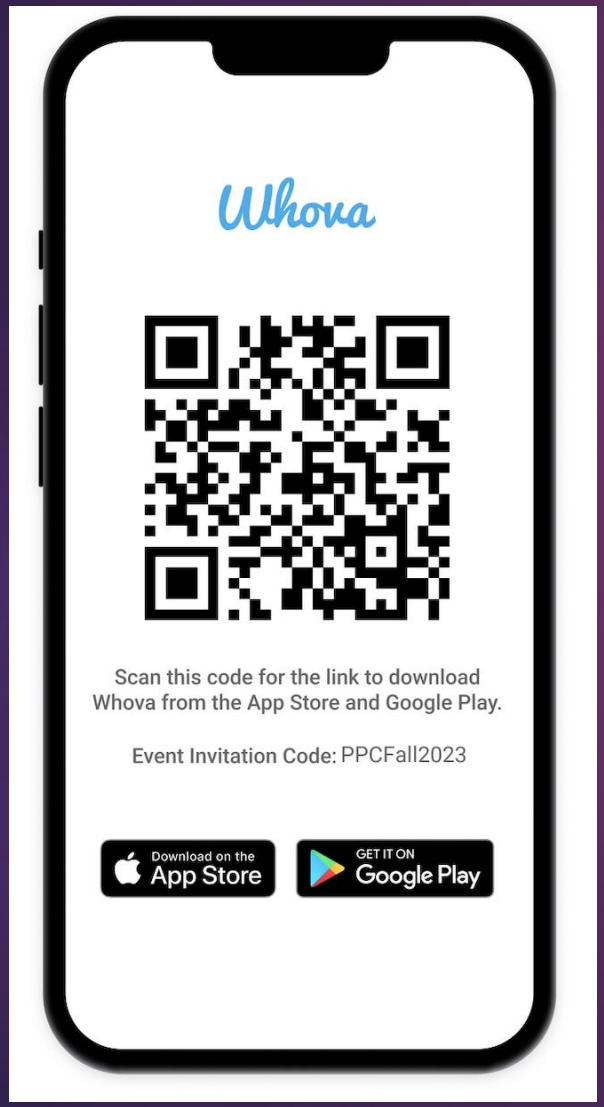
Power Up Skills with Power BI

Pragati Jain, Miguel Felix

Whova

The official event app for the **Microsoft Power Platform Conference – Fall 2023**



Join the event app to access:

- Event announcements
- Personalized agenda, session details
- Speaker & attendee profiles
- Networking, meet-ups, messages
- Event documents

Event Invitation Code: PPCFall2023

Accessing Content Online

- All the content like PowerPoint presentation, Power BI files and data files can be found here.
- Download Power BI Desktop from Microsoft website here.
  - We will also show the Microsoft Store app download

Speakers Introduction:

Pragati Jain

Manager, Analytics Experience

avanade

Blog: https://datavibe.co.uk/

Microsoft Data Platform MVP

Super User at Power BI Community

Miguel Félix

Lead BI Architect

iLink Digital

Blog: https://pbiportugal.com/

DATA VIBE
BRING YOUR DATA TO LIFE

Microsoft Fabric - UK User Group

#DataWeekender

pbi portugal

Fabric Power BI Portugal
Power BI Portugal, now even better

Ground Rules for the Training day

- Phones on silent or buzz is really appreciated
- Raising hand for any questions

HAVE FUN!!!

Agenda

- Introduction to Business Intelligence
- Introduction to Power BI
- Data Cleaning
- Data Modelling
- DAX
- Data Visualization – PBI report from scratch
- Power BI Service
- Introduction to Gateways
- Summary

Poll Results

What is Everyone Looking to Gain from this Training?

Introduction to Business Intelligence

- What is Business Intelligence
- Business Intelligence Evolution
- What is Power BI
- Comparison with Excel

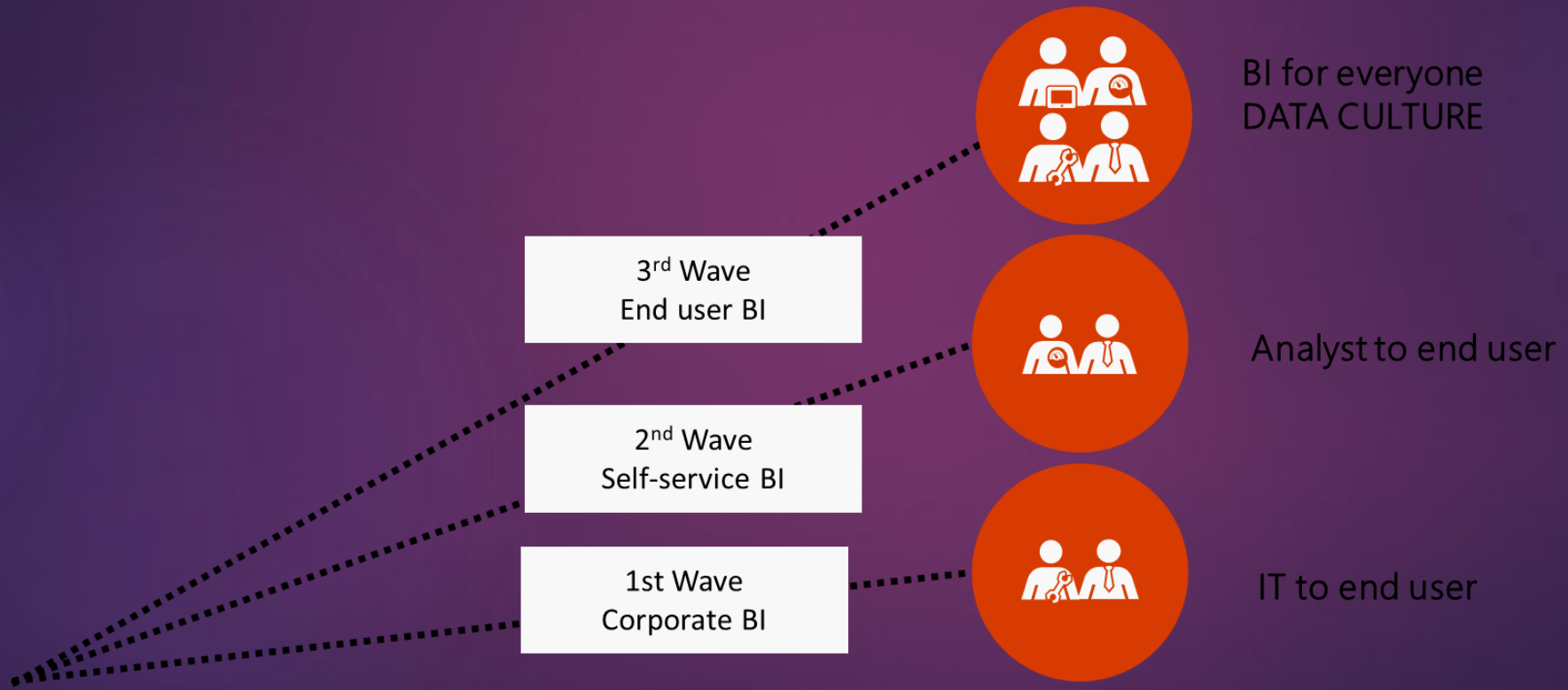
What is Business Intelligence?

- Business intelligence (BI) leverages software and services to transform data into actionable insights that inform an organization's strategic and tactical business decisions.

- BI tools access and analyse data sets and present analytical findings in reports, summaries, dashboards, graphs, charts and maps to provide users with detailed intelligence about the state of the business.

- Also refers to a range of tools that provide quick, easy-to-digest access to insights about an organization's current state, based on available data.

Business Intelligence Evolution

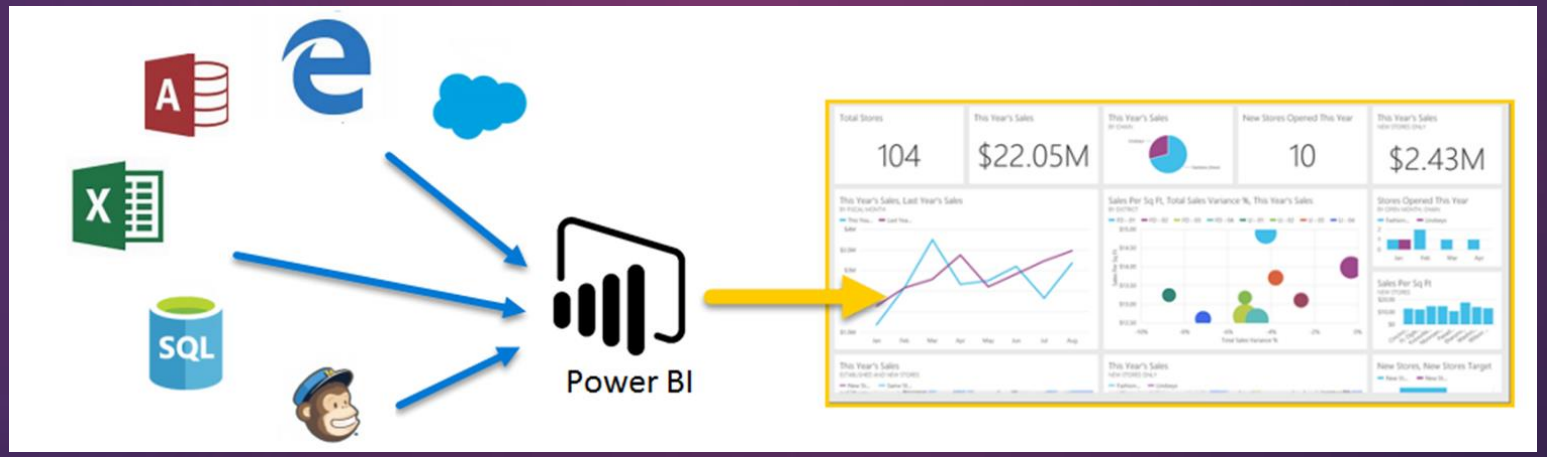


What is Power BI?

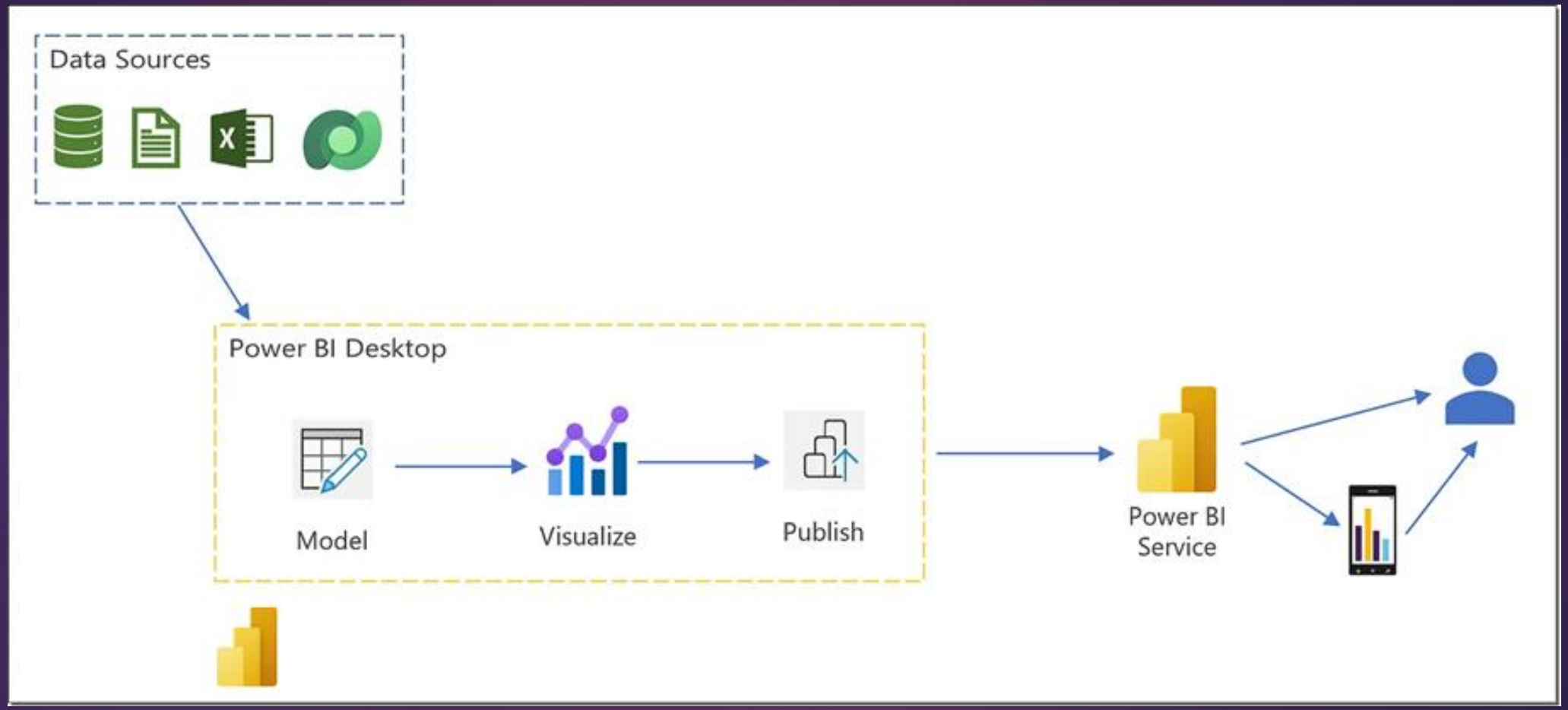
Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights.

What is Power BI?

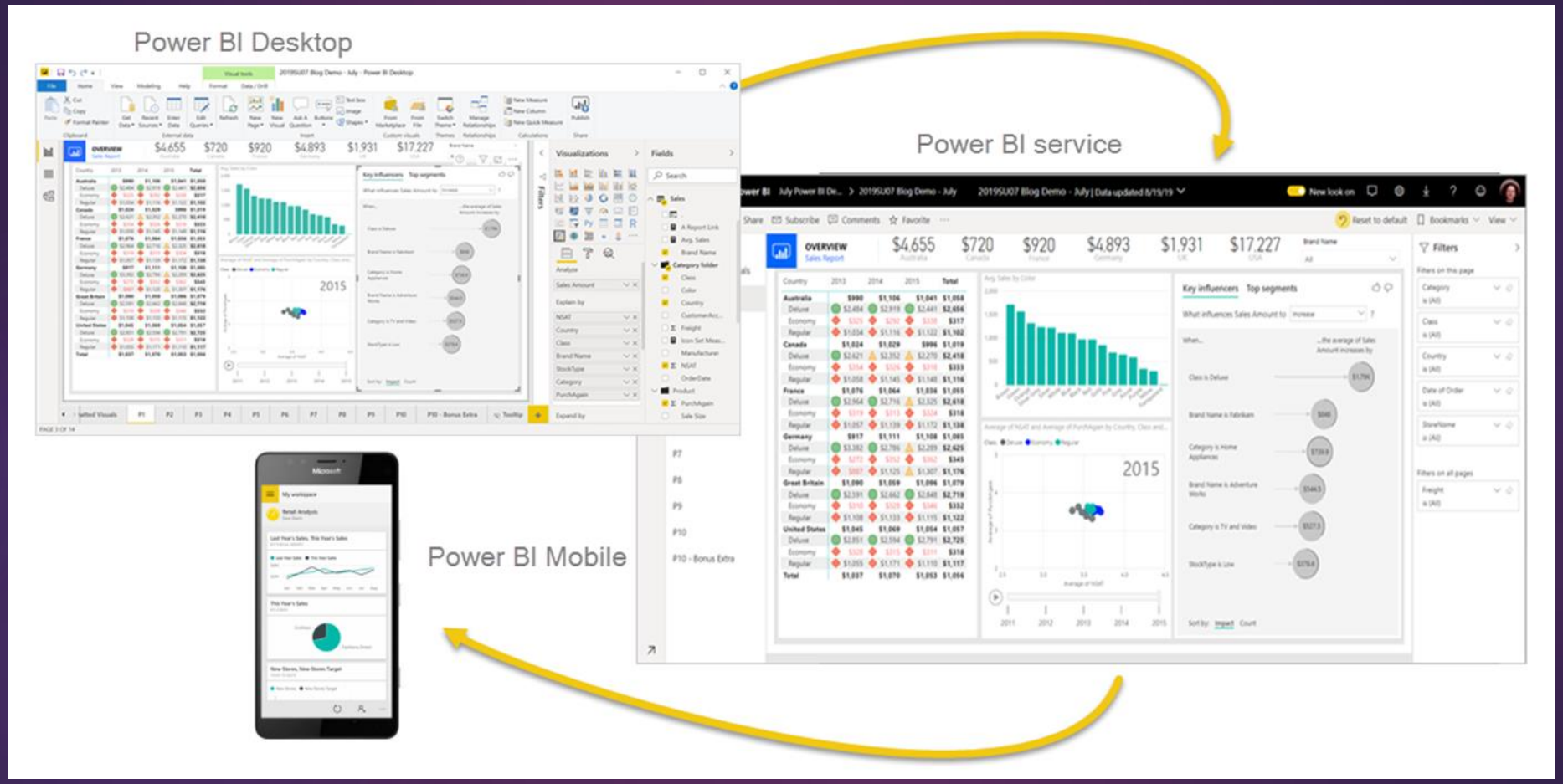
- Self-service BI tool that allows:
  - Connectivity to hundreds of data sources
  - User friendly and easy data preparation, analysis and presentation.
  - Create professional looking reports and the possibility of sharing with the organization's stakeholders



Power BI


Data Sources
Power BI Desktop
Model
Visualize
Publish
Power BI
Service

Power BI Eco-System



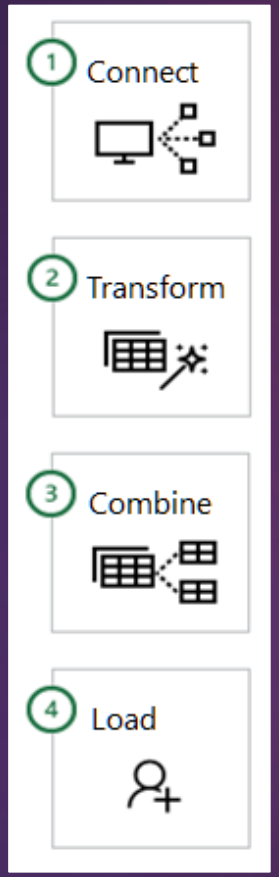
What is different from Excel

	Excel	Power BI
Easy to learn	✓	✗
Chart Selections	!	✓
Chart Customization	✓	!
Interactivity	!	✓
Flexible Analytics	✓	!
Sharing	✗	✓
Data Size	!	✓
Data Sources	✓	✓
Automatic Refreh	!	✓
Accessible	✓	!
Cost	✓	✗

Data Cleaning

- Introduction to Data Cleaning
- Import Data
- Data Profiling
- Basic Transformations
- Advance Editor
- Customs Columns
- Best Practices
- Quiz

Data Cleaning: Power Query



Allows:

- Import or connect to external data
- Shape the data
- Load the query into Power BI (Excel) to create charts and reports.
- Refresh of the data to have the information up to date.

Transformations:

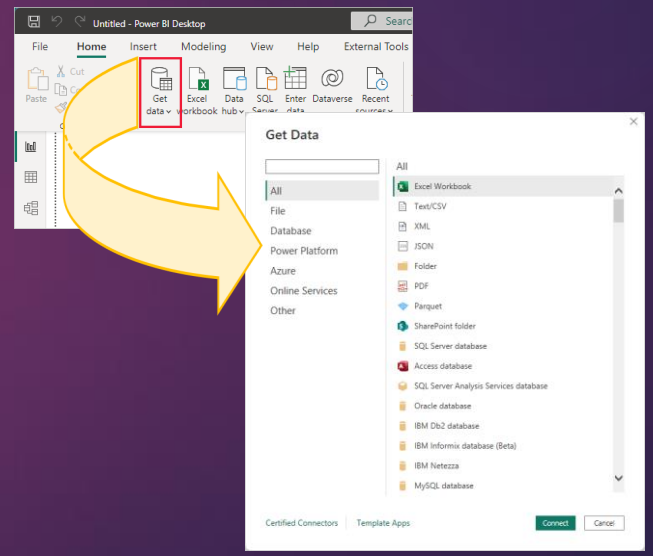
- Remove columns
- Change data types
- Merge tables
- ...

Availability:

- Power BI Desktop
- Power BI Service
- Excel (App and Online)

Import Data

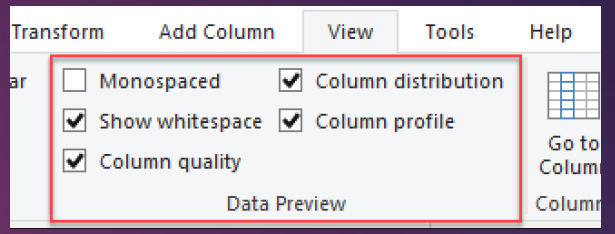
- **Files**
  - Excel
  - Text/CSV
  - XML
  - JSON
  - Sharepoint
  - …
- **Database**
  - SQL Server
  - Access
  - Oracle
  - Google Big Query
  - …
- **Fabric / Power Platform**
  - Power BI Dataset
  - Dataverse
  - Dataflows
  - Fabric (Datamarts, Lakehouses, Warehouses)
  - …
- **Azure**
  - Azure SQL Database
  - Azure SQL Data WH
  - Azure Blob Storage
  - Axure Table Storage
  - Azure Databricks
  - …
- **Online Services**
  - Dynamics 365
  - Salesforce Objects
  - Facebook
  - GitHub
  - …
- **Other**
  - Web
  - Active Directory
  - Microsoft Exchange
  - OData Feed
  - Spark
  - …

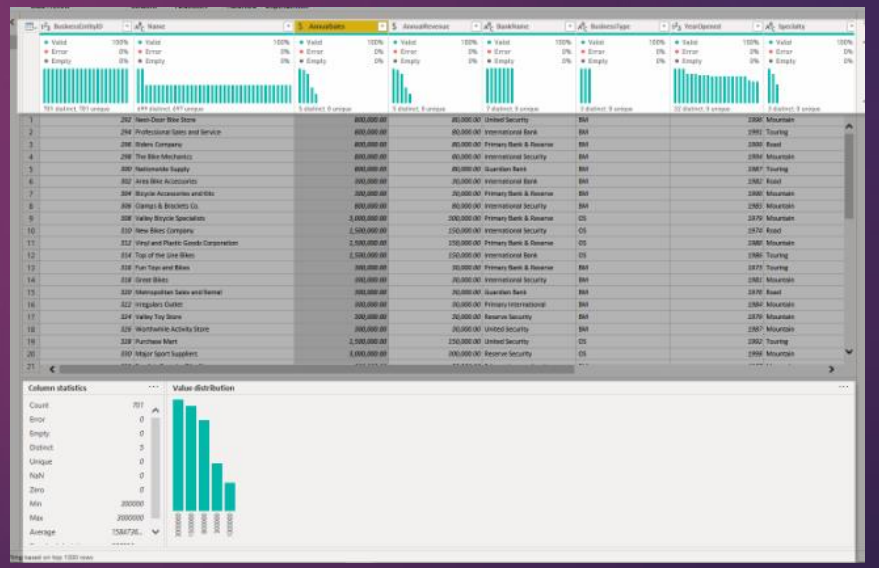


Data Profiling

Provide new and intuitive ways to clean, transform, and understand data in Power Query Editor.

- Column quality (5 values):
  - Valid
  - Error
  - Empty
  - Unknow
  - Unexpected Error
- Column distribution:
  - Frequency
  - Distribution of the values
- Column profile:
  - Statistics chart



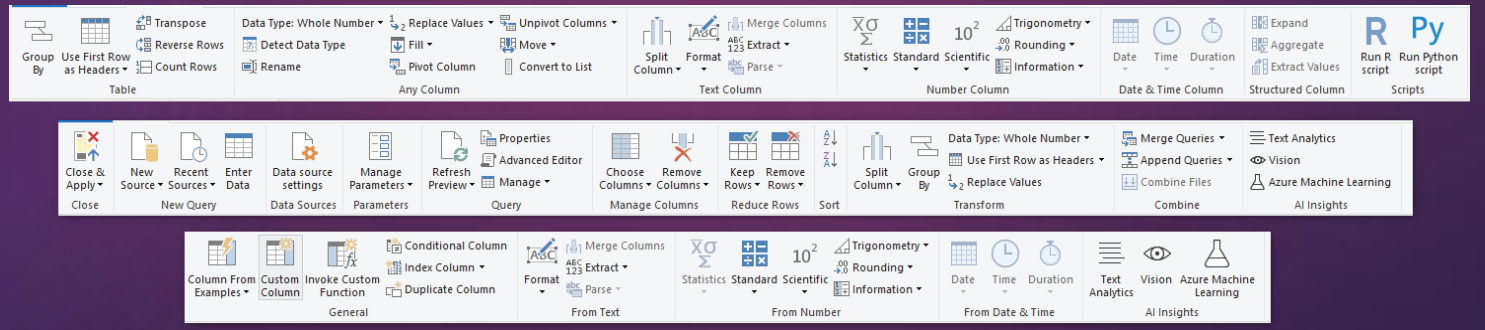


Basic Transformations

The transformation engine in Power Query includes many prebuilt transformation functions that can be used through the graphical interface of the Power Query Editor.

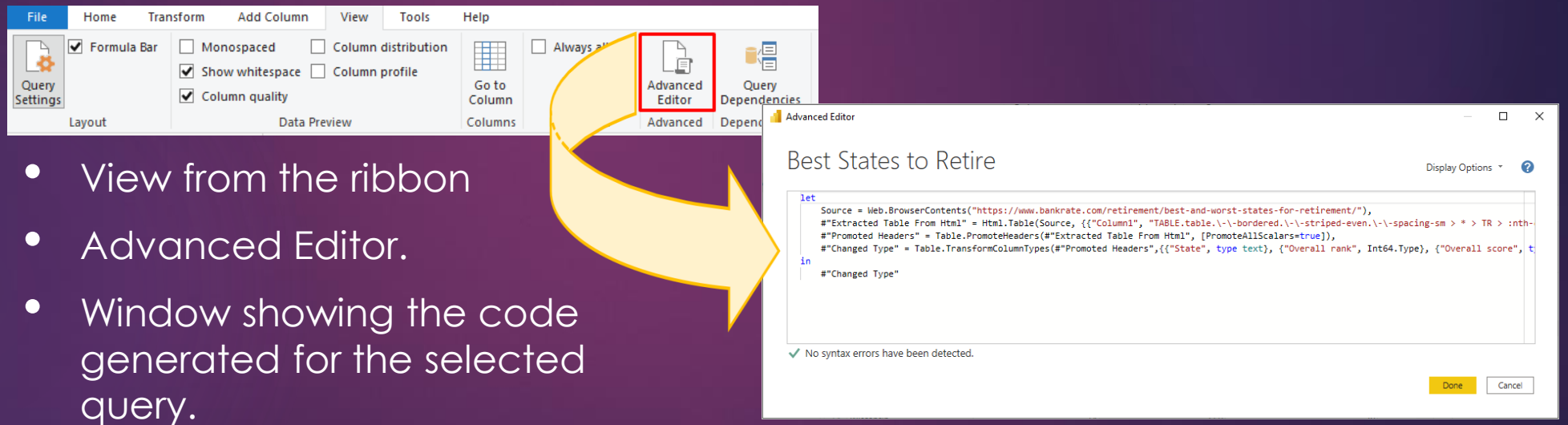
These transformations can be as simple as removing a column or filtering rows, or as common as using the first row as a table header. There are also advanced transformation options such as merge, append, group by, pivot, and unpivot.

All these transformations are made possible by choosing the transformation option in the menu, and then applying the options required for that transformation. The following illustration shows a few of the transformations available in Power Query Editor.



Advance Editor

Lets you see the code that Power Query Editor is creating with each step. It also lets you create your own code in the Power Query M formula language.



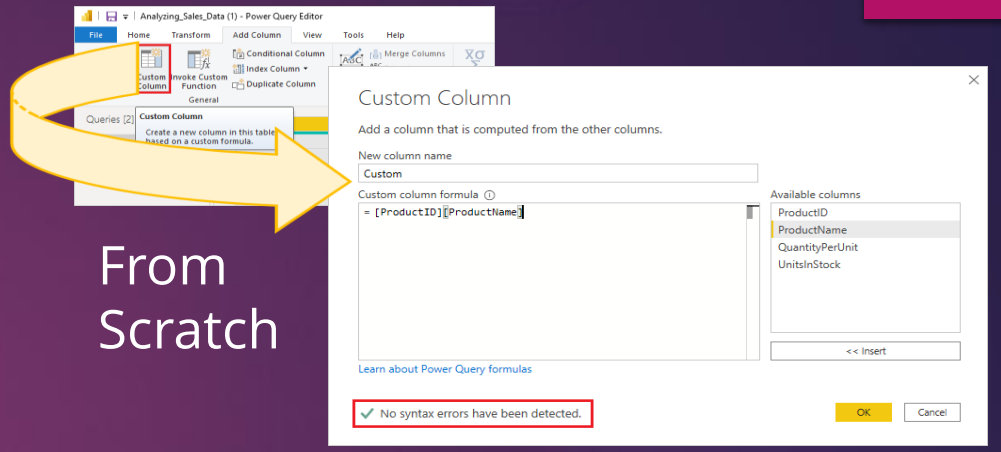
- View from the ribbon
- Advanced Editor.
- Window showing the code generated for the selected query.

Custom Columns

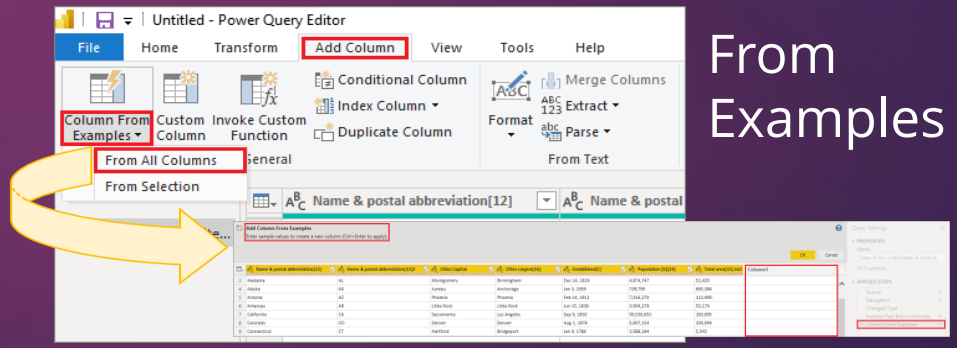
A custom column can be added to the model using Power Query Editor.

With Power Query Editor, you can create and rename your custom column to create PowerQuery M formula queries to define your custom column.

PowerQuery M formula queries have a comprehensive function reference content set.



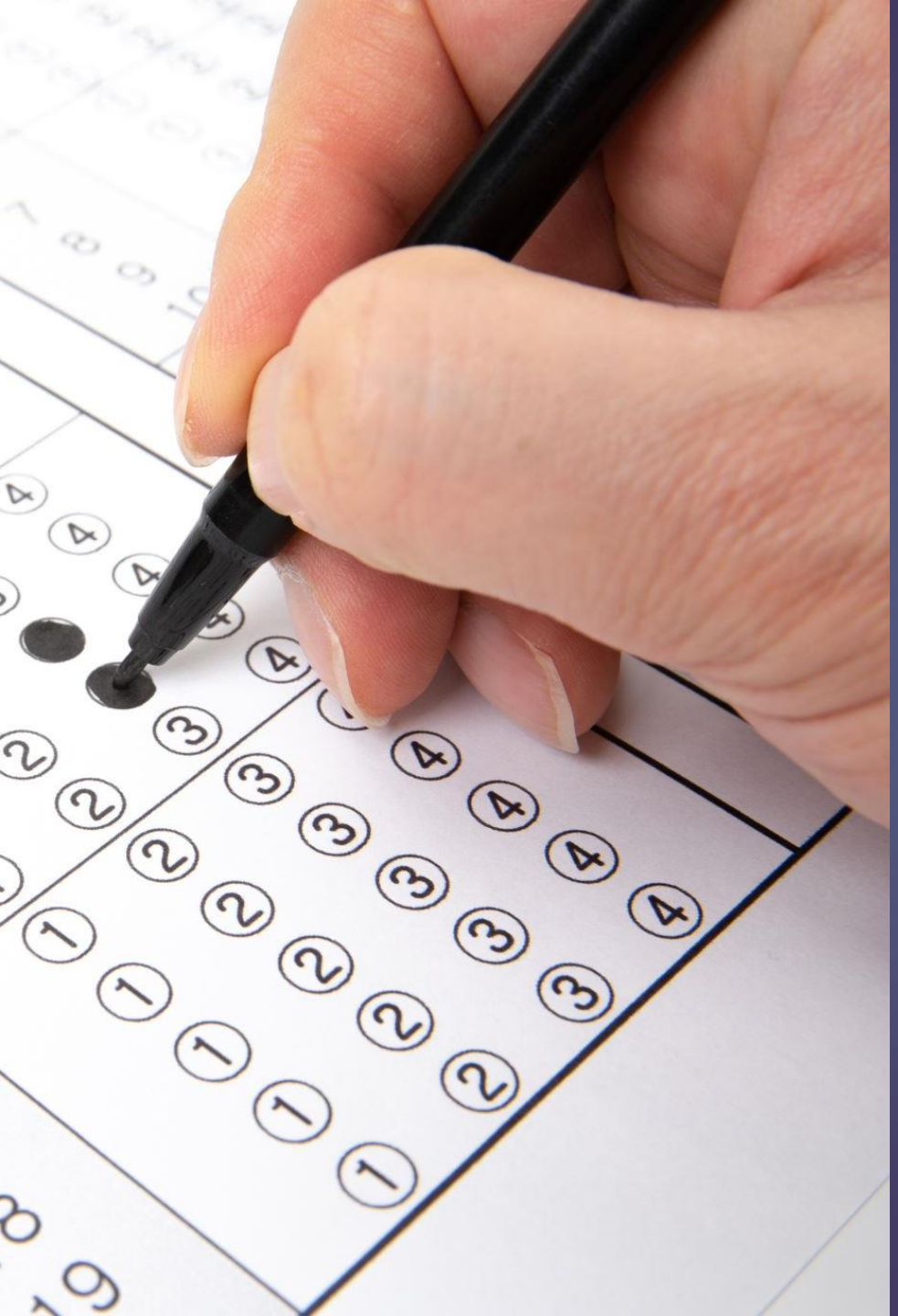
From Scratch



From Examples

Best Practices

- Rename steps (easy identification)
  - Advantage: Avoid the repetition that occurs with auto naming
  - How: Select step to rename: right click and rename, double click step or press F2
- Avoid spaces, replace by Upper letters or _
  - Advantage: Facilitates Intelissense and/or Advance Editor coding
  - Example: Format_Delivery_Date or FormatDeliveryDate
- Look for repetition of steps
  - Advantages: Avoid duplication of names
    - Reduce number of steps
- Define datatype for all columns
  - Advantage: Avoid issues when loading the query
  - How: View column header for icon ABC/123 43 or Home tab – Data Type equals Any
- Datatypes transformation in the last step and only once
  - Turn off the Type detection on the Options of Power BI desktop
  - Detect datatype is standard based on the top 1000 rows



Data Cleaning

Quiz

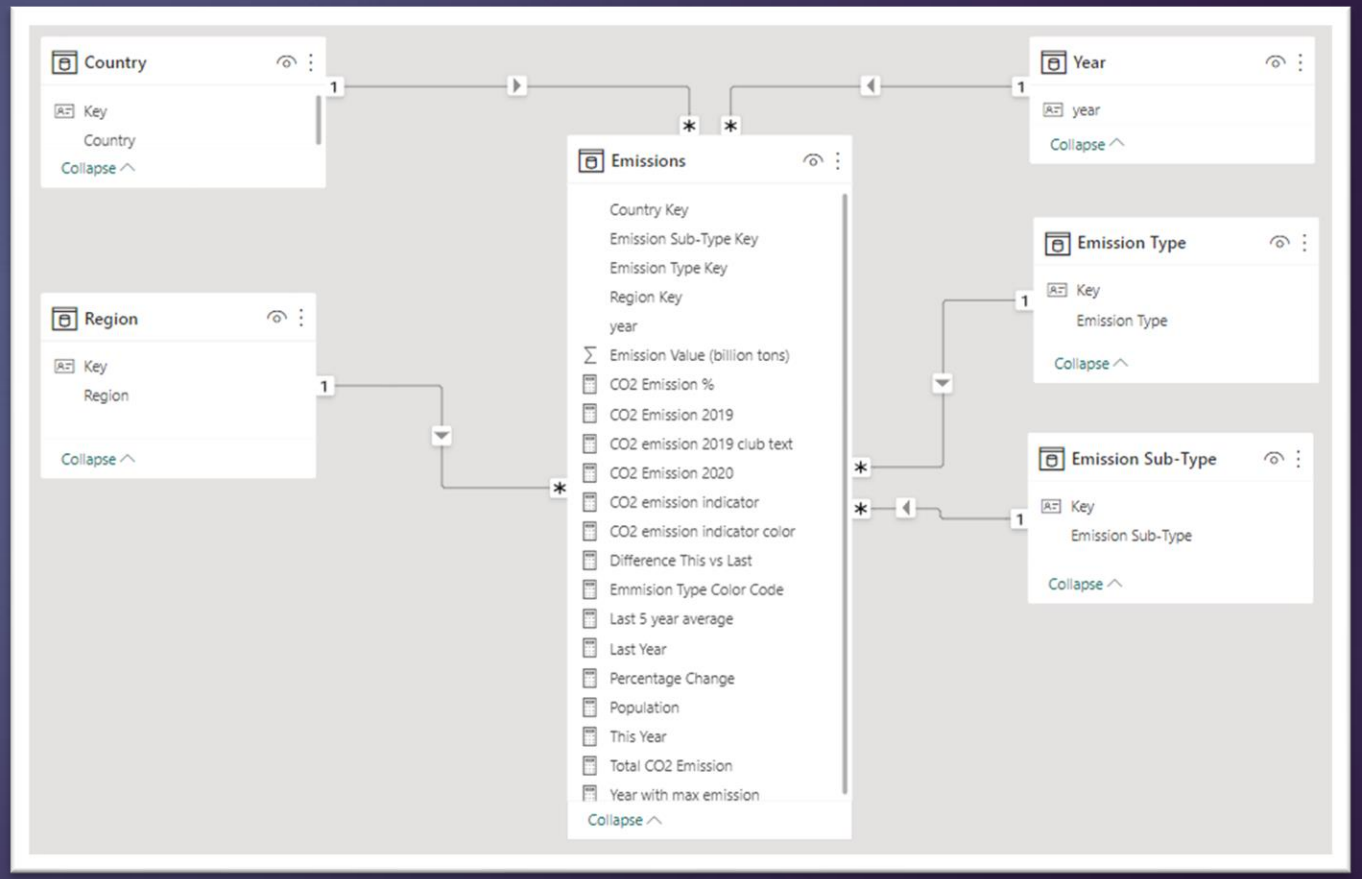
Data Modelling

- Introduction to Data Model
- Star Schemas
- Create Date Tables
- Relationships & Cardinalities
- Dimensions & Hierarchies
- Role Playing Dimensions
- Data Model Optimization
- Modelling View
- Best Practices
- Quiz

Introduction to Data Modelling

Benefits of a good data model:

- Accurate reports.
- Faster data exploration.
- Simpler aggregations.
- Easier to maintain.

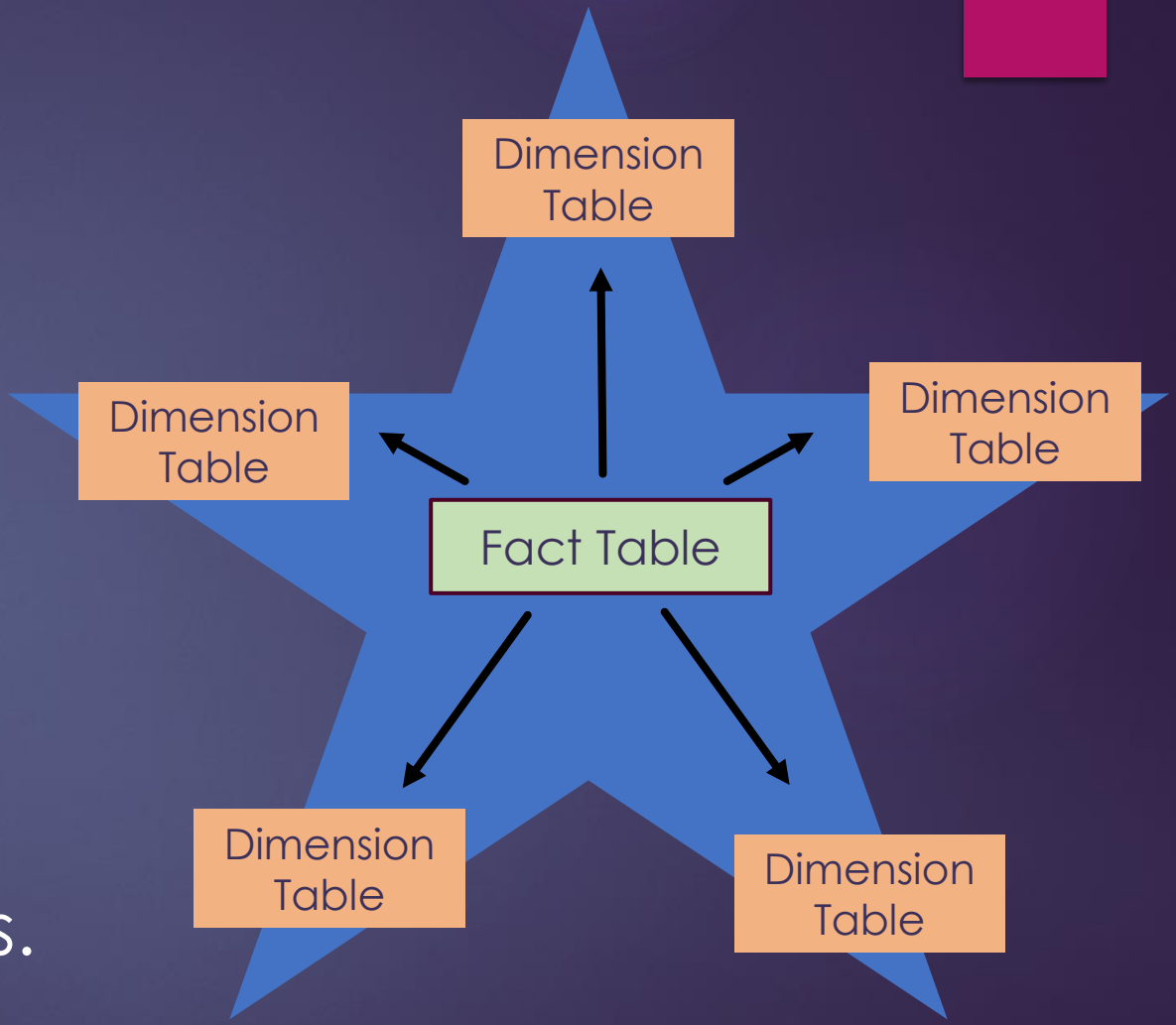


Star Schema

Table Classification:

- Dimension:
  Describes business entities.

- Fact:
  Store observations or events.



Calendar Table

Importance of a Date Table:

- Makes it simple to organize and analyse data by date
- Slice and dice your data by date attributes such as weekday, month, quarter, and year

How to create:

- The Auto date/time option
- Power Query to connect to a date dimension table
- Power Query to generate a date table (Chris Webb's BI Blog)
- DAX to generate a date table (SQLBI, Radacad)
- DAX to clone an existing date table

Requirements:

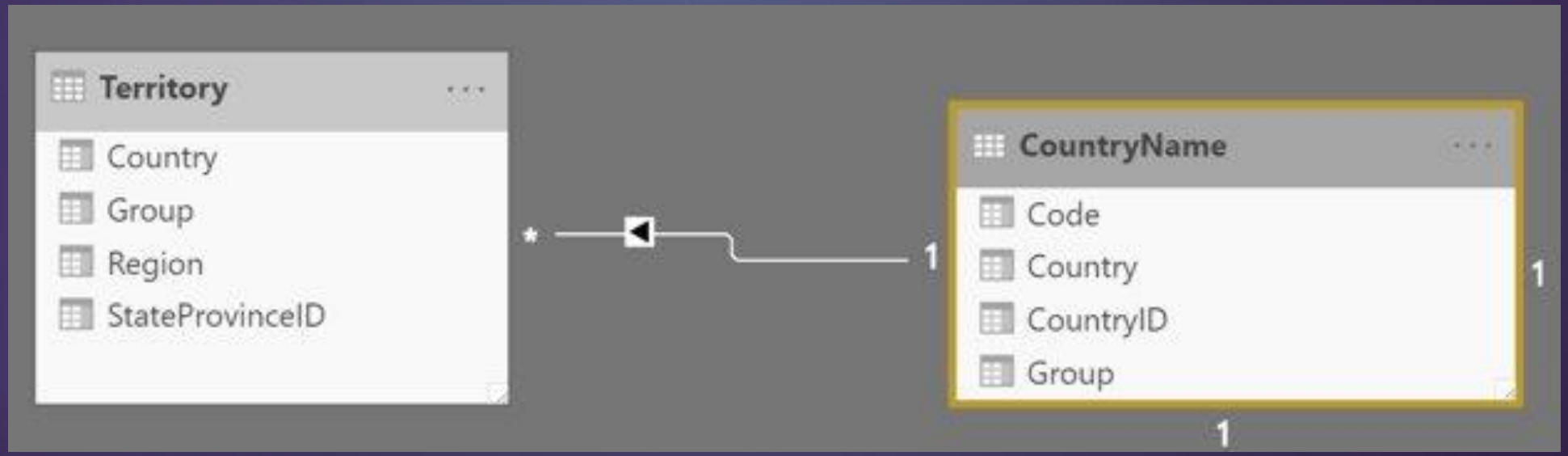
- It must have a column of data type date (or date/time)—known as the date column.
- The date column must contain unique values.
- The date column must not contain BLANKs.
- The date column must not have any missing dates.
- The date column must span full years. A year isn't necessarily a calendar year (January-December).
- The date table must be marked as a date table.

Standardize On Date Formats And Ranges That Meet Company Requirements.

Date	Year	MonthNum	WeekNum	DayoftheWeek
Tuesday, May 31, 2011	*2011*	*5*	*23*	Tuesday
Wednesday, June 1, 2011	*2011*	*6*	*23*	Sunday
Thursday, June 2, 2011	*2011*	*6*	*23*	Monday
Friday, June 3, 2011	*2011*	*6*	*23*	Tuesday

Relationship & Cardinalities

- Relationship: Formed by correlating rows belonging to different tables.
- Cardinality: Uniqueness of data values in a column.



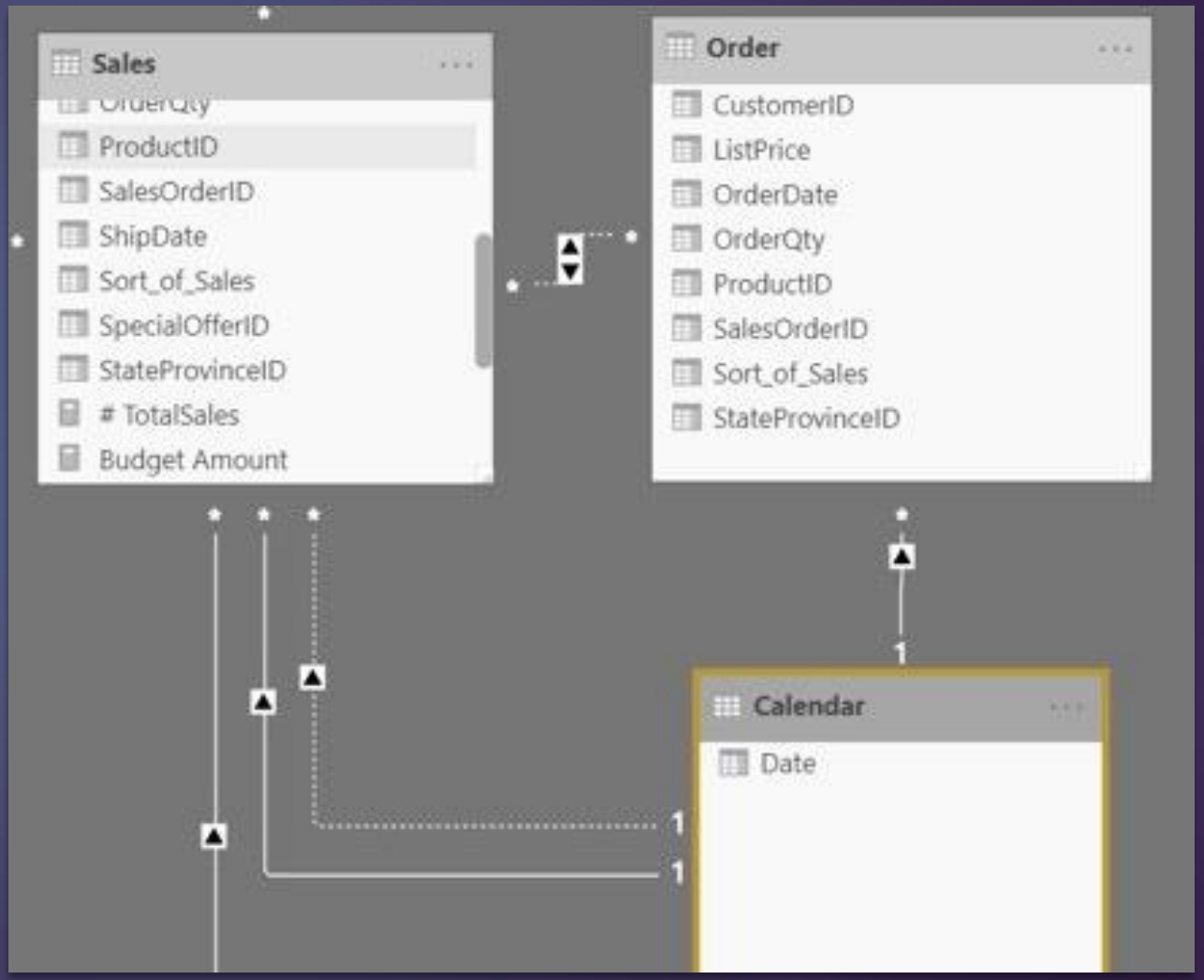
Introduction to Dimension & Hierarchies

- Dimension: Store details about business entities.
- Hierarchy: Organize data such that one element is ranged over other data.

	Employee ID	Employee	Manager ID	Manager
1	1010	Roy F	null	
2	1011	Pam H	1010	Roy F
3	1012	Guy L	1010	Roy F
4	1013	Roger M	1011	Pam H
5	1014	Kaylie S	1011	Pam H
6	1015	Mike O	1012	Guy L
7	1016	Rudy Q	1012	Guy L

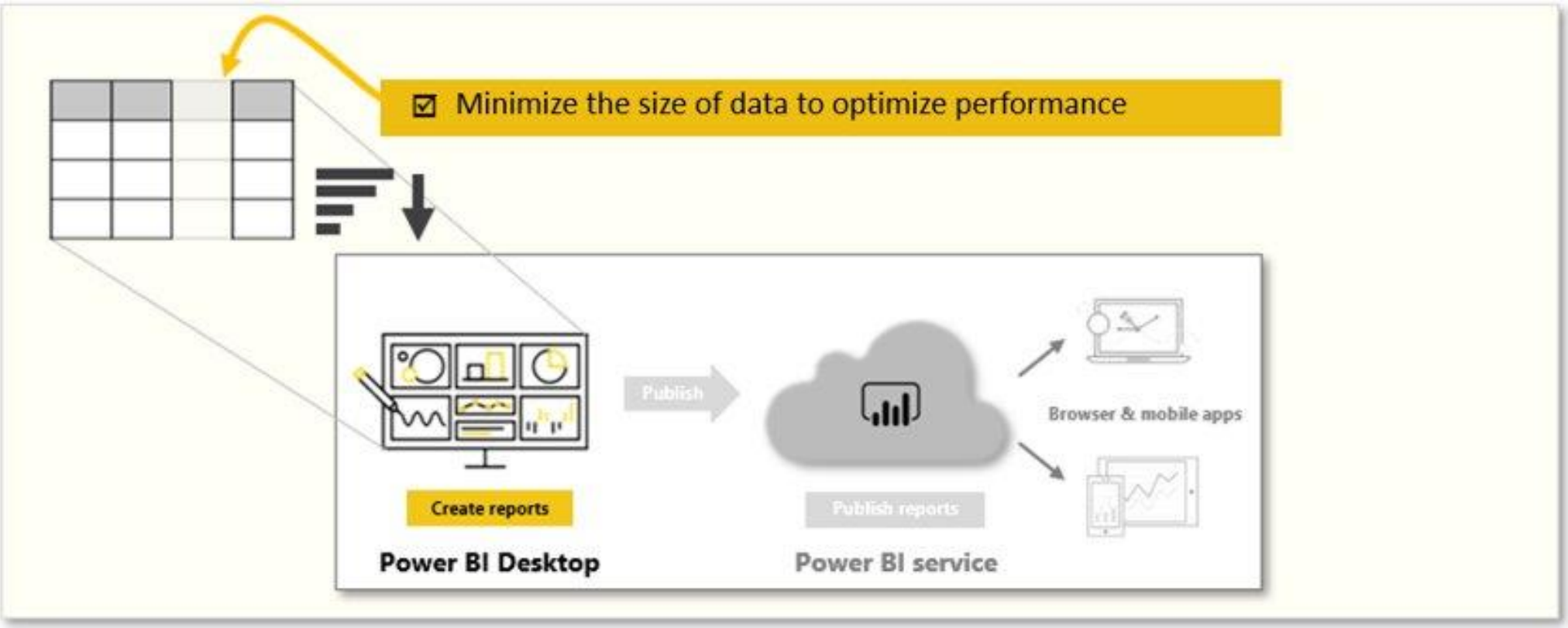
Role Playing Dimension

A dimension that can filter related facts differently.



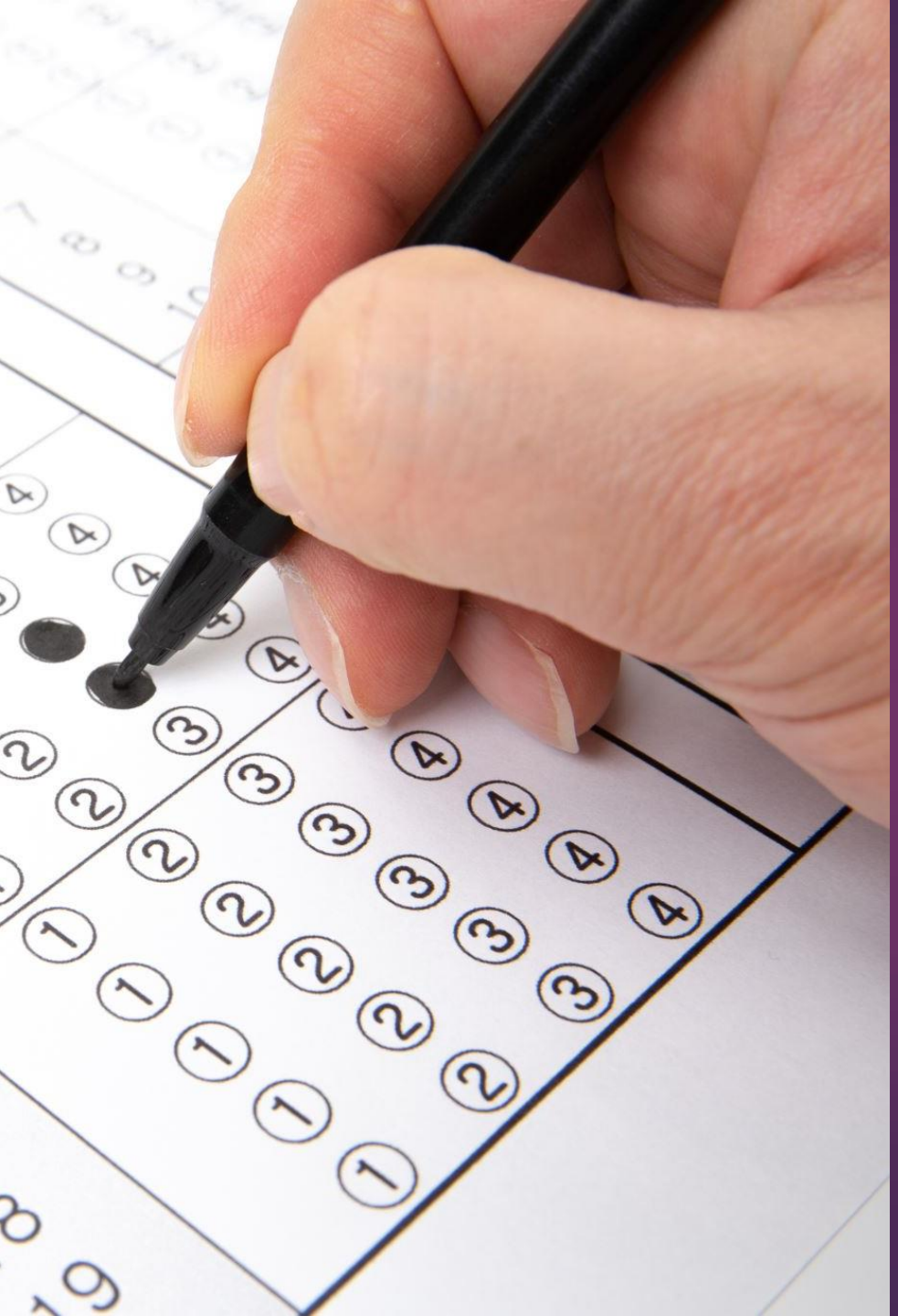
Data Model Optimization

When your data model is optimized, it performs better.



Data Model Best Practices

- Bring only what you need – the right columns
- Be cautious about the format of the columns – date, number, etc.
- See if you can follow the Star Schema approach
- Turn-off auto-date time
- Make sure to check your relationships (auto-detect !!!)
- Avoid Many-Many relationship. Use Bridge Tables!
- Clean your data on the data-source side. Let's try to avoid burden on Power BI side



Data Modeling Quiz

DAX

Measures vs columns

Quick Measures

Basic DAX Functions

Quiz

DAX

Data Analysis Expressions (DAX) is a formula expression language used in Analysis Services, Power BI, and Power Pivot in Excel.

DAX formulas include functions, operators, and values to perform advanced calculations and queries on data in related tables and columns in tabular data models.

DAX formulas are used in measures, calculated columns, calculated tables, and row-level security.

Measures vs Columns

Measures and calculated columns both use DAX expressions.

Difference: context of evaluation.

Measures: evaluated in the context of the cell evaluated in a report or in a DAX query

SUM(Sales[SalesAmount]) = sum of all the cells that are aggregated under this cell.

Columns: computed at the row level within the table it belongs to.

Sales[SalesAmount] =value of the SalesAmount column in the current row.

The context of the cell depends on user selections in the report or on the shape of the DAX query.

Quick Measures

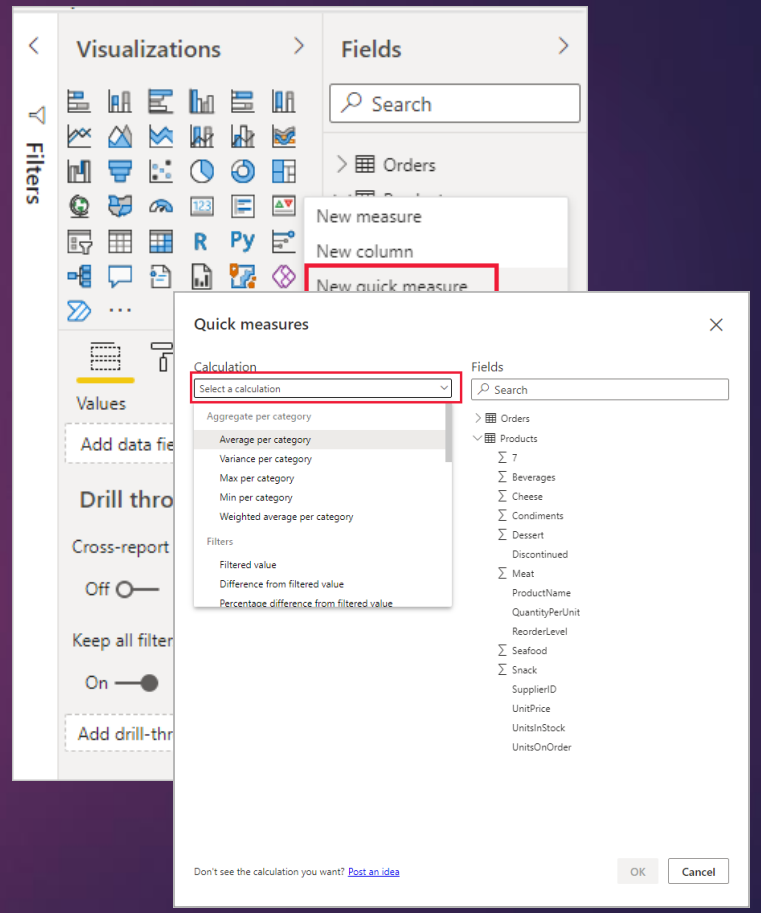
Quick measures: quickly and easily perform common, powerful calculations.

Quick measure runs a set of Data Analysis Expressions (DAX) commands behind the scenes, then presents the results to use in a report.

No need to write the DAX. Done based on input provided.

Several categories of calculations and ways to modify each calculation.

The DAX can be immediately seen and jump-start or expand the user DAX knowledge.



Categories of Quick Measures

- Aggregate per category
  - Average per category
  - Variance per category
  - Max per category
  - Min per category
  - Weighted average per category
- Filters
  - Filtered value
  - Difference from filtered value
  - Percentage difference from filtered value
  - Sales from new customers
- Time intelligence
  - Year-to-date total
  - Quarter-to-date total
  - Month-to-date total
  - Year-over-year change
  - Quarter-over-quarter change
  - Month-over-month change
  - Rolling average
- Totals
  - Running total
  - Total for category (filters applied)
  - Total for category (filters not applied)
- Mathematical operations
  - Addition
  - Subtraction
  - Multiplication
  - Division
  - Percentage difference
  - Correlation coefficient
- Text
  - Star rating
  - Concatenated list of values

DAX Basic Functions

Aggregate Functions

- MIN
- MAX
- Average
- SUM
- SUMX
- Counting Functions
- DISTINCTCOUNT
- COUNT
- COUNTA
- COUNTROWS
- COUNTBLANK

Logical Functions

- AND
- OR
- NOT
- IF
- IFERROR

TEXT Functions

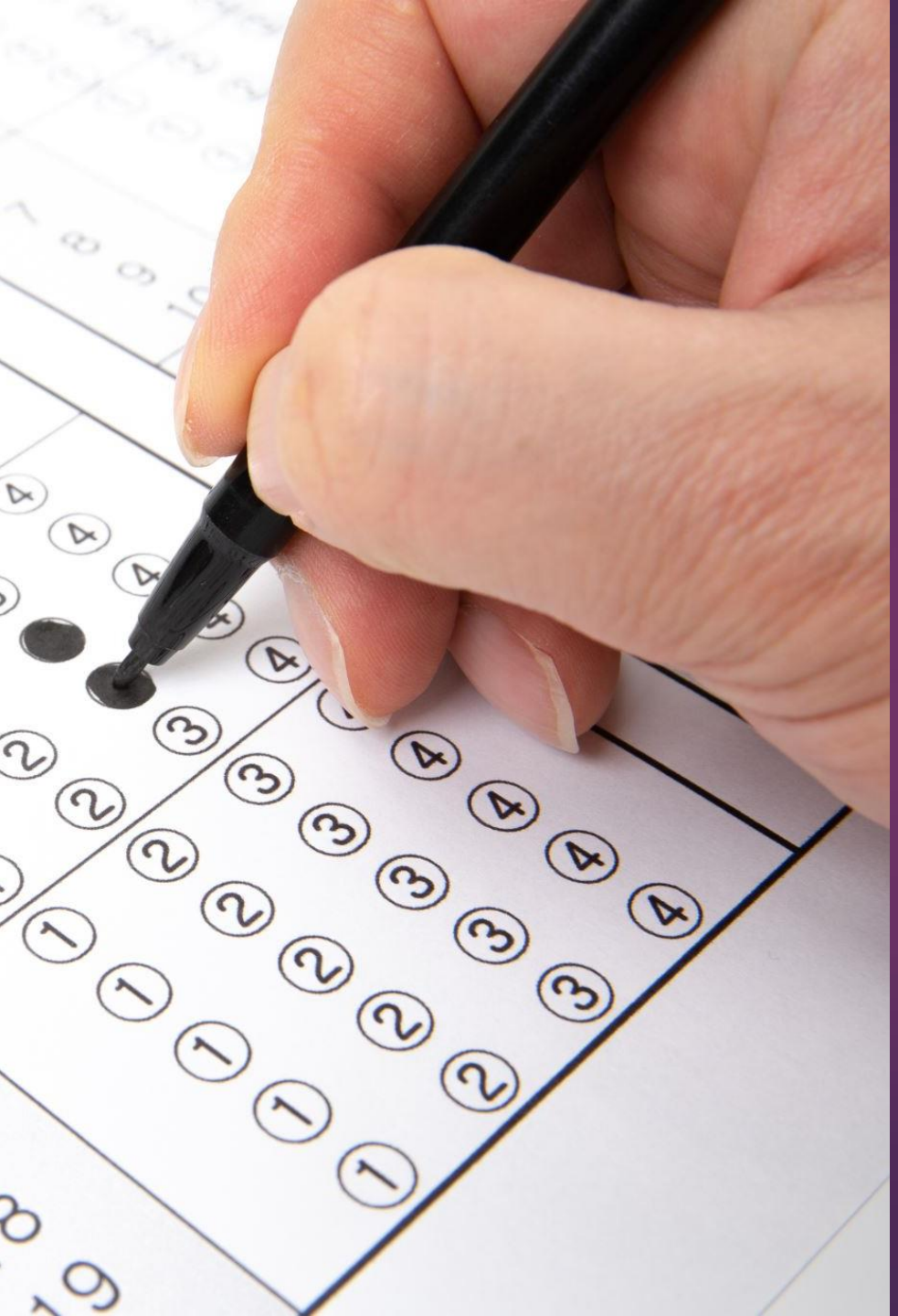
- REPLACE
- SEARCH
- UPPER
- FIXED
- CONCATENATE

DATE Functions

- DATE
- HOUR
- WEEKDAY
- NOW
- EOMONTH

INFORMATION Functions

- ISBLANK
- ISNUMBER
- ISTEXT
- ISNONTEXT
- ISERROR



DAX Quiz

Data Visualizations

- Page canvas, background & settings
- Visuals in Power BI
- Customs Visuals
- What Visuals to use when
- Analytics feature in visuals
- Conditional formatting
- Buttons/bookmarks
- Drill down, drill up & drill troughs
- Themes
- Brand specific custom theme
- Best Practices
- Quiz

Introduction to Data Visualizations

Visuals allow you to share data insights more effectively

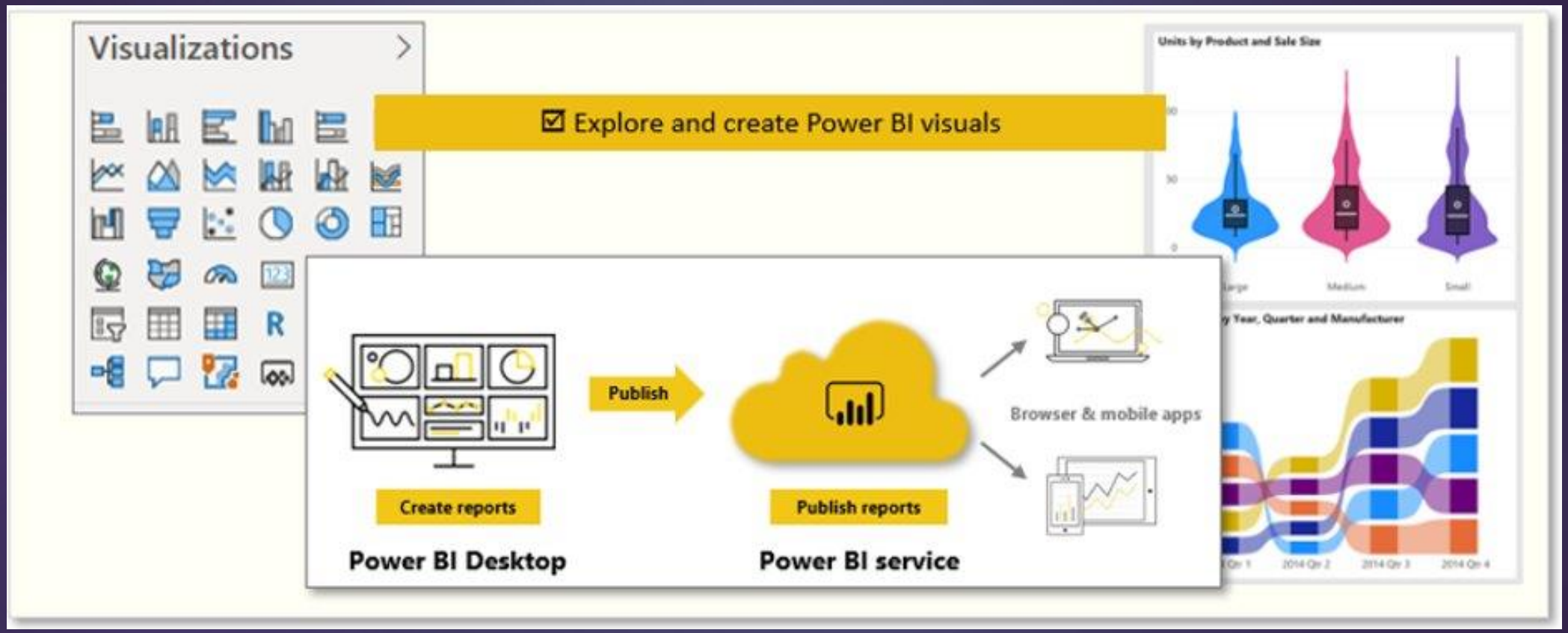
Effective visualizations help your users connect and interact with the information.

Design a Report Layout

Choosing Effective Visualizations

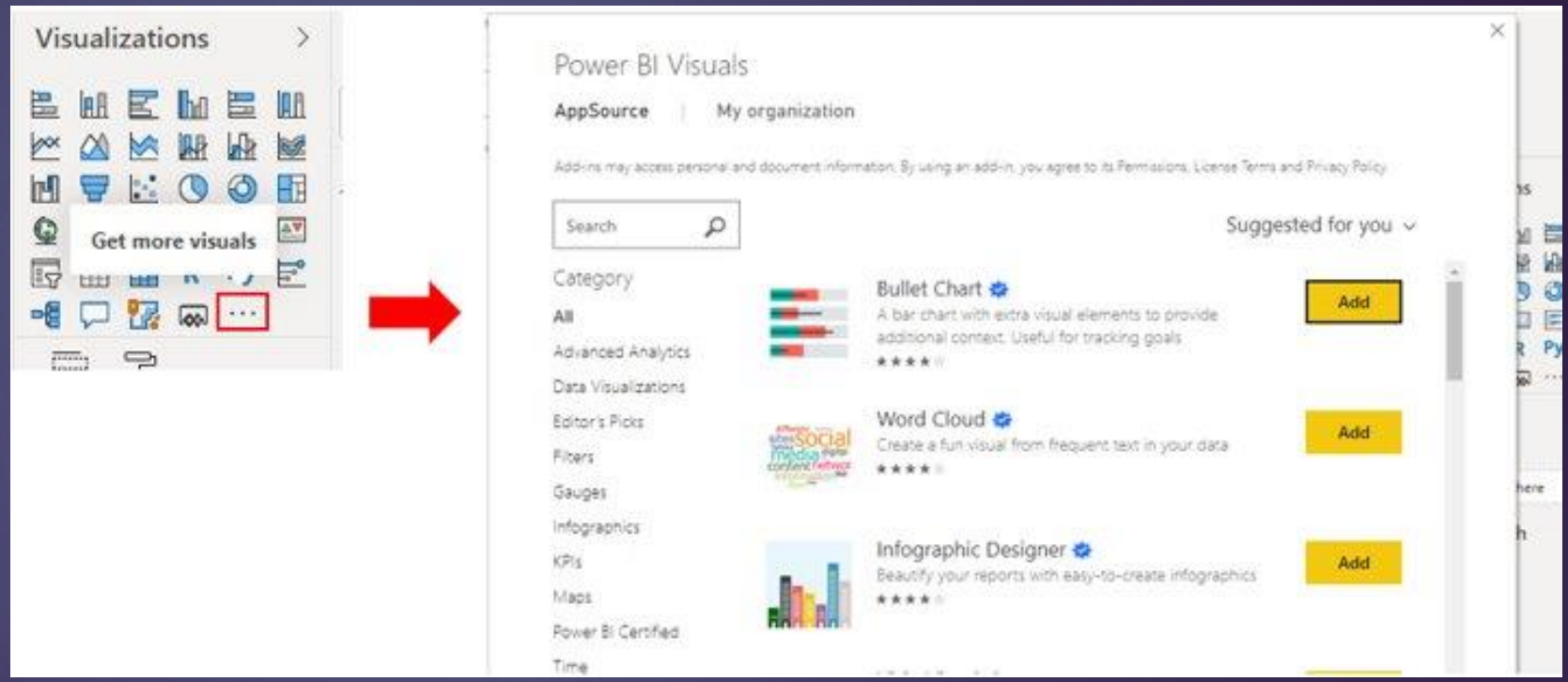
The Right Visual
Makes All
The difference.

Adding Visualizations to Reports



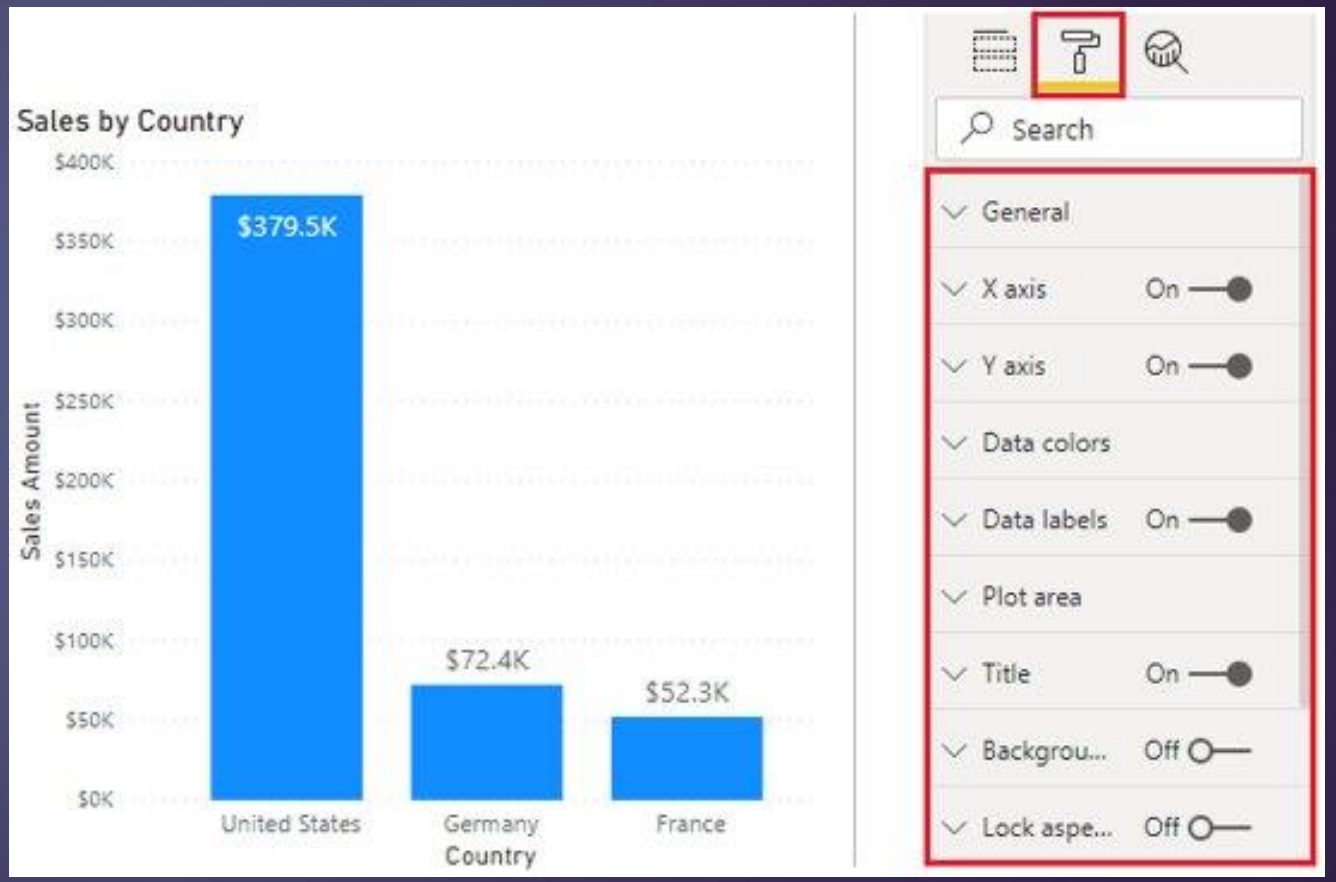
Import a Custom Visual

Use visuals tailored for your needs.



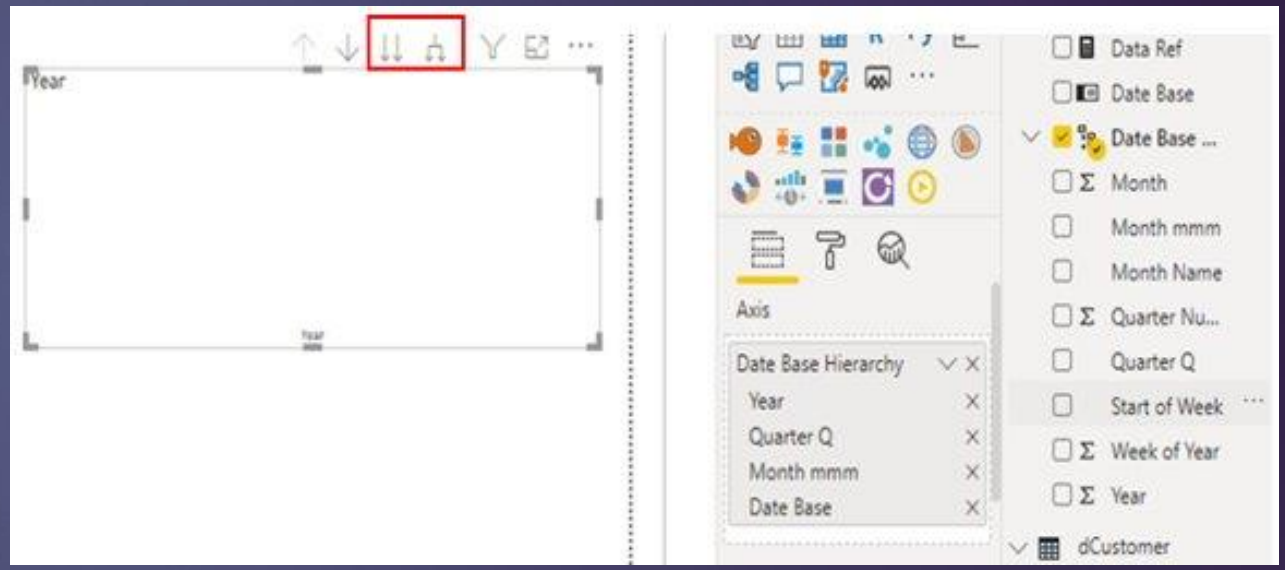
Format & Configure Visualizations

- Control the look and feel of each visual.
- Format options differ depending on the type of visual selected.

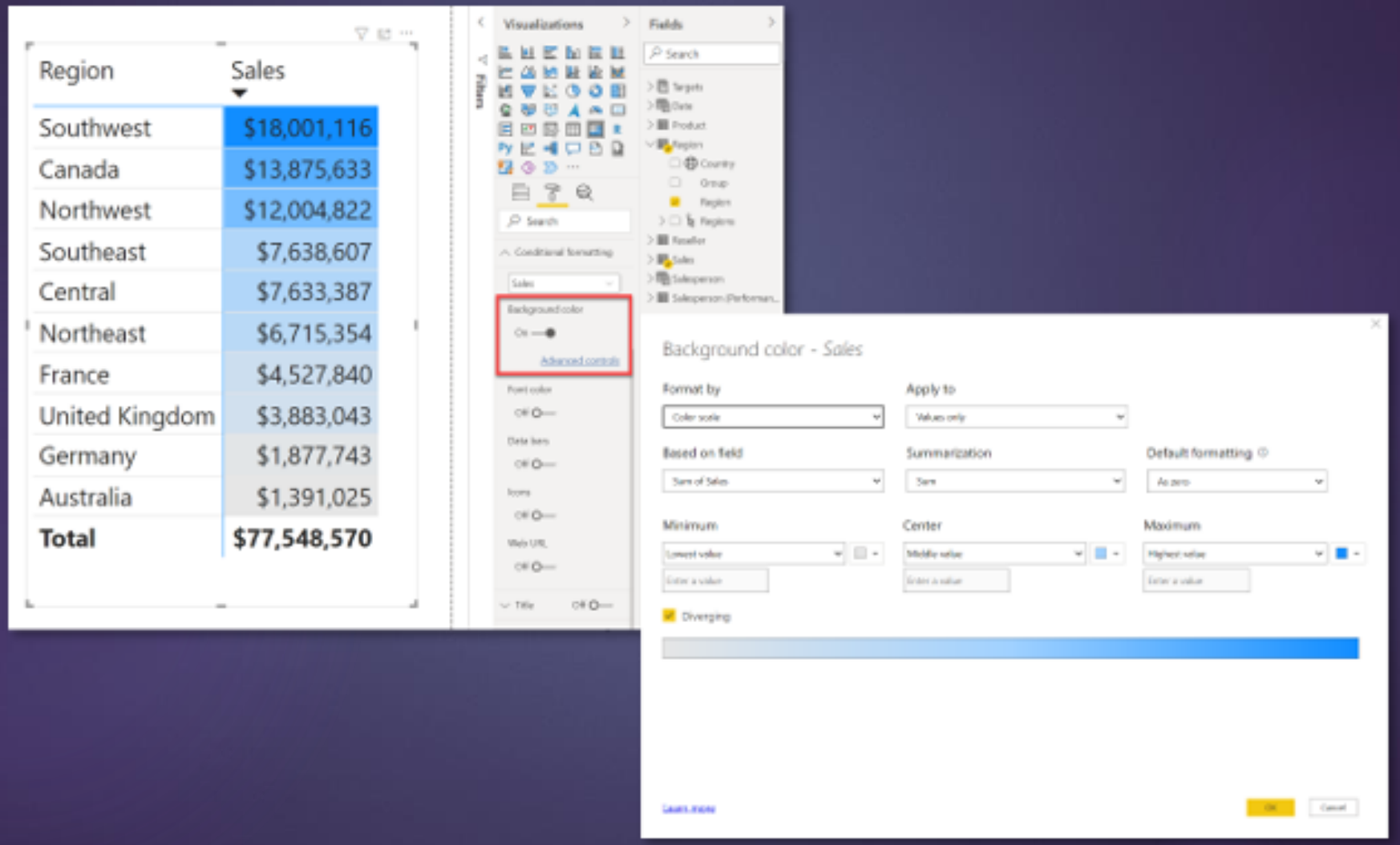


Basic Interactions

- Use interactions to change how visuals impact each other.
- Use hierarchies to drill down for additional relevant content.

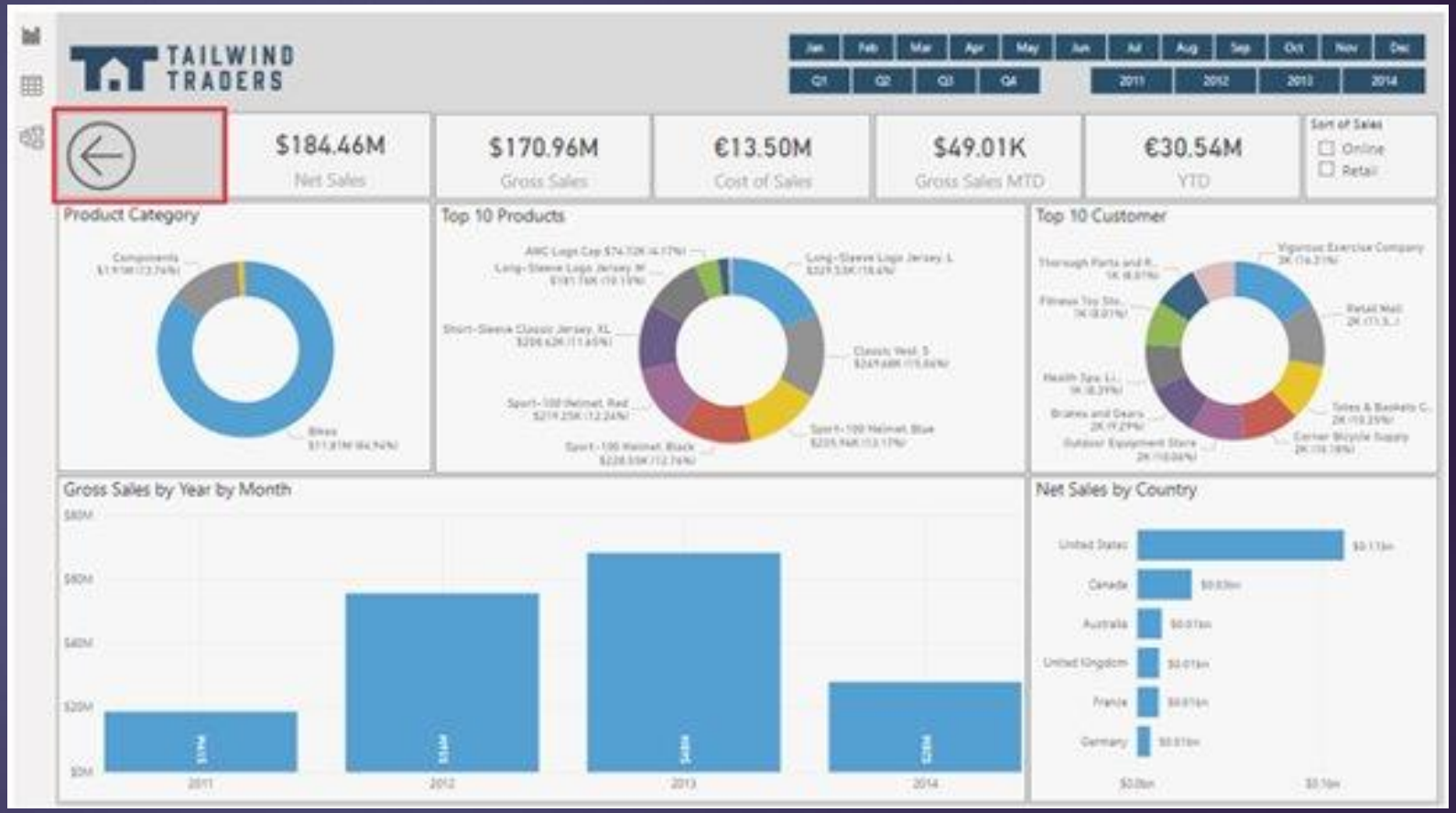


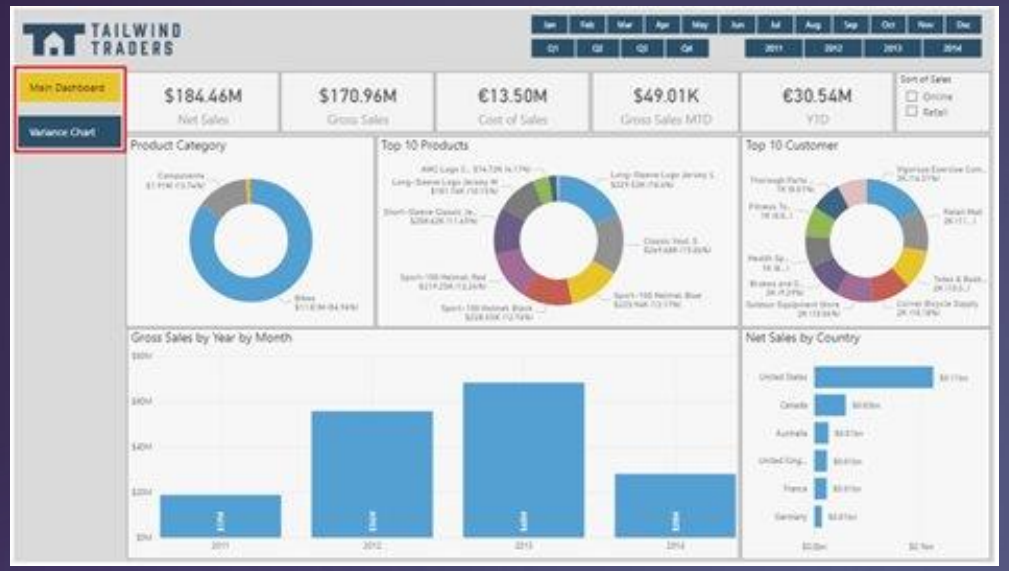
Configure Conditional formatting



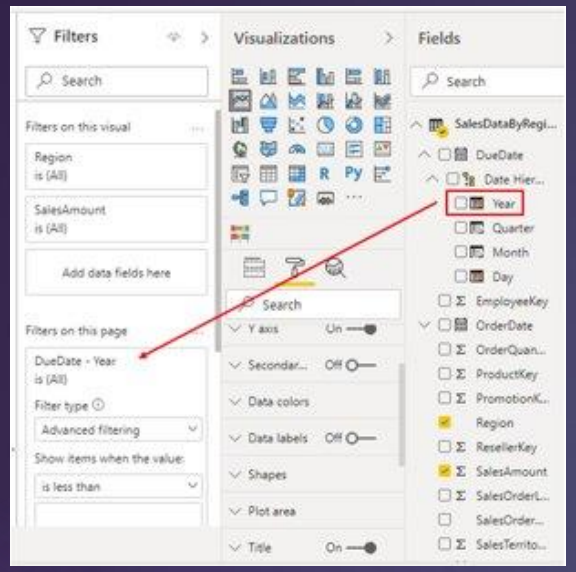
Design Report Navigation

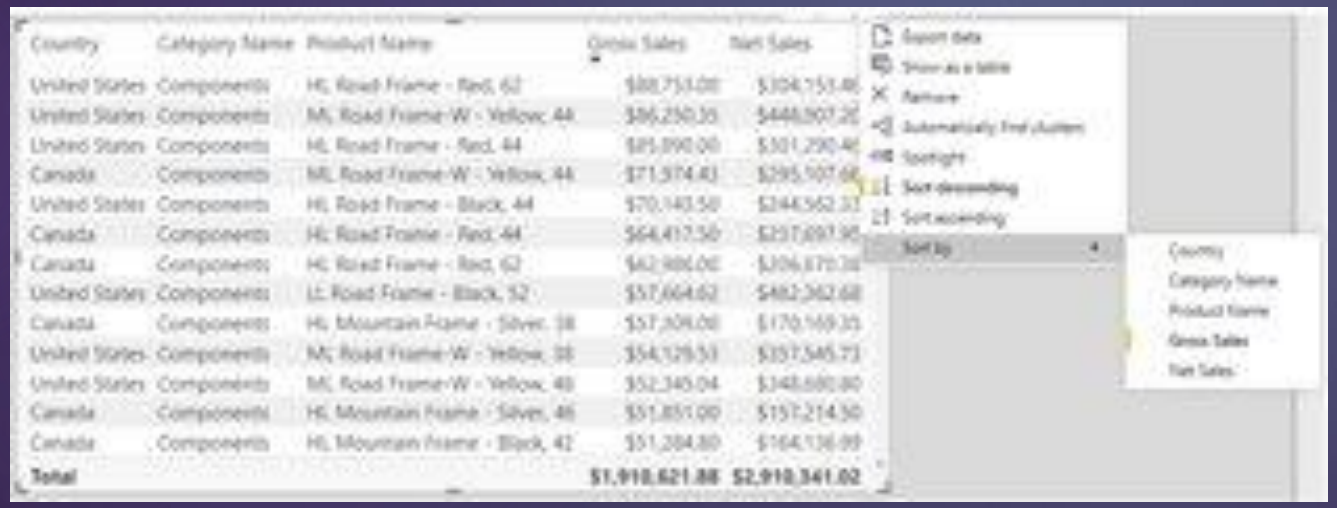
- Move users between pages.
- Use buttons, bookmarks, or conditional formatting.





Adding Buttons, Bookmarks & Selections





Apply Slicing, Filtering, Sorting

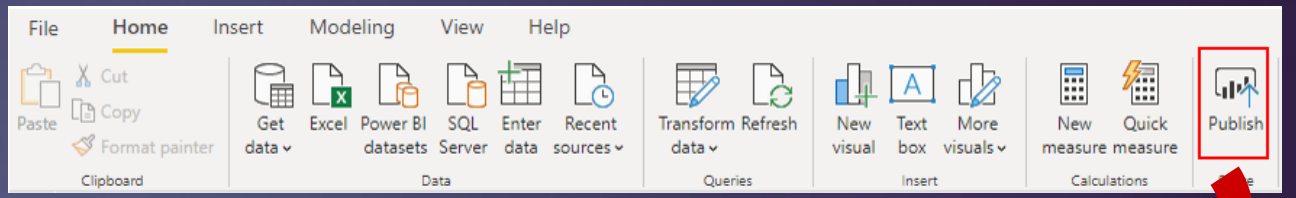
Advanced Interactions & Drillthroughs

Key Performance Indicators

AN EXCELLENT SOURCE IN HELPING TRACK TOWARD A SPECIFIC GOAL OVER TIME.

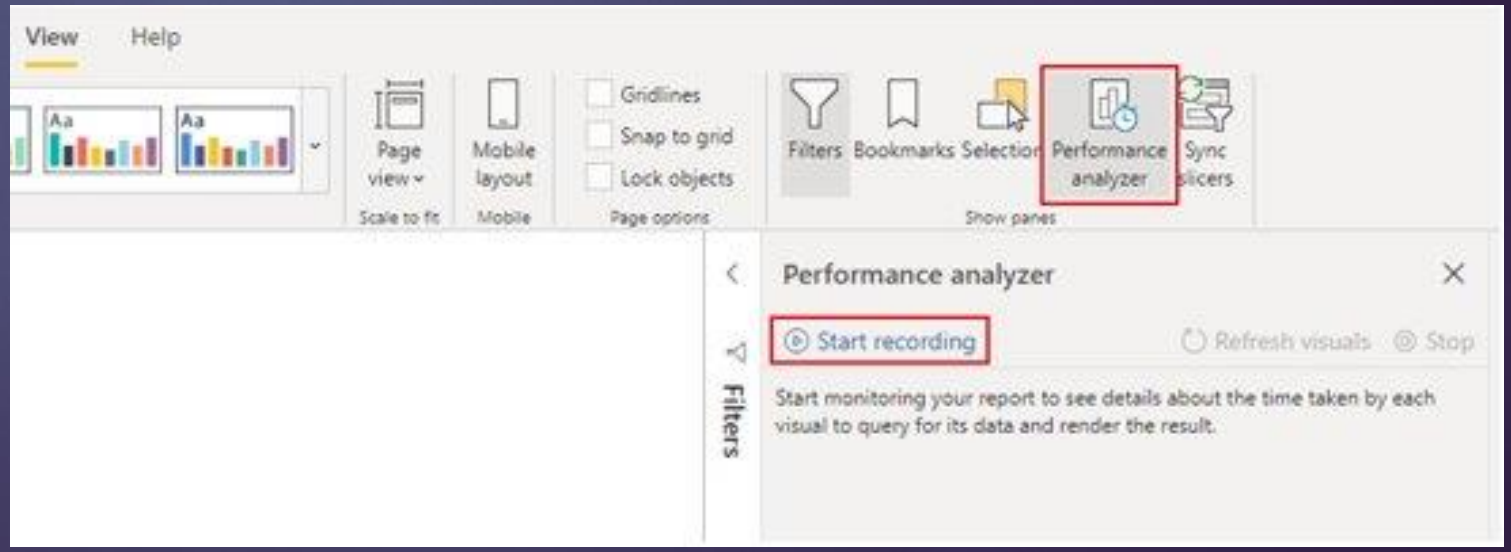
BEST WHEN USED IN A SERIES (E.G., DAILY, MONTHLY, ETC.).

Publish & Export Reports



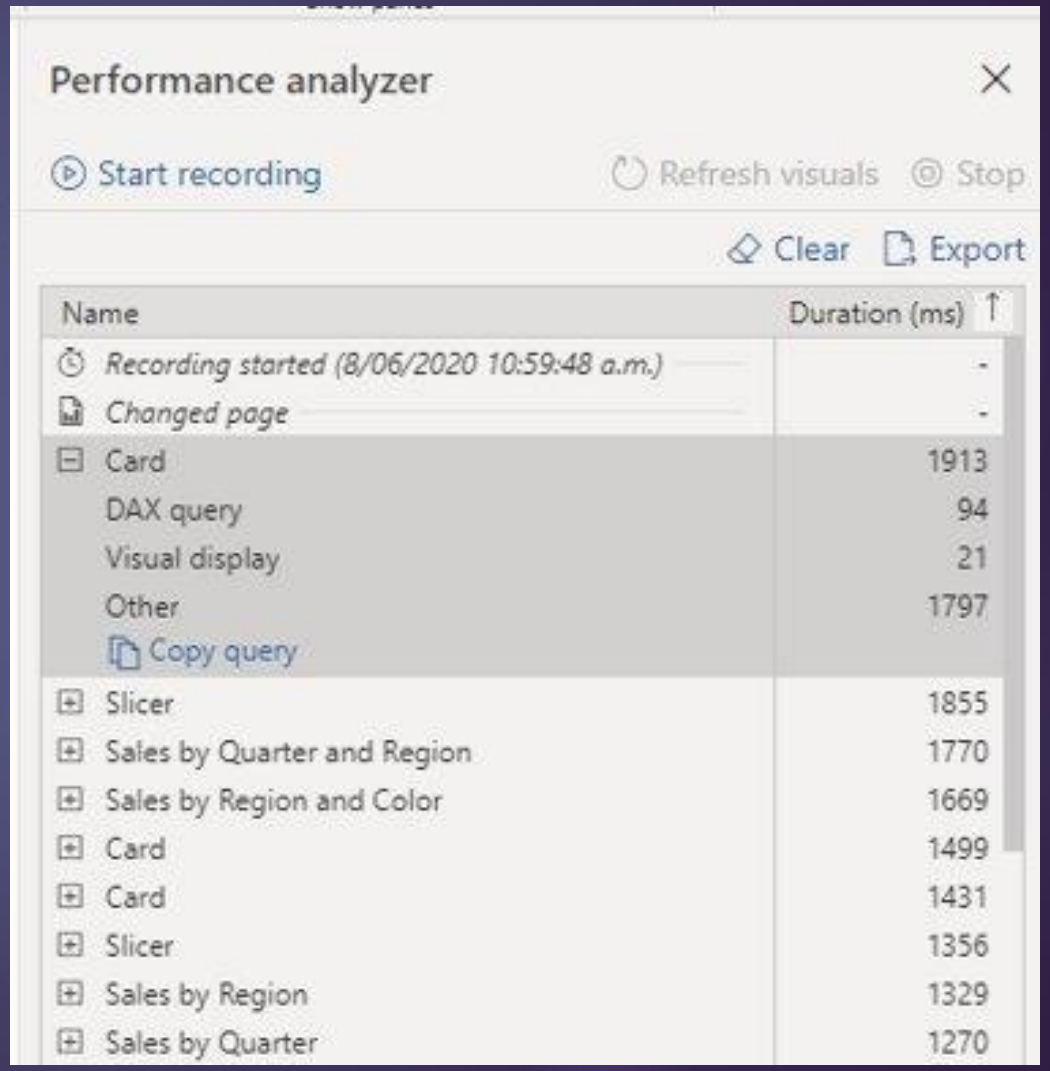
Performance Analyzer

- Find out how each report element is performing.
- Measure report elements during user interaction.
- Detect which aspects are least or most resource intensive.



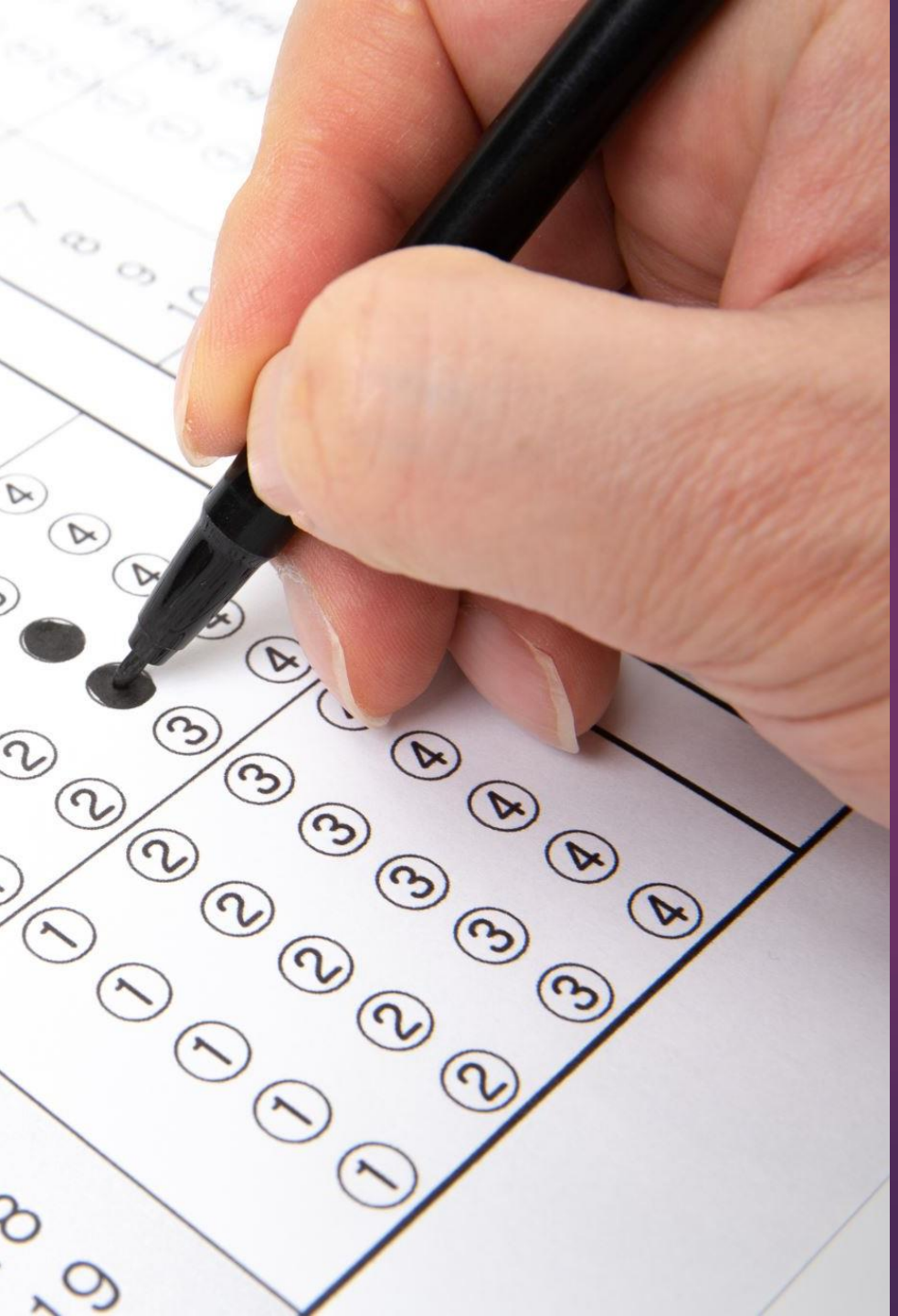
Review Performance Results

- Log information shows duration to complete each task.
- Duration value indicates the difference between the start and end timestamp for each operation.



Data Visualization Best Practices

- Less is More! Think about the number of visuals on the page/tab
- Keep it simple – use the right visuals to represent the right information
- Make sure to use the right themes/colours – standard colours make a very big difference
- Look for Accessibility friendly colours
- Try to tell a story with the visuals
- Use conditional formatting, icons, where relevant
- Think before adding Pie-charts/Donut-charts to your report



Data Visualization Quiz

Power BI Service

Power BI Service

- Basics of Power BI Service
- Creating your first workspace
- Publish & share your first report
- Creating a Dashboard from a report
- Quiz

Introduction to Workspaces

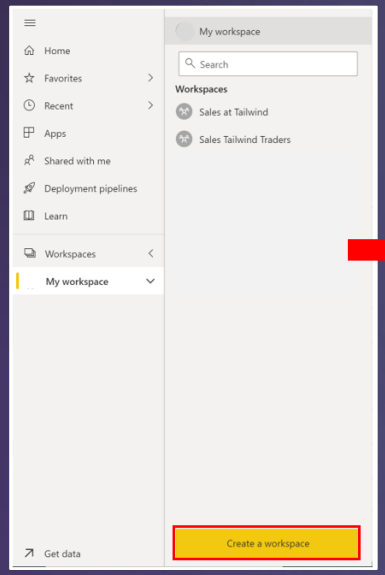
A centralized repository to:

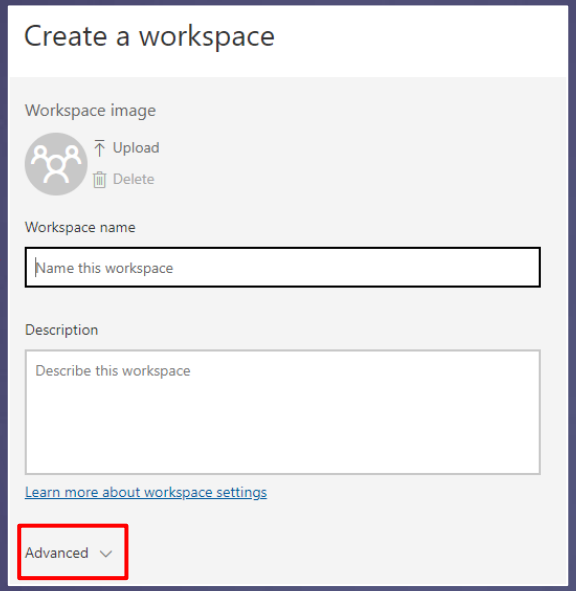
- Collaborate with colleagues and teams.
- Create collections of reports and dashboards.

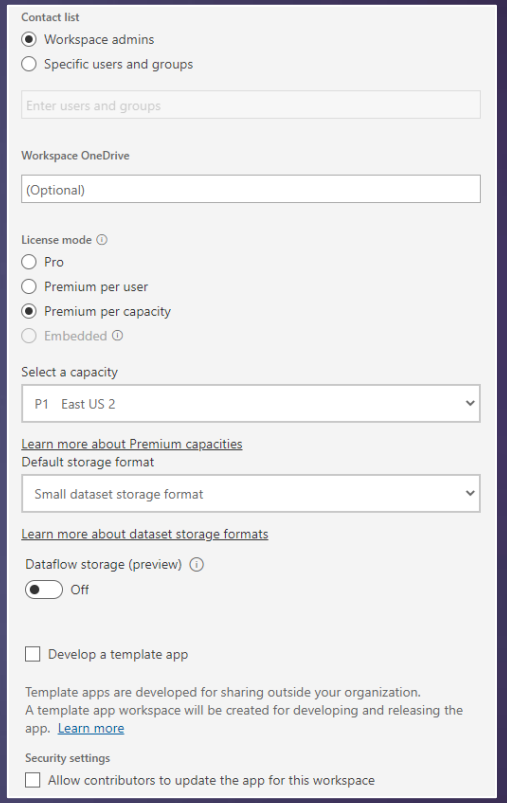
Workspaces provide the following benefits:

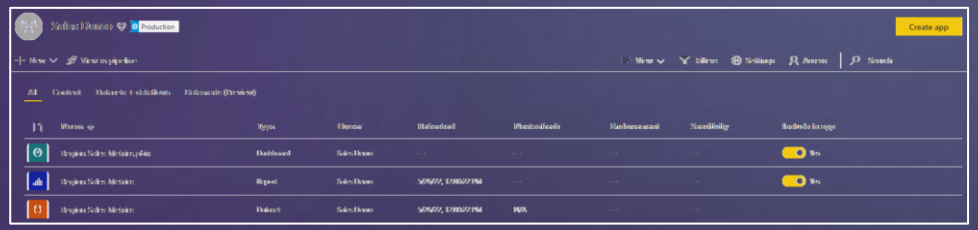
- Share and present reports in a single environment.
- Enable the highest level of security.
- An environment for housing reports and dashboards for use by others.

Create a Workspace





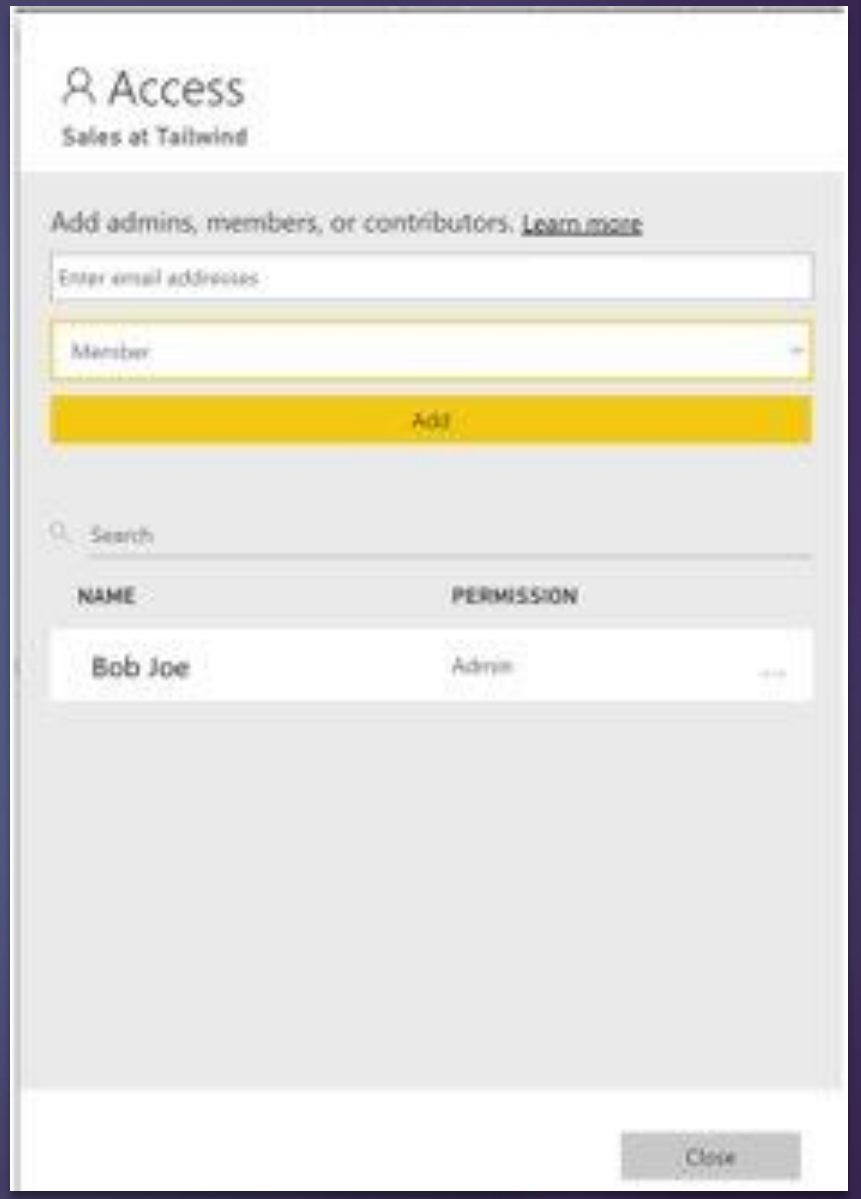




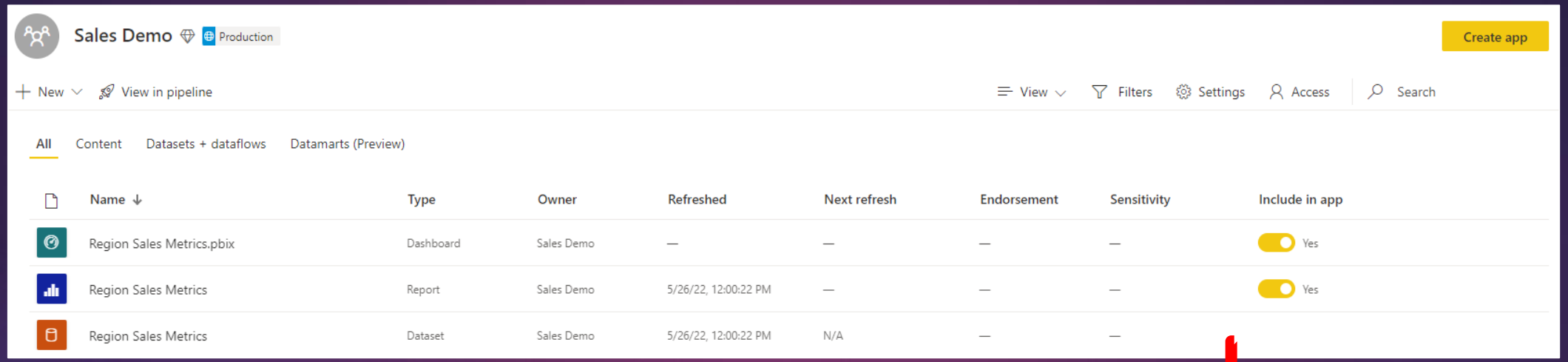
Assign Workspace Roles

- Roles determine what a user can do in a workspace, so teams can collaborate.
- Key roles include:
  - Admin.
  - Member.
  - Contributor.
  - Viewer.

More Info Here



Create Apps


Sales Demo
Production
Create app
New
View in pipeline
View
Filters
Settings
Access
Search
All
Content
Datasets + dataflows
Datamarts (Preview)
Name
Type
Owner
Refreshed
Next refresh
Endorsement
Sensitivity
Include in app
Region Sales Metrics.pbix
Dashboard
Sales Demo
—
—
—
—
Yes
Region Sales Metrics
Report
Sales Demo
5/26/22, 12:00:22 PM
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Yes
Region Sales Metrics
Dataset
Sales Demo
5/26/22, 12:00:22 PM
N/A
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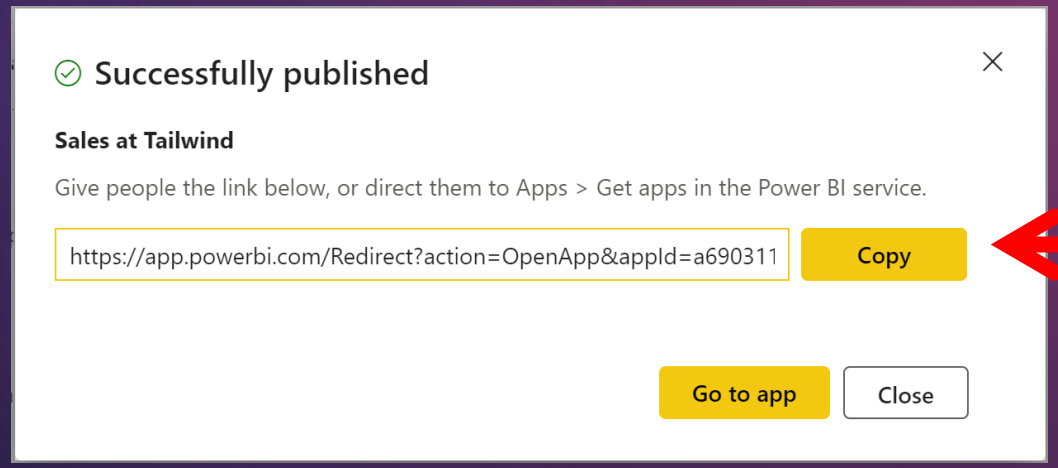
Successfully published
Sales at Tailwind
Give people the link below, or direct them to Apps > Get apps in the Power BI service.
https://app.powerbi.com/Redirect?action=OpenApp&appId=a690311
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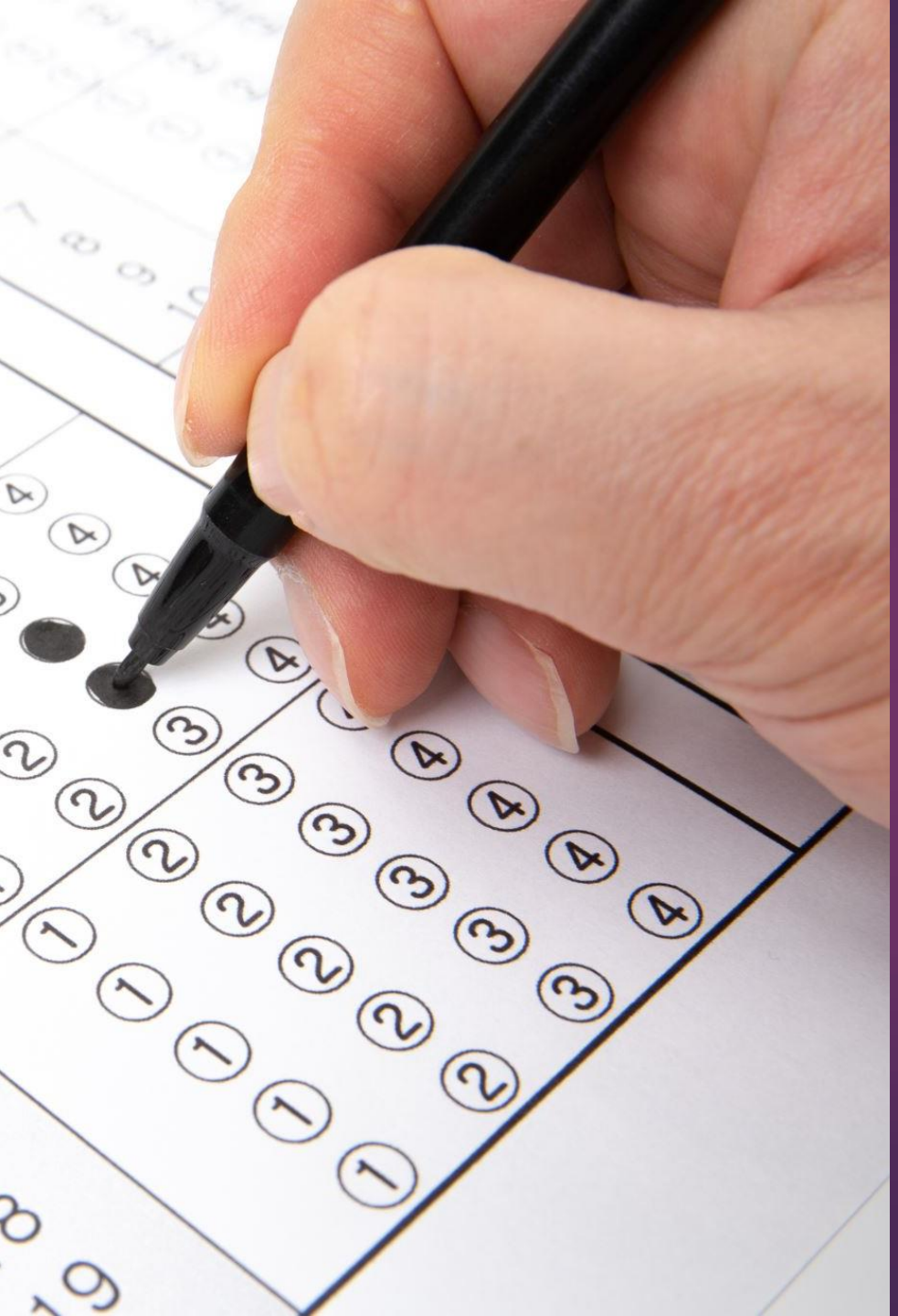


Power BI Service Quiz

Introduction to Gateways

Installing personal gateway

Configuring gateways in Power BI Service

Quiz

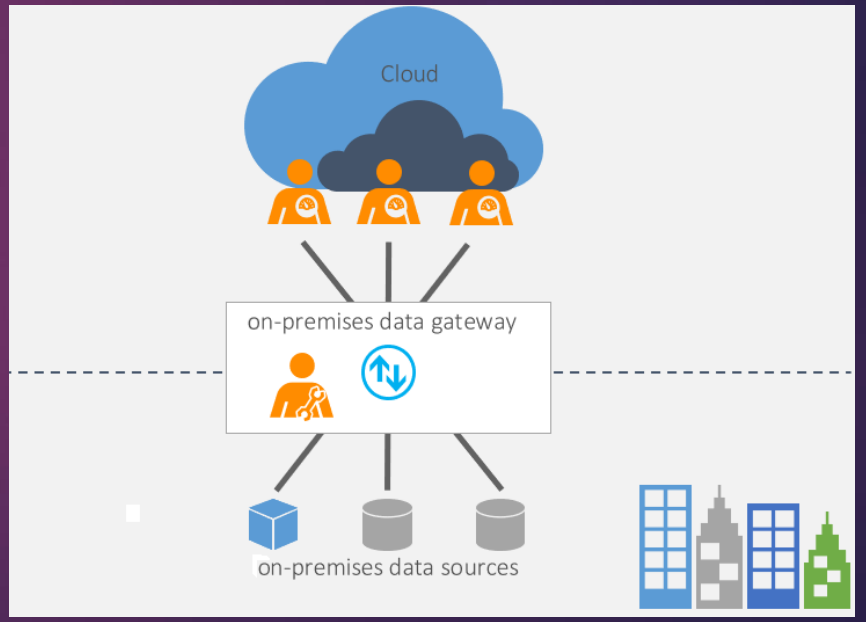
Power BI gateway?

The on-premises data gateway acts as a bridge. It provides quick and secure data transfer between on-premises data, which is data that isn't in the cloud, and several Microsoft cloud services. These services include Power BI, Power Apps, Power Automate, Azure Analysis Services, and Azure Logic Apps.

By using a gateway, organizations can keep databases and other data sources on their on-premises networks while securely using that on-premises data in cloud services.

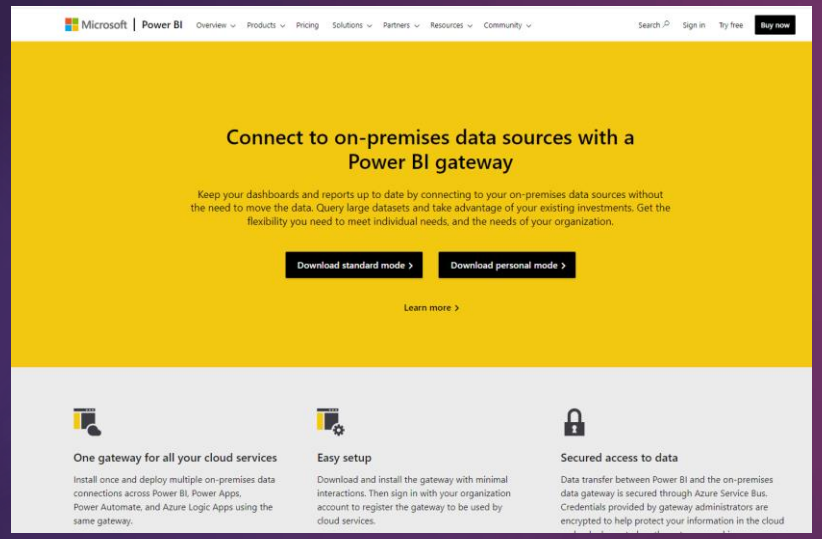
Types of Gateways:

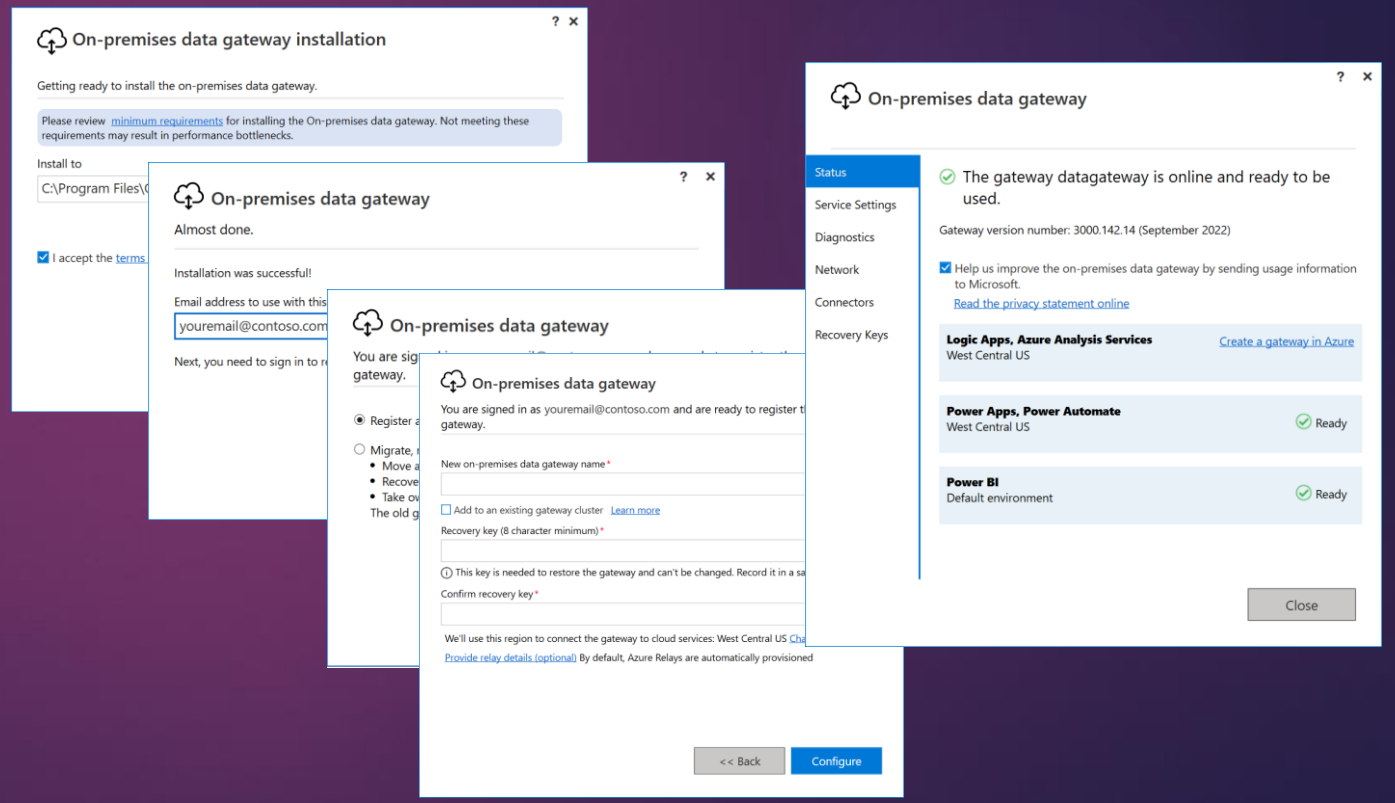
- On-premises data gateway
- On-premises data gateway (personal mode)

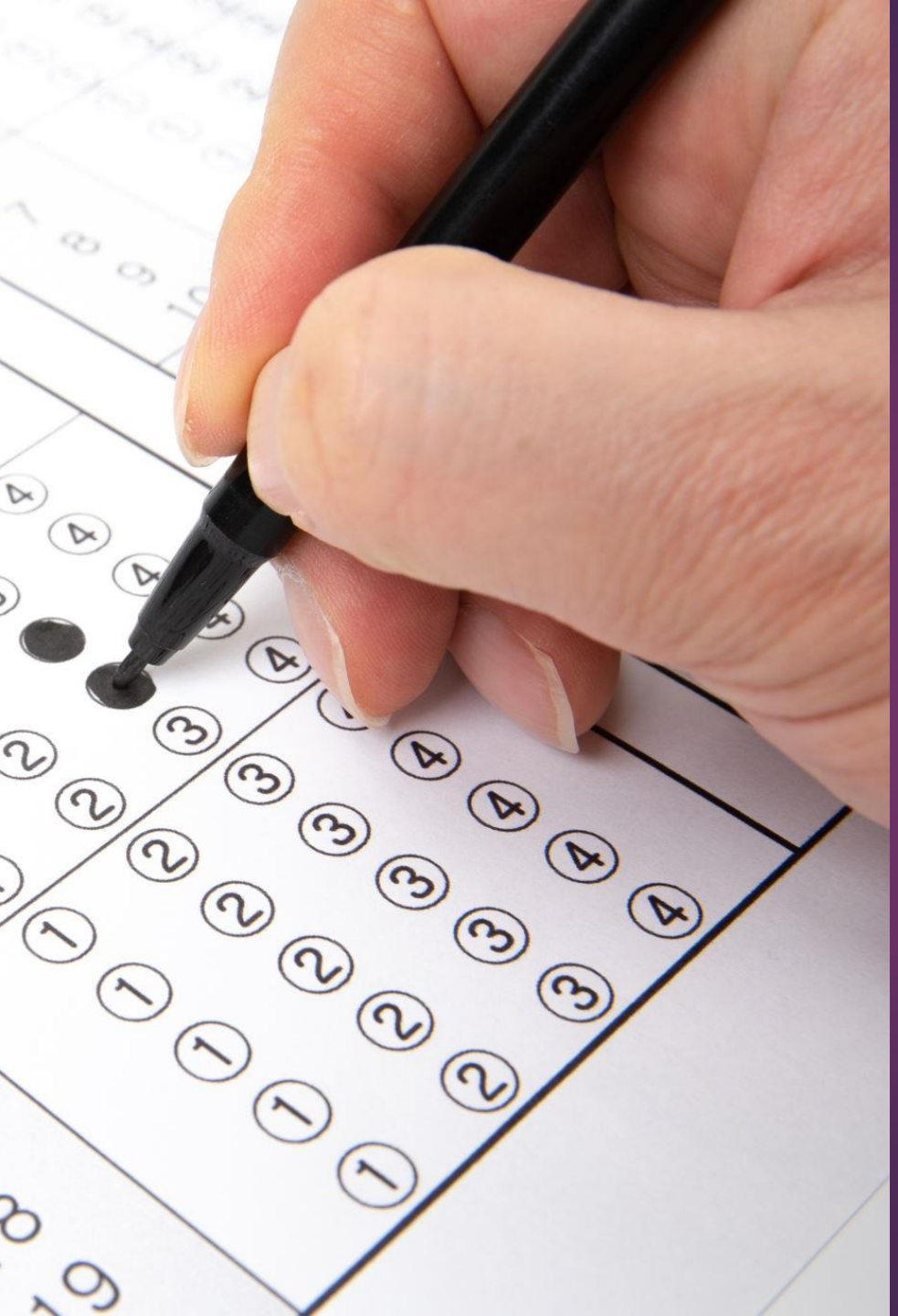


Install a personal gateway

- Download the installation package - https://powerbi.microsoft.com/en-us/gateway/
- Follow the installer options





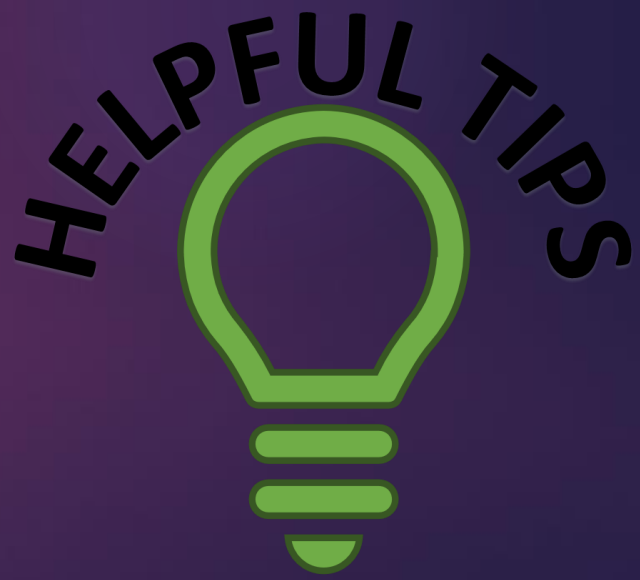


Introduction to Gateways

Quiz

Do you want some Tips?

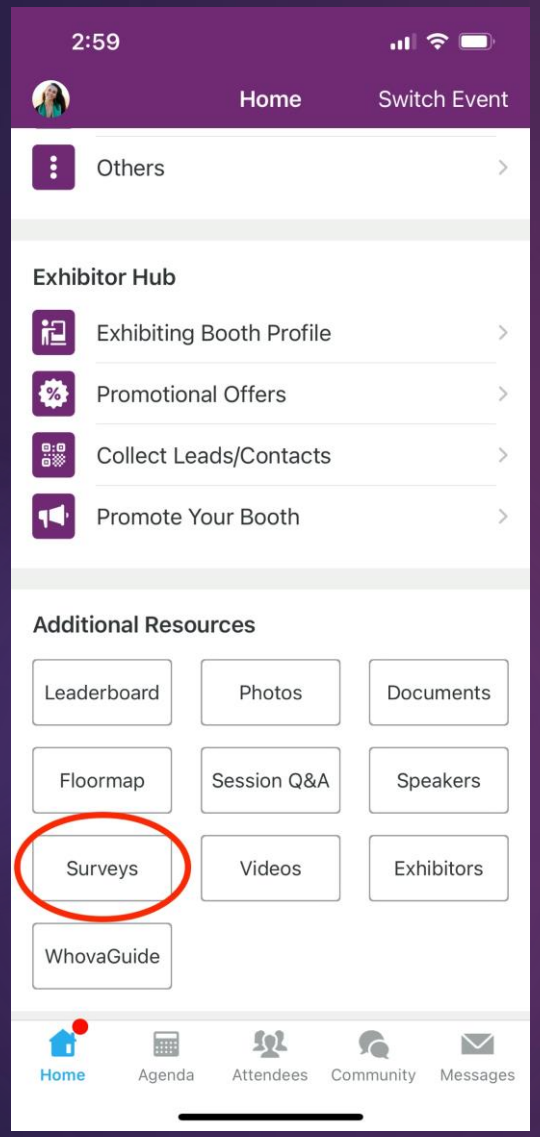
- Start small grow big
- On building a model think of the now not the future
- Always remind of automation, repletion and scalability
- Try to tell a story with your data
- Take advantage of online resources
  - Documentation
  - Community
  - YouTube
  - LinkedIn



Summary

- Introduction to Business Intelligence
- Introduction to Power BI
- Data Cleaning
- Data Modelling
- DAX
- Data Visualization – PBI report from scratch
- Power BI Service
- Introduction to Gateways

Session Feedback Surveys



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- *Click Session Feedback.*
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