



Power BI

Dashboard in a Day

by Power BI Team, Microsoft



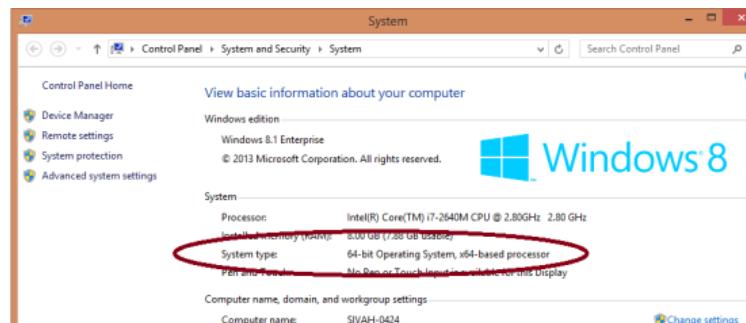
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Lab Prerequisites

Following prerequisites and setup must be complete for successful completion of the exercise:

- You must be connected to the internet.
- **Signup for Power BI:** Go to <http://aka.ms/pbidiadtraining> and sign up for Power BI with a business email address. If you cannot sign up for Power BI, let the instructor know.
- If you have an existing account, please go to <http://app.powerbi.com> and **Sign in** using your **Power BI Account**.
- At minimum, a computer with 2-cores and 4GB RAM running one of the following version of Windows: Windows 10, Windows 7, Windows 8 (64-bit preferred), Windows 8.1, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2.
- Microsoft Power BI Desktop requires Internet Explorer 9 or greater.
- Verify if you have 32-bit or 64-bit operating system to decide if you need to install the 32-bit or 64-bit applications.
 - Search for computer on your PC, right click properties for your computer.
 - You will be able to identify if your operating system is 64 or 32 bit based on “system type” as shown below.



- **Download the Power BI Content:** Create a folder called **DIAD** on the C drive of your local machine. Copy all contents from the folder called **Dashboard in a Day Assets** on the flash drive to the **DIAD** folder you just created (C:\DIAD).
- **Download and install Power BI Desktop:** Download and install Microsoft Power BI Desktop from <http://www.microsoft.com/en-us/download/details.aspx?id=45331>. Optionally, you can also install the Power BI Desktop tool from the Install folder on the flash drive. Please choose appropriate 64-bit or 32-bit version depending on your platform. Microsoft Power BI Desktop is available for 32-bit (x86) and 64-bit (x64) platforms.
- **Download Microsoft On-premises Data Gateway** from <https://powerbi.microsoft.com/en-us/gateway> . We will walk through the **Installation** steps in this lab under “Refreshing data on the Dashboard” section.

- Download and install the Microsoft Power BI Mobile app for Windows.

Document Structure

This document has two main sections:

- **Power BI Desktop:** This section highlights the features available in Power BI Desktop and walks the user through the process of bringing in data from the data source, modeling and creating visualizations.
- **Power BI Service:** This section highlights the features available in Power BI Service including the ability to publish the Power BI Desktop model to the web, creating and sharing dashboard and Power Q & A.

The document flow is in a table format. On the left panel are steps the user needs to follow and in the right panel are screenshots to provide a visual aid for the users. In the screenshots, sections are highlighted with red boxes to highlight the action/area user needs to focus on.

NOTE: This lab is using real anonymized data and is provided by ObviEnce LLC. Visit their site to learn about their services: www.obvience.com.

This data is property of ObviEnce LLC and has been shared for the purpose of demonstrating PowerBI functionality with industry sample data.

Any uses of this data must include this attribution to ObviEnce LLC.

Overview

Introduction

Today you will be learning various key features of the Power BI service. This is an introductory to intermediate course intended to learn how to author reports using Power BI Desktop and create operational dashboards via the Power BI Service.

Data Set

The dataset you will use today is a sales and market share analysis. This type of analysis is very common for the office of a Chief Marketing Officer (CMO). Unlike the office of the Chief Financial Officer (CFO), a CMO is focused not only on company's performance internally (how well do our products sell) but also externally (how well do we do against the competing products).

The company, VanArsdel, manufactures expensive electronic products that could be used for fun as well as work and it sells them directly to consumers nationwide as well as several other countries. VanArsdel and its competitors have retained a 3rd party marketing company to collect and anonymize industry sales so that all participants can benchmark themselves.

Course Outline

1. Power BI Desktop
2. Power BI Service – Part I
3. Power BI Service – Part II
4. Q&A
5. Create your own Dashboard

Power BI Desktop

Importing Data

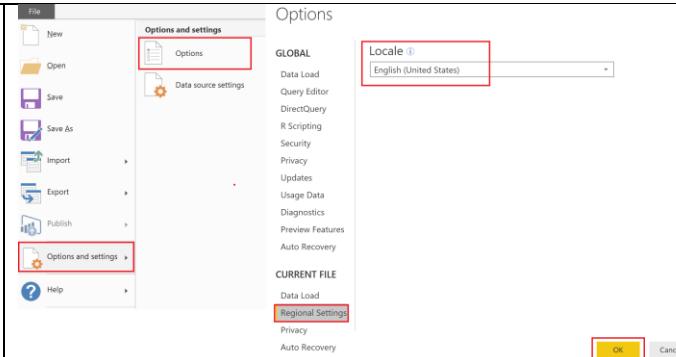
In this section, you will be importing sales data of VanArsdel and competing companies within United States. In addition, you also will be merging sales data from other countries.

Power BI Desktop - Load Data

Steps	Power BI Desktop		
<ol style="list-style-type: none">1. If you don't have the Power BI Desktop open, launch it now.2. Startup screen opens. Click on Sign In and sign in using your Power BI credentials. Signing in to Power BI Desktop helps later when you are publishing to Power BI Service.		<p>WHAT'S NEW Take a look at what's new and improved in Power BI in this month's update.</p> <p>POWER BI BLOG Keep up to date with the latest news, resources, and updates from the Power BI team.</p> <p>FORUMS Visit the Power BI Forum to ask questions or interact with other users in the Power BI community.</p> <p>Microsoft Data Insights Summit June 12-13, 2017 Seattle, WA From data to insights to action – faster than ever Register now </p>	

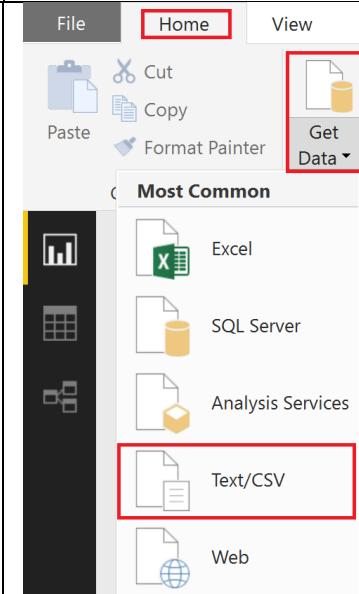
Let's set up the locale to US English, to make it convenient to go through the rest of this lab.

3. From the ribbon, select **File -> Options and settings -> Options**.
4. In the left panel of Options dialog, select **Regional Settings**.
5. From the **Locale** drop down select **English (United States)**.



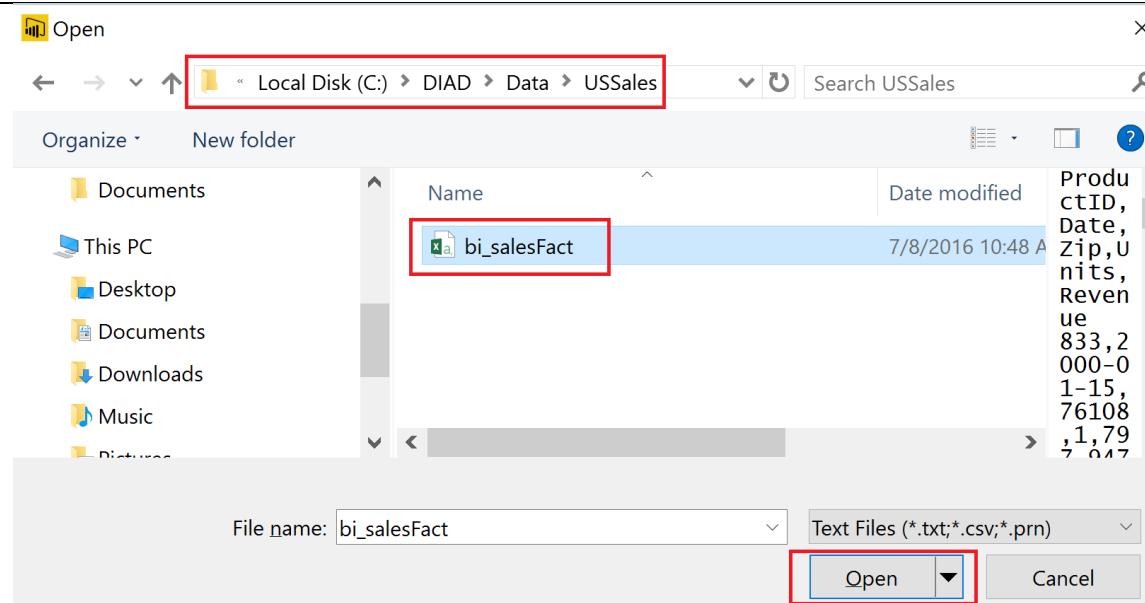
First step is to [load data](#) to Power BI Desktop. We will load USA Sales data which is in CSV files.

6. From the ribbon, select **Home -> Get Data**.
7. Select **Text/CSV**.



8. Browse to **DIAD\Data\USSales** folder and select **bi_salesFact.csv**.

9. Click Open.



Power BI detects the data type of each column. There are options to detect the data type based on the first 200 rows or based on the entire dataset or not detect it. Since our dataset is large and it will take time and resources to scan the complete data set, let's leave the default option of selecting dataset based on the first 200 rows.

After completing your selection, you have three options – Load, Edit or Cancel.

- **Load**, loads the data from the source into Power BI Desktop for you to start creating reports.
- **Edit** allows you to perform data shaping operations such as merging columns, adding additional columns,

- changing data types of columns as well as bringing in additional data.
- **Cancel** gets you back to the main canvas.

10. Click **Edit** as shown in the diagram. Now you have loaded the Sales data into the file.

You should be in the Query Editor window as shown in the picture to the right. Notice data type of each field is indicated next to the column header.

Note: You will be bringing in sales data from other countries as well as performing certain data shaping operations.

11. Notice Power BI has set Zip field to data type Whole Number. To ensure that Zip codes which start with zero don't lose the leading zero, we will format them as text. Highlight the **Zip column** and change the **Data Type** to **Text**.

12. **Change Column Type** dialog opens. Select **Replace Current** button.

The image contains two screenshots of the Power BI Query Editor interface, illustrating the process of changing a column's data type.

Screenshot 1 (Top): Shows the 'Query Editor' ribbon tab selected. A screenshot of the 'Properties' pane on the right indicates that the 'Data Type' for the 'Zip' column is currently set to 'Whole Number'. The 'Zip' column in the data grid is highlighted with a red box.

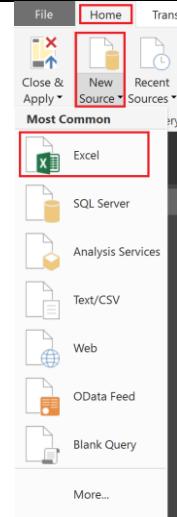
ProductID	Date	Zip	Units	Revenue
1	1/15/2000	76108	1	797.9475
2	1/15/2000	33436	1	813.6975
3	1/15/2000	76531	1	813.6975
4	1/15/2000	29526	1	934.4475
5	1/15/2000	33584	1	944.9475
6	1/15/2000	33947	1	944.9475
7	1/15/2000	74132	1	929.1975

Screenshot 2 (Bottom): Shows the 'Properties' pane with the 'Data Type' dropdown open, displaying options like Decimal Number, Fixed Decimal Number, Whole Number, Percentage, Date/Time, etc. A large red box highlights the 'Text' option at the bottom of the list. A callout box with the text 'IMPORTANT! Changing the data type is a big deal to use later' is overlaid on the interface.

ProductID	Date	Zip	Units	Revenue
1	1/15/2000	76108	1	797.9475
2	1/15/2000	33436	1	813.6975
3	1/15/2000	76531	1	813.6975
4	1/15/2000	29526	1	934.4475
5	1/15/2000	33584	1	944.9475
6	1/15/2000	33947	1	944.9475
7	1/15/2000	74132	1	929.1975
8	1/15/2000	75080	1	944.9475

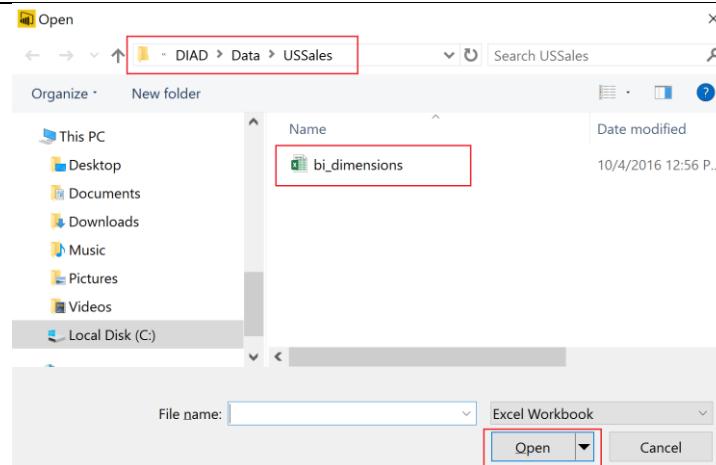
Now let's get the data that is in excel source file.

13. From the ribbon, select **Home** -> **New Source** -> **Excel**.



14. Browse to **DIAD\Data\USSales** folder and select **bi_dimensions.xlsx**.

Navigator dialog opens.



15. In the Navigator window select all the tables. Select each **table** to preview the columns and rows.

Note: The first four items are the named Excel Tables and the second set are the Excel Worksheet names. Table names are differentiated from Worksheet names by using different icons.

The preview window retrieves a sample of data and shows the data for you to understand the columns, data type and the data.

16. Click **OK** to edit these tables in the query editor.

Notice 4 new queries are added to the query editor.

Navigator

Display Options

bi_dimensions.xlsx [8]

bi_date
bi_geo
bi_manufacturer
bi_product

bi_product

ProductID	Product	Category	Segment	ManufacturerID
1	Abbas MA-01	Mix	All Season	1
2	Abbas MA-02	Mix	All Season	1
3	Abbas MA-03	Mix	All Season	1
4	Abbas MA-04	Mix	All Season	1
5	Abbas MA-05	Mix	All Season	1
6	Abbas MA-06	Mix	All Season	1
7	Abbas MA-07	Mix	All Season	1
8	Abbas MA-08	Mix	All Season	1
9	Abbas MA-09	Mix	All Season	1
10	Abbas MA-10	Mix	All Season	1
11	Abbas MA-11	Mix	All Season	1
12	Abbas MA-12	Mix	All Season	1
13	Abbas MA-13	Mix	All Season	1
14	Abbas MA-14	Mix	All Season	1
15	Abbas MA-15	Mix	All Season	1

OK Cancel

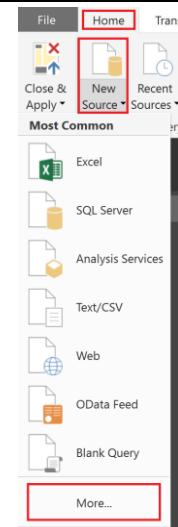
Power BI Desktop - Adding additional data

Your international subsidiaries have agreed to provide their sales data so that the company's sales can be analyzed together. You've created a folder where they will each put their data.

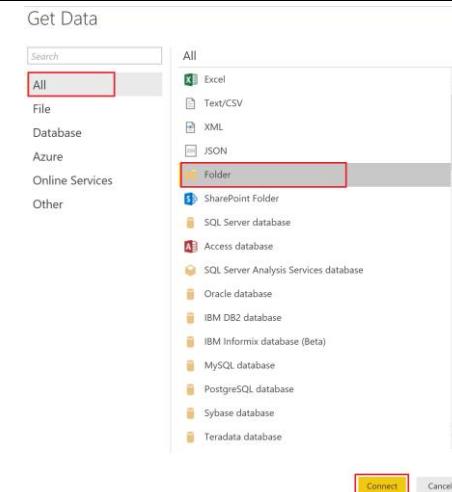
To analyze all the data together you will want to import the new data from each of the subsidiaries and combine it with the US Sales you loaded earlier.

17. Click on the **New Source** drop down in the Home menu tab of the Query Editor.
18. Select **More...** as shown in the figure.

Get Data dialog opens



19. In the Get Data dialog select **Folder** as shown in the diagram.
20. Click **Connect**.



Folder dialog opens.

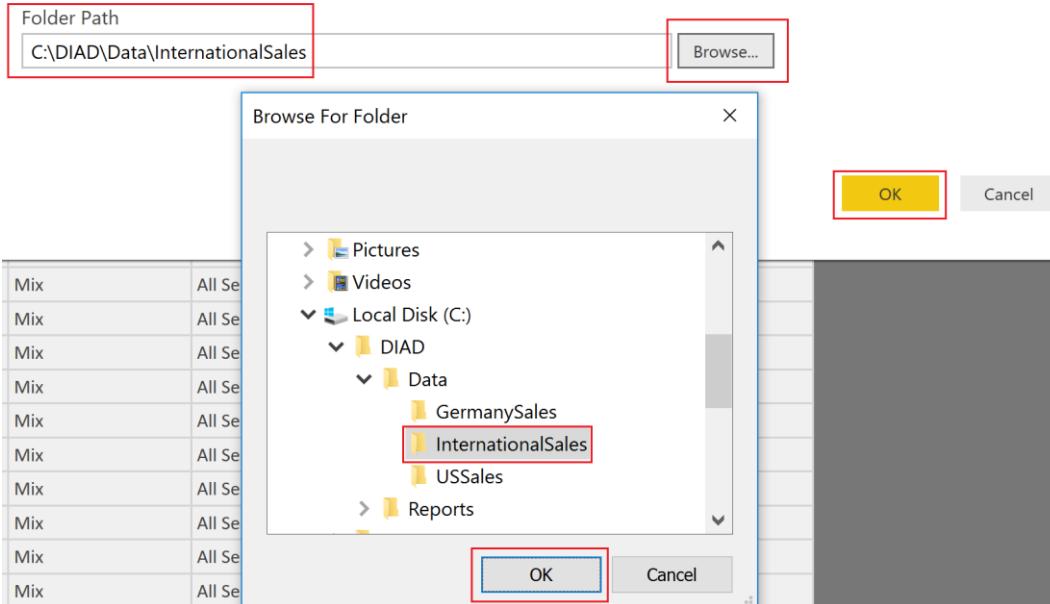
21. Click **Browse...** button.
22. In the **Browse for Folder** dialog navigate to the location where you unzipped the class files.
23. Open the **DIAD** folder.
24. Open the **Data** folder.
25. Select the **InternationalSales** folder.
26. Click **OK** (to close the **Browse for Folder** dialog box).
27. Click **OK** (to close the **Folder** dialog box).

Note: This approach, uses folders instead of individual files. This will load all files in the folder. This is useful when you have a group that puts files on an ftp site each month and you are not always sure of the names of the files or the number of files.

Note: All the files must be of the same file type with columns in the same order.

Folder

Choose a folder.



Dialog displays the list of files in the folder.

28. Since we want to combine data, click **Combine & Edit**.

Note: Date accessed, Date modified and Date created might be different compared to the dates displayed in the screenshot.

C:\DIAD\Data\InternationalSales

Content	Name	Extension	Date accessed	Date modified	Date created	Attributes	Folder Path
Binary	AU Sales.csv	.csv	4/24/2017 10:44:50 PM	4/24/2017 9:17:49 PM	4/24/2017 10:44:50 PM	Record	C:\DIAD\Data\InternationalSales\
Binary	CA Sales.csv	.csv	12/5/2016 10:54:33 AM	7/22/2016 1:53:15 PM	12/5/2016 10:54:33 AM	Record	C:\DIAD\Data\InternationalSales\
Binary	FR Sales.csv	.csv	12/5/2016 10:54:33 AM	7/22/2016 1:53:26 PM	12/5/2016 10:54:33 AM	Record	C:\DIAD\Data\InternationalSales\
Binary	JP Sales.csv	.csv	4/24/2017 10:44:50 PM	4/24/2017 9:29:01 PM	4/24/2017 10:44:50 PM	Record	C:\DIAD\Data\InternationalSales\
Binary	MX Sales.csv	.csv	12/5/2016 10:54:33 AM	7/22/2016 1:53:34 PM	12/5/2016 10:54:33 AM	Record	C:\DIAD\Data\InternationalSales\

Combine & Edit Edit Cancel

CSV dialog opens. By default, Power BI again detects the data type based on the first 200 rows.

Notice there is an option to select various file Delimiters. The file we are working with is Comma delimited, so let's leave Delimiter option as Comma.

There is also an option to select each individual file in the folder (using Example File dropdown) to validate the format of the files.

29. Select **OK**.

Combine Files

Specify the settings for each file. [Learn more](#)

ProductID	Date	Zip	Units	Revenue	Country
2331	2002-02-14	3042	1	540.697500	Australia
733	2004-07-10	1022	1	330.697500	Australia
753	2004-07-10	838	1	246.697500	Australia
964	2004-07-10	1158	1	320.197500	Australia
400	2004-07-10	854	1	772.275000	Australia
499	2004-07-10	854	1	911.662500	Australia
683	2002-02-08	9009	1	839.737500	Australia
714	2002-02-08	1117	1	162.697500	Australia
1105	2002-02-08	7907	1	246.697500	Australia
1451	2002-02-08	1206	1	367.395000	Australia

Skip files with errors

OK **Cancel**

You will be in the **Query Editor** window with a new query called **InternationalSales**.

30. If you do not see the **Queries** pane on left, click on the > icon to expand.

31. If you do not see the **Query Settings** pane on the right as shown in the figure, click on **View** in the ribbon and click **Query Settings** to see the pane.

32. Click on the Query **InternationalSales**.

File Home Transform Add Column **View**

Query Settings

Properties

Name: InternationalSales

Applied Steps

Source
Invoke Custom Function1
Renamed Columns1
Removed Other Columns1
Expanded Table Column1
Changed Type

Queries [10]

- Transform File from InternationalSales [3]
 - Sample Query [2]
 - Sample File Parameter1 (Sample File)
 - Sample File
 - Transform Sample File from InternationalSales
 - Transform File from InternationalSales
- Other Queries [6]
 - bi_salesFact
 - bi_date
 - bi_geo
 - bi_manufacturer
 - bi_product
 - InternationalSales

Source.Name	ProductID	Date	Zip	Units	Revenue	Country
1 AU Sales.csv	2331	2/14/2002	3042	1	540.6975	Australia
2 AU Sales.csv	733	7/10/2004	1022	1	330.6975	Australia
3 AU Sales.csv	753	7/10/2004	838	1	246.6975	Australia
4 AU Sales.csv	964	7/10/2004	1158	1	320.1975	Australia
5 AU Sales.csv	400	7/10/2004	854	1	772.275	Australia
6 AU Sales.csv	499	7/10/2004	854	1	911.6625	Australia
7 AU Sales.csv	683	2/8/2002	9009	1	839.7375	Australia
8 AU Sales.csv	714	2/8/2002	1117	1	162.6975	Australia
9 AU Sales.csv	1105	2/8/2002	7907	1	246.6975	Australia
10 AU Sales.csv	1451	2/8/2002	1206	1	367.395	Australia
11 AU Sales.csv	1990	2/8/2002	1730	1	262.4475	Australia
12 AU Sales.csv	2056	2/8/2002	1741	1	325.4475	Australia
13 AU Sales.csv	2400	2/8/2002	1120	1	89.1975	Australia
14 AU Sales.csv	396	2/8/2002	1710	1	892.2375	Australia
15 AU Sales.csv	445	2/8/2002	1233	1	860.475	Australia

Notice that column Zip is of type Whole Number. Let's change it to Text as before.

33. Highlight the **Zip** column and change the **Data Type** to **Text**.
34. **Change Column Type** dialog opens. Select **Replace Current** button.

The screenshot shows the Power BI Data Editor interface. The 'Home' tab is selected in the ribbon. In the main area, there is a table with columns: Source.Name, ProductID, Date, Zip, and Revenue. The 'Zip' column is highlighted with a red box. A context menu is open over the 'Zip' column, and the 'Data Type' option is selected, showing a dropdown menu with 'Text' highlighted. A callout box with the text 'IMPORTANT! Changing the data type is a big deal to use later' is overlaid on the table area.

Source.Name	ProductID	Date	Zip	Revenue
AU Sales.csv	2331	2/14/2002	3042	540.6975
AU Sales.csv	733	7/10/2004	1022	330.6975
AU Sales.csv	753	7/10/2004	838	246.6975
AU Sales.csv	964	7/10/2004	1158	320.1975
AU Sales.csv	400	7/10/2004	854	772.275
AU Sales.csv	499	7/10/2004	854	911.6625
AU Sales.csv	683	2/8/2002	9009	839.7375
AU Sales.csv	714	2/8/2002	1117	162.6975
AU Sales.csv	1105	2/8/2002	7907	246.6975
AU Sales.csv	1451	2/8/2002	1206	367.395
AU Sales.csv	1990	2/8/2002	1730	262.4475
AU Sales.csv	2056	2/8/2002	1741	325.4475
AU Sales.csv	2400	2/8/2002	1120	89.1975
AU Sales.csv	396	2/8/2002	1710	892.2375
AU Sales.csv	445	2/8/2002	1233	860.475

In Queries panel, notice Transform Binary from International Sales folder is created. This contains the function used to load each of the files in the folder.

If you compare this table and **bi_salesFact** table you imported earlier, you will see the **InternationalSales** table contains two new columns, **Source.Name** and **Country**.

The screenshot shows the Power BI Data Editor interface. The 'Home' tab is selected in the ribbon. In the main area, there is a table with columns: Source.Name, ProductID, Date, Zip, Units, Revenue, and Country. The 'Country' column is highlighted with a red box. A context menu is open over the 'Country' column, and the 'Data Type' option is selected, showing a dropdown menu with 'Text' highlighted. The 'Source.Name' column is also highlighted with a red box.

Source.Name	ProductID	Date	Zip	Units	Revenue	Country
AU Sales.csv	2331	2/14/2002	3042	1	540.6975	Australia
AU Sales.csv	733	7/10/2004	1022	1	330.6975	Australia
AU Sales.csv	753	7/10/2004	838	1	246.6975	Australia
AU Sales.csv	964	7/10/2004	1158	1	320.1975	Australia
AU Sales.csv	400	7/10/2004	854	1	772.275	Australia
AU Sales.csv	499	7/10/2004	854	1	911.6625	Australia
AU Sales.csv	683	2/8/2002	9009	1	839.7375	Australia
AU Sales.csv	714	2/8/2002	1117	1	162.6975	Australia
AU Sales.csv	1105	2/8/2002	7907	1	246.6975	Australia
AU Sales.csv	1451	2/8/2002	1206	1	367.395	Australia
AU Sales.csv	1990	2/8/2002	1730	1	262.4475	Australia
AU Sales.csv	2056	2/8/2002	1741	1	325.4475	Australia
AU Sales.csv	2400	2/8/2002	1120	1	89.1975	Australia
AU Sales.csv	396	2/8/2002	1710	1	892.2375	Australia
AU Sales.csv	445	2/8/2002	1233	1	860.475	Australia

35. We do not need Source.Name column.
 Select **Source.Name** column. From the ribbon, select **Home -> Remove Columns -> Remove Columns.**

The screenshot shows the Power BI desktop interface. The ribbon is open with the 'Home' tab selected. In the 'Columns' section of the ribbon, the 'Remove Columns' button is highlighted with a red box. Below the ribbon, the 'Queries [10]' pane is visible, showing a list of queries including 'Transform File from InternationalSales [3]', 'Sample Query [2]', and 'Other Queries [6]'. The 'InternationalSales' query is selected and highlighted with a red box. To the right of the pane is a data grid displaying 15 rows of sales data. The first column is labeled 'Source.Name' and is also highlighted with a red box.

	Source.Name	ProductID	Date
1	AU Sales.csv	2331	2/14/2002
2	AU Sales.csv	733	7/10/2004
3	AU Sales.csv	753	7/10/2004
4	AU Sales.csv	964	7/10/2004
5	AU Sales.csv	400	7/10/2004
6	AU Sales.csv	499	7/10/2004
7	AU Sales.csv	683	2/8/2002
8	AU Sales.csv	714	2/8/2002
9	AU Sales.csv	1105	2/8/2002
10	AU Sales.csv	1451	2/8/2002
11	AU Sales.csv	1990	2/8/2002
12	AU Sales.csv	2056	2/8/2002
13	AU Sales.csv	2400	2/8/2002
14	AU Sales.csv	396	2/8/2002
15	All Sales.csv	445	2/8/2002

36. Click on the drop down next to **Country** column to see the unique values.
 37. You will only see Australia as shown in the figure. Click on **Load more** to validate you have data from various countries included.

The screenshot shows the Power BI desktop interface with the 'InternationalSales' query selected. The data grid displays 17 rows of sales data. The 'Country' column header is highlighted with a red box. A context menu is open over the 'Country' column, listing options such as 'Sort Ascending', 'Sort Descending', 'Clear Filter', 'Remove Empty', and 'Text Filters'. Under 'Text Filters', there is a checkbox for '(Select All)' which is checked, and another checkbox for 'Australia' which is also checked. At the bottom of the menu, there is a note 'List may be incomplete.' followed by 'Load more' and 'OK' buttons.

You will see the countries, Australia, Canada, France, Japan and Mexico.

38. Click **OK**.

Note: You can perform various types of Filters, sorting ascending/descending operations using the drop down to verify your data import and shaping operations.

The screenshot shows the Power BI Desktop interface. On the left, the 'Queries [10]' pane is open, displaying a list of queries including 'Transform File from InternationalSales [3]', 'Sample Query [2]', 'Other Queries [6]', and 'InternationalSales'. The 'InternationalSales' query is selected and highlighted with a red box. To the right, a data preview table is shown with columns: ProductID, Date, Zip, Units, Revenue, and Country. A context menu is open over the table, with the 'Country' column selected. The menu includes options: Sort Ascending, Sort Descending, Clear Sort, Clear Filter, Remove Empty, and Text Filters. Under Text Filters, a list of countries is shown with checkboxes: '(Select All)', 'Australia', 'Canada', 'France', 'Japan', and 'Mexico'. All checkboxes are checked. The 'OK' button at the bottom of the context menu is highlighted with a red box.

	ProductID	Date	Zip	Units	Revenue	Country
1	2331	2/14/2002				
2	733	7/10/2004				
3	753	7/10/2004				
4	964	7/10/2004				
5	400	7/10/2004				
6	499	7/10/2004				
7	683	2/8/2002				
8	714	2/8/2002				
9	1105	2/8/2002				
10	1451	2/8/2002				
11	1990	2/8/2002				
12	2056	2/8/2002				
13	2400	2/8/2002				
14	396	2/8/2002				
15	445	2/8/2002				
16	604	2/8/2002				
17	604	2/8/2002				

Transforming your Data

In this section, we will explore methods to [transform data in the data model](#). Transforming the data by renaming tables, updating data types, and appending tables together ensures that the data is ready to be used for reporting. In some instances, this means cleaning the data up so that similar sets of data are combined. In other instances, groups of data are renamed so that they are more recognizable by end users and simplifies report writing.

Power BI Desktop - Renaming tables

The Query Editor window should appear as shown in the diagram.

- You can turn on the formula bar from the View ribbon. This enables you to see the “M” code generated by each click on the ribbons.
- Select the options available on the ribbon – **Home, Transform, Add Column and View** to notice the various features available.

1. Under **Queries** panel, **minimize Transform Binary** from InternationalSales folder.
2. Select each query name in the **Other Queries** section.
3. **Rename** them in the Query Settings -> Properties section as shown below:

Initial Name	Final Name
bi_salesFact	Sales
bi_date	Date
bi_geo	Geography
bi_manufacturer	Manufacturer
bi_product	Product
InternationalSales	International Sales

ProductID	Date	A%	Zip	Units	Revenue
1	740	2/15/2000	84121	2	341.145
2	747	2/15/2000	84104	1	291.3225
3	748	2/15/2000	84095	1	291.3225
4	753	2/15/2000	47429	1	244.0725
5	753	2/15/2000	95008	1	241.4475
6	753	2/15/2000	95336	1	244.0725
7	754	2/15/2000	70503	1	244.0725
8	754	2/15/2000	97266	1	241.4475
9	757	2/15/2000	85350	1	83.9475

Power BI Desktop – Using Fill feature

Some of the data provided is not in the right format. Power BI provides extensive transformation capabilities to clean and prepare the data to meet our needs. Let's start with Date query. Notice that there are a lot of null values. This is because field like Year is populated on the first row of a new Year entry and is blank thereafter. Similarly, Month field is populated on the first row of a new month. We need to get rid of nulls values and fill it with values.

4. From the left panel, select **Date** Query.
5. Using Ctrl left click key select **Year, Quarter, MonthNo, MonthName and MonthID** fields.
6. From the ribbon select **Transform -> Fill -> Down**.

Notice now all the null values are filled with the appropriate Year, Quarter, MonthNo, MonthName, MonthID values.

The screenshot shows the Power BI Data Editor interface. On the left, the 'Queries [10]' pane lists several queries, with 'Date' highlighted. On the right, a table view displays data with columns: Year, Quarter, MonthNo, MonthName, MonthID, and Date. The first row contains data: 1999, Q1, 1, Jan, 199901, and 1/1/1999. Rows 2 through 9 are entirely null. A red box highlights the 'Fill Down' button in the 'Transform' ribbon toolbar, which has been used to propagate the first row's values down the rows. The table view on the right shows the result: all rows now have the same values: 1999, Q1, 1, Jan, 199901, and 1/1/1999.

	Year	Quarter	MonthNo	MonthName	MonthID	Date
1	1999	Q1	1	Jan	199901	1/1/1999
2	null	null	null	null	null	1/2/1999
3	null	null	null	null	null	1/3/1999
4	null	null	null	null	null	1/4/1999
5	null	null	null	null	null	1/5/1999
6	null	null	null	null	null	1/6/1999
7	null	null	null	null	null	1/7/1999
8	null	null	null	null	null	1/8/1999
9	null	null	null	null	null	1/9/1999

	Year	Quarter	MonthNo	MonthName	MonthID	Date
1	1999	Q1	1	Jan	199901	1/1/1999
2	1999	Q1	1	Jan	199901	1/2/1999
3	1999	Q1	1	Jan	199901	1/3/1999
4	1999	Q1	1	Jan	199901	1/4/1999
5	1999	Q1	1	Jan	199901	1/5/1999
6	1999	Q1	1	Jan	199901	1/6/1999
7	1999	Q1	1	Jan	199901	1/7/1999
8	1999	Q1	1	Jan	199901	1/8/1999
9	1999	Q1	1	Jan	199901	1/9/1999

Power BI Desktop – Using Transpose feature

7. From the left panel, select **Manufacturer Query**. Notice ManufacturerID and Manufacturer data is laid across in rows. And the header is not useful. We need to transpose the table to meet our needs.

8. From the ribbon select **Transform -> Transpose**.

Notice this transposes the data into columns. Now we need the first row to be the header.

9. From the ribbon select **Home -> Use First Row As Headers**.

Notice now Manufacturer table is laid out the way we need it with a header and values along columns.

Also, notice in the **APPLIED STEPS** section on the right panel, all the steps that we add is being recorded.

Also, notice the **data type** of ManufacturerID and Manufacturer field is of type **Any**. This is because Power BI was not able to detect the data type. We will manually set the data types soon.

The screenshot shows two instances of the Power BI Query Editor. The top instance has the 'Transform' ribbon tab selected, with the 'Transpose' button highlighted. The bottom instance has the 'Home' ribbon tab selected, with the 'Use First Row As Headers' button highlighted. Both instances show a table named 'Manufacturer' with data rows 1 and 2. The right side of the interface displays the 'Applied Steps' pane, which lists the 'Promoted Headers' step under the 'Transposed Table' section.

Column	1	2	3	4	5
Column1	ManufacturerID	Abbas	Aliqui	Barba	Currus
Column2	1	2	3	4	5

Queries [10]

- Transform File from InternationalSales [3]
- Other Queries [6]
 - Sales
 - Date
 - Geography
 - Manufacturer**

File Home Transform Add Column View

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Refresh Preview Advanced Editor Parameters Manage Properties Choose Columns Remove Columns Keep Rows Remove Rows Reduce Rows Sort Split Column Group By Replace Values Transform

Data Type: Any Use First Row As Headers

Queries [10]

- Transform File from InternationalSales [3]
- Other Queries [6]
 - Sales
 - Date
 - Geography
 - Manufacturer**

= Table.PromoteHeaders(#"Transposed Table",

Column	1	2	3	4	5	6	7	8	9	10	11	12
ManufacturerID	Abbas	Aliqui	Barba	Currus	Fama	Leo	VanArdel	Natura	Palma	Pirum	Pomum	Quibus
Manufacturer												

Properties

- Name: Manufacturer
- All Properties

Applied Steps

- Source
- Navigation
- Changed Type
- Transposed Table
- Promoted Headers**

Power BI Desktop – Using Split feature

10. From the left panel, select **Product** Query. Notice Product field is a concatenation of Product Name and Product ID. For our scenario, we need only the Product Name.

11. Select **Product column**.

12. From the ribbon select **Home -> Split Column -> By Delimiter**.

13. Dialog opens. From the dialog, select – **Custom**—from the dropdown.

14. Enter “-” in the text area since we want to split the column based on the hyphen.

15. Select **OK**.

Notice Product column is split into two columns, Product.1 and Product.2.

We do not need Product.2 column since it is the Product ID, which is already available.

16. Select **Product.2 column**.

17. From the ribbon select **Home -> Remove Columns** to remove the column.

Let's rename Product.1 column to Product.

18. Right click on **Product.1 column header**.

19. From the menu select **Rename** to rename the column to **Product**.

The screenshot shows the Power BI Desktop interface with the following details:

- Top Ribbon:** Home, Transform, Add Column, View, Properties, Advanced Editor, Manage, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Reduce Rows, Sort, Data Type: Text*, Use First Row As Headers*, Group By, Replace Values, Transform, Merge Queries, Append Queries, Combine Files, Combine.
- Left Panel:** Queries [10] pane showing various queries including "Product" (selected), "Transform File from InternationalSales [3]", and "Other Queries [6]" (Sales, Date, Geography, Manufacturer).
- Main Area:**
 - Table View:** Shows a table with columns ProductID, Product, Category, Segment, and ManufacturerID. The Product column is highlighted with a red border.
 - Split Column by Delimiter Dialog:** Opened over the table. It has a dropdown "Select or enter delimiter" set to "--Custom--". Below it are radio buttons for "Split at": "the left-most delimiter" (unchecked), "the right-most delimiter" (unchecked), and "each occurrence of the delimiter" (checked). A link "Advanced options" is visible.
 - Bottom Area:** Shows the results of the transformation. The Product column has been split into Product.1 and Product.2. The Product.2 column is highlighted with a red border. The context menu for the Product.1 column is open, with the "Rename..." option highlighted.

Power BI Desktop - Changing data types of columns

Power BI Desktop automatically infers data types based on the data types from the source data. It is always a good idea to check the data types to make sure they are as you need them. This ensures that the data will appear in the right format when authoring reports.

For time intelligence functions to work properly, it's especially important to make sure the date columns data types are set to Date (or Date/Time).

20. From the left panel, select **Sales** Query.
21. Verify and if needed, **Replace Current Data Type** using **Home** → **Data Type** drop down as shown below:

Column	Data Type
Date	Date
Revenue	Fixed Decimal Number

Select **Replace Current** in the Change Column Type dialog.

Note: We formatted Zip column as text earlier to ensure that zip codes which start with zero don't lose the leading zero.

The screenshot shows the Power BI Desktop interface. The top navigation bar has the 'Home' tab selected. On the far right, a 'Data Type' dropdown menu is open, with 'Fixed decimal number' highlighted. Below the ribbon, the 'Queries [10]' pane shows a tree structure with 'Transform File from InternationalSales [3]' and 'Other Queries [6]', with 'Sales' selected. The main workspace displays a table with columns: ProductID, Date, Zip, Units, and Revenue. The 'Revenue' column is highlighted with a red box, indicating it is currently being edited or selected for modification. The table data is as follows:

	ProductID	Date	Zip	Units	Revenue
1	740	2/15/2000	84121	2	341.145
2	747	2/15/2000	84104	1	291.3225
3	748	2/15/2000	84095	1	291.3225
4	753	2/15/2000	47429	1	244.0725
5	753	2/15/2000	95008	1	241.4475
6	753	2/15/2000	95336	1	244.0725
7	754	2/15/2000	70503	1	244.0725
8	754	2/15/2000	97266	1	241.4475
9	757	2/15/2000	85350	1	83.9475

22. From the left panel, select **Date Query**.
 23. Verify and if needed **Replace Current Data Type** using **Home -> Data Type** drop down as shown below.

Column	Data Type
Date	Date

24. From the left panel, select **Manufacturer Query**.
 25. Verify and if needed set Data Type using **Home -> Data Type** drop down as shown below.

Column	Data Type
ManufacturerID	Whole Number
ManufacturerName	Text

Queries [10]

- Transform File from InternationalSales [3]
- Other Queries [6]
 - Sales
 - Date**
 - Geography
 - Manufacturer
 - Product
 - International Sales

	Year	Quarter	MonthNo	MonthName	MonthID	Date
1	1999	Q1	1	Jan	199901	1/1/1999
2	1999	Q1	1	Jan	199901	1/2/1999
3	1999	Q1	1	Jan	199901	1/3/1999
4	1999	Q1	1	Jan	199901	1/4/1999
5	1999	Q1	1	Jan	199901	1/5/1999
6	1999	Q1	1	Jan	199901	1/6/1999
7	1999	Q1	1	Jan	199901	1/7/1999
8	1999	Q1	1	Jan	199901	1/8/1999
9	1999	Q1	1	Jan	199901	1/9/1999

IMPORTANT!
Changing the data type is a big deal to use later

26. From the left panel, select **International Sales Query**.
 27. Verify and if needed set Data Type using **Home -> Data Type** drop down as shown below.

Column	Data Type
ProductID	Whole Number
Date	Date
Zip	Text
Units	Whole Number
Revenue	Fixed Decimal Number

Queries [10]

- Transform File from InternationalSales [3]
- Other Queries [6]
 - Sales
 - Date
 - Geography
 - Manufacturer
 - Product
 - International Sales**

	ProductID	Date	Zip	Units	\$ Revenue
1	2331	2/14/2002	3042	1	540.6975
2	733	7/10/2004	1022	1	330.6975
3	753	7/10/2004	838	1	246.6975
4	964	7/10/2004	1158	1	320.1975
5	400	7/10/2004	854	1	772.275
6	499	7/10/2004	854	1	911.6625
7	683	2/8/2002	9009	1	839.7375
8	714	2/8/2002	1117	1	162.6975
9	1105	2/8/2002	7907	1	246.6975

IMPORTANT!
Changing the data type is a big deal to use later

Notice on the right panel under **APPLIED STEPS** you will see the list of transformations and steps that have been applied.

You can navigate through each change made to the data by clicking on the step. Steps can also be deleted by clicking on the X that appears to the left of the step.

The properties of each step can be reviewed by clicking on the **gear** to the right of the step.

The screenshot shows the Power BI Data Editor interface. On the left, the 'Queries [10]' pane lists 'Transform File from InternationalSales [3]' and 'Other Queries [6]'. Under 'Other Queries', 'Sales' is selected. The main area displays a table with columns: ProductID, Date, Zip, Units, Revenue, and Country. The formula bar above the table shows: = Table.TransformColumnTypes(#"Removed Columns", {"Revenue", Currency.Type}). To the right, the 'Query Settings' pane shows 'Name: International Sales' and the 'APPLIED STEPS' pane, which is highlighted with a red box. The 'APPLIED STEPS' pane lists several steps: 'Source', 'Invoke Custom Function1', 'Renamed Columns1', 'Removed Other Columns1', 'Expanded Table Column1', 'Changed Type', 'Removed Columns', and 'Changed Type1'. The 'Changed Type1' step is also highlighted with a red box.

To analyze the Sales of all countries, it is convenient to have a single Sales table. Hence you want to append all the rows from **International Sales** to **Sales**.

28. Select **Sales** in the Queries window in the left panel as shown in the figure.
29. From the ribbon select **Home -> Append Queries** as shown in the figure.

The screenshot shows the Power BI Data Editor interface. The ribbon is visible with the 'Home' tab selected. The 'Queries [10]' pane shows 'Sales' selected. The main area displays a table with columns: ProductID, Date, Zip, Units, and Revenue. The formula bar above the table shows: = Table.TransformColumnTypes(#"Promoted Headers", {"ProductID", Int64.Type}). To the right, the 'Query Settings' pane shows 'Name: Sales' and the 'APPLIED STEPS' pane, which is highlighted with a red box. The 'APPLIED STEPS' pane lists 'Source' and 'Promoted Headers'. The 'Promoted Headers' step is also highlighted with a red box.

Append dialog opens. There is option to append **Two tables or Three or more tables**. Leave Two tables selected since we are appending just two tables.

30. Select **International Sales** from the drop down and click **OK**.

The screenshot shows the 'Append' dialog box. It has two radio buttons: 'Two tables' (selected) and 'Three or more tables'. Below is a dropdown menu labeled 'Table to append' with 'International Sales' selected. In the bottom right corner, there are 'OK' and 'Cancel' buttons, with 'OK' highlighted with a red box.

You will now see a new column in the **Sales** table called **Country**. Since International Sales had the additional column for Country, Power BI Desktop added the column to the Sales table when it loaded the values from International Sales.

You see **null** values in the **Country** column by default for the Sales table rows because the column did not exist for the table with USA data.

We will add the value “**USA**” as a data shaping operation.

31. From the ribbon select **Add Column** -> **Conditional Column** as shown in the figure.

32. In the **Add Conditional Column** dialog, enter name of the column as “**CountryName**”.
 33. Select **Country** from the **Column Name** dropdown.

34. Select **equals** from the **Operator** dropdown.

35. Enter **null** in the **Values** text.

36. Enter **USA** in the **Output** text.

37. Select the dropdown under **Otherwise** and pick **Select a column** option.

38. Select **Country** from the column dropdown.

39. Click **OK**.

	ProductID	Date	Zip	Units	Revenue	Country
1	740	2/15/2000	84121	2	341.145	null
2	747	2/15/2000	84104	1	291.3225	null
3	748	2/15/2000	84095	1	291.3225	null
4	753	2/15/2000	47429	1	244.0725	null
5	753	2/15/2000	95008	1	241.4475	null
6	753	2/15/2000	95336	1	244.0725	null
7	754	2/15/2000	70503	1	244.0725	null
8	754	2/15/2000	97266	1	241.4475	null
9	757	2/15/2000	85350	1	83.9475	null

Add Conditional Column

Add a conditional column that is computed from the other columns or values.

New column name	ColumnName
If	Column Name: Country Operator: equals Value: null Then: USA
Otherwise	Column Name: Country Select a column Parameter

This reads, if Country equals null then the value is USA else value is that of Country.

40. You will see the **CountryName** column in the Query editor window.

The screenshot shows the Power BI Query Editor interface. On the left, the 'Queries [10]' pane lists 'Transform File from InternationalSales [3]' and 'Other Queries [6]', with 'Sales' selected. In the center, a table preview shows columns: uctID, Date, Zip, Units, Revenue, Country, and CountryName. The 'CountryName' column contains values like 'null' and 'USA'. On the right, the 'Query Settings' pane shows 'Name: Sales' and the 'APPLIED STEPS' pane, which includes 'Source', 'Promoted Headers', 'Changed Type', 'Appended Query', and 'Added Conditional Column' (highlighted with a red box).

The original **Country** column is only required as a temporary column. It is not required in the final table for analysis and can be removed.

41. Right click on the **Country** column and select **Remove** as shown in the figure.

We can now rename **CountryName** column to **Country**.

42. Right click on the **CountryName** column and rename to **Country**.

43. Using **Home -> Data Type**, change the **data type** of the **Country** column to type **Text**.

When the data is refreshed, it will process through all the “Applied Steps” that you have created.

The screenshot shows the Power BI Query Editor interface. On the left, the 'Queries [10]' pane lists 'Transform File from InternationalSales [3]' and 'Other Queries [6]', with 'Sales' selected. In the center, a table preview shows columns: uctID, Date, Zip, Units, Revenue, and Country (highlighted with a red box). On the right, the context menu for the 'Country' column is open, showing options like 'Copy', 'Remove' (highlighted with a red box), 'Remove Other Columns', 'Duplicate Column', 'Add Column From Examples...', 'Remove Duplicates', 'Remove Errors', 'Change Type', 'Transform', and 'Replace Values...'.

The newly named **Country** column will have names for all countries, including the USA. You can validate this by clicking on the drop down next to **Country** column to see the unique values.

44. At first, you will only see USA data. Click on **Load more** to validate you have data from all 4 countries included.

45. Click **OK** to close this filter.

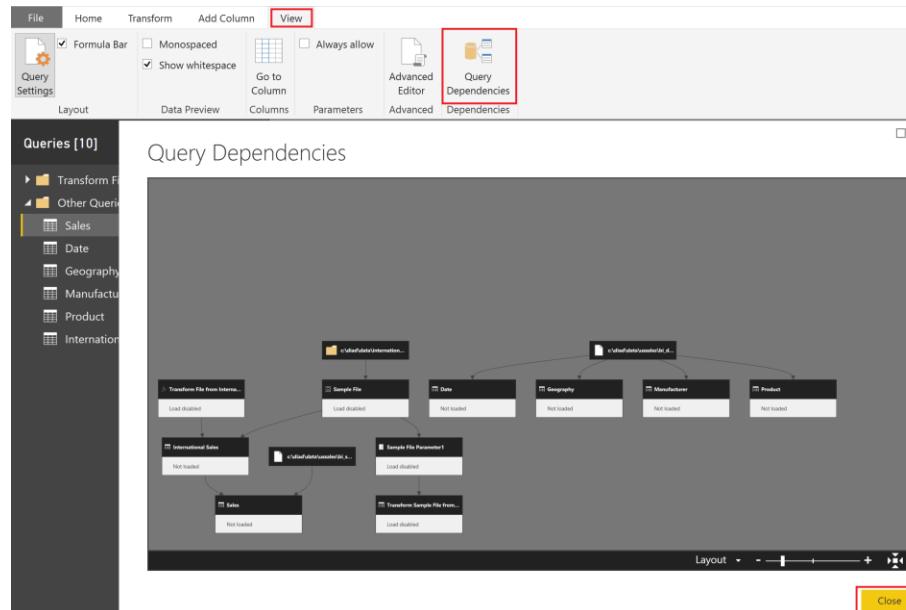
	ProductID	Date	Zip	Units	Revenue	Country
1	740	2/15/2000	8412			Australia
2	747	2/15/2000	8410			Australia
3	748	2/15/2000	8409			Australia
4	753	2/15/2000	4742			Canada
5	753	2/15/2000	9500			Canada
6	753	2/15/2000	9533			Canada
7	754	2/15/2000	7050			France
8	754	2/15/2000	9726			France
9	757	2/15/2000	8535			Japan
10	758	2/15/2000	3680			Japan
11	758	2/15/2000	5964			Mexico
12	767	2/15/2000	3387			Mexico
13	767	2/15/2000	9311			USA
14	768	2/15/2000	6484			USA
15	768	2/15/2000	9226			USA
16	769	2/15/2000	0805			USA
17	769	2/15/2000	3428			USA
18	797	2/15/2000	7501			USA

46. From the ribbon select **View -> Query Dependencies**.

This opens Query Dependencies dialog. The dialog shows the source of each of the query and dependencies. E.g. We see that Sales query has a csv file source and it has a dependency on International Sales query.

47. Select **Close** in the dialog.

Query Dependencies view can be zoomed in and out as needed.

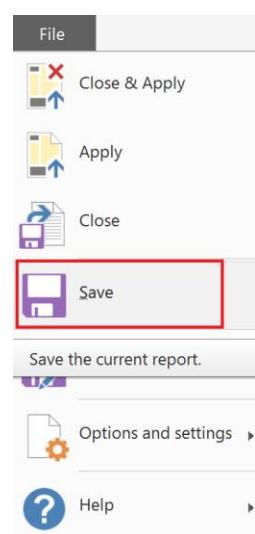


48. Let's save the file before we proceed. From the ribbon select **File -> Save As**.

49. You will see a dialog box indicating that there are pending changes in your queries that have not been applied. Select **Apply Later**.

Note: If you selected **Apply**, your queries would have been processed and all of your data would have been loaded to the data model. With **Apply Later**, your queries are saved but you control when the data is loaded.

50. Name the file as "**MyFirstPowerBIModel**" and select **Save**. Save the file in **\DIAD\Reports** folder.



Microsoft Power BI Desktop

There are pending changes in your queries that haven't been applied.
Do you want to apply them?

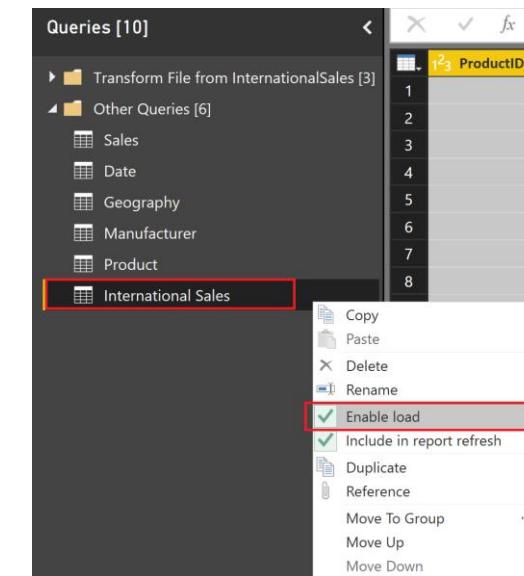
Apply **Apply Later** **Cancel**

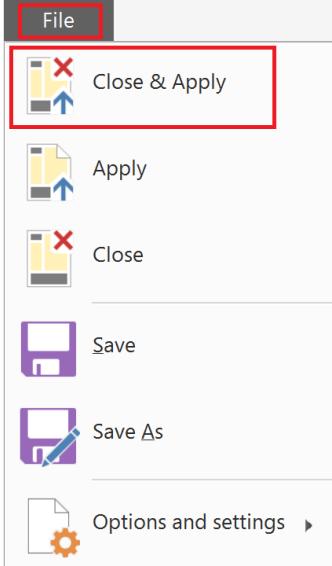
We don't need the **International Sales** table to load to the data model now that its rows have been appended to the **Sales** table. Let's prevent the **International Sales** table from loading to the data model.

51. From the Queries panel on the left, select **International Sales** query.

52. Right click and select **Enable Load**. This will disable loading International Sales.

Note: The appropriate data from the International Sales table will load into the Sales table each time the model is refreshed. By removing the International Sales table, we are preventing duplicate data from loading into the model and increasing its file size. In some



<p>instances, storing very large amounts of data affects the data model performance.</p>	
<p>You have successfully completed import and data shaping operations and are ready to load the data into the Power BI Desktop data model which allows you to visualize the data.</p> <p>53. Click on File -> Close & Apply.</p>	
<p>All the data will be loaded in memory within Power BI Desktop. You will see the progress dialog with the number of rows being loaded in each table as shown in the Figure.</p> <p>Note: It may take several minutes to load all the tables.</p> <p>54. Select File -> Save to save the file after the data loading is completed.</p>	<p>Apply query changes</p> <ul style="list-style-type: none"> · Sales 72.5 MB from bi_salesFact.csv · Date 134 KB from bi_dimensions.xlsx · Geography 5.68 MB from bi_dimensions.xlsx · Manufacturer 49.6 KB from bi_dimensions.xlsx · Product 127 KB from bi_dimensions.xlsx <p style="text-align: right;"><input type="button" value="Cancel"/></p>

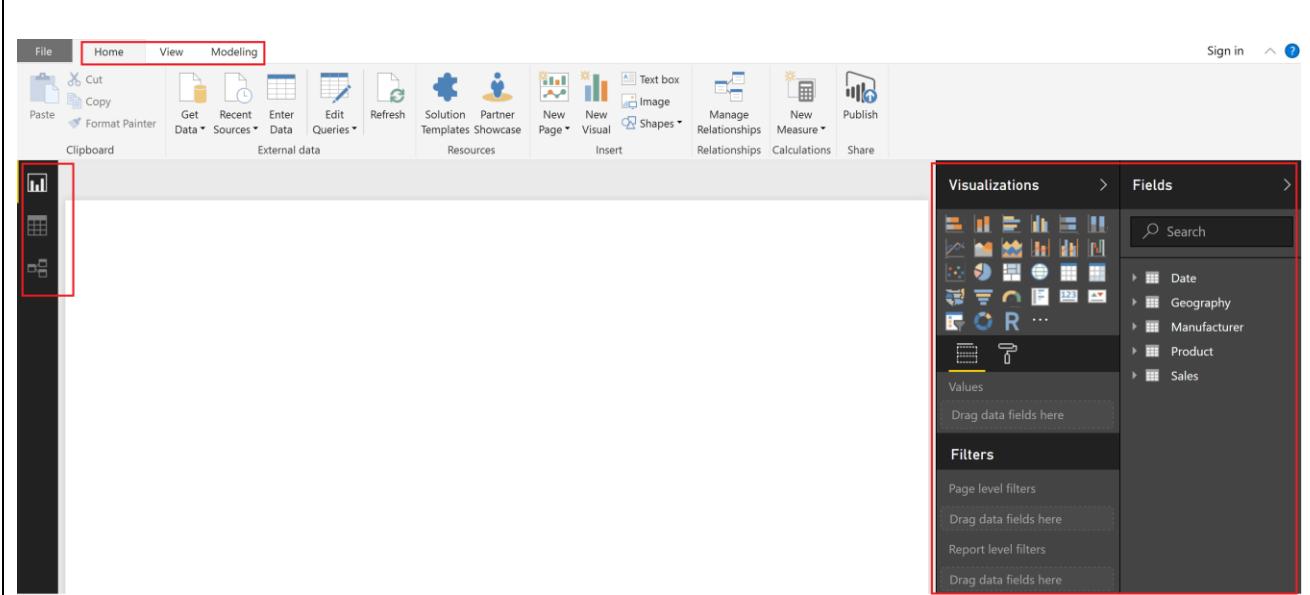
Interactive Data Exploration

In this section, we will learn the [key parts of the Power BI desktop](#), to do ad-hoc exploration of the data.

Power BI Desktop - Layout

You will land on the main **Power BI Desktop** window. Let's familiarize with the distinct sections available in the Power BI Window.

1. On the top, you see the **Home** tab where the most common operations you perform are available.
2. **View** tab has options to format the page layout.
3. **Modeling** tab in the ribbon enables additional data modeling capabilities like adding custom columns and calculated measures.
4. The **Fields** window on the right panel, is where you will see the list of tables which were generated from the queries. Click the  icon next to a table name to expand to the field list for that table.
5. **Visualizations** panel on the right allows you to select visualizations, add values to the visuals and add columns to the axes or filters.
6. The center **white space** is the canvas where you will be creating visuals.
7. On the left side, you have three icons, **Report**, **Data** and **Relationships**. If you hover over the icons, you can see the tool



tips. Switching between these allows you to see the data and the relationships between the tables.

8. Click on the Data icon. Expand **Sales** table in the **Fields** as shown in the figure
9. Scroll up and down to notice how fast you can navigate **through ~ 11 Million rows**.

The screenshot shows the Microsoft Power BI interface in the 'Modeling' tab. On the left, there's a data grid displaying a table with columns: ProductID, Date, Zip, Units, Revenue, and Country. The first few rows show identical data: ProductID 2388, Date Saturday, April 15, 2000, Zip 56438, Units 1, Revenue \$309.6975, and Country USA. A red box highlights the table icon in the grid's header. At the bottom of the grid, a red box encloses the text 'TABLE: Sales (11,046,444 rows)'. The top ribbon has tabs for File, Home, and Modeling, with Modeling selected. The right side features a 'Fields' pane with a search bar and a tree view of fields. A red box highlights the 'Sales' node under the 'Product' category. The 'Fields' pane also lists other fields: Country, Date, ProductID, Revenue, Units, and Zip.

10. Click on the **Relationships** icon on the left panel of Power BI Desktop

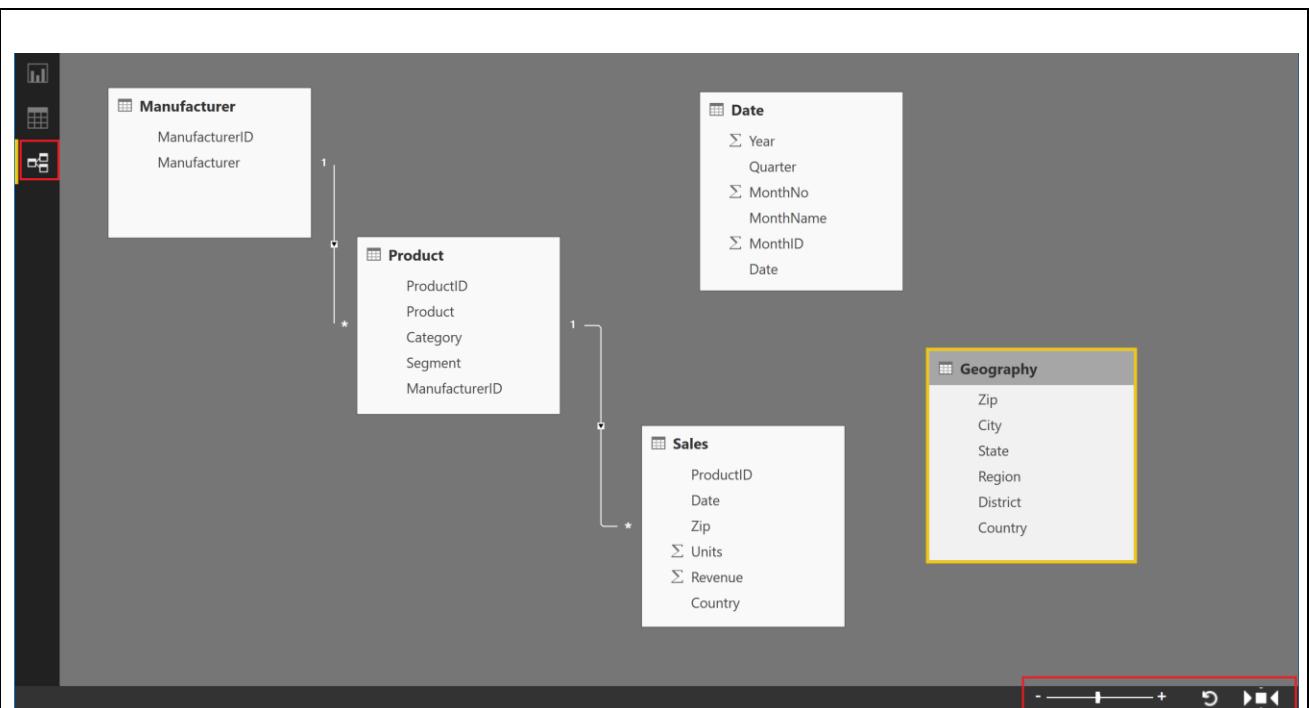
You will see the tables you have imported along with some Relationships. The Power BI Desktop automatically infers relationships between the tables.

- Relationship is created between Sales and Product tables using ProductID column.
- Relationship is created between Product and Manufacturer tables using ManufacturerID column.

Note: Tables may not appear as shown in the figure. You can zoom in and out of the Relationships page by dragging the zoom slider in the bottom right corner of the window. Also, if want to ensure you are seeing all the tables, use the fit to page icon:



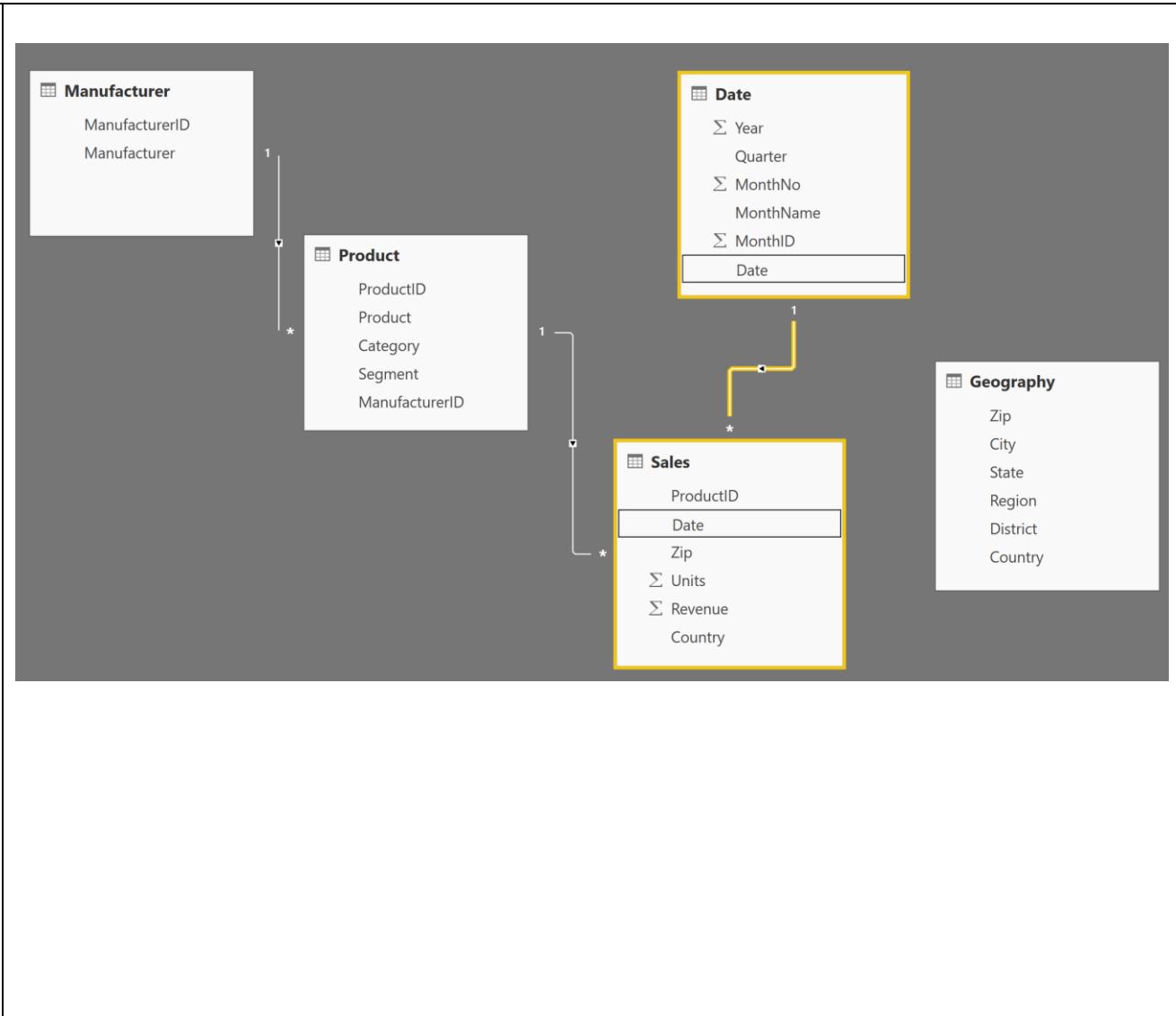
. Drag and move the tables to appear as shown in the figure.



Power BI desktop supports 1 to many or 1 to 1 relationships between the tables. This means the column involved in the relationships in one of the tables needs to have unique values. Notice that there is no relationship between Sales and Date tables. We need this relationship to build time intelligence measures.

11. To create a relationship between the **Date** and **Sales** tables, **drag the Date field from the Sales table to the Date field in the Date table**.
12. **Highlight** the relationship line to validate which columns are related.

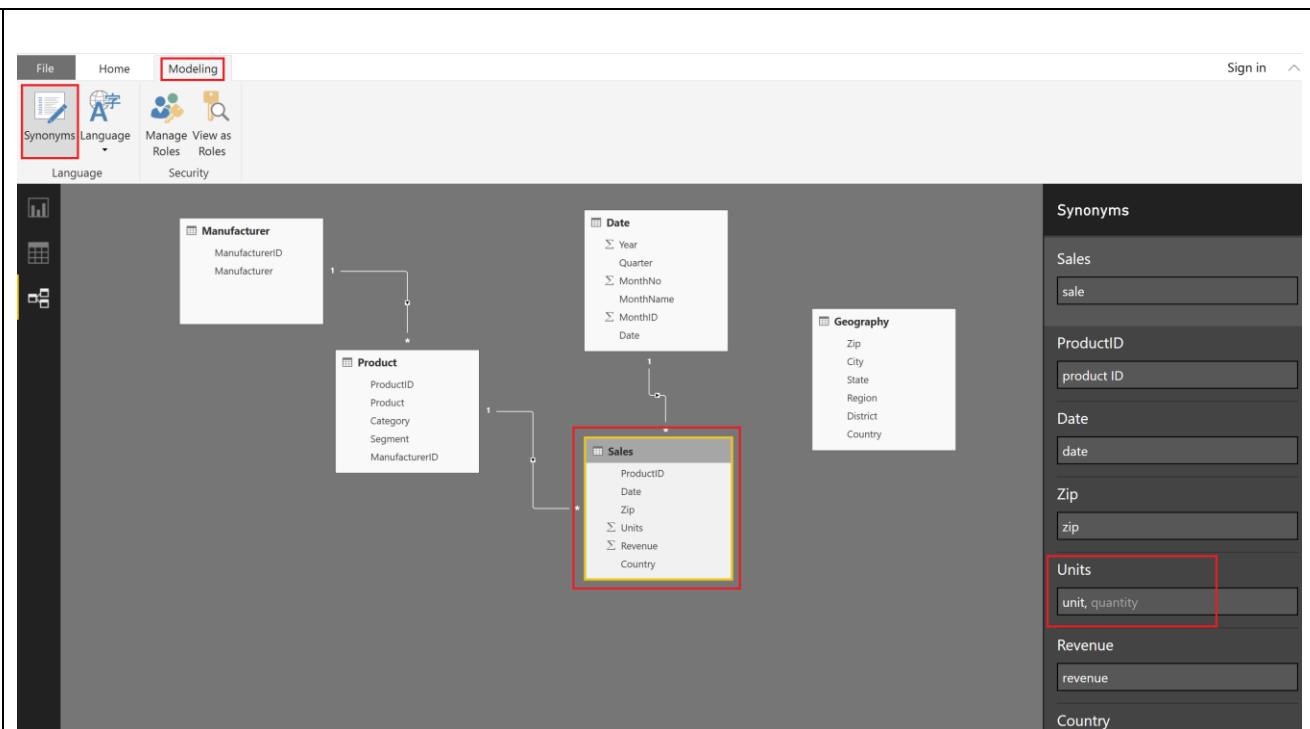
Notice there is no relationship between the Geography and Sales tables. If you want to explore sales data across state or city or country, you will need to setup the relationship between the Geography and Sales tables. You will create the relationship in a later lab.



In our organization, there are some key attributes names that are used interchangeable. E.g. Units and Quantity mean the same and Product and Item are interchangeable used. Power BI provides **synonyms** feature which provides an option to specify alternate names. Here we will do the initial set up and reap the benefits in a later section when we handle Natural Query language (QnA) feature.

13. Select **Sales** table.
14. From the ribbon select **Modeling** -> **Synonyms**. Notice Synonyms section is displayed in the right panel.
15. Scroll down to **Units** section and enter **quantity**.
16. Highlight **Product** table in relationship panel.
17. In the Synonyms panel, scroll to **Product** and enter **item**.

Now we have entered alternate names for two of the attributes. Later in the lab we will use QnA to show how we benefit from synonyms.

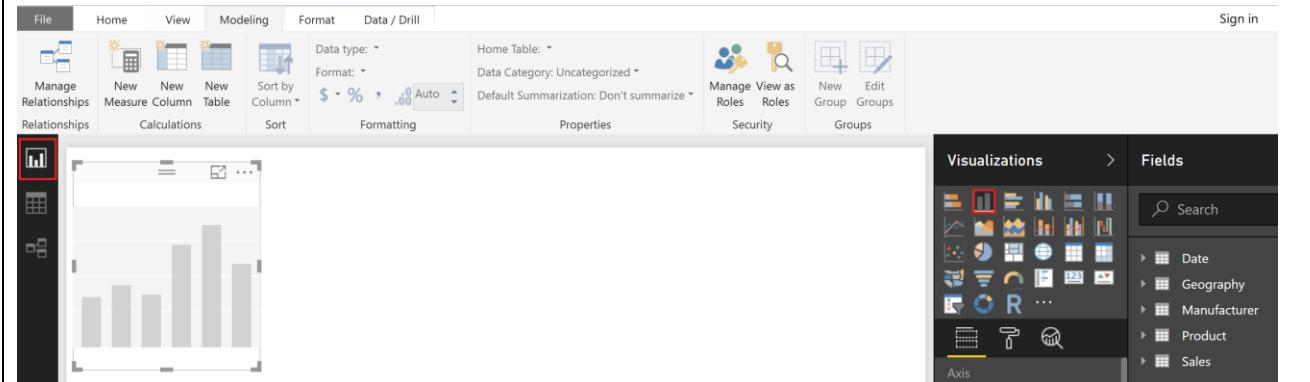


Power BI Desktop - Enhancing your model and Data exploration

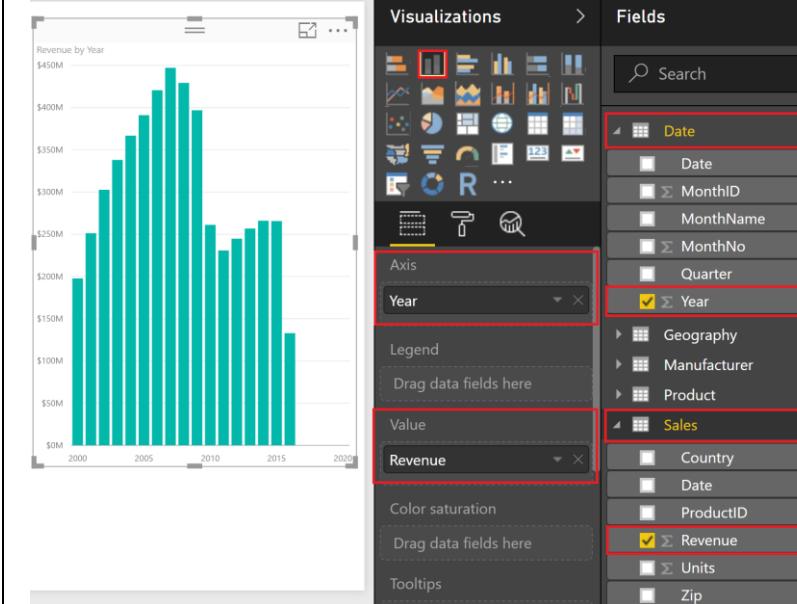
In this section, you will do initial data exploration along with model enhancements to create a calculated column, set up relationships and create a measure using DAX (Data Analysis Expression).

You have been asked to analyze the sales over time

1. Click on the **Report** icon on the left panel to get to the Report view.
2. Select the **Stacked column chart** visual in **Visualizations** as shown in the figure.



3. From **Fields** section, expand the **Date** table.
4. Drag and drop **Year** into **Axis**.
5. From **Fields** section, expand the **Sales** table.
6. Drag and drop **Revenue** to **Values** as shown in the figure.
7. You now see the total revenue of all manufacturers by years.
8. **Resize** the visual as needed by dragging the edges.



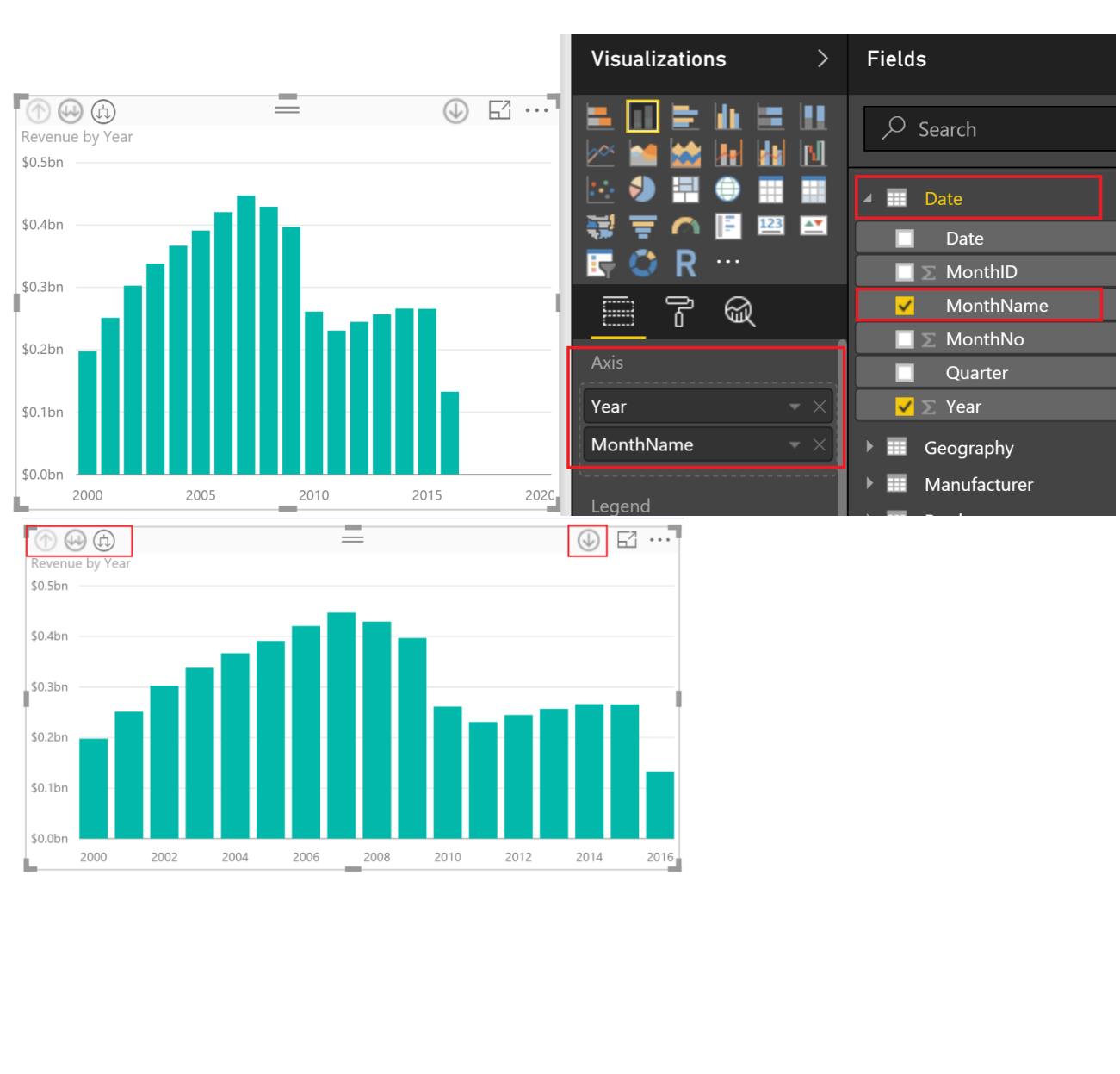
Let us say an executive at your company asks "How were the sales at my company (VanArsdel) by months in addition to years?" You can answer this question very easily by enabling the "drill up/down" functionality in Power BI desktop.

9. To enable this functionality in the visual drag **MonthName** column from the **Date** Table into the **Axis** below the **Year**. You have now created a Year/Month "Hierarchy" in the Axis column.

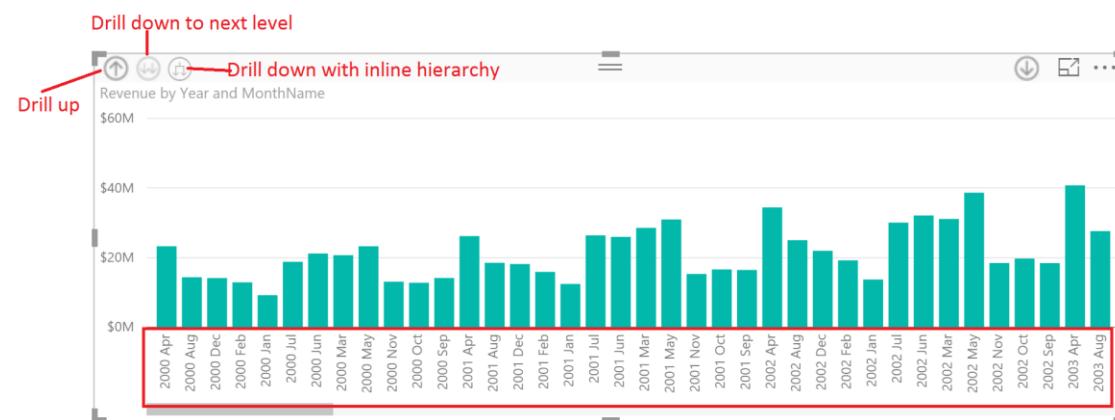
You should see additional icons enabled on the top left and right hand side of the visual. These icons allow you to "Drill down/up".

10. You can drill down from Year level to see Revenue at a month level across all data points by clicking on the **double down** arrow at the top left corner of the visual. Clicking on the **split arrow** on the top left corner of the visual provides the capability to view Inline hierarchy i.e., you will be able to view Year and Month information on the X-axis. Click on both the arrow types to view the difference in experience.

To go back up to Revenue by Year click on the **up-arrow** button on the extreme top left corner of the visual.



When you drill down you will notice that the months are sorted in alphabetical order. Power BI offers you the ability to change the sort order on a column.



11. To change the sort order, go to the **Data** view. Select **Date** table from the **Fields** list on the right. Then highlight the **MonthName** column within that table. From the ribbon, select **Modeling** -> **Sort by Column** -> **MonthNo**.

	MonthName	MonthID	Date
1999	Jul	199907	Thursday, July 1, 1999
1999	Jul	199907	Friday, July 2, 1999
1999	MonthID	199907	Saturday, July 3, 1999
1999	Date	199907	Sunday, July 4, 1999
1999 Q3	/ Jul	199907	Monday, July 5, 1999
1999 Q3	7 Jul	199907	Tuesday, July 6, 1999
1999 Q3	7 Jul	199907	Wednesday, July 7, 1999
1999 Q3	7 Jul	199907	Thursday, July 8, 1999
1999 Q3	7 Jul	199907	Friday, July 9, 1999
1999 Q3	7 Jul	199907	Saturday, July 10, 1999

12. Navigate back to the **report view** and notice the months are now sorted in the right order.

Year and month is concatenated in the X-Axis. Let's say we want we want the months grouped by years.

13. With the column chart highlighted, in the **Visualization** section, click on the **Format** (paint brush) icon.

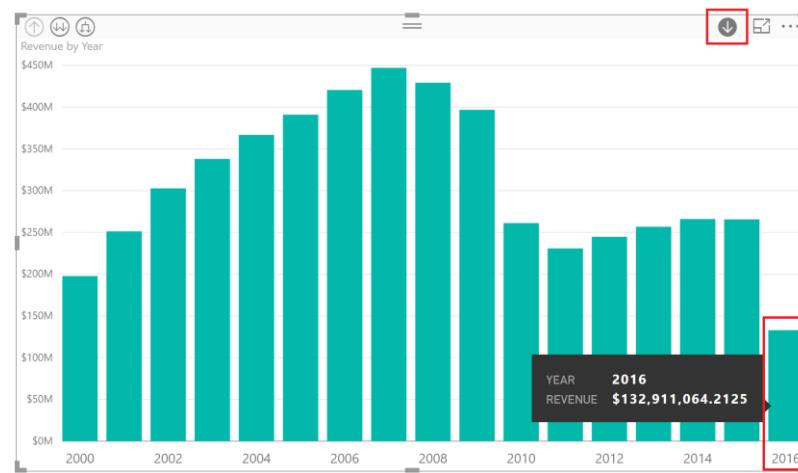
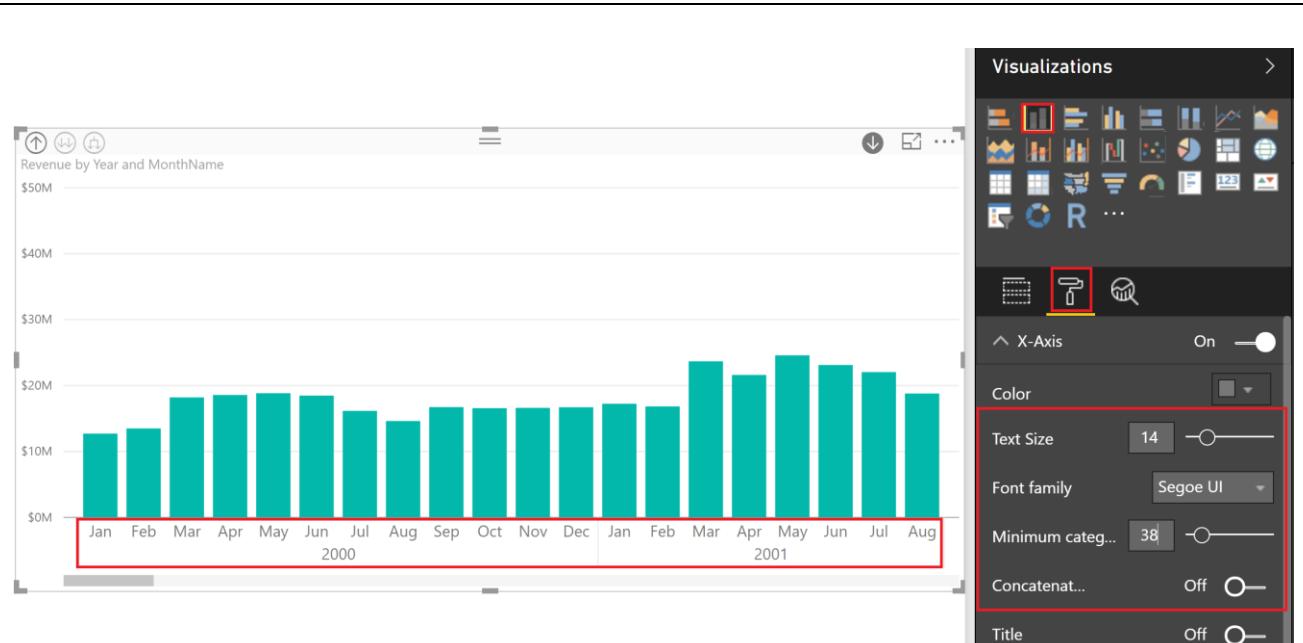
14. Expand **X-Axis** and using the **slider** turn **Off Concatenation Labels** option.

15. Using **Minimum category width** change the column width as needed.

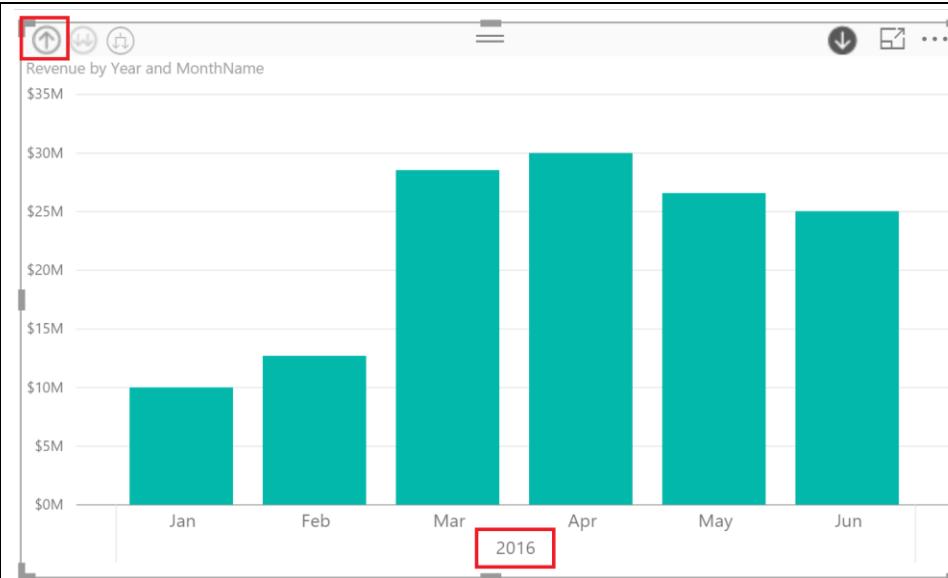
16. Using **Text Size** option, change the size as needed.

17. Navigate up to the Year level by clicking on the **up arrow** in the top left corner.

18. If you would like to drill down on the month level revenue numbers for a specific year say "2016" then click on the **single down arrow** on top right hand corner of your visual. The arrow should turn black showing that "Single data point" drill is now enabled. Now single click on the rectangle for **year 2016**.



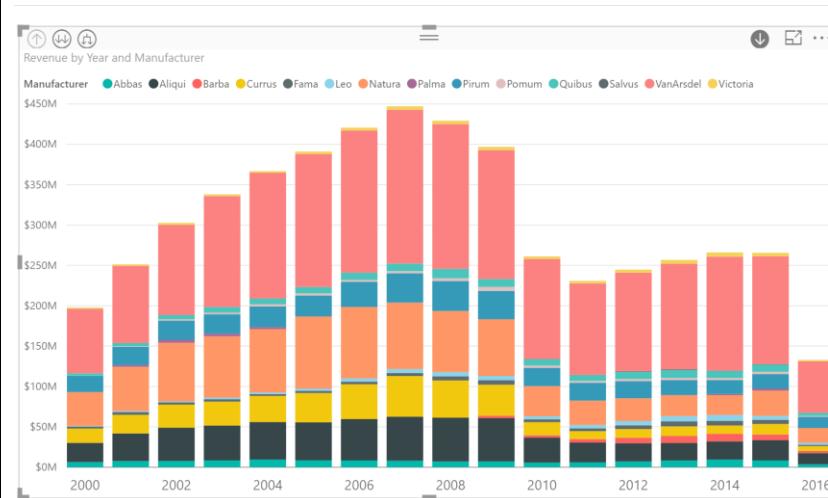
19. You should now see the revenue breakdown by month for 2016. You can again go back up to Year level revenue numbers by clicking on the **up arrow** in the top left corner.



Now let's compare how my company (VanArsdel), is doing as compared to other manufacturers.

20. From the **Fields** section, expand **Manufacturers** table and drag and drop **Manufacturer** column to the **Legend** section as shown in Figure.

You will see the stacked column chart of sales by various companies and the legend on the top as shown in the figure.



You are primarily interested comparing VanArsdel with the top competitors and the rest of the competitors. Power BI Desktop has the option to create groups. Let's try it out.

21. Select the **Stacked column chart** visual. In the Legend section, select the arrow next to **Manufacturer** and select **New Group**.



Group dialog opens.

22. In the Ungrouped values section, using Ctrl key, select **Aliqui, Currus, Natura and Pirum**.

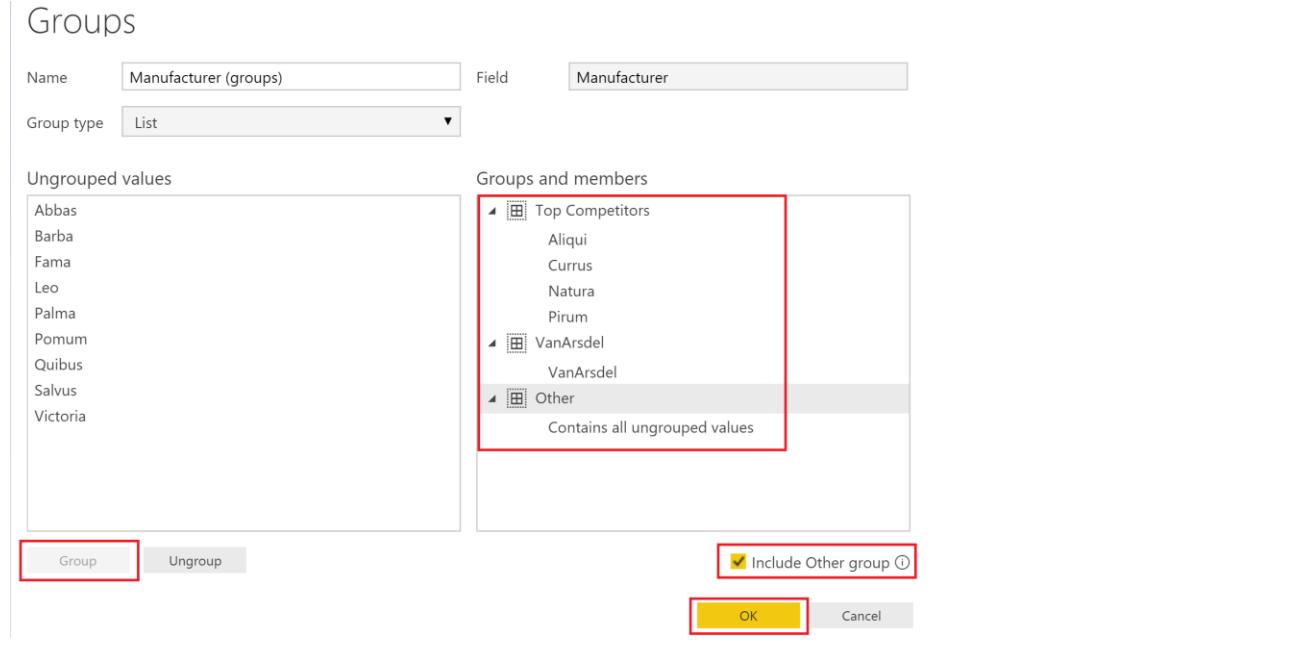
23. Select **Group** button. Notice a new group is added in the Groups and members section.

24. Double click the newly created group and **rename it to Top Competitors**.

25. Select **VanArsdel** from the Ungrouped values section and select **Group** button to create **VanArsdel Group**.

26. Select the check box **Include Other group**. This will create an Other group which will include all the other manufacturers.

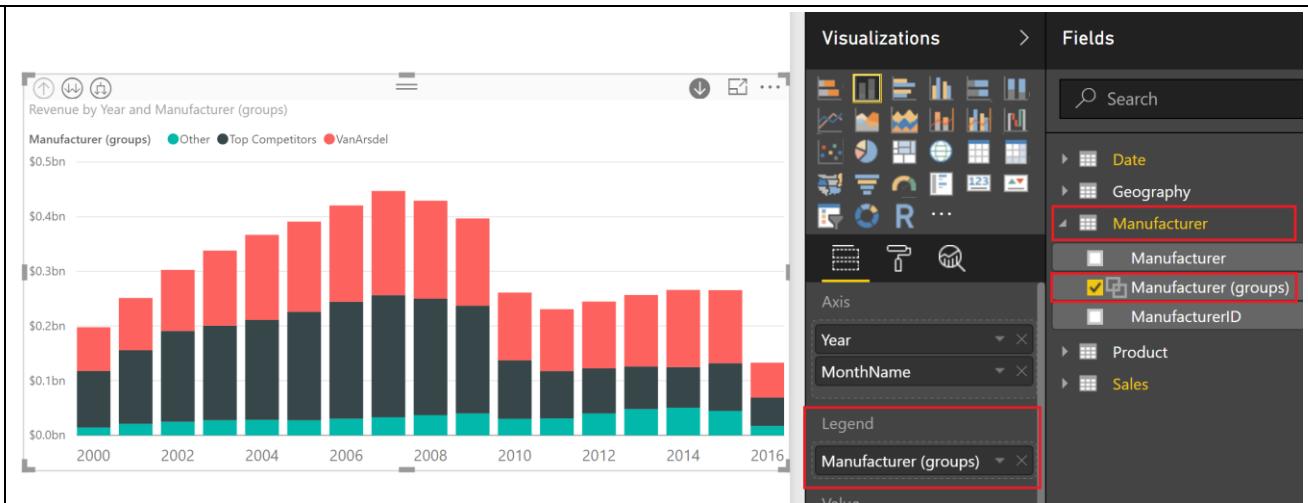
27. Select **OK** to close Groups dialog.



In the **Fields** section, notice **Manufacturer group** is created under Manufacturer table.

Manufacturer (groups) field is added to the Legend section.

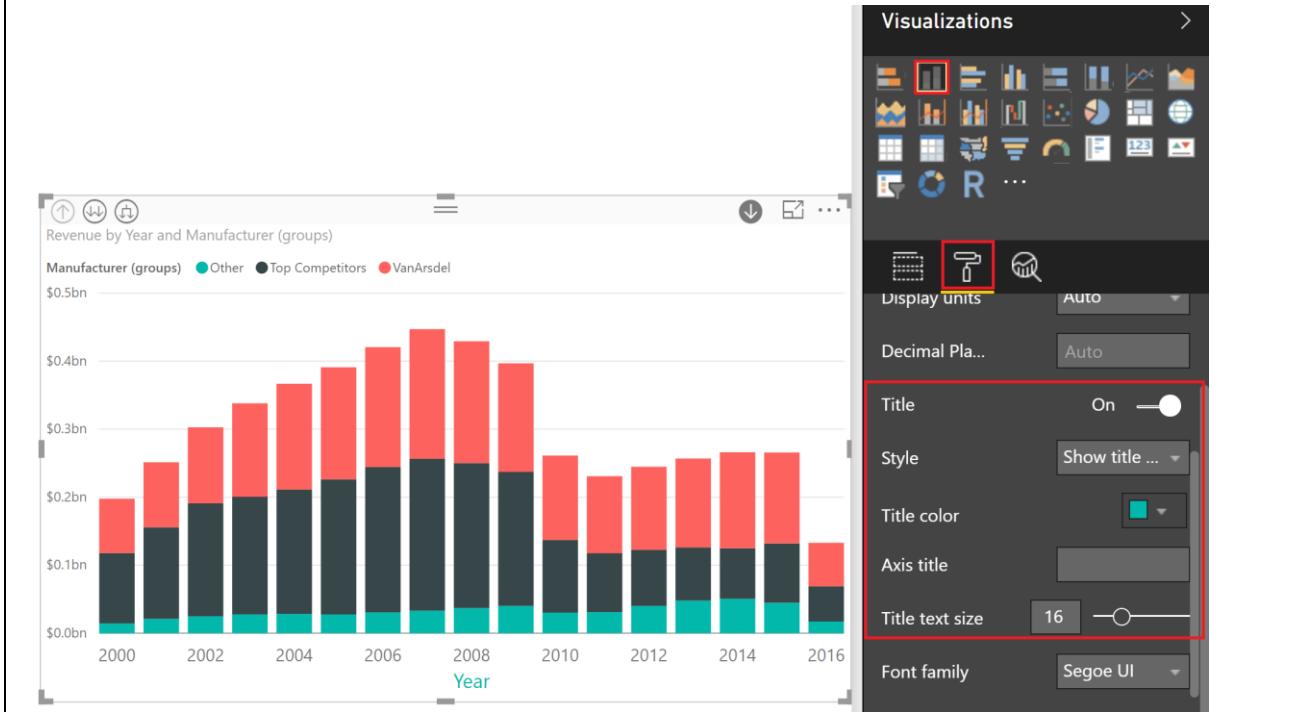
Now we have a visual that shows Revenue by Year for VanArsdel, the top competitors and the rest of the competitors.



28. From the **Visualization** section, select **Format** (brush icon).
29. Expand **X-Axis** and scroll down.
30. Using the slider **enable Title**.
31. Change the **Title color** to **Green**.
32. Change the **Title text size** as needed.

Notice there is an option to enter a custom **Axis title**.

When you drill from Year to Month level, notice the X-axis title changes to MonthName. Similarly, Y-axis can also be formatted.

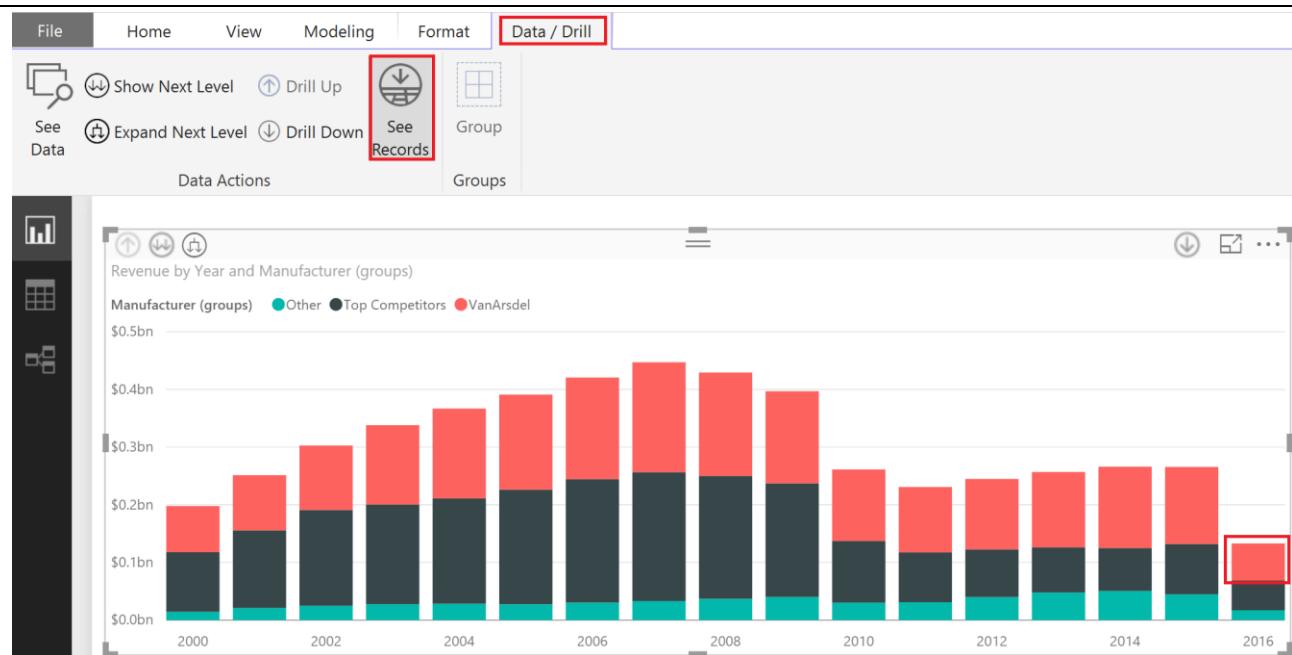


Suppose you want to investigate the records that make up VanArdel's sales for the year 2016.

33. With the Stacked column chart selected, from the ribbon, select **Data/Drill** -> **See Records**.

Selecting See Records, enables the ability to view the records based on the selection.

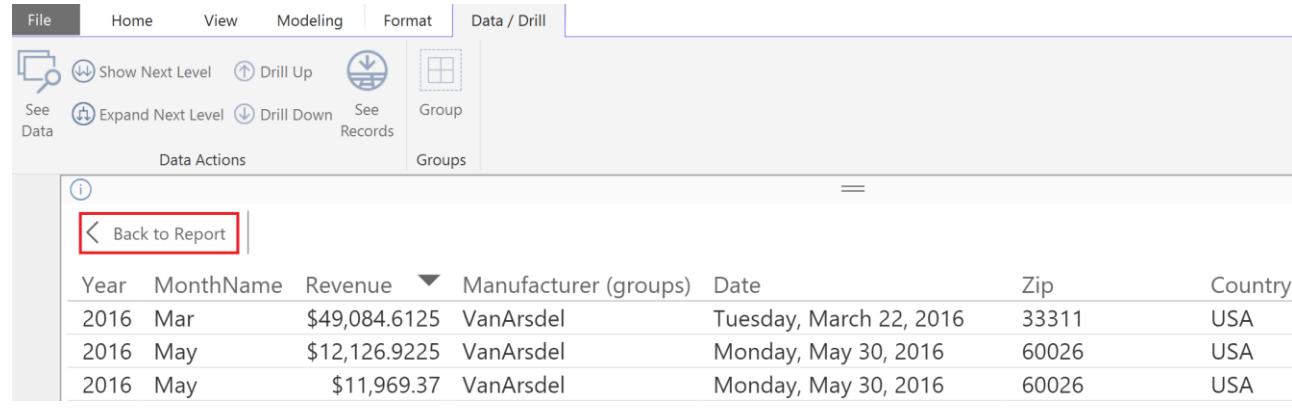
34. Click on **VanArdel** section of the column for the year **2016**.



All the records that make up VanArdel's data for 2016 is displayed.

35. Click on **Back to Report** to get back to the chart view.

36. From the ribbon select **Data/Drill** -> **See Records** again to disable viewing records.

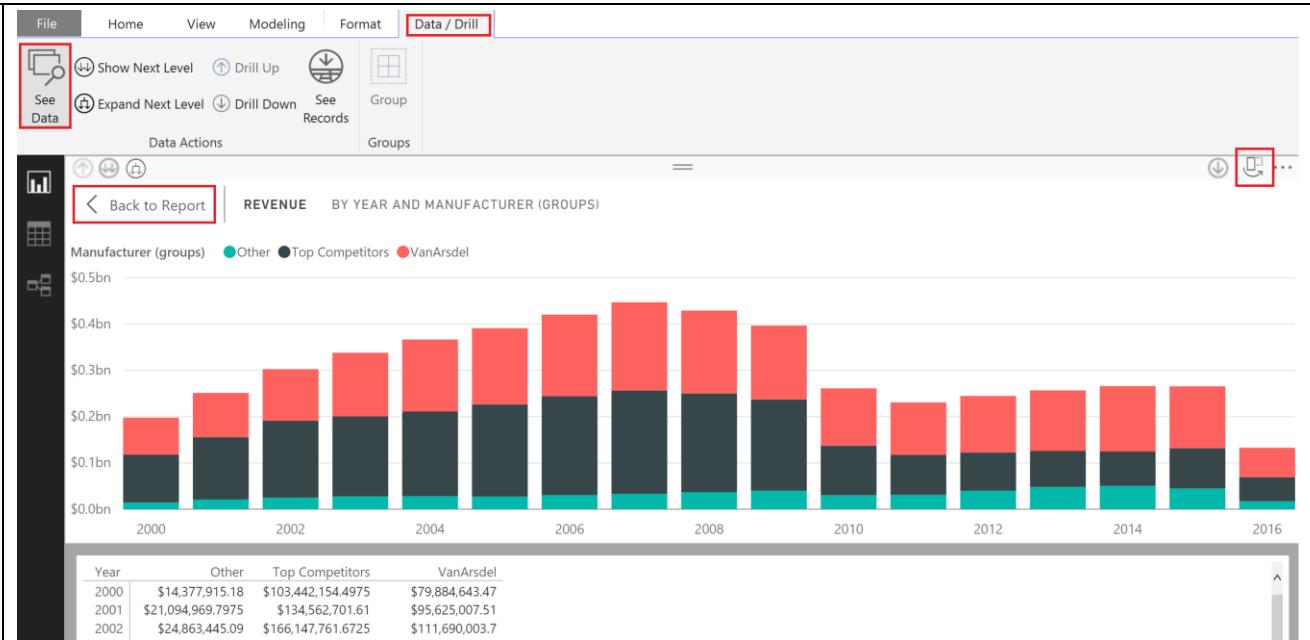


37. From the ribbon select **Data/Drill** -> **See Data**.

Notice now the canvas is divided into two panes, top displays the chart and bottom displays the data that makes the chart.

38. Clicking on **Switch to vertical layout** icon on the top right corner will change the layout to display chart on the left and data on the right.

39. Click on **Back to Report** to get back to the chart view.



For the next visualization, assume you want to be able to analyze the sales of units by various countries along with the sales by years/months.

40. Click on the white canvas in Power BI Desktop.

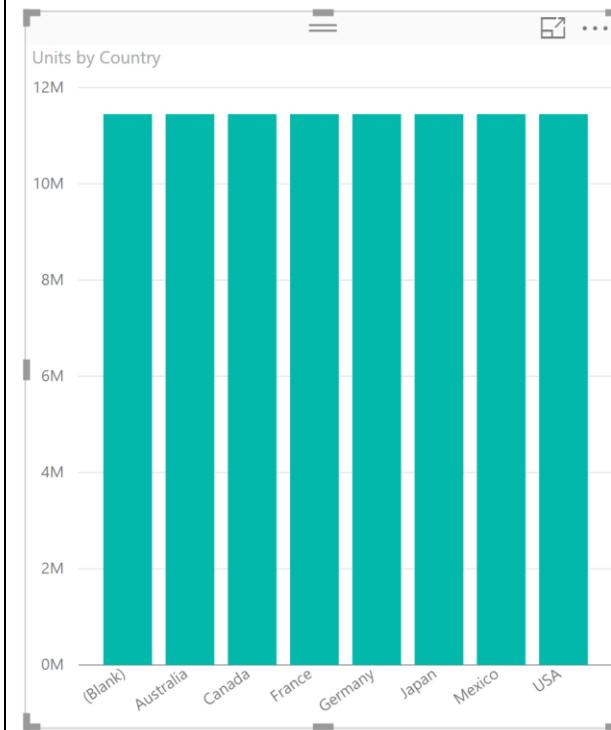
41. From **Visualizations** section, select **Stacked column** chart. You will see the column chart appear below your existing column chart.

42. From **Fields** section, expand **Geography** table. Drag and drop the **Country** column to **Axis**.

43. From **Fields** section, expand **Sales** table. Drag and drop the **Units** column to the **Value**.

You will see all the countries having about 11.4 Million units. The reason you see the same value is due to the fact there is no relationship between the Geography table and the Sales table.

You now need to set up the correct relationship between these tables. To create a relationship between the two tables we need a “joining” or “relating” column.



The screenshot shows the Power BI desktop interface. On the left, the **Visualizations** pane displays a grid of chart icons, with the **Stacked column** icon highlighted. On the right, the **Fields** pane shows a tree view of available fields. The **Geography** and **Sales** tables are expanded. The **Country** column from the **Geography** table and the **Units** column from the **Sales** table are selected and highlighted with red boxes. Other columns like **Date**, **City**, **District**, **Region**, **State**, **Zip**, **Manufacturer**, **Product**, **Revenue**, and **Zip** are also listed in the Fields pane.

In this case the columns Zip and Country will help us establish the relationship since you can uniquely identify each row in the Geography table with Zip and Country.

We need to create a new column in both the Geography table and the Sales table that combines "Zip" and "Country". Let us start by creating a new column in the Sales table.

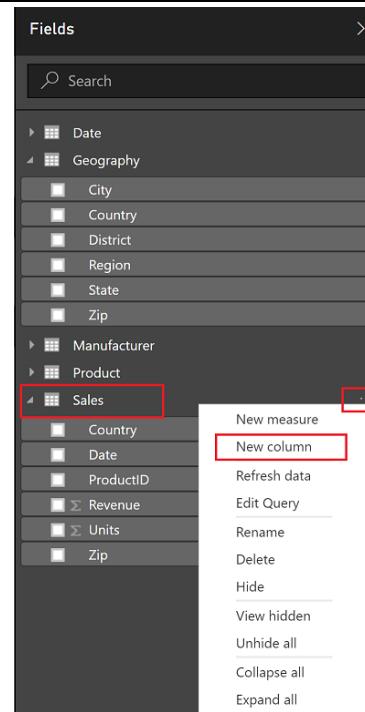
44. In the **Fields** section, click on the ellipsis next to **Sales** table. Select "**New Column**" as shown in the figure.

You will see a formula editor appear as shown in the figure to help create this new column.

45. We can combine or concatenate the Zip and Country columns into a new column called ZipCountry separated by a comma. Let us create this column called **ZipCountry** using the following calculation in the editor.

ZipCountry = Sales[Zip] & "," & Sales[Country]

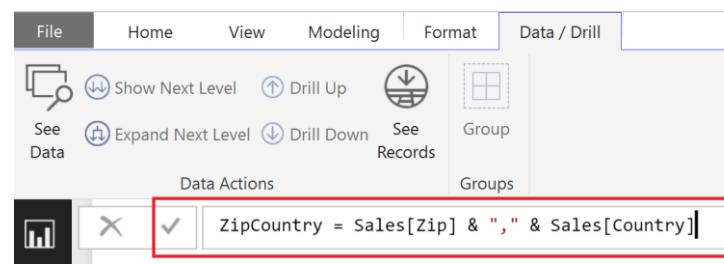
46. Once you are done entering the formula click in the check mark on the left side of the formula editor.



IMPORTANT!

If you get an error creating a new column here, make sure your Zip column is the Text Data Type.

If you still have problems, ask!

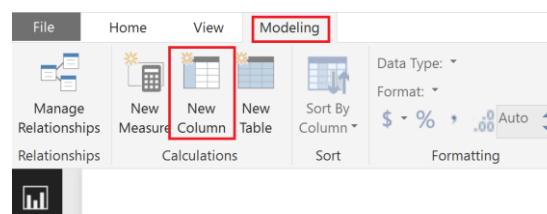
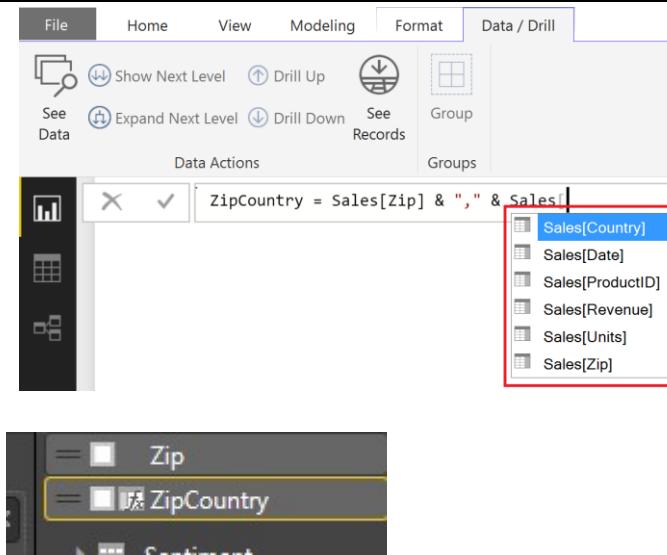


You will notice that as you type the expression the Power BI desktop guides you to choose the right columns using a Technology called Intellisense. As you type half way through you can select the right column by double clicking on it using your mouse or by continuing to hit tab until you see the correct name.

The language you used to create this new column is called DAX (Data Analysis Expression) which is very similar to writing expressions in Excel where you are concatenating the two columns (Zip and Country) in each row by using the “&” symbol.

You will see a new column ZipCountry in Sales table. The icon with a (fx) indicates you have a column that contains an expression, also referred to as calculated column.

You can also create a new column by selecting the table and then clicking on **Modeling -> New Column** from the ribbon. Let us use this method to create a “ZipCountry” column in the Geography table.



47. From **Fields** section, select **Geography** table and from the ribbon select **Modeling - > New Column** as shown in the figure.

48. Formula bar appears. Enter the following DAX expression in the formula bar:

ZipCountry = Geography[Zip] & "," & Geography[Country]

You will see a new column ZipCountry in Geography table. The final step is to setup the relationship between the two tables using the newly created "ZipCountry" columns in each of these tables.

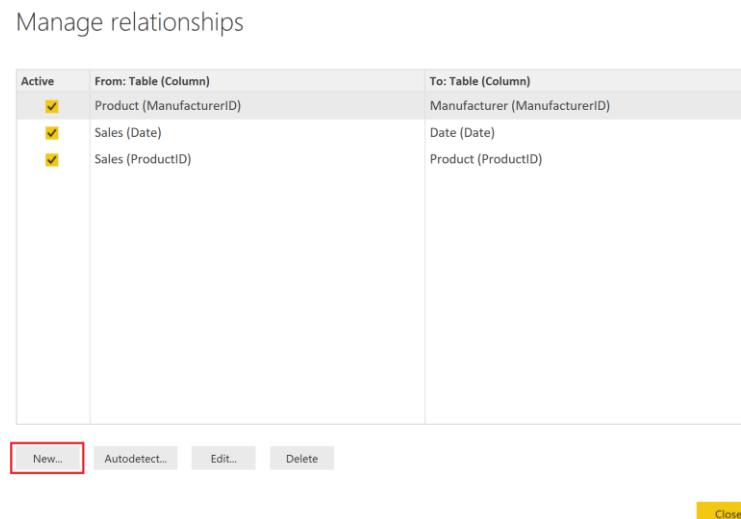
The screenshot shows the Microsoft Power BI ribbon with the 'Modeling' tab selected. In the formula bar, the DAX expression 'ZipCountry = Geography[Zip] & "," & Geography[Country]' is entered. The 'Geography' table is selected in the Fields pane on the right.

49. From the ribbon select **Modeling -> Manage Relationships**.

The screenshot shows the Microsoft Power BI ribbon with the 'Modeling' tab selected. The 'Manage Relationships' button is highlighted with a red box.

50. In the **Manage Relationships** dialog you will see all existing relationship between the tables. You can also create new relationships in this dialog.

51. Click on the **New** button to create a new relationship.

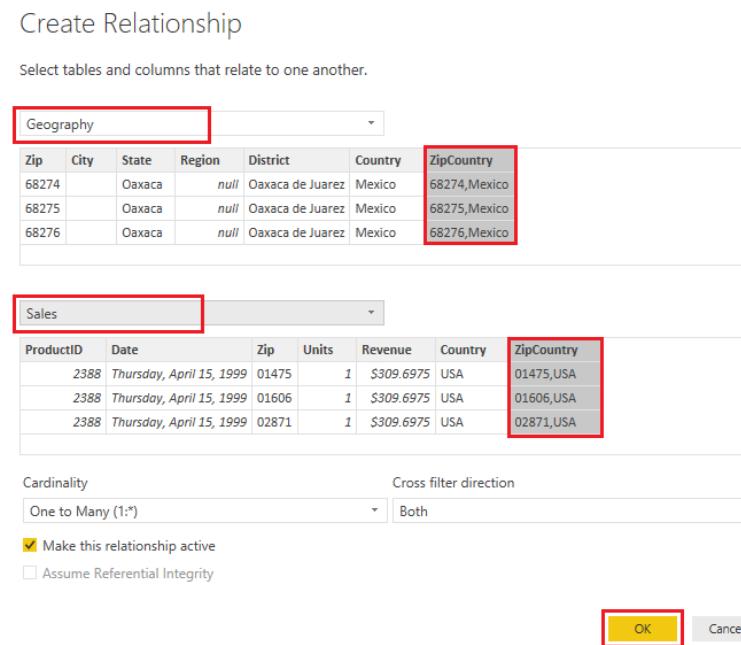


52. In the **Create Relationship** dialog first select **Geography** from the top drop down as shown in the figure.

53. Select the column **ZipCountry**.

54. Select **Sales** table from the second drop down as shown in the figure. Power BI automatically selects the **ZipCountry** column for you because you selected a column with a same name in the **Geography** table.

55. Click **OK** in the **Create Relationship** dialog.



56. You will see the new relationship created as shown in the figure.

57. Click **Close** in the **Manage Relationships** dialog.

Manage relationships

Active	From: Table (Column)	To: Table (Column)
<input checked="" type="checkbox"/>	Product (ManufacturerID)	Manufacturer (ManufacturerID)
<input checked="" type="checkbox"/>	Sales (Date)	Date (Date)
<input checked="" type="checkbox"/>	Sales (ProductID)	Product (ProductID)
<input checked="" type="checkbox"/>	Geography (ZipCountry)	Sales (ZipCountry)

New... Autodetect... Edit... Delete Close

58. When you look at the report canvas you will immediately see that the relationship has taken effect. You can now see the total units sold in each country. You can hover over USA to see the actual value.



Let's compare non-USA sales by using exclude functionality.

59. Right click on the USA column of the column chart.

60. Select **Exclude**. Notice this filters out USA from the visual. Also, notice a filter is added to in the Visual level filters section in the right panel.

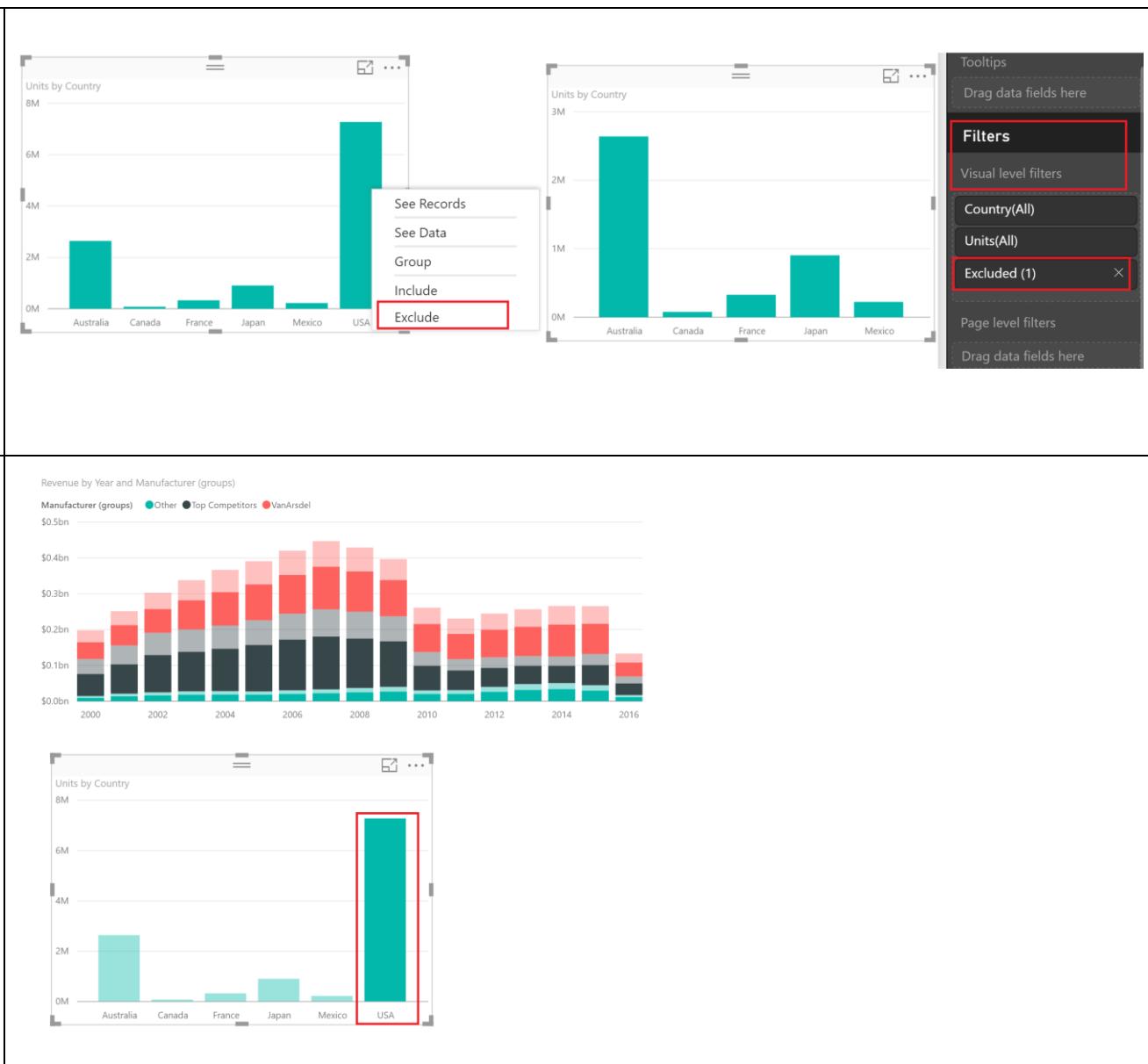
61. To remove the exclude filter, click on the "x" in the Filter section.

Similarly, there is an option to **Include** as well.

62. Click on bar for **USA** in the bottom graph to analyze what portion of the units sold in USA contributes towards to overall Sales.

You will immediately notice that in the bottom graph the rest of the bars fade away and USA remains highlighted in the bold. Similarly, in the graph on the top a portion of each bar is highlighted in bold and the rest is faded. This visually shows the proportion of sales from USA (for each manufacturer and in each Year/Month). This is called **Cross filtering** in Power BI. You can remove the cross-filtering effect by clicking anywhere on the bottom graph.

Note: You have now created a visual filter on the top graph while the bottom graph on units sold includes all manufacturers.



Since the units sold are by country, you can easily map your sales.

63. Select the bottom column chart and click on the **map** visual icon (not the filled map visual) in Visualizations. You will see the bottom visual change to a map visualization and the size of the bubble in each country shows the total number of units sold.

64. **Resize** the map as needed.

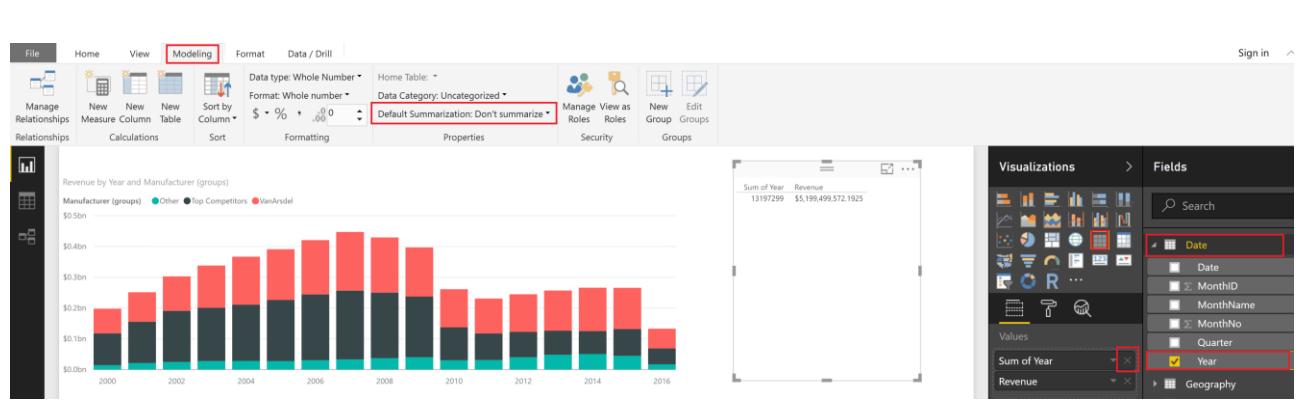
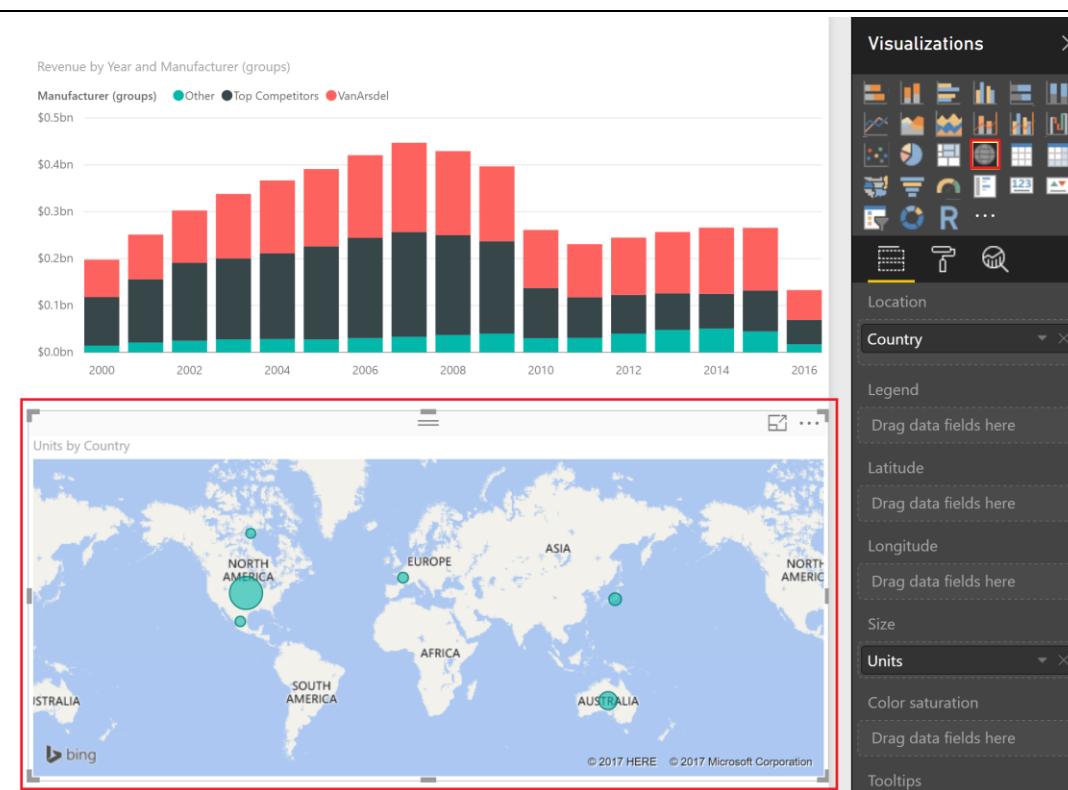
Note: Microsoft Bing is used to create the map; hence you must be connected to the internet for the map visual to work.

Note: You didn't have to do any complex operations to change the visual type, Power BI desktop automatically understood the Country column and add it to the location and the units to the values.

Let's assume we want to create a table visual to display the Revenue by year and add a column that displays the % of revenue for each year to help figure out the years where sales were high.

65. Click on the white space in the canvas. From the **Visualizations** section, select **Table**.

66. From the **Fields** section, expand **Date** table and select **Year**.



67. From the **Fields** section, expand **Sales** and select **Revenue**.

Notice that Year is summed by default since the data type is of type Whole Number. We would never sum Year, so let's change it.

68. In the **Fields** section, click on **Year**.

69. From the ribbon, select **Modeling -> Default Summarization -> Do Not Summarize**.

70. From the **Values** section of the Table visual, delete **Sum of Year** field by clicking on the “x”.

71. From the **Date** table, drag **Year** field and drop it above **Revenue** in **Values** section of the table visual.

Notice Year is not summed anymore.

72. From the **Sales** table, drag **Revenue** field and drop it below Revenue in **Values** section of the table visual. Notice the newly added Revenue field is not summed.

73. Click the arrow next to the newly dropped **Revenue** field.

74. Select **Sum**.

The screenshot shows a Power BI interface. On the left is a Table visual with columns Year, Revenue, and Revenue. The data is as follows:

Year	Revenue	Revenue
2000	\$13,9125	\$13,9125
2000	\$62,895	\$31,4475
2000	\$39,3225	\$39,3225
2000	\$44,52	\$44,52
2000	\$196,153,65	\$52,4475
2000	\$18,042,8	\$52,45
2000	\$6,443,19	\$55,07
2000	\$113,449,35	\$55,0725
2000	\$56,1225	\$56,1225
2000	\$661,559,535	\$57,6975
2000	\$58,277	\$57,77
2000	\$59,325	\$59,325
2000	\$255,252,1125	\$62,9475
2000	\$22,536,1	\$62,95
2000	\$61,373,52	\$65,57
2000	\$780,181,605	\$65,5725
2000	\$377,404,965	\$68,1975
2000	\$21,960,4	\$68,2
Total	\$5,199,499,572,1925	

To the right is the Fields pane. Under the Values section, the Revenue field has a context menu open. The menu options are:

- Remove field
- Don't summarize
- Sum (highlighted with a red box)
- Average
- Minimum
- Maximum
- Count (Distinct)
- Count
- Standard deviation
- Variance
- Median

Notice now both the Revenue fields are summed.

75. Click the arrow next to the second Revenue field.

76. Select Show value as -> Percent of grand total.

The screenshot shows the Power BI Fields pane. Two 'Revenue' fields are selected in the list. The second 'Revenue' field's properties pane is open, specifically the 'Show value as' dropdown. The 'Percent of grand total' option is highlighted with a red box. Other options like 'Sum', 'Average', and 'Median' are also visible.

Year	Revenue	Revenue
2000	\$197,704,713.1475	\$197,704,713.1475
2001	\$251,282,678.9175	\$251,282,678.9175
2002	\$302,700,895.515	\$302,700,895.515
2003	\$338,020,092.0275	\$338,020,092.0275
2004	\$366,785,005.055	\$366,785,005.055
2005	\$391,029,032.4825	\$391,029,032.4825
2006	\$426,593,780.11	\$426,593,780.11
2007	\$447,096,083.19	\$447,096,083.19
2008	\$429,293,079.0375	\$429,293,079.0375
2009	\$396,834,759.375	\$396,834,759.375
2010	\$261,166,724.965	\$261,166,724.965
2011	\$230,811,969.9675	\$230,811,969.9675
2012	\$244,761,416.34	\$244,761,416.34
2013	\$256,810,540.4075	\$256,810,540.4075
2014	\$266,053,436.5525	\$266,053,436.5525
2015	\$265,644,300.89	\$265,644,300.89
2016	\$132,911,064.2125	\$132,911,064.2125
Total	\$5,199,499,572.1925	\$5,199,499,572.1925

Notice now we have % GT Revenue field. With Quick Cal feature we can add a calculation to the report and meet the requirement of displaying % of revenue by year.

The screenshot shows the Power BI Fields pane. A new calculated column '%GT Revenue' is added to the list. The visualization on the left shows the same data as the previous screenshot, but the last row now includes the percentage value '100.00%'.

Year	Revenue	%GT Revenue
2000	\$197,704,713.1475	3.80%
2001	\$251,282,678.9175	4.83%
2002	\$302,700,895.515	5.82%
2003	\$338,020,092.0275	6.50%
2004	\$366,785,005.055	7.05%
2005	\$391,029,032.4825	7.52%
2006	\$426,593,780.11	8.09%
2007	\$447,096,083.19	8.60%
2008	\$429,293,079.0375	8.26%
2009	\$396,834,759.375	7.63%
2010	\$261,166,724.965	5.02%
2011	\$230,811,969.9675	4.44%
2012	\$244,761,416.34	4.71%
2013	\$256,810,540.4075	4.94%
2014	\$266,053,436.5525	5.12%
2015	\$265,644,300.89	5.11%
2016	\$132,911,064.2125	2.56%
Total	\$5,199,499,572.1925	100.00%

It would be nice to have conditional formatting on the table so we can easily identify the years where sales were good versus bad.

77. In the **Values** section of the table report, click on the arrow next to **% GT Revenue**.

78. From the menu select **Conditional Formatting**.

The screenshot shows the Power BI Fields pane. The 'Values' section is open, and the '%GT Revenue' field is selected. A red box highlights the '%GT Revenue' field in the list. To the right of the list, there are several buttons: 'Remove field', 'Conditional formatting' (which is also highlighted with a red box), 'Don't summarize', and 'Sum'.

Conditional formatting dialog opens. By default, there is options to format minimum and maximum.

79. We want to format center value as well, so select the **Diverging** checkbox.

80. Select **Lowest Value** from **Minimum** drop down.

81. Select **Middle Value** from **Center** drop down.

82. Select **Highest Value** from **Maximum** drop down.

83. Pick **Red** color for the minimum value, **Yellow** for center and **Green** for maximum.

84. Click **OK**.

Notice now we can quickly figure out that sales peaked in 2007.

Feel free to explore other table formatting options available in the format section (paint

Conditional formatting

Format cells based on their values.

Base value

%GT Revenue

Format blank values

As zero

Minimum

Lowest value

(Lowest value)

Diverging

Center

Middle value

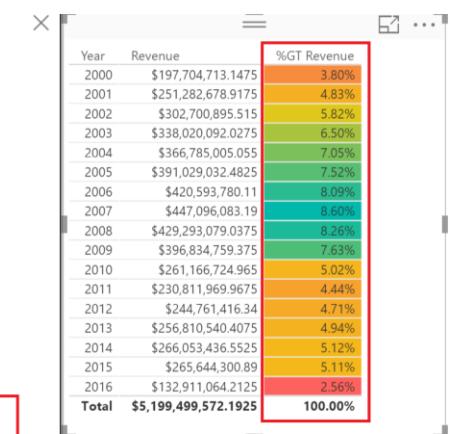
(Middle value)

Maximum

Highest value

(Highest value)

OK



brush) section of the visual. E.g. Word wrap column header, etc.

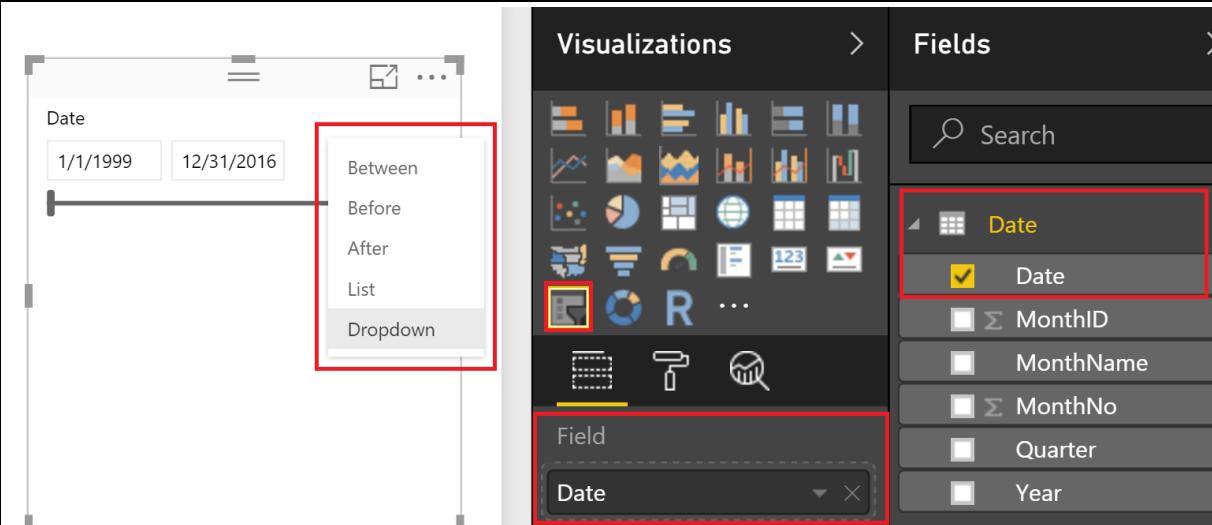
Let's add a date slicer, so we can filter by date.

85. From the **Visualization** section, select **Slicer** visual.

86. From the **Fields** section, expand **Date** table and select **Date**. This creates a Date slicer.

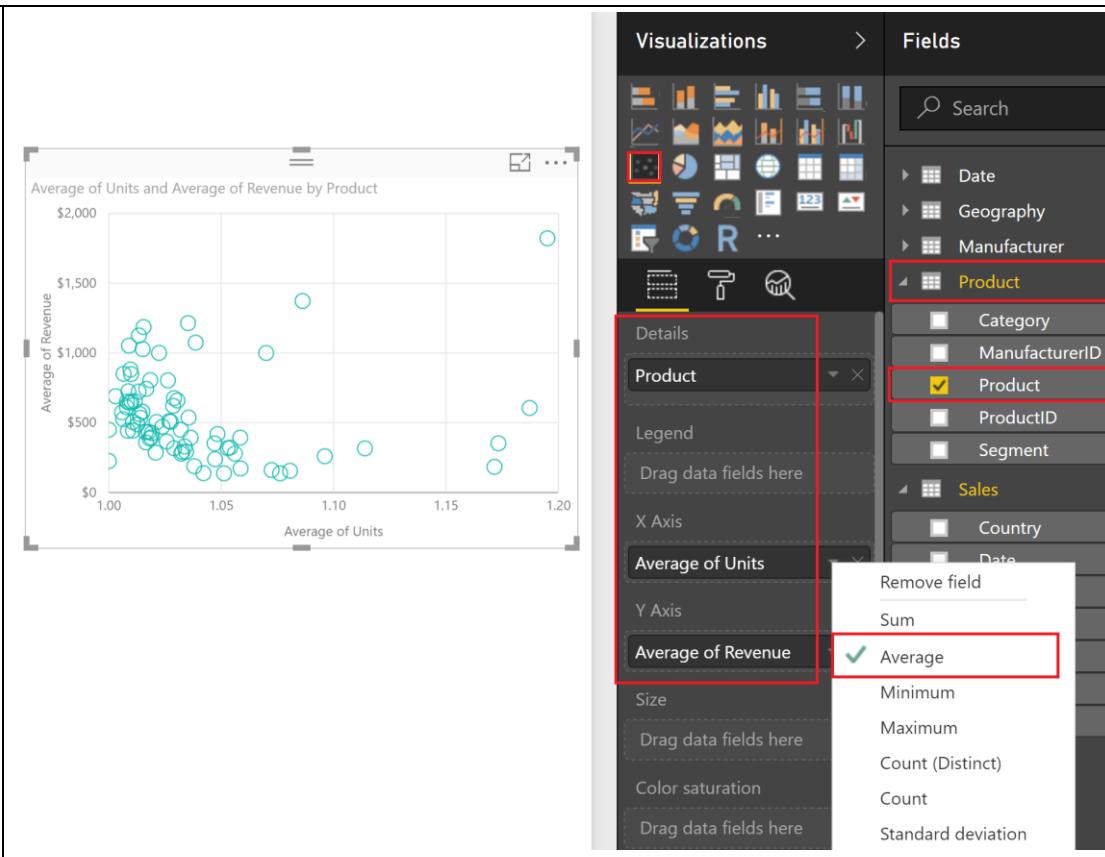
87. Using the **slider**, change the date filter. Notice the visuals on the page change based on the filter selection.

Clicking on the date field opens a **date picker** which provides the ability to pick a date. On the top right corner of the slicer, click on the arrow next to **Between** and notice there are options to display the date slicer in the following formats: **Before**, **After**, **List** or **Dropdown**.



It will be helpful to know how the Products are clustered. E.g. Products that have lower quantity sales but bring in higher revenue versus products that have higher quantity sales but lower revenue, etc. This will also help with finding outliers.

88. From **Visualizations** section, select **Scatter chart**.
89. From **Fields** section, expand **Product** and drag and drop **Product** field to **Details** section.
90. From **Fields** section, expand **Sales** and drag and drop **Units** to **X-Axis** section.
91. From **Fields** section, expand **Sales** and drag and drop **Revenue** to **Y-Axis** section.
92. Click on the **dropdown** next to **Units in X-Axis**. Select **Average**. This will provide Average Units Sold.
93. Similarly, click on the **dropdown** next to **Revenue in Y-Axis**. Select **Average**. This will provide Average Revenue.



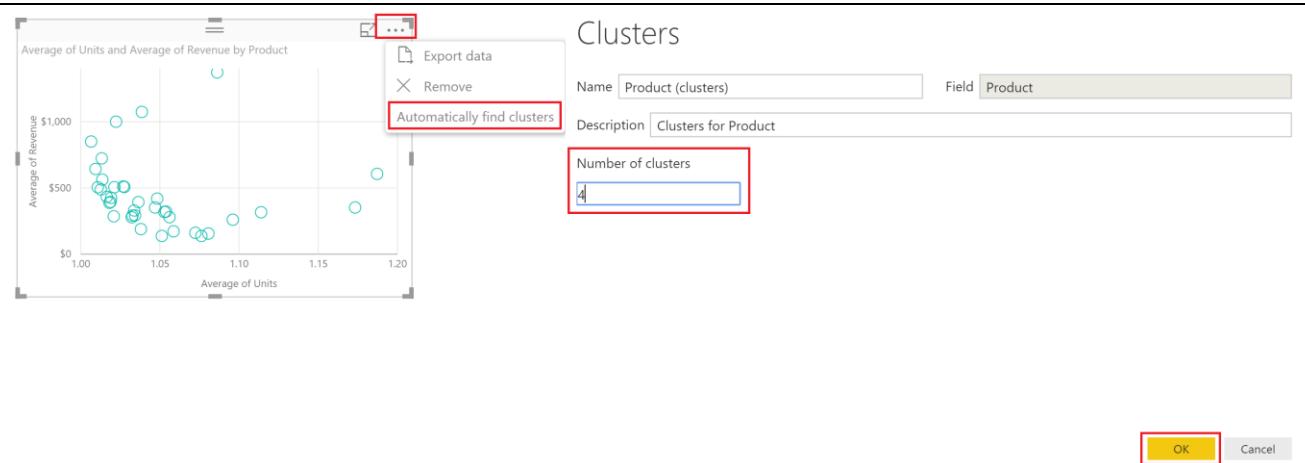
Next let's create clusters.

94. Click on the **ellipsis** on the top right corner of the **Scatter chart**.

95. Select **Automatically find clusters**.

96. Clusters dialog opens. We have option to provide cluster Name and Description and the Number of clusters. Enter **4** for **Number of Clusters**.

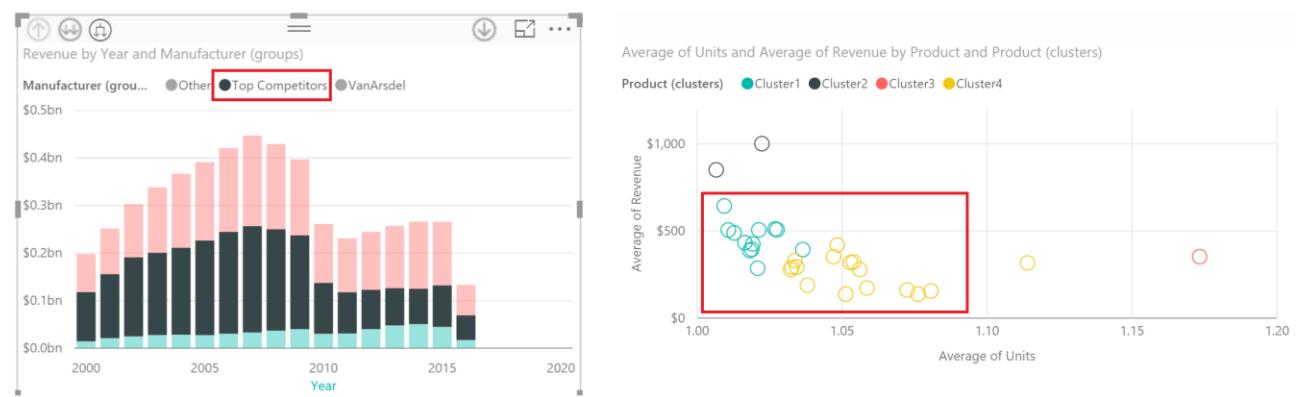
97. Click **OK**.



Using clustering algorithm 4 clusters are created by default. Notice it clusters products with low average units sold and low average revenue, products with low average units sold and high average revenue and so on.

98. On the **bar chart** click on **Top Competitors** and notice the change in clustering. Notice that most the competitor products are in two major clusters – low to medium average units sold and low to medium average revenue.

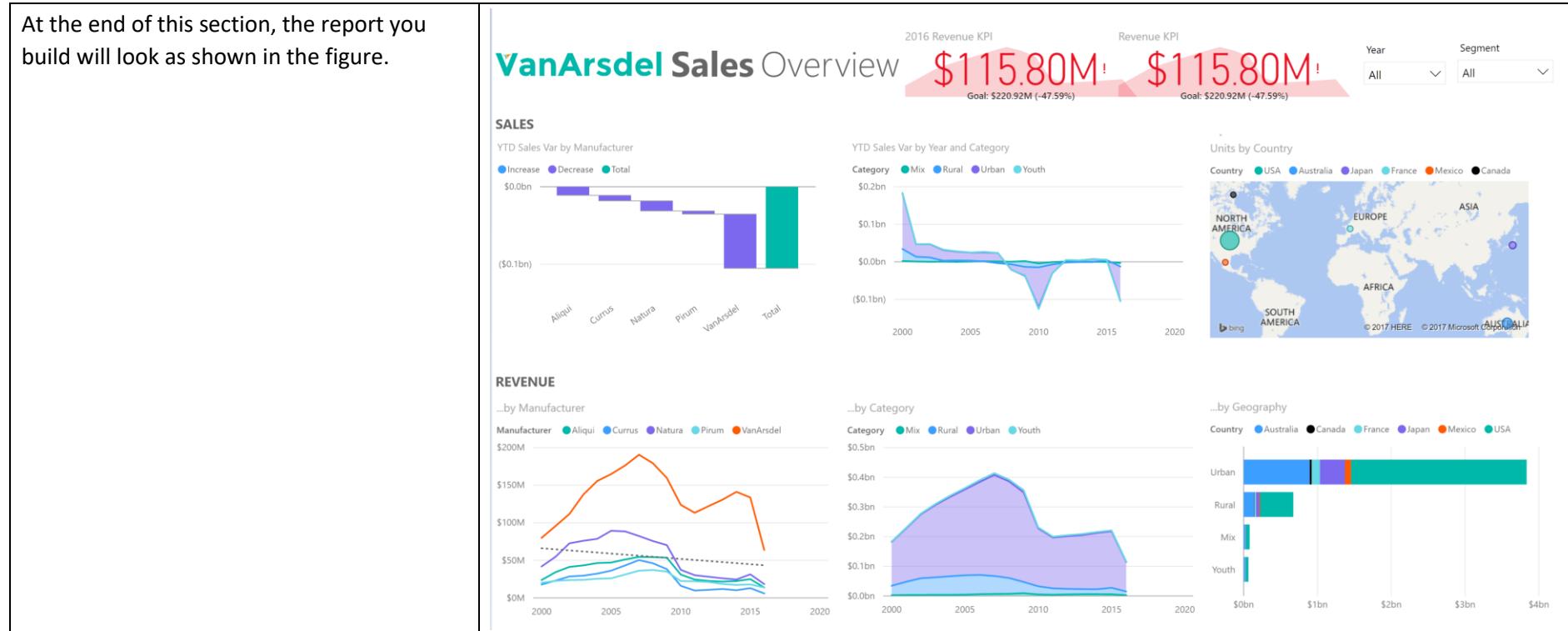
You can change the number of clusters to see how the distribution changes.



Power BI Desktop - Report Authoring

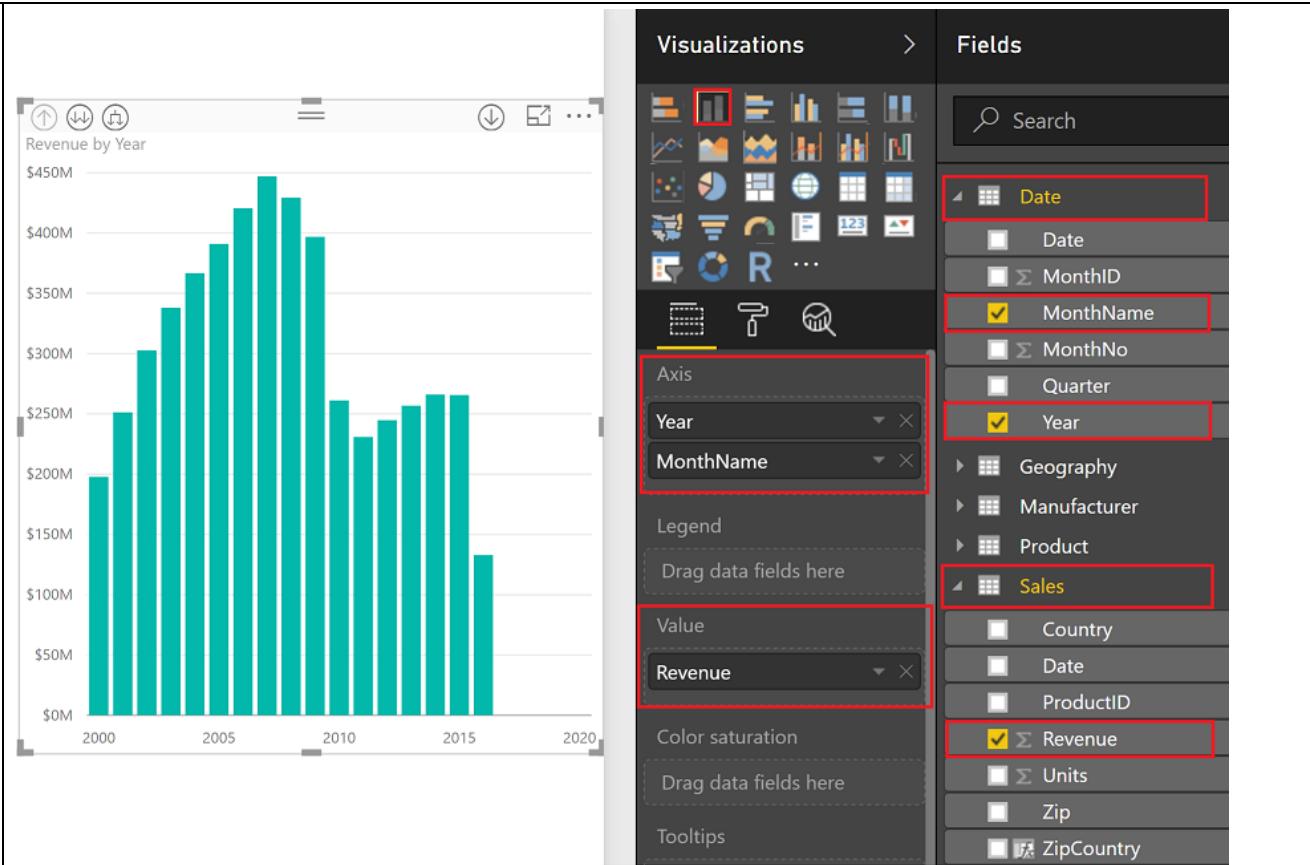
Having done some initial data exploration and visualization you are now finding good insights to share with your team. In this section, you will create a professional report that you and your entire team can benefit from on a daily basis. You will be creating a report that can give quick insights into comparing sales of various months this year and easily being able to compare it to previous years in this report.

At the end of this section, the report you build will look as shown in the figure.



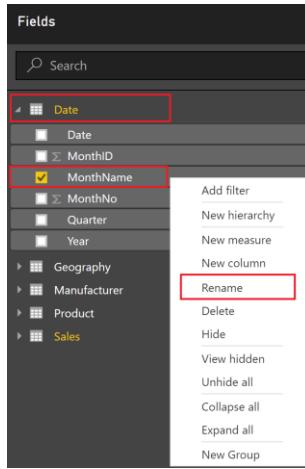
Let us start with a clean slate again for this section. To do this, select each visual in the page that we created in the previous section and **delete** it. Now we should be ready to move to the next section.

1. From **Visualizations** section select **Stacked column chart**.
2. From the **Fields** section expand **Sales** table and drag and drop **Revenue** to Value as shown in the figure.
3. From the **Fields** section expand **Date** table and drag and drop **Year** to **Axis** as shown in the figure.
4. From the **Fields** section expand **Date** table and drag and drop **MonthName** to **Axis**, **below Year** as shown in the figure. This will allow you to drill up and down from Year to Month level.



We can rename fields to provide a better user experience. Let's rename MonthName field to Month.

5. From the **Fields** section, expand **Date** table and click on the **ellipsis** next to **MonthName** field.
6. Select **Rename** and name the field as **Month**.

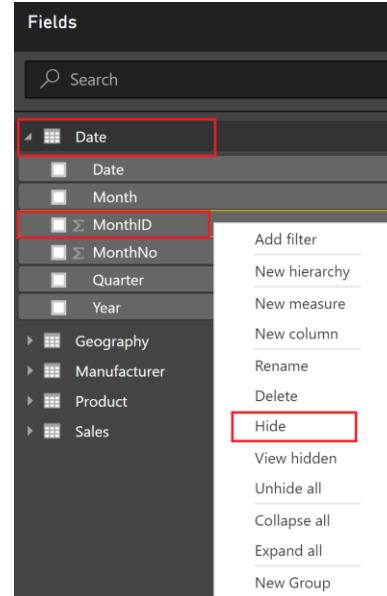


Several of the ID columns in the tables are not useful to the end-users. Let's hide some of the fields to present a clean user experience.

7. From **Fields** section, expand **Date** table and click on the ellipsis next to **MonthID** field and select **Hide**. This hides the column from the report.

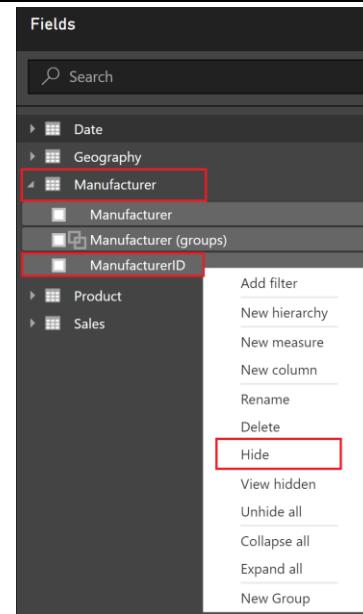
Note: You can still see this column in the data view and relationship view.

8. Similarly **Hide** the **MonthNo** field in the **Date** table.



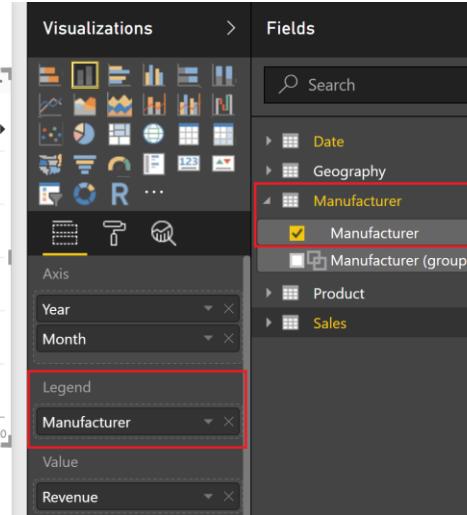
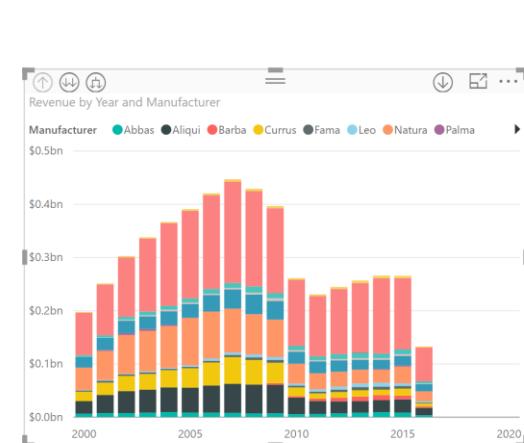
9. In the **Manufacturer** table, **Hide** **ManufacturerID** column.
10. In the **Product** table, **Hide** the columns **ManufacturerID** and **ProductID**.
11. In the **Sales** table, **Hide** the columns **Country**, **Date**, **ProductID**, **Zip** and **ZipCountry**.
12. Select **Geography** table and **Hide** the column **ZipCountry**.

Note: You can hide **columns or tables** from the report view so that your end users of the report only see the columns with which they need to interact.



Like our analysis of top competitors, when doing comparisons of competitors, your team is also only interested in comparing top competitors individually (**Aliqui**, **Currus**, **Natura**, **Pirum**) with **VanArsdel**. Earlier we grouped these competitors, now let's use Top N feature to compare them individually.

13. Move the column chart visual to the right of the canvas.
14. From the **Fields** section, expand **Manufacturer** table and drag and drop **Manufacturer** to the **Legend** of the visual.



15. In **Visualizations** section, scroll to **Visual level filters**.

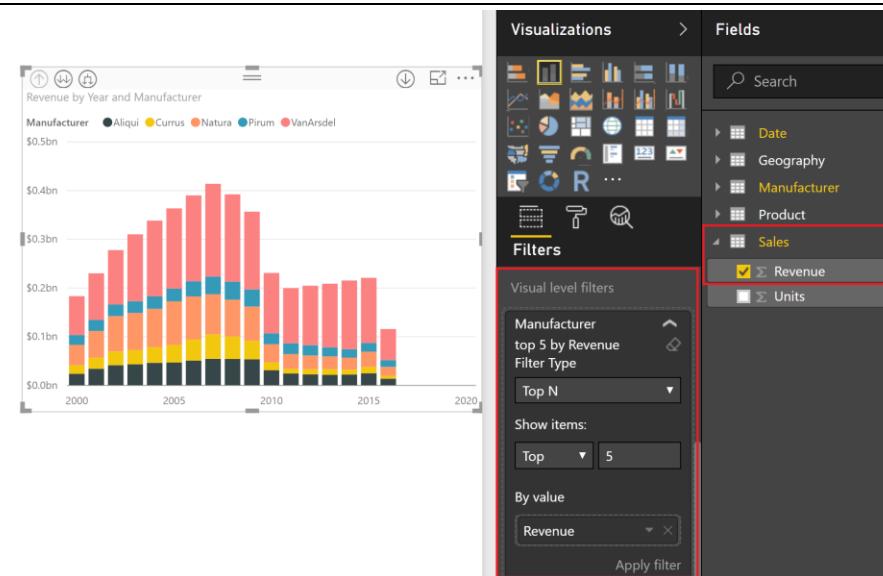
16. Expand **Manufacturer** and from the **Filter Type** drop down select **Top N**.

17. Enter **5** next to Top since we are comparing the Top 4 competitors.

18. From the **Fields** section, expand **Sales** table and drag and drop **Revenue** to **By Value**. We are doing this to get the Top 5 competitors based on revenue.

19. Select **Apply Filter**.

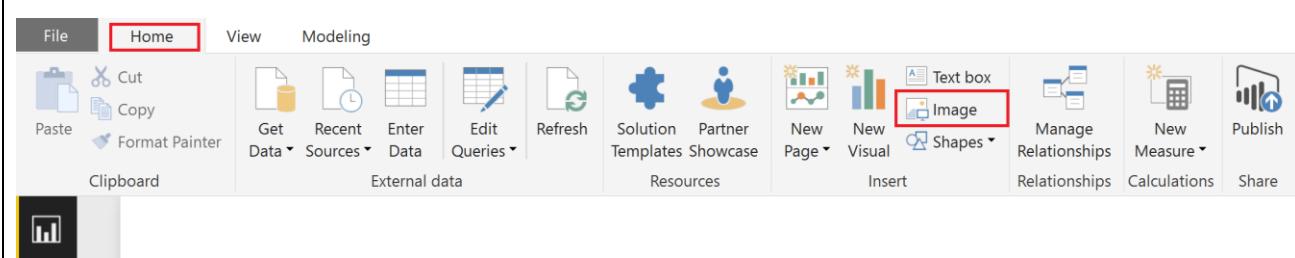
Notice the column chart updates to compare data for the Top 5 competitors.



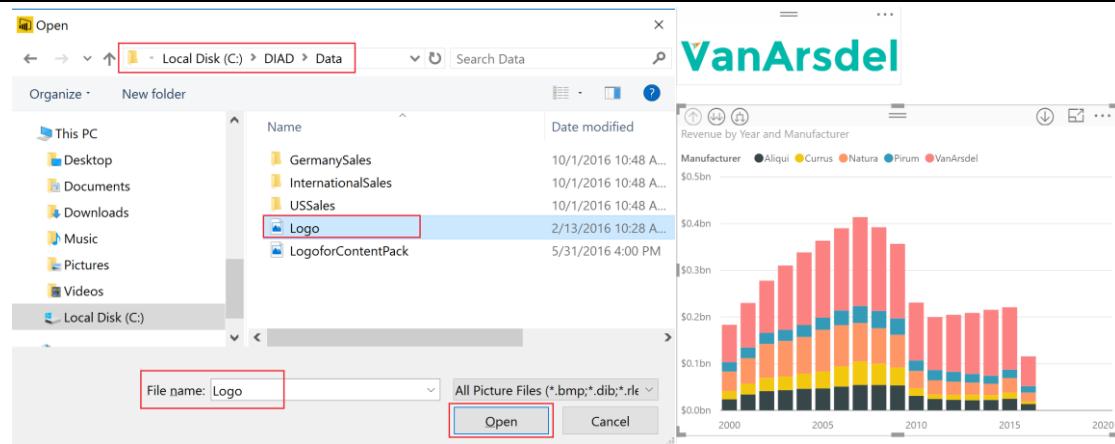
You need the company logo in most reports.

20. Click on the white space on the canvas.

21. From the ribbon, select **Home -> Image**.

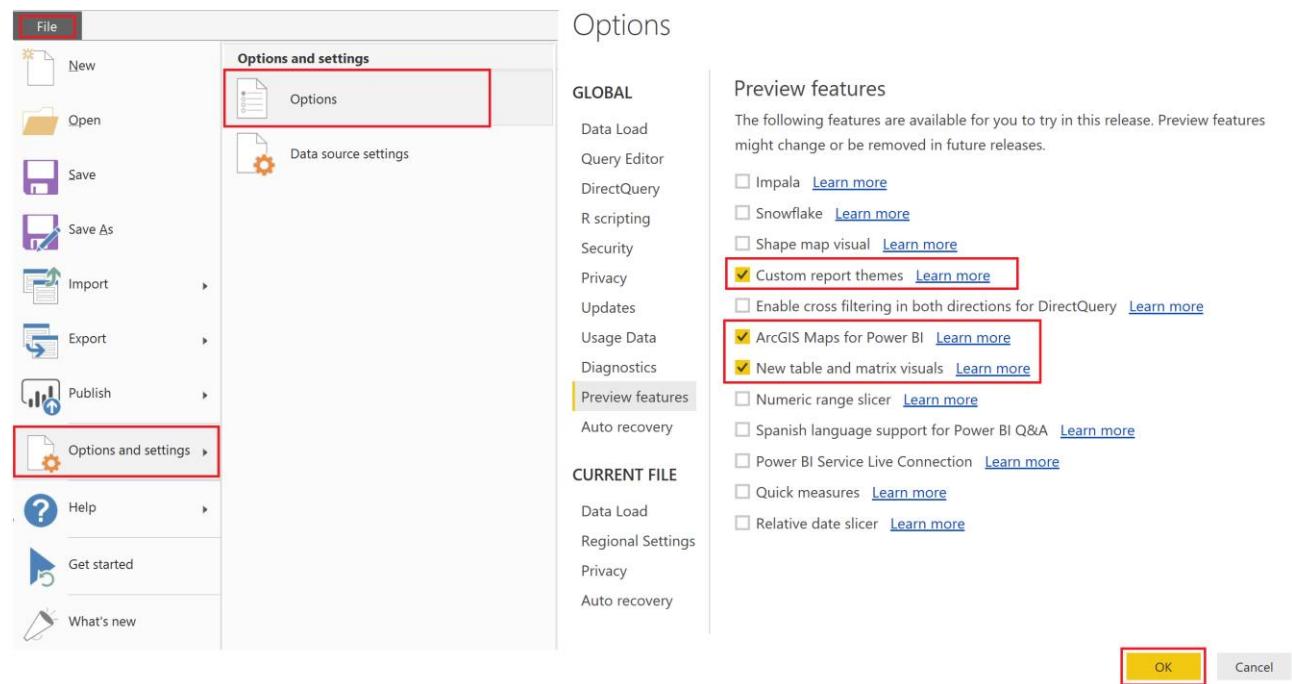


22. Navigate to **/DIAD/Data** folder and select Logo.png. Click **Open**. Logo will appear on the report.
23. **Resize** and move the logo to the top left of the report.



VanArsdel has a **standard theme** (color palette) they use for all the reports. Power BI Desktop has the capability to import and use the theme to build the reports. This is a preview feature, we need to enable it before using.

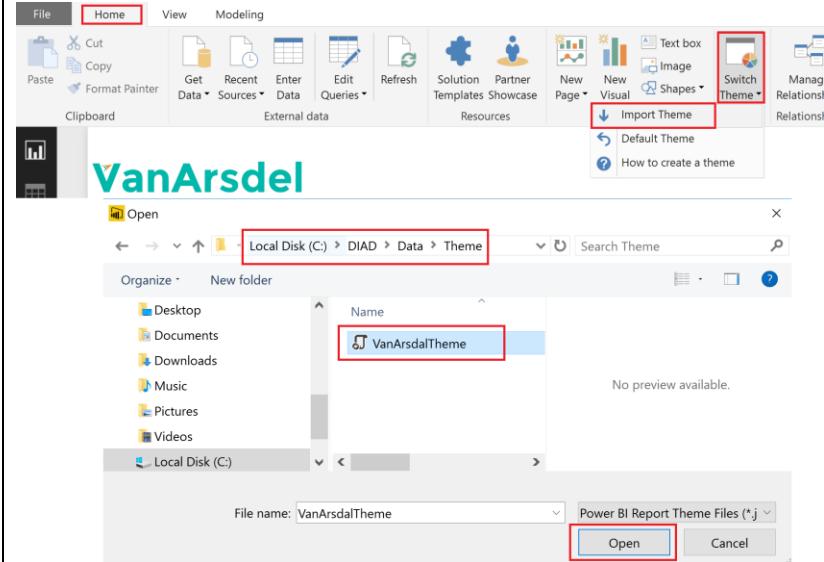
24. To enable preview feature, from the ribbon select **File -> Options and settings - > Options**.
25. Options dialog opens. Select **Custom report themes** from the Preview features list.
26. We will also be using **ArcGIS Maps for Power BI** and **New matrix visual** later in the lab. Select these two features as well.
27. Select **OK**.
28. A message requesting a **restart** of Power BI Desktop to enable the preview feature



- is displayed. Click **OK** on the message dialog.
29. Let's save the file before restarting.
Select **File -> Save**
30. From the ribbon select **File -> Exit** to close Power BI Desktop.
31. Navigate to the location where you saved the pbix file (**MyFirstPowerBIModel.pbix**) file. Double click on the file to open it.

Note the chart color theme is updated to the default theme. Let's update the theme to VanArsdel's standard.

32. From the ribbon, select **Switch Theme -> Import Theme**.
33. Navigate to **/DIAD/Data/Theme** folder and select **VanArsdelTheme.json** file.



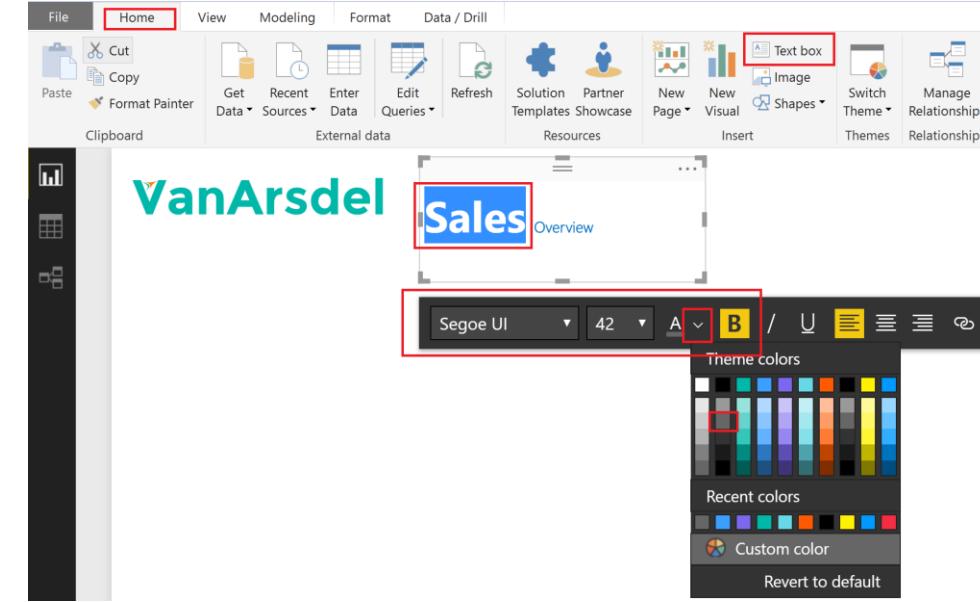
Notice the column chart updates to incorporate the new theme. Optionally, you can further customize colors for the visual.

34. Click on the previously created **Stacked column chart**. From the **Visualization** section, select the **format** icon as shown in the figure.
35. Expand Data colors section.
36. Select the **drop down** next to the color assigned to each manufacturer. Theme colors are displayed. Select the available color or choose a Custom color.



Next let us add a title to this report. To do so click anywhere on the white canvas.

37. From the ribbon, select **Home -> Text box**. Text box area is available in the canvas.
38. Enter the title "[Sales Overview](#)".
39. Highlight **Sales** section of the header and change the font to **Segoe UI**, **font size to 42** and make the text **bold**.
40. Select the arrow next to **A** and pick a **dark gray font color**.
41. Highlight **Overview** section of the header and change the font to **Segoe UI Light**, **font size to 42**.
42. Select the arrow next to **A** and pick the same **dark gray font color** as earlier.



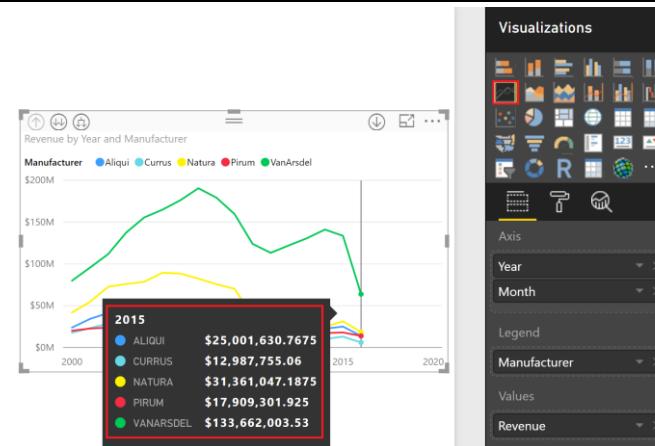
43. Click on the **canvas**.
 44. From the **Fields** section, expand **Date** table and select **Year** column.
 45. Click on the **slicer icon** in **Visualizations** pane.
 46. **Hover** on the top right corner of the slicer and select the arrow. Select **Dropdown** to change the slicer from a **List** to a **Dropdown**. **Resize** the slicer as needed.
 47. **Move** the slicer to the top right corner of the canvas.

A slicer provides the ability for end users to visually see the key filters applied to the entire page and the flexibility to select/deselect values easily.

The screenshot shows the Power BI interface. On the left, a dropdown slicer is displayed with the 'Year' column selected. A red box highlights the 'Dropdown' option in the context menu. To the right, the 'Visualizations' pane shows various chart icons, and the 'Fields' pane lists fields under the 'Date' table. The 'Year' column is selected, indicated by a checked checkbox and a red box around the 'Year' entry in the list.

- To compare the revenue by competitors over time easily line charts are more helpful.
 48. Select the **column chart** visual and change it to **Line chart** visual in the **Visualizations**. Your report should like the one on the right.

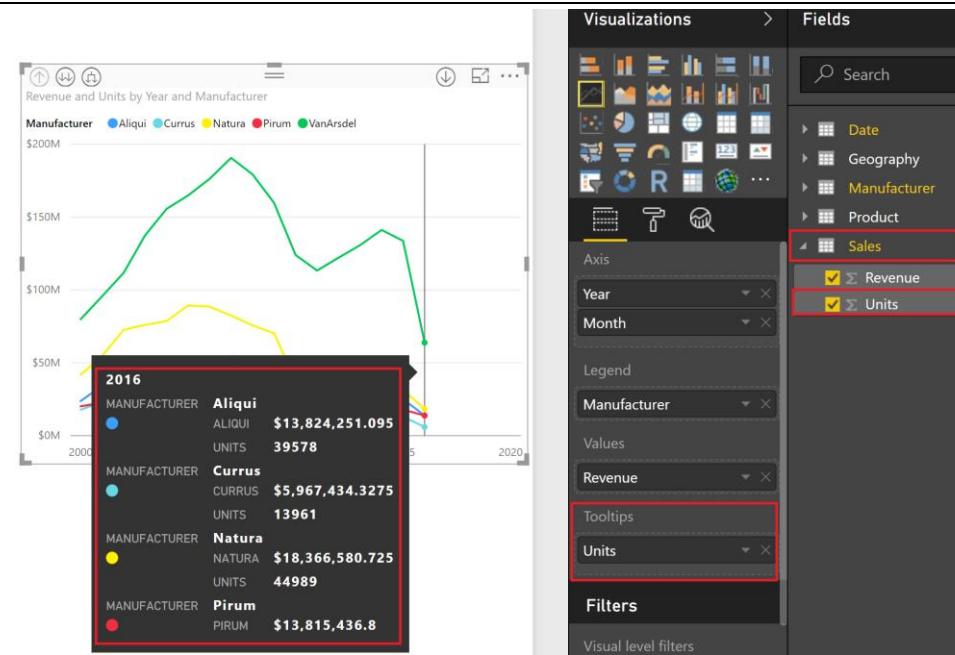
Hover over the visual and notice a tooltip appears displaying the Revenue numbers for each of the manufacturers.



It will be useful to display Units sold along with Revenue information on the tooltip.

49. From the **Fields** section, expand **Sales** and drag **Units** to **Tooltips**.

Hover over the visual now and notice the tooltip has both Revenue and Units information. Also, notice Revenue and Units field need to be formatted.



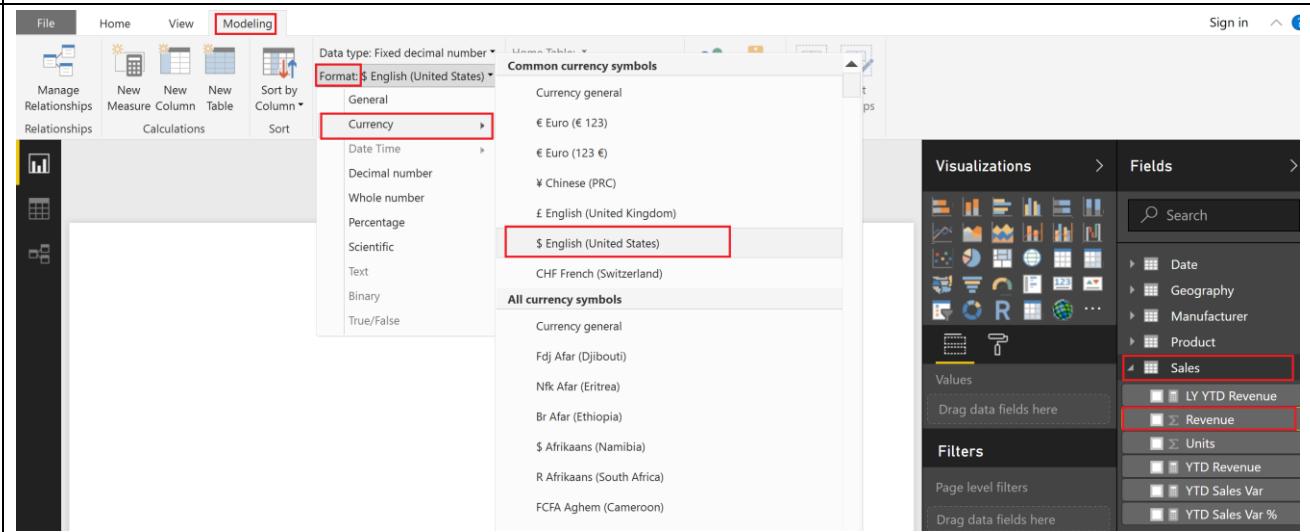
50. Click on the white space on the canvas. From the **Fields** section, expand **Sales** select **Revenue** field.

51. From the ribbon, select **Modeling** -> **Format** -> **Currency** -> **\$ English (United States)**.

52. From the **Fields** section, expand **Sales** select **Units** field.

53. From the ribbon, select **Modeling** -> **Format** ->, (add comma to format Units)

Hover over the line chart and notice the tooltip, both Revenue and Units is formatted.



Power BI Desktop provides capability to perform analytics on visuals. It's useful to know the revenue trend. Let's add it to the Line chart.

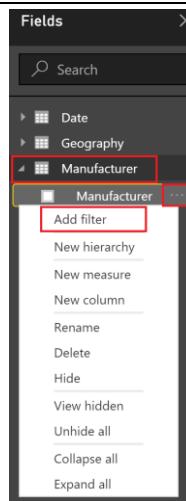
54. With the Line chart selected, from the **Visualization** click on the **Analytics** icon.
55. Notice there is options to add Trend, Constant, Min, Max and Average Line. We need to add a Trend Line. Expand **Trend Line** and select **+ Add**.
56. Double click on the **text** area and rename to **Revenue Trend**.
57. Click on the drop down next to **Color** and select **Dark Gray**.
58. Click on the drop down next to **Style** and select **Dotted**.

Notice the trend line is displayed on the Line chart.

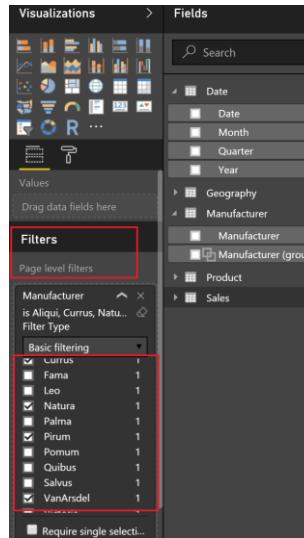


Earlier we used Top N feature to filter the column chart down to Top competitors. Suppose we want to apply this filter to all the visuals in a page, here is how we do it.

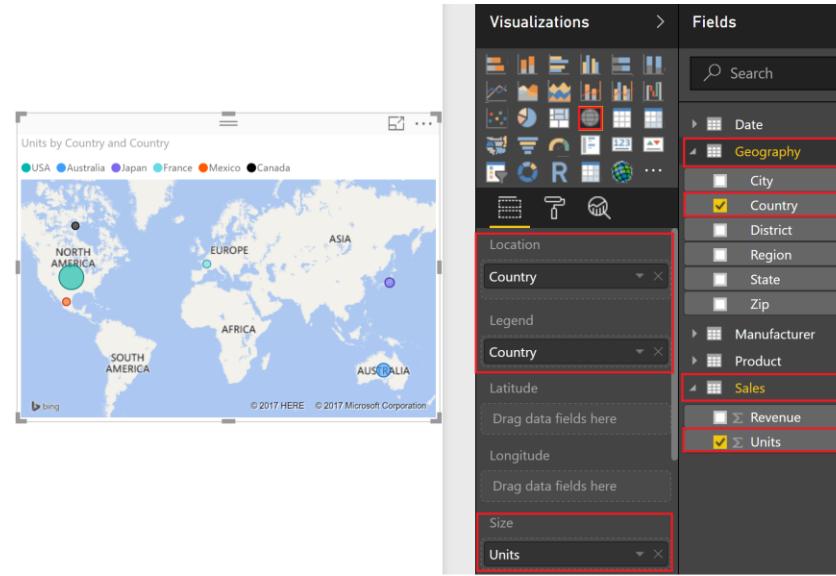
59. To apply a global filter for the entire page, **click on the white space on the canvas**
60. In **Fields** section, select the **ellipsis** next to **Manufacturer** column in **Manufacturer** table and click **Add Filter**. This will add the **Manufacturer** column to Page filter.



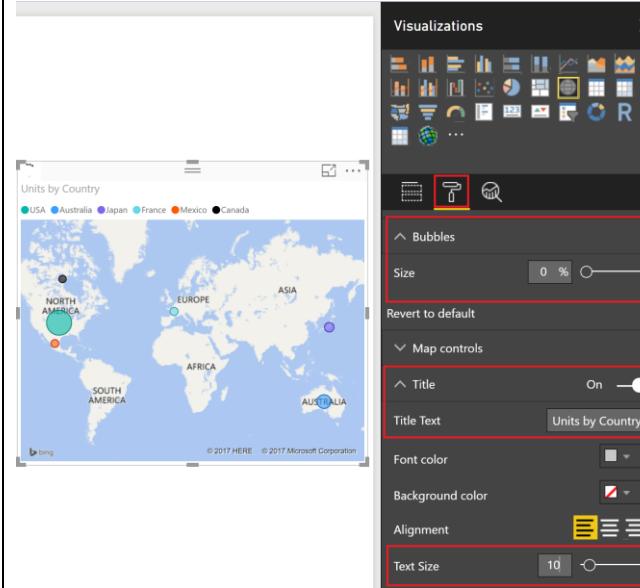
61. In **Visualizations** section, scroll to **Page level filters**.
62. Expand **Manufacturer** and select the manufacturers **Aliqui, Currus, Natura, Pirum** and **VanArsdel** in the filter.



63. Click in the report canvas. Select the **map** visual from Visualizations.
64. From Fields section, expand **Geography** table and drag and drop **Country** column from **Location** of the map visual as shown in figure.
65. From Fields section, expand **Sales** table and drag and drop **Units** column to **Size** section of the visual.
66. From Fields section, expand **Geography** table and drag and drop **Country** field to **Legend** section.
67. **Resize** the map as needed.
The map visual provides units sold by country.



68. Select the **map** visual.
69. Click on the **Format icon** (paint brush) in the **Visualizations** pane.
70. Expand **Title** section. Change Title text to **Units by Country**.
71. Update **Text Size** to **10**.
72. Expand **Bubbles** section and use the **slider** to change the **size** of the bubbles as needed.



Let's add a slicer which will help analyze the data by Product Segment.

73. Click in the report canvas. Select the **slicer** visual from the **Visualizations** section.

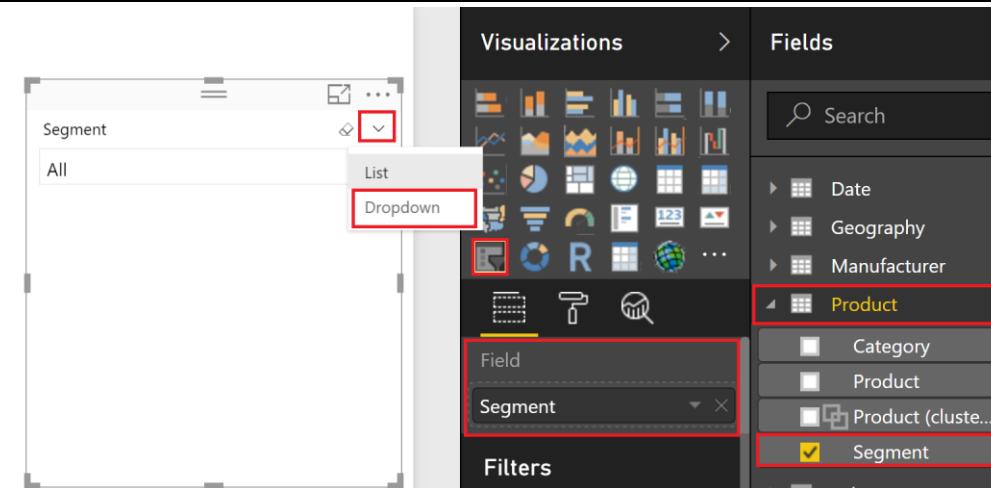
74. From **Fields** section, expand **Product** table and select **Segment** column.

75. **Hover** on the top right corner of the slicer and select the arrow. Select **Dropdown** to change the slicer from a **List** to a **Dropdown**.

76. **Resize** the slicer as needed.

77. From the slicer, select **Regular Segment** and in the line chart notice that revenue has been up and down over the years.

78. **Deselect Regular** in the slicer.



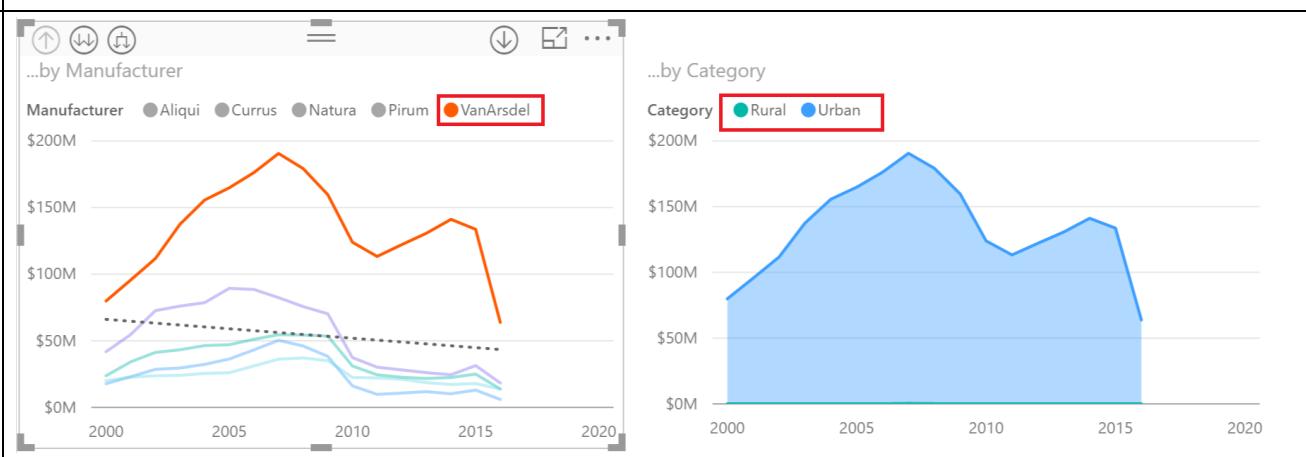
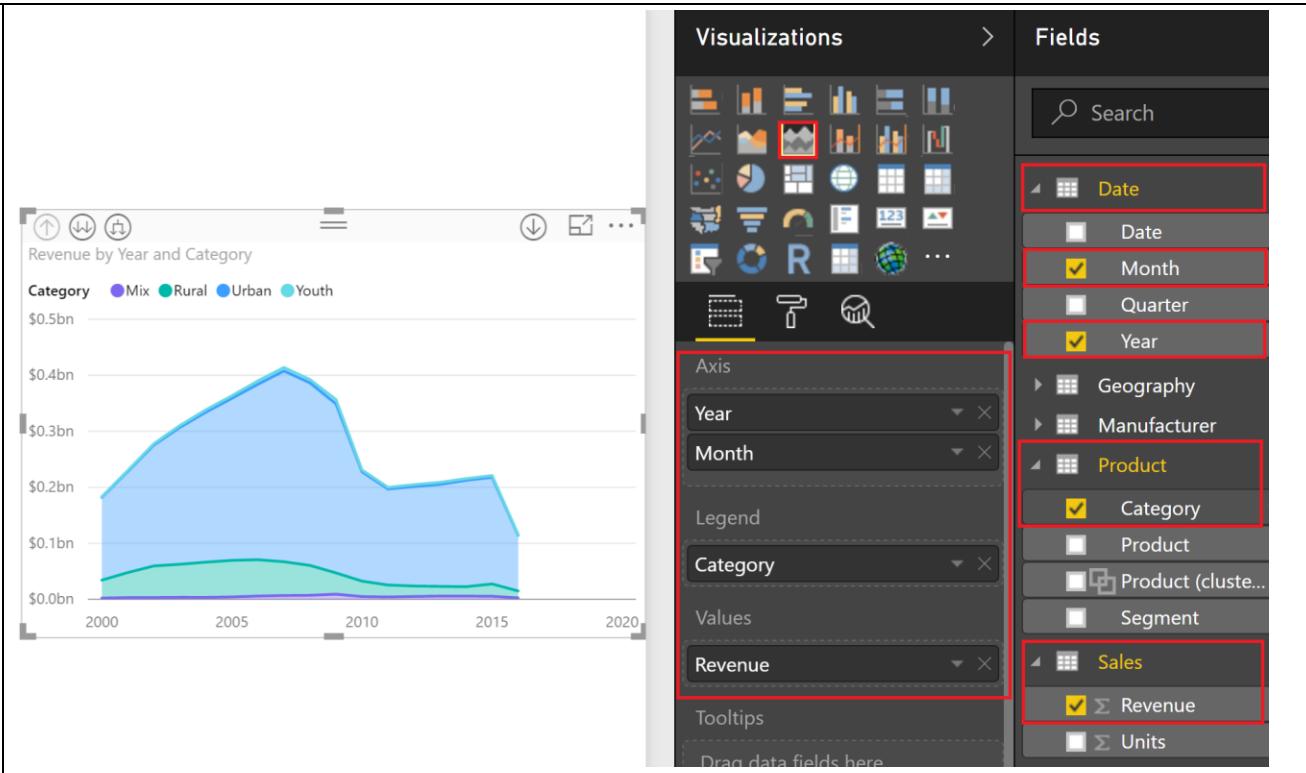
The line chart provides Revenue by Manufacturer. Let's add charts that will provide Revenue by the other two areas, Geography and Product.

79. Click in the report canvas. Select the **Stacked area chart** visual from the **Visualizations** section.
80. From the **Fields** section, expand **Date** table and drag and drop **Year** field to Axis.
81. From the **Fields** section, expand **Date** table and drag and drop **Month** field to Axis below Year.
82. From the **Fields** section, expand **Product** table and drag and drop **Category** field to Legend.
83. From the **Fields** section, expand **Sales** table and drag and drop **Revenue** field to Values.
84. **Resize** the chart as needed.

85. In the **line chart**, select **VanArsdel** from the Legend and notice the newly created Stacked area chart is updated.

Notice that VanArsdel has products in two categories Rural and Urban.

86. Select **VanArsdel** again in the **line chart** to remove the filter.
87. Select **Mix** in the **Stacked area chart**. Notice the trend line in the line chart. The trend is upwards.



88. Select **Mix** again in the **Stacked area chart** to remove the filter.

Feel free to drill up and down the Year and Month hierarchy.



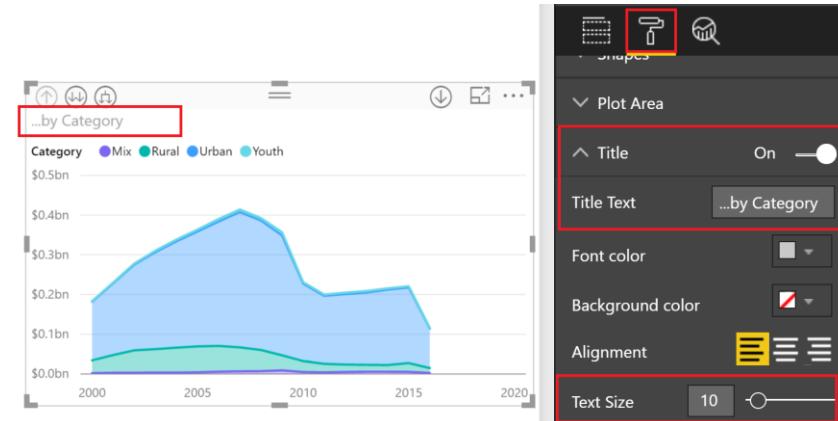
89. With the newly created **Stacked area chart** selected, click on the **Format** (paint brush) option.

90. Scroll down and expand **Title section**.

91. Enter [...by Category](#) in the title text.

92. Change the **Text Size to 10**.

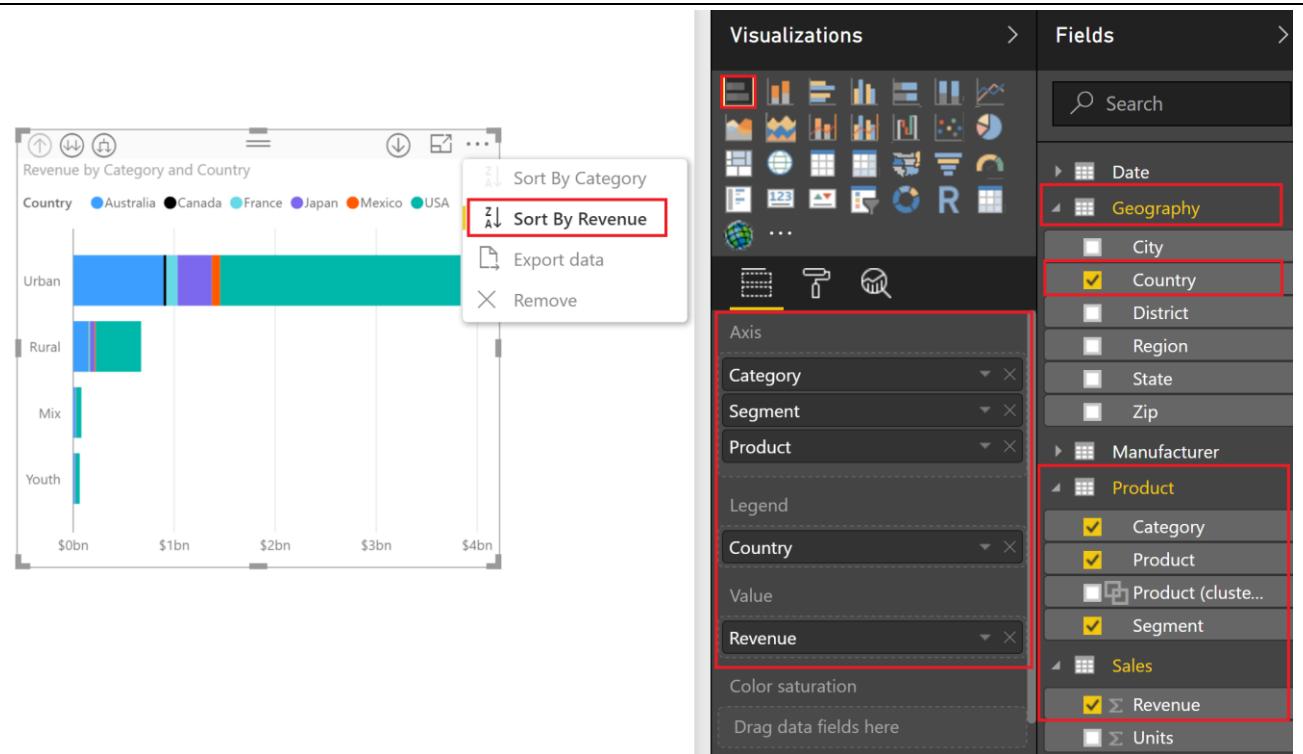
93. Similarly, change the Title of the **line chart** to [...by Manufacturer](#) and the **Text Size to 10**.



94. Click in the report canvas. Select the **Stacked bar chart** visual from the **Visualizations** section.
95. From the **Fields** section, expand **Product** table and drag and drop **Category** field to Axis.
96. From the **Fields** section, expand **Product** table and drag and drop **Segment** field to Axis below **Category**.
97. From the **Fields** section, expand **Product** table and drag and drop **Product** field to Axis below **Segment**.
98. From the **Fields** section, expand **Geography** table and drag and drop **Country** field to Legend.
99. From the **Fields** section, expand **Sales** table and drag and drop **Revenue** field to Values.
100. **Resize** the chart as needed.
101. **Hover** over the chart and select the **ellipsis** on the top right corner. Select **Sort by Revenue**.

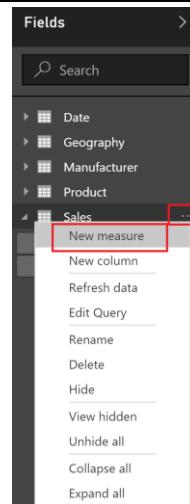
This chart provides Revenue by Country by Product hierarchy. Feel free to drill up and down the Product hierarchy and analyze the revenue.

Change the **Title** of the to **...by Geography** and the **Text Size to 10**.



You want the ability to compare current Year to Date sales with the previous year and see if you are doing better or worse. To achieve such calculations in Power BI desktop you need to create a Measure using a DAX functions that understand Time calculations such as “**Year to Date**”, “**Month over Month**”, “**Year over Year**” etc.

102. To create a new Measure, from **Fields** section click on the **ellipsis** next to **Sales** table. Select **New Measure**. Notice a formula bar appears.



103. In the formula bar enter the following DAX Expression as shown in the figure.

```
YTD Revenue =
TOTALYTD(Sum(Sales[Revenue]),'Date'[Date])
```

104. Click on the **check mark** next to the formula bar.

You will see the YTD Revenue under Sales table with a special icon which indicates it is a measure (calculator).

This DAX calculation aggregates the value of revenue on a year to date basis.

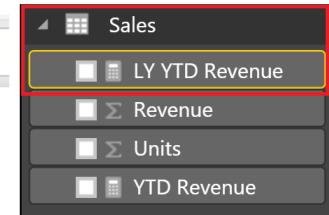
Similarly, let's create Last Year to Date Revenue measure.

105. Create a **New Measure** in the **Sales** table and enter the following DAX expression.

```
LY YTD Revenue = CALCULATE([YTD Revenue],SAMEPERIODLASTYEAR('Date'[Date]))
```

This DAX expression evaluates the YTD revenue for the previous year in context of the current date so that it's easier to compare the revenue.

LY YTD Revenue = `CALCULATE([YTD Revenue],SAMEPERIODLASTYEAR('Date'[Date]))`



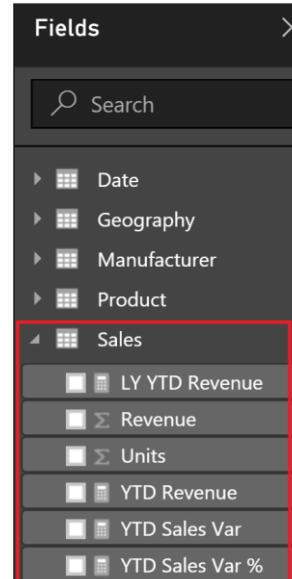
To compare the percentage difference in Revenue between the years, you need two additional DAX expressions.

106. Please create the two additional **Measures** in the **Sales** table.

```
YTD Sales Var = [YTD Revenue]-[LY YTD Revenue]
```

```
YTD Sales Var % = DIVIDE([YTD Sales Var],[LY YTD Revenue])
```

These above DAX expressions calculate the YTD revenue difference between a specific year and its previous year and then the percentage Variance.



Let's format the newly created measures.

107. From the **Fields** section, expand **Sales** table and select **YTD Revenue** field.

108. From the ribbon, select **Modeling** -> **Format** -> **Currency** -> **\$ English (United States)**.

109. Similarly, format LY YTD Revenue and **YTD Sales Var** measures.

110. From the **Fields** section, expand **Sales** table and select **YTD Sales Var %** field.

111. From the ribbon, select **Modeling** -> **Format** -> **Percentage**.

The screenshot shows the Power BI Model view. The ribbon is at the top with 'Modeling' selected. A dropdown menu for 'Format' is open, showing 'Currency general' selected. A sub-menu for 'Currency' is open, with '\$ English (United States)' highlighted. The 'Fields' pane on the right shows the 'Sales' table expanded, with 'YTD Revenue' selected.

FYI: Let's say you created YTD Sales Var measure in the Date table instead of Sales table. We can easily move it to Sales table.

112. Select **YTD Sales Var** measure that is in the **Date** table.

113. From the ribbon, select **Modeling** -> **Home Table** -> **Sales**.

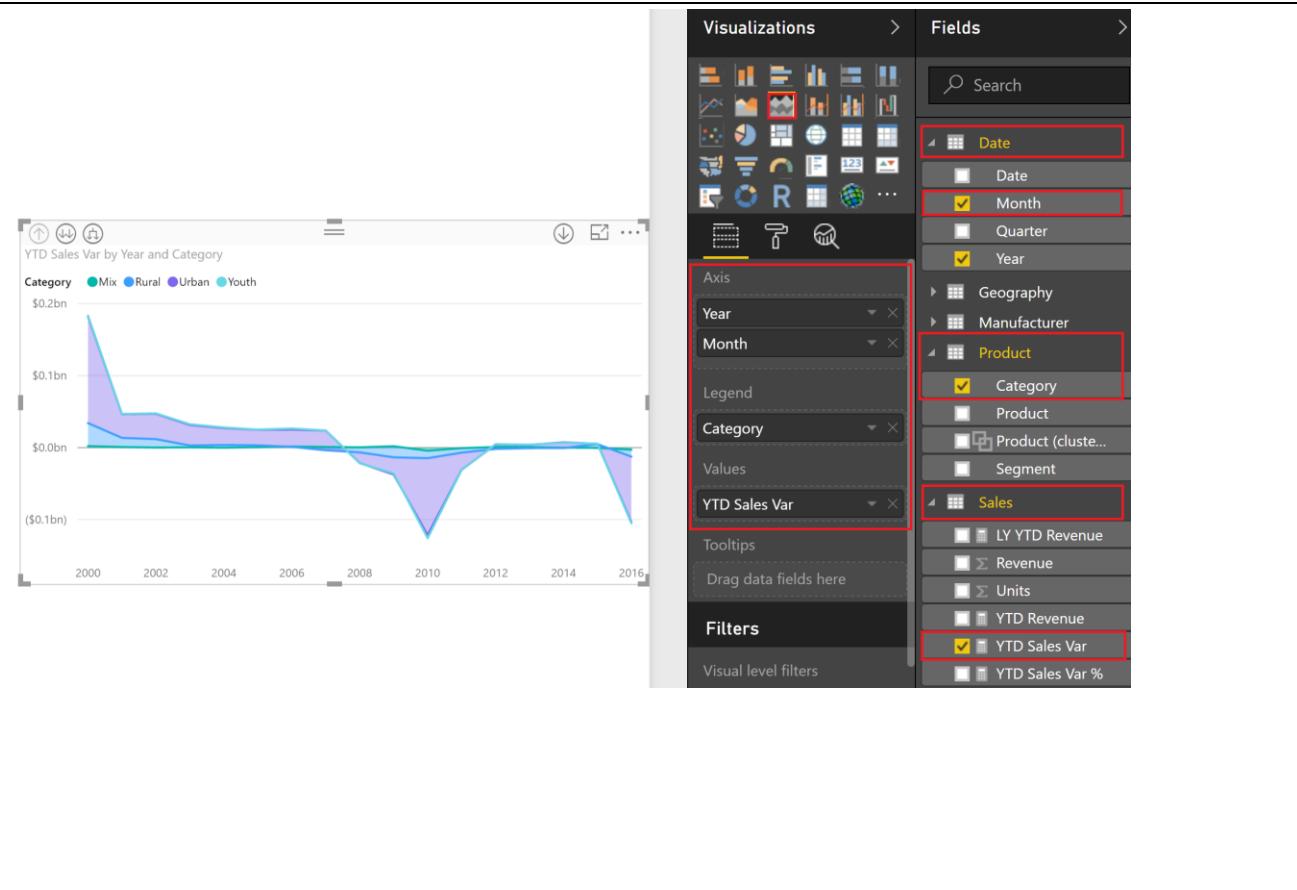
Notice now YTD Sales Var is moved to Sales table.

The screenshot shows the Power BI Model view. The ribbon is at the top with 'Home Table' selected. The 'Home Table' dropdown shows 'Sales' selected. The 'Fields' pane on the right shows the 'Date' table expanded, with 'YTD Sales Var' selected.

Let's use the YTD Sales Var measure to trend the sales by product category over time.

114. Click in white space in the report canvas. Select the **stacked area chart** visual from **Visualizations**.
115. From the **Fields** section, expand **Date** table and drag and drop **Year** field to **Axis**.
116. From the **Fields** section, expand **Date** table and drag and drop **Month** field to **Axis** below **Year**.
117. From the **Fields** section, expand **Product** table and drag and drop **Category** field to **Legend**.
118. From the **Fields** section, expand **Sales** table and drag and drop **YTD Sales Var** field to **Values**.
119. **Resize** the chart as needed.

Notice Urban is the biggest product category and in 2010 there was a big drop. Feel free to drill into a Year, analyze the data and drill back up.



It will be helpful to find out how all the Manufacturers have performed overtime.

120. Click in white space in the report canvas. Select the **Waterfall chart** visual from **Visualizations**.

121. From the **Fields** section, expand **Manufacturer** table and drag and drop **Manufacturer** field to **Category** section.

122. From the **Fields** section, expand **Sales** table and drag and drop **YTD Sales Var** field to **Y Axis**.

123. Notice none of the manufacturers are having a good year. From the **Year slicer** select **2015**. Notice all the manufacturers except VanArsdel had a positive sales variance.

124. Hover over the **Year slicer** and click on the **Clear selections** option on the top right corner of the slicer to remove 2015.

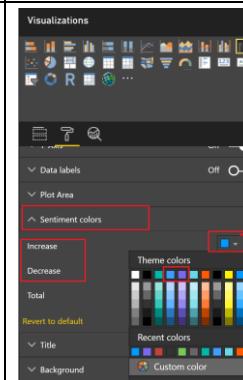
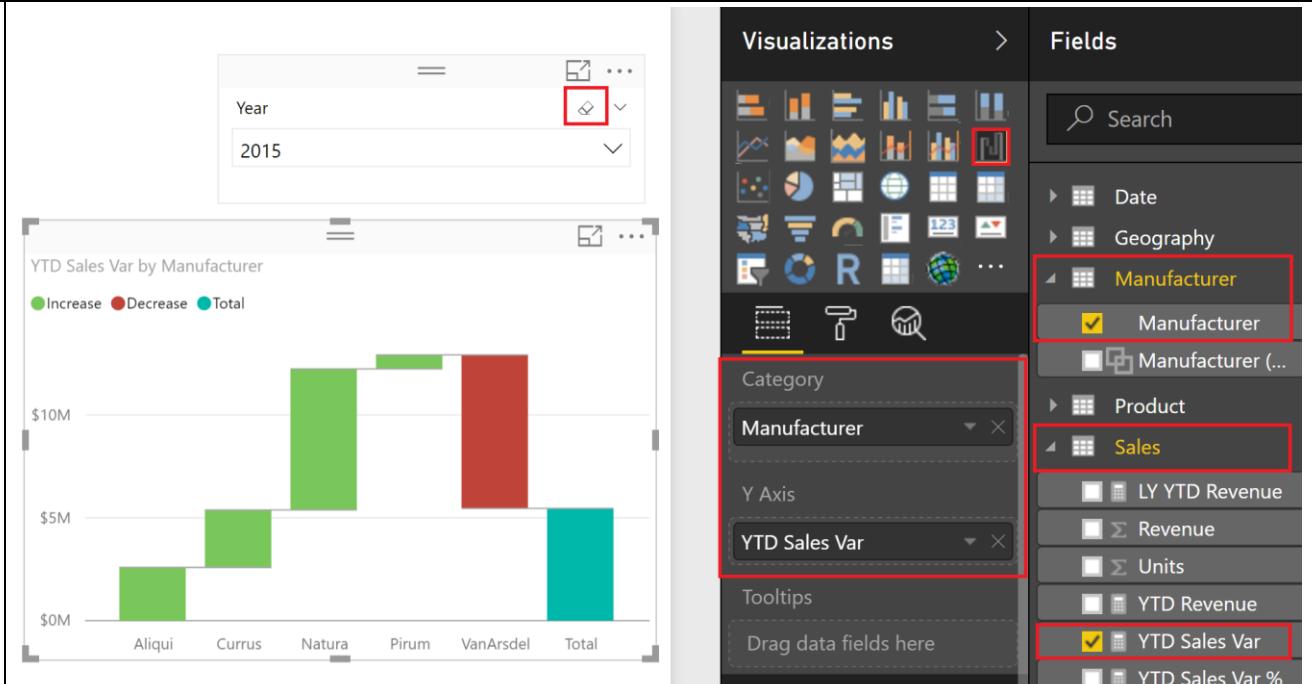
Let's change colors of the waterfall chart to match the rest of the visuals.

125. With the Waterfall chart selected, from the **Visualization** section, select **Format** (paint brush) option.

126. Expand **Sentiment colors** section.

127. Choose a shade of **blue** for **Increase**.

128. Choose a shade of **purple** for **Decrease**.



Your team will most likely be interested only in performance in recent years.

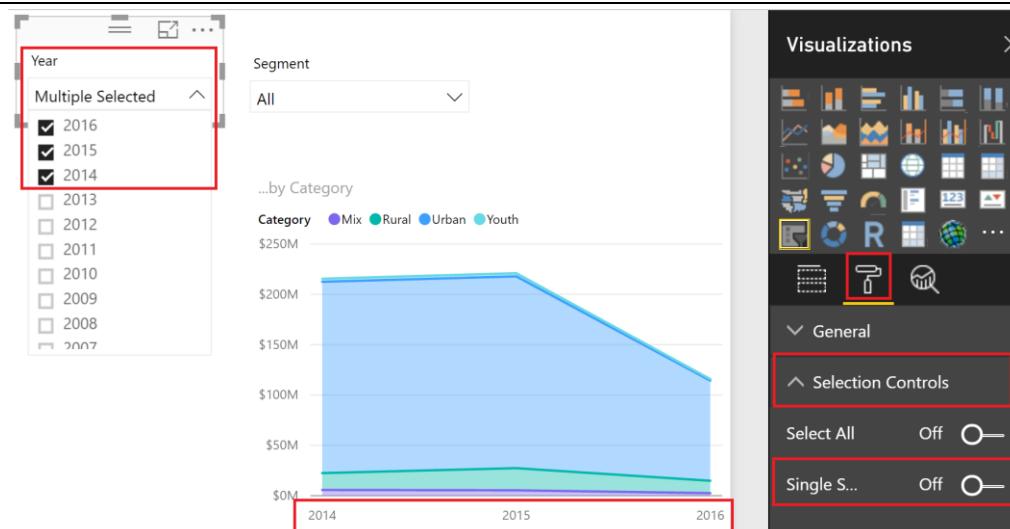
129. By default, a slicer is single select. To enable multi select, highlight **Year slicer**.

130. From **Visualizations** section, select **Format** icon.

131. Expand **Selection Controls**.

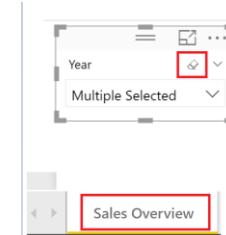
132. Turn **Single Selection Off** by moving the slider bar.

133. From the **Year slicer** select the years **2014, 2015 and 2016**. Notice all the visuals update to reflect the selection.



134. Clear the **Year** slicer by clicking on the clear selections icon on the top right of the slicer.

135. Double click on the **Page1** at the bottom of the screen and change the name "**Sales Overview**".



Let's add a KPI visual that compares this year's revenue versus last year. We will add two cards. One card will show the KPI based on the year selected in the slicer. The second will always show the KPI for the latest year in the dataset (2016).

136. Click on the **whitespace** in the canvas.

137. Click on the **KPI visual** visual in **Visualizations** section.

138. From the **Fields** section, expand **Date** table and drag and drop **Year** field to **Trend axis** section.

139. From the **Fields** section, expand **Sales** table and drag and drop **YTD Revenue** field to **Indicator** section.

140. From the **Fields** section, expand **Sales** table and drag and drop **LY YTD Revenue** field to **Target goals** section.

The screenshot shows the Power BI desktop interface. On the left, there is a large white space where a KPI visual is placed. To the right of this is the 'Visualizations' pane, which contains a grid of icons for different types of visualizations, with the 'Indicator' icon selected. Below the grid is a search bar and some filters. The main area is the 'Fields' pane, which is divided into sections: Date, Sales, and Geography. The 'Date' section has 'Year' checked. The 'Sales' section has 'LY YTD Revenue' and 'YTD Revenue' checked. The 'Geography' section is collapsed. At the bottom of the Fields pane, there is a message: 'Viewed Local Client'.

Let's add a title to the visual.

141. Click on the **Format icon** in the **Visualizations** pane.

142. **Expand** Title section.

143. Enter the **Title Text** as **Revenue KPI**.

144. Set **Text Size** to size **10**.

145. Expand **Color coding** section and notice there is options to change the Direction and color of Good, Neutral and Bad.

The screenshot shows the 'Format' pane for the KPI visual. It includes sections for 'Color coding', 'Title', 'Font color', 'Background color', 'Alignment', and 'Text Size'. The 'Color coding' section is expanded, showing 'Direction' set to 'High is good' and color swatches for 'Good Color' (green), 'Neutral Color' (yellow), and 'Bad Color' (red). The 'Title' section is also expanded, showing 'Title' set to 'On' and 'Title Text' set to 'Revenue KPI'. The 'Text Size' is set to 10. At the bottom, there are buttons for 'OK', 'Cancel', and 'Apply'.

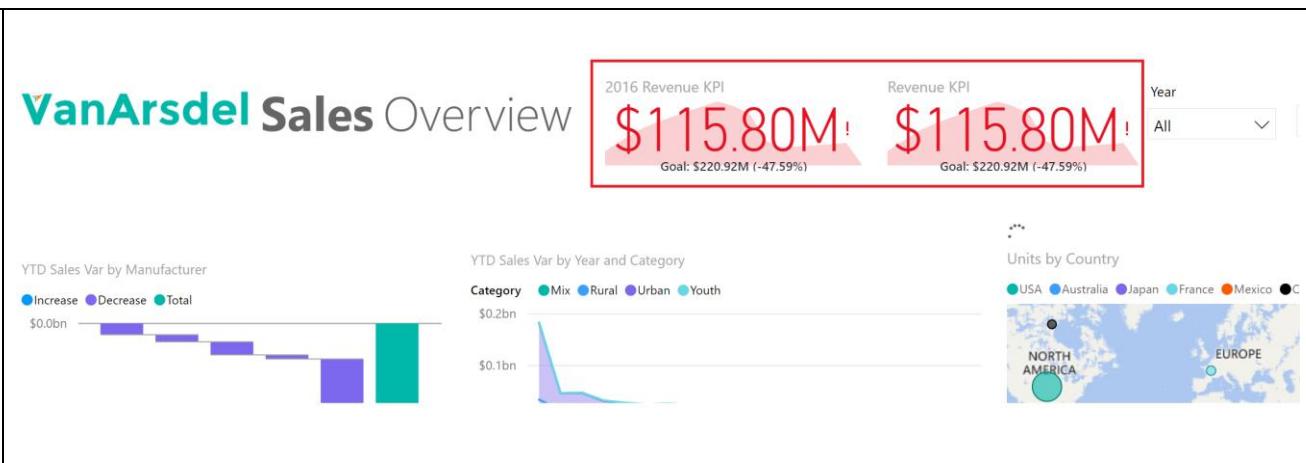
Let's create the KPI that will always show the progress for the latest year in the dataset.

146. Select the newly created **KPI visual** and use **Ctrl+C** to copy.

147. Click on the **whitespace** in the canvas. Use **Ctrl+V** to paste the visual.

148. Change the **title** of the pasted visual to "**2016 Revenue KPI**".

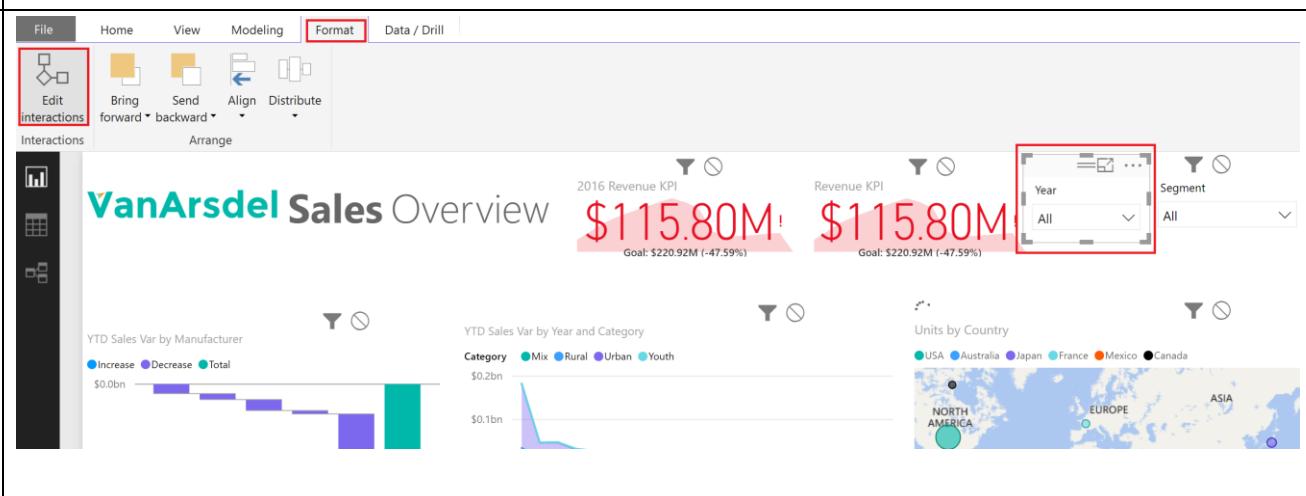
149. Resize the visuals and move it so that it looks similar to the screenshot.



2016 Revenue KPI visual should not filter based on the value selected in the Year slicer. Power BI Desktop enables users to control how specific slicers interact with charts on a report via Edit Interactions.

150. Select **Year** slicer.

151. From the ribbon select **Format -> Edit interactions**.



Notice two icons appears on the top right corners of all the other visuals in the report. One is the **filter icon**, which is selected by default. This means that the visual will be filtered based on the slicer selection. Second is a **none icon**. Selecting this icon will make the visual not interact with the slicer.

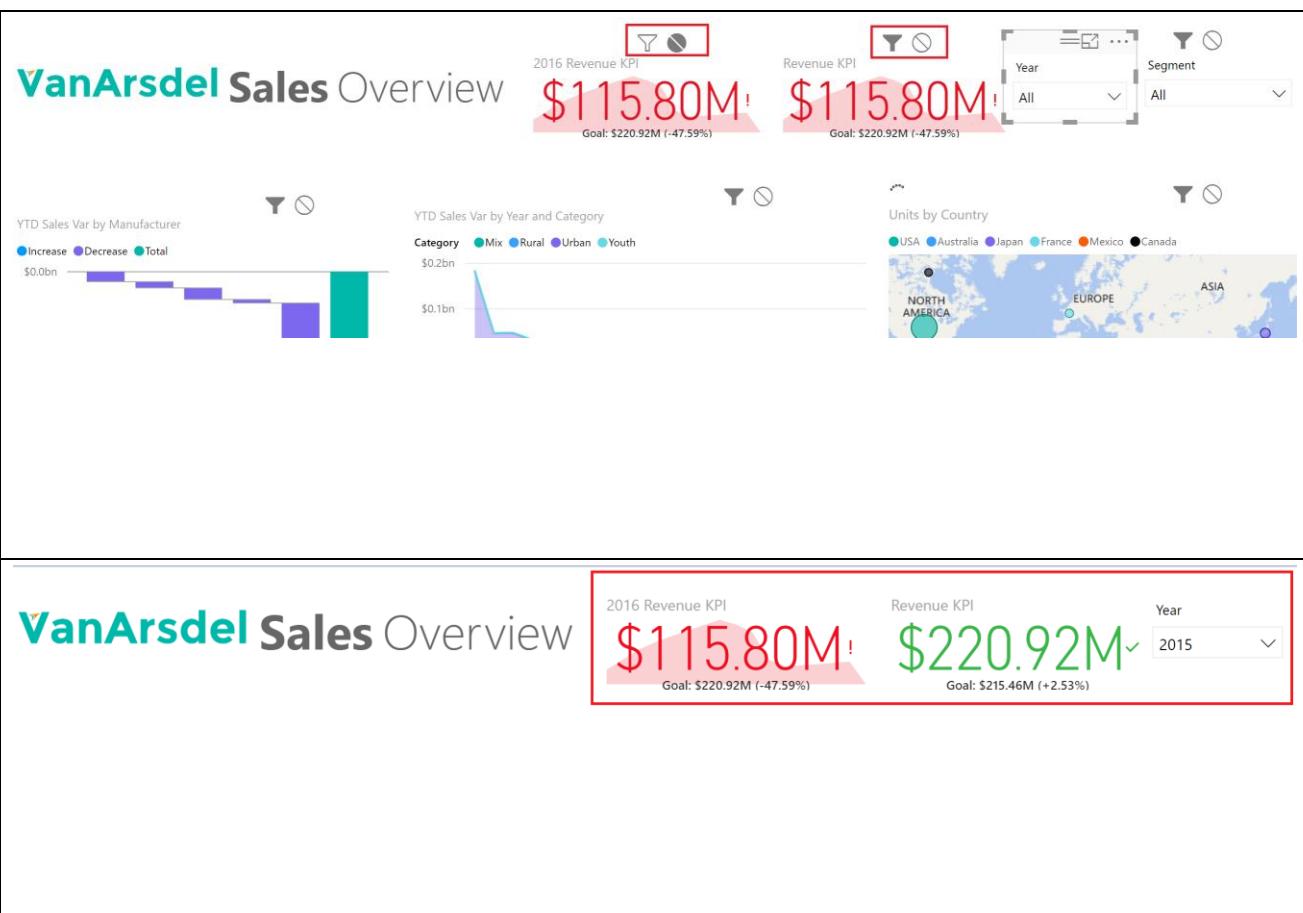
152. Select **None** for the **2016 Revenue KPI**.
153. Click on **Edit Interactions** again to turn off Edit Interactions view.

You can apply similar interaction for any of the other visuals.

154. From the **Year slicer**, select **2015**.

Notice that the value of 2016 Revenue KPI did not change and value of Revenue KPI changed.

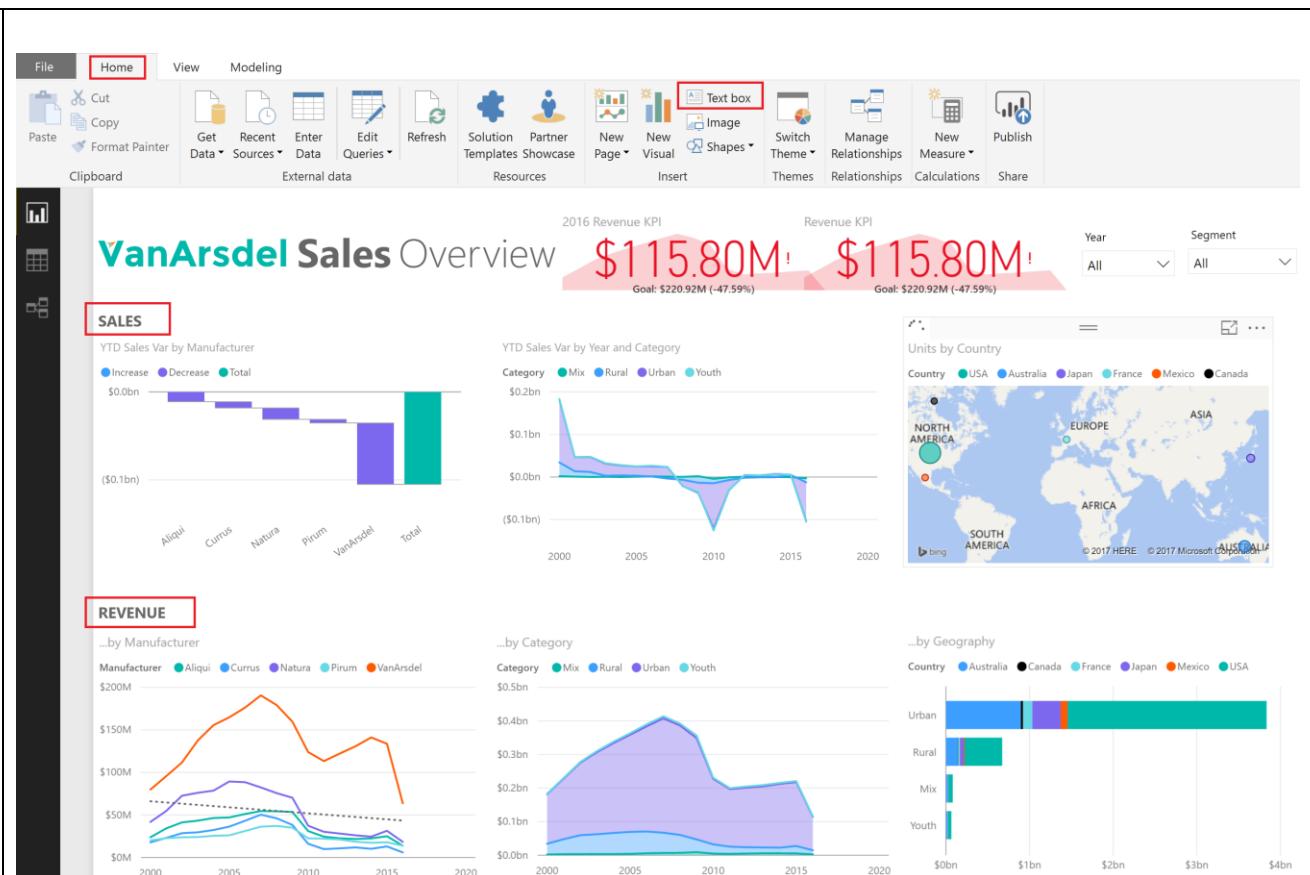
155. From the **Year** slicer, **de-select 2015** to clear the filter.



Now that we have built all the visuals that we like to display on the report, let's format the report.

156. Resize and move the **logo** to the top left of the canvas.
157. Resize and move the **title** to the right of the logo.
158. Resize and move the **KPI visuals** to the right of the title.
159. Resize and move the **Year and Segment slicers** to the right of the KPI visuals.
160. Resize the **remaining visuals** so that they are approximately the same size.
161. **Move ...by Manufacturer, ...by Category and ...by Geography to the bottom row.**
162. **Move** the remaining 3 visuals to the middle row of the canvas as shown in the screenshot.
The middle row of visuals are Sales related and the bottom row of visuals are Revenue related. Let's give them headers.
163. From the ribbon select **Home -> Textbox.**

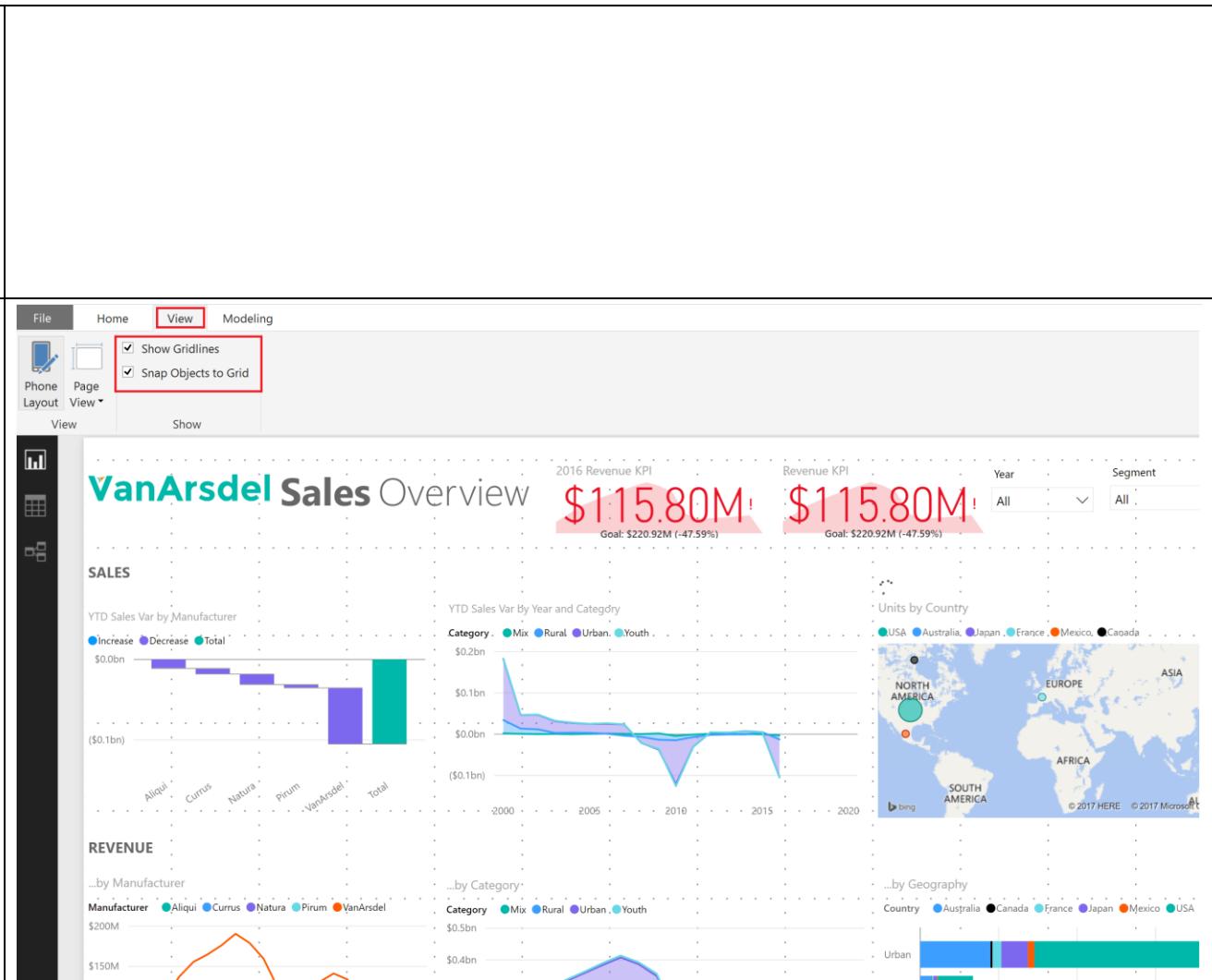
164. Enter **SALES** in the textbox.
165. Highlight **SALES** section of the header and change the font to **Segoe UI, font size to 16** and make the text **bold**.
166. Select the arrow next to **A** and pick a **dark gray font color**.



167. Resize and move the text box **above the middle row** as shown in the screenshot.
168. Using **Ctrl+C** copy the Sales text box and past it using **Ctrl+V**.
169. Change the text to **Revenue** and move it **above the bottom row** as show in the screenshot.

Let's make sure that the charts are aligned with each other.

170. From the ribbon select **View**.
171. Select **Show gridlines** and **Snap objects to grid** options.
172. Now **move** the visuals and **align** them so that they are neatly spaced in the report.
173. Once you are done, from the ribbon select **View**
174. Uncheck **Show gridlines** and **Snap objects to grid** options.



Now we have the model and report ready, we want to add security around it, so that individuals from a USA view only USA data and individuals from Mexico view only Mexico data and so forth.

175. From the ribbon select **Modeling** -> **Manage Roles**.
176. Manage roles dialog opens. Click on **Create** button.
177. Name the role as **US Role**.
178. Click on the **ellipsis** next to **Geography**.
179. Select **Add Filter** -> **[Country]**.

The screenshot shows the Power BI ribbon with the 'Modeling' tab selected. In the main area, the 'Manage roles' dialog is open, displaying a list of roles with 'US Role' selected. Below the list are 'Create' and 'Delete' buttons. To the right, the 'Tables' section lists Date, Geography, Manufacturer, Product, and Sales. A 'Table filter DAX expression' box is open, containing the expression '[Country]' = "USA".

Notice a DAX Expression appears in the text area.

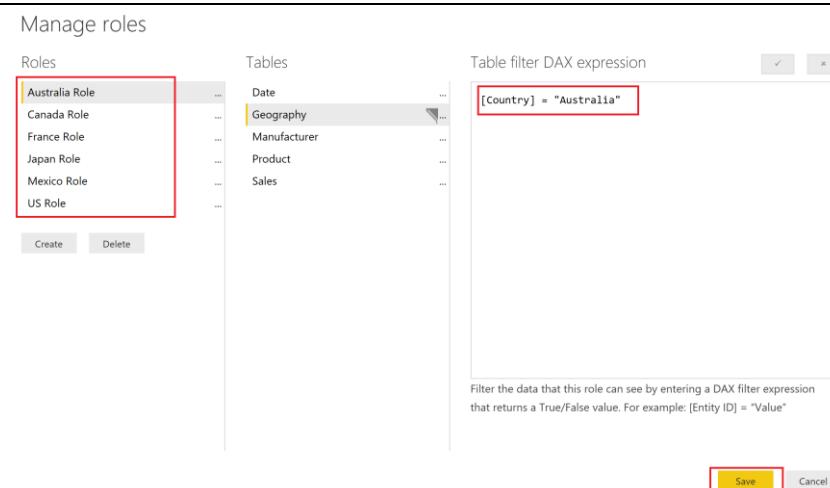
180. Edit the DAX Expression to **[Country] = "USA"**.
181. Click on the **check mark** on the top right corner. This will validate the DAX expression.

The screenshot shows the 'Manage roles' dialog with the 'US Role' selected. The 'Tables' section includes Date, Geography, Manufacturer, Product, and Sales. A 'Table filter DAX expression' box contains the expression '[Country] = "USA"'. A checkmark is visible in the top right corner of the validation box. At the bottom, there are 'Save' and 'Cancel' buttons.

Similarly add roles for Australia, Canada, France, Japan and Mexico using the following DAX Expressions.

Australia Role	[Country] = "Australia"
Canada Role	[Country] = "Canada"
France Role	[Country] = "France"
Japan Role	[Country] = "Japan"
Mexico Role	[Country] = "Mexico"

182. Once you add all the roles, click on **Save** button.

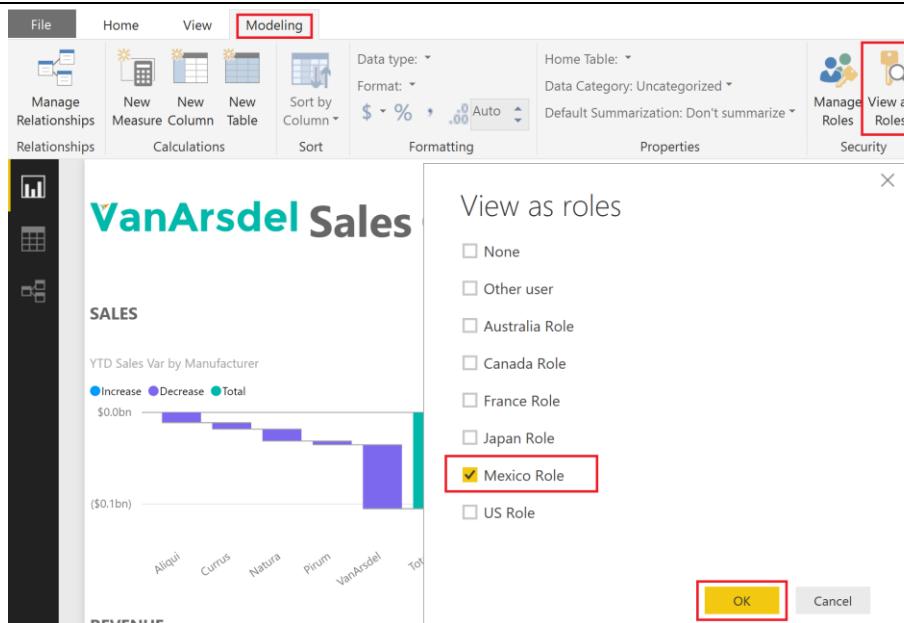


Power BI Desktop provides the capability to validate the roles you created. This helps us view the reports as a different role and make sure it's formatted right for that role.

183. From the ribbon, select **Modeling** -> **View as Roles**.

184. View as roles dialog appears. Select **Mexico Role**.

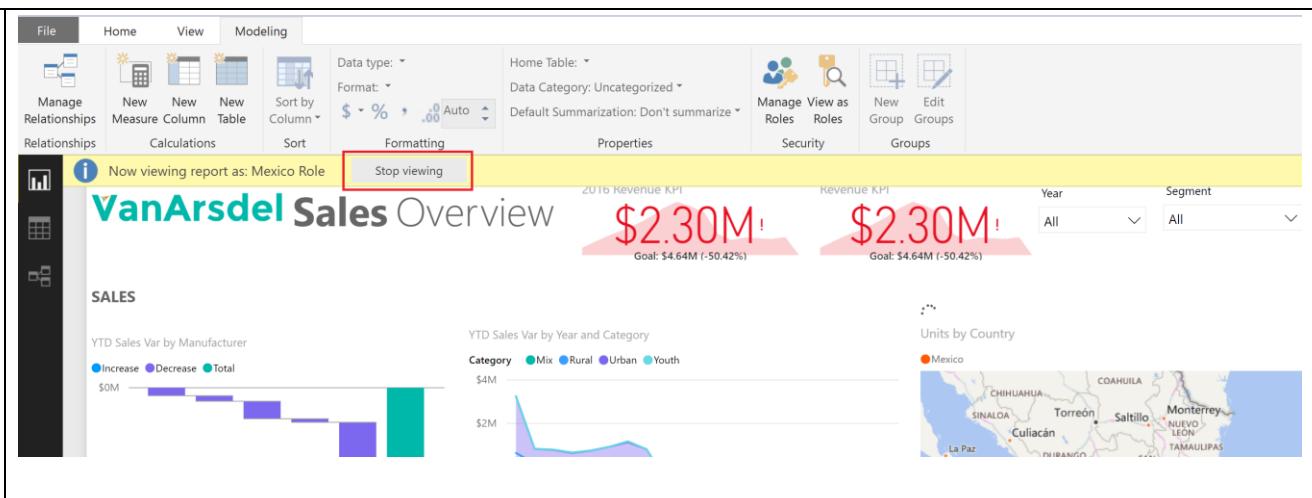
185. Click **OK**.



Notice now you are viewing as a person with Mexico Role would view.

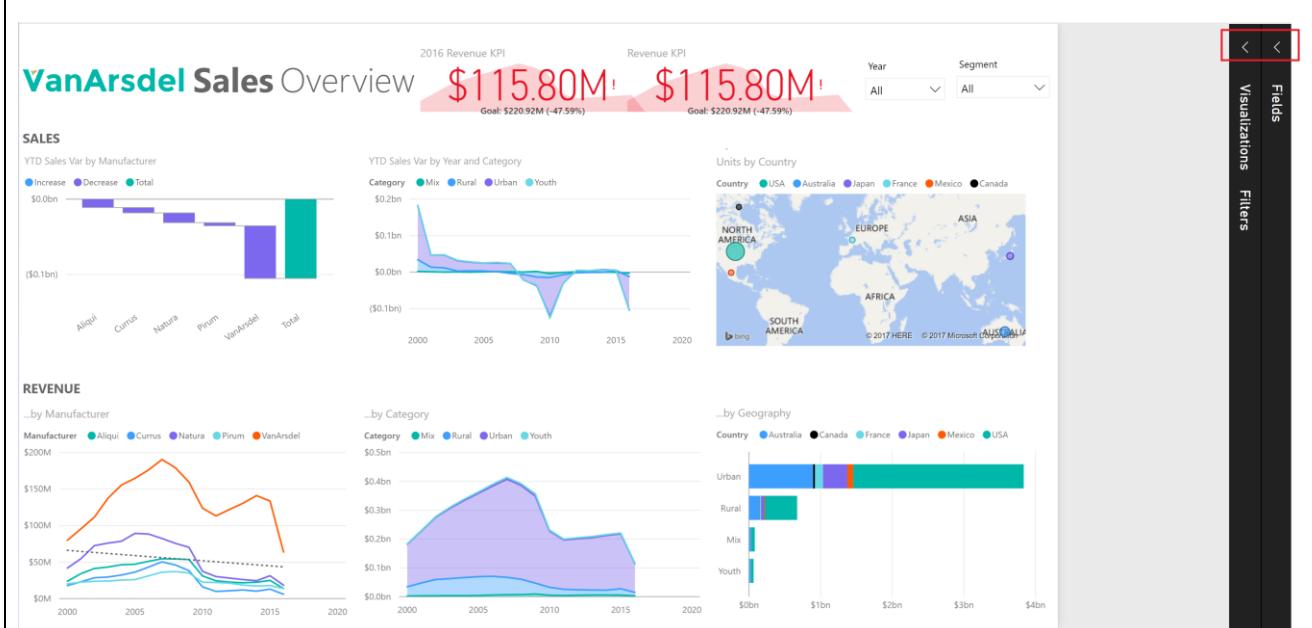
186. Click on **Stop viewing** to exit Mexico Role view.

We will add users to these roles once we publish the model to Power BI Service.



187. Collapse the **Visualizations** and Filters pane by clicking on the arrows

188. Your **report** should look as shown in the figure. **Save** the file.



You have successfully completed the hands-on lab in creating a report to share to your team. The next section covers creating a dashboard from this report so that you can easily share it to your team. You have learned a quick overview of various functionality in Power BI Desktop to get accelerated. There are a lot more features for you to build upon this on your own data.

Power BI Service – Part I

You will now leverage the report authored using Power BI Desktop and create a dashboard for VanArsdel data analysis team and finally share it to the CMO. A Power BI Desktop file with additional reports / visuals is provided. Please use this for the next two sections of the lab.

Power BI Service - Creating Dashboard and uploading your Report

1. If you have not signed up for a Power BI account, go to <http://aka.ms/pbidiadtraining> and sign up for Power BI with a business email address.
2. If you have not already opened app.powerbi.com page, please open the browser and navigate to <http://app.powerbi.com>.
3. Sign in to Power BI using your user account. Once logged in, you will see Welcome to Power BI page.
4. Click on **Power BI** in the upper left corner.

The screenshot shows the 'Welcome to Power BI' page. At the top, there's a navigation bar with icons for Home, Reports, Dashboards, Workbooks, and Data. The 'Power BI' icon is highlighted with a red box. Below the navigation bar, the main heading 'Welcome to Power BI' is displayed in large bold letters. A sub-headline says 'You're on your way to exploring your data and monitoring what matters. Let's start by getting some data.' There are four main sections: 'Content Pack Library' (with 'My organization' and 'Services' options), 'Import or Connect to Data' (with 'Files' and 'Databases' options), and two 'Get' buttons for each category. At the bottom right, there's a search icon and a help icon.

New navigation feature is being deployed to Power BI Service. Let's make sure you have this new feature enabled.

5. Click on the **Settings gear** on the top right corner of your screen.
6. Select **Settings**.
7. You will be navigated to the **General** tab, select **Preview features** in the left navigation.
8. If New navigation feature is turned off, select **On** and then select **Apply**.

The screenshot shows the 'General' tab selected in the navigation bar. A red box highlights the 'Preview features' link in the left sidebar. In the main content area, there is a section titled 'New navigation' with a sub-section 'Get easy access to the content that's most important to you.' Below it is a radio button group where 'On' is selected. At the bottom are 'Apply' and 'Discard' buttons, with 'Apply' highlighted by a yellow box.

9. Refresh the browser screen.

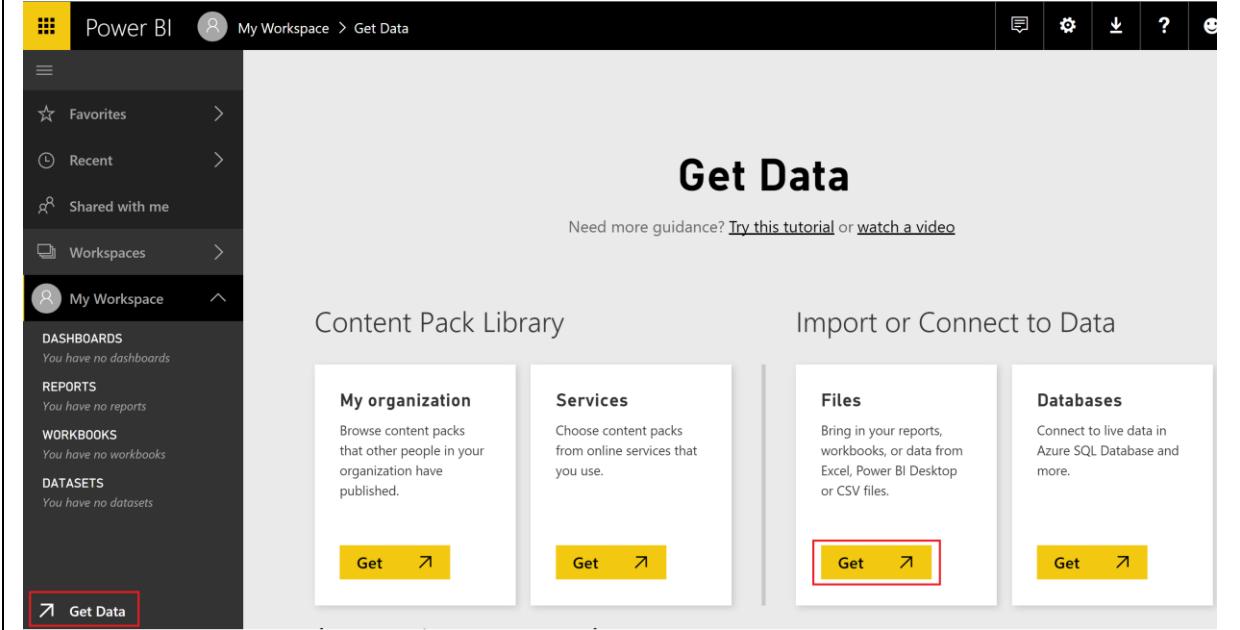
10. Select  icon below Power BI on the top left of the screen. This will expand the left navigation.

Following options are listed in the left navigation:

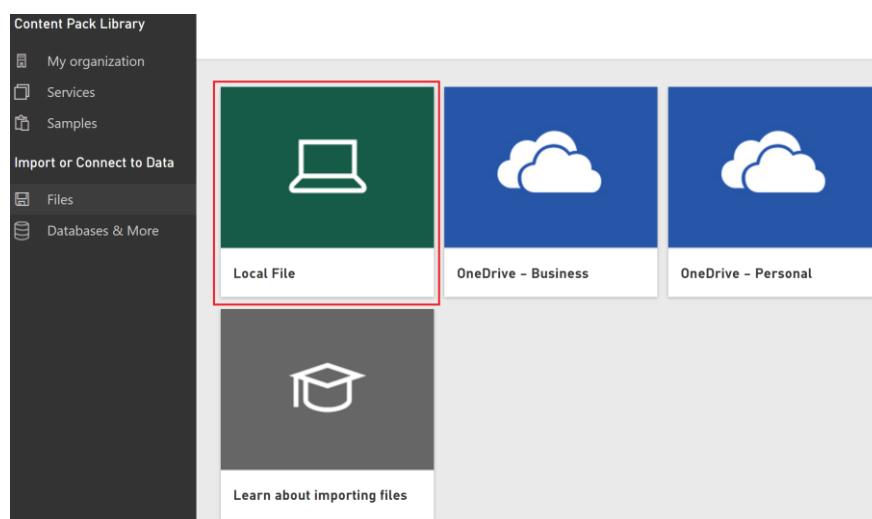
- Favorites:** Lists all your favorite dashboards (we will create a favorite in a later section).
- Recent:** Lists the most recent dashboards you have viewed.
- Shared with me:** Lists the dashboards that are shared with you (we will share dashboards in a later section).
- Workspaces:** Lists all the workspaces you are assigned. By default, you are assigned My Workspace.

11. Select the down arrow next to **My Workspace**.

The screenshot shows the expanded left navigation menu. A red box highlights the  icon. The menu items listed are: Favorites, Recent, Shared with me, Workspaces, and My Workspace. A red box highlights the downward arrow next to 'My Workspace'.

<p>Note: If you have previously signed into Power BI, then your screen will look different. You will be directly navigated to your Workspace skipping the Welcome page.</p>	
<p>Notice DASHBOARDS, REPORTS, WORKBOOKS and DATASETS section are empty. Let's import a Power BI Desktop file and create dashboards.</p> <p>12. Select Get Data in the bottom left of the screen.</p> <p>13. Select Get under Files.</p>	

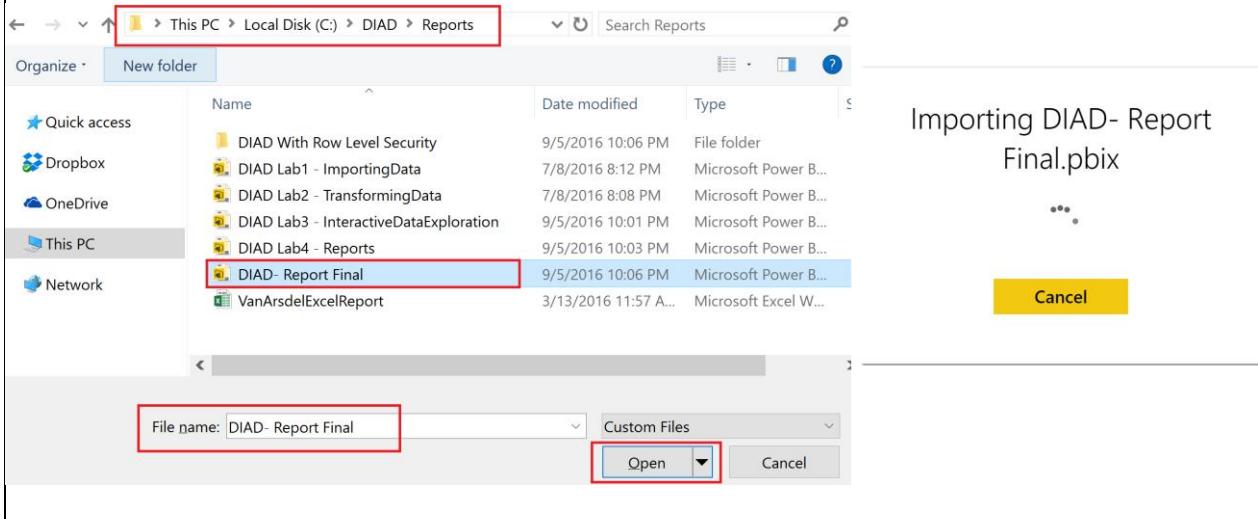
14. Select **Local File** as shown in the Figure.



15. Browse to **\DIAD\Reports** folder.

16. Select the Power BI Desktop file **DIAD – Report Final.pbix** and click **Open**.

You will see the upload status as shown in the figure. Upload might take a few minutes based on bandwidth and network connectivity.



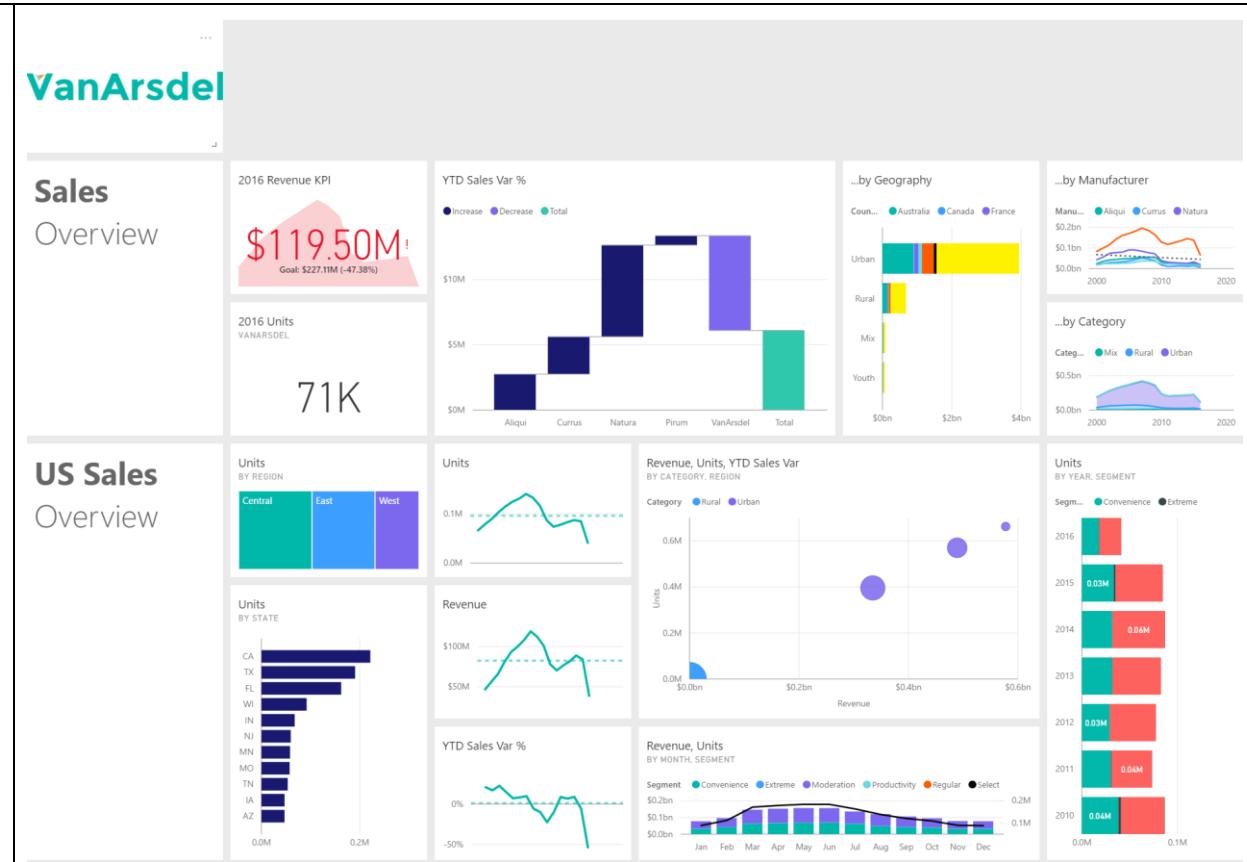
Power BI Service - Operational Dashboard and Sharing

You will see a message on the top right indicating the data set is ready for use. You will see a tile with the name of the file on the dashboard.

The service extracted the data model and reports that were part of the Power BI Desktop file and added separate entries under DASHBOARDS, REPORTS and DATASETS as shown in the Figure.

The screenshot shows the Power BI Service interface. On the left, the navigation pane includes sections for Favorites, Recent, Shared with me, Workspaces, and My Workspace. Under My Workspace, there are three main categories: DASHBOARDS, REPORTS, and DATASETS. The DASHBOARDS section contains a single item: 'DIAD- Report Final.pbix'. The REPORTS section contains 'DIAD- Report Final'. The DATASETS section contains 'DIAD- Report Final'. A red box highlights the 'DIAD- Report Final.pbix' entry in the Dashboards list. The main content area displays a dashboard with a single tile labeled 'DIAD- Report Final.pbix' and a line graph icon. At the top right of the dashboard area, a message box is displayed with a red border. The message says 'Your dataset is ready!' followed by 'Let Power BI help you explore your data.' and a 'Get Quick Insights' link. Below the message is a yellow button labeled 'View dataset'.

In this section, we will create a dashboard that will help compare VanArsdel's performance over the years and compare VanArsdel's performance with the competitors. At the end of the section, we will create a dashboard that looks like this

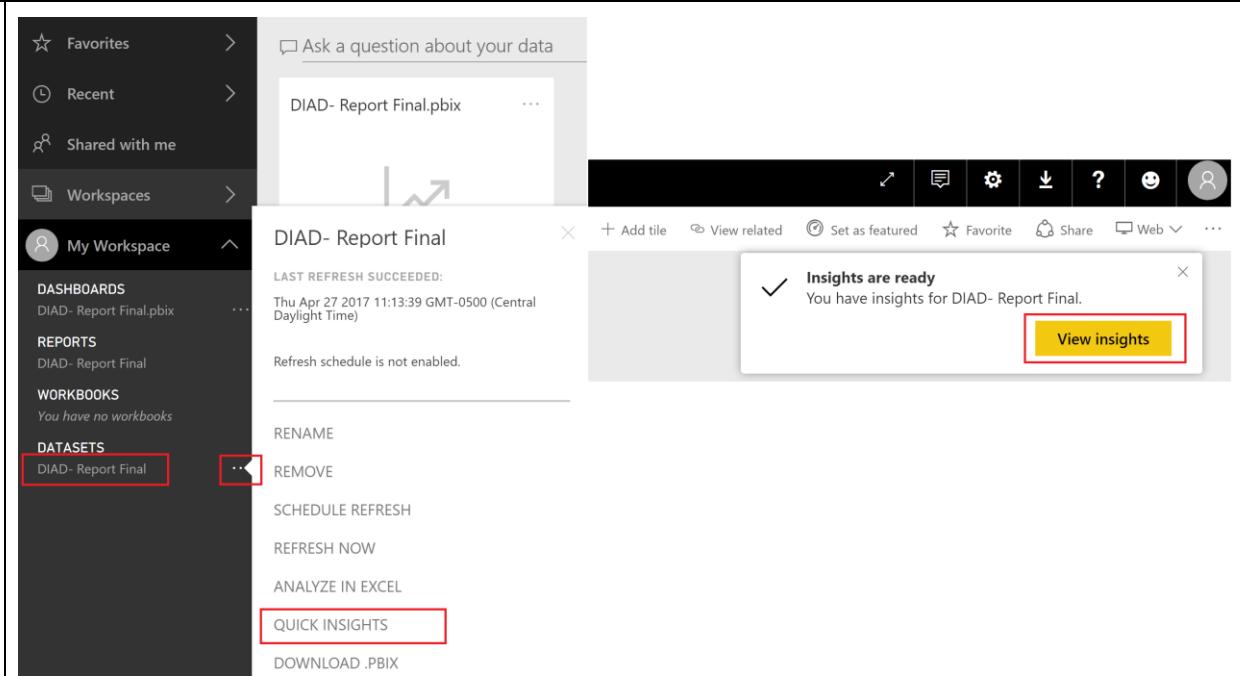


Once the dataset is loaded, Power BI provides an option to get quick insights into the data.

1. In the left panel, under **DATASETS**, hover over **DIAD- Report Final** and click on the **ellipsis**.
2. Select **QUICK INSIGHTS**.

It might take a few minutes for the insights to be created. Once insights are ready a message appears of the top right corner.

3. Select **View insights**.



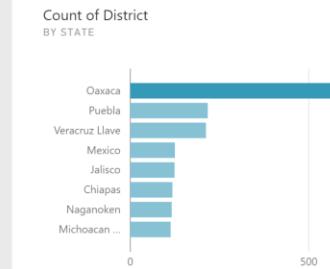
A quick insights report is displayed based on the dataset. This provides insights into data you may have missed and helps to get a quick start with creating dashboards.

Hovering over each report provides an option to Pin it to a dashboard.

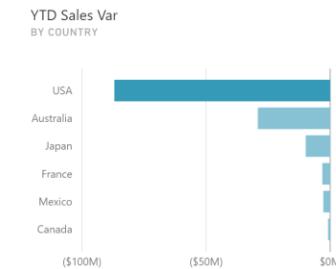
We will talk about pinning to dashboard in the next few steps.

Quick Insights for DIAD- Report Final

A subset of your data was analyzed and the following insights were found. [Learn more](#)



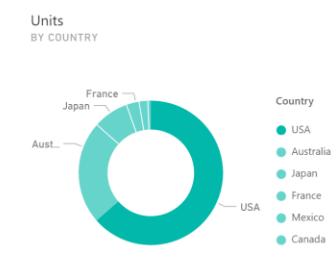
CATEGORY OUTLIERS
'Oaxaca' has noticeably more District.



CATEGORY OUTLIERS
'USA' has noticeably less YTD Sales Var.

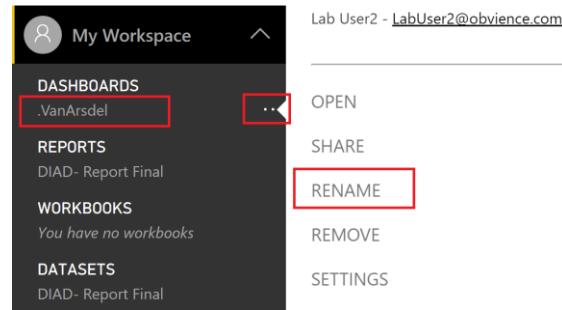


CATEGORY OUTLIERS
'Japan' and 'USA' have noticeably more City.



MAJORITY
'USA' accounts for the majority of Units.

4. From the left panel, hover over **DASHBOARDS -> DIAD- Report Final.pbix** and click on the ellipsis.
5. Select **RENAME**.
6. Rename the dashboard as **.VanArsdel**.

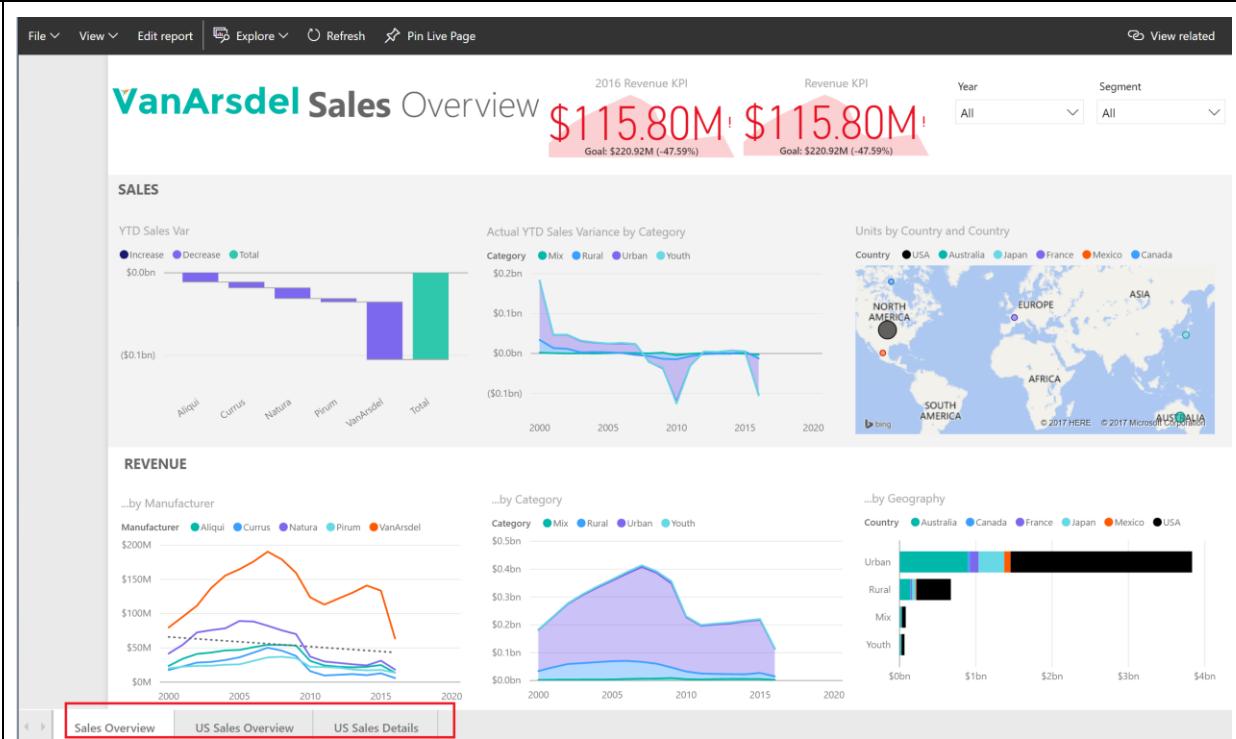


To create an operational dashboard, you need to open the report and select visuals that provide metrics for the organization.

7. From the left panel, select **DASHBOARDS** -> **.VanArsdel** to navigate back to the dashboard.
8. Click on the **tile** of the report (DIAD – Report Final.pbix).
9. You will see Welcome to ArcGIS Maps for Power BI dialog. Read through the Terms and click OK.
We have added ArcGIS visuals to the report. Hence you see the dialog.

The screenshot shows the ArcGIS Maps for Power BI interface. On the left, there's a navigation sidebar with options like Favorites, Recent, Shared with me, Workspaces, My Workspace, DASHBOARDS (.VanArsdel selected), and REPORTS (DIAD- Report Final). In the center, there's a tile for 'DIAD- Report Final.pbix' featuring a line chart icon. A red box highlights this tile. On the right, a blue header bar says 'Welcome to ArcGIS Maps for Power BI' with the 'esri' logo. Below it is a welcome message: 'Get more from Maps with new experiences provided by Esri. You can create rich maps and analyze them with unique interactions and demographics.' It also includes terms and conditions information: 'By clicking OK, you agree (a) to be bound by the Esri [terms](#) and [privacy policy](#), (b) you will be sharing your data with Esri, who will use it according to its terms and privacy policy, (c) Esri may store and process your data in the United States or any other country in which Esri maintains facilities, and (d) Microsoft may share your contact information with Esri if needed for Esri to operate and troubleshoot the service or prevent misuse.' There's a link 'Learn more about ArcGIS Maps for Power BI...' and two buttons at the bottom: 'OK' (highlighted with a red box) and 'Cancel'.

You will see the **entire report open**. Notice there are three report pages.

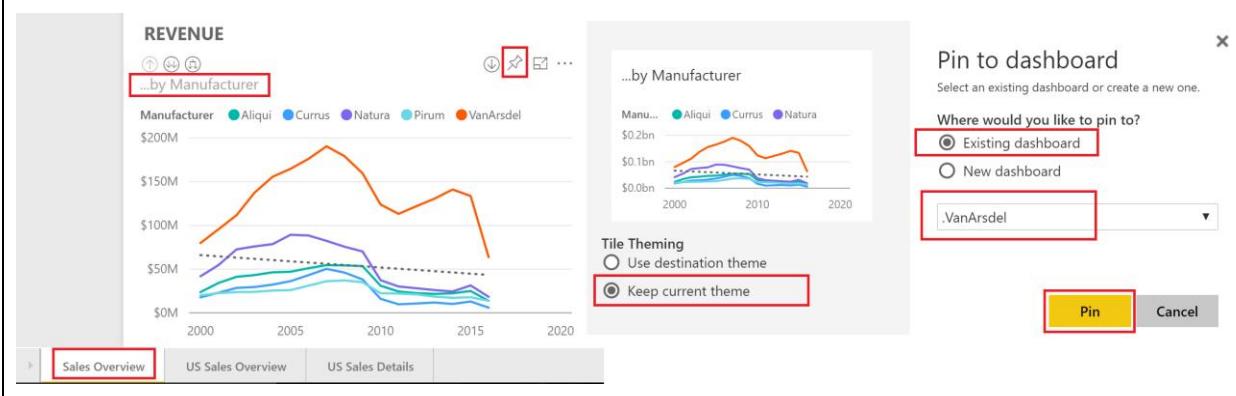


Let's add tiles to the dashboard. Make sure you are in Sales Overview report page.

10. In the **bottom row**, hover over ...by **Manufacturer** line chart. A pin icon will appear on the top right corner of the visual. The pin icon will appear for each visual you would like to pin to the dashboard.

11. Click on the **Pin** icon.

This brings up a dialog box which asks you to select which Dashboard you would like to pin the Visual.



By default Power BI selects the last viewed Dashboard, **.VanArsdel**. There is an option to create a new dashboard or select another dashboard.

12. Select **.VanArsdel** from the dropdown.
13. There is an option to use default destination theme or the current theme. Pick **Keep current theme** radio button.
14. Select **Pin** button.
Once pinning is successful a confirmation dialogue displays.

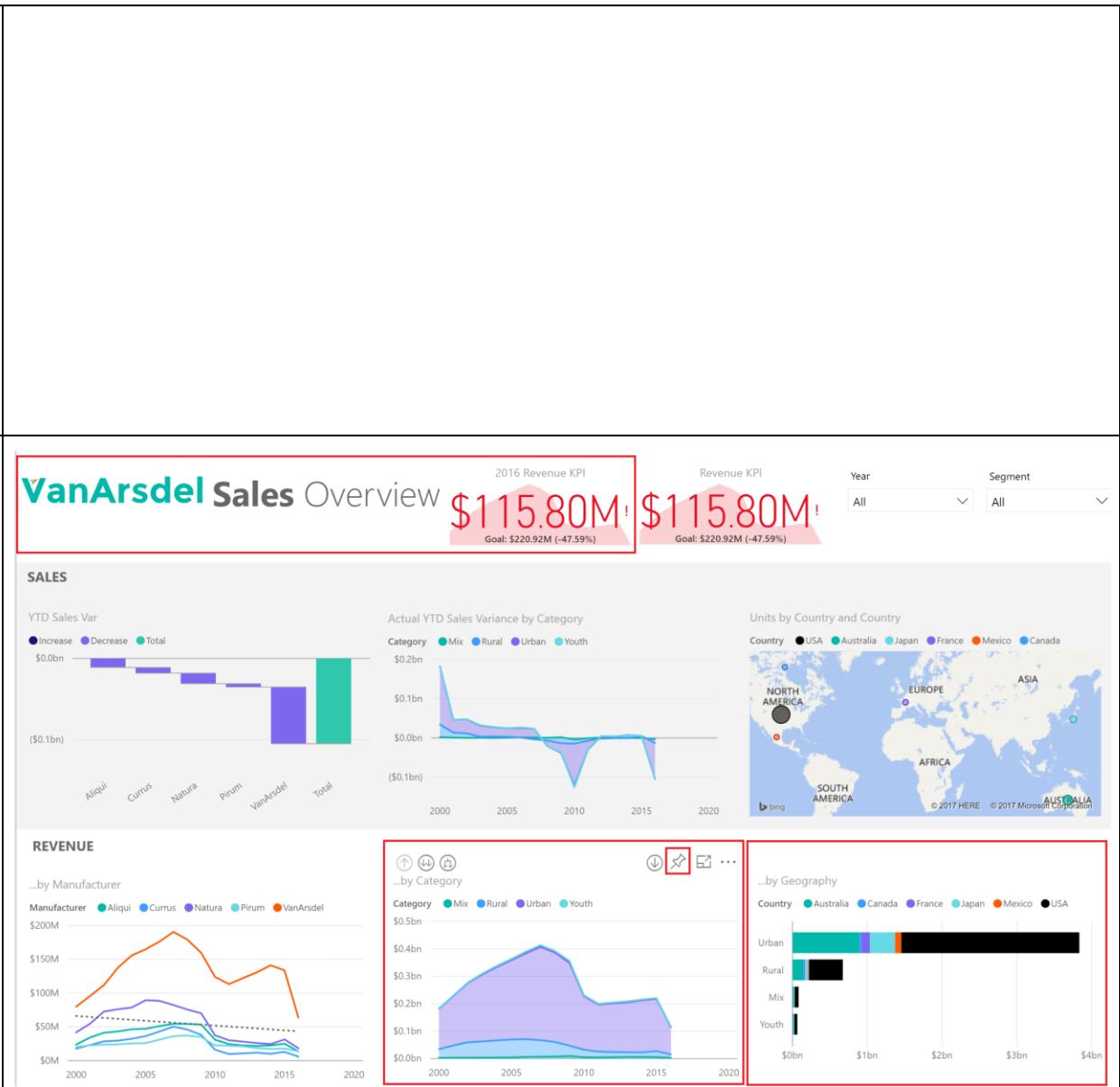
15. Hover over the **logo** visual and click on the **Pin** icon and pin it to **.VanArsdel dashboard**.

16. Hover over the page **title** and click **on** the Pin icon and pin it to **.VanArsdel dashboard**.

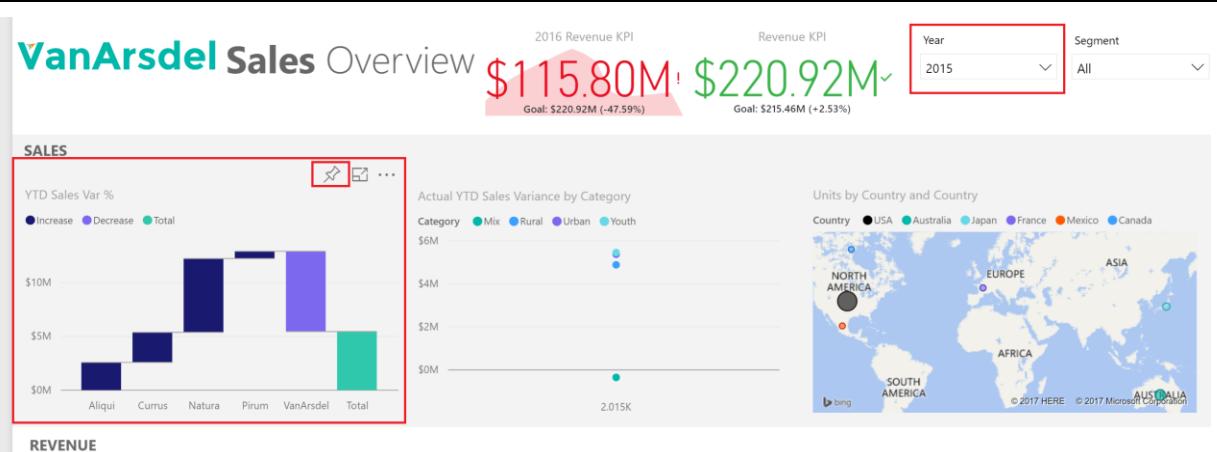
17. Hover over **2016 Revenue KPI** visual and click **on** the Pin icon and pin it to **.VanArsdel dashboard**.

18. Hover over **...by Category stacked area chart** and click **on** the Pin icon and pin it to **.VanArsdel dashboard**.

19. Hover over **...by Geography stacked bar chart** and click **on** the Pin icon and pin it to **.VanArsdel dashboard**.



20. From the **Year** slicer, select **2015**.
21. Hover over **Waterfall** visual and click on the Pin icon and **repeat step 12**.
22. **Clear the 2015** selection in the slicer.



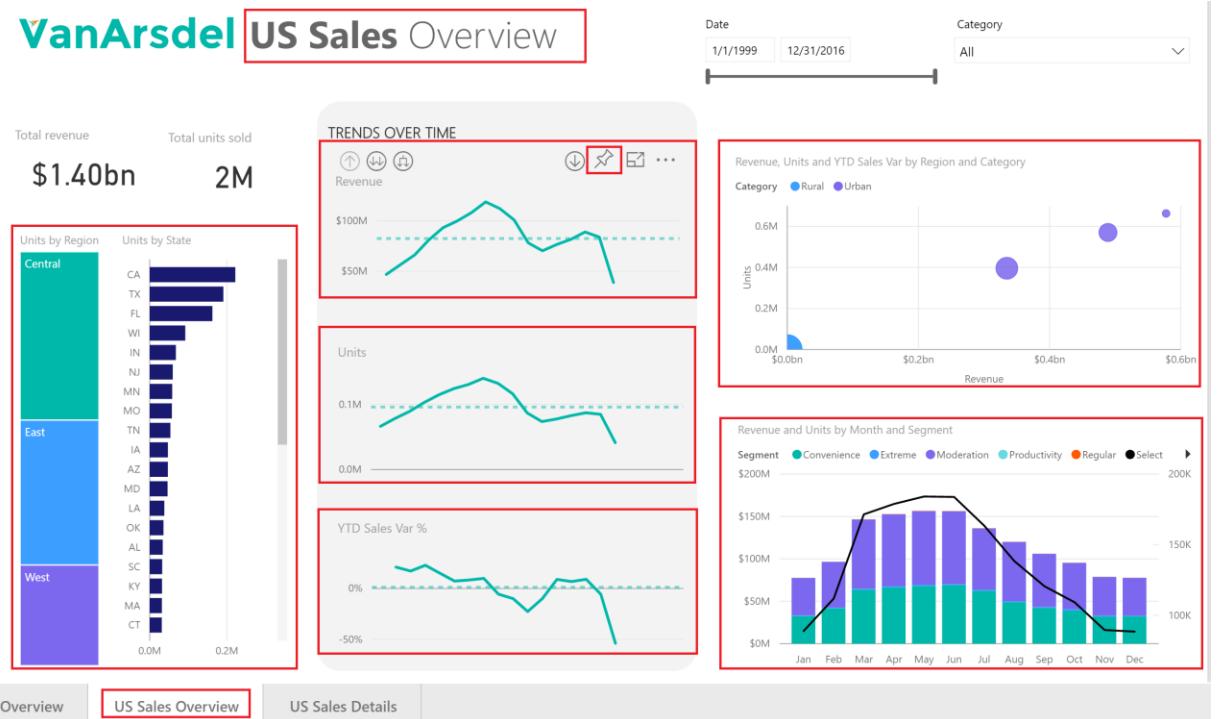
23. Navigate to **US Sales Overview** report page.

24. Pin the following visuals:

- **Title text**
- **Tree map (Units by Region)**
- **Stacked bar chart (Units by State)**
- **All the 3 line charts (Trends Over Time)** Note: these are 3 individual line charts. Pin all 3 of them.
- **Bubble Chart**
- **Line and Stacked Column Chart**

IMPORTANT!

The US Sales Overview page is on a tab at the bottom of your window like an Excel worksheet!



25. In the left panel, select **DASHBOARDS** -> **.VanArsdel** to navigate to the dashboard.

You will see the visuals on the dashboard like the screenshot.

Each visual on the dashboard is called as a tile. The tiles represent the data chosen and will be kept up to date as the data in the data model updates. Tiles are not interactive.

Let's organize the dashboard now.

The screenshot shows a Power BI dashboard titled "DIAD- Report Final.pbix". On the left, there is a navigation pane with sections for Favorites, Recent, Shared with me, Workspaces, My Workspace, DASHBOARDS (which is selected and highlighted with a red box), REPORTS, WORKBOOKS, and DATASETS. The main content area features a line chart titled "...by Manufacturer" showing revenue trends from 2000 to 2020 for various manufacturers. Below the chart is a KPI card for "2016 Revenue KPI" with the value "\$115.80M" and a goal of "\$220.92M (-47.59%)". The overall theme of the dashboard is teal and grey, with a large "VanArsdel" logo on the right side.

We do not need the default report tile that was created.

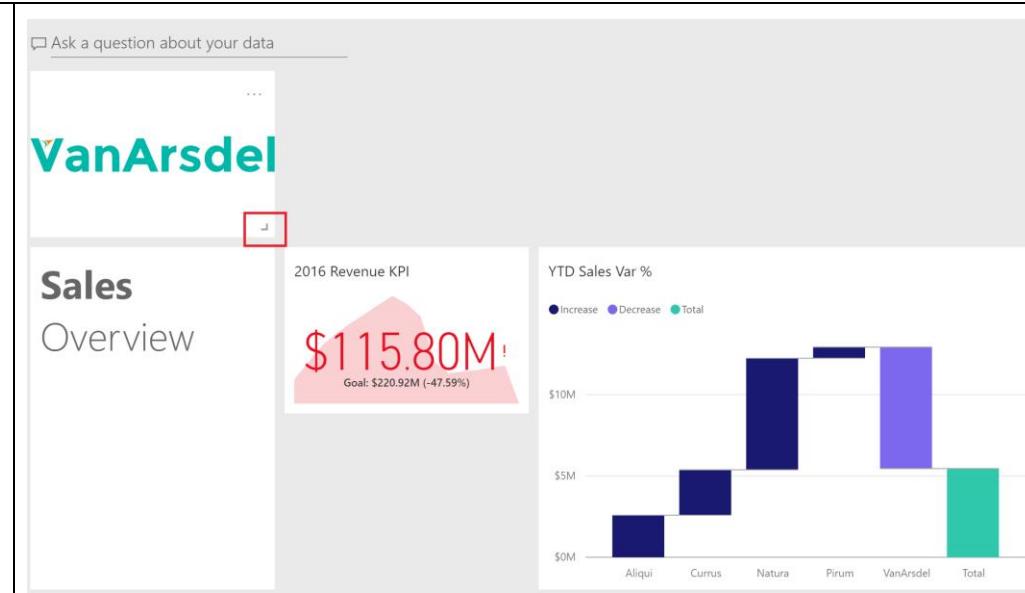
26. Highlight **DIAD-Report Final.pbix** tile and click on the ellipsis on the top right corner.
27. Click on the **delete** icon.

The screenshot shows the same Power BI dashboard as before, but now the "DIAD- Report Final.pbix" tile is selected and highlighted with a red box. A context menu is open over the tile, showing options like "GO TO REPORT" and "DIAD- Report Final". The "Delete" icon in the menu is also highlighted with a red box. The overall interface is clean and modern, typical of Microsoft's design style.

28. Select and move the **logo image visual** to the top left corner.

29. Select the **bottom right corner** of the visual and move it diagonally to change the image to a **small**.

Tiles can be of **various sizes (1x1 to 5x5)**. Drag the tile using the bottom right corner to resize. As you are dragging, note the gray shadow which indicates the size of the tile when you stop dragging.



30. Change the tile size and **organize** the dashboard as shown in the screenshot.

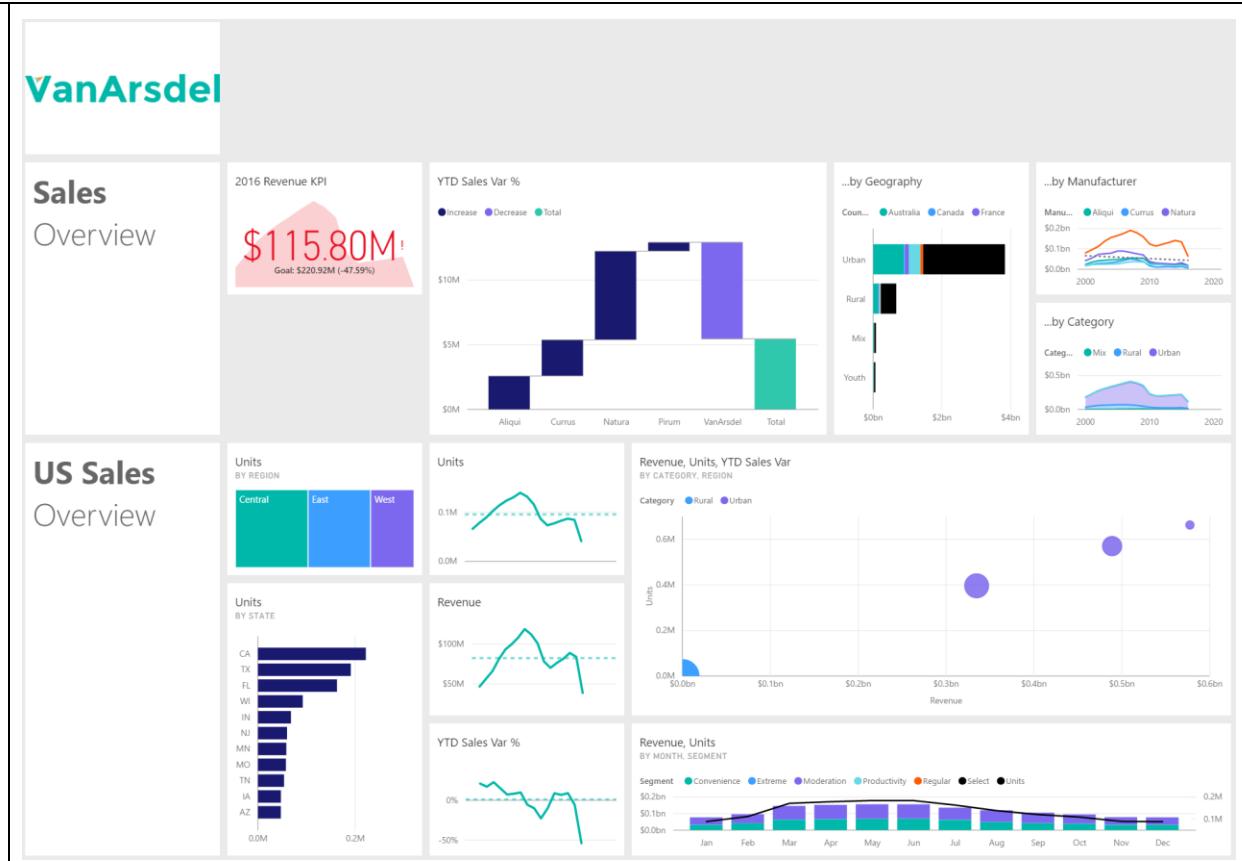
Logo is in the top row. Below that is the Sales Overview information and the bottom row is US Sales Overview information.

Note: The tiles can be of various sizes.

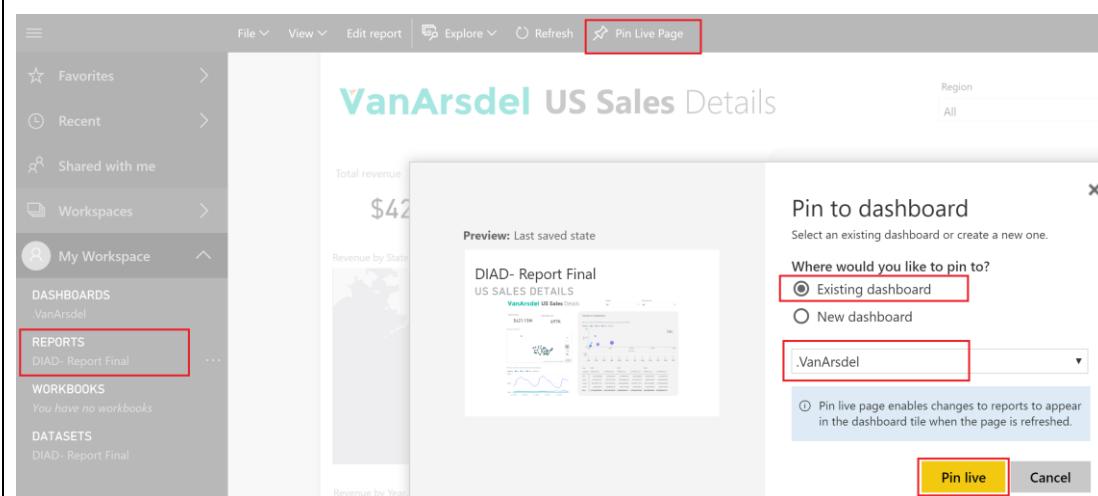
Notice clicking on a tile navigates you to the underlying report. Tiles are not interactive.

If you accidentally click on a tile, you can get back to the dashboard by clicking on the dashboard name on the left navigation pane.

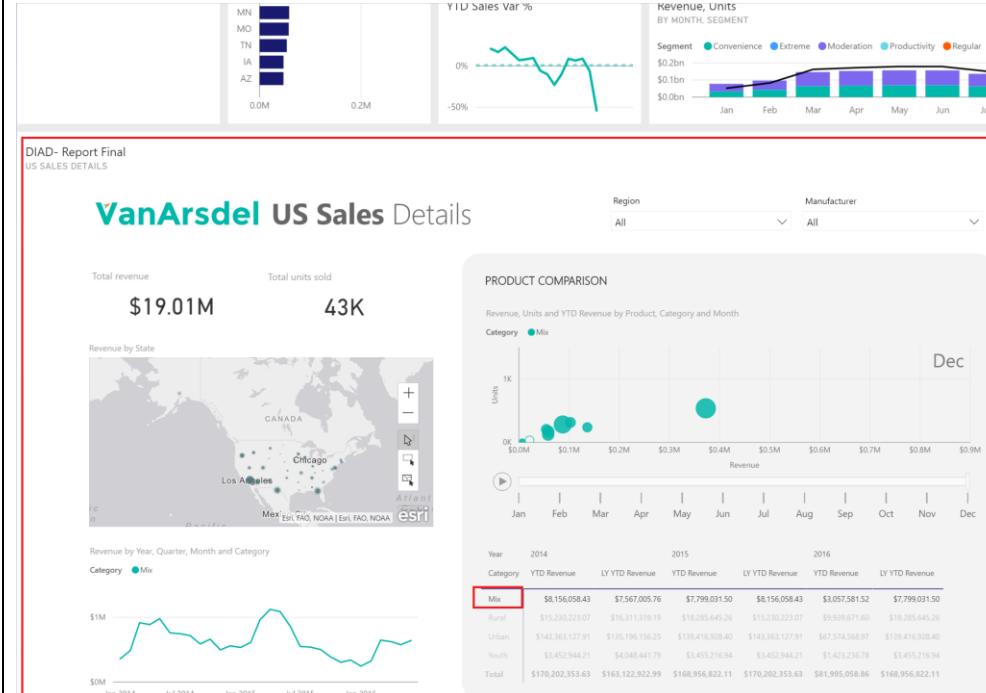
We can pin a complete report to the dashboard. This report tile will be interactive. Let's do this.



31. Click **REPORTS** -> **DIAD- Report Final** to navigate the report.
 32. Navigate to **US Sales Details** page.
 33. Select **Pin Live Page** on the top menu of the report.
 34. Pin to dashboard dialog opens. Select **existing .VanArsdel dashboard**.
 35. Select **Pin live**.



36. Click **DASHBOARDS** -> **.VanArsdel** to navigate to the dashboard. Scroll down and notice the full report is pinned to the dashboard.
 37. Select **Mix** in the bottom matrix visual. Notice rest of the US Sales Details visuals update by filtering data for Product Category of Mix.



38. Power BI supports asking questions against your data. Type “**Total units in 2016 for VanArsdel**” in the box below the dashboard name as shown in the figure.

Note: You are encouraged to type in the question instead of pasting the text. As you type the query, notice Q&A changes its answer and visualization in real time.

You will see the total units sold shown as a card. Power BI also shows how it translated your request.

The screenshot shows the Power BI Q&A interface. On the left is a sidebar with navigation links: Favorites, Recent, Shared with me, Workspaces, My Workspace (selected), Dashboards (.VanArsdel), Reports (DIAD- Report Final), Workbooks (You have no workbooks), and Datasets (DIAD- Report Final). The main area has a header '< Exit Q&A'. A search bar contains the query 'Total units in 2016 for VanArsdel'. Below the search bar is a large card visualization showing the number '68071' and the word 'Units' underneath. At the bottom of the main area, it says 'Showing total unit where year is in 2016 and manufacturer is VanArsdel' and 'Source: DIAD- Report Final'.

Remember we had created a **synonym** for **units called quantity**. We can utilize the synonym feature to perform natural language query.

39. Type “**Total quantity in 2016 for VanArsdel**” in the query box as shown in the figure. Notice it can interpret quantity as units and provide the same result.

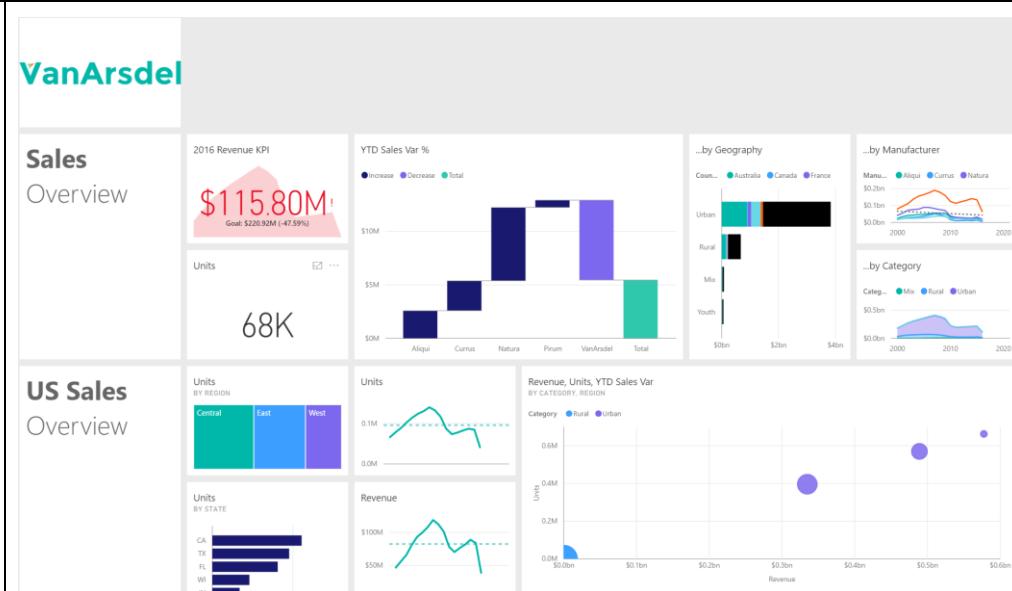
40. Click on the **Pin visual** on the right corner to pin the visual to the dashboard. Notice in the Pin dialog total units is rounded to 68K. Pin the visual to **.VanArsdel dashboard**.

41. Click on the < **Exit Q&A** or Power BI or the dashboard name to get to the dashboard

The screenshot shows the Power BI Q&A interface with the same query as the previous screenshot. The main area shows the card visualization '68071 Units'. To the right, a 'Pin to dashboard' dialog box is open. It has a title 'Pin to dashboard', a sub-instruction 'Select an existing dashboard or create a new one.', and a question 'Where would you like to pin to?'. There are two radio buttons: 'Existing dashboard' (selected) and 'New dashboard'. Below this is a dropdown menu with '.VanArsdel' selected. At the bottom of the dialog are two buttons: 'Pin' (highlighted with a red box) and 'Cancel'.

The units sold in 2016 will be pinned to the dashboard.

42. Reorganize the tiles on the dashboard so that your dashboard looks like the screenshot.



You can hover over a tile to edit it.

43. Hover over the newly created **Unit** tile and click on the **ellipsis** on the top right corner.

44. Select the **pen** icon. Notice Tile Details dialog opens on the right.

45. Change the title to **2016 Units**.

46. Add a Subtitle as **VanArsdel**.

47. Click **Apply**. Notice the changes are applied to the tile.

Tile details

* Required

Details

Display title and subtitle

Title:

Subtitle:

Functionality

Display last refresh time

Set custom link

URL *

Open custom link in the same tab?

Yes

No

[Restore default](#)

[Technical Details](#)

Apply **Cancel**

Power BI provides the ability to set alerts. Let's say you want to receive an alert if VanArsdel's unit sales reaches 69,000. Let's add an alert to the Q & A visual we created.

48. Hover over the newly created **Unit** tile and click on the **ellipsis** on the top right corner.
49. Select the **bell** icon. Notice Manage Alerts dialog opens on the right.
50. Select **Add alert rule**.
51. Update Alert title to **Alert for 2016 VanArsdel Units**.
52. Update Threshold to **69000**.
53. Select **Save and close** to save the alert.

We have set up an alert that will send an email and create a notification on powerbi.com when VanArsdel's 2016 sales reaches 69000.

This is an introduction to managing alerts. Complete functionality is not covered in this lab.

The screenshot shows the Power BI Sales Overview page on the left and the Manage alerts dialog on the right. The Sales Overview page displays a KPI card for 2016 Revenue with a value of \$115.80M and a goal of \$220.92M (-47.59%). Below the KPI card, there is a Q&A visual with a 'GO TO Q&A' button and a 'Total quantity in 2016 f...' text. To the right of the Q&A visual is a 'Manage alerts' dialog. The dialog has a yellow header bar with '+ Add alert rule'. It shows an active alert for '2016 VanArsdel Units' which is turned 'On'. The alert title is 'Alert for 2016 VanArsdel Units'. The 'Set alerts rule for' field is set to 'Units'. The 'Condition' dropdown is set to 'Above' and the 'Threshold' input field contains '69000'. The 'Maximum notification frequency' section has two radio buttons: 'At most every 24 hours' (selected) and 'At most once an hour'. A note states 'Alerts are only sent if your data changes.' Below that, a note says 'By default, you'll receive notifications on the service in the notification center.' with a checked checkbox for 'Send me email, too'. At the bottom of the dialog are 'Save and close' and 'Cancel' buttons, with 'Save and close' highlighted with a red box.

Earlier in the section we created Insights for the complete dataset. Power BI also provides the capability to get quick insights for a tile on the dashboard.

54. On .VanArsdel dashboard, click on the ellipsis on the top right corner of the ...by Category tile (stacked area chart).

55. Click on light bulb icon.

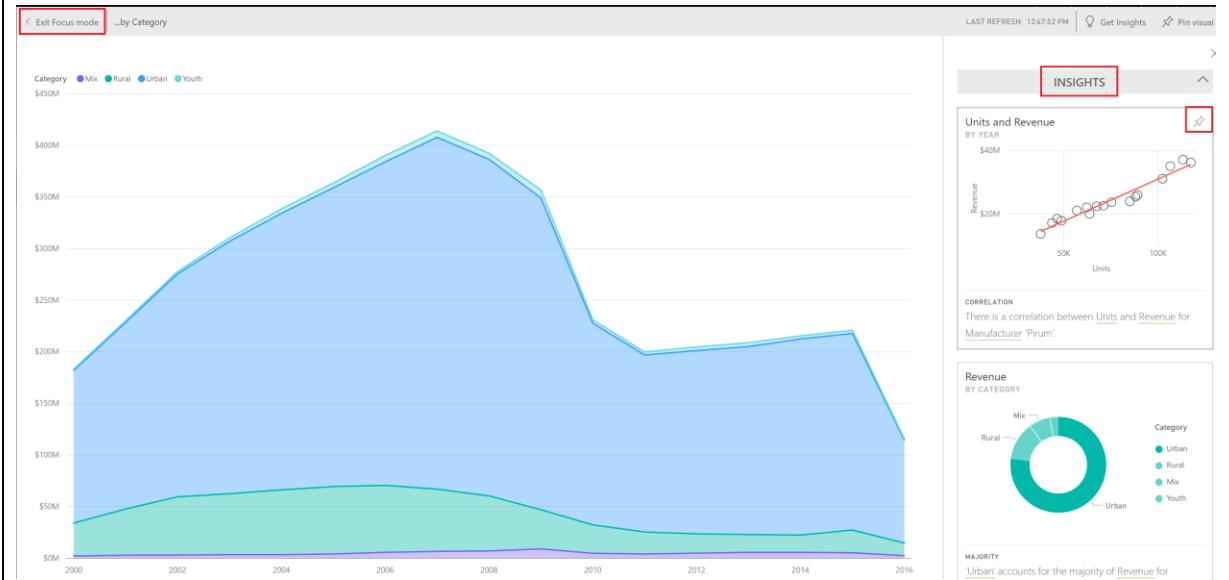


You will be navigated to **focus mode** and on the right panel you will find quick insights into the data that makes up the tile.

56. **Scroll** on the Insights panel to review the various insights Power BI can generate.

Notice that there is an option to pin insight visuals to the dashboard.

57. Click on **Exit Focus mode** on the top left to navigate back to the dashboard.



58. In the left panel, click **REPORTS -> DIAD-Report Final** to navigate the report.
59. Navigate to **US Sales Details** page.
60. The bottom right visual is the New matrix visual. Let's look at the visual's behavior.
61. Click **Category Mix** in the **Matrix** visual. Notice all the other visuals updates. Now all the visuals are filtered by Category of Mix.
62. Click on **Year 2015** in the **Matrix** visual. Now all the visuals are updated to filter data for the Year 2015.
63. Now click on cell that is the **intersection of Category Rural and YTD Revenue for the year 2015**. Now all the visuals are updated to filter data for the Category rural and Year 2015.
64. Hover over the **Matrix visual** and click on the **In Focus mode** icon on the top right corner.



65. From the report menu, select **Explore -> Show Next Level**.

Notice matrix visual is drilled down to display Revenue by Product.

66. Use the **arrow on the top left corner** to navigate back to Revenue by Product Category.

Year	2014	2016	LY YTD Revenue	YTD Revenue	LY YTD Revenue
Product					
Abbas MA	\$2,423,286.86		\$2,638,592.88	\$1,021,822.62	
Abbas RP				\$46,623.46	\$31,609.83
Abbas RS				\$608.89	\$21,060.01
Abbas UE	\$1,108,107.26	\$1,069,529.74	\$657,371.40	\$1,108,107.26	\$543,074.44
Abbas UM	\$2,250,191.79	\$2,118,775.26	\$1,938,719.95	\$2,250,191.79	\$675,500.75
Abbas UR	\$201,547.76	\$200,222.14	\$504,049.61	\$201,547.76	\$51,883.13
Abbas YY	\$230,745.38	\$71,412.07	\$74,453.40	\$230,745.38	\$74,453.40
Aliqui MA	\$1,009,318.96	\$972,645.27	\$867,860.18	\$1,009,318.96	\$228,452.33
Aliqui RP	\$2,036,570.45	\$2,166,440.54	\$2,259,604.41	\$2,036,570.45	\$1,252,565.26
Aliqui RS	\$1,461,208.98	\$1,302,583.17	\$2,043,932.42	\$1,461,208.98	\$1,324,757.80
Aliqui UC	\$4,336,938.27	\$4,173,433.74	\$4,681,395.76	\$4,336,938.27	\$2,843,006.09
Aliqui UE	\$3,538,249.73	\$3,812,727.35	\$4,439,983.38	\$3,538,249.73	\$2,311,820.81
Aliqui UM	\$1,083,198.38	\$637,022.19	\$764,749.49	\$1,083,198.38	\$443,983.38

67. From the report menu, this time select **Explore -> Expand to next level**.

Notice matrix visual is drilled down to display Revenue by Product. But this time it is further broken down to display Product by Product Category (hierarchical display).

68. Use the **arrow on the top left corner** to navigate back to Revenue by Product Category.

Year	2014	2016	LY YTD Revenue	YTD Revenue	LY YTD Revenue
Category					
Mix	\$8,156,058.43	\$3,057,581.52	\$7,799,031.50		
Abbas MA	\$2,638,592.88	\$1,021,822.62	\$2,423,286.86		
Aliqui MA	\$1,009,318.96	\$228,452.33	\$867,860.18		
Currus MA	\$1,149,053.80	\$1,184,729.12	\$999,528.07	\$1,149,053.80	\$287,779.75
Natura MA	\$703,493.23	\$496,815.16	\$553,311.89	\$703,493.23	\$219,329.09
Pirum MA	\$785,095.24	\$948,164.59	\$961,082.48	\$785,095.24	\$784,502.25
Pomum MA	\$53,810.77	\$60,014.69	\$73,028.87	\$53,810.77	\$19,502.07
Quibus MA	\$1,246,848.01	\$711,908.87	\$1,293,084.87	\$1,246,848.01	\$194,583.11
Quibus MP	\$34,718.99	\$778,416.87	\$281,905.89	\$34,718.99	\$301,610.29
Victoria MA	\$535,126.57	\$594,799.12	\$345,942.40	\$535,126.57	\$345,942.40
Rural	\$15,230,223.07	\$16,311,319.19	\$18,285,645.26	\$15,230,223.07	\$9,939,671.60
Abbas RP		\$143,925.08	\$31,609.83		\$46,623.46
Abbas RS	\$40,439.91	\$14,141.35	\$21,060.01	\$40,439.91	\$608.89

69. From the report menu, this time select **Explore -> Drill Down**.

70. In the matrix visual, **click on any cell**.

Notice it drills down to Product level of that particular Product Category cell you selected.

71. Use the **arrow on the top left corner** to navigate back to Revenue by Product Category.

72. Click **Back to Report**, to navigate back to the report page.

See Records and See Data features are not currently available for the matrix visual. You can use any of the other visuals to explore these features. The behavior of these features is like what we explored in Power BI Desktop.

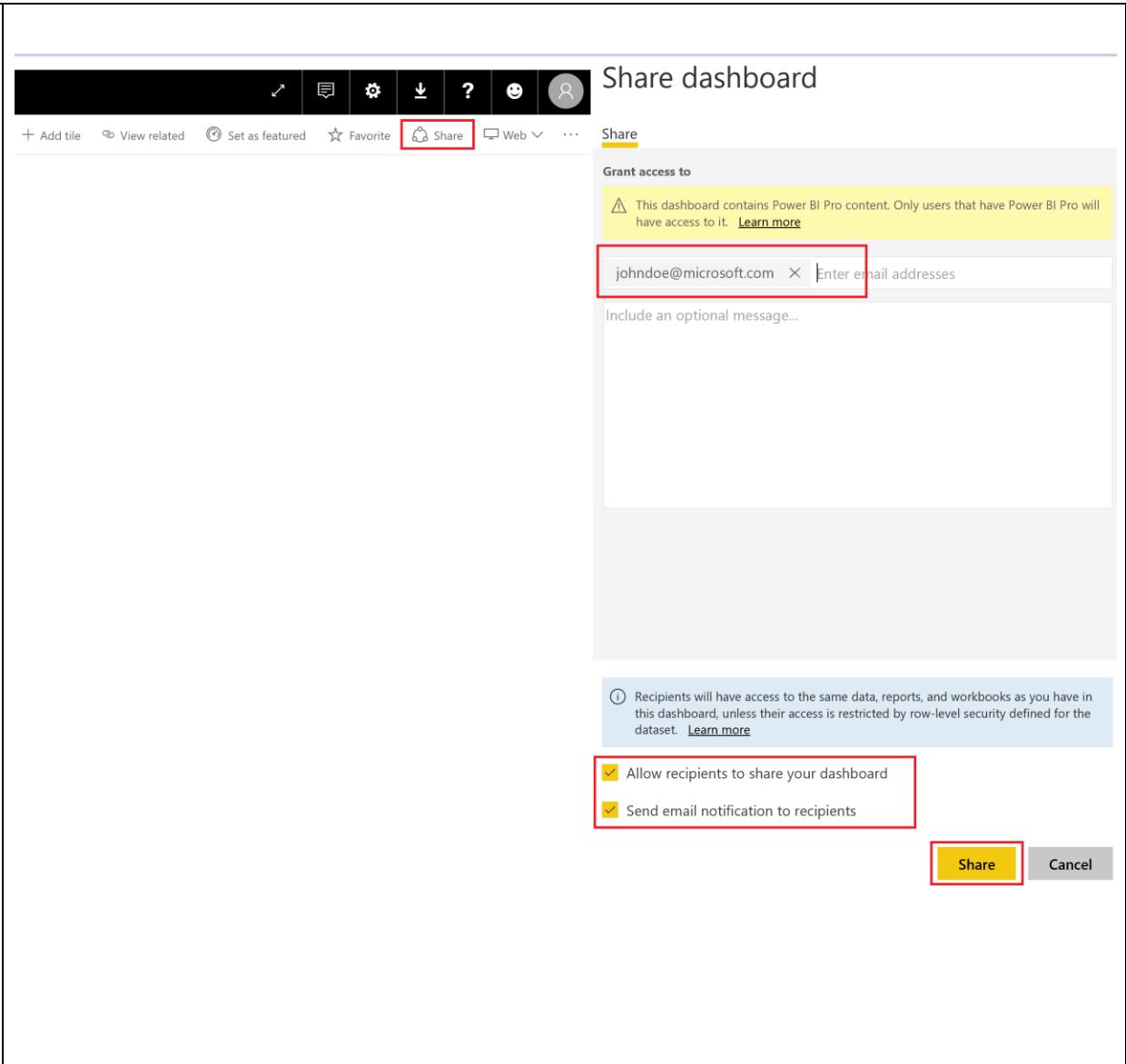
The screenshot shows a Microsoft Power BI report interface. At the top, there's a navigation bar with 'File', 'Edit report', 'Explore' (which is highlighted with a red box), 'Refresh', and 'Pin Live Page'. Below the navigation bar is a matrix visual. The matrix has 'Year' and 'Category' columns on the left, and '2014' and '2016' rows at the top. The data cells show YTD Revenue values. A context menu is open over one of the data cells, specifically over the 'Rural' category in 2014. The menu items include 'Back to Report', 'Explore' (with sub-options 'See Data', 'Show Next Level', 'Expand to next level', 'Drill Up', and 'Drill Down'), and 'See Records'. The 'Drill Down' option is also highlighted with a red box.

Year	Category	2014	2016	
YTD Revenue	YTD Revenue	YTD Revenue	YTD Revenue	
Rural	\$15,230,223.07	\$15,230,223.07	\$9,939,671.60	\$18,285,645.26
Abbas RP	\$46,623.46	\$46,623.46	\$31,609.82	\$31,609.82
Abbas RS	\$40,439.91	\$40,439.91	\$608.89	\$21,060.00
Aliqui RP	\$2,036,570.45	\$2,166,440.54	\$2,259,604.41	\$2,036,570.45
Aliqui RS	\$1,461,208.98	\$1,302,583.17	\$2,043,932.42	\$1,461,208.98
Currus RP	\$183,950.34	\$183,950.34	\$68,973.98	\$119,168.28
Currus RS	\$673,368.10	\$542,626.72	\$741,641.88	\$673,368.10

Now that you have a dashboard built, let's share it with your colleagues.

73. Select **DASHBOARDS -> .VanArsdel** to navigate back to the dashboard.
74. You can share your dashboard with your team using their email address. Click on **Share** in the top right of the screen.
75. Enter **email address** of the members of your team separate by ";". Power BI is connected to Azure Active directory.
76. Enter appropriate **message** in the text box below the email addresses.
77. You can **allow recipients to share these dashboards** with other team members. If you do not want the users to re-share, please deselect the checkbox and then **Share** the dashboard.

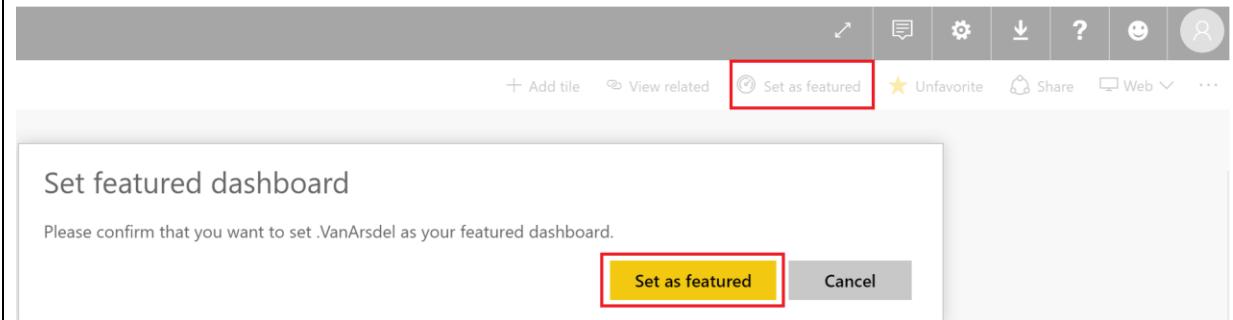
Power BI service will send out email notification if the option is selected. Once the recipient accepts the invite, the user will get a read only copy of the dashboard and will see any changes to the dashboard you make periodically.
If the dashboard is backed by tiles from on premise SSAS then the recipients' credential is passed through to SSAS and the Power BI service retrieves the data that can be accessed by the recipient.



78. Navigate back to **.VanArsdel** dashboard.
79. Notice on the top right of the menu bar, there is options to add this dashboard to the favorites. Click on **Favorite** option.
80. Now click on **Favorite** in the left panel.
- Notice the dashboard is added to the list. This is an easy way to access all your favorite or most used dashboards quickly.
81. Click on the **ellipsis** on the top right corner of the page, next to **Share** option.
- Notice there is options to **duplicate, print and refresh dashboard** and **Set as Featured** dashboard. Set as Featured dashboard sets the dashboard as the default dashboard that user will land every time they login.
82. Select **Set as Featured**.
83. A warning message is displayed. Select **Set as Featured Dashboard**. This sets **.VanArsdel** as the featured/default dashboard. Notice Featured Dashboard is enabled in the left panel.

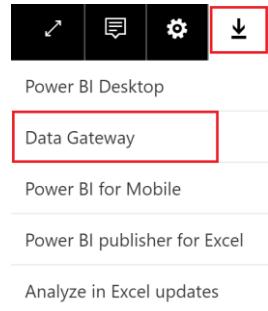
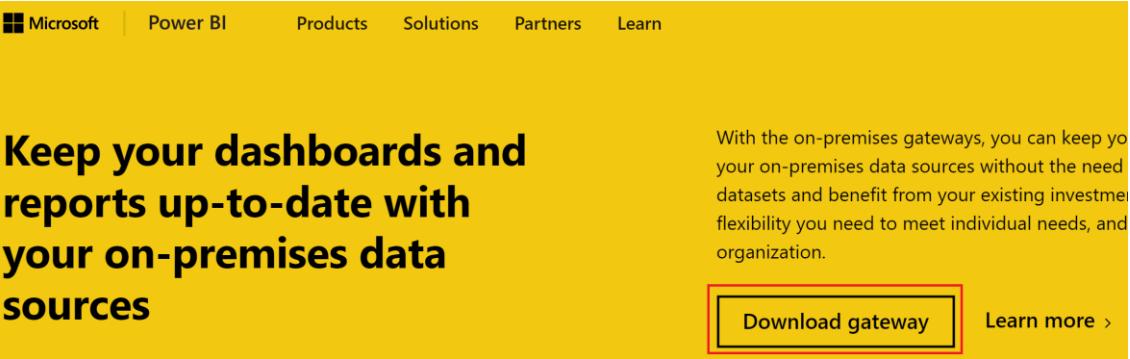


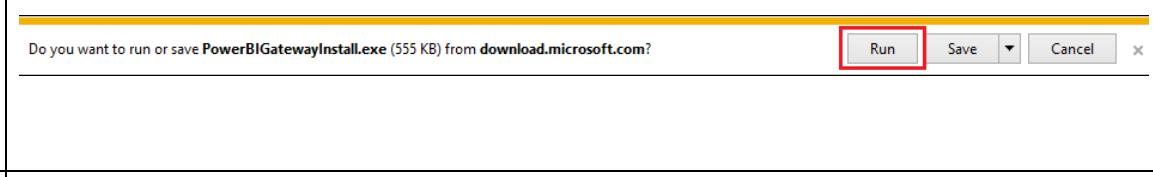
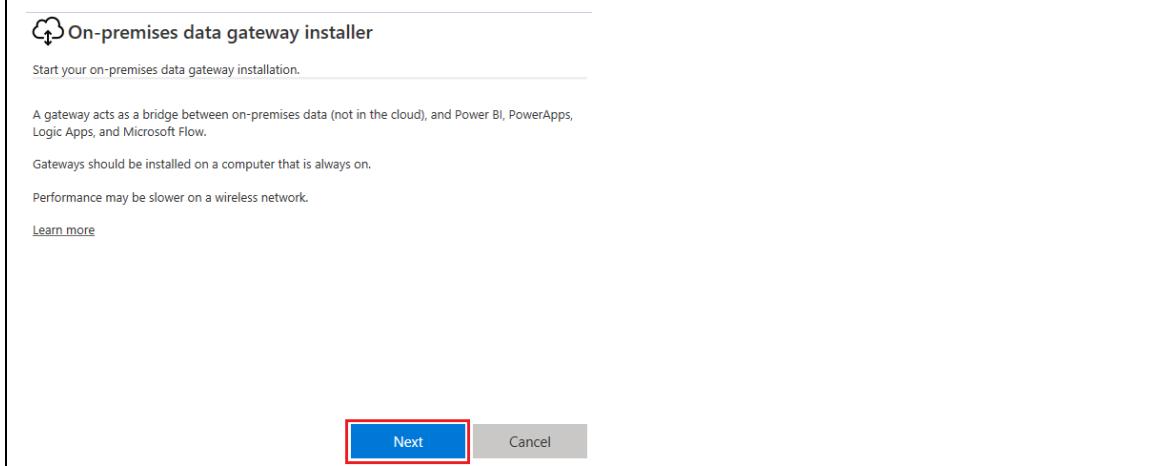
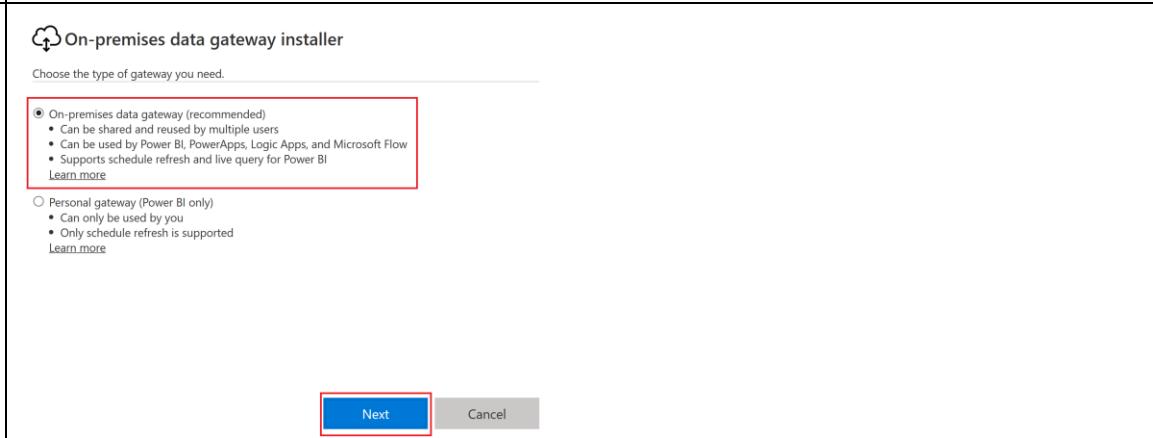
- On the top right corner of the screen, next to Favorite, there is Set as featured option. Set as Featured dashboard sets the dashboard as the default dashboard that user will land every time they login.
84. Select **Set as Featured**.
85. A confirmation dialog is displayed. Select **Set as Featured Dashboard**. This sets **.VanArsdel** as the featured/default dashboard.

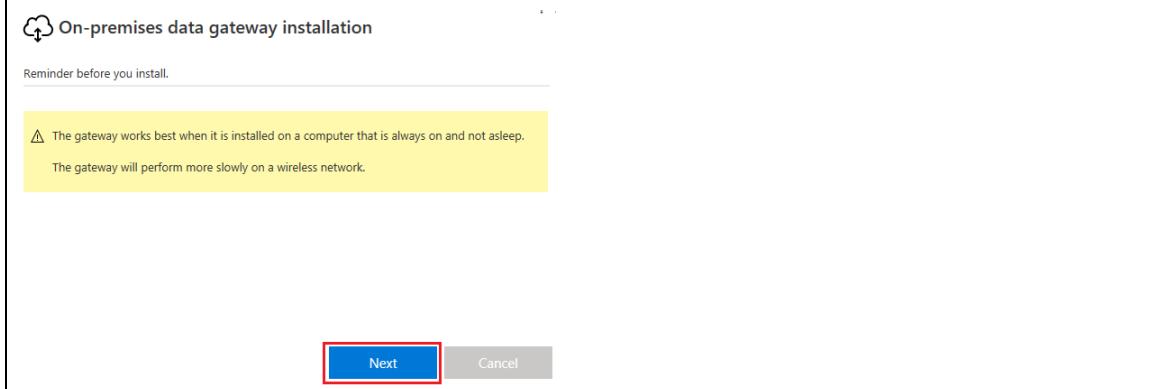
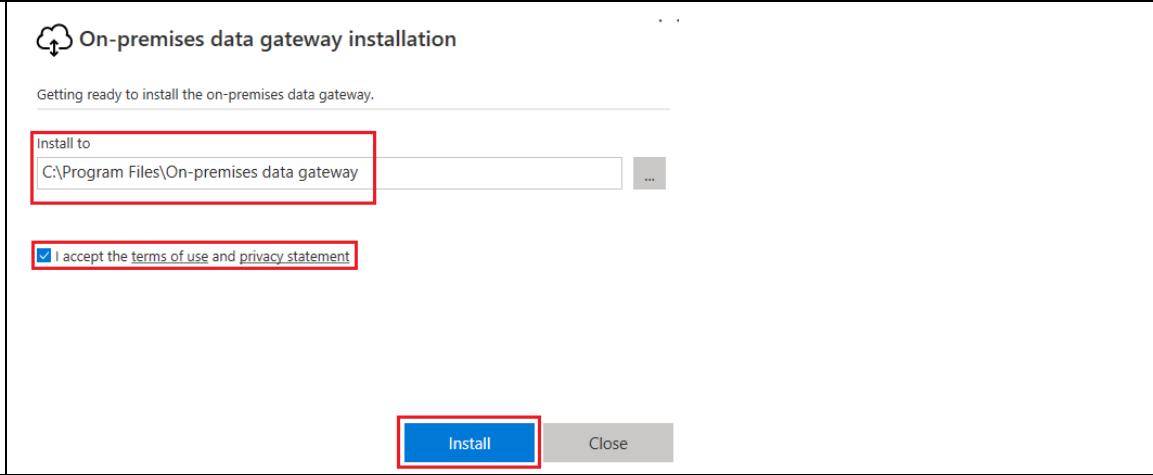


Power BI Service - Refreshing data on the Dashboard

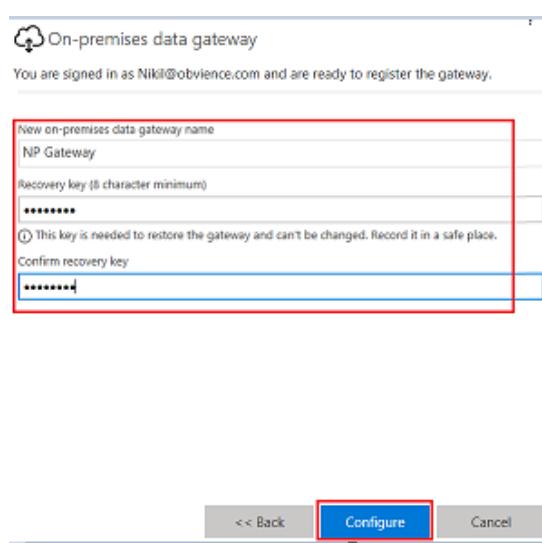
Once the dashboard has been shared with the members of the team, one of the key benefits of Power BI is the ability to setup automated data refresh. This enables the dashboard to be live and operational for the organization. If your data is being retrieved from a cloud data source such as SQL Azure, then you can click on the Dataset ... and schedule the refresh as per your organization needs. In this section, you will learn to setup On-Premises Gateway that allows the author of the report and dashboard to refresh the content in the data model from an on-premises data source.

<ol style="list-style-type: none">1. Go to http://app.powerbi.com and click on the down arrow on the top right corner.2. Select Data Gateway.	 <p>The screenshot shows the Power BI Desktop ribbon with four icons: a left arrow, a right arrow, a gear, and a downward arrow. Below the ribbon, a vertical menu is displayed with the following options: Power BI Desktop (selected), Data Gateway (highlighted with a red box), Power BI for Mobile, Power BI publisher for Excel, and Analyze in Excel updates.</p>
This opens a new browser window which provides details regarding the On-Premises gateway. 3. Select Download gateway .	 <p>The screenshot shows the Microsoft Power BI homepage with a yellow header bar. The header includes the Microsoft logo, Power BI, Products, Solutions, Partners, and Learn. Below the header, there is a large yellow call-to-action button with the text "Keep your dashboards and reports up-to-date with your on-premises data sources". To the right of this button, there is descriptive text: "With the on-premises gateways, you can keep your on-premises data sources without the need datasets and benefit from your existing investment flexibility you need to meet individual needs, and organization." At the bottom right of the yellow area, there are two buttons: "Download gateway" (highlighted with a red box) and "Learn more >".</p>

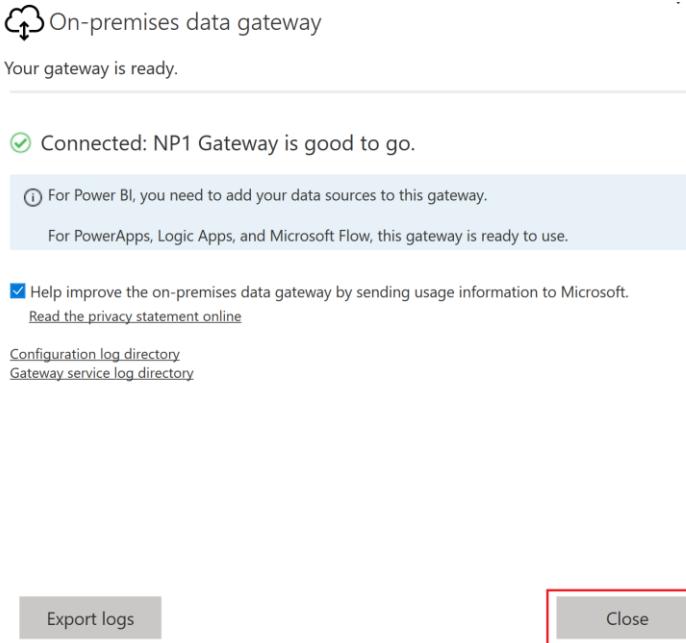
<p>4. Click on Run once the download is complete.</p> <p>5. Click on Yes on the alert message box.</p>	
<p>6. Installation wizard will start. Click on Next as shown in the figure.</p>	
<p>You are provided with 2 options:</p> <p>On-premises gateway that can be shared with multiple users and used by other apps like Power Apps, Logic Apps, etc.</p> <p>Personal gateway is used by Power BI only and can only be used by you.</p> <p>7. Let's leave the default On-premises gateway selected. Click Next in this dialog.</p>	

<p>A reminder message is displayed.</p> <p>8. Click Next in this dialog.</p>	 <p>The screenshot shows the 'On-premises data gateway installation' dialog. At the top, it says 'Reminder before you install.' Below that is a yellow warning box with the text: '⚠ The gateway works best when it is installed on a computer that is always on and not asleep. The gateway will perform more slowly on a wireless network.' At the bottom right are two buttons: a blue 'Next' button and a grey 'Cancel' button.</p>
<p>9. Select the default install path for the gateway install.</p> <p>10. Select the check box once you have read through the Terms of use and privacy statement.</p> <p>11. Select Install.</p>	 <p>The screenshot shows the 'On-premises data gateway installation' dialog. It says 'Getting ready to install the on-premises data gateway.' There is a red box around the 'Install to' field, which contains 'C:\Program Files\On-premises data gateway'. Below it is a red box around a checked checkbox labeled 'I accept the terms of use and privacy statement'. At the bottom right are two buttons: a blue 'Install' button and a grey 'Close' button.</p>

12. After the installation is complete click on **Sign In** as shown in the figure.
13. Sign in to account window opens. Enter the credentials you use to access powerbi.com and sign in.
14. Provide a **name** for the gateway.
15. Follow the instructions to create a **Recovery key** and confirm it. In case you want to restore the gateway, you will need this key. Record it in a safe place.
16. Select **Configure**.

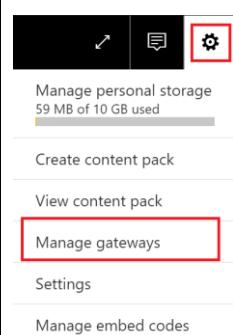


17. Your gateway is now installed and configured. Click on **Close** to close the dialog.



Next step is to configure the gateway on Power BI Service by adding data sources that can be accessed by the gateway and the users who have

18. Login to <http://app.powerbi.com> or the service URL provided by the instructor.
19. From the menu on the top right, click on the **gear** and select **Manage gateways**.



You will be navigated to Gateways screen. Notice the gateway you created is available. On the right panel of the screen you can add more information regarding the gateway using **Gateway Settings** screen.

On the right panel of the screen there is also an option to add **Administrators** for the gateway.

Let's add data sources that are used in our model so we can set up a refresh schedule.

20. Click on the **ellipsis** next to the gateway name and select **ADD DATA SOURCE**.

The image contains three screenshots of the Power BI Service Gateways screen. The first screenshot shows a list of gateways with 'NP Gateway' selected. The second screenshot shows the details for 'NP Gateway', including 'Gateway Settings' (with a red box around it) and 'Administrators'. The third screenshot shows a context menu for 'NP Gateway' with 'ADD DATA SOURCE' highlighted.

We need to configure 3 data sources that are used in the model.

21. In the Data Source Settings page enter the name of the data as **Dimensions**.
22. From the Data Source Type drop down select **File**.
23. Enter following for the Full Path
C:\DIAD\Data\USSales\bi_dimensions.xlsx (if your file is in a different location change the path accordingly).
24. Enter the **Windows username and password** (this is typically the username and password you use to login to your machine).
25. Select **Add**.

Once the data source is added, notice you can add **Users** who can access this data source.

- Let's add the US Sales csv data source file.
26. Click on the **ellipsis** next to the gateway name and select **ADD DATA SOURCE**.
 27. In the Data Source Settings page enter the name of the data as **US Sales**.
 28. From the Data Source Type drop down select **File**.
 29. Enter following for the Full Path
C:\DIAD\Data\USSales\bi_salesFact.csv (if your file is in a different location change the path accordingly).
 30. Enter the **Windows username and password** (this is typically the username

Data Source Settings

Data Source Name: Dimensions

Data Source Type: File

Full path: C:\DIAD\Data\USSales\bi_dimensions.xlsx

The credentials are encrypted using the key stored on-premises on the gateway server. [Learn more](#)

Windows username: johndoe

Windows password:

>Advanced settings

Add **Discard**

Data Source Settings

Data Source Name: US Sales

Data Source Type: File

Full path: C:\DIAD\Data\USSales\bi_salesFact.csv

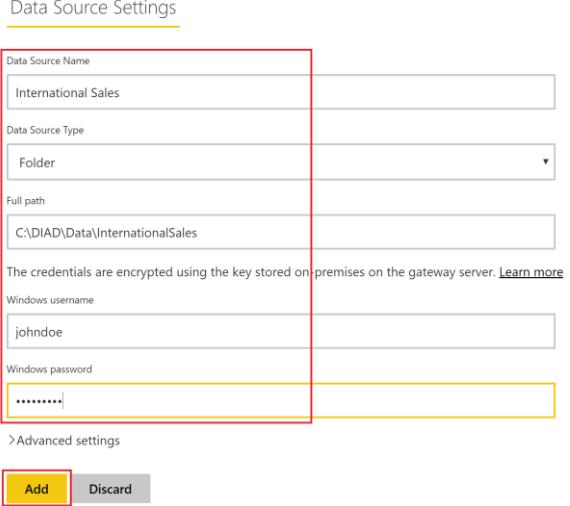
The credentials are encrypted using the key stored on-premises on the gateway server. [Learn more](#)

Windows username: johndoe

Windows password:

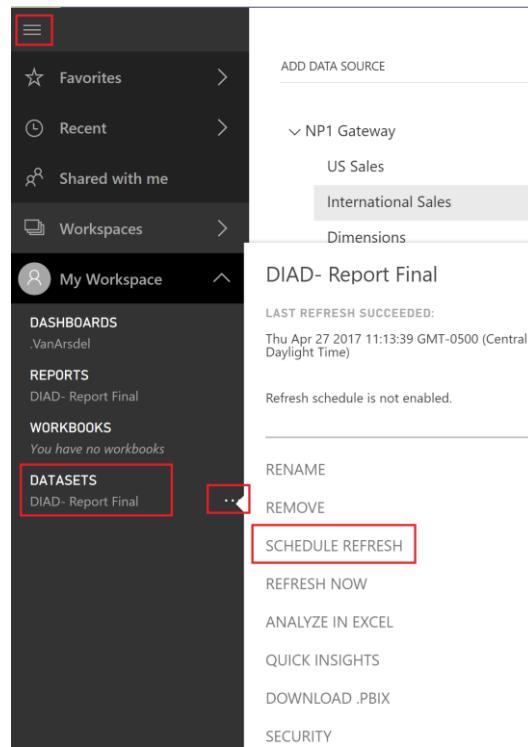
>Advanced settings

Add **Discard**

<p>and password you use to login to your machine).</p> <p>31. Select Add.</p>	
<p>Let's add the International Sales folder data source.</p> <p>32. Click on the ellipsis next to the gateway name and select ADD DATA SOURCE.</p> <p>33. In the Data Source Settings page enter the name of the data as International Sales.</p> <p>34. From the Data Source Type drop down select Folder.</p> <p>35. Enter following for the Full Path C:\DIAD\Data\InternationalSales (if your file is in a different location change the path accordingly).</p> <p>36. Enter the Windows username and password (this is typically the username and password you use to login to your machine).</p> <p>37. Select Add.</p>	

Now let's look at how refresh is going to work.

38. If the left panel is collapsed, expand it by clicking on the three bars below PowerBI.
39. Navigate to Datasets section on the left panel and locate the dataset called **DIAD-ReportFinal**. Click on the **ellipses** and click on **Schedule Refresh** as shown in the Figure.



40. Scheduling a refresh from on-premise data sources is a **pro feature**. However, Microsoft is offering pro features for free for a limited time.
41. Click on Try Pro for free.
42. Start free **60-day trial** dialog appears.
43. Agree to the **terms and conditions** and click on Try Power BI Pro.
44. Once trial is extended, click on **Close** to close the dialog.
45. You will be directed back to .VanArsdel Dashboard.

Notice a few pop ups are displayed to indicate the Pro features.

Key features include:

- Storage space is increased to 10GB (click on the gear on the top right of the page).
- Ability to refresh on premise data sources.
- Ability to create content packs.
- Ability to collaborate using Group feature.
- Live connectivity to various sources.

Settings

General Dashboards Datasets Workbooks

DIAD- Report Final

This dataset contains on-premises data sources. To schedule data refresh, try Power BI Pro for 60 days, or contact your Office 365 tenant administrator to purchase Power BI Pro.

Try Pro for free

On-premises data sources

Build reports and dashboards that connect to your existing on-premises databases. You will always see the latest information with live connections to your most important data sources.

Learn more Got it

Get Data

Manage personal storage
58 MB of 10 GB used

Create content pack

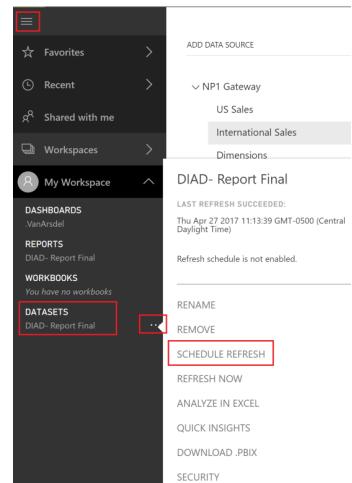
View content pack

Manage gateways

46. Navigate back to **Datasets** section and locate the data set called **DIAD-Report Final**, click on the ellipses.

47. Click on **Schedule Refresh** as shown in the Figure.

Notice that this time you are redirected directly to the Datasets page.

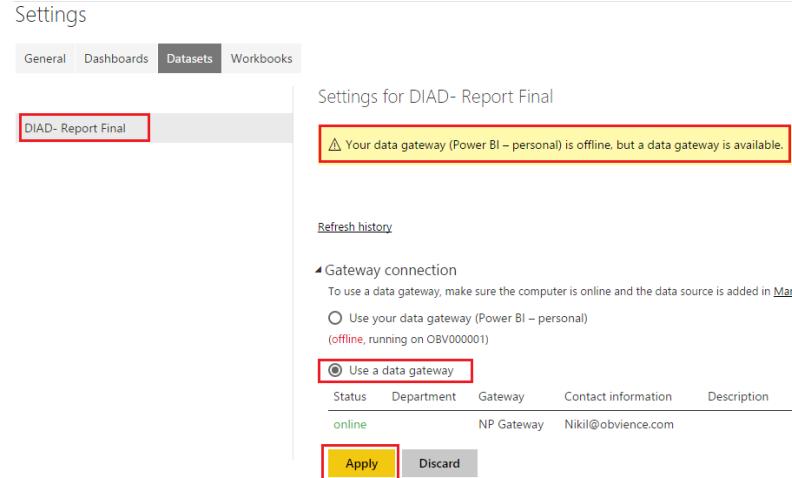


In the Settings page, you will see the Datasets section is selected.

48. The Power BI service has detected that you have setup a Gateway. **Expand Gateway connection**.

49. Select **Use a data gateway** and click **Apply**.

A dialog appears confirming the gateway for DIAD- Report Final has been updated.



Now let's schedule data refresh. Notice that you do not have to re-enter the credentials for each data source again. Since it is set up at the gateway level.

50. Expand Schedule Refresh section.
51. Enable data refresh by moving the slider below "Keep your data up to date".
52. There are two options for Refresh Frequency, daily and weekly. Pick Daily.
53. Using "Time Zone" drop down update the time zone to the appropriate selection.
54. Click on "Add another time" to select refresh time.
55. Data refresh can be scheduled on the hour or 30min. Change the time to the next available 30 min time slot but give 5 min to complete the next few steps.
56. Click **Apply**.

You have now setup automated refresh. Power BI Service also has an option to send out failure notifications.

► Data source credentials (admin has granted access, credentials are not required)

◀ Schedule Refresh

Keep your data up to date

On

Refresh frequency

Daily ▾

Time zone

(UTC-06:00) Central Time (US and Canada) ▾

Time

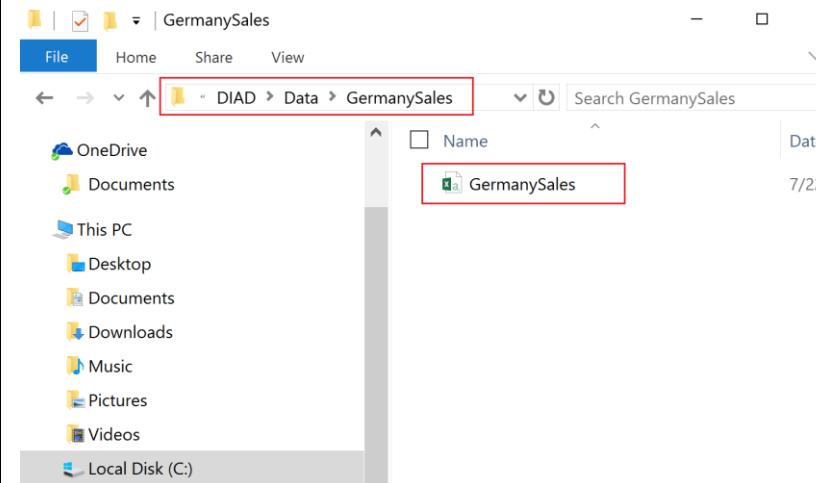
[Add another time](#)

Send refresh failure notification email to me

The company has acquired another company selling the product in Germany and just received the sales details from Germany. The CSV file is located under the folder **\DIAD\Data\GermanySales**.

57. Copy and paste this file from **\DIAD\Data\GermanySales** to **\DIAD\Data\InternationalSales** folder where you have all the remaining CSV files.

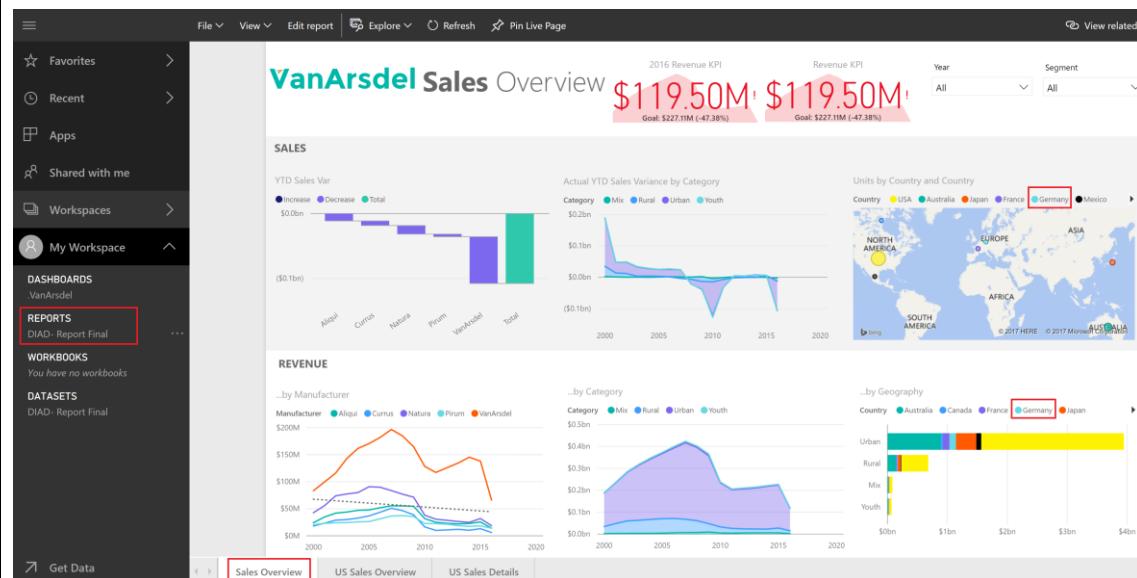
Note: If your file is in a different location change the path accordingly.



58. Once data refresh is complete, navigate to REPORTS -> DIAD-Report Final.

In **Sales Overview** report page, notice in the map visual there is a bubble for Germany.

Also, in ...by Geography stacked bar chart, there is an entry for Germany.



Now you have configured on premise data refresh. Wait for the refresh operation to complete and the data to change on the dashboard. Continue to next section to learn more functionality.

Power BI Service -- Part II

The dashboards and report you have shared with your team have become really useful for entire team to get insights. You have heard the following requests from your team. You are unable to support them individually and you cannot meet their needs even if you work 24 hour/day.

1. Several users have requested you to create a dashboard for them that they can customize.
2. Some users have complained to you that the dashboards you have shared are dynamically changing sometimes and they are not clear what's happening. This is due to the fact you are updating the dashboards based on some user requests.
3. You want the ability to manage the list of users to whom you want to share the dashboards and you have existing security groups in your organization.
4. Certain Excel power users in your team created reports in Excel with Excel data model where they have pivot tables and power view sheets. They really like Power BI and want to be able to see all their reports in Power BI. In addition, they really like the functionality of automatic refresh in Power BI.
5. Additional people on your team have started creating reports that are useful for your team and organization. You want to be able to leverage them as a group and maintain content efficiently.

You only have 24 hours in a day and you are unable to meet the demands from all your users for the requests above. You want to make them be successful. In order to tackle this business problem in this section you will learn how to leverage the features in Power BI.

Distributing content to larger audiences for them to customize

Power BI offers a feature content pack which helps you to package dashboards, reports and datasets and share it to a broad set of audiences – entire company or a group of people.

Power BI Service - Sharing content to your organization

1. Go to **.VanArsdel** dashboard.
2. Click on the Settings icon on the top right and select **Create content pack** as shown in the figure.

The screenshot shows the Power BI Service interface. On the left, there is a navigation sidebar with sections for Favorites, Recent, Shared with me, Workspaces, My Workspace (which is currently selected), DASHBOARDS, and REPORTS. Under DASHBOARDS, the '.VanArsdel' dashboard is selected. The main area displays the '.VanArsdel' dashboard, which includes a large title 'VanArsdel', a section titled 'Sales' with a subtitle 'Overview', a KPI card for '2016 Revenue KPI' with a red triangle, and a chart for 'YTD Sales Var %' with three data points. On the top right, there is a settings icon with a gear symbol. A context menu is open, showing options like 'Add tile', 'View related', 'Manage personal storage' (showing 60 MB of 10 GB used), 'Create content pack' (which is highlighted with a red box), 'View content pack', 'Manage gateways', 'Settings', and 'Manage embed codes'. The 'Create content pack' option is the focal point of the figure.

3. Enter a valid **email address** with whom you want to share the content pack.
4. In the create content pack page enter the “**VanArsdel Sales Report**” under Title as shown in the figure.
5. Enter “**This report contains VanArsdel revenue and unit shares over the years along with competitor information**”.
6. Select the Upload text below Image and choose **LogoforContentPack** file from **\DIAD\Data** folder
7. You can select the set of Dashboards, reports and datasets to be shared. In this example, we will just be using the **.VanArsdel dashboard, report and dataset** as shown in the Figure.
8. Finally, you will be choosing if you want to share this to a group of users or to entire organization which is your entire company. **Follow the instructions from the instructor on what group to share your content pack.**
9. Click on **Publish**.

Create content pack

Choose who will have access to this content pack:

Specific groups My entire organization

X

Title

Description

This report contains VanArsdel revenue and unit shares over the years along with competitor information

Upload an image or company logo
Image size: 45 KB or less, 4:3 aspect ratio, JPG or PNG format
[Use default](#)

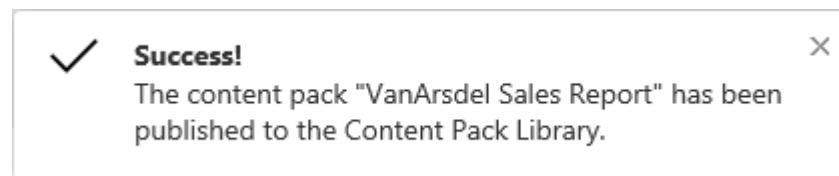
Select items to publish

Dashboards	Reports	Datasets
<input checked="" type="checkbox"/> .VanArsdel	<input type="checkbox"/> DIAD- Report Final	<input type="checkbox"/> DIAD- Report Final

The content pack will be available in your organization's content gallery. [Learn more](#)

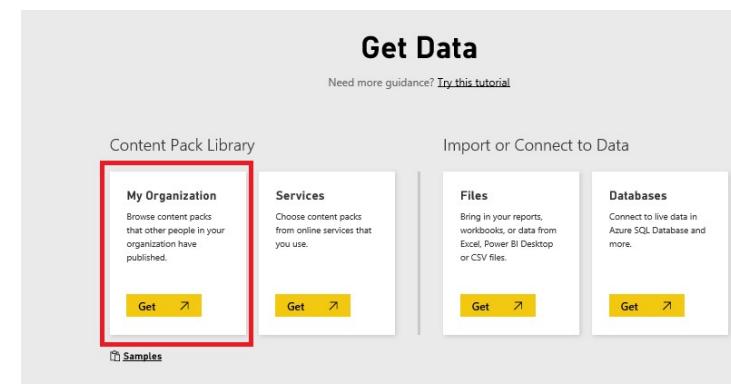
Publish **Cancel**

You should see a notification that content pack creation was successful as shown in the figure.

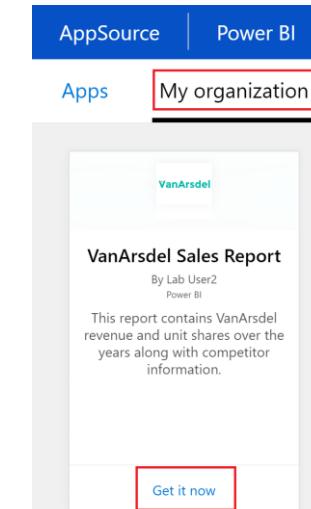


Identify the user from your company with whom you shared the content pack. This user can be you as well.

10. Click on **Get Data** on the Power BI Service.
11. In the Get Data page click on **Get** under **My Organization** as shown in the figure.



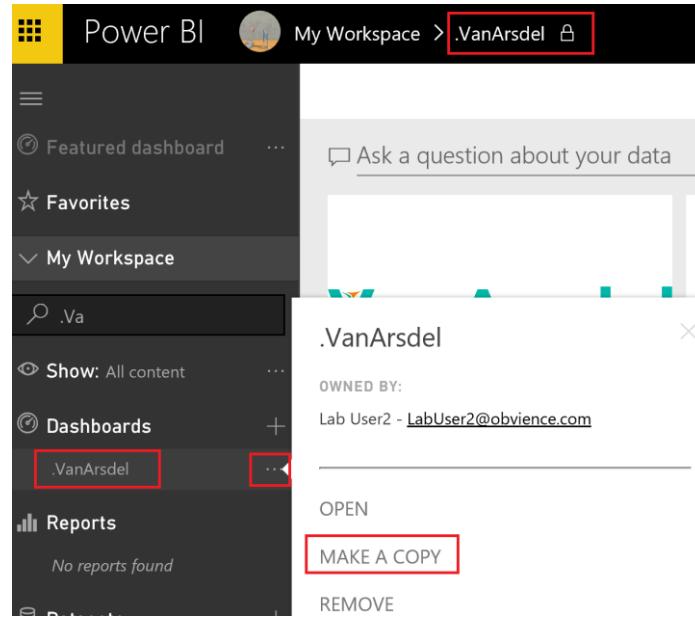
12. In **My Organization** page you will see the VanArsdel content package as shown in the figure.
13. Request the end user to click on **Get it Now**.



A new dashboard is created for the end user as shown in the figure. By default, the dashboard is a read only dashboard for the end user and any updates made to the content packs will be seen by the end user. You will learn how to make updates to the content pack shortly.

14. If the user wants to personalize (rearrange the tiles, add additional tiles from his/her reports) then the user needs to make a **copy** of the dashboard. Request your co-worker to click on the **ellipsis** next to .VanArsdel dashboard and select **MAKE A COPY**.

This creates a copy of the dashboard with edit capability.



Power BI Service - Updating a content pack

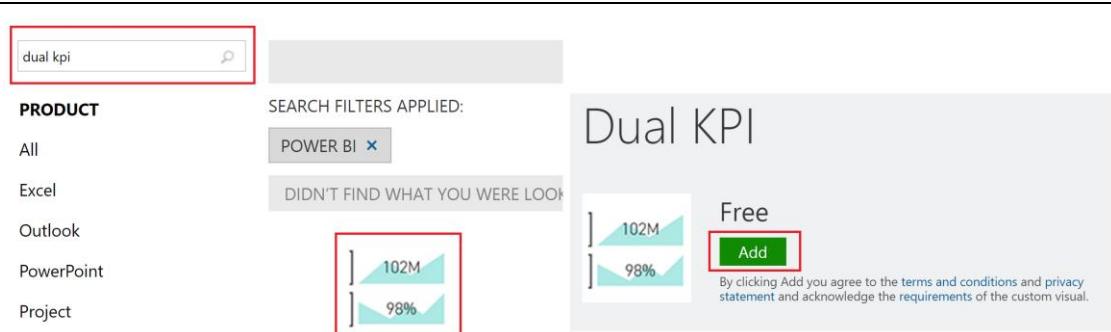
After publishing your content pack, you receive requests from key members of your team to organize and add additional content (tiles to the dashboard, new reports using the same data as well as additional data). In this section, you will learn how to update a content pack. In this example, you will add a custom visual, add a new QnA tile and re-organize the tiles to update the content pack.

By default, a set of standard visuals is available in Power BI desktop and service. But there is always a need for visuals that are outside the standard set. Power BI has created an open source community where users can contribute and consume custom visuals.

In your browser, navigate to [https://store.office.com/en-us/appshome.aspx?productgroup=Power BI](https://store.office.com/en-us/appshome.aspx?productgroup=Power%20BI) and browse the gallery to find custom visuals. This is an ever-growing community with new visuals added frequently.

For the purposes of this lab, download Dual KPI visual.

1. In the search box, type in **Dual KPI** and hit Enter.
2. Select the **visual**. You will be navigated to the next screen, that provides details about the visual.
3. Click **Add** to navigate to the download screen.
4. Click **Select to download Dual KPI** link to download the visual.
5. Save the downloaded file to **DIAD\Data** folder. File is named **DualKPI**.



Search the Office Store

Step 1: Download Dual KPI

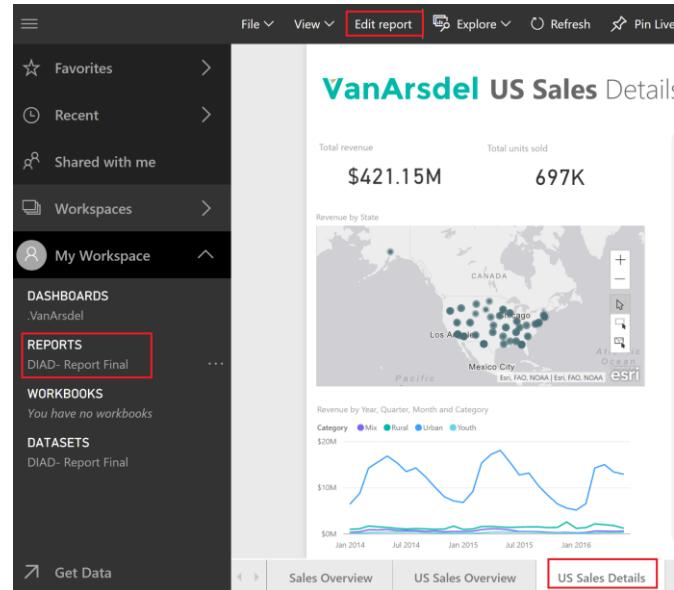
 [Select to download Dual KPI](#)

Step 2: Using your custom visual

Show ▾

Your organization has requested a KPI representation of Units and Revenue trend for VanArsdel.

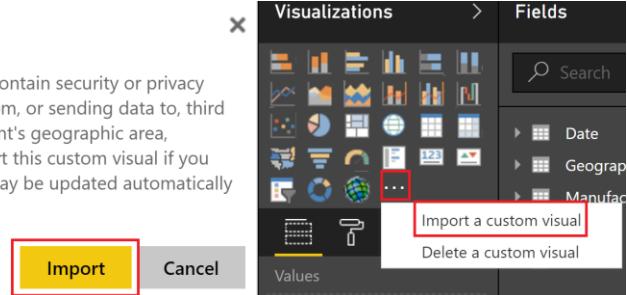
6. Navigate back to your Power BI service.
7. From the left menu select **REPORTS -> DIAD – Report Final**.
8. Navigate to **US Sales Details** report page.
9. Click on **Edit Report** on the top menu bar.



10. In the **Visualizations** section click on the **ellipsis** in the last row of the visualizations and select **Import a custom visual**.
11. A warning dialog opens. Click **Import**.

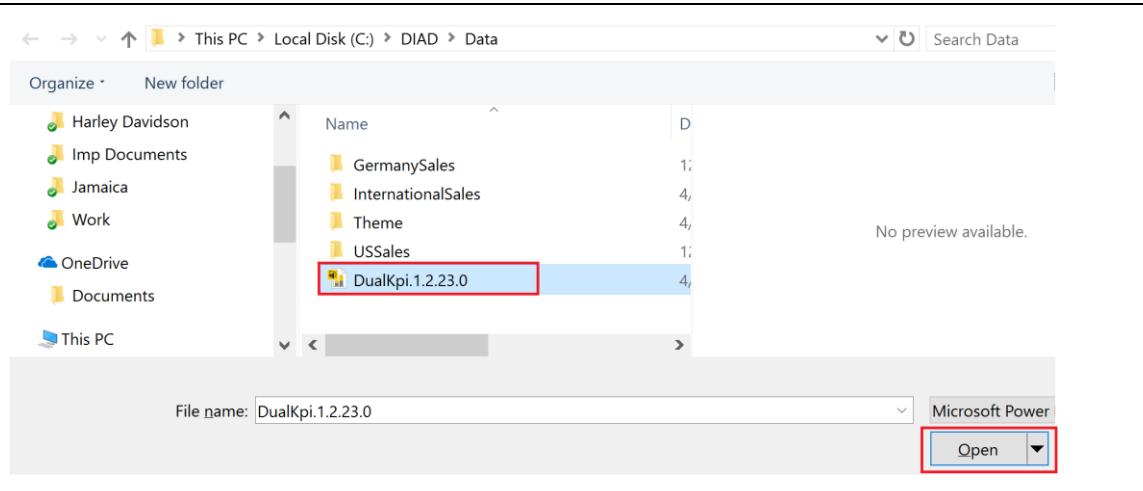
Caution: Import custom visual

Custom visuals may be provided by a third party and could contain security or privacy risks. By using custom visuals, you may be importing data from, or sending data to, third party or other services located outside of your Power BI tenant's geographic area, compliance boundary, or national cloud instance. Only import this custom visual if you trust its author and source. Once imported, custom visuals may be updated automatically without any additional notice.



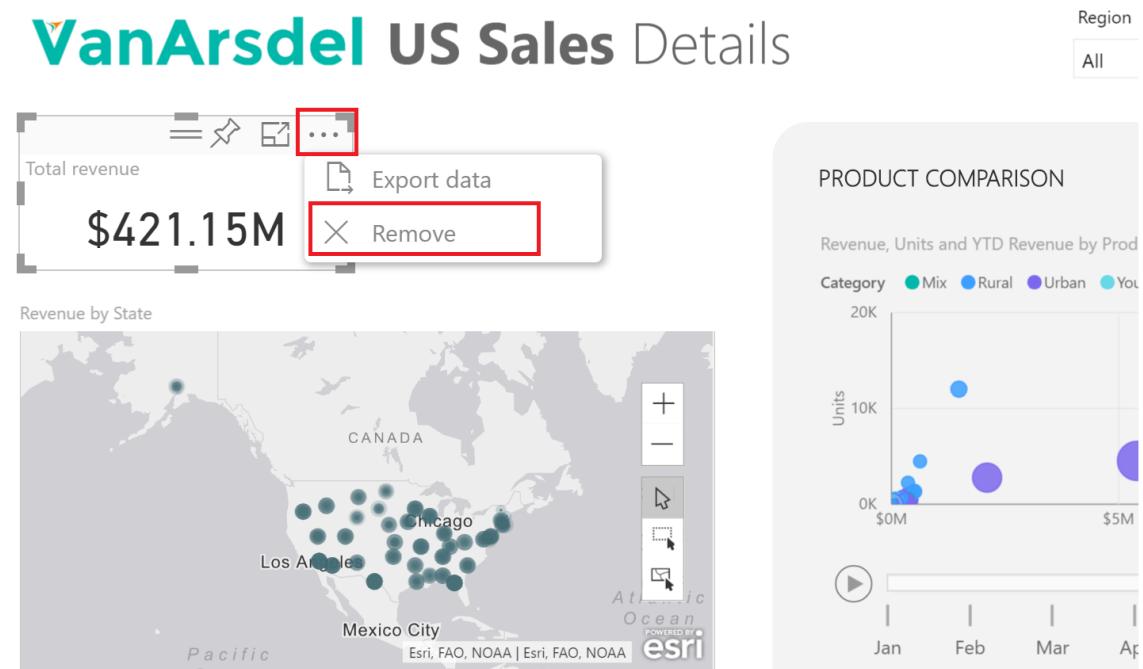
12. Browse window opens. Navigate to **DIAD\Data** and select **DualKPI** visual.
 13. Click **Open**.

A success message appears and notice a new visualization option is added.



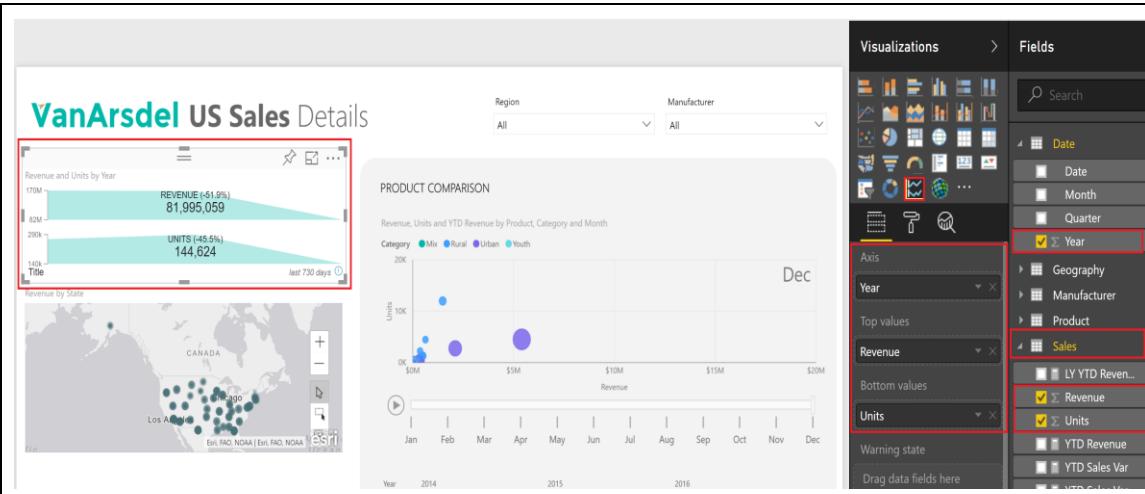
Let's delete the existing card KPI visuals before adding the new visuals.

14. Select **Total Revenue** card visual located under VanArsdel logo.
 15. Click on the **ellipsis** on the top right corner of the visual.
 16. Select **Remove** to delete the visual.
 17. Similarly, **delete Total units sold** card visual.



18. From the **Visualizations** section select the newly added **DualKPI** visual and move it to the space available in the top left corner
19. From the **Fields** section expand **Date** table and drag **Year** column to **Axis** section.
20. From the **Fields** section expand **Sales** table and drag **Revenue** column to **Top values** section.
21. From the **Fields** section expand **Sales** table and drag **Units** column to **Bottom values** section.

Notice that Revenue and Units sold is on a downward trend.

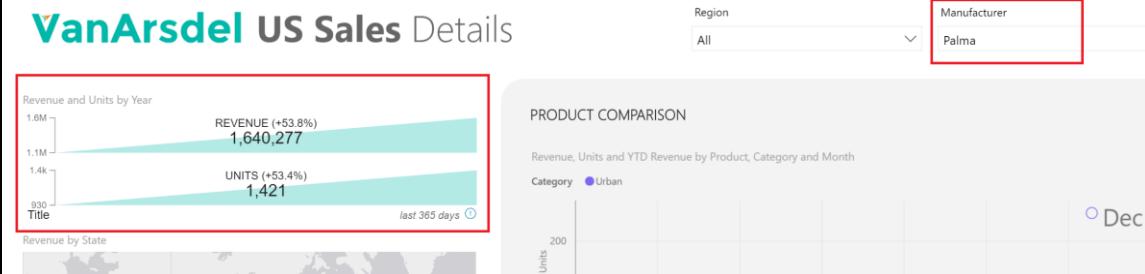


Let's check if the trend is similar across Manufacturers

22. From the **Manufacturer** slicer dropdown, select **Palma**.

Notice, the trend for Palma is the opposite direction.

23. Clear **Manufacturer** slicer.



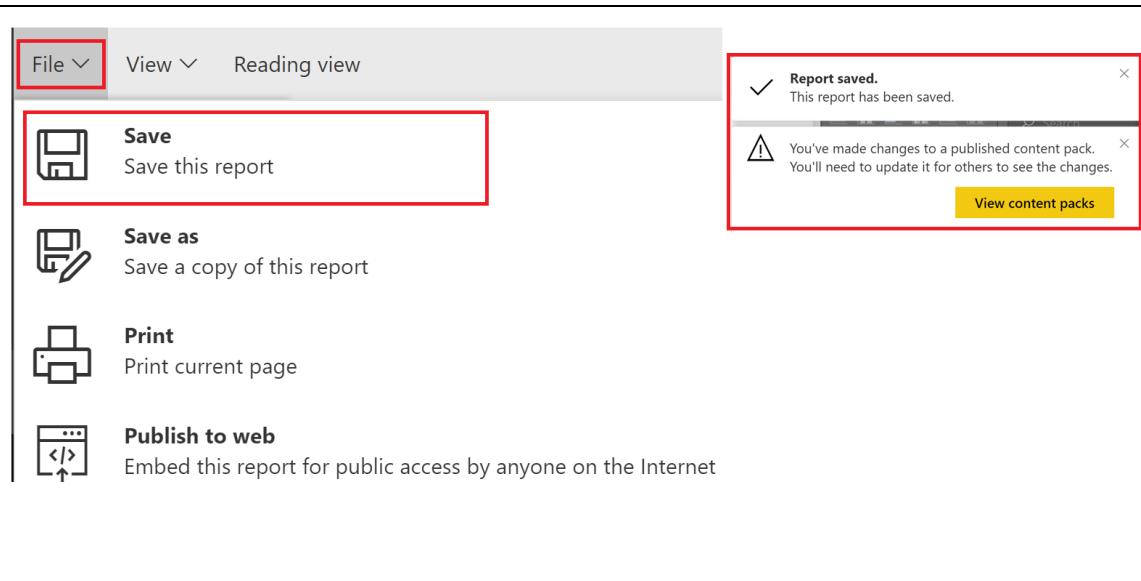
24. From the report menu, select **File -> Save**.

Notice you get a dialog confirming that the report was saved and a warning message stating that you need to update the content pack for your changes to be published. (We will do this soon).

Note: You can add custom visuals to Power BI Desktop as well.

You can add pin custom visuals to the dashboard.

Custom visuals behavior is like other visuals.



Your organization has requested you to add the **total units sold since 2010 for United States** as top level metric.

25. Navigate to .VanArsdel dashboard, by selecting **DASHBOARDS -> .VanArsdel** from the left menu.

26. Enter the text “**show Total units**” in the **QnA** text box. You will see a card value is returned by QnA.

27. Continue typing “**show Total units by Year**”. Notice now QnA automatically changes the visualization to a line chart.

28. Continue typing “**show Total units by Year since 2010 for VanArsdel in USA**”. Notice values in the line chart automatically updates as you type.



29. Continue typing “**show Total units by Year since 2010 for VanArsdel in USA as stacked bar chart**”. Notice now visualization is changed to a stacked column chart.

30. Click on the > icons next to **Visualizations** and **Fields** so that you can see the list of filters that have been applied in the filter pane.

In Visualization section, scroll down to Visual level filters and notice as you are typing visual level filters are added.

31. From Fields section, expand **Product** table and drag and drop **Segment** column to the **Legend** section of the column chart.

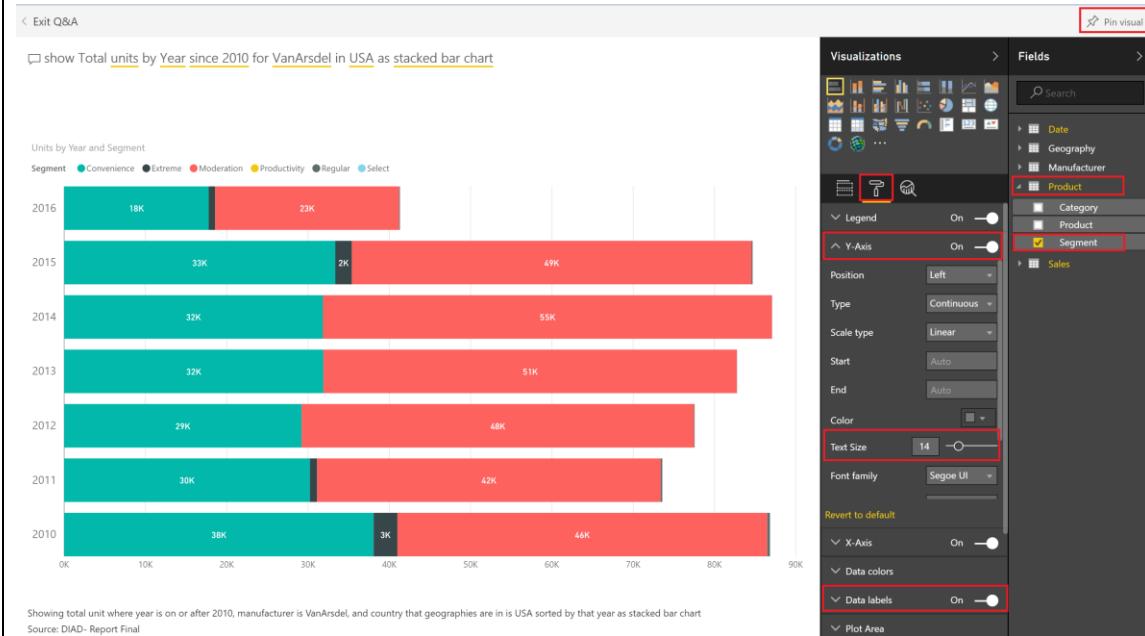
32. Click on the **formatting brush**.

33. Enable **Data Labels**.

34. **Increase Text Size to 14**. Notice this increases the size of the years on the Y-axis

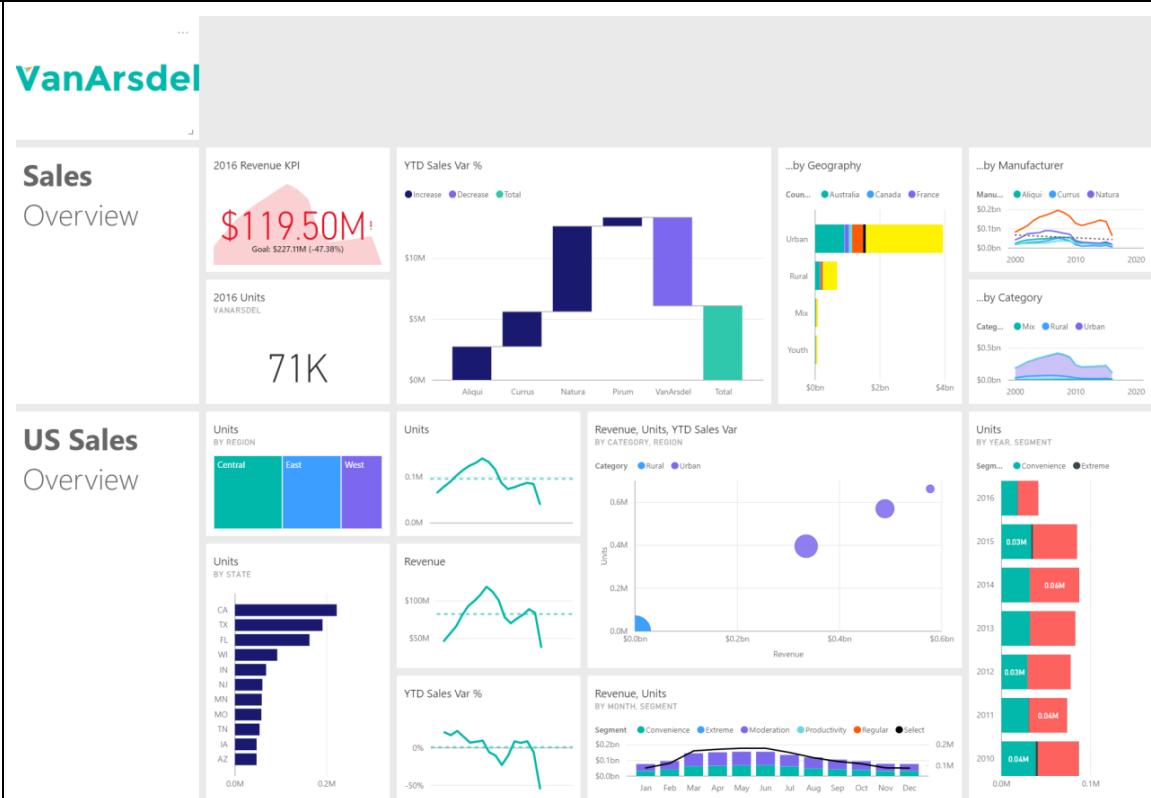
35. **Pin** the tile to your dashboard.

Again, you will notice warning about changes to the content pack is displayed.

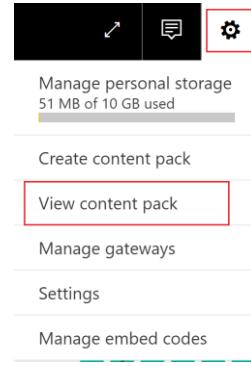


36. Navigate to **.VanArsdel** dashboard
 37. Re-organize your dashboard by moving tiles as shown in the Figure.

You will see a warning on the top right stating that the dashboard that was published as content pack has changed. You do need to republish for your end users to see the changes



38. Now that you have made all the changes, you do need to update the content pack. Click on the **Settings** and click on **View Content Pack**.



In the View Content Packs page, you get to see all the content packs you have published, to whom you have published as well as date it was published.

Notice there is a warning icon next to VanArsdel Sales Report content pack.

Hover over the warning icon and warning details is displayed.

39. You can edit or delete content pack to make changes. Click **Edit**.

Name	Published To	Date published	Actions
VanArsdel Sales Report 	Lab User1; Lab User2	Apr 27, 2017	Edit Delete

40. Make any changes to description to inform your users about the changes and click **Update** to republish your content pack. A dialog is displayed confirming the update.

If your end-users did not personalize the content pack, they see the changes to the dashboard. No user action required.

If end-users have personalized the content pack, they will see a warning that a new version of the content pack has been published. They can choose to get the updated content pack.

Delivering the dashboards as content pack helps you in formatting the right content on the dashboard before your end-users can see the changes.

The users will not see new data at random times. You can establish a rhythm in your organization that changes will get published on a regular cadence that the users can expect. In addition, you can also manage this efficiently for large user group via security group.

Using the content pack, you will achieve the first three business requirements in the beginning of this section.

Choose who will have access to this content pack:

Specific groups My entire organization

Lab User1 Lab User2 Enter email addresses

Title
VanArsdel Sales Report

Description
This report contains VanArsdel revenue and unit shares over the years along with competitor information.


[Upload](#) an image or company logo
Image size: 45 KB or less, 4:3 aspect ratio, JPG or PNG format
[Use default](#)

Select items to publish

Dashboards	Reports	Datasets
<input checked="" type="checkbox"/> .VanArsdel	<input type="checkbox"/> DIAD- Report Final	<input type="checkbox"/> DIAD- Report Final

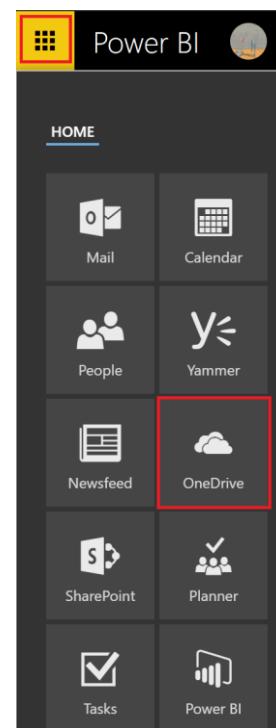
The content pack will be available in your organization's content gallery. [Learn more](#)

Make this a content pack template. This only applies to Power BI Desktop (.pbix) with imported data. [Learn more](#)

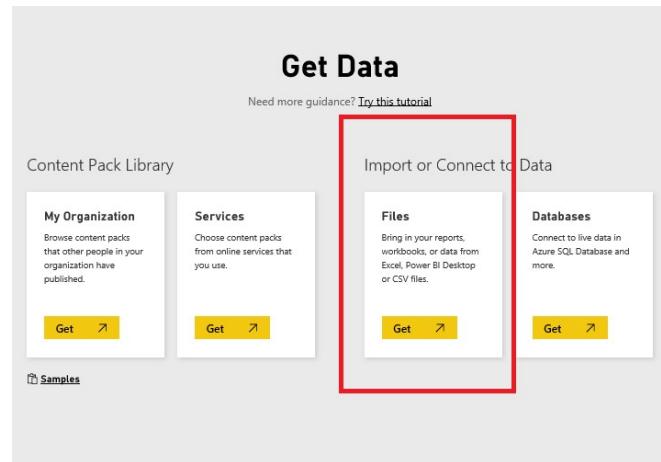
View and manage your Excel reports in Power BI

The next business problem is to share information to your end-users on how they can bring in their Excel content and setup data refresh. In this section you will learn how to bring your Excel content and setup refresh so that you can guide your end-users who want to view all their content from Power BI.

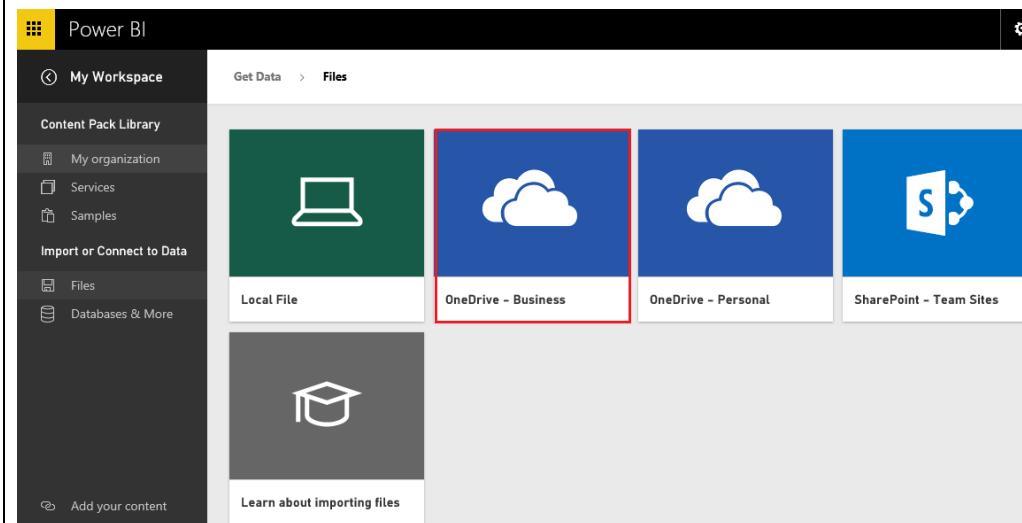
1. Click on the top left corner and select OneDrive.
2. Go to the documents and upload **VanArsdelExcelReport.xlsx** located in **/DIAD/Reports** folder.



4. Login to <http://app.powerbi.com> (or URL provided by the instructor) using your organizational credential and click on **Get Data**.
5. Click on **Get** under **Files** as shown in the figure.



6. In the **Get Data Files** page click on **OneDrive – Business** as shown in the figure.



7. Select the **VanArsdelExcelReport.xlsx** you uploaded to your Onedrive for Business and click **Connect** as shown in the figure.

The screenshot shows the 'Get Data' interface in Microsoft Power BI. The path is 'Get Data > Files > OneDrive - Business'. The main area displays 'OneDrive for Business' files under 'Microsoft > DIAD'. A file named 'VanArsdelExcelReport.xlsx' is listed, with its 'Name', 'Modified date' (4 minutes ago), and 'Size' (1.28MB) visible. A red box highlights the 'Connect' button in the top right corner of the interface, and another red box highlights the file name 'VanArsdelExcelReport.xlsx' in the list.

8. In the OneDrive for Business page you have two options:
- Import Excel data into Power BI.
 - Connect, Manage and View Excel reports in Power BI.
9. Select option (b) (**Connect**) as highlighted in the figure.

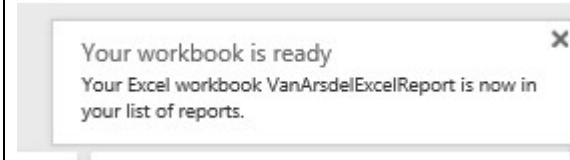
The screenshot shows the 'OneDrive for Business' connection options. It offers two choices: 'Import Excel data into Power BI' and 'Connect, Manage and View Excel in Power BI'. The 'Connect' button is highlighted with a red box. Below each choice is a brief description and a yellow 'Import' or 'Connect' button.

Import Excel data into Power BI
Connect to the data in your workbook on OneDrive so you can create Power BI reports and dashboards for it. Data is automatically refreshed from OneDrive.
Import

or

Connect, Manage and View Excel in Power BI
Bring your Excel workbook into Power BI and see it exactly as it is in Excel Online - charts, PivotTables, worksheets, and all. Then keep your workbooks up to date with scheduled refresh.
Connect

Once the Excel workbook has been successfully connected to Power BI you will see the information shown in the figure on top right corner of your browser.



10. From the top menu, select **Workbooks** and notice the uploaded file.

11. Click on the report name to view it.
Notice the report opens in your browser.
12. **Highlight** the Excel cells with data and click on the Pin on the top right corner.
13. **Pin** the Excel report to .VanArsdel dashboard.

Navigate to the other sheets of the excel work book and filter the pivot table to analyze data.

	January	February	MARCH	APRIL	MAY	JUNE	Total YTD Total Units
	YTD Total Units	YTD Total					
ALQUI	700	1543	3077	4900	7068	8299	8299
CURRUS	218	437	1177	1844	2364	2858	2858
NATURA	1095	2177	4016	5734	7269	8851	8851
PRIUM	840	1640	3577	5087	6362	8102	8102
VANARSDEL	1237	2596	5109	7745	10082	12348	12348
Grand Total	4090	8393	16956	25310	33145	40458	40458
VANARSDEL Share	0.327148896	0.342011	0.33426	0.339219	0.335262	0.330828	0.334982219

14. Navigate back to **.VanArsdel dashboard** and notice the Excel report is part of the dashboard.
15. **Resize** and reposition the tiles as needed.

	January YTD Total Units	February YTD Total Units	MARCH YTD Total Units	APRIL YTD Total Units	MAY YTD Total Units	JUNE YTD Total Units	Total YTD Total Units
ALIQUI	700	1543	3077	4900	7068	8299	8299
CURRUS	218	437	1177	1844	2364	2858	2858
NATURA	1095	2177	4016	5734	7269	8851	8851
PIRUM	850	1656	3109	4745	6362	8071	8071
VANARSDEL	1337	2596	5109	7745	10291	12348	12348
Grand Total	4090	8393	16956	25310	33145	40458	40458
VanArsdel Share	0.33714096%	0.34101067%	0.33126075%	0.31931861%	0.33226352%	0.33932077%	0.34932215%

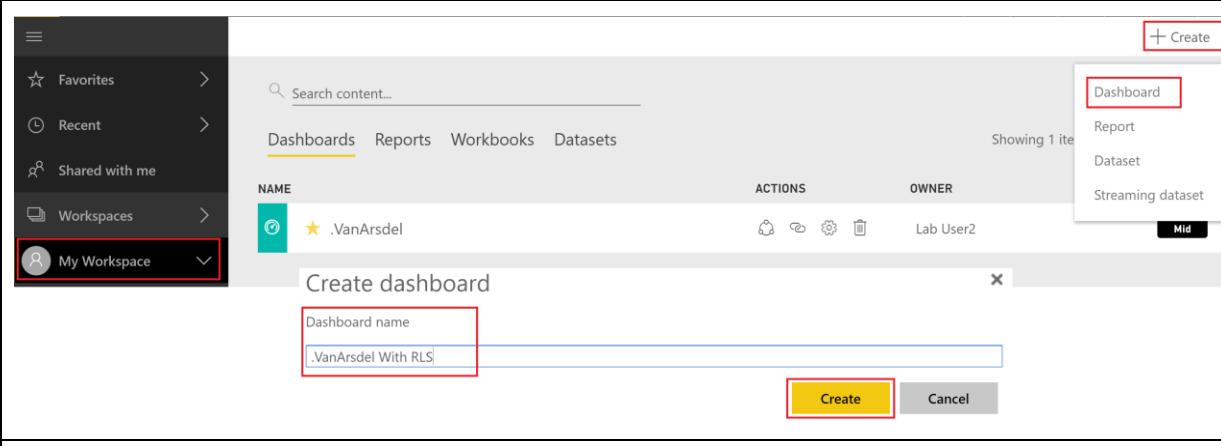
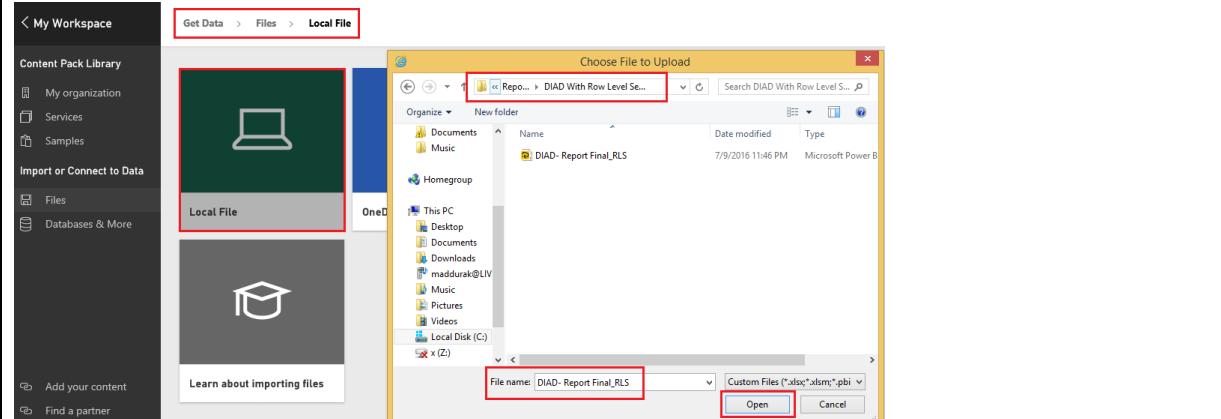
16. To schedule a refresh for your Excel workbook click on the **ellipsis ...** next to your Excel report and click **Schedule Refresh**.

Setting up the schedule is like before.

You have learned how to view and manage your Excel reports within Power BI. You can now communicate to your power users of Excel to leverage this functionality for your workbooks. This helps address the fourth business problem we reviewed earlier.

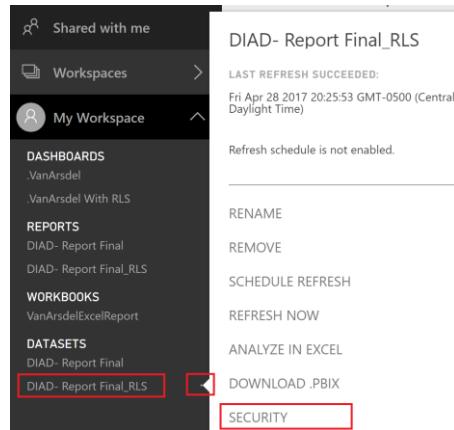
Row-Level Security

Row-level security with Power BI can be used to restrict data access for given users. Remember we have created various roles in the Power BI Desktop model. Using Power BI Service, we will add users to these roles. For dashboards with row-level security enabled, QnA and Quick Insights is not enabled. Since we are using both QnA and Quick Insights feature in the .VanArsdel dashboard we created, let's create a new dashboard and publish a different Power BI Desktop file which has row-level security created.

<ol style="list-style-type: none">1. Click on My Workspace in the left panel.2. On the top right corner select Create -> Dashboard.3. Create dashboard dialog opens. Enter .VanArsdel With RLS as the Dashboard name.4. Click Create.	 <p>The screenshot shows the Power BI Service interface. On the left, there is a sidebar with options like Favorites, Recent, Shared with me, Workspaces, and My Workspace (which is highlighted with a red box). In the center, there is a search bar and a navigation bar with tabs: Dashboards, Reports, Workbooks, and Datasets. Below the navigation bar, a table lists a single item: ".VanArsdel" by Lab User2. To the right of the table, a context menu is open with options: Dashboard (highlighted with a red box), Report, Dataset, and Streaming dataset. At the bottom, there is a "Create" button (highlighted with a yellow box) and a "Cancel" button.</p>
<ol style="list-style-type: none">5. Select Get Data from the bottom left corner of the screen.6. Select Files in Get Data page.7. Select Local File in the next page.8. Browse to \DIAD\Reports\DIAD With Row Level Security and select DIAD- Report Final_RLS.pbix file.9. Select Open.	 <p>The screenshot shows the Power BI desktop interface. On the left, there is a sidebar with Content Pack Library, Import or Connect to Data, and Local File (highlighted with a red box). In the center, there is a "Get Data" ribbon tab with sub-options: Files (highlighted with a red box) and Local File. Below the ribbon, there are two large icons: "Local File" (highlighted with a red box) and "OneDrive". At the bottom, there is a "Learn about importing files" link. On the right, a "Choose File to Upload" dialog box is open. It shows a file tree with "This PC" and "Local Disk (C:)". A file named "DIAD- Report Final_RLS.pbix" is selected. The "File name" field shows "DIAD- Report Final_RLS" and the "Open" button is highlighted with a red box.</p>

Once the data is imported, a notification appears on the top right corner.

10. In the left panel, **hover over DIAD- Report Final_RLS** under **DATASETS** section. Click on the **ellipsis**.
11. Click on **SECURITY**. Row-Level Security page is displayed. You can create and configure roles.



12. Click on each role, and enter members **email address**.
13. Click on **Add** to add users.

Row-Level Security

Mexico Role (0)

US Role (0)

Australia Role (0)

France Role (0)

Japan Role (0)

Germany Role (0)

Canada Role (0)

Members (0)

People or groups who belong to this role

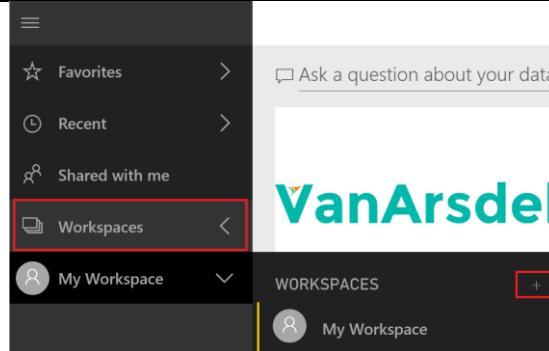
Add

Collaboration via Office 365 Groups

In order to address the last business problem of leveraging your co-workers preparing reports and collaboratively creating content for your organization you can leverage the group functionality in Power BI. In this section you will learn how to create groups and create content. You will learn this section more efficiently if you can pair up with a co-worker from your organization.

Power BI Service - Creating a Group

1. Log into your <http://app.powerbi.com> or the URL provided by your instructor using your organizational credential.
2. Expand the left panel.
3. Select **Workspaces**. If you are part of other groups those groups will be displayed here.
4. Select “+” next to WORKSPACES.



Notice Create a Group panel opens on the right side of the screen.

5. Enter a **name** for your group.
6. Select if you want the group to be private or public. We recommend using **private**.
7. Select if you want the members of the group to can edit content.
8. Enter the email addresses of users of your organization who need to be part of this group as shown in the figure.
9. Click **Add** to add the members.
10. Save button is enabled at the top of the screen. Click on **Save**.

You will now have a group created.

A screenshot of the 'Create a group' dialog box. It includes fields for 'Name your group' (containing 'DIAD'), 'Group ID' (containing 'dia'), and dropdowns for 'Available' (set to 'Private - Only approved members can see what's inside') and 'Members can edit Power BI content'. A 'Add group members' section with an 'Enter email addresses' field and a yellow 'Add' button is also shown. At the bottom, a yellow 'Save' button is highlighted with a red box, and a 'Cancel' button is to its right.

Notice that you are navigated to the new group workspace you just created. In this example, we created a group called DIAD. In DIAD workspace, you have separate set of Dashboards, Reports and Datasets that are part of the group. You and your co-workers can bring content into the group, create dashboards together and package the set of dashboards, reports and datasets and share them as content pack.

The screenshot shows the Microsoft Power BI desktop application. On the left, there is a sidebar with navigation links: Favorites, Recent, Shared with me, Workspaces, and a selected item labeled 'DIAD' which is highlighted with a red box. Below this, there are sections for Dashboards, Reports, Workbooks, and Datasets, each stating 'You have no [category]'. At the top right, there is a search bar labeled 'Search content...' and tabs for Dashboards, Reports, Workbooks, and Datasets, with 'Dashboards' being the active tab. A large area below the sidebar is labeled 'NAME'.

When you create a group, there is a separate OneDrive account created for the group. You can have all your assets of Excel and Power BI Desktop files stored in the group's OneDrive.

You can get to the groups OneDrive account by clicking on the ellipsis next to the group name and selecting Files or logging into Office 365 and selecting the appropriate group.

Please wait for automated email about creation of groups to see all the functionality about groups.

The screenshot shows the Microsoft OneDrive interface. On the left, there is a sidebar with Favorites, Recent, Shared with me, and a 'Workspaces' button which is highlighted with a red box. Below this, there is a list of workspaces: 'DIAD' (highlighted with a green circle), 'My Workspace' (highlighted with a green circle), and 'DIAD' again (highlighted with a green circle). To the right of the workspaces, there is a vertical menu with options: 'Files' (highlighted with a red box), Members, Calendar, Conversations, Edit group, and Leave group.

References

Dashboard in a Day provides an introduction to some of the key functionalities available in Power BI. Here are a few references that will help you with your next steps with Power BI.

Getting started: <http://powerbi.com>

Power BI Desktop: <https://powerbi.microsoft.com/desktop>

Power BI Mobile: <https://powerbi.microsoft.com/en-us/mobile>

Community site <https://community.powerbi.com/>

Power BI Getting started support page: <https://support.powerbi.com/knowledgebase/articles/430814-get-started-with-power-bi>

Support site <https://support.powerbi.com/>

Feature requests <https://support.powerbi.com/forums/265200-power-bi>

Power BI course <https://www.edx.org/course/analyzing-visualizing-data-power-bi-microsoft-dat207x-0>

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