Microsoft Power BI for Real-Time Reporting of IBM Db2 data

A step-by-step guide

Bhaskar Bandam
Azure Global Legacy Engineering Team

June 2021

Contents

Using IBM Db2 data in real-time Power BI reports

Microsoft Power BI provides a cost-effective solution to the problem of the information silos created by mainframes. Data is a key asset for enterprises, where IBM mainframes and IBM Db2 databases continue to play a critical role. However, data-driven innovation requires access to the data, while mainframes format and store data in a way that limits your ability to share it.

Cloud applications and distributed systems can enhance the potential of your data, but first the proprietary mainframe data types must be transformed to common data formats. In the past, this data transformation step required advanced skills, took place on the mainframe in close proximity to the data, and resulted in increased MIPs consumption and costs.

Now your IBM Db2 data is more accessible than ever. Microsoft Power BI Connector provides a fast, easy way to connect to IBM Db2 data so you can work with it in Power BI Desktop, a free service for creating rich, interactive reports with visual analytics.
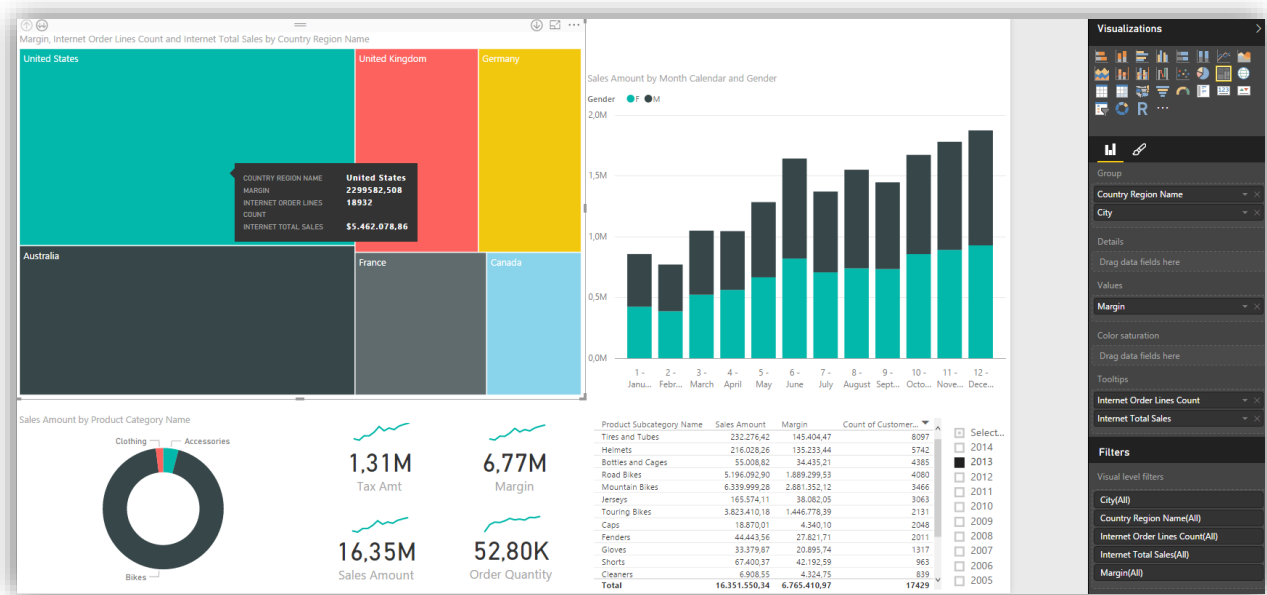

Figure 1. Power BI Connector and Power BI Desktop give you the tools to establish live connectivity with IBM Db2 data sources so you can visualize real-time data in reports like this.

This step-by-step guide is based on our work with Microsoft customers who want to make the most of the business intelligence (BI) hidden within their mainframe databases.

Here are a few scenarios we commonly encounter.

	Analyze mainframe data	Big data analytics is a strong business advantage. Many enterprise mainframes have decades of historical business transactions for massive amounts of users. Unlocking this valuable BI can help you create new sales channels, enhance the client experience, reach new markets, and more. Using the Power BI IBM Db2 Connector, your data is available right away for faster analytics. The ability to access the data very early in the data life cycle—before it has been curated or refined for broad use—gives you significant flexibility. You can mix structured and unstructured data, and Power BI provides the flexibility to grow and scale as you go.
	Enhance cloud applications	Mainframe development cycles based on legacy programming languages tend to be slow and rigid, while today's organizations need to move quickly. Power BI Connector provides easy access to your IBM Db2 data, making it available for deeper analytics. For example, an online store benefits from using recent and historical customer data to make purchase recommendations in a user's shopping cart, while a banking app might use the data to inform loan approvals, just to name a couple ideas. For more ideas, consider these Power BI customer stories.
	Reduce MIPS consumption	Power BI IBM Db2 Connector uses the extract, load, transform (ELT) architecture, in which data is delivered in its original format. The more compute-intensive transformation work is handled on the Power BI platform in the cloud.

About Power BI

Known for its powerful dashboards and reporting capabilities, Power BI is also a collection of software services, apps, and connectors that work together to connect unrelated data sources. This guide focuses on two free services:

- **Power BI Connector for IBM Db2** is the link to your data. A connector is a wrapper around an API that allows you to work with and display real-time data. You can refresh data on demand or on a schedule to ensure that your analyses always reflect the latest data.

- **Power BI Desktop** provides tools for interacting with your IBM Db2 data and building reports with visual analytics.

Figure 2 outlines the high-level steps. Using the connector, you get your data—that is, establish an IBM Db2 database as the source. The next step is to shape the data, which means you prepare it to meet your business requirements. For example, it's common to clean the data by correcting and removing errors. You may also want to provide more meaningful names for your data to make it easier to work with. Shaping the data does not change the source data. These changes are applied on Power BI Desktop only.

After shaping the data, you can build a report that you can share. In designing reports, you can add charts, tables, maps, and other visuals. Creating great data visualizations is an art as well as a science. Power BI Desktop gives you fine-grained control over your visualizations, and new types of visualizations are released frequently by Microsoft and other vendors.
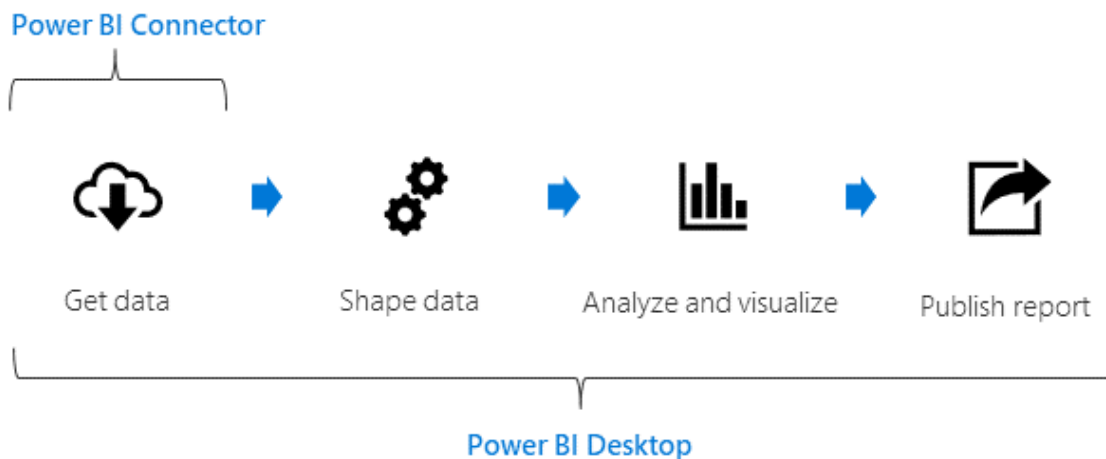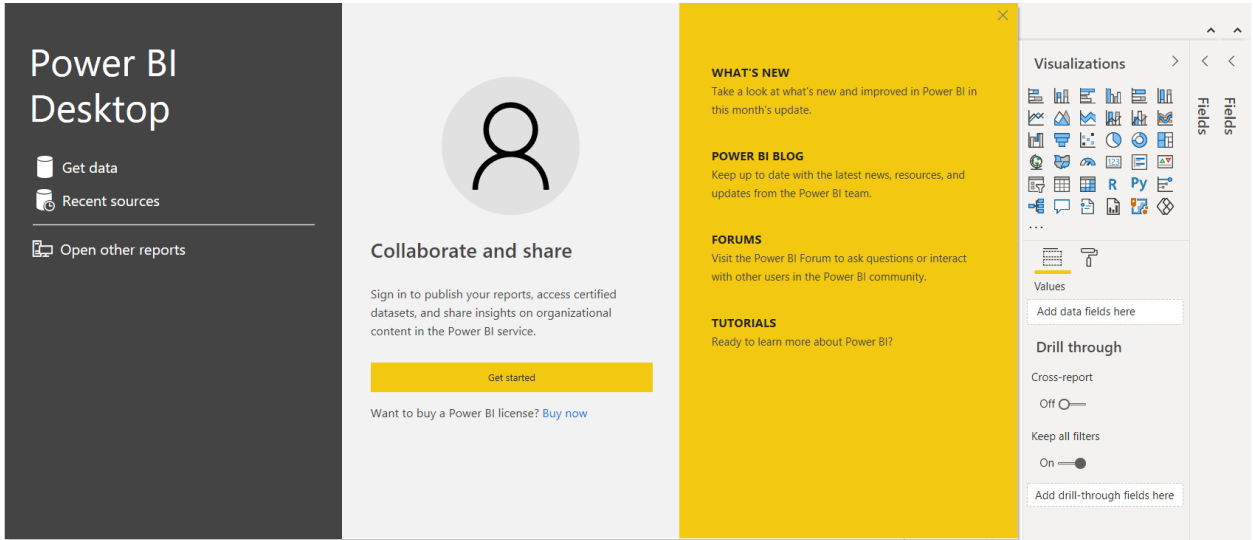

Figure 2. You can use Power BI Connector and Power BI Desktop to work directly with data from IBM Db2 databases.
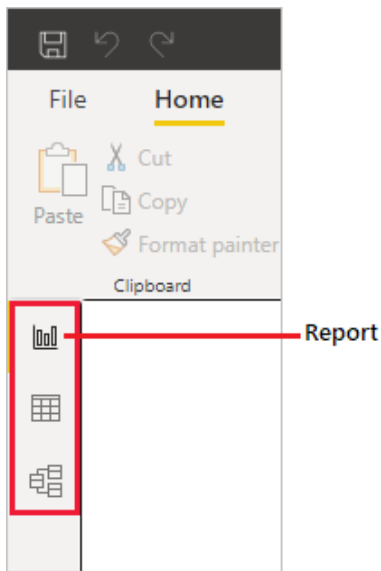
Step 1: Set up Power BI Desktop

To get started, download and install Power BI Desktop as follows.

1. Go to the Power BI Desktop site and select **Download free**. Or for download options, select See download or language options.

   ⓘ **Tip:** If your organization already has the Power BI service, select **Download** (⬇) in the menu bar and select **Power BI Desktop**.

2. In Microsoft Store, select **Get**, and follow the prompts to install Power BI Desktop on your computer.

3. Start Power BI Desktop from the Windows **Start** menu or from the icon in the Windows taskbar.

4. Close the Welcome screen, then select **Report** from the navigation on the left.

ⓘ **Tips**

The current view is indicated by a yellow bar. **Report** is the default view.
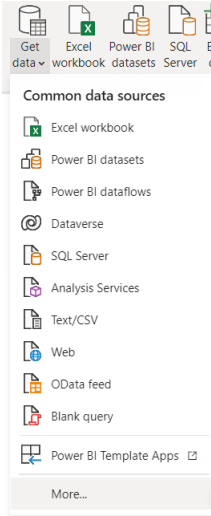
To change views, select **Data** (▦) or **Model** (⊞).

If you are using keyboard navigation, press Ctrl + F6 to move focus to that section of buttons in the window. To learn more, see [Creating reports in Power BI using accessibility tools](#) in the Power BI documentation.

For details about working with the report editor, see [Tour the report editor in Power BI](#) in the Power BI documentation.
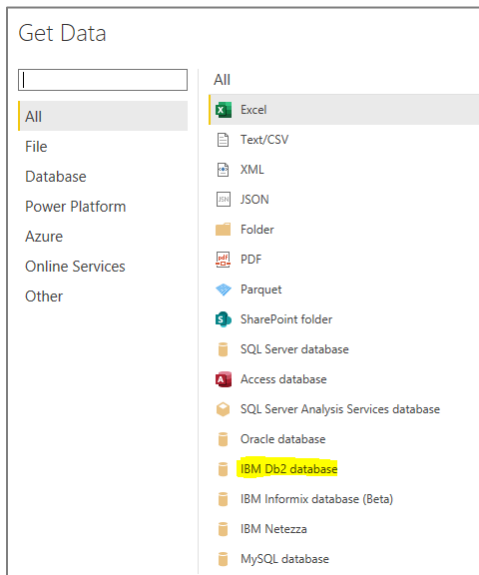
Step 2: Connect to IBM Db2 data

After setting up Power BI Desktop, you're ready to connect to the ever-expanding world of data.

1. On the **Home** tab, select **Get Data** > **More** to see all available data sources.

2. In the **Get Data** window, in the **All** column, select **IBM Db2 database**, then select **Connect**.

3. Enter the name of the server and database you want to connect to. Select **Import**, then click **OK**.

4. In **Navigator**, expand the Power BI Db2 folder and expand an associated schema folder. Select the tables and views you want to load, as in the following sample database.

Step 3: Shape the data

Before you load the data, you can use Query Editor to build queries and transform your data. Query Editor gives you more control so you can load a refined data model into Power BI Desktop to use in creating reports. Power BI Desktop detects the column behavior from the Db2 metadata retrieved by the Db2 Connector. Using Query Editor, you can filter, summarize, and sort on columns and perform other actions.

1. To open Query Editor, in the **Navigator** window, click **Edit**.

2. To change how a row is displayed, right-click a row and apply a filter.

3. Right-click a column header to change column data types, remove a column, or group by columns.

   Power BI records your query modifications in the Applied Steps section, adjusting the underlying data retrieval query that is executed to the remote Db2 data.

4. When you have finished shaping your data, select **Load**. The connector executes the underlying query to Db2.

Step 4: Create data visualizations

After loading Db2 data into Power BI, you can create data visualizations in the Report view by dragging fields from the Fields pane onto the canvas. Figure 3 shows the DEPT data used in this guide's sample database. In a typical table format, the data is interesting, but a different view can reveal deeper insights.

WORKDEPT	FIRSTNME	LASTNAME	JOB	SALARY
A00	CHRISTINE	HAAS	PRES	52,750.00
A00	DIAN	HEMMINGER	SALESREP	46,500.00
A00	GREG	ORLANDO	CLERK	29,250.00
A00	SEAN	O'CONNELL	CLERK	29,250.00
A00	VINCENZO	LUCCHESI	SALESREP	46,500.00
B01	MICHAEL	THOMPSON	MANAGER	41,250.00
C01	DOLORES	QUINTANA	ANALYST	23,800.00
C01	HEATHER	NICHOLLS	ANALYST	28,420.00
C01	KIM	NATZ	ANALYST	28,420.00
C01	SALLY	KWAN	MANAGER	38,250.00
D11	BRUCE	ADAMSON	DESIGNER	25,280.00
D11	DAVID	BROWN	DESIGNER	27,740.00
D11	ELIZABETH	PIANKA	DESIGNER	22,250.00
D11	IRVING	STERN	MANAGER	32,250.00
Total				**1,152,525.00**

Figure 3. Imported data from a table in an IBM Db2 database showing employees of a fictitious company.

For example, you can create a pie chart by selecting **Pie Chart** (🌓) in the **Visualizations** pane. In Figure 4, we selected **Salary**, **Bonus**, and **Comm** (commission) as the fields to display.
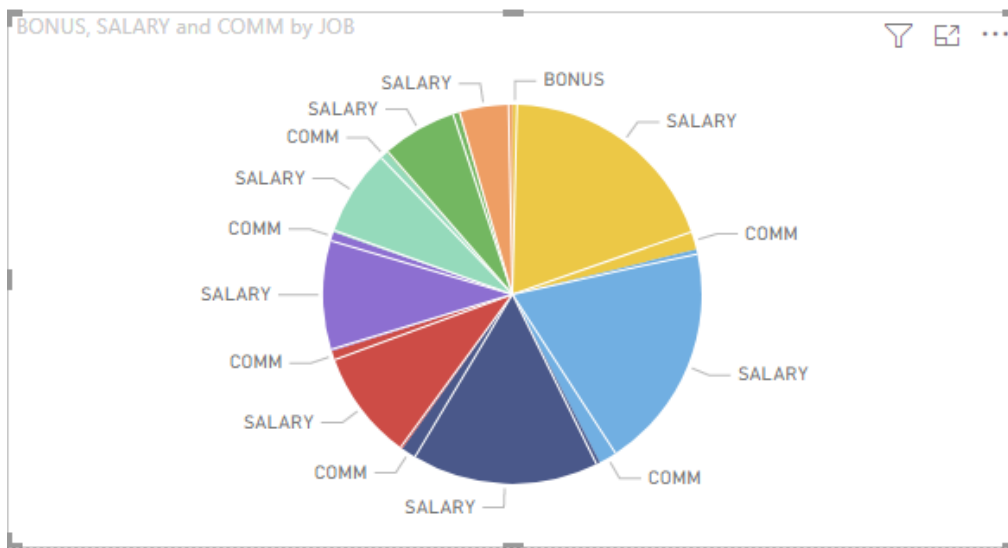

Figure 4. This pie chart is based on a sample data set that includes salary, bonus, and commission data.

You can select a field to highlight that data and make it more visible. You can also use filters to focus on certain data. For example, to see only the manager job description in Figure 5, you can click the manager data on the pie chart, which filters the table view.

These are just a few of the display options you can use. Experiment with different visualization types until you find the look that best conveys the information in your data. If you're familiar with Office, you'll feel at home in Power BI Desktop. You can also create advanced queries, mash

up data from multiple sources, create relationships between tables, and more. For details, see
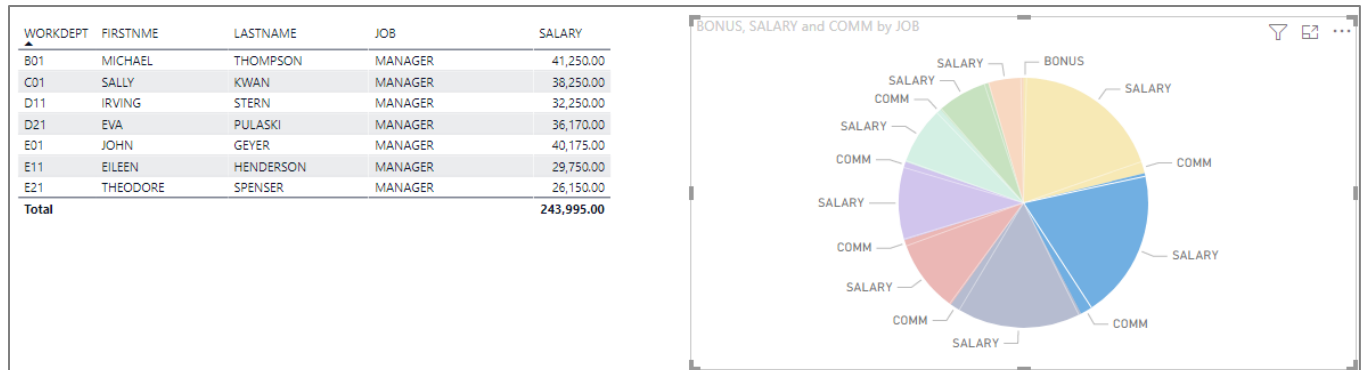[Create reports and dashboards in Power BI](#).

Figure 5. Use highlighting and filtering to focus on your data.

Step 5: Publish to PowerBI.com

When your report is ready, you can refresh the data to make sure it's up to date. Publishing a
Power BI Desktop file publishes the data in the model to your Power BI workspace—a place
where you can collaborate with colleagues in the Power BI service.
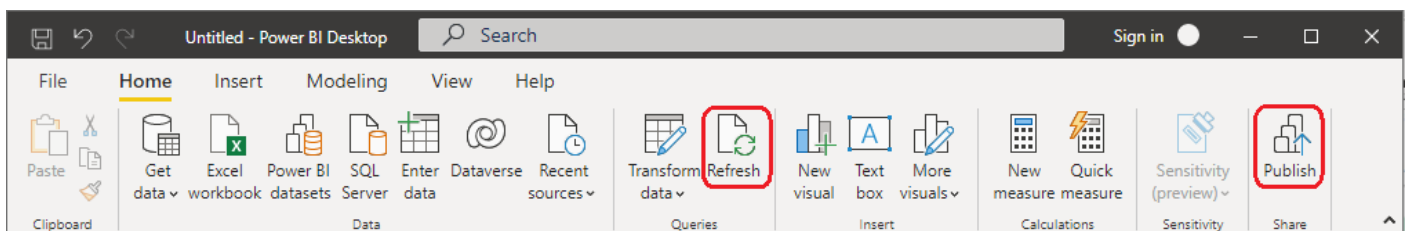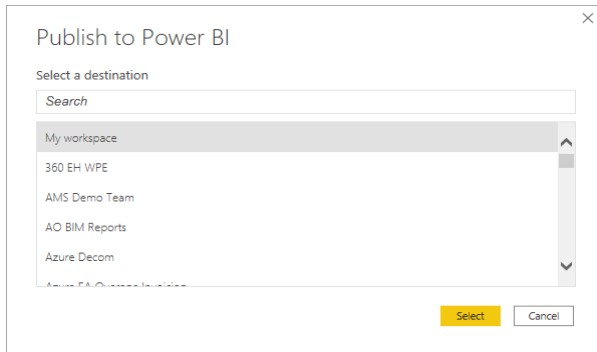

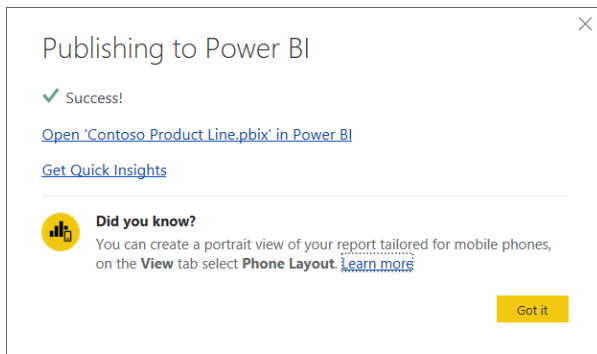Figure 6. Use **Refresh** to get the latest data and **Publish** to publish your report.

To publish your report:

1. Click **Refresh** to get the latest data for your report.
2. In Power BI Desktop, select **Publish** on the Home ribbon.
3. Sign in to Power BI, if you aren't already signed in.

4. Search your list of available workspaces and select where you want to publish. To filter the list, use the **Search** box. Click **Select** to publish.

5. When publishing is complete, click the link to go to your report in your Power BI site.

Learn more

Whether your data is on-premises or in the cloud—or even in an IBM Db2 database—a connector makes your data accessible. Power BI Connector for IBM Db2 databases is one of the latest connectors, and Microsoft is always adding new data sources. Once you connect to your data, it's an easy step to use Power BI Desktop analytics, deliver reports, and visualize and share fresh insights with others.

- For help creating reports, dashboards, goals, and paginated reports, see the Power BI documentation.

- To try out Power BI with sample data, see Get samples for Power BI.