Power Systems · IBM

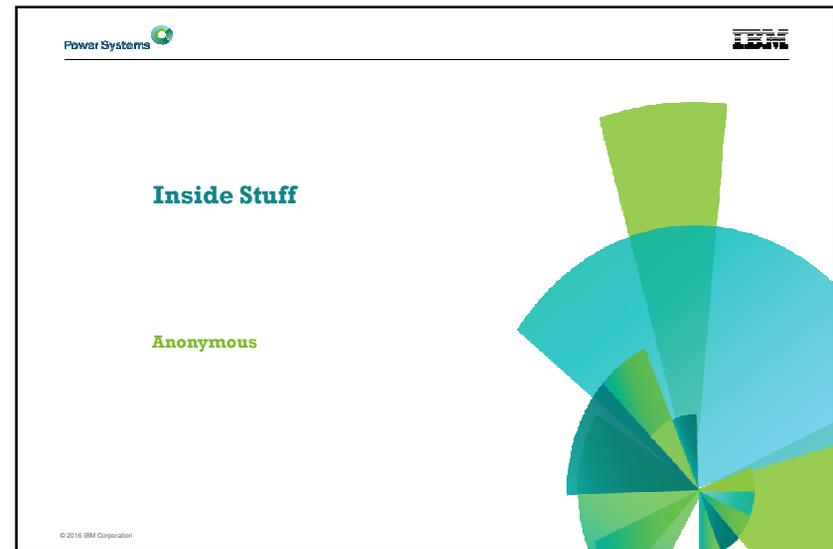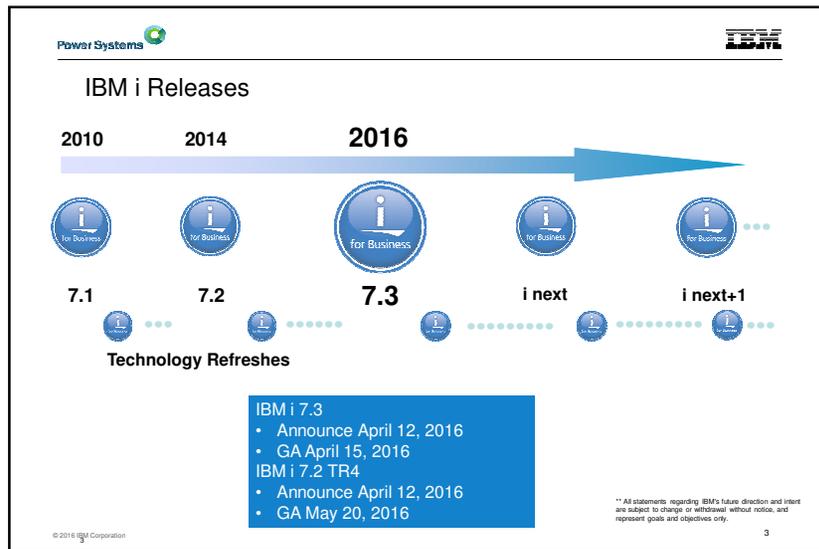**Rev up your system with
IBM i 7.3**

Power Systems · IBM

Power Systems · IBM

Tonight's Agenda

- IBM i Roadmap with IBM i 7.3

- Some inside stuff about messaging

- IBM i 7.3 Solving Business Problems using
  - Simplified Insight
  - Intelligent Security and
  - The Power of Integration

- Reference Material (Knowledge Center, dW, blogs)

© 2016 IBM Corporation

2

Slide 1

IBM i Releases

2010	2014	**2016**		

7.1   **7.2**   **7.3**   **i next**   **i next+1**

Technology Refreshes

IBM i 7.3
• Announce April 12, 2016
• GA April 15, 2016
IBM i 7.2 TR4
• Announce April 12, 2016
• GA May 20, 2016

** All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

© 2016 IBM Corporation   3

Slide 2

Inside Stuff

Anonymous

© 2016 IBM Corporation

IBM i 7.3 Overview

Simplifying Insights,
Intelligent Security and the
Power of Integration

Steve Will
IBM i Chief Architect

© 2016 IBM Corporation

IBM i 7.3 – Simplify Insights, Intelligent Security & the Power of Integration

- Historical data simplifies business insights for the future
  - **DB2 Temporal support** automatically maintains history

- Intelligent Security matches actual authority with policy
  - **Authority Collection** analysis ensures continuous operation

- Integrated data analytics for new insights
  - **OLAP enhancements** built into DB2 for i

- Extensive integrated application development options
  - Easy-to-learn **RPG** + **Open Source** development technology

- And much, much more!

i4HiFashion

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

Business Characteristics

- Locations around the world

- Business growth through acquisition

- All key business data in IBM i DB2

- Mix of Solutions – Home-grown + ISV

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

i4HiFashionDB

New Business Requirements

- Learn from history

- Ask new kinds of questions

- Ensure intelligent security

- Know who did what and when

© 2016 IBM Corporation

15

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

i4HiFashionDB

New Business Requirements

- Learn from history

- Ask new kinds of questions

- Ensure intelligent security

- Know who did what and when

© 2016 IBM Corporation

16

Power Systems   IBM

Learning from History

What Did My Business Look Like Last Month?
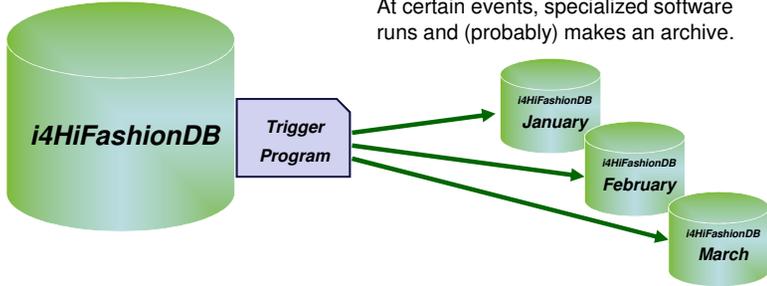
Before 7.3 DB2 Temporal Support

i4HiFashionDB

- 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

© 2016 IBM Corporation   17

Power Systems   IBM

What Did My Business Look Like Last Month?

Trigger Program approach

At certain events, specialized software runs and (probably) makes an archive.

i4HiFashionDB → **Trigger Program** →
- *i4HiFashionDB* **January**
- *i4HiFashionDB* **February**
- *i4HiFashionDB* **March**

© 2016 IBM Corporation   18

Slide 19

IBM

What Did My Business Look Like Last Month?

Trigger Program approach?
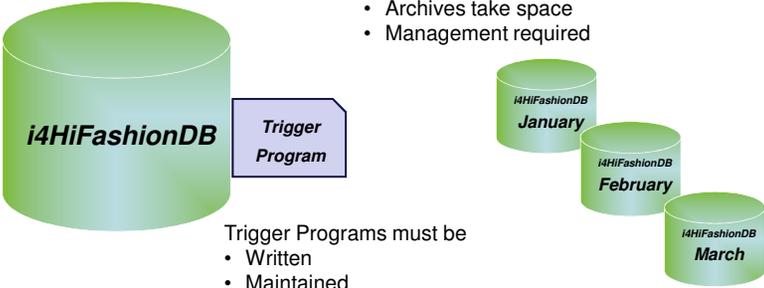
Trigger programs

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

i4HiFashionDB

Trigger Program

i4HiFashionDB
January

i4HiFashionDB
February

i4HiFashionDB
March

Trigger Programs must be
- Written
- Maintained
- Updated as requirements change
  - Will "monthly" always be the requirement?

© 2016 IBM Corporation

19

Slide 20

IBM

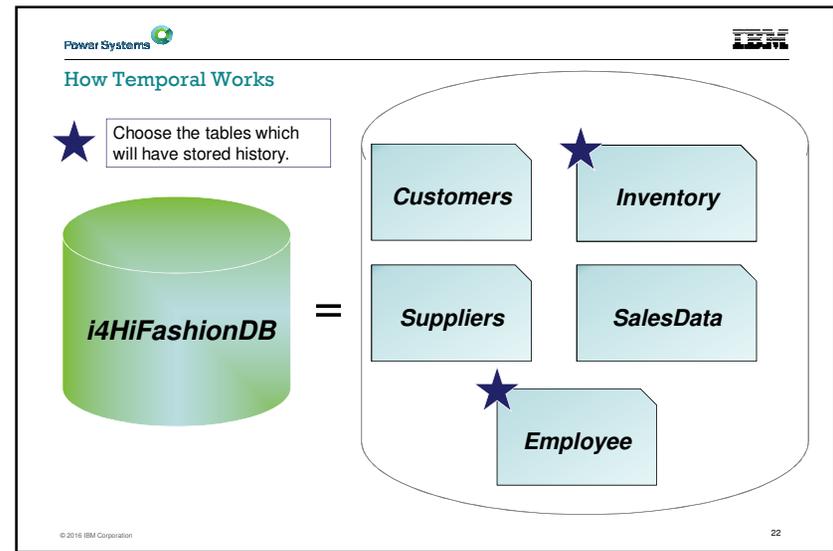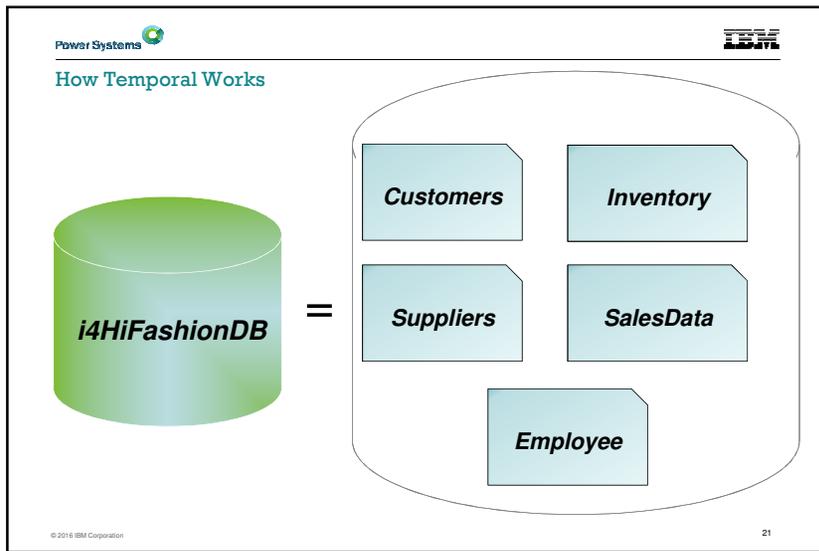**What Did My Business Look Like Last Month?**

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

i4HiFashionDB
+ History

© 2016 IBM Corporation

20

Slide 23

Adding History to a Table

Production Table

Employee

Add enabling columns to table.

© 2016 IBM Corporation   23
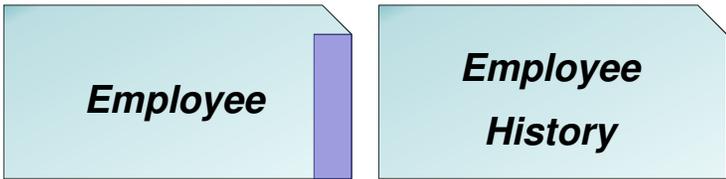
Slide 24

Power Systems   IBM
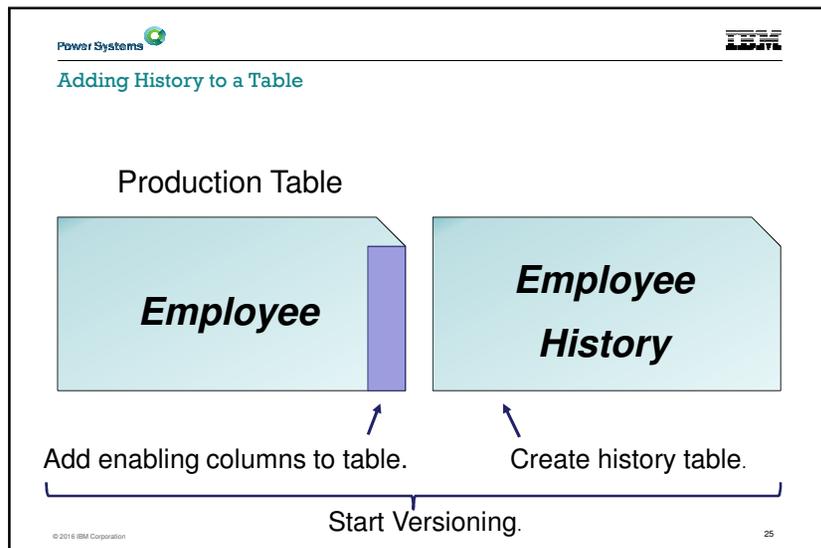
Adding History to a Table

Production Table

Employee

Employee History

Add enabling columns to table.   Create history table.

© 2016 IBM Corporation   24

04/26/2016

Adding History to a Table

Power Systems   IBM

Production Table

Employee

Employee History

Add enabling columns to table.   Create history table.

Start Versioning.

© 2016 IBM Corporation   25

Power Systems   IBM

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

© 2016 IBM Corporation   26

13

Slide 27

Temporal Queries – How to ask historical questions

SELECT * FROM employees AS OF TIMESTAMP '2014-12-24:00:00.000000'

SELECT * FROM employees FOR SYSTEM_TIME FROM '2014-06-01' AND '2014-12-31'

SELECT * FROM employees FOR SYSTEM_TIME BETWEEN '2014-06-01' AND '2014-12-31'

OR

SET CURRENT TEMPORAL_SYSTEM_TIME = '2014-12-24:00:00.000000'
SELECT * FROM employees

27

Slide 28

DB2 for i – Insight Enhancements in IBM i 7.3

New Generated Columns
- ROW BEGIN (birth)
- ROW END (death)
- TRANSACTION START ID
- DATA CHANGE OPERATION
- Special Register
- Built-in Global Variable

New Special Register
- CURRENT TEMPORAL SYSTEM_TIME

New SET OPTION
- SYSTIME (*YES | *NO)

New Query *period-specification*
- FOR SYSTEM TIME AS OF <value>
- FOR SYSTEM TIME FROM <value> TO <value>
- FOR SYSTEM TIME BETWEEN <value> AND <value>

Data-centric history… INSIGHT

New Catalogs
- QSYS2/SYSPERIODS
- QSYS2/SYSHISTORYTABLES

28

Slide 29

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

i4HiFashionDB

New Business Requirements

- Learn from history

⭐ Ask new kinds of questions

- Ensure intelligent security

- Know who did what and when

29

Slide 30

Ask New Kinds of Questions

i4HiFashionDB

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?

30

Slide 31

IBM

Ask New Kinds of Questions

i4HiFashionDB

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

© 2016 IBM Corporation

31

Slide 32

Power Systems

IBM

Ask New Kinds of Questions – with DB2 OLAP

i4HiFashionDB

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!

© 2016 IBM Corporation

32

Slide 33

IBM

SQL Query Engine and OLAP Specification Extensions

Business questions:

i4HiFashionDB

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

• If so -- Can we predict sales based on the amount spent on marketing?

33

Slide 34

IBM

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

Sales

Yes, increasing marketing helps sales at a pretty consistent rate

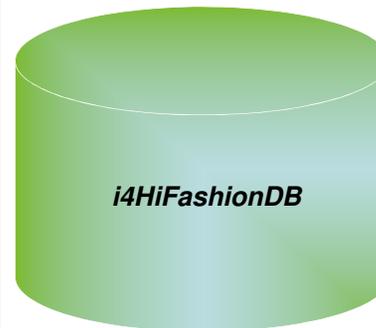No, increasing marketing doesn't do much.

Marketing Dollars Spent

34

Slide 35

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?

35

Slide 36

SQL Query Engine and OLAP Specification Extensions

i4HiFashionDB

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?

36

Slide 37

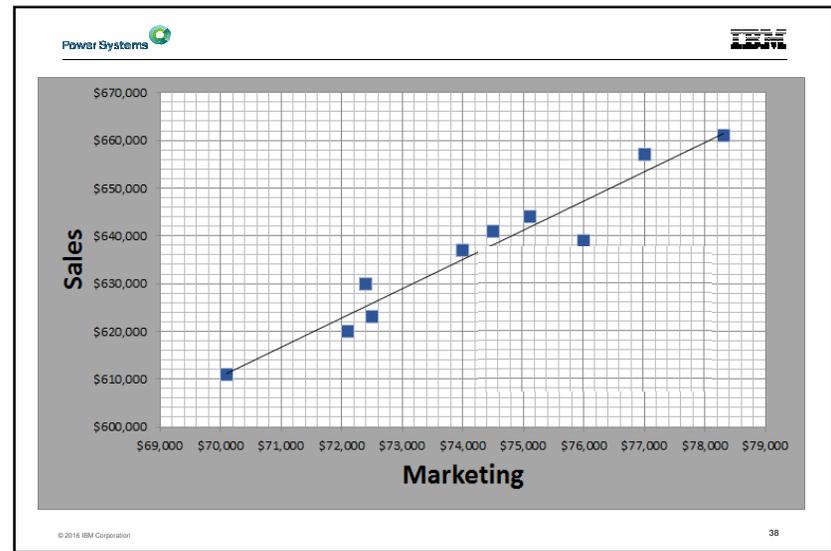### SQL Query Engine and OLAP Specification Extensions

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?

- Is the correlation weak or strong?

- Can we predict sales based on the amount spent on marketing?
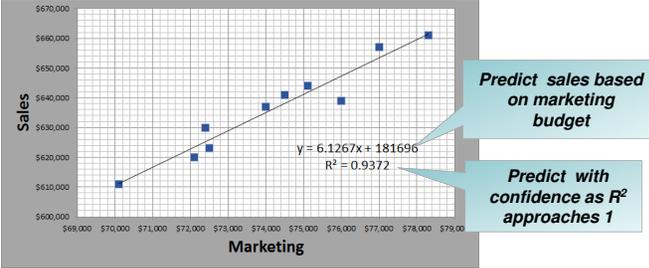
We have the data; how do we answer the question?

37

Slide 38

38

Slide 1

SQL Query Engine and OLAP Specification Extensions

Predict sales based on marketing budget

$y = 6.1267x + 181696$
$R^2 = 0.9372$

Predict with confidence as R^2 approaches 1

Business results:
- SELECT REGR_SLOPE (sales, mktg), REGR_INTERCEPT (sales, mktg)
      FROM salesdata ;
- SELECT POWER (CORRELATION (sales, mktg), 2)
      FROM salesdata ;

© 2016 IBM Corporation

39

Slide 2

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.

© 2

Power Systems   IBM

SQL Query Engine and OLAP Specification Extensions

Option	Description
REGR_COUNT	Returns the number of non-null number pairs used to fit the regression line.
REGR_INTERCEPT	Returns the y-intercept of the regression line.
REGR_R2	Returns the coefficient of determination for the regression.
REGR_SLOPE	Returns the slope of the line.
REGR_AVGX, REGR_AVGY, REGR_SXX, REGR_SXY, REGR_SYY	Returns the quantities that can be used to compute various diagnostic statistics needed for the evaluation of the quantity and statistical validity of the regression model.

https://en.wikipedia.org/wiki/Regression_analysis
Regression analysis *is a statistical process for estimating the relationships among variables.*

© 2016 IBM Corporation   41

Power Systems   IBM

SQL Query Engine and OLAP Specification Extensions

On-Line Analytical Processing (OLAP) specifications provide the ability to return ranking and row numbering as a scalar value in a query result.
Today we support RANK, DENSE_RANK, and ROW_NUMBER.

With IBM i 7.3, DB2 for i supports the following OLAP options:

Option	Description
Aggregates	Returns the aggregate value (SUM, COUNT…) for the OLAP window
LAG or LEAD	Returns the value computed using rows prior to or following the current row.
NTILE	Specifies the quantile rank of a row within the window in which it is computed.
NTH_VALUE	Returns the value for the nth row in an OLAP window.
FIRST_VALUE and LAST_VALUE	Returns the first or last value in an OLAP window.
RATIO_TO_REPORT	Returns the ratio of an argument to the sum of the arguments in an OLAP window.
CUME_DIST	Returns the relative position of a specified value in a group of values.

© 2016 IBM Corporation   42

Slide 43

First_Value, Last_Value, Nth_Value Example

Show the difference in sales between the current store and the store with the best sales, the second best sales, and the worst sales

SELECT store, sales,
sales - **first_value**(sales)　 over (order by sales desc range between unbounded preceding and unbounded following) Behind_1st,
sales - **nth_value**(sales,2) over (order by sales desc range between unbounded preceding and unbounded following) Behind_2nd,
sales - **last_value**(sales)　 over (order by sales desc range between unbounded preceding and unbounded following) Compared_to_Last
from stores order by sales desc

Stores	Sales	Behind_1st	Behind_2nd	Compared_to_Last
Caining	770,000.00	0.00	270,000.00	670,000.00
Mills	500,000.00	-270,000.00	0.00	400,000.00
..	…	…	…	…
Bobs	100,000.00	-670,000.00	-400,000.00	0.00

© 2016

43

Slide 44

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

i4HiFashionDB

New Business Requirements

- Learn from history

- Ask new kinds of questions

- Ensure intelligent security

- Know who did what and when

44

IBM

Ensure Intelligent Security

Business reality:

i4HiFashionDB

- 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.

45

IBM

Ensure Intelligent Security

Business questions:

i4HiFashionDB

- 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?

46

Power Systems   IBM

IT / Application Questions Related to Authority

– Does User 'Joe' really need to have *ALLOBJ to run an application?

– What object authority should the HR department have for these 15 objects to get their job done?

– What is the minimum authority required on the objects it uses for the application to work correctly?

47

Power Systems   IBM

IT / Application Questions Related to Authority

– All my objects have PUBLIC *ALL authority!   Is it needed?

– We have little detailed knowledge of the applications… where is the data?

   – Yes, the data is in DB2 and/or IFS …   but where?

– What is the "minimum" authority level that can be granted for the end user?

48

Slide 49

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?"

49

Slide 50

Authority Collection Usage Overview

- Turn on the authority collection for a given user
  - or set of users

1

- Collect authority info for the user

2

- Examine the results via SQL or Navigator

3

50

Power Systems — IBM

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:	TLK
Libraries to search:	None
Objects to search:	All
Object types:	All

© 2016 IBM Corporation

Power Systems — IBM

Authority Collection – Interrogate the collected data

Leverage Navigator to do **basic** data investigation

Welcome | Users | Display Authority Collection - Tlk

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	Auth
	Tlk	2015-08-17 11:41:48	Qmsf	QSYS	*USRPRF	*ALL	*ALL	U
	Tlk	2015-08-17 11:41:48	Qmsf	QSYS	*USRPRF	*ALL	*ALL	U
	Tlk	2015-08-17 11:42:03	Syslimtbl	QSYS2	*FILE	*ALL	*ALL	U

No filter applied

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 = 'SCOTTF' AND SYSTEM_OBJECT_SCHEMA = 'TOYSTORE'
19  GROUP BY SYSTEM_OBJECT_NAME, DETAILED_REQUIRED_AUTHORITY, DETAILED_CURRENT_AUTHORITY
20  ORDER BY 1,2,3;
21
```

© 2016 IBM Corporation

52

Power Systems · IBM

Solution: Authority Collection – Important Usage Points

• While the collection is active, run-time performance is affected. Start small and learn from experience.

• Be aware of storage being consumed, especially when doing a long running authority collection.

• "User" based, only.
  – "Object" would be a natural next step.
  – "Groups" would be a natural next step.
  – Seeking feedback on future possibilities.

© 2016 IBM Corporation   53

Power Systems · IBM

Authority Collection Usage Overview

• Turn on the authority collection for a given user
  – or set of users

• Collect authority info for the user
  –Access via the group authority is collected
    o Group level collection not supported

  –Adopted authority information collected

• QSYS file system has object level selectivity but

• IFS (root, QOpenSys, UDFs do not have object level selectivity)

© 2016 IBM Corporation   54

Power Systems   IBM

i4HiFashion – The World's Source for Fashion – and More!

i4HiFashion

i4HiFashionDB

New Business Requirements

- Learn from history

- Ask new kinds of questions

- Ensure intelligent security

★ Know who did what and when

55

Power Systems   IBM

Know Who Did What and When – DB2 Generated Columns

i4HiFashionDB

Business questions:

- When was this row last updated?

- Who did it?

- From which IP address?

56

Slide 57

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

57

Slide 58

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

  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----------'
```

58

Slide 59

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----------'
```

59

Slide 60

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.

60

The Power of Integration

Overview

---

i4HiFashion – Infrastructure Requirements

Operating an infrastructure means

- Monitoring performance easily

- Learning from (performance) history

- Identifying top resource consumers

- Access from anywhere

Slide 63

i4HiFashion – Productivity Requirements

i4HiFashion

IBM i Access Client Solutions

File Edit Actions Tools Help

- Welcome

System: ut30p08.rch.stglabs.ibm.com

General
- Data Transfer
- 5250 Emulator
- Navigator for i
- Printer Output

Database
- Run SQL Scripts
- SQL Performance Center

Productivity means

- Mobile, Web, Windows & Linux devices

- Quick answers with SQL Scripts

- Managing Availability – BRMS & PowerHA

- Live Data Dashboards – DB2 WebQuery

63

Slide 64

i4HiFashion – Application Development Requirements

i4HiFashion

RPG

source open library

git php python Orion JS

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

64

Slide 1

IBM

i4HiFashion – Additional Infrastructure Function from IBM i 7.3

i4HiFashion
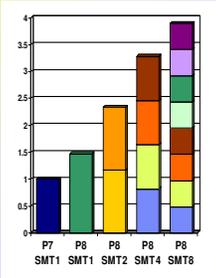
Maximum use of system resources

- Large POWER8 capacity

- Latest Storage Options

- Latest I/O Virtualization capabilities

- Increase system limits

© 2016 IBM Corporation

65

Slide 2

IBM

i4HiFashion – Additional Integrated Enhancements in IBM i 7.3

i4HiFashion

Key Integrated Technologies enhanced

- IFS

- NetServer

- Networking – Security Auditing

- Save/Restore and Related

© 2016 IBM Corporation

66

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

http://developerworks/ibmi/techupdates/i73

Power Systems — IBM

You and i *IBM i Trends and Strategies*

Previous Post | See All Posts

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.

By Steve Will

Tweet

SHARE

RSS

Recent Posts

IBM i 7.3 Announcement
04/12/2016

Signs and Portents for IBM i Announcements

i for Business

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

- Simplifying Insight
- Intelligent Security
- The Power of Integration

http://www.ibmsystemsmag.com/Blogs/You-and-i/

© 2016 IBM Corporation   69

Power Systems — IBM

The Power of Integration

Details

© 2016 IBM Corporation   70
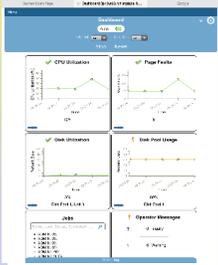
Slide 71

i4HiFashion – Infrastructure Requirements

i4HiFashion

Operating an infrastructure means

- Monitoring performance easily

- Learning from (performance) history

- Identifying top resource consumers

- Access from anywhere

71

Slide 72

Visualize Performance Metrics in Navigator

Navigator

- Monitor Performance Metrics

- Set Thresholds to take actions

- Visualize the collected results

- View Many Metrics at Once

72

36

Slide 1: **Monitor Your System– Visualize Performance Metrics in Navigator**

Navigator – Historical View

- Click to see the top resource consumers for a data point.

- View detailed information about each of the top consumers.

- Use property information details to get advanced information about the selected top consumer.

Slide 2: **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

Slide 77 (left):

Power Systems — IBM

i4HiFashion – Productivity Requirements

i4HiFashion

IBM i Access Client Solutions
File Edit Actions Tools Help

- Welcome
- System: ut30p08.rch.stglabs.ibm.com
- General
  - Data Transfer
  - 5250 Emulator
  - Navigator for i
  - Printer Output
- Database
  - Run SQL Scripts
  - SQL Performance Center

Productivity means

- Mobile, Web, Windows & Linux devices

- Quick answers with SQL Scripts

- Managing Availability – BRMS & PowerHA

- Live Data Dashboards – DB2 WebQuery

© 2016 IBM Corporation   77

Slide 78 (right):

Power Systems — IBM

iAccess for Windows

- Only Windows
- Difficult to install
- Worse to Manage
- No Windows 10

Navigator

iAccess Mobile

Access Client Solutions

Application Runtime Expert

- Supports Todays Devices
- Simple Install & Mgmt
- Improved Function

DB2 SQL

Mac

© 2016 IBM Corporation   78

Manage and Access your System

Windows 10

Access Client Solution – 5733XJ1

• Run SQL Scripts

• SQL Performance Center

• Direct Connect to Navigator

• Improved 5250 Emulator

• Full Windows 10 Support
  • Plus Mac & Linux
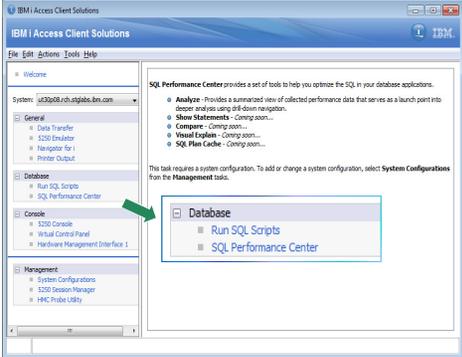
© 2016 IBM Corporation

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

Contact IBM
Call IBM Support Line:
1-800-IBM-SERV (1-800-426-7378)
Inside the US

→ IBM Software Support Guide
Outside the US

→ IBM Support Service Requests
Manage incidents electronically with IBM support

Browse Power Systems
Hardware   Solutions
Operating systems   Migrate to Power
System software   Advantages

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

© 2016 IBM Corporation   80

40

Slide 81

IBM

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 Runtime Single Location
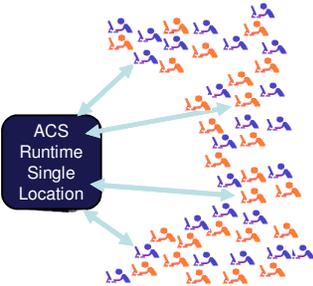
© 2016 IBM Corporation   81

Slide 82

IBM

ACS & Navigator

No extra sign-on!

IBM i Access Client Solutions

Welcome to the IBM Navigator for i

IBM Navigator for i provides an easy to use interface for the web-enabled IBM i management tasks, including all previous IBM i Navigator tasks on the web, and 2001 port tasks.

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

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

IBM i Tasks Page

© 2016 IBM Corporation   82

41

ACS & Navigator

Power Systems

IBM

No extra sign-on!

© 2016 IBM Corporation

83

Work with Your Data

Power Systems

IBM

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

© 2016 IBM Corporation

Slide 1

Work with Your Data – SQL Performance Center

Navigator and ACS Working together

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

Slide 2

Work with Your Data – SQL Performance Center

Work with LARGE amounts of data with amazing speed
Dig into the details of your SQL Performance

DB2 for i – Enhancements delivered via DB2 PTF Groups

7.2 – TR2   7.2 – TR3   7.2 – TR4
                            7.3 – GA

2015   2016

SF99702   SF99702   SF99702
Level 5   Level 9   Level 11
                           SF99703
                           Level 1

TR2-timed Enhancements
• Create OR REPLACE table
• JSON – DB2 Store Technology Preview
• SQE Performance improvements
• And more…

TR3-timed Enhancements
• LIMIT and OFFSET
• Guardium V10 and other database security monitoring enhancements
• SQE Performance improvements
• More IBM i Services
• New SQL built-in functions
• Enhancements for SAP on i clients

TR4-timed Enhancements
• Inlined UDTFs
• Trigger (re)deployment
• More IBM i Services
• New DB2 built-in Global Variables
• Enhanced SQL Scalar functions
• Guardium on i enhancement
• Evaluation option for DB2 SMP & DB2 Multisystem

Enhancements in 7.3:
• Temporal Tables
• Generated columns for auditing
• New OLAP built-ins
• Raised architecture limits
• New support for partitioned tables
• More IBM i Services
• All TR-timed enhancements

www.ibm.com/developerworks/ibmi/techupdates/db2

© 2016 IBM Corporation   87

IBM i Services for SQL users

7.2 – TR1   7.2 – TR2   7.2 – TR3   7.2 – TR4
                                       7.3 – GA
             2015   2016

Services in 2014:
• JOURNAL_INFO
• LIBRARY_LIST_INFO
• REPLY_LIST_INFO
• JOBLOG_INFO()
• SYSTMPSTG (7.2)
• DB2 for i built-in Global Variables (7.2)
• JOB_NAME (7.2)
• SERVER_MODE_JOB_NAME (7.2)
• SYSTOOLS.GROUP_PTF_CURRENCY

Services in 2Q/2015:
• ACTIVE_JOB_INFO()
• SCHEDULED_JOB_INFO
• SERVER_SBS_ROUTING
• SET_SERVER_SBS_ROUTING()
• DRDA_AUTHENTICATION_ENTRY_INFO
• JVM_INFO
• SET_JVM()

Services in 4Q/2015:
• MEMORY_POOL_INFO
• SYSTEM_STATUS_INFO
• LICENSE_INFO
• OBJECT_LOCK_INFO
• RECORD_LOCK_INFO
• OUTPUT_QUEUE_ENTRIES
• MEDIA_LIBRARY_INFO
• NETSTAT_INFO
• NETSTAT_JOB_INFO
• NETSTAT_INTERFACE_INFO
• NETSTAT_ROUTE_INFO
• SYSTOOLS.GROUP_PTF_DETAILS

Services in 2Q/2016:
• OUTPUT_QUEUE_INFO
• ENVIRONMENT_VARIABLE_INFO
• SERVICES_INFO
• Services & SQL dependency management
• Enhanced NETSTAT services
• Enhanced SET_SERVER_SBS_ROUTING()
• Enhanced System Limits
• Enhanced DISPLAY_JOURNAL()
• Enhanced OBJECT_STATISTICS (7.3 only)

http://ibm.biz/DB2foriServices

© 2016 IBM Corporation   88

44

04/26/2016

Power Systems   IBM

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
  o IFS lists supported
  o Movement back and forth between SSD & HDD tiers
  o I-ASP support
  o Including help text

© 2016 IBM Corporation   89

Power Systems   IBM

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.

© 2016 IBM Corporation   90

45

Slide 91

Power Systems   IBM

Leveraging SSDs and IASPs with BRMS Migration
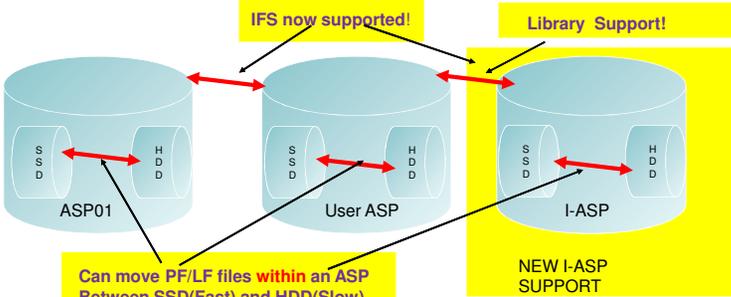
IFS now supported!

Library Support!

```
ASP01          User ASP          I-ASP
[SSD]-[HDD]   [SSD]-[HDD]       [SSD]-[HDD]
```

NEW I-ASP SUPPORT

Can move PF/LF files within an ASP Between SSD(Fast) and HDD(Slow)

© 2016 IBM Corporation   91

Slide 92

Power Systems   IBM

BRMS 7.3 Enhancements

Back Up
Restore

- BRMS Web Client
  - Multi-task navigational tree added to the main panel
  - Key panels converted to Dojo
  - Improved backup list editing (sorting)
  - Improved Include panel selection on "ok"
  - Newer infrastructure support(Liberty)

- BRMS Server
  - Modernization of Storage Tiering using BRMS Migration
    - o IFS lists supported
    - o SSD <→ HDD support
    - o I-ASP support
    - o Including help text
  - PRTRPTBRM FROMSYS support w/help text
  - INZBRM network checker options w/help text
  - CHGMEDBRM movement support of 1 volume with help text.
  - SAVBRM now supports Pattern parameter

© 2016 IBM Corporation   92

Slide 93

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

93

Slide 94

PowerHA for i – Reduced time for Vary On of IASP

- Initially an IASP vary on performance enhancement effort
  – Reduce abnormal IASP vary on time and minimize variability
  – Most performance enhancements apply to abnormal IPL
  – Some enhancements also reduce normal IPL and vary on time
  – Focus on DB Access Path Recovery, Journal Synchronization, Journal Recovery steps

- Normal vs. abnormal IPL and IASP vary on
  – Abnormal IPL is an unexpected termination, should be rare
  – Abnormal IASP vary on is common, could be daily
    o FlashCopy or detach of a mirror copy in an active environment (Even if jobs are stopped, quiesced, or restricted state)

- All improvements are in 7.3 base IBM i
- 7.1 and 7.2 improvements in latest cum and DB PTF Group

- "Faster IASP vary on" document on developerWorks site

94

Slide 95

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."

NEW !!

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

© 2016 IBM Corporation   95

Slide 96

DB2 Web Query Web Query Version 2.1.1

- Geographical Mapping Capabilities
  - Associate data with points on the map

- Jump Start Reports and Dashboards with *Wizard Analytics*
  - Create meta data and 20-30 sample reports and dashboards in minutes
  - Use created reports as templates for others
  - Meta Data Wizard over DB2 data; Upload Wizard for spreadsheet/flatfiles
    - See Video Demos at https://ibm.biz/DB2WQWizards

- Many Additional Enhancements
  - Leverage DB2 SQL or User Defined Functions in virtual fields
  - Control library lists dynamically or build audit exit program with *Run Time Environments*
  - Create drill downs within personal dashboards
  - Send URL link to recently run reports via email

© 2016 IBM Corporation   96

Slide 97

Power Systems   IBM

Take Reports and Dashboards Mobile with DB2 Web Query

- Ease of Development
  - Build Reports once, deploy anywhere
  - Dynamic detection of the device
    - Converts to "mobile"
    - Renders appropriate content for the device
- Ease of Use
  - Gesturing & screen rotation
  - Embedded analysis and visualization
  - Offline interactivity

- Automate Report Distribution
  - Mobile Faves app for syncing reports with server and organizing mobile reports for Apple/Android Devices
  - Execute reports from job scheduler and route via email

© 2016 IBM Corporation   97

Slide 98

Power Systems   IBM

DB2 Web Query Update: Version 2.2   NEW !!

- **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

© 2016 IBM Corporation   98

Slide 99

Power Systems — IBM

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 !!

- **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

© 2016 IBM Corporation

99

Slide 100

Power Systems — IBM

Links

- DB2 Web Query for i Marketing Website
  - ibm.biz/db2webqueryi

- DB2 Web Query for i Wiki
  - ibm.co/db2wqwiki

- DB2 Web Query Getting Started Enablement
  - https://ibm.biz/db2wqconsulting

- DataMigrator Info
  - https://ibm.biz/DB2WQDATAMIGRATOR

- Video Demonstrations
  - Wizards: https://ibm.biz/DB2WQWizards
  - End User: https://ibm.biz/db2wqreportingdemos
  - Getting Started: https://ibm.biz/db2wqgettingstarteddemos

- Or reach out to the DB2 Web Query team at QU2@us.ibm.com

© 2016 IBM Corporation

100

50

Slide 101

Power Systems   IBM

DB2 Web Query Update: Version 2.2

NEW !! For 7.3

DB2 Web Query (5733-WQx) enhancements!
- New Version 2.2 : Required for IBM i 7.3!!

Expands Heterogeneous database access
- Support for MySQL, Postgres, or generic JDBC Driver

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 - new Mobile Layout canvas and enhancements
  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

© 2016 IBM Corporation   101

Slide 102

Power Systems   IBM

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
  - Both Journal Receivers and SQL processes
- Data transforms, data profiling, job scheduling built in

NEW !!

NEW with V2.2
- Support for MySQL, Postgres, or generic JDBC for others (e.g., Oracle)

Why?
- Consolidate data from multiple systems/databases
- Isolate and optimize analytics workloads from production systems
- Cleanse and transform data for accurate, speed

> 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

© 2016 IBM Corporation   102

Slide 103

Power Systems — IBM

i4HiFashion – Application Development Requirements

i4HiFashion

RPG

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

© 2016 IBM Corporation   103

Slide 104

Power Systems — IBM

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!

Transformation

© 2016 IBM Corporation   104

Slide 1

RPG IV - A Modern Business Language

Free format C specs

– 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

```
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;
```

105

Slide 2

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.

106

Slide 107

Open Source for IBM i

- Recently created LPO – Open Source for IBM i 5733-OPS

- What we have added
  - Option 1 – Node.JS 1.x
  - Option 2 – Python 3.x
  - Option 3 – GCC & CHROOT
  - Option 4 – Python 2.7
  - Option 5 – Node.JS 4.x
  - Option 6 – git
  - Option 7 – Tools (.zip, .unzip, bash)
  - Option 8 - Orion

- Continue to Partner for other key technologies
  - **Zend** latest PHP version and updates
 - **PowerRuby** latest Ruby on Rails support for i

107

Slide 108

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

108
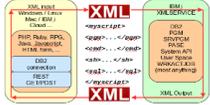
Python

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

109

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

110

Slide 111

Power Systems   IBM

Open Source – GCC & GNU Compiler Collection

- This is the environment that the 'open source developer' uses to do their job
- IBM i User community now has the tools and environment needed to create applications using open source technologies

• autoconf	• gcc-gfortranm	• libssh2	• readline
• automake	• gcc-'	• libstdc++	• sed
• rpm.rte	• gdb'	• libtool	• tar
• wget	• gmp'	• m4	• unzip
• bash	• grep'	• make	• wget
• binutils	• gzip'	• mpfr	• xz
• bison	• info-'	• nedit	• xz-libs
• bzip2	• libgcc	• openldap	• xz-lzma
• curl	• libgomp	• openssl	• zip-3.0
• expat-m	• libiconv	• p7zip	• zlib-1.2.4
• gcc-c++	• libidn	• pcre	• bash-4.3
• gcc-cpp	• libmpc	• perl	
	• libsigsegv	• python-libs	
		• python-2.6.8-1	

© 2016 IBM Corporation   111

Slide 112

Power Systems   IBM

Zend Server

- New UI
  - Cleaner
  - More modern
- Z-Ray for IBM i
  - Z-Ray extensibility: create your own Z-Ray extensions
  - Z-Ray Live! - insight on non-browser based requests, such as mobile client requests and APIs/web services
- URL Insights: details on the slowest, poorest performing, and most popular URLs on your website
- Faster runtime engine!
- Run parallel with older versions

© 2016 IBM Corporation   112

04/26/2016

Slide 113

Power Systems IBM

Development tools….

Tried and True, Yes but also SLOW, OLD, No new features

© 2016 IBM Corporation

113

Slide 114

Power Systems IBM

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
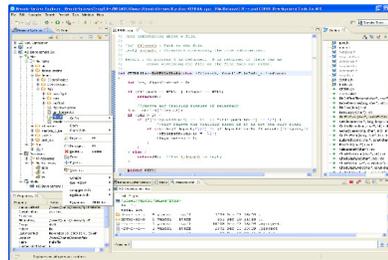
© 2016 IBM Corporation

114

57

Slide 1

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

RPG ➕

115

Slide 2

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

116

Slide 119

Power Systems — IBM

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

© 2016 IBM Corporation

119

Slide 120

Power Systems — IBM

POWER8 Multi-threading Options

POWER8

•**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"
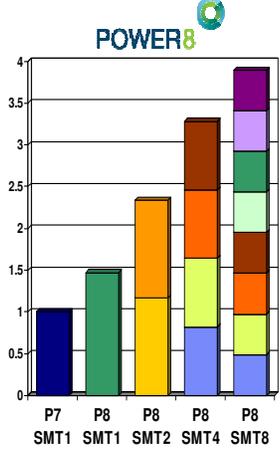
© 2016 IBM Corporation

120

Power Systems   IBM

Storage Configurations – New since IBM i 7.2
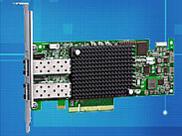
FlashSystem Attach

Native and VIOS NPIV attachment of FlashSystem

Support for SVC HyperSwap

IBM i 16 Gb FC direct attach

Support for SVC configs, including Storwize products

Native attachment for 16 Gb FC direct attach configs

© 2016 IBM Corporation   121

Power Systems   IBM

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

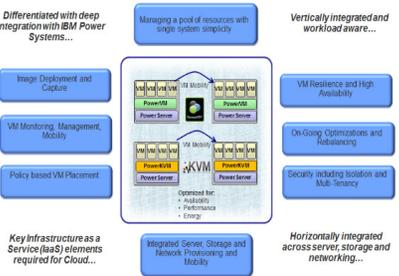© 2016 IBM Corporation   122

Slide 123

IBM

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

Differentiated with deep integration with IBM Power Systems...

Managing a pool of resources with single system simplicity

Vertically integrated and workload aware...

Image Deployment and Capture

VM Resilience and High Availability

VM Monitoring, Management, Mobility

On-Going Optimizations and Rebalancing

Policy based VM Placement

Security including Isolation and Multi-Tenancy

Optimized for:
- Availability
- Performance
- Energy

Key Infrastructure as a Service (IaaS) elements required for Cloud...

Integrated Server, Storage and Network Provisioning and Mobility

Horizontally integrated across server, storage and networking...

© 2016 IBM Corporation

123

Slide 124

IBM

PowerVC for i Latest Enhancements

Virtualization Management with PowerVC

Virtualization Management → PowerVC
- Management solution for PowerVM
- Virtual Image Management and Deployment
- Resource Pooling and Dynamic VM Placement
- On-going optimization and VM resilience

openstack

- **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

© 2016 IBM Corporation

124

Power Systems — IBM

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

© 2016 IBM Corporation

125

Power Systems — IBM

i4HiFashion – Additional Integrated Enhancements in IBM i 7.3

i4HiFashion

Key Integrated Technologies enhanced

- IFS

- NetServer

- Networking – Security Auditing

- Save/Restore and Related

© 2016 IBM Corporation

126

Slide 127

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
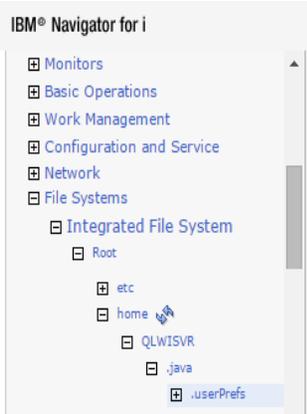
IBM® Navigator for i

- ⊞ Monitors
- ⊞ Basic Operations
- ⊞ Work Management
- ⊞ Configuration and Service
- ⊞ Network
- ⊟ File Systems
  - ⊟ Integrated File System
    - ⊟ Root
      - ⊞ etc
      - ⊟ home
        - ⊟ QLWISVR
          - ⊟ .java
            - ⊞ .userPrefs

127

Slide 128

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

128

Slide 1
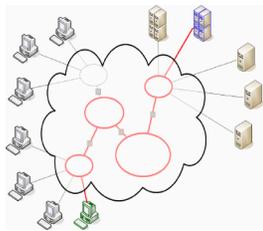
IBM i 7.3 Networking Enhancements

Security

- Network Auditing Enhancements (New QAUDLVL values)
  - *NETTELSVR
    - o Generate audit records for Telnet Server TCP connections.
  - *NETUDP
    - o Generate audit records for inbound and outbound UDP packets.
  - *NETSECURE
    - o Generate audit records for successful and failed System SSL handshakes.
    - o Generate audit records for successful VPN negotiations.
    - o 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

129

Slide 2

IBM i 7.3 Networking Enhancements

Currency

- Quality of Service (QoS) IPv6 support
- IPv6 Neighbor Discovery Ping to provide an IPv6 low-level reachability test. (NDPING)
- DNS BIND refreshes to version 9.10.2

Usability, Stability and Performance

- Host Table merge enhancements (CPYTCPHT/MRGTCPHT)
- Sorting enhancements for WRKSMTPEMM
- Many improvements of usability, stability and performance have been done for SMTP
- NTP improves the time synchronization accuracy

130

Slide 131

Operations Enhancements

- DUPOPT of IPL-capable media
  - Enables duplicating an existing IPL-capable DVD or distributed media image to RDX or flash media

- Save/Restore Enhancements
  - Recover authorization list links for objects in QSYS
  - Better performance restoring one object from a large back-up
  - GO SAVE menu enhancements

© 2016 IBM Corporation   131

Slide 132

Power Systems   IBM

IBM ▾   IBM Knowledge Center

🔍 Search

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

Table of Contents

↑ Back to all products
↑ IBM i
IBM i 7.3

Welcome
▸ About IBM i information
▸ Availability
▸ Basic system operations
▸ Blade and System x
▸ Connecting to your system

My Collections

🔍 Search Results

IBM i 7.3 documentation

Welcome to the IBM® i 7.3 documentation, where you can find in

Getting started
IBM i overview and what's new
Basic system operations
Memo to users
Frequently asked questions

Common tasks
APIS
CL commands
DB2 for i SQL reference
ILE RPG reference

© 2016 IBM Corporation   132

http://developerworks/ibmi/techupdates/i73

http://www.ibmsystemsmag.com/Blogs/You-and-i/