GCC / chroot
- Option 4 – Python 2.7
- Option 5 – Node.JS 4.x
- Option 6 – Git
- Option 7 – Tools
- Option 8 – Orion
- Option 9 – cloud-init
- Option 10 – Node.JS 6.x

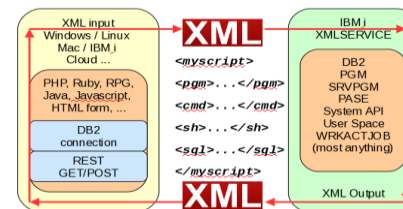


New



Open Source for IBM i - Runtime plus++

- FastCGI
 - Allows fast connection from HTTP server to backend PASE environment
- ILE Object Toolkit
 - Toolkit for each environment to easily allow connections to ILE objects and information – Built on XML Service
- SQL Connection for Db2 on i
 - Easy integrated (from the open source language) way to transfer data to and from Db2 for i leveraging SQL



Db2 for i

Python

Python is powerful... and fast;
plays well with others;
runs everywhere;
is friendly & easy to learn;
is Open.



- Why Python ?
 - Python is to the open source community as CL is to IBM i
 - It's the most popular scripting language in the industry
 - Taught and used by pretty much 'all' new developers
- Python V2.7 & V3

What are GCC & CHROOT?

GNU Compiler Collection

- Compilers for C & C++
- Collection of compilers, tools, build, deployment, shells, etc
- Industry standard vs the XLC currently on IBM i
- Allows the advanced user the ability to get any OS package running on IBM i without IBM intervention



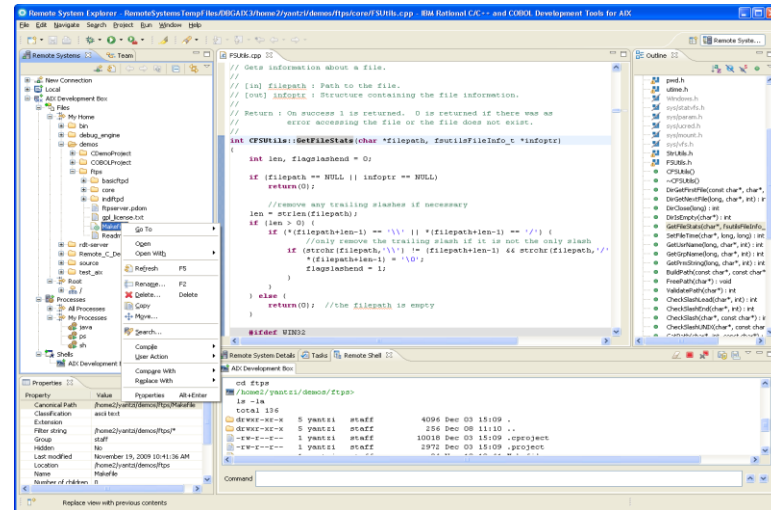
CHROOT

- Create a development 'sandbox'
- Ensure developers don't mess things up on the system
- Allow multiple environments to co-exist
- Provide a layer of protection

chRoot

Rational Developer for i V9.5

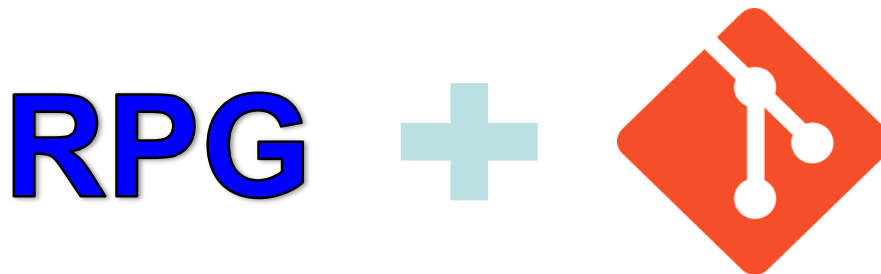
- Addition of a built-in 5250 emulator
- Removal of the 80 column restriction in RPG code editor
- Addition of Snippet Support in the Push-to-Client feature
- Enhanced ability to rearrange Remote System Explorer (RSE) Filters
- Improvements to free-form RPG formatting (indentation support) in the RPG code editor
- Improved RPG Content Assist
- General improvements to code coverage analysis capabilities, significant performance improvements



Git – Source Control Management

Git

- Support RPG source stored in IFS
- Provides an alternative to other source control
- Would allow the same source control for both open source and RPG



Orion - Web Based IDE

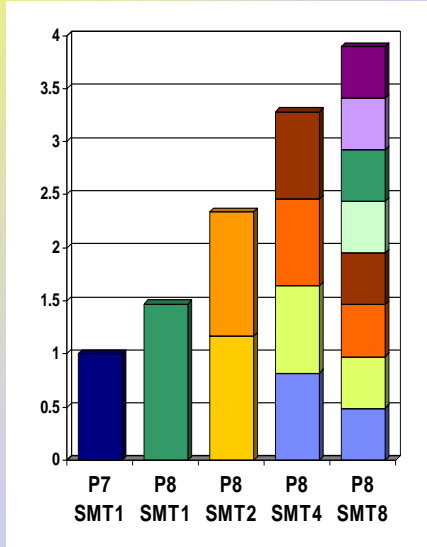
- Orion
 - Open Source Development Environment
 - Based on Eclipse
 - Browser based development environment
 - Free
 - Always there
 - Node, Python, others
- RPG ? YES!
 - Access RPG source from IFS Files



i4HiFashion – Additional Infrastructure Function from IBM i 7.3



i4HiFashion



Maximum use of system resources

- Large POWER8 capacity
- Latest Storage Options
- Latest I/O Virtualization capabilities
- Increase system limits

Raised architectural limits in IBM i 7.3

Maximum # of objects in a Library

360,000 → 1,000,000

Maximum # of parameters in a Db2 procedure

1,024 → 2,000

Maximum # of parameters in a Db2 function

1,024 → 2,000

Maximum # of return columns from a Db2 table function

1,025 → 8,000

Maximum # of members referenced in an SQL view

256 → 1,000



IBM i System Support

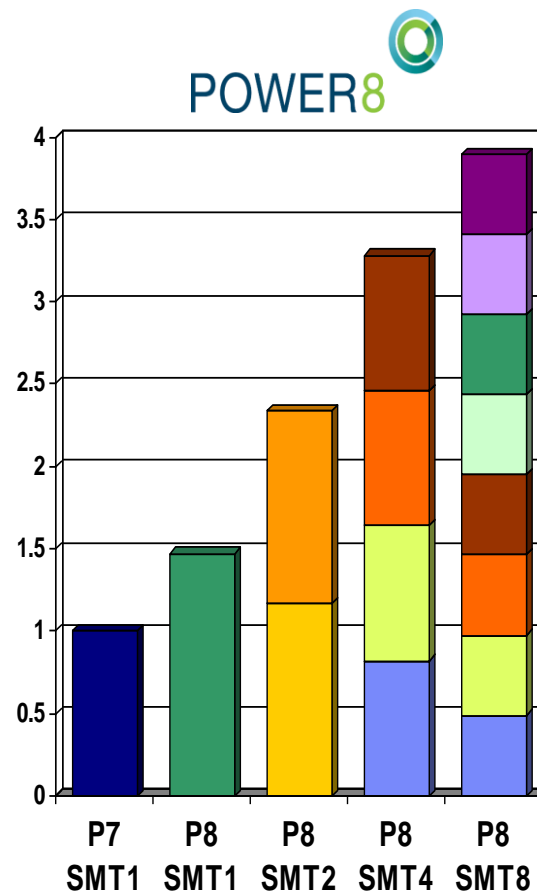
<http://www-01.ibm.com/support/docview.wss?uid=ssm1platformibmi>

Systems	IBM i 7.1	IBM i 7.2	IBM i 7.3
POWER8 S814, S822 (VIOS only), S824, E870, E880	✓	✓	✓
POWER7/7+ Servers Power 710, 720, 730, 740, 750, 760, 770, 780, 795	✓	✓	✓
POWER7/7+ Blades and Compute Nodes PS700/701/702/730/704, PureFlex p260/460	✓	✓	
POWER6+ 520, 550, 560, JS23/43 POWER6 520, 550, 570, 595, JS12/22	✓	✓ ¹	
POWER5/5+ 515, 520, 525, 550, 570, 595	✓		

Note 1 – no IOP or HSL support

POWER8 Multi-threading Options

- **SMT1:** Largest unit of execution work
- **SMT2:** Smaller unit of work, but provides greater amount of execution work per cycle
- **SMT4:** Smaller unit of work, but provides greater amount of execution work per cycle
- **SMT8:** Smallest unit of work, but provides the maximum amount of execution work per cycle
- Can dynamically shift between modes as required: SMT1 / SMT2 / SMT4 / SMT8
- Mixed SMT modes supported within same LPAR
 - Requires use of “Resource Groups”



Storage Configurations – New since IBM i 7.2

FlashSystem Attach



Native and VIOS NPIV attachment of FlashSystem

Support for SVC HyperSwap



Support for SVC configs, including Storwize products

IBM i 16 Gb FC direct attach



Native attachment for 16 Gb FC direct attach configs

Hardware and Virtualization Configuration Support

– New since IBM i 7.2

Systems with POWER8 Technology

- PCIe Gen3 I/O Expansion Drawer
- Native, Native SR-IOV, and VIOS
- Support for 4-port 10 Gb Ethernet NIC

Virtualization

- vNIC Configurations allow SR-IOV to be used with Live Partition Mobility
- IBM i Virtualization Configurations with Little Endian Linux
- Large Send Offload for Virtual Ethernet

SAS Disk Configurations

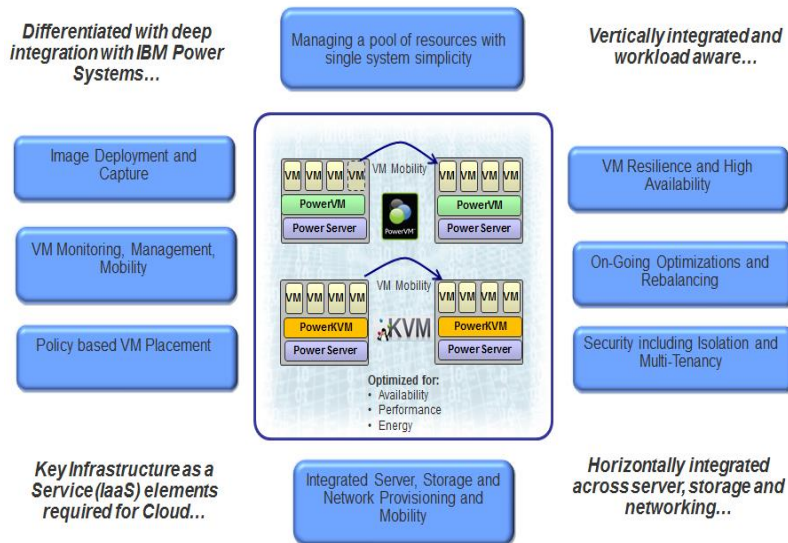
- SAS Adapter Availability Improvement
- RAID Array Start Time Reduction
- Larger SSD and HDD Disks with 4K Block Sizes

Tape Device Support

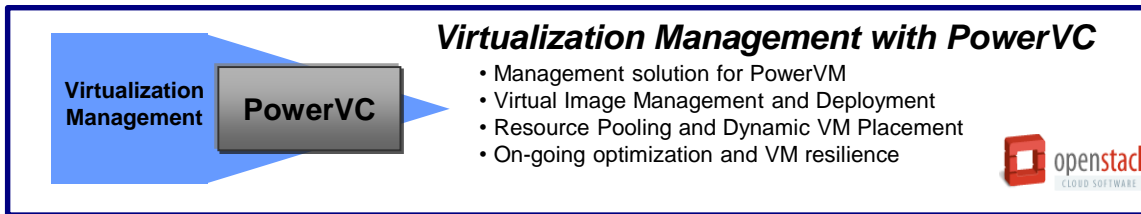
- TS1150 Enterprise Tape Drives
- Tape with LTO7 Technology
- Multipath Support for SAN Tape Configurations

PowerVC for i – What can you do for IBM i virtualization?

- Virtualization management for Power Systems – PowerVM
- Key Capabilities
 - Advanced virtualization management for Power Systems
 - IBM i virtual machine capture and deployment
 - IBM i virtual machine relocation
 - Policy based VM placement
 - One-click system evacuation
 - Optimization and rebalancing
 - Quick setup and Time to Value
- Based on OpenStack
 - Leverage open community
- Capabilities beyond OpenStack
 - Simplified user interface
 - Platform EGO scheduler
 - Reliability and serviceability



PowerVC for i Latest Enhancements



- **Advanced Policy-based Management**
 - New placement policies for system affinity, CPU utilization, CPU and Memory capacity, Host grouping with policies by group
- **High Availability Improvements**
 - Support for redundant HMCs, VM Restart, SVC local mirroring configurations
- **Storage Capabilities**
 - Support for DS8000, EMC Powerpath, XIV, Shared Storage Pool, IBM SDDPCM Multi-path managers, SVC local mirroring, Multi-disk VM capture / deploy
- **Cloud-Init Beta Support** – Newly deployed IBM i partition could be initialized with Cloud-Init.
- **Novalink support**
 - Provides much better capabilities and scalabilities of managing a virtualized environment. Support LPM between HMC and Novalink managed hosts.



*All Cloud initiatives require a well
orchestrated and **managed**
virtualized environment*

i4HiFashion – Additional Integrated Enhancements in IBM i 7.3



i4HiFashion



Key Integrated Technologies enhanced

- IFS
- NetServer
- Networking – Security Auditing
- Save/Restore and Related

Integrated File System

Display Attributes (DSPATR)

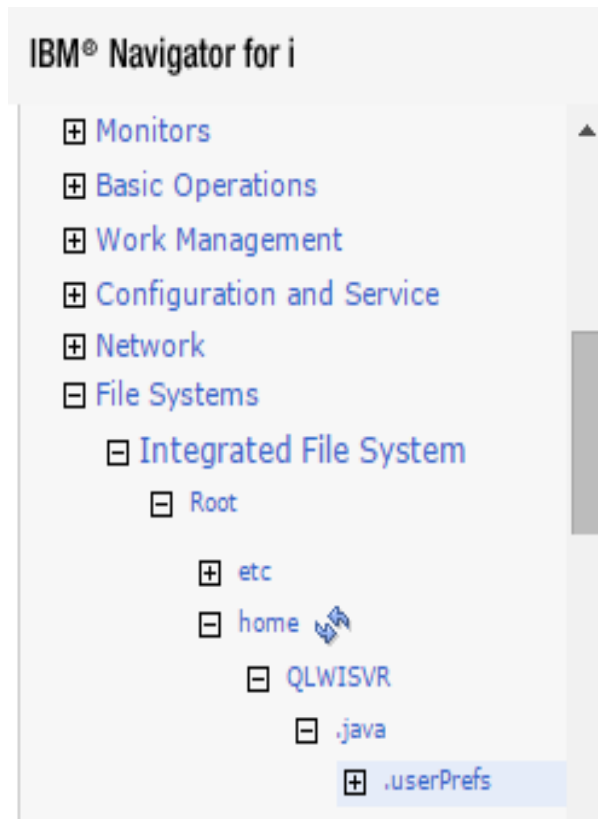
- Detailed object attributes
- Leverage Wild Cards
- Process entire Sub-tree

Improved Save-While-Active

- Set *ALWCKPWRT for directories.
- Save-while-active will no longer lock those directories
- Or interfere with link, rename, or unlink

CHGATR command - *TEXT attribute

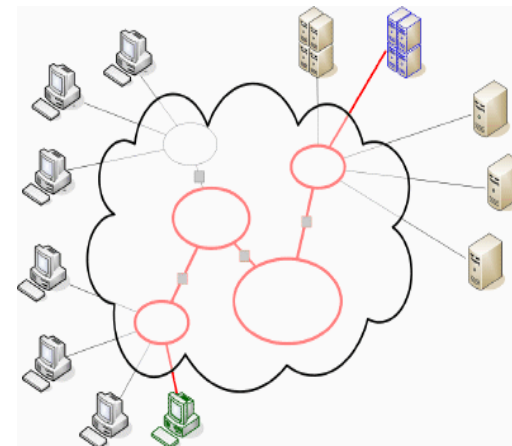
- Display a short (50-character) text description for any object in a file system that supports extended attributes



Connectivity - NetServer

NetServer improvements

- SMB2
 - Transparent negotiation of the new protocol between clients and servers
 - Latest Industry Standard
 - Allows read and write sizes up to 64kb to better move large blocks of data
 - Improved performance for large data blocks
- Route based on User Profile



IBM i 7.3 Networking Enhancements

Security

- Network Auditing Enhancements (New QAUDLVL values)
 - *NETTELSVR
 - Generate audit records for Telnet Server TCP connections.
 - *NETUDP
 - Generate audit records for inbound and outbound UDP packets.
 - *NETSECURE
 - Generate audit records for successful and failed System SSL handshakes.
 - Generate audit records for successful VPN negotiations.
 - Generate audit records for IPsec.
- Simple Network Management Protocol (SNMP) support for AES encryption, and enhancements to simplify application and firewall configuration
- LIC Service Tools Server TLS configuration via application definition in DCM
- Intrusion Detection System (IDS) SSL Handshake failure policy
- System SSL - System Values updated to disable older algorithms by default





Technology Refresh Summaries

7.3 TR1 Summary

- Optical Containers – Adding value for USB
- Rational Developer for i: Mac OS X support and more
- IBM i ACS: Smart Card support and more
- Open Source offerings: perl, node.js v6 and more
- Db2: JSON_Table and more
- IBM Cloud Storage Solutions for i: BRMS Backup to Softlayer

Leveraging USB Device Technology

IBM i 7.3 TR 1

IBM i 7.2 TR 5



USB Flash Drives



Looking for more uses?



USB RDX Drives



**Want to make better use of
large capacity media?**

As DVD technology ages, IBM is looking toward USB devices as a replacement

- DVD drive becomes more optional
- Saves cost on systems

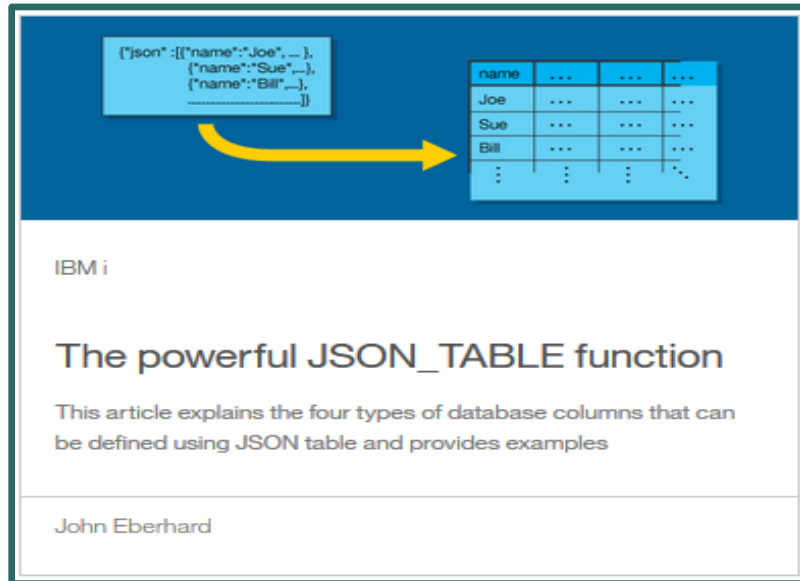
Optical Containers Make USB Flash Look Like a Stack of DVDs

IBM i 7.3 TR 1**IBM i 7.2 TR 5**

Scenario	Prior handling	New option	Benefit
Creating Optical Image Catalogs	Create only on disk (IFS)	Store Image catalog into QOPT file system on USB device	Makes data on USB media look like stack of DVDs
Use USB Flash drive to download PTFs	Not possible – instead stored image on disk in IBM i LPAR and added it to image catalog or burned it to DVD	Download ISO image of PTFs onto PC at office, move it to USB Flash drive, apply PTFs directly from Flash drive	Easy portability of PTFs
Storing image catalogs	Had to use expensive DASD and virtual media	Store image on USB Flash Drive. BP or ISV could take a USB Flash Drive to a customer site	USB is less expensive and more portable
Back-ups with RDX media	Incremental saves in separate directories, followed by deletes for re-use, resulted in file fragmentation & performance degradation	Partition RDX media into multiple virtual disks to allow multiple incremental saves	Allows RDX media to be leveraged for nightly back-ups, weekly back-ups, etc. ** Although these virtual disk images cannot be used for D-mode IPL, they are very useful for restoring data after IPL.

JSON_TABLE

- Allows queries to process JSON as relational data
- Leverage HTTP functions to tap external JSON data sources
- Conceptually similar to XML_TABLE



The diagram illustrates the concept of the JSON_TABLE function. On the left, a JSON array is shown: `[{"json": [{"name": "Joe", ...}, {"name": "Sue", ...}, {"name": "Bill", ...}]}]`. A yellow arrow points from this JSON structure to a table on the right. The table has a header row with 'name' and three columns of ellipses. The data rows are 'Joe', 'Sue', and 'Bill', each followed by three columns of ellipses. Below the diagram, a screenshot of an IBM i article titled 'The powerful JSON_TABLE function' is shown. The article text reads: 'This article explains the four types of database columns that can be defined using JSON table and provides examples'. The author is listed as 'John Eberhard'.

name	...	...	...
Joe	...	...	...
Sue	...	...	...
Bill	...	...	...
...

IBM i

The powerful JSON_TABLE function

This article explains the four types of database columns that can be defined using JSON table and provides examples

John Eberhard

“The powerful JSON_TABLE function”

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

IBM i 7.3 TR2 Overview

- S812
- Db2
 - More JSON
 - SQL Services
- Access Client Solutions Version 1.1.7.0
 - Schemas
- Open Source
 - rsync, wget, curl, SQLite
 - git enhancement
 - GOLICPGM list
- Db2 WebQuery
 - “Easy Button” install
 - Sample Admin Graphical Reports
 - New Redbook

Power S812



8284-21A

Entry price server

- 1-core server for IBM i
- 4-core server for AIX



- Single partition
- no virtualization
 - Not for Processor, memory or I/O
 - No VIOS, No PowerVC
- no Linux
- Simpler memory & I/O options

JSON support in Db2 for i



Db2 JSON Store

JSON_TABLE()

JSON Query support:

Predicates:

- IS JSON
- JSON_EXISTS

June 2015

November
2016

March
2017

IBM i 7.1, 7.2, &
7.3

IBM i 7.2 & 7.3

IBM i 7.2 & 7.3

New IBM i Services

- **QSYS2.AUTHORIZATION_LIST_INFO** – Similar to the Display Authorization List Objects (DSPAUTLOBJ) CL command
- **QSYS2.AUTHORIZATION_LIST_USER_INFO** – Similar to the Display Authorization List (DSPAUTL) CL command
- **QSYS2.OBJECT_PRIVILEGES** – Similar to the Display Object Authority (DSPOBJAUT) CL command
- **QSYS2.USER_INFO** – Add Supplement Group detail
- **And more...**



IBM Knowledge Center

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Search Filters: [IBM i 7.3](#)  ☒ [Auto-select](#) | [Clear All](#) | [Add Products...](#)

http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_73/rzahg/welcome.htm



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IBM i 7.3

Welcome

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IBM i 7.3 TR3 Announced

- You and i blog October 3 2017
 - <http://ibmsystemsmag.com/blogs/you-and-i/october-2017/announcing-ibm-i-7-3-tr3-and-ibm-i-7-2-tr7/>

Blog

You and i *IBM i Trends and Strategies*



By Steve Will

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Announcing IBM i 7.3 TR3 and IBM i 7.2 TR7

October 03, 2017

Today IBM is announcing the latest Technology Refreshes (TRs) for our two most current releases: IBM i 7.3 TR3 and IBM i 7.2 TR7. As long-time readers will know, the IBM i strategy includes twice a year deliveries of new function, allowing many parts of the IBM i OS and its related products to fulfill customer requirements between major releases.

And really, that's the theme of this pair of TRs—delivering on client requirements.

IBM i 7.3 TR3 – Some Items

- Db2
 - JSON Publishing & Scalar functions
- USB Installation process
 - Copy image for D-mode IPL onto USB drive
- 4767 Cryptographic Co-Processor support
 - Performance & Most Secure Key Storage
- Open Source
 - Announcement of various features added recently including: nginx, Orion
- And More

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IBM i 7.3 - Base Enhancements

 | Updated today at 7:02 AM by [ScottForstie](#) | Tags: None

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IBM i 7.3

<http://developerworks/ibmi/techupdates/i73>

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By Steve Will



IBM i 7.3 Announcement

April 12, 2016

Today's the day! As I hinted a couple of months ago, we have big news. Today, we are announcing the IBM i 7.3 release, which will be generally available on April 15, 2016.



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Our themes for 7.3 apply to many of the new features:

- Simplifying Insight
- Intelligent Security
- The Power of Integration

<http://www.ibmssystemsmag.com/Blogs/You-and-i/>



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