

Sponsors of International i-Power 2019



FALCONSTOR



Things Love about 7.4

Presented by

Steve Bradshaw

Technical Director

i-UG.co.uk (CommonUK)

Nearly time to start the presentation

But first a Disclaimer

- ▶ You may be used to seeing IBM Disclaimers



Trademarks & Disclaimers

© IBM Corporation 1994-2005. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

System i	IBM (logo)	OS/400
DB2 for iSeries	iSeries	AS/400
e (logo) business		iSeries
IBM		

Lotus, Freelance Graphics, and Word Pro are registered trademarks of Lotus Development Corporation and/or IBM Corporation. Domino is a trademark of Lotus Development Corporation and/or IBM Corporation.

C-bus is a trademark of Corollary, Inc. in the United States, other countries, or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

ActionMedia, LANDesk, MMX, Pentium and ProShare are trademarks of Intel Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

SET and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.

Other company, product and service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information in this presentation concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Some information in this presentation addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.

This is mine

- ▶ I tried ever so hard to get it right
- ▶ “*Opinions are like Arseholes - Everyone has them!*”
 - ▶ You are hearing mine, not Common’s, not the i-UGs, not IBM’s
 - ▶ My opinions are not necessarily right
 - ▶ But then again, neither are yours



You are the lucky ones!

IBM

IBM i has an Active, Passionate Community

IBM Systems Technical Events | ibm.com/training/events

17

- So far I have found 52 IBM i user groups
- I'm told there are many more.
- **Support your local IBM i User Group**

20

i nnovative
nsightful
ntegral

Health attributes added to SQL Plan Cache

Health attributes added to the SQL Plan Cache

This helps you to understand if your SQL is running efficiently

Additional SQL Plan Cache Health Properties

— SQL Plan Cache Properties

New fields to show plan cache efficiency (health) and potential issues

- Is my query environment volatile or being limited?
 1. Total Number of Plan Cache Autosizing Adjustments
 2. Last Plan Cache Autosizing Adjustment
 3. Plan Cache Size (Last Autosizing) Limited Due to Temporary Storage
 4. Total Plans Removed
 5. Number of Times Plan Cache Pruned
 6. Time Plan Cache was Last Pruned
- Do I have an issue with excessive bad data (mapping errors) in my environment?
 7. Number of Query Mapping Errors Since Start

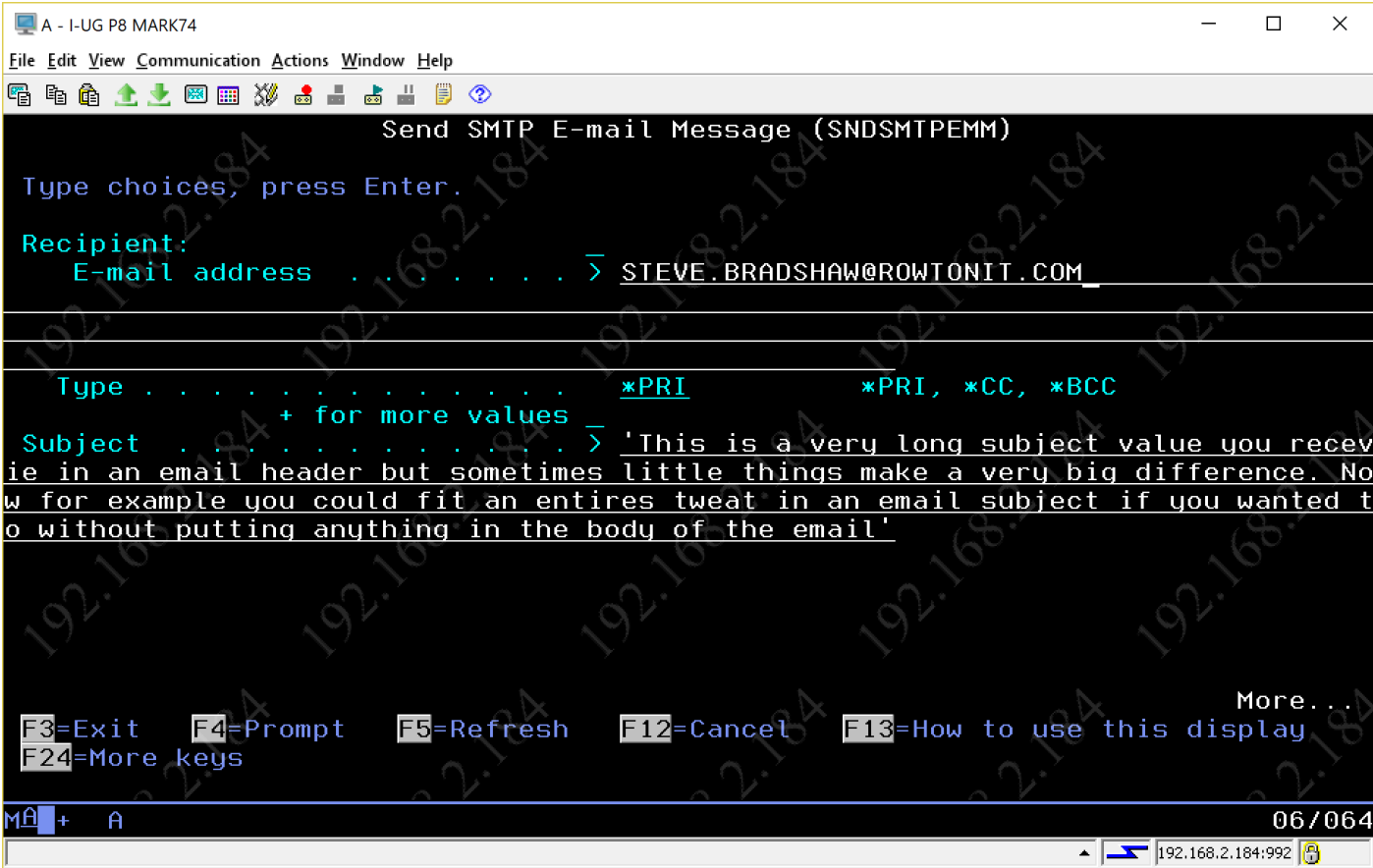
Description	Value	Value Unit
Active Query Summary		
Number of Currently Active Queries	71	
Number of Queries Run Since Start	1336	
Number of Query Full Opens Since Start	982	
Plan Usage Summary		
Current Number of Plans in Cache	349	
Total Number of Plans Built Since Start	395	
Total Number of Unique Queries Since Start	295	
Current Plan Cache Size	23	MB
Current Plan Cache Size Threshold	*AUTO	
Maximum Plan Cache Size For AutoSizing	*DEFAULT (24576)	MB
Current Plan Cache Hit Ratio	60	%
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)	%
Total Number of Plan Cache Autosizing Adjustments	0	
Last Plan Cache AutoSizing Adjustment	0000-00-00-00.00.000000	
Last Autosizing Limited Due to Temporary Storage	0000-00-00-00.00.000000	
Current Number of Job Scoped (QTEMP) Plans	21	
Total Number of Job Scoped (QTEMP) Plans Built Since Start	38	
Total Number of Unique Queries With Job Scoped (QTEMP) ...	7	
Total Times Plans Used from Cache	505	
Total Plans Removed	18	
Total Plans Pruned	0	
Number of Times Plan Cache Pruned	0	
Time Plan Cache was Last Pruned	0000-00-00-00.00.000000	
Current Number of Temporary Runtime Objects Stored in Cache	238	
Current Total Size of Temporary Runtime Objects stored in ...	15	MB
Maximum Number of Temporary Runtime Objects Stored Pe...	*DEFAULT (5)	
Total Number of Temporary Indexes Created	7	
Current Number of Temporary Indexes	4	
Number of Plans Rebuilt due to AQP	0	
Number of Query Mapping Errors Since Start	0	
Plan Cache Configuration		
Current Plan Cache Size Threshold	*AUTO	
Maximum Plan Cache Size For AutoSizing	*DEFAULT (24576)	MB
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)	%
Maximum Number of Longest Runs Allowed Per Plan	*DEFAULT (3)	
Maximum Number of Temporary Runtime Objects Stored...	*DEFAULT (5)	

19

SMTP Email enhancements

SNDSMTPEMM has longer subject & note

Until 7.4 the limit of the subject was 60 characters, now 255
the limit of the email note was 400, now 5000



Sometimes even the smallest requests make a big difference
IBM i 7.4 only

Email distribution groups

New CL commands to manage SMTP distribution lists (mailing groups)

Create SMTP Dist List (CRTSDSTL)

Change SMTP Dist List (CHGSDSTL)

Delete SMTP Dist List (DLTSDSTL)

Display SMTP Dist List (DSPSDSTL)

Rename SMTP Dist List (RNMSDSTL)

Work with SMTP Dist List (WRKSDSTL)

Add SMTP Dist List Entry (ADDSDSTLE)

Remove SMTP Dist List Entry (RMVSDSTLE)

18

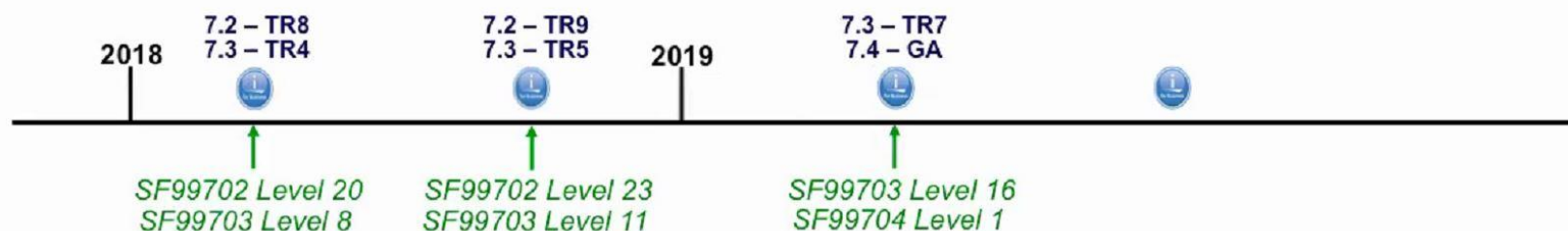
New IBM i Services

i nnovative
nsightful
ntegral

What are IBM i Services

- ▶ The new way to monitor and manage your system
- ▶ A replacement to API Programs based on standard SQL

IBM i Services – Timeline



Services in 4Q/2017:

- Syslog detail returned from DISPLAY_JOURNAL & HISTORY_LOG_INFO
- ASP_INFO
- ASP_VARY_INFO
- JOB_QUEUE_INFO
- STACK_INFO
- And more...

Services in 3Q/2018:

- JOB_DESCRIPTION_INFO
- ACTIVE_JOB_INFO enhancements
- NETSTAT_INFO & NETSTAT_JOB_INFO enhancements
- And more...

Services in 2Q/2019:

- DATA_AREA_INFO
- ASP_JOB_INFO
- MESSAGE_FILE_DATA
- SYSTOOLS.FIRMWARE_CURRENCY
- SYSTOOLS.SPLIT
- SYSTOOLS.SPOOLED_FILE_DATA
- IBM i 7.4 only services
- And many enhanced services

<http://ibm.biz/Db2foriServices>

IBM i Service for Message Queues

```
1  --
2  -- Review messages sent to the system operator message queue
3  -- with license expiration details
4  --
5  select message_text, M.*
6  from Qsys2.Message_Queue_Info M
7  where Message_Queue_Name = 'QSYSOPR'
8  and message_text like '%exceeded%';
```

MESSAGE_TEXT	MESSAGE_QUEUE_LIBRARY	MESSAGE_QUEUE_NAME	MESSAGE_ID
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
Usage limit of 0 exceeded. Grace period expires in 69 days on 14/08/19.	QSYS	QSYSOPR	CPF9E72
IBM i usage limit exceeded - operator action required.	QSYS	QSYSOPR	CPF9E7F
IBM i usage limit exceeded - operator action required.	QSYS	QSYSOPR	CPF9E7F
IBM i usage limit exceeded - operator action required.	QSYS	QSYSOPR	CPF9E7F

Oops, someone forgot to enter the keys!

IBM i Service for Spool Files

```
1  --
2  -- Find the top 5 consumers of SPOOL storage.
3  --
4  select user_name, sum(size) as total_spool_space,
5         varchar_format(sum(size), '999G999G999G999G999')
6         as total_spool_space_formatted
7  from qsys2.output_queue_entries_basic
8  where user_name in (select user_name
9                      from qsys2.user_info
10                     where user_creator <> '*IBM')
11  group by user_name
12  order by total_spool_space desc
13  limit 5;
```

USER_NAME	TOTAL_SPOOL_SPACE	TOTAL_SPOOL_SPACE_FORMATTED
STEVE	41704	41,704
GSTREET	6416	6,416
QIJS	540	540
ROWTON	308	308
RUDI	36	36

Answers delivered in less than a second!

This service PTF'd back to IBM i 7.3 other OUTQ services go back to 7.2

Why are IBM i Services better?

DSPUSRPRF output for users with *ALLOBJ show below

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

IBM i Service Output for the same question – Notice the extra user!

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

Note: User SURPRISE does not have *ALLOBJ specified in its own parameters, so does not show up on the PRTUSRPRF

That doesn't stop this user from having full access to every object on the system!

This service is not new to 7.4 but it shows how you can get a better answer

17

New Functions in ACS

New Functions in ACS

Not just for IBM i 7.4, ACS works back to 5.4

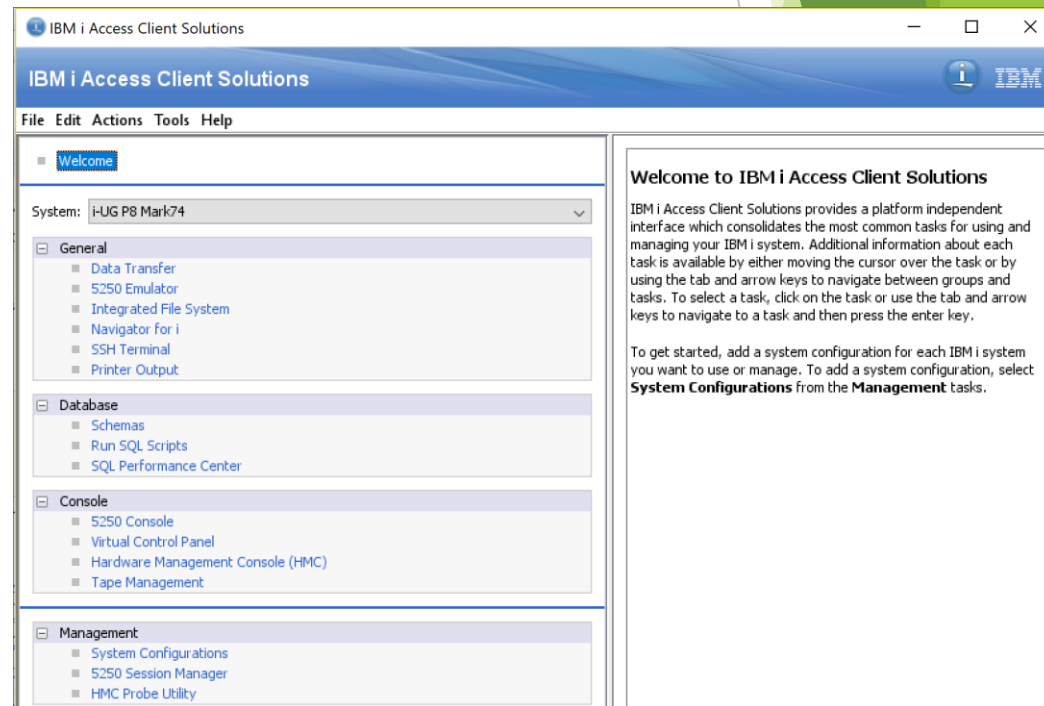
ACS runs in all flavours of Windows, MacOS & Linux

Centralised deployment and updating makes management easy

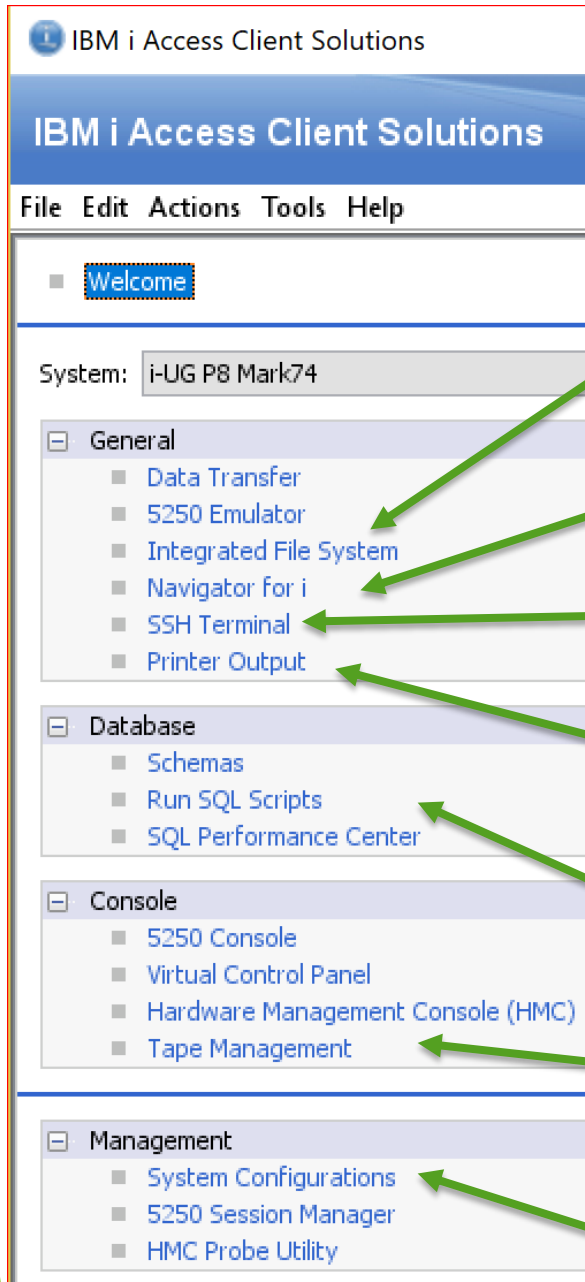
ACS makes configuring TLS Encryption as simple as ticking a box

New functions and faster functions

Best place to start is with IBM i Services, it includes 100's of examples



New Functions in ACS



Faster transfer rate, larger file support & filters to help you find a needle in an IFS haystack

Encryption aware link for ease of access to Nav4i

SSH Emulator Integration

New filters, better language and locale support & new download location options

Major overhaul of SQL interface. Now faster, more intuitive and has auto formatting.

Manage all of your estate not just IBM i HMC, SAN, SAN Switch, Tape Library, etc

Multi system admin view in Sys Config

16

R – Yet another new language for IBM i

Say Hello to R

No it's not the new name for RPG

R excels at statistical computing, data mining & data analysis

Ideal for real time integration with Google Docs



Available on IBM i 7.3, you will have to check 7.2 support

15

Native IBM i ODBC Driver

Native IBM i ODBC Driver

This is not a connector to access your IBM i data from a PC

It is a connector used in IBM i to access other databases

i.e. You write a program on your IBM i to go read data
from a Windows / Linux / IBM i / z based database



Available on IBM i 7.3, you will have to check 7.2 support

14

Workload Capping by Job Description

Workload Capping by JobD

If you don't know what sub capacity licensing is,
then lucky you, chances are you don't use it.

If you use IBM products like MQ, Domino, WebQuery
then you should, as you are charged more for every core.

Workload Capping means that you limit the amount
of processing power a particular job or subsystem uses

Workload Capping saves money on license costs
e.g. you have 10 cores on your LPAR but just 1 used by MQ

Workload Capping by JobD

```
A - I-UG P8 MARK74
File Edit View Communication Actions Window Help
Create Job Description (CRTJOB)

Type choices, press Enter.

Job message queue maximum size      *SYSVAL      2-64, *SYSVAL
Job message queue full action      *SYSVAL      *SYSVAL, *NOWRAP, *WRAP...
CL syntax check                    *NOCHK       0-99, *NOCHK
End severity                        30          0-99
Inquiry message reply              *RQD         *RQD, *DFT, *SYSRPYL
Hold on job queue                  *NO          *NO, *YES
Job date                           *SYSVAL      Date, *SYSVAL
Job switches                        00000000     Character value
Device recovery action              *SYSVAL
Time slice end pool                *SYSVAL      *SYSVAL, *NONE, *BASE
Authority                          *LIBCRTAUT   Name, *LIBCRTAUT, *CHANGE...
Allow multiple threads              *NO          *NO, *YES
Spooled file action                 *SYSVAL      *SYSVAL, *KEEP, *DETACH
DDM conversation                    *KEEP        *KEEP, *DROP
Workload group                      *SBSD        Name, *SBSD, *NONE

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

MA + A 05/03/7
```

ProTip: You can also use this to limit the processor use of your regular IBM i jobs. Do you have one batch program or ODBC job that runs away with all of your processor?

By JOB is IBM i 7.4 only but capping by group available from 7.1

13

DB2 Web Query for i 2.2.1

i nnovative
nsightful
ntegral

DB2 Web Query for i

I love Query/400 BUT not all my users do!

If you have never tried Web Query - you should

If you tried v1.x and found it slow - try again at v2

It has been re-written, it's faster and easier to use

Don't know where to start - Use it for System Monitoring

Built-in EZinstall, literally a turnkey solution

The screenshot displays the DB2 Web Query for i web application. The interface includes a navigation pane on the left with categories like Repository, Common, IBM Db2 Web Query Information, and IBM i Administration Samples. The main content area shows a 'PTF Group - Currency Report' table. The table has columns for Status, PTF Group ID, PTF Group Name, Installed Level, Level Available, and Date of last IBM Update. A red box highlights the 'UPDATE AVAILABLE' status for the 'Db2 Web Query for i V2.2.1' group. A green box highlights the 'INSTALLED LEVEL IS CURRENT' status for the 'RELATED GROUP'. The table lists various PTFs and their details. The bottom of the screen shows the date and time: 13 January, 2019 at 10.08.56.

Status	PTF Group ID	PTF Group Name	Installed Level	Level Available	Date of last IBM Update
UPDATE AVAILABLE	SF99433	Db2 Web Query for i V2.2.1	4	5	2018/12/23
	SF99727	Technology Refresh	4	5	2018/09/13
	SF99730	Current Cumulative PTF Media Documentation	16299	16242	2018/09/14
	SF99859	IBM MQ for IBM i - v7.1.0/V8.0.0/V9.0.0/V9.1.0	3	15	2018/12/20
RELATED GROUP INSTALLED LEVEL IS CURRENT	SF99333	DB2 Web Query for i V2.2.0	5	5	2018/05/13
	SF99225	IBM Open Source Solutions for i	6	6	2017/11/06
	SF99252	Content Manager OnDemand for i - 5770-RD1 7.3	10	10	2018/10/15
	SF99581	WebSphere App Server V8.5	6	6	2018/08/17
	SF99703	DB2 for IBM i	12	12	2018/09/25
	SF99722	IBM HTTP Server for i	17	17	2018/12/27
	SF99723	Performance Tools	4	4	2017/10/25
	SF99724	Backup Recovery Solutions	25	25	2019/01/02
	SF99725	Java	11	11	2018/12/18
	SF99726	Group Security	38	38	2019/01/08
	SF99729	Group Hiper	75	75	2019/01/08
	SF99731	All PTF Groups except Cumulative PTF Package	11	11	2018/08/28
	SF99867	730 TCP/IP PTF	1	1	2018/06/21
	SF99875	Hardware and Related PTFs	15	15	2018/06/01
SF99876	High Availability for IBM i	7	7	2018/09/14	

EZinstaller upgrade & PTFs available back to IBM i 7.1 (needs Java8)

DB2 Web Query for i

Note From WebQuery 2.2 onwards:

You can now move your reporting back to IBM i

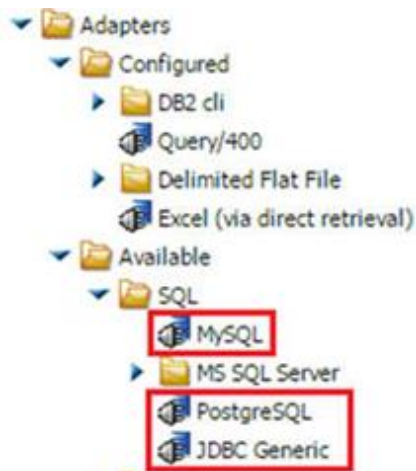
Not just for DB2 for i data but for your entire system

DB2 Web Query Database connectors allow you to

Pull in data from other databases and report on them

No longer do you need to export your IBM i data

Now you can pull data from MS SQL server, PostgreSQL and more



12

Improved DST/SST Security

Improved SST User Security

Make your SST Passwords more secure

Manage them from IBM i (not just from within SST)

Service tools user ID and password enhancements - IBM i 7.4

Service tools security options now support service tools user ID password composition rules like those allowed for operating system user profile passwords. The following password composition rules are configured for service tools user IDs:

Limit profile name	Limit digit last position
Hours to block password change	Minimum letters
Minimum password length	Maximum letters
Maximum password length	Limit adjacent letters
Use chars from three groups	Limit letter first position
Limit adjacent characters	Limit letter last position
Limit repeating characters	Number of mixed case letters
Limit characters same position	Minimum special characters
Minimum digits	Maximum special characters
Maximum digits	Limit adjacent special chars
Limit adjacent digits	Limit special char first position
Limit digit first position	Limit special char last position

Service tools password composition rules are configured using DST, SST, or the new SST Security Attribute commands.

- Change SST Security Attributes (CHGSSTSECA)
- Display SST Security Attributes (DSPSSTSECA)

In addition to password rule attributes, the commands support the “service tools password level” attribute and the “allow security-related system values to be changed” attribute.

New commands were added for service tools user ID management. These commands configure the same SST privileges managed through DST or SST.

- Create Service Tools User ID (CRTSSTUSR)
- Change Service Tools User ID (CHGSSTUSR)
- Delete Service Tools User ID (DLTSSTUSR)

Refer to the [Service Tools](#) topic in IBM Knowledge Center for more information.

11

Improved Searching of QHST

Improved Searching of QHST

No need to know job name & number

```
A - I-UG P8 MARK74
File Edit View Communication Actions Window Help

Display Log (DSPLOG)

Type choices, press Enter.

Additional Parameters

Jobs to display . . . . . > *ALL          Name, generic*, *NONE, *ALL
User . . . . . > ROWTON          Name, generic*, *ALL
Number . . . . .                000000-999999, *ALL
+ for more values

Message identifier . . . . . *ALL          Name, *ALL
+ for more values
Message identifier selection . . *INCLUDE    *INCLUDE, *OMIT

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

Bottom
08/037
```

DSPLOG JOB(ROWTON/*ALL)

Shows all entries for user Rowton

```
A - I-UG P8 MARK74
File Edit View Communication Actions Window Help

Display History Log Contents

Job 001405/ROWTON/QPADEV0001 started on 06/06/19 at 15:17:42 in subsystem QIN
Usage limit threshold exceeded for product 5770SS1.
System value QPWLVL changed from 0 to 2.
TCP/IP attributes of the CHGTCPDMN command changed by user ROWTON.
Job 001337/QTCP/QTSMTPSRVD was ended by user ROWTON.
Job 001347/QTCP/QTSMTPCLTD was ended by user ROWTON.
Job 001346/QTCP/QTSMSTMPD was ended by user ROWTON.
Job 001348/QTCP/QTSMSTMPD was ended by user ROWTON.
Job 001349/QTCP/QTSMSTMPD was ended by user ROWTON.
Internal distribution recipient index (*DRX) is being built again for user ID
PWRDWSYS command issued by user ROWTON and is being processed.
Job 001405/ROWTON/QPADEV0001 ended on 06/06/19 at 15:51:19; .249 seconds used
Job 001647/ROWTON/QPADEV0001 started on 06/06/19 at 15:55:13 in subsystem QIN
Session stopped by a request from device QPADEV0001.
Job 001647/ROWTON/QPADEV0001 ended on 06/06/19 at 16:06:54; .029 seconds used
Job 001682/ROWTON/QPADEV0001 started on 06/06/19 at 16:13:26 in subsystem QIN
38 objects restored.

More...

Press Enter to continue.

F3=Exit  F10=Display all  F12=Cancel

01/001
```


10

Improvements to RGZPFM

Improvements to RGZPFM



Reorganize While Active - Enhancement

- The Reorganize Physical File Member (RGZPFM) command includes:
 1. ALWCANCEL(*NO) – Data is offline, create a copy of the file
 2. ALWCANCEL(*YES) – Data is online, delete and insert rows

Problem: If RPG CHAIN is used, a single row can appear to be missing while it is being reorganized (delete/insert)

Enhancement: With IBM i 7.4, the delete/insert occurs as a conjoined operation. The row won't have a window where it does not exist.

The enhanced behavior applies automatically to any ALWCANCEL(*YES) use.

Note: Assumes that the file is not replicated by Db2 Mirror.

9

SMB v3 for Netserver

SMBv3 for Netserver

Protocol used to map a network drive to an IBM i
Used by Windows, MAC or Linux clients
Also used by /QNTC to access this clients

SMBv1 protocol has so many holes in it
it's only useful for draining pasta!

SMBv2 is not really up to standard.
Several implementations that don't always play nicely together

In short SMB is currently a mess.
Which is slightly worrying as it's how the WannaCry virus is spread

I have high hopes that SMBv3,
if we a lucky, it will plug security and work uniformly on all platforms

It's also faster, supporting larger read and write block sizes,
whilst still providing end to end encryption

8

i nnovative
nsightful
ntegral

New Exit Points on SBMJOB

New Exit Points on SBMJOB

QIBM_QWT_SBMJOB

Calls an exit program during SBMJOB,
before the job is placed on the job queue.

QIBM_QWT_CHGJOB

Calls an exit program
when CHGJOB command or API is used to change a job on a queue.

*ProTip: particularly useful on systems that submit a lot of jobs to batch
using multiple job queues. These exit points can be used to load balance.*

7

Digital Certificate Manager APIs

Digital Certificate Manager APIs

Taking control of your certificates

Digital Certificate Manager APIs

Digital Certificate Manager (DCM) APIs added to automate the management of certificates without using the DCM browser-based user interface. An application written using these APIs can renew a certificate residing in the system certificate store, update an application definition to use the renewed certificate, and update the trust list with the CA that issued the renewed certificate.

These three APIs provide Application Definition certificate assignment capabilities. An Application Definition, also known as Application ID, is created and maintained in DCM for use by System TLS based applications.

- Remove a certificate assignment from an application ([QycdRemoveCertUsage](#)).
- Add a certificate assignment to an application ([QycdUpdateCertUsage](#)).
- Retrieve information about the certificate currently assigned to an application ([QycdRetrieveCertUsageInfo](#)).

These three APIs provide Certificate Authority (CA) Trust List configuration capabilities. A CA Trust List is an optional configuration for Application Definitions. The list allows individual applications to trust a different set of CAs from other applications.

- Add a CA certificate to the CA certificate trust list ([QycdAddCACertTrust](#)).
- Remove a CA certificate from the CA certificate trust list ([QycdRemoveCACertTrust](#)).
- Check if CA certificate is in the CA certificate trust list ([QycdCheckCACertTrust](#)).

This API is used in a two-step process to renew an existing certificate residing in the system certificate store.

- Request a certificate renewal and import certificate into system store ([QycdRenewCertificate](#)).

With the first call, a CSR (Certificate Signing Request) is generated based on an existing certificate. After out of band processing of the CSR is complete, the second call imports the issued certificate into the system certificate store.

Refer to the IBM Knowledge Center documentation for [Digital Certificate Management APIs](#) for additional information.

6

Authority Collection

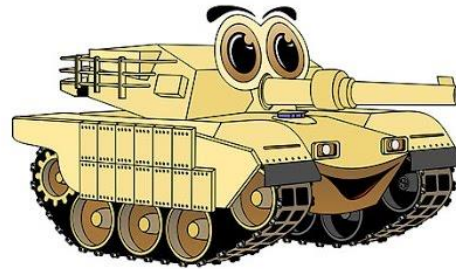
i nnovative
nsightful
ntegral

What is the problem?

IBM i is the most secure platform in the world right ?



=



Yes - but it has to be configured
and security has to be maintained

The million dollar question

How do you know what security you need?

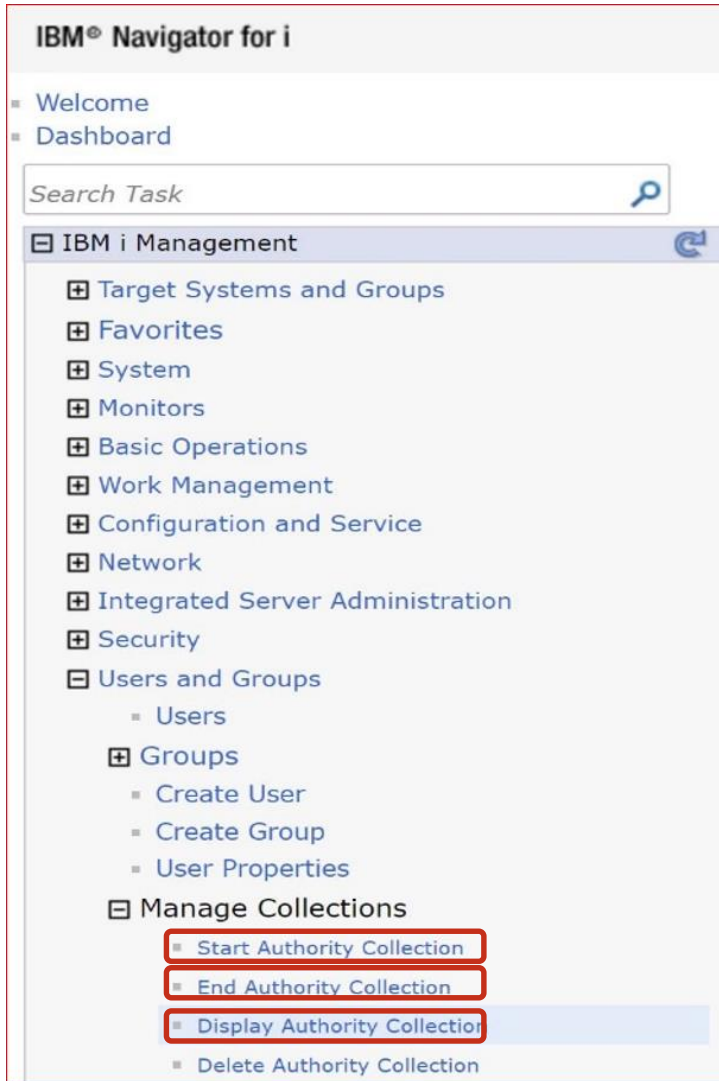


Answer = Authority Collection

Bonus Answer = It is Free!

Authority Collector

Three simple steps



1. Start Authority Collection
Enter Library and User
2. The user does their job
Authority Collector monitors their access to the objects in the library.
End monitor when ready to review.
3. Display the Collection Database
file is created showing what authority they have and what they actually needed

Authority Collection

Easier view of the results in Nav4i

IBM® Navigator for i

Welcome qsecofr Target system: 192.168.2.206 Help Logout

Welcome Dashboard Display Authority Collection Display Authority Collection - Rowton

Display Authority Collection - Rowton - 192.168.2.206

Actions Search

No filter applied

	System Object Name	System Object Library	System Object Type	Required Authority	Current Authority	Authority Source	Adopted Authority Source	Current Adopted Authority	Authority Check Successful	Check Any Authority
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	x
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE		*ALL	USER *ALLOBJ	ADOPTED *ALLOBJ	*ALL	x	
<input type="checkbox"/>	Wrkoutqs	RITMON	*FILE	*ALL	*ALL	USER *ALLOBJ	ADOPTED *ALLOBJ	*ALL	x	x
<input type="checkbox"/>	Ritmon	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Ritmon	RITMON	*FILE		*ALL	USER *ALLOBJ			x	x
<input type="checkbox"/>	Ritmon	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Ritmon	RITMON	*FILE	*USE	*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Ritmon	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Ritmon	RITMON	*FILE	*ALL	*ALL	USER *ALLOBJ			x	x
<input type="checkbox"/>	Rit005fm	RITMON	*FILE		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit003	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit003	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit005	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit005	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit002	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit002	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit004	RITMON	*PGM		*ALL	USER *ALLOBJ			x	
<input type="checkbox"/>	Rit004	RITMON	*PGM		*ALL	USER *ALLOBJ			x	

You can use the result file as input file to your own customer authority monitor / remediation tool

Functionality up to this point available in IBM i 7.3

Authority Collection by object

New in 7.4

Changes the focus of collection from a user to object(s)

Security Authority Collection for objects

Authority collection captures data that is associated with the runtime authority checking that is built into the IBM i system. This data is logged to a repository, and interfaces are available to display and analyze the data. A security administrator or application provider can analyze the captured data to determine the minimum authority that is required to the objects to allow the application to run successfully. Setting the minimum authority on the objects improves the security of the objects and provides for better protection from access outside of the application.

The enhanced IBM i 7.4 authority collection support allows the collection of authority information for specific objects when accessed by any user. The IBM i 7.3 support collects authority information for all objects accessed by a specific user.

New command:

- Change Authority Collection (CHGAUTCOL)

Updated interfaces:

- Start Authority Collection (STRAUTCOL)
- End Authority Collection (ENDAUTCOL)
- Delete Authority Collection (DLTAUTCOL)
- Display Security Attributes (DSPSECA) command and Retrieve Security Attributes (QSYRTVSA) API show the authority collection for objects active indicator.
- Interfaces that show object attributes now include the authority collection value for the object.

The authority collection value for an object can be set with the new Change Authority Collection (CHGAUTCOL) command. When authority collection for objects is started using the enhanced Start Authority Collection (STRAUTCOL) command, authority information is collected for the specific objects that have an authority collection value set. Authority information is collected for these objects when accessed by any user and is written to the authority collection repository for objects.

New SQL views have been added to display and analyze the authority collection data for objects:

- QSYS2.AUTHORITY_COLLECTION_OBJECT view - for QSYS objects; use this when the number of entries in the authority collection is large and you are looking for a specific object or objects in a specific library.
- QSYS2.AUTHORITY_COLLECTION_LIBRARIES view - for QSYS objects; use this when the number of entries in the authority collection is small or you are looking for all, or most, objects in the authority collection.
- QSYS2.AUTHORITY_COLLECTION_FSOBJ view - for file system objects in the "root" (/), QOpenSys, and user-defined file systems.
- QSYS2.AUTHORITY_COLLECTION_DLO view - for document and folder objects.

For complete details on the enhanced authority collection support, see the [Authority Collection section](#) of the Security reference topic in the IBM Knowledge Center.

Authority Collection by object

New in 7.4 – Integration with IBM i Services

IBM i Service	Type of Service	IBM i 7.4	IBM i 7.3	IBM i 7.2
Security Services				
QSYS2.AUTHORITY_COLLECTION	View		Base	-
QSYS2.AUTHORITY_COLLECTION_DLO	View	Base	-	-
QSYS2.AUTHORITY_COLLECTION_FSOBJ	View	Base	-	-
QSYS2.AUTHORITY_COLLECTION_LIBRARIES	View	Base	-	-
QSYS2.AUTHORITY_COLLECTION_OBJECT	View	Base	-	-

Simplifies the investigation of the Authority Collection data

A	B	C	D	E	F	G	H	I	J	K
AUTH_NAME	CHECK_TIMESTAMP	SYSTEM_OBJ	SCHEMA	TYPE	DETAILED_REQUIRED_AUTHORITY	CURRENT_AUTHORITY	JOB_NAME	JOB_USER	JOB_No	CURRENT_USER
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*READ	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OWNER *OBJEXIST *OBJMGT *OBJALTER *OBJREF *OBJOPR *READ *ADD *DLT *UPD *EXECUTE	*ALL	QPADEV0001	ROWTON	002317	ROWTON
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR *READ	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OWNER *OBJEXIST *OBJMGT *OBJALTER *OBJREF *OBJOPR *READ *ADD *DLT *UPD *EXECUTE	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OWNER *OBJEXIST *OBJMGT *OBJALTER *OBJREF *OBJOPR *READ *ADD *DLT *UPD *EXECUTE	*ALL	QPADEV0001	ROWTON	002317	ROWTON
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OWNER *OBJEXIST *OBJMGT *OBJALTER *OBJREF *OBJOPR *READ *ADD *DLT *UPD *EXECUTE	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
QSECOFR	2019-06-07 17:22:49.	IFSINFO2D	IFSINFO	*FILE	*OWNER *OBJEXIST *OBJMGT *OBJOPR *READ *ADD *DLT *UPD	*ALL	QPADEV0001	ROWTON	002317	QSECOFR
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON
ROWTON	2019-06-07 17:25:00.	IFSINFO2D	IFSINFO	*FILE	*OBJOPR	*ALL	QPADEV0001	ROWTON	002317	ROWTON

IBM i 7.4 only

5

Improved Encryption

Improved Encryption

7.4 IBM has added support for new ciphers

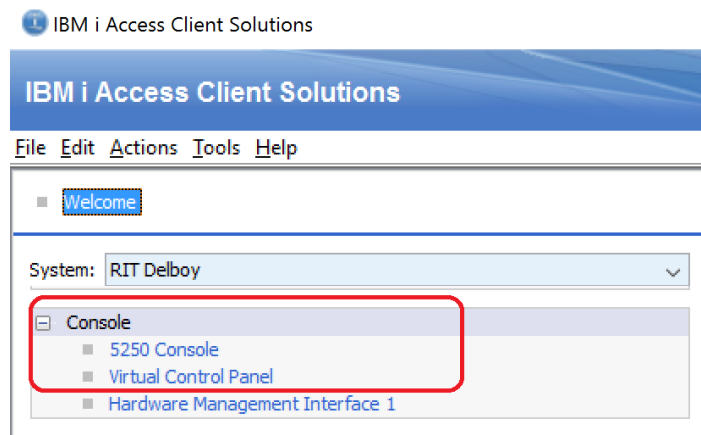
TLS 1.3 enabled by default

7.4 IBM has removed the older weaker ciphers

SSL 2.0, TLS 1.0, TLS 1.1, 3DES, CBC & RSA disabled by default

ProTip: This also applies to Ops Console

If you use Ethernet Ops console you will have to switch to the ACS client



Improved Encryption

Secure SNMPv3 Trap and Inform message support

The IBM i support for Simple Network Management Protocol version 3 (SNMPv3) has been enhanced in IBM i 7.4 with the ability to securely send SNMPv3 Trap and Inform messages. The IBM i local trap manager has also been enhanced with the ability to securely receive and forward SNMPv3 Trap and Inform messages. In addition, traps generated by 3rd party sub-agents can now be sent as SNMPv3 Traps or Informs without any changes to the sub-agent code.

The IBM i local trap manager can now be configured to start and end with the SNMP server using the Change SNMP Attributes (CHGSNMIPA) command. With this change, invocations of the Start Trap Manager (STRTRPMGR) and End Trap Manager can be eliminated from programs such as the system start up program. Also, the QIBM_QZCA_SNMPTRAP exit program associated with the IBM i local trap manager will now log received SNMPv3 traps and informs in addition to SNMPv1 traps to the configured data queue.

Refer to the IBM Knowledge Center command documentation for [Change SNMP Attributes \(CHGSNMIPA\)](#) for additional information.

NetServer and QNTC updated to SMB3

End to end data encryption for their entire
client / server conversations

Why should you care?

These ciphers have known vulnerabilities

They fail security standard like PCI-DSS

So if you process credit cards you have to take note

GDPR is vague on this subject but implies you should use it.

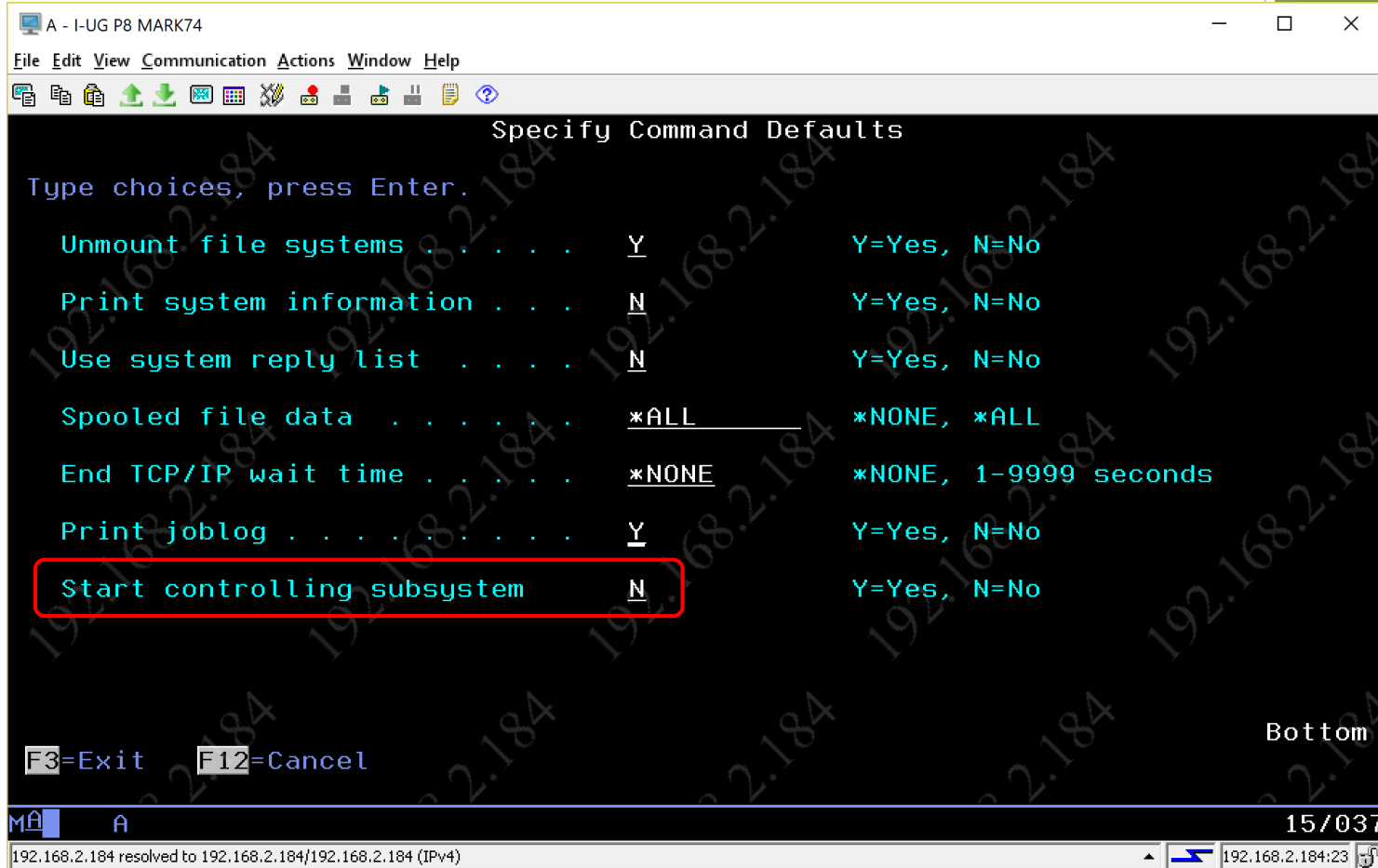
IBM i 7.4 only

4

i nnovative
nsightful
ntegral

Improvements in IBM i Save / Restore

Improvements in Save / Restore

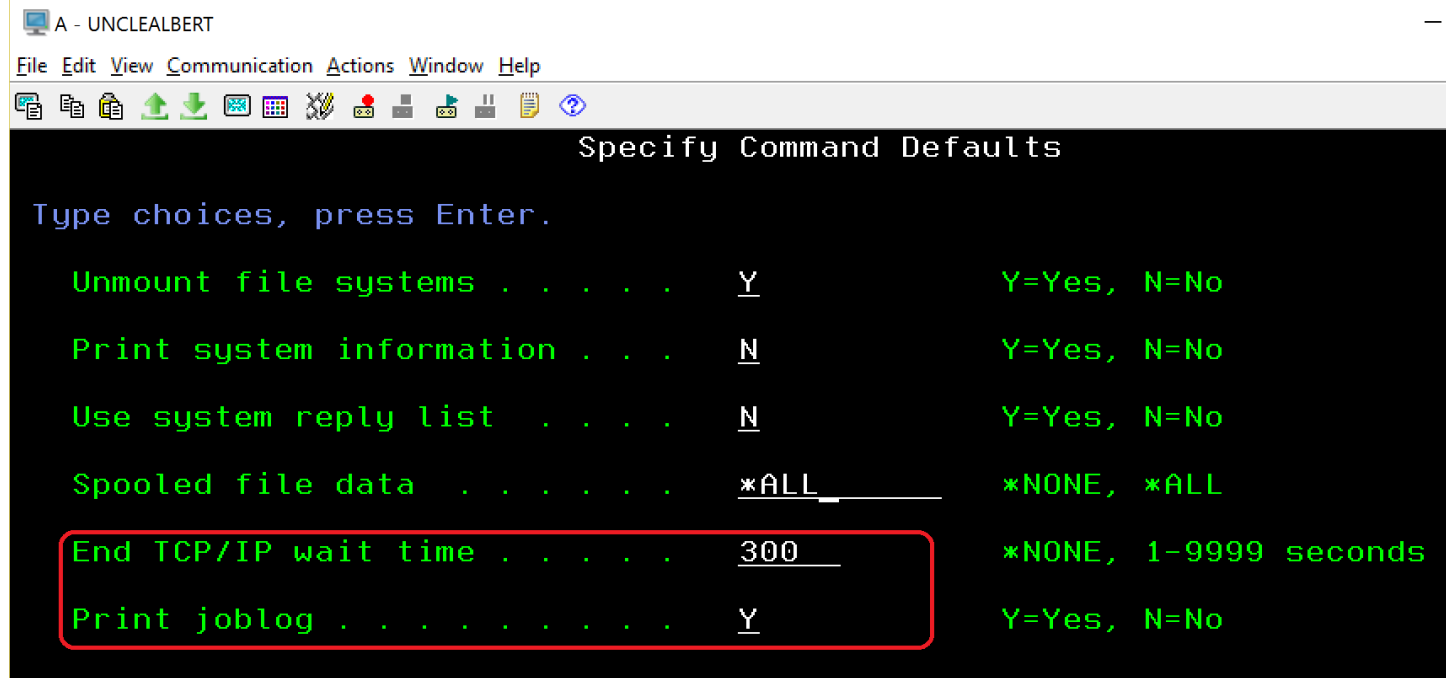


ProTip:

Useful if you want to keep the users off after your backup

Improvements in Save / Restore

IBM also added extra options at 7.2 & 7.3



Setting End TCP/IP wait time to *NONE saves 10 minutes on the save

Setting Print joblog to Y gives you a nice clean joblog from the save

Reminder about AsyncBring

Just checking you know about ASYNCBRING(*YES)

```
Save Object (SAV)

Type choices, press Enter.

Target release . . . . . *CURRENT
Update history . . . . . *NO

Clear . . . . . *NONE
Data compression . . . . . *DEV
Data compaction . . . . . *DEV
ASP device . . . . . *DFT

Scan objects:
  Scan during save . . . . . *NO
  Save failed objects . . . . . *NOSAVFAILED
Private authorities . . . . . *NO
Asynchronous bring . . . . . > *YES
```

This can dramatically improve save times
Especially when your IFS has a large numbers of small files

This is a 7.1 function, also PTF'd back to 6.1

3

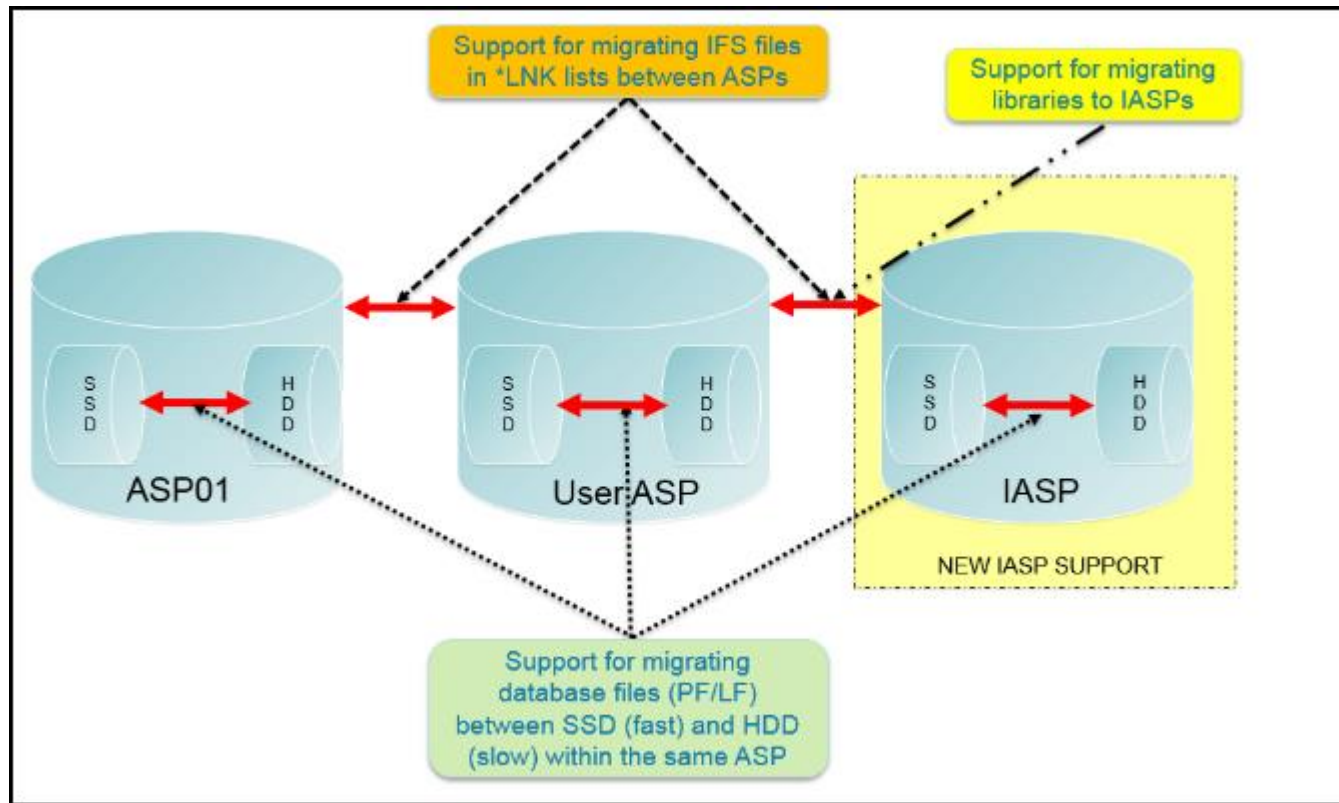
BRMS Enhancements

BRMS Enhancements



- Turnkey cloud control group deployment for easy set-up
- SAVLIBBRM default now backs up changes to journaled objects
- Support to easily back up all spooled files,
which improves restore performance
- Enhanced logging to help preserve message order
when log entries occur at the same second
- Support for new 3592 tape device

BRMS is more than just backup



Similar to the IBM Easy Tier, BRMS storage tiering can move data between HDDs, SSDs & Flash.

It can also migrate data between ASPs & iASPs!

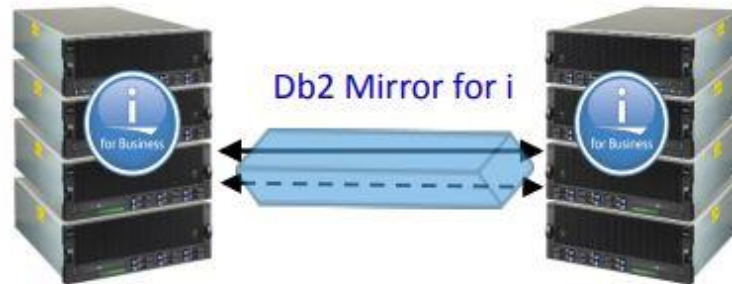
2

i nnovative
nsightful
ntegral

Db2 Mirror for i

Zero downtime is now a reality

Db2 Mirror for i



Is this the end of third-party HA / DR solutions?

No, not at all, this is NOT an HA solution!

Operating System Synchronous Replication

Continuous Availability

24 x 7 Up Time

RTO/RPO Near Zero

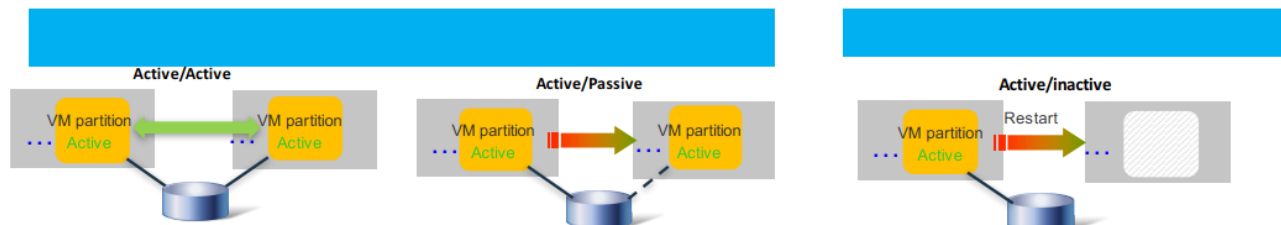
IBM Db2 Mirror for i(5770-DBM)



For more details on Db2 Mirror for i: [IBM Db2 Mirror for i Knowledge Center](#).

Db2 Mirror for i

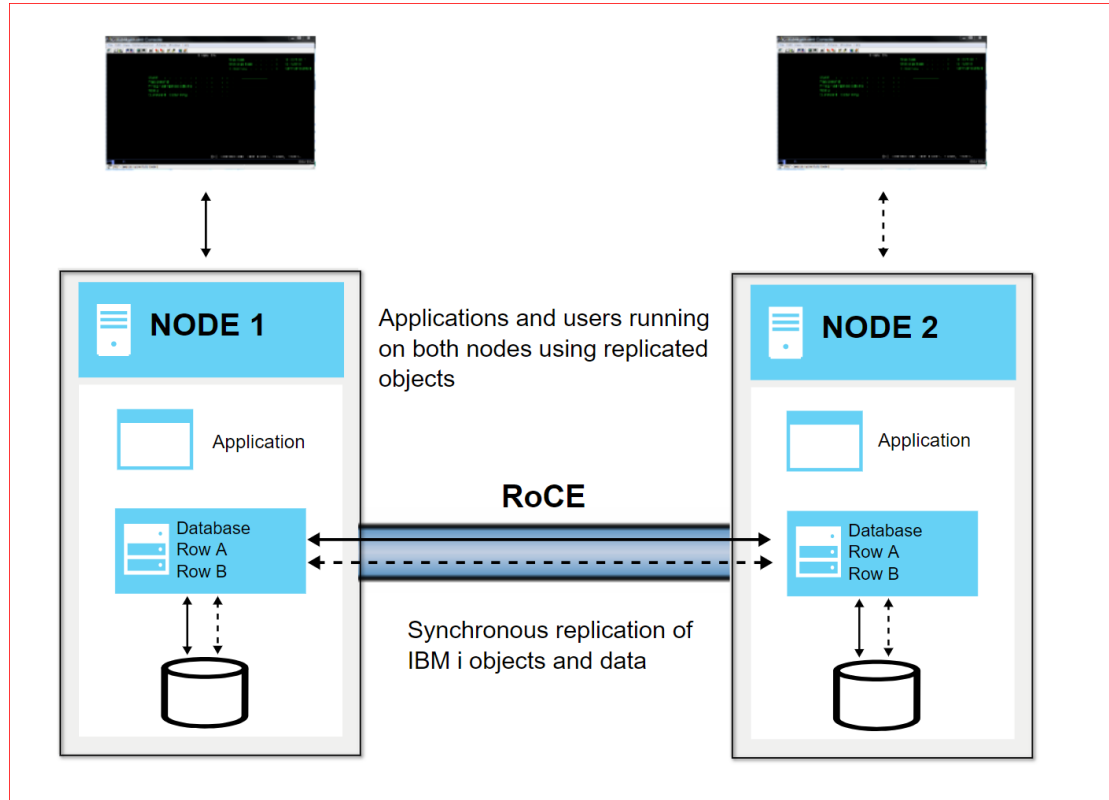
High Availability topology classification & positioning



Technology	Active/Active Clustering	Active/Passive Clustering	Active/Inactive
Definition	Application level clustering; applications in the cluster have simultaneous access to the production data therefore no app restart upon an app node outage. Certain types enable read-only access from secondary nodes	OS level clustering; one OS in the cluster has access to the production data, multiple active OS instances on all nodes in the cluster. Application is restarted on a secondary node upon outage of a production node.	VM level clustering, One VM in a cluster pair has access to the data, one logical OS, one or two physical copies. OS and applications must be restarted on a secondary node upon a primary node outage event. LPM enables the VM to be moved non-disruptively for a planned outage event.
Outage Types	SW,HW,HA, planned, unplanned RTO 0, limited distance	SW,HW,HA,DR, planned, unplanned, RTO>0, multi-site	HW,HA,DR, planned, unplanned, RTO>0, multi-site
OS integration	Inside the OS	Inside the OS	OS agnostic
RPO	Sync mode only	Sync/Async	Sync/Async
RTO	0	Fast (minutes)	Fast Enough (VM Reboot)
Licensing*	N+N licensing	N+1 licensing	N+0 licensing
Industry Examples	Oracle RAC, Db2 Mirror , pureScale	PowerHA, Redhat HA, Linux HA	VMware, VMR HA, LPM,

- N = number of licensed processor cores on each system in the cluster
- Illustrations represent two-node shared-storage configurations for conceptual simplicity. There are many other topologies and data resiliency combinations

Db2 Mirror for i



Put simply: You can run your applications on two systems at the same time and access the same data

**This is not a copy of your data, it's the same data!
Locks, Constraints, Commitment Control all the same**

Db2 Mirror for i

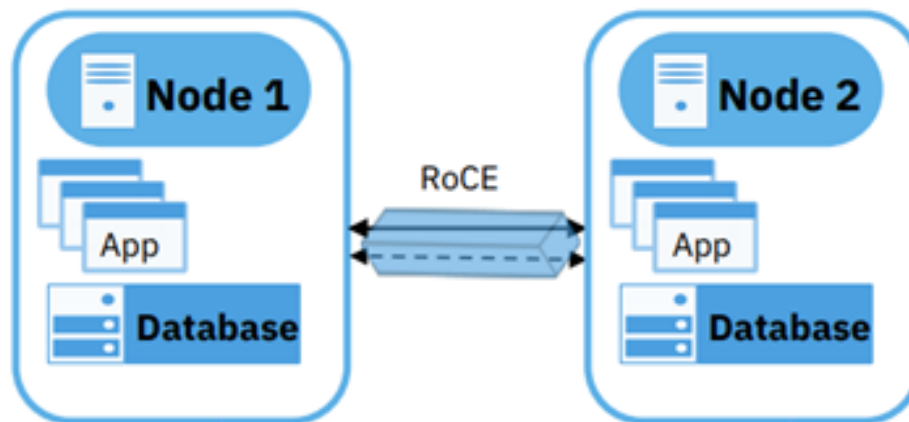
Db2 Mirror – Other Supported Objects

Other Objects

- User profiles
 - Authority
 - Ownership
 - Security
 - PGM/SRVPGM
 - Data Areas
 - Data Queues (DDL Only)
 - SYSVALs
 - ENVARs
 - LIB
 - JOBD
 - Journals
 - Files (also has DDL Only option)
- ### Special Handling
- OUTQ / Spool
 - Job Queue

Exceptions

- No User Spaces
- No User Indexes
- No User Queues
- No Journal Receivers



1

Free performance boost

IBM i 7.4 has been optimised

Not just a tune up, a major overhaul !

Network stack

Journaling and Commitment control

Program Execution

Security Parsing

SQE Engine

IASP Vary On time

Database access, update and locking

All of the above have been reviewed, optimised
and where needed redesigned

The result is a faster, more efficient environment

More Processor and more storage

More processor threads per partition

Maximum has more than doubled in 7.4 to 1536

More disks arms available

Roughly 50% more arms with up to 3 times the capacity

Selected Operating System Limits	IBM i 7.3	IBM i 7.4
Disk arms in all basic auxiliary storage pools (ASPs 1 – 32), per partition	2047	3999
Disk arms in all independent auxiliary storage pools (iASPs 33 – 255) in all nodes in a cluster	2047	5999
4160 byte block size LUNs (Note 1): <ul style="list-style-type: none">• 4K block SAS disks (internal or vSCSI attached)	4 TB	16 TB
4096 byte block size LUNs (Note 1): <ul style="list-style-type: none">• 4K block SAS disks (vSCSI attached)• FlashSystems LUNs	2 TB	16 TB

Note 1 – Actual limit is one block short of the max shown in the table.

Note that for all 512/520 block disks/LUNs, the maximum size is still up to 2 TB. This includes 5xx block SAS disks (internal or vSCSI attached), DS8000 LUNs, and IBM Storwize family LUNs.

For more information about these limits, and others, see IBM Knowledge Center [Miscellaneous Limits](#) topic.

IBM i 7.4 only

Programs may even run faster at 7.4

There is talk that programs created for 7.4
may actually run faster too

IBM has found evidence of this but is still
reviewing the findings before going public

What does created for 7.4 mean?

Recompilation

Object Conversion - STROBJCVN

Translation - QBNCVTPLST

Simple IBM i program and module conversion

No retranslation of programs is required to work with IBM i 7.3 or IBM i 7.2. However, there are times when a retranslation may be beneficial to ensure that programs are using the latest technology updates for performance, efficiency, and so on. For this purpose, IBM is providing the new QBNCVTPGM tool. See the [Simple IBM i program and module conversion](#) technical article for more information.

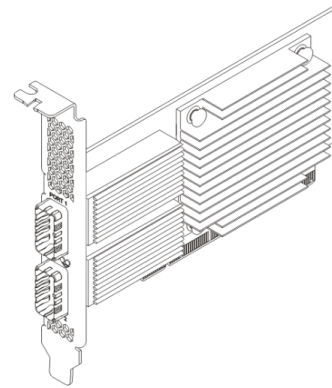
Note: The article references CL program source that can be downloaded. The following link can be used to download the source:

[QBNCVTPLST CL Program](#)

IBM i 7.4 only

New hardware support

Hardware



. I/O

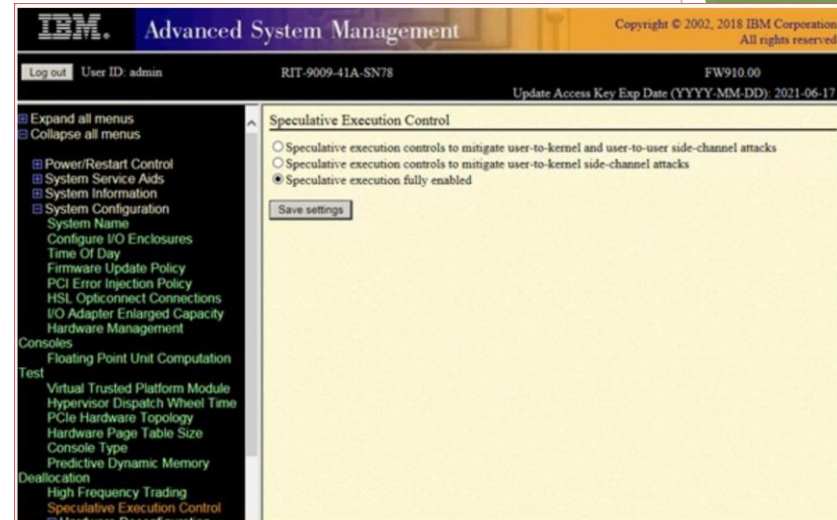
- PCIe4 2-port 100 Gb ROCE EN adapter adds dedicated and native SR-IOV NIC, and dedicated and native SR-IOV RoCE
- PCIe 2-port Ethernet adapters add dedicated and native SR-IOV RoCE
- PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
- PCIe x16 to CXP Converter Card
- New Enterprise SSDs
- New Mainstream SSDs

PCIe4 is IBM i 7.4 only, others available at 7.3, check with IBM for 7.2

Speed Boost from Spectre / Meltdown

If you don't use cloud, consider turning off Speculative Mitigations

You can do this in hardware
using HMC / ASMI



And at the LPAR level in SST

```
Display Formatted Data
Page/Line. . . 1 / 1
Columns. . . : 1 - 78
Find . . . . .
.....+.....1.....+.....2.....+.....3.....+.....4.....+.....5.....+.....6.....+.....7.....+.....
DISPLAY/ALTER/DUMP
Running macro: OXMITIGATIONS
System-Wide Translator Mitigation Controls
OX level: 5
Mitigations disabled
```

POWER8 & POWER9 for hardware, IBM i 7.4 to 7.1 for SST

Questions?



Sponsors of International i-Power 2019



FALCONSTOR

