



# Building Interactive Dashboards with Power BI

*From Data to Decisions*

Day - 1

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# Agenda

## Day 1: Power BI Foundations & First Report

- Introduction to Business Intelligence & Power BI
- Power BI ecosystem and workflow
- Power BI Desktop interface overview
- Connecting to data (Excel / CSV)
- Data cleaning using Power Query
- Basics of data modeling and relationships
- Creating basic visuals:
  - Tables, Charts, Cards
- Applying filters and basic interactions

## Learning Outcomes

- Load and clean data
- Build a basic data model
- Create a functional Power BI report

# What Is Business Intelligence?

BI = Process of analyzing data to support decisions



Image source: <https://www.edureka.co/blog/power-bi-tutorial/>

# Why Business Intelligence (BI)?

- Organizations generate huge amounts of data
- Without a Business Intelligence tool, an organisation may have to handle;
  1. Multiple Excel files
  2. Manual reports
  3. Time-consuming analysis
  4. Inconsistent numbers
  5. No real-time view
- Raw data  $\neq$  Insights
- Decision-makers need:
  1. Fast insights
  2. Accurate numbers
  3. Visual storytelling

# What is Power BI and where it fits?

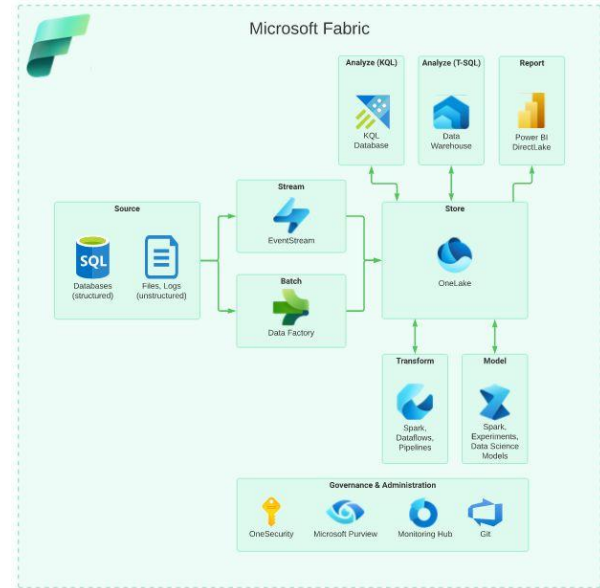
Power BI is a **Business Intelligence & Data Visualization** tool developed by Microsoft

Used to:

1. Connect to data
2. Analyze data
3. Create interactive dashboards
4. Share insights

Part of Microsoft Analytics Platform

1. Excel
2. Power BI
3. Azure Synapse Analytics
4. Azure Data Factory
5. Azure Analysis Services
6. SQL Server



source: <https://www.softwebsolutions.com/resources/predictive-analysis-microsoft-fabric/>

# Power BI Ecosystem



Power BI Desktop

Windows application used to **connect, clean, model data and build reports**



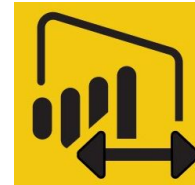
Power BI Service

Cloud platform to **publish, share, and collaborate** on reports



Power BI Mobile

Mobile app (Android / iOS) to **view and interact with reports & dashboards**



Power BI Gateway

Bridge between **on-premises data sources** and Power BI Service



Report Server

On-premises server to **host Power BI reports internally**

# Power BI Workflow



Image source: <https://www.edureka.co/blog/power-bi-tutorial/>

# Power BI Desktop Workflow

Get Data → Transform Data → Model Data → Create Visuals → Share Insights

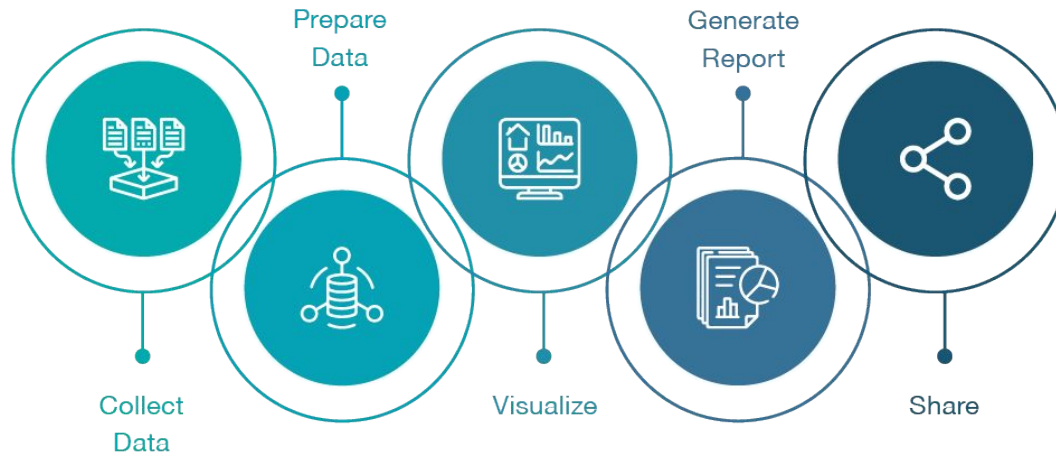


Image source: <https://www.hitechbpo.com/data-visualization-services.php>



# Power BI vs Excel



Vs.



Excel:

1. Good for analysis
2. Limited interactivity

Power BI:

1. Handles large data
2. Interactive dashboards
3. Centralized reporting

# What you will learn vs what you will not

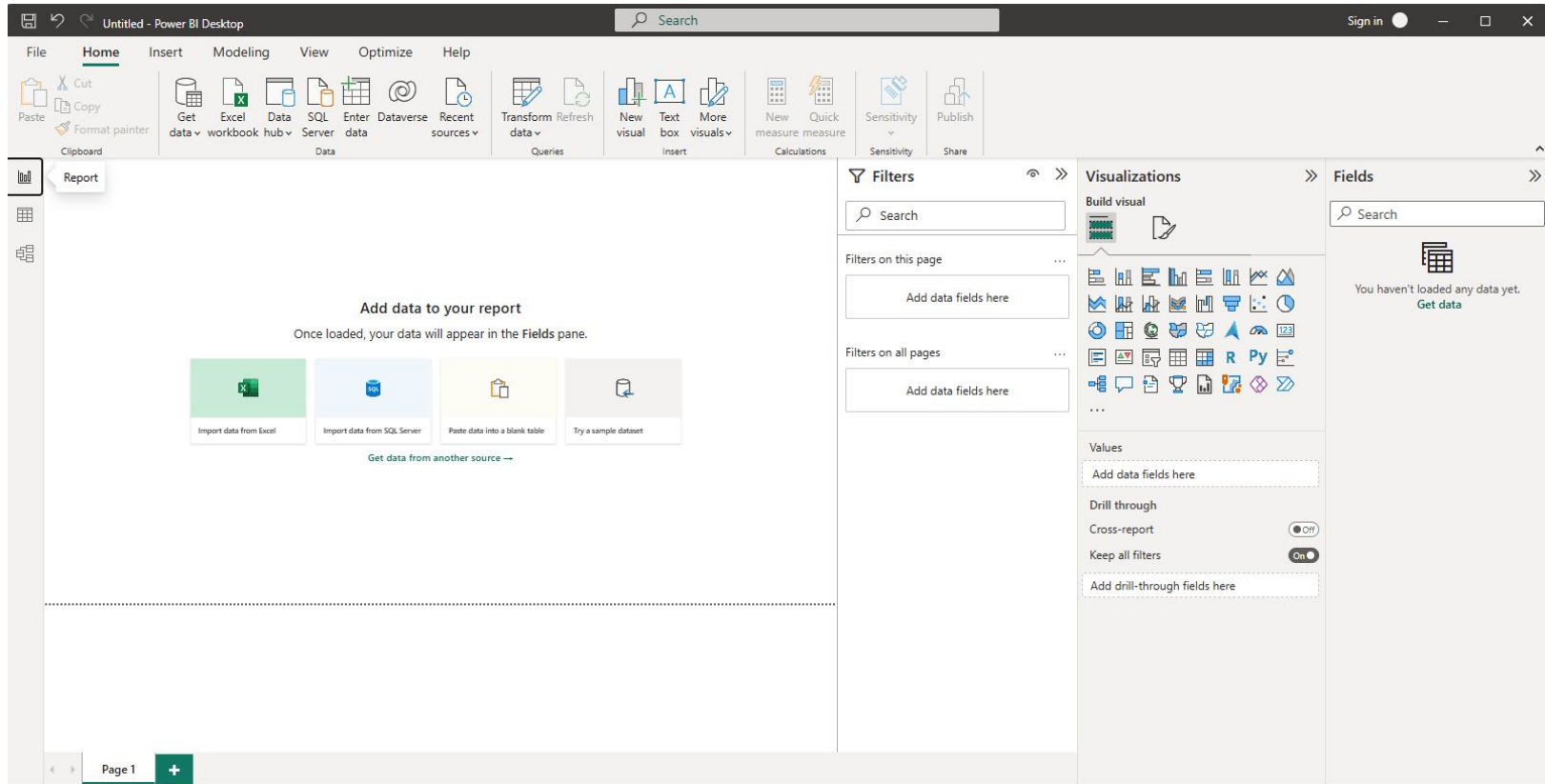
1. Load and clean data
2. Create relationships
3. Build interactive visuals
4. Use basic DAX
5. Publish reports

1. Advanced DAX
2. Administration
3. Security (RLS)
4. Gateways (deep dive)

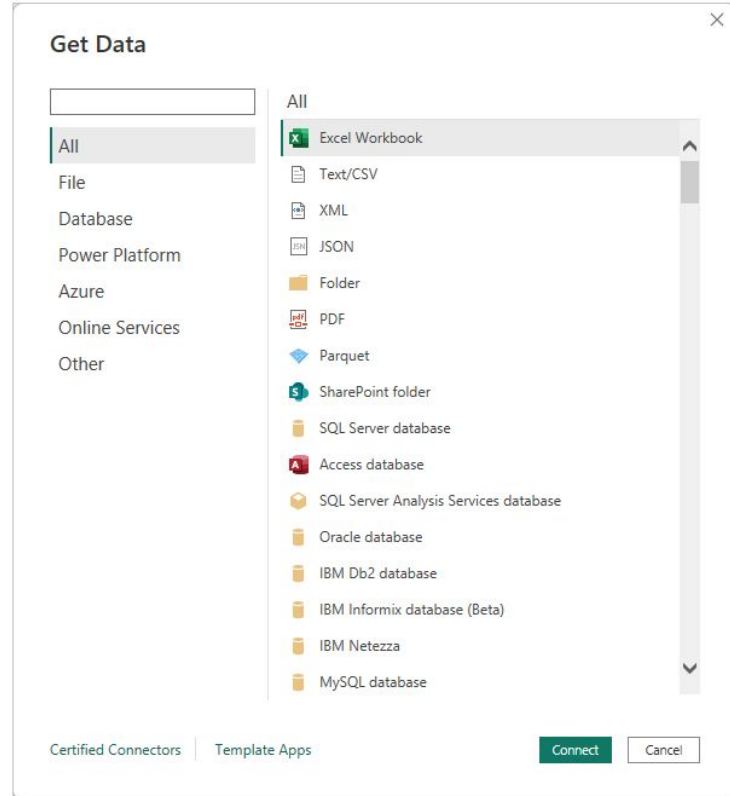
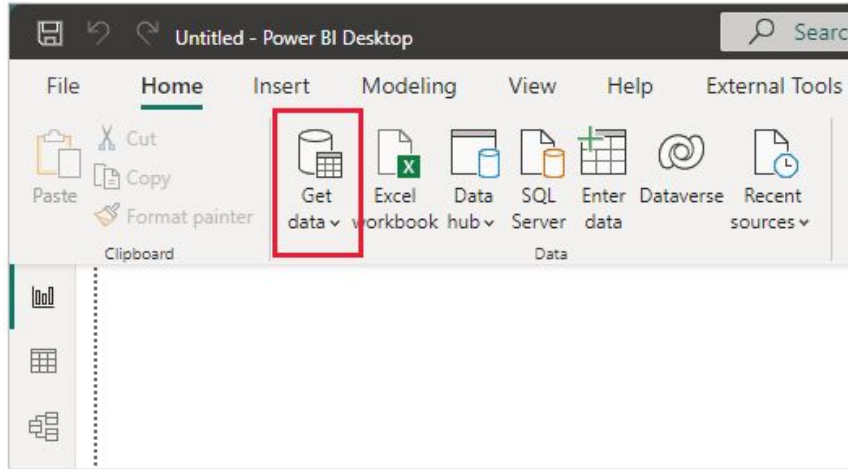
# Power BI Desktop

## Deep Dive

# Power BI Desktop Interface



# Connect to Data



# Navigator and Data view in fields pane

Navigator

Display Options

Financial Sample.xlsx [2]

financials

Sheet1

Sheet1

Segment	Country	Product	Discount Band	Units Sold
Government	Canada	Carretera	None	
Government	Germany	Carretera	None	
Midmarket	France	Carretera	None	
Midmarket	Germany	Carretera	None	
Midmarket	Mexico	Carretera	None	
Government	Germany	Carretera	None	
Midmarket	Germany	Montana	None	
Channel Partners	Canada	Montana	None	
Government	France	Montana	None	
Channel Partners	Germany	Montana	None	
Midmarket	Mexico	Montana	None	
Enterprise	Canada	Montana	None	
Small Business	Mexico	Montana	None	
Government	Germany	Montana	None	
Enterprise	Canada	Montana	None	
Midmarket	United States of America	Montana	None	
Government	Canada	Paseo	None	
Midmarket	Mexico	Paseo	None	
Channel Partners	Canada	Paseo	None	
Government	Germany	Paseo	None	
Channel Partners	Germany	Paseo	None	
Government	Mexico	Paseo	None	
Midmarket	France	Paseo	None	

Load Transform Data Cancel

Visualizations

Build visual

Filters

Fields

Search

financials

Sales

COGS

Country

Date

Discount Band

Discounts

Gross Sales

Manufacturing P...

Month Name

Month Number

Product

Profit

Sale Price

Segment

Units Sold

Values

Add data fields here

Drill through

Cross-report

Keep all filters

# Power Query Editor

## Deep Dive

# What is Power Query?

Power Query is a **data preparation** and **transformation** tool used in Microsoft Excel and Power BI.

- Used to connect, clean, and transform data
- Works with data from:
  1. Excel files
  2. Databases (SQL, Access)
  3. Text/CSV files
  4. Web pages
  5. APIs and cloud sources
- Uses a no-code / low-code interface
- Automates repetitive data-cleaning tasks
- Based on the M language behind the scenes

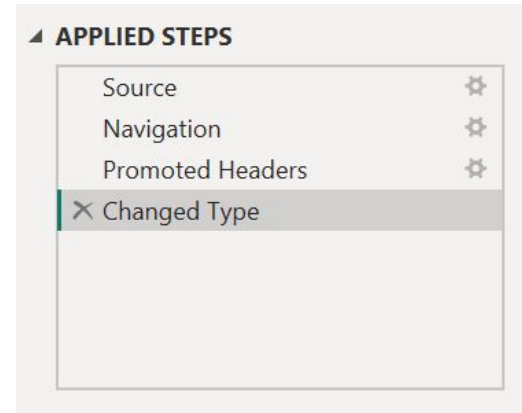




# What Are Applied Steps?

Applied Steps show every transformation applied to the data in Power Query.

- Located in the Query Settings pane
- Each action creates a new step
- Steps are applied in sequence
- Can be:
  1. Renamed
  2. Deleted
  3. Reordered
- Helps track and understand data changes

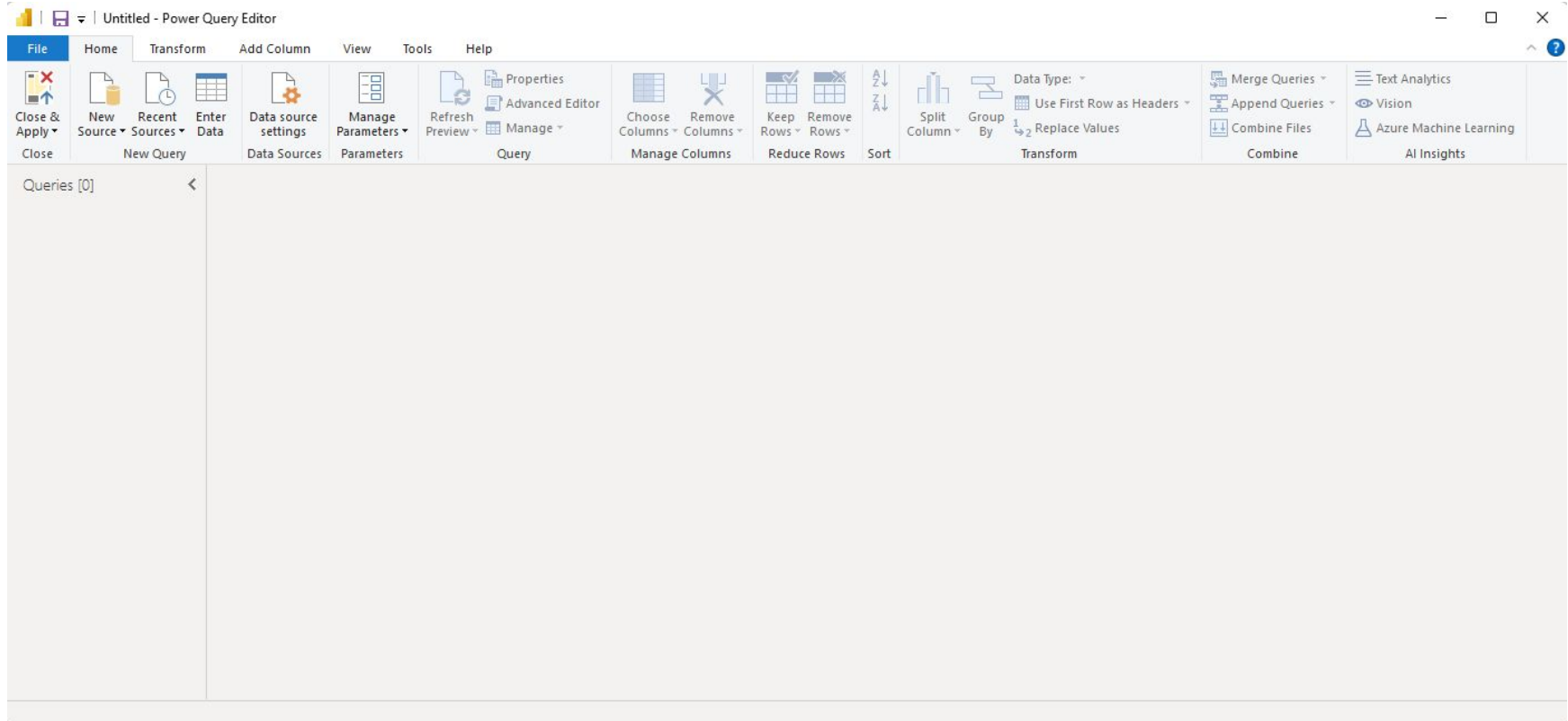


# Common Transformations in Power Query

Power Query provides many built-in transformations such as;

- Filtering rows
- Removing duplicates
- Sorting data
- Renaming columns
- Changing data types
- Splitting and merging columns
- Handling errors and null values
- Pivot and unpivot columns
- Grouping and aggregating data
- Merging queries (joins)

# Power Query Editor Interface - Blank



# Power Query Editor Interface - with Data connected

In the ribbon, many buttons are now active to interact with the data in the query.

The screenshot displays the Power Query Editor interface. The ribbon at the top includes tabs for File, Home, Transform, Add Column, View, Tools, and Help. The Home tab is active, showing various buttons for data manipulation. The left pane lists three queries: Orders, Returns, and Users. The center pane displays a table with 14 rows of data. The right pane shows the Query Settings for the 'Orders' query, including properties and applied steps.

Row ID	Order	Priority	Discount
1	20847	High	0.01
2	20228	Not Specified	0.02
3	21776	Critical	0.06
4	24844	Medium	0.09
5	24846	Medium	0.08
6	24847	Medium	0.05
7	24848	Medium	0.05
8	18181	Critical	0
9	20925	Medium	0.01
10	26267	High	0.04
11	26268	High	0.05
12	23890	High	0.05
13	24063	Not Specified	0.07
14	5890	High	0.05

Query Settings

PROPERTIES

Name: Orders

APPLIED STEPS

- Source
- Navigation
- Promoted Headers
- Changed Type

In the left pane, queries are listed and available for selection, viewing, and shaping.

In the center pane, data from the selected query is displayed and available for shaping.

The Query Settings pane appears, listing the query's properties and applied steps.

# Power Modeling

## Deep Dive

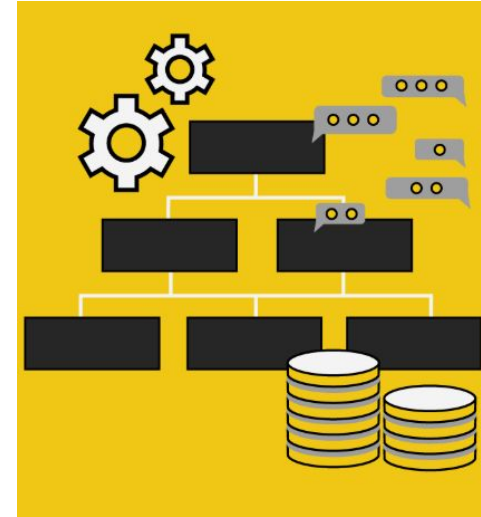
# What Is Data Modeling?

Data Modeling is the process of organizing data into related tables to support analysis.

- Defines how tables connect to each other
- Improves performance and accuracy
- Enables meaningful calculations
- Separates raw data from analytical logic

## Why Data Modeling Matters

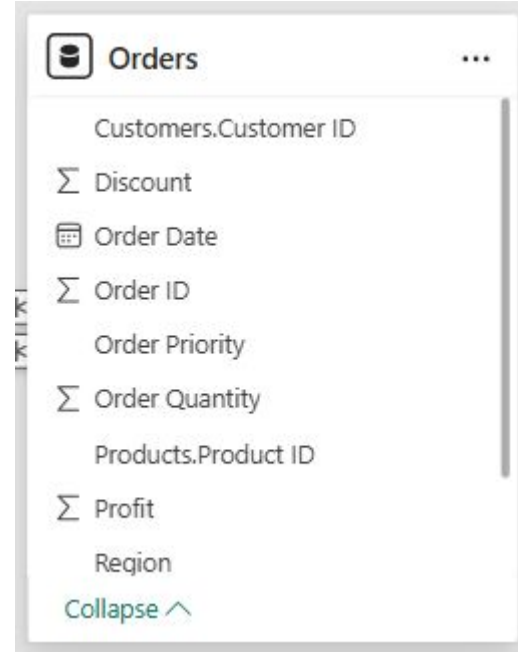
- Simplifies complex datasets
- Reduces data duplication
- Improves report performance



# Fact Tables

**Fact Tables** store measurable, numerical data.

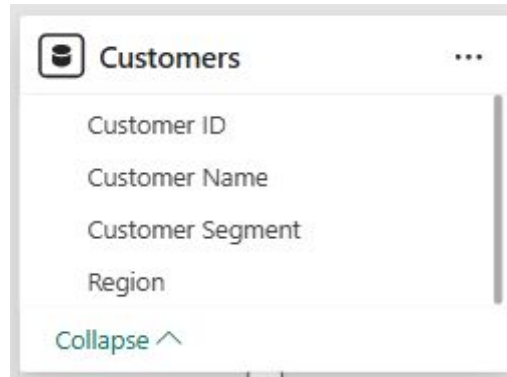
- Contains business metrics (sales, quantity, revenue)
- Usually large in size
- Includes foreign keys to dimensions
- Example:
  - Sales Amount
  - Quantity Sold
  - Order Date Key



# Dimension Tables

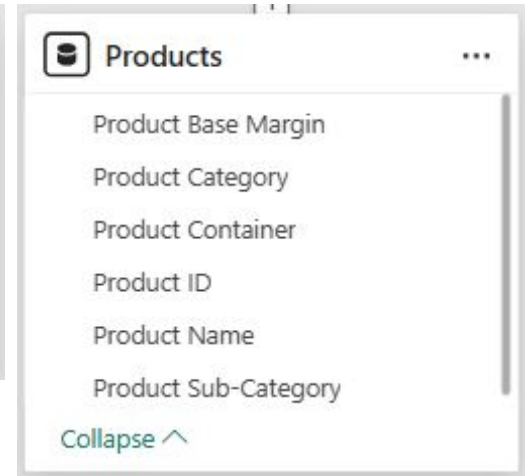
**Dimension Tables** provide descriptive context.

- Contains attributes used for filtering and grouping
- Usually smaller than fact tables
- Connected to fact tables
- Examples:
  - Date
  - Product
  - Customer
  - Region



A screenshot of a software interface for a 'Customers' dimension table. The title bar shows a database icon, the word 'Customers', and a three-dot menu. The table lists four attributes: 'Customer ID', 'Customer Name', 'Customer Segment', and 'Region'. At the bottom, there is a 'Collapse' button with an upward-pointing chevron.

Customers
Customer ID
Customer Name
Customer Segment
Region
<a href="#">Collapse ^</a>



A screenshot of a software interface for a 'Products' dimension table. The title bar shows a database icon, the word 'Products', and a three-dot menu. The table lists five attributes: 'Product Base Margin', 'Product Category', 'Product Container', 'Product ID', and 'Product Name'. At the bottom, there is a 'Collapse' button with an upward-pointing chevron.

Products
Product Base Margin
Product Category
Product Container
Product ID
Product Name
Product Sub-Category
<a href="#">Collapse ^</a>



# Creating Relationships and Cardinality (One-to-Many)

Relationships connect tables using common columns.

- Typically between **Fact and Dimension tables**
- Based on **primary key** ↔ **foreign key**
- Enables filtering across tables
- Created automatically or manually

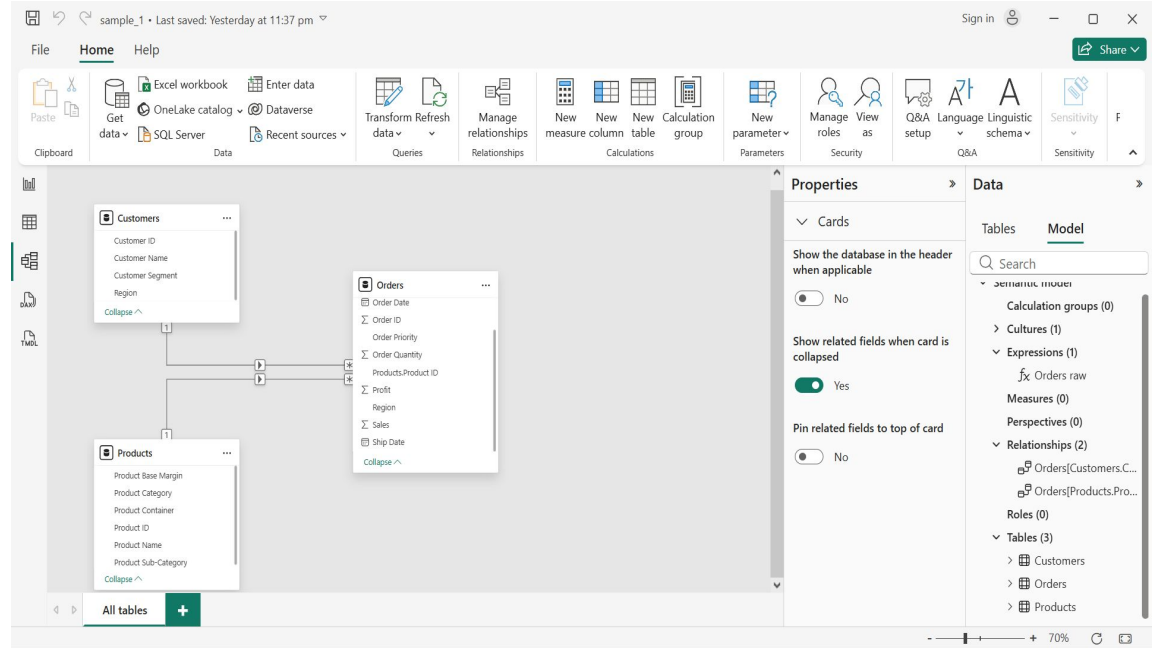
**Cardinality** defines how rows relate between tables.

- **One-to-Many (1:\*)** is the most common
- One dimension row relates to many fact rows
- Example:
  - One Product → Many Sales
  - One Customer → Many Orders
- Ensures accurate aggregations
- Prevents double counting
- Improves query performance
- Forms the basis of the **Star Schema**

# Model View Overview

**Model View** provides a visual representation of the data model shown in a **star schema**

- one central fact table is connected to multiple dimension tables.
- Displays tables and relationships
- Allows easy relationship editing
- Helps identify model issues
- Improves understanding of data flow

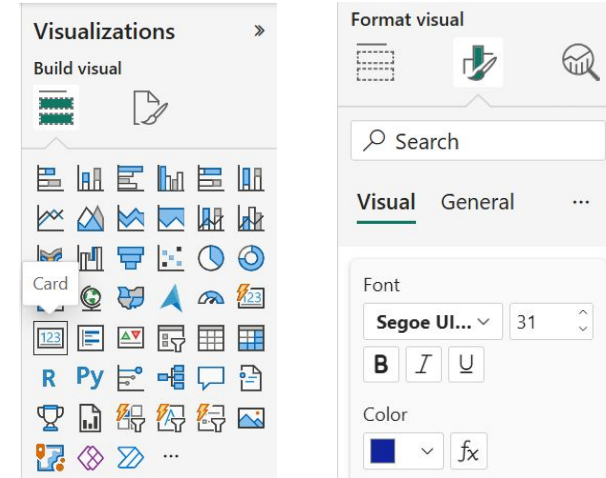


# Creating our first visual Deep Dive

# Visual 1: KPI Card – Total Sales

1. Chart Name KPI Card – Total Sales
2. Parameters Used
  - a. Visual Type: Card
  - b. Field Used: *Values*: Total Sales (Measure)
3. What Does It Signify
  - a. Displays the overall sales value for the selected data
  - b. Provides a quick, high-level business KPI
  - c. Acts as a summary metric that stakeholders look at first

Steps: Report View → Card → Total Sales → Format Pane → Title  
(ON) → “Total Sales”



**Total Sales**  
Gives the total sales

**418.03**  
Sum of Sales

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# Visual 2: Column Chart – Sales by Product Category

1. Chart Name: Column Chart – Sales by Product Category

2. Parameters Used

a. Visual Type: Clustered Column Chart

b. Fields Used:

i. *Axis*: Product Category

ii. *Values*: Total Sales

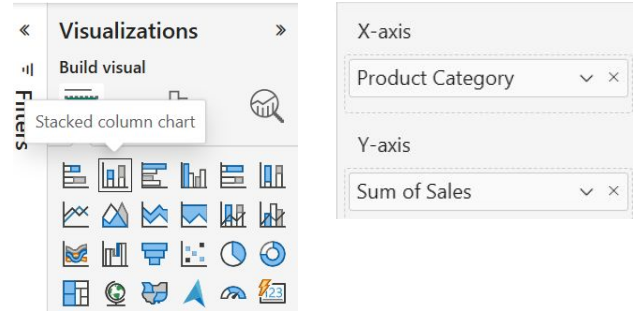
3. What Does It Signify

a. Compares sales performance across product categories

b. Identifies:

i. Top-performing categories

ii. Underperforming categories



Steps: Visualization Pane → Column Chart → Axis(Product cat) → Values (Total Sales) → Format Pane → Title (ON) → “Sales by Product Category”

# Visual 3: Line Chart – Sales Trend Over Time

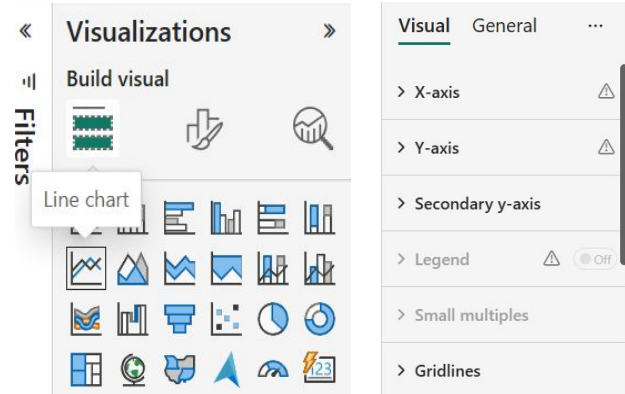
1. Chart Name: Line Chart – Sales Trend Over Time

2. Parameters Used

- a. Visual Type: Line Chart
- b. Fields Used:
  - i. *Axis*: Order Date (Year → Month hierarchy)
  - ii. *Values*: Total Sales

3. What Does It Signify

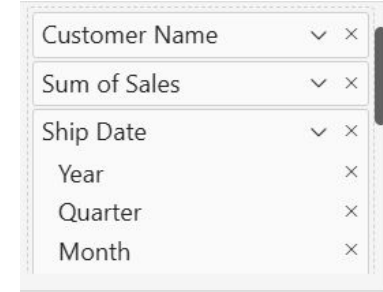
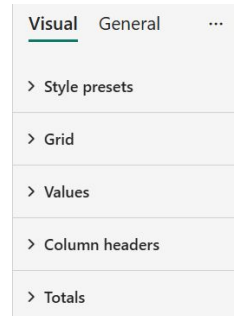
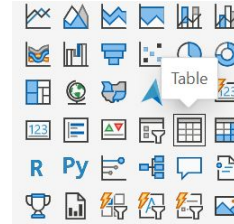
- a. Shows how sales change over time
- b. Helps identify:
  - i. Growth or decline
  - ii. Seasonal patterns
  - iii. Trends across months and years



Steps: Visualization pane → Line chart → Axis(Order Date) → Values(Total Sales)  
→ Format Pane → Title (ON) → “Sales Trend Over Time”

# Visual 4: Table – Customer Sales Breakdown

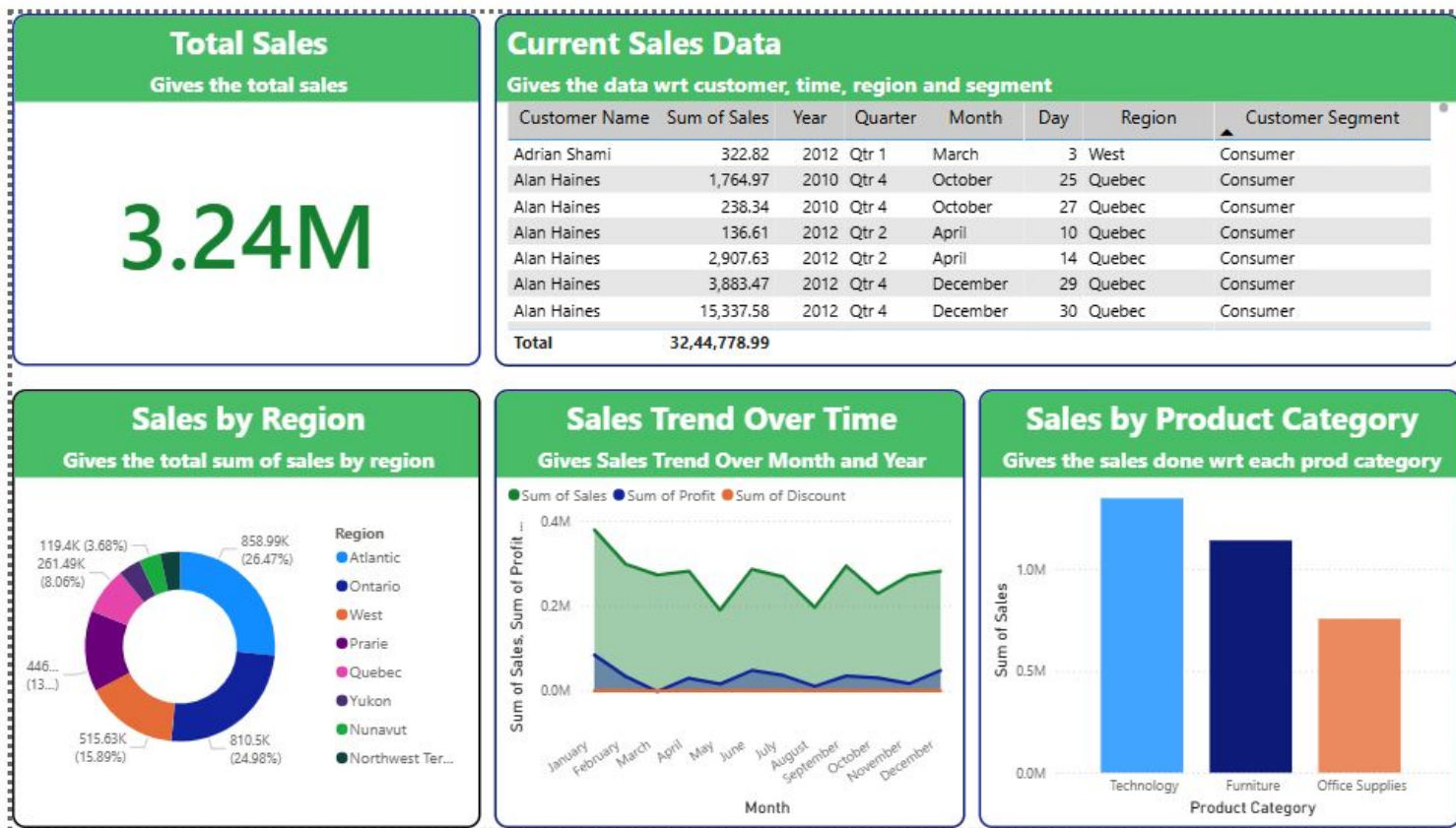
1. Chart Name: Table – Customer Sales
2. Parameters Used
  - a. Visual Type: Table
  - b. Fields Used:
    - i. Customer Name
    - ii. Total Sales
3. What Does It Signify
  - a. Displays detailed customer-level sales
  - b. Identifies top customers
  - c. Provides exact numbers (not aggregated visually)



Current Sales Data				
Gives the data wrt customer, time, region and segment				
Customer Name	Sum of Sales	Year	Quarter	
Adam Hart	547.00	2010	Qtr 1	
Adam Hart	2,086.68	2010	Qtr 4	
Adam Hart	7,640.23	2011	Qtr 1	
Adam Hart	51.90	2011	Qtr 2	
Adam Hart	1,463.42	2011	Qtr 2	
Adam Hart	391.90	2011	Qtr 3	
Adam Hart	1,451.59	2011	Qtr 3	
Adam Hart	330.21	2011	Qtr 3	
Adam Hart	418.03	2011	Qtr 4	
Adam Hart	336.86	2011	Qtr 4	
Adam Hart	211.97	2011	Qtr 4	
Total	1,46,47,187.90			

Steps: Visualization Pane → Table → Select column → Sort  
Column(Optional)

# Complete Dashboard at a glance





End of Presentation  
Thank You