1.1. Exercise: Create a sales report

Introduction

Sales reports are critical tools for business owners, stakeholders, and decision-makers. They provide essential insights into how a company's products or services are performing in the market—guiding decisions and shaping future strategies. In this exercise, you'll explore how you can use Power BI's data visualization capabilities to create an interactive sales report.

Case study

As the data analyst at Adventure Works, creating sales reports is critical to your role. By analyzing sales performance, you can help the company identify trends and areas for improvement, assess business performance and progress toward goals, plan and allocate resources, and ultimately make data-driven decisions. Say the sales department requests a sales report demonstrating Adventure Works' sales revenue over time. The sales dataset you'll use for the report consists of rows representing a transaction with various data points, such as Product Category, Product Name, Order Date, and Total Sales.

Instructions

Download and open the Power BI file, *Create a sales report*.

Note: If your data import was successful, the Fields pane on the right side of the screen should list the Adventure Works sales data columns like Order Date, Order Total, and Product Category. The Fields pane lists all your data columns from the imported datasets. With your data imported successfully, follow the prompts below to complete the exercise.

Step 1: Create a line chart for sales revenue over time

1. First, select the Sales Revenue over Time page.
2. Navigate to the Visualizations pane to create a simple line chart to visualize Adventure Works' sales revenue over time. The pane is on the right side of your screen, marked by an icon resembling a bar graph.
3. Once in the Visualizations pane, find and select the Line Chart icon represented by a jagged line ascending across a grid to create a standard line chart. An empty chart should appear in the center of your Power BI canvas.

4. To populate the empty chart with data, you'll need to drag and drop the relevant fields into the appropriate chart areas. To do this, find Order Date > Month in the Fields pane. Drag it across to the X-Axis field well under the Visualizations pane.
5. Similarly, find Order Total in the Fields pane. Drag it to the Y-Axis field well. When the Y-Axis highlights, drop Order Total into it.

By completing the above steps, your line chart will display the total sales over time. Note: You can adjust the chart's size by clicking and dragging its edges.

Step 2: Create a pie chart for sales by product category

Next, let's create a pie chart visualizing sales by product category, a valuable tool for Adventure Works to understand the contribution of each product category to its total sales.

1. Begin by selecting the Sales by Product Category page.
2. Select the Pie chart icon in the Visualizations pane to start creating your pie chart. A blank pie chart box should appear in your report canvas.
3. To add data to your pie chart, locate the Product Category field in your sales dataset. Then, select and hold the Product Category field, and drag it over to the Legend box.
4. Next, locate the Order Total field, then select and drag it over the Values box. Note: The Order Total field represents each order's total sales amount in monetary value (USD). Power BI automatically sums up the order totals for each product category you visualize.

At this point, you should have created your pie chart. Hovering over each slice will display a tooltip with the exact sales figure.

Step 3: Create a stacked bar chart as sales by day of the week

Visualizing sales by day of the week complements the broader picture of sales revenue over time as it facilitates more precise, data-driven decision-making to enhance business performance. To create a bar chart for this analysis:

1. Select the Sales by Day of Week page.
2. Navigate to the Visualizations pane on the right side of the screen. Select the Stacked bar chart icon. A blank bar chart box will appear on your report canvas.
3. To add data to your bar chart, find the Order Day of Week field in the sales dataset and drag it to the Y-Axis field well.
4. Next, locate the Order Total field and drag it to the X-Axis field well.

After completing these steps, you should have a bar chart representing the sales by day of the week, where the bar height corresponds to the total sales for that day.

Step 4: Add a slicer visual to alter the data to reflect changes

Slicers can provide Adventure Works with a way to filter data interactively, enabling stakeholders to select one or more items and filter the rest of the visuals in the report accordingly. To create a slicer:

1. Select the Sales by Day of Week page.
2. Navigate to the Visualizations pane on the right side of the screen. Select the Slicer icon. An empty slicer box will appear on your report canvas.
3. To add data to your slicer, find the Order Date field in the Sales dataset and drag it to the Field well.

Conclusion

As a data analyst, insights gained from the sales reports you create in Power BI can guide a company's direction, shape its future strategies, and play a crucial role in its success. Your work is not just about extracting information from datasets but leading companies like Adventure Works to growth and success.

Exemplar: Create a sales report

Introduction

In the exercise *Create a sales report*, you were tasked with creating a sales report for Adventure Works, providing the company with insights into its business performance. Specifically, you were asked to:

- Create a line chart to track sales revenue over time, enabling Adventure Works to identify sales peaks, trends, and patterns.
- Visualize the contribution of each product category to total sales using a pie chart.
- Produce a bar chart demonstrating sales by day of the week, reflecting customer buying patterns.

This reading is a guide you can use to compare your work. Your answers may differ from the example answers provided but still be correct.

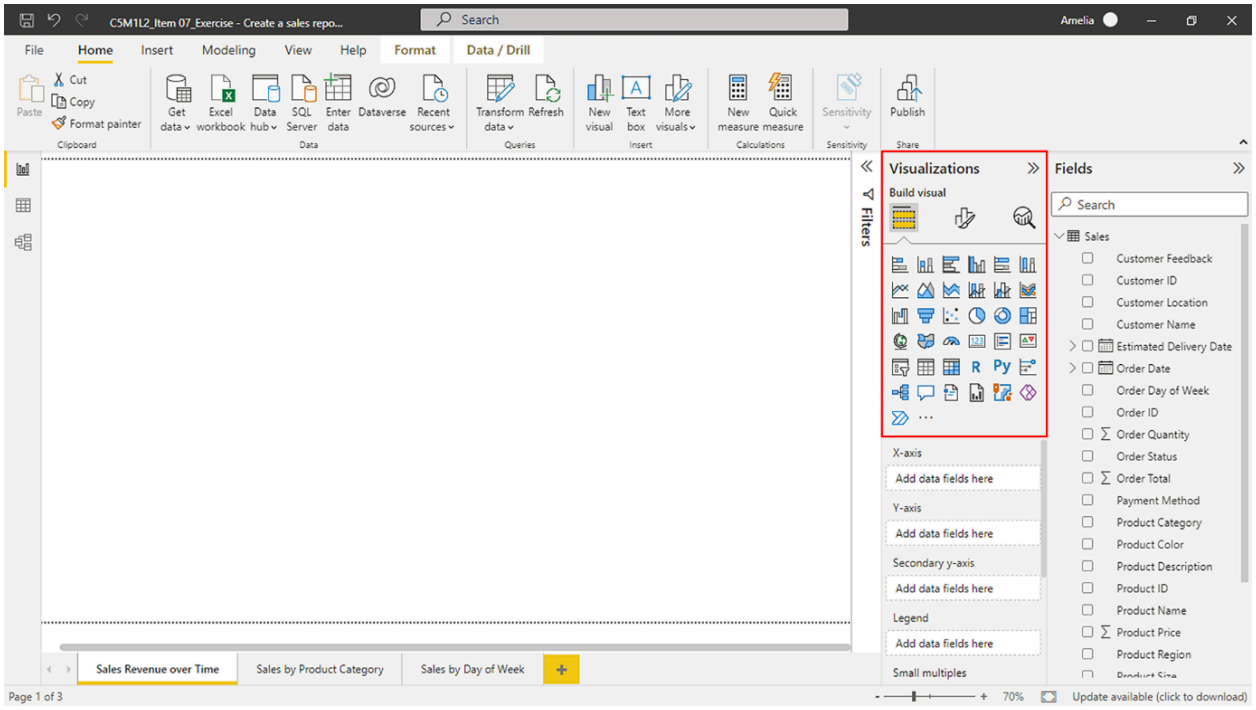
Power BI Desktop user interface

In this exercise, you created visualizations using Power BI Desktop. Power BI Desktop is updated and released monthly, incorporating customer feedback and new features. You might experience changes in the Power BI Desktop User Interface (UI) that have taken place after the development of this training content. As a result, the screenshots in the videos, readings, or exercises, including the current reading, might not align exactly with how you experience the UI. However, please note that these changes do not impact the functionalities of the UI. Hence, you can still perform all the steps shown in that video, reading, or exercise.

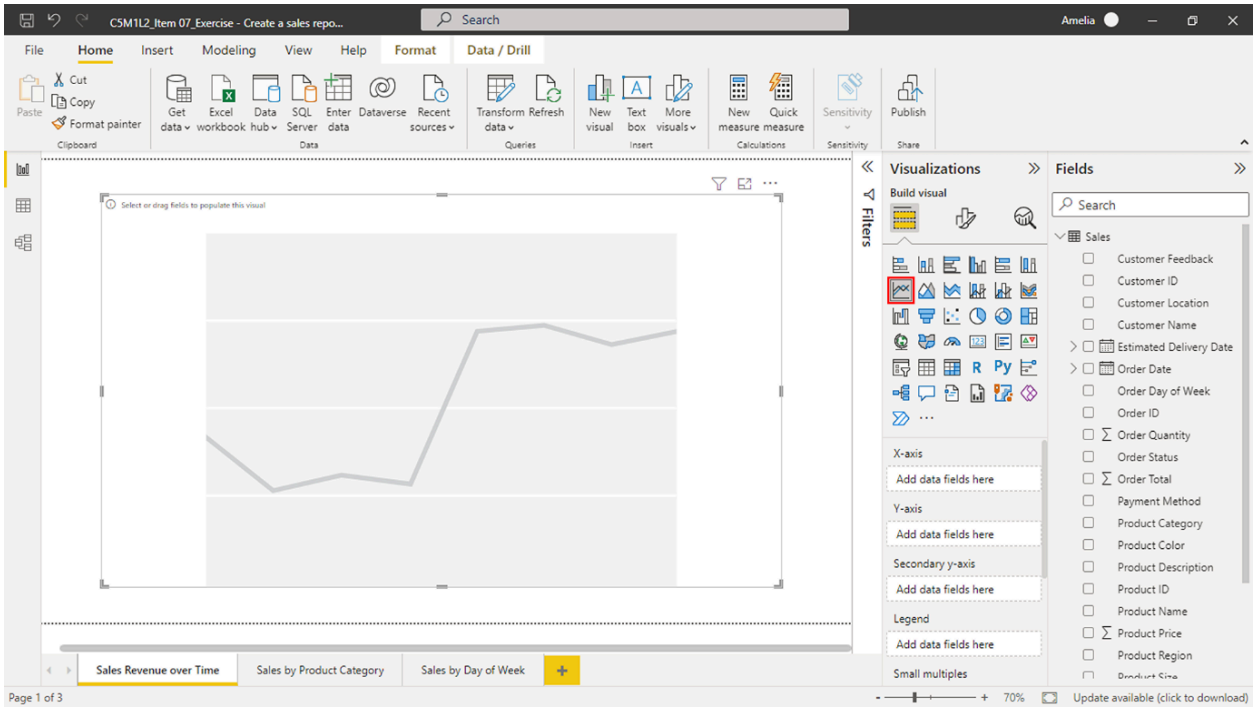
Create a sales report

Step 1: Create a line chart for sales revenue over time

1. First, select the Sales Revenue over Time page.
2. To create a line chart (a helpful visualization for depicting changes over time, allowing for clear visualization of trends, fluctuations, and patterns), navigate to the Visualizations pane.

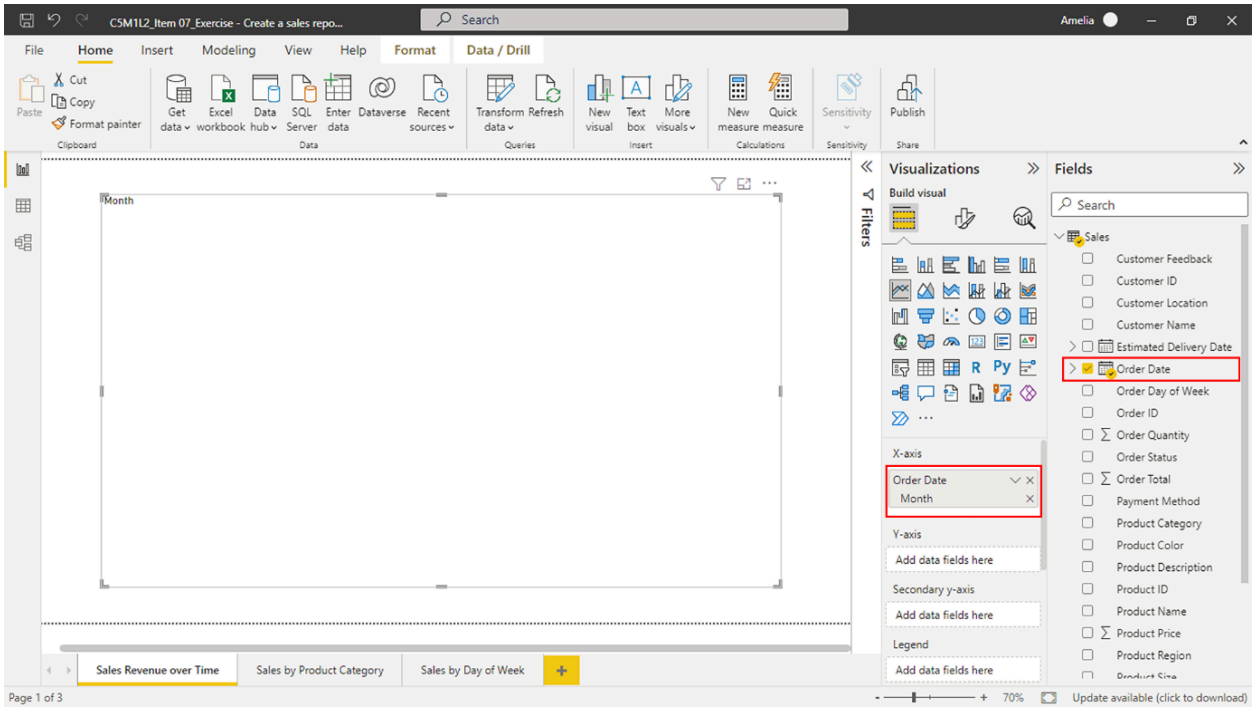


1. Select the Line chart icon. An empty chart should appear in the center of your Power BI canvas.

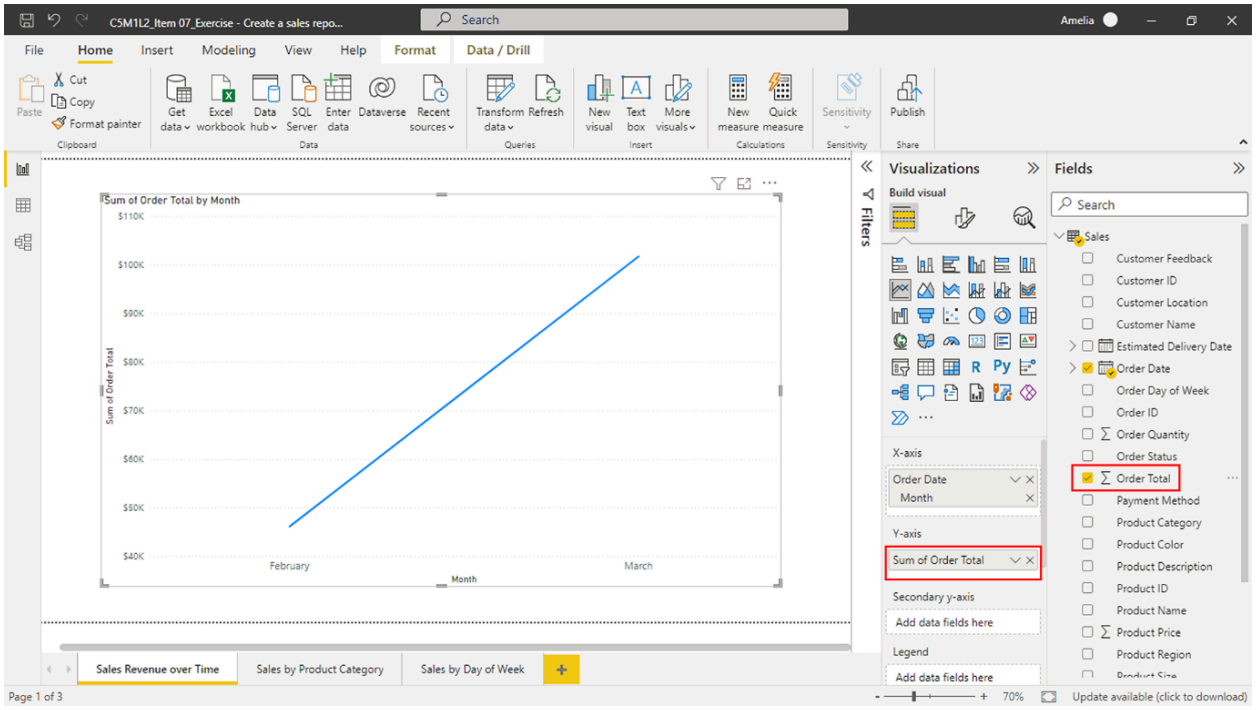


1. To start populating this chart with data (by dragging and dropping the relevant fields into the appropriate chart areas), select, hold, and drag the Order Date >

Month field across to the X-Axis field well under the Visualizations pane. Note: Order Date will populate the X-Axis area when you release the mouse button. Assigning Order Date > Month to the X-Axis sets the foundation of your time series analysis. In other words, it defines the time frame for sales data analysis.



1. Next, locate Order Total in the Fields pane. Select it and drag it to the Y-axis field well. This action will define the Y-Axis of your line chart, representing the total sales.

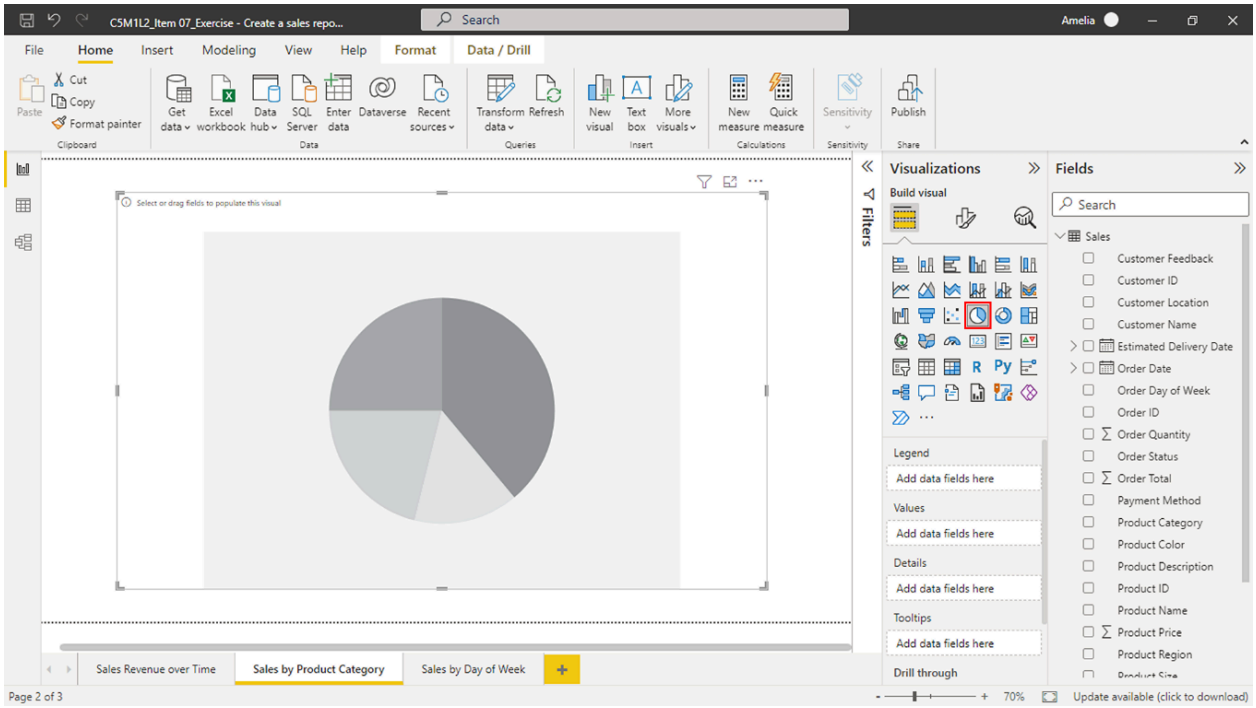


Your line chart now visualizes total sales over time. The Order Date field allows for tracking sales trends across different periods, while the Order Total quantifies the total sales for each date. You can change the chart's size by clicking and dragging its edges.

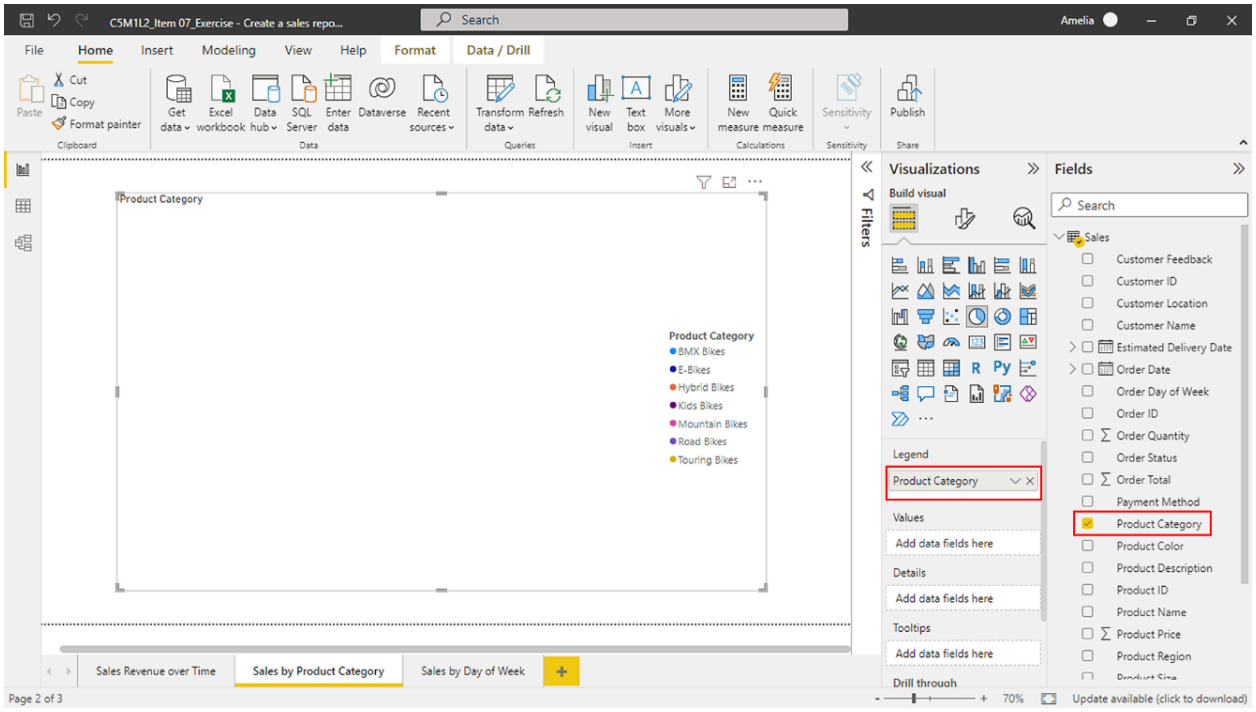
Step 2: Create a pie chart for sales by product category

Your next instruction was to create a pie chart, a circular statistical graphic divided into slices to illustrate numerical distribution. The aim is to create a pie chart of sales by product category to visualize each product category's contribution to total sales for Adventure Works. Combined with the line chart showing sales revenue over time, it gives a comprehensive view of the sales performance, allowing decision-makers to see the “when” and the “what” of sales revenue.

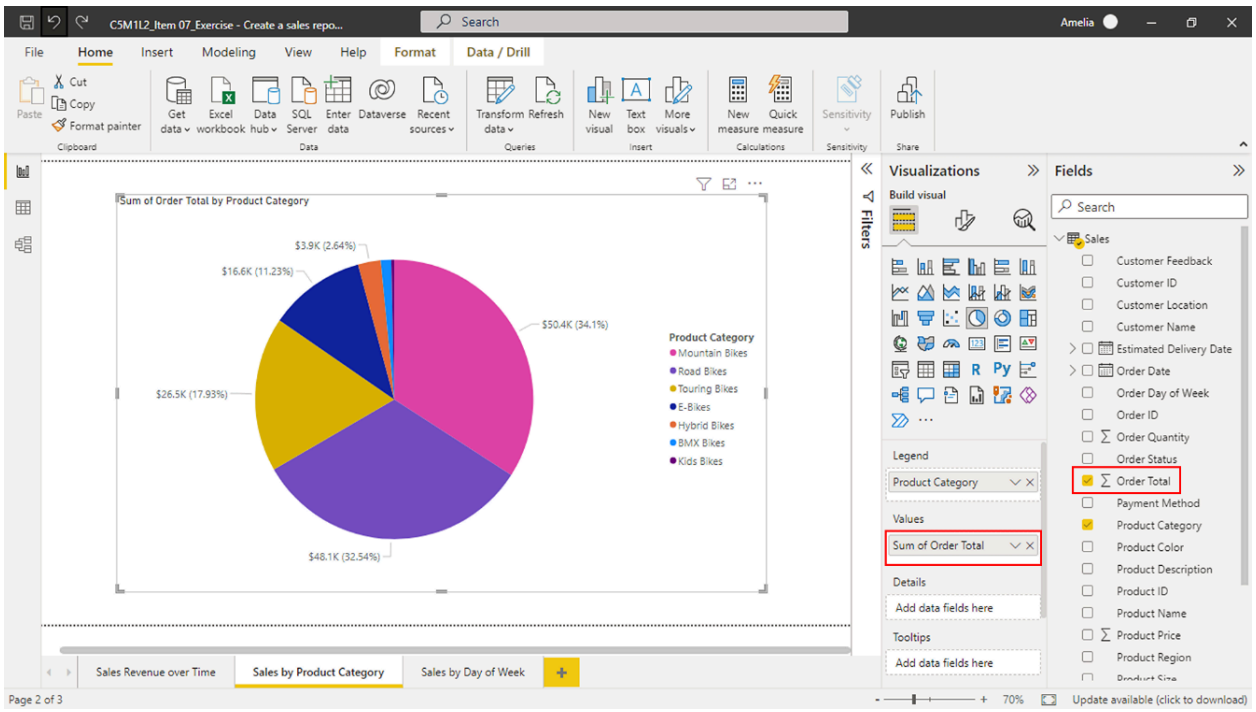
1. Begin by selecting the Sales by Product Category page.
2. To create a pie chart, move to the Visualizations pane and select the Pie chart icon. A blank pie chart box will appear in your report canvas.



1. The next step is to add data to your pie chart. Select the Product Category field in the Adventure Works sales dataset, hold down the mouse button, and then drag the field over to the Legend box under the Visualizations pane. Note: The Legend box represents the categories in your pie chart, with each category assigned a different color in your chart for easy distinction. Adding the Product Category field to the Legend box tells Power BI that you want to show sales data for each product category in your pie chart.



1. Next, find the Order Total field, which represents the total sales for each order. Select Order Total and then drag it over to the Values box. Note: The Values box defines what the pie chart measures. In this case, it's the total sales for each product category. By adding Order Total to the Values box, you set the pie chart to display the proportion of total sales represented by each product category.

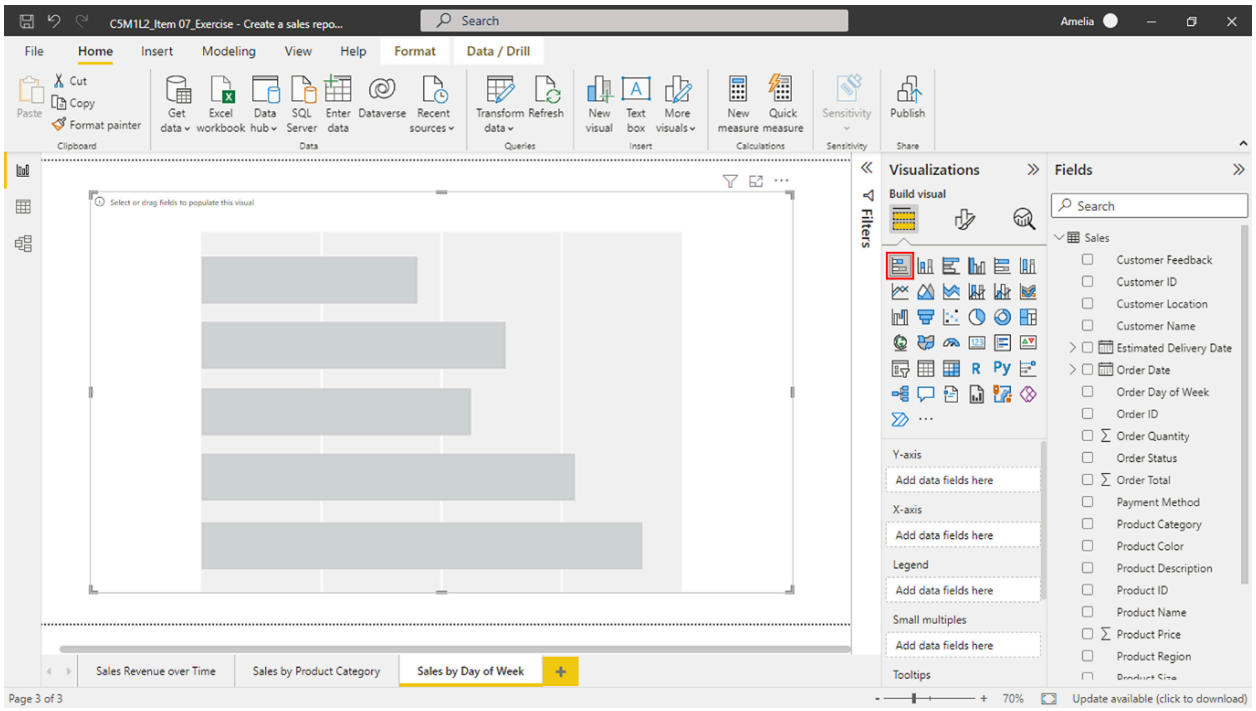


By completing these steps, your pie chart will come to life on your report canvas. Each slice of the pie represents a different product category, and their sizes correspond to the total sales for that category. Viewers can hover over each slice to display a tooltip with the exact sales figure.

Step 3: Create a stacked bar chart for sales by day of the week

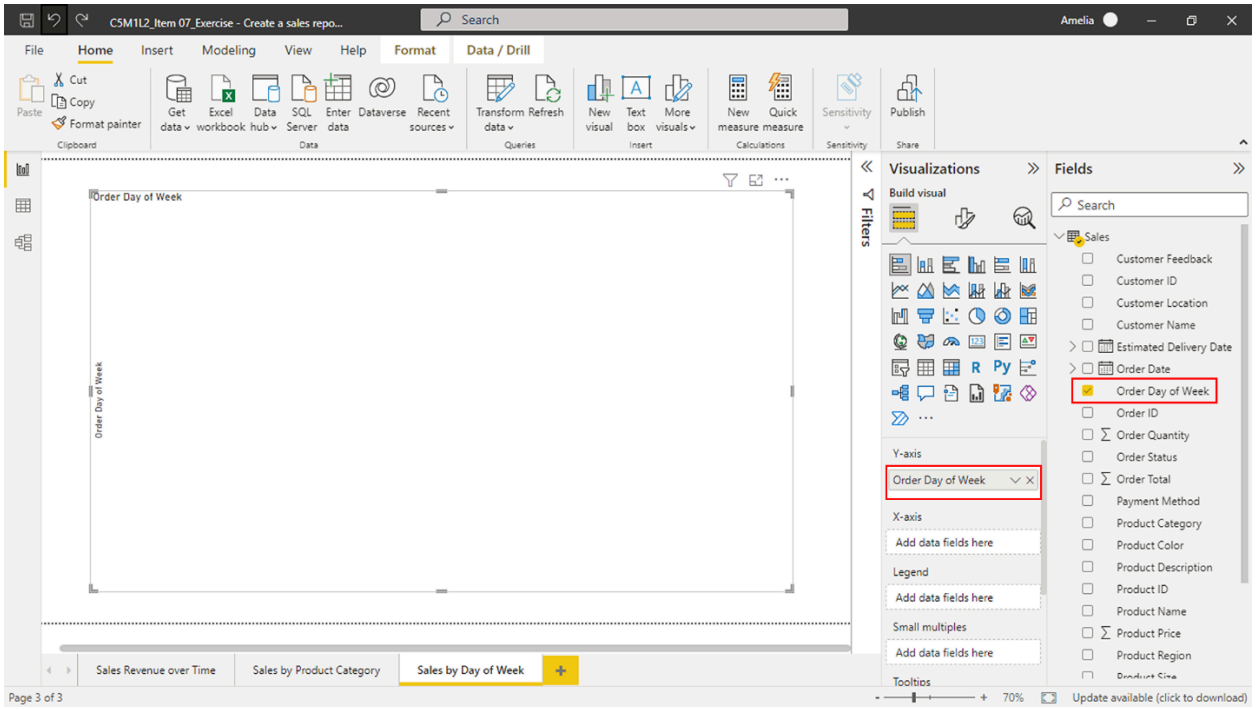
Now you need to create a stacked bar chart that visualizes sales by the day of the week. Understanding product sales by day of the week can help Adventure Works identify customer buying patterns and adjust inventory, marketing, and sales strategies accordingly. For example, if sales of bikes are high on a Monday, the company might want to increase its stock based on the increased demand.

1. Select the Sales by Day of Week page.
2. To create a blank bar chart for this analysis, navigate to the Visualizations pane and select the Stacked bar chart icon. An empty bar chart box should now be on your report canvas. Tip: The Stacked bar chart is best suited for comparing different categories of a variable (in this case, days of the week) against a numerical value (total sales).

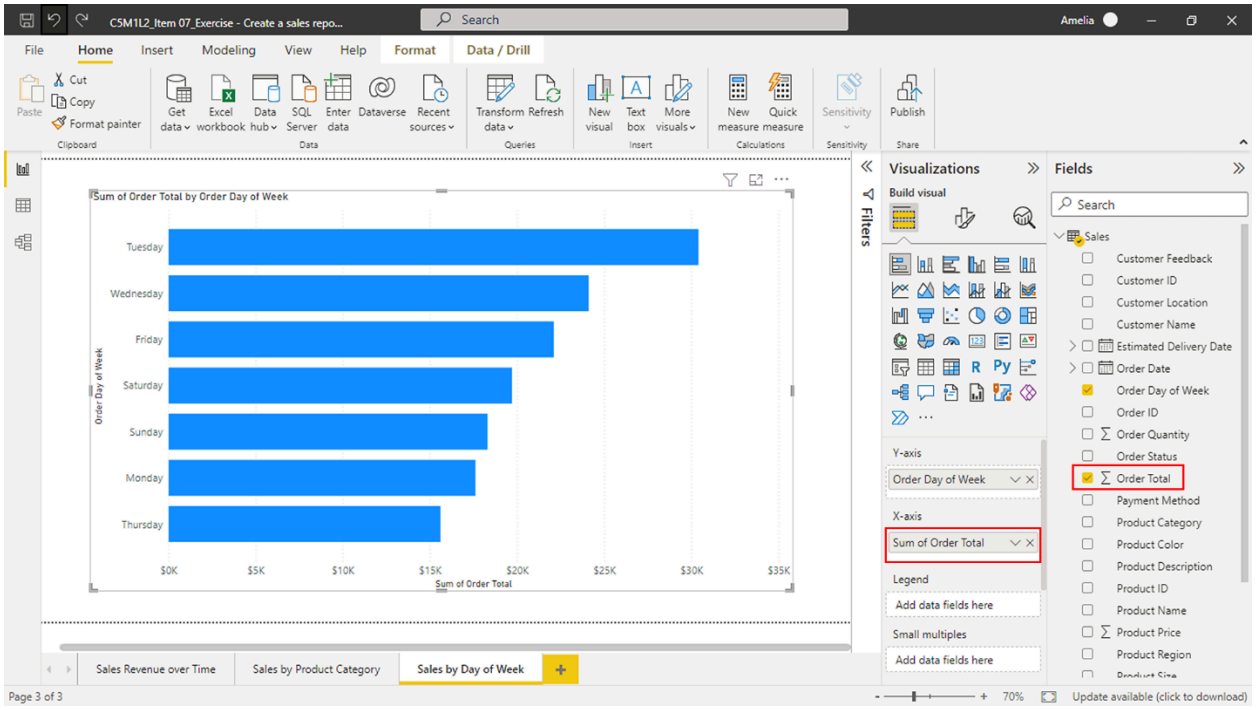


1. Select the Order Day of Week field and drag it to the Y-axis box to add data to your bar chart. Note: This field can reveal sales trends by capturing the day of

the week each order was placed. For example, Adventure Works may find that most orders are placed on a specific day.



1. Next, select and drag the Order Total field to the X-axis box. This action tells Power BI to populate the bars of your chart with the total sales values.

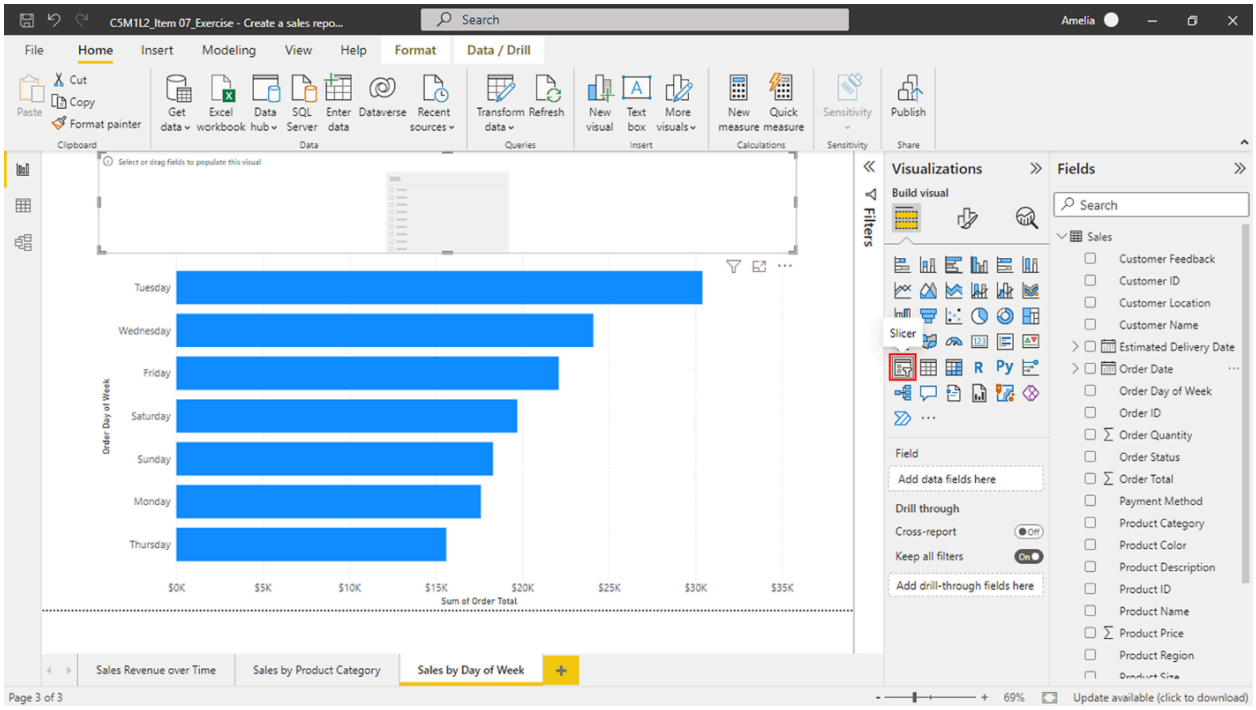


These steps should fully populate your stacked bar chart. Each bar represents a different day of the week, and the height of each bar signifies the total sales made on that day.

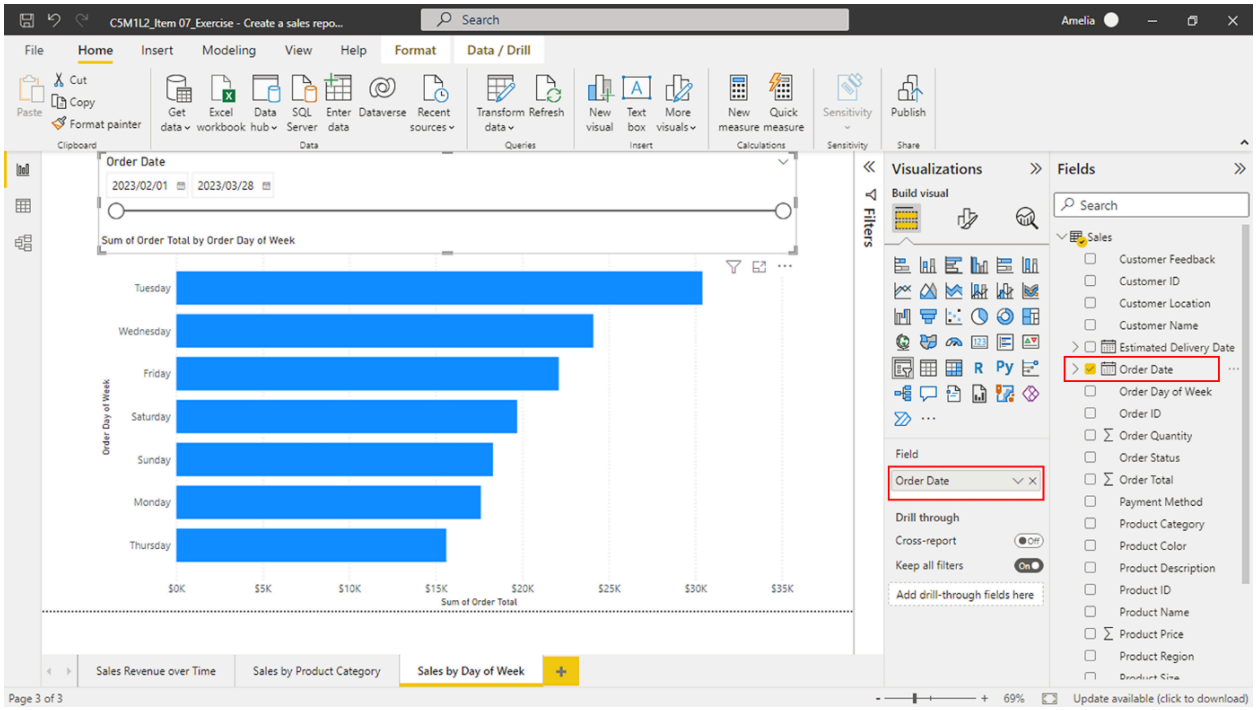
Step 4: Add a slicer visual to alter the data to reflect changes

Slicers can provide Adventure Works with a way to filter data interactively, enabling stakeholders to select one or more items and filter the rest of the visuals in the report accordingly. For instance, adding a slicer for Order Date would allow viewers to filter all visuals to display data from a specific time range. This could be invaluable for time-bound sales analysis—such as month-end sales, quarterly performance, or year-over-year trends—which are crucial for strategic planning and decision-making.

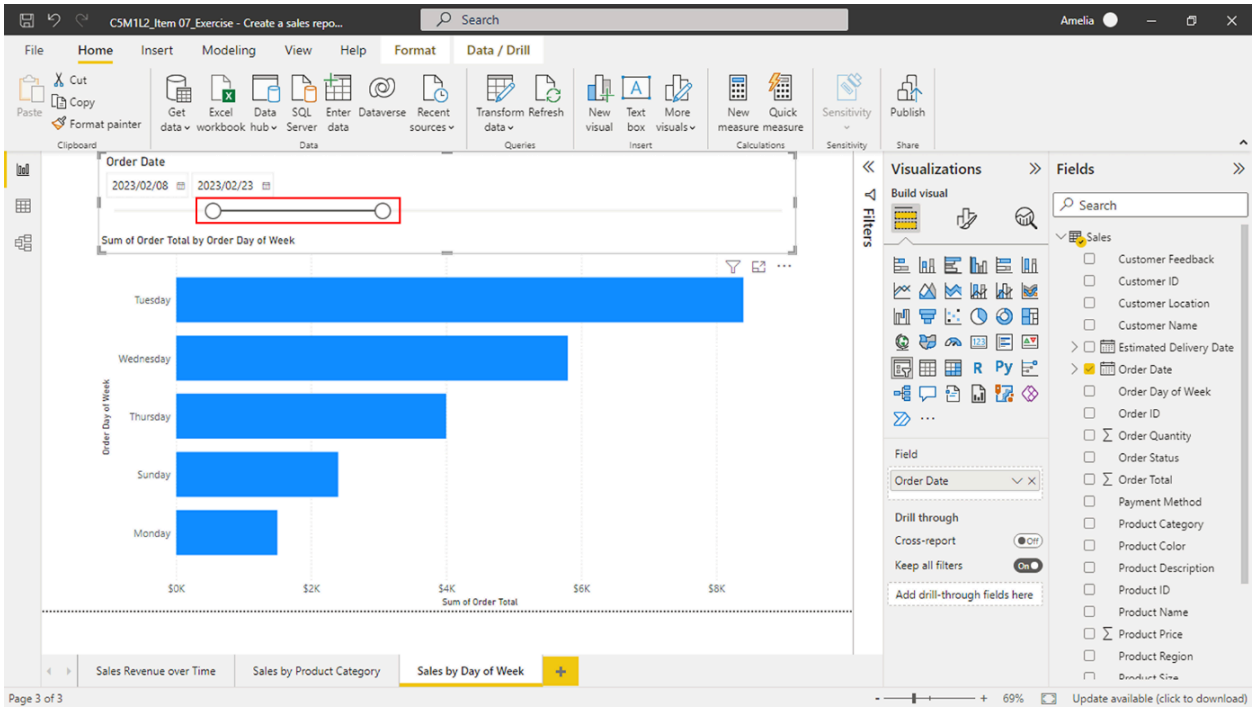
1. In the Visualizations pane, select the Slicer icon to add an empty slicer box to your report canvas.



1. To add data to your slicer, select and hold the Order Date field from your dataset in the Fields pane. Then, drag it to the Field area under the Visualizations pane. Release the mouse button to populate the slicer with data from the Order Date field.



1. A range of dates will appear after adding the Order Date to the slicer. Note: By default, Power BI automatically recognizes the Order Date field as containing date data and thus provides a slider for ease of use. This slider will allow stakeholders to adjust the range of dates they want to examine data for in the report.



You have now added an interactive slicer to your sales report. Anytime a user adjusts the range on the Order Date slicer, all visuals in the report will update to reflect the selected date range. Slicers empower you to create informative, engaging, and flexible reports for users, catering to various data analysis needs and preferences.

Conclusion

By creating your own visualizations in the *Create a sales report* exercise, you gained first-hand experience using Power BI to convert raw data into easily understandable insights. You transformed sales data into an interactive story that conveys Adventure Works' sales revenue over time! Companies like Adventure Works can use reports like the one you created to make data-driven decisions, essential for driving business growth in today's data-rich world.

1.2. Activity: Using bars, columns, and lines

Introduction

Previously, you learned about different chart types in Microsoft Power BI, including line charts, various bar and column charts, as well as area and stacked area charts. These visualizations are popular for displaying data in a clear and organized way.

In this step-by-step activity, you will apply some of your newly gained knowledge by creating a comprehensive report for Adventure Works using these visualizations. Specifically, you will:

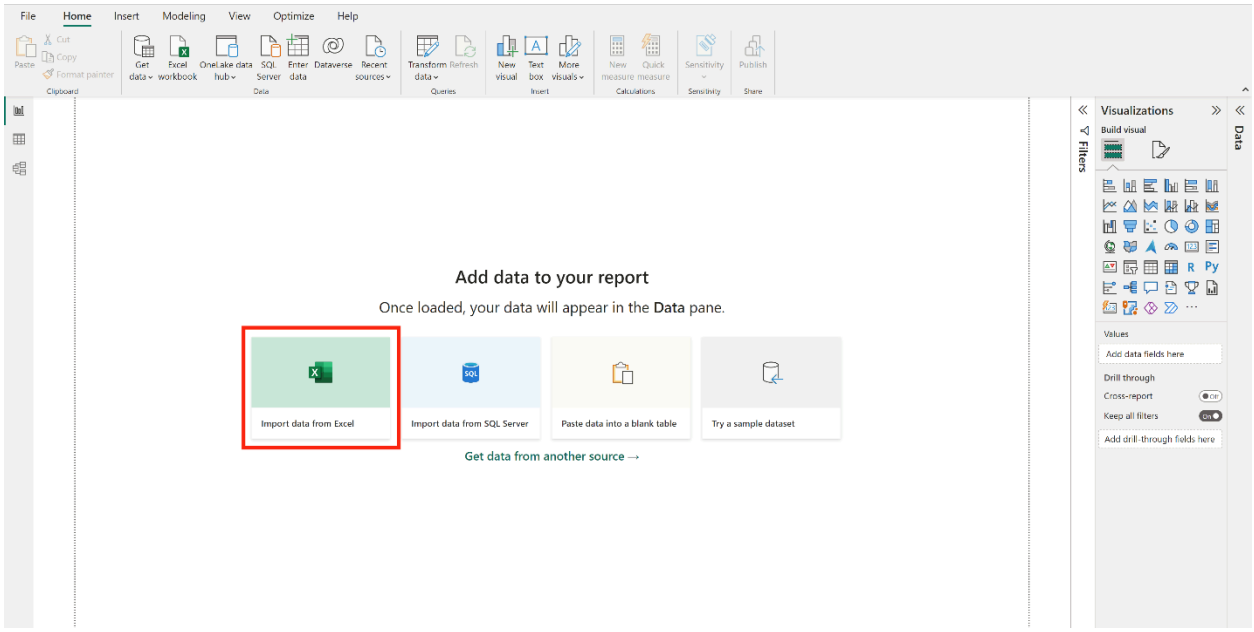
1. Import the provided sales dataset, *Using bars, columns, and lines,* provided in Step 1 below.
2. Present the February, March, and April sales trends across all regions using a line chart.
3. Display the distribution of canceled orders, shipped orders, and orders under processing individually in all regions during the quarter using a clustered column chart.
4. Display the order quantity across all regions during this time using a stacked bar chart.

Instructions

Step 1: Load the dataset

Before you begin, download the *Using bars, columns, and lines* dataset containing Adventure Works sales data for February, March, and April.

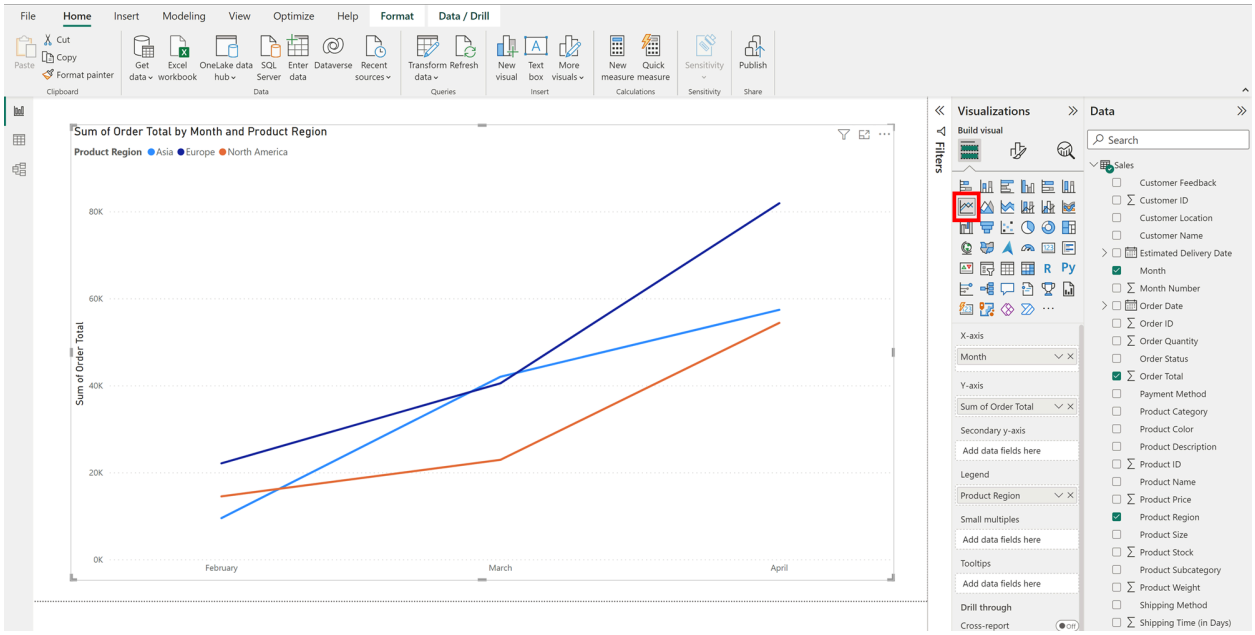
1. Create a new Power BI file. Import the dataset by selecting the Import data from Excel button.



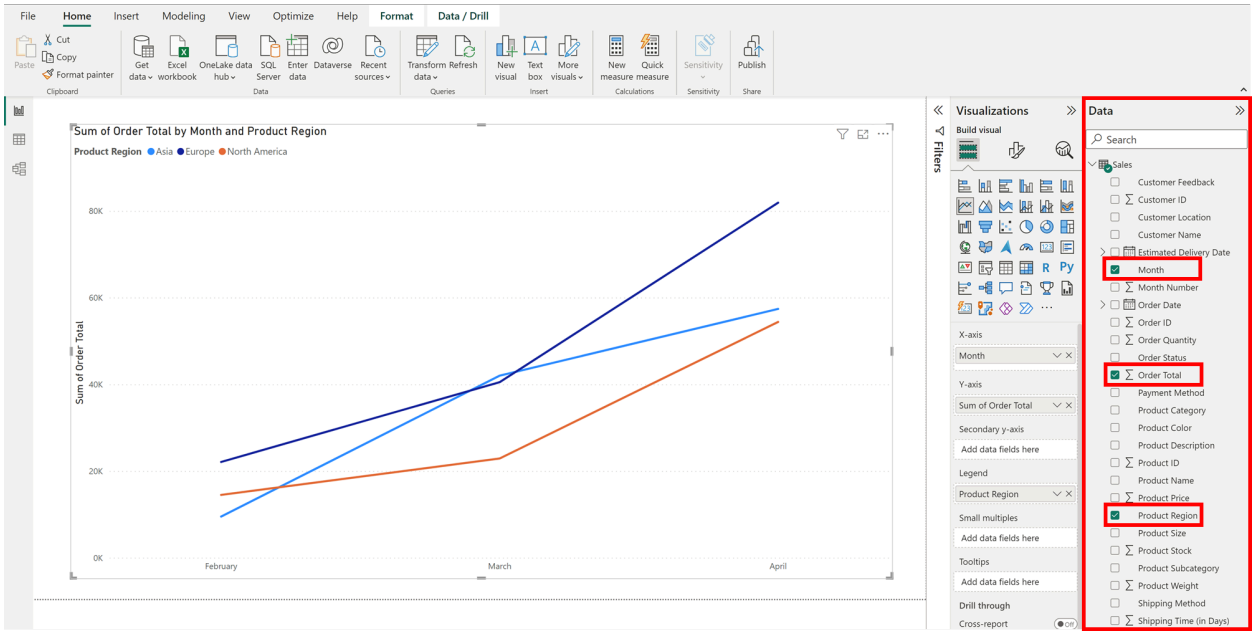
1. On the next screen, select the File, then *Using bars, columns, and lines.xlxs*.
2. Select Load on the next screen, as you don't need to transform the dataset for this exercise.

Step 2: Add a line chart to illustrate sales trends over time

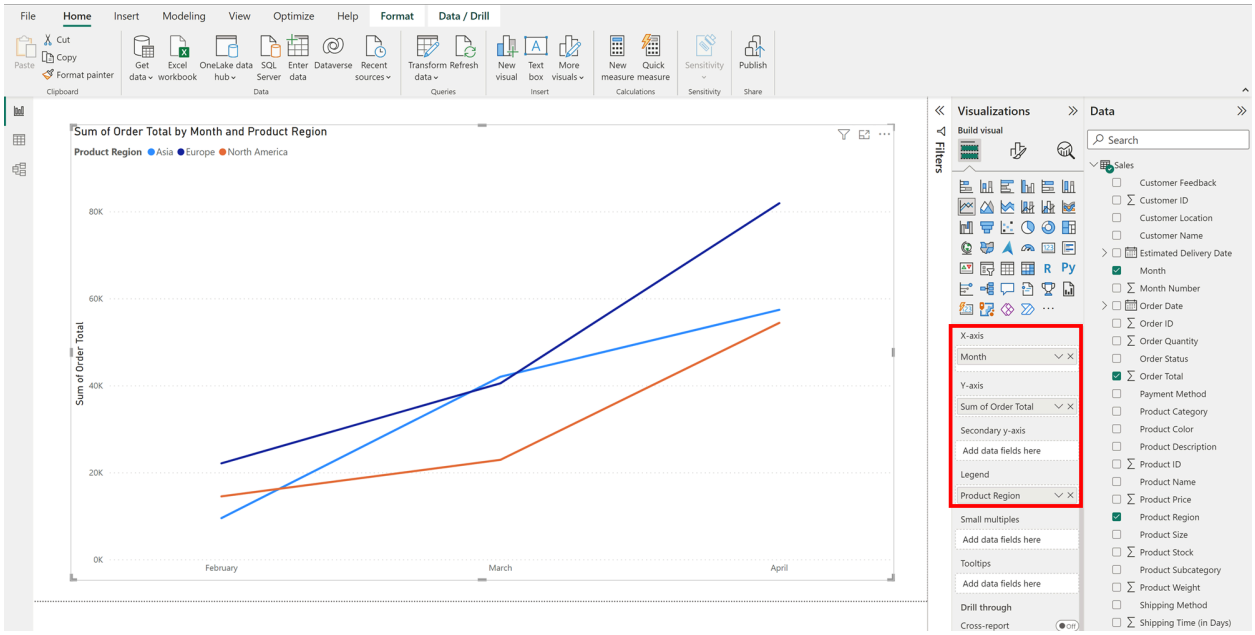
1. Insert a line chart in the report by selecting the line chart icon on the Visualizations pane.



1. Select the Month, Order Total, and Product Region fields from the Data pane.



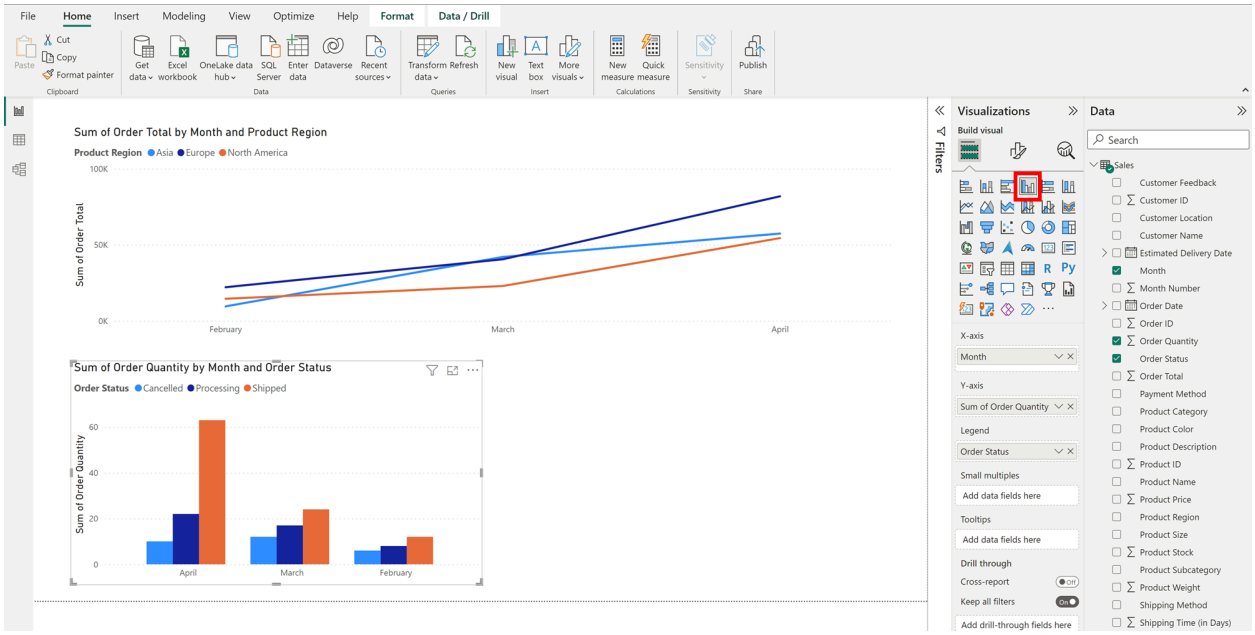
1. Ensure that the X-axis contains the Month field, the Y-axis contains the Sum of Order Total field, and the Legend contains the Product Region field.



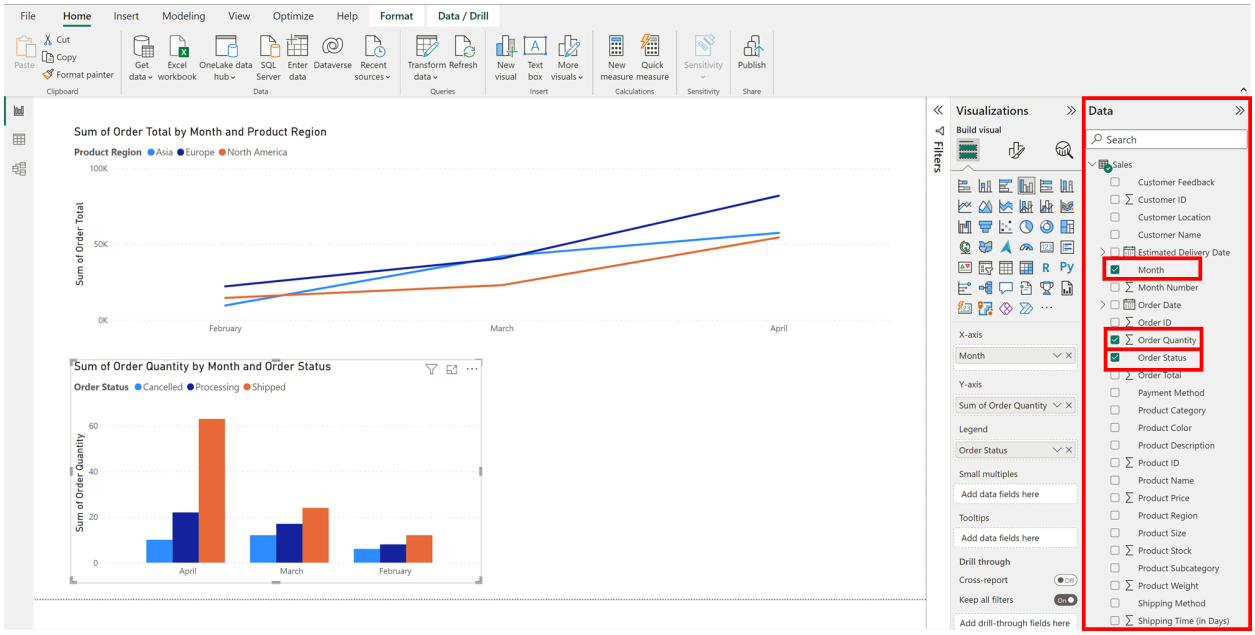
1. Resize the line chart as needed to create space for additional visuals under it.

Step 3: Add a clustered column chart to display the distribution of order statuses

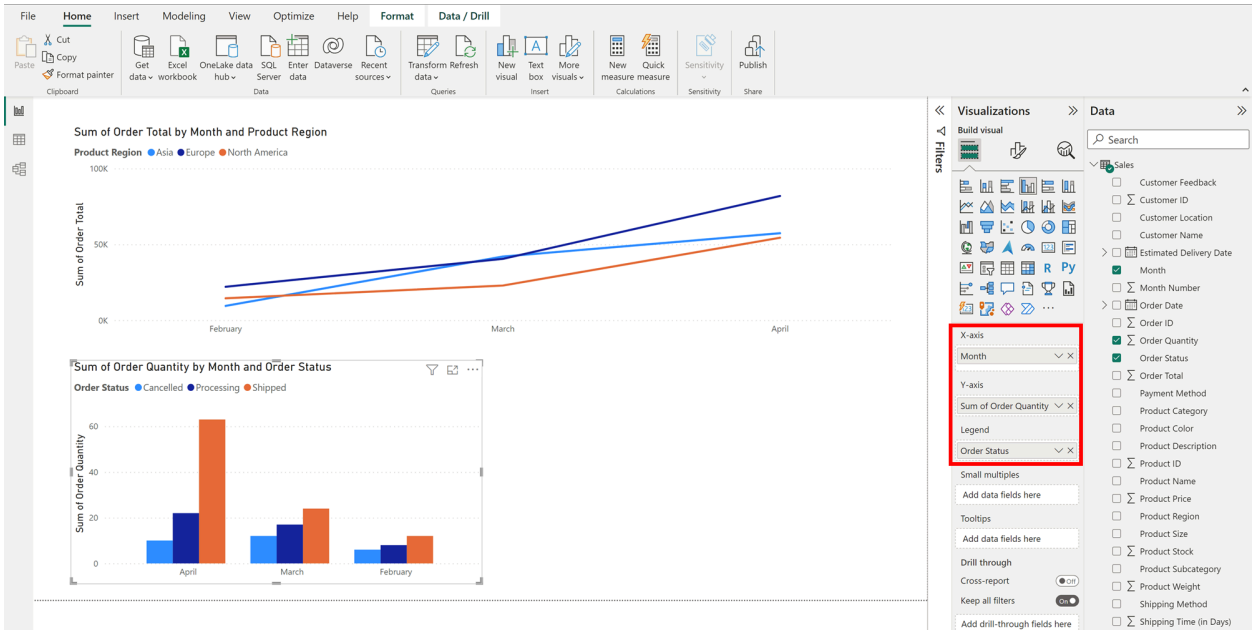
1. Insert a clustered column chart under the line chart by selecting the clustered column chart icon on the Visualizations pane.



1. Select the column chart you inserted, and, from the Data pane, select the Month, Order Quantity, and Order Status fields for this visual.

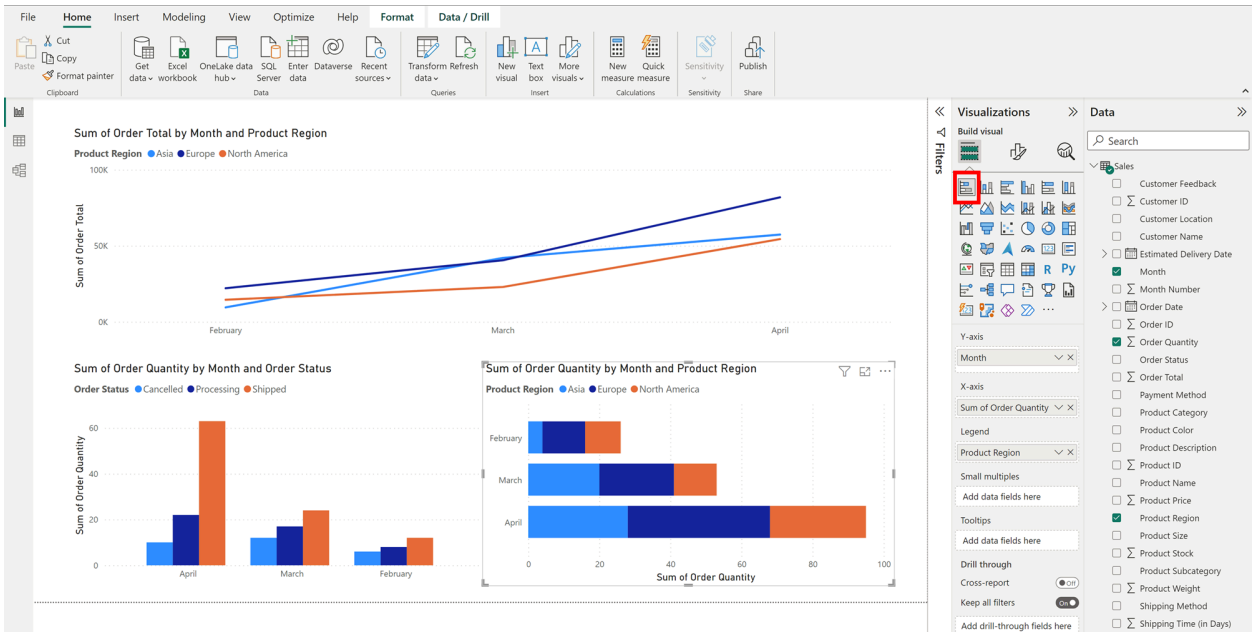


1. Ensure the X-axis contains the Month field, the Y-axis contains the Sum of Order Quantity field and the Legend contains the Order Status field.

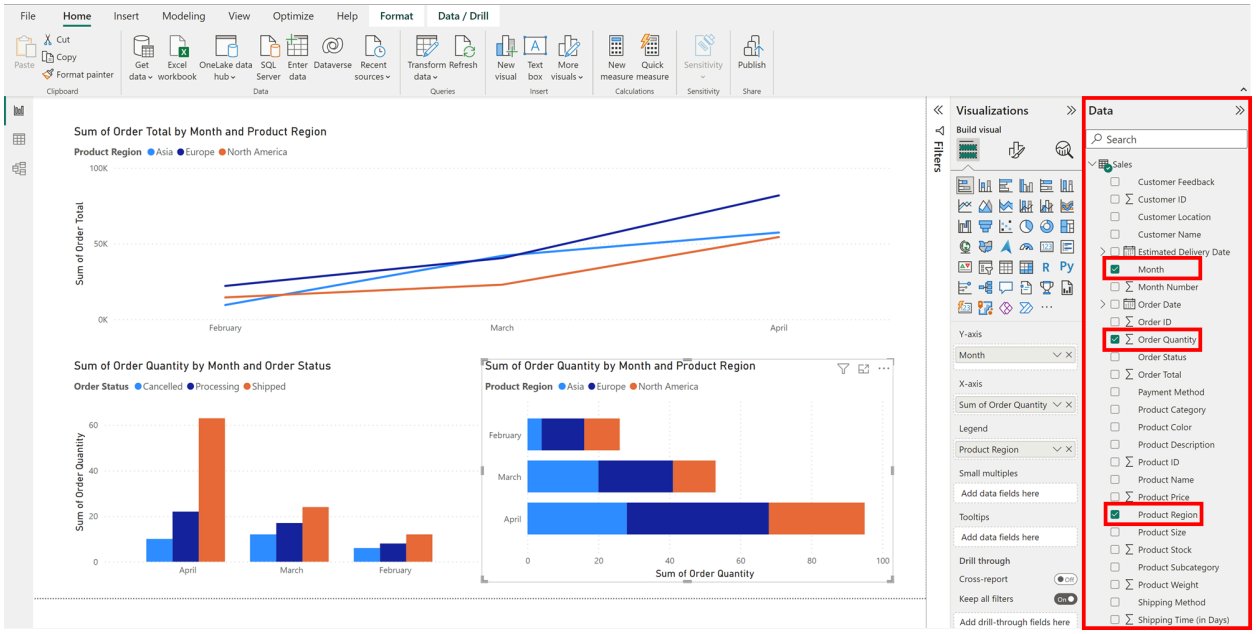


Step 4: Add a stacked bar chart to demonstrate differences in order quantity across different regions

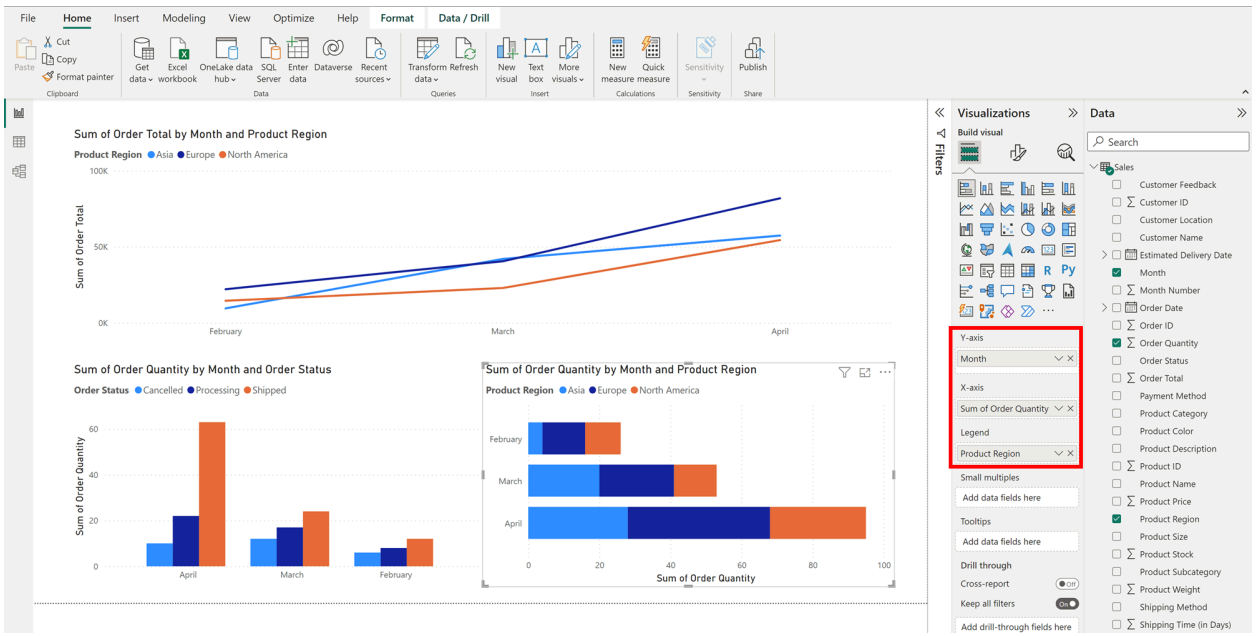
1. Insert a stacked bar chart by selecting the stacked bar chart icon on the Visualizations pane. Drag this chart to the right side of the stacked column chart.



1. Select the Month, Order Quantity, and Product Region fields from the Data pane for this chart.

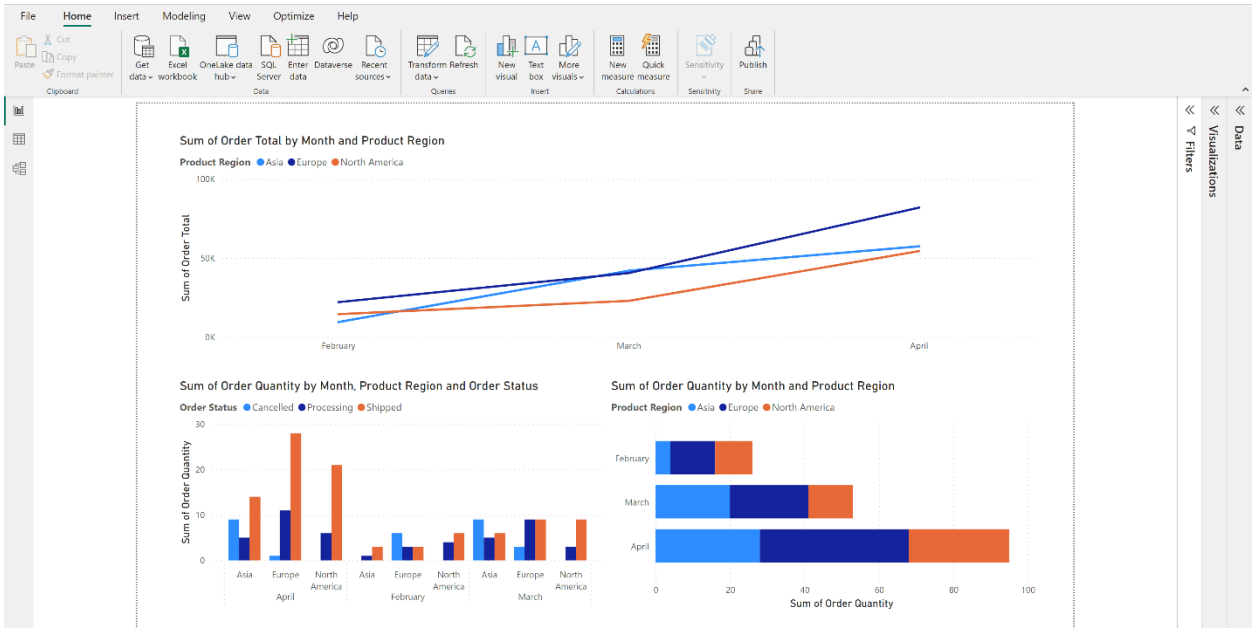


1. Ensure the X-axis contains the Sum of Order Quantity field, the Y-axis contains the Month field, and the Legend contains the Product Region field.



Step 5: Save the report

Select the save icon in the top left corner to save the report. You will need this file for another exercise later in this course. Your saved report should appear as follows:



Conclusion

In this activity, you practiced using line, clustered column, and stacked bar charts to illustrate sales data. Stakeholders can use the line chart to understand trends over time, helping them identify patterns and make informed decisions. The clustered column chart allowed you to display the distribution of order statuses (canceled, shipped, and under processing) across regions, highlighting areas of concern or success. The stacked bar chart helped you present variations in order quantity across regions during a specific period.

By creating these visuals and compiling them in a report, you have demonstrated your ability to visualize data and gained a better understanding of how to present information clearly and attractively.

1.3. Activity: Enhance the report with brand information

Introduction

Previously, you learned about pie, donut, and treemap charts in Microsoft Power BI. These visualizations are useful for representing proportional data. In this step-by-step activity, you will apply some of your newly gained knowledge by updating the report you created previously. You'll add a pie chart that displays product breakdown by order quantities. To complete this activity, you have to:

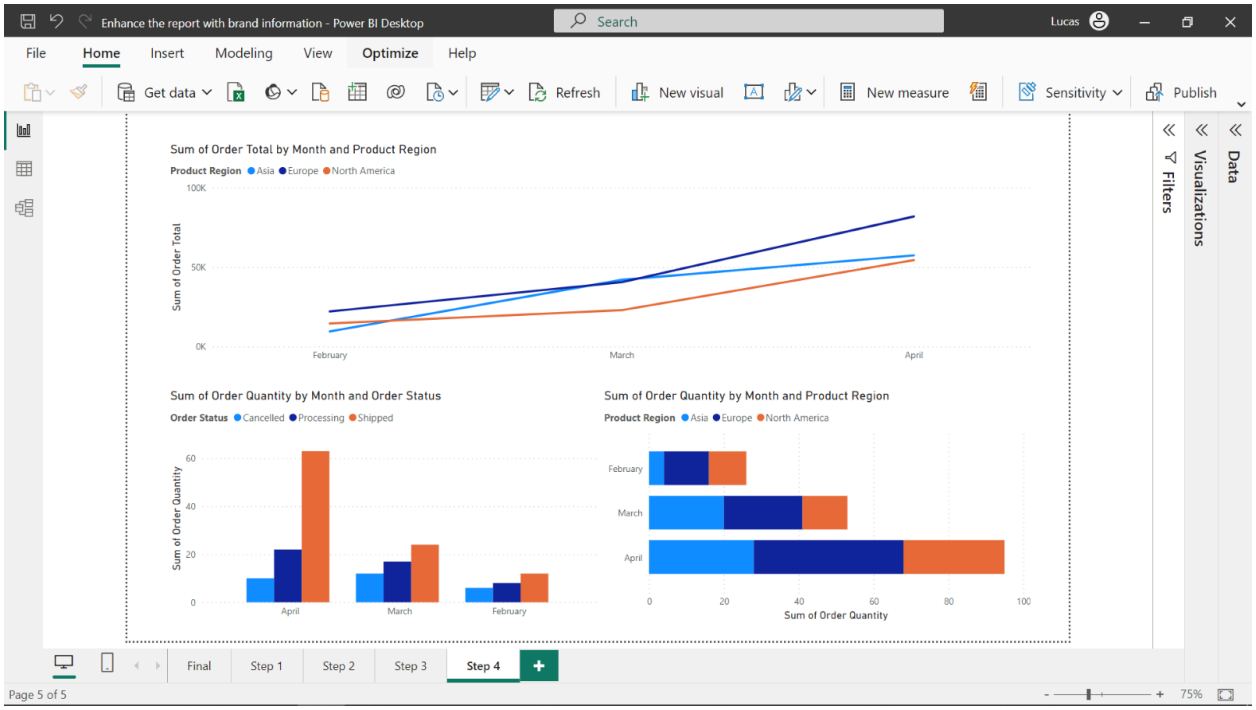
1. Open the exercise file you previously created in Power BI and make space for a new visual.
2. Incorporate a pie chart that displays the product categories and their corresponding order quantities for February, March, and April.
3. Hide the legend to declutter the chart.

Instructions

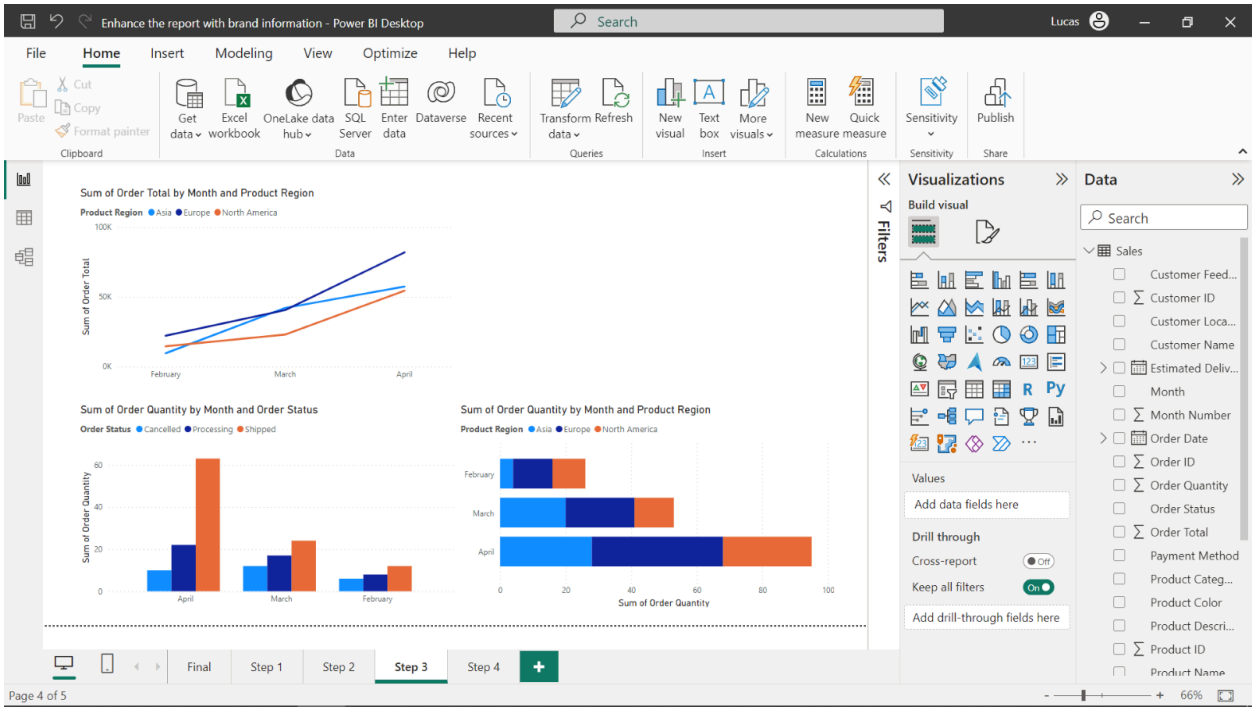
You created a report with a line, bar, and column chart in a previous activity, *Using bars, columns, and lines*. In this activity, you will need to open and work on your existing .pbix file.

Step 1: Open an existing Power BI report and make space for a new visual

1. Select the File menu, followed by Open Report.
2. Select the file you created for the previous activity, *Using bars, columns, and lines*.

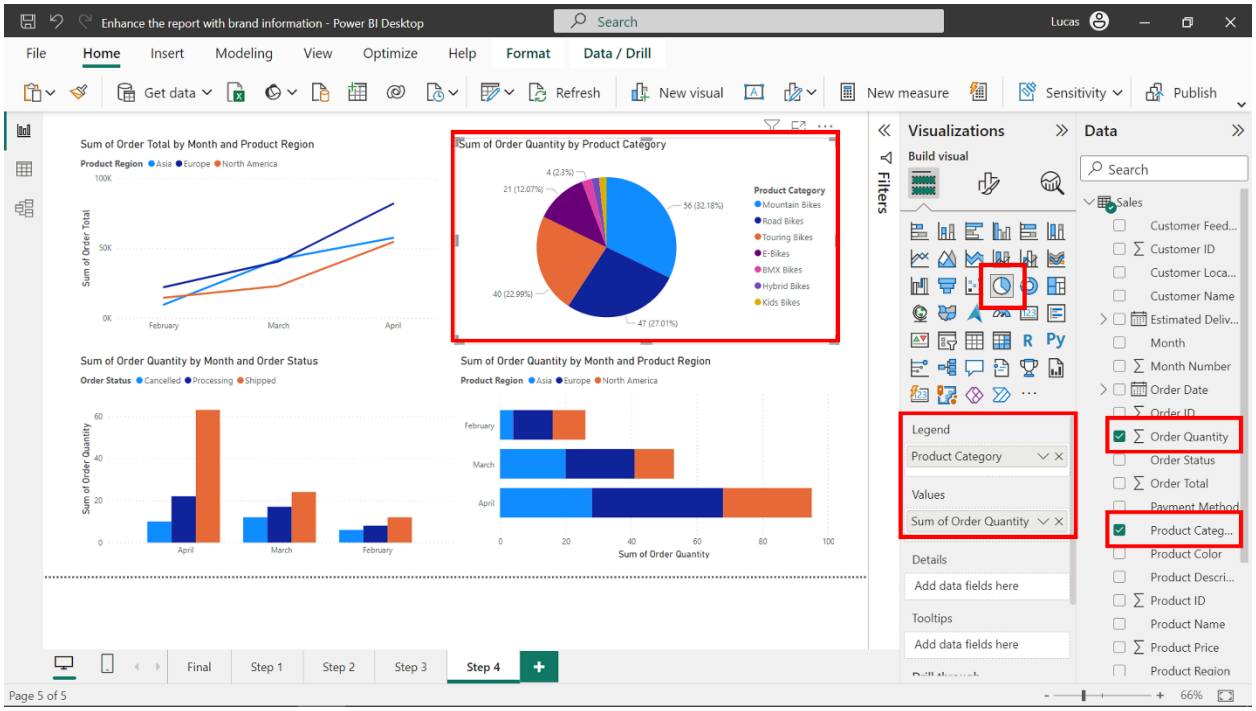


1. Resize the line chart to make space for a new chart.



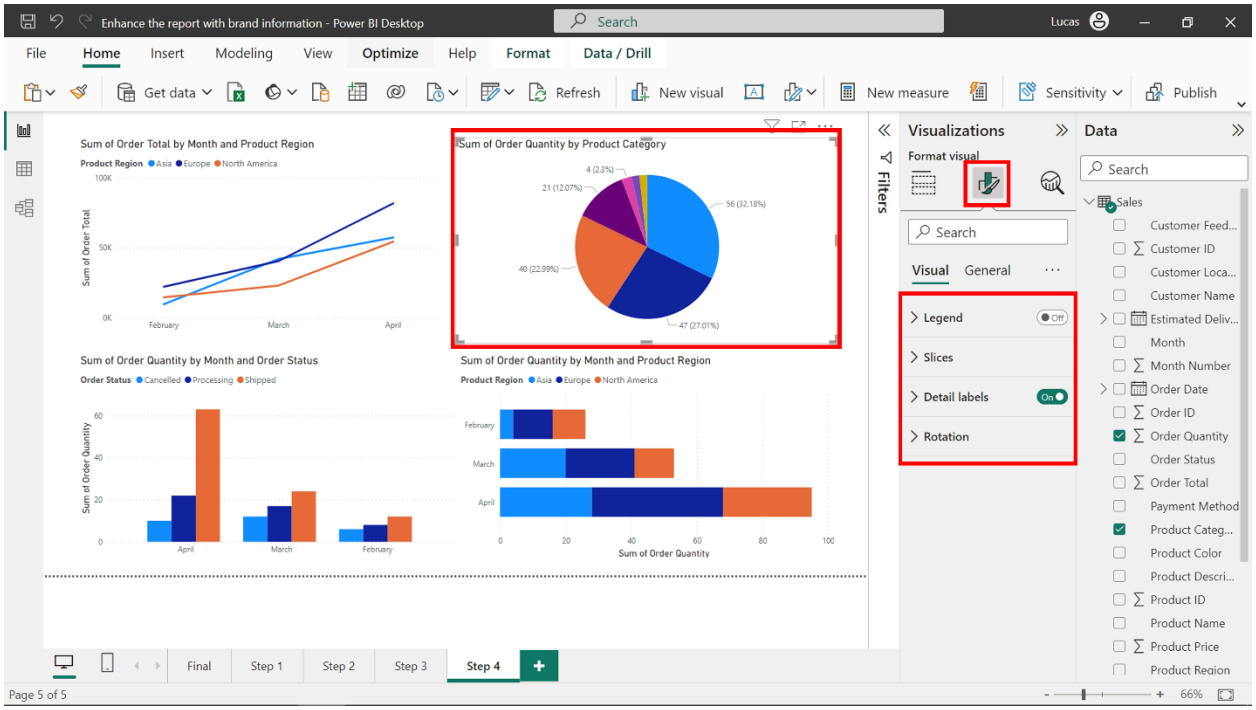
Step 2: Add a pie chart displaying order quantity by product category

1. Insert a pie chart to the right of the line chart by selecting the pie chart icon on the Visualizations pane. Resize the pie chart to fit in the space indicated.
2. Select the pie chart you inserted and, from the Data pane, select the Order Quantity and Product Category fields for this visual.
3. Ensure the Legend area contains the Product Category field and the Values area contains the Sum of Order Quantity field. Note: You selected the Order Quantity field, but Power BI calculates the sum of it and automatically renamed it to Sum of Order Quantity.



Step 3: Hide the legend to declutter the chart

1. Select the newly created pie chart.
2. Select the Format tab on the Visualizations pane.
3. To hide the legend, locate and select the switcher displaying On beside the Legend section to change it to Off.



Conclusion

In this activity, you added a pie chart to an existing Power BI report. The pie chart offers a clear and concise representation of the distribution of order quantities across different product categories during the specified period for Adventure Works. You also discovered how to hide a chart legend, effectively reducing visual clutter and improving the pie chart's overall readability.

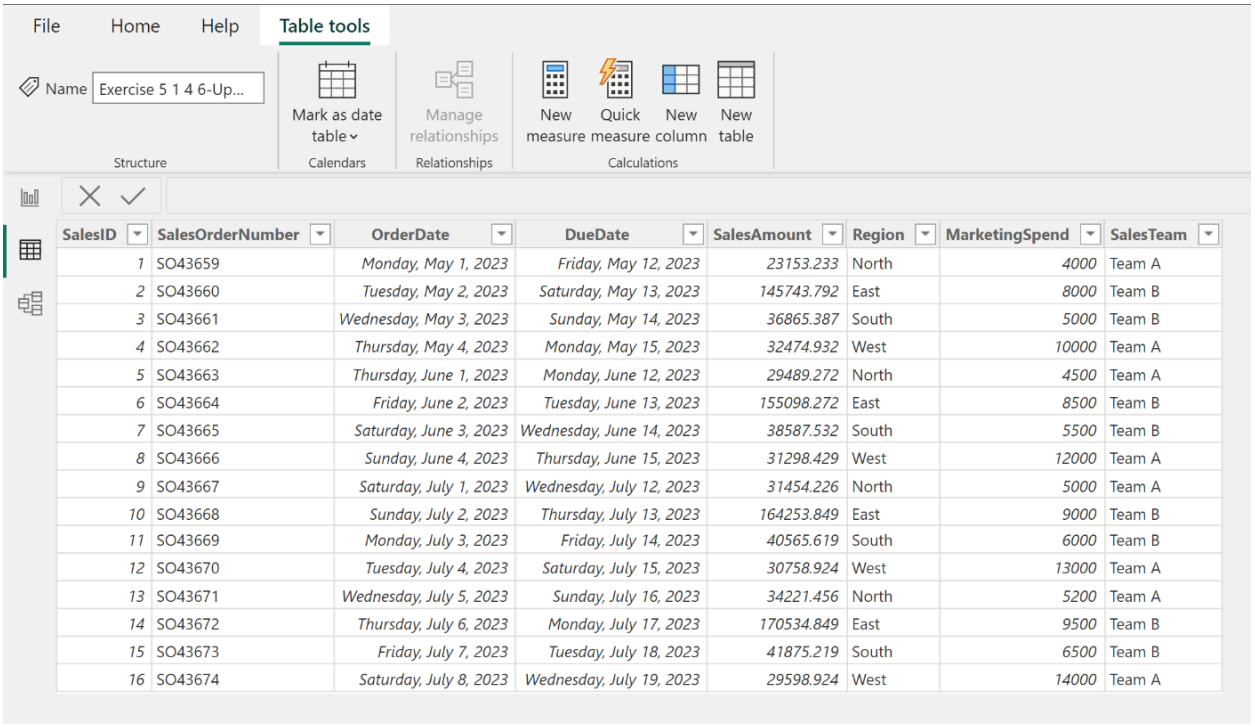
1.4. Exercise: Indicating business performance

Introduction

Your manager, Adio, asks you to prepare a report for the sales team at Adventure Works displaying key performance indicators (KPIs). The stakeholders need your report to answer a variety of KPI-related questions, including:

- What are the total sales and average sales?
- What are the monthly total sales?
- What is the total number of orders placed during this time period?
- What is the total marketing expenditure, and what is the monthly marketing expenditure?
- What is the change in sales over time for the sales teams, and how does this correlate with marketing spending?
- What sales region had the highest sales during this time period, and how did their ranking change over time?
- What is the performance of different sales regions with their advertising campaigns?

To complete this task, your manager provides you with a sales dataset for the last three months containing total sales volume and advertising spending for various sales regions. Each of these regions runs different advertising campaigns.



SalesID	SalesOrderNumber	OrderDate	DueDate	SalesAmount	Region	MarketingSpend	SalesTeam
1	SO43659	Monday, May 1, 2023	Friday, May 12, 2023	23153.233	North	4000	Team A
2	SO43660	Tuesday, May 2, 2023	Saturday, May 13, 2023	145743.792	East	8000	Team B
3	SO43661	Wednesday, May 3, 2023	Sunday, May 14, 2023	36865.387	South	5000	Team B
4	SO43662	Thursday, May 4, 2023	Monday, May 15, 2023	32474.932	West	10000	Team A
5	SO43663	Thursday, June 1, 2023	Monday, June 12, 2023	29489.272	North	4500	Team A
6	SO43664	Friday, June 2, 2023	Tuesday, June 13, 2023	155098.272	East	8500	Team B
7	SO43665	Saturday, June 3, 2023	Wednesday, June 14, 2023	38587.532	South	5500	Team B
8	SO43666	Sunday, June 4, 2023	Thursday, June 15, 2023	31298.429	West	12000	Team A
9	SO43667	Saturday, July 1, 2023	Wednesday, July 12, 2023	31454.226	North	5000	Team A
10	SO43668	Sunday, July 2, 2023	Thursday, July 13, 2023	164253.849	East	9000	Team B
11	SO43669	Monday, July 3, 2023	Friday, July 14, 2023	40565.619	South	6000	Team B
12	SO43670	Tuesday, July 4, 2023	Saturday, July 15, 2023	30758.924	West	13000	Team A
13	SO43671	Wednesday, July 5, 2023	Sunday, July 16, 2023	34221.456	North	5200	Team A
14	SO43672	Thursday, July 6, 2023	Monday, July 17, 2023	170534.849	East	9500	Team B
15	SO43673	Friday, July 7, 2023	Tuesday, July 18, 2023	41875.219	South	6500	Team B
16	SO43674	Saturday, July 8, 2023	Wednesday, July 19, 2023	29598.924	West	14000	Team A

In this exercise, you'll apply your knowledge of specialist visualizations, such as waterfall and ribbon charts, to create visualizations for the sales report that will convey the required insights

Instructions

Step 1: Load the data

Load the *Indicating business performance* dataset into Power BI Desktop.

Step 2: Compute the metrics and create visualizations

Based on the stakeholders' needs, you identify the following as KPIs relevant to the sales teams:

- Total sales
- Average sales
- Total sales per month
- Total orders
- Total and monthly marketing spend
- Sales change over time for sales teams and in relation to marketing spend
- Highest sales region

- Sales ranking changes

Compute the key performance indicators (KPIs) for the sales data and represent them using the appropriate visualizations by completing the following steps:

1. Total sales and average sales
    - Create a card visualization to compute the total sales using the Sales Amount data field.
    - Create a card visualization to compute average sales using the Sales Amount data field. Tip: Make sure the Fields field is set to Average.
1. Total sales per month
    - Create a multi-row card visualization to compute the total sales for each month using the Order Date and Sales Amount data fields.
1. Total orders
    - Create a card visualization to compute the total number of orders using the Sales ID data field.
1. Total and monthly marketing spend:
    - Create a card visualization to compute the total marketing spend using the Marketing Spend data field.
    - Create a multi-row card visualization to compute the monthly marketing spend using the Order Date and Marketing Spend data fields.
1. Total marketing spend in relation to monthly marketing spend
    - Create a waterfall chart to show how the sales have changed over time for the different sales teams and how this change correlates with the marketing spend. Use the Sales Amount, Month, and Sales Team data fields.
    - Tip: Place the Marketing Spend data field into the Tooltips field well to gain insight into the correlation between marketing spend and sales changes.
1. Region performance and ranking:
    - Create a ribbon chart to identify the region with the highest sales during this period and visualize how their ranking has changed over time using the Sales Amount, Month, and Sales Region data fields.
    - Tip: Place the Marketing Spend and Sales Team data fields into the Tooltips field well to gain insight into the factors that influence sales performance in different regions, and how marketing strategies and teams contribute to the overall result.

Step 3: Communicate results

In a Word document, write a few sentences about each visualization, communicating the results of your analysis to support the stakeholders' understanding. Ensure you address the sales team's questions in your written report:

- What are the total sales and average sales?
- What are the monthly total sales?
- What is the total number of orders placed during this time period?
- What is the total marketing expenditure, and what is the monthly marketing expenditure?
- What is the change in sales over time for the sales teams, and how does this correlate with marketing spending?
- What sales region had the highest sales during this time period, and how did their ranking change over time?
- What is the performance of different sales regions with their advertising campaigns?

Step 4: Save your work

Save your report and analysis write-up for future use.

Conclusion

In this exercise, you consolidated your understanding of the significance and use of KPIs in a business context. You experienced ways of extracting meaningful insights from raw data by calculating and visualizing specific KPIs such as total sales, average sales, number of orders, and marketing expenditure. Additionally, you learned to relate different KPIs to each other to unearth deeper insights, for instance, how sales trends are affected by marketing spending, and had the opportunity to tackle anomalies in data, such as identifying regions where high marketing spend does not translate to high sales.

Exemplar: Indicating business performance

Introduction

In the exercise, *Indicating business performance*, you put your knowledge of data visualization into practice by computing and creating KPI-related visualizations for Adventure Works' sales team.

Your task in this exercise was to create a report showing KPIs that provided the sales team with insights into their performance in the last three months. In particular, your task was to create a report that answered various KPI-related questions:

- What are the total sales and average sales?
- What are the total sales across all regions?
- What is the total number of orders placed during this time period?
- What is the total marketing expenditure, and what is the monthly marketing expenditure?
- What is the change in sales over time for the sales teams, and how does this correlate with marketing spending?
- What sales region had the highest sales during this time period, and how did their ranking change over time?
- What is the performance of different sales regions with their advertising campaigns?

You were required to create card and multi-row card visualizations, as well as a waterfall and ribbon chart in Microsoft Power BI.

This reading provides you with a step-by-step guide for creating this report. It also includes screenshots that you can compare against your work.

Instruction solutions

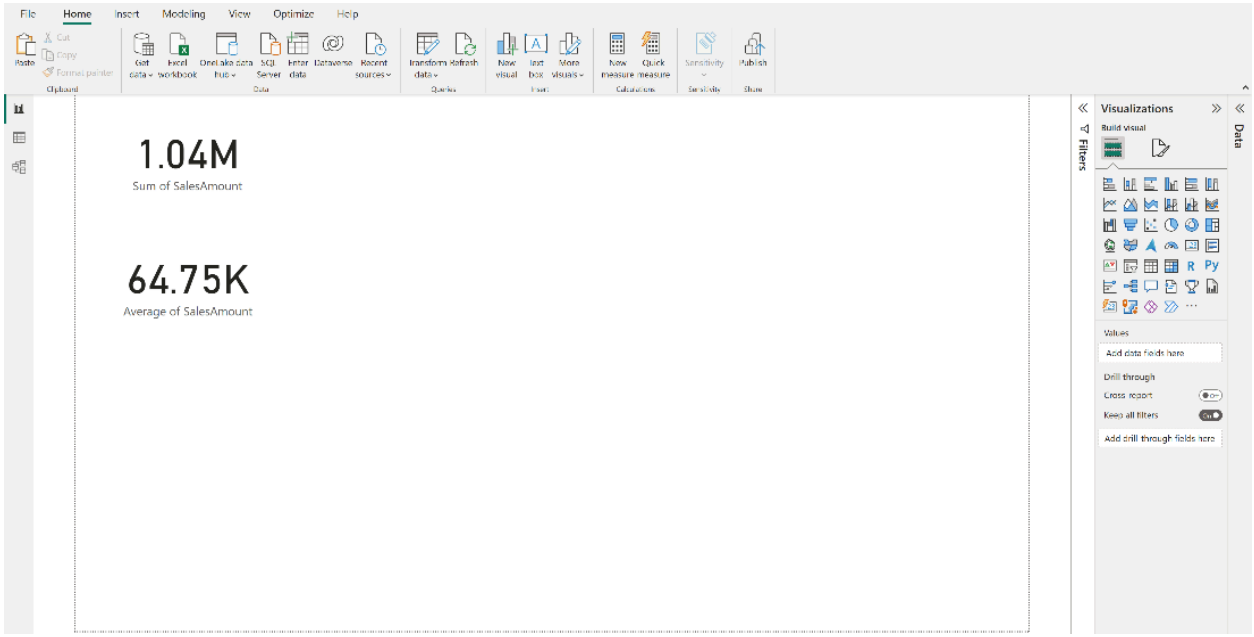
Step 1: Load the data

1. Download the provided dataset to your computer.
2. Create a new Power BI project.
3. Import this dataset Excel file to your Power BI project.
4. In the preview window, ensure the data appears correct, and then select Load to import data without transforming anything.

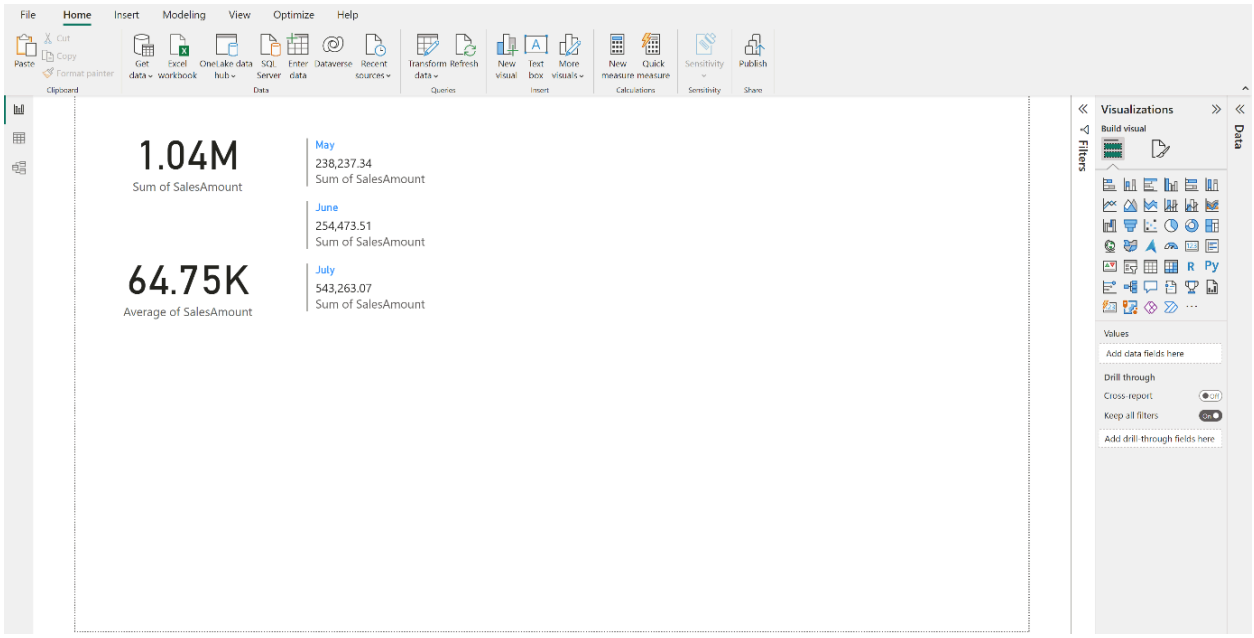
Step 2: Compute the KPI metrics and create visualizations

Compute the key performance indicators (KPIs) for the sales data and represent them using the appropriate visualizations by completing the following steps:

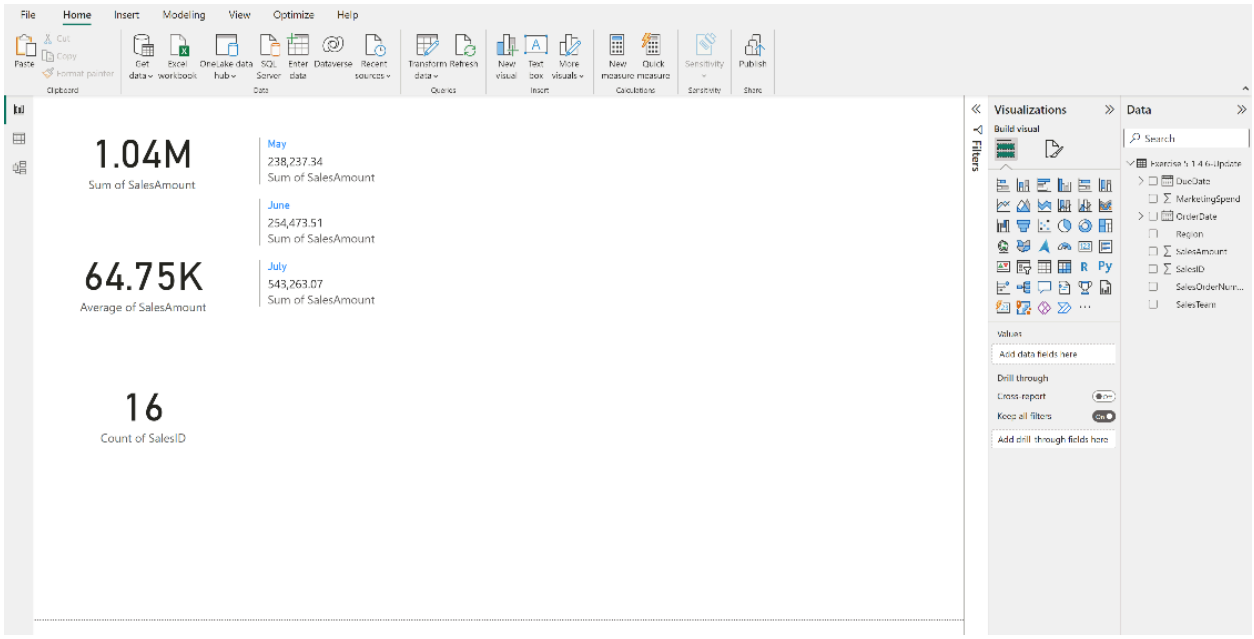
1. Total sales and average sales
    - For total sales, select the Card visualization from the Visualizations pane.
    - Drag and drop Sales Amount into the Values field. This will automatically calculate the total sales.
    - Create another Card visualization to represent average sales by selecting the Card visualization from the Visualizations pane.
    - Drag and drop Sales Amount into the Values field.
    - Select the Fields field and change Sum to Average. This calculates the average sales.



1. Total sales per month
    - Select the Multi-row card visualization from the Visualizations pane.
    - Drag and drop the Sales Amount field into the Fields well.
    - Expand the Order Date field. Drag and drop the Month field into the Fields well. This will show the total sales for each month.

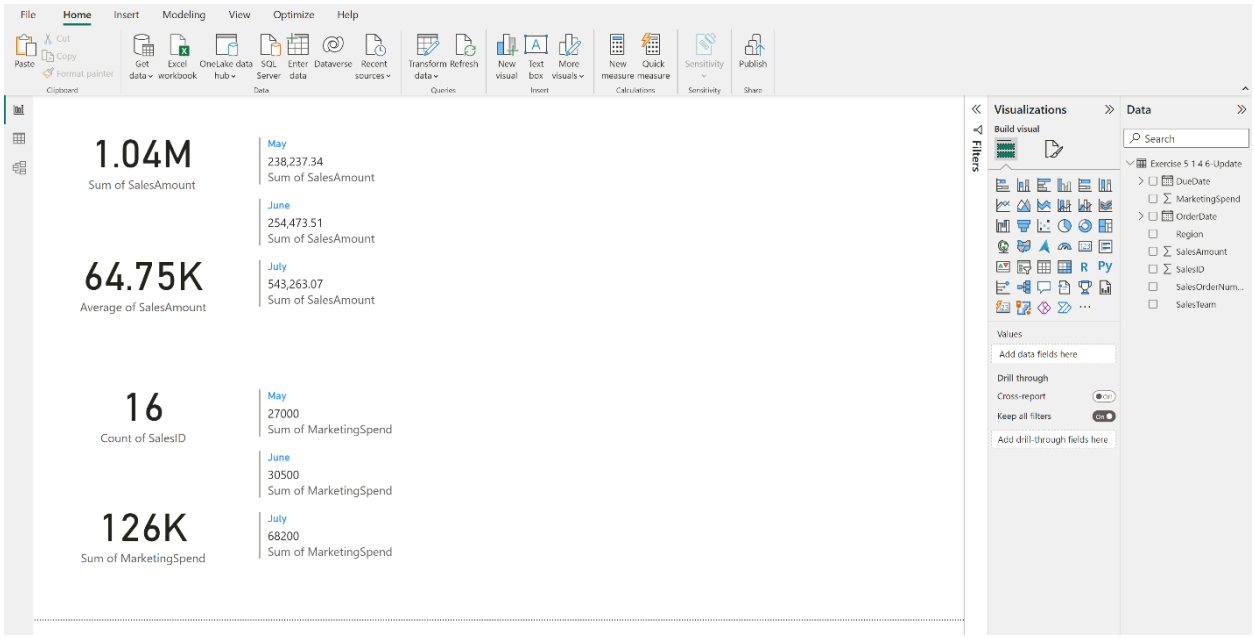


1. Total orders
    - Select the Card visualization from the Visualizations pane.
    - Drag and drop Sales ID into the Fields field. This will show the number of total sales during this time.

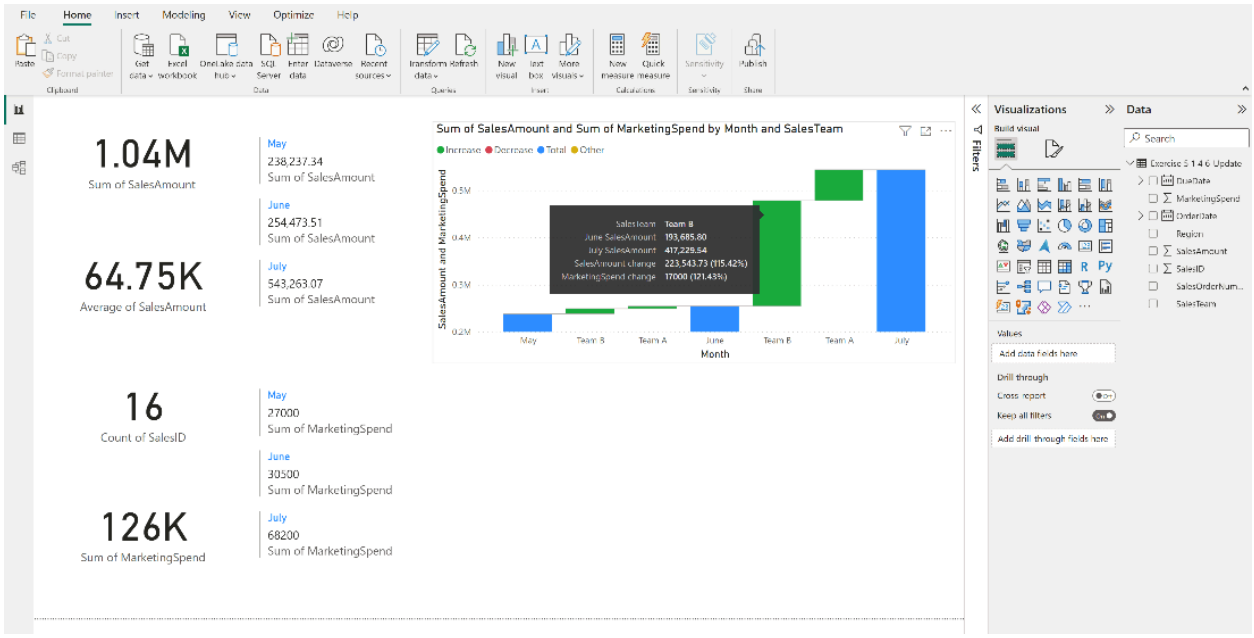


1. Total marketing spend and monthly marketing spend
    - For total marketing spend, select the Card visualization from the Visualizations pane.

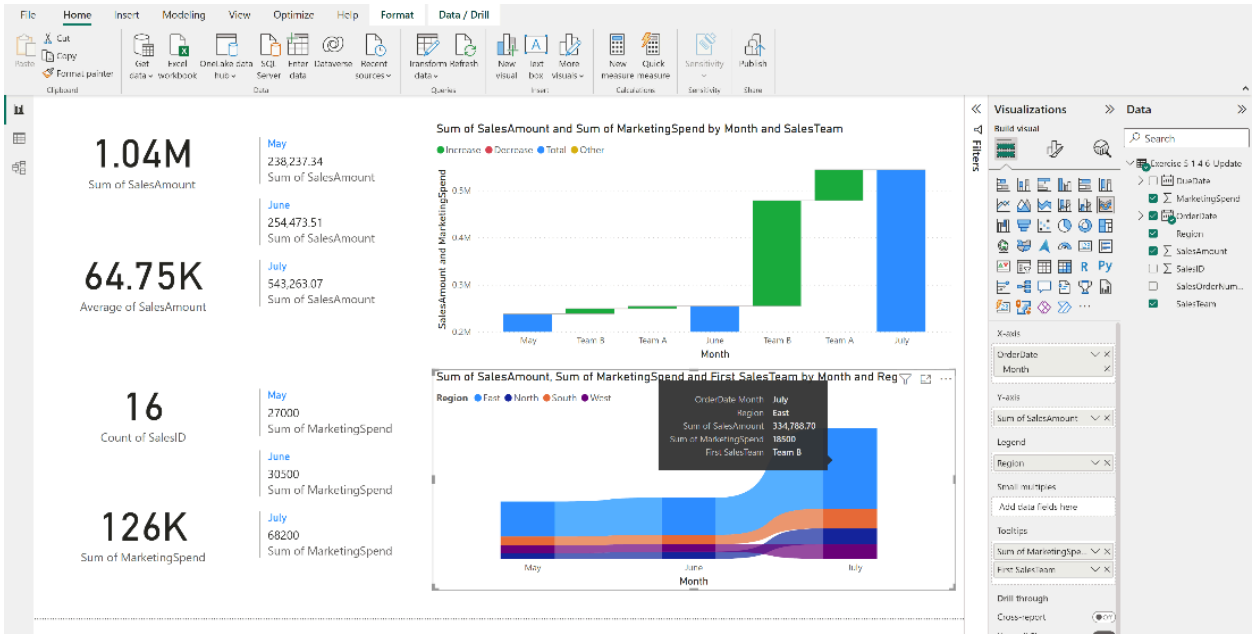
- Drag and drop Marketing Spend into the Fields field. This will show the sum of total marketing spend during this time.
- For monthly marketing spend, select the Multi-row card visualization from the Visualizations pane.
- Drag and drop the Marketing Spend into the Fields well.
- Expand the Order Date field. Drag and drop the Month field into the Fields well. This will show total marketing spend for each month.



1. Total marketing spend in relation to monthly marketing spend
   - Select the Waterfall chart from the Visualizations pane.
   - Drag and drop Sales Amount into the Y-axis field and Month from Order Date into the Category field. This will display sales changes over the months.
   - Drag and drop the Sales Team field into the Breakdown field.
   - Drag and drop Marketing Spend into the Tooltips field to see its correlation with sales changes.
   - Hover over each item to examine how the team did with their advertising budget compared to the previous month.



1. Region performance and ranking:
    - Select the Ribbon chart from the Visualizations pane.
    - Drag and drop Sales Amount field into the Y-axis well and Month from the Order Date field into the X-Axis well. This will display sales changes over the months.
    - Drag and drop the Region field into the Legend well.
    - Drag and drop Marketing Spend into the Tooltips field to see its value with sales changes.
    - Hover the mouse to the region with the highest sales. For example, the tooltip displayed when hovering over this region tells you that it's the East region and values are for July.



Step 3: Communicate results

Based on the analysis performed in Power BI, the following key insights and trends can be concluded:

- Total and average sales: The total sales for the business across all regions from January to March amount to approximately $1.04 million, with an average monthly sale of approximately $64.75K per order.
- Sales across regions: When looking at the regional breakdown from the ribbon chart, the East and South regions (Team B) have higher sales when compared to the North and West regions (Team A), indicating better overall performance.
- Number of orders: The total number of distinct orders placed during this period is around 16. This provides an insight into the volume of transactions that were processed.
- Marketing expenditure: The total marketing expenditure during this period amounts to about $126K. In a monthly breakdown, marketing spend has seen a consistent increase which aligns with the objective of driving up sales.
- Sales and marketing expenditure relationship: The waterfall chart indicates a positive correlation between sales and marketing spending. As the marketing expenditure increased, sales also grew. However, the ad campaigns run by Team B were more successful than Team A. An extra $17,000 spent on marketing brought approximately $223K of sales for Team B in July. On the other hand, an extra $20,000 marketing budget brought only $65K in sales for Team A in July.

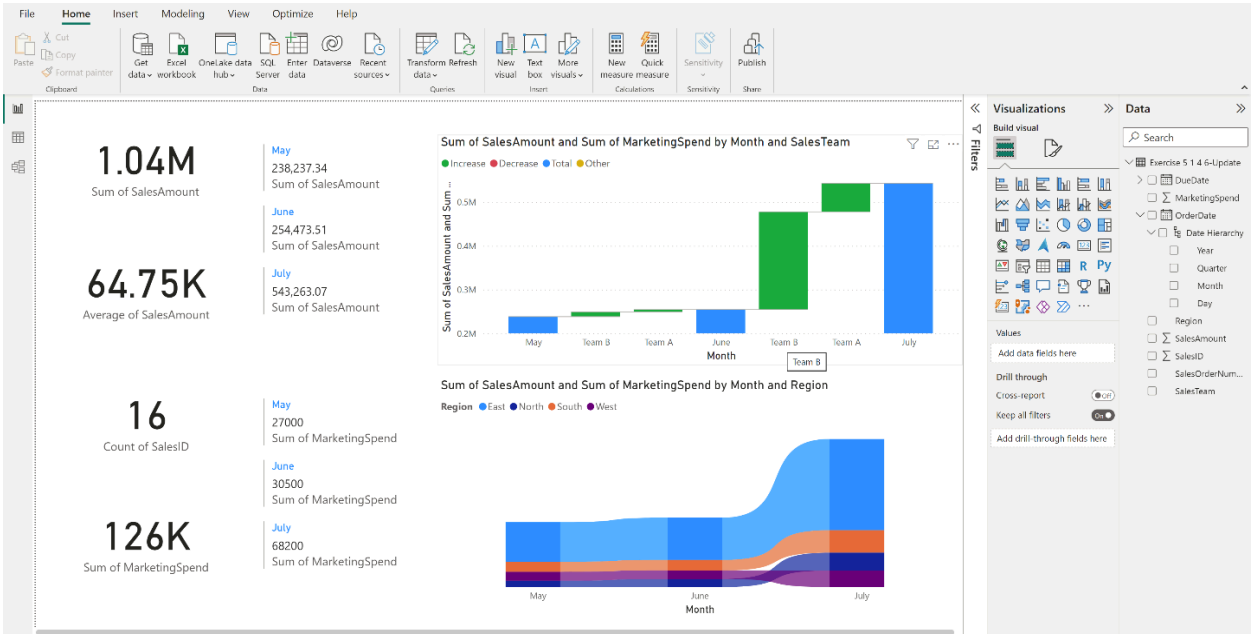
- Region performance and ranking: The ribbon chart reveals that the East region consistently performed the best in terms of sales. However, even with substantial advertising spend, the West region did not perform proportionally well in sales, indicating potential issues with their advertising campaigns.

Step 4: Save the report

- Once you are satisfied with your report, save your work by going to the File menu and then selecting Save.

Final output

One example of the final sales report is suggested below:



Conclusion

Through this exercise, you practiced leveraging Power BI's visualization tools to extract, analyze, and visualize significant insights. You successfully created KPI visualizations, such as total sales, average sales, and total orders using card and multi-row card visuals. The usage of waterfall and ribbon charts allowed you to track the changes in sales over time, understand how marketing expenses influence sales, and monitor the ranking changes of different sales regions. Your analysis revealed valuable insights for the sales team, like the powerful performance of the East and South regions (Team B) and potential inefficiencies in the West region's advertising campaigns.

2.1. Activity: Creating an accessible report

Introduction

So far, in the *Designing an accessible report* lesson, you explored the importance of accessibility in reporting and designing accessible reports in Microsoft Power BI. You'll now apply the knowledge you've gained to create an accessible report. In this activity, you will improve the accessibility of an existing Adventure Works sales report using formatting, themes, and design best practices as follows:

- Enhance the accessibility of the visuals using descriptive titles, markers, alt text, and accessible coloring.
- Improve the accessibility of the overall report by changing the tab order and using themes.
- Discuss the improvements made to the report, outlining their benefit for users with disabilities.

Case study

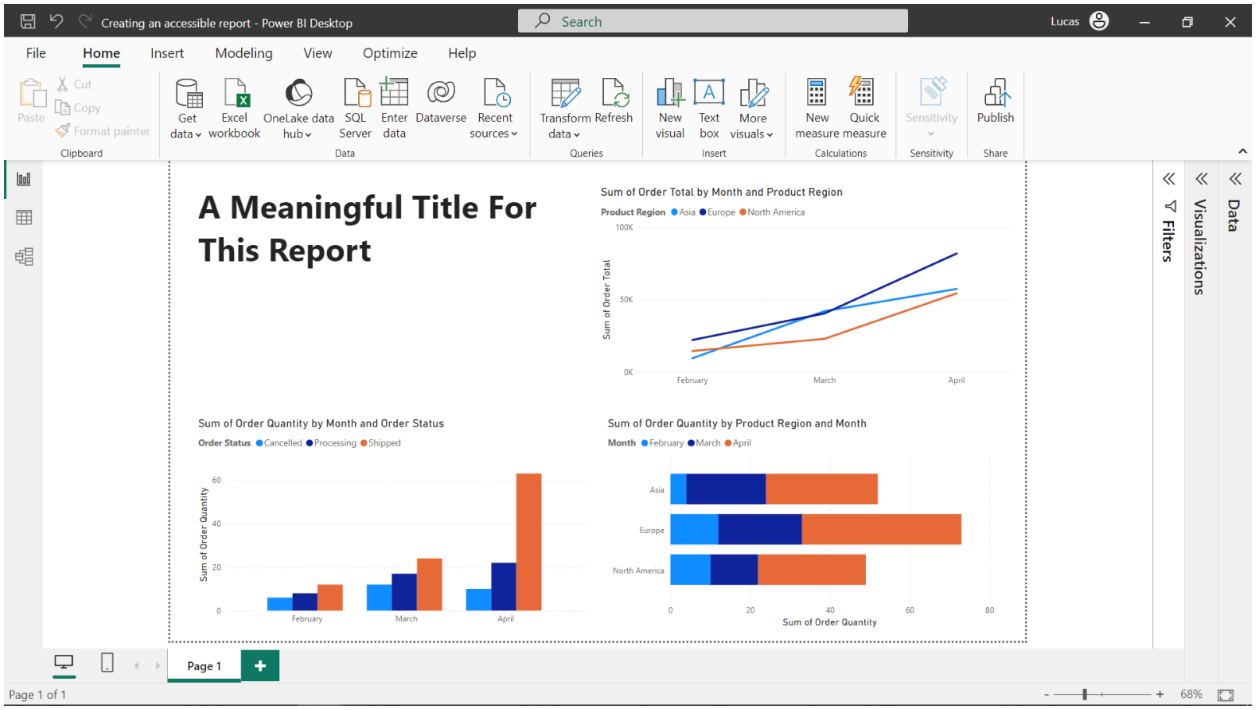
Adventure Works recently welcomed new members to its sales team, including Logan, who is visually impaired. Committed to inclusivity, the directors have asked the data analytics team to ensure all reports are accessible, aiming to make them more user-friendly for a wider audience. You are assigned the task of incorporating accessibility features to enhance and refine an existing report that contains sales data for the months of February, March, and April across various sales regions, aligning with the best practices you have learned.

Instructions

Step 1: Open the given report file using Power BI Desktop

Download and open the *Creating an accessible report* file in Power BI Desktop.

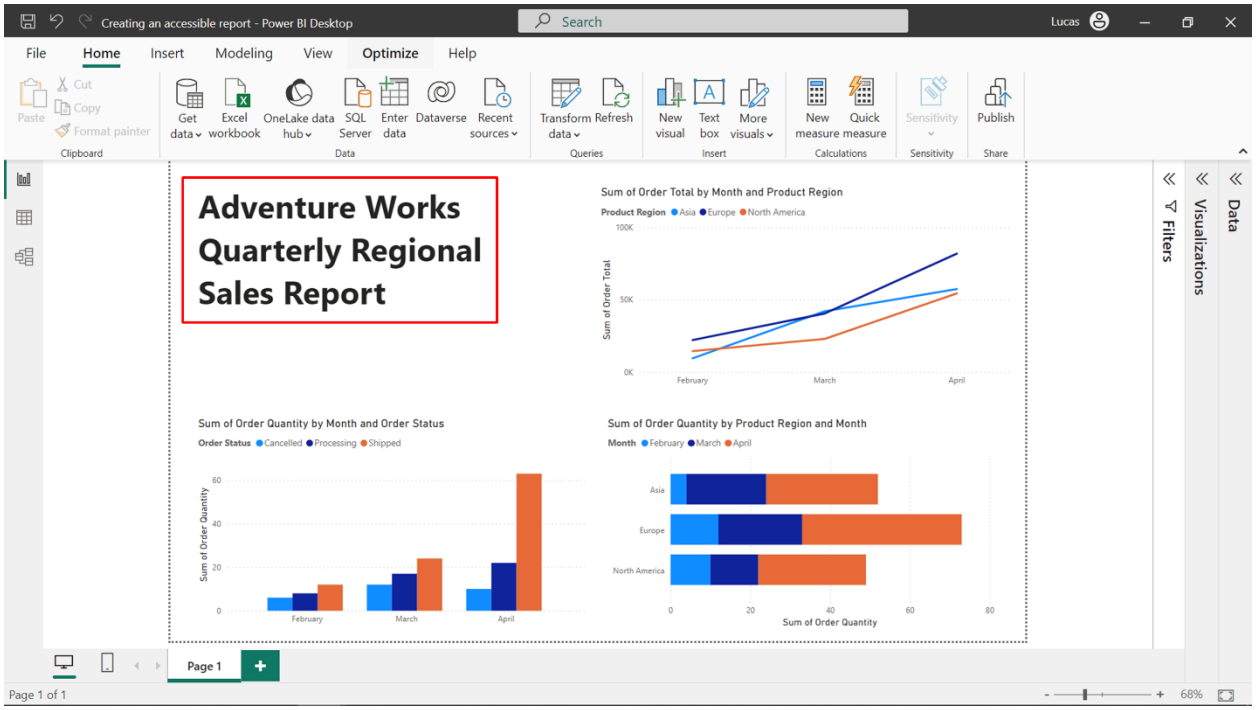
This step gives you access to the current structure and contents of the report, enabling you to determine where necessary improvements to accessibility need to be made.



Step 2: Add a meaningful report title

To set a clear context for the report's focus, you should provide a succinct and meaningful title. This title will aid all users, including users with disabilities, in quickly grasping the purpose and content of the report.

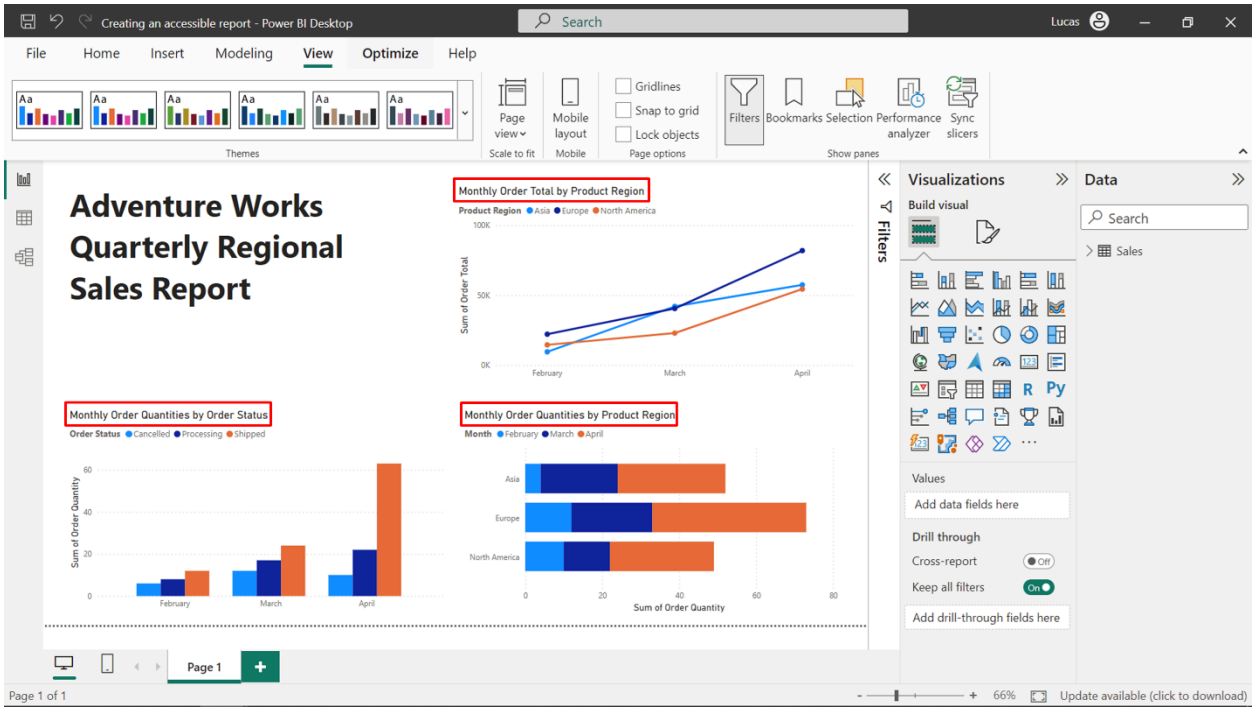
1. To add a title, select the title of the report.
2. Update it to Adventure Works Quarterly Regional Sales Report.



Step 3: Improve the accessibility of the chart visuals

Adjust the chart titles

The visuals should have existing chart titles as displayed in the screenshot below.

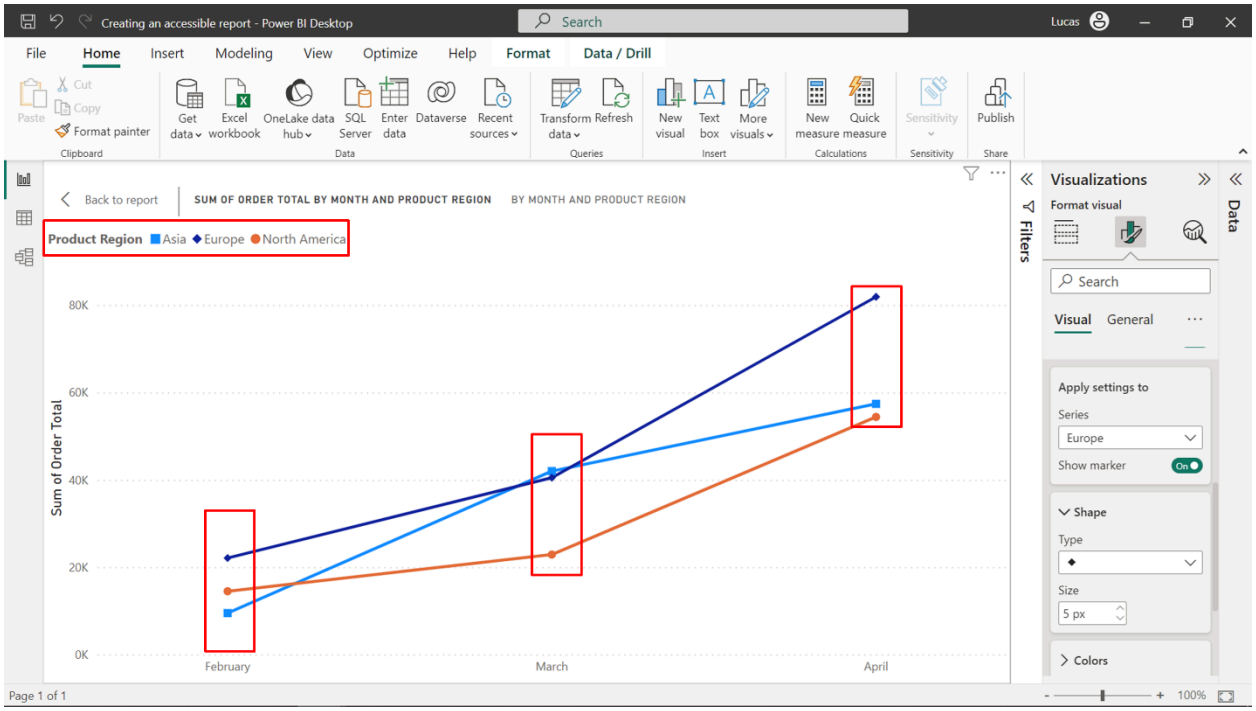


Improve the titles by completing the steps that follow:

1. Select the clustered column chart at the bottom left position of the report, open the Format tab, select General, and expand Title. Change the title to: Monthly Order Quantities by Order Status.
2. Repeat step one for the line chart visual at the top right position of the report. Change the title to: Monthly Order Total by Product Region.
3. Repeat step one for the stacked bar chart at the bottom right position of the report. Change the title to: Monthly Order Quantities by Product Region.

Display markers in the line chart

1. Select the line chart visual at the top right position and press the Focus mode button to look closely at the visual. Then, open the Format tab, scroll to the Markers toggle, and turn it to On.
2. To make the report more accessible, a different marker should be used in each region line. To achieve this, expand the Markers settings and select a specific region as a series in the Apply settings to section. Change the marker symbol to a different shape. Then, repeat the process to modify the marker shape for the other two regions.
3. Now all three regions are represented using a different marker shape as highlighted in the image below.



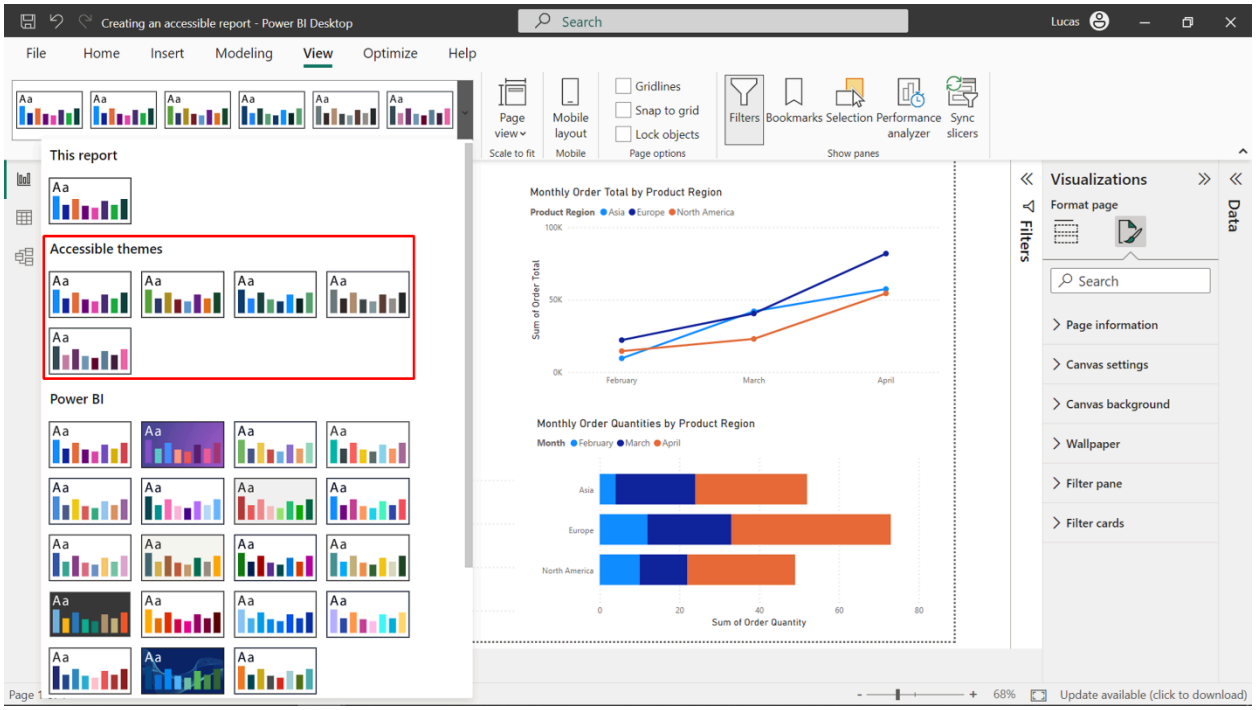
1. Press Back to report to exit Focus mode and return to the main report view.

Add alt text

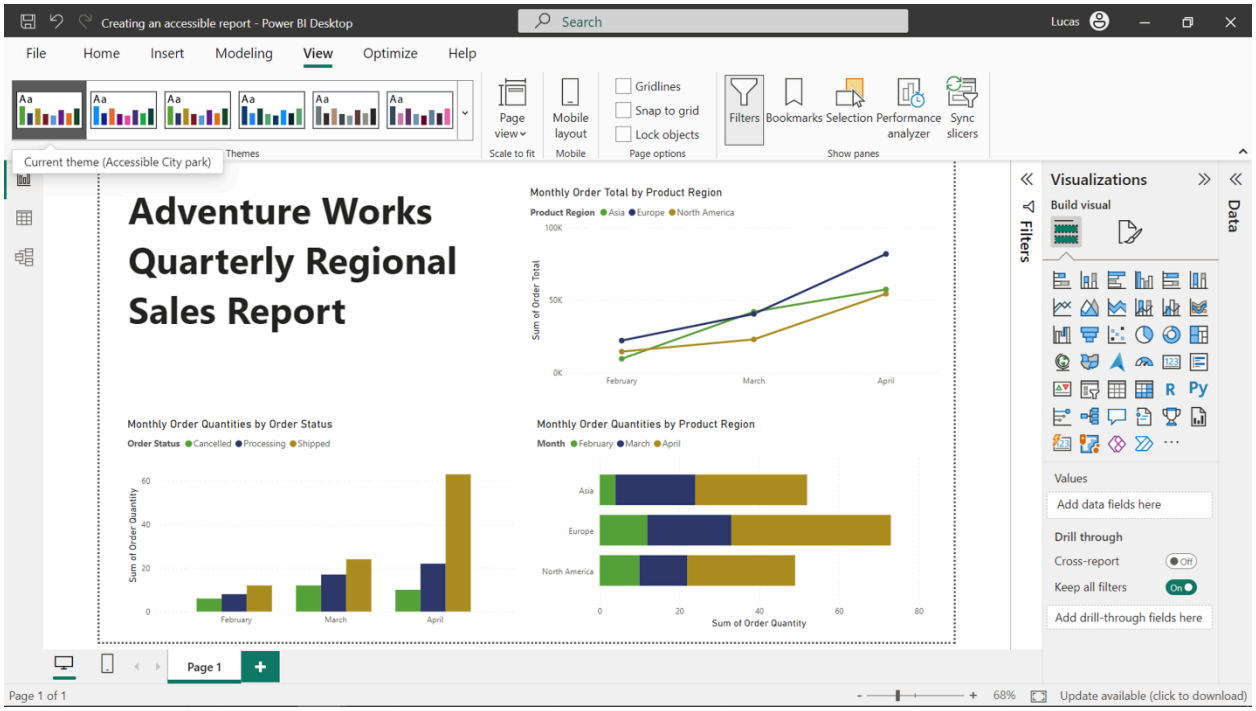
1. Select the clustered column visual at the bottom left position of the report, open the Format tab, select General and expand Alt text. Set the alt text as: From February to April, the canceled order status is consistently the lowest category, processing shows steady growth, and shipped displays exponential growth, notably surging in April.
2. Select the line chart visual at the top right position of the report, open the Format tab, select General, and expand Alt text. Set the alt text as: Order totals increased monthly in all regions with Europe leading. North America and Europe accelerated monthly, particularly in April. Asia's growth slowed from March to April and totals were comparable to North America except in March when Asia overtook.
3. Select the stacked bar visual at the bottom right position of the report, open the Format tab, select General, and expand Alt text. Set the alt text as: Total order quantities increased monthly for all regions. Europe led each month, showing accelerating growth. Asia had more accelerated growth from February to March than March to April. North America showed the opposite trend.

Use an accessible theme

1. Adjust the default color palette used in all visualizations by selecting a theme. To set the theme, open the Themes dropdown menu in the View ribbon.
2. Select any theme from the Accessible themes category highlighted in the screenshot below, such as the second theme Accessible City park.



1. The theme applies instantly to all of the visuals in your report, as shown in the screenshot that follows.

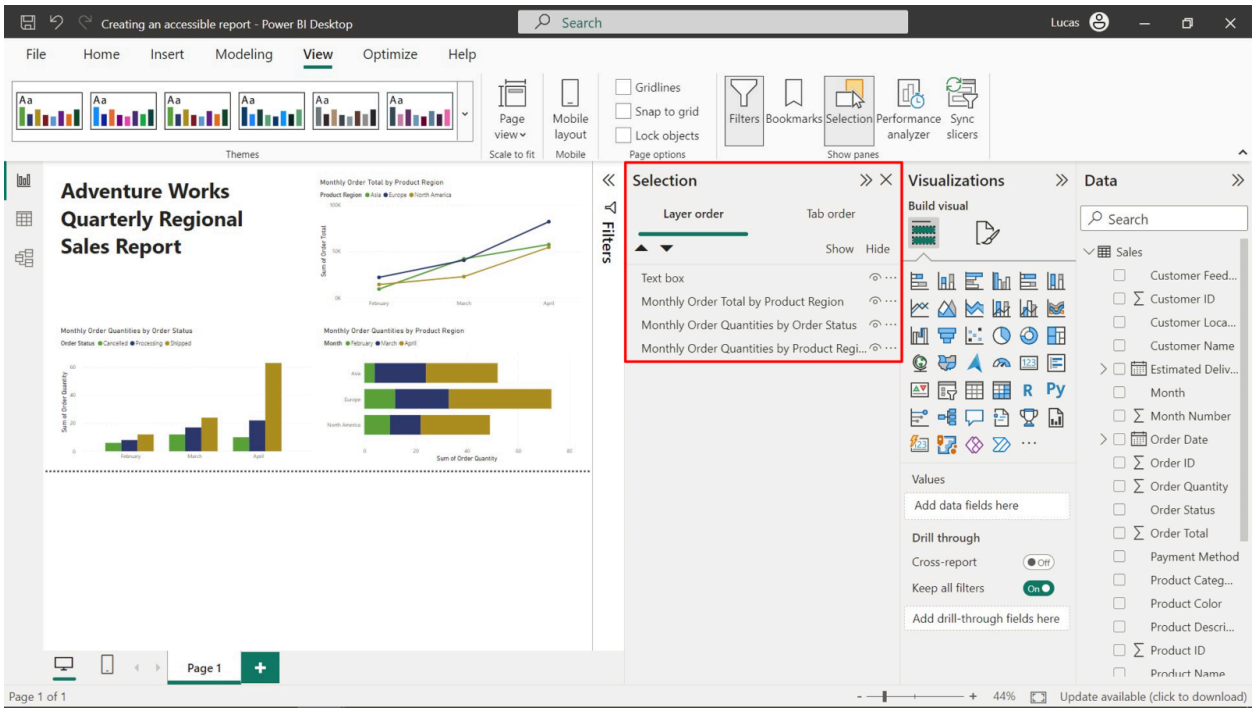


Note: You can also change the color of each item in the chart to a single color, using various shades (light color to dark color). To do so, start by selecting each visual one by

one. To find the color formatting options, navigate to the Format tab, and expand the appropriate section based on the chart type, such as Lines for the line chart, Columns for the clustered column chart, or Bars for the stacked bar chart.

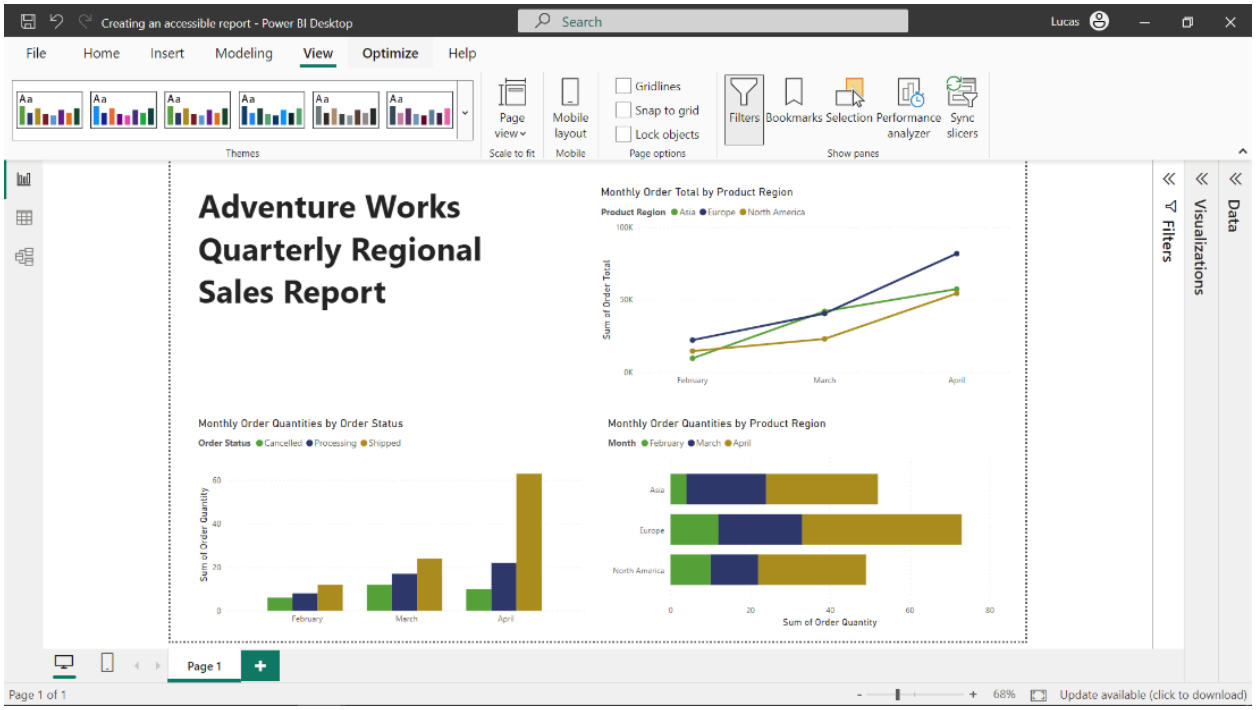
Step 4: Enhance accessibility of chart navigation by changing tab order

1. To set the tab order, select the View tab in the ribbon. Under Show panes, select Selection to display the Selection pane.
2. Drag and change the position of visuals in the following order on the Selection pane, as highlighted in the screenshot below:
    - Text box
    - Monthly Order Total by Product Region
    - Monthly Order Quantities by Order Status
    - Monthly Order Quantities by Product Region



Step 5: Save the report

Once you have made all the necessary changes, save the report by opening File menu and selecting Save. Your final report may appear as follows:



Step 6: Write a summary of the improvements you made to enhance report accessibility

The following improvements were made to enhance the accessibility of the Power BI report, with a focus on improving the experience for visually impaired users such as Logan:

- Descriptive titles: The titles of the report and each chart were made more descriptive. This enables all users can quickly and easily grasp the report's purpose and the content of each chart.
- Alt text: Alternative text descriptions were provided for each chart visual, aligning with inclusive design best practices. This allows users with visual impairments to understand the visualized data, for example, via screen readers. The alt text can also support all users in understanding the purpose and key insights of each chart.
- Markers: Markers were added to the line chart. This enhances the accessibility of the visual by providing users with an alternative way to distinguish between data points that is not solely reliant on color.
- Shaded colors: Shaded colors were introduced to enhance color contrast within the charts. This helps visually impaired users distinguish between different chart elements more easily.
- Tab order: Tab orders for these visuals were changed in the report. This allows users to easily navigate between different elements and sections of the report

using their keyboard, which is particularly useful for users with motor difficulties, such as challenges with using a mouse.
- Accessible theme: An accessible theme was implemented, designed with features like large, legible fonts and a high-contrast color palette. These features improve the readability and overall accessibility of the report.

These improvements make the report more accessible and create an inclusive environment where all users, regardless of their abilities, can understand and interact effectively with the data.

Conclusion

By completing this activity, you explored how to create an accessible report using formatting, themes and design best practices. As you continue on your data analysis journey, remember that accessibility is an integral part of the report design process. By designing for accessibility, you consider a diverse audience, making your reports more inclusive and promoting equity. And that’s not all—these accessibility enhancements also improve the overall user experience and clarity of your reports, which is of benefit to all users.

2.2. Activity: Improving accessibility with tooltips

Introduction

Congratulations on completing another activity successfully. In the previous activity, *Creating an accessible report*, you improved the accessibility of an AdventureWorks sales report using formatting, themes, and design best practices. Although you have improved the report from an accessibility perspective, you can improve it even further using tooltips.

Instructions: Improving accessibility with tooltips

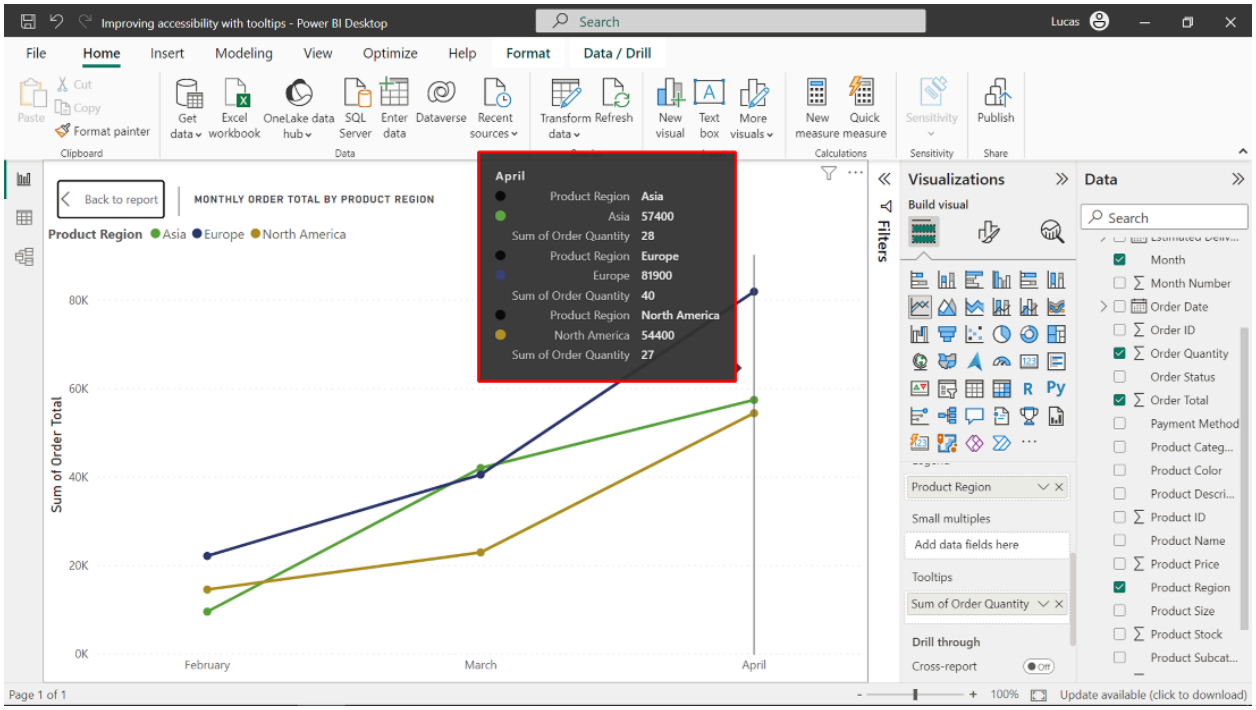
Your task now is to refine the accessibility of the report by integrating tooltips. These tooltips should provide more detailed information about each data point when a user hovers over it. This task aims to make the data more comprehensible without sacrificing the clean visual presentation of the report.

Step 1: Open the previous activity file in Power BI Desktop.

1. Select File menu, followed by Open Report.
2. Select the file you created for the previous activity, *Creating an accessible report*.

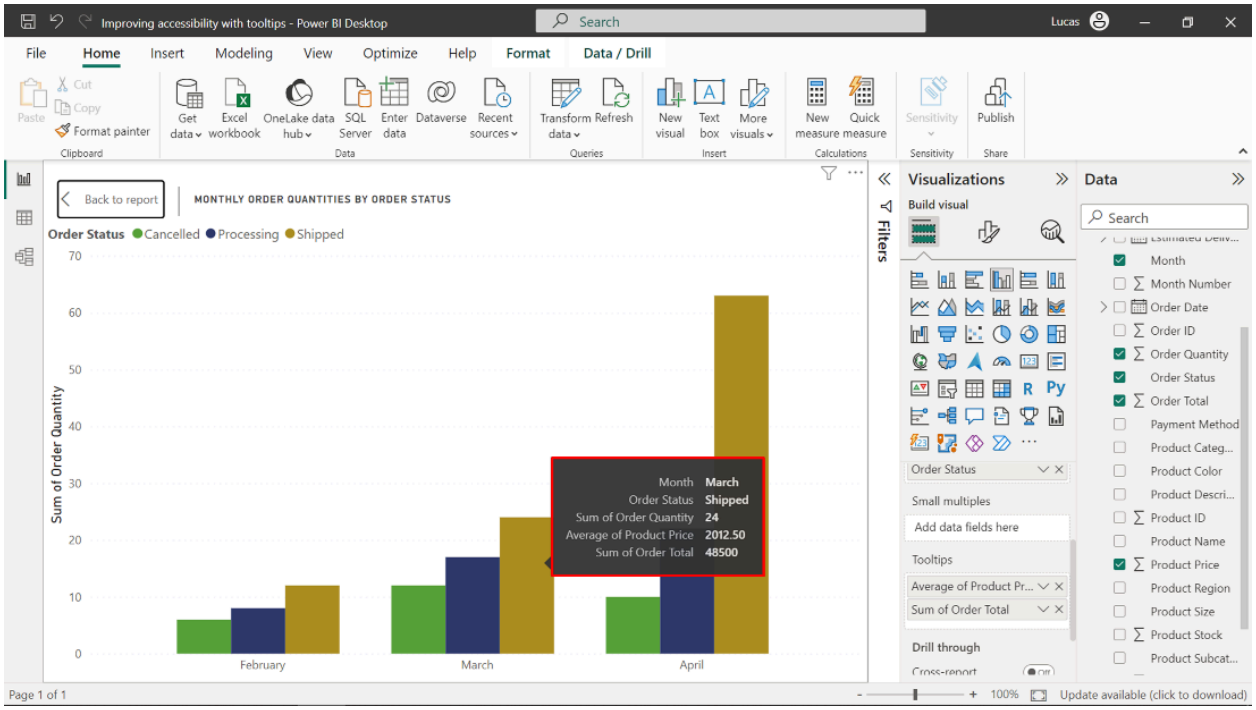
Step 2: Display order quantity in the tooltip for each region in the line chart.

1. Select the line chart and drag the Order Quantity field into the Tooltips well.
2. Hover over any data point on the line chart to ensure that the newly added order quantity data is visible in the tooltip, as demonstrated in the screenshot below.



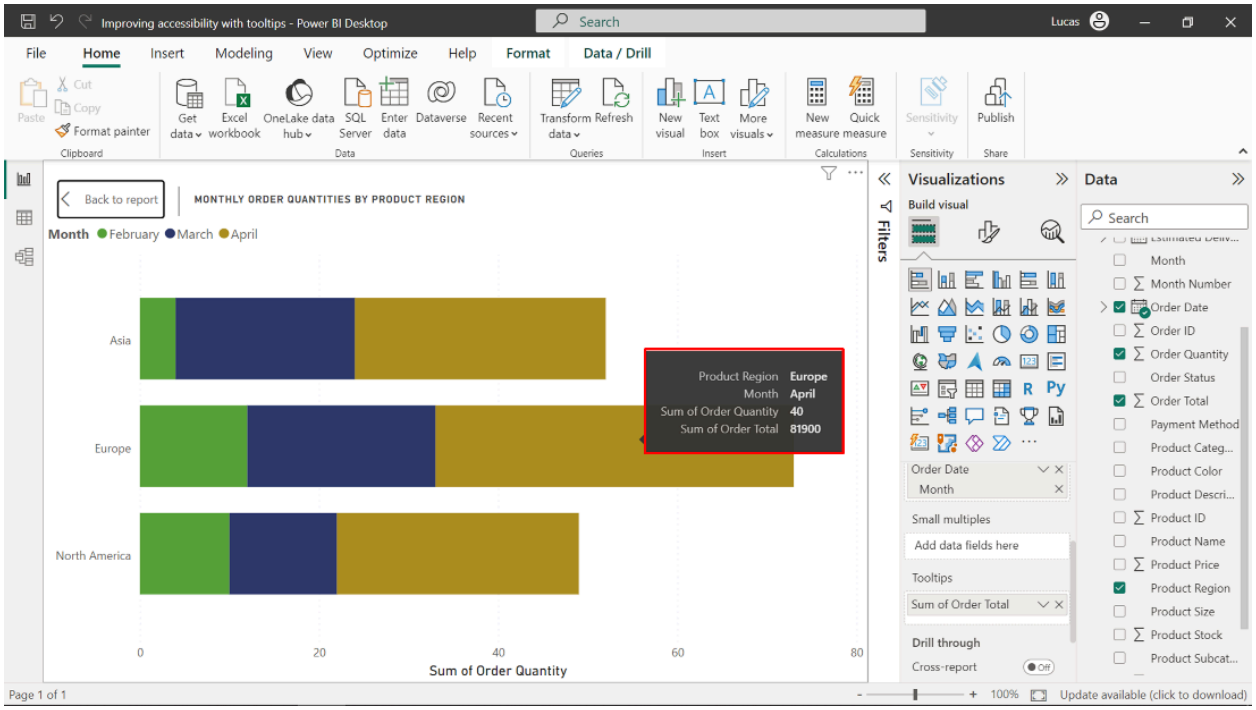
Step 3: Display average product price and total order quantity in the clustered column chart.

1. Select the clustered column chart on the bottom left corner and drag Order Total field into the Tooltips well.
2. Drag the Product Price field to the Tooltips well, select the arrow icon beside this field, and select the Average aggregate function instead of Sum.
3. Hover over any data point on the clustered column chart to confirm that these newly added fields are appearing in the tooltip, as demonstrated in the screenshot below.



Step 4: Display total sales in the stacked bar chart

1. Select the stacked bar chart on the bottom right corner and drag Order Total field into the Tooltips well.
2. Hover over any data point on the stacked bar chart to confirm that the newly added field is appearing in the tooltip, as demonstrated in the screenshot below.



Task 5: Save the report for future use.

- Once you have made all the necessary changes, save the report by opening File menu and selecting Save.

Conclusion

In this activity, you added an additional interactive dimension to your report by including custom tooltips, enhancing overall accessibility. These tooltips will empower all users to more easily understand data points in the different charts, all without cluttering your report's presentation. Combined with the other formatting and design best practices you learned about in this lesson, you are now better equipped to enable inclusive data exploration and decision-making.

2.3. Activity: Sorting and filtering a report

Introduction

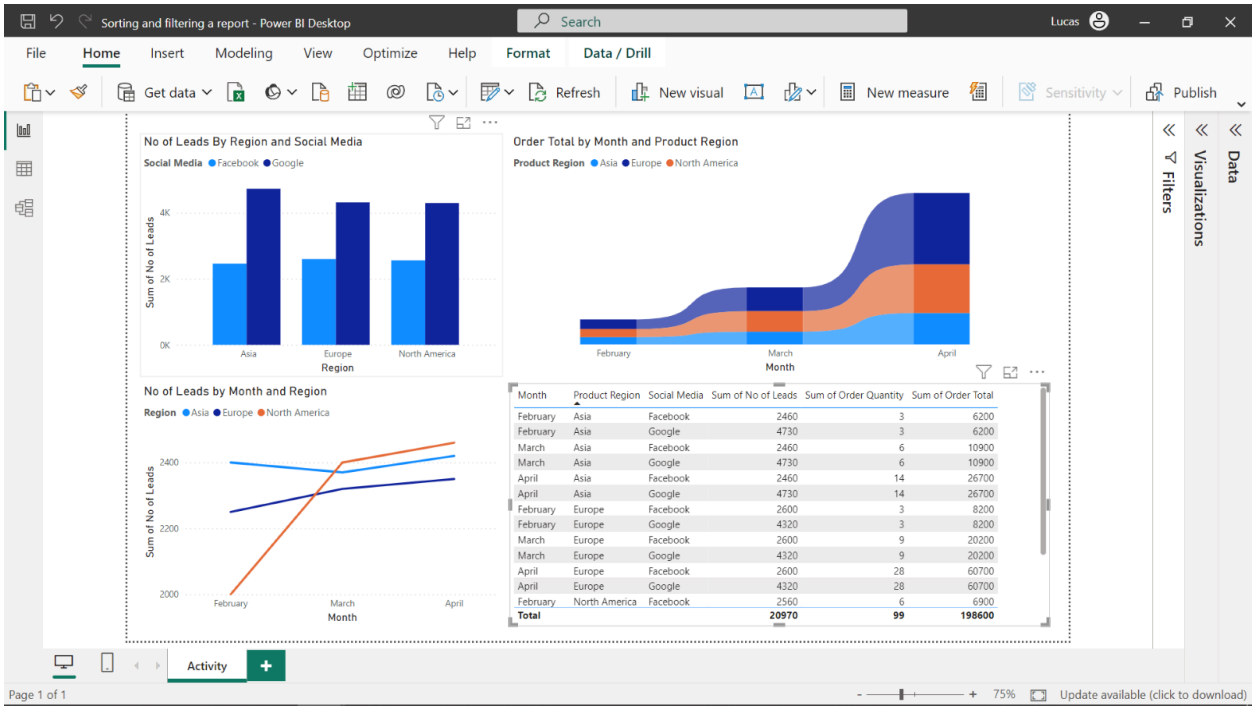
In this lesson on report navigation, you've gained insights into report hierarchies, drillthrough, sorting and filtering data, and cross-filtering and cross-highlighting. You will now have an opportunity to put some of your newly gained knowledge into action and apply it in a hands-on activity.

Activity

Your task is to open the given report and apply filtering and sorting to help the marketing stakeholders at Adventure Works make more informed data-driven decisions. To complete this activity, you need to:

- Open the existing marketing report in Power BI Desktop.
- Sort the ribbon chart in chronological order.
- Apply filters so that the ribbon chart and table chart display results for shipped orders only.
- Sort the line chart by the number of leads in ascending order.
- Sort the table and stacked column chart by region in ascending order.
- Make the stacked column chart and line chart display leads from Facebook and Google only.
- Display marketing data in the table for Facebook and Google only.
- Save the report for future use.

This screenshot that follows provides a visual representation of what your report will look like after successfully completing the tasks outlined in this activity.



Month	Product Region	Social Media	Sum of No of Leads	Sum of Order Quantity	Sum of Order Total
February	Asia	Facebook	2460	3	6200
February	Asia	Google	4730	3	6200
March	Asia	Facebook	2460	6	10900
March	Asia	Google	4730	6	10900
April	Asia	Facebook	2460	14	26700
April	Asia	Google	4730	14	26700
February	Europe	Facebook	2600	3	8200
February	Europe	Google	4320	3	8200
March	Europe	Facebook	2600	9	20200
March	Europe	Google	4320	9	20200
April	Europe	Facebook	2600	28	60700
April	Europe	Google	4320	28	60700
February	North America	Facebook	2560	6	6900
Total			**20970**	**99**	**198600**

Instructions

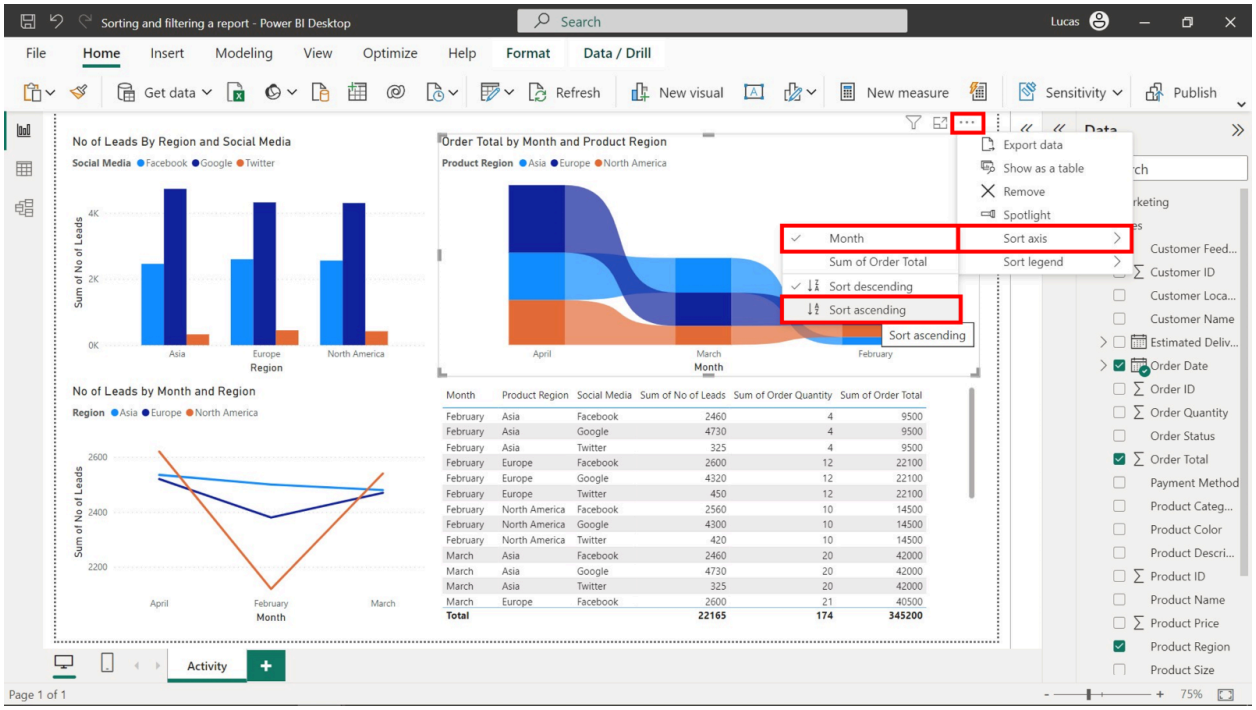
Before starting the activity, you need to download the existing Power BI report from the marketing team at Adventure Works, *Sorting and filtering a report.*

Step 1: Open the report file in Power BI Desktop.

- Select the File menu, followed by Open Report and the *Sorting and filtering a report* file.

Step 2: Sort the ribbon chart in chronological order

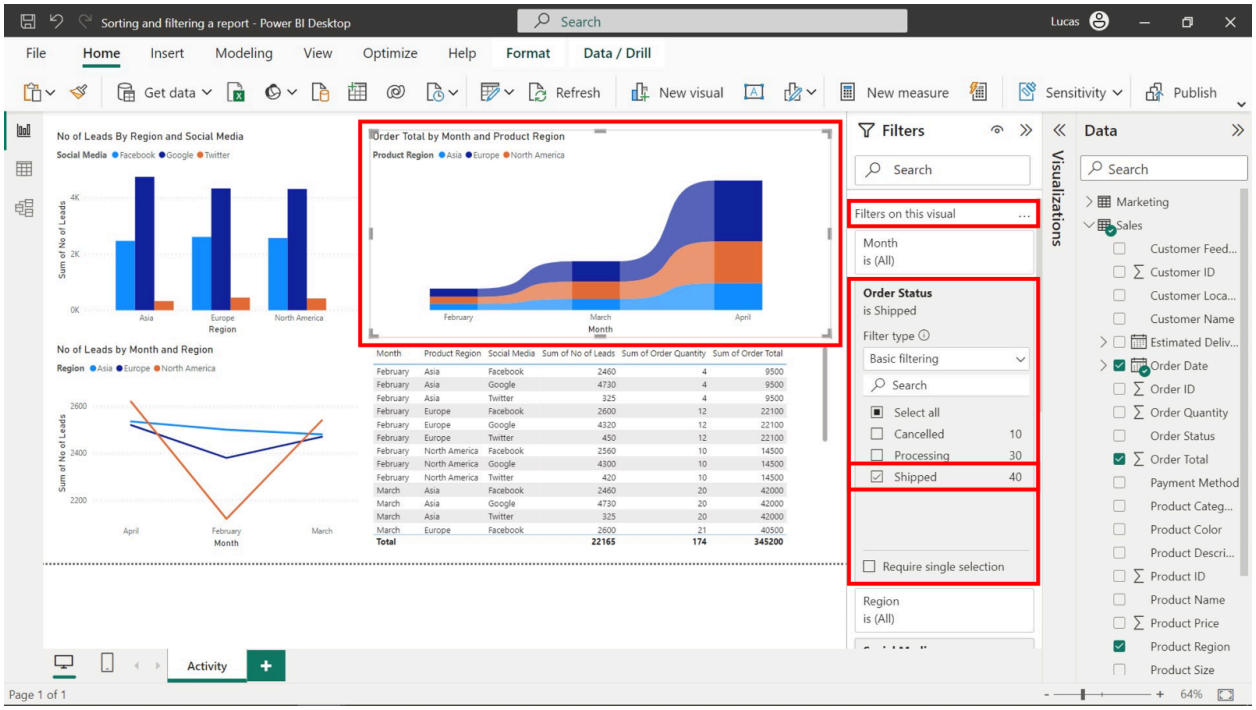
1. Select the ribbon chart, then the three dots on the top right corner of the visual.
2. Select Sort axis, then Month, then Sort ascending.



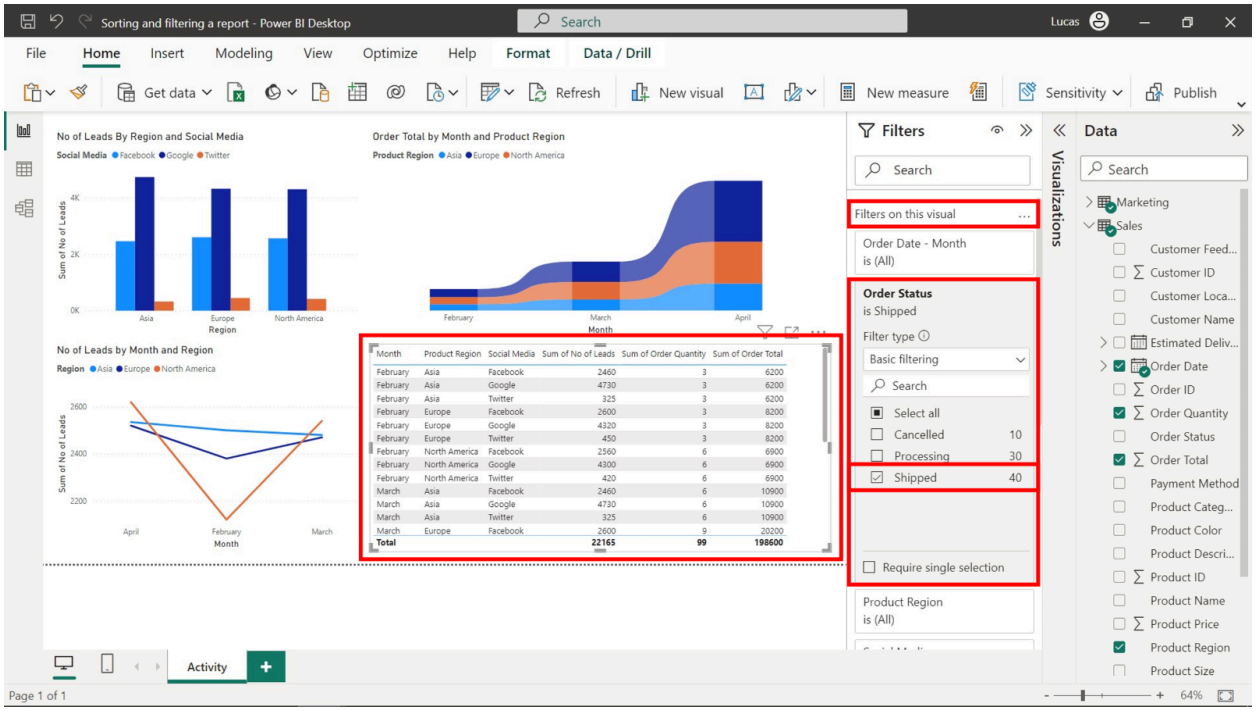
Month	Product Region	Social Media	Sum of No of Leads	Sum of Order Quantity	Sum of Order Total
February	Asia	Facebook	2460	4	9500
February	Asia	Google	4730	4	9500
February	Asia	Twitter	325	4	9500
February	Europe	Facebook	2600	12	22100
February	Europe	Google	4320	12	22100
February	Europe	Twitter	450	12	22100
February	North America	Facebook	2560	10	14500
February	North America	Google	4300	10	14500
February	North America	Twitter	420	10	14500
March	Asia	Facebook	2460	20	42000
March	Asia	Google	4730	20	42000
March	Asia	Twitter	325	20	42000
March	Europe	Facebook	2600	21	40500
Total			**22165**	**174**	**345200**

Step 3: Apply filters so the ribbon and table charts display results for shipped orders only.

1. Select the ribbon chart and open the Filters pane.
2. Drag the Order Status field from the Data pane to the Add data fields here box in the Filters on this visual section.
3. Check Shipped in the Order Status filter.

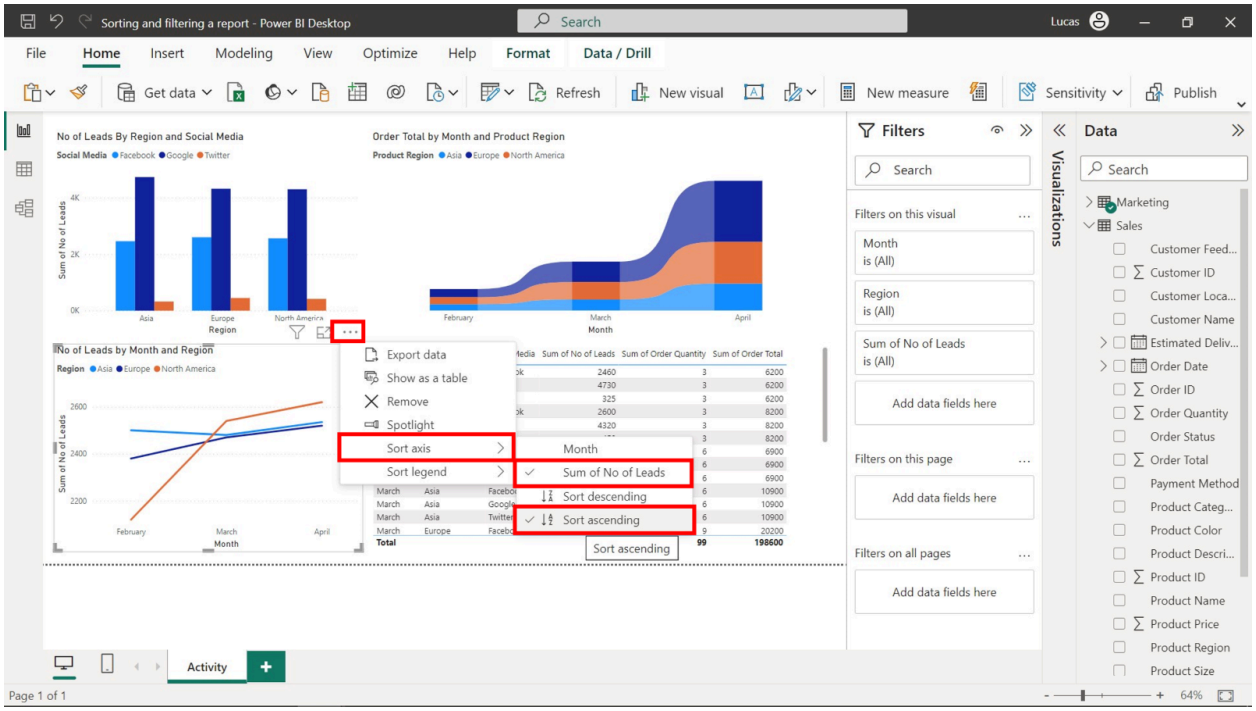


1. Select the table chart and open the Filters pane.
2. Apply the same process to the table chart.



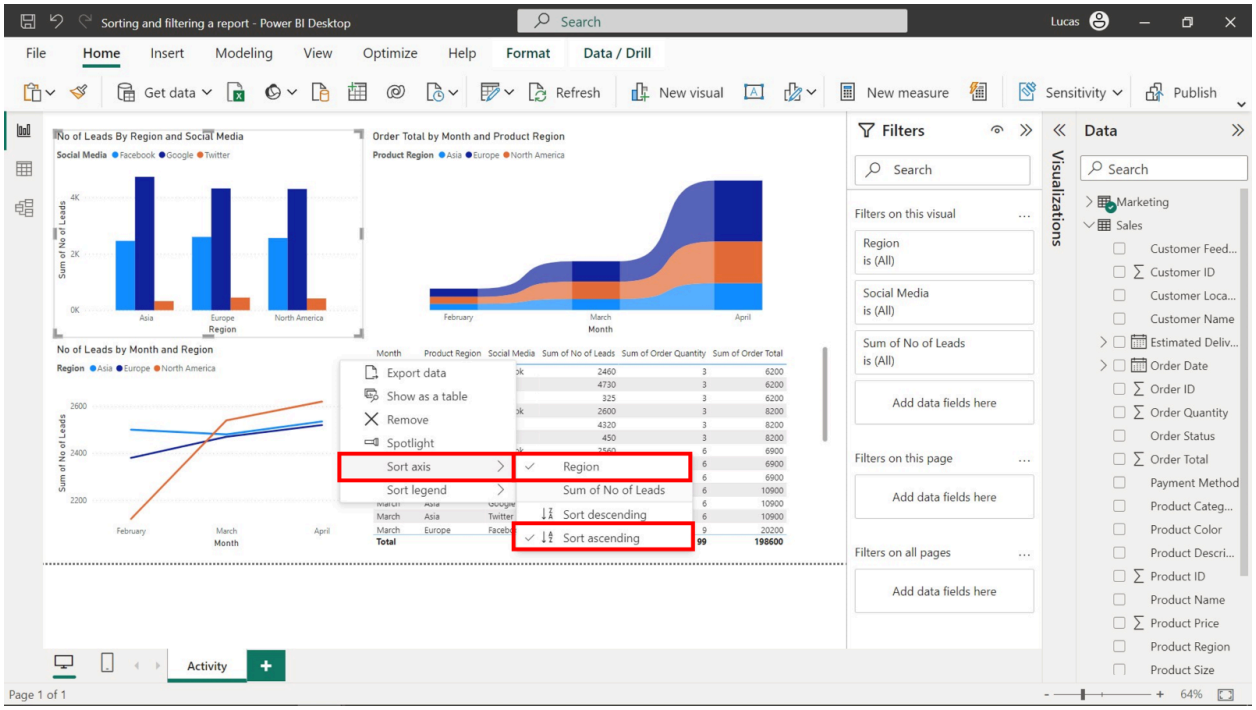
Step 4: Sort the line chart by no of leads in ascending order.

1. Select the line chart and then the three dots in the top right corner of the visual.
2. Select Sort axis, then Sum of No of Leads, then Sort ascending.

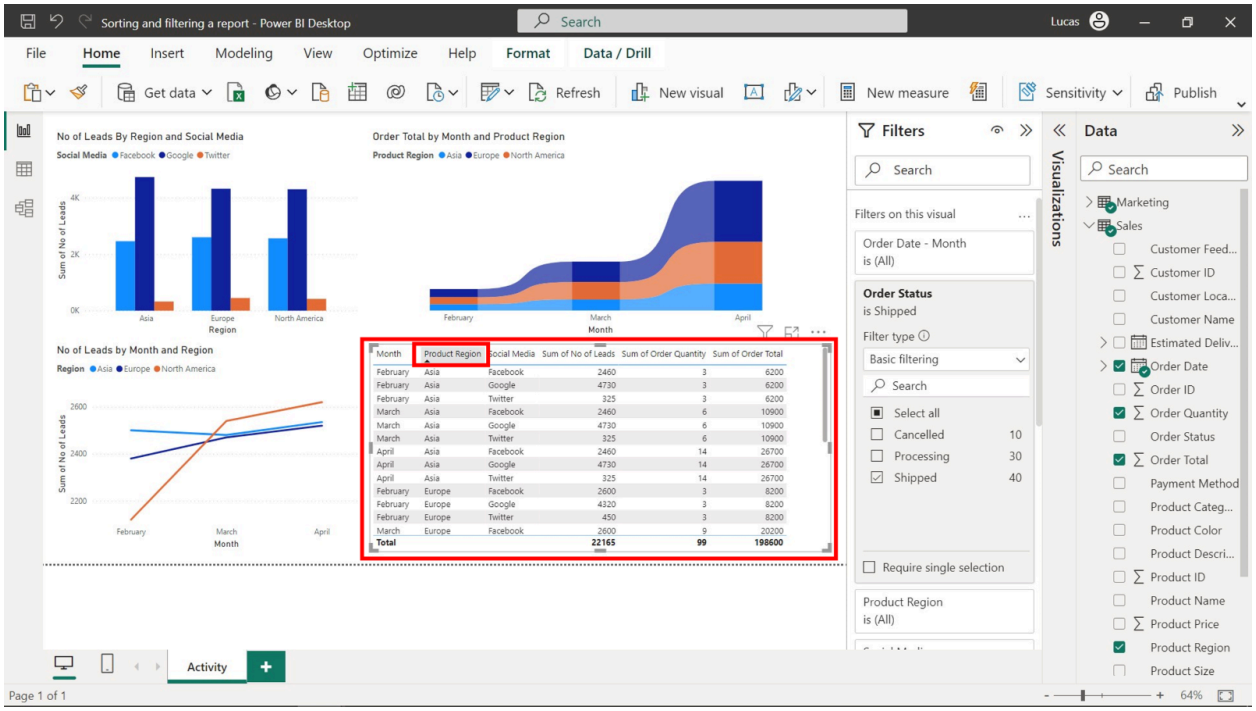


Step 5: Sort the table and stacked column chart by regions in ascending order.

1. Select the stacked column chart, followed by the three dots in the top right corner of the visual.
2. Select Sort axis, then Region, then Sort ascending.

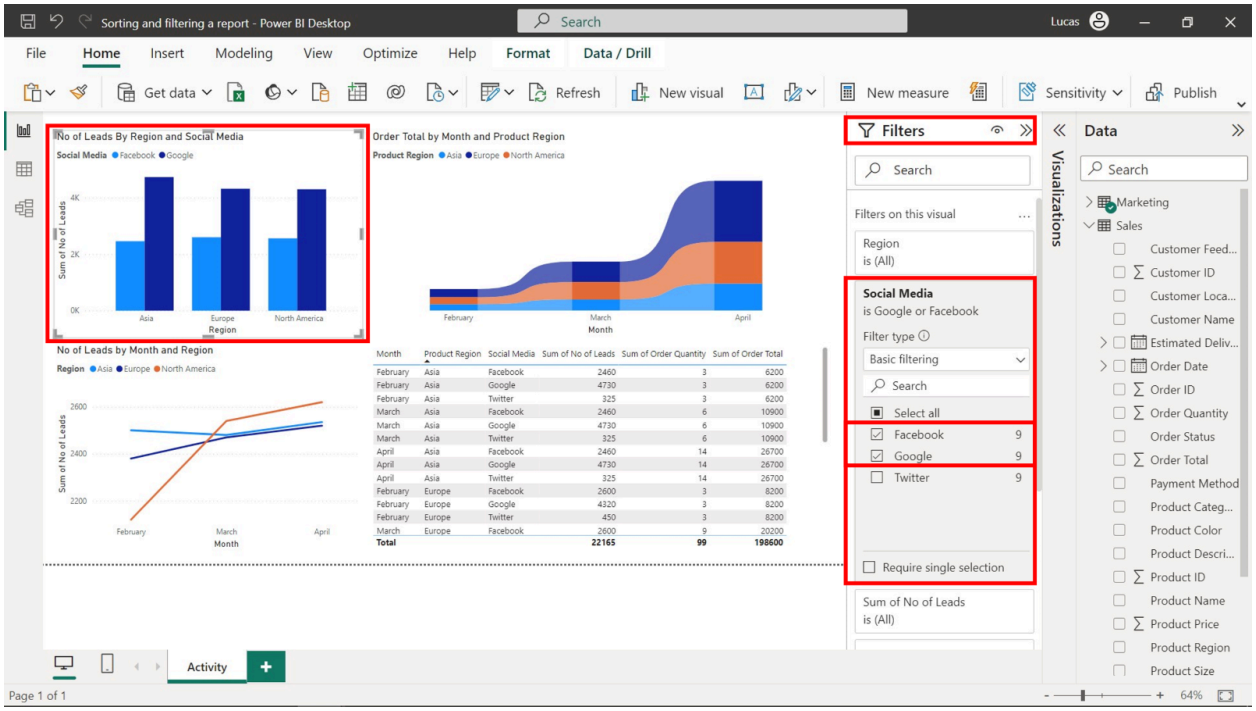


1. Next, select the table visual, then the Product Region column title. Make sure the arrow sign under this column title is pointing upward.

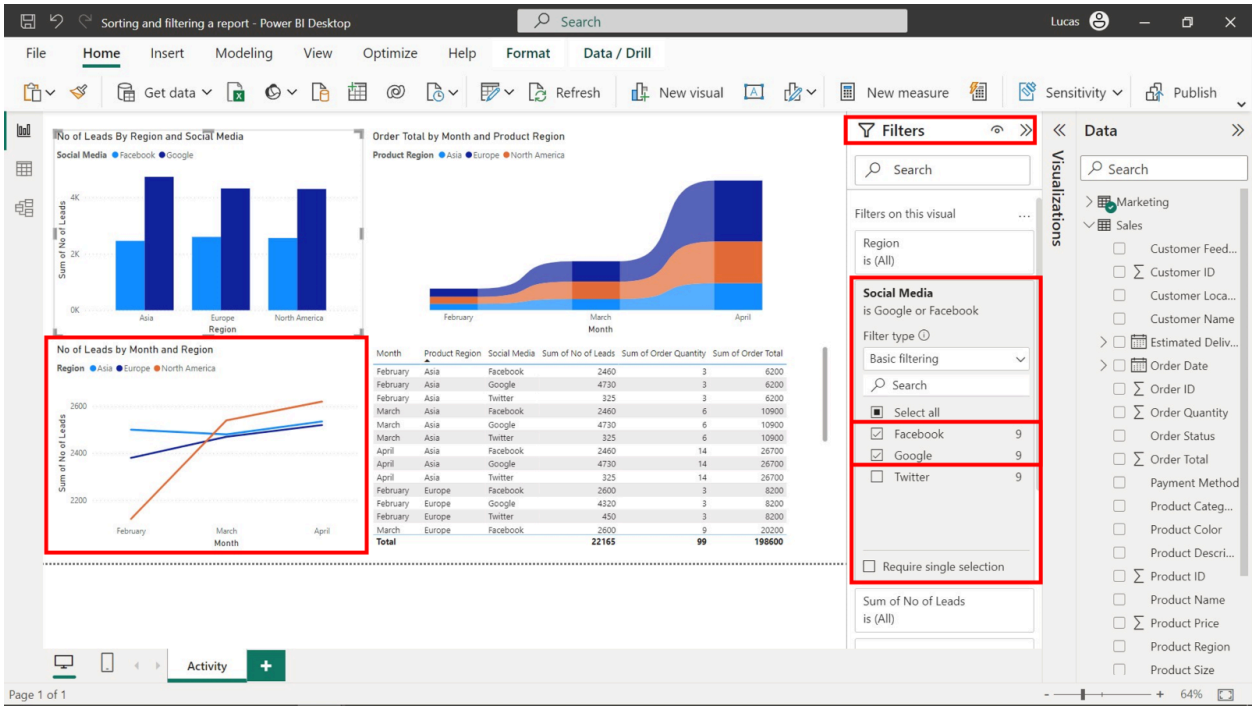


Step 6: Filter the stacked column and line charts to display leads from Facebook and Google only.

1. Select the stacked column chart and open the Filters pane
2. Drag the Social Media field from the Data pane to the Add data fields here box in the Filters on this visual section.
3. Check Google and Facebook only.

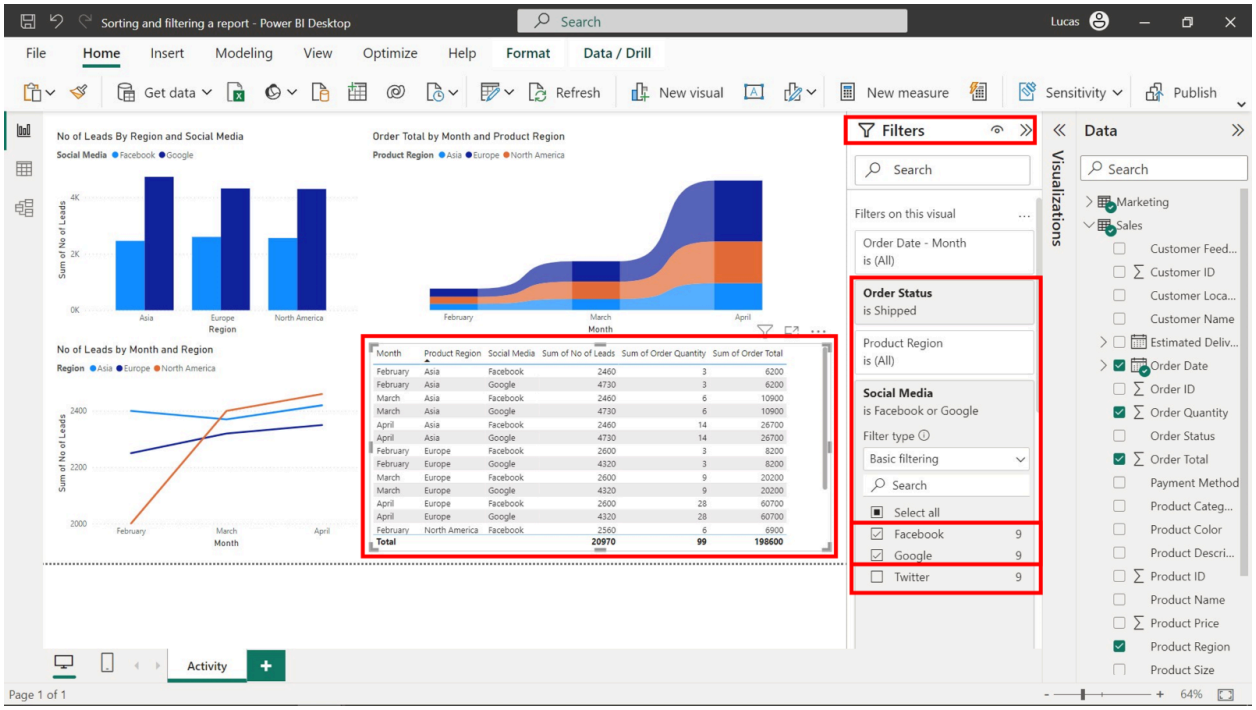


1. Select the line chart and open the Filters pane.
2. Apply the same process to the line chart.



Step 7: Display marketing data in the table for Facebook and Google only.

1. Select the table visual and open the Filter pane.
2. Drag the Social Media field from the Data pane to the Add data fields here box in the Filters on this visual section.
3. Check Google and Facebook only.



Step 8: Save the report for future use

- Once all the changes have been made, save the report by opening File menu and selecting Save.

Conclusion

By completing this activity, you have gained insight into the impact and importance of sorting, filtering, and refining data within a report for driving informed decision-making. By practicing using and applying report navigation techniques like sorting and filtering in Power BI, you will become increasingly proficient at shaping data into meaningful insights for stakeholders.

2.4. Exercise: Creating an interactive report

Introduction

Giving stakeholders the ability to dive into report data to explore summaries and insights is an essential role for a data analyst. As different stakeholders bring different viewpoints, an interactive report will enable various discoveries and help unlock key business decisions. In this exercise, you will learn how to use Power BI to enable user interactions in reports and encourage engagement with the data.

Case study

You are preparing a quarterly sales report for the CEO of Adventure Works. After analyzing the data, you identify some key insights into the Mountain Bike product category and how the products in this category peak at the end of the first quarter (Q1) in preparation for summer.

As a data analyst, you know it is your role to bring these insights to the CEO to enable effective decision-making. As part of the final preparations, to improve the user experience and highlight the key insight into mountain bike sales, you decide to do the following:

- Configure drillthrough to allow for data exploration.
- Allow for easy filtering of product categories using a slicer.
- Provide a convenient bookmark to reload the report with the key insight highlighted.

Step 1: Create the Sales Detail page

1. Download the *Creating an interactive report.pbix* file and open it in Power BI. The Q1 Sales Summary chart will be displayed.
1. Add a new report page and name it Sales Detail.
2. In the Sales Detail page, add a table visualization that displays the Customer Location and Order Total.
3. Note down the total revenue displayed in the Summary row at the bottom of the table.

Step 2: Connect the order Month as the Drillthrough field

1. Open the Data pane and expand the Order Date field.

2. In the Data Hierarchy, drag the Month field to the Drillthrough field in the Visualizations pane.

Note: Power BI automatically creates a back arrow button in the top-left corner of the report page. Holding the control key and selecting the back arrow button will navigate to the Sales Summary page.

Step 3: Add a slicer for Product Category

1. Open the Sales Summary page.
2. Add a slicer visualization and select Product Category as the filter field.

Step 4: Add a bookmark for Mountain Bikes sold in March

1. Select Mountain Bikes in the slicer to filter the data to only sales in the Mountain Bike product category.
2. Right-click the March column, select Drill-through, and then Sales Detail.
3. Now that the report is in a filtered state, add a new bookmark and name it March Mountain Bikes Revenue.
4. Select the bookmark and note down the total sales revenue on the Sales Detail page.

Conclusion

In this exercise, you increased the interactivity of a report and improved the user experience. As you build reports for different audiences, you can utilize these features to deliver valuable insights to stakeholders using the organization’s data.

Exemplar: Creating an interactive report

Introduction

In the exercise *Creating an interactive report,* you were asked to build an interactive report that allowed viewers to drillthrough the data hierarchy based on month and navigate report pages using buttons and bookmarks.

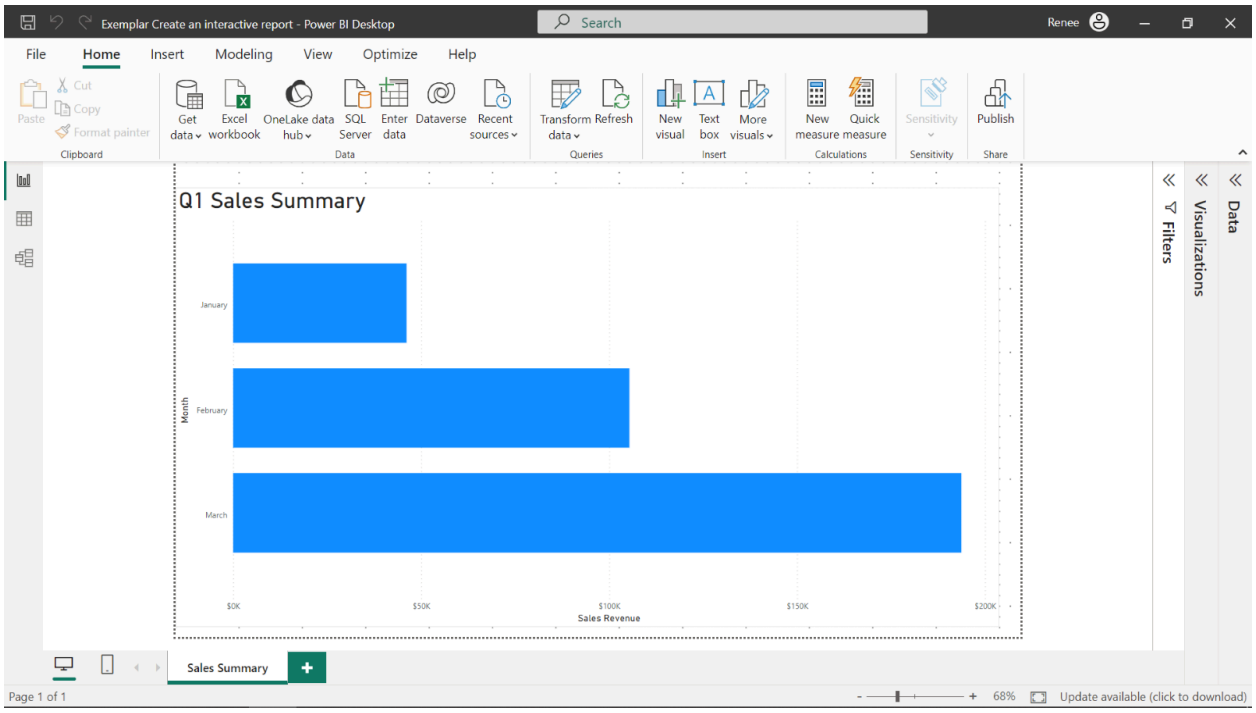
Your task in this exercise was to:

- Create a new report page and configure the drillthrough for the sales month
- Add a slicer to filter by product category
- Create a bookmark for mountain bikes sold in March

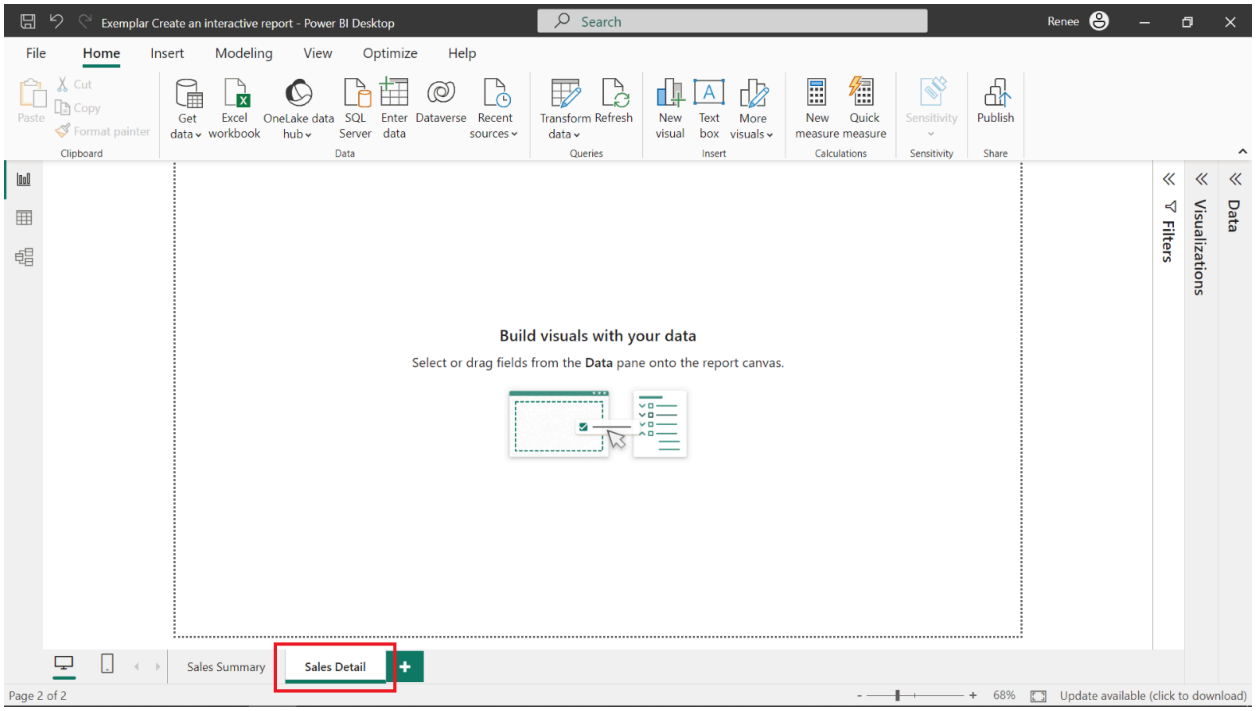
This reading provides you with a step-by-step guide for completing these steps. It also includes screenshots that you can compare against your work.

Step 1: Create the Sales Detail page

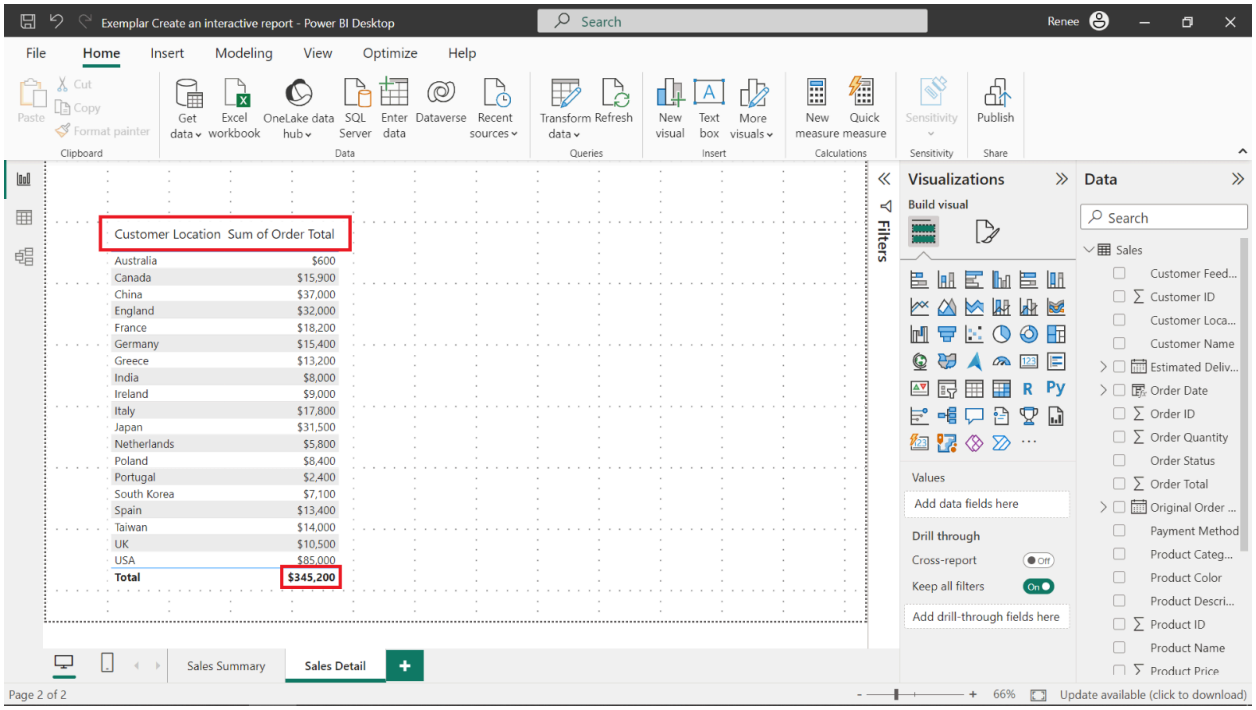
1. Download the *Creating an interactive report.pbix* file and open it in Power BI. The Q1 Sales Summary page will be displayed.



1. Select the Plus icon beside the Sales Summary tab to create a new report page. Name the report page Sales Detail.



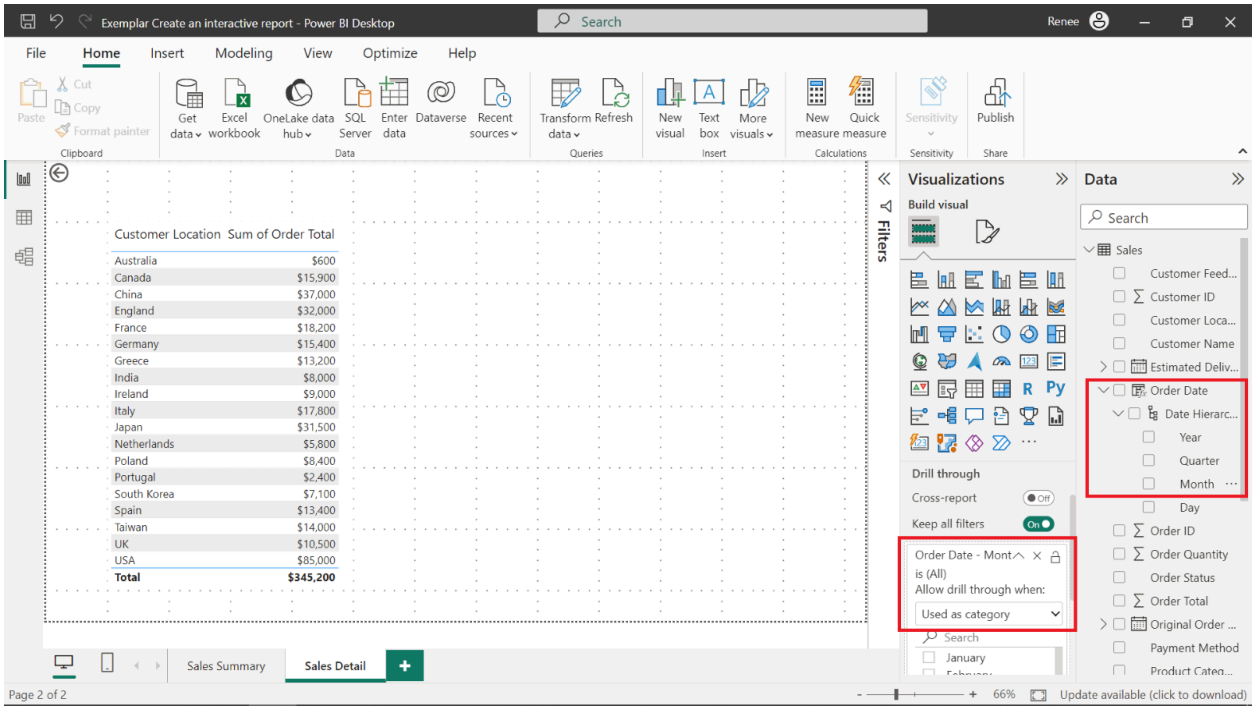
1. Add a table visualization containing a summary of sales revenue per customer location.



1. The Total sales revenue is displayed as $345,200 in the summary row at the bottom of the table.

Step 2: Connect the order Month as the Drillthrough field

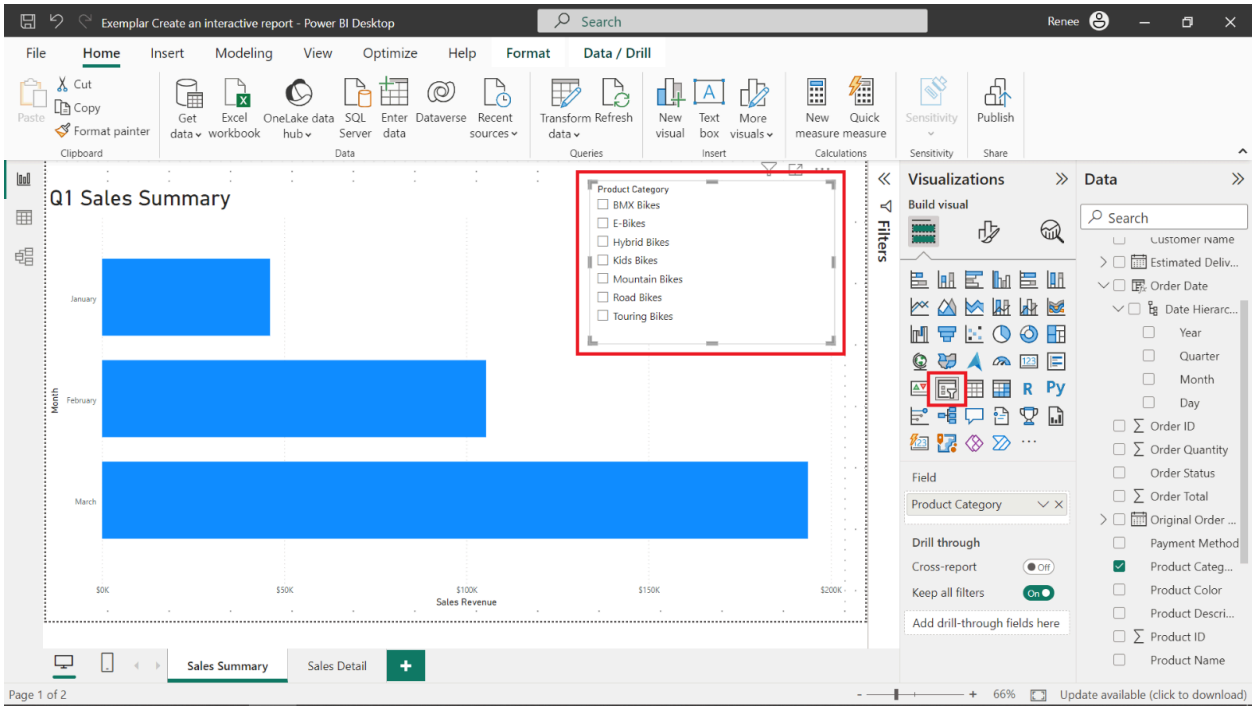
1. Open the Data pane and expand the Order Date field in the Data pane.
2. Drag the Month field from the Data Hierarchy to the Drillthrough field of the table.



Power BI automatically creates a back arrow button in the top-left corner of the report page. Holding the control key and selecting the back arrow button will navigate to the Sales Summary page.

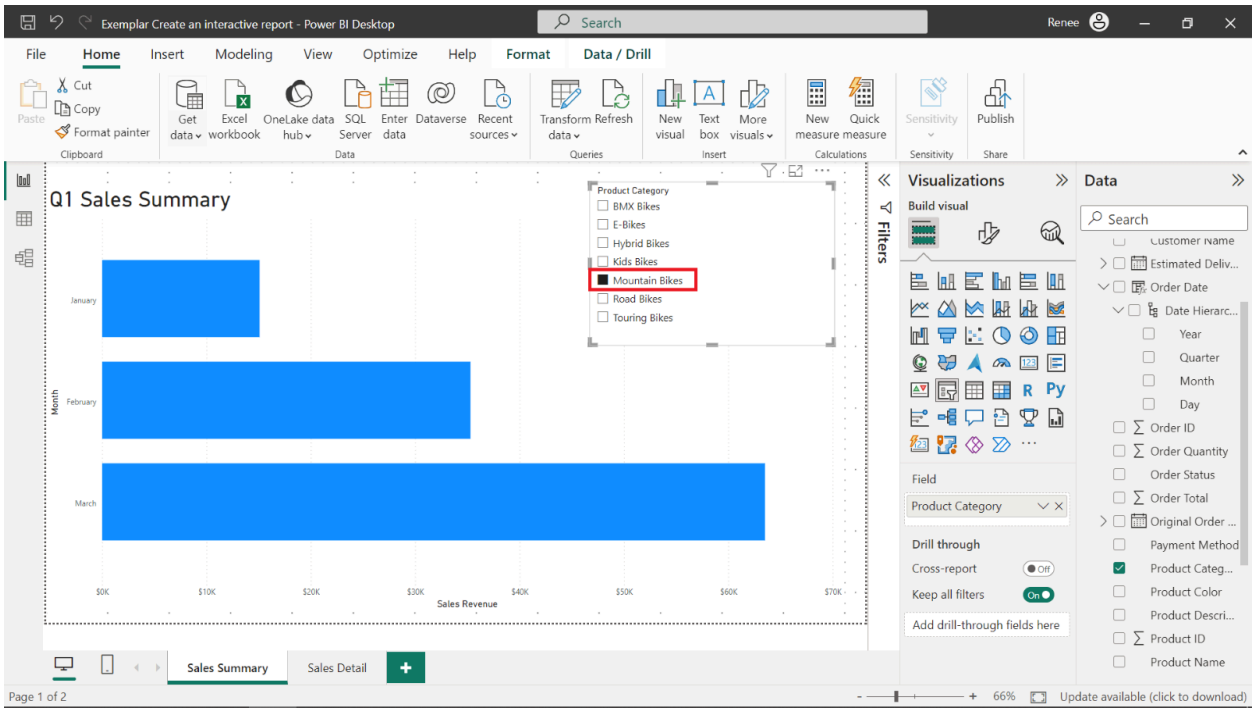
Step 3: Add a slicer for Product Category

1. Open the Sales Summary page.
2. Add a slicer visualization and select Product Category as the filter field.

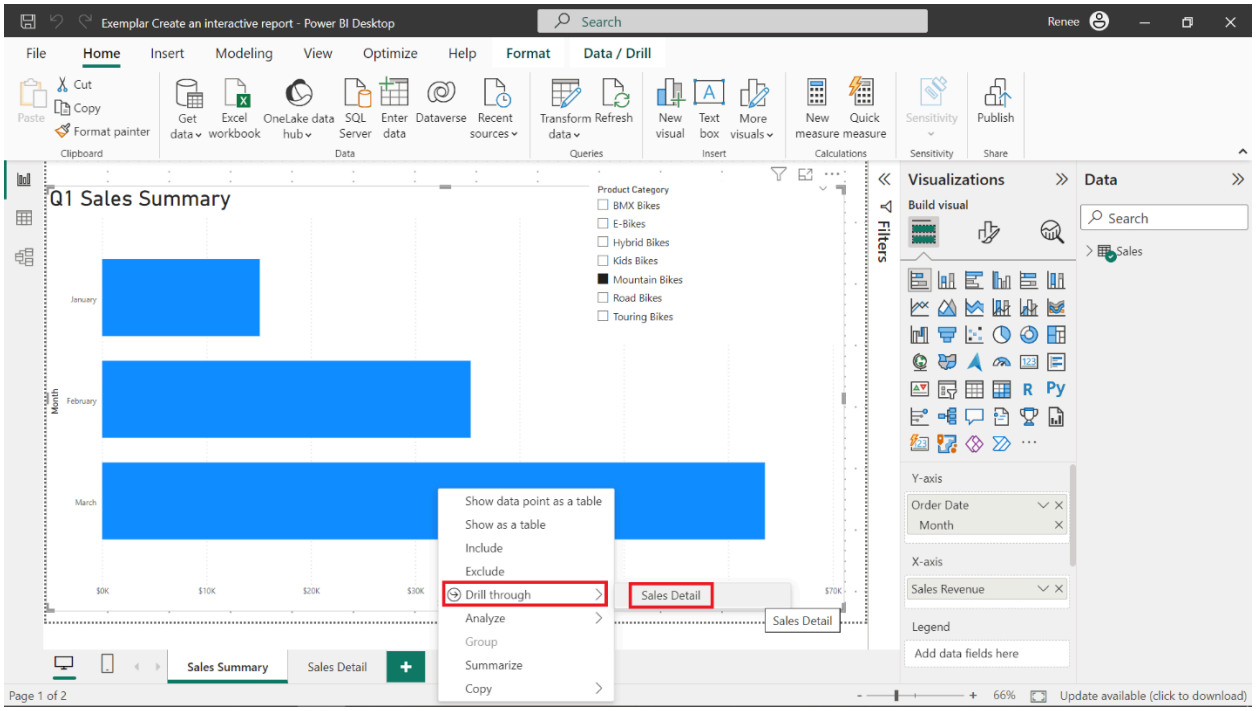


Step 4: Add a bookmark for Mountain Bikes sold in March

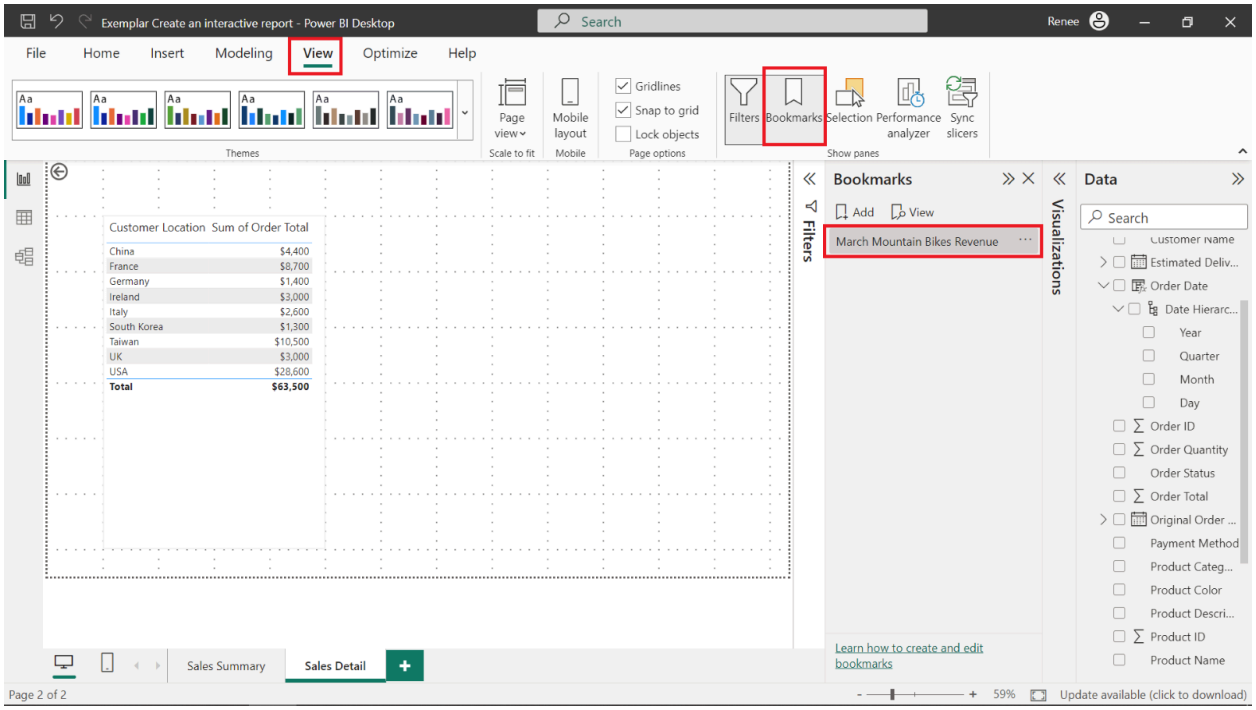
1. Select Mountain Bikes in the slicer to filter the data to only sales in the Mountain Bike product category.



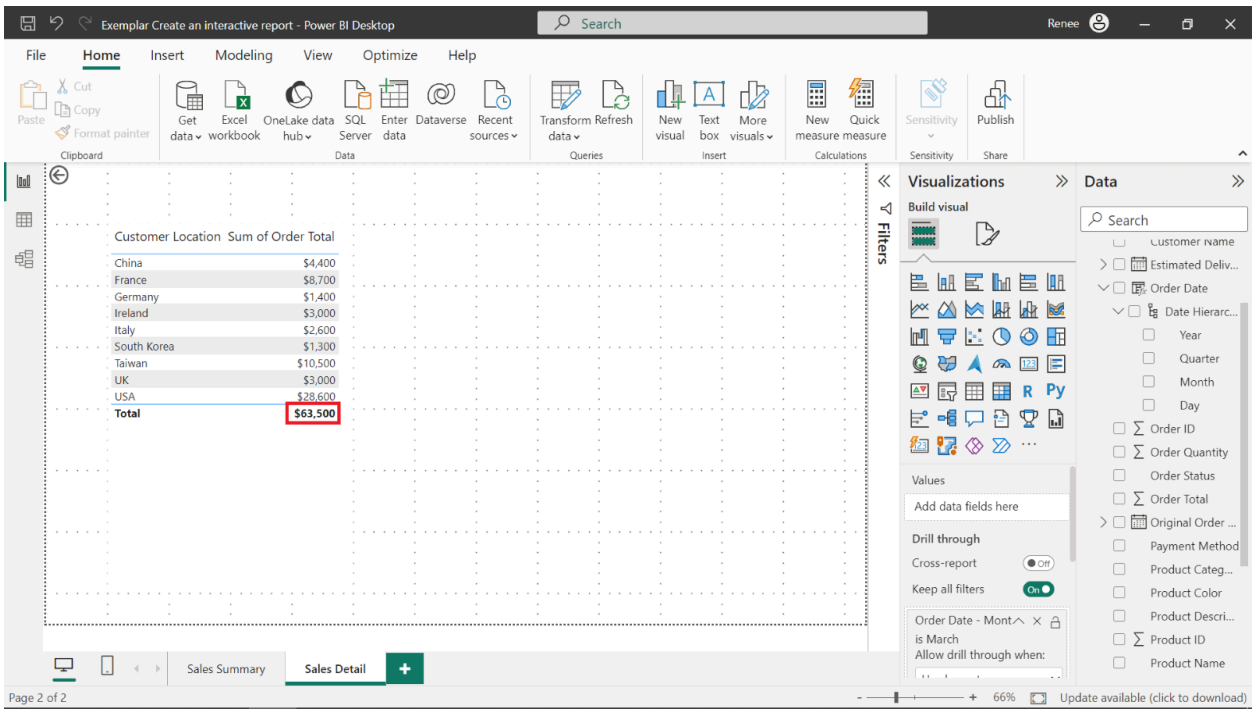
1. Right-click the March column, select Drill through and then Sales Detail.



1. Navigate to the View tab in the Ribbon and select Bookmarks. In the Bookmarks pane, select Add to add a new bookmark and rename it March Mountain Bikes Revenue.



1. Select the bookmark to restore the filtered state. The Total sales revenue is $63,500 in the Sales Detail page.



Conclusion

Congratulations! You have successfully completed this exercise. By adding the drillthrough, button, slicer, and bookmark features to the Power BI report, you've elevated it by making it more interactive and engaging. These tools give you the power to deliver valuable insights and create a smoother experience for your audience. As you keep working on your reports, these skills will be a valuable asset, helping you create more impactful, interactive, and user-friendly presentations.

3.1. Activity: Preparing a simple workspace

Introduction

As a data analyst at Adventure Works, your focus is on extracting valuable insights from a large variety of data to aid strategic decision-making related to sales, marketing, orders, and potential areas of growth. Microsoft Power BI is a tool you can use to sort, organize, and analyze this vast information. In particular, Power BI Workspaces empower you to efficiently create compartments to store, access, share, and analyze different types of data.

In this step-by-step activity, you will learn how to create a simple workspace in Power BI. This is in preparation for the next exercise, where you will build your own dashboard. Creating dashboards within a workspace allows for more efficient content management, organization, and collaboration.

Power BI workspaces

A workspace in Power BI is a dedicated container or space that holds various components such as dashboards, reports, workbooks, and datasets. Consider the specific folders you might create for different projects or tasks on your desktop to keep things organized and easily accessible. A Power BI workspace is like your personal project folder. However, instead of Word documents or Excel files, it's your powerhouse of data assets, making it easy to organize and access these assets. A workspace is an exclusive zone where you can store, manage, and work on data-related components.

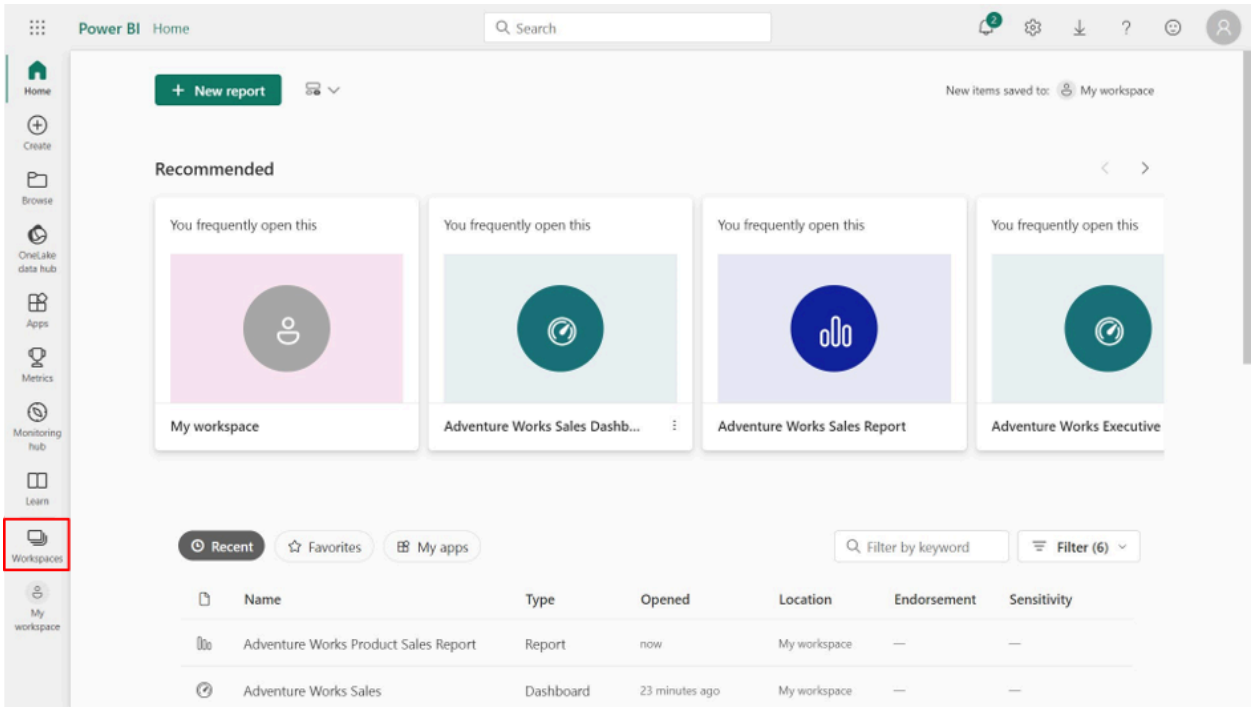
Creating a workspace in Power BI isn't just an elementary step—it's the core foundation of your data management strategy. Like your project folders, workspaces allow you to group related content together. Whether handling datasets, creating reports, or sharing insights, having an organized space makes your tasks easier to manage. Consider Adventure Works as an example. It's a large organization with multiple departments, each with its own set of data requirements. Adventure Works might create separate workspaces for their Sales, Human Resources, Manufacturing, and Marketing departments. This allows them to keep the data related to these departments separate, organized, and tailored to their specific needs. Now, let's dive into how you can create a workspace in Power BI.

Creating a workspace in Power BI

Step 1: Locate workspaces

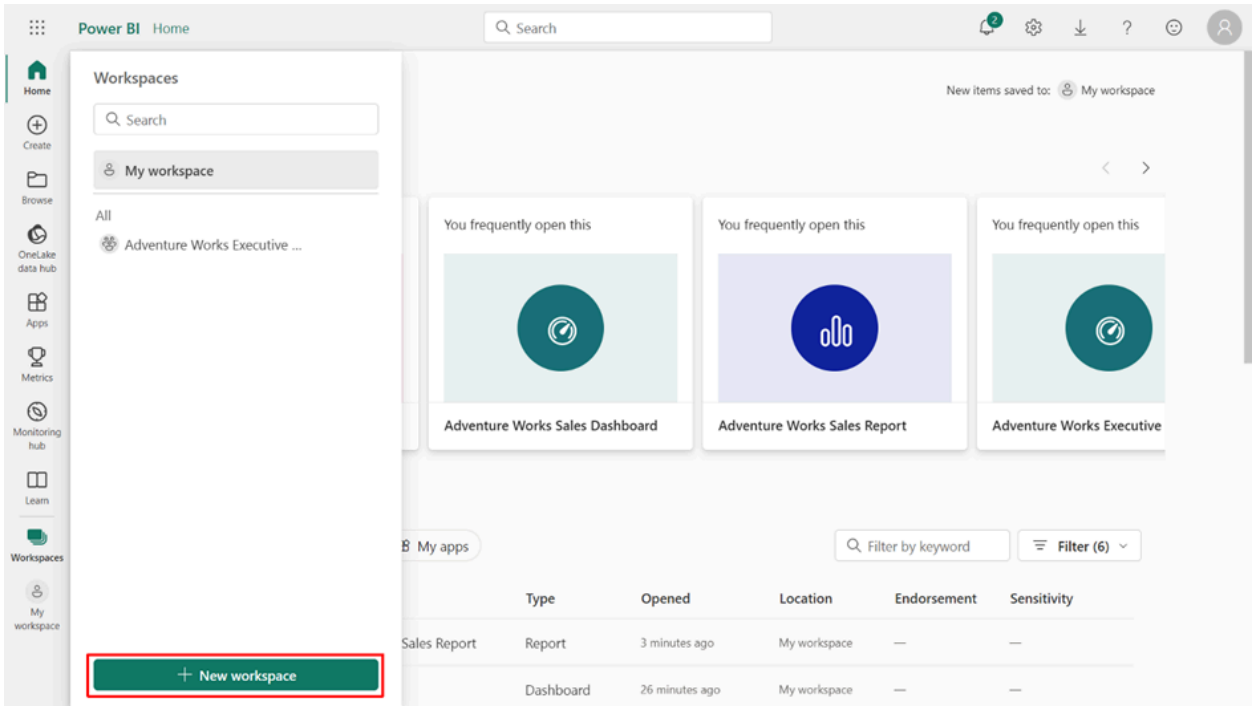
1. Once successfully logged into the Power BI Service, locate the vertical navigation bar on the left side. This is your magic panel that houses various options.
2. Among these options, find and select Workspaces. The icon resembles multiple windows stacked upon each other, symbolizing collective collaboration.

Note: All your current and future workspaces reside in the Workspaces pane. You can think of it as a command center that provides a birds-eye view to manage all your workspaces.



Step 2: Create a workspace

- Select the + New workspace button on the bottom left corner of the open Workspaces pane. This button is your starting point for creating a new workspace.

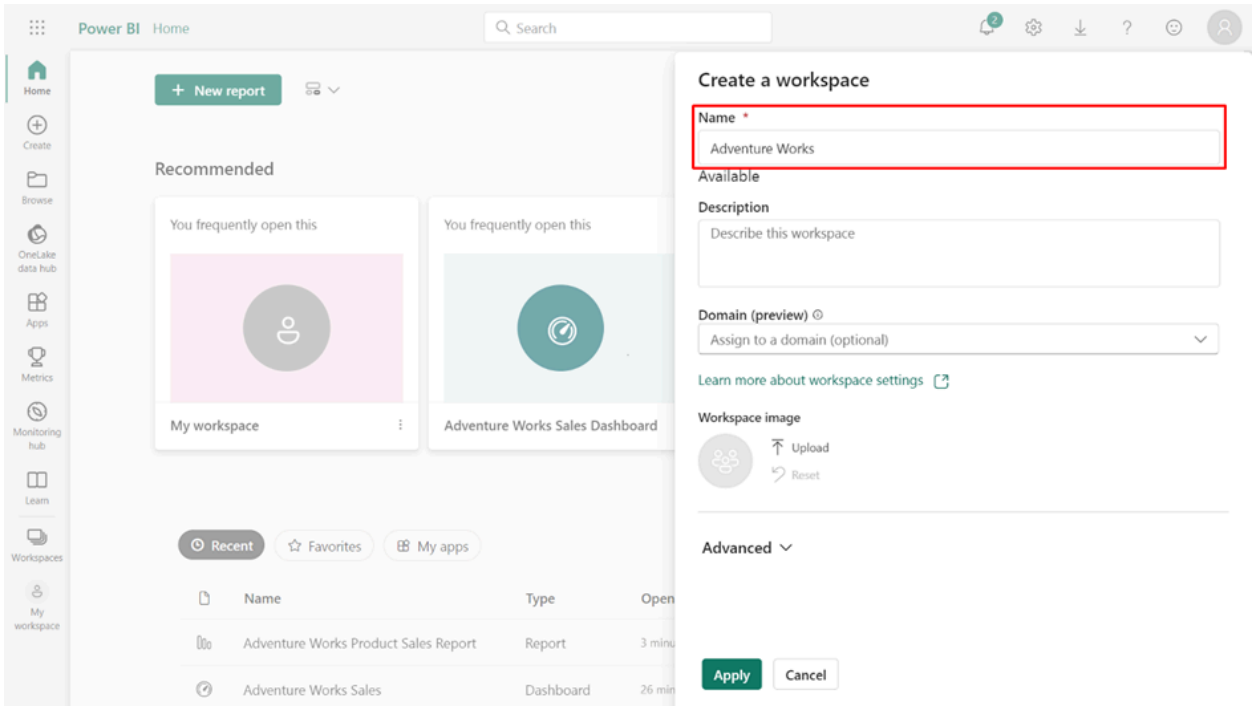


Step 3: Name your workspace

As you select the + New workspace button, a Create a workspace window opens on the right side of your screen.

- In the Name field, enter the title of your workspace. For example, name the workspace *Adventure Works* as you're creating this workspace for the general analysis of multiple datasets like Product Sales, Customers, and Orders.

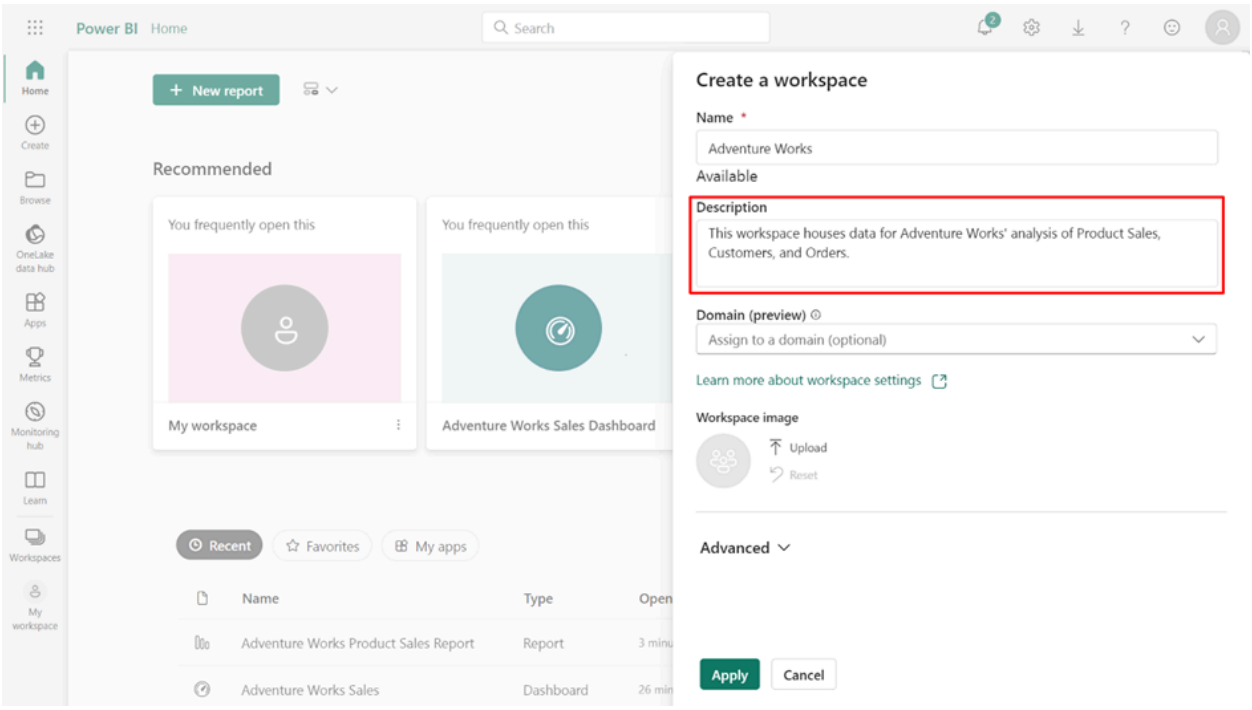
Note: The Name field is the first field in the Create a workspace window. Think of this as the identity card of your workspace. Each workspace you create has to have a unique, meaningful, and distinct name, as this will be its primary identifier within the Power BI ecosystem. As a result, the name you choose should be intuitive and reflective of the workspace's purpose or the data it holds.



Step 4: Describe your workspace

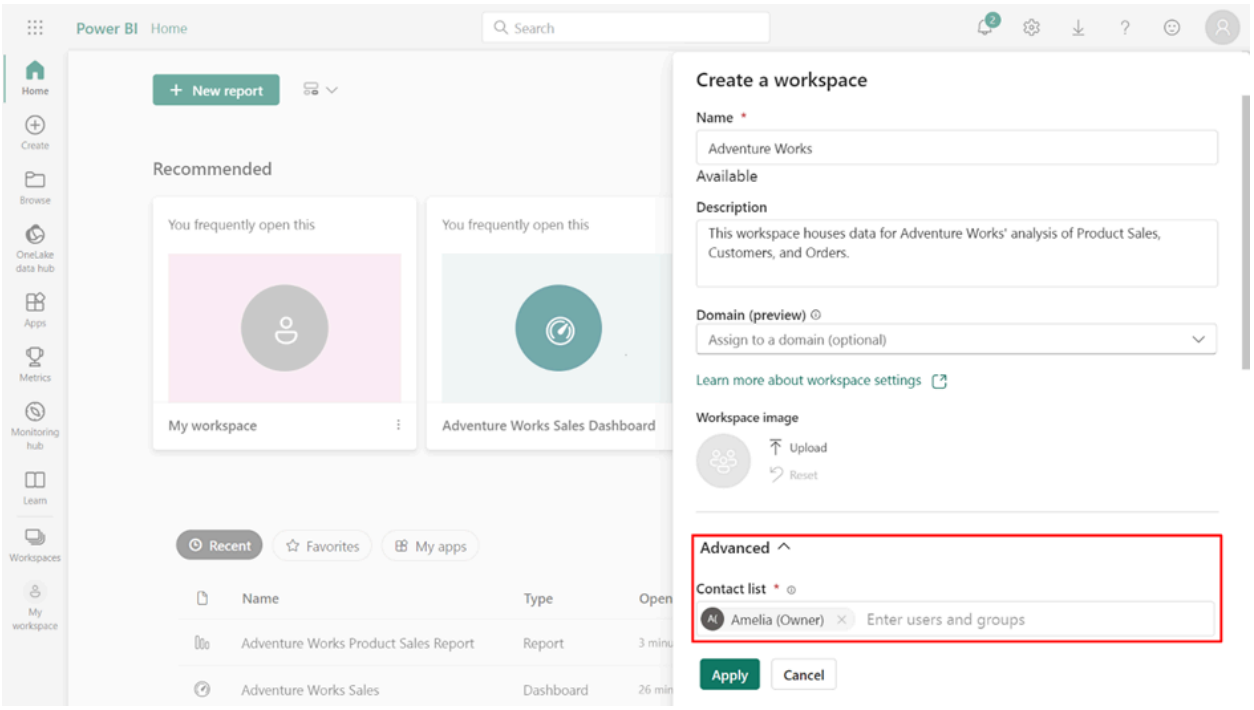
1. Locate the Description box below the Name field.
2. In the Description field, enter This workspace houses data for Adventure Works' analysis of Product Sales, Customers, and Orders.

Note: Describing your workspace is like laying the foundation of a building. It allows you to brief everyone about the workspace's purpose, what it houses, or what project or department it caters to. While the description is optional, it's highly recommended to guide any future users who may come across your workspace.



Step 5: Workspace contact settings

1. Scroll further down the Create a workspace window and expand the Advanced menu.
2. Identify the Contact list section. Note: This is an important setting where you define who gets contacted when there are questions or issues with the workspace's content.
3. In the Contact list section, check that your email address is listed. This default setting implies that, as the creator and owner of this workspace, you are the primary point of contact for any questions or issues concerning the workspace's content.
4. You can change this listing and specify additional users who can serve as contacts. Note: By adding additional contacts, you are decentralizing the communication process. This helps when you need to distribute responsibility or ensure that questions and issues are directed to the most suitable person.

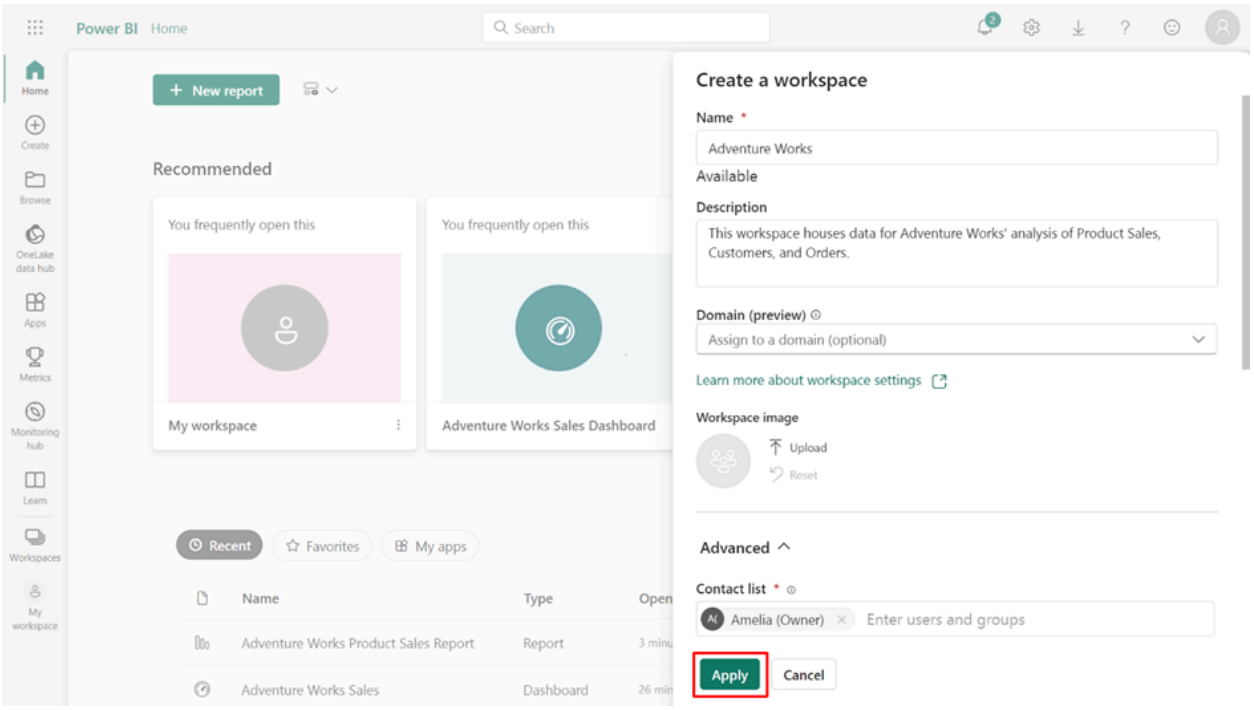


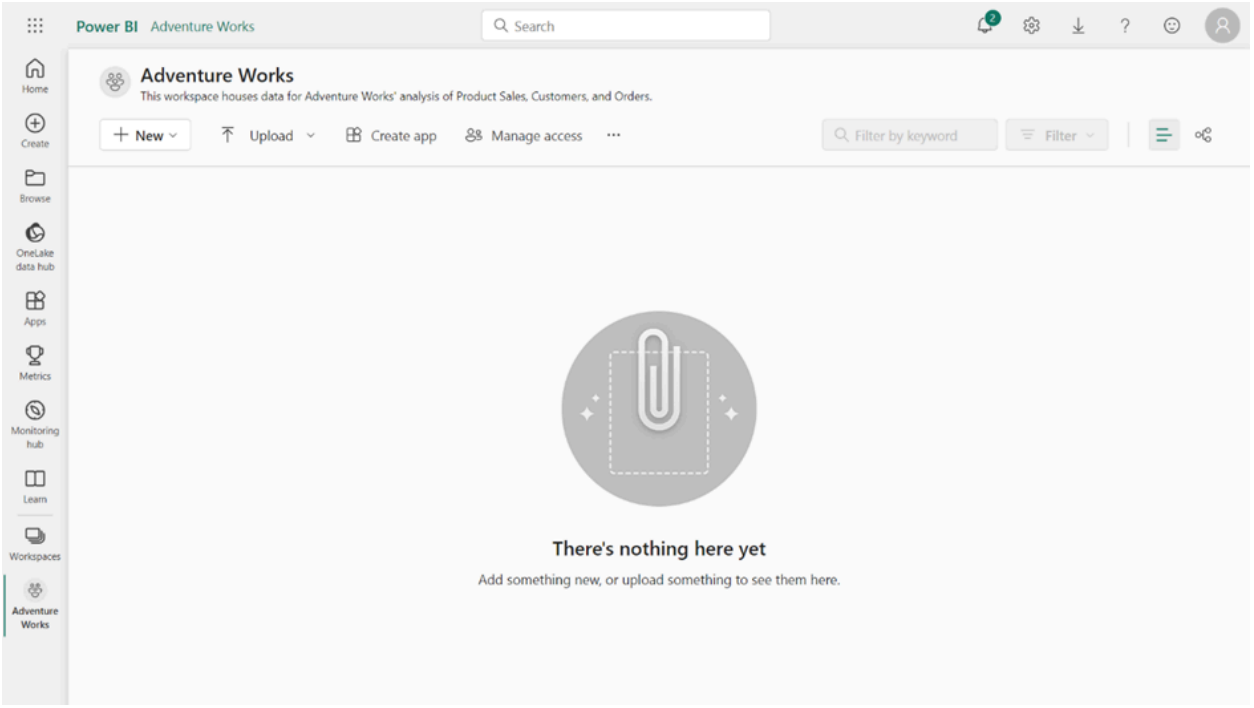
Step 6: Finalize workspace creation

Once you've fine-tuned the contact settings, the next step is to create the workspace.

- At the bottom of the Create a workspace window, select Apply to finalize the creation process. Once you select this, all the details you have entered and adjusted take effect.

Note: You can modify each workspace as per your evolving needs. You can add or remove members, adjust their roles, or change workspace settings even after you've created it.





Conclusion

And there you have it—the creation of your first workspace in Power BI service. Each workspace you create in Power BI is like a chapter in the story of your data analysis

journey. While this reading introduced you to creating a workspace in Power BI, you will explore workspaces in much greater depth in a later course. You are now prepared to build your own dashboard in the next exercise, using the workspace you created in this activity.

3.2. Exercise: Building a dashboard

Introduction

You're part of the data analytics team at Adventure Works, responsible for transforming streams of raw data from around the globe about products, sales, and customers into a strategic tool to support business success. The company's CEO relies on you to provide insights that empower her to quickly and effectively understand the complex narrative of the company's performance. Microsoft Power BI's dashboarding capabilities are your answer to condensing an ocean of data into a few clear, digestible visuals. That's why, in this exercise, you'll practice creating an executive summary dashboard in Power BI for the CEO of Adventure Works.

Case study

In Power BI, a dashboard is a collection of visuals, reports, and other data that provides a consolidated view of business data, making it an essential tool for any executive. In preparation for building your dashboard, your manager gives you three separate reports: *Adventure Works Product Sales Report*, *Adventure Works Customer Report*, and *Adventure Works Order Report*. Each report contains specific visuals that tell a unique part of the business story. Your task is to gather the most important elements from these reports and bring them together to create the executive dashboard.

Instructions

Download the following Power BI report files to your local machine. Then, follow the prompts below to complete the exercise.

Step 1: Upload the pre-made reports to Power BI service

1. Open a new tab in your web browser and navigate to the Power BI service website at https://app.powerbi.com/.
2. Within the Adventure Works workspace, which you created in the previous activity, locate and select the Upload button on the top left of the screen.
3. From the dropdown menu, select Browse.
4. Select the first report you want to upload. Note: You can only upload one report at a time.
5. To start the uploading process, select Open.
6. Repeat steps 3 to 5 for each report.

Step 2: Create a new dashboard

1. In the Navigation view of My Workspace, locate and select the + New button on the top left corner of the screen. This button serves as a quick action to create new BI assets.
2. A menu will appear with options such as Report, Dashboard, Scorecard, and so on. You're creating a dashboard for this step, so select Dashboard from the list.
3. A pop-up window titled Create a dashboard will appear. Type Adventure Works Executive Summary in the Name field.
4. Select Create.

Note: This action creates a new dashboard shell and redirects you to it. At this point, it's empty because you haven't added any content to it.

Step 3: Pin live reports to the dashboard

1. On the left side of your Power BI service screen, locate and select Workspaces > My Workspace again.
2. Find and select the *Adventure Works Product Sales Report* in the list of reports within the workspace. This opens the report for viewing and editing.
3. Locate and select the ellipsis (…) option on the top-right corner of the menu bar.
4. From the dropdown menu that appears, navigate to Pin to a dashboard. A window will appear, showing a preview of the page and a dropdown to select which dashboard to pin the page to.
5. Select the Adventure Works Executive Summary dashboard from the dropdown menu and then Pin live.
6. Repeat steps 1 to 5 for the visuals in the *Adventure Works Customer Report* and the *Adventure Works Order Report*. Each report will contribute important visuals to your dashboard, providing a comprehensive view of business performance.

Step 4: Add Quick Insights

1. Navigate to the My Workspace area of the Power BI service and locate the specific dataset you're interested in. Start with the *Adventure Works Product Sales Report*.
2. Select the ellipsis (...) next to the report name. Find and select Quick Insights. Note: This prompts Power BI to start an automated search for data insights. It can take a few minutes for Power BI to complete this analysis.
3. Once Power BI generates insights, it will present them as a list of visuals. As you review the results, you decide that the Product Stock by Customer Feedback visuals might be helpful to your CEO.

4. To pin the Product Stock by Customer Feedback visual to your dashboard, hover over the visual and select the pin icon in the top right corner.
5. A pop-up window will ask you to select a destination dashboard for the visual. Choose your Adventure Works Executive Summary dashboard from the dropdown list and select Pin. The Product Stock by Customer Feedback visual will now appear on your dashboard, ready to provide quick insight at a glance.
6. Repeat steps 1 to 5 for the *Adventure Works Order Report* and *Adventure Works Customer Report* datasets.

Conclusion

In this exercise, you learned how to use and refine various raw data sources into an executive summary dashboard for the Adventure Works CEO. Converting raw data into dynamic, intuitive dashboards full of quick insights is a vital skill that can help guide critical business decisions.

Exemplar: Building a dashboard

Introduction

The *Building a dashboard* exercise challenged you with creating an executive summary dashboard for Adventure Works' CEO. The task required transforming global data about products, sales, and customers into an insightful, intuitive tool for decision-making—a Power BI dashboard.

More specifically, your tasks were to:

- Upload pre-made reports to the Power BI service, providing you with the data you need for your dashboard.
- Create a new dashboard titled Adventure Works Executive Summary, giving the CEO a centralized, interactive interface for viewing and understanding the company's data.
- Pin live reports from the three reports to the dashboard, ensuring dynamic, interactive data is readily available to the CEO.
- Add Quick Insights to your dashboard, leveraging Power BI's automated analysis features to uncover hidden trends and patterns in the data.

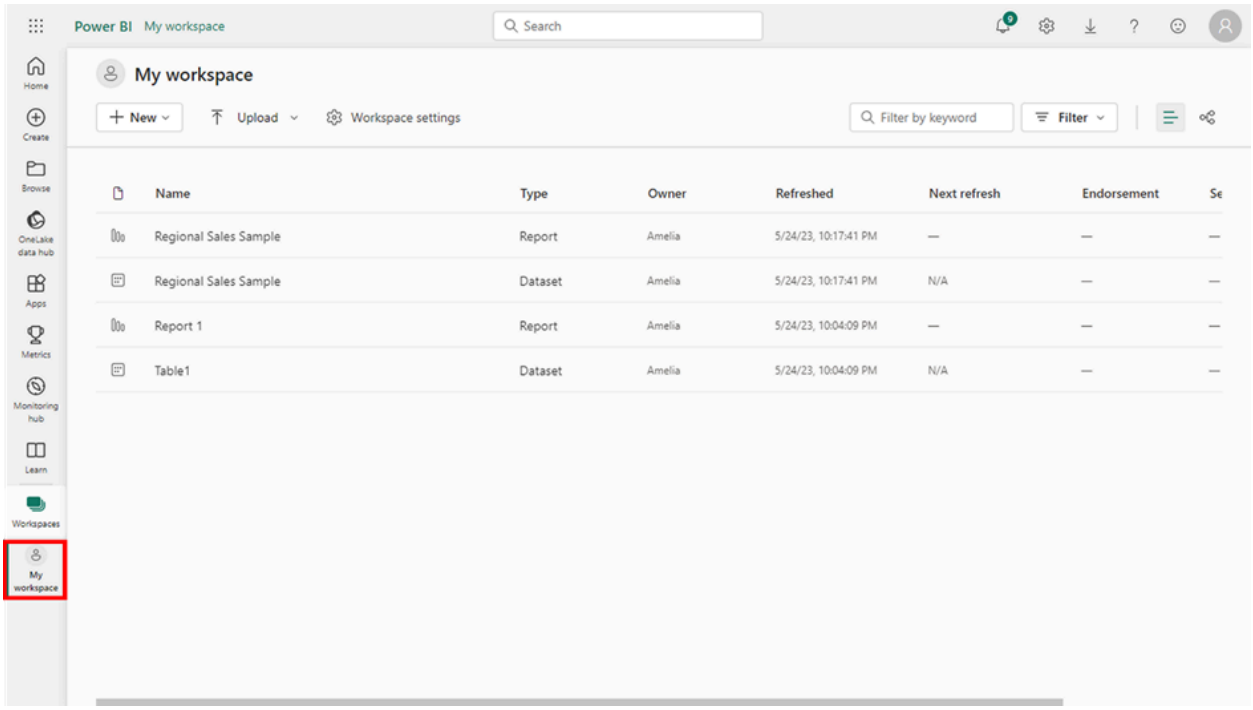
This reading provides you with an exemplar guide that you can use to compare your solution.

Building a dashboard

In preparation for the exercise, you were asked to download the Power BI report files (*Adventure Works Product Sales Report*, *Adventure Works Order Report,* and *Adventure Works Customer Report*) to your local machine and then follow the prompts that below.

Step 1: Upload the pre-made reports to Power BI Service

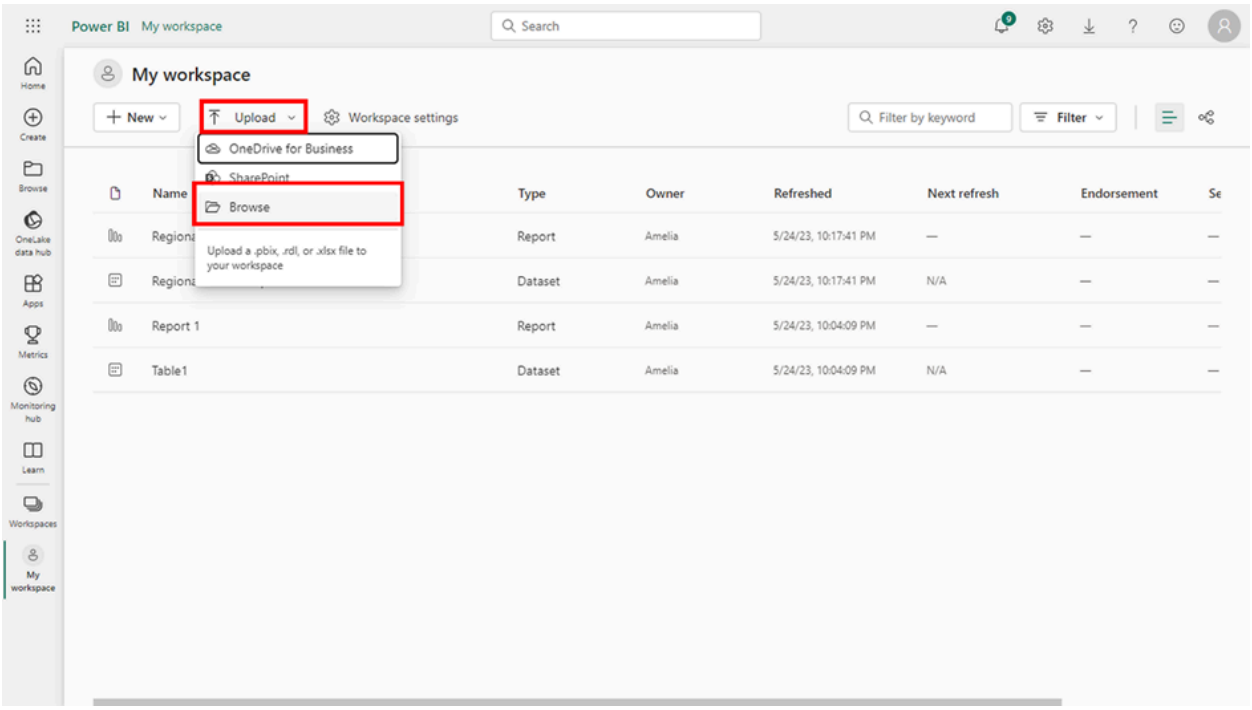
1. Open a new tab in your web browser and navigate to the Power BI service website at https://app.powerbi.com/. If you're not logged in, enter your Microsoft account credentials associated with Power BI.
2. Once logged in, find My Workspace on the left sidebar. Select it to enter your workspace, your personal area to create and manage your Power BI content.



3. Within My Workspace, locate and select the Upload button on the top left of the screen. This will open a

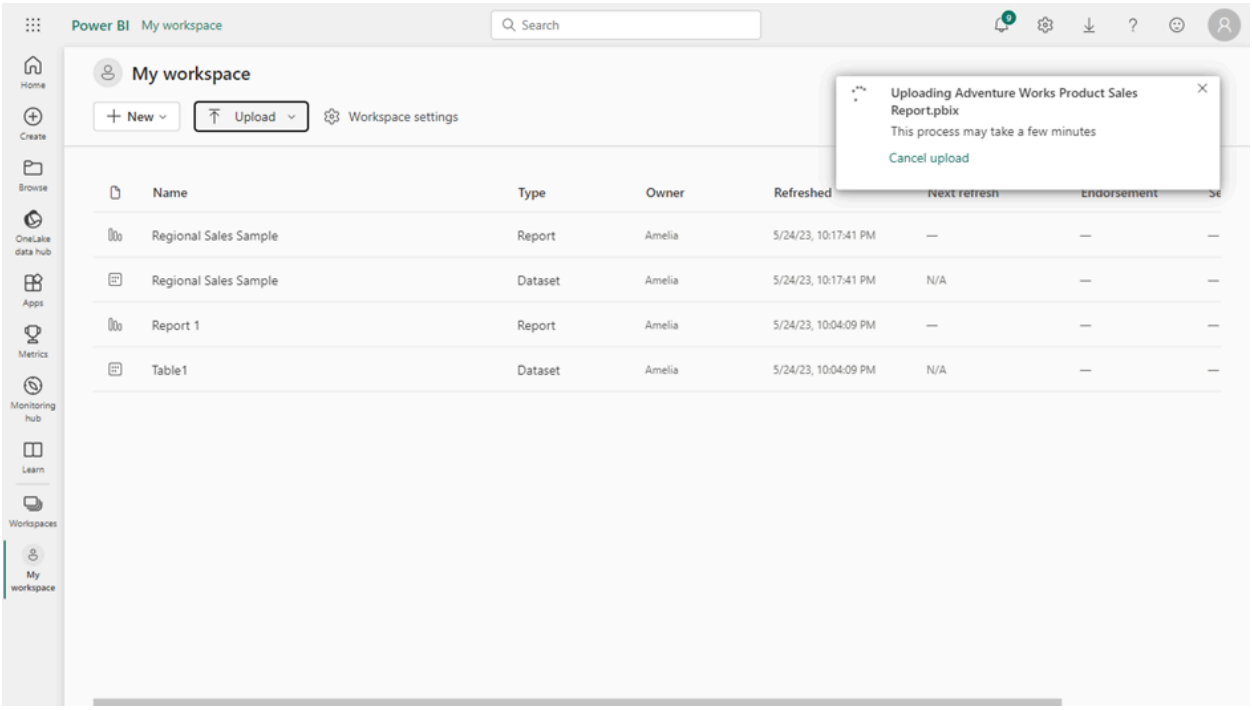
dropdown menu with options to create different types of content to upload.

4. From the dropdown menu, select Browse. This will open a file explorer window.



5. In the file explorer window, navigate to where you saved your downloaded reports. Select the first report you

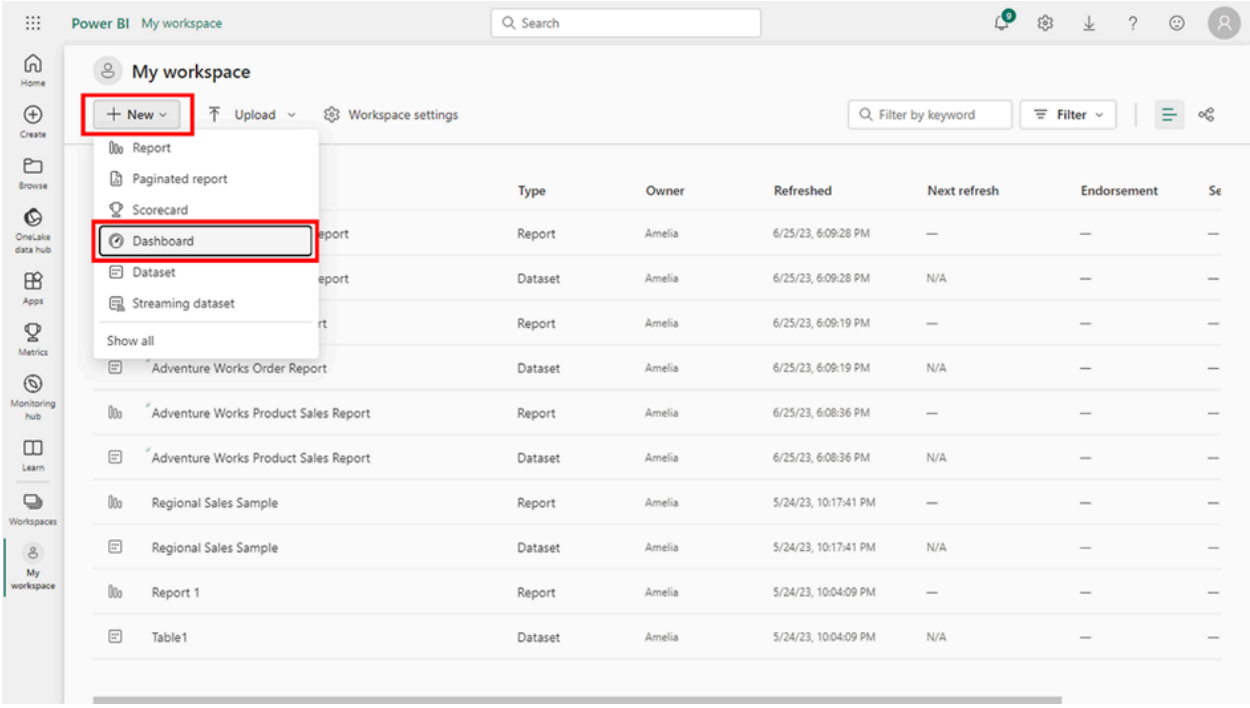
want to upload and then Open to start the uploading process.



6. Repeat steps 3 to 5 for each report.

Step 2: Create a new dashboard

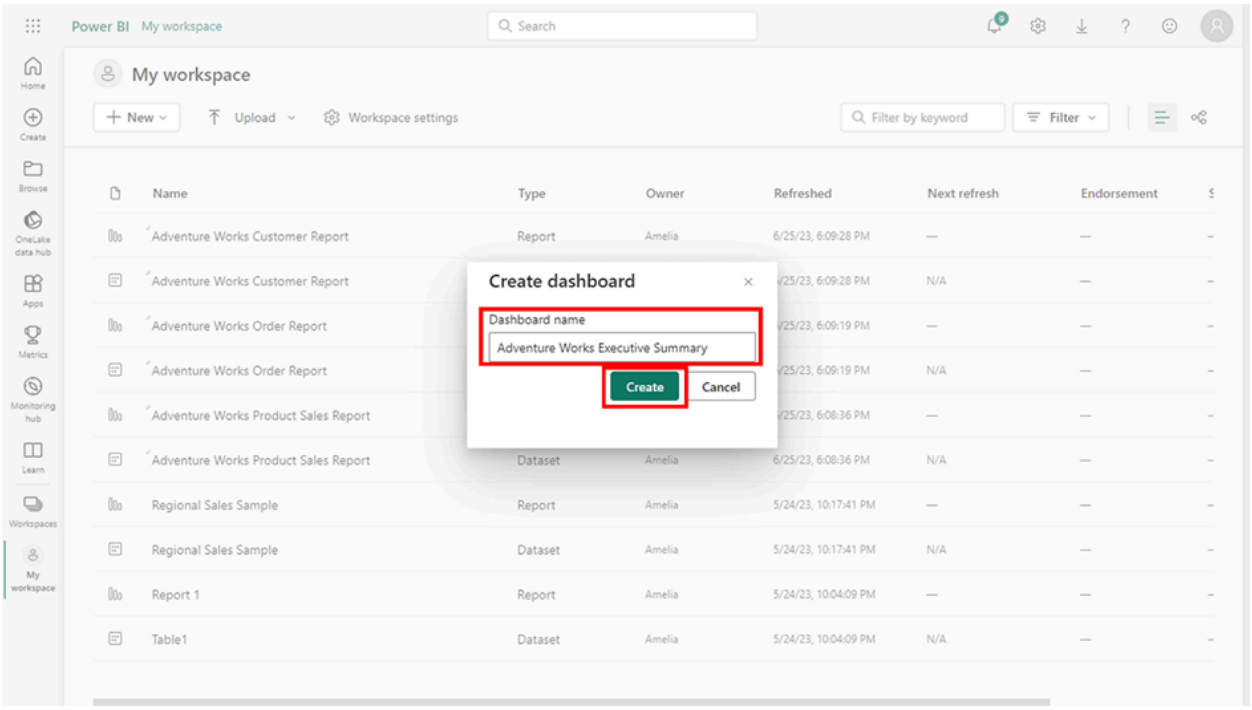
1. In the Navigation view of My Workspace, locate and select the + New button on the top left corner of the screen. This button serves as a quick action to create new BI assets.
2. A menu will appear with options such as Report, Dashboard, Scorecard, and so on. You're creating a dashboard for this step, so select Dashboard from the list.



3. A pop-up window titled Create a dashboard will appear. It has a single field: Dashboard Name. The name you

give should represent what the dashboard contains. This name will appear in lists and the dashboard header, so

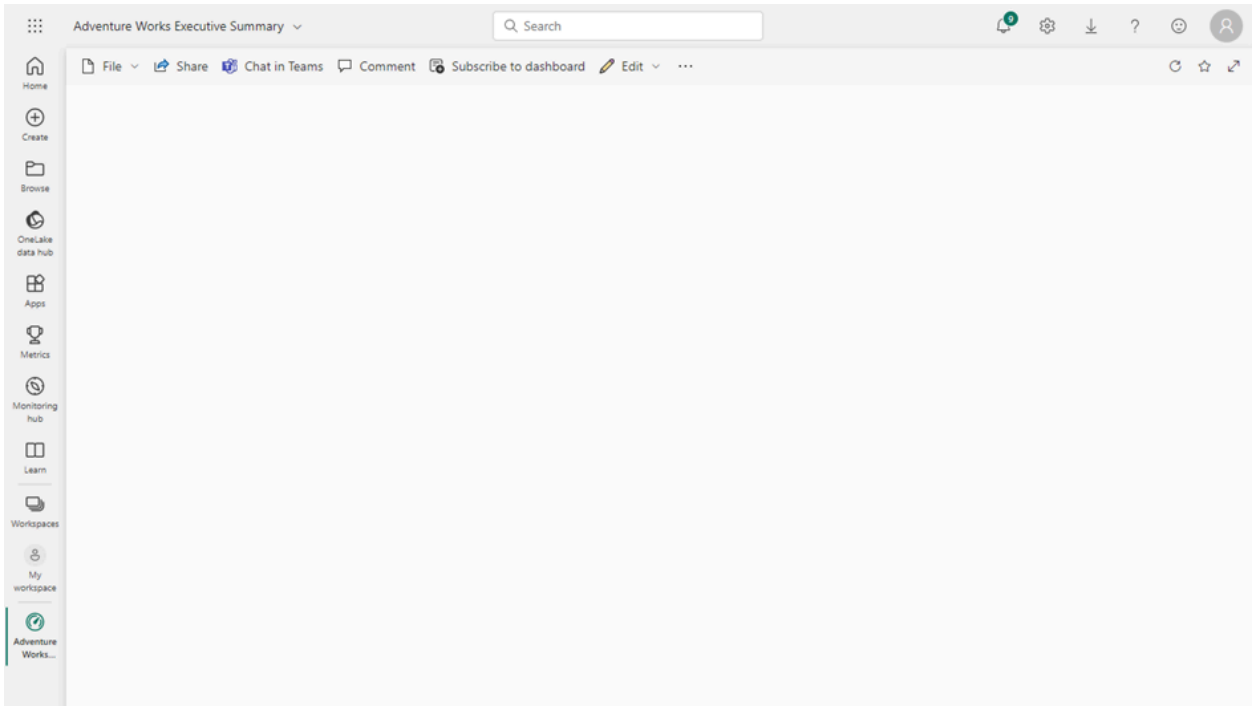
make it descriptive. Type Adventure Works Executive Summary in the Name field.



4. Select Create.

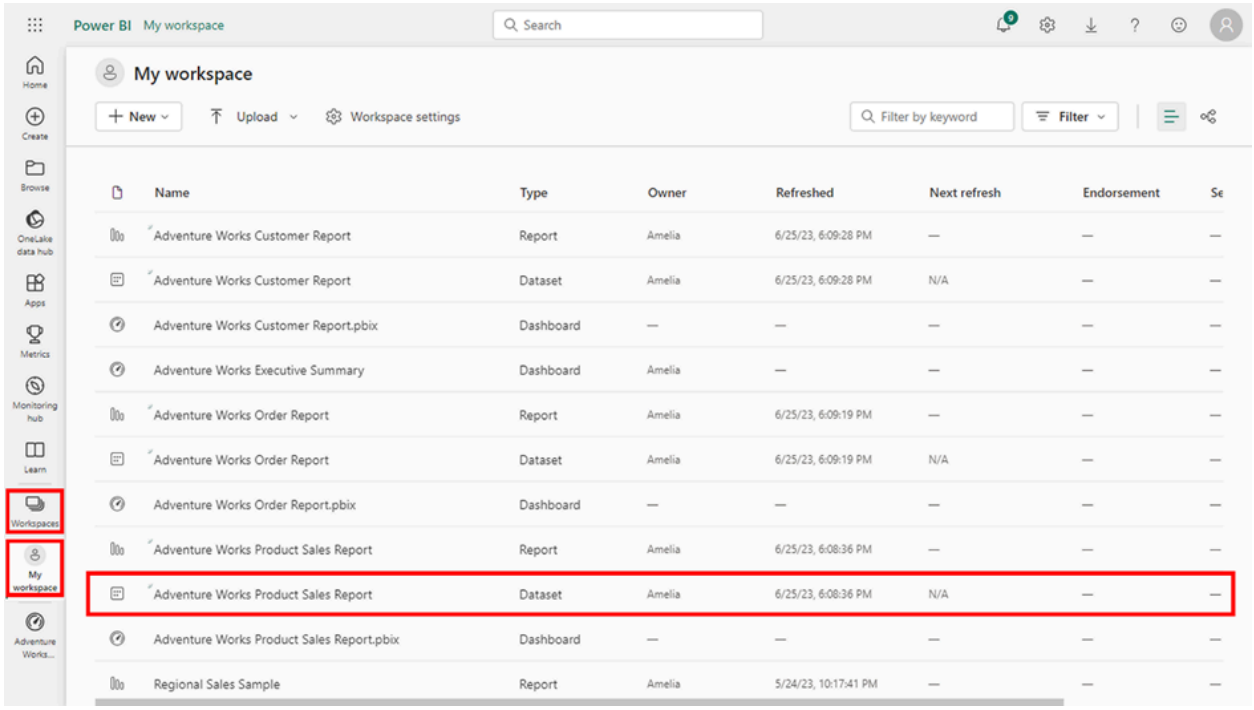
Note: This action creates a new dashboard shell and redirects you to it. At this point, it's empty because you

haven't added any content to it.



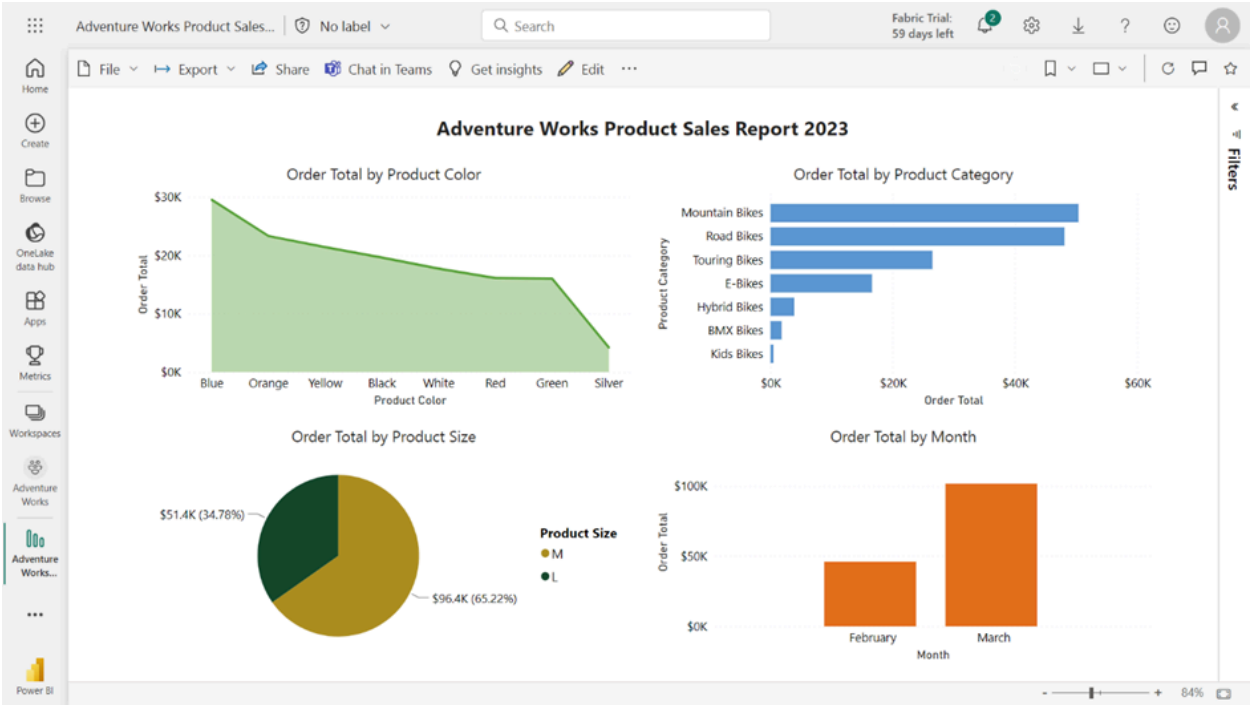
Step 3: Pin live reports to the dashboard

1. On the left side of your Power BI service screen, locate and select Workspaces > My Workspace again.



2. Find and select the Adventure Works Product Sales Report in the list of reports within the workspace. This

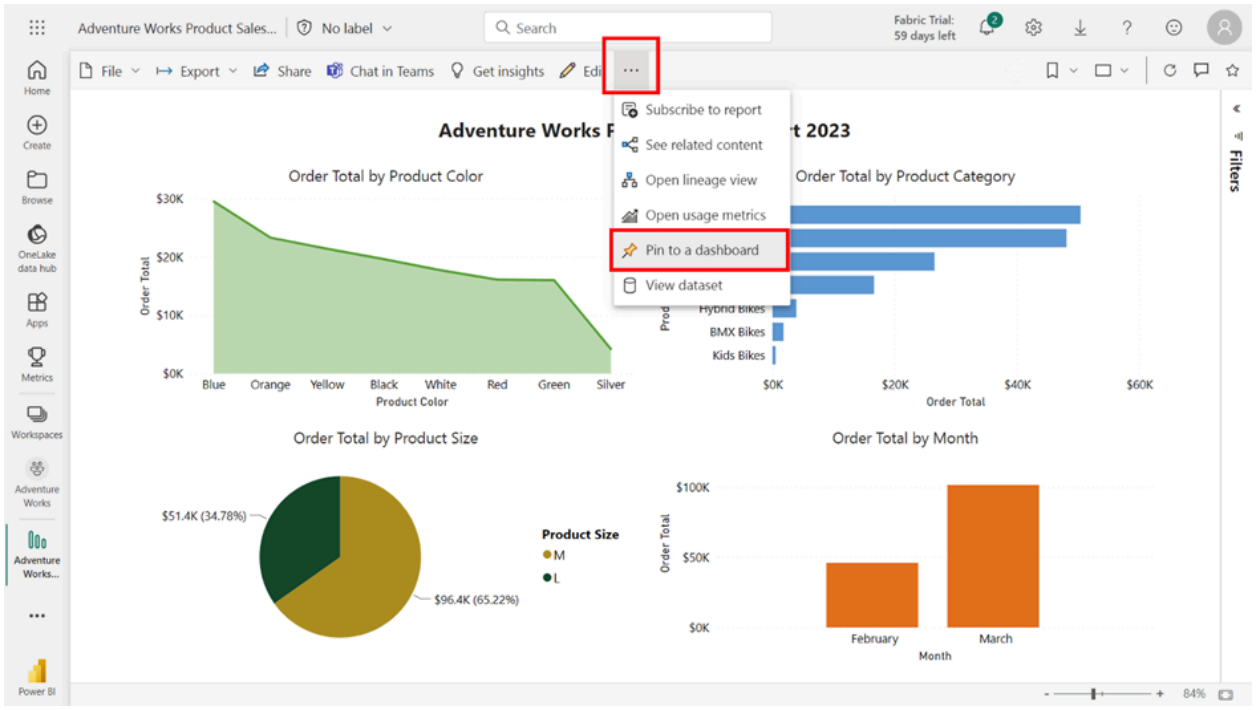
opens the report for viewing and editing.



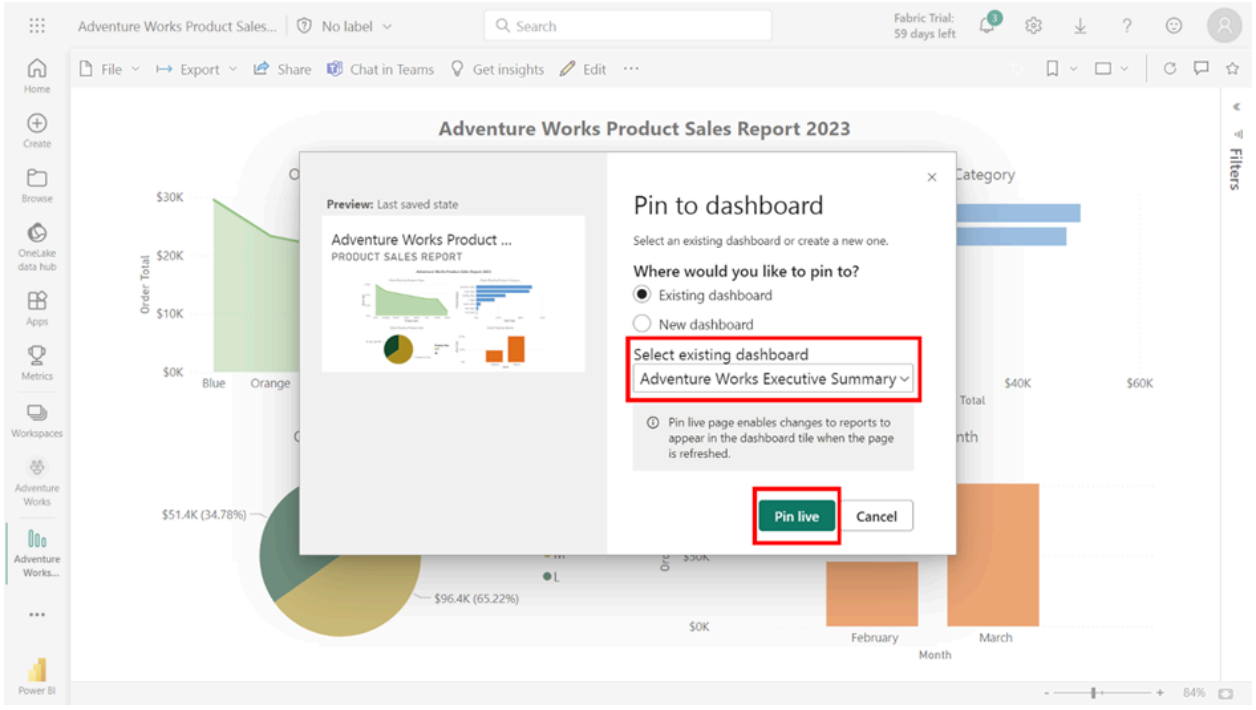
3. Locate and select the ellipsis (…) option on the top-right corner of the menu bar.

4. From the dropdown menu that appears, navigate to Pin to a dashboard. A window will appear, showing a

preview of the page and a dropdown to select which dashboard to pin the page to.



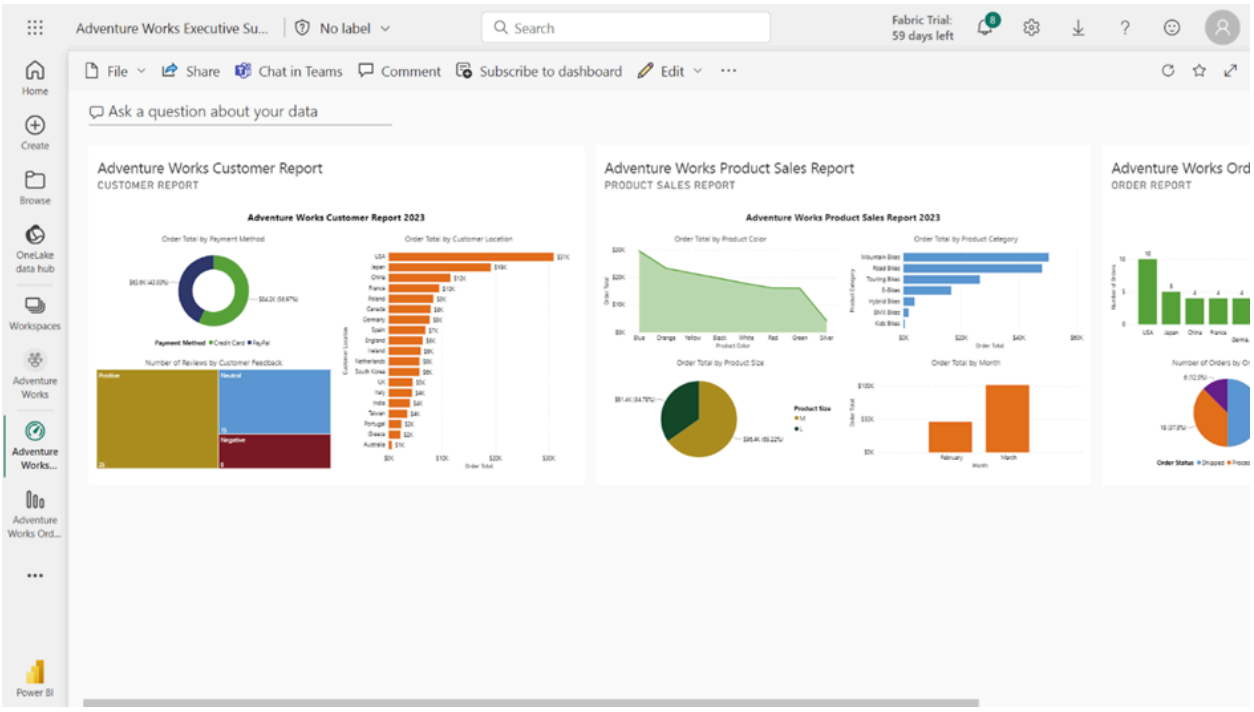
5. Select the Adventure Works Executive Summary dashboard from the dropdown menu and then Pin live.



6. Repeat steps 1 to 5 for the visuals in the Adventure Works Customer Report and the Adventure Works Order

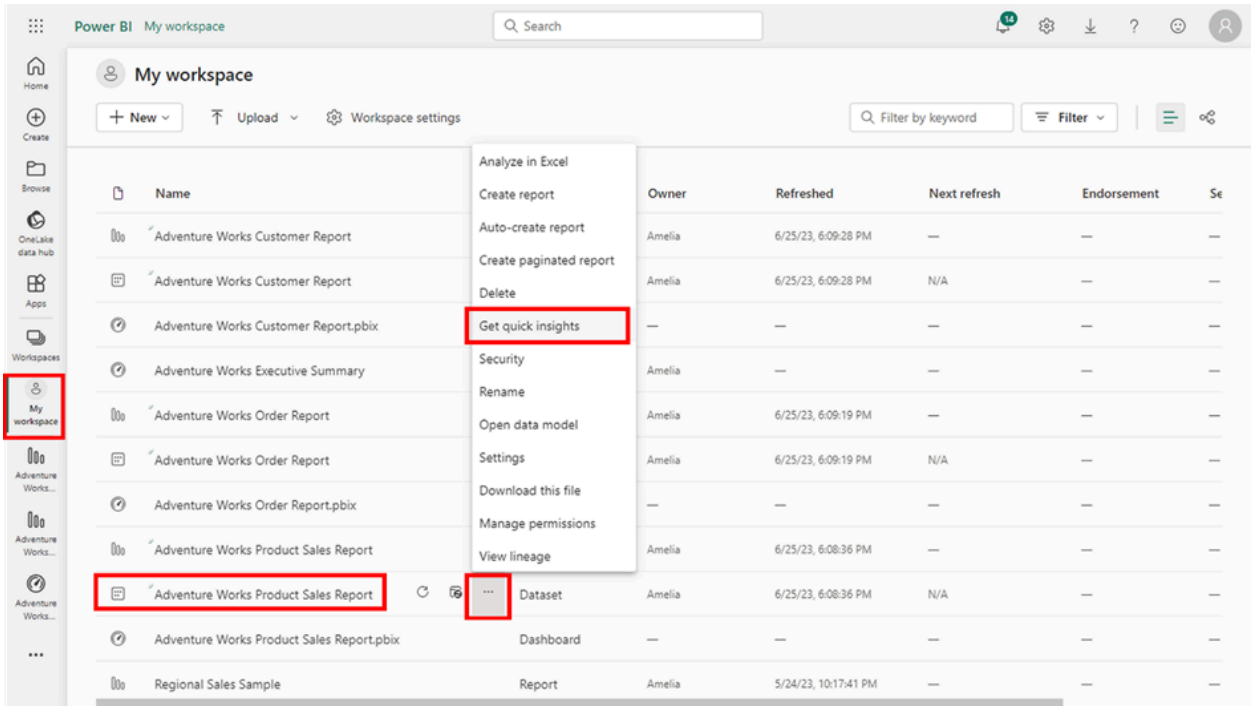
Report. Each report will contribute important visuals to your dashboard, providing a comprehensive view of

business performance.

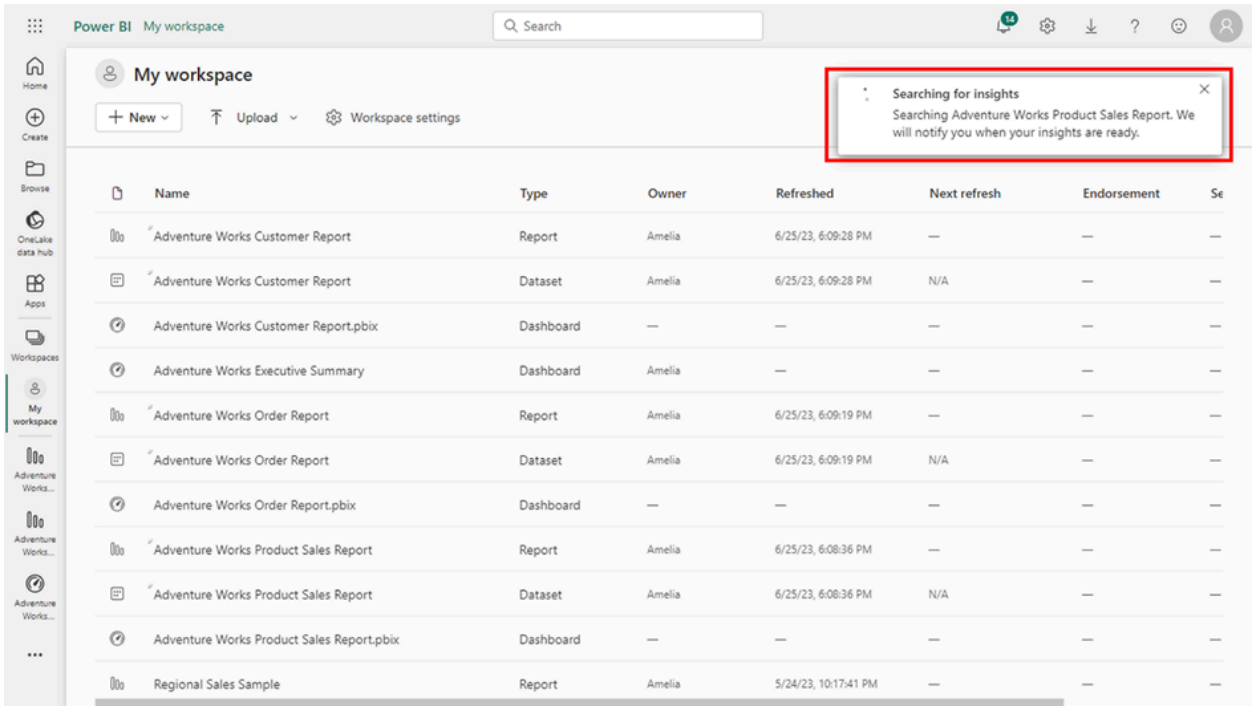


Step 4: Add Quick Insights

1. Navigate to My Workspace area of the Power BI service and locate the specific dataset you're interested in. This will depend on which report's insights you're attempting to generate. In this scenario, start with the Adventure Works Product Sales Report.
2. Select the ellipsis (...) next to the report name. A context menu with several options will pop up. These options allow you to perform various actions related to the dataset. In this list, find and click on Get quick Insights.



Note: This prompts Power BI to start an automated search for data insights. This functionality leverages machine learning algorithms to detect patterns, trends, and anomalies in your data that might not be readily apparent. It can take a few minutes for Power BI to complete this analysis, especially if your dataset is large or complex. Keep in mind that the effectiveness of Quick Insights depends on the nature and quality of your data, so it may not always produce useful results.

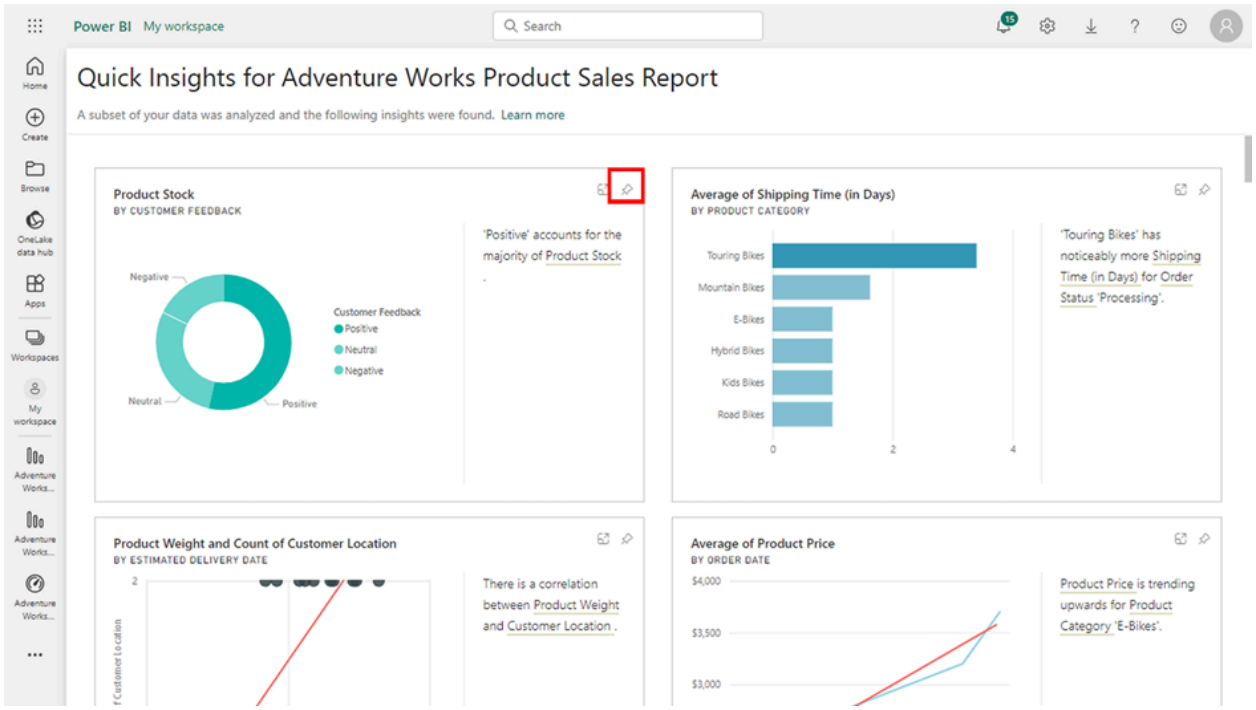


3. Once Power BI generates insights, it will present them as a list of visuals. As you review the results, you decide

that the Product Stock by Customer Feedback visuals might be helpful to your CEO.

4. To pin the Product Stock by Customer Feedback visual to your dashboard, hover over the visual and select the

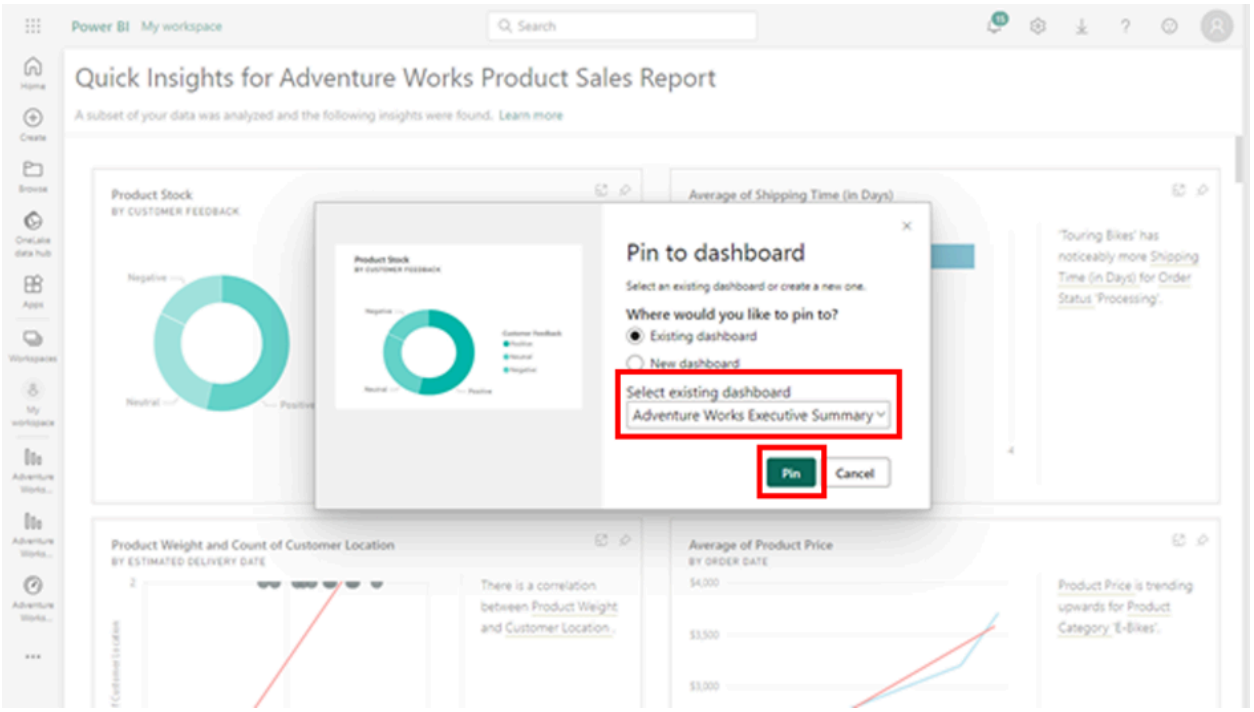
pin icon in the top right corner.



5. A pop-up window will ask you to select a destination dashboard for the visual. Choose your Adventure Works

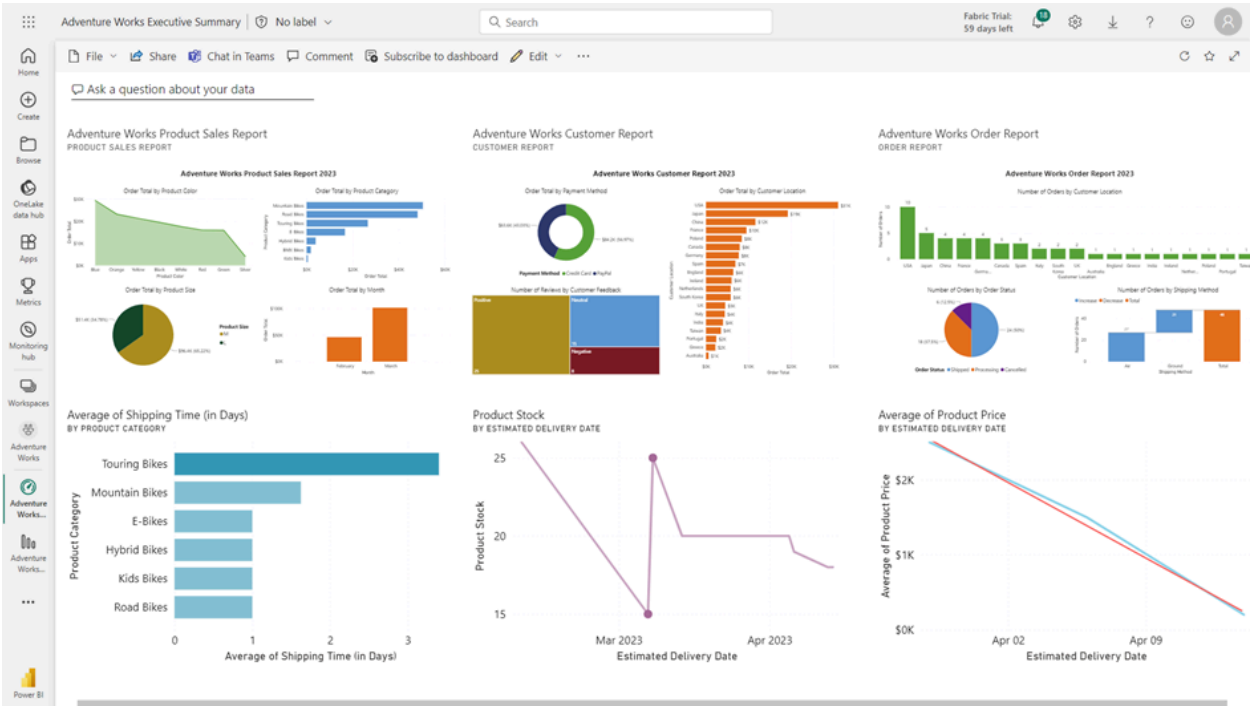
Executive Summary dashboard from the dropdown list and select Pin. The Product Stock by Customer

Feedback visual will now appear on your dashboard, ready to provide quick insight at a glance.



6. Repeat steps 1 to 5 for the Adventure Works Order Report and Adventure WorksCustomer Report datasets.

7. This is what the final Adventure Works Executive Summary looks like.



Conclusion

As you complete the exercise, take pride in the intuitive Power BI dashboard you've created, which may be similar to the output below. In the real-world scenario used in this exercise, the CEO at Adventure Works’ can use this executive summary dashboard to understand the company's performance at a glance, making data-driven decisions confidently and promptly. Mastering build Power BI dashboards adds great value to your growing data analytics skillset.

3.3. Exercise: Sharing a report

Introduction

It's the end of the quarter at Adventure Works, and the financial team is preparing a comprehensive review of the company's performance. They need data and not raw, indigestible numbers. They need insights, trends, and patterns, all woven into a coherent narrative. They need to know which products have been flying off the shelves, the customers' geographical distribution, and how order processing is holding up.

Case study

Your manager tasks you with implementing a crucial aspect of data management: the art of paginating, publishing, and exporting a report using Power BI. In this exercise, you will learn how to create an organized and easily digestible report to guide the financial team in their quest for insights and understanding.

Instructions

Download and open the *Adventure Works Product Sales Report* Power BI file.

Follow the prompts below to complete the exercise.

Step 1: Open Power BI and the report

1. Open Power BI Desktop and select the File menu.
2. Navigate to the place where you've stored your Power BI report file. Select the file, and then select Open to load the report.

Step 2: Observe the data for a better understanding

1. On the left side of your screen, select the Table view.
2. A table representing your data will display towards the middle of your screen. Locate the Product Name column and observe the first ten records.

Step 3: Switch to the Report view

- On the left side of your screen, select the Report view.

Step 4: Create pages for pagination

1. Navigate to the Pages section at the bottom of the screen, on the left.
2. Add two new pages by selecting the new page button, represented by a + sign.

Step 5: Rename the pages

1. Select the tab for the new page you want to rename to make it active.
2. Select the Format icon on the Visualizations pane to open the formatting options for your page.
3. Find and select the Page Information option to expand the menu.
4. From the Page Information menu, select the Name field. Clear the current name and type in the new name for the page, Sales Monthly Summary. Select outside the field or press enter to confirm it.
5. Repeat steps 1-4 for the second new page and change the name to Top Product Categories.

Step 6: Distribute report content across pages

1. Move the Order Total by Product Category visual from your main report to the newly created *Top Product Categories* page.
2. Move the Order Total by Month visual from your main report to the newly created *Sales Monthly Summary* page.

Step 7: Publish the report

Note: Before you can publish to Power BI service, ensure you save your report. Power BI does not allow you to publish unsaved reports.

1. Select the Publish button in the Home tab.
2. Select My Workspace from the dialog box and then the Select button. Note: After selecting the destination, Power BI starts publishing the report. Depending on the size of the report and your internet connection, this could take a few moments.
3. Once the report is published, a new dialog box pops up to confirm. Select Open to view the published report to Power BI Service.

Step 8: Export the report

1. Select the Export button at the top left corner of the screen.
2. Select PDF from the dropdown menu that appears.
3. In the Export with dropdown, select Current Values.

4. Then, select Export to start the export process. Depending on the size of your report, this could take anywhere from a few seconds to a few minutes.

Conclusion

You have now provided the financial team with the insights that will guide their planning for Adventure Works' for the next quarter. With Power BI, you're not just a data analyst; you're the hero behind the numbers who brings the data to life!

Exemplar: Sharing a report

Introduction

In the exercise, *Sharing a Report*, you were tasked with a crucial assignment: paginate, publish, and export a Microsoft Power BI report for the financial team at Adventure Works.

More specifically, you were asked to:

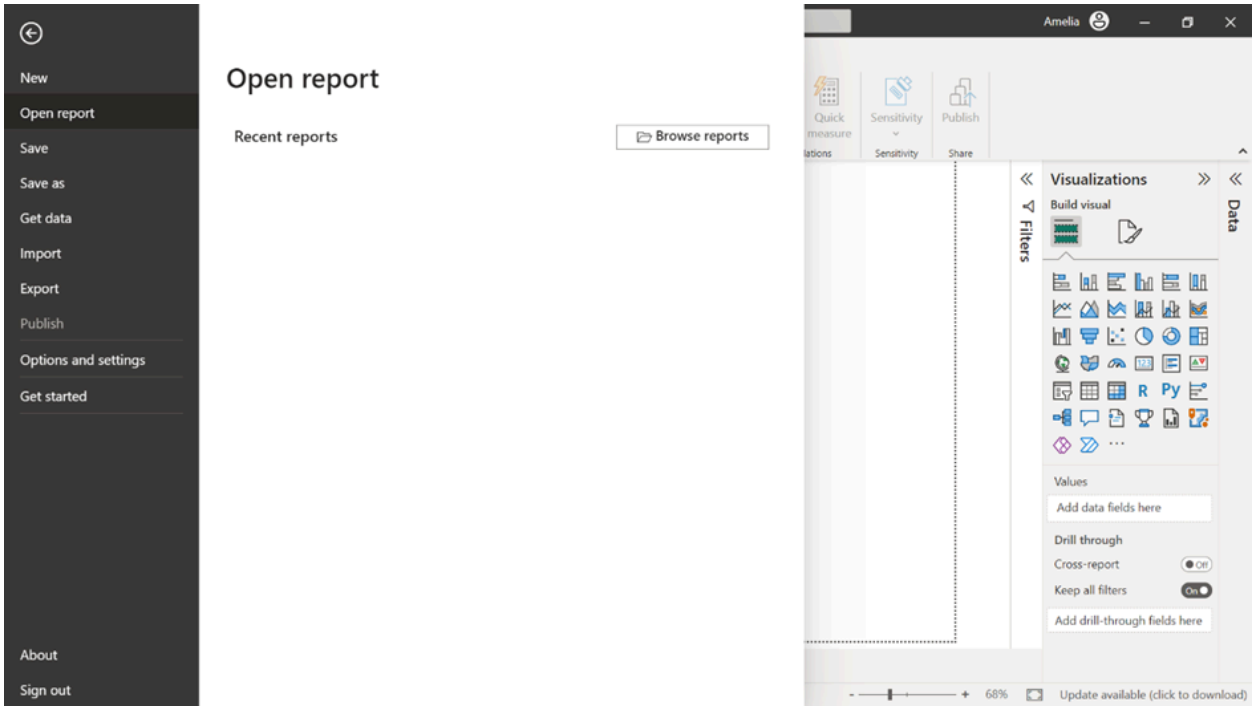
- Create new pages for pagination, organizing your data into a more readable format that users can easily navigate.
- Publish your report to the Power BI service, making it available for the financial team and other stakeholders in Adventure Works.
- Export your report as a PDF, providing a portable and easily shareable format for the financial team to review.

This reading provides you with a guide that you can use to compare your solution.

Instructions

Step 1: Open Power BI and the report

1. Launch Power BI Desktop, select the File menu, and navigate to where you've stored your Power BI report file.
2. Select the file, and then select Open to load the report.

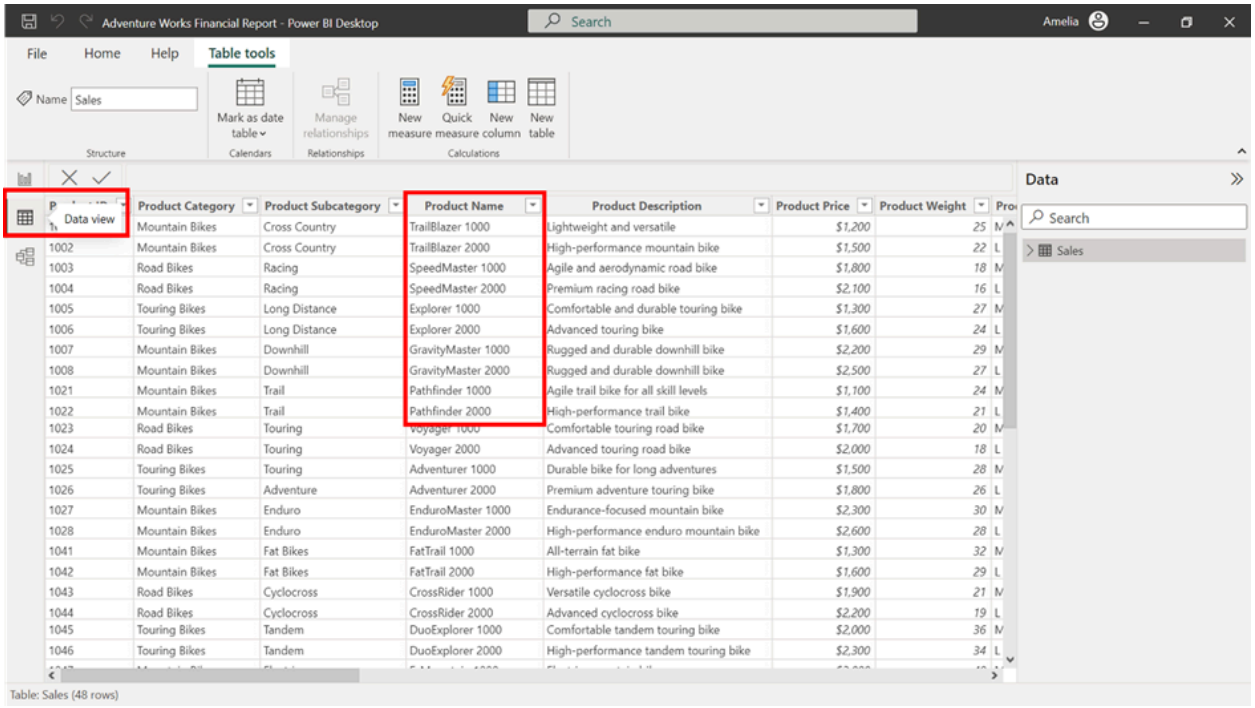


Step 2: Observe the data

1. Select the Data view on the left side of your screen.

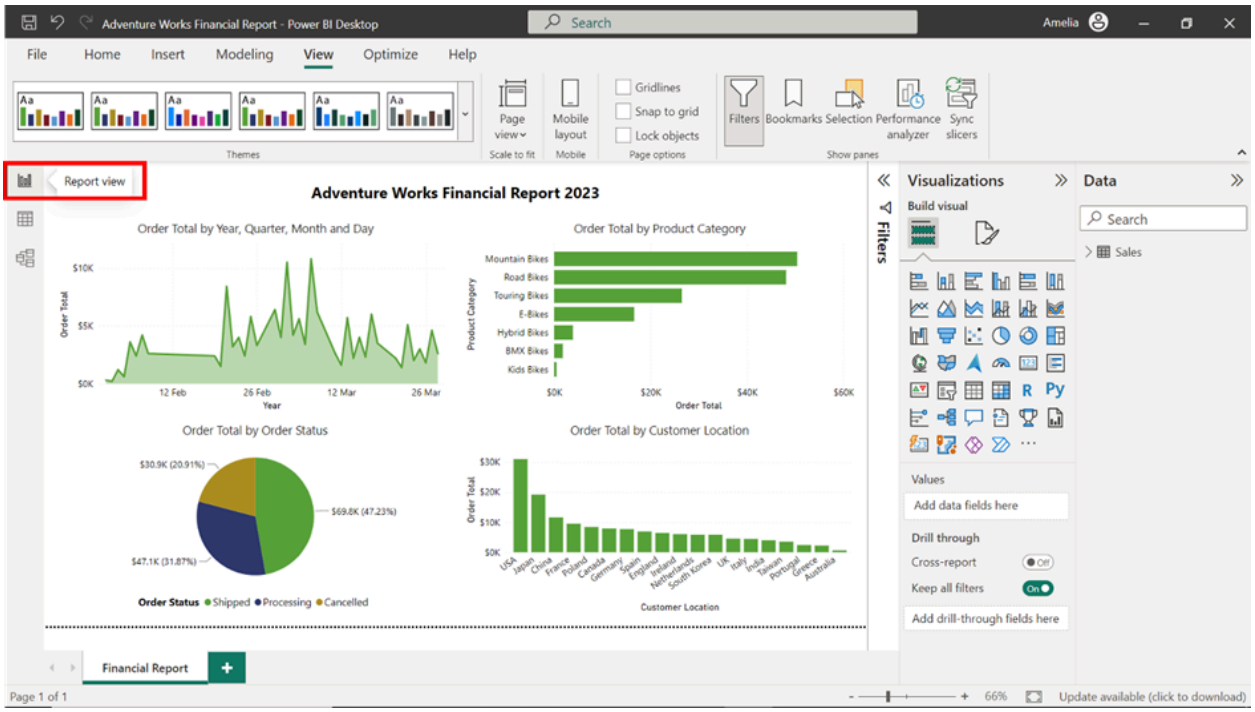
Note: This view allows you to view the records you will handle throughout the rest of this exercise.

2. A table representing your data will display towards the middle of your screen. Locate the Product Name column and observe the first ten records.



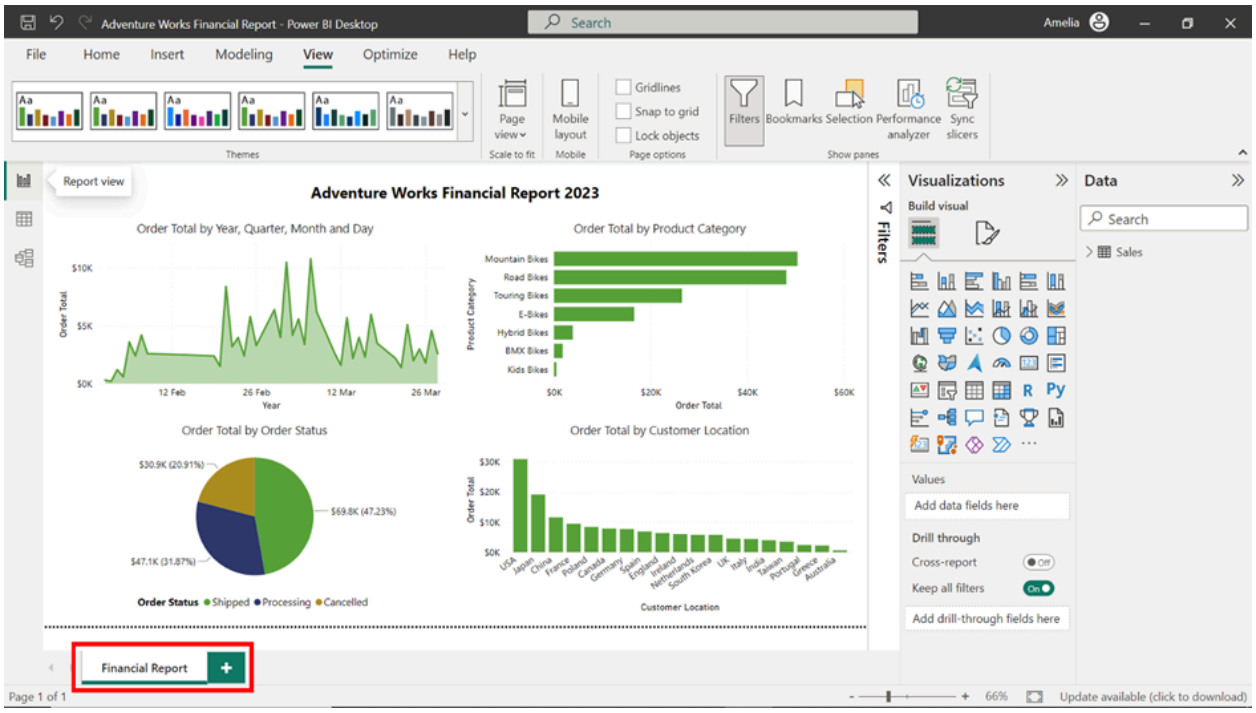
Step 3: Switch to the Report view

- On the left side of your screen, select the Report view. It's the canvas where you'll paginate your data story, transforming it into a meaningful narrative.

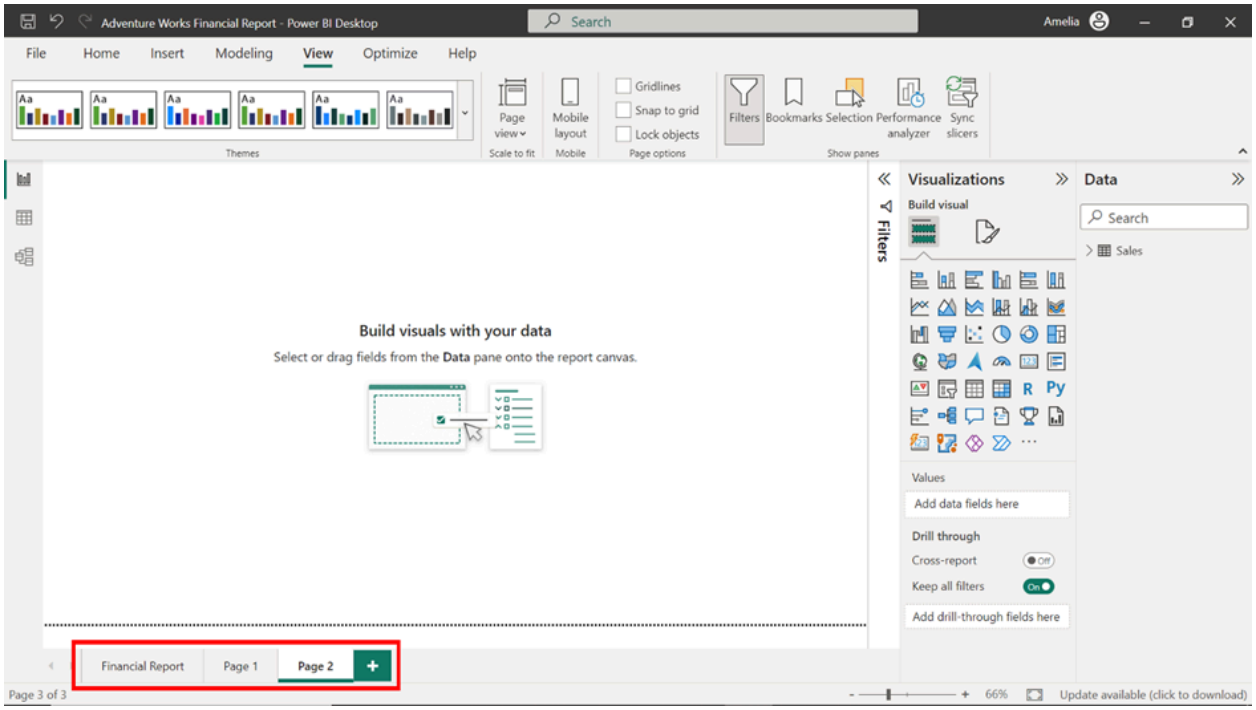


Step 4: Create pages for pagination

1. Navigate to the Pages section at the bottom left of the screen.
2. Add two new pages by selecting the new page button, represented by a Plus sign.



Note: This is like creating chapters in a book. Each page or chapter will focus on a specific aspect of the data story. This way, you can guide the financial team through the narrative systematically and logically. It makes the data more digestible and allows for focused analysis.

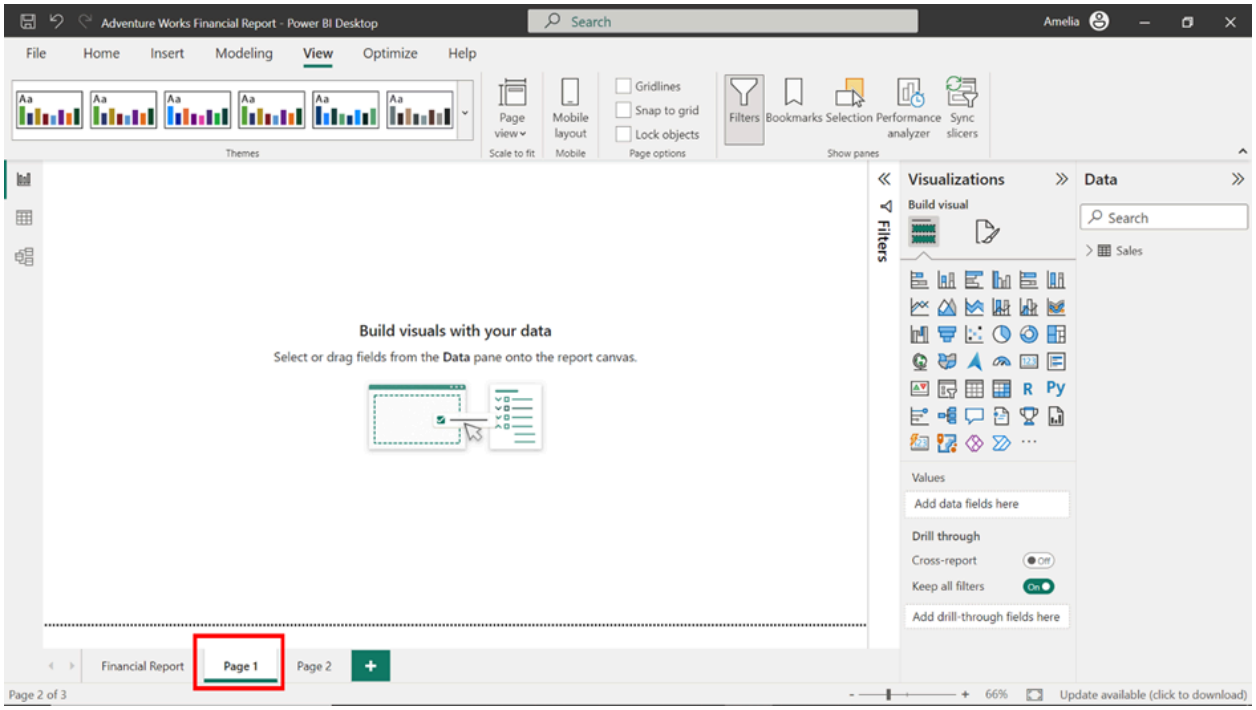


Step 5: Rename the pages

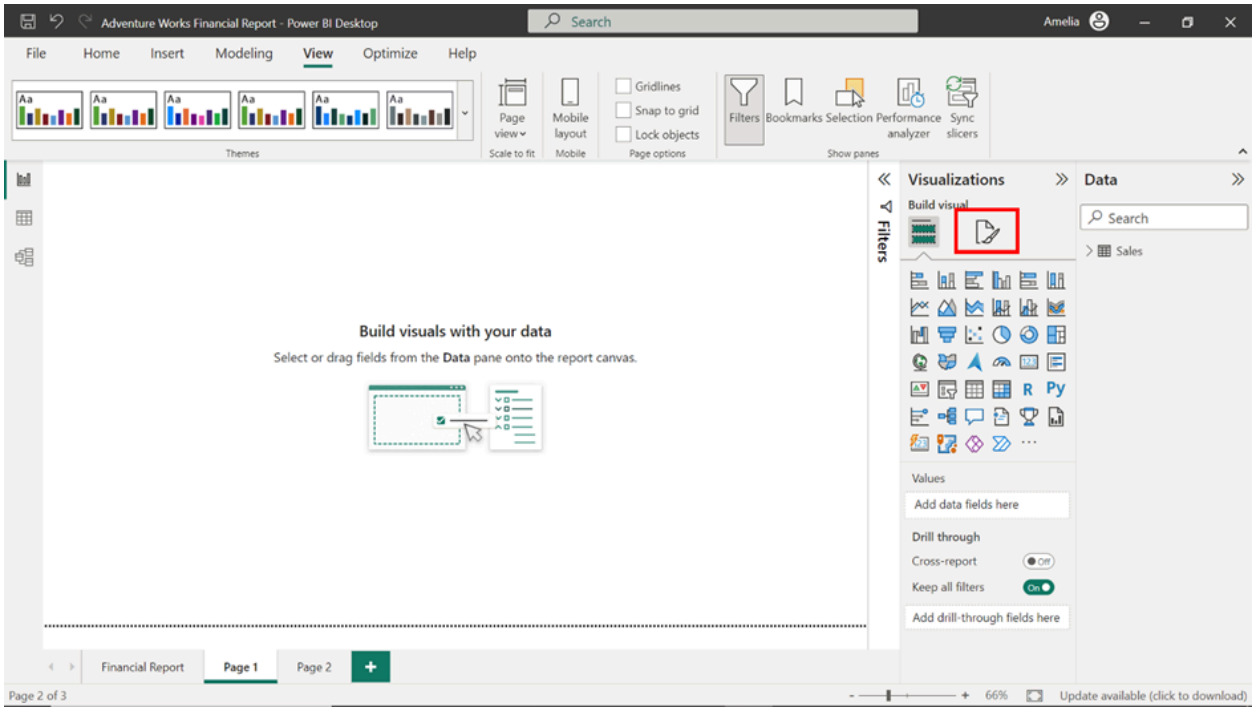
Note: At the bottom of the Power BI Desktop application window, you'll see tabs representing each page in your report.

1. Select the tab for the new page you want to rename to make it active.

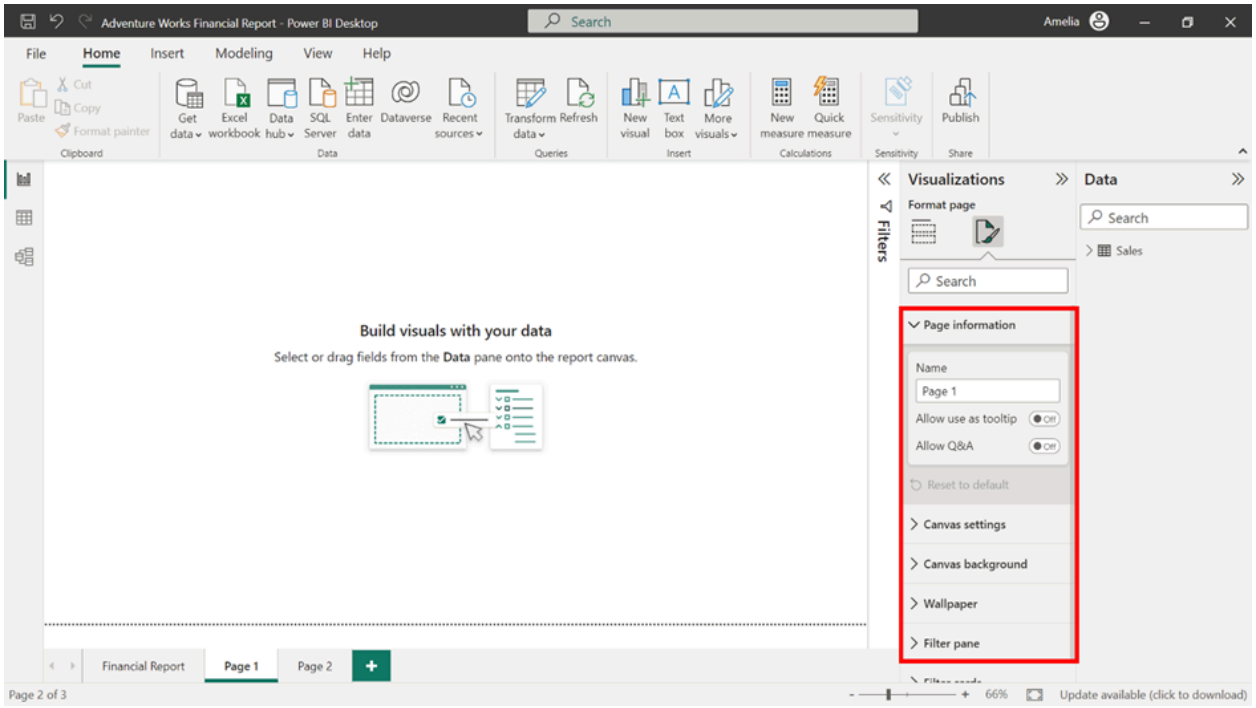
Note: Just like the chapters of a book, each name should indicate what to expect from that page.



2. Select the Format icon on the Visualizations pane to open the formatting options for your page.

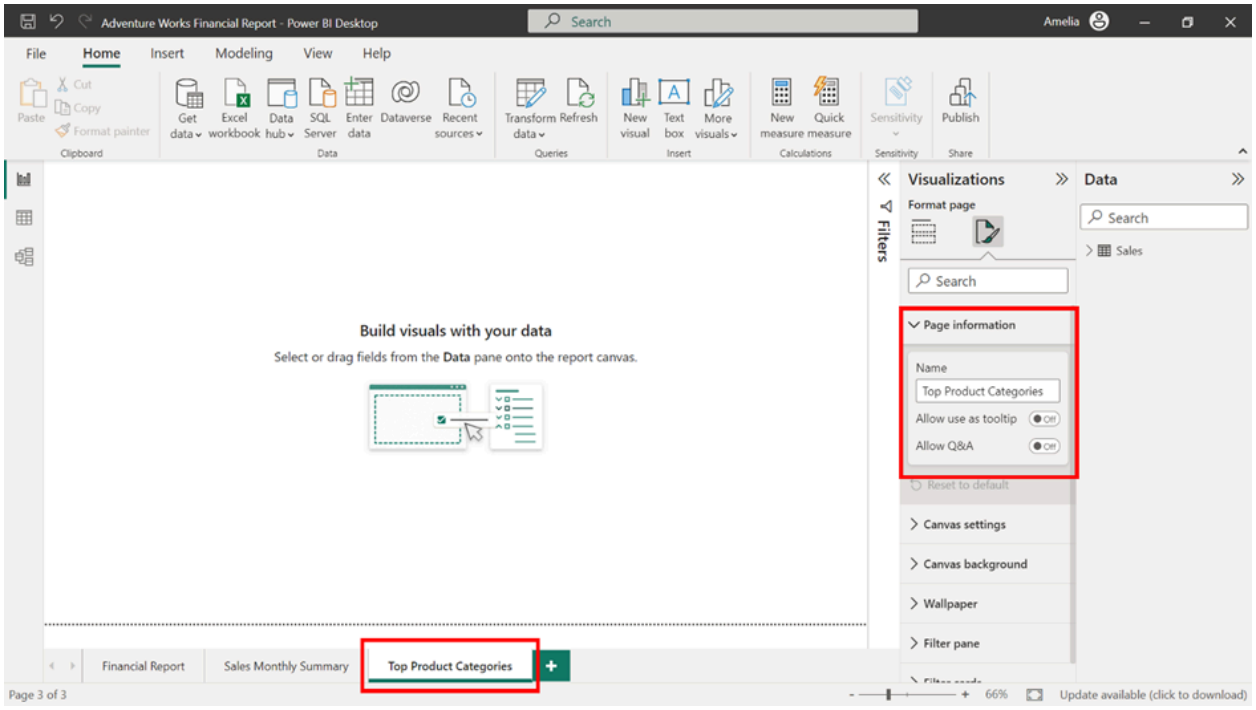


3. Find and select the Page Information option to expand the menu.



4. From the Page Information menu, select the Name field. Clear the current name and type in the new name for the page ***Sales Monthly Summary***. Click outside the field or press enter to confirm it.

5. Repeat steps 1-4 for the second new page and change the name to *Top Product Categories*. This way, your report is organized into well-defined sections, each clearly labeled, guiding the financial team's data discovery journey.

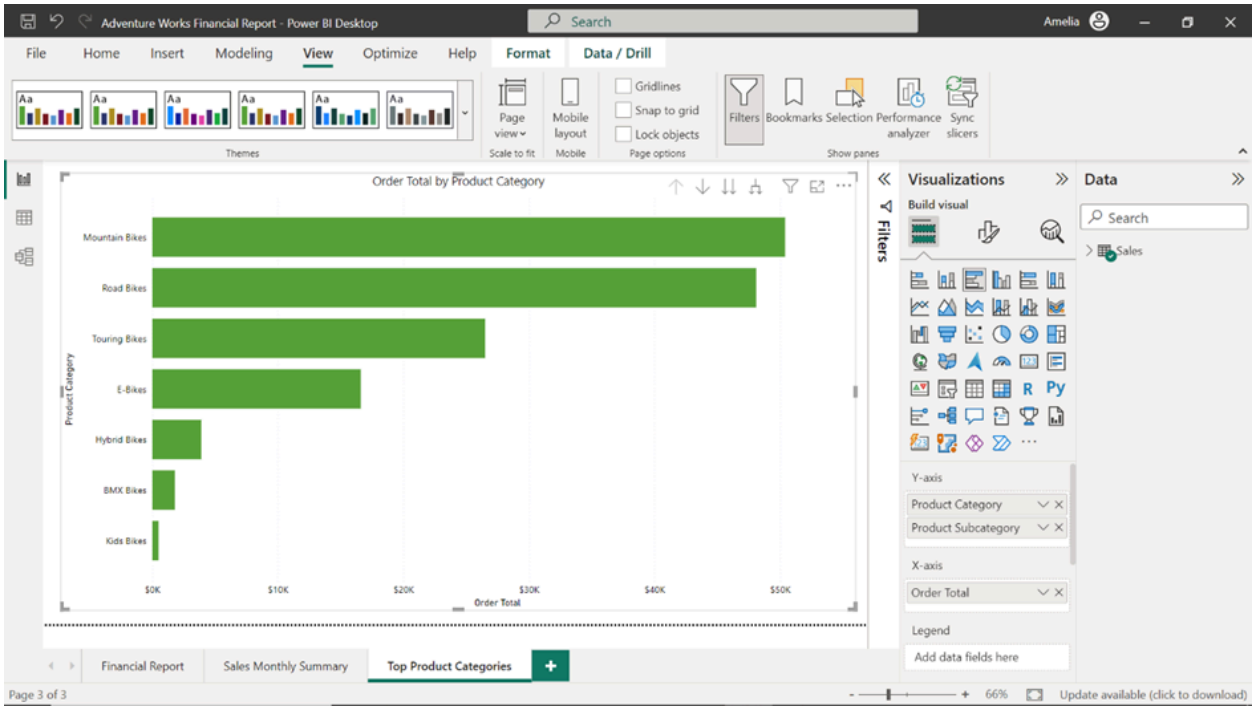


Step 6: Distribute report content across pages

It's time to populate your pages.

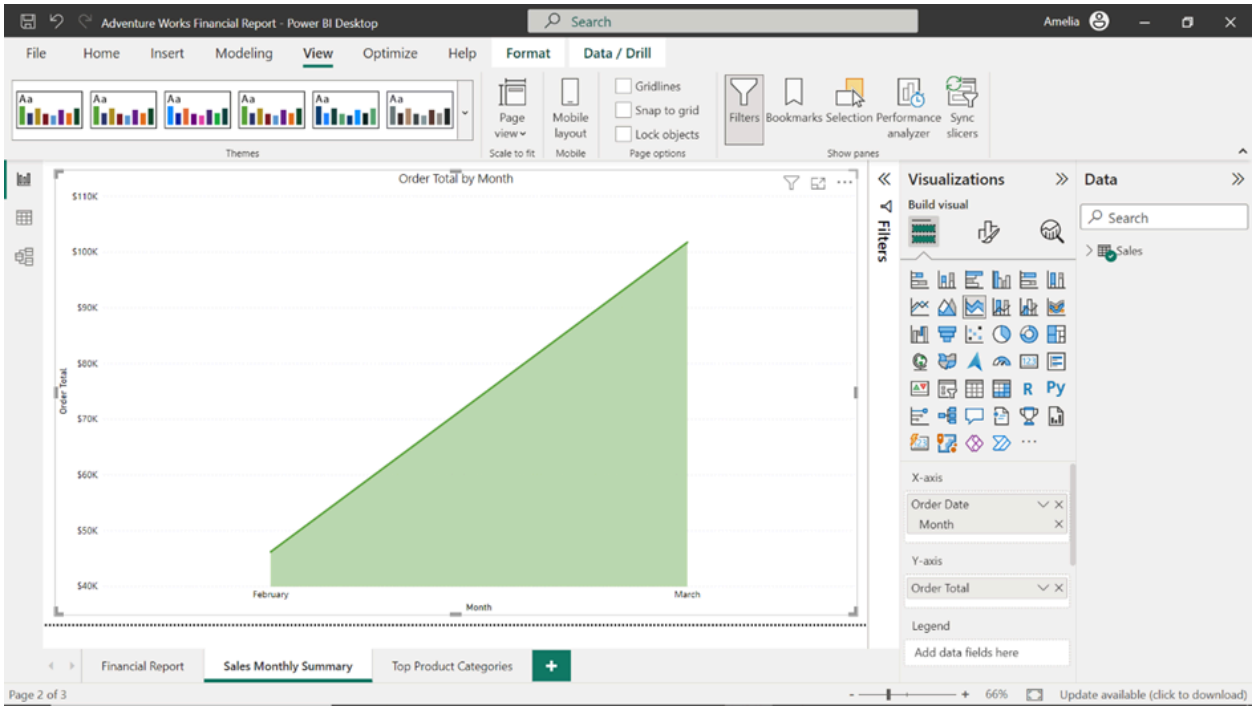
1. Move the Order Total by Product Category visual from your main report to the newly created Top Product Categories page.

Note: This visual provides insights into product performance, guiding decisions about resource allocation and marketing efforts.



2. Move the Order Total by Month visual from your main report to the newly created Sales Monthly Summary page.

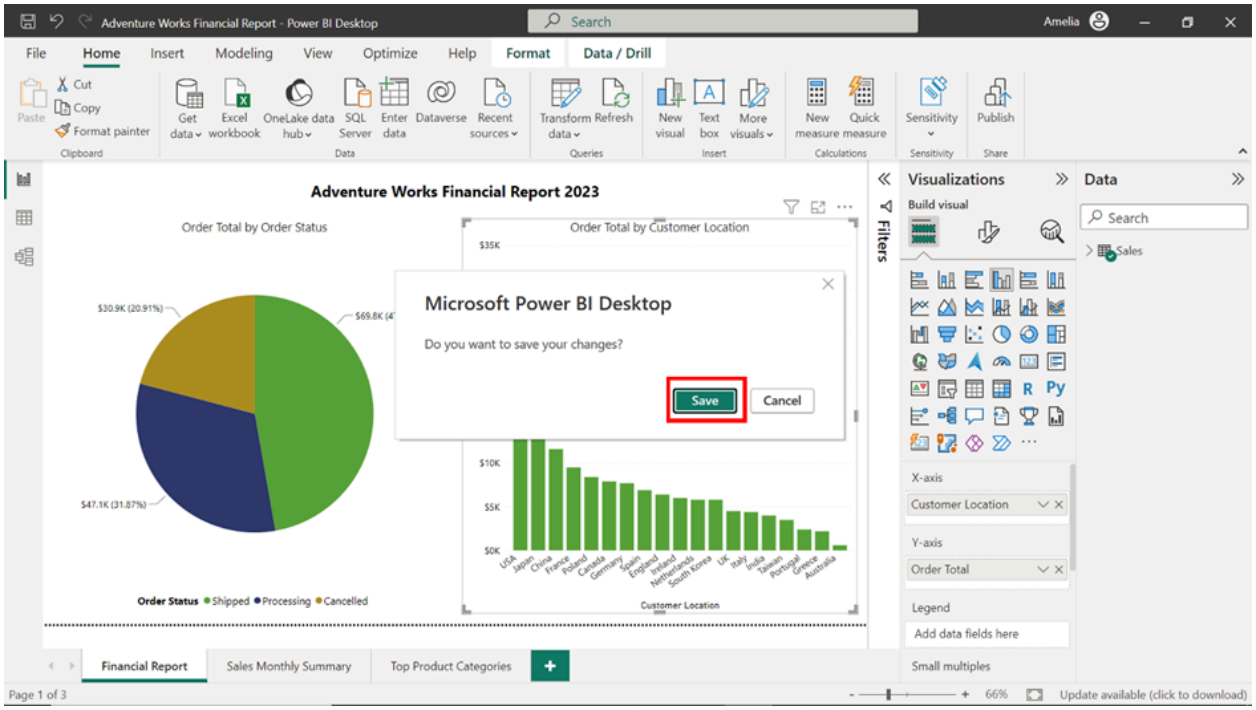
Note: This visual tells a story about timing. It can reveal seasonal trends, inform about peak sales periods, and guide decisions about when to launch new products or promotions.



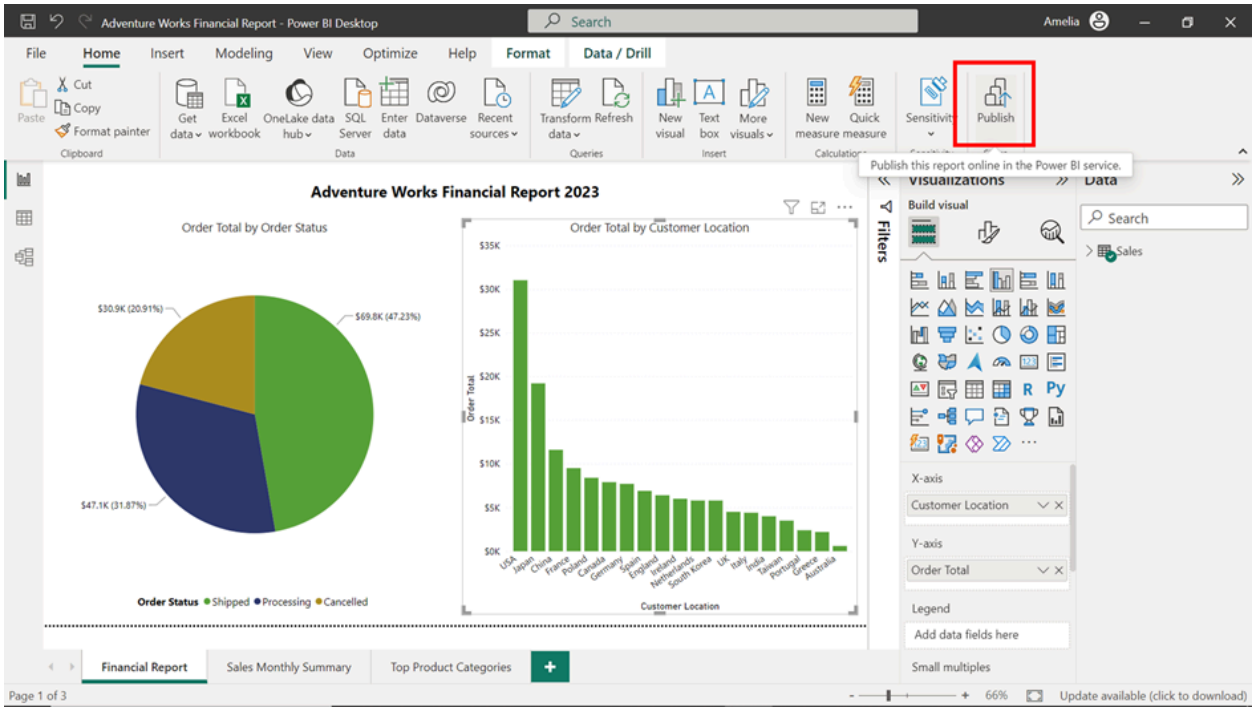
Step 7: Publish the report

The first thing to remember before publishing your report to Power BI service is to save it. Think of this step as finalizing the draft of a book before you send it to the publisher.

Note: Power BI will not allow the publishing of unsaved reports. It's a built-in safeguard to ensure no work gets lost in the process.

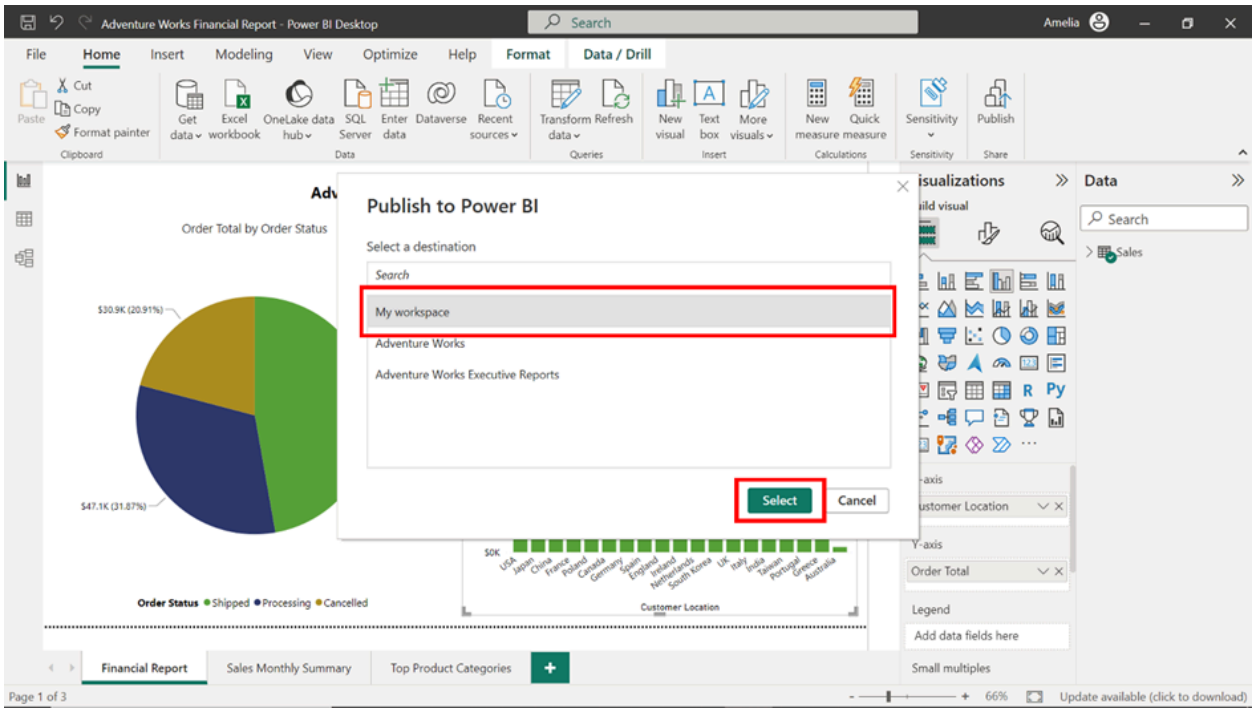


1. Select the Publish button in the Home tab.



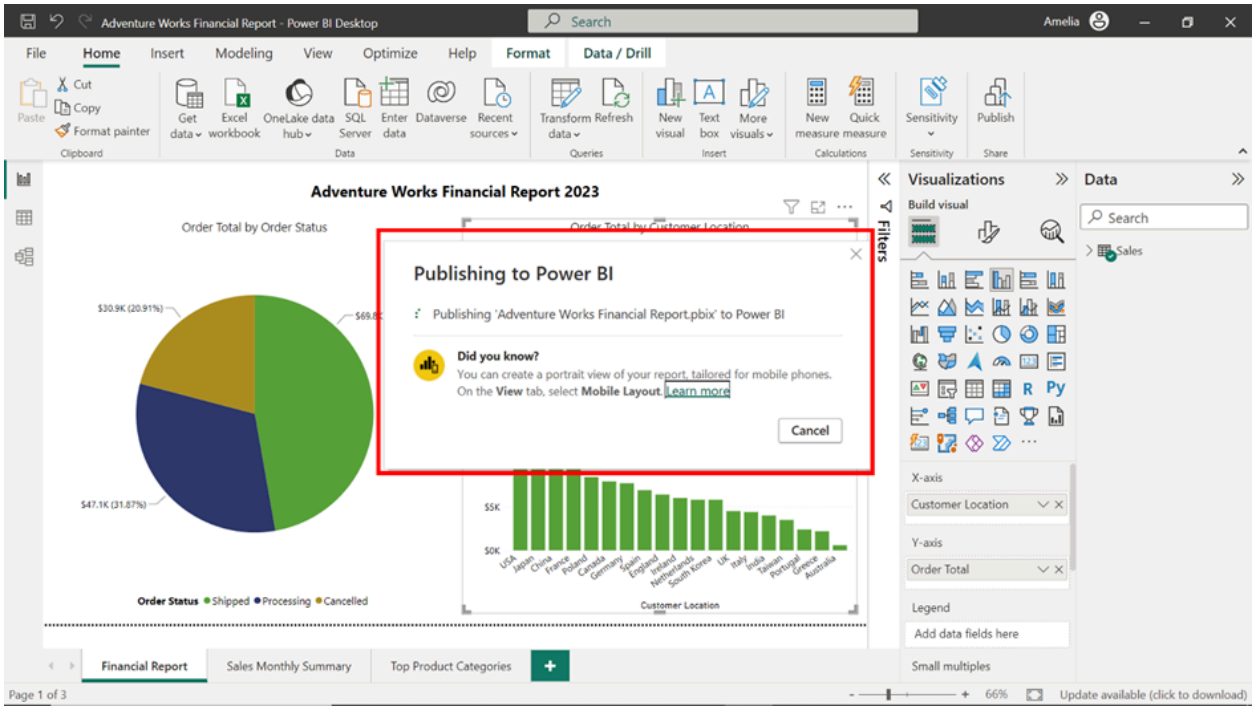
2. Select My Workspace from the dialog box and select the Select button

Note: Consider this step as picking a bookstore to sell your newly published book. After the destination is selected, Power BI begins publishing the report. Depending on the size of the report and your internet connection, this could take a few moments.



3. After your report is published, a new dialog box will confirm its successful publication. Select Open to view the published report in Power BI Service.

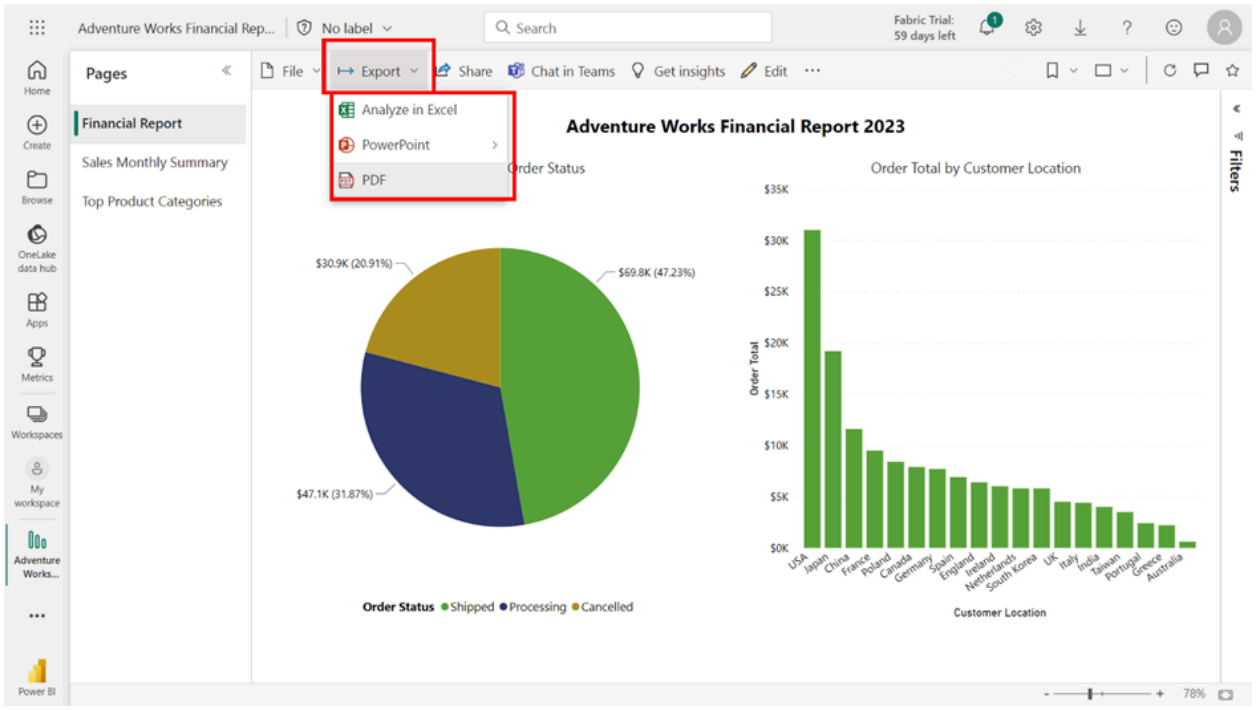
Note: This is your chance to review your work and ensure everything is in order, much like an author reading their published book.



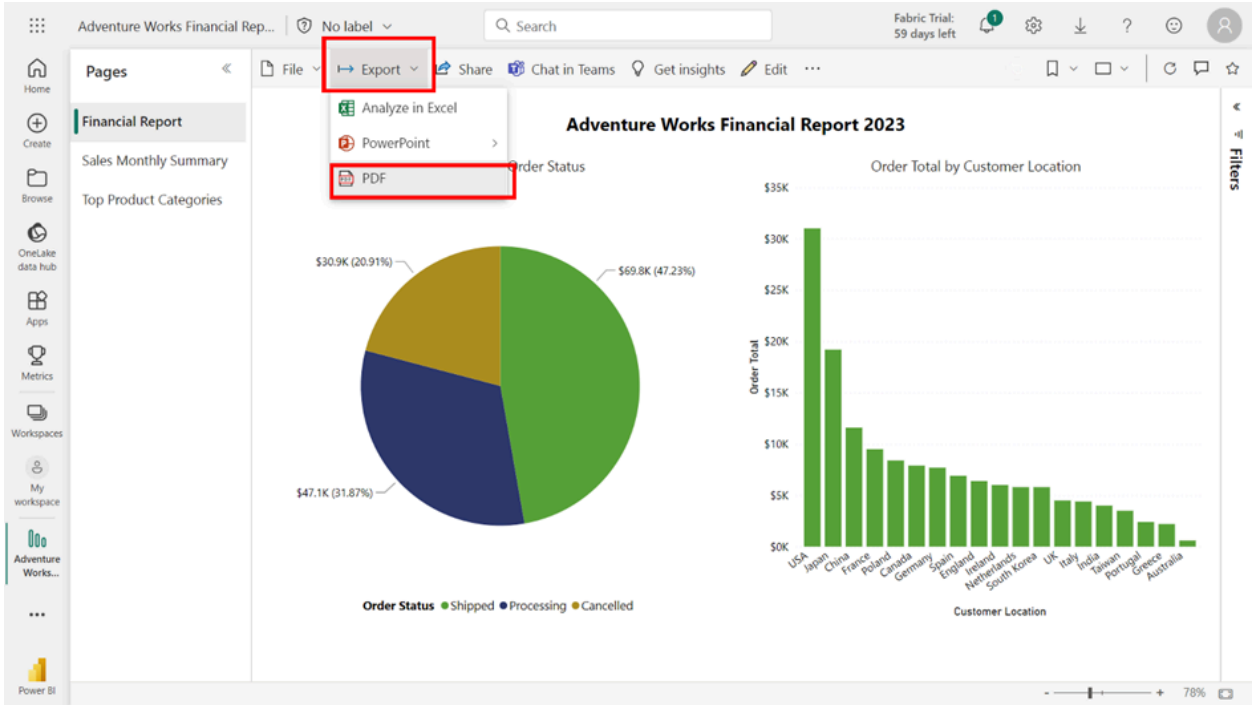
Step 8: Export the report

1. With your report open in Power BI Service, select the Export button at the top left corner of the screen.

Note: This option allows you to create a shareable version of your report, like printing copies of your book for distribution.

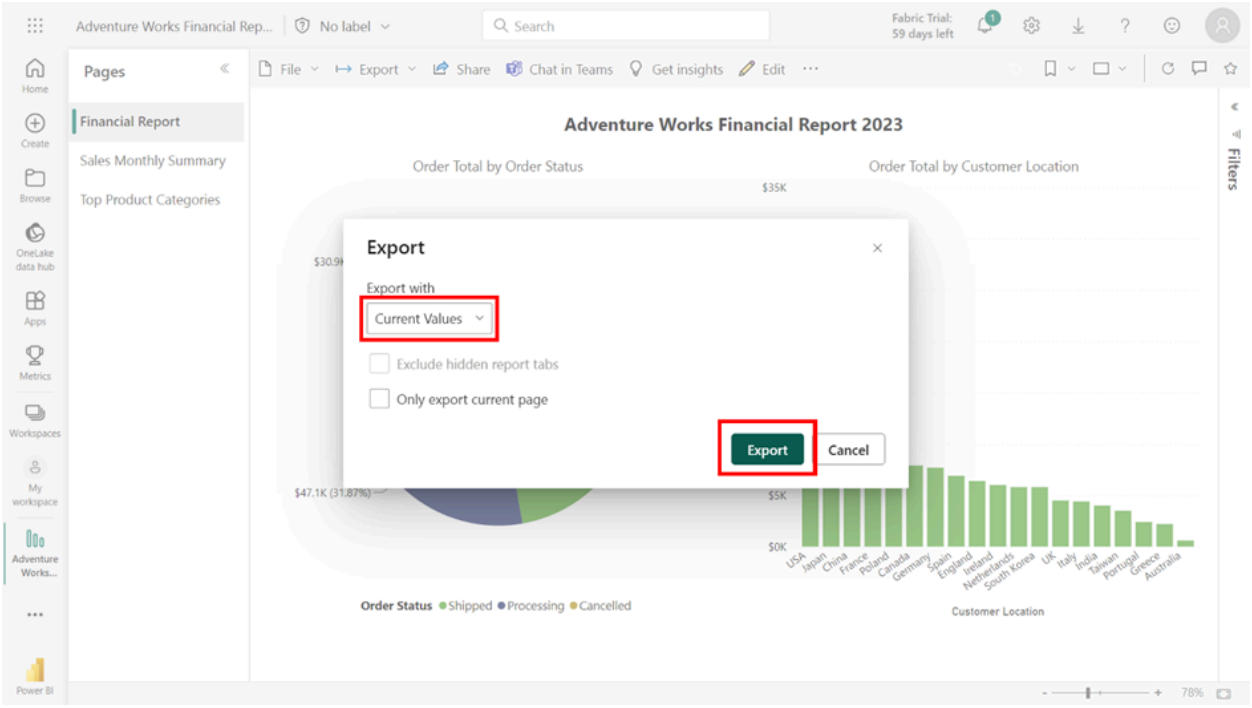


2. When you select the Export button, a dropdown menu appears with three options: PDF, PowerPoint, and Analyze in Excel. Select PDF.



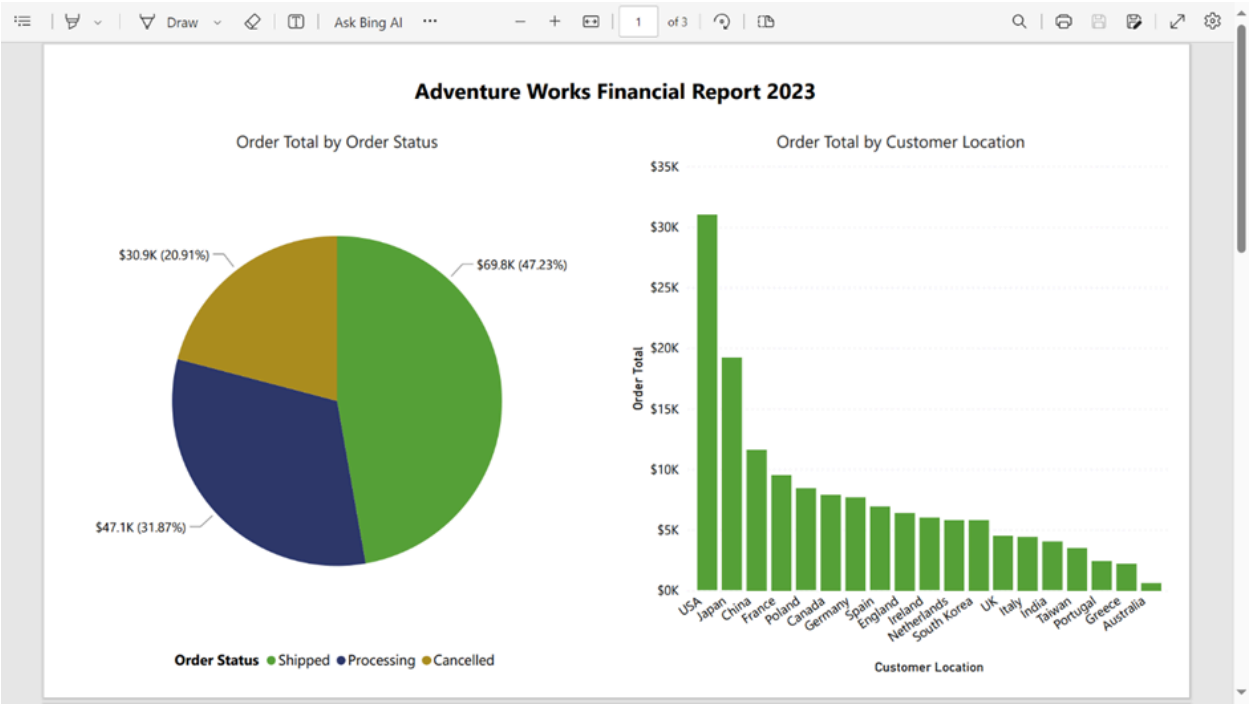
3. After selecting PDF, an Export pop-up dialog appears. In the Export with dropdown, select Current Values.

Note: This option ensures that the data in the report matches what's currently in your system, providing the most up-to-date insights to the financial team.



4. Finally, select Export to start the export process.

Note: The duration will depend on the size of your report. This last step is like the final printing press run, creating a product ready to be handed off to the financial team, providing them with the crucial insights they need to analyze Adventure Works' performance.



Conclusion

With these steps, you have accomplished much more than just sharing a report; you have navigated the narrative of data, organized its chapters, and brought it to life through Power BI.

3.4. Activity: Analyze in Excel

Introduction

You've just put the final touches on a new Microsoft Power BI report at Adventure Works. The crisp visuals and interactive charts reflect the company's financials across various continents, countries, and regions. Feedback from your boss is that the colorful visualizations are helpful, but she needs to dive deeper. She's preparing for a crucial board meeting where every visual and number must be perfect. In meetings like these, she prefers Excel and wants to know if there's a way to explore the report further in Excel. Your knowledge of the Analyze in Excel feature in Power BI saves the day!

In this activity, you'll learn how to open Power BI data in Excel.

What is Analyze in Excel?

The Analyze in Excel function is a powerful feature in Power BI that allows you to explore your Power BI data in Excel. This way, you get the best of both worlds–the interactive, visual capabilities of Power BI and the flexibility, familiarity, and depth of analysis possible with Excel. It provides a live connection from an Excel PivotTable to the data in Power BI. This means that when the data in Power BI is updated, the user can simply refresh their Excel report to see the new data.

Using the Analyze in Excel feature

Follow the step-by-step instructions below to open your data in Excel.

Step 1: Access the Power BI Service

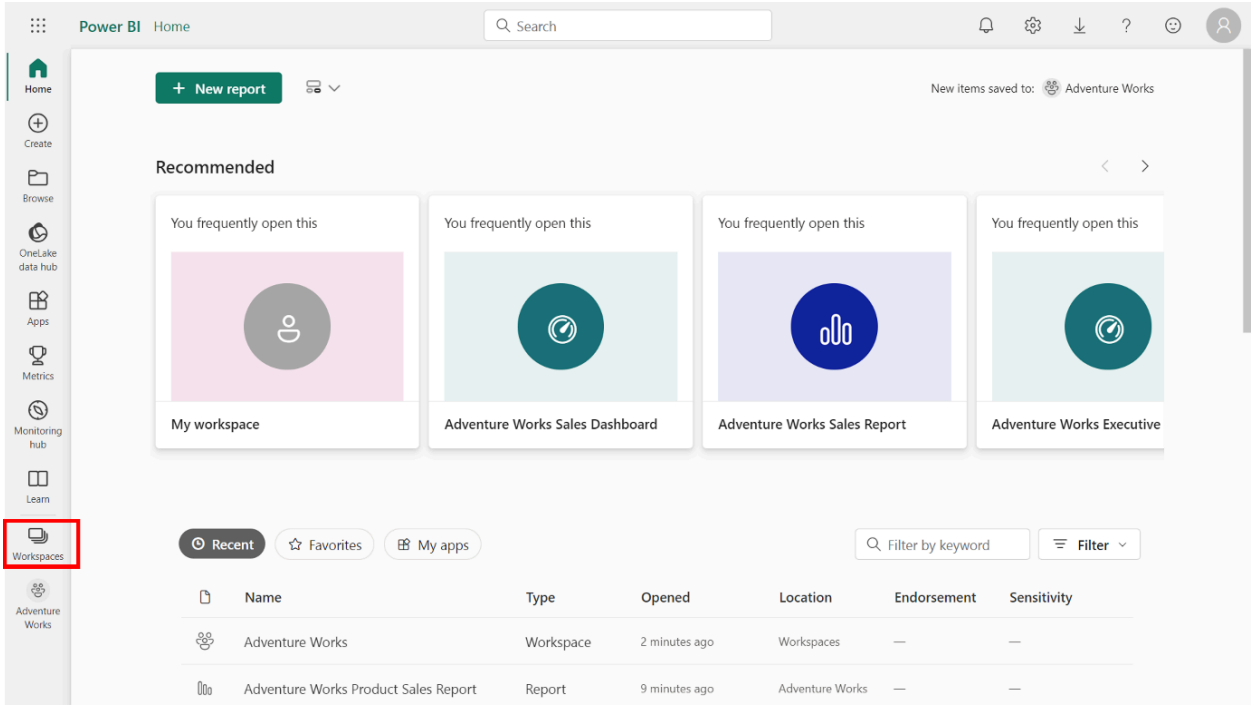
- Open your preferred web browser. Type app.powerbi.com in the address bar and press Enter.

Note: This action takes you to the Power BI Service's home page. The Analyze in Excel feature is only available in Power BI Service, not in Power BI Desktop. Power BI Service offers numerous advantages over its desktop counterpart, including sharing reports across your organization, setting up data alerts, and Analyze in Excel.

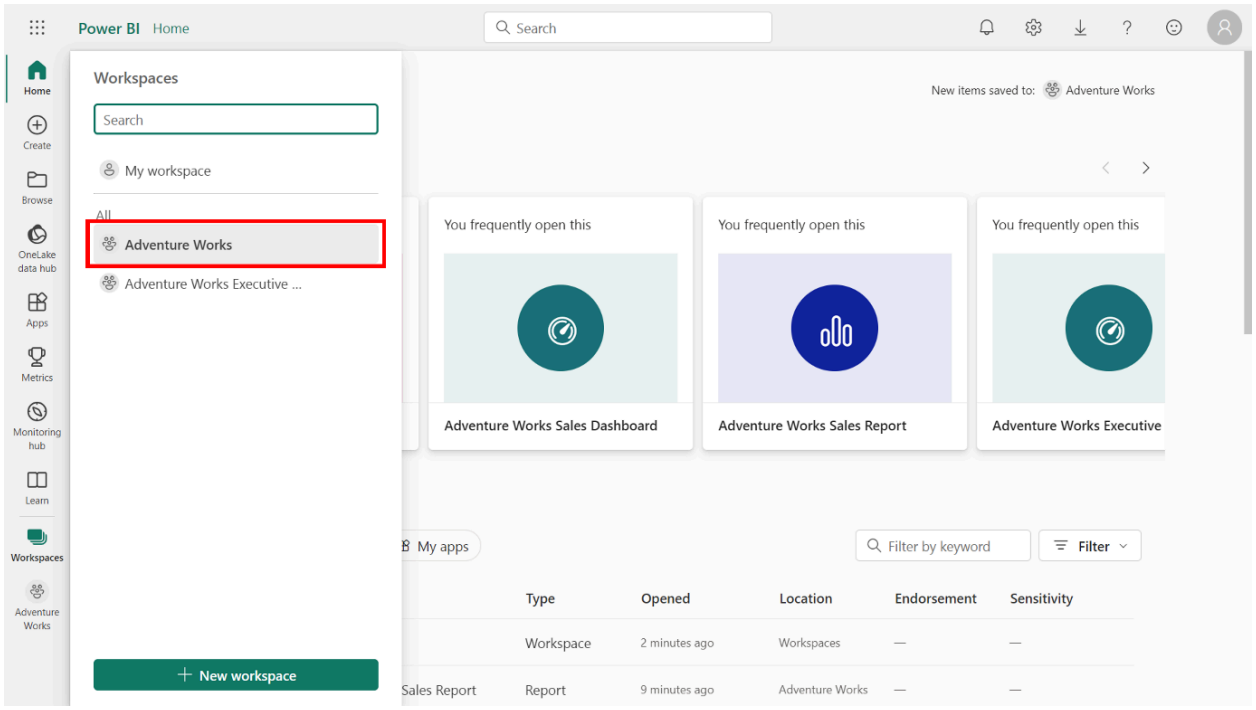
Step 2: Navigating to your Workspace

1. Once on the Power BI Service home page, locate the vertical navigation bar on the left.
2. Select the Workspaces icon.

Note: This icon looks like multiple windows stacked together, symbolizing the collaborative nature of workspaces.



1. Select the Adventure Works workspace option, which you created in a previous activity, from the available workspace options.

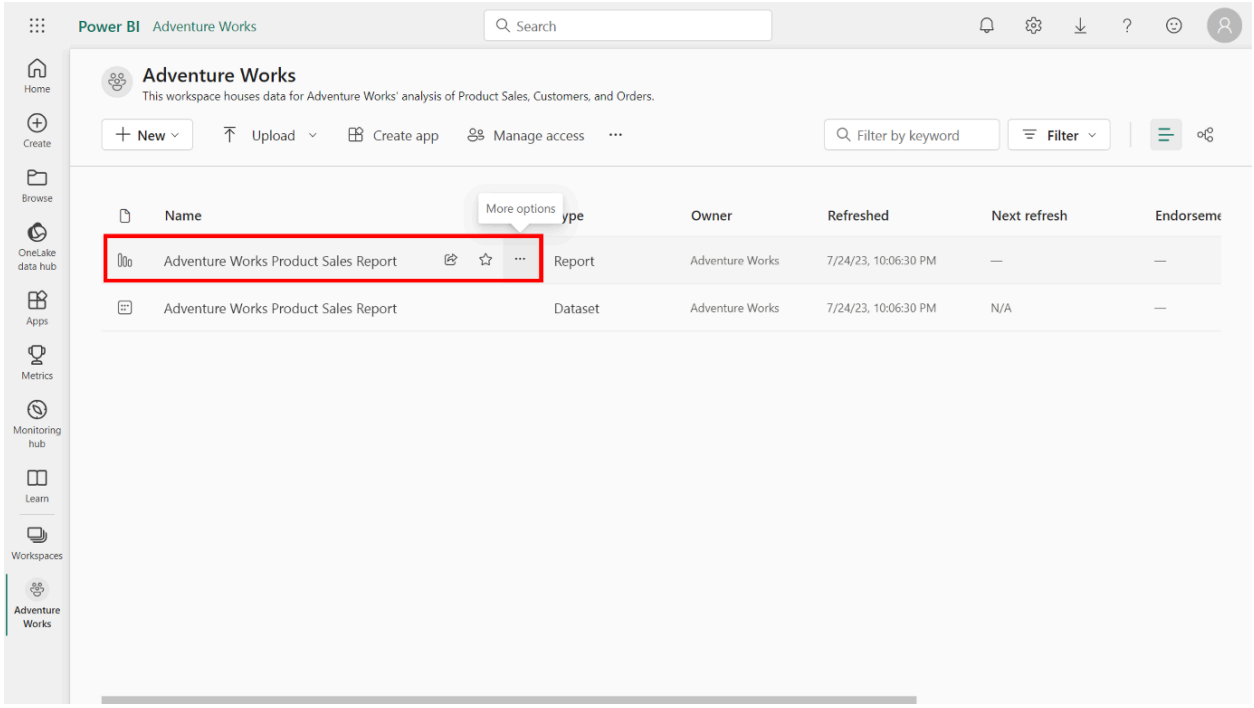


Step 3: Find your report

Your dashboards, reports, and datasets are displayed within your workspace. The reports are the ones you've developed and published from Power BI Desktop.

- Find the *Adventure Works Product Sales Report* report and select the ellipsis (three horizontal dots) next to it.

Note: This ellipsis is a common user interface element representing additional options or actions

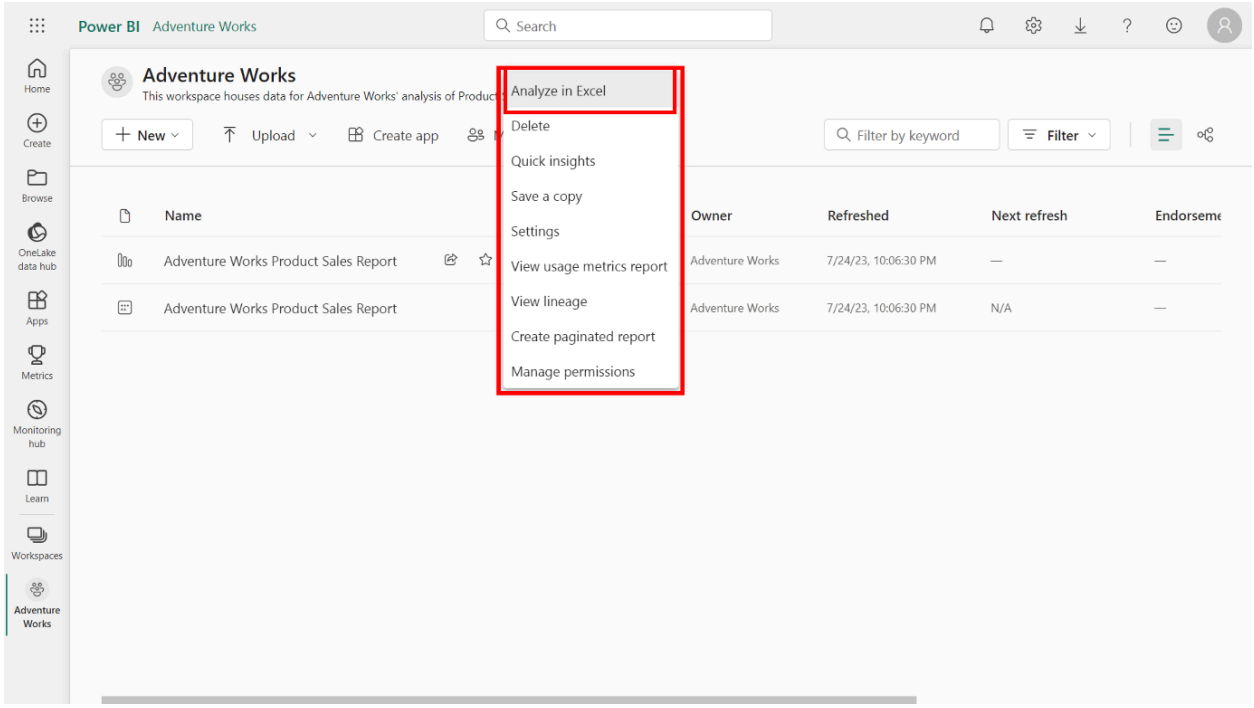


Step 4: Select Analyze in Excel

A drop-down menu appears when you select the ellipsis next to the Adventure Works Product Sales Report. This menu includes several options, such as Quick Insights, View Lineage, Analyze in Excel, and more.

- Select the Analyze in Excel option.

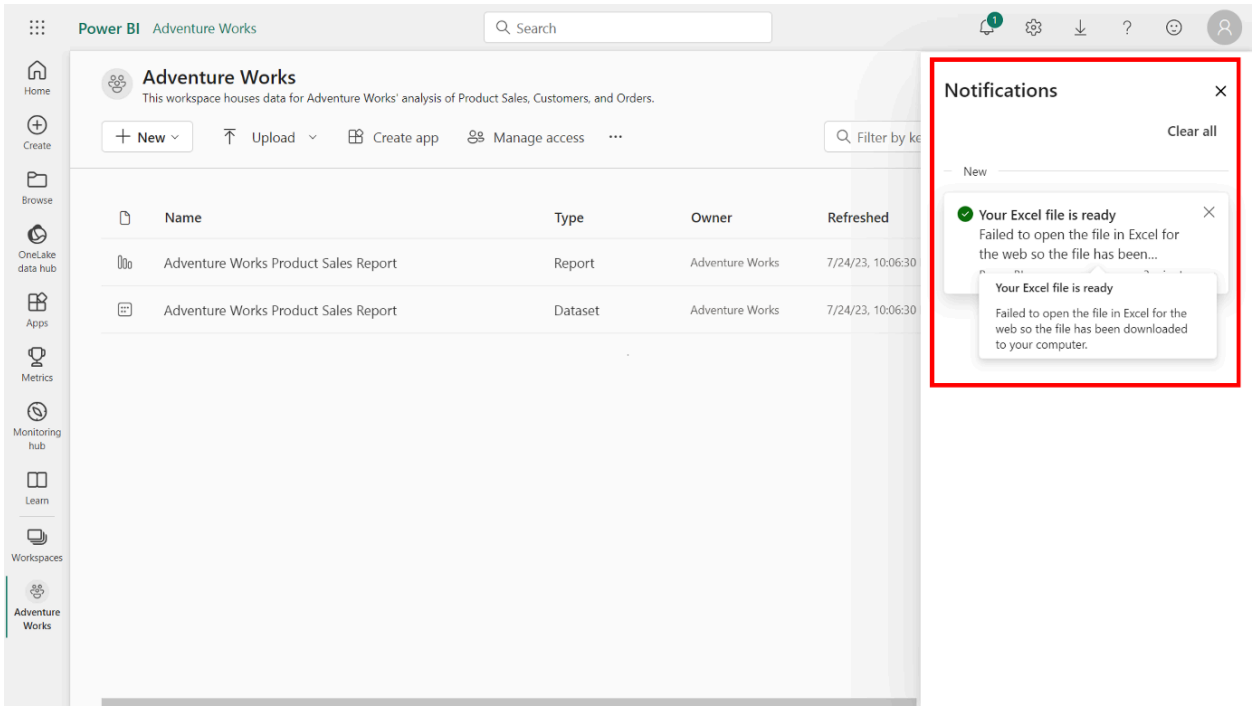
Note: This option is specifically designed to let you examine your Power BI data in Excel, offering you the extensive, flexible analytical capabilities that Excel is known for.



Step 5: Launch Excel

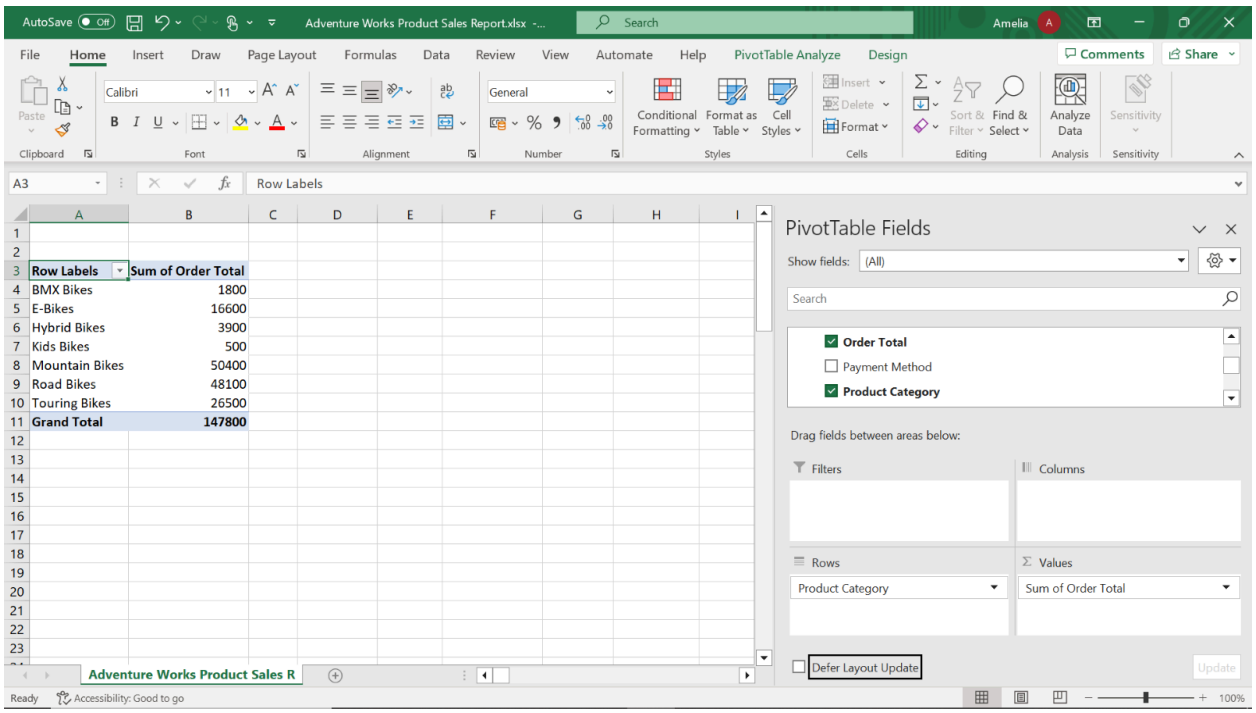
- After you select Analyze in Excel, Power BI generates an Excel workbook and saves it to your OneDrive SharePoint account.

Note: It has the same name as the Power BI report so that you can open the workbook directly in Excel for the web. If you don't have a OneDrive SharePoint account, Power BI prepares a copy of your data and downloads the Excel workbook to your local computer.



Step 6: Explore your data in Excel

With the file opened, an Excel workbook containing a PivotTable will display. This PivotTable holds a live connection to your Power BI dataset, meaning you can manipulate and analyze your data as you would with any other Excel file.



You have now successfully guided your boss through the process of opening a Power BI report in Excel using the Analyze in Excel feature!

Conclusion

The combination of Power BI's dynamic data visualization and Excel's analytical depth is a powerful combination that can elevate Adventure Work's data-driven decision-making process. You've experienced first-hand how seamless and intuitive it is to analyze your data from Power BI in Excel. The PivotTables and Excel's familiar interface enable you to dive deep into the numbers, making sense of the data. By utilizing the Analyze in Excel feature, you're not just opening an Excel spreadsheet; you're opening a portal to deeper insights and better-informed decision-making.

3.5. Exercise: Improving DAX performance

Introduction

You have now gained a clearer understanding of Power BI and grasped the significance of DAX variables in optimizing your report performance. Through this exploration, you've discovered how variables can be instrumental in troubleshooting and relieving performance challenges within your reports and visualizations. As you continue this journey, the potential of these variables to streamline complex calculations and bolster report performance will become even more apparent.

In this exercise, you will need to apply your knowledge to identify DAX performance issues and implement optimization in an Adventure Work Microsoft Power BI report. Your task is to:

- Use the Table view to examine the data in the report
- Use the Performance Analyzer to identify slow visuals and DAX formulas
- Test the changes with the Performance Analyzer to ensure improved report efficiency

Case study

Imagine you're a data analyst at Adventure Works. You've just built an impressive dashboard that showcases sales data over time, integrating data from across the globe and telling a comprehensive story of the company's sales operations. There's just one small problem–the masterpiece is in slow motion. Whenever you try to refresh or manipulate the data, it takes forever. Even a few seconds can feel like an eternity in today's fast-paced business landscape. Every extra second it takes to load is a dent in its efficiency. The culprit? It's a DAX query that's dragging everything down.

Instructions

Download the Adventure Works Power BI report, *Improving DAX performance*, and follow the steps below to complete the exercise.

Step 1: Open your project

1. Once you have Power BI Desktop open, in the top left corner, select the File menu.
2. Navigate through this to the location where the *Improving DAX performance.pbix* report file is saved.

3. Select the file and select Open in the file explorer window.

Step 2: Explore the data in Table view

1. When you select the Table view icon, Power BI takes you to the Table view, which allows you to explore the data contained in your project.
2. Select the Sales dataset on the right of the screen and take a moment to observe the first ten records.
3. Note which record has the highest Product Weight value.
4. Note the Day of Week with the highest frequency of sales records.
5. Finally, use the icons on the vertical toolbar on the left side of the Power BI interface to switch back to the Report view.

Step 3: Access the Performance Analyzer

1. Once you're in the Report view, you'll first need to open the Performance Analyzer. Locate and select the View tab on the ribbon interface at the top of your Power BI report.
2. Within the View tab, find and select the Performance Analyzer option.
3. Within the Performance Analyzer pane, locate and select the Start Recording button.

Step 4: Refresh the report

- Now, it's time to refresh your report. You can accomplish this in two ways: either by selecting the Refresh button situated in the Home tab of the ribbon interface or by directly interacting with the report.

Step 5: Observe the results

1. Once the report has finished refreshing, review the Performance Analyzer pane. Pay special attention to any visual items that take significantly longer to load than others.
2. For these slower visuals, drill down into the details by selecting the + symbol beside the visual item's name.
3. You should find that the Total Sales by Year, Quarter, Month and Day area chart is slowing down the report performance.

Step 6: Improve DAX performance

In DAX, the CROSSJOIN function generates a cartesian product by pairing every row of the first table with every row of the second table. This operation is conducted regardless of any matching column values between the tables. It merges each row from one table with all the rows from the other table.

1. Locate the Total Sales field of the area chart from the Table view on your right and select it to view the underlying DAX formula.
2. To simplify the DAX formula, eliminate the nested CROSSJOIN and GENERATESERIES functions.
3. Instead, use the SUMX function enclosed with a single CROSSJOIN:

```
Total Sales =
SUMX(
CROSSJOIN(VALUES(Sales[Product Category]),
VALUES(Sales[Payment Method])),
CALCULATE(SUM(Sales[Sales Total]))
)
```

Step 7: Test and review

- Finally, re-run the performance analyzer to test if the optimization was successful.

Conclusion

Think of every data report as a story—a narrative waiting to be told. When there's a delay, the essence of the story gets lost. But when data flows smoothly, it speaks volumes, narrating tales of opportunities, challenges, and growth. Every time you refine a DAX calculation and streamline a query, you're not just improving a report—you're elevating the entire data-driven decision-making process. And in a world increasingly powered by data, that's not just a skill; it's a superpower.

Exemplar: Improving DAX performance

Introduction

In the exercise *Improving DAX performance*, you were immersed in the world of Adventure Works, the multinational bicycle and accessories powerhouse, where you confronted a unique challenge: a slow Microsoft Power BI report. The mission in hand was to locate and optimize a DAX query that hindered the report's performance, ensuring that data-driven decisions could be made efficiently and without delay.

More specifically, you were required to:

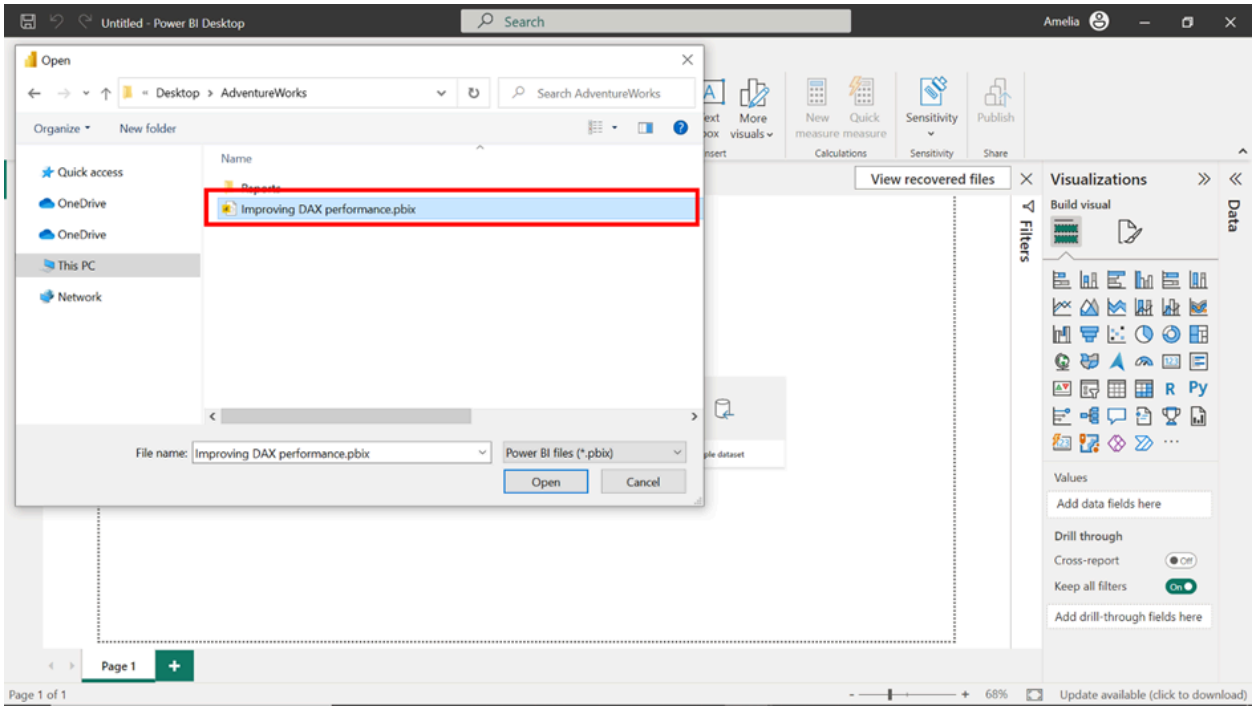
- Download the Adventure Works Power BI report named *Improving DAX performance.pbix* and open it in Power BI Desktop, setting the groundwork for your journey.
- Dive into the Table view to familiarize yourself with the dataset available in the report, laying the foundation for understanding the details of the data at hand.
- Harness the power of the Performance Analyzer to pinpoint the underperforming visualization and DAX formula in your report.
- Refine the DAX formula of the Total Sales field to optimize its performance, replacing the nested functions with a more streamlined version.
- Validate the modifications by re-running the Performance Analyzer, ensuring that the tweaks made indeed have a positive effect on the dashboard's efficiency.

This reading serves as a structured walkthrough, guiding you step by step, ensuring that you're on the right track, and assisting you in comparing your efforts against a standard solution.

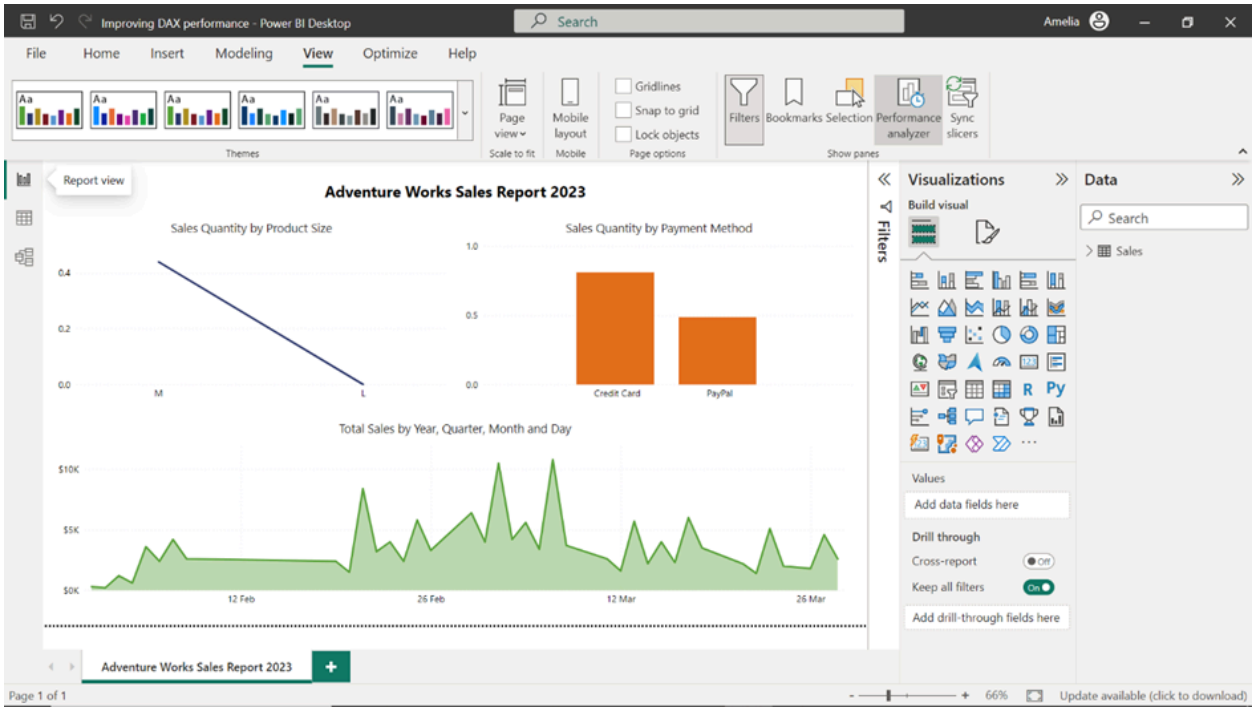
Improving DAX performance

Step 1: Open your project

1. Once you have Power BI Desktop open, in the top left corner, select the File menu.
2. Navigate through this to the location where your *Improving DAX performance* report file is saved.

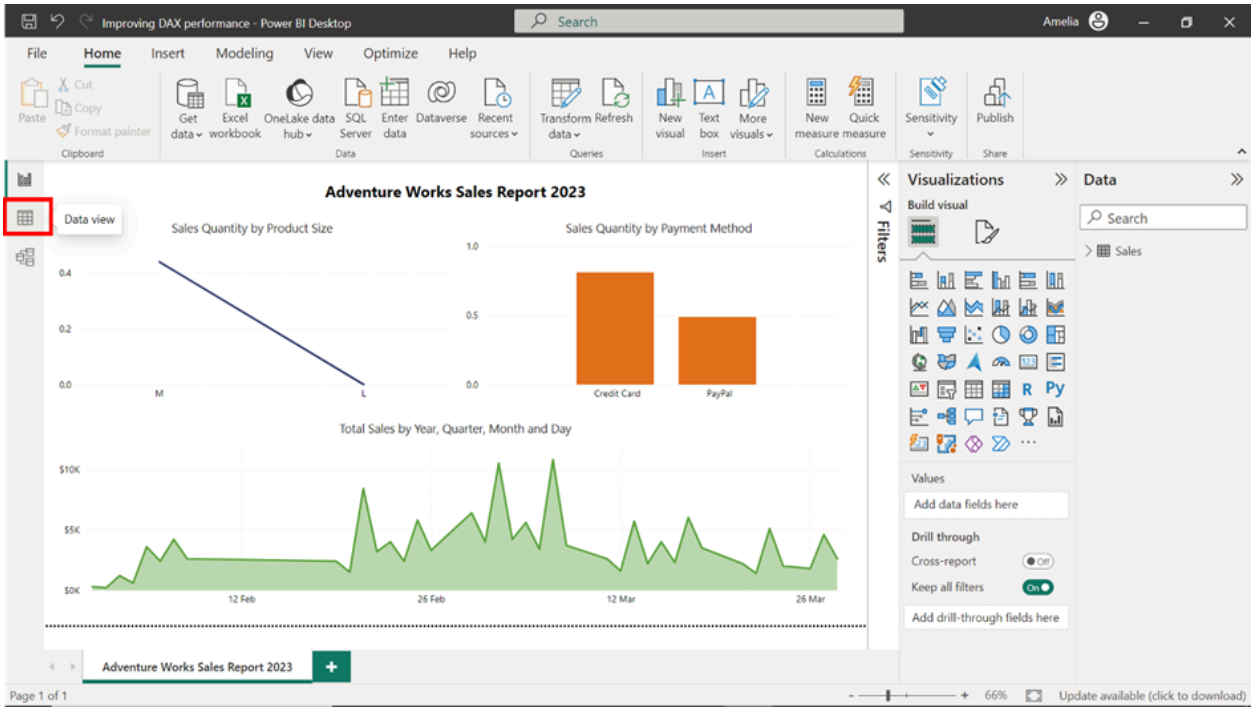


3. Select the file and select Open in the file explorer window. This action opens the saved project in the Power BI Desktop application.



Step 2: Explore the data in Table view

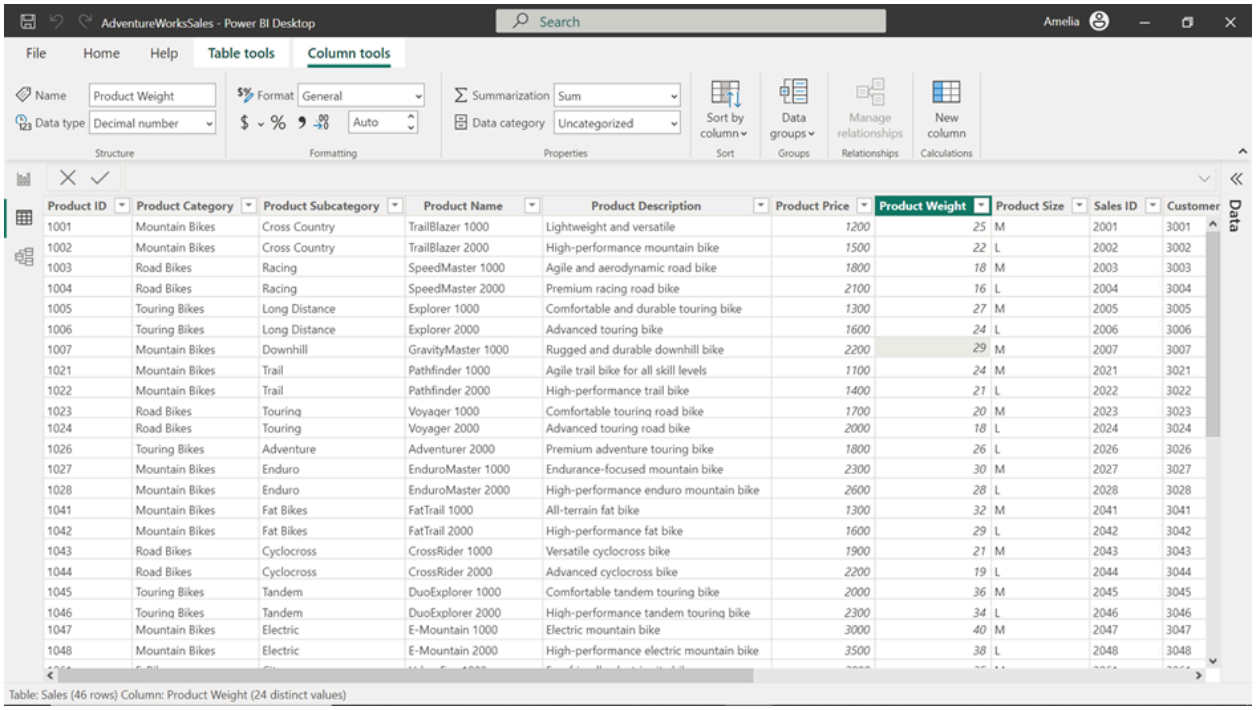
1. Once your report is loaded, on the left side of the Power BI interface, you'll find a vertical toolbar with different icons. The second icon from the top that resembles a table is the Table view icon. When you select this, Power BI takes you to the Table view which allows you to explore the data contained in your project.



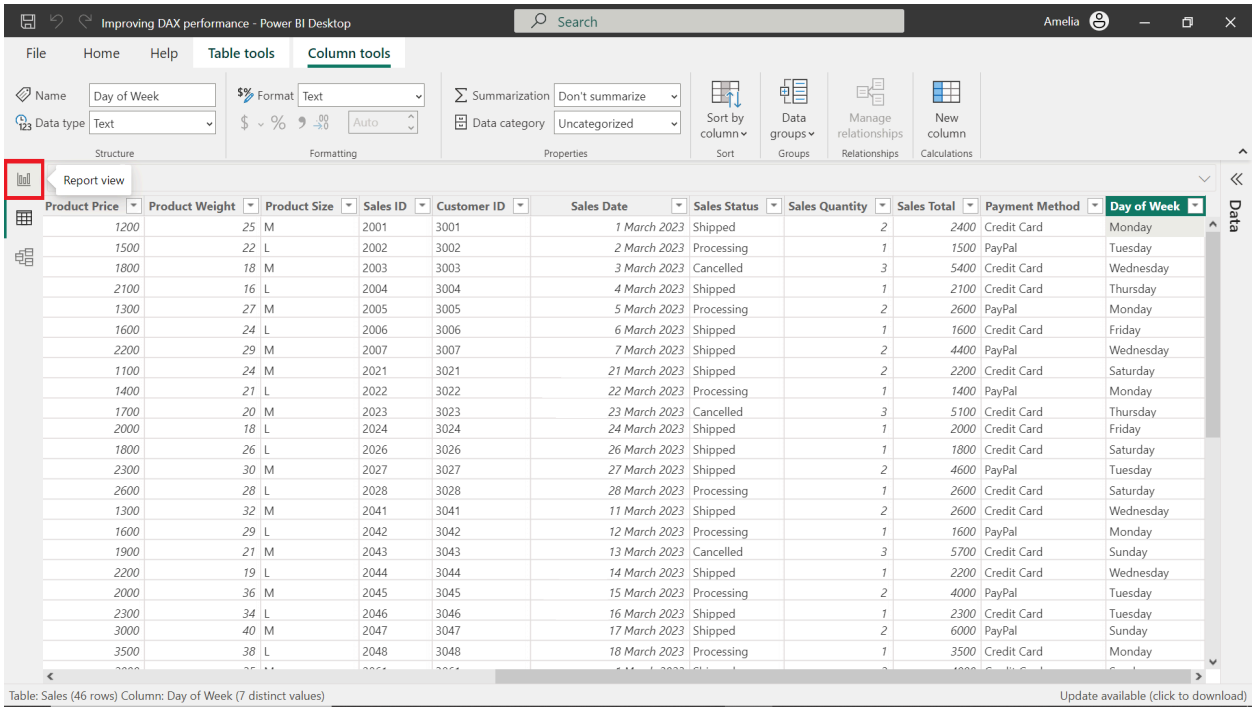
2. Select the Sales dataset on the right of the screen and take a moment to observe the first 10 records.

3. Note which record has the highest Product Weight value. With a weight of 29 units, the GravityMaster 1000 stands as the heaviest bicycle.

4. Then, note the Day of Week that has the highest frequency of sales. Monday stands out as the busiest day at Adventure Works–with three sales records, it has the highest frequency in the Day of Week column.



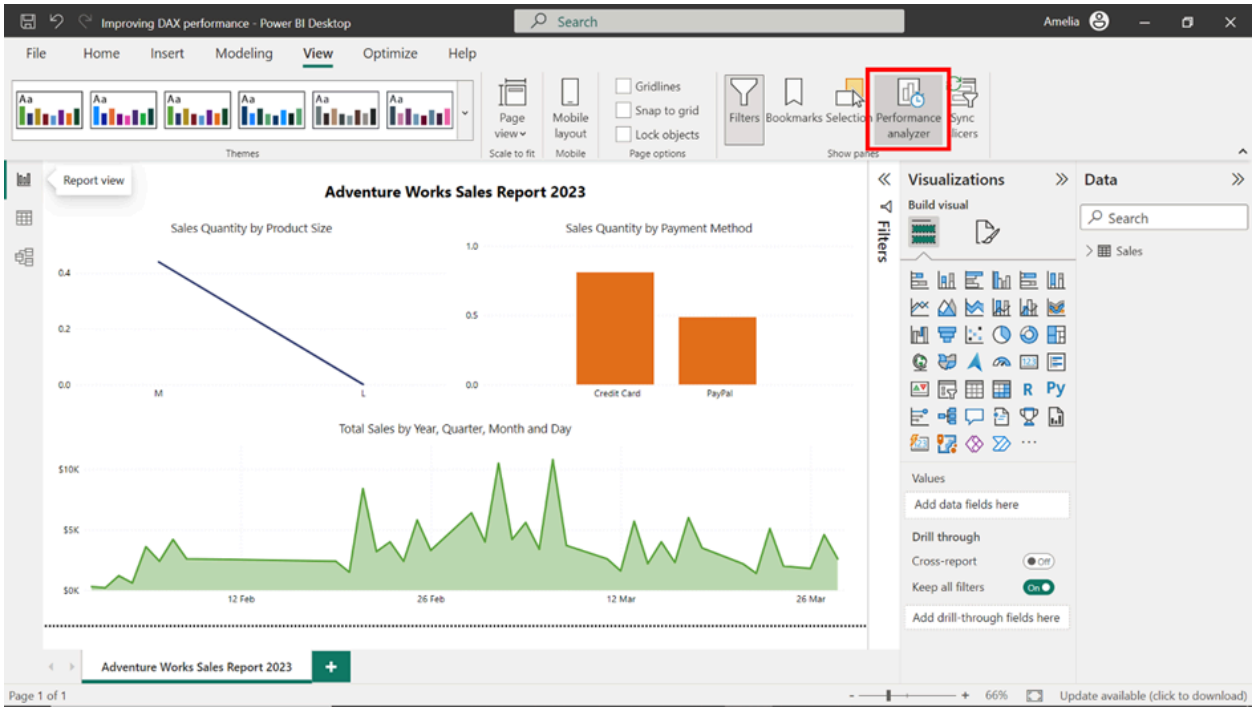
5. Finally, use the icons on the vertical toolbar on the left side of the Power BI interface to switch back to the Report view.



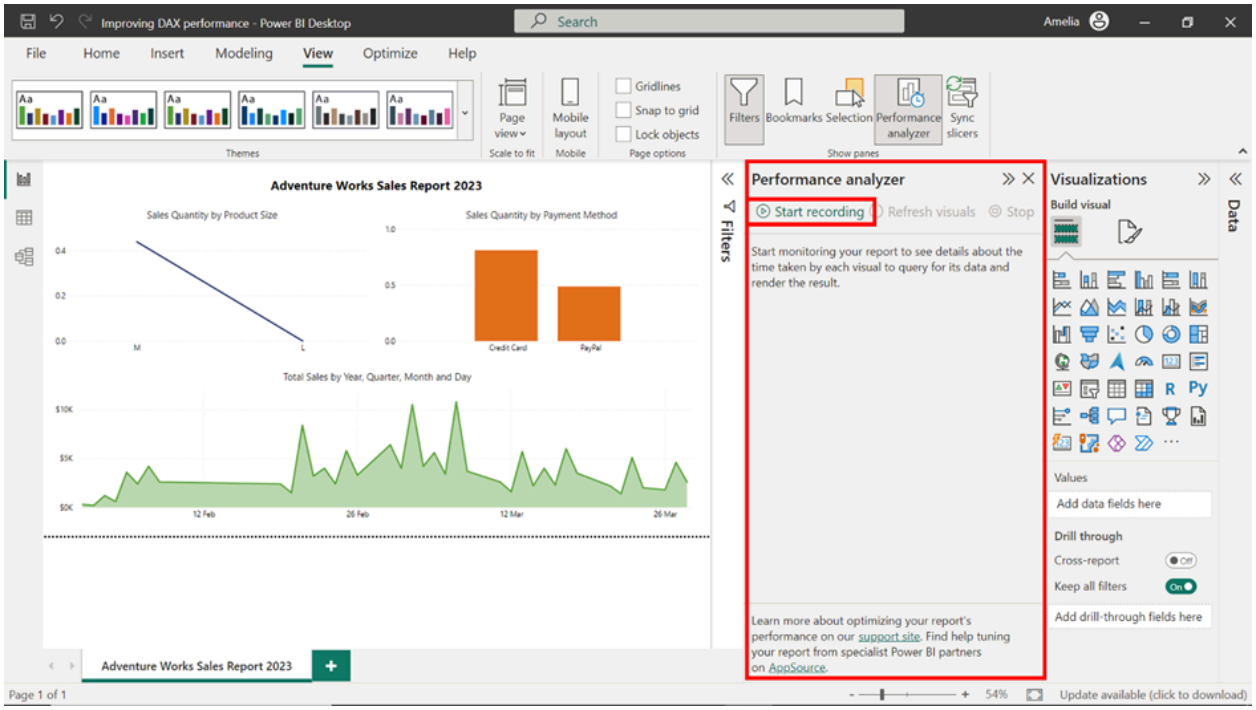
Step 3: Access the Performance Analyzer

1. Once you're in the Report view, you first need to open the Performance Analyzer. On the ribbon interface at the top of your Power BI report, locate and select the View tab.

2. Within the View tab, find and select the Performance Analyzer option.

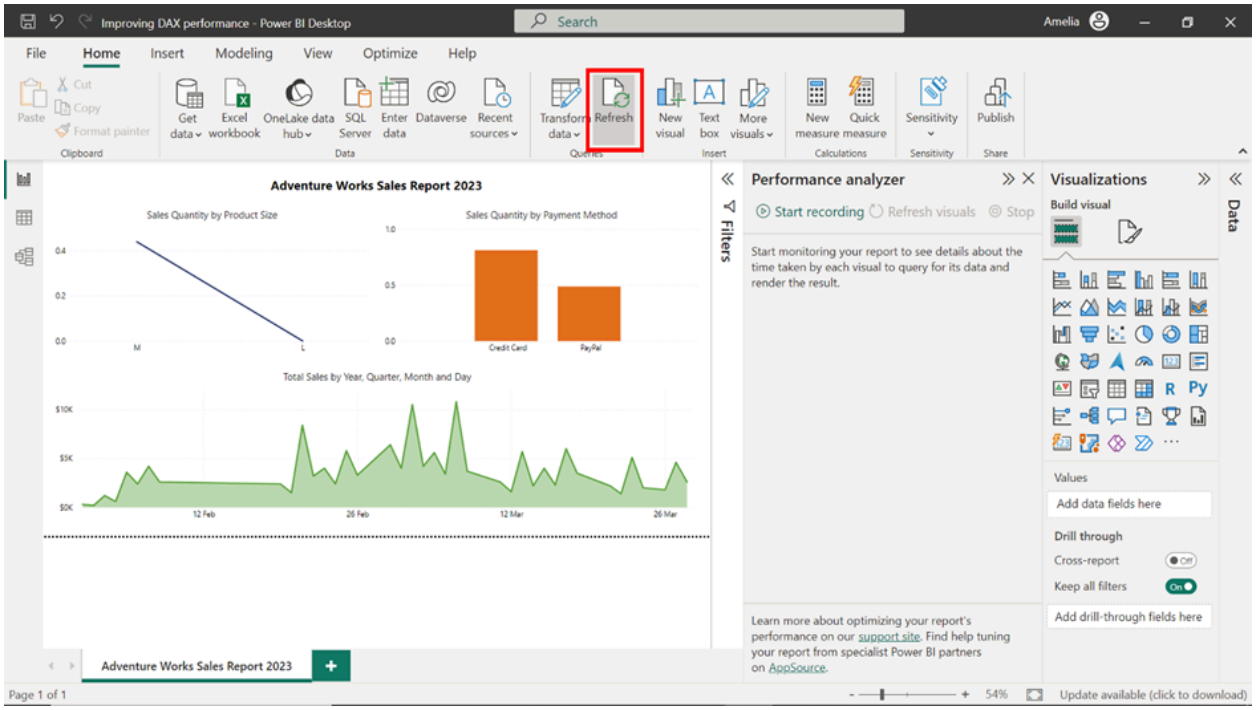


3. Upon selection, you'll notice a pane unfold on the right side of the Power BI window. This Performance Analyzer pane is designed to showcase real-time performance metrics of your report visuals. Within the Performance Analyzer pane, locate and select the Start Recording button.



Step 4: Refresh the report

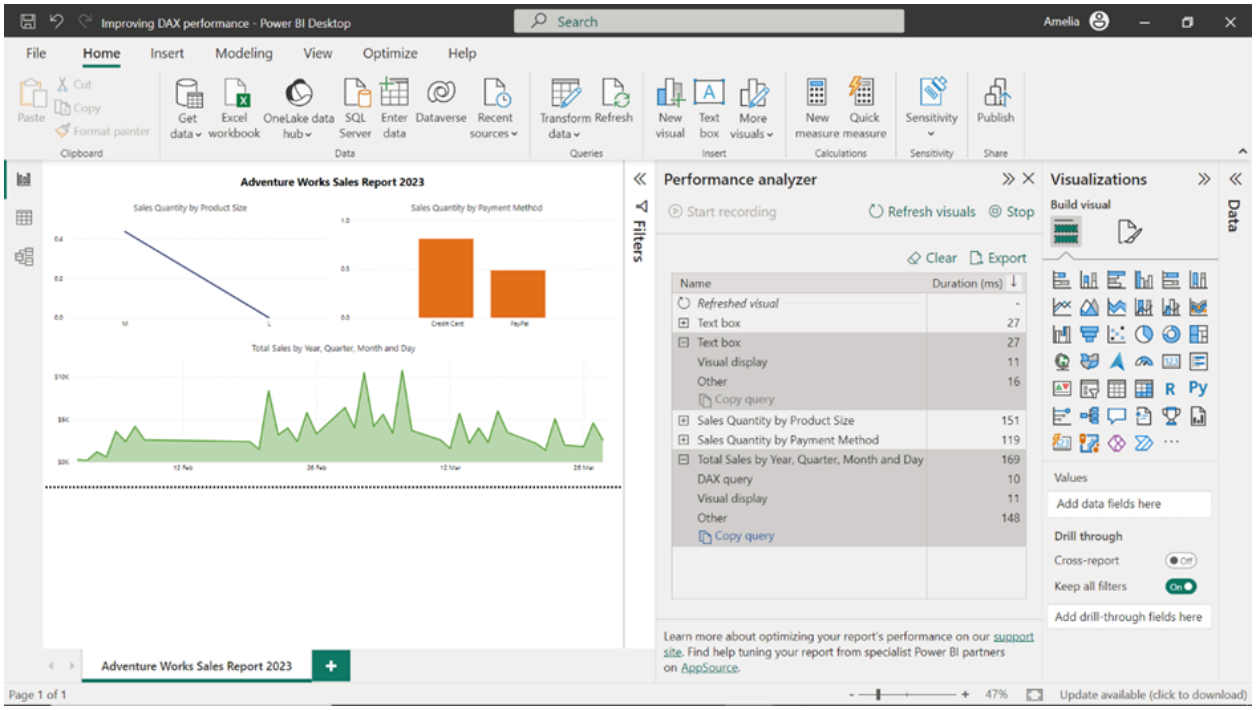
- Now, it's time to refresh your report. You can accomplish this in two ways: either by selecting the Refresh button situated in the Home tab of the ribbon interface or by directly interacting with the report.



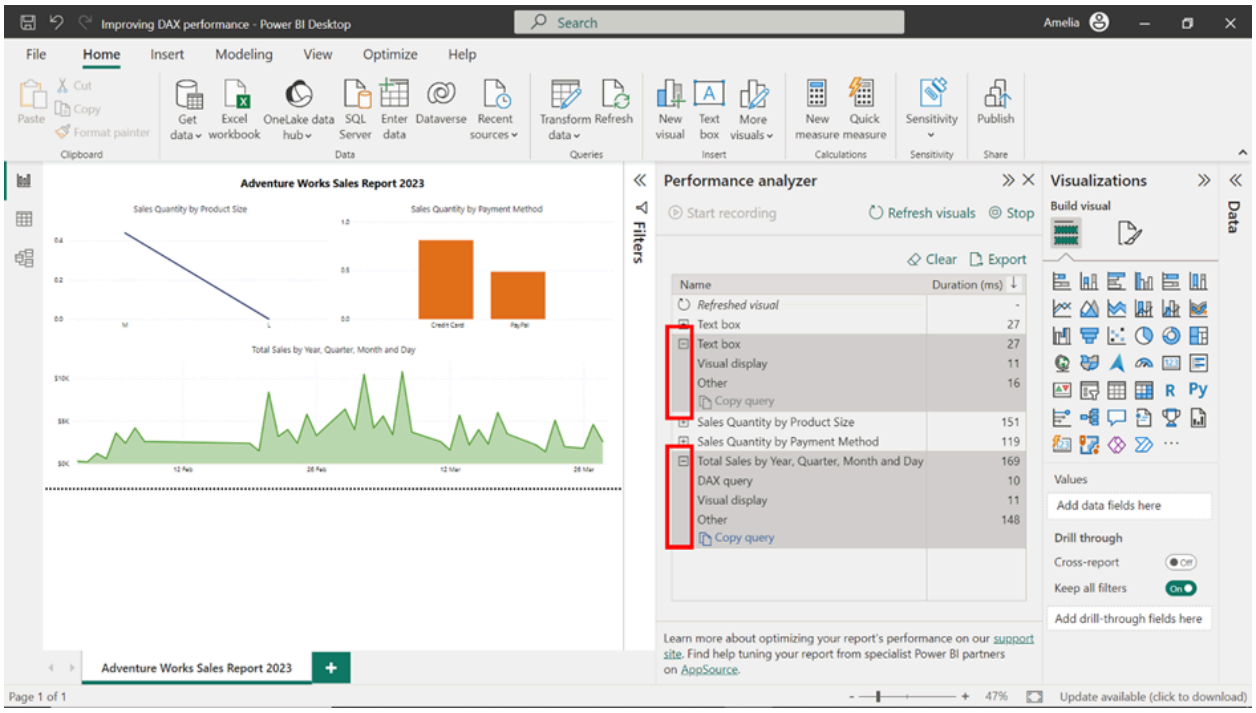
Note: As you interact with the report while the Performance Analyzer is recording, it will track and document the time taken to load each individual visual item. This data will be crucial for diagnosing performance issues.

Step 5: Observe the results

1. Once the report has finished refreshing, review the Performance Analyzer pane. A list of all the visual items in your report and their respective load times is available. Pay special attention to any visual items that take a significantly longer time to load compared to others. This ensures that you're not wasting time optimizing calculations that are already performing well.



2. For these slower visuals, drill down into the details by selecting the + symbol beside the visual item's name. This will provide a detailed breakdown of the DAX query time and the visual rendering time, helping you understand where the bottleneck lies. If the DAX query time is high, then your efforts should be directed towards optimizing the DAX measures.

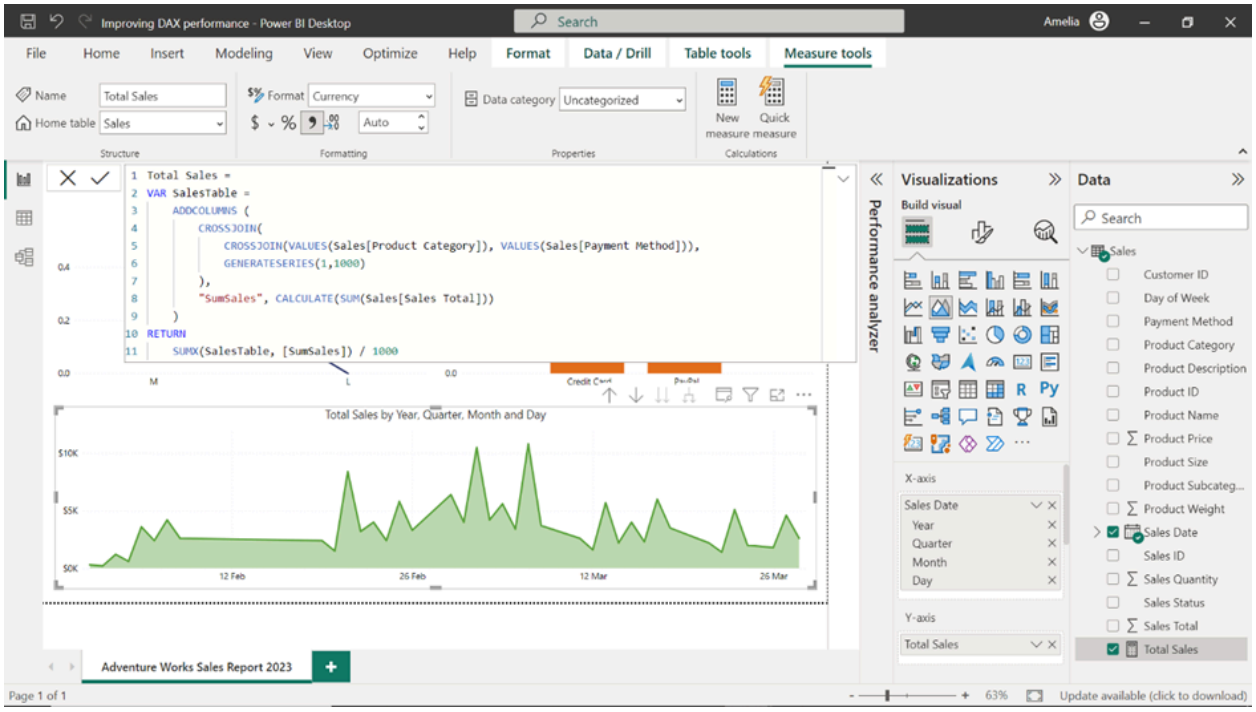


3. In this case, it appears that the Total Sales by Year, Quarter, Month and Day area chart is slowing down the report performance, as it has a considerably larger DAX loading time compared to other visuals.

Step 6: Improve DAX performance

Now that you have identified that the problematic visual is Total Sales by Year, Quarter, Month and Day, the next step is to refine and optimize. This might involve rewriting certain parts of the DAX formula for efficiency, eliminating unnecessary calculations, or simplifying complex ones. The goal is to reduce the computational load on the Power BI engine.

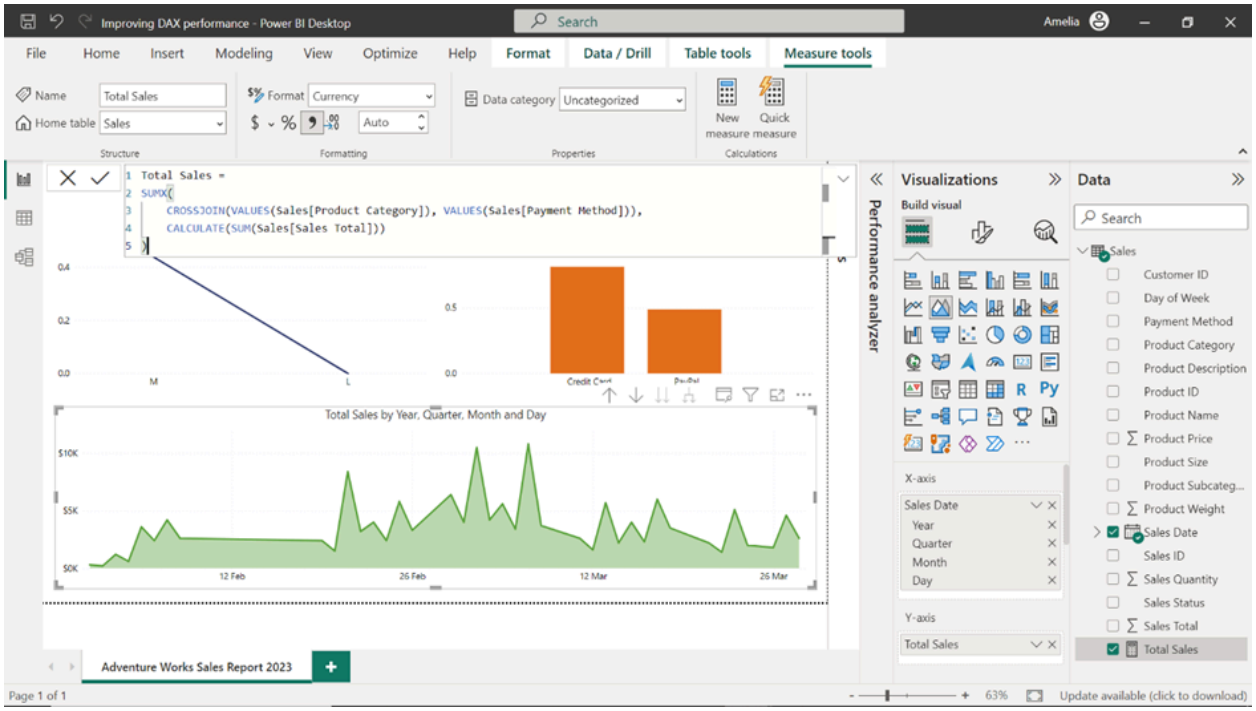
1. Locate the Total Sales field from the Table view on your right and select it to view the underlying DAX formula. This DAX formula inflates data with the nested CROSSJOIN operations, creating a much larger table. For each row, it recalculates the Total Sales using CALCULATE, a resource-intensive operation. Aggregating this massive table again with SUMX further strains performance, making the entire computation slow.



2. To simplify the DAX formula, eliminate the nested CROSSJOIN and GENERATESERIES functions. Instead use the SUMX function enclosed with a single CROSSJOIN:

```
Total Sales =

SUMX(

    CROSSJOIN(VALUES(Sales[Product Category]), VALUES(Sales[Payment Method])),

    CALCULATE(SUM(Sales[Sales Total]))

)
```

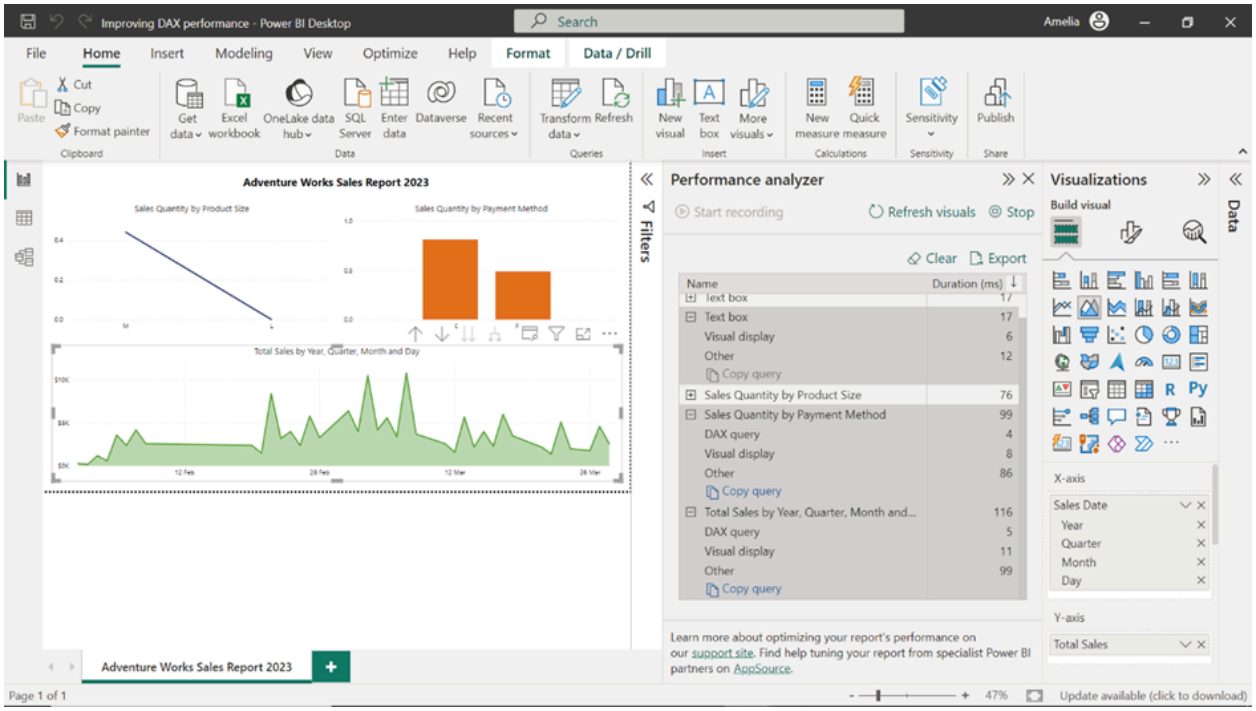
3. The SUMX function iterates over each unique combination of Product Category and Payment Method and calculates the Total Sales for that specific combination using CALCULATE (SUM (Sales [Sales Total])). After calculating the sales for each combination, SUMX then sums up these individual results to produce the final Total Sales.



Step 7: Test and review

- Finally, re-run the Performance Analyzer to test if the optimization was successful. Optimizing DAX is often an iterative process. Once changes are made, it's vital to test and review the impact. Sometimes, what seems like an

optimization might not have the desired effect, or there could be unintended side effects. Regular testing ensures that you're moving in the right direction.



Conclusion

After walking through these steps to enhance your DAX performance, you've not only elevated the efficiency of your report but acquired a set of skills that are universally applicable. Always remember, in the world of data analytics, it's not just about having data, but how swiftly and accurately you can harness its potential.

4.1. Activity: Performing an analysis

Introduction

In your Microsoft Power BI analytics journey thus far, you have learned about statistical summary, groups and bins, histograms, Top N analysis, and clustering. In this step-by-step exercise, you will apply some of your newly gained knowledge to enhance the three visualizations in the report, *Adventure Works Fact Sales.xlsx,* using Power BI analytics.

Your task is to:

1. Enhance the funnel chart by highlighting the top 10 selling products by sales amount.
2. Enhance the clarity of the histogram by using age bins instead of distinct ages.
3. Enhance the scatter chart by clustering the cities into four categories according to their performance.

Instructions

Step 1: Download the data

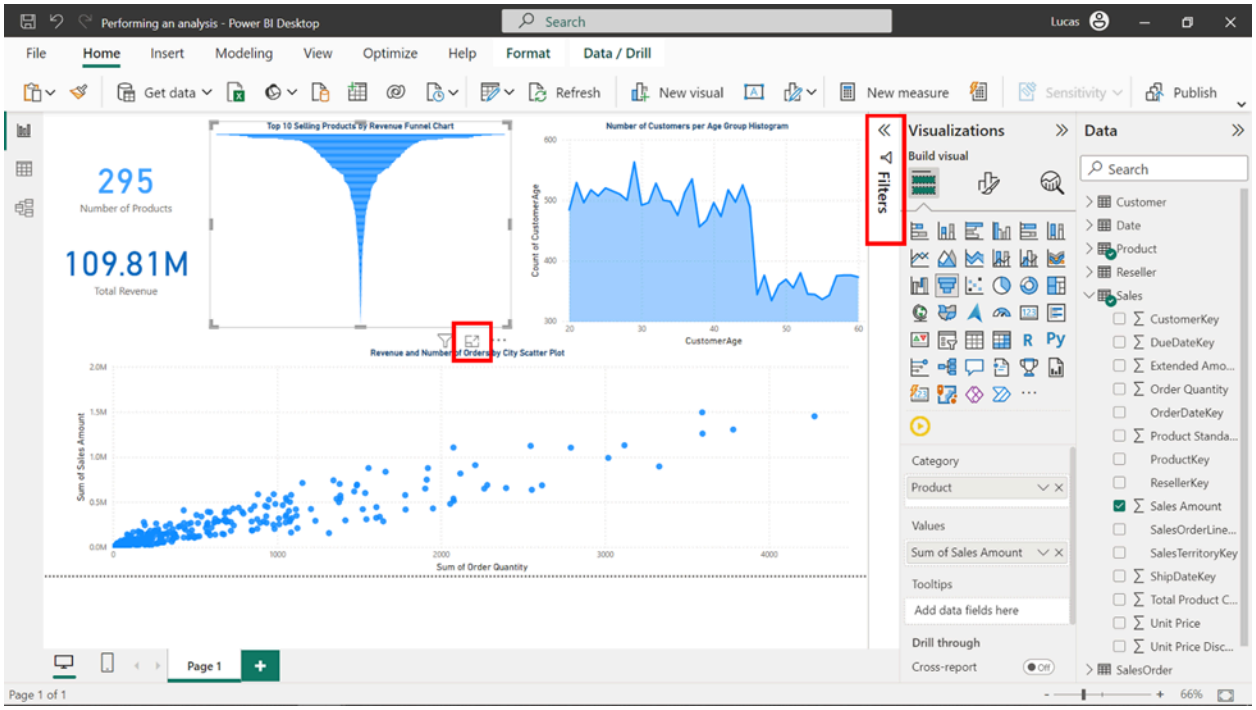
- Download and open the *Performing an analysis.pbix* file.

Step 2: Enhance the funnel chart with Top N analysis

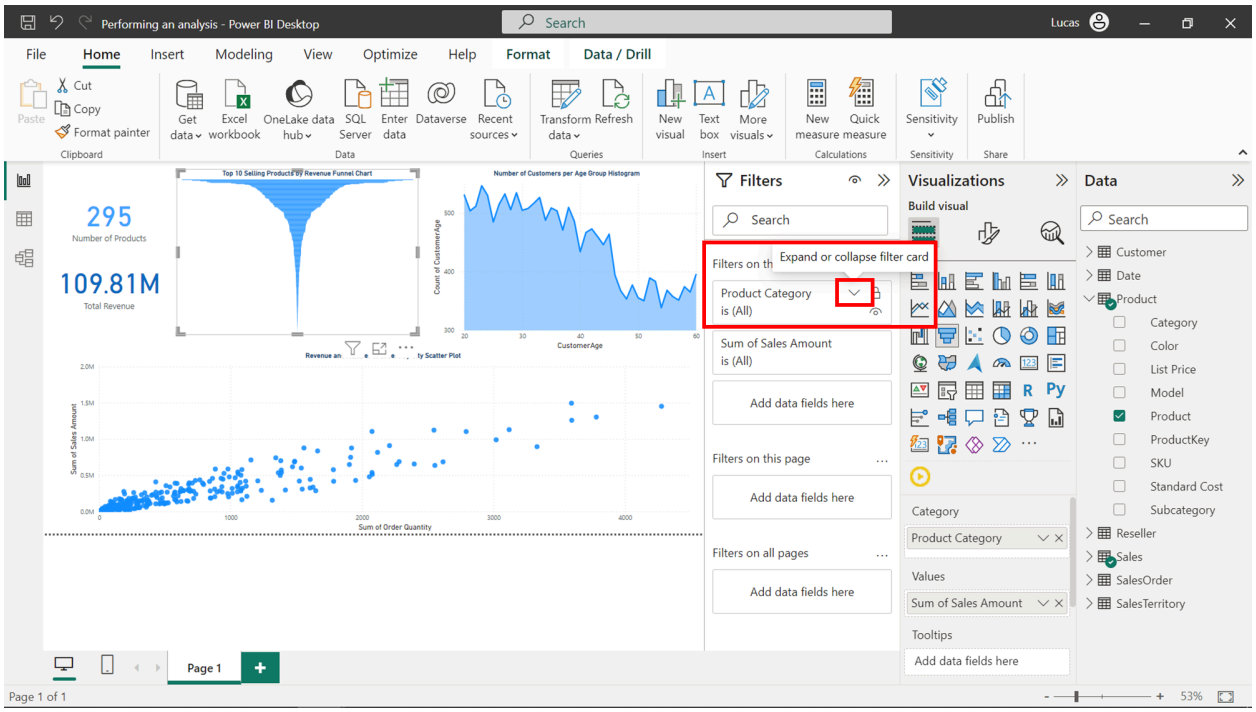
The funnel chart features all 295 products and their corresponding revenue. Due to the substantial number of products, the visualization is cluttered. To address this, apply Top N analysis to the funnel chart to highlight the top 10 selling products by revenue.

1. Select the funnel chart visual. You can select the Focus mode button on the visual to enlarge it on your screen.

2. Navigate to the Filter pane, specifically focusing on the Product category.



3. Select the down arrow to expand your filtering options.

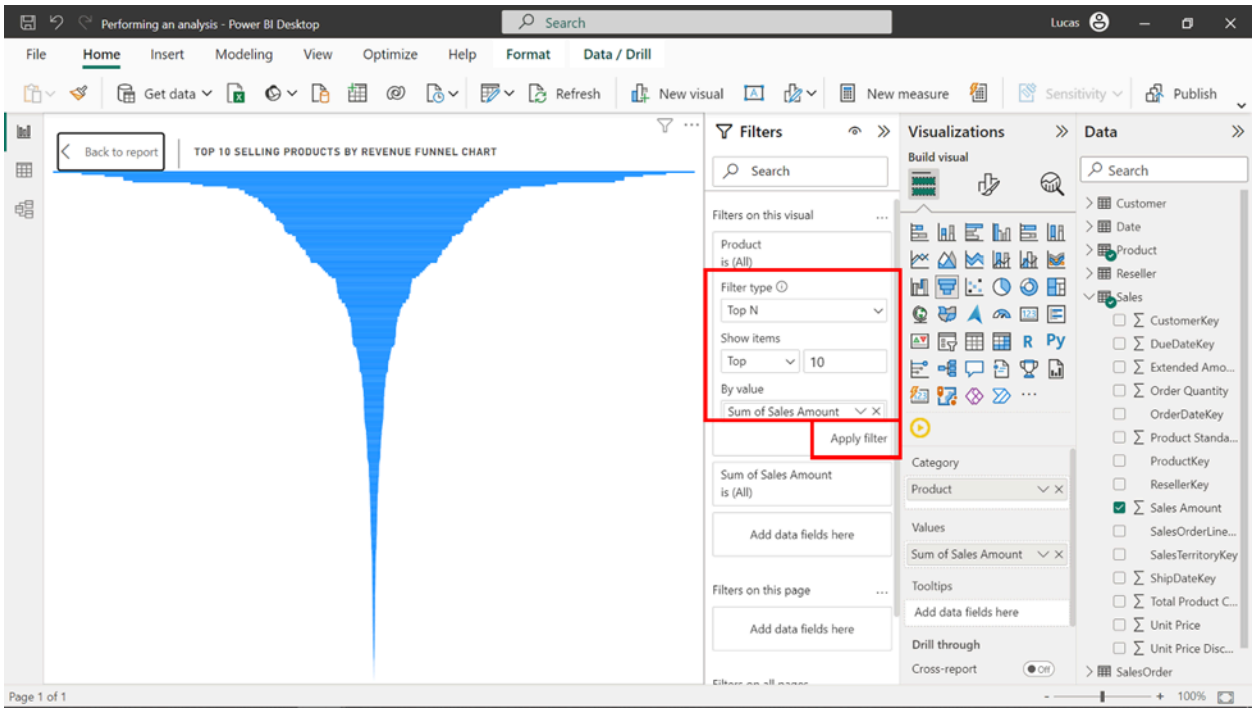


4. Select Top N as the Filter type.

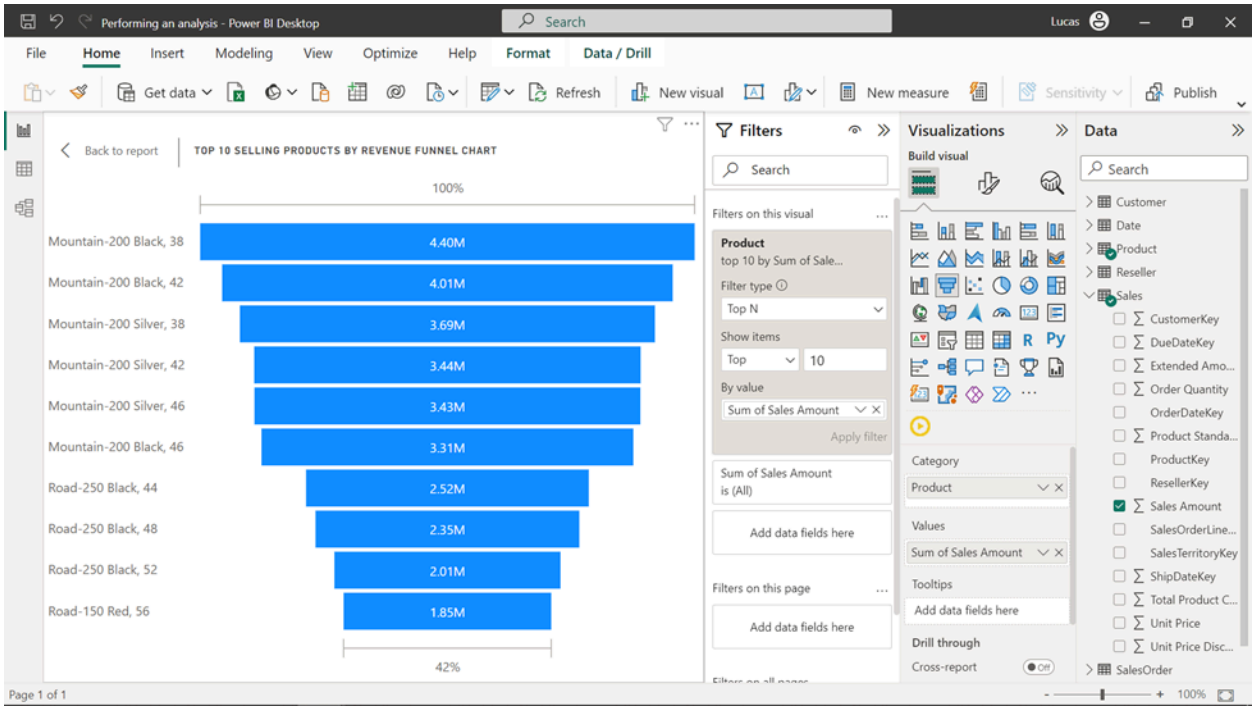
5. Ensure Top is selected and input 10 as the Filter value.

6. Add Sales Amount to the By value field to enable sorting by revenue on the chart.

7. Finally, select Apply Filter to see the updated chart with the top 10 Selling Products by Revenue.



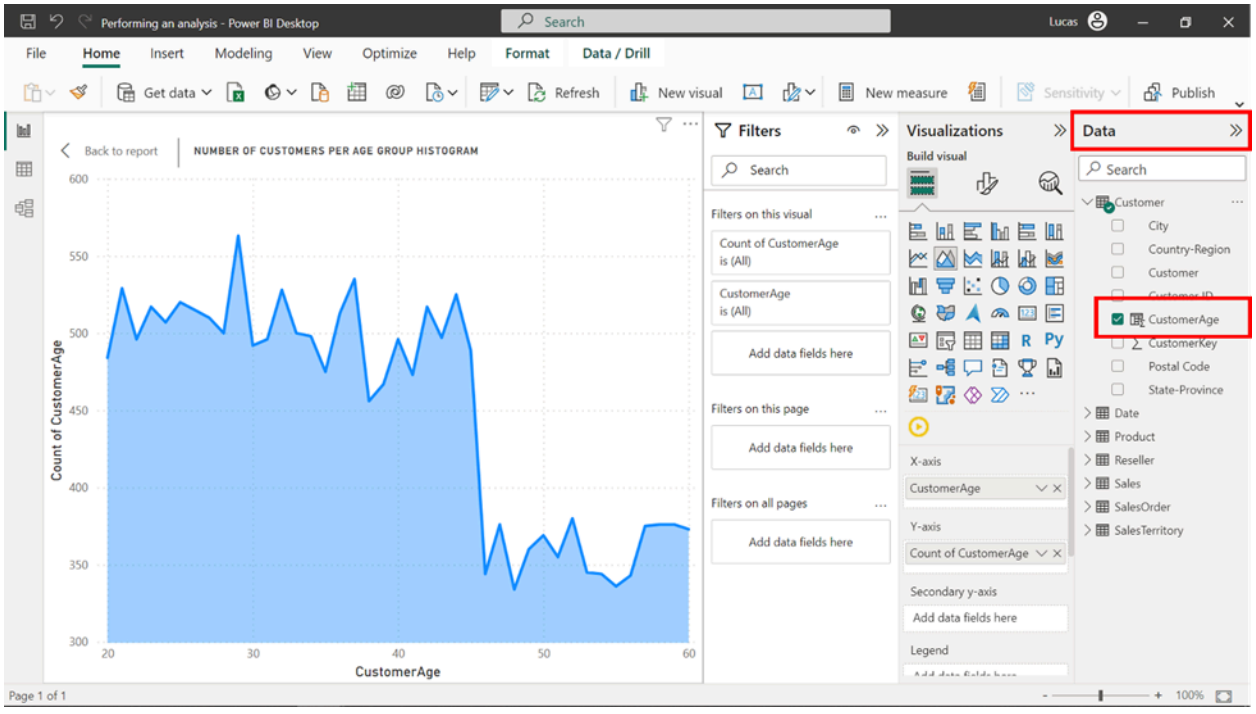
8. Your visual should now look like this:



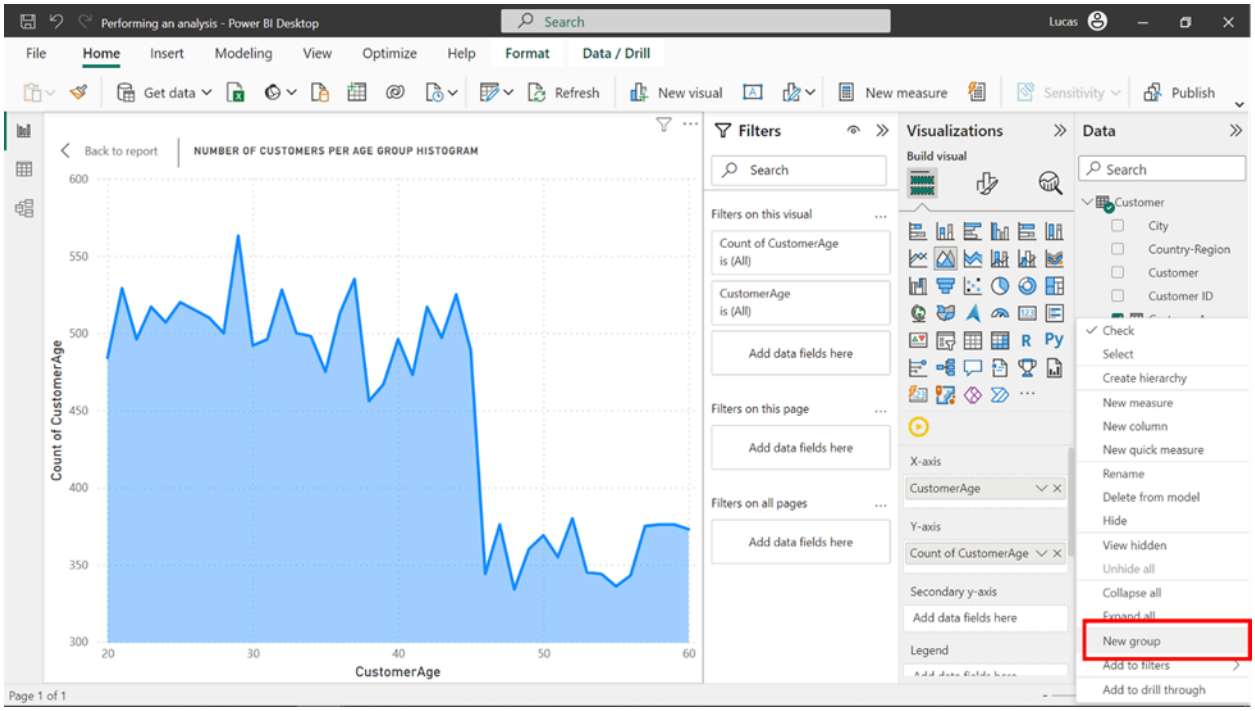
Step 3: Enhance the histogram with age group bins

To enhance the histogram using age group bins, follow these steps:

1. Locate the CustomerAge column in the Data pane on the right.

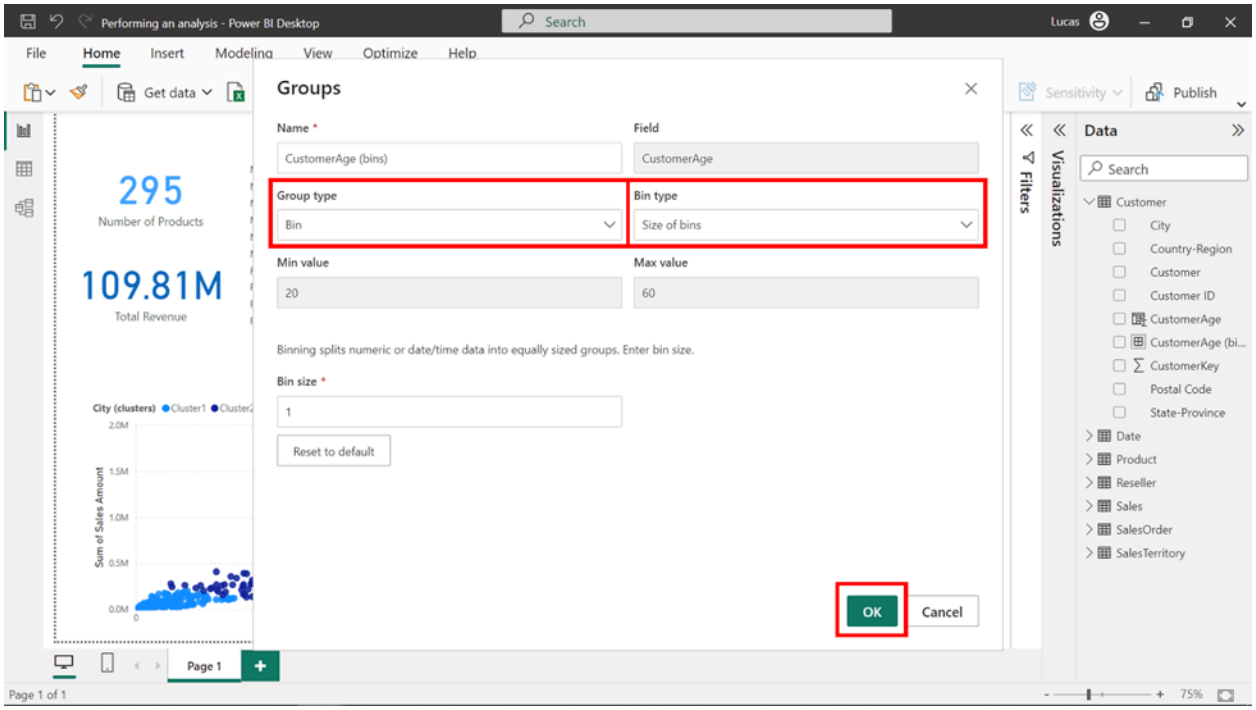


2. Right-click on CustomerAge and select New group from the pop-up menu.



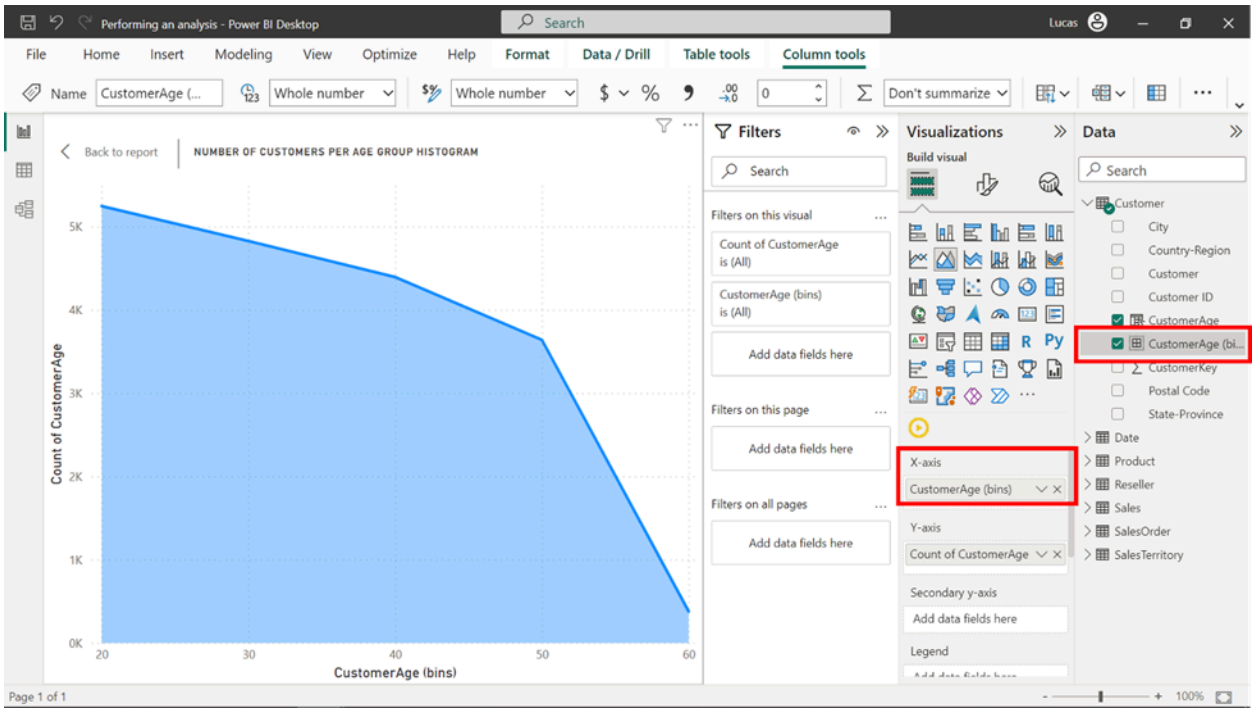
3. Select Bin on the Groups menu as the Group type and Size of bins as the Bin type.

4. To segment customer ages into decade ranges (20-30, 30-40, 40-50, 50-60), set the bin size as 10 and select OK.



5. Remove CustomerAge from the X-axis of the histogram visualization.

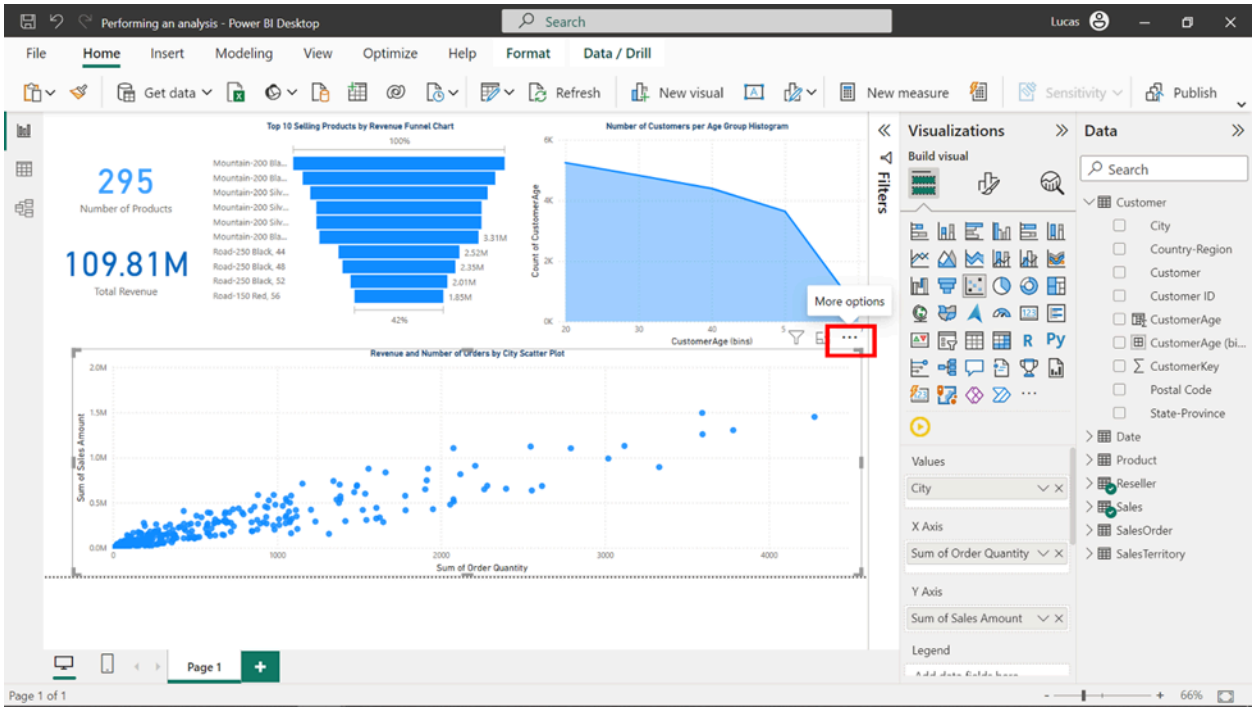
6. Drag and drop the newly created CustomerAge bin to the X-axis to incorporate the age group bins.



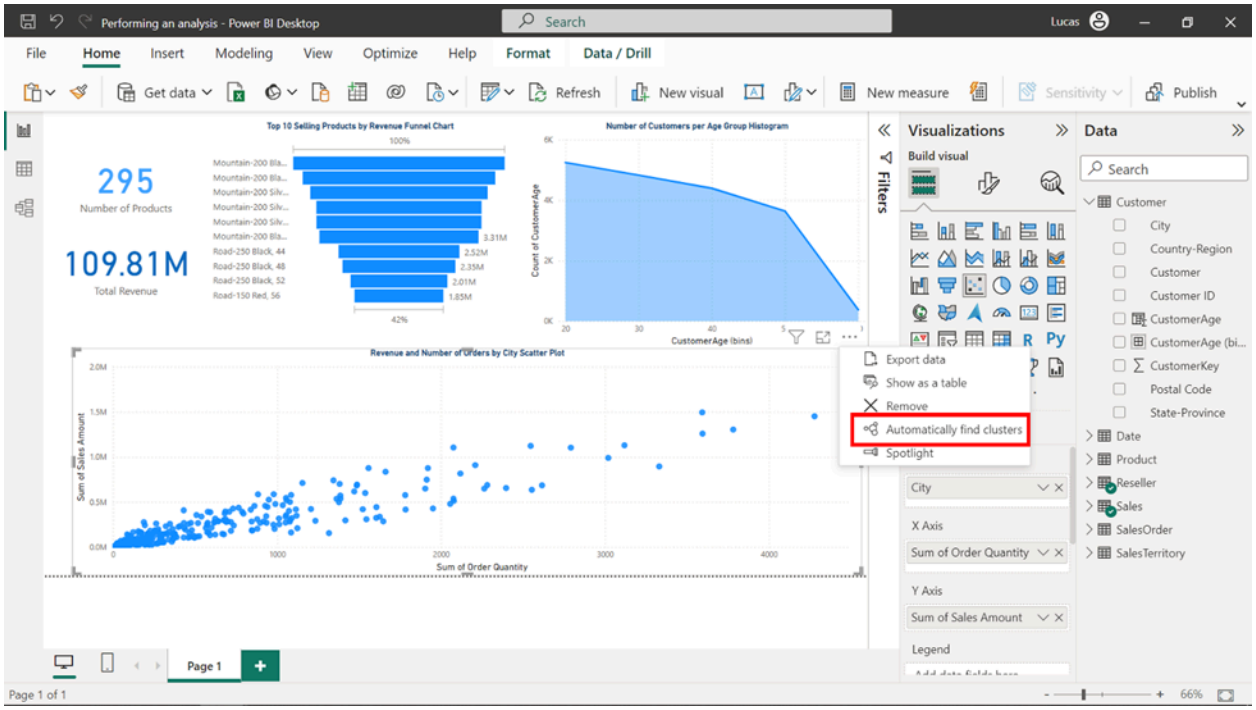
Step 4: Add clustering techniques to the scatter chart

To integrate the clustering technique into the scatter chart:

1. Select the ellipsis (three dots) located at the upper-right corner of the scatter chart.



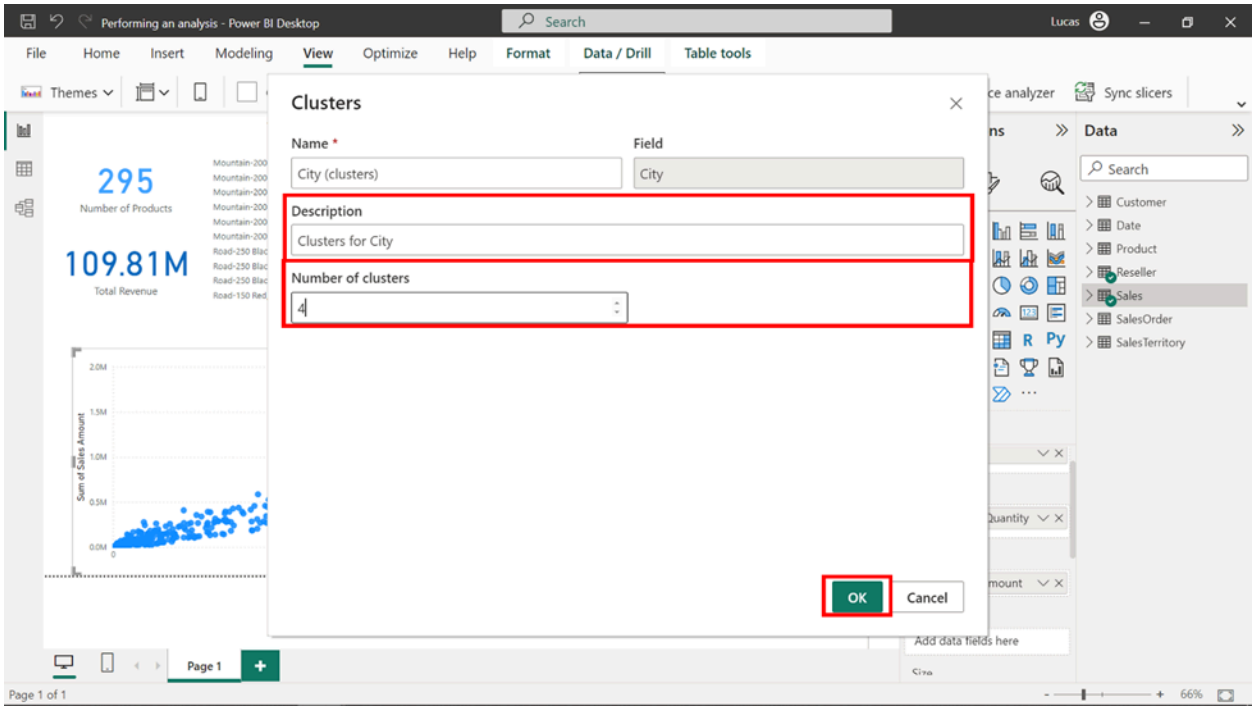
2. Select the Automatically find clusters option from the drop-down menu.



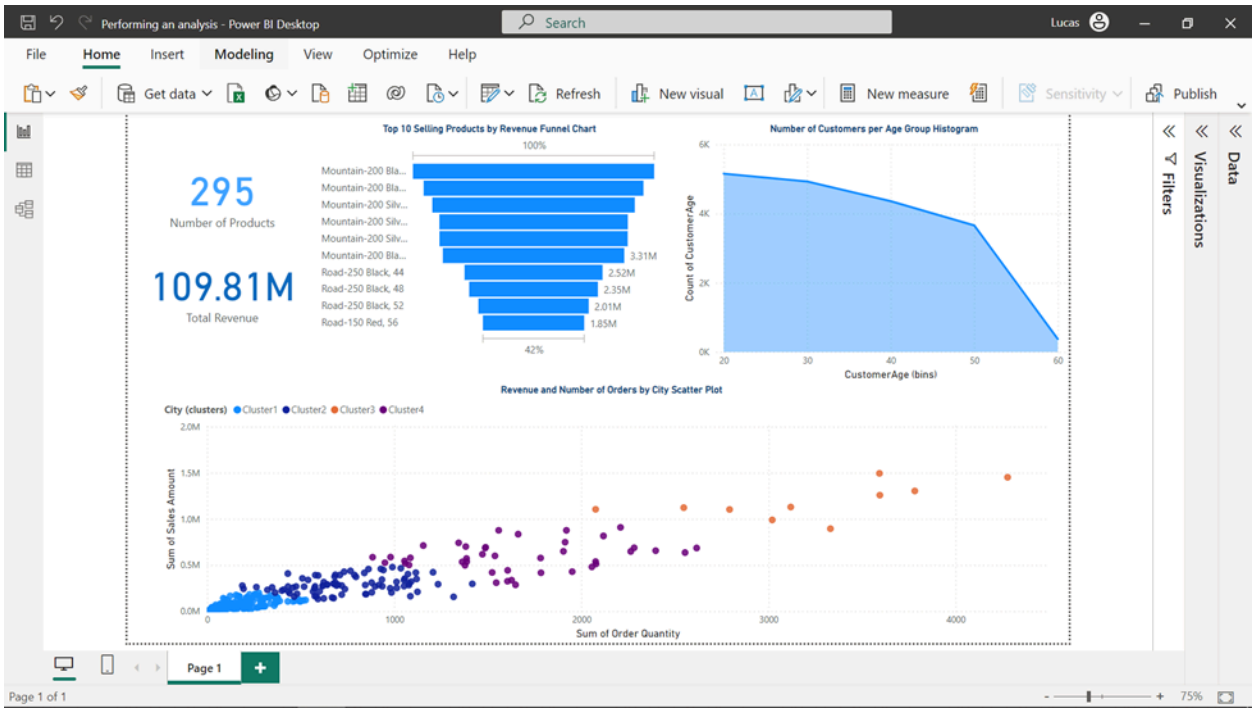
3. A Clusters window appears. Modify the description to Clusters for City based on Revenue and Order Number.

4. Input 4 as the desired number in the Number of clusters field.

5. Select OK to finalize the clustering settings.



6. The final output of your report should look like this:



Conclusion

The addition of analytics to the report has significantly raised the value of the information it provides. The Top N analysis has effectively highlighted the best-performing products, offering a concise overview of their success. Additionally, the incorporation of age group binning using a histogram has visually represented the decline in customer numbers per age group.

4.2. Activity: Using the Play Axis visualization

Introduction

In this reading, you'll explore how to perform time series analysis in Microsoft Power BI, emphasizing the importance of suitable visualization types like line charts, area charts, and scatter charts.

Additionally, you'll delve into the use of the Play Axis visualization, available through Microsoft AppSource, to create compelling and dynamic representations of time trends and patterns in data.

Scenario

As Adventure Works' fiscal year-end approaches, the sales team shifts their focus towards evaluating year-long results. A decision is made to put together a report that highlights the team's achievements over the past year.

You take on the task of creating a time-series analysis report, delving into the sales data accumulated throughout the year. However, you decide to add a surprising twist - incorporating a Play-axis visual.

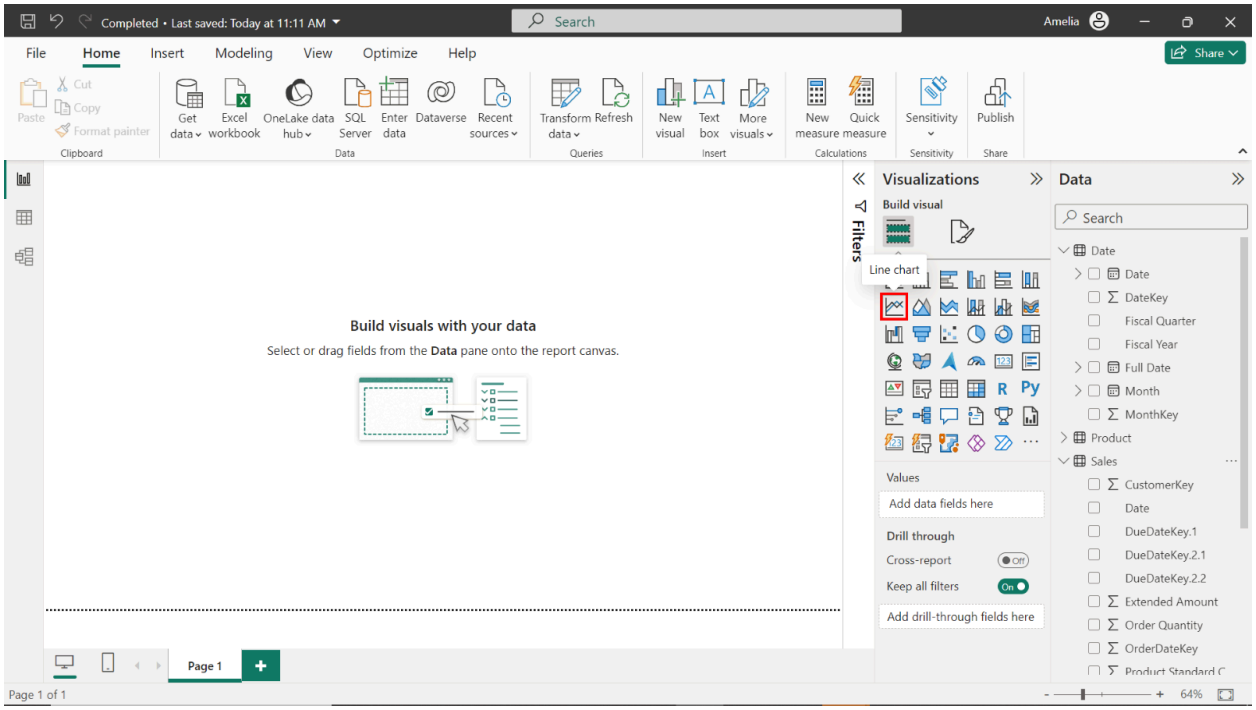
This dynamic feature not only enhances interactivity but also promises to grab everyone's attention and provide a unique perspective on the year's sales performance.

For this example, you are developing a sales report. You decide to use two visuals, a Scatter chart and Line chart, for the purpose of time series analysis and then enhance those visuals with animation so the sales team can see how the sales data changes over time.

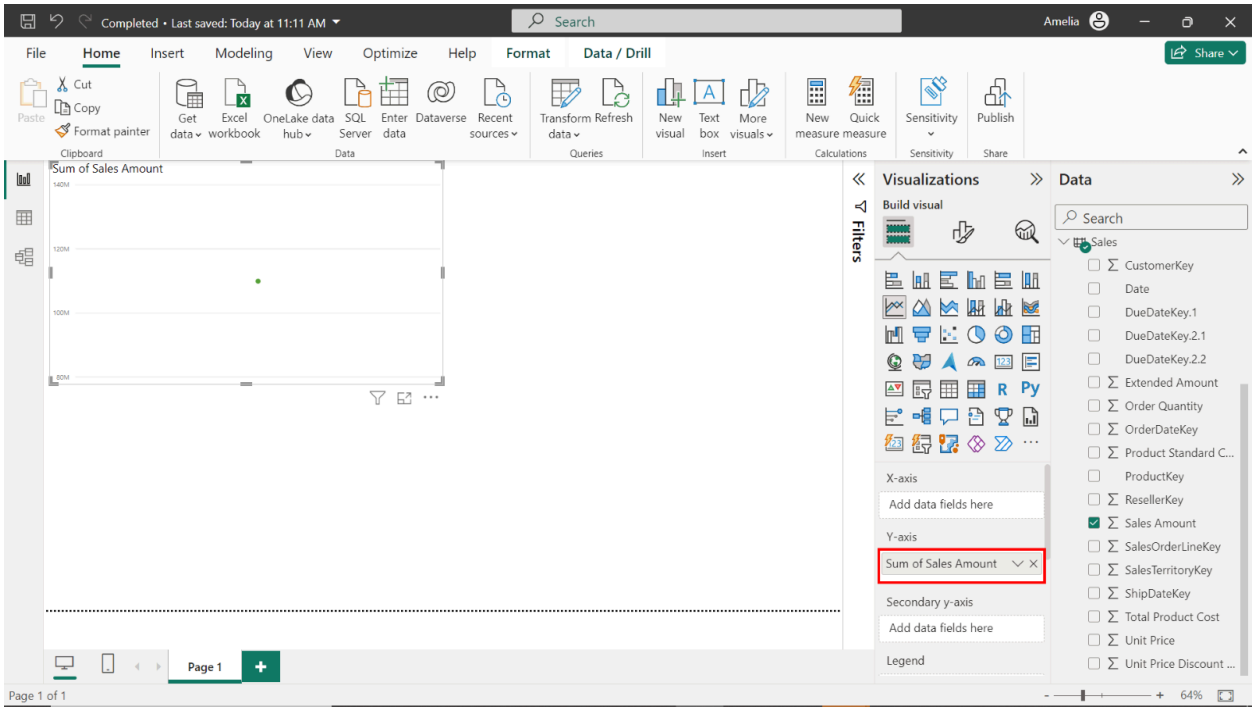
Instructions

Step 1: Add a Line chart visual to the report

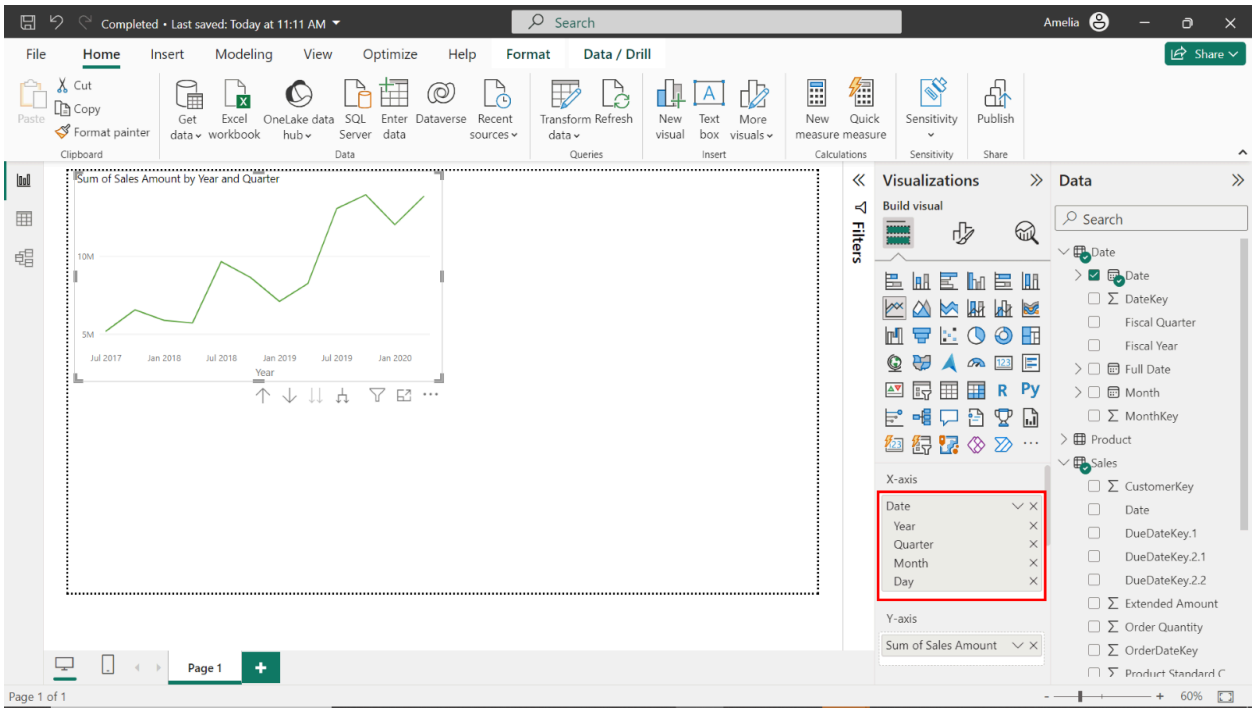
1. Download and open the *Times series analysis* PBIX file in Power BI Desktop.
2. Locate the Visualizations pane on the right of the Power BI interface.
3. Select the Line chart icon to add the chart to your report canvas.



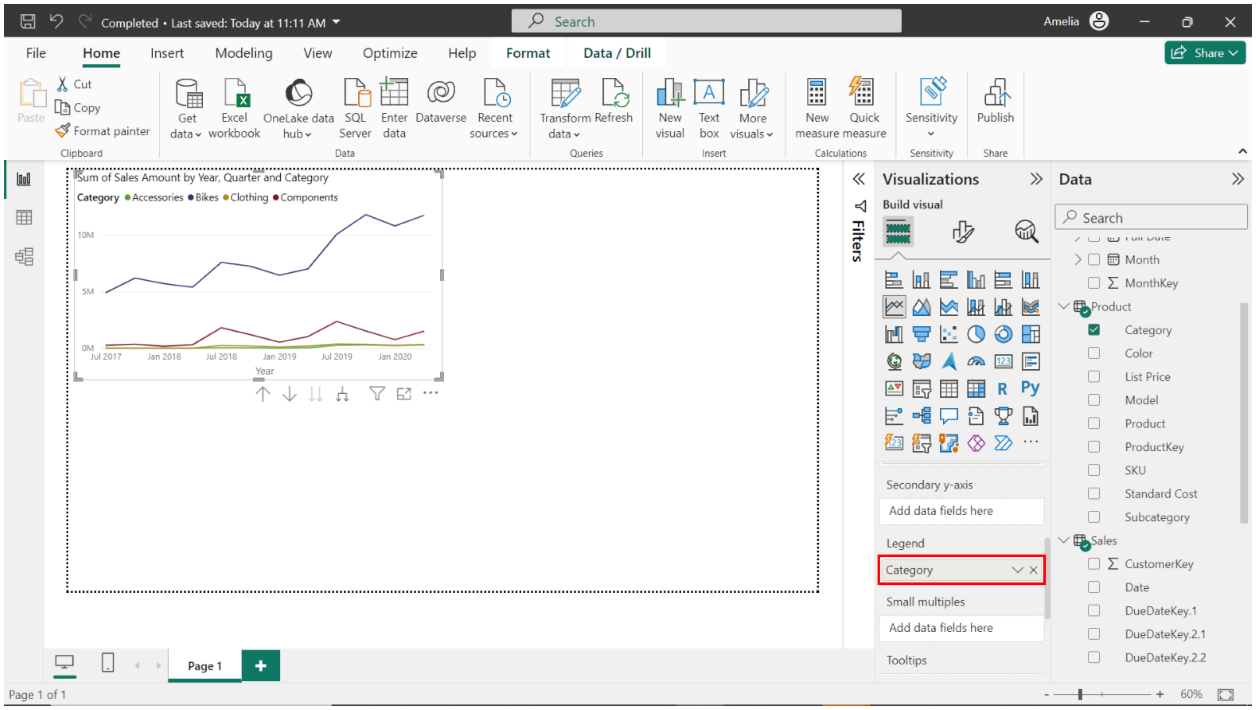
1. In the Fields pane, identify the Sales Amount field in the Sales table.
2. Drag Sales Amount into the Y-Axis well of the Line chart. The Y-axis on the Line chart updates with this information.



1. Next, locate and drag the Date field from the Date table into the X-Axis area of the Line chart. The date is now represented on the X-axis, allowing you to visualize how sales amounts have changed over time.

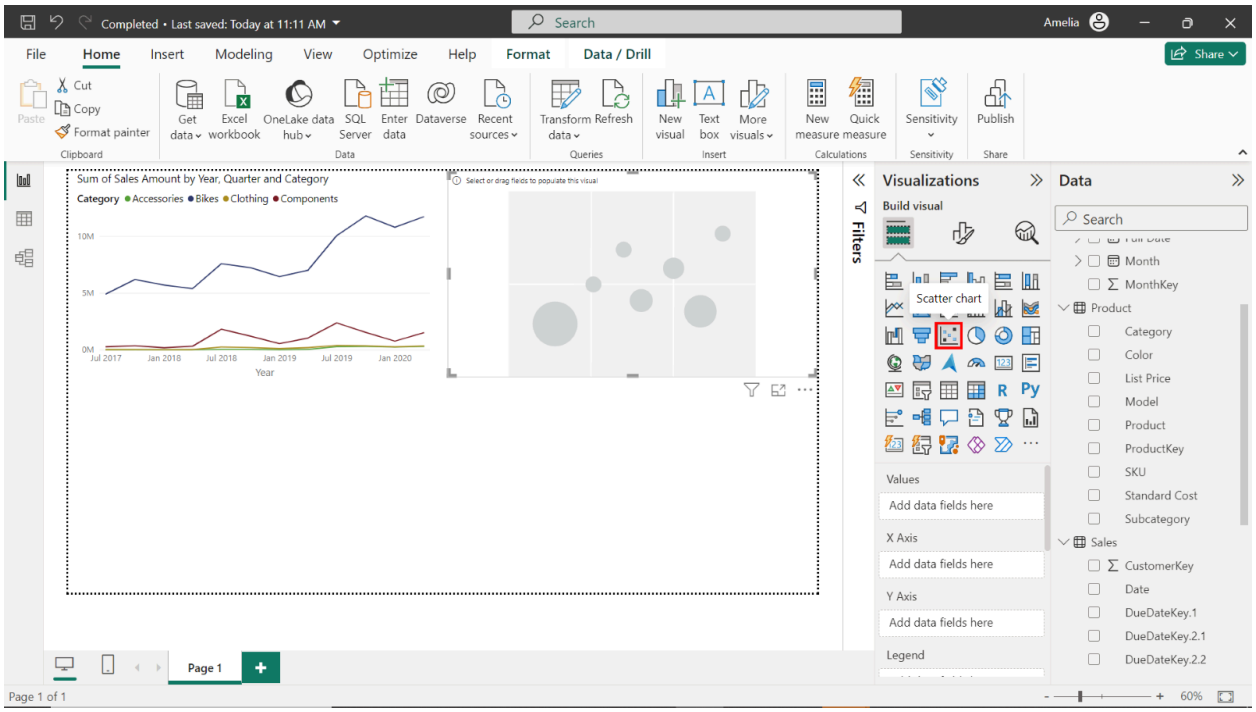


1. Finally, add Category from the Product table to the Legend area to break down sales by category over time.

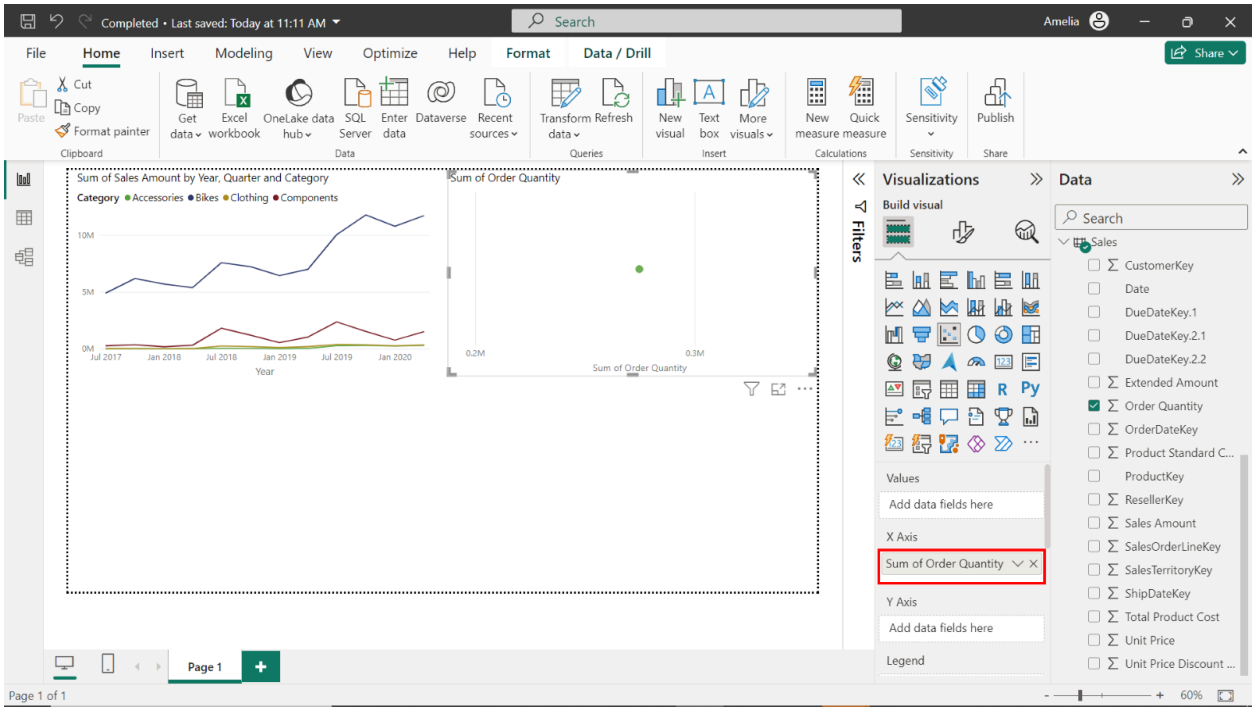


Step 2: Add a Scatter chart visual to the report

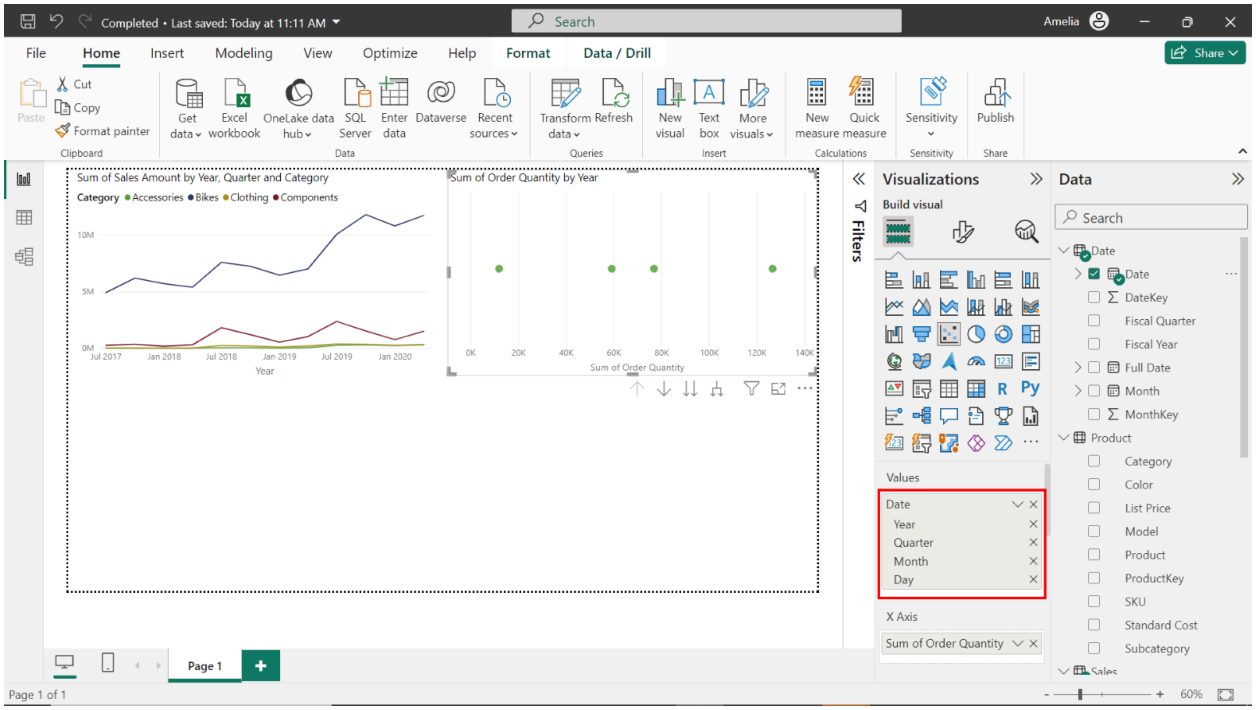
1. In the Visualizations pane, locate and select the Scatter chart icon.



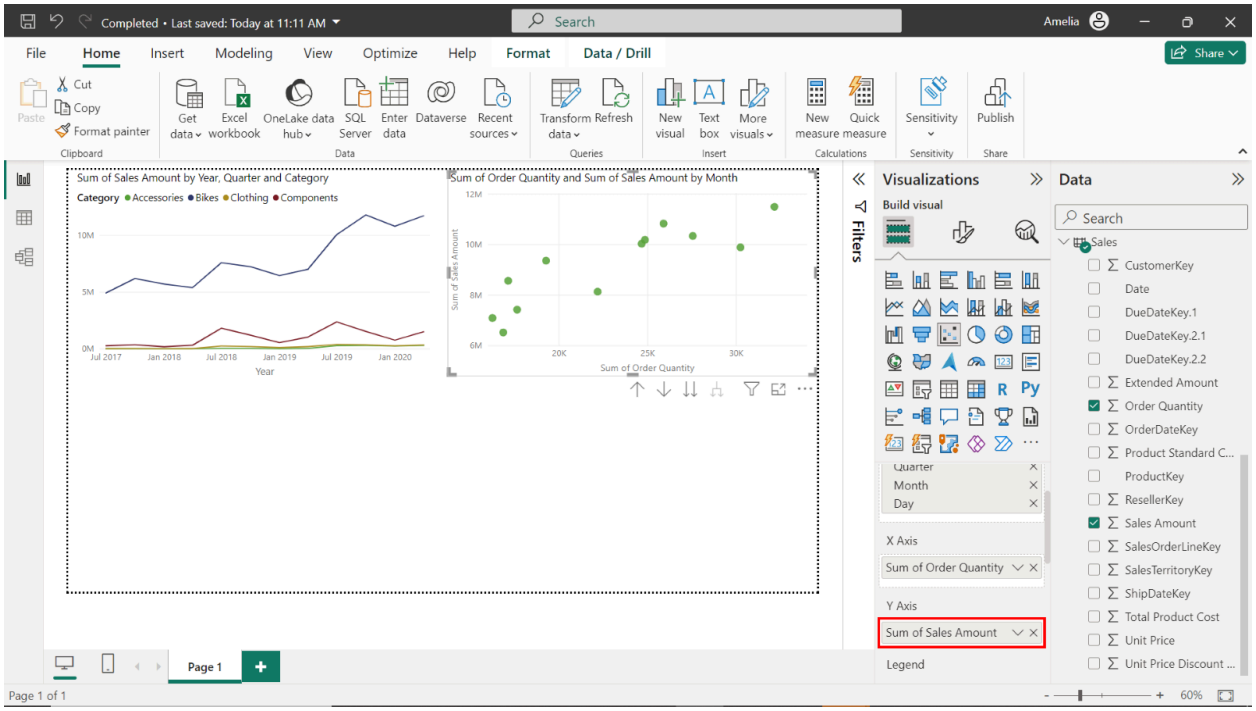
1. Drag Order Quantity from the Sales table into the X-Axis well to determine the value of each point in the Scatter chart.



1. Drag the Date field from the Date table into the Values well. This sets the horizontal axis to represent time, showing how the Order quantity data points are distributed over this period.

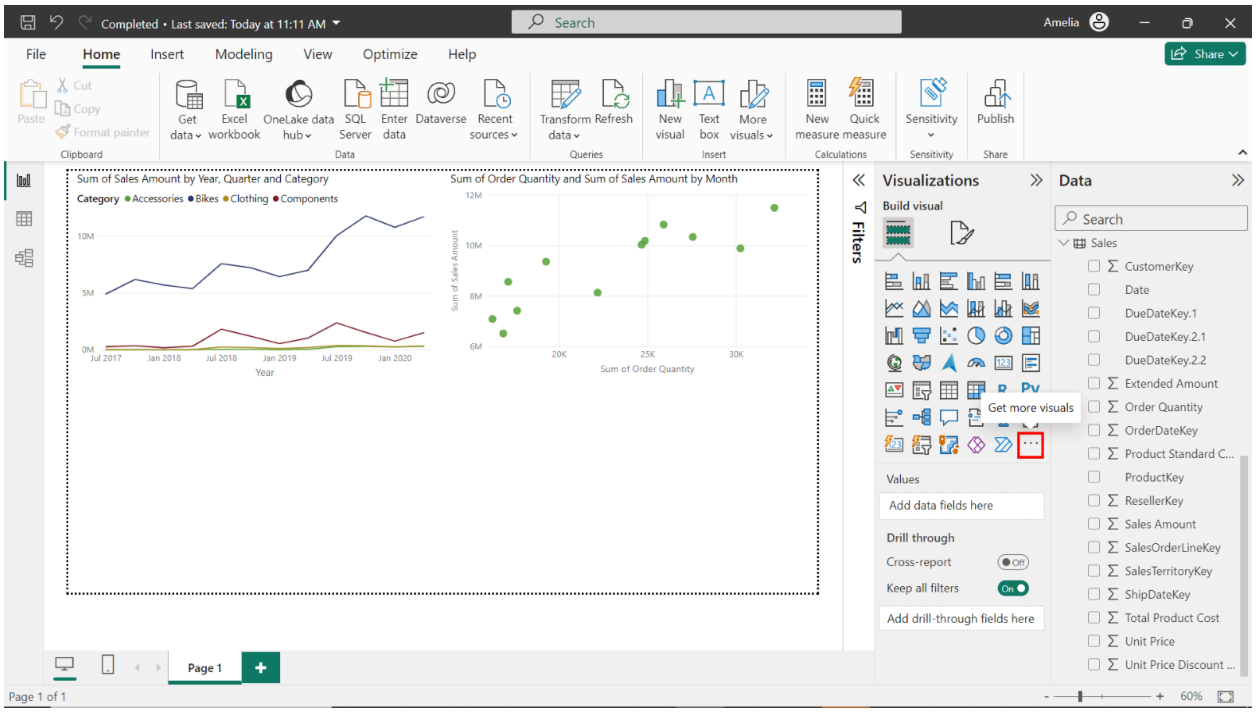


1. Finally, drag Sales Amount from the Sales table into the Y-Axis well.

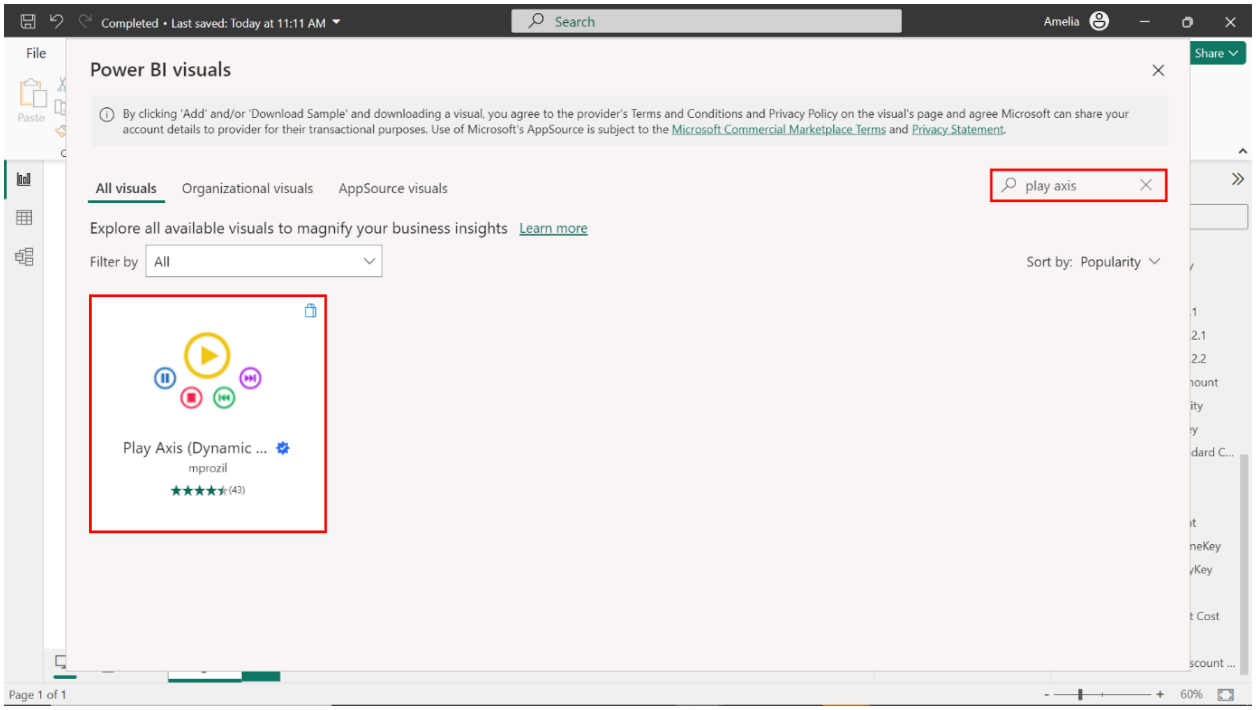


Step 3: Import the animation custom visual

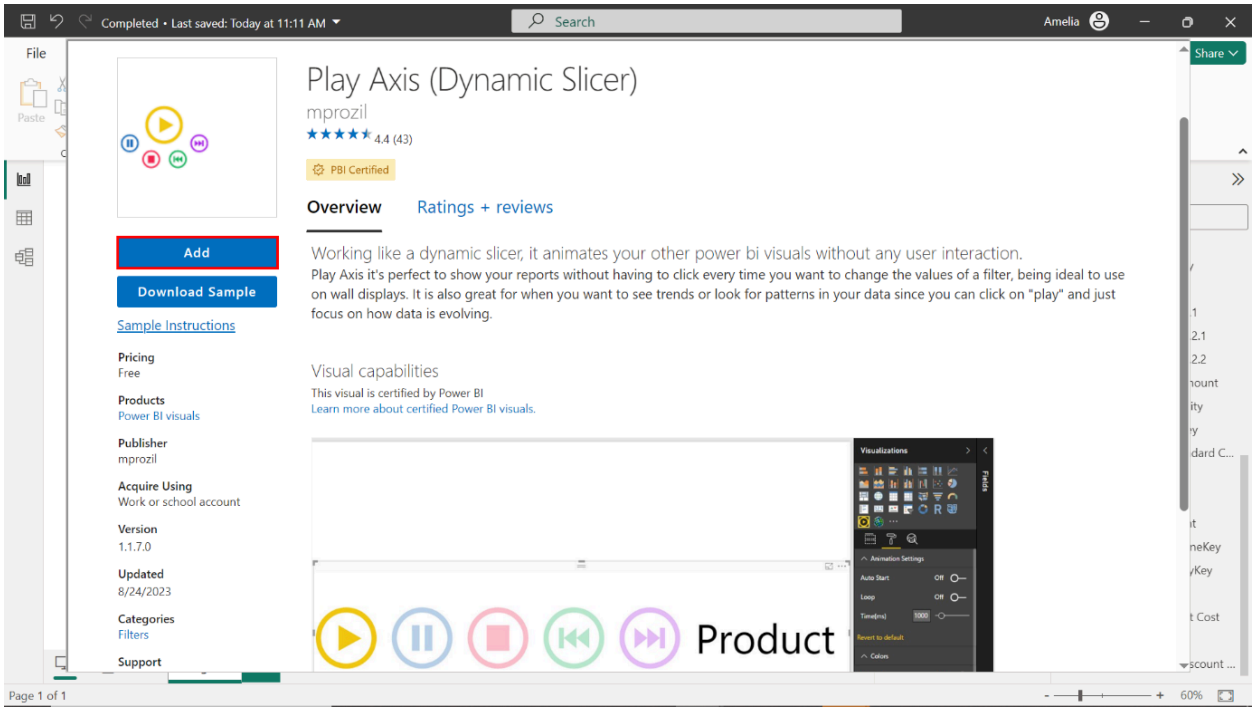
1. In the Visualizations pane, select the ellipses (...) which represent the Get more visuals choice. Selecting the ellipses will allow you to explore additional visuals that are not included by default in Power BI.



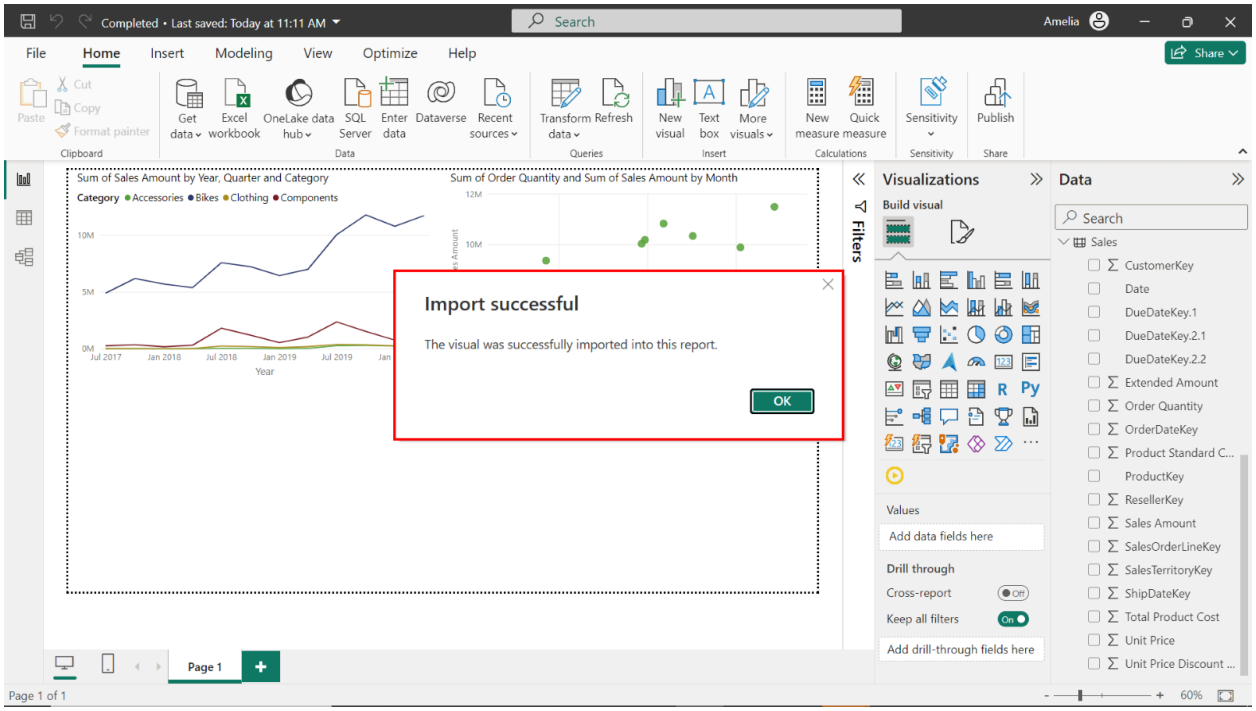
1. A Power BI visuals window opens with a Search bar in the top right. Type Play Axis into the Search bar. The search result, Play Axis (Dynamic Slicer) will appear in the window. Select this result.



1. The details of the Play Axis (Dynamic Slicer) option are now displayed. Select the Add button on the left of the window to import this option and add it to your available visuals.

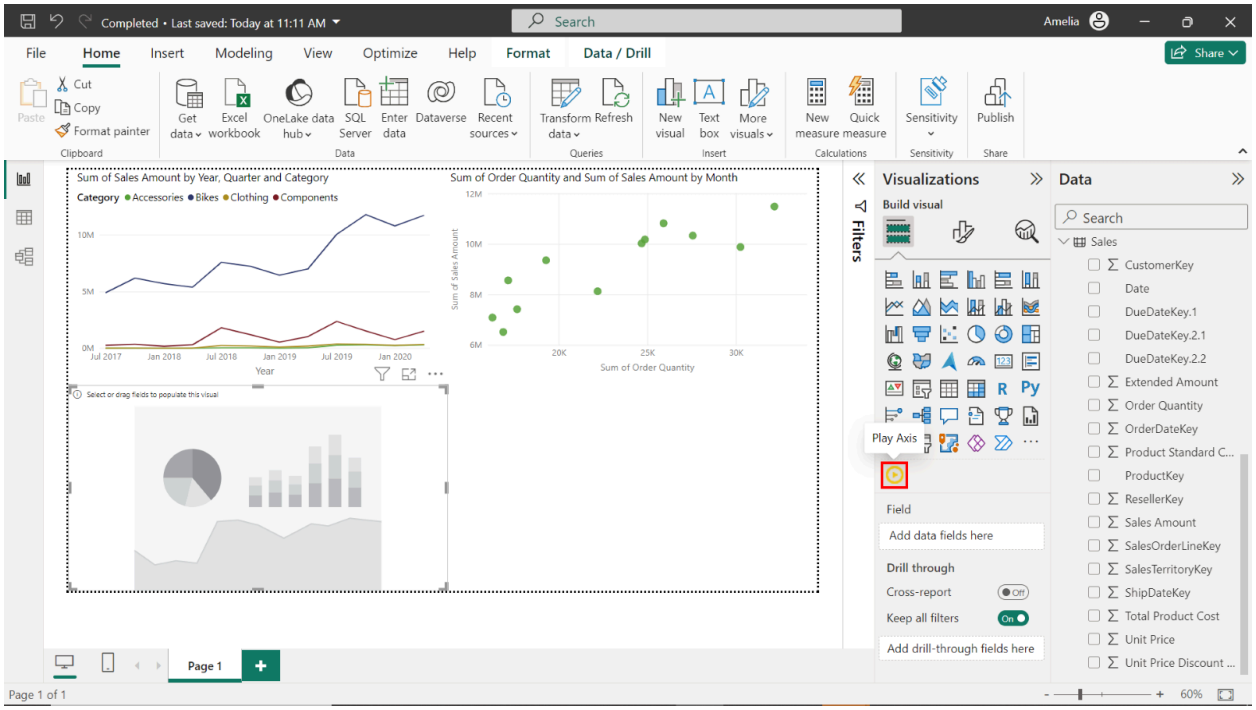


1. A confirmation message appears indicating that the visual was successfully imported.

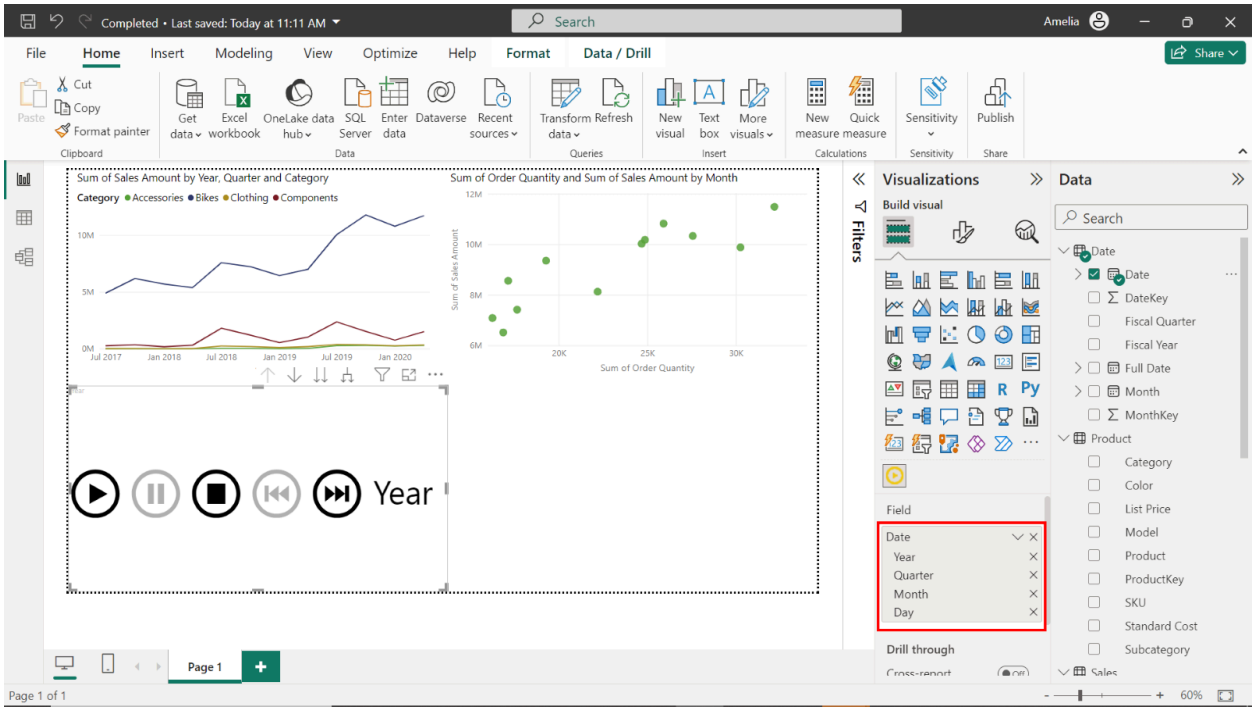


Step 4: Resize and reposition the visual

1. The Visualizations pane now contains a new icon for the Play Axis visual. Select this icon to add the Play Axis visual to the report page.

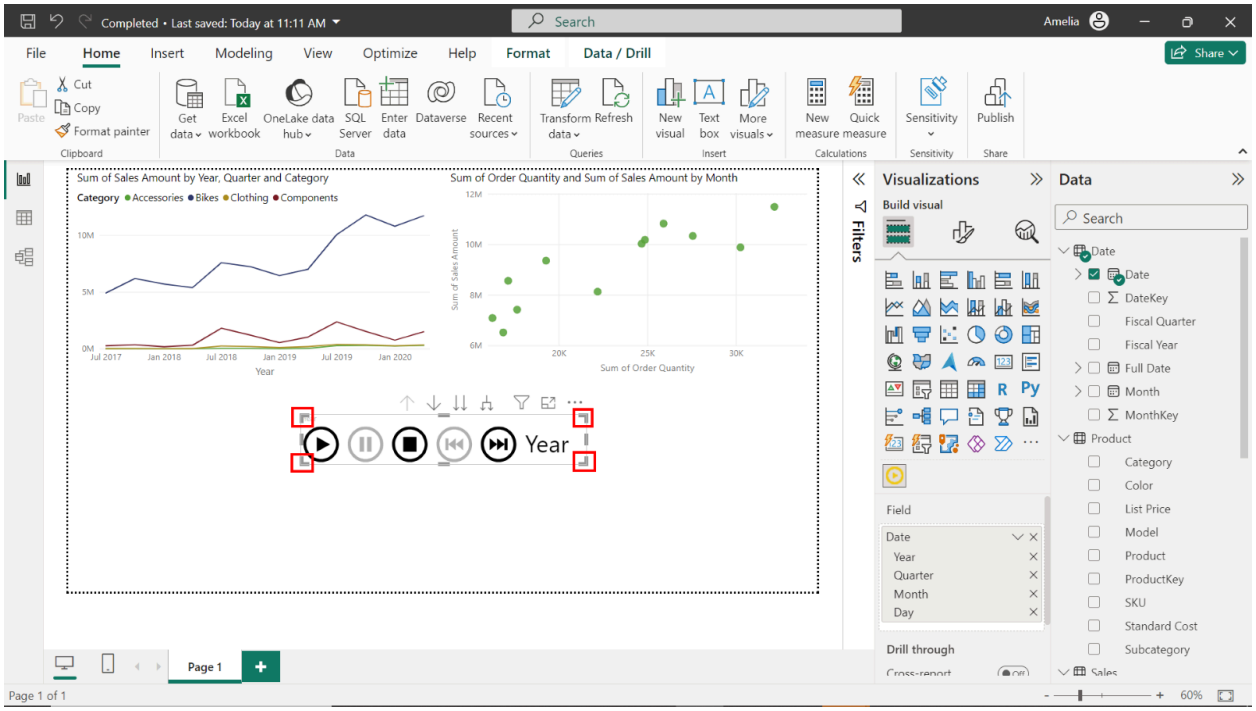


1. In the Fields pane, locate and drag the Date field from the Date table to the Field well of the Play Axis visual.
2. The Play Axis visual now contains a new set of controls. These are animation controls, which allow you to control how the Play Axis interacts with your data.

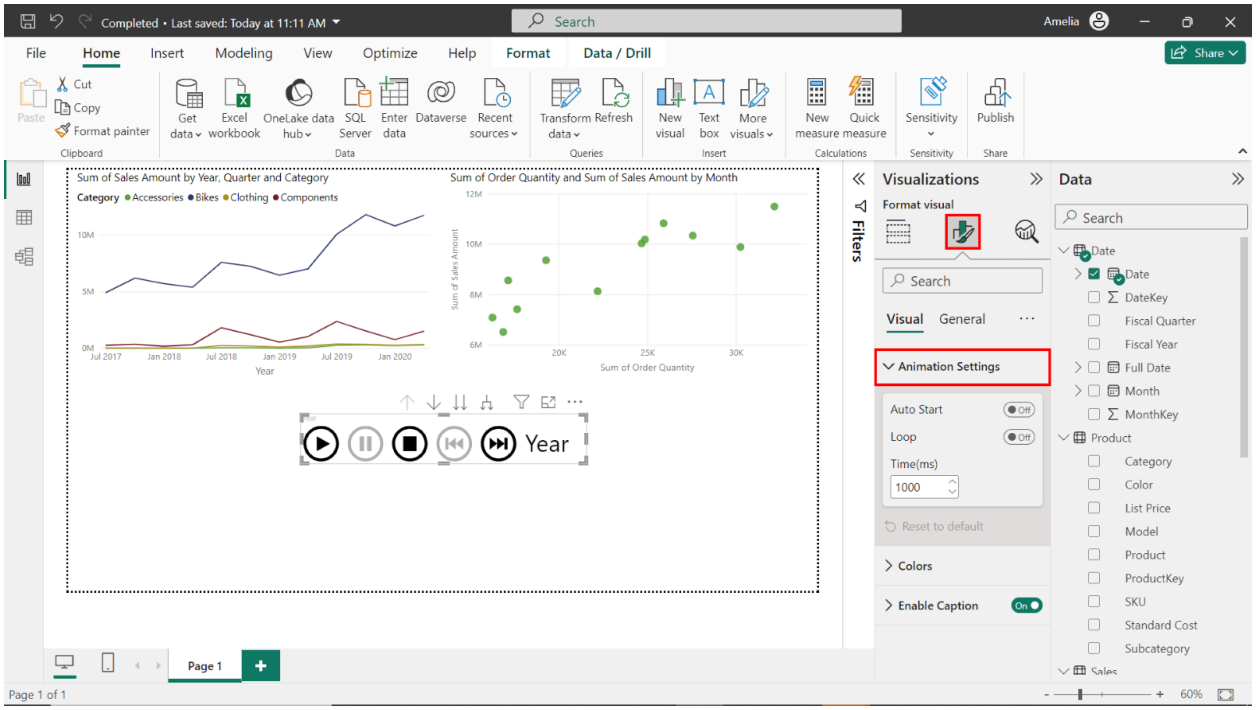


Step 5: Customizing the Visual

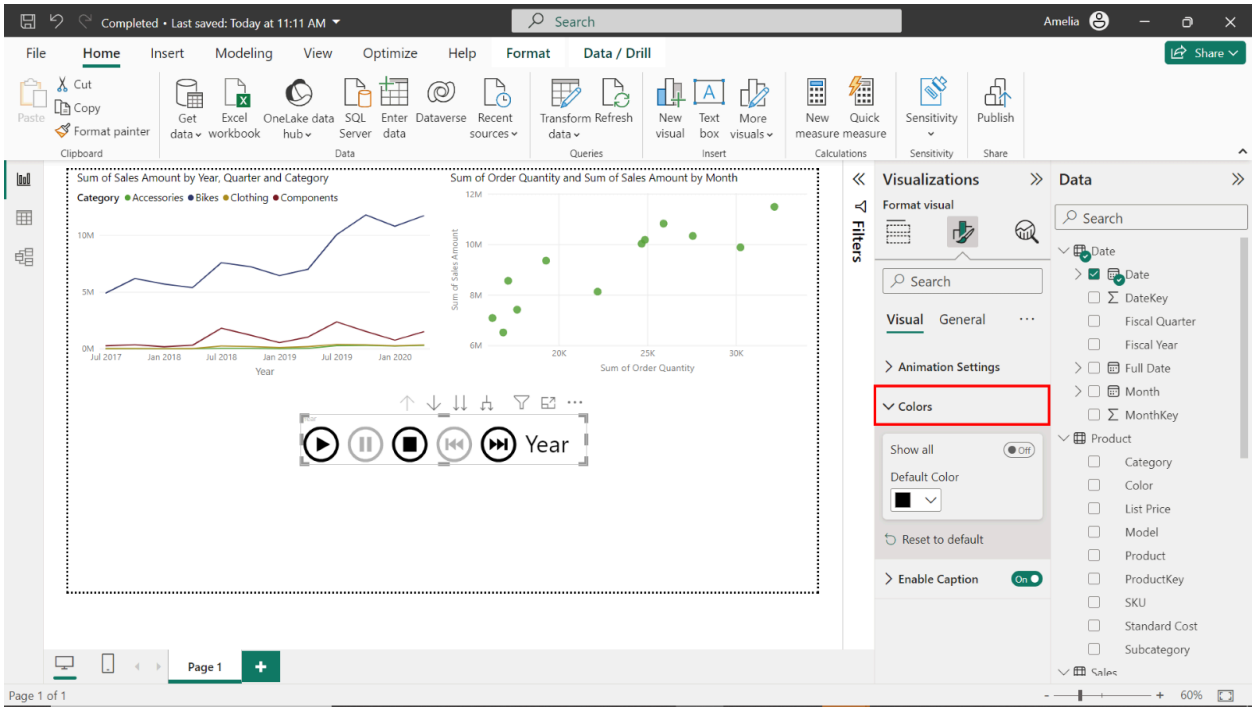
1. Select and drag the corners of the Play Axis visual to adjust its size. Select and drag its Title bar to reposition it on the page.



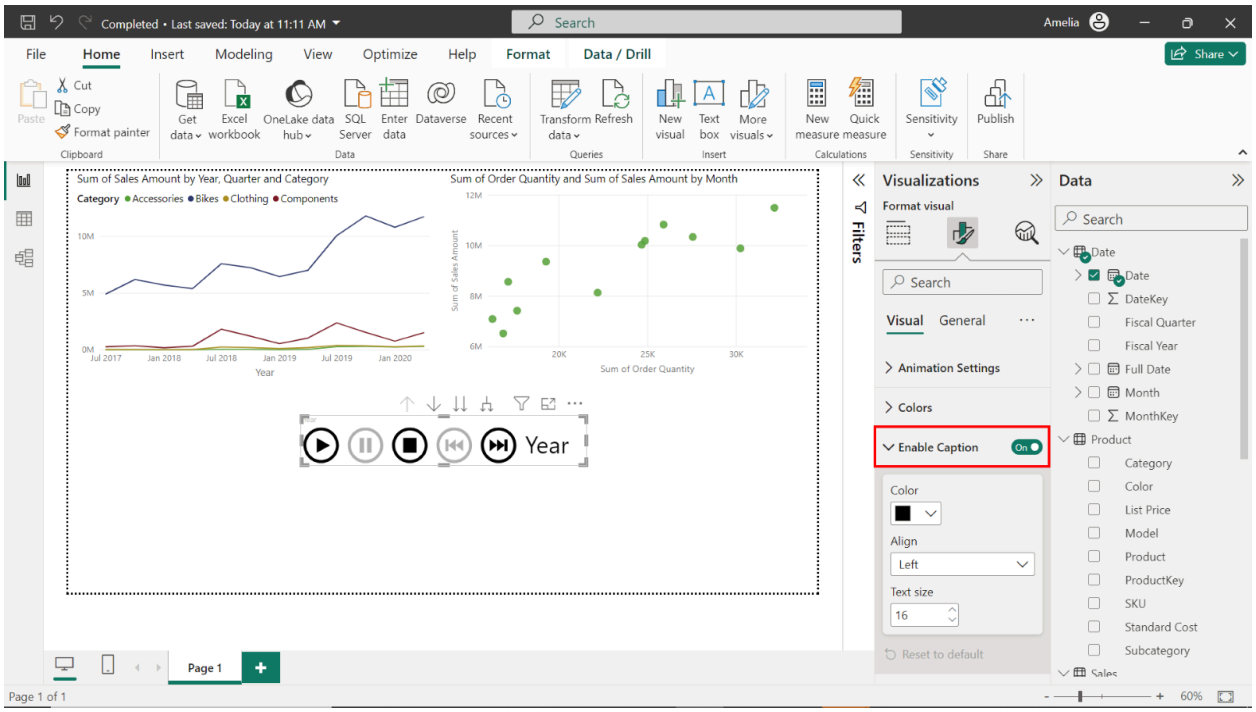
1. You can use the choices in Animation Settings to control how the animation behaves. Animation Settings is in the Visual tab of the Format visual pane on the right of the Power BI window. Here, you can adjust settings such as whether it starts automatically or loops continuously, and control the speed of the animation.



1. The Format visual pane also contains a Colors section. Here, you can make changes to the appearance of the Play Axis visual, such as adjusting the color of individual control buttons.

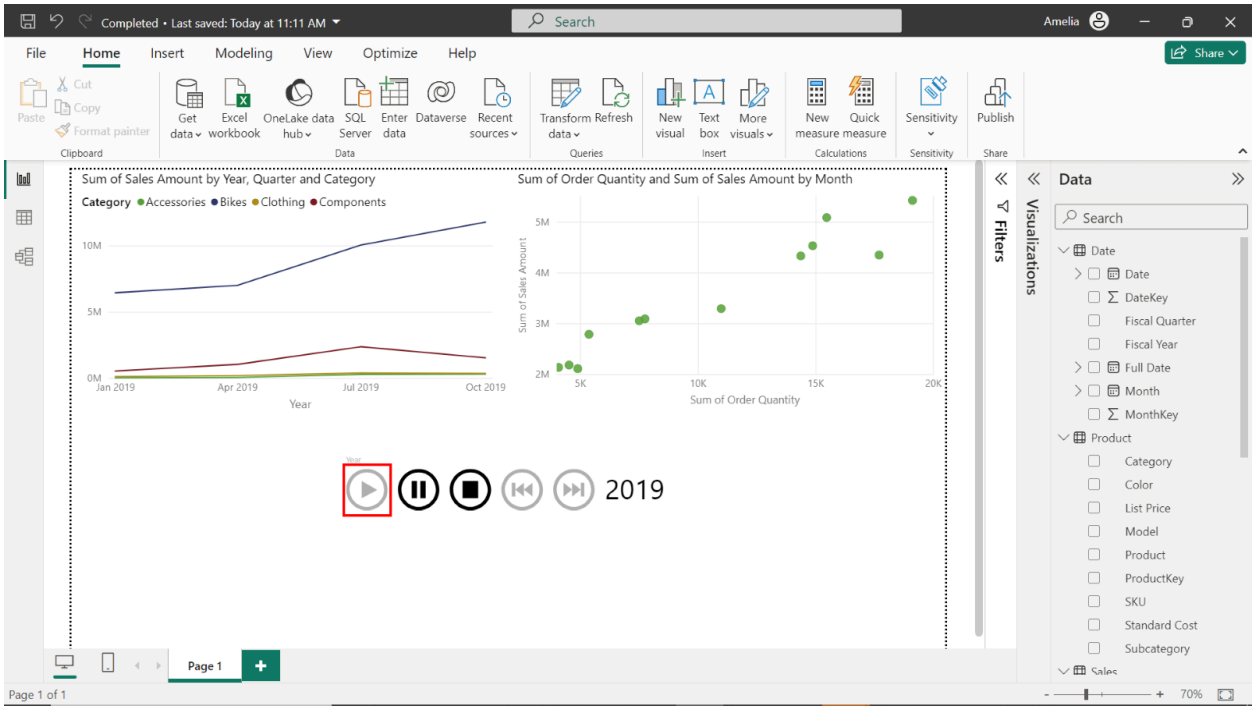


1. The final section in the Format visual pane, is titled Enable Caption On. This allows you to turn the caption next to the visual on or off and adjust its formatting, like font size and color.

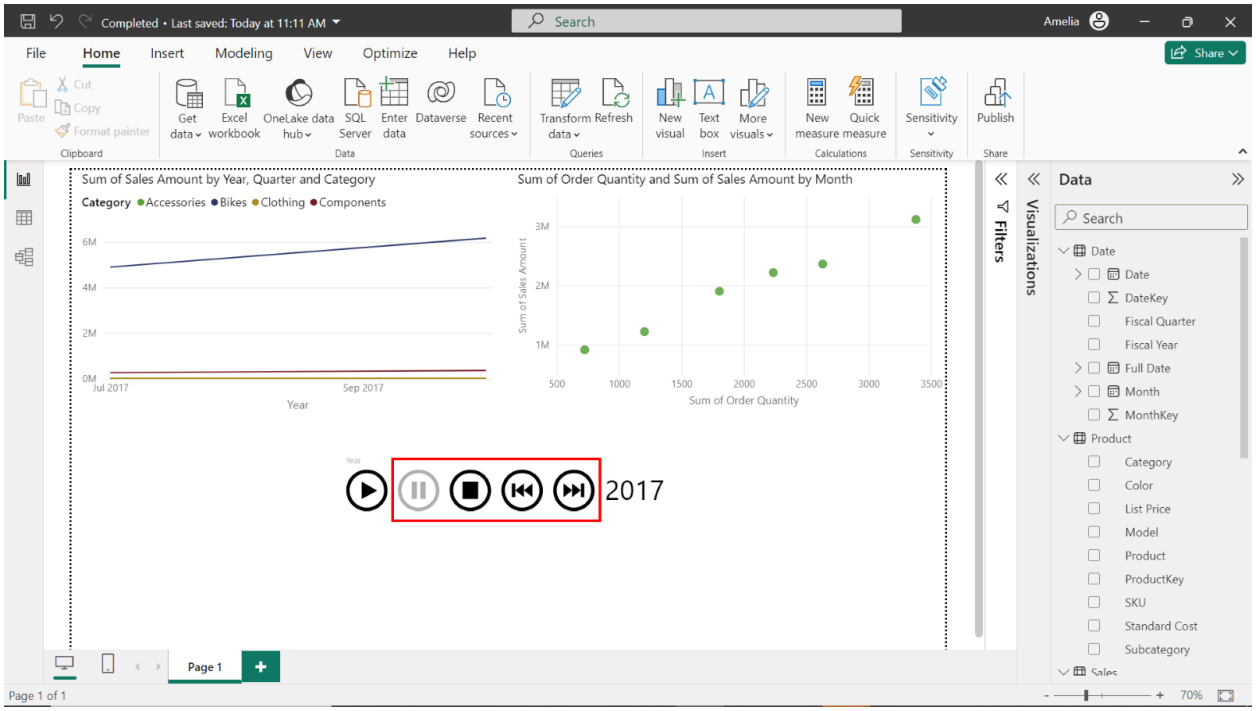


Step 6: Using the Play Axis

1. Select the Play button on the Play Axis visual. This will start the animation, demonstrating how your data changes over time.



1. You can use the control buttons on the Play Axis to pause, restart, or step through the animation.



Conclusion

In this step-by-step guide, you learned how to integrate animation into your Power BI visuals to explore data evolution over time. By adding animation elements, such as Play Axis, you learned that you could enhance your reports and enable stakeholders to gain deeper insights into time-dependent data patterns. Whether you're analyzing quarterly sales trends, stock market fluctuations, or any time-based dataset, Power BI's time series capabilities and animation tools can transform your data analysis into a visually compelling and informative experience.

4.3. Exercise: Explaining the increase

Introduction

One of the essential tasks of the marketing department in any business is to monitor the company's performance, assess trends, and highlight any unusual results or anomalies. In a retail environment, they would keep track of the sales performance over time and identify any unusual rise or fall in results. This vital information allows the business to quickly rectify errors or capitalize on positive results.

In this exercise you will explore how you can use Microsoft Power BI features to quickly identify this type of crucial data. You will be asked to identify the two big sales spikes in the dataset and analyze them. You will apply the clustering technique to separate the data points into similar categories and then use the explain the increase tool of the Analyze feature to generate and add visualizations in your report and identify the driving factors behind this increase.

Case study

The marketing department at Adventure Works has identified an unexpected surge in bike sales on two distinct days in the previous month. Once they notified the senior management team of this sharp increase, the information caught the eye of the CEO. They have informed the marketing department that they are keen to identify the contributing factors behind this growth so that the company can capitalize on it and propel the business forward.

The manager of the marketing department has asked the analytics department to determine the reason for the surge in bike sales. It is important that the contributing factors are identified quickly as they may be time-specific and if so, the company would need to move quickly to take advantage of them and generate more business. After a brief discussion with your manager Jamie, you both feel that Microsoft Power BI's Analyze feature would be the most effective tool to rapidly generate visualizations that could uncover the driving forces behind the sales surge.

Instructions

Step 1: Download the data

- Download the Power BI report file titled *Adventure Works Sales Report.pbix* and open it in Power BI Desktop.

Step 2: Identify the two big sales spikes

To begin your analysis, you first examine the dataset you will be working with and create a proper visualization to identify the big sales days.

1. In Data view in Power BI, select the Sales table so you can familiarize yourself with the dataset.
2. Locate the Order Date column, Order Total column, as well as an attribute column that could support clustering. The Product Name column has high cardinality and is suitable for clustering.
3. Switch back to Report view and create a chart to depict a time series analysis, with the Date column in the X-axis and the Amount column in the Y-axis. Switch to the Report view and create a Line chart with Order Date on the X-axis and Order Total on the Y-axis. Opens in a new tab
4. With the help of the line chart, identify the two separate days where there was a spike in sales.

Step 3: Use the clustering technique to assist the Analyze feature

Before using the Analyze feature, it would be helpful to create a new product group using clustering techniques on the dataset.

1. Add a scatter chart with Product Name in the Values field, Order Total on the X-axis, and Product Price on the Y-axis.
2. Select three dots in the top right corner of this scatter chart and select Automatically find clusters.
3. Assign names and descriptions to your clusters and then enter 3 as the number of clusters.

Step 4: Use the Analyze feature to generate automated visualizations

After creating the clusters, it is time to use the Analyze feature on the days showing a sales surge to identify trends and patterns.

1. Identify the day with the most sales and use the Explain the increase tool of the analyze feature. Make a note of the percentile increase in the Sum of Order Total.
2. Note the five specific categories that seem to have had the most influence on the sales spike for that day.
3. Now pinpoint the day with the second highest number of sales and use the Explain the increase tool of the analyze feature on that day as well.

4. Using the analyze feature, identify which positive elements appear on this day as well. There are three shared contributory factors between the two days.

Step 5: Act on the insights by using the Analyze feature

The three fields mainly contributing to the sales increase have now been identified. You can now create visualizations and add them to the report.

1. Adjust the size of the two visualizations on the screen to an appropriate size for viewing.
2. It's now time to add more insightful visualizations to the report. Switch back to Data view to identify the fields that will be added to visualizations.
3. Determine the number of distinct values in each field to aid you in the creation of the visualizations.
4. There is a field with two distinct values, a field with three distinct values, and a field with seven distinct values. Return to Report view and create two visualizations that properly depict a two or three value column and add them to your report.

Step 6: Act on the insights by Analyze feature

There is still one category to add to the report. You decide to use the Analyze feature again to review the impact of the result and add the last visualization to your report.

1. On the line chart, navigate back to the pop-up window produced by the Explain the increase choice in the Analyze feature for the 7th of March.
2. Scrolling through the generated visualizations, determine if any of them lack insights, and provide feedback to Power BI that it wasn't helpful. This will improve the functioning of the Analyze feature in your future reports.
3. Locate the three most important factors for the increase and provide positive feedback to Power BI.
4. In the specific category that hasn't been visualized yet in the report, add the automatically generated visual to the report.
5. Now that all five visualizations are in the report, resize and customize them as per your preference before saving the report.

Conclusion

In this exercise, you used the Analyze feature to swiftly produce insightful results on your report. Walking through a practical example and following exactly the thought process of a data analyst, you were able to identify that the surge in bike sales was due

to a high-selling performance of Road Bikes with a Medium product size. Working on this task you gained the experience of working with data and the power of the Analyze feature and the speed with which it generates results.

Exemplar: Explaining the increase

Introduction

In the exercise *Explaining the increase*, you were asked to use the Analyze feature in Microsoft Power BI to explain unexpected increases in sales totals and provide insights on the reasons for these increases.

More specifically, you were asked to:

- Use clustering in a Scatter chart to add product clusters that would assist the Analyze feature.
- Create a Line chart from the sales figures to identify the dates where a sales surge occurred, and then use the Analyze feature to detect the reason for these increases.
- Add to the report all the relevant visualizations based on the insights generated by the Explain the increase tool in Power BI.

This reading will provide you with a detailed guide that you can use to compare your solution.

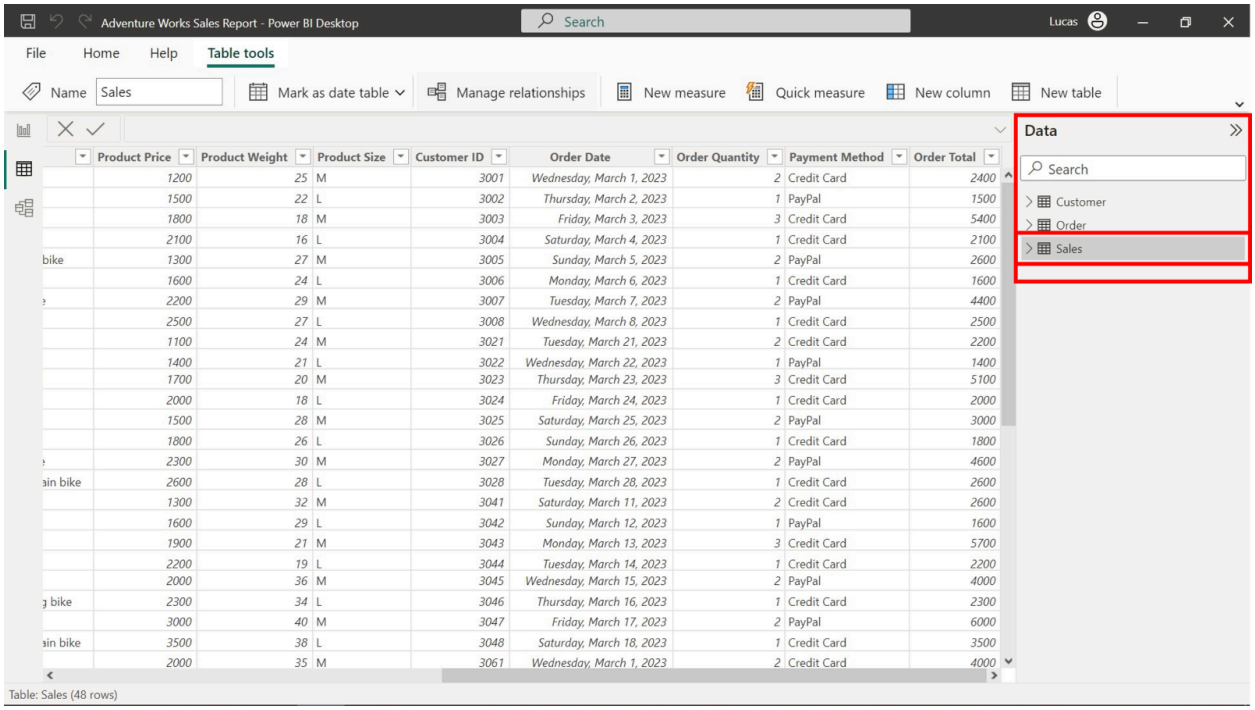
Explaining the increase

Step 1: Download the data

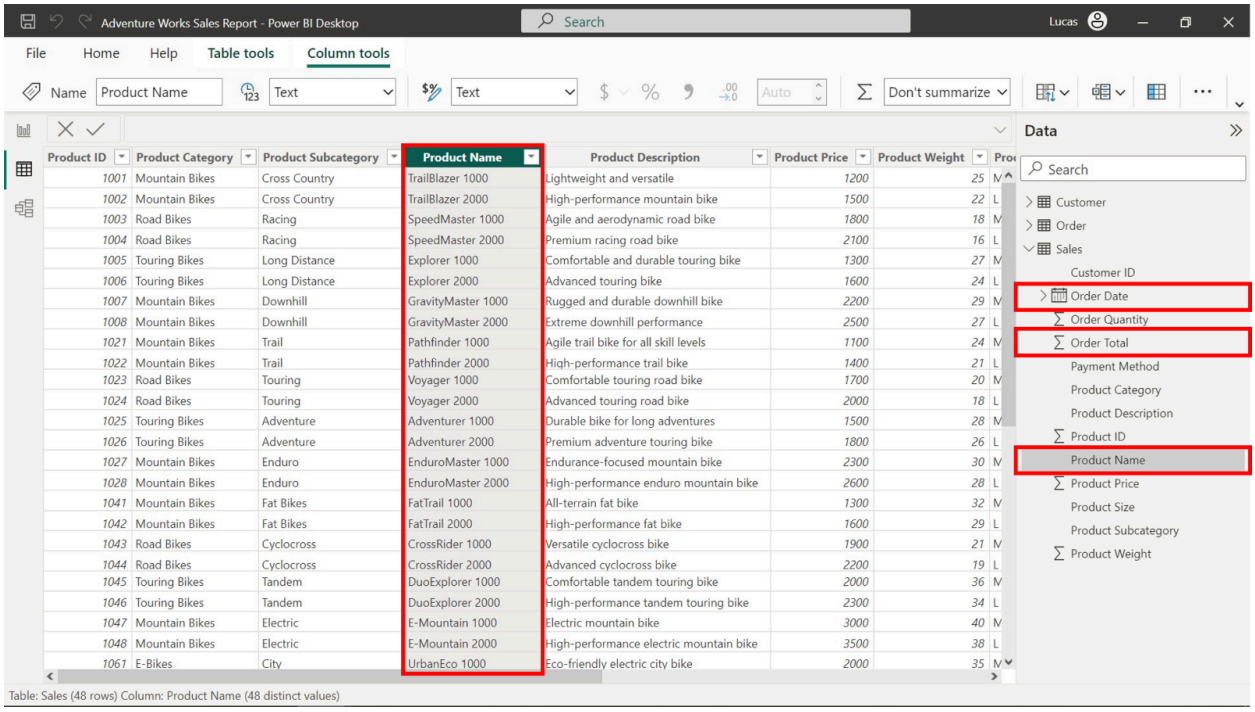
- Download the Power BI report file *Adventure Works Sales Report.pbix* and load it into Power BI Desktop.

Step 2: Identify the two big sales spikes

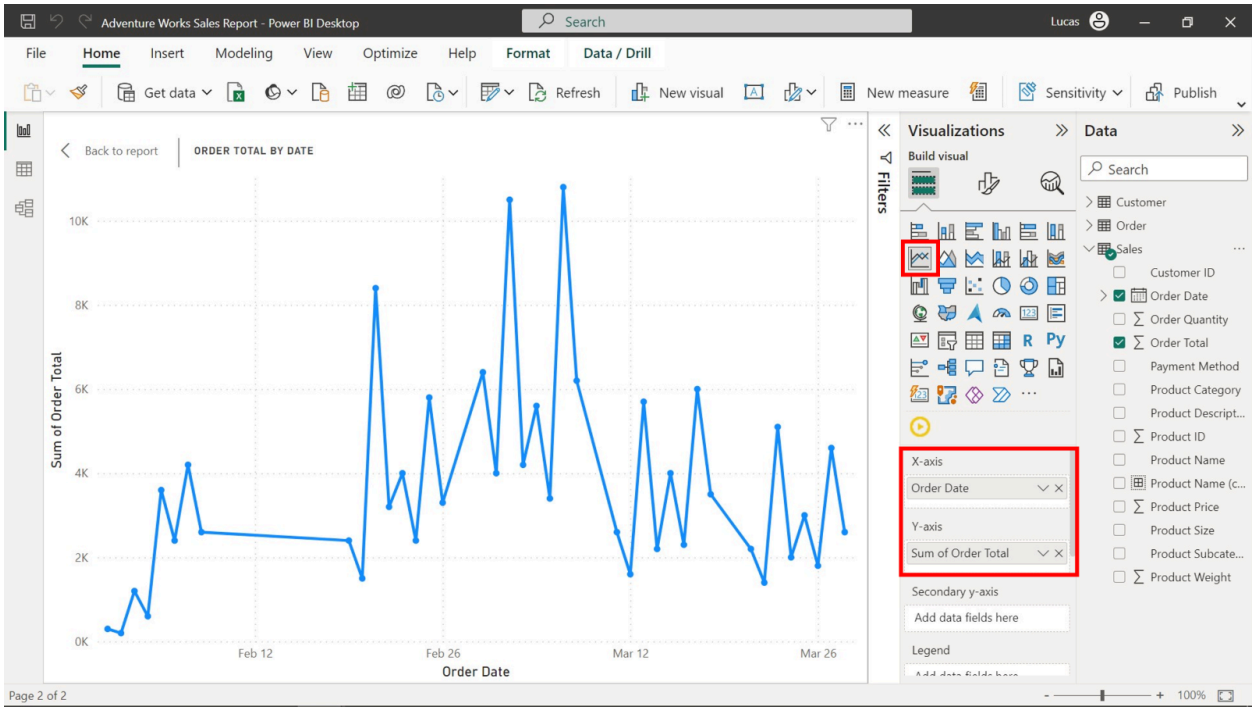
1. In Data view in Power BI, select the Sales table so you can familiarize yourself with the dataset.



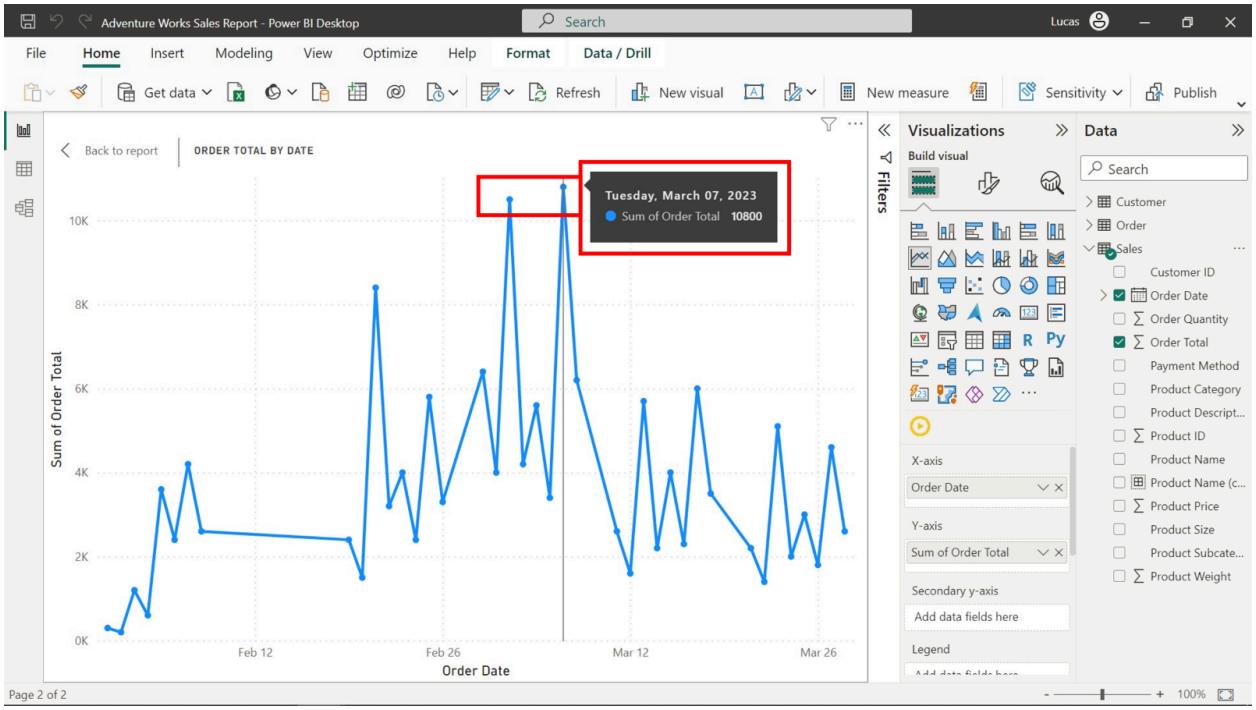
1. Locate the Order Date column, Order Total column, as well as an attribute column that could support clustering. In this case, the Product Name column has high cardinality (high number of distinct values) and is suitable for clustering.



1. Switch to the Report view and create a Line chart with Order Date on the X-axis and Order Total on the Y-axis.

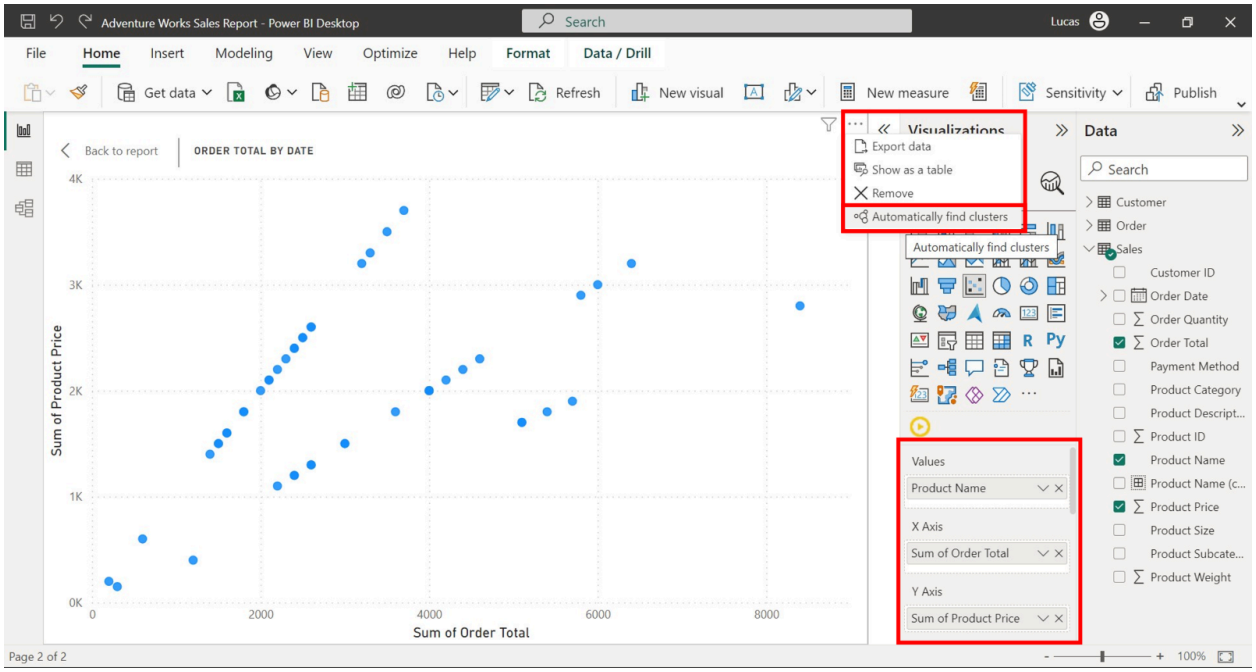


1. With the help of the line chart, identify the third and seventh of March as the two separate days where there was a spike in sales.

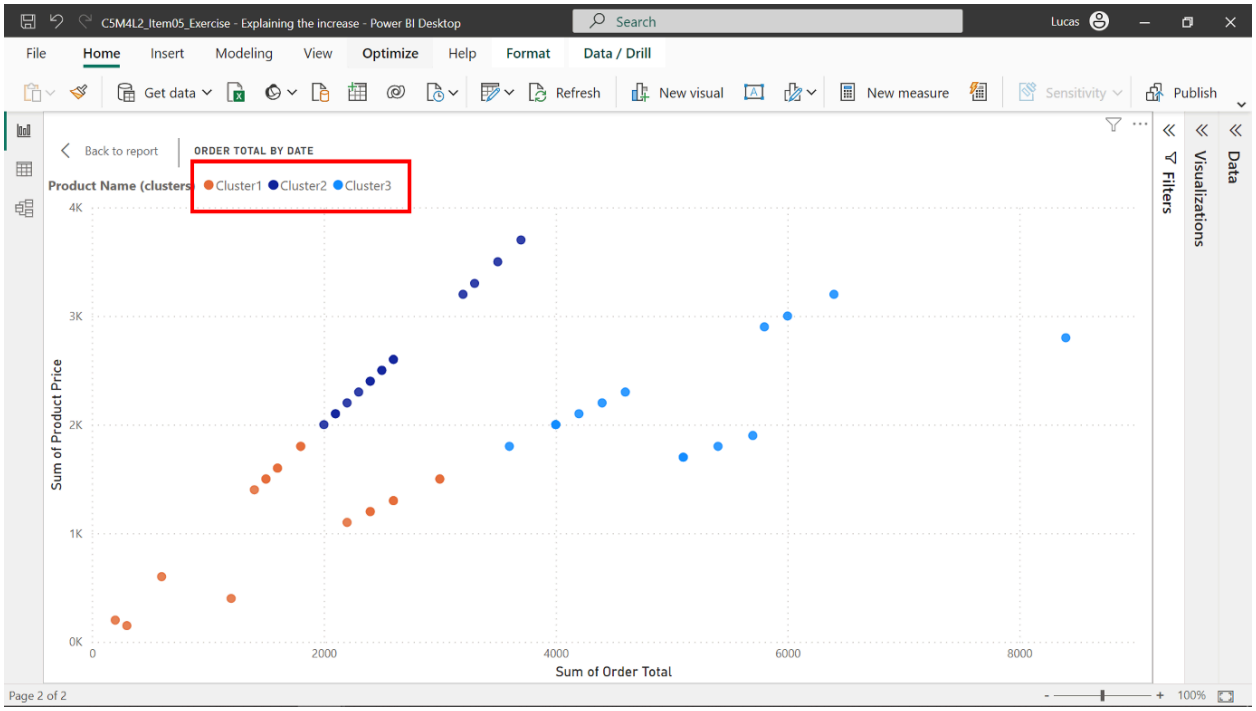


Step 3: Use the clustering technique to assist the Analyze feature

1. Add a scatter chart with Product Name in the Values field, Order Total on the X-axis, and Product Price on the Y-axis. Because outliers exist in the dataset, a clustering technique will further help you in your analysis.
2. Select the ellipsis in the top right, and then select Automatically find clusters.

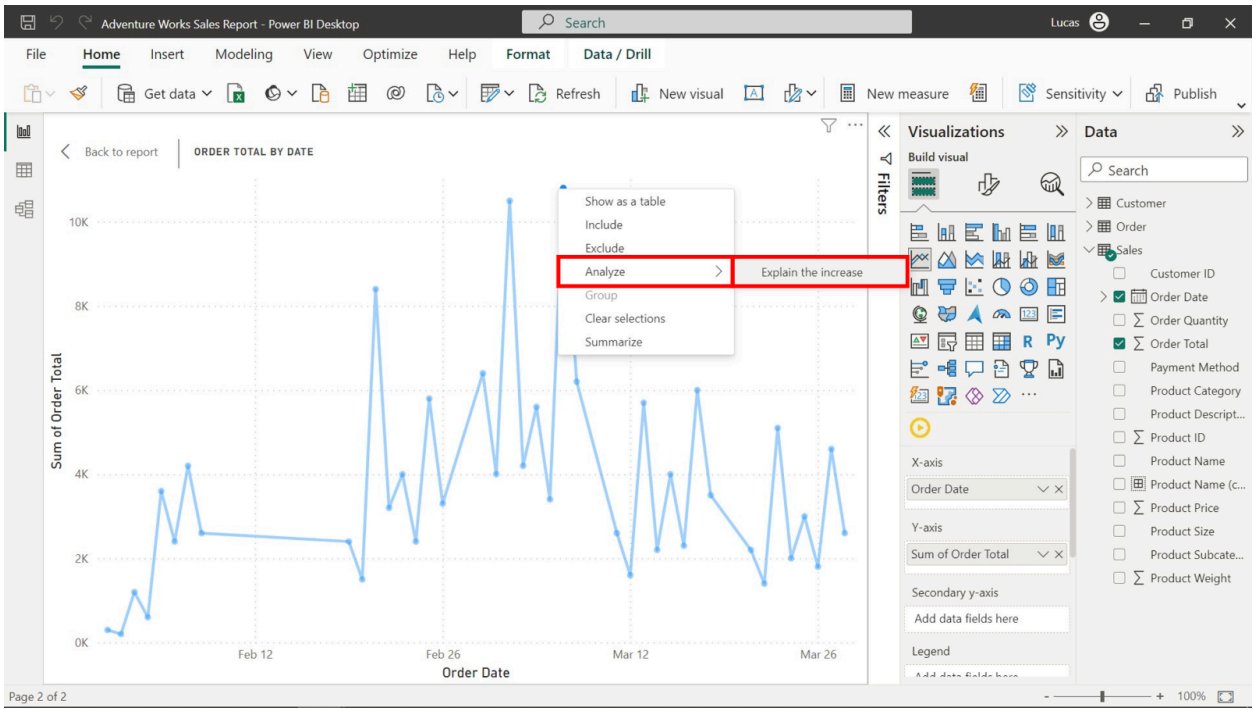


1. Assign names and descriptions to your clusters and then enter three as the number of clusters.

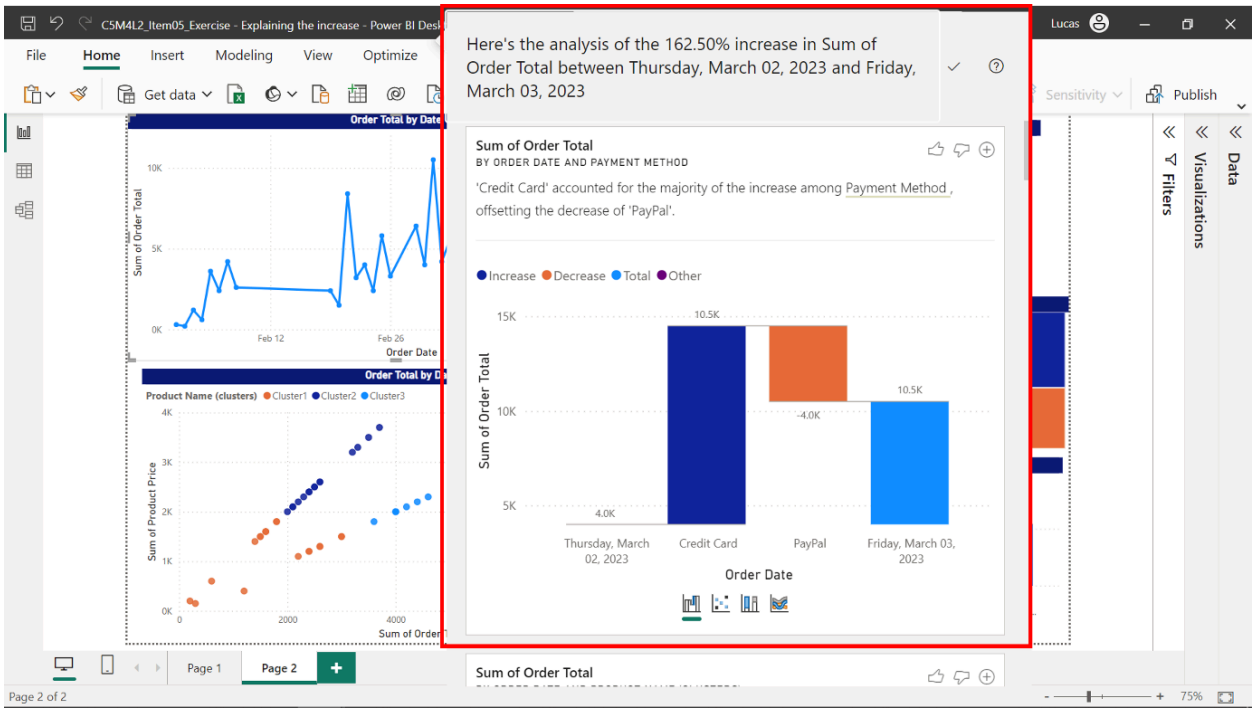


Step 4: Use the Analyze feature to generate automated visualizations

1. On the line chart, identify and right-click on the 7th of March. Then select Analyze from the list. Select Explain the increase to generate visualizations for the selected day.



1. Identify the specific fields that had the most influence on the sales spike for that day. Product Size, Product Category, Product Cluster, Payment Method, and Location had the highest sales spike for that day.
2. Close the pop-up window and right-click on the 3rd of March to use the Analyze feature and bring up the explanation of the increase window for that day as well.

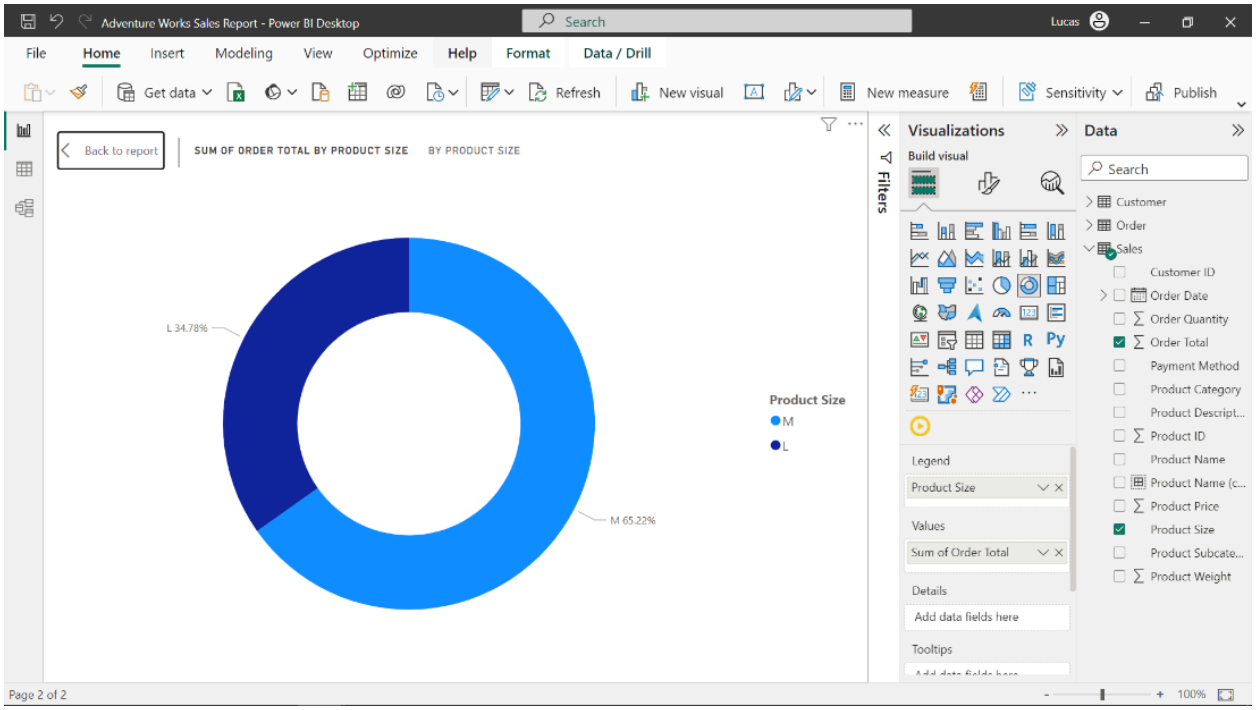


1. Scroll through the window's visualization to identify the positive elements that also appear on this day. Product Size, Product Category, and Product Cluster seem to contribute to the spike in sales on this day.

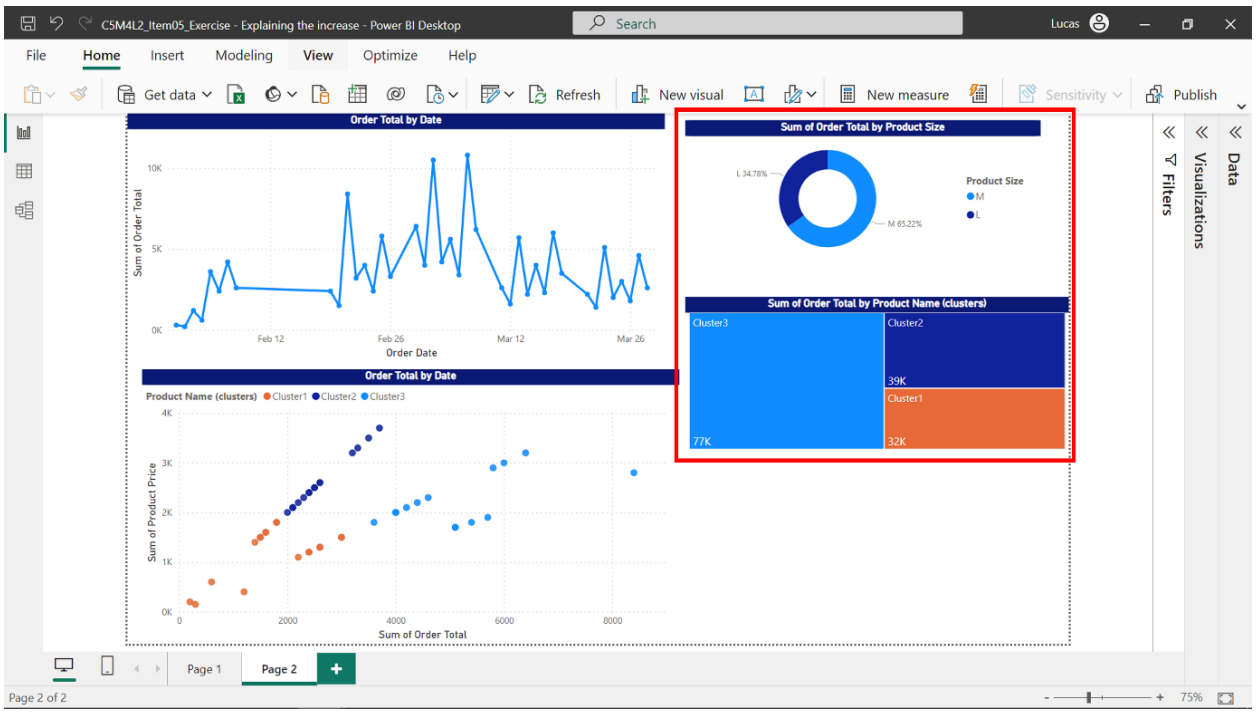
Step 5: Act on the insights by using the Analyze feature

After identifying the three attributes that contributed to the sales spikes, you were then tasked with adding some insightful visualizations to the report by completing the following steps:

1. Navigate back to the Data view to determine the cardinality (number of distinct values) of the three categories.
2. Note that Product Size has a cardinality of 2, Product Cluster has a cardinality of 3, and Product Category has a cardinality of 7. Then, add the first two categories as visualizations.
3. Since there were only two values, a pie or donut chart could be a good choice. Add a pie or donut visual to depict the difference in Order Total accumulated by each of the two product sizes.

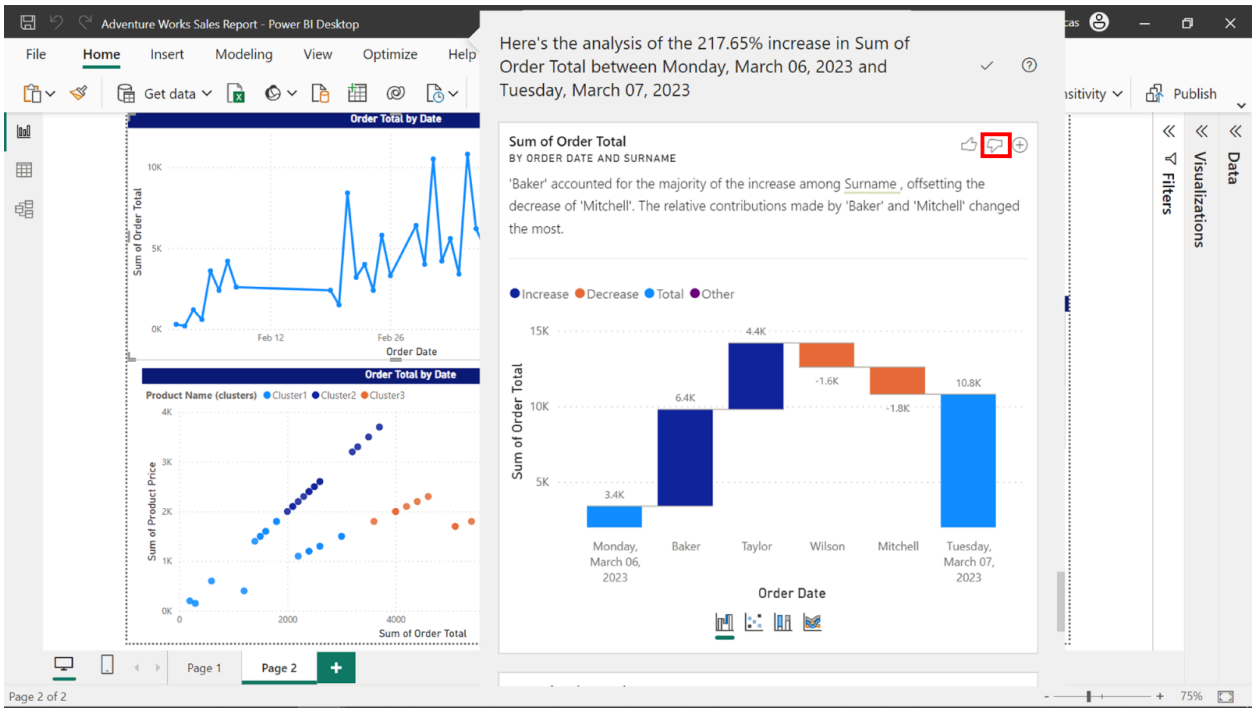


1. Create a treemap to showcase the difference in Order Total accumulated by all three of the clusters.

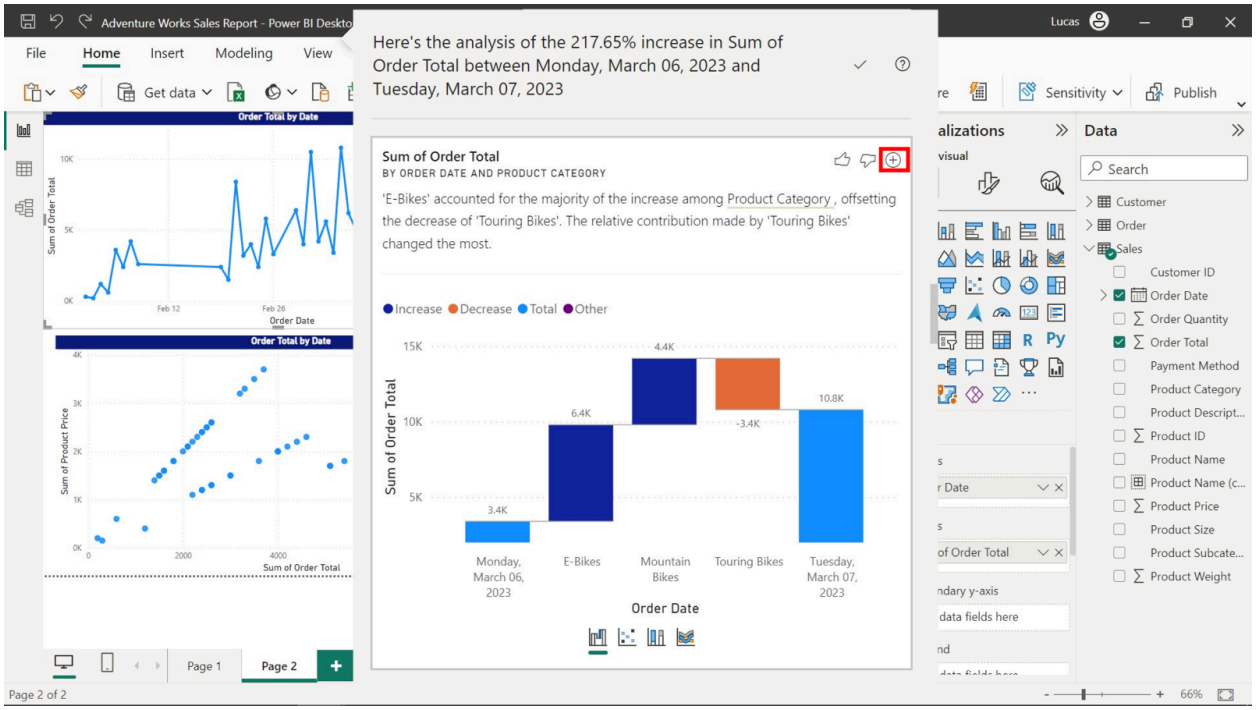


Step 6: Act on the insights by using the Analyze feature

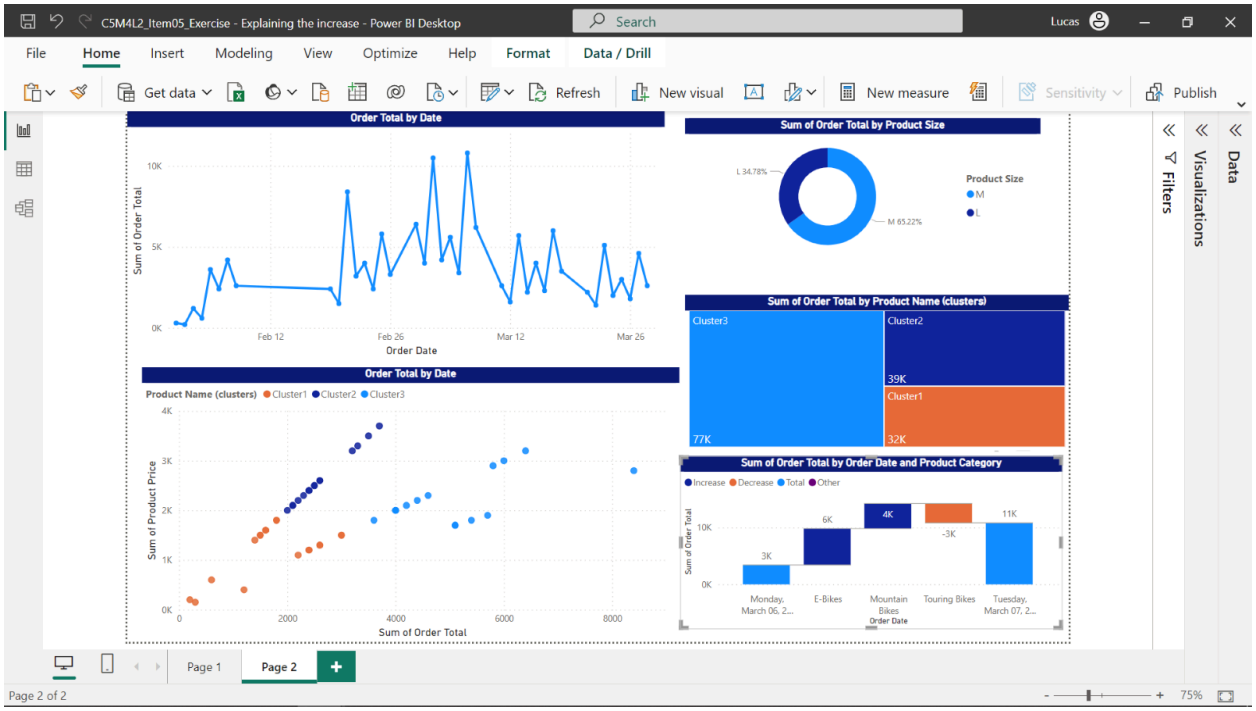
1. Upon selecting the line chart, navigate back to the pop-up window by selecting the Explain the increase option in the Analyze feature for the 7th of March.
2. When reviewing the visualizations that have been created, the single chart that analyzes the Order Total by customer surname seems lacking in insights. You can provide helpful feedback to the Analyze feature by selecting the thumbs-down button on the top-right.



1. Locate the three most important factors for the increase and provide positive feedback on them. These would be Product Category, Product Size, and Product Name (clusters)
2. In the Product Category visualization, select the cross button on the top-right to add it to the report.



1. Readjust the size of all visualizations to fit the canvas and customize them according to your company's standards. The outcome of this exercise should be a report similar to the following screenshot.



Conclusion

In the exercise, *Explaining the increase*, you created an insightful report exploring the sudden increase in Adventure Work's sales figures by utilizing the tools offered by the Analyze feature in Power BI. Your visualizations may vary in formatting and layout from the examples given here because every report bears a unique imprint from the data analyst who crafted it. What is important is that you have provided valuable information and analysis to the Adventure Works management team, which can inform decisions related to the next steps they need to take to maintain the increase in sales.

4.4. Activity: Forecasting sales

Introduction

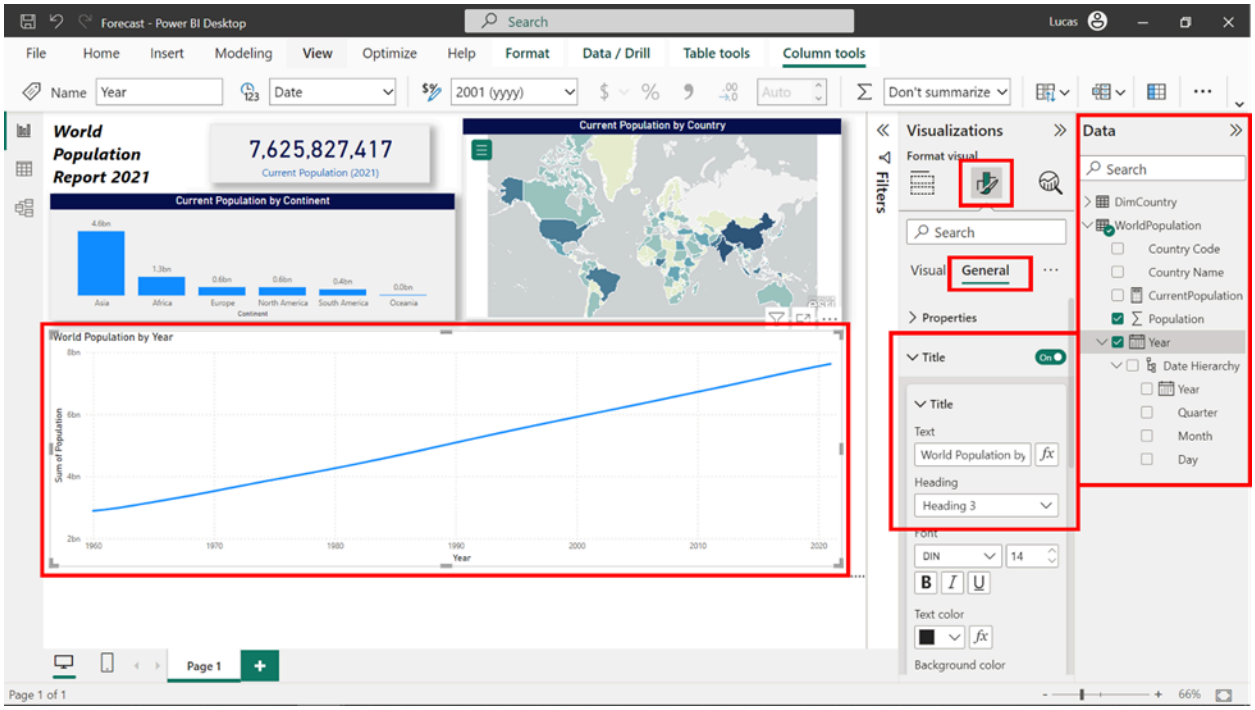
Analytical tools within Microsoft Power BI provide users with advanced tools to deepen the data insights in their reports. One significant tool is the Forecasting feature, which enables users to add predictive analysis to line chart visualizations. In this exercise, you will apply your newly gained knowledge of this feature to create forecasts for global population trends in the Power BI report *WorldPopulation.pbix*.

This report focuses on analyzing global population data spanning from 1960 to 2021. Several visualizations have already been incorporated into the report, including a card visual displaying the current population as of 2021, a column chart illustrating the current population by continent, and a map visual showcasing population figures by country.

Instructions

Step 1: Add and customize a line chart in the report

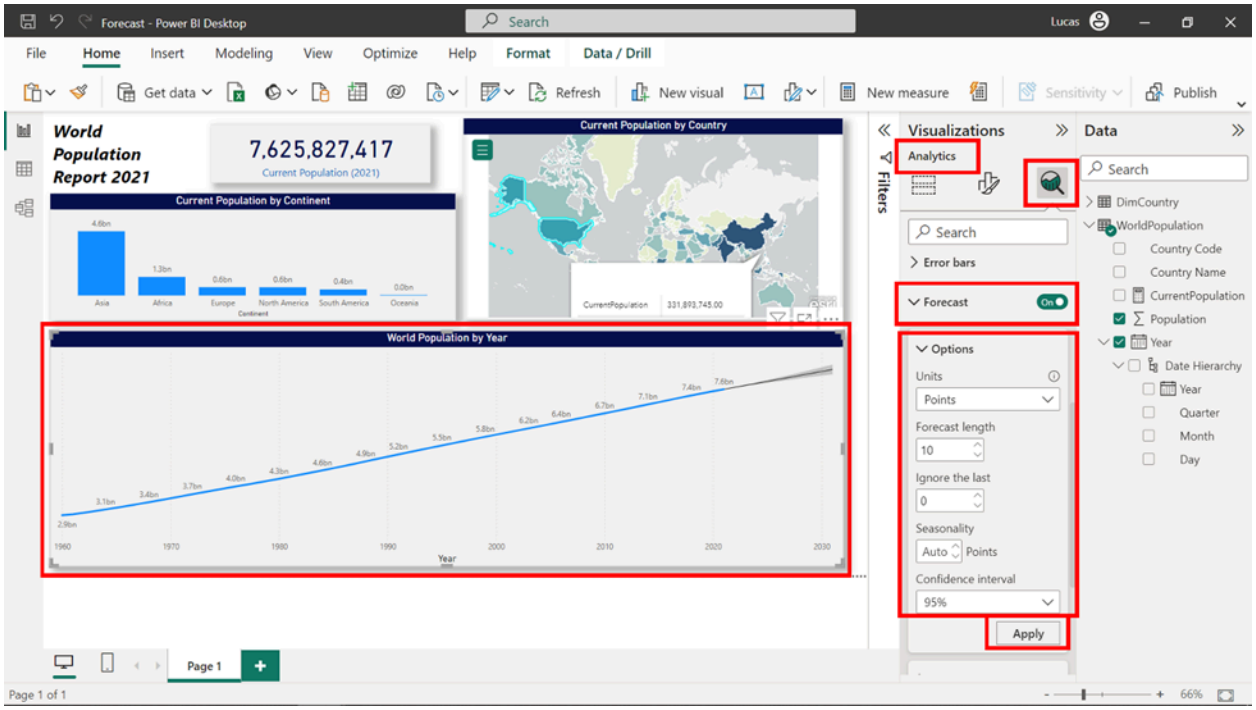
1. Download and open the *WorldPopulation.pbix* activity file.
2. Add a line chart visual at the bottom of the report page.
3. Add the Year column in the X-axis without the date hierarchy.
4. Add the Population column in the Y-axis.
5. Resize the visualization to fill the bottom part of the report
6. In the visualizations pane select the Format visual button. In the General tab, expand the Title option. Change Sum of Population by Year to World Population by Year.
7. To format the line chart in the style of the other visualizations in the report, select the bar chart above the line chart you have added. In the Home ribbon, select the Format Painter choice in the Clipboard group. Then, select the line chart to apply the same style to that visualization.



Now that the line chart has been added and formatted you can add the forecasts.

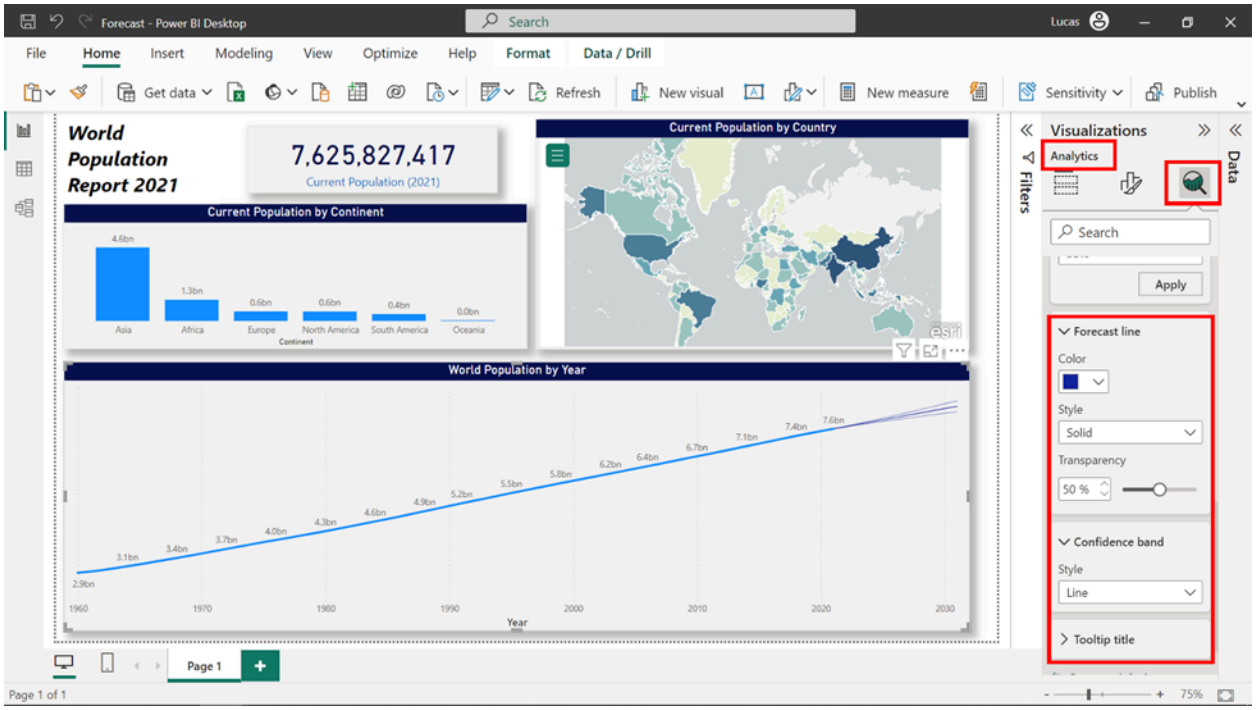
Step 2: Enhancing the report with forecasting

1. Select the line chart.
2. Open the Analytics tab which is located on the right side of the Visualizations pane.
3. Locate the Forecast tool in the Analytics pane list.
4. Turn the Forecast toggle to on. A forecasting line appears in the visualization.
5. Expand the Forecast settings section to access the forecasting line options.
6. Input 10 in the Forecast length field to incorporate a 10-year prediction on the visualization.
7. Select a Confidence interval of 95% to expand the upper and lower bounds of the prediction.
8. Select Apply to modify the forecasting line. Note the new resulting forecasting results by hovering over the forecasting line with the mouse.

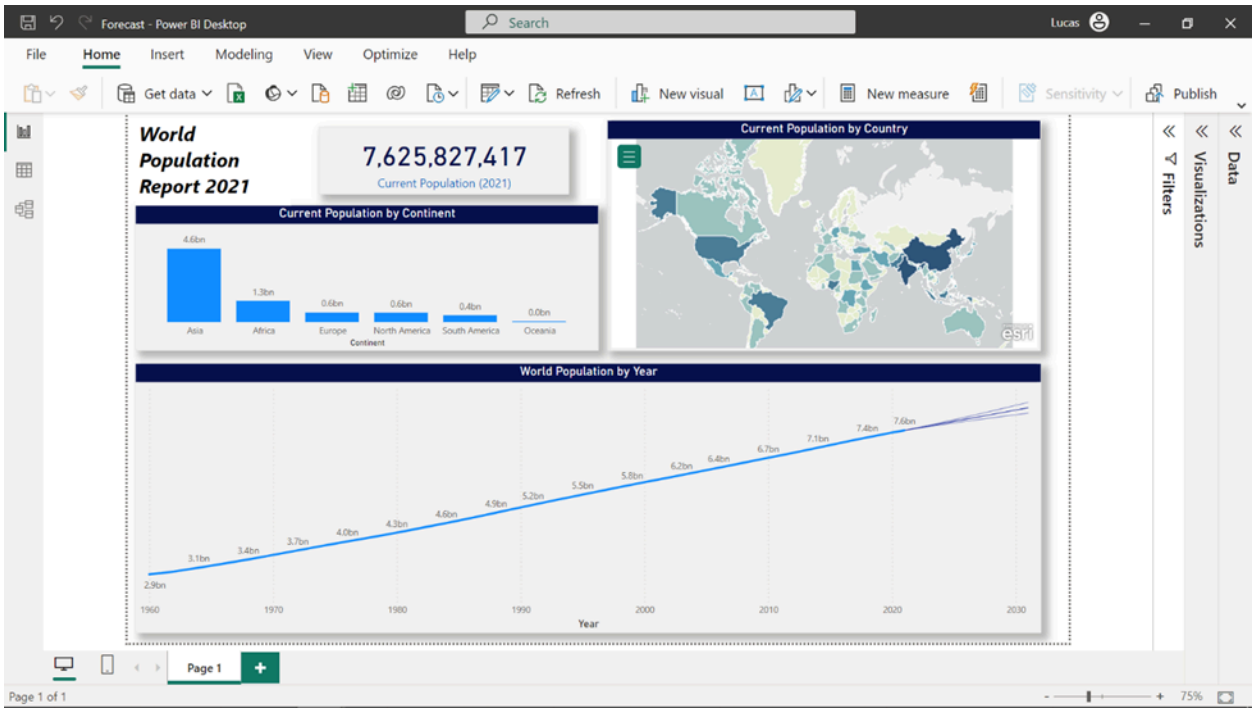


Step 3: Customize the forecast line

1. Scroll down below the Options settings for the forecast line in the Analytics pane.
2. Expand the Forecast line settings.
3. Modify the color of the line to blue so it adjusts with the rest of the report.
4. To keep the appearance solid, drop the transparency of the line to 50% so the forecasted plot stands out more.
5. In the Confidence band settings, modify the style to Line to change the forecast line’s bands into two additional lines that showcase the forecasted value's upper and lower bounds.
6. Last, on the Tooltip title field, enter Population Forecast as the Title text so that it is accurately displayed when hovering over the forecast line.
7. Note the new design and tooltip on the line chart’s forecasting line by hovering the mouse over it.



The output of your report after all your efforts should look like this:



Conclusion

Well done for completing another activity. In this activity, you completed the vacant section at the bottom of a report by harnessing Power BI's forecasting capabilities. In doing so, the report now offers a glimpse into the projected world population for the next 20 years, adding a valuable dimension to the analysis.

4.5. Exercise: Root cause analysis

Introduction

Proficiency in data analysis is a versatile skill that extends beyond corporate requirements. Having honed your analytical skills with Adventure Works data, you decide to put them to the test in a practical scenario. While exploring the endless array of available online datasets, you came upon one containing information on a critical matter: the environmentally pressing issue of CO2 vehicle emissions.

In this exercise, you will embark on a practical scenario of building an insightful report from an actual dataset. You will use the capabilities of specialized visualizations like key influencers and decomposition trees to add impact to your report and swiftly recognize the hidden patterns behind raw information.

Case study

Environmental issues are on everyone's mind, and vehicle CO2 emissions stand out as a major contributor. A dataset filled with raw data about CO2 emissions per vehicle holds a wealth of valuable insights waiting to be uncovered through data analytics. In this case study, you'll focus on a targeted investigation: using root cause analysis to identify the vehicle attributes that have the greatest impact on air pollution.

To do this, you will have to:

- Identify the key vehicle attributes that have the most impact on CO2 emissions in the environment.
- Identify the major contributors to pollution through a perceptive root cause analysis, leveraging the AI-driven visualizations of Power BI.
- Create relevant visualizations to enrich your report, including a decomposition tree, allowing users to freely explore and navigate the dataset's values.

Instructions

Step 1: Download the report

- Download the Power BI report file *CO2 emissions by vehicle* and open it in Power BI Desktop.

Step 2: Identify the key influencers of CO2 emissions

To commence your analysis, you'll take an initial look at the dataset you'll be working with, acquainting yourself with its values and attributes.

1. Navigate to the Data view of Power BI. Select the Vehicles table to familiarize yourself with the dataset.
2. Identify the CO2 emission column for analysis. Consider all attributes associated with it that could contribute to an increase or decrease in emissions.
3. Identify the column that won't contribute to specialized visualizations and thus can be excluded.
4. Navigate back to the Report View to initiate the creation of your report.

Step 3: Report Creation

To create the report, add a simple card visual to highlight the count of vehicles in your dataset. Introducing some general information about the dataset is a common practice in reporting. Then, with the help of the Key influencers' visual, start creating insightful charts in your report.

1. Create a basic card visual with the number of vehicles on the dataset, renaming it to *Vehicles analyzed*, to showcase the volume of the dataset.
2. Create the Key influencers visual to assist you in deriving insights from the dataset.
3. Add the appropriate column in the Analysis field, and all potential influencing factors as its attributes.
4. Explore each Key influencer calculated by the specialized visualization.
5. Notice the insightful scatter plot in the generated visualizations and recreate it within your report.

Step 4: Use the Top segments tool to detect groups of influencing factors

To understand if there is a potential group of influencing factors behind the CO2 emissions, use the Top segments tool of the visualization.

1. Navigate to the Top segments tool of the visualization.
2. Explore the top segments, identifying the main groups of attributes behind air pollution.
3. Observe an instance where a single factor holds such importance that it creates its own segment. This observation should validate the significance of the previously created scatter plot.
4. In the remaining segments, notice that apart from the field already visualized, there are two additional attributes creating segments and affecting the emissions.

5. Create a visualization highlighting the relationship between those two factors with emissions. Use the higher cardinality (number of distinct values) column as an axis, and the lower cardinality column as the legend.
6. Recognize the third attribute influencing the emissions that is not currently highlighted in the report. Select a visualization of your choice and add it to the report.

Step 5: Build a decomposition tree with AI capabilities

Having built a number of visualizations for your report, it is time to give your users the ability to explore the dataset freely with a specialized visualization. On a new page, add a decomposition tree and work with its data.

1. Create a new page on your report and select the decomposition tree visualization. Adjust it to fit the whole screen.
2. Add the average of the emission field and all its relevant attributes on their respective visualization fields.
3. Expand all attributes in a hierarchical function. You should notice that a specific field cannot be easily used in the decomposition tree due to its high cardinality.
4. Create 5 bins to group the column mentioned above into equal-sized groups. Remove the ungrouped column from the chart and add the newly created bins.
5. Using the power of AI analysis of the visualization, identify what is the lowest average CO2 emission on a vehicle with powertrain: Hybrid Electric Vehicle (HEV), taking into account all lowest emission scoring attributes.

Conclusion

The aim of this exercise was to underscore the invaluable role of data analysis in addressing pressing environmental issues. Throughout this activity, you used the capabilities of specialized visuals within Power BI to construct an enlightening report, employing authentic case study data. With the remarkable support of AI-powered visualizations, you crafted a captivating report that would captivate anyone concerned with the realm of CO2 emissions.

Exemplar: Root cause analysis

Introduction

In the exercise, *Root cause analysis,* you were assigned a real case scenario of actual environmental data to hone your analytical skills on Power BI reporting. With the immense help of Power BI specialized visuals on your side, your goal was to craft an insightful report, leveraging the significance of all available information in the dataset.

Your specific tasks were to:

- Create and explore the Key influencers visualization to identify the driving forces behind the CO2 emissions field.
- Use the information provided by the Key influencers visual to add insightful visualizations to your report.
- Create a decomposition tree to allow users to navigate themselves through the dataset.

This reading provides you with a detailed guide that you can use to compare your solution.

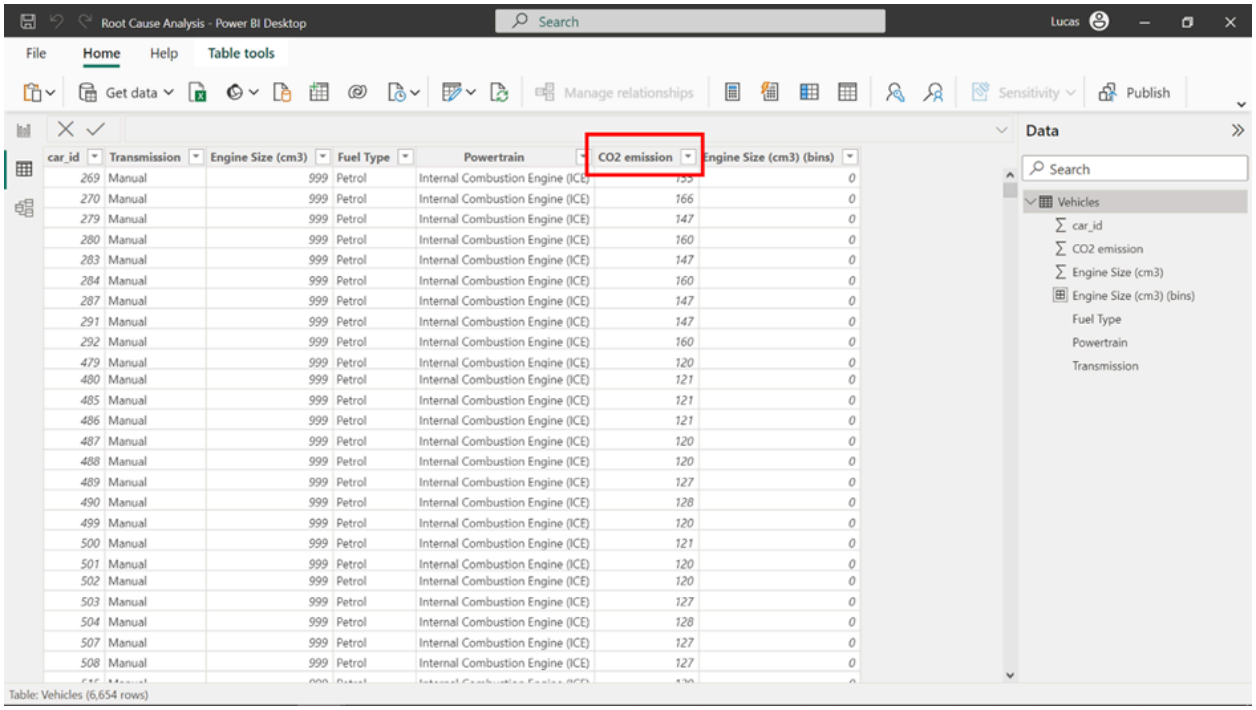
Instructions

Step 1: Download the report

- Download the Power BI report file *CO2 emissions by vehicle* and open it in Power BI Desktop.

Step 2: Identify the key influencers of CO2 emissions

1. Navigate to the Data view of Power BI. Select the Vehicles table to identify all necessary columns to be used on the specialized visuals.
2. The CO2 emission field is the main column to be analyzed. Transmission, Engine Size (cm3), Fuel Type, and Powertrain are the attributes that might explain the increase or decrease in a vehicle's CO2 emissions.

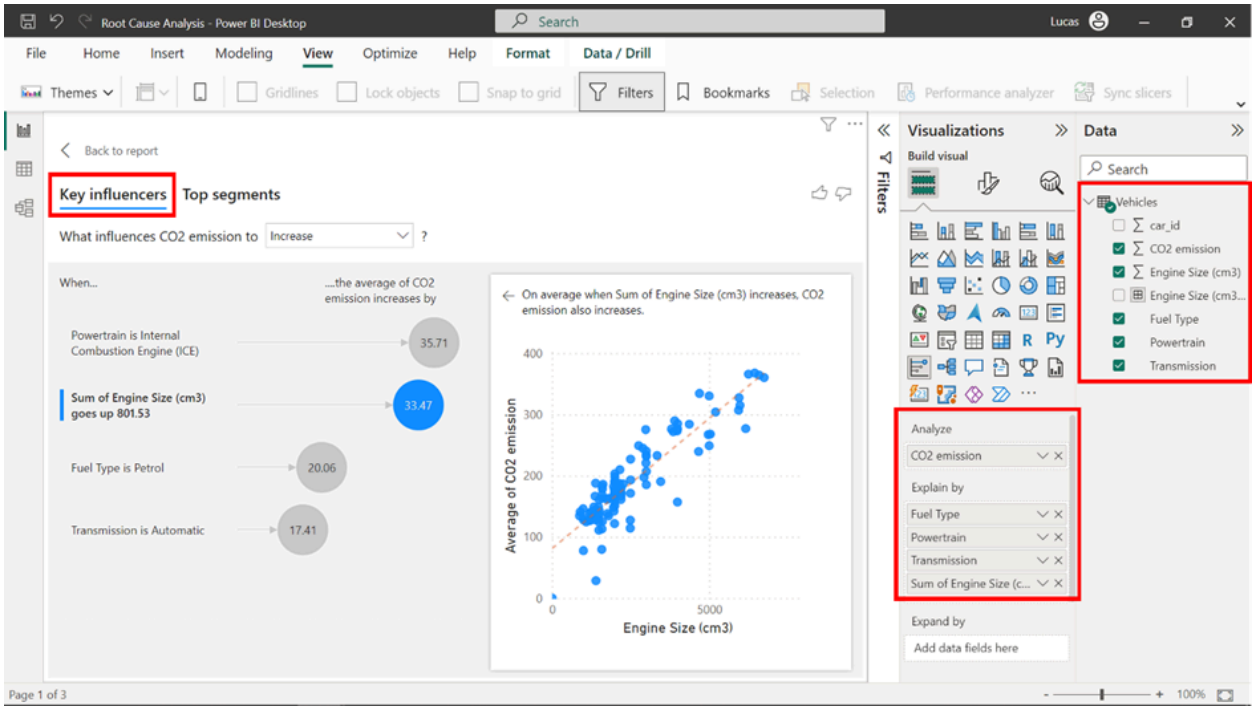


car_id	Transmission	Engine Size (cm3)	Fuel Type	Powertrain	CO2 emission	Engine Size (cm3) (bins)
269	Manual	999	Petrol	Internal Combustion Engine (ICE)	155	0
270	Manual	999	Petrol	Internal Combustion Engine (ICE)	166	0
279	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
280	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
283	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
284	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
287	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
291	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
292	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
479	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
480	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
485	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
486	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
487	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
488	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
489	Manual	999	Petrol	Internal Combustion Engine (ICE)	127	0
490	Manual	999	Petrol	Internal Combustion Engine (ICE)	128	0
499	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
500	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
501	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
502	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
503	Manual	999	Petrol	Internal Combustion Engine (ICE)	127	0
504	Manual	999	Petrol	Internal Combustion Engine (ICE)	128	0
507	Manual	999	Petrol	Internal Combustion Engine (ICE)	127	0
508	Manual	999	Petrol	Internal Combustion Engine (ICE)	127	0

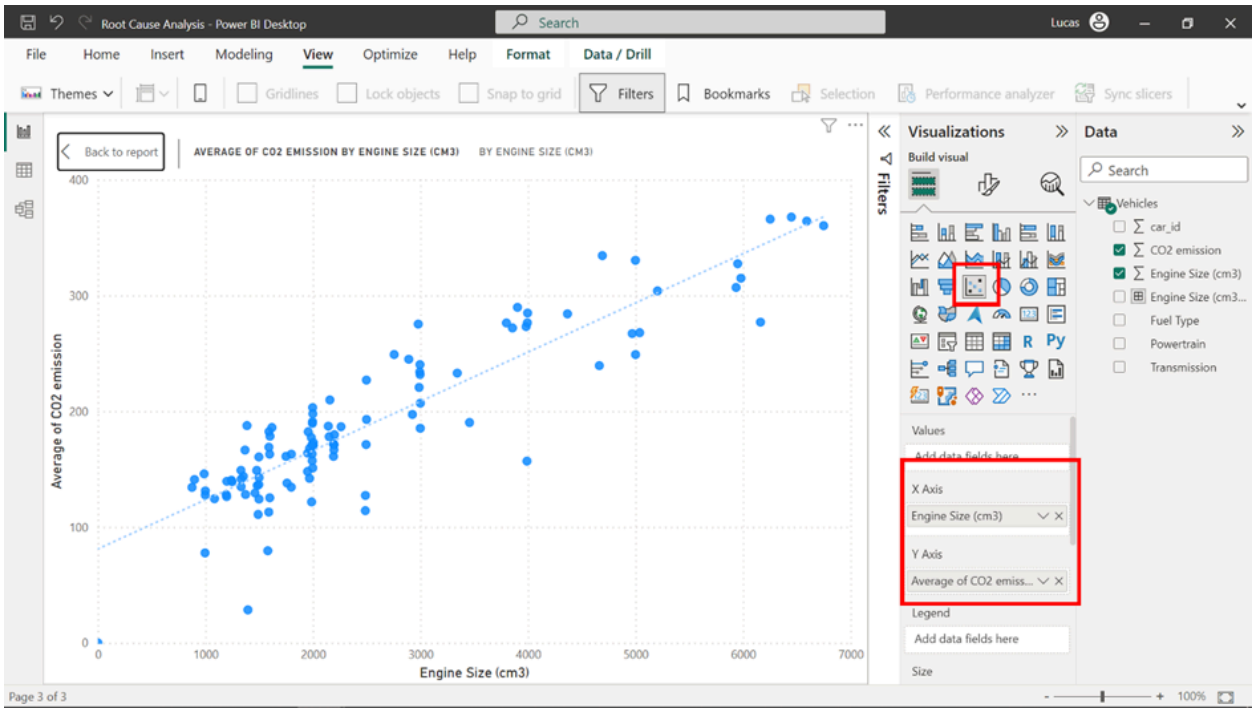
1. The car_id column serves as an index column for the table and holds no specific analytical value in specialized visuals.
2. Navigate back to the Report view to initiate the creation of your report.

Step 3: Report creation

1. Create a basic card visual and add the car_id column from the table with the Count function. Keep in mind that because each table row indicates a distinct vehicle and holds no blank values, any column with the Count function can be used, delivering the same result. Double-click on the field name to rename it to Vehicles analyzed.
2. Locate and select the Key influencers visual from the Visualizations pane.
3. Add the CO2 emission column to the Analyze field and all other attribute columns (excluding car_id) in the Explain by field.
4. Explore each key influencer calculated by the specialized visualization.

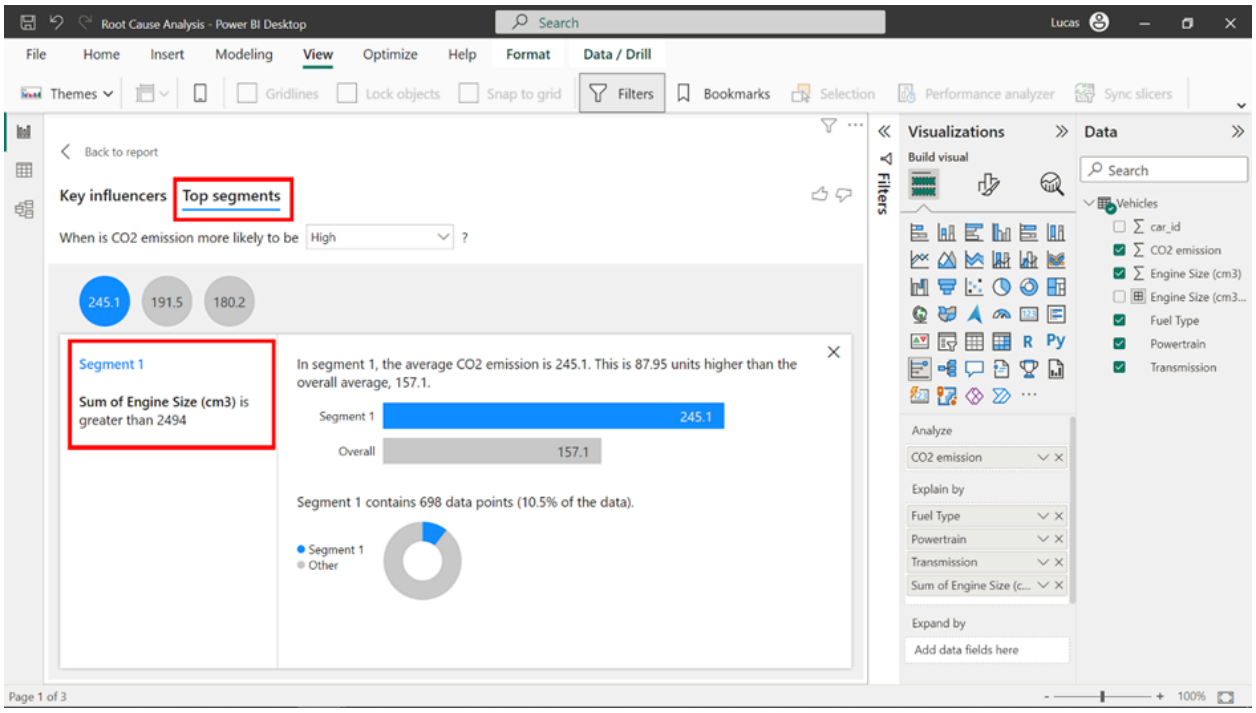


5. Note the insightful scatter plot about the relationship of Engine size (cm3) with Average of CO2 emission in the generated visualizations. Recreate it in the report by selecting a scatter plot and adding the columns mentioned above in the X-axis and Y-axis respectively. The Y-axis will default to Sum of CO2 emission, so be sure to change it to Average using the down arrow symbol at the right side of the field.

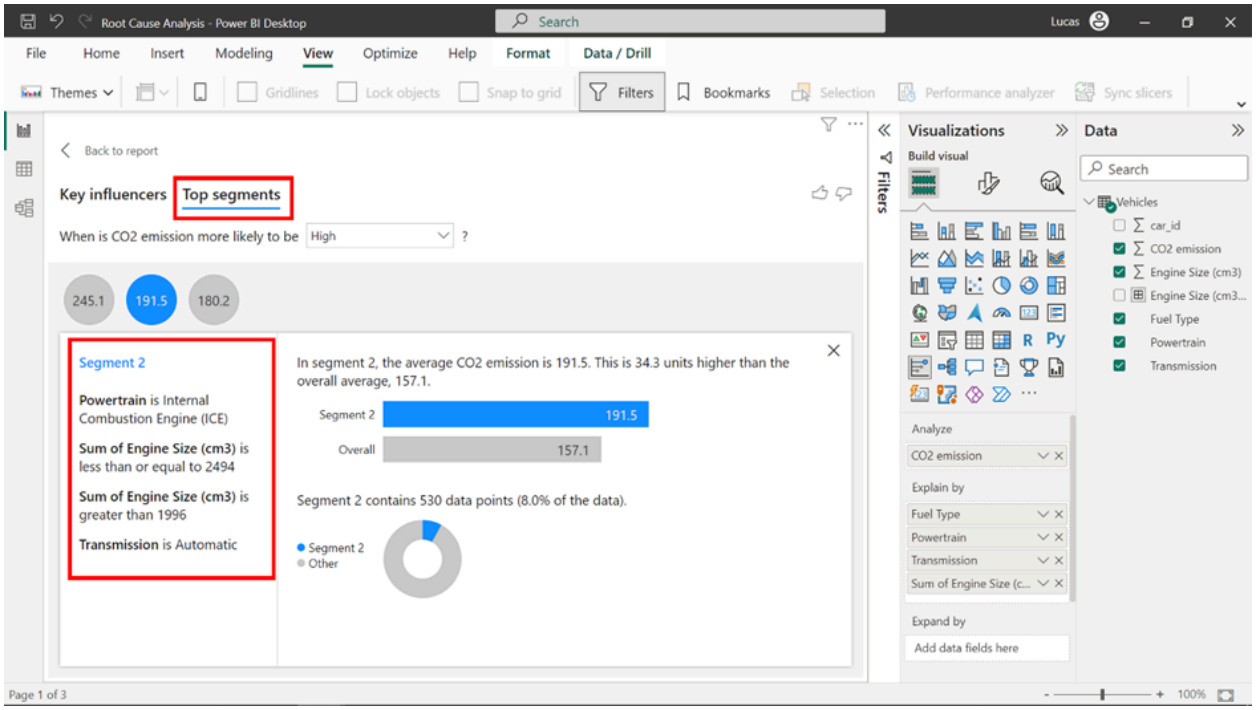


Step 4: Utilize the Top segments tool to detect groups of influencing factors

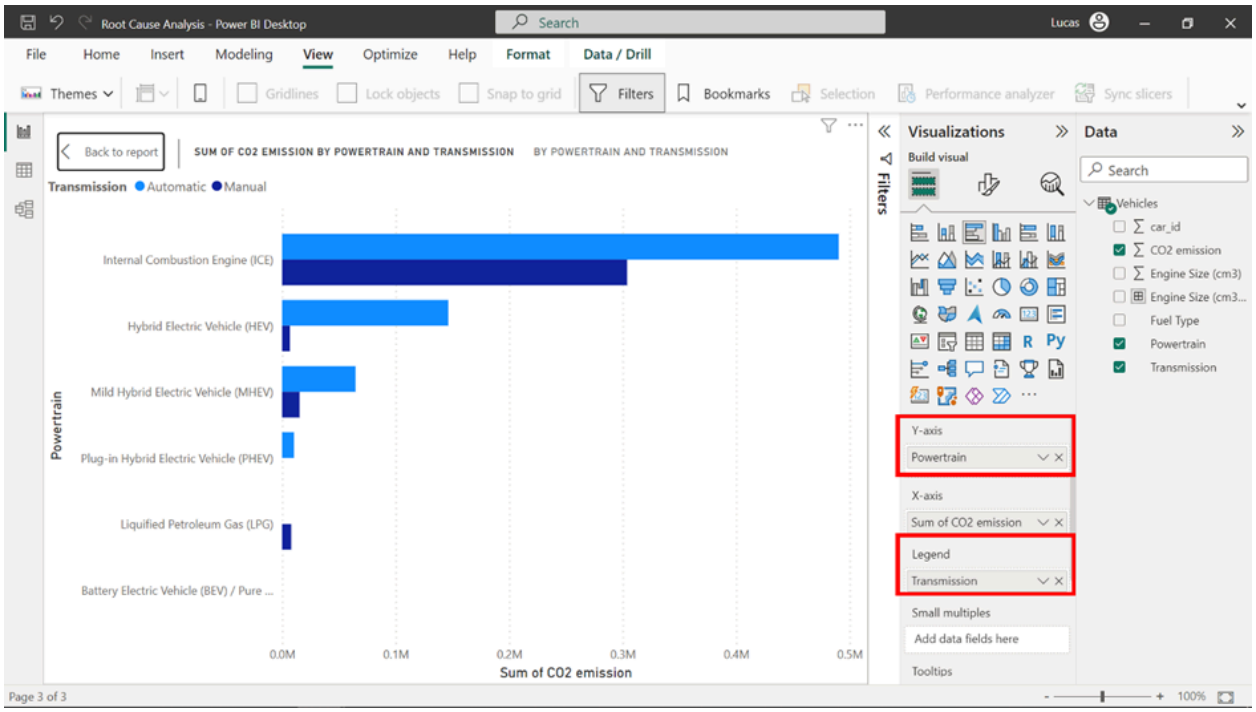
1. Navigate to the Top segments tool of the visualization. It is the second tab on the upper side of the visualization.
2. Explore the top segments, identifying the main groups of attributes behind air pollution.
3. Note that Sum of Engine Size is a segment by itself as it heavily influences the CO2 emissions of the vehicle. This observation confirms the significance of the scatter plot that was added in the previous step.



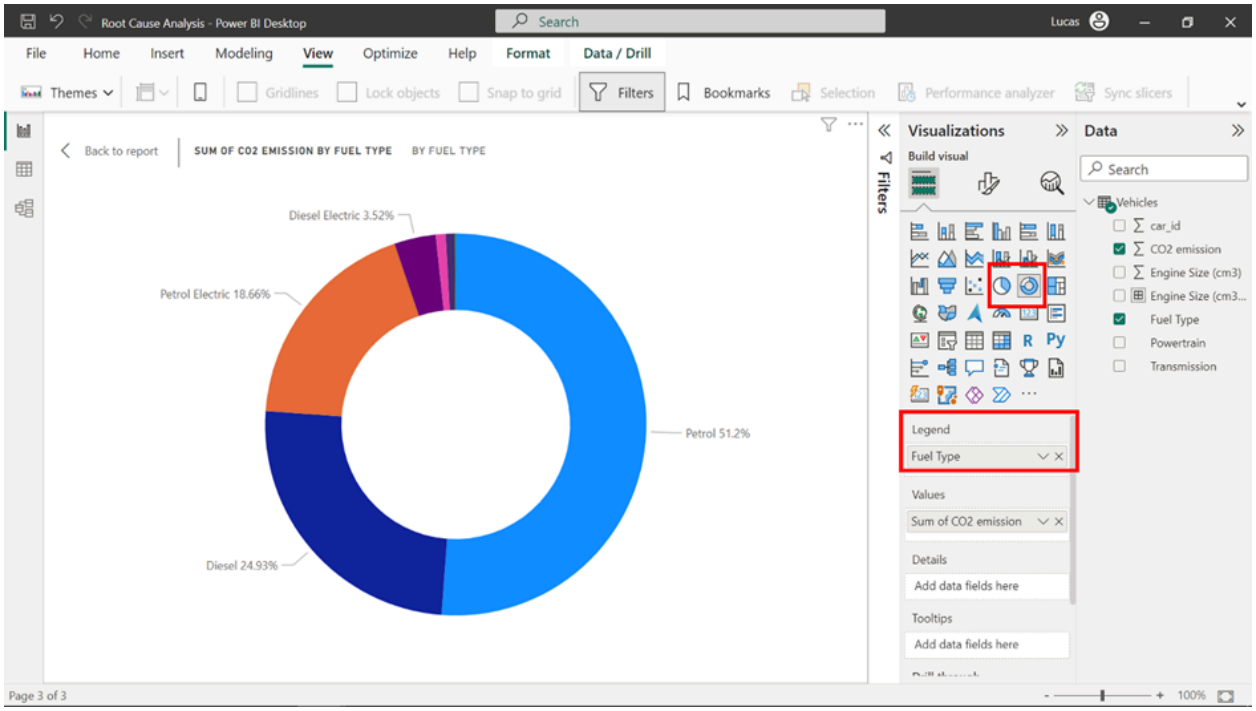
4. In the remaining segments, notice that apart from the field already visualized, Powertrain and Transmission combined are important factors when it comes to CO2 emissions.



5. Create a visualization highlighting the relationship between these two factors with emissions. Use Powertrain in the Y-axis, as it has a higher cardinality than Transmission, which can be added to the Legend.

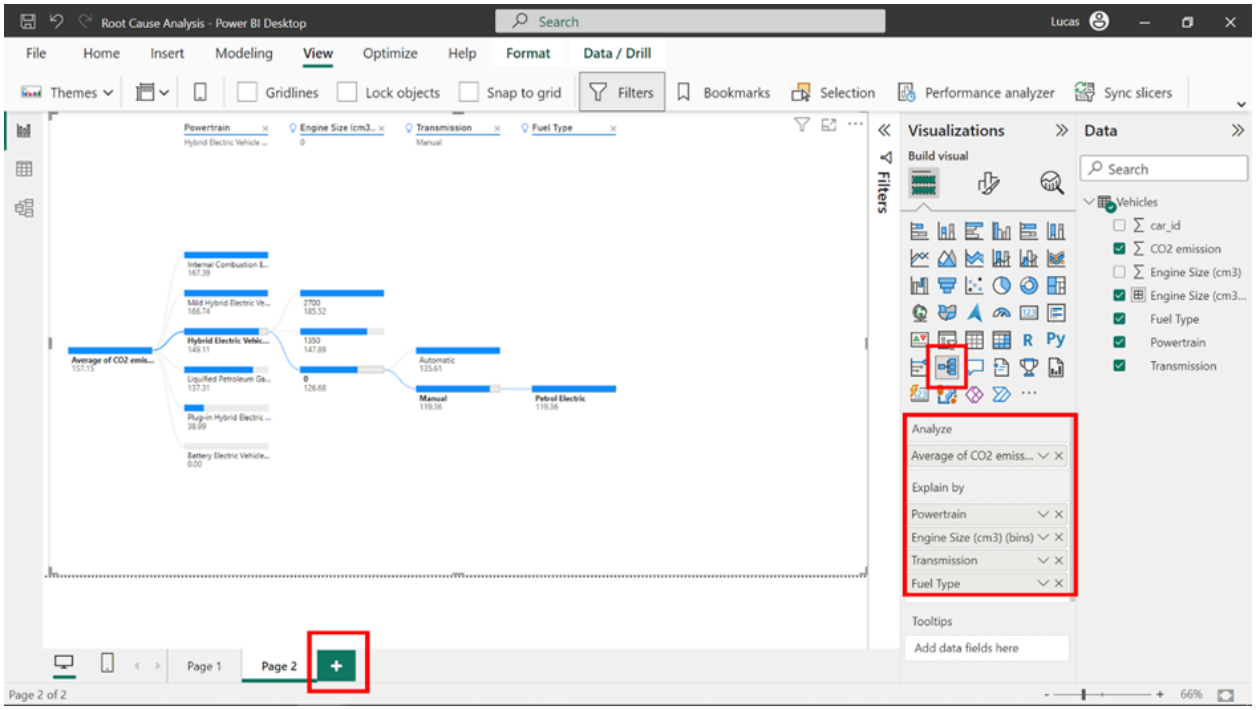


6. The Fuel type field has not been included in the report. Identifying the three categories of fuel types that consist of more than 90% of CO2 emissions. A pie or donut chart would be a fitting visualization for this field.



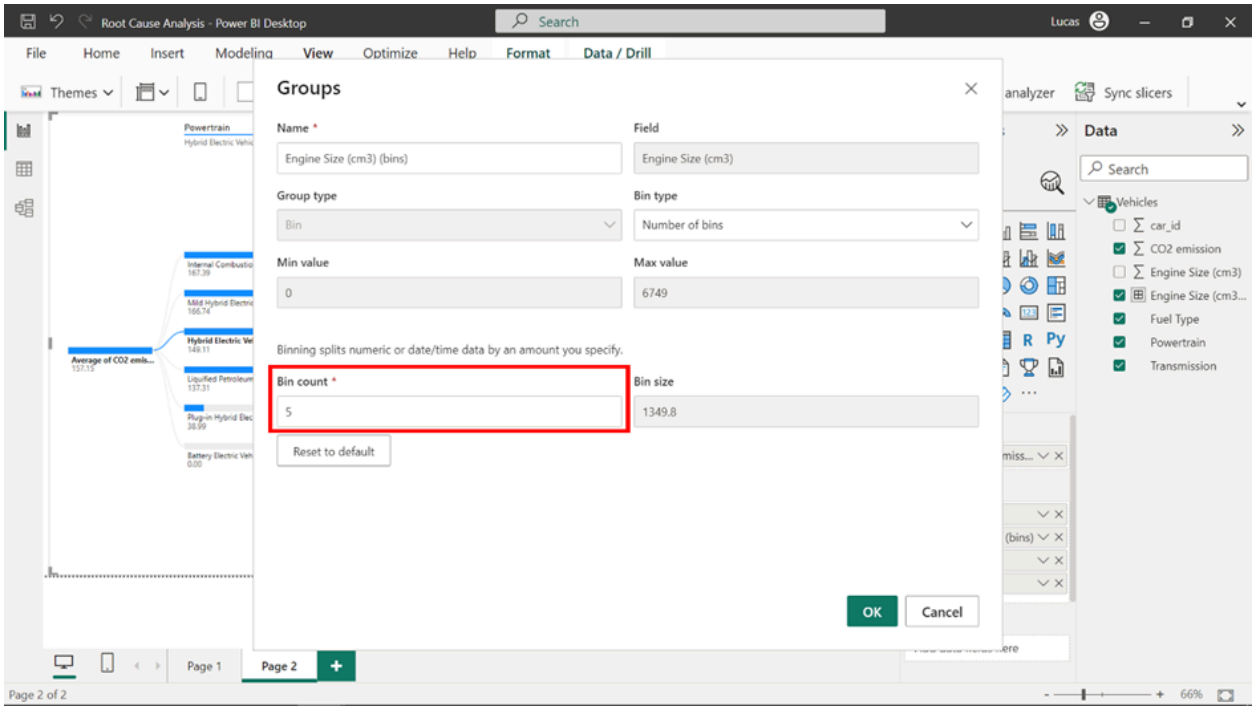
Step 5: Build a decomposition tree with AI capabilities

1. Select the + symbol on the bottom of the canvas to create a new page on your report, and then select the decomposition tree visualization in the Visualizations pane. Adjust the visual to fit the whole screen.
2. Add the average of the CO2 emission in the Analyze field and all its relevant attributes in the Explain by field.

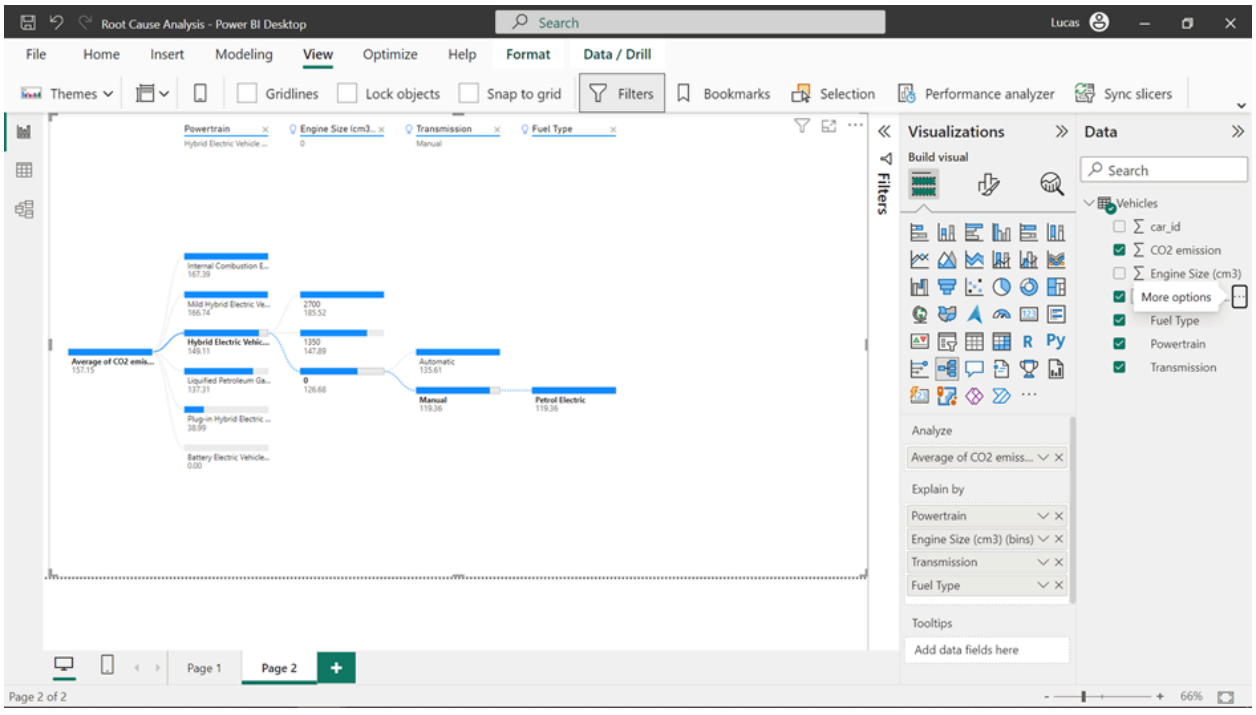


3. Expand all attributes in a hierarchical function using the plus sign at the right side of each bar. Engine size (cm3), having a high cardinality, cannot be successfully visualized in the decomposition tree.

4. Right-click on the column Engine size (cm3). Select New group to group the data points into equal-sized bins by selecting five as the number of bins. Remove the ungrouped column from the chart and add the newly created bins.



5. Using the power of AI analysis on the visualization, identify what is the lowest average CO2 emission on a vehicle with Powertrain: Hybrid Electric Vehicle (HEV). To do this, close all previously opened tabs of the visual, and navigate using Power train as the first hierarchy selection, and then Low value on the rest of the attributes to leverage the AI functionality of the visualization.



Conclusion

By completing this exercise, you explored how to create an accessible report using the capabilities of specialized visualizations in Power BI, like key influencers and decomposition trees to add impact to your report and swiftly recognize the hidden patterns behind raw information. With the AI visuals of Power BI as your tools, you build a report from scratch, issuing a definitive presentation of vehicle attributes' association with air pollution from CO2.

5. Exercise: Adventure Works executive summary

Introduction

You've come a long way on your journey to master data analytics. By now, you're well-versed in visualizing and analyzing data in Power BI. Today, you'll apply that knowledge in a scenario, working on an Adventure Works Microsoft Power BI report that urgently needs your expertise. In this exercise, you'll be doing more than just creating visuals; you'll translate data into actionable insights for decision-making at the highest levels. Specifically, you will be asked to:

- Utilize the table, column chart, line chart, KPI, and Q&A visuals to bring data to life.
- Implement forecasting on your line chart to anticipate future trends.
- Employ the Q&A visual to enable a more natural conversation with data.

Scenario

You've just received an email marked "URGENT" from the executives at Adventure Works. They've heard about your expertise in data analytics and have a pressing request: "We need a comprehensive Power BI report and dashboard ASAP!" Now, the room you find yourself in isn't just any room; you're in the executive suite of Adventure Works, surrounded by the company's top minds. These decision-makers juggle multi-million-dollar budgets, eyeing global expansion and continually adapting to ever-changing market dynamics. They don't just want data; they need actionable insights, and they need them now.

The executives understand that in the modern business landscape, data isn't just an asset; it's the essence of strategic decision-making. As you look around, you see various department heads clutching different pieces of the data puzzle—sales printouts, customer demographics, and inventory reports—but they're fragmented, disjointed, and not speaking to each other. The executives look to you to make the data understandable and actionable. You've been given a significant responsibility: to harness the potential of sales and customer data that will influence high-stakes decision-making. So, are you ready to dive in?

Instructions

Download and open the Adventure Works Power BI report titled *Adventure Works executive summary.pbix* and follow the prompts below to complete the exercise.

Step 1: Create core visualizations

Table visualization

In a bustling company like Adventure Works, getting lost in the noise of numerous SKUs, fluctuating sales, and changing order statuses is easy. First, create a table visualization that will serve as a quick reference, telling the executive team what products are selling and where it’s at in the delivery pipeline.

1. From the Visualizations pane, select the Table icon to create an empty table visualization on the canvas.
2. On the Fields pane, select the Sales table to expand it and view its fields.
3. Drag Product ID from the Fields pane to the Columns well in the Visualizations pane.
4. Next, drag Product Name, Order ID, Order Status, and Order Total to the same Columns well.
5. In the Format tab, expand the Style preset option and select the Minimal preset from the available dropdown.
6. Select and drag the edges of the table visualization on your canvas to resize it and place the visualization on the right side of the canvas.

Column chart

It's not enough to know what sold; it's crucial to know what's selling dominantly and what's not leaving the warehouse. A column chart instantly displays which product categories at Adventure Works are revenue-generators and which need a strategic revisit.

1. Select the Clustered column chart icon in the Visualizations pane.
2. Drag Product Category from the Sales table and drop it into the X-Axis well.
3. Drag Order Total from the same Sales table and drop it into the Y-Axis well.
4. In the Format tab, locate the Columns > Colors option. Input Dark Blue: #2D386Dfor a unified look.
5. Drag Order Quantity and Product Weight fields from the Sales table into the Tooltips field well.
6. Upon selecting the ellipsis at the visualization's top right corner, select the Sort Axis dropdown, followed by Sum of Order Total. Then select Sort ascending to sort the values in ascending order.
7. Observe the column chart results and note the Product Category with the lowest Order Total value.

Line chart

Remembering the conversation while seated in the executive suite, you overheard the Adventure Works executive team ponder “When did the sales peak? When did they drop?” as their seasonal strategies depend on these insights. Sales figures are meaningless without context, so you decide to take action and create a line chart.

1. Select the Line chart icon in the Visualizations pane.
2. Drag OrderDate from the Sales table into the X-Axis well.
3. Then, drag Order Total and put it in the Y-Axis well.
4. Select and drag the edges of the Line chart visualization on your canvas to resize it, and place it in the middle of the canvas, below the column chart, next to the table visualization.

Step 2: Create KPIs

KPIs offer the executive team a precise performance check into questions like, "Are we hitting our sales goals? How expansive is our customer reach? How are we tracking our goals of being a global player?" These KPIs provide a reality check and inspiration rolled into one.

1. Select the KPI icon in the Visualizations pane.
2. Drag Order Total from the Sales table to the Value field well.
3. Then drag OrderDate from the Sales table to the Trend Axis field well.
4. Repeat steps 1–3, adding two more KPIs:
    - Drag Customer ID from the Customers table to the Value field well and the OrderDate from the Sales table to the Trend Axis.
    - Drag City from the Customers table to the Value field well and the OrderDate from the Sales table to the Trend Axis.

Step 3: Setup forecasting

You know that forecasting is a critical feature in Power BI that enables the prediction of future trends based on historical data. This is especially useful for executives at Adventure Works looking to make data-driven decisions for the future.

1. Upon selecting the line chart visualization you've created, you'll notice different tabs in the Visualizations pane.
2. Select the Analytics tab, represented by a magnifying glass icon.
3. In the Analytics pane, locate the Forecast option and toggle the switch beside it. This will add a forecast line to your chart.
4. Once you've added the forecast, adjust the Seasonality and Confidence interval parameters. Set the Seasonality to 12, as this is useful to account for monthly

seasonality. Adjust the Confidence interval value to 99% to ensure high forecast confidence.
5. Once you've configured the parameters, select Apply.
6. Observe the line chart and note the day of the month with the lowest order total for Q1 in 2023.

Step 4: Configure Q&A

Instead of sifting through several visualizations, you want Adventure Works stakeholders to converse with your data. For the executive team, the Q&A feature could be transformative, allowing them to interact with the data in a conversational manner and generate insights on-the-fly.

1. On the Visualizations pane, locate and select the Q&A icon that looks like a chat bubble.
2. The initial size of the Q&A box may not fit your needs. Select the corners to resize the box and select and drag the title bar to reposition it on the left side of your canvas.
3. Inside the Q&A box, you'll see a text prompt titled Ask a question about your data. Select inside this box, type the following queries, and note down the results:
    - Which Customer City has the lowest average Order Total?
    - Which Product Category has the highest average Order Quantity?
    - Which Product Subcategory has the highest Product Weight?

Conclusion

You have now not only unraveled the complexity of sales and customer data, but you've empowered the executive decision-makers at Adventure Works with the tools they need to ask the right questions at the right time to make the right decisions. This is not just about visualizing data—it's about turning raw numbers into a meaningful story that everyone in the room can understand and act upon. Remember, in today's world, data is not just an asset – it's the language of business, the currency of the digital age. When used correctly, it has the power not just to reflect the state of a business but to transform it!

Exemplar: Adventure Works executive summary

Introduction

In the exercise, *Adventure Works executive summary*, you were entrusted with the significant responsibility of transforming the sales and customer data of Adventure Works into a series of compelling, actionable Microsoft Power BI visuals. The exercise aimed to provide the company's executive team with insightful and targeted information that could drive strategic decision-making at the highest level.

More specifically, you were asked to:

- Create a variety of visualizations, including a table, column chart, line chart, and Key Performance Indicators (KPIs), to represent complex sales and customer data in a digestible format.
- Customize these visuals by setting specific colors and adding tooltips, enhancing the user experience and accessibility of the data.
- Implement forecasting functionalities on the line chart, empowering the executives to anticipate future sales trends and take proactive measures.
- Integrate a Q&A visual into the report, enabling the executive team to query the data directly and receive timely insights.

This reading will provide you with an exemplar guide against which you can compare your solution, evaluate your approach, and hone your data analysis and visualization skills even further.

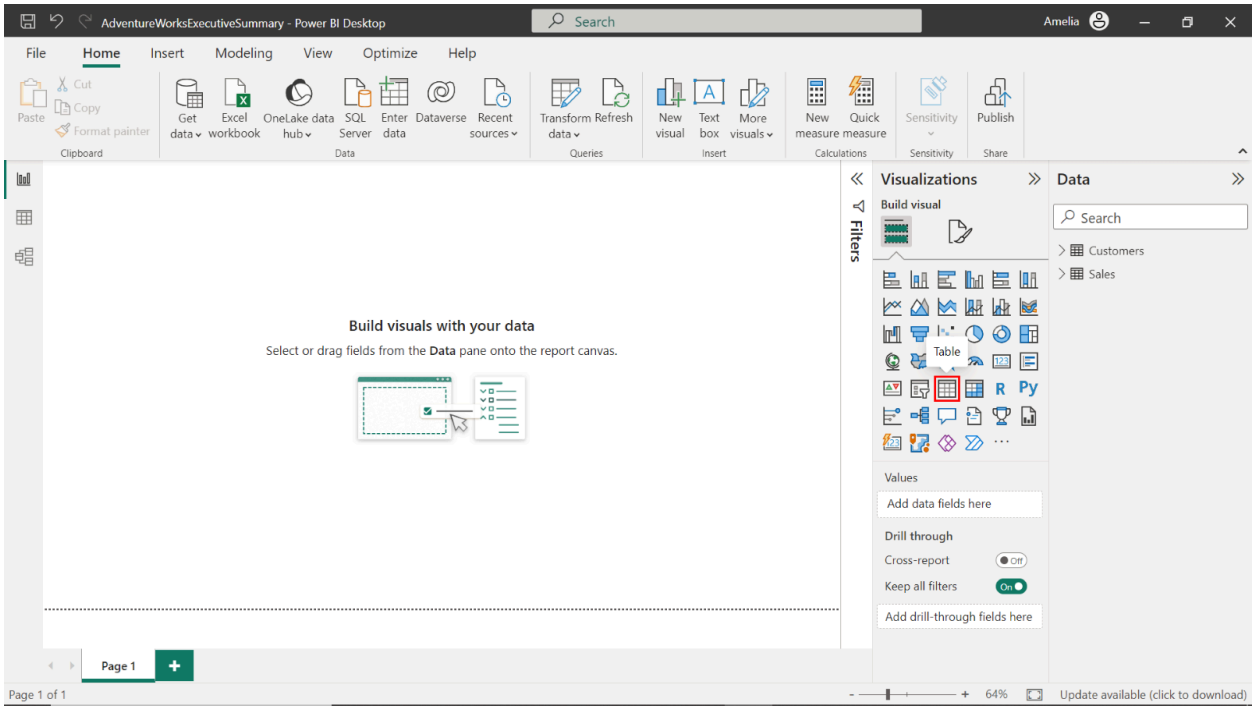
Exemplar: Adventure Works executive summary

Step 1: Create core visualizations

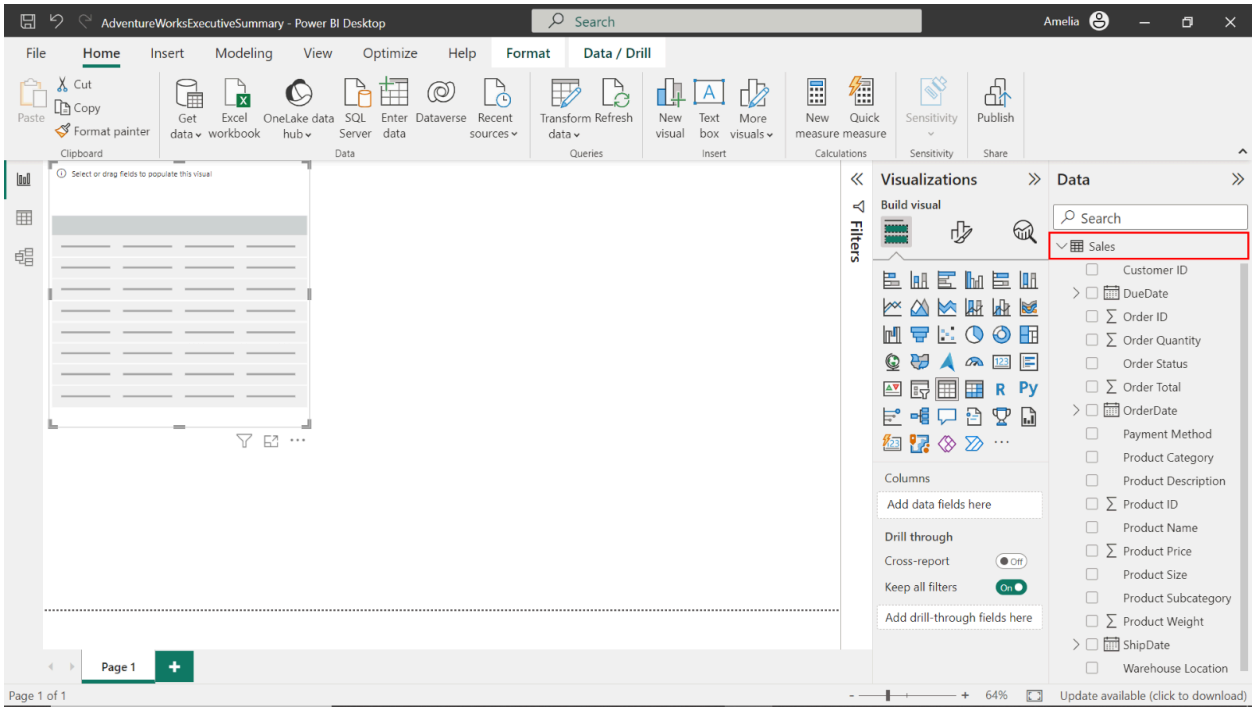
Table visualization

In a bustling company like Adventure Works, it's easy to get lost in the noise of numerous SKUs, fluctuating sales, and changing order statuses. First, create a table visualization that will serve as a quick reference, telling the executive team what products are selling and where it’s at in the delivery pipeline.

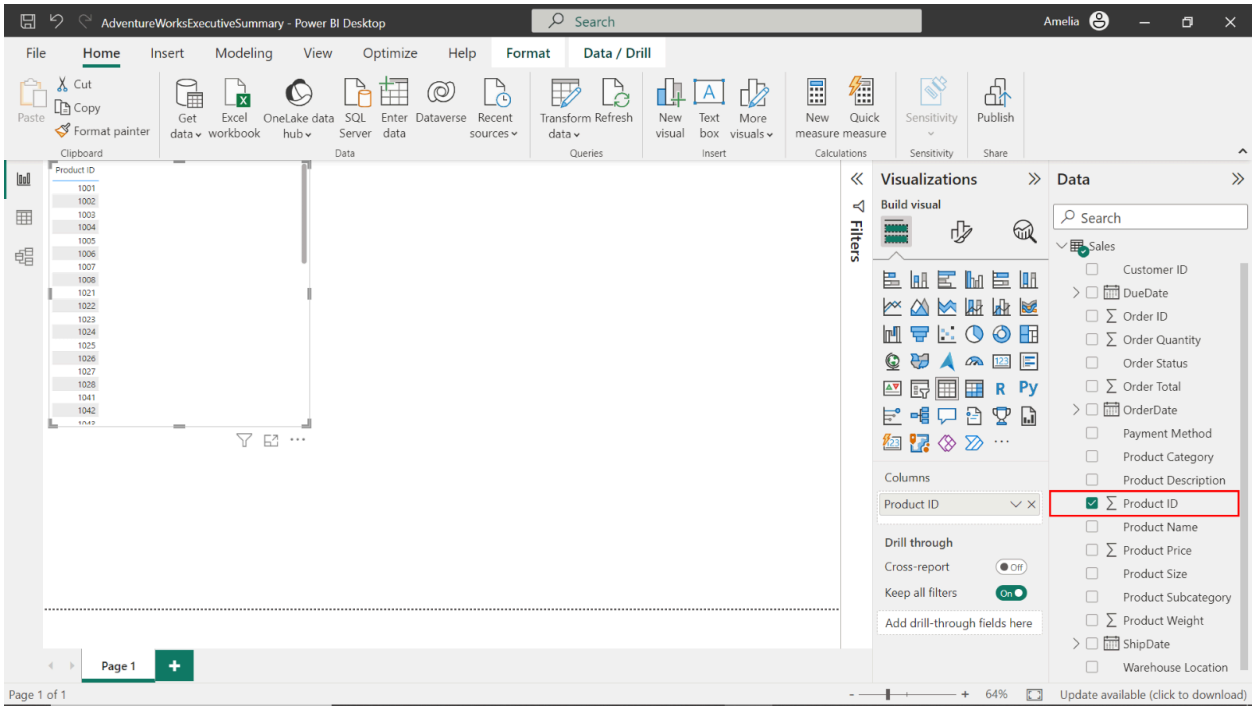
1. Start by going to the blank canvas and locate the Visualizations pane on the right-hand side of your screen. Select the Table icon (it appears as a small grid) to create an empty table visualization on the canvas.



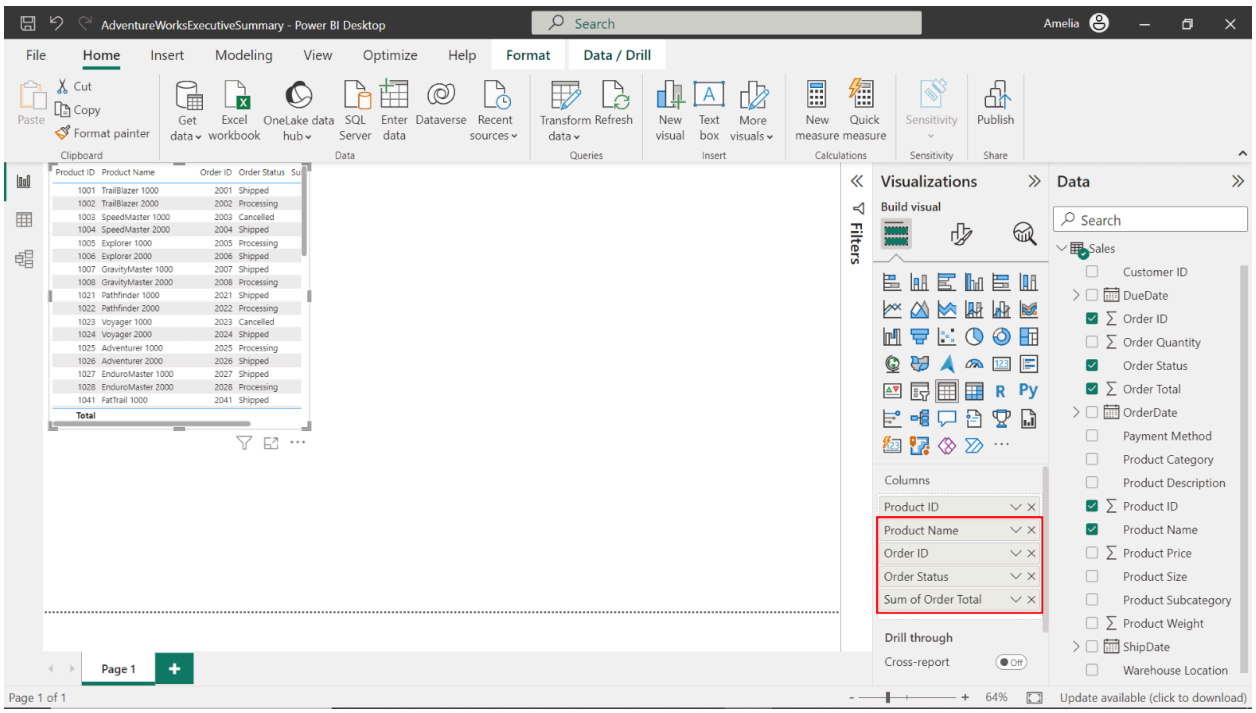
1. Find the Data pane on the right-hand side of the screen. Locate your Sales and Customers tables there. Select the Sales table to expand it and view its fields.



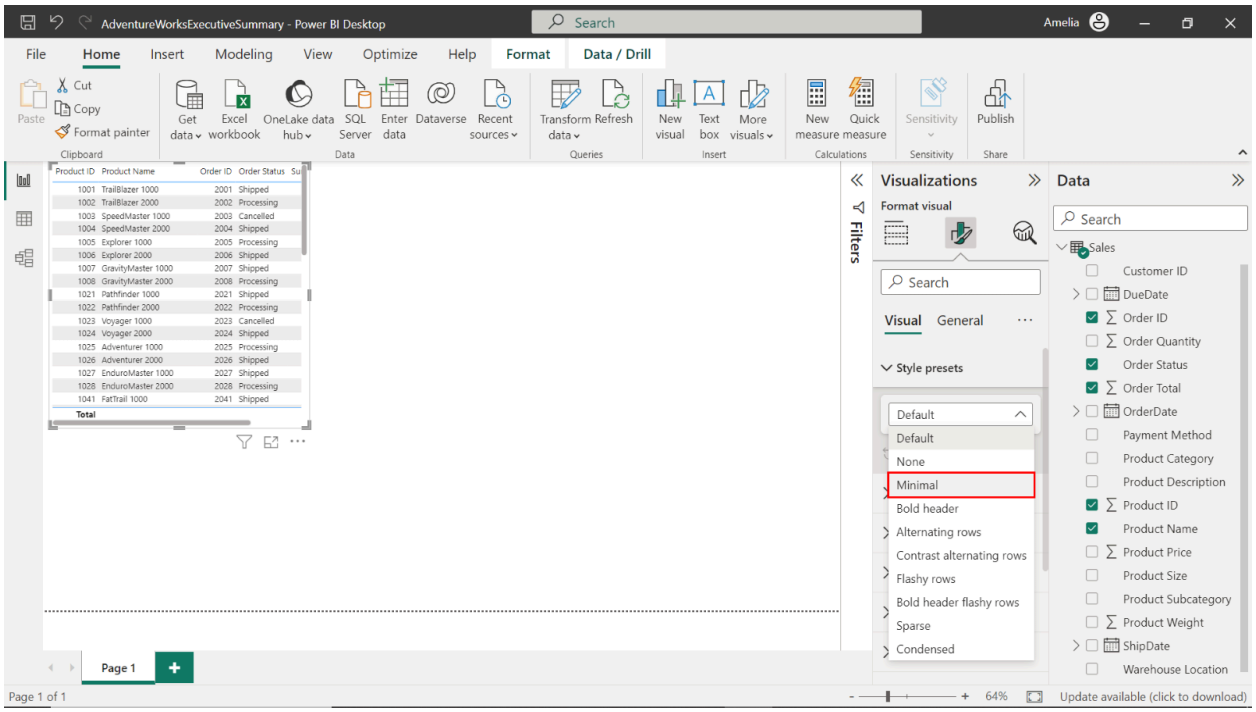
1. Drag Product ID from the Data pane to the Columns well in the Visualizations pane.



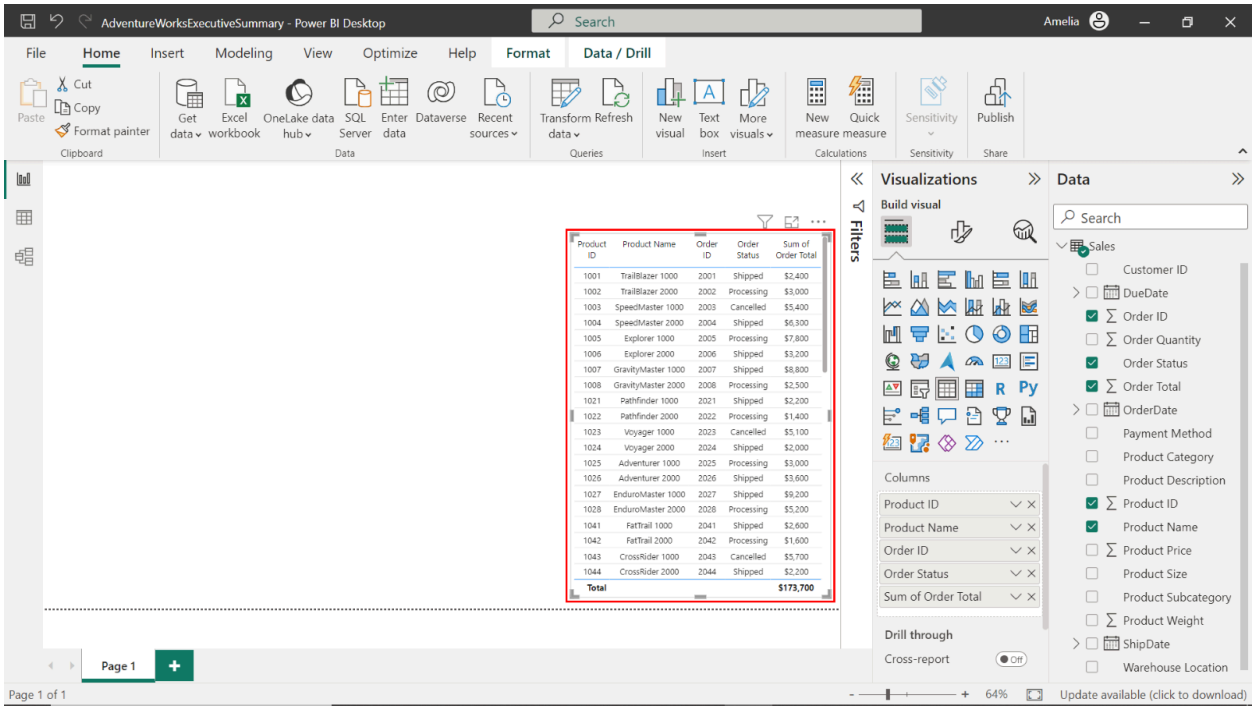
1. Next, drag Product Name, Order ID, Order Status, and Order Total into the same Columns well.



1. To format this table visual and change its appearance, select the Format tab. Expand the Style presets option and select the Minimal preset from the available dropdown.



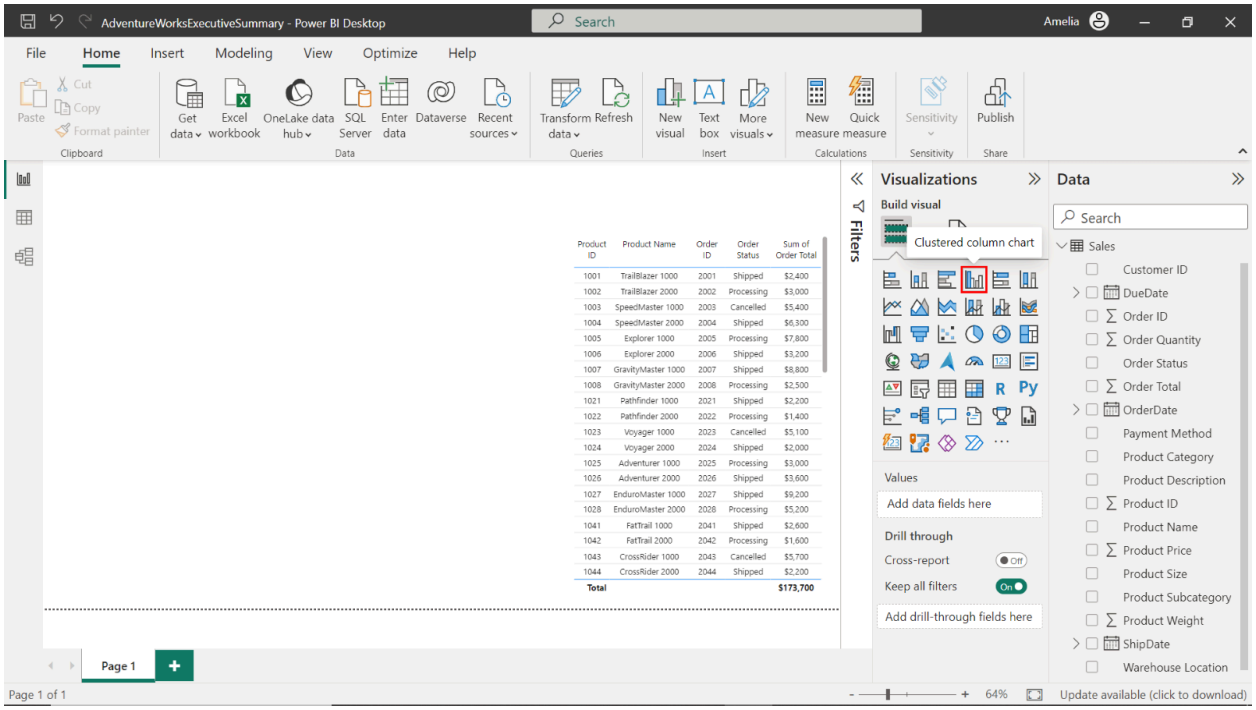
1. You will notice that your table is a bit small or not well-positioned. Select the edges of the table visualization box on your canvas to resize it and place the visualization on the right side of the canvas.



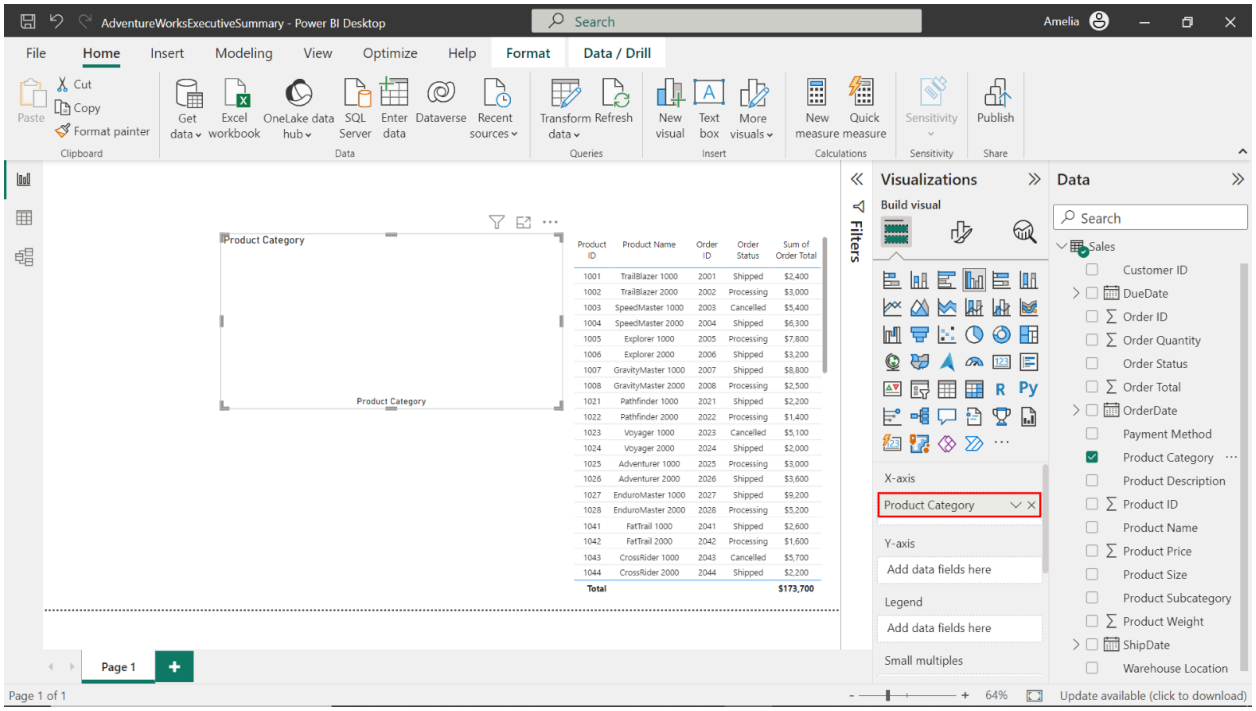
Column chart

It's not enough to know what sold; it's crucial to know what's selling dominantly and what's not leaving the warehouse. A column chart instantly shows which product categories at Adventure Works are revenue generators and which need a strategic revisit.

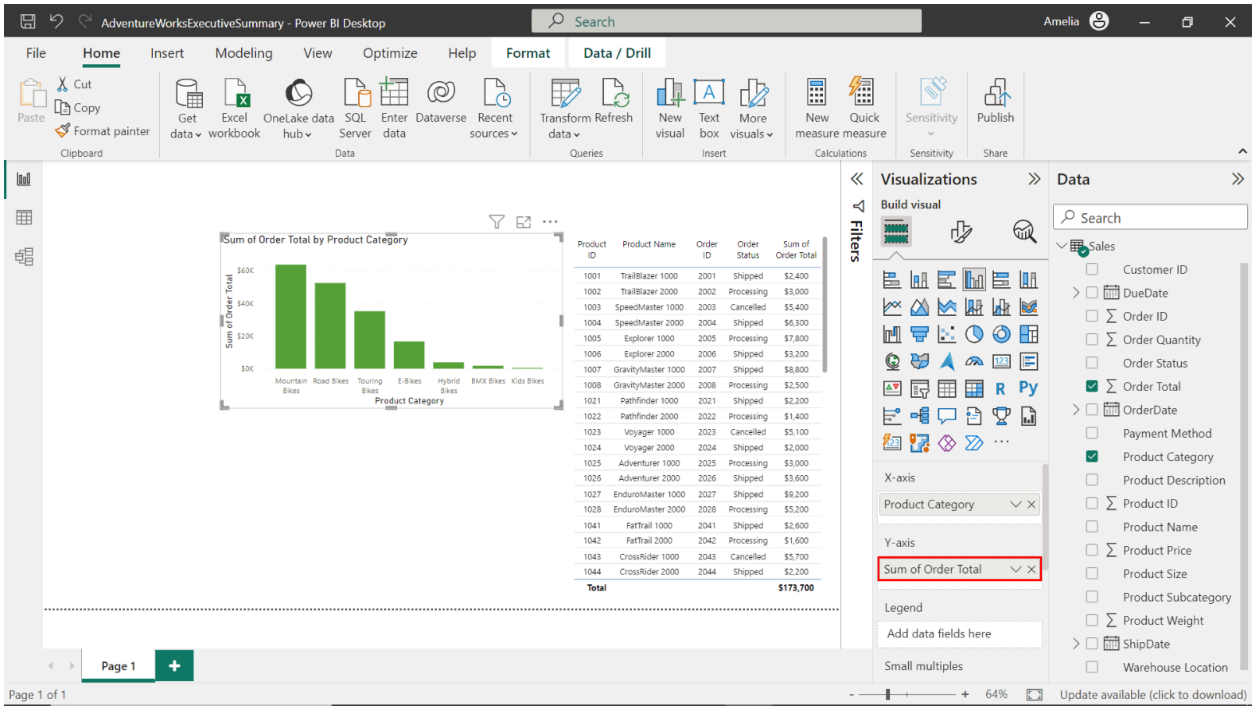
1. Select the white space of your canvas to deselect the table visualization. Then, select the Clustered Column chart icon in the Visualizations pane. An empty column chart will appear on the canvas.



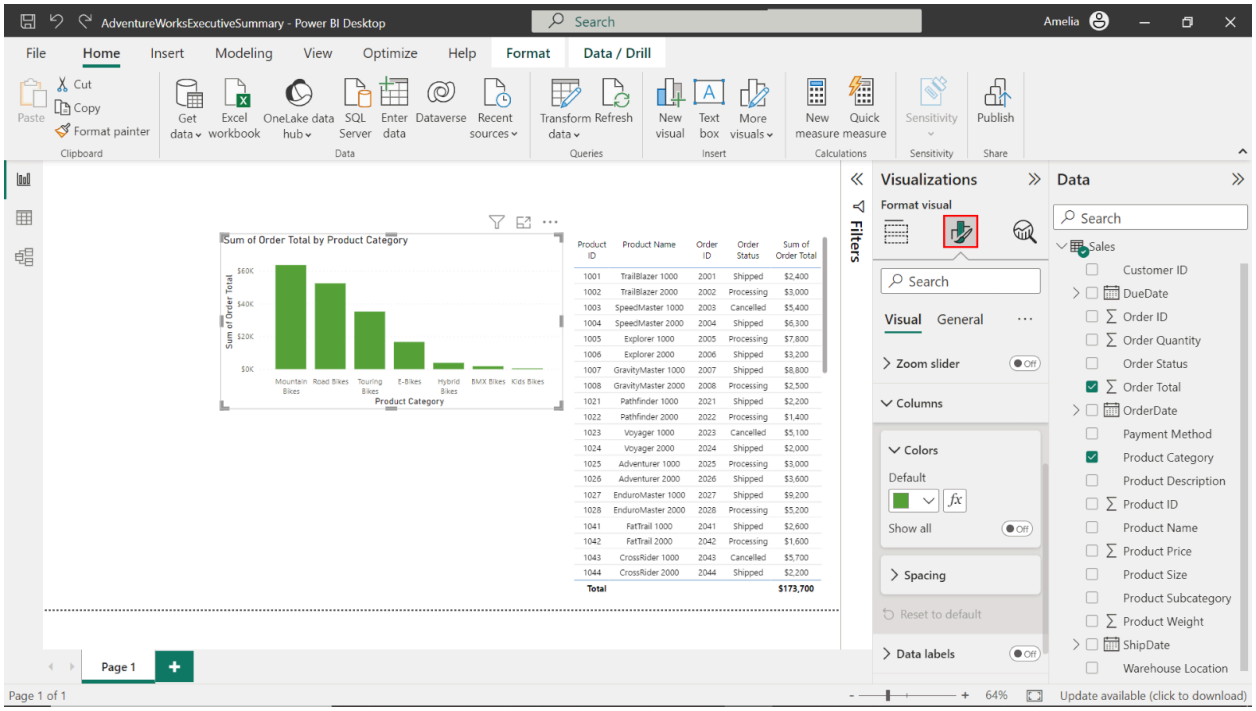
1. Drag Product Category from the Sales table and drop it into the X-Axis well.

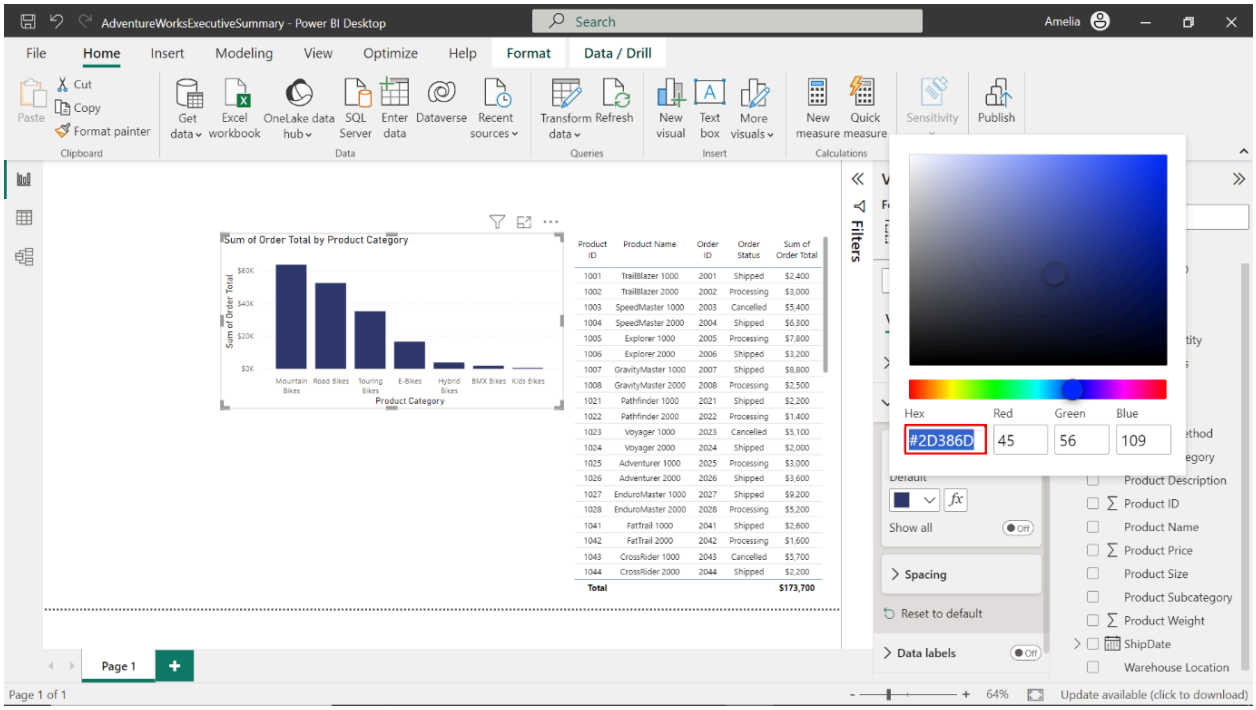


1. Now, drag Order Total from the same Sales table and drop it into the Y-Axis well.

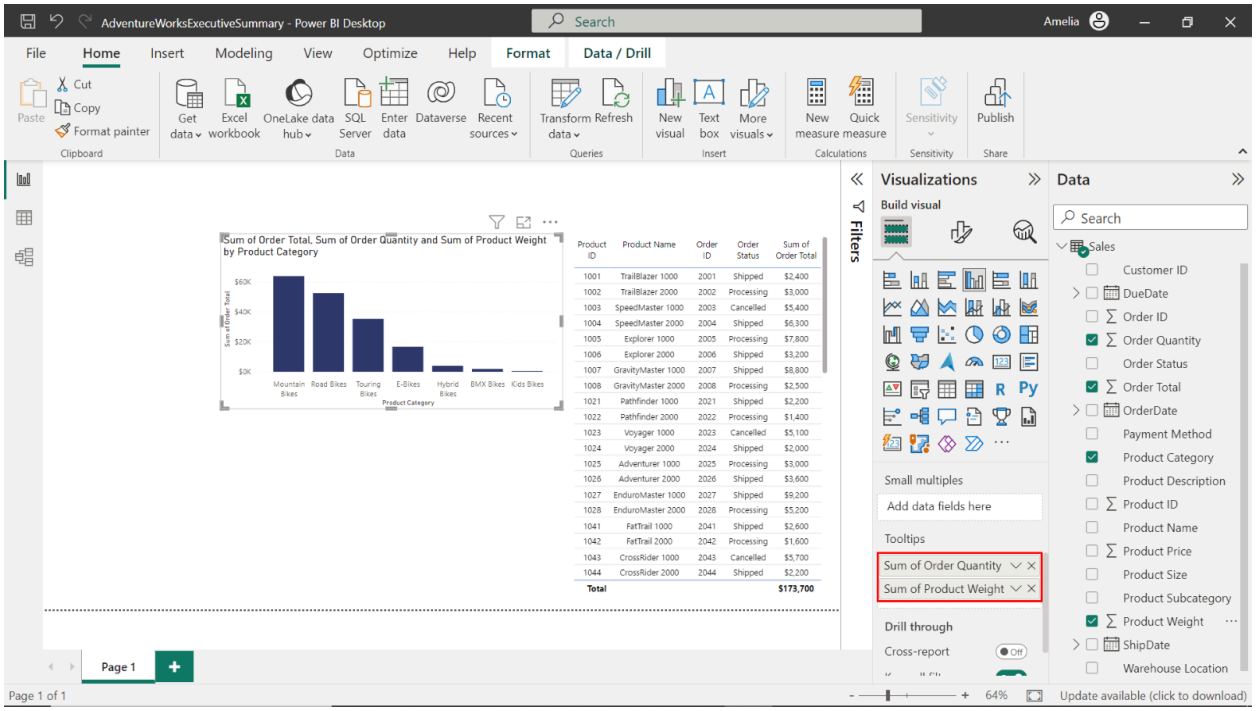


1. To format this column chart and change its appearance, select the Format tab. In the Format tab, locate the Columns > Colors option. Here, input Dark Blue: #2D386D for a unified look.

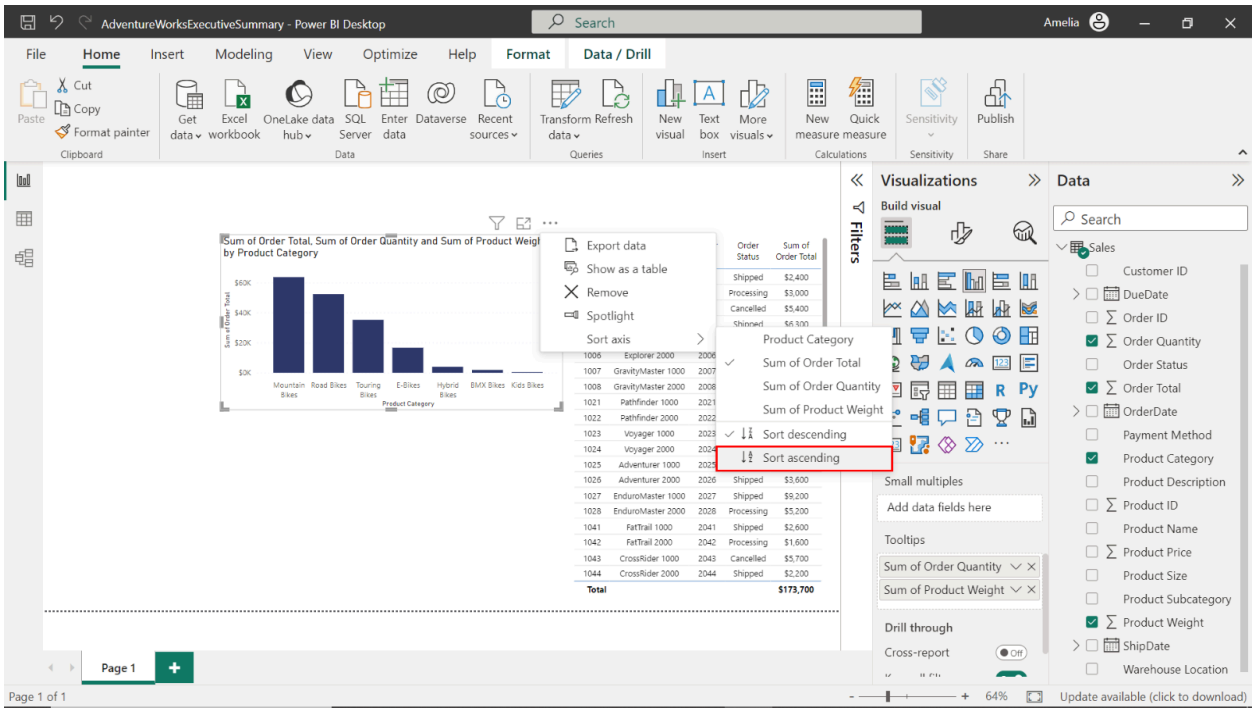




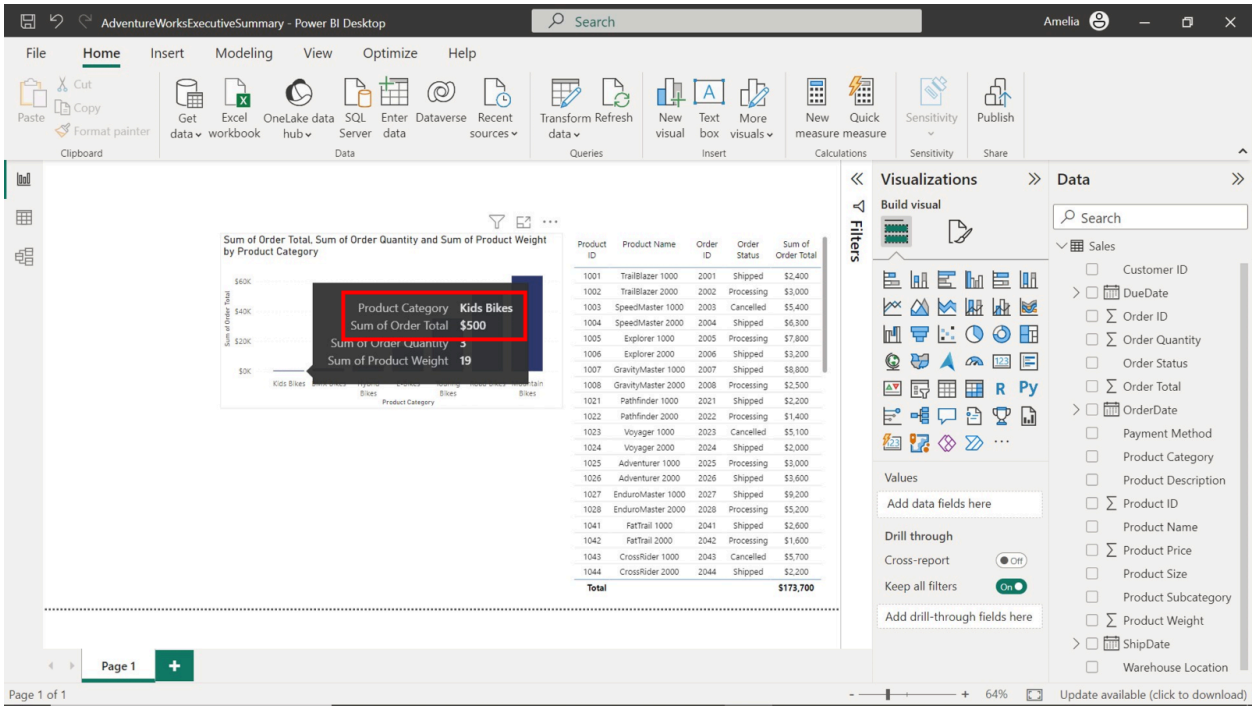
1. Drag Order Quantity and Product Weight fields from the Sales table into the Tooltips field well.



1. Upon selecting the ellipsis at the visualization's top right corner, select the Sort axis dropdown, followed by Sum of Order Total. Then select Sort ascending to sort the values in ascending order.



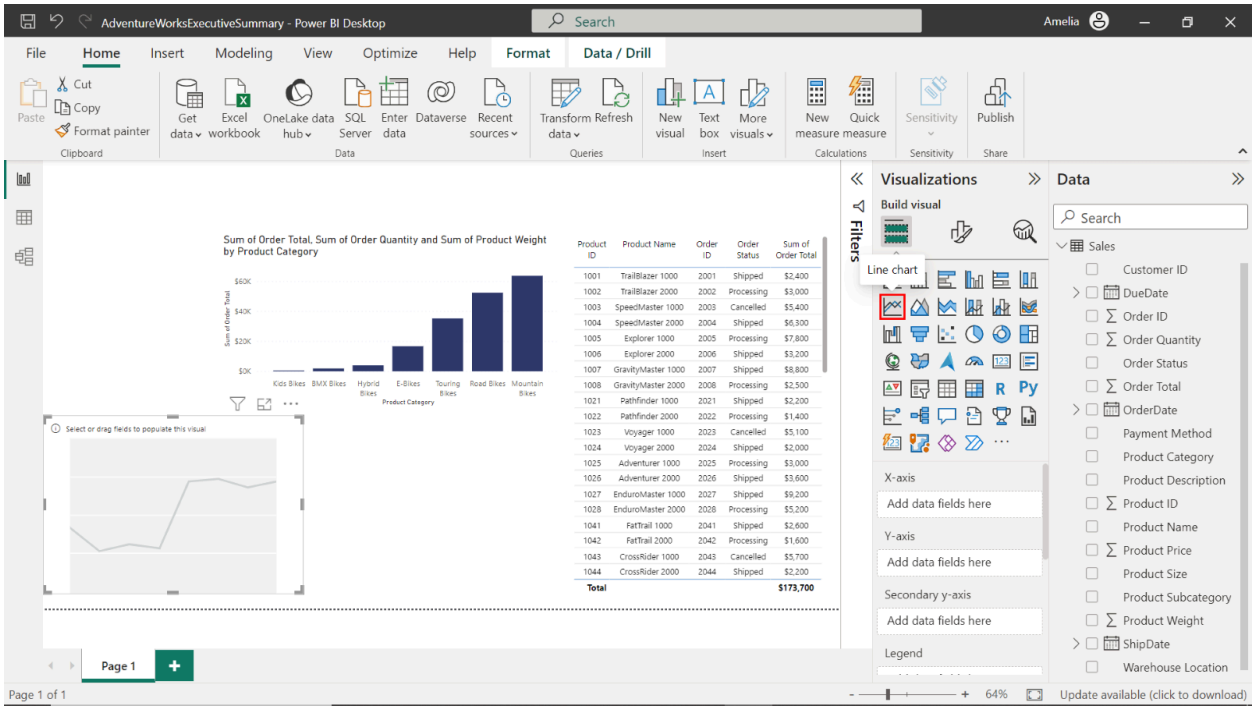
1. Observe the column chart results and note the Product Category with the lowest Order Total value. The Order Total for Kids Bikes is $500, making it the product category with the lowest overall sales.



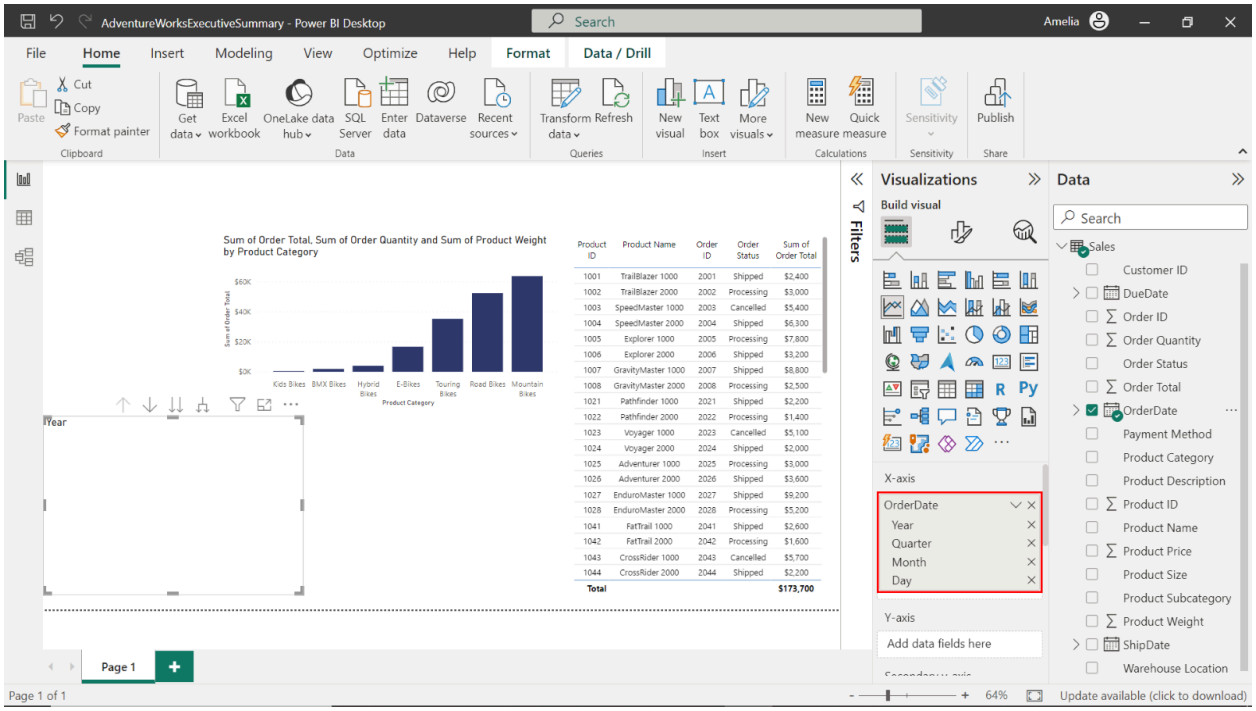
Line chart

Remembering the conversation while seated in the executive suite, you overheard the Adventure Works executive team ponder "When did the sales peak? When did they drop?" as their seasonal strategies depend on these insights. Sales figures are meaningless without context, so you decide to take action and create a line chart.

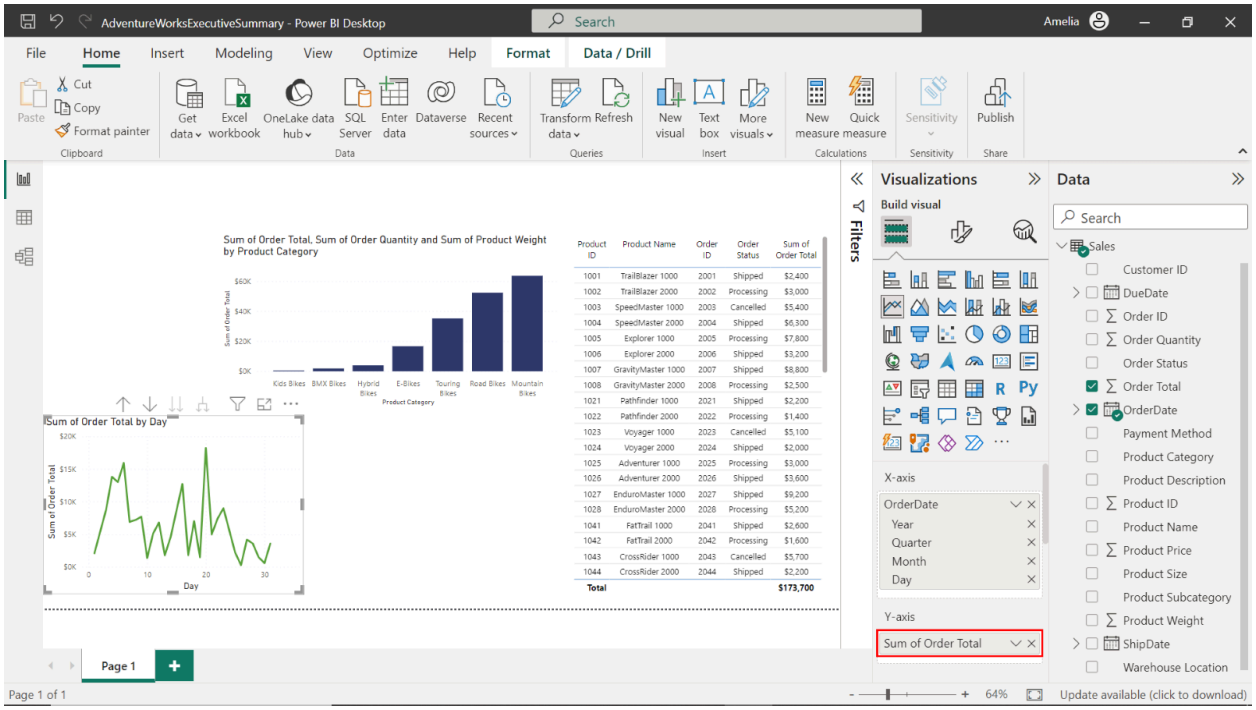
1. Select the canvas's empty space to deselect the column chart. Now, select the Line chart icon in the Visualizations pane. An empty line chart will appear on the canvas.



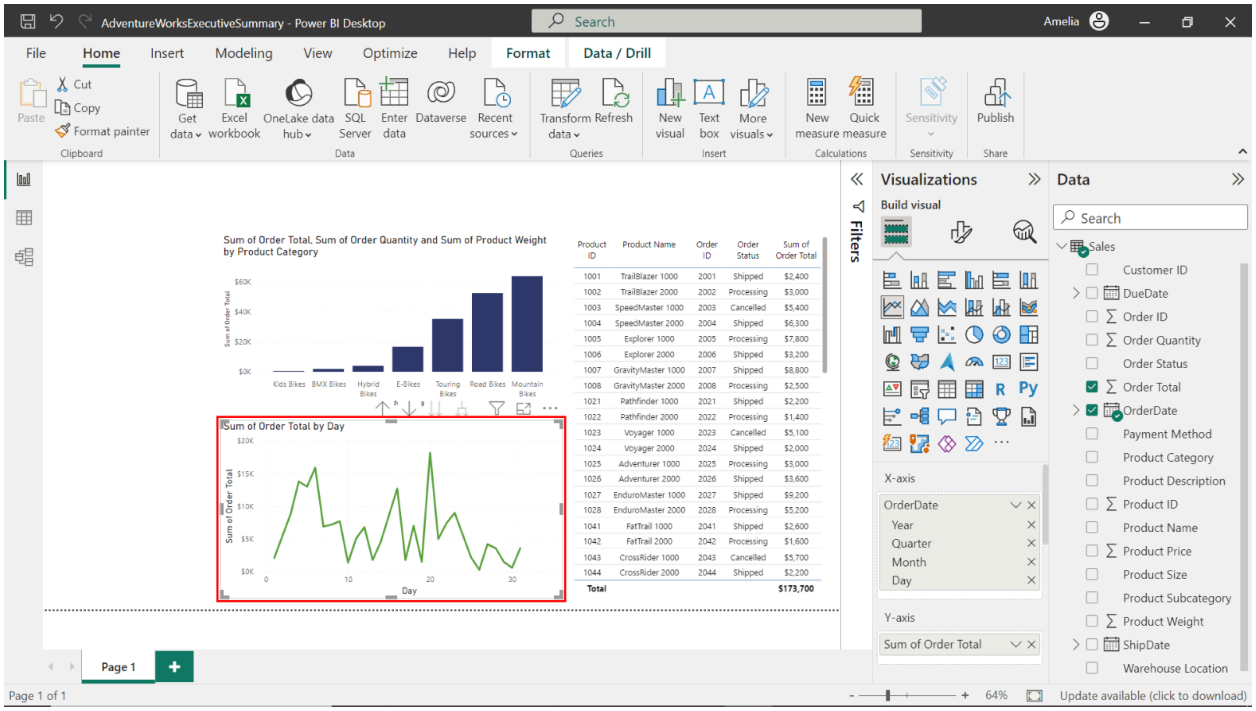
1. Drag OrderDate from the Sales table into the X-Axis well.



1. Then, drag Order Total and put it in the Y-Axis well.



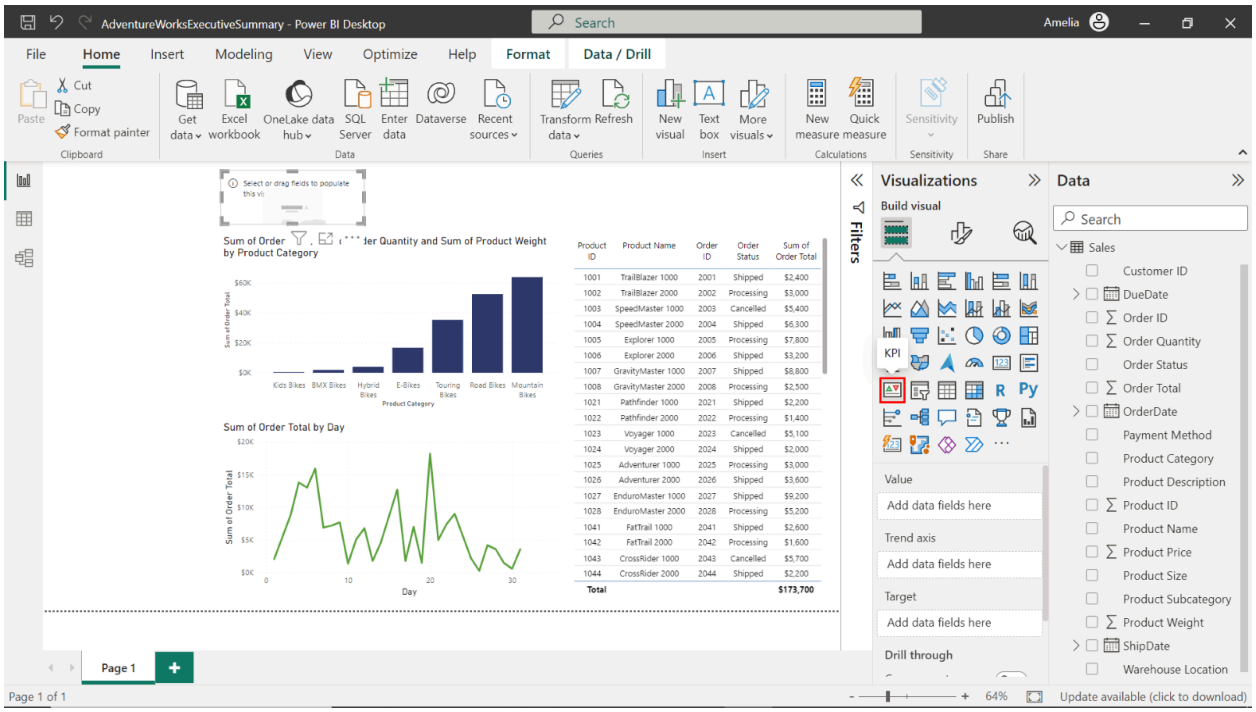
1. You will notice the OrderDate appearing too cramped. To fix this, select the edges of the Line chart visualization box on your canvas to resize it, and place it in the middle of the canvas, below the column chart, next to the table visualization.



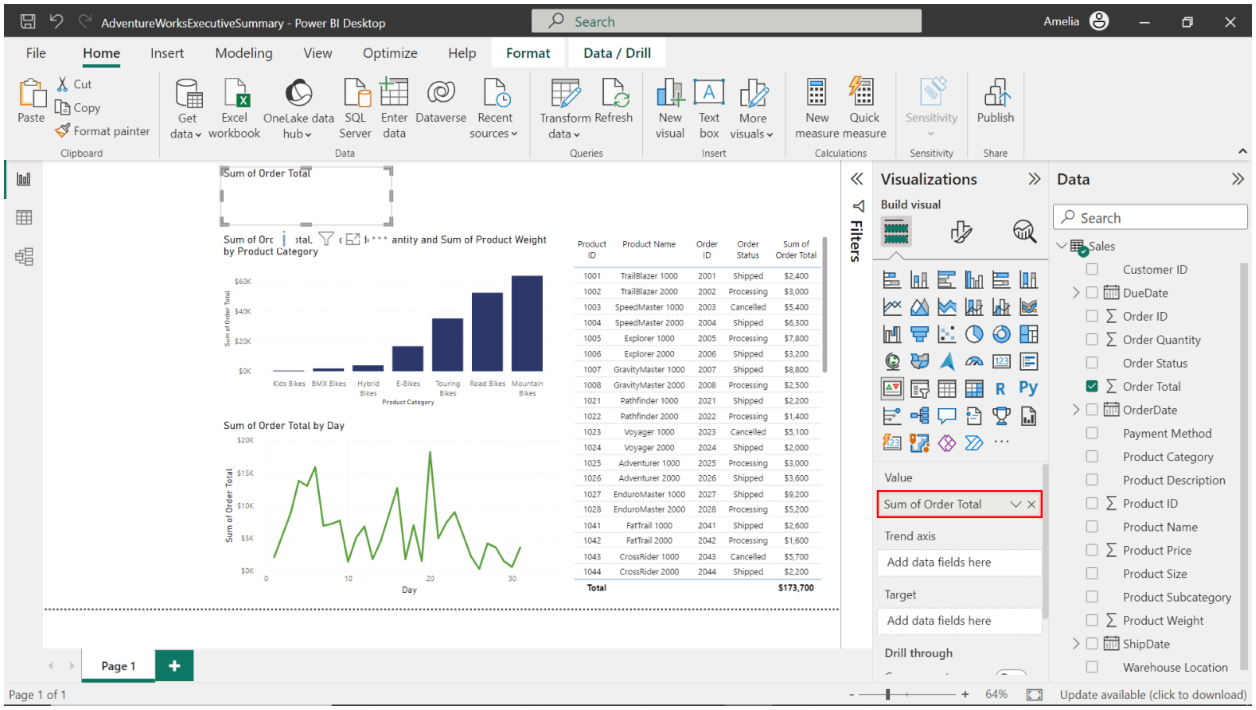
Step 2: Create KPIs

KPIs offer the executive team a precise performance check into questions like "Are we hitting our sales goals? How expansive is our customer reach? How are we tracking our goals of being a global player?" These KPIs provide reality check and inspiration rolled into one.

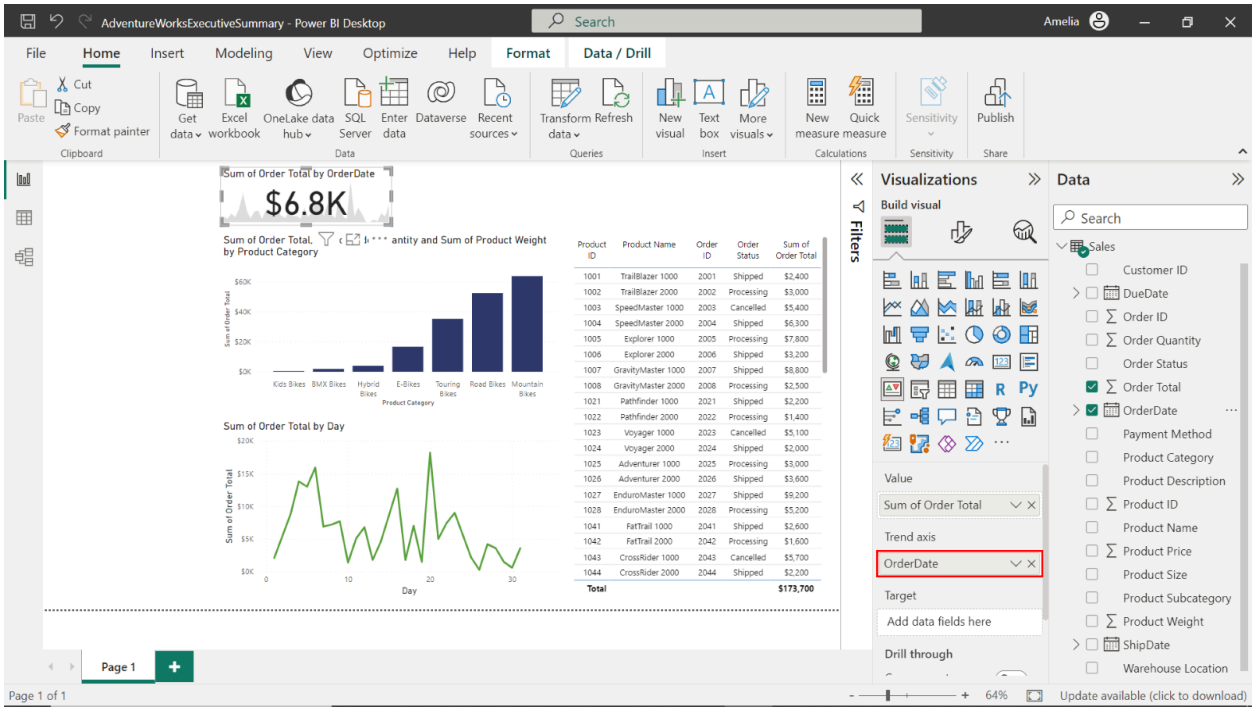
1. Ensuring that nothing is selected on the canvas, select the KPI icon in the Visualizations pane. An empty KPI chart will appear on the canvas.



1. Drag Order Total from the Sales table to the Value field well.

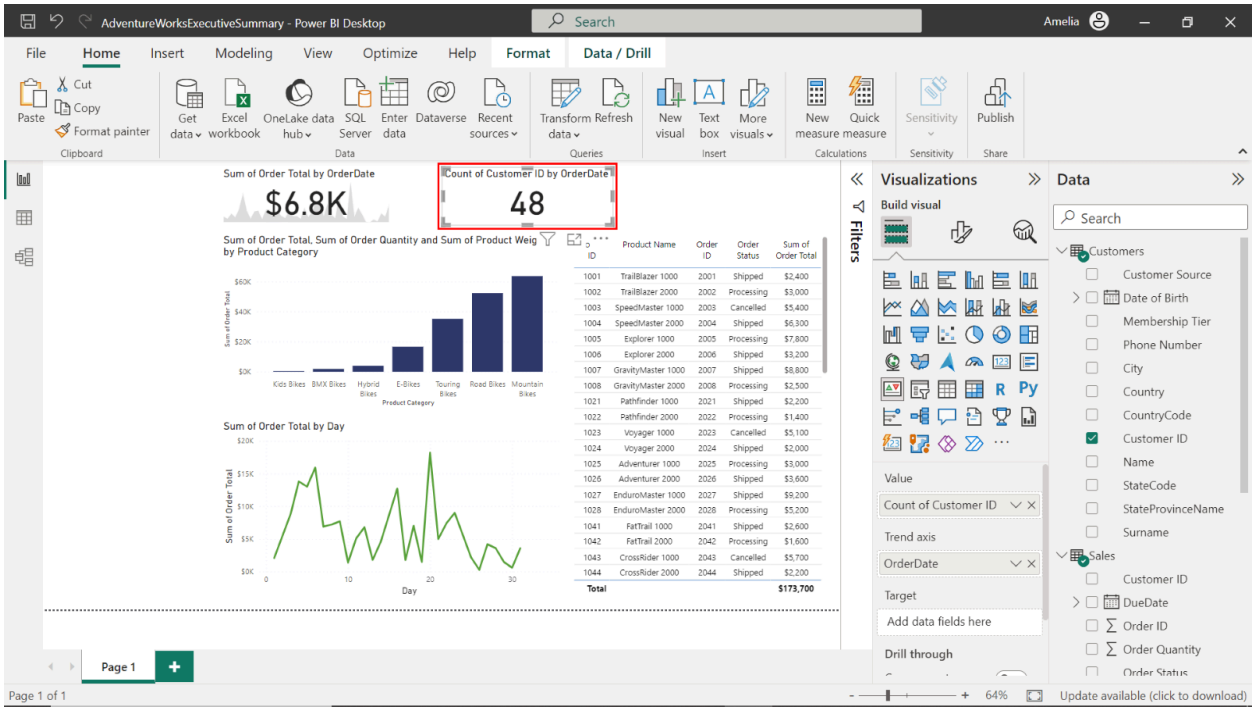


1. Then drag OrderDate from the Sales table to the Trend Axis field well.

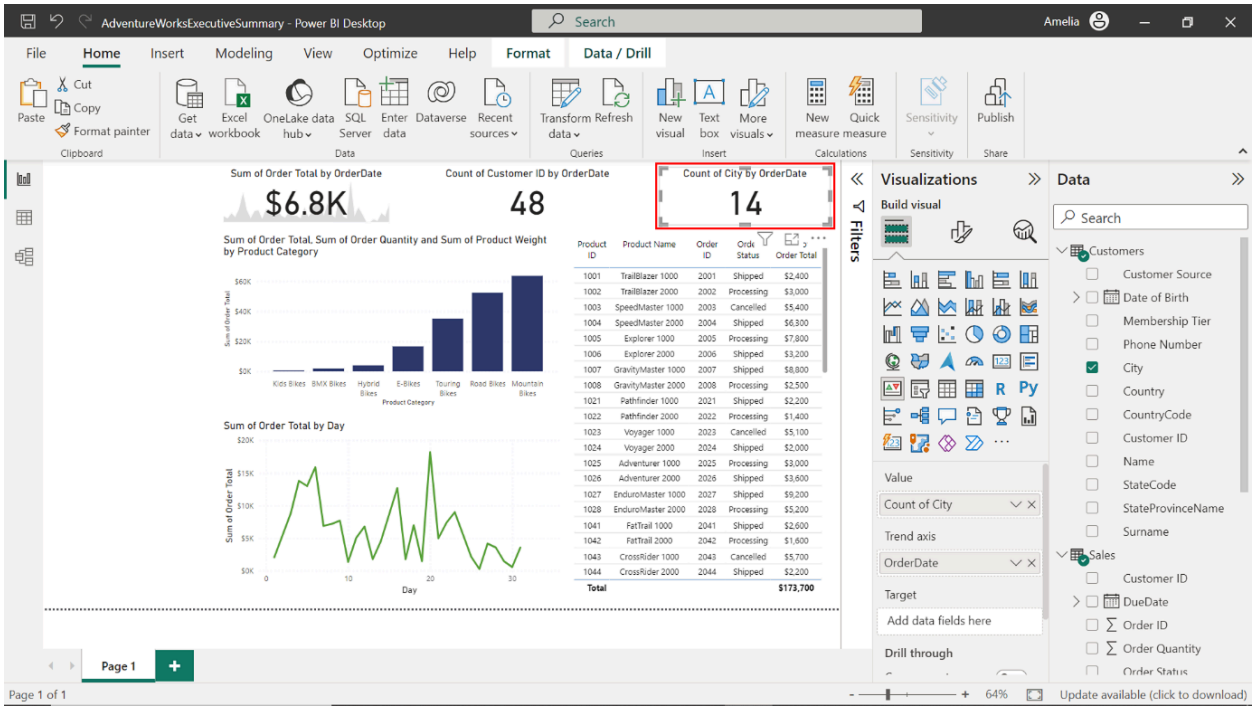


1. Repeat steps 1 – 3, adding two more KPIs:
    - Drag Customer ID from the Customers table to the Indicator field well and the OrderDate from the Sales table to the Trend Axis. This will count the

number of unique customers that have made a purchase with Adventure Works.



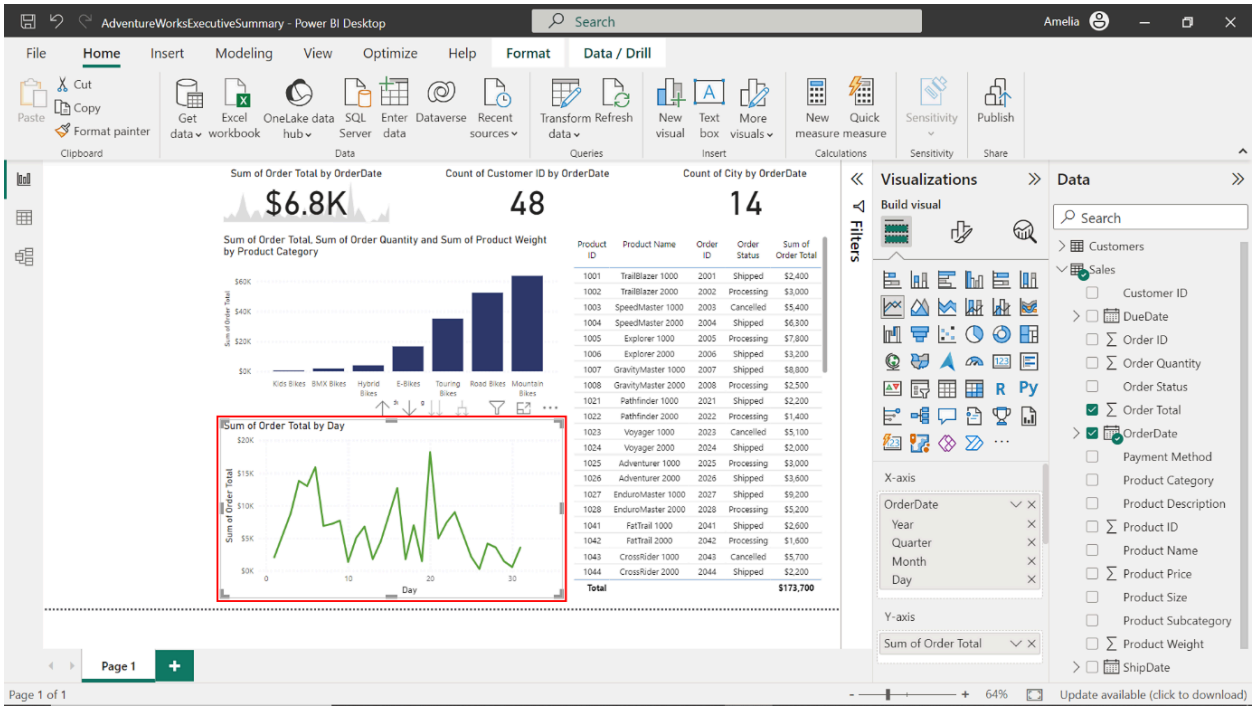
- Drag City from the Customers table to the Indicator field well and the OrderDate from the Sales table to the Trend Axis. This will count the number of unique countries that Adventure Works customers are located in.



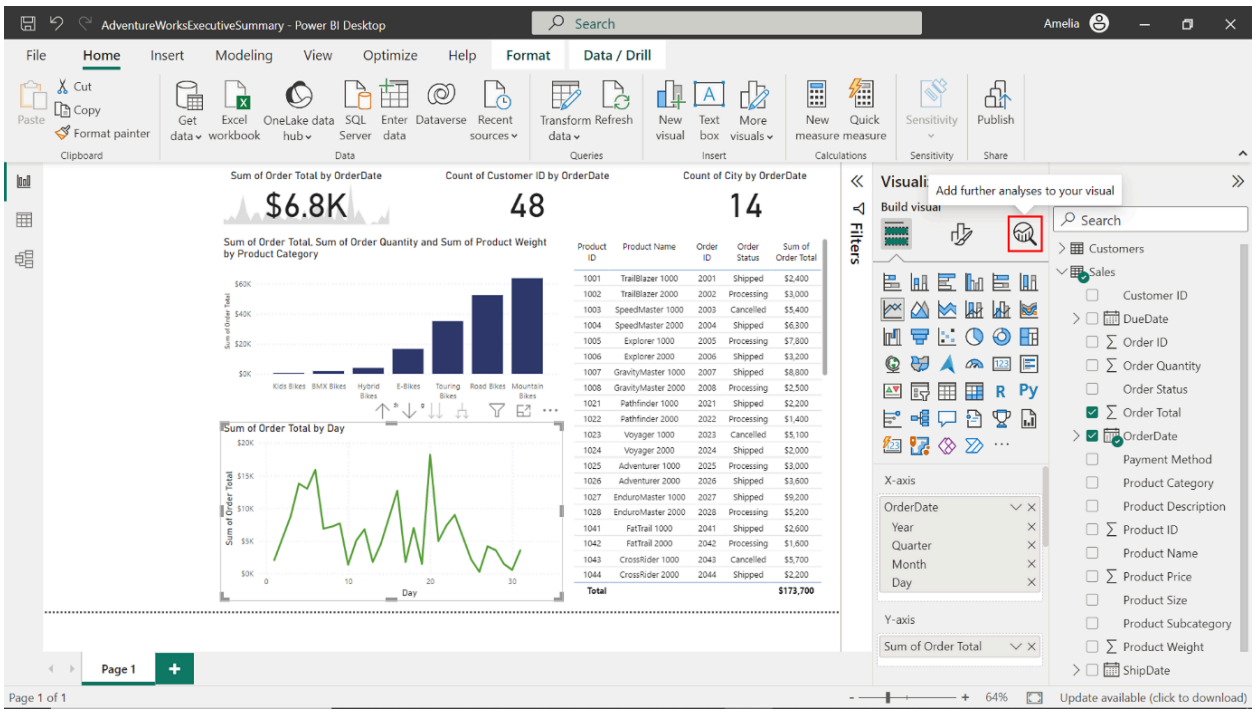
Step 3: Setup forecasting

You know that forecasting is a critical feature in Power BI that enables the prediction of future trends based on historical data. This is especially useful for executives at Adventure Works who are looking to make data-driven decisions for the future.

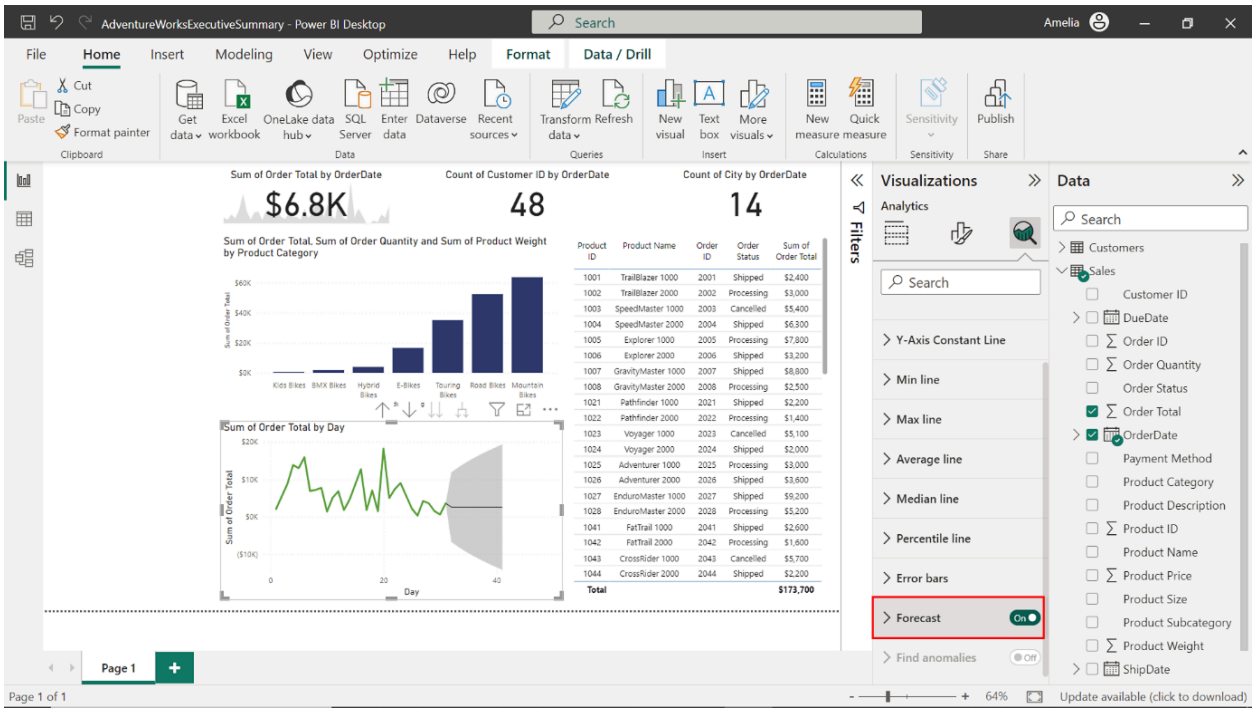
1. The first step is to select the line chart visualization you've created. This will bring up the related options in the Visualizations pane on the right-hand side of your Power BI workspace.



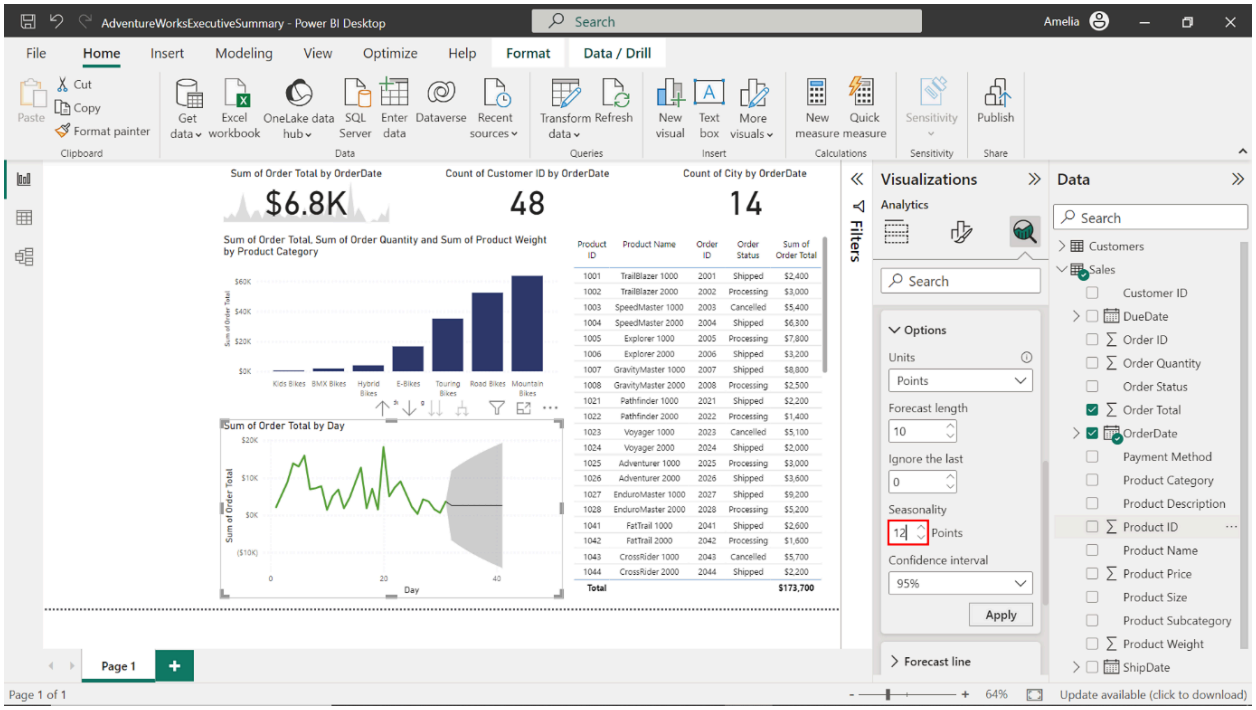
1. You'll notice different tabs in the Visualizations pane, namely Fields, Format, and Analytics. Select the Analytics tab, represented by a magnifying glass icon.



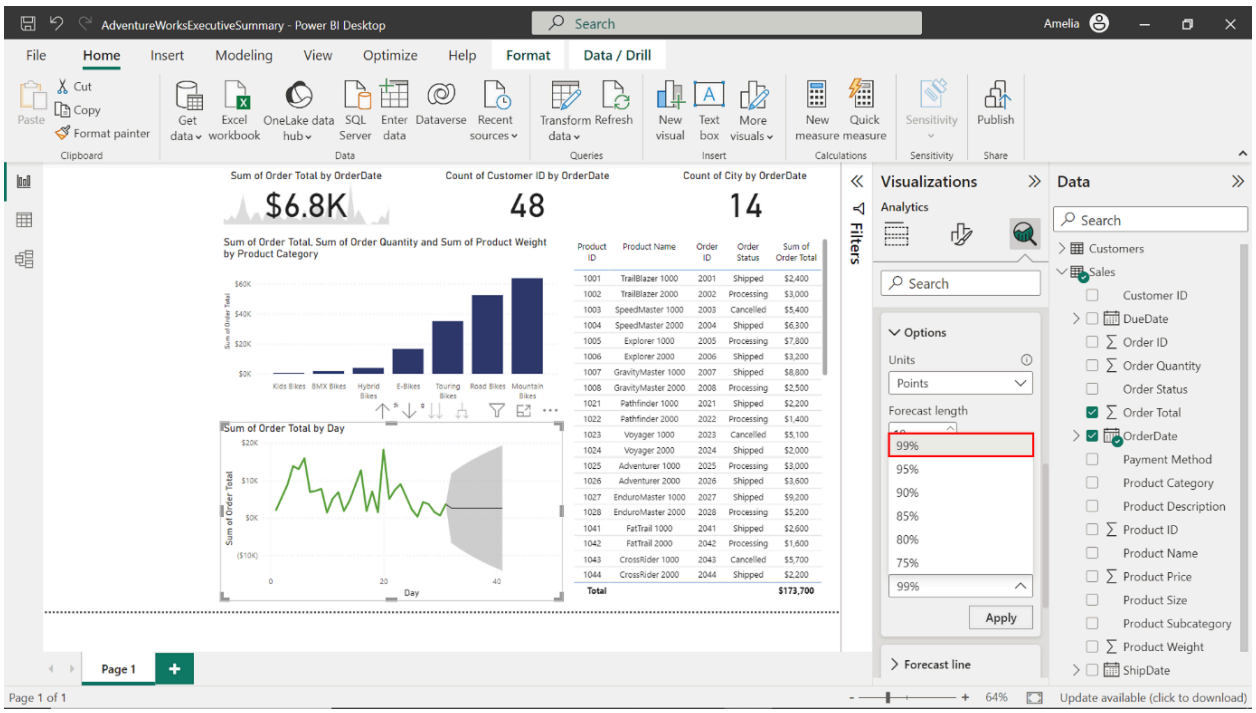
1. There are a variety of options for adding analytical information to your chart in the Analytics pane. Locate the Forecast option and toggle the switch beside it. This will add a forecast line to your chart.



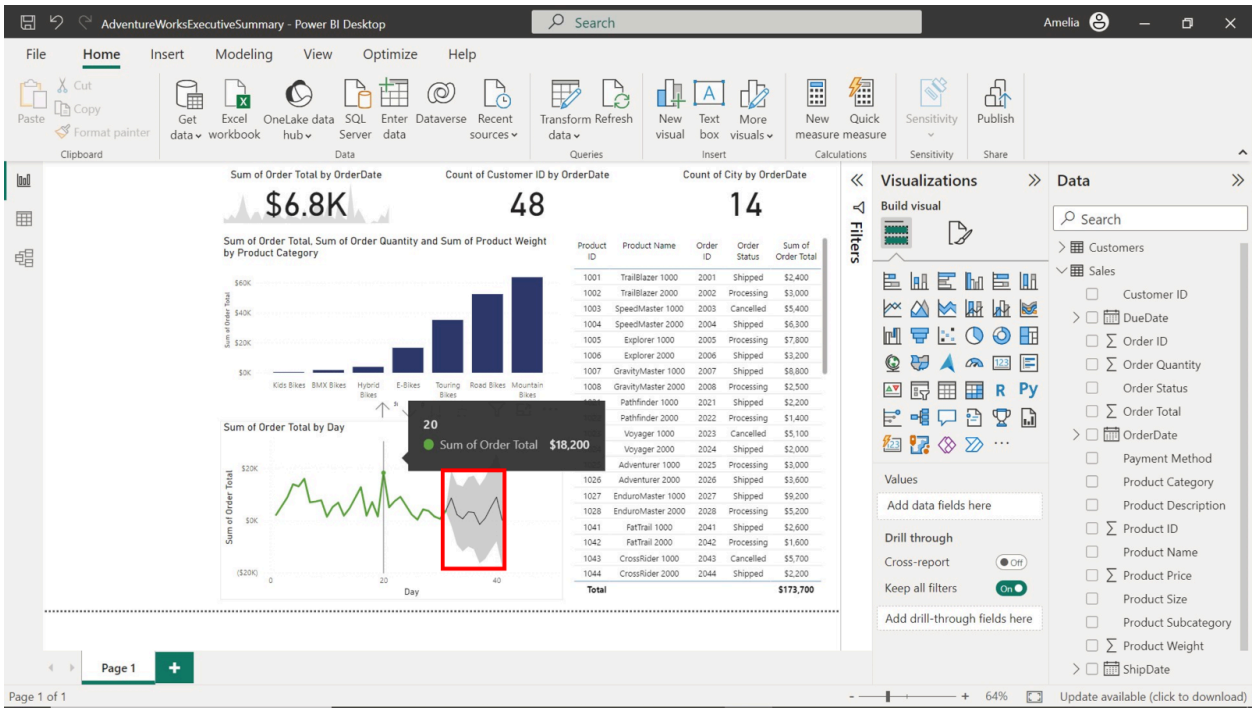
1. Once you've added the forecast, you need to adjust several parameters, such as Seasonality and Confidence interval.
    - Seasonality: This is useful if your data has a repeating pattern. For the Adventure Works sales dataset, setting this to 12 is useful to account for monthly seasonality.



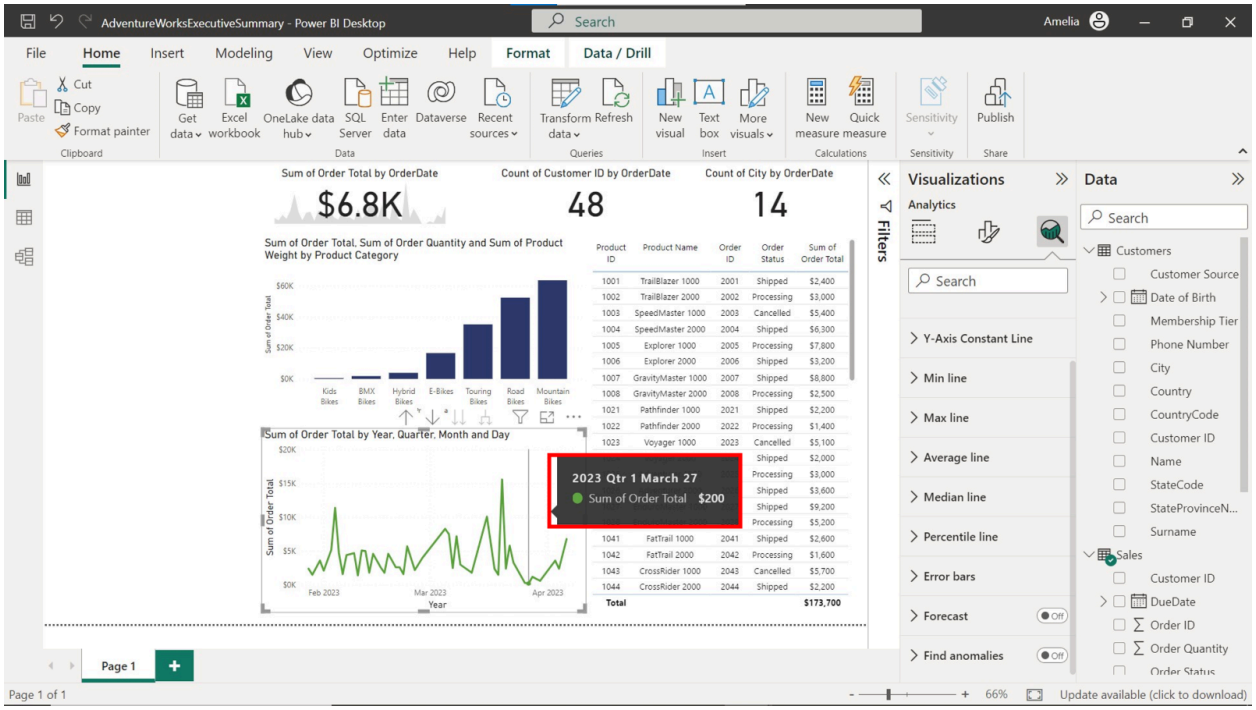
- Confidence interval: This is usually set at 95% by default, however you want to ensure the forecast is as confident as possible. Adjust the value to 99%.



1. Once you've configured the parameters, select Apply to apply the changes. A forecasted line will appear on your line chart, in a different color with shading to indicate the confidence intervals.



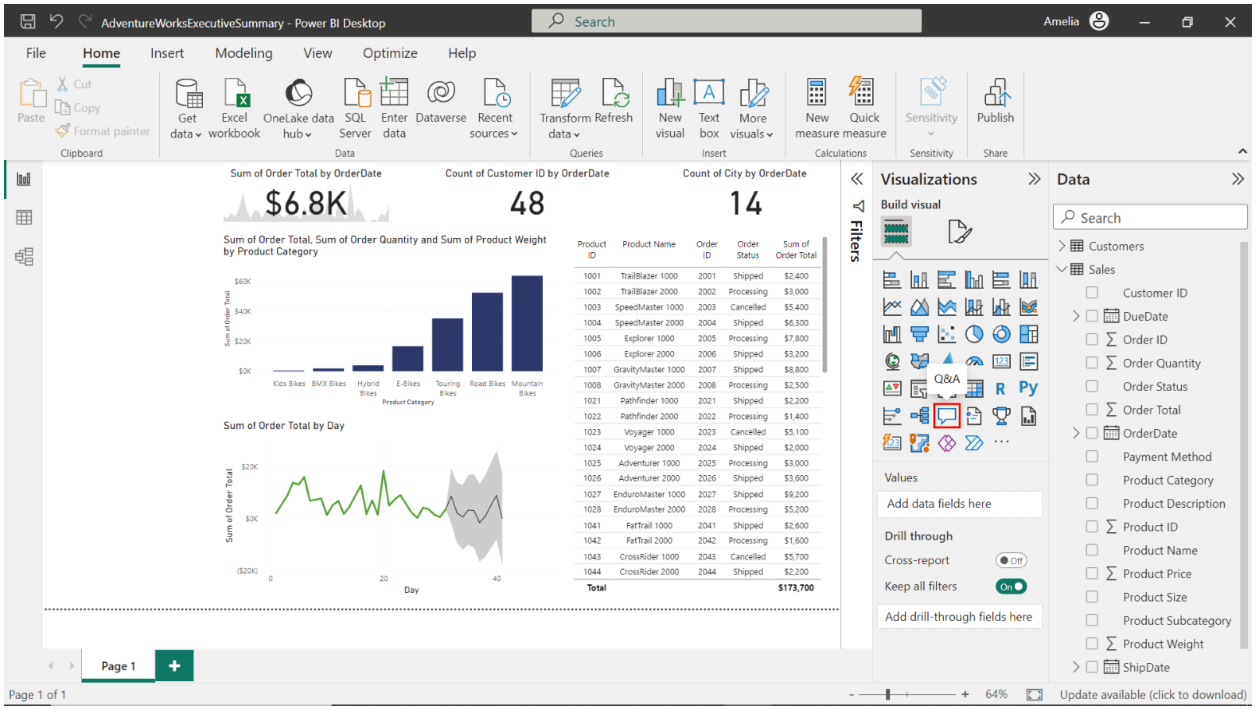
1. Observe the line chart and take note of day of the month with the lowest order total for Q1 in 2023. Your analysis shows that the Order Total for March 27th is $200, making it the day with the lowest sales.



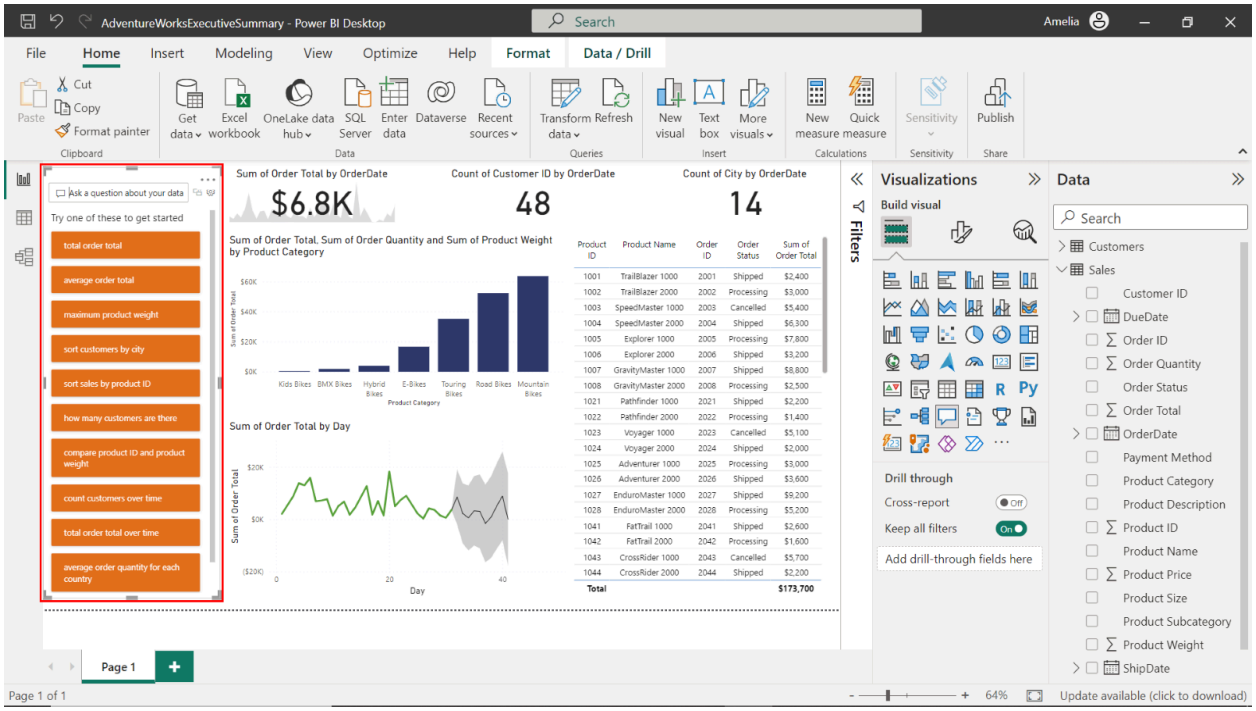
Step 4: Configure Q&A

Instead of sifting through several visualizations, you want Adventure Works stakeholders to have a conversation with your data. For the executive team, the Q&A feature could be transformative, allowing them to interact with the data in a conversational manner and generate insights on-the-fly.

1. On the right-hand side of the Power BI Desktop in the Visualizations pane, locate and select the Q&A icon that looks like a chat bubble.

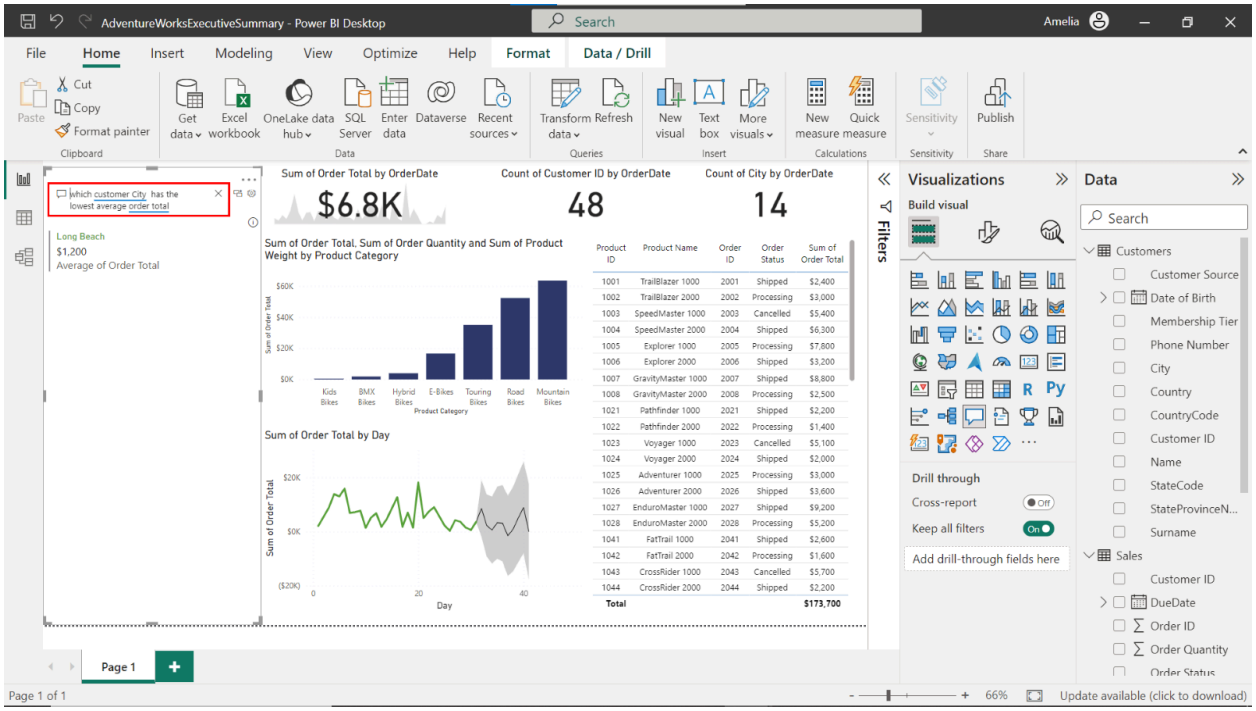


1. Upon selecting the Q&A icon, a Q&A visual will appear on the canvas. The initial size of the Q&A box may not fit your needs. Select and drag the corners to resize the box and select and drag the title bar to reposition it on the left side of your canvas.

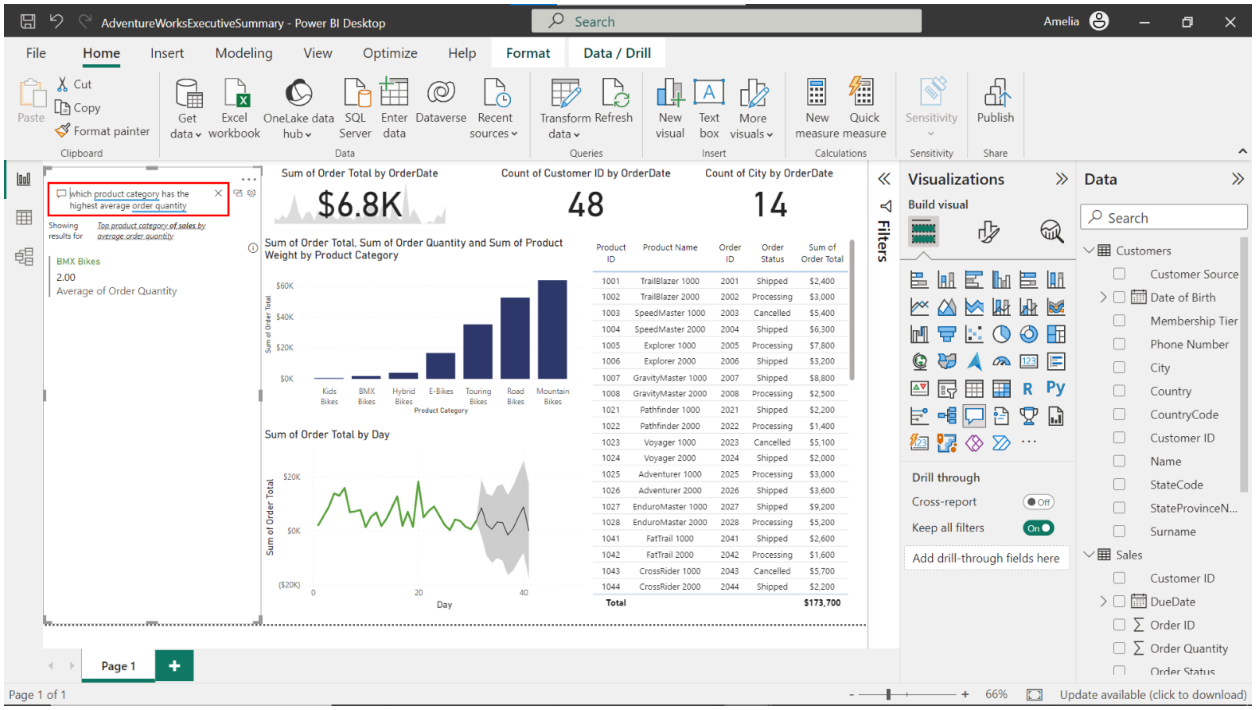


1. Inside the Q&A box is a text prompt titled Ask a question about your data. Select inside this box, type the following queries, and note down the results:

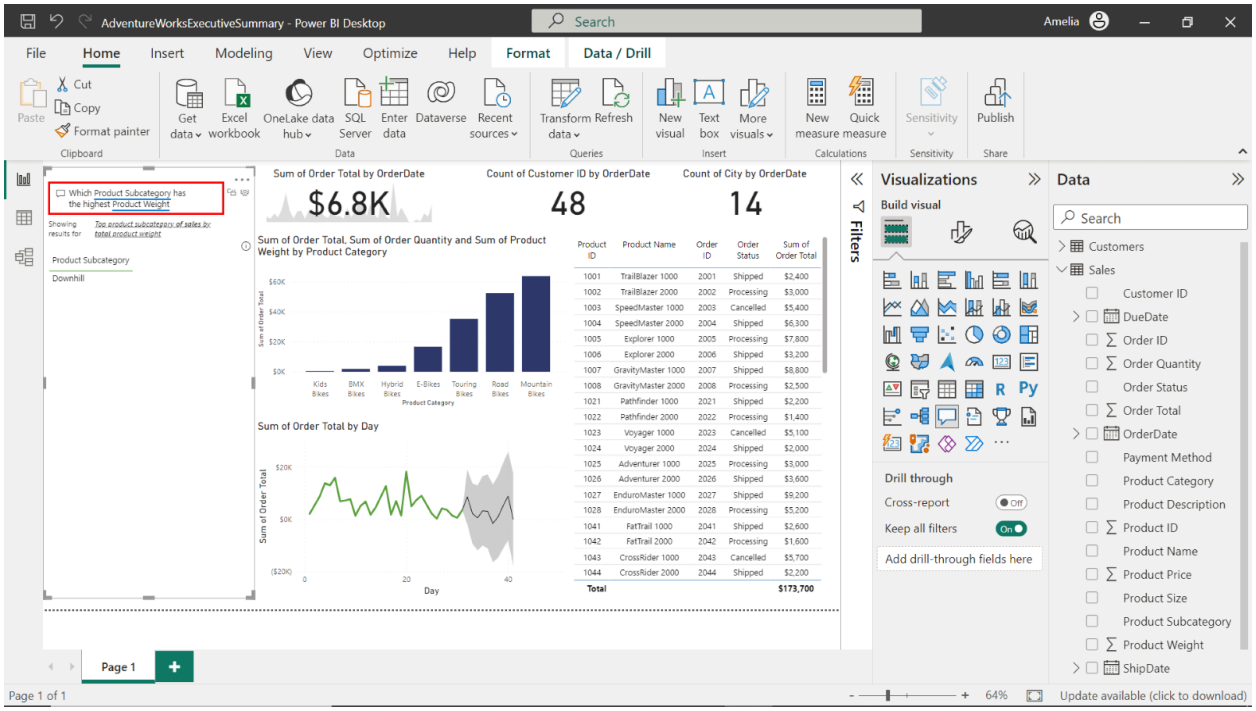
- Which customer City has the lowest average Order Total? Long Beach has the lowest average Order Total at $1,200.



- Which Product Category has the highest average Order Quantity?BMX Bikes have the highest average Order Quantity at 2.00.

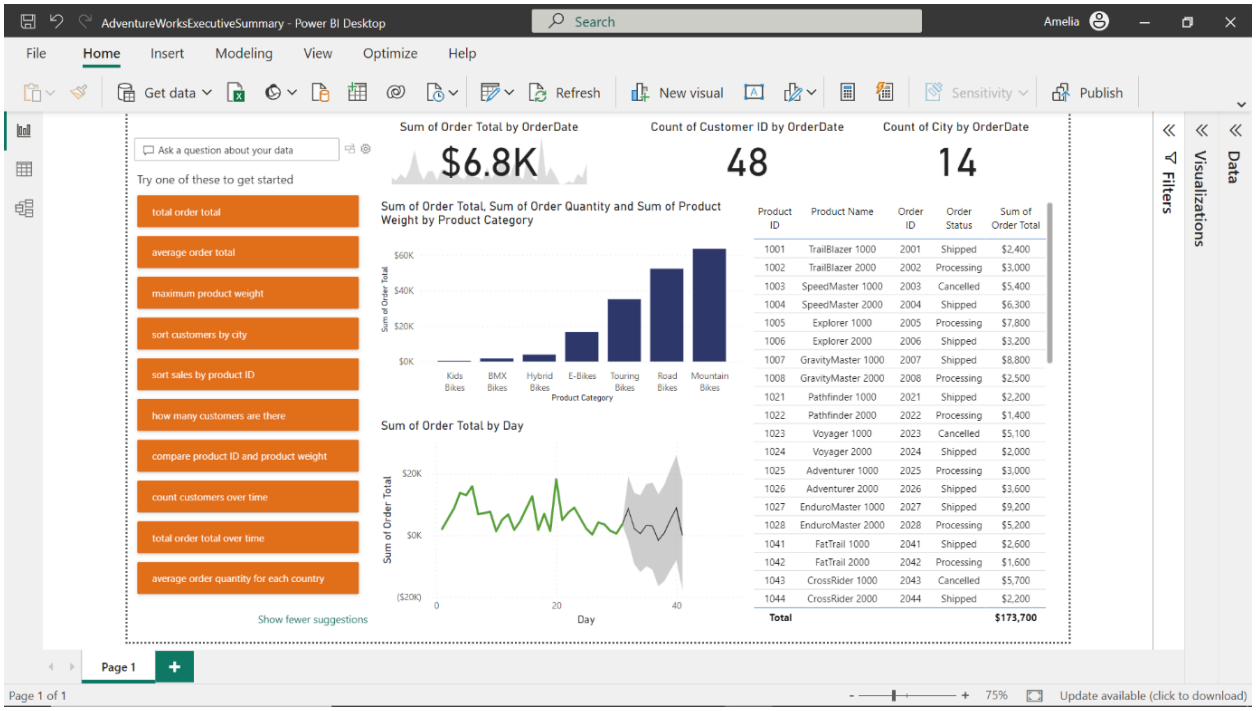


- Which Product Subcategory has the highest Product Weight? The Downhillsubcategory has the highest Product Weight, registering at 151ounces.



Final output

The following is an example report against which you can compare your solution:



Conclusion

As you wrap up this transformative journey, it's essential to pause and consider the impact of what you've just achieved. You've not only mastered the tools to create compelling Power BI reports, but you've also unlocked the hidden stories within Adventure Works' vast data. In doing so, you've empowered decision-makers to act swiftly, strategically, and substantively. Remember, every visualization and every KPI you set could be the butterfly effect that drives a revolution. Now, go out there and turn those numbers into narratives that can drive business outcomes!