

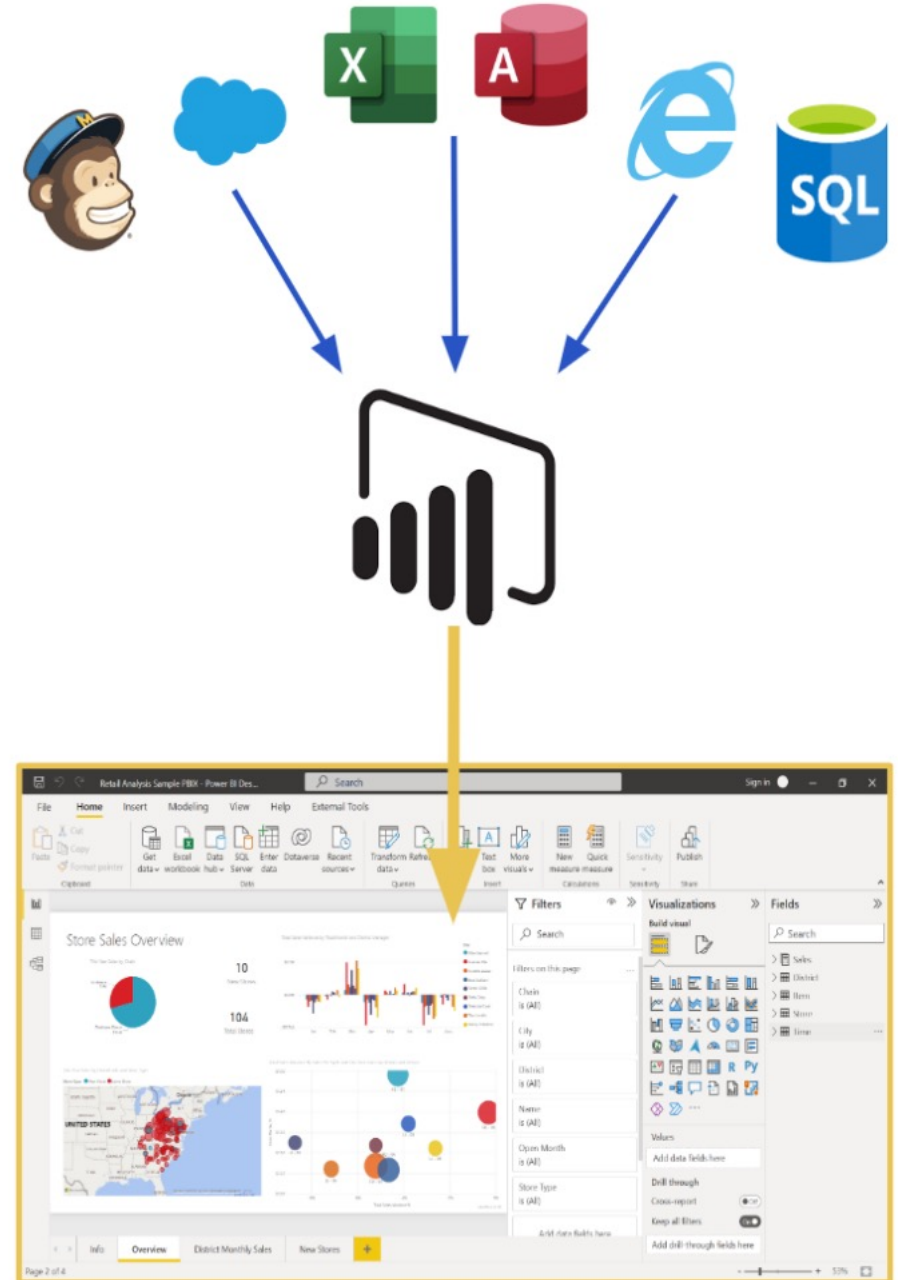
Introduction to PowerBI

Bernardo Carvalho

What is Power BI?

It is a collection of **apps, software services and connectors** that come together to turn unrelated data into visual interactive components. From Excel to cloud-based or on-premises hybrid Data warehouses.

1. Connect to data
2. Clean and structure data
3. Create visualizations
4. Share findings



Why PowerBI?

1. **Leading BI tool** according to Gartner
2. Over **97% of Fortune 500** companies use Power BI
3. Over **6 million** customers
4. Mastering Power BI can **advance your career**

Figure 1: Magic Quadrant for Analytics and Business Intelligence Platforms

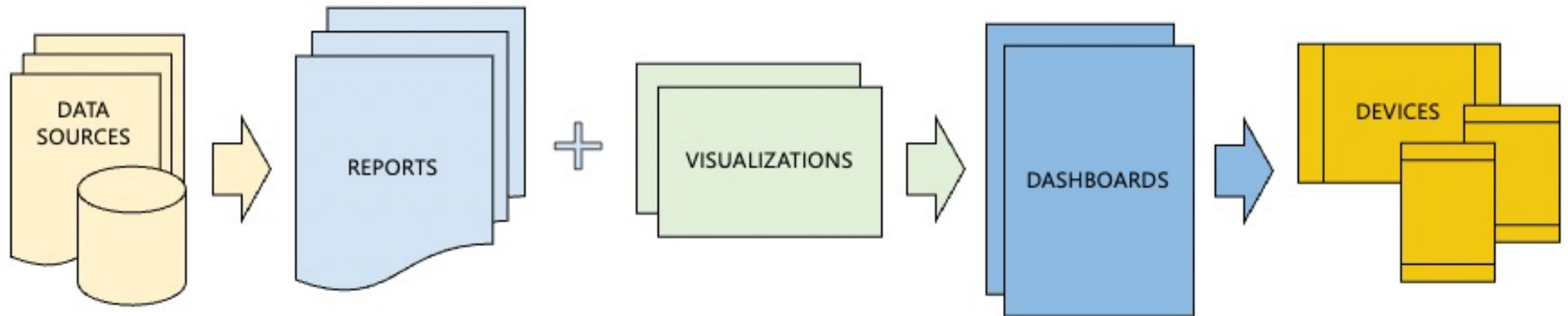


Source: Gartner (March 2022)

The common flow

1. Bring data into Power BI Desktop, and create a report.
2. Publish to the Power BI service, where you can create new visualizations or build dashboards.
3. Share dashboards with others, especially people who are on the go.
4. View and interact with shared dashboards and reports in Power BI Mobile apps.

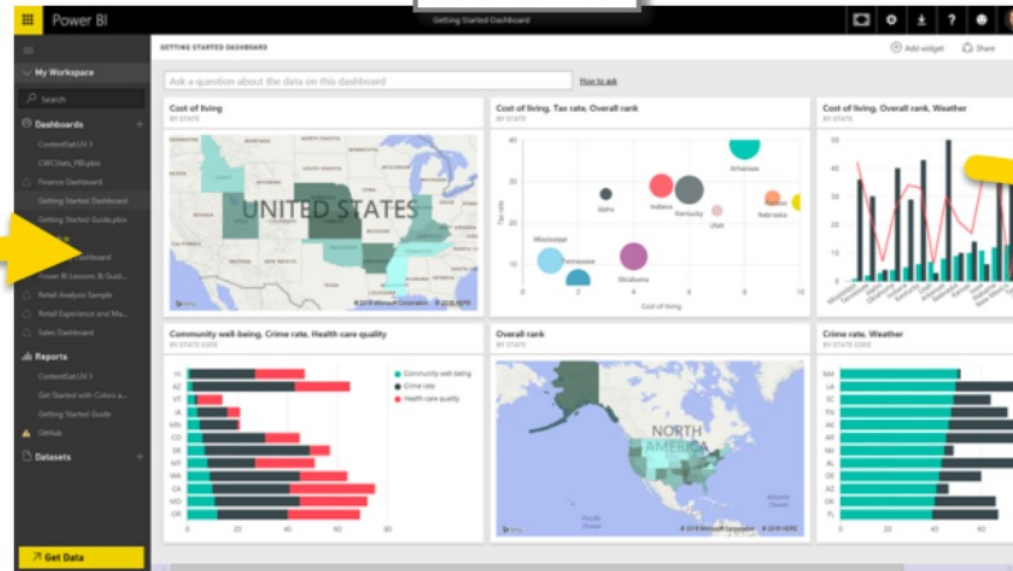
The common flow





Analysts

Power BI service

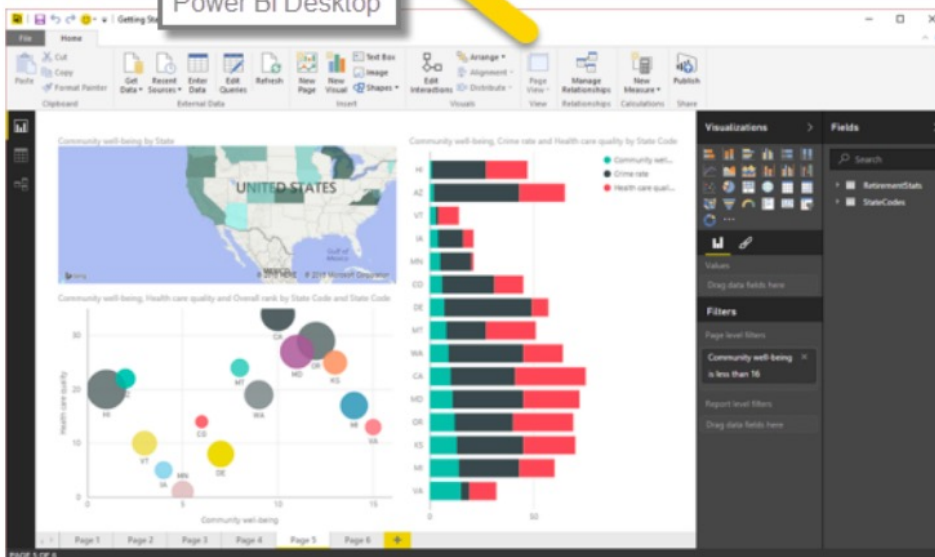


Power BI Mobile

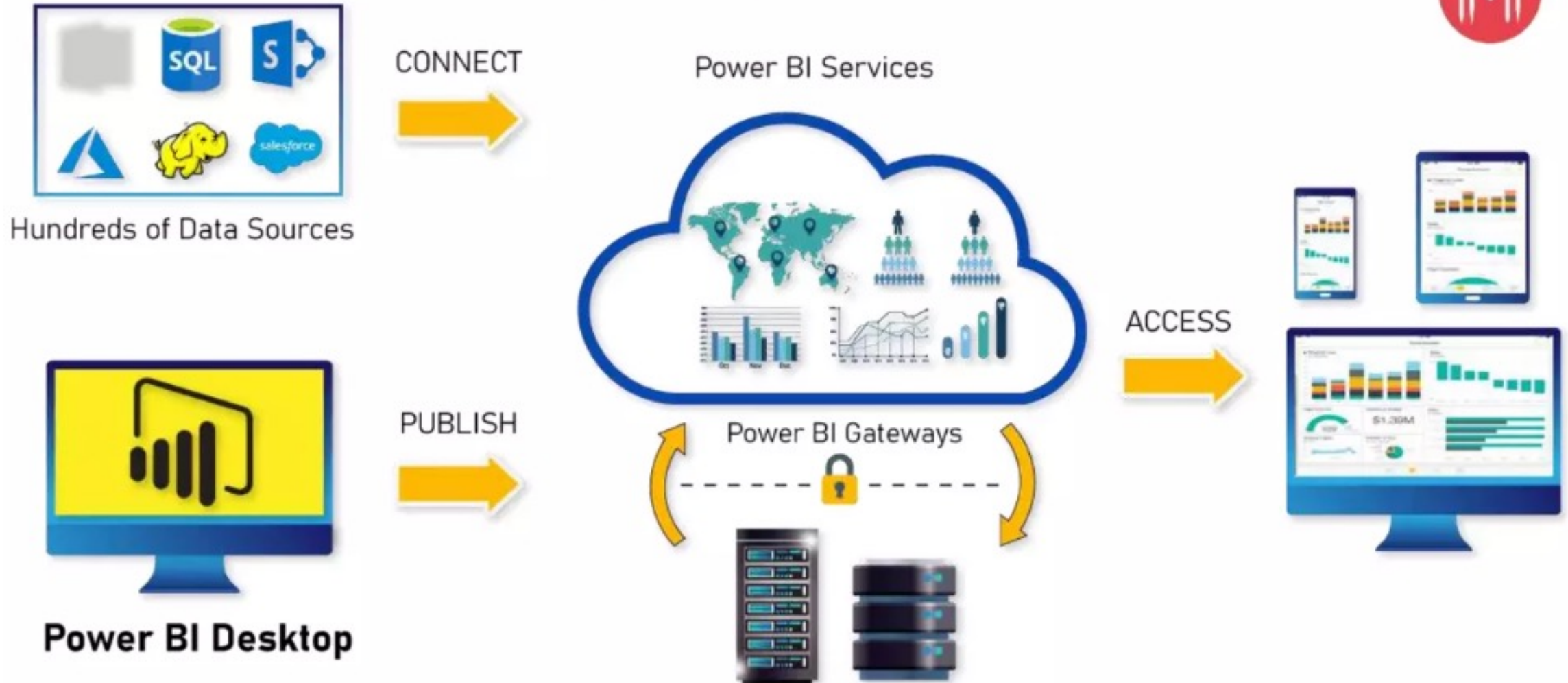


Stakeholders

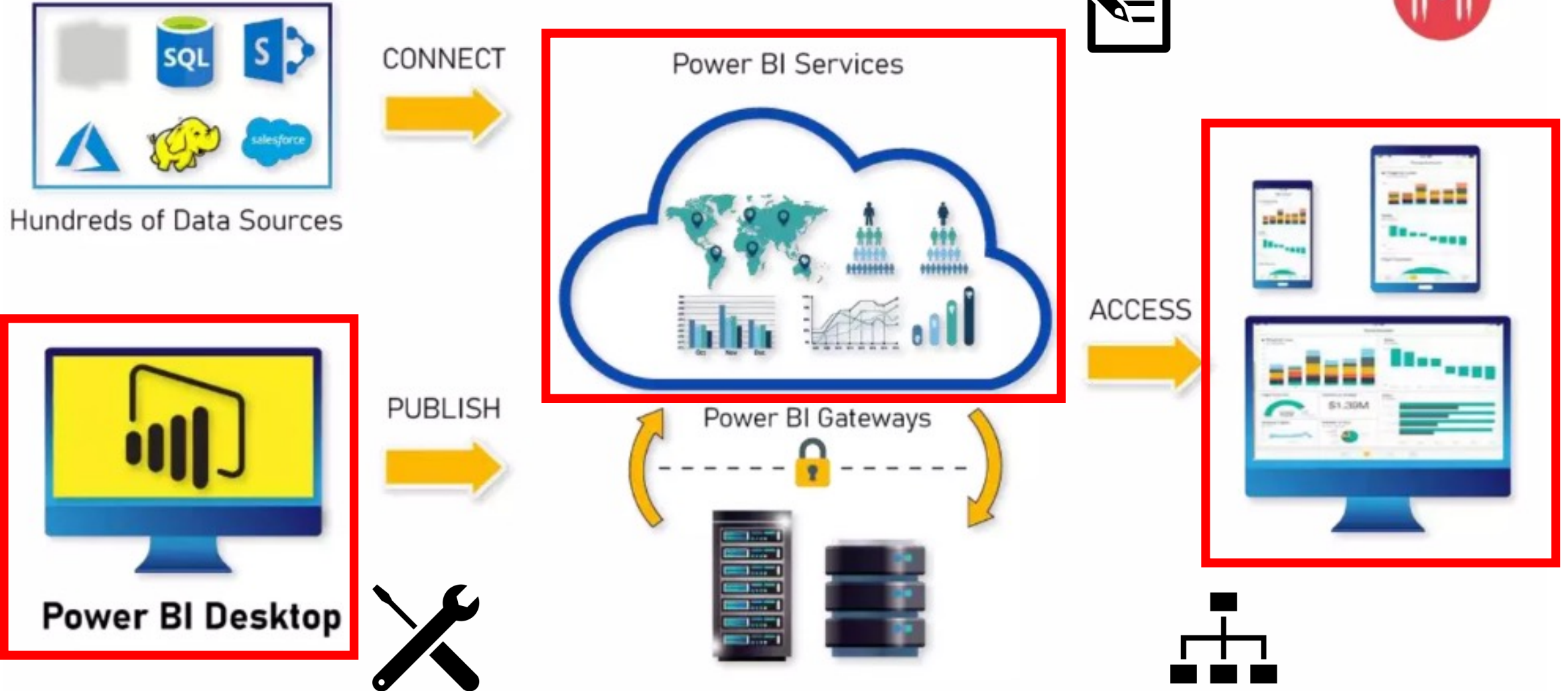
Power BI Desktop



Power BI Architecture



Power BI Architecture



PowerBI Architecture

Services	Desktop	Mobile	Embedded
<ul style="list-style-type: none">• Web-based• All platforms• Limited design tools• Limited data sources• Dashboards• Publishing	<ul style="list-style-type: none">• Windows only• Robust design tools• Query and modeling tools	<ul style="list-style-type: none">• Cross-platform• Report viewers	<ul style="list-style-type: none">• Report integration• REST services• Create custom visualizations

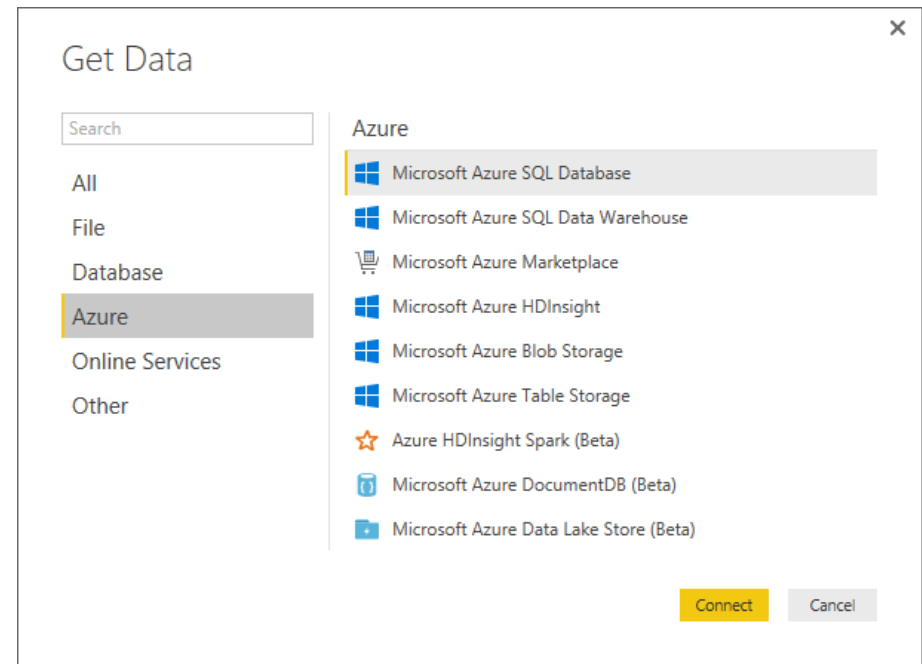
Building blocks of Power BI

- The basic building blocks in Power BI are:
- Visualizations
- Datasets
- Reports
- Dashboards
- Tiles

Getting Data

Power BI can connect to wide variety of data sources, including on-premises databases, Azure storage, Excel worksheets and a large number of 3rd party services.

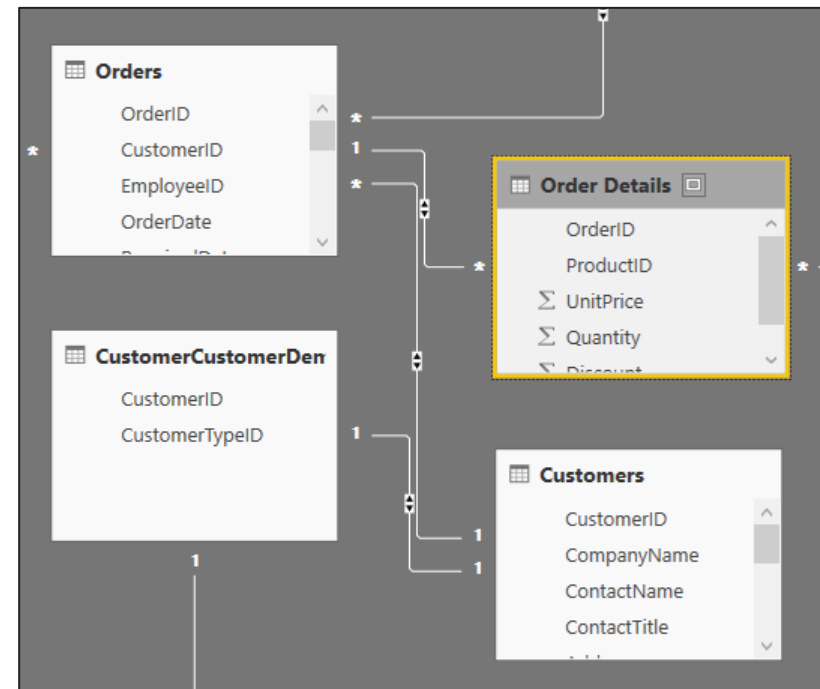
- Clean and transform data with the Query Editor
- Connect to advanced data sources and create transformations
- “Massage” irregularly formatted data



Modeling

Modeling is the technique of creating a logical connections and relationships between data sources.

- Create Calculated Columns
- Optimize data models for better visuals
- Create Measures and work with time-based functions
- Create Calculated Tables

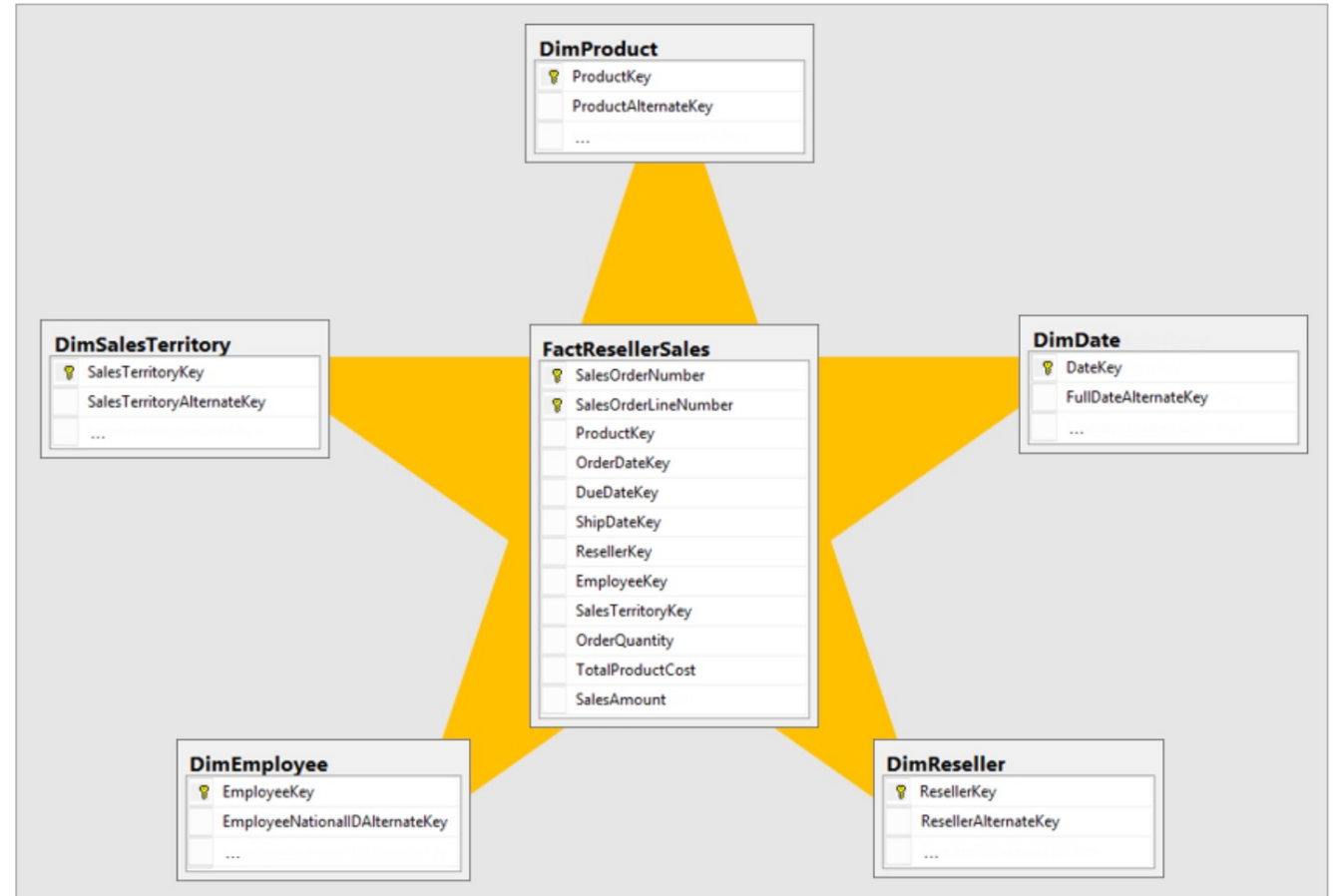


Modeling – Star schema approach

Star schema is a modeling approach widely adopted by data warehouses. Modelers to classify their model tables as either dimension or fact.

Dimension tables describe business entities—the *things* you model. E.g: products, people, places, and concepts

Fact tables store observations or events, and can be sales orders, stock balances, exchange rates, temperatures, etc. A fact table contains dimension key columns that relate to dimension tables, and numeric measure columns.



Modeling – Normalization

	SalesOrderNumber	OrderDate	ProductKey	ResellerKey	SalesAmount
1	SO69561	2020-05-31	594	546	226.00
2	SO69560	2020-05-30	513	100	218.45
3	SO69560	2020-05-30	594	100	113.00
4	SO69539	2020-05-28	243	529	858.90
5	SO69539	2020-05-28	378	529	1466.01
6	SO69541	2020-05-28	594	661	113.00
7	SO69542	2020-05-28	243	317	1717.80
8	SO69544	2020-05-28	243	666	3435.60
9	SO69545	2020-05-28	378	436	5864.04
10	SO69532	2020-05-27	594	312	113.00
11	SO69532	2020-05-27	513	312	436.90
12	SO69533	2020-05-27	594	476	226.00

	SalesOrderNumber	OrderDate	ProductKey	Product	Category	Color	Size	ResellerKey	SalesAmount
1	SO69561	2020-05-31	594	Mountain-500 Silver, 48	Bikes	Silver	48	546	226.00
2	SO69560	2020-05-30	513	ML Mountain Frame-W - Silver, 46	Components	Silver	46	100	218.45
3	SO69560	2020-05-30	594	Mountain-500 Silver, 48	Bikes	Silver	48	100	113.00
4	SO69539	2020-05-28	243	HL Road Frame - Red, 44	Components	Red	44	529	858.90
5	SO69539	2020-05-28	378	Road-250 Black, 52	Bikes	Black	52	529	1466.01
6	SO69541	2020-05-28	594	Mountain-500 Silver, 48	Bikes	Silver	48	661	113.00
7	SO69542	2020-05-28	243	HL Road Frame - Red, 44	Components	Red	44	317	1717.80
8	SO69544	2020-05-28	243	HL Road Frame - Red, 44	Components	Red	44	666	3435.60
9	SO69545	2020-05-28	378	Road-250 Black, 52	Bikes	Black	52	436	5864.04
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Modeling – Why?

Consider that each Power BI report visual **generates a query that is sent to the Power BI model**. These queries are used to **filter, group, and summarize model data**. A well-designed model, then, is one that provides tables for filtering and grouping, and tables for summarizing. This design fits well with star schema principles:

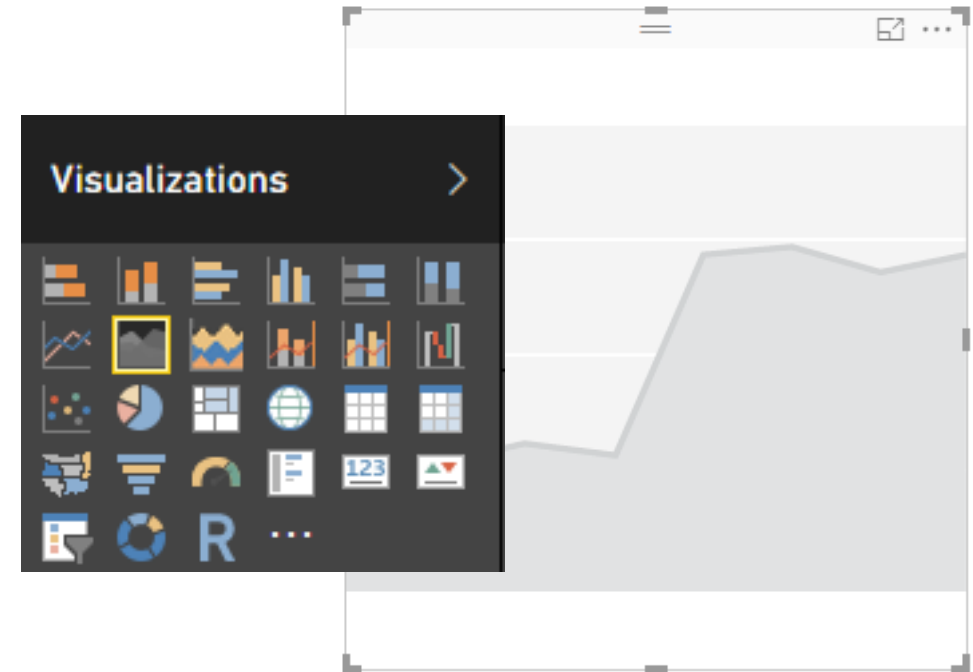
1. Dimension tables support *filtering* and *grouping*
2. Fact tables support *summarization*

There's no table property that modelers set to configure the table type as dimension or fact. **It's in fact determined by the model relationships**

Visualizations

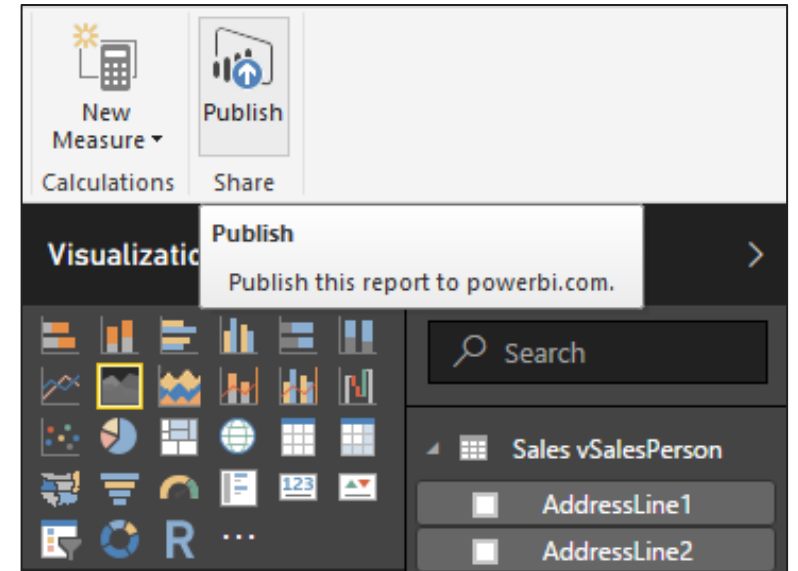
A **visualization** is a visual representation of data, such as a chart, graph, map, or other “visual” representations of data.

- Line, bar, pie, stacked
- Matrix/pivots
- Key performance
- Tree maps
- Geo and filled maps
- Slicers/filters
- Custom visualizations



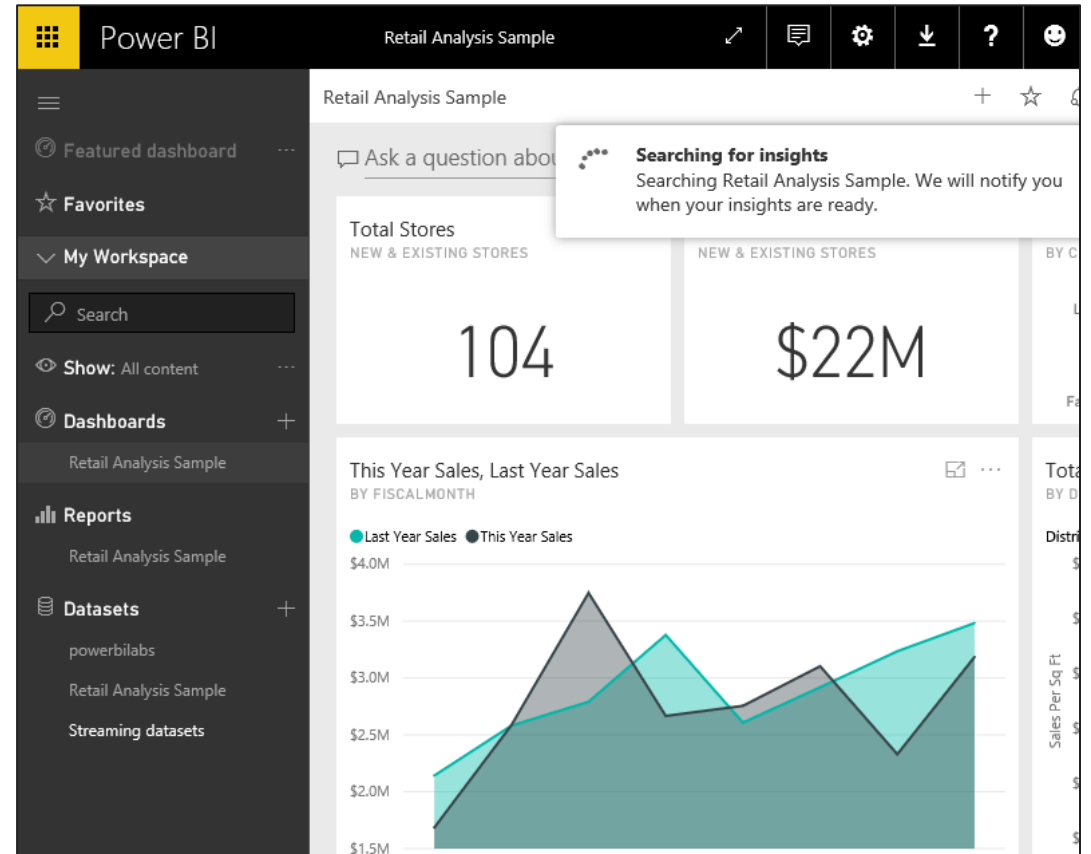
Publishing & Sharing

- Publish reports from Power BI Desktop to the Power BI Service
- Print and export dashboards
- Manually republish and refresh data
- Create and connect to content packs
- Integrate OneDrive for Business



Exploring Data

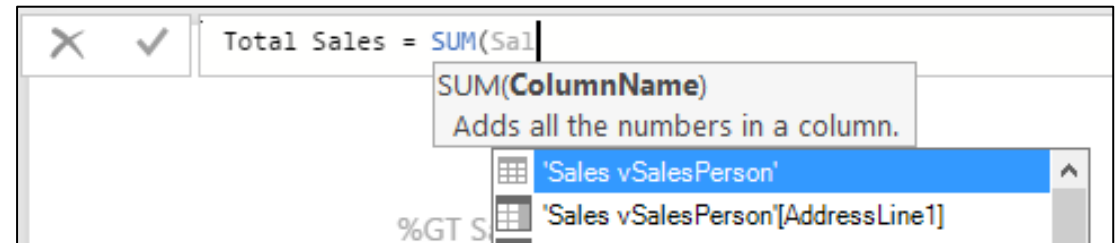
- Use Quick Insights
- Ask questions using natural language
- Create custom Q&A suggestions
- Share Dashboards with your organization
- Edit Tile details



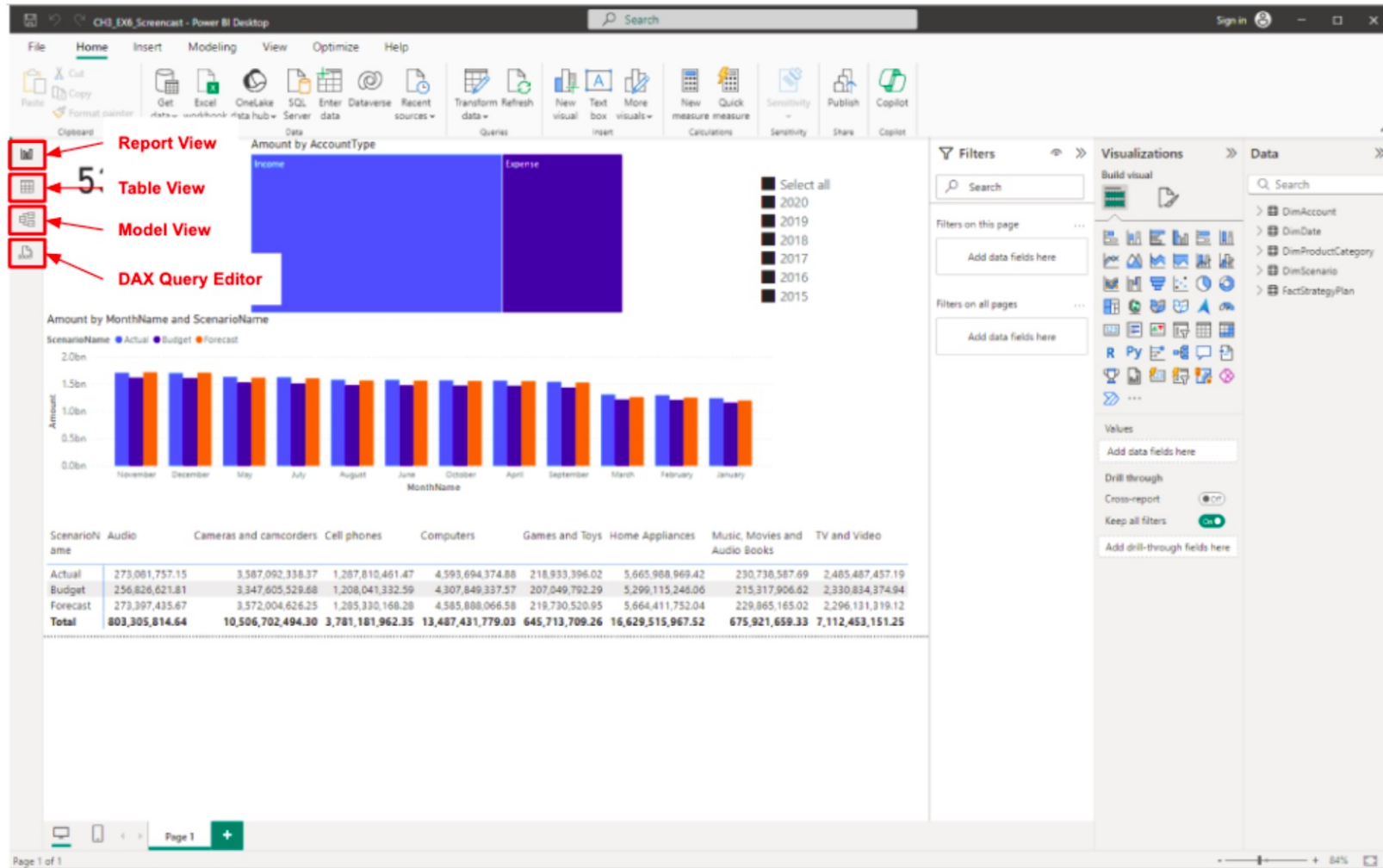
Data Analysis Expressions

DAX is a collection of functions, operators, and constants that can be used in a formula, or expression, to calculate and return one or more values.

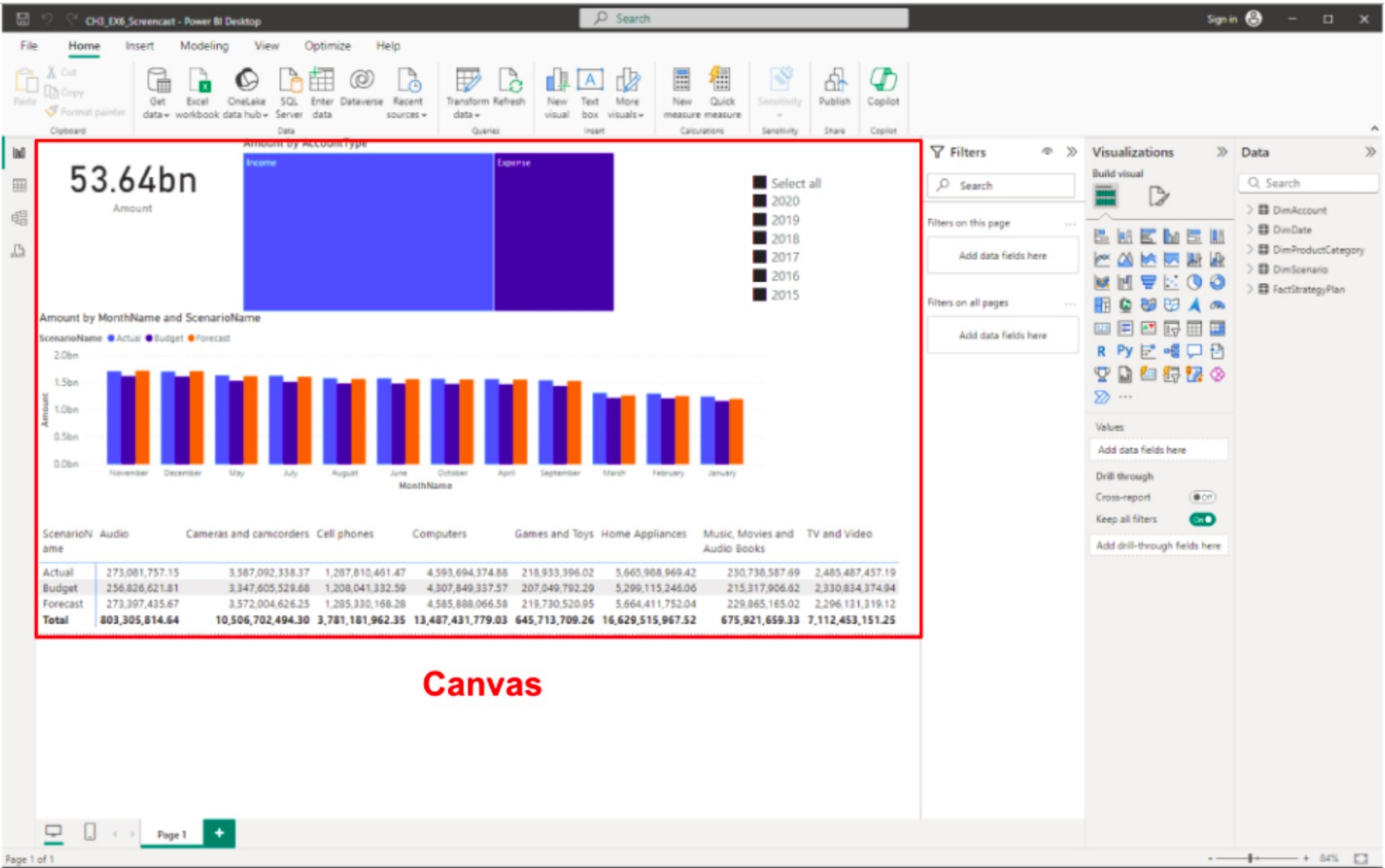
- **Measure**
Calculation on a collection of rows AFTER aggregation.
- **Calculated Column**
Calculation on each individual row BEFORE aggregation.



Interface

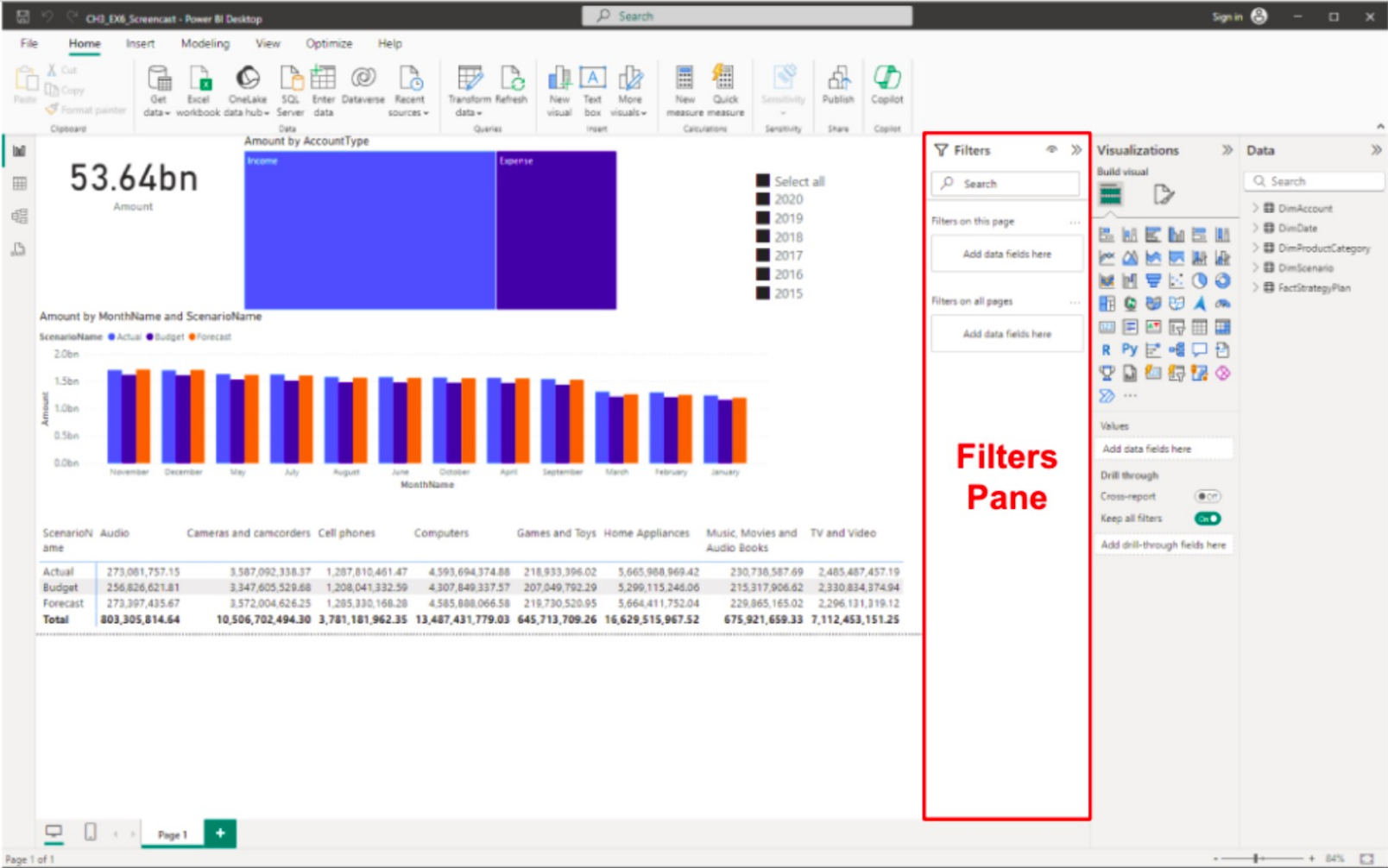


Interface

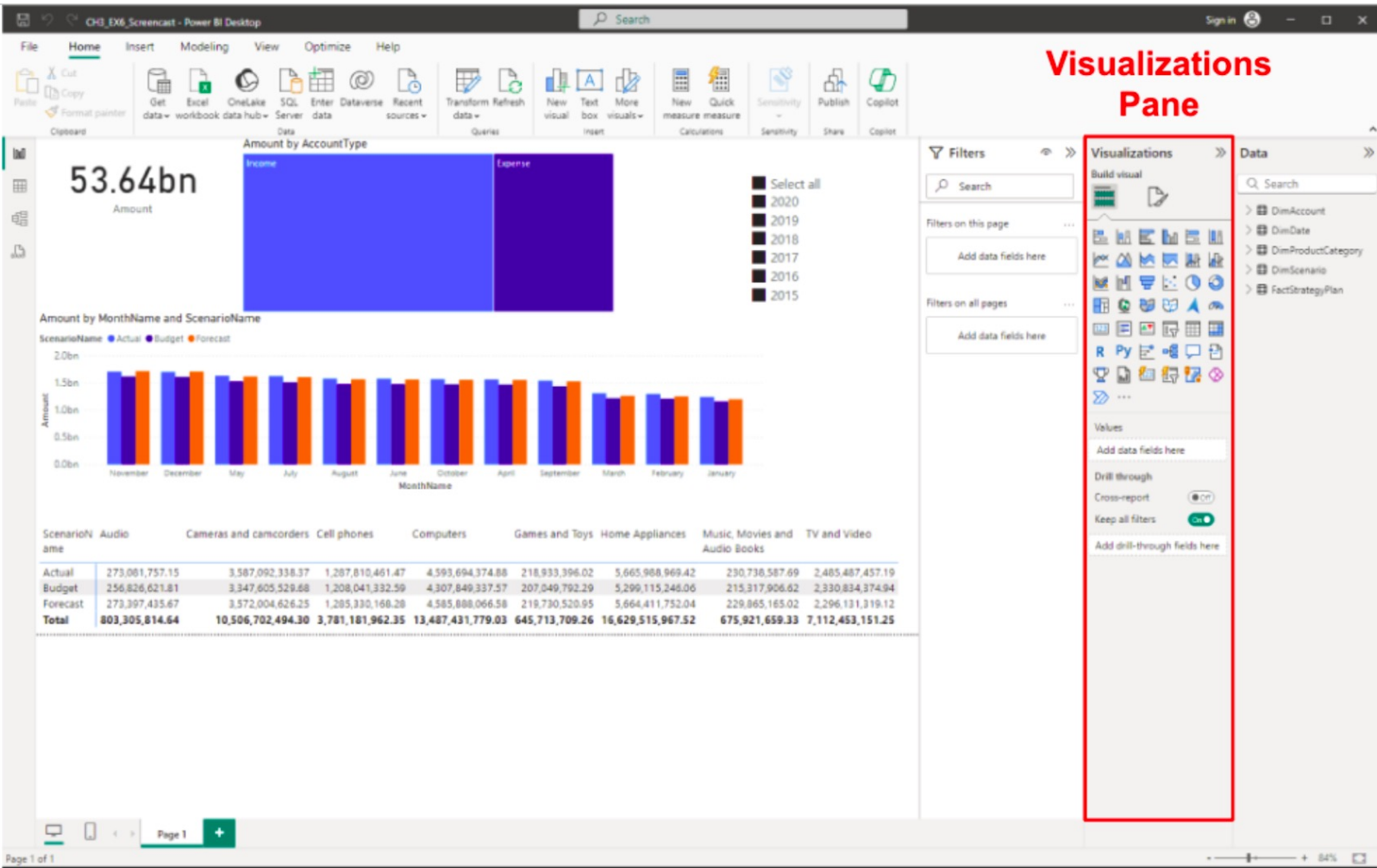


Canvas

Interface



Interface



Interface

