

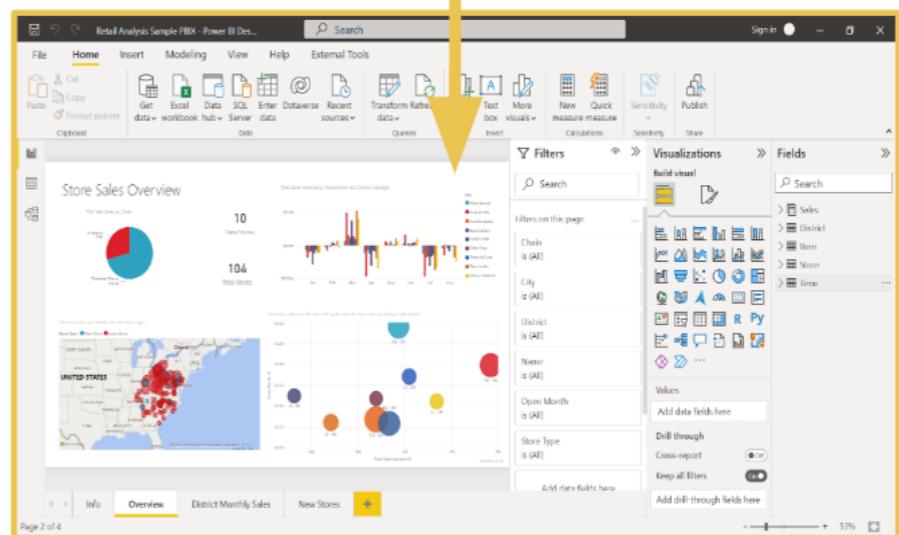
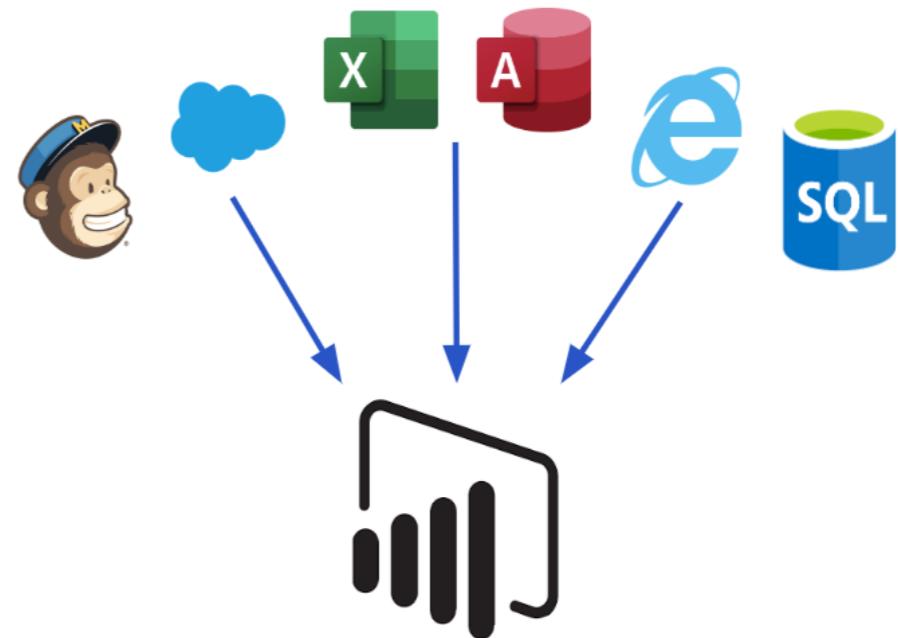
Introduction to Power BI

INTRODUCTION TO POWER BI

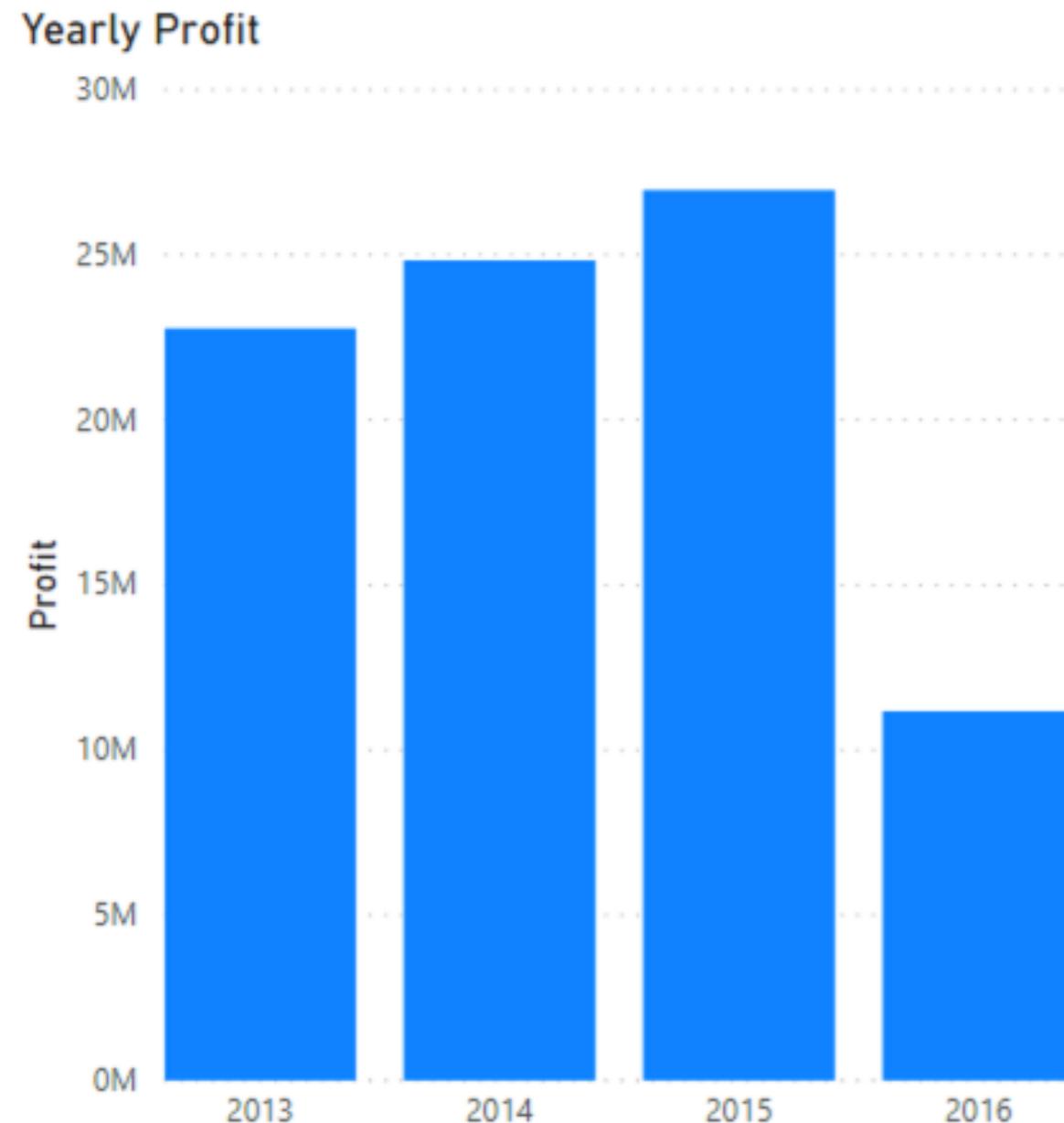


What is Power BI?

- Connect to data
- Clean and structure data
- Create visualizations
- Share findings



Data Visualization in Power BI

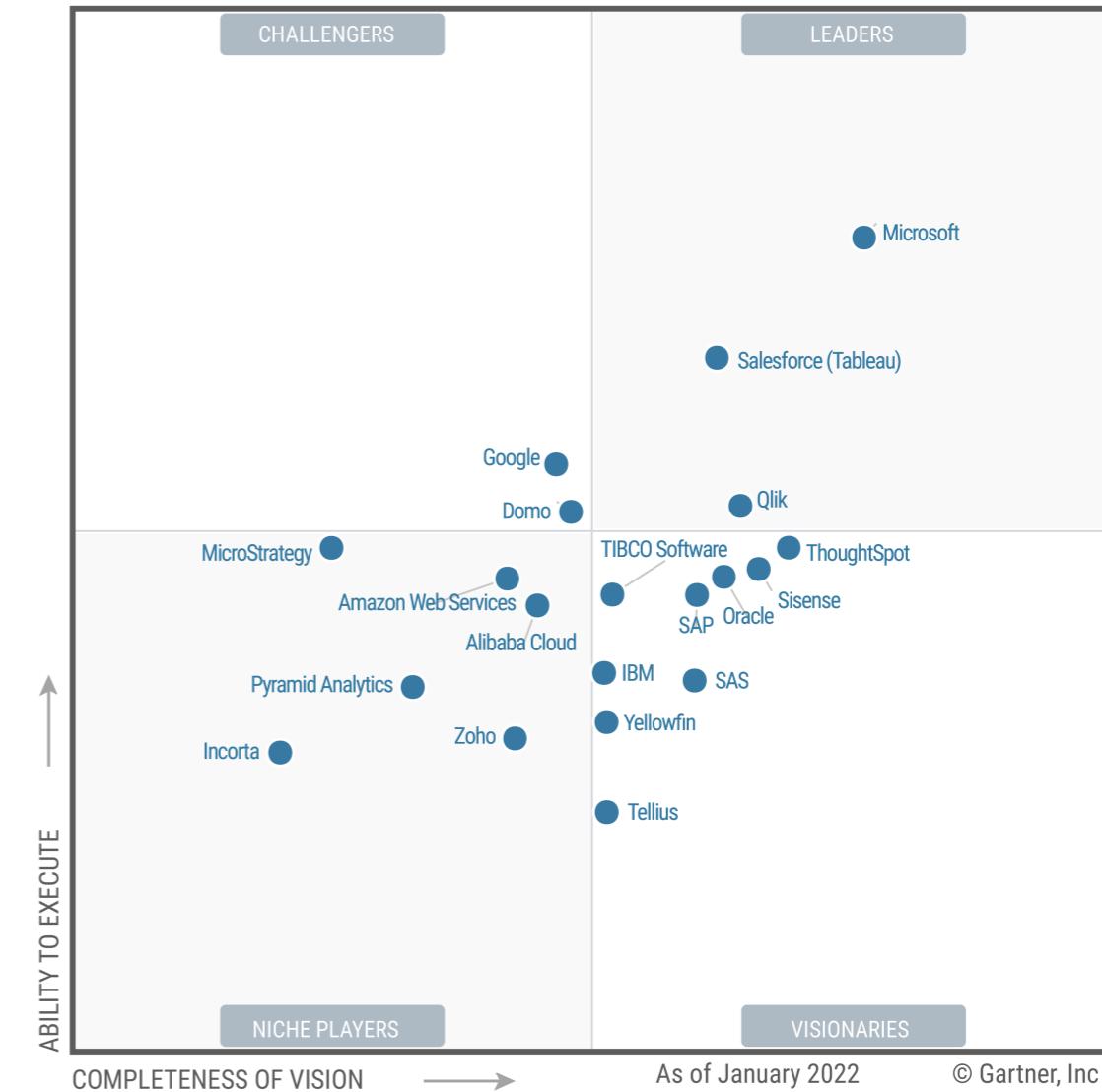


Total Excluding Tax	Tax Amount	Profit	Total Including Tax
129	19.35	67.5	148.35
258	38.7	135	296.7
301	45.15	157.5	346.15
172	25.8	90	197.8
86	12.9	45	98.9
387	58.05	202.5	445.05
387	58.05	202.5	445.05
387	58.05	202.5	445.05
344	51.6	180	395.6
344	51.6	180	395.6
344	51.6	180	395.6
344	51.6	180	395.6
258	38.7	135	296.7
258	38.7	135	296.7
258	38.7	135	296.7
258	38.7	135	296.7

Why Power BI?

- Leading BI tool according to Gartner
- Over 97% of Fortune 500 companies use Power BI
- Over 6 million customers
- Mastering Power BI can advance your career

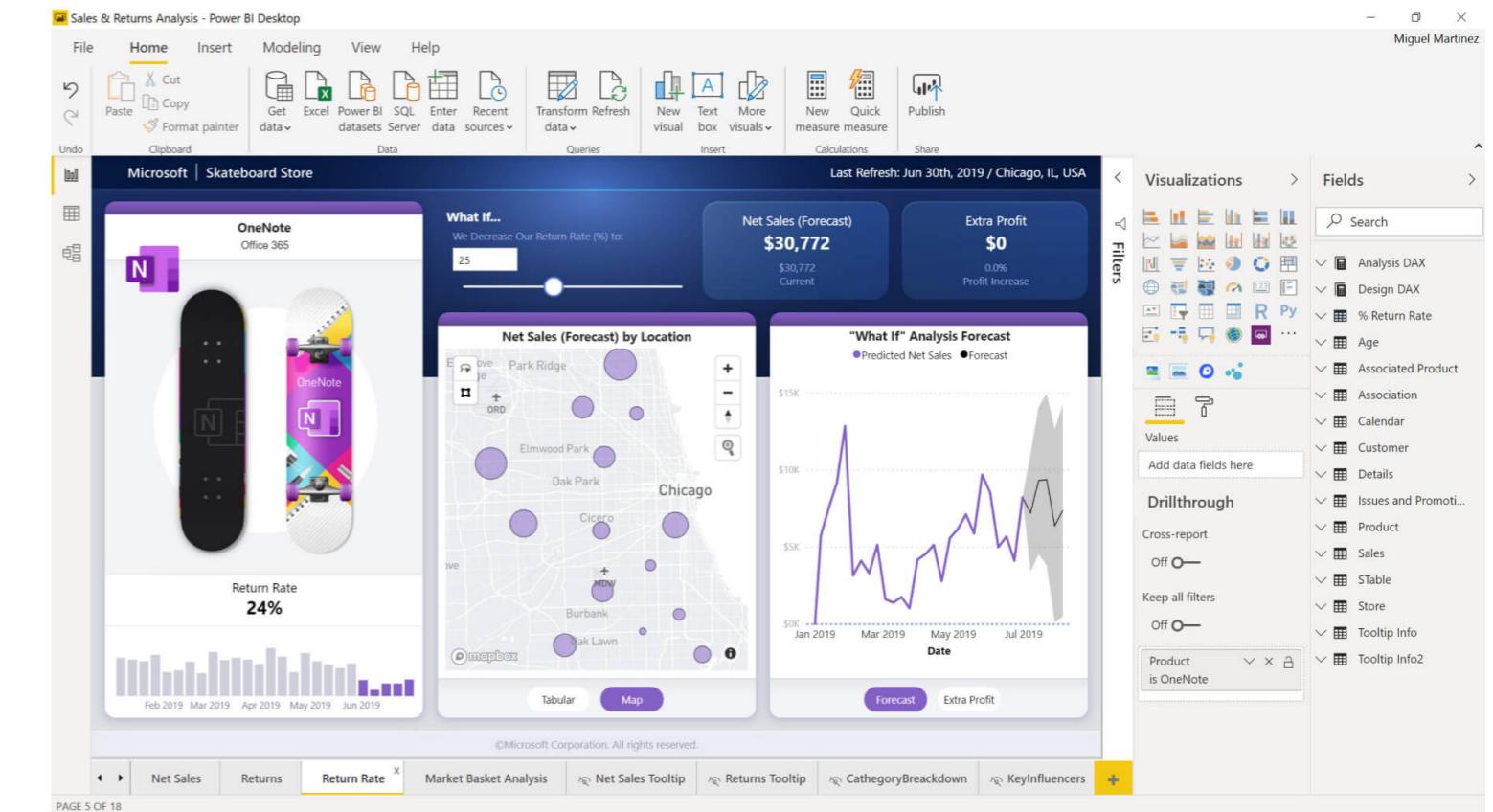
Figure 1: Magic Quadrant for Analytics and Business Intelligence Platforms



Source: Gartner (March 2022)

Power BI Desktop

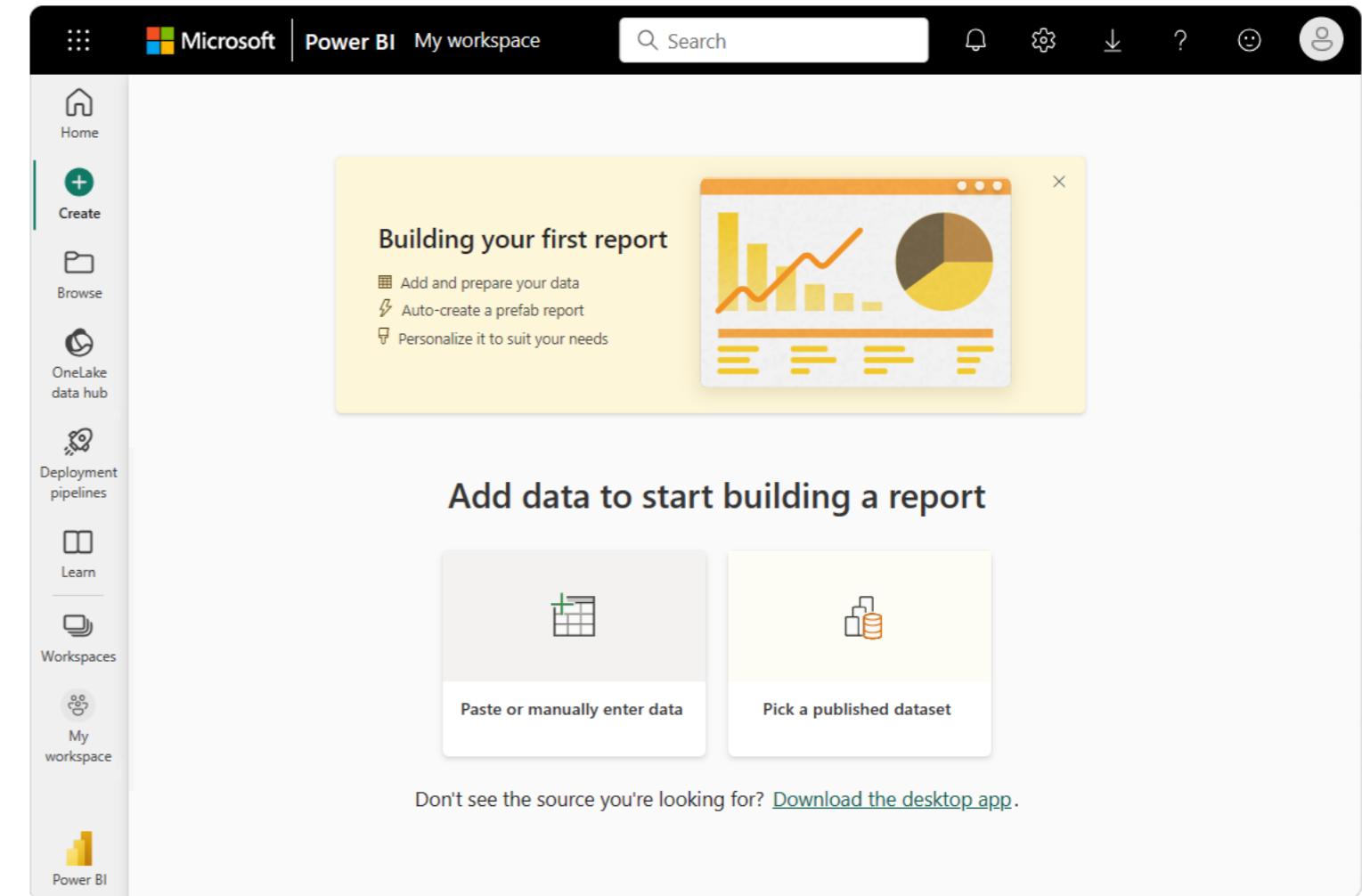
- Data analysis and report creation tool
- Includes the Power Query Editor
- 100% free
- Power BI Pro is a paid license
- Publish and share material on cloud platform
- Collaborate with other Power BI users



¹ <https://powerbi.microsoft.com/en-cy/desktop/>

Power BI Service

- Cloud-based version
- Not available for free license users
- Light report editing
- Share and distribute reports



¹ <https://learn.microsoft.com/en-us/power-bi/consumer/end-user-reading-view>

Power BI Interface - Three views

The screenshot illustrates the Power BI Desktop interface with three main views:

- Data View:** Located on the left, it displays a table titled "Employee Sales Data" with columns: Year, Quarter, Month, Day, Employee, Sum of Total Excluding Tax, Sum of Tax Rate, Sum of Profit, City, and State Province. A red box highlights the first three icons in the "Clipboard" section of the ribbon.
- Visualizations View:** Located in the center, it features a bar chart titled "Sum of Total Excluding Tax and Sum of Profit by Employee". The Y-axis represents "Sum of Total Excluding Tax and Sum of Profit" in millions (0M to 20M). The X-axis lists employees: Archer Lambie, Kayla Woodcock, Hudson Orslow, Iq Shand, Sophia Hinton, Hudson Hollinworth, Lily Code, Jack Potter, Amy Trefl, and Anthony Grosse. The chart shows two bars per employee: a blue bar for "Sum of Total Excluding Tax" and a dark blue bar for "Sum of Profit". A large value "172M" is displayed above the chart, labeled "Sum of Total Excluding Tax".
 - Filters Panel:** To the right of the chart, it shows "Filters on this page" and "Filters on all pages" sections, both with "Add data fields here" buttons.
 - Values Panel:** Shows a list of sales territories: External, Far West, Great Lakes, Midwest, New England, Plains, Rocky Mountain, Southeast, and Southwest.
- Data View:** Located on the right, it contains sections for "Build visual", "Visualizations", and "Data". It includes a search bar and lists of data sources: DimCity, DimEmployee, DimStockItem, and FactSale.

At the bottom, the ribbon shows "Employee Sales Data" as the active report, and the status bar indicates "Page 1 of 1" and a zoom level of "65%".

Power BI Interface - Three views

The screenshot illustrates the Power BI Desktop interface with three distinct views:

- Report View:** The main workspace where visualizations are displayed. In this view, there is a bar chart titled "Sum of Total Excluding Tax and Sum of Profit by Employee" and a table titled "Employee Sales Data".
- Data View:** Located on the left side of the interface, this view shows the underlying data for the report. It includes a table with columns: Year, Quarter, Month, Employee, Sum of Total Excluding Tax, Sum of Tax Rate, Sum of Profit, City, and State Province.
- Model View:** Also located on the left side, this view shows the data model structure. It includes a table with columns: Year, Quarter, Month, Employee, Sum of Total Excluding Tax, Sum of Tax Rate, Sum of Profit, City, and State Province.

The interface also features a ribbon menu at the top with tabs like File, Home, Insert, Modeling, View, Optimize, and Help. On the right side, there are sections for Filters, Visualizations, and Data, along with a search bar and various settings.

Power BI Interface - Canvas area

The screenshot shows the Power BI Desktop application window titled "Ch2_Ex6_Screencast - Power BI Desktop". The interface is divided into several sections:

- Top Bar:** Includes File, Home, Insert, Modeling, View, Optimize, Help menus; a Search bar; and a Sign in button.
- Home Tab:** Contains icons for Paste, Cut, Copy, Format painter, Get data, Excel workbook, OneLake data hub, SQL Server data, Enter Data, Dataverse, Recent sources, Transform Refresh data, New visual, Text box, More visuals, New measure, Quick measure, Sensitivity, Publish, and Share.
- Left Sidebar:** Shows a list of data sources: DimCity, DimEmployee, DimStockItem, and FactSale.
- Canvas Area:** The main workspace where visualizations are built. A red box highlights a bar chart titled "Employee Sales Data" showing "Sum of Total Excluding Tax and Sum of Profit by Employee". The chart has "Employee" on the x-axis and "Sum of Total Excluding Tax and Sum of Profit" on the y-axis, ranging from 0M to 20M. The legend indicates two series: "Sum of Total Excluding Tax" (blue bars) and "Sum of Profit" (dark blue bars). The chart includes a large value "172M" above it, labeled "Sum of Total Excluding Tax".

Employee Sales Data

172M

Sum of Total Excluding Tax

Sales Territory

 - External
 - Far West
 - Great Lakes
 - Mideast
 - New England
 - Plains
 - Rocky Mountain
 - Southeast
 - Southwest

Values

Add data fields here

Drill through

Cross-report

Keep all filters

Add drill-through fields here

Canvas

Employee Sales Data

Page 1 of 1

65%

Power BI Interface - Filters pane

The screenshot shows the Power BI Desktop application window titled "Ch2_Ex6_Screencast - Power BI Desktop". The interface includes a ribbon with tabs like File, Home, Insert, Modeling, View, Optimize, and Help. The Home tab is selected. Below the ribbon is a toolbar with various icons for data management and visualization creation. On the left, there's a data grid titled "Employee Sales Data" showing sales data for employees across different years, quarters, months, and days. A bar chart titled "Sum of Total Excluding Tax and Sum of Profit by Employee" displays sales data for ten employees. The main area features a large title "Employee Sales Data" and a prominent value "172M" with the subtitle "Sum of Total Excluding Tax". To the right, the "Filters" pane is highlighted with a red box. It contains sections for "Filters on this page" and "Filters on all pages", each with a "Add data fields here" button. Below these are sections for "Sales Territory" (with checkboxes for External, Far West, Great Lakes, Midwest, New England, Plains, Rocky Mountain, Southeast, and Southwest) and "Values" (with a "Add data fields here" button). There are also options for "Drill through", "Cross-report" (set to Off), and "Keep all filters" (set to On). The bottom of the screen shows the status bar with "Employee Sales Data" and a plus sign icon, and the page number "Page 1 of 1". The overall theme is light gray with blue and green accents.

Power BI Interface - Visualizations pane

The screenshot shows the Power BI Desktop interface with the title bar "Ch2_Ex6_Screencast - Power BI Desktop". The ribbon menu is visible with tabs like File, Home, Insert, Modeling, View, Optimize, and Help. The Home tab is selected. The main area displays a table titled "Employee Sales Data" and a bar chart titled "Sum of Total Excluding Tax and Sum of Profit by Employee". The table has columns for Year, Quarter, Month, Day, Employee, Sum of Total Excluding Tax, Sum of Tax Rate, Sum of Profit, City, and State Province. The bar chart shows sales data for various employees. The Visualizations pane on the right is highlighted with a red border and has a title "Visualizations Pane". It contains sections for "Filters", "Visualizations", "Data", and "Values". The "Visualizations" section includes icons for different types of charts and reports. The "Data" section lists data sources: DimCity, DimEmployee, DimStockItem, and FactSale. The "Values" section has a placeholder "Add data fields here". The "Drill through" section has a "Keep all filters" button set to "On". The "Cross-report" section has a radio button set to "Off". The "Add drill-through fields here" section is empty.

Visualizations Pane

Employee Sales Data

Year	Quarter	Month	Day	Employee	Sum of Total Excluding Tax	Sum of Tax Rate	Sum of Profit	City	State Province
2013	Qtr 1	January	1	Amy Trell	178	30	121.00	Hahira	Georgia
2013	Qtr 1	January	1	Amy Trell	91	15	59.50	Jones Creek	Texas
2013	Qtr 1	January	1	Amy Trell	90	15	24.00	Tomnolen	Mississippi
2013	Qtr 1	January	1	Amy Trell	258	45	165.00	Trily	Florida
2013	Qtr 1	January	1	Amy Trell	535	45	48.50	Wappingers Falls	New York
2013	Qtr 1	January	1	Anthony Grosse	424	30	303.00	Golden Meadow	Louisiana
2013	Qtr 1	January	1	Anthony Grosse	370	45	236.50	Janison	Iowa
2013	Qtr 1	January	1	Anthony Grosse	650	45	382.00	Meadowdale	Washington
2013	Qtr 1	January	1	Anthony Grosse	780	45	521.00	Old River-Winfrey	Texas
2013	Qtr 1	January	1	Anthony Grosse	405	30	256.50	Termo	California
2013	Qtr 1	January	1	Anthony Grosse	603	60	340.50	Trumansburg	New York
2013	Qtr 1	January	1	Anthony Grosse	301	30	220.00	Victory Gardens	New Jersey
				Total	172261230	3418795	85,729,180.90		

Sum of Total Excluding Tax and Sum of Profit by Employee

● Sum of Total Excluding Tax ● Sum of Profit

172M
Sum of Total Excluding Tax

Sales Territory

- External
- Far West
- Great Lakes
- Mideast
- New England
- Plains
- Rocky Mountain
- Southeast
- Southwest

Employee Sales Data

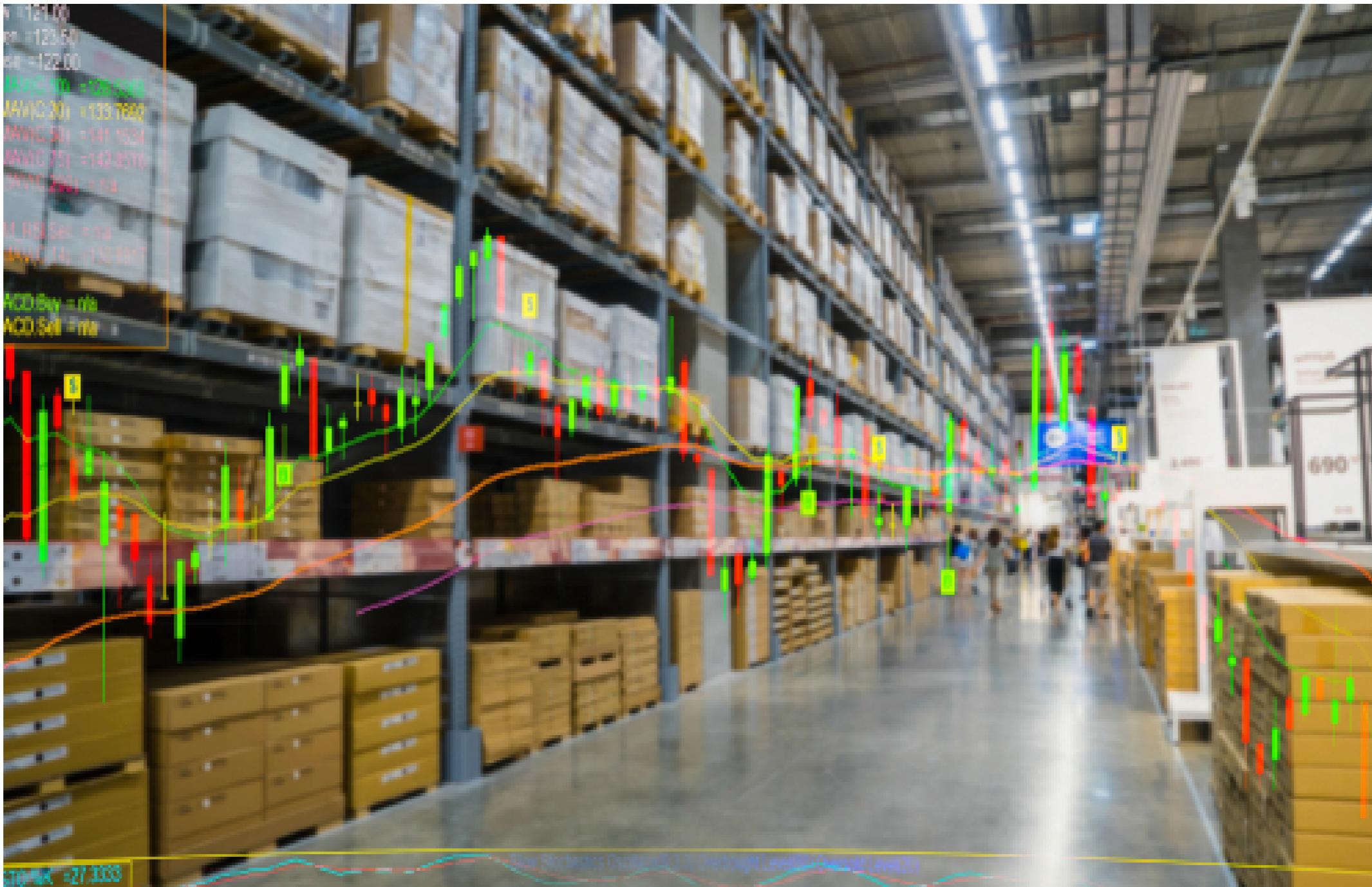
Page 1 of 1

65%

Power BI Interface - Data pane

The screenshot shows the Power BI Desktop application window titled "Ch2_Ex6_Screencast - Power BI Desktop". The interface includes a ribbon menu with tabs like File, Home, Insert, Modeling, View, Optimize, and Help. Below the ribbon are various icons for data import (Get data from Excel, OneLake data hub, SQL Server, Dataverse), data transformation (Transform data, Refresh data), and visualization creation (New visual, Text box, More visuals). The main workspace displays a bar chart titled "Employee Sales Data" showing "Sum of Total Excluding Tax and Sum of Profit by Employee". The chart has "Employee" on the x-axis and "Sum of Total Excluding Tax and Sum of Profit" on the y-axis, ranging from 0M to 20M. The legend indicates two series: "Sum of Total Excluding Tax" (blue bars) and "Sum of Profit" (dark blue bars). The chart area also contains a large value "172M" and a subtitle "Sum of Total Excluding Tax". To the right of the chart is a "Filters" pane with sections for "Filters on this page" and "Filters on all pages", both with "Add data fields here" buttons. Below these is a "Visualizations" pane showing icons for different chart types. The rightmost pane, which is the focus of the image, is the "Data" pane. It features a search bar, a list of data sources (DimCity, DimEmployee, DimStockItem, FactSale), and sections for "Values" (with an "Add data fields here" button), "Drill through" (with an "Off" radio button), "Cross-report" (with an "Off" radio button), and "Keep all filters" (with an "On" radio button). A red box highlights this "Data" pane. At the bottom of the workspace, there's a navigation bar with "Employee Sales Data" and a "+" icon, and a status bar indicating "Page 1 of 1" and a zoom level of "65%".

Wide World Importers (WWI) dataset



Wide World Importers (WWI) dataset

- Sales information (fact table):
 - FactSales.csv
- Further transaction details (dimension tables):
 - DimCustomer.csv
 - DimEmployee.xlsx
 - DimStockItem.csv
 - DimDate.csv
 - DimCity.csv



Getting started!

INTRODUCTION TO POWER BI



Navigation Power BI

- On the desktop, click on the Exercises folder and open the report called 1_o_loading.pbix .
- Once the report opens, make sure you are viewing the Sales Data page.
- You can enlarge the Power BI interface by clicking on the full-screen button in the bottom right corner or by zooming out.
- You can also make the canvas area bigger by expanding and collapsing the Filters, Visualizations, and Fields panes by selecting the arrows at the tops of the panes.
- What was the total prot for World Wide Importers?

Your first visualization

- Time to start loading your own data!
- In this exercise, FactSale.csv has been loaded and there is already a bar chart with the quantity of items ever sold by Wide World Importers (WWI). This would be more meaningful if we segmented the graph into years.
- Let's load another data file that contains that informations. Note that you can use the undo-button in the top left corner to undo any edits you made.
- From the bottom left corner of the file, change the page you are viewing from Sales Data to Page 1 .
- You can delete the Sales Data page as you will no longer be using it.
 - You can delete the Sales Data page by hovering over the name and clicking the x. You can also rightclick the name and select Delete page.

Your first visualization

- Using the Get Data button, select Text/CSV from the list and load DimDate.csv from Datasets/WWI . Make sure to use the file in the WWI folder.
 - To load data, you can use the Get Data > Text/CSV button on the top Home plane. If you are only seeing DimEmployee.xlsx , it means you selected Excel instead of Text/CSV.
 - Make sure to use the correct dataset! You can find the DimDate.csv file in the Datasets/WWI folder. If there are no files in that location, you may be trying to open a workbook instead of loading a data file.
 - In the pop-up window showing a preview of the DimDate.csv data, you can click on the yellow Load button

Your first visualization

- In the Model view, create a relationship between FactSale 's Invoice Date Key and DimDate 's Date .
 - There are three different views in Power BI (Report, Data, and Model). They are represented by icons on the left-hand pane. You can see their names by hovering over them.
 - To create a relationship, drag Invoice date key from the FactSale table on top of the Date field in the DimDate table.
- In the Report view, select the existing bar chart and then select Calendar Year from DimDate in the Data pane.
- Make sure to use Calendar Year instead of Calendar Year Label . You can expand the Data pane by dragging its left-hand border.
 - In the Visualizations pane, below the visualization icons, you might need to scroll down to see the Value field.

Your first visualization

- In the Visualizations pane, drag Calendar Year to X-axis rather than Y-axis
- Based on your resulting visualization, which statement is true?
 - Quantity of items sold per year has decreased every year.
 - Quantity of items sold per year has remained about the same through all years.
 - Quantity of items sold per year has only increased from 2013 to 2015.
 - Quantity of items sold per year has been increasing every year.

Add a Card

- Let's add some more details to your report. We already found the quantity of items sold per year. Now, you want to know more about the profit made over the years. A card is a great choice because it's simple and adds some elegant interactivity.
- In the Report view, deselect any visuals you have selected by clicking a blank area of the canvas.
- Select the Profit field from FactSale . A bar chart will get created automatically. Note that you can use the Search function in the Fields pane to easily locate columns.

Add a Card

- Choose the Card visualization to change the bar chart into text
 - The card visualization is represented by a rectangle icon with the numbers "123" in the Visualizations pane. You can hover over the icons to see their names.
 - You can select the year 2014 bar by clicking on it.
 - Make sure you have the bar chart selected when clicking the card icon.
- You should now have two visualizations in your report. Arrange and resize them to your liking so there is no overlap between the two visuals!
- Select the year 2014 bar. What does the profit card change to?

Slicers and Tables

INTRODUCTION TO POWER BI



- We have the fields Quantity and Profit in our report. It would be interesting to analyze how each Wide World Importers (WWI) salesperson has contributed to the quantity of items sold and the profit generated. To do this, we'll add a new dimension table and a slicer.
- Let's continue building on your last report. If you lost progress, close any open reports and load 1_3_slicers.pbix from the Exercises folder on the desktop
- Load the Excel file DimEmployee.xlsx from Datasets/WWI using the Excel workbook button on the top menu. This is located next to the Get data option.
- Create a relationship between FactSale 's Salesperson Key and DimEmployee 's Employee Key

Slicer

- In the Report view, add a slicer.
 - Verify you properly added an slicer. In the Report view, make sure no visualizations are selected by selecting a blank space on the canvas. Go to the Visualization pane and select the slicer icon. (Funnel on board icon)
 - Remember, making a click over a section of a visualization helps filtering the display.
- Add the Employee field to the slicer, and change the slicer by going to Format section in the Visualizations pane, you can then navigate to Slicer Settings > Options > Style and switch from Vertical list to Dropdown.
 - The Employee field is under DimEmployee in the left-hand most Field pane. Select it while the new slicer is also selected.
 - Using the slicer you've just added, how much profit did salesperson "Taj Shand" generate for WWI in 2014? Round accordingly to the nearest \$1,000. (answer format: \$____K)

More Columns

- Wide World Importers sells two types of products: chilled and dry. This is recorded in the database because chilled products require a different kind of packaging. To compare these product types, you will add the quantity of products sold that are chilled or dry to the column chart.
- Select Total Dry Items and Total Chiller Items in the Fields pane.
- Question: Based on the result, which statement is true about Wide World Importers?
 - Chilled items take up about 25% of the items sold every year.
 - It seems like Wide World Importers only started selling chilled items in 2016.
 - Most of the items Wide World Importers have sold are chilled.

L Table

- Let's add a table to our report with the details of sales transactions. With the interactivity of Power BI, this will allow us to see examples of sales based on our selection. (*If you lost progress, close any open reports and load 1_5_table.pbix from the Exercises folder on the desktop*)
- De-select any selected visualization and add a table. If you don't have space you can make the bar chart smaller, so you can add a table at the bottom of the page
- Add the dimension field Employee to the table.
- Add the fact fields to the table: Description , Quantity , Total Including Tax , Profit .

L Table

- Add a text box to clearly title the report "Sales Data" and arrange the report to your liking.
 - A text box can be added in the top menu under Home
- Change the name of the page tab to contain the same name as the title.
 - To change the name of the page tab, right-click on Page 1 and select Rename Page.
- Using the table's total row, how much "Total Including Tax" did "Sophia Hinton" generate in 2016?

Data Analyst in Power BI track

INTRODUCTION TO POWER BI



Exam PL-300: Microsoft Power BI Data Analyst



- Courses cover the main skills required
 - Prepare the data
 - Model the data
 - Visualize and analyze the data
 - Deploy and maintain assets
- Become Microsoft Certified: Power BI Data Analyst Associate

Transforming data

INTRODUCTION TO POWER BI



Transforming data

- Dataset may contain:
 - Columns you don't need
 - Inconvenient and inconsistent formatting
 - Extra characters
 - Blank rows
- Cleaning data

Loading data

FactSale.csv

File Origin: 65001: Unicode (UTF-8) Delimiter: Comma Data Type Detection: Based on first 200 rows

Sale Key	City Key	Customer Key	Bill To Customer Key	Stock Item Key	Invoice Date Key	Delivery Date Key	Salesperson Key	W1
49258	71135	0	0	194	10/22/2013	10/23/2013	86	
49265	41568	0	0	204	10/22/2013	10/23/2013	83	
49456	70409	0	0	202	10/22/2013	10/23/2013	74	
49372	48937	0	0	173	10/22/2013	10/23/2013	83	
49624	41981	0	0	168	10/24/2013	10/25/2013	85	
49635	70510	0	0	164	10/24/2013	10/25/2013	84	
49908	66274	0	0	198	10/25/2013	10/26/2013	70	
50034	44106	0	0	180	10/25/2013	10/26/2013	85	
50190	56014	0	0	195	10/26/2013	10/27/2013	74	
50487	79969	0	0	164	10/28/2013	10/29/2013	19	
50367	81342	0	0	180	10/28/2013	10/29/2013	85	
50379	91464	0	0	174	10/28/2013	10/29/2013	70	
50436	38583	0	0	192	10/28/2013	10/29/2013	19	
50715	85575	0	0	190	10/29/2013	10/30/2013	39	
50739	81481	0	0	168	10/29/2013	10/30/2013	83	
50914	75393	0	0	171	10/30/2013	10/31/2013	74	
51426	87371	0	0	163	11/4/2013	11/5/2013	84	
51623	47499	0	0	179	11/5/2013	11/6/2013	19	
51656	84269	0	0	187	11/5/2013	11/6/2013	19	
51680	52627	0	0	184	11/5/2013	11/6/2013	91	

Extract Table Using Examples Load Transform Data Cancel

Loading data

FactSale.csv

File Origin: 65001: Unicode (UTF-8) Delimiter: Comma Data Type Detection: Based on first 200 rows

Sale Key	City Key	Customer Key	Bill To Customer Key	Stock Item Key	Invoice Date Key	Delivery Date Key	Salesperson Key	W1
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FactSale.csv

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50487	79969	0	0	164	10/28/2013	10/29/2013	19	
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51623	47499	0	0	179	11/5/2013	11/6/2013	19	
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51680	52627	0	0	184	11/5/2013	11/6/2013	91	

Extract Table Using Examples Load Transform Data Cancel

Power Query Editor

The screenshot shows the Microsoft Power Query Editor interface. The title bar reads "Untitled - Power Query Editor". The ribbon menu includes File, Home, Transform, Add Column, View, Tools, and Help. The Home tab is selected.

The main area displays a table titled "FactSale" with 21 columns and 999+ rows. The columns are labeled: Sale Key, City Key, Customer Key, Bill To Customer Key, Stock Item Key, Invoice Date Key, Delivery Date Key, and several other columns partially visible. The table contains numerical values, mostly zeros, and dates ranging from 10/22/2013 to 11/13/2013.

The "Transform" ribbon tab is selected, showing various tools for managing columns, rows, and data types. A status bar at the bottom indicates "21 COLUMNS, 999+ ROWS" and "Column profiling based on top 1000 rows".

The "Query Settings" pane on the right shows the query name "FactSale" and a list of applied steps: "Source", "Promoted Headers", and "Changed Type".

INTRODUCTION TO POWER BI

Don't forget to Close & Apply

The screenshot shows the Microsoft Power Query Editor interface. The title bar reads "Untitled - Power Query Editor". The ribbon menu is visible with tabs: File, Home, Transform, Add Column, View, Tools, and Help. The Home tab is selected. Below the ribbon, there are several icons and dropdown menus:

- Close & Apply**: This button is highlighted with a mouse cursor, indicating it is the focus of the message.
- New Source
- Recent Sources
- Enter Data
- Data source settings
- Manage Parameters
- Refresh Preview
- Properties
- Advanced Editor
- Manage

The "Close & Apply" button has a tooltip that says: "Close the Query Editor window and apply any pending changes." Below the ribbon, the "FactSale" query is listed in the navigation pane. The main area displays a table with columns: Sale Key, City Key, and Customer Key. The data is as follows:

	Sale Key	City Key	Customer Key
1	49258	71135	
2	49265		41568

Power Query Editor

INTRODUCTION TO POWER BI



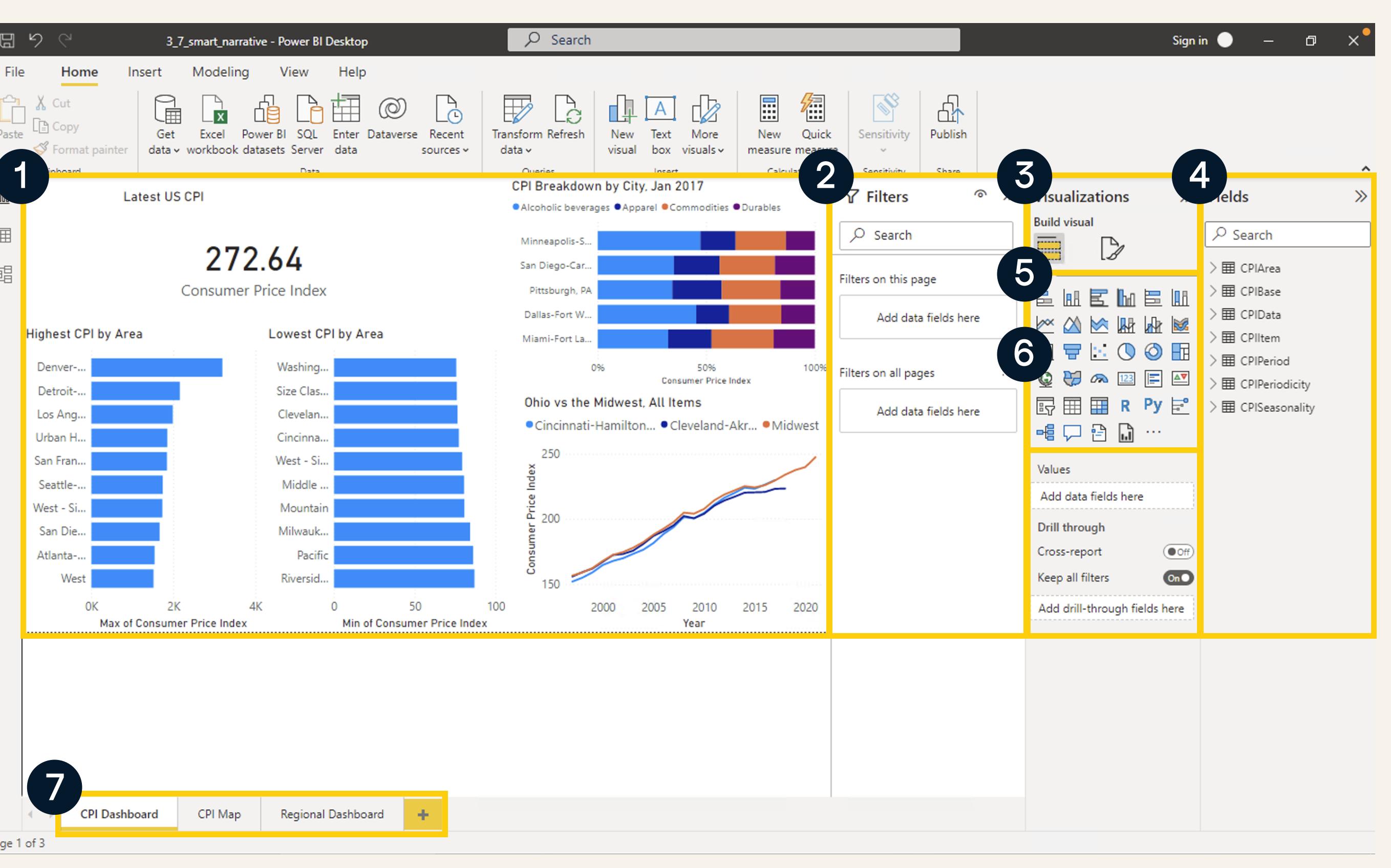
Transform before load

- Raw data usually doesn't arrive in the perfect form when you account for things like human errors, bugs, and file conversion. Power BI accounts for this with the Power Query Editor which allows you to transform data before loading it. In this exercise, you will load another dimension called DimCustomer, except unlike the others, this file will need to be edited prior to loading.
- If you lost progress, close any open reports and load 2_1_transform_load.pbix from the Exercises folder on the desktop.
- Open the csv file DimCustomer.csv from Datasets/WWI folder on the desktop.
- Select the Transform Data button to navigate to Power Query as shown in navigation cheat sheet.

Navigation Cheatsheet

> Report View

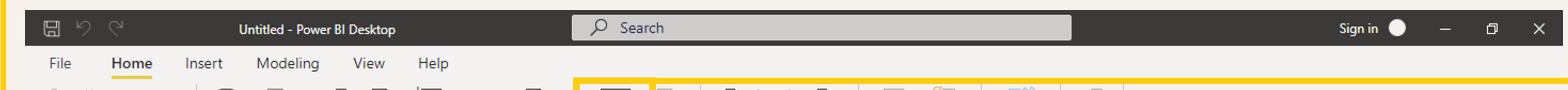
In the Report view let's you create any number of report pages with visualizations. You can edit and rearrange the format of your visualizations in various ways.



- 1 Latest US CPI
- 2 272.64 Consumer Price Index
- 3 CPI Breakdown by City Jan 2017
- 4 CPI Dashboard
- 5 Filters
- 6 Visualizations
- 7 Page Overview

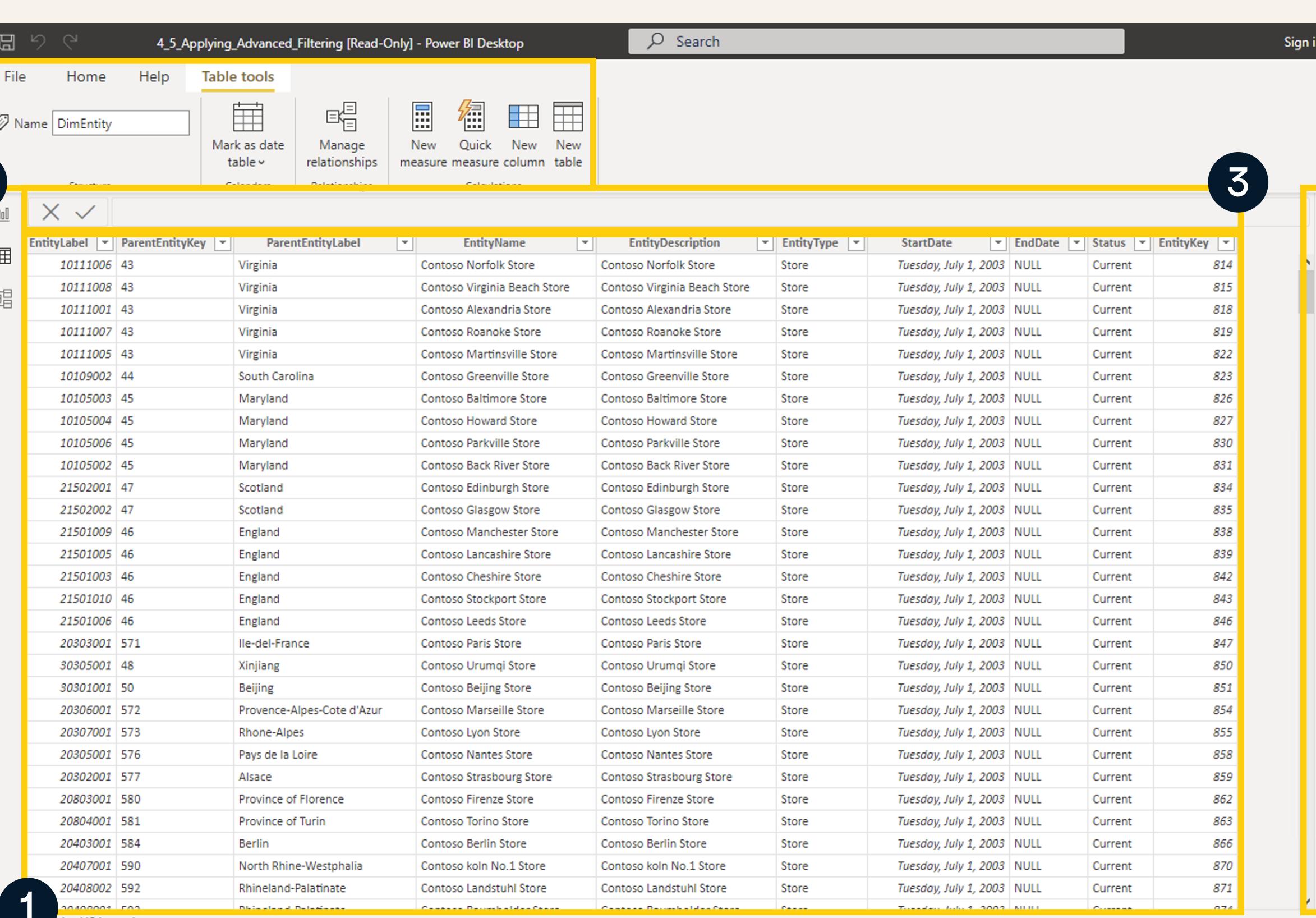
> Start Screen

When opening Power BI the default screen is the Report view. There are three views: Report, Data, and Model view, which can be accessed through the icons on the left side of the screen. The Power Query Editor can be found in the Home tab.



> Data View

The Data View allows you to monitor, explore, and understand your data. You can explore each table, values, columns and rows. The Data view is different than the Power Query Editor because you're looking at your data **after** it has been loaded into the model.



- 1 Data Grid
- 2 Fields Pane
- 3 DAX Formula bar
- 4 Table Tools

Add data to your report

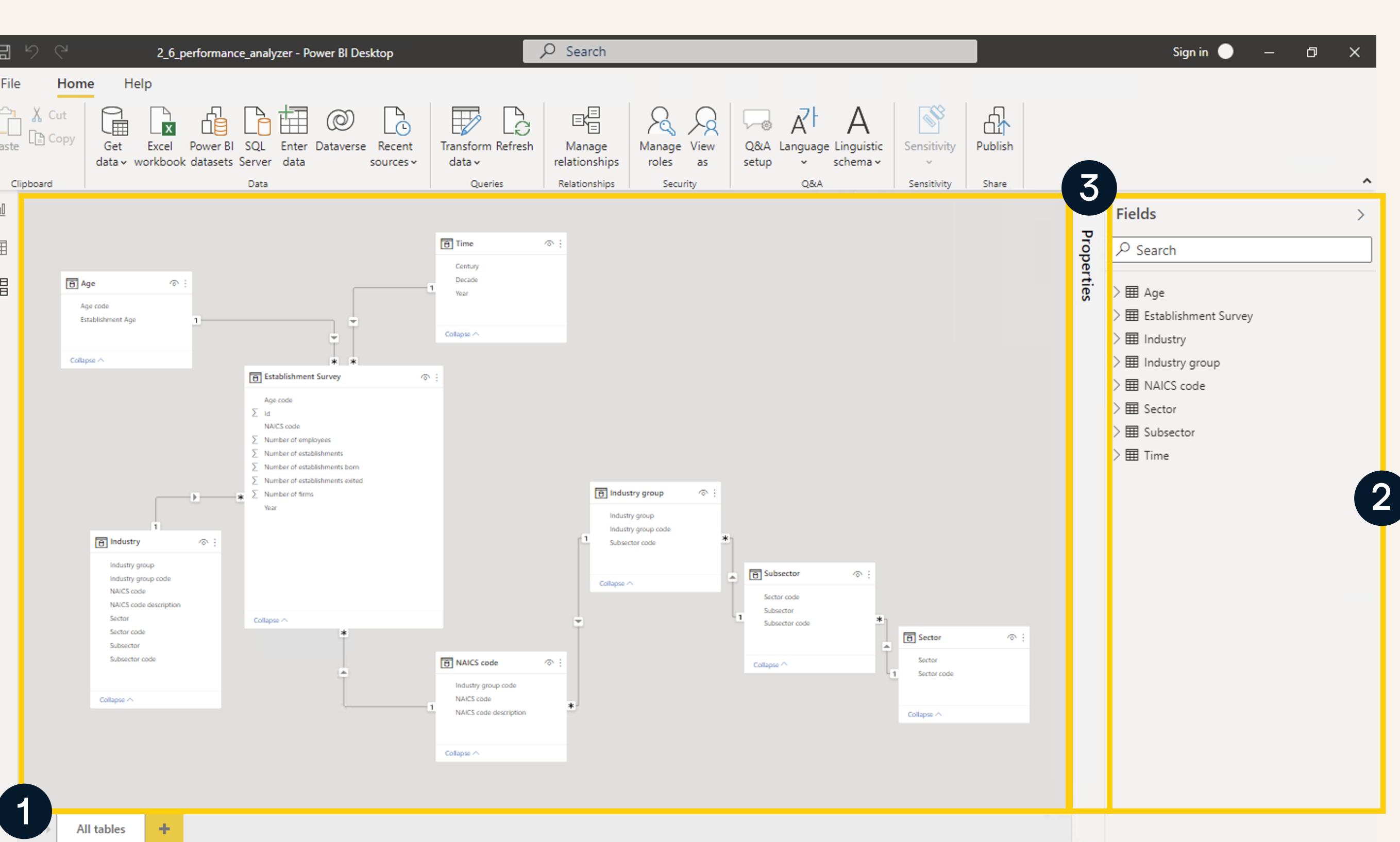
Once loaded, your data will appear in the Fields pane.



Get data from another source →

> Model View

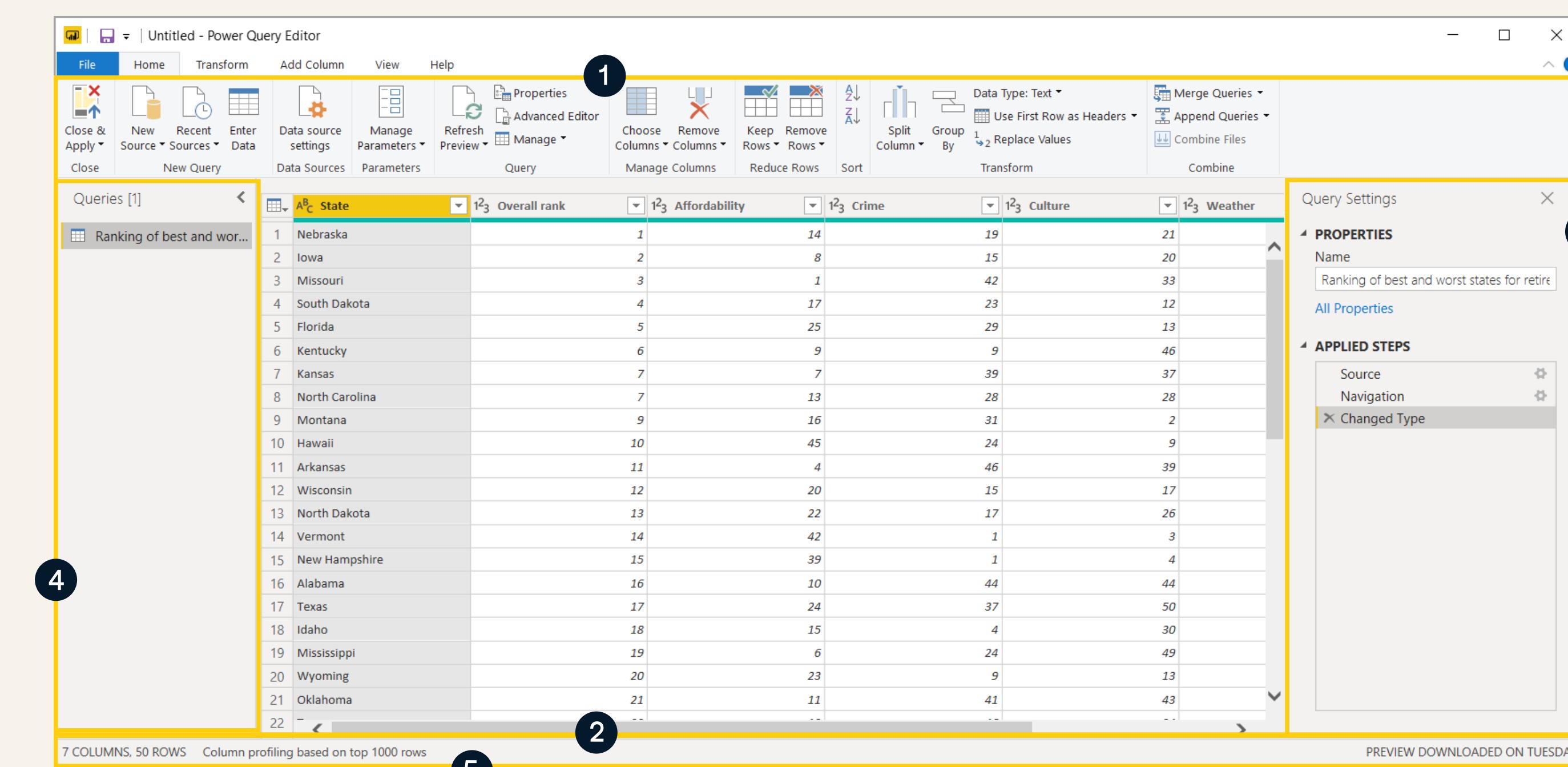
The Model view provides a visual representation of the relationships among the tables. It shows all tables and columns in your model.



- 1 Data Model
- 2 Fields Pane
- 3 Properties Pane

> Power Query Editor

The Power Query Editor opens in a separate window. It helps you to build queries and transform data before loading it in the refined data model to create reports.



- 1 Query Editor Ribbon
- 2 Queries Pane
- 3 Query Setting
- 4 Queries Pane
- 5 Status Bar

Transform before load

- Remove the first row. It contains mostly blanks and does not provide any information.
 - To remove the first row, select the Remove Rows button on the top Home menu. Select Remove Top Rows and specify 1 row in the input, since we only want to remove that one row.
- Make the resulting first row the header row
 - After removing the first row, select Use First Row as Headers from the top Home menu.
- Delete the columns Valid From and Valid To .
 - While selecting the columns you would like to remove, select the Remove Columns button in the top Home menu.
- Close and apply

Transform before load

- In the Fields pane, select the Edit Query menu option from DimCustomer
 - The Fields pane is on the right hand side. The Edit Query option is in the dropdown shown after selecting the three dots, ... , after DimCustomer ..
- In Power Query Editor window that has opened, how many steps are listed in the "Applied Steps" section?

Field aggregation

- Now that we've loaded DimCustomer and cleaned it up, let's create a visualization with it. Power BI automatically sums up numerical fields in a visualization. For example, the default is to show the sum of all the sale totals, rather than the average sale total. In this exercise, you will try a new aggregation.
- Click "Close & Apply" to close Power Query in case it is still open.
- Check that Power BI recognized a relationship between FactSale and DimCustomer .
- Add a new page tab in the Report view.
- Make a Clustered Column Chart using Buying Group from DimCustomer and Total Including Tax from FactSale .
- Change it so that the value is the minimum of Total Including Tax .
 - Select the bar chart you created. Look at the Value section within the Visualization pane. In the drop down of Total Including Tax, select Minimum over Sum.
- According to total including tax, how much was the cheapest sale made to Tailspin Toys?

Transforming and formatting columns

INTRODUCTION TO POWER BI



Transforming columns

- Earlier you practiced cleaning data at row-level, like deleting erroneous rows or changing the header row. Now, we'll take a look at issues at the column-level.
- Make sure no bars are selected on the bar graph.
- Create a Card visualization with the value Credit Limit from DimCustomer
- The card should show ? - , which is unexpected! Edit the query of DimCustomer to open up the Power Query Editor and fix the Credit Limit column.
 - If you're having trouble finding the Credit Limit column, make sure you are viewing DimCustomer .
 - To edit the query, select the "..." after DimCustomer in the Fields pane and select Edit Query from the dropdown.
 - Select the Credit Limit column within the DimCustomer table.

Transforming columns

- Replace values so that ? s are replaced with blanks in Credit Limit .
 - Find the Replace values button in the top menu to the right of the Group By button. The first value inputted should be either ? or - and the second value should be blank.
- Repeat so that - s are replaced with blanks for the Credit Limit column
- Change the data type of Credit Limit from Text to Decimal Number.
 - Make sure the Credit Limit column is selected. Click the dropdown above Replace values that currently says Data Type: Text and select Decimal Number.
- Close and apply and return to the Report view. In the card, change the value to be the average Credit Limit.
- What is the average credit card limit of a Wide World Importers customer (answer format: \$11.11K)?

Formatting currency

- Now that you know more about formatting data types. Let's go back to the first report you made, which should be the first page tab titled "Sales Data". Take a look at the formatting of the data in the table. Let's improve the formatting of the Profit and the Total Including Tax columns so it's immediately clear they are monetary values, unlike Quantity.
- In the Data view of FactSale , select the Total Including Tax column.
- Using Column tools, change the format to Currency.
 - The Data view is the second icon in the left-hand menu.
 - When you select a column in the Data view, the Column Tools menu should appear above automatically. Within it you can find the option to change the format
- Change the number of decimal places shown to 2 instead of Auto.
 - To change the number of decimal places, select the comma icon and increase the input to 2.

Formatting currency

- Change the default aggregation from Sum to Average .
 - To change the default aggregation, select Average in the dropdown labeled Summarization in Column Tools.
- Repeat the same format and decimal place changes to the Profit column.
 - Make sure to select the Profit column in order to make changes
- Add a card to your report and select Total Including Tax .
- If applicable, clear any selections on the Employee slicer so that all employees are considered
- What does the "Total Including Tax" card now display? (answer format: \$111.11)

Making maps with geographic data

- Maps are an engaging way to present data with a geographic layer. Imagine we wanted to depict the profit each state in the US generates. We could create a bar chart showing the states and the profit they generate. However, since there are 50 states, a map is much easier to scan for patterns and outliers.
- If you lost progress, close any open reports and load 2_5_making_maps.pbix from the Exercises folder on the desktop.
- Load the dimension table DimCity.csv from the Datasets/WWI folder on the Desktop.
- Go to the Model view and make sure a relationship is found between DimCity and FactSale .
- In the Data view, change the Data category of DimCity 's State Province to "State or Province".
 - When you select a column in the Data view, the Column Tools menu should appear above automatically. There you can find the option to change the Data Category.

Making maps with geographic data

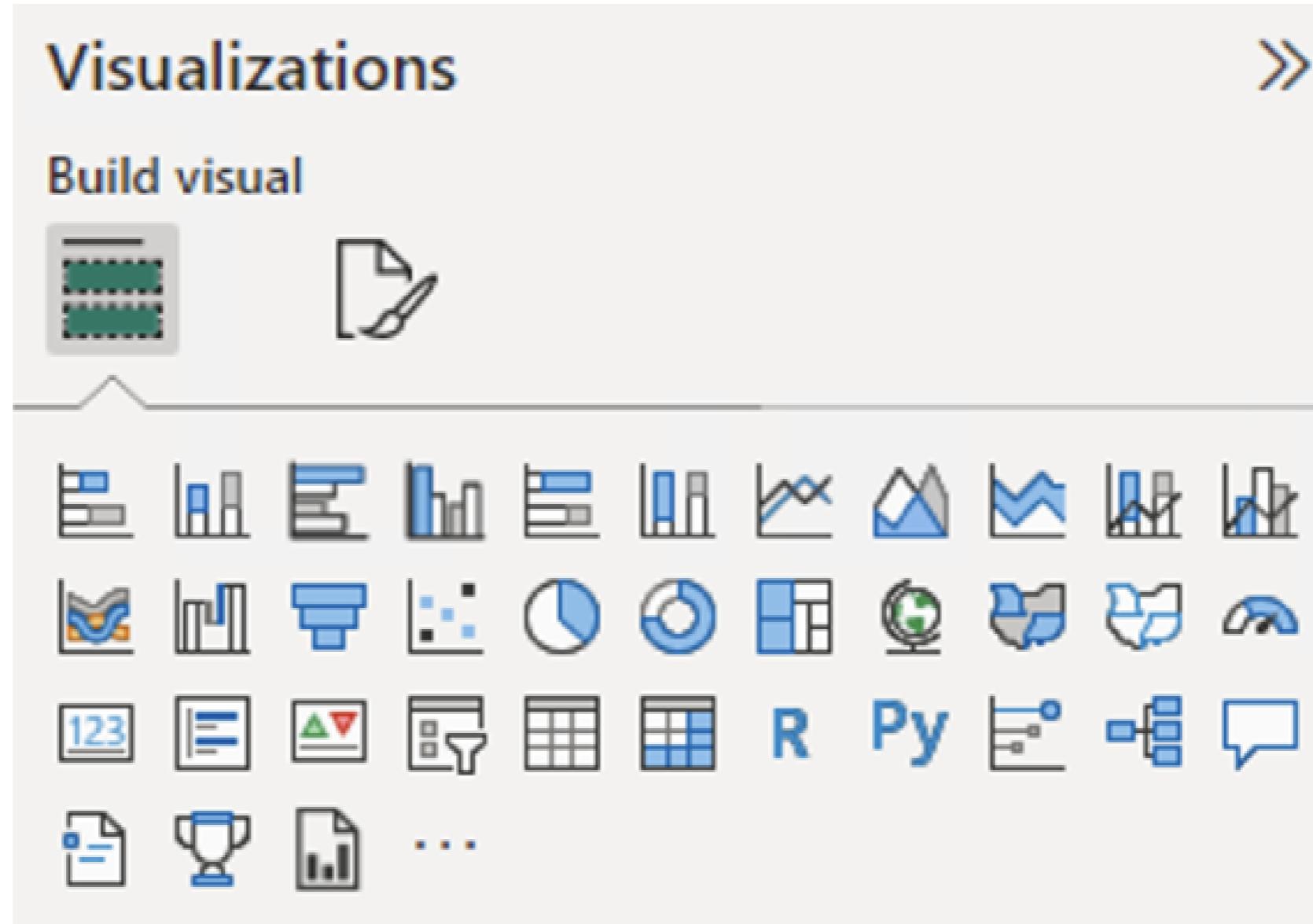
- Make sure the default summarization for Profit from FactSale is "Average"
- In the Report view, navigate to the second tab. Create a Map visualization using State Province as Location and Profit as Bubble size.
- Add a Slicer for the Buying Group field from the DimCustomer table. Arrange the report to your liking and add a title.
- Using the map and the slicer, which state generates the highest average profit for the "Wingtip Toys"?

Visualization options

INTRODUCTION TO POWER BI



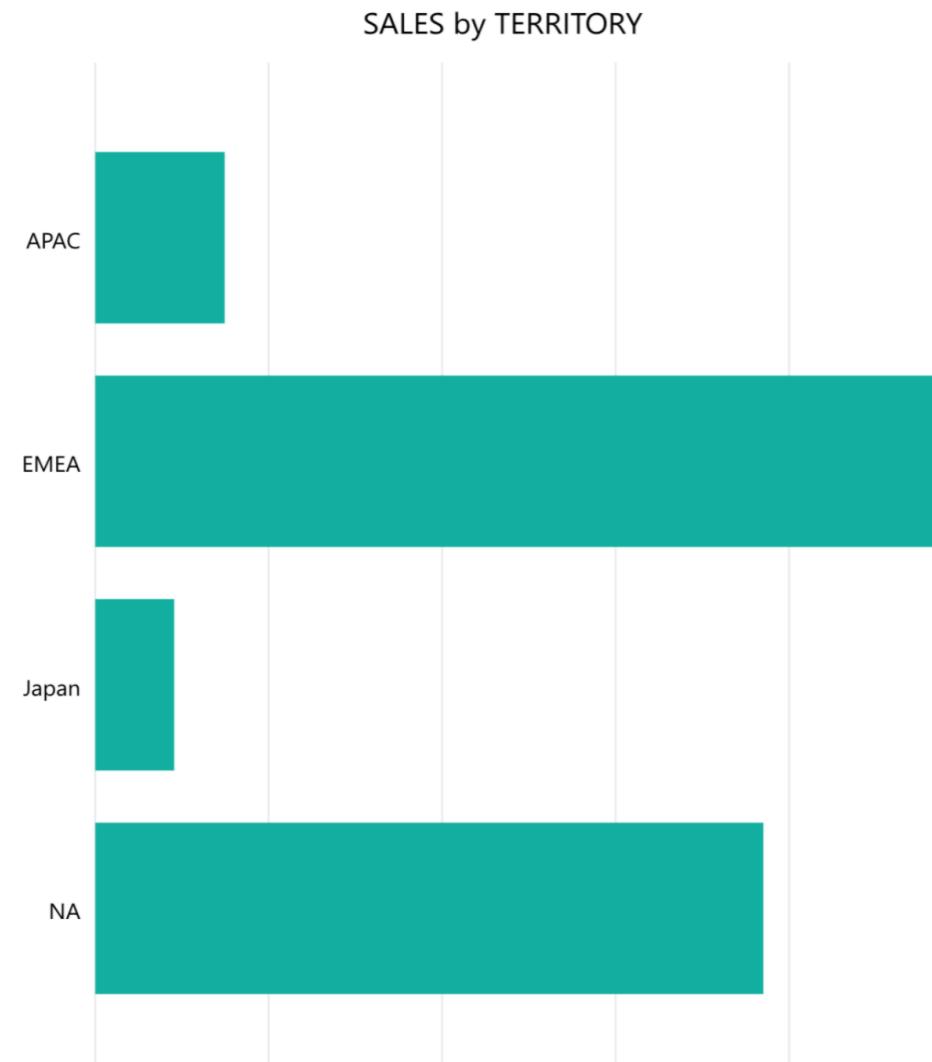
Visualization types



Column and bar charts

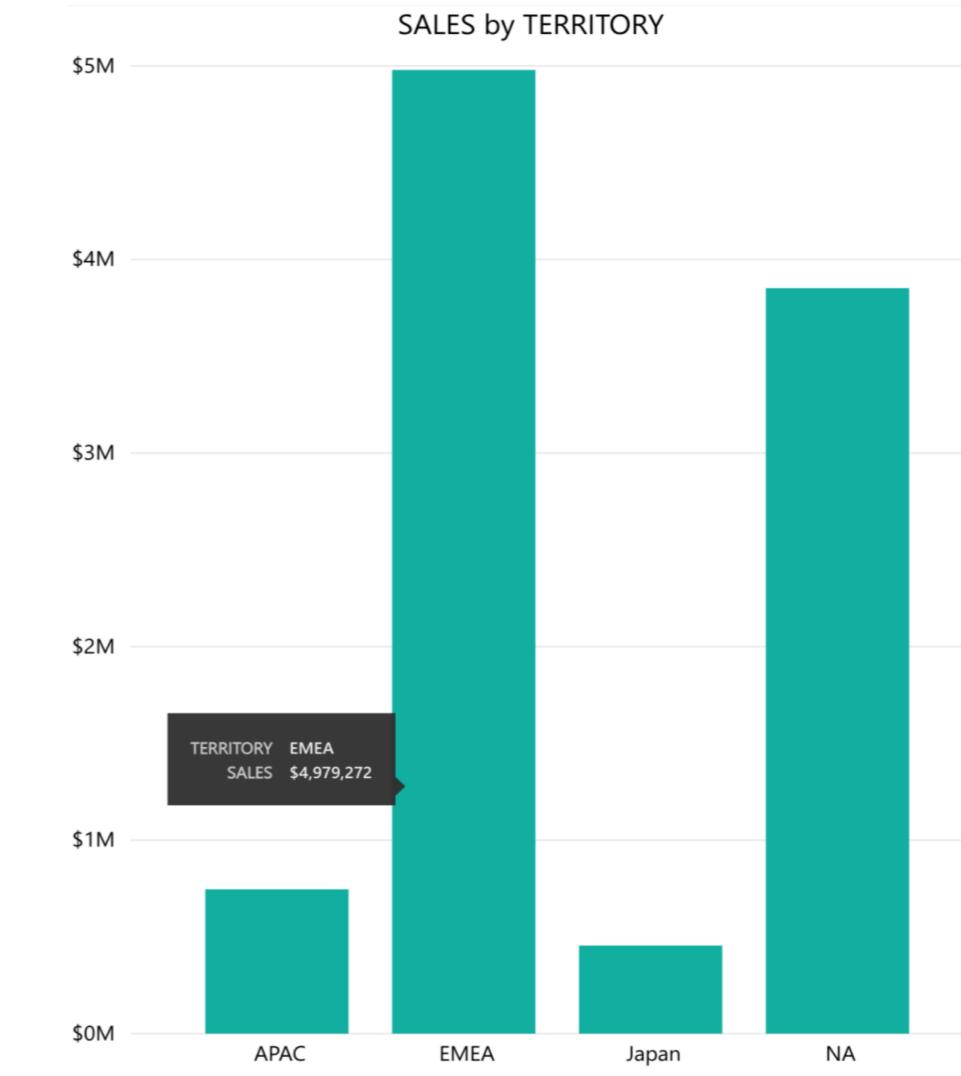
Bar chart

- Horizontal rectangles



Column chart

- Vertical rectangles



Column and bar charts

Stacked bar and column chart



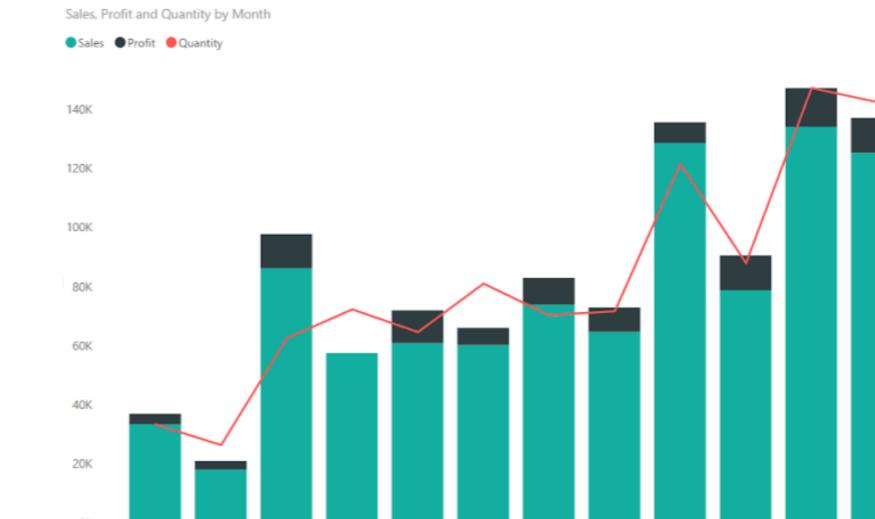
100% stacked bar and column chart



Clustered bar and column chart



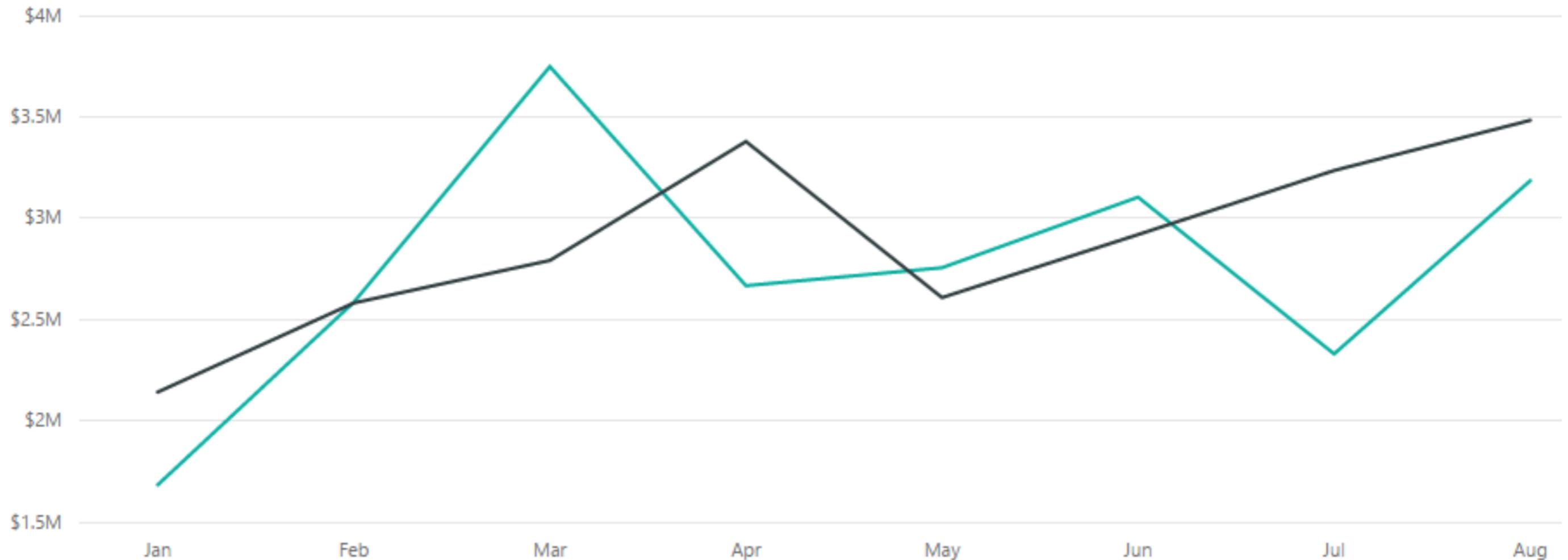
Combo chart



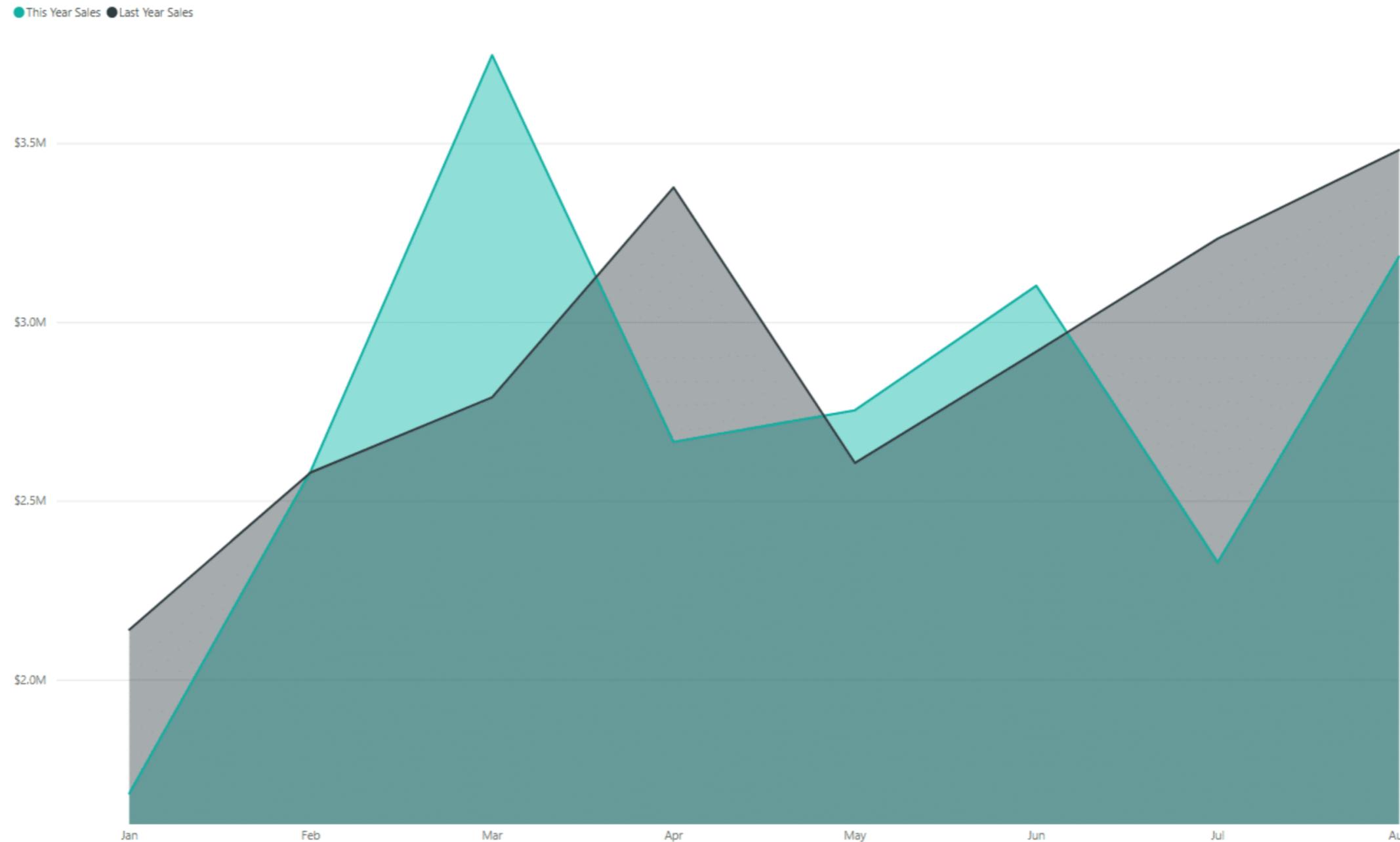
Line charts

This Year Sales and Last Year Sales by FiscalMonth

This Year Sales Last Year Sales

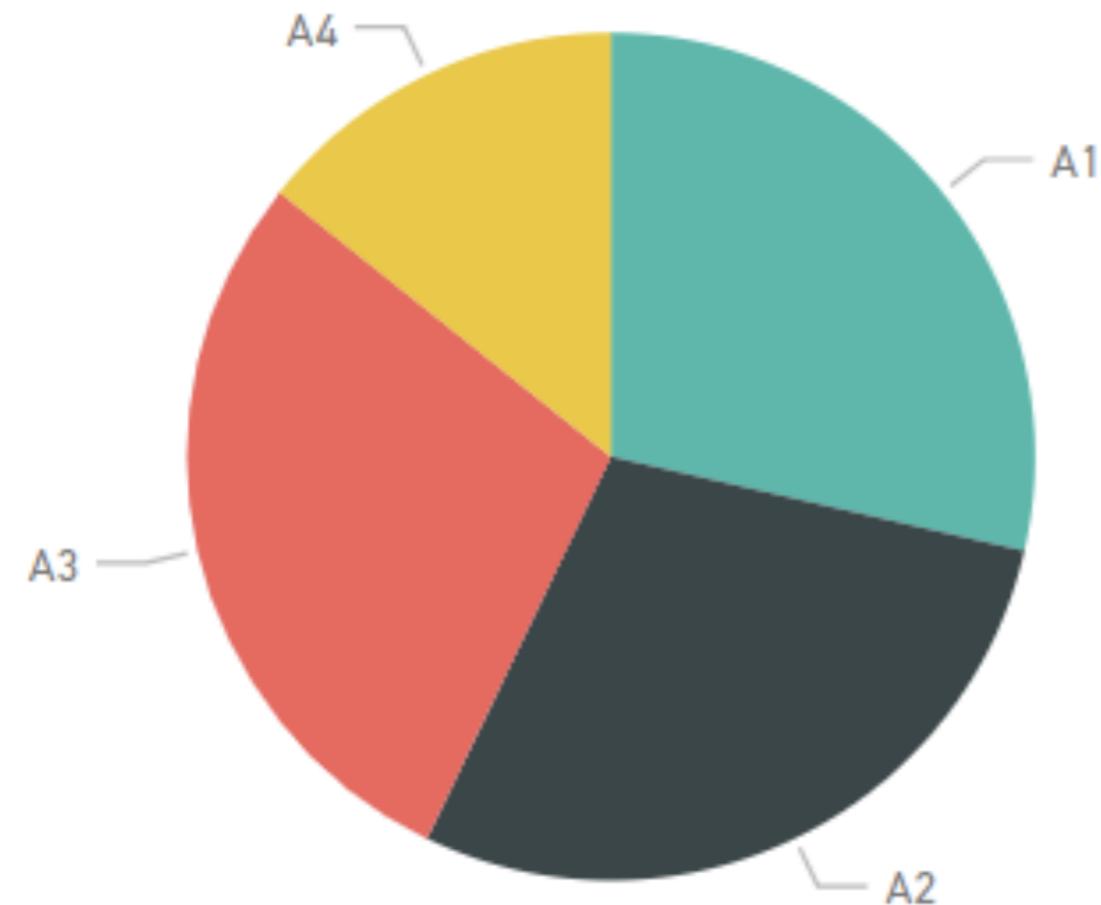


Area charts



Pie and donut charts

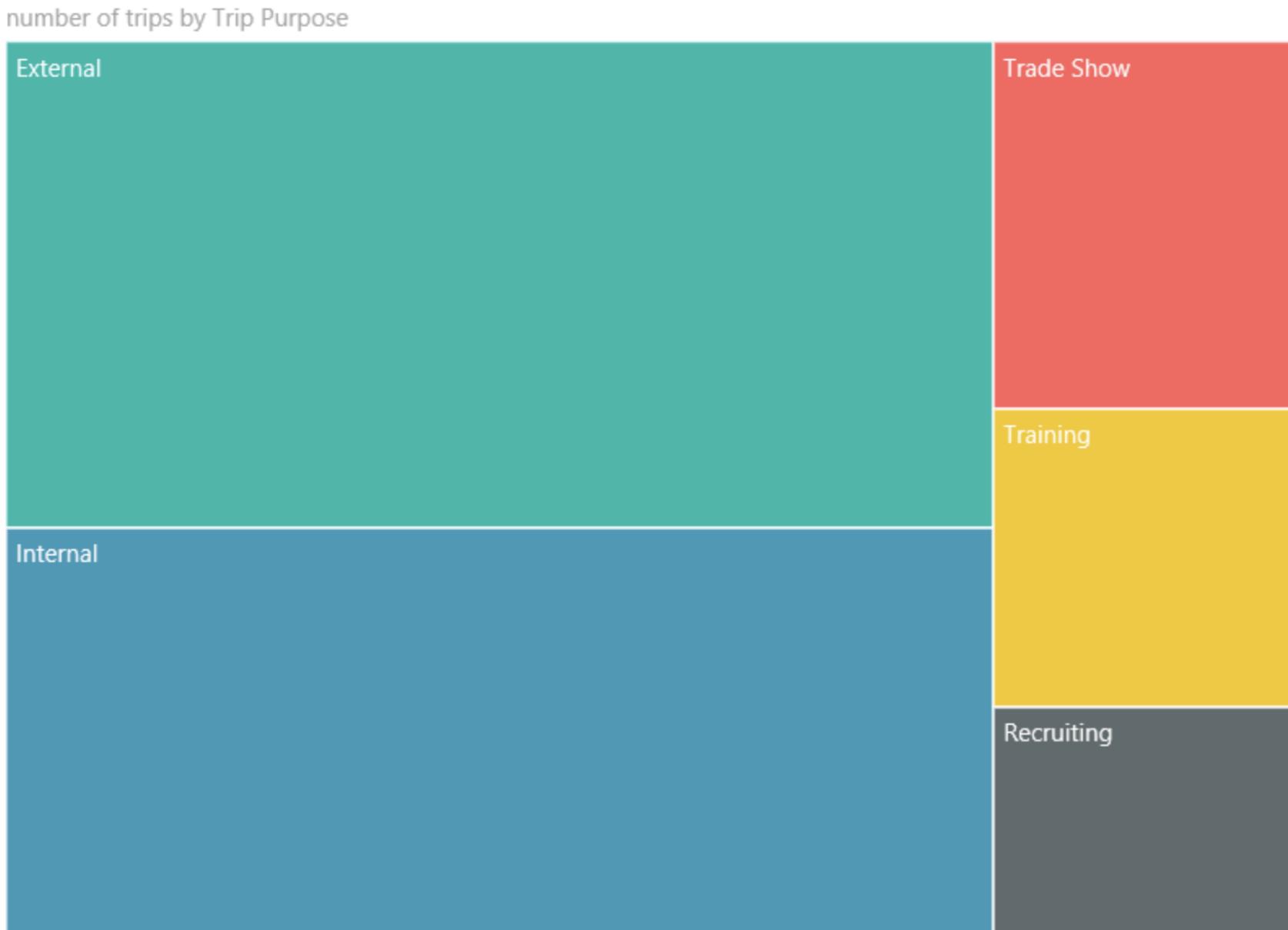
Pie chart



Donut chart



Tree maps



Some other visualization types

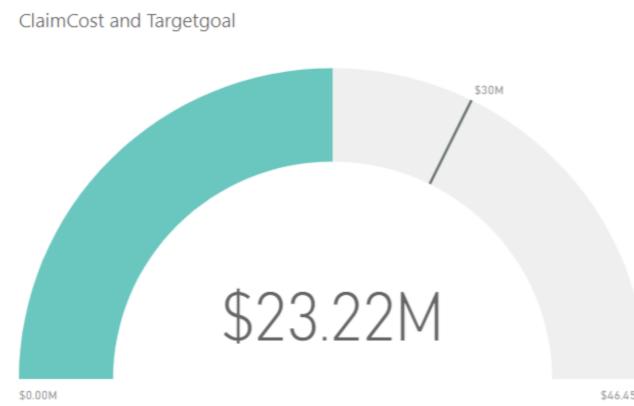
Card



Multi-row card

-\$366,891,365.00
Measure 4
-\$1,735.61
Measure 6

Gauge chart



KPI



Table and matrix

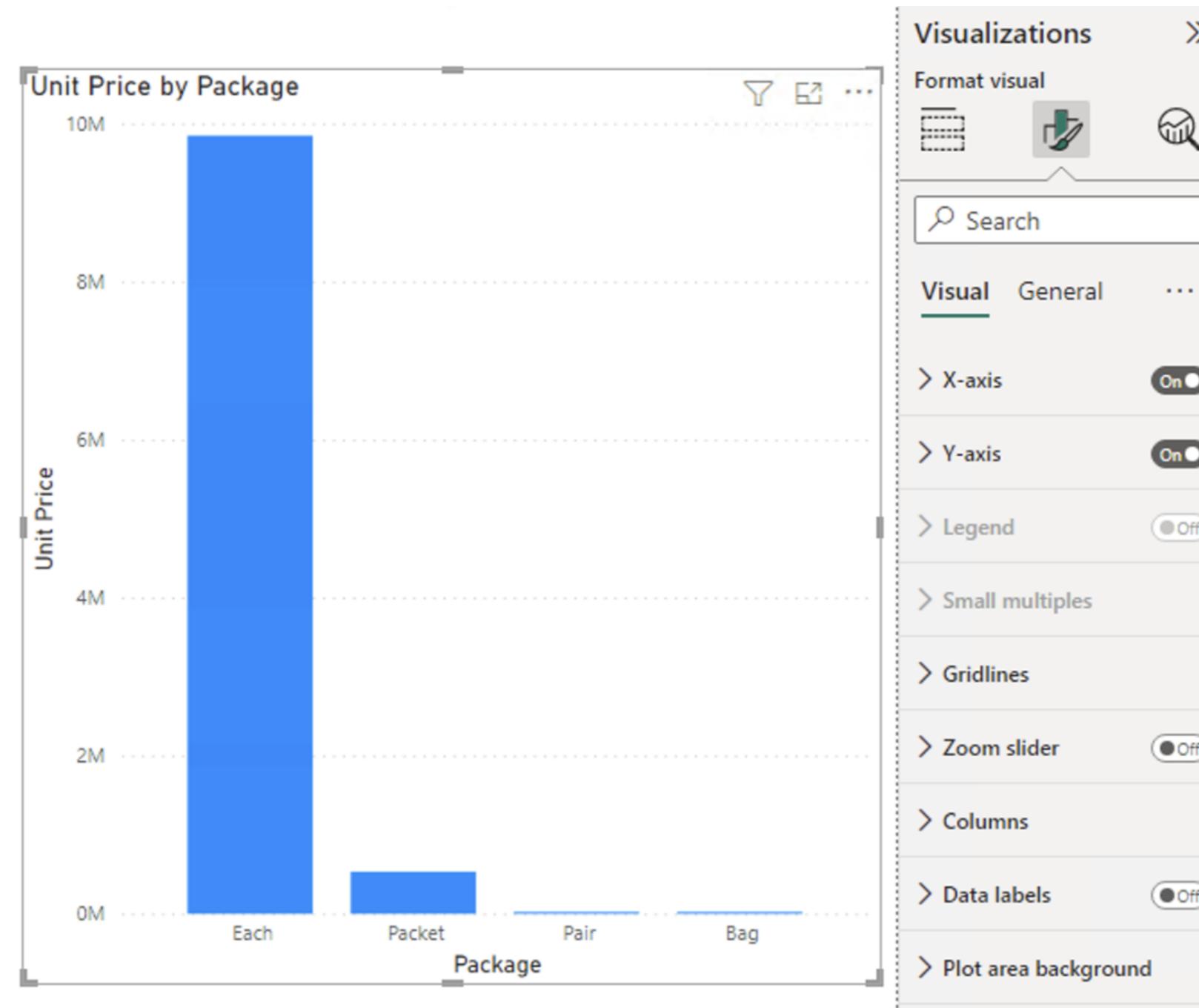
Table

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%
Total			281.88	99.21%

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%

Editing visualizations



Contoso data warehouse dataset



Contoso data warehouse dataset

- Snowflake schema
- Fact Table:
 - FactStrategyPlan
- Dimension Tables:
 - DimAccount
 - DimDate
 - DimEntity
 - DimProductCategory
 - DimScenario

Making changes

INTRODUCTION TO POWER BI



Changing visuals

- Time to get to work! You are going to change and format visuals. First, you'll turn the donut chart into a tree map to get a better understanding of the product categories. Then, you'll change the simple card visual to a multi-row card so that it's possible to closely track the actual, forecasted, and budgeted amounts.
- Close any open reports and open the `3_1_changing_visuals.pbix` report from the Exercises folder on the desktop.
- Change the donut chart to a tree map.
 - You can change a visual by selecting it and then selecting a different chart type in the Visualizations pane.
- Go into the formatting settings and set the title of the chart to Product Category Amount with a size of 16.

Changing visuals

- Change the card in the top left hand corner to a multi-row card, and add ScenarioName to it.
 - Every line on the card should represent a different scenario, so you need to drag ScenarioName from the DimScenario table under Amount in Fields.
- What is the total forecasted sales amount (answer format: \$1.111B)?

Editing properties

- Let's keep working on this report and make it look even nicer. This time around, you are going to edit the bottom two visuals in the report. You want to see the data in a summarized way so the table needs to become a matrix. Additionally, you want to show the amount by month in a bar chart.
- Change the table to a matrix.
- Go to the Format menu under the Visualizations pane and change the text size of the Row Headers and Column Headers to 18.
- Go to the Values section to change the font size in the rest of the columns to 18 as well.
- What is the budgeted amount for cell phones (using two decimal points)?

Sorting and more formatting

INTRODUCTION TO POWER BI



Sorting Data

- Sorting is a common method used for visualizing data in a form that makes it easier to comprehend the story the data is telling. It's your job to sort the months in the bar chart in the correct order, from January to December. This will make it easier to interpret the visual and look at amount changes over time.
- Close any open reports and open the 3_3_sorting_data.pbix report from the Exercises folder on the desktop.
- Go to the Data View to make sure that ShortMonth in the DimDate table is ordered by MonthNumber.
- Go back to the report and sort the columns in the Monthly Amount visual by month instead of amount.
- Sort the months in ascending order.
 - The three dots will also allow you to change the sorting to ascending.

Sorting Data

- Question: How is the sales amount evolving throughout the year?
 - There is a downwards trend.
 - There is an upwards trend.
 - The amount stays the same.

Using the slicer

- Let's apply some more advanced formatting to our report. You find that the slicer in the top right takes up a bit too much space in the report. There are a lot of categories and it would be better to not show them all but enable users to select from a dropdown menu instead.
- If you lost progress, close any open reports and load `3_4_using_the_slicer.pbix` from the Exercises folder on the desktop.
- Go to the formatting options and turn off the slicer header.
- Change the slicer to a dropdown box and make sure nothing is being selected.

Making it look good

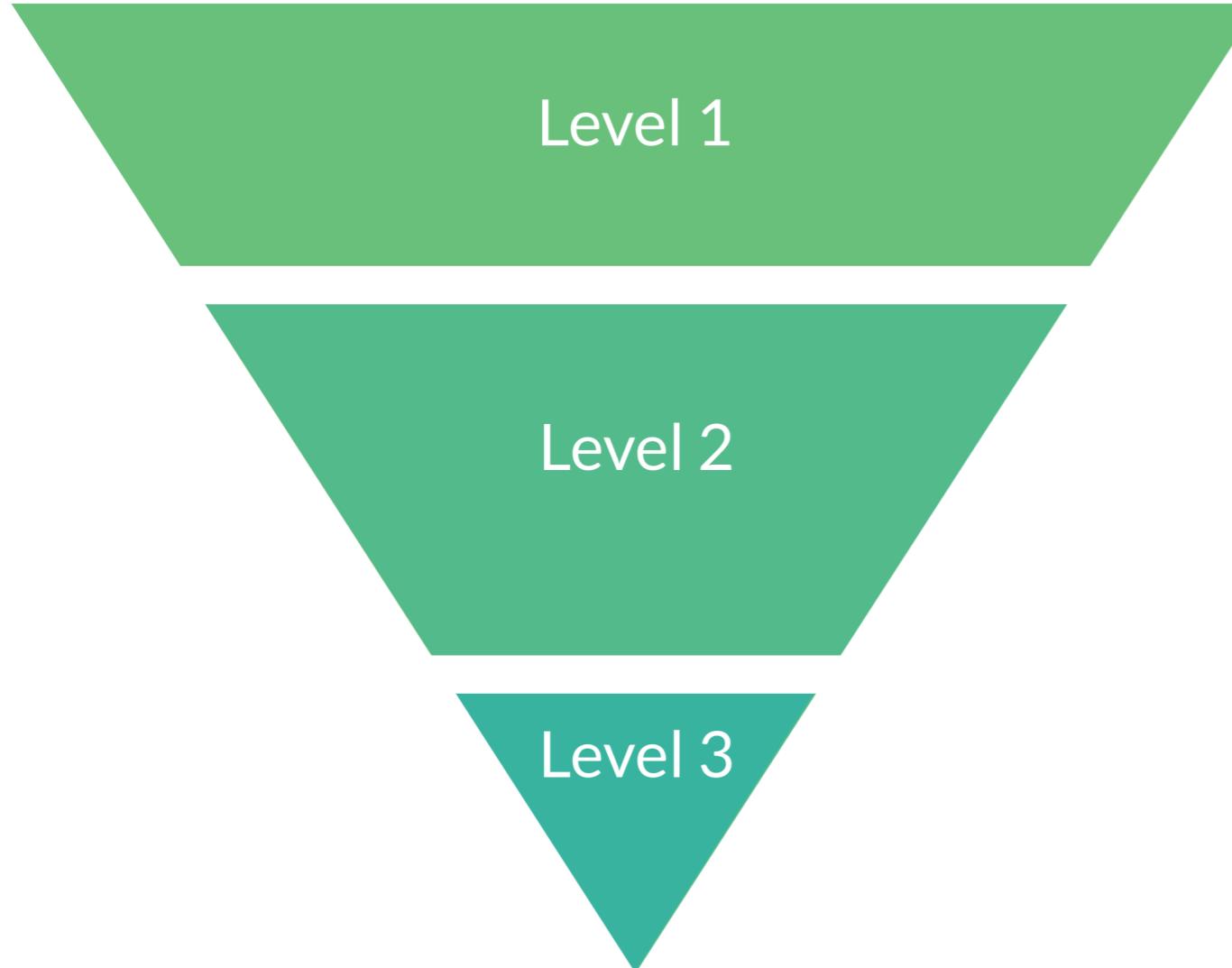
- Before your report is ready to share with other users, it's worth taking a final pass and making sure everything is looking great. In this exercise, you'll format the report by changing the background color and making sure every visual has an appropriate size.
- Change the theme of the report to the Sunset theme.
 - Go to the View tab on top to see the themes. Clicking on the little arrow next to the theme previews will expand the box and show you all the available themes.
 - Hover over the Power BI themes to see their names. Click on the Sunset theme to apply it to the report. Your bars should now be purple
- Adjust the height of the dropdown box to be the same as the multi-row card.

Drilling down and filtering

INTRODUCTION TO POWER BI



Drilling down



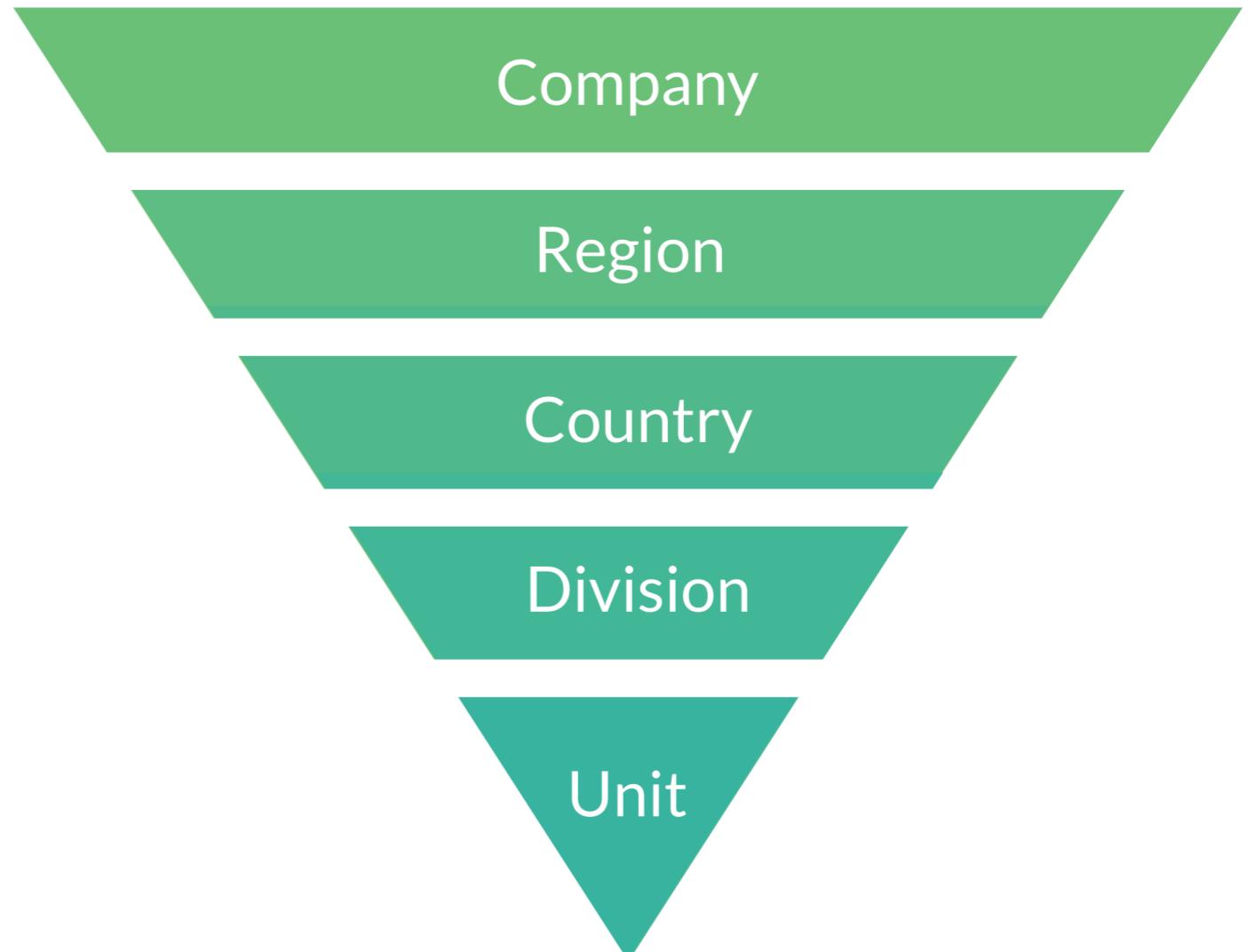
- Show data at a high level
- Option to show a more detailed level

Hierarchies

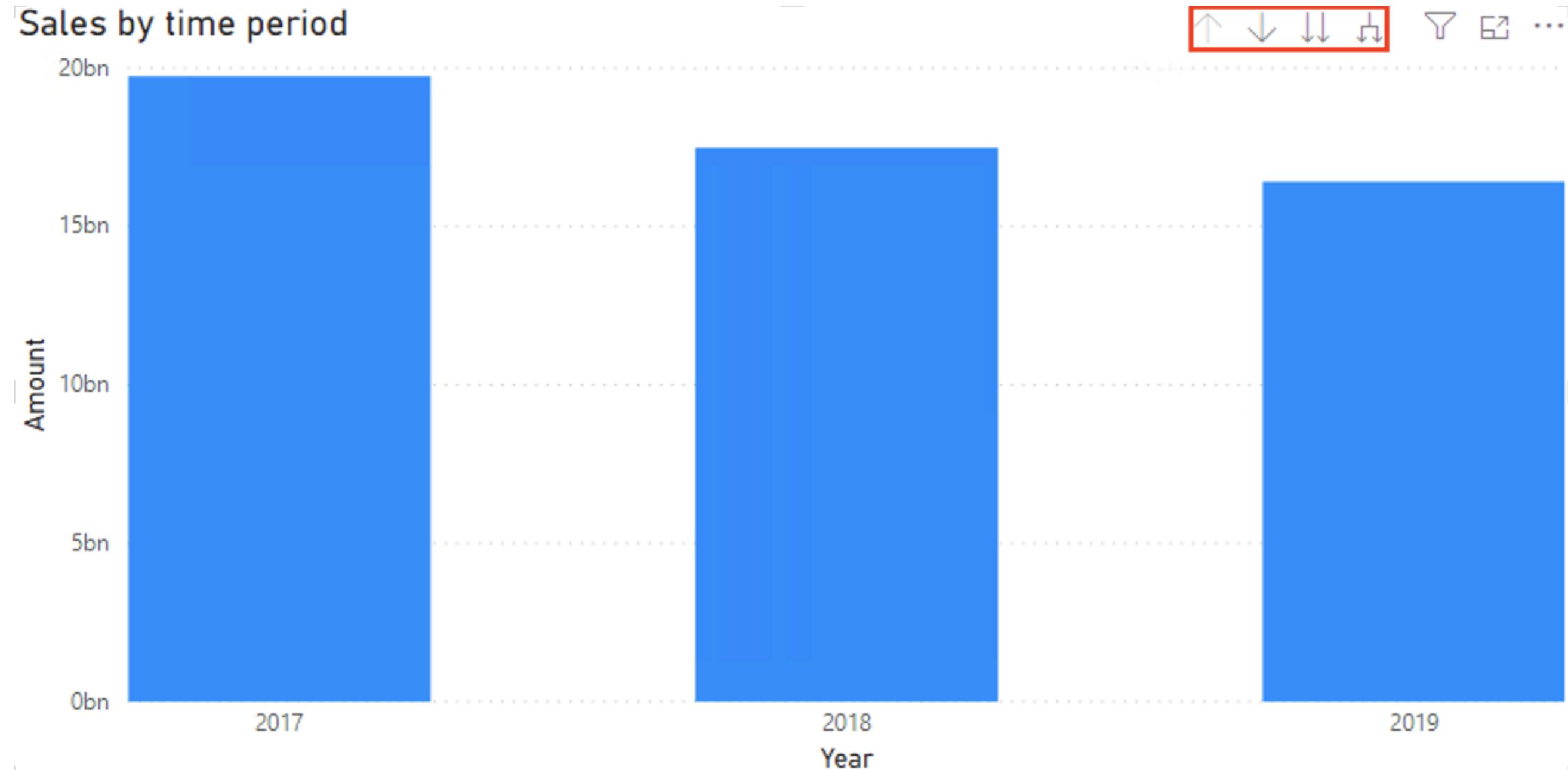
Example 1



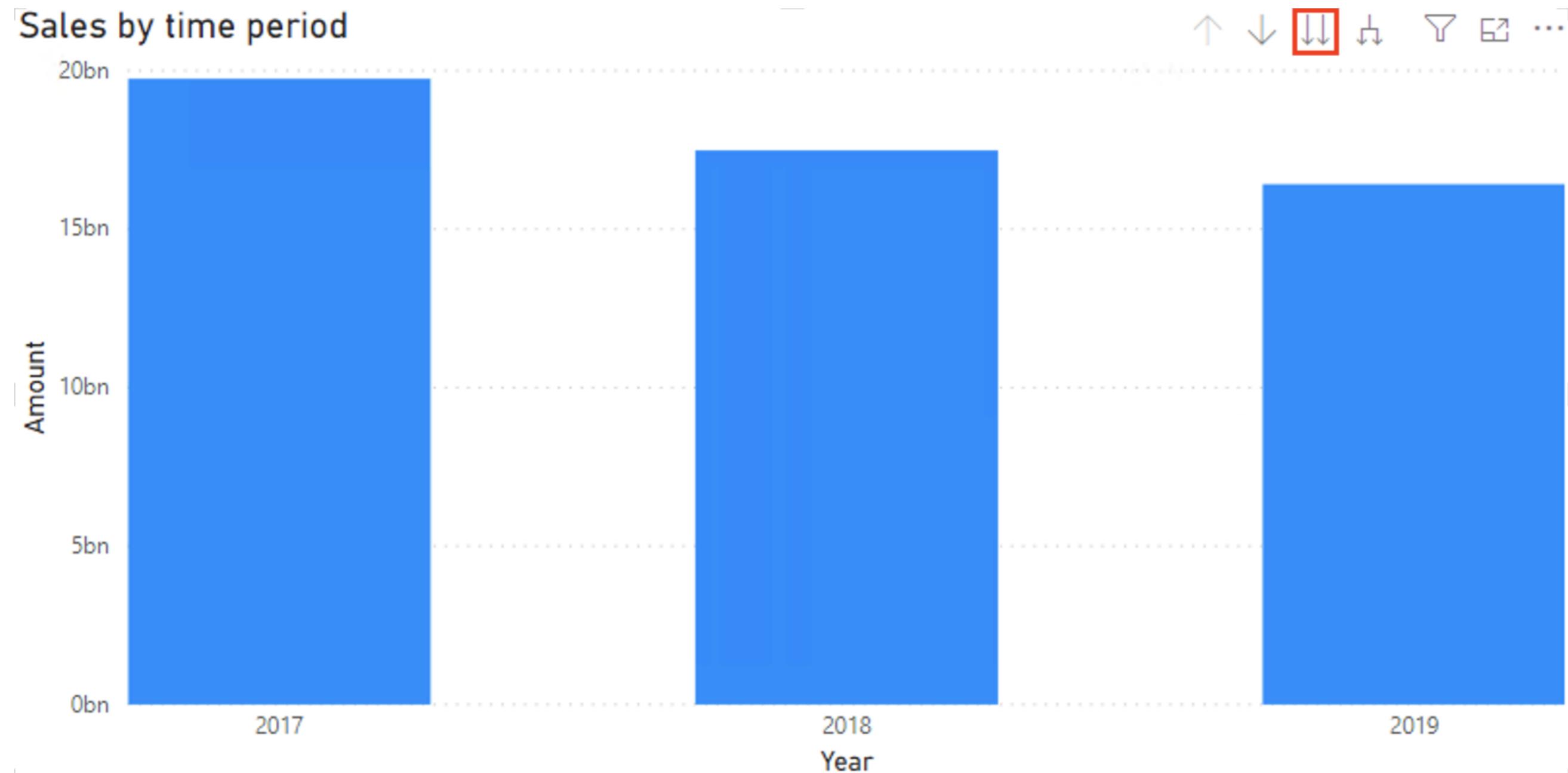
Example 2



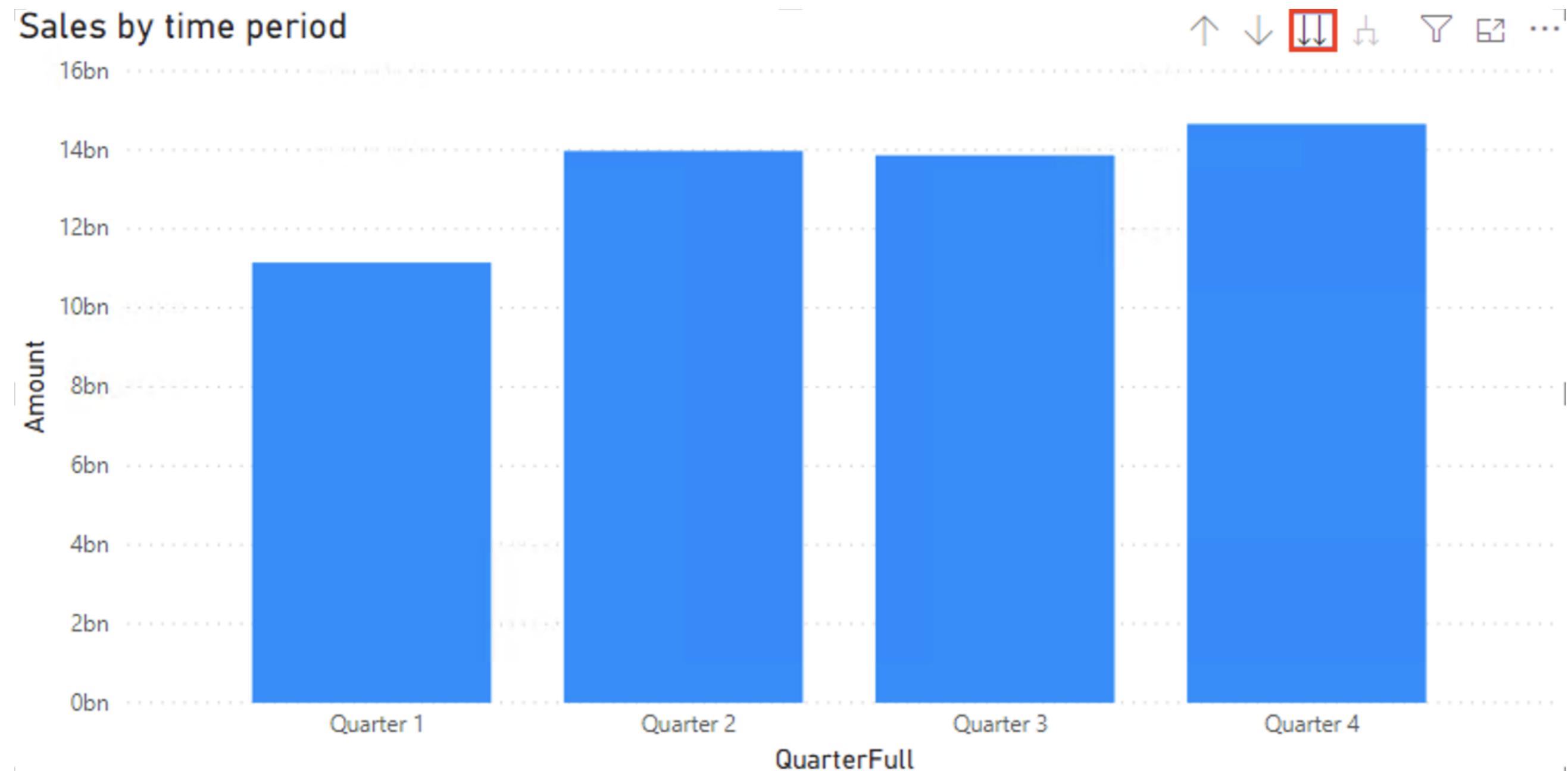
Drilling down on a visual



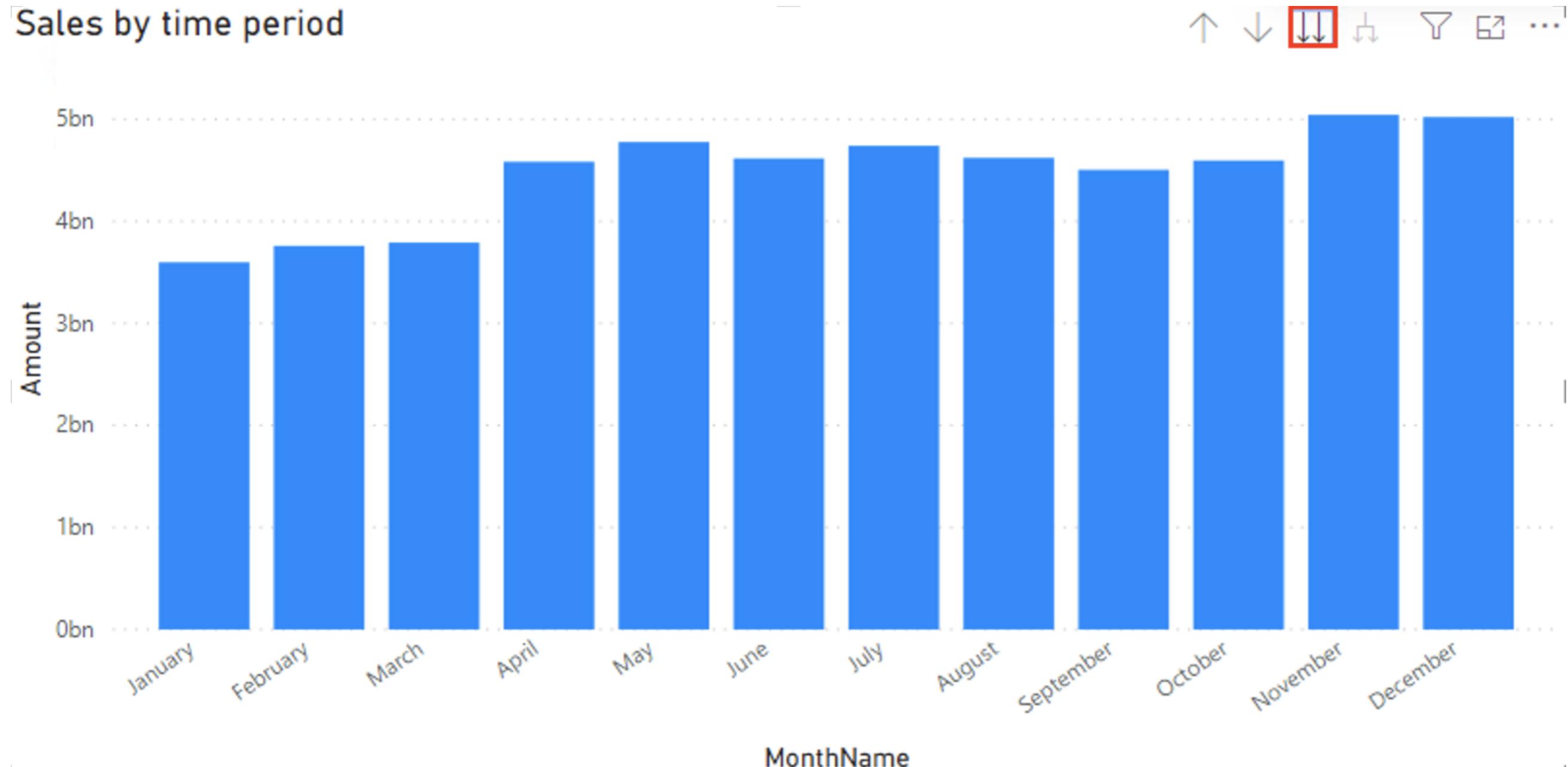
Drill down all fields at once



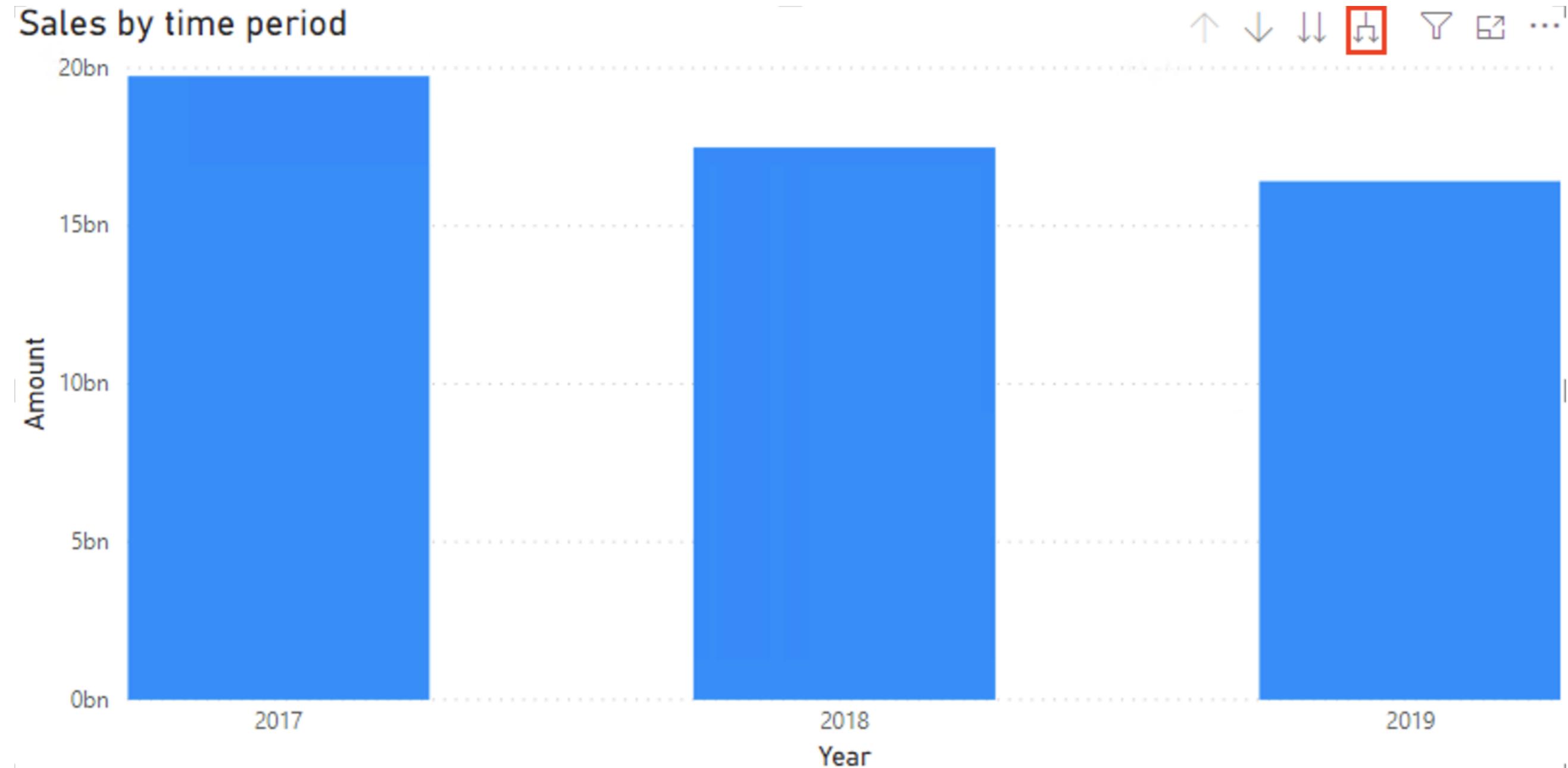
Drill down all fields at once



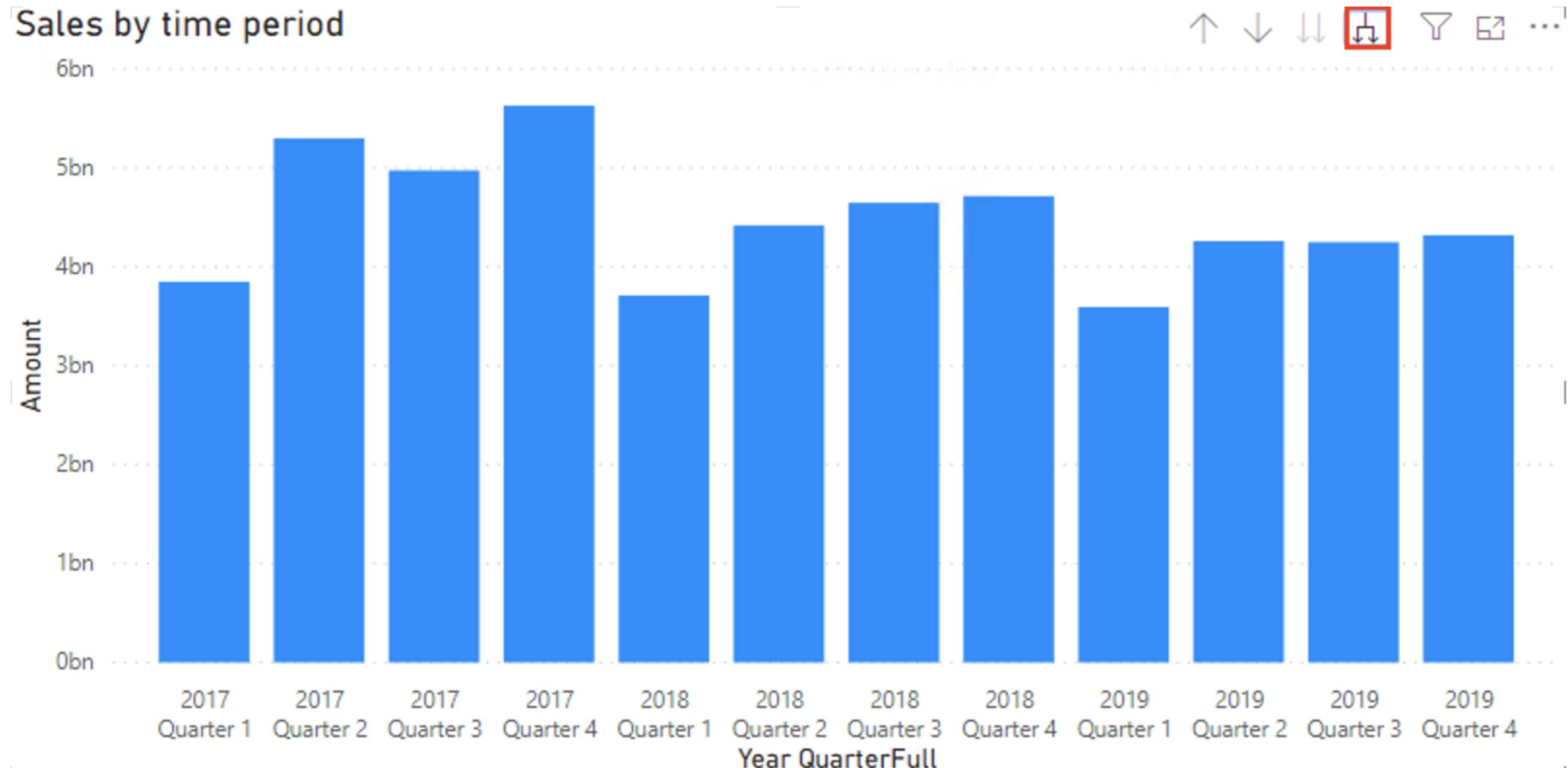
Drill down all fields at once



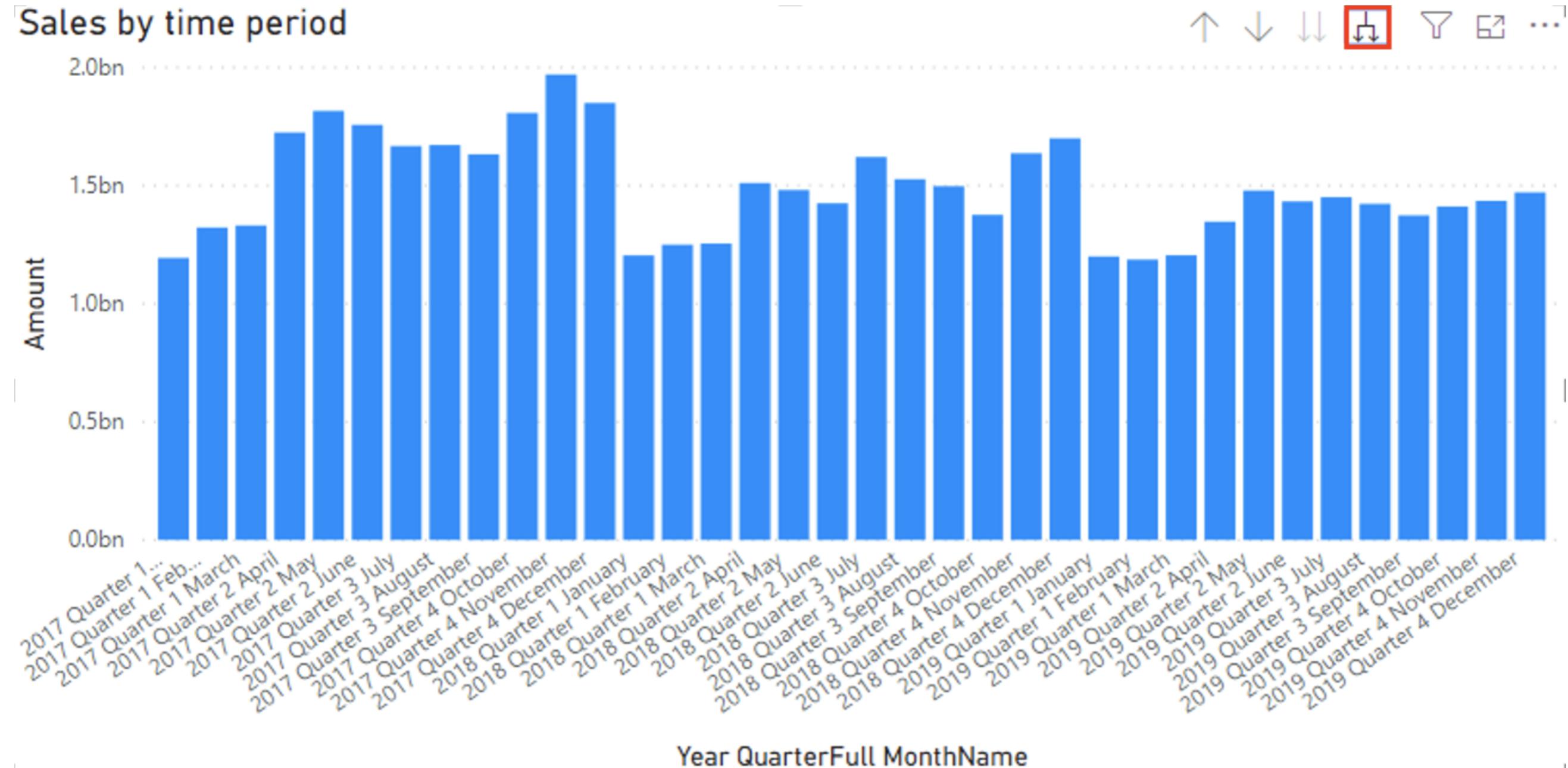
Expand all fields at once



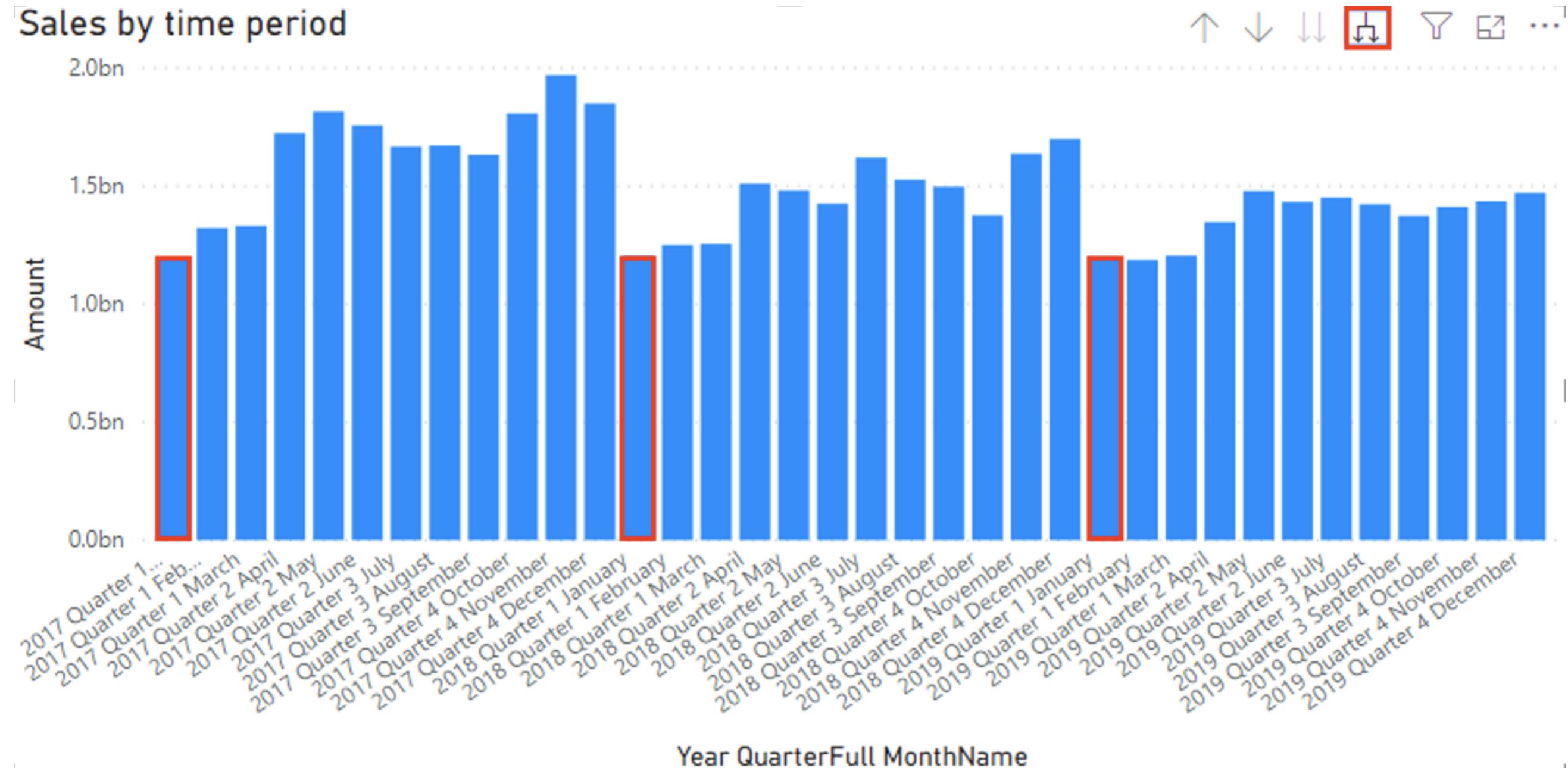
Expand all fields at once



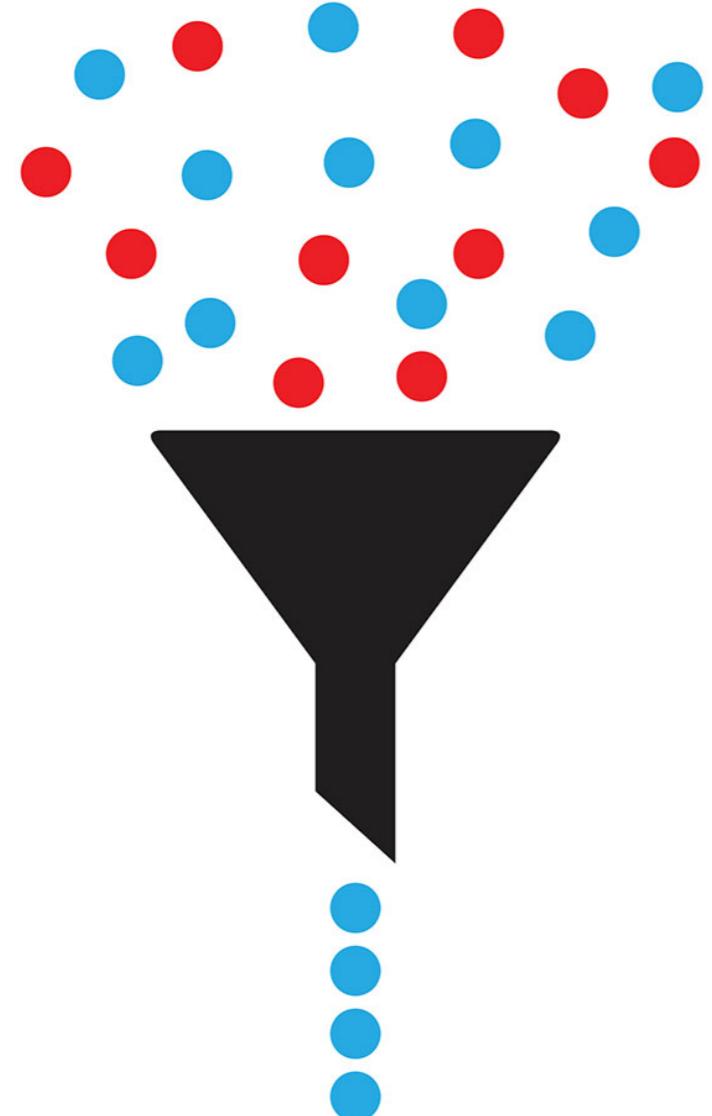
Expand all fields at once



Expand all fields at once



Filtering



- Display data based on some selected criteria
- Examples:
 - Filter on one year or one customer
 - Show the top 5 regions
- Types of filters in Power BI:
 - Visual-level filters
 - Page-level filters
 - Report-level filters

Turning off filtering

- Don't allow the end-user of your report to change the filters
- In Power BI: turning off interactions
 - Visual will not change when another field is selected

The underlying data and hierarchies

INTRODUCTION TO POWER BI



Looking at the data

- If you'd like to see the data that Power BI uses to create a visualization, you can display that data. You can even export the data as an .xlsx or .csv file so you can open it in Excel later. In this exercise, you'll look at the data and export it to a csv file that you will then open up with Windows' default text editor, Notepad. Notepad will open automatically if you double-click on any text file, like a .csv file.
- Close any open reports and open the `4_1_looking_at_the_data.pbix` report from the Exercises folder on the desktop.
- Select the clustered column chart.
- Display the underlying data.
 - Select the clustered column chart and click on the three dots on the top right hand corner of the visual to select Show as a table.

Looking at the data

- Export the data as a .csv file and save it on the desktop.
 - To export data, select the ellipse at the top right corner of the clustered column chart and then Export data.
 - Save the file as MonthlyAmount.csv and take a look at the file.
- Export the data as a .csv file and save it on the desktop.
- Open the .csv file with Notepad to look at the data.
- What is the last character in the csv file?

Creating a hierarchy

- Sometimes you want to drill down into a chart and see different levels of your data. With hierarchies, you can add this functionality to your Power BI reports. Let's create a date hierarchy that looks like this: Year-Quarter-Month-Day.
- Navigate to the DimDate table in the Data View.
- Create a hierarchy that starts with Year, goes on to the QuarterFull, then the MonthName, and ends with the DateKey.
- If the drag functionality isn't working, you can right-click DimDate's Year in the Fields pane and select "Create hierarchy". From there, you can right-click the necessary fields and select "Add to hierarchy".
 - In the Data View, select the DimDate table.
 - You can create a hierarchy by dragging QuarterFull on top of Year .
 - Do the same for MonthName and DateKey

Creating a hierarchy

- Rename the hierarchy to Date Hierarchy.
- In the column chart on the Report view, replace the ShortMonth Axis value of the column chart by the Date Hierarchy.
- Use the drill controls in the top right corner of the visual to explore the different levels.
Click the single down arrow to enable drill mode.
 - Click the single down arrow to turn on the drill mode.
 - When drill mode is enabled, you can click the bars in the chart to drill down one level.
 - The double down arrow goes to the next level of the hierarchy.
 - The double down arrow with a line expands all fields at once to the next level.
 - The single up arrow drills up again.
- Which quarter across all years had the highest amount (format example: Y2020 Q1)?

Filters

INTRODUCTION TO POWER BI



Adding a filter

- Filtering is an important tool when you're creating Power BI reports. You don't always want to look at all of the data. Limiting the data used in visuals to only a selection that is relevant can help you answer more detailed business questions.
- In the report, you can see that the cards on the Sales Analysis page tab are labeled Actual, Forecast, and Budget, but they all have the same values. You'll need to apply some filters to fix this.
- Close any open reports and open the `4_3_adding_a_filter.pbix` report from the Exercises folder on the desktop.
- Open the Filters pane.

Adding a filter

- Add a filter to the "Actual" card visual that filters on rows where ScenarioName is equal to Actual
 - You can expand the Filters pane by clicking on the arrow pointing to the left right next to the report title "Sales Analysis".
 - To modify the filtering of a visual:
 - Select the visual.
 - Drag the field ScenarioName of the
 - DimScenario table to the Filters on this visual section.
 - Click on the required check box.
- Add a filter to the "Forecast" card visual that filters on rows where ScenarioName is equal to Forecast.
- Add a filter to the "Budget" card visual that filters on rows where ScenarioName is equal to Budget.
- What was the total forecasted amount?

Turning off interactions

- By default, visualizations on a report page can be used to cross-filter the other visualizations on the page. Sometimes, you want to disable this functionality and keep a chart static regardless of what selections have been made elsewhere in the report. Let's turn off those interactions! Note that you might have to temporarily move a visual to be able to see the circle with the line through it.
- In this report, we want to make sure the Actual, Forecast, and Budget cards don't change when other elements are selected.
- If you lost progress, close any open reports and load `4_4_turning_off_interactions.pbix` from the Exercises folder on the desktop.

Turning off interactions

- Select the "Budget Product Sold" visual.
- Go into the interaction editing mode in the Format tab at the top of the screen.
 - You can enable the interaction editing mode by clicking on the icon labeled Edit Interactions in the Format tab.
- Turn off interactions with each of the three cards.
 - For each of the three cards, select the icon that shows a circle with the line through it to turn off the interaction. It will turn black.
 - Don't forget you need to select the relevant column chart first before starting to edit the interactions for it
- Exit the interaction editing mode.
- Select the "TV and Video" bar in the "Budget Product Sold" chart. What is the value of the Budget card? (format example: 11.11bn)

Applying advanced filtering

- Let's take our filter skills up a notch! You want to find out what the five best performing stores are in terms of sales amount. To do this you'll create a new bar chart that displays only those stores. After that, you'll use some of your formatting skills from earlier in the chapter to improve your visual.
- Remove the "Budgeted Monthly Amount" chart to make room.
- Add a clustered bar chart to the report, with the EntityName on the Y-axis and the Amount as X-axis.
- Go to the filter pane and add a Top N filter on EntityName and Show only the top five stores.
 - To filter on the top N, click on EntityName in the filter pane, change the filter type to Top N.
 - To show only the top five, you need to type "5" in the Show items box.
 - The value you want to filter by is Amount , so you'll need to drag it to the By value section in the Filters panel.
 - Don't forget to click Apply filter

Applying advanced filtering

- Change the title of the visual to Top 5 Stores by Sales .
 - To change the title you need to access the formating options, which you can access by clicking the paint roller in the Visualizations pane
- Try to sort the columns in ascending order. Does it make sense visually?
 - Sorting can be done when clicking the three dots in the right hand corner of a visual.
- What is the name of the 5th best performing
 - Contoso store?
 - Contoso Catalog Store
 - Contoso North America Online Store
 - Contoso Asia Online Store
 - Contoso North America Reseller

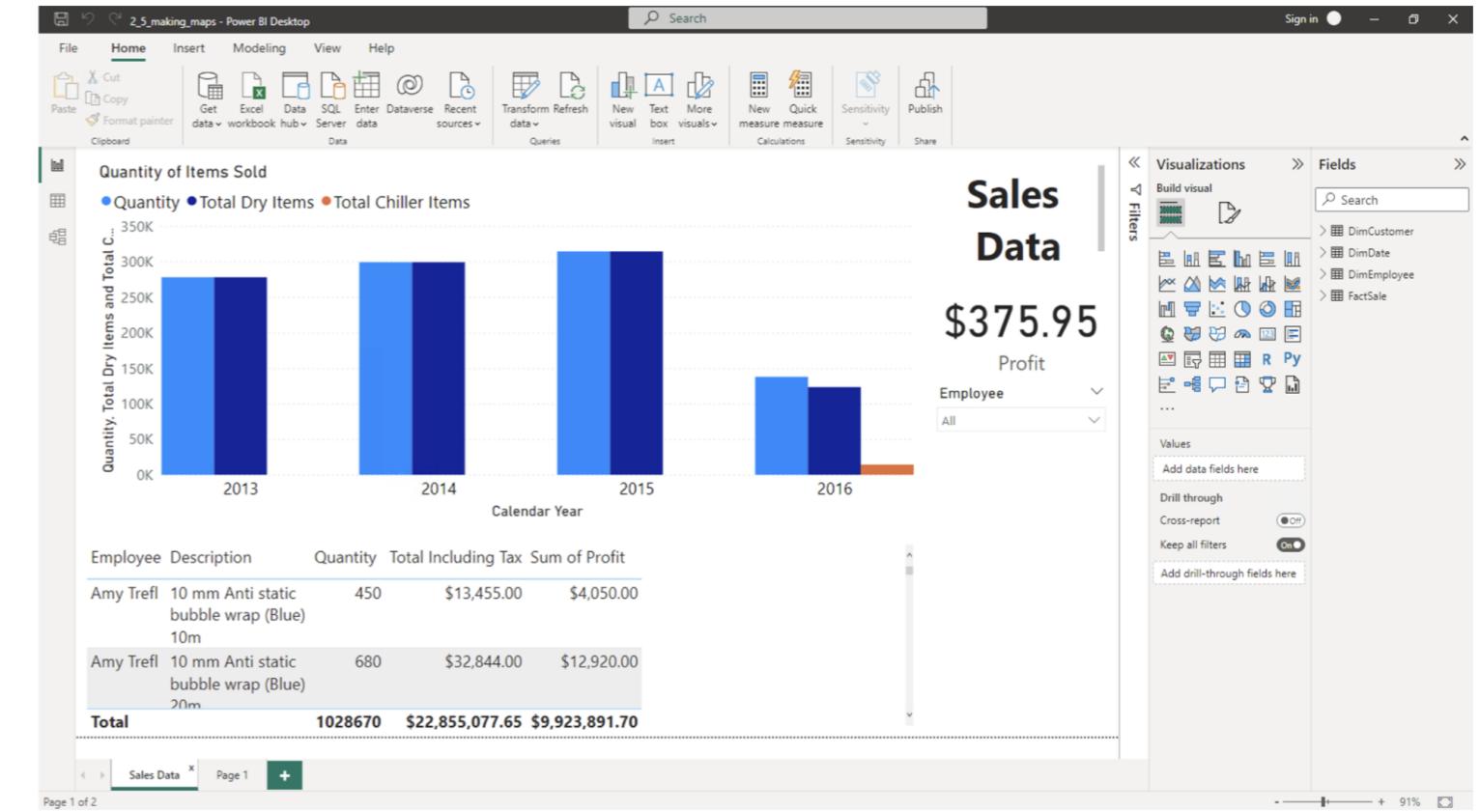
Congratulations!

INTRODUCTION TO POWER BI



Getting Started with Power BI

- Data, Model, and Report view
- Loading multiple datasets
- Building a data model
- First interactive report
- Power Query Editor



Visualizing data

- Different types of visualization
- Hierarchies
- Drill-down paths
- Sorting
- Filtering
- Controlling interactivity

