



POWER BI

WHAT IS POWER BI?



Power BI

- ❖ A cloud-based business analytics service by Microsoft
- ❖ Provides tools for aggregating, analyzing, visualizing, and sharing data
- ❖ Helps create interactive dashboards and business intelligence reports
- ❖ Integrates seamlessly with various Microsoft and third-party platforms

WHY POWER BI?



- ❖ Easy-to-use drag-and-drop interface
- ❖ Advanced data modeling and visualization features
- ❖ Real-time dashboard updates
- ❖ Integrates with Excel, Azure, SQL, and more
- ❖ Scalable from small teams to large organizations

POWER BI - COMPONENTS



Power BI

- ❖ Data Sources feed into Power BI via connectors
- ❖ Data is transformed using Power Query Editor
- ❖ Data Modeling
- ❖ DAX
- ❖ Reports created and published to Power BI Service .Dashboards accessed via web, mobile, or embedded interfaces

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SOURCE

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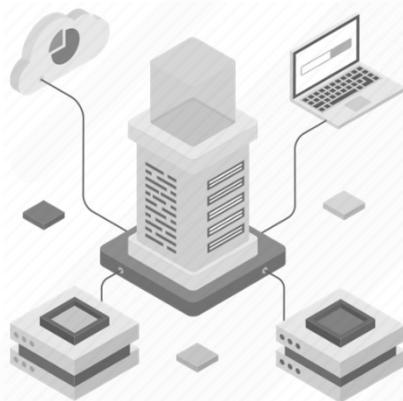
WHICH SOURCE ?



DATA SOURCE

DATA SOURCE ?

INTRODUCTION TO DATA CONNECTIVITY



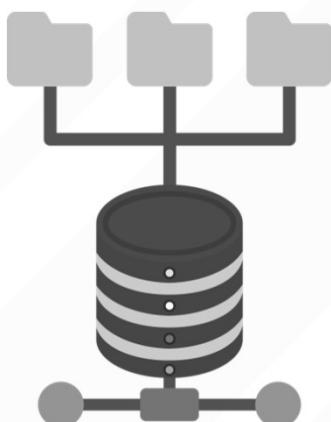
- ❖ Power BI supports 100+ data sources
- ❖ Seamless connection to cloud, on-premises, and file-based data
- ❖ Enables real-time and scheduled refresh options
- ❖ Data connection type affects performance and capabilities



DATA SOURCE

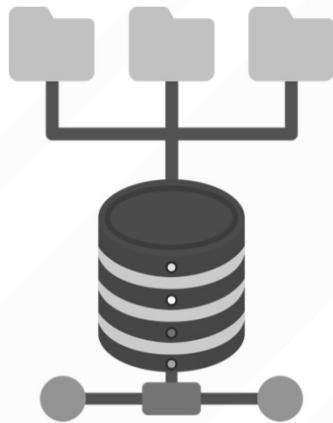
WHAT ARE HIGH-LEVEL CATEGORIES OF DATA SOURCES ?

TYPES OF DATA SOURCES



- ❖ File-based
- ❖ Databases
- ❖ Cloud
- ❖ Online Services
- ❖ Web APIs and custom connectors

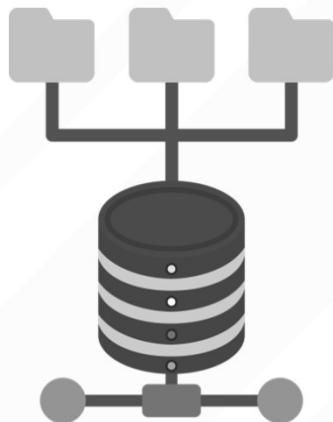
TYPES OF DATA SOURCES



File-based – Examples ?

Excel, CSV, XML, JSON

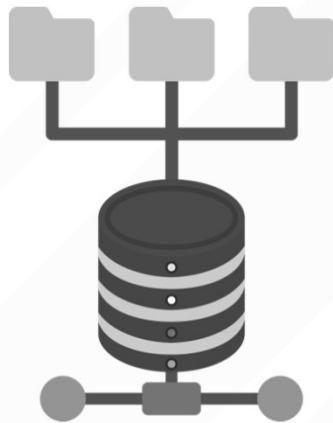
TYPES OF DATA SOURCES



❖ Databases - Examples

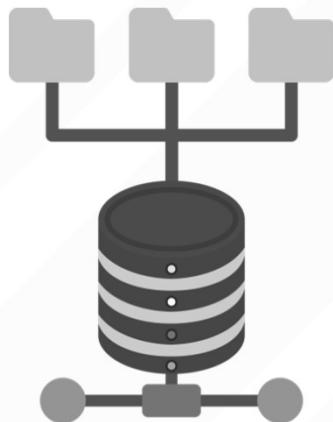
❖ SQL Server, Oracle, MySQL,
PostgreSQL

TYPES OF DATA SOURCES



- ❖ Cloud - Examples
- ❖ Azure SQL, SharePoint, OneDrive, Google BigQuery

TYPES OF DATA SOURCES



Online Services:

- ❖ Salesforce, Google Analytics, Dynamics 365

FILE-BASED CONNECTION: EXCEL



- ❖ Go to "Home" > "Get Data" > "Excel"
- ❖ Browse and select the Excel file
- ❖ Choose sheets or tables to import
- ❖ Option to transform data in Power Query

FILE-BASED CONNECTION: CSV



- ❖ Go to "Home" > "Get Data" > "Text/CSV"
- ❖ Browse and select the CSV file
- ❖ Automatically previews the data
- ❖ Transform using Power Query if needed

DATABASE CONNECTIONS

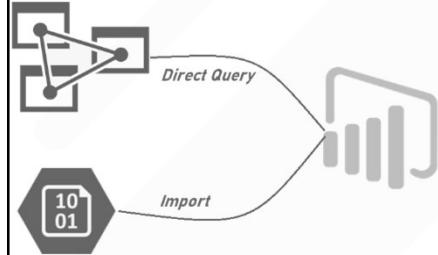


- ❖ SQL Server, Oracle, MySQL, PostgreSQL, etc.
- ❖ Steps:
 - ❖ Get Data > Choose your DB type
 - ❖ Enter server name and credentials
 - ❖ Select tables or views to import
 - ❖ Choose Import or DirectQuery

USING SQL SERVER



WHAT ARE IMPORT AND DIRECTQUERY?



- ❖ Power BI offers two primary methods to connect to SQL Server data:
 - Import Mode
 - DirectQuery Mode
- ❖ Each mode affects performance, data freshness, and functionality.

IMPORT MODE



- ❖ Data is copied and stored inside the Power BI file (.pbix).
- ❖ Enables fast report performance since queries run locally.
- ❖ Supports full modeling capabilities (DAX, relationships, calculated columns).

IMPORT MODE



- ❖ Requires data refresh to update the data from the source.
- ❖ Larger file size due to embedded data.
- ❖ Best for datasets that fit in memory and don't require real-time updates.

DIRECTQUERY MODE



- ❖ Data remains in the SQL Server database; Power BI sends queries live.
- ❖ Provides real-time or near real-time data access.
- ❖ Smaller Power BI file size, as data is not imported.

DIRECTQUERY MODE



- ❖ Limited support for some DAX functions and complex transformations.
- ❖ Performance depends on SQL Server and network speed.
- ❖ Ideal for very large datasets or when up-to-date data is critical.

WHICH MODE SHOULD YOU USE?



- ❖ Use Import Mode if:
 - Your dataset fits in memory.
 - You need complex calculations and fast visuals.
 - Real-time data is not essential.

WHICH MODE SHOULD YOU USE?



❖ Use DirectQuery Mode if:

- Your data is too large to import.
- You need up-to-the-minute data accuracy.
- You want to minimize file size.

CONNECTING TO WEB & APIs



❖ Connect to:

- ❖ Public web pages
- ❖ REST APIs (JSON/XML format)

❖ Steps:

- ❖ Get Data > Web
- ❖ Enter URL of the data source
- ❖ Power BI fetches and previews the data
- ❖ Option to transform and clean via Power Query

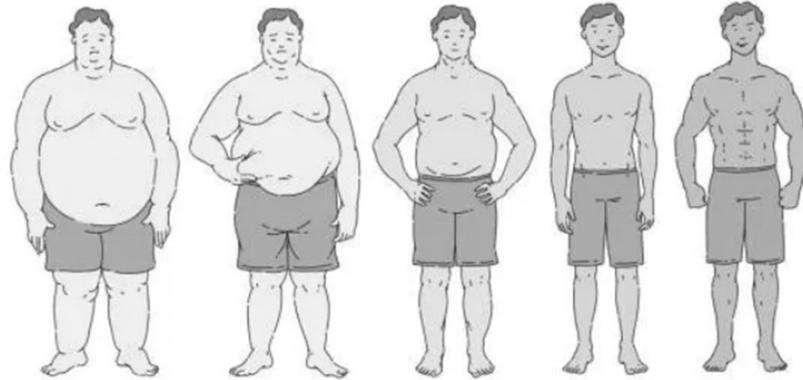
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TRANSFORMATION

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**WHAT
TRANSFORMATION ?**





**DATA
TRANSFORMATION ?**



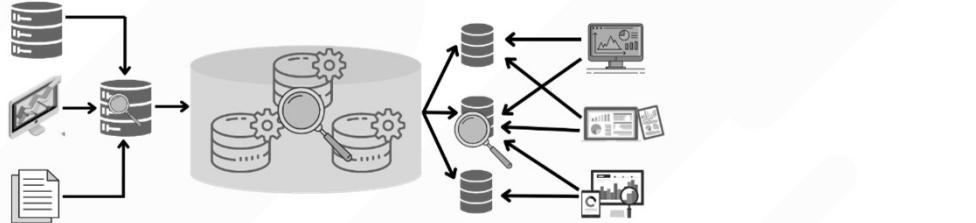
WHAT IS TRANSFORMATION ?



Process of altering data based on a set of business rules

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TRANSFORM



Process of converting data from one format of source system into the required format of a destination system

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DIFFERENT TYPES OF TRANSFORMATION

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- Basic Conversion
- Integration
- Filtering
- Calculations
- Sorting
- Error handling



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TRANSFORMATION – BASIC CONVERSION

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05/04/2023 → 04/05/2023

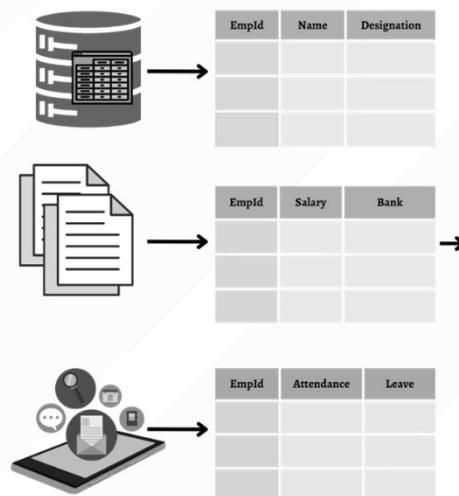
It transforms data from one form to another

- ❖ Date Format Conversion
- ❖ Currency Conversion

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TRANSFORMATION – INTEGRATION

Data Sources



Warehouse



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TRANSFORMATION – FILTERING



It filters the data based on Business rules

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TRANSFORMATION – FILTERING

- ❖ Filter all the transactions below 100 Rupees or 2 Dollars
- ❖ Filter all the data below 10 yr old and 90 yr old



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TRANSFORMATION – CALCULATIONS



- ❖ COUNT
- ❖ MAX
- ❖ AVERAGE

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TRANSFORMATION – SORTING



Sorts the data based on business rules

- ❖ Highest Salary to lowest
- ❖ Highest Transaction to lowest

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TRANSFORMATION – ERROR HANDLING

Handle the errors



Emp_ID	Emp_Phone	Emp_Degree
123	233-9876	
678	233-1231	BA, BSc, PhD
950	233-1231	BSc, MSc

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SOME MORE COMMON TRANSFORMATIONS



TRANSFORMATION —

BASIC DATA OPERATIONS



- ❖ Remove columns or rows
- ❖ Rename columns
- ❖ Change data types

TRANSFORMING DATA



- ❖ Split and merge columns
- ❖ Replace values
- ❖ Create custom columns

COLUMN TRANSFORMATIONS



- ❖ Add Conditional Columns
- ❖ Extract values from text
- ❖ Use column statistics

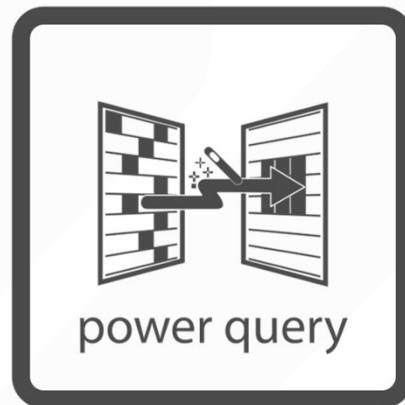
HOW WILL YOU TRANSFORM DATA ?

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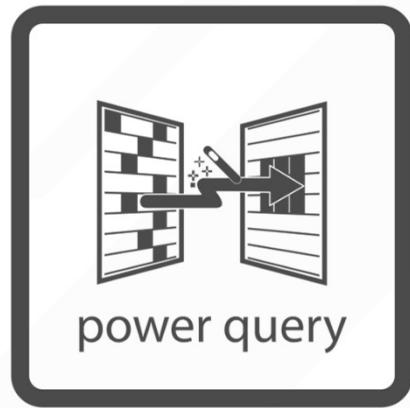
POWER QUERY EDITOR

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INTRODUCTION TO POWER QUERY EDITOR

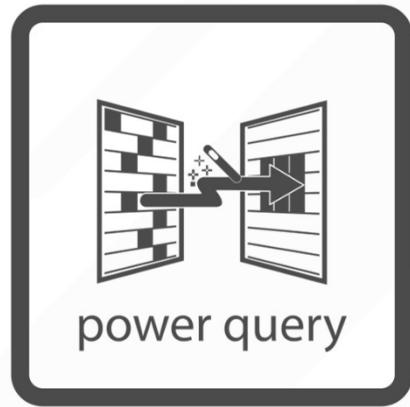
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- ❖ Power Query Editor is used for data shaping
- ❖ Interface components: Ribbon, Queries pane, Data preview, Applied Steps
- ❖ Supports M language for custom transformations

ACCESSING THE QUERY EDITOR

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- ❖ Open Power BI Desktop
- ❖ Click on Transform Data
- ❖ Launches Power Query Editor window
- ❖ Available for both import and DirectQuery modes

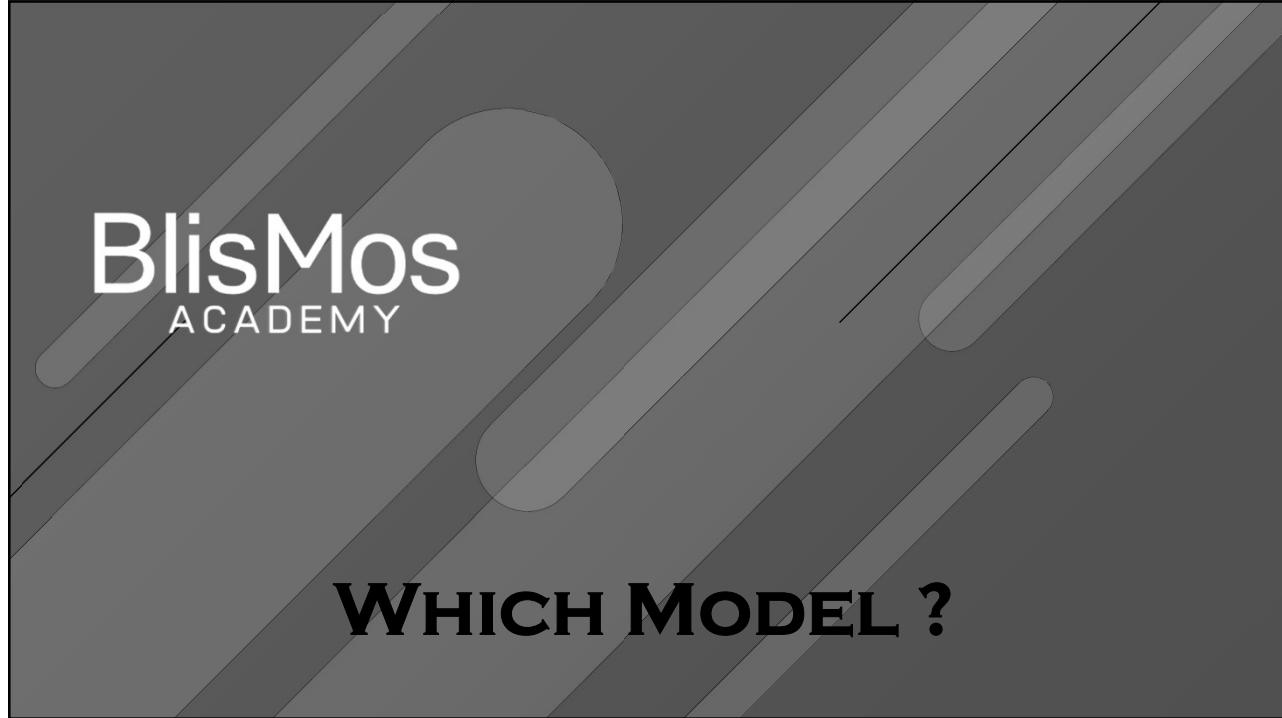
USER INTERFACE OVERVIEW



- ❖ Ribbon: Common commands
- ❖ Queries Pane: List of all loaded queries
- ❖ Data Preview: View of your current data
- ❖ Applied Steps: Sequence of transformations

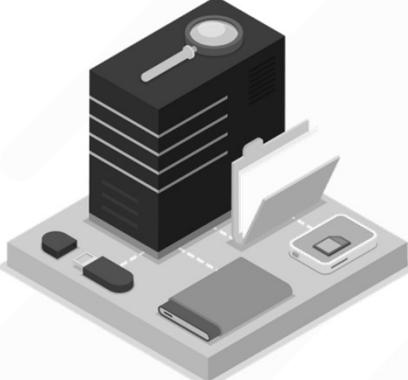
HANDS ON

- ❖ Import the file from local storage
- ❖ Transform the data while importing



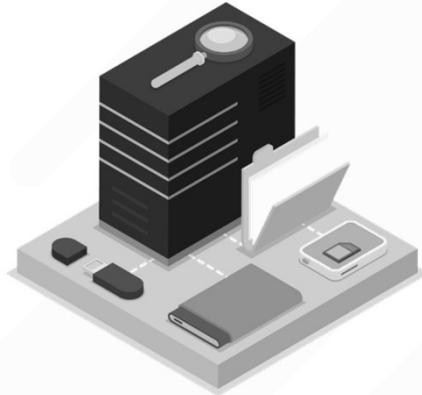


WHAT IS DATA MODELING?



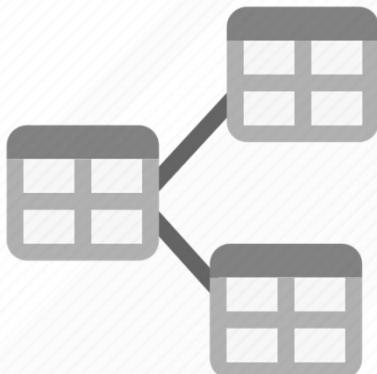
- ❖ Organizing data into tables and relationships
- ❖ Enables accurate filtering and aggregation
- ❖ Reduces data redundancy and improves performance
- ❖ Core part of the Power BI development process

WHY FOCUS ON DATA MODELING?



- ❖ Foundation for efficient and high-performing reports
- ❖ Ensures accuracy, scalability, and maintainability
- ❖ Critical for complex analytics and large datasets

COMPONENTS OF A DATA MODEL



- ❖ Tables (Fact and Dimension)
- ❖ Relationships
- ❖ Keys (Primary and Foreign)
- ❖ Hierarchies and calculated fields

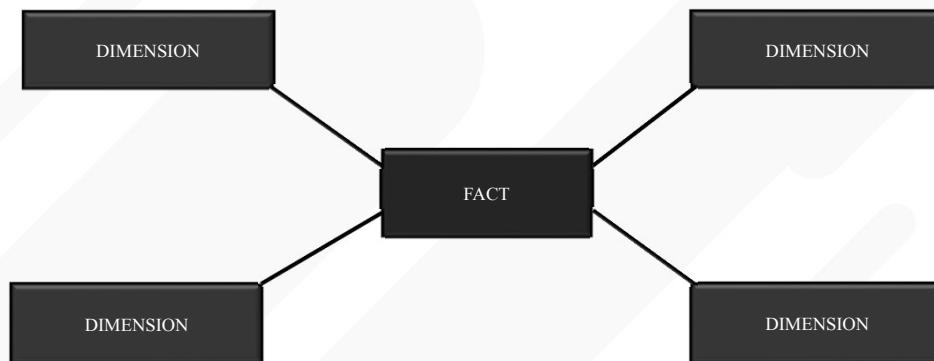
DIMENSIONS AND FACTS

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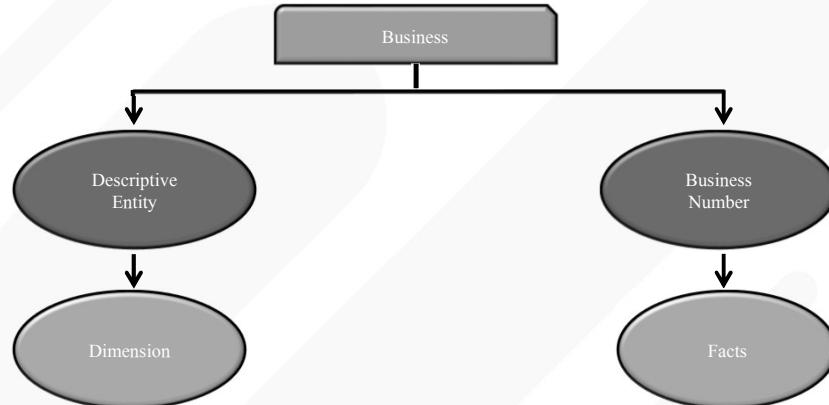
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DIMENSION & FACT



- The Data that explains the business numbers are called as Dimension
- The entities that are numeric are called as Facts

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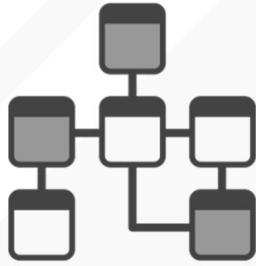
FACT TABLE



- A Fact is a quantitative piece of information about Business process
- It is also called as Measurement or Matrix
- Fact table is the central table in a schema which contains facts and connected to dimensions

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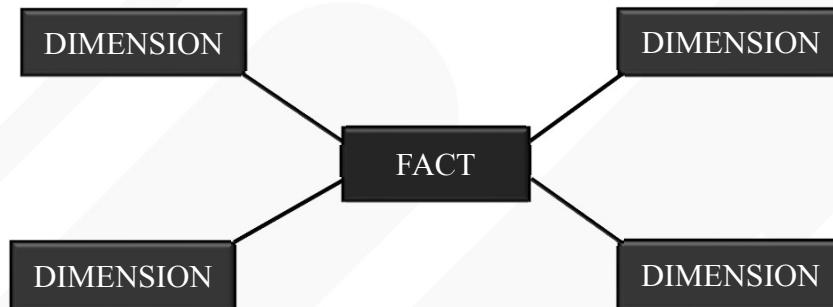
FACT TABLE



- It is a primary table in a dimensional model it contains:
 - Measurements/facts
 - Foreign key to dimension table
- Used for Analysis and Reporting

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DIMENSION TABLE



automated data mining survey
 responses consumer transcripts
 quickinfo competitive root cause
 diagnosis context analysis highlights
 ad-hoc analysis product reviews
 reviews sentiment analysis with the
 customer feedback consumer
 trends ad-hoc analysis early warning

- A Dimension Table is a table that stores the attributes or dimensions that describe the objects in a fact table
- Dimension table are descriptive entity which provides the perspectives or for the users to view the business numbers

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RELATIONSHIP - MODEL

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WHICH
RELATIONSHIP ?

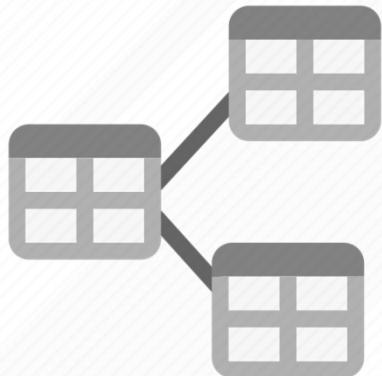


**MOTHER – DAUGHTER
FATHER - SON**



**TABLE
RELATIONSHIP
MODEL**

INTRODUCTION TO RELATIONSHIPS



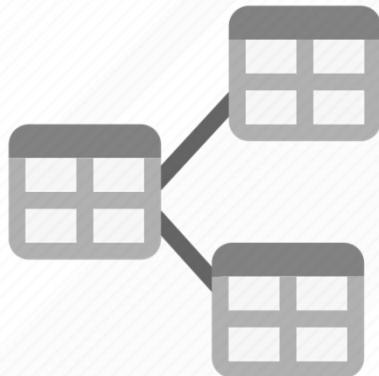
- ❖ Relationships connect tables in a data model
- ❖ Enable filtering and data navigation across related tables
- ❖ Critical for building accurate visuals and reports

WHY RELATIONSHIPS MATTER



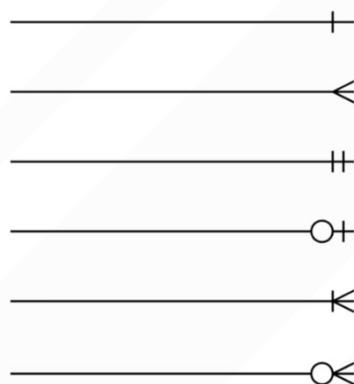
- ❖ Enable accurate analysis across multiple tables
- ❖ Help filter and aggregate data correctly
- ❖ Essential for normalized data models

WHEN TO CREATE RELATIONSHIPS



- ❖ When working with more than one table
- ❖ Data has foreign keys or shared fields
- ❖ Use relationships instead of repeated data

WHAT IS CARDINALITY?



- ❖ Describes the nature of data relationships
- ❖ Cardinality types:
 - One-to-Many (default)
 - Many-to-One
 - Many-to-Many
 - One-to-One

ONE-TO-MANY RELATIONSHIPS



- ❖ Most common type
- ❖ Example: One customer has many orders
- ❖ Ensures correct filtering and aggregation

MANY-TO-MANY RELATIONSHIPS



- ❖ Both tables contain duplicate values
- ❖ Example: Multiple customers associated with multiple sales agents
- ❖ Introduced to handle complex data models

CREATING RELATIONSHIPS IN POWER BI



- ❖ Automatically detected or manually created
- ❖ Drag and drop fields in Model view
- ❖ Specify cardinality and cross filter direction
- ❖ Ensure data types match on both sides

ADVICE FOR BUILDING TRUSTWORTHY RELATIONSHIPS



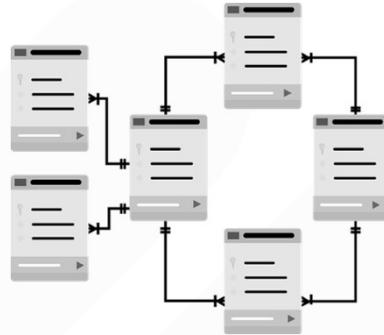
- ❖ Use fields with unique, consistent values
- ❖ Ensure matching data types
- ❖ Avoid many-to-many unless necessary
- ❖ Check for nulls or duplicates in key columns

ACTIVE VS INACTIVE RELATIONSHIPS



- ❖ Power BI allows only one active relationship between two tables
- ❖ Others are inactive and can be used in DAX with USERELATIONSHIP()
- ❖ Helps manage multiple logical paths

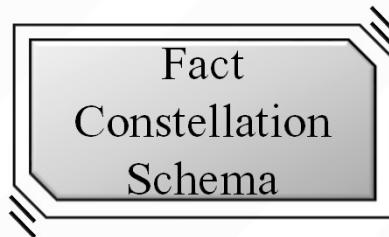
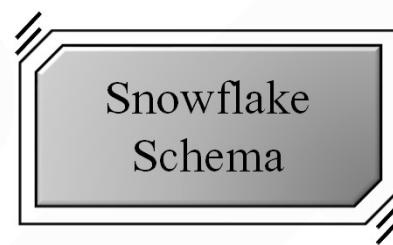
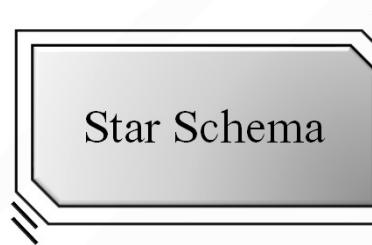
WHAT IS SCHEMA?



- A schema is a analytic framework that helps to organize and interpret information
- It defines how the data is organized and how the relations among them are associated

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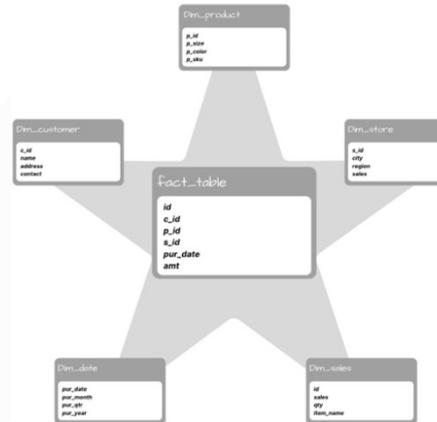
TYPES OF SCHEMA



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STAR SCHEMA

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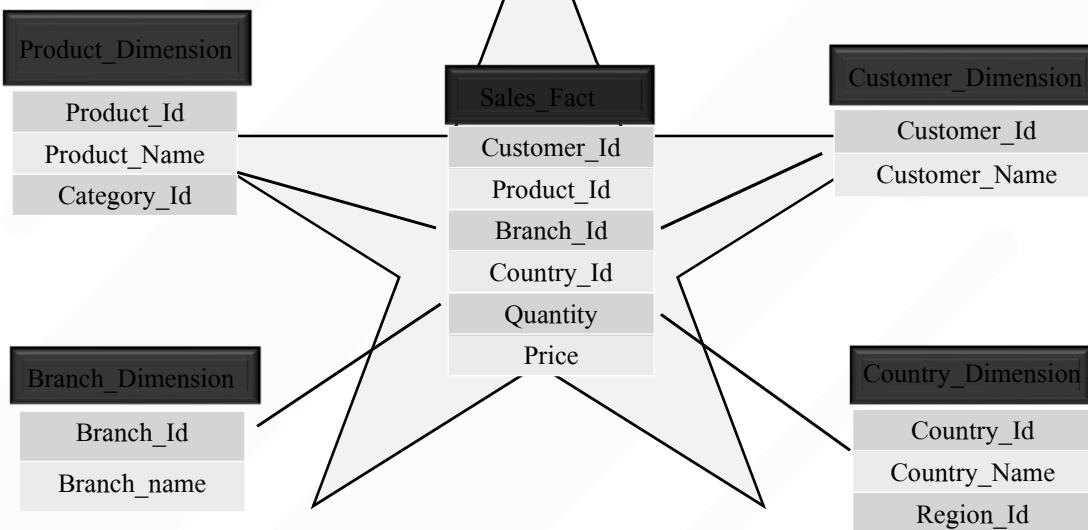


Star schema is the fundamental schema that is composed of single central Fact table that is surrounded by Dimension tables

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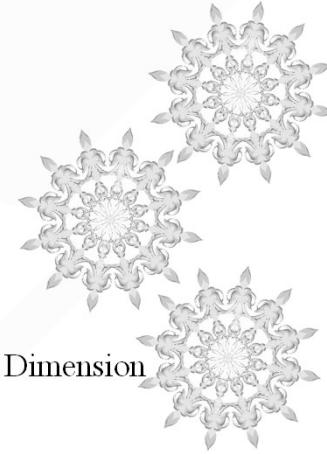
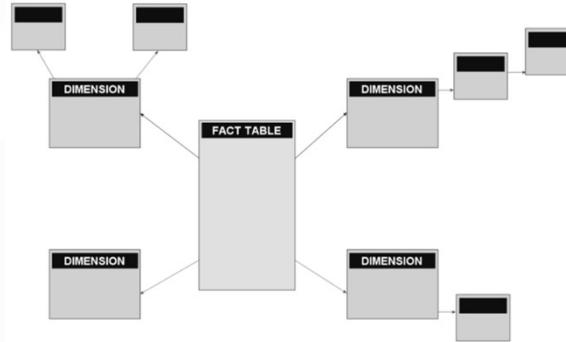
STAR SCHEMA EXAMPLE

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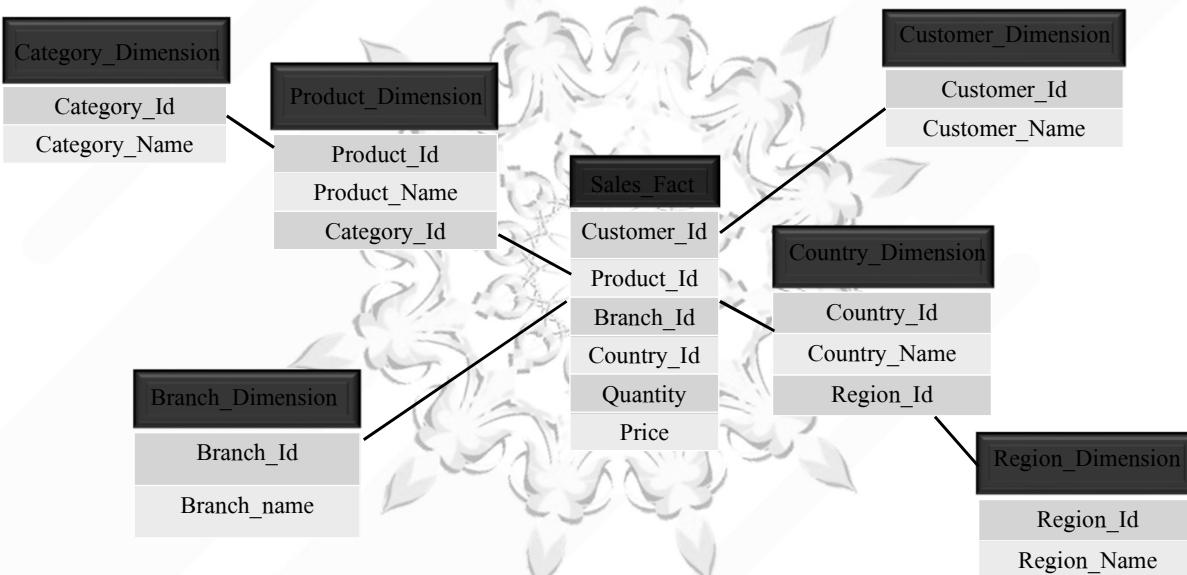
SNOWFLAKE SCHEMA



- Snowflake schema is an extension of star schema where the Dimension tables are connected to one or more Dimensions
- The entity relationship diagram resembles a Snowflake shape

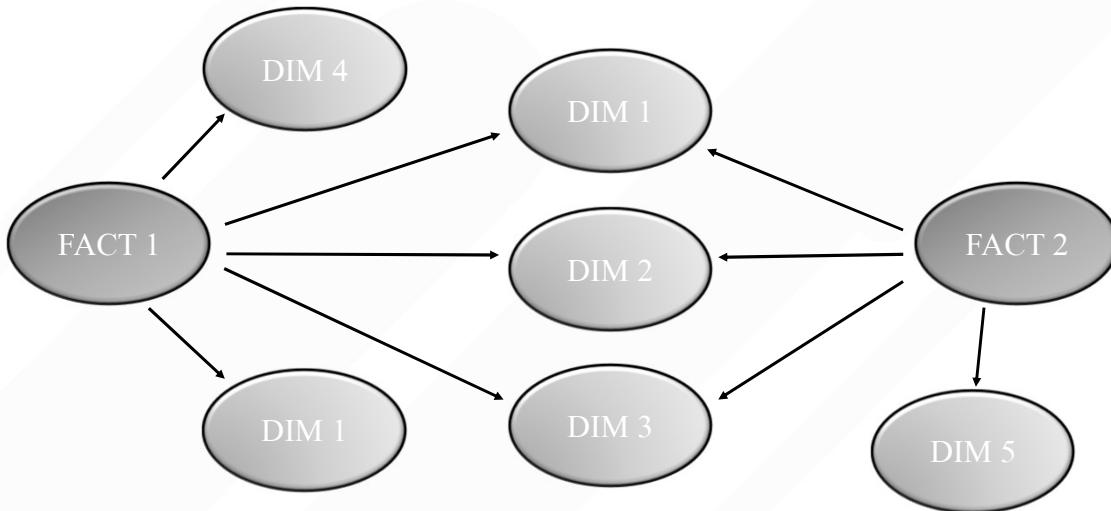
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SNOWFLAKE SCHEMA EXAMPLE



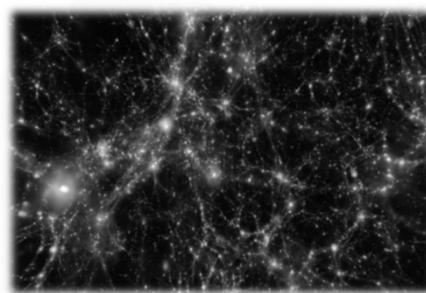
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FACT CONSTELLATION SCHEMA



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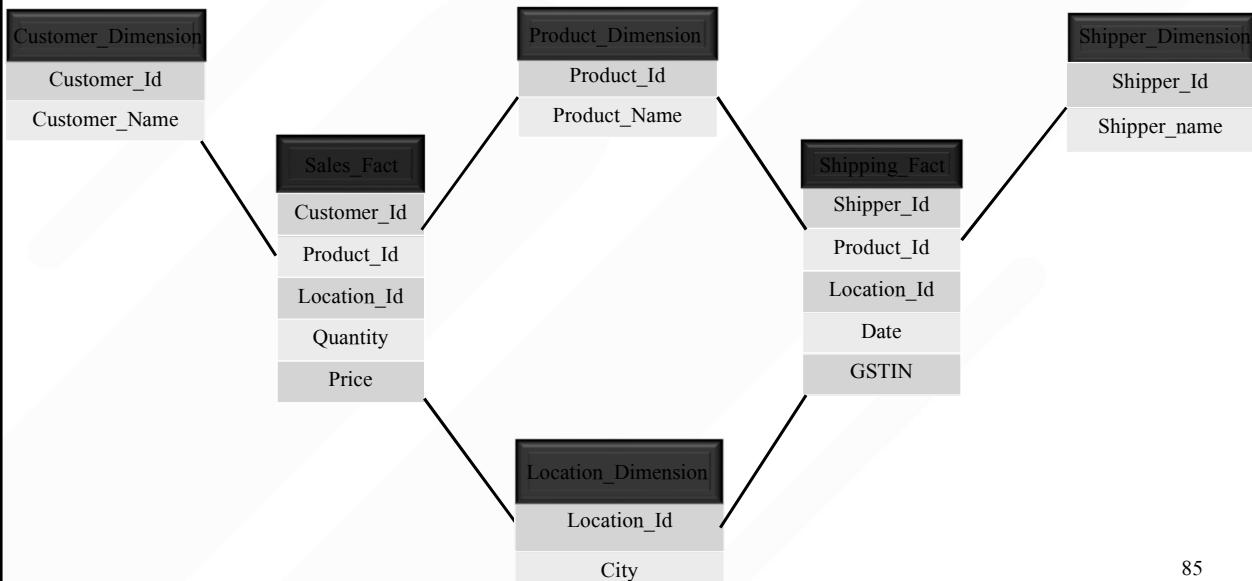
FACT CONSTELLATION SCHEMA



- It is a collection of multiple Fact tables having some common Dimension tables
- It can be viewed as a collection of several star schemas and also known as Galaxy schema

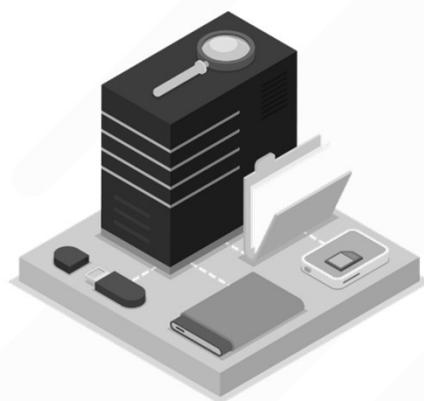
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FACT CONSTELLATION SCHEMA EXAMPLE



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CREATING A DATA MODEL IN POWER BI



- ❖ Load multiple tables
- ❖ Identify primary and foreign keys
- ❖ Create relationships in Model View
- ❖ Check visuals for proper interaction

KEEP THE MODEL SIMPLE



- ❖ Only import necessary columns
- ❖ Avoid unnecessary calculated columns
- ❖ Focus on essential measures and visuals

MANAGE RELATIONSHIPS CAREFULLY



- ❖ Define correct cardinality (One-to-Many, Many-to-One)
- ❖ Prefer single-directional relationships
- ❖ Avoid ambiguous and circular relationships

OPTIMIZE DATA TYPES



- ❖ Use appropriate data types (e.g., Integer, Decimal, Text)
- ❖ Smaller data types reduce memory usage
- ❖ Format fields correctly from the start

MANAGING RELATIONSHIPS IN THE MODEL VIEW



- ❖ View and edit relationships visually
- ❖ Highlight fields with errors or missing matches
- ❖ Delete or reconfigure connections easily

MODEL VIEW IN POWER BI

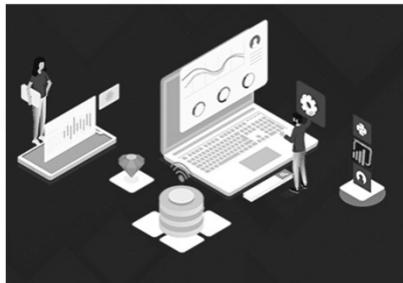


- ❖ Visual interface for managing relationships
- ❖ Tables shown as blocks with fields
- ❖ Relationships shown as lines with cardinality

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DAX

WHAT IS DAX?



- ❖ Data Analysis Expressions (DAX)
- ❖ Language used to create custom calculations
- ❖ Key component for measures, calculated columns, and tables

WHY USE DAX?



- ❖ Create dynamic and advanced calculations
- ❖ Enable time intelligence, filtering, and aggregation
- ❖ Empower deeper data analysis

WHY USE DAX FUNCTIONS



- ❖ Basic functions simplify data analysis
- ❖ Key to building measures and calculated columns

BASIC DAX SYNTAX



- ❖ Formula always starts with "="
- ❖ Components:
 - Functions
 - References (columns/tables)
 - Operators (+, -, *, /)
 - Values and literals

SUM FUNCTION OVERVIEW



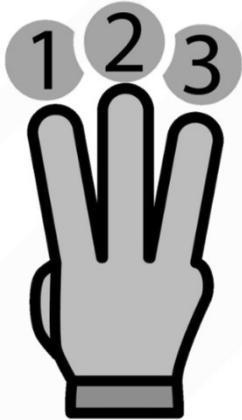
- ❖ Purpose: Adds up all numbers in a column
- ❖ Syntax: SUM()
- ❖ Example: Total Sales =
SUM(Sales[SalesAmount])

AVERAGE FUNCTION OVERVIEW



- ❖ Purpose: Calculates the mean of numbers in a column
- ❖ Syntax: AVERAGE()
- ❖ Example: Average Price =
AVERAGE(Products[UnitPrice])

COUNT FUNCTION OVERVIEW



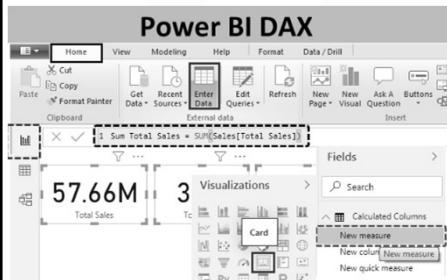
- ❖ Purpose: Counts the number of values in a column
- ❖ Syntax: COUNT()
- ❖ Example: Total Orders = COUNT(Orders[OrderID])

COMMON DAX FUNCTIONS



- ❖ SUM(), AVERAGE(), MIN(), MAX()
- ❖ IF(), SWITCH(), LOOKUPVALUE()
- ❖ RELATED(), CALCULATE(), FILTER()

EXAMPLE OF A SIMPLE DAX FORMULA



- ❖ Formula: Total Sales =
 $\text{SUM}(\text{Sales}[\text{SalesAmount}])$
- ❖ Aggregates total sales across the Sales table

UNDERSTANDING CONTEXT IN DAX



- ❖ Row Context: Applies operations row-by-row
- ❖ Filter Context: Result changes based on filters applied
- ❖ Critical for writing correct formulas

BEST PRACTICES FOR WRITING DAX



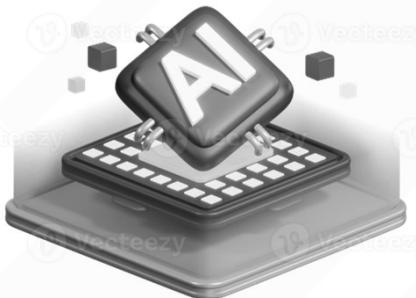
- ❖ Use indentation and comments for readability
- ❖ Test formulas in small steps
- ❖ Use DAX Studio for performance testing

COMMON DAX MISTAKES TO AVOID



- ❖ Confusing calculated columns and measures
- ❖ Ignoring filter context
- ❖ Overcomplicating formulas unnecessarily

WHAT IS TIME INTELLIGENCE IN DAX?



- ❖ Set of functions to calculate and analyze data across time periods
- ❖ Common in financial, sales, and trend analysis
- ❖ Key to dynamic, calendar-based reporting

IMPORTANCE OF TIME-BASED CALCULATIONS



- ❖ Compare performance across periods (Month-over-Month, Year-over-Year)
- ❖ Enable trend spotting and forecasting
- ❖ Automate calendar logic (no manual filtering!)

TYPES OF TIME CALCULATIONS



- ❖ Date Navigation (e.g., Previous Month, Same Period Last Year)
- ❖ Aggregations Over Periods (e.g., Running Totals, Moving Averages)
- ❖ Period Comparisons (e.g., Growth % vs Last Year)

ESSENTIAL DAX TIME FUNCTIONS



- ❖ TOTALYTD(), TOTALQTD(), TOTALMTD()
- ❖ SAMEPERIODLASTYEAR()
- ❖ DATEADD()
- ❖ PARALLELPERIOD()
- ❖ PREVIOUSMONTH(), NEXTYEAR()

EXAMPLE: YTD CALCULATION



- ❖ Sales_YTD = TOTALYTD(
SUM(Sales[Amount]),
'Date'[Date]
)
- ❖ Automatically accumulates sales from the start of the year
- ❖ Respects calendar hierarchy

EXAMPLE: SAME PERIOD LAST YEAR



- ❖ Sales_LastYear = CALCULATE(
SUM(Sales[Amount]),
SAMEPERIODLASTYEAR('Date'[Date])
)
- ❖ Compares the current period with the same one last year

EXAMPLE: MOVING AVERAGES



- ❖ `3MonthAvg =
AVERAGEX(DATESINPERIOD('Date'[Date],
MAX('Date'[Date]), -3, MONTH),
[Sales]
)`
- ❖ Smooth out seasonal fluctuations

BEST PRACTICE FOR USING TIME INTELLIGENCE FUNCTIONS



- ❖ Always use a properly marked Date Table
- ❖ Use CALCULATE() to modify filter context
- ❖ Watch out for missing dates in your data!

ADVANCED TIME INTELLIGENCE



- ❖ Custom fiscal calendars
- ❖ Rolling periods (e.g., last 7 days, last 30 days)
- ❖ Multi-year trend analysis

OVERVIEW OF STATISTICAL FUNCTIONS AND ADVANCED CALCULATIONS



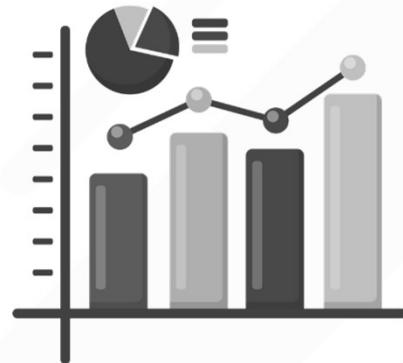
- ❖ Importance of statistics in data analysis
- ❖ Role of statistical functions in modern analytics
- ❖ Advanced calculations to solve real-world problems

WHAT ARE STATISTICAL FUNCTIONS?



- ❖ Functions to summarize, interpret, and analyze data
- ❖ Core areas: Central Tendency, Dispersion, Distribution, Prediction

COMMON STATISTICAL FUNCTIONS



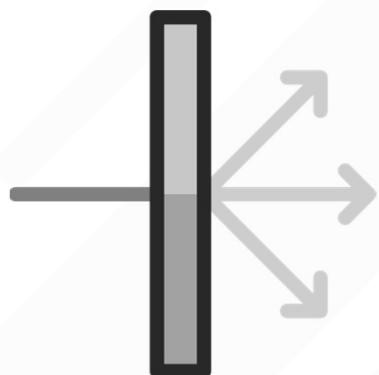
- ❖ AVERAGE(), MEDIAN(), MODE()
- ❖ STDEV.P(), STDEV.S()
- ❖ VAR.P(), VAR.S()
- ❖ MIN(), MAX(), PERCENTILE()

CENTRAL TENDENCY FUNCTIONS



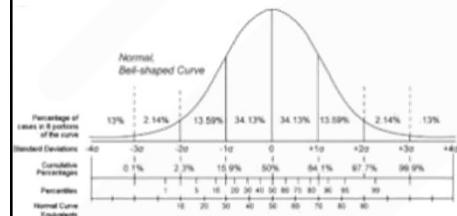
- ❖ Mean (AVERAGE): Sum of values divided by count
- ❖ Median: Middle value in ordered list
- ❖ Mode: Most frequent value

DISPERSION FUNCTIONS



- ❖ STDEV.P(), STDEV.S(): Spread of values around the mean
- ❖ VAR.P(), VAR.S(): Measure of variability
- ❖ Use Cases: Risk analysis, quality control

PERCENTILE AND RANK CALCULATIONS



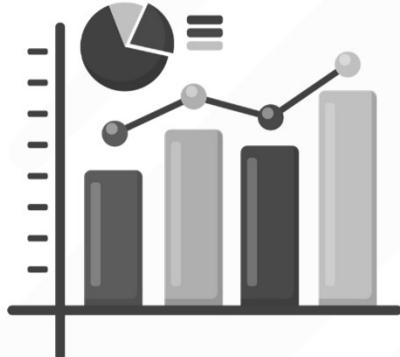
- ❖ PERCENTILE.INC() and PERCENTILE.EXC()
- ❖ RANK.EQ(), RANK.AVG()
- ❖ Applications: Customer segmentation, exam scores analysis

ADVANCED STATISTICAL FUNCTIONS



- ❖ FORECAST.LINEAR() – Predicts future values
- ❖ CORREL() – Measures relationship between variables
- ❖ COVARIANCE.P() and COVARIANCE.S() – Analyze dependency

EXAMPLE: PREDICTING FUTURE SALES



- ❖ Excel
`=FORECAST.LINEAR(2025, Known_Y, Known_X)`
- ❖ Predict future sales based on historical data
- ❖ Key for budgeting and planning

EXAMPLE: ANALYZING RELATIONSHIPS



- ❖ Excel
`=CORREL(Sales, Advertising_Spend)`
- ❖ Correlation between sales and advertising spending
- ❖ Value close to +1 or -1 shows strong relationship

ADVANCED CALCULATIONS BEYOND BASICS

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- ❖ Weighted averages
- ❖ Moving averages
- ❖ Running totals and cumulative sums
- ❖ Dynamic percentiles and ranks

EXAMPLE: WEIGHTED AVERAGE CALCULATION

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ACADEMY

$$\text{Weighted Average} = \frac{\text{Sum of weighted terms}}{\text{total number of terms}}$$

- ❖ DAX
- Weighted_Avg = SUMX(Table, Table[Weight] * Table[Value]) / SUM(Table[Weight])
- ❖ Accounts for different levels of importance
- ❖ Useful in portfolio analysis, grading systems

WHY OPTIMIZE DAX?



- ❖ Improve performance of reports and models
- ❖ Ensure faster data refresh and query execution
- ❖ Create scalable and efficient Power BI solutions

FACTORS AFFECTING DAX PERFORMANCE



- ❖ Data model design
- ❖ Query complexity
- ❖ Storage engine (VertiPaq) vs Formula engine
- ❖ Filter context and row context handling



VISUALIZATIONS

INTRODUCTION TO VISUALIZATIONS



- ❖ Visualizations help interpret data effectively
- ❖ Power BI offers a wide range of built-in visuals
- ❖ Start with bar charts, line charts, and tables for common scenarios

VISUALIZATION PANE OVERVIEW

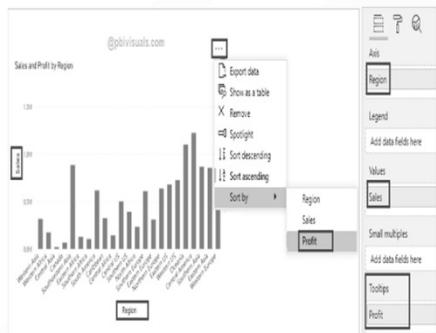
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- ❖ Located on the right side of Power BI Desktop
- ❖ Includes different chart types and formatting tools
- ❖ Drag-and-drop interface for quick creation

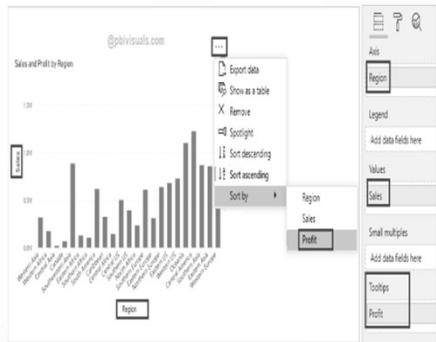
SORTING DATA IN VISUALS

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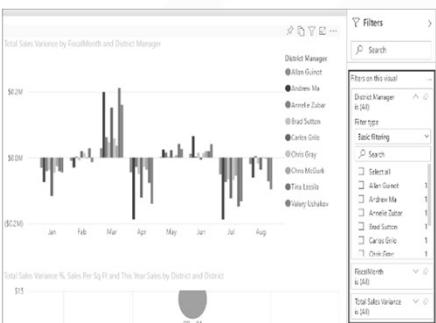
- ❖ Sort ascending or descending
- ❖ Sort by value, category, or custom field
- ❖ Sorting affects visual order (e.g., bars, rows)

HOW TO SORT A VISUAL



- ❖ Click on the ellipsis ("...") on the visual
- ❖ Select "Sort by" and choose a field
- ❖ Adjust ascending/descending as needed

FILTERING DATA IN VISUALS



- ❖ Focus visuals on specific data subsets
- ❖ Use basic, advanced, or relative date filters
- ❖ Filtering affects only the selected visual or page

IMPORTANCE OF ADVANCED VISUALS

Important

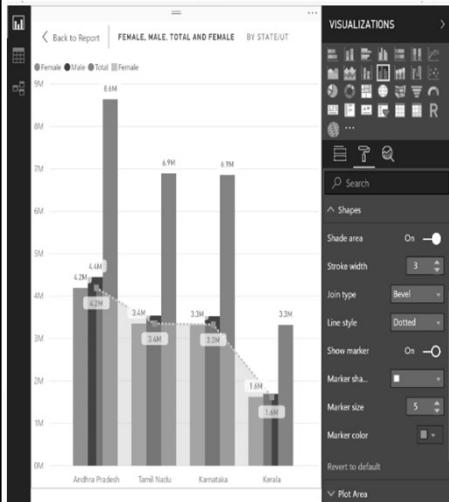
- ❖ Go beyond basic charts
- ❖ Visualize complex relationships
- ❖ Provide quick summaries and geographic insights

BEST PRACTICES FOR ADVANCED VISUALS



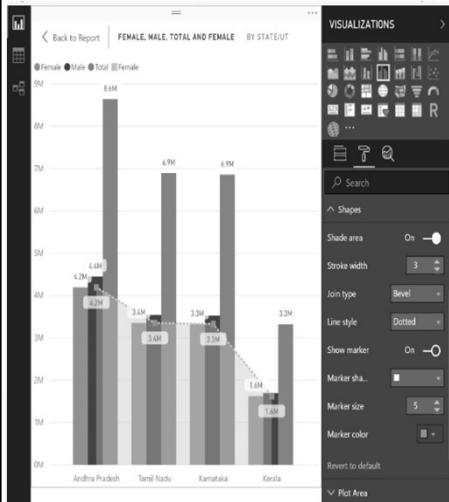
- ❖ Ensure geographic data is clean for maps
- ❖ Label axes clearly in scatter plots
- ❖ Use cards sparingly for high-impact metrics
- ❖ Combine visuals for richer reports

WHAT ARE COMBO CHARTS?



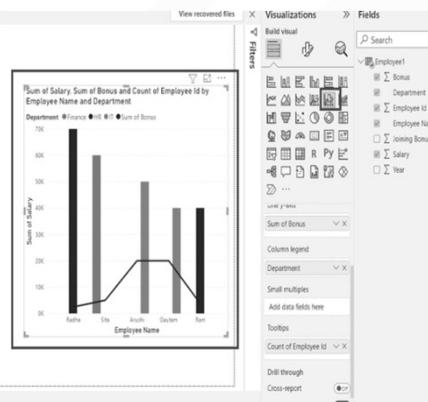
- ❖ Combine two chart types (e.g., bar and line) into one visual
- ❖ Useful for comparing different types of information
- ❖ Commonly used for dual-axis analysis

WHY USE COMBO CHARTS?



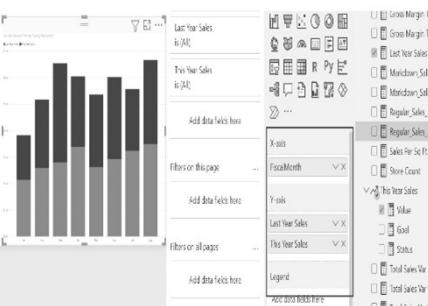
- ❖ Show relationships between two measures
- ❖ Compare trends and totals together
- ❖ Improve storytelling with layered data

CREATING A COMBO CHART



- ❖ Insert "Line and Clustered Column Chart" from Visualizations pane
- ❖ Assign fields to:
 - Column Values
 - Line Values
 - Shared Axis

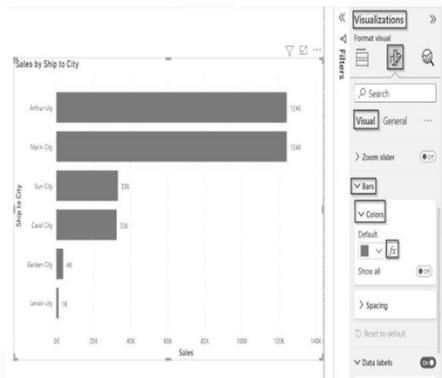
SETTING UP THE SHARED AXIS



- ❖ Drag the categorical field (e.g., Month, Category) to Shared Axis
- ❖ Ensures alignment between bar and line visuals

ASSIGNING VALUES

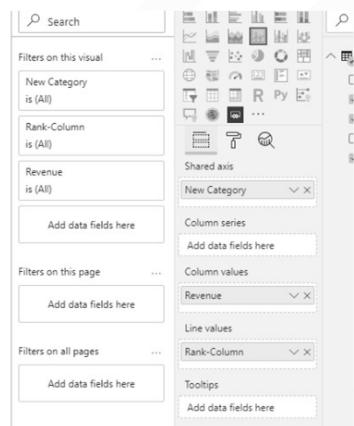
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- ❖ Column Values: Add measure for bars (e.g., Sales)
- ❖ Line Values: Add measure for lines (e.g., Profit Margin)
- ❖ Customize which measure appears as a line or column

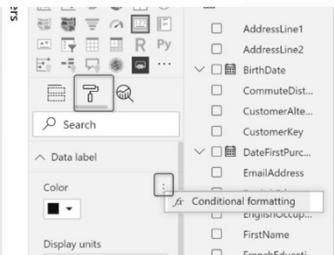
FORMATTING COMBO CHARTS

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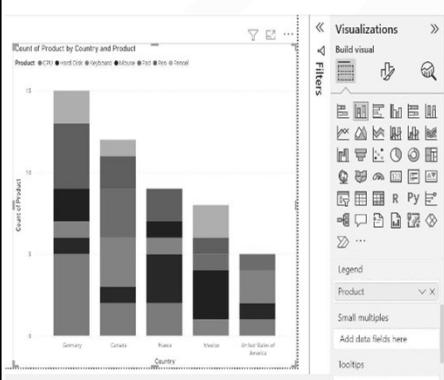
- ❖ Access Format pane (paint roller icon)
- ❖ Format axes separately (Y-axis for column and line)
- ❖ Customize colors, data labels, titles, and legends

ENHANCING READABILITY



- ❖ Use contrasting colors for bar and line
- ❖ Add data labels carefully
- ❖ Adjust axis scales for better comparison

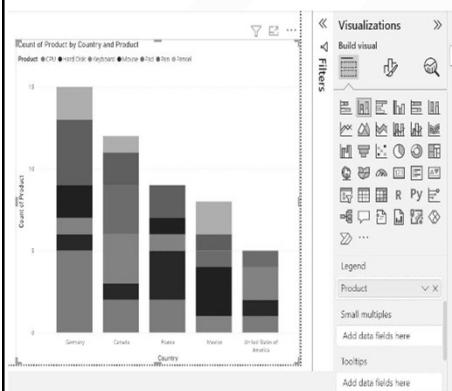
CREATING A BAR CHART



- ❖ Select Bar Chart icon from Visualizations pane
- ❖ Drag a category field to Axis
- ❖ Drag a measure field to Values
- ❖ Customize title, labels, and colors in Format pane

WHEN TO USE A BAR CHART

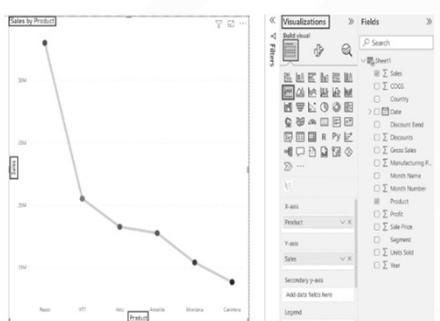
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- ❖ Comparing values across categories
- ❖ Examples: Sales by Region, Products by Profit
- ❖ Easy to interpret and widely understood

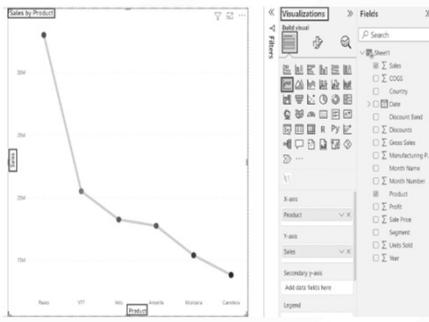
CREATING A LINE CHART

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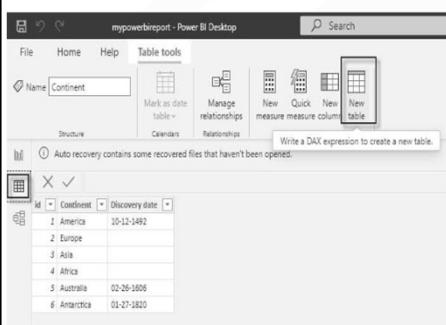
- ❖ Select Line Chart from Visualizations pane
- ❖ Drag time-based field to Axis
- ❖ Drag numeric field to Values
- ❖ Add series for multiple lines (e.g., by Category)

WHEN TO USE A LINE CHART



- ❖ Tracking trends over time
- ❖ Examples: Monthly Revenue, Daily Visitors
- ❖ Good for showing patterns and changes

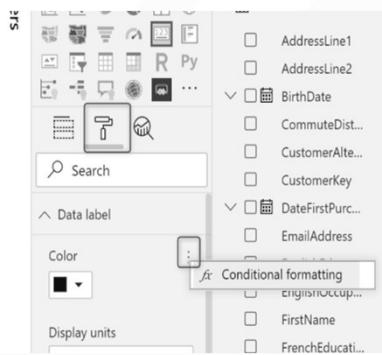
CREATING A TABLE



- ❖ Select Table visual from Visualizations pane
- ❖ Drag multiple fields into Values
- ❖ Sort columns, apply conditional formatting
- ❖ Can be exported for tabular analysis

FORMATTING AND INTERACTION TIPS

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- ❖ Use the Format pane for colors, fonts, titles
- ❖ Enable tooltips for extra detail
- ❖ Use slicers and filters for interactivity
- ❖ Resize and arrange visuals on the canvas

IMPORTANCE OF CUSTOMIZATION

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Important

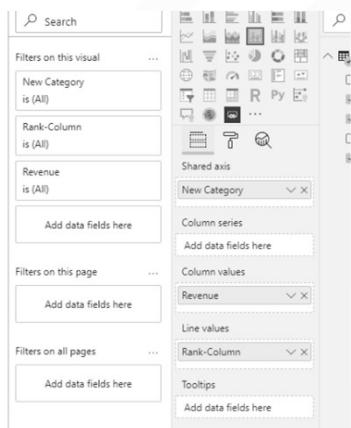
- ❖ Tailor visuals for clarity and aesthetics
- ❖ Highlight key insights for better decision-making
- ❖ Align with brand guidelines or presentation themes

ACCESSING THE FORMAT PANE



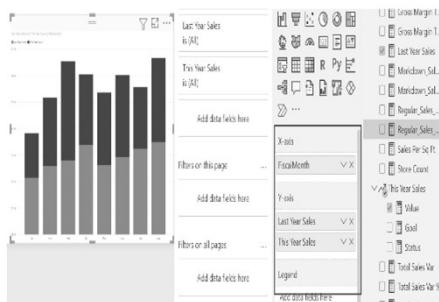
- ❖ Select a visual, then click the paint roller icon
- ❖ Format options change based on visual type
- ❖ Categories: Visual, Data Labels, Title, Axis, etc.

CUSTOMIZING TITLES AND LABELS



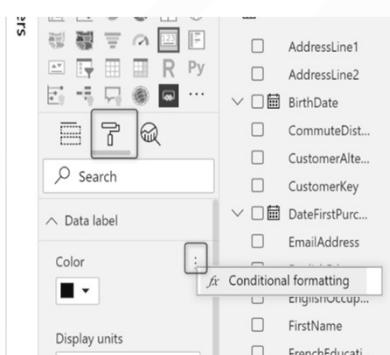
- ❖ Edit chart titles for clarity
- ❖ Adjust font size, color, and alignment
- ❖ Enable or disable data labels

MODIFYING AXES AND GRIDLINES



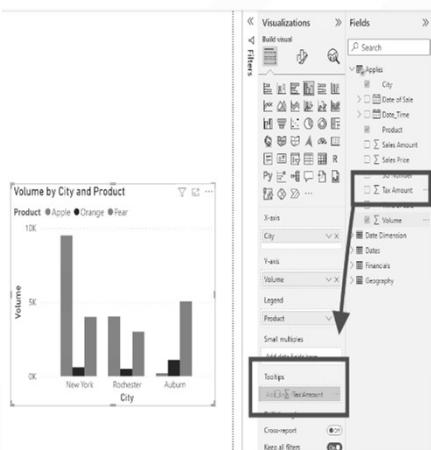
- ❖ Turn axes on/off
- ❖ Change axis scale and title
- ❖ Customize gridline color and visibility

FORMATTING COLORS AND THEMES



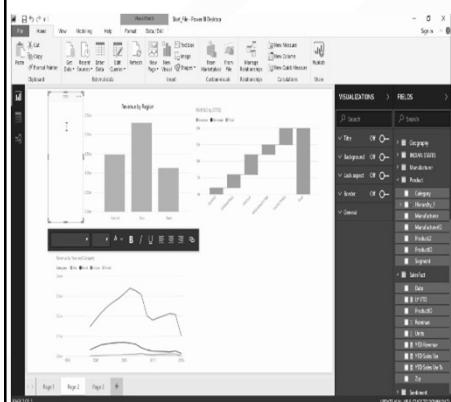
- ❖ Change color of bars, lines, and shapes
- ❖ Use conditional formatting for insights
- ❖ Apply report themes or create custom themes

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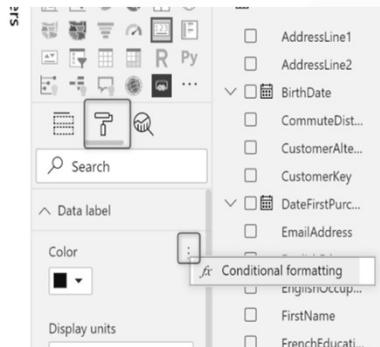
- ❖ Enable tooltips to show extra data on hover
 - ❖ Add fields to the Tooltips section
 - ❖ Format tooltip visuals with custom backgrounds

USING SHAPES AND IMAGES



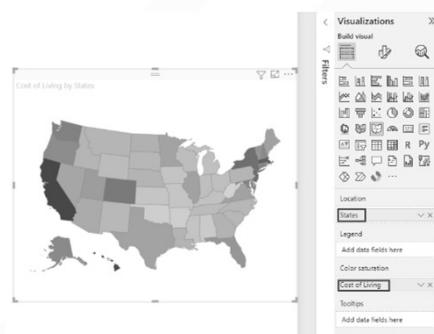
- ❖ Add branding elements or annotations
 - ❖ Insert shapes (lines, rectangles, circles)
 - ❖ Add images like logos or backgrounds

ADVANCED FORMATTING TIPS



- ❖ Use bookmarks for alternate views
- ❖ Layer visuals for storytelling
- ❖ Combine formatting with slicers and filters

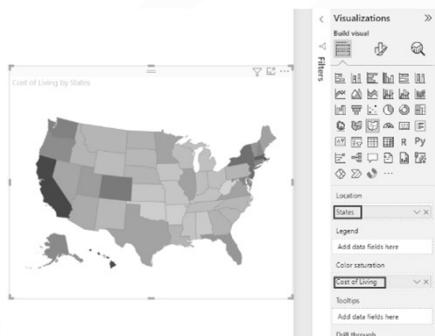
INTRODUCTION TO MAP VISUALS



- ❖ Display geographic data points
- ❖ Built-in map and filled map visuals
- ❖ Requires location data (city, country, coordinates)

CREATING A MAP VISUAL

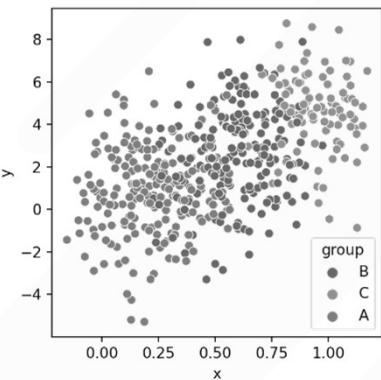
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- ❖ Add a map visual from the Visualizations pane
- ❖ Drag location fields into Location bucket
- ❖ Use size and color saturation for deeper insights

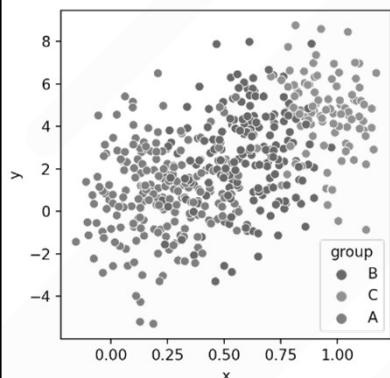
INTRODUCTION TO SCATTER PLOTS

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- ❖ Explore relationships between two numerical variables
- ❖ Useful for identifying trends, clusters, and outliers

CREATING A SCATTER PLOT



- ❖ Select Scatter Chart visual
- ❖ Add fields to X Axis, Y Axis, Details, and Play Axis (for animations)
- ❖ Customize markers, labels, and colors

INTRODUCTION TO CARDS



- ❖ Display a single value clearly and prominently
- ❖ Good for KPIs (e.g., total sales, number of customers)

CREATING A CARD VISUAL



- ❖ Select Card visual
- ❖ Drag a single value field into Fields bucket
- ❖ Format text size, background, and colors for emphasis

- ❖ Creating visual

HANDS ON

INTRODUCTION TO FILTERING



- ❖ Filtering: narrowing down data to focus on key information
- ❖ Essential for large datasets
- ❖ Improves analysis speed and accuracy

BASIC VS ADVANCED FILTERING



- ❖ Basic Filtering:
 - Simple dropdown selections
 - Limited to one condition at a time
- ❖ Advanced Filtering:
 - Multiple conditions
 - Complex logical expressions (AND, OR)
 - Dynamic filtering options

TYPES OF ADVANCED FILTERS



- ❖ Custom Filters (greater than, less than, between)
- ❖ Text Filters (contains, does not contain, begins with)
- ❖ Date Filters (before, after, specific range)
- ❖ Top/Bottom Filters (Top 10, Bottom 5)
- ❖ Dynamic/Relative Filters (Last 7 days, This Month)

ADVANCED FILTERING IN EXCEL



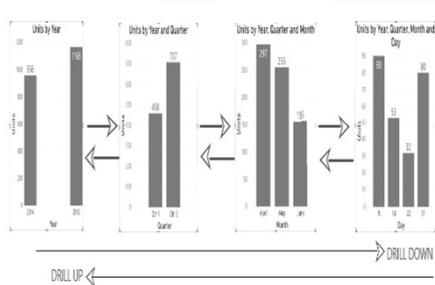
- ❖ Use the Advanced Filter tool
- ❖ Filter in place or copy results to another location
- ❖ Use criteria ranges for complex conditions
- ❖ Combine with Formulas (e.g., =IF, =AND, =OR)

ADVANCED FILTERING IN POWER BI



- ❖ Slicers for interactive filtering
- ❖ Visual-level, Page-level, and Report-level filters
- ❖ Relative Date filtering
- ❖ Filter by Measures and Conditions
- ❖ Use DAX for dynamic filter logic (e.g., CALCULATE, FILTER)

WHAT IS DRILL-DOWN AND DRILL-UP?



- ❖ Drill-down: Navigate from a higher-level summary to more detailed data
- ❖ Drill-up: Move back to higher summary levels
- ❖ Enables multi-level data exploration within a single visual

IMPORTANCE OF DRILL CAPABILITIES

Important

- ❖ Simplifies complex datasets
- ❖ Enables interactive analysis
- ❖ Provides a smoother storytelling experience

ENABLING DRILL-DOWN



- ❖ Click on a visual to activate it
- ❖ Use the "Drill Mode" button (double arrow icon)
- ❖ Click on elements (bars, points) to drill into details

PERFORMING DRILL-UP



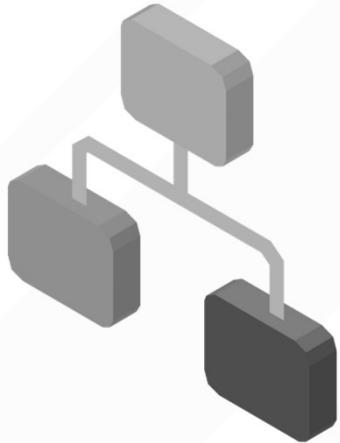
- ❖ Use the "Drill-up" button (upward arrow)
- ❖ Return to a broader view of the data
- ❖ Available when in drill-down mode

USING DRILL-THROUGH PAGES



- ❖ Create dedicated pages for deep dives
- ❖ Right-click a data point and select "Drill-through"
- ❖ Set up drill-through filters

WHAT ARE HIERARCHIES?



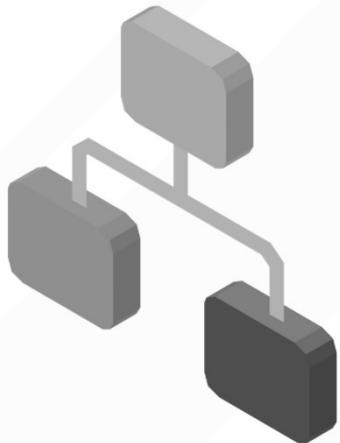
- ❖ Logical structures organizing data into levels
- ❖ Examples: Year > Quarter > Month > Day
- ❖ Improve data navigation and visualization

IMPORTANCE OF HIERARCHIES

Important

- ❖ Enable drill-down and drill-up functionality
- ❖ Simplify complex datasets
- ❖ Enhance user interactivity and exploration

CREATING HIERARCHIES IN POWER BI



- ❖ Drag and drop fields into a hierarchy in Fields pane
- ❖ Right-click a field and select "New hierarchy"
- ❖ Add levels by dragging additional fields

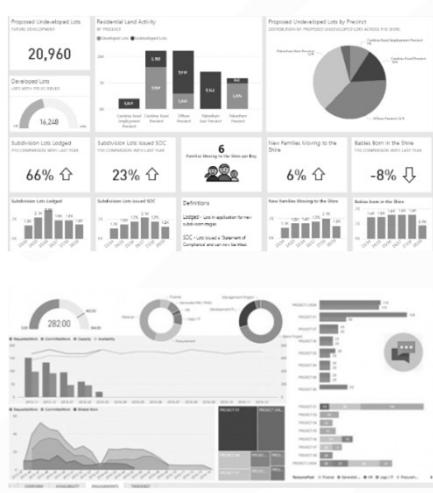
USING HIERARCHIES IN VISUALS



- ❖ Apply hierarchies to visuals like tables, matrices, and charts
- ❖ Drill through data with a click
- ❖ Provide summarized and detailed views seamlessly



POWER BI REPORTS



- ❖ Power BI allows users to create different types of reports to visualize and analyze data.
 - ❖ Reports are tailored to different business needs: operational, strategic, analytical, etc.
 - ❖ Choosing the right report type improves efficiency and decision-making.

TYPES OF POWER BI REPORTS



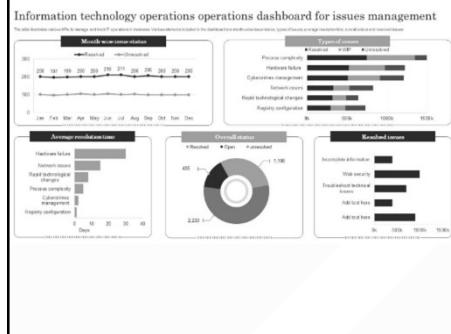
- ❖ Operational Reports – Monitor real-time business activities and transactions.
- ❖ Analytical Reports – Explore data to identify trends and patterns.
- ❖ Strategic Reports – High-level KPIs and insights for executive planning.
- ❖ Dashboards – Condensed visual overviews across multiple reports.

TYPES OF POWER BI REPORTS



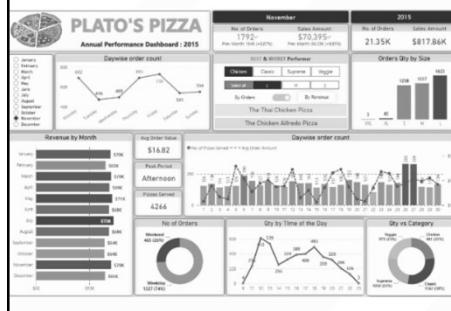
- ❖ Paginated Reports – Print-ready, fixed-layout documents.
- ❖ Ad Hoc/Exploratory Reports – On-the-fly data exploration by users.
- ❖ Role-Based Custom Reports – Personalized reports with security controls.

OPERATIONAL REPORTS



- ❖ Track day-to-day operations
- ❖ Features:
 - Real-time or near real-time data
 - Detailed tables, matrixes, and charts
 - Alerts and notifications based on thresholds
- ❖ Benefits: Immediate insights into business health
- ❖ Example: Daily sales tracking, inventory levels, service desk tickets

ANALYTICAL REPORTS



- ❖ Deep dive into data for insights
- ❖ Features:
 - Interactive visuals (charts, slicers, filters)
 - Drill-through and drill-down capabilities
 - Use of DAX for advanced calculations
- ❖ Benefits: Identifies trends, patterns, and outliers
- ❖ Example: Product performance analysis, customer behavior segmentation

STRATEGIC REPORTS



- ❖ Long-term planning and high-level decision-making
- ❖ Features:
 - Summary KPIs and executive visuals
 - High-level dashboards with forecasting models
 - Integration with planning tools
- ❖ Benefits: Informs leadership strategy and goals
- ❖ Example: Quarterly business review, yearly financial performance

DASHBOARDS



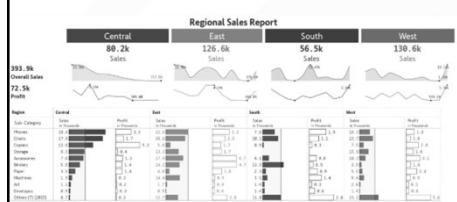
- ❖ Summarize data from multiple reports
- ❖ Features:
 - Single-page view with pinned visuals
 - Supports real-time data with streaming datasets
 - Can include tiles from various datasets
- ❖ Benefits: Quick overview for stakeholders
- ❖ Example: Executive KPI dashboard, multi-department overview

PAGINATED REPORTS



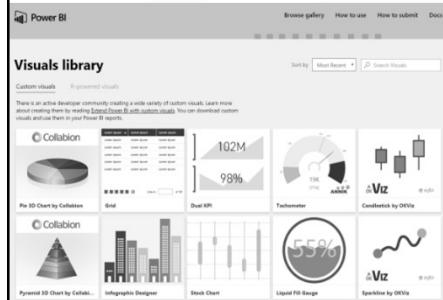
- ❖ Generate printable, formatted reports
- ❖ Features:
 - Pixel-perfect layout, designed for printing/export
 - Fixed pagination, headers, and footers
 - Built using Power BI Report Builder
- ❖ Benefits: Useful for formal reports and regulatory compliance
- ❖ Example: Invoices, financial statements, audit-ready reports

EXPLORATORY/AD HOC REPORTS



- ❖ Enable dynamic data exploration
- ❖ Features:
 - Drag-and-drop visual building
 - Use of slicers, bookmarks, and Q&A
 - Allows users to ask natural language questions
- ❖ Benefits: Empowers users to self-serve insights
- ❖ Example: Analysts exploring sales data, ad hoc revenue breakdowns

ROLE-BASED CUSTOM REPORTS



- ❖ Tailored for specific departments or users
- ❖ Features:
 - Custom visuals and metrics per role
 - Row-level security (RLS) to restrict access
 - Navigation customized by job function
- ❖ Benefits: Relevance and clarity for end users
- ❖ Examples:
 - ❖ Sales report for reps showing targets vs. actuals
 - ❖ HR report monitoring hiring, attrition, and diversity