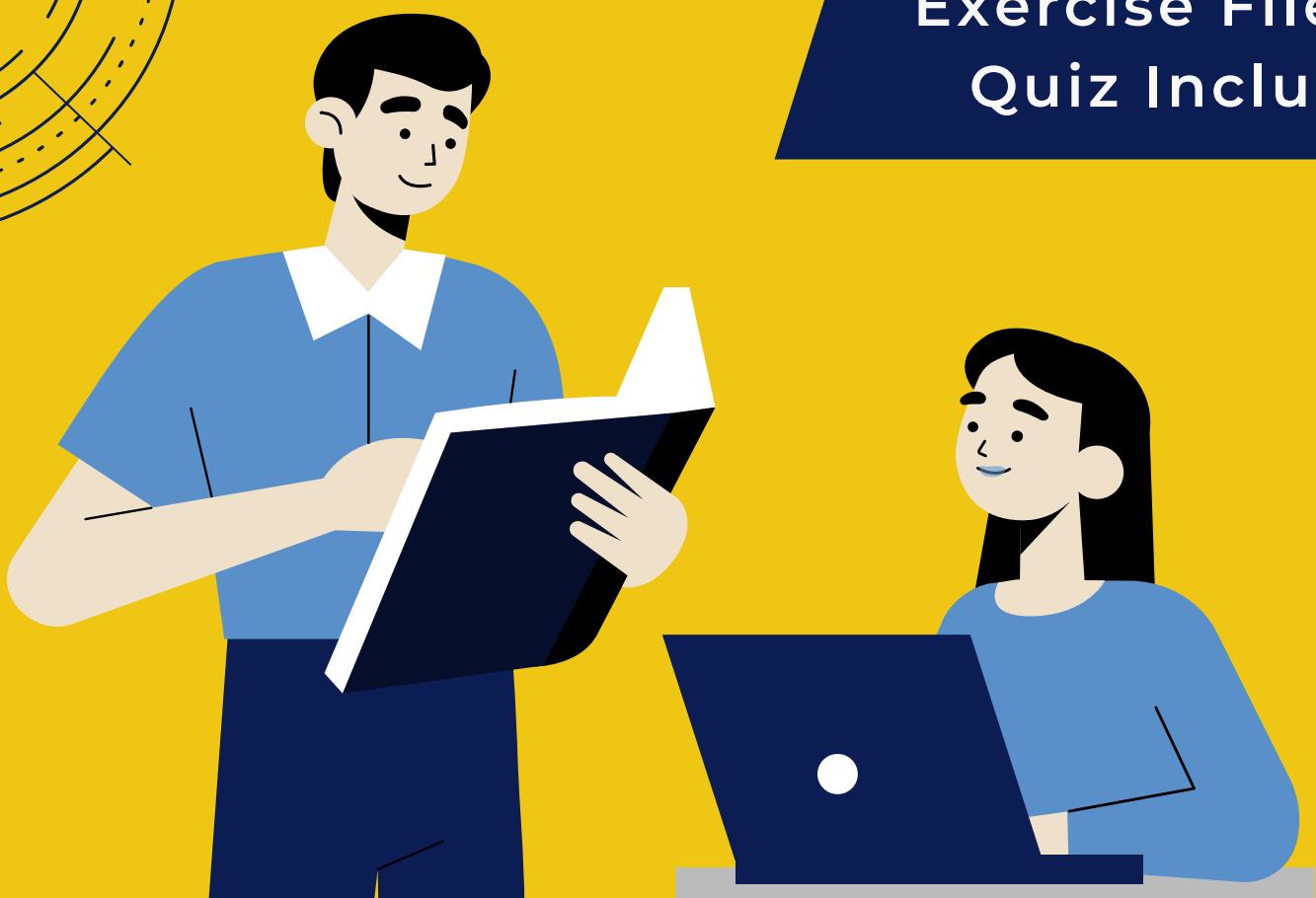


BEGINNER'S GUIDE TO POWER BI

Concise, Practical, Jargon-Free
guide for Excel users to develop
their first **Power BI Report**

Exercise Files &
Quiz Included



ALI NOORANI

Power BI Crash Course

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CHAPTER 1

Introduction to Power BI

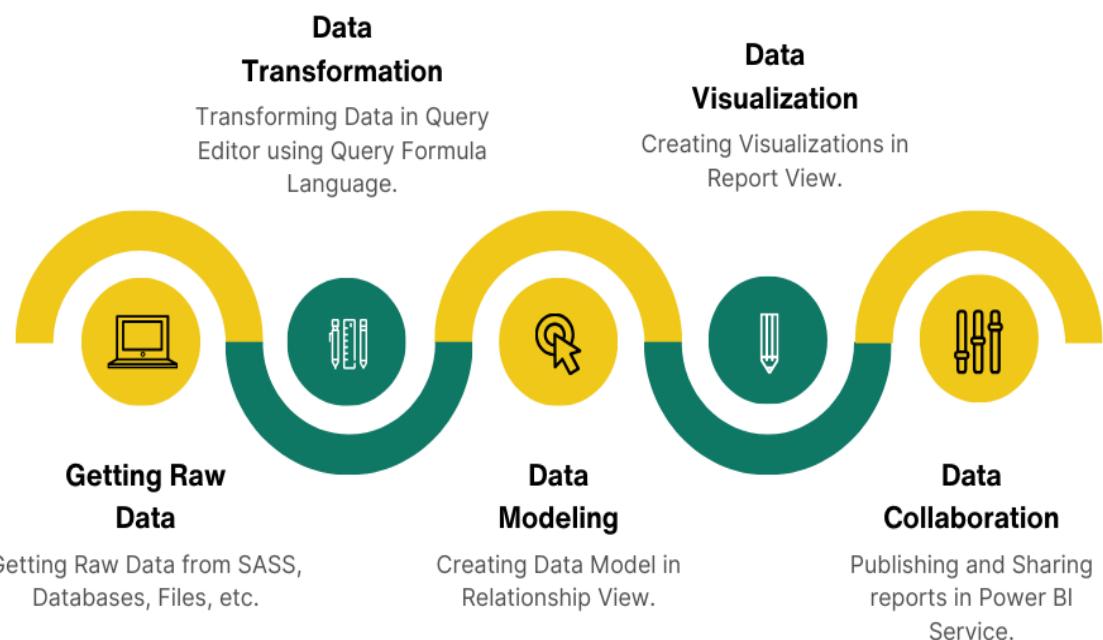
- ✓ What is Power BI
- ✓ Different Products of Power BI
 - ❑ Power BI Desktop
 - ❑ Power BI Service
 - ❑ Power BI Report Server
 - ❑ Power BI Mobile
- ✓ Competitive Advantages of Power BI



What is Power BI

Power BI comprises a comprehensive suite of self-service Business Intelligence (BI) tools designed to facilitate data analysis and the seamless dissemination of insights. Within the Power BI ecosystem, several distinct products coexist, each possessing its unique capabilities and constraints. These products include Power BI Desktop, Power BI Service, Power BI Report Server, Power BI Embedded, and the Power BI Mobile App.

In this course, you will navigate through the different phases associated with the development of a Business Intelligence (BI) solution. The accompanying flowchart below will serve as your visual guide, assisting you in grasping the nuances as we progress in the course.



Different Products of Power BI

Power BI Desktop:

Power BI Desktop is a free application that can be installed on a local computer. It allows collecting data from multiple sources, transforming raw data into clean, workable data, creating data models, and developing fine-looking reports. You cannot create dashboards on Power BI Desktop.

Power BI Service:

The Power BI Service is built upon and protected by the Windows Azure Cloud platform. With Power BI Service, you can share your reports and dashboard with your co-workers and other stakeholders. It also allows you to create workspaces to collaborate on the development of reports. Data flows allow for the transformation of the dataset. However, you can not make or amend data models in Power BI Service.

Power BI Report Server:

The Power BI Report Server is an on-premises report server that hosts Power BI reports (.pbix), excel files, and paginated reports (.RDL). It also has a web portal to display reports and KPIs.

Power BI Mobile:

All the reports and dashboards created on Power BI Service or Desktop, whether on-premises or in the cloud, become available in the Power BI Mobile Apps. These reports and dashboards can be viewed on iOS (iPad, iPhone, iPod Touch, or Apple Watch), Android, or Windows devices. See the table below to distinguish between the capabilities and limitations of Power BI Desktop vs. Service.

Criteria	Power BI Desktop	Power BI Service
What is it?	A free application installed on a computer.	A cloud-based service.
Primary Use	Designed for comprehensive data analysis and report creation.	Focused on light report editing and collaboration.



CHAPTER 1: INTRODUCTION TO POWER BI

Data Modeling	Offers powerful data modelling capabilities with the ability to import and combine multiple data sources.	Allows connection to data sources but with limited modelling capabilities.
Visualization	Provides a wide range of Visualization options and interactive features like drill-downs, filters, and slicers.	Similar range of Visualizations as Desktop; includes web-based report editing.
Publishing	Enables creation and publication of reports and dashboards to Power BI Service for sharing and collaboration.	Facilitates sharing and collaboration on reports and dashboards within workspaces.
Data Sharing and Collaboration	Not available in Desktop.	Available in Service, allowing for effective collaboration and



Competitive Advantages of Power BI

- ✓ For 14 consecutive years, Gartner has recognised Microsoft as a Magic Quadrant Leader in analytics and business intelligence platforms.
- ✓ Power BI developers remain constantly engaged with the community and act upon bug fixes, recommendations, and feedback remarkably fast.
- ✓ It does not require significant initial learning to start with Power BI as it is comparatively easier to navigate and more intuitive for new users.
- ✓ Microsoft Power BI offers one of the lowest per-user pricing options. Most of the features are given out for free, and even a Pro License just costs \$10 per month, which is much cheaper than its competitors.
- ✓ Power BI can be integrated with Microsoft Teams, making it the most preferred option for remote work.
- ✓ It has an incredibly easy-to-use Visualization tool; charts are interactive by default.
- ✓ It's easy to import data from SQL servers (on-premises and cloud), flat files, Spark clusters, and almost all the popular online services.
- ✓ Power BI offers augmented analytics through AI-infused experiences, including anomaly detection capabilities and narratives that utilise the Natural Language Generation (NLG) technique.

Enrol now to our Power BI Essentials Course, To get an in-depth introduction to the Microsoft Power BI Products and Services.

<https://powerbitraining.com.au/power-bi-basic-training-course/>



CHAPTER 2

Getting Started with Power BI

- ✓ Setting Up Office365 Business Basic Trial Account
- ✓ Power BI Service License Comparison
 - Power BI Free
 - Power BI Pro
 - Power BI Premium
- ✓ Downloading Power BI Desktop



Setting Up Office365 Business Basic Trial Account

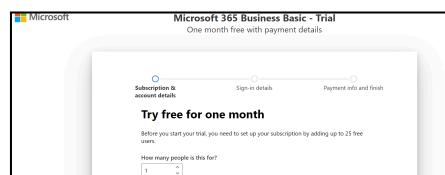
Signing up for Power BI Service cannot be done using a personal email address and requires an email account on your company's website. However, this can be bypassed by signing up for an **Office365 Business Basic** trial account and using that to sign up for Power BI Service. You can continue using Power BI even after your subscription has expired.

To get started:

1. On your internet browser, go to [Microsoft 365 Business Basic | Microsoft 365](#).
2. Click on **Try free for one month**.



3. Select the number of people who will use this account.



4. Enter your email address and click **Next**.

A screenshot of the 'Let's get you started' sign-up page. It has a title 'Let's get you started' and a sub-instruction to enter a work or school email address. Below that is an 'Email' input field containing 'studentamz11@gmail.com', which is highlighted with a red box. At the bottom are 'Next' and 'Back' buttons.

5. Click on **Set up account**.



CHAPTER 2: GETTING STARTED WITH POWER BI

Let's get you started

Looks like you need to create a new account. Let's get you started! Continue as [studentamz11@gmail.com](#).

[Set up account](#) [Change my email](#)

6. Enter your details and click **Next**.

Tell us about yourself

First name * Student Middle name (Optional)

Last name * AMZ

Job title * Data Analyst

Business phone number * 1300 194 753

Company name * AMZ Consulting Pty Ltd Company size * 10-24 people

Country or Region * Australia

The currency, tax, and price in the order summary may change when the country or region is changed.

I understand that Microsoft may contact me about my trial.

7. Set up your password and click **Next**.

How you'll sign in

This username is what you'll use to sign in each time you use your apps. The domain name is a suggestion. You can change your domain now, or later at any time with your own custom domain.

Username * StudentAMZ Domain name * @ AMZConsultingPtyLtd.onmicrosoft.com Save

Password *

Confirm password *

[Next](#)

8. Enter your details for quantity. Then click on **Add payment method** and enter your details.

Subscription & account details Sign-in details Payment info and finish

Quantity and payment

First month is free

Product name	Price (AUD)	Quantity	Subtotal (AUD)
Microsoft 365 Business Basic Trial	A\$9.00 / user / month	1	A\$9.00 Maximum of 25 during trial

Yearly plan, paid monthly after trial (before tax): A\$9.00
Total today: A\$0.00

Prices shown do not include GST. The "Payment and Billing" page will show amounts payable including GST (if applicable) before you purchase.

[Add payment method](#)

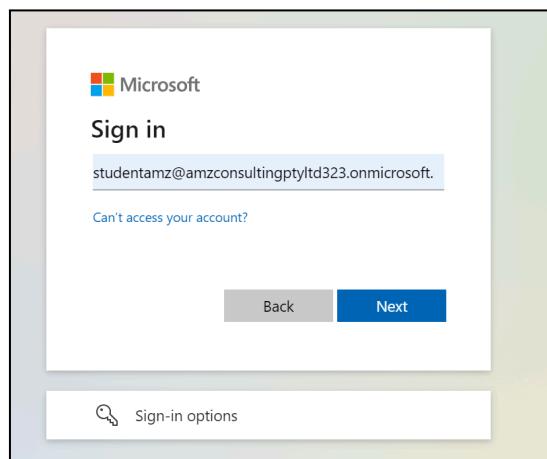
9. Keep track of the new email address and wait a few minutes for the setup to complete.



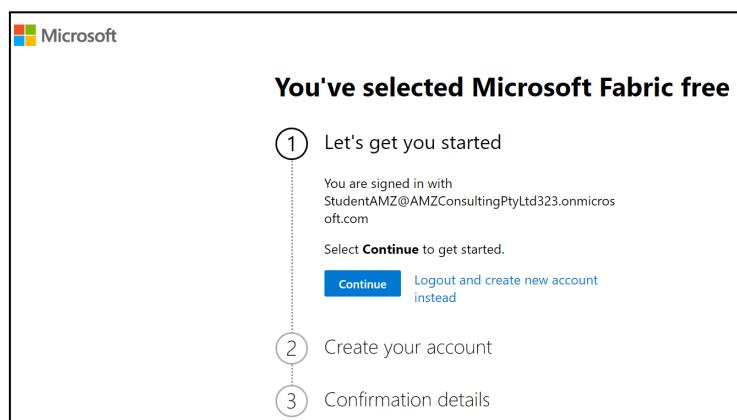
Signing Up for Power BI Service

We can now use the Office365 Business Basic trial account we created in the previous step to sign up for the Power BI service.

1. On the browser, go to www.powerbi.com.
2. Sign in with Enter the Office365 Business Basic Trail email address you created in the previous section. Click **Next**.



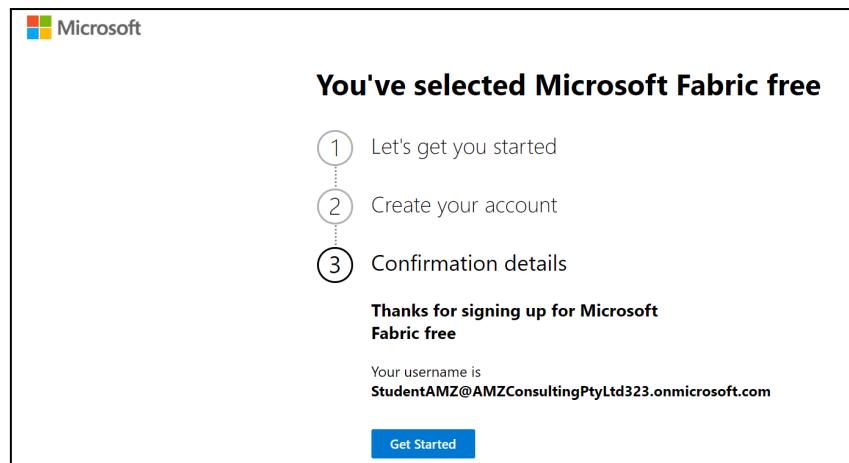
3. In the **Let's get you started** Section, click on **Continue**.



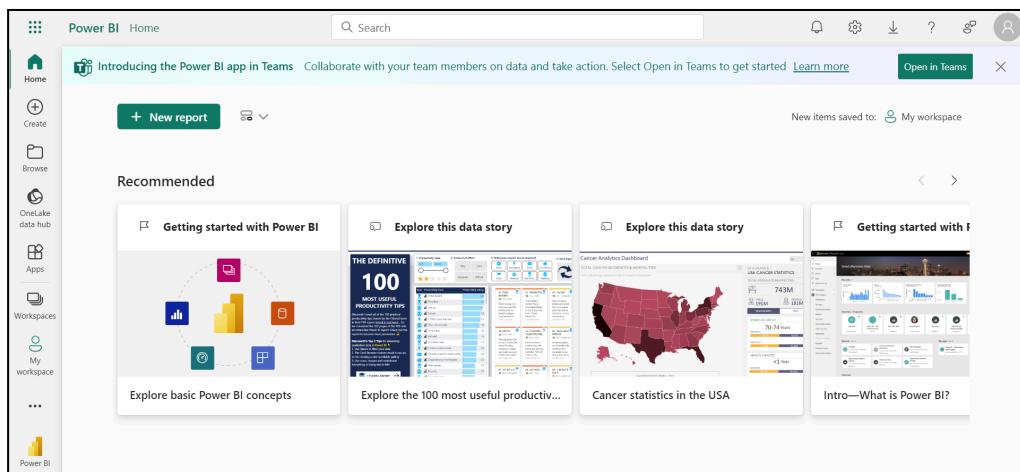
4. Fill out the details required in the **Create your account** Section.



CHAPTER 2: GETTING STARTED WITH POWER BI



5. You have successfully signed up for Power BI Service.



Power BI Service License Comparison

Changes in Microsoft Licences have been coming quickly. It is advisable to subscribe to [Power BI blogs](#) to remain current with the latest announcements.

Three types of Power BI licences/subscriptions per users are listed on the pricing page:

Power BI in Microsoft Fabric free account:

Power BI Free is included in all Office 365 Plans, and you can sign up for Power BI Free any time you like. With Power BI Free, some of the features you get are as follows:

- ✓ You can consume a data capacity of up to 1 GB/user.
- ✓ With this licence, you can import data from 70+ data sets.
- ✓ It allows users free access to Power BI Desktop.

Power BI Pro:

Power BI Pro costs \$10/user/month (AUD 15.21). It is also included in Office 365 Enterprise E5. With Power BI Pro, some of the features you get are as follows:

- ✓ Everything you get with Power BI Free License.
- ✓ You can consume up to 10 GB/user data capacity.
- ✓ With this licence, you can import data from 70+ data sets and share reports with other users.
- ✓ Consumers of the report also require a Pro licence.

Power BI Premium:

Power BI Premium costs \$20/user/month (AUD 30.42). It is mainly used by businesses who want Premium license services but don't want to pay much; it offers most Premium services except for unlimited distribution and multi-geo support. It is also included in Office 365 Enterprise E5. With Power BI Premium, some of the features you get are as follows:

- ✓ Everything you get with Power BI Free License.
- ✓ You can consume up to 100 TB Maximum storage.
- ✓ With this license, you can import data from 70+ data sets and share reports with other users.

To get more information regarding the subscriptions per capacity types, visit the Microsoft official webpage: <https://powerbi.microsoft.com/en-us/pricing/>



Downloading Power BI Desktop

There are two main ways to download Power BI Desktop:

- ✓ Microsoft Download Center
- ✓ Microsoft Store (this option is only available for Windows 10 and later)

Downloading via Microsoft Download Center

To download from Microsoft Download Center:

1. Go to the Microsoft Download Center

<https://www.microsoft.com/en-us/download/details.aspx?id=58494>.

2. Click on the Download button.

The screenshot shows the Microsoft Download Center page for Power BI Desktop. At the top, there's a banner for Microsoft 365 with options for 'For 1 person' and 'For up to 6 people'. Below the banner, there's a section for 'Power BI Desktop' with a brief description: 'Microsoft Power BI Desktop is built for the analyst. It combines state-of-the-art interactive visualizations, with industry-leading data query and modeling built-in. Create and publish your reports to Power BI. Power BI Desktop helps you empower others with timely critical insights, anytime, anywhere.' A note below says, 'Important! Selecting a language below will dynamically change the complete page content to that language.' There are dropdown menus for 'Select language' (set to English) and a red 'Download' button.

3. Choose the version of Power BI Desktop that matches your operating system (32-bit or 64-bit).

The screenshot shows a modal window titled 'Choose the download you want'. It lists three download options:

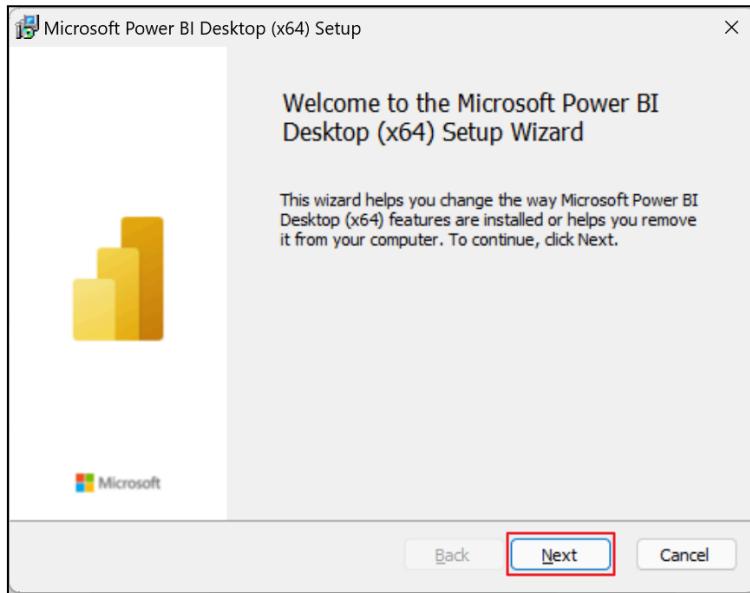
File Name	Size
PBIDesktopSetup.exe	430.6 MB
PBIDesktopSetup_x64.exe	479.2 MB

A blue 'Download' button is at the bottom left, and a note at the bottom right says 'Total size: 909.8 MB'.



CHAPTER 2: GETTING STARTED WITH POWER BI

4. Run the setup file to install **Power BI Desktop**.



5. Click **Next** and follow the on-screen instructions to complete the installation.
6. Select **Finish** to run it.



7. On the startup screen, select **Sign In** and enter your Office365 Business Basic email address and password.
8. You can now use Power BI Desktop.

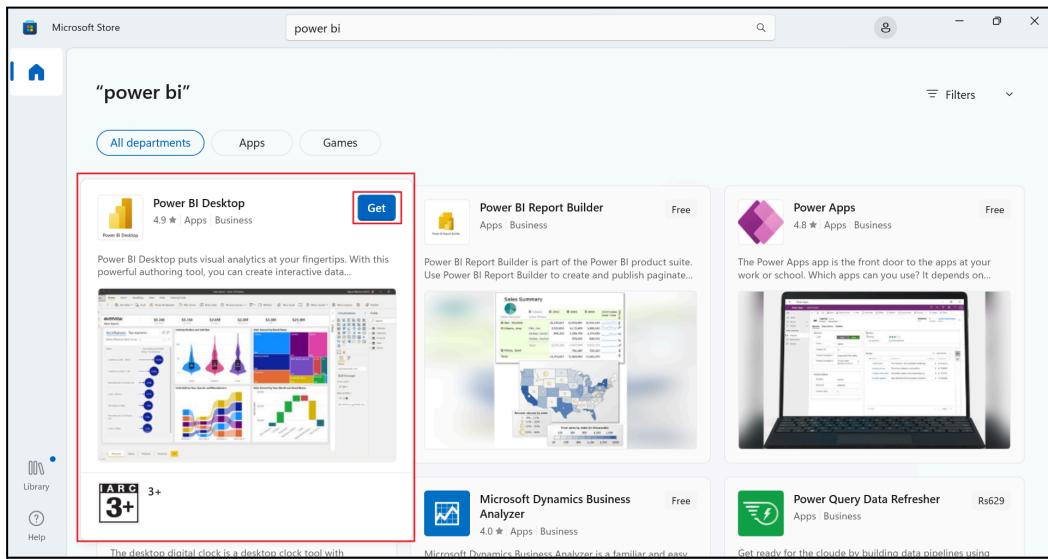
Downloading via Microsoft Store:

1. Open the Microsoft Store app.
2. Search for Power BI Desktop.



CHAPTER 2: GETTING STARTED WITH POWER BI

3. Click on the Get button.



4. Power BI Desktop will be downloaded and installed automatically.



CHAPTER 3

Power BI Desktop Navigation

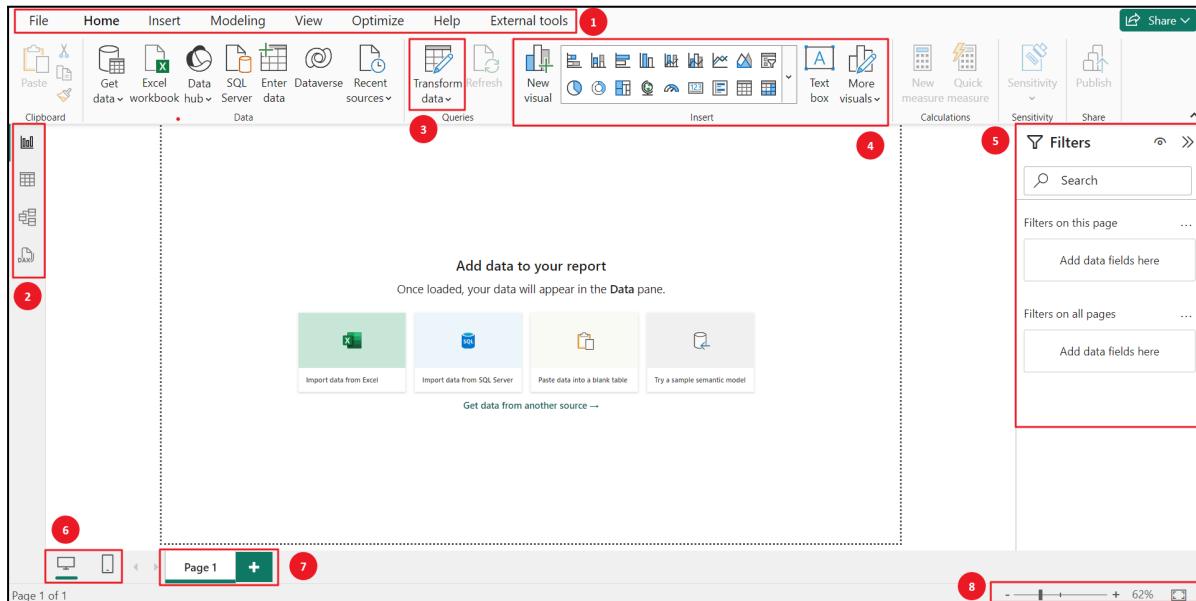
- ✓ Exploring Power BI Desktop Navigation
- ✓ Getting Familiar with Ribbon Menu
- ✓ Getting Familiar with Tab Menu
- ✓ Introduction to Pane Switcher and Filter Pane
 - ❑ Filters Pane
- ✓ Getting Started with Power Query Editor
 - ❑ Power Query Editor Layout



Exploring Power BI Desktop Navigation

Power BI Desktop is a free desktop application that lets you import data from different sources, transform it, and convert it to visually compelling reports and dashboards. It also lets you share your reports on the web via Power BI Service. This section will introduce you to different menus and sections of Power BI Desktop.

Power BI Desktop has four different sections for navigation purposes:



1. Ribbon Menu
2. Tab Menu
3. Power Query Editor
4. Visualizations Section
5. Filters Page
6. Desktop/Mobile Layout
7. Report Pages
8. Zoom Control

We will discuss these in detail one by one in the next section.

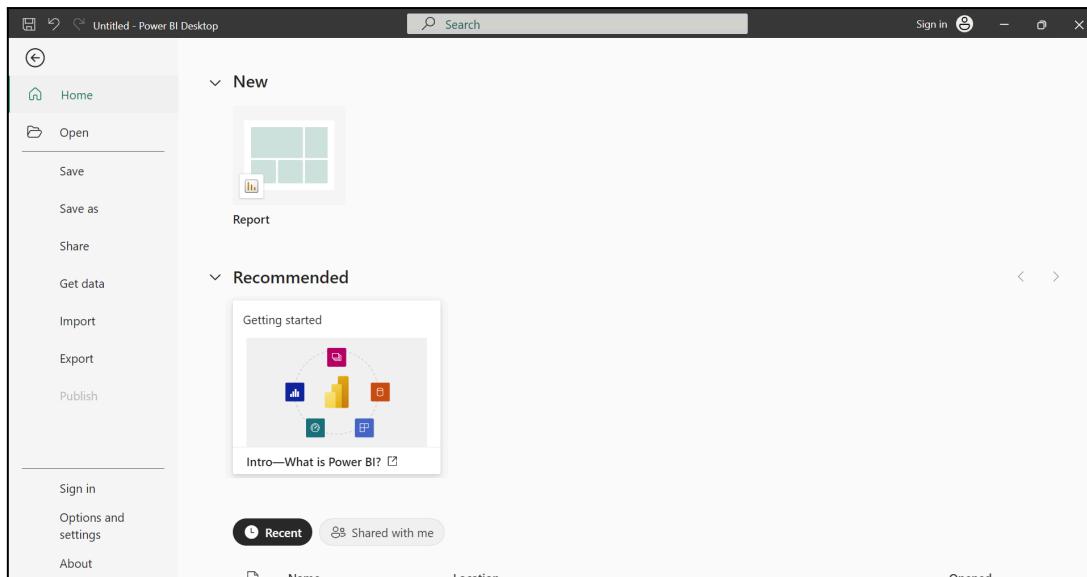


Getting Familiar with Ribbon Menu

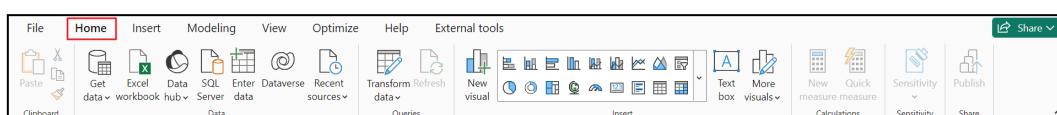
Power BI Desktop's Ribbon menu, like other Microsoft products, includes various options to interact with the application. Let us discuss some of them briefly.



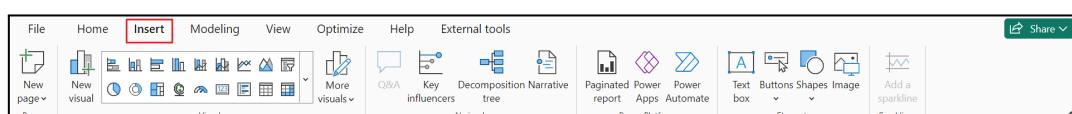
File: Once you are in the report view, in the upper left corner, you have the File menu containing various options related to the file.



Home: The home tab in the ribbon menu consists of various sub-sections that provide options to help you create and publish reports.



Insert: This tab of the ribbon menu contains all the options for adding new components to the report.



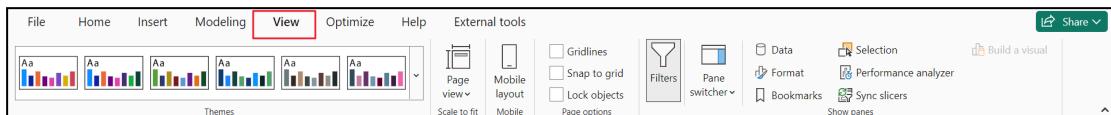
Modelling: This tab of the ribbon menu contains all options related to data modelling.



CHAPTER 3: POWER BI DESKTOP NAVIGATION



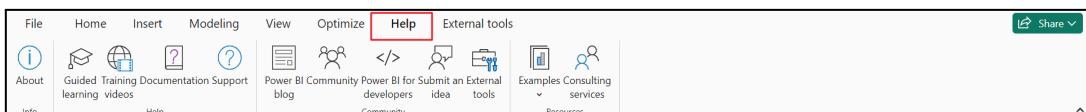
View: This tab of the ribbon menu contains options related to the user interface.



Optimise: This tab of the ribbon menu contains options to identify slow-performing visuals and explore potential bottlenecks.



Help: – This tab of the ribbon menu contains multiple options for help.

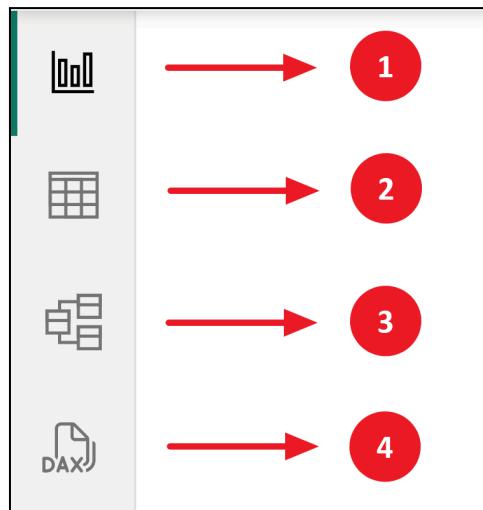


External Tools: – This tab provides access to resources and connections.



Getting Familiar with Tab Menu

On the left side of the application, you will see three tabs. Let us explore them from top to bottom.



1. **Report:** This allows you to access the canvas to create your report using different visual techniques.
2. **Table View:** This section visualizes all your datasets in tabular format.
3. **Model View:** You can see the tables' relationship here. You can also rearrange and connect different tables to form a data model.
4. **DAX Query View:** It allows you to write and run DAX queries directly within Power BI, giving you increased flexibility and control over your data model and calculations.

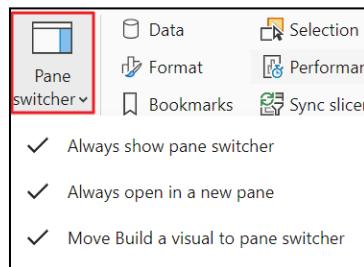


Introduction to Pane Switcher and Filter Pane

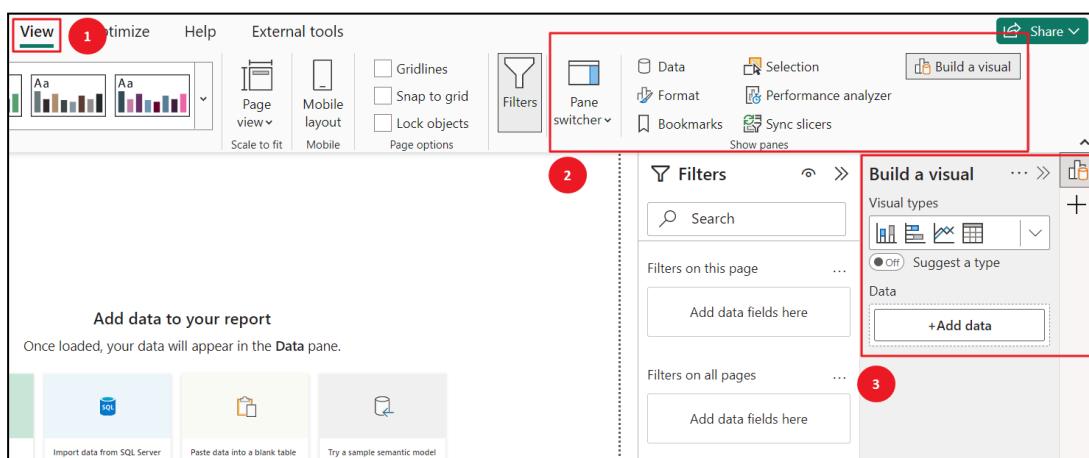
The Power BI Desktop interface has evolved significantly, introducing the Pane Switcher as a critical component in streamlining your report creation workflow. The Pane Switcher is a vertical bar on the right side of your Power BI Desktop window, providing quick and easy access to essential panes.

Getting Started with the Pane Switcher:

1. Click on the **View** tab.
2. Select the panes to show on the right in the **Show Panes** section. Select all options in the pane switcher dropdown menu.



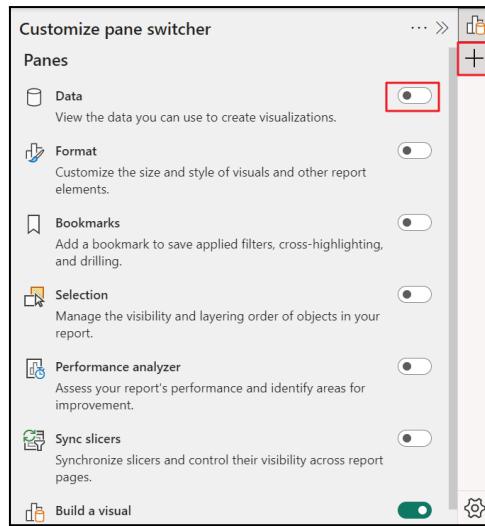
3. Customize the displayed panes and their order.



4. To add a pane, click on the + sign and then click on the pane toggle.

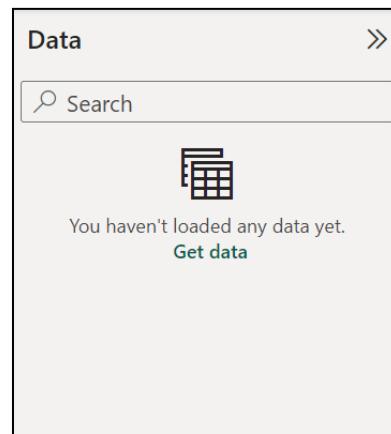


CHAPTER 3: POWER BI DESKTOP NAVIGATION

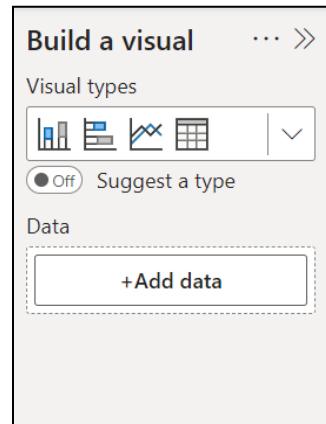


Different Panes in the pane section are:

- ✓ **Data:** This pane contains all the tables in your datasets/data models and their respective fields/columns.

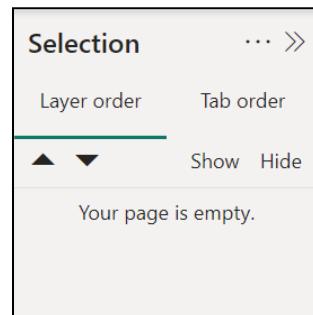


- ✓ **Build a Visual:** All visuals and their relevant configuration options are found in this tab.

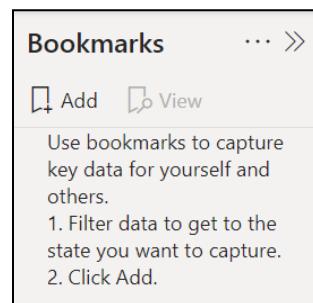


CHAPTER 3: POWER BI DESKTOP NAVIGATION

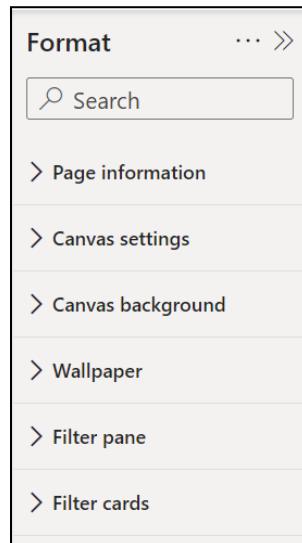
- ✓ **Selection:** Explore data interactions and selections made on your visuals.



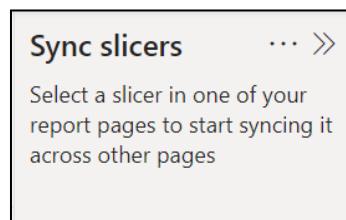
- ✓ **Bookmarks:** Navigate through specific report sections or visualizations.



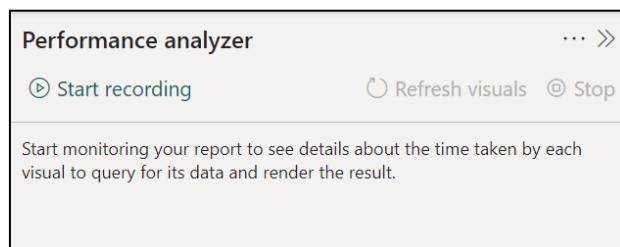
- ✓ **Format:** Customize the visual appearance of your charts and graphs.



- ✓ **Sync Slicers:** This helps ensure consistency and synchronization of slicers across different report pages.

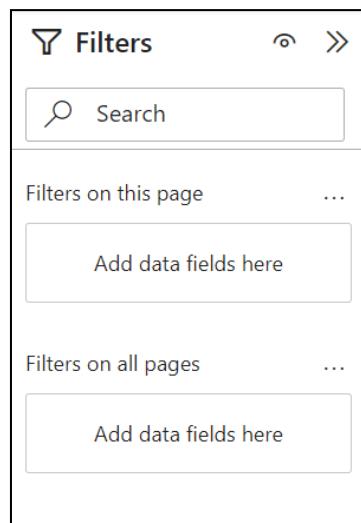


- ✓ **Performance Analyzer:** It is used to analyze the time it takes for different visual elements in your report to update when interacting with slicers, filters, or other controls.



Filters Pane

In the Filters pane, you can configure new filters and update existing filters.

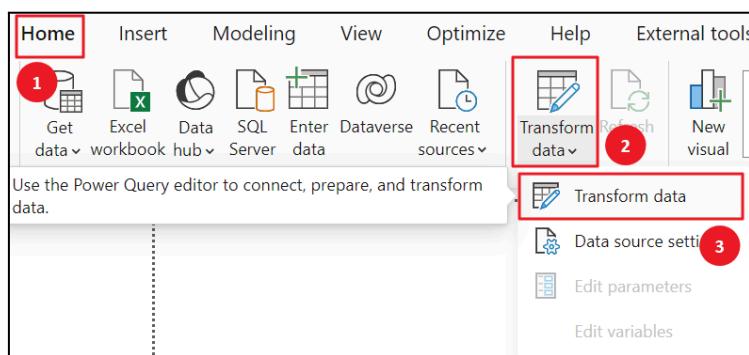


Getting Started with Power Query Editor

Power Query Editor lets you clean and transform data for further analysis. It has multiple options to assist you in pre-processing your datasets and make them usable for visualizations. It lets you record every step to transform or clean data so that it can be reviewed, amended, or removed later if required.

To open the Query Editor:

1. Click on the **Home** tab in the **Ribbon Menu**.
2. In the **Queries** section, click on **Transform Data**.
3. Now click on **Transform Data** to enter the **Query Editor**.



Power Query Editor Layout

Let us explore the navigation options briefly.

The screenshot shows the Power Query Editor interface. Step 1 highlights the ribbon menu. Step 2 highlights the 'Queries [3]' pane on the left, which lists 'Country Table', 'Product Table', and 'Sales Table'. Step 3 highlights the formula bar with the formula '= Table.TransformColumnTypes(#"Promoted Headers", {"[Sales Data]", type date}, {"Column2", "Column3", "Column4", "Column5"})'. Step 4 highlights the 'Properties' pane on the right, which shows 'Name: Sales Table' and 'Applied Steps: Promoted Headers, Changed Type'. Step 5 highlights the main data grid area.

1. **Ribbon Menu:** The Ribbon menu contains tabs with various options to help you in data cleaning and transformation.
2. **Queries Pane:** This pane contains all the tables.



3. **Data View:** This area shows a tabular view of your data.
4. **Query Settings:** All the steps performed on the data are recorded here during data cleaning and transformation.
5. **Row and Column Count:** It shows the total rows and columns of the data based on the current profile.



CHAPTER 4

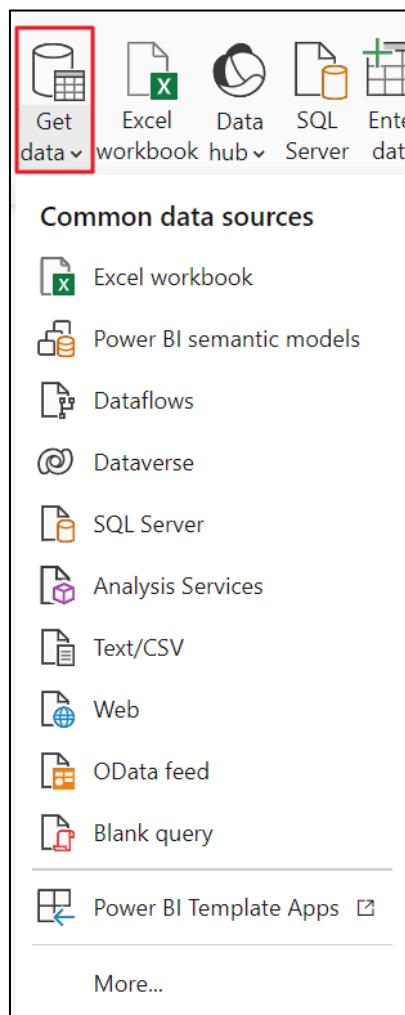
Getting Data from Data Sources

- ✓ Getting Data in Power BI
 - File
 - Database
 - Power BI Platform
 - Azure
 - Online Services
 - Other
- ✓ Getting Data from Excel



Getting Data in Power BI

Power BI supports connection to an ample number of data sources like File, Azure Cloud Services, SQL Databases, websites, and even from web applications like Salesforce and Google Analytics, etc. You can connect to these sources by clicking the Get Data button in the Home ribbon. Some common data source categories are:



File:

The file category contains different file types, including Excel, CSV, XML, PDF, Jason, etc. You can even connect to a folder containing multiple flat files.

Database:

The database category contains industry big names like Oracle, SAP Hana, Amazon Redshift, SQL, IBM, etc.

Power BI Platform:

This lets you connect with Power Platform sources.



Azure:

Microsoft has its own Cloud Service called Azure. This category contains a long list of Azure-based databases to connect to.

Online Services:

The online services section provides connectivity with SaaS tools such as Google & Adobe Analytics, Salesforce, Dynamics, Facebook, and GitHub.

Other:

You can also connect to other data sources like Web, R scripts, Hadoop files, ODBC, Active Directory, and Microsoft Exchange here.



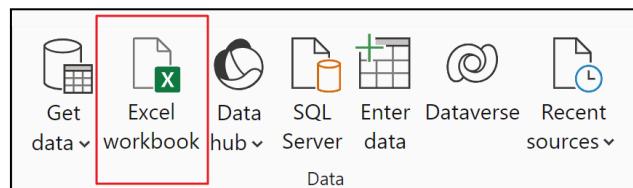
Getting Data from Excel

Excel is still by far the most widely used spreadsheet app by many businesses worldwide. For this manual, download the **Sales Data** workbook from:

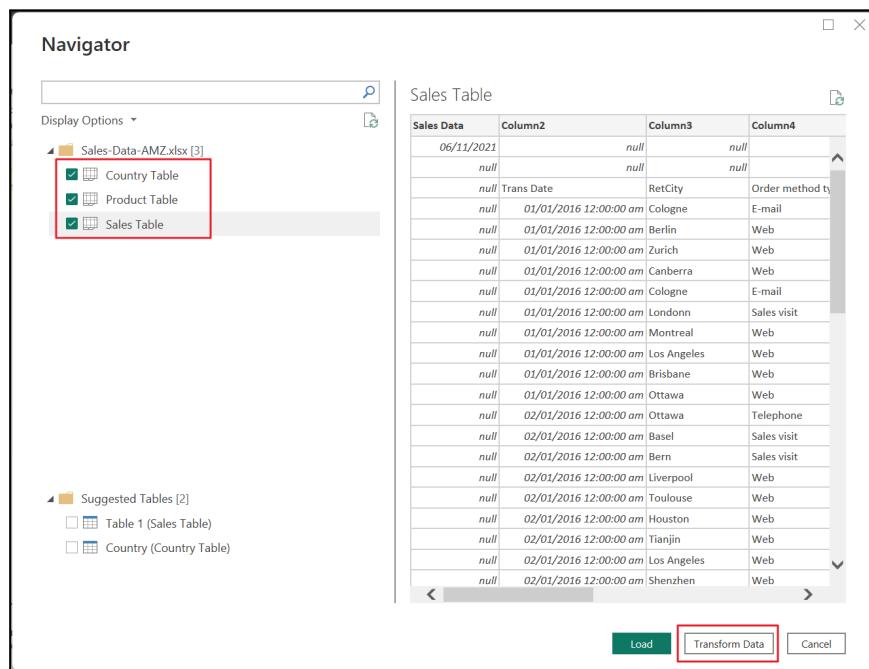
<https://www.powerbitraining.com.au/powerbidesktopcrashcoursedownloads/>

You can get the data from Microsoft Excel into Power BI by following the below-mentioned steps.

1. Click on **Excel Workbook** in the Data section of the **Home** tab in the Ribbon.



2. Browse to the location where you saved the dataset on your computer to open it.
3. Click on sales, country, and product.
4. Click **Transform Data**.



Wait for the processing to finish and the Navigator windows to appear.

*Sometimes, you need to change the path of your source file. You just need to hit on **Home Tab** >**Transform data**>**Data Source Settings**. Here, you can browse your desired file path. This will update the source, and refreshing your report will show the impact as well.*



CHAPTER 5

Data Transformation

- ✓ Removing Blank Rows from the Top
- ✓ Using the First Row as a Header
- ✓ Removing Blank Columns and Choosing Relevant Columns
- ✓ Renaming Column Names
- ✓ Understanding the Data Types
 - ❑ Number Data Types
 - Decimal Number
 - Fixed Decimal Number
 - Whole number
 - ❑ Date/ Time Data Types
 - Date/Time
 - Date
 - Time
 - ❑ Text Data Type
 - Text
 - Boolean
- ✓ Removing Errors
- ✓ Removing Duplicates



Removing Blank Rows from the Top

As you can see there are some blank rows on the top. We will start by removing them.

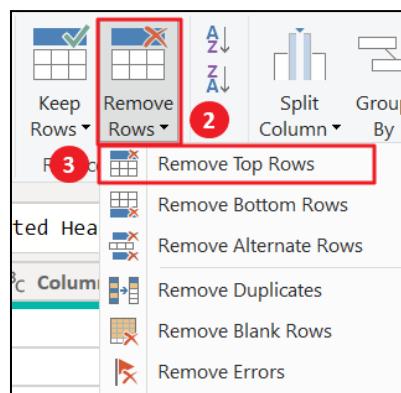
To Remove Top Rows:

1. Click on **Sales Table** Query on the left pane.

The screenshot shows the Power BI Query Editor with the 'Sales Data' query selected. The first two rows of the table are empty (containing only null values) and are highlighted with a red box. The table has five columns: Trans Date, RetCity, Order method type, Urgent?, and Sales visit. The 'APPLIED STEPS' pane on the right shows the 'Promoted Headers' step.

The top 2 rows are empty and need to be removed.

2. Select **Remove Rows** on the **Home** tab.
3. Click on **Remove Top Rows** from the dropdown list.



4. Type the number of rows, which is 2.



5. Click **OK**.

	Sales Data	Column2	Column3	Column4	Column5
1	null	Trans Date	RetCity	Order method type	Urgent?
2	null	01/01/2016 12:00:00 am	Cologne	E-mail	NO

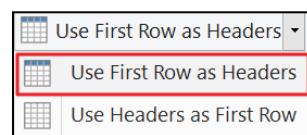


Using the First Row as a Header

After removing the top 2 empty rows, we can see that the Header still contains Column 1, Column 2, etc. However, our headings (Trans Date, Ret City, etc.) remain in Row 1.

To promote the first row to column header names:

1. Click on **Sales Table Query** on the left pane.
2. Select **Use First Row as Headers**.
3. Click on **Use First Row as Headers** from the drop-down.



The column names in the first row will be promoted to column header names.

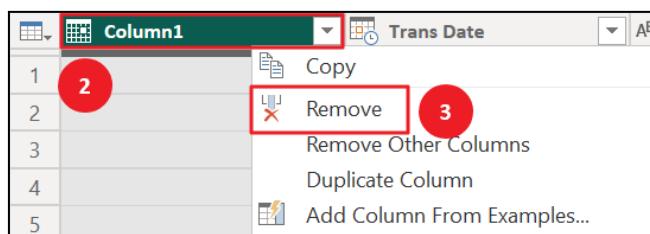
	Column1	Trans Date	RetCity	Order method type	Urgent?	Retailer type
1	null	01/01/2016 12:00:00 am	Cologne	E-mail	NO	Sports Store
2	null	01/01/2016 12:00:00 am	Berlin	Web	YES	Outdoors Shop
3	null	01/01/2016 12:00:00 am	Zurich	Web	NO	Department Store



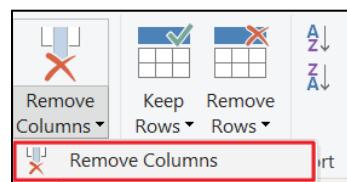
Removing Blank Columns and Choosing Relevant Columns

Now, we will remove blank and irrelevant columns.

1. Click on **Sales Table Query** on the left pane.
2. Right-click on the **Column1** header to select the blank column.
3. Click on **Remove**.

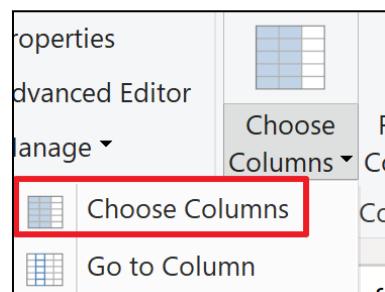


*Columns can also be removed by clicking on **Manage Columns > Remove Columns > Remove columns**.*



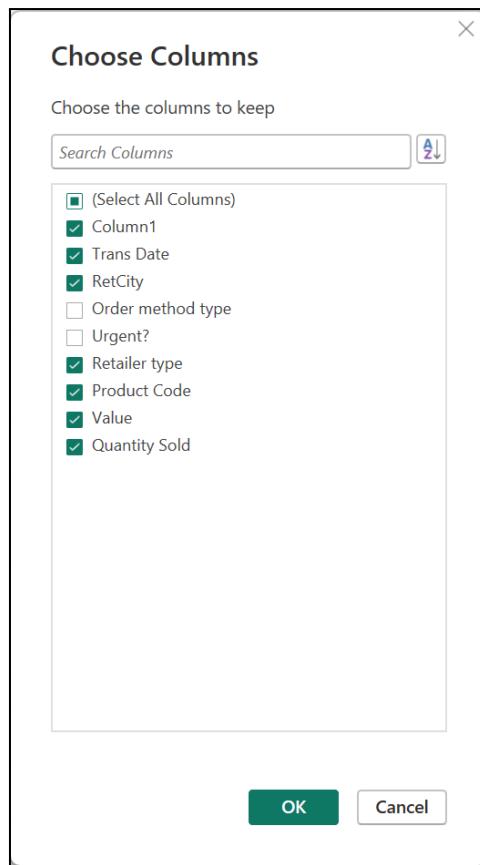
In addition, we don't need columns **Order Method Type** and **Urgent** for our analysis, so will remove them, too. The Choose Column option is another handy way to remove irrelevant columns (especially when dealing with large queries).

4. Select **Choose Columns > Choose Columns** from the Home tab.



5. Uncheck the **Order method type** and **Urgent** columns.





6. Click **OK**.
7. Similarly, we will remove the blank columns from the **Country Table**.
8. Click on **Country Table Query** on the left pane.
9. Click on **Column 3, Column 4 up to Column 9** headers while pressing the **Shift** key to select the blank columns.
10. Click on **Manage Columns > Remove Columns > Remove columns**.



Renaming Column Names

Now, we will rename columns. The intention is to make column names as easy as possible.

You can rename a column in two ways:

- ✓ Right-click on a column header and select rename.
- ✓ Double-click on the column header and write a new name.

To Rename a column:

1. Click on **Sales Table** Query on the left pane.
2. Click on **Trans Date** and rename it to **Transaction Date**.
3. Click on the **Value** column to rename it to **Sale Price**.
4. Click on **RetCity** and rename it to **Retailer City**.

	Transaction Date	ABC Retailer City	ABC Retailer type	ABC Product Code	1.2 Sale Price	ABC 123 Quantity Sold
1	01/01/2016 12:00:00 am	Cologne	Sports Store	H33	39.84	217
2	01/01/2016 12:00:00 am	Berlin	Outdoors Shop	F24	35.09	96
3	01/01/2016 12:00:00 am	Zurich	Department Store	H34	17.3	381
4	01/01/2016 12:00:00 am	Canberra	Outdoors Shop	H35	120.91	361

5. Similarly, click on **Product Table** Query on the left pane.
6. Click on **Product type** and rename it to **Product Type**.
7. Click on **Product line** and rename it to **Product Line**.

	ABC Product Code	ABC Product Line	ABC Product Type
1	E10	Camping Equipment	Lanterns
2	E11	Camping Equipment	Lanterns



Understanding the Data Types

Although Power BI can detect correct data types automatically, we may need to change them at times. Some Important Data Types are explained below:

Number Data Types:

- ✓ **Decimal Number:** This data type can store numbers with a decimal separator, and the numbers can be up to 15 digits long. The decimal can be placed anywhere between numbers.
- ✓ **Fixed Decimal Number:** It has a fixed location of decimal occurrence, as it can only have a maximum of four digits to the right. The maximum length of this type of number is 19 digits. This type is ideally used for currency representation.
- ✓ **Whole number:** These numbers are a maximum of 19-digit long numbers with no decimal separator. It can be represented as both positive and negative.

Date/ Time Data Types:

- ✓ **Date/Time:** Both date and time values can be stored under this data type. Dates from 1900 to 9999 are supported.
- ✓ **Date:** Only date is supported with no time. It is suitable for scenarios where Time has no significance in the calculations.
- ✓ **Time:** Only time is supported with no date. It is suitable for scenarios where the Date has no significance in the calculations.

Text Data Type:

- ✓ **Text:** This data type is a Unicode character data string and can store anything from strings, numbers, or dates in a text format. The maximum allowed length is 268,435,456 Unicode characters. Data stored under this data type will have no impact on numerical calculations..

Boolean:

- ✓ **True/False:** This data type only sets a value to True or False.

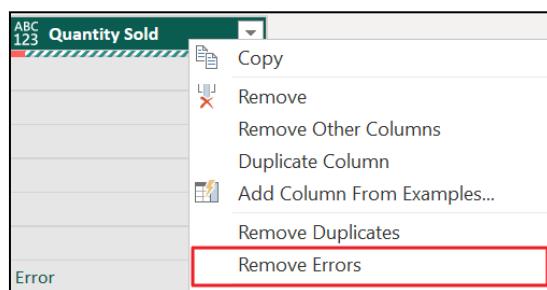


Removing Errors

Getting rid of erroneous values is also involved in the Data Transformation process. As you can see, we have some errors in the Quantity Sold Column.

To remove errors:

1. Click on **Sales Table Query** on the left pane.
2. Right-click on the **Quantity Sold** column header.
3. Click on **Remove Errors** from the dropdown list.



Visit our Blogs, to learn more about Data Transformation:
<https://www.powerbitraining.com.au/category/data-transformation/>



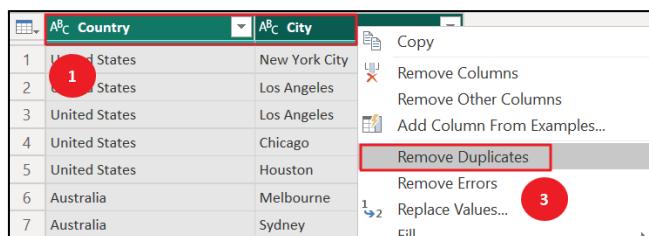
Removing Duplicates

Duplicates are one of the common problems in datasets. So far, we have been working with **Sales Table**. In this exercise, we will be working with **Country Table**. As you can see, **Los Angeles** and **Melbourne** are duplicates.

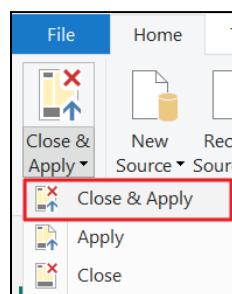
	A ^B C Country	A ^B C City
1	United States	New York City
2	United States	Los Angeles
3	United States	Los Angeles
4	United States	Chicago
5	United States	Houston
6	Australia	Melbourne
7	Australia	Sydney
8	Australia	Brisbane
9	Australia	Melbourne
10	Australia	Canberra

You can cope with this issue by following the steps below.

1. Click on the **Country** column header, hold the **Shift key**, and click on the **City** column header to select both.
2. Right-click on the **City** column header.
3. Click on **Remove Duplicates**.



4. Now click on “Close & Apply” at the top left corner.



Congratulations on completing the Data Transformation chapter! Ready to take your Power BI skills to the next level? Check out our Power BI Essentials Course for a comprehensive introduction to the world of Power BI:
<https://powerbitraining.com.au/power-bi-basic-training-course/>



CHAPTER 6

Introduction to Data Modeling

- ✓ Understanding Data Modeling
 - Primary Keys (or a Unique Identifier)
 - Foreign Keys
- ✓ Cardinality and Cross Filter Direction
 - Cardinality
 - Many to One (*:1)
 - One to One (1:1)
 - One to Many (1:*)
 - Many to Many (*:*)
 - Cross Filter Direction
 - Single
 - Both
- ✓ Deleting Relationships
- ✓ Creating New Relationships: Drag and Drop



Understanding Data Modeling

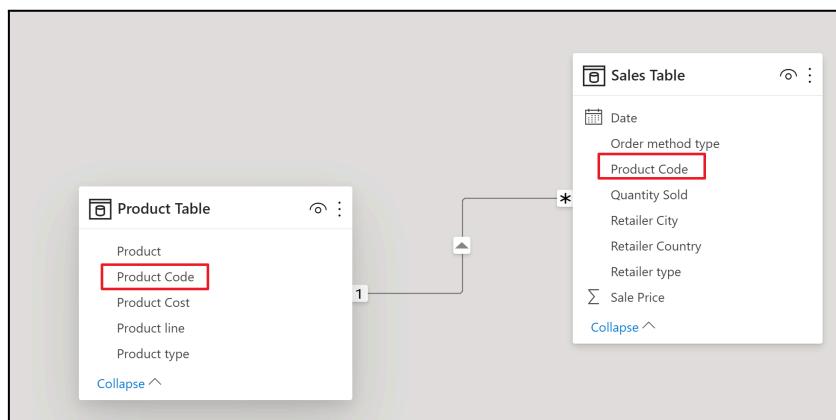
Data Modeling is the process of creating relationships between multiple datasets. These **Relationships** are established by relating the **Primary Key** and **Foreign Key**. Once relationships are in place, these datasets act as a single data model, which can be used for Visualization and reporting.

Primary Keys (or a Unique Identifier)

The **Primary Key** is the field that uniquely identifies each row in the table. In our case, the **Product Code** in the **Product Table** will act as a **Primary Key**.

Foreign Keys

A **Foreign Key** is the field that refers to the **Primary Key** in another table. Foreign keys can have duplicates. In our case, the **Product Code** in the **Sales Table** will act as a **Foreign Key** for the **Product Code** in the **Product Table**.



Tables having Primary keys are referred to as **Dimension Tables** or **Lookup Tables**. Tables having foreign keys are referred to as **Fact Tables** or **Data Tables**. Usually, a data model has a single **Fact Table** surrounded by multiple **Dimension Tables**.



Cardinality and Cross-Filter Direction

There are two crucial aspects in establishing the relationship between two data sets. These are Cardinality and Cross Filter Direction. Let's discuss them in detail.

Cardinality

Cardinality is the type of connection established between two tables. There are four types of Cardinalities in Power BI. The relation between tables is denoted by two symbols, the asterisk (*) and 1, where the asterisk (*) represents many sides and 1 denotes a single side.

1. Many to One (*:1) – This means the column in a given table can have more than one instance of a value, and the other related table has only one instance of a value.
2. One-to-One (1:1) – One primary key from the dimension table will be linked to just one foreign key in the fact table.
3. One to Many (1:*) – This means the column in one table has only one instance of a particular value, and the other related table can have more than one instance of a value.
4. Many to Many (*:*) – A many-to-many relationship between tables removes requirements for unique values in tables. This setting indicates multiple records for the single value in both tables.

Cross Filter Direction

The arrow in the centre of the line represents the direction of filtering being applied to two tables and is called Cross Filter Direction. There are two types:

1. **Single** – This is the default type. It means that filtering flows from the dimension table towards the fact table.
2. **Both** – This means filtering flows from the dimension table towards the fact table and vice versa.

Cardinality: The **one-to-many** and **many-to-one** cardinality options are essentially the same and the most common type.

Cross-filtering Direction: The “**Both**” Cross Filter Direction type is used in rather complex data models and should be used cautiously as it may lead to unexpected results.



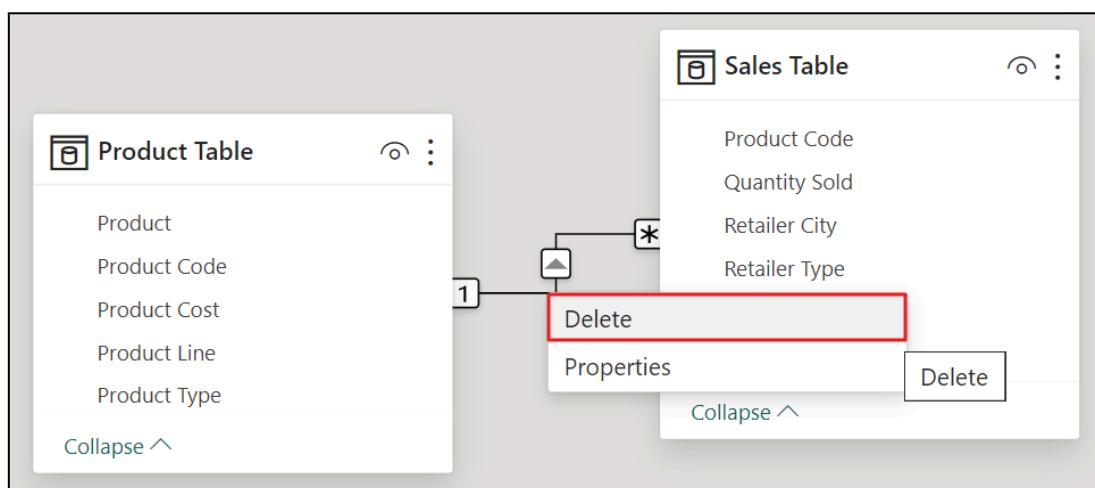
Deleting Relationships

Relationships between data sets are auto-detected by Power BI based on columns/field names and values. However, sometimes, this guesswork by Power BI can be incorrect. Let us discuss deleting and re-establishing the relationship to rectify the error.

1. Switch to the **Model view** tab from the left pane by clicking the Relationships icon in the screenshot.



2. Right-click on the line connecting the two tables, select **Delete**, or press the delete key on the keyboard.



The line connecting the tables disappears.

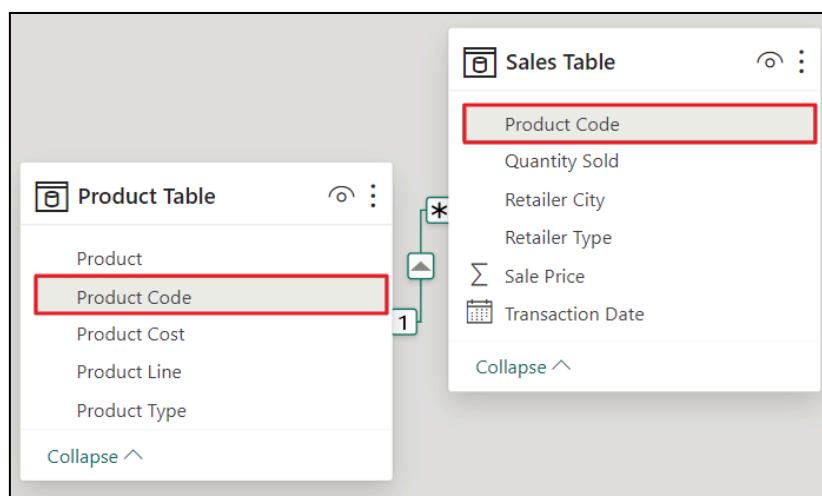


Creating New Relationships: Drag and Drop

A simple drag-and-drop method can be used to create a relationship between two tables. We will discuss the **drag-and-drop** method here.

To create relationships using this method:

1. Click on the **Product Code** field in the **Product Table**.
2. Drag the mouse from the **Product Code** field in the **Sales Table** and drop it on the **Product Code** field in the **Sales Table**.



A relationship line will appear connecting the Product Table and the Sales Table.

Well done on mastering Data Modeling! Ready for more advanced techniques? Explore our Power BI Advanced Course and elevate your data modelling skills to new heights:
<https://powerbitraining.com.au/power-bi-advanced-training-course/>
 Visit the following link to read blogs about Data Modelling:
<https://www.powerbitraining.com.au/category/data-modeling/>



CHAPTER 7

Introduction to DAX

- ✓ What is DAX?
- ✓ What is DAX Query View?
- ✓ Defining Calculated Columns
- ✓ Defining Measures



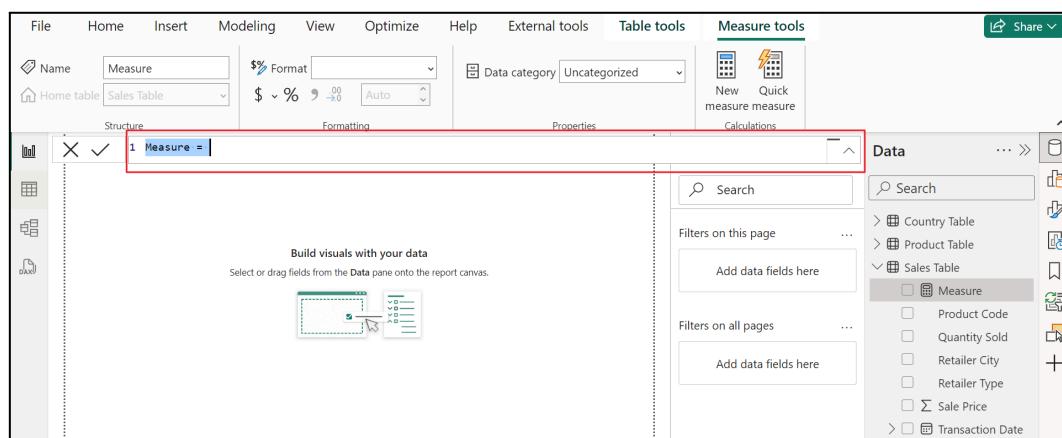
What is DAX?

DAX stands for **Data Analysis Expressions**. DAX is a formula language, which means there is one formula call with many parameters. This function call can also contain other function calls as parameters.

DAX is used and applied in many Microsoft tools and platforms such as:

- ✓ Power BI
- ✓ Microsoft Power Pivot for Excel
- ✓ SSAS Tabular

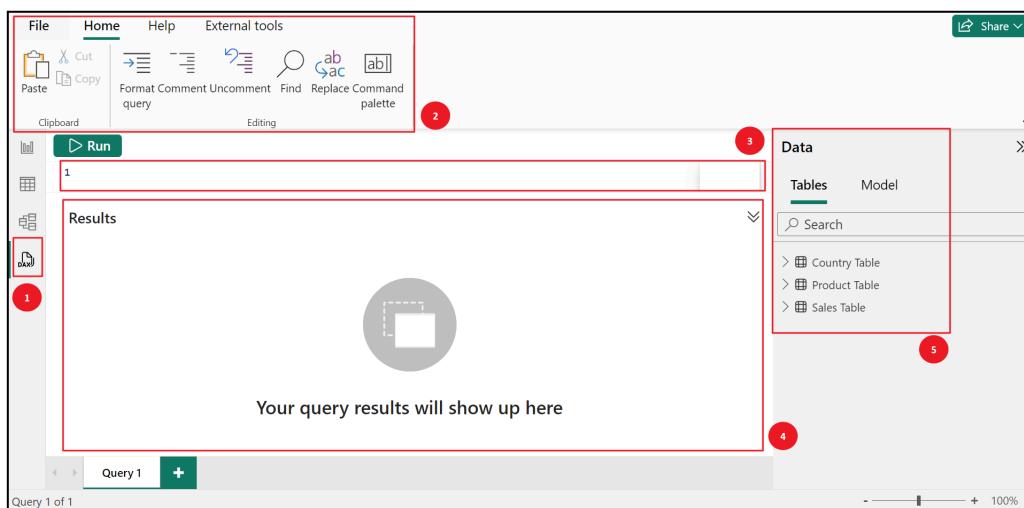
All the DAX codes are typed in the formula bar below. A DAX expression consists of a formula followed by a measure or a column reference. The measure/column tool additionally provides all the information related to the measure or column.



What is DAX Query View?

With DAX query view in Power BI, you can view and work with DAX queries in semantic models. In Power BI, DAX formulas define different types of calculations for your data. DAX queries, on the other hand, can be used to return data from the model.

Select the **DAX Query View** icon on the left to open DAX Query View in Power BI Desktop.



1. DAX Query View
2. Ribbon Menu
3. Command Bar
4. Result Grid
5. Data Pane

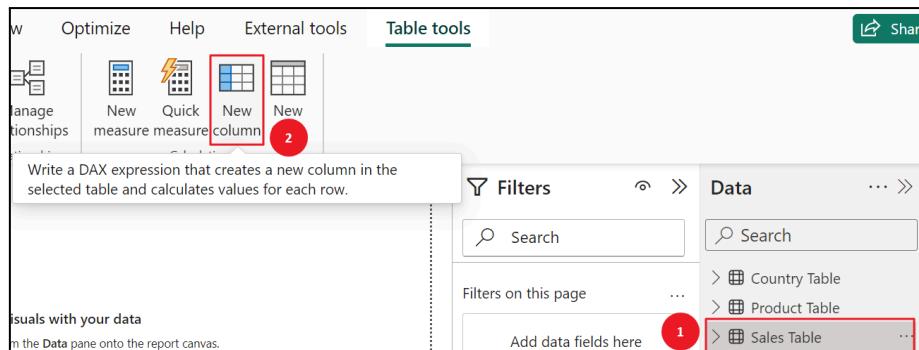


Defining Calculated Columns

We can calculate additional columns from existing columns to create various visuals. This enriches your dataset and enables you to perform in-depth analysis.

To create Calculated Columns:

1. Click on the **Sales Table**.
2. Click on the **New Column** in the **Ribbon** menu.



Let's get **Product Cost** in the **Sales Table** from the **Product Table**.

3. Type the following **DAX formula** in **Formula Bar**.

Product Cost (CC) = RELATED('Product Table'[Product Cost])

```

1 | Product Cost (CC) =
2 | RELATED ( 'Product Table'[Product Cost] )

```

Let's Create a **Revenue** column by multiplying the **Quantity Sold** by the **Sale Price**.

4. Right-click on the **Sales Table**.
5. Click on **New Column**.
6. Type the following DAX formula in **Formula Bar**.

Revenue (CC) = 'Sales Table'[Quantity Sold]*'Sales Table'[Sale Price]

```

1 | Revenue (CC) =
2 | 'Sales Table'[Quantity Sold] * 'Sales Table'[Sale Price]

```

Let's create a **Total Cost** column by multiplying **Quantity Sold** by **Product Cost**.

7. Right-click on the **Sales Table**.
8. Click on **New Column**.



9. Type the following **DAX** formula in **Formula Bar**.

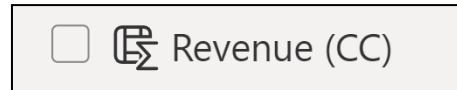
```
Total Cost (CC) = 'Sales Table'[Quantity Sold]*'Sales Table'[Product Cost (CC)]
```

```
1 | Total Cost (CC) =
2 | 'Sales Table'[Quantity Sold] * 'Sales Table'[Product Cost (CC)]
```

All the three columns, i.e., **Total Cost (CC)** column, **Revenue (CC)** column and the **Product Cost (CC)** column have been created, giving values for which row of the table.

Transaction Date	Retailer City	Retailer Type	Product Code	Sale Price	Quantity Sold	Product Cost (CC)	Revenue (CC)	Total Cost (CC)
01/01/2016 12:00:00 am	Brisbane	Outdoors Shop	\$48	\$5.00	340	\$1.79	\$1,700.00	\$608.60
09/01/2016 12:00:00 am	Montreal	Outdoors Shop	\$48	\$5.00	322	\$1.79	\$1,610.00	\$576.38
14/01/2016 12:00:00 am	London	Outdoors Shop	\$48	\$5.00	372	\$1.79	\$1,860.00	\$665.88
19/01/2016 12:00:00 am	Liverpool	Outdoors Shop	\$48	\$5.00	435	\$1.79	\$2,175.00	\$778.65
22/01/2016 12:00:00 am	London	Outdoors Shop	\$47	\$5.00	206	\$1.95	\$1,030.00	\$401.70
01/02/2016 12:00:00 am	Glasgow	Outdoors Shop	\$47	\$5.00	193	\$1.95	\$965.00	\$376.35
08/02/2016 12:00:00 am	Geneva	Outdoors Shop	\$49	\$5.00	435	\$1.86	\$2,175.00	\$809.10
19/02/2016 12:00:00 am	Basel	Outdoors Shop	\$47	\$5.00	141	\$1.95	\$705.00	\$274.95
20/02/2016 12:00:00 am	Canberra	Outdoors Shop	\$50	\$5.00	327	\$1.96	\$1,635.00	\$640.92
21/02/2016 12:00:00 am	Liverpool	Outdoors Shop	\$50	\$5.00	256	\$1.96	\$1,280.00	\$501.76

Calculated Columns have a distinct icon, as seen in the screenshot, to differentiate them from other data entities.



Notice that each of the columns has been formatted using Column Tools.

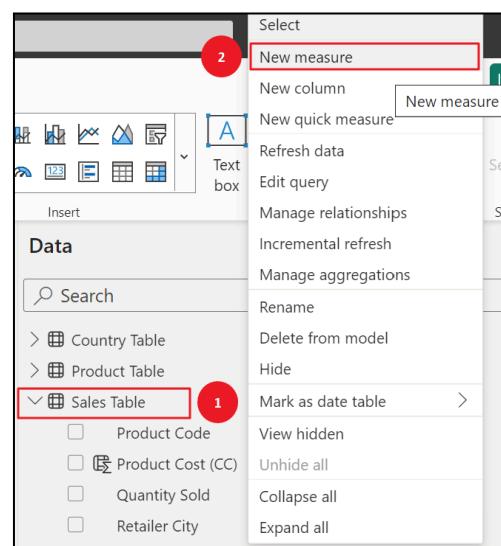


Defining Measures

Measures are lightweight alternatives to Calculated Columns. The reason is that they do not appear in the dataset; hence, they do not occupy any physical memory. Measures are only calculated when used within a visual; this property takes your data model's efficiency to the next level.

Let's Calculate **Profit** by subtracting **Product Cost** from **Revenue**

1. Right-click on the **Sales Table**.
2. Click on **New Measure**.



3. Type below mentioned **DAX formula** in Formula Bar.

```
Profit (CM) = SUM('Sales Table'[Revenue (CC)]) - SUM('Sales Table'[Total Cost (CC)])
```

1	Profit (CM) =
2	SUM ('Sales Table'[Revenue (CC)])
3	- SUM ('Sales Table'[Total Cost (CC)])

Calculated Measures have a distinct icon as seen in the screenshot to differentiate them from other data entities.

<input type="checkbox"/>  Profit (CM)
--

*Want to delve deeper into the world of DAX functions and calculations? Enroll in our DAX Essentials Course for a deeper understanding:
<https://powerbitraining.com.au/dax-course/>*



CHAPTER 8

Data Visualization

- ✓ Creating a Card Visual
- ✓ Creating an Area Chart
- ✓ Creating a Bubble Map Visual
- ✓ Creating a Donut Chart
- ✓ Creating a Stacked Bar Chart
- ✓ Creating a Slicer

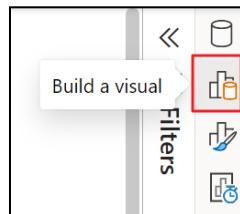


Creating a Card Visual

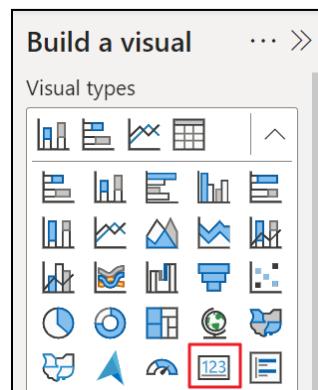
Card visuals are used to display key metrics of your data.

To create a Card Visual:

1. Open the **Build a Visual** pane from the **pane switcher**.

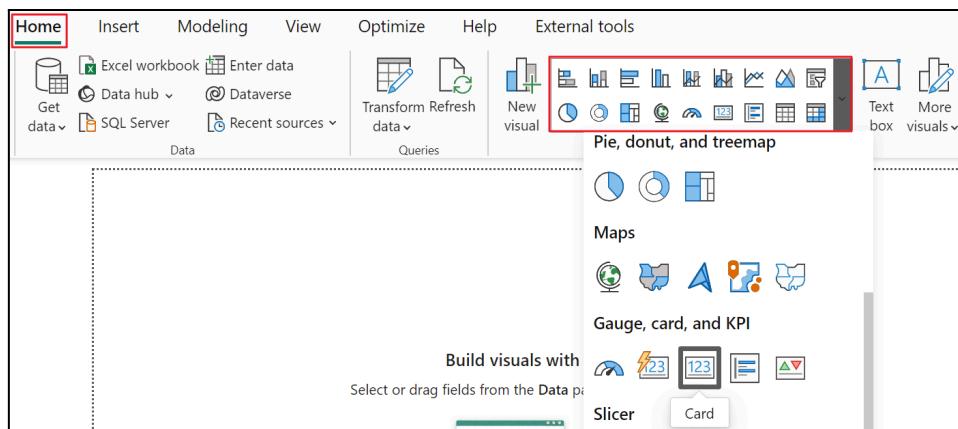


2. Click on **Card** visualization in the **Build a Visual** pane.



Or

3. You can also access the visuals in the **Insert** section of the **Home** tab in the **Ribbon Menu**.



4. Drag the **Total Cost (CC)** value from the **Sales Table** to the **Field** area.
5. Click on **Total Cost (CC)** in the **Sales Table**.
Column tools open.
6. Click “\$” and type 2 in the text area in the **Formatting** section.
7. Click on the **Format** pane icon from the pane switcher to access the Format options.



Size and Style Dropdown	Visual Border	On	Title Dropdown	Title Alignment	Centre
	Border Color	#F3CA1A		Title Font	Verdana
	Background	On		Title Background Color	#117865
	Background Color	White with Transparency 18		Title Text Size	14
	Shadow	On		Callout Value	On
Title Dropdown	Title	On	Callout Value	Call Out Value Text Size	17
	Title Text	Total Cost		Callout Value Font	Verdana
	Title Font Color	White		Category Label	Off



The filters Pane on the right side configures visual, page, and report-level filters.

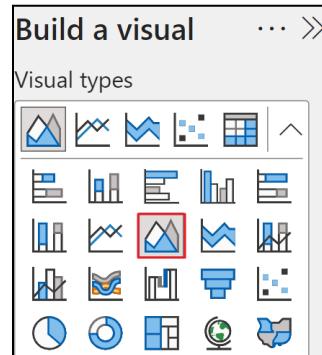


Creating an Area Chart

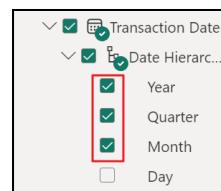
Area charts emphasise the magnitude of change over time and can be used to draw attention to the total value across a trend. For example, data representing profit over time can be plotted in an area chart to emphasise the total profit.

To create an Area chart:

1. Click on the **Area Chart** visualization in the **Build a Visual** pane.



2. Drag the **Year**, **Quarter**, and **Month** from the **Transaction Date Hierarchy** from the **Sales Table** to the **X-Axis** field.



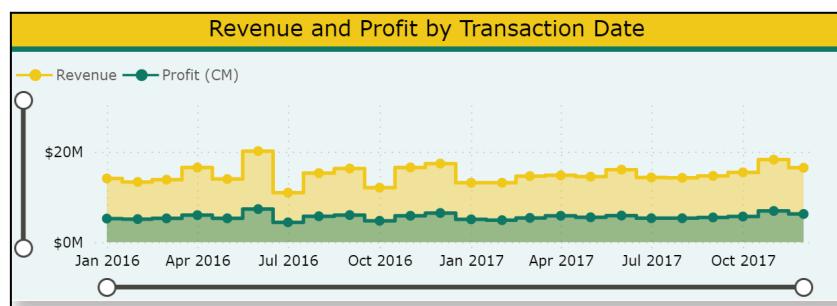
3. Drag **Revenue (CC)** and **Profit (CM)** from the **Sales Table** to the **Y-Axis** field.
4. Click on the **Format** pane icon from the pane switcher to access the Format options.

Size and Style	Background	On	Title	Title Divider	On
	Background Color	White with Transparency 18		Title Divider Color	#117865
	Visual Border	Off		Title Divider Width	5 px
	Shadow	On		Legend	On
Title	Title	On	Legend	Style	Line and Markers
	Title Text	Revenue and Profit by Transaction Date		Title	Off
	Title Text Size	14		Zoom Slider	On



CHAPTER 8: DATA VISUALIZATION

	Title Alignment	Centre	Lines	Line Type	Step
	Title Font Color	Black		Colors > Profit (CM)	#117865
	Title Font	Verdana		Colors > Revenue	#F3CA1A
	Title Background Color	#F3CA1A	Markers	Markers	On



*Do you know the secret to that green shade? Transparency, even when the backgrounds are set to white! Want to master more design secrets and create visually stunning reports? Join our Power BI Report Design Course today:
<https://powerbitraining.com.au/power-bi-report-design-course/>*

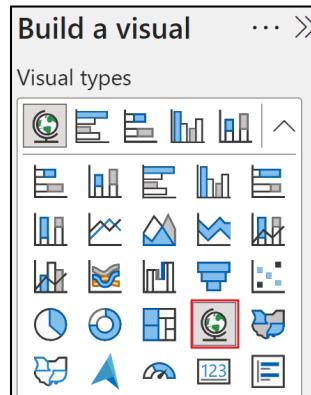


Creating a Bubble Map Visual

A bubble map displays geographical data with different-sized bubbles. The size of the bubble is directly proportional to the numerical value it indicates.

To create a Bubble Map:

1. Click on the **Map** visualization in the **Build a Visual** pane.



2. Drag **Retailer City** from the **Sales Table** to the **Location** field.
3. Drag **Total Cost (CC)** from the **Sales Table** to the **Bubble Size** field.
4. Click on the **Format** pane icon from the pane switcher to access the Format options.

Size and Style	Background	On	Title	Title Font	Verdana
	Background Color	White with Transparency 18		Title Background Color	#F3CA1A
	Visual Border	Off		Title Divider	On
	Shadow	On		Title Divider Color	#117865
Title	Title	On	Bubbles	Title Divider Width	5 px
	Title Text	Total Cost by Retailer City		Map Style	Grayscale
	Title Font Color	Black		Bubble Size	15
	Title Text Size	14		Colors	#117865
	Title Alignment	Centre	Category Labels	Category Labels	On



CHAPTER 8: DATA VISUALIZATION

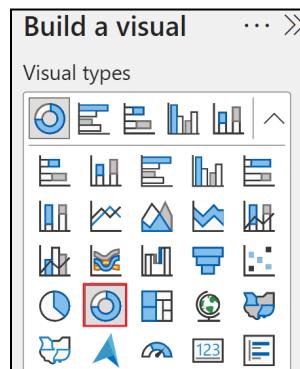


Creating a Donut Chart

A donut chart is a variation of the pie chart and is generally used to show the proportions of categorical data, with the size of each segment representing the proportion of each category.

To create a Donut Chart:

1. Select **Donut Chart** visualization in the **Build a Visual** pane.

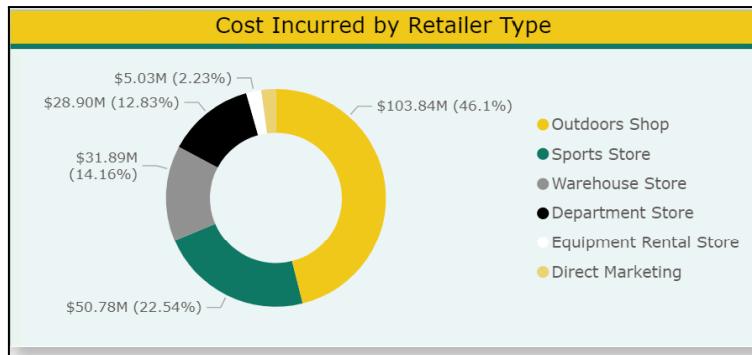


2. Drag **Retailer Type** from **Sales** Table to **Legend** field.
3. Drag **Total Cost (CC)** from the **Sales** Table to the **Value** field.
4. Click on the **Format** pane icon from the pane switcher to access the Format options.

Size and Style	Background	On	Title	Title Alignment	Centre
	Background Color	White with Transparency 18		Title Font	Verdana
	Visual Border	Off		Title Background Color	#F3CA1A
	Shadow	On		Title Divider	On
Title	Title	On		Title Divider Color	#117865
	Title Text	Cost Incurred by Retailer Type		Title Divider Width	5 px
	Title Font Color	Black	Legend	Legend	On
	Title Text Size	14	Detailed Labels	Detail Labels	On



CHAPTER 8: DATA VISUALIZATION



Hovering with the mouse over the Donut Chart will display a tooltip with more information including the percentage.

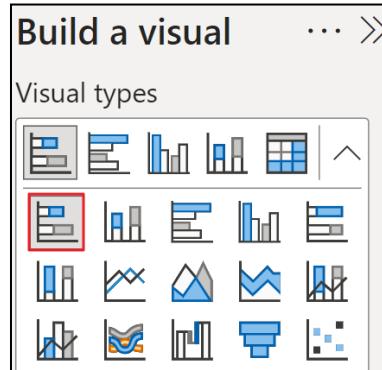


Creating a Stacked Bar Chart

A stacked bar chart is used to break down and compare statistics between different categories.

To create a Stacked Bar Chart:

1. Select **Stacked Bar Chart** visualization in the **Build a Visual** pane.



2. Drag **Product Type** from **Product Table** to **Y-Axis** field.
3. Drag **Country** from **Country Table** to **Legend** field.
4. Drag **Revenue (CC)** from **Sales Table** to **Values** field.
5. Expand **Country** in **Filters** pane.

Top N filter is a type of visual level filter which when applied displays N number of top items in a visual based on the given value.

6. Select **Top N** from Filter Type dropdown.
7. Type **3** in the Show Items textbox.
8. Drag **Revenue (CC)** from Sales Table to **By Value Field**.
9. Click on **Apply Filter**.

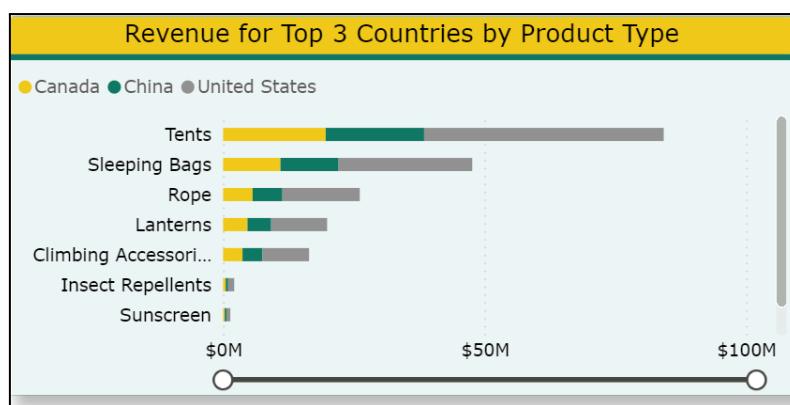
10. Click on the **Format** pane icon from the pane switcher to access the Format options.

Size and Style	Background	On	Title	Title Alignment	Centre
	Background Color	White with Transparency 18		Title Font	Verdana
	Shadow	On		Title Background Color	#F3CA1A
	Border	Off		Title Divider	On
	Title	On		Title Divider Color	#117865



CHAPTER 8: DATA VISUALIZATION

	Title Text	Revenue for Top 3 Countries by Product Type		Title Divider Width	5 px
	Title Font Color	Black	Legend	Legend	On
	Title Text Size	14	Zoom Slider	Zoom Slider	On

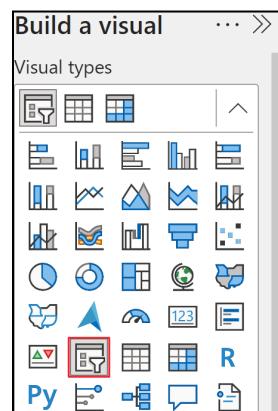


Creating a Slicer

Slicer is an alternate way of filtering that narrows the other visualizations in a report. Unlike filters, the slicers are present as a visual on the report.

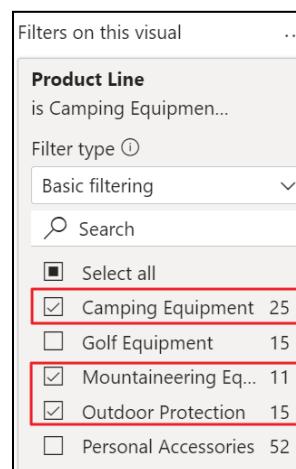
To create a Slicer:

1. Click on **Slicer** visualization in the **Build a Visual** pane.



2. Drag **Product Line** from **Product Table** to the **Field** area.
3. Expand **Product Line** in **Filters** pane.

Select Camping Equipment, Mountaineering Equipment, and Outdoor Protection in the dropdown list.



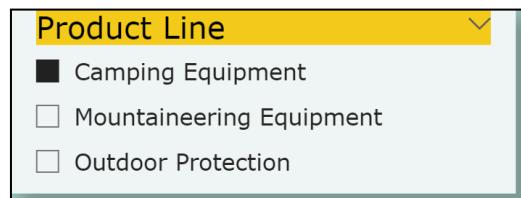
4. Click on the **Format** pane icon from the pane switcher to access the Format options.

Size and Style	Background	On	Slicer Header	Text Font Color	Black
	Background Color	White with Transparency 18		Text Size	14
	Visual Border	Off		Alignment	Centre
	Shadow	On		Font	Verdana



Title	Title	Off		Background Color	#F3CA1A
Slicer Header	Slicer Header	On		Slicer Header Text	Product Line

5. To filter the whole report for **Camping Equipment**, click on its checkbox.



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CHAPTER 9

Publish and Share

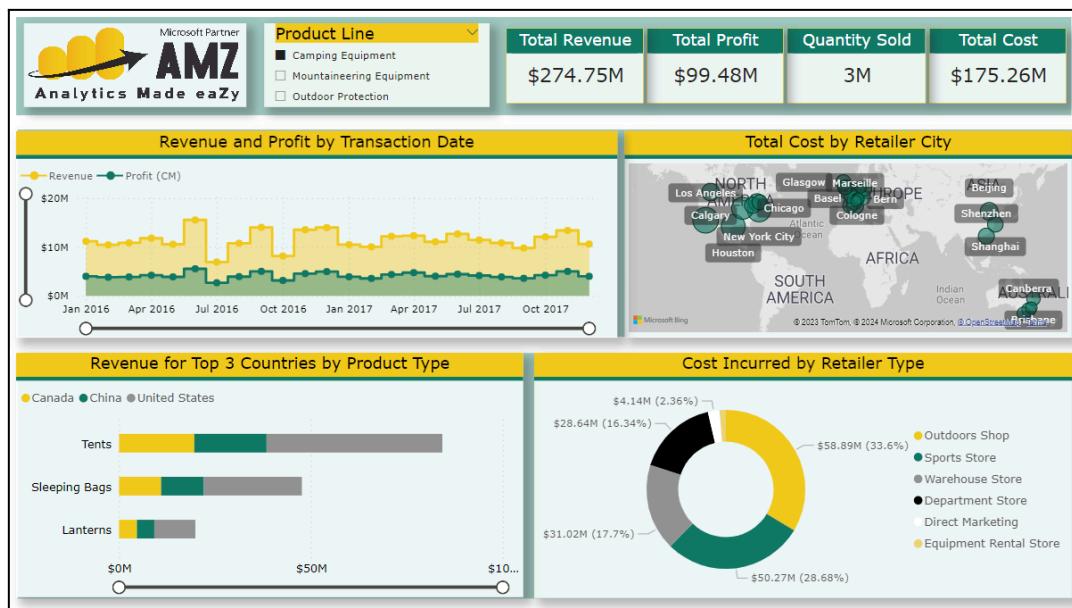
- ✓ Save and Publish to My Workspace
- ✓ Sharing the Report



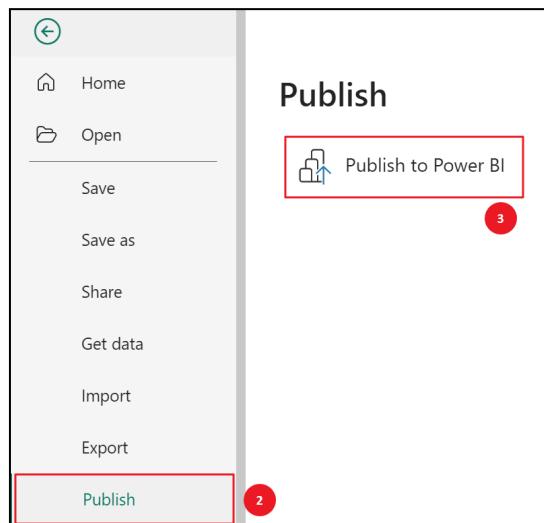
Save and Publish to My Workspace

Now that you have created your report. It is time to publish your report to the web so we can create dashboards and share them with other stakeholders.

1. Click on the **File > Save**.
2. Rearrange your visuals as shown below or in any other way that you may like.



3. Click on the **File menu again and click Publish**.
4. Click on **Publish to Power BI**.



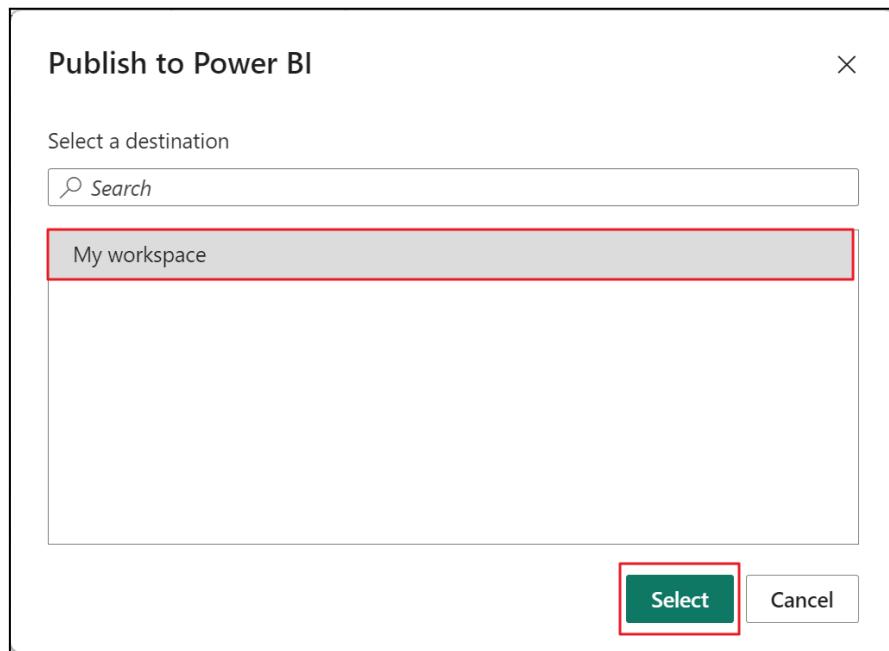
Or



5. You can also click on **Publish** in the **Home** tab in the Ribbon Menu to publish your report.



6. Select the appropriate **Workspace** and click **Select**.



A confirmation dialogue box will appear once your report has been published on the web.

You can now share the link to your report by visiting the Power BI app on the web.

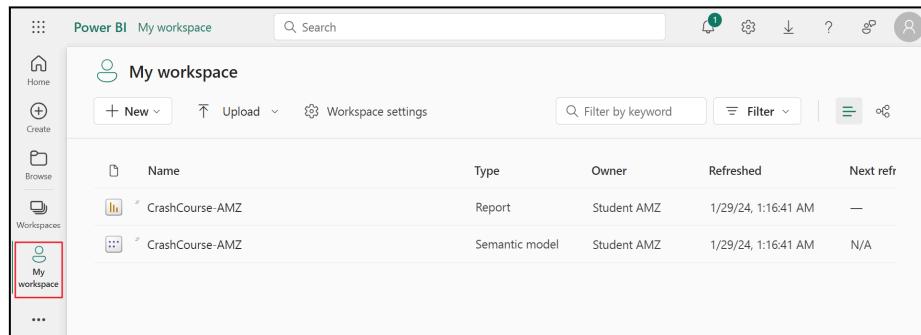
*To understand the visuals in more depth, download the **Crash Course** file from the following link and access the complete Power BI report:
<https://www.powerbitraining.com.au/powerbidesktopcrashcoursedownloads/>*



Sharing the Report

Reports published to Power BI Service can then be shared with other stakeholders via a shareable link or as a dashboard.

1. Open app.powerbi.com and sign in using your login credentials.
2. Click on **My Workspaces** on the Navigation pane on the left to access your workspace components.



The screenshot shows the 'My workspace' page in the Power BI service. On the left, there's a navigation pane with icons for Home, Create, Browse, Workspaces, and 'My workspace', which is highlighted with a red box. The main area is titled 'My workspace' and lists two items:

Name	Type	Owner	Refreshed	Next refresh
CrashCourse-AMZ	Report	Student AMZ	1/29/24, 1:16:41 AM	—
CrashCourse-AMZ	Semantic model	Student AMZ	1/29/24, 1:16:41 AM	N/A

*In the Report tab, a list of all the **Published Reports** can be seen.*

3. Click on **Share icon** in front of **CrashCourse-AMZ**.
4. In the given field enter the Email address of the person you want to share the Report with.
5. You can include a message as well for the recipient.





Take the Power BI Quiz!

Take the Quiz from the following link to test your understanding of Power BI:



<https://www.powerbitraining.com.au/power-bi-crash-course-quiz/>





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ABN:

11627874668

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