Programming for AI

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BS(AI)-IV

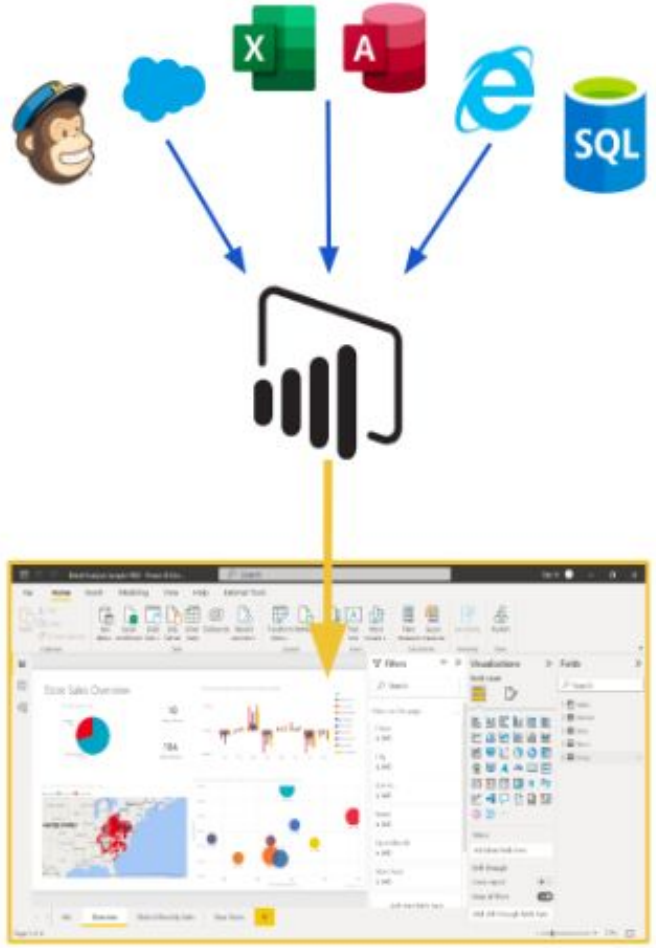
Objectives

- Introduction to Power BI
- Data Transformation using Power Query Editor
- Visualizing the Data

Introduction to PowerBI

What is PoweBI?

- Helps organize and visualize data from different sources
- Helps to connect to data
- Clean and Structure Data
- Create Visualizations
- Easily share findings with others



Why PowerBI?

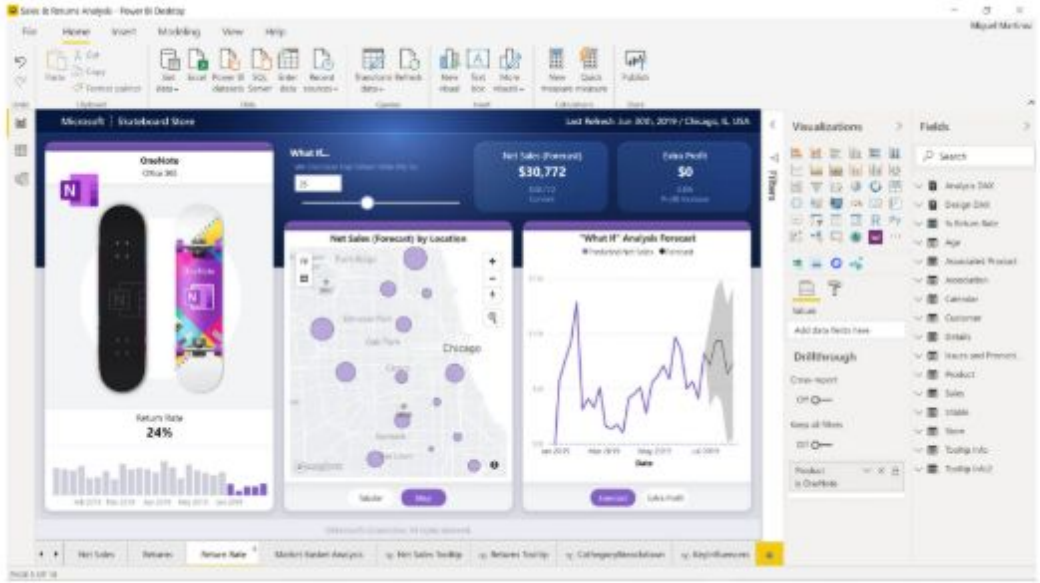
Leading BI tool according to Gartner

Over 97% of Fortune 500 companies use Power BI

Over 6 million customers

Power BI Desktop

- Data Analysis and Report Creation Tool
- Includes the Power BI Query Editor
- 100% free
- Paid Licenses available:
  - Power BI Pro
    - Publish and share material on cloud
    - Collaborate with other Power BI Users

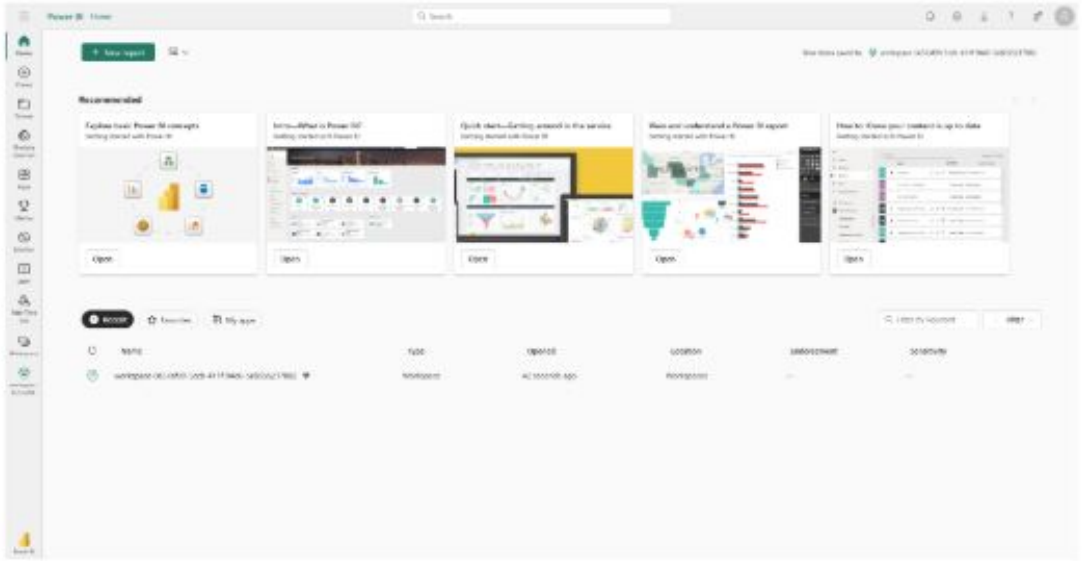


Link to download Power BI Desktop

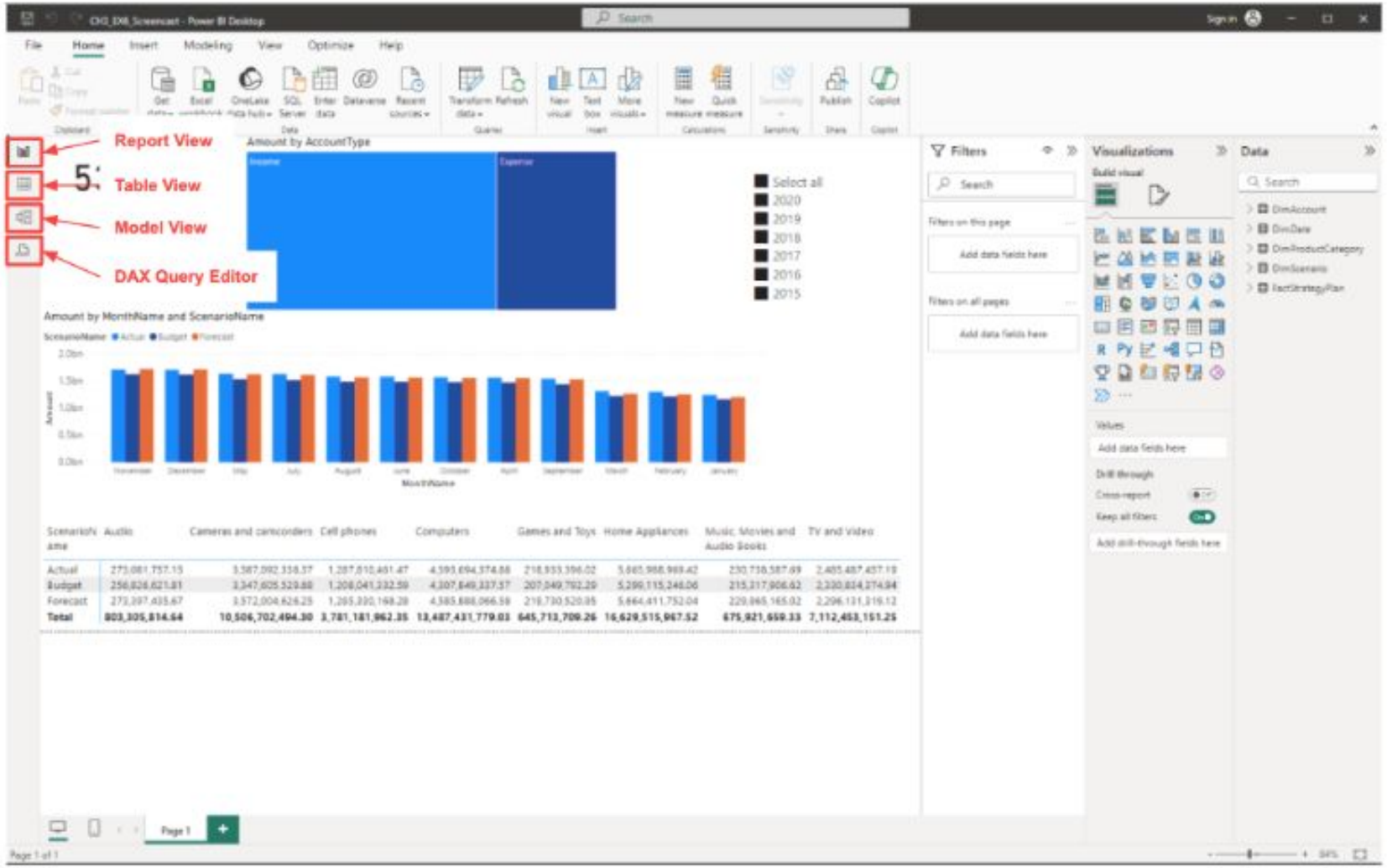
- https://www.microsoft.com/en-us/download/details.aspx?id=58494

Power BI Service

- Cloud Based Version.
- License required to access all features.
- The main purpose of Power BI service is to share and distribute the reports.
- You will often use power BI Desktop to create a report and Power BI Service to share the report.

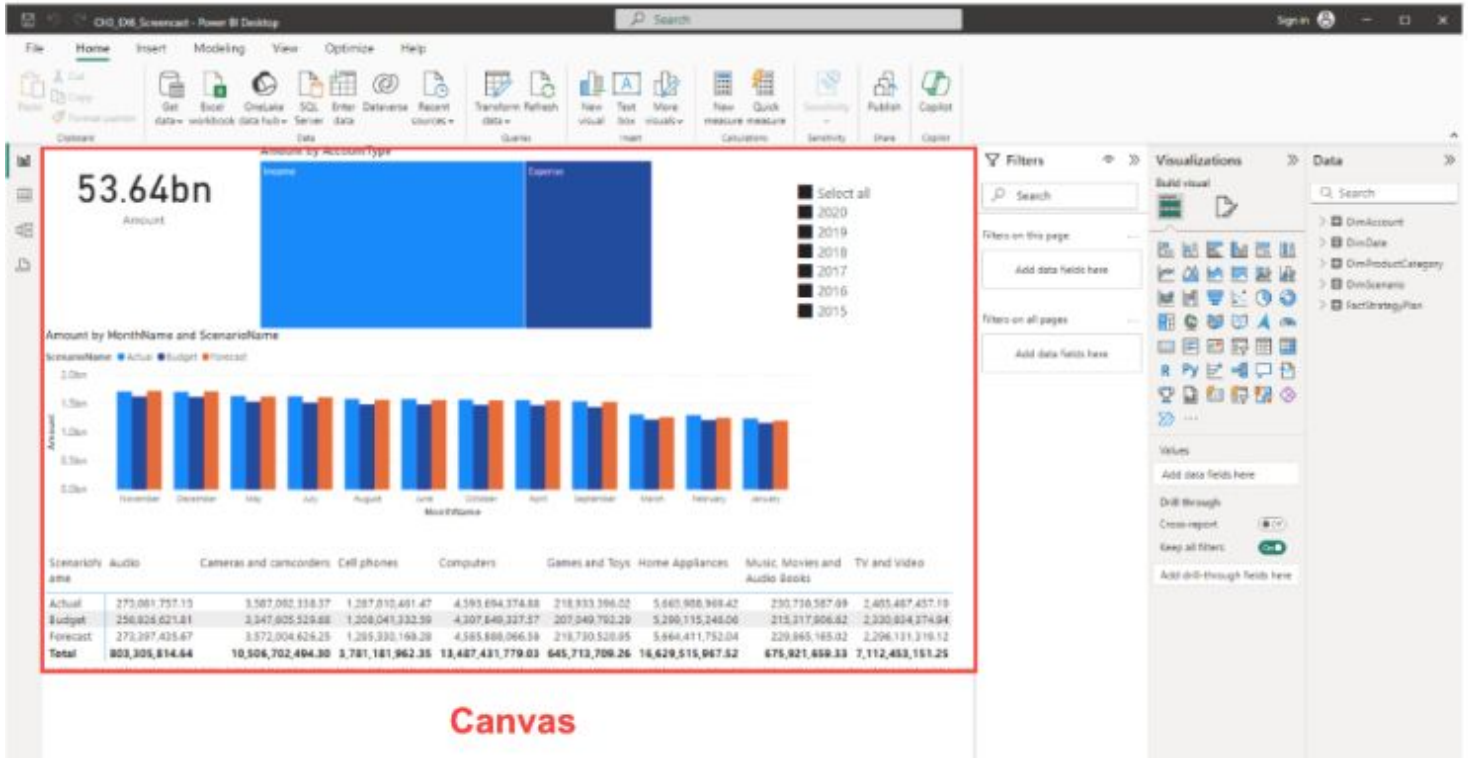


Power BI Interface - Four views



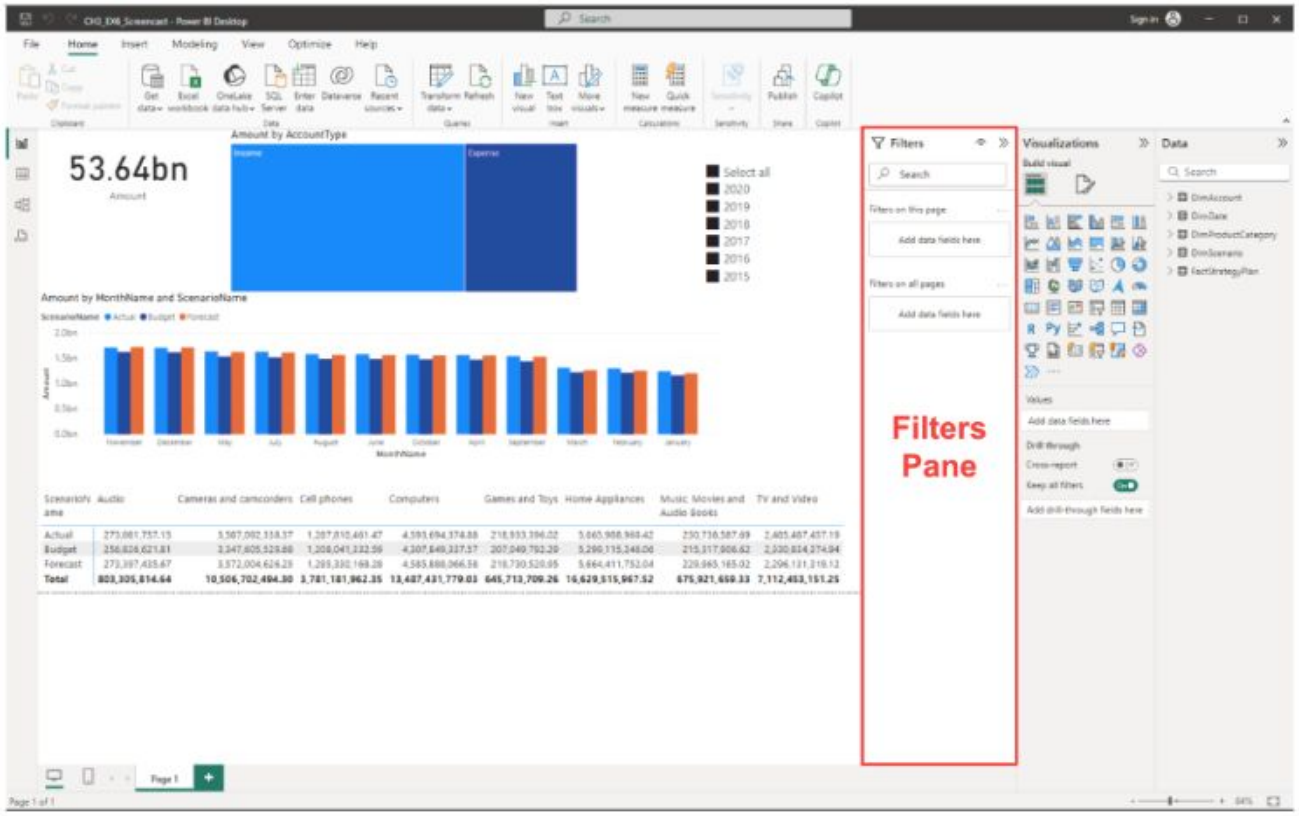
Canvas Area

- The canvas area in the middle of the report view is where visualizations are created and arranged.



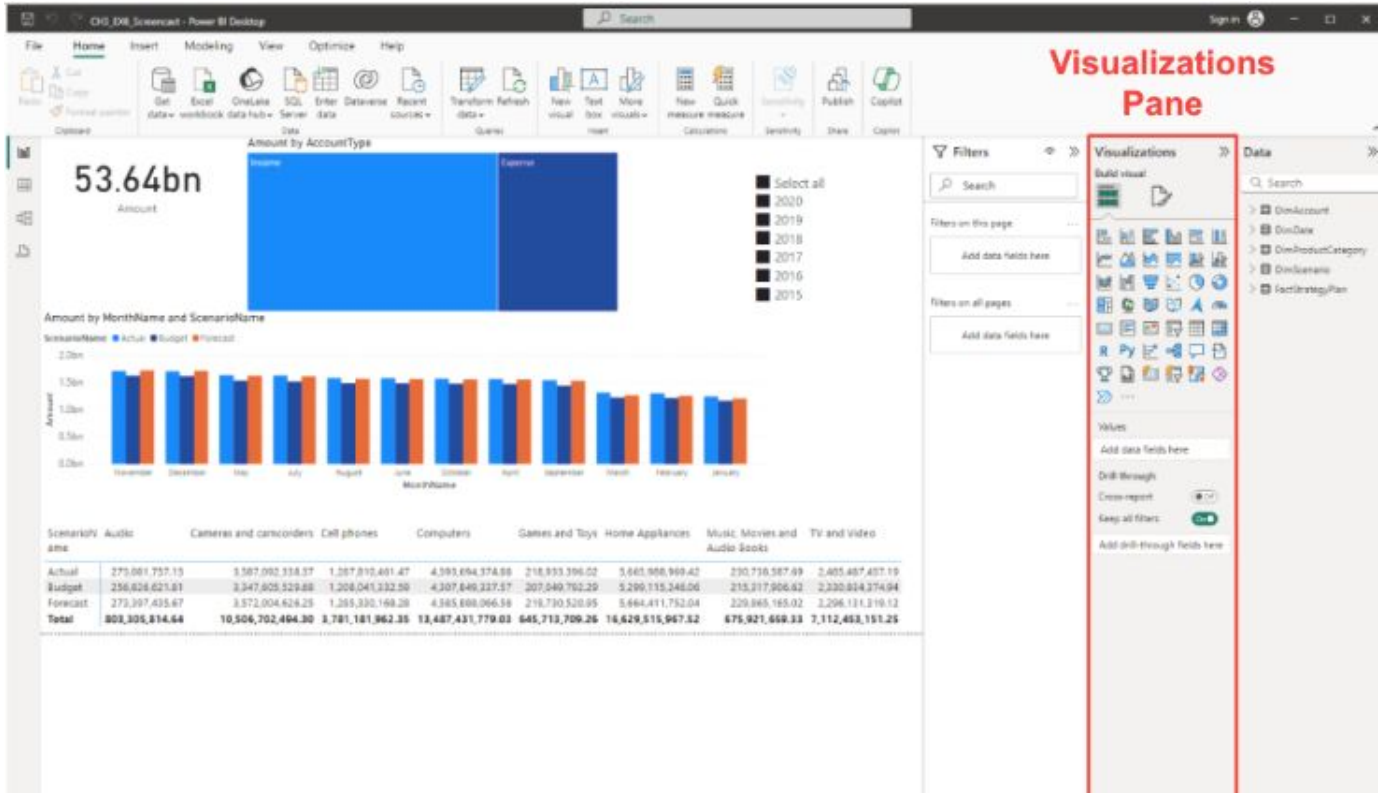
Filter Pane

- You can filter Data Visualizations



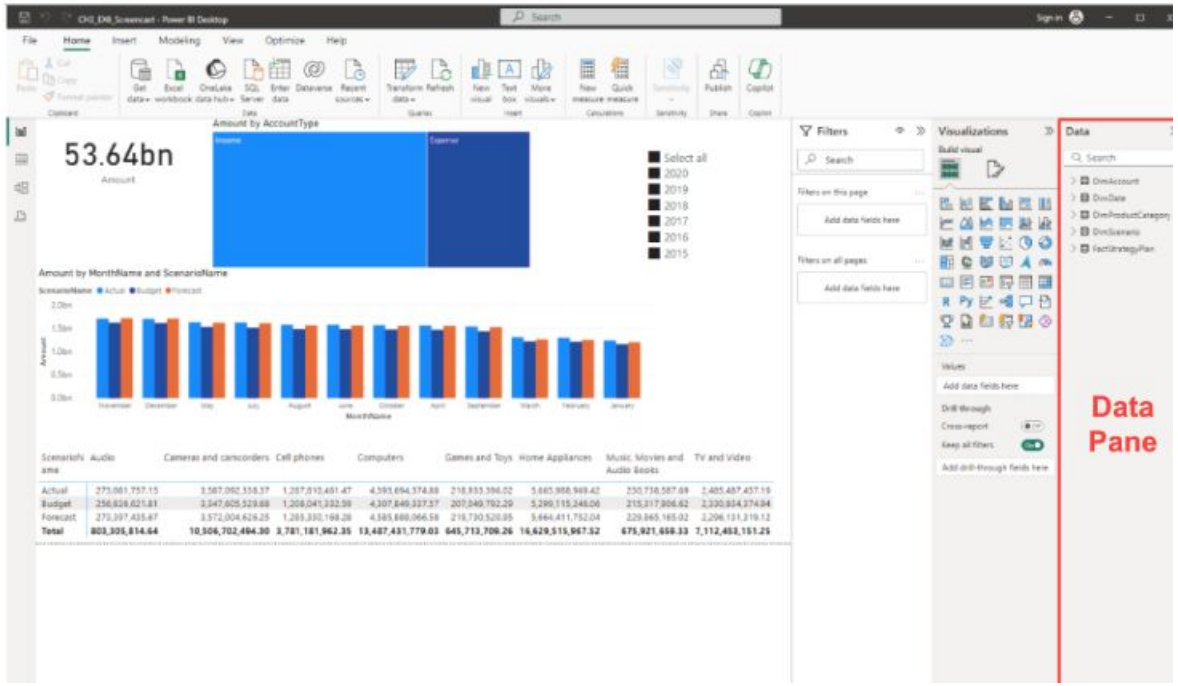
Visualization Pane

- Add, change or customize visualizations



Data Pane

- Data Pane contains the available columns, we can drag these columns to Canvas pane, Visualization pane, or filter pane

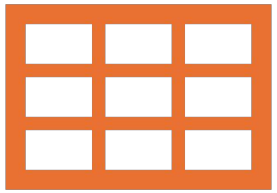


World Wide Importers (WWI) Dataset

Fictional Company

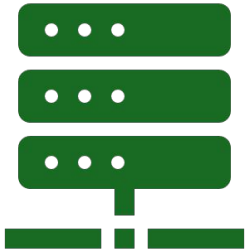
Wholesale Novelty goods importer and distributor operating from san franciso

WWI Dataset



All sales information (fact table):

FactSales.csv



Further Transaction Details (Dimension Tables):

DimCustomer.csv

Dimemployee.xlsx

DimStockItem.csv

DimDate.csv

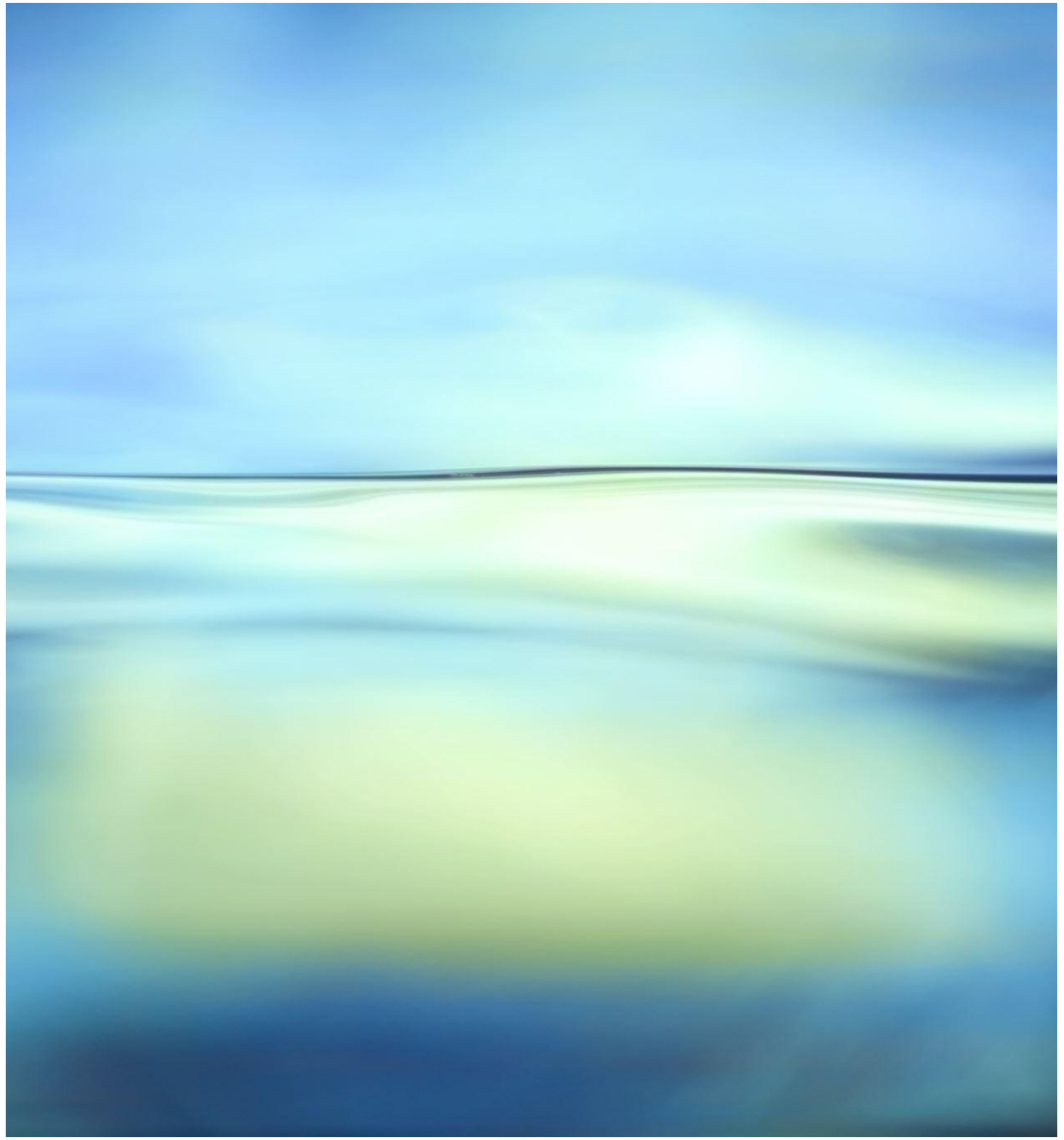
DimCity.csv

Importing Factsales.csv table

Open Power BI Desktop

Click on Home Tab

- Click get data
- Select type of file
- Select file from file explorer
- Click on Load
  - Data is now available in Power BI



After Loading..

Let's click on table name in Data pane

Switch to Table view.

The power of Power BI is to load data from multiple sources

- Let’s load another file DimDate.csv

Let us switch to Model View

Here we can see all the loaded tables

Power BI Automatically creates relationship between tables when it detects common fields.

Auto Relationships can be deleted by right clicking on those.

When you want to create relationship manually, drag field from one table towards the matching field on other table where you want to create the relationship.

- Let’s create between fact sales Invoice Date Key, and Dim Date’s Date

Let's Move to Report view to create some visuals

- From fact sales table we select Quantity field from the data pane
  - PowerBI automatically generates a bar chart, because it recognizes it as a numerical value, and adds it to y-axis in visualization pane.
  - You can drag and resize your visual

Let’s enhance it more by adding some more data

With your chart selected, expand the Dim Date table in the Data Pane

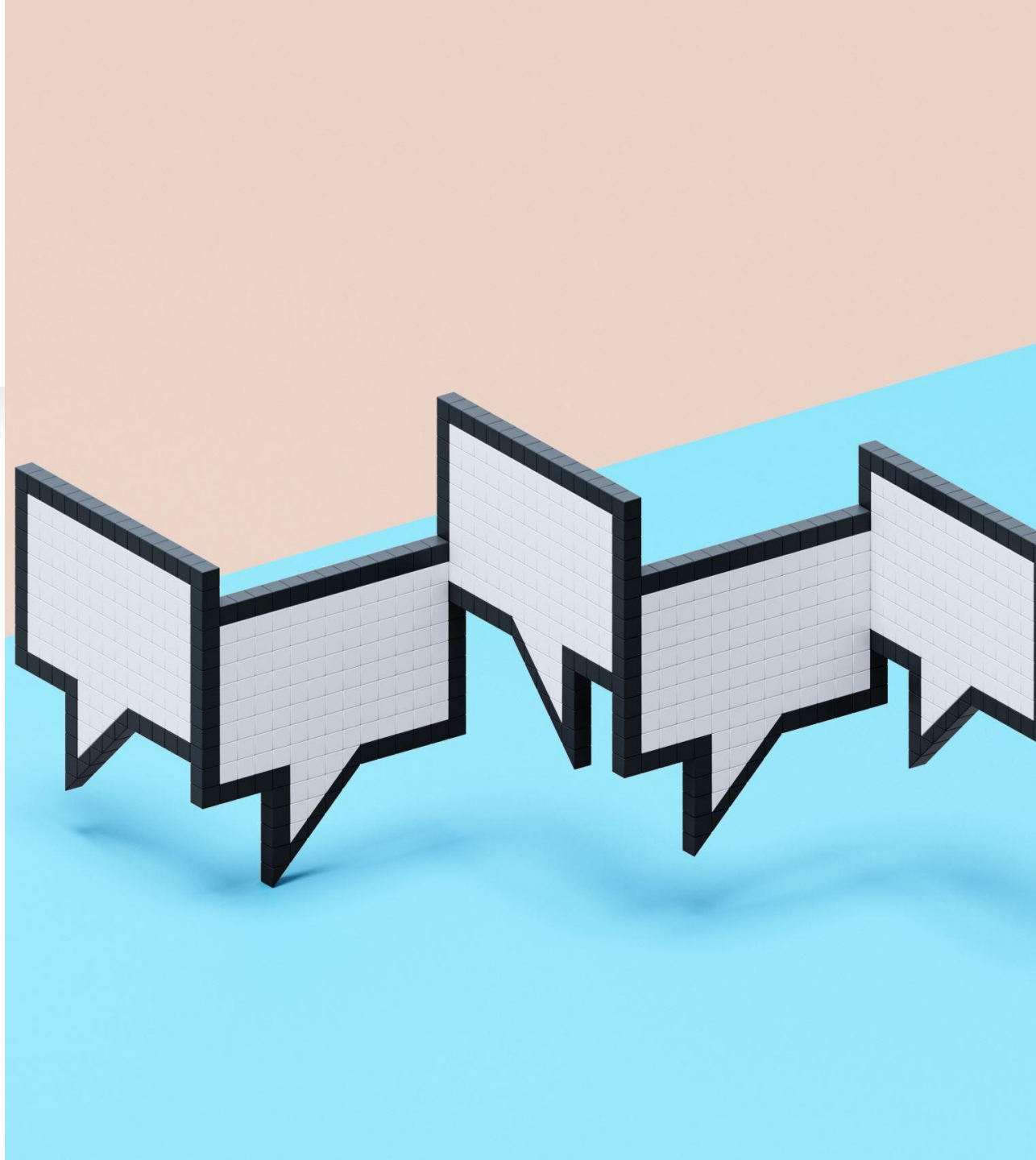
Drag the calendar year from Data Pane to the x-axis in Visualization pane

Now Bar chart reflects sales Year wise quantity sold.

You can also hover over each bar to see the sales

Let’s add another visual

- A card visualization- showing the total sales amount
  - Click on blank spot in canvas
  - Choose card option in visualization pane
  - Select the profit field from fact sales table
  - Visuals are Interactive if you click on a category bar, then card will show you total profit for that category
  - Click on the bar again to reset.



Switching visualization types

- Select the bar chart
- Choose any other visual from visualization pane such as a tree map
- You can add and delete the pages at the bottom
- You can also load some existing reports from the file tab

Slicers and Tables

Let's change our treemap to clustered column chart

A slicer allows the viewers to filter the visuals based on their field of choice.

Let’s Practice

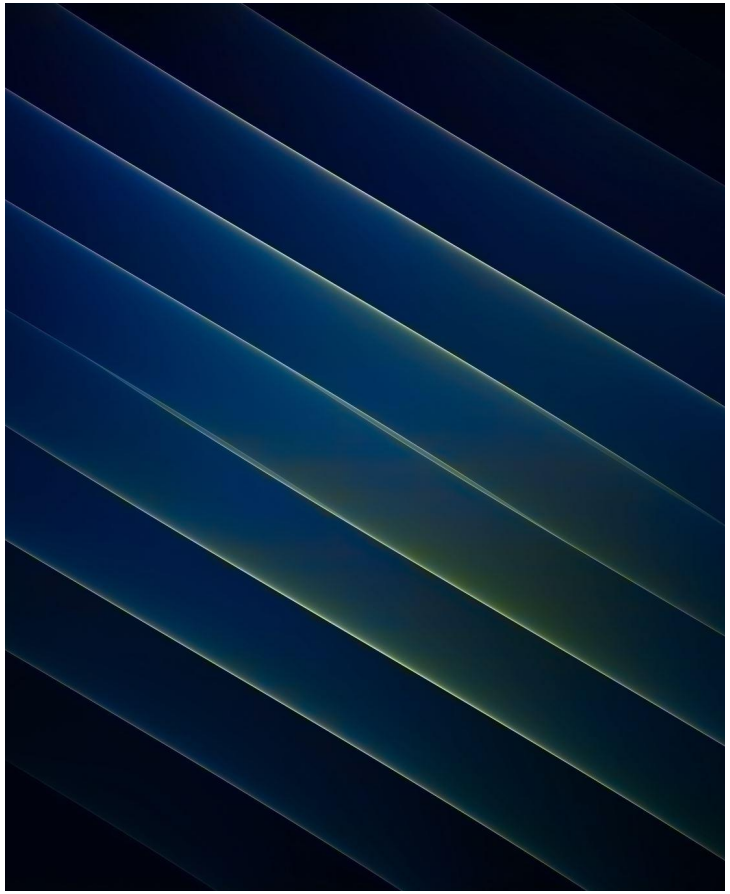
We must have factsales and DimEmployees Table, and previous visualization

Lets create a relationship between factsales: Salesperson key and Dimemployees: Employee Key

Click on canvas Add a slicer

Add Employee field from DimEmployee to the slicer

Click on slicer, go to visualization pane and click on format visualization, change the style to a drop down list



Let's add some more data

Select the quantity of items sold bar chart

Click on total chiller items and total dry items

- We can see that only most of the sold items were dry

Adding Table

1

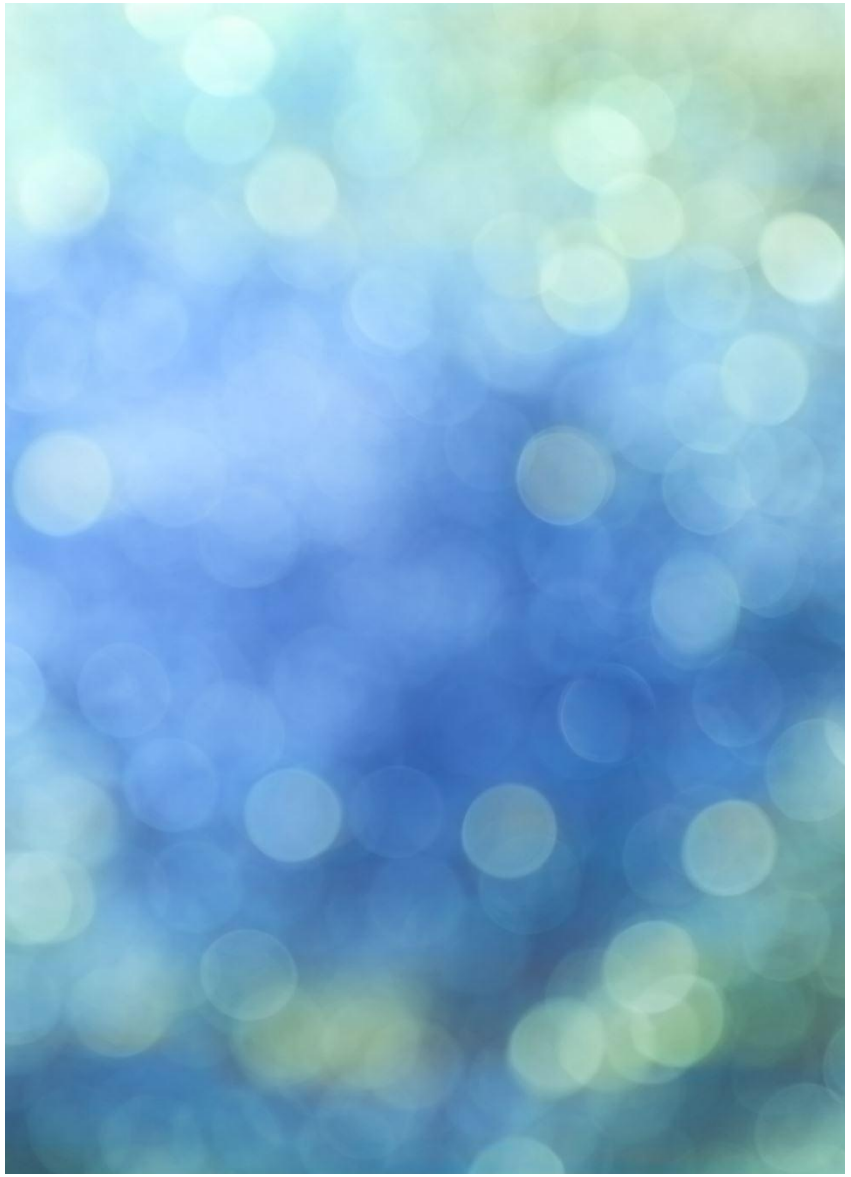
Click on canvas, Add Table from visualization pane

2

Click on Table, Add Employee field from the Dim Table

3

Add Description, Quantity, Total Including Sales and Profit from fact table



Add a text Box

1

Add a text box in the canvas area

- Write “Sales Data” in the text box

2

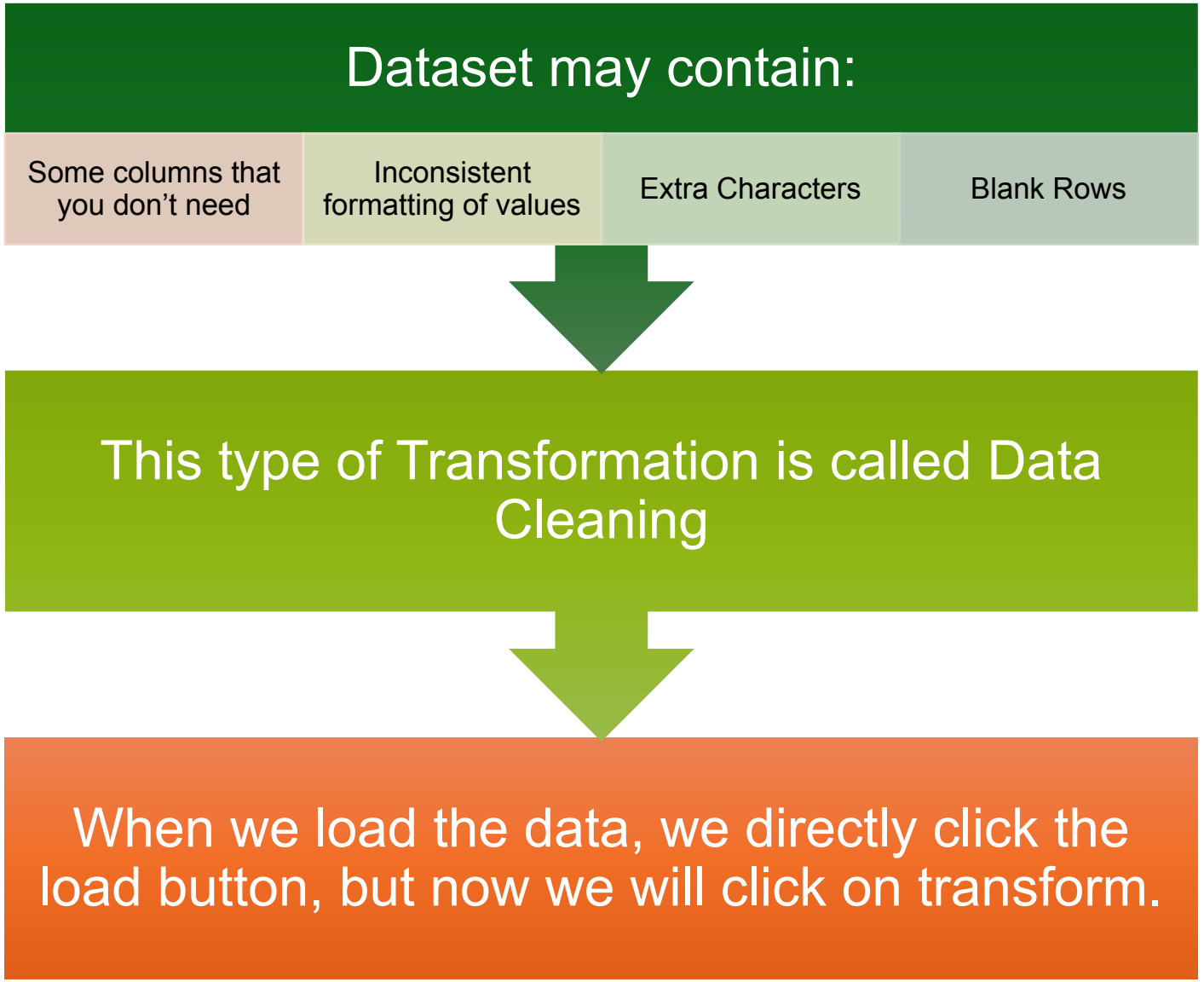
Also change the name of the page tab at the bottom

Data Transformation in Power BI

Objective

- We will learn how to shape and transform the data before data analysis using power query editor

Why Transforming the Data?



Why Transforming the Data?

We will use a tool called power query editor:

- Allows us to edit the data before loading it
- You decide what gets loaded

Power query editor uses a language called M

You don’t need to know M, to use it.

You need to close and apply, while closing it.

Transformation in Practice

Let's Transform Dim Customers.

Click on Remove Rows to Remove the top unwanted Row.

- It also keep tracks of the changes in Applied Steps
- Use first row as headers

Delete Valid from and Valid to by selecting them

Close and Apply

You can jump back to query editor, by first going to data pane, clicking on three dots near table name and clicking Edit Query

- We can rollback the changes made or edit the changes

Let’s Add a new page at the Bottom

Now the Power BI model has recognized relationship between these two tables

Let's create a visualization

- Add a clustered column chart using Buying Group from DimCustomer and Total Including Tax from factSales
- We can also change the formulas like Min, Max etc from Visualization Pane

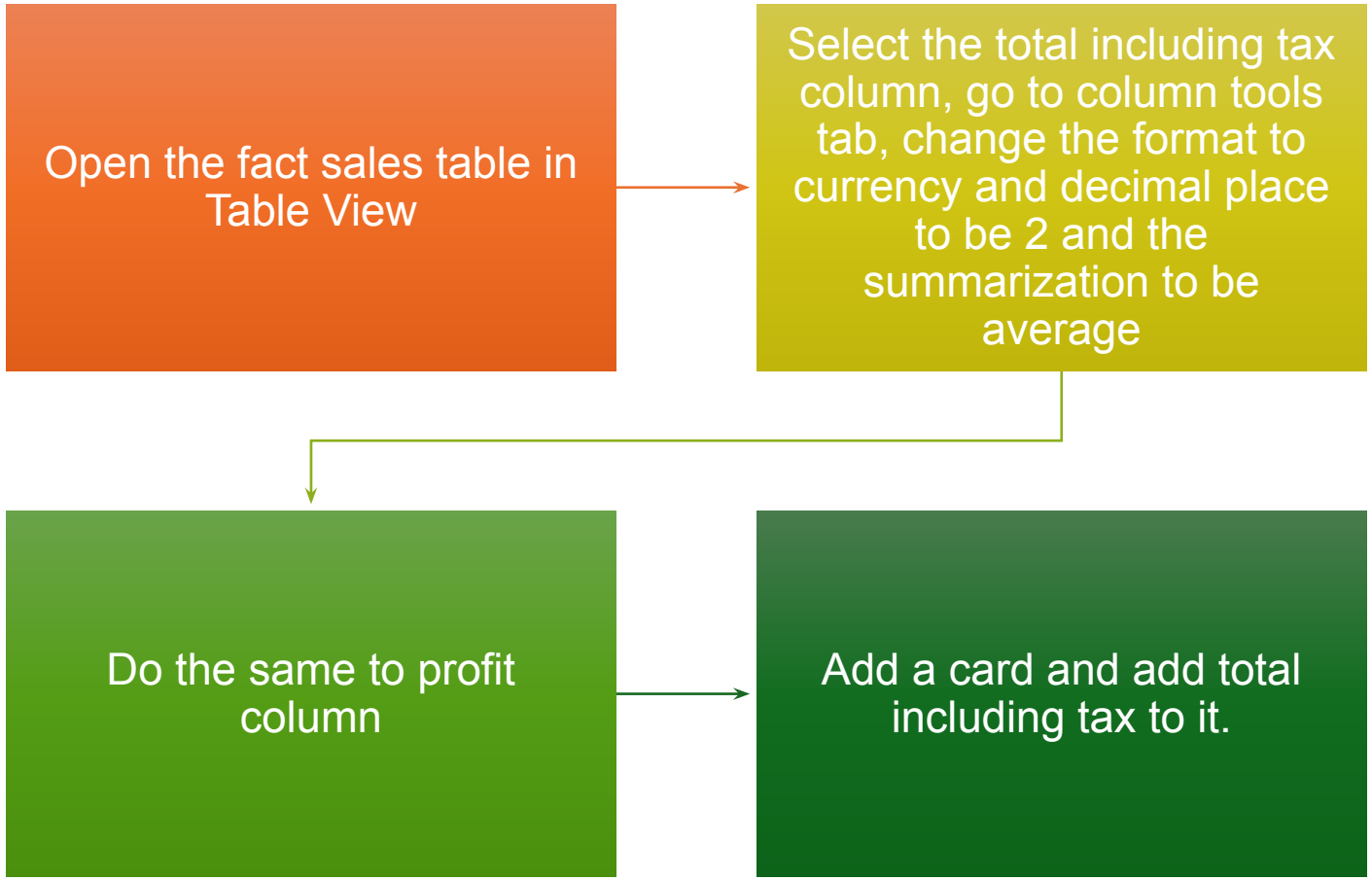
Transforming and Formatting Columns

In our report view, we can click on Transform Data, to open up power query editor.

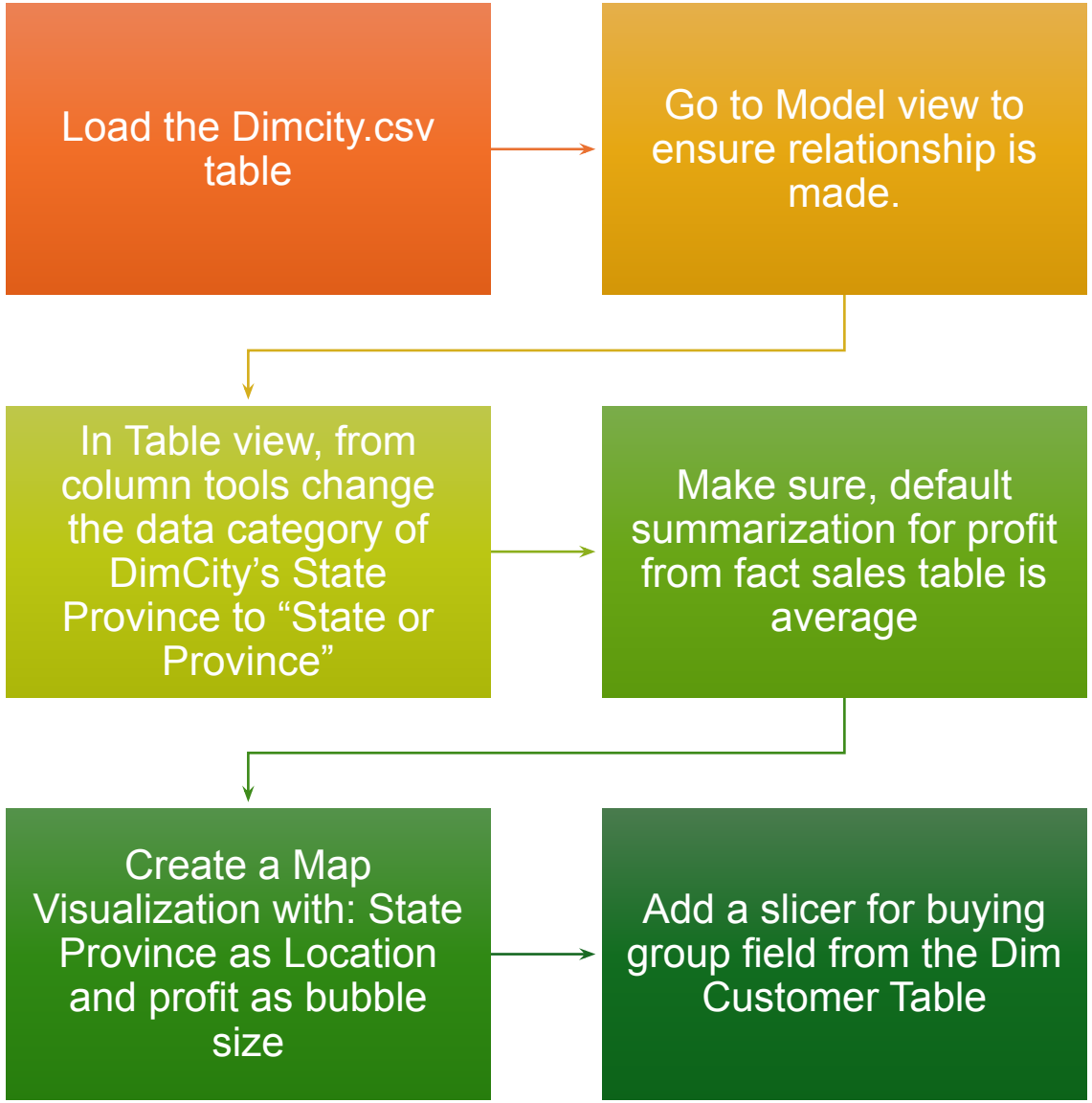
Create a card visualization and add Credit Limit field from Dim Customers to this card

- The card will show ?- which is unexpected
- Edit the query of DimCustomers to open Power Query Editor and Fix Credit Limit column
- Replace ? And – by using replace with blanks
- Still blank?
  - Change data type by right clicking on column, from Text to Decimal
  - Change the card to show average

Transforming and Formatting Columns



Making Maps with Geographic Data



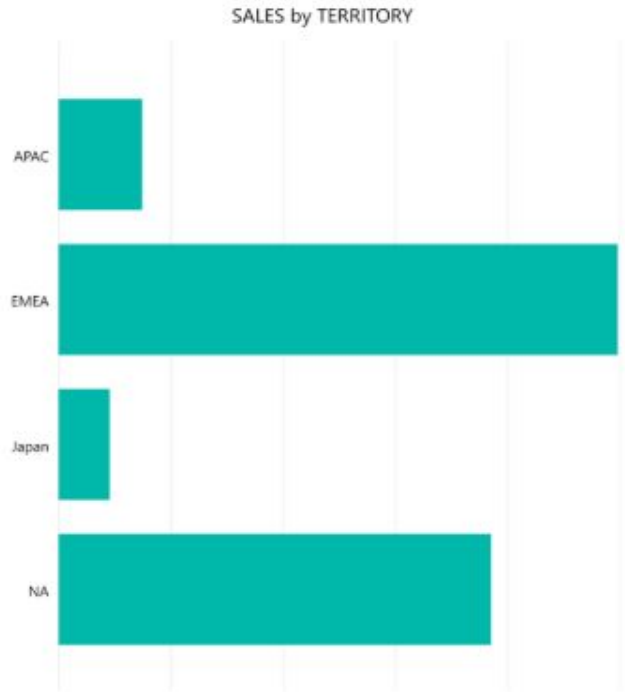

Visualizing the Data

Visualizing Data

Visualization Types

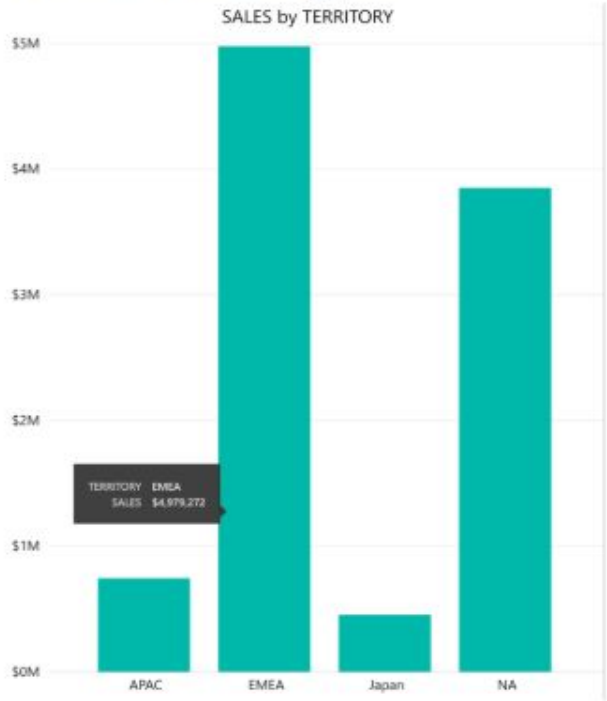
Bar chart

- Horizontal rectangles



Column chart

- Vertical rectangles

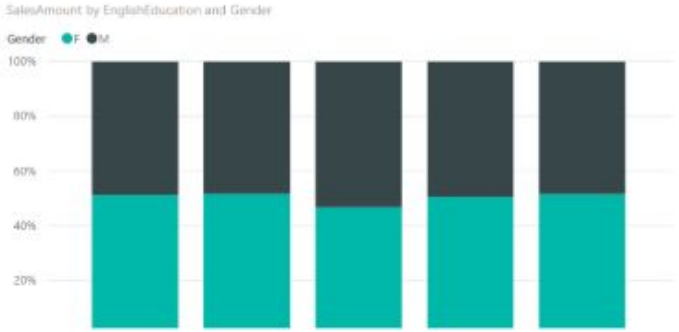


Column and Bar Charts

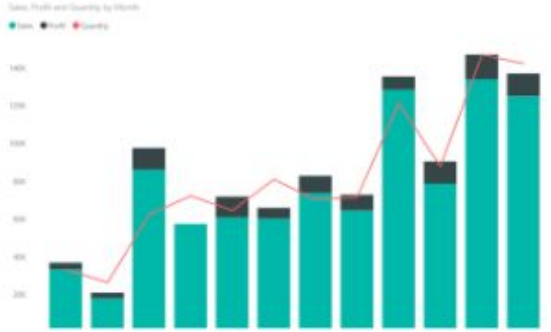
Stacked bar and column chart

Clustered bar and column chart

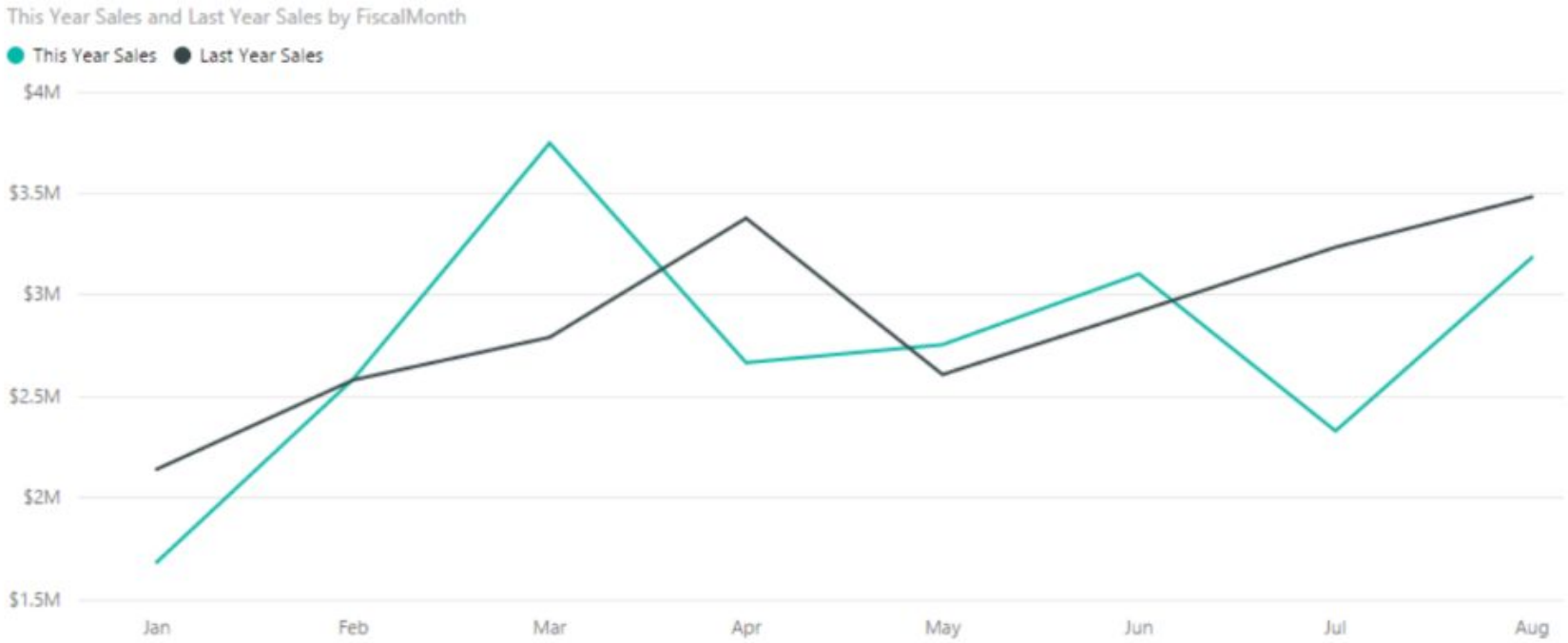
100% stacked bar and column chart



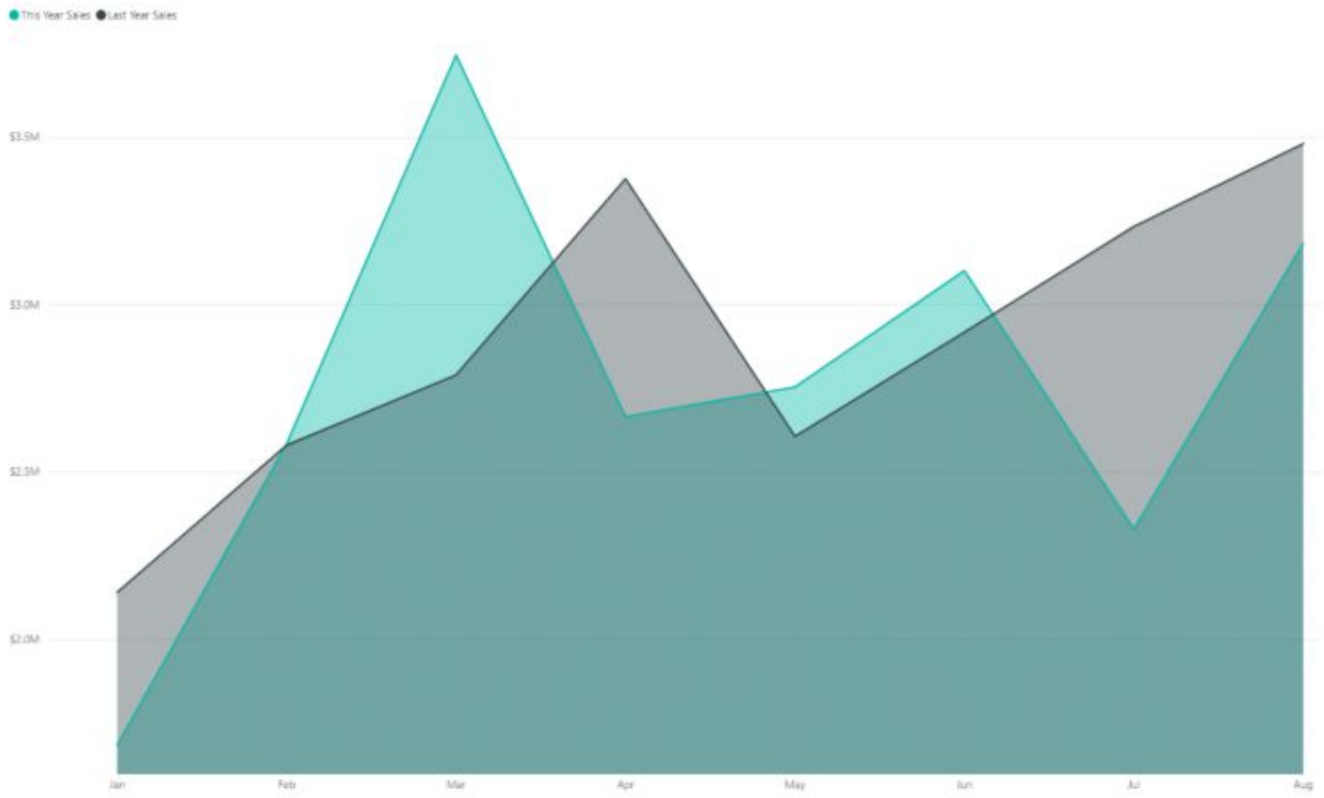
Combo chart



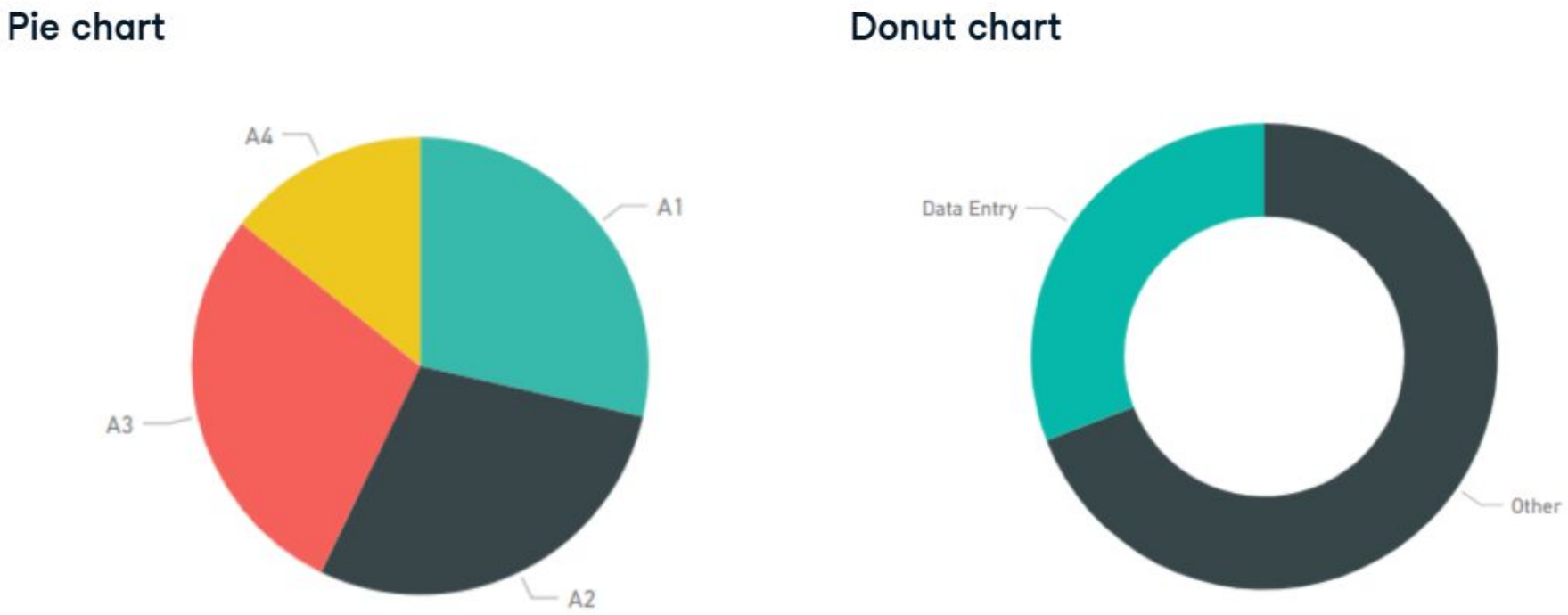
Line Charts


This Year Sales and Last Year Sales by FiscalMonth
This Year Sales
Last Year Sales
$4M
$3.5M
$3M
$2.5M
$2M
$1.5M
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

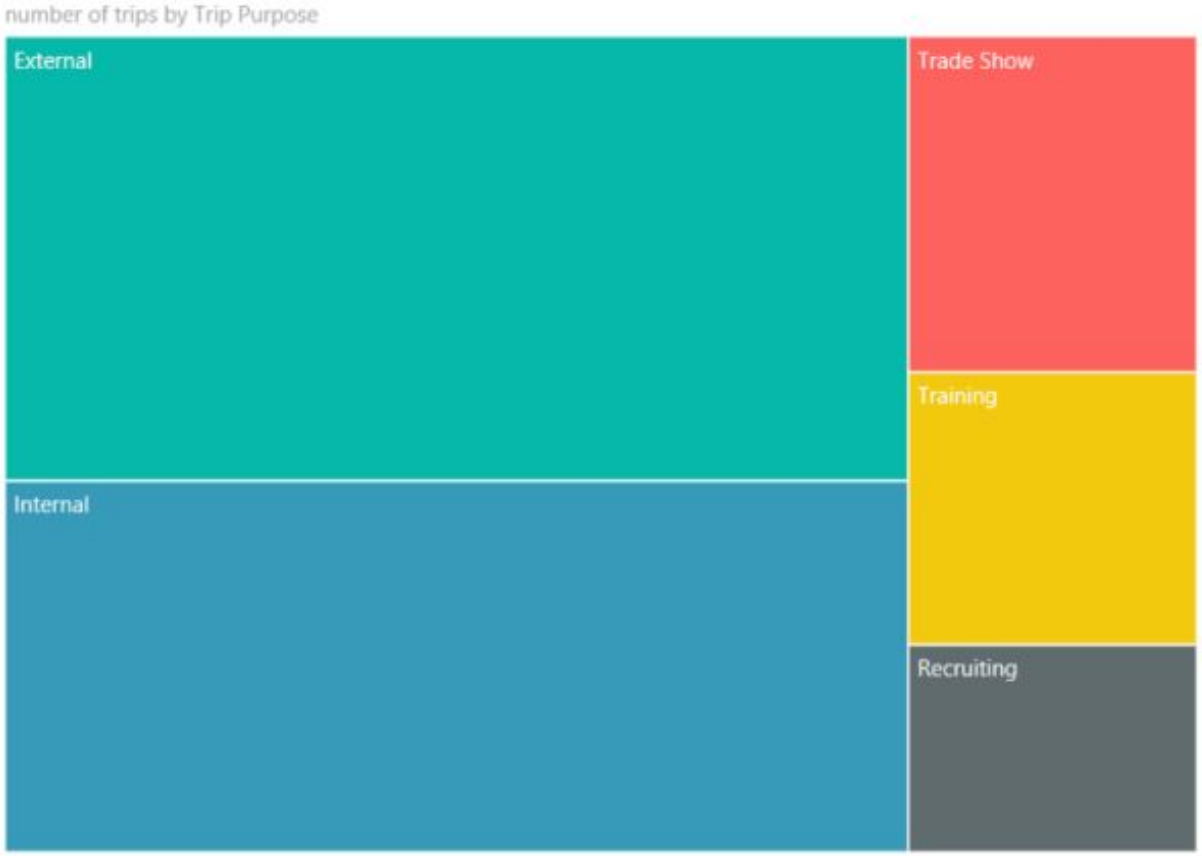
Area Charts


This Year Sales
Last Year Sales
$3.5M
$3.0M
$2.5M
$2.0M
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug

Pie and Donut Chart



Tree Maps


number of trips by Trip Purpose
External
Trade Show
Training
Internal
Recruiting

Single Value Visualizations

Card

104

Open Store Count

Multi-row card

-$366,891,365.00
Measure 4

-$1,735.61
Measure 6

Gauge chart

KPI

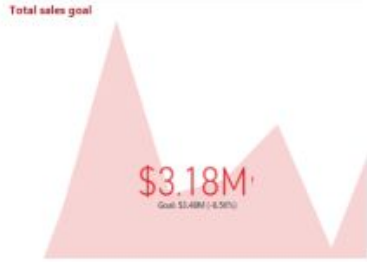


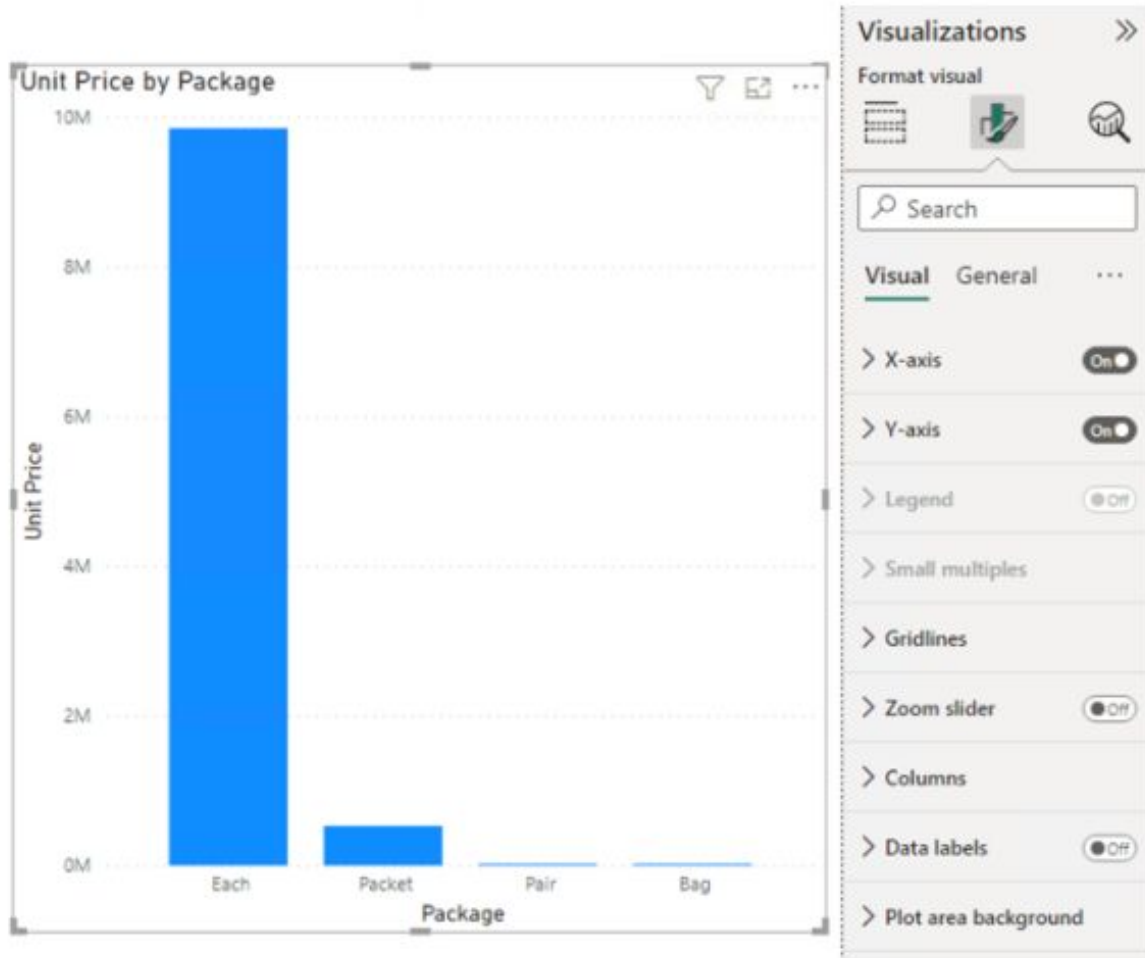
Table and Matrix

Table

Client	Component	Region	Average of Performance	Average of Reliability
Mobile	Page1 load	EMEA	353.00	99.52%
Mobile	Page1 load	NA	172.00	99.61%
Mobile	Page2 load	EMEA	329.00	99.76%
Mobile	Page2 load	NA	182.00	99.45%
Mobile	Page3 load	EMEA	323.00	98.50%
Mobile	Page3 load	NA	383.00	99.67%
Mobile	Page4 load	EMEA	390.00	99.42%
Mobile	Page4 load	NA	275.00	99.37%
Web	Page1 load	EMEA	201.00	98.08%
Web	Page1 load	NA	483.00	99.10%
Web	Page2 load	EMEA	276.00	99.40%
Web	Page2 load	NA	106.00	99.47%
Web	Page3 load	EMEA	148.00	99.69%
Web	Page3 load	NA	402.00	98.03%
Web	Page4 load	EMEA	203.00	99.03%
Web	Page4 load	NA	284.00	99.30%

Matrix

Component	Performance (ms)	Reliability (%)
Page1 load	**262.50**	**99.57%**
Mobile	**262.50**	**99.57%**
EMEA	353.00	99.52%
NA	172.00	99.61%
Total	**262.50**	**99.57%**


Unit Price by Package
10M
8M
6M
4M
2M
0M
Unit Price
Each
Packet
Pair
Bag
Package
Visualizations
Format visual
Search
Visual
General
X-axis
On
Y-axis
On
Legend
Off
Small multiples
Gridlines
Zoom slider
Off
Columns
Data labels
Off
Plot area background

Contoso Data ware house Dataset

- Contoso is a fictional online retail company, that is working on trying to meet sales goals

Contoso Data Ware House Data set

- Fact Table:
  - Fact Strategy Plan
- Dimension Table:
  - DimAccount
  - DimDate
  - DimEntity
  - DimProductCategory
  - DimScenario

Task

- Insert a card with amount from fact table at the top left corner
- Insert a donut chart after that show amount by account type
- Insert a stacked bar chart to display amount by Account Type and Product Category Name
- Now Lets Add Area chart to show Amount by Year and ScenarioName
- Add a slicer for the year
- Add a Table
- Change Theme
- Format these visualizations as you please…