Things You Probably Didn’t Know You Could Do with Db2 Web Query *for i*

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IBM i Anywhere
IBM i Everywhere

IBM

Who Uses Db2 Web Query?

Executives - Dashboards to monitor Key Performance Indicators

Finance Dept – they love their spreadsheets!

Business Analysts and Data Scientists – Cobble together data and analyze on premise or in the cloud

Users on the Go - Mobile Device Support

Applications - URL API to Embed Reports in Apps

And YES, **IBM i Admins and Developers** – Monitor System and Security Metrics

FAST START: INSTALL with EZ-Install…..PLEASE

- EZ-Install is **HIGHLY RECOMMENDED** for installing webquery or upgrading from previous versions
  - Request it by sending an email to QU2@us.ibm.com, including name, company name, and s/n
  - It provides **VALUE ADD** way beyond just restoring the license program products
    - Sample Reports, Tutorials, Utilities to help you get a **FAST START**
      - Query/400 Discovery Tool
      - Create Date Dimension Table (really cool)
      - **Sample Reports for the Systems Administrator**
      - Business oriented sample reports backed by tutorials
  - Tutorials and additional “how to” documentation provide guides to show you how the sample reports were built

HELP us help you – make sure your IBM Business Partner is using EZ-Install to install or upgrade!

Request EZ-Install by emailing QU2@us.ibm.com. Include name, company name, serial number and OS level (ex. 7.3)

What Do You Get with EZ-Install?

IBM i Administration Samples folder

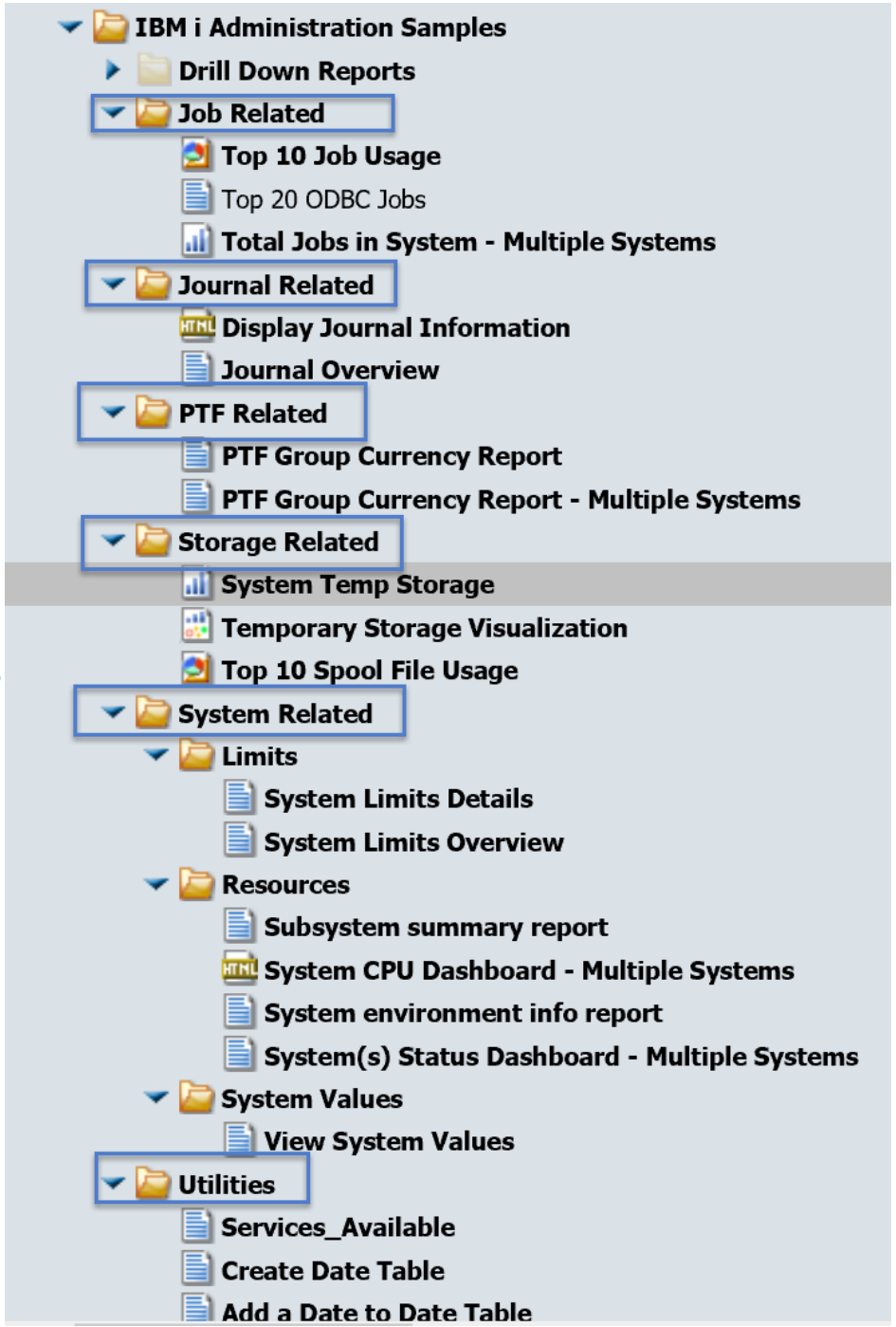
- Use as is
- Modify as you like
- Learn how you can build your own

There are other things of interest in EZ-Install

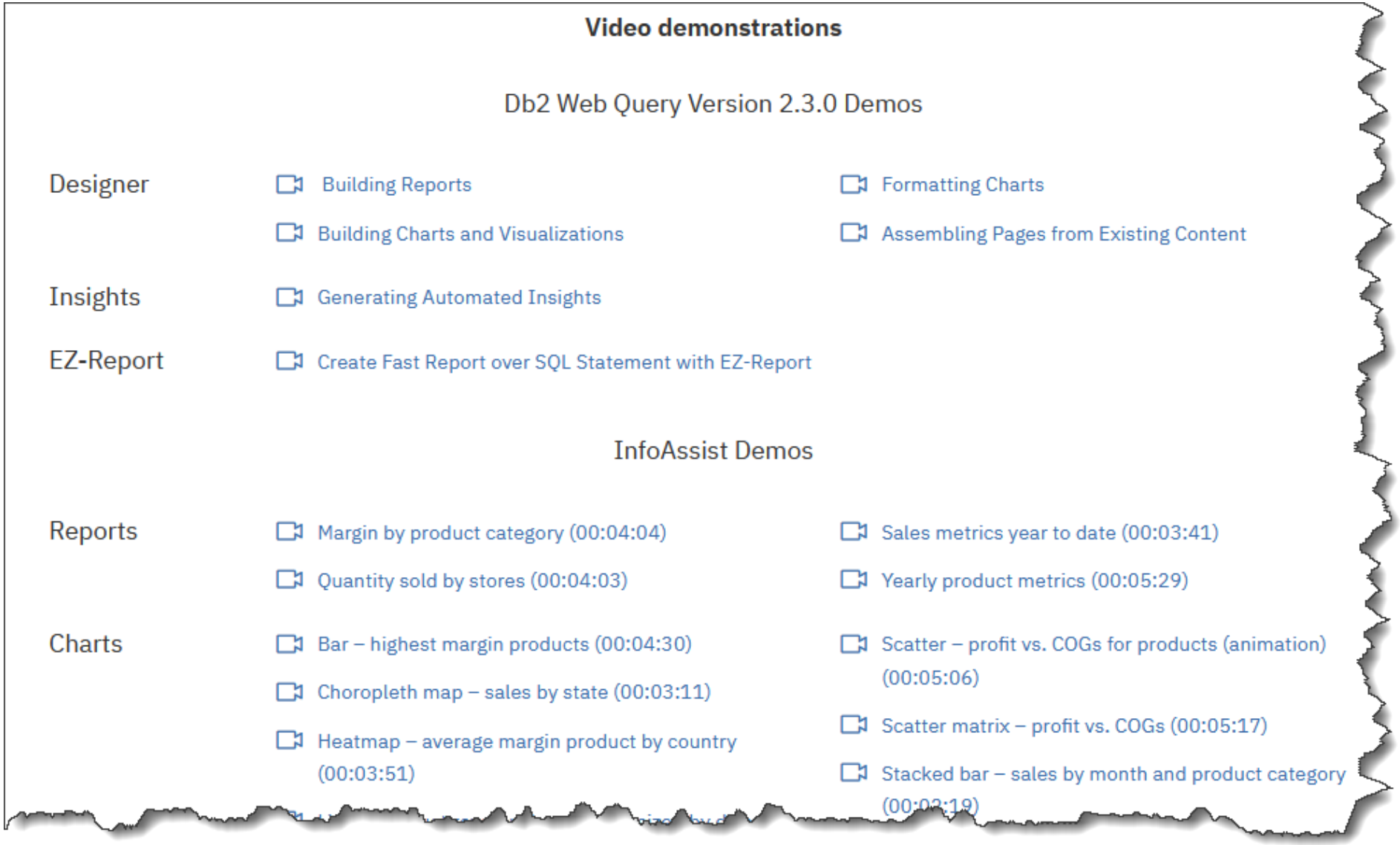
- Query/400 Discovery Tool
- Create Date Dimension Table
- **EZ-Report** ← NEW

And other things that come with the product

- Audit/Monitoring reports
  - Who is running the longest reports
  - Which reports are taking the longest
  - When was a report last modified
  - Who owns which “schedules”



Video Demonstrations



Video demonstrations

Db2 Web Query Version 2.3.0 Demos

Designer	Building Reports	Formatting Charts
	Building Charts and Visualizations	Assembling Pages from Existing Content
Insights	Generating Automated Insights	
EZ-Report	Create Fast Report over SQL Statement with EZ-Report	

InfoAssist Demos

Reports	Margin by product category (00:04:04)	Sales metrics year to date (00:03:41)
	Quantity sold by stores (00:04:03)	Yearly product metrics (00:05:29)
Charts	Bar – highest margin products (00:04:30)	Scatter – profit vs. COGs for products (animation) (00:05:06)
	Choropleth map – sales by state (00:03:11)	Scatter matrix – profit vs. COGs (00:05:17)
	Heatmap – average margin product by country (00:03:51)	Stacked bar – sales by month and product category (00:03:19)

http://ibm.biz/db2webqueryi or http://ibm.biz/db2wq-230-videos

New Db2 Web Query Editions

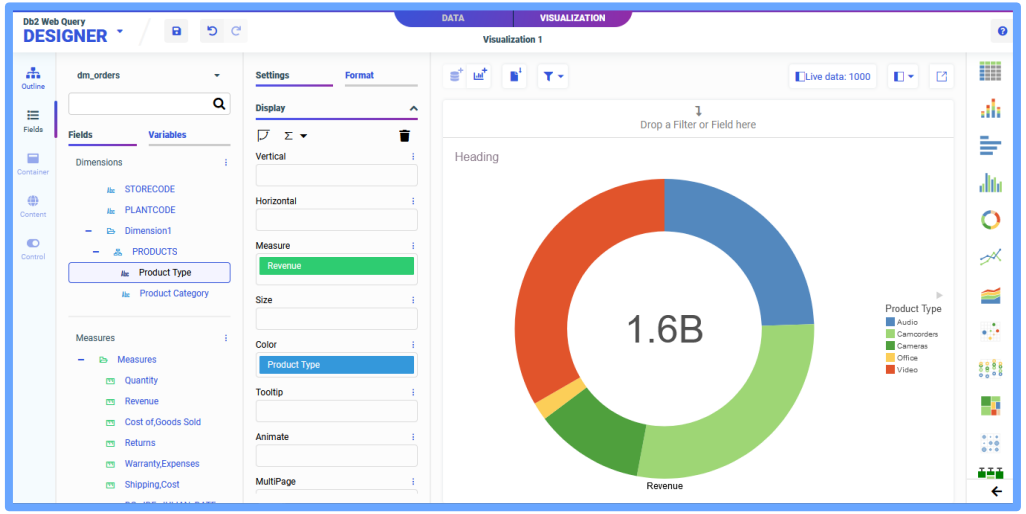
2020 iSight

Db2 Web Query **Scheduler Edition 5733-WQB**

– **Express + Job Scheduling**

– Unlimited report “consumers”

- Distributed via email, FTP, or placed on network drive
- Users can work with data offline
- Support Mobile or At Home Workers



Db2 Web Query **RunTime User Edition 5733-WQR**

– **Express + RunTime Licensing**

– Users can run interactive reports with live data

OVER 50% Savings for 20 user system

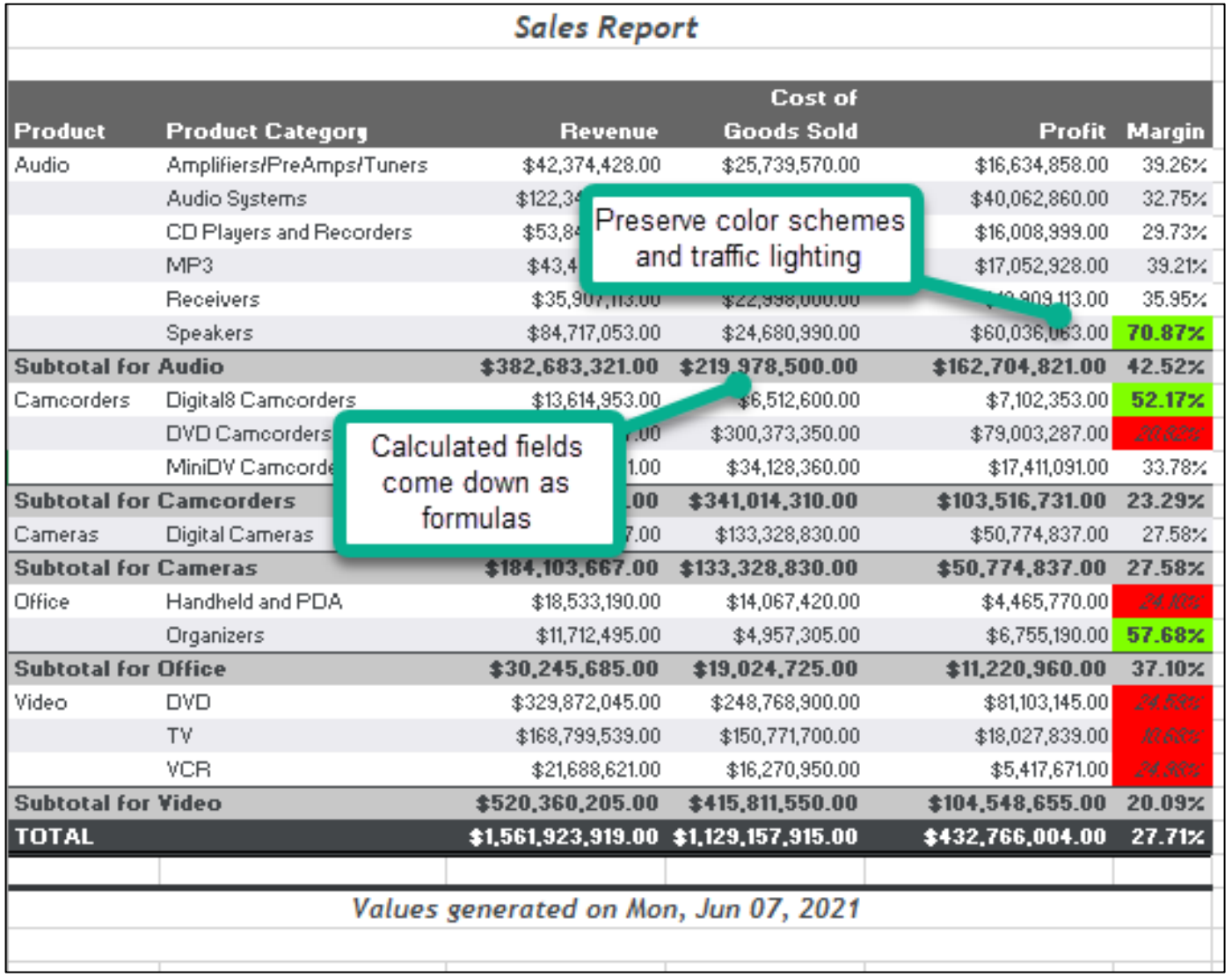
OVER 75% Savings for 50 user system

ibm.biz/db2wq-blog-neweditions

Savings compares adding user licenses to Express vs. Upgrading to new Edition
Calculated using U.S. List Prices and includes SW Maintenance
Assumes you already own Express Edition + 2 user licenses

I am Required to Show This Slide

- Yes, Db2 Web Query Does Excel



Sales Report

Product	Product Category	Revenue	Cost of Goods Sold	Profit	Margin
Audio	Amplifiers/PreAmps/Tuners	$42,374,428.00	$25,739,570.00	$16,634,858.00	39.26%
	Audio Systems	$122,3		$40,062,860.00	32.75%
	CD Players and Recorders	$53,8		$16,008,999.00	29.73%
	MP3	$43,4		$17,052,928.00	39.21%
	Receivers	$35,907,113.00	$22,998,000.00	909,113.00	35.95%
	Speakers	$84,717,053.00	$24,680,990.00	$60,036,063.00	**70.87%**
Subtotal for Audio		**$382,683,321.00**	**$219,978,500.00**	**$162,704,821.00**	**42.52%**
Camcorders	Digital8 Camcorders	$13,614,953.00	$6,512,600.00	$7,102,353.00	**52.17%**
	DVD Camcorders	.00	$300,373,350.00	$79,003,287.00	20.82%
	MiniDV Camcorde	1.00	$34,128,360.00	$17,411,091.00	33.78%
Subtotal for Camcorders		**.00**	**$341,014,310.00**	**$103,516,731.00**	**23.29%**
Cameras	Digital Cameras	7.00	$133,328,830.00	$50,774,837.00	27.58%
Subtotal for Cameras		**$184,103,667.00**	**$133,328,830.00**	**$50,774,837.00**	**27.58%**
Office	Handheld and PDA	$18,533,190.00	$14,067,420.00	$4,465,770.00	24.10%
	Organizers	$11,712,495.00	$4,957,305.00	$6,755,190.00	**57.68%**
Subtotal for Office		**$30,245,685.00**	**$19,024,725.00**	**$11,220,960.00**	**37.10%**
Video	DVD	$329,872,045.00	$248,768,900.00	$81,103,145.00	24.59%
	TV	$168,799,539.00	$150,771,700.00	$18,027,839.00	10.68%
	VCR	$21,688,621.00	$16,270,950.00	$5,417,671.00	24.98%
Subtotal for Video		**$520,360,205.00**	**$415,811,550.00**	**$104,548,655.00**	**20.09%**
TOTAL		**$1,561,923,919.00**	**$1,129,157,915.00**	**$432,766,004.00**	**27.71%**

Values generated on Mon, Jun 07, 2021

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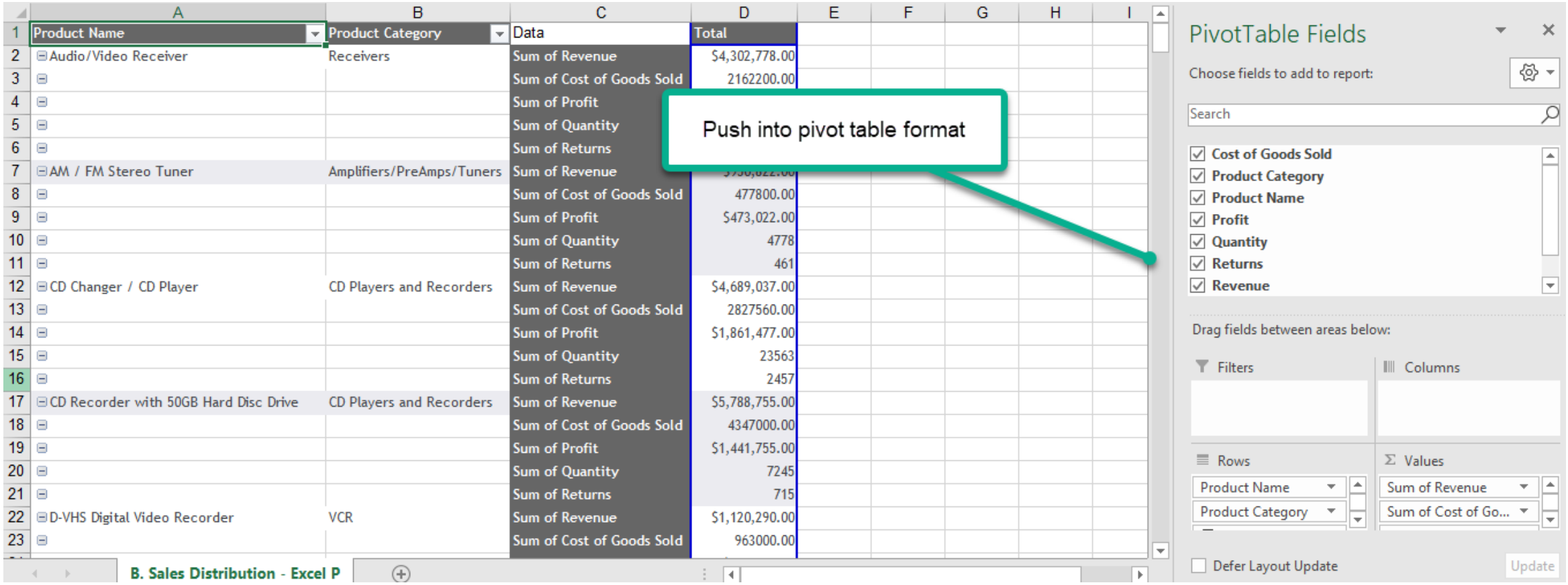
- Yes, Db2 Web Query Does Excel



	A	B	C	D
1	Product Name	Product Category	Data	Total
2	Audio/Video Receiver	Receivers	Sum of Revenue	$4,302,778.00
3			Sum of Cost of Goods Sold	2162200.00
4			Sum of Profit	
5			Sum of Quantity	
6			Sum of Returns	
7	AM / FM Stereo Tuner	Amplifiers/PreAmps/Tuners	Sum of Revenue	
8			Sum of Cost of Goods Sold	477800.00
9			Sum of Profit	$473,022.00
10			Sum of Quantity	4778
11			Sum of Returns	461
12	CD Changer / CD Player	CD Players and Recorders	Sum of Revenue	$4,689,037.00
13			Sum of Cost of Goods Sold	2827560.00
14			Sum of Profit	$1,861,477.00
15			Sum of Quantity	23563
16			Sum of Returns	2457
17	CD Recorder with 50GB Hard Disc Drive	CD Players and Recorders	Sum of Revenue	$5,788,755.00
18			Sum of Cost of Goods Sold	4347000.00
19			Sum of Profit	$1,441,755.00
20			Sum of Quantity	7245
21			Sum of Returns	715
22	D-VHS Digital Video Recorder	VCR	Sum of Revenue	$1,120,290.00
23			Sum of Cost of Goods Sold	963000.00

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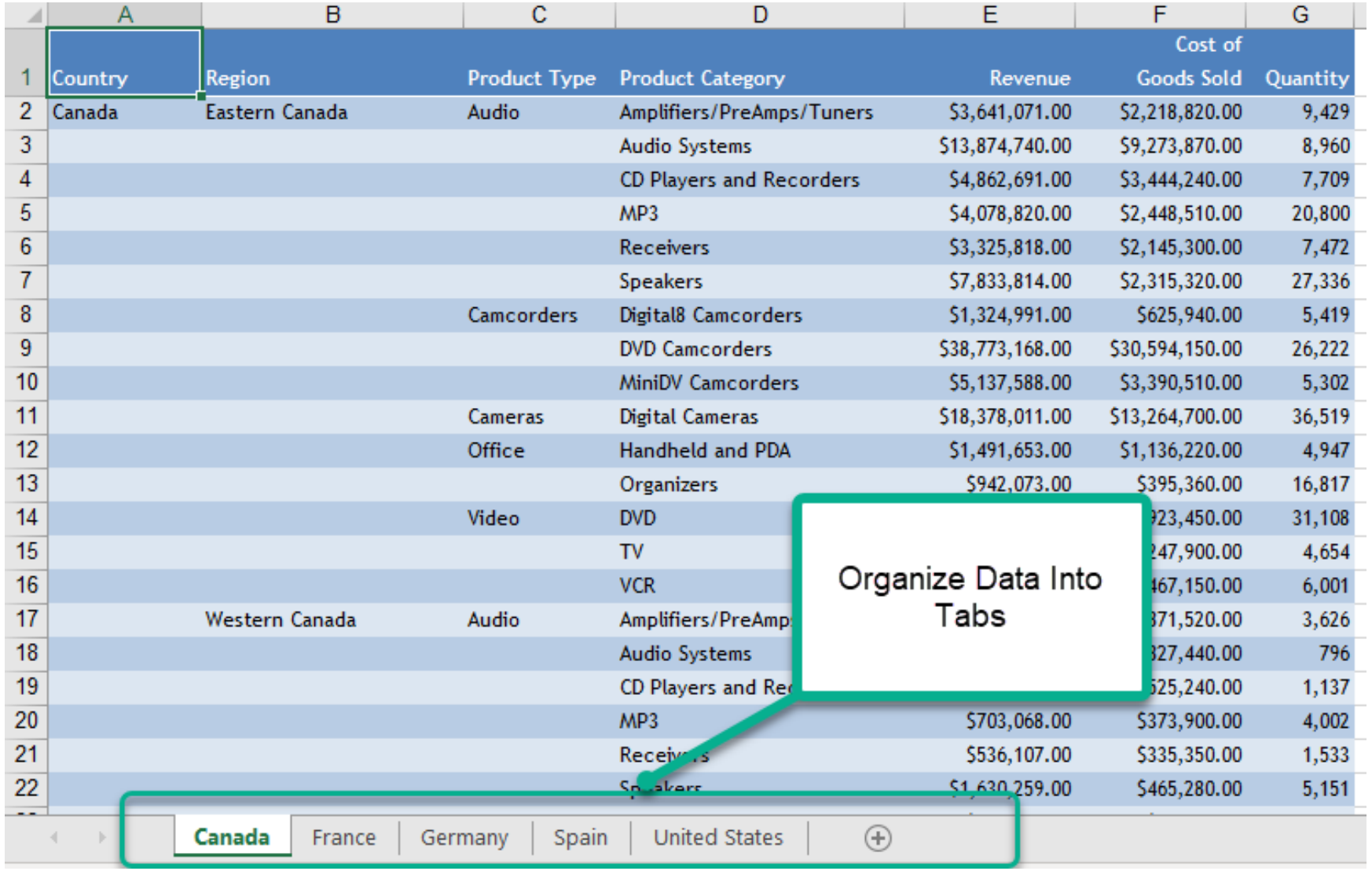


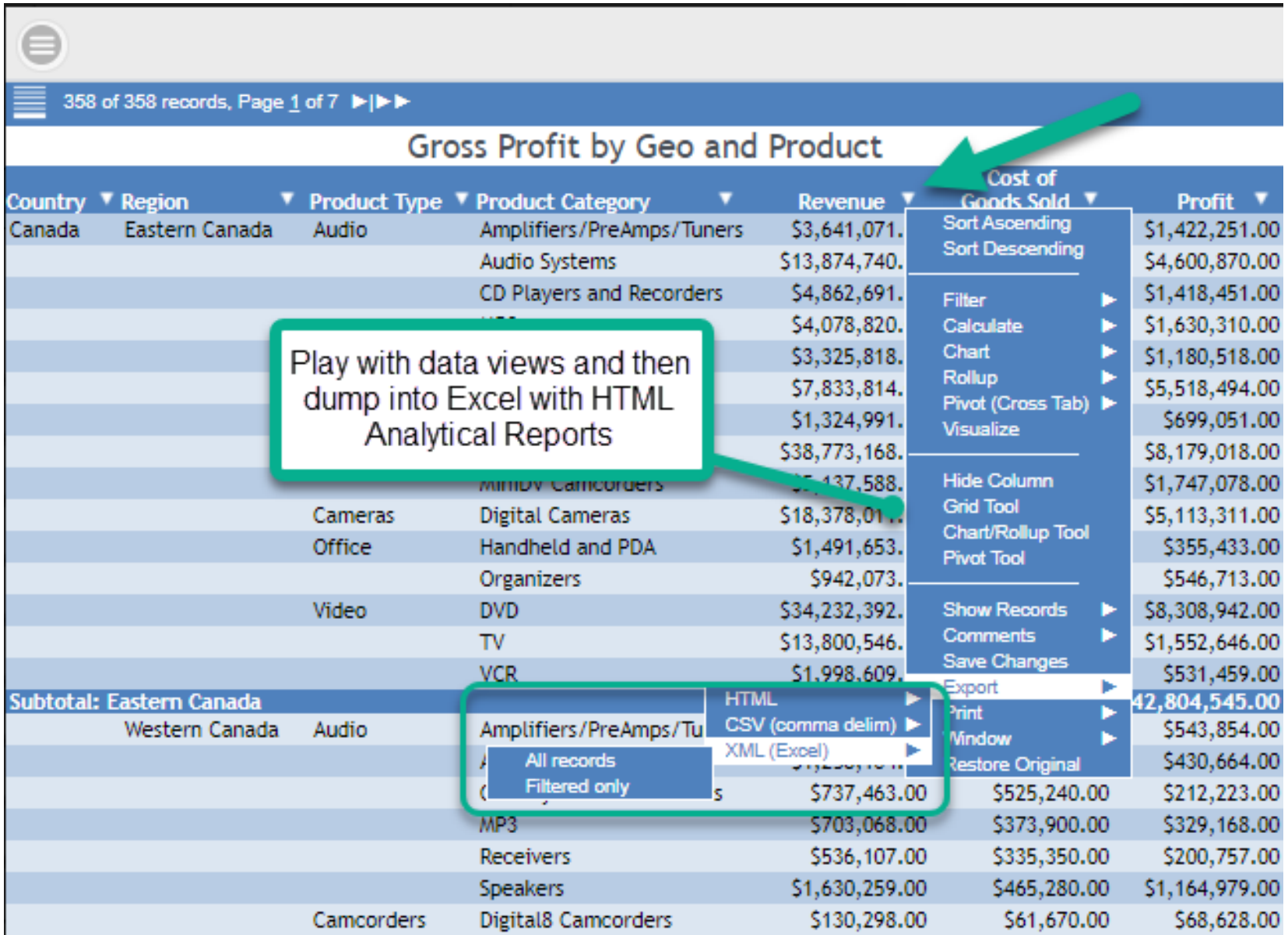
	A	B	C	D	E	F	G
1	Country	Region	Product Type	Product Category	Revenue	Cost of Goods Sold	Quantity
2	Canada	Eastern Canada	Audio	Amplifiers/PreAmps/Tuners	$3,641,071.00	$2,218,820.00	9,429
3				Audio Systems	$13,874,740.00	$9,273,870.00	8,960
4				CD Players and Recorders	$4,862,691.00	$3,444,240.00	7,709
5				MP3	$4,078,820.00	$2,448,510.00	20,800
6				Receivers	$3,325,818.00	$2,145,300.00	7,472
7				Speakers	$7,833,814.00	$2,315,320.00	27,336
8			Camcorders	Digital8 Camcorders	$1,324,991.00	$625,940.00	5,419
9				DVD Camcorders	$38,773,168.00	$30,594,150.00	26,222
10				MiniDV Camcorders	$5,137,588.00	$3,390,510.00	5,302
11			Cameras	Digital Cameras	$18,378,011.00	$13,264,700.00	36,519
12			Office	Handheld and PDA	$1,491,653.00	$1,136,220.00	4,947
13				Organizers	$942,073.00	$395,360.00	16,817
14			Video	DVD		923,450.00	31,108
15				TV		247,900.00	4,654
16				VCR		467,150.00	6,001
17		Western Canada	Audio	Amplifiers/PreAmp		371,520.00	3,626
18				Audio Systems		327,440.00	796
19				CD Players and Re		525,240.00	1,137
20				MP3	$703,068.00	$373,900.00	4,002
21				Receivers	$536,107.00	$335,350.00	1,533
22				Speakers	$1,630,259.00	$465,280.00	5,151

Organize Data Into Tabs

Canada | France | Germany | Spain | United States

I am Required to Show This Slide

- Yes, Db2 Web Query Does Excel



Country	Region	Product Type	Product Category	Revenue	Cost of Goods Sold	Profit
Canada	Eastern Canada	Audio	Amplifiers/PreAmps/Tuners	$3,641,071.		$1,422,251.00
			Audio Systems	$13,874,740.		$4,600,870.00
			CD Players and Recorders	$4,862,691.		$1,418,451.00
				$4,078,820.		$1,630,310.00
				$3,325,818.		$1,180,518.00
				$7,833,814.		$5,518,494.00
				$1,324,991.		$699,051.00
				$38,773,168.		$8,179,018.00
						$1,747,078.00
		Cameras	Digital Cameras	$18,378,01		$5,113,311.00
		Office	Handheld and PDA	$1,491,653.		$355,433.00
			Organizers	$942,073.		$546,713.00
		Video	DVD	$34,232,392.		$8,308,942.00
			TV	$13,800,546.		$1,552,646.00
			VCR	$1,998,609.		$531,459.00
Subtotal: Eastern Canada						42,804,545.00
	Western Canada	Audio	Amplifiers/PreAmps/Tu			$543,854.00
						$430,664.00
				$737,463.00	$525,240.00	$212,223.00
			MP3	$703,068.00	$373,900.00	$329,168.00
			Receivers	$536,107.00	$335,350.00	$200,757.00
			Speakers	$1,630,259.00	$465,280.00	$1,164,979.00
		Camcorders	Digital8 Camcorders	$130,298.00	$61,670.00	$68,628.00

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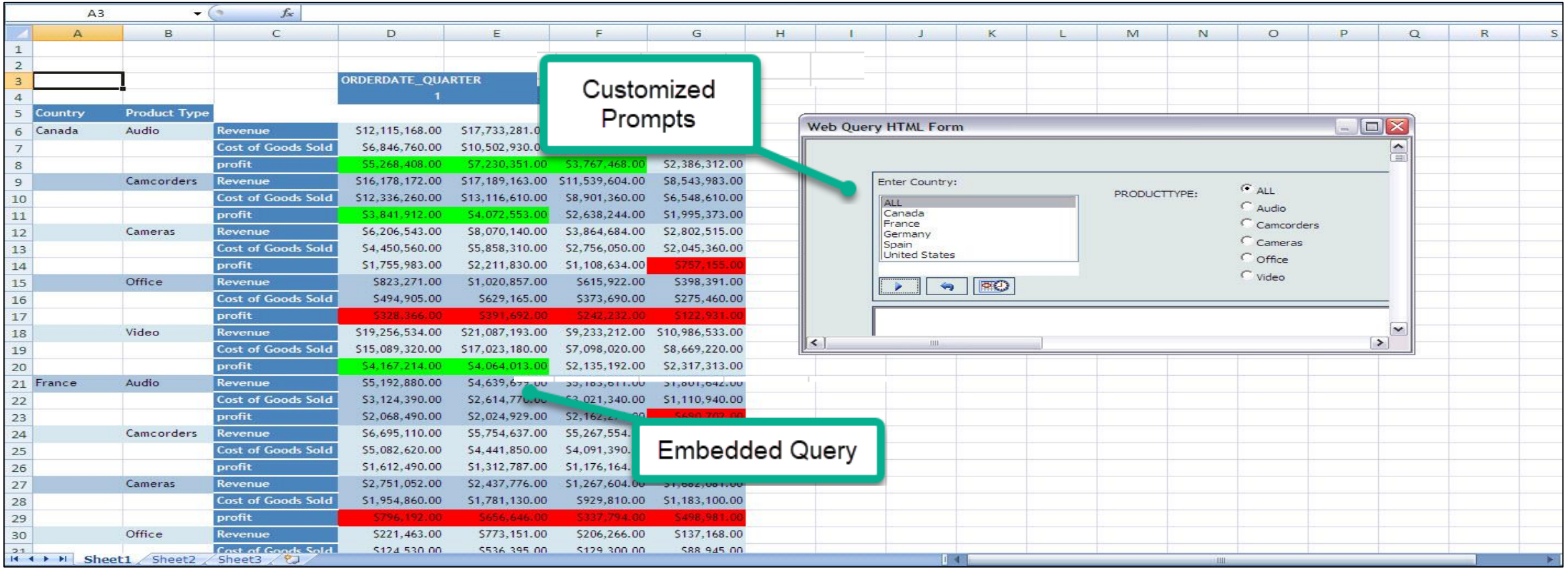
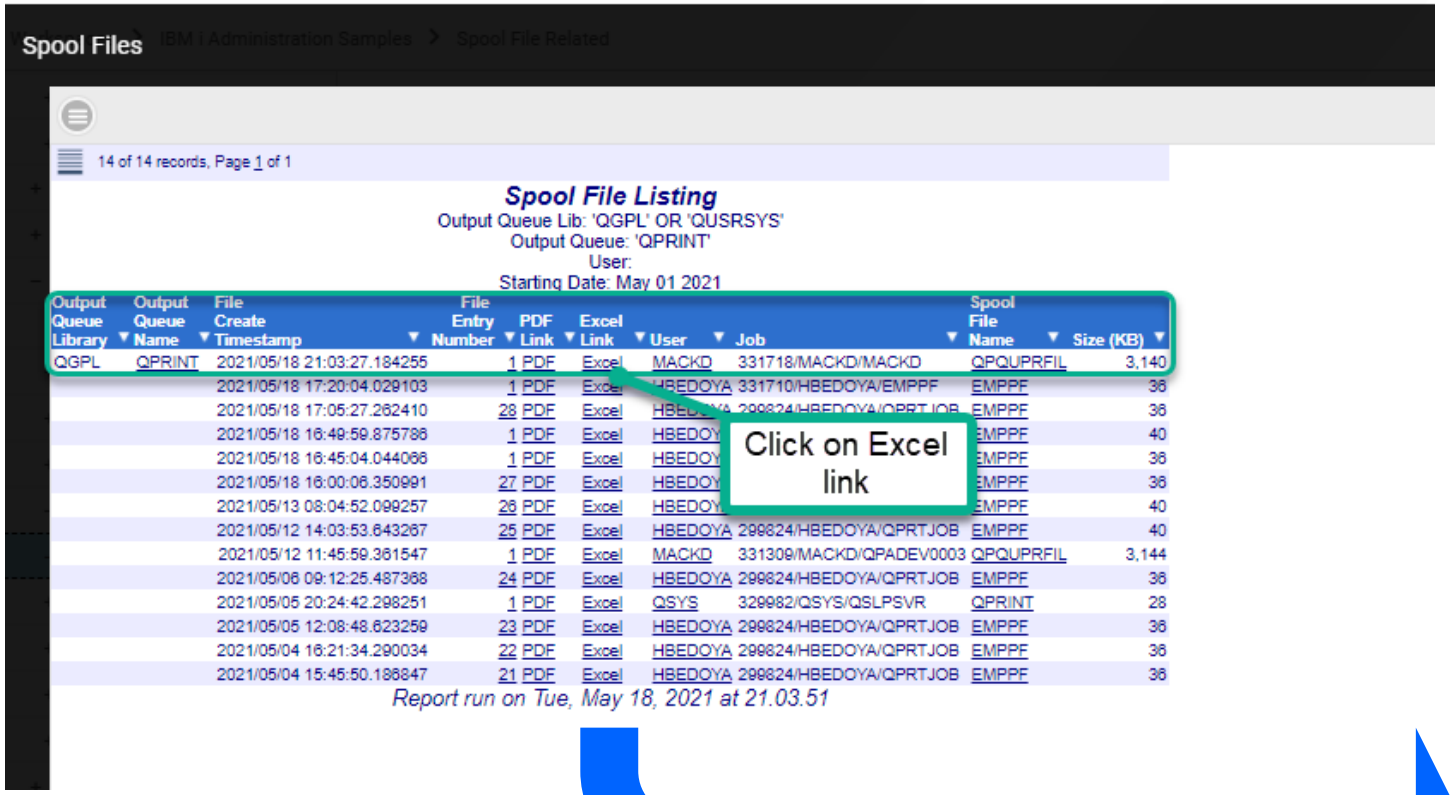


I’m not required to show this but I thought I would anyway

- Run Spool Files report to generate list of spooled files based on selection criteria



	A	B	C	D	E	F	G
1	5/18/2021	21:03:27					PAGE 1
2	Order	Order	Requested	Actual	Receive	Price	Cost
3	Number	Date	Ship Date	Ship Date	Date		
4	54390	12/29/2021	2/8/2022	4/23/2022	4/28/2022	199	100
5	54390	12/29/2021	3/29/2022	3/28/2022	4/13/2022	129	40
6	54390	12/29/2021	2/1/2022	2/17/2022	2/27/2022	199	150
7	54390	12/29/2021	2/13/2022	2/23/2022	3/24/2022	399	300
8	54390	12/29/2021	4/4/2022	4/1/2022	4/27/2022	899	750
9	54510	12/29/2021	2/19/2022	5/3/2022	5/30/2022	199	100
10	54510	12/29/2021	1/30/2022	4/14/2022	5/2/2022	129	60
11	54510	12/29/2021	3/22/2022	3/19/2022	4/6/2022	189	100
12	54510	12/29/2021	2/14/2022	2/5/2022	2/25/2022	279	150
13	54510	12/29/2021	2/12/2022	3/2/2022	3/8/2022	329	250
14	54510	12/29/2021	2/15/2022	2/23/2022	3/19/2022	459	350

Agenda

2020 iSight

- What’s New in 2.3.0
- To SQL or not to SQL using IBM i Services Examples

Db2 Web Query Version 2.3.0

- **Significant** upgrades in ease of use and navigation
- **New Home Page** simplifies organization of content
  - Complements legacy BI Portal
- Powerful **New Designer** for creating content
  - Complements legacy InfoAssist authoring tool
- Data Preparation facilities to **“work with data”** for building of extracts or “wrangling” data to use for visualizations
- **New “Insights”** brings packaged AI/ML models to Web Query to auto generate additional data relationship charts and information

Auto Generate Insights – New in Version 2.3.0

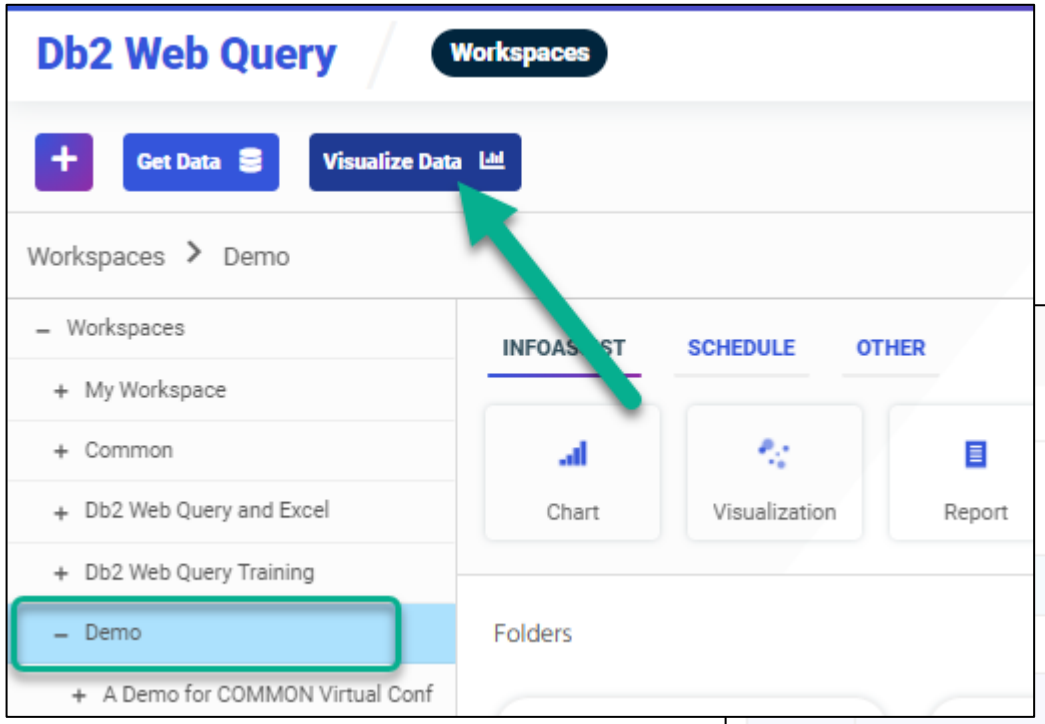
Increase productivity and gain insights through automatic generation of analytics

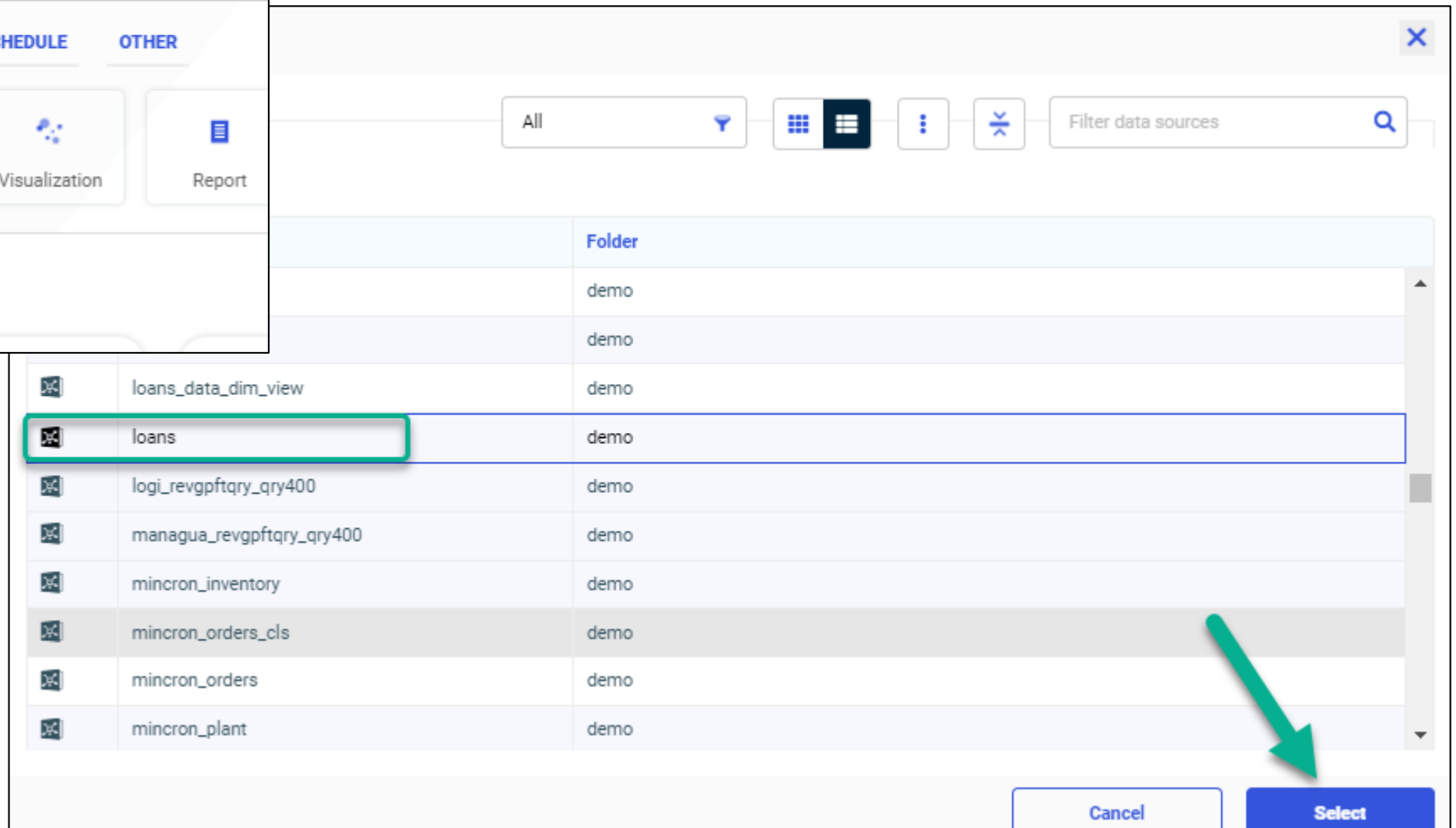
- Automatically analyze data sets via pre-built ML (machine learning) models to find correlations and outliers
- User can cobble the data set together through synonyms, or new Data Flows
- **Initially shipped as a limited use cloud-based approach for Phase 1**

Chart Category	Description	Statistical Model Used
Correlations	Detects cases where multiple measures show a similar trend or pattern.	Pearson Correlation
Outliers	Identifies unusual patterns in categorical data.	Entropy Analysis
Time-based	Analyzes business data over time to identify consistent and inconsistent patterns in noisy data.	Time-based outlier: Isolation Forest
		Time-based seasonality: STL Decomposition
		Time-based trend: Piecewise Linear Regression

Note: Insights ships with a default of being disabled

Example: Loan Data

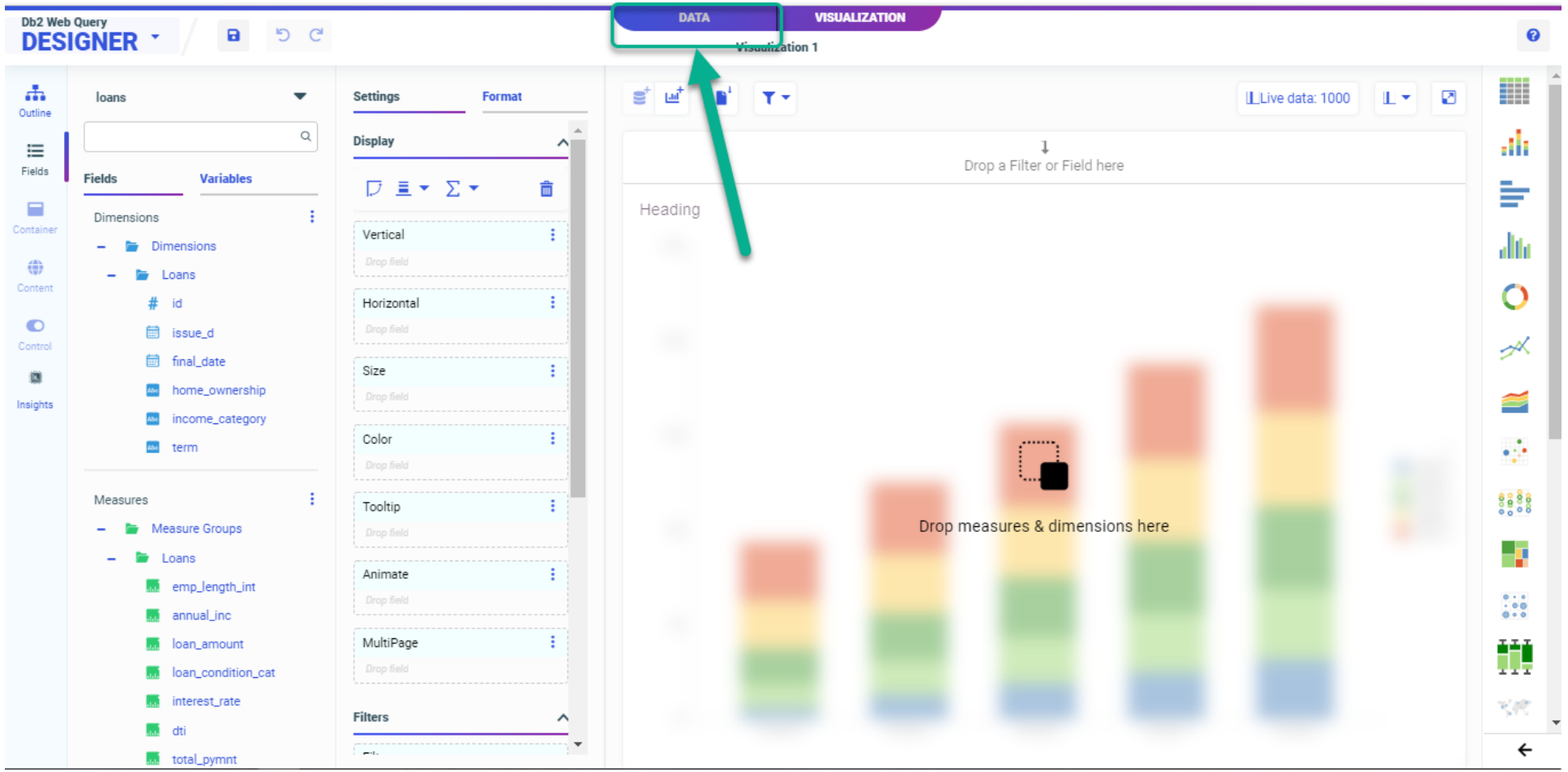




- Navigate to your workspace
- Click on Visualize Data
- Select the LOANS Synonym

Loan Data

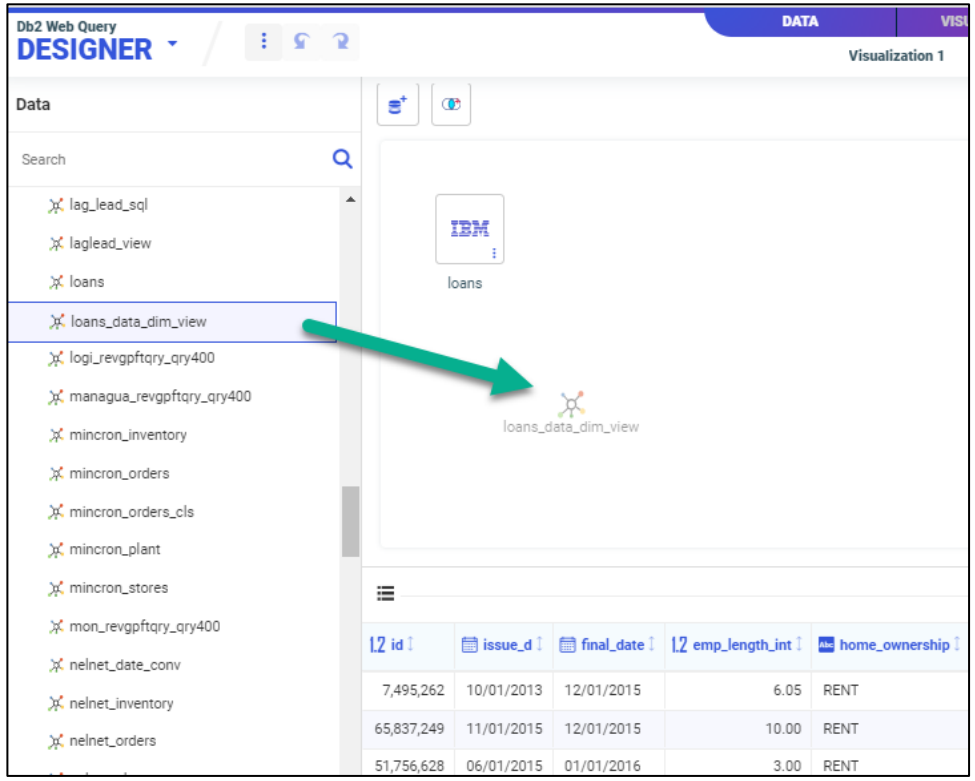
- New Db2 Web Query “Designer” Opens
- Let’s cobble some data together first. Click on DATA Tab

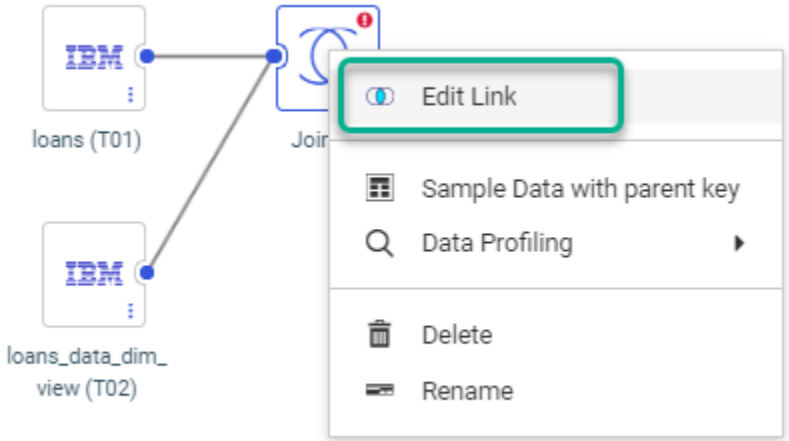


Loan Data

- Suppose you had a Packed 8 Decimal field for date
  - Let's fix that – web query ships with a utility to create a date dimension table (and view)

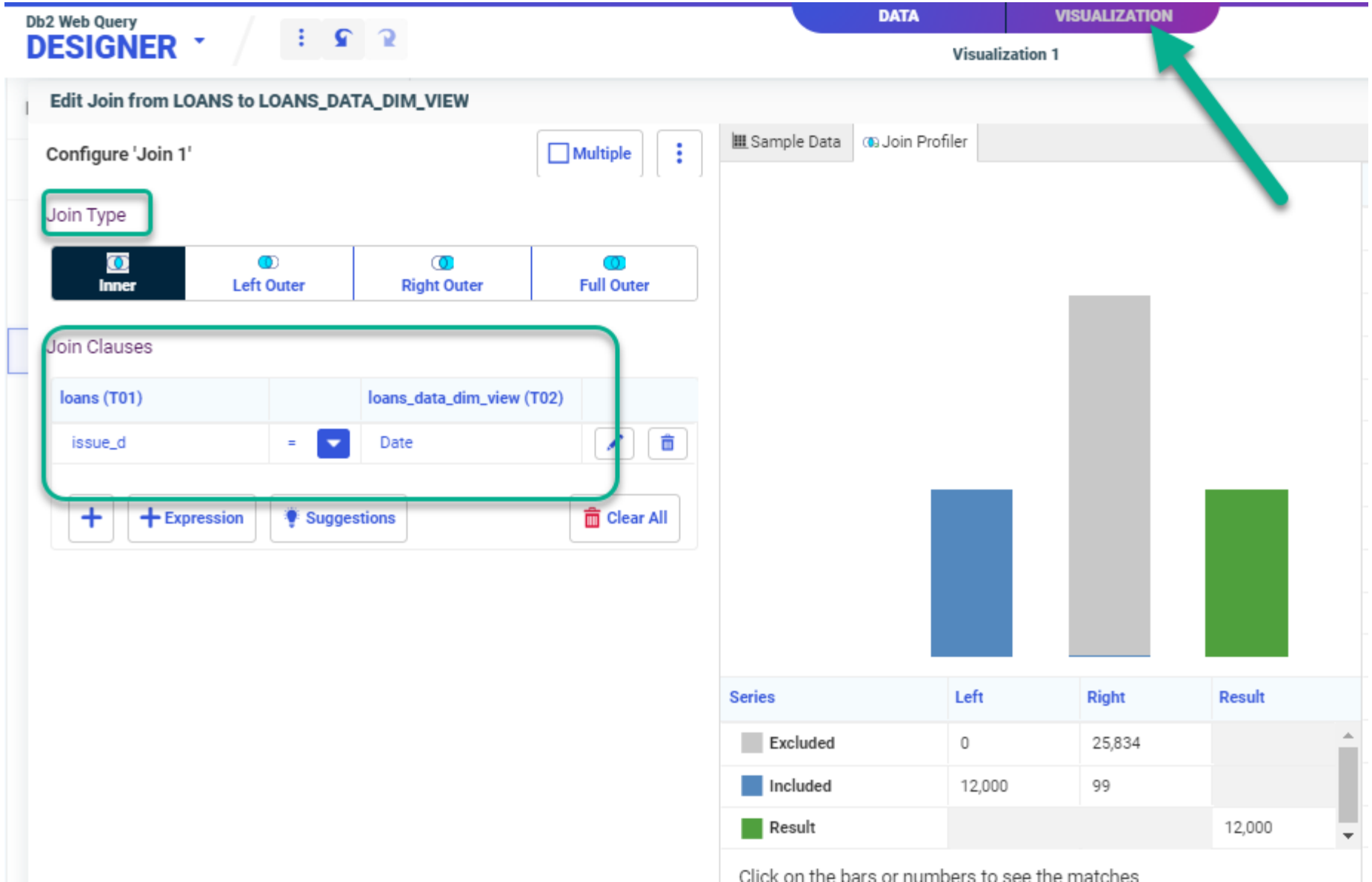
- Joining the LOAN synonym to the date dimension view will add all kinds of date attributes including a true date set of fields that Python Libraries will understand (they won't know a P8 decimal is a date)!





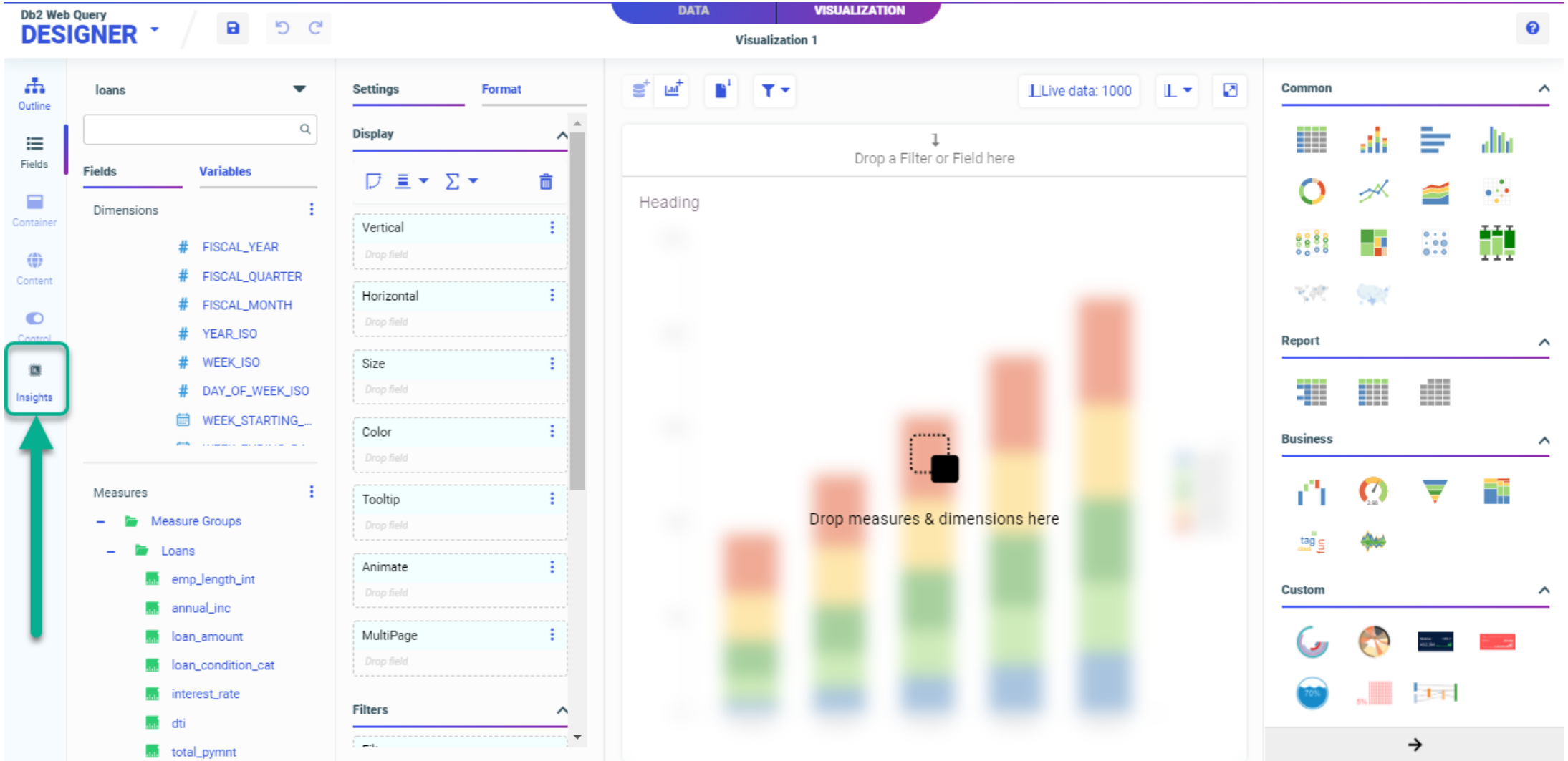
Loan Data

- Satisfied with JOIN definition? Click on Visualization tab



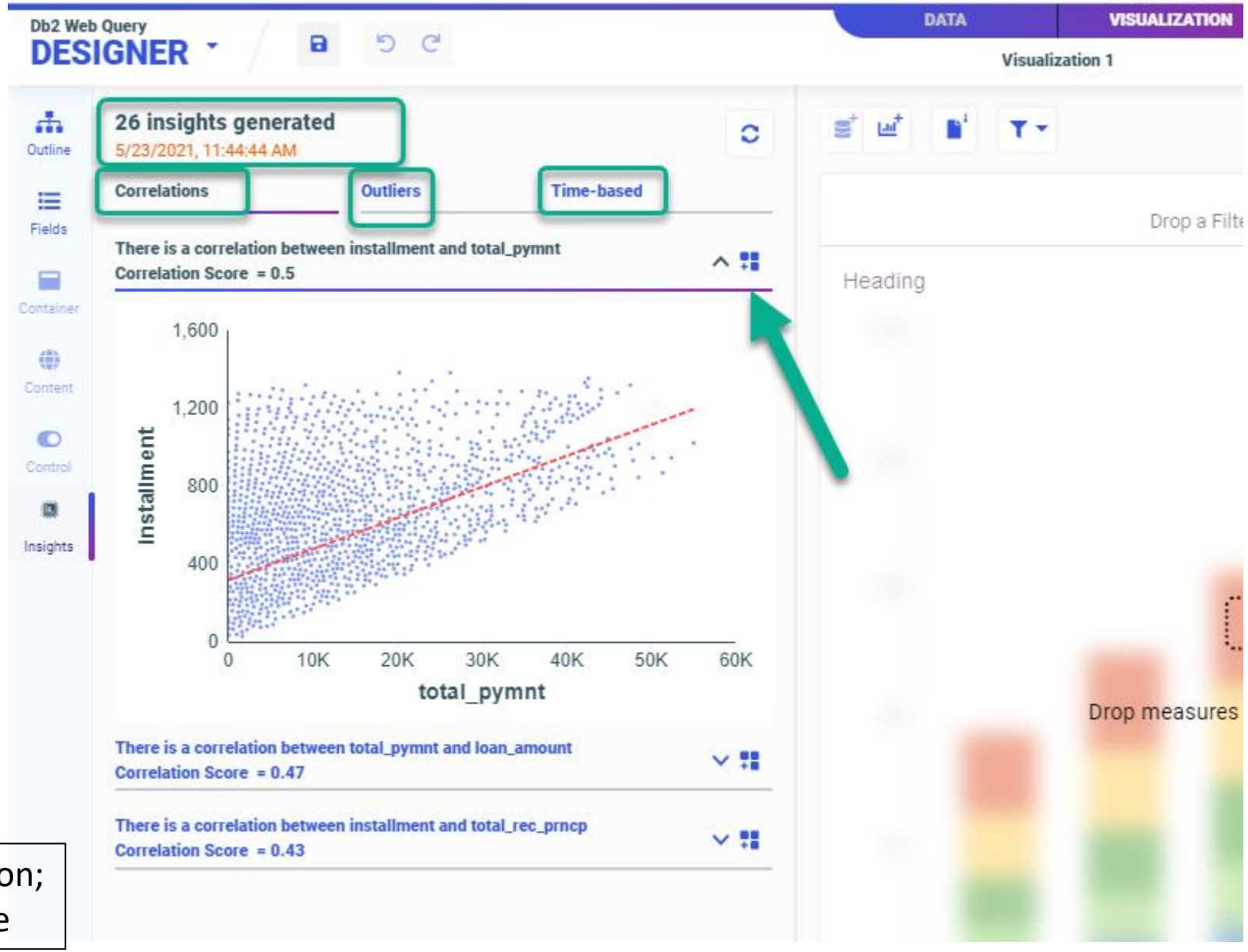
Load Data Supplemented Now with Date Attributes

- Within Designer you could start building a dashboard with your data set, then turn it into a “page”
  - A page can contain many different charts/graphs/report in single windowpane
  - For NOW, let’s get some insights from some pre-built ML Models; **Click on INSIGHTS**



Loan Data Supplemented Now with Date Attributes

- Data Sent to Cloud* Service
- 26 “insights” in the form of charts and text description returned from ML Models in 3 categories
  - Correlations
  - Outliers
  - Time-Based
- You can peruse each insight and decide to add to your “Page” (dashboard) using buttons in upper right-hand side.



* We are working on an On-Premise option; 500,000 row limit in current cloud service

Loan Data Supplemented with Date Attributes

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Db2 Web Query
DESIGNER

DATA | VISUALIZATION

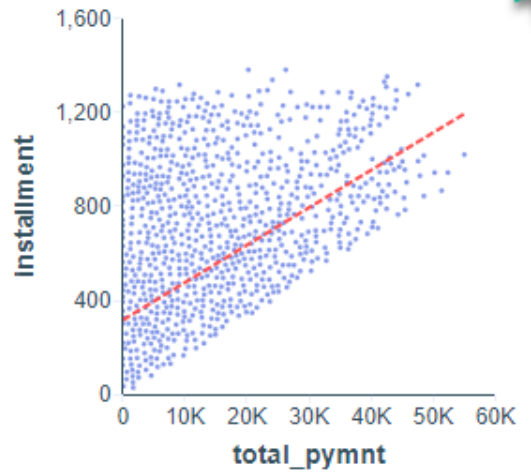
Visualization 1

Outline
Fields
Container
Content
Control
Insights

26 insights generated
5/23/2021, 11:44:44 AM

Correlations | Outliers | Time-based

There is a correlation between installment and total_pymnt
Correlation Score = 0.5



There is a correlation between total_pymnt and loan_amount
Correlation Score = 0.47

There is a correlation between installment and total_rec_prncp
Correlation Score = 0.43

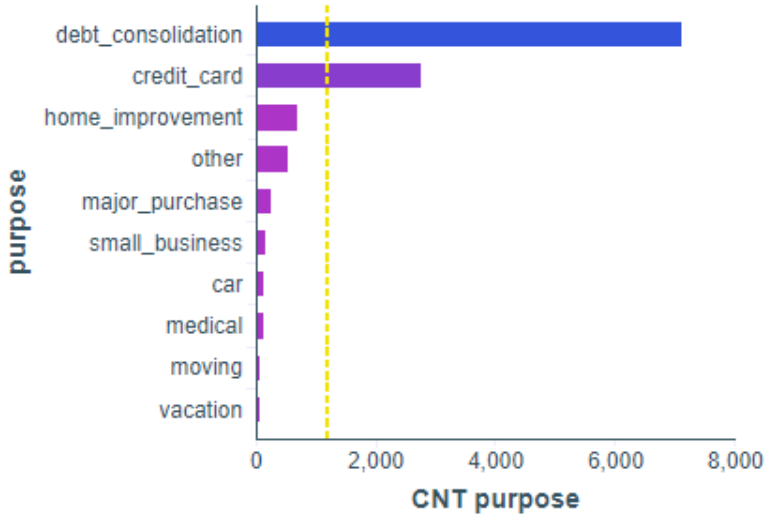
Live data: All

Page Heading

Drop a Filter or Field here

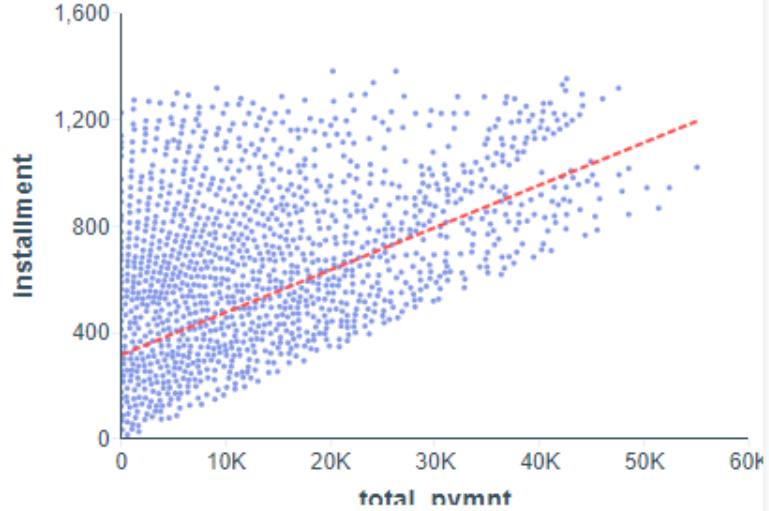
Container 1

Count of purpose is noticeably different per purpose



Container 2

There is a correlation between installment and total_pymnt
Correlation Score = 0.5



Now What?

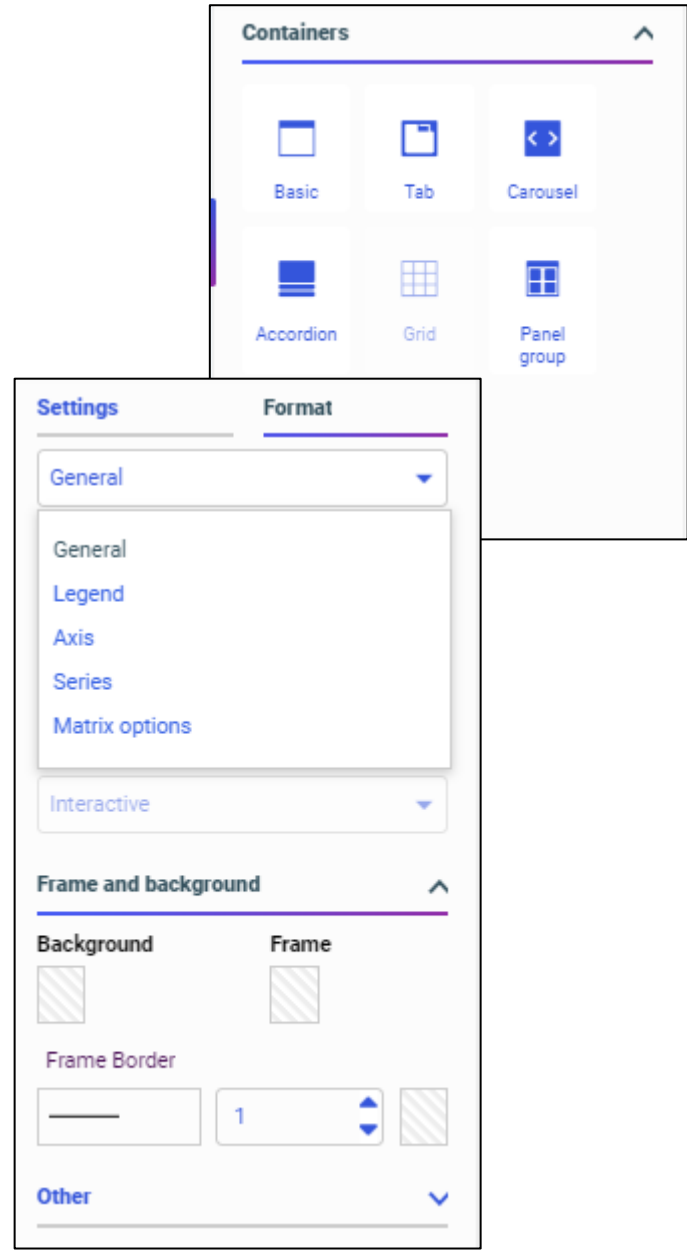
- You can add your own containers to the page with the data set you're working with
  - Multiple options for containers to contain more than one visualization/report
    - Tab, Carousel, Accordian, etc.

- Customize the page (formatting options)

- Add a dynamic Filter

- Save the page, allow others to run it
  - Post auto generation, you are feeding more/new data **into the charts** but not going back to the cloud ML Models (i.e., you trained the model, no need to do so except you may want to down the road at some point)

- You can create a DATA FLOW as a permanent object (similar to creating a permanent Synonym)



Loan and Date Time

issue_d Y-Q
All

Loan and Date Time Analysi

issue_d Y-Q
All

Clear | Custom

Previous month and current
Previous quarter and current
Previous year and current
YTD
Last 5 quarters
Last 13 months
Last 9 quarters
Last 25 months
Prior YTD
Last 7 days

Reason for Loan

Count of purpose

debt_conso
cred
home_impro
major_pu
small_bu

purpose

4,000 5,000 6,000 7,000 8,000

purpose

Install ment and Total Payment Correlation

There is a correlation between installment and total_pymnt
Correlation Score = 0.5

Installment
1,600
1,200
800
400
0

0 10K 20K 30K 40K 50K 60K

total_pymnt

Loan Amount an

loan_amount
60M
50M
40M
30M
20M
10M
0

Autumn Spring Summer Winter

Northern Season

purpose

car credit_card debt_consolidation educational
home_improvement house major_purchase medical
moving other renewable_energy small_business
vacation wedding

Financials by Purpose of Loan

120M
100M
80M
60M
40M
20M
0

car credit_card debt_conso... educational home_impr... house major_purc... medical moving other renewable_... small_busi... vacation wedding

purpose

interest_rate loan_amount

Synonyms Describe (and simplify) the Data Source

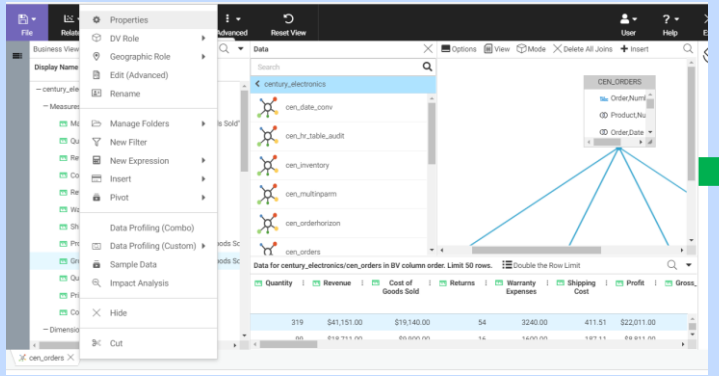
IBM i Anywhere
IBM i Everywhere

Data Sources

- Db2 for i Files/Tables
- Query/400 Definitions
- Log Files (Journal Receivers)
  - Mostly for ETL purposes
- **Db2 or RPG Stored Procedures**
- **Db2 SQL Views**
- **SQL Statements**
  - **EZ-Report makes this v… EASY**
- Non Db2 Databases
  - Postgres, MySQL, S… Oracle, et.al.
- **IBM i Services**

Report Writer Productivity

Simplified Data Perspective
"Meta data"



SYNONYMS

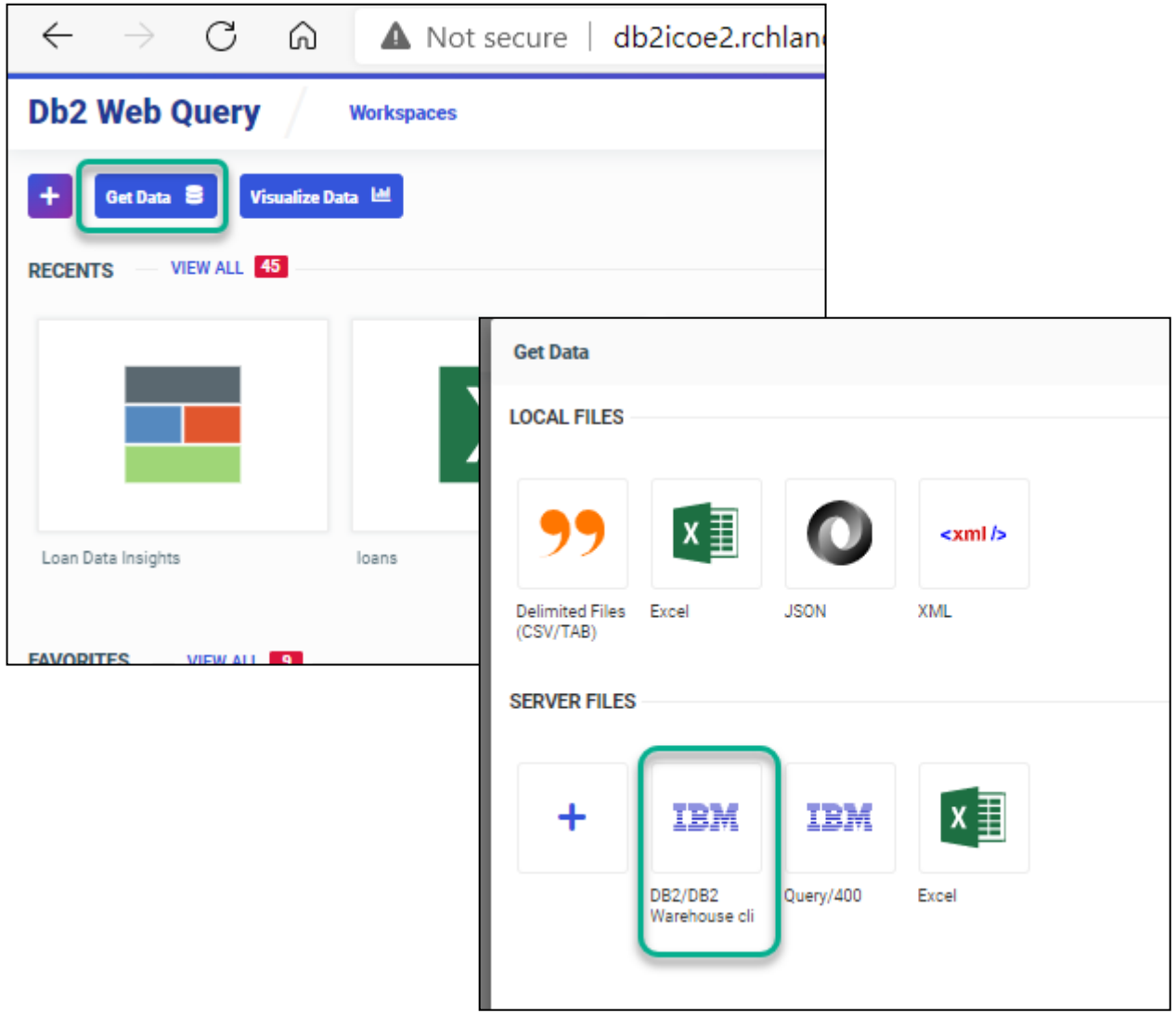
Product Type	Product Category	Revenue	As a Percent of Product Category
Audio	Amplifiers/PreAmps/Tuners	$42,374,428.00	11.07%
	Audio Systems	$122,345,680.00	31.97%
	CD Players and Recorders	$53,847,459.00	14.07%
	MP3	$43,491,588.00	11.36%
	Receivers	$35,907,113.00	9.38%
	Speakers	$84,717,053.00	22.13%
Subtotal: Audio		$382,683,321.00	

Single Version of the Truth !!!

AND ALL ON IBM i

Building a Synonym from Scratch

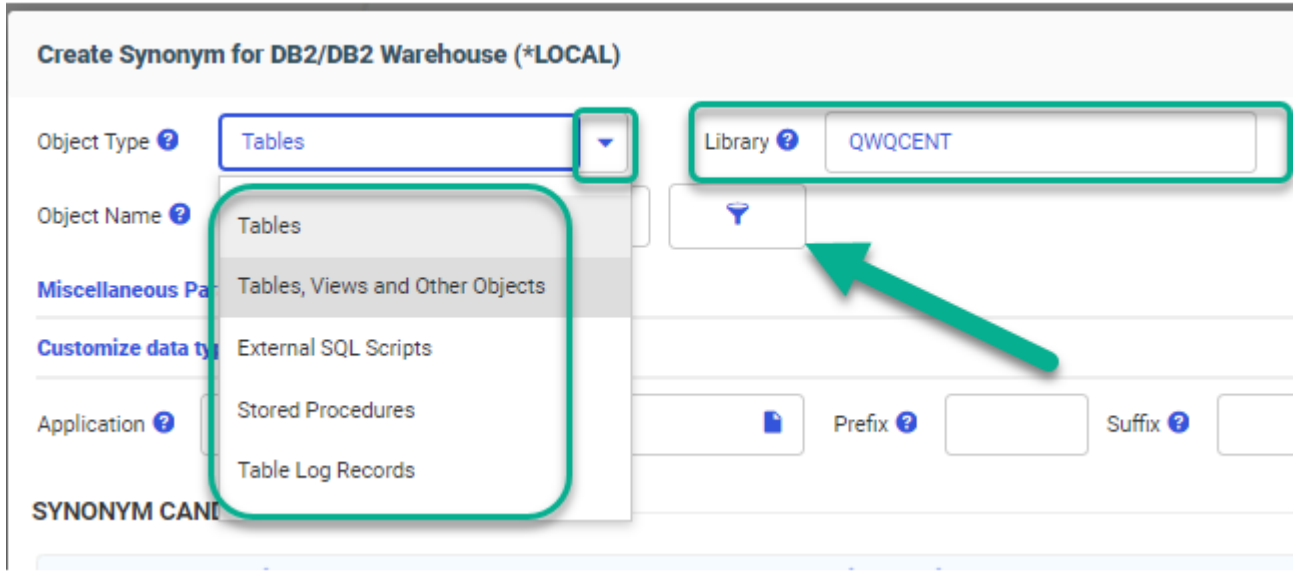
- Get Data to create a new Synonym
- Choose Db2/Db2 Warehouse Adapter



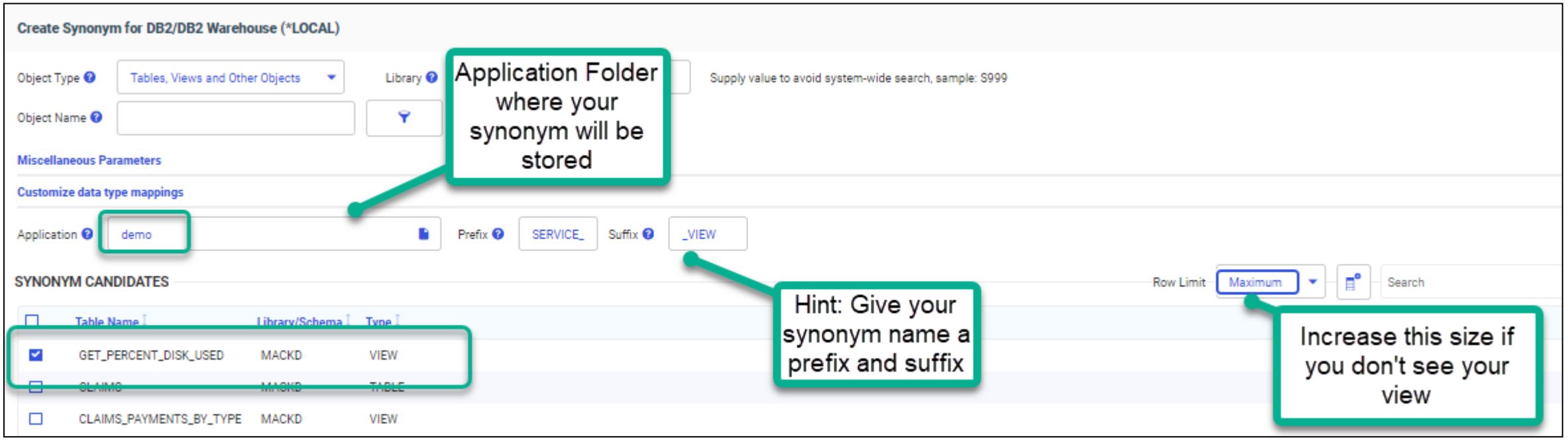
Building a Synonym from Scratch

- Choose *LOCAL for Db2 database in the same partition/server where Db2 Web Query is installed
  - Note you can also choose remote server adapters to access remote databases

- Use the Object Type Drop down to select your source
  - **Tables, Views, and Other Objects**
  - **Uploaded SQL Script File**
    - Note: I'm not going to cover this option because you now have EZ-Report to auto generate synonym and report
  - **Stored Procedure**
    - HINT: When you create a synonym over a stored procedure, you MUST enter valid values for the INPUT fields during creation

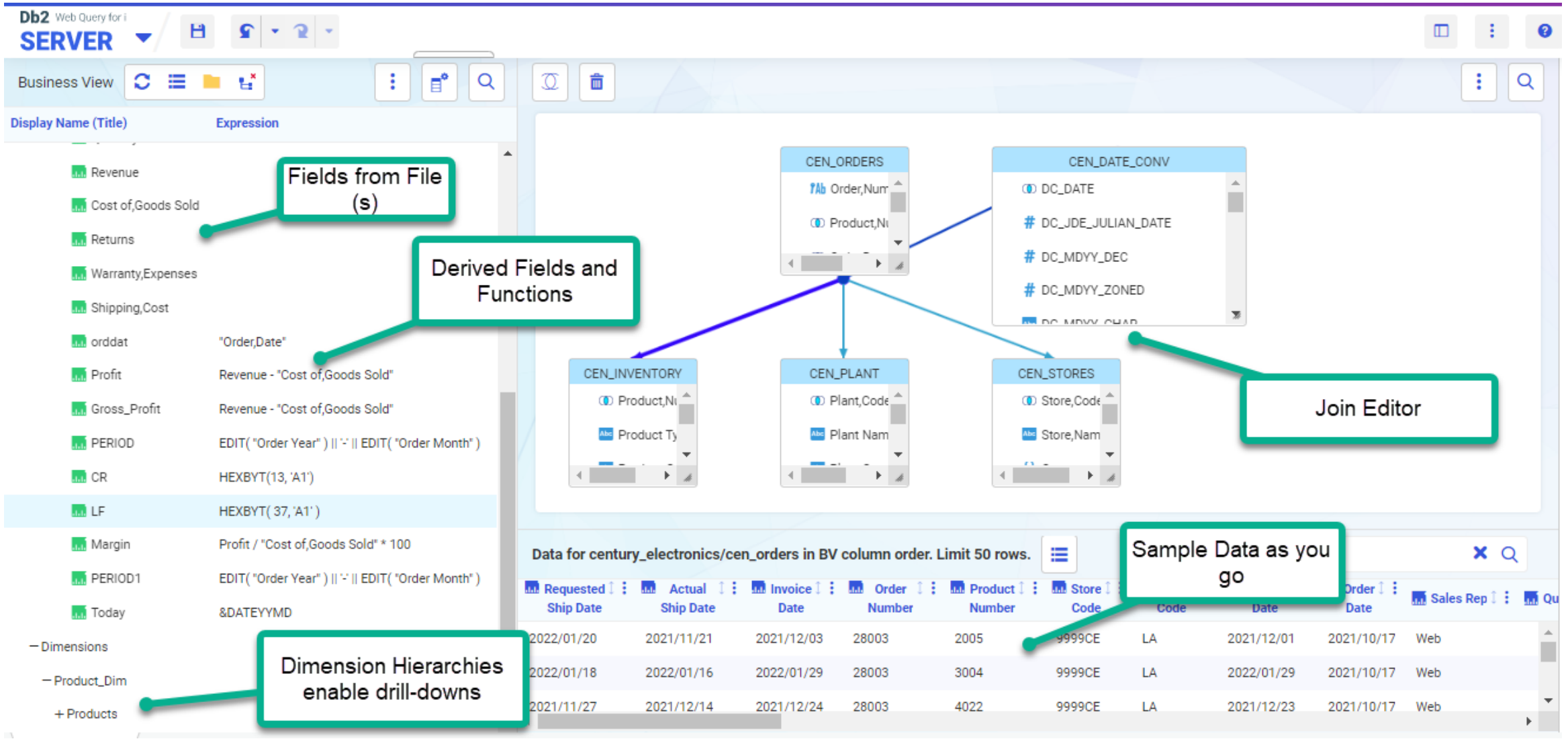


Building a Synonym from Scratch



- Make (multiple?) Selections, click on ADD
- Creating a synonym over a bunch of files is a very short exercise, but then…..you might want to
  - Create file relationships (joins, dimensions)
  - Format fields (add Euro/Pound sign to monetary fields)
  - Deal with those pesky LEGACY Date Fields (join to a date dimension table)
  - Create Derived (calculated) Fields using Express Builder and Built-in (or Db2 SQL) FUNCTIONS

Building a Synonym from Scratch



Auto Generate Synonyms (and sometimes Reports Too)

IBM i Anywhere
IBM i Everywhere

- Query/400 Import function using Query/400 Adapter
  - Auto generates a synonym AND a report from one or more Query/400 Definitions
  - MODERNIZE – enhance the report and/or synonym

- Spreadsheet Upload
  - Auto generates a synonym after uploading Excel data into Db2 table (stored in web query's REPOSITORY)
    - Enhance the synonym (maybe JOIN to your production files represented by another synonym)

- **Automated Insights**
  - Generates a handful of charts providing correlations, outliers and time-series analysis
  - You just saw this

- **EZ-Report**
  - Generates a synonym and a report from an SQL statement (or over a file)
  - Coming up Soon ☺

- Conversion Tools (Mostly Showcase Strategy)

To SQL, or Not to SQL

Monday, February 19, 2018

To SQL or not to SQL - with Db2 Web Query

Sometimes I find myself talking out of both sides of my mouth when discussing Db2 Web Query capabilities. The term is related to contradicting yourself – maybe saying one thing to one person, and another, opposite thing to another.

While certainly not trying to deceive anyone, the association with Db2 Web Query is about whether you need to be an SQL programmer to use it. The short answer is, ABSOLUTELY NOT. However, out the other side of my mouth, I have to say, it certainly can be an advantage if you do know SQL!

Db2 Web Query provides a graphical interface to building reports, dashboards, and BI applications. With the metadata interface simplifying the database structures for report authors, the graphical interface is easily used by those other than programmers and database experts. The "Business Analyst" is a classic power user of Db2 Web Query, building reports from scratch and never having to code at an SQL or RPG level to accomplish their goals – because under the covers Db2 Web Query generates the necessary code to access the data and provide the report logic, formatting, etc.

While we strongly discourage you from editing any of that code, you can see what is generated by right clicking on a report or chart and choosing (if you have authority) to open ***with text editor.*** The code probably won't make any sense to you, and you definitely DO NOT want to edit anything there as it might mess up the execution of the report. The code is stored in IBM i in something we call the repository.

Many people have asked the Db2 Web Query team if you can write your own, or leverage existing SQL code in a report. So out the other side of my mouth I say "Absolutely!" Reports, charts, and dashboards can contain data from many different data sources. Db2 file/tables are the most obvious data source, but did you know you can also leverage existing Query/400 definitions, SQL Views, SQL (or any HLL) stored procedures, Db2 functions (including user defined functions), and uploaded SQL

Links

DB2 Web Query Home Page

DB2 Web Query Technical Wiki

DB2 for i Blog

Follow by Email

Email address... Submit

Translate

Select Language

Powered by Google Translate

About Me

Doug Mack

Doug Mack leads the Analytics team within the DB2 for i Lab Services group. The broader DB2

http://db2webqueryi.blogspot.com/2018/02/to-sql-or-not-to-sql-with-db2-web-query.html

Synonyms Over SQL Objects Can be Very Useful

- You want to leverage already existing SQL objects that cobble together data
  - Note you could also build a synonym over an (“externalized”) RPG Program

- Not all Db2 Join options are supported in a Synonym
  - Exception Joins, UNIONS
    - **New news:** Unions aren’t supported in a synonym, but are supported in a new “data flow” object!

- Dealing with Multiple Member Files
  - Use SQL Aliases

- Data Wrangling is required and more efficient in SQL
  - When a report is run you need to do a lot of data processing like what you might do with RPG and use of temp or work files or with a CHAINED (multiple pass) Query/400 report
  - You want to consolidate data from multiple systems into a single report

- Complex data relationship requirements are easier using advanced SQL Functions
  - Use of Advanced SQL to pre-process data
    - OLAP, Hierarchical queries, Common Table Expressions, Pivoting Data

Pushing the work to Db2 will always be more efficient

Auto Generate Synonym (and Report) over IBM i Services

IBM i Services

- Shipped as SQL View, SQL Procedure, or SQL Table Function

Security Services

QSYS2.AUTHORITY_COLLECTION – VIEW
QSYS2.AUTHORITY_COLLECTION_DLO – VIEW
QSYS2.AUTHORITY_COLLECTION_FSOBJ – VIEW
QSYS2.AUTHORITY_COLLECTION_LIBRARIES – VIEW
QSYS2.AUTHORITY_COLLECTION_OBJECT – VIEW
QSYS2.AUTHORIZATION_LIST_INFO – VIEW
QSYS2.AUTHORIZATION_LIST_USER_INFO – VIEW
QSYS2.CERTIFICATE_INFO – UDTF
QSYS2.DRDA_AUTHENTICATION_ENTRY_INFO – VIEW
QSYS2.FUNCTION_INFO – VIEW
QSYS2.FUNCTION_USAGE – VIEW
QSYS2.GROUP_PROFILE_ENTRIES – VIEW
QSYS2.OBJECT_OWNERSHIP – VIEW
QSYS2.OBJECT_PRIVILEGES – UDTF & VIEW
QSYS2.SECURITY_INFO – VIEW
QSYS2.SQL_CHECK_AUTHORITY – UDF
QSYS2.USER_INFO – VIEW
QSYS2.USER_INFO_BASIC – VIEW
SYSPROC.SET_COLUMN_ATTRIBUTE – PROCEDURE
SYSTOOLS.CHANGE_USER_PROFILE – UDTF

Spool Services

QSYS2.OUTPUT_QUEUE_ENTRIES – UDTF & VIEW
QSYS2.OUTPUT_QUEUE_ENTRIES_BASIC – VIEW
QSYS2.OUTPUT_QUEUE_INFO – VIEW
SYSTOOLS.DELETE_OLD_SPOOLED_FILES – PROCEDURE
SYSTOOLS.GENERATE_PDF – UDF
SYSTOOLS.SPOOLED_FILE_DATA – UDTF

Storage Services

QSYS2.ASP_INFO – VIEW
QSYS2.ASP_JOB_INFO – VIEW
QSYS2.ASP_VARY_INFO – VIEW
QSYS2.MEDIA_LIBRARY_INFO – VIEW
QSYS2.NVME_INFO – VIEW
QSYS2.SYSDISKSTAT – UDTF & VIEW
QSYS2.SYSTMPSTG – VIEW
QSYS2.USER_STORAGE – VIEW

Journal Services

QSYS2.DISPLAY_JOURNAL – UDTF
QSYS2.JOURNAL_INFO – VIEW
QSYS2.JOURNALED_OBJECTS – VIEW
SYSTOOLS.AUDIT_JOURNAL_nn – UDTFs

Java Services

QSYS2.JVM_INFO – VIEW
QSYS2.SET_JVM – PROCEDURE

Librarian Services

QSYS2.JOURNAL_INHERIT_RULES – VIEW
QSYS2.LIBRARY_INFO – UDTF
QSYS2.LIBRARY_LIST_INFO – VIEW
QSYS2.OBJECT_STATISTICS – UDTF

System Health Services

QSYS2.SYSLIMITS – VIEW
QSYS2.SYSLIMITS_BASIC – VIEW
QSYS2.SYSLIMTBL – TABLE

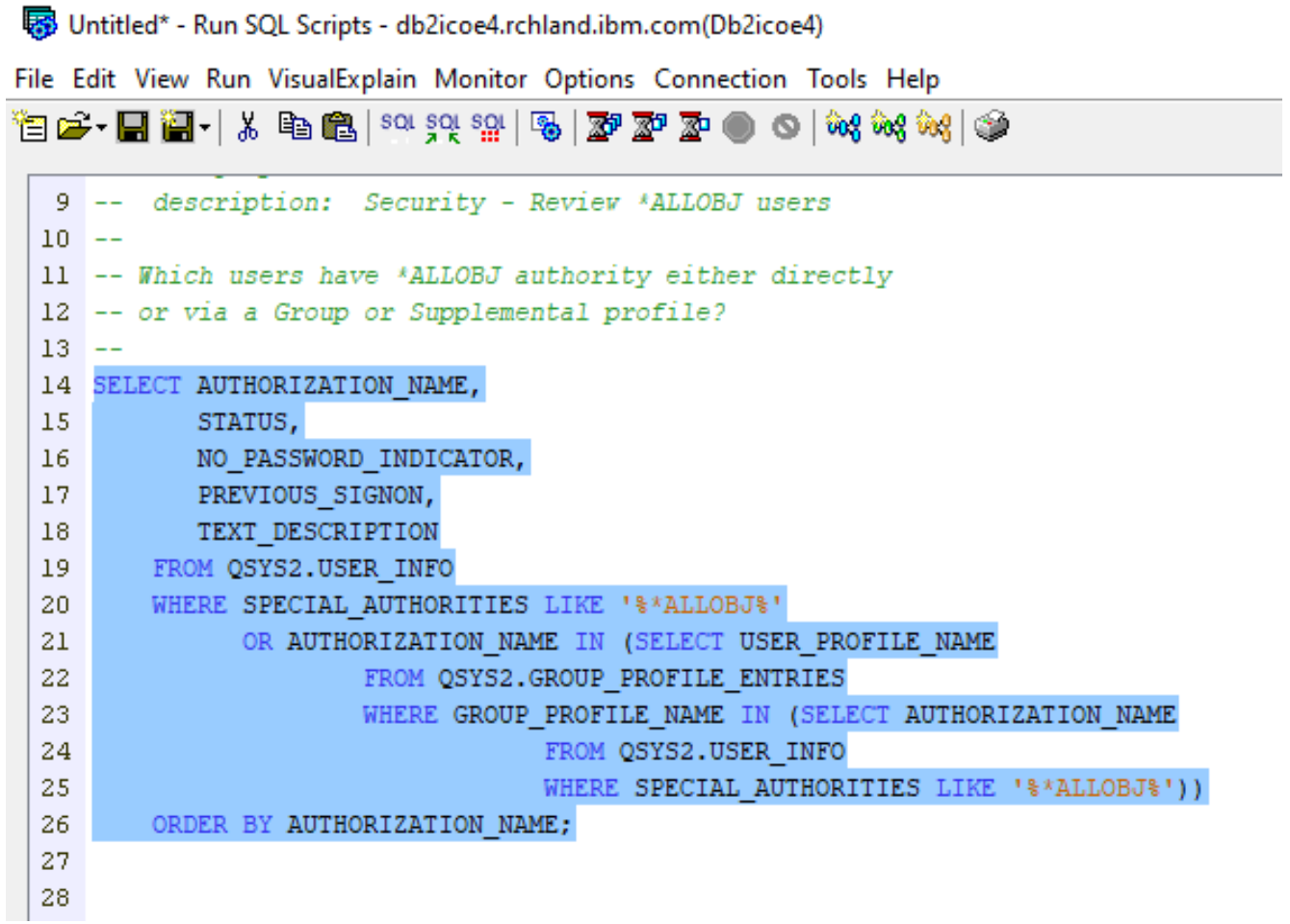
New or Enhanced @ IBM i 7.3 TR10 and IBM i 7.4 TR4

http://ibm.biz/Db2foriServices

IBM i Services are SQL Statements

2020 iSight

Use ACS Insert from Examples



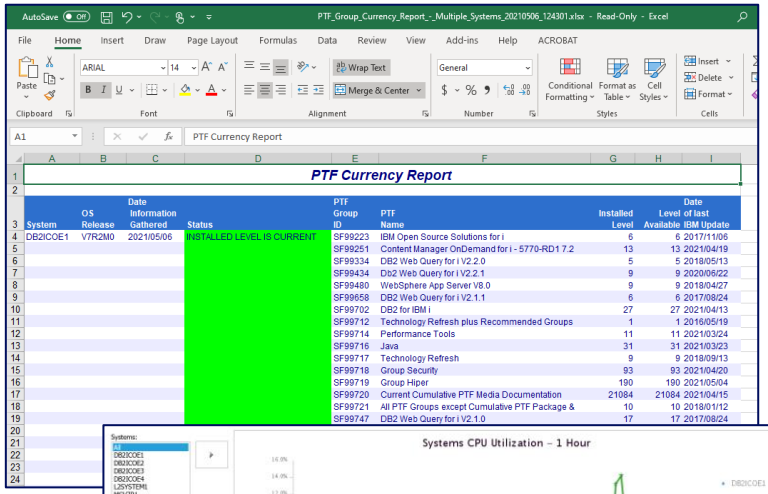

```
 9  --  description:  Security - Review *ALLOBJ users
10  --
11  -- Which users have *ALLOBJ authority either directly
12  -- or via a Group or Supplemental profile?
13  --
14  SELECT AUTHORIZATION_NAME,
15         STATUS,
16         NO_PASSWORD_INDICATOR,
17         PREVIOUS_SIGNON,
18         TEXT_DESCRIPTION
19     FROM QSYS2.USER_INFO
20     WHERE SPECIAL_AUTHORITIES LIKE '%*ALLOBJ%'
21           OR AUTHORIZATION_NAME IN (SELECT USER_PROFILE_NAME
22                   FROM QSYS2.GROUP_PROFILE_ENTRIES
23                   WHERE GROUP_PROFILE_NAME IN (SELECT AUTHORIZATION_NAME
24                                 FROM QSYS2.USER_INFO
25                                 WHERE SPECIAL_AUTHORITIES LIKE '%*ALLOBJ%'))
26     ORDER BY AUTHORIZATION_NAME;
27
28
```

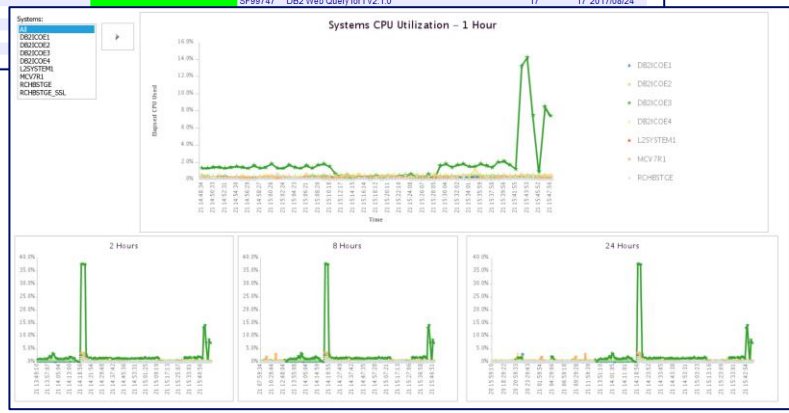
IBM i Services and SYSTOOLS Are Really Awesome!

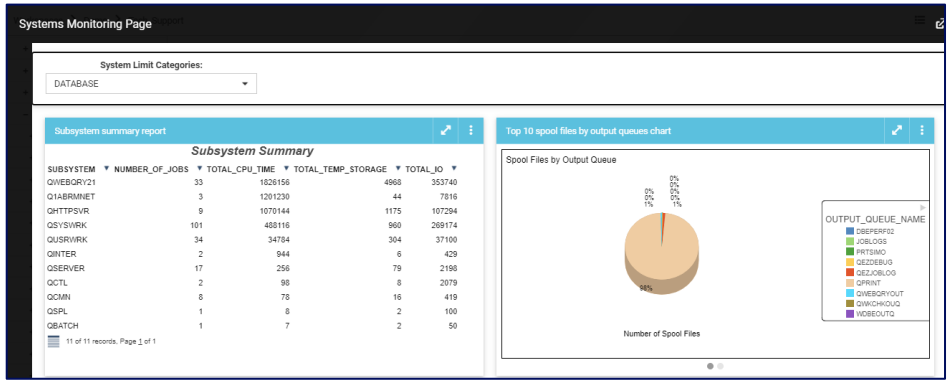
2020 iSight

But now I want to....

- Dump the information into a spreadsheet
- Run a report with simple parameters with an option to choose output format
- Schedule the report to run every Friday night and email the report to stakeholders
- Capture the data on a daily basis and add into a history table for trending reports
- Run the reports against multiple systems/VMs and consolidate data into a central file/table for cross system reporting
- Build charts/visualizations over the services and place on a dashboard
- **Get Spooled File data into a spreadsheet or PDF**





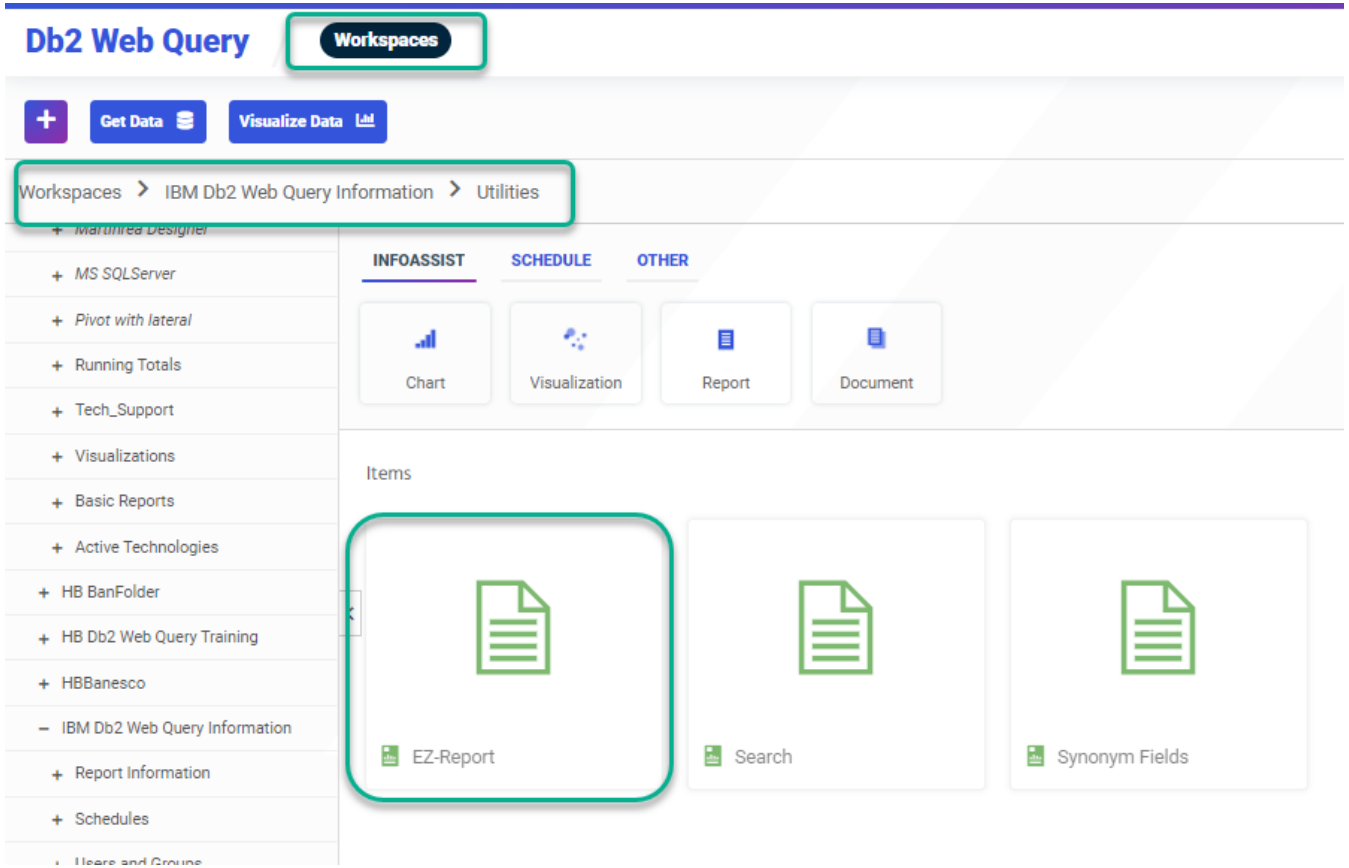


Auto Generate Synonym and Report from **EZ-Report** Utility

2020 iSight

Navigate to IBM Db2 Web Query Information -> Utilities Folder

Double click on EZ-Report

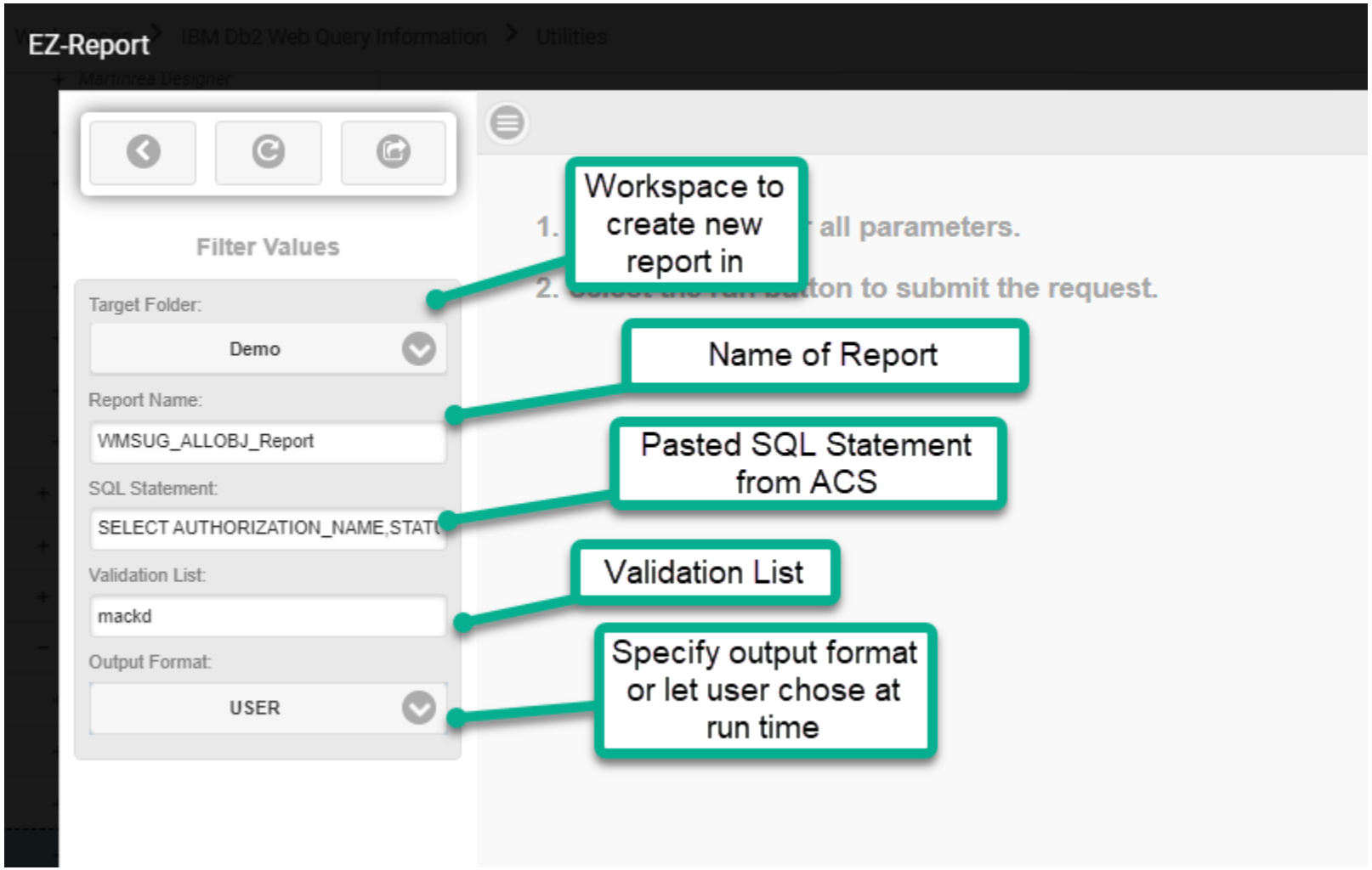


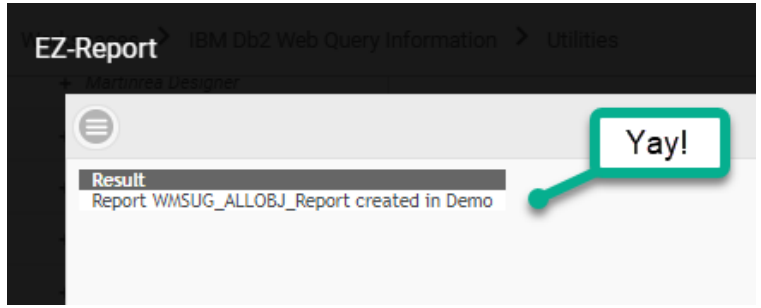
Auto Generate Synonym and Report from EZ-Report Utility

2020 iSight

Navigate to IBM Db2 Web Query Information -> Utilities Folder

Double click on EZ-Report



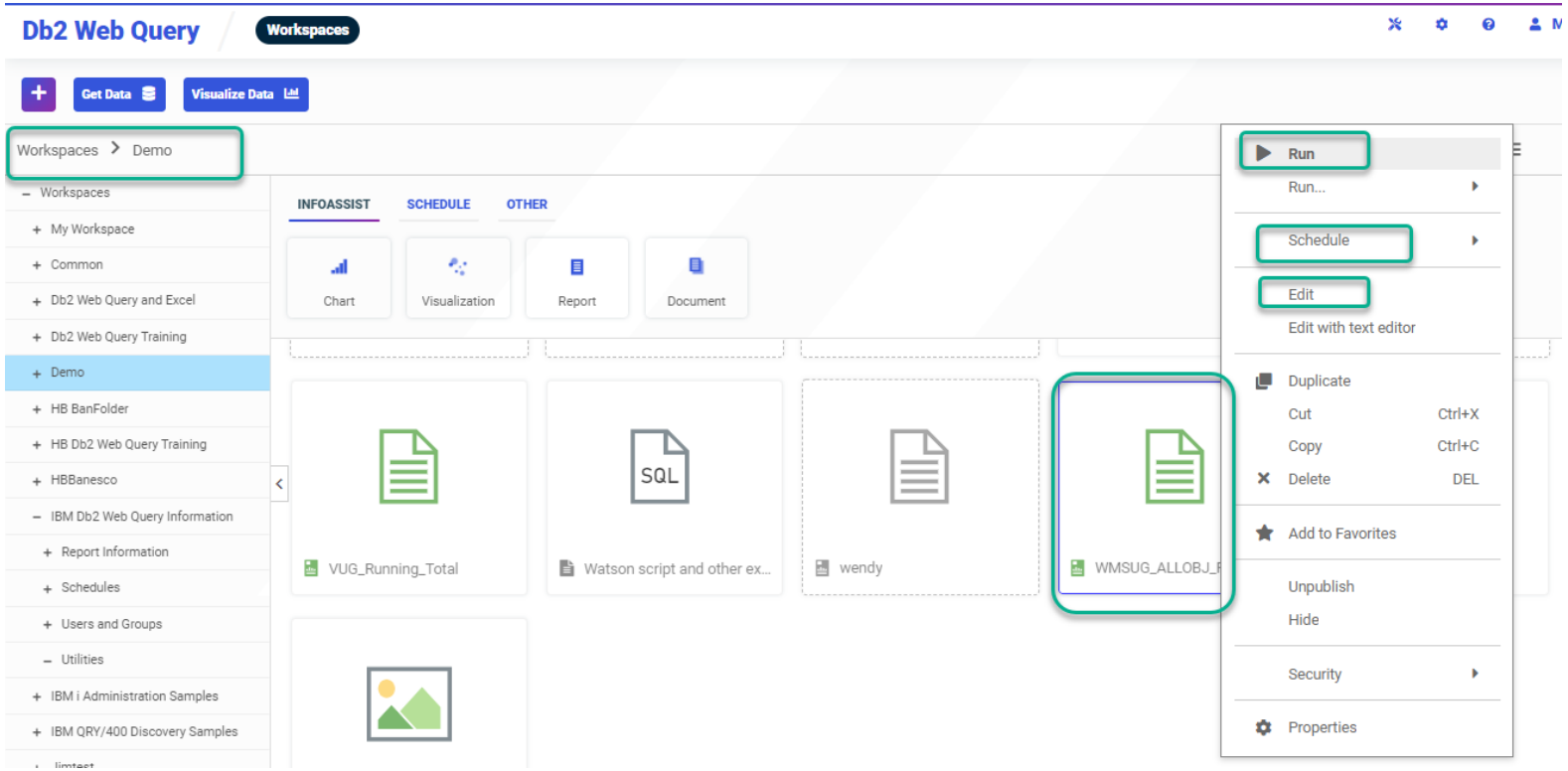


Auto Generate Synonym and Report from EZ-Report Utility

2020 iSight

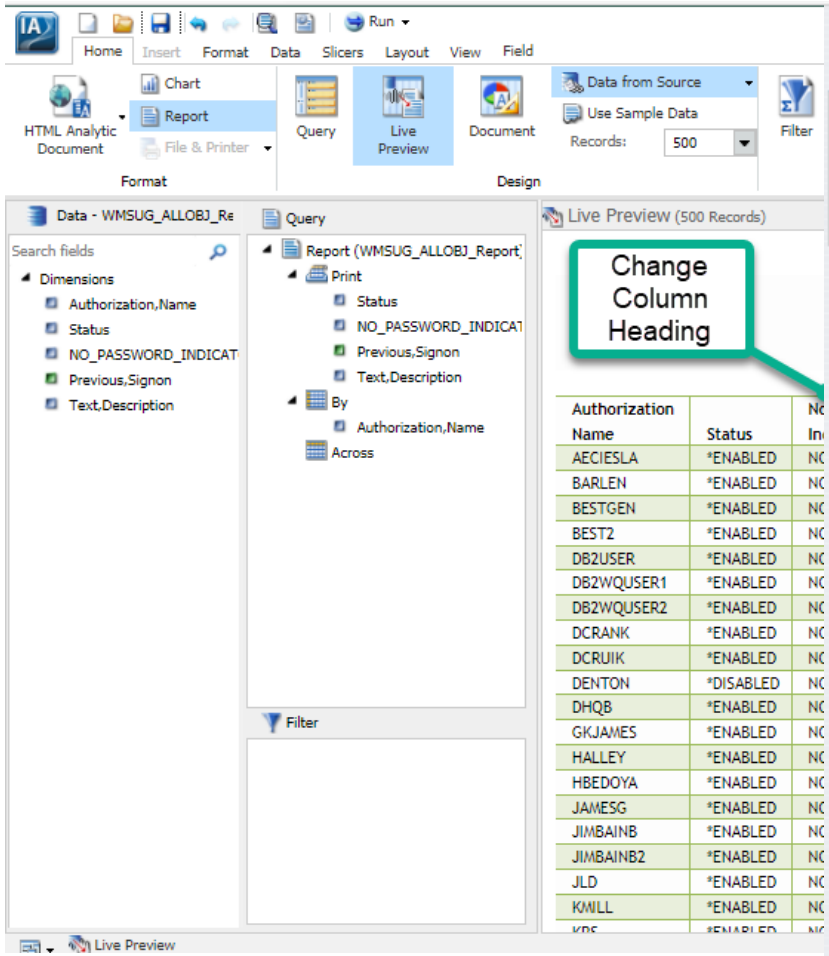
Now What?

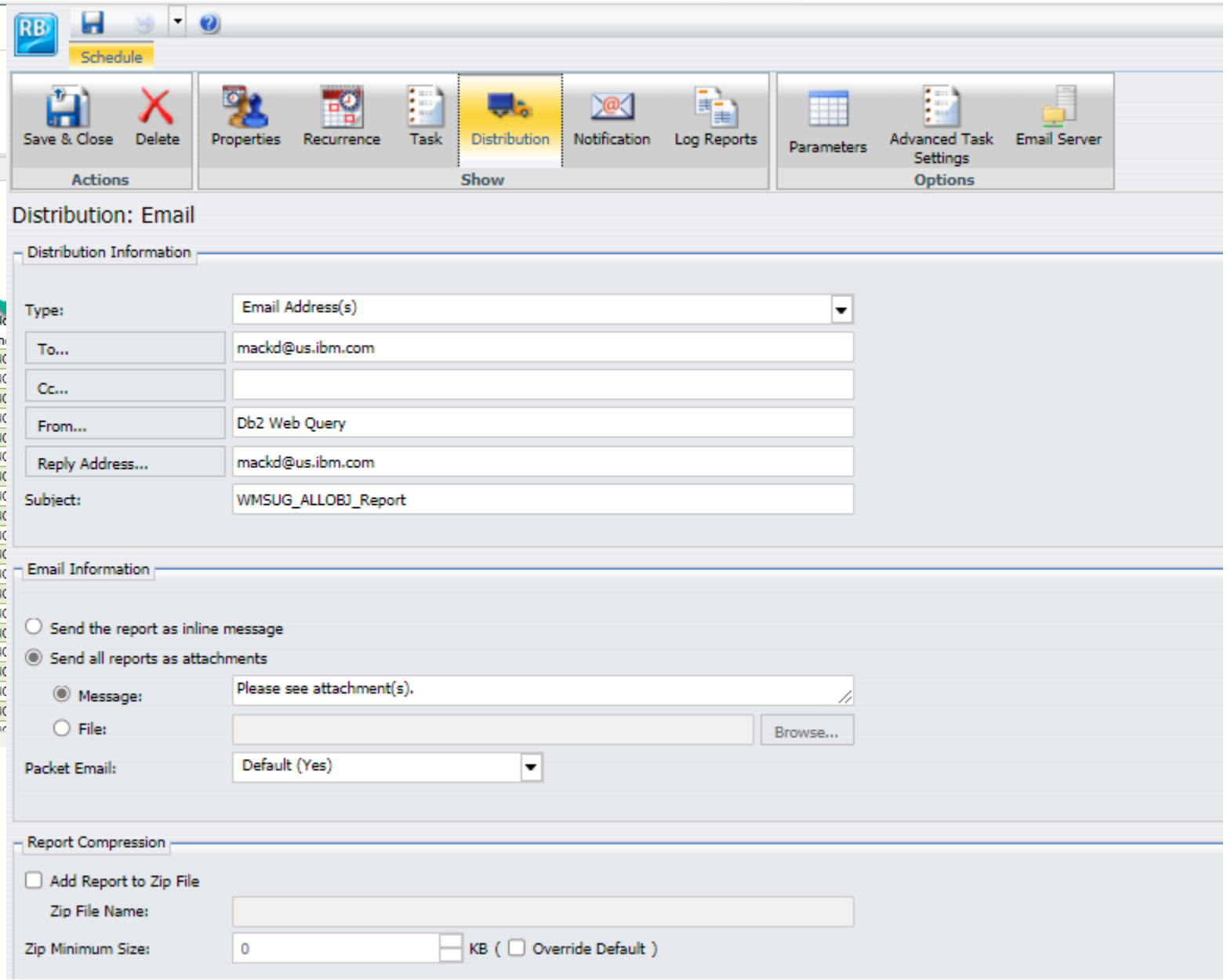
- Run Report
- Edit Report
- Schedule the Report to run in batch and distribute via email distribution



Auto Generate Synonym and Report from EZ-Report Utility

2020 iSight

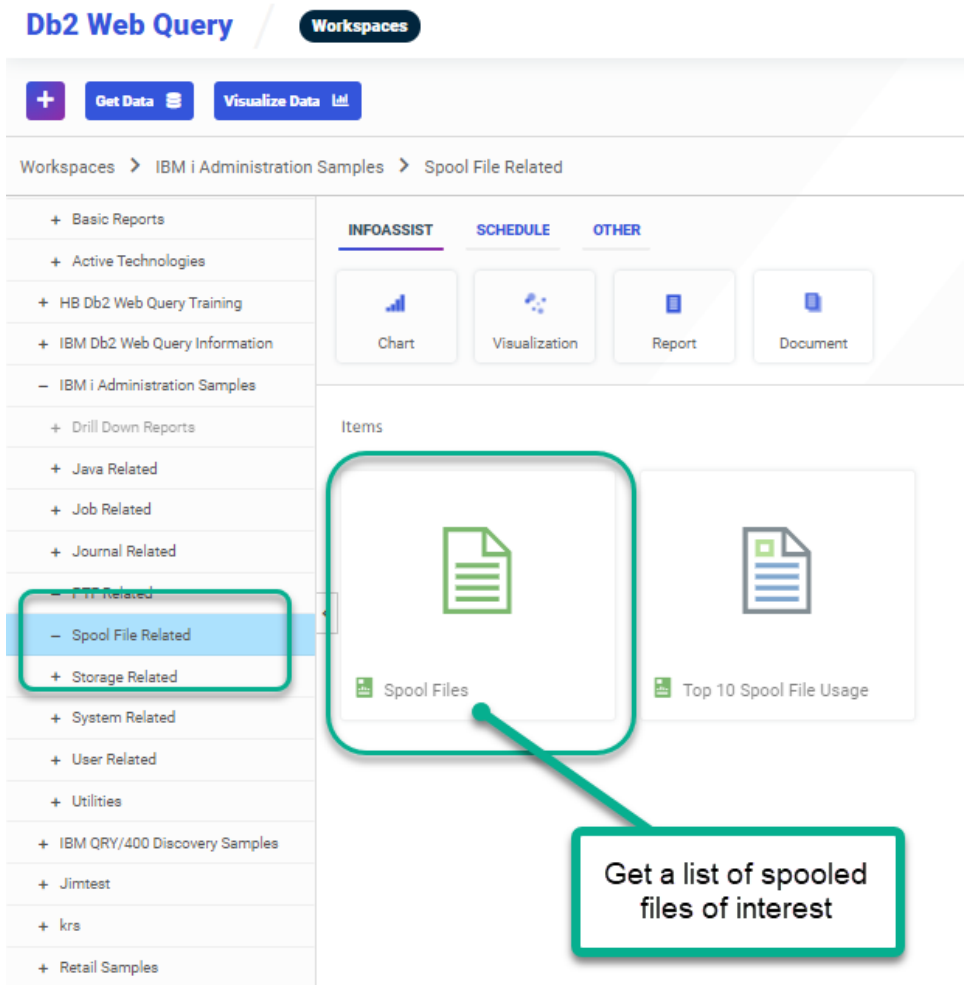




If We Have Time

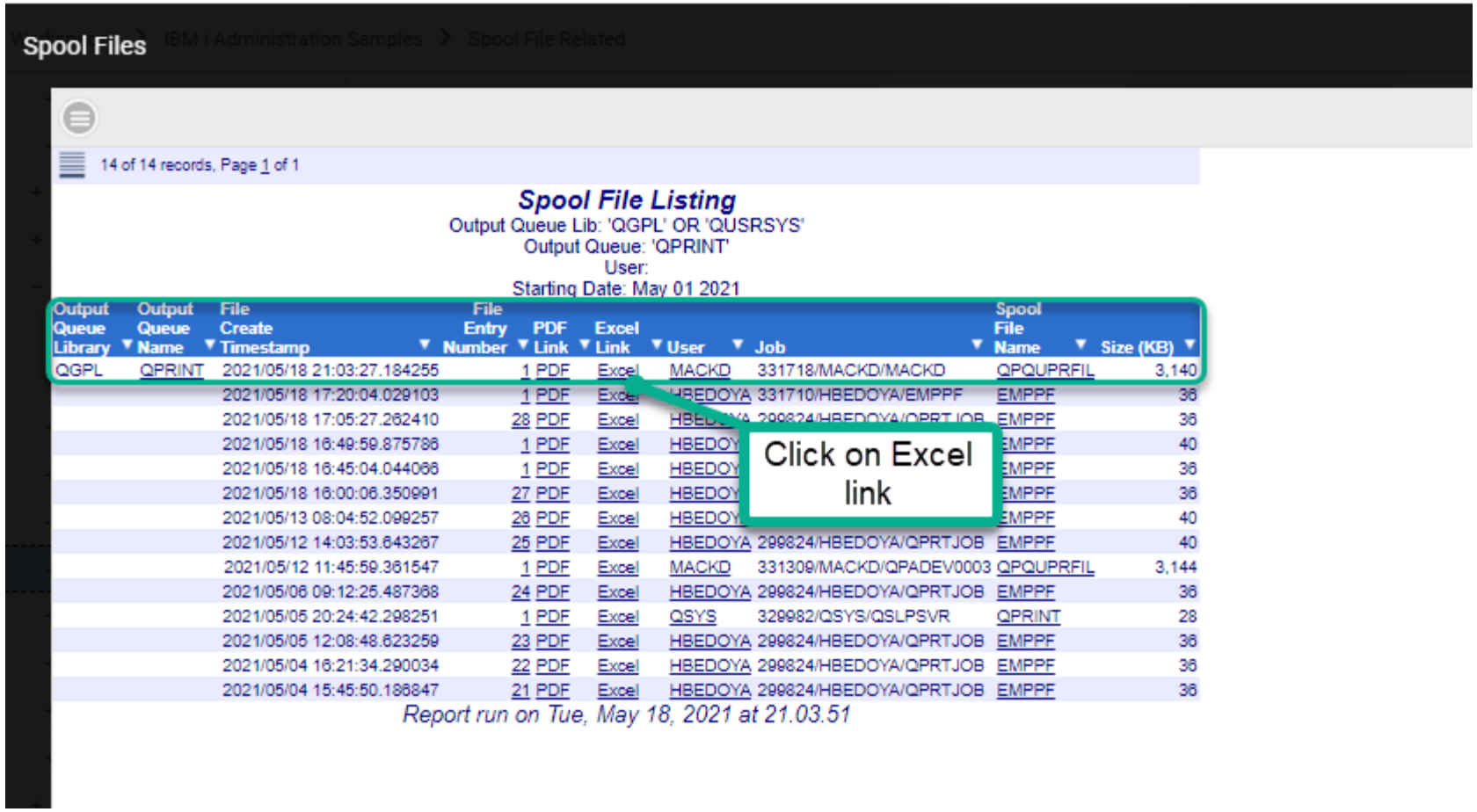
Spool File to Excel Example

- Run Spool Files report to generate list of spooled files based on selection criteria



Spool File Related

- Run Spool Files report to generate list of spooled files based on selection criteria



Spool File Related

IBM i Anywhere
IBM i Everywhere

- Run Spool Files report to generate list of spooled files based on selection criteria

	A
1	05/18/21 21:03:27
	PAGE 1
2	Order Order Requested Actual Receive Price
3	Number Date Ship Date Ship Date Date Cost
4	54390 2021-12-29 2022-02-08 2022-04-23 2022-04-28 199.00
	100.00
5	54390 2021-12-29 2022-03-29 2022-03-28 2022-04-13 129.00
	40.00
6	54390 2021-12-29 2022-02-01 2022-02-17 2022-02-27 199.00
	150.00
7	54390 2021-12-29 2022-02-13 2022-02-23 2022-03-24 399.00
	300.00
8	54390 2021-12-29 2022-04-04 2022-04-01 2022-04-27 899.00
	750.00
9	54510 2021-12-29 2022-02-19 2022-05-03 2022-05-30 199.00
	100.00
10	54510 2021-12-29 2022-01-30 2022-04-14 2022-05-02 129.00
	60.00
11	54510 2021-12-29 2022-03-22 2022-03-19 2022-04-06 189.00
	100.00
12	54510 2021-12-29 2022-02-14 2022-02-05 2022-02-25 279.00
	150.00
13	54510 2021-12-29 2022-02-12 2022-03-02 2022-03-08 329.00
	250.00
14	54510 2021-12-29 2022-02-15 2022-02-23 2022-03-19 459.00
	350.00
	54510 2021-12-29 2022-03-21 2022-03-19 2022-03-24 199.00

Display Spool File - Excel

Text to Data to column-ize the data

	A	B	C	D	E	F	G
1	5/18/2021	21:03:27					PAGE 1
2	Order	Order	Requested	Actual	Receive	Price	Cost
3	Number	Date	Ship Date	Ship Date	Date		
4	54390	12/29/2021	2/8/2022	4/23/2022	4/28/2022	199	100
5	54390	12/29/2021	3/29/2022	3/28/2022	4/13/2022	129	40
6	54390	12/29/2021	2/1/2022	2/17/2022	2/27/2022	199	150
7	54390	12/29/2021	2/13/2022	2/23/2022	3/24/2022	399	300
8	54390	12/29/2021	4/4/2022	4/1/2022	4/27/2022	899	750
9	54510	12/29/2021	2/19/2022	5/3/2022	5/30/2022	199	100
10	54510	12/29/2021	1/30/2022	4/14/2022	5/2/2022	129	60
11	54510	12/29/2021	3/22/2022	3/19/2022	4/6/2022	189	100
12	54510	12/29/2021	2/14/2022	2/5/2022	2/25/2022	279	150
13	54510	12/29/2021	2/12/2022	3/2/2022	3/8/2022	329	250
14	54510	12/29/2021	2/15/2022	2/23/2022	3/19/2022	459	350

How Was This Done?

- Services and SYSTOOLS are shipped as VIEWS, Stored Procedures, or User Defined Table Functions
- In Db2 Web Query, you build a report over a “synonym” (meta data object) that represents the data source
- The Data Source can be an SQL View, Stored Procedure, View containing a user defined table function (and of course your files/tables, query/400 definitions, etc.)

Report #1: **Query to get a list of Spooled Files using QSYS.OUTPUT_QUEUE_ENTRIES_BASIC service Shipped as a VIEW**

Spool Services				
QSYS2.OUTPUT_QUEUE_ENTRIES	View	Base	Base	SF99702 Level 9
QSYS2.OUTPUT_QUEUE_ENTRIES_BASIC	View	Base	SF99703 Level 11	SF99702 Level 23
QSYS2.OUTPUT_QUEUE_ENTRIES()	Table function	Base	Base	SF99702 Level 9

Detailed Information on IBM i Services at https://www.ibm.com/support/pages/node/1119123

How Was This Done?

1. Create a Synonym over the VIEW

Within Web Query Home Page, select GET DATA button and Db2/Db2 Warehouse Adapter

Choose *LOCAL to run the service on the same system Db2 Web Query is installed on
(note you could also choose a remote server/connection adapter and get the list of spooled files from another partition)!

How Was This Done?

1. Create a Synonym over the VIEW

Set Library to QSYS2

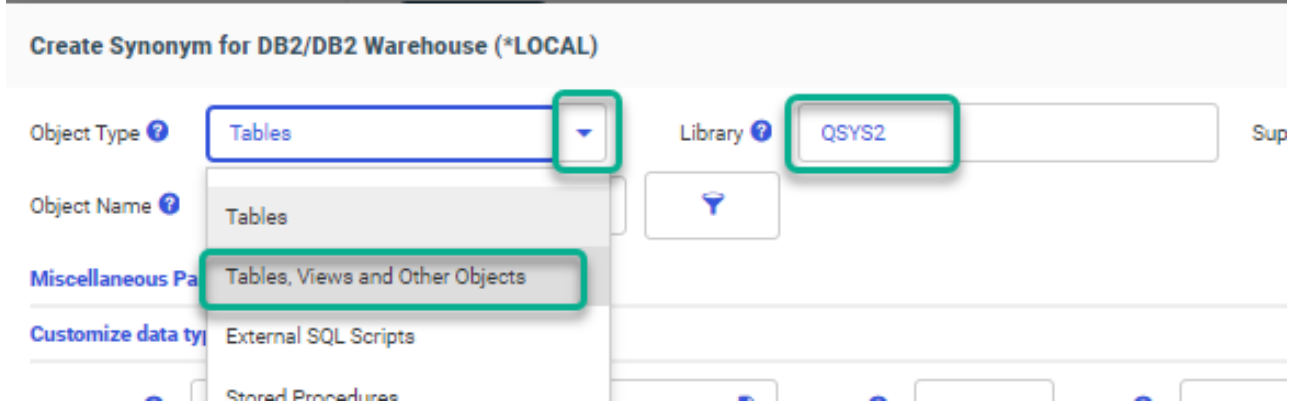
Hit the drop-down button for Object Type and select “Tables, Views, and other Objects”

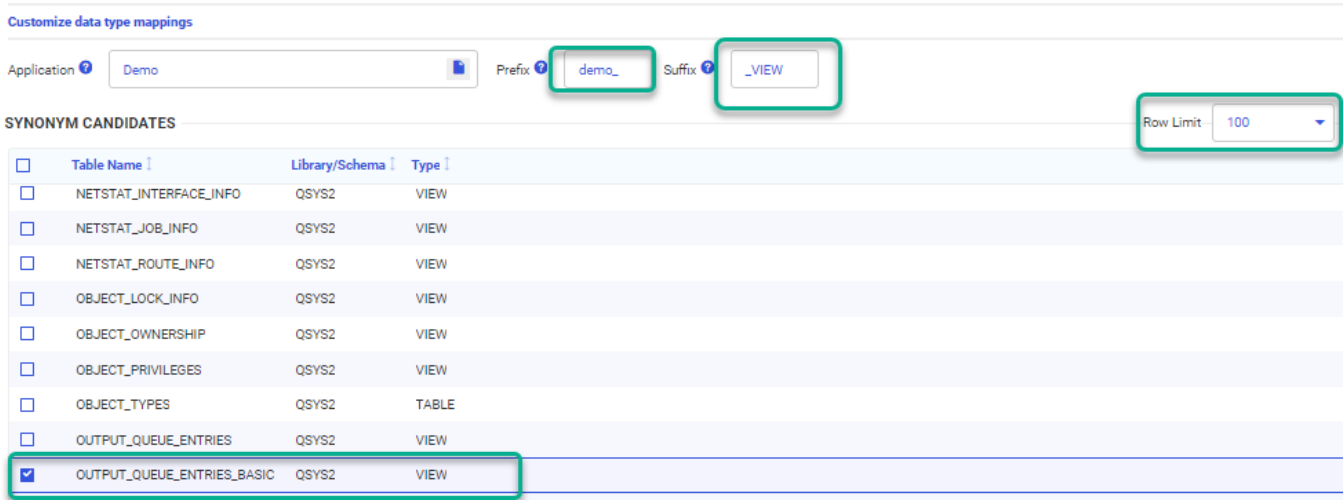
Select the filter (search) icon to see the list of objects in QSYS2

You may need to set Row Limit to 100

Choose the Output_queue_entries_basic VIEW

Hint: Provide a prefix and suffix to your synonym name to recognize it later and identify it as a VIEW synonym



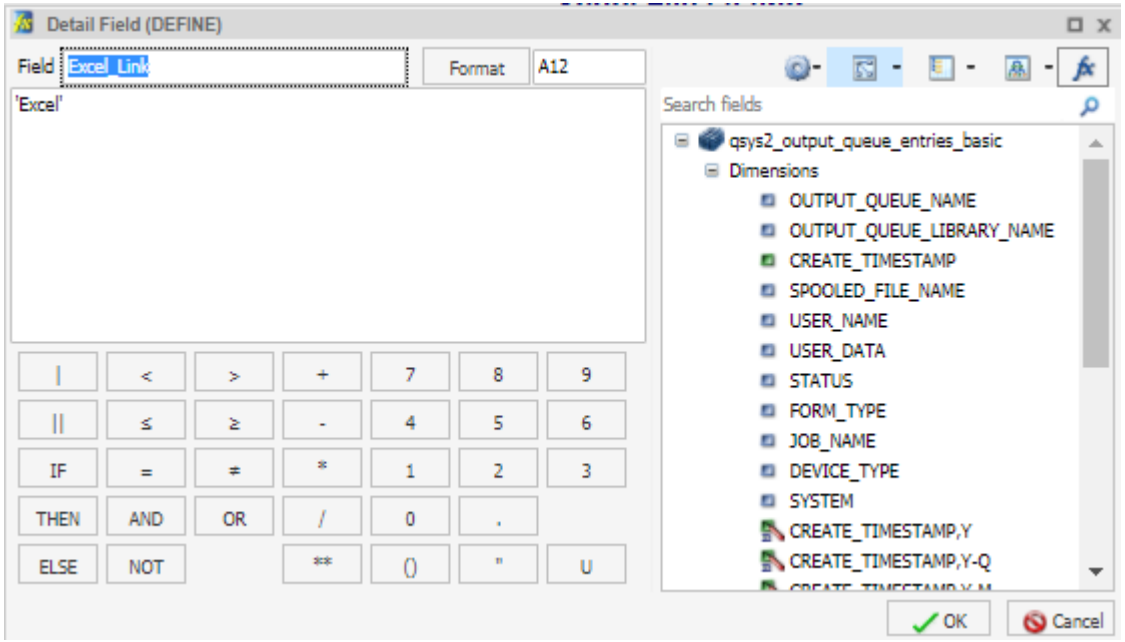


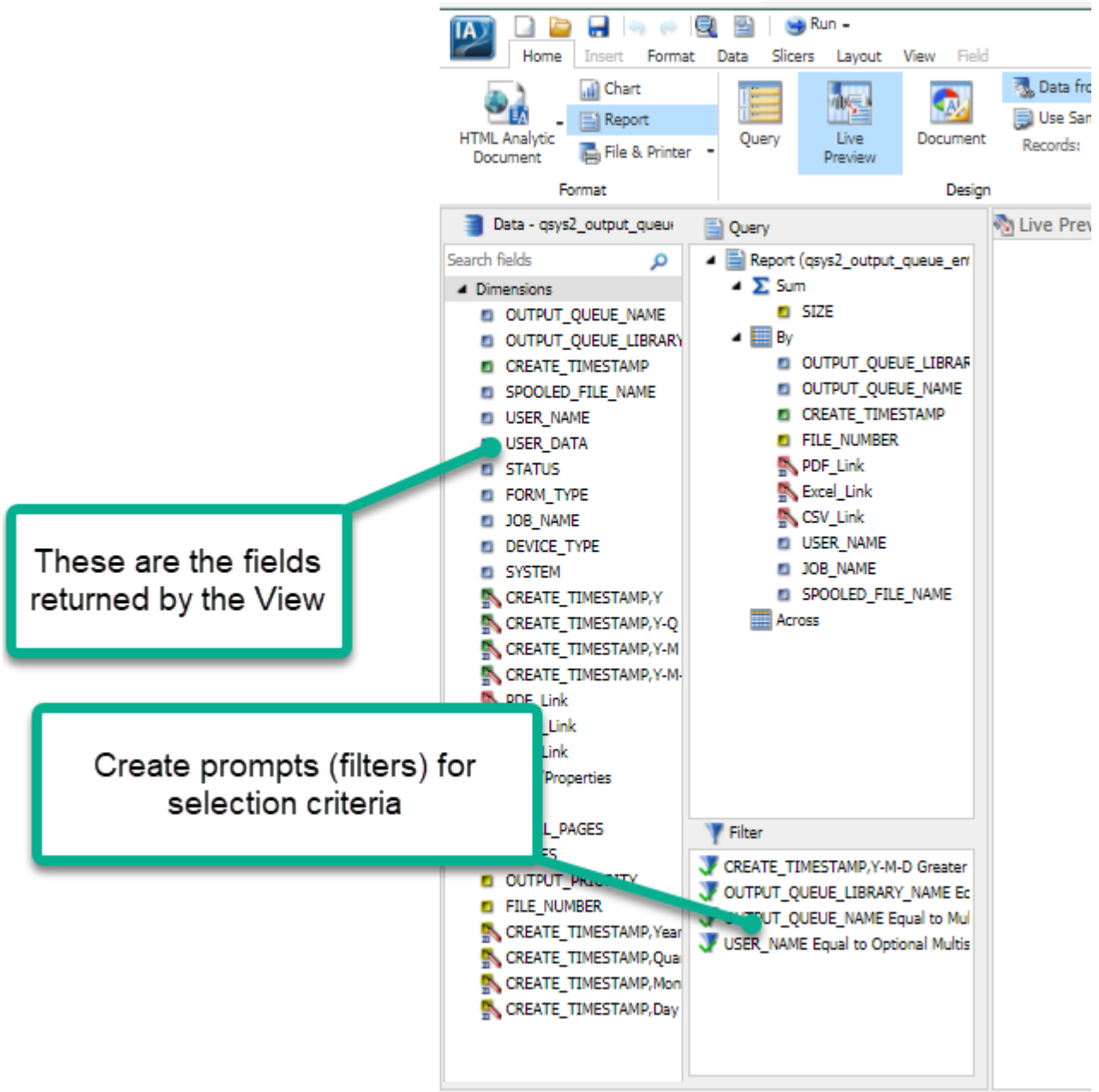
Note: You could also have reversed engineer the select statement using ACS Run SQL Scripts, then copy pasted the view’s SELECT statement into our EZ-Report auto generation utility to auto generate the synonym (and a report)!

How Was This Done?

2. Create your report over the synonym!

- Add a dummy “define” field with a value of “Excel” for creating a hyper link (will we do this later)
  - You could create the link on the spooled_file_name field too as an alternative





How Was This Done?

3. Report #2 (to drill down to): Find the Service to Return the data from Spooled File: **QSYSTOOL.SPOOLED_FILE_DATA** and note that it is shipped as a table function

4. Because this SQL function requires parameters to be passed to a table function, we're going to need to create a Stored Procedure containing the SELECT FROM TABLE function
   - First, use ACS Run SQL Scripts to test the SQL with the table function

```
1 SELECT * FROM TABLE(SYSTOOLS.SPOOLED_FILE_DATA(
2                             JOB_NAME          =>'331718/MACKD/MACKD',
3                             SPOOLED_FILE_NAME =>'QPQUPRFIL'))
4 ORDER BY ORDINAL_POSITION;
```

ORDINAL_POSITION	SPOOLED_DATA				
1	05/18/21 21:03:27				
2	Order	Order	Requested	Actual	Receive
3	Number	Date	Ship Date	Ship Date	Date
4	54390	2021-12-29	2022-02-08	2022-04-23	2022-04-28
5	54390	2021-12-29	2022-03-29	2022-03-28	2022-04-13
6	54390	2021-12-29	2022-02-01	2022-02-17	2022-02-27

How Was This Done?

5. Create your Stored Procedure (Remember, this already provided in the QWQREPOS library)

```
SET PATH "QSYS","QSYS2","SYSPROC","SYSIBMADM","MACKD" ;

CREATE OR REPLACE PROCEDURE MACKD.SPOOLED_FILE_DETAIL (
    IN JOB_NAME VARCHAR(28) ,
    IN SPOOLED_FILE_NAME VARCHAR(10) DEFAULT  'QPJOBLOG' ,
    IN FILE_NUMBER VARCHAR(6) DEFAULT  '*LAST'  )
    DYNAMIC RESULT SETS 1
    LANGUAGE SQL
    SPECIFIC MACKD.SPLFDETAIL
    NOT DETERMINISTIC
    MODIFIES SQL DATA
    CALLED ON NULL INPUT
    PROGRAM TYPE SUB
    SET OPTION  ALWBLK = *ALLREAD ,
    ALWCPYDTA = *OPTIMIZE ,
    COMMIT = *NONE ,
    DECRESULT = (31, 31, 00) ,
    DFTRDBCOL = MACKD ,
    DYNDFTCOL = *NO ,
    DYNUSRPRF = *USER ,
    SRTSEQ = *HEX,
    [illegible] = V7R3M0
```

```
    BEGIN
DECLARE ERROR_OCCURRED INT ;

DECLARE C1 CURSOR FOR SELECT *
  FROM TABLE(SYSTOOLS.SPOOLED_FILE_DATA(JOB_NAME, SPOOLED_FILE_NAME))
  ORDER BY ORDINAL_POSITION;

DECLARE CONTINUE HANDLER FOR SQLEXCEPTION SET ERROR_OCCURRED = 1 ;

OPEN C1 ;
END  ;
```

```
CALL MACKD.SPOOLED_FILE_DETAIL ('331864/MACKD/MACKD','QPQUPRFIL');
```

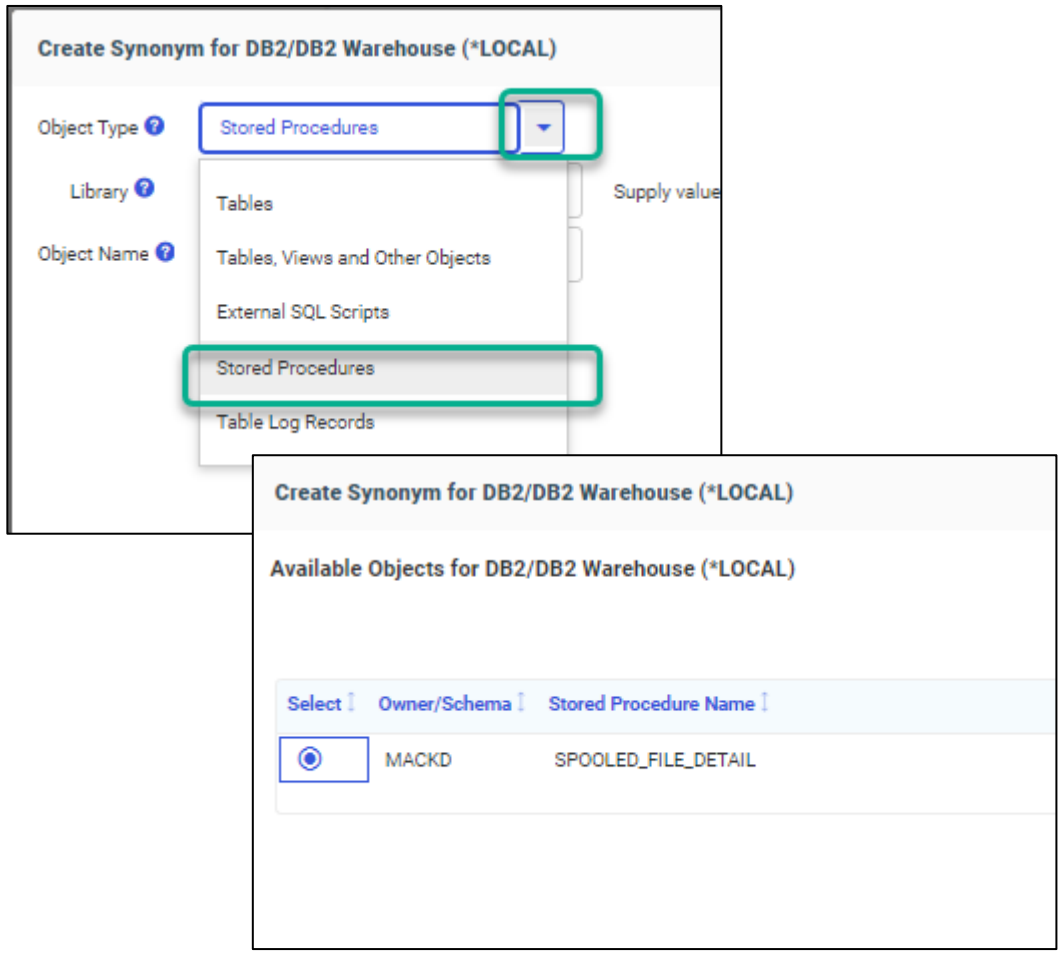
ORDINAL_POSITION	SPOOLED_DATA						
1	05/20/21 13:03:15					PAGE 1	
2	Order	Order	Requested	Actual	Receive	Price	Cost
3	Number	Date	Ship Date	Ship Date	Date		
4	54080	2021-12-18	2022-03-11	2022-03-15	2022-04-12	1,999.00	1,500.00
5	54130	2021-12-18	2022-03-06	2022-03-21	2022-04-06	1,999.00	1,500.00
6	28657	2021-12-04	2022-01-24	2022-01-25	2022-02-22	3,999.00	3,700.00
7	28251	2021-11-28	2022-02-13	2022-02-12	2022-03-12	3,999.00	3,700.00
8	28390	2021-11-28	2022-01-05	2022-01-06	2022-01-10	4,599.00	4,000.00
9	28519	2021-11-28	2022-03-01	2022-03-07	2022-03-14	3,999.00	3,700.00
10	28015	2021-10-17	2021-11-18	2021-11-19	2021-12-25	2,999.00	2,000.00
11	28045	2021-10-17	2021-12-04	2021-12-01	2021-12-27	3,999.00	3,700.00
12	37984	2021-10-02	2021-12-30	2022-03-05	2022-03-09	3,999.00	3,700.00
13	96654	2021-09-28	2021-11-26	2021-12-10	2021-12-22	3,199.00	2,500.00
14	96731	2021-09-16	2021-11-05	2021-11-12	2021-11-24	3,199.00	2,500.00
15	96061	2021-09-06	2021-10-08	2021-10-25	2021-11-24	3,999.00	3,700.00
16	96175	2021-09-06	2021-10-10	2021-10-09	2021-10-12	1,999.00	1,500.00
17	48580	2021-08-29	2021-10-11	2021-10-20	2021-11-11	3,999.00	3,700.00

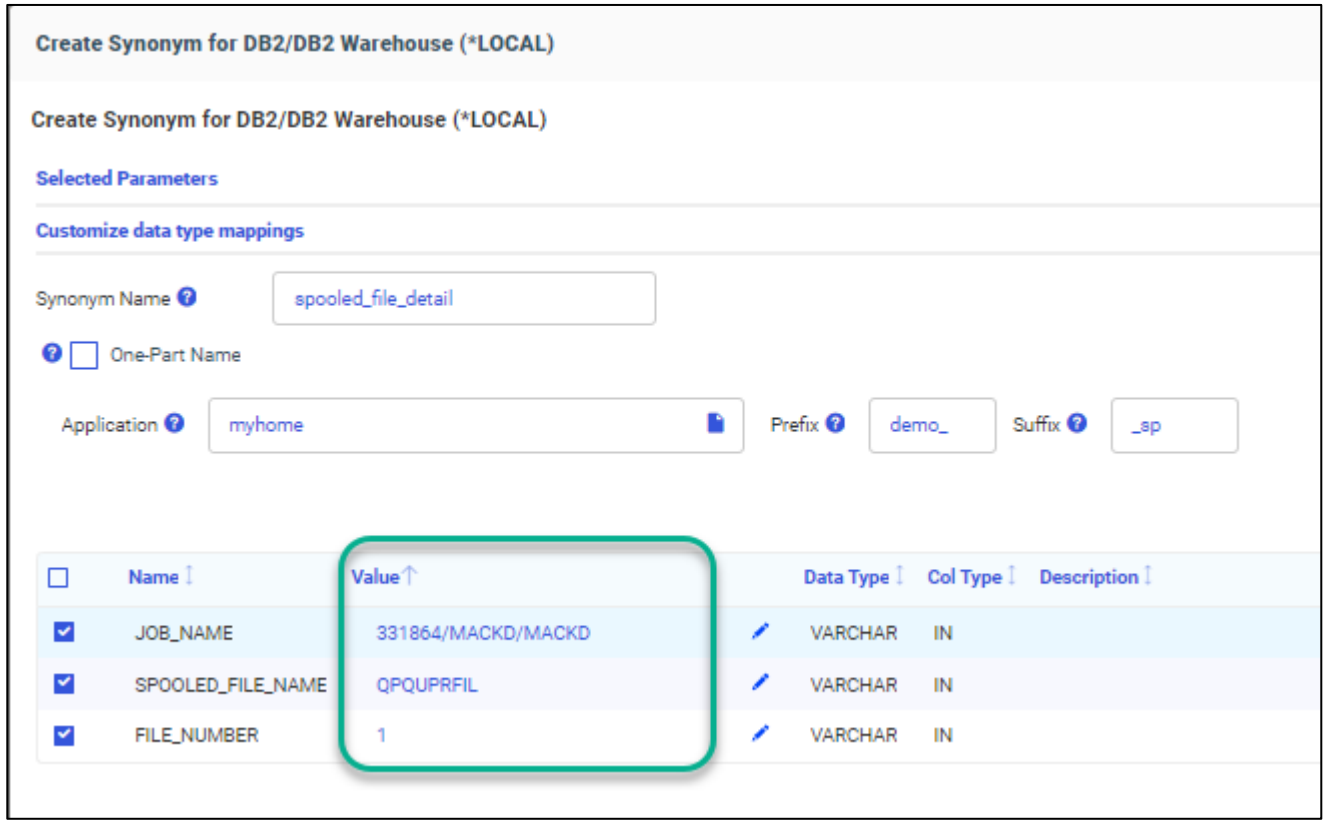
Done: 70 rows retrieved

- Test by calling it with parameters within ACS

How Was This Done?

6. Create a Synonym over your Stored Procedure

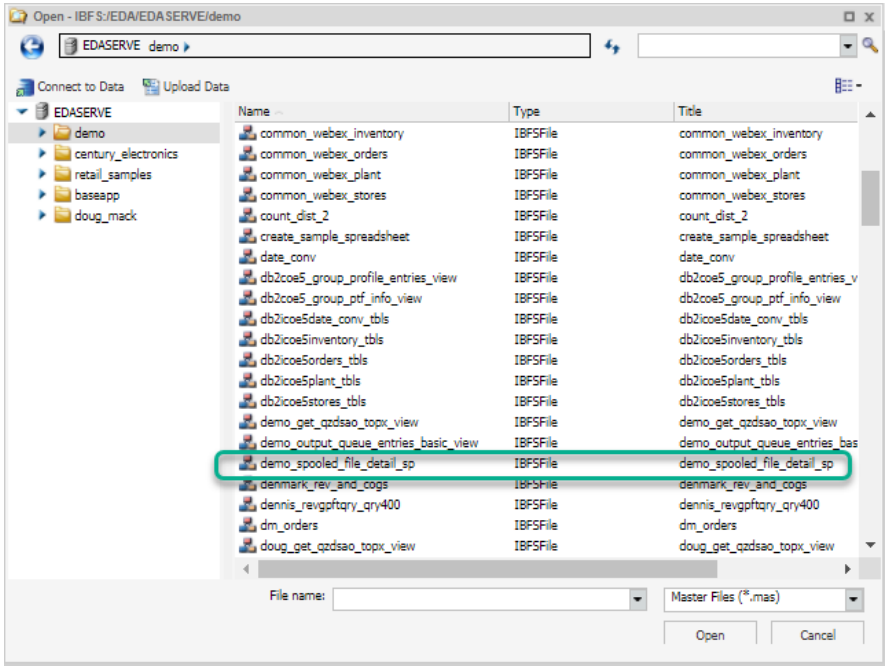


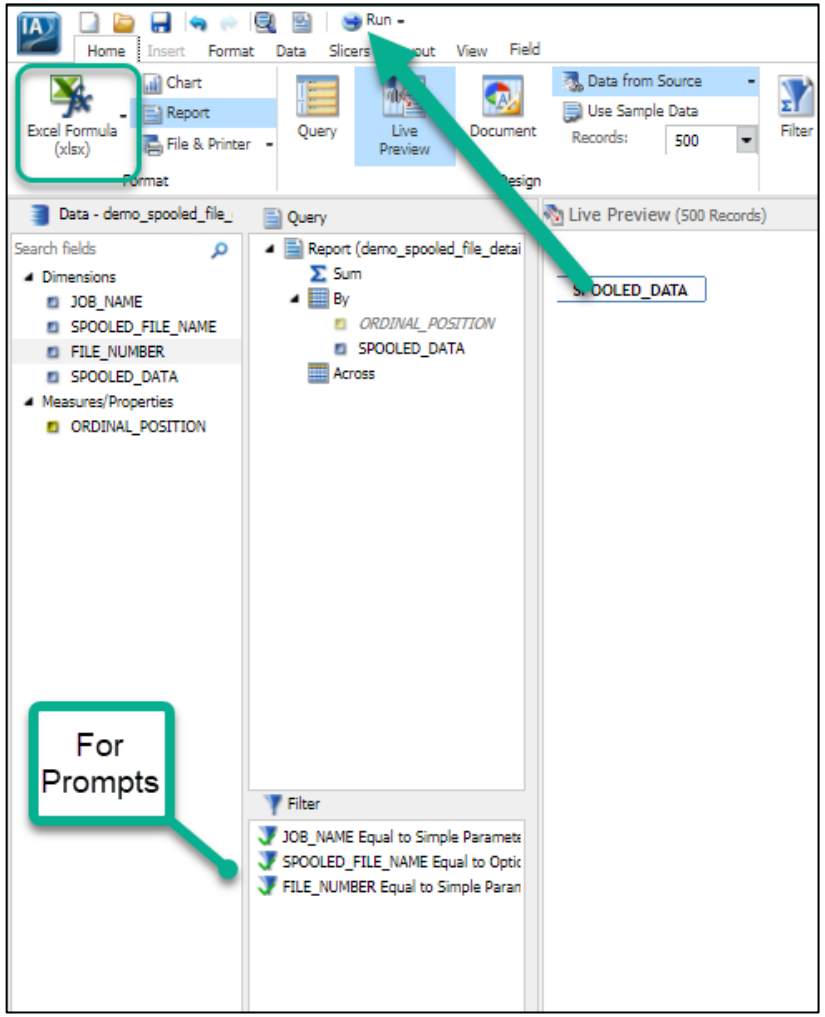


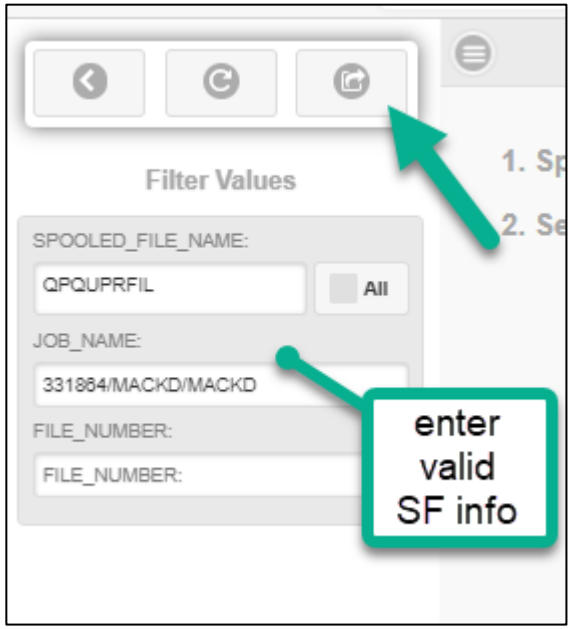
You're prompted for the input fields the SP is expecting and you need to provide VALID values

How Was This Done?

6. Create a Report over your new Synonym – specify OUTPUT as .xlsx or .csv



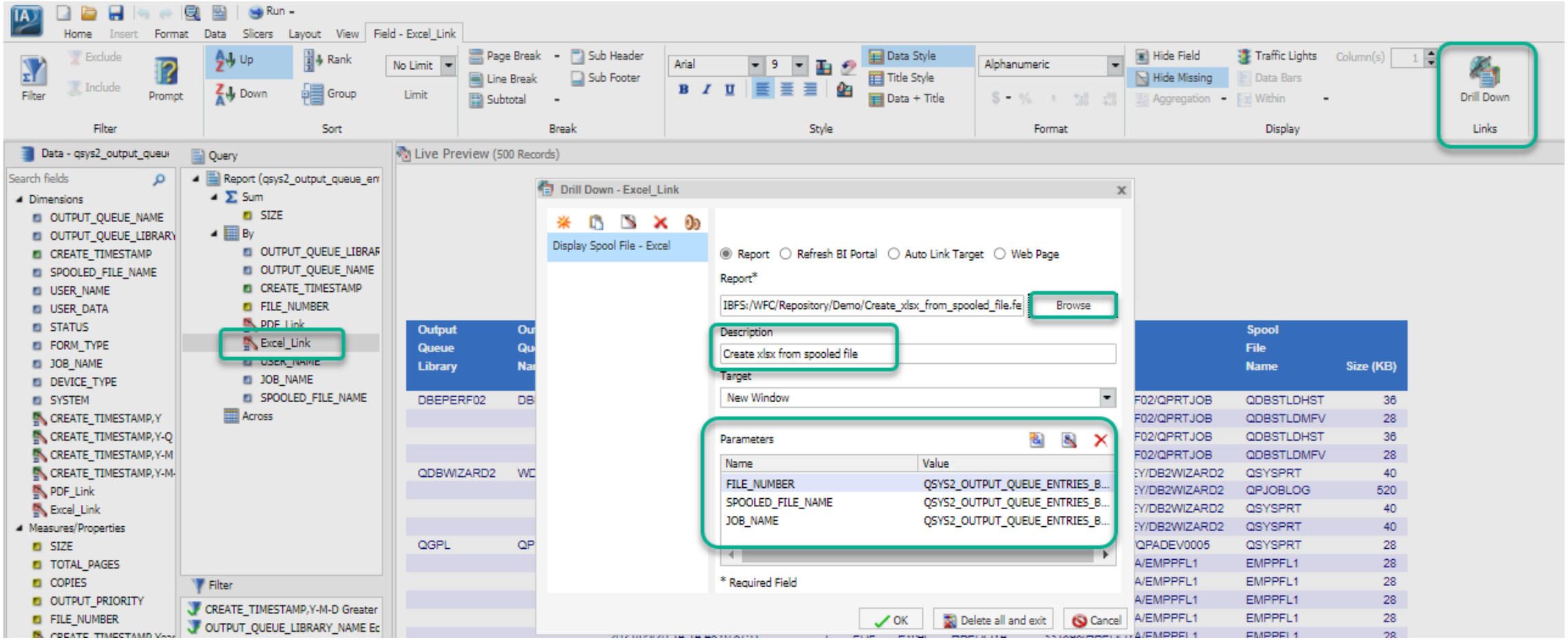




- Add filters for inputting spooled file name/job name
- Test with the RUN button
- Save your Report

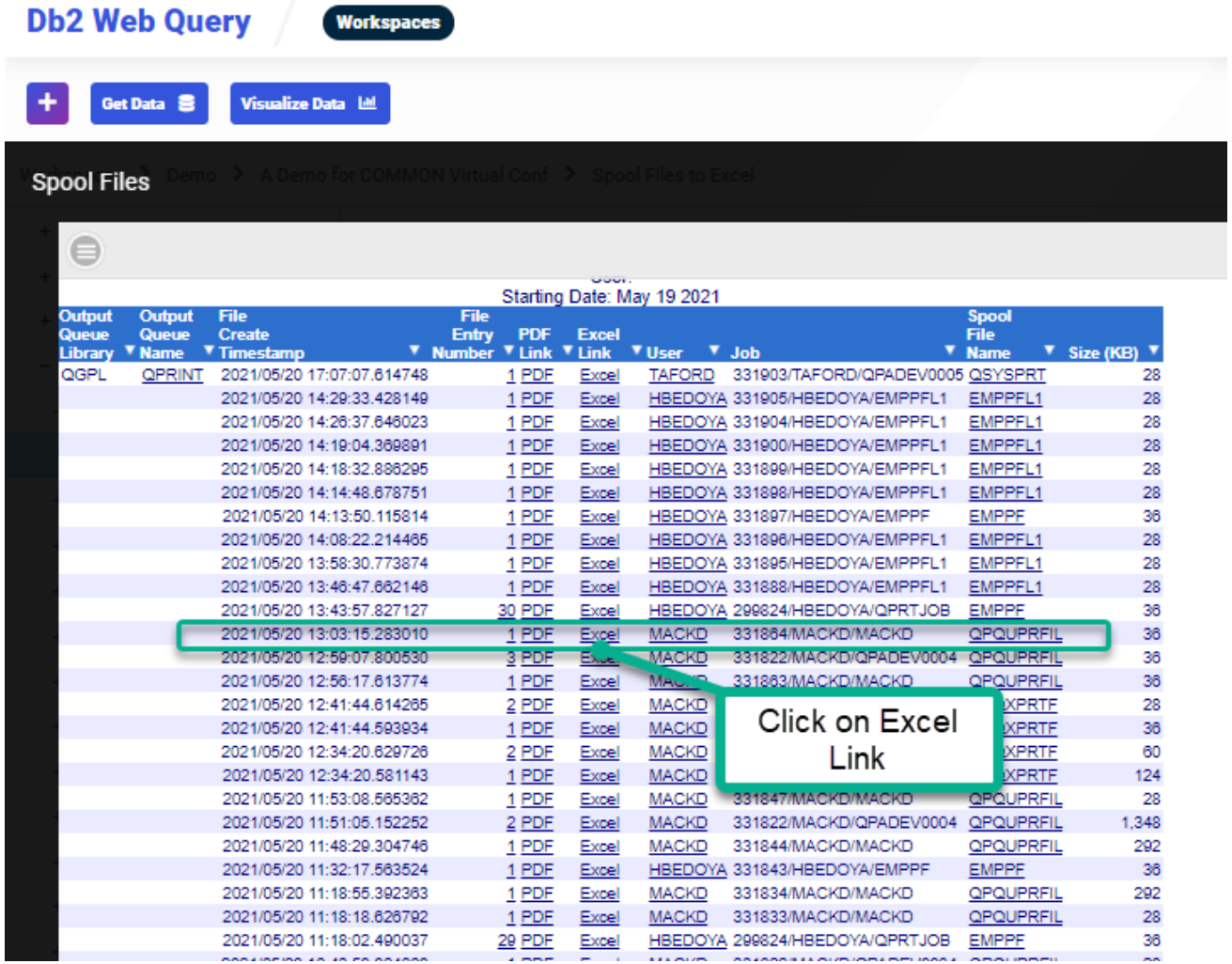
Almost Done!

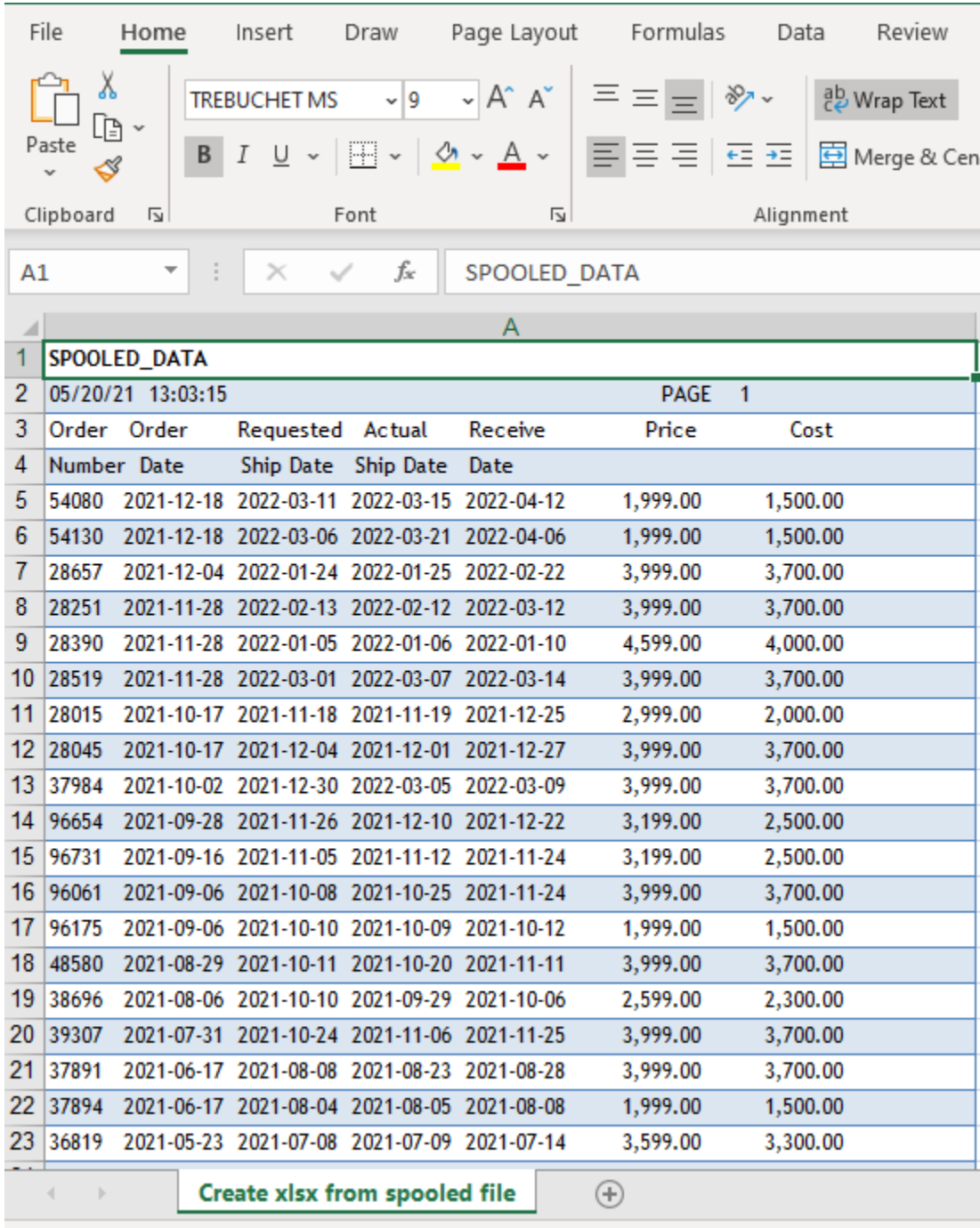
7. Link the Parent report to the Spooled File Detail report we just created



- Open Parent Report. Click on Excel_Link then Drill Down Tool
- Browse for the Create xlsx from Spooled File report
- Add the fields to be used to pass the Spooled File information to it, click OK and SAVE!

Whoo Hoo!





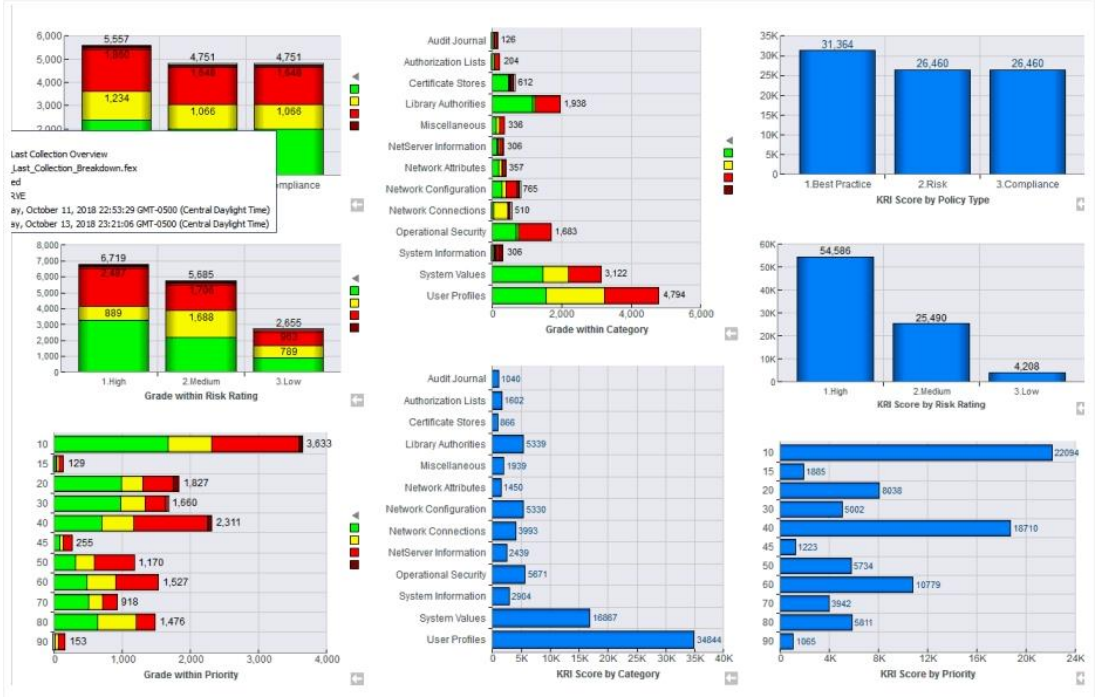
	A						
1	SPOOLED_DATA						
2	05/20/21 13:03:15				PAGE 1		
3	Order Number	Order Date	Requested Ship Date	Actual Ship Date	Receive Date	Price	Cost
4							
5	54080	2021-12-18	2022-03-11	2022-03-15	2022-04-12	1,999.00	1,500.00
6	54130	2021-12-18	2022-03-06	2022-03-21	2022-04-06	1,999.00	1,500.00
7	28657	2021-12-04	2022-01-24	2022-01-25	2022-02-22	3,999.00	3,700.00
8	28251	2021-11-28	2022-02-13	2022-02-12	2022-03-12	3,999.00	3,700.00
9	28390	2021-11-28	2022-01-05	2022-01-06	2022-01-10	4,599.00	4,000.00
10	28519	2021-11-28	2022-03-01	2022-03-07	2022-03-14	3,999.00	3,700.00
11	28015	2021-10-17	2021-11-18	2021-11-19	2021-12-25	2,999.00	2,000.00
12	28045	2021-10-17	2021-12-04	2021-12-01	2021-12-27	3,999.00	3,700.00
13	37984	2021-10-02	2021-12-30	2022-03-05	2022-03-09	3,999.00	3,700.00
14	96654	2021-09-28	2021-11-26	2021-12-10	2021-12-22	3,199.00	2,500.00
15	96731	2021-09-16	2021-11-05	2021-11-12	2021-11-24	3,199.00	2,500.00
16	96061	2021-09-06	2021-10-08	2021-10-25	2021-11-24	3,999.00	3,700.00
17	96175	2021-09-06	2021-10-10	2021-10-09	2021-10-12	1,999.00	1,500.00
18	48580	2021-08-29	2021-10-11	2021-10-20	2021-11-11	3,999.00	3,700.00
19	38696	2021-08-06	2021-10-10	2021-09-29	2021-10-06	2,599.00	2,300.00
20	39307	2021-07-31	2021-10-24	2021-11-06	2021-11-25	3,999.00	3,700.00
21	37891	2021-06-17	2021-08-08	2021-08-23	2021-08-28	3,999.00	3,700.00
22	37894	2021-06-17	2021-08-04	2021-08-05	2021-08-08	1,999.00	1,500.00
23	36819	2021-05-23	2021-07-08	2021-07-09	2021-07-14	3,599.00	3,300.00

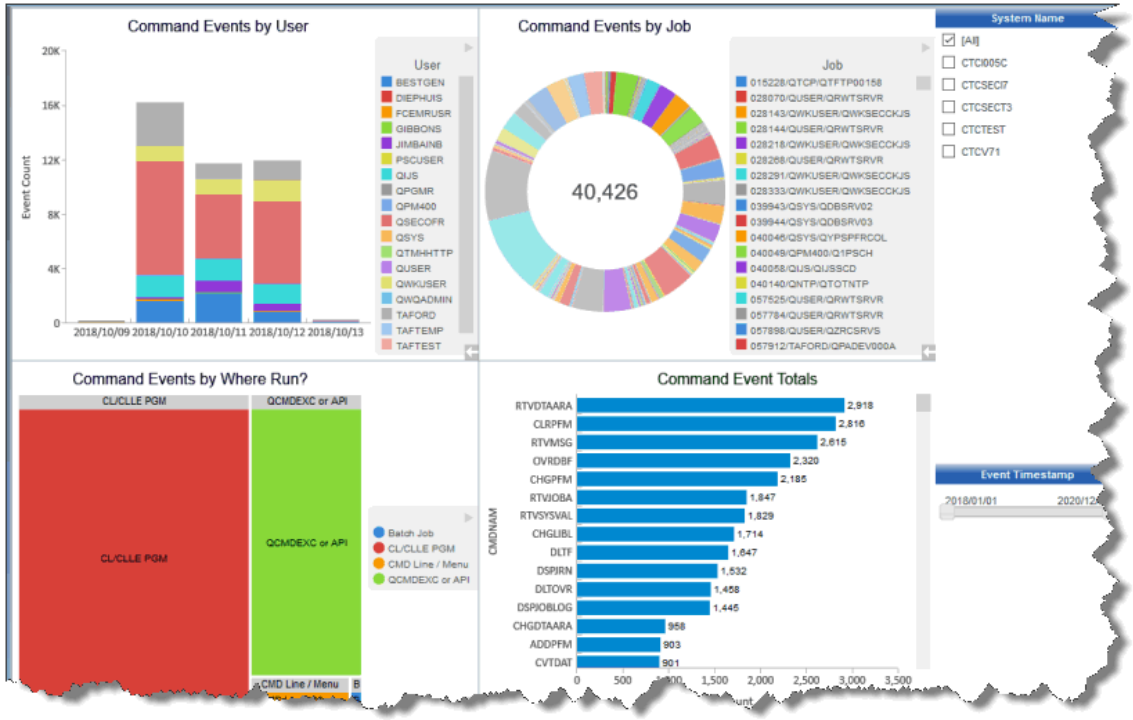
IBM Has Done Some of the Work For You

IBM i Anywhere
IBM i Everywhere

- Sample set of reports and dashboards using IBM i “Services” built into the product
  - Documentation on how these were built

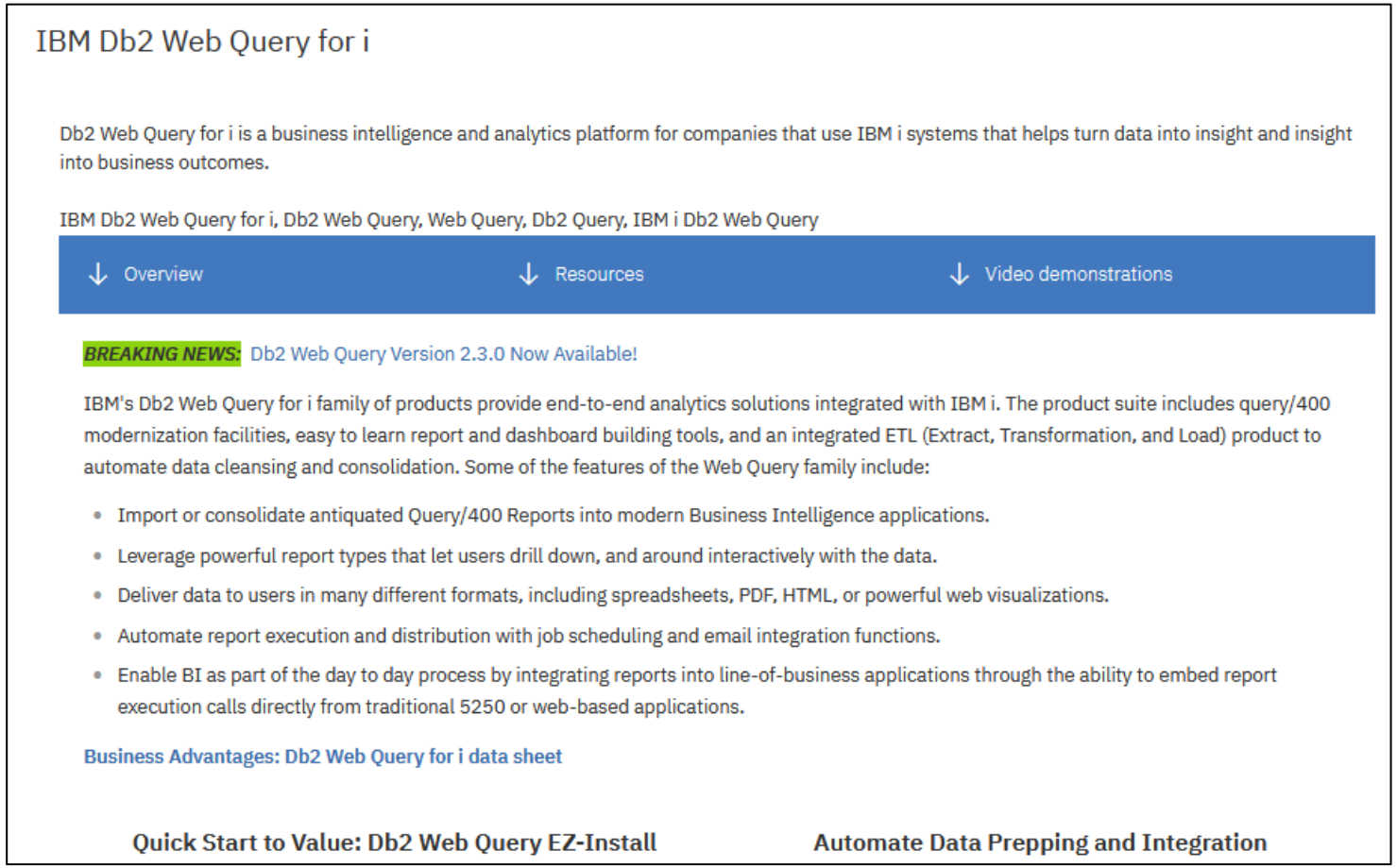
- Out of the box Security Centric but also contains many systems/object type monitoring reports
  - Compliance Automation and Reporting Solution Enterprise Edition (multiple systems/LPARs)
    - Sold as a Lab Services solution
    - Single Server Express Edition coming soon
    - https://www.ibm.com/support/pages/ibm-i-security#cart





Where to Go For MORE Information on 2.3.0

- Db2 Web Query for i main website
  - http://ibm.biz/db2webqueryi
- New Features Guide available on the Db2 Web Query WIKI
  - http://ibm.biz/db2wqwiki take the DOCUMENTATION link
- Product Manual also on the wiki
  - http://ibm.biz/db2wqwiki take the DOCUMENTATION link
- Doug Mack blog posts
  - Db2webqueryi.blogspot.com
- EZ-Install Test Drive and InfoAssist Tutorials
  - Included in the EZ-Install package
- EZ-Report
  - http://ibm.biz/db2wq-ezreport



THANK YOU!