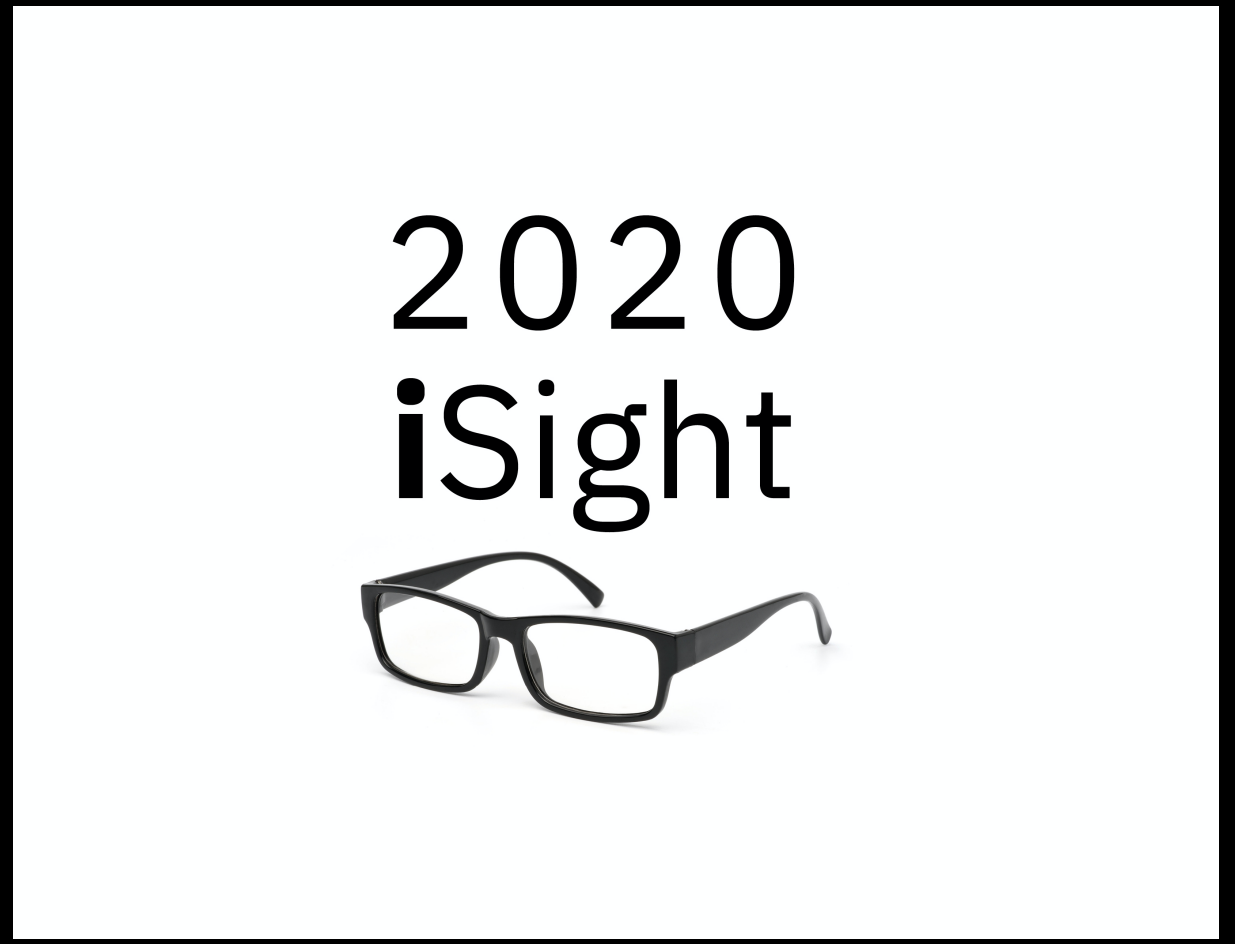
2020 iSight
Clear Vision for the Future

Steve Sibley
VP, IBM Power Systems Offering Management

Steve Will
IBM i Chief Architect



We are experiencing a New World

COVID-19: What IBM is Doing to Help

COVID-19 HPC Computing Consortium
- Unprecedented compute power to help researchers attack the virus
- 400 Petaflops, hundreds of researchers
- National Labs, MIT, Rensselaer Polytechnic Institute and others

Watson and the The Weather Company
- Trusted data at the fingertips of citizens and health experts
- Watson Assistant for Citizens (Analytics / Speech Recognition)
- “Global Call for Code”

Trusted infrastructure delivering business continuity
- Instant Scaling
- Availability
- Remote Management & Automation

IBM i in a World with COVID-19

The IBM i Portfolio is uniquely positioned to support the remote working environment required by COVID-19 policies

Manage your system from anywhere

- **IBM Navigator for i:** Manage many aspects of your system, control devices and even monitor performance remotely from a web browser at home
- **IBM i Access Client Solutions**: Remote access to IBM i applications

Employee productivity from anywhere

- **IBM i Mobile Access:** Access IBM i remotely from any mobile device that has a web browser
- **IBM Rational Developer for i**: Strategic developer's environment for working unattached from IBM i
- **IBM Db2 Web Query for i**: Data analytics delivered anywhere

Business Continuity

- The most available system in the industry (ITIC Global Server Hardware Reliability Report)
- **IBM Db2 Mirror for i:** Continuous availability for applications & data
- **IBM PowerHA SystemMirror for i:** High availability with one integrated configuration
- **IBM Cloud for IBM i:** IBM i available in IBM Power Systems Virtual Server on IBM Cloud

IBM Cognitive Systems Strategy

Hybrid Cloud Innovation:
Agility, Flexibility & Automation
On-prem and Public Cloud

Resilient, Scalable, & Secure:
Architectural Strength & Superiority

Application Modernization:
Enterprise AI, Advanced Analytics, Containerization, Extension via Microservices

AIX

Extend resilient, scalable and mission critical Unix environment with new innovative on-prem and public cloud offerings with consistent industry automation.

IBM i

Extend the most integrated operating system with innovative resiliency platform in Db2 Mirror, open source languages and AI integration.

Enterprise Linux

Deliver optimized infrastructure for workload modernization and growth on Power Systems through SAP HANA, SAS Viya, OpenShift & Cloud Paks.

IBM Public Cloud

Leverage Power Systems in the IBM Public Cloud across AIX/IBM i and Enterprise Linux as clients adopt mission-critical workloads in public clouds.

Built on Innovative POWER Processor Roadmap in conjunctions with stack integration across Hardware Systems and System Software

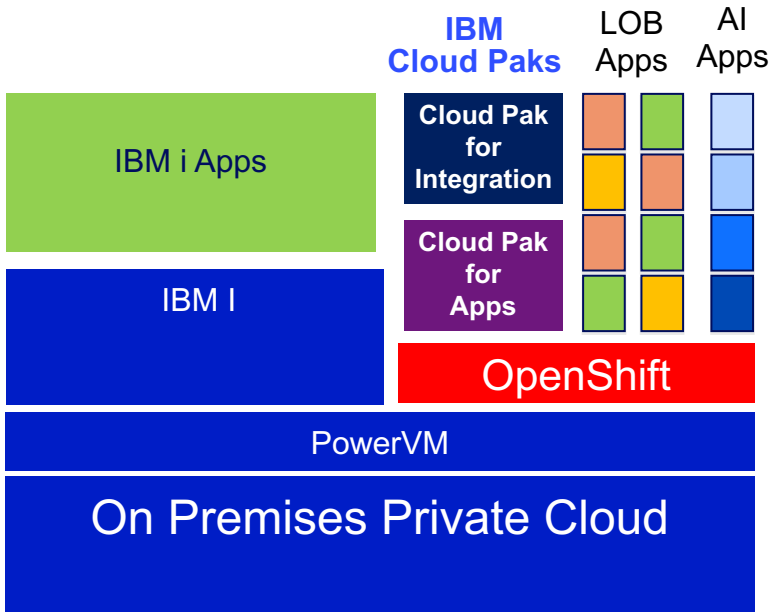
POWER9 14nm

POWER10 7nm

POWER11

Red Hat

IBM i and Red Hat



What is being announced today – April 14, 2020

IBM i 7.4 TR2 and IBM i 7.3 TR8

- Availability & Virtualization
  - Db2 Mirror for i – responding to client feedback
  - Enhancements for PowerHA and BRMS
- Analytics & Db2
  - Highly requested enhancements and extensions
  - Continue to drive AI adoption into IBM i installed clients
- Solution Enablement
  - Additional capabilities to traditional coding environments - RPG
  - Enhancements to traditional languages and tools
  - New Open Source enhancements
- Security
  - 7.3 Support for TLS v1.3
  - 7.3 GUI interface for Digital Certificate Manager

IBM i Db2 Mirror
for small and medium businesses

Bringing leading business continuity to everyone

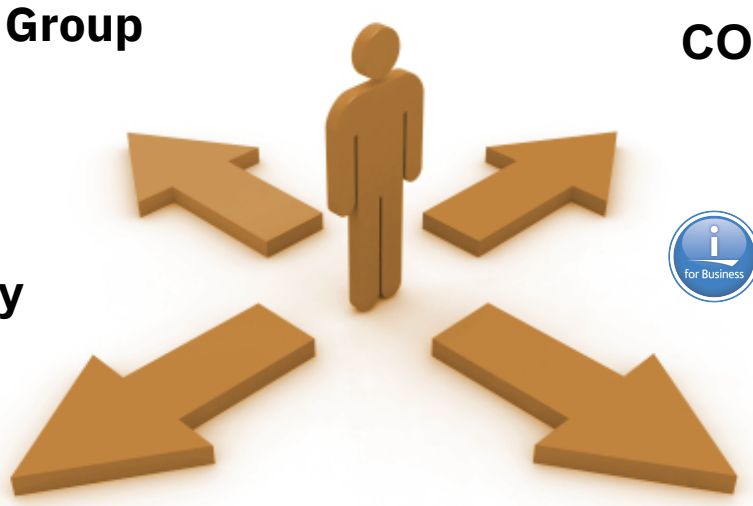
- Support for internal storage devices
- NVMe
- New entry price

IBM i Solution Editions – Worldwide

In partnership with industry-leading ISVs

- Complete, integrated solutions for small to mid-sized businesses
- Rapid deployment
- Simplified, flexible and highly secure infrastructure for core business applications
- Minimize risk
- Maximize ROI

Listening to Clients: Community Requests Drive Enhancements



COMMON Americas

Large Users Group (LUG)

COMMON Europe

ISV Advisory Council

实验室之旅

ISV Interlocked Development

RFEs

Customer Briefings & Planning Sessions

IBM i 7.4 TR2 & 7.3 TR8: Integrating Innovation and Simplicity

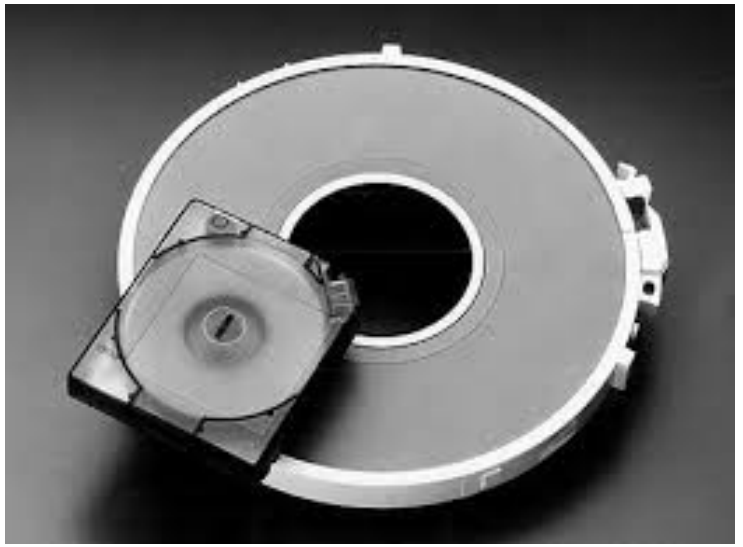
- Semi-annual Technology Refreshes for two most recent releases
  - allow IBM i to be agile in responding to requests
- Focus of these TRs is:
  - Innovation: Helping clients and solution providers provide value through new capabilities
  - Integration: Allowing IBM i technology to be easily consumed, with no disruption to clients
  - Simplicity: Making life easier for IBM i users, administrators and developers
-

Topics covered in today's Session

- Virtual Tape Libraries
  - Easier configuration and use
- Db2 Mirror – New function
  - Direct Attached Storage Support – and Save/Restore Setup
  - Application evaluation in Stand-Alone mode
- Security – Specifically 7.3 Support
  - TLS 1.3, TLS 1.2
  - New Digital Certificate Manager Interface
- Db2 – SQL new function
  - INTERPRET and COMPARE_FILE; and more!
- SQL Services
  - Work Management services are a focus area; IFS authority a highlight
  - Video blog to help you learn
- Rational Developer for i (RDi)
  - With a new tool to help modernize older RPG; and more!
- Db2 Web Query
  - Get started fast; do hard things easily

IBM i Virtualization for Tape Libraries

- **RFE 127631 -** NPIV Tape support for IBM i Hosting
  - Want to virtualize a Fibre Channel attached Tape library
  - Want a simple hosting environment without VIOS to get NPIV-like behavior



IBM i Virtualization for Tape Libraries

- **New IBM i Tape Library Virtualization Support**
  - Sharing between multiple IBM i partitions – without multiple adapters, a SAN switch, or a VIOS partition
  - Sharing of the library device is done via an NWSD, as easily as sharing a stand-alone tape device
  - Both server and client partitions can be running **any combination of IBM i 7.4, 7.3, or 7.2**
  - Selected entry and midrange IBM Tape Library Devices are supported
  - Configuration types:
    - SAS direct-attached devices
    - Fibre Channel direct-attached devices
    - SAN devices connected with a single adapter

IBM TS2900 (3572)

IBM TS3100/3200 (3573)

IBM TS4300 (3555)

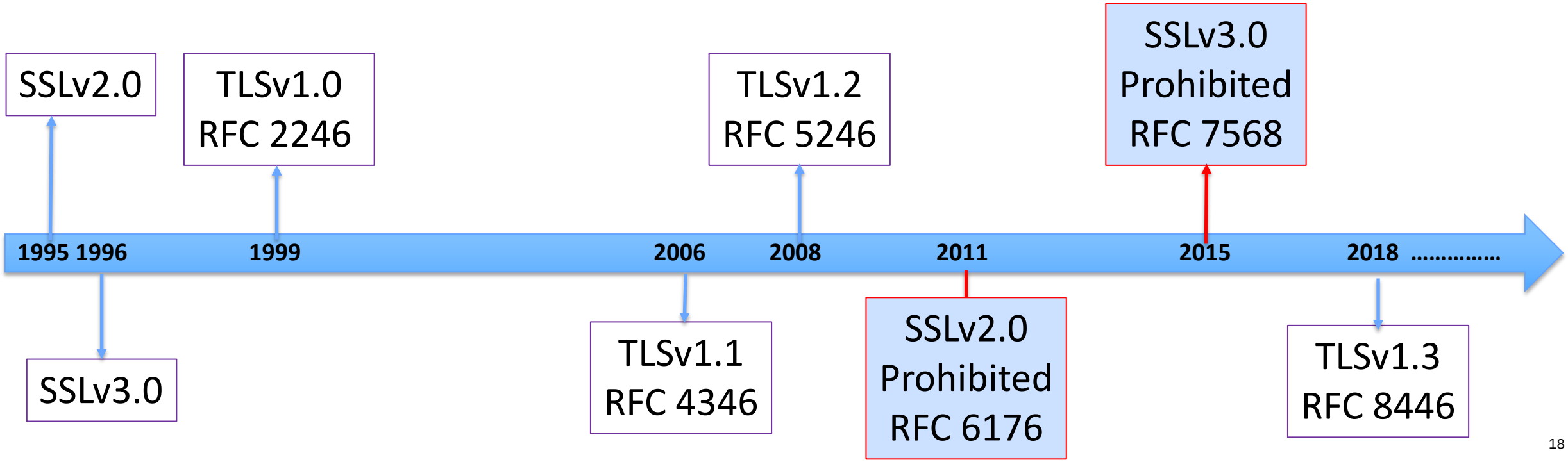
IBM i Virtualization for Tape Libraries

- **Required PTFs**
  - IBM i 7.4 MF66863
    - Requisite PTFs: MF66860, MF66861, MF66862, MF66837, MF66825, MF66840
  - IBM i 7.3 MF64802
    - Requisite PTFs: MF66857, MF66858, MF66859, MF66836, MF66824, MF66839, SI70255
  - IBM i 7.2 MF64803
    - Requisite PTFs: MF66854, MF66855, MF66856, MF66835, MF66823, MF66838, SI70254

- **Additional information (available on April 14th)**
  - The Client Virtual Tape Devices section of IBM i Support website: https://www.ibm.com/support/pages/node/1108539
  - The IBM Knowledge Center: https://www.ibm.com/support/knowledgecenter/ssw_ibm_i_74/rzam4/rzam4clientvirtdevices.htm

TLS - Transport Layer Security v1.3

- Newest and most secure version of the TLS/SSL protocols replacing TLSv1.2
  - All key negotiation protected by elliptical curve algorithms
  - Majority of handshake messages are encrypted
  - Fixed or removed features susceptible to existing named vulnerabilities
  - Used at IBM i 7.4 when QSSLPCL is set to *OPSYS



Transport Layer Security (TLS) version 1.3 (IBM i 7.3)

- IBM i 7.4 and 7.4 TR1 TLS 1.3 support moved back to IBM i 7.3
- TLS 1.3 is newest and most secure version of the TLS protocols
- Replaces TLSv1.2 (eventually, long transition period with both protocols)
- All key negotiation protected by elliptical curve algorithms
  - Including the popular Curve25519(x25519) and Curve448(x448) curves
- System Value Enablement
- QSSLPCL *OPSYS now includes TLS 1.3
- QSSLCSLCTL *OPSYS now includes new TLSv1.3 and 1.2 cipher suites
- Admins need to explicitly add new values when *OPSYS is not used
- Many applications will automatically try use TLS 1.3 because they use the System TLS defaults.

Transport Layer Security (TLS) version 1.2 (IBM i 7.3)

- IBM i 7.4 TR1 TLSv1.2 support moved back to IBM i 7.3
- ChaCha20 Poly1305 cipher suites
- TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256
- TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256
- Additional elliptic curve Diffie-Hellman key exchange support
  - Curve25519(x25519)
  - Curve448(x448)
- Online Certificate Status Protocol (OCSP) stapling

Retrieve TLS Attributes (QsoRtvTLSA) API (IBM i 7.3)

- Programmatic way to retrieve System TLS system wide attributes
  - Use instead of Advanced Analysis Command: TLSCONFIG –display

Supported protocol list
Eligible default protocol list
Default protocol list
Supported cipher suite list
Eligible default cipher suite list
Default cipher suite list
Supported signature algorithms
Default signature algorithms
Supported signature algorithm certificates
Default signature algorithm certificates

Supported named curves
Default named curves
Default minimum RSA key size
Renegotiation without RFC 5746 allowed
Handshake protocol counters
Secure session caching
RFC required (EtM, EMS, RFC5746 etc)
Middlebox compatibility mode
Audit Secure Telnet handshakes

Modern Digital Certificate Manager (DCM) Interface (IBM i 7.3)

- View all the certificates in the store, filter and sort them for quick identification
- Tabbed interface with each tab representing a certificate store
  - Work with multiple certificate stores at the same time
- Hovering capabilities to provide instant help on fields, buttons, tasks
- Visually see certificates that are expiring or already expired
- To access this new GUI, apply the required PTFs and enter http://hostname:2001/DCM from the web browser.
- Original GUI interface still available

What's new with SQL in Db2 for i

- SQL Language Enhancements:

- Built-in functions
- Embedded SQL for RPG
- Extending usage of Extended Indicators
- Easier shredding of JSON using SQL
- And more…
- Add it up and there are many gains in programmer productivity

INTERPRET built-in function

- Q: How do I transform data from IBM i internal data types?
  A: INTERPRET(expression AS data-type)
- The expression must be binary or character (bit data or 65535)
- Length of expression must exactly match the result data type

```
VALUES INTERPRET(X'0003C1C2C3' AS VARCHAR(3));
=> 'ABC'

VALUES INTERPRET(X'00000011' AS INTEGER);
=> 17
```

COMPARE_FILE

- An efficient tool that compares two files
- Compare file object attributes, data, or both
- Compare files on the same IBM i or against a remote IBM i
- Compare using Db2 SMP parallel processing (5770SS1 Option 26)

IBM i 7.4 only

```
select * from table(qsys2.compare_file(
   LIBRARY1 => 'DATALIB',  FILE1  => 'CUSTMAST',
   LIBRARY2 => 'TESTLIB',  FILE2  => 'CUSTMAST',
   PARALLEL_DEGREE => '2', COMPARE_TYPE => 'BOTH'));
```

What's new with IBM i Services?

- SQL alternative to APIs and CL Commands

- 15 new QSYS2 services
- 9 enhanced QSYS2 services
- 4 new tools with source code in SYSTOOLS

- Add it up and there are 28 new ways to gain iSight

Work Management Services

QSYS2.ACTIVE_JOB_INFO – UDTF
QSYS2.AUTOSTART_JOB_INFO – VIEW
QSYS2.GET_JOB_INFO – UDTF
QSYS2.JOB_DESCRIPTION_INFO – VIEW
QSYS2.JOB_INFO – UDTF
QSYS2.JOB_LOCK_INFO – VIEW
QSYS2.JOB_QUEUE_INFO – VIEW
QSYS2.MEMORY_POOL – UDTF
QSYS2.MEMORY_POOL_INFO – VIEW
QSYS2.OBJECT_LOCK_INFO – VIEW
QSYS2.PRESTART_JOB_INFO – VIEW
QSYS2.PRESTART_JOB_STATISTICS – UDTF
QSYS2.RECORD_LOCK_INFO – VIEW
QSYS2.ROUTING_ENTRY_INFO – VIEW
QSYS2.SCHEDULED_JOB_INFO – VIEW
QSYS2.SUBSYSTEM_INFO – VIEW
QSYS2.SUBSYSTEM_POOL_INFO – VIEW
QSYS2.SYSTEM_STATUS – UDTF
QSYS2.SYSTEM_STATUS_INFO – VIEW
QSYS2.SYSTEM_VALUE_INFO – VIEW
QSYS2.WORKSTATION_INFO – VIEW

New or Enhanced @ IBM i 7.3 TR8 and IBM i 7.4 TR2

IFS_OBJECT_PRIVILEGES

- 1 row returned for an IFS object's public and private privileges
- Similar to OBJECT_PRIVILEGES for QSYS objects

```
select * from table (
  qsys2.ifs_object_privileges(path_name =>
'/usr/local/tap.ini')
)
```

OWNER	AUTHORIZATION_NAME	DATA_AUTHORITY	OBJECT_OPERATIONAL	OBJECT_MANAGEMENT	OBJECT_EXISTENCE
SCOTTF	*PUBLIC	*RWX	YES	NO	NO
SCOTTF	SCOTTF	*RWX	YES	YES	YES

IFS_OBJECT_PRIVILEGES

- Combine services to gain more insight

```
with ifsobjs(path) as (
  select path_name from table(qsys2.object_ownership('SCOTTF'))
    where path_name is not null
)
select z.* from ifsobjs i, lateral (select *
  from table(qsys2.ifs_object_privileges(path_name=>path))) z
where authorization_name = '*PUBLIC'
order by data_authority;
```

IFS_OBJECT_PRIVILEGES

- Study IFS security deployment with SQL

PATH_NAME	OBJECT_TYPE	DATA_AUTHORITY	OBJECT_OPERATIONAL	OBJECT_MANAG
/usr/local/guardium/uninstall	*STMF	*EXCLUDE	NO	NO
/usr/local/guardium/istap_console.socket	*FIFO	*EXCLUDE	NO	NO
/usr/local/guardium/LICENSE.TXT	*STMF	*R	YES	NO
/usr/local/guardium/iso-swid/1986-03.com.ibm_IBM_Securi...	*STMF	*R	YES	NO
/usr/scott.out	*STMF	*RW	YES	NO
/usr/local/guardium/guard_itap.stderr.1.txt	*STMF	*RW	YES	NO
/tmp/guard-stap-setup-180418_120550/guard_stap_setup.log	*STMF	*RW	YES	YES
/usr/local/guardium/install_out.txt	*STMF	*RW	YES	NO
/tmp/guard-stap-setup-180502_093030/guard_stap_setup.log	*STMF	*RW	YES	YES
/foo.out	*STMF	*RW	YES	NO
/tmp/guard-stap-setup-180502_093030/update	*DIR	*RWX	YES	YES

New Video Blog

https://ibmsystemsmag.com/tags/isee-video-blog

Db2 Mirror Update

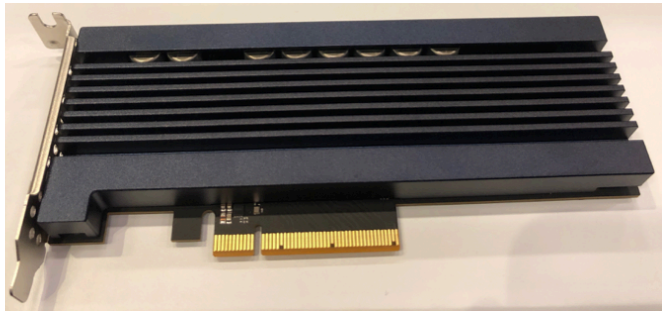
Spring 2020 Announcements

Kris Whitney
STSM,
IBM i Development
whitneyk@us.ibm.com

Kris Whitney@i_virtualize

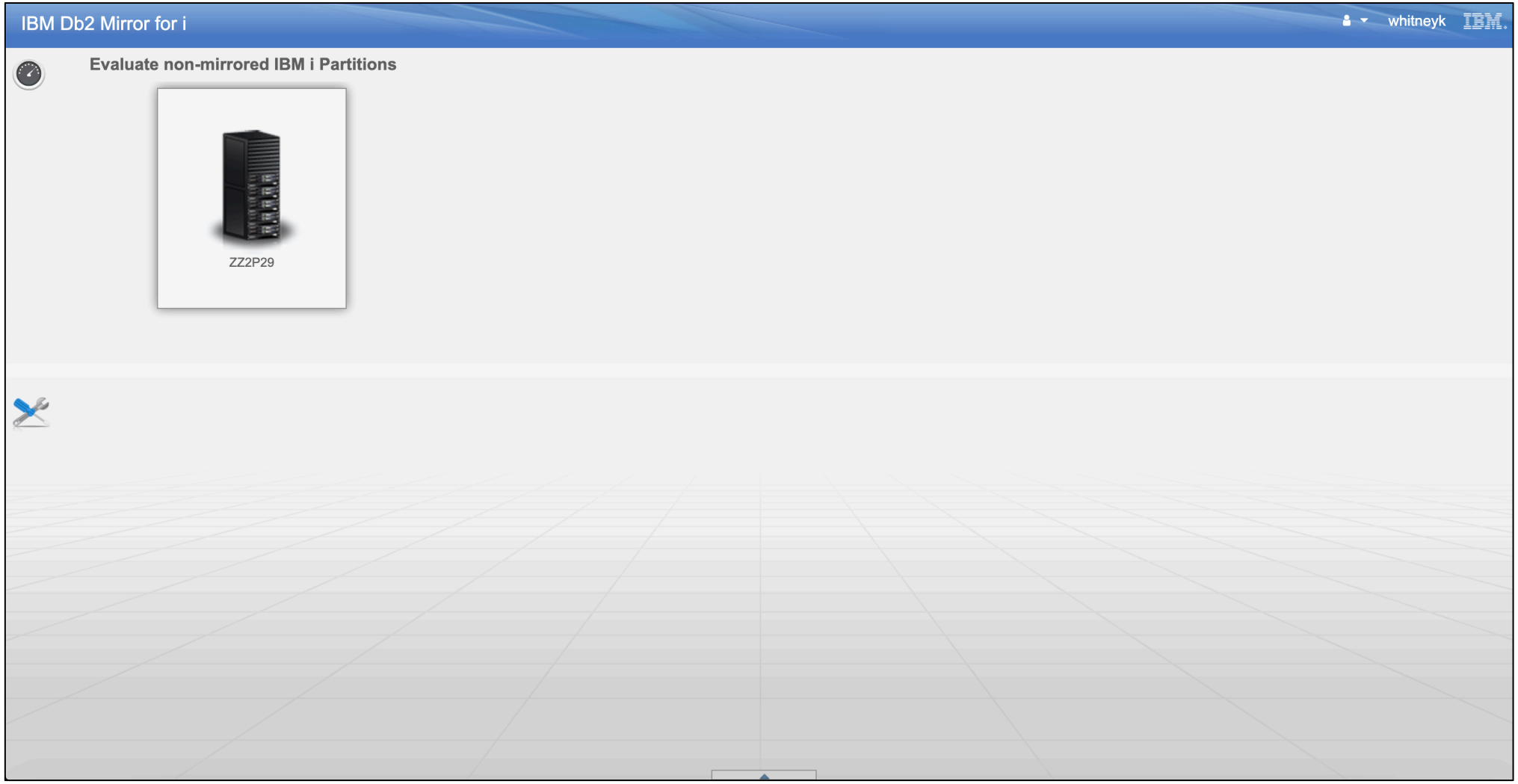
Db2 Mirror for i now supports Direct Attach Storage

- Can configure Db2 Mirror for i regardless if the storage has copy service functionality.
- Db2 Mirror for i can use save and restore to configure mirroring
- Enables support for storage such as NVMe or SAS SSD



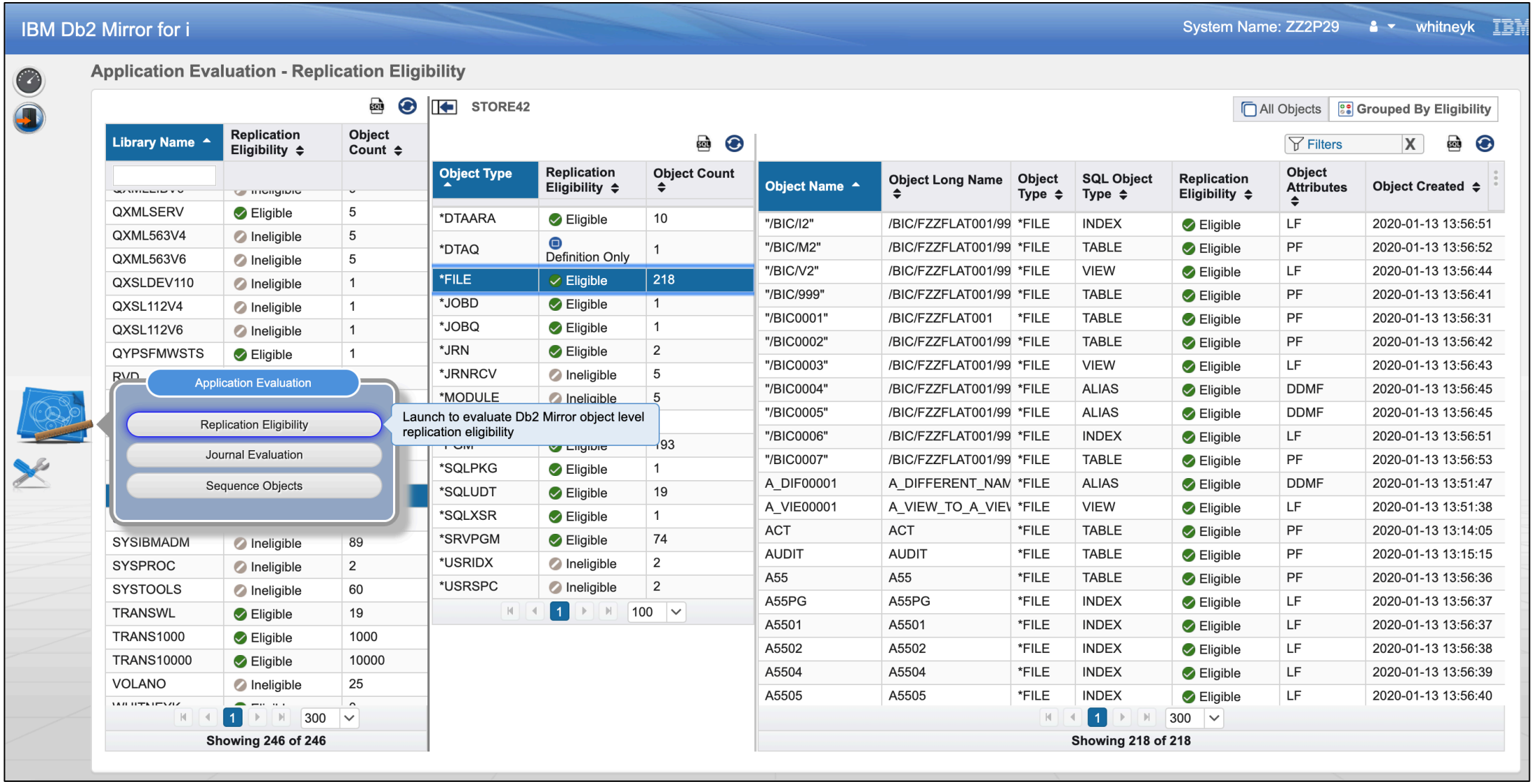
Application Evaluation Standalone Mode

- From an IBM i LPAR with the base 5770-DBM installed it is possible to point to another IBM i LPAR that is at 7.2, 7.3 or 7.4 to gain insight into some considerations for Db2 Mirror.



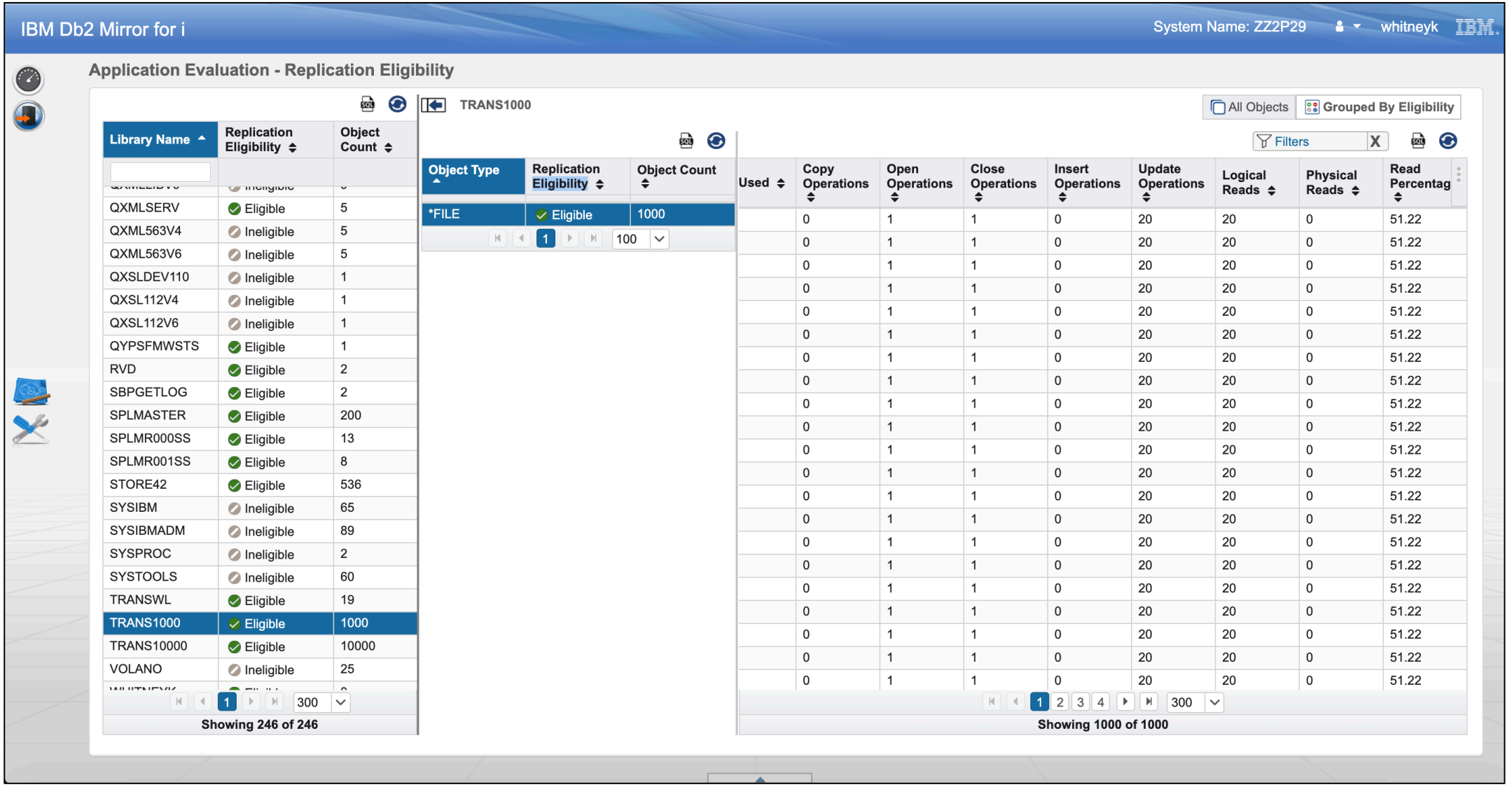
Application Evaluation – Examine Replication Eligibility

- Drill down on which Libraries and Objects are eligible to be replicated



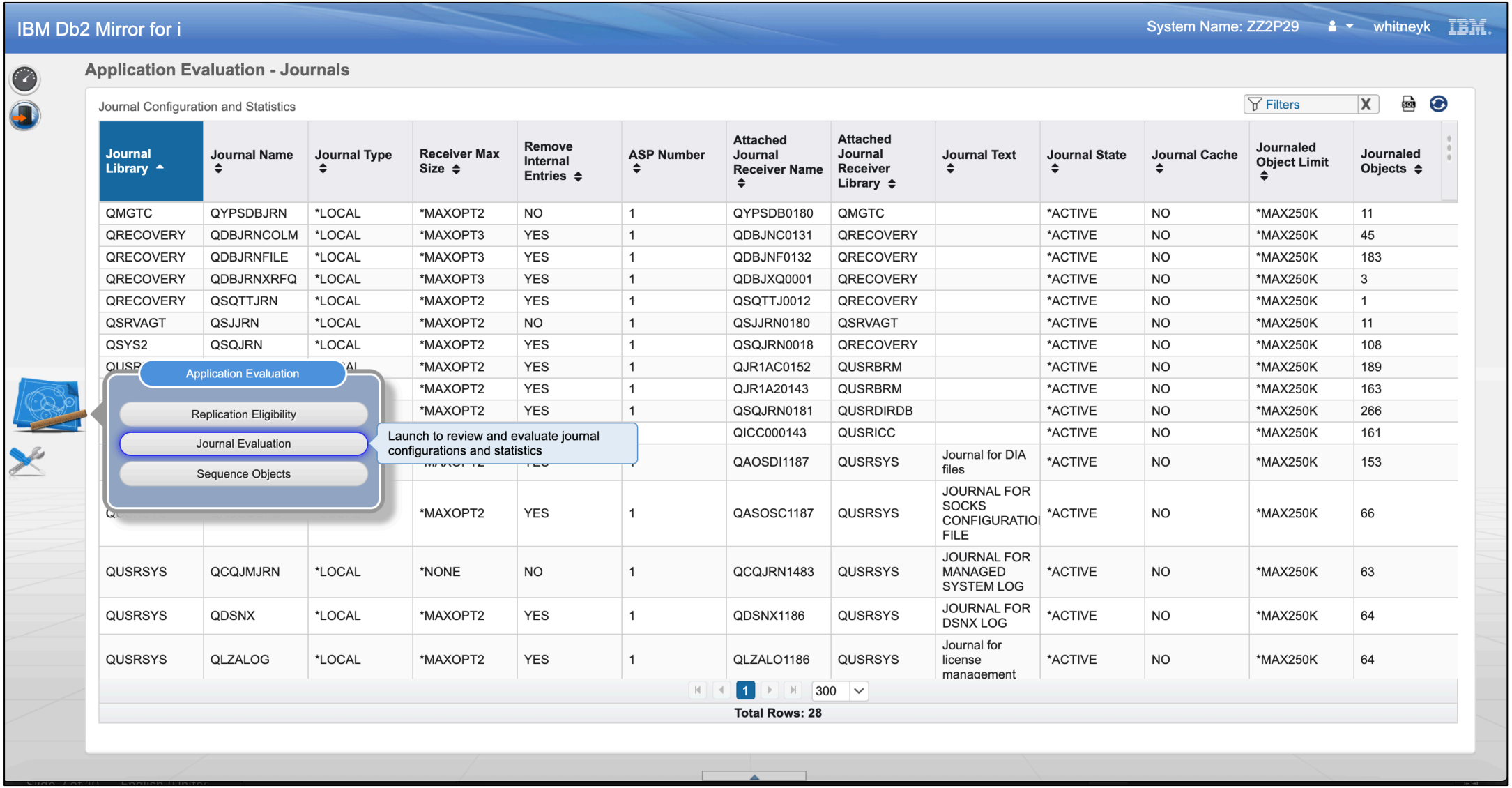
Application Evaluation – Examine Object Statistics

- Gain some insight into how the file is being used



Application Evaluation – Look for Journal Improvements

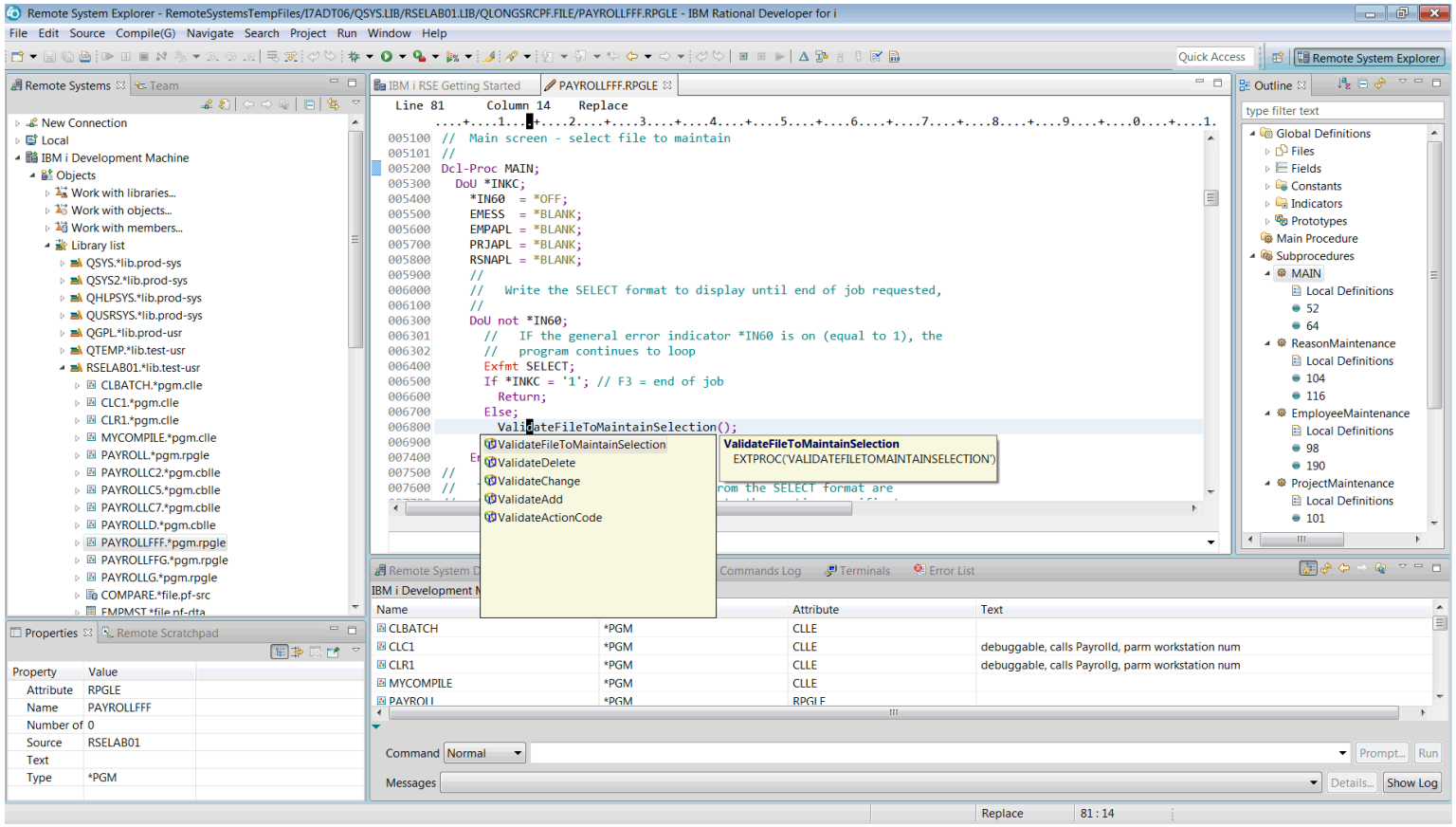
- Journal tuning could change the performance of Db2 Mirror



Journal Library	Journal Name	Journal Type	Receiver Max Size	Remove Internal Entries	ASP Number	Attached Journal Receiver Name	Attached Journal Receiver Library	Journal Text	Journal State	Journal Cache	Journaled Object Limit	Journaled Objects
QMGTC	QYPSDBJRN	*LOCAL	*MAXOPT2	NO	1	QYPSDB0180	QMGTC		*ACTIVE	NO	*MAX250K	11
QRECOVERY	QDBJRNCOLM	*LOCAL	*MAXOPT3	YES	1	QDBJNC0131	QRECOVERY		*ACTIVE	NO	*MAX250K	45
QRECOVERY	QDBJRNFILE	*LOCAL	*MAXOPT3	YES	1	QDBJNF0132	QRECOVERY		*ACTIVE	NO	*MAX250K	183
QRECOVERY	QDBJRNXRFQ	*LOCAL	*MAXOPT3	YES	1	QDBJXQ0001	QRECOVERY		*ACTIVE	NO	*MAX250K	3
QRECOVERY	QSQTTJRN	*LOCAL	*MAXOPT2	YES	1	QSQTTJ0012	QRECOVERY		*ACTIVE	NO	*MAX250K	1
QSRVAGT	QSJJRN	*LOCAL	*MAXOPT2	NO	1	QSJJRN0180	QSRVAGT		*ACTIVE	NO	*MAX250K	11
QSYS2	QSQJRN	*LOCAL	*MAXOPT2	YES	1	QSQJRN0018	QRECOVERY		*ACTIVE	NO	*MAX250K	108
QUSR		AL	*MAXOPT2	YES	1	QJR1AC0152	QUSRBRM		*ACTIVE	NO	*MAX250K	189
			*MAXOPT2	YES	1	QJR1A20143	QUSRBRM		*ACTIVE	NO	*MAX250K	163
			*MAXOPT2	YES	1	QSQJRN0181	QUSRDIRDB		*ACTIVE	NO	*MAX250K	266
						QICC000143	QUSRICC		*ACTIVE	NO	*MAX250K	161
						QAOSDI1187	QUSRSYS	Journal for DIA files	*ACTIVE	NO	*MAX250K	153
Q			*MAXOPT2	YES	1	QASOSC1187	QUSRSYS	JOURNAL FOR SOCKS CONFIGURATIOI FILE	*ACTIVE	NO	*MAX250K	66
QUSRSYS	QCQJMJRN	*LOCAL	*NONE	NO	1	QCQJRN1483	QUSRSYS	JOURNAL FOR MANAGED SYSTEM LOG	*ACTIVE	NO	*MAX250K	63
QUSRSYS	QDSNX	*LOCAL	*MAXOPT2	YES	1	QDSNX1186	QUSRSYS	JOURNAL FOR DSNX LOG	*ACTIVE	NO	*MAX250K	64
QUSRSYS	QLZALOG	*LOCAL	*MAXOPT2	YES	1	QLZALO1186	QUSRSYS	Journal for license management	*ACTIVE	NO	*MAX250K	64

Rational Developer for i 9.6.0.7

- Refactoring – Extract Procedure
- Realtime
  - SQL Validation
  - SQL Formatting
- Conditional Set Breakpoint
- Much more…

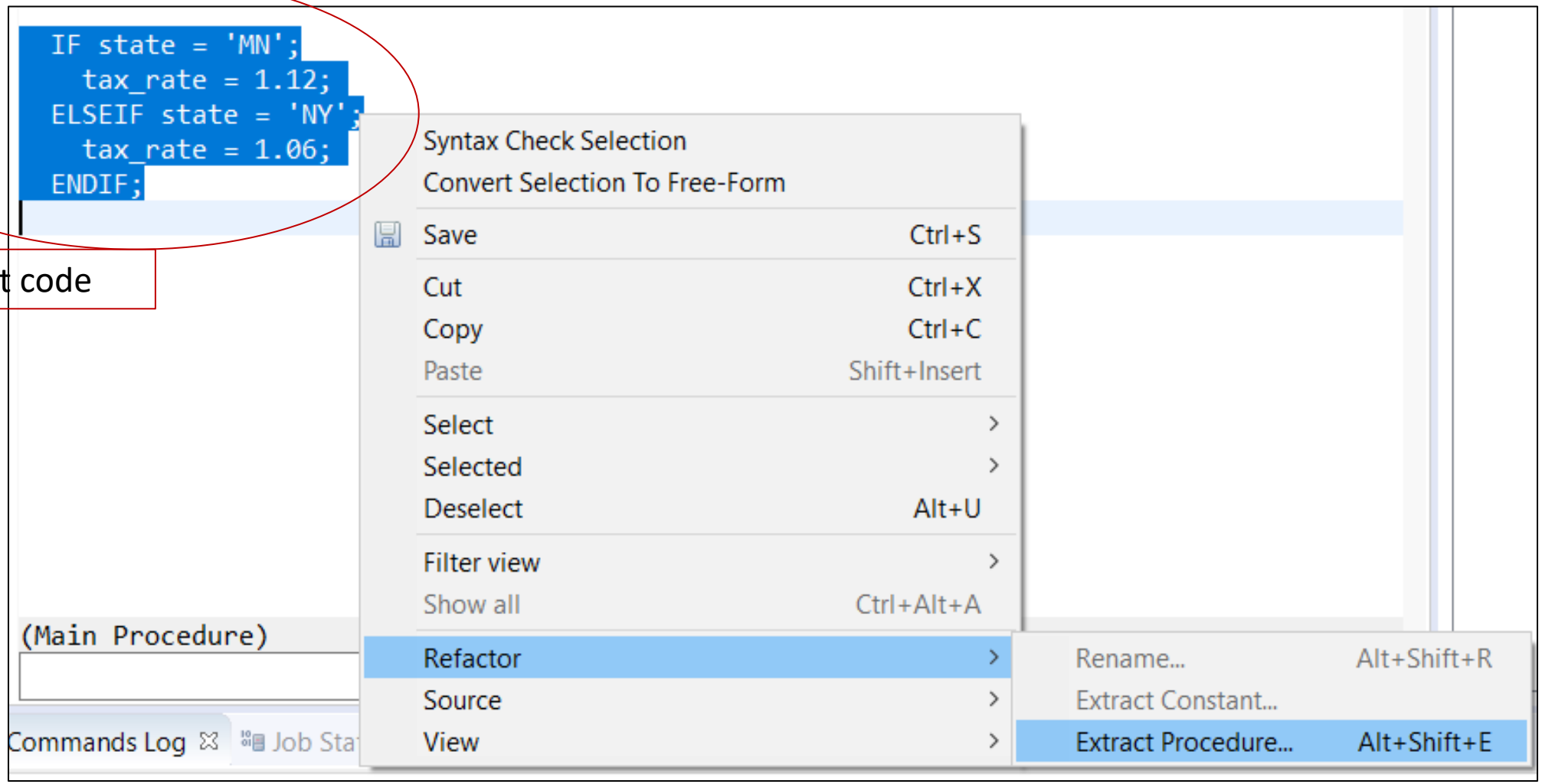


120 Day Free Trial

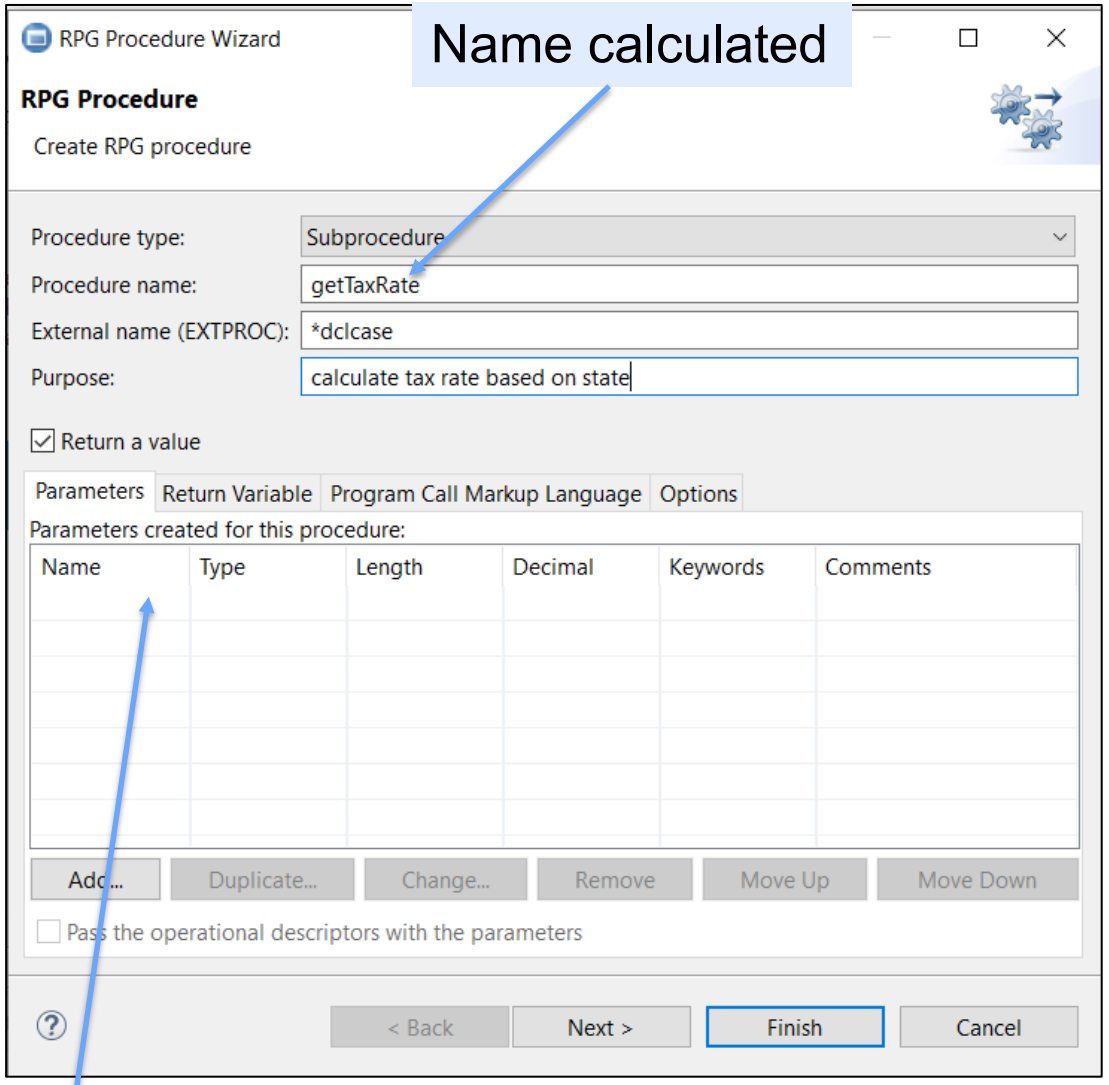
https://www.ibm.com/us-en/marketplace/rational-developer-for-i

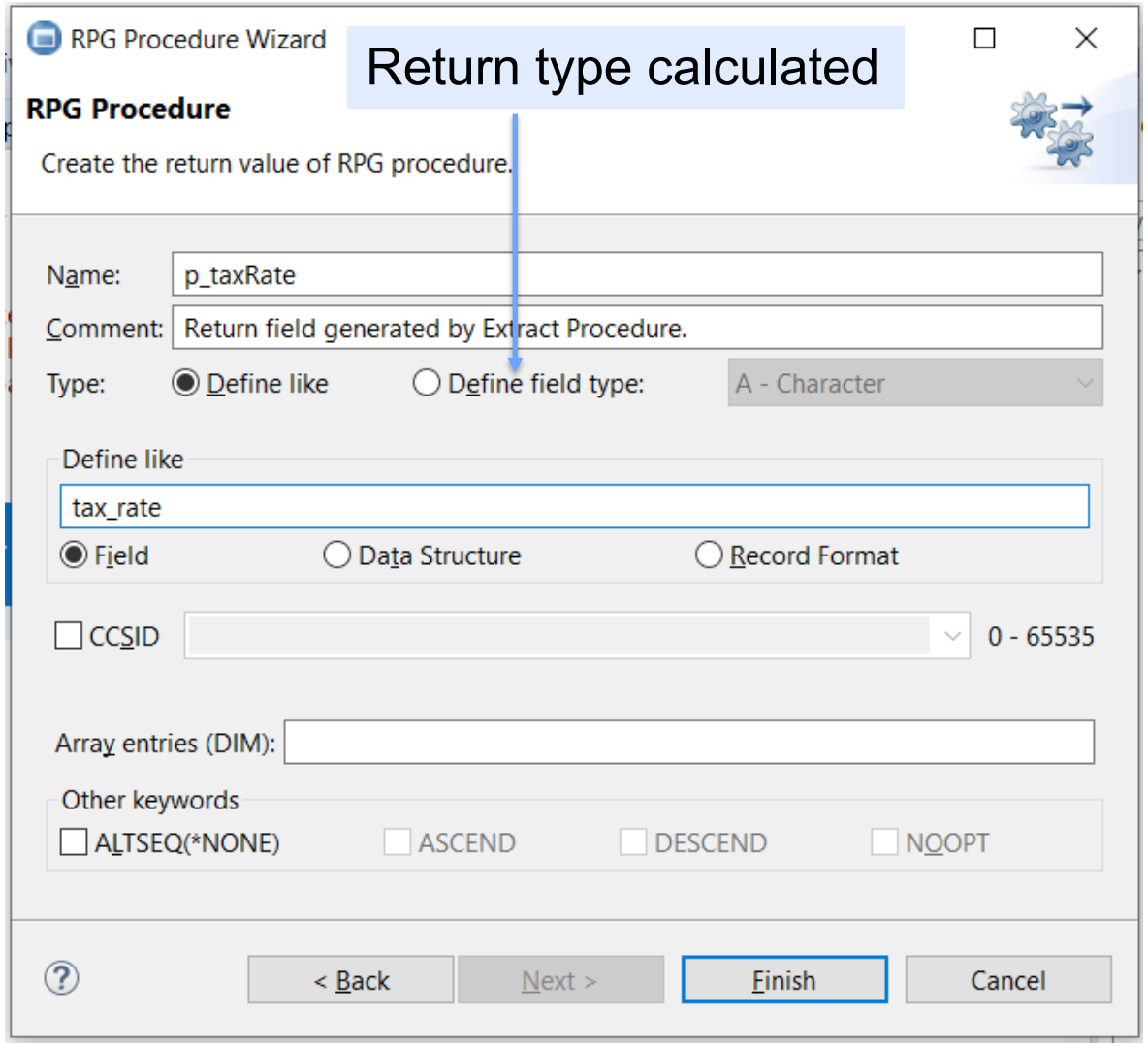
Rational Developer for i 9.6.0.7

- Refactoring – Extract and Create Procedure



RDi Creating a Procedure





Refactoring – Extract and Create Procedure

Procedure call inserted

Reusable procedure generated

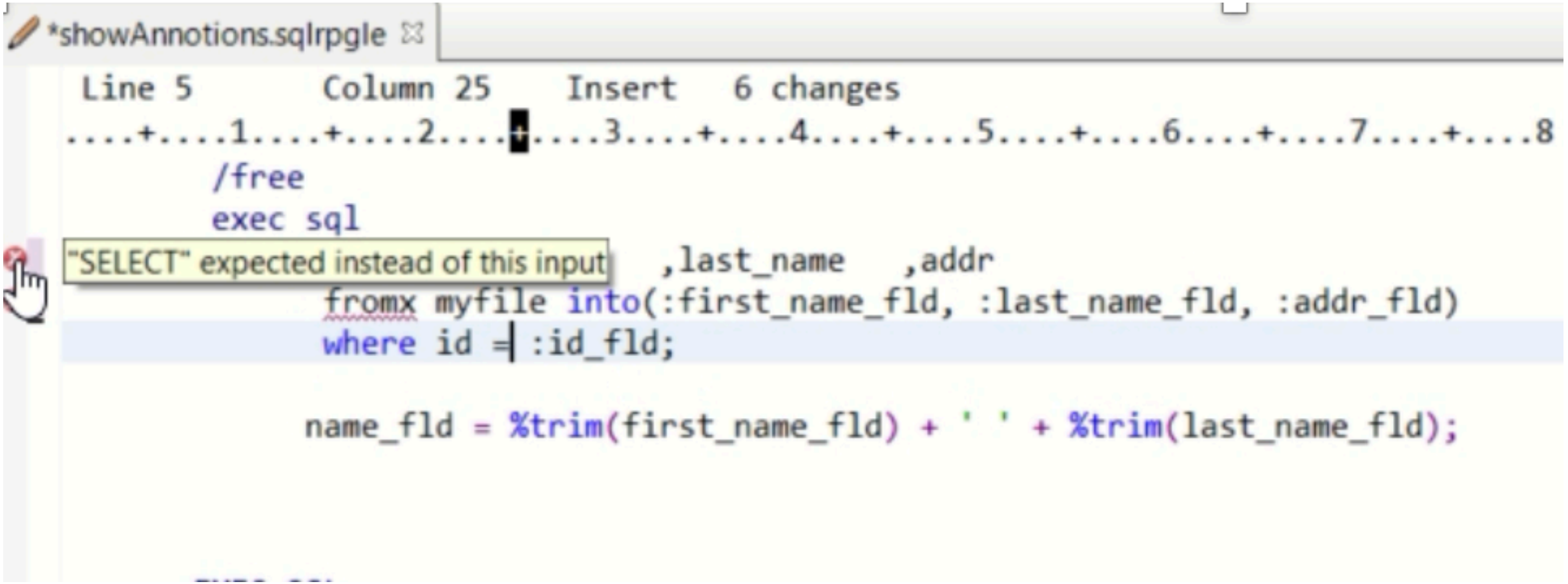
```
// calculate tax rate given state
taxRate = getTaxRate();

// ------------------------------------------------
// Procedure name: getTaxRate
// Purpose:        calculate tax rate given state
// Returns:        Return field generated by Extract Procedur
// ------------------------------------------------
dcl-proc getTaxRate;
  dcl-pi *N LIKE(tax_rate);
  end-pi;
  // Local fields

  dcl-s p_taxRate LIKE(tax_rate);
  IF state = 'MN';
    p_taxRate = 1.12;
  ELSEIF state = 'NY';
    p_taxRate = 1.06;
  ENDIF;

  return p_taxRate;
end-proc;
```

Realtime SQL Validation & Formatting



IBM Db2 Web Query for i

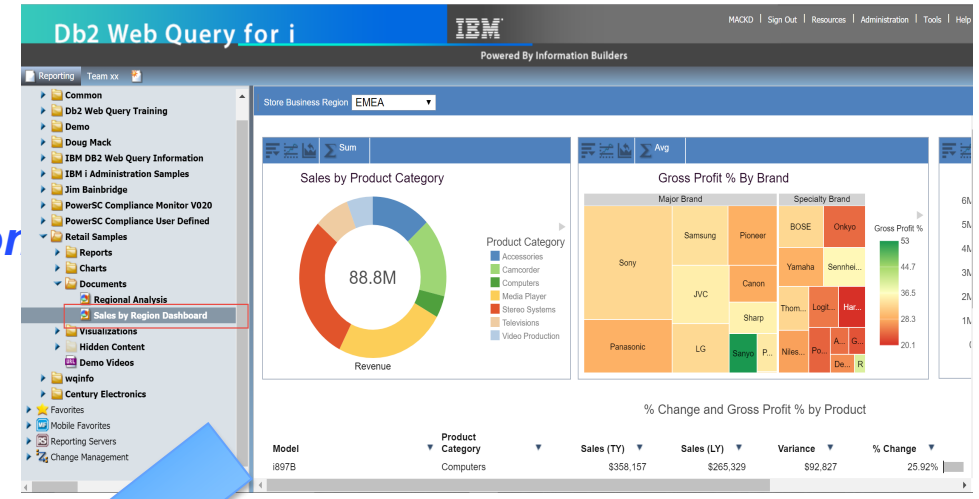
Doug Mack,
Senior Consultant,
IBM Lab Services
mack@us.ibm.com

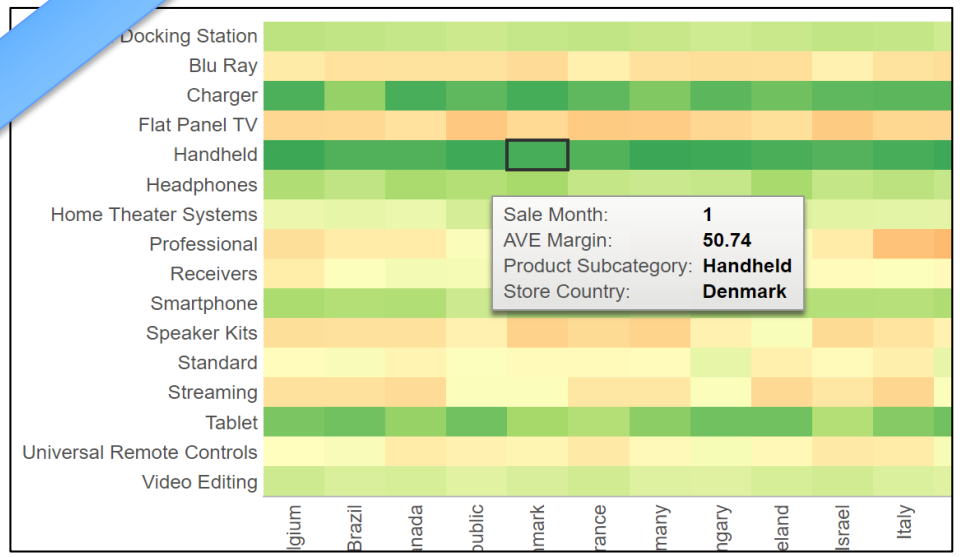
Updated Db2 Web Query EZ-Install Package

- Business Partner “Demo in a box”
- Simplified First Time Installation
- Simplified Upgrade from Previous Version
  - ***Do NOT use for applying PTF Group in same version***

- ***Jump Start the Learning Process***
  - **Test Drive** what you now have
  - **Learn** how to build reports/dashboards tutorial
  - Run **Query/400 Discovery Tool**
  - Learn about **System Admin Reports**
  - Learn about **Developer Workbench**
  - Learn about **DataMigrator ETL**
  - Learn about **Date Dimension Table**

- Request by sending email to QU2@us.ibm.com w/ Serial Number





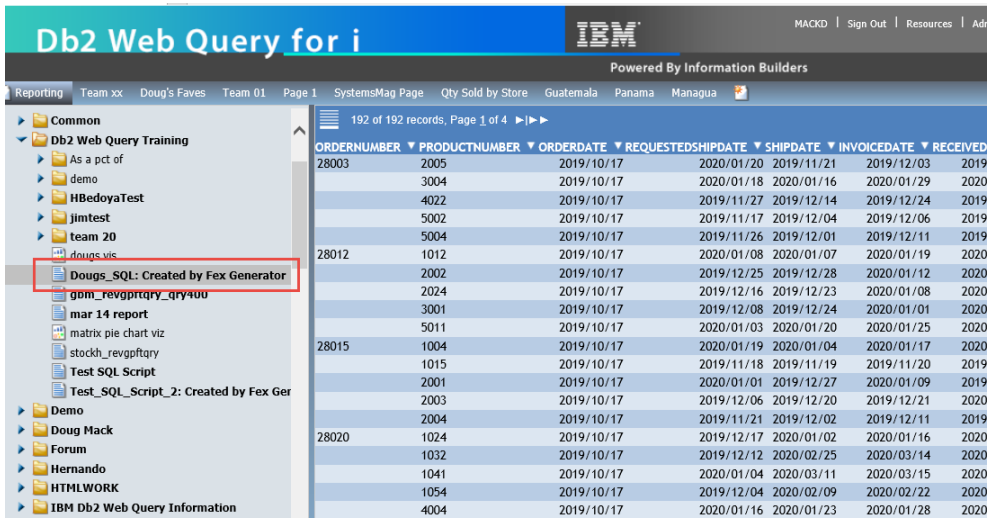
EZ-Report: Auto generate Synonym and Report from SQL

- Have already delivered auto generate for Query/400, now adding it for SQL

- Use Cases
  - Fast report over a Table/File
  - Fast report over IBM i Services
    - Copy/Paste from ACS Run SQL Scripts Examples
  - Fast report over SQL Statement
  - Converting other BI/Query tools to Db2 Web Query

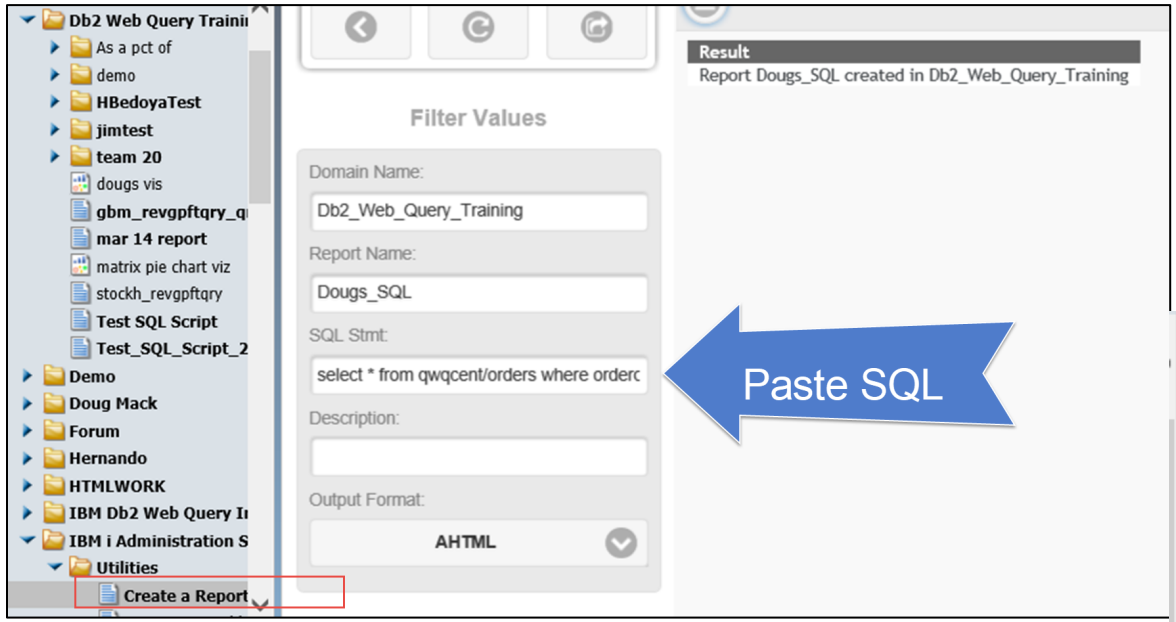
- What does it do?
  - Auto creates a synonym (meta data) over data source
  - Auto creates a “fex” object (i.e. report) in folder specified
  - Run report as is, or modify

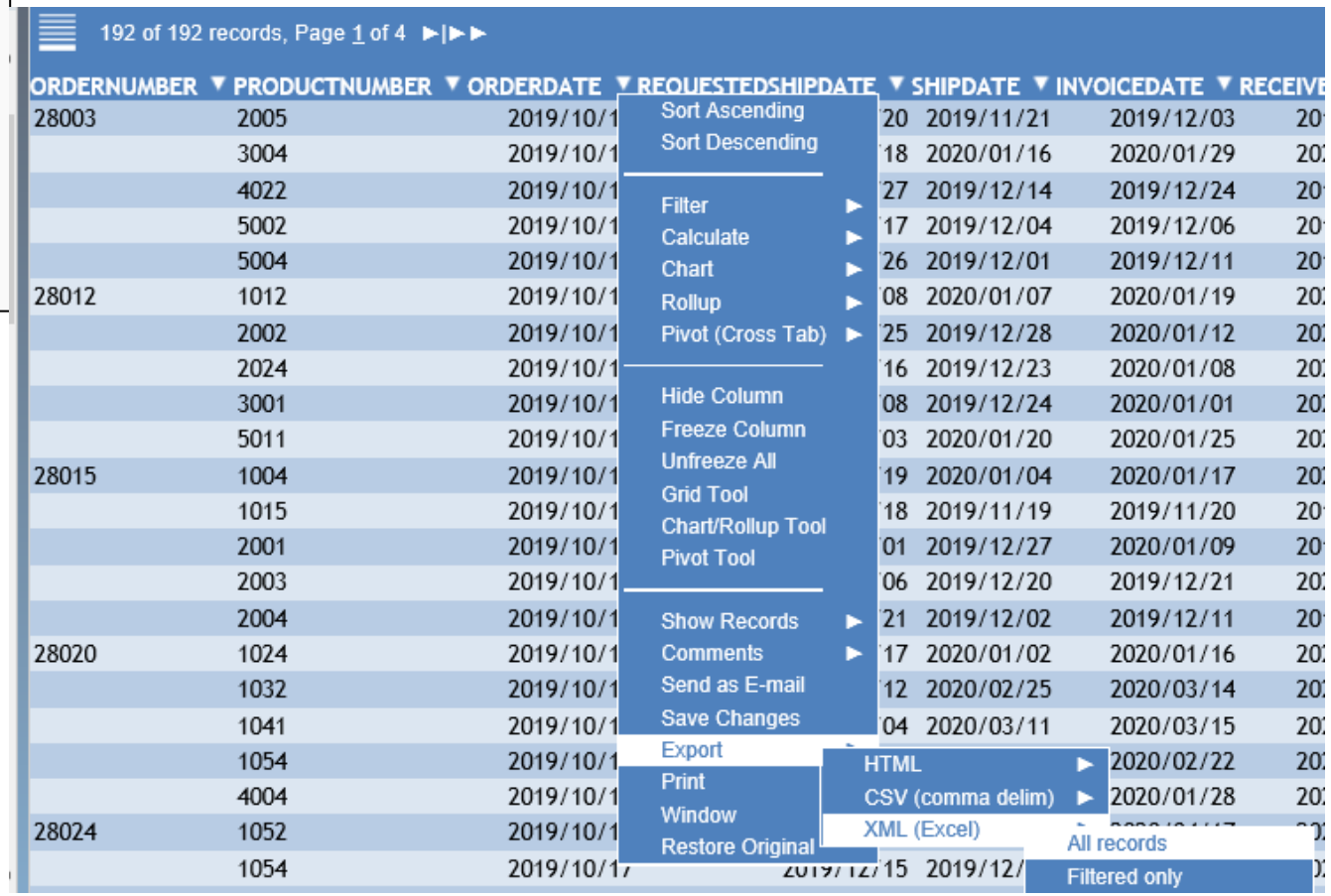
- How it will be shipped
  - As a utility in the next Db2 Web Query EZ-Install



Planned for Mid April

EZ-Report: Auto generate Synonym and Report from SQL



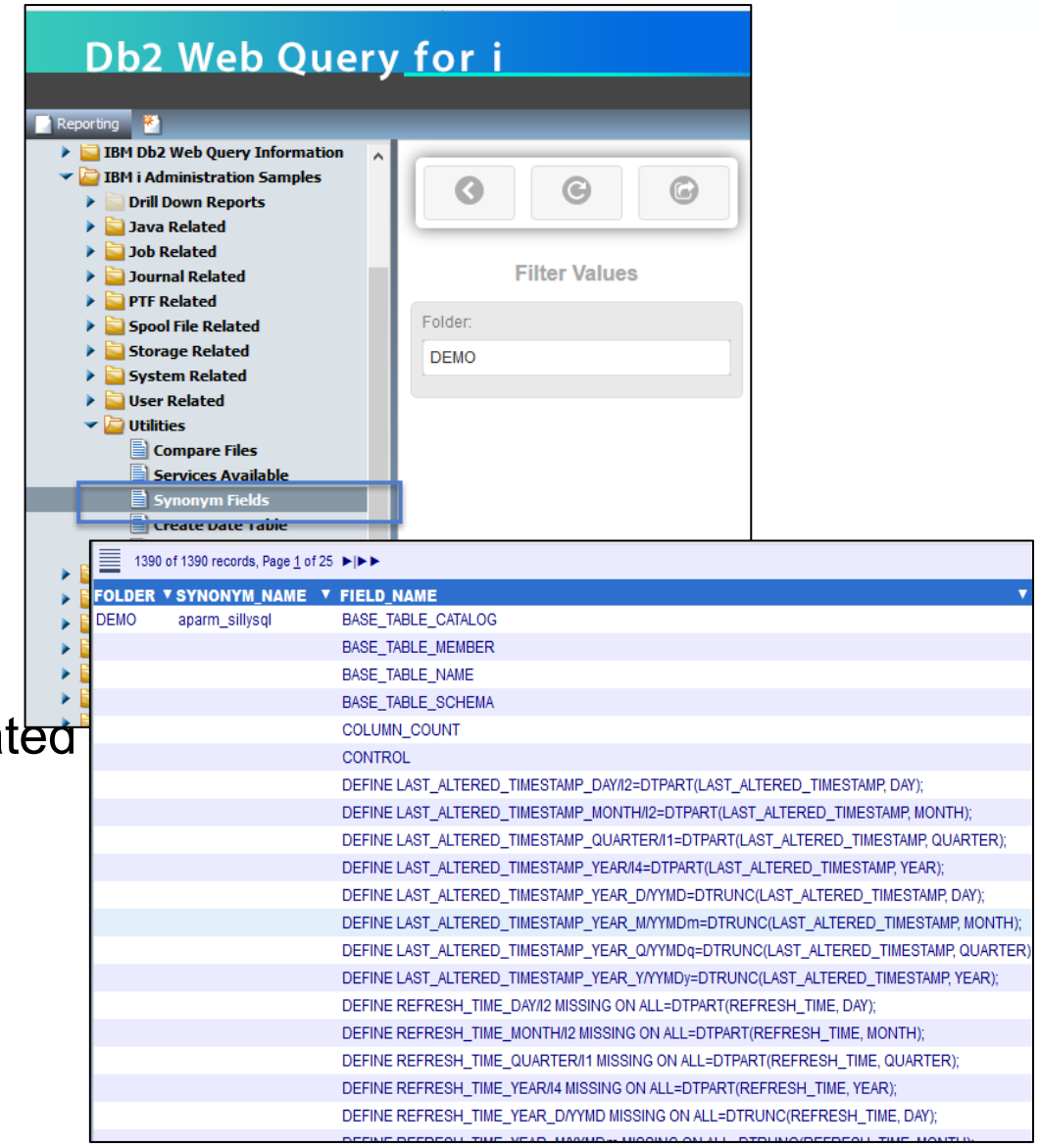


Search Synonyms and Report Objects

- Adds to additional utilities for the Db2 Web Query Administrator
  - Reverse engineer Spool File into Excel or PDF
  - Create Date Dimension Table
  - Compare Files

- Use Cases
  - Document field usage in synonyms for end users
  - Provides administrator with where used information
  - Eliminate redundancy of reports or synonyms
  - Search reports for common keywords (in the generated code)
  - Categorize reports via search to know what's available

- How it will be shipped
  - As a utility in the next Db2 Web Query EZ-Install



Planned for Mid April

Other technologies with new capabilities

- Db2 SQL new functions – compare file, JSON, INTERPRET and more
- Clustering – more automation
- PowerHA – Automation, use of SQL services, simplified updates
- BRMS – a large number of popular RFEs
- Hybrid Networking – Making full use of high-speed fabric with Live Partition Mobility
- RPG – growing the language to have features expected by new developers
- Access Client Solutions – improved content assist support plus more ease-of-use functions
- Open Source – including a way to use RPM when IBM i is not connected to the Internet

Rochester Executive Briefing Center

- In addition to the regular briefings held for clients, Rochester now hosts
- A Co-creation Center
  - What is that?
    - Joint workshops to develop plans/ best practices
  - Who can come there?
    - Business Partners
    - Customers
- Direct access to IBM i development team
- On-line briefings and webcasts also available.

Submit requests for briefings, meetings or web events at
https://briefingsource.dst.ibm.com/site/switchBriefingCenter?briefingCenterId=54

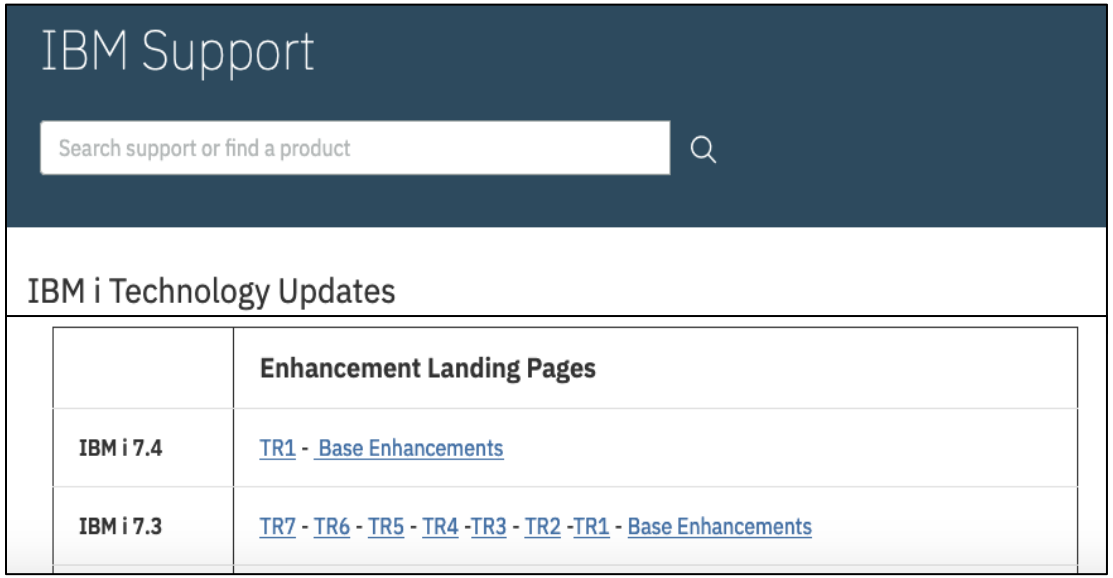
Helpful Links

IBM i Home Page:

– http://bit.ly/ibm_i_home

Technology Refresh Updates home page:

– https://www.ibm.com/support/pages/node/1119129



– Specific TR pages:

- https://supportcontent.ibm.com/support/pages/ibm-i-73-tr8-enhancements
- https://supportcontent.ibm.com/support/pages/ibm-i-74-tr2-enhancements

Blog

– ”You and i” home is http://bit.ly/You-and-i --

- IBM i in Spring 2020
- Fresh Faces and Finding Developers
- Announce blog

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