

Turning Data into Information

(Leveraging SQL Edition)

Power VUG June 2021

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IBM i Anywhere
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Who Uses Db2 Web Query?

Executives - Dashboards to monitor Key Performance Indicators

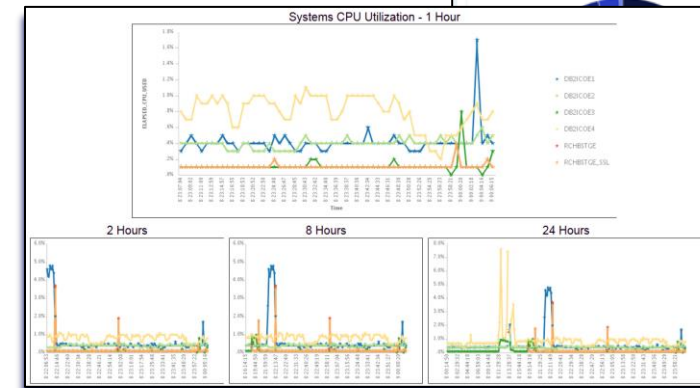
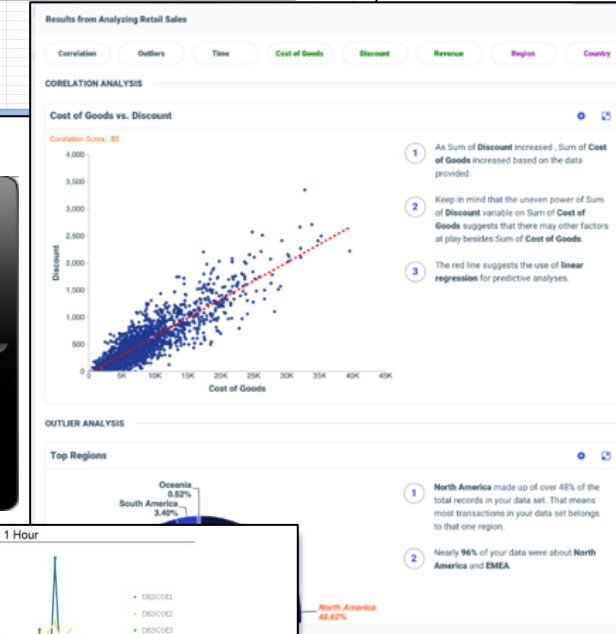
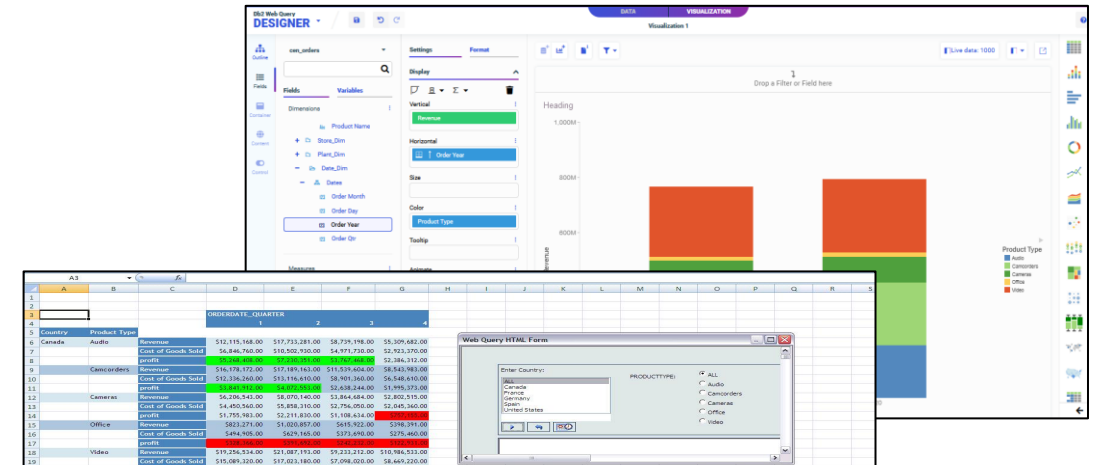
Finance Dept – they love their spreadsheets!

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

IBM i Anywhere
IBM i Everywhere

- 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)

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>

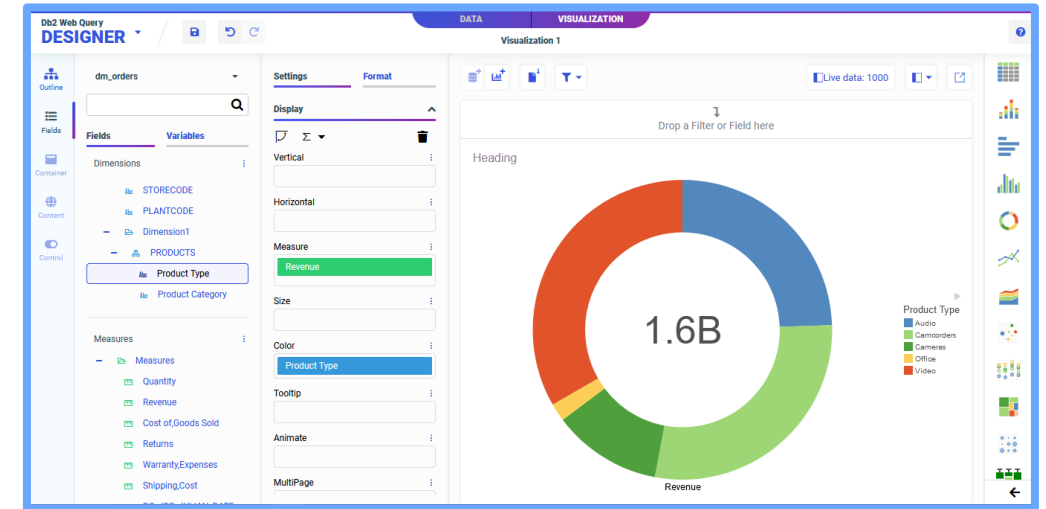
New Db2 Web Query Editions

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

<i>Sales Report</i>					
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	\$122,340,000.00	\$81,277,140.00	\$40,062,860.00	32.75%
	CD Players and Recorders	\$53,840,000.00	\$37,751,000.00	\$16,008,999.00	29.73%
	MP3	\$43,400,000.00	\$26,347,772.00	\$17,052,228.00	39.21%
	Receivers	\$35,907,113.00	\$22,998,000.00	\$12,909,113.00	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	\$1,000,000.00	\$300,373,350.00	\$79,003,287.00	28.82%
	MiniDV Camcorders	\$1,000,000.00	\$34,128,360.00	\$17,411,091.00	33.78%
Subtotal for Camcorders		\$1,000,000.00	\$341,014,310.00	\$103,516,731.00	23.29%
Cameras	Digital Cameras	\$184,103,667.00	\$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%
<i>Values generated on Mon, Jun 07, 2021</i>					

Preserve color schemes and traffic lighting

Calculated fields come down as formulas

I am Required to Show This Slide

- Yes, Db2 Web Query Does Excel

The screenshot shows an Excel spreadsheet with a data table and a PivotTable Fields task pane. The data table has columns for Product Name, Product Category, Data, and Total. The PivotTable Fields task pane is on the right, showing a list of fields to add to the report: Cost of Goods Sold, Product Category, Product Name, Profit, Quantity, Returns, and Revenue. A callout box with a green border and arrow points to the data table with the text "Push into pivot table format".

Product Name	Product Category	Data	Total
Audio/Video Receiver	Receivers	Sum of Revenue	\$4,302,778.00
		Sum of Cost of Goods Sold	2162200.00
		Sum of Profit	
		Sum of Quantity	
		Sum of Returns	
AM / FM Stereo Tuner	Amplifiers/PreAmps/Tuners	Sum of Revenue	\$730,822.00
		Sum of Cost of Goods Sold	477800.00
		Sum of Profit	\$473,022.00
		Sum of Quantity	4778
		Sum of Returns	461
CD Changer / CD Player	CD Players and Recorders	Sum of Revenue	\$4,689,037.00
		Sum of Cost of Goods Sold	2827560.00
		Sum of Profit	\$1,861,477.00
		Sum of Quantity	23563
		Sum of Returns	2457
CD Recorder with 50GB Hard Disc Drive	CD Players and Recorders	Sum of Revenue	\$5,788,755.00
		Sum of Cost of Goods Sold	4347000.00
		Sum of Profit	\$1,441,755.00
		Sum of Quantity	7245
		Sum of Returns	715
D-VHS Digital Video Recorder	VCR	Sum of Revenue	\$1,120,290.00
		Sum of Cost of Goods Sold	963000.00

PivotTable Fields

Choose fields to add to report:

Search

- Cost of Goods Sold
- Product Category
- Product Name
- Profit
- Quantity
- Returns
- Revenue

Drag fields between areas below:

Filters

Columns

Rows

Product Name
Product Category

Values

Sum of Revenue
Sum of Cost of Go...

Defer Layout Update Update

I am Required to Show This Slide

- Yes, Db2 Web Query Does Excel

	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/PreAmps		\$871,520.00	3,626
18				Audio Systems		\$327,440.00	796
19				CD Players and Rec		\$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

358 of 358 records, Page 1 of 7

Gross Profit by Geo and Product

Country	Region	Product Type	Product Category	Revenue	Cost of Goods Sold	Profit
Canada	Eastern Canada	Audio	Amplifiers/PreAmps/Tuners	\$3,641,071.00		\$1,422,251.00
			Audio Systems	\$13,874,740.00		\$4,600,870.00
			CD Players and Recorders	\$4,862,691.00		\$1,418,451.00
			MP3	\$4,078,820.00		\$1,630,310.00
			MP3	\$3,325,818.00		\$1,180,518.00
			MP3	\$7,833,814.00		\$5,518,494.00
			MP3	\$1,324,991.00		\$699,051.00
			MP3	\$38,773,168.00		\$8,179,018.00
			MiniDV Camcorders	\$5,137,588.00		\$1,747,078.00
		Cameras	Digital Cameras	\$18,378,011.00		\$5,113,311.00
		Office	Handheld and PDA	\$1,491,653.00		\$355,433.00
			Organizers	\$942,073.00		\$546,713.00
		Video	DVD	\$34,232,392.00		\$8,308,942.00
			TV	\$13,800,546.00		\$1,552,646.00
			VCR	\$1,998,609.00		\$531,459.00
Subtotal: Eastern Canada						42,804,545.00
	Western Canada	Audio	Amplifiers/PreAmps/Tu	\$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

Play with data views and then dump into Excel with HTML Analytical Reports

Context Menu Options:

- Sort Ascending
- Sort Descending
- Filter
- Calculate
- Chart
- Rollup
- Pivot (Cross Tab)
- Visualize
- Hide Column
- Grid Tool
- Chart/Rollup Tool
- Pivot Tool
- Show Records
- Comments
- Save Changes
- Export
 - HTML
 - CSV (comma delim)
 - XML (Excel)
- Print
- Window
- Restore Original

I am Required to Show This Slide

- Yes, Db2 Web Query Does Excel

The screenshot displays an Excel spreadsheet with the following data:

Country	Product Type	Revenue	Cost of Goods Sold	profit
Canada	Audio	\$12,115,168.00	\$6,846,760.00	\$5,268,408.00
	Camcorders	\$16,178,172.00	\$12,336,260.00	\$3,841,912.00
	Cameras	\$6,206,543.00	\$4,450,560.00	\$1,755,983.00
	Office	\$823,271.00	\$494,905.00	\$328,366.00
	Video	\$19,256,534.00	\$15,089,320.00	\$4,167,214.00
France	Audio	\$5,192,880.00	\$3,124,390.00	\$2,068,490.00
	Camcorders	\$6,695,110.00	\$5,082,620.00	\$1,612,490.00
	Cameras	\$2,751,052.00	\$1,954,860.00	\$796,192.00
	Office	\$221,463.00	\$124,530.00	\$96,933.00

The 'Web Query HTML Form' window includes the following fields:

- Enter Country: [Dropdown menu with options: ALL, Canada, France, Germany, Spain, United States]
- PRODUCTTYPE: [Radio buttons for ALL, Audio, Camcorders, Cameras, Office, Video]

Callouts in the image:

- Customized Prompts**: Points to the 'ORDERDATE_QUARTER' header in the spreadsheet.
- Embedded Query**: Points to the 'profit' row in the spreadsheet.

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

Spool Files IBM Administration Samples > Spool File Related

14 of 14 records, Page 1 of 1

Spool File Listing
Output Queue Lib: 'QGPL' OR 'QUSRSYS'
Output Queue: 'QPRINT'
User:
Starting Date: May 01 2021

Output Queue Library	Output Queue Name	File Create Timestamp	File Entry Number	PDF Link	Excel Link	User	Job	Spool File Name	Size (KB)
QGPL	QPRINT	2021/05/18 21:03:27.184255	1	PDF	Excel	MACKD	331718/MACKD/MACKD	QPQUPRFL	3,140
		2021/05/18 17:20:04.029103	1	PDF	Excel	HBEDOYA	331710/HBEDOYA/EMPPF	EMPPF	38
		2021/05/18 17:05:27.262410	28	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/18 16:49:59.875788	1	PDF	Excel	HBEDOYA		EMPPF	40
		2021/05/18 16:45:04.044066	1	PDF	Excel	HBEDOYA		EMPPF	38
		2021/05/18 16:00:06.350991	27	PDF	Excel	HBEDOYA		EMPPF	38
		2021/05/13 08:04:52.099257	26	PDF	Excel	HBEDOYA		EMPPF	40
		2021/05/12 14:03:53.643267	25	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	40
		2021/05/12 11:45:59.361547	1	PDF	Excel	MACKD	331309/MACKD/QPADEV0003	QPQUPRFL	3,144
		2021/05/06 09:12:25.487368	24	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/05 20:24:42.298251	1	PDF	Excel	QSYS	329982/QSYS/QSLPSVR	QPRINT	28
		2021/05/05 12:08:48.623259	23	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/04 16:21:34.290034	22	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/04 15:45:50.188847	21	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38

Report run on Tue, May 18, 2021 at 21.03.51

Click on Excel link

	A	B	C	D	E	F	G	H
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

- Concept of Meta Data (“Synonyms”)
 - Auto Generation Facilities
- To SQL or not to SQL
 - Examples
 - Olap
 - IBM i Services
- Automated Insights

Synonyms Describe (and simplify) the Data Source

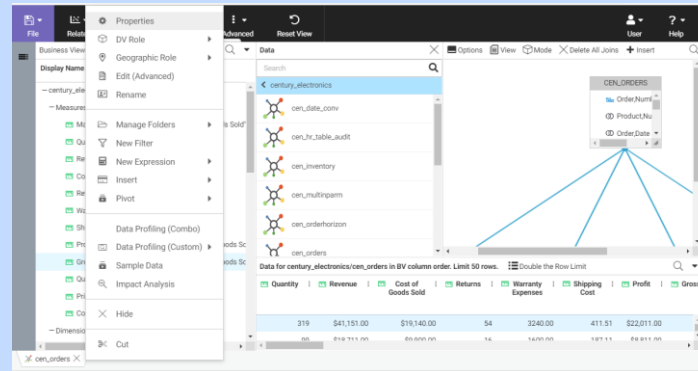
IBM i Anywhere
IBM i Everywhere

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 very EASY**
- Non Db2 Databases
 - Postgres, MySQL, Oracle, et.al.
- **IBM i Services**

Report
Writer
Productivity

Simplified Data Perspective “Meta data”

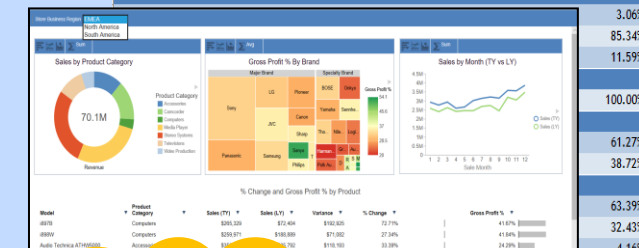


SYNONYMS

End User Happiness!



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	

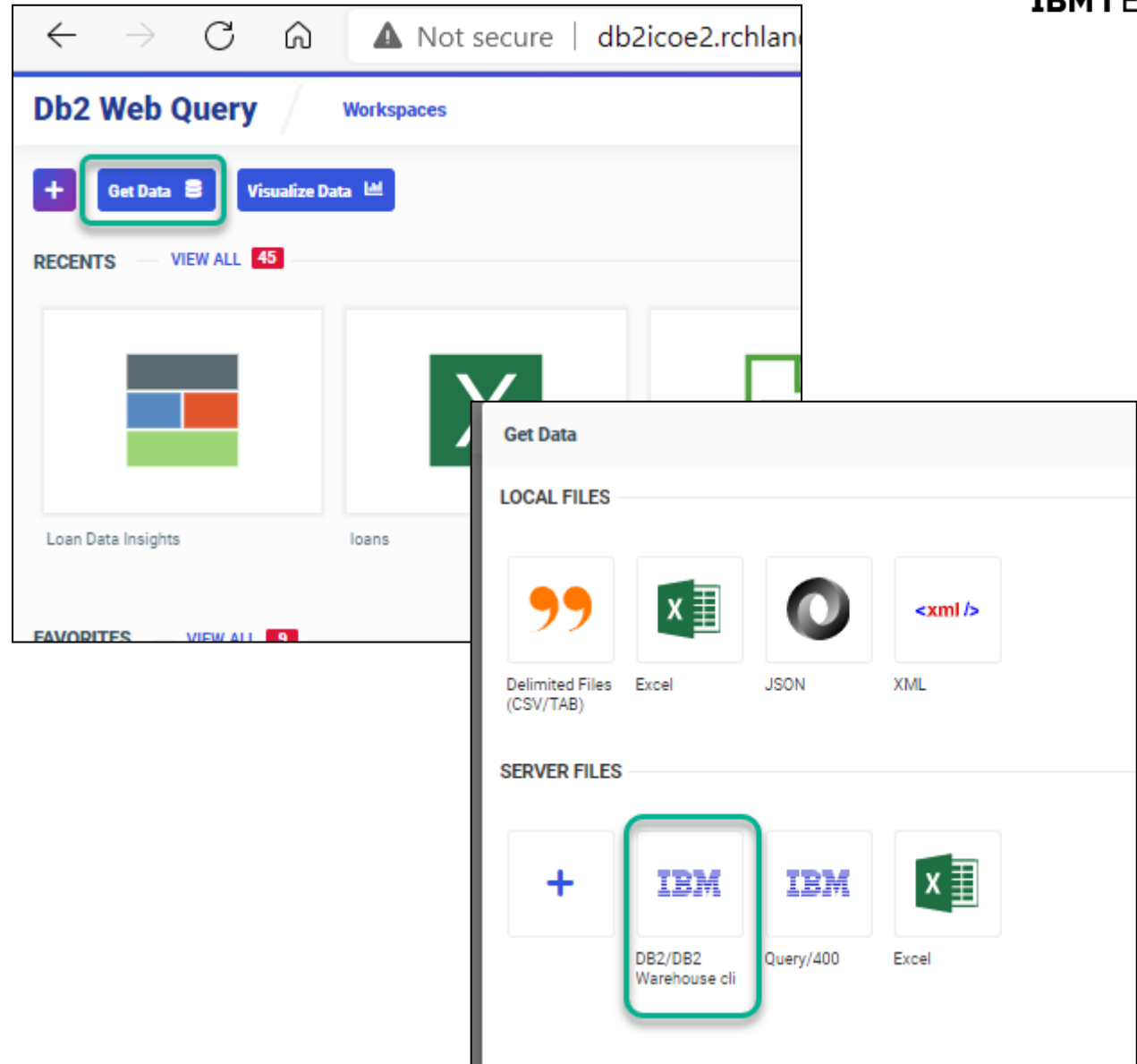


Single Version
of the Truth !!!

AND ALL ON IBM i

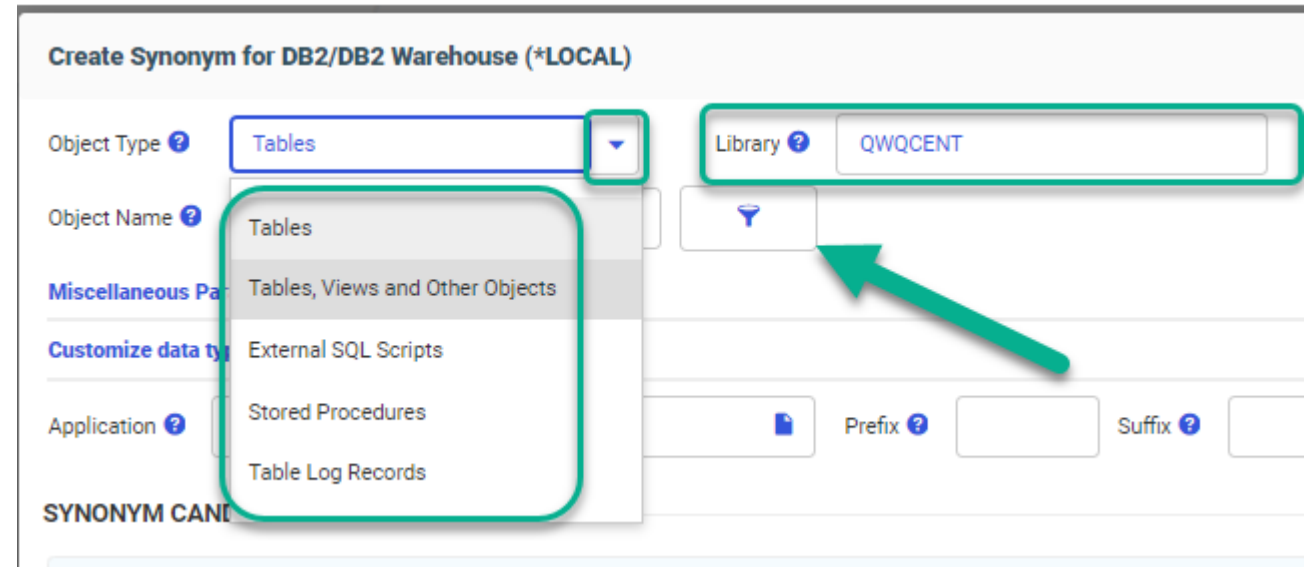
Building a Synonym

- 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

The screenshot shows the 'Create Synonym for DB2/DB2 Warehouse (*LOCAL)' interface. It includes fields for Object Type (set to 'Tables, Views and Other Objects'), Object Name, Library, Application (set to 'demo'), Prefix (set to 'SERVICE_'), and Suffix (set to '_VIEW'). A 'SYNONYM CANDIDATES' table is visible with the following data:

Table Name	Library/Schema	Type
<input checked="" type="checkbox"/> GET_PERCENT_DISK_USED	MACKD	VIEW
<input type="checkbox"/> CLAIMS	MACKD	TABLE
<input type="checkbox"/> CLAIMS_PAYMENTS_BY_TYPE	MACKD	VIEW

Callouts in the image provide additional information:

- 'Application Folder where your synonym will be stored' points to the 'Application' field.
- 'Hint: Give your synonym name a prefix and suffix' points to the 'Prefix' and 'Suffix' fields.
- 'Increase this size if you don't see your view' points to the 'Row Limit' dropdown menu.

- 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

The screenshot displays the Db2 Web Query for i SERVER interface. On the left, a 'Business View' pane lists various fields and their corresponding expressions. A table at the bottom shows sample data for 'century_electronics/cen_orders'. Several callout boxes with green borders and arrows point to specific features in the interface.

Fields from File(s): Points to the 'Revenue' field in the Business View list.

Derived Fields and Functions: Points to the 'Profit' field, which has the expression 'Revenue - "Cost of,Goods Sold"'. Other derived fields include 'Gross_Profit' and 'Margin'.

Join Editor: Points to the central diagram showing a star schema with tables: CEN_ORDERS, CEN_DATE_CONV, CEN_INVENTORY, CEN_PLANT, and CEN_STORES. Lines indicate relationships between these tables.

Sample Data as you go: Points to the data table below the join editor.

Dimension Hierarchies enable drill-downs: Points to the 'Products' dimension in the left-hand pane.

Requested Ship Date	Actual Ship Date	Invoice Date	Order Number	Product Number	Store Code	Code	Date	Order Date	Sales Rep	Qu
2022/01/20	2021/11/21	2021/12/03	28003	2005	9999CE	LA	2021/12/01	2021/10/17	Web	
2022/01/18	2022/01/16	2022/01/29	28003	3004	9999CE	LA	2022/01/29	2021/10/17	Web	
2021/11/27	2021/12/14	2021/12/24	28003	4022	9999CE	LA	2021/12/23	2021/10/17	Web	

Building a Synonym from Scratch

- Use SYNONYM REPORT and SEARCH function to aid report authors in knowing how to point to the appropriate data source representation

The screenshot displays the Db2 Web Query interface. At the top, there are buttons for '+', 'Get Data', and 'Visualize Data'. Below this, a breadcrumb trail shows 'Workspaces > IBM Db2 Web Query Information > Utilities'. The left sidebar contains a list of workspaces, with 'IBM Db2 Web Query Information' and 'Utilities' highlighted. The main area is divided into three tabs: 'INFOASSIST', 'SCHEDULE', and 'OTHER'. Under 'INFOASSIST', there are four utility icons: 'Chart', 'Visualization', 'Report', and 'Document'. Below these, the 'Items' section shows three utility cards: 'EZ-Report', 'Search', and 'Synonym Fields'. Two callout boxes with green borders point to the 'Search' and 'Synonym Fields' cards. The first callout box contains the text 'Search a synonym (or report) utility' and points to the 'Search' card. The second callout box contains the text 'Provide a list of fields in selected synonyms' and points to the 'Synonym Fields' card.

Auto Generation Facilities in Db2 Web Query

- 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
 - More on this later 😊
- **EZ-Report**
 - Generates a synonym and a report from an SQL statement (or over a file)
 - More on this later 😊

To SQL, or Not to SQL

IBM i Anywhere
IBM i Everywhere

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](#)

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About Me



[e](#) **Doug Mack**

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

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

Example #1

- Human Resources Request for Salary Comparison Report
 - By department, give me every employee's salary, and comparisons to the employees with the closest two salaries but under theirs, and the closest two above theirs
 - Include the values and % difference

Salary Comparison Report															
WORKDEPT	EMPNO	SALARY	Next Salary Above	Plus One Difference	Plus One Percentage	Second Salary Above	Plus Two Difference	Plus Two Percentage	Next Salary Below	Minus One Difference	Minus One Percentage	Second Salary Below	Minus Two Difference	Minus Two Percentage	
A00	000120	29250.00	29250.00	.00	.00%	46500.00	-17,250.00	-58.97%	N/A	.00	.00%	N/A	.00	.00%	
	200120	29250.00	46500.00	-17,250.00	-58.97%	46500.00	-17,250.00	-58.97%	29250.00	.00	.00%	N/A	.00	.00%	
	000110	46500.00	46500.00	.00	.00%	52750.00	-6,250.00	-13.44%	29250.00	17,250.00	37.10%	29250.00	17,250.00	37.10%	
	200010	46500.00	52750.00	-6,250.00	-13.44%	N/A	.00	100.00%	46500.00	.00	.00%	29250.00	17,250.00	37.10%	
	000010	52750.00	N/A	.00	100.00%	N/A	.00	100.00%	46500.00	6,250.00	11.85%	46500.00	6,250.00	11.85%	
B01	000020	41250.00	N/A	.00	100.00%	N/A	.00	100.00%	N/A	.00	.00%	N/A	.00	.00%	
C01	000130	23800.00	28420.00	-4,620.00	-19.41%	28420.00	-4,620.00	-19.41%	N/A	.00	.00%	N/A	.00	.00%	
	000140	28420.00	28420.00	.00	.00%	38250.00	-9,830.00	-34.59%	23800.00	4,620.00	16.26%	N/A	.00	.00%	
	200140	28420.00	38250.00	-9,830.00	-34.59%	N/A	.00	100.00%	28420.00	.00	.00%	23800.00	4,620.00	16.26%	
	000030	38250.00	N/A	.00	100.00%	N/A	.00	100.00%	28420.00	9,830.00	25.70%	28420.00	9,830.00	25.70%	
D11	000210	18270.00	20450.00	-2,180.00	-11.93%	21340.00	-3,070.00	-16.80%	N/A	.00	.00%	N/A	.00	.00%	
	000190	20450.00	21340.00	-890.00	-4.35%	22250.00	-1,800.00	-8.80%	18270.00	2,180.00	10.66%	N/A	.00	.00%	
	000180	21340.00	22250.00	-910.00	-4.26%	24680.00	-3,340.00	-15.65%	20450.00	890.00	4.17%	18270.00	3,070.00	14.39%	
	000160	22250.00	24680.00	-2,430.00	-10.92%	24680.00	-2,430.00	-10.92%	21340.00	910.00	4.09%	20450.00	1,800.00	8.09%	
	000170	24680.00	24680.00	.00	.00%	25280.00	-600.00	-2.43%	22250.00	2,430.00	9.85%	21340.00	3,340.00	13.53%	
	200170	24680.00	25280.00	-600.00	-2.43%	27740.00	-3,060.00	-12.40%	24680.00	.00	.00%	22250.00	2,430.00	9.85%	
	000150	25280.00	27740.00	-2,460.00	-9.73%	29840.00	-4,560.00	-18.04%	24680.00	600.00	2.37%	24680.00	600.00	2.37%	
	000200	27740.00	29840.00	-2,100.00	-7.57%	29840.00	-2,100.00	-7.57%	25280.00	2,460.00	8.87%	24680.00	3,060.00	11.03%	
	000220	29840.00	29840.00	.00	.00%	32250.00	-2,410.00	-8.08%	27740.00	2,100.00	7.04%	25280.00	4,560.00	15.28%	
	200220	29840.00	32250.00	-2,410.00	-8.08%	N/A	.00	100.00%	29840.00	.00	.00%	27740.00	2,100.00	7.04%	
	000060	32250.00	N/A	.00	100.00%	N/A	.00	100.00%	29840.00	2,410.00	7.47%	29840.00	2,410.00	7.47%	
D21	000260	17250.00	19180.00	-1,930.00	-11.19%	22180.00	-4,930.00	-28.58%	N/A	.00	.00%	N/A	.00	.00%	
	000250	19180.00	22180.00	-3,000.00	-15.64%	27380.00	-8,200.00	-42.75%	17250.00	1,930.00	10.06%	N/A	.00	.00%	
	000230	22180.00	27380.00	-5,200.00	-23.44%	28760.00	-6,580.00	-29.67%	19180.00	3,000.00	13.53%	17250.00	4,930.00	22.23%	
	000270	27380.00	28760.00	-1,380.00	-5.04%	28760.00	-1,380.00	-5.04%	22180.00	5,200.00	18.99%	19180.00	8,200.00	29.95%	
	000240	28760.00	28760.00	.00	.00%	36170.00	-7,410.00	-25.76%	27380.00	1,380.00	4.80%	22180.00	6,580.00	22.88%	
	200240	28760.00	36170.00	-7,410.00	-25.76%	N/A	.00	100.00%	28760.00	.00	.00%	27380.00	1,380.00	4.80%	
	000070	36170.00	N/A	.00	100.00%	N/A	.00	100.00%	28760.00	7,410.00	20.49%	28760.00	7,410.00	20.49%	
E01	000050	40175.00	N/A	.00	100.00%	N/A	.00	100.00%	N/A	.00	.00%	N/A	.00	.00%	
E11	000290	15340.00	15900.00	-560.00	-3.65%	15900.00	-560.00	-3.65%	N/A	.00	.00%	N/A	.00	.00%	

Example

- Db2 for i OLAP Functions to the Rescue!

The screenshot shows a Db2 SQL script editor window with the following SQL query:

```
1 SELECT      WORKDEPT, EMPNO, SALARY,
2             LEAD(SALARY, 1) OVER (PARTITION BY WORKDEPT
3                                   ORDER BY SALARY) as LEAD_SALARY_1,
4             LEAD(SALARY, 2) OVER (PARTITION BY WORKDEPT
5                                   ORDER BY SALARY) as LEAD_SALARY_2,
6             LAG(SALARY, 1)  OVER (PARTITION BY WORKDEPT
7                                   ORDER BY SALARY) as LAG_SALARY_1,
8             LAG(SALARY, 2)  OVER (PARTITION BY WORKDEPT
9                                   ORDER BY SALARY) as LAG_SALARY_2
10 FROM        SAMPLEDB.EMPLOYEE;
```

The result table below shows the output of the query, with columns: WORKDEPT, EMPNO, SALARY, LEAD_SALARY_1, LEAD_SALARY_2, LAG_SALARY_1, and LAG_SALARY_2.

WORKDEPT	EMPNO	SALARY	LEAD_SALARY_1	LEAD_SALARY_2	LAG_SALARY_1	LAG_SALARY_2
A00	000120	29250.00	29250.00	46500.00	-	-
A00	200120	29250.00	46500.00	46500.00	29250.00	-
A00	000110	46500.00	46500.00	52750.00	29250.00	29250.00
A00	200010	46500.00	52750.00	-	46500.00	29250.00
A00	000010	52750.00	-	-	46500.00	46500.00
B01	000020	41250.00	-	-	-	-
C01	000130	23800.00	28420.00	28420.00	-	-
C01	000140	28420.00	28420.00	38250.00	23800.00	-
C01	200140	28420.00	38250.00	-	28420.00	23800.00
C01	000030	38250.00	-	-	28420.00	28420.00
D11	000210	18270.00	20450.00	21340.00	-	-
D11	000190	20450.00	21340.00	22250.00	18270.00	-
D11	000180	21340.00	22250.00	24680.00	20450.00	18270.00
D11	000160	22250.00	24680.00	24680.00	21340.00	20450.00
D11	000170	24680.00	24680.00	25280.00	22250.00	21340.00
D11	200170	24680.00	25280.00	27740.00	24680.00	22250.00
D11	000150	25280.00	27740.00	29840.00	24680.00	24680.00
D11	000200	27740.00	29840.00	29840.00	25280.00	24680.00

**LEAD(SALARY, 1) OVER (PARTITION BY WORKDEPT
ORDER BY SALARY) as LEAD_SALARY_1,**

**LAG(SALARY, 1) OVER (PARTITION BY WORKDEPT
ORDER BY SALARY) as LAG_SALARY_1**

Example

- Create (and test) a VIEW Object over your SQL

```
CREATE VIEW SAMPLEDB.LAGLEAD (  
    WORKDEPT ,  
    EMPNO,  
    SALARY ,  
    LEAD_SALARY_1,  
    LEAD_SALARY_2,  
    LAG_SALARY_1,  
    LAG_SALARY_2 )  
AS  
    SELECT          WORKDEPT, EMPNO, SALARY,  
                   LEAD(SALARY, 1)      OVER (PARTITION BY WORKDEPT  
                                               ORDER BY SALARY) as LEAD_SALARY_1,  
                   LEAD(SALARY, 2)      OVER (PARTITION BY WORKDEPT  
                                               ORDER BY SALARY) as LEAD_SALARY_2,  
                   LAG(SALARY, 1)       OVER (PARTITION BY WORKDEPT  
                                               ORDER BY SALARY) as LAG_SALARY_1,  
                   LAG(SALARY, 2)       OVER (PARTITION BY WORKDEPT  
                                               ORDER BY SALARY) as LAG_SALARY_2  
FROM              SAMPLEDB.EMPLOYEE  
  
RCDFMT LAGLEAD   ;
```


Example

- Create Synonym over View

Create Synonym for DB2/DB2 Warehouse (*LOCAL)

Object Type Library Supply value to avoid system-wide search, sa

Object Name

Miscellaneous Parameters

Customize data type mappings

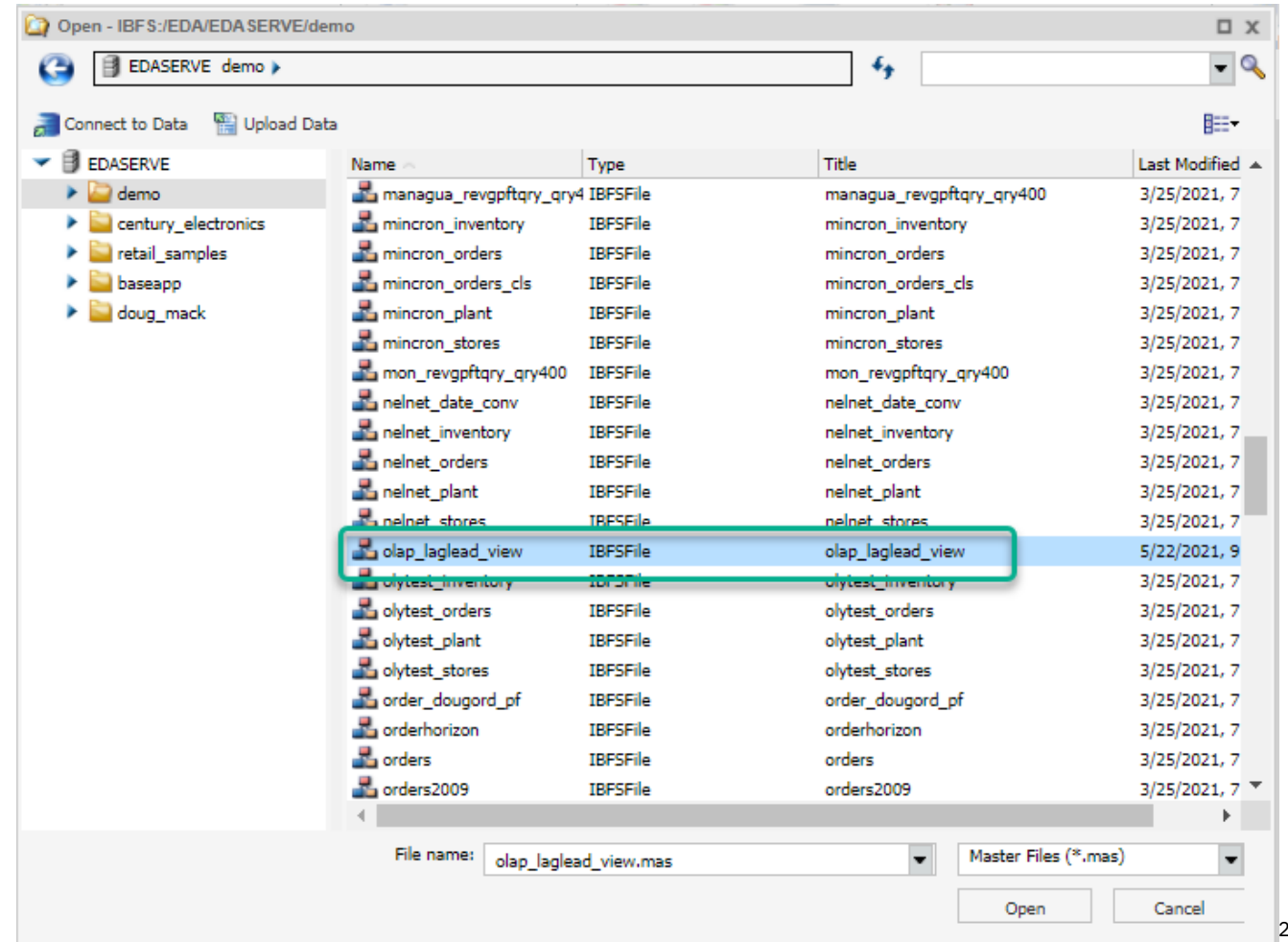
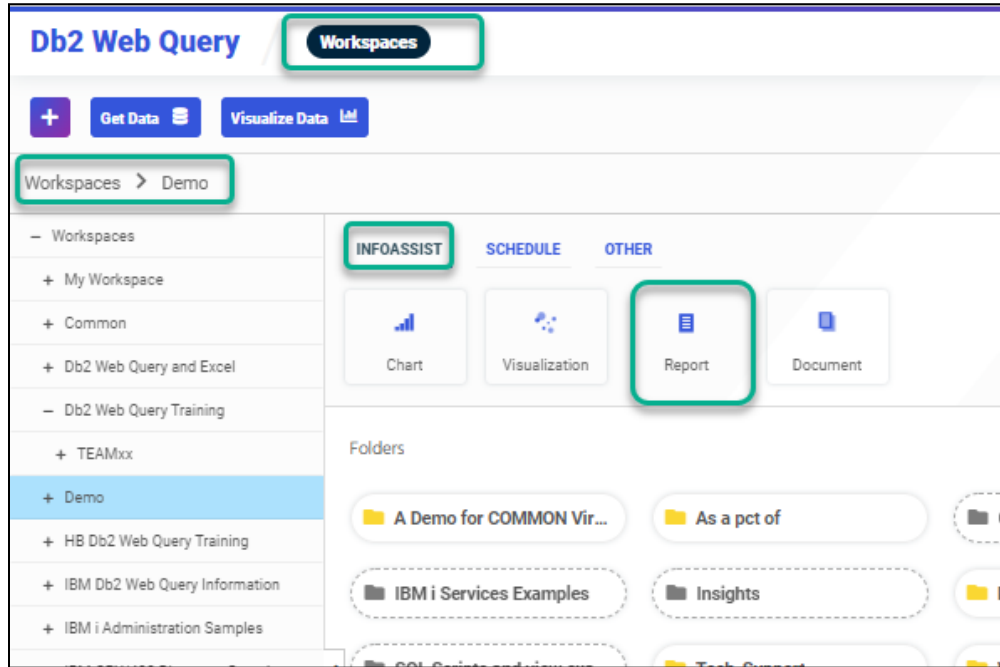
Application Prefix Suffix

SYNONYM CANDIDATES

<input type="checkbox"/>	Table Name	Library/Schema	Type
<input type="checkbox"/>	IN_TRAY	SAMPLEDB	TABLE
<input checked="" type="checkbox"/>	LAGLEAD	SAMPLEDB	VIEW
<input type="checkbox"/>	ORG	SAMPLEDB	TABLE
<input type="checkbox"/>	PROJ	SAMPLEDB	ALIAS
<input type="checkbox"/>	-----	-----	-----

Example

- Create InfoAssist Report
 - Choose your new Synonym



Example

- Enhance the Data Provided by the View
 - Add “differences” values and % differences with Expression Builder
 - Add Traffic Lighting
 - Schedule the report to run every Month and route to HR Management
 - Burst the report so Dept Managers only see THEIR Department

The screenshot displays the IBM i Reporting software interface. The ribbon at the top includes tabs for Home, Insert, Format, Data, Slicers, Layout, View, and Field. The 'Format' tab is active, showing options for HTML Analytic Document, Report, File & Printer, Query, Live Preview, and Document. The 'Live Preview' section shows 500 records. The left pane shows the 'Data - EZ_LagLead' source and a 'Query' for 'Report (EZ_LagLead)' with dimensions (WORKDEPT, EMPNO) and measures (SALARY, LEAD_SALARY_1, LAG_SALARY_2, etc.).

The main area displays a 'Salary Comparison Report' table with the following columns: WORKDEPT, EMPNO, SALARY, Next Salary Above, Plus One Difference, Plus One Percentage, Second Salary Above, Plus Two Difference, Plus Two Percentage, Next Salary Below, Minus One Difference, Minus One Percentage, and Sex. The table is filtered by WORKDEPT and shows data for departments A00, B01, C01, and D11. Red highlighting is used for negative percentage differences.

WORKDEPT	EMPNO	SALARY	Next Salary Above	Plus One Difference	Plus One Percentage	Second Salary Above	Plus Two Difference	Plus Two Percentage	Next Salary Below	Minus One Difference	Minus One Percentage	Sex
A00	000120	29250.00	29250.00	.00	.00%	46500.00	-17,250.00	-58.97%	N/A	.00	.00%	
	200120	29250.00	46500.00	-17,250.00	-58.97%	46500.00	-17,250.00	-58.97%	29250.00	.00	.00%	
	000110	46500.00	46500.00	.00	.00%	52750.00	-6,250.00	-13.44%	29250.00	17,250.00	37.10%	
	200010	46500.00	52750.00	-6,250.00	-13.44%	N/A	.00	100.00%	46500.00	.00	.00%	
	000010	52750.00	N/A	.00	100.00%	N/A	.00	100.00%	46500.00	6,250.00	11.85%	
B01	000020	41250.00	N/A	.00	100.00%	N/A	.00	100.00%	N/A	.00	.00%	
C01	000130	23800.00	28420.00	-4,620.00	-19.41%	28420.00	-4,620.00	-19.41%	N/A	.00	.00%	
	000140	28420.00	28420.00	.00	.00%	38250.00	-9,830.00	-34.59%	23800.00	4,620.00	16.26%	
	200140	28420.00	38250.00	-9,830.00	-34.59%	N/A	.00	100.00%	28420.00	.00	.00%	
	000030	38250.00	N/A	.00	100.00%	N/A	.00	100.00%	28420.00	9,830.00	25.70%	
D11	000210	18270.00	20450.00	-2,180.00	-11.93%	21340.00	-3,070.00	-16.80%	N/A	.00	.00%	
	000190	20450.00	21340.00	-890.00	-4.35%	22250.00	-1,800.00	-8.80%	18270.00	2,180.00	10.66%	
	000180	21340.00	22250.00	-910.00	-4.26%	24680.00	-3,340.00	-15.65%	20450.00	890.00	4.17%	
	000160	22250.00	24680.00	-2,430.00	-10.92%	24680.00	-2,430.00	-10.92%	21340.00	910.00	4.09%	
	000170	24680.00	24680.00	.00	.00%	25280.00	-600.00	-2.43%	22250.00	2,430.00	9.85%	
	200170	24680.00	25280.00	-600.00	-2.43%	27740.00	-3,060.00	-12.40%	24680.00	.00	.00%	
	000150	25280.00	27740.00	-2,460.00	-9.73%	29840.00	-4,560.00	-18.04%	24680.00	600.00	2.37%	
	000200	27740.00	29840.00	-2,100.00	-7.57%	29840.00	-2,100.00	-7.57%	25280.00	2,460.00	8.87%	
	000220	29840.00	29840.00	.00	.00%	32250.00	-2,410.00	-8.08%	27740.00	2,100.00	7.04%	
	200220	29840.00	32250.00	-2,410.00	-8.08%	N/A	.00	100.00%	29840.00	.00	.00%	
	000060	32250.00	N/A	.00	100.00%	N/A	.00	100.00%	29840.00	2,410.00	7.47%	

EZ-Report: Auto Generate Report (and Synonym) from SQL

- Use Cases
 - Fast report over a Table/File
 - Fast report over IBM i Services
 - **Fast report over any SQL Statement**
 - Fast report over Security Compliance Tool “Consolidate Remote Files”
 - Conversion Tools
- What does it do?
 - Auto creates a synonym (meta data) over the data source
 - Auto creates a “fex” object (I.e., a report) in the folder you specify
 - Run report as is, or modify
- Need to be at Version 2.2.1 PTF Group Level 9 or 10 or Version 2.3.0 Level 1

Example #2

- Requirement is for a RUNNING TOTAL report but with one catch - you need to reset that running total at each Product Type break point. I.e., you want to see running totals WITHIN the Product Type aggregations

Db2 Web Query / Workspaces

+ Get Data Visualize Data

Running_Totals_By_Product_Type: Created by Fex Generator

Running Totals By Product Type

PRODUCTTYPE	PRODUCTCATEGORY	REVENUE	RUNNING_TOTAL	Running_Total2
Audio	Receivers	35907113.00	35907113.00	35,907,113.00
	Amplifiers/PreAmps/Tuners	42374428.00	78281541.00	78,281,541.00
	MP3	43491588.00	121773129.00	121,773,129.00
	CD Players and Recorders	53847459.00	175620588.00	175,620,588.00
	Speakers	84717053.00	260337641.00	260,337,641.00
	Audio Systems	122345680.00	382683321.00	382,683,321.00
Subtotal: Audio		382683321.00		
Camcorders	Digital8 Camcorders	13614953.00	13614953.00	396,298,274.00
	MiniDV Camcorders	51539451.00	65154404.00	447,837,725.00
	DVD Camcorders	379376637.00	444531041.00	827,214,362.00
Subtotal: Camcorders		444531041.00		
Cameras	Digital Cameras	184103667.00	184103667.00	1,011,318,029.00
Subtotal: Cameras		184103667.00		
Office	Organizers	11712495.00	11712495.00	1,023,030,524.00
	Handheld and PDA	18533190.00	30245685.00	1,041,563,714.00
Subtotal: Office		30245685.00		
Video	VCR	21688621.00	21688621.00	1,063,252,335.00
	TV	168799539.00	190488160.00	1,232,051,874.00
	DVD	329872045.00	520360205.00	1,561,923,919.00
Subtotal: Video		520360205.00		
Total:		1561923919.00		

Prepared on 05/22/21 at 11.58.01

Reset the running total at each PRODUCTTYPE break

Simple SQL with Sub-Select Should Do the Trick!

```
SELECT d1.PRODUCTTYPE, d1.PRODUCTCATEGORY, d1.REVENUE, SUM(d1.REVENUE)  
OVER(PARTITION BY PRODUCTTYPE ORDER BY d1.REVENUE ASC) as running_total
```

Final
Selection

```
FROM
```

```
(SELECT PRODUCTTYPE, PRODUCTCATEGORY, SUM(LINETOTAL) as revenue  
FROM QWQCENT.INVENTORY T1 INNER JOIN QWQCENT.ORDERS T2  
ON T1.PRODUCTNUMBER = T2.PRODUCTNUMBER  
GROUP BY PRODUCTTYPE,PRODUCTCATEGORY  
ORDER BY PRODUCTTYPE,PRODUCTCATEGORY) d1
```

Sub-Select

```
ORDER BY PRODUCTTYPE, REVENUE;
```

Simple SQL with Sub-Select Should Do the Trick!

Test in ACS

COPY the SQL Statement

```
1 SELECT d1.deptno, d1.empcount
2   FROM (SELECT workdept as deptno, COUNT(*) as empcount
3         FROM sampledb.employee GROUP BY workdept) d1;
4
5 SELECT d1.PRODUCTTYPE, d1.PRODUCTCATEGORY, d1.REVENUE, SUM(d1.REVENUE)
6 OVER(PARTITION BY PRODUCTTYPE ORDER BY d1.REVENUE ASC) as running_total
7   FROM (SELECT PRODUCTTYPE, PRODUCTCATEGORY, SUM(LINETOTAL) as revenue
8         FROM QWQCENT.INVENTORY T1 INNER JOIN QWQCENT.ORDERS T2
9         ON T1.PRODUCTNUMBER = T2.PRODUCTNUMBER
10        GROUP BY PRODUCTTYPE, PRODUCTCATEGORY
11        ORDER BY PRODUCTTYPE, PRODUCTCATEGORY) d1
12   ORDER BY PRODUCTTYPE, REVENUE;|
13
14
```

Product Type	Product Category	REVENUE	RUNNING_TOTAL
Audio	Receivers	7113.00	35907113.00
Audio	Amplifiers/PreAm	1428.00	78281541.00
Audio	MP3	43491588.00	121773129.00
Audio	CD Players and Recorders	53017459.00	175620588.00
Audio	Speakers	8471703.00	260337641.00
Audio	Audio Systems	122345680.00	382683321.00
Camcorders	Digital8 Camcorders	13614953.00	13614953.00
Camcorders	MiniDV Camcorders	51539451.00	65154404.00

Note the reset!

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L

EZ-Report

- In Web Query, navigate to IBM Db2 Web Query Information Workspace, Utilities sub-folder
- Double Click on EZ-Report

The screenshot displays the IBM Db2 Web Query Information Workspace interface. At the top, the title "Db2 Web Query" is followed by a "Workspaces" button. Below this, there are two main action buttons: "Get Data" and "Visualize Data". A breadcrumb navigation path is shown: "Workspaces > IBM Db2 Web Query Information > Utilities".

On the left side, there is a sidebar menu with the following items:

- Workspaces
- My Workspace
- My Content
- + Common
- + Db2 Web Query and Excel
- Db2 Web Query Training
- + TEAMxx
- + Demo
- + HB Db2 Web Query Training
- IBM Db2 Web Query Information
- + Report Information
- + Schedules
- + Users and Groups

The main content area is divided into three tabs: "INFOASSIST", "SCHEDULE", and "OTHER". Under the "INFOASSIST" tab, there are four icons representing different actions: "Chart", "Visualization", "Report", and "Document".

Below the tabs, there is a section titled "Items" which contains three document icons. The first icon, labeled "EZ-Report", is highlighted with a green rounded rectangle. The other two icons are labeled "Search" and "Synoi".

EZ-Report

- HINT: Validation List stores an encrypted userid/PW that is required by EZ-Report
- RUN Button will auto generate a Synonym AND a report!

The screenshot shows the EZ-Report configuration page. At the top, there are navigation icons: a back arrow, a refresh icon, and a 'RUN' button. Below these is the 'Filter Values' section with the following fields:

- Target Folder:** A dropdown menu showing 'Demo'.
- Report Name:** A text input field containing 'COMMON_DEMO_SUBSELECT'.
- SQL Statement:** A text input field containing 'SELECT d1.PRODUCTTYPE, d1.PRODU'.
- Validation List:** A text input field containing 'mackd'.
- Output Format:** A dropdown menu showing 'AHTML'.

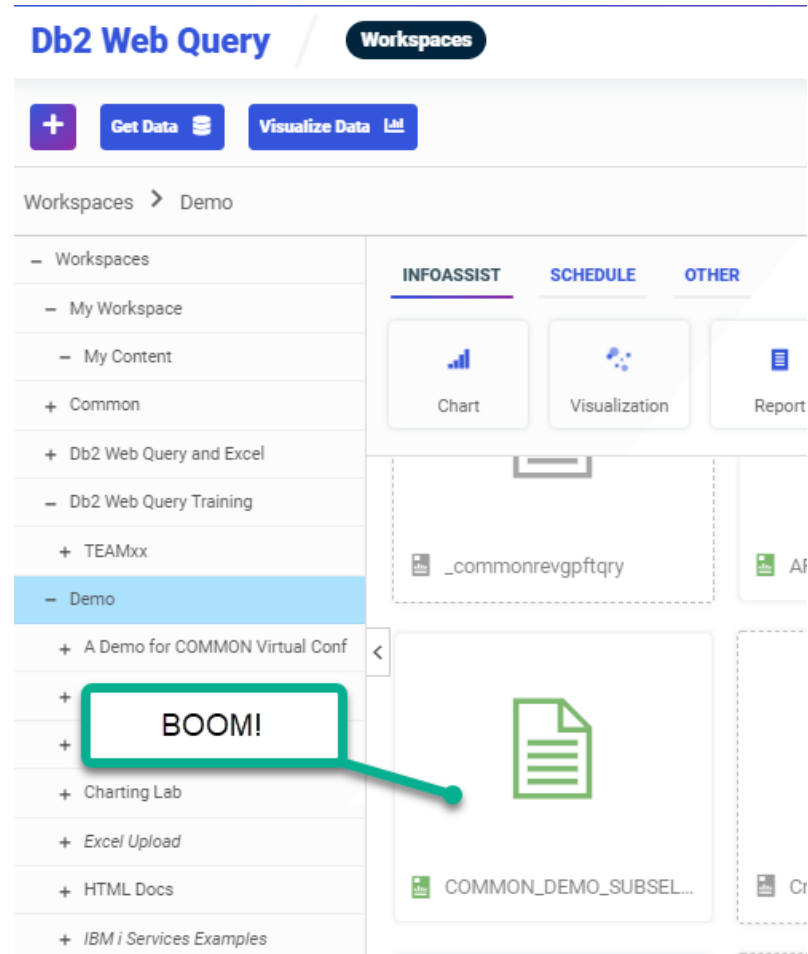
Five callout boxes with green borders and lines pointing to specific elements:

- 'RUN' points to the 'RUN' button.
- 'Target Workspace' points to the 'Target Folder' dropdown.
- 'Report Name' points to the 'Report Name' text field.
- 'Paste your SQL Statement Here' points to the 'SQL Statement' text field.
- 'Need to have a validation list in place' points to the 'Validation List' text field.
- 'Choose output or let user choose at run time' points to the 'Output Format' dropdown.

The screenshot shows the result page of the EZ-Report. At the top, there is a 'YAY!' callout box. Below it, a 'Result' section displays the message: 'Report COMMON_DEMO_SUBSELECT created in Demo'.

EZ-Report

- Right Click to Edit Report



Examples

- You Might Want to
 - Tailor the Header/Footer
 - Change the Color Scheme
 - Add GRAND and SUB TOTALS
 - Create a PROMPT for Product Type selection
 - Schedule the Report to Run on a Regular Basis creating a spreadsheet and sending out via email
 - See EZ-Install InfoAssist TUTORIAL

Db2 Web Query / Workspaces

+ Get Data Visualize Data

Running_Totals_By_Product_Type: Created by Fex Generator

15 of 15 records, Page 1 of 1

Running Totals By Product Type

PRODUCTTYPE	PRODUCTCATEGORY	REVENUE	RUNNING TOTAL	Running Total2
Audio	Receivers	35907113.00	35907113.00	35,907,113.00
	Amplifiers/PreAmps/Tuners	42374428.00	78281541.00	78,281,541.00
	MP3	43491588.00	121773129.00	121,773,129.00
	CD Players and Recorders	53847459.00	175620588.00	175,620,588.00
	Speakers	84717053.00	260337641.00	260,337,641.00
	Audio Systems	122345680.00	382683321.00	382,683,321.00
Subtotal: Audio		382683321.00		
Camcorders	Digital8 Camcorders	13614953.00	13614953.00	396,298,274.00
	MiniDV Camcorders	51539451.00	65154404.00	447,837,725.00
	DVD Camcorders	379376637.00	444531041.00	827,214,362.00
Subtotal: Camcorders		444531041.00		
Cameras	Digital Cameras	184103667.00	184103667.00	1,011,318,029.00
Subtotal: Cameras		184103667.00		
Office	Organizers	11712495.00	11712495.00	1,023,030,524.00
	Handheld and PDA	18533190.00	30245685.00	1,041,563,714.00
Subtotal: Office		30245685.00		
Video	VCR	21688621.00	21688621.00	1,063,252,335.00
	TV	168799539.00	190488160.00	1,232,051,874.00
	DVD	329872045.00	520360205.00	1,561,923,919.00
Subtotal: Video		520360205.00		
Total:		1561923919.00		

Prepared on 05/22/21 at 12.19.14

change to a summary report

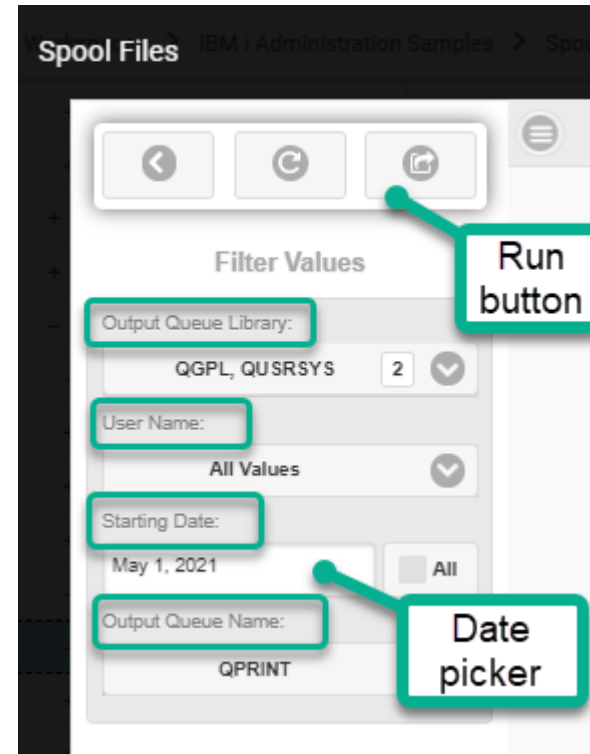
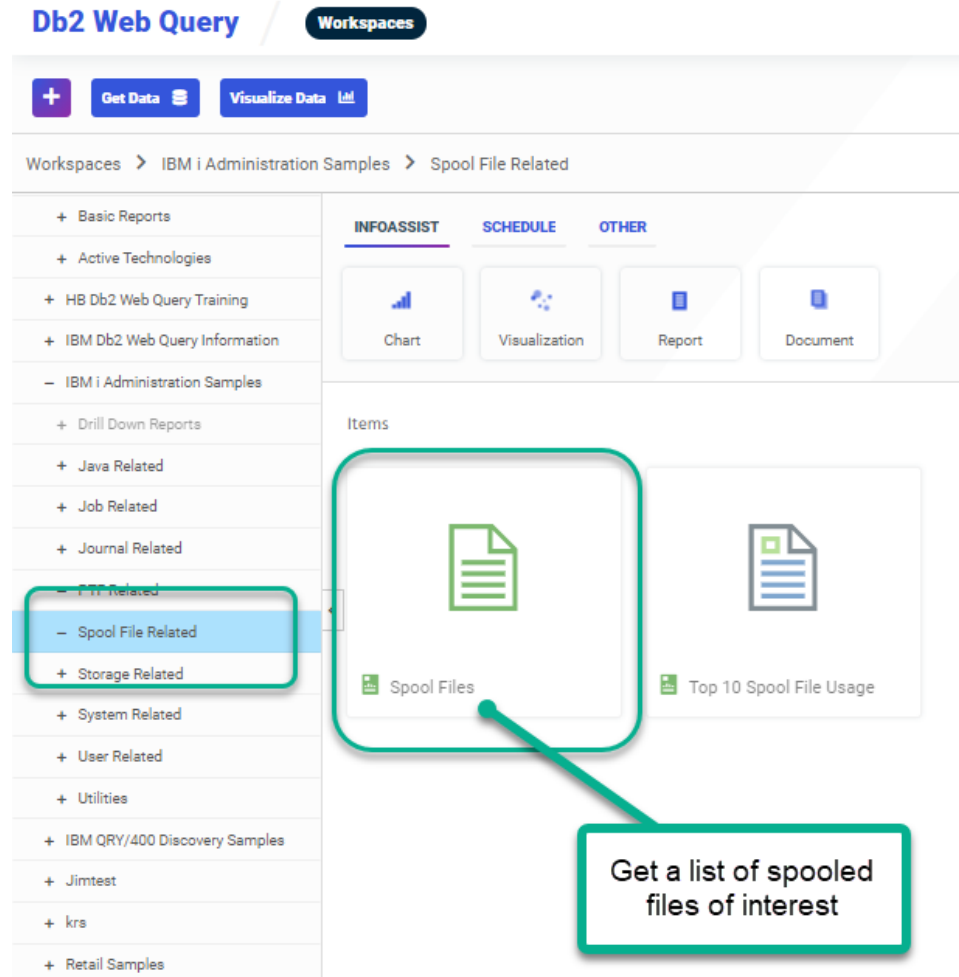
Add Subtotals

Choose color scheme

Add grand totals

Spool File Related

- 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 Files IBM i Administration Samples > Spool File Related

14 of 14 records, Page 1 of 1

Spool File Listing
Output Queue Lib: 'QGPL' OR 'QUSRSYS'
Output Queue: 'QPRINT'
User:
Starting Date: May 01 2021

Output Queue Library	Output Queue Name	File Create Timestamp	File Entry Number	PDF Link	Excel Link	User	Job	Spool File Name	Size (KB)
QGPL	QPRINT	2021/05/18 21:03:27.184255	1	PDF	Excel	MACKD	331718/MACKD/MACKD	QPQUPRFILE	3,140
		2021/05/18 17:20:04.029103	1	PDF	Excel	HBEDOYA	331710/HBEDOYA/EMPPF	EMPPF	38
		2021/05/18 17:05:27.262410	28	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/18 16:49:59.875788	1	PDF	Excel	HBEDOYA		EMPPF	40
		2021/05/18 16:45:04.044068	1	PDF	Excel	HBEDOYA		EMPPF	38
		2021/05/18 16:00:06.350991	27	PDF	Excel	HBEDOYA		EMPPF	38
		2021/05/13 08:04:52.099257	26	PDF	Excel	HBEDOYA		EMPPF	40
		2021/05/12 14:03:53.643267	25	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	40
		2021/05/12 11:45:59.361547	1	PDF	Excel	MACKD	331309/MACKD/QPADEV0003	QPQUPRFILE	3,144
		2021/05/06 09:12:25.487368	24	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/05 20:24:42.298251	1	PDF	Excel	QSYS	329982/QSYS/QSLPSVR	QPRINT	28
		2021/05/05 12:08:48.623259	23	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/04 16:21:34.290034	22	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38
		2021/05/04 15:45:50.188847	21	PDF	Excel	HBEDOYA	299824/HBEDOYA/QPRTJOB	EMPPF	38

Report run on Tue, May 18, 2021 at 21.03.51


Click on Excel link

Spool File Related

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

Order Number	Order Date	Requested Ship Date	Actual Ship Date	Receive Date	Price	Cost
54390	2021-12-29	2022-02-08	2022-04-23	2022-04-28	199.00	100.00
54390	2021-12-29	2022-03-29	2022-03-28	2022-04-13	129.00	40.00
54390	2021-12-29	2022-02-01	2022-02-17	2022-02-27	199.00	150.00
54390	2021-12-29	2022-02-13	2022-02-23	2022-03-24	399.00	300.00
54390	2021-12-29	2022-04-04	2022-04-01	2022-04-27	899.00	750.00
54510	2021-12-29	2022-02-19	2022-05-03	2022-05-30	199.00	100.00
54510	2021-12-29	2022-01-30	2022-04-14	2022-05-02	129.00	60.00
54510	2021-12-29	2022-03-22	2022-03-19	2022-04-06	189.00	100.00
54510	2021-12-29	2022-02-14	2022-02-05	2022-02-25	279.00	150.00
54510	2021-12-29	2022-02-12	2022-03-02	2022-03-08	329.00	250.00
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	

Text to
Data to
column-ize
the data



Order Number	Order Date	Requested Ship Date	Actual Ship Date	Receive Date	Price	Cost
54390	12/29/2021	2/8/2022	4/23/2022	4/28/2022	199	100
54390	12/29/2021	3/29/2022	3/28/2022	4/13/2022	129	40
54390	12/29/2021	2/1/2022	2/17/2022	2/27/2022	199	150
54390	12/29/2021	2/13/2022	2/23/2022	3/24/2022	399	300
54390	12/29/2021	4/4/2022	4/1/2022	4/27/2022	899	750
54510	12/29/2021	2/19/2022	5/3/2022	5/30/2022	199	100
54510	12/29/2021	1/30/2022	4/14/2022	5/2/2022	129	60
54510	12/29/2021	3/22/2022	3/19/2022	4/6/2022	189	100
54510	12/29/2021	2/14/2022	2/5/2022	2/25/2022	279	150
54510	12/29/2021	2/12/2022	3/2/2022	3/8/2022	329	250
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**

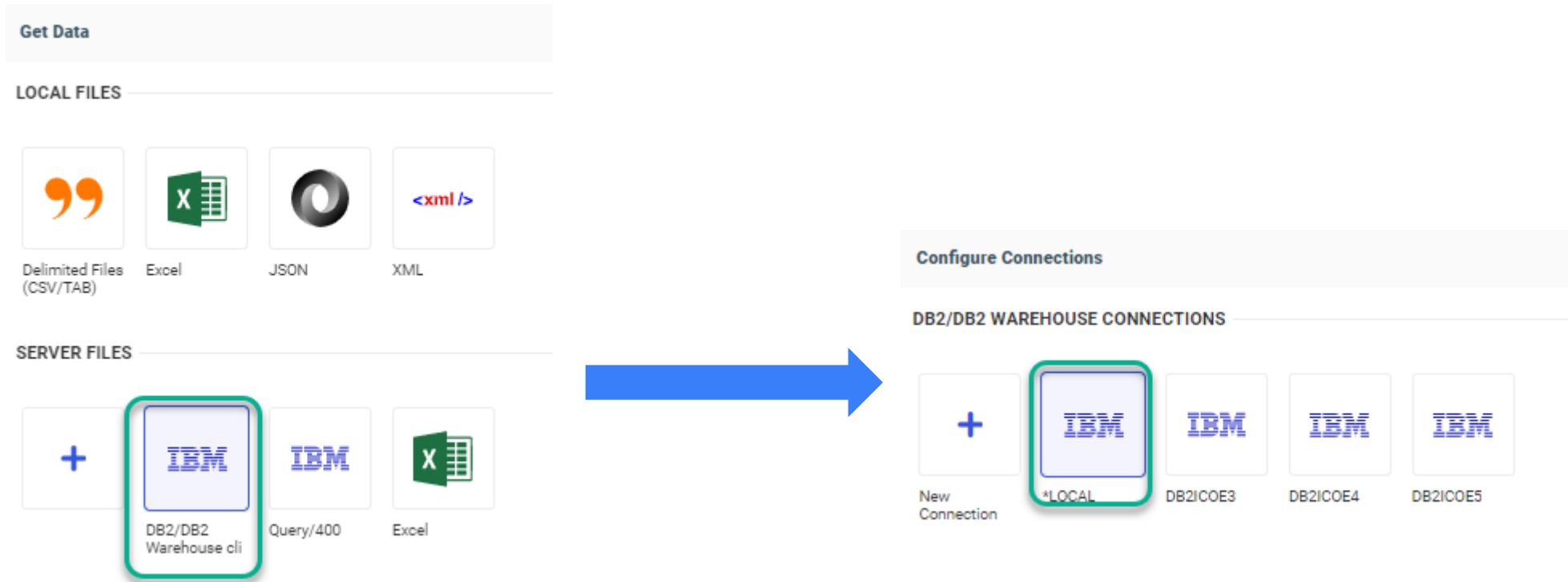
Spool Services				
QSYS2.OUTPUT_QUEUE_ENTRIES	View	Base	Base	SF99702 Level 9
QSYS2.OUTPUT_QUEUE_ENTRIES_BASIC	View	Base	SF99703 Level 11	SF99702 Level 23
QSYS2.OUTPUT_QUEUE_ENTRIES()	Table function	Base	Base	SF99702 Level 9

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

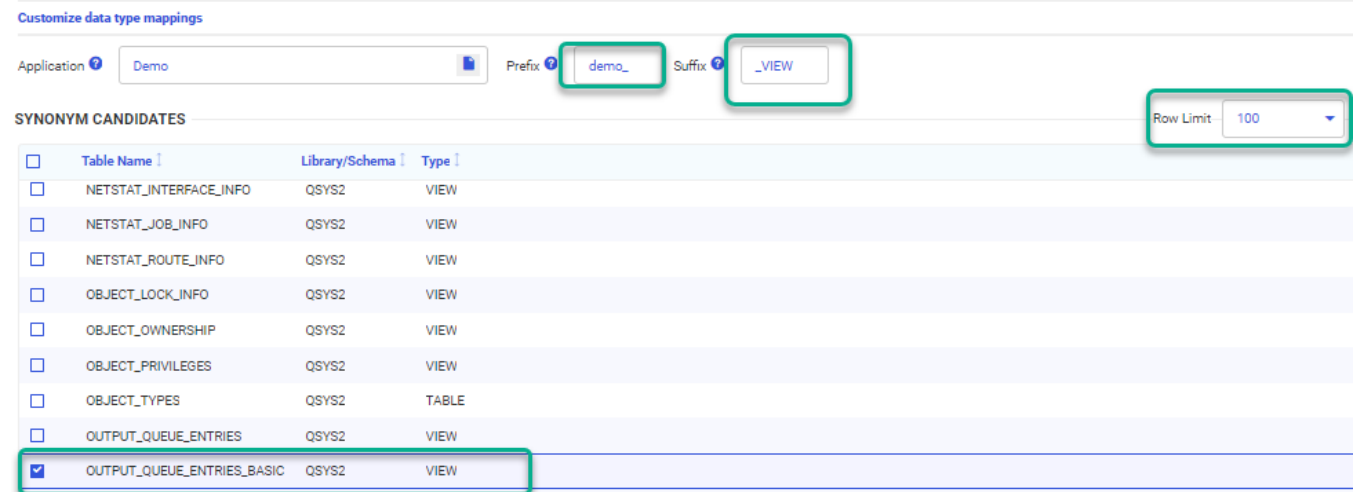
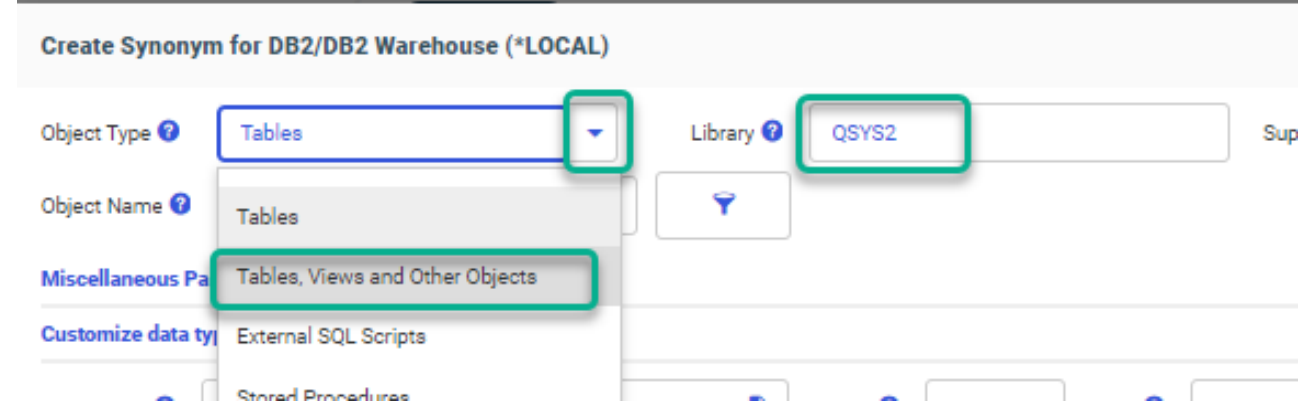
Hit the drop-down button for Object Type and select “Tables, Views, and other Objects”

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

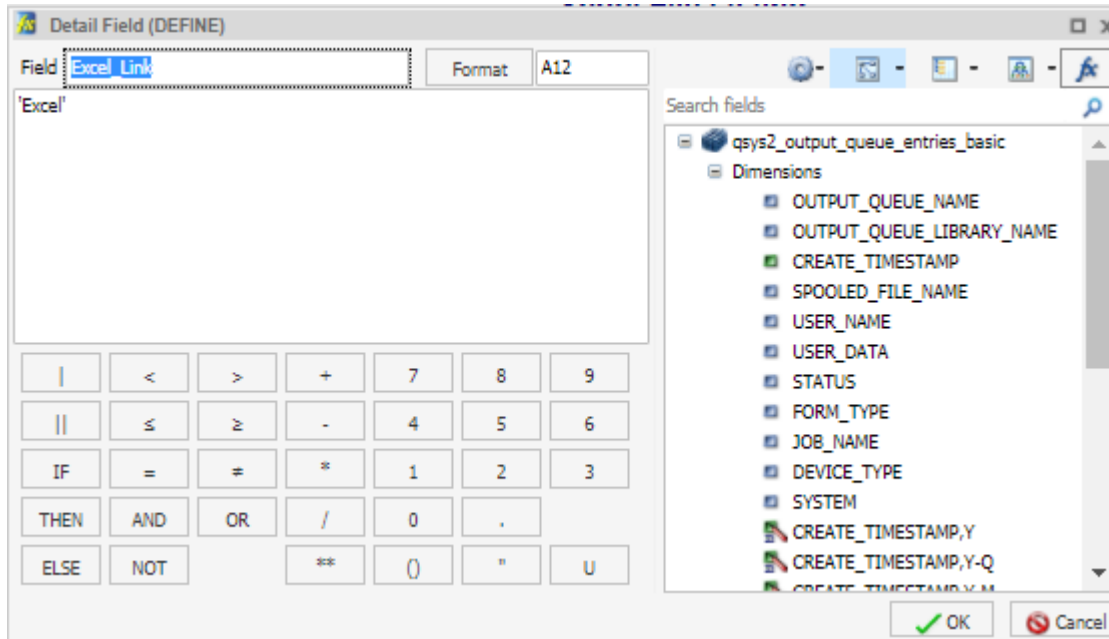


Note: You could also have reversed engineer the select statement using ACS Run SQL Scripts, then copy pasted the view's SELECT statement into our EZ-Report auto generation utility to auto generate the synonym (and a report)!

How Was This Done?

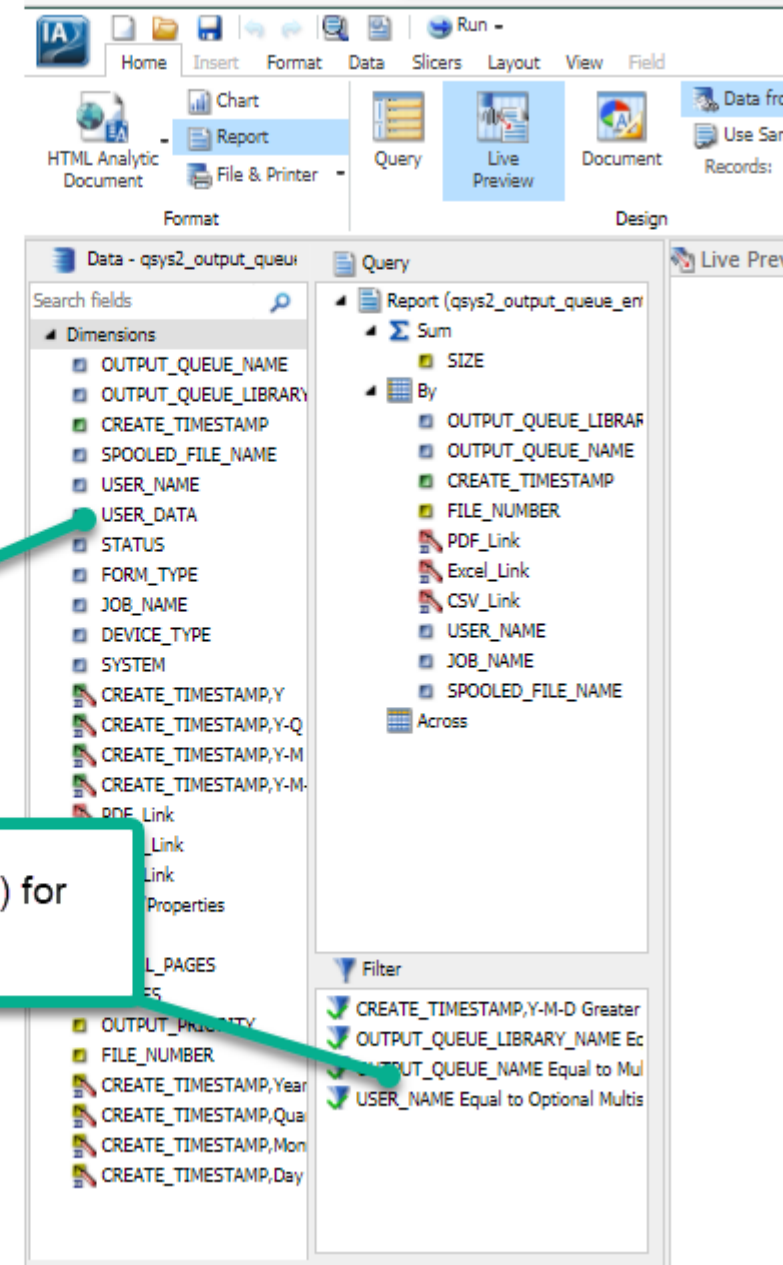
2. Create your report over the synonym!

- 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



These are the fields returned by the View

Create prompts (filters) for selection criteria



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?

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

The screenshot shows a window titled "C:\Users\DouglasMack\Documents\SQL Scripts\dump spooled file data using systools.sql* - Run SQL Scripts - db2ico6". The window contains a menu bar (File, Edit, Search, View, Connection, Run, Explain, Monitor, Tools, Help) and a toolbar with various icons. The main area displays a SQL query:

```
1 SELECT * FROM TABLE(SYSTOOLS.SPOOLED_FILE_DATA(  
2  
3     JOB_NAME      =>'331864/MACKD/MACKD',  
4     SPOOLED_FILE_NAME =>'QPQUPRFIL')));  
5  
6  
7  
8
```

Below the query, the results are displayed in a table with the following columns: ORDINAL_POSITION and SPOOLED_DATA. The data is as follows:

ORDINAL_POSITION	SPOOLED_DATA
1	05/20/21 13:03:15
2	Order Order Requested Actual Receive Price
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
5	54130 2021-12-18 2022-03-06 2022-03-21 2022-04-06 1,999.00
6	28657 2021-12-04 2022-01-24 2022-01-25 2022-02-23 3,999.00

How Was This Done?

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

```
6 SET PATH "QSYS","QSYS2","SYSPROC","SYSIBMADM","MACKD" ;
7
8 CREATE OR REPLACE PROCEDURE MACKD.SPOOLED_FILE_DETAIL (
9     IN JOB_NAME VARCHAR(28) ,
10    IN SPOOLED_FILE_NAME VARCHAR(10) DEFAULT 'QPJOBLOG'
11    IN FILE_NUMBER VARCHAR(6) DEFAULT '*LAST' )
12    DYNAMIC RESULT SETS 1
13    LANGUAGE SQL
14    SPECIFIC MACKD.SPLFDETAIL
15    NOT DETERMINISTIC
16    MODIFIES SQL DATA
17    CALLED ON NULL INPUT
18    PROGRAM TYPE SUB
19    SET OPTION ALWBLK = *ALLREAD ,
20    ALWCOPYDTA = *OPTIMIZE ,
21    COMMIT = *NONE ,
22    DECRESULT = (31, 31, 00) ,
23    DFTRDBCOL = MACKD ,
24    DYNDFTCOL = *NO ,
25    DYNUSRPRF = *USER ,
26    SRTSEQ = *HEX,
27    = V7R3M0
28    BEGIN
29    DECLARE ERROR_OCCURRED INT ;
30
31    DECLARE C1 CURSOR FOR SELECT *
32    FROM TABLE(SYSTOOLS.SPOOLED_FILE_DATA(JOB_NAME, SPOOLED_FILE_NAME))
33    ORDER BY ORDINAL_POSITION;
34
35    DECLARE CONTINUE HANDLER FOR SQLEXCEPTION SET ERROR_OCCURRED = 1 ;
36
37    OPEN C1 ;
38    END ;
39
53
54 CALL MACKD.SPOOLED_FILE_DETAIL ('331864/MACKD/MACKD','QPQUPRFILE');
55
56
57
```

ORDINAL_POSITION	SPOOLED_DATA					PRICE	PAGE	COST
1	05/20/21	13:03:15					1	
2	Order	Order	Requested	Actual	Receive			
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

- Test by calling it with parameters within ACS

How Was This Done?

6. Create a Synonym over your Stored Procedure

Create Synonym for DB2/DB2 Warehouse (*LOCAL)

Object Type ? ▼

Library ? Supply value

Object Name ?

Create Synonym for DB2/DB2 Warehouse (*LOCAL)

Available Objects for DB2/DB2 Warehouse (*LOCAL)

Select	Owner/Schema	Stored Procedure Name
<input checked="" type="radio"/>	MACKD	SPOOLED_FILE_DETAIL

Create Synonym for DB2/DB2 Warehouse (*LOCAL)

Create Synonym for DB2/DB2 Warehouse (*LOCAL)

Selected Parameters

Customize data type mappings

Synonym Name ?

One-Part Name

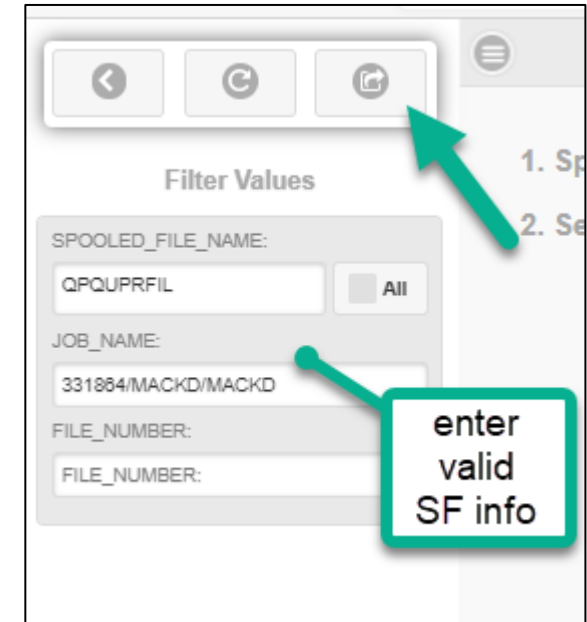
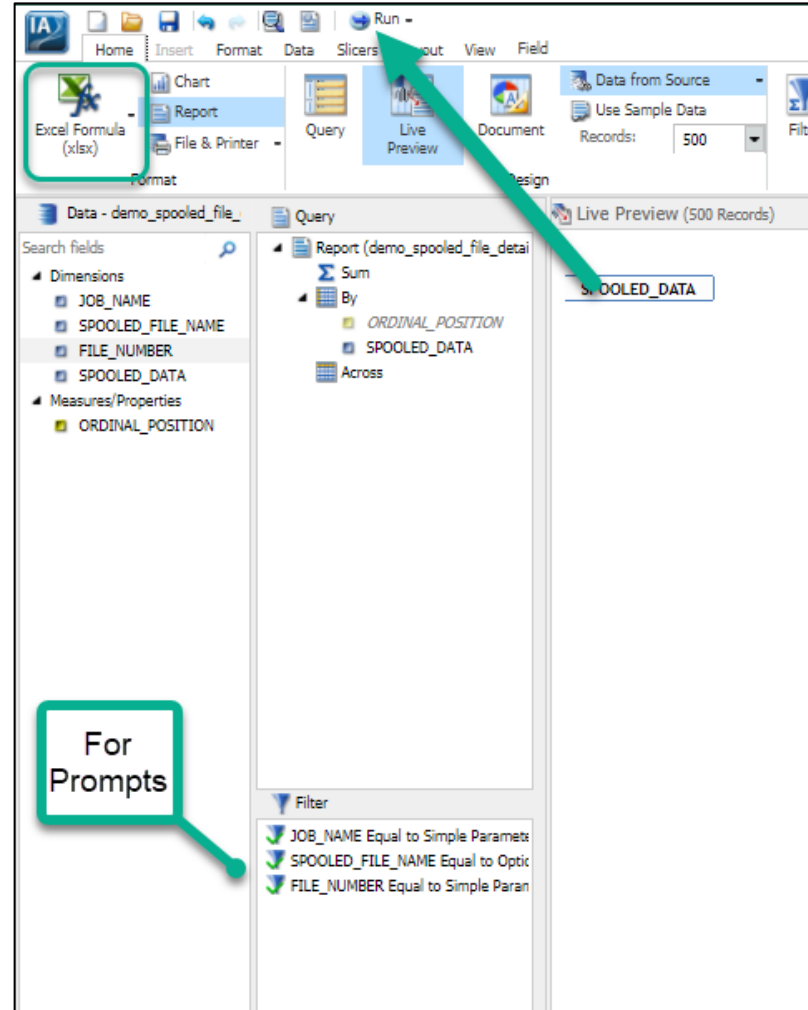
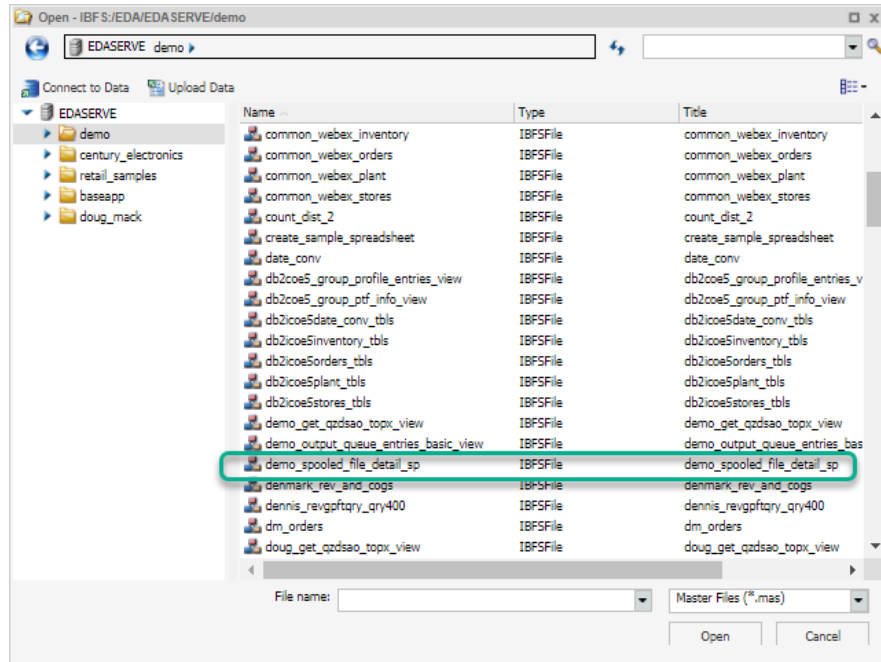
Application ? Prefix ? Suffix ?

<input type="checkbox"/>	Name ↓	Value ↑	Data Type ↓	Col Type ↓	Description ↓
<input checked="" type="checkbox"/>	JOB_NAME	331864/MACKD/MACKD	VARCHAR	IN	
<input checked="" type="checkbox"/>	SPOOLED_FILE_NAME	QPQUPRFL	VARCHAR	IN	
<input checked="" type="checkbox"/>	FILE_NUMBER	1	VARCHAR	IN	

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

The screenshot shows the IBM i Anywhere interface. In the 'Query' pane, the 'Excel_Link' field is highlighted in the 'By' section of the query. The 'Drill Down - Excel_Link' dialog box is open, showing the following configuration:

- Report*: IBFS:/WFC/Repository/Demo/Create_xlsx_from_spooled_file.fe
- Description: Create xlsx from spooled file
- Target: New Window
- Parameters table:

Name	Value
FILE_NUMBER	QSYS2_OUTPUT_QUEUE_ENTRIES_B...
SPOOLED_FILE_NAME	QSYS2_OUTPUT_QUEUE_ENTRIES_B...
JOB_NAME	QSYS2_OUTPUT_QUEUE_ENTRIES_B...

The background shows a 'Live Preview' of a table with columns 'Output Queue Library' and 'Spool File Name'.

- 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!

Db2 Web Query

Workspaces

Get Data Visualize Data

Spool Files

Demo -> A Demo for COMMON Virtual Conf -> Spool Files to Excel

Starting Date: May 19 2021

Output Queue Library	Output Queue Name	File Create Timestamp	File Entry Number	PDF Link	Excel Link	User	Job	Spool File Name	Size (KB)
QGPL	QPRINT	2021/05/20 17:07:07.814748	1	PDF	Excel	TAFORD	331903/TAFORD/QPADEV0005	QSYSRPT	28
		2021/05/20 14:29:33.428149	1	PDF	Excel	HBEDOYA	331905/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 14:26:37.648023	1	PDF	Excel	HBEDOYA	331904/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 14:19:04.389891	1	PDF	Excel	HBEDOYA	331900/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 14:18:32.886295	1	PDF	Excel	HBEDOYA	331899/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 14:14:48.878751	1	PDF	Excel	HBEDOYA	331898/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 14:13:50.115814	1	PDF	Excel	HBEDOYA	331897/HBEDOYA/EMPPFL1	EMPPFL1	38
		2021/05/20 14:08:22.214465	1	PDF	Excel	HBEDOYA	331896/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 13:58:30.773874	1	PDF	Excel	HBEDOYA	331895/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 13:48:47.862146	1	PDF	Excel	HBEDOYA	331888/HBEDOYA/EMPPFL1	EMPPFL1	28
		2021/05/20 13:43:57.827127	30	PDF	Excel	HBEDOYA	298824/HBEDOYA/QPRTJOB	EMPPFL1	38
		2021/05/20 13:03:15.283010	1	PDF	Excel	MACKD	331884/MACKD/MACKD	QPQPRFIL	38
		2021/05/20 12:59:07.800530	3	PDF	Excel	MACKD	331822/MACKD/QPADEV0004	QPQPRFIL	38
		2021/05/20 12:58:17.813774	1	PDF	Excel	MACKD	331883/MACKD/MACKD	QPQPRFIL	38
		2021/05/20 12:41:44.814265	2	PDF	Excel	MACKD		XPRTF	28
		2021/05/20 12:41:44.593934	1	PDF	Excel	MACKD		XPRTF	38
		2021/05/20 12:34:20.829726	2	PDF	Excel	MACKD		XPRTF	60
		2021/05/20 12:34:20.581143	1	PDF	Excel	MACKD		XPRTF	124
		2021/05/20 11:53:08.565362	1	PDF	Excel	MACKD	331847/MACKD/MACKD	QPQPRFIL	28
		2021/05/20 11:51:05.152252	2	PDF	Excel	MACKD	331822/MACKD/QPADEV0004	QPQPRFIL	1,348
		2021/05/20 11:48:29.304746	1	PDF	Excel	MACKD	331844/MACKD/MACKD	QPQPRFIL	292
		2021/05/20 11:32:17.563524	1	PDF	Excel	HBEDOYA	331843/HBEDOYA/EMPPFL1	EMPPFL1	38
		2021/05/20 11:18:55.392363	1	PDF	Excel	MACKD	331834/MACKD/MACKD	QPQPRFIL	292
		2021/05/20 11:18:18.826792	1	PDF	Excel	MACKD	331833/MACKD/MACKD	QPQPRFIL	28
		2021/05/20 11:18:02.490037	29	PDF	Excel	HBEDOYA	298824/HBEDOYA/QPRTJOB	EMPPFL1	38

Click on Excel Link

File Home Insert Draw Page Layout Formulas Data Review

Paste

TREBUCHET MS 9 A^ A^

B I U

Clipboard Font Alignment

A1

SPOOLED_DATA

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

Create xlsx from spooled file

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>



What is Machine Learning (ML)?

- Training a computer to make intelligent predictions...
 - ...about things humans **are good at**:
 - Language Translation
 - Text-to-Speech Generation
 - Playing Games
 - ...about things humans **are bad at**:
 - What factors indicate failure of components?
 - Identify the factors of high-risk credit accounts
 - Doing complex stock market analysis

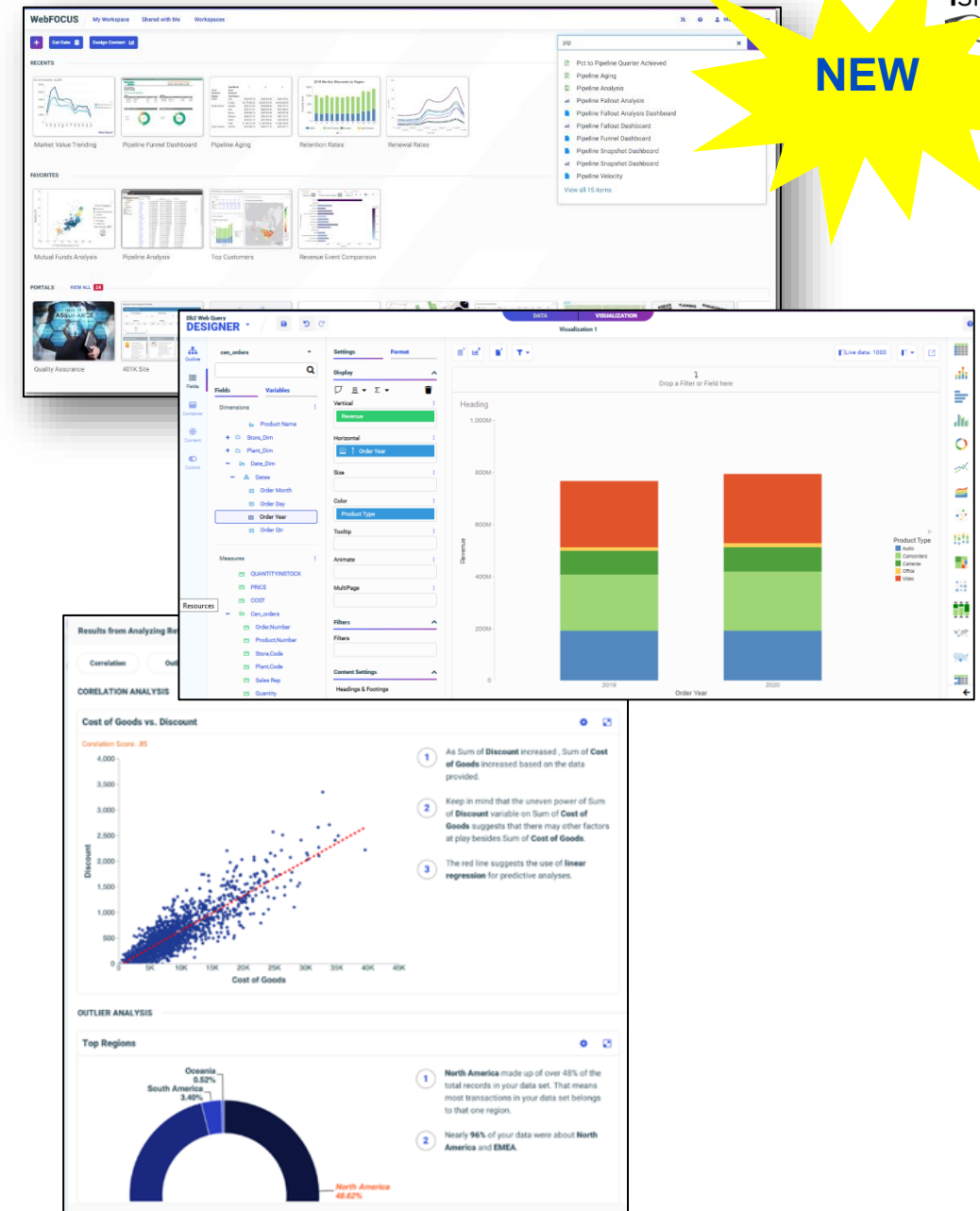
- **Training:**

- Taking data and building a mathematical **model** to draw some conclusions about relationships in that data
- Data is usually labeled, with **known outcomes**
- Typically done by Data Scientist

- **Inferencing:**

- Feeding new data into your model to make informed **predictions**
- Data may or may not be labeled, with **unknown outcomes**
- Often done by Data Scientist, but doesn't have to be

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

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

The screenshot shows the Db2 Web Query interface. At the top, there are three buttons: a purple plus sign, 'Get Data', and 'Visualize Data'. A green arrow points to the 'Visualize Data' button. Below the buttons, there is a 'Workspaces' section with a dropdown menu showing 'Demo' selected. On the left, a sidebar lists workspaces: 'My Workspace', 'Common', 'Db2 Web Query and Excel', 'Db2 Web Query Training', and 'Demo' (highlighted with a green box). The main area has tabs for 'INFOASIST', 'SCHEDULE', and 'OTHER'. Under 'INFOASIST', there are three options: 'Chart', 'Visualization', and 'Report'. Below these are 'Folders'.

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

The screenshot shows a dialog box for selecting data sources. At the top, there is a search bar with 'All' and a filter icon, and a search box labeled 'Filter data sources'. Below the search bar is a table of data sources. The 'loans' synonym is highlighted with a green box. A green arrow points to the 'Select' button at the bottom right.

	Folder
	demo
	demo
<input checked="" type="checkbox"/>	loans_data_dim_view
<input checked="" type="checkbox"/>	loans
<input checked="" type="checkbox"/>	logi_revpgftqry_qry400
<input checked="" type="checkbox"/>	managua_revpgftqry_qry400
<input checked="" type="checkbox"/>	mincron_inventory
<input checked="" type="checkbox"/>	mincron_orders_cls
<input checked="" type="checkbox"/>	mincron_orders
<input checked="" type="checkbox"/>	mincron_plant

Loan Data

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

The screenshot displays the Db2 Web Query Designer interface. At the top, there are two tabs: "DATA" and "VISUALIZATION". The "DATA" tab is currently selected and highlighted with a green box and a green arrow pointing to it. Below the tabs, the interface is divided into several sections:

- Left Panel:** Contains a sidebar with navigation icons (Outline, Fields, Container, Content, Control, Insights) and a main area for the "loans" dataset. It includes a search bar, "Fields" and "Variables" sections, and a "Measures" section with a list of fields like # id, issue_d, final_date, home_ownership, income_category, term, emp_length_int, annual_inc, loan_amount, loan_condition_cat, interest_rate, dti, and total_pymnt.
- Middle Panel:** Labeled "Settings" and "Format", it contains a "Display" section with options for Vertical, Horizontal, Size, Color, Tooltip, Animate, and MultiPage, each with a "Drop field" prompt. There is also a "Filters" section at the bottom.
- Right Panel:** Labeled "Visualization 1", it shows a preview of a stacked bar chart. The chart has a heading area and a main area with the prompt "Drop measures & dimensions here". A dashed box highlights a portion of the chart. Above the chart, there are icons for data refresh, zoom, and a filter icon. A "Live data: 1000" indicator is also present.

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)!

Db2 Web Query DESIGNER

Data

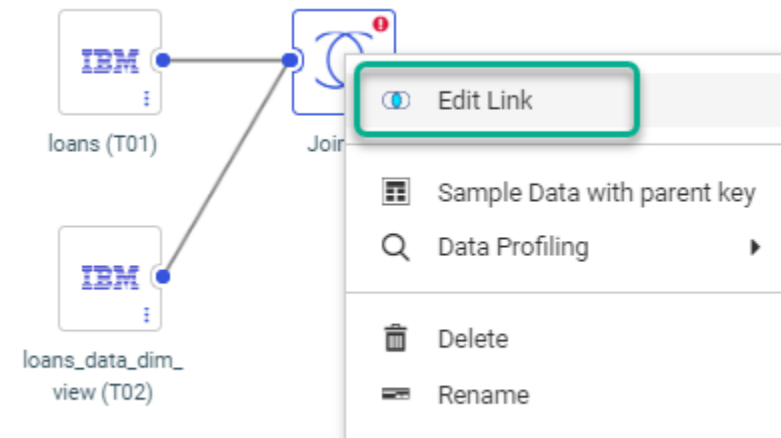
Search

- lag_lead_sql
- laglead_view
- loans
- loans_data_dim_view**
- logi_revgpftqry_qry400
- managua_revgpftqry_qry400
- mincron_inventory
- mincron_orders
- mincron_orders_cls
- mincron_plant
- mincron_stores
- mon_revgpftqry_qry400
- nelnet_date_conv
- nelnet_inventory
- nelnet_orders

loans

loans_data_dim_view

id	issue_d	final_date	emp_length_int	home_ownership
7,495,262	10/01/2013	12/01/2015	6.05	RENT
65,837,249	11/01/2015	12/01/2015	10.00	RENT
51,756,628	06/01/2015	01/01/2016	3.00	RENT



Loan Data

- Satisfied with JOIN definition? Click on Visualization tab

The screenshot shows the Db2 Web Query Designer interface. The top navigation bar has two tabs: 'DATA' and 'VISUALIZATION'. A green arrow points to the 'VISUALIZATION' tab. Below the navigation bar, the main area is titled 'Edit Join from LOANS to LOANS_DATA_DIM_VIEW'. On the left, there is a configuration panel for 'Join 1'. The 'Join Type' is set to 'Inner'. Below that, the 'Join Clauses' section shows a join between 'loans (T01)' and 'loans_data_dim_view (T02)' on the 'issue_d' field, with an equals sign and a dropdown menu set to 'Date'. On the right, the 'Visualization 1' area shows a bar chart with three bars: a blue bar for 'Included', a grey bar for 'Excluded', and a green bar for 'Result'. Below the chart is a table with the following data:

Series	Left	Right	Result
Excluded	0	25,834	
Included	12,000	99	
Result			12,000

Click on the bars or numbers to see the matches

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](#)

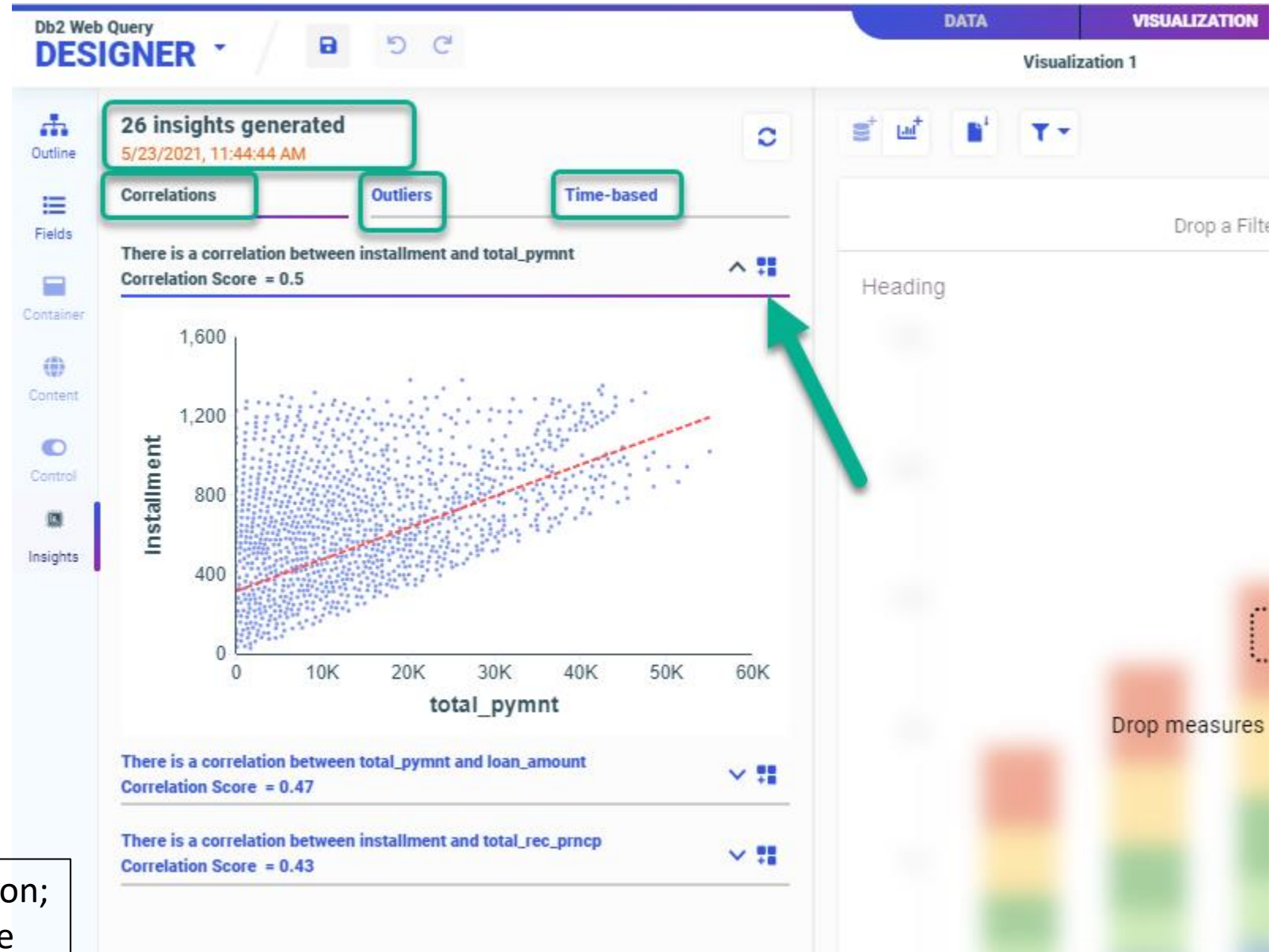
The screenshot displays the IBM i Designer interface for a 'Db2 Web Query' project. The interface is divided into several sections:

- Left Panel:** Contains navigation icons for Outline, Fields, Container, Content, and Control. The 'Insights' icon is highlighted with a red arrow.
- Fields Panel:** Shows a list of fields for the 'loans' dataset, categorized into Dimensions and Measures. Dimensions include FISCAL_YEAR, FISCAL_QUARTER, FISCAL_MONTH, YEAR_ISO, WEEK_ISO, DAY_OF_WEEK_ISO, and WEEK_STARTING_... Measures include emp_length_int, annual_inc, loan_amount, loan_condition_cat, interest_rate, dti, and total_pymnt.
- Settings Panel:** Includes 'Display' and 'Format' tabs. The 'Display' tab shows options for Vertical, Horizontal, Size, Color, Tooltip, Animate, and MultiPage, each with a 'Drop field' prompt.
- Visualization Area:** Labeled 'Visualization 1', it features a 'Drop a Filter or Field here' area and a 'Drop measures & dimensions here' area. A blurred bar chart is visible in the background.
- Right Panel:** Contains a 'Common' section with various chart and report icons, and a 'Report' section with grid icons.

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



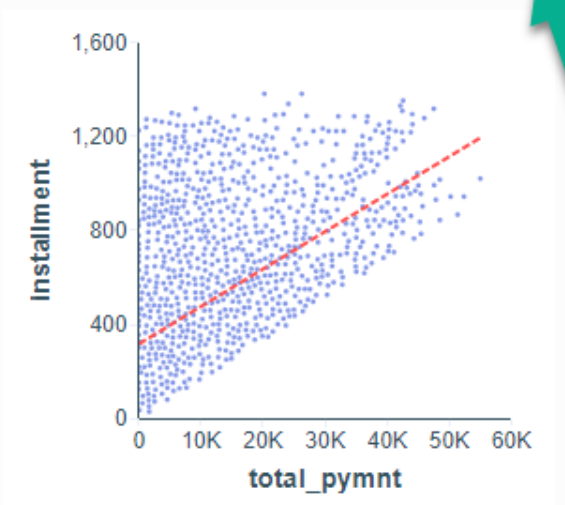
Loan Data Supplemented with Date Attributes

Db2 Web Query DESIGNER / Visualization 1

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



Installment

total_pymnt

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

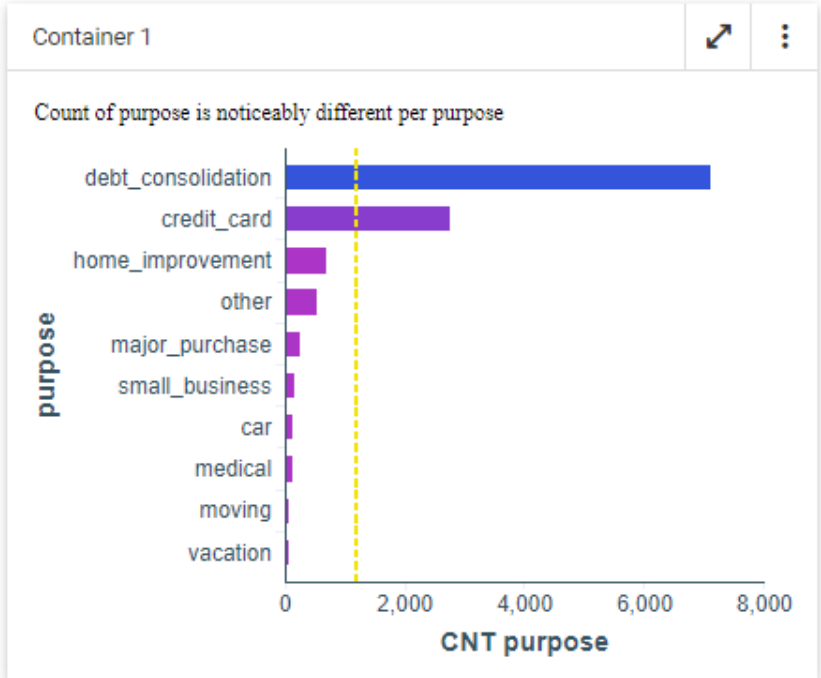
There is a correlation between installment and total_rec_prncp
Correlation Score = 0.43

Page Heading

Drop a Filter or Field here

Container 1

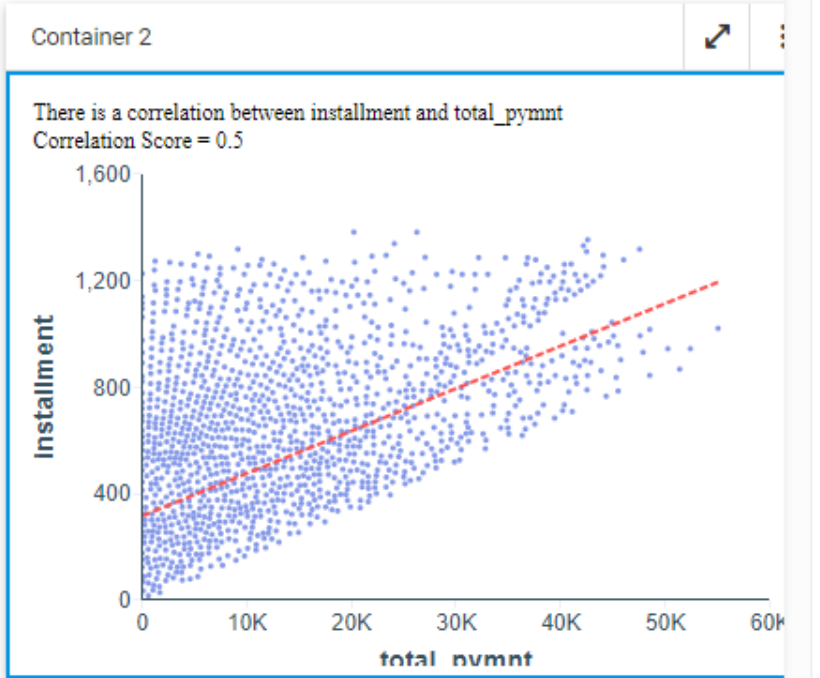
Count of purpose is noticeably different per purpose



purpose	CNT purpose
debt_consolidation	7000
credit_card	3000
home_improvement	1000
other	800
major_purchase	500
small_business	400
car	300
medical	200
moving	100
vacation	100

Container 2

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

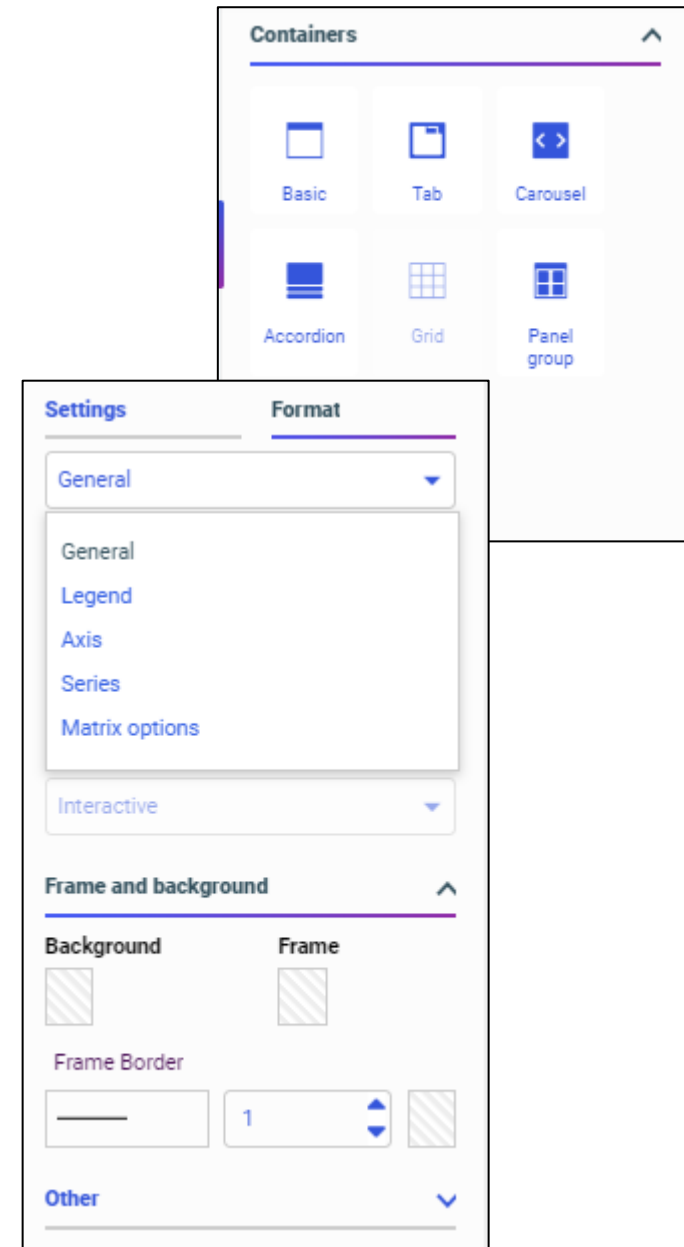


Installment

total_pymnt

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, Accordion, 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 Analysis

issue_d Y-Q
All

issue_d Y-Q
All

Reason for Loan

Count of purpose

- debt_conso
- cred
- home_impro
- major_pur
- small_bu

Clear Custom >

Previous month and current

Previous quarter and current

Previous year and current

YTD

Last 5 quarters

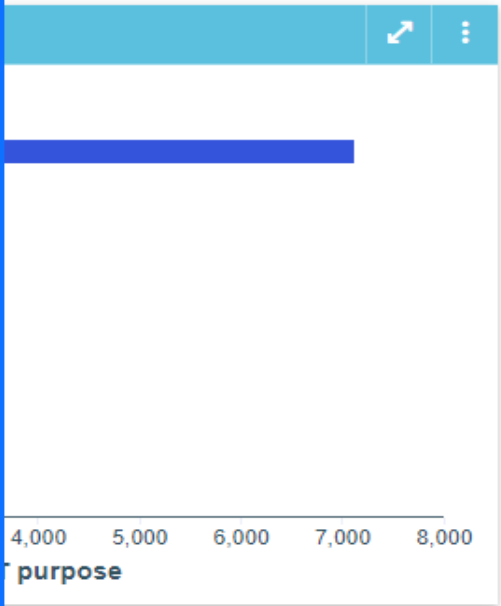
Last 13 months

Last 9 quarters

Last 25 months

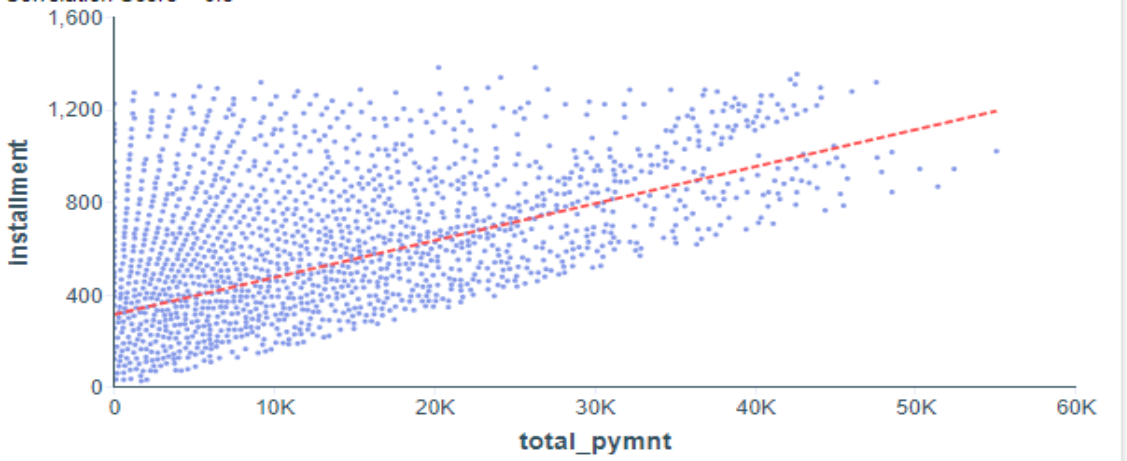
Prior YTD

Last 7 days



Installment and Total Payment Correlation

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

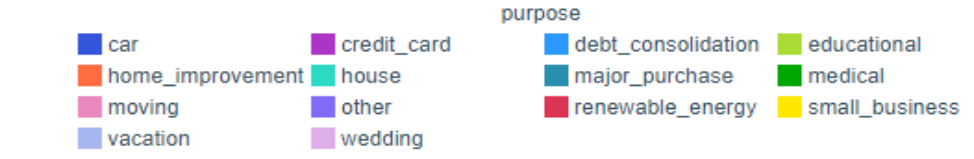


Loan Amount and

loan_amount

Autumn Spring Summer Winter

Northern Season



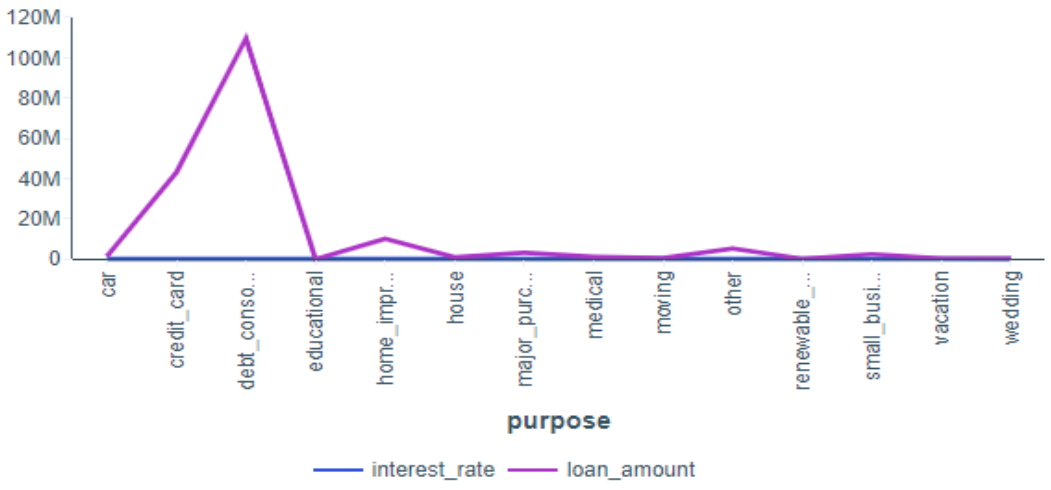
Financials by Purpose of Loan

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

car credit_card debt_conso... educational home_impr... house major_pur... medical moving other renewable... small_busi... vacation wedding

purpose

interest_rate loan_amount

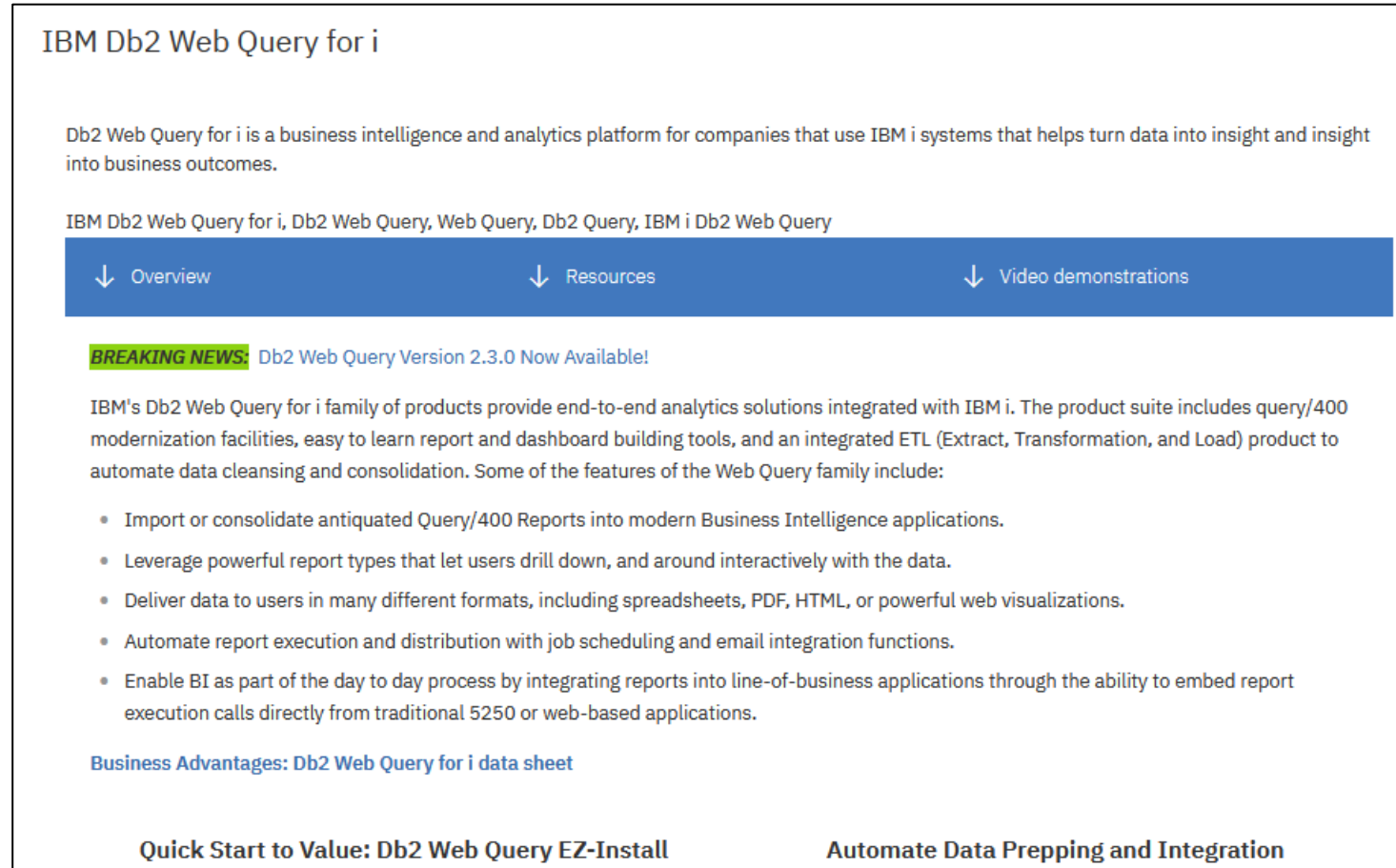


What Have You Learned Today?

- The BEST way to get started or evaluation or “play with” Db2 Web Query is EZ-Install
 - Request by sending an email to QU2@us.ibm.com with your name, company name, serial number and OS level and we’ll send you the installation info and package
 - Take the TEST DRIVE and InfoAssist Tutorials once you’ve installed
- You don’t need to be an SQL Programmer to use Db2 Web Query, but with even some basic knowledge of SQL you can leverage it to eliminate multi-pass workfile approaches, improve performance and build reports/dashboards over IBM i Services
- Synonyms are a GOOD THING. They simplify the data for report authors, and create a “single version of the truth” so people trust the data
 - Auto generation of synonyms can improve productivity and get ‘er done FAST
- Automated Insights is interesting and new – WE WANT YOUR FEEDBACK (QU2@us.ibm.com)!!!

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](http://db2webqueryi.blogspot.com)
- EZ-Install Test Drive and InfoAssist Tutorials
 - Included in the EZ-Install package
- EZ-Report
 - <http://ibm.biz/db2wq-ezreport>



IBM Db2 Web Query for i

Db2 Web Query for i is a business intelligence and analytics platform for companies that use IBM i systems that helps turn data into insight and insight into business outcomes.

IBM Db2 Web Query for i, Db2 Web Query, Web Query, Db2 Query, IBM i Db2 Web Query

↓ Overview ↓ Resources ↓ Video demonstrations

BREAKING NEWS: Db2 Web Query Version 2.3.0 Now Available!

IBM's Db2 Web Query for i family of products provide end-to-end analytics solutions integrated with IBM i. The product suite includes query/400 modernization facilities, easy to learn report and dashboard building tools, and an integrated ETL (Extract, Transformation, and Load) product to automate data cleansing and consolidation. Some of the features of the Web Query family include:

- Import or consolidate antiquated Query/400 Reports into modern Business Intelligence applications.
- Leverage powerful report types that let users drill down, and around interactively with the data.
- Deliver data to users in many different formats, including spreadsheets, PDF, HTML, or powerful web visualizations.
- Automate report execution and distribution with job scheduling and email integration functions.
- Enable BI as part of the day to day process by integrating reports into line-of-business applications through the ability to embed report execution calls directly from traditional 5250 or web-based applications.

[Business Advantages: Db2 Web Query for i data sheet](#)

Quick Start to Value: Db2 Web Query EZ-Install Automate Data Prepping and Integration

THANK YOU!

