
O'REILLY®

Power BI Bootcamp

Instructors:

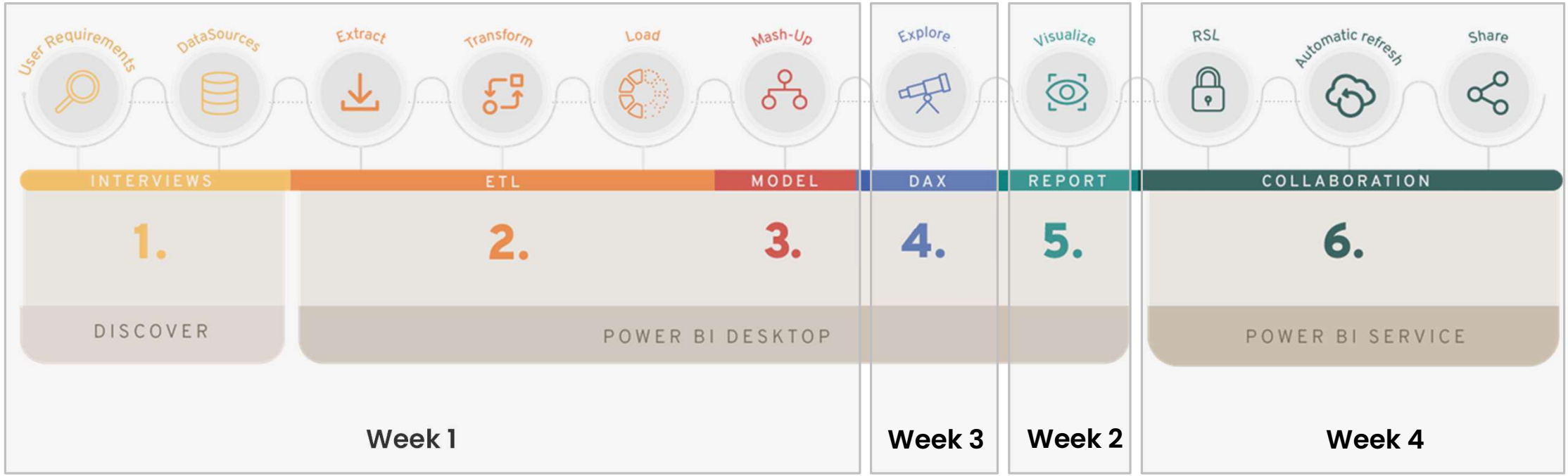
Nicolás Lagreste Zucchini

Maria Florencia Hourcouripé

Course Agenda

- **Week 1:** Introduction to Business Intelligence, Power BI and Power Query.
- **Week 2:** Advanced and Interactive Visuals.
- **Week 3:** Calculated measures, columns & custom tables with Power BI Programming Language (DAX).
- **Week 4:** Ways to collaborate and share in Power BI.

Our Method: Flow of Report Development



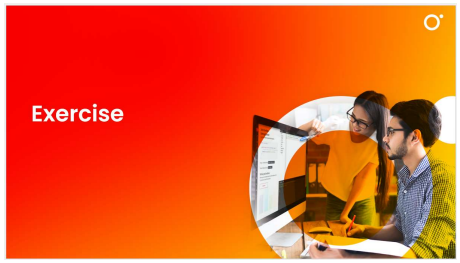
Our Method on each topic:

Demo example, followed by exercises to practice!

We will develop two projects in PowerBI:

- **DEMO – Flor & Nico**

- **EXERCISE – Your turn!**



*Student should have the latest version of **Power BI Destkop installed.**

March 2023 or later.

About us:

Nicolás Lagreste Zucchini

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www.analyticmood.com

analytic mood

- Co-founder Analytic Mood
- Data Expert and Business Analyst in BI Applications, NTT Data, Kabel Systems, Grupo Solutio and Analytic Mood.
- He is responsible for Microsoft Power BI training and full lifecycle development of next-generation software, including initial requirement gathering to design, coding, testing, documentation and implementation.
- Active participant in the Power BI community. He participated as a speaker in the last Power BI Summit.

María Florencia Hourcouripe

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analytic mood

- Co-founder Analytic Mood
- Master's degree from the EAE Business School in "Business Intelligence & Innovación tecnológica".
- Consultant & trainer in Microsoft Power BI.
- Active participant in the Power BI community. She participated as a speaker in the last Power BI Summit.

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WEEK 01

Introduction to Business Intelligence, Power BI and Power Query

Week 1: Introduction to Business Intelligence, Power BI and Power Query

- What is Business Intelligence and Power BI; What do we mean by Business Intelligence? A brief explanation of what is the maturity cycle of Business Intelligence & Data Science. Understanding that Power BI is a collection of software, services, apps, and connectors.
- What is an ETL and how to build a powerful ETL solution with no code. Defining and creating a Star Schema Model, and translation of all this into visual graphics.
- Brief explanation of the difference between Power BI Desktop and Service. Understand what the main features of each tool or service are.

Introduction to Business Intelligence and Power BI

- Introduction to Business Intelligence and Power BI Platform.
- Maturity cycle of Business Intelligence & Data Science.
- Working with Power BI projects step by step – Full architecture.
- Exercise: Setting Up Power BI Desktop
- Q&A

Exercise 0.0 – Initial set up

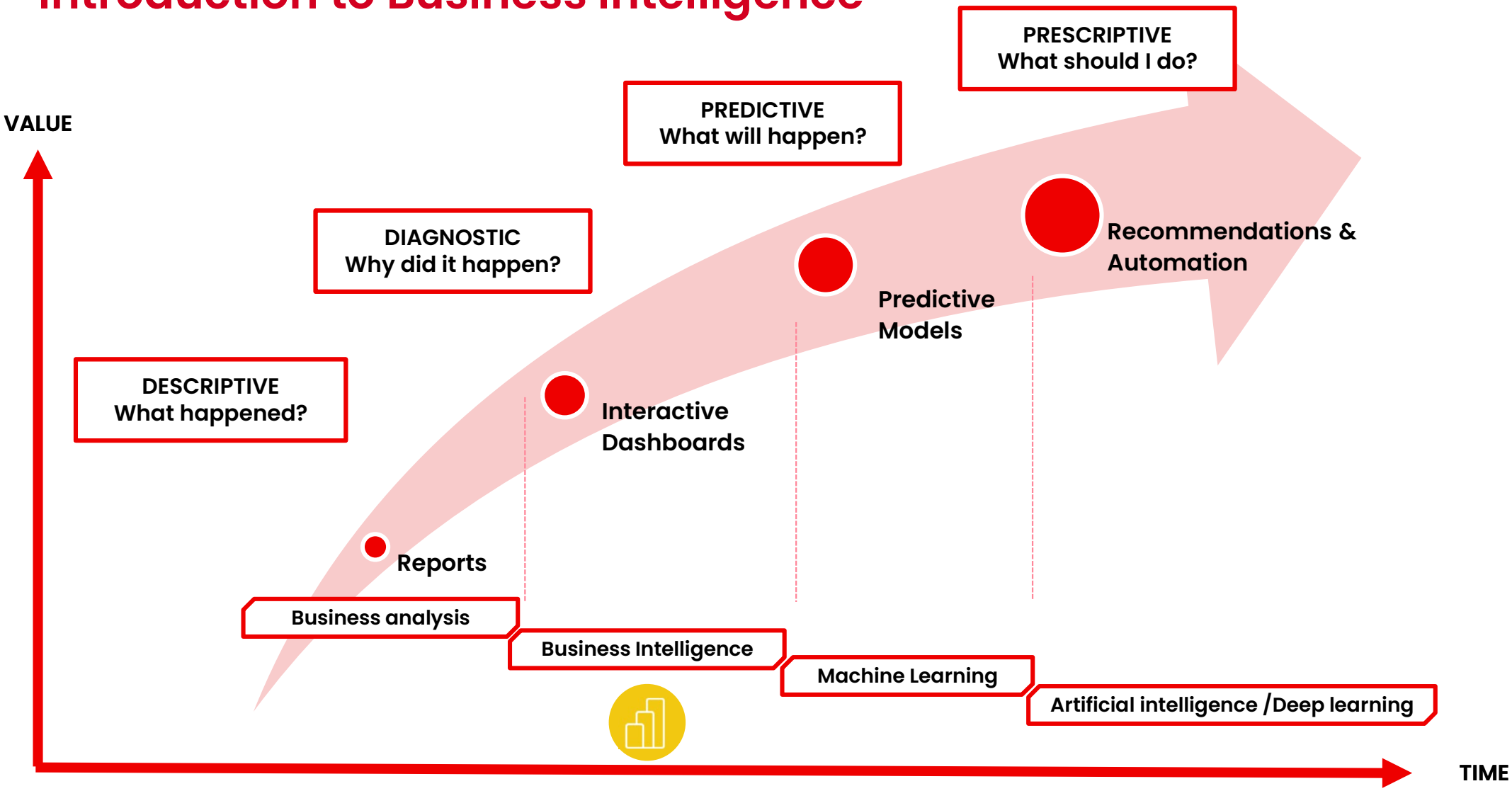
Download the shared .ZIP

- Link 01:
  bit.ly/PowerBIBootcamp202309

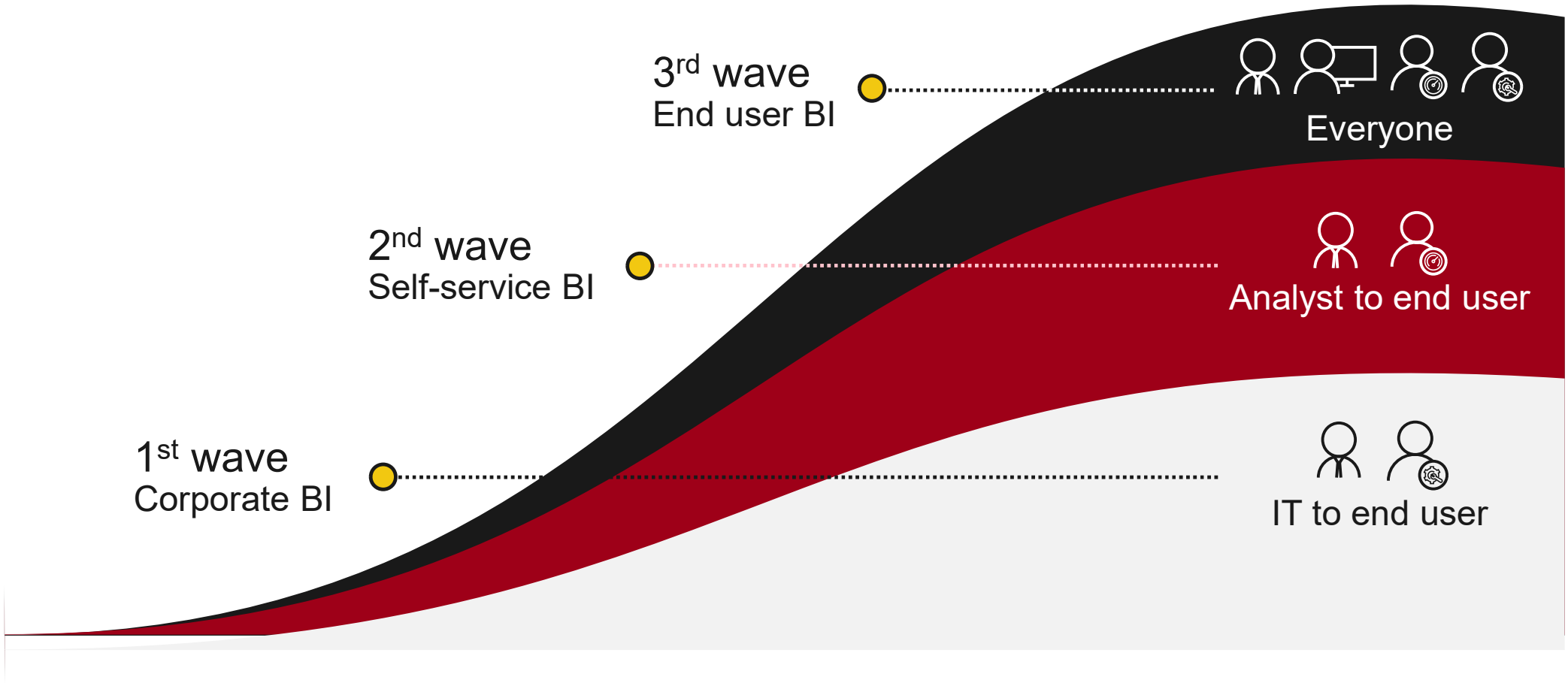
  Pass: ***OREILLY2023***

- Link 02:
  bit.ly/PowerBIBootcamp202309W01

Introduction to Business Intelligence



Evolution of BI



Microsoft Power Platform

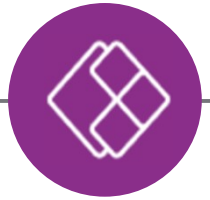
Give everyone the power to innovate:

Empower everyone at your organization with an intuitive, collaborative, and extensible platform of low-code tools that makes it easy to create efficient and flexible solutions.

Power BI

Analyze:
Discover intelligent insights in diverse data

Power Apps



Act:
Build low-code solutions to business challenges.

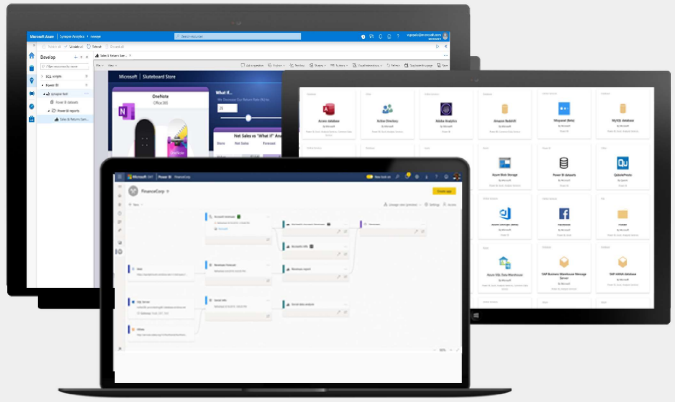
Power Automate

Automate
Streamline processes with no-code automation.

Power Virtual Agents

Assist
Handle routine inquiries at scale with conversational AI.

Microsoft Power BI

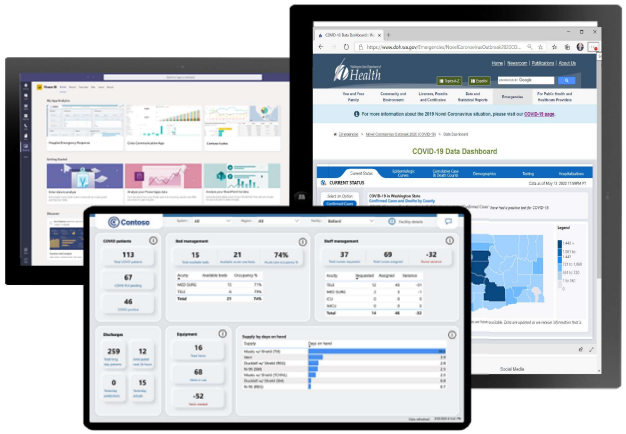


All Data

Break down data silos and enrich your data with intelligence

For Everyone

Create rich-interactive data experiences with AI infused insights

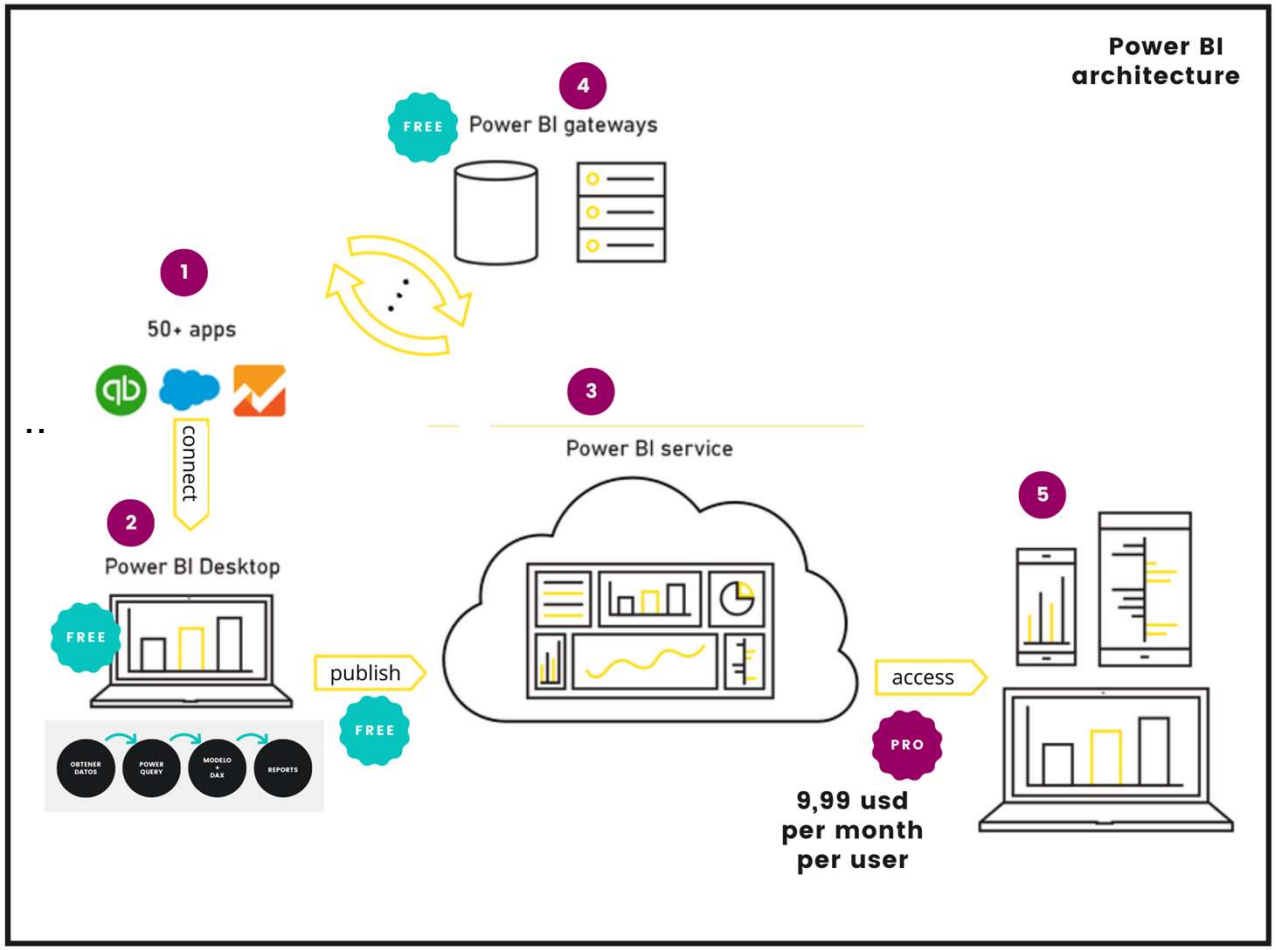


For Every Decision

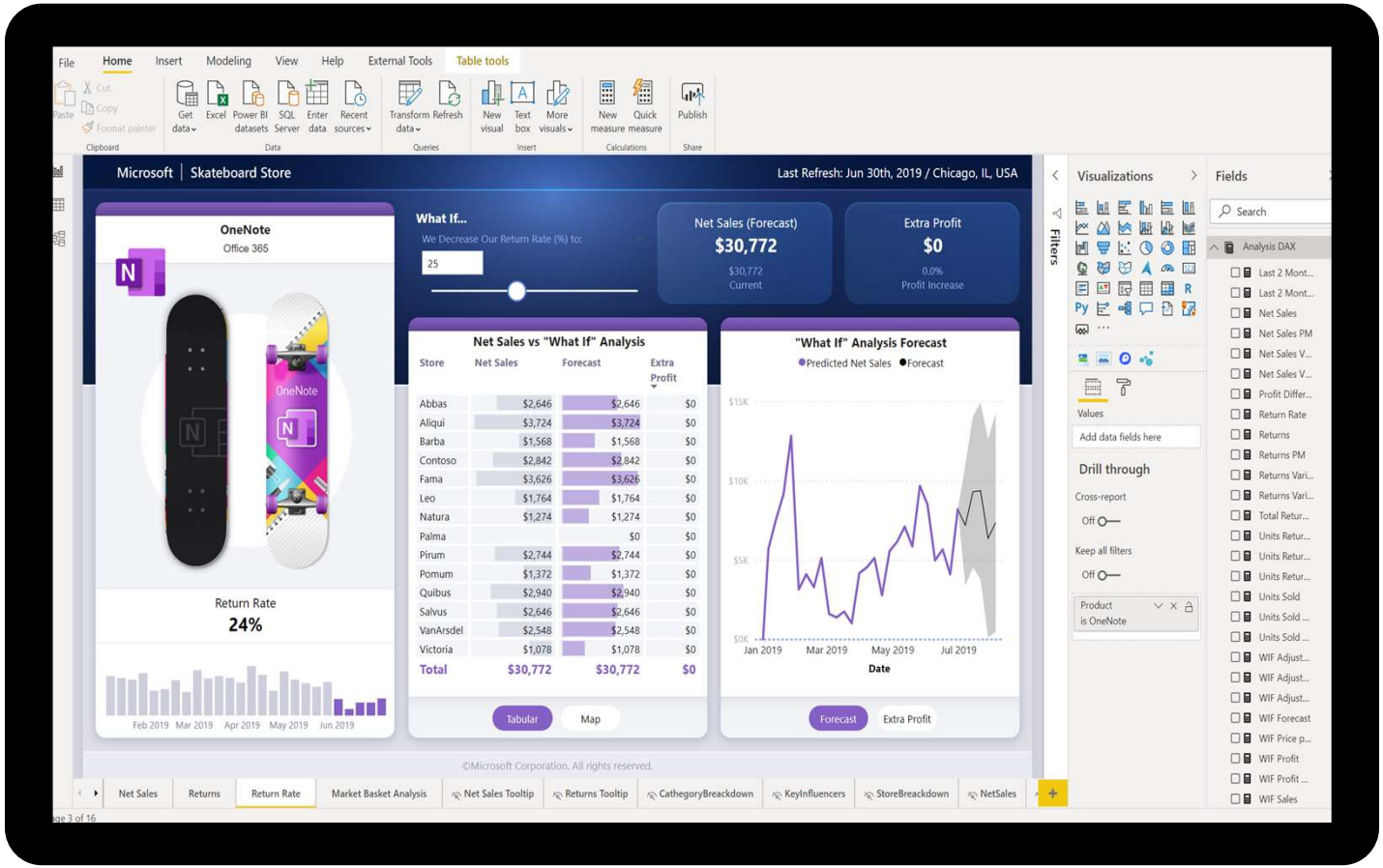
Integrate trusted and secure BI into the fabric of your organization and apps

Power BI drives a data culture for everyone and every decision

Full Architecture

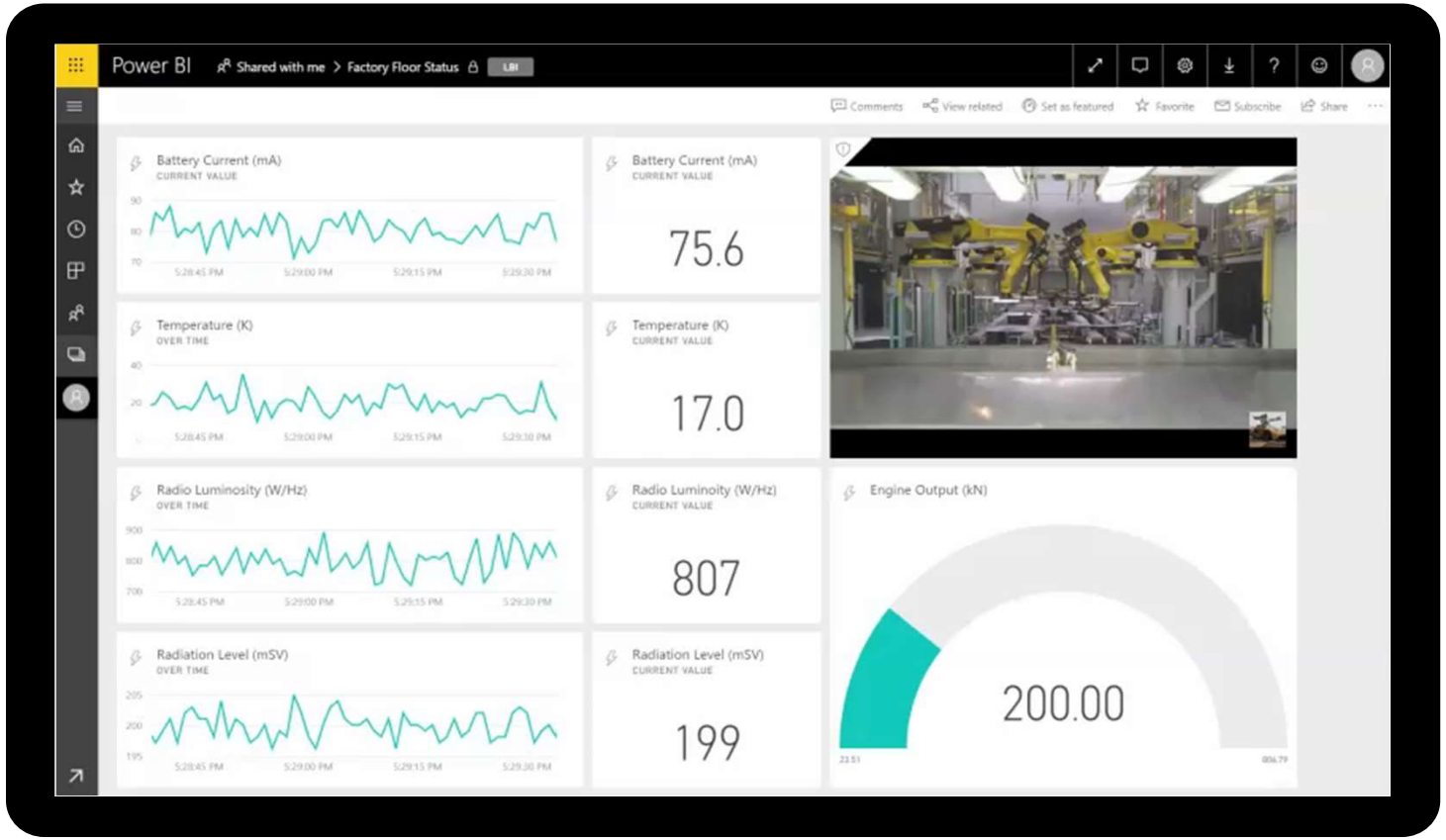


Why using Power BI?



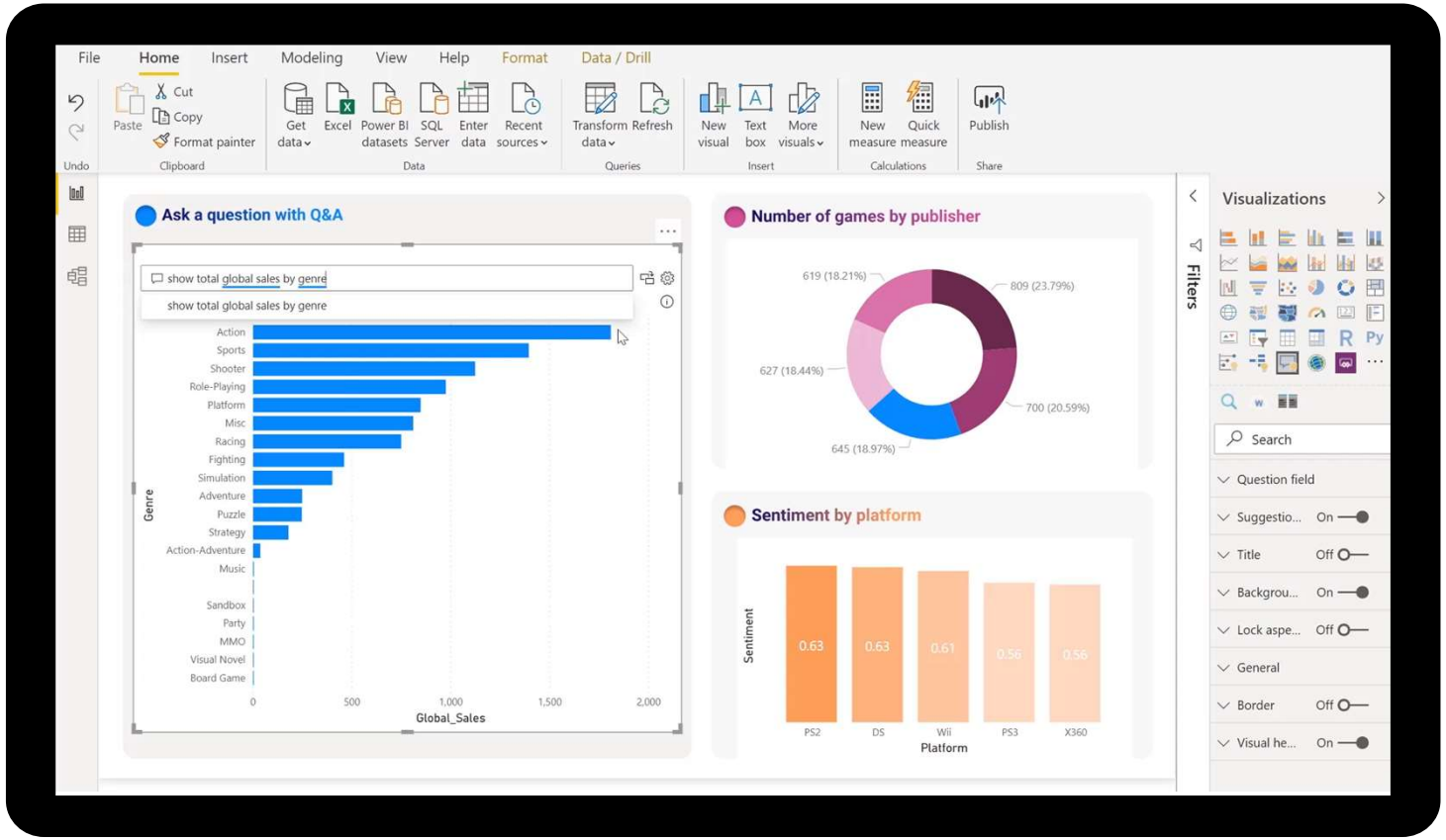
Power BI Desktop is free

Why using Power BI?



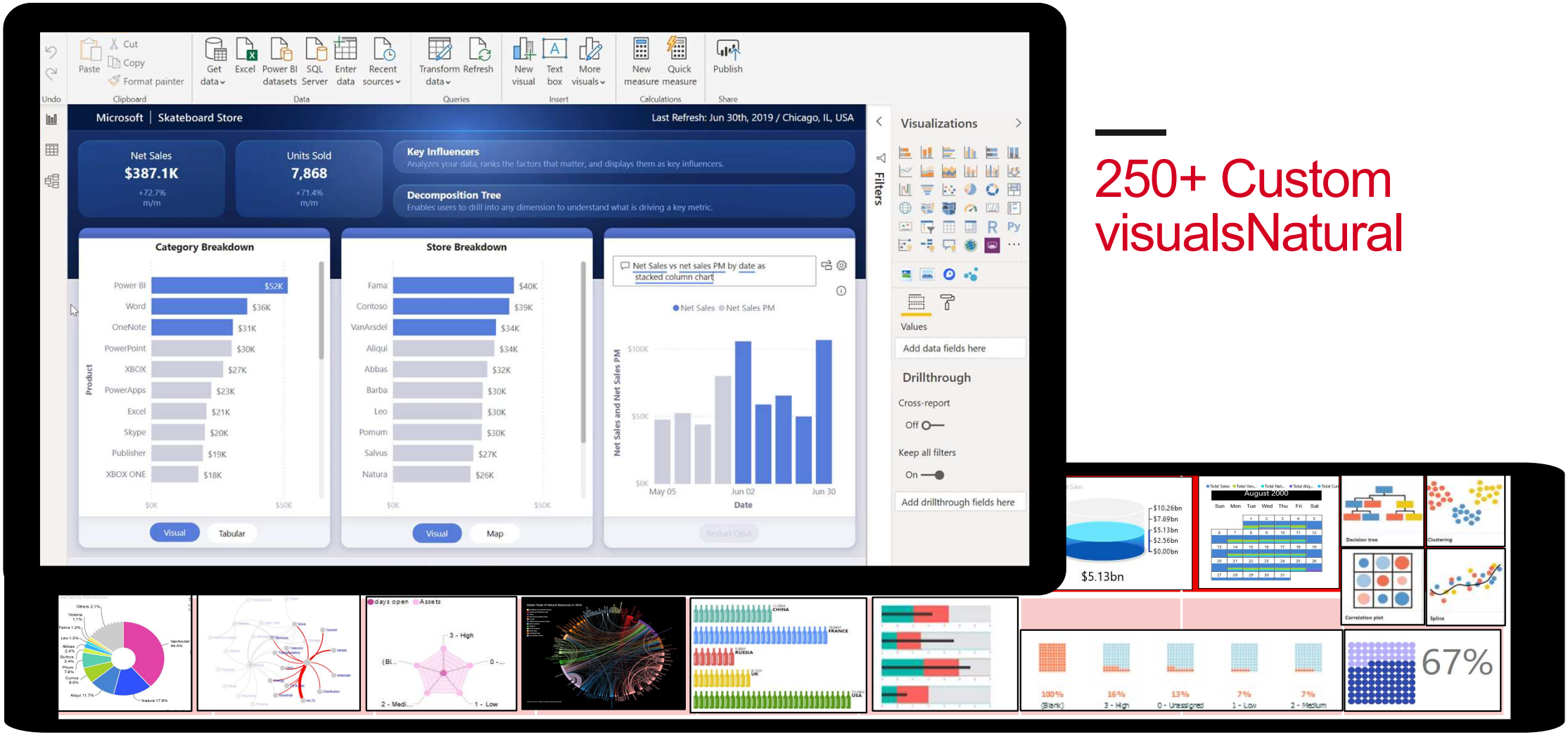
Real time dashboards and interactive reports

Why using Power BI?



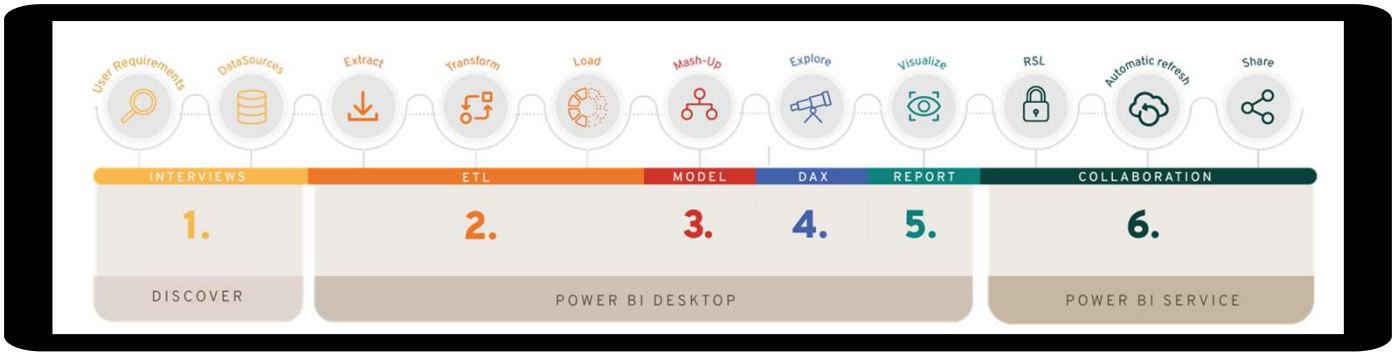
Natural Language query & AI insights

Why using Power BI?

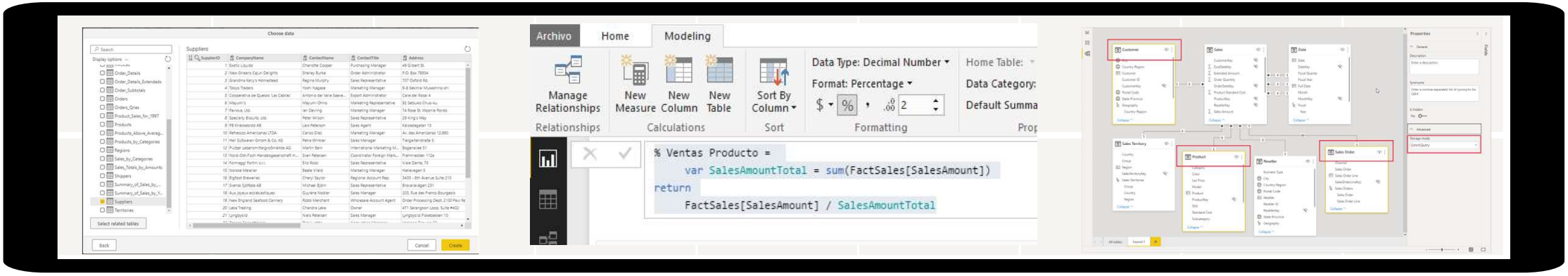


250+ Custom visualsNatural

Why using Power BI?



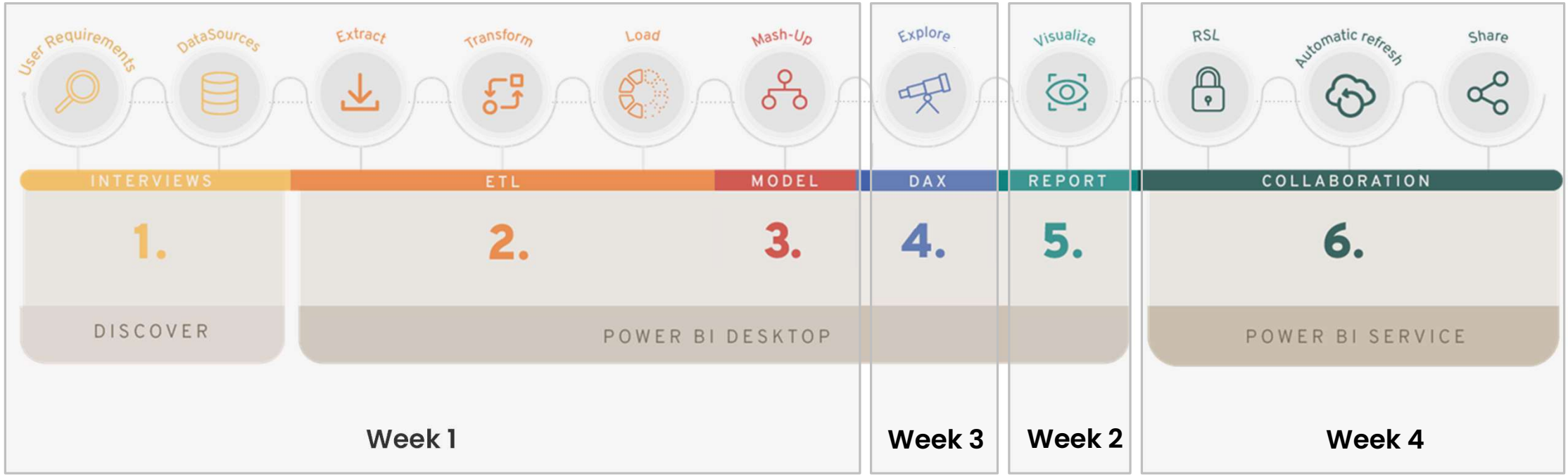
All Business Intelligence process in one



Why using Power BI?

Gartner Magic Quadrant for “Analytics and Business Intelligence Platforms”

Our Method: Flow of Report Development



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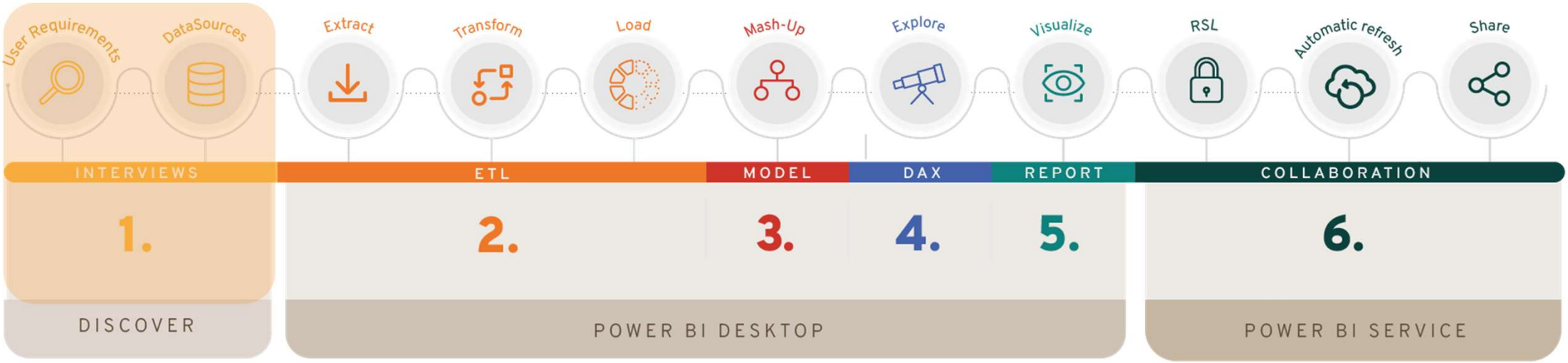
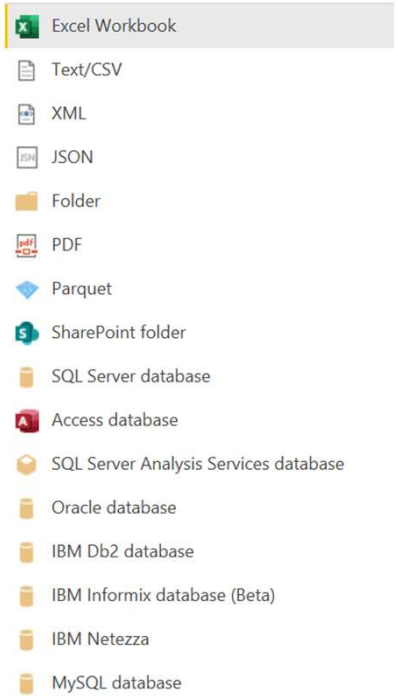
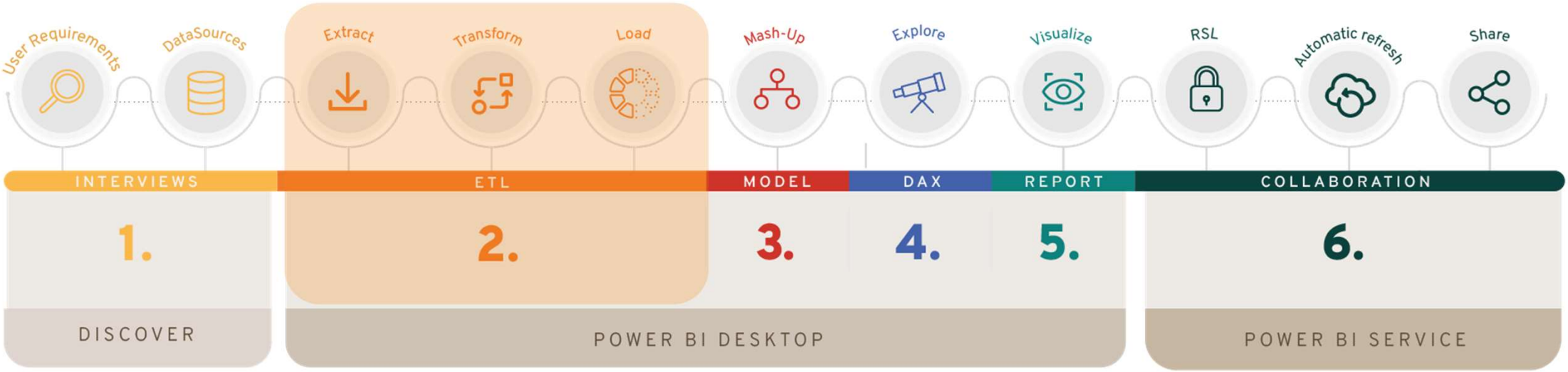


Interviews

Understand processes, needs and data sources



Our Method: Flow of Report Development



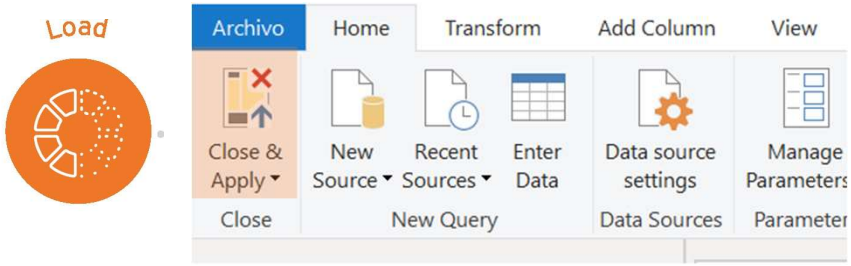
Power BI Desktop: Power Query

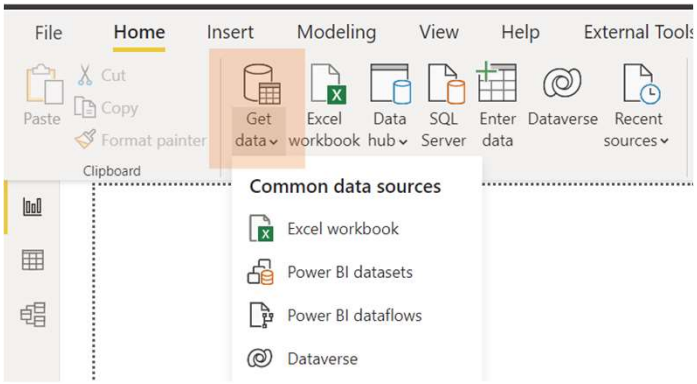
Clean and transform data sources

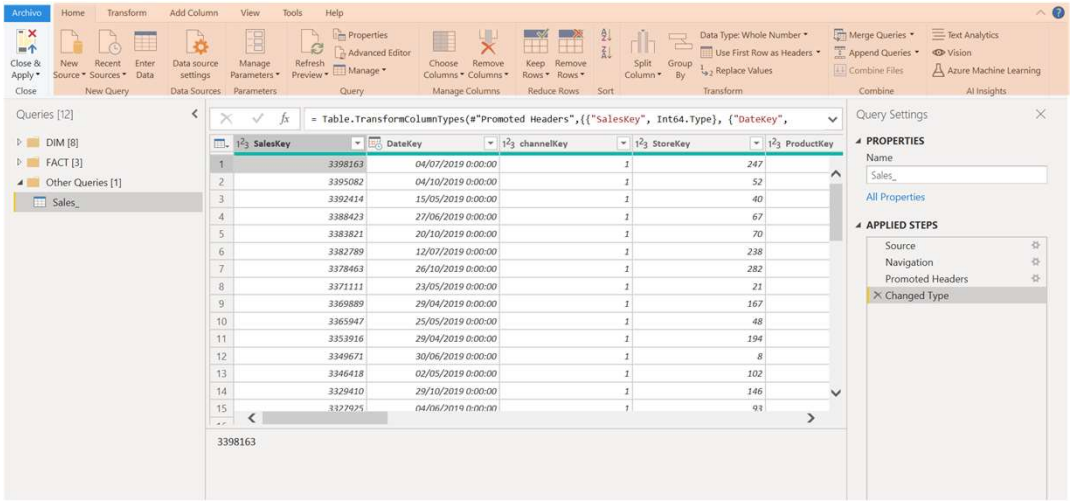
Extract

Transform

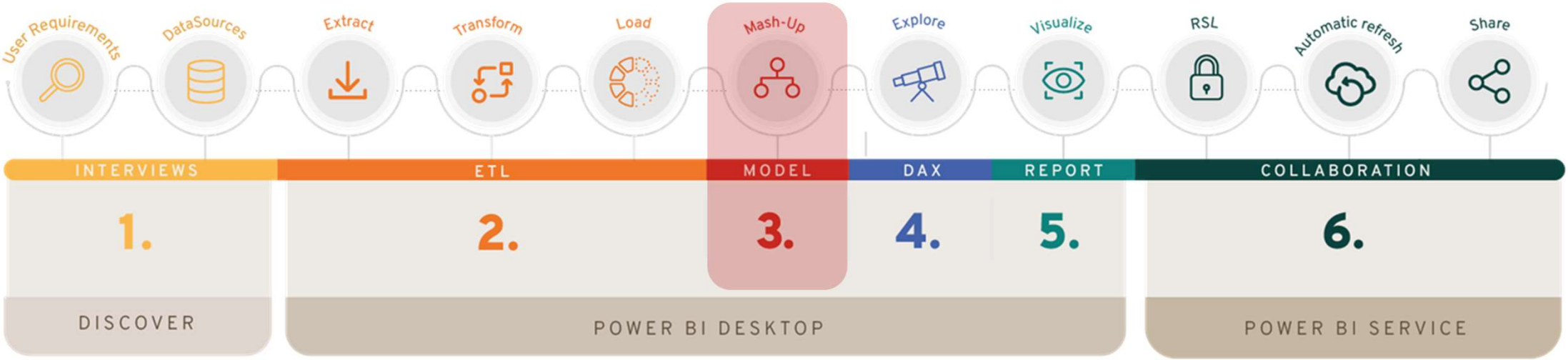
Load





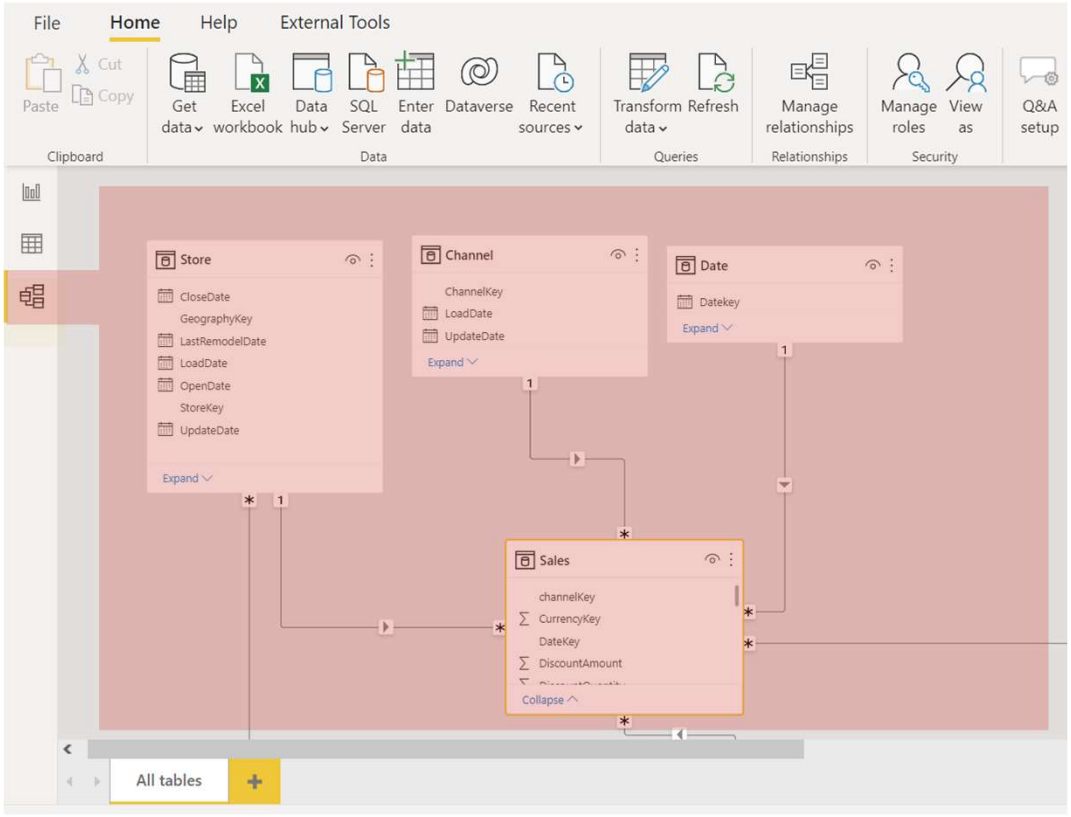


Our Method: Flow of Report Development

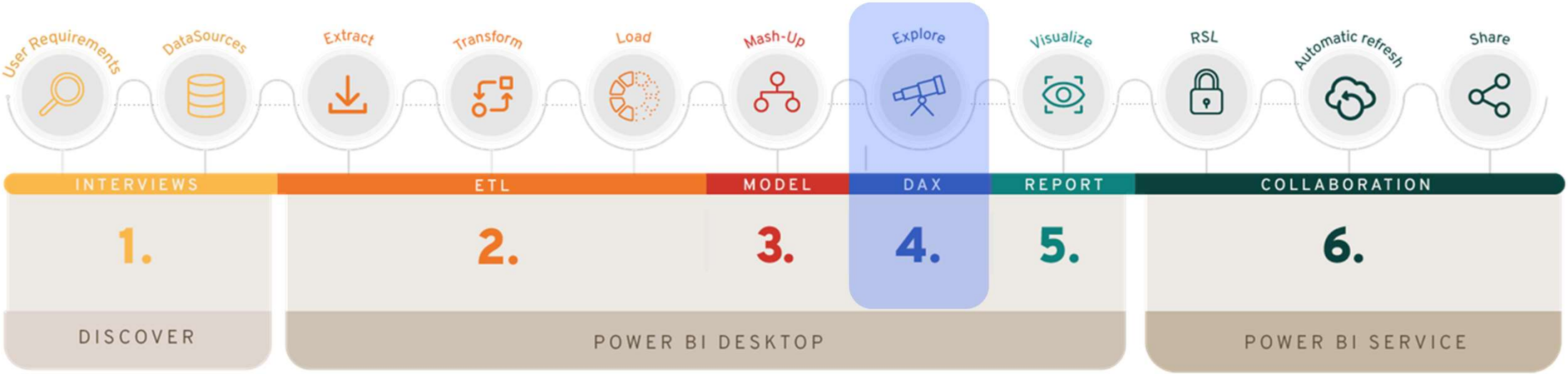


Power BI Desktop: Model

Mash-Up tables to create a model that allows different analysis



Our Method: Flow of Report Development



Power BI Desktop: DAX

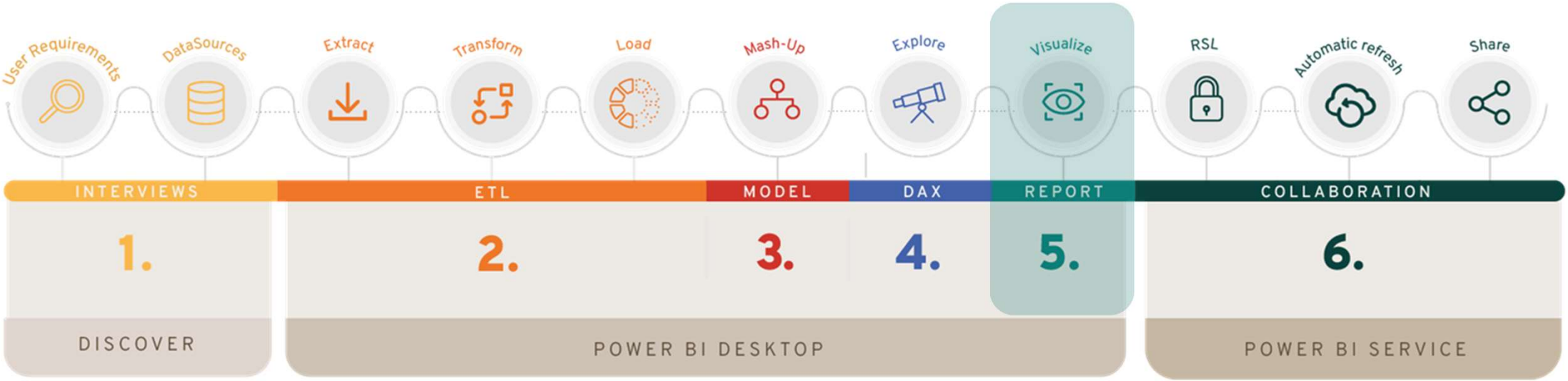
KPIs to answer business questions

Structure | Formatting | Properties | Sort | Groups | Relationships | Calculations

```
1 Kind of purchase =
2 SWITCH(TRUE(),
3 Sales[SalesQuantity] < 20, "Retail",
4 "WholeSale")
```

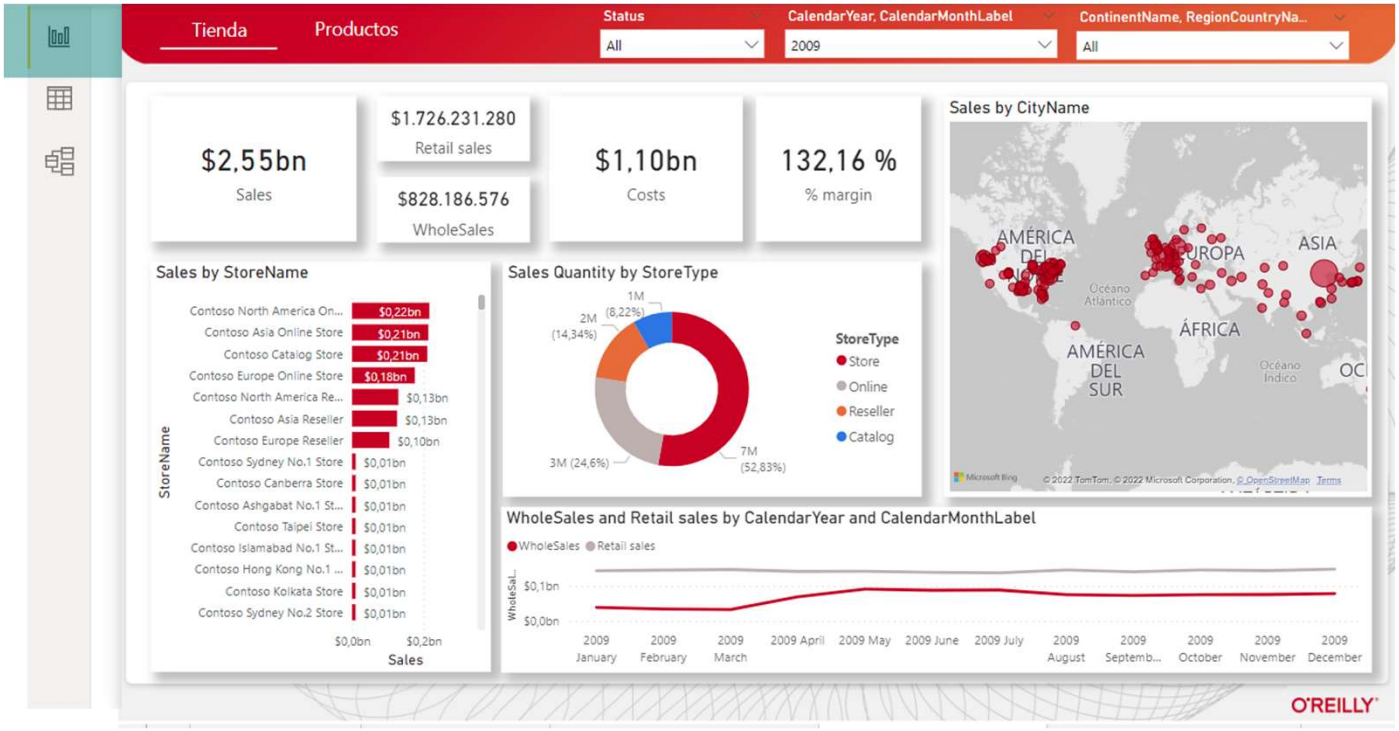
Quantity	ReturnAmount	DiscountQuantity	DiscountAmount	TotalCost	SalesAmount	ETLLoadID	LoadDate	UpdateDate	Year	Kind of purchase
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2007	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2009	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2009	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2008	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2009	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2008	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2008	Retail
0	S/.0	0	S/.0	S/.3.214,4	6.990,00 €	1	01/01/2010 0:00:00	01/01/2010 0:00:00	2009	Retail

Our Method: Flow of Report Development

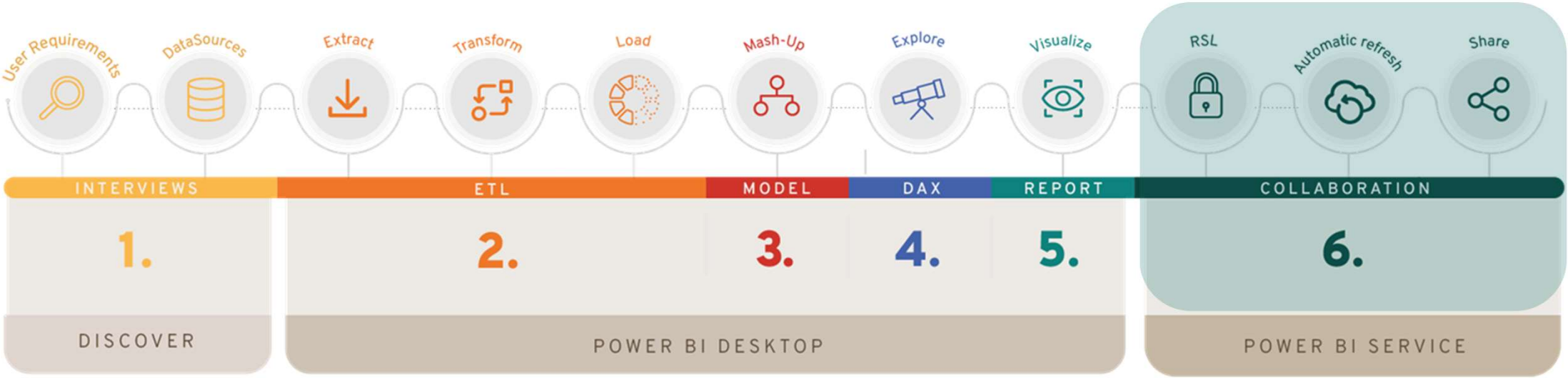


Power BI Desktop: Report

Create visuals for business users to understand their business

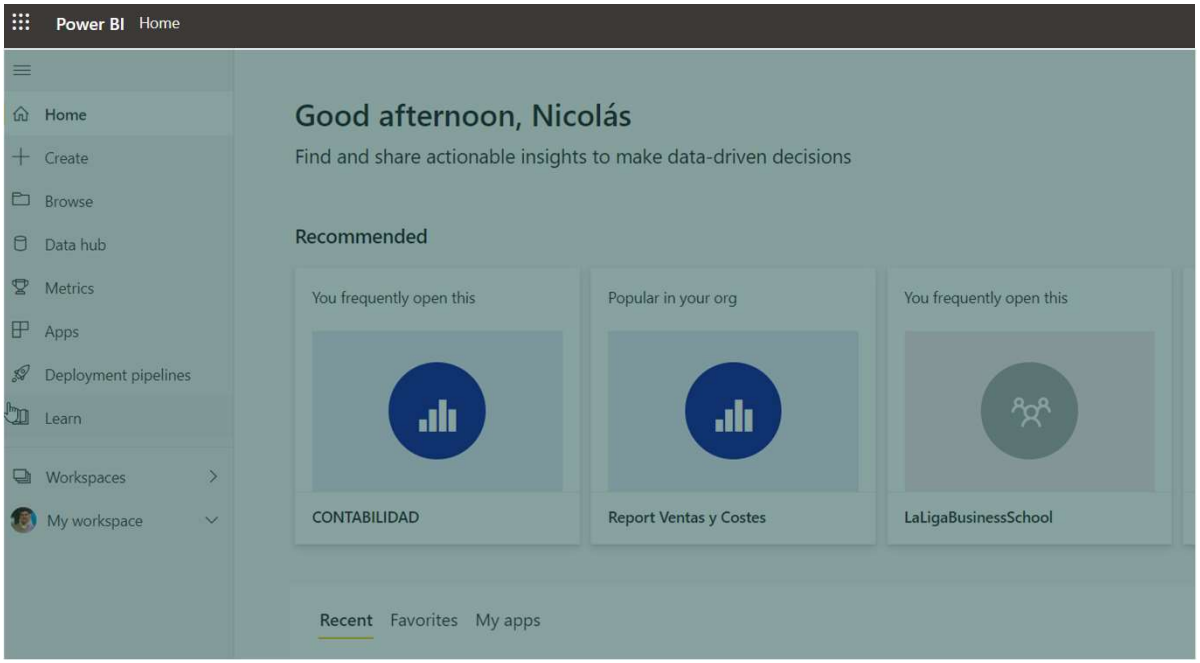


Our Method: Flow of Report Development



Web Service Power BI

Share reports with colleagues



Exercise 0.0

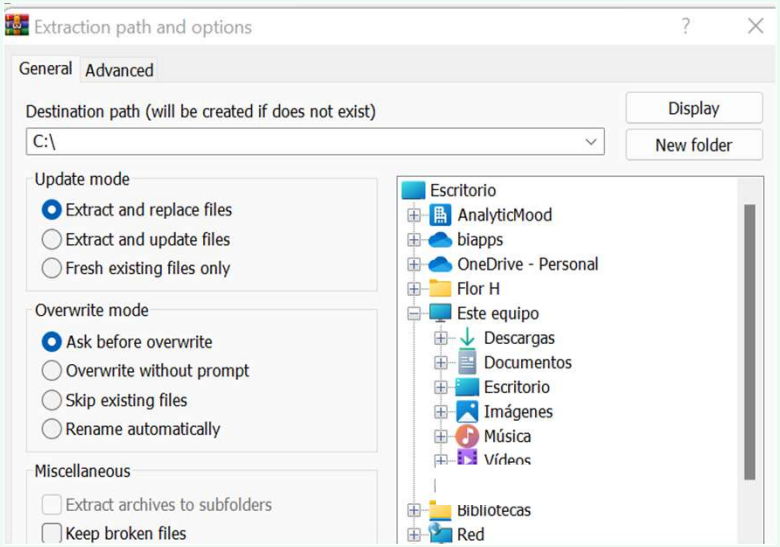
Exercise 0.0 – Initial set up

1. First you must download the shared .ZIP and extract it to the Local **C:\ path.**

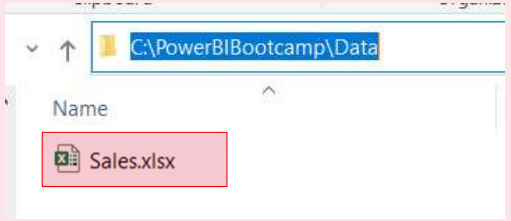
   - Link 01: **bit.ly/PowerBIBootcamp202309**

     Pass: ***OREILLY2023***

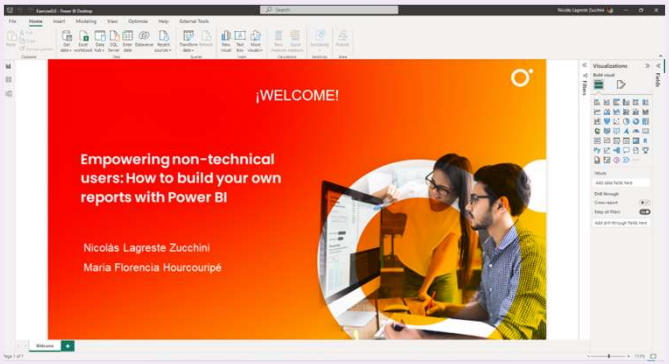
   - Link 02: **bit.ly/PowerBIBootcamp202309W01**



2. Make sure the path to the **data sources (Sales.xslx file)** is as follows: **C:\PowerBIBootcamp\Data**



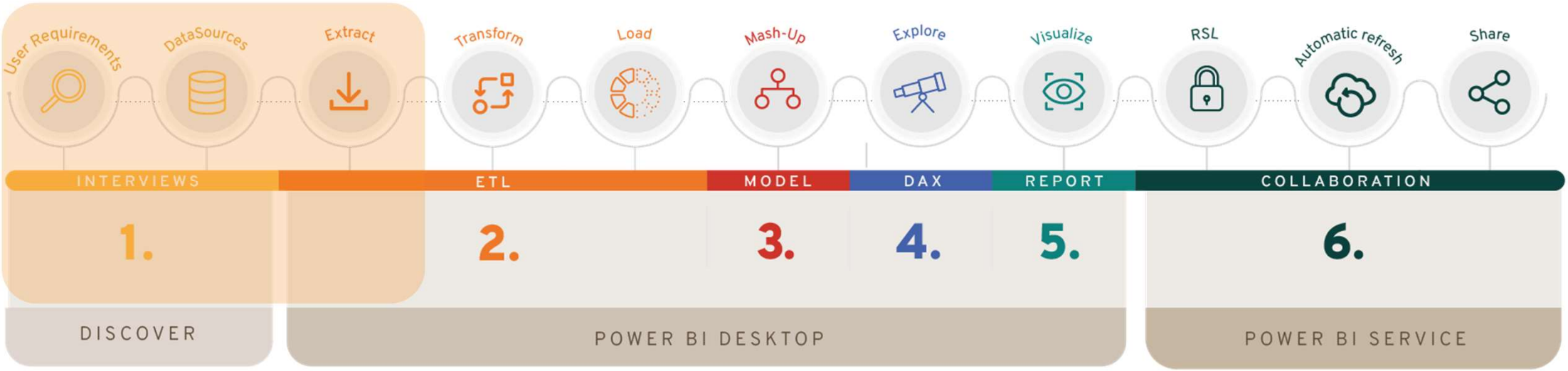
3. Lets test Power BI Desktop by opening **Exercise0.0** that is located in **C:\PowerBIBootcamp\Week01\Exercises\Exercise0.0.pbix**



Basic Transformation in Power Query

- Demo 1.1: Connect to 3 Excel Sheets and do basic transformation in Power Query (delete columns, filter rows, change names, add calculated columns, change data types).
- Load transform data to Power BI.
- Exercise 1.1: Basic Transformation in Power Query.
- Q&A

Our Method: Flow of Report Development



Demo 1.0

Interviews

Understand processes, needs and data sources

You are not the user

- Who is the audience?
- What do they need?

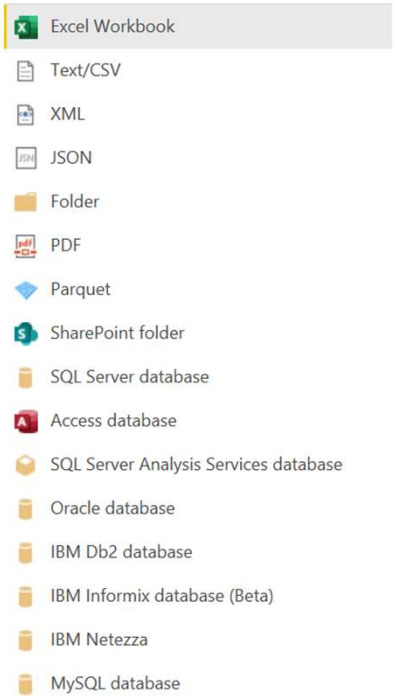
How do you know your audience?

- Observing
- Listening
- Interviewing
- Understand the business.
- What are our user's goals?
- What is the objective of this dashboard?

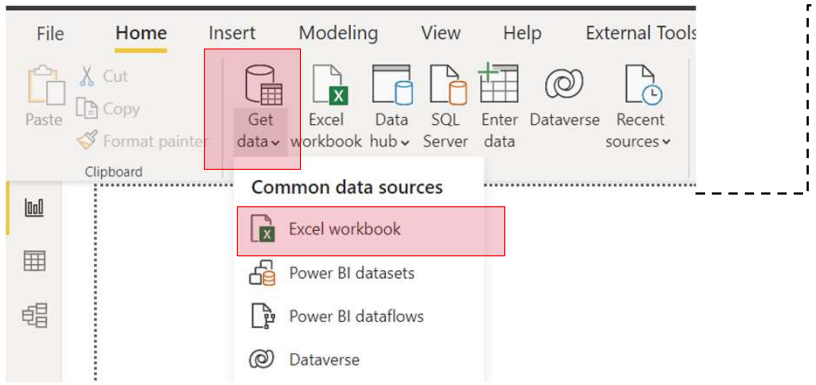
Try to understand what they need, not what they want.

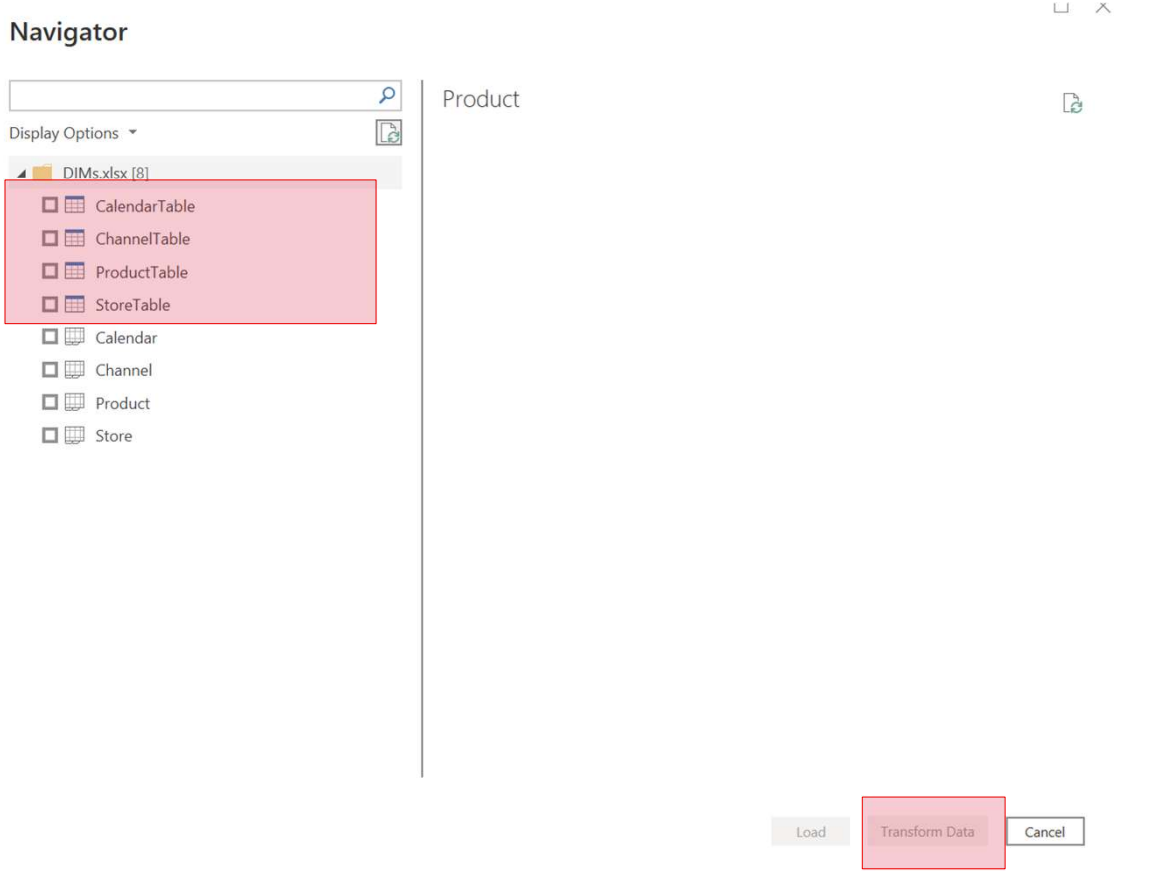
Interviews

Understand processes, needs and data sources



Power BI Desktop: Power Query: Extract





Exercise 1.0

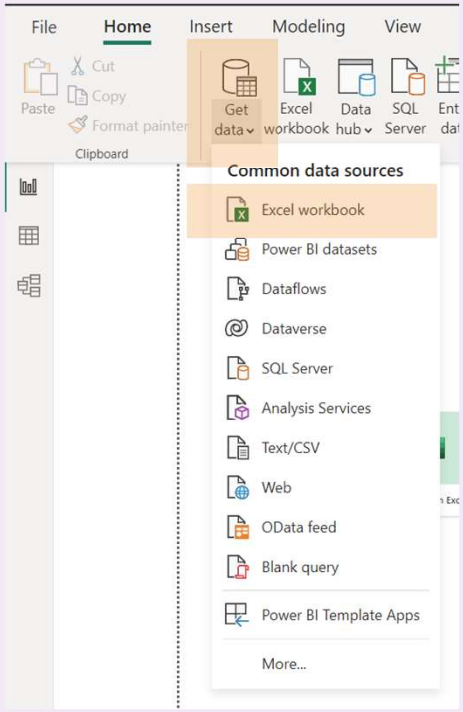
Exercise 1.0.

Goal: Become familiar with the different data sources.

In order to do it, open a new **Power BI Desktop** and connect it to the following data sources. Just select *transform* option before *loading* them.

1 Source: **Excel**

File: **Sales.xslx** (Location: "C:\PowerBIBootcamp\Data\Sales.xlsx")



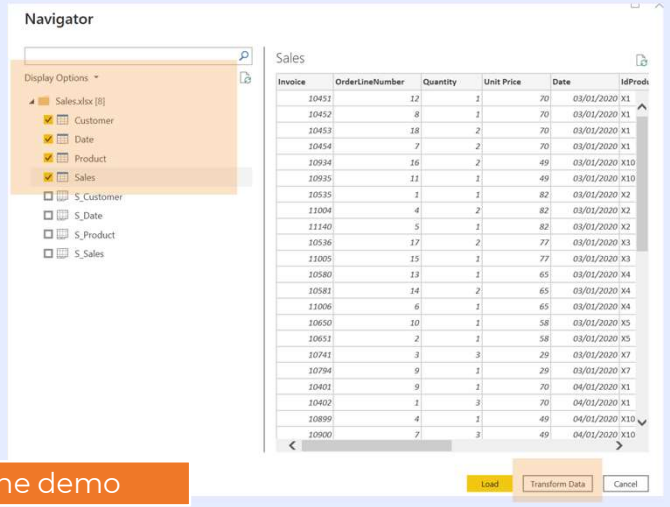
2 **Tables**:

a **Sales**

b **Customer**

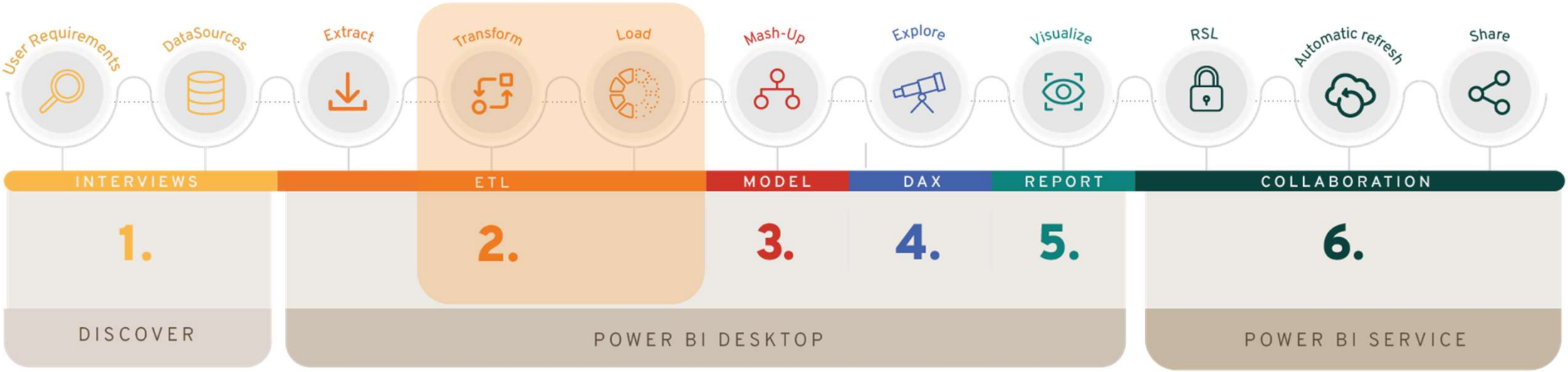
c **Date**

d **Product**



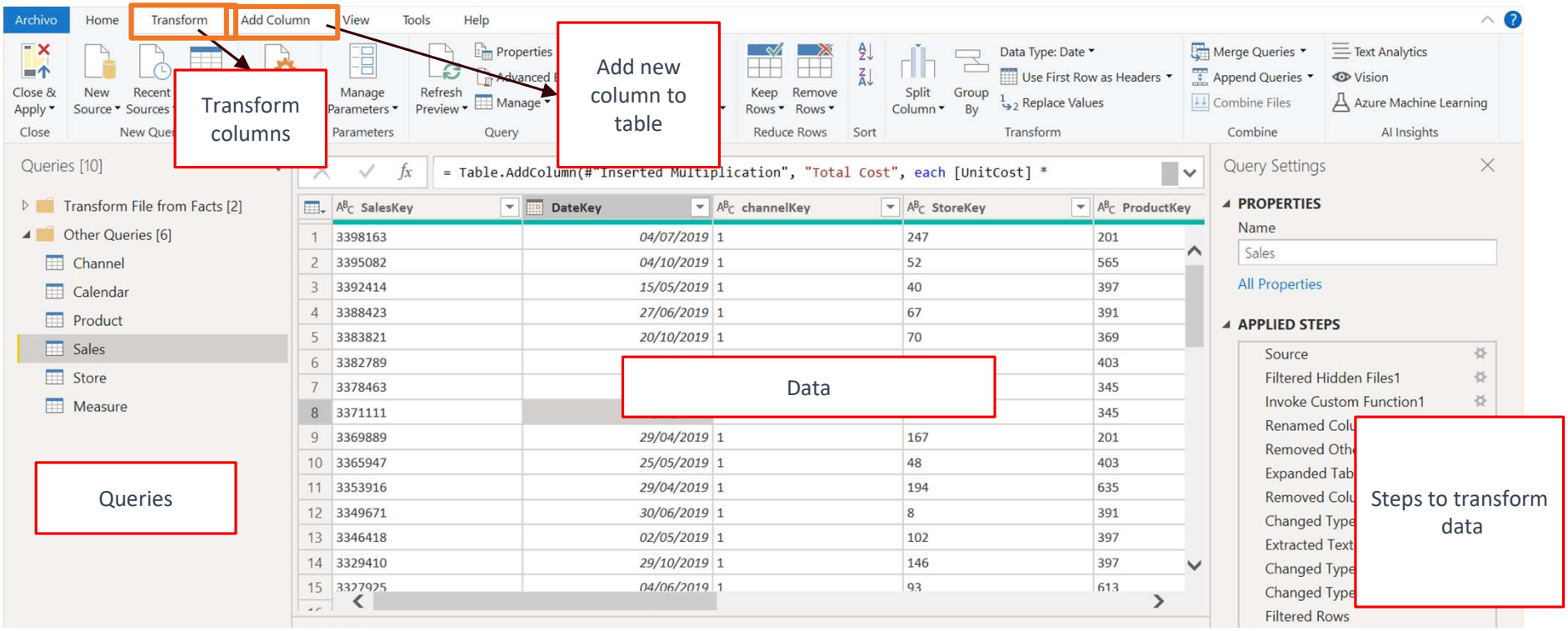
*Note: these data are different from those of the demo

Our Method: Flow of Report Development

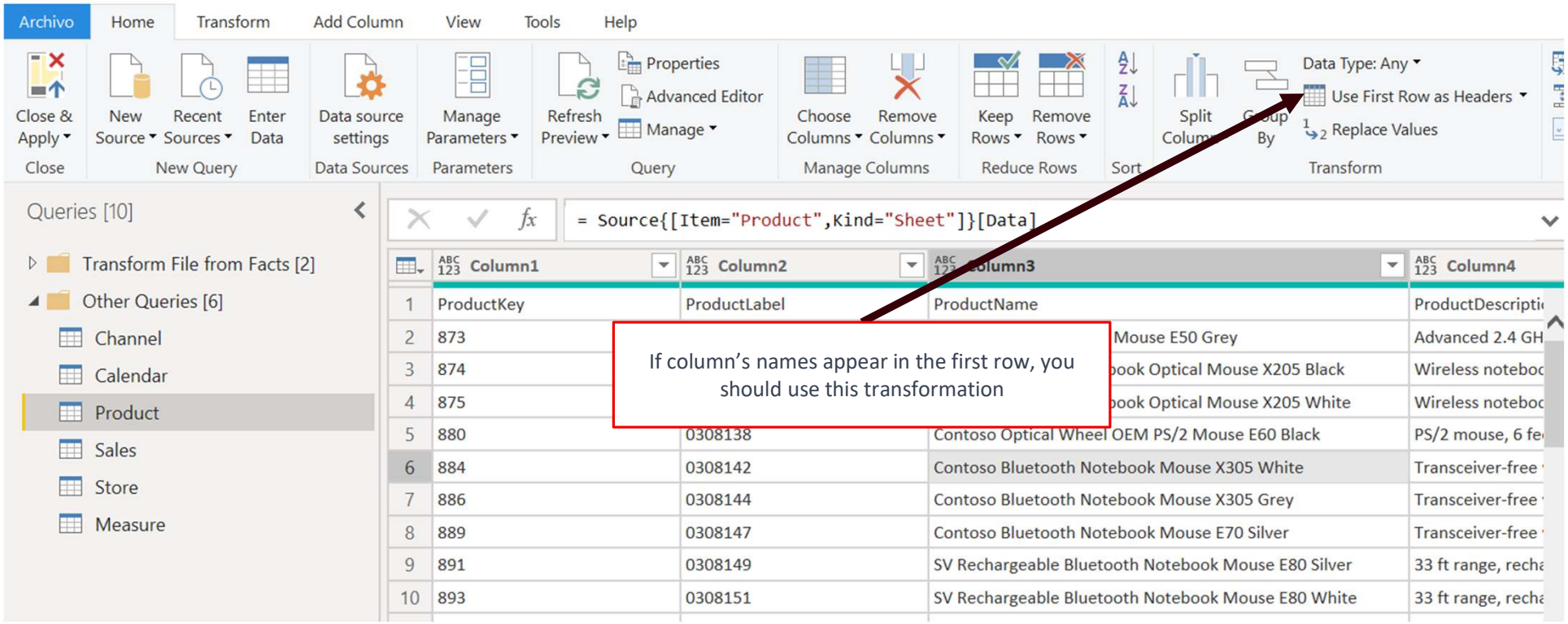


Demo 1.1

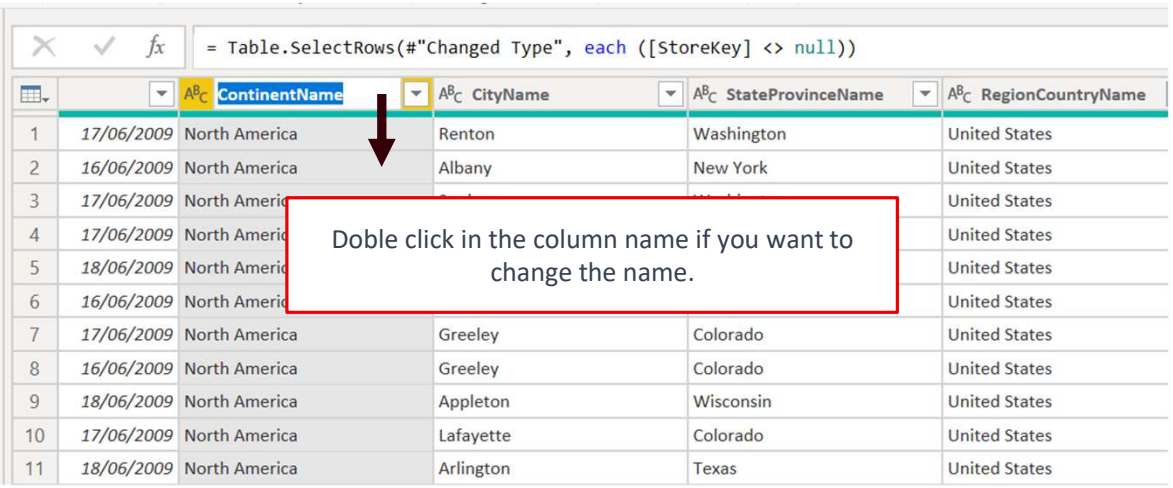
Presentation:
Parts of Power query (report, data, relations)

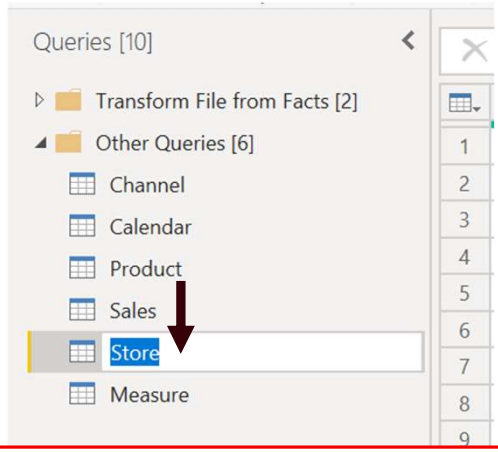


Use first Row as Headers



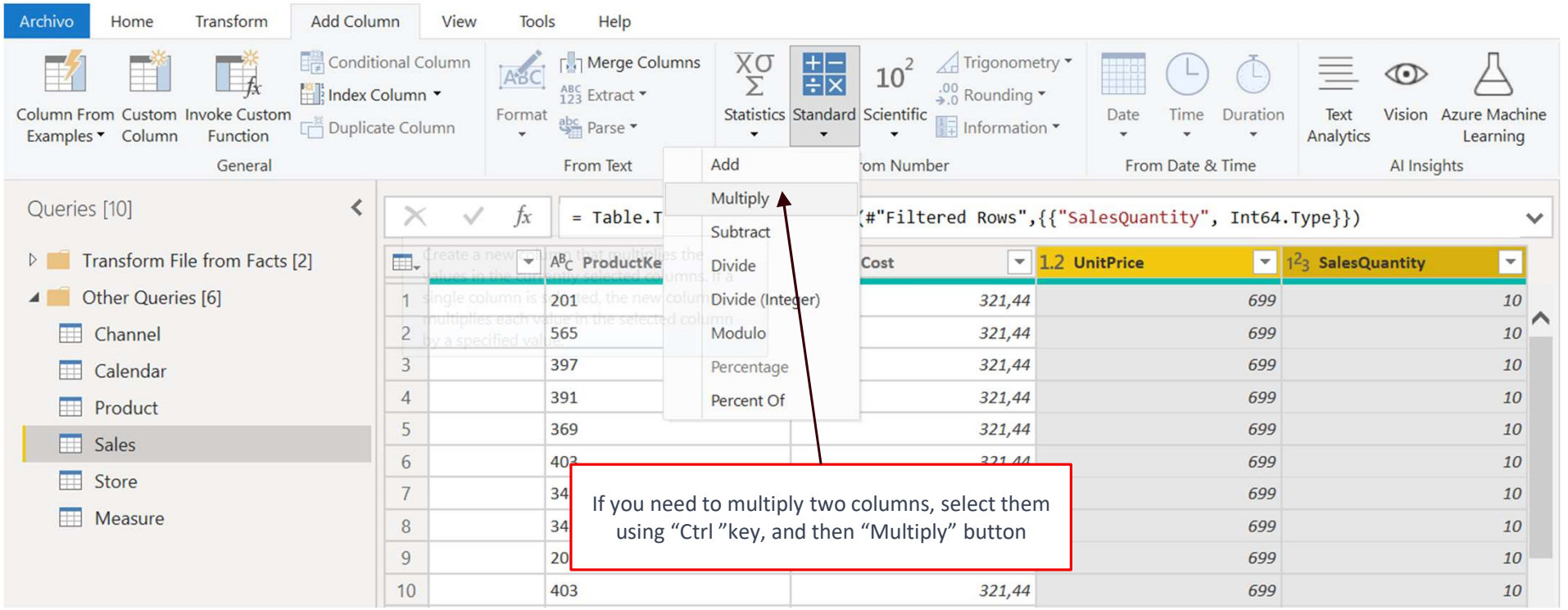
Change names





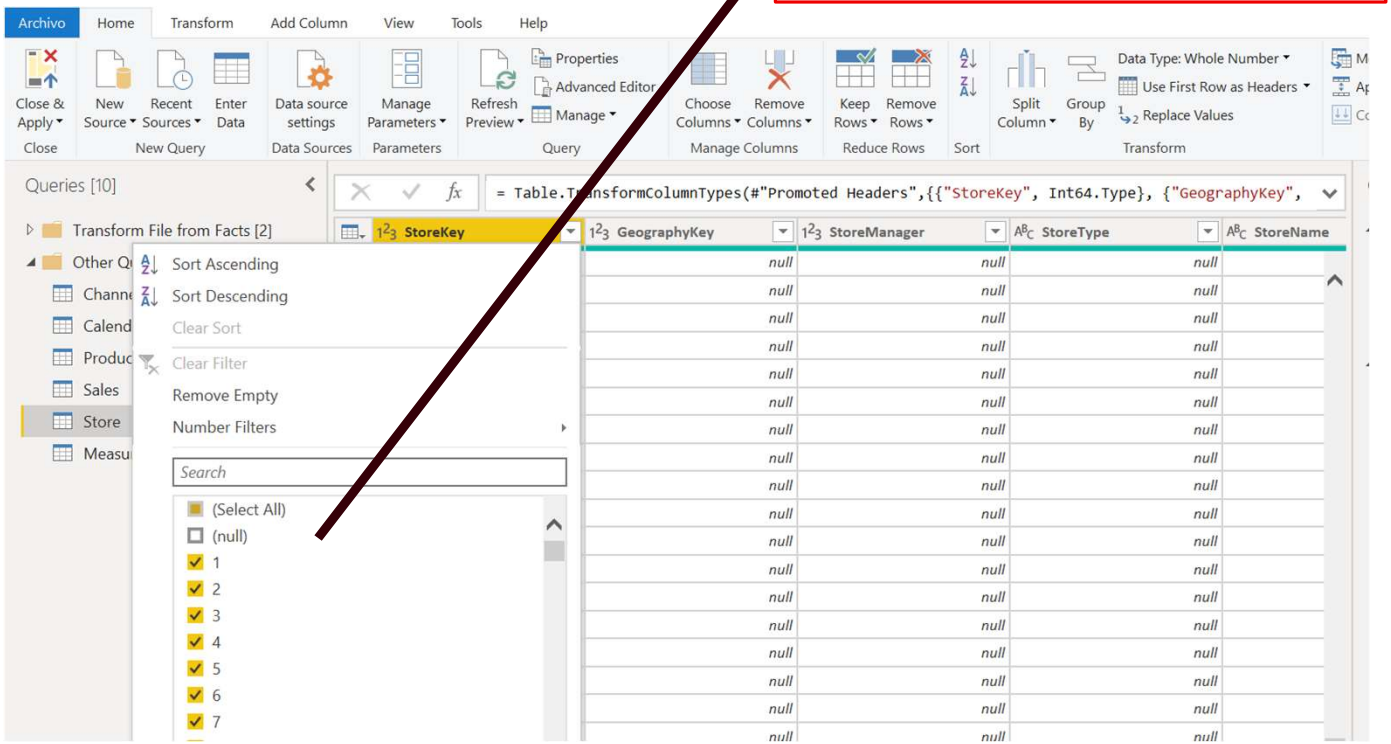
Doble click in the query name if you want to change the name.

Multiply Columns



Filter Rows

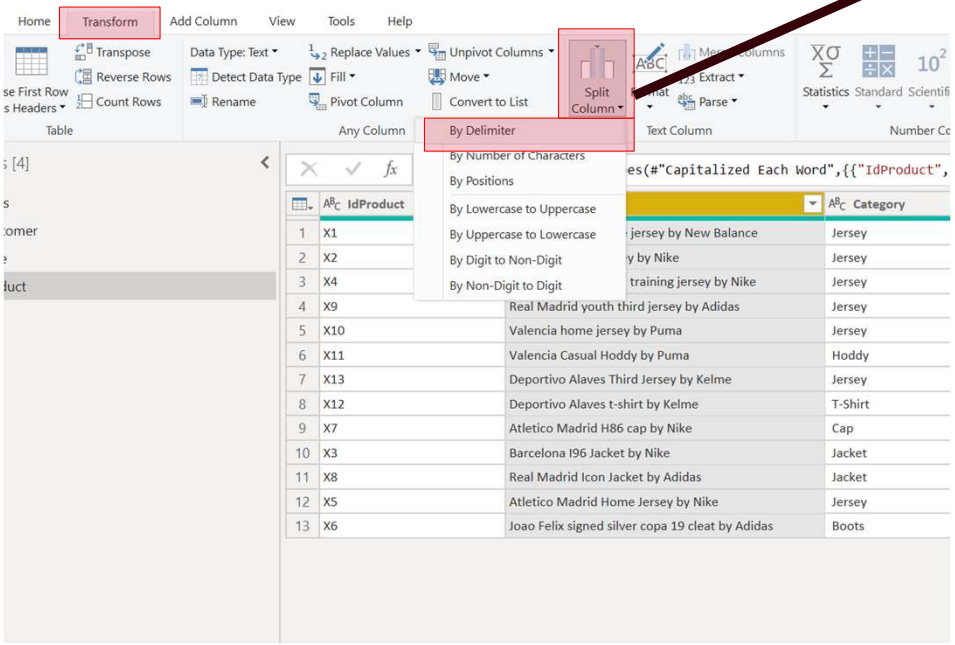
If you filter one value in one specific column, that full row will be deleted from the query.

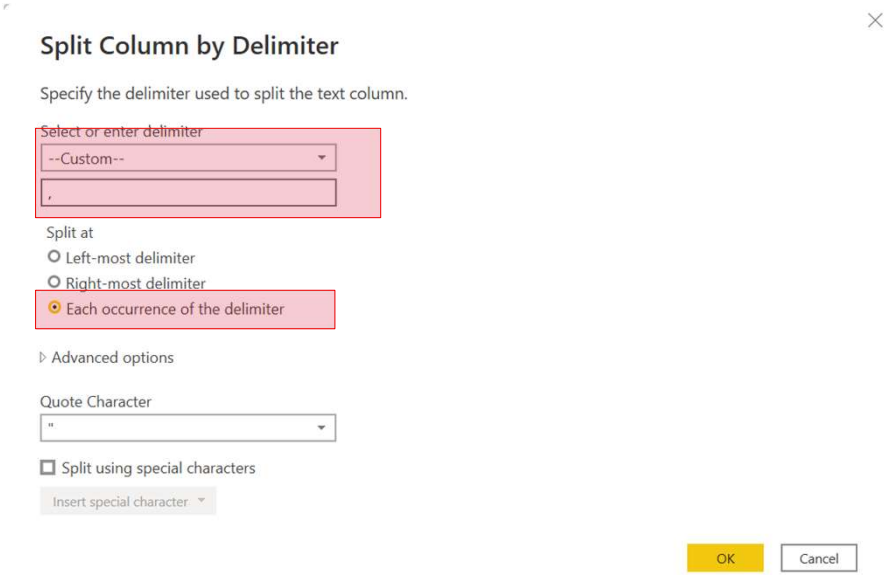


Note: this does not affect the data source

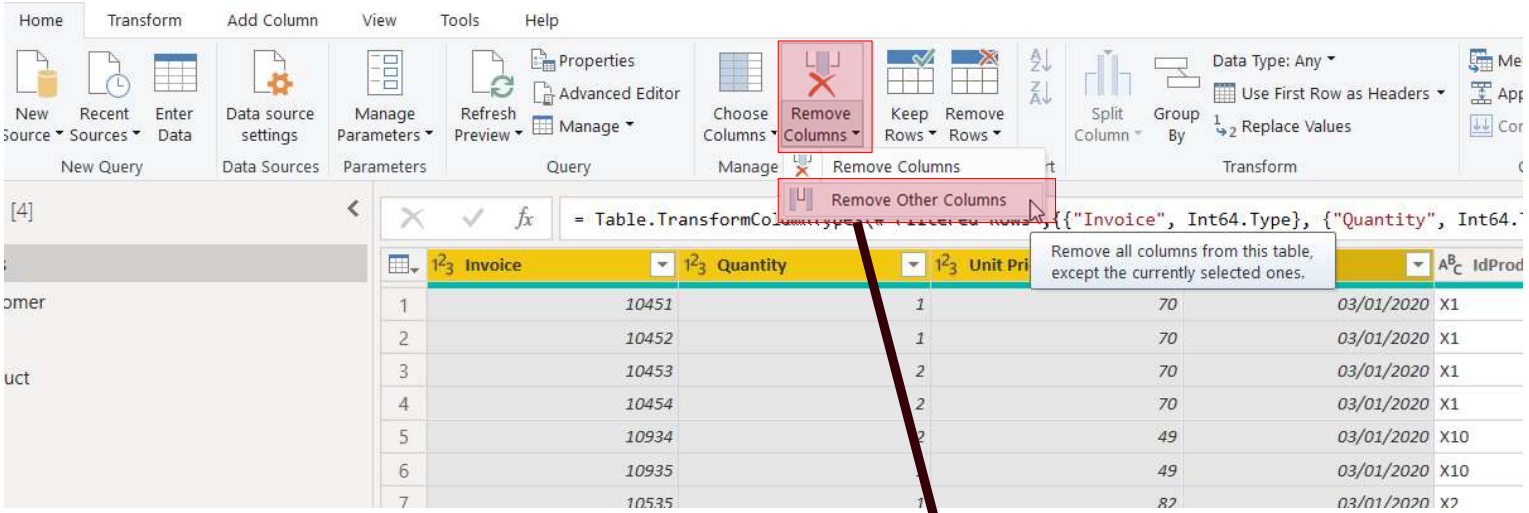
Split Colum

You can separate columns delimited by comma or other separator using this option.





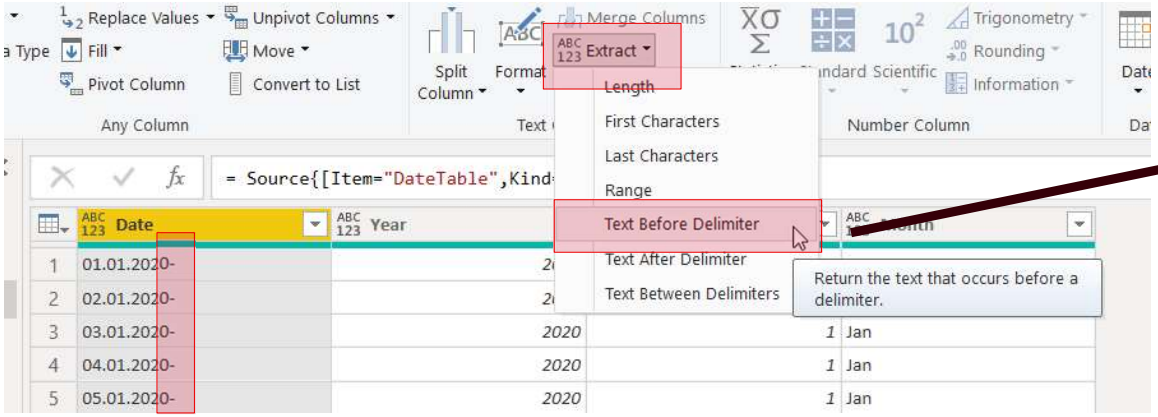
Remove Other Columns



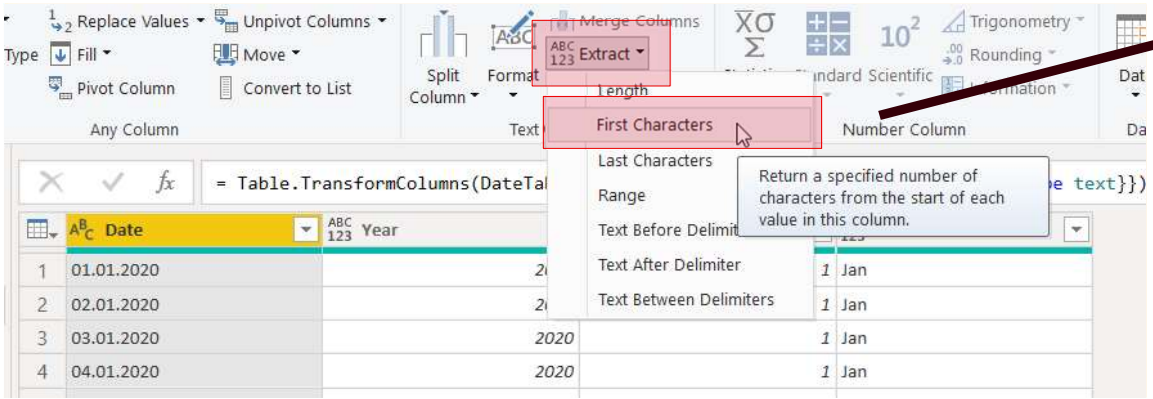
It is a good practice to remove all unnecessary columns.

This option leaves only the necessary columns of the model.

Extract

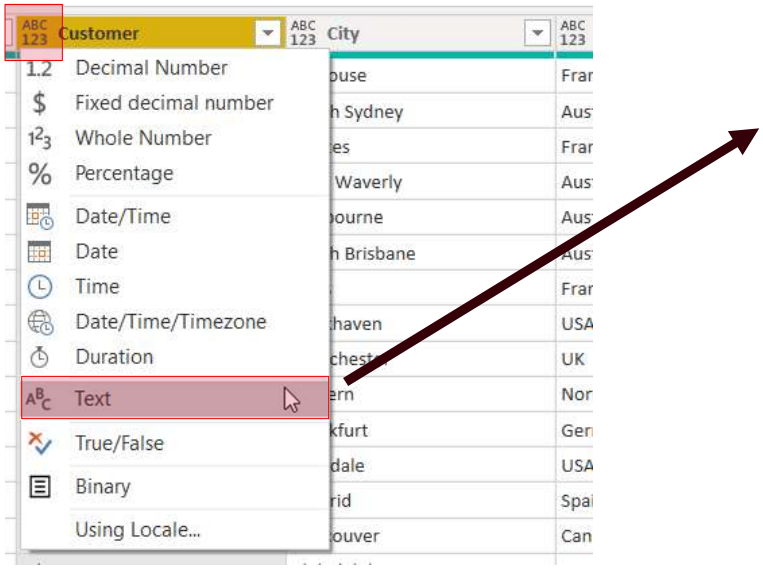


Characters can be extracted from the different values in order to clean the data.

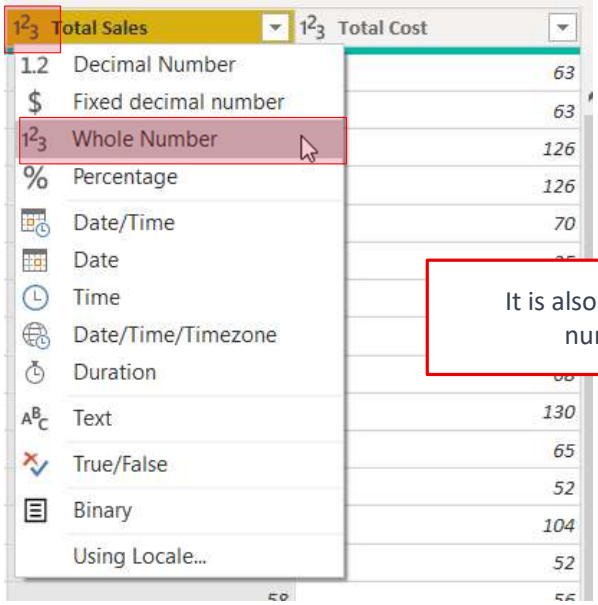


It is also possible to extract the first characters only.

Change Data Types

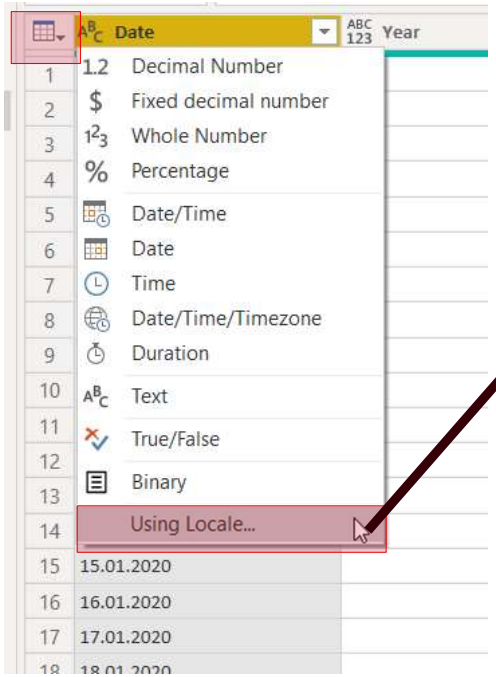


It is important that each column has the correct data type for better compression.

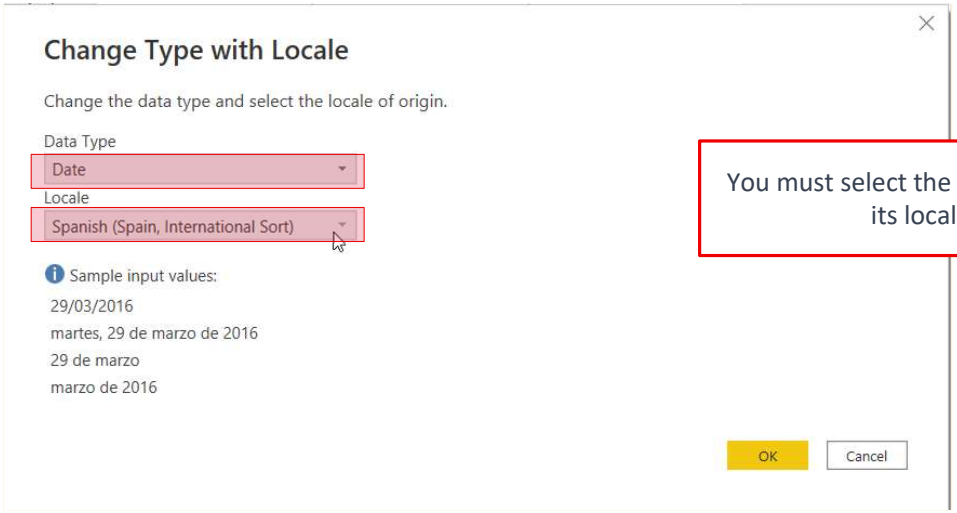


It is also important for correct calculations that the numerical columns are well categorized.

Change Data Types (cont.)

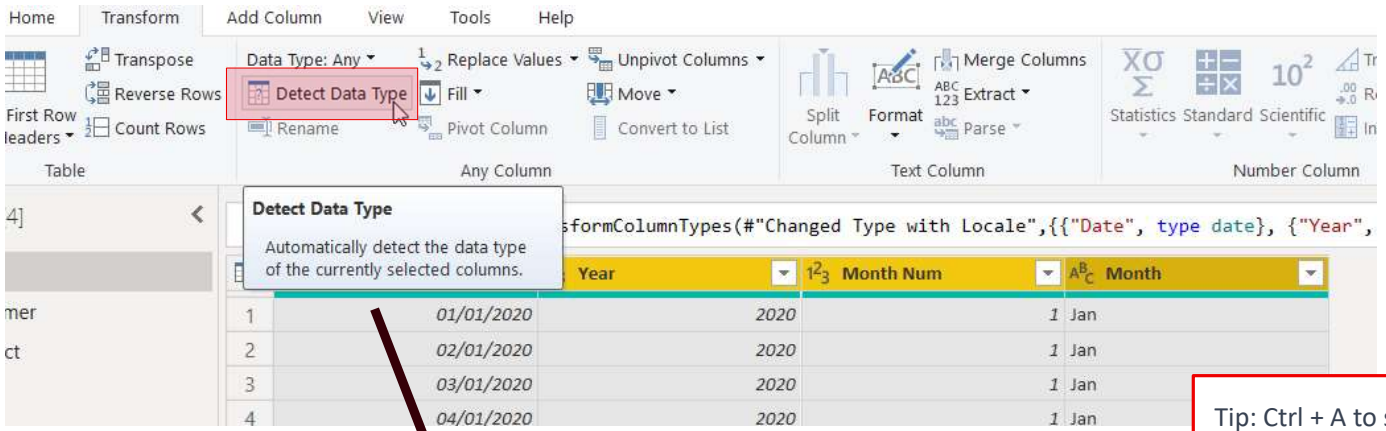


Sometimes it is necessary to change using the locale of the source file.



You must select the data type and its locale

Detect Data Type



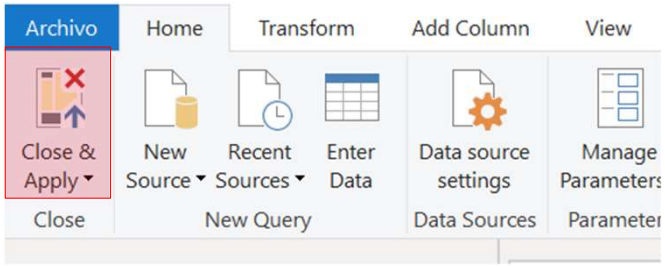
Tip: Ctrl + A to select all columns at the same time

To detect all types of data automatically it is very useful to use this functionality.

Select the required columns and click Detect Data Type in the Transform tab.

Load data to model

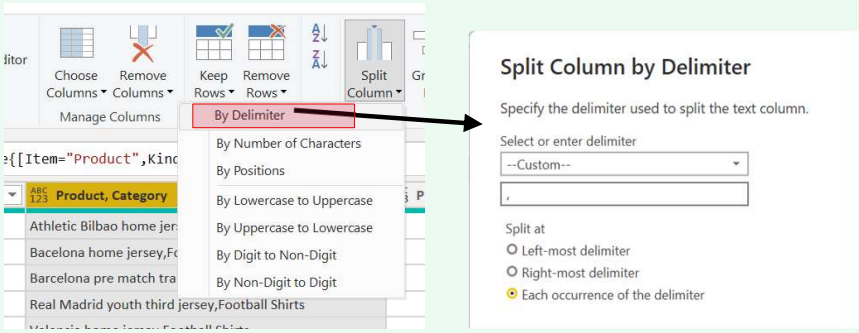
- Once all changes have been made, close and apply the changes to view them and generate a data model.



Exercise 1.1

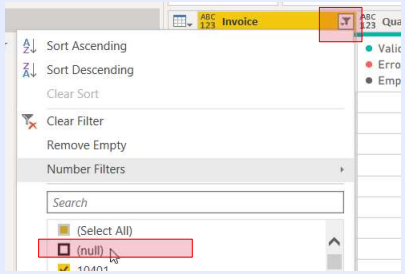
Exercise 1.1. Open the file ***Exercise1.1.pbix*** *(Location: C:\PowerBIBootcamp\Week01\Exercises\Exercise1.1.pbix)* and then open **Power Query**

1 **In Product table** separate the product from the category. Rename columns.



2 **In Sales table**:

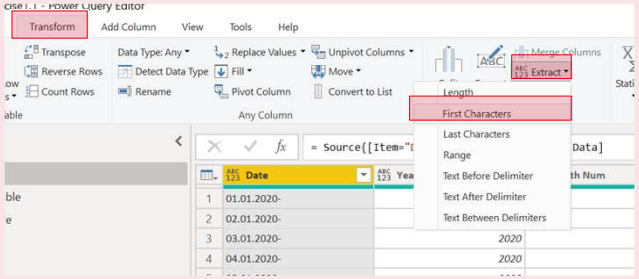
a Filter out null records.



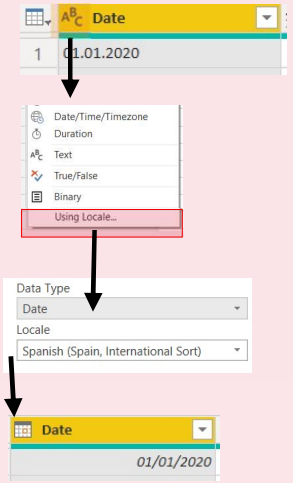
b Remove the OrderLineNumber column.

3 **In Date table:**

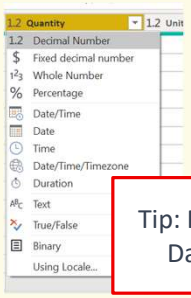
a Extract first 10 characters from date column.



b Change Type with Date Locale.

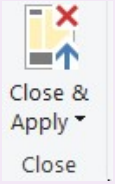


4 Check the data types for each column.



Tip: Press Ctrl + A and use Detect Data Type in Transform tab.

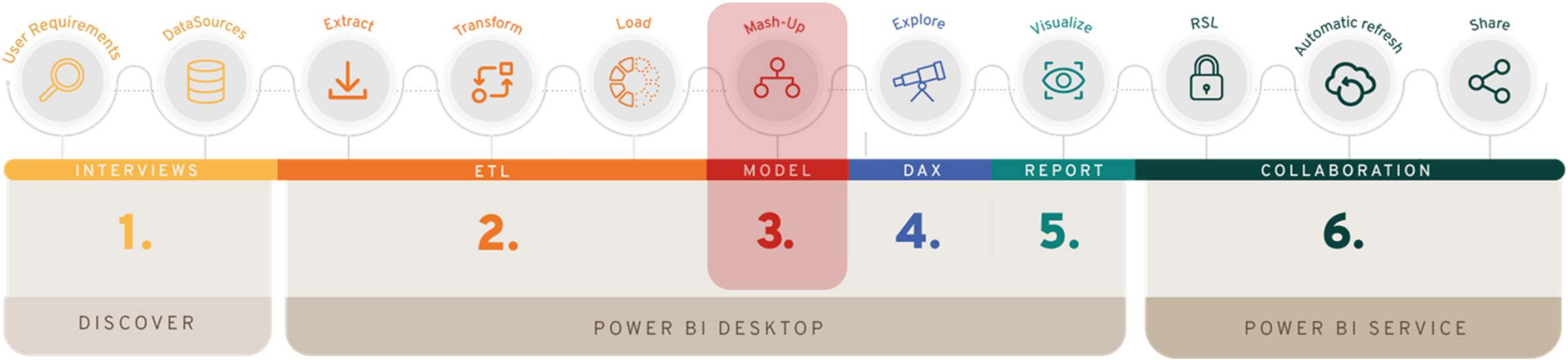
5 Load the tables into the data model.



Why building star schema models in Power BI

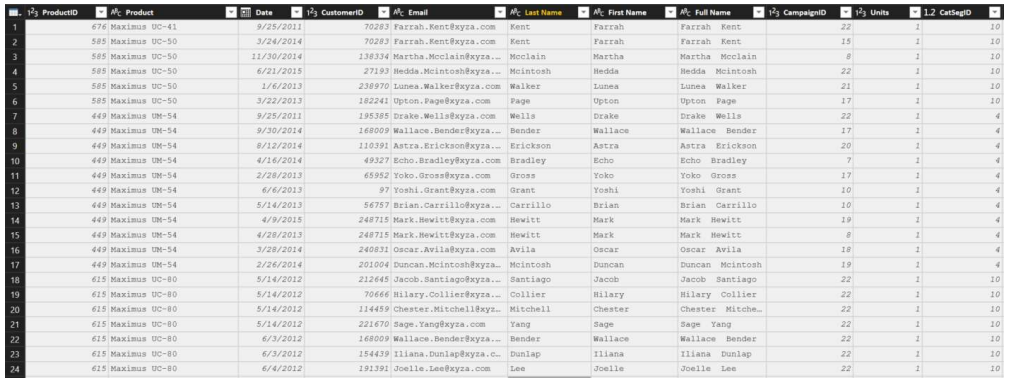
- What is a Star Schema Model?
- Facts and dimensions of star schema models.
- What do we mean with relationships between tables.

Our Method: Flow of Report Development



What type of models are better suited for data analysis?

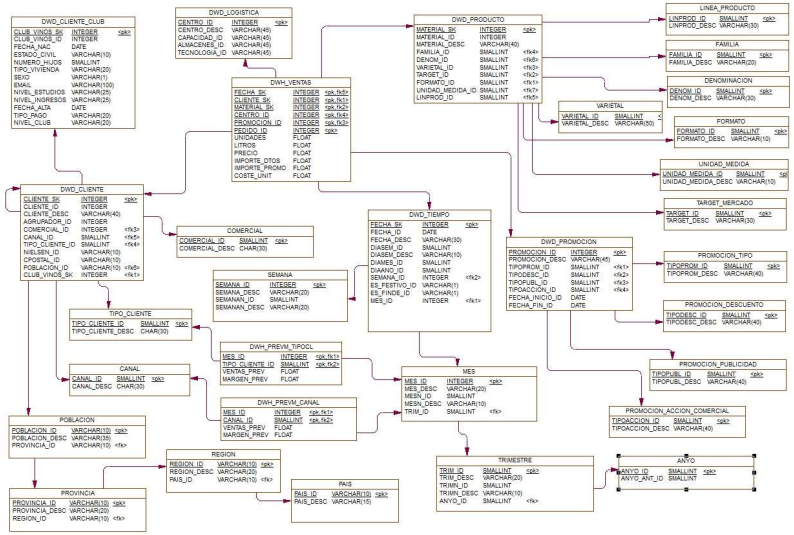
Denormalized models in Excel



	ProductID	Product	Date	CustomerID	Email	Last Name	First Name	Full Name	CampaignID	Units	CatSegID
1	676	Maximus UC-41	9/25/2011	70283	Farrah.Kent@xyza.com	Kent	Farrah	Farrah Kent	22	1	10
2	585	Maximus UC-50	3/24/2014	70283	Farrah.Kent@xyza.com	Kent	Farrah	Farrah Kent	15	1	10
3	585	Maximus UC-50	11/30/2014	138334	Martha.Mcclain@xyza...	Mcclain	Martha	Martha Mcclain	8	1	10
4	585	Maximus UC-50	6/21/2015	27193	Hedda.Mcintosh@xyza...	Mcintosh	Hedda	Hedda Mcintosh	22	1	10
5	585	Maximus UC-50	1/6/2013	238970	Lunea.Walker@xyza.com	Walker	Lunea	Lunea Walker	21	1	10
6	585	Maximus UC-50	3/22/2013	182241	Upton.Page@xyza.com	Page	Upton	Upton Page	17	1	10
7	449	Maximus UM-54	9/25/2011	195385	Drake.Wells@xyza.com	Wells	Drake	Drake Wells	22	1	4
8	449	Maximus UM-54	9/30/2014	168009	Wallace.Bender@xyza...	Bender	Wallace	Wallace Bender	17	1	4
9	449	Maximus UM-54	8/12/2014	110391	Astra.Erickson@xyza...	Erickson	Astra	Astra Erickson	20	1	4
10	449	Maximus UM-54	4/16/2014	49327	Echo.Bradley@xyza.com	Bradley	Echo	Echo Bradley	7	1	4
11	449	Maximus UM-54	2/28/2013	65952	Yoko.Gross@xyza.com	Gross	Yoko	Yoko Gross	17	1	4
12	449	Maximus UM-54	6/6/2013	97	Yoshi.Grant@xyza.com	Grant	Yoshi	Yoshi Grant	10	1	4
13	449	Maximus UM-54	5/14/2013	56757	Brian.Carrillo@xyza...	Carrillo	Brian	Brian Carrillo	10	1	4
14	449	Maximus UM-54	4/9/2015	248715	Mark.Hewitt@xyza.com	Hewitt	Mark	Mark Hewitt	19	1	4
15	449	Maximus UM-54	4/28/2013	248715	Mark.Hewitt@xyza.com	Hewitt	Mark	Mark Hewitt	8	1	4
16	449	Maximus UM-54	3/28/2014	240831	Oscar.Avila@xyza.com	Avila	Oscar	Oscar Avila	18	1	4
17	449	Maximus UM-54	2/26/2014	201004	Duncan.Mcintosh@xyza...	Mcintosh	Duncan	Duncan Mcintosh	19	1	4
18	615	Maximus UC-80	5/14/2012	212645	Jacob.Santiago@xyza...	Santiago	Jacob	Jacob Santiago	22	1	10
19	615	Maximus UC-80	5/14/2012	70666	Hilary.Collier@xyza...	Collier	Hilary	Hilary Collier	22	1	10
20	615	Maximus UC-80	5/14/2012	114459	Chester.Mitchell@xyz...	Mitchell	Chester	Chester Mitche...	22	1	10
21	615	Maximus UC-80	5/14/2012	221670	Sage.Yang@xyza.com	Yang	Sage	Sage Yang	22	1	10
22	615	Maximus UC-80	6/3/2012	168009	Wallace.Bender@xyza...	Bender	Wallace	Wallace Bender	22	1	10
23	615	Maximus UC-80	6/3/2012	154439	Iliana.Dunlap@xyza.c...	Dunlap	Iliana	Iliana Dunlap	22	1	10
24	615	Maximus UC-80	6/4/2012	191391	Joelle.Lee@xyza.com	Lee	Joelle	Joelle Lee	22	1	10

- **Data Duplication:** Excel often leads to data duplication as different sheets or workbooks may contain similar data, increasing the risk of inconsistencies and errors.
- **Performance Issues:** As the data grows, Excel's performance can degrade, leading to slow calculations and analysis, especially when using complex formulas or functions.
- **Lack of Data Integrity:** Excel lacks strict data integrity controls, making it easier for users to input incorrect or inconsistent data, impacting the accuracy of analysis and reporting.

Normalized models in Data Bases

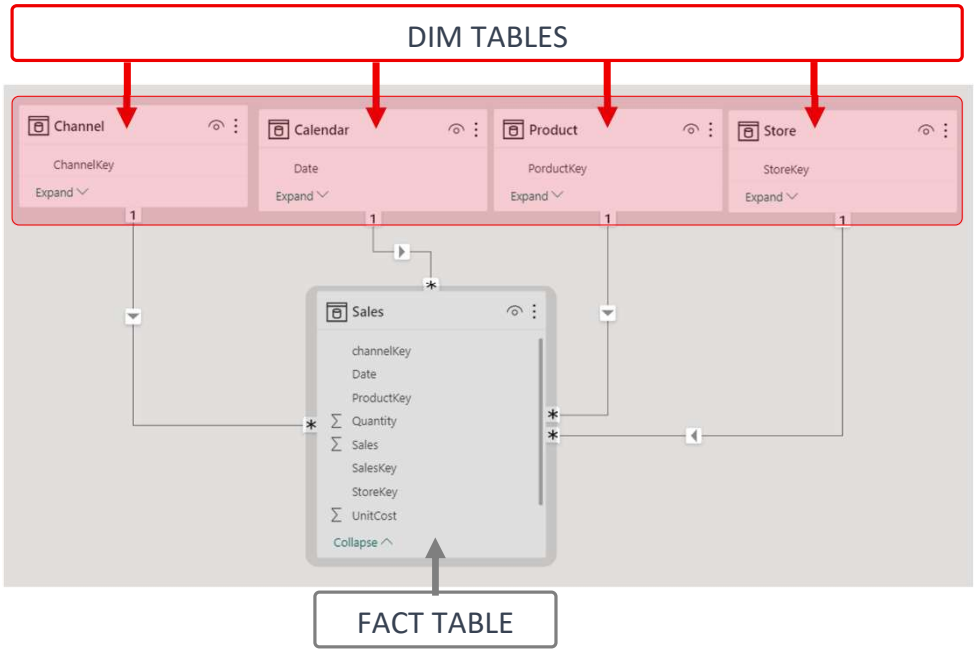


- **Readability:** The normalized structure may result in cryptic column names and lack of context, making it harder for non-technical users to understand the data and generate reports.
- **Complex Queries:** Normalized models require complex queries with multiple joins to retrieve meaningful data for reporting, leading to slower performance and increased query complexity.
- **Performance Overhead:** The need for multiple joins and complex data retrieval can cause performance overhead, leading to slower reporting and longer processing times.

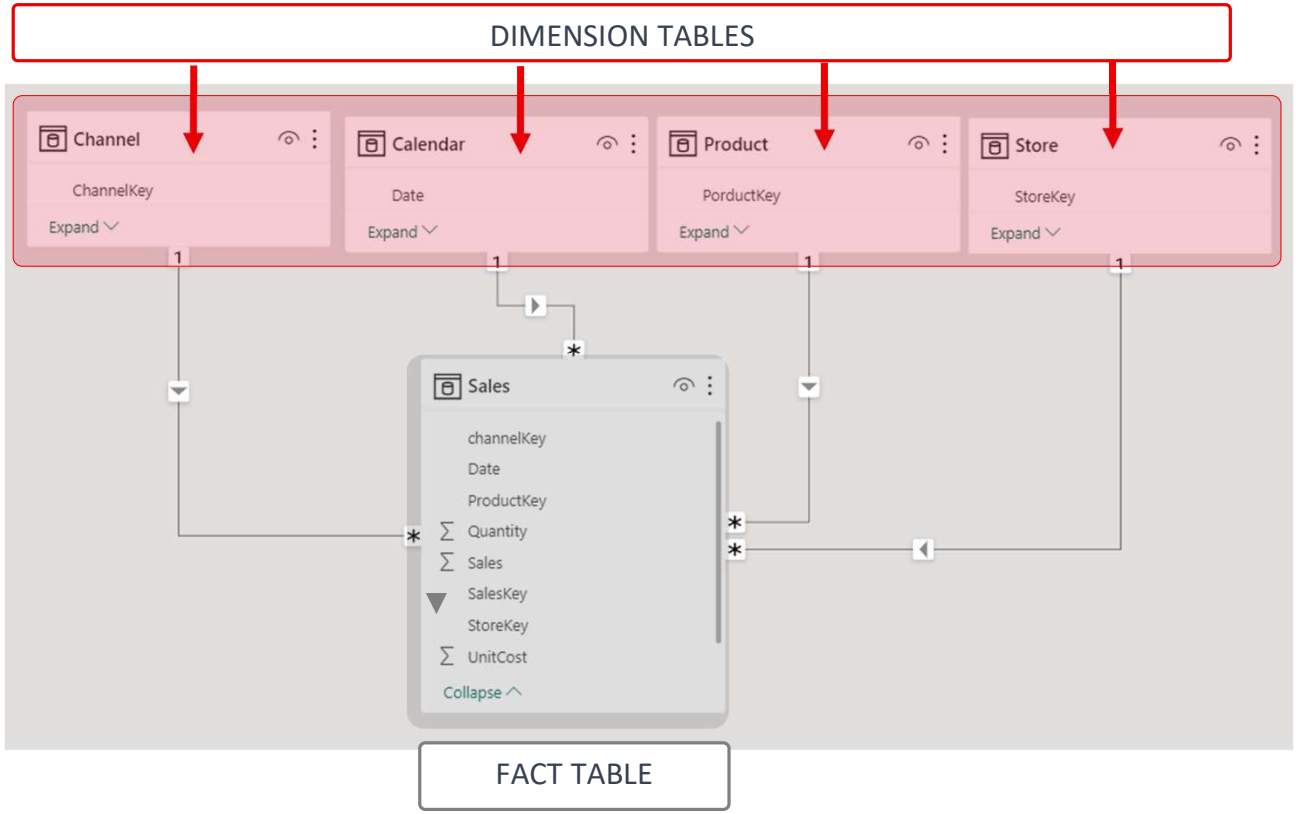
Star Schema Overview

A star schema is a type of data modeling approach used in data warehouses and business intelligence systems.

It is designed for efficient data analysis and reporting.



Dim & Facts

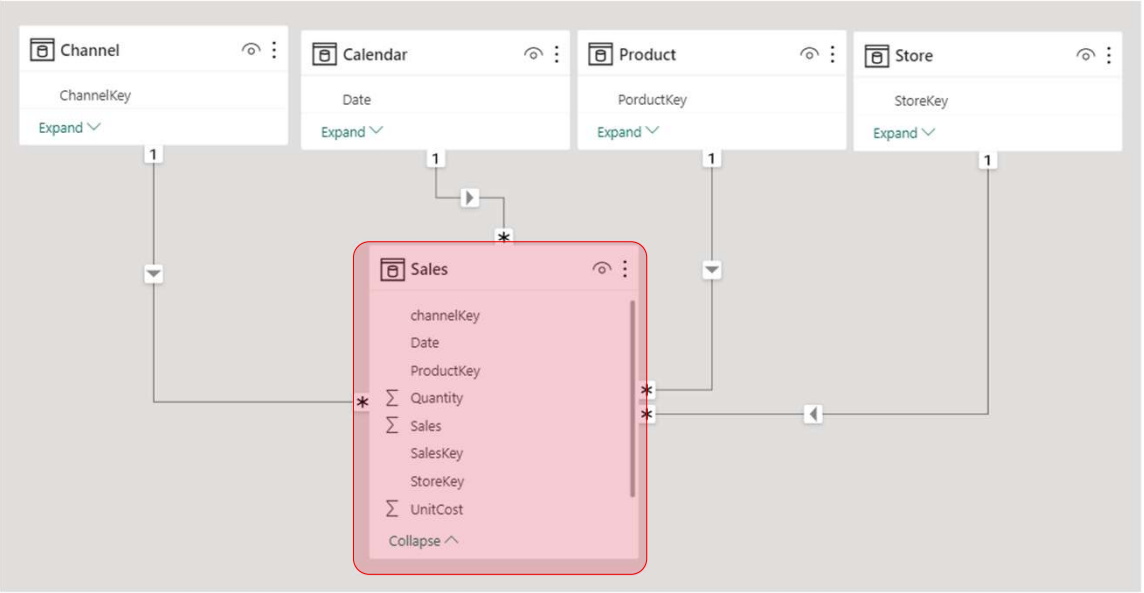

DIMENSION TABLES
Channel
ChannelKey
Expand
Calendar
Date
Expand
Product
PorductKey
Expand
Store
StoreKey
Expand
1
1
1
1
*
*
*
*
Sales
channelKey
Date
ProductKey
Quantity
Sales
SalesKey
StoreKey
UnitCost
Collapse
FACT TABLE

Facts

A **fact table** represents individual transactions or events.

Each row contains numerical data to be aggregated.

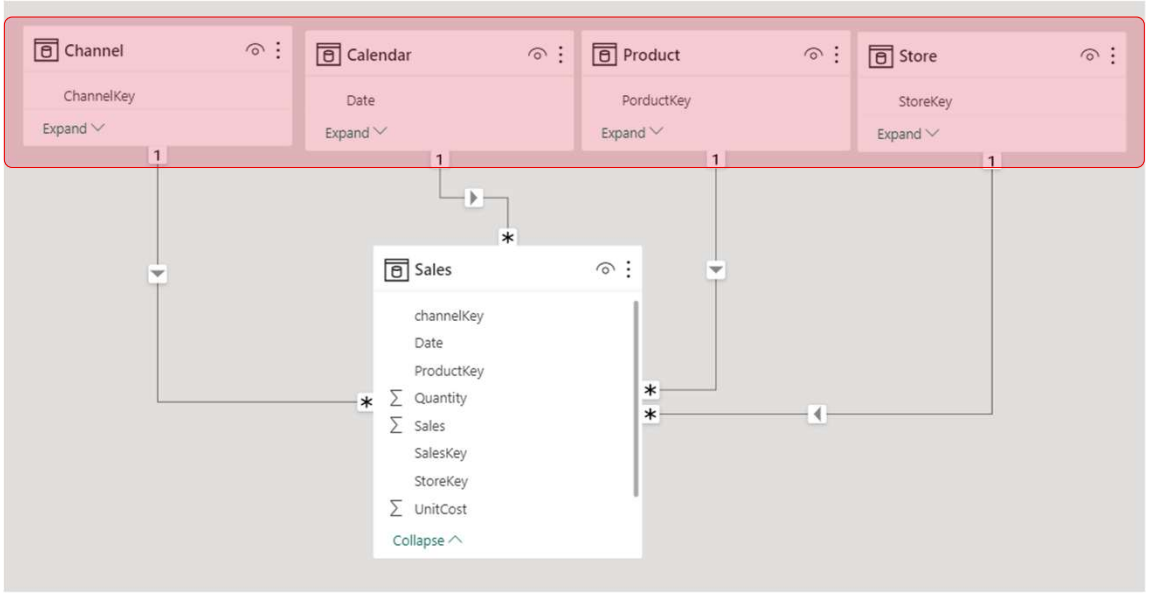
Examples include sales, units sold, and costs.



Dimensions

A **Dim** (or Dimension) table contains descriptive attributes that define how a fact should roll up.

- Sales by customer
- Quantity by Product



Facts & Dim

The **fact table** stores two types of information:

- Numeric values
- Dimensions ID

VALUE DATA

DIMENSION ID

ORDER ID	SALES AMOUNT	QUANTITY	PRODUCT_ID	EMPLOYEE_ID	DATE_ID
101	150	2	22	12225	20230501
102	210	3	17	12588	20230505
103	250	1	12	14558	20230509
104	350	5	16	13225	20230512
105	70	1	16	16442	20230515

The **dim table** stores two types of information:

- Dimensions ID
- Descriptive columns

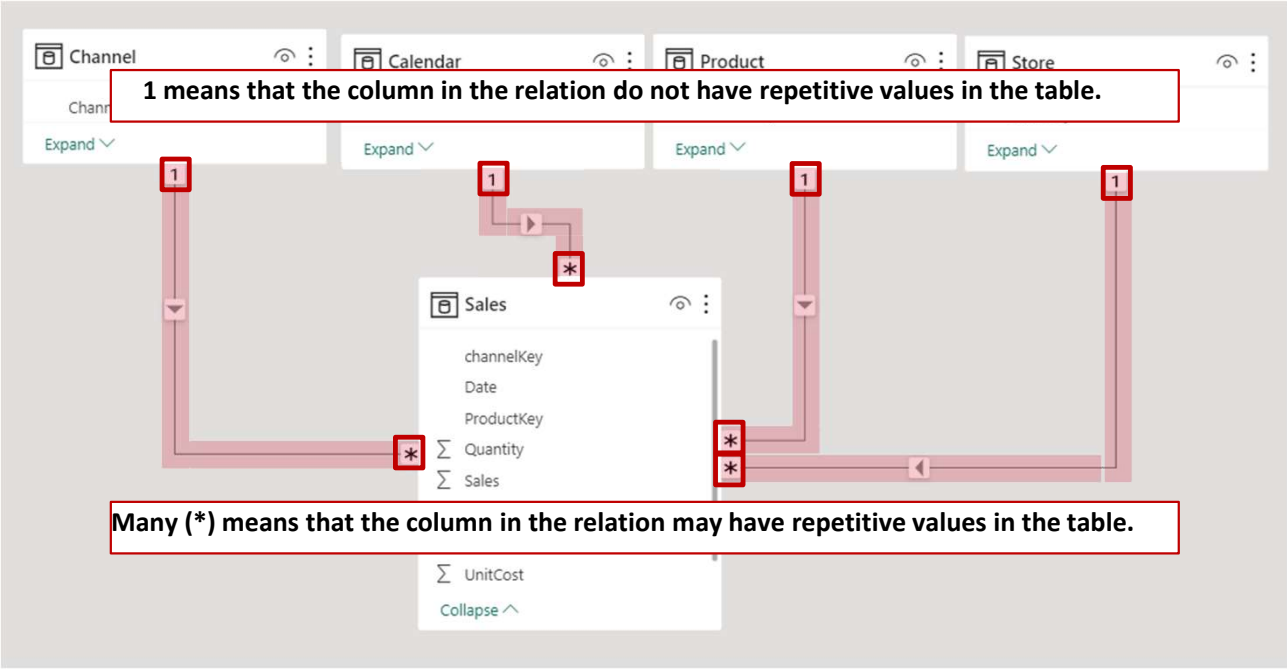
DIMENSION ID

DESCRIPTIVE COLUMNS

PRODUCT_ID	PRODUCT NAME	MANUFACTURER	RANGE	TYPE
1	Apple Watch Series 7	Apple Inc.	Very Light	Smartwatch
2	Lenovo IdeaCentre AIO 520	Lenovo	Light	All-in-One PC
3	LG UltraGear 27GL850	LG	Very Light	Gaming Monitor
4	ASUS RT-AX82U	ASUS	Medium	Wi-Fi Router
5	Dell XPS 13	Dell	Light	Laptop
6	TP-Link Kasa Smart Plug	TP-Link	Light	Smart Plug
7	Sony PlayStation 5	Sony	Light	Gaming Console
8	Epson Perfection V600	Epson	Very Light	Flatbed Scanner
9	iPad Pro 12.9-inch	Apple Inc.	Medium	Tablet
10	Philips Hue White & Color	Signify	Light	Smart Bulb
11	Samsung Galaxy S22	Samsung	Very Light	Smartphone

Cardinality

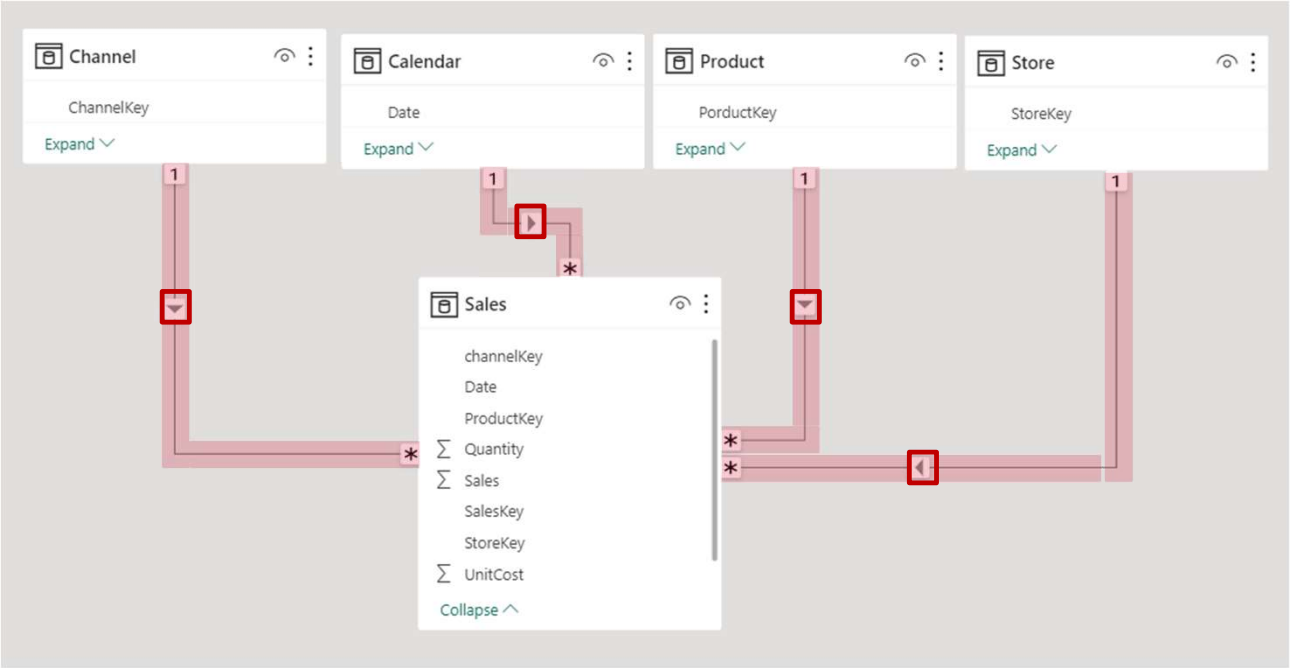
A relationship in Power BI establishes a connection between two tables (typically a fact table and a dimension table) using a column from each table.



Direction

The direction in a relationship determines how data flows between tables.

In a traditional Star model (image), **dimensions filter the facts** through the field that is part of the relationship.

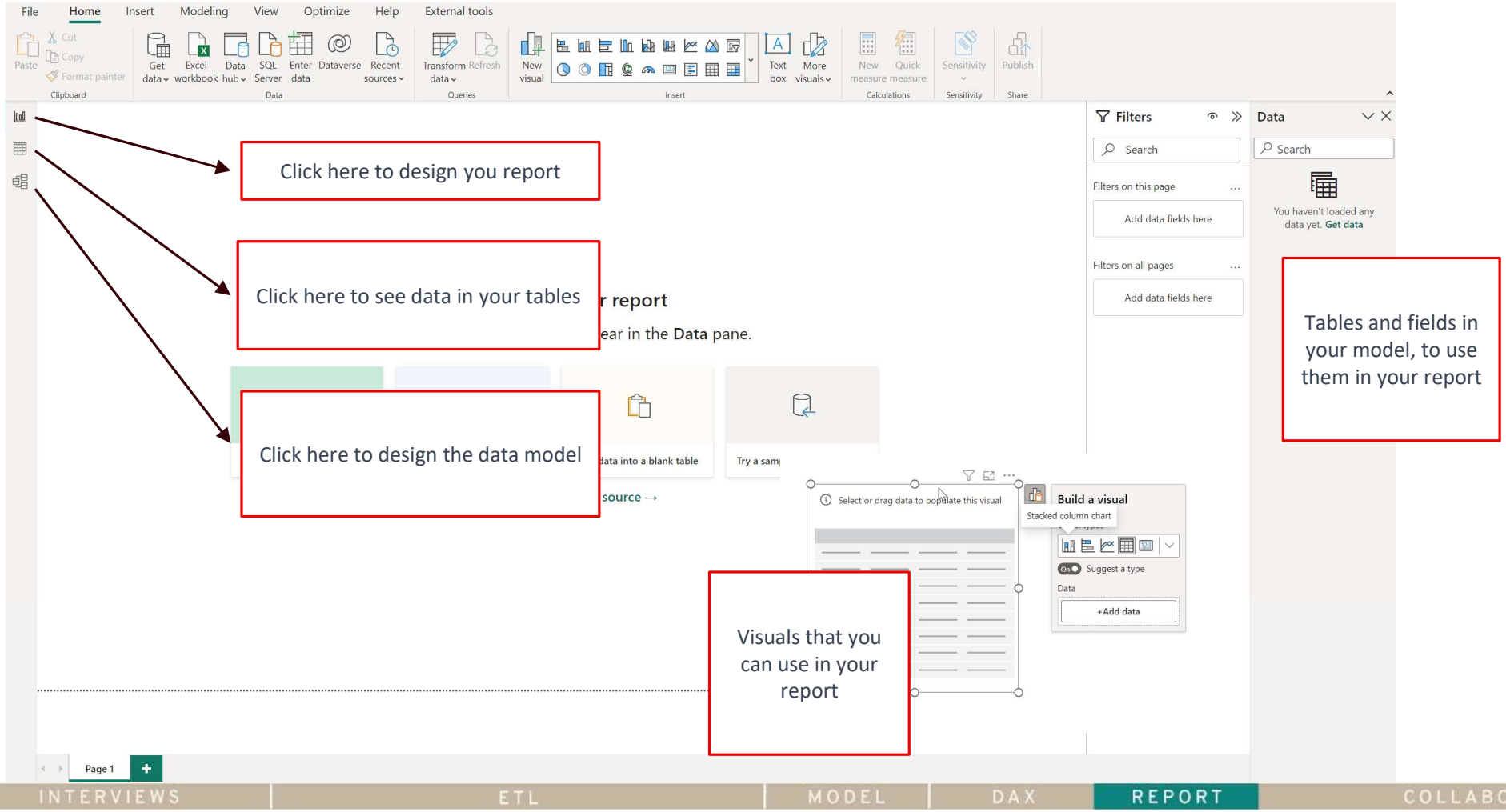


Building the model

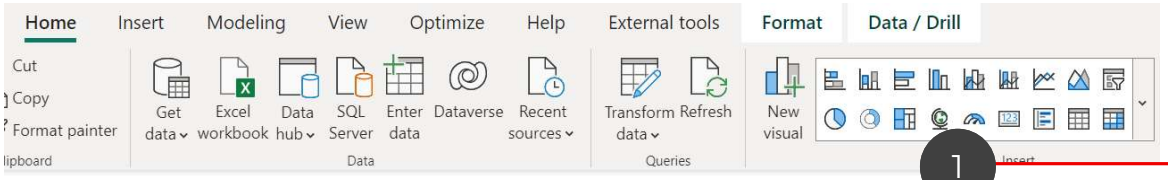
- Presentation: Parts of Power BI (report, data, relations)
- Demo1.2: Create relations between 3 tables (products, sales & calendar) and draw a table in Power BI. The difference between number, text, and date columns is explained in order to validate and assign the correct data type to create the correct visualization.
- Exercise 1.2: Building a model
- Q&A

Demo 1.2

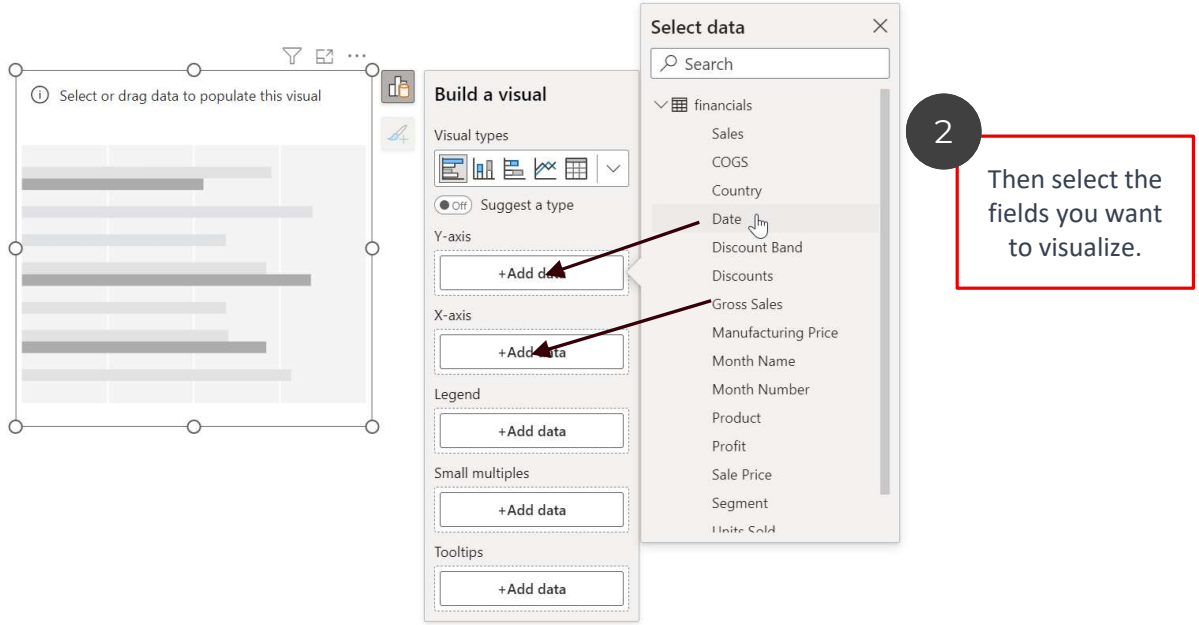
Presentation: Parts of Power BI (report, data, relations)



Your first visual in Power BI



1 First select the visual you want to create



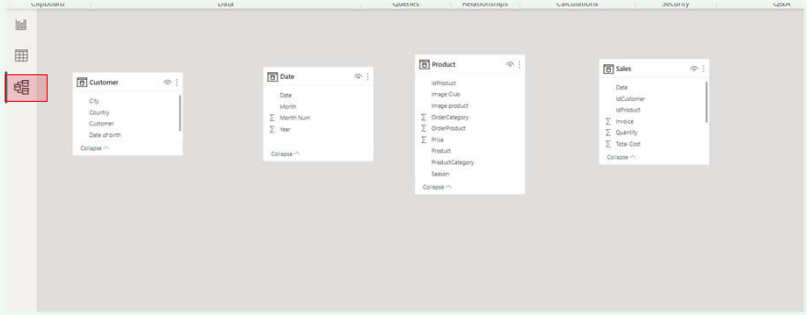
2 Then select the fields you want to visualize.

Exercise 1.2

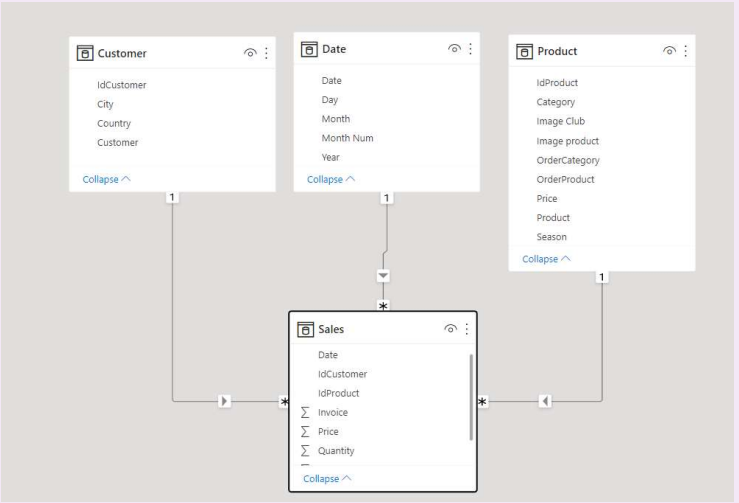
Exercise 1.2.

Open the file ***Exercise1.2.pbix*** *(Location: C:\PowerBIBootcamp\Week01\Exercises\Exercise1.2.pbix)*

1 Check that the tables are properly loaded.



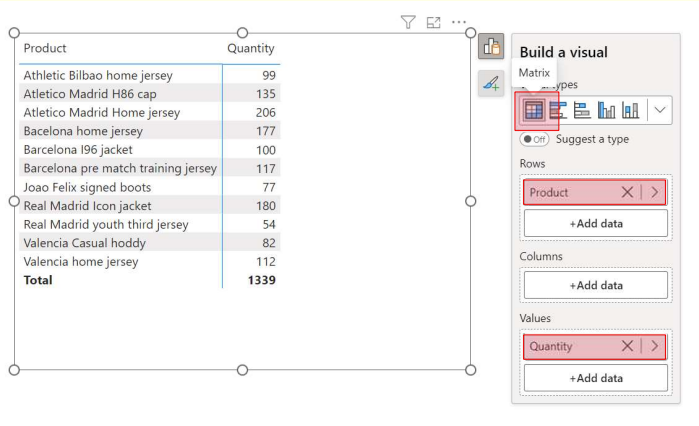
2 Create the relationships between the **Sales** table and the rest of the tables through their main keys. For the relationship with the **Date** table, create an active relationship with the column date.



**HINT*: You may need to preview some of the tables to see what is in them.

Think about: What sort of data model are you creating?

3 Insert a matrix to visualize the quantity sold per product.



Product	Quantity
Athletic Bilbao home jersey	99
Atletico Madrid H86 cap	135
Atletico Madrid Home jersey	206
Bacelona home jersey	177
Barcelona I96 jacket	100
Barcelona pre match training jersey	117
Joao Felix signed boots	77
Real Madrid Icon jacket	180
Real Madrid youth third jersey	54
Valencia Casual hoddy	82
Valencia home jersey	112
Total	**1339**

Poll

What type of model is recommended to use in Power BI?

- ✓ Star schema Model
- ✓ Denormalized
- ✓ Single table repeating data
- ✓ Normalized
- ✓ None of them

Q&A

- Write your questions in the chat so that we can answer them and discuss them together.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