

# SQL Saturday

## Power BI Workshop

Amy Nicholson  
@amykatenicho

Andrew Fryer  
@deepfat



# SQL Saturday

## Power BI Workshop

Amy Nicholson  
@amykatenicho

Andrew Fryer  
@deepfat

Overview

Why Power BI?

Power BI Desktop:  
Connecting to Data

Power BI Desktop:  
Building a Report

Power BI Service:  
Mobile Reports

Power BI Desktop:  
Preparing Data

Power BI Service:  
Get Data

Power BI Service:  
Keeping Data Current

Power BI Desktop:  
Creating a Data Model

Power BI Service:  
Pinning and Navigation

Power BI: Pro vs. Free

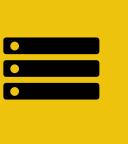
Power BI Desktop:  
Calculations

Power BI Service:  
Sharing

Performance Tips

# Overview

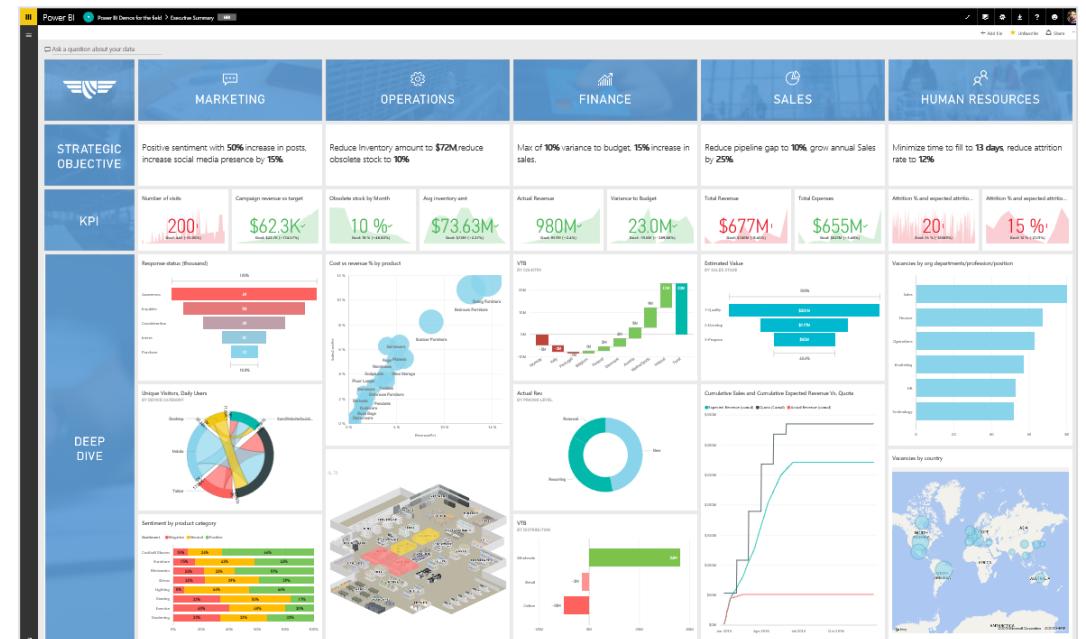
# Common challenges for BI IT Professionals

	Management of BI systems	Time spent on setup and management of BI systems. Ongoing hardware acquisitions and maintenance to meet SLAs
	Variety of data sources	Complexity of connecting to on-premise and cloud (SaaS) data sources
	Managing data in the cloud	Security, privacy and data refresh concerns for moving data into the cloud
	Integration with existing environment	Cost and time involved in integration of solution into existing environment. Extensibility of system
	Keeping data current	Complexity of refreshing data from variety of data sources, increased demand for real-time data
	Ease of use and adoption	Ease of adoption by business and IT orgs. Time spent on creating reports and visualizations

# Connecting any user, in any business, anywhere, with their data

## Power BI

- Industry-leading SaaS service
  - 5 seconds to sign up, 5 minutes to WOW
- Large Power BI ecosystem
  - ISVs, SIIs and partners creating unparalleled momentum
- Integrated across Microsoft products
  - Customers benefit from integration with other Microsoft products



# Key benefits and differentiators of Power BI for IT



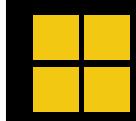
Fast deployment with a hybrid solution, ease of maintenance and 99.9% uptime SLA



Live connection to your data sources, on-premises and in the cloud



Keep your data secure, use groups to manage access and sharing



Integrated with familiar Microsoft products, utilizes infrastructure, scale & availability in Azure & O365



Open APIs for integration and new scenarios, e.g. real-time insights from devices



Content delivery (dashboards, reports, models) for ease of consumption across your organizations



# Power BI Overview

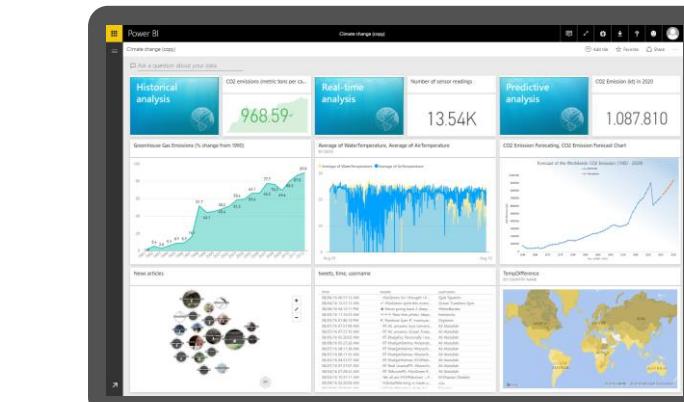


## Data sources

- Cloud-based SaaS solutions  
e.g. Marketo, Salesforce, Quickbooks, Google Analytics, ...
- On-premises data  
e.g. Analysis Services, SQL Server
- Organizational content packs  
Corporate data sources or external data services
- Azure services  
Azure SQL, Stream Analytics...
- Excel and CSV files  
Workbook data, flat files
- Power BI Desktop files  
Data from files, databases, Azure, Online Services, and other sources

## Power BI Service

- Content packs
- Live dashboards
- Visualizations
- Reports
- Datasets
- Data refresh



- Natural language query
- Sharing & collaboration

# Power BI Overview



## Data sources

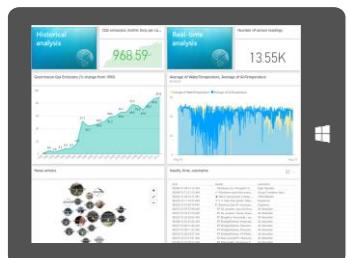
- Cloud-based SaaS solutions  
e.g. Marketo, Salesforce, Quickbooks, Google Analytics, ...
- On-premises data  
e.g. Analysis Services, SQL Server
- Organizational content packs  
Corporate data sources or external data services
- Azure services  
Azure SQL, Stream Analytics...
- Excel and CSV files  
Workbook data, flat files
- Power BI Desktop files  
Data from files, databases, Azure, Online Services, and other sources

## Power BI Service

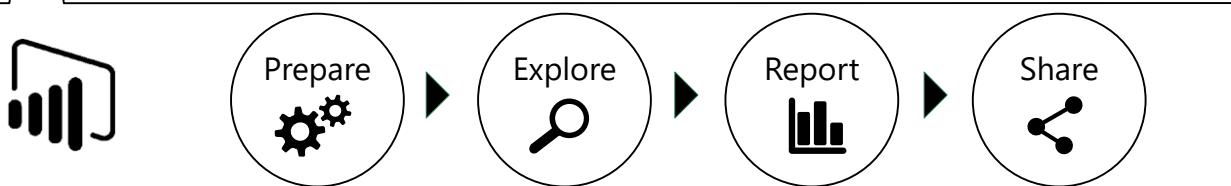
- Content packs
- Live dashboards
- Visualizations
- Reports
- Datasets
- Data refresh

Natural language query

Sharing & collaboration



## Power BI Desktop



## Power BI Platform



embed, extend, integrate

# Why Power BI ?

# IT challenges



**Management of BI systems**



**Variety of data sources**



**Managing data in the cloud**



**Integration with existing environment**



**Keeping data current**



**Ease of use and adoption**

# Faster time to solution and ease of management

- Power BI is a Software as a Service (SaaS) BI solution
  - No need to setup your own hardware
  - 99.9% uptime SLA
  - Grows with your needs for number of users and data volumes
  - Ease of maintenance with automatic updates
- Realize the benefits of a SaaS-based BI solution without moving your data to the cloud
- More time to focus on business needs and creating better solutions for end users
- Power BI will meet your security and compliance requirements
  - Use Azure Conditional Access policies for secure access
  - Manage users, groups, admins (in O365 admin portal)
  - View and search audit logs (in O365 Security and Compliance portal)
  - View usage metrics
  - Specify tenant settings – what features are available in your organization

# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



Keeping data current



Ease of use and adoption

# Built-in connectivity to all of your data

- Lowered IT investment in ETL infrastructure
- Data from services
  - Content packs for SaaS services that you already use
  - Growing number of supported SaaS solutions
- Data from databases
  - Cloud: Azure SQL Database, Azure SQL Data Warehouse, Spark on HDInsight
  - On-premise: SQL Server Analysis Services tabular or multi-dimensional, SQL Server, SAP HANA, Oracle, Teradata (Gateway required)
- Data from your organization
  - Content published by others in your org
- Data from files
  - Import data from Excel, Power BI Desktop, or CSV files
  - Connect (upload), manage and view Excel in Power BI
- Solution templates
  - Quickly provision end-to-end, enterprise solutions

The screenshot shows the 'Get Data' interface in Power BI. At the top, there's a header with the title 'Get Data' and links to 'Try this tutorial' and 'watch a video'. Below the header, there are two main sections: 'Content Pack Library' and 'Import or Connect to Data'. Under 'Content Pack Library', there are two cards: 'My organization' (describing content packs from other people in your organization) and 'Services' (describing content packs from online services). Each card has a 'Get' button. Under 'Import or Connect to Data', there are two more cards: 'Files' (describing bringing in reports, workbooks, or data from Excel, Power BI Desktop, or CSV files) and 'Databases' (describing connecting to live data in Azure SQL Database and more). Each of these cards also has a 'Get' button. At the bottom left, there's a 'Samples' link.

# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



Keeping data current



Ease of use and adoption

## Create organizational content packs

- IT can work with the business analysts to create content packs for an organization
- Content packs include
  - pre-built dashboards
  - reports
  - pre-defined data models
- IT can focus on providing authoritative datasets to analysts and end users, instead of developing reports
- Sample content packs for industry related scenarios are provided

Create content pack

Choose who will have access to this content pack:

Specific groups  My entire organization

Enter email addresses

Title

Finance Dashboard

Description

Dashboard for Finance managers

Upload an image or company logo  
Image size: 45 KB or less, 4:3 aspect ratio, JPG or PNG format

Select items to publish

Dashboards	Reports	Datasets
<input type="checkbox"/> Wide World Importers	<input type="checkbox"/> 311 Scenario Demo	<input type="checkbox"/> My Power BI Analysis
<input type="checkbox"/> Sales Analysis	<input type="checkbox"/> ClimateChangeDemo	<input type="checkbox"/> 311 Scenario Demo
<input type="checkbox"/> IT Dashboard	<input type="checkbox"/> IT Dashboard	<input type="checkbox"/> IT Dashboard
<input type="checkbox"/> Operations Dashboard	<input type="checkbox"/> My Power BI Analysis	<input type="checkbox"/> Operations Dashboard
<input type="checkbox"/> Climate Change Demo	<input type="checkbox"/> Operations Dashboard	<input type="checkbox"/> ClimateChangeDemo
<input type="checkbox"/> ExcelDemo.xlsx	<input checked="" type="checkbox"/> Profit and Sales	<input type="checkbox"/> ExcelDemo
<input checked="" type="checkbox"/> Profit and Sales	<input checked="" type="checkbox"/> Sales and Expenses	<input checked="" type="checkbox"/> Sales and Profitability
<input checked="" type="checkbox"/> Sales and Expenses	<input checked="" type="checkbox"/> Sales and Profitability	

The content pack will be available in your organization's content gallery. Learn more

**Publish** **Cancel**

# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



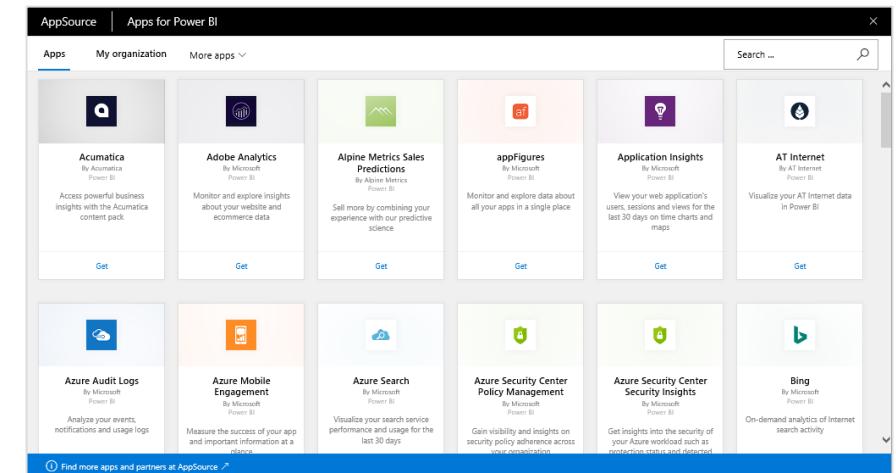
Keeping data current



Ease of use and adoption

# Get instant value from your cloud data sources

- No need to build connectors or develop data extraction processes for your SaaS solutions
- Business can quickly start with solution-specific content packs which include
  - pre-configured dashboards
  - reports
  - data models
- Users can explore data with fast data processing
- Automatic data refresh is built-in



Please refer to [powerbi.com](http://powerbi.com) for latest list of SaaS partners

# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



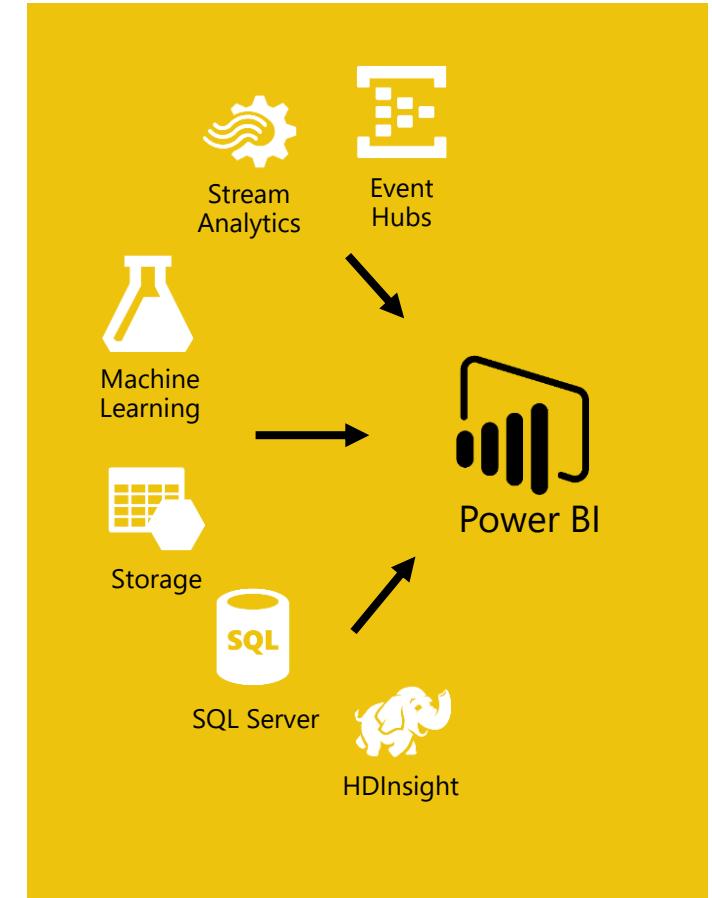
Keeping data current



Ease of use and adoption

## Consume structured/unstructured data using other Azure services

- Connect directly to data from Azure services, including
  - Azure SQL Database
  - Azure SQL Data Warehouse
  - Spark on HDInsight
- Push live, streaming data from Azure Stream Analytics with built-in destination for Power BI for real-time dashboards at any scale
- Integration with other Azure services, including Azure ML, opens up new scenarios, without writing thousands of lines of code



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



Keeping data current

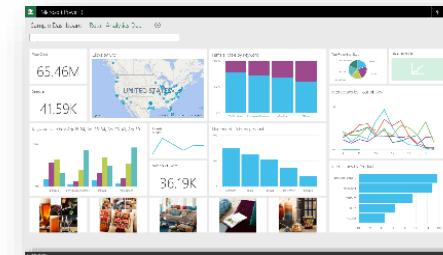


Ease of use and adoption

# Live connectivity to your on-premises data

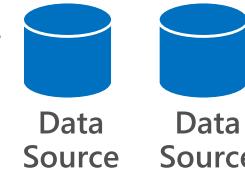
- Connect live to your existing on-premises data sources:
  - Analysis Services (tabular and multidimensional)
  - SQL Server
  - SAP HANA
  - Oracle
  - Teradata
- Requires On-Premises Data Gateway
- Role-based and row-level data security
- Data remains on-premise, only query is stored in Power BI

Live Power BI Dashboards and Reports



Scheduled Refresh  
Manage & Monitor

On-Premises Data Gateway



PowerApps

Microsoft Flow

Azure Logic Apps

Cloud

On-premises



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



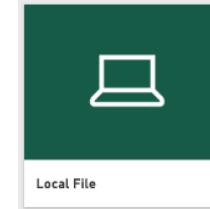
Keeping data current



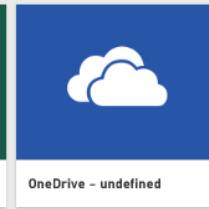
Ease of use and adoption

## Connect to data from your files

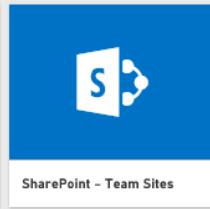
- Import data into Power BI from files
  - Microsoft Excel (xlxs or xlsm)
  - Power BI Desktop (pbix)
  - Comma Separated Value (csv)
- Files can be located on
  - Local machine
  - OneDrive Business or Personal
  - SharePoint Team Sites
- Two ways to use Excel files
  - Import into Power BI
  - Connect (upload), manage and view in Power BI
- Any changes to a file in OneDrive or SharePoint are synced automatically (hourly)
- Data and reports from Power BI Desktop files



Local File



OneDrive – undefined



SharePoint – Team Sites



Learn about importing files

# IT challenges



**Management of BI systems**



**Variety of data sources**



**Managing data in the cloud**



**Integration with existing environment**



**Keeping data current**

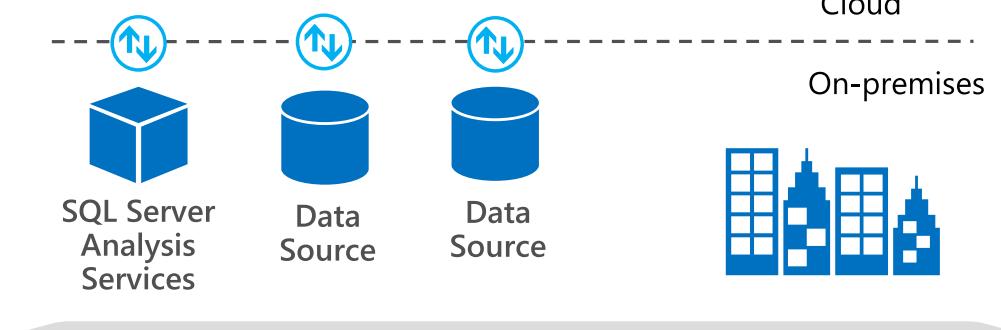
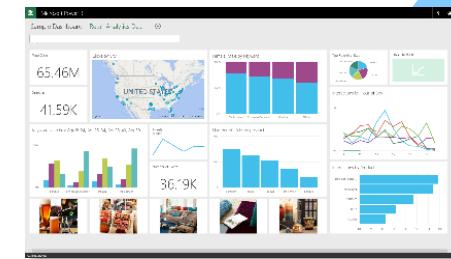


**Ease of use and adoption**

# Keep your data where it is and connect securely

- Faster time to insight with a hybrid BI solution
- Cloud data sources
  - SaaS sources
  - Azure – SQL, DW, Blob, Table, HDInsight, Marketplace
  - SharePoint, web sources, OData
  - OneDrive
- On-premise data sources
  - SQL Server, Teradata, Oracle, DB2, MySQL, PostgreSQL, Sybase, SAP HANA, Access, Custom SQL, Custom ODBC Drivers
  - SQL Server Analysis Services (tabular and multi-dimensional)
  - Files/folder, SharePoint on-premises

Live Power BI  
Dashboards  
and Reports



# IT challenges



## Management of BI systems



## Variety of data sources



## Managing data in the cloud



## Integration with existing environment



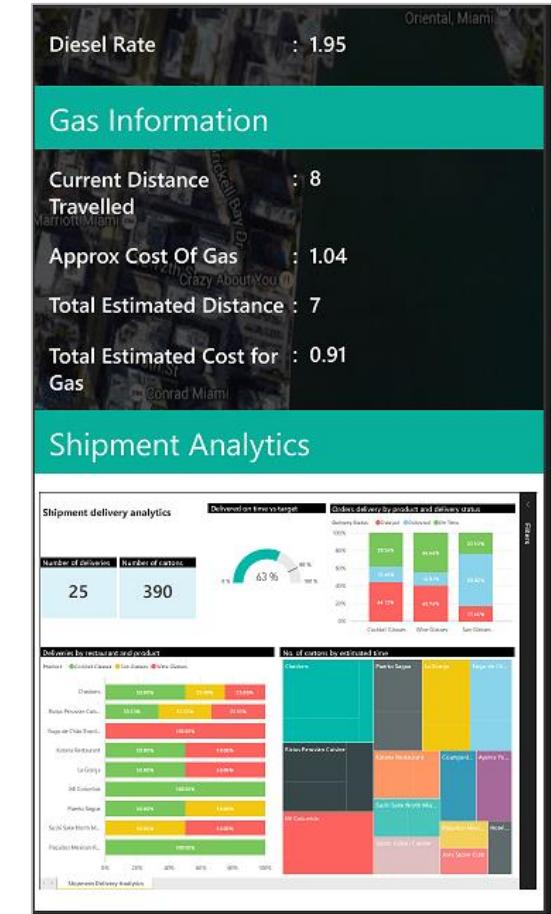
## Keeping data current



## Ease of use and adoption

# Embed, extend, and integrate with the Power BI Platform

- Application developers can embed Power BI tiles and reports as an IFrame into an app, such as a mobile app or web app.
- Use the REST API to push data directly from your application into Power BI
- Programmatically access Power BI resources (datasets, tables, schemas)
- Secure access to Power BI service using Azure Active Directory and OAuth 2.0 authentication
- Create your own custom visuals from the published open source visuals and the provided framework



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



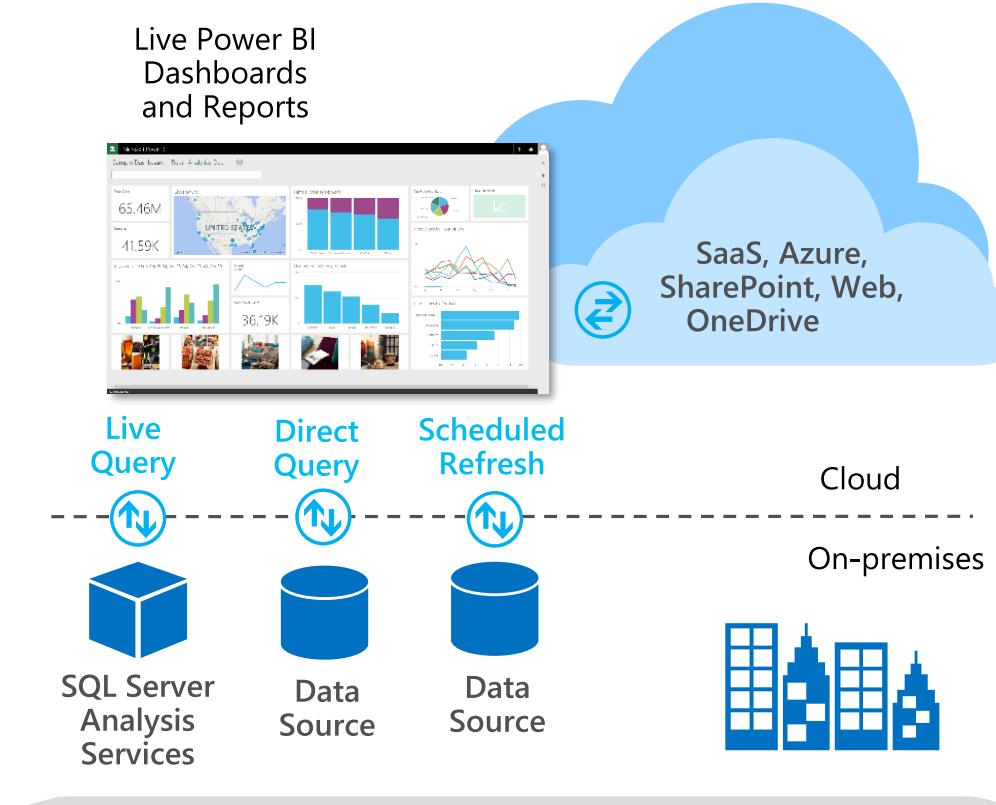
Keeping data current



Ease of use and adoption

## Keep your data current

- Access and refresh the data via
  - Direct Query (Azure SQL, DW and Spark HDInsight)
  - Import (with scheduled refresh)
  - REST APIs to stream data
- Refresh on-premise data with
  - Power BI Personal Gateway
  - On-Premises Data Gateway



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



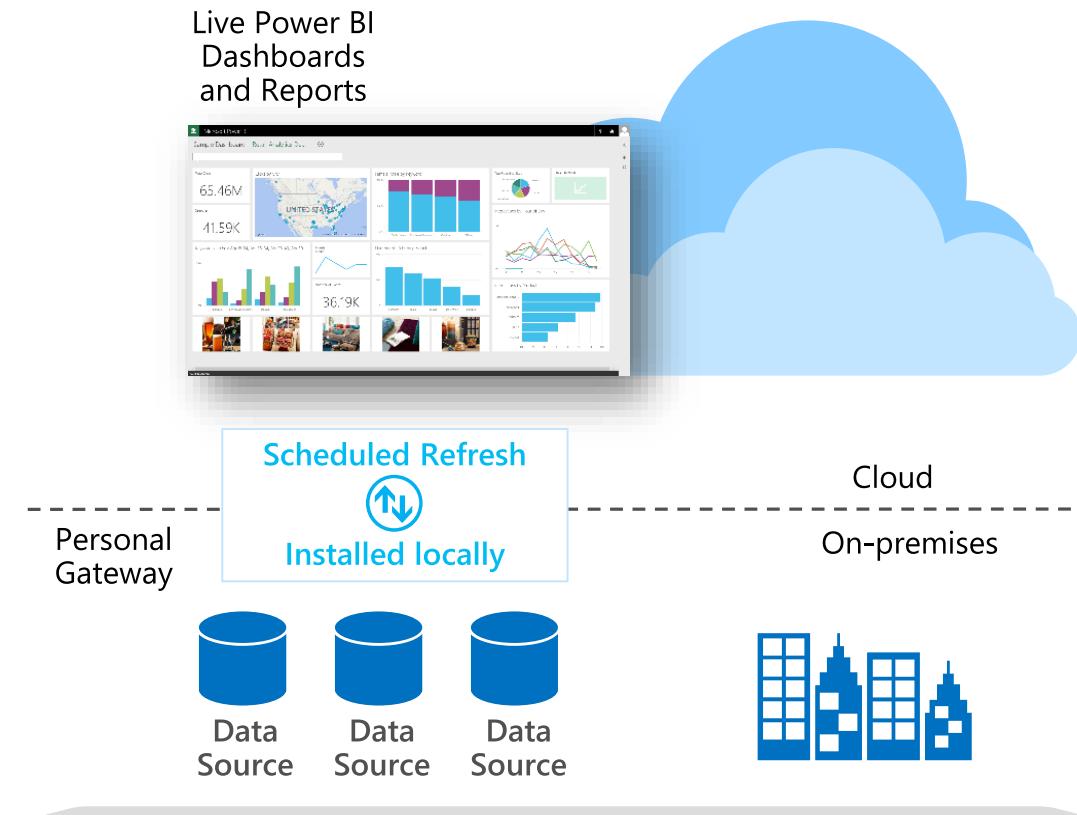
Keeping data current



Ease of use and adoption

# Scheduled refresh with Power BI Personal Gateway

- Personal Gateway empowers the business analyst to securely and easily refresh on-premise data
- Self-service data refresh - no help from IT required
- Easy & simple to use - lightweight one-click installer
- One Personal Gateway per user
- Runs either as a service or an app
- Import of data with scheduled refresh



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



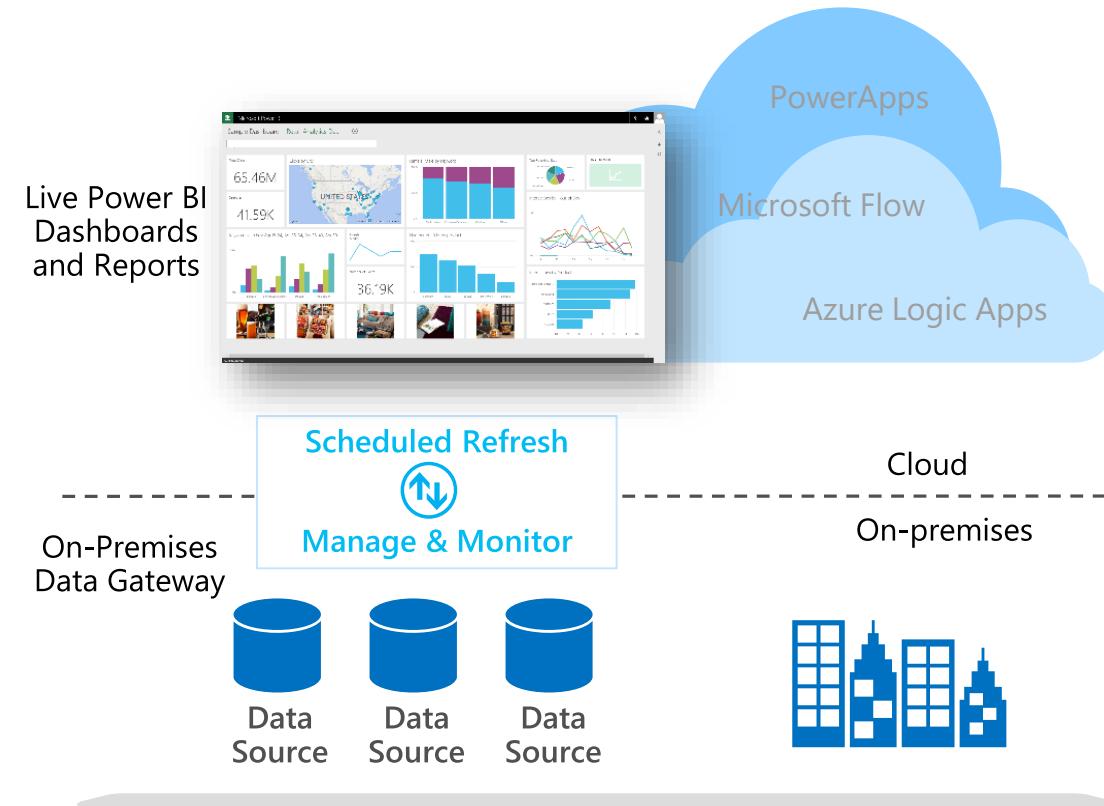
Keeping data current



Ease of use and adoption

## Centralized data refresh with On-Premises Data Gateway

- IT departments can deploy and manage on-premise data access centrally
- BI governance: IT can monitor and audit usage
- Live, interactive query to on-premises data sources (e.g. SQL Server) and scheduled refresh
- One gateway for multiple cloud services and experiences: Power BI, PowerApps, Microsoft Flow, Azure Logic Apps
- Gateway recovery and restore features built-in



# IT challenges



Management of BI systems



Variety of data sources



Managing data in the cloud



Integration with existing environment



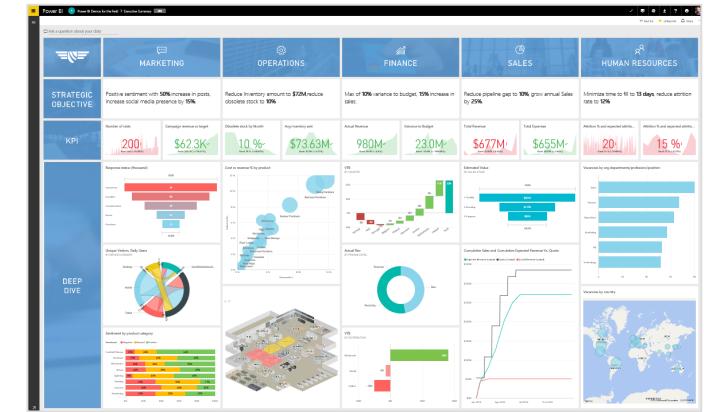
Keeping data current



Ease of use and adoption

# Easy to use and drive adoption

- Easy to use
  - For end users: intuitive and interactive dashboards and reports
  - For BI analysts: familiar tools to create data models and reports
  - For IT: Administering Power BI tenants, users, and groups is the same as in Office 365
- Easy to share
  - End users can easily share dashboards and reports, inside and outside the organization
  - Collaborate with others in a group workspace
  - Create content packs and publish them to your organization



Save Cancel

### Create a Group

Name your group

Group ID  Available

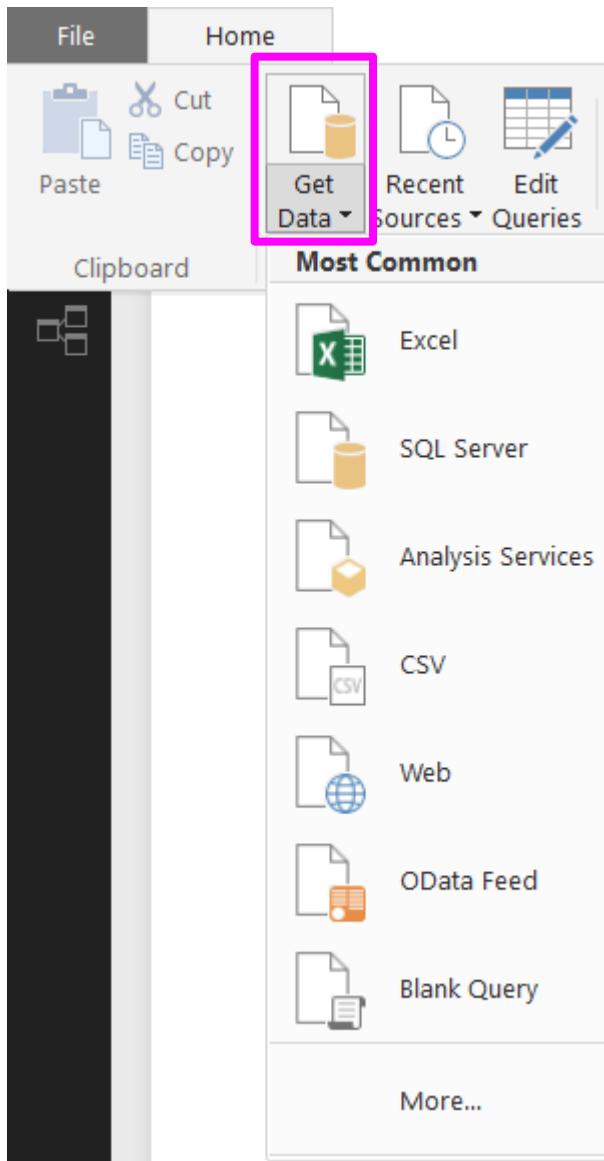
Privacy  Members can edit Power BI content

Add group members  Add

# Power BI Desktop: Connecting to Data



# Connecting to Data



- The “Get Data” option allows the definition of **connections** to data sources and the selection of **entities and columns**
- Authentication options can be specified including **credential types** such as Windows or others
- Data can be **imported in-memory** or be **accessed live** for some data sources
- Each selected entity will become a query that can be further **enhanced** to meet business requirements



# Connecting to Data

*Data sources available through Power BI Desktop (not all listed)*

File	Database	Azure	Online Services	Other
<ul style="list-style-type: none"> <li>Excel</li> <li>Text / CSV</li> <li>XML</li> <li>JSON</li> <li>Folder</li> <li>Sharepoint Folder</li> </ul>	<ul style="list-style-type: none"> <li>SQL Server (<b>DQ</b>)</li> <li>Access</li> <li>SQL Server Analysis Services (<b>LQ</b>)</li> <li>Oracle (<b>DQ</b>)</li> <li>IBM DB2</li> <li>MySQL</li> <li>PostgreSQL</li> <li>Sybase</li> <li>Teradata (<b>DQ</b>)</li> <li>SAP HANA (<b>DQ</b>)</li> <li>IBM Informix database<sup>1</sup></li> <li>SAP BW</li> <li>Amazon Redshift<sup>1</sup></li> <li>Impala<sup>1</sup></li> <li>Snowflake<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>SQL Database (<b>DQ</b>)</li> <li>SQL Data Warehouse (<b>DQ</b>)</li> <li>Marketplace</li> <li>HDInsight</li> <li>Blob Storage</li> <li>Table Storage</li> <li>HDInsight Spark<sup>1</sup></li> <li>DocumentDB<sup>1</sup></li> <li>Data Lake<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>SharePoint Online List</li> <li>Dynamics 365</li> <li>PowerApps</li> <li>Facebook</li> <li>Salesforce Objects</li> <li>Salesforce Reports</li> <li>Google Analytics</li> <li>appFigures<sup>1</sup></li> <li>Azure Enterprise<sup>1</sup></li> <li>comScore Digital Analytix<sup>1</sup></li> <li>GitHub<sup>1</sup></li> <li>MailChimp<sup>1</sup></li> <li>Marketo<sup>1</sup></li> <li>Dynamics 365 for Financials<sup>1</sup></li> <li>MixPanel<sup>1</sup></li> <li>Planview Enterprise<sup>1</sup></li> <li>Projectplace<sup>1</sup></li> <li>QuickBooks Online<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>SparkPost<sup>1</sup></li> <li>Smartsheet</li> <li>SQL Sentry<sup>1</sup></li> <li>Stripe<sup>1</sup></li> <li>SweetIQ<sup>1</sup></li> <li>Troux<sup>1</sup></li> <li>Twilio<sup>1</sup></li> <li>tyGraph<sup>1</sup></li> <li>Visual Studio Team Services<sup>1</sup></li> <li>Webtrends<sup>1</sup></li> <li>ZenDesk<sup>1</sup></li> </ul>

<sup>1</sup> In Beta

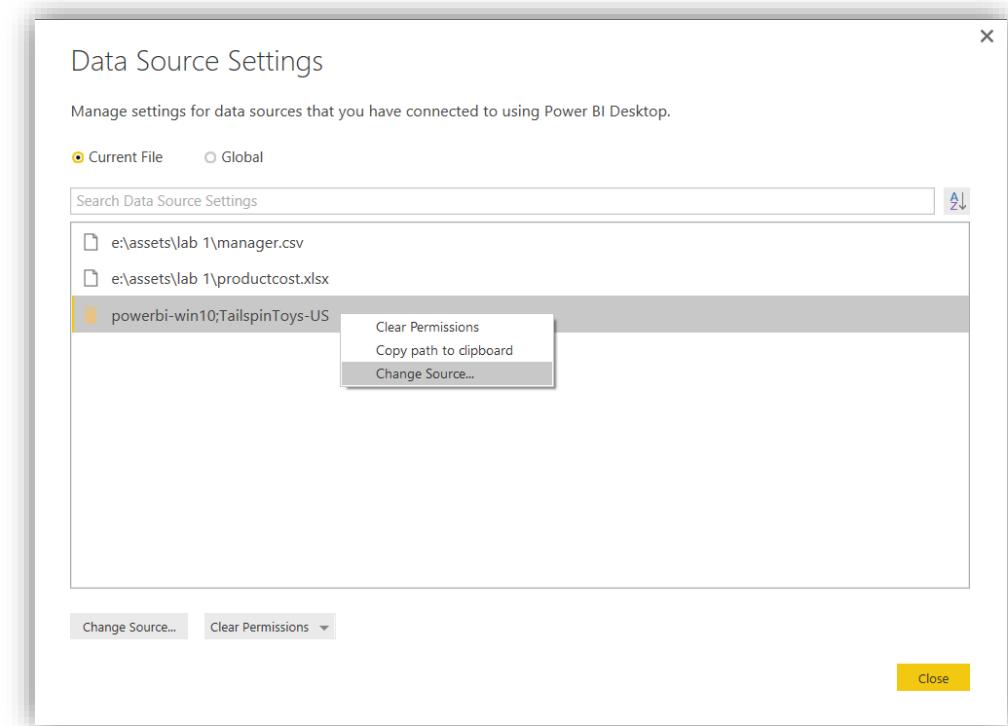
- The available data sources are constantly evolving
- Some of them support **Direct Query (DQ)**. No data is imported but **cannot mix import modes or data sources**
- There are also some **limitations on the transformations** that can be done with DQ



# Connecting to Data

## *Changing connections*

- Once connections are established, you can easily change them
- For instance change from Test to Production Environment
- Go to File -> Options and Settings -> Data Source Settings
- Specified credentials can be cleared
- The scope can be current file or previous created connections



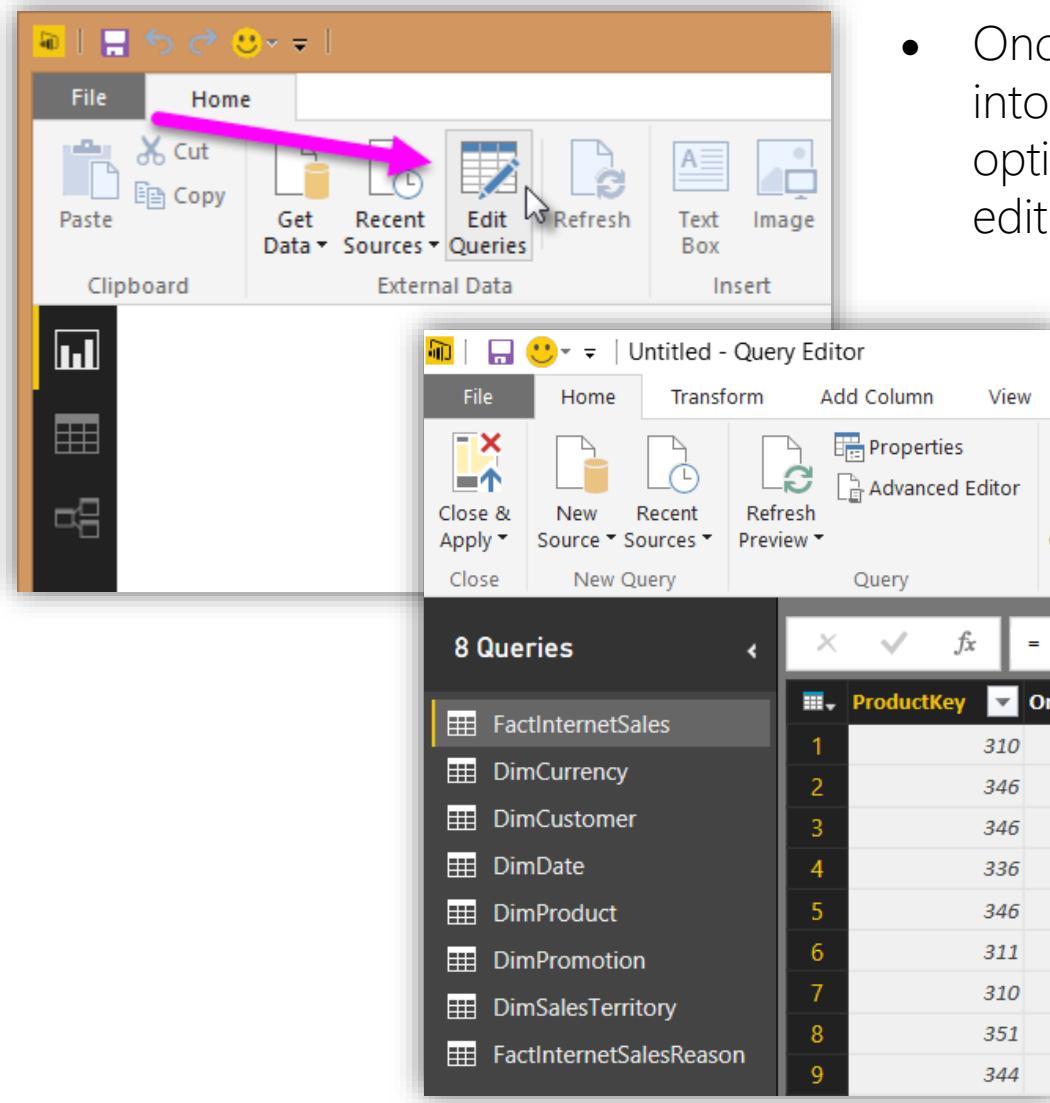
# Power BI Desktop: Preparing Data



# Shaping Data

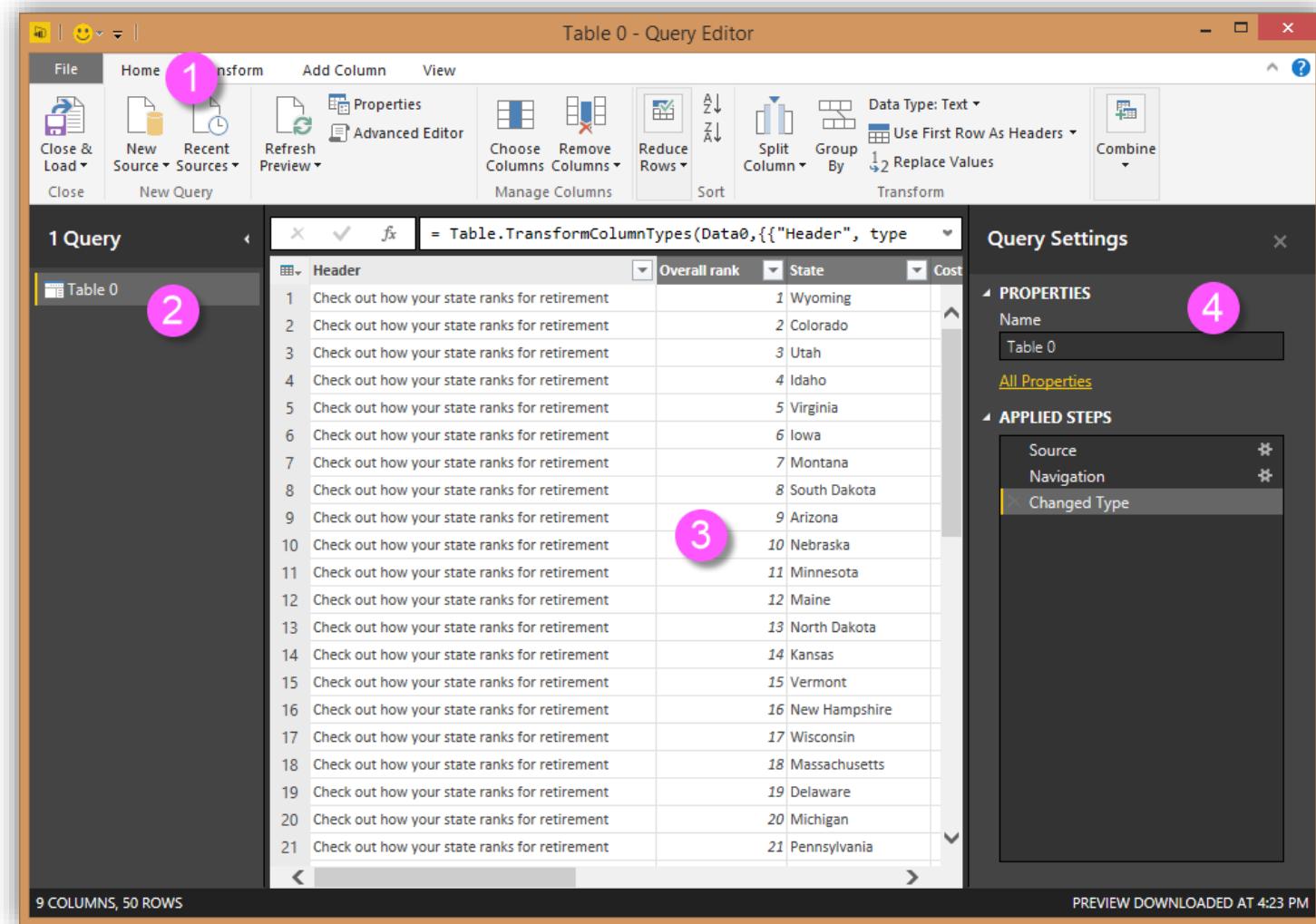
- Shaping is the act of **transforming** the data to meet our **business requirements**
- Apply **data cleaning operations** and correct/remove errors
- Rename the data so it is more meaningful
- Combine **data** from different data sources in a single table
- Create personal (reusable) **views** of the data
- A set of **out-of-the box transformations** are available to help
- A **programming language** is available for addressing more complex use-cases
- Source data is **not changed**, all the transformations are applied on the Desktop engine

# Query Editor



- Once the data is loaded or referenced into Power BI Desktop, the “Edit Queries” option in the “Home” ribbon allows the edition of the imported entities
- Each entity that was loaded from each data source will generate a **separate query**
- Transformations are applied **per-entity**, although it is possible to combine them.

# Query Editor



1 Query Ribbon

2 The Left Pane

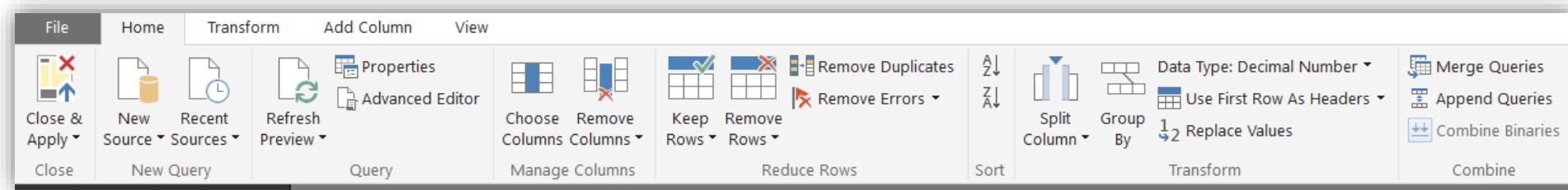
3 The Center Pane

4 The Query Settings Pane

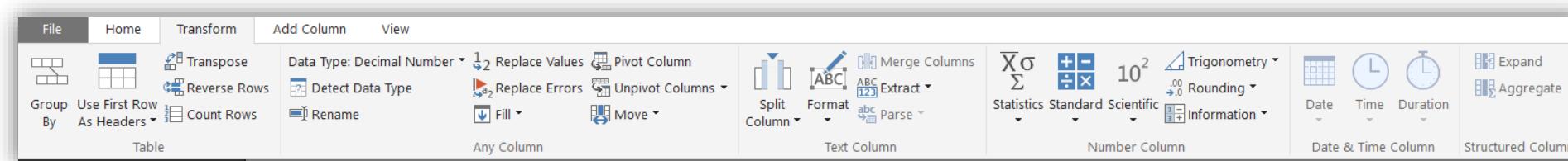
# Query Editor - Query Ribbon



- The “Home” tab contains the common query tasks including the combination of queries



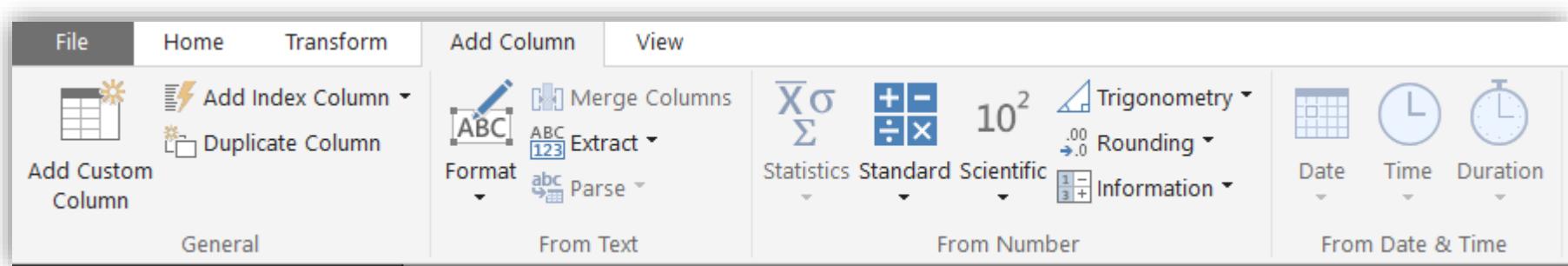
- The “Transform” tab provides access to common data transformation tasks, such as adding or removing columns, changing data types, splitting columns, and other data-driven tasks



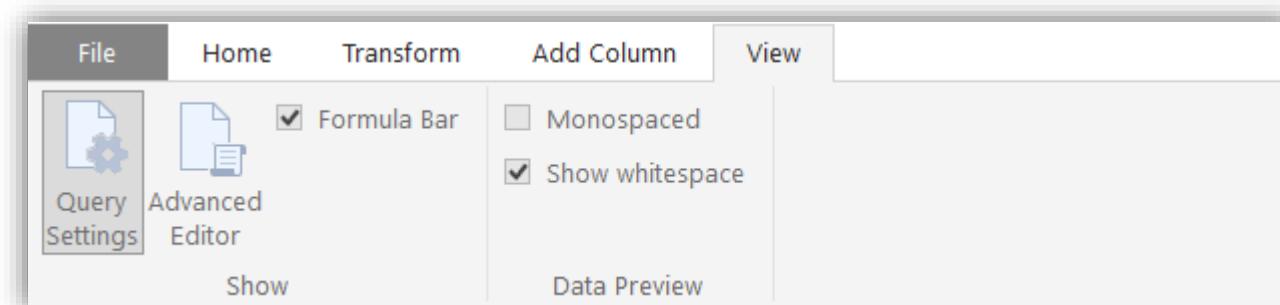
# Query Editor - Query Ribbon



- The “Add Column” tab provides additional tasks associated with columns such as formatting column data, adding custom columns or invoking functions



- The “View” tab provides access to query settings and the Advanced Editor where we can develop our own data transformation scripts.





# Shaping Data

*Available Data Transformations – Advanced Editor*

- **Advanced Editor**

- Every transformation generates code automatically
- For more advanced scenarios
- OOB transformations will cover more than 90% of the cases

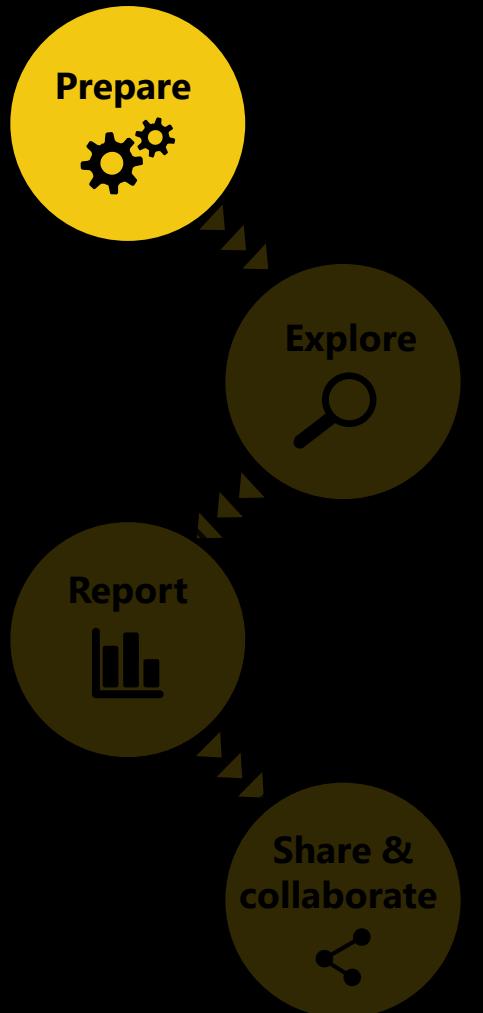
The screenshot shows the "Advanced Editor" window with the title "FactInternetSales". The code pane contains the following M code:

```
let
    Source = Sql.Databases("testbot01.cloudapp.net,60000\SQL2K14"),
    AdventureWorksDW2014 = Source{[Name="AdventureWorksDW2014"]}[Data],
    dbo_FactInternetSales = AdventureWorksDW2014{[Schema="dbo",Item="FactInternetSales"]}[Data],
    #"Changed Type" = Table.TransformColumnTypes(dbo_FactInternetSales,{{"OrderQuantity", Int64.Type}}),
    #"Removed Columns" = Table.RemoveColumns(#"Changed Type",{"DimCurrency", "DimCustomer", "DimDate(DueDateKey)", "DimDate(OrderDateKey)", "DimDate(ShipDateKey)", "DimProduct", "DimPromotion"}),
    #"Renamed Columns" = Table.RenameColumns(#"Removed Columns",{{"SalesOrderNumber", "Sales Order Number"}}),
    #"Merged Queries" = Table.NestedJoin(#"Renamed Columns", {"ProductKey"}, DimProduct, {"ProductKey"}, "NewColumn", JoinKind.LeftOuter),
    #"Expanded NewColumn" = Table.ExpandTableColumn(#"Merged Queries", "NewColumn", {"ListPrice"}, {"NewColumn.ListPrice"})
in
    #"Expanded NewColumn"
```

The status bar at the bottom left indicates: **No syntax errors have been detected.**

At the bottom right are the "Done" and "Cancel" buttons.

# Power BI Desktop: Creating a Data Model



# Creating a Data Model

- After data connections were created and data was shaped according to business requirements, we start modeling it
- Relationships between the extracted tables can be established to allow filtering
- Calculations can be created for additional context or for implementing business metrics or even key performance indicators
- Data can be categorized, typed and formatted
- Custom sorting can be implemented for the attributes

# Creating a Data Model



## Data View

The screenshot shows the Power BI Data View interface with the following elements highlighted:

- A**: Data View icon (highlighted in pink).
- B**: Data Grid – Shows the data for the selected table (highlighted in pink).
- C**: Modeling Ribbon – Manage relationships, calculations, data types, formats and categorization (highlighted in pink).
- D**: Formula bar – DAX formulas for calculations (highlighted in pink).
- E**: Search – Search for tables or column names (highlighted in pink).
- F**: Fields List – Select a table or column to view in the Data Grid (highlighted in pink).

The Data Grid displays the following table data:

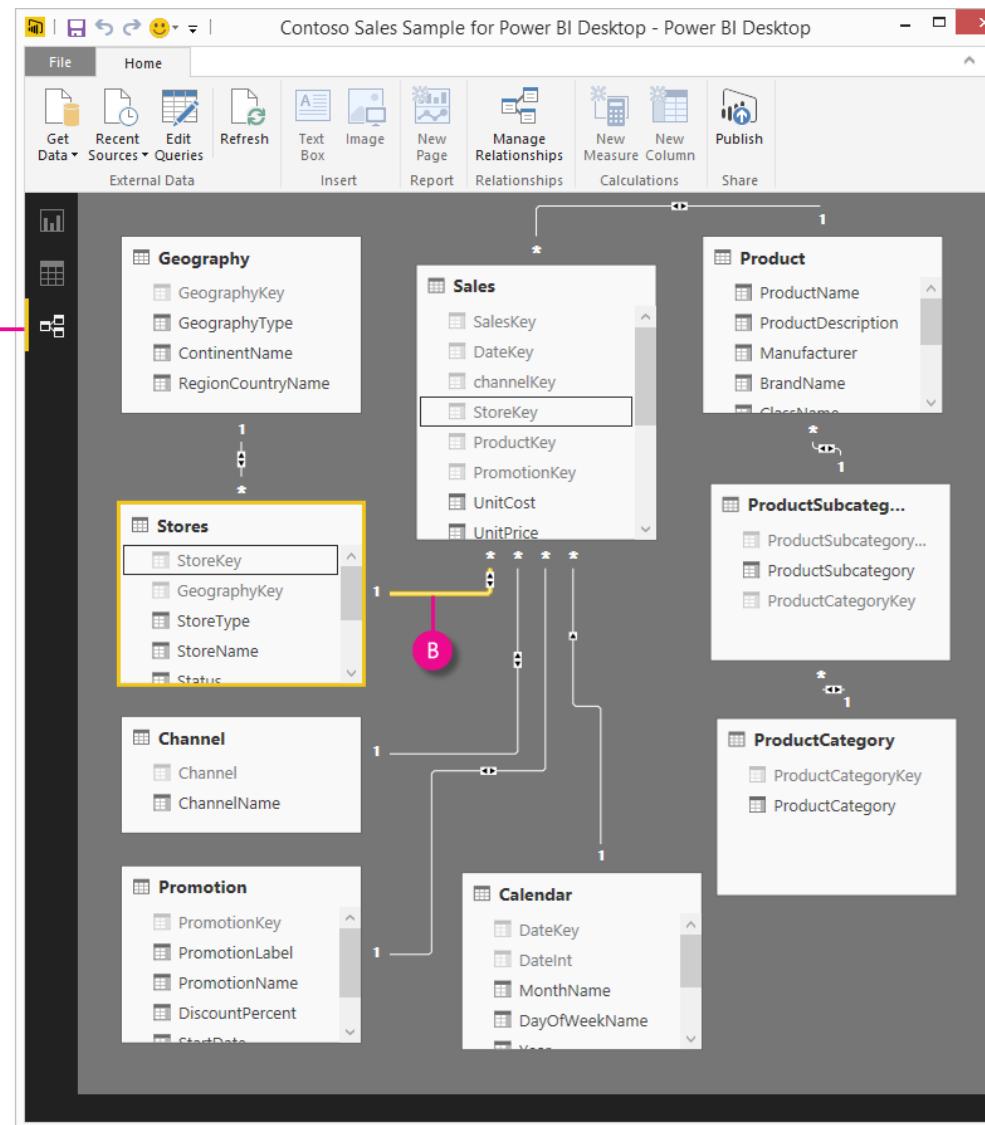
StoreKey	GeographyKey	StoreType	StoreName	Status	CloseReason	EmployeeCount
1	693	Store	Contoso Seattle No.1 Store	On		17
2	693	Store	Contoso Seattle No.2 Store	On		25
3	856	Store	Contoso Kennewick Store	On		26
4	424	Store	Contoso Bellevue Store	On		19
5	677	Store	Contoso Redmond Store	On		33
6	575	Store	Contoso Yakima Store	On		47
7	838	Store	Contoso Granger Store	On		22
8	935	Store	Contoso Sunnyside Store	On		17
9	941	Store	Contoso Toppenish Store	On		25
10	947	Store	Contoso Wapato Store	On		25
11	813	Store	Contoso Cle Elum Store	On		26
13	930	Store	Contoso Snoqualmie Store	On		33
14	825	Store	Contoso Fall City Store	On		47
15	678	Store	Contoso Renton Store	On		22
16	627	Store	Contoso Everett Store	On		17
17	551	Store	Contoso Spokane Store	On		25
18	944	Store	Contoso Veradale Store	On		26
20	824	Store	Contoso Englewood Store	On		33
21	950	Store	Contoso Wheat Ridge Store	On		47
22	571	Store	Contoso Westminster Store	On		22
23	836	Store	Contoso Grand Junction Store	On		17
24	887	Store	Contoso New Castle Store	On		25

TABLE: Stores (306 rows)

- A** Data View icon
- B** Data Grid – Shows the data for the selected table
- C** Modeling Ribbon – Manage relationships, calculations, data types, formats and categorization
- D** Formula bar – DAX formulas for calculations
- E** Search – Search for tables or column names
- F** Fields List – Select a table or column to view in the Data Grid

# Creating a Data Model

## Relationship View



**A** Relationship View icon – Shows the relationships in the model. Here you can create relationships or view them.

**B** Relationship – You can hover your cursor over a relationship to show the columns used.

Double-click on a relationship to open it in the **Edit Relationship** dialog box

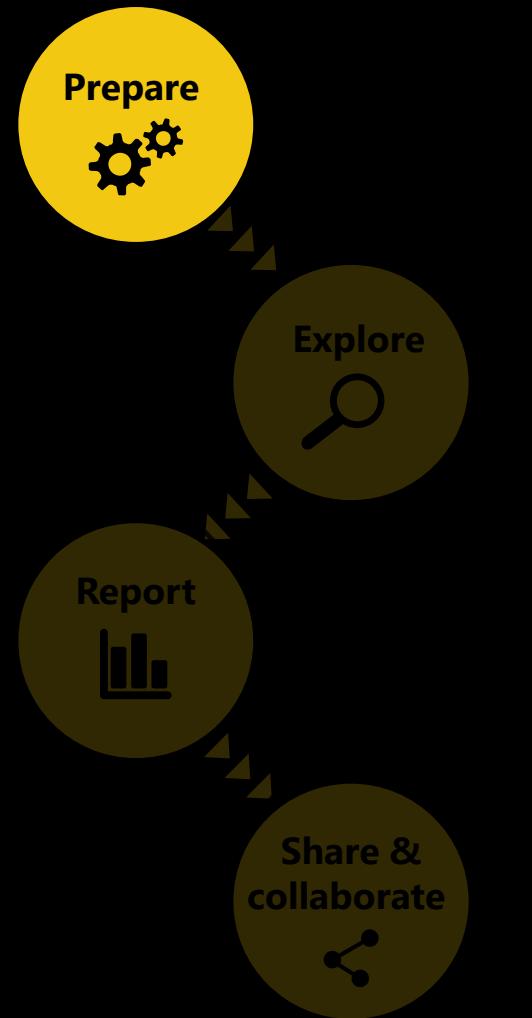
In the example, Sales and Stores have a relationship via StoreKey



# Creating a Data Model

## *Relationships*

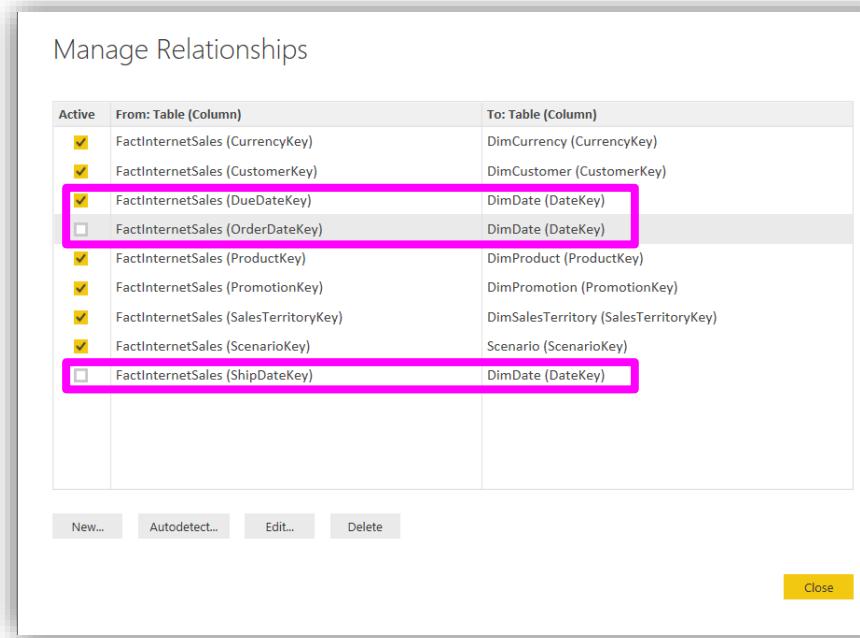
- They **connect two tables** allowing filtering and calculations that leverage columns from both. **No need to flatten!**
- They are based on a **single column** from **each table**. One table acts as a lookup table and the other as a referencing table
- The **datatypes** for the columns do not have to be the same
- Relationships can be **created manually** or automatically inferred by the tool
- More than one relationship can exist between two tables



# Creating a Data Model

*Relationships – Active and Inactive*

- It is possible to control what relationship is active via the Manage Relationships window

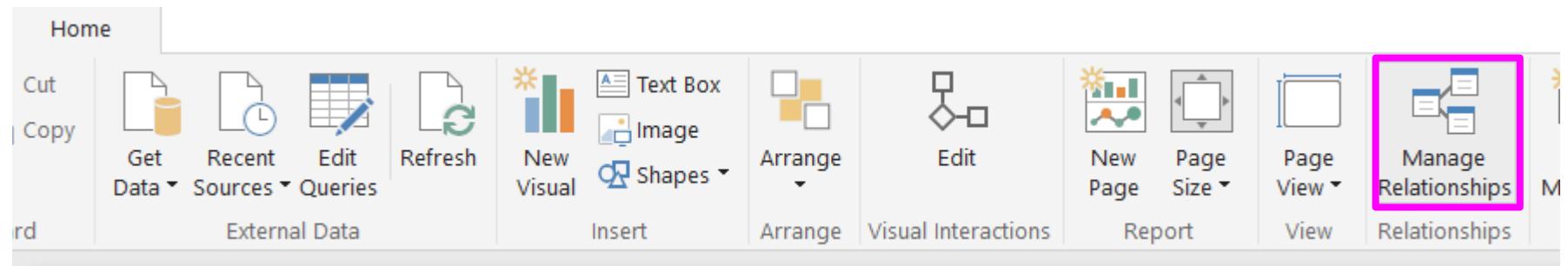


- It is also possible to use DAX to activate a relationship in a calculation or import the lookup table more than once.

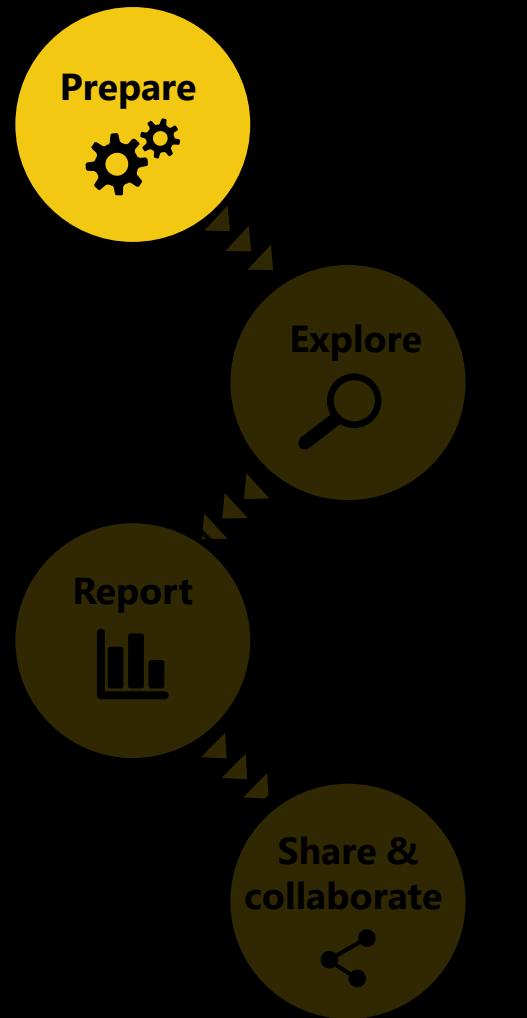
# Creating a Data Model

## *Relationships – Creation*

- Relationships can be created manually via the **Manage Relationships** tab.



- Or by dragging-and-dropping in the Relationship Viewer
- There is also an **auto-detect** feature where Power BI desktop will rely on **column names and data types** (or constraints defined in the data source) to detect relationships.

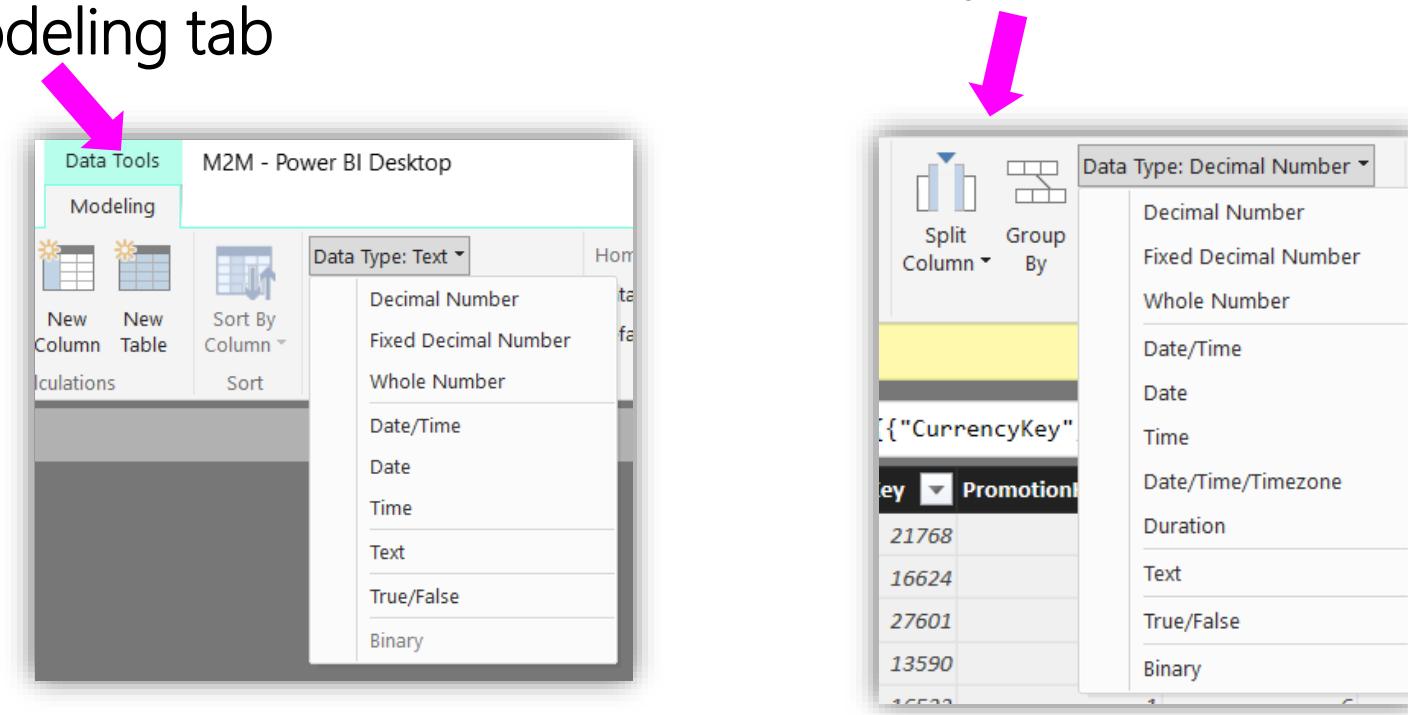




# Creating a Data Model

## Data Types

- Power BI Desktop **optimizes data types automatically** when loading the data for more efficient storage, calculations and data visualization
- Data types can be **set** both at the **Query Editor** and in the **Modeling tab**





# Creating a Data Model

## *Data Categorization*

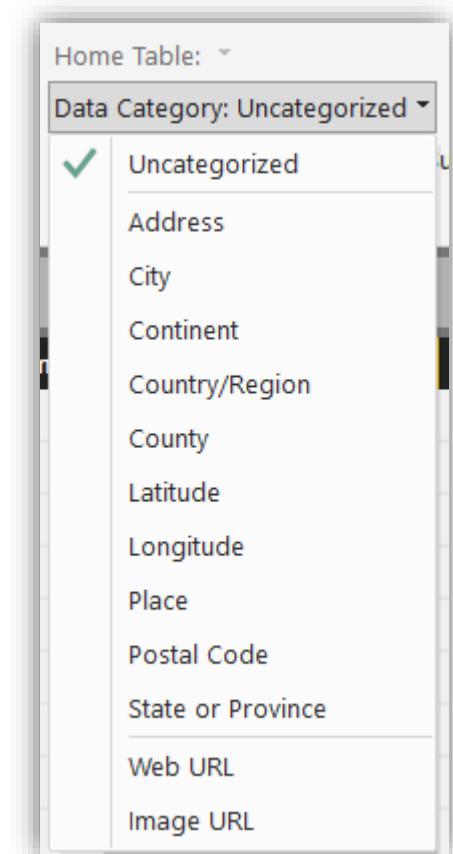
- Categorizing fields is **relevant** for **geographical** fields or for **image** or **URL** fields

GeoCode	Sales Amount
AL	\$ 10,175,870.00
AR	\$ 4,351,530.00
AZ	\$ 6,114,241.00
CA	\$ 6,688,589.00
KY	\$ 53,832,611.00

Am I seeing country sales or US states' sales?

Is AL, Albania or Alabama? Or, is AR, Argentina or Arkansas?

- In the modeling tab a field can be classified at a certain **geographical** granularity or as an **image** that comes from an **URL** or a text field which is actually an **URL**.
- Power BI desktop will render data based on this categorization

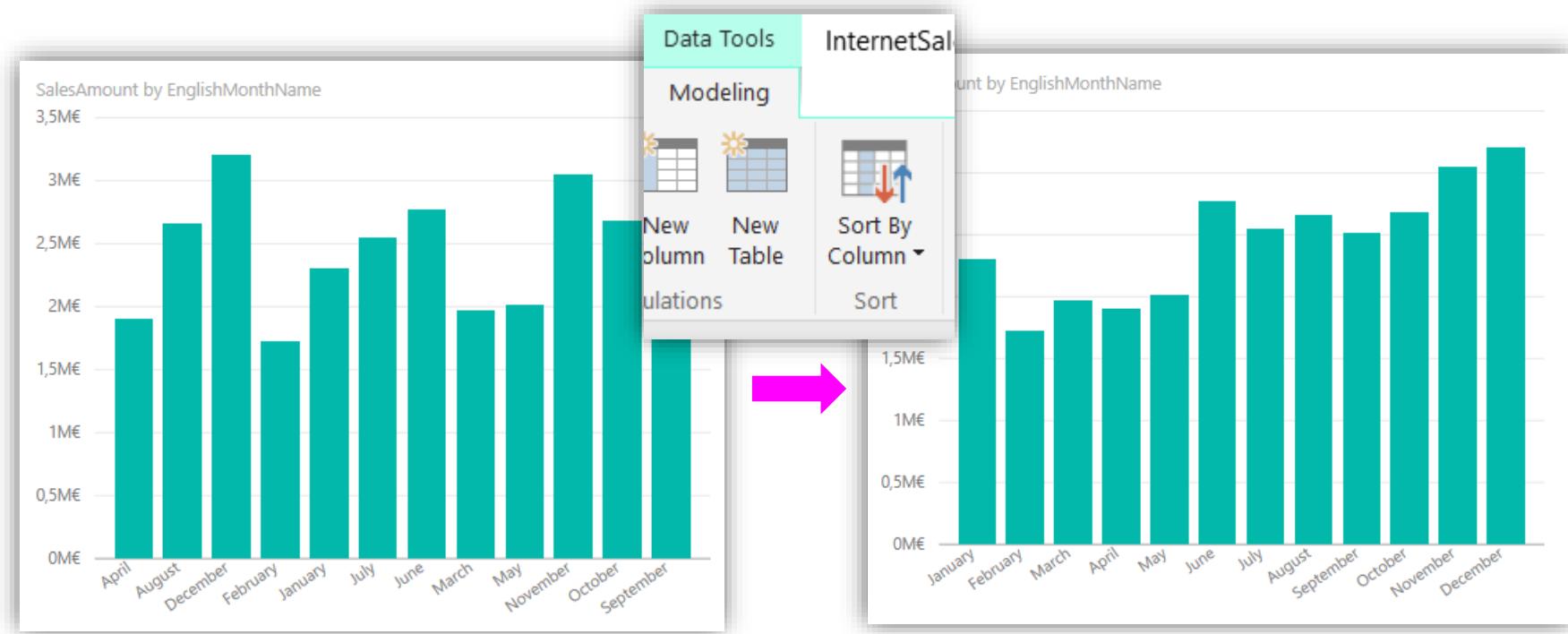




# Creating a Data Model

## *Sorting by Column*

- By default, Power BI desktop will sort data in a column based on the alphabet
- It is possible to use a separate column to determine sorting

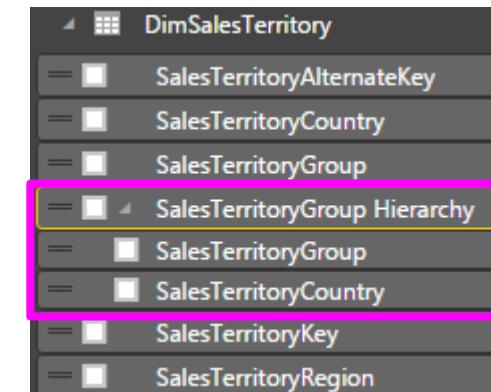
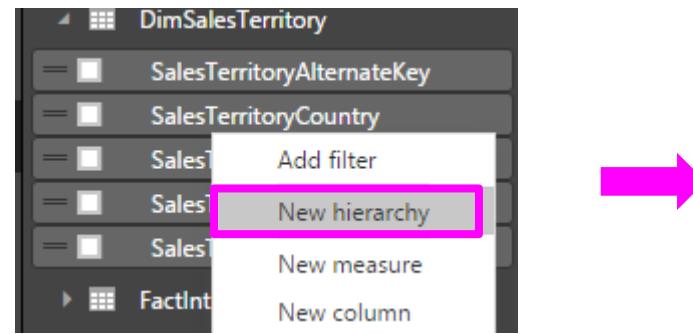


# Creating a Data Model

## Hierarchies



- Can be created in the Data View



- They must use attributes from a single entity
- Can be used in the different visualizations, allowing drilling
- Imported Power Pivot models or connected to SSAS models with hierarchies are also usable.

# Power BI Desktop: Calculations



# Calculations

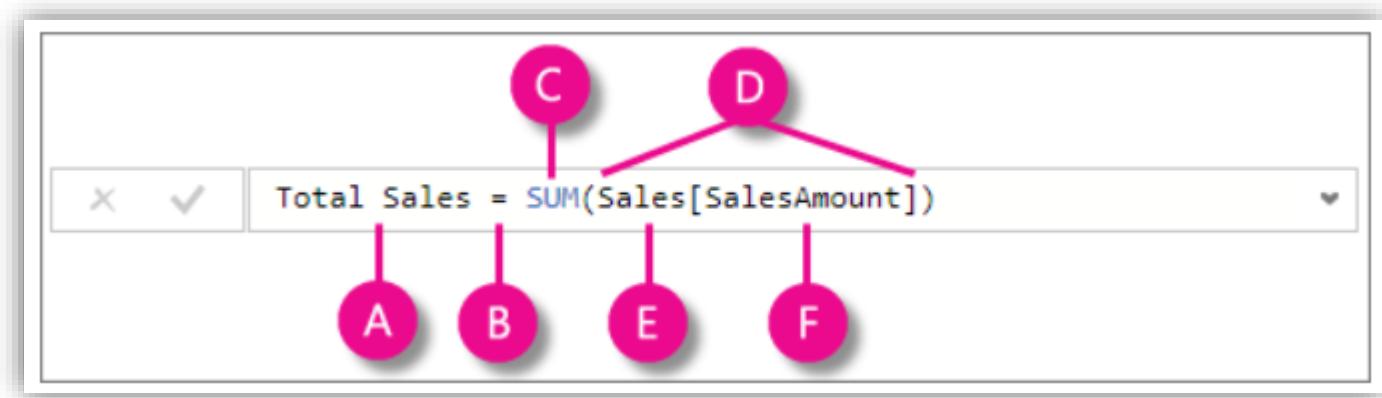
## *DAX Basics*

- Excel like Language that allows the **extension** of the model with additional business logic
- Ideal for **complex calculations** such as time intelligence, growth formulas, ratios and more complex KPIs
- Business rules can be materialized at the row level (Calculated Column) or can be calculated on-the-fly (Measures)
- Certain capabilities might overlap with Formula Language



# Calculations

## DAX Basics - Syntax



- A** An expression always **starts** with the name of the calculation
- B** The **equal sign** indicates the **beginning** of the formula
- C** A function or a combination of functions is applied which will **return** a value
- D** The **arguments** of the function (can be a reference to columns or additional functions)
- E** The **table** that is being referenced
- F** The **column** that is being referenced for the specified table



# Calculations

## DAX Basics - Functions

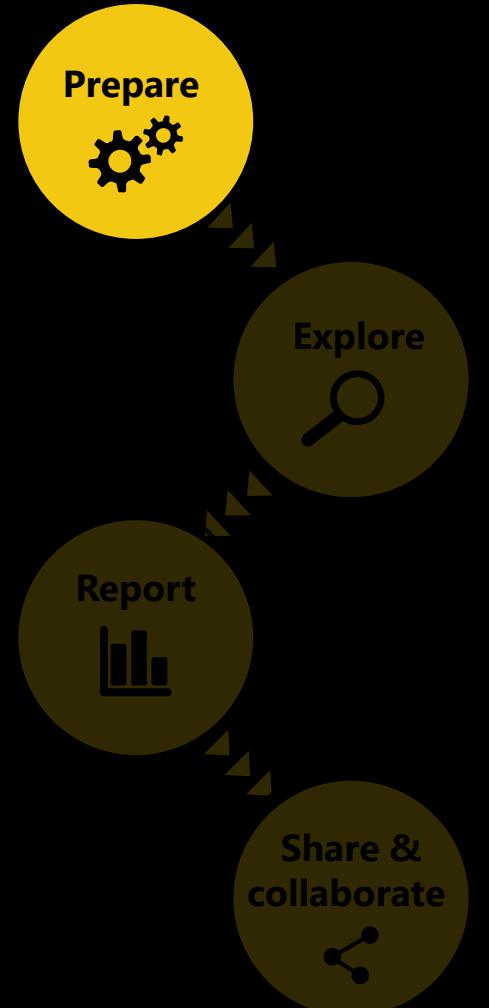
- A function always **references a column or a table**. Filters can be added to filter context of evaluation
- A function **always returns a value or a table**. When a table is returned, further functions should be applied to obtain a value

```
Total Sales Amount Current = CALCULATE(SUM(FactInternetSales[SalesAmount]);FILTER(DimCustomer;DimCustomer[NumberCarsOwned]<3))
```

- Several **time intelligence** functions exist out of the box

```
Total Sales Amount = CALCULATE([Total Sales Amount Current];DATESYTD(DimDate[FullDateAlternateKey]))
```

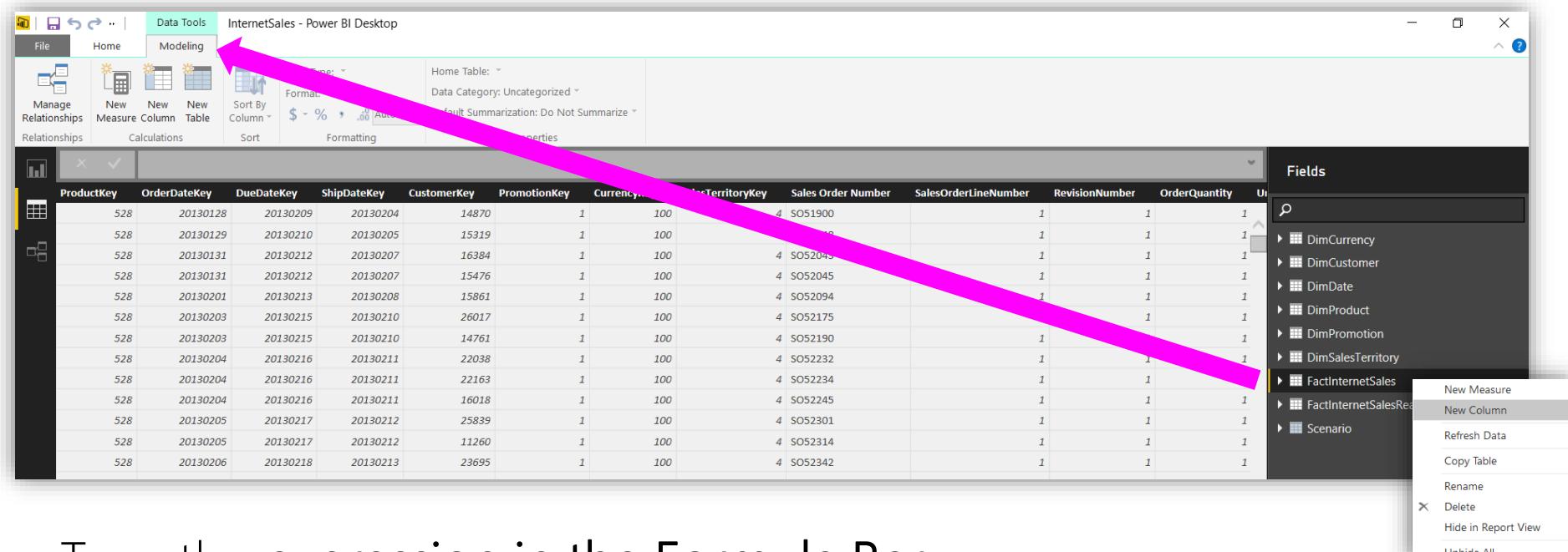
- Some **Excel functions** are also valid (like MONTH, FLOOR...)
- Full **reference** of available functions here:  
<https://msdn.microsoft.com/en-us/library/ee634396.aspx>



# Calculations

## DAX Basics – Creating Calculations

- Select the **Data View** and then the **Modeling** tab for the target **table** (or with the table contextual menu)



- Type the **expression** in the **Formula Bar**

Total Sales Amount = `SUM(FactInternetSales[SalesAmount])`



# Calculations

## Measures

- Measures are **calculated** when they are used in a particular visualization
- And they can also be calculated on a row-by-row basis
- They can be **implicit** – an aggregation of a field with “Default Summarization” different from “Do Not Summarize”  
 $\Sigma$  SalesAmount
- They can be **explicit**, where they are the result of a DAX expression. You cannot control the aggregation for this type.  
Total Sales Amount



# Calculations

## Measures

- They can (and should) be **referenced from other measures** – this is a best practice
- Measures are **evaluated for each cell** they appear in (Filter Context)

Gender		
F	M	
		Average Sales per Transaction ▾
2011	Reseller	2,887 €
2012	Reseller	1,857 €
2011	No Discount	1,827 €
2013	Reseller	1,605 €
2012	No Discount	1,240 €
2013	No Discount	1,166 €
Total		1,326 €

CalendarYear=2012  
Promotion="Reseller"  
Gender="M"

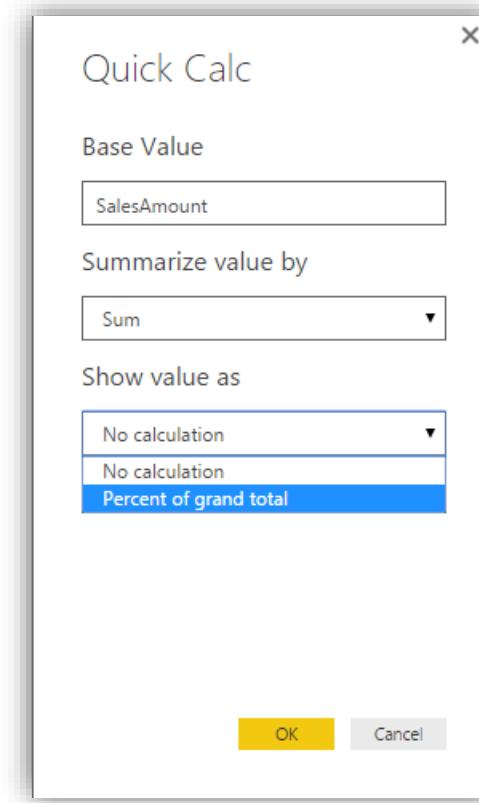
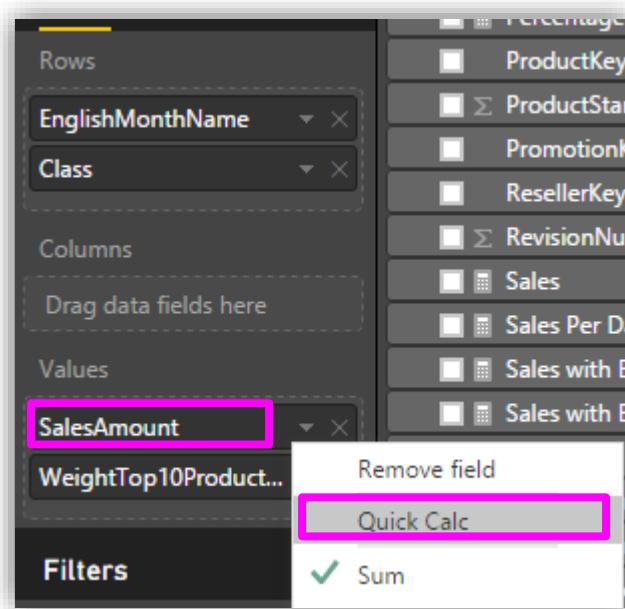
The total is also calculated independently. It is not an aggregation of the rows.



# Calculations

## Quick Calcs

- Out-of-the-box calculations that can be applied without coding
- Accessible via field well, you can change how a measure is displayed





# Calculations

## Advanced Calculations

- `CALCULATE(<measure expression>, <filter1>, <filter2>, ...)` allows us to change the filter context

No Discount Sales =

```
CALCULATE (
    SUM ( FactResellerSales[SalesAmount] ),
    DimPromotion[EnglishPromotionName] = "No Discount"
)
```

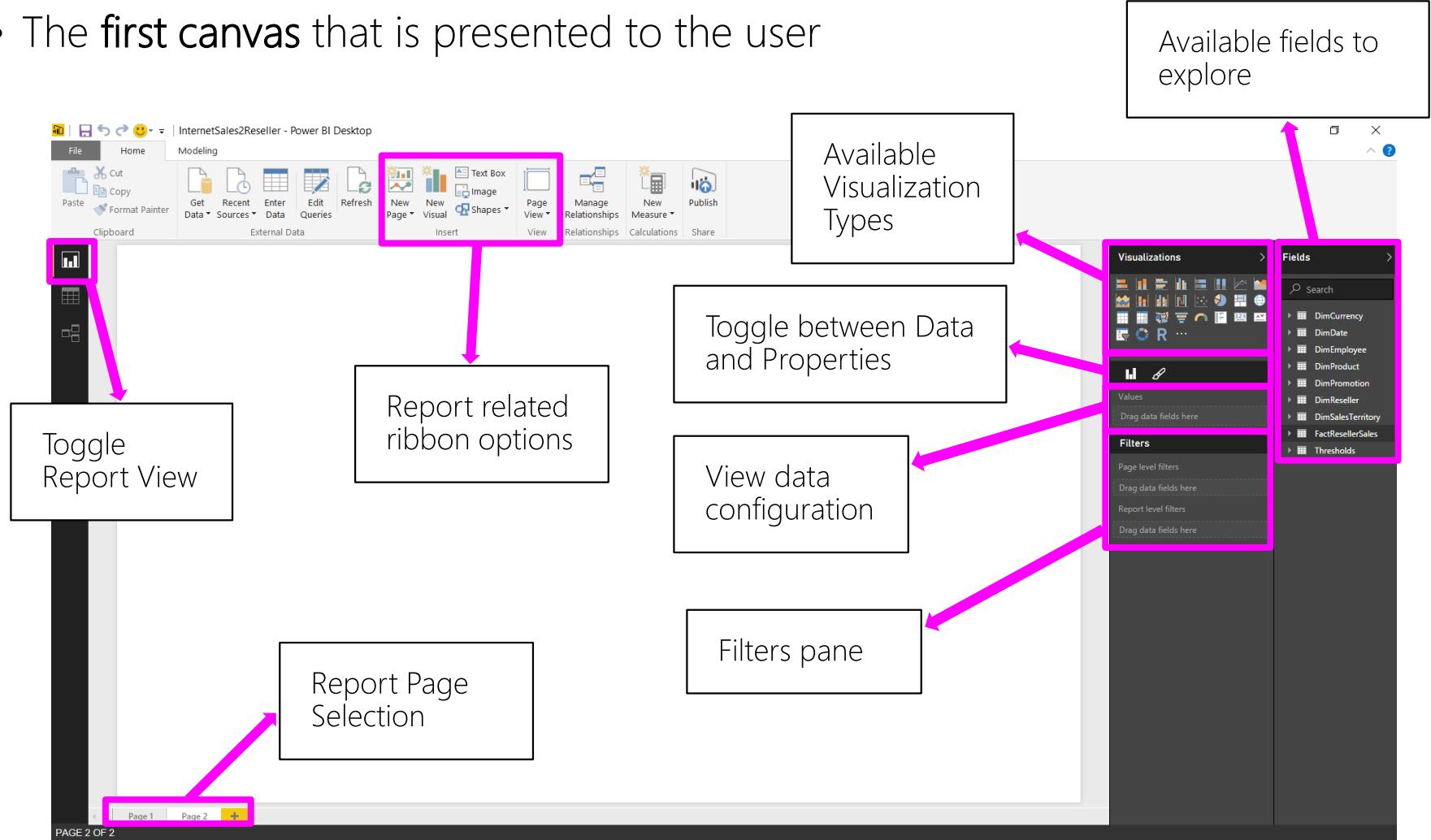
CalendarYear	EnglishPromotionCategory	No Discount Sales	SalesAmount
2011	No Discount	15,772,060 €	15,772,060 €
2011	Reseller		516,381 €
2012	No Discount	26,609,942 €	26,609,942 €
2012	Reseller		1,311,727 €
2013	No Discount	32,645,904 €	32,645,904 €
2013	Reseller		3,594,579 €
<b>Total</b>		<b>75,027,907 €</b>	<b>80,450,596 €</b>

# Power BI Desktop: Building a Report

# Report View



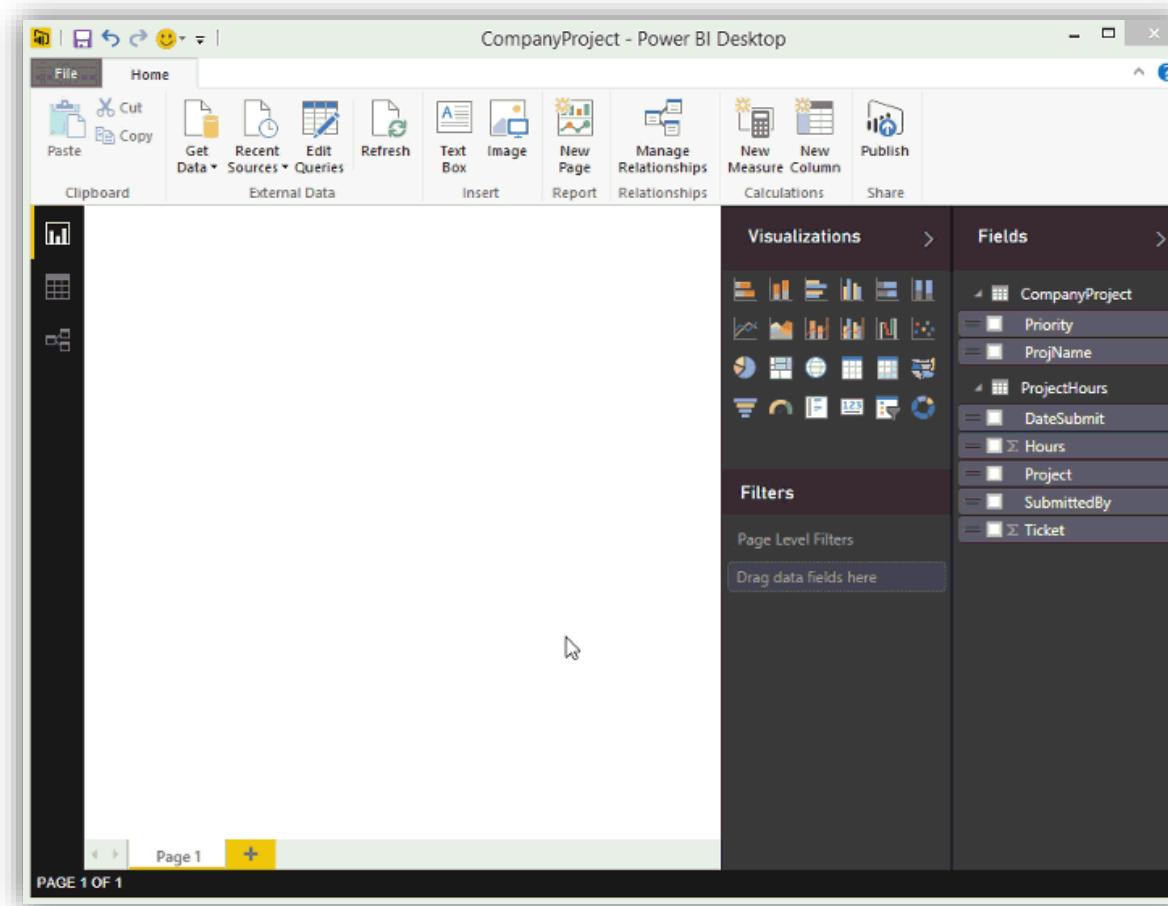
- The **first canvas** that is presented to the user



# Report View



- Use drag-and-drop and search to build your analysis like a pivot table in Excel



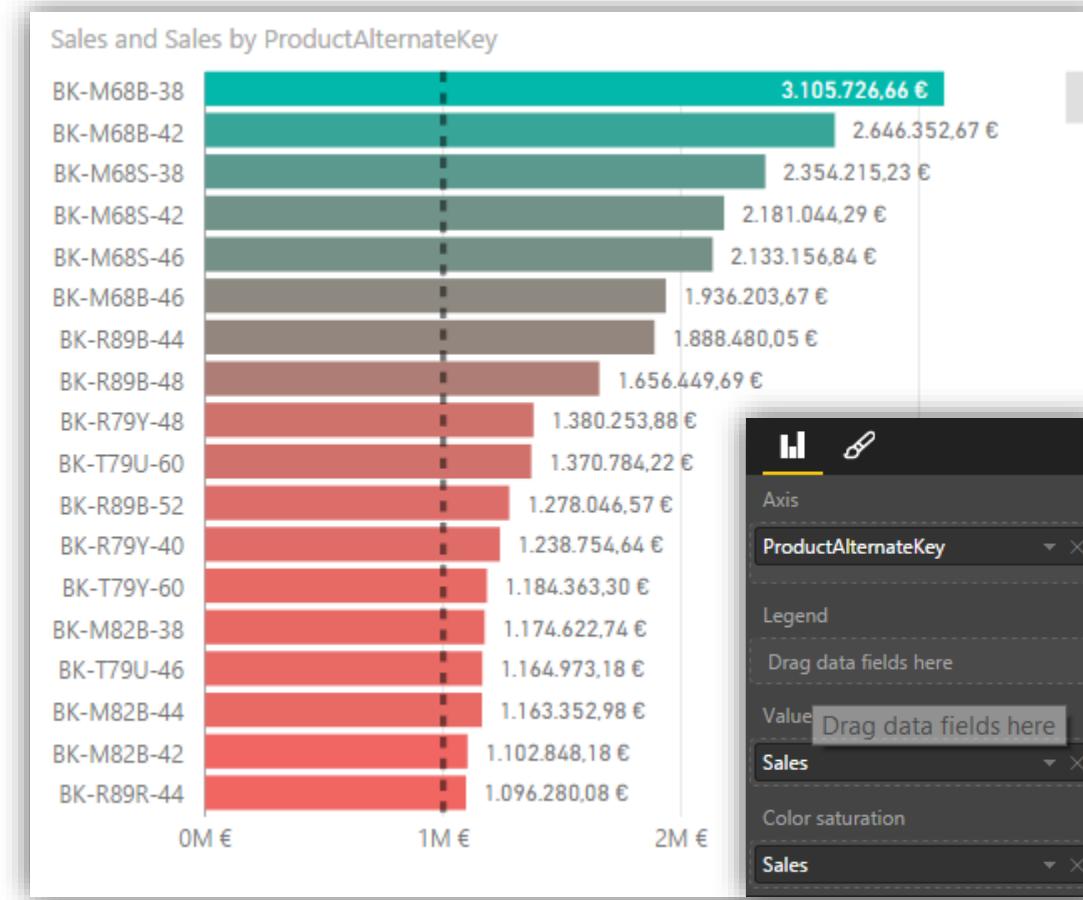


# Building a Report - Visualisations

- Several visualizations exist out-of-the box and developed by 3<sup>rd</sup> party
- Choose the one that **best conveys** your message
- New visualizations are **released frequently**
- Change **easily** between visualizations
- Each visualization has its **own data settings** and properties
- Fine control on **display settings**

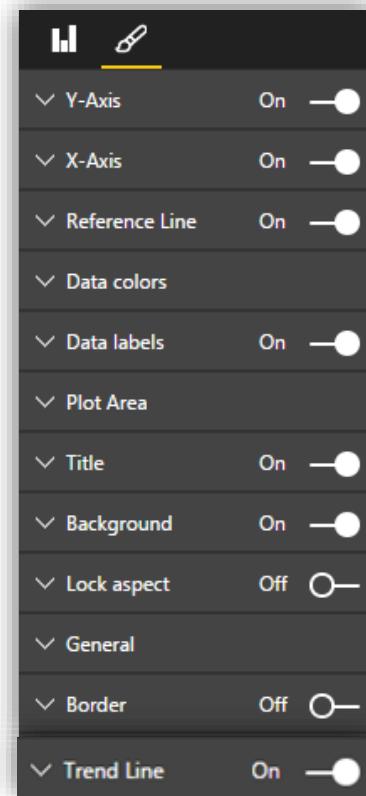


# Visualisations - Clustered Bar Chart



- Allows several items on Axis to enable drill
- Legend will cluster many values per Axis item
- Value will provide the size of the bar
- Color Saturation allows a third dimension on the data

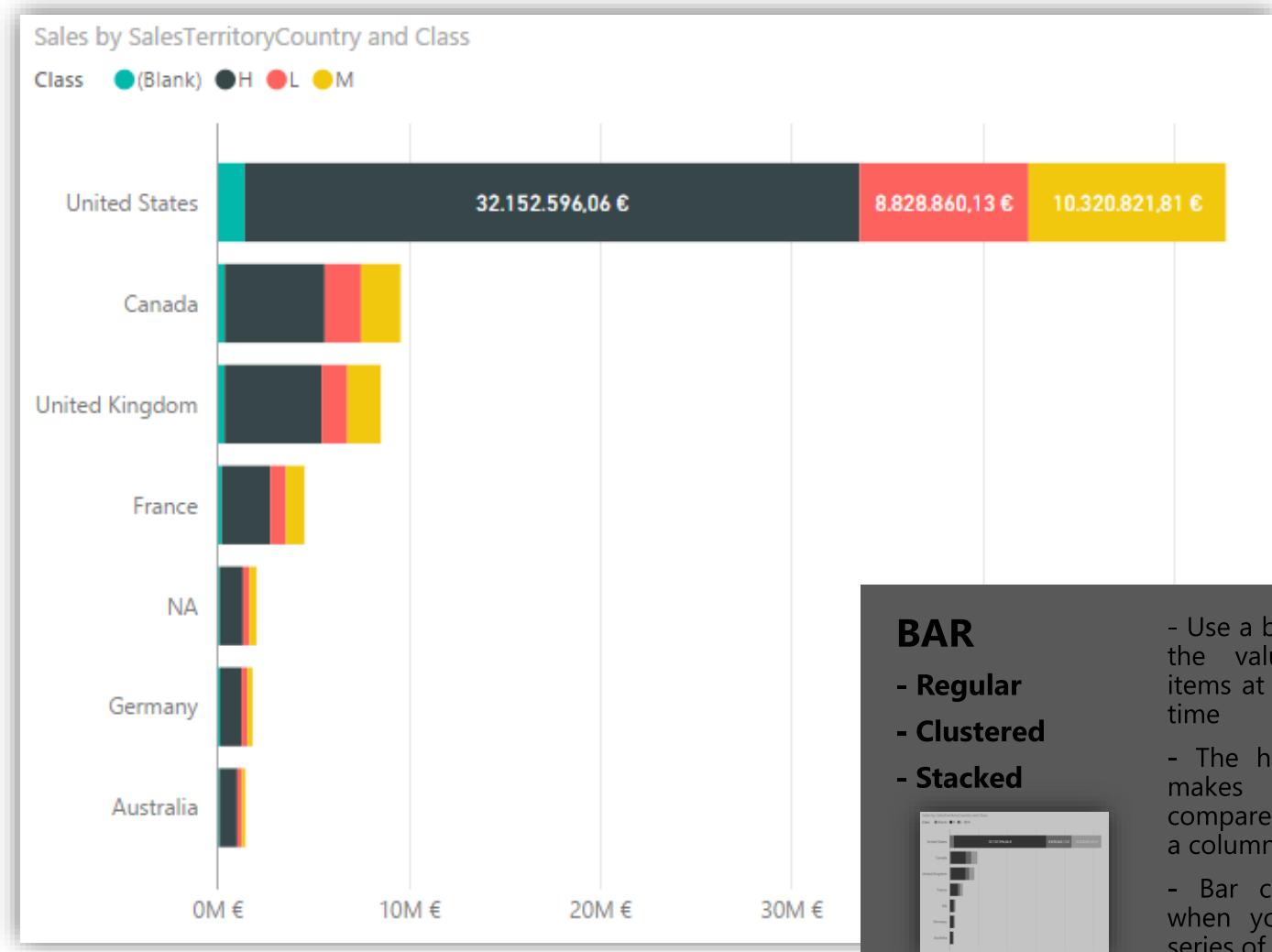
# Visualisations - Properties



- Enables the X/Y-Axis, control alignment, title and color and scale (Y - linear/log)
- Enables a reference line for a particular value and with formatting options
- Granular control on the color of each axis occurrence
- Display the values associated to a series. Control the unit, color and font
- Plot area formatting, namely define an image as background
- Enable the title and format it
- Enable a background color and define transparency
- Lock the current aspect
- Pixel level control of placement and size
- Enable a border and control its color
- Enable a trend line

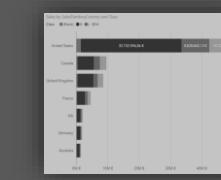
\* Properties might vary, depending on visualization.

# Visualisations - Stacked Bar Chart



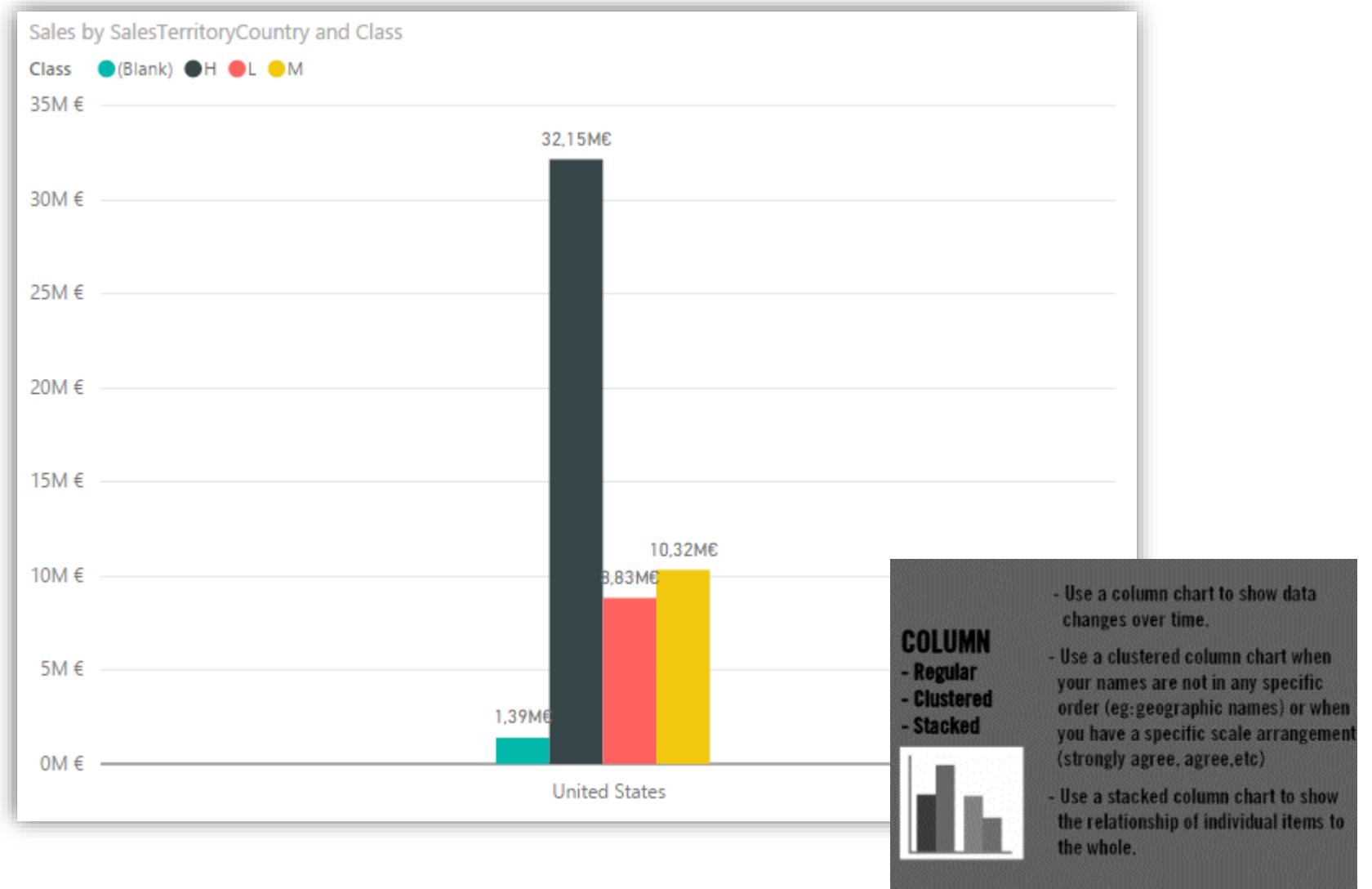
## BAR

- Regular
- Clustered
- Stacked

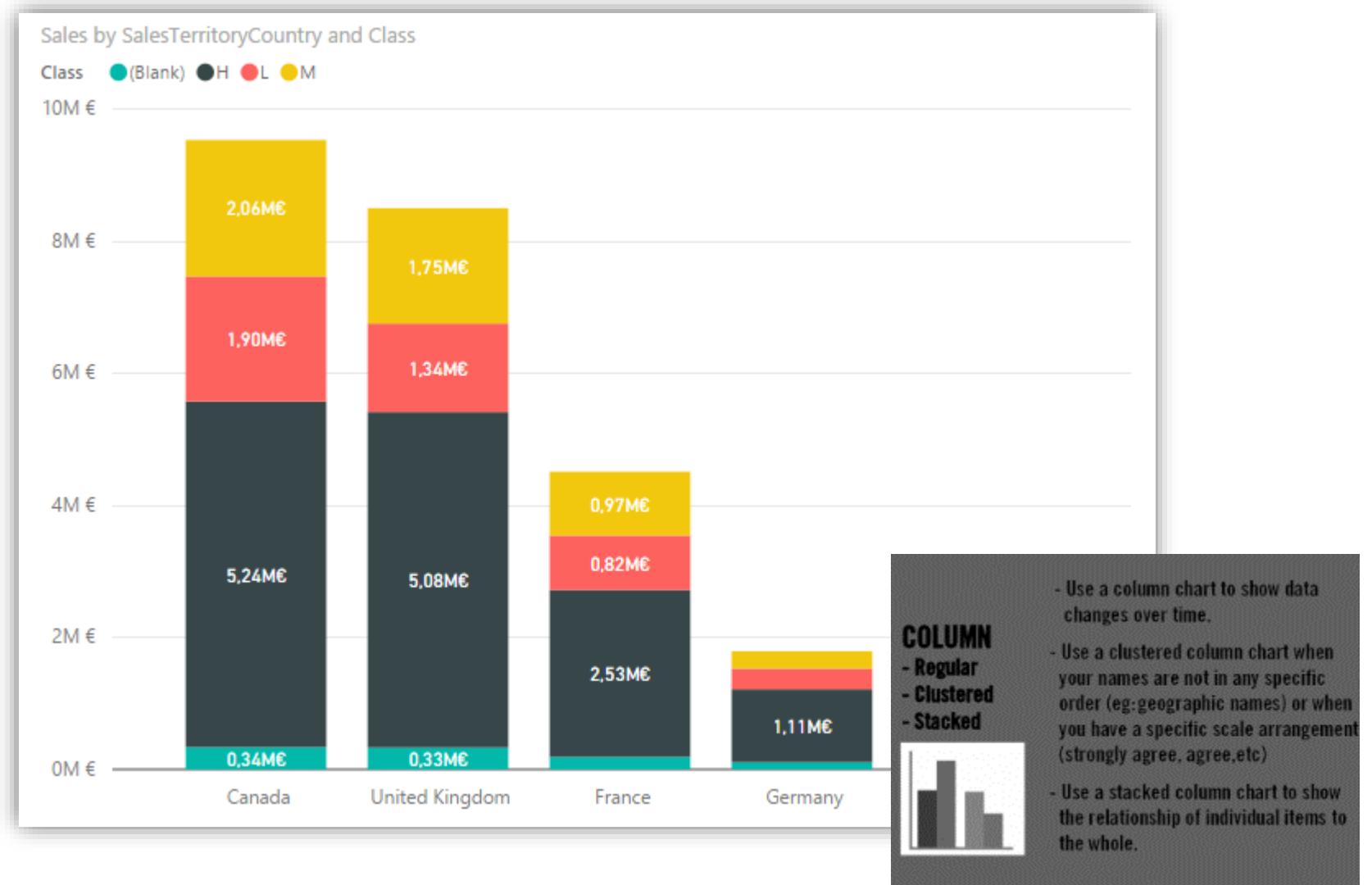


- Use a bar chart to show the values of several items at a single point in time
- The horizontal format makes it easier to compare the values than a column chart
- Bar charts are good when you have a long series of labels

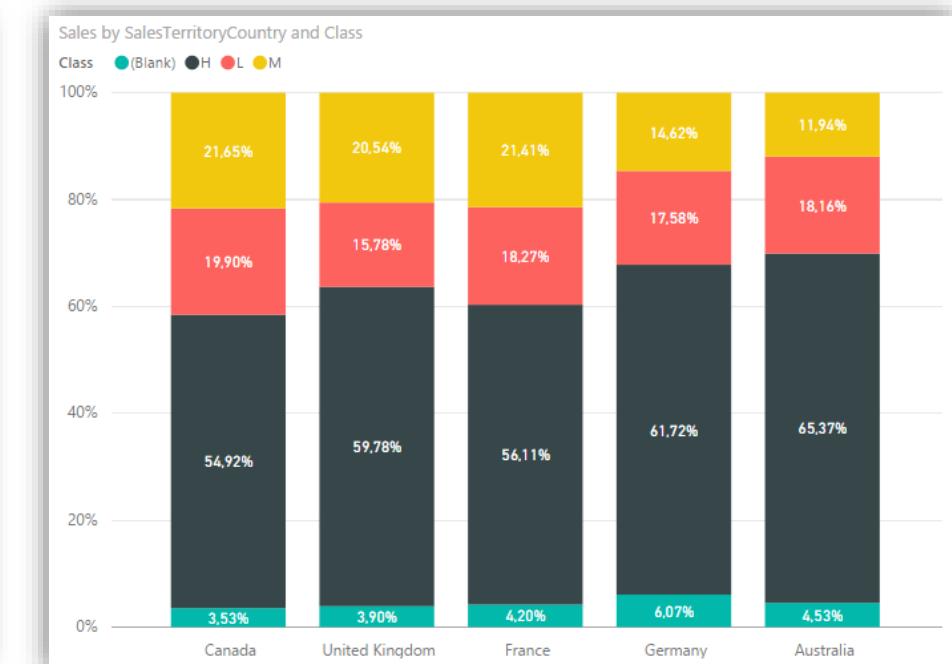
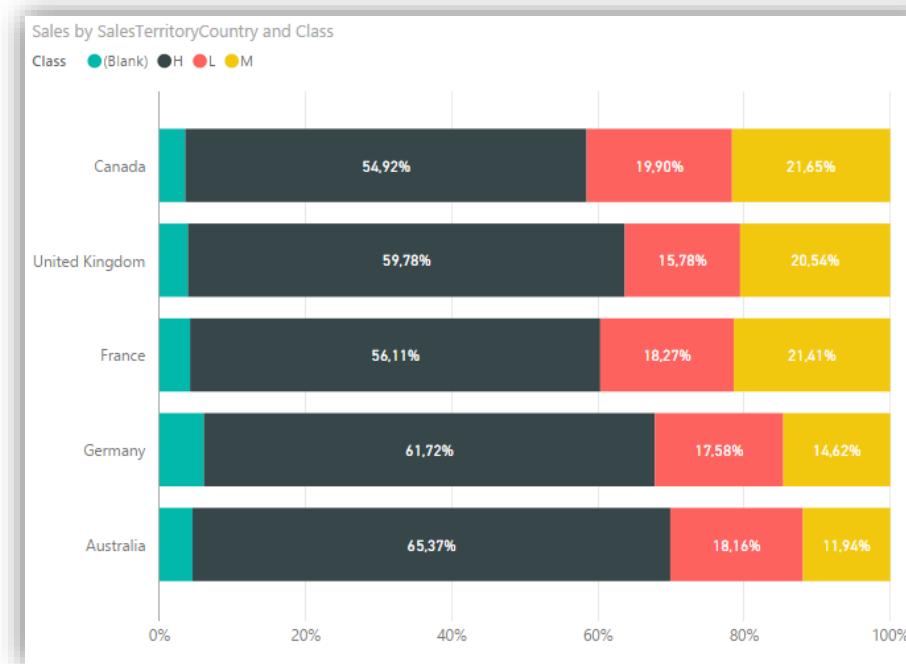
# Visualisations - Clustered Column Chart



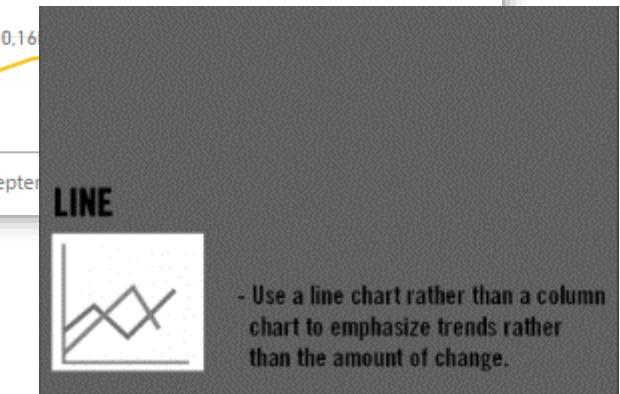
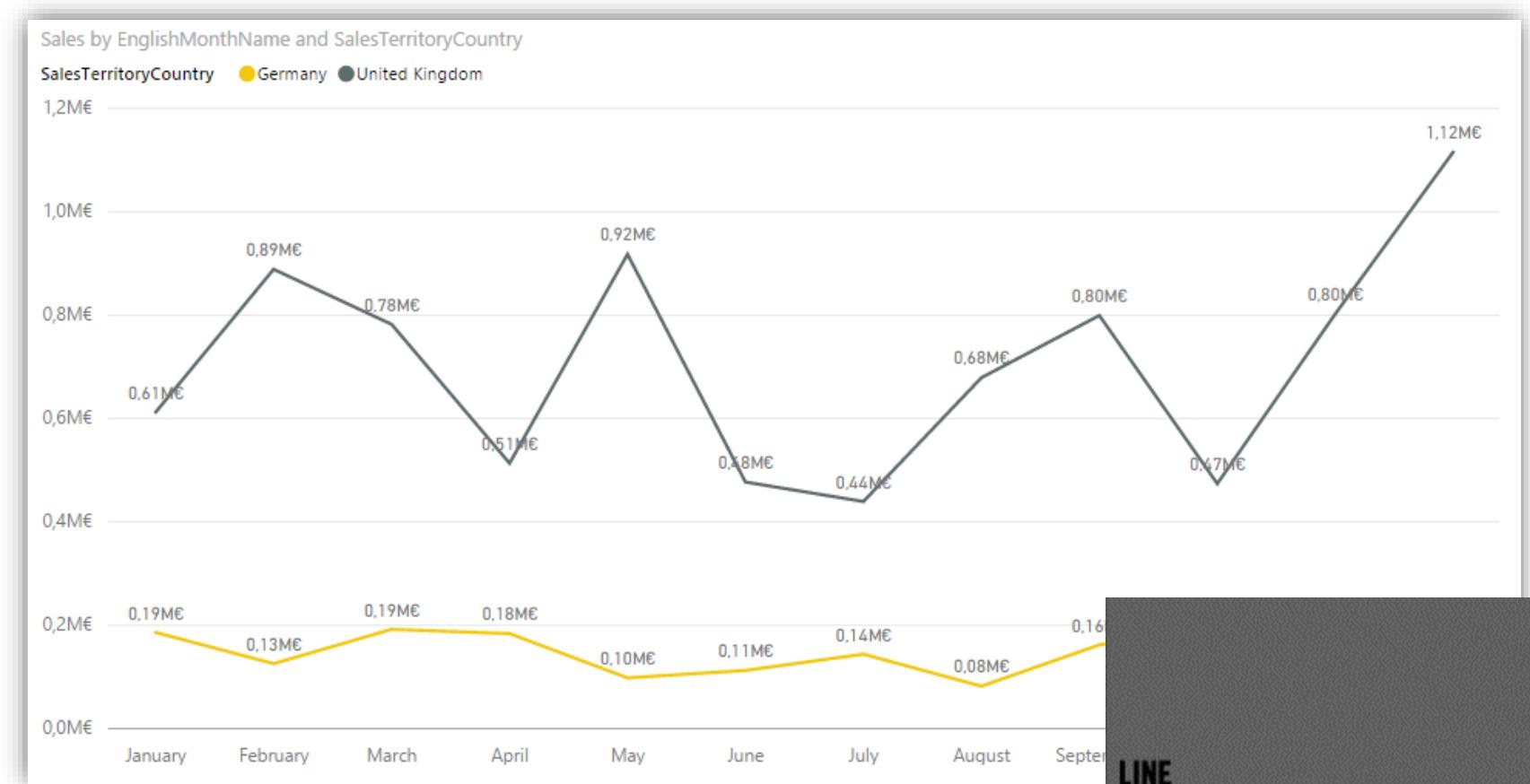
# Visualisations - Stacked Column Chart



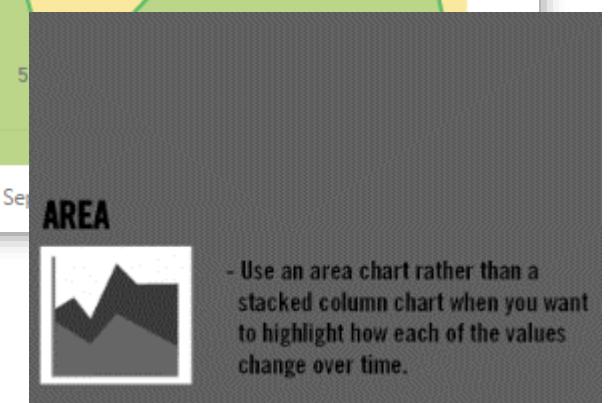
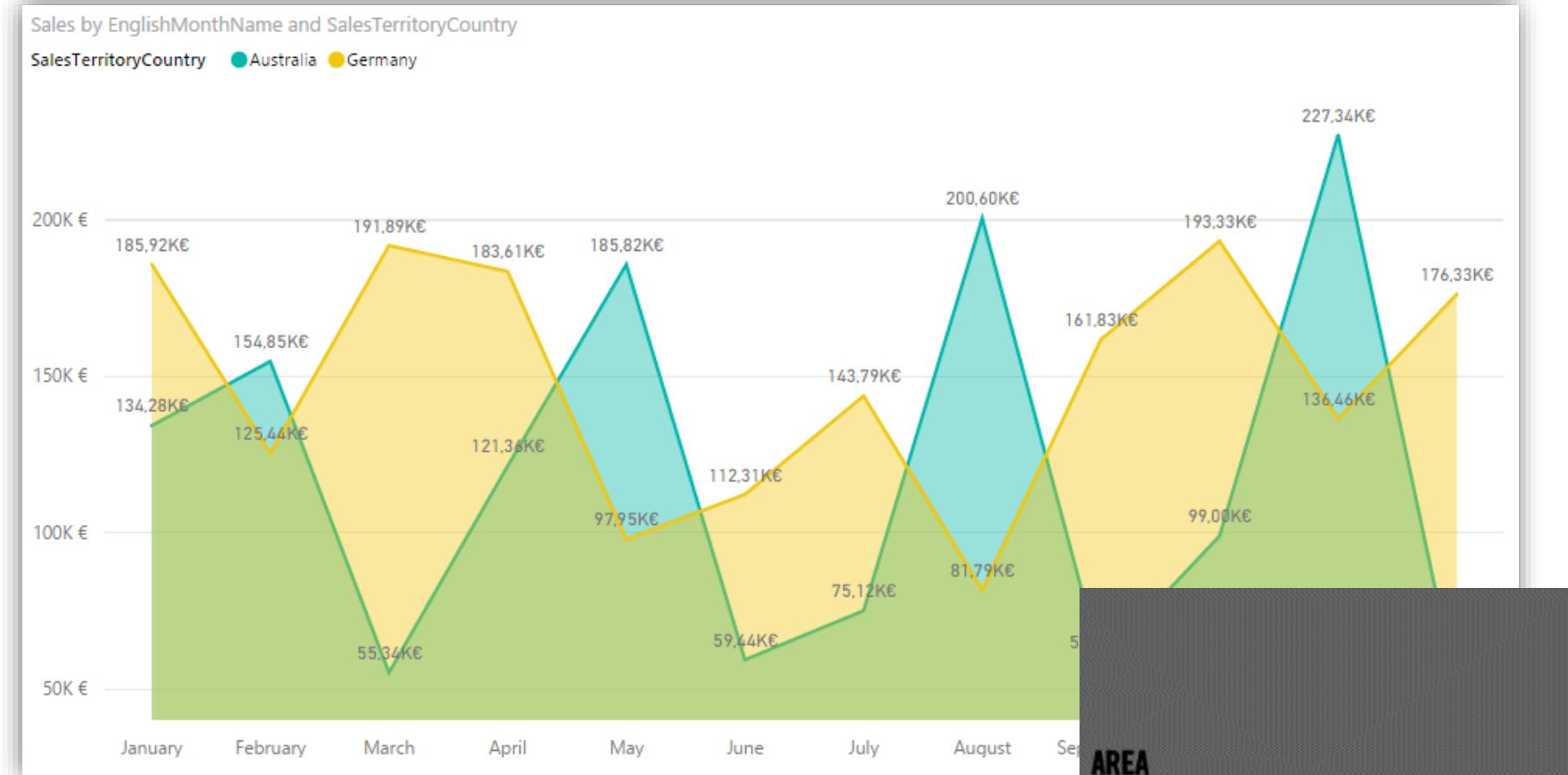
## Visualisations - 100% Stacked Bar and Column Chart



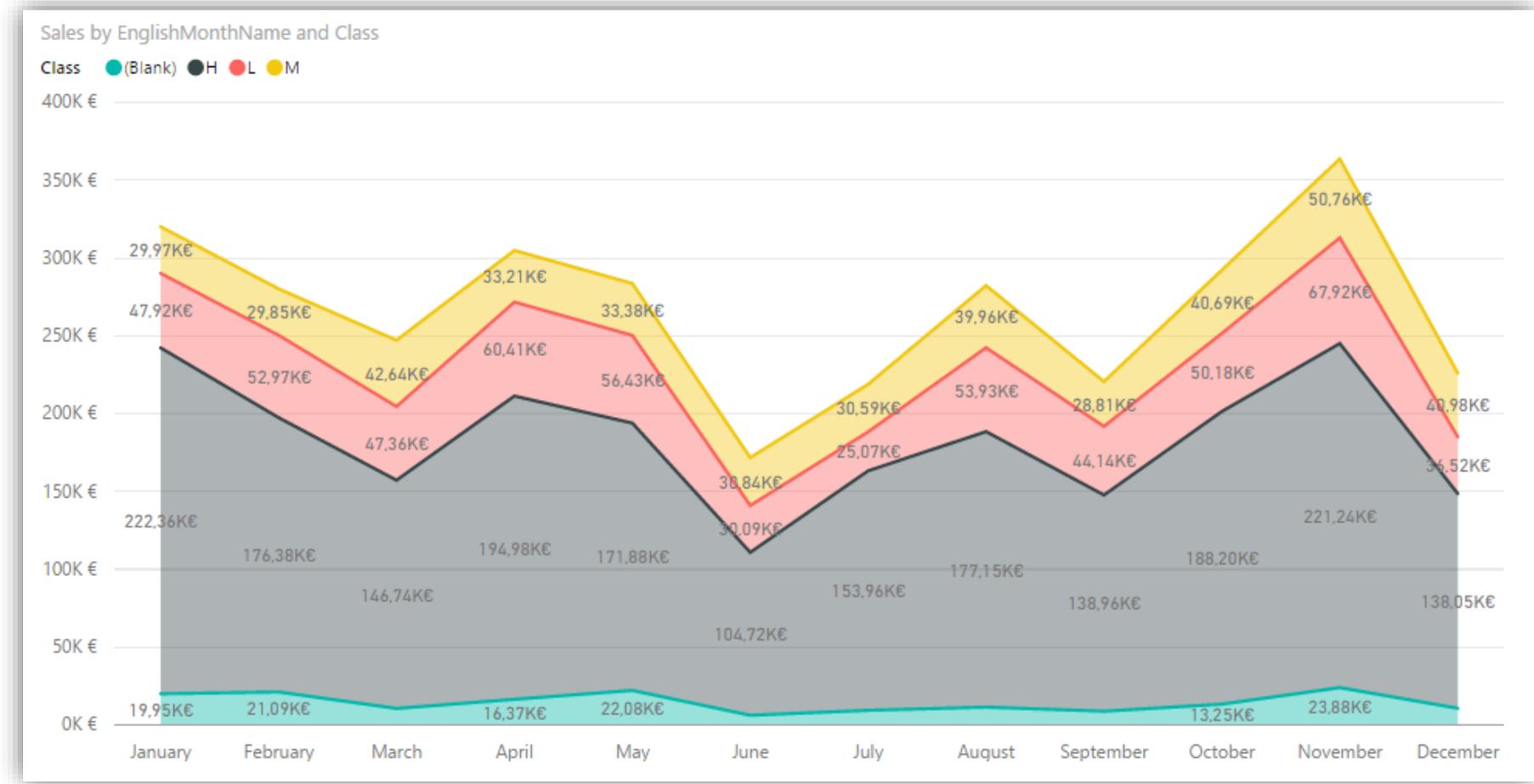
# Visualisations - Line Chart



# Visualisations - Area Chart



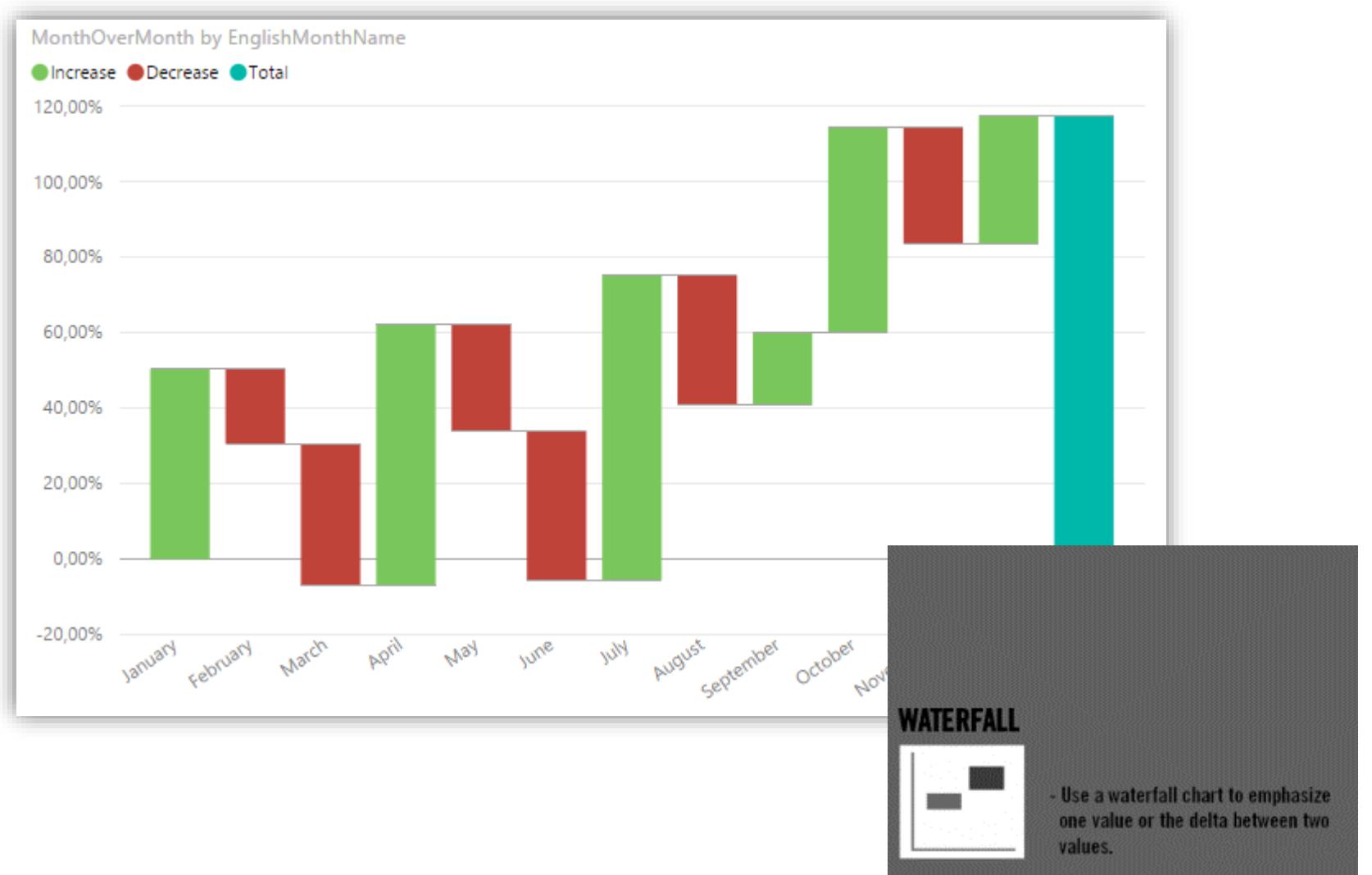
# Visualisations – Stacked Area Chart



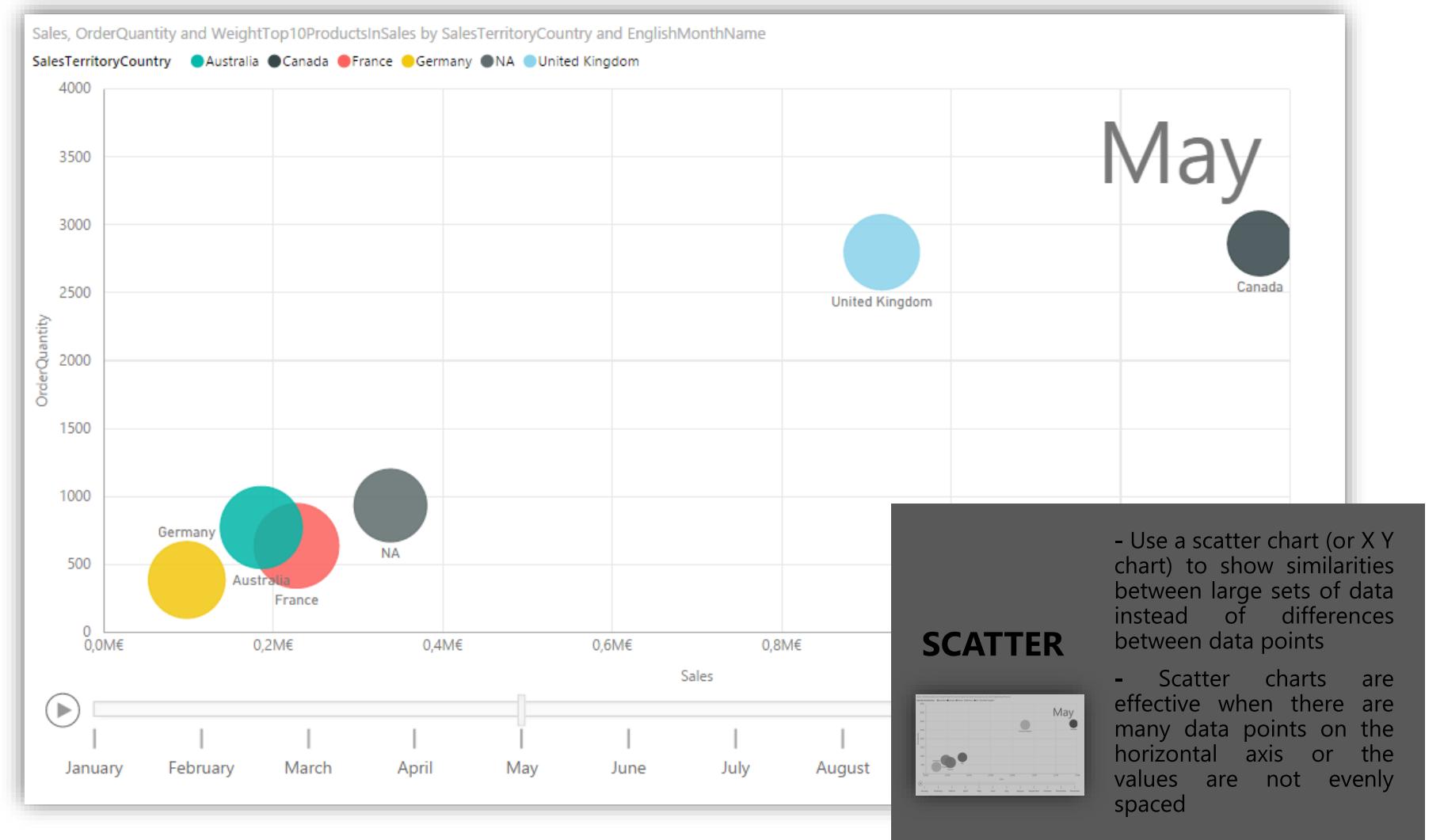
## Visualisations – Stacked and Clustered Bar and Line Area Chart



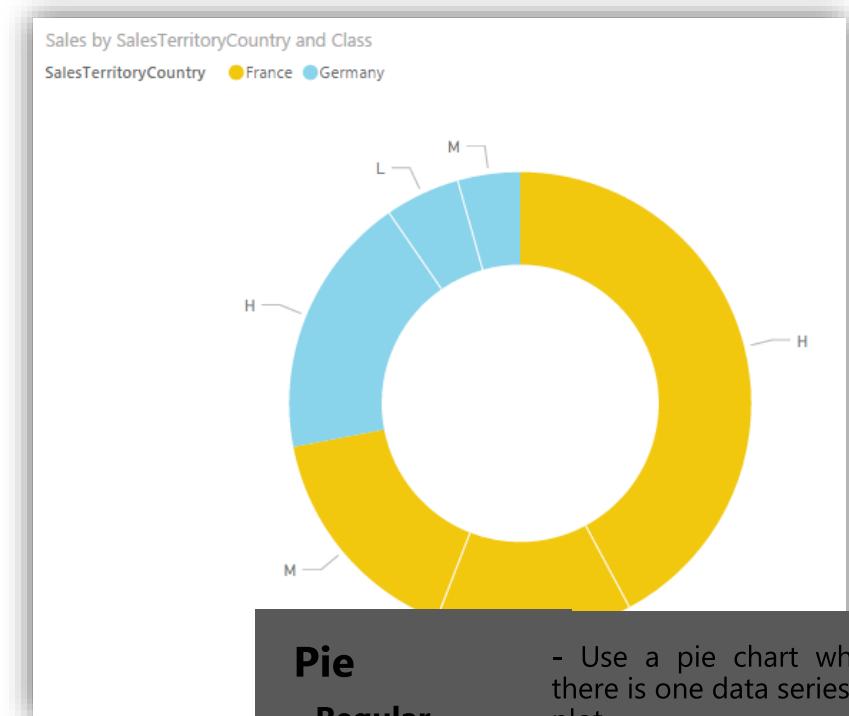
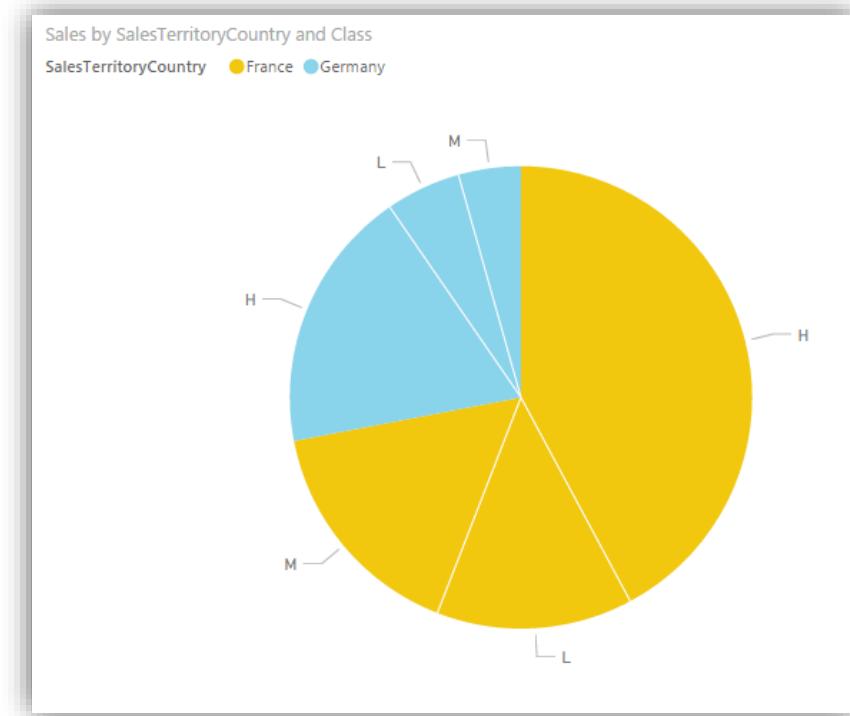
# Visualisations – Waterfall Chart



# Visualisations – Scatter Chart

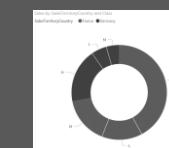


# Visualisations – Pie and Donut Chart



## Pie

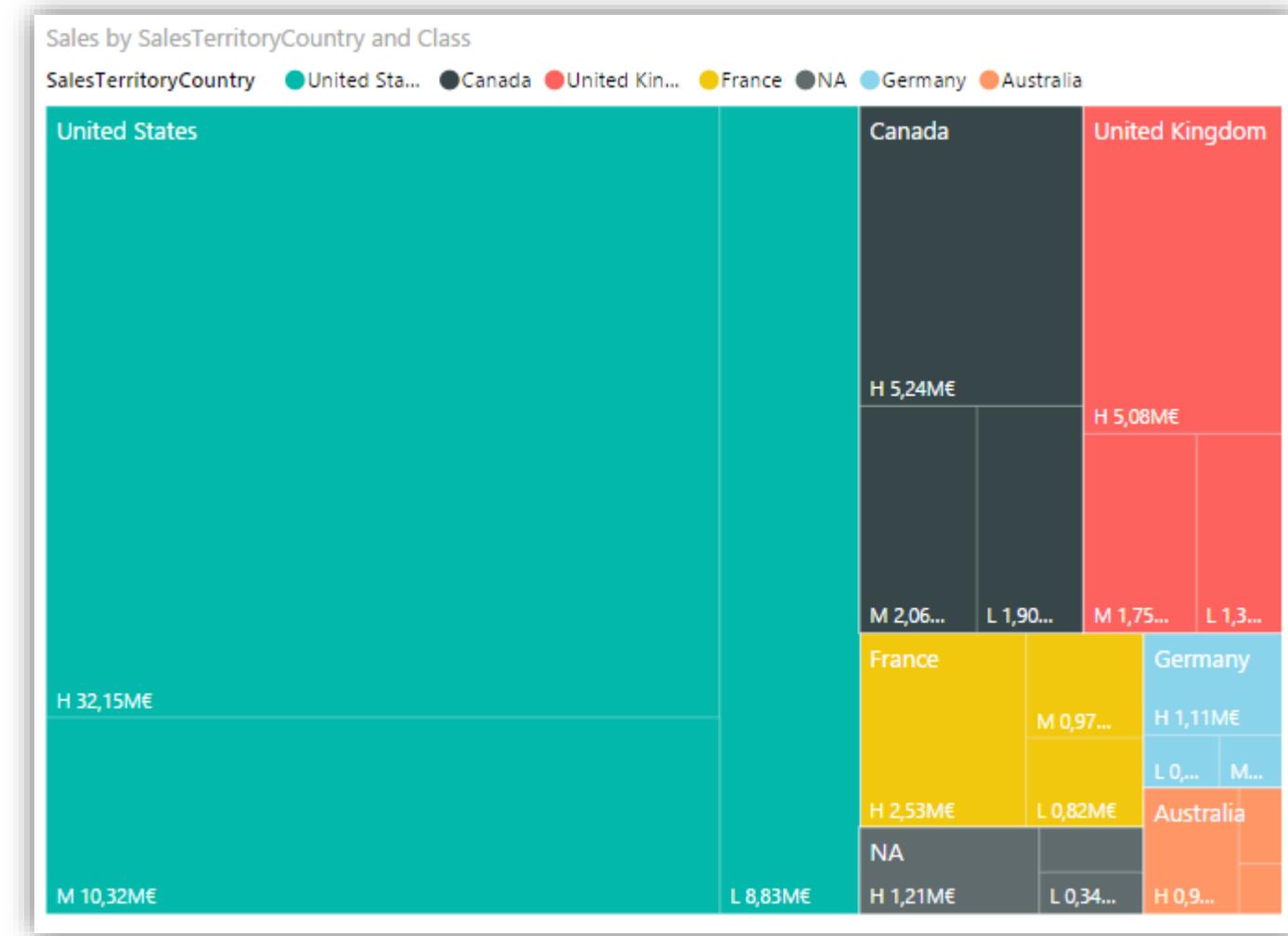
- Regular
- Donut



- Use a pie chart when there is one data series to plot

- Pie charts show composition (how categories represent parts of the whole)

# Visualisations – Treemap Chart



# Visualisations – Map Chart



- Plotting data requires internet connection
- Bing is used to return the location
- Latitude and Longitude can be used, but...
- Location names are also mapped automatically
- Combine attributes for increased accuracy and use data categories

# Visualisations – Filled Map Chart



# Visualisations – ArcGIS Maps (Preview)



- Use ArcGIS Maps for Power BI visual
- To start using this **preview feature**, turn on ArcGIS Maps for Power BI
- ESRI map icon on the visualization pane

The screenshot shows the Power BI Desktop interface. On the left, the 'Visualizations' pane displays various chart and map icons. One specific icon, representing an ESRI map, is highlighted with a pink square and a pink arrow pointing to a larger preview window. The preview window shows a map of Florida with numerous green and yellow circular markers. At the top of the screen, the 'Options' menu is open, showing the 'Preview Features' section. This section lists several preview features, with 'ArcGIS Maps for Power BI' and its 'Learn More' link highlighted with a pink rectangle.

Options

GLOBAL

- Data Load
- Query Editor
- DirectQuery
- R Scripting
- Security
- Privacy
- Updates
- Usage Data
- Diagnostics
- Preview Features**
- Auto Recovery

Preview Features

The following features are available for you to try in this release. Preview features might change or be removed in future releases.

- Amazon Redshift [Learn More](#)
- Impala [Learn More](#)
- Snowflake [Learn More](#)
- Shape Map Visual [Learn More](#)
- Enable cross filtering in both directions for DirectQuery [Learn More](#)
- Forecasting [Learn More](#)
- ArcGIS Maps for Power BI [Learn More](#)
- Mobile report authoring [Learn More](#)



# Visualisations – Shape Maps (Preview)

## Visualizations – Shape Maps (Preview)

- Shows relative comparisons of regions on a map by coloring them differently
- Based on ESRI/TopoJSON maps
- Supports custom maps

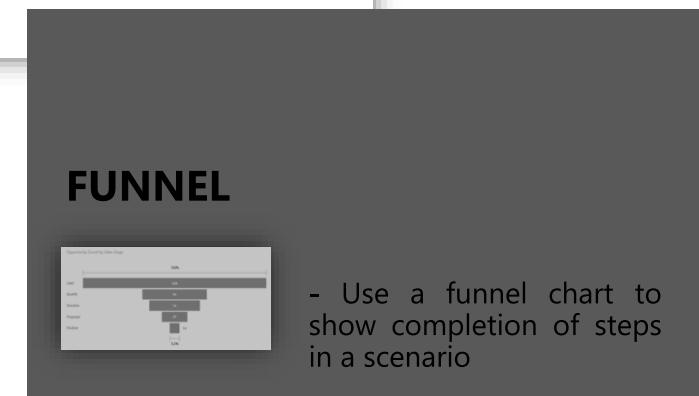
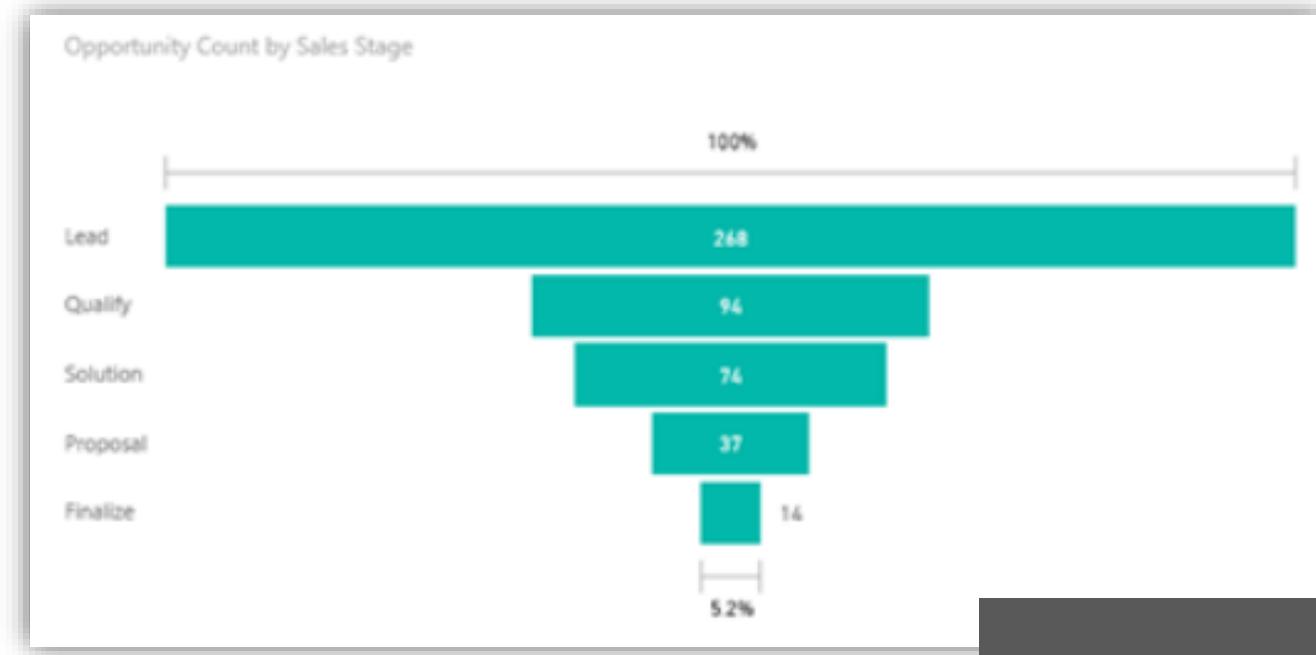


The figure consists of four screenshots illustrating the creation of a shape map:

- Step 1:** The "Visualizations" pane shows the "Shape" icon selected. A pink arrow points to it.
- Step 2:** The "Fields" pane shows the "US\_States" table with the "rnd\_value" field selected. A pink arrow points to the table name.
- Step 3:** The "Visualizations" pane shows the "Shape" section with "USA: states" selected. A pink arrow points to the dropdown menu.
- Step 4:** The "Fields" pane shows the "US\_States" table again, with the "rnd\_value" field highlighted. A pink arrow labeled "1" points to the "rnd\_value" field.



# Visualisations – Funnel Chart



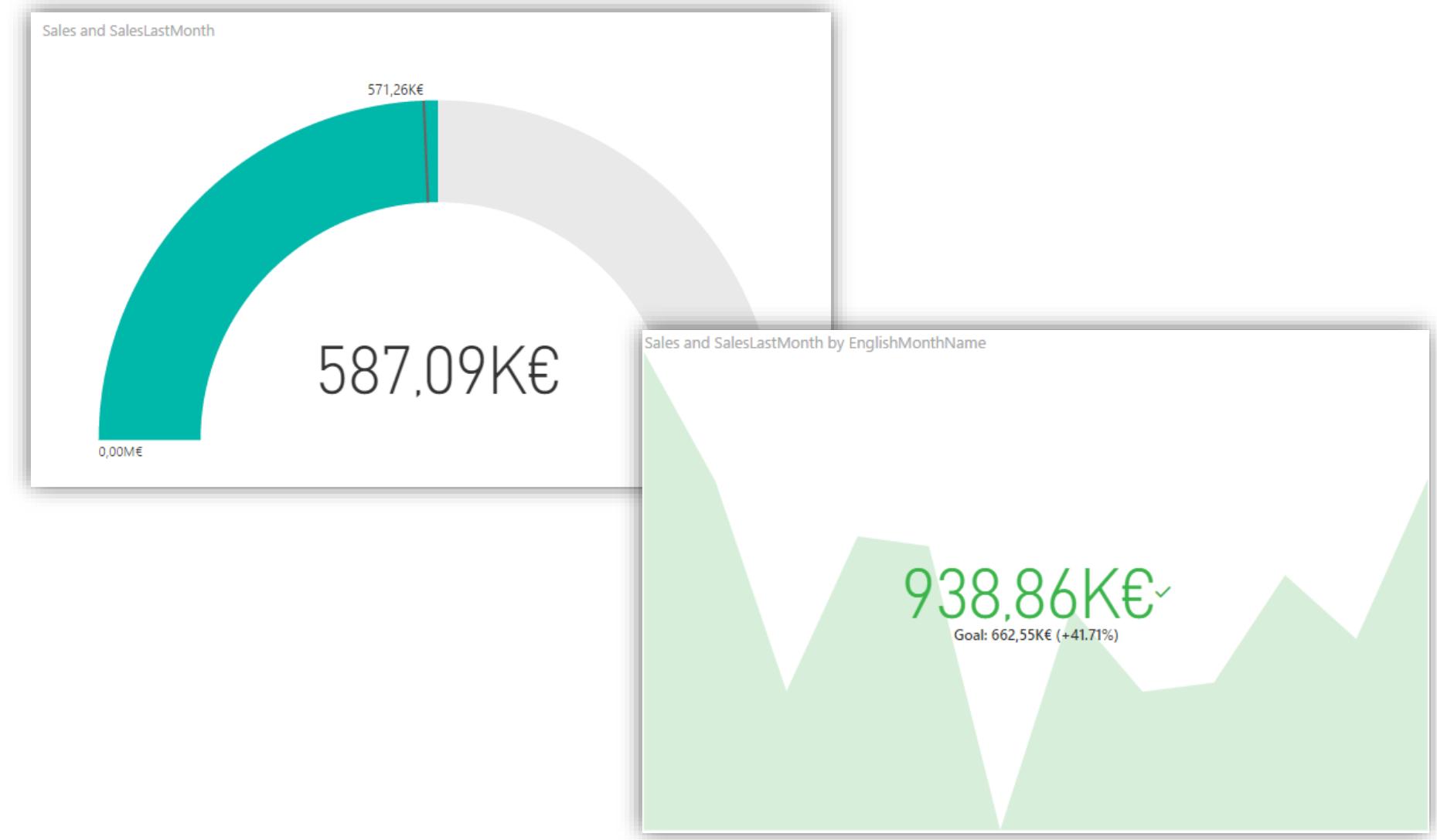


# Visualisations – Card and Multi-Row Card

**587,09K€**  
Sales

January	H	2.102.125,2...	2.068.846,72 €
EnglishMonthName	Class	Sales	No Discount Sales
January	L	735.199,95 €	685.600,30 €
EnglishMonthName	Class	Sales	No Discount Sales
January	M	642.080,61 €	639.508,70 €
EnglishMonthName	Class	Sales	No Discount Sales
February	H	1.717.849,5...	1.548.025,29 €
EnglishMonthName	Class	Sales	No Discount Sales
February	L	547.882,23 €	448.408,13 €
EnglishMonthName	Class	Sales	No Discount Sales
February	M	518.169,22 €	504.668,76 €
EnglishMonthName	Class	Sales	No Discount Sales

# Visualisations – Gauge and KPI



# Visualisations – Table and Matrix



A screenshot of the Power BI Desktop interface demonstrating the use of tables and matrix visualizations.

**Table Visualization:** A horizontal table showing monthly sales data across four categories (H, L, M) for January through April. The "SalesAmount" column shows values like 2.102.125,21 € and 735.199,95 €. The "WeightTop10ProductsInSales" column uses a color scale from green (highest value) to red (lowest value), with values ranging from 65,52% to 85,63%. A pink arrow points from this table to the conditional formatting dialog.

EnglishMonthName	Class	SalesAmount	WeightTop10ProductsInSales
January	H	2.102.125,21 €	65,52%
January	L	735.199,95 €	71,66%
January	M	642.080,61 €	73,64%
February	H	1.717.849,59 €	68,43%
February	L	547.882,23 €	75,70%
February	M	518.169,22 €	75,29%
March	H	936.948,43 €	75,63%
March	L	446.138,05 €	85,63%
March	M	355.768,79 €	79,35%
April	H	1.780.784,31 €	69,91%
April	L	641.542,42 €	78,40%
April	M	546.528,63 €	
May	H	1.266.668,79 €	
May	L	447.153,48 €	
May	M	396.751,50 €	
June	H	688.540,50 €	
June	L	345.109,65 €	
June	M	249.192,93 €	
July	H	1.392.831,15 €	
July	L	536.661,11 €	
July	M	408.107,53 €	
August	H	872.069,71 €	
August	L	350.380,86 €	
August	M	302.157,31 €	
September	H	1.013.474,18 €	
September	L	425.944,96 €	
September	M	363.425,17 €	
October	H	1.622.190,91 €	
<b>Total</b>		<b>27.277.726,52 €</b>	

**Matrix Visualization:** A large matrix table showing sales data by month and year. The columns represent months (H, L, M) and the rows represent years (2010-2013). The "Total" row provides a summary for each year. A pink arrow points from the conditional formatting dialog to this matrix table.

	CalendarYear	EnglishMonthName	H	L	M	Total	
2010	December	4.570,82 €	283.596,31 €	108.293,68 €	92.867,77 €	489.328,58 €	
	<b>Total</b>	<b>4.570,82 €</b>	<b>283.596,31 €</b>	<b>108.293,68 €</b>	<b>92.867,77 €</b>	<b>489.328,58 €</b>	
	2011	January	10.631,77 €	1.159.704,49 €	208.097,33 €	159.974,72 €	1.538.408,31 €
		March	13.910,01 €	1.471.696,18 €	301.821,20 €	223.190,69 €	2.010.618,07 €
May		25.499,10 €	2.971.225,31 €	561.045,25 €	469.310,68 €	4.027.080,34 €	
July		2.240,55 €	475.011,94 €	133.443,50 €	102.420,70 €	713.116,69 €	
2012	August	14.408,47 €	2.507.113,37 €	459.961,16 €	374.586,34 €	3.356.069,34 €	
	September	5.429,03 €	578.710,86 €	171.901,41 €	126.858,64 €	882.899,94 €	
	October	15.065,01 €	1.678.510,24 €	325.358,26 €	250.183,21 €	2.269.116,71 €	
	November	11.387,62 €	570.485,66 €	223.571,39 €	196.359,10 €	1.001.803,77 €	
2013	December	83.649,37 €	1.322.947,62 €	542.480,16 €	444.612,38 €	2.393.689,53 €	
	<b>Total</b>	<b>182.220,93 €</b>	<b>12.735.405,67 €</b>	<b>2.927.679,67 €</b>	<b>2.347.496,45 €</b>	<b>18.192.802,71 €</b>	
	January	121.784,94 €	2.102.125,21 €	735.199,95 €	642.080,61 €	3.601.190,71 €	
	February	101.458,16 €	1.717.849,59 €	547.882,23 €	518.169,22 €	2.885.359,20 €	
March	63.298,93 €	936.948,43 €	446.138,05 €	355.768,79 €	1.802.154,21 €		
April	84.960,97 €	1.780.784,31 €	641.542,42 €	546.528,63 €	3.053.816,33 €		
May	74.639,45 €	1.266.668,79 €	447.153,48 €	396.751,50 €	2.185.213,21 €		
June	34.698,76 €	688.540,50 €	345.109,65 €	249.192,93 €	1.317.541,83 €		
July	47.246,81 €	1.392.831,15 €	536.661,11 €	408.107,53 €	2.384.846,59 €		
August	39.347,20 €	872.069,71 €	350.380,86 €	302.157,31 €	1.563.955,08 €		
September	62.434,12 €	1.013.474,18 €	425.944,96 €	363.425,17 €	1.865.278,43 €		
October	87.949,43 €	1.622.190,91 €	634.480,97 €	536.131,37 €	2.880.752,68 €		
November	73.681,53 €	1.112.970,12 €	440.499,00 €	360.722,06 €	1.987.872,71 €		
December	124.404,70 €	1.419.305,44 €	386.350,14 €	735.590,26 €	2.665.650,54 €		
<b>Total</b>	<b>915.905,01 €</b>	<b>15.925.758,34 €</b>	<b>5.937.342,81 €</b>	<b>5.414.625,37 €</b>	<b>28.193.631,53 €</b>		
January	201.762,89 €	2.422.361,16 €	589.742,93 €	999.104,53 €	4.212.971,51 €		

# Visualisations – Table and Matrix



- Contains predefined styles for Table and Matrix

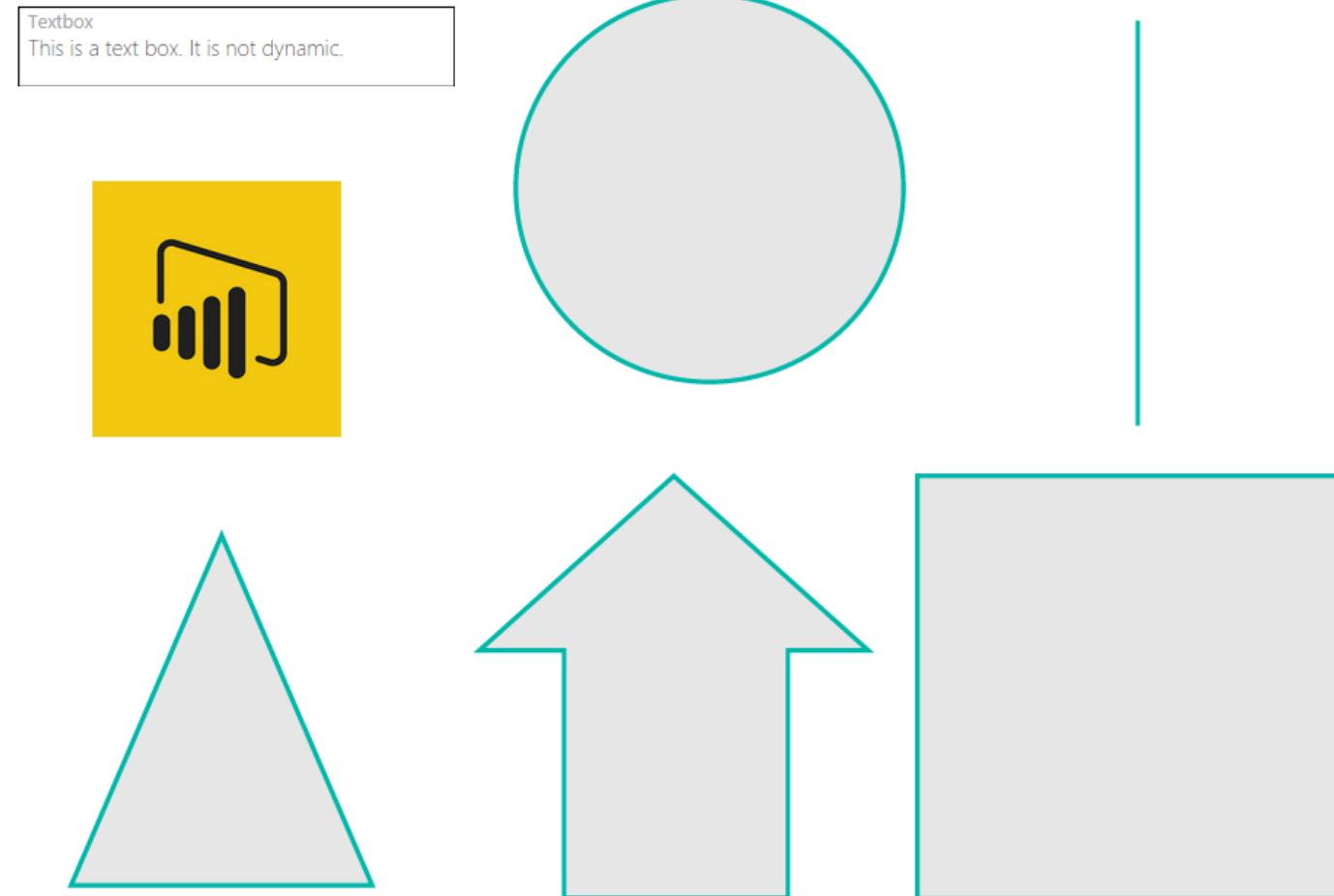
The screenshot shows the Power BI Desktop interface with two visualizations:

- Table visualization:** A table showing sales data from 2013 to 2015. The columns are Color, Class, Year, Quarter, Month, Day, Units, and SalesTax. The rows include various dates and unit counts, with a total row at the bottom.
- Matrix visualization:** A matrix showing financial data by year and country/region. The columns are Year, Country/Region, Gross Margin, Gross Margin %, Sum of Taxes, Sum of Travel Expenses, and Sum of Third Party Costs. The rows are grouped by year (2014, 2015) and then by country (US, CA, GB). Total rows are present for each year and country.

The right side of the screen shows the **Visualizations** and **Fields** panes. The **Table style** pane is open, with the **Style** dropdown menu expanded, showing options like None, Minimal, Bold header, Alternating rows, Contrast alternating rows, Flashy rows, Bold header Flashy rows, Sparse, and Condensed. The **Matrix style** pane is also visible, with the **Style** dropdown menu expanded, showing similar options for the matrix visualization.



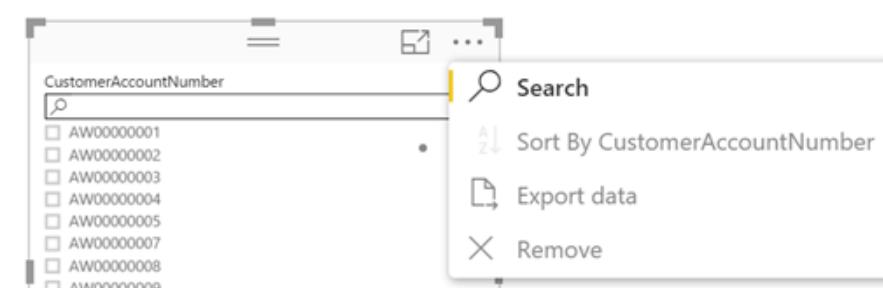
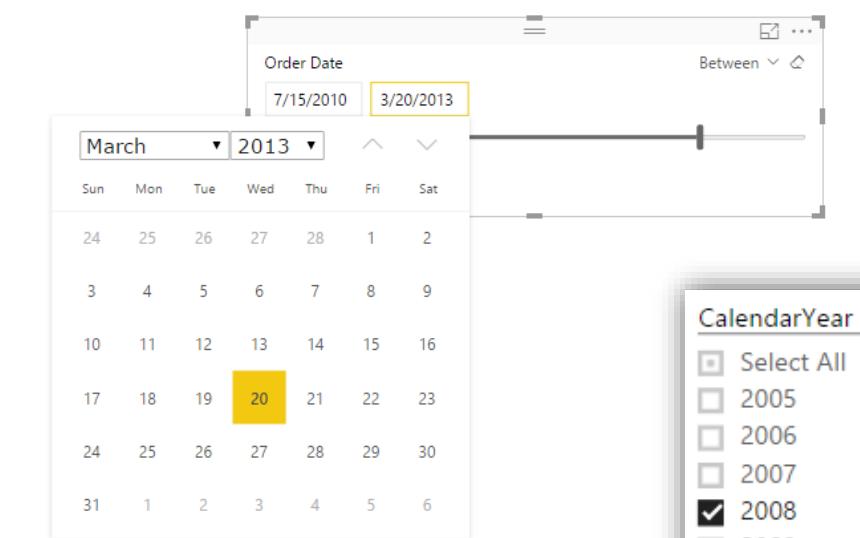
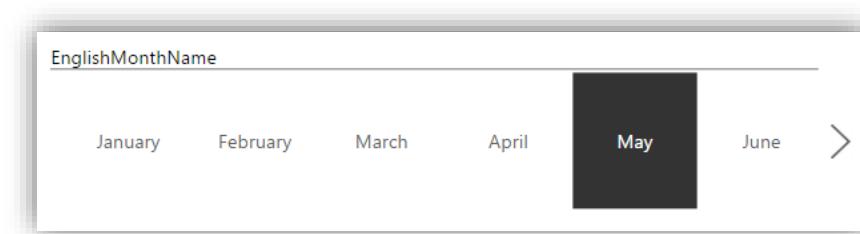
# Visualisations – Textboxes, Images and Shapes





# Visualisations – Slicers

- Filter data on multiple visualizations (similar to Excel slicers)
- Allow Select All
- Multi and Single selection
- Special slicers for date field
- Slicers are searchable

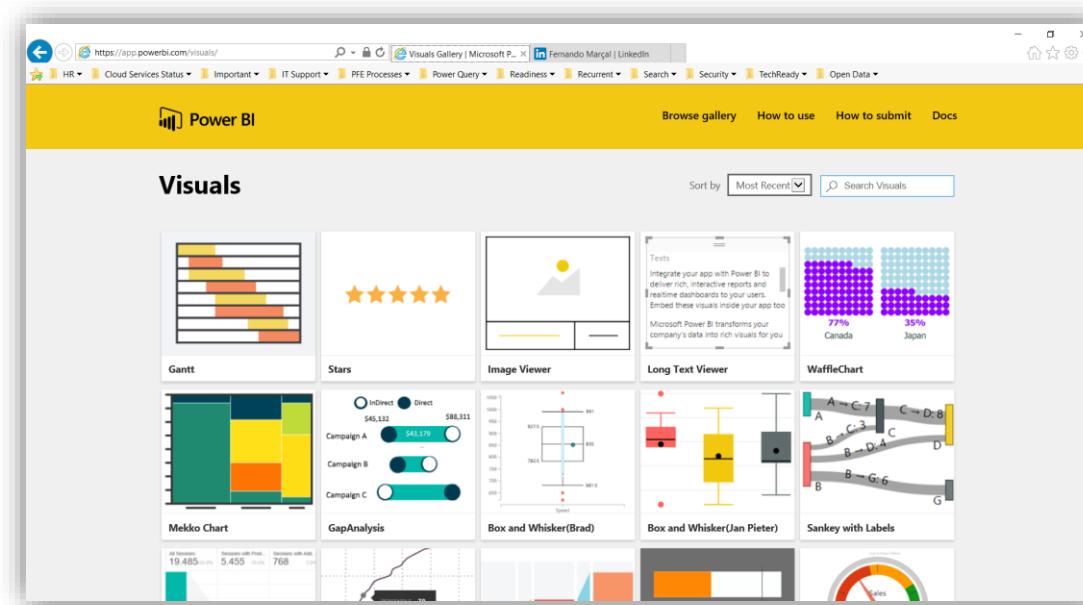


CalendarYear
<input type="checkbox"/> Select All
<input type="checkbox"/> 2005
<input type="checkbox"/> 2006
<input type="checkbox"/> 2007
<input checked="" type="checkbox"/> 2008
<input type="checkbox"/> 2009
<input checked="" type="checkbox"/> 2010
<input type="checkbox"/> 2011
<input type="checkbox"/> 2012
<input type="checkbox"/> 2013
<input type="checkbox"/> 2014



# Visualisations – Custom Visualisations

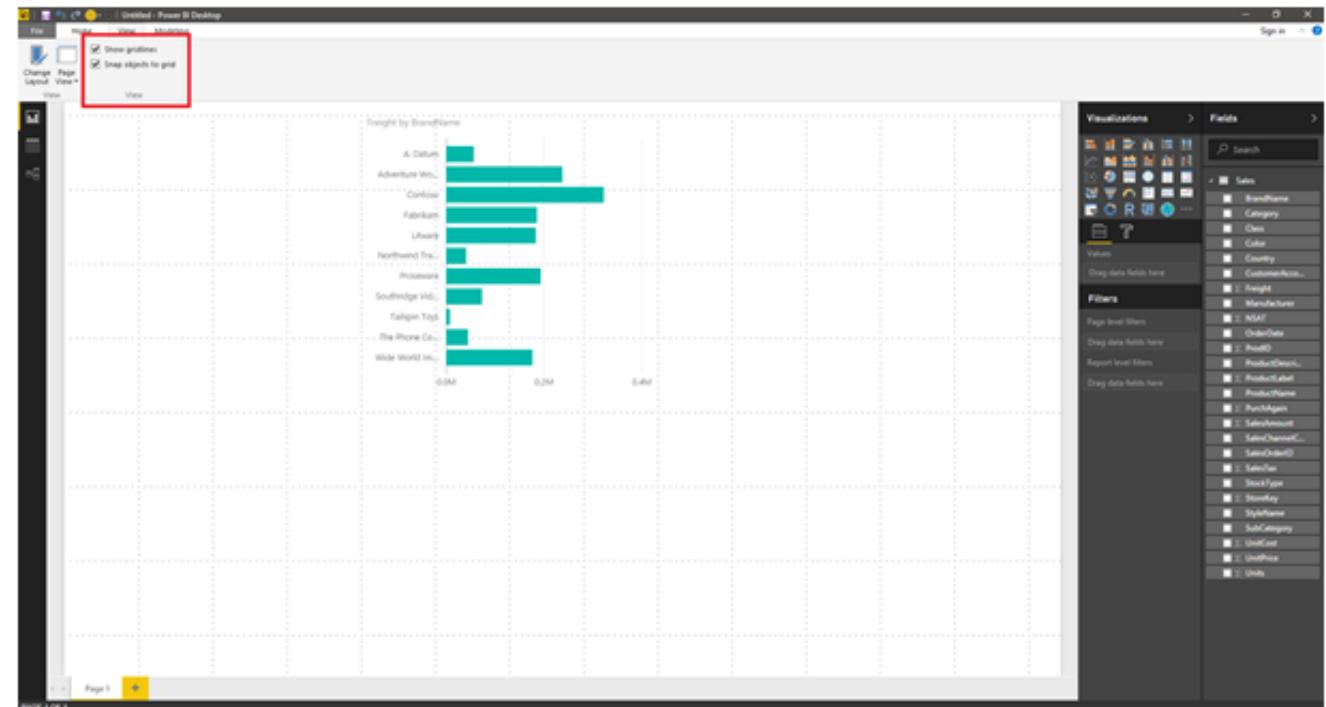
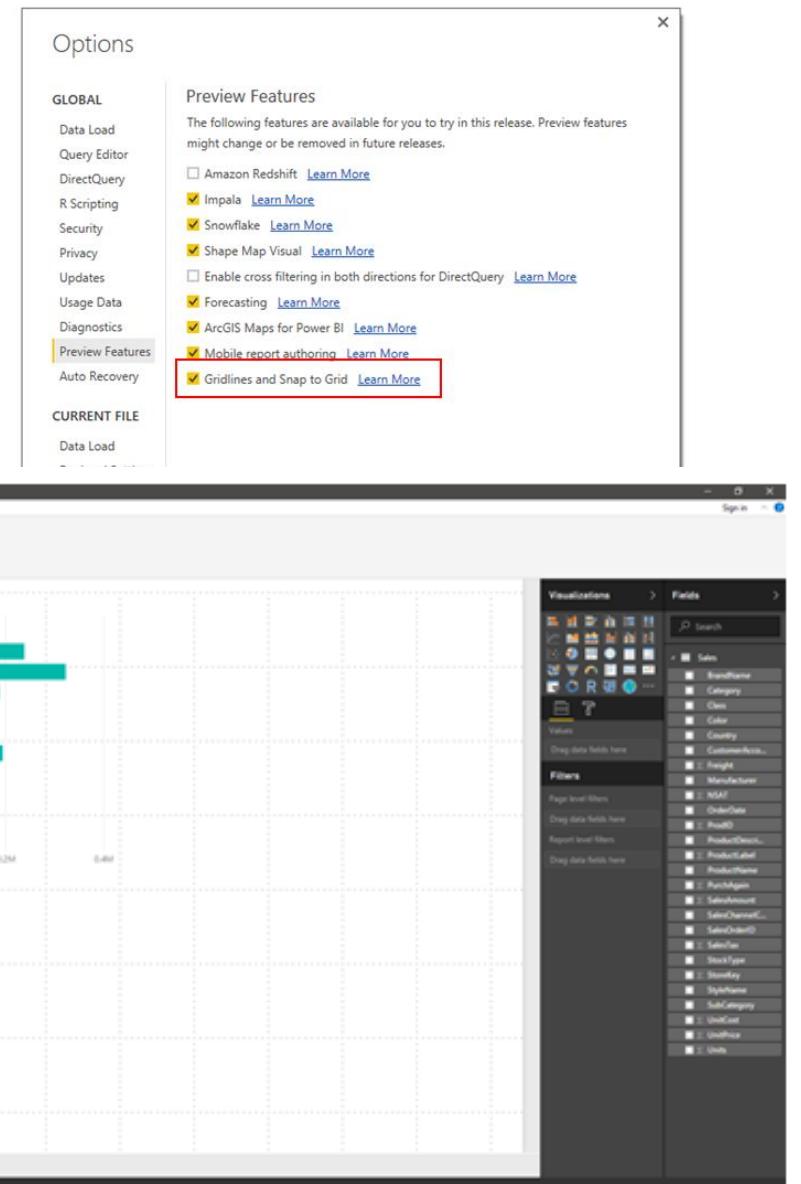
- We enabled 3<sup>rd</sup> party, or you, to build your own Visuals
- After you build them, you can use them or you can share with the community
- If you share, we will do a quality check and make it available at <https://app.powerbi.com/visuals/>



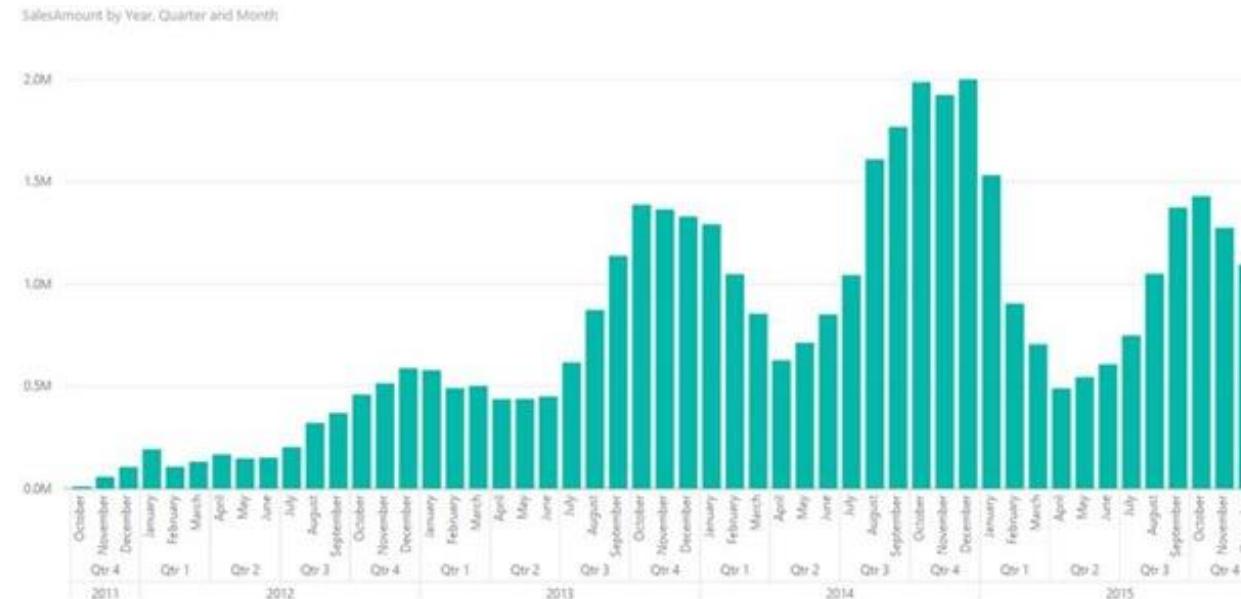


# Report gridlines and snap to grid (Preview)

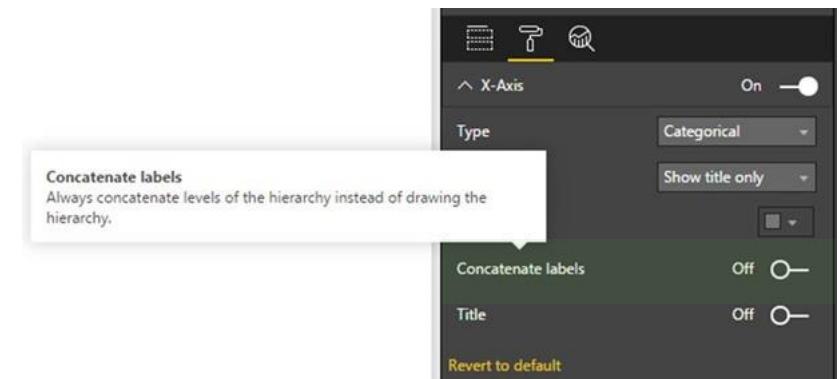
- Enable gridlines on your report canvas while authoring
- Snap to gridlines



# Visualisations – Hierarchical Axis



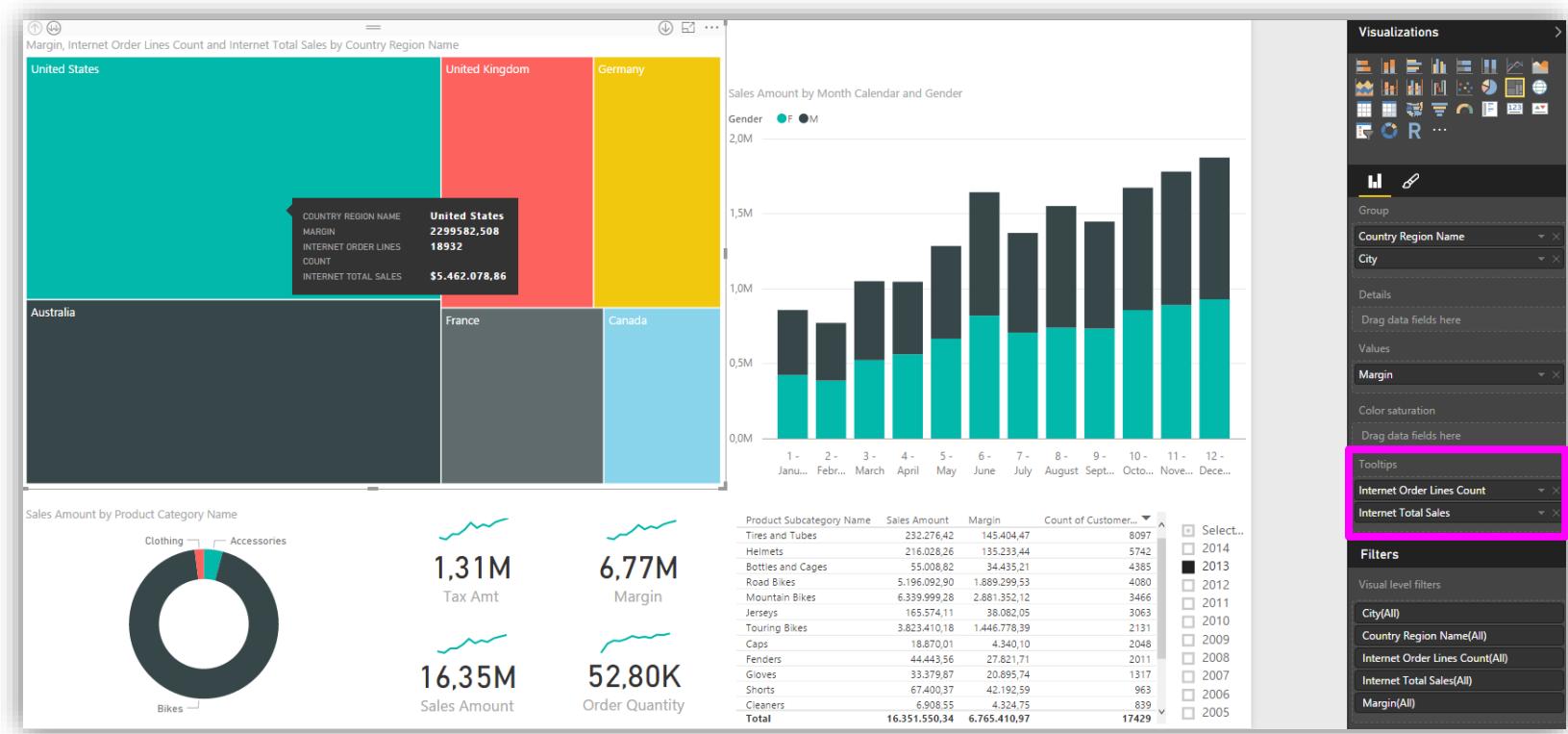
You can use hierarchical labels by turning off the label concatenation experience in the formatting pane



# ToolTips



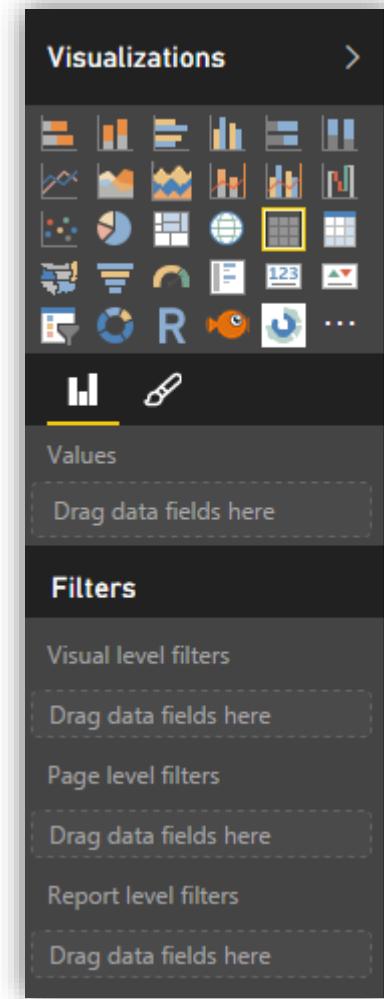
- Provide additional context when hovering over a series in a visualization
- They are customizable but only Measures or aggregations can be shown



# Report Filtering



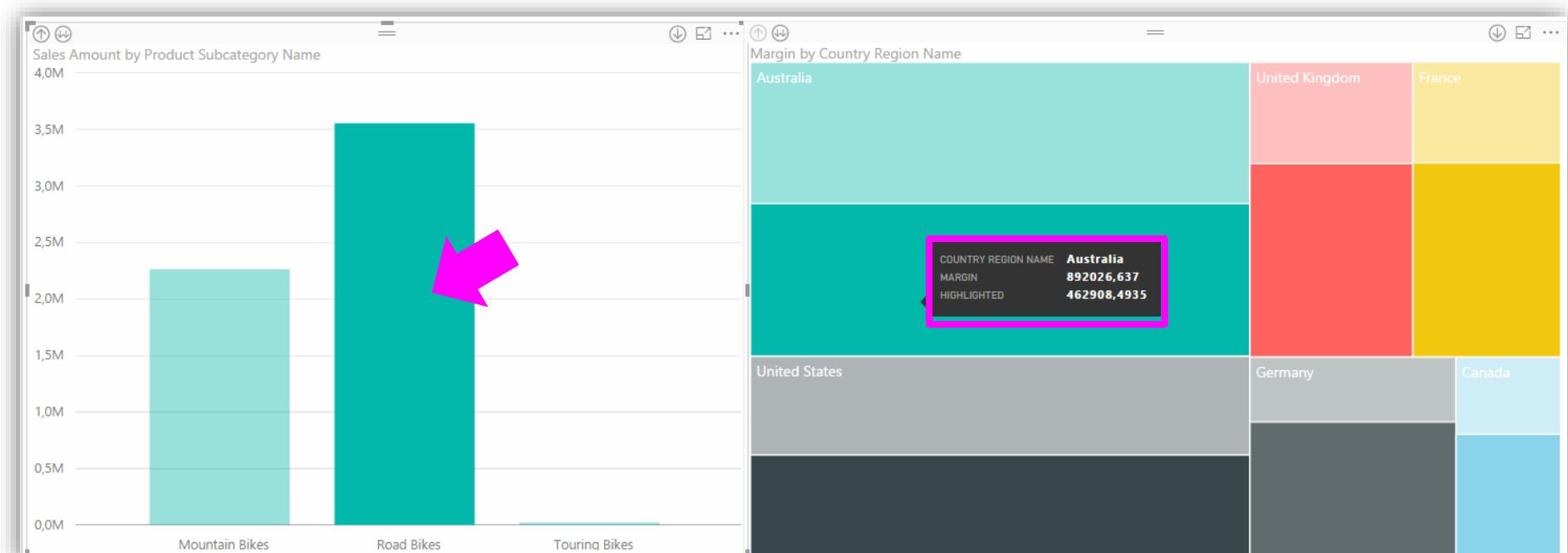
- Filters can be applied at three different levels:
- **Visual** – The filter only applies to the current visualization
- **Page** – The filter applies for every visualization on the page
- **Report** – The filter applies for every visualization for every page in the report (file)





# Cross-Filtering and Cross-Highlighting

- Clicking a visualization element, filters other visualizations
- A tooltip displays the highlighted portion and the total
- Click an empty space to clear the filter

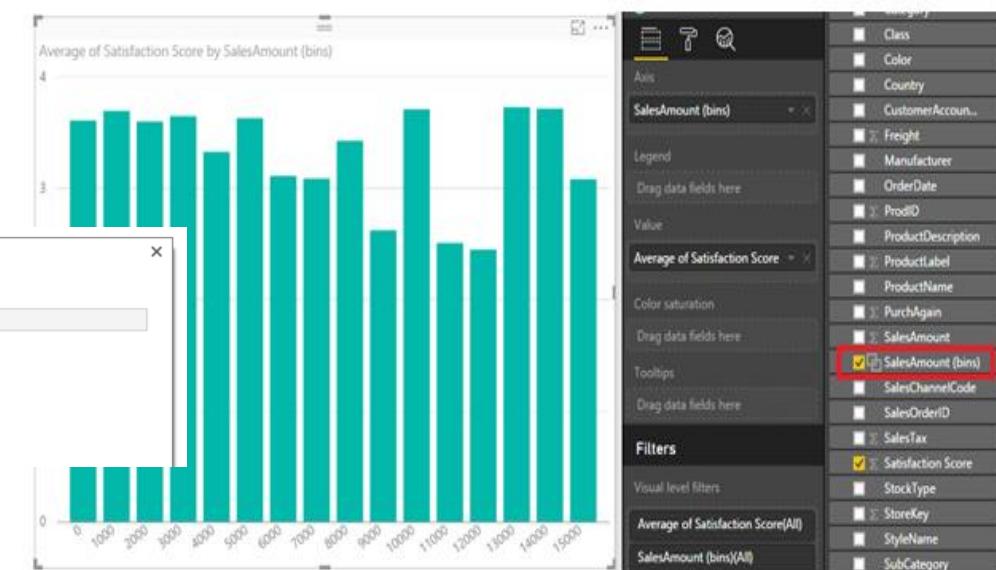
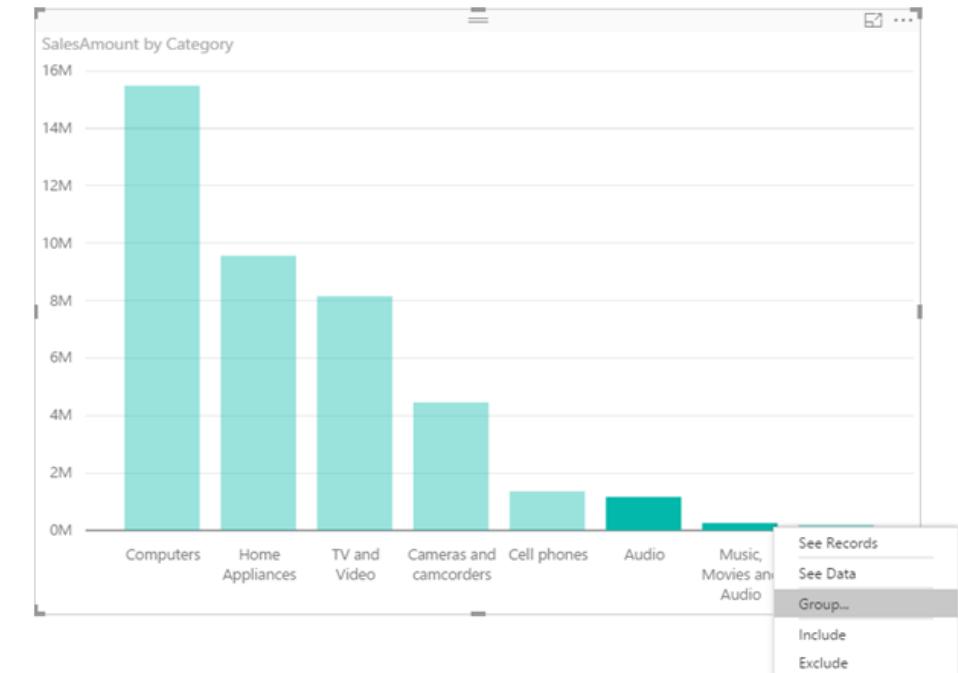
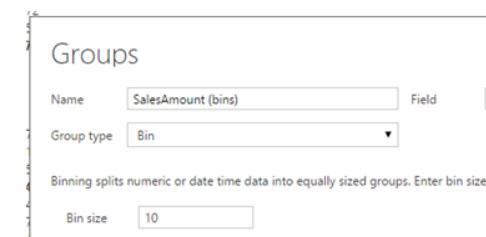
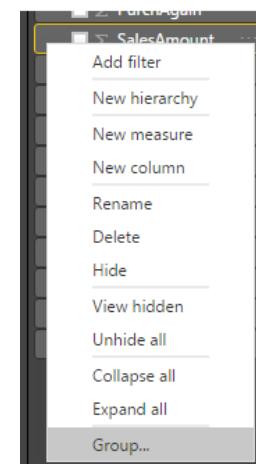




# Grouping and Binning

- Group up points on your visual to easily explore and analyze related categories

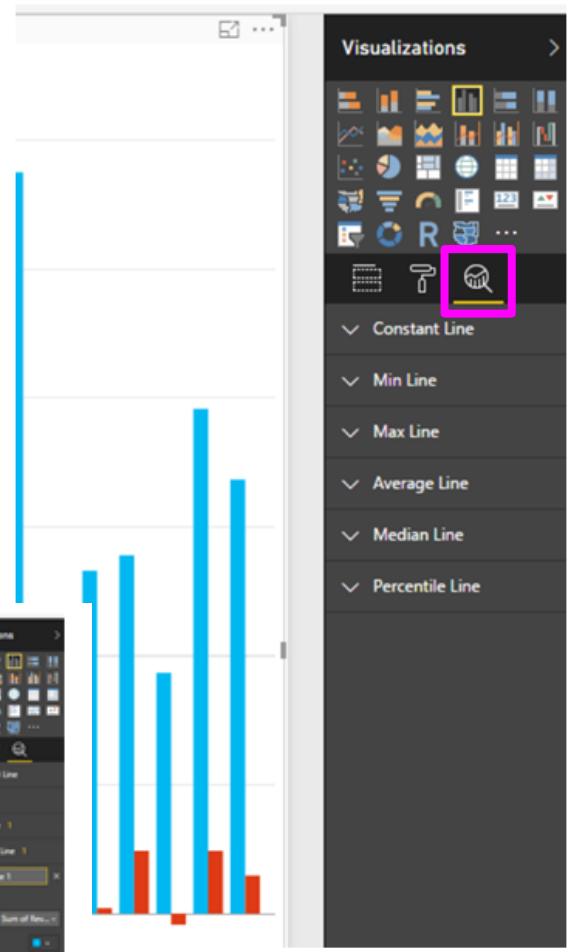
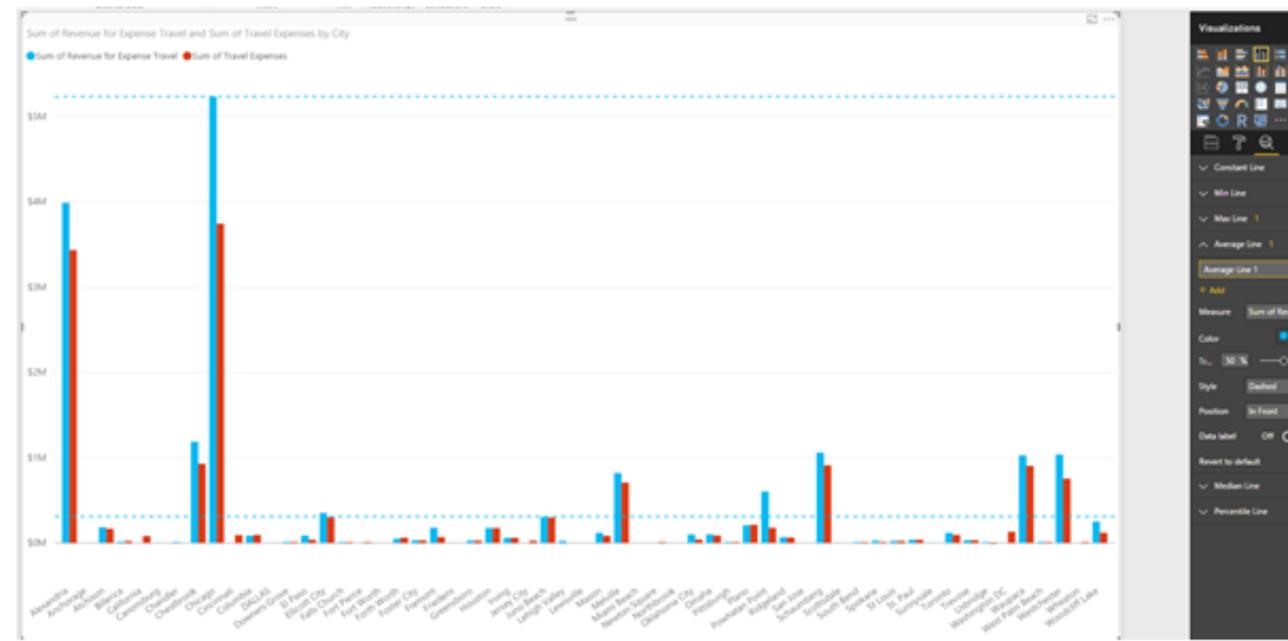
- Bin on numerical and time fields to create data categories



# Analytics Pane



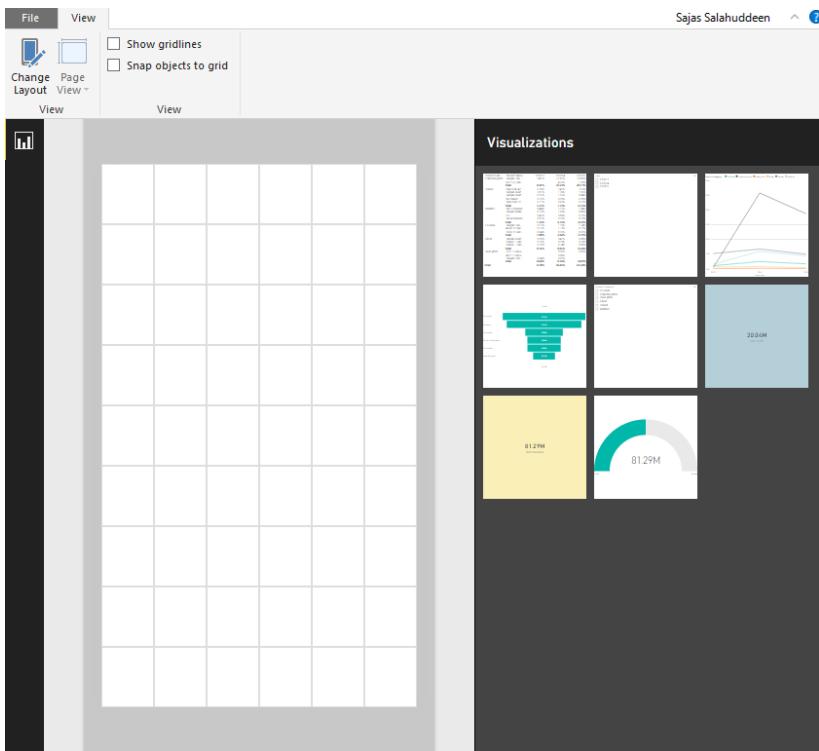
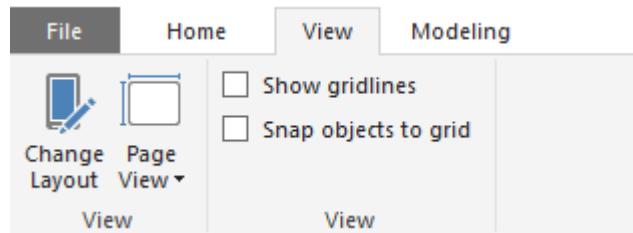
- Analytics pane will be the central location for all analytical features
- Add dynamic reference lines and trend lines on charts
- More analytical features will be added in future





# Mobile Report Layout

- Create report layouts specific to mobile devices



- After publishing, anyone who views this report on their **Power BI mobile app** will see the phone layout of the report



# Drill Down and Up



- It is possible to **navigate across attributes** if they are stacked on a particular area of a visualization (down/up/across)
- Those attributes don't have to be **natural hierarchies**, all of them can be mixed.

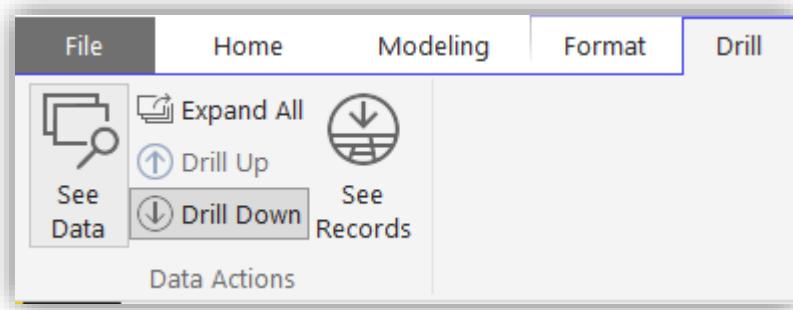


- Drill features works on bar and line charts

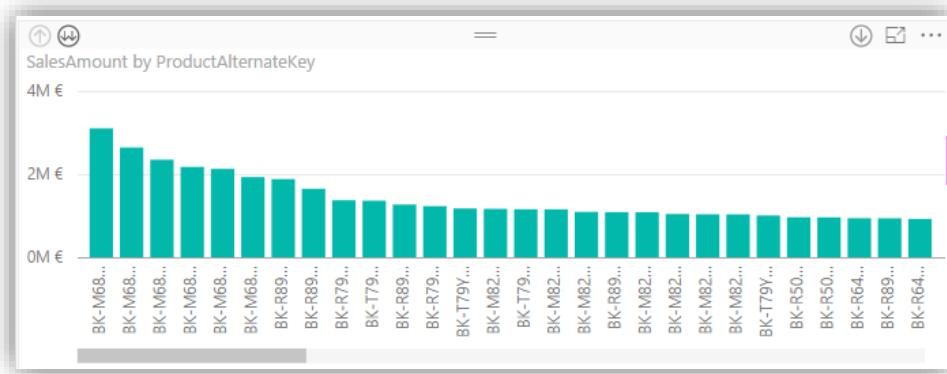
# Drill to Records



- Drill ribbon allows controlling of drilling operations



- See records drills-through detail, for a clicked data point, and See Data displays data also in tabular format

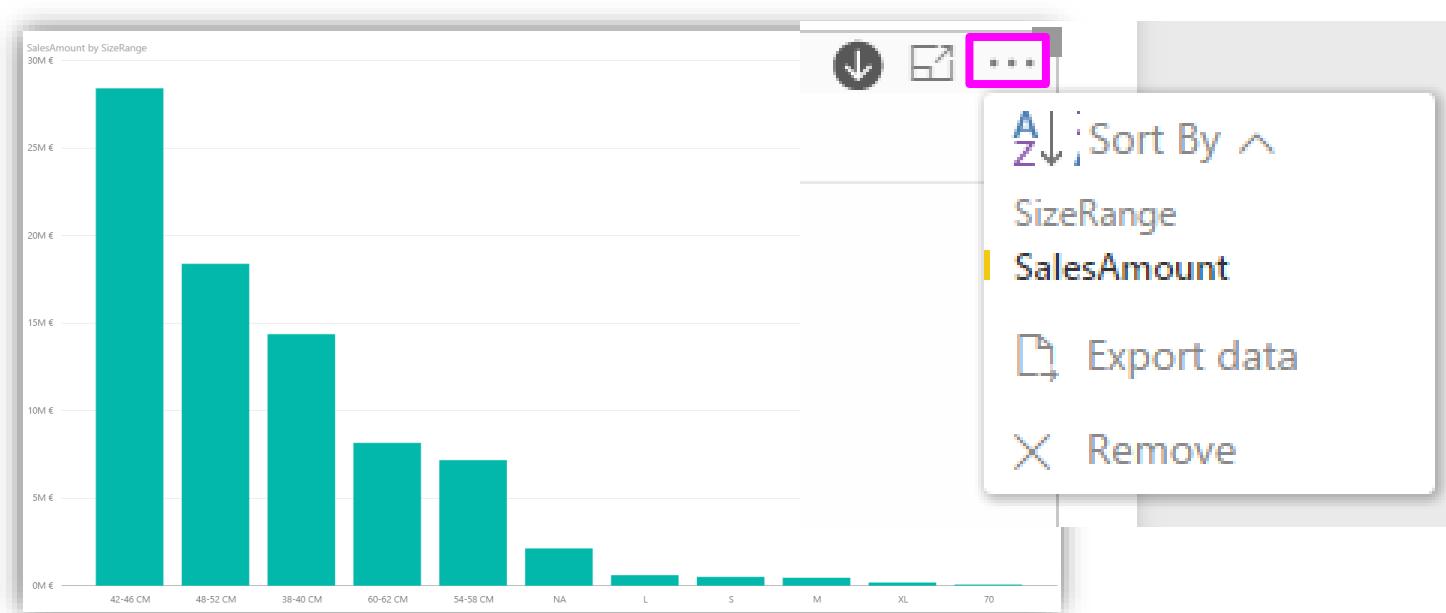


ProductAlternat...	Class	SalesAmount	SalesOrderNumber	CarrierTrackingNumber	CustomerPONumber	OrderDate
BK-M68B-42	H	19.816,12	S067297	58A-442C-BB	P02552176926	29 de Setembro de 2013
BK-M68B-42	H	17.986,69	S051822	E4EE-1C87	P08845178563	14 de Janeiro de 2013
BK-M68B-42	H	16.059,81	S047441	2582-4E47-98	P07569166535	29 de Fevereiro de 2012
BK-M68B-42	H	15.653,67	S053518	5712-448C-BB	P084197199	28 de Fevereiro de 2013
BK-M68B-42	H	15.653,67	S061199	EFA0-4D12-2A	P02552199779	30 de Junho de 2013
BK-M68B-42	H	14.349,20	S063291	9860-4378-BB	P08845151318	31 de Julho de 2013.
BK-M68B-42	H	14.349,20	S069437	AEEF-448B-AB	P012072116983	29 de Outubro de 2013
BK-M68B-42	H	13.974,69	S046611	934A-44D9-99	P016588117269	29 de Dezembro de 2011
BK-M68B-42	H	13.769,94	S051127	D321-AFF4-80	P02552155165	28 de Dezembro de 2012
BK-M68B-42	H	13.769,94	S057046	52C2-460F-B3	P014500161818	30 de Abril de 2013
BK-M68B-42	H	13.769,94	S057105	3AE1-A729-91	P018676113963	30 de Abril de 2013
BK-M68B-42	H	13.769,94	S071936	95F1-4750-9A	P08671170385	29 de Novembro de 2013
BK-M68B-42	H	12.811,76	S049166	14E2-4351-5A	P0884515490	31 de Julho de 2012
BK-M68B-42	H	12.392,95	S051090	EBDE-4471-8E	P013688110947	28 de Dezembro de 2012
BK-M68B-42	H	12.392,95	S053573	F674-4899-B9	P08671171198	28 de Fevereiro de 2013
BK-M68B-42	H	12.392,95	S057186	E791-4946-97	P08845159236	30 de Abril de 2013
BK-M68B-42	H	12.392,95	S058963	6ADC-4485-8C	P084129336	30 de Maio de 2013
BK-M68B-42	H	12.392,95	S059068	B7C4-4A9D-86	P09715125059	30 de Maio de 2013
BK-M68B-42	H	12.204,59	S046645	F857-446D-9C	P01711132491	29 de Dezembro de 2011
BK-M68B-42	H	11.065,13	S050295	575E-47FA-9C	P04466165095	28 de Outubro de 2012
BK-M68B-42	H	11.065,13	S050312	89ED-4505-8D	P07424134798	28 de Outubro de 2012
BK-M68B-42	H	11.015,98	S051120	62CD-4670-80	P01024111289	28 de Dezembro de 2012
BK-M68B-42	H	11.015,98	S051711	5CB9-480D-81	P01641429790	28 de Janeiro de 2013
BK-M68B-42	H	11.015,98	S051825	E395-4F72-84	P06525184188	28 de Janeiro de 2013
BK-M68B-42	H	11.015,98	S053566	3543-4780-97	P0803317470	28 de Fevereiro de 2013
BK-M68B-42	H	11.015,98	S053621	9324-4A3D-83	P09715186611	28 de Fevereiro de 2013
BK-M68B-42	H	11.015,98	S055241	FTDC-4907-89	P016588188882	30 de Março de 2013
BK-M68B-42	H	11.015,98	S058905	7985-4713-94	P019604111691	30 de Maio de 2013
BK-M68B-42	H	11.015,98	S063212	B54D-4C63-85	P05684138881	31 de Julho de 2013
BK-M68B-42	H	11.015,98	S069561	BBC0-44CA-42	P08845186382	29 de Outubro de 2012
BK-M68B-42	H	11.015,98	S071794	C39A-4853-99	P017574111985	29 de Novembro de 2013
BK-M68B-42	H	9.835,67	S046624	1240-4C47-93	P013695199342	29 de Dezembro de 2011
BK-M68B-42	H	9.835,67	S071794	D183-44C1-9E	P010179116574	10 de Agosto de 2013



# Sorting

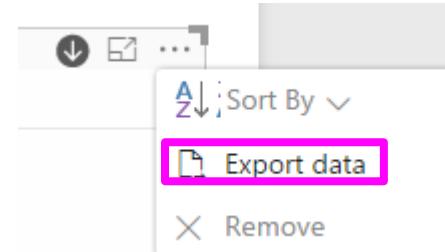
- It is possible to **sort** data according to **numeric values** or to **data categories**, for each visualization
- For categories, the order that is used is either **alphabetical** (or **numerical**) or the **custom sort** order
- Data can be presented **ascending** or **descending**



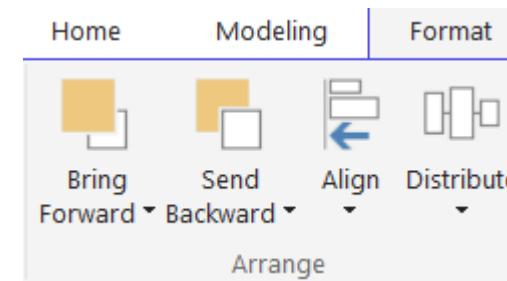


# Other Reporting Features

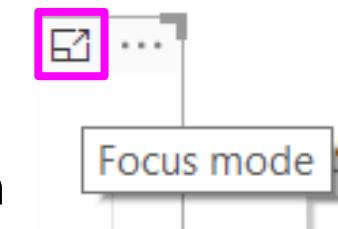
- Data for a visualization can be **exported** as .csv file



- Alignment and Depth can be controlled



- Focus mode pops-up the visualization
- It is possible to **overlay** visualizations



# Power BI Service: Get Data



**Get Data**



**Pinning and Navigation**



**Keeping Data Current**



**Q&A and Quick Insights**



**Sharing**



**Connect from Excel**



**Mobile Reports**

# Get Data

## *Connect to Data*

- You can start by connecting to data directly in the service, without going into Desktop or Excel first.

**↗ Get Data**

- Data can come from
  - your Organization
  - SaaS Services
  - an Excel or a Power BI Desktop File
  - Other data sources

The screenshot shows the 'Get Data' interface in the Power BI Service. At the top right, there's a link to 'Try this tutorial'. Below it, the 'Content Pack Library' section contains four cards: 'My Organization' (with a 'Get' button), 'Services' (with a 'Get' button), 'Files' (with a 'Get' button), and 'Databases' (with a 'Get' button). At the bottom left of the library area, there's a 'Samples' link.

- Once connected, a **dataset** and associated **reports** and **dashboards** will be available.
- The **data sources available in the Desktop** are not the same that are available directly from the service, but a **.pbix file** is a valid source



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

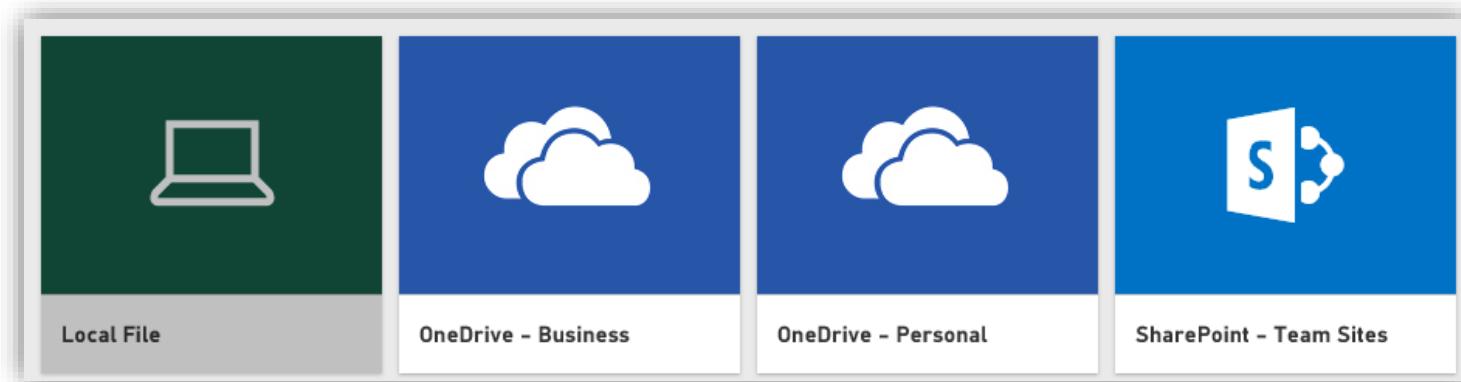


Mobile Reports

# Get Data

## *Import or Connect to Data - Files*

- When you select the **File** option data can come from on-prem or cloud



- Excel (.xlsx, xlsm) – import the **file** or the **Data Model**
- Power BI Desktop – the model and the visualizations are imported into the service
- .csv file – data should be comma separated and have a header
- Replacements must have the **same name**



**Get Data**



**Pinning and Navigation**



**Keeping Data Current**



**Q&A and Quick Insights**



**Sharing**



**Connect from Excel**



**Mobile Reports**

# Get Data

## *Import or Connect to Data - Files*

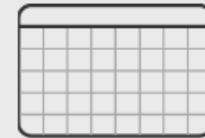
- When you connect to Excel, there are two options



### **Import Excel data into Power BI**

Connect to the data in your workbook on OneDrive so you can create Power BI reports and dashboards for it. Data is automatically refreshed from OneDrive.

**Import** →



### **Connect, Manage and View Excel in Power BI**

Bring your Excel workbook into Power BI and see it exactly as it is in Excel Online - charts, PivotTables, worksheets, and all. Then keep your workbooks up to date with scheduled refresh.

**Connect** →

- The **first** expects a **Data Model** in the file
- The **second** will allow you to **see the Excel file inside of Power BI** and even **edit it** and use **parts of it** for dashboards (OD4B or Sharepoint, only)
- Updates will reflect automatically in Power BI (~1h) (for Excel and Desktop)



**Get Data**



**Pinning and Navigation**



**Keeping Data Current**



**Q&A and Quick Insights**



**Sharing**



**Connect from Excel**



**Mobile Reports**

# Get Data

*Import or Connect to Data - Databases*



- Data can live in the cloud or on-prem (SSAS)
- Access to the data is live (DirectQuery) every interaction starts a query on the backend (data is always updated)
- For access to SSAS data on-prem, an Enterprise Gateway has to be set up
- More live sources are expected in the future.



**Get Data**



**Pinning and Navigation**



**Keeping Data Current**



**Q&A and Quick Insights**



**Sharing**



**Connect from Excel**



**Mobile Reports**

# Get Data

## *Content Pack Library – My Organization*

- Similar to Service content Packs, they contain elements like datasets, reports, dashboards and even Excel files
- Can be **shared** with **specific teams** (groups) or with the **entire organization**
- A **dedicated library** exists to display them which **follows permissions** and is **searchable**
- Analytical elements are **read-only** but **can be extended**. At that time, a **personal copy** is generated.
- Updates to the source content pack will not overwrite the personal copy
- Only the creator controls content and data refresh scheduling
- Except for SSAS as a source and Cloud Secured Models, **all users see the same data**



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

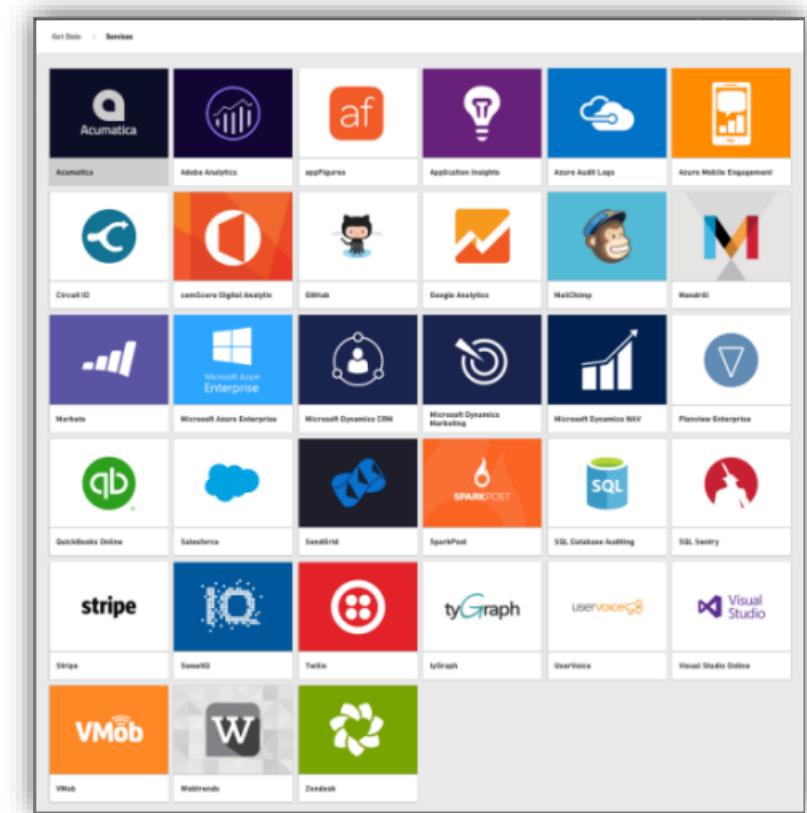


Mobile Reports

# Get Data

## *Content Pack Library - Services*

- Data can come from 3<sup>rd</sup> party SaaS services as **content packs**
- These content packs contain a dataset, reports and dashboards
- Data shown depends on **credentials provided** (depends on service as well)
- More than fifty already exist and more will be added frequently
- Data is curated by the provider
- You are not limited to the existing reports and dashboards.



# Power BI Service: Pinning and Navigation

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

## Workspace

The screenshot shows the Power BI Service workspace interface. On the left, there's a sidebar with navigation links: 'Featured dashboard', 'My Workspace' (selected), 'Search', 'Show: My Content', 'Dashboards' (with 'Azure' and 'CSS Summary' under it), 'Reports' (with 'AWInfoGraphic', 'Biberões', 'CSS Summary', 'IAM Expenses', 'IAM Movements', 'IAM Profit'), 'Datasets' (with 'AdventureWorks2012', 'DemoFinished', 'DomesticAccounting'), and a yellow 'Get Data' button at the bottom. The main area displays a dashboard titled 'Retail Analysis Sample'. It includes several visualizations: a card for 'Total Stores' (104), a card for 'This Year's Sales' (\$22M), a pie chart for 'This Year's Sales BY CHAIN' (Lindseys, Fashions Direct), a card for 'New Stores Opened This Year' (10), a line chart for 'This Year's Sales, Last Year's Sales BY FISCAL MONTH', a bubble chart for 'Sales Per Sq Ft, Total Sales Variance %, This Year's Sales BY DISTRICT', a map for 'This Year's Sales ESTABLISHED AND NEW STORES', and a map for 'This Year's Sales NEW STORES ONLY' (Fashions Direct, Lindseys) across the US Northeast.

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

## Dataset

The screenshot shows the Power BI Service interface. On the left, there's a sidebar with a yellow header bar containing a 'Get Data' button. Below it are sections for 'My Workspace' (with a search bar), 'Dashboards' (listing Azure, Baby Milk Bottle Analy..., CSS Summary, IAM 1.Expenses, AWInfoGraphic, Biberões, IAM Expenses, IAM Movements, IAM Profit), 'Reports' (listing AdventureWorks2012, AWInfoGraphic, Biberões, DemoFinished, DomesticAccounting), and a 'Datasets' section highlighted with a pink rectangle. This 'Datasets' section lists AdventureWorks2012, AWInfoGraphic, Biberões, DemoFinished, and DomesticAccounting. At the bottom of the sidebar is a yellow 'Get Data' button. The main area displays a dashboard titled 'Retail Analysis Sample' with various visualizations like charts and maps. Overlaid on the dashboard are three bullet points:

- A dataset is something you import or connect to
- Each dataset represents a source of data
- That dataset can be an intricate data model created by you in Desktop or a connection to a database
- A dataset can feed many reports and dashboards

At the bottom center, there's a diagram showing a blue box labeled 'a dataset' connected by lines to two smaller boxes below it: one labeled 'A report' and another labeled 'dashboard'.

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

Report

The screenshot shows the Power BI Service interface. On the left, there's a navigation pane with sections like 'Featured dashboard', 'My Workspace', 'Dashboards', 'Reports' (which is highlighted with a pink rectangle), and 'Datasets'. At the bottom of the navigation pane is a yellow button labeled 'Get Data'. The main area displays a report titled 'Retail Analysis Sample' with several visualizations, including a line chart, a scatter plot, and a map. Overlaid on the right side of the report are three bullet points:

- A report is composed of one or more pages of visualizations
- Can be developed in Desktop (or Excel) or in the service
- Gets its data from one dataset

Below these points is a diagram illustrating the data flow: 'datasets' feeds into 'A report', which in turn feeds into a 'dashboard'.

# Power BI Service



## Get Data



## Pinning and Navigation



## Keeping Data Current



## Q&A and Quick Insights



## Sharing



## Connect from Excel



## Mobile Reports

# Pinning and Navigation

## Report



# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



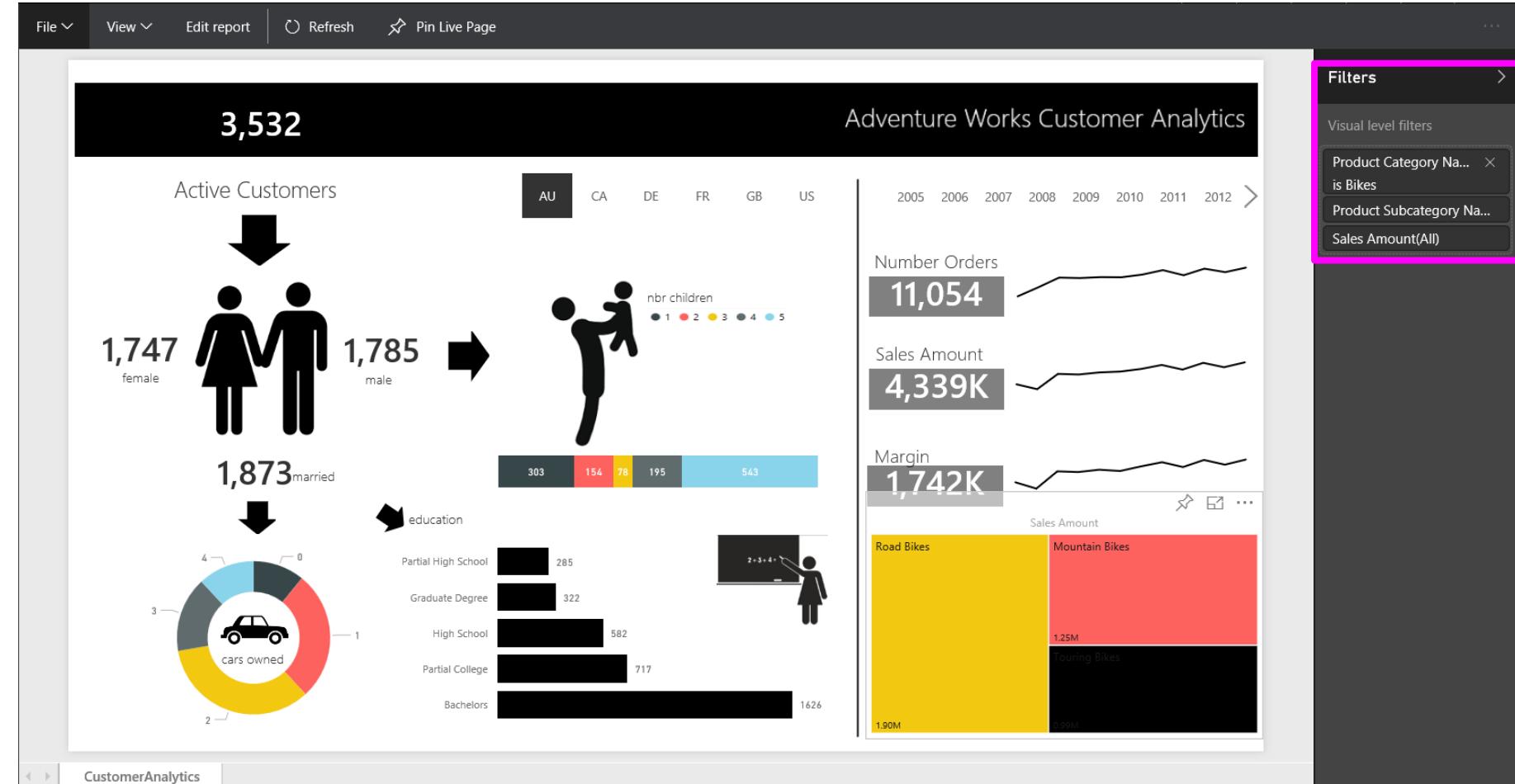
Connect from Excel



Mobile Reports

# Pinning and Navigation

Report



# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



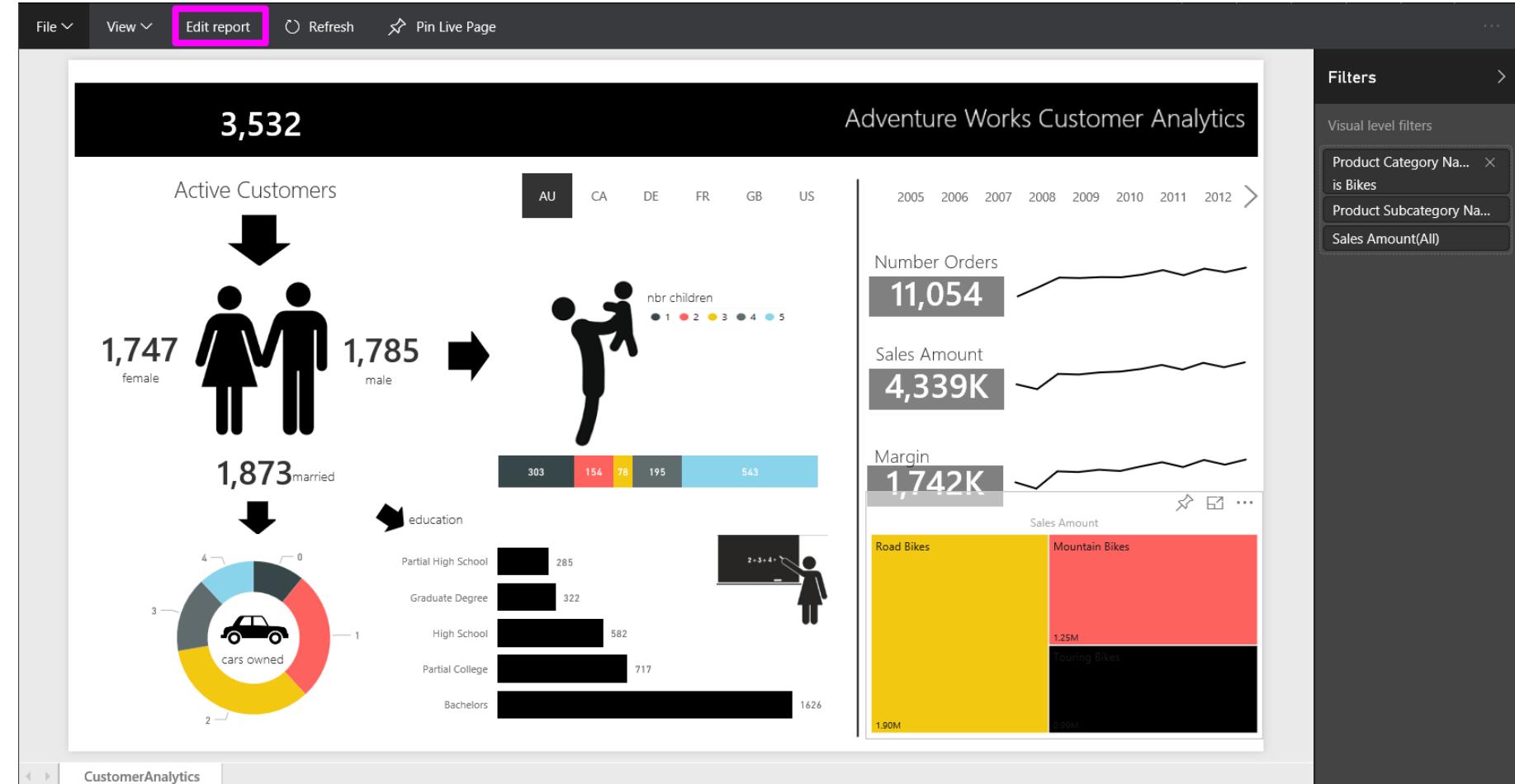
Connect from Excel



Mobile Reports

# Pinning and Navigation

Report



# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



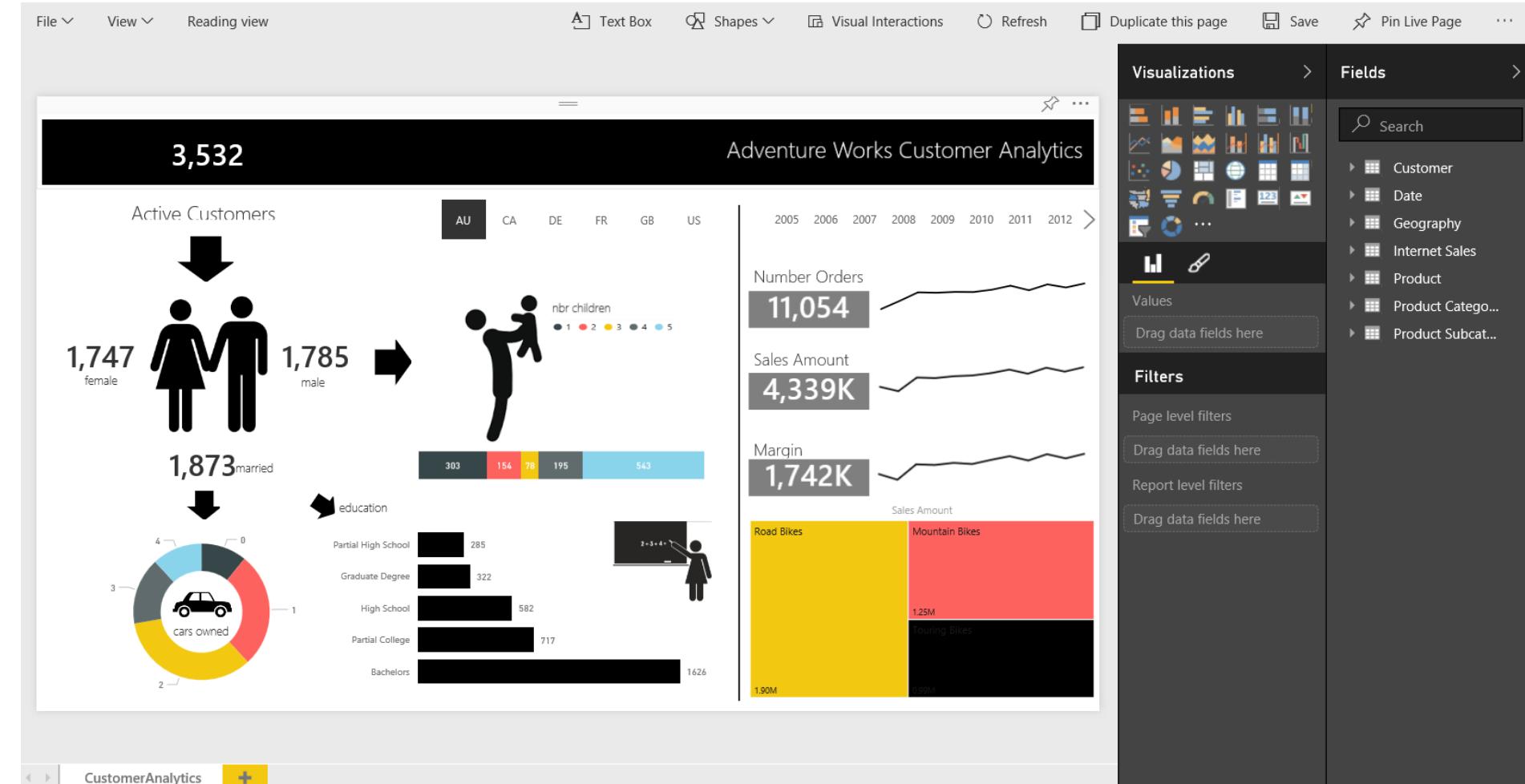
Connect from Excel



Mobile Reports

# Pinning and Navigation

Report – Editing View





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

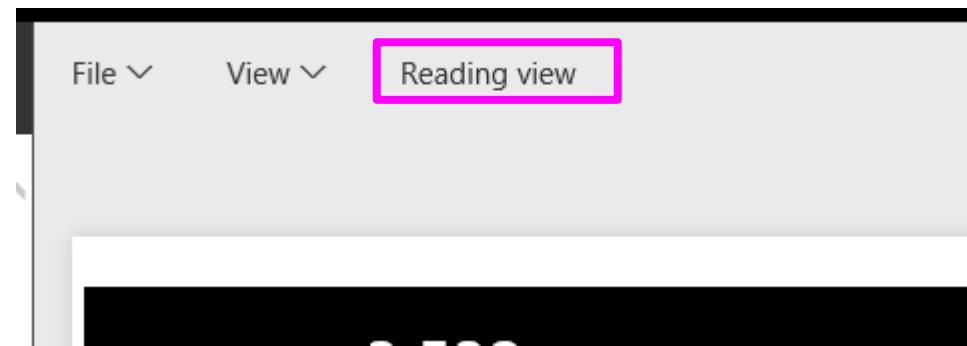


Mobile Reports

# Pinning and Navigation

## *Report – Editing View*

- It is possible to **alter** an existing report page or to **create** new pages in Editing View
- Similar reporting functionality to Power BI Desktop
- Can also use **Custom Visualizations**
- In the end a **Save** has to be done to commit the changes
- Click “Reading View” to return to that mode





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

## Report - Pinning

- Individual visualizations can be pinned to dashboards as tiles

The screenshot shows a Power BI report interface. On the left, there's a bar chart titled "Count of Customer Id BY EDUCATION" with the following data:

Education Level	Count
Partial High School	285
Graduate Degree	322
High School	
Partial College	
Bachelors	

To the right of the chart, a "Pin to dashboard" dialog box is open. It contains the following text and options:

Pin to dashboard  
Select an existing dashboard or create a new one.  
Where would you like to pin to?  
 Existing dashboard  
 New dashboard  
Adventure Works Customer Analytics  
Pin Cancel



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

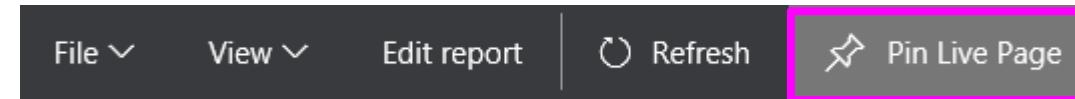


Mobile Reports

# Pinning and Navigation

## *Report - Pinning*

- Entire pages can be pinned to dashboards



- They become **live tiles** and can be interacted with straight from the dashboard with the same interactivity as in Reading View
- When a change happens in this report, the changes are synchronized to the dashboard
- This does not happen with individual visualizations

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

## Dashboard

The screenshot shows a Power BI dashboard titled "Retail Analysis Sample". The left sidebar lists various dashboards, reports, and datasets. A pink box highlights the "Dashboards" section, which includes items like "Azure", "CSS Summary", and "IAM 1.Expenses". Below this is the "Reports" section, followed by "Datasets". At the bottom of the sidebar is a yellow button labeled "Get Data". The main area of the dashboard displays several tiles: a large number "104", a pie chart for "Fashions Direct", a line chart for "This Year's Sales", and a map of the Northeastern United States with data points. Overlaid on the dashboard are three bullet points:

- A dashboard **aggregates most important visualizations** from several different reports (and datasets)
- It is composed of **tiles** and **wIDGETS**
- Tiles can be updated in real-time
- Each tile can navigate back to its underlying report or to a custom URL

At the bottom right, there is a diagram illustrating the relationship between a dashboard, a report, and datasets:

```
graph TD; Dashboard[a dashboard] --- Report[A report]; Dashboard --- Datasets[datasets]
```

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



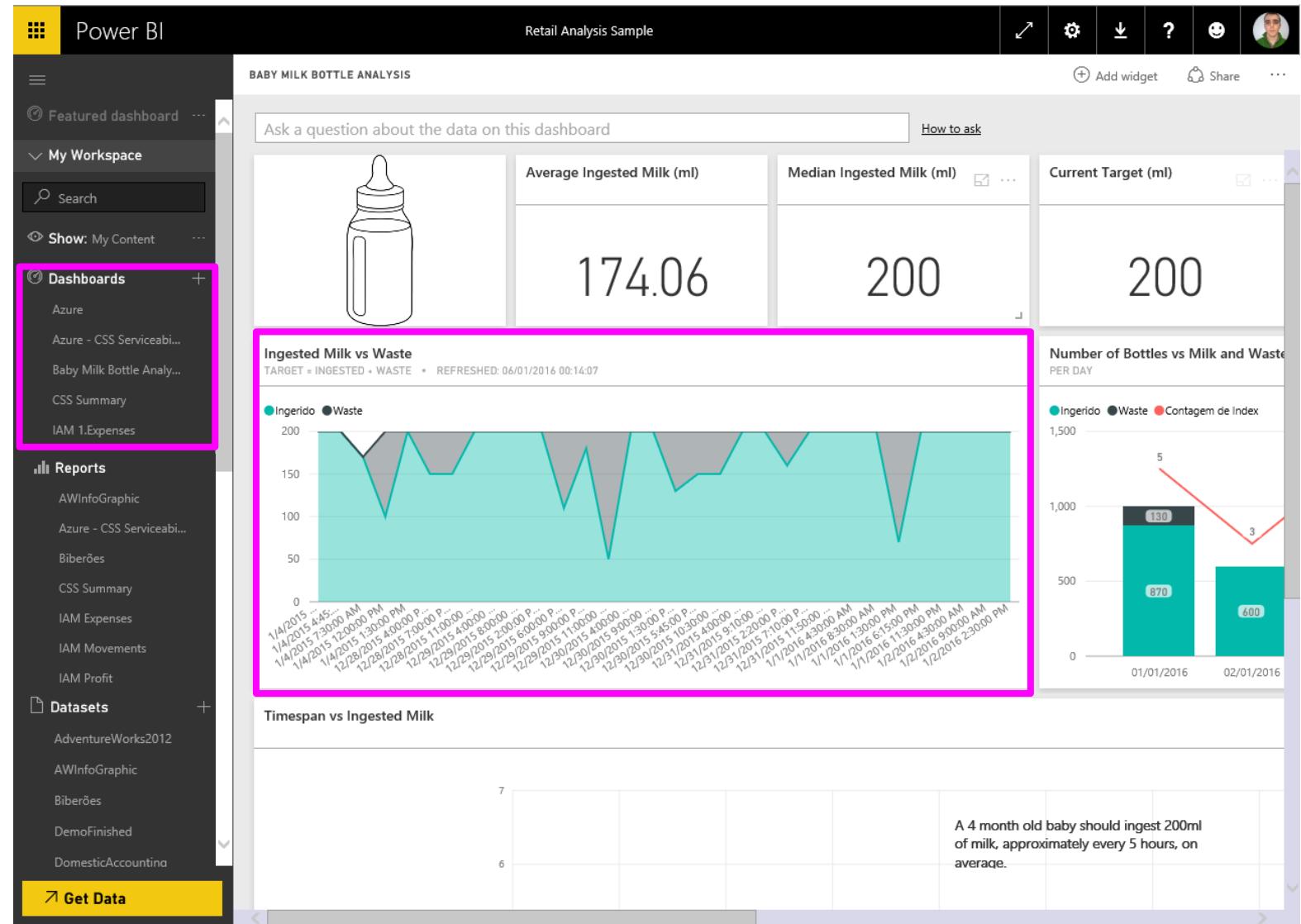
Connect from Excel



Mobile Reports

# Pinning and Navigation

## Dashboard - Tiles





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

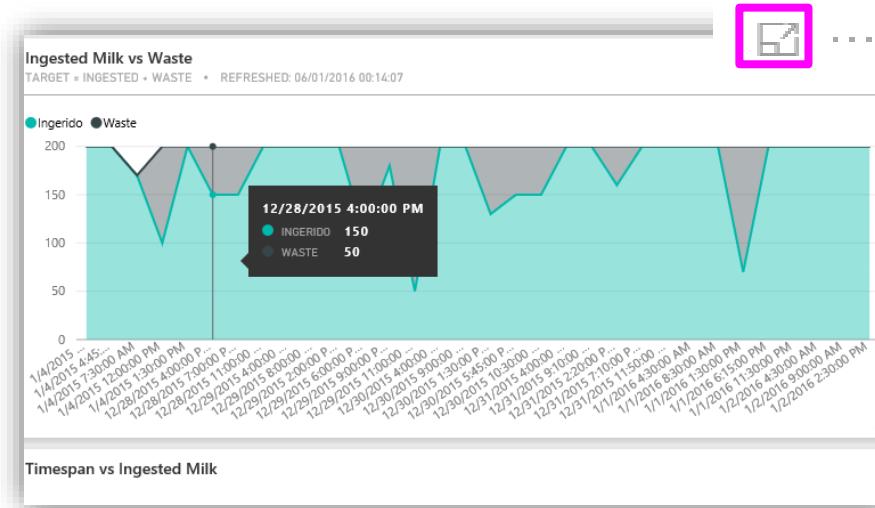


Mobile Reports

# Pinning and Navigation

## Dashboard - Tiles

- A tile can display a tooltip
- And can be open in **Focus Mode** maximizing it this way



- Interactivity is more limited than in reports except if a Live Page was pinned – in that case is the same



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

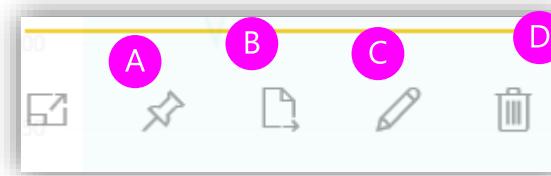


Mobile Reports

# Pinning and Navigation

## Dashboard - Tiles

- Additional options exist



- A Pin the tile to another dashboard
- B Export its data as .csv file
- C Edit Tile Details
- D Delete Tile

**C** Tile details

\* Required

Details

Display title and subtitle

Title \*

Ingested Milk vs Waste

Subtitle

Target = Ingested + Waste

Functionality

Display last refresh time

Set custom link

URL \*

Open custom link in the same tab?

Yes

No

[Restore default](#)

**Apply** **Cancel**



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



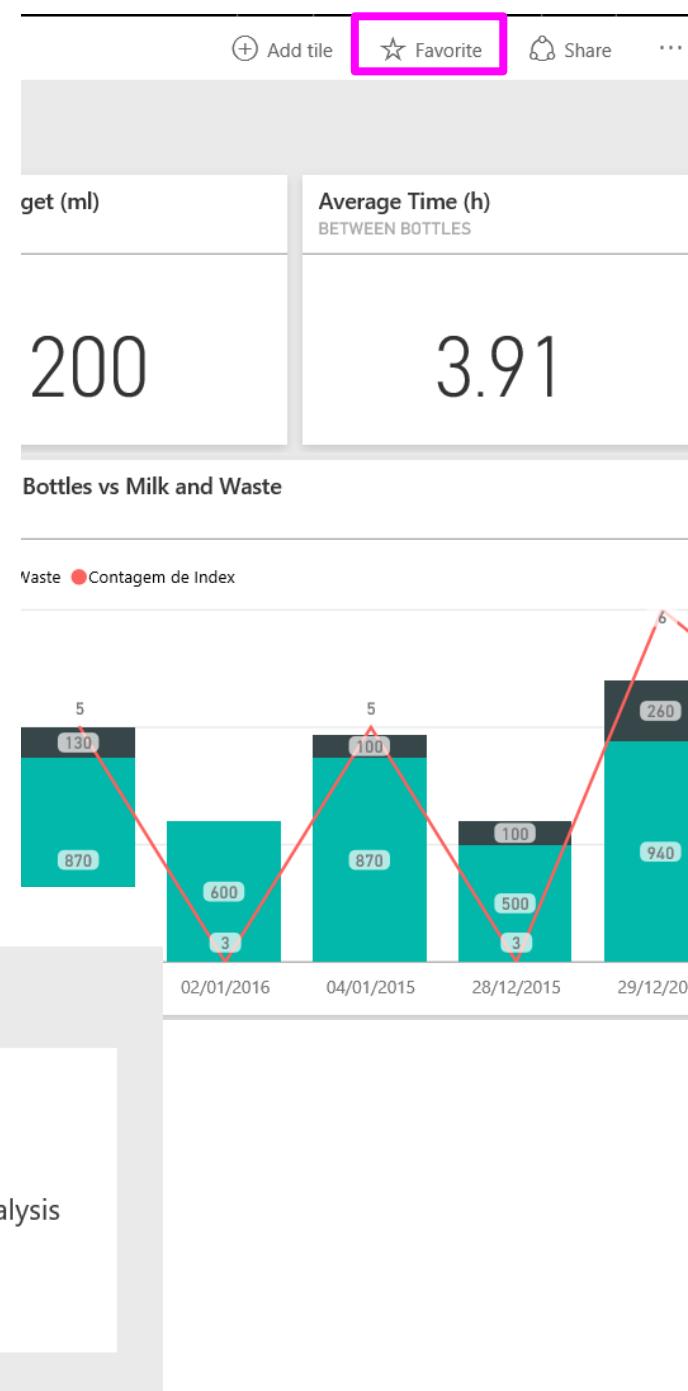
Mobile Reports

# Pinning and Navigation

## Dashboard - Favorites

- The most **relevant dashboards** can be defined as favorites
- They will appear in a **dedicated area**
- Work **across groups**
- Fully synchronized across platforms** – can set or view from mobile app and Power BI Service

The screenshot shows the Power BI Service navigation menu. On the left, there's a sidebar with 'Featured dashboard', 'My Workspace' (expanded), 'Search', 'Show: All content', 'Dashboards', and a '+' button. Below this is a link to 'AdvWorks Customer A...'. To the right, under 'FAVORITES', there are two cards: 'FEMAR Utilization' by FERNANDO MARCAL and 'Baby Milk Bottle Analysis' by FERNANDO MARCAL. Each card has a profile picture, a clock icon, a star icon, and a small bell icon.





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



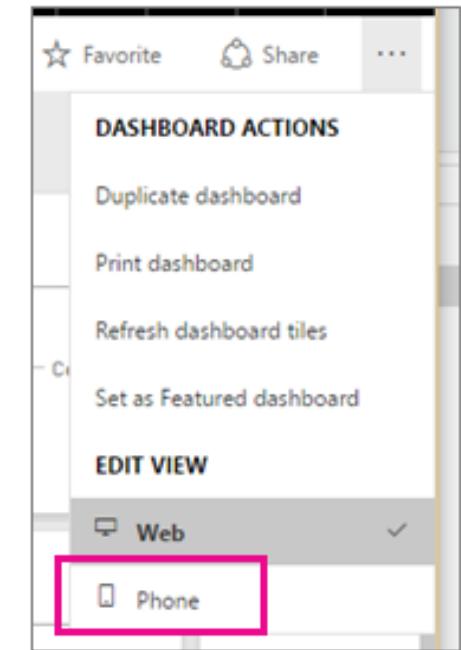
Mobile Reports

# Pinning and Navigation

## Dashboard – Phone View

- Create a customized view of any dashboard that you own specifically for phones
- Drag, resize, pin/unpin tiles to the phone view

The screenshot shows the 'Phone Dashboard' for the 'Opportunity Analysis Sample' report. The main area displays a summary card with '487' and '\$2bn', followed by three cards: 'Opportunity Count BY SALES STAGE', 'Opportunity Count BY REGION', and 'Factored Revenue BY OPPORTUNITY SIZE'. To the right, a 'Tiles' panel lists two cards: 'Opportunity Count BY PARTNER DRIVEN OPPORTUNITY SIZE' and 'Factored Revenue BY OPPORTUNITY SIZE'.





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

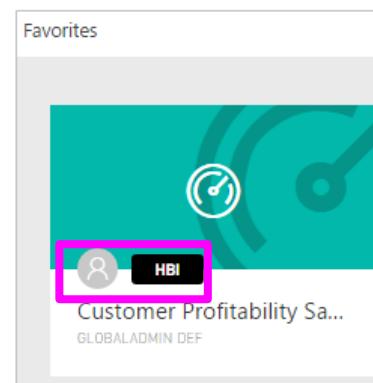
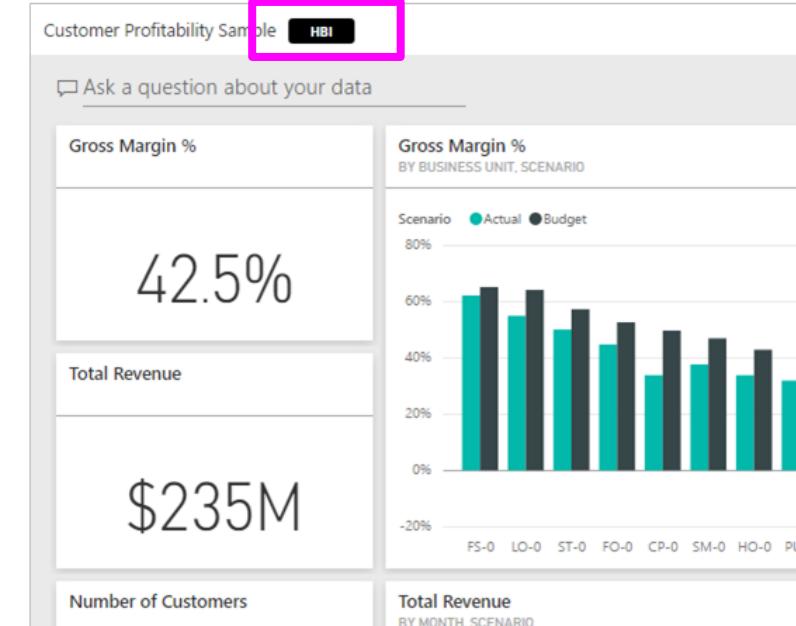


Mobile Reports

# Pinning and Navigation

## Dashboard – Data Classification

- Raise awareness of those viewing your dashboards about the level of security that should be used
- Tag your dashboards with classifications defined by your company's IT
- Tags show up next to the dashboard name
- Hover over tag to view full name of classification





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

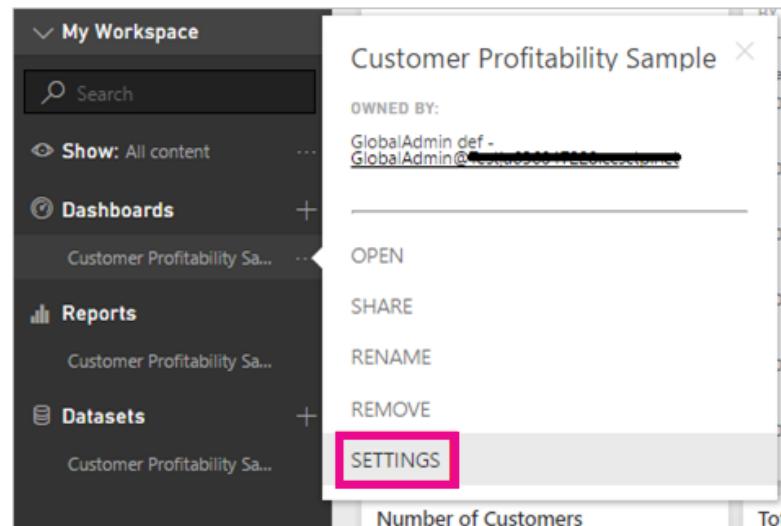


Mobile Reports

# Pinning and Navigation

## Dashboard – Data Classification

- All dashboards start out with a **default classification type**
- Dashboard owner can **change** the classification



Settings for Customer Profitability Sample

Q&A

Q&A allows users to find data and create charts using natural language from datasets used on a dashboard. [Learn more](#)

Show the Q&A search box on this dashboard

Dashboard tile flow

Tile flow automatically aligns your content to the canvas

Turn on tile flow

Data classification

Medium Business Impact

Apply Discard

A detailed view of the 'Settings' dialog for the 'Customer Profitability Sample' dashboard. It shows various configuration options like Q&A settings and tile flow. A specific section for 'Data classification' is highlighted with a pink rectangle, showing the current setting as 'Medium Business Impact'. There are 'Apply' and 'Discard' buttons at the bottom.



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

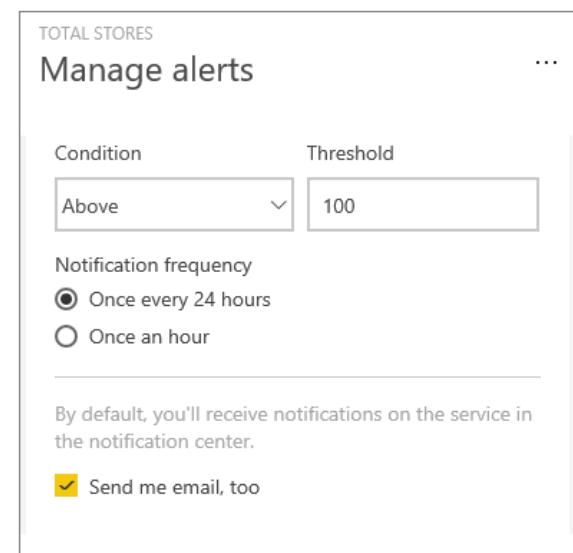
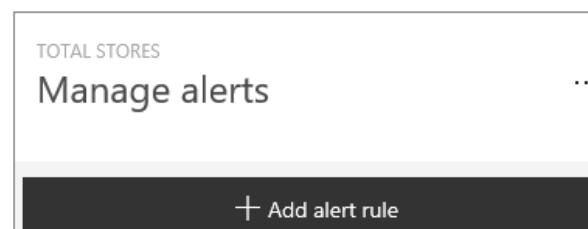
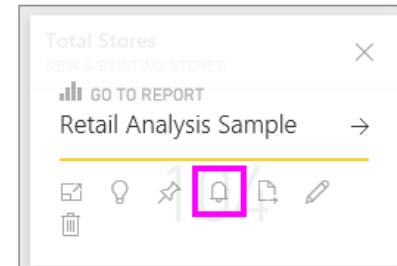
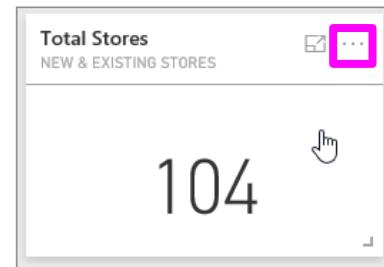


Mobile Reports

# Pinning and Navigation

## Dashboard – Data driven alerts

- Get notifications when a metric on your dashboard exceeds a set threshold
- Alerts work for numeric tiles featuring cards and gauges
- Fully synchronized across platforms – set and view alerts in mobile app and Power BI Service.



# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Pinning and Navigation

## Power BI Notification Center

- Important information related to your Power BI experience in one place
- Notification on all platforms – web (Power BI Service) and mobile app
- Includes data driven alerts

The screenshot displays two views of notification centers. On the left is the 'NOTIFICATION CENTER' from the Power BI Service, showing three notifications: a 'Realtime' message from 'Realtime' about a dashboard being added to Realtime, a message from 'Yaron Canari' about sharing a dashboard, and a message from 'Alexander Angriawan' about sharing a dashboard. Each notification includes a 'Go to dashboard' link. On the right is a 'Notifications' screen from a mobile device, showing a list of notifications from various users: 'Mobile BI', 'Fabrikam', 'Alert on Number of Cars', 'Amir Baranes', 'Yaron Canari', 'Yaniv Kravitz', and 'Yaron Canari'. The mobile screen also shows standard navigation icons at the top.

# Power BI Service: Sharing

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

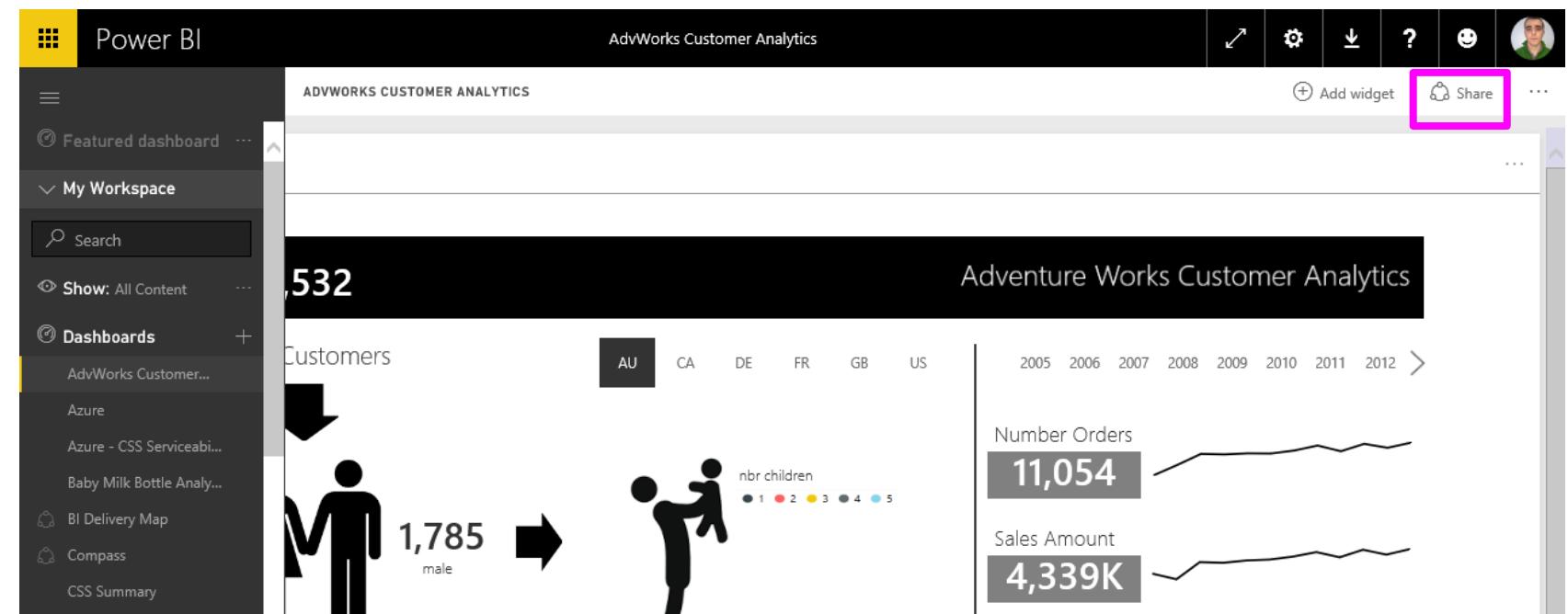


Mobile Reports

# Sharing

*Peer-to-peer/Peer-to-distribution group*

- It is possible to share dashboards and underlying reports with colleagues inside and outside of your organization
- The share happens at the dashboard level and each recipient gets an additional dashboard and reports in their **My Workspace**





Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel

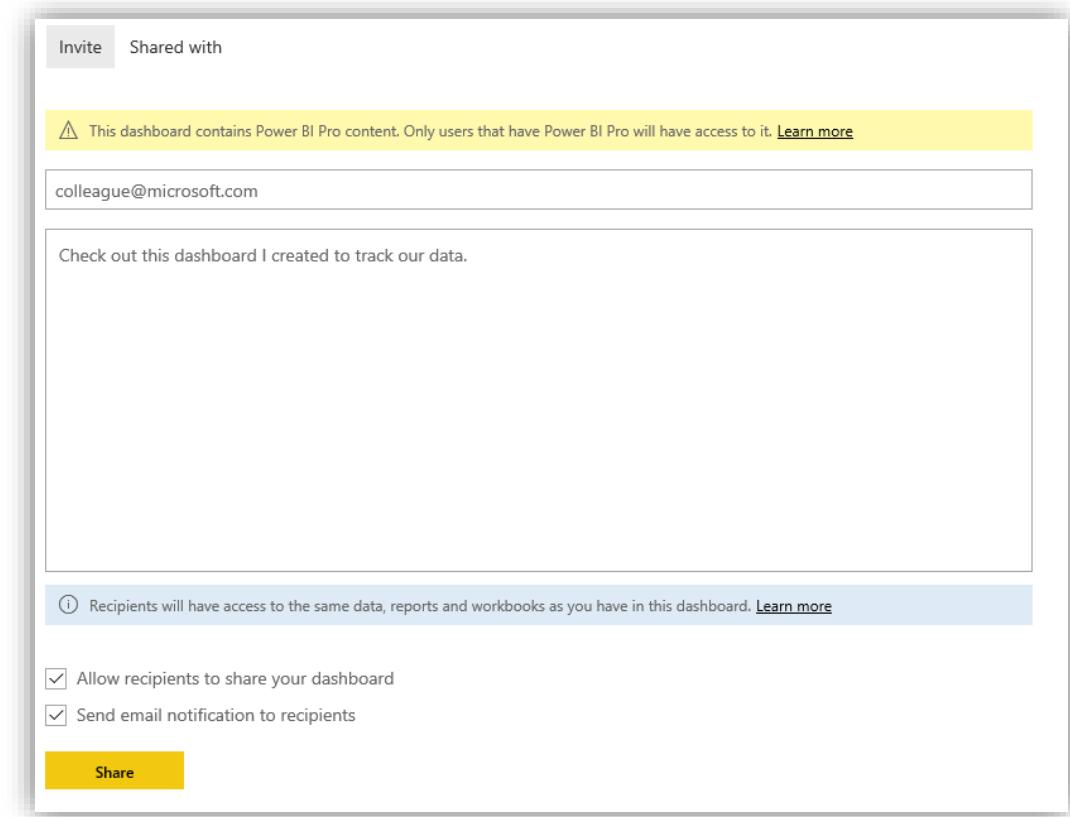


Mobile Reports

# Sharing

*Peer-to-peer/Peer-to-distribution group*

- Recipient e-mail can be a **distribution group** (if using O365 for email)
- Can control if recipients can re-share
- Recipients get an **e-mail with a link** (lasts one month)
- A shared dashboard appears with the symbol 



The screenshot shows the 'Shared with' tab of the sharing interface. It displays the recipient's email address: colleague@microsoft.com. Below the email field is a message: 'Check out this dashboard I created to track our data.' At the bottom, there are two checked checkboxes: 'Allow recipients to share your dashboard' and 'Send email notification to recipients'. A large yellow 'Share' button is located at the bottom right.



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Sharing

*Peer-to-peer/Peer-to-distribution group*

- Recipients can **see** the dashboard and interact with reports in **Reading View**
- **Changes** made by the owner are **available for everyone** when saved
- No one can see the dataset
- When re-sharing is enabled, users outside the organization can also share if their domain is registered in your tenant.
- If users already have access to a dashboard, they can **access it directly via the dashboard's URL**
- **Users outside the organization** have to **bookmark the URL**, it will not appear in their My Workspace



Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Sharing

*Peer-to-peer/Peer-to-distribution group*

- It is possible to see with **whom** the dashboard is currently shared and **revoke** re-sharing rights individually
- People outside the organization are listed as **Guest**

Share dashboard

Shared with David

Invite Shared with

Share Link

<https://groups/me/dashboards/d79cd3b1a20>

This dashboard has been shared with:

Maggie	Owner
David	Can view ...
vicki@contoso.com	Guest ⓘ Cancel invite

Can view ...

Cancel invite Stop sharing Disable reshares



Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel

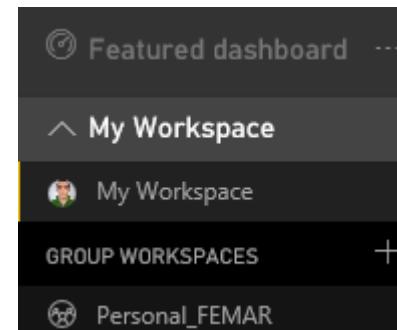


Mobile Reports

# Sharing

## Group Share

- Groups in Power BI are **O365 groups** and can be used in other services such as OneDrive or Exchange (have their own space and e-mail).
- AADSync can be used to **sync on-premises AD groups** with O365 groups
- A group has its **own workspace** with its own Datasets, Reports and Dashboards
- A user has **one My Workspace** but can have **access to several Group Workspaces**





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Sharing

## *Group Share*

- Members of the group can either have **Can Only View** or **Can Edit** permissions
- **Can Only View** allows the users to see all of the dashboards and reports that belong to that group. Access is **read-only**
- **Can Edit** allows the users to see and edit all of the content
- A dashboard in a Group can also be **shared with another peer directly** via the peer-to-peer method.
- A group workspace allows **several people to take ownership** of a certain set of content
- It also **allows the content to be organized** according to your governance rules (department, business area)



Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Sharing

## Group Share

- Members with **Admin** can manage access to the group
- Access is set to either View or Edit for **everyone** in the group (except Admins)

Save Cancel

### Edit group

Name

Privacy

Private - Only approved members can see what's inside

Members can only view Power BI content

Add group members

Enter email addresses

Add

femar@microsoft.com	Admin	X
nurinm@microsoft.com	Member	X



**Get Data**



**Pinning and Navigation**



**Keeping Data Current**



**Q&A and Quick Insights**



**Sharing**



**Connect from Excel**

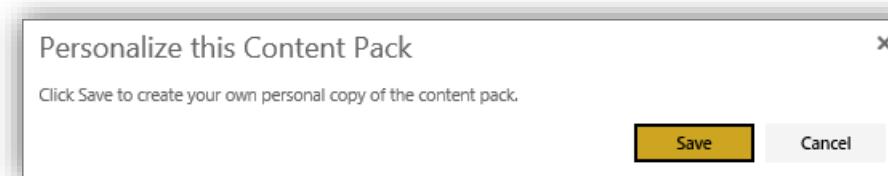


**Mobile Reports**

# Sharing

## *Organizational Content Packs*

- Distribute to a large audience a set of dashboards, reports and datasets
- Users can **subscribe** to the Pack via the Get Data experience
- Access to the content is **read-only**, but users can **customize** by creating a copy of their own



- Schedule refresh is set by author
- Can be used in conjunction with **Groups**
- Can be edited after creation

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



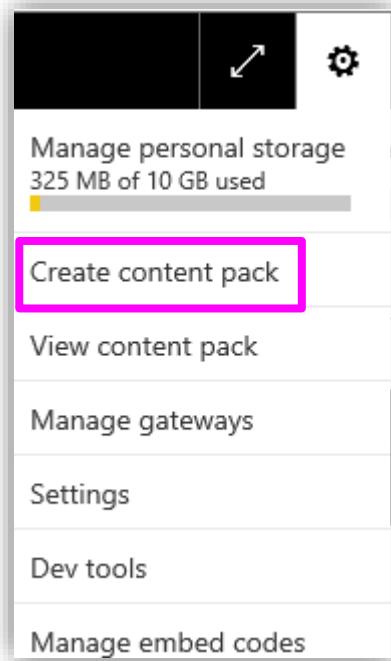
Connect from Excel



Mobile Reports

# Sharing

## Organizational Content Packs



Choose who will have access to this content pack:

Specific groups  My entire organization

Enter email addresses

Title

Description

Upload an image or company logo  
Image size: 45 KB or less, 4:3 aspect ratio, JPG or PNG format

Select items to publish

Dashboards	Reports	Datasets
<input type="checkbox"/> Polling Results - on the s... <sup>①</sup>	<input type="checkbox"/> AWInfoGraphic	<input type="checkbox"/> ElectionPoll
<input type="checkbox"/> Sales Analysis <sup>①</sup>	<input type="checkbox"/> Biberões	<input type="checkbox"/> Sales Analysis
<input type="checkbox"/> IAM 1.Expenses	<input type="checkbox"/> IAM Expenses	<input type="checkbox"/> DomesticAccounting
<input type="checkbox"/> IAM 2.Profits	<input type="checkbox"/> IAM Movements	<input type="checkbox"/> FEMAR-LEN01\SQL2K14...
<input type="checkbox"/> IAM 3.Movements	<input type="checkbox"/> IAM Profit	<input type="checkbox"/> IAMMovementReport
<input type="checkbox"/> WeightWatch	<input type="checkbox"/> Milk Bottle Analysis	<input type="checkbox"/> WeightWatch



Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel

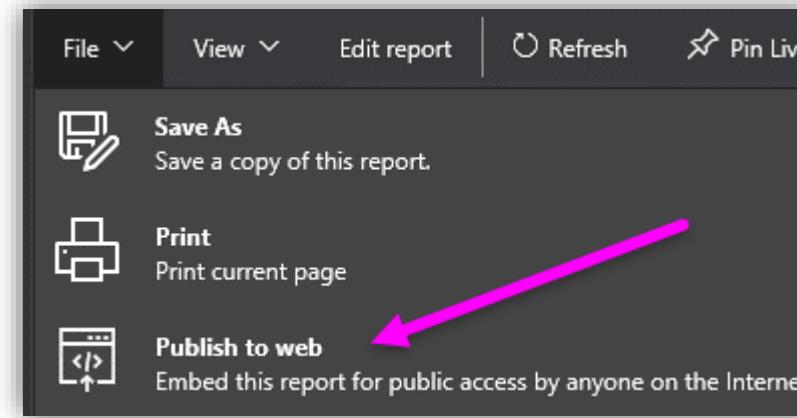


Mobile Reports

# Sharing

## *Public Share*

- Embed interactive visualizations online such as blog posts, websites or social media
- Visuals can be edited, updated, refreshed or un-shared after publishing
- Sharing starts on a report





Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel

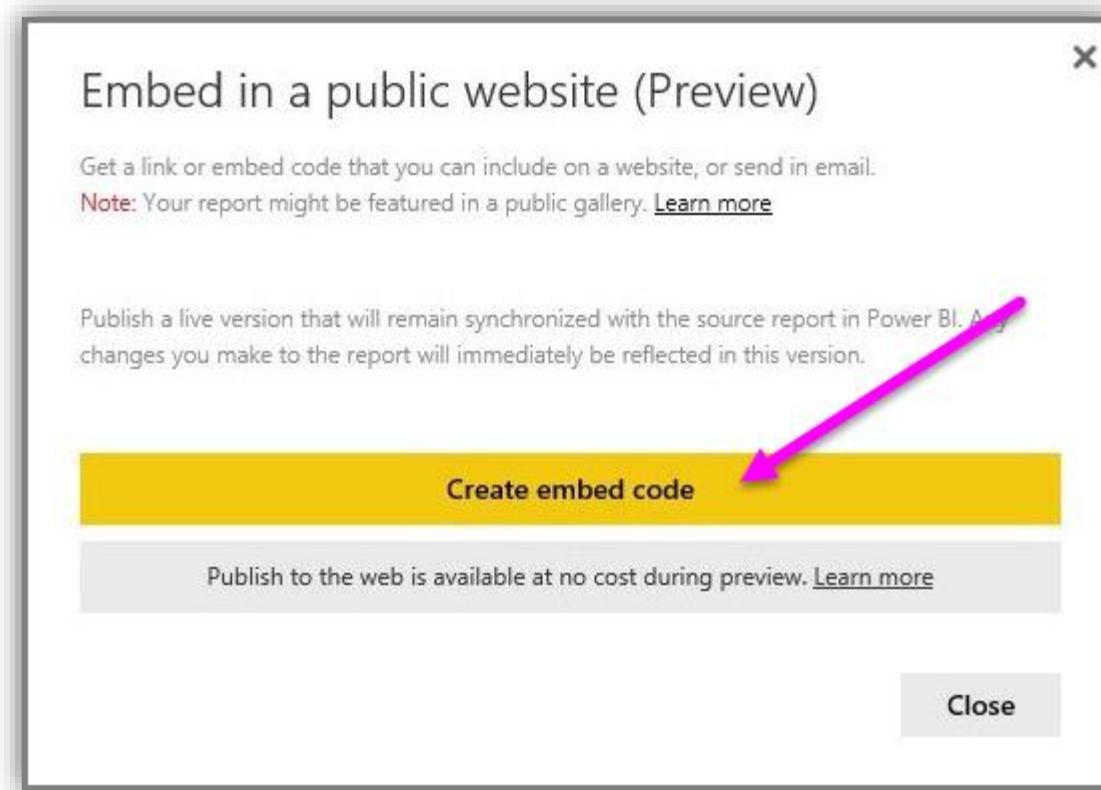


Mobile Reports

# Sharing

## Public Share

- A link and html code will be generated





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

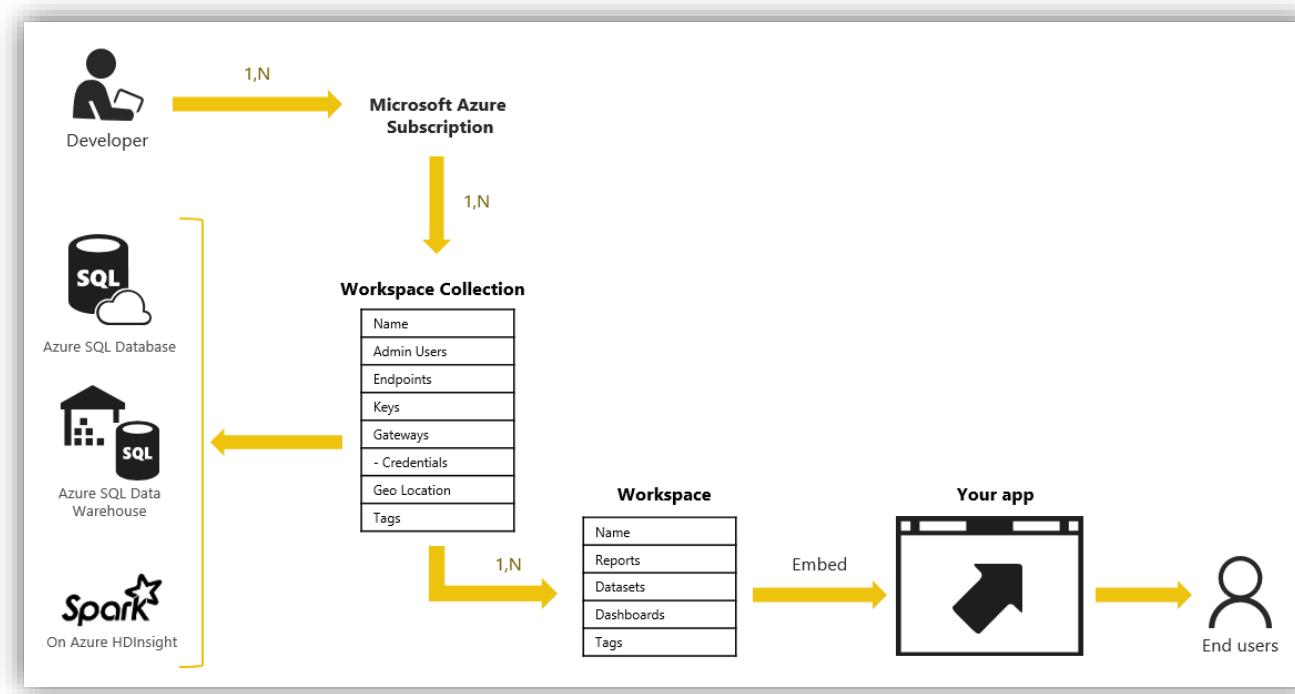


Mobile Reports

# Sharing

## Power BI Embedded

- Is a new Azure service that allows the inclusion of Power BI visualizations inside of **custom desktop or mobile apps** (through iframe)
- Users of the **application** don't need to be Power BI users (pricing is per rendering)





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

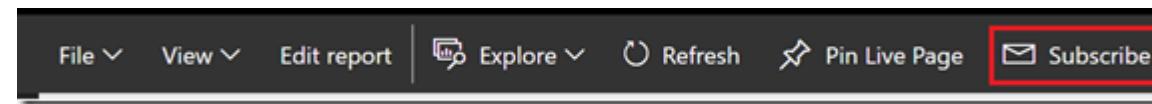


Mobile Reports

# Sharing

## E-mail subscriptions

- With Power BI **e-mail subscriptions**, you can quickly subscribe to emails of the report pages that matter most.
- Once subscribed, Power BI will regularly **send screenshots** of that report page directly to your inbox whenever the **data changes**.



RETAIL ANALYSIS

### Subscribe to emails

+ Add another subscription

Overview

Report page

Overview

You will be sent an email whenever the data is updated, but no more than once per day.

Retail Analysis 12/21/2016 11:24:04 PM

Store Sales Overview

Total Sales Variance by Month and District Manager

District Manager: Jillian Gantlett, Andrew Lee, Annaic Jules, Brianne Johnson, Celia Sibley, Chris Gray, Chris McEvily, Tracy Lavelle, Vicki Lohman

10 New Stores, 104 Total Stores

This Year Sales by Product Line and Store Type

New Store, Sale Store

UNITED STATES

Total Sales Variance %, Sales Per Sq Ft and This Year Sales by District and District

\$12.3, \$12.5, \$12.7, \$12.9, \$13.1, \$13.3, \$13.5, \$13.7, \$13.9, \$14.1, \$14.3, \$14.5, \$14.7, \$14.9, \$15.1, \$15.3, \$15.5, \$15.7, \$15.9, \$16.1, \$16.3, \$16.5, \$16.7, \$16.9, \$17.1, \$17.3, \$17.5, \$17.7, \$17.9, \$18.1, \$18.3, \$18.5, \$18.7, \$18.9, \$19.1, \$19.3, \$19.5, \$19.7, \$19.9, \$20.1, \$20.3, \$20.5, \$20.7, \$20.9, \$21.1, \$21.3, \$21.5, \$21.7, \$21.9, \$22.1, \$22.3, \$22.5, \$22.7, \$22.9, \$23.1, \$23.3, \$23.5, \$23.7, \$23.9, \$24.1, \$24.3, \$24.5, \$24.7, \$24.9, \$25.1, \$25.3, \$25.5, \$25.7, \$25.9, \$26.1, \$26.3, \$26.5, \$26.7, \$26.9, \$27.1, \$27.3, \$27.5, \$27.7, \$27.9, \$28.1, \$28.3, \$28.5, \$28.7, \$28.9, \$29.1, \$29.3, \$29.5, \$29.7, \$29.9, \$30.1, \$30.3, \$30.5, \$30.7, \$30.9, \$31.1, \$31.3, \$31.5, \$31.7, \$31.9, \$32.1, \$32.3, \$32.5, \$32.7, \$32.9, \$33.1, \$33.3, \$33.5, \$33.7, \$33.9, \$34.1, \$34.3, \$34.5, \$34.7, \$34.9, \$35.1, \$35.3, \$35.5, \$35.7, \$35.9, \$36.1, \$36.3, \$36.5, \$36.7, \$36.9, \$37.1, \$37.3, \$37.5, \$37.7, \$37.9, \$38.1, \$38.3, \$38.5, \$38.7, \$38.9, \$39.1, \$39.3, \$39.5, \$39.7, \$39.9, \$40.1, \$40.3, \$40.5, \$40.7, \$40.9, \$41.1, \$41.3, \$41.5, \$41.7, \$41.9, \$42.1, \$42.3, \$42.5, \$42.7, \$42.9, \$43.1, \$43.3, \$43.5, \$43.7, \$43.9, \$44.1, \$44.3, \$44.5, \$44.7, \$44.9, \$45.1, \$45.3, \$45.5, \$45.7, \$45.9, \$46.1, \$46.3, \$46.5, \$46.7, \$46.9, \$47.1, \$47.3, \$47.5, \$47.7, \$47.9, \$48.1, \$48.3, \$48.5, \$48.7, \$48.9, \$49.1, \$49.3, \$49.5, \$49.7, \$49.9, \$50.1, \$50.3, \$50.5, \$50.7, \$50.9, \$51.1, \$51.3, \$51.5, \$51.7, \$51.9, \$52.1, \$52.3, \$52.5, \$52.7, \$52.9, \$53.1, \$53.3, \$53.5, \$53.7, \$53.9, \$54.1, \$54.3, \$54.5, \$54.7, \$54.9, \$55.1, \$55.3, \$55.5, \$55.7, \$55.9, \$56.1, \$56.3, \$56.5, \$56.7, \$56.9, \$57.1, \$57.3, \$57.5, \$57.7, \$57.9, \$58.1, \$58.3, \$58.5, \$58.7, \$58.9, \$59.1, \$59.3, \$59.5, \$59.7, \$59.9, \$60.1, \$60.3, \$60.5, \$60.7, \$60.9, \$61.1, \$61.3, \$61.5, \$61.7, \$61.9, \$62.1, \$62.3, \$62.5, \$62.7, \$62.9, \$63.1, \$63.3, \$63.5, \$63.7, \$63.9, \$64.1, \$64.3, \$64.5, \$64.7, \$64.9, \$65.1, \$65.3, \$65.5, \$65.7, \$65.9, \$66.1, \$66.3, \$66.5, \$66.7, \$66.9, \$67.1, \$67.3, \$67.5, \$67.7, \$67.9, \$68.1, \$68.3, \$68.5, \$68.7, \$68.9, \$69.1, \$69.3, \$69.5, \$69.7, \$69.9, \$70.1, \$70.3, \$70.5, \$70.7, \$70.9, \$71.1, \$71.3, \$71.5, \$71.7, \$71.9, \$72.1, \$72.3, \$72.5, \$72.7, \$72.9, \$73.1, \$73.3, \$73.5, \$73.7, \$73.9, \$74.1, \$74.3, \$74.5, \$74.7, \$74.9, \$75.1, \$75.3, \$75.5, \$75.7, \$75.9, \$76.1, \$76.3, \$76.5, \$76.7, \$76.9, \$77.1, \$77.3, \$77.5, \$77.7, \$77.9, \$78.1, \$78.3, \$78.5, \$78.7, \$78.9, \$79.1, \$79.3, \$79.5, \$79.7, \$79.9, \$80.1, \$80.3, \$80.5, \$80.7, \$80.9, \$81.1, \$81.3, \$81.5, \$81.7, \$81.9, \$82.1, \$82.3, \$82.5, \$82.7, \$82.9, \$83.1, \$83.3, \$83.5, \$83.7, \$83.9, \$84.1, \$84.3, \$84.5, \$84.7, \$84.9, \$85.1, \$85.3, \$85.5, \$85.7, \$85.9, \$86.1, \$86.3, \$86.5, \$86.7, \$86.9, \$87.1, \$87.3, \$87.5, \$87.7, \$87.9, \$88.1, \$88.3, \$88.5, \$88.7, \$88.9, \$89.1, \$89.3, \$89.5, \$89.7, \$89.9, \$90.1, \$90.3, \$90.5, \$90.7, \$90.9, \$91.1, \$91.3, \$91.5, \$91.7, \$91.9, \$92.1, \$92.3, \$92.5, \$92.7, \$92.9, \$93.1, \$93.3, \$93.5, \$93.7, \$93.9, \$94.1, \$94.3, \$94.5, \$94.7, \$94.9, \$95.1, \$95.3, \$95.5, \$95.7, \$95.9, \$96.1, \$96.3, \$96.5, \$96.7, \$96.9, \$97.1, \$97.3, \$97.5, \$97.7, \$97.9, \$98.1, \$98.3, \$98.5, \$98.7, \$98.9, \$99.1, \$99.3, \$99.5, \$99.7, \$99.9, \$100.1, \$100.3, \$100.5, \$100.7, \$100.9, \$101.1, \$101.3, \$101.5, \$101.7, \$101.9, \$102.1, \$102.3, \$102.5, \$102.7, \$102.9, \$103.1, \$103.3, \$103.5, \$103.7, \$103.9, \$104.1, \$104.3, \$104.5, \$104.7, \$104.9, \$105.1, \$105.3, \$105.5, \$105.7, \$105.9, \$106.1, \$106.3, \$106.5, \$106.7, \$106.9, \$107.1, \$107.3, \$107.5, \$107.7, \$107.9, \$108.1, \$108.3, \$108.5, \$108.7, \$108.9, \$109.1, \$109.3, \$109.5, \$109.7, \$109.9, \$110.1, \$110.3, \$110.5, \$110.7, \$110.9, \$111.1, \$111.3, \$111.5, \$111.7, \$111.9, \$112.1, \$112.3, \$112.5, \$112.7, \$112.9, \$113.1, \$113.3, \$113.5, \$113.7, \$113.9, \$114.1, \$114.3, \$114.5, \$114.7, \$114.9, \$115.1, \$115.3, \$115.5, \$115.7, \$115.9, \$116.1, \$116.3, \$116.5, \$116.7, \$116.9, \$117.1, \$117.3, \$117.5, \$117.7, \$117.9, \$118.1, \$118.3, \$118.5, \$118.7, \$118.9, \$119.1, \$119.3, \$119.5, \$119.7, \$119.9, \$120.1, \$120.3, \$120.5, \$120.7, \$120.9, \$121.1, \$121.3, \$121.5, \$121.7, \$121.9, \$122.1, \$122.3, \$122.5, \$122.7, \$122.9, \$123.1, \$123.3, \$123.5, \$123.7, \$123.9, \$124.1, \$124.3, \$124.5, \$124.7, \$124.9, \$125.1, \$125.3, \$125.5, \$125.7, \$125.9, \$126.1, \$126.3, \$126.5, \$126.7, \$126.9, \$127.1, \$127.3, \$127.5, \$127.7, \$127.9, \$128.1, \$128.3, \$128.5, \$128.7, \$128.9, \$129.1, \$129.3, \$129.5, \$129.7, \$129.9, \$130.1, \$130.3, \$130.5, \$130.7, \$130.9, \$131.1, \$131.3, \$131.5, \$131.7, \$131.9, \$132.1, \$132.3, \$132.5, \$132.7, \$132.9, \$133.1, \$133.3, \$133.5, \$133.7, \$133.9, \$134.1, \$134.3, \$134.5, \$134.7, \$134.9, \$135.1, \$135.3, \$135.5, \$135.7, \$135.9, \$136.1, \$136.3, \$136.5, \$136.7, \$136.9, \$137.1, \$137.3, \$137.5, \$137.7, \$137.9, \$138.1, \$138.3, \$138.5, \$138.7, \$138.9, \$139.1, \$139.3, \$139.5, \$139.7, \$139.9, \$140.1, \$140.3, \$140.5, \$140.7, \$140.9, \$141.1, \$141.3, \$141.5, \$141.7, \$141.9, \$142.1, \$142.3, \$142.5, \$142.7, \$142.9, \$143.1, \$143.3, \$143.5, \$143.7, \$143.9, \$144.1, \$144.3, \$144.5, \$144.7, \$144.9, \$145.1, \$145.3, \$145.5, \$145.7, \$145.9, \$146.1, \$146.3, \$146.5, \$146.7, \$146.9, \$147.1, \$147.3, \$147.5, \$147.7, \$147.9, \$148.1, \$148.3, \$148.5, \$148.7, \$148.9, \$149.1, \$149.3, \$149.5, \$149.7, \$149.9, \$150.1, \$150.3, \$150.5, \$150.7, \$150.9, \$151.1, \$151.3, \$151.5, \$151.7, \$151.9, \$152.1, \$152.3, \$152.5, \$152.7, \$152.9, \$153.1, \$153.3, \$153.5, \$153.7, \$153.9, \$154.1, \$154.3, \$154.5, \$154.7, \$154.9, \$155.1, \$155.3, \$155.5, \$155.7, \$155.9, \$156.1, \$156.3, \$156.5, \$156.7, \$156.9, \$157.1, \$157.3, \$157.5, \$157.7, \$157.9, \$158.1, \$158.3, \$158.5, \$158.7, \$158.9, \$159.1, \$159.3, \$159.5, \$159.7, \$159.9, \$160.1, \$160.3, \$160.5, \$160.7, \$160.9, \$161.1, \$161.3, \$161.5, \$161.7, \$161.9, \$162.1, \$162.3, \$162.5, \$162.7, \$162.9, \$163.1, \$163.3, \$163.5, \$163.7, \$163.9, \$164.1, \$164.3, \$164.5, \$164.7, \$164.9, \$165.1, \$165.3, \$165.5, \$165.7, \$165.9, \$166.1, \$166.3, \$166.5, \$166.7, \$166.9, \$167.1, \$167.3, \$167.5, \$167.7, \$167.9, \$168.1, \$168.3, \$168.5, \$168.7, \$168.9, \$169.1, \$169.3, \$169.5, \$169.7, \$169.9, \$170.1, \$170.3, \$170.5, \$170.7, \$170.9, \$171.1, \$171.3, \$171.5, \$171.7, \$171.9, \$172.1, \$172.3, \$172.5, \$172.7, \$172.9, \$173.1, \$173.3, \$173.5, \$173.7, \$173.9, \$174.1, \$174.3, \$174.5, \$174.7, \$174.9, \$175.1, \$175.3, \$175.5, \$175.7, \$175.9, \$176.1, \$176.3, \$176.5, \$176.7, \$176.9, \$177.1, \$177.3, \$177.5, \$177.7, \$177.9, \$178.1, \$178.3, \$178.5, \$178.7, \$178.9, \$179.1, \$179.3, \$179.5, \$179.7, \$179.9, \$180.1, \$180.3, \$180.5, \$180.7, \$180.9, \$181.1, \$181.3, \$181.5, \$181.7, \$181.9, \$182.1, \$182.3, \$182.5, \$182.7, \$182.9, \$183.1, \$183.3, \$183.5, \$183.7, \$183.9, \$184.1, \$184.3, \$184.5, \$184.7, \$184.9, \$185.1, \$185.3, \$185.5, \$185.7, \$185.9, \$186.1, \$186.3, \$186.5, \$186.7, \$186.9, \$187.1, \$187.3, \$187.5, \$187.7, \$187.9, \$188.1, \$188.3, \$188.5, \$188.7, \$188.9, \$189.1, \$189.3, \$189.5, \$189.7, \$189.9, \$190.1, \$190.3, \$190.5, \$190.7, \$190.9, \$191.1, \$191.3, \$191.5, \$191.7, \$191.9, \$192.1, \$192.3, \$192.5, \$192.7, \$192.9, \$193.1, \$193.3, \$193.5, \$193.7, \$193.9, \$194.1, \$194.3, \$194.5, \$194.7, \$194.9, \$195.1, \$195.3, \$195.5, \$195.7, \$195.9, \$196.1, \$196.3, \$196.5, \$196.7, \$196.9, \$197.1, \$197.3, \$197.5, \$197.7, \$197.9, \$198.1, \$198.3, \$198.5, \$198.7, \$198.9, \$199.1, \$199.3, \$199.5, \$199.7, \$199.9, \$200.1, \$200.3, \$200.5, \$200.7, \$200.9, \$201.1, \$201.3, \$201.5, \$201.7, \$201.9, \$202.1, \$202.3, \$202.5, \$202.7, \$202.9, \$203.1, \$203.3, \$203.5, \$203.7, \$203.9, \$204.1, \$204.3, \$204.5, \$204.7, \$204.9, \$205.1, \$205.3, \$205.5, \$205.7, \$205.9, \$206.1, \$206.3, \$206.5, \$206.7, \$206.9, \$207.1, \$207.3, \$207.5, \$207.7, \$207.9, \$208.1, \$208.3, \$208.5, \$208.7, \$208.9, \$209.1, \$209.3, \$209.5, \$209.7, \$209.9, \$210.1, \$210.3, \$210.5, \$210.7, \$210.9, \$211.1, \$211.3, \$211.5, \$211.7, \$211.9, \$212.1, \$212.3, \$212.5, \$212.7, \$212.9, \$213.1, \$213.3, \$213.5, \$213.7, \$213.9, \$214.1, \$214.3, \$214.5, \$214.7, \$214.9, \$215.1, \$215.3, \$215.5, \$215.7, \$215.9, \$216.1, \$216.3, \$216.5, \$216.7, \$216.9, \$217.1, \$217.3, \$217.5, \$217.7, \$217.9, \$218.1, \$218.3, \$218.5, \$218.7, \$218.9, \$219.1, \$219.3, \$219.5, \$219.7, \$219.9, \$220.1, \$220.3, \$220.5, \$220.7, \$220.9, \$221.1, \$221.3, \$221.5, \$221.7, \$221.9, \$222.1, \$222.3, \$222.5, \$222.7, \$222.9, \$223.1, \$223.3, \$223.5, \$223.7, \$223.9, \$224.1, \$224.3, \$224.5, \$224.7, \$224.9, \$225.1, \$225.3, \$225.5, \$225.7, \$225.9, \$226.1, \$226.3, \$226.5, \$226.7, \$226.9, \$227.1, \$227.3, \$227.5, \$227.7, \$227.9, \$228.1, \$228.3, \$228.5, \$228.7, \$228.9, \$229.1, \$229.3, \$229.5, \$229.7, \$229.9, \$230.1, \$230.3, \$230.5, \$230.7, \$230.9, \$231.1, \$231.3, \$231.5, \$231.7, \$231.9, \$232.1, \$232.3, \$232.5, \$232.7, \$232.9, \$233.1, \$233.3, \$233.5, \$233.7, \$233.9, \$234.1, \$234.3, \$234.5, \$234.7, \$234.9, \$235.1, \$235.3, \$235.5, \$235.7, \$235.9, \$236.1, \$236.3, \$236.5, \$236.7, \$236.9, \$237.1, \$237.3, \$237.5, \$237.7, \$237.9, \$238.1, \$238.3, \$238.5, \$238.7, \$238.9, \$239.1, \$239.3, \$239.5, \$239.7, \$239.9, \$240.1, \$240.3, \$240.5, \$240.7, \$240.9, \$241.1, \$241.3, \$241.5, \$241.7, \$241.9, \$242.1, \$242.3, \$242.5, \$242.7, \$242.9, \$243.1, \$243.3, \$243.5, \$243.7, \$243.9, \$244.1, \$244.3, \$244.5, \$244.7, \$244.9, \$245.1, \$245.3, \$245.5, \$245.7, \$245.9, \$246.1, \$246.3, \$246.5, \$246.7, \$246.9, \$247.1, \$247.3, \$247.5, \$247.7, \$247.9, \$248.1, \$248.3, \$248.5, \$248.7, \$248.9, \$249.1, \$249.3, \$249.5, \$249.7, \$249.9, \$250.1, \$250.3, \$250.5, \$250.7, \$250.9, \$251.1, \$251.3, \$251.5, \$251.7, \$251.9, \$252.1, \$252.3, \$252.5, \$252.7, \$252.9, \$253.1, \$253.3, \$253.5, \$253.7, \$253.9, \$254.1, \$254.3, \$254.5, \$254.7, \$254.9, \$255.1, \$255.3, \$255.5, \$255.7, \$255.9, \$256.1, \$256.3, \$256.5, \$256.7, \$256.9, \$257.1, \$257.3, \$257.5, \$257.7, \$257.9, \$258.1, \$258.3, \$258.5, \$258.7, \$258.9, \$259.1, \$259.3, \$259.5, \$259.7, \$259.9, \$260.1, \$260.3, \$260.5, \$260.7, \$260.9, \$261.1, \$261.3, \$261.5, \$261.7, \$261.9, \$262.1, \$262.3, \$262.5, \$262.7, \$262.9, \$263.1, \$263.3, \$263.5, \$263.7, \$263.9, \$264.1, \$264.3, \$264.5, \$264.7, \$264.9, \$265.1, \$265.3, \$265.5, \$265.7, \$265.9, \$266.1, \$266.3, \$266.5, \$266.7, \$266.9, \$267.1, \$267.3, \$267.5, \$267.7, \$267.9, \$268.1, \$268.3, \$268.5, \$268.7, \$268.9, \$269.1, \$269.3, \$269.5, \$269.7, \$269.9, \$270.1, \$270.3, \$270.5, \$270.7, \$270.9, \$271.1, \$271.3, \$271.5, \$271.7, \$271.9, \$272.1, \$272.3, \$272.5, \$272.7, \$272.9, \$273.1, \$273.3, \$273.5, \$273.7, \$273.9, \$274.1, \$274.3, \$274.5, \$274.7, \$274.9, \$275.1, \$275.3, \$275.5, \$275.7, \$275.9, \$276.1, \$276.3, \$276.5, \$276.7, \$276.9, \$277.1, \$277.3, \$277.5, \$277.7, \$277.9, \$278.1, \$278.3, \$278.5, \$278.7, \$278.9, \$279.1, \$279.3, \$279.5, \$279.7, \$279.9, \$280.1, \$280.3, \$280.5, \$280.7, \$280.9, \$281.1, \$281.3, \$281.5, \$281.7, \$281.9, \$282.1, \$282.3, \$282.5, \$282.7, \$282.9, \$283.1, \$283.3, \$283.5, \$283.7, \$283.9, \$284.1, \$284.3, \$284.5, \$284.7, \$284.9, \$285.1, \$285.3, \$285.5, \$285.7, \$285.9, \$286.1, \$286.3, \$286.5, \$286.7, \$286.9, \$287.1, \$287.3, \$287.5, \$287.7, \$287.9, \$288.1, \$288.3, \$288.5, \$288.7, \$288.9, \$289.1, \$289.3, \$289.5, \$289.7, \$289.9, \$290.1, \$290.3, \$290.5, \$290.7, \$290.9, \$291.1, \$291.3, \$291.5, \$291.7, \$291.9, \$292.1, \$292.3, \$292.5, \$292.7, \$292.9, \$293.1, \$293.3, \$293.5, \$293.7, \$293.9, \$294.1, \$294.3, \$294.5, \$294.7, \$294.9, \$295.1, \$295.3, \$295.5, \$295.7, \$295.9, \$296.1, \$296.3, \$296.5, \$296.7, \$296.9, \$297.1, \$297.3, \$297.5, \$297.7, \$297.9, \$298.1, \$298.3, \$298.5, \$298.7, \$298.9, \$299.1, \$299.3, \$299.5, \$299.7, \$299.9, \$300.1, \$300.3, \$300.5, \$300.7, \$300.9, \$301.1, \$301.3, \$301.5, \$301.7, \$301.9, \$302.1, \$302.3, \$302.5, \$302.7, \$302.9, \$303.1, \$303.3, \$303.5, \$303.7, \$303.9, \$304.1, \$304.3, \$304.5, \$304.7, \$304.9, \$305.1, \$305.3, \$305.5, \$305.7, \$305.9, \$306.1, \$306.3, \$306.5, \$306.7, \$306.9, \$307.1, \$307.3, \$307.5, \$307.7, \$307.9, \$308.1, \$308.3, \$308.5, \$308.7, \$308.9, \$309.1, \$309.3, \$309.5, \$309.7, \$309.9, \$310.1, \$310.3, \$310.5, \$310.7, \$310.9, \$311.1, \$311.3, \$311.5, \$311.7, \$311.9, \$312.1

# Power BI Service: Mobile Reports

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Mobile Reports

## Mobile Apps – Platforms

- Apps are available for iPad, iPhone, Apple Watch, Android and Windows Devices



- Features may vary across platforms but tend to be the same in the future
- The mobile apps can also be used with SQL Server 2016 Mobile Reports and KPIs and require no Power BI licensing

# Power BI Service



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

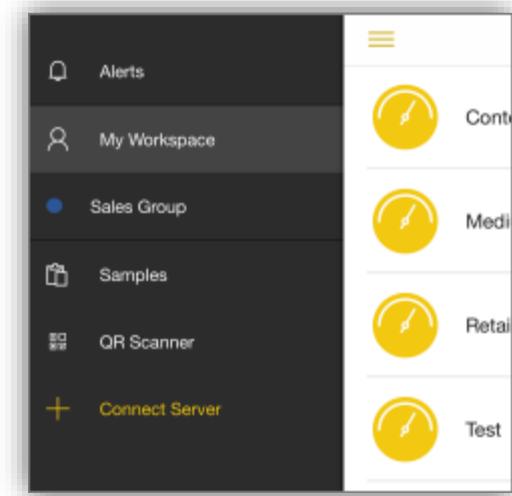
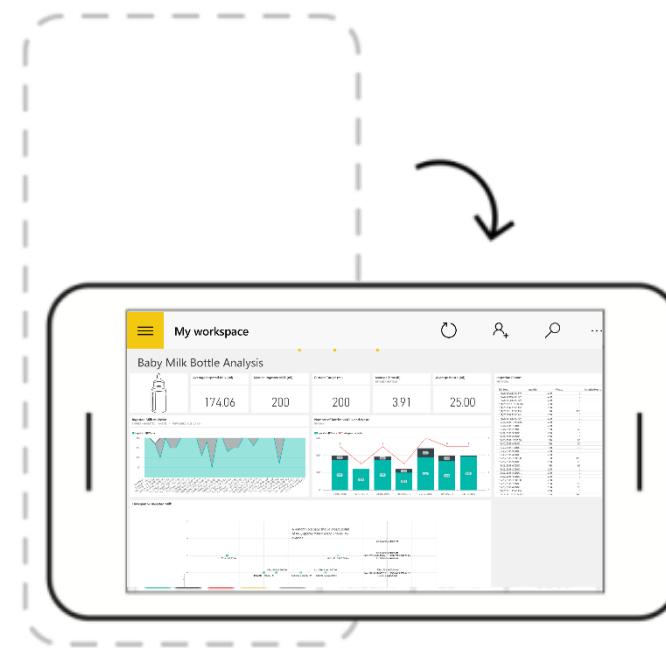
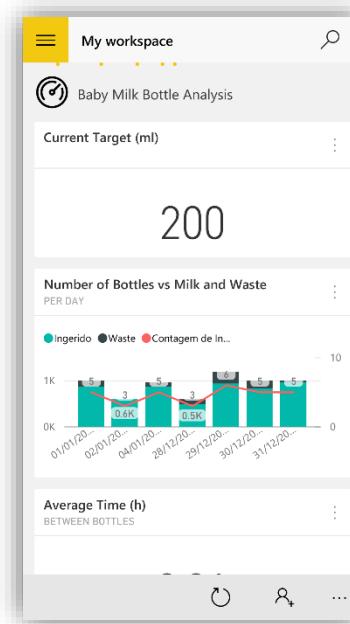


Mobile Reports

# Mobile Reports

## Mobile Apps – Dashboards

- Interact with dashboards in your workspace or groups'
- When the dashboard is open it displays a series of tiles and supports real-time
- Flip it to display the entire dashboard and pinch to zoom





Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Mobile Reports

## *Mobile Apps – Offline*

- While you are offline you can access **all** of your dashboard in My Workspace
- You can also access any previously accessed dashboards
- You have read-only access to **reports** previously accessed, but no interactivity
- Visual queues for available content exist for ease of use
- Power BI refreshes the data automatically every two hours on the device (can be turned off). The cache lasts indefinitely.
- 250 MB limit for data offline
- Whole Excel workbooks are not available

# Power BI Service: Keeping Data Current



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel

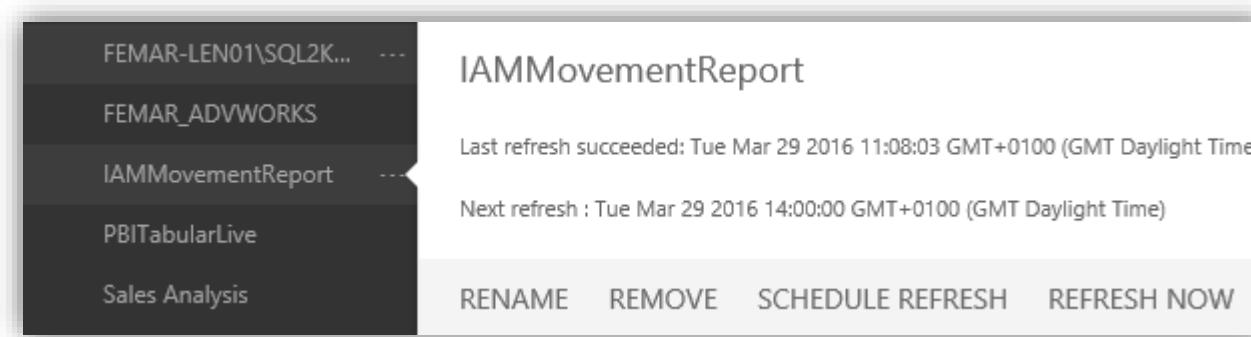


Mobile Reports

# Keeping Data Current

## *Data Refresh*

- When a **dataset** is created in Power BI it might have several **data sources**



- When you refresh data in Power BI, you're updating data in the dataset with new data coming from data sources
- Some data sources might be live or self-updateable
- Refresh Now performs the operation immediately based on the definition of the data sources



Get Data



Pinning and  
Navigation



Keeping Data  
Current



Q&A and  
Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Keeping Data Current

## *Data Refresh*

- The Scheduled Refresh option allows configuration of credentials and schedule

▲ Data source credentials

ppr\_applicationDB-[Edit credentials](#)

AzureBlob [Edit credentials](#)

OneDrive - Personal [Edit credentials](#)

Configure IAMMovementReport\*

Server:

Database:

Authentication method:

User name:

Password:



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Keeping Data Current

## Data Refresh

- The Scheduled Refresh option allows configuration of credentials and schedule

▲ Schedule Refresh

Keep your data up to date  
 Yes

Refresh frequency

Time zone

Time  
1  00  PM  X  
9  00  PM  X

[Add another time](#)

Send refresh failure notification email to me

▲ Schedule Refresh

Keep your data up to date  
 Yes

Refresh frequency

Time zone

Sunday  Monday  Tuesday  Wednesday  
 Thursday  Friday  Saturday

Time  
1  00  PM  X  
9  00  PM  X

[Add another time](#)

Send refresh failure notification email to me



Get Data



Pinning and Navigation



Keeping Data Current



Q&A and Quick Insights



Sharing



Connect from Excel



Mobile Reports

# Keeping Data Current

## *Data Refresh – Data Source Types*

- Automatic Refresh – no user configuration necessary
  - Content packs from SaaS providers – typically once a day
  - Files loaded from OneDrive/Sharepoint Online – happens every hour (can be overridden)
- Live with Direct Query – Data is always in sync with the data source. No schedule can be defined
  - SQL Azure Database
  - SQL Azure Data Warehouse
  - Spark on HDInsight
  - SSAS (Multidimensional and Tabular) – requires a Gateway and allows row-level-security
- Real-time data coming from Power BI API or Microsoft Stream Analytics
- Refreshable Data Sources – a schedule can be defined in Power BI service
  - SQL Azure Database
  - SQL Server On-Premises – requires a Gateway
  - File stored in OneDrive
  - ...

# Power BI: Pro vs. Free

# Power BI portfolio

## Power BI Desktop

Licensed by user

**Free** report authoring and ad-hoc data exploration

## Power BI Free

Licensed by user

Quick, easy-to-use self-service analytics for **personal use**

## Power BI Pro

Licensed by user

Quick, easy-to-use **self-service** analytics for users requiring **collaboration**, dashboard sharing, ad hoc analysis, and report publishing

## Power BI Premium

Licensed by capacity

An add-on to **Power BI Pro** for projects requiring **large scale data**, demanding **performance**, and the ability to distribute content without requiring per user licensing

# Power BI user license tiers

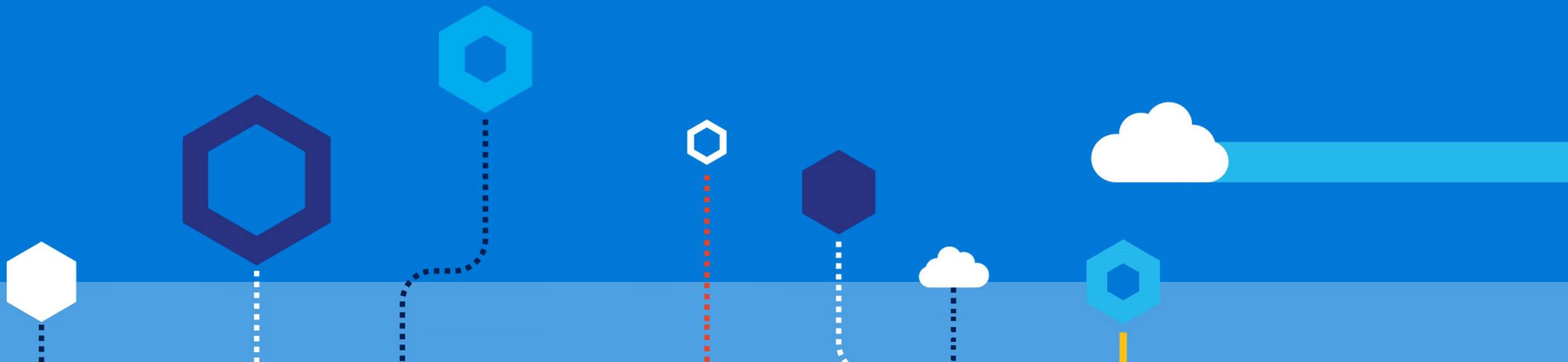
	Free	Pro (\$10/user/month)
Connect to 70+ data sources	✓	✓
Peer-to-peer sharing	✗	✓
Enterprise distribution		
Apps	✗	✓
Email subscriptions	✗	✓
Embed APIs and controls	✗	✓
Collaboration		
Group workspaces	✗	✓
Analyze in Excel, analyze in Power BI Desktop	✗	✓

# Performance Tips

# Power BI Solution Scenarios

- Cloud Model
- Live Connect to Analysis Services
- DirectQuery
  - Azure SQL DB
  - Azure SQL DW

# Power BI on SQL DW



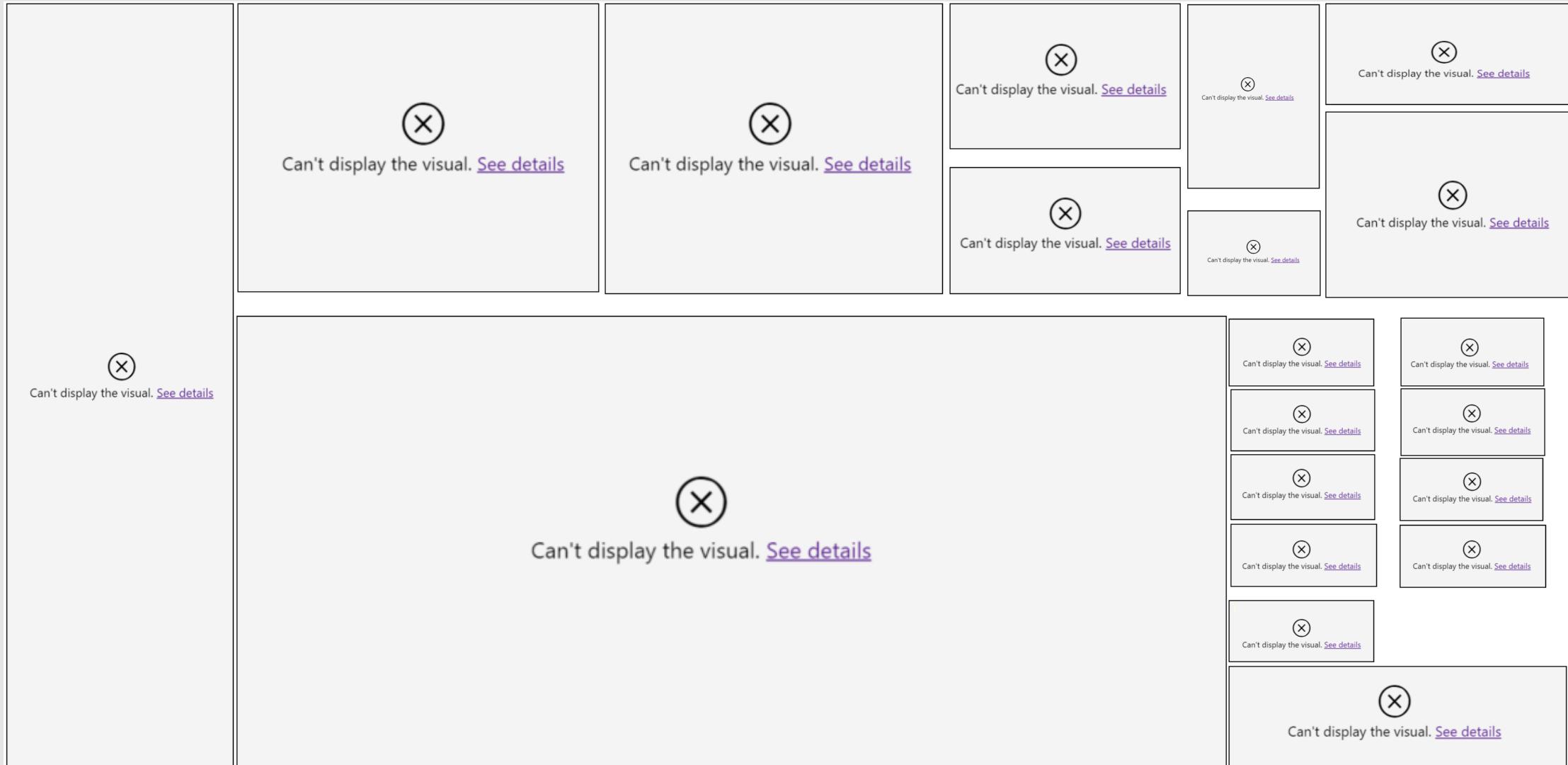
# Power BI Report



# Power BI Report



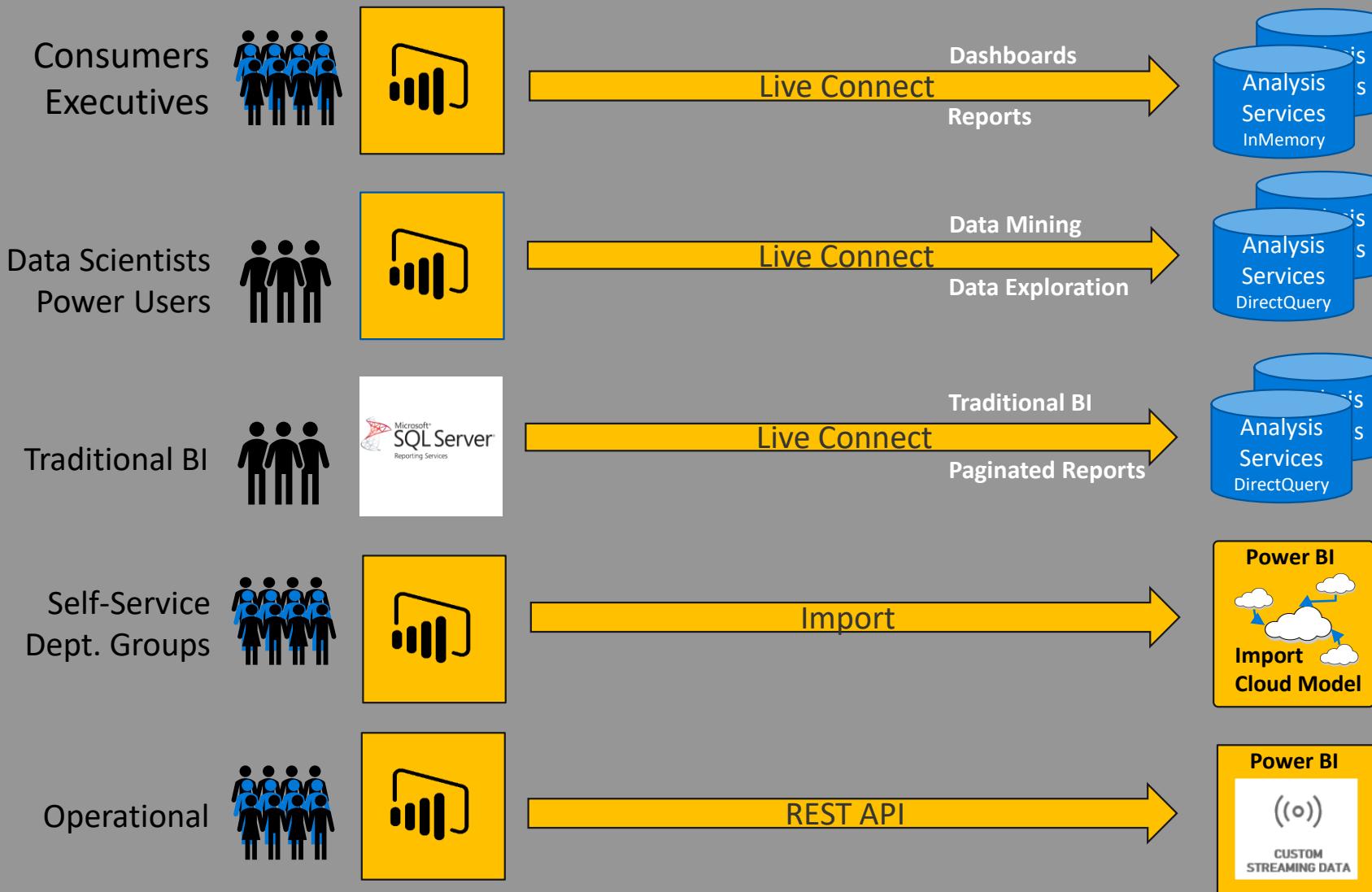
# Power BI Report



# SQL DW Concurrency

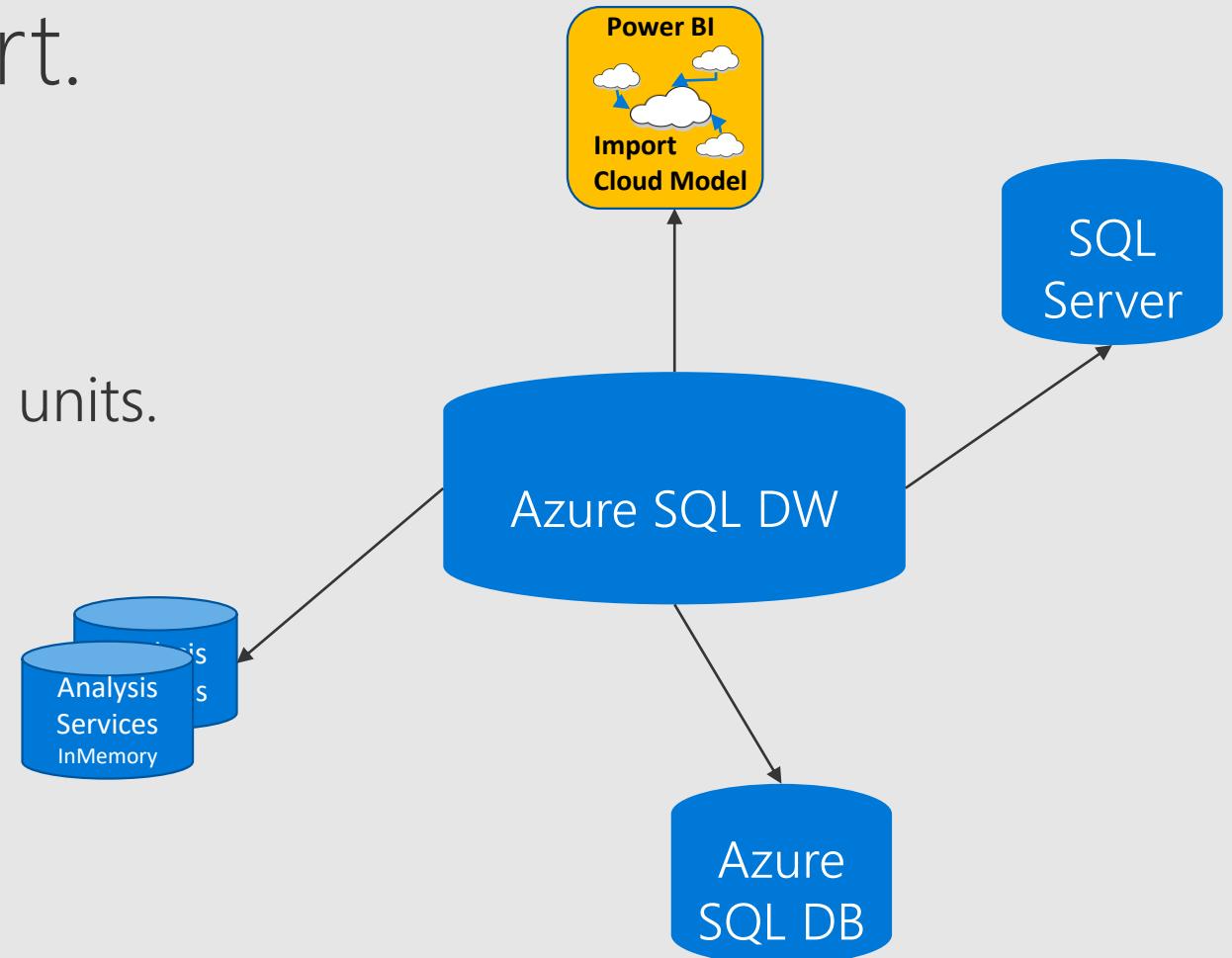
DWU	Max Concurrent Queries	Concurrency Slots
DW100	4	4
DW200	8	8
DW300	12	12
DW400	16	16
DW500	20	20
DW600	24	24
DW1000	32	40
DW1200	32	48
DW1500	32	60
DW2000	32	80
DW3000	32	120
DW6000	32	240

# Data Access Pattern : Personas

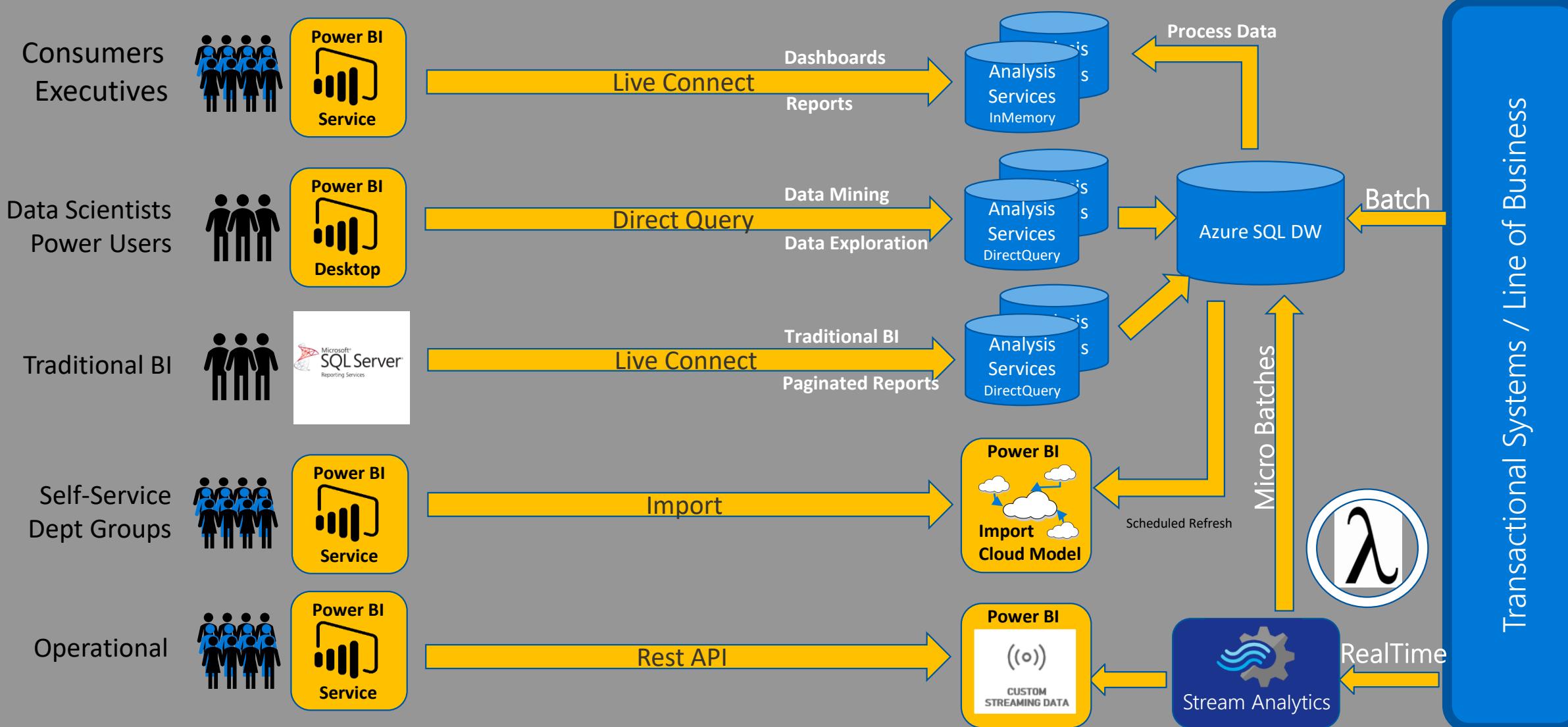


# Hub and Spoke Architecture

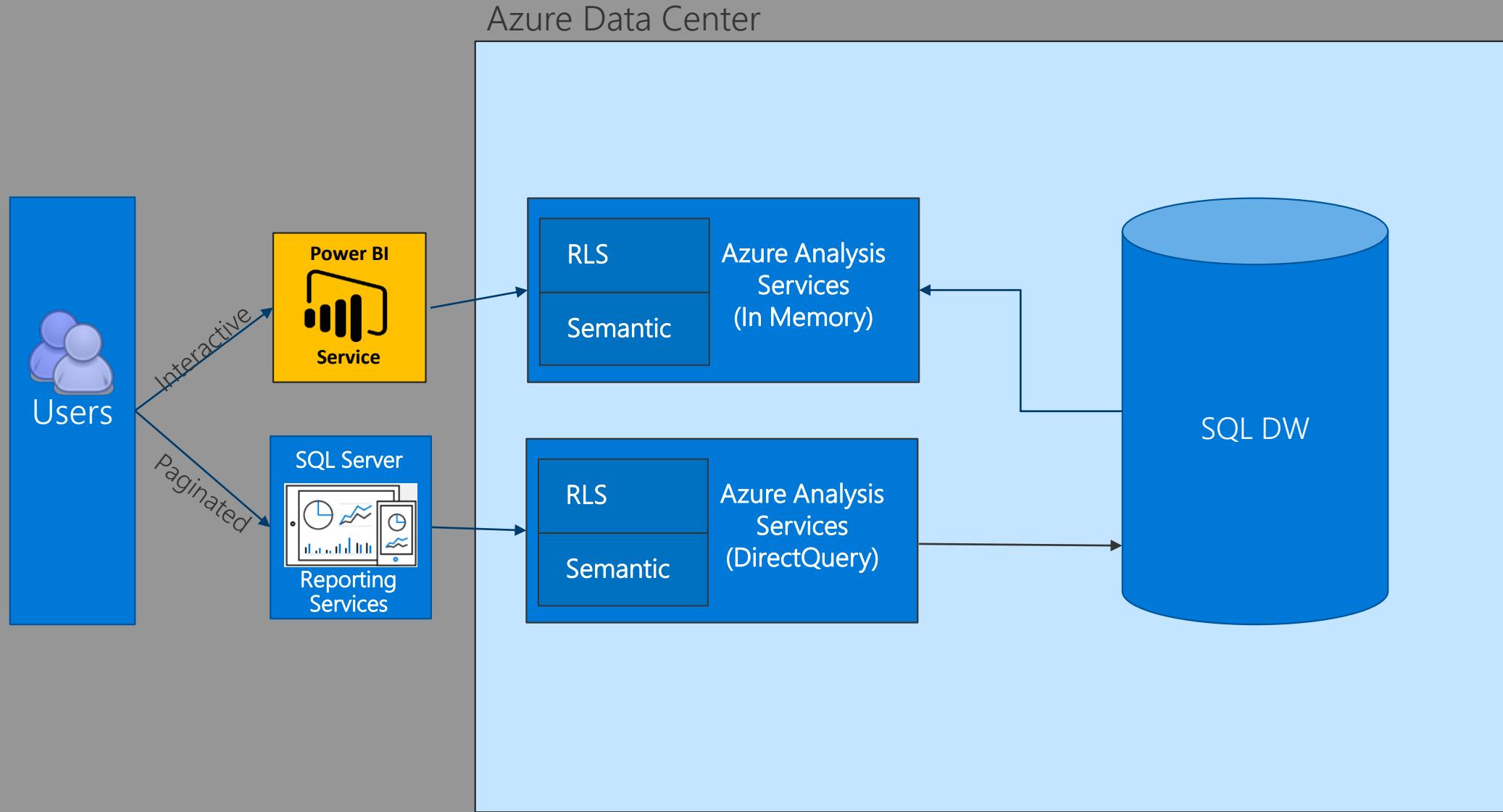
- Data Warehouse for Massive processing
- Spoke for Reporting Mart.
  - Quick Point Queries
  - Pre-summarized aggregations
  - Data Subset (Hot Data)
  - Multiple Spokes for different business units.



# Data Access Pattern : Personas



# Architectural Blueprint



# Role Level Security

The screenshot illustrates the configuration of Role Level Security in Power BI Desktop. At the top, the ribbon shows the 'Modeling' tab selected. The 'Security' button in the ribbon is highlighted with a yellow oval.

**Top Left:** Shows the 'Manage Relationships' ribbon group and the 'Relationships' section of the ribbon.

**Top Right:** Shows the 'Roles' and 'Tables' sections of the ribbon. The 'Manager' role is selected under 'Roles'. The 'District', 'Item', 'Sales', and 'Store' tables are listed under 'Tables'.

**Bottom Left:** Shows the Power BI Data Model canvas. A relationship is being configured between the 'Time' table (ReportingPeriodID) and the 'Sales' table (MonthID). The 'Item' table is also visible.

**Bottom Center:** A 'Manage roles' dialog box is open, showing the 'Manager' role assigned to the 'District' table.

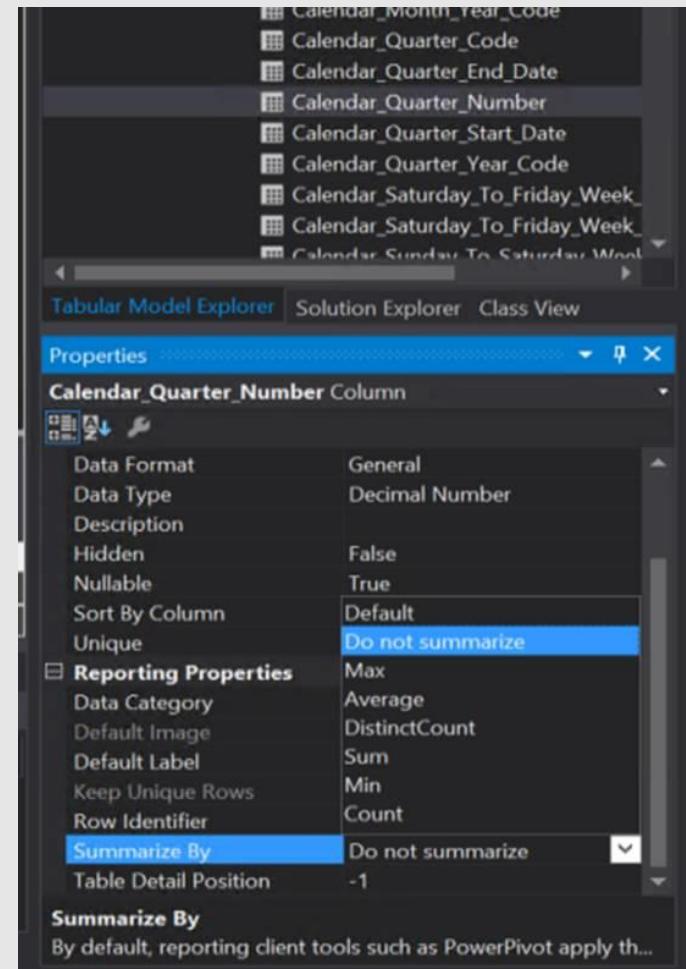
**Bottom Right:** An 'Edit Relationship' dialog box is open, showing the 'Sales' and 'Item' tables. The 'Cross filter direction' dropdown is set to 'Both' and is circled in red. The 'Apply security filter in both directions' checkbox is checked.

**Bottom Footer:** The URL <https://msdn.microsoft.com/en-us/library/jj127437.aspx> is displayed.

# In Memory Performance Tips

- Inefficient DAX

- Column with numeric values treated as a Measure.
  - Eg. Data such as Year is not a Measure
- Set Implicit Measures to “Do Not Summarize” in AS
- Can also be set in Power BI, but recommended to do at AS Model level

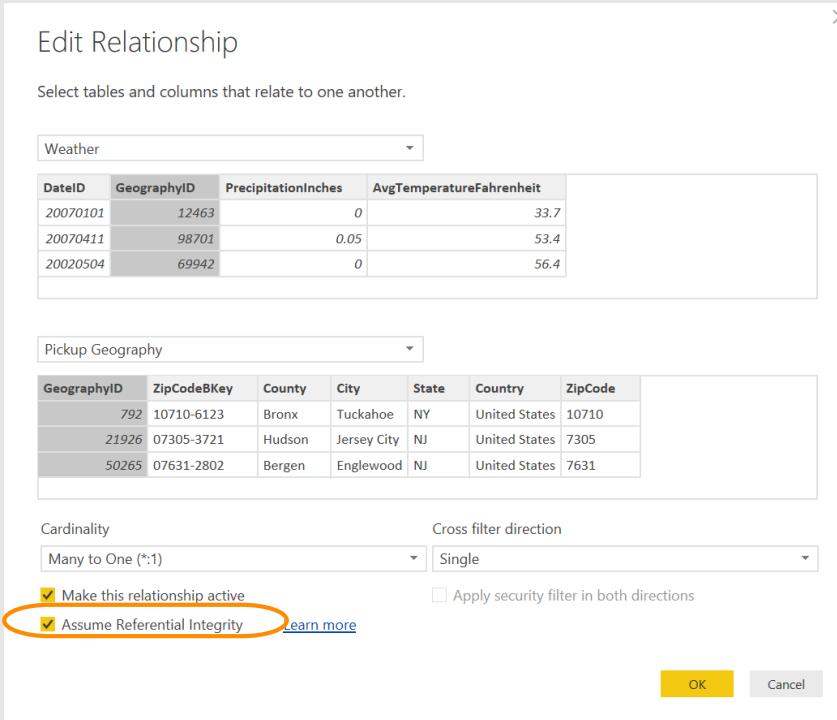


# Direct Query Performance Tips

- Use Inner Joins

- Power BI : Assume Referential Integrity
- Analysis Services : relyOnReferentialIntegrity: true

### Power BI



The screenshot shows the 'Edit Relationship' dialog in Power BI. It displays two tables: 'Weather' and 'Pickup Geography'. The 'Weather' table has columns DateID, GeographyID, PrecipitationInches, and AvgTemperatureFahrenheit. The 'Pickup Geography' table has columns GeographyID, ZipCodeBKey, County, City, State, Country, and ZipCode. Below the tables, the 'Cardinality' section shows 'Many to One (\*:1)' and the 'Cross filter direction' is set to 'Single'. Under 'Relationship Settings', the 'Make this relationship active' checkbox is checked, and the 'Assume Referential Integrity' checkbox is checked and highlighted with a yellow circle.

### Analysis Services



The screenshot shows a portion of the Analysis Services semantic model schema in JSON format. The 'relationships' section contains three entries. The first entry, for the relationship between 'FactOnlineSales' and 'DimDate', includes the line ' "relyOnReferentialIntegrity": true'. This line is highlighted with a red oval. The other two entries show similar structures for relationships between 'FactOnlineSales' and 'DimCustomer' and between 'DimCustomer' and 'DimGeography', also including the 'relyOnReferentialIntegrity' setting.

```
"relationships": [
  {
    "name": "cb8e0242-8bf5-4922-b67e-cf7879b59c7b",
    "fromTable": "FactOnlineSales",
    "fromColumn": "DateKey",
    "toTable": "DimDate",
    "toColumn": "Datekey",
    "relyOnReferentialIntegrity": true
  },
  {
    "name": "81ed90fe-6ee2-4bef-998a-fc512d3ee89d",
    "fromTable": "FactOnlineSales",
    "fromColumn": "CustomerKey",
    "toTable": "DimCustomer",
    "toColumn": "CustomerKey",
    "relyOnReferentialIntegrity": true
  },
  {
    "name": "485df54d-c251-4a01-9d58-acf974935978",
    "fromTable": "DimCustomer",
    "fromColumn": "GeographyKey",
    "toTable": "DimGeography",
    "toColumn": "GeographyKey",
    "relyOnReferentialIntegrity": true
  }
],  
  "id": "SemanticModel"
```

\*Direct Query Whitepaper for Analysis Services



Microsoft