Microsoft Azure Training - Power BI Course Notes

(Scroll to bottom for training signature work visuals)

PART 1 - Get started with Microsoft data analytics

Module 1: Discover Data Analysis (45 minutes)

Introduction

A retail business should be able to use their vast amounts of data and information in such a way that impacts the business, including:

- Tracking inventory
- Identifying purchase habits
- Detecting user trends and patterns
- Recommending purchases
- Determining price optimizations
- Identifying and stopping fraud

The key to unlocking this data is being able to tell a story with it. You need to be able to act on the data to affect change within the business. The underlying challenge that businesses face today is understanding and using their data in such a way that impacts their business and ultimately their bottom line.

Overview of data analysis

Before data can be used to tell a story, it must be run through a process that makes it usable in the story. Data analysis is the process of identifying, cleaning, transforming, and modeling data to discover meaningful and useful information. The data is then crafted into a story through reports for analysis to support the critical decision-making process.

The process of data analysis focuses on the tasks of cleaning, modeling, and visualizing data.

To analyze data, core components of analytics are divided into the following categories:

- **Descriptive**: help answer questions about what has happened based on historical data
- **Diagnostic**: help answer questions about why events happened.
- **Predictive**: help answer questions about what will happen in the future
- **Prescriptive**: help answer questions about which actions should be taken to achieve a goal or target
- **Cognitive**: help you learn what might happen if circumstances change and determine how you might handle these situations

Roles in data

The following sections highlight these different roles in data and the specific responsibility in the overall spectrum of data discovery and understanding:

- **Business analyst**: closer to the business and is a specialist in interpreting the data that comes from the visualization
- **Data analyst**: enables businesses to maximize the value of their data assets through visualization and reporting tools such as Microsoft Power BI. Data analysts are responsible for profiling, cleaning, and transforming data.
- **Data engineer**: provision and set up data platform technologies that are on-premises and in the cloud. They manage and secure the flow of structured and unstructured data from multiple sources.

- **Data scientist**: perform advanced analytics to extract value from data. Their work can vary from descriptive analytics to predictive analytics.
- **Database administrator**: implements and manages the operational aspects of cloud-native and hybrid data platform solutions that are built on Microsoft Azure data services and Microsoft SQL Server. A database administrator is responsible for the overall availability and consistent performance and optimizations of the database solutions.

Tasks of a data analyst

The following figure shows the five key areas that you'll engage in during the data analysis process

- **Prepare**: the process of profiling, cleaning, and transforming your data to get it ready to model and visualize. The process of taking raw data and turning it into information that is trusted and understandable. Data analysts follow a series of steps and methods to prepare data for placement into a proper context and state that eliminate poor data quality and allow it to be turned into valuable insights.
- **Model**: process of determining how your tables are related to each other. This process is done by defining and creating relationships between the tables. From that point, you can enhance the model by defining metrics and adding custom calculations to enrich your data. Understanding and preparing your data before you model it will make the modeling step much easier.
- **Visualize**: ultimate goal of the visualize task is to solve business problems – this should help explain to businesses what the data means. A well-designed report should tell a compelling story about that data, which will enable business decision makers to quickly gain needed insights. By using appropriate visualizations and interactions, you can provide an effective report that guides the reader through the content quickly and efficiently, therefore allowing the reader to follow a narrative into the data.
- **Analyze**: important step of understanding and interpreting the information that is displayed on the report. Find insights, identify patterns and trends, predict outcomes, and then communicate those insights in a way that everyone can understand. Advanced analytics enables businesses and organizations to ultimately drive better decisions throughout the business and create actionable insights and meaningful results
- **Manage**: data analysts are responsible for the management of Power BI assets, overseeing the sharing and distribution of items, such as reports and dashboards, and ensuring the security of Power BI assets.

Knowledge check:

1. Which data role enables advanced analytics capabilities specifically through reports and visualizations?

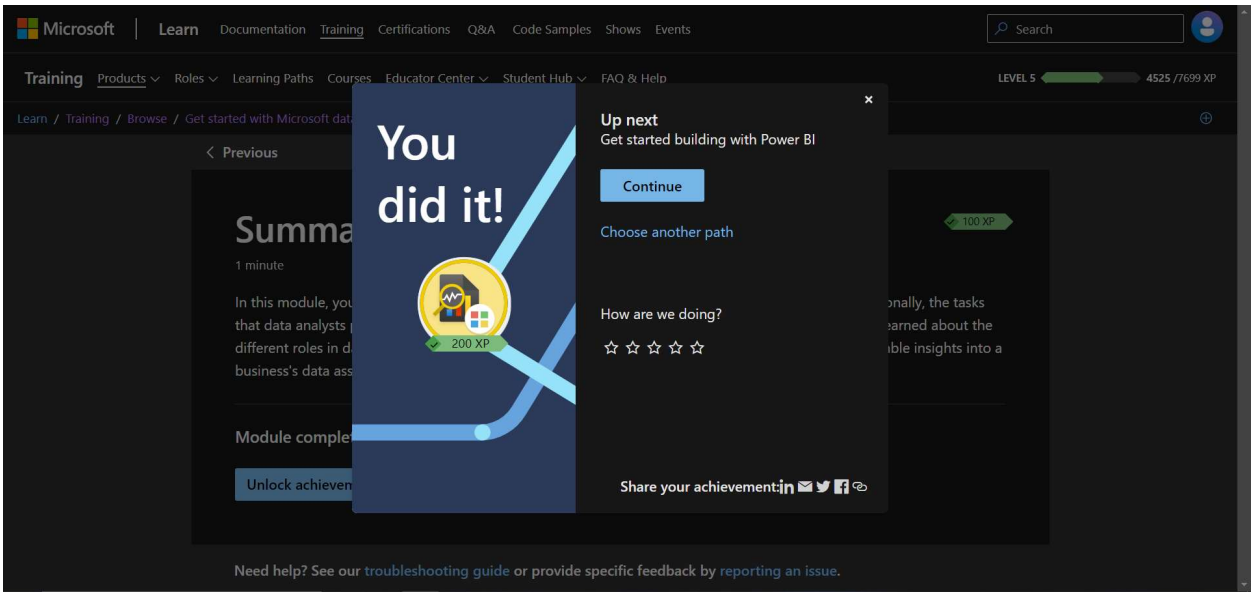
Data analyst -A data analyst uses appropriate visuals to help business decision makers gain deep and meaningful insights from data.

2. Which data analyst task has a critical performance impact on reporting and data analysis?

Model - An optimized and tuned data model performs better and provides a better data analysis experience.

3. Which one of the following options is the most important key benefit of data analysis?

Informed business decisions - A key benefit of data analysis is the ability to gain valuable insights from a business's data assets to make timely and optimal business decisions.



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Module 2: Get Started Building with Power BI (50 mins)

Introduction

Microsoft Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Whether your data is a simple Microsoft Excel workbook, or a collection of cloud-based and on-premises hybrid data warehouses, Power BI lets you easily connect to your data sources, visualize (or discover) what's important, and share that with anyone or everyone you want.

Three primary services:

- Power BI Desktop
- Power BI service (Online SaaS)
- Mobile Power BI apps

A common flow of work in Power BI begins in Power BI Desktop, where a report is created. That report is then published to the Power BI service and finally shared, so that users of Power BI Mobile apps can consume the information.

Use Power BI

The common flow of activity looks like this:

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

Building blocks of Power BI

These are the basic building blocks in Power BI:

- **Visualizations**: visual representation of data, like a chart, a color-coded map, or other interesting things you can create to represent your data visually. The goal of a visual is to present data in a way that provides context and insights, both of which would probably be difficult to discern from a raw table of numbers or text.
- **Datasets**: a collection of data that Power BI uses to create its visualizations. Datasets can be a single Excel file or a combination of many different sources, which you can filter and combine to provide a unique collection of data (a dataset) for use in Power BI. Filtering data before bringing it into Power BI lets you focus on the data that matters to you. Power BI has built-in data connectors that let you easily connect to that data, filter it if necessary, and bring it into your dataset.
- **Reports**: collection of visualizations that appear together on one or more pages. Reports let you create many visualizations, on multiple pages if necessary, and let you arrange those visualizations in whatever way best tells your story.
- **Dashboards**: to share a report, or a collection of visualizations, you must create a dashboard. This is a collection of visuals that you can share with others. It must fit on a single page, often called a canvas. You can share dashboards with other users or groups, who can then interact with your dashboards when they're in the Power BI service or on their mobile device.
- **Tiles**: a single visualization on a dashboard. It's the rectangular box that holds an individual visual. When you're creating a dashboard in Power BI, you can move or arrange tiles however you want. When you're viewing, or consuming, a dashboard or report you can interact with the tile, but cannot alter it.

Tour and use the Power BI service

With Power BI, connecting to data is easy. From the Power BI service, you can just select the Get Data button in the lower-left corner of the home page.

The canvas (the area in the center of the Power BI service) shows you the available sources of data in the Power BI service. In addition to common data sources like Microsoft Excel files, databases, or Microsoft Azure data, Power BI can just as easily connect to a whole assortment of software services (also called SaaS providers or cloud services): Salesforce, Facebook, Google Analytics, and more.

For these software services, the Power BI service provides a collection of ready-made visuals that are pre-arranged on dashboards and reports for your organization. This collection of visuals is called an app. Apps get you up and running quickly, with data and dashboards that your organization has created for you. For example, when you use the GitHub app, Power BI connects to your GitHub account (after you provide your credentials) and then populates a predefined collection of visuals and dashboards in Power BI.

You can also choose to update the dataset for an app, or other data that you use in Power BI. To set update settings, select the schedule update icon for the dataset to update, and then use the menu that appears. You can also select the update icon (the circle with an arrow) next to the schedule update icon to update the dataset immediately.

Knowledge Check

1. What is the common flow of activity in Power BI?

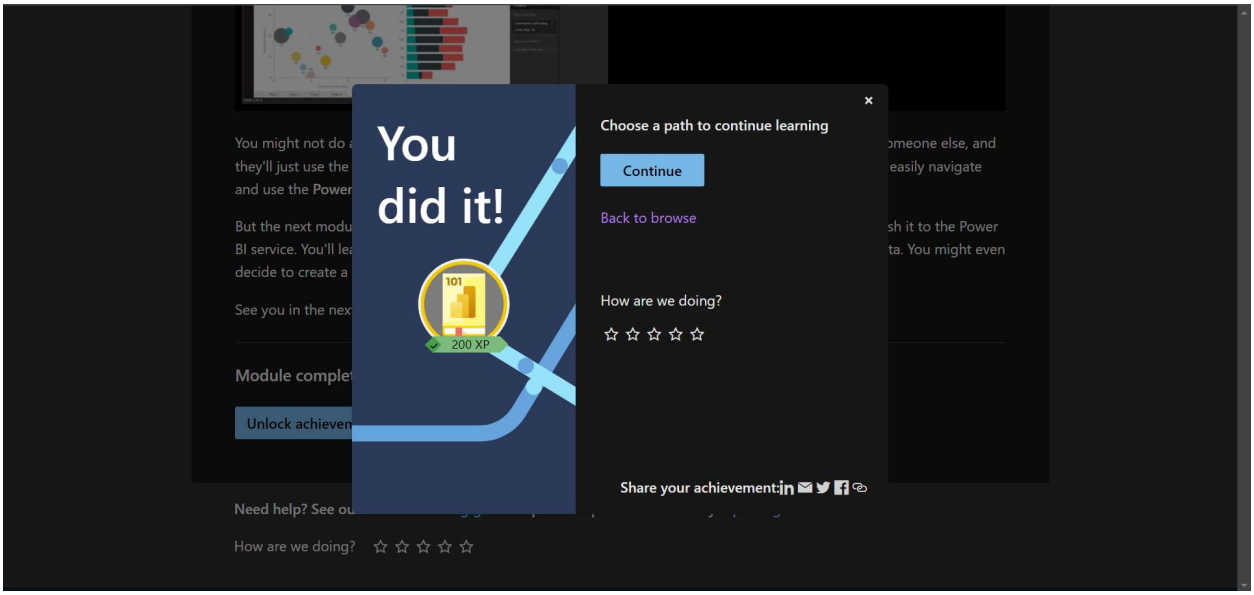
Bring data into Power BI Desktop and create a report, share it to the Power BI service, view and interact with reports and dashboards in the service and Power BI mobile. - The Power BI service lets you view and interact with reports and dashboards, but doesn't let you shape data.

2. Which of the following are building blocks of Power BI?

Visualizations, datasets, reports, dashboards, tiles. – The building blocks for Power BI are visualizations, datasets, reports, dashboards, tiles.

3. A collection of ready-made visuals, pre-arranged in dashboards and reports is called what in Power BI?

An app - An app is a collection of ready-made visuals, pre-arranged in dashboards and reports. You can get apps that connect to many online services from the AppSource.



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Part 2 - Prepare data for analysis (1 hr 10 mins)

Module 3 – Get Data in Power BI

Introduction

This module will focus on the first step, of getting the data from the different data sources and importing it into Power BI by using Power Query.

Get data from Files

Supported files: flat files, i.e. comma-separated values (.csv) files, delimited text (.txt) files, Microsoft Excel workbooks (.xlsx), and fixed width files

Flat file location options:

- **Local -** You can import data from a local file into Power BI. The file isn't moved into Power BI, and a link doesn't remain to it. Instead, a new dataset is created in Power BI, and data from the Excel file is loaded into it. Accordingly, changes to the original Excel file are not reflected in your Power BI dataset. You can use local data import for data that doesn't change.
- **OneDrive for Business -** You can pull data from OneDrive for Business into Power BI. This method is effective in keeping an Excel file and your dataset, reports, and dashboards in Power BI synchronized. Power BI connects regularly to your file on OneDrive. If any changes are found, your dataset, reports, and dashboards are automatically updated in Power BI.
- **OneDrive - Personal** - You can use data from files on a personal OneDrive account, and get many of the same benefits that you would with OneDrive for Business. However, you'll need to sign in with your

personal OneDrive account, and select the Keep me signed in option. Check with your system administrator to determine whether this type of connection is allowed in your organization.

- **SharePoint - Team Sites -** Saving your Power BI Desktop files to SharePoint Team Sites is similar to saving to OneDrive for Business. The main difference is how you connect to the file from Power BI. You can specify a URL or connect to the root folder.

Power Query provides a number of ways for you to accomplish this task, so that you can make this type of change when needed.

- Data source settings
- Query settings
- Advanced Editor

Get data from relational data sources

Connecting Power BI to your database will help you to monitor the progress of your business and identify trends, so you can forecast sales figures, plan budgets and set performance indicators and targets. Power BI Desktop can connect to many relational databases that are either in the cloud or on-premises.

You will have three sign-in options:

- **Windows** - Use your Windows account (Azure Active Directory credentials).
- **Database** - Use your database credentials. For instance, SQL Server has its own sign-in and authentication system that is sometimes used. If the database administrator gave you a unique sign-in to the database, you might need to enter those credentials on the Database tab.
- **Microsoft account** - Use your Microsoft account credentials. This option is often used for Azure services.

Load Data - Automatically load your data into a Power BI model in its current state.

Transform Data - Open your data in Microsoft Power Query, where you can perform actions such as deleting unnecessary rows or columns, grouping your data, removing errors, and many other data quality tasks.

Get data from a NoSQL database

Some organizations don't use a relational database but instead use a NoSQL database. A NoSQL database (also referred to as non-SQL, not only SQL or non-relational) is a flexible type of database that does not use tables to store data.

JSON type records must be extracted and normalized before you can report on them, so you need to transform the data before loading it into Power BI Desktop.

Get data from online services

Organizations frequently use a range of software applications, such as SharePoint, OneDrive, Dynamics 365, Google Analytics and so on. Power BI can combine the data from multiple applications to produce more meaningful insights and reports.

Select a storage mode

The most popular way to use data in Power BI is to import it into a Power BI dataset. Importing the data means that the data is stored in the Power BI file and gets published along with the Power BI reports. This process helps make it easier for you to interact directly with your data. However, this approach might not work for all organizations.

The three different types of storage modes you can choose from:

- **Import**: allows you to create a local Power BI copy of your datasets from your data source. You can use all Power BI service features with this storage mode, including Q&A and Quick Insights
- **DirectQuery**: useful when one doesn't want to save local copies of your data because your data will not be cached. Instead, you can query the specific tables that you will need by using native Power BI queries, and the required data will be retrieved from the underlying data source. Essentially, you're creating a direct connection to the data source.
- **Dual (Composite**): identify some data to be directly imported and other data that must be queried. Any table that is brought in to your report is a product of both Import and DirectQuery modes. Using the Dual mode allows Power BI to choose the most efficient form of data retrieval.

Get data from Azure Analysis Services

Getting data from Azure Analysis Services cubes is similar to getting data from SQL Server, in that you can:

- Authenticate to the server.
- Pick the cube you want to use.
- Select which tables you need

Notable differences between Azure Analysis Services cubes and SQL Server are:

- Analysis Services cubes have calculations already in the cube, which will be discussed in more detail later.
- If you don't need an entire table, you can query the data directly. Instead of using Transact-SQL (T-SQL) to query the data, like you would in SQL Server, you can use multi-dimensional expressions (MDX) or data analysis expressions (DAX).

Fix performance issues

Power BI provides the Performance Analyzer tool to help fix problems and streamline the process of correcting performance issues when running reports.

The performance in Power Query depends on the performance at the data source level. The variety of data sources that Power Query offers is very wide, and the performance tuning techniques for each source are equally wide.

The benefits to query folding include:

- More efficiency in data refreshes and incremental refreshes. When you import data tables by using query folding, Power BI is better able to allocate resources and refresh the data faster because Power BI does not have to run through each transformation locally.
- Automatic compatibility with DirectQuery and Dual storage modes. All DirectQuery and Dual storage mode data sources must have the back-end server processing abilities to create a direct connection, which means that query folding is an automatic capability that you can use. If all transformations can be reduced to a single Select statement, then query folding can occur.

Native queries are not possible for the following transformations:

- Adding an index column
- Merging and appending columns of different tables with two different sources
- Changing the data type of a column

A good guideline to remember is that if you can translate a transformation into a Select SQL statement, which includes operators and clauses such as GROUP BY, SORT BY, WHERE, UNION ALL, and JOIN, you can use query folding.

Another tool that you can use to study query performance is query diagnostics. This feature allows you to determine what bottlenecks (if any) exist while loading and transforming your data, refreshing your data in Power Query, running SQL statements in Query Editor, and so on

Other ways to optimize query performance in Power BI include:

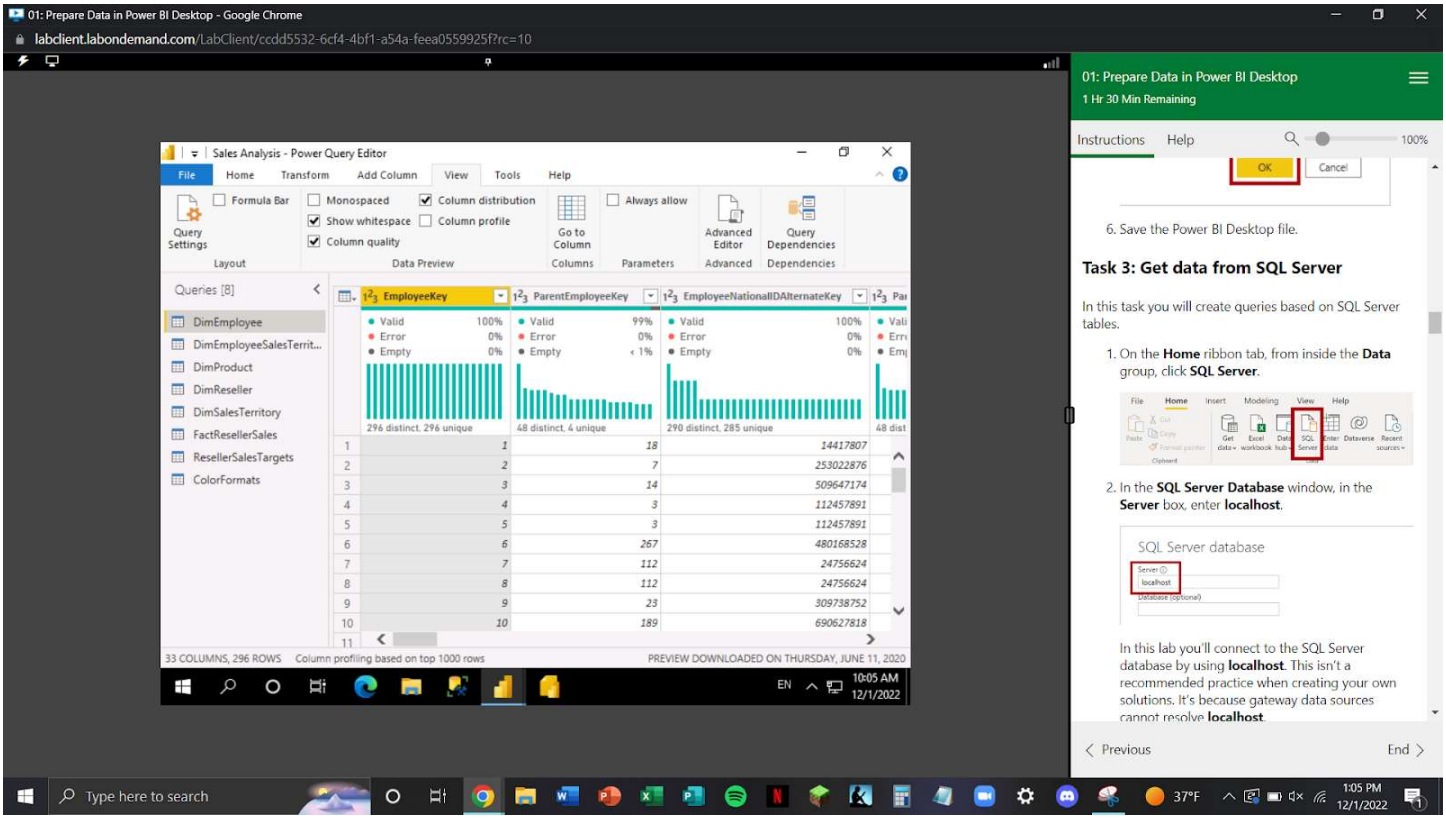
- Process as much data as possible in the original data source.
- Use native SQL queries.
- Separate date and time, if bound together.

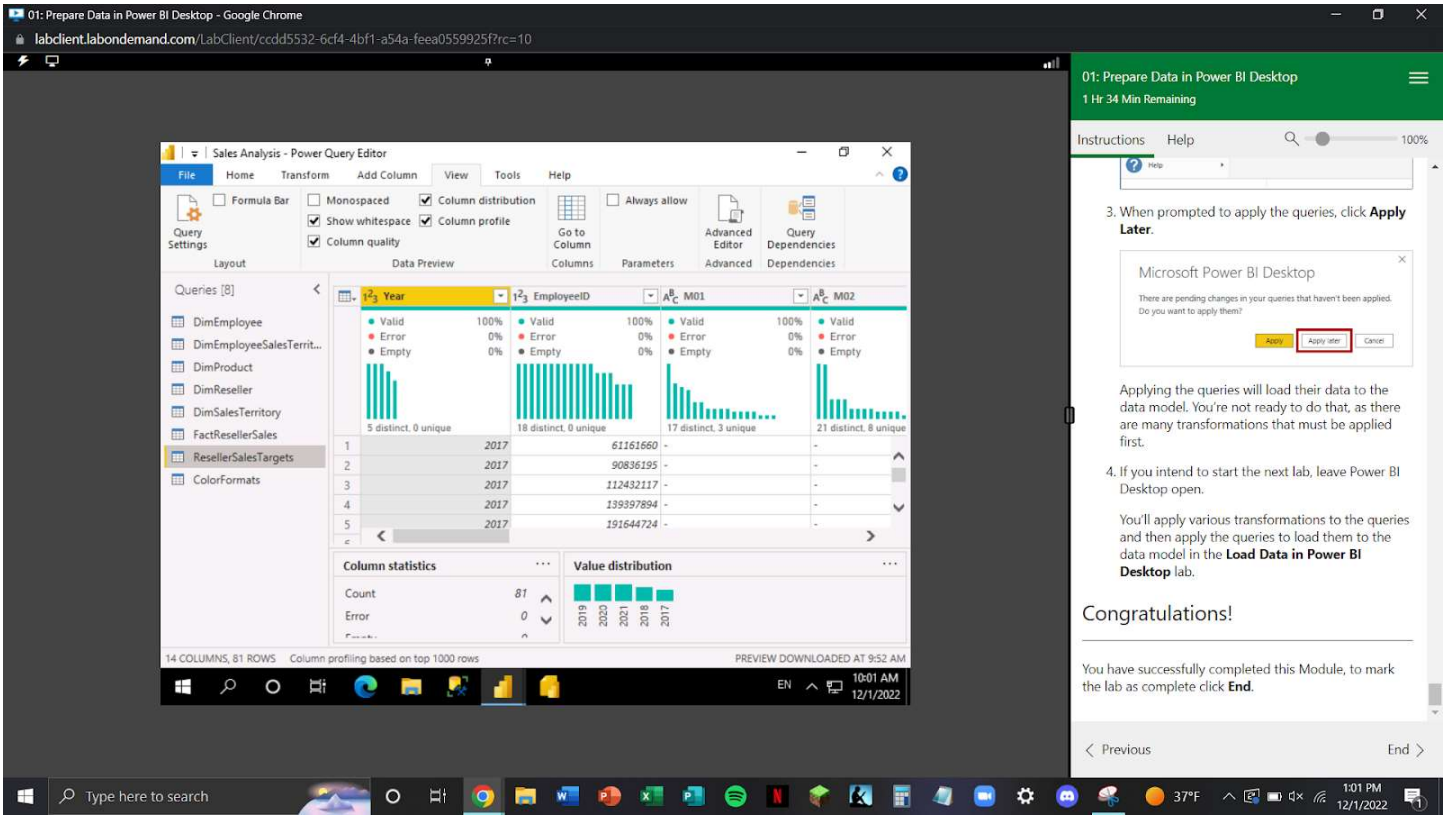
Resolve data import errors

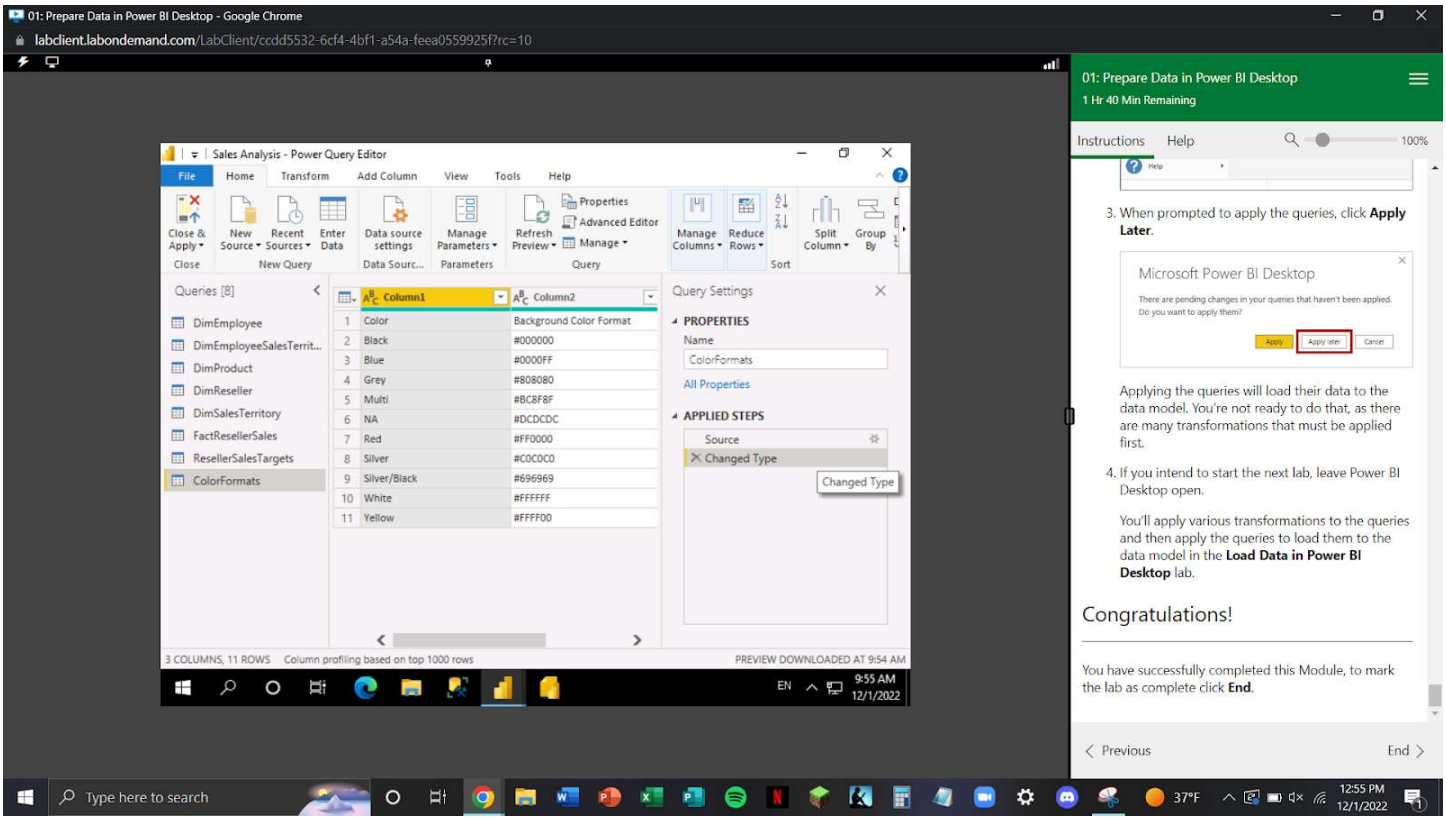
While importing data into Power BI, you may encounter errors resulting from factors such as:

- Power BI imports from numerous data sources.
- Each data source might have dozens (and sometimes hundreds) of different error messages.
- Other components can cause errors, such as hard drives, networks, software services, and operating systems.
- Data can often not comply with any specific schema.

Exercise - Prepare data in Power BI Desktop







Skills gained from exercise:

- Get data from SQL server
- Explore column quality
- Explore column distribution
- Importing a .csv

- Explore column profile
- Import an .xlsx

Knowledge Check:

1. What type of expression do you use to extract data from Microsoft SQL Server?

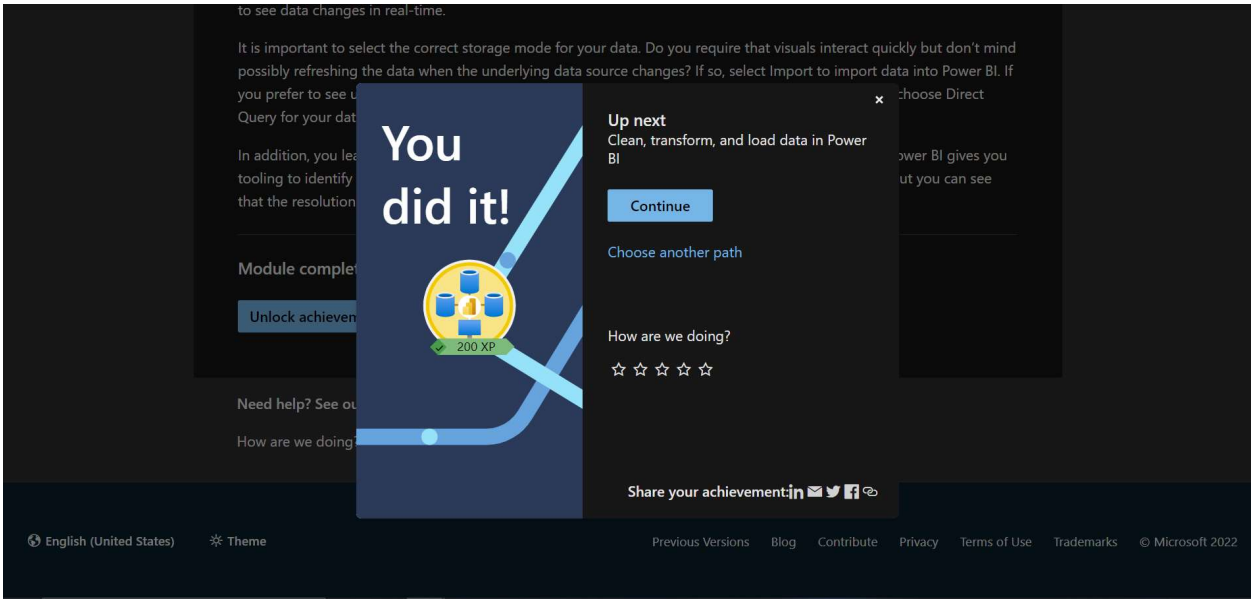
T-SQL - True. T-SQL is the query language that you would use for SQL Server.

2. You're creating a Power BI report with data from an Azure Analysis Services Cube. When the data refreshes in the cube, you would like to see it immediately in the Power BI report. How should you connect?

Live connection - This will reflect cube changes immediately.

3. What can you do to improve performance when you're getting data in Power BI?

Use query folding - Power Query and Power Query Editor are built to allow you to process the data, however, the processing power required to do this might lower performance in other areas of your reports. It's good practice to process as much as possible in the native data source by using query folding.



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Module 4: Clean, transform, and load data in Power BI

Clean data has the following advantages:

- Measures and columns produce more accurate results when they perform aggregations and calculations.
- Tables are organized, where users can find the data in an intuitive manner.
- Duplicates are removed, making data navigation simpler. It will also produce columns that can be used in slicers and filters.
- A complicated column can be split into two, simpler columns. Multiple columns can be combined into one column for readability.
- Codes and integers can be replaced with human readable values.

Shape the initial data (methods)

- Identify column headers and names
- Promote headers
- Rename columns
- Remove top rows & columns
- Unpivot and pivot columns

Simplify the data structure (methods)

- Rename a query
- Replace values
- Replace null values
- Remove duplicates
- Naming conventions for tables, columns, and values have no fixed rules

Evaluate and change column data types

Implications of incorrect data types

- Change the column data type in Power Query Editor

Combine multiple tables into a single table

- Append queries
- Merge queries
    - Left Outer Join - Displays all rows from the first table and only the matching rows from the second.
    - Full Outer Join - Displays all rows from both tables.
    - Inner Join - Displays the matched rows between the two tables.

Profile data in Power BI (steps)

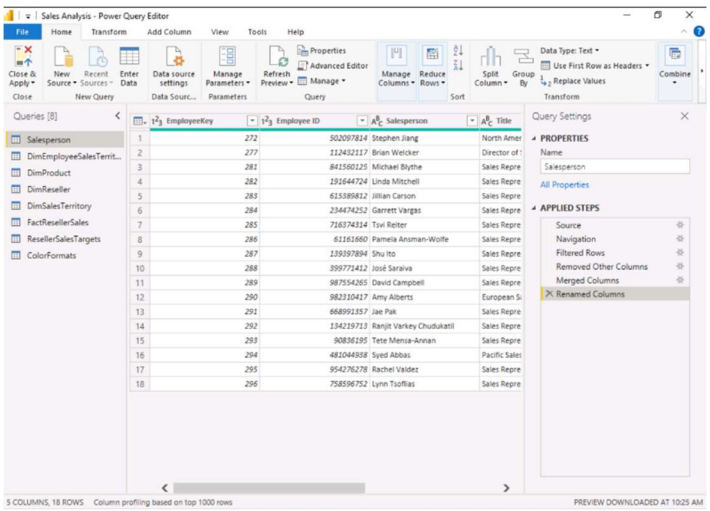
- Examine data structures
- Find data anomalies and data statistics
    - **Column distribution** shows you the distribution of the data within the column and the counts of distinct and unique values, both of which can tell you details about the data counts
    - **Column profile** gives you a more in-depth look into the statistics within the columns for the first 1,000 rows of data
    - **Value distribution** graph tells you the counts for each distinct value in that specific column.
    - **Column Statistics** will also include how many zeroes and null values exist, along with the average value in the column, the standard deviation of the values in the column, and how many even and odd values are in the column

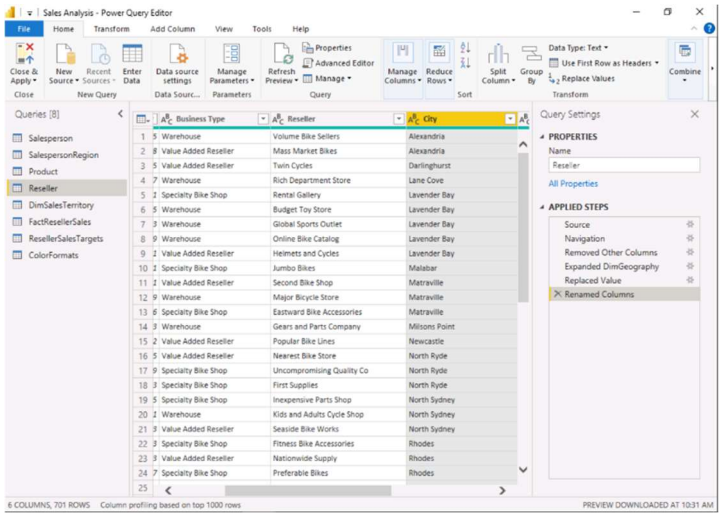
Exercise 2: Load data in Power BI Desktop

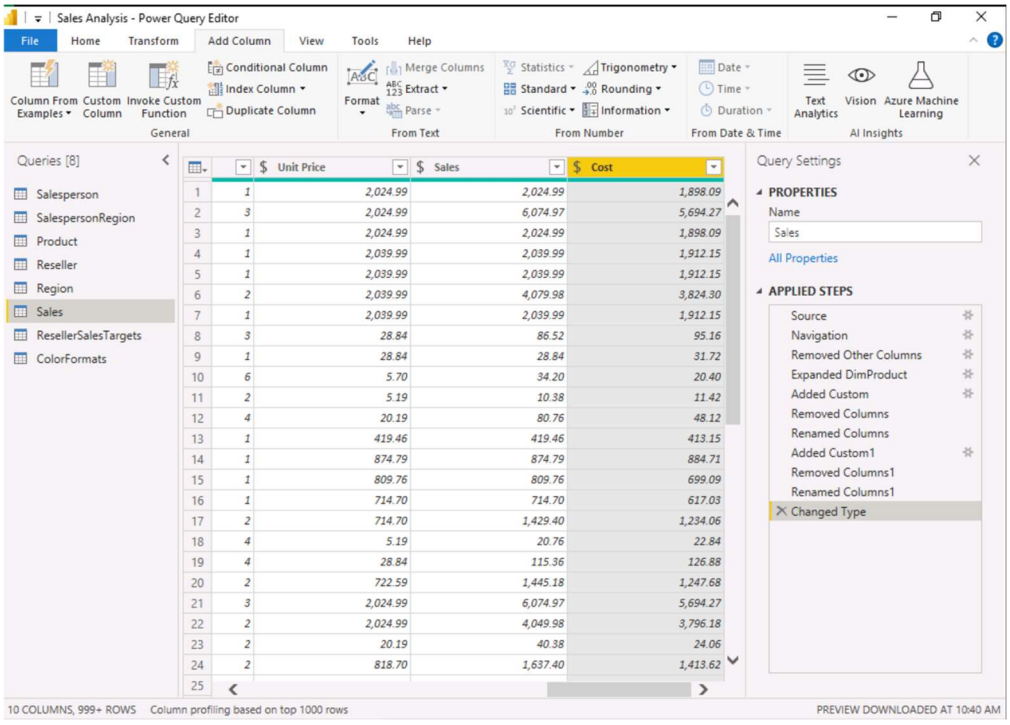
Skills learned in Exercise 2:

- Transform data
- Rename queries
- Filter rows
- Remove columns
- Merge columns
- Rename columns

- Expand columns
- Replace values
- Create custom column
- Change data type







<u>Knowledge Check</u>

1. What is a risk of having null values in a numeric column?

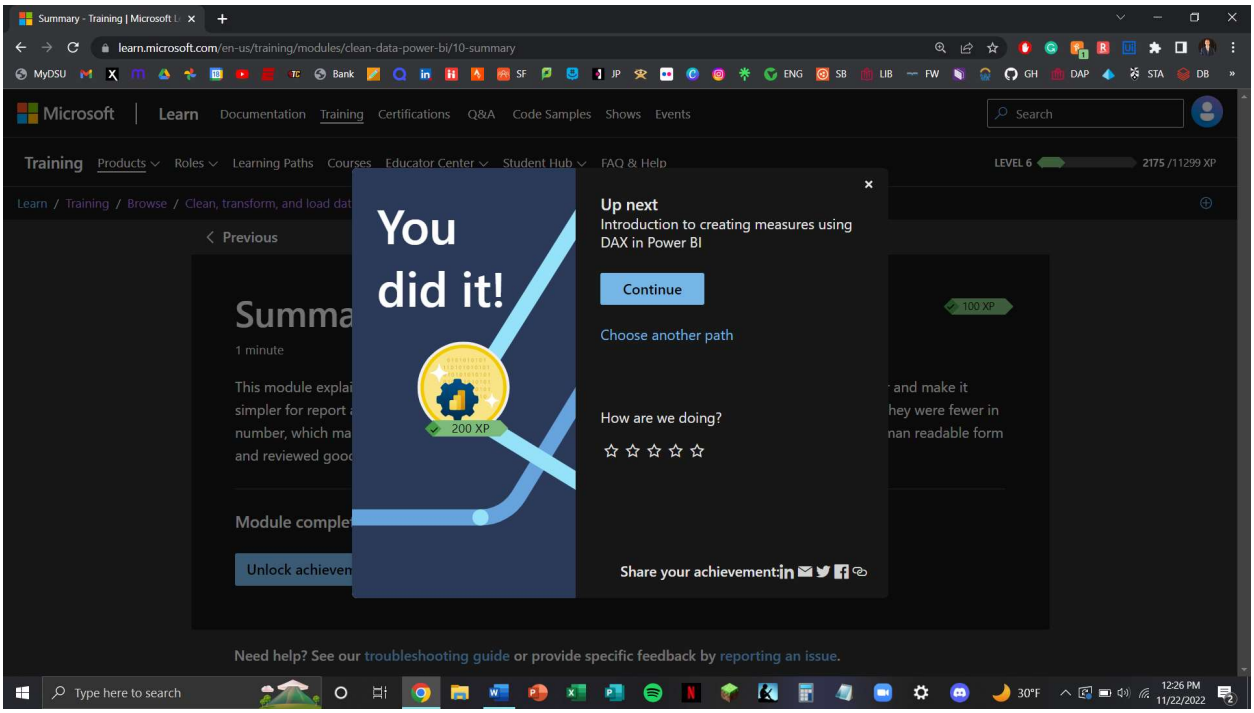
That function AVERAGE of data will be incorrect.

2. If you have two queries that have different data but the same column headers, and you want to combine both tables into one query with all the combined rows, which operation should you perform?

Append

3. Which of the following selections are not best practices for naming conventions in Power BI?

Abbreviate column names.

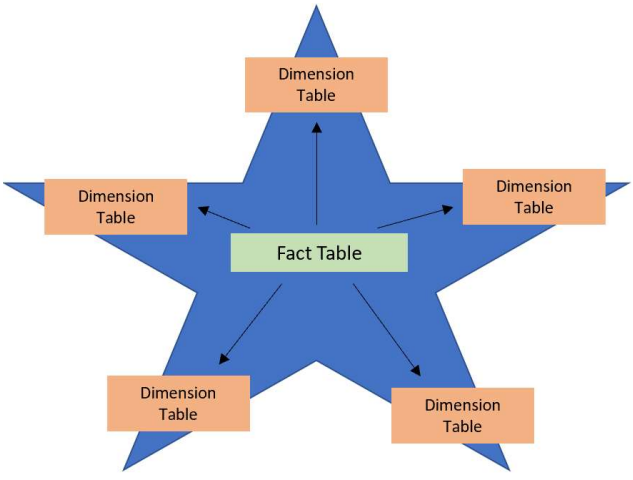


Module 5: Design a data model in Power BI

A good data model offers the following benefits:

- Data exploration is faster.
- Aggregations are simpler to build.
- Reports are more accurate.
- Writing reports takes less time.
- Reports are easier to maintain in the future.

Star schema: includes fact tables and dimension tables



Fact tables contain observational or event data values: sales orders, product counts, prices, transactional dates and times, and quantities.

Dimension tables contain the details about the data in fact tables: products, locations, employees, and order types. These tables are connected to the fact table through key columns.

Working with tables

A simple table structure will:

- Be simple to navigate because of column and table properties that are specific and user-friendly.
- Have merged or appended tables to simplify the tables within your data structure.
- Have good-quality relationships between tables that make sense.

Under the General tab, you can:

- Edit the name and description of the column.
- Add synonyms that can be used to identify the column when you are using the Q&A feature.
- Add a column into a folder to further organize the table structure.
- Hide or show the column.

Under the Formatting tab, you can:

- Change the data type.
- Format the date.

Under the Advanced tab, you can:

- Sort by a specific column.
- Assign a specific category to the data.
- Summarize the data.
- Determine if the column or table contains null values.

Create a date table

Ways that you can build a common date table are:

- Source data
- DAX
- Power Query

Work with dimensions

- Hierarchies
- Parent-child hierarchy
- Flattened parent-child hierarchy
- Role-playing dimensions

Define data granularity

For different scenarios, you could settle on data granularity that is defined weekly, monthly, or quarterly. Generally, the fewer the records that you are working with, the faster your reports and visuals will function. This approach translates to a faster refresh rate for the entire dataset, which might mean that you can refresh more frequently.

Data granularity can also have an impact when you are building relationships between tables in Power BI.

Work with relationships and cardinality

- Describes a relationship in which you have many instances of a value in one column that are related to only one unique corresponding instance in another column.

- Describes the directionality between fact and dimension tables.
- Is the most common type of directionality and is the Power BI default when you are automatically creating relationships.

One-to-one (1:1) relationship:

- Describes a relationship in which only one instance of a value is common between two tables.
- Requires unique values in both tables.
- Is not recommended because this relationship stores redundant information and suggests that the model is not designed correctly. It is better practice to combine the tables.

Many-to-many (.) relationship:

- Describes a relationship where many values are in common between two tables.
- Does not require unique values in either table in a relationship.
- Is not recommended; a lack of unique values introduces ambiguity and your users might not know which column of values is referring to what.

With a single cross-filter direction:

- Only one table in a relationship can be used to filter the data. For instance, Table 1 can be filtered by Table 2, but Table 2 cannot be filtered by Table 1.

With both cross-filter directions or bi-directional cross-filtering:

- One table in a relationship can be used to filter the other. For instance, a dimension table can be filtered through the fact table, and the fact tables can be filtered through the dimension table.

For one-to-one relationships, the only option that is available is bi-directional cross-filtering.

For many-to-many relationships, you can choose to filter in a single direction or in both directions by using bi-directional cross-filtering.

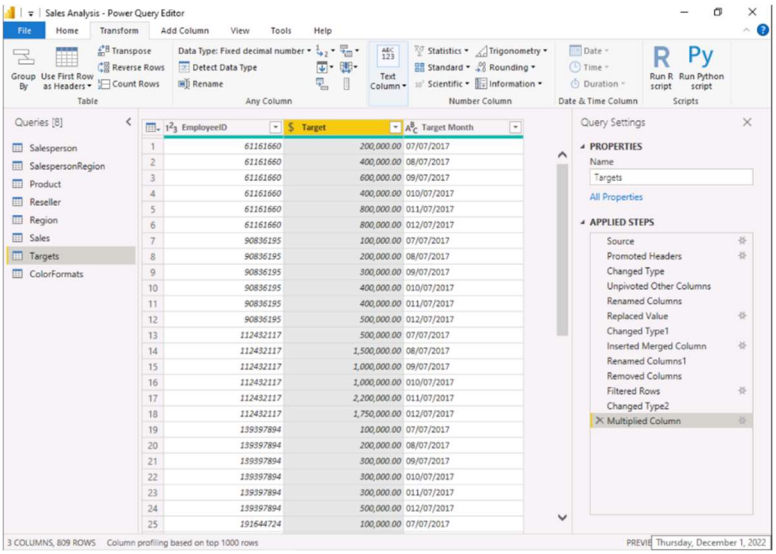
Resolve modeling challenges

Modeling data is about establishing and maintaining relationships so that you can effectively visualize the data in the form that your business requires. When you are creating these relationships, a common pitfall that you might encounter are circular relationships.

Exercise 3: Model data in Power BI Desktop, part 1

Skills learned in Exercise 3:

- Unpivot columns
- Insert merged column
- Multiply columns



Knowledge Check

1. What does data granularity mean?

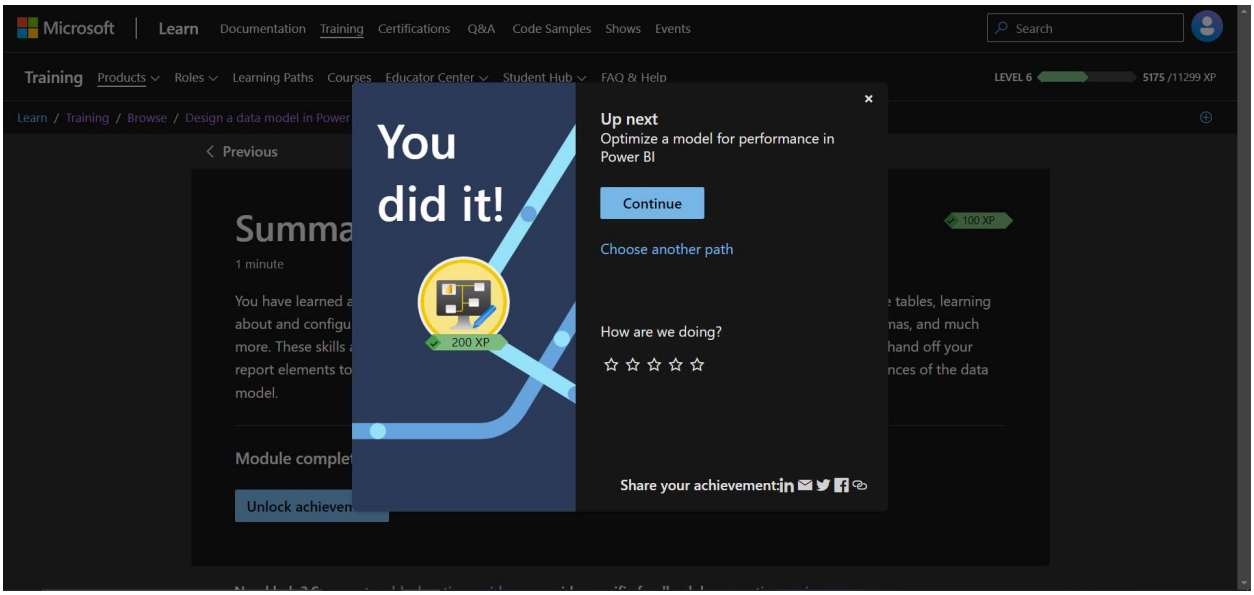
Data granularity is the level of detail that is represented within the data.

2. What is the difference between a fact table and a dimension table?

Fact tables contain observational data while dimension tables contain information about specific entities within the data.

3. What is cardinality?

Cardinality is the measure of unique values in a table.

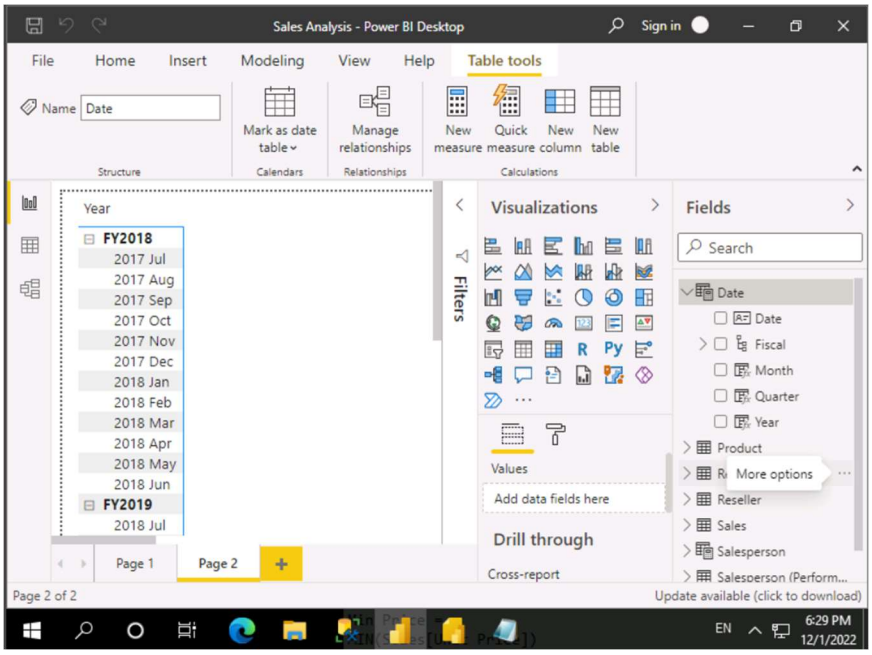


Module 6: Introduction to creating measures using DAX in Power BI

Exercise 4: Introduction to DAX in Power BI Desktop

Skills learned in Exercise 4:

- Create date table
- Create calculated columns
- Mark and complete date table



Salesperson	Sales	Target	Variance	Variance Margin
Amy Alberts	$10,288,626	$19,450,000	($9,161,374)	-47.10%
Brian Welcker	$77,548,570	$221,700,000	($144,151,430)	-65.02%
David Campbell	$12,004,822	$19,625,000	($7,620,178)	-38.83%
Garrett Vargas	$13,875,633	$23,675,000	($9,799,367)	-41.39%
Jae Pak	$8,410,883	$13,575,000	($5,164,117)	-38.04%
Jillian Carson	$7,633,387	$13,675,000	($6,041,613)	-44.18%
José Saraiva	$13,875,633	$18,875,000	($4,999,367)	-26.49%
Linda Mitchell	$25,634,503	$40,850,000	($15,215,497)	-37.25%
Lynn Tsoflias	$1,391,025	$3,210,000	($1,818,975)	-56.67%
Michael Blythe	$21,987,348	$31,150,000	($9,162,652)	-29.41%
Pamela Ansman-Wolfe	$30,005,939	$53,850,000	($23,844,061)	-44.28%
Total	**$77,548,570**			

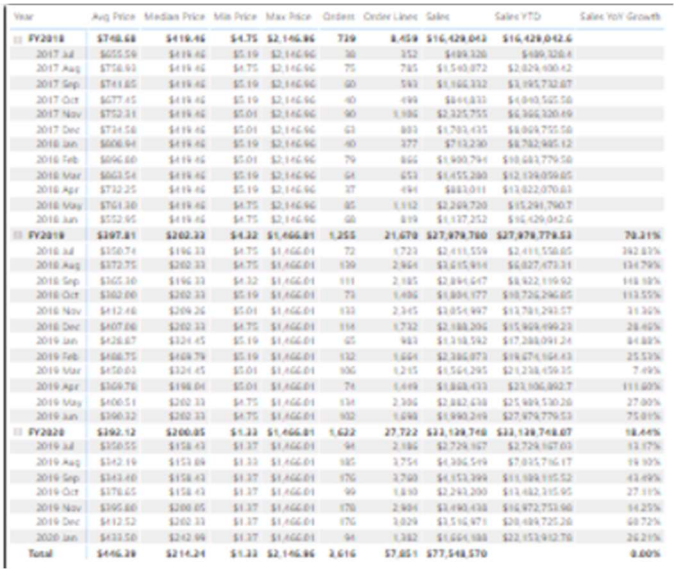
Year	Avg Price	Median Price	Min Price	Max Price	Orders	Order Lines
FY2018	**$748.68**	**$419.46**	**$4.75**	**$2,146.96**	**739**	**8,459**
2017 Jul	$655.59	$419.46	$5.19	$2,146.96	38	352
2017 Aug	$758.93	$419.46	$4.75	$2,146.96	75	785
2017 Sep	$741.85	$419.46	$5.19	$2,146.96	60	593
2017 Oct	$677.45	$419.46	$5.19	$2,146.96	40	499
2017 Nov	$752.31	$419.46	$5.01	$2,146.96	90	1,106
2017 Dec	$734.58	$419.46	$5.01	$2,146.96	63	803
2018 Jan	$808.94	$419.46	$5.19	$2,146.96	40	377
2018 Feb	$896.80	$419.46	$5.01	$2,146.96	79	866
2018 Mar	$863.54	$419.46	$5.19	$2,146.96	64	653
2018 Apr	$732.25	$419.46	$5.19	$2,146.96	37	494
2018 May	$761.30	$419.46	$4.75	$2,146.96	85	1,112
2018 Jun	$552.95	$419.46	$4.75	$2,146.96	68	819
FY2019	**$397.81**	**$202.33**	**$4.32**	**$1,466.01**	**1,255**	**21,670**
2018 Jul	$350.74	$196.33	$4.75	$1,466.01	72	1,723

Exercise 5: Time intelligence and measures in DAX

Skills learned in Exercise 4:

- Manipulate filter context
- Create hierarchical report
- Create a display folder
- Create a YTD measure
- Create a YoY growth measure

Group	Country	Region	Sales	Sales % All Region	Sales % Country	Sales % Group
Europe	France	France	$4,527,840	5.84%	100.00%	44.01%
		Total	**$4,527,840**	**5.84%**		**44.01%**
	Germany	Germany	$1,877,743	2.42%	100.00%	18.25%
		Total	**$1,877,743**	**2.42%**		**18.25%**
	United Kingdom	United Kingdom	$3,883,043	5.01%	100.00%	37.74%
		Total	**$3,883,043**	**5.01%**		**37.74%**
	Total		**$10,288,626**	**13.27%**		
North America	Canada	Canada	$13,875,633	17.89%	100.00%	21.07%
		Total	**$13,875,633**	**17.89%**		**21.07%**
	United States	Northeast	$6,715,354	8.66%	12.92%	10.20%
		Central	$7,633,387	9.84%	14.68%	11.59%
		Southeast	$7,638,607	9.85%	14.69%	11.60%
		Northwest	$12,004,822	15.48%	23.09%	18.23%
		Southwest	$18,001,116	23.21%	34.62%	27.33%
		Total	**$51,993,286**	**67.05%**		**78.93%**
	Total		**$65,868,919**	**84.94%**		
Pacific	Australia	Australia	$1,391,025	1.79%	100.00%	100.00%
		Total	**$1,391,025**	**1.79%**		**100.00%**
	Total		**$1,391,025**	**1.79%**		
Total			**$77,548,570**	**100.00%**		



Knowledge Check

1. Which two functions will help you compare dates to the previous month?

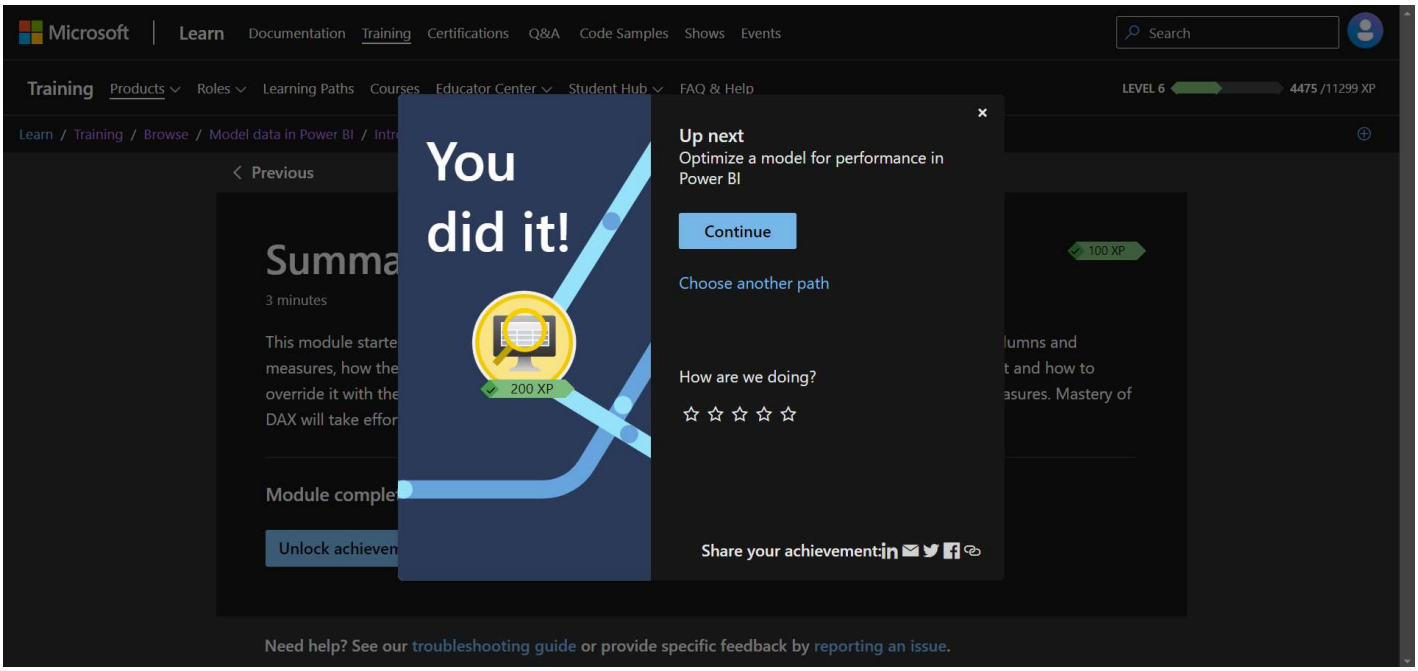
CALCULATE and PREVIOUSMONTH

2. Why would you want to override the default context?

To create measures that behave according to your intentions, regardless of what the user selects.

3. How do you use an inactive relationship in a single measure?

Use the USERELATIONSHIP function.



Module 7: Optimize a model for performance in Power BI

Knowledge Check

1. What benefit do you get from analyzing the metadata?

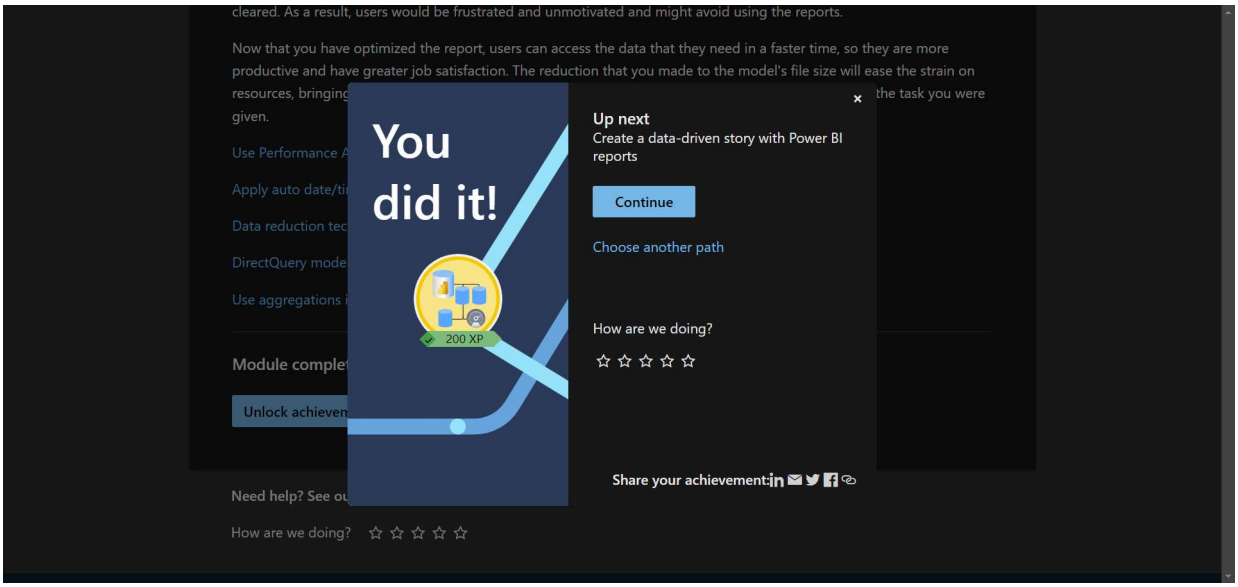
The benefit of analyzing the metadata is that you can clearly identify data inconsistences with your dataset.

2. What can be achieved by removing unnecessary rows and columns?

Deleting unnecessary rows and columns will reduce a dataset size and its good practice to load only necessary data into your data model.

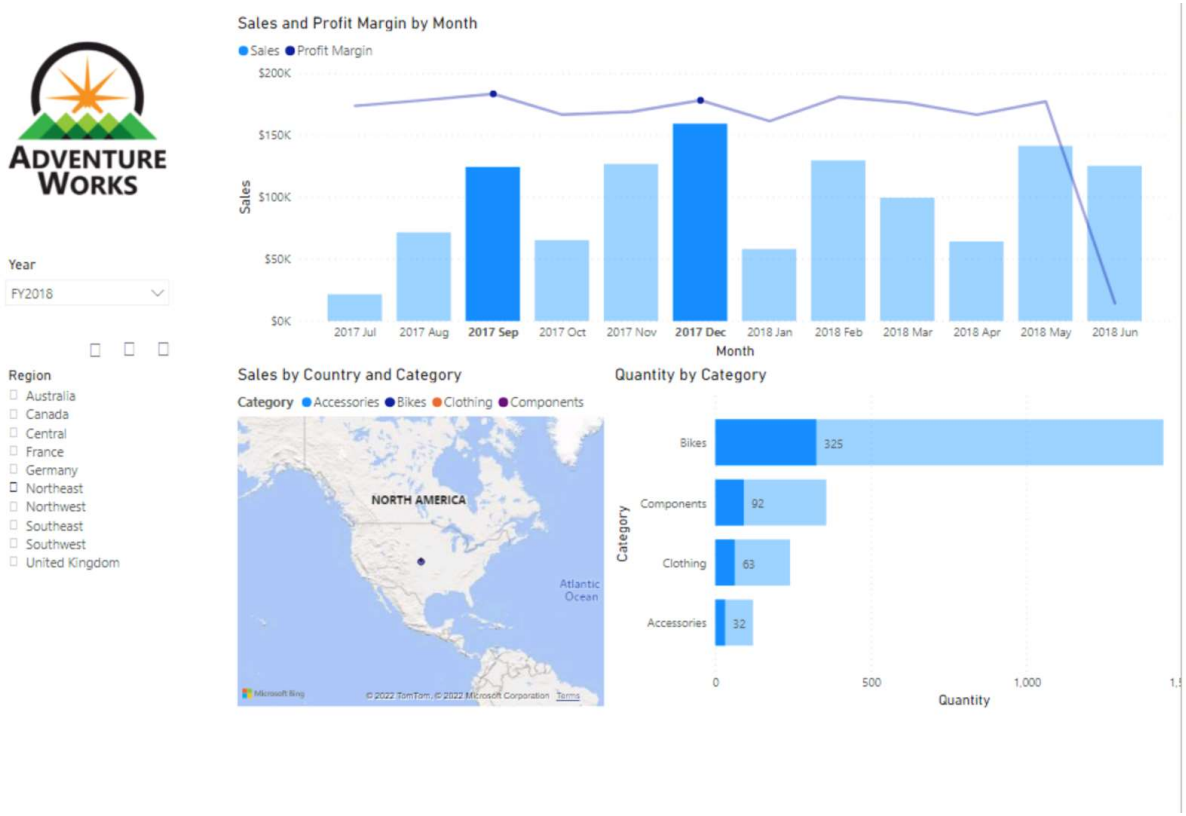
3. Is it possible to create a relationship between two columns if they are different DATA TYPE columns?

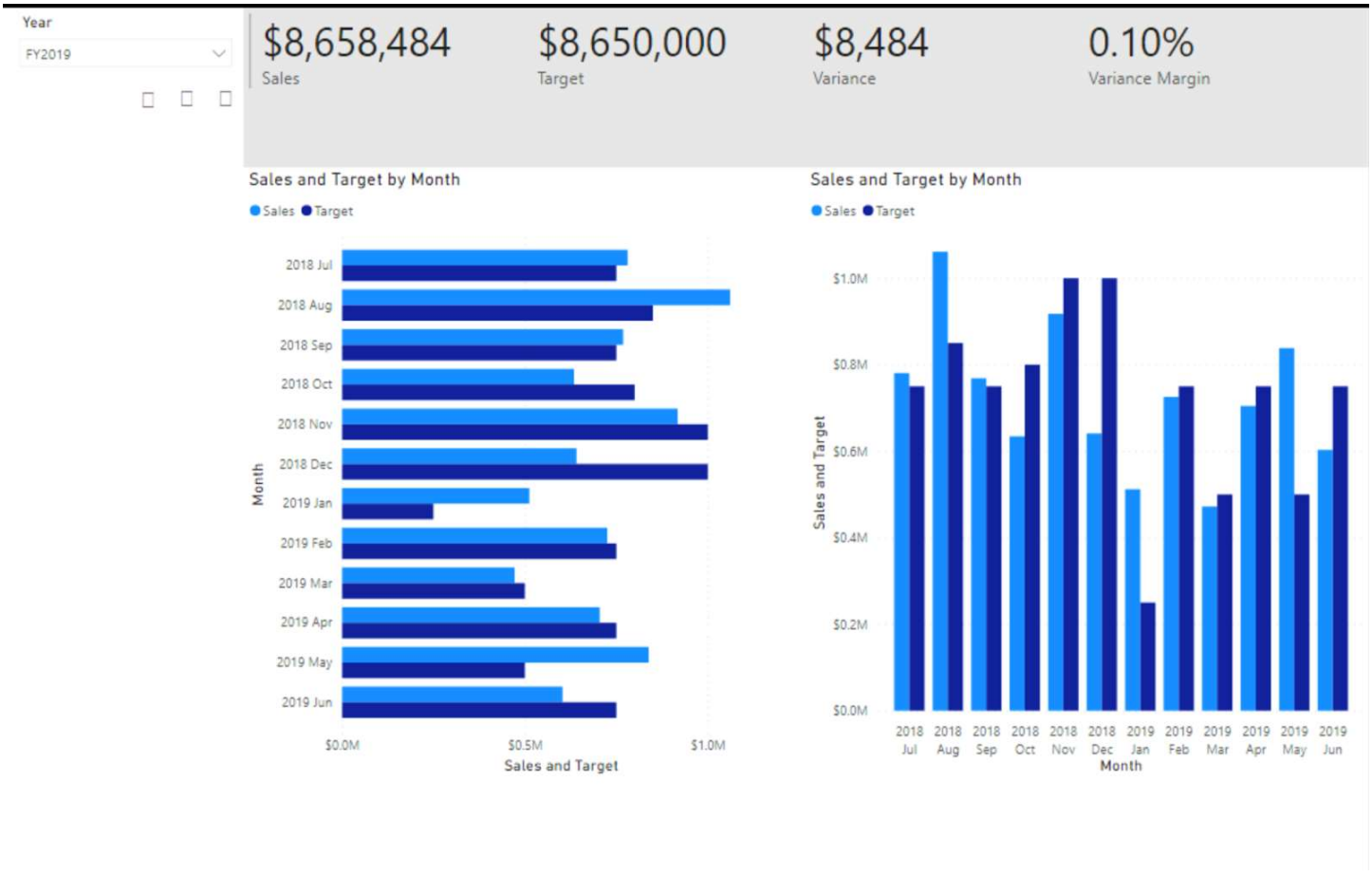
No, both columns in a relationship must be sharing the same DATA TYPE.



Modules 8/9: Create a data-driven story with Power BI reports & Work with Power BI visuals

Exercise 7 & 8: Design a report in Power BI (Part 1 & 2)





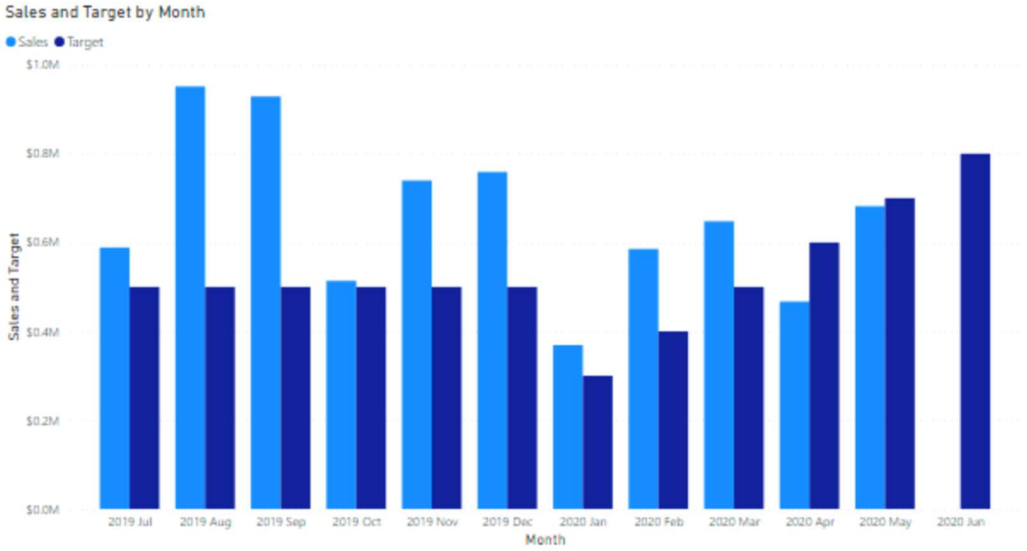
Year

FY2020

Bar Chart

Column Chart

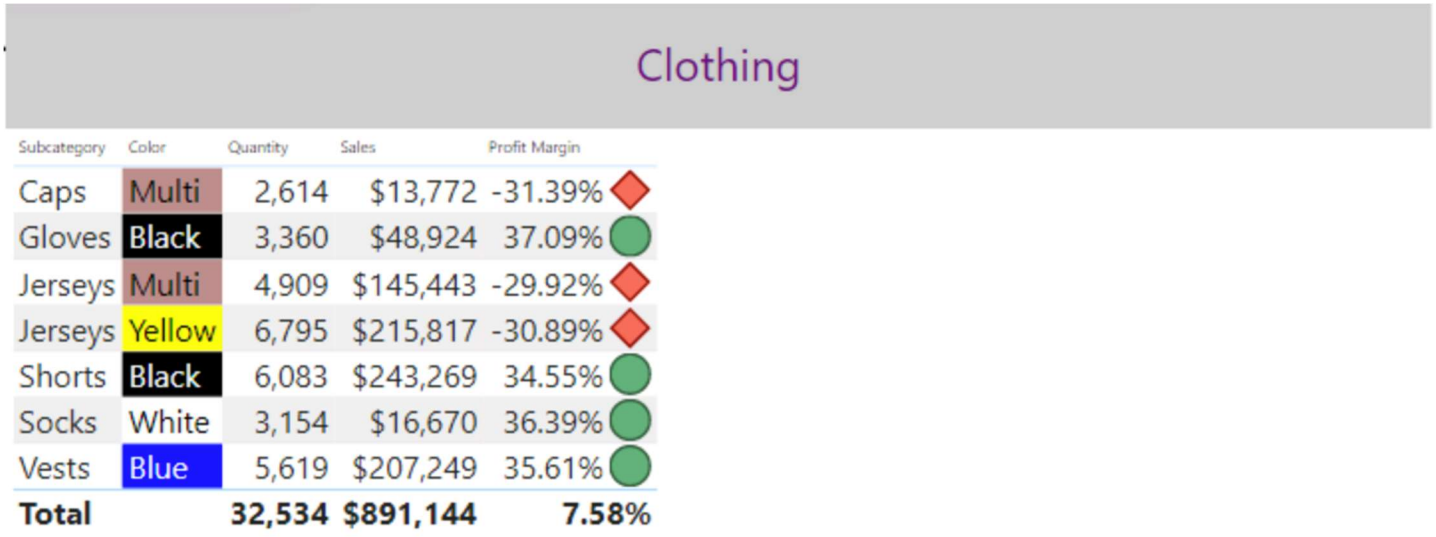
$7,232,695	$6,300,000	$932,695	14.80%
Sales	Target	Variance	Variance Margin



Region

- Select all
- Australia
- Canada
- Central
- France
- Germany
- Northeast
- Northwest
- Southeast
- Southwest
- United Kingdom

Year	Orders	Sales	Cost	Profit	Profit Margin
FY2018	**158**	**$3,109,733**	**$3,119,494**	**($9,761)**	**-0.31%**
FY2018 Q1	40	$638,095	$612,504	$25,591	4.01%
FY2018 Q2	40	$876,191	$850,212	$25,979	2.96%
FY2018 Q3	37	$775,871	$750,361	$25,510	3.29%
FY2018 Q4	41	$819,576	$906,417	($86,841)	-10.60%
FY2019	**250**	**$5,627,351**	**$5,376,060**	**$251,291**	**4.47%**
FY2019 Q1	63	$1,868,559	$1,784,716	$83,843	4.49%
FY2019 Q2	67	$1,398,013	$1,329,297	$68,716	4.92%
FY2019 Q3	60	$1,009,218	$970,701	$38,517	3.82%
FY2019 Q4	60	$1,351,561	$1,291,346	$60,215	4.46%
FY2020	**250**	**$5,138,550**	**$5,124,503**	**$14,046**	**0.27%**
FY2020 Q1	71	$1,779,882	$1,822,656	($42,774)	-2.40%
FY2020 Q2	72	$1,550,489	$1,523,463	$27,026	1.74%
FY2020 Q3	67	$1,024,556	$1,008,178	$16,378	1.60%
FY2020 Q4	40	$783,622	$770,206	$13,417	1.71%
Total	**658**	**$13,875,633**	**$13,620,057**	**$255,576**	**1.84%**



Subcategory	Color	Quantity	Sales	Profit Margin
Caps	Multi	2,614	$13,772	-31.39%
Gloves	Black	3,360	$48,924	37.09%
Jerseys	Multi	4,909	$145,443	-29.92%
Jerseys	Yellow	6,795	$215,817	-30.89%
Shorts	Black	6,083	$243,269	34.55%
Socks	White	3,154	$16,670	36.39%
Vests	Blue	5,619	$207,249	35.61%
Total		**32,534**	**$891,144**	**7.58%**

Skills learned in Lessons 7 & 8:

- Creating and using buttons
- Drill through data

Knowledge Check (Lesson 7)

1. Which of the following filters are not available in Power BI reports?

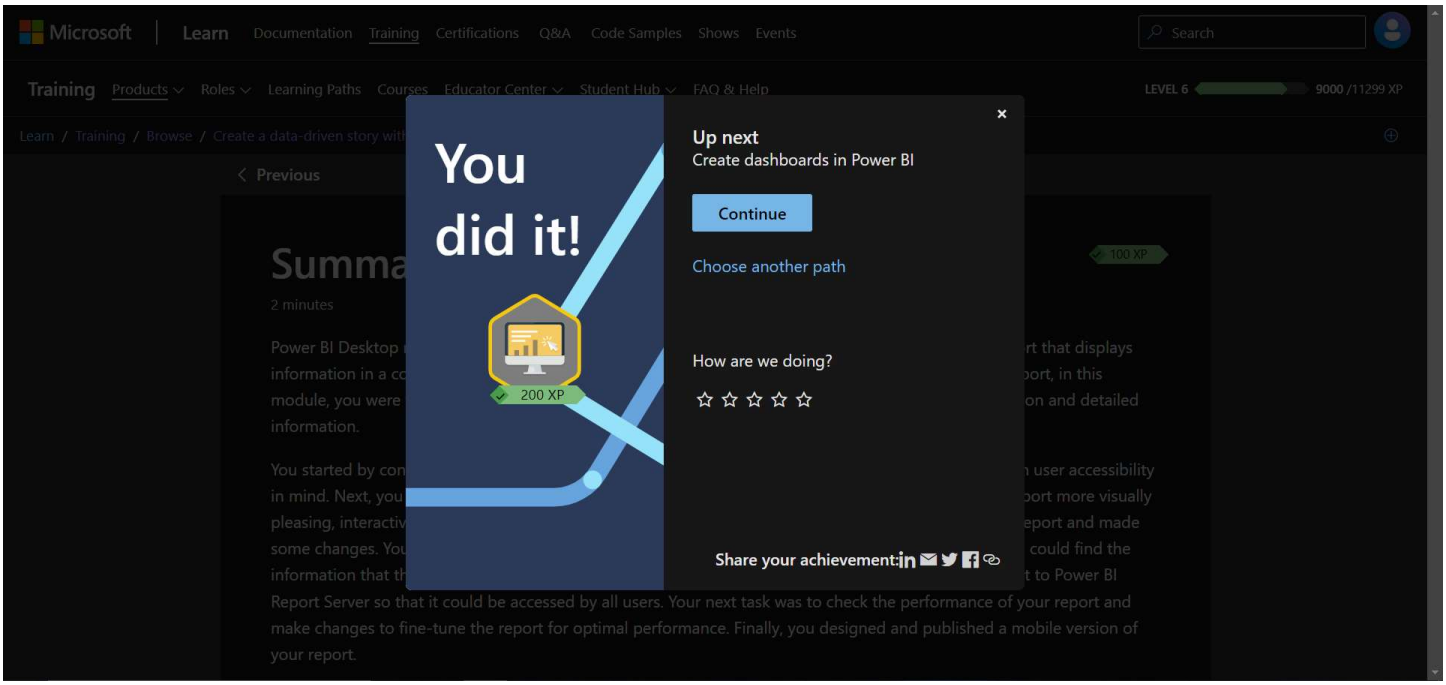
Page type

2. How can you analyze performance of each of your report elements?

By using performance analyzer

3. Can you use bookmarks to create a slide show in Power BI?

Yes, you can, by adding buttons as navigation to go between saved bookmarks.



Knowledge Check (Lesson 8)

1. What is the benefit of using a report tooltip?

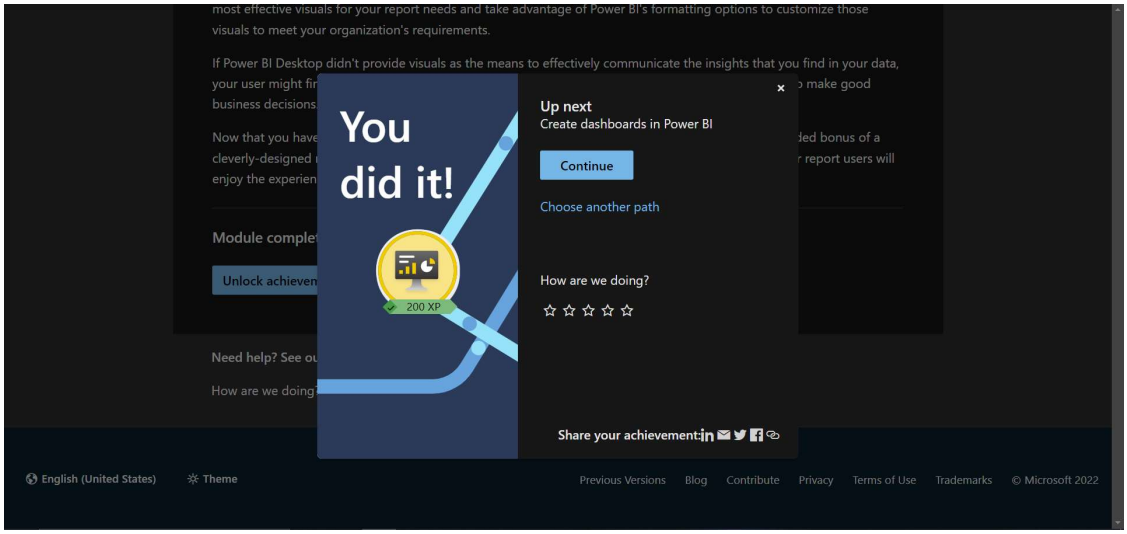
To provide additional detail that is specific to the context of the data that is being hovered over.

2. Which of the following options isn't one of the four components in the Q&A visualization?

Automatic creation of a custom tooltip

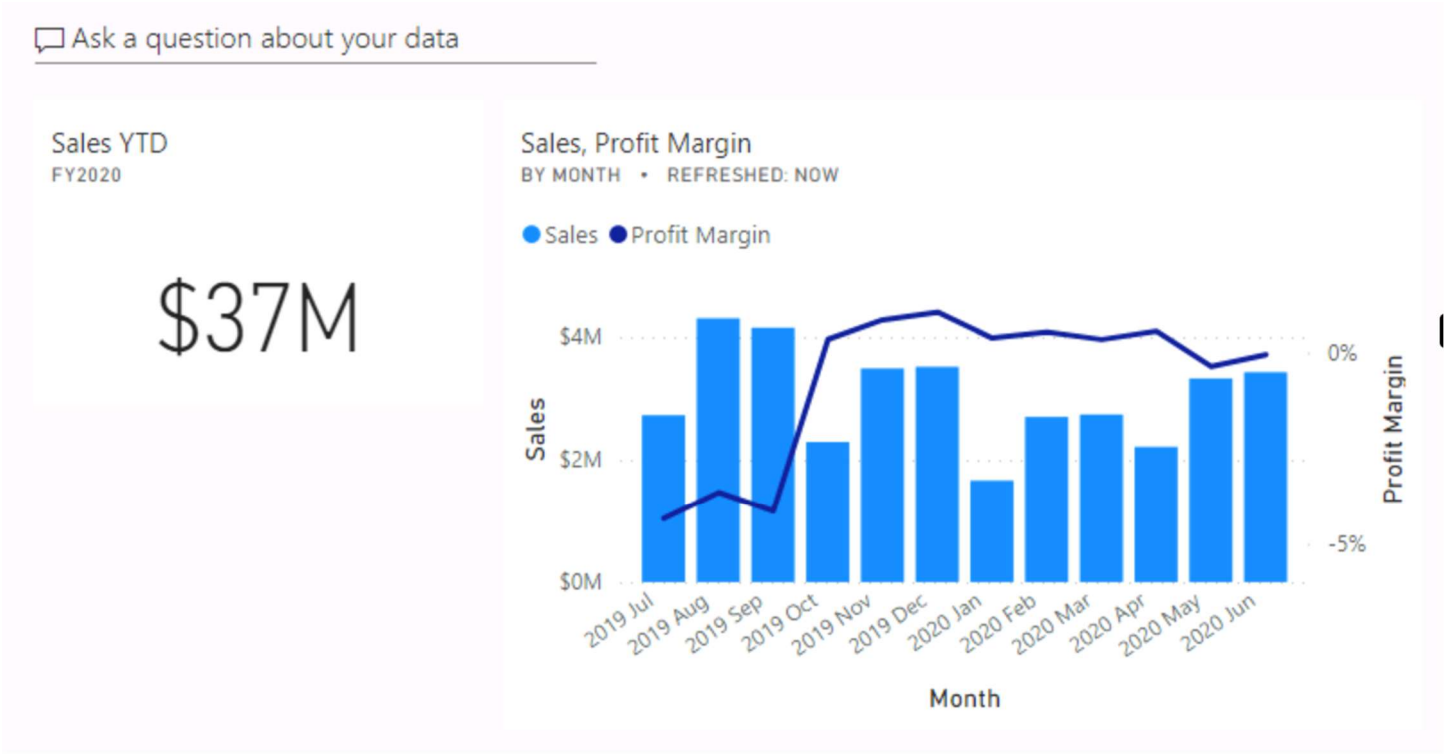
3. Do you need to import custom visuals each time you want to use them when you're developing a new report, not an existing report?

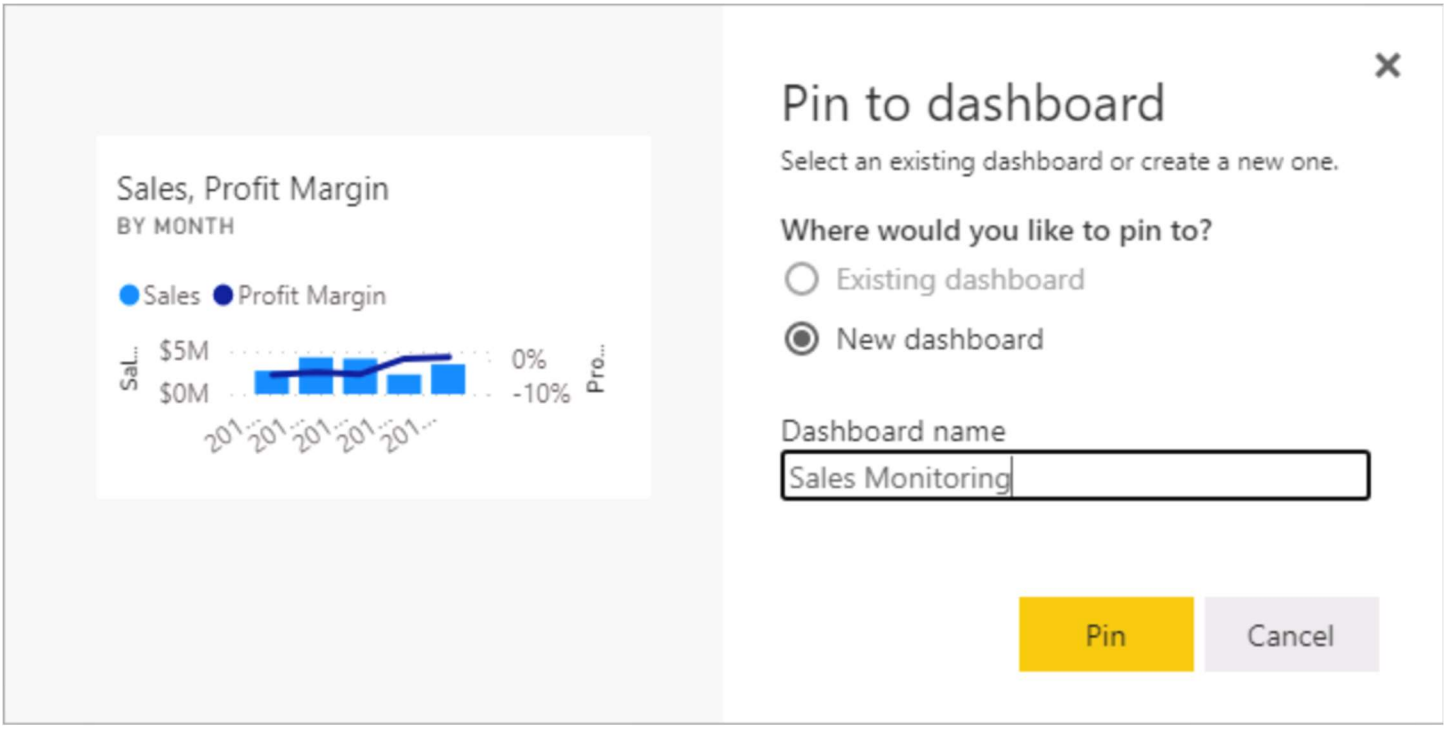
Yes, custom visuals must be imported from AppSource each time you start developing a new report.



Module 10 - Create dashboards in Power BI

Exercise 9: Create a Power BI dashboard





Skills learned in Exercise 9:

- Setting mobile view.
- Adding a theme to the visuals in your dashboard.
- Configuring data classification.
- Adding real-time dataset visuals to your dashboards.
- Pinning a live report page to a dashboard.

Knowledge Check

1. What is a dashboard?

A canvas of report elements that can be built in Power BI service

2. What is one way that reports and dashboards differ?

You can only build reports and dashboards in Power BI service.

3. Where can you configure and set data alerts?

Data alerts can be set only in Power BI service on specific visuals such as KPI cards, gauges, and cards.

< No achievement for this lesson >

Module 11: Perform analytics in Power BI

Skills explored this lesson

- Explore statistical summary.
- Identify outliers with Power BI visuals.
- Group and bin data for analysis.
- Apply clustering techniques.
- Conduct time series analysis.
- Use the Analyze feature.
- Use advanced analytics custom visuals.
- Review Quick insights.
- Apply AI Insights.

Knowledge Check

1. What Power BI feature can give an in-depth analysis of the distribution of data?

The Analyze feature allows a user to understand why the distribution looks the way that it does.

2. Where are time series charts located?

Time series charts can be imported from AppSource.

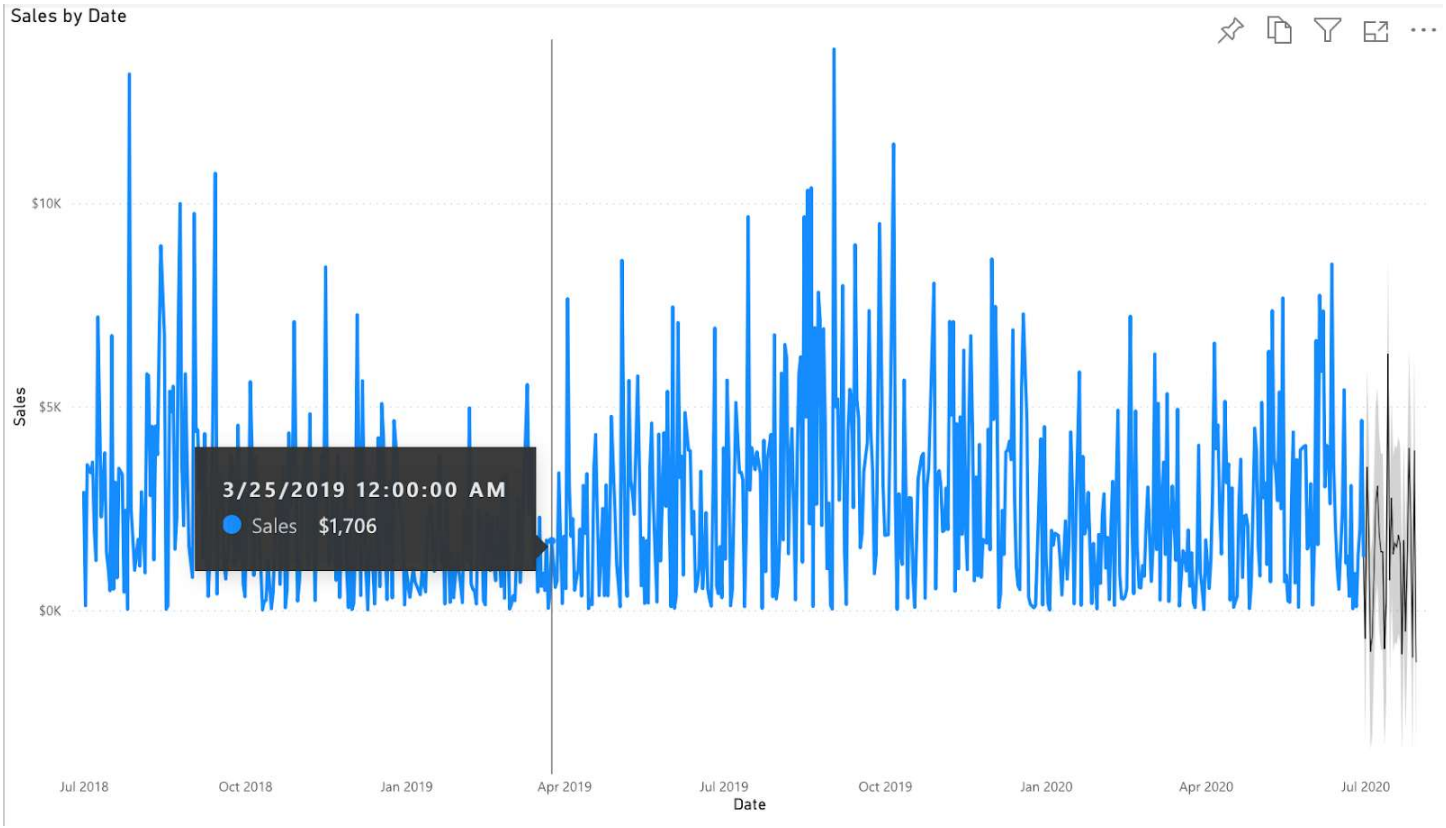
3. What visual should be used to display outliers?

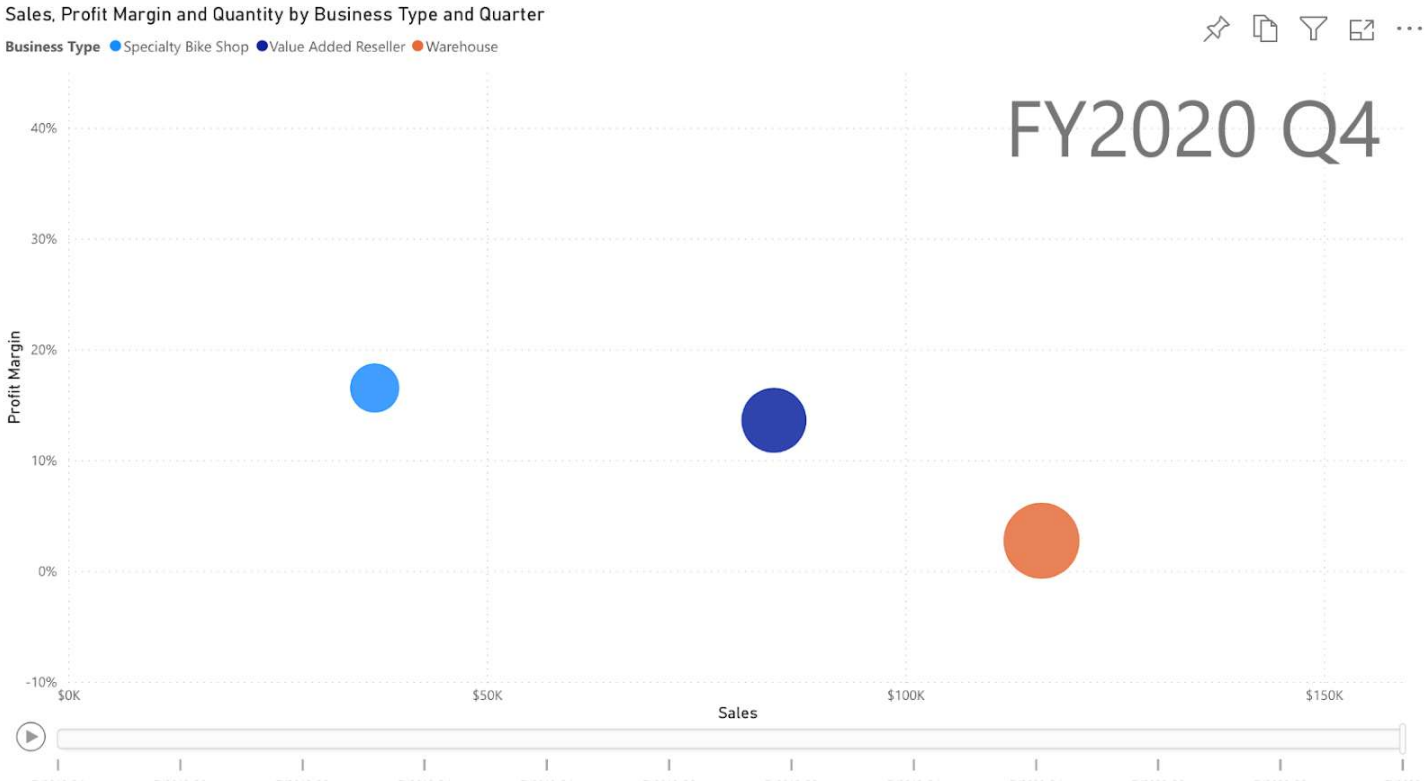
The scatter chart is best-suited to display outliers.

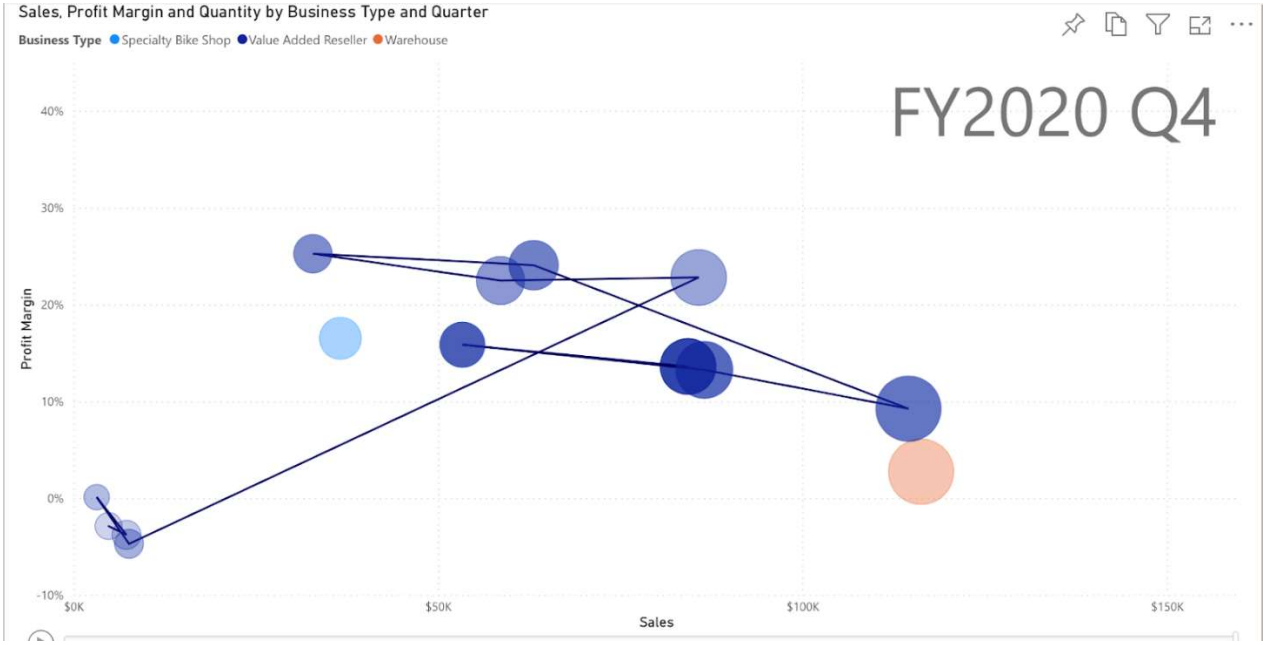
< No achievement for this lesson >

Module 12: Work with AI visuals in Power BI

Exercise 10 - Analyze data with AI visuals


Sales by Date
$10K
$5K
$0K
Sales
3/25/2019 12:00:00 AM
Sales $1,706
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Apr 2020
Jul 2020
Date


Sales, Profit Margin and Quantity by Business Type and Quarter
Business Type Specialty Bike Shop Value Added Reseller Warehouse
FY2020 Q4
40%
30%
20%
10%
0%
-10%
Profit Margin
$0K
$50K
$100K
$150K
Sales



Skills gained from Exercise 10:

- Use the Q&A visual.
- Find important factors with the Key influencers visual.
- Use the Decomposition Tree visual to break down a measure.

Knowledge Check

1. What does the AI splits feature do?

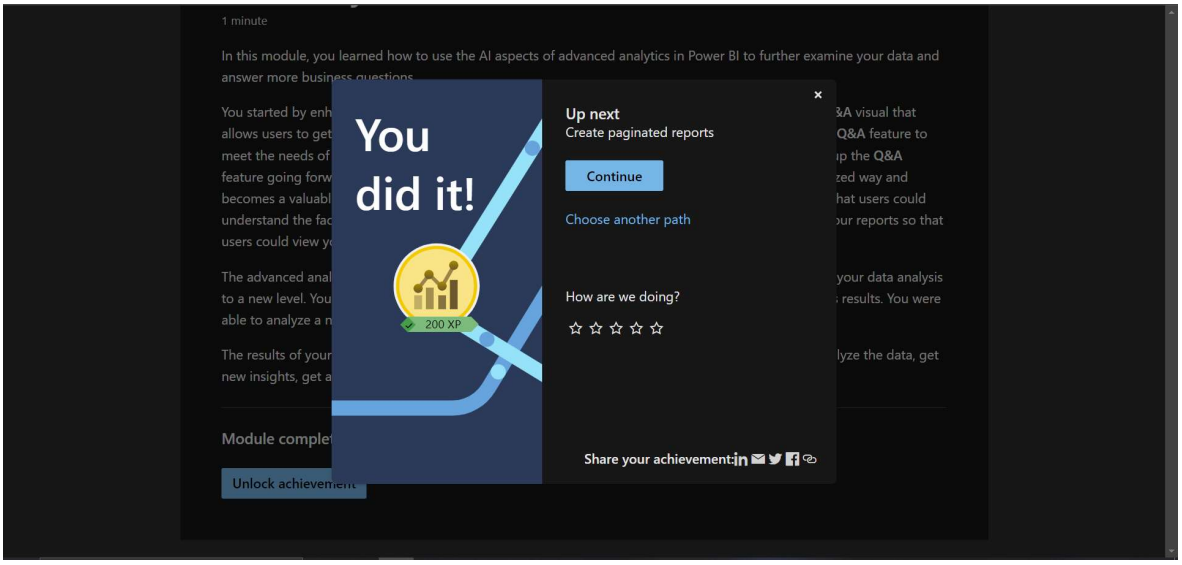
AI splits work by considering all available fields and determining which one to drill into to get the highest/lowest value of the measure that is being analyzed.

2. Can you access the Q&A feature by using buttons?

Yes, you can access the Q&A feature by selecting Q&A button type.

3. Which of the following selections is NOT a feature of the Q&A visual?

Searching for help topics about Power BI.



Module 13: Create and manage workspaces in Power BI

Benefits of workspaces:

- Focused collaboration efforts. You can use workspaces to house reports and dashboards for use by multiple teams.
- Ability to share and present reports and dashboards in a single environment.
- Assurance that the highest level of security is maintained by controlling who can access datasets, reports, and dashboards.

Skills learned:

- Distribute a report or dashboard
- Monitor usage and performance
- Recommend a development life cycle strategy
- Troubleshoot data by viewing lineage
- Configure data protection

Knowledge Check:

1. How is the Admin workspace role different from other types of workspace roles?

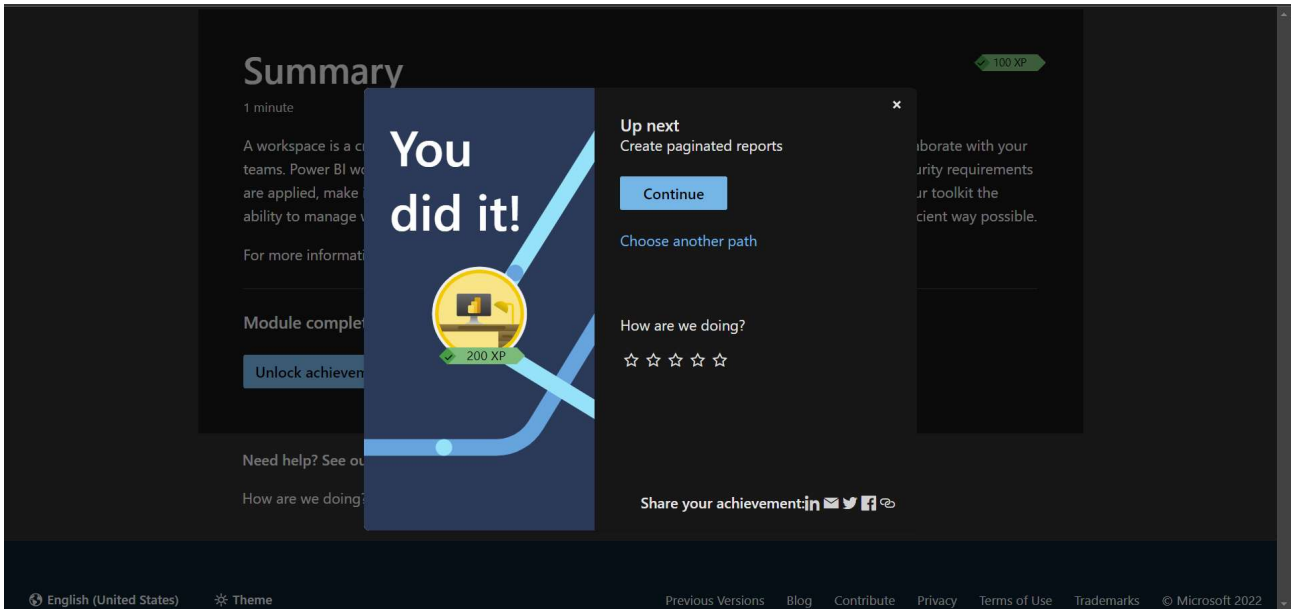
Admin is the only role that can remove users.

2. Which one of the following options is the best description of a workspace?

A workspace is a centralized location or repository that allows you to collaborate with colleagues and teams to create collections of reports, dashboards, and so on.

3. What feature in Power BI service can you use to troubleshoot the flow of data from its source to its destination?

Lineage view



Module 14: Manage datasets in Power BI

Skills learned:

- Create dynamic reports with parameters.
- Create what-if parameters.
- Use a Power BI gateway to connect to on-premises data sources.
- Configure a scheduled refresh for a dataset.
- Configure incremental refresh settings.
- Manage and promote datasets.
- Troubleshoot service connectivity.

Knowledge Check:

1. Where are dataset-scheduled refreshes configured?

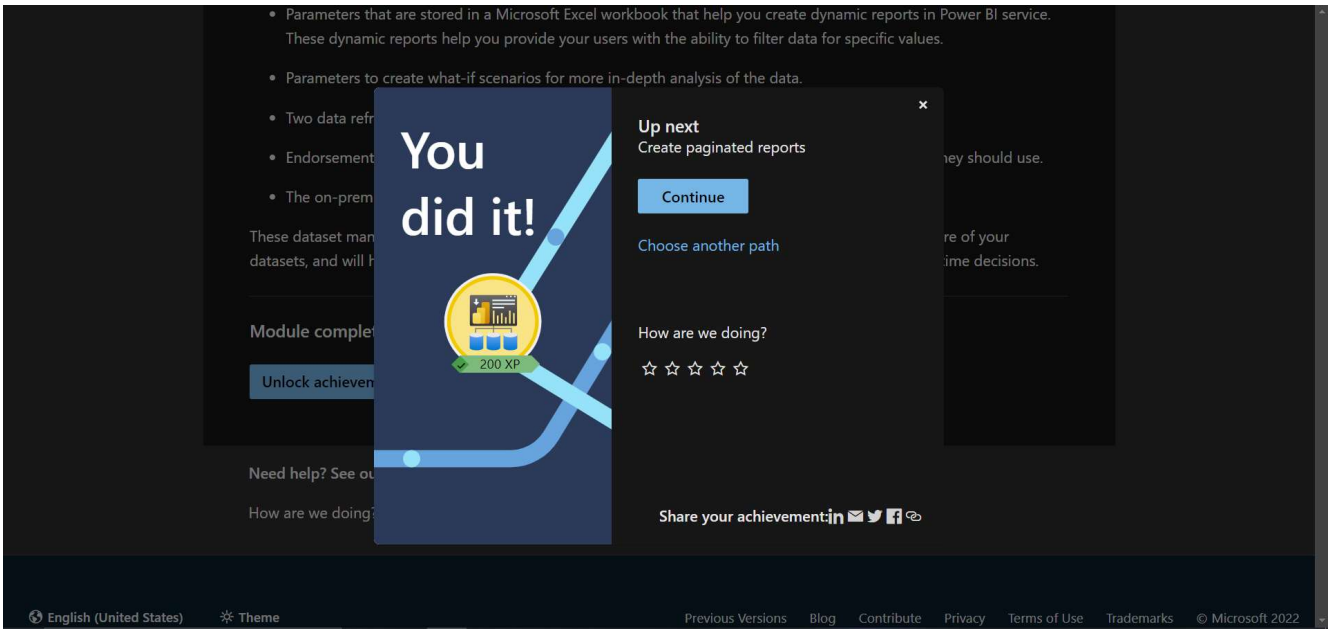
Power BI service

2. What reserved parameters configure the start and end of where Incremental refresh should occur?

RangeStart and RangeEnd

3. What is the difference between Promotion and Certification when you are endorsing a dataset?

Promotion is for broad usage while Certification needs permission granted on the Admin Tenant settings.



Module 15: Implement row-level security

Skills Learned

- Static method of row-level security
- Dynamic method of row-level security

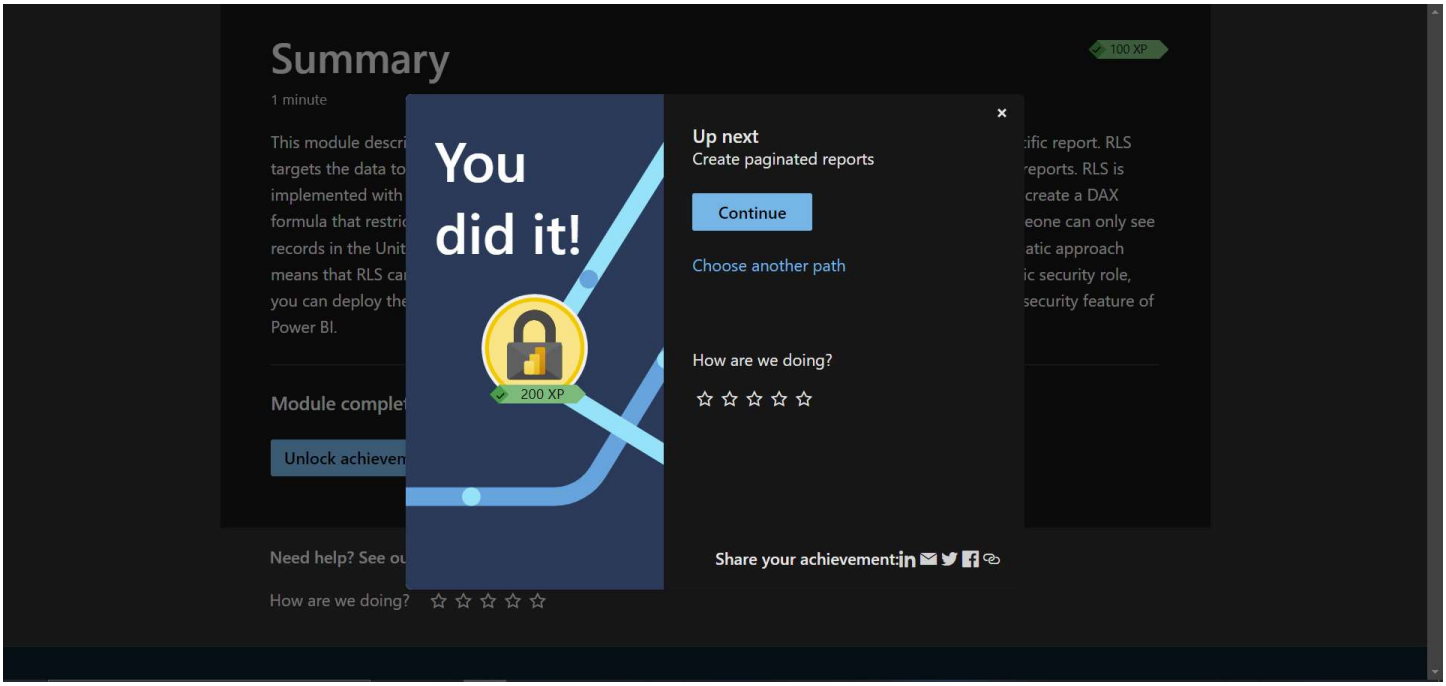
Knowledge Check

1. Which function will tell you the username of the person who is signed in to Power BI service?

USERPRINCIPALNAME()

2. Where can you test RLS by using different security roles?

Both Power BI Desktop and Power BI service



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https://learn.microsoft.com/en-us/users/31355918/transcript/7o5pqi3ozel1myj?username=31355918&section=activity