Power BI Course (Business Intelligence)

Ghalib Alshammri, PhD
Associate Professor in AI & Data Science

Power BI Desktop Course

Business Intelligence

This workshop introduces a set of strategies and technologies enterprises use to analyze business information and transform it into actionable insights that inform strategic and tactical business decisions.

Data Modeling

This workshop presents the process of analyzing and defining all the different data types your business collects and produces, as well as the relationships between those bits of data

Data Manipulation

This workshop focuses on the process of organizing or arranging data in order to make it easier to interpret. Data manipulation typically requires the use of a type of database language called data manipulation language (DML)

Data Visualization

This workshop provides the representation of data through use of common graphics, such as charts, plots, infographics, and even animations. These visual displays of information communicate complex data relationships and data-driven insights in a way that is easy to understand

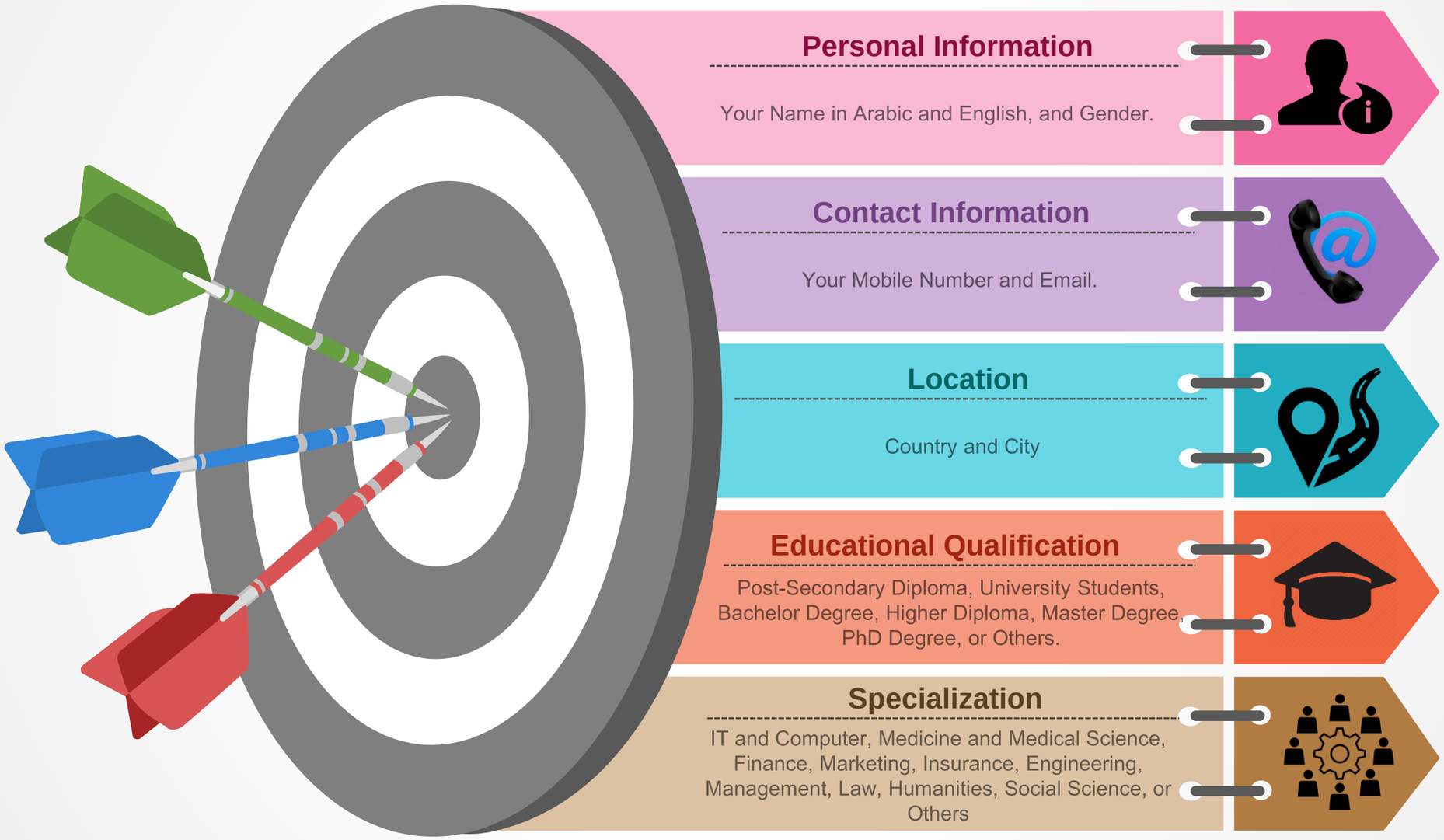
Teamwork

Data Science &
Artificial Intelligence

Ghalib Alshammri, PhD
Artificial Intelligence & Nano-Network Communication

https://github.com/galshammri/Power-BI

AI in Education Course: Trainee Info.



About Me

Personal Profile

Ghalib Alshammri, Ph.D.
Associate Professor at KSU
Teaching Assistant at Stevens Institute of Technology, USA

Work Experience

Associate Professor in Artificial Intelligence and Nano Communication Networks
Scientific Research Constant at SEU
Co-Founder and Board Member at SSDS
Founder and Board Member at SSAIIS
Assistant Teaching at Stevens Institute of Technology, and others

Achievements

- More than 35 Research Publications.
- Talk at Bell Works, NJ USA
- 1 Textbook.
- 1 Provisional Patent.
- Peer-Reviewer in more than 10 IEEE Journals.
- Invited Speaker.
- Grants.

Skills & Languages

Programming
Researcher
Problem-Solving
Leadership
Management skills
Transferable skills

Arabic
English

Education

Ph.D. in Computer Engineering, AI
M. Sc. in Intelligent Systems
B.Ed. in Computer Science

Interesting Area

AI, IoT, Molecular Nano Communication Networks, Unmanned Aerial Vehicles, …, etc.

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Our Services

First Section: Importing Dataset & Processing Using Power Query

- What is Business Intelligence?
- Introduction to Power BI
- How to Install Power BI Desktop
- Import Data (Connecting Data with Excel File)
- Import Data (Connecting Data with other files)
- Import Data (Linking Data with Website)
- Processing & Converting Data
- Filtering Data
- Sorting Data
- Add & Delete Columns
- Adding Columns with Conditions

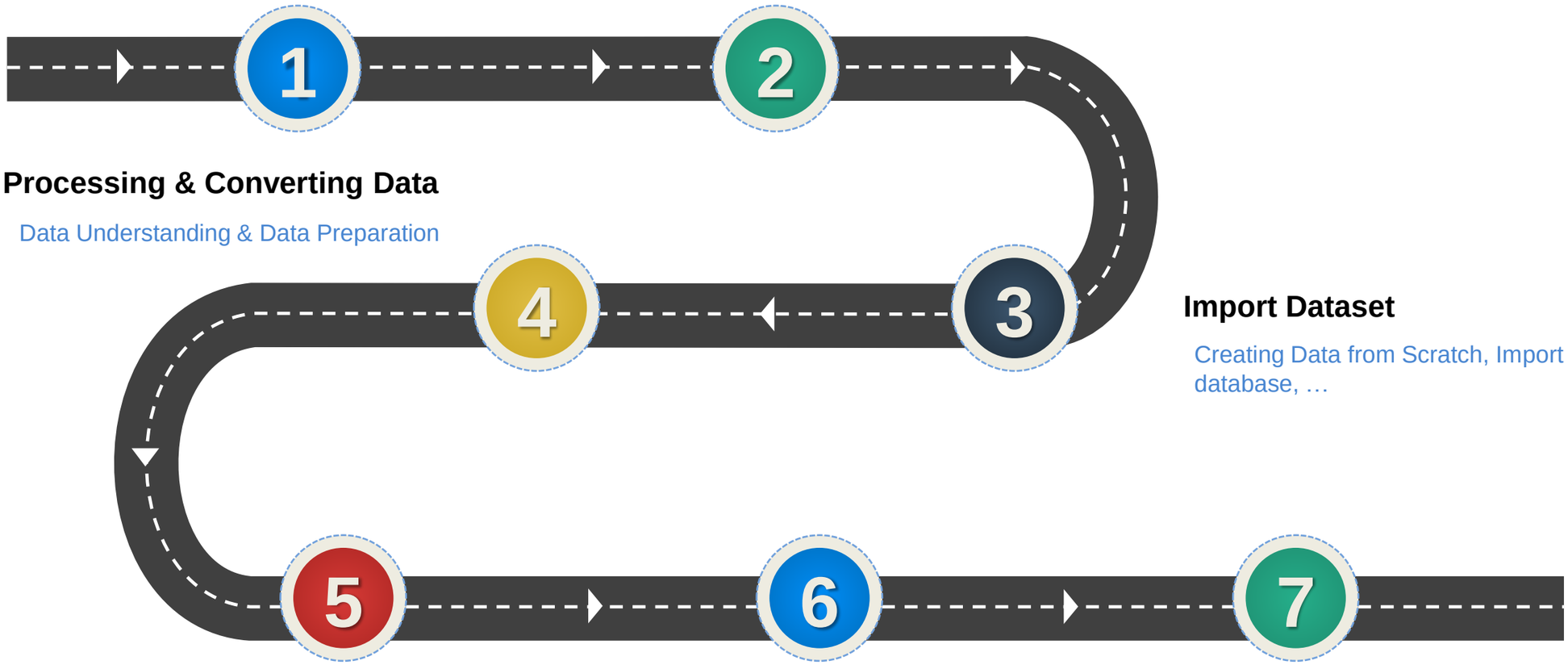
What we'll cover?

Business Intelligence

Definition, Why?, important, properties, …..

Power BI Desktop

Introduction, Installation, Components, …



Processing & Converting Data

Data Understanding & Data Preparation

Import Dataset

Creating Data from Scratch, Import database, …

Filtering Data

Preparing Data, Determining Data

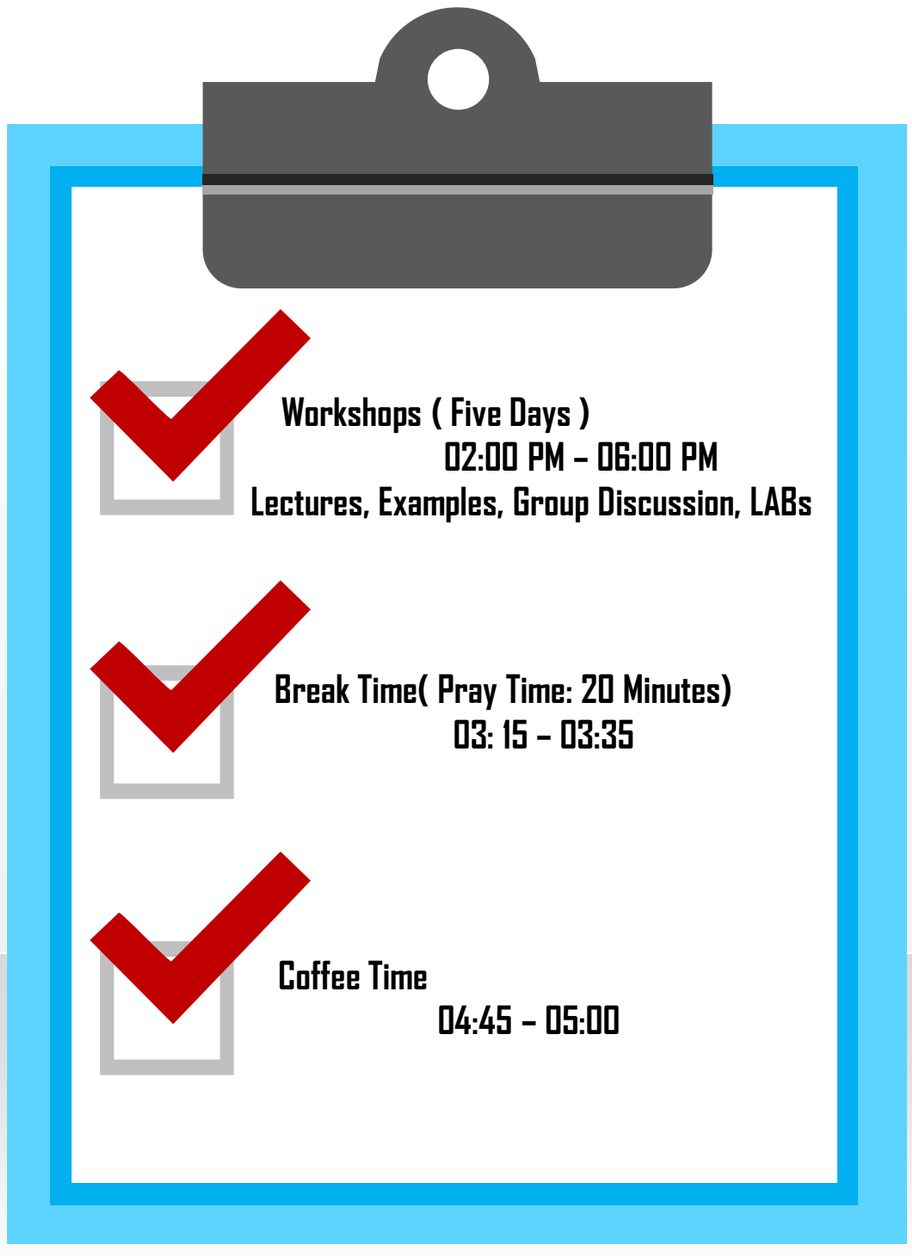
Sorting Data

Understanding Data, …

Adding Columns

Creating Custom Column, Adding Data

Time Management



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Business Intelligence

Group Discussion:

01 What is Business Intelligence?

02 How does it affect the process of decision-making?

03 How can it help use to understand the business?

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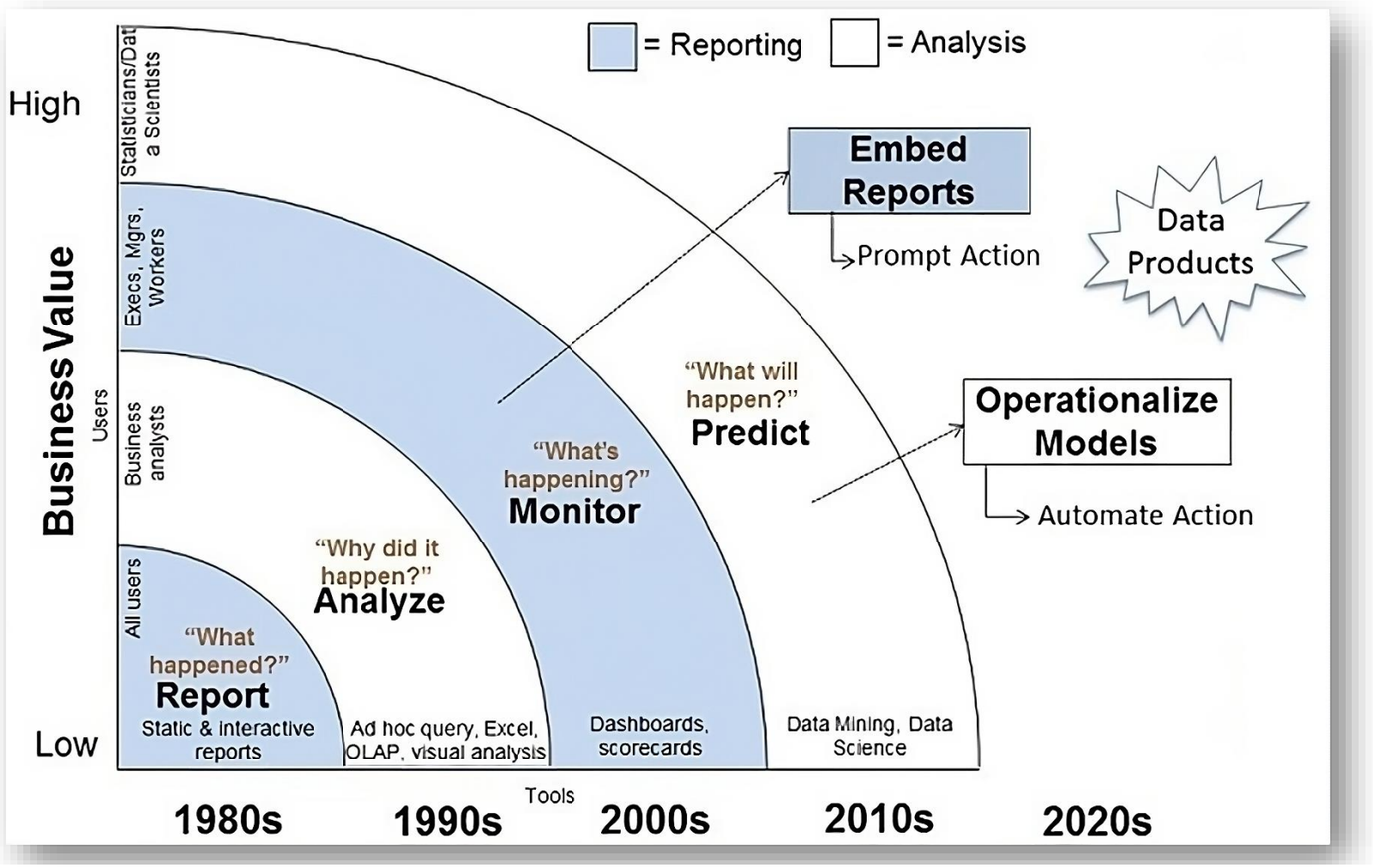
What is Business Intelligence?

Business Intelligence is an umbrella term for set of

- Methods,
- Processes,
- Technologies, and
- Tools

that help us to convert data into **information**, information into **knowledge**, and knowledge into **plans** that guide the organizations for its very betterment, traditionally known as Decision Support System (DSS).



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What is Business Intelligence?

Group Discussion:

Why Using Business Intelligence Technique?

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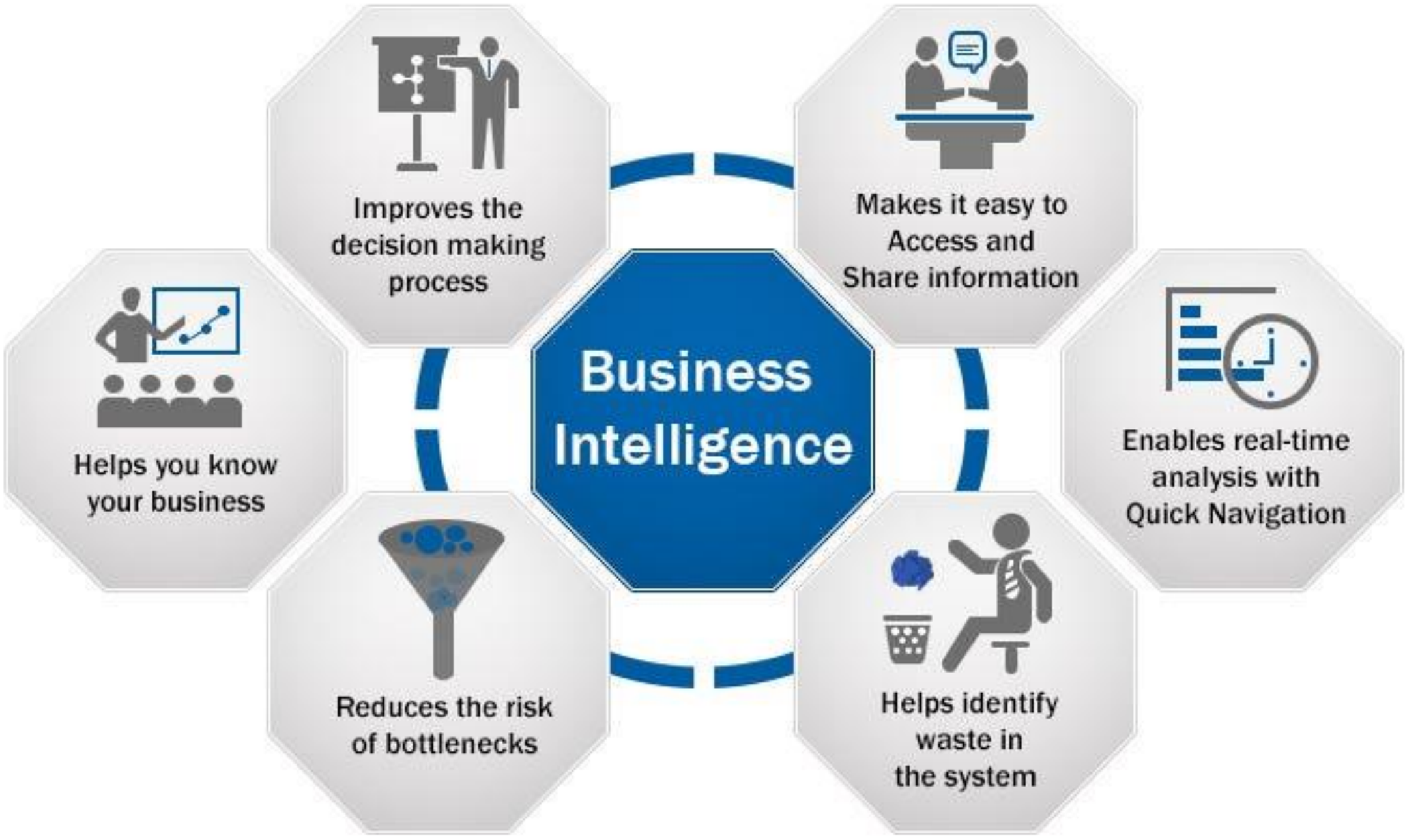
Why Business Intelligence?



Why Business Intelligence?

- **Improve Management Processes**
  - Planning, Controlling, Measuring / Changing results in increased revenues and reduced costs.
- **Improve Operational Processes**
  - Fraud detection, order processing, purchasing, etc.
- **Better Adjustment Settings**
  - Competitor analysis, adjustment settings to changing trends, etc.
- **Predict the Future**
  - Predictive analysis, Forecasting, etc.

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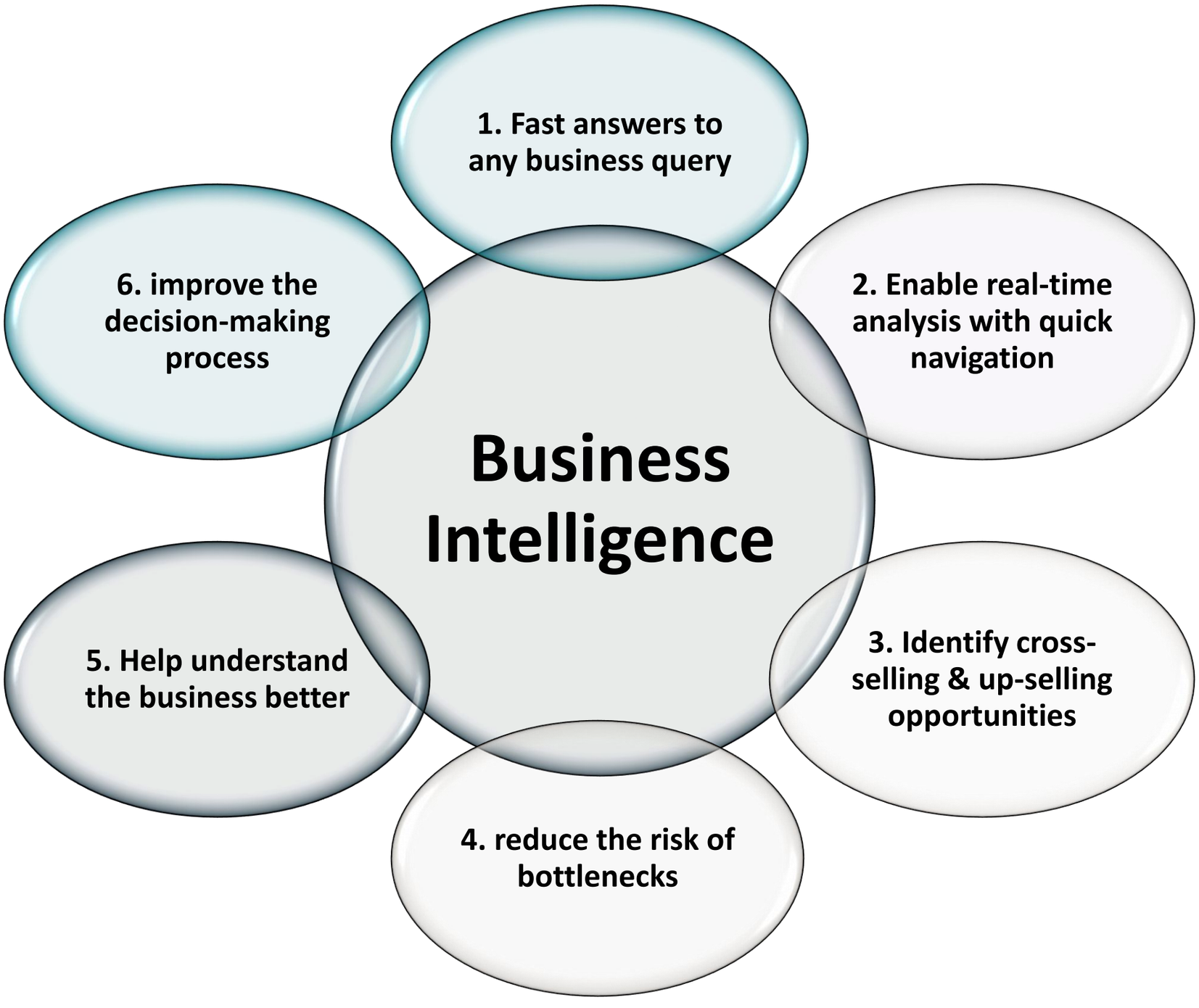
Why Business Intelligence?



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What is Business Intelligence?

Group Discussion:

What is Business Intelligence Life Cycle?

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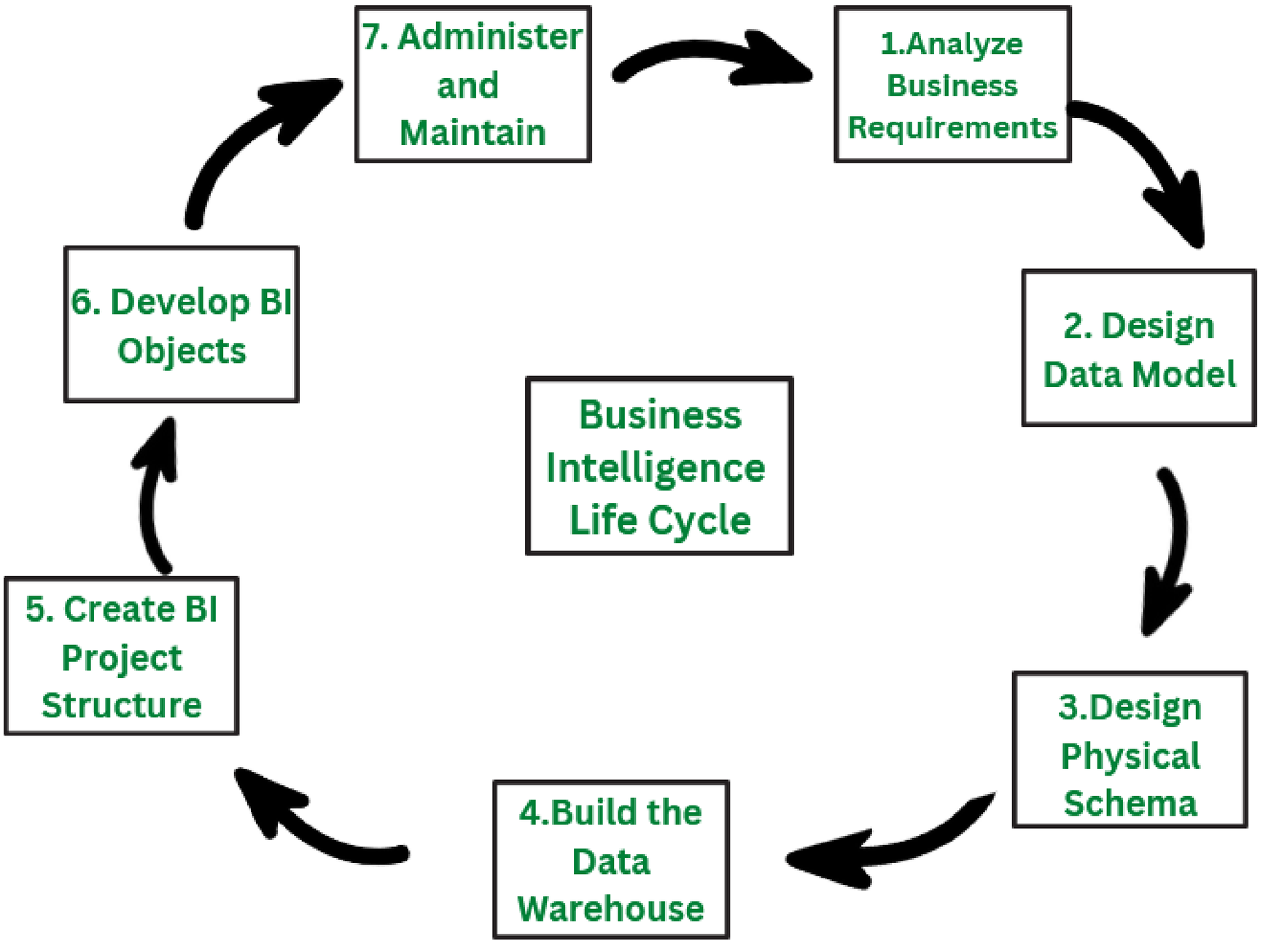
Business Intelligence Life Cycle



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What is Business Intelligence?

Group Discussion:

What is Business Analysis Requirements?

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Business Intelligence Life Cycle

- **Analyze Businesss Requirements**

  The first step in the Business Intelligence life cycle is to analyze the business requirements. The user identifies the business requirements in order to determine the type of analysis that the user then needs to perform. Identifying the requirements, let the user decides the further action to be performed.

  For example, any retail company can analyze the sales data to figure out the products that are top-selling and the products that least sell.

Business Requirement Analysis:

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What is Business Intelligence?

Group Discussion:

What is Data Model vs. Physical Schema?

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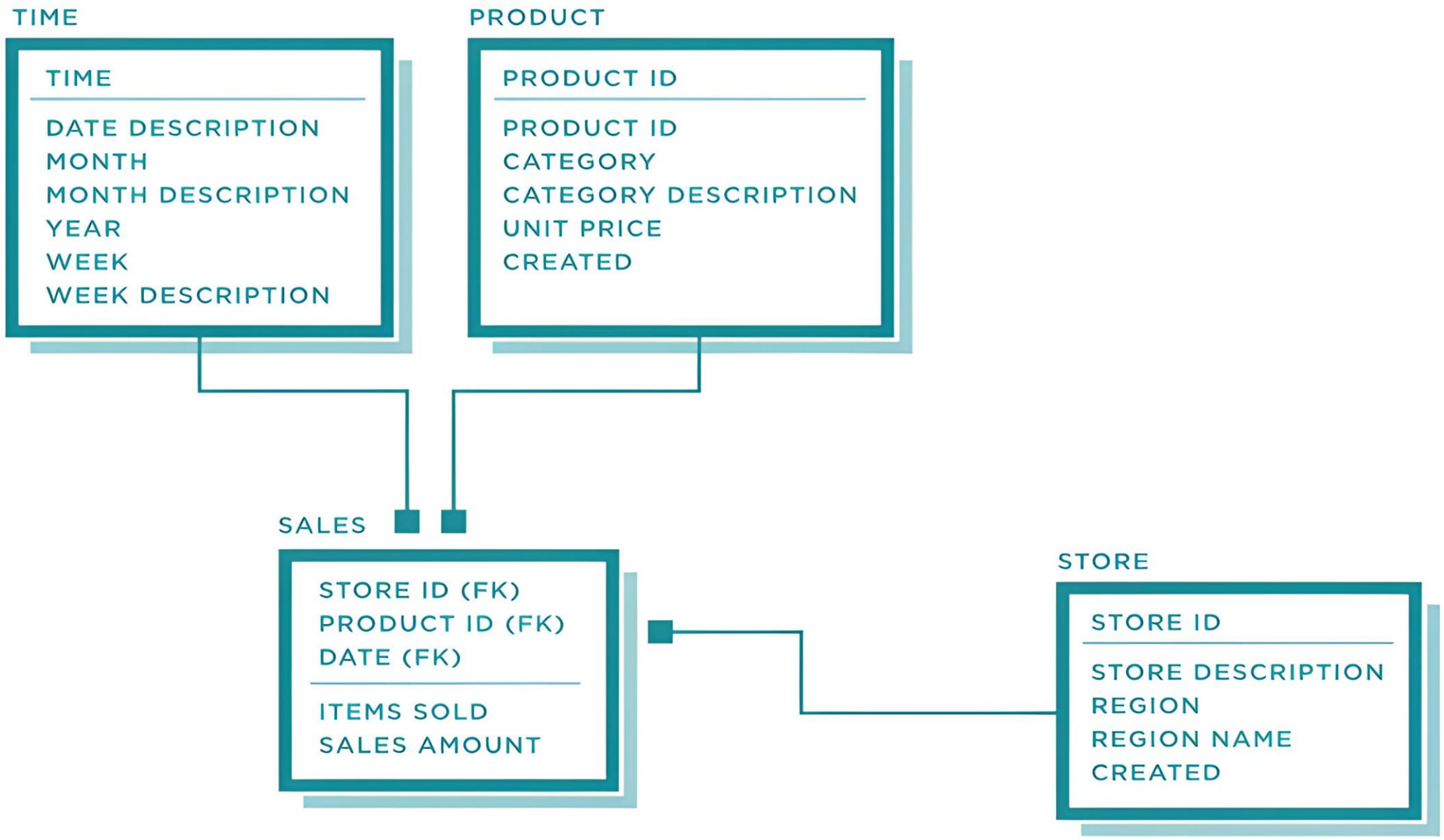
Business Intelligence Life Cycle

- **Desing Data Model**

  Once the requirements are identified the user needs to design the logical model according to the requirements. This logical model helps the user to analyze the relationships that exist within the data entities.

  For example, For any retail company, the data model consists of products, their customers, and the sales data.

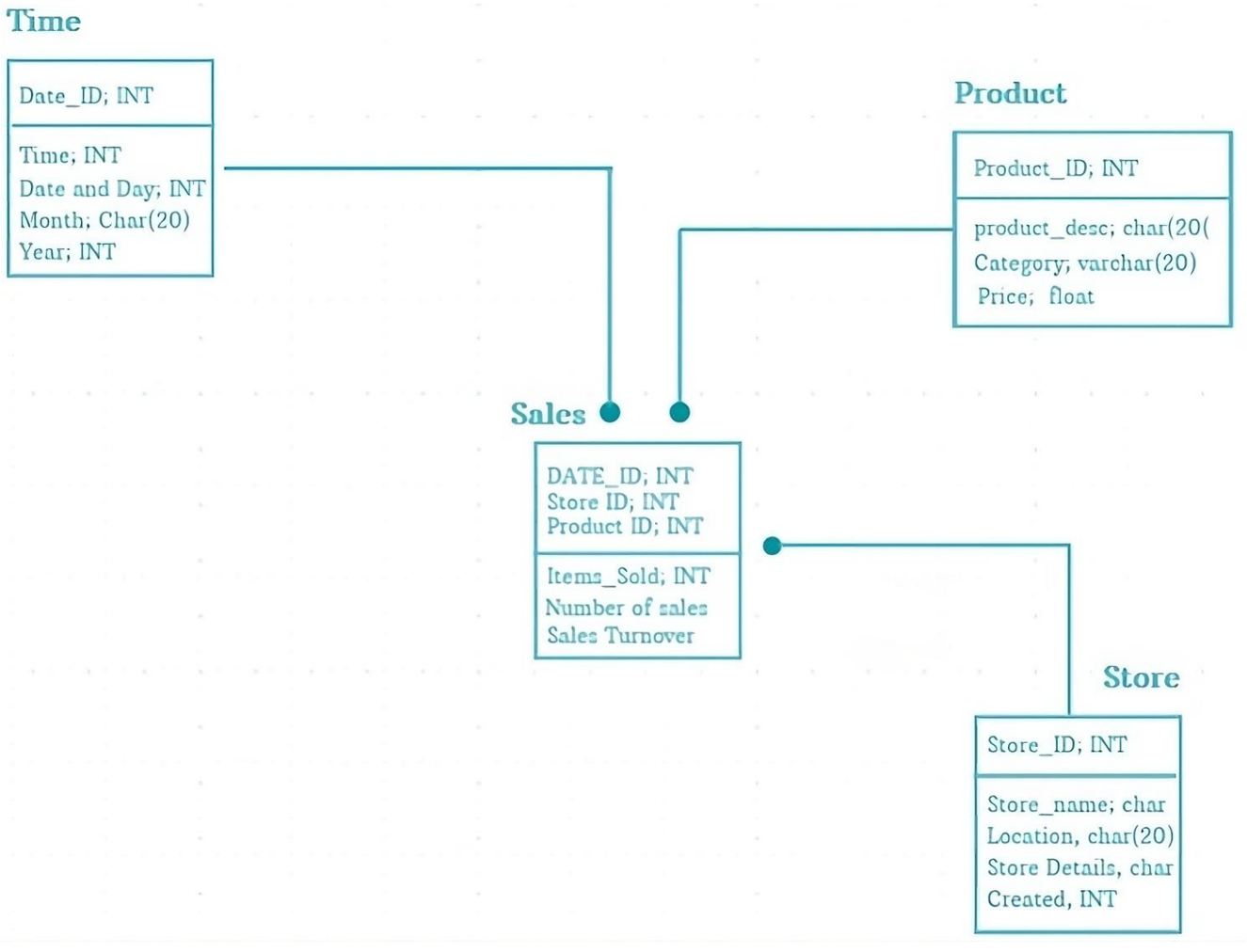


Business Intelligence Life Cycle

- **Design the Physical Schema**

  Once the logical model is prepared the next step is to design the physical schema using the data model. The physical schema describes the structure and the content of the data warehouse.

  For example, in any retail company, physical schema consists of sales-related facts, product-customer relationships, and the sales transactions



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Business Intelligence Life Cycle

Conceptual vs. Logical vs. Physical Model Design

PHASE 1 Conceptual model	PHASE 2 Logical model	PHASE 3 Physical model
Assign properties for each component.	Creates unique data identifiers and determines the sources of data	Dicates the structure of the actual database implentation.
Identifies data relationships (often business data relationships.)	Provides explicit identification of data sources	Allows database administrators to move forward with planning.
Important to work with business-side groups to determine data relationships.	Provides the data architechture framework that will guide the physical model.	Often best to work with database management tools already avaible to your organization, as adopting new vendors can be expensive.

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What is Business Intelligence?

Group Discussion:

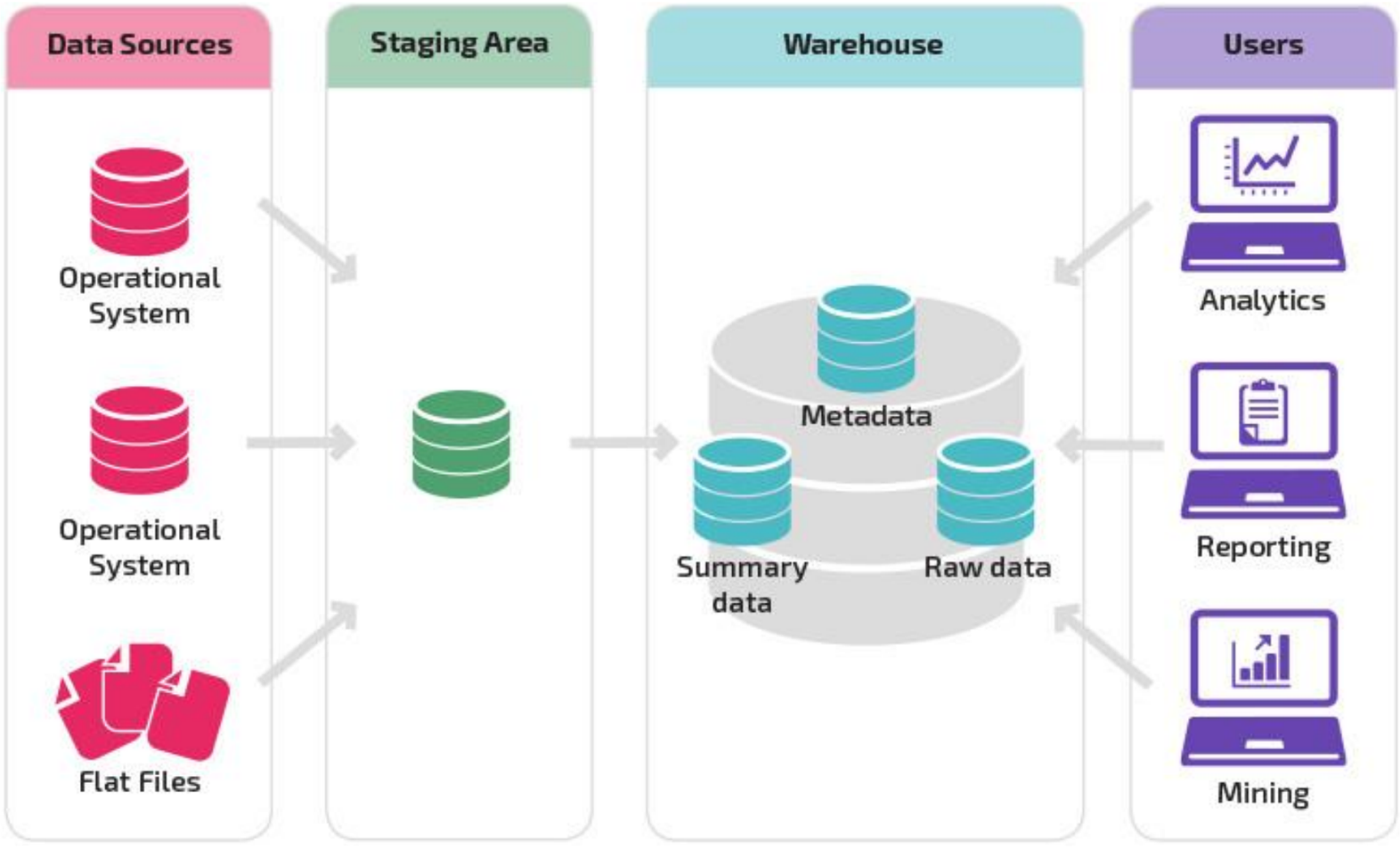
What is Data Warehousing ?

Business Intelligence Life Cycle

- **Build the Data Warehouse**

  Once the logical and physical schema is designed, the next step is to build the data warehouse. The design of a data warehouse depends on the physical and logical schema. After the design of the data warehouse, the data and the content from the source system are loaded into the data warehouse for further steps.

  For example, for the retail system, designing the data warehouse consists of developing a database that would store the details of customers, products, and other requirements for the business.



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What is Business Intelligence?

Group Discussion:

What is Metadata Project?

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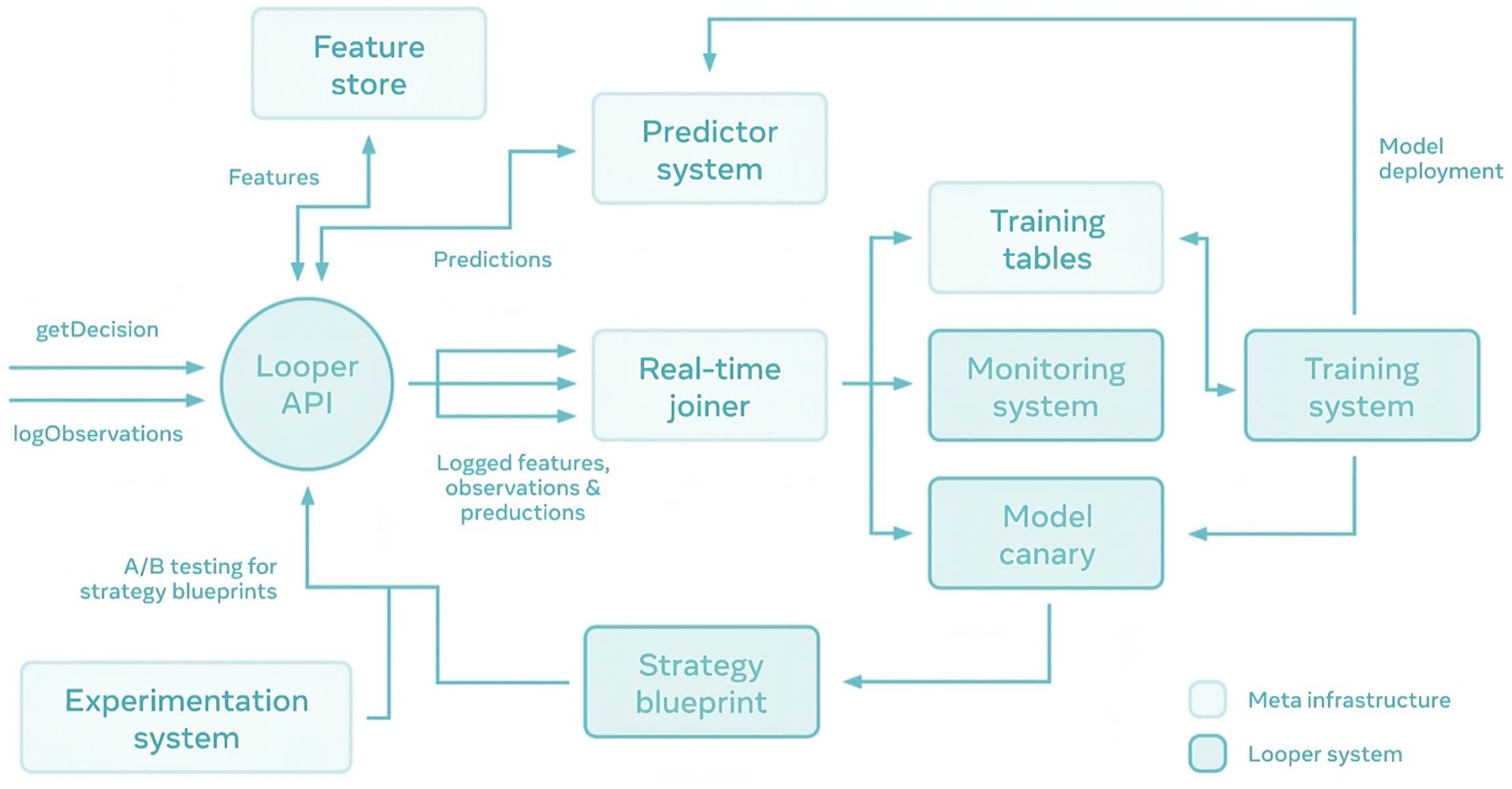
Business Intelligence Life Cycle

- **Create the Project Structure (Metadata)**

  The next step after designing the data warehouse is to create a project structure also known as metadata. With the help of this created project structure, the mapping of the tables and data in the data warehouse is easier. Creating the project structure describes the further steps and types that need to be implemented.

  For example, The project structure of the retail company consists of the attributes of the data, the design, and the working flow of the system. This project structure or metadata gives a brief idea about the working of the system.



Business Intelligence Life Cycle

- **Develop the BI Objects**

  The next step is to develop the BI objects such as metrics, attributes, dashboards, reports, and facts. This step consists of developing the reports and dashboards that can be used to analyze the data in the data warehouse.

  For example, the retail company can develop reports and statistics charts that can describe the profit and loss margins.

- **Administer and Maintain the Project**

  The last step is to administer and maintain the project continuously as it undergoes changes. The project needs to be monitored to maintain the changes, security, and performance of the system.

  For example, the retail company needs to monitor the reports and statistics accordingly to increase the profit of the sales.

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What is Business Intelligence?

Group Discussion:

What is Business Intelligence vs. Data Science?

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Business Intelligence vs. Data Science

	BUSINESS INTELLIGENCE	DATA SCIENCE
Perspective	Looking Toward Past & Present	Looking Toward the Future
Data Types	Structured	Structured & Unstructured
Deliverables	Dashboards, Reports, Ad-Hoc Requests	Statistical & Predictive Models, Hypothesis Testing
Process	Descriptive & Static	Exploratory
Business Value	Drives Decisions	Strategic Planning

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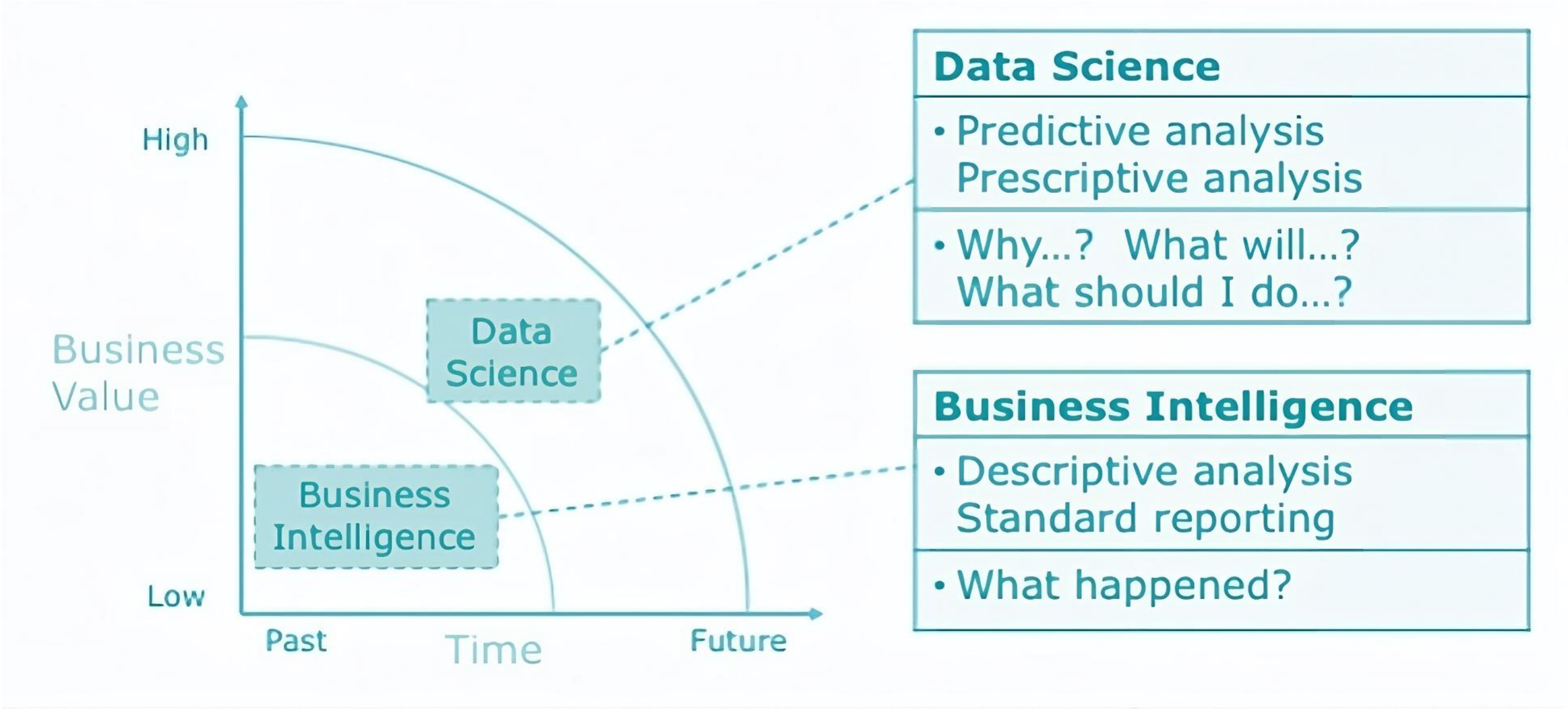
Business Intelligence vs. Data Science



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What is Business Intelligence?

Group Discussion:

What is Power BI? Why use it?

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Introduction to Power BI Desktop

- Designed and created by Ron George in 2010, who released it with the name “Project Crescent” and released on 11th July 2011.
- September of 2013, Microsoft changed the name to Power BI and launched it for the public.
- 2013 release was a Power BI for Office 365 and had Microsoft Excel add-ins, Power Pivot, Power View, Power Query in it.
- Later versions, Microsoft added advanced features like natural language Q&A, enterprise-level data security and connectivity, Power data gateways, etc.
- on July 24th, 2015, Power BI’s first general-public was released.
- Power BI has been officially declared as one of the **leading BI tools by 2019** Gartner Magic Quadrant for Analytics and Business Intelligence Platform.

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Why Power BI?

01 Real Time trends

02 Auto- searching capabilities

03 Get end-to end view

04 Manage multiple data sources

05 Enterprise Ready

06 Advance Analytics

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What is Business Intelligence?

Group Discussion:

What is User Roles in Power BI?

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Different User Roles

- **General User**
  - Consumer of operational reports
  - MAY want to interact with reports beyond what is available
  - Labeled as a “consumer” in Microsoft Power BI training manuals
- **Managerial User**
  - High-level executives who use delivered reports or dashboards to answer complex questions with data.
  - Mainly looking at reports in the Power BI service
  - Labeled as a “consumer” in Microsoft Power BI training manuals
- **Advanced user**
  - Utilizes queries, formulas, transformations, and visualizations to analyze data
  - Develops own reports and dashboards to be shared with others
  - Labeled as a “report designer” in Microsoft Power BI training manuals

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Different User Roles

- **Business user**
    - Import data from SaaS sources, and work with dashboards and reports
- **Business analyst**
    - Import, reshape, integrate and model data
    - Create compelling reports and visualizations
    - Create content packs to share insights
- **BI professional**
    - Connect to live Azure data services
    - Connect to on-premises Analysis Services databases
    - Empower colleagues to create their own reports
- **Developer**
    - Integrate applications with Power BI
    - Create real-time dashboards
    - Develop custom visuals

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What is Business Intelligence?

Group Discussion:

What is BI vs. Data vs. Visualization?

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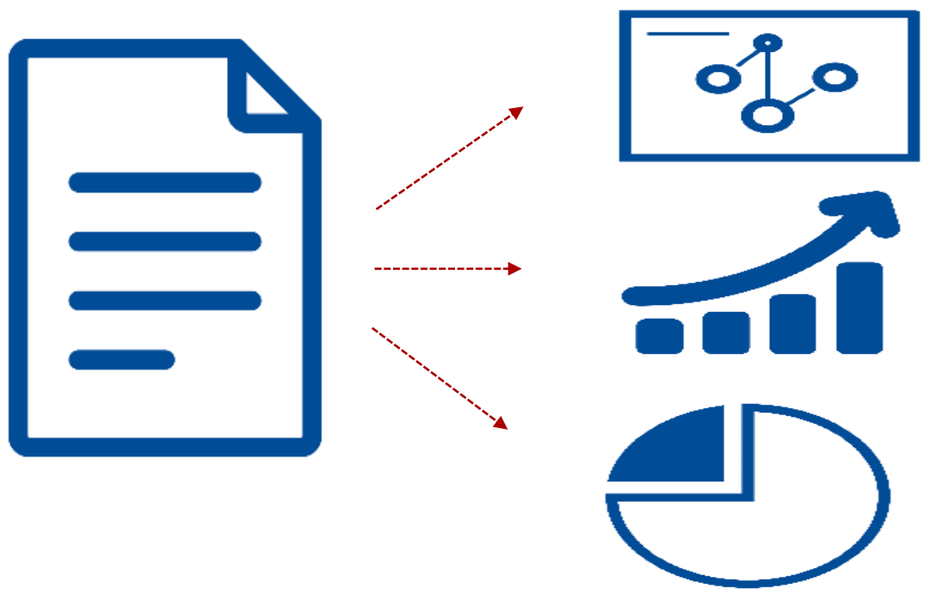
Power BI: Data Visualization Benefits

- Help in representing data in different ways, leading to hidden insights for the data relationships that may not be easily seen.
- Allow users to create and adjust visualizations based on their own needs.
- Look at data from different perspectives
- Find insights for the data relationships, that help users to make better and informed decisions.



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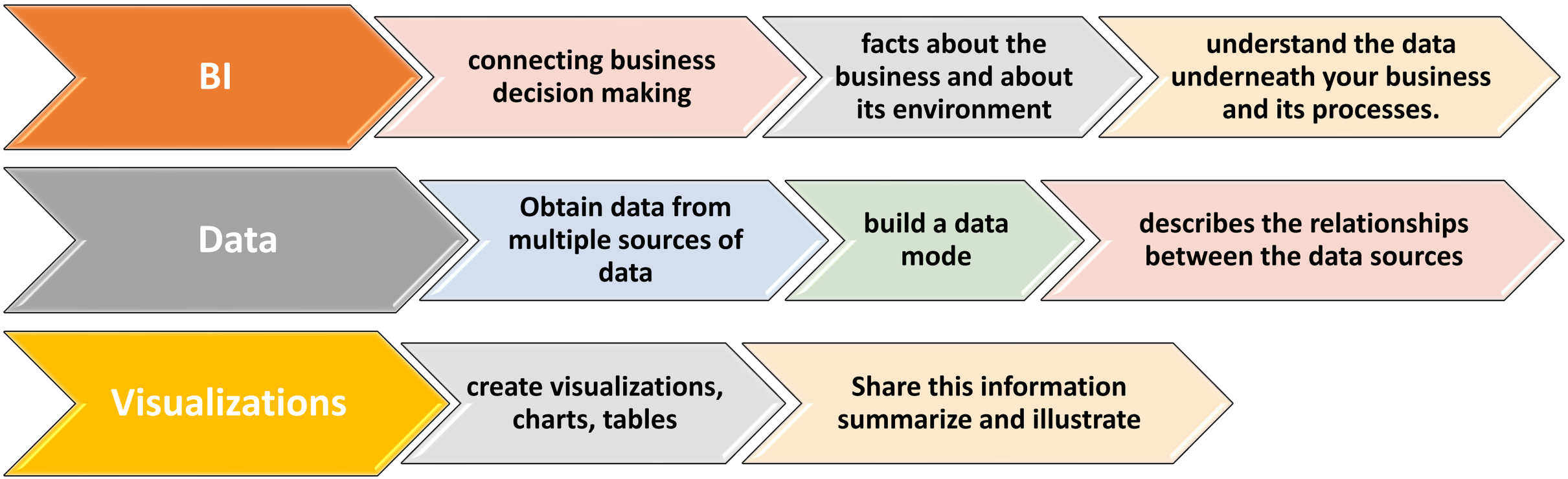
Power BI Concept



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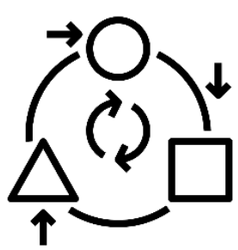
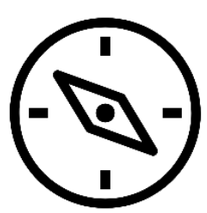
What does Power BI do?

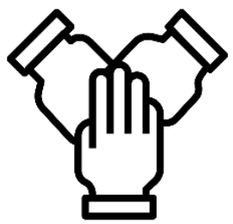
Delivers insights to enable fast, informed decisions



Transform data into stunning visuals and share them with colleagues on any device.



Visually explore and analyze data—on-premises and in the cloud—all in one view.



Collaborate on and share customized dashboards and interactive reports.

Scale across your organization with built-in governance and security.

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What is Business Intelligence?

Group Discussion:

What is Power BI Architecture?

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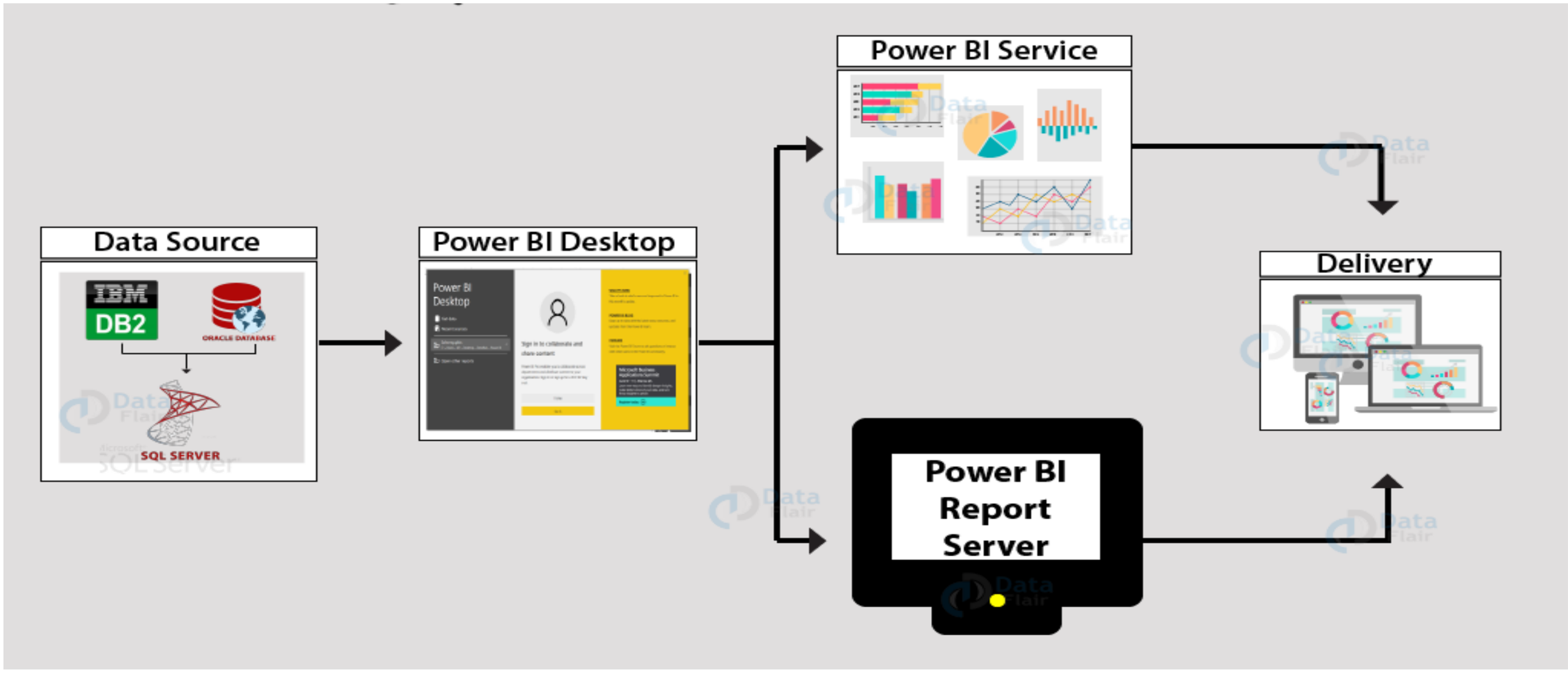
Power BI Architecture

Seven Components for Power BI Architecture:



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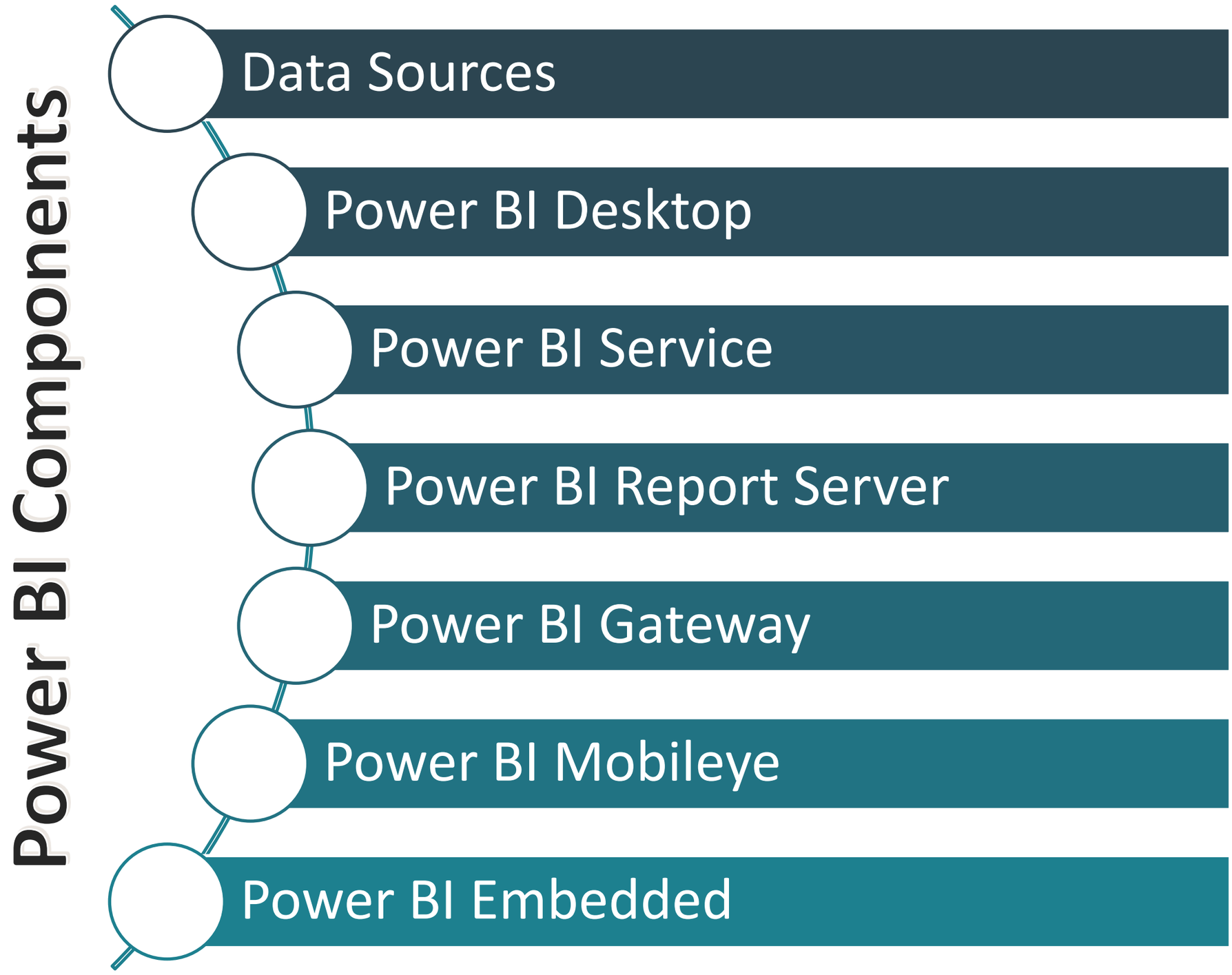
Power BI Architecture



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Power BI Architecture

1. Data Sources

An important component of Power BI is its vast range of data sources. You can import data from files in your system, cloud-based online data sources or connect directly to live connections. If you import from data on-premise or online services, there is a limit of 1 GB. Some commonly used data sources in Power BI are:

- Excel
- Text/CSV
- XML
- JSON
- Oracle Database
- IBM DB2 Database
- MySQL Database
- PostgreSQL Database
- Sybase Database
- Teradata Database
- SAP HANA Database
- SAP Business Warehouse Server
- Amazon Redshift
- Impala
- Google BigQuery (Beta)
- Azure SQL Database
- Salesforce Reports
- Google Analytics
- Facebook
- GitHub

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Power BI Architecture

2. Power BI Desktop

- Power BI Desktop is a client-side tool known as a companion development and authoring tool.
- This desktop-based software is loaded with tools and functionalities to connect to data sources, transform data, data modeling and creating reports.
- You can download and install Power BI Desktop in your system for free. Using Power BI Desktop features, one can do data cleansing, create business metrics and data models, define the relationship between data, define hierarchies, create visuals and publish reports.

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Power BI Architecture

3. Power BI Service

Power BI Service is a web-based platform from where you can share reports made on Power BI Desktop, collaborate with other users, and create dashboards. It is available in three versions:

- Free version
- Pro version
- Premium version

Power BI Service is also known as, “**Power BI.com**”, “**Power BI Workspace**”, “**Power BI Site**” and “**Power BI Web Portal**”. This component also offers advanced features like natural language Q&A and alerts.

Power BI Architecture

4. Power BI Report Server

- The Power BI Report Server is similar to the Power BI Service. The only difference between these two is that Power BI Report Server is an on-premise platform. It is used by organizations who do not want to publish their reports on the cloud and are concerned about the security of their data.

- Power BI Report Server enables you to create dashboards and share your reports with other users following proper security protocols. To use this service, you need to have a Power BI Premium license.

Power BI Architecture

5. Power BI Gateway

This component is used to connect and access on-premise data in secured networks. Power BI Gateways are generally used in organizations where data is kept in security and watch. Gateways help to extract out such data through secure channels to Power BI platforms for analysis and reporting.

6. Power BI Mobile

Power BI Mobile is a native Power BI application that runs on iOS, Android, and Windows mobile devices. For viewing reports and dashboards, these applications are used.

7. Power BI Embedded

Power BI Embedded offers APIs which are used to embed visuals into custom applications.

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What is Business Intelligence?

Group Discussion:

Power BI Desktop vs. Power BI Service

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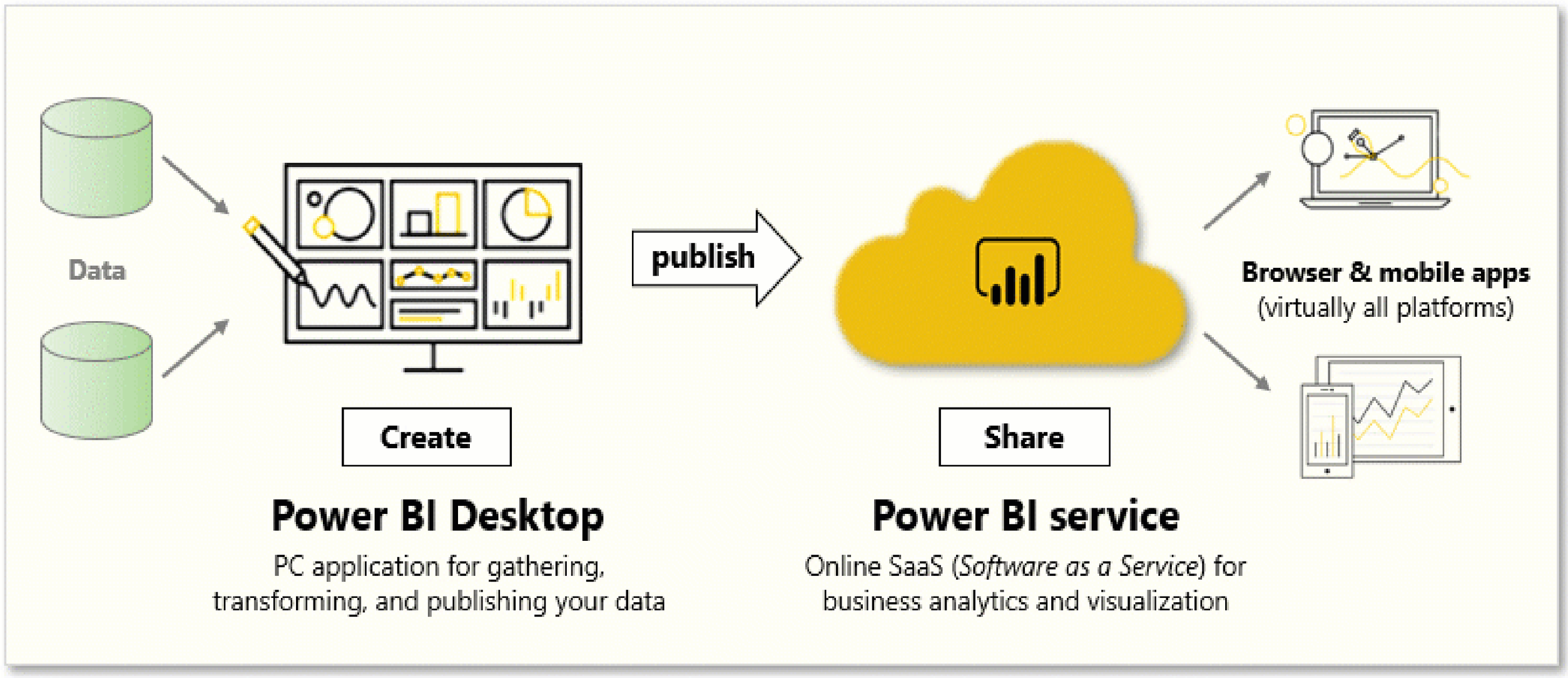
Power BI Desktop vs. Power BI Service



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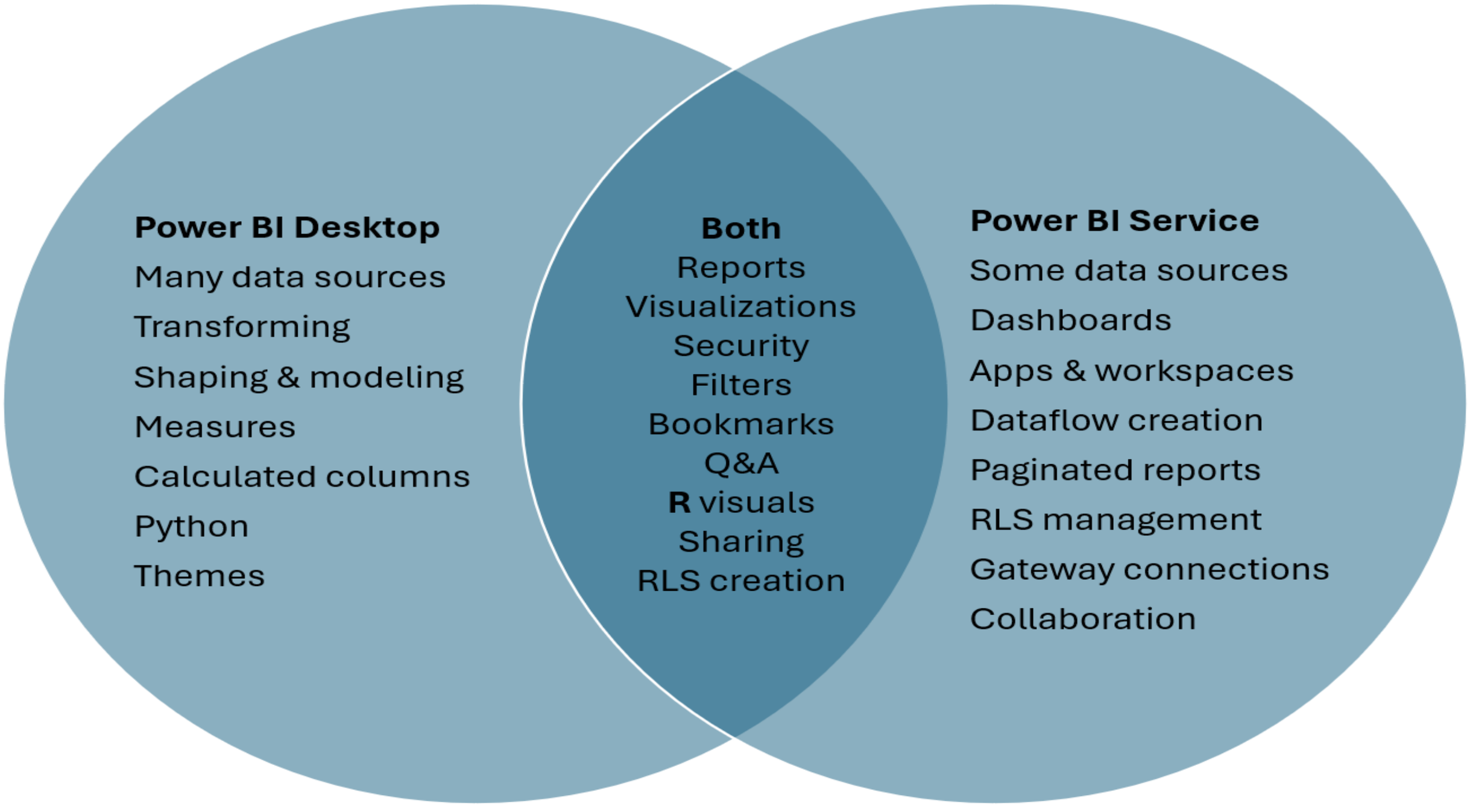
Power BI Desktop vs. Power BI Service



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Minimum Requirements to Run Power BI Desktop

- Power BI Desktop is no longer supported on Windows 7.
- Windows 8.1 or Windows Server 2012 R2 or later.
- .NET 4.6.2 or later.
- Microsoft Edge browser (Internet Explorer is no longer supported)
- Memory (RAM): At least 2 GB available, 4 GB or more recommended.
- CPU: 1 Gigahertz (GHz) 64-bit (x64) processor or better recommended.
- Display: 1440x900 or 1600x900 (16:9) required.
- Windows Display Settings: If you set your display to change the size of text, apps, and other items to more than 100%, you won't see some dialogs that you must interact with to continue using Power BI Desktop. If you encounter this issue, check your display settings in Windows by going to **Settings** > **System** > **Display**, and use the slider to return display settings to 100%.

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Prerequisites for Power BI Desktop

1. **Download** and **install** Power BI Desktop, in which it is a free application that can be installed and runs on your local computer.
2. **Download** any dataset as an Excel file.

Power BI Types	Link
Power BI Desktop	Click Here
ISO	Click Here
Android	Click Here
Web	Click Here

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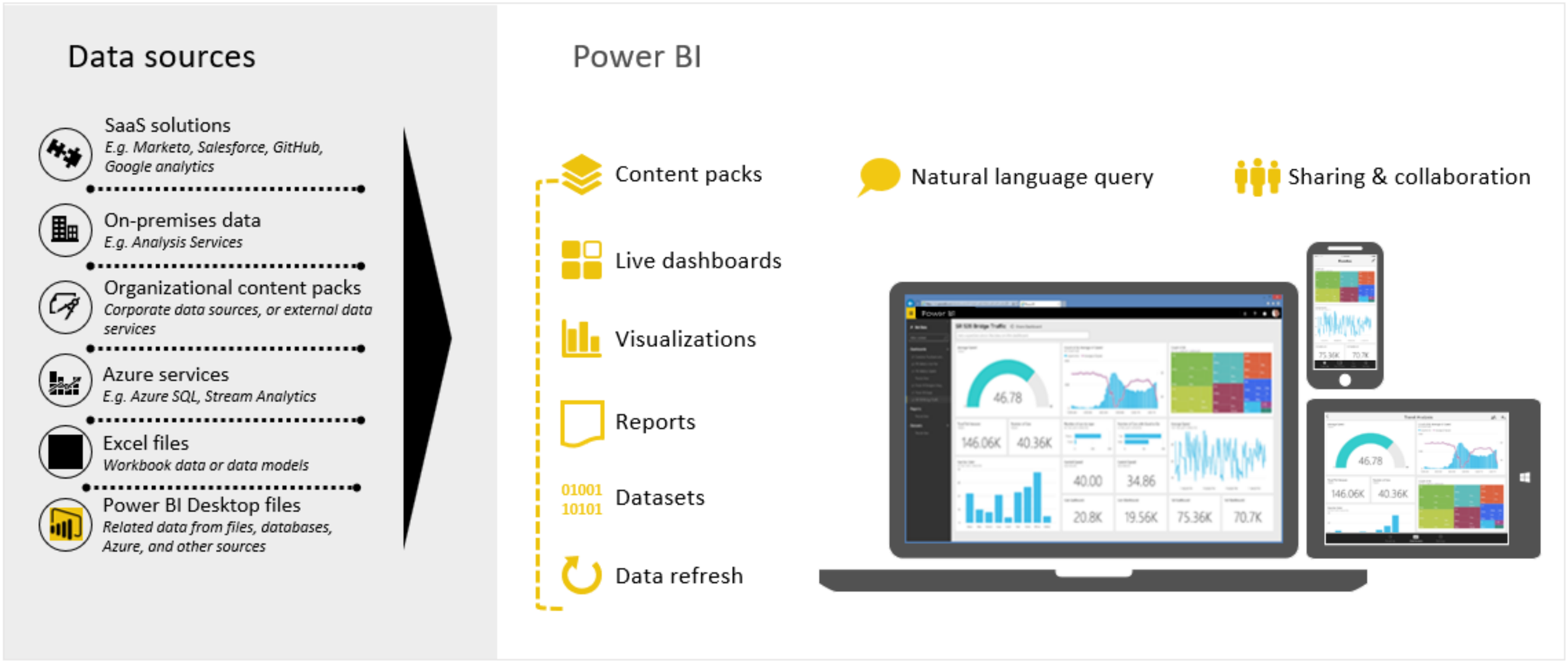
Power BI Overview (Explore Power BI Elements)



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Power BI Desktop: Capacities

- Capacities are a core Power BI concept representing a set of resources used to host and deliver your Power BI content. Capacities are either shared or dedicated.
  - A shared capacity is shared with other Microsoft customers, while a dedicated capacity is fully committed to a single customer.
  - Dedicated capacities require a subscription. By default, workspaces are created on a shared capacity.

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Power BI Desktop: Workspaces

Workspaces are containers for dashboards, reports, datasets, and dataflows in Power BI. There are two types of workspaces: My workspace and workspaces.

- **My workspace** is the personal workspace for any Power BI customer to work with your own content. Only you have access to your My workspace. You can share dashboards and reports from your My Workspace. If you want to collaborate on dashboards and reports or create an app, then you want to work in a workspace.
- **Workspaces** are used to collaborate and share content with colleagues. You can add colleagues to your workspaces and collaborate on dashboards, reports, and datasets. With one exception, all workspace members need Power BI Pro licenses. Workspaces are also the places where you create, publish, and manage apps for your organization. Think of workspaces as staging areas and containers for the content that will make up a Power BI app. So, what is an app? An app is a collection of dashboards and reports built to deliver key metrics to the Power BI consumers in your organization. Apps are interactive, but consumers cannot edit them. App consumers, colleagues who have access to the apps, do not necessarily need Pro licenses.

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Power BI Desktop: Datasets

A **dataset** is a collection of data that you import or connect to. Power BI lets you connect to and import all sorts of datasets and bring all of it together in one place. Datasets can also source data from dataflows. **Datasets** are associated with **workspaces** and a single dataset can be part of many workspaces. When you open a workspace, the associated datasets are listed under the **Datasets** tab. Each listed dataset represents a collection of data. **For example**, a dataset can contain data from an Excel workbook on OneDrive, an on-premises SSAS tabular dataset, and/or a Salesforce dataset. There are many different data sources supported. Datasets added by one workspace member are available to the other workspace members with an admin, member, or contributor role.

Shared Datasets: Business intelligence is a collaborative activity. It's important to establish standardized datasets that can be the 'one source of truth. Discovering and reusing those standardized datasets is key. When expert data modelers in your organization create and share optimized datasets, report creators can start with those datasets to build accurate reports. Your organization can have consistent data for making decisions, and a healthy data culture. To consume these shared datasets just choose **Power BI datasets** when creating your Power BI report.

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Power BI Desktop: Reports

A Power BI report is one or more pages of visualizations such as line charts, maps, and other elements. Reports can be created from scratch within Power BI, they can also be imported with dashboards that colleagues share with you, or Power BI can create them when you connect to datasets from Excel, Power BI Desktop, databases, and SaaS applications. For example, when you connect to an Excel workbook that contains Power View sheets, Power BI creates a report based on those sheets. And when you connect to a SaaS application, Power BI imports a pre-built report. There are two modes to view and interact with reports:

- **Reading view: When** a report is opened by a user, it is displayed in reading view.
- **Editing view**: For individuals that have edit permissions, editing view is used to modify the different elements on the report and how they are presented.

When a workspace is opened, associated reports are listed under the **Reports** tab. Each listed report represents one or more pages of visualizations based on only one of the underlying datasets. To open a report, select it. When you open an app, you are presented with a **dashboard**. To access an underlying report, select a dashboard tile (more on tiles later) that was pinned from a report. Keep in mind that not all tiles are pinned from reports, so you may have to click a few tiles to find a report. By default, the report opens in Reading view. Just select **Edit report** to open it in Editing view (if you have the necessary permissions).

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Power BI Desktop: Dashboards

A **dashboard** is a single canvas that contains zero or more tiles and widgets. Each tile pinned from a report or from Q&A displays a single visualization that was created from a dataset and pinned to the dashboard. Entire report pages can also be pinned to a dashboard as a single tile. There are many ways to add tiles to your dashboard, too many to be covered in this overview topic. Why do people create dashboards? Here are just some of the reasons:

- To **see** all information needed to make decisions in one glance.
- To **monitor** the most important information about your business.
- To **ensure** all colleagues are on the same page, viewing and using the same information.
- To **monitor** the health of a business, product, business unit, or marketing campaign, etc.
- To **create** a personalized view of a larger dashboard and show all the metrics that matter.

When you open a **workspace**, the associated dashboards are listed under the **Dashboards** tab. To open a dashboard, select it. When you open an app, you will be presented with a dashboard. If you own the dashboard, you will also have edit access to the underlying dataset(s) and reports. If the dashboard was shared with you, you will be able to interact with the dashboard and any underlying reports but will not be able to save any changes.

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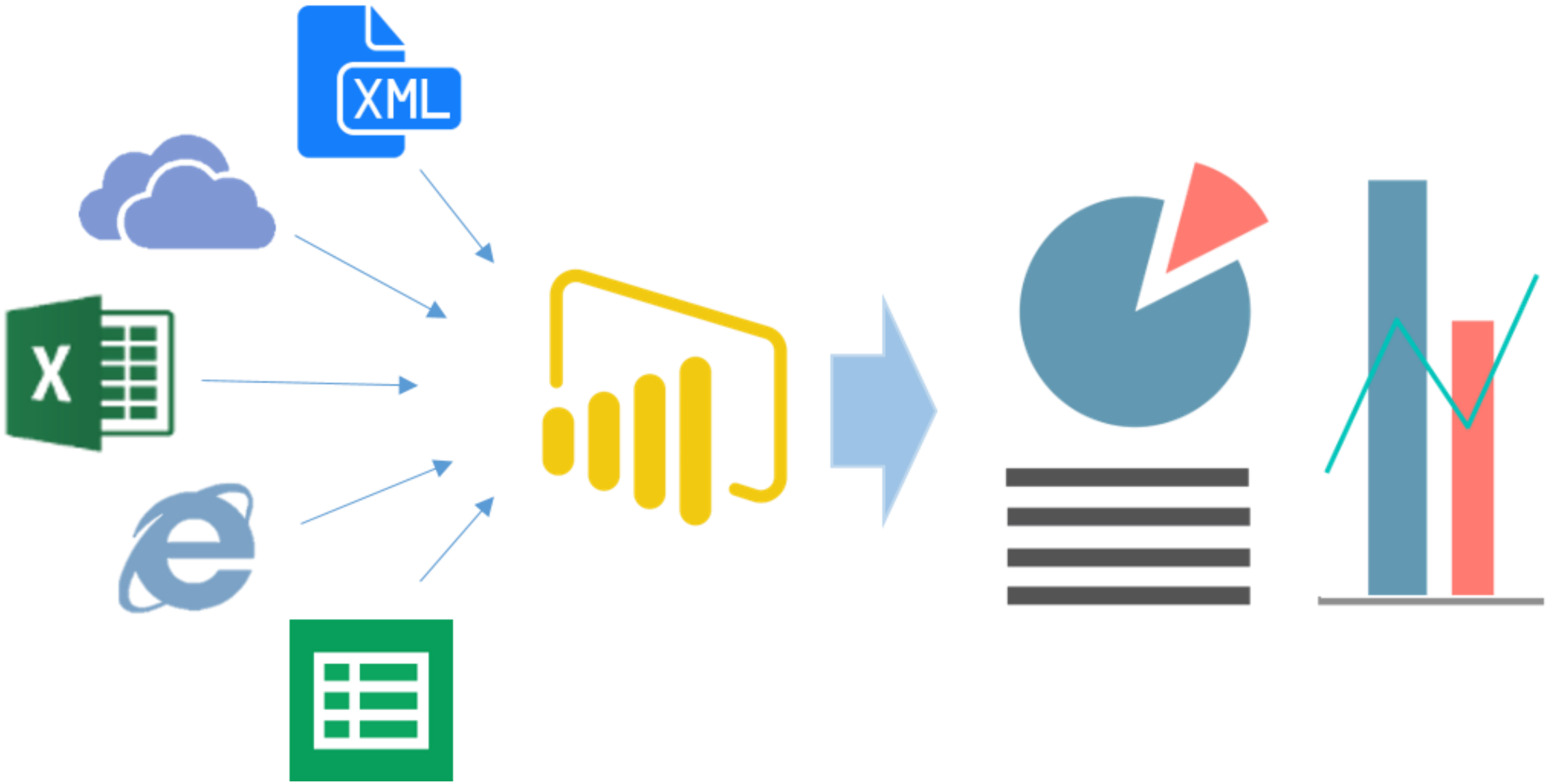
Power BI Integration with Resources



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What is Business Intelligence?

Group Discussion:

What is Power BI Desktop?

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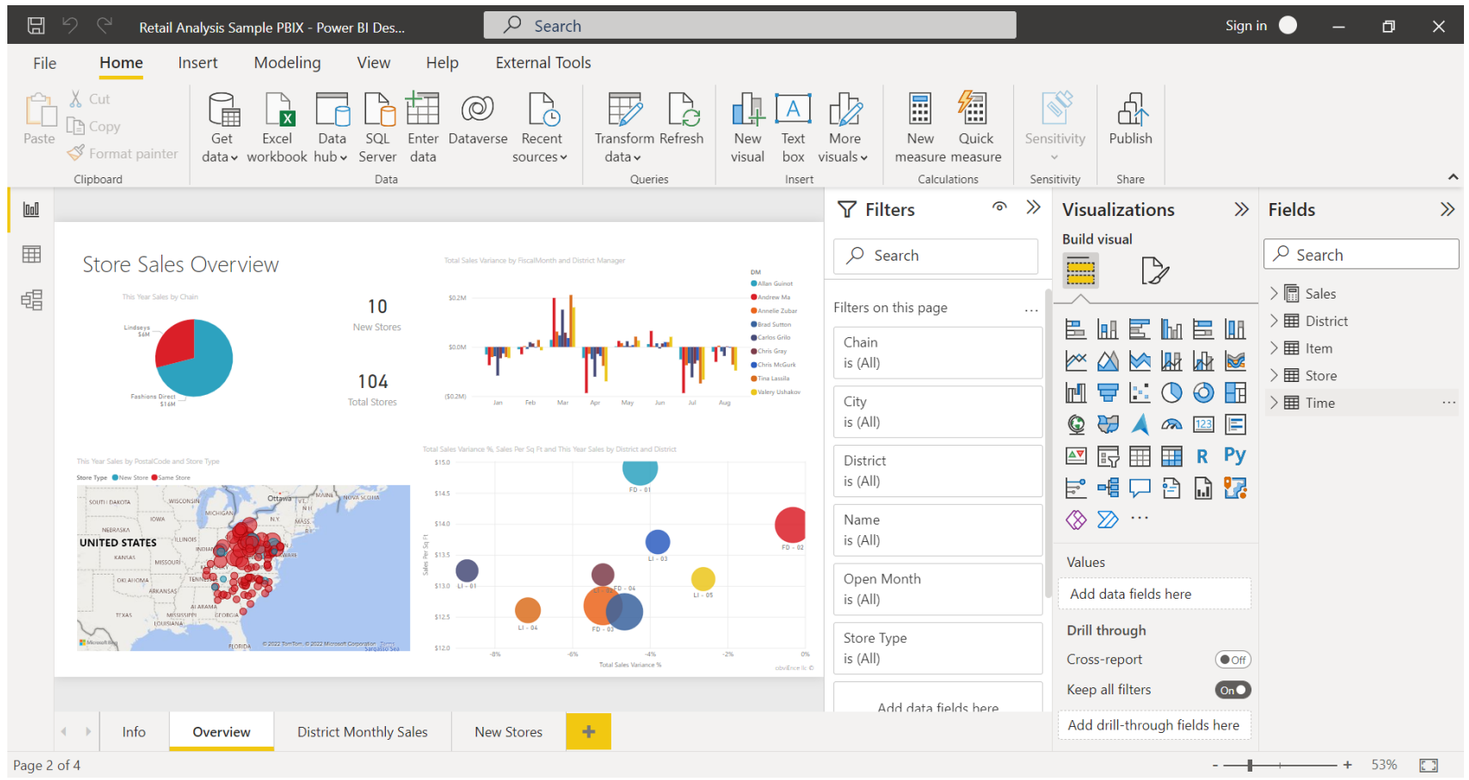
What is Power BI Desktop?

Power BI Desktop is a free application you install on your local computer that lets you connect to, transform, and visualize your data. With Power BI Desktop, you can connect to multiple different sources of data, and combine them (often called modeling) into a data model. This data model lets you build visuals, and collections of visuals you can share as reports, with other people inside your organization. Most users who work on business intelligence projects use Power BI Desktop to create reports, and then use the Power BI service to share their reports with others.



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What is Power BI Desktop?

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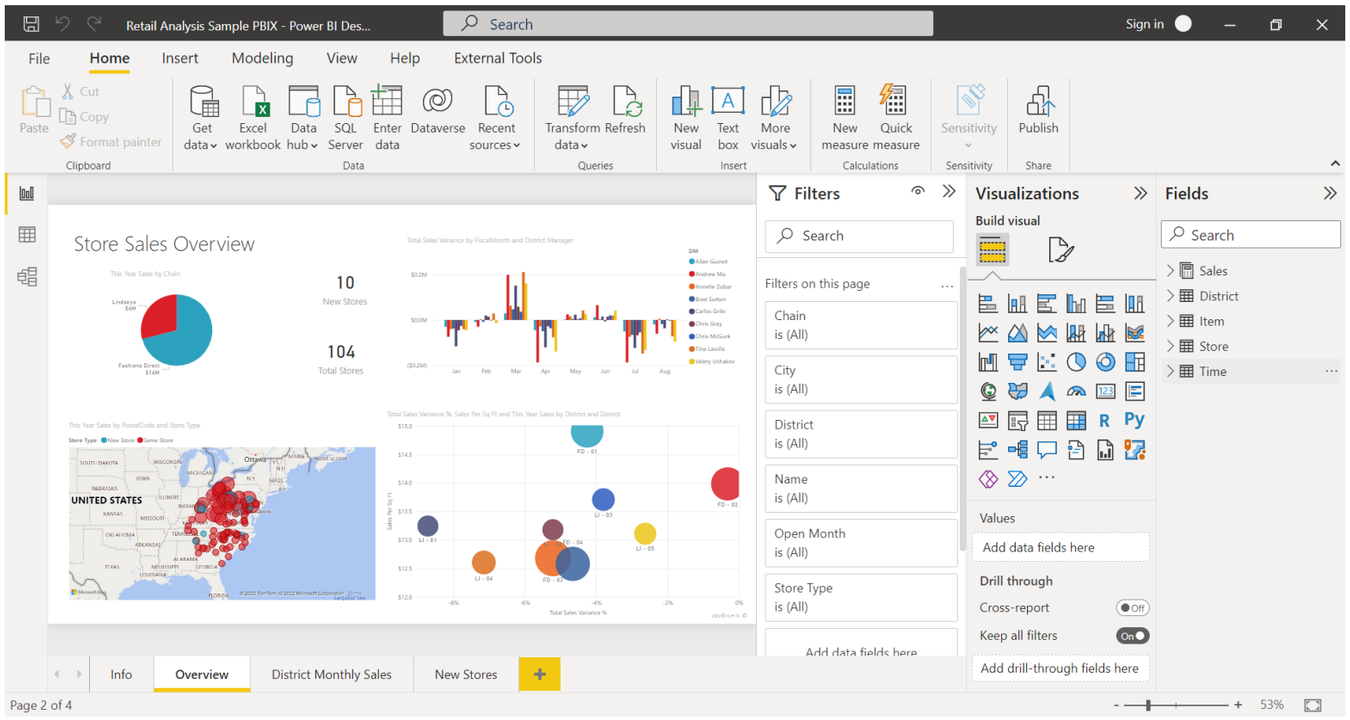
What is Business Intelligence?

Group Discussion:

What is the uses of Power BI Desktop?

Uses of Power BI Desktop

- Connect to data.
- Transform and clean data to create a data model.
- Create visuals, such as charts or graphs that provide visual representations of the data.
- Create reports that are collections of visuals on one or more report pages.
- Share reports with others by using the Power BI service



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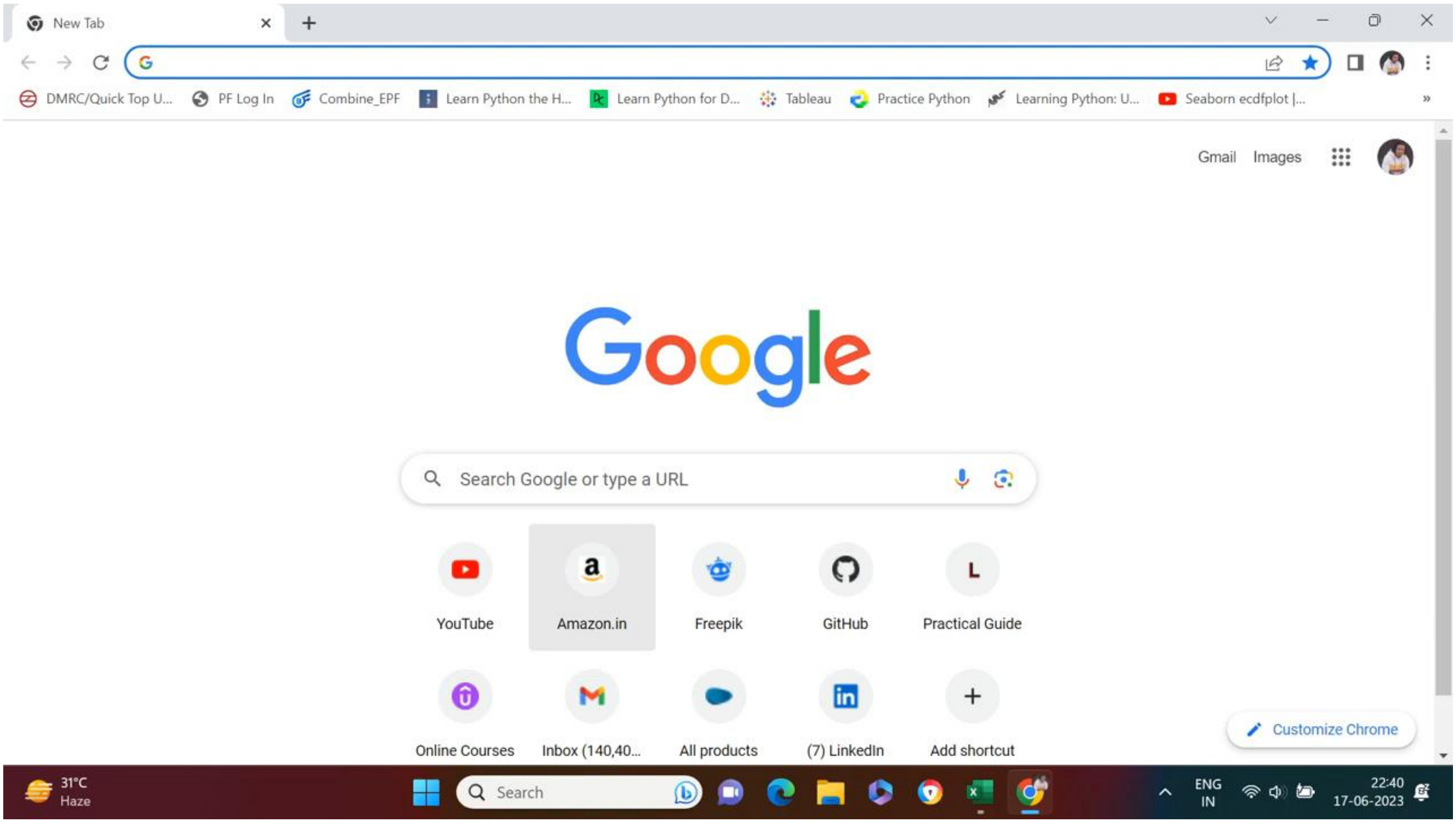
Power BI Desktop: Download & Install



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Power BI Desktop: Download & Install (Step-by-Step)

Step 1: Go to Google Engine

Step 2: Write (Download Power BI Desktop)

Step 3: Press (Free Download) or

Change (Language Options)

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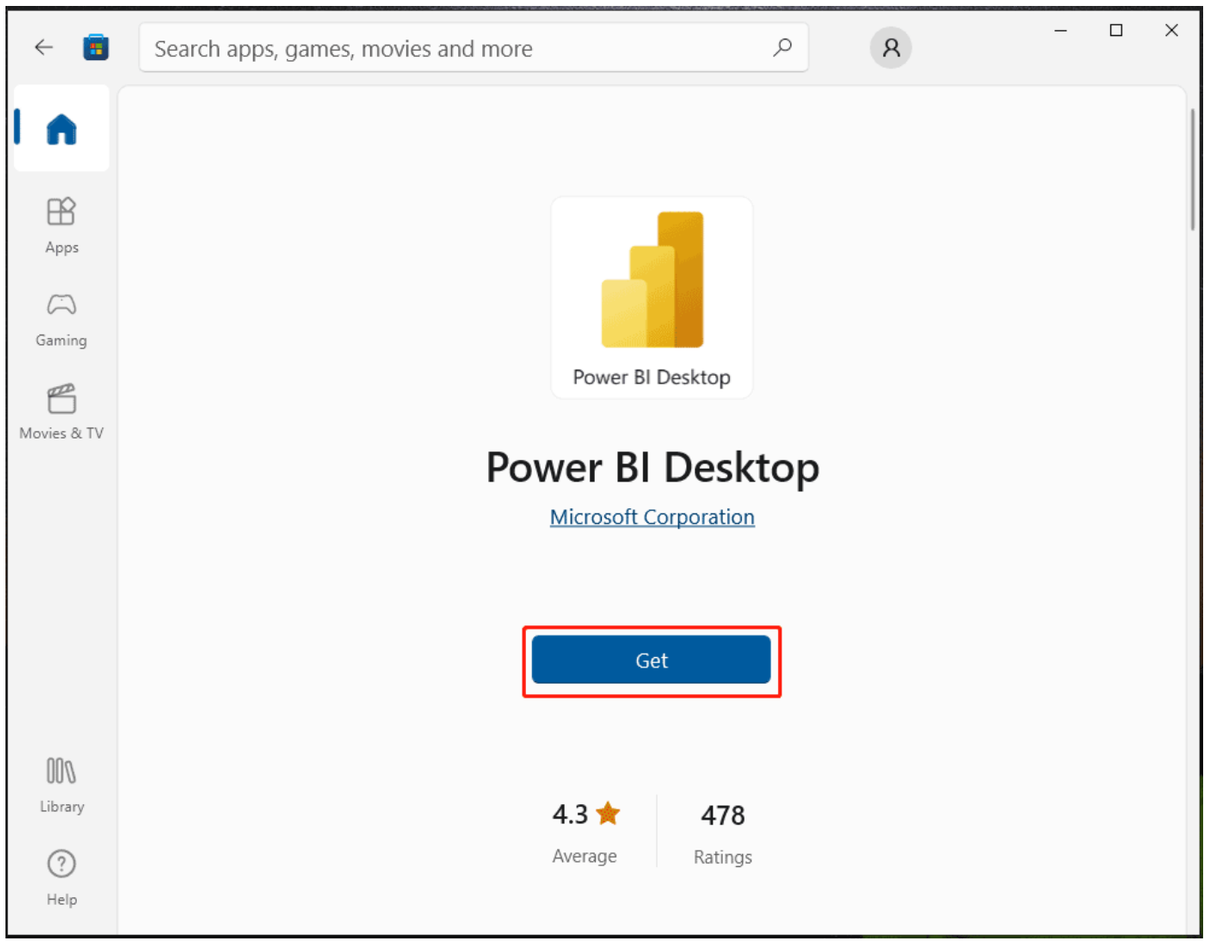
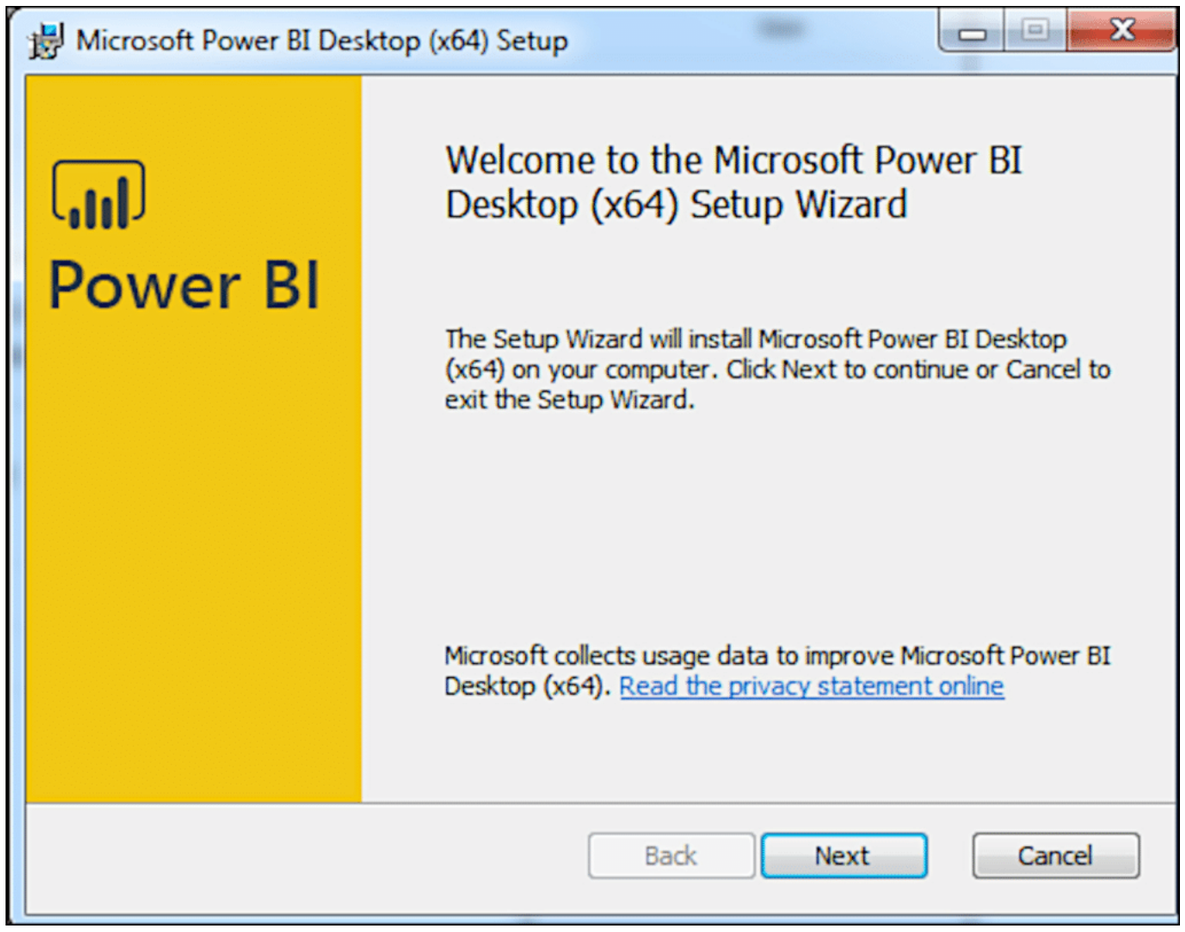
Power BI Desktop: Download & Install (Step-by-Step)

Step 4: Install from (Microsoft Store)
or App Setup





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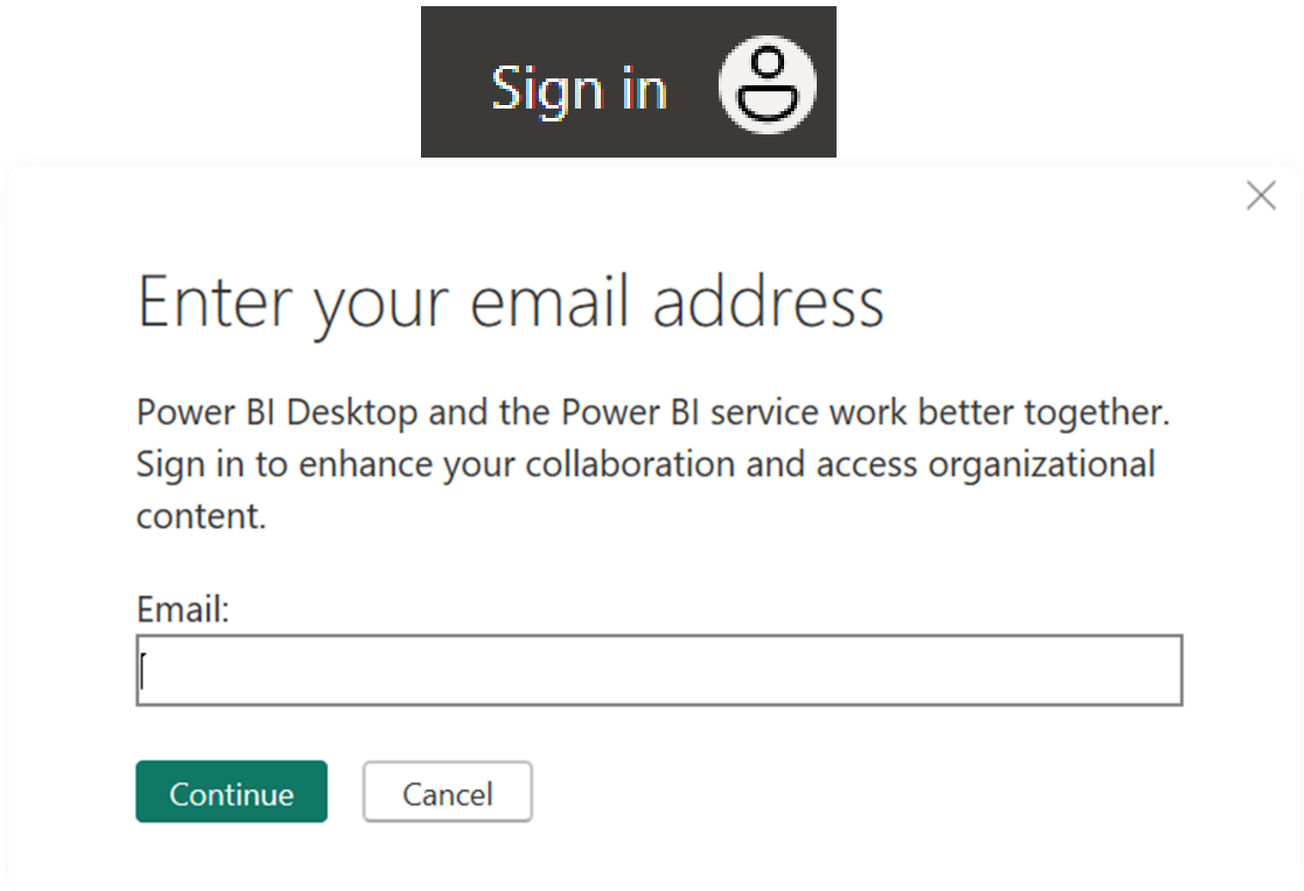
Power BI Desktop: Download & Install (Step-by-Step)

Step 5: Sign in into Power BI Desktop



Note: Needed Microsoft Account or Assigned with your organization

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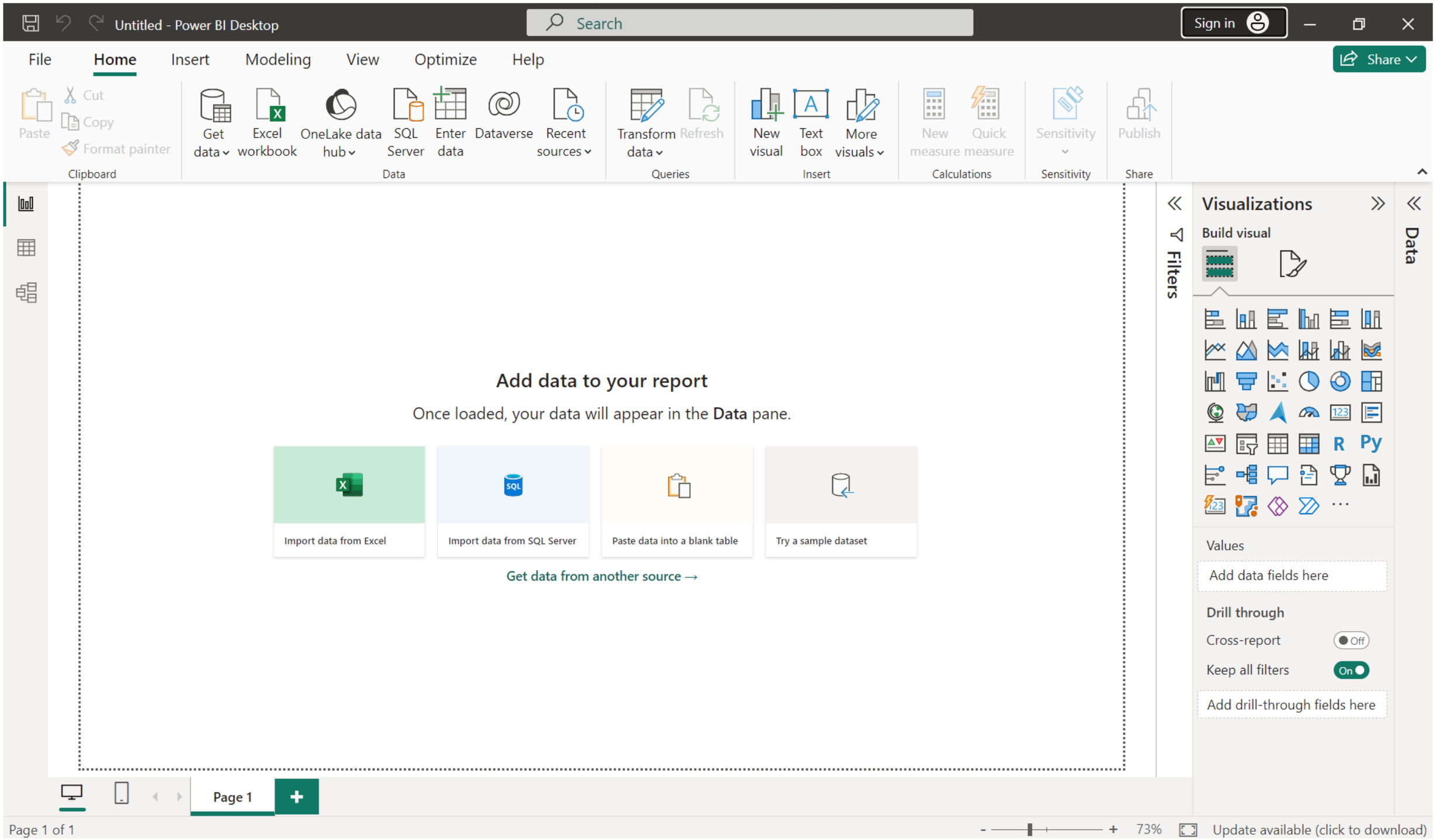
Power BI Desktop: Download & Install (Step-by-Step)



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What is Business Intelligence?

Group Discussion:

Power BI Desktop Navigation

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Power BI Desktop: Navigation

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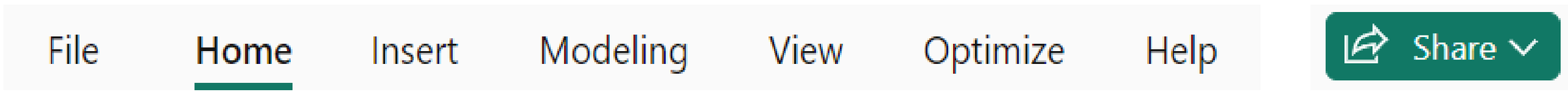
Power BI Desktop: Navigation (Step-by-Step)

Menu Bar



Menu Bar is a thin and horizontal bar containing essential functions including:

- **File Menu:** New, Open, Save, Save As, Share, Get Data, Import, Export
- **Home Menu:** Clipboard, Data Options, Queries, Insert Visual, etc.
- **Insert Menu:** Pages, Visuals, AI visuals, Elements, etc.
- **Modeling Menu:** Relationships, Calculations, Security, etc.
- **View Menu:** Themes, Scale to Fit, Mobile Layout, Show Panes, etc.
- **Optimize Menu:** can improve report authoring performance by pausing data source queries when adding or changing visuals on the Report
- **Help Menu:** to get hep
- **Share Option:** to share your report and manage permission

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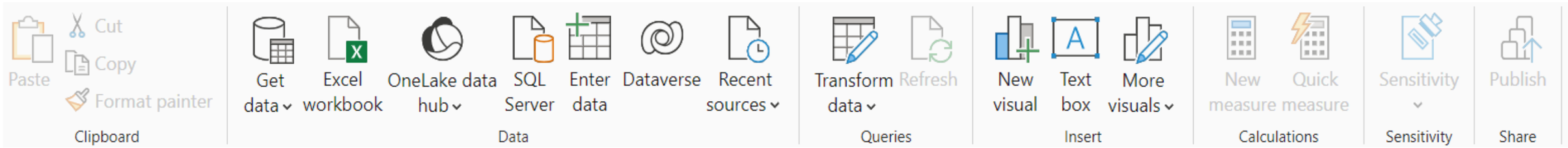
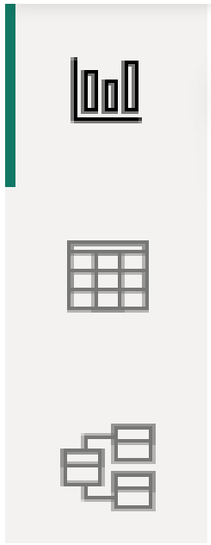
Power BI Desktop: Navigation (Step-by-Step)

Ribbon Bar



Ribbon Bar is a command bar that organizes a program's features into a series of tabs and also search bar.

View Bar



View Bar contains options for customizing the appearance of display. This options includes:

- Report View
- Table View
- Model View

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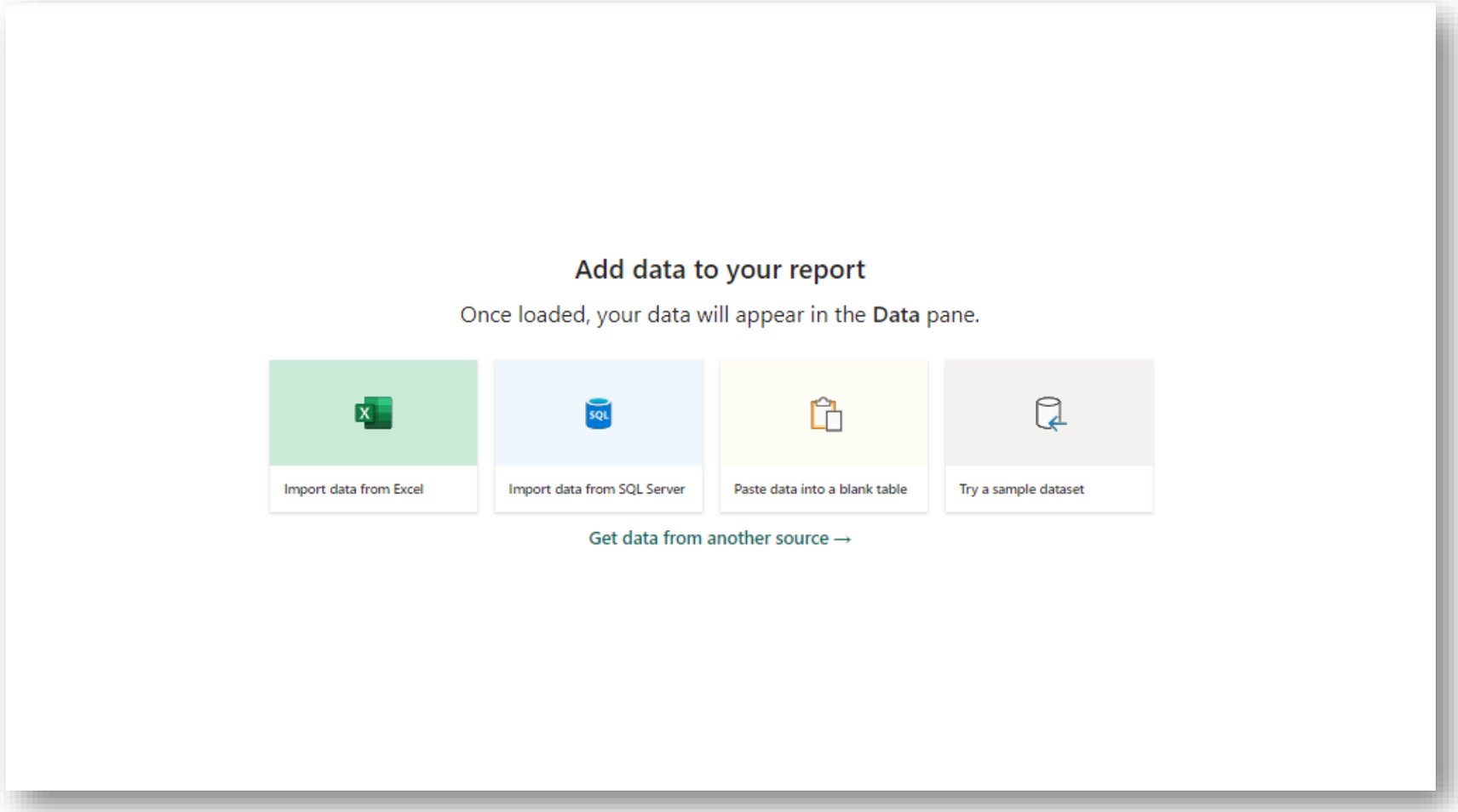
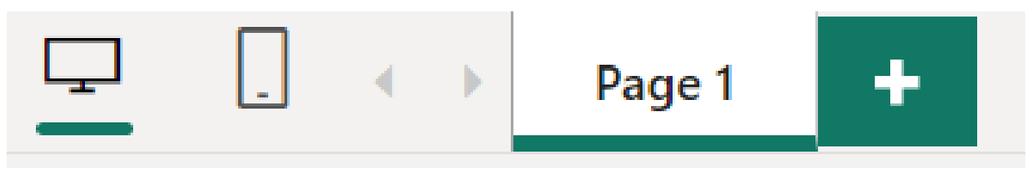
Power BI Desktop: Navigation (Step-by-Step)

Dashboard & Report Area



Layout View & Add new Dashboard



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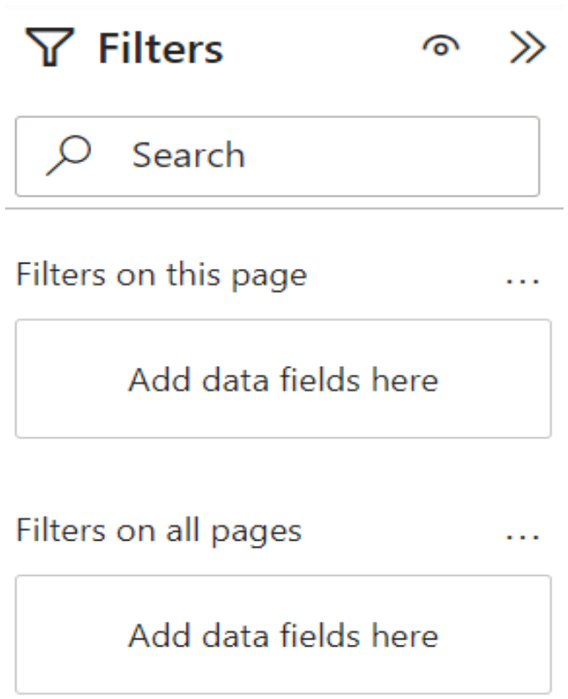
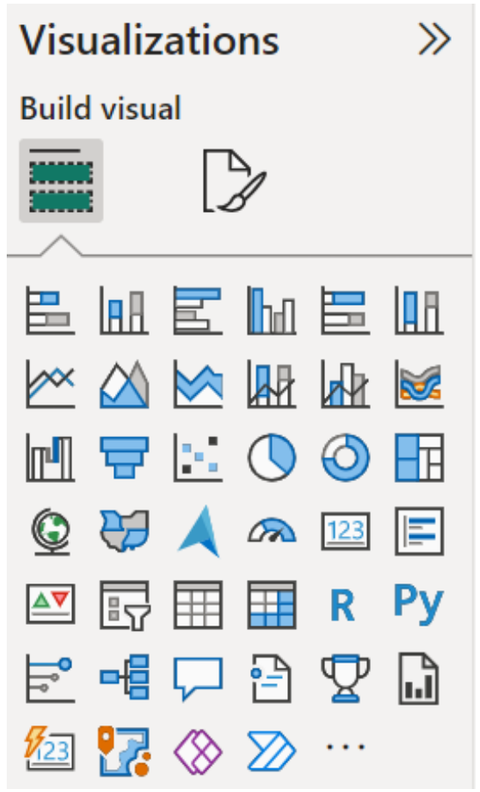
Power BI Desktop: Navigation (Step-by-Step)

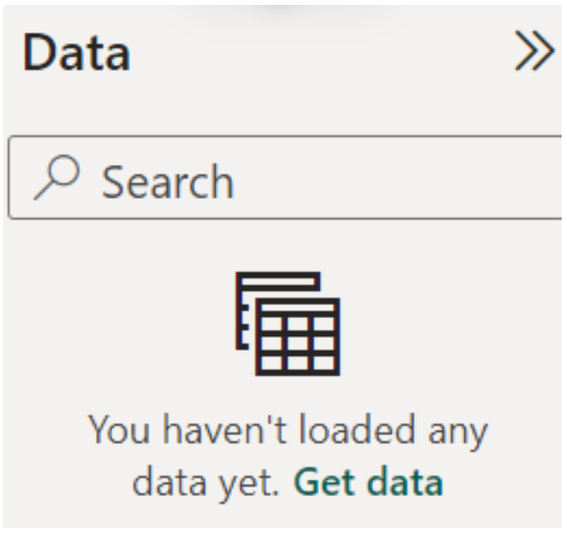
Filters Pane



Visualizations Pane



Data View



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What is Business Intelligence?

Group Discussion:

How to open new or existing project?

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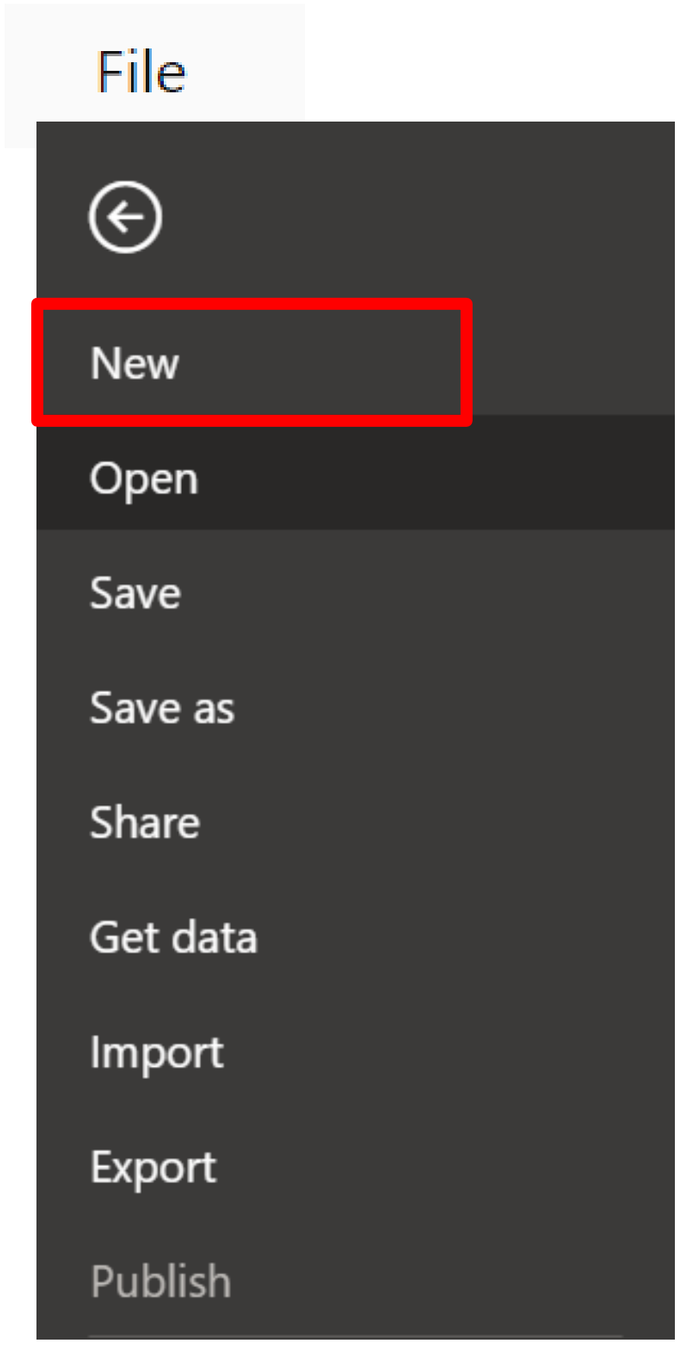
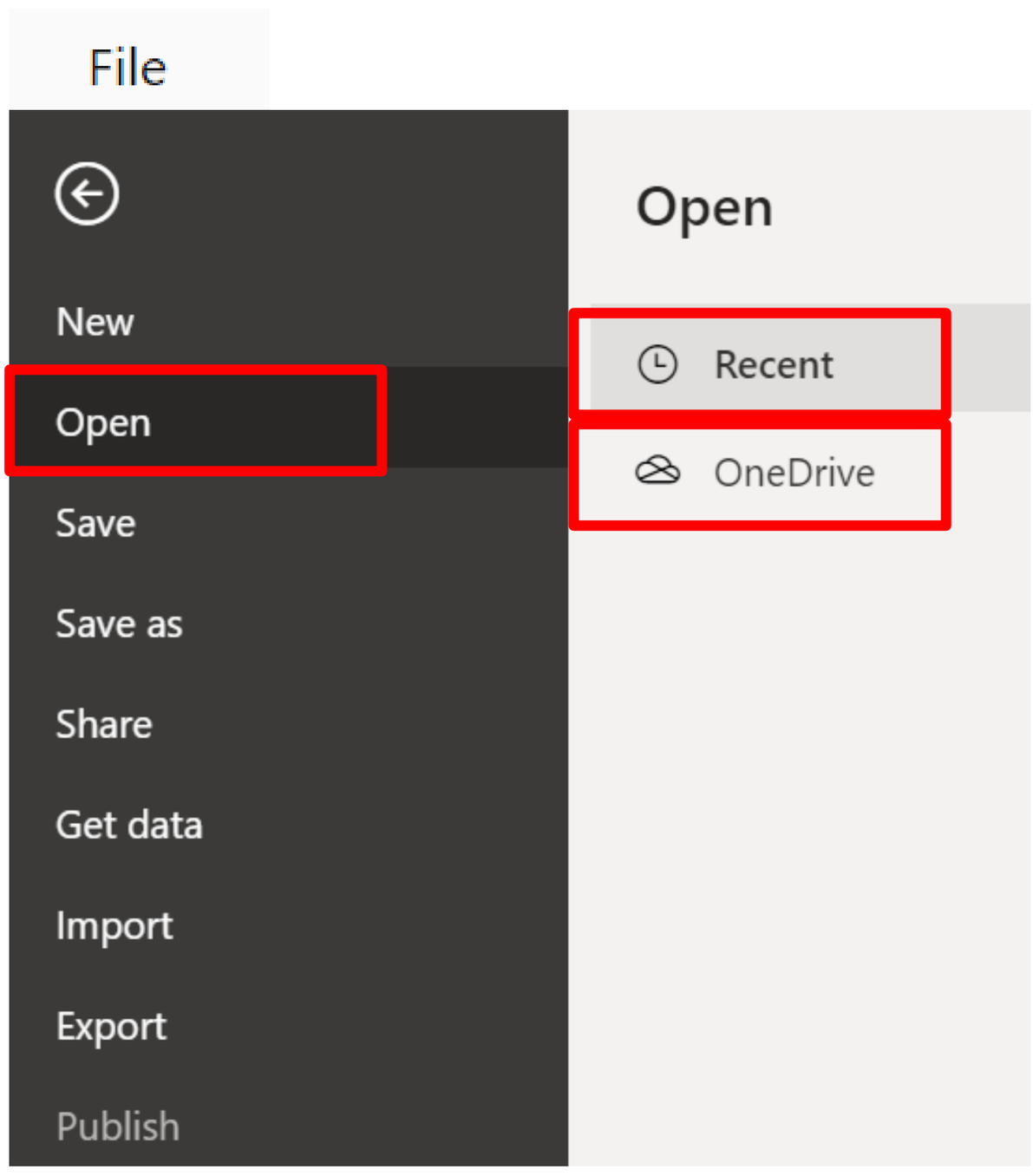
Power BI Desktop: Open New & Existing Project

Open New Project



Open Exist Project (Local + Cloud)



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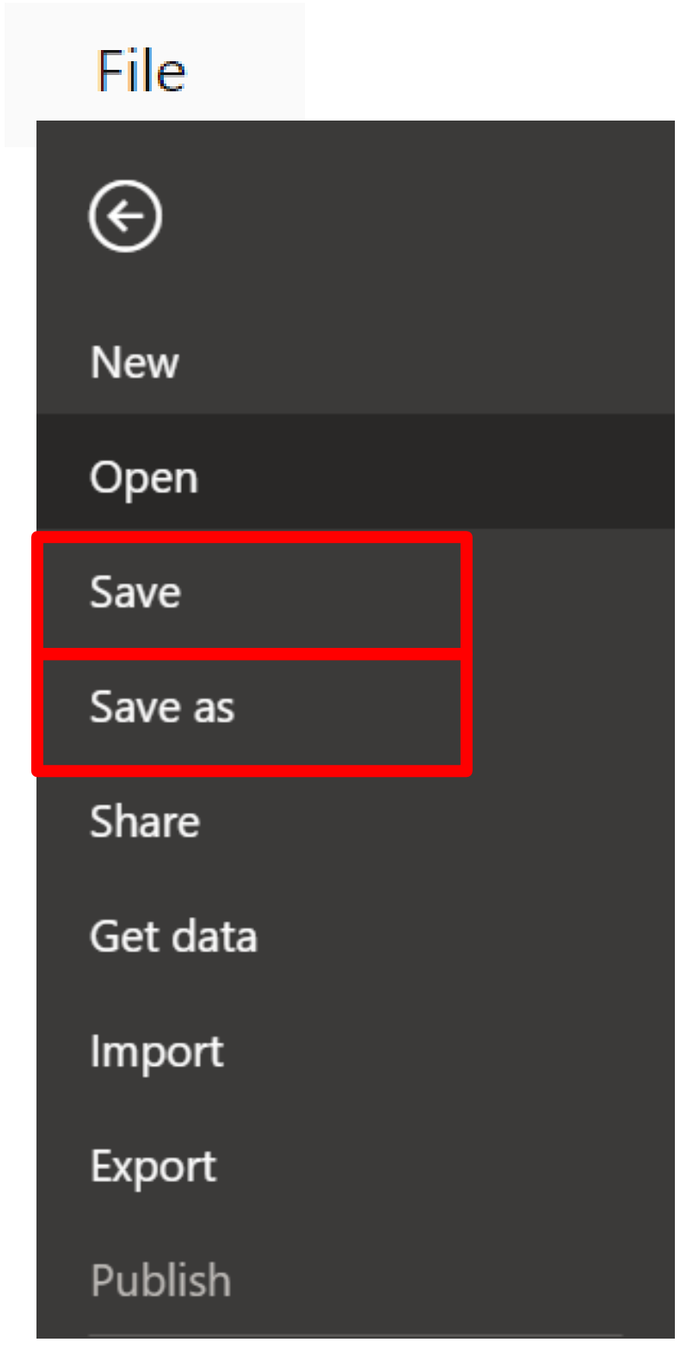
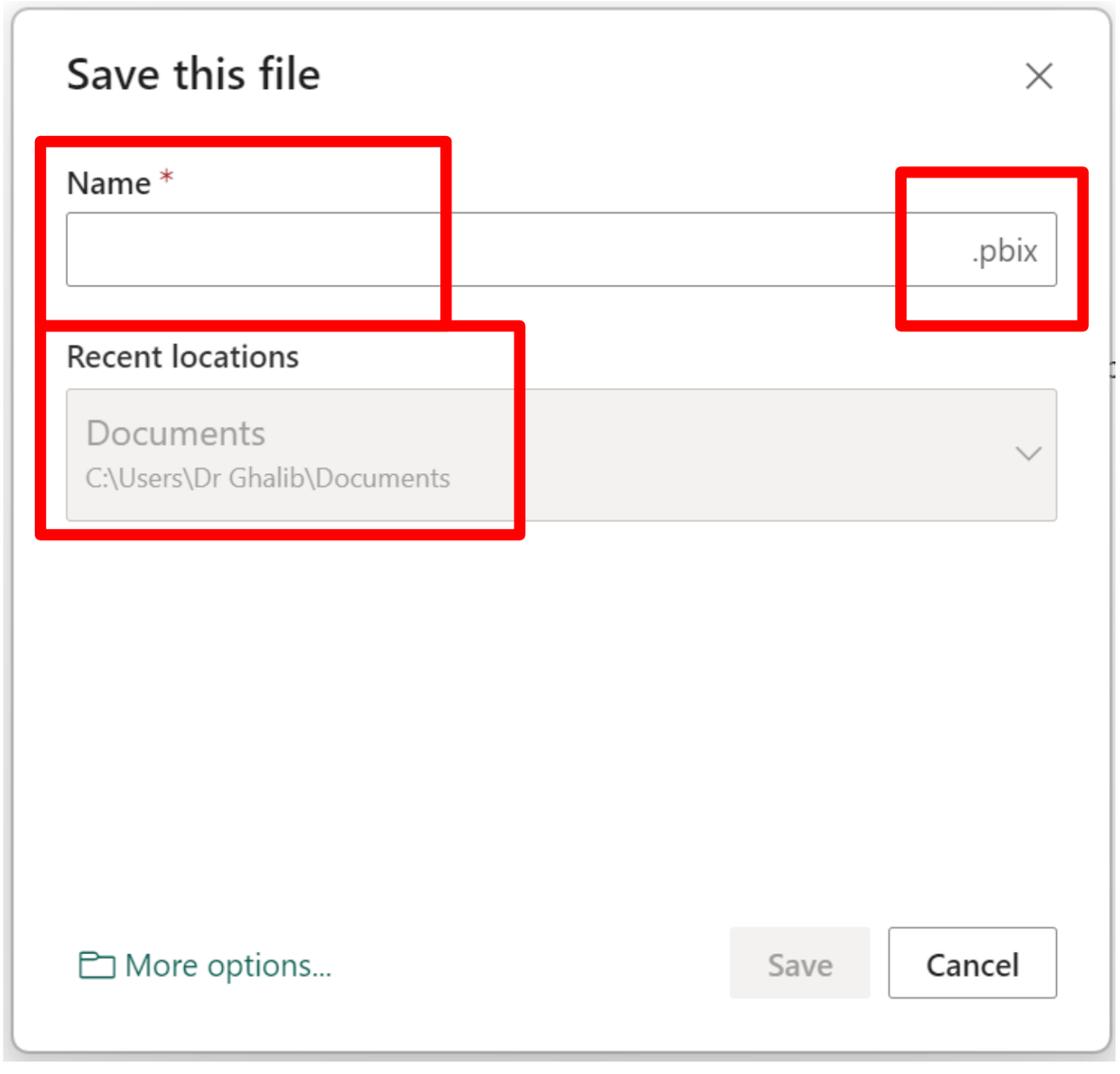
Power BI Desktop: Save New & Existing Project

Save New Project





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What is Business Intelligence?

Group Discussion:

How to share your project?

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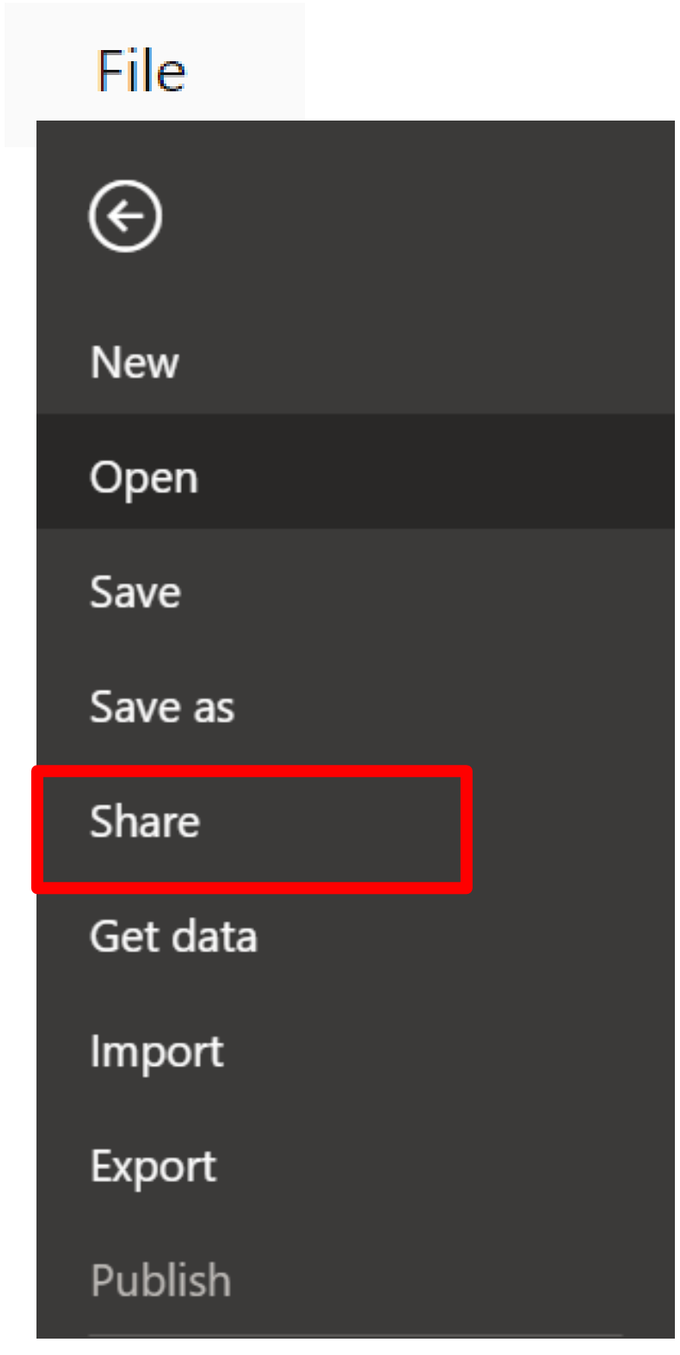
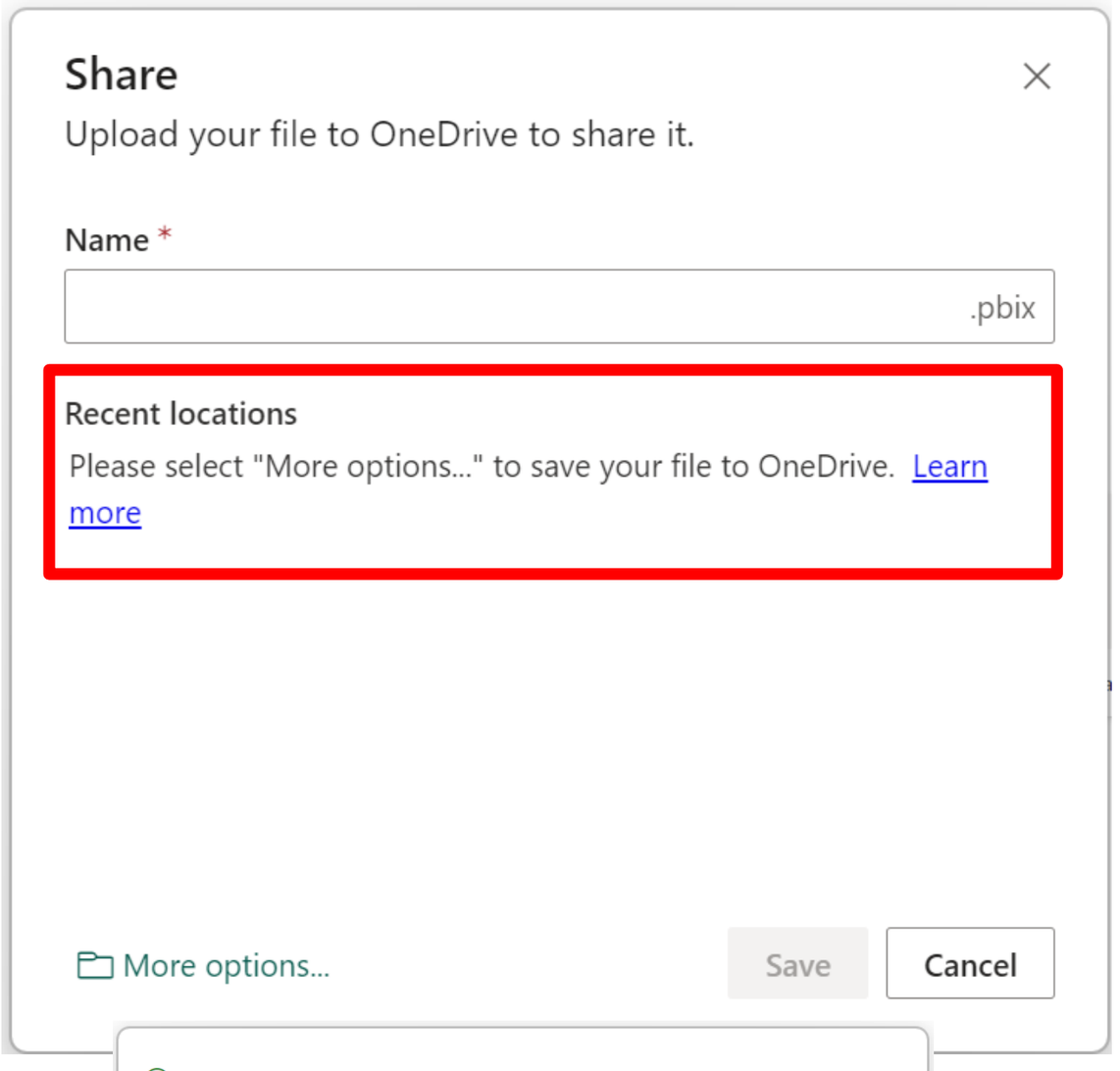
Power BI Desktop: Share Project

Import Option





Note: save project in cloud platform

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What is Business Intelligence?

Group Discussion:

How to import files?

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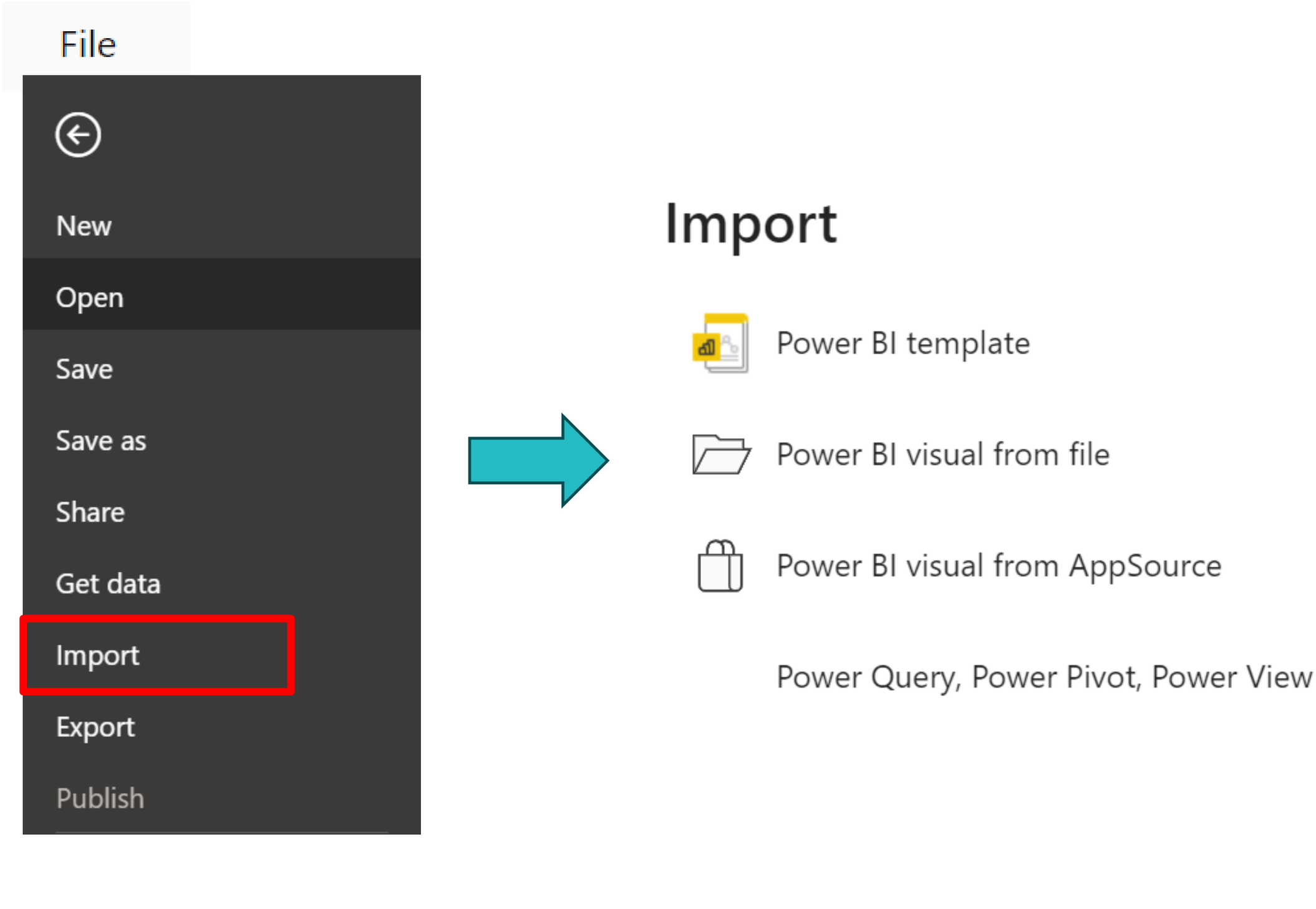
Power BI Desktop: Import Option

Import Option



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What is Business Intelligence?

Group Discussion:

How to export your project?

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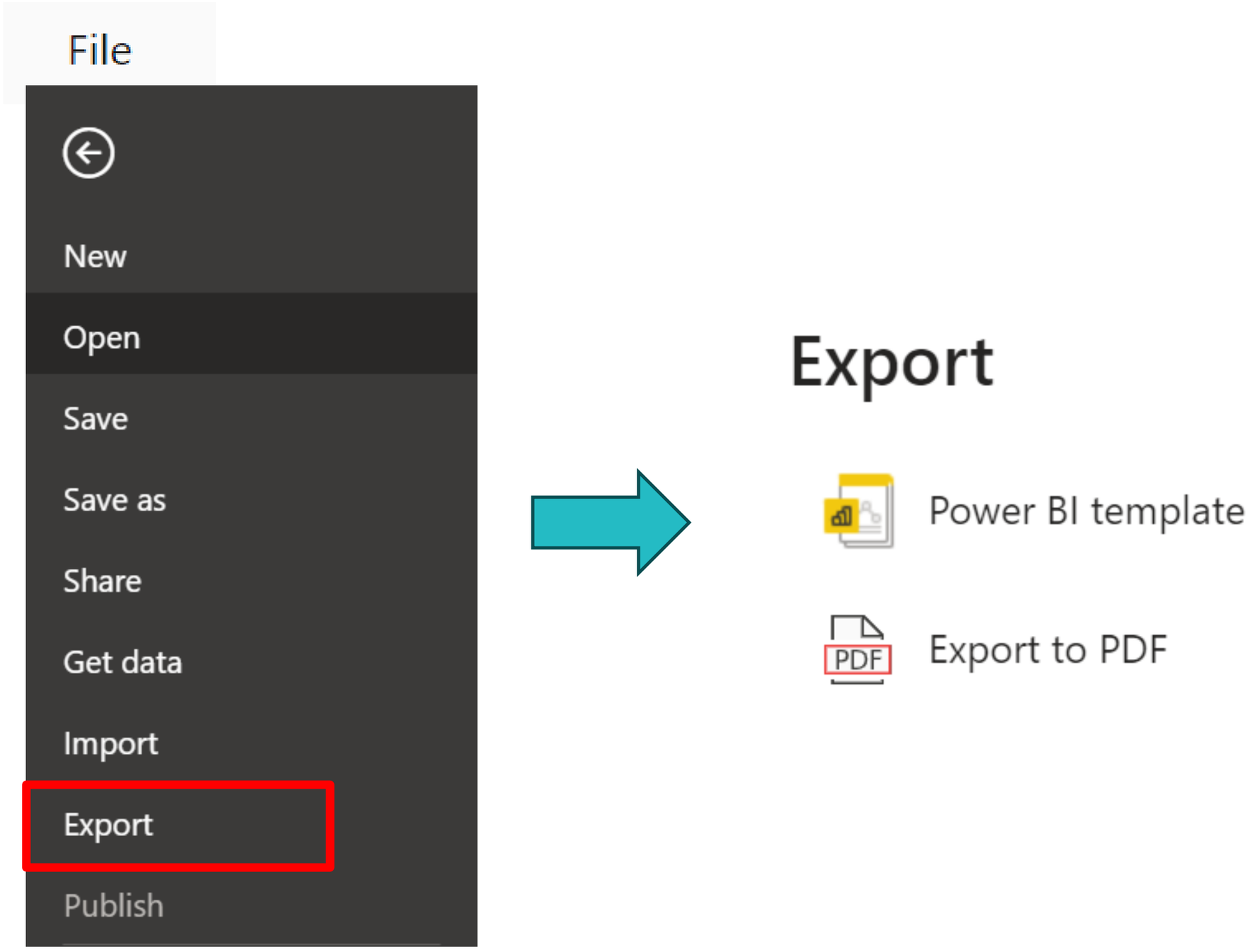
Power BI Desktop: Export Option

Export Option



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What is Business Intelligence?

Group Discussion:

How to view your project content?

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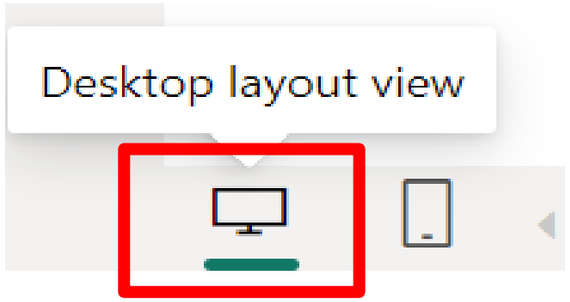
Power BI Desktop: Layout View



Add data to your report

Once loaded, your data will appear in the **Data** pane.

Import data from Excel

Import data from SQL Server

Paste data into a blank table

Try a sample dataset

Get data from another source →

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What is Business Intelligence?

Group Discussion:

How to open, delete or hide a report?

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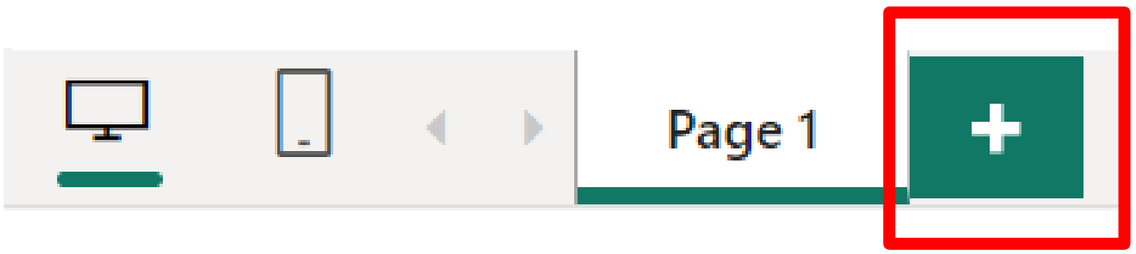
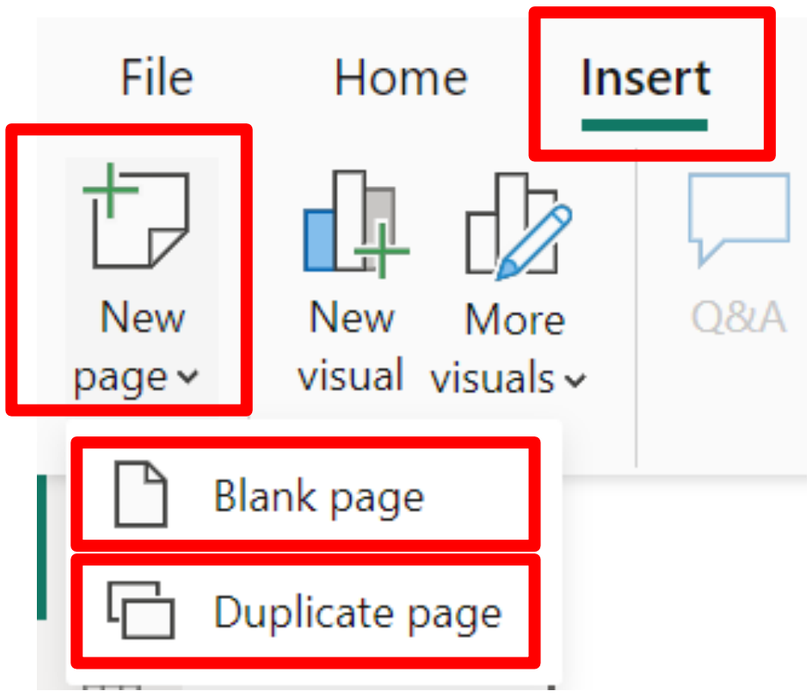
Power BI Desktop: Create page in your report

First Method: press “+” from the button bar



Second Method: From “Insert Menu”, choose “New Page”



Options:

- Blank Page
- Duplicate Page
- Rename Page
- Delete Page
- Hidden Page

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Power BI Desktop: Importance of Tables in Power BI

Tables are the **backbone of any data analysis project** in Power BI. They represent a collection of related data that we can use to create visualizations, calculate metrics, and perform complex data transformations.

Without using tables, we would be **unable to analyze data** in a **meaningful way**. Instead, we would be limited to viewing raw data in its unstructured form. Tables therefore play a critical role in data analysis and are the foundation of any Power BI project.

One of the key benefits of using tables in Power BI is that they allow us to **easily filter** and **sort data**. This means that we can **quickly identify trends** and **patterns in our data**, and **make informed decisions based on these insights**. Additionally, tables can be linked together **using relationships**, which enables us to **combine data from multiple sources** and **create more complex visualizations.**

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What is Business Intelligence?

Group Discussion:

How to create a Table from scratch?

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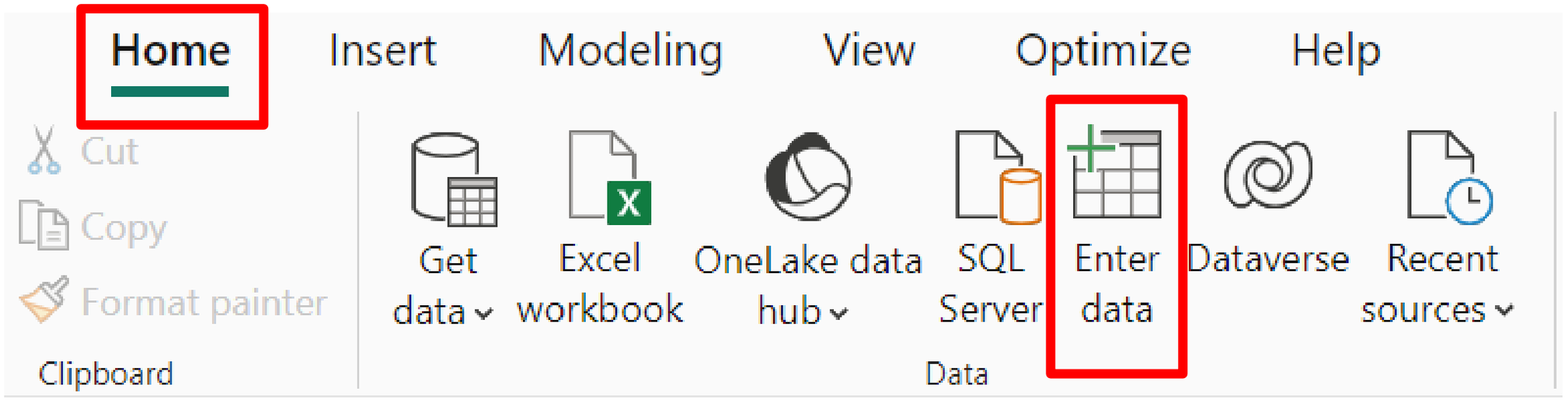
Power BI Desktop: Create a Table from Scratch

To create a new table from scratch instead of connecting to an existing data source. This can be done by using the “Enter Data” feature in Power BI as following:

1. **Go to the Home tab & select “Enter Data”**
2. **Define the columns**
3. **Enter your data in cells provided**
4. **Click “Load” to Save your new table**



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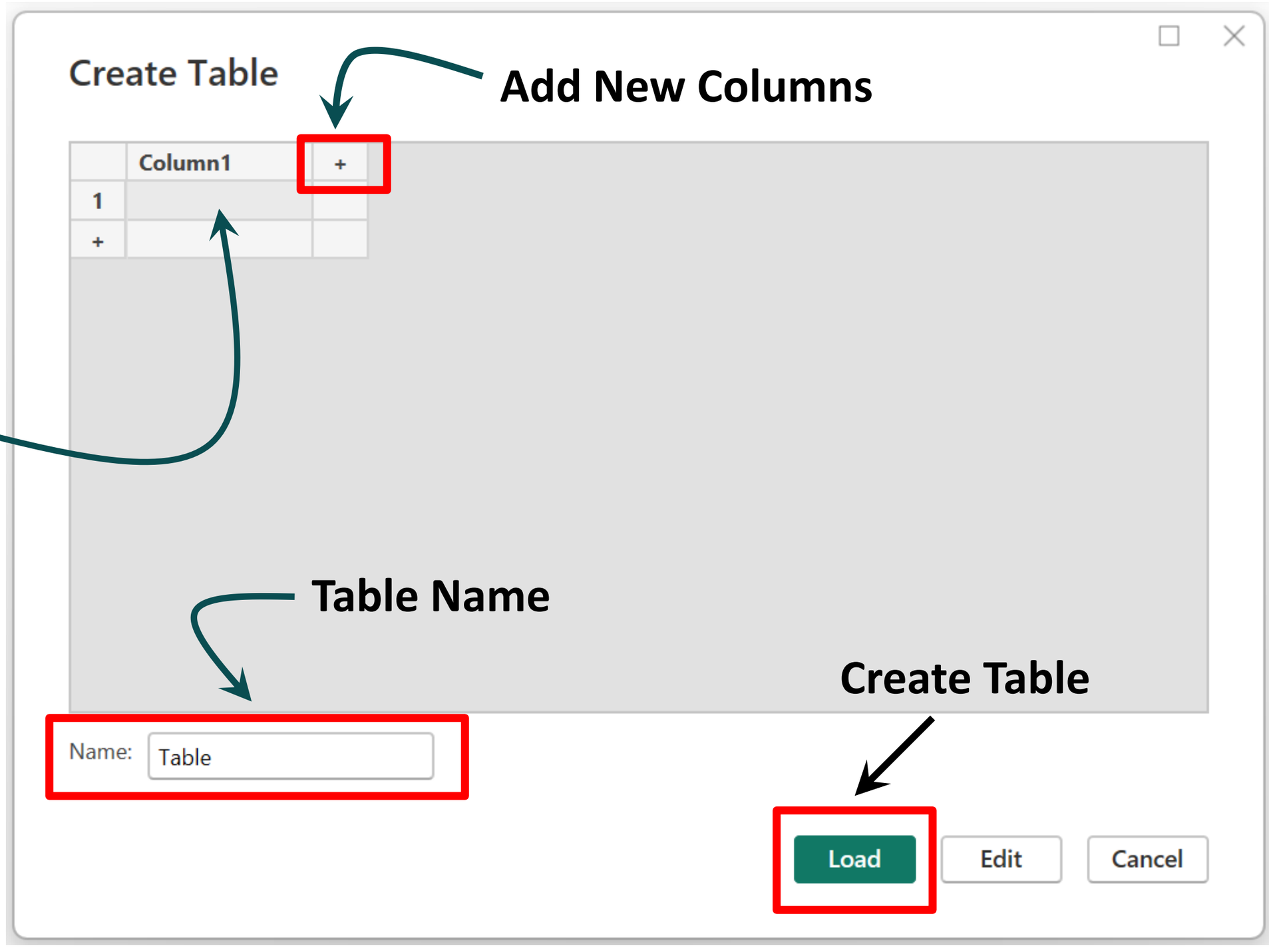
Power BI Desktop: Create a Table from Scratch



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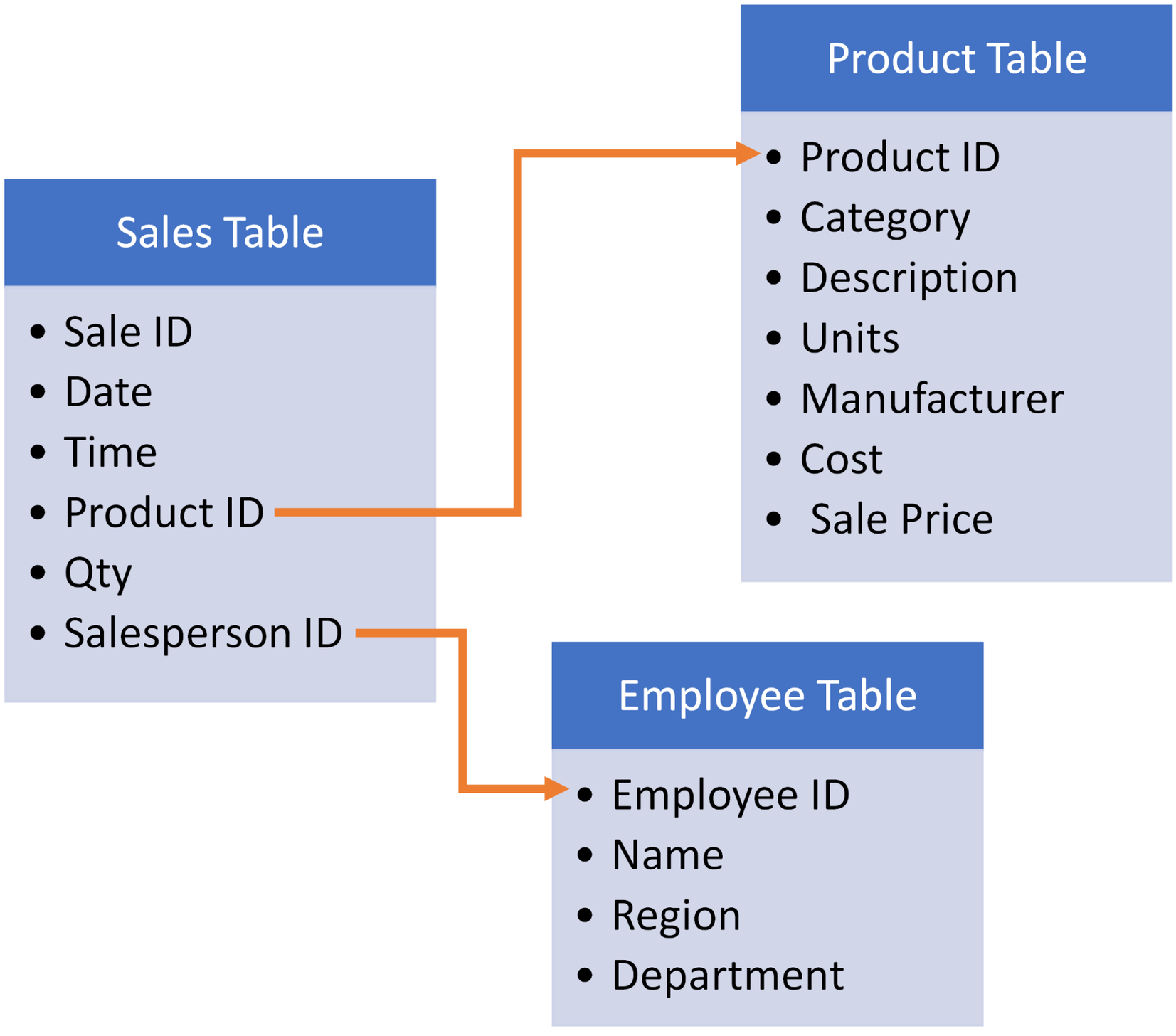
Power BI Desktop: ER Diagram & Relationship



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Power BI Desktop: ER Diagram & Relationship

Create Table

	Employee ID	Name	Region	Department	+
1	12345	Ghalib	Riyadh	HR	
2	23456	Mohammed	Jeddah	HelpDesk	
3	34567	Ali	Riyadh	IT	
4	45678	Salam	Dammam	HR	
5	56789	Abdullah	Dammam	Sales	
6	67890	Tariq	Riyadh	Sales	
7	13456	Khaled	Jeddah	Sales	
8	14567	Bader	Jeddah	IT	
9	15678	Tariq	Dammam	IT	
10	16789	Turky	Riyadh	HelpDesk	
+					

Name: Employee Table

Load Edit Cancel

Employee Table

- Employee ID
- Name
- Region
- Department

Ghalib Alshammri, PhD

Power BI Desktop: ER Diagram & Relationship

Create Table

	Product ID	Category	Description	Units	Manufacturer	Cost	Sale Price
1	001	Iphone 15	Mobile Phone	10	Apple	3500	3550
2	002	S3	Mobile Phone	15	Samsung	4500	4599
3	003	8100 Max	Mobile Phone	7	OPPO	2100	2170
4	004	Mi 12	Mobile Phone	13	Xiaomi	1350	1370
5	005	One Plus	Mobile Phone	10	Nokia	2150	2198
6	006	Nova 11	Mobile Phone	25	Huawei	1249	1299
+							

Name: Product Table

Load | Edit | Cancel

Product Table

- Product ID
- Category
- Description
- Units
- Manufacturer
- Cost
- Sale Price

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Power BI Desktop: ER Diagram & Relationship

Create Table

	Sale ID	Date	Time	Product ID	Qty	Salesperson ID	+
1	1001	12/3/2023	9:30 AM	002	2	56789	
2	1002	3/6/2023	10:10 AM	004	3	13456	
3	1003	23/5/2023	1:23 PM	001	1	67890	
4	1004	7/5/2023	2:23 PM	005	2	56789	
5	1005	16/6/2023	11:05 AM	001	3	13456	
6	1006	19/5/2023	11:45 AM	002	3	56789	
+							

Name: Sales Table

Load | Edit | Cancel

Sales Table

- Sale ID
- Date
- Time
- Product ID
- Qty
- Salesperson ID

Ghalib Alshammri, PhD

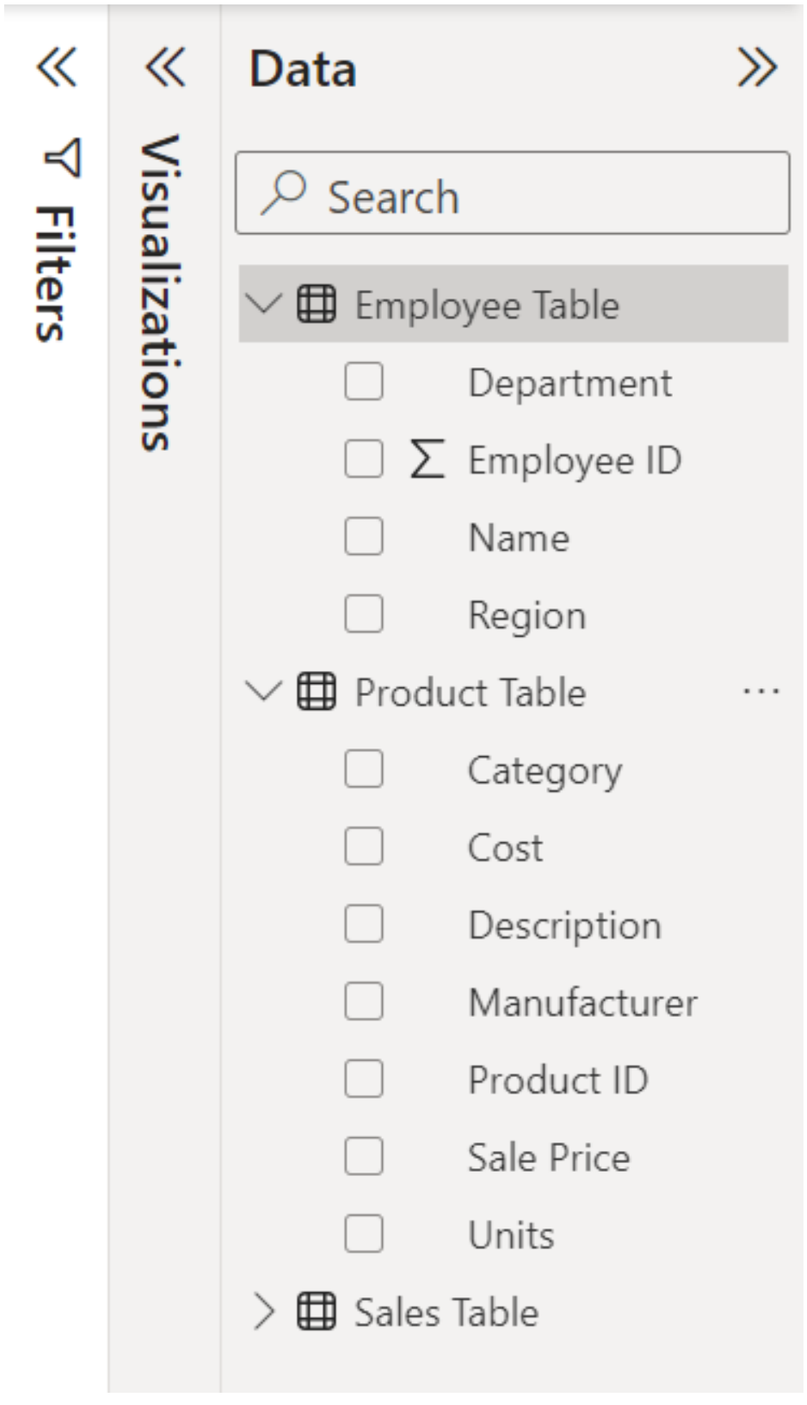
What is Business Intelligence?

Group Discussion:

How to view your data via Power Query?

Ghalib Alshammri, PhD

Power BI Desktop: Data View



Employee ID	Name	Region	Department
12345	Ghalib	Riyadh	HR
23456	Mohammed	Jeddah	HelpDesk
34567	Ali	Riyadh	IT
45678	Salam	Dammam	HR
56789	Abdullah	Dammam	Sales
67890	Tariq	Riyadh	Sales
13456	Khaled	Jeddah	Sales
14567	Bader	Jeddah	IT
15678	Tariq	Dammam	IT
16789	Turky	Riyadh	HelpDesk

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Power BI Desktop: Power Query

To manipulate data, open Power Query as following:

1. **Go to the Home tab & select “Queries” group**
2. **Select “Transform data”**
3. **Power Query is opened**

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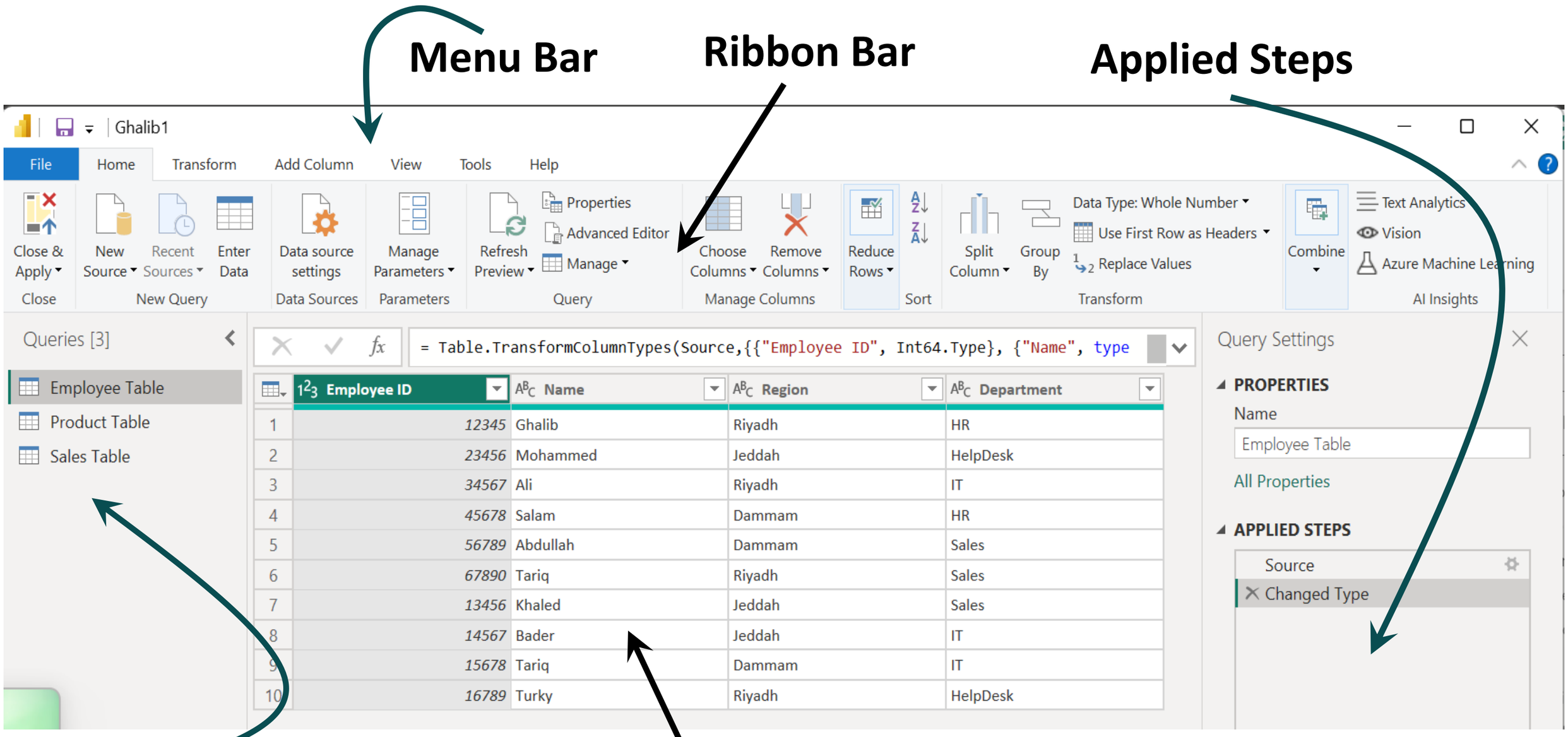
Power BI Desktop: Power Query



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What is Business Intelligence?

Group Discussion:

How to edit Fields in Table?

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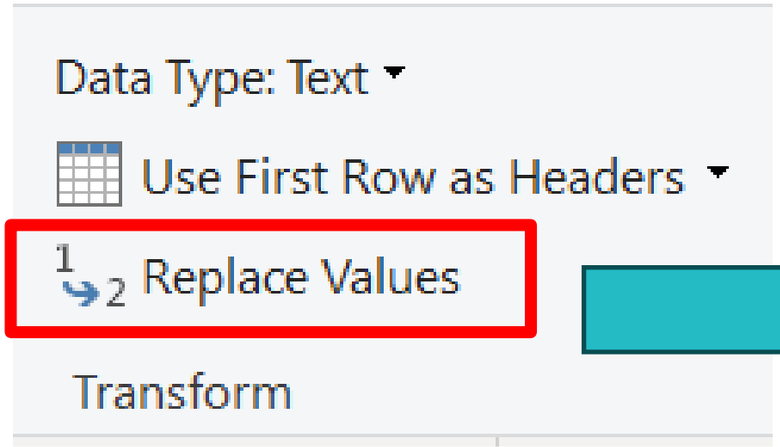
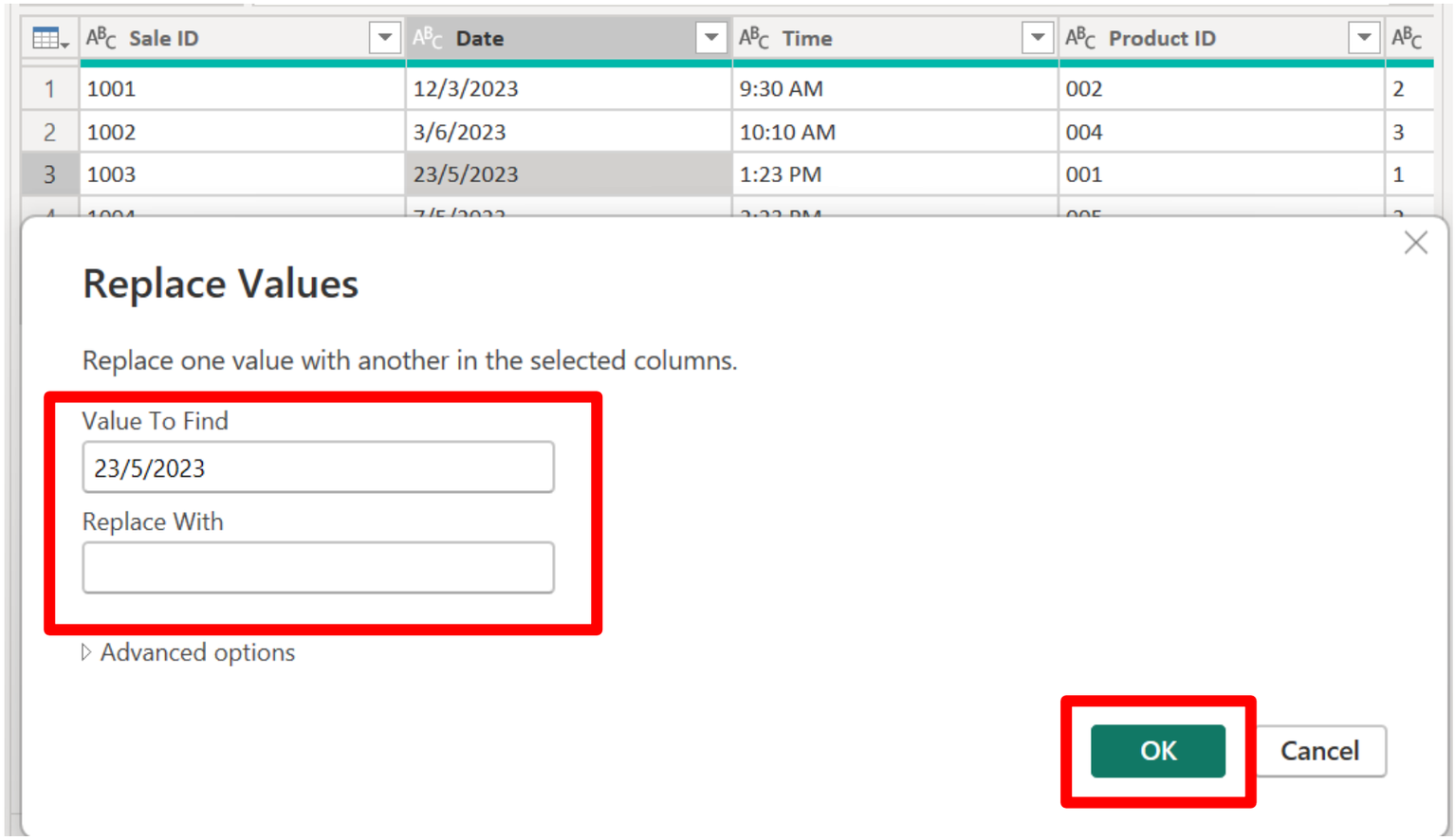
Power BI Desktop: Edit Data

To edit data, open Power Query as following:

1. **Select a specific field**
2. **Go to the Home tab & select “Transform” group**
3. **Select “Replace Values”**





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What is Business Intelligence?

Group Discussion:

How to change data type for specific attribute?

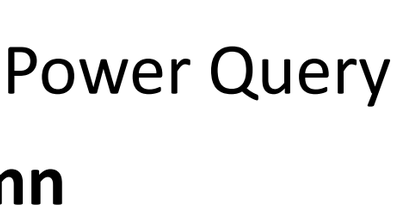
Ghalib Alshammri, PhD

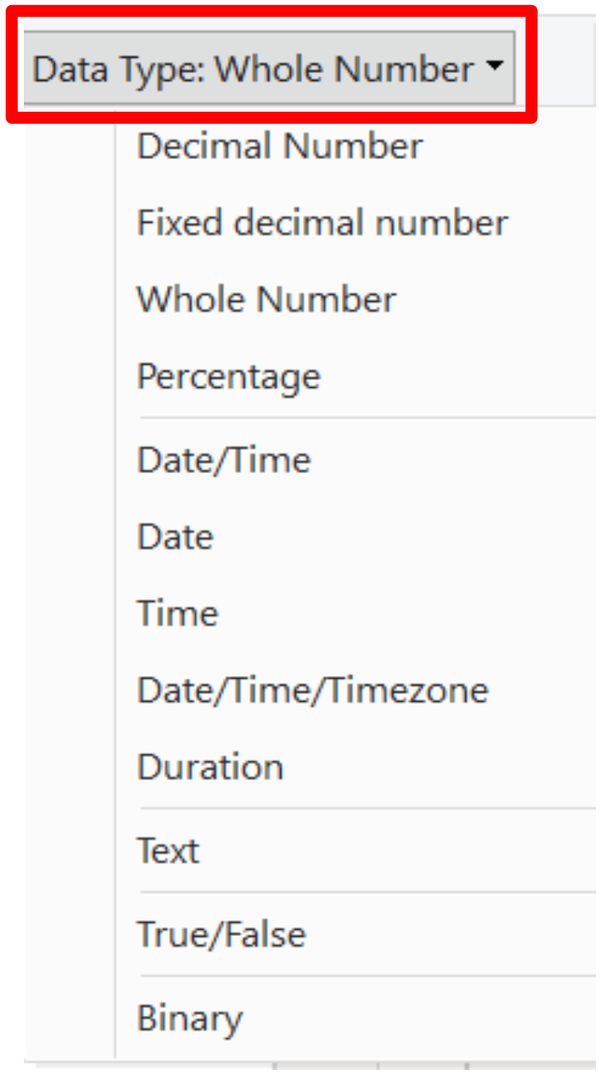
Power BI Desktop: Convert Data (Data Type)

To convert data type, open Power Query as following:

1. **Select a specific column**
2. **Go to the Home tab & select “Transform” group**
3. **Select “Data Type”**

	1²3 Employee ID
1	12345
2	23456
3	34567
4	45678
5	56789
6	67890
7	13456
8	14567
9	15678
10	16789

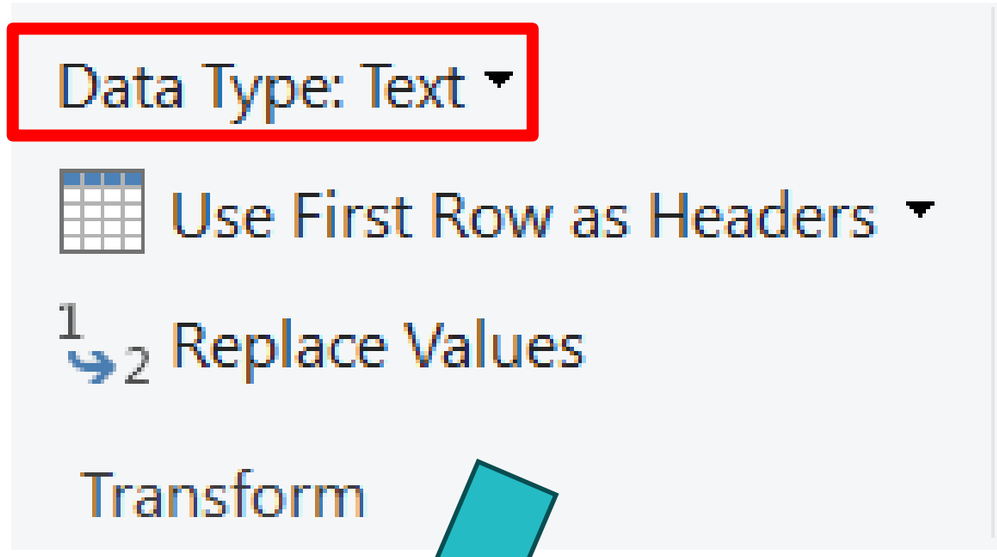




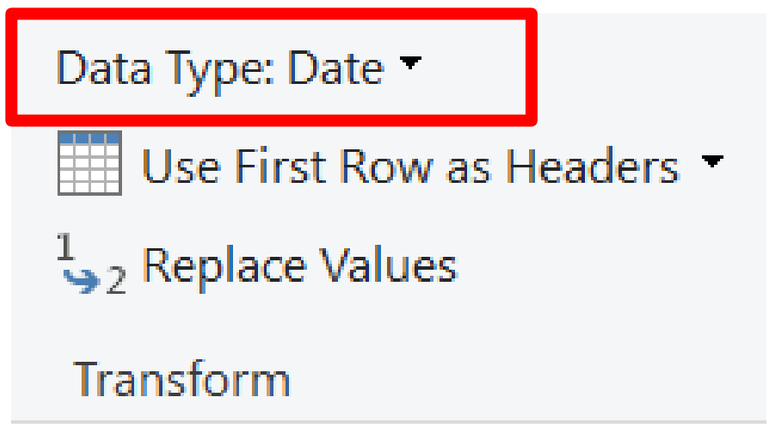
Ghalib Alshammri, PhD

Power BI Desktop: Convert Data (Data Type)

Date
12/3/2023
3/6/2023
23/5/2023
7/5/2023
16/6/2023
19/5/2023



Date
12/3/2023
3/6/2023
5/23/2023
7/5/2023
6/16/2023
5/19/2023



Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

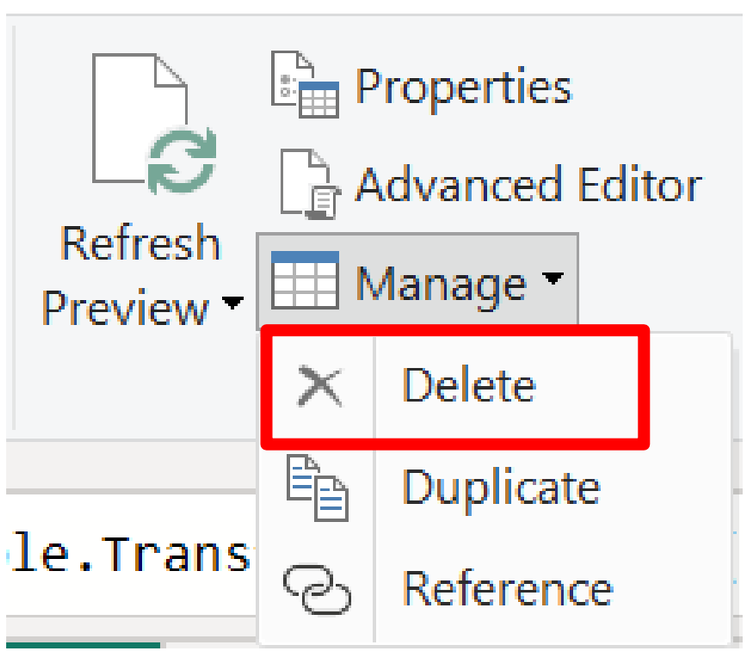
How to delete Table?

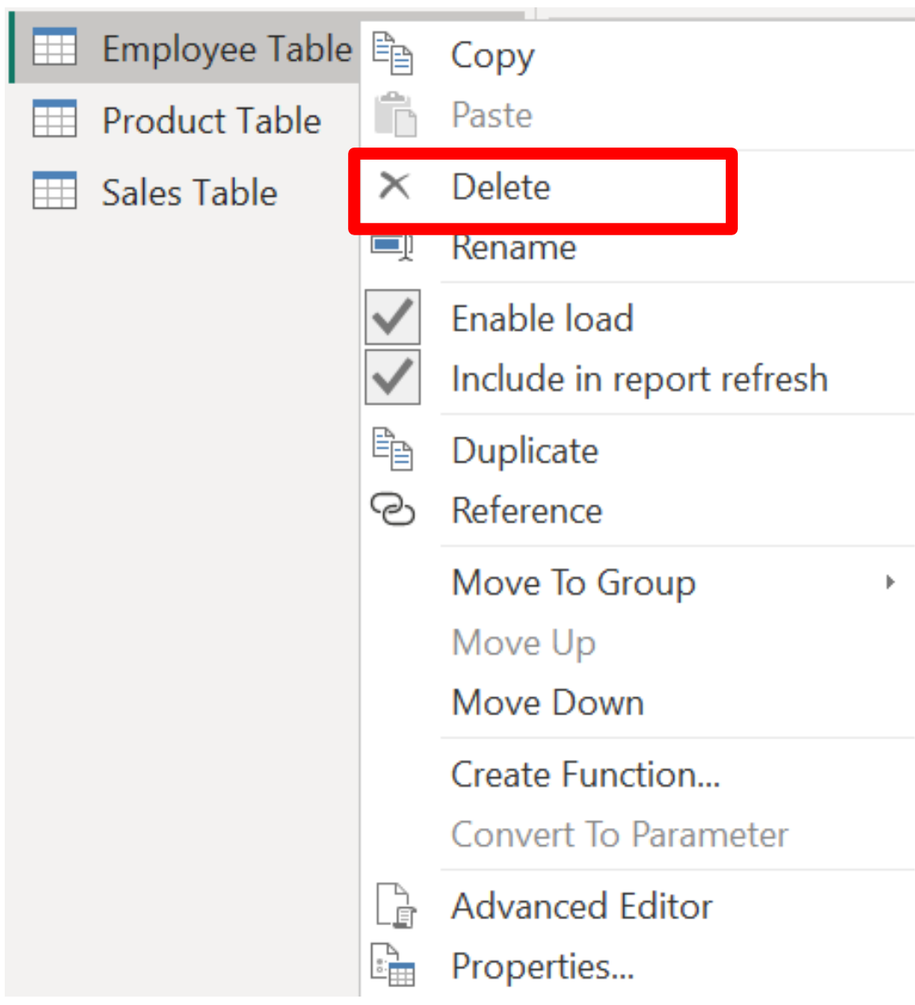
Ghalib Alshammri, PhD

Power BI Desktop: Delete Table

To delete table in Power Query as following:

1. **Go to the Home tab & select “Query” group**
2. **Select “Manger”, and choose “Delete”**
3. **Or right-click on Table Name in Queries workplace, select “Delete”**





Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

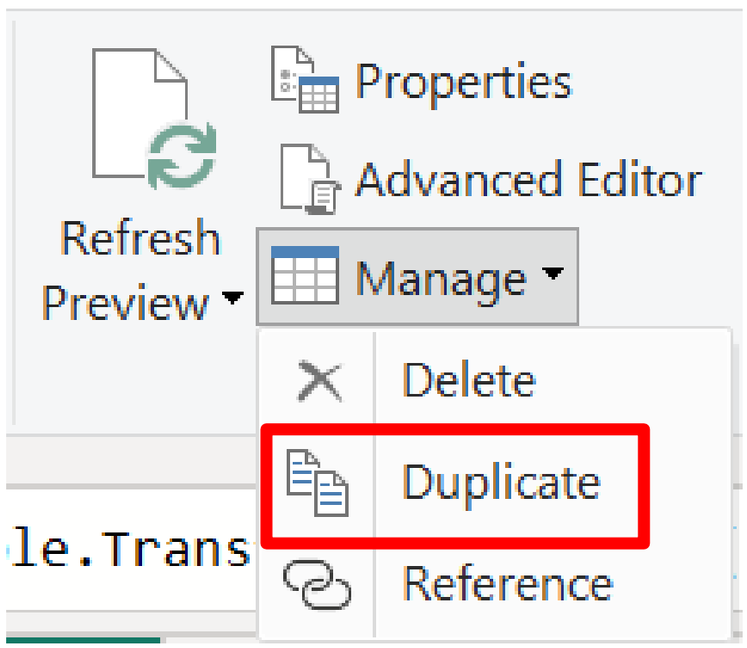
How to duplicate a specific Table?

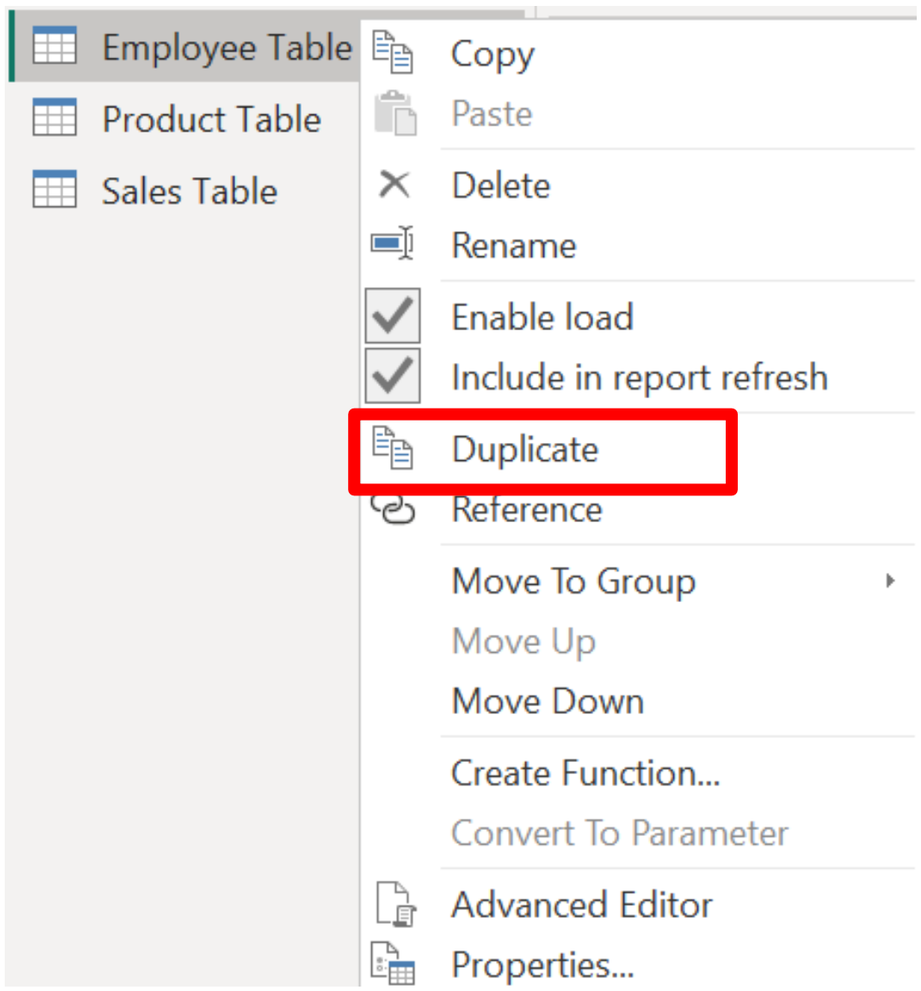
Ghalib Alshammri, PhD

Power BI Desktop: Duplicate Table

To duplicate table in Power Query as following:

1. **Go to the Home tab & select “Query” group**
2. **Select “Manger”, and choose “Duplicate”**
3. **Or right-click on Table Name in Queries workplace, select “Duplicate”**





Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

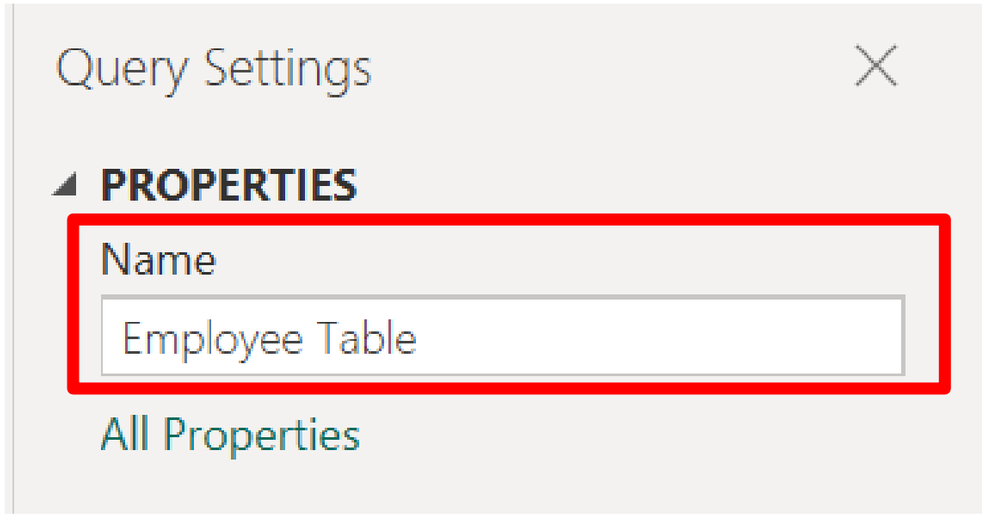
How to rename Table & specific Column?

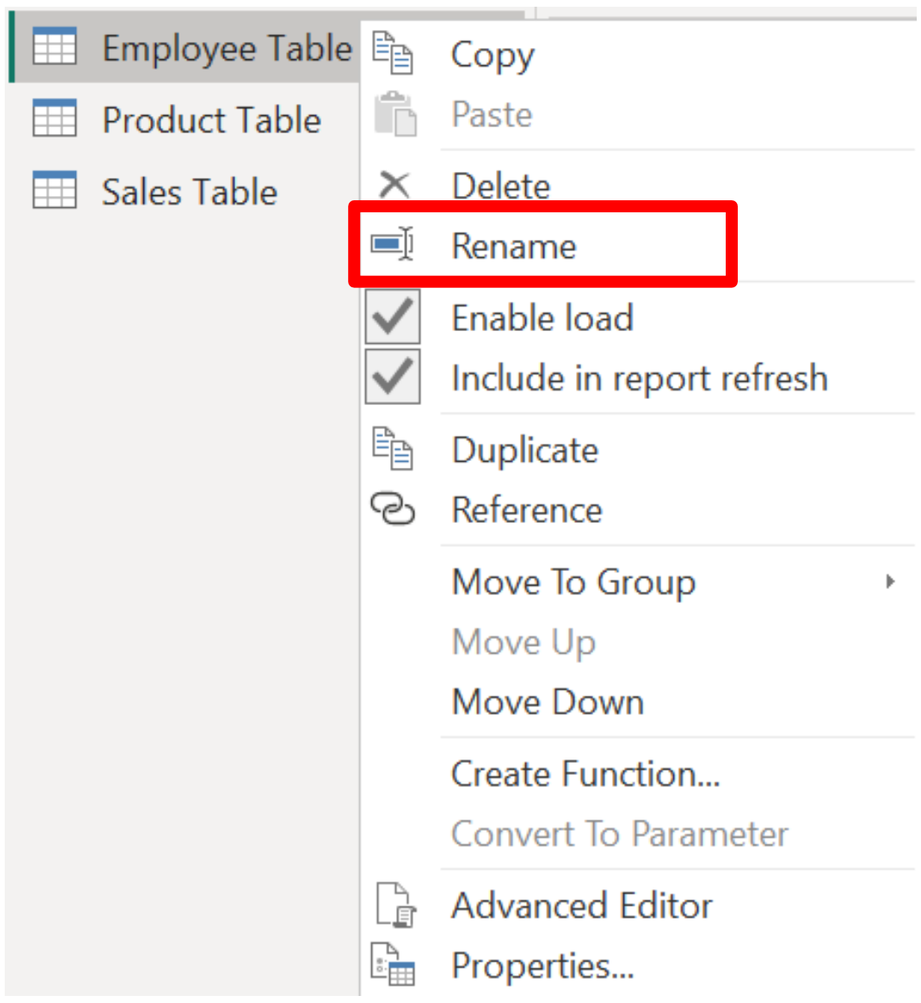
Ghalib Alshammri, PhD

Power BI Desktop: Rename Table

To rename table in Power Query as following:

1. **Go to the Query Setting list & change table name**
2. **Or right-click on Table Name in Queries workplace, select “Rename”**





Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

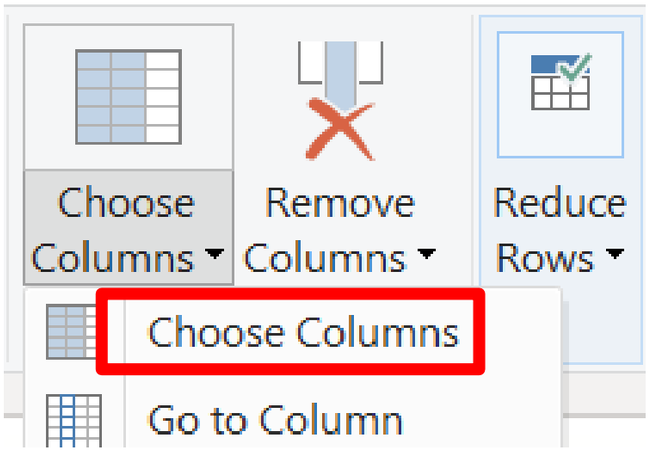
How to filter attributes in Table?

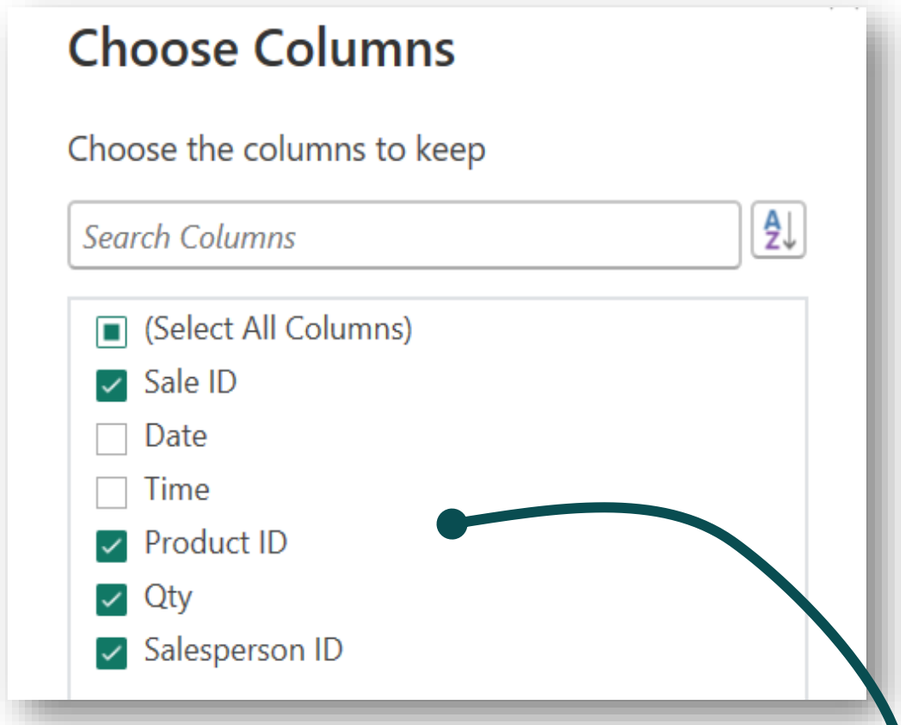
Ghalib Alshammri, PhD

Power BI Desktop: Choose Specific Columns in Table

To duplicate table in Power Query as following:

1. **Select a specific table**
2. **Go to the Home tab & select “Manage Columns” group**
3. **Select “Choose Columns”**





	Sale ID	Product ID	Qty	Salesperson ID
1	1001	002	2	56789
2	1002	004	3	13456
3	1003	001	1	67890
4	1004	005	2	56789
5	1005	001	3	13456
6	1006	002	3	56789

Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

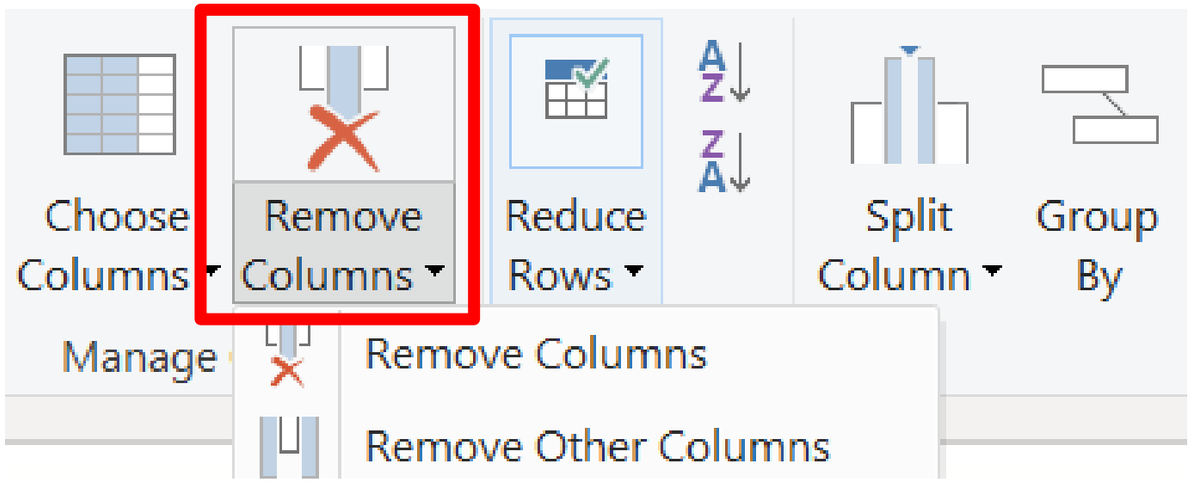
How to remove columns?

Ghalib Alshammri, PhD

Power BI Desktop: Remove Specific Columns

To duplicate table in Power Query as following:

1. **Select specific column(s)**
2. **Go to the Home tab & select “Manage Columns” group**
3. **Select “Remove Columns”**



Remove Columns: to delete the selected column(s)

Remove Other Columns: to delete the unselected columns(s)

Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

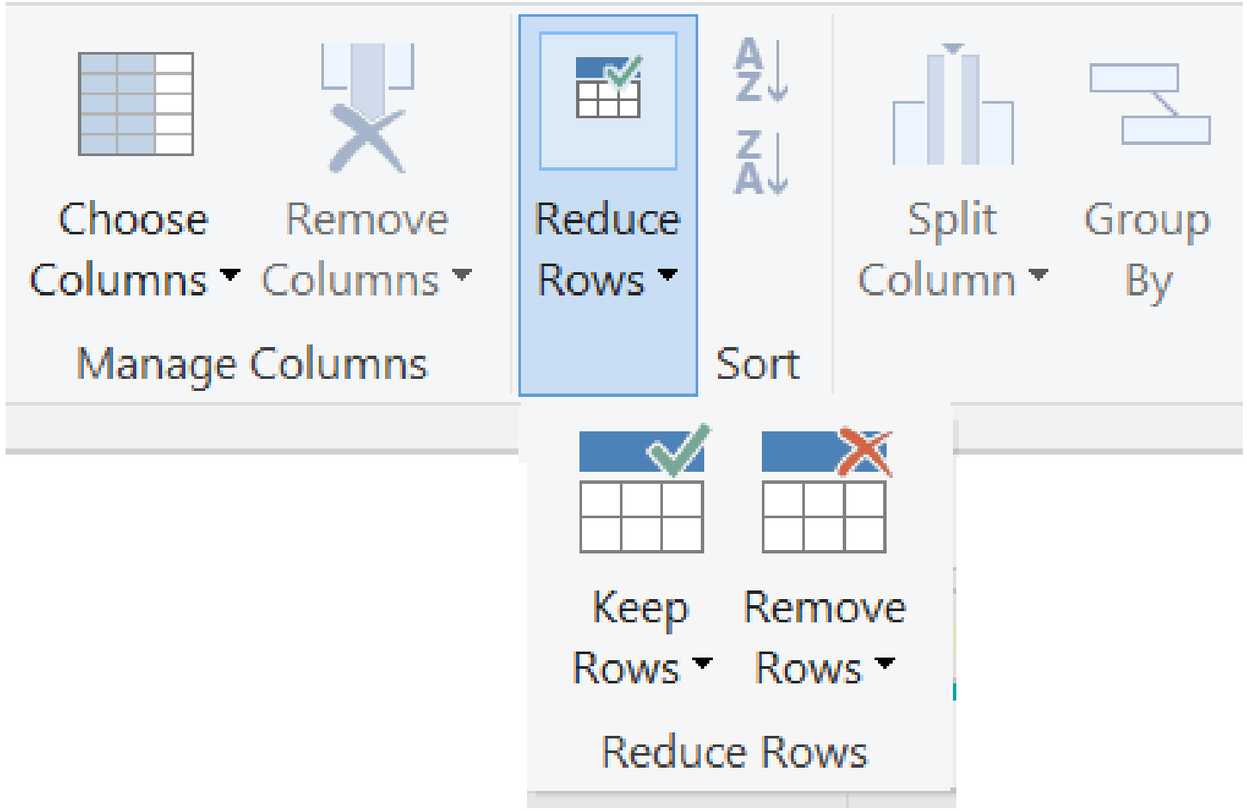
How to remove rows?

Ghalib Alshammri, PhD

Power BI Desktop: Remove Specific Rows

To duplicate table in Power Query as following:

1. **Select specific column(s)**
2. **Go to the Home tab & select “Manage Columns” group**
3. **Select “Reduce Rows”**



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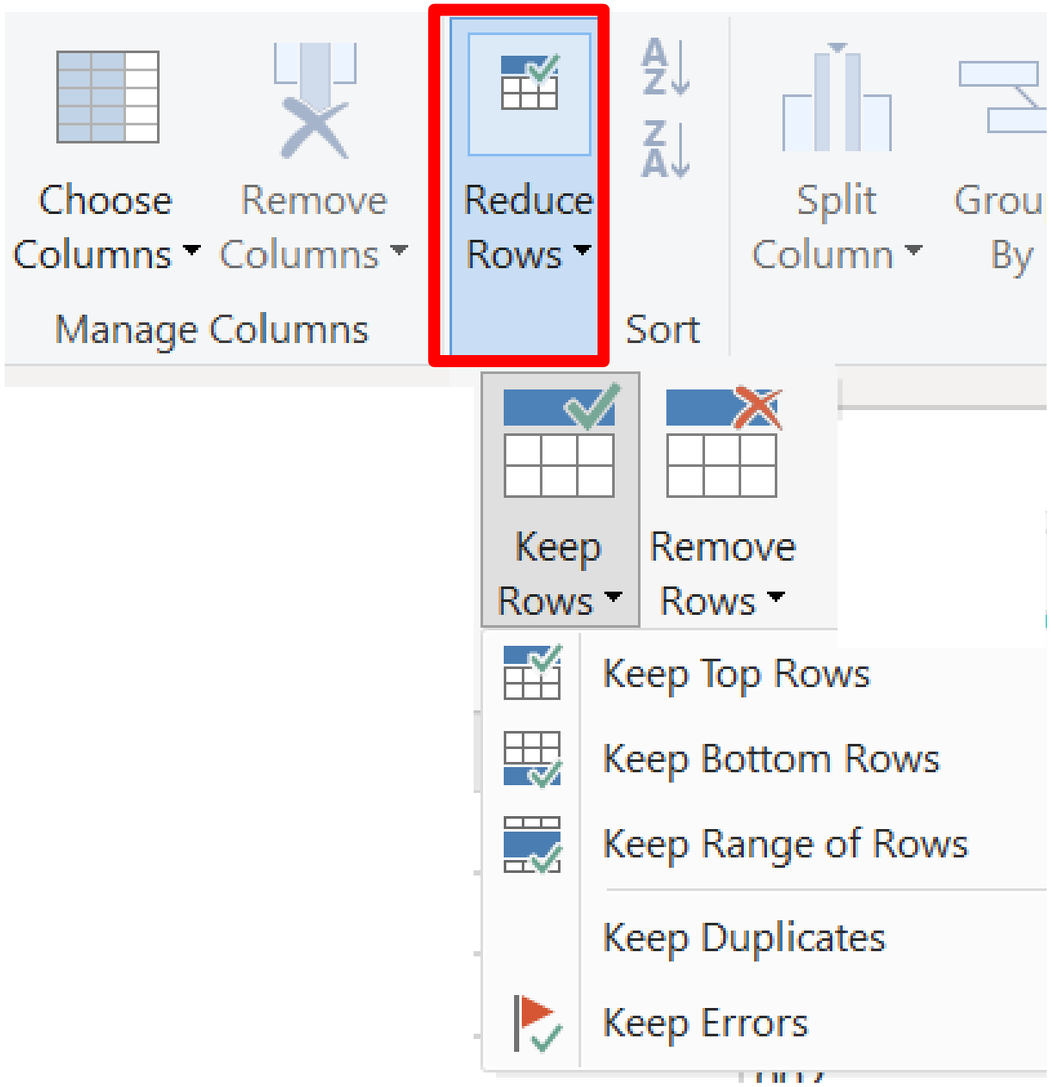
Power BI Desktop: Keep Specific Rows

To keep rows in Table using Power Query as following:

1. **Keep Top Rows**
2. **Keep Bottom Rows**
3. **Keep Range of Rows**
4. **Keep Duplicates**
5. **Keep Errors**



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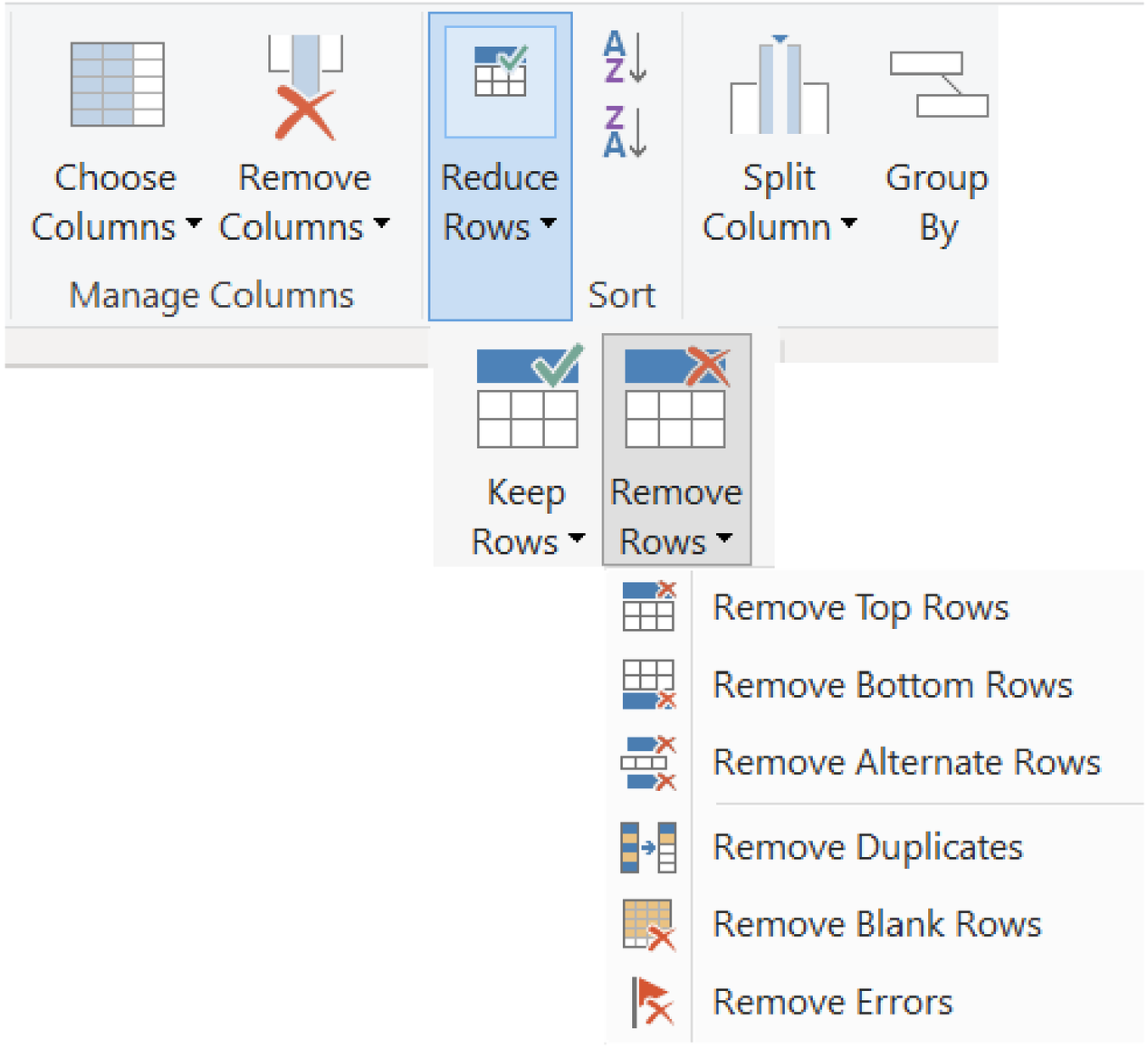
Power BI Desktop: Remove Specific Rows

To remove rows in Table using Power Query as following:

1. **Remove Top Rows**
2. **Remove Bottom Rows**
3. **Remove Alternate Rows**
4. **Remove Duplicates**
5. **Remove Blank Rows**
6. **Keep Errors**



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What is Business Intelligence?

Group Discussion:

How to sort data in Table?

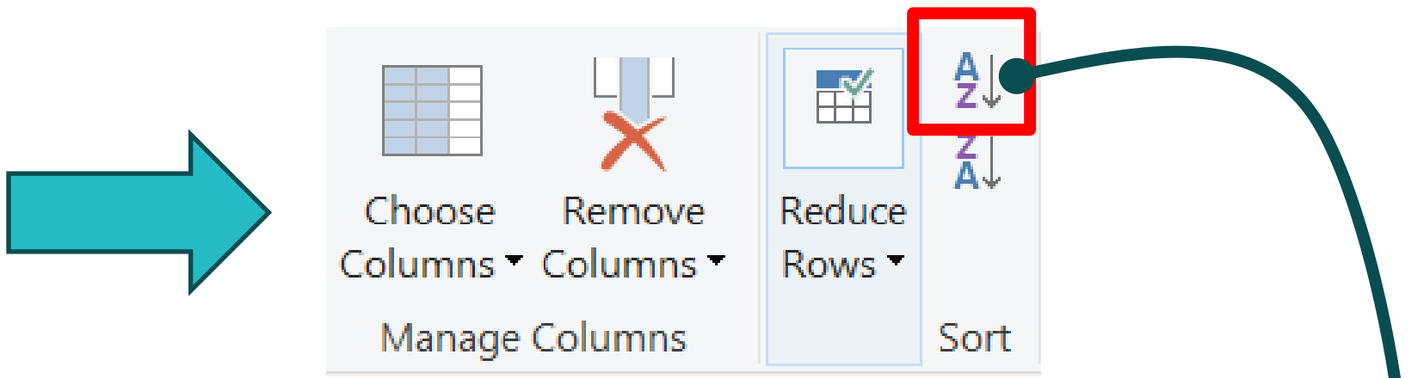
Ghalib Alshammri, PhD

Power BI Desktop: Sort Data

To sort data in Power Query as following:

1. **Select a specific column**
2. **Go to the Home tab & select “sort” group**
3. **Select “Sort Ascending” or “Sort Descending”**

Employee ID	Name
12345	Ghalib
23456	Mohammed
34567	Ali
45678	Salam
56789	Abdullah
67890	Tariq
13456	Khaled
14567	Bader
15678	Tariq
16789	Turky



Employee ID	Name
56789	Abdullah
34567	Ali
14567	Bader
12345	Ghalib
13456	Khaled
23456	Mohammed
45678	Salam
15678	Tariq
67890	Tariq
16789	Turky

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What is Business Intelligence?

Group Discussion:

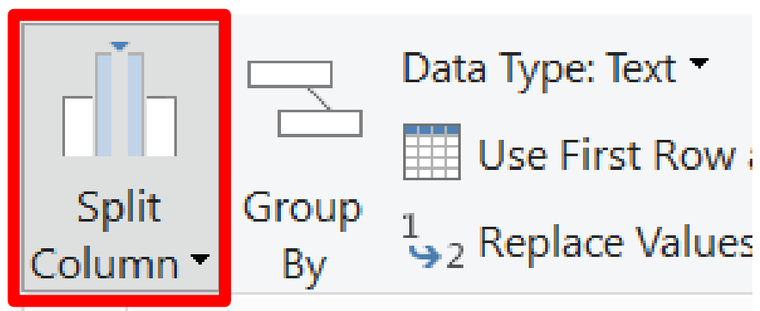
How to spilt columns with specific conditions?

Ghalib Alshammri, PhD

Power BI Desktop: Split Column

To split column in Power Query as following:

1. **Select a specific column**
2. **Go to the Home tab & select “Transform” group**
3. **Select “Split Column”**



By Delimiter: split column by specific delimiter

By Number of Characters: split column by specific length of characters

By Positions: split column by specific position

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What is Business Intelligence?

Group Discussion:

How to group a specific data?

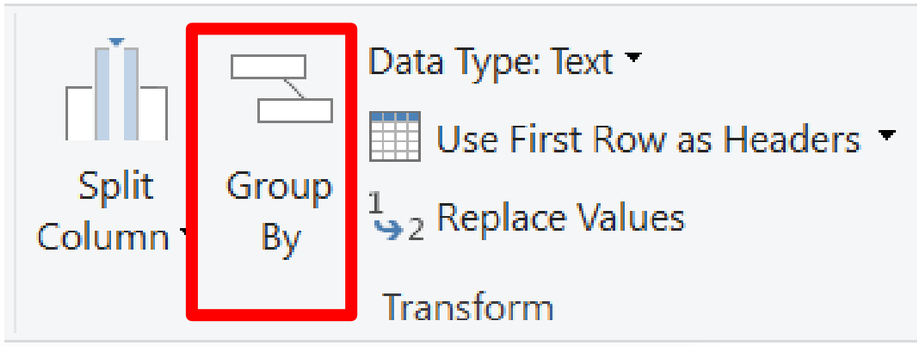
Ghalib Alshammri, PhD

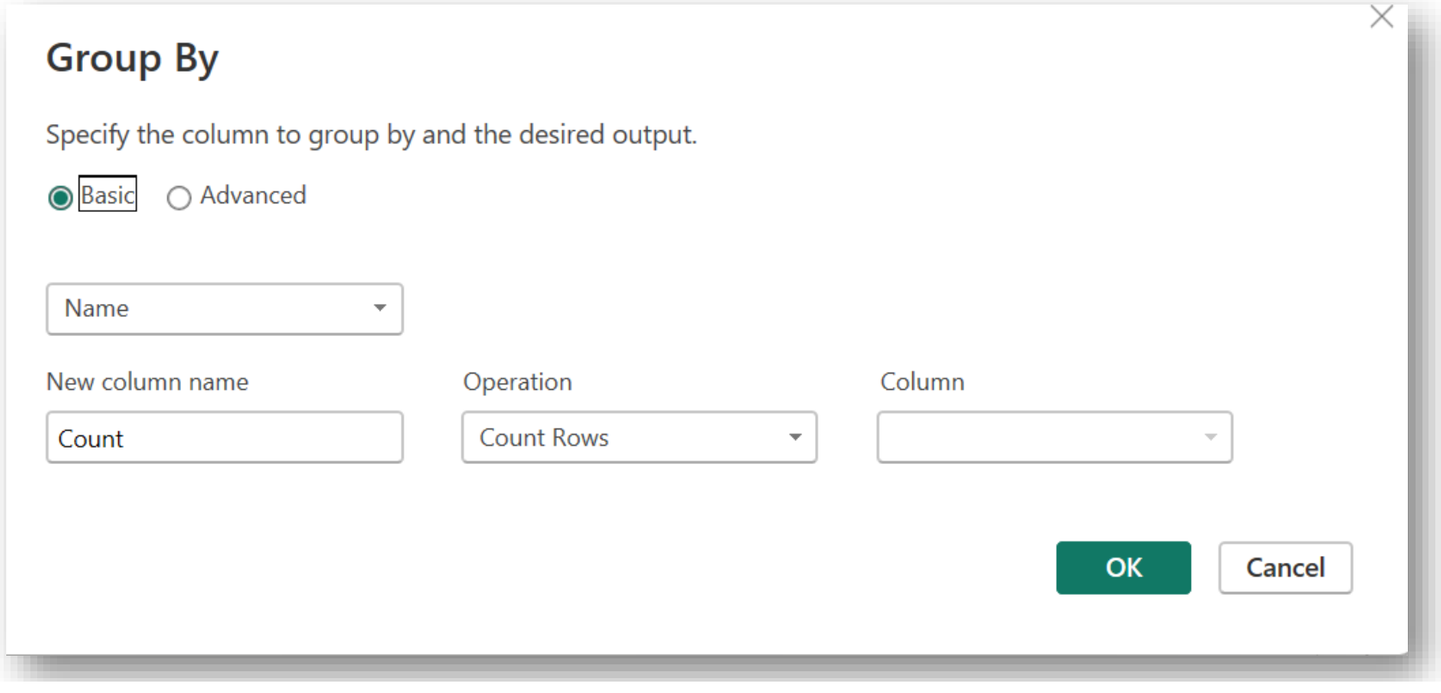
Power BI Desktop: Group By

The **Group By feature** summaries data based on one or more aggregate functions

To group by feature in Power Query as following:

1. **Select a specific table**
2. **Go to the Home tab & select “Transform” group**
3. **Select “Group By”**





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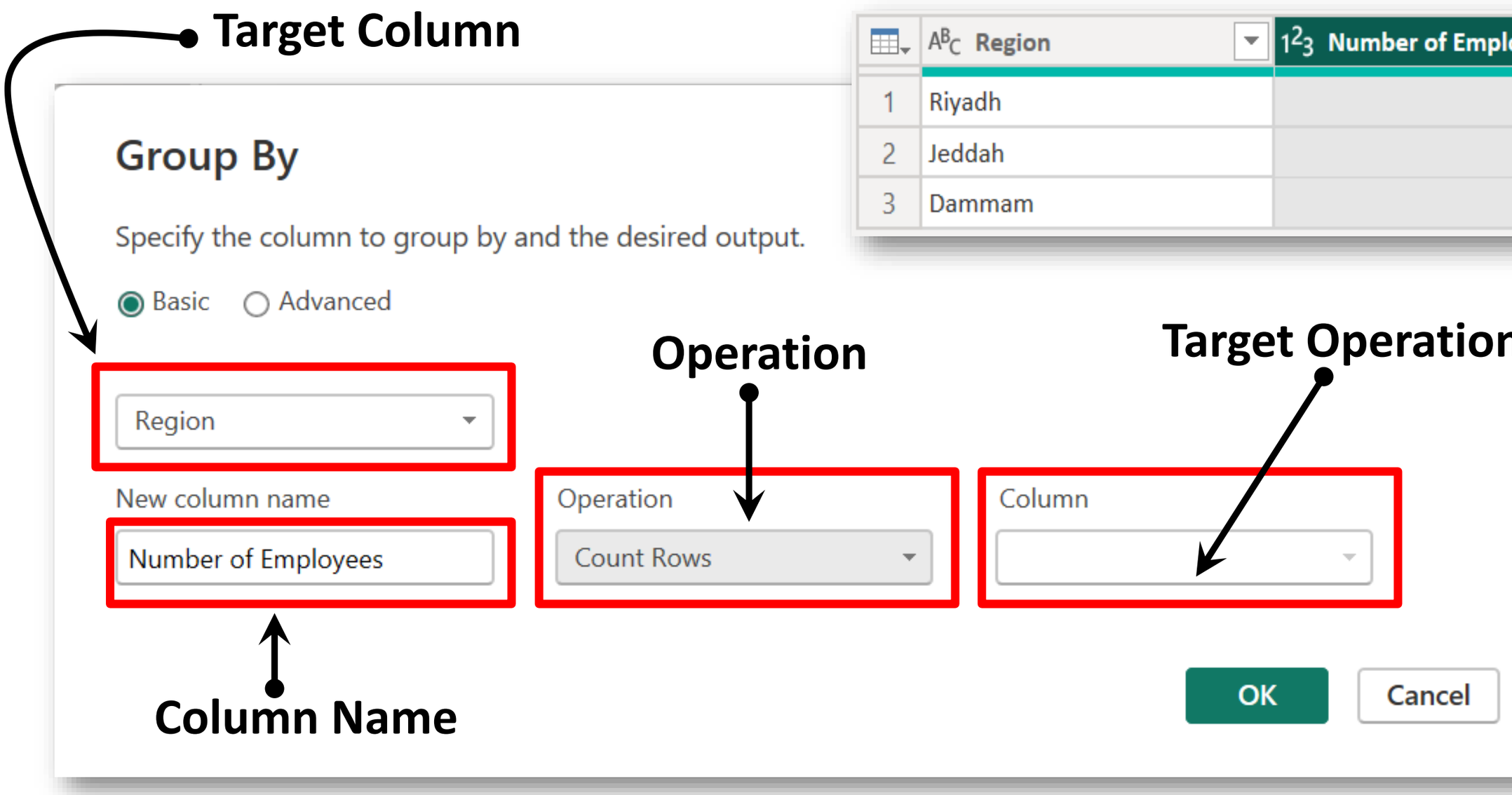
Power BI Desktop: Group By

The **Group By feature** summaries data based on one or more aggregate functions

e.g., group by “region” with number of employees in each region

	Region	Number of Employees
1	Riyadh	4
2	Jeddah	3
3	Dammam	3



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What is Business Intelligence?

Group Discussion:

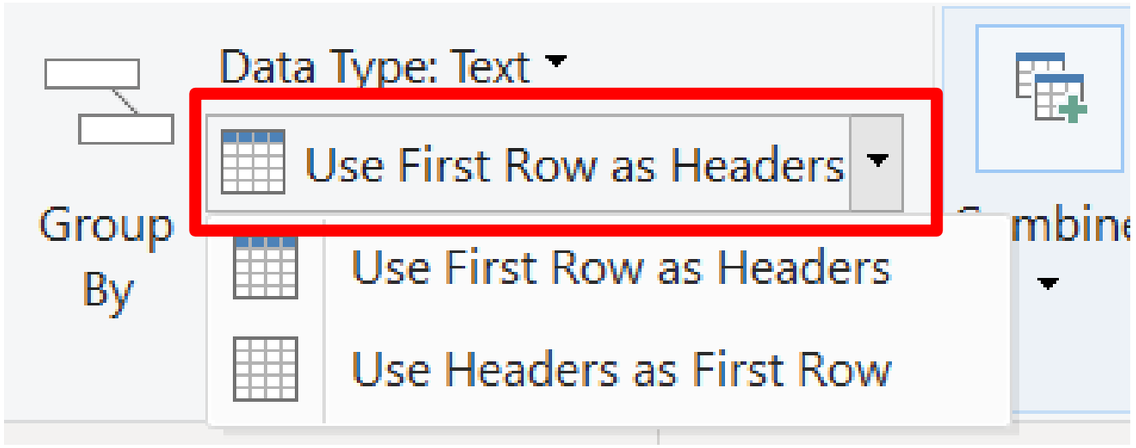
How to deal with Header Options?

Ghalib Alshammri, PhD

Power BI Desktop: Header Options

To change the status of header in Power Query as following:

1. **Select a specific table**
2. **Go to the Home tab & select “Transform” group**
3. **Select “Header Options”**



Header

	Employee ID	Name	Region	Department
1	12345	Ghalib	Riyadh	HR
2	23456	Mohammed	Jeddah	HelpDesk

	Column1	Column2	Column3	Column4
1	Employee ID	Name	Region	Department
2	12345	Ghalib	Riyadh	HR
3	23456	Mohammed	Jeddah	HelpDesk

Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

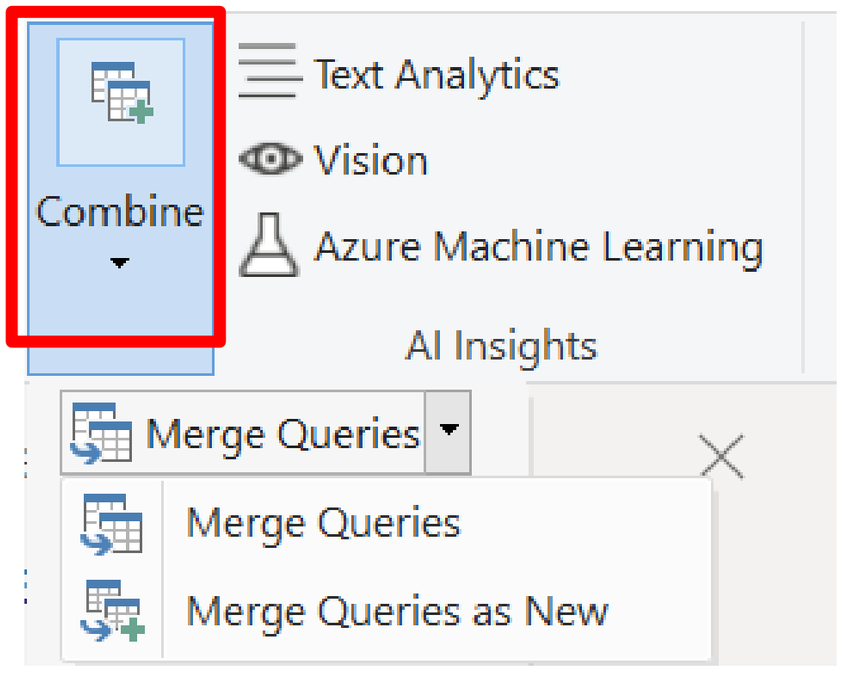
How to merge Tables?

Ghalib Alshammri, PhD

Power BI Desktop: Merge Table

To merge tables in Power Query as following:

1. **Go to the Home tab**
2. **Select “Combine”, then choose “Merge Queries”**



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Power BI Desktop: Merge Table

Merge

Select tables and matching columns to create a merged table.

Employee Table

Column1	Column2	Column3	Column4
Employee ID	Name	Region	Department
12345	Ghalib	Riyadh	HR
23456	Mohammed	Jeddah	HelpDesk
34567	Ali	Riyadh	IT
45678	Salam	Dammam	HR

Product Table

Product ID	Category	Description	Units	Manufacturer	Cost	Sale Price
1	Iphone 15	Mobile Phone	*10*	Apple	*3500*	*3550*
2	S3	Mobile Phone	*15*	Samsung	*4500*	*4599*
3	8100 Max	Mobile Phone	*7*	OPPO	*2100*	*2170*
4	Mi 12	Mobile Phone	*13*	Xiaomi	*1350*	*1370*
5	One Plus	Mobile Phone	*10*	Nokia	*2150*	*2198*

Join Kind

Left Outer (all from first, matching from second)

- Left Outer (all from first, matching from second)
- Right Outer (all from second, matching from first)
- Full Outer (all rows from both)
- Inner (only matching rows)
- Left Anti (rows only in first)
- Right Anti (rows only in second)

OK Cancel

No Matching Columns

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Power BI Desktop: Merge Table

	ID	Name	Department	+
1	101	Ali	IT	
2	102	Mohammed	Sales	
3	103	Salah	HR	
+				

Name: Emp1

	ID	Salary	Address	+
1	102	5600	Riyadh	
2	103	7000	Jedahh	
3	102	3400	Dammam	
+				

Name: Emp2

After Merge

	ID	Name	Department	Emp2
1	*101*	Ali	IT	Table
2	*102*	Mohammed	Sales	Table
3	*103*	Salah	HR	Table

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What is Business Intelligence?

Group Discussion:

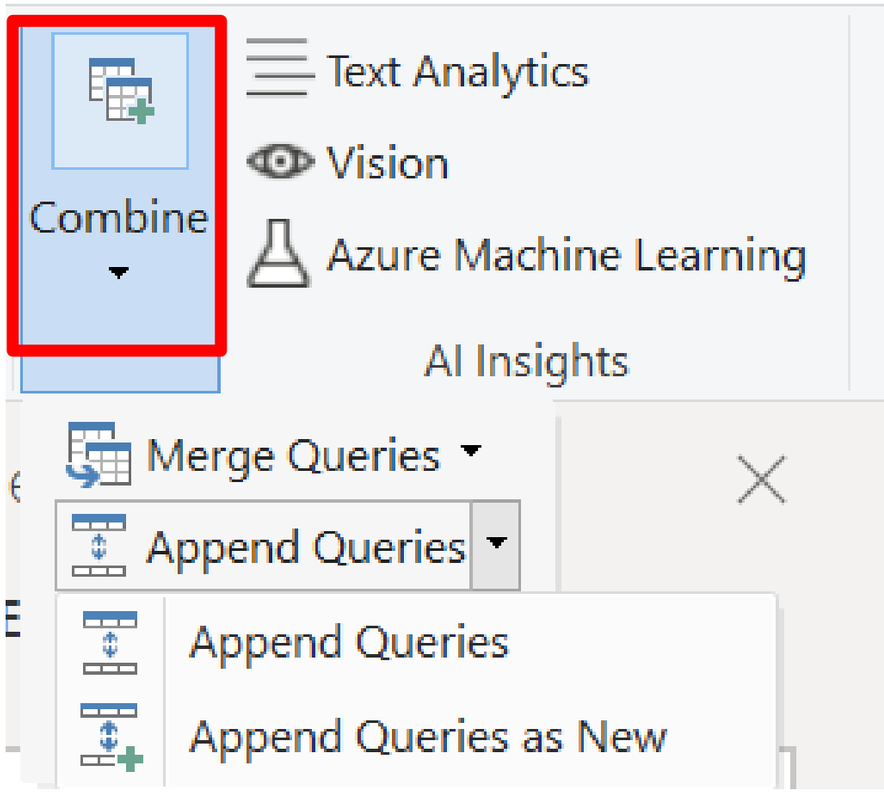
How to append Tables?

Ghalib Alshammri, PhD

Power BI Desktop: Append Table

To append tables in Power Query as following:

1. **Go to the Home tab**
2. **Select “Combine”, then choose “Append Queries”**



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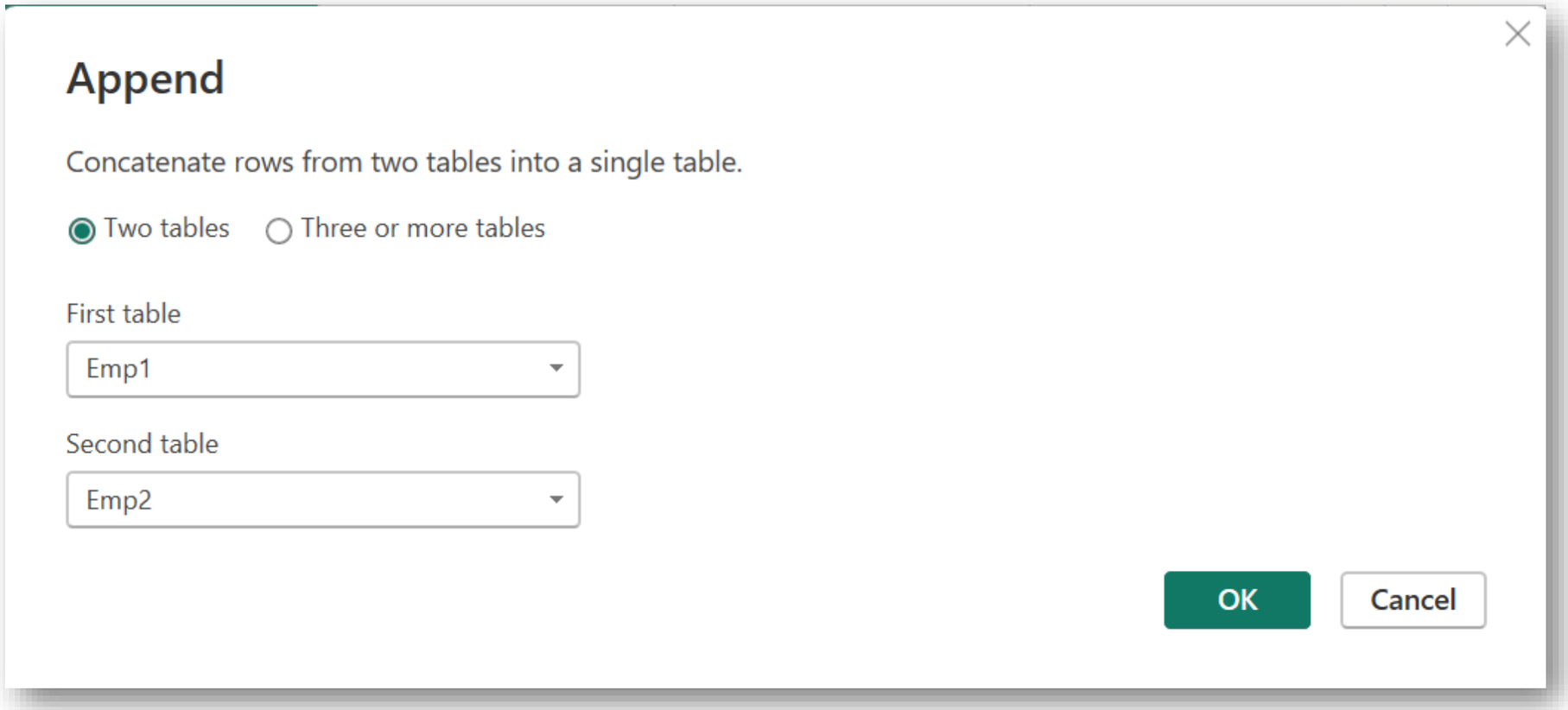
Power BI Desktop: Append Table



	1.2 ID	Name	Department	Salary	Address
1	101	Ali	IT	null	null
2	102	Mohammed	Sales	null	null
3	103	Salah	HR	null	null
4	101	null	null	5600	Riyadh
5	103	null	null	7000	Jedahh
6	101	null	null	3400	Dammam

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Power BI Desktop: Append Table

Group Discussion:

Why we have Null vales after “Append Table”?

Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

How to edit a specific field?

Ghalib Alshammri, PhD

Power BI Desktop: Edit Specific Cell

	ID	Salary	Address
1	102	5600	Riyadh
2	103	7000	Jedahh
3	102	3400	Dammam

	Salary	Address	ID
1	5600	Riyadh	101
2	7000	Jedahh	103
3	3400	Dammam	102

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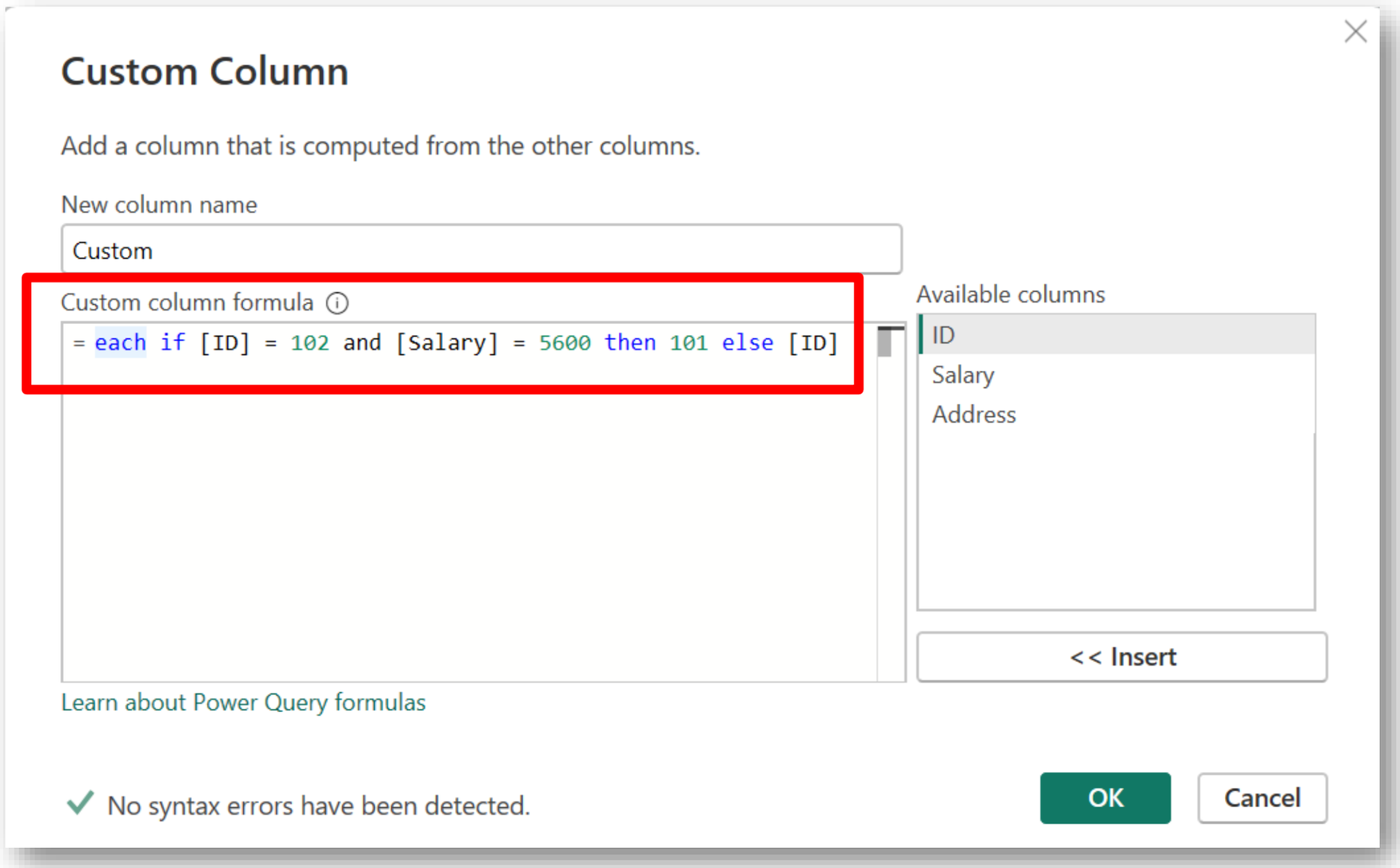
Power BI Desktop: Edit Specific Cell

To edit specific cell in Power Query as following:

1. **Go to the Add Column tab & select “General” group**
2. **Select “Custom Column”**



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What is Business Intelligence?

Group Discussion:

How to add custom column?

Ghalib Alshammri, PhD

Power BI Desktop: Add Custom Column

	Units	Cost	Total Cost	Product ID
1	10	3500	35000	1
2	15	4500	67500	2
3	7	2100	14700	3
4	13	1350	17550	4
5	10	2150	21500	5
6	25	1249	31225	6

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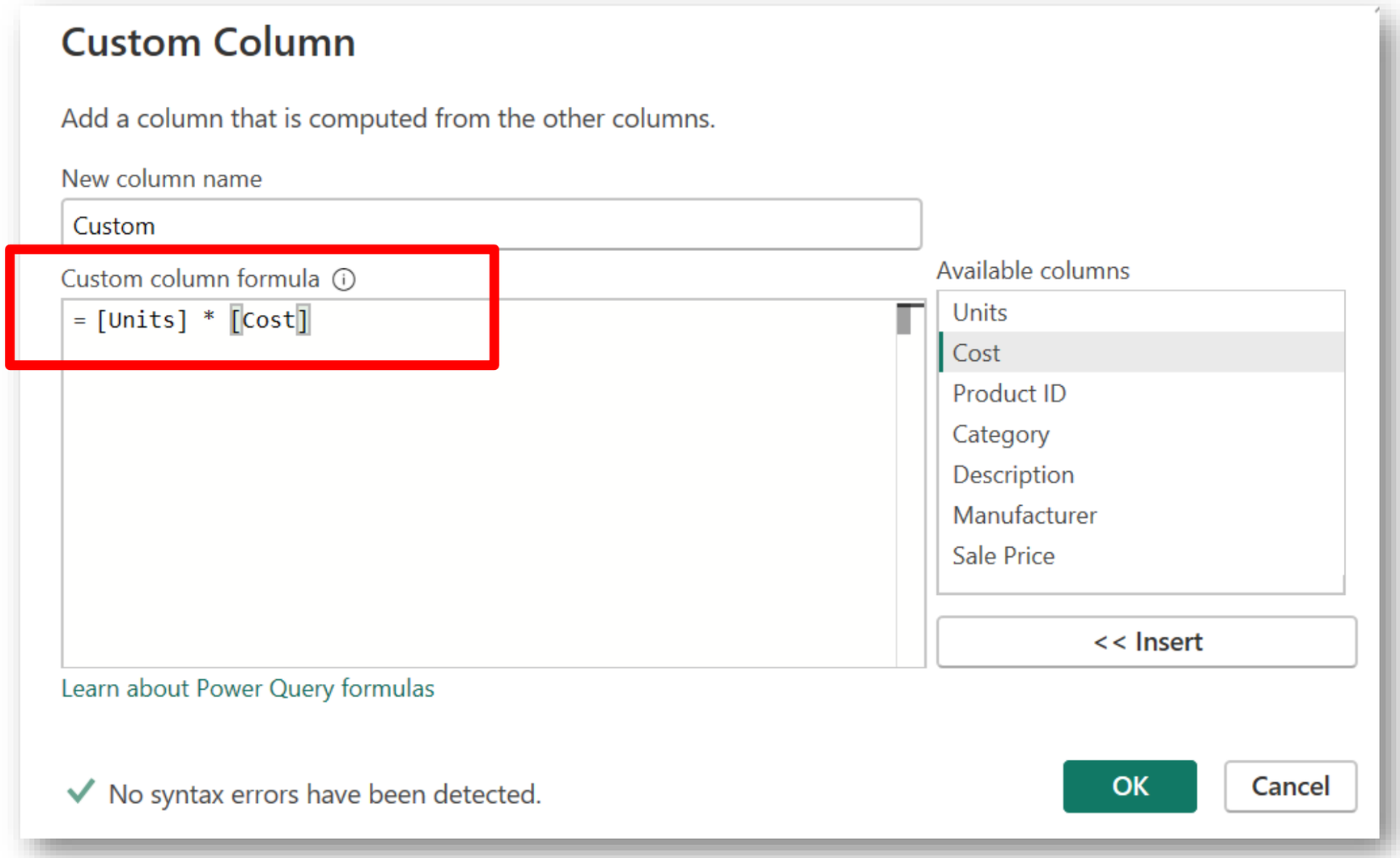
Power BI Desktop: Add Custom Column

To add custom column in Power Query as following:

1. **Go to the Add Column tab & select “General” group**
2. **Select “Custom Column”, then add “Total Cost”**



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What is Business Intelligence?

Group Discussion:

How to filter data in Report or Visual?

Ghalib Alshammri, PhD

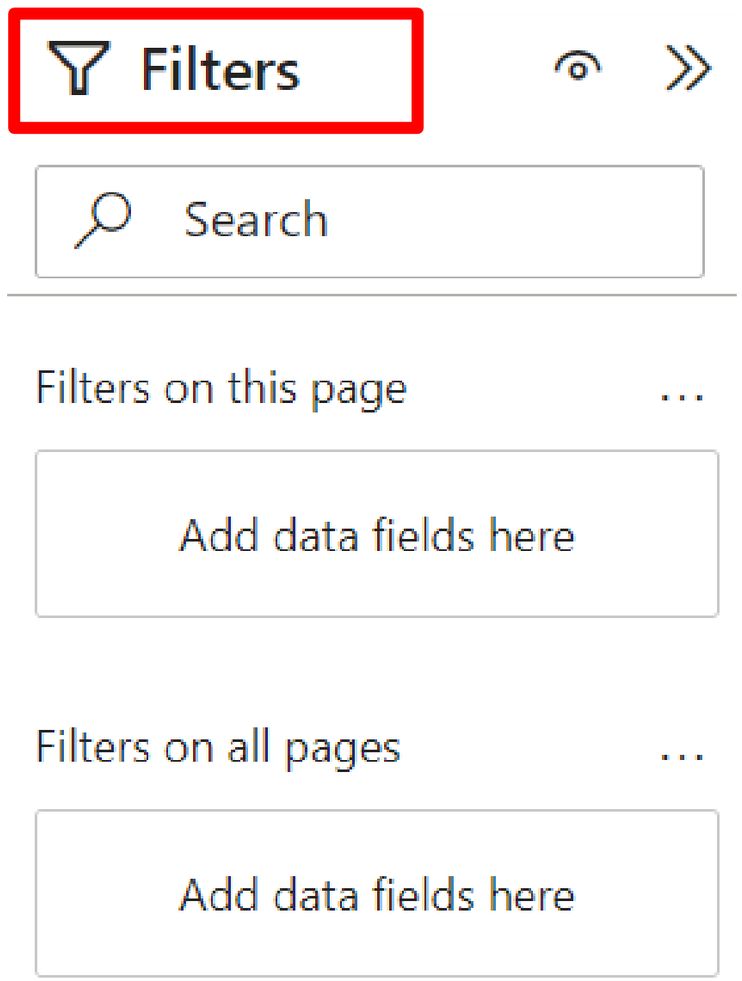
Power BI Desktop: Filtering Data

There are two levels of filters in Power BI Desktop, which are:

- Filters on this page
- Filters on all pages
- Filters on this visual

To filter data in Power Query as following:

1. **Go to main page in Power BI Desktop**
2. **Determine “Filters” list, then choose Filter Level**



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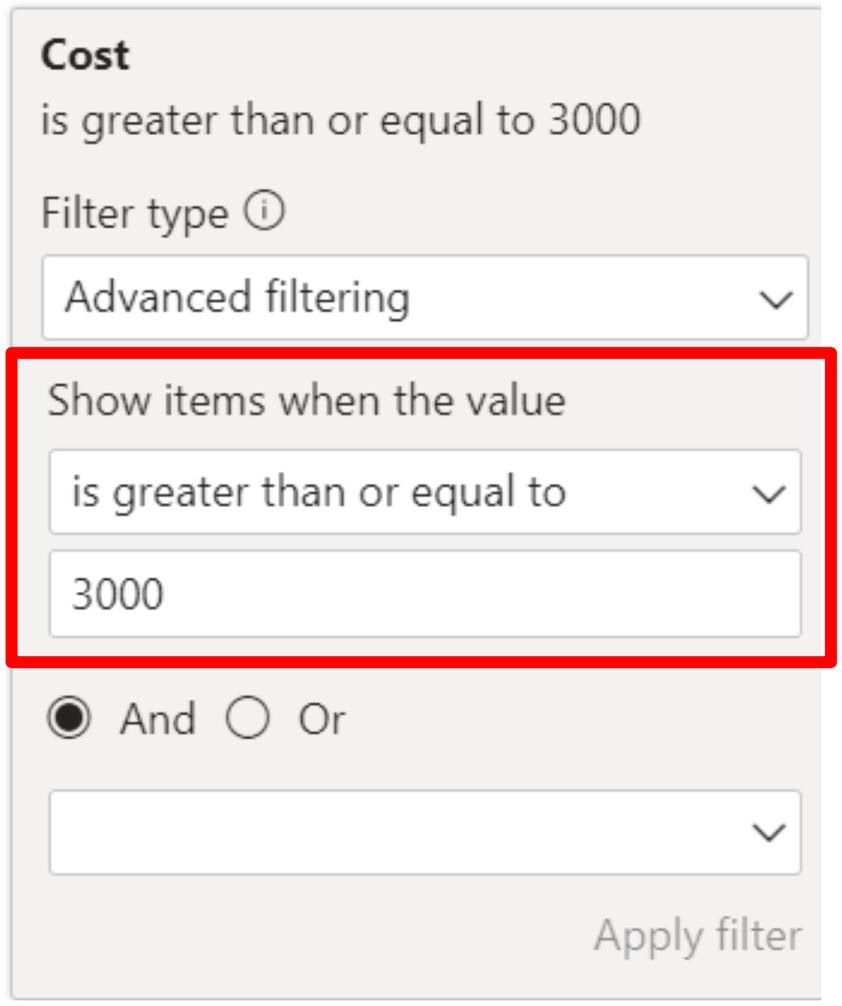
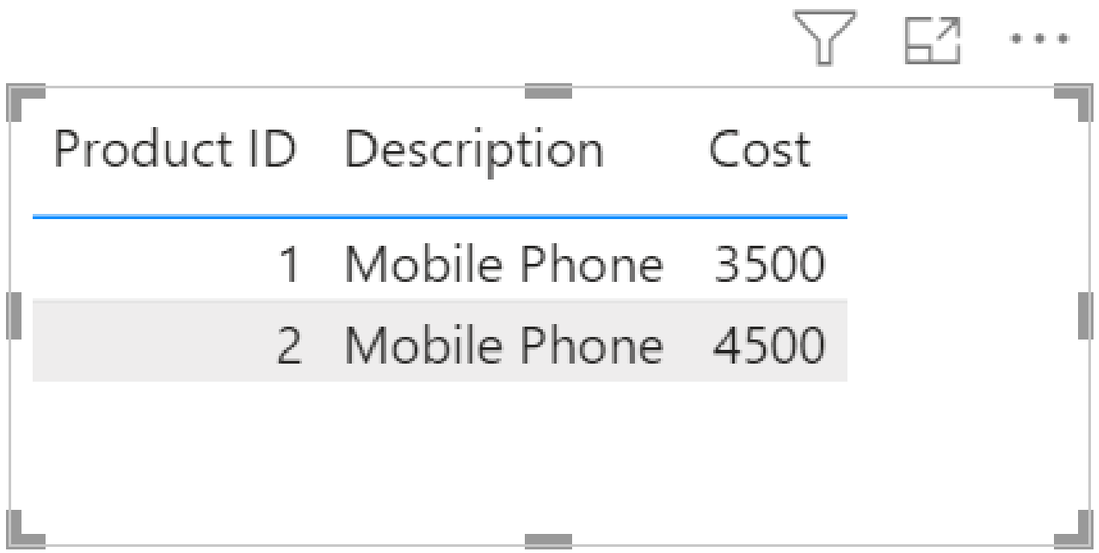
Power BI Desktop: Filtering Data

3. **Drag & drop a specific cell**
4. **Apply specific setting for Filter**





Product ID	Description	Cost
1	Mobile Phone	3500
2	Mobile Phone	4500

Ghalib Alshammri, PhD

What is Business Intelligence?

Group Discussion:

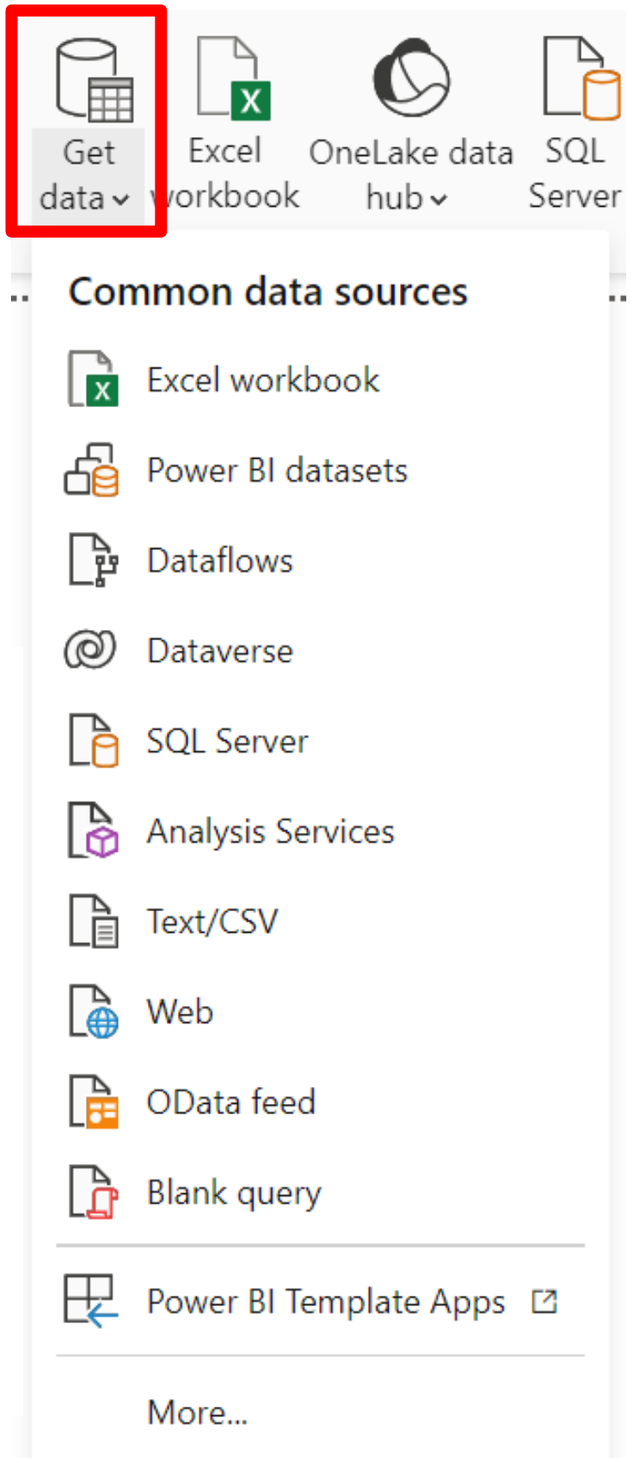
How to import different type of dataset?

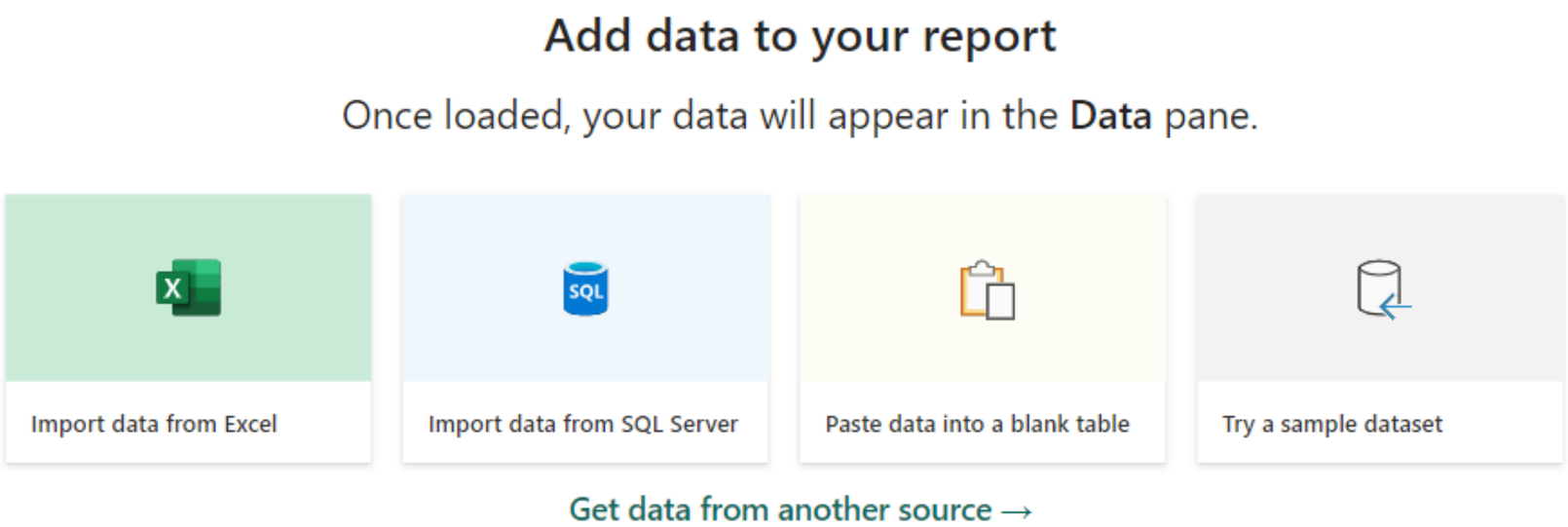
Ghalib Alshammri, PhD

Power BI Desktop: Import Different Dataset

To import dataset in Power BI as following:

1. **Go to the Home tab & select “Data” group**
2. **Determine “Get Data”**
3. **or File Tab, choose “Get Data”**
4. **or from “Report Area”**





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Power BI Desktop: Close & Apply

To close & apply in Power Query as following:

1. **Go to the Home tab & select “close” group**
2. **Select “close”, “apply” or “close & apply”**