



Power BI

Dashboard in a Day

by Power BI Team, Microsoft



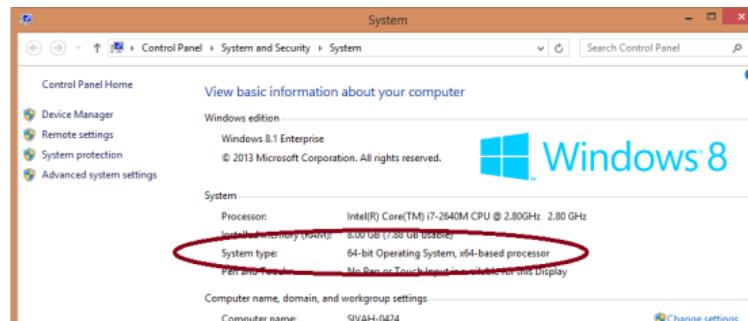
Contents

Overview	5
Introduction	5
Data Set.....	5
Course Outline	5
Power BI Desktop	6
Power BI Desktop - Importing Data	6
Power BI Desktop - Transforming your Data	16
Power BI Desktop - Interactive Data Exploration	29
Power BI Desktop - Report Authoring	58
Power BI Service – Part I.....	90
Power BI Service - Creating Dashboard and uploading your Report.....	90
Power BI Service - Operational Dashboard and Sharing	94
Power BI Service - Refreshing data on the Dashboard.....	115
Power BI Service -- Part II	128
Power BI Service - Distributing content to larger audiences for them to customize	128
Power BI Service - View and manage your Excel reports in Power BI.....	141
Power BI Service - Row-Level Security.....	146
Power BI Service - Collaboration via Office 365 Groups.....	148
References	151

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

Power BI Desktop - Importing Data

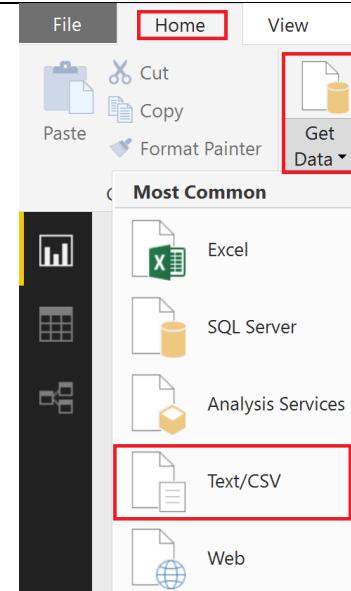
In this section, you will be importing sales data of VanArsdel and competing companies within United States. In addition, you also will be merging sales data from other countries.

Power BI Desktop - Load Data

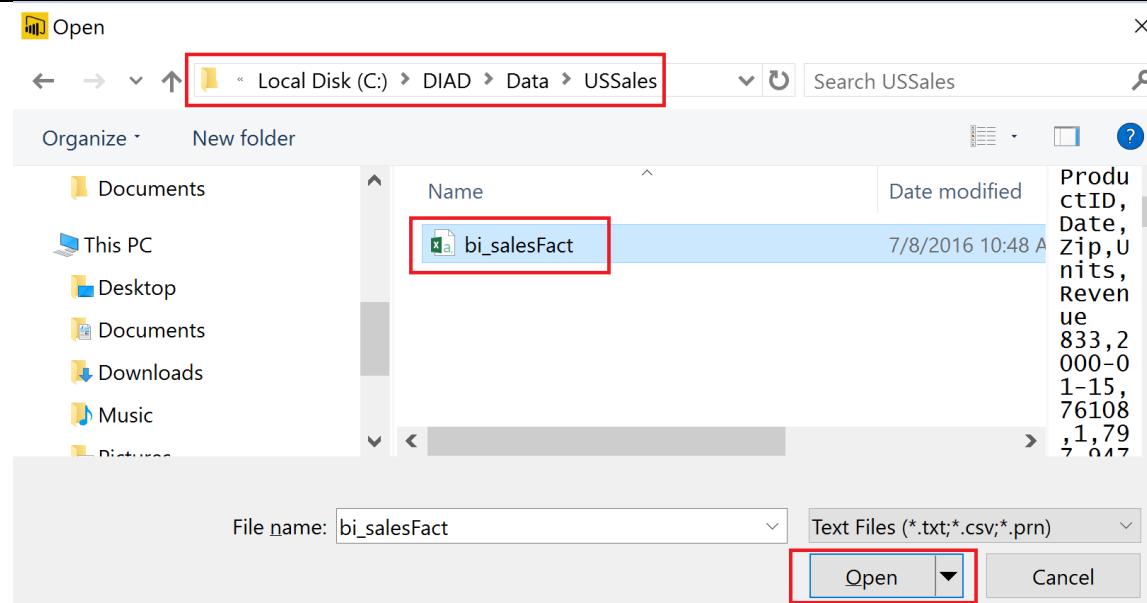
<p>Steps</p> <ol style="list-style-type: none">1. If you don't have the Power BI Desktop open, launch it now.2. Startup screen opens. Click on Sign In and sign in using your Power BI credentials. Signing in to Power BI Desktop helps later when you are publishing to Power BI Service.	
<p>Let's set up the locale to US English, to make it convenient to go through the rest of this lab.</p> <ol style="list-style-type: none">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.

bi_salesFact.csv

The screenshot shows the Power BI Desktop interface. At the top, there is a 'File Origin' dropdown set to '1252: Western European (Windows)', a 'Delimiter' dropdown set to 'Comma', and a 'Data Type Detection' dropdown set to 'Based on first 200 rows'. Below this is a preview of the 'bi_salesFact.csv' data, showing several rows of sales data with columns: ProductID, Date, Zip, Units, and Revenue. The 'Edit' button in the top right corner is highlighted with a red box. Below the preview, there is a 'Skip files with errors' checkbox and three buttons: 'Load', 'Edit' (highlighted), and 'Cancel'. The main area shows the 'Untitled - Query Editor' window. The ribbon tabs include File, Home, Transform, Add Column, View, and various data manipulation tools like Close & Apply, New, Recent, Data, Data Source Settings, Manage, Refresh, Advanced Editor, Properties, Choose Columns, Remove Rows, Keep Rows, Remove Columns, Sort, Split Column, Group By, and Replace Values. The 'Transform' tab is selected. On the left, the 'Queries [1]' pane shows 'bi_salesFact'. In the center, the query editor displays the same sales data as the preview, with column headers: ProductID, Date, Zip, Units, and Revenue. The 'Revenue' column has a data type indicator '12' next to it. On the right, there are two panes: 'Query Setting' and 'APPLIED STEP'. The 'Query Setting' pane shows 'Name: bi_salesFact' and 'All Properties'. The 'APPLIED STEP' pane shows 'Source: Promoted'.

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**.

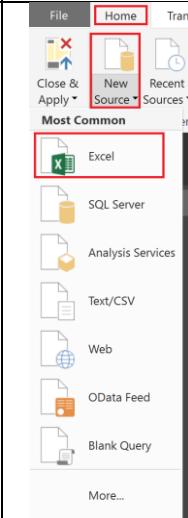
12. **Change Column Type** dialog opens. Select **Replace Current** button.

The screenshot shows the Power BI interface with the 'Transform' ribbon tab selected. In the 'Manage Columns' section, a tooltip box with red borders contains the text: 'IMPORTANT! Changing the data type is a big deal to use later'. The 'Data Type' dropdown menu is open, showing options like Whole Number, Decimal Number, Fixed Decimal Number, Percentage, Date/Time, Date, Time, Date/Time/Timezone, Duration, Text, True/False, and Binary. The 'Whole Number' option is currently selected.

ProductID	Date	Zip
833	1/15/2000	761
837	1/15/2000	334
837	1/15/2000	762
838	1/15/2000	295
838	1/15/2000	333
838	1/15/2000	333
838	1/15/2000	74132
838	1/15/2000	75080

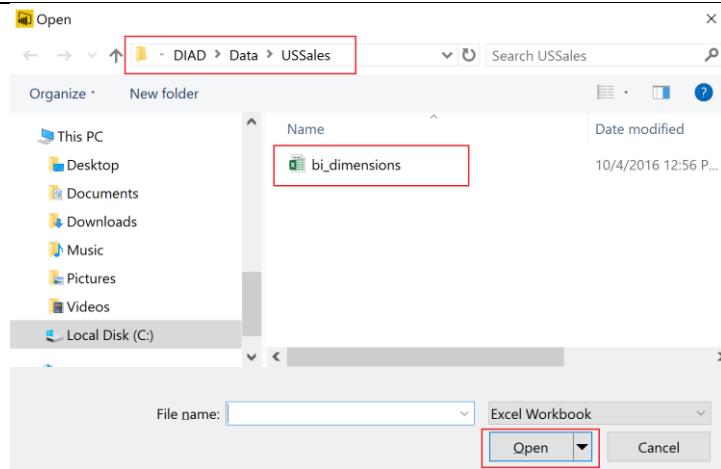
Now let's get the data that is in excel source file.

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.

A screenshot of the Navigator dialog. On the left, under 'Display Options', there is a tree view with 'bi_dimensions.xlsx [8]' expanded. Under it, 'bi_date', 'bi_geo', 'bi_manufacturer', and 'bi_product' are checked and highlighted with a red box. Below them are 'date', 'geo', 'manufacturer', and 'product' which are not checked. To the right, the 'bi_product' table is previewed with 15 rows of data. The columns are ProductID, Product, Category, Segment, and ManufacturerID. The data shows various products like Abbas MA-01 to Abbas MA-15. At the bottom right of the dialog are 'OK' and 'Cancel' buttons, with 'OK' highlighted by a red box.

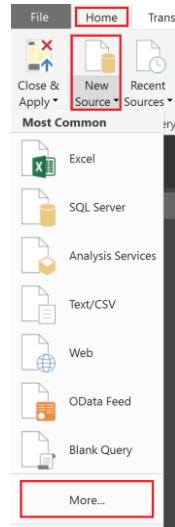
Power BI Desktop - Adding additional data

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.

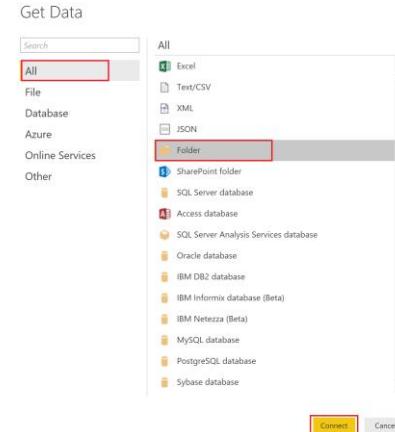
17. Click on the **New Source** drop down in the Home menu tab of the Query Editor.
18. Select **More...** as shown in the figure.

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

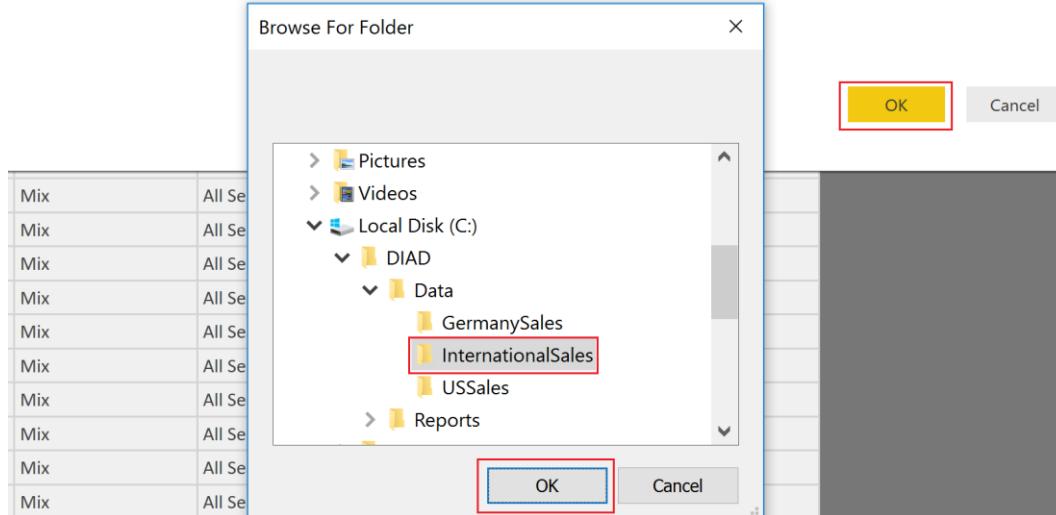
Choose a folder.

Folder Path
C:\DIAD\Data\InternationalSales

Browse...

OK

Cancel



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

Combine Files 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**.

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.

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

Source.Name	ProductID	Date	Zip
AU Sales.csv	2331	2/14/2002	3042
AU Sales.csv	733	7/10/2004	1022
AU Sales.csv	753	7/10/2004	838
AU Sales.csv	964	7/10/2004	1158
AU Sales.csv	400	7/10/2004	854
AU Sales.csv	499	7/10/2004	854
AU Sales.csv	683	2/8/2002	9009
AU Sales.csv	714	2/8/2002	1117
AU Sales.csv	1105	2/8/2002	7907
AU Sales.csv	1451	2/8/2002	1206
AU Sales.csv	1990	2/8/2002	1730
AU Sales.csv	2056	2/8/2002	1741
AU Sales.csv	2400	2/8/2002	1120
AU Sales.csv	396	2/8/2002	1710
AU Sales.csv	445	2/8/2002	1233

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**.

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 at the top with 'File', 'Home' (highlighted with a red box), 'Transform', 'Add Column', and 'View'. Under 'Home', there are buttons for 'Close & Apply', 'New', 'Recent', 'Enter Data', 'Data source settings', 'Manage Parameters', 'Refresh Preview', 'Properties', 'Advanced Editor', 'Manage', 'Query', and 'Remove Columns'. A red box highlights the 'Remove Columns' button. Below the ribbon is a 'Queries [10]' pane showing a hierarchy of queries: 'Transform File from InternationalSales [3]', 'Sample Query [2]', and 'Other Queries [6]'. Under 'Other Queries', 'InternationalSales' is highlighted with a red box. To the right is a table preview with columns: 'Source.Name', 'ProductID', 'Date'. The 'Source.Name' column is also highlighted with a red box. The table data shows 15 rows of sales data from AU Sales.csv.

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 in the 'Queries [10]' pane. In the table preview, the 'Country' column has a dropdown arrow icon. A red box highlights this icon. A context menu is open, showing filter options: '(Select All)' and 'Australia'. At the bottom right of the menu, there is a 'Load more' button, which is also highlighted with a red box. The table preview shows 17 rows of sales data.

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. 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 for sorting (Sort Ascending, Sort Descending), clearing filters, and removing empty rows. A filter dialog is open, listing countries: Australia, Canada, France, Japan, and Mexico, each with a checked checkbox. The 'OK' button at the bottom of the dialog is also 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				

Power BI Desktop - 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.

- If formula bar is disabled, 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' being the selected query, indicated by a red box. On the right, the main workspace displays a table 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 blank ('null') in all columns. A red box highlights the 'Fill' button in the 'Transform' ribbon, which is used to fill these null values. Below the ribbon, the 'Column' section of the Transform tab is visible, with 'Down' highlighted in a red box. The bottom part of the screenshot shows the same table after the 'Fill Down' operation has been performed, where every row now contains the same data as the first row (1999, Q1, 1, Jan, 199901, 1/1/1999), with no more null values.

	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 'Queries [10]' pane on the left and a main table view on the right. In the bottom instance, the 'Applied Steps' pane on the right lists 'Promoted Headers' as the last step added.

Queries [10]

= Table.TransformColumnTypes(bi_manufacturer_Table,{{"Column1", type

ABC Column1	ABC Column2	ABC Column3	ABC Column4	ABC Column5
1	ManufacturerID	1	2	3
2	Manufacturer	Abbas	Aliqui	Barba
				Currus

File Home Transform Add Column View

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Refresh Preview Advanced Editor Properties Parameters Manage 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]

= Table.PromoteHeaders(#"Transposed Table",

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

File Home Transform Add Column View

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Refresh Preview Advanced Editor Properties Parameters Manage 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]

= Table.PromoteHeaders(#"Transposed Table",

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

File Home Transform Add Column View

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Refresh Preview Advanced Editor Properties Parameters Manage 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

Properties

Name: Manufacturer

All Properties

Applied Steps

Source: Transposed Table

Navigation: Changed Type

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 three main windows illustrating the process:

- Top Window:** The Power BI ribbon with the "Home" tab selected. The "Transform" tab is also visible. The "Split Column" icon is highlighted with a red box. The formula bar shows a query transformation: `= Table.TransformColumnTypes(bi_product_Table,{{"ProductID", Int64.Type}, {"Product", type text}, {"Category", type text}})`. The "Product" column is selected.
- Middle Window:** A "Split Column by Delimiter" dialog box. It has a red box around the "Select or enter delimiter" dropdown, which contains "--Custom--". Below it, under "Split at", there are three radio buttons: "the left-most delimiter" (unchecked), "the right-most delimiter" (unchecked), and "each occurrence of the delimiter" (checked). There is also an "Advanced options" link and a yellow "OK" button.
- Bottom Window:** The Power BI ribbon again, with the "Transform" tab selected. The "Remove Columns" icon is highlighted with a red box. The formula bar shows a query transformation: `= Table.RemoveColumns(#"Changed Type1",{"Product.2"})`. The "Product.1" column is selected.

The data grid in the bottom window shows the transformed data, where the "Product.1" column contains values like "Abbas MA".

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. A context menu is open over a table, specifically targeting the 'Revenue' column. The 'Data Type' option in this menu is highlighted with a red box. The menu also lists other data type options: Decimal Number, Whole Number, Percentage, Date/Time, Date, Time, Duration, Text, True/False, and Binary. Below the menu, a table titled 'Sales' is displayed with 9 rows of data. The columns are labeled ProductID, Date, Zip, Units, and Revenue. The 'Revenue' column contains numerical values like 341.145, 291.3225, etc. The entire table area is highlighted with a red box.

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

The screenshot shows the Power BI Data Editor interface. On the left, the 'Queries [10]' pane is open, showing a tree structure with 'Sales' and 'Date' selected under 'Other Queries [6]'. On the right, a preview grid displays columns for Year, Quarter, MonthNo, MonthName, MonthID, and Date. The 'Date' column is highlighted with a red box. A callout box with the text 'IMPORTANT! Changing the data type is a big deal to use later' points to the 'Date' column. The top ribbon has 'Home' selected, and the 'Data Type' dropdown is also highlighted with a red box.

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

The screenshot shows the Power BI Data Editor interface. On the left, the 'Queries [10]' pane is open, showing a tree structure with 'International Sales' selected under 'Other Queries [6]'. On the right, a preview grid displays columns for ProductID, Date, Zip, Units, and Revenue. The 'Revenue' column is highlighted with a red box. A dropdown menu for 'Data Type' is open, showing options like 'Fixed decimal number', 'Decimal Number', and 'Whole Number'. The top ribbon has 'Home' selected, and the 'Data Type' dropdown is also highlighted with a red box.

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.

Queries [10]

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

= Table.TransformColumnTypes(#"Removed Columns", {"Revenue", Currency.Type})

	ProductID	Date	Zip	Units	Revenue	Country
1	2331	2/14/2002	3042	1	540.6975	Australia
2	733	7/10/2004	1022	1	330.6975	Australia
3	753	7/10/2004	838	1	246.6975	Australia
4	964	7/10/2004	1158	1	320.1975	Australia
5	400	7/10/2004	854	1	772.2775	Australia
6	499	7/10/2004	854	1	911.6625	Australia
7	683	2/8/2002	9009	1	839.7375	Australia
8	714	2/8/2002	1117	1	162.6975	Australia
9	1105	2/8/2002	7907	1	246.6975	Australia
10	1451	2/8/2002	1206	1	367.395	Australia
11	1990	2/8/2002	1730	1	262.4475	Australia
12	2056	2/8/2002	1741	1	325.4475	Australia
13	2400	2/8/2002	1120	1	89.1975	Australia
14	396	2/8/2002	1710	1	892.2375	Australia

Query Settings

Properties

All Properties

Applied Steps

- Source
- Invoke Custom Function1
- Renamed Columns1
- Removed Other Columns1
- Expanded Table Column1
- Changed Type
- Removed Columns
- Changed Type1

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.

Queries [10]

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

= Table.TransformColumnTypes(#"Promoted Headers", {"ProductID", Int64.Type})

	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

Query Settings

Properties

All Properties

Applied Steps

- Source
- Promoted Headers
- Changed Type

Append dialog opens. There is an 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**.

Append

Two tables Three or more tables

Table to append

International Sales

OK Cancel

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
CountryName

If	Column Name	Operator	Value	Output
	Country	equals	null	USA

Otherwise

Column	Select a column
Country	

OK Cancel

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.

The screenshot shows the Power BI Data View interface. On the left, the 'Queries [10]' pane is open, with 'Sales' selected. In the main area, a table displays 18 rows of sales data. A dropdown menu is open over the 'Country' column header, showing a list of countries: (Select All), Australia, Canada, France, Japan, Mexico, and USA. The 'OK' button at the bottom of the dropdown is highlighted with a red box.

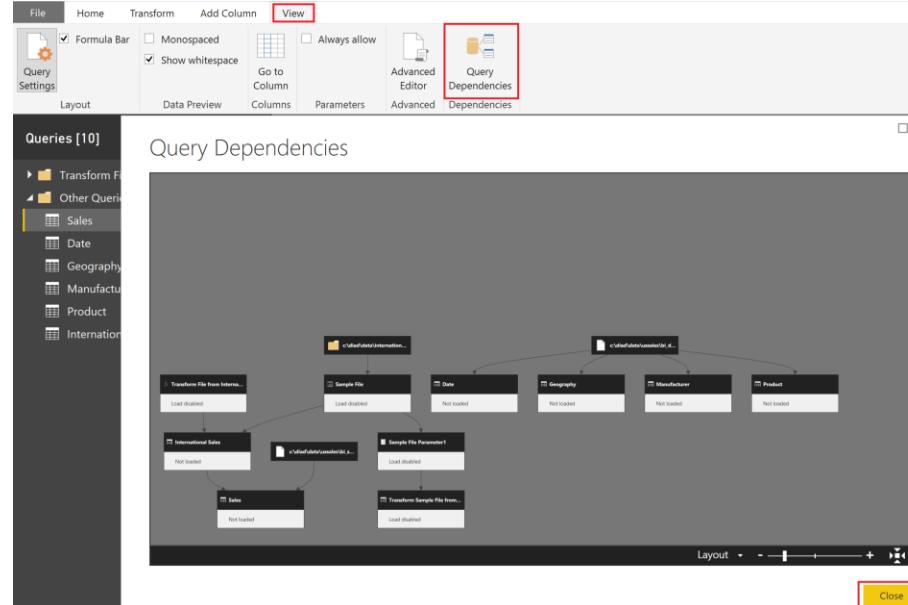
ProductID	Date	Zip	Units	Revenue	Country
740	2/15/2000	8412			
747	2/15/2000	8410			
748	2/15/2000	8409			
753	2/15/2000	4742			
753	2/15/2000	9500			
753	2/15/2000	9533			
754	2/15/2000	7050			
754	2/15/2000	9726			
757	2/15/2000	8535			
758	2/15/2000	3680			
758	2/15/2000	5964			
767	2/15/2000	3387			
767	2/15/2000	9311			
768	2/15/2000	6484			
768	2/15/2000	9226			
769	2/15/2000	0805			
769	2/15/2000	3428			
797	2/15/2000	7501			

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?

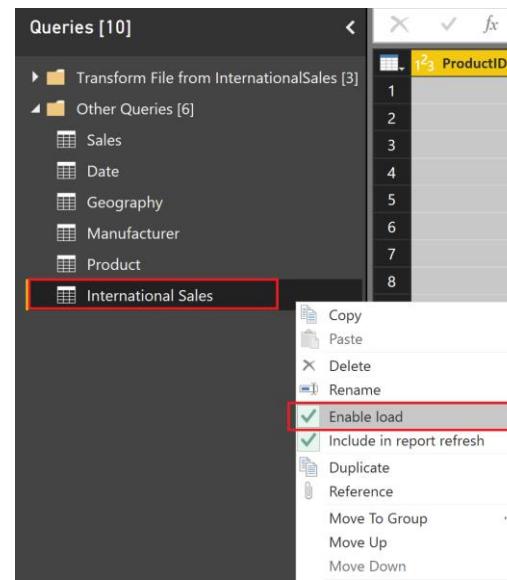
Apply **Apply later** **Cancel**

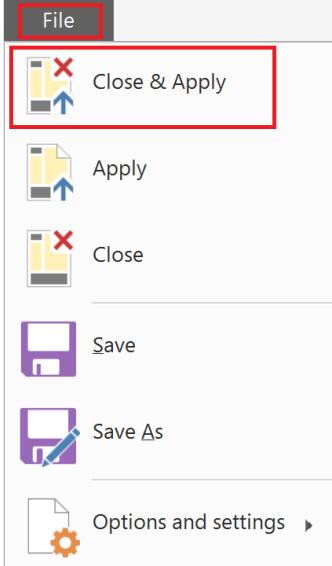
We don't need the **International Sales** table to load to the data model now that its rows have been appended to the **Sales** table. Let's prevent the **International Sales** table from loading to the data model.

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>

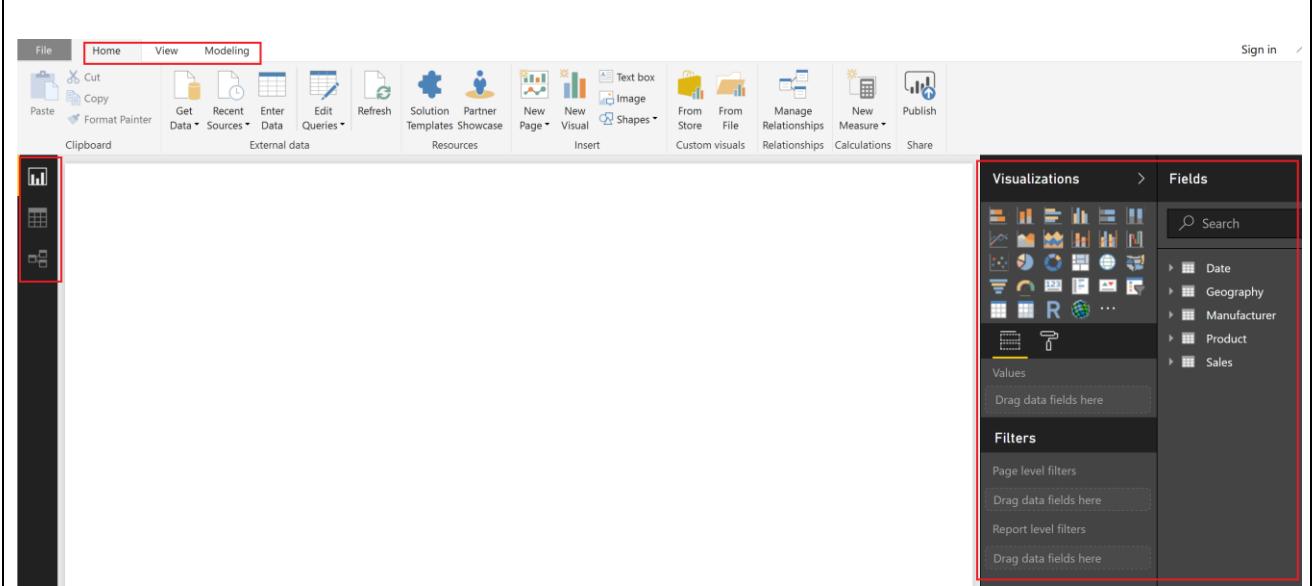
Power BI Desktop - Interactive Data Exploration

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 desktop application. The ribbon at the top has the 'Modeling' tab selected, indicated by a red box. Below the ribbon, there are several icons for managing relationships, creating new measures, tables, and calculations, along with tools for sorting and formatting. The main workspace displays a preview of a table with columns: ProductID, Date, Zip, Units, Revenue, and Country. The preview shows 11 rows of data, all of which have the same value: ProductID 2388, Date Saturday, April 15, 2000, Zip 56438, Units 1, Revenue \$309.6975, and Country USA. At the bottom of the preview, it says 'TABLE: Sales (11,046,444 rows)'. To the right, the 'Fields' pane is open, showing a tree view of available fields. The 'Sales' table is expanded, and its columns—Country, Date, ProductID, Revenue, Units, and Zip—are listed under it. A red box highlights the 'Sales' table entry in the Fields pane. The status bar at the bottom right shows 'Sign in' and other user information.

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

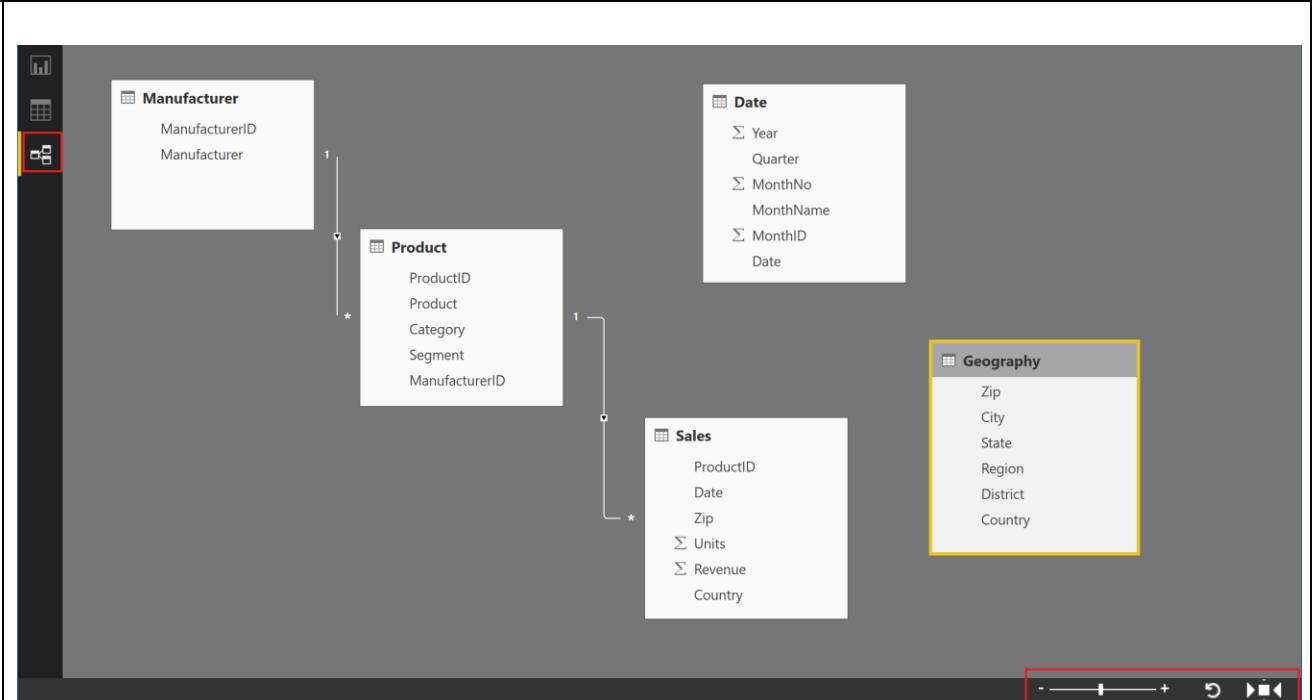
You will see the tables you have imported along with some Relationships. The Power BI Desktop automatically infers relationships between the tables.

- 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:



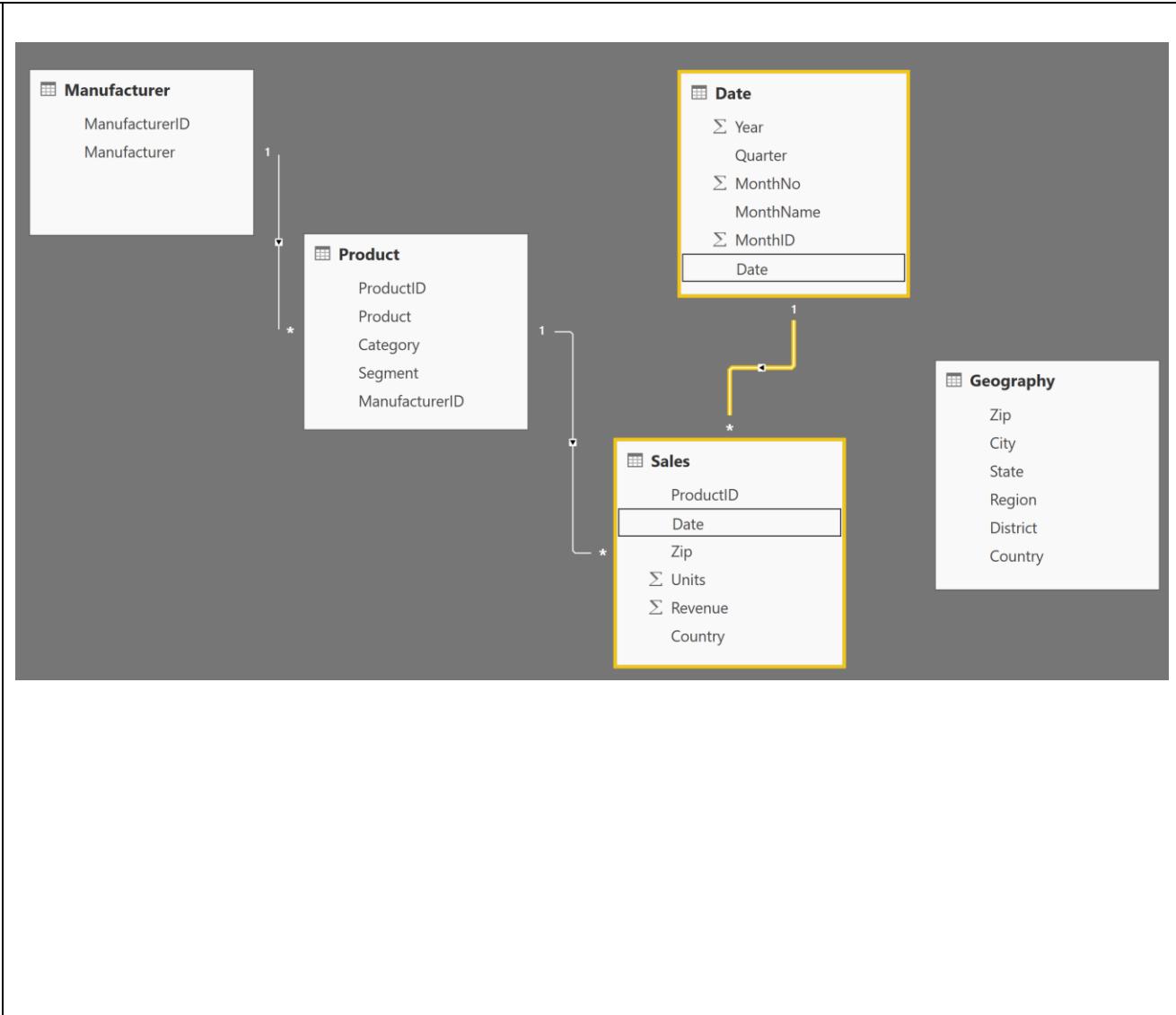
. Drag and move the tables to appear as shown in the figure.



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.

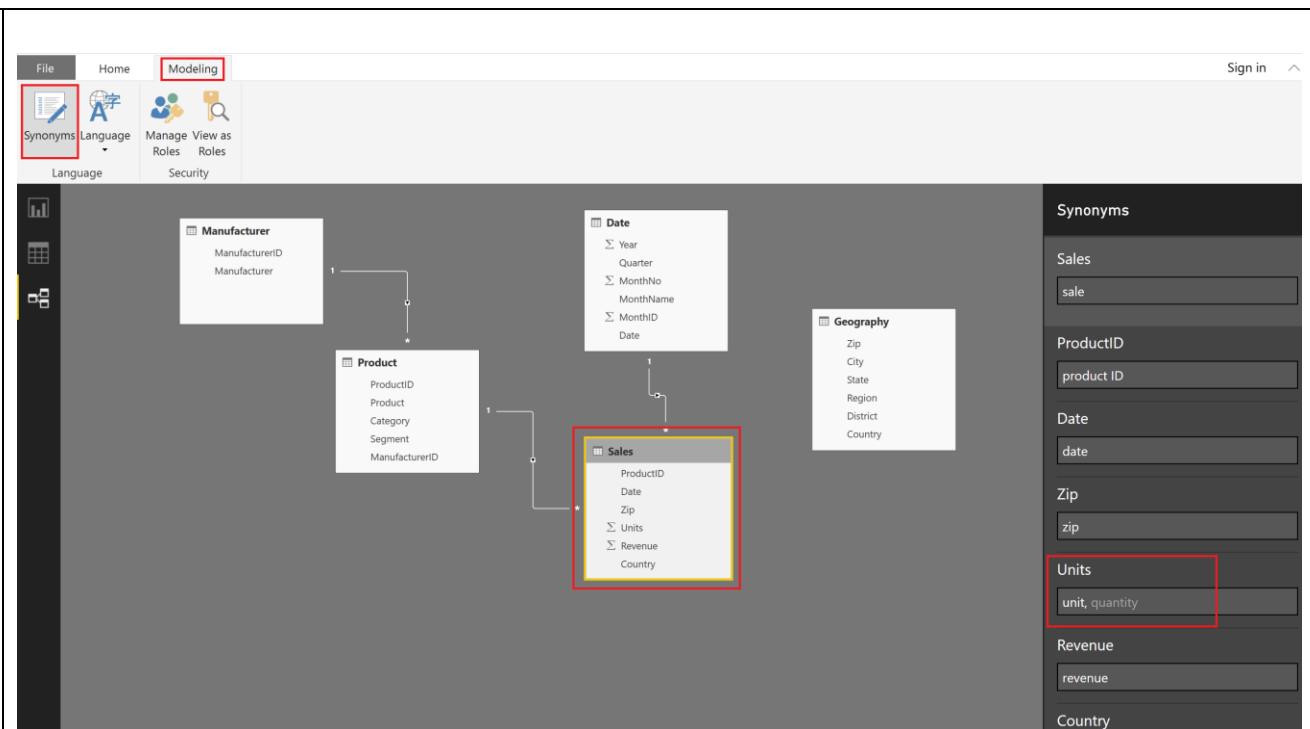
Notice there is no relationship between the Geography and Sales tables. If you want to explore sales data across state or city or country, you will need to setup the relationship between the Geography and Sales tables. You will create the relationship in a later lab.



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.

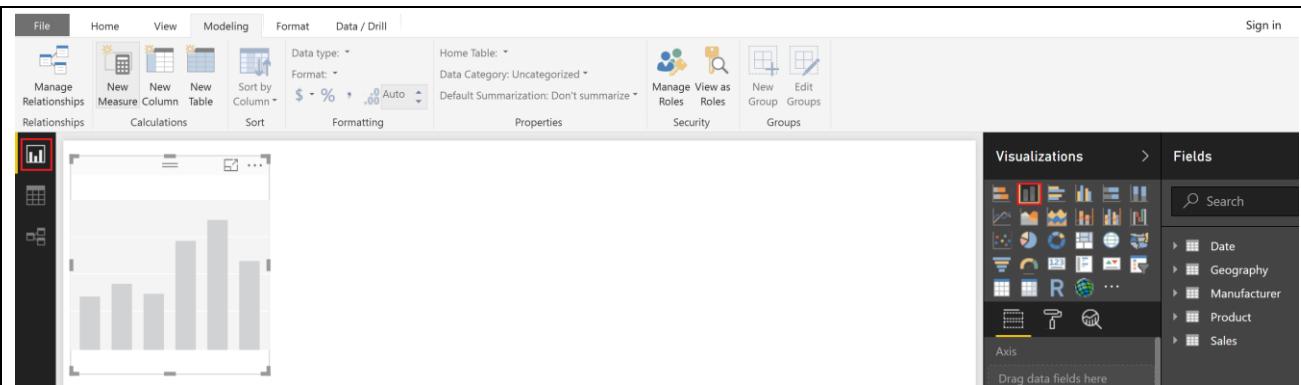


Power BI Desktop - Enhancing your model and Data exploration

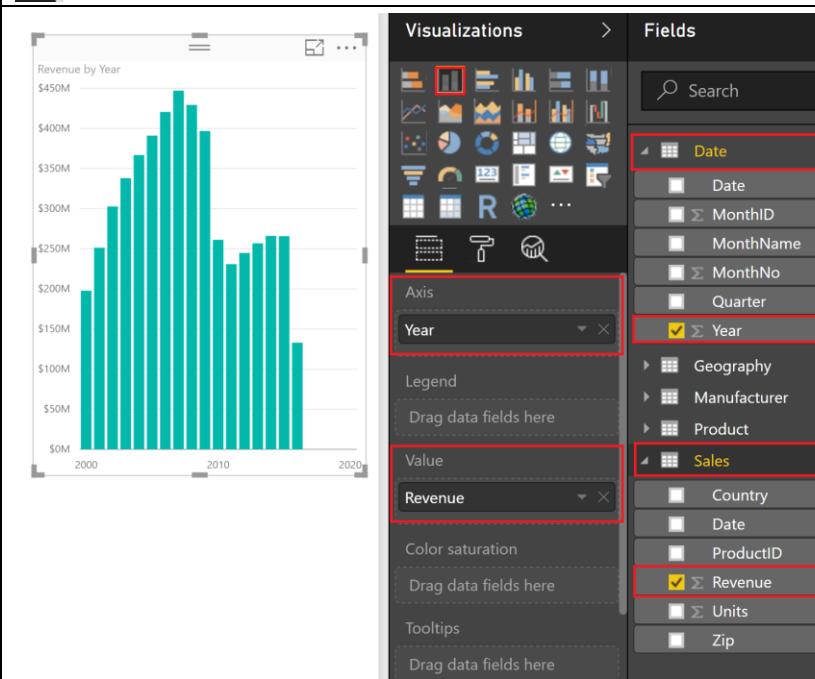
In this section, you will do initial data exploration along with model enhancements to create a calculated column, set up relationships and create a measure using DAX (Data Analysis Expression).

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 **Value** 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.

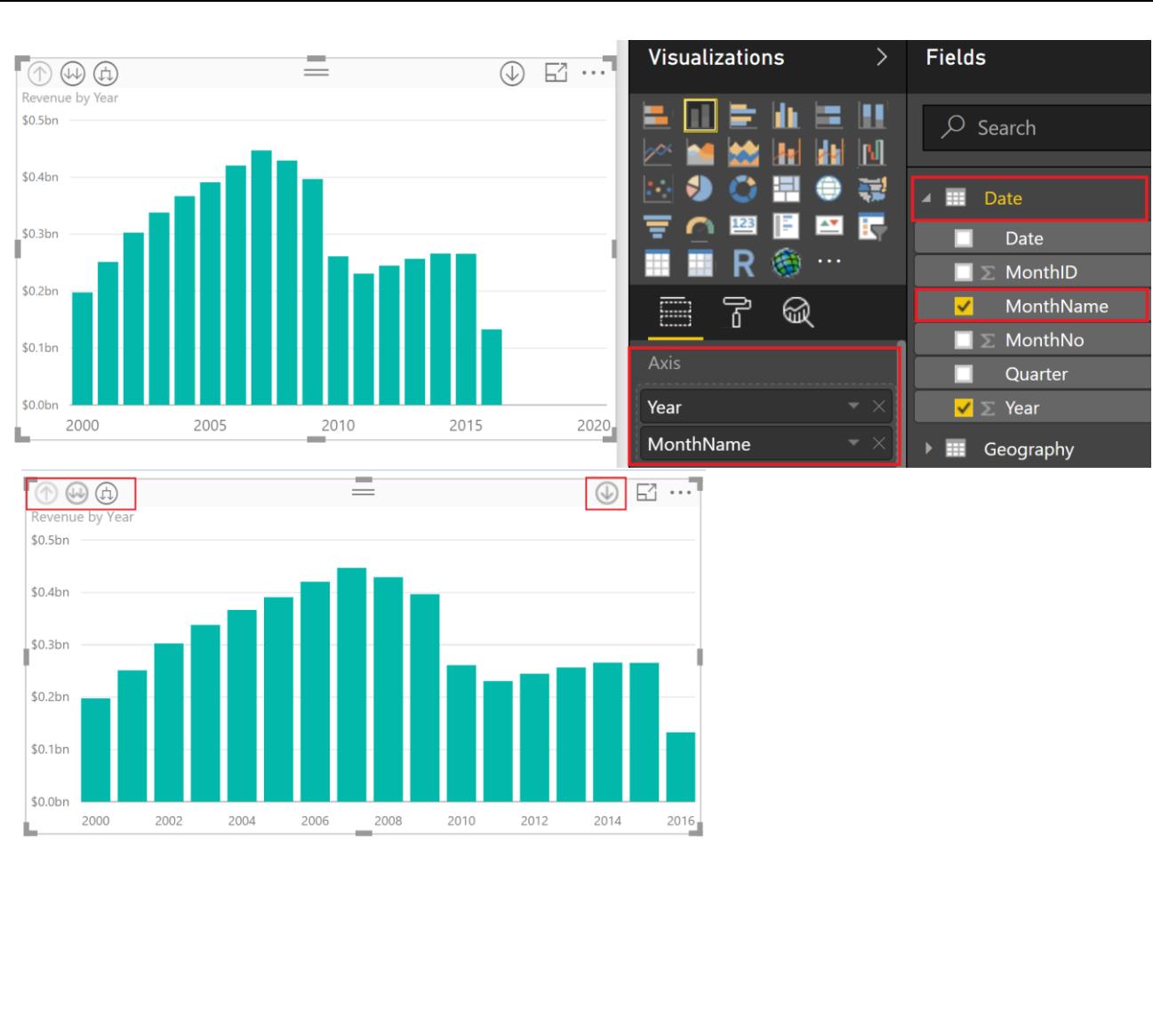


Let us say an executive at your company asks “How were the sales at my company (VanArsdel) by months in addition to years?” You can answer this question very easily by enabling the “drill up/down” functionality in Power BI desktop.

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.

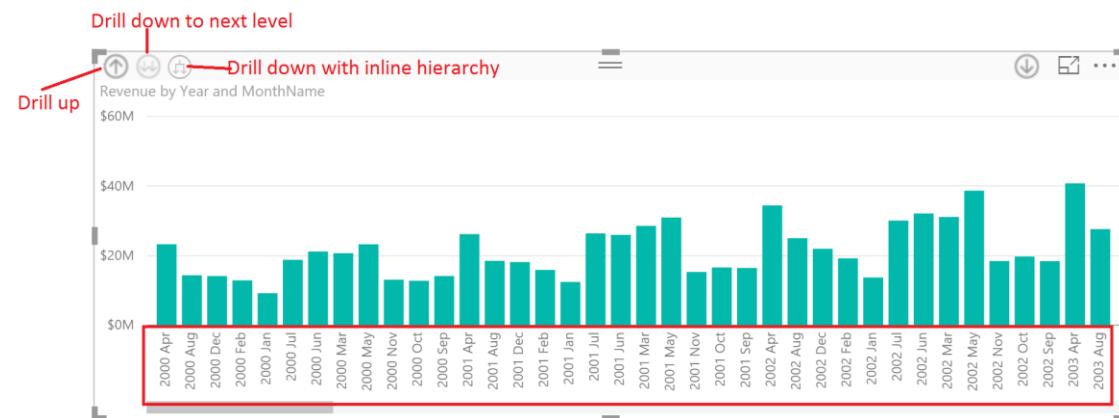
You should see additional icons enabled on the top left and right hand side of the visual. These icons allow you to “Drill down/up”.

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**.

The screenshot shows the Power BI Data view with the Date table selected. The MonthName column is highlighted with a red box. The ribbon shows the Modeling tab is selected. The Fields pane on the right shows the Date table with MonthName highlighted.

	MonthName	MonthID	Date
1999	Jul	199907	Thursday, July 1, 1999
1999	Jul	199907	Friday, July 2, 1999
1999	Jul	199907	Saturday, July 3, 1999
1999	Jul	199907	Sunday, July 4, 1999
1999	Jul	199907	Monday, July 5, 1999
1999	Jul	199907	Tuesday, July 6, 1999
1999	Jul	199907	Wednesday, July 7, 1999
1999	Jul	199907	Thursday, July 8, 1999
1999	Jul	199907	Friday, July 9, 1999
1999	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 roller) icon.

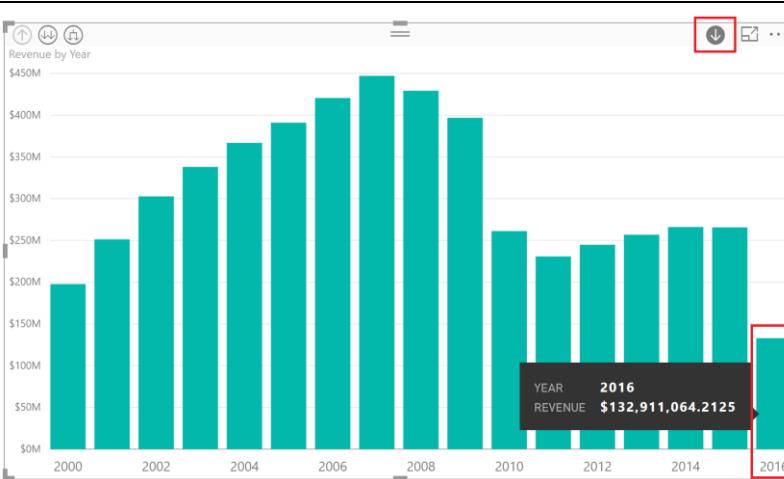
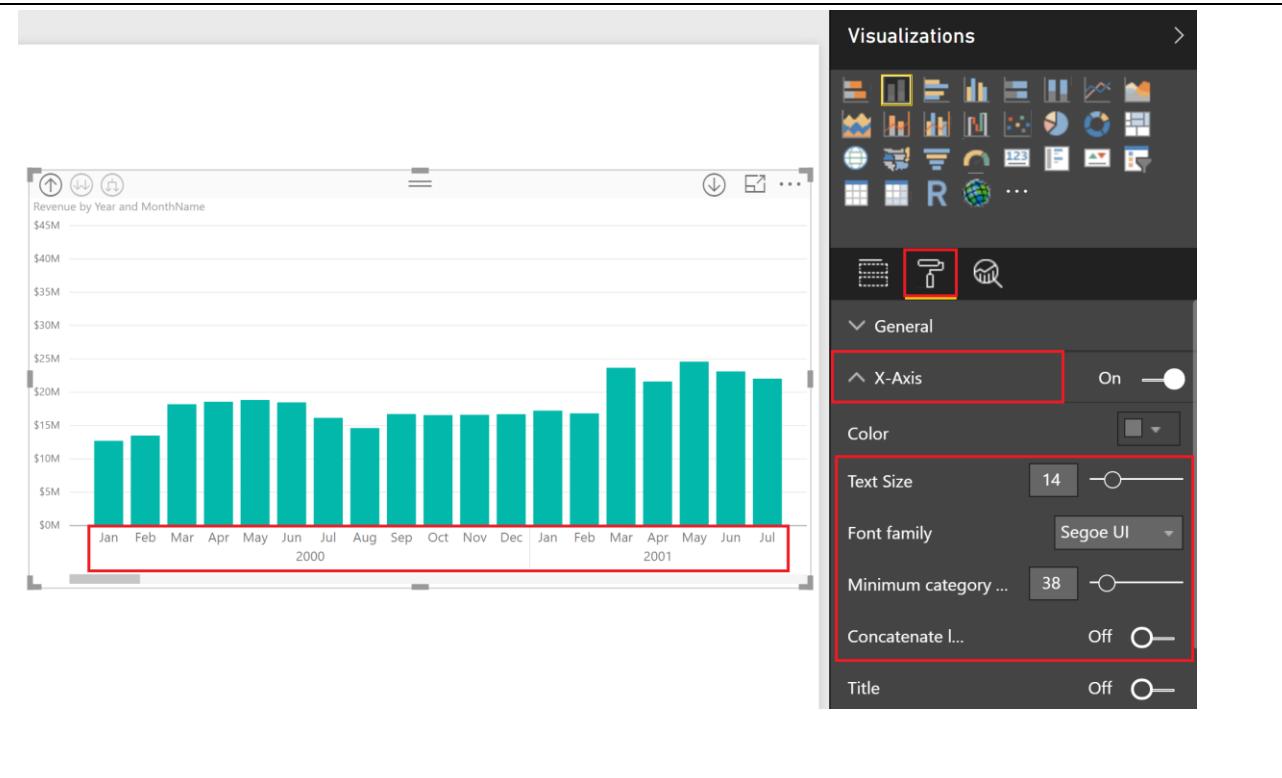
14. Expand **X-Axis** and using the **slider** turn **Off Concatenate Labels** option.

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 column for **year 2016**.



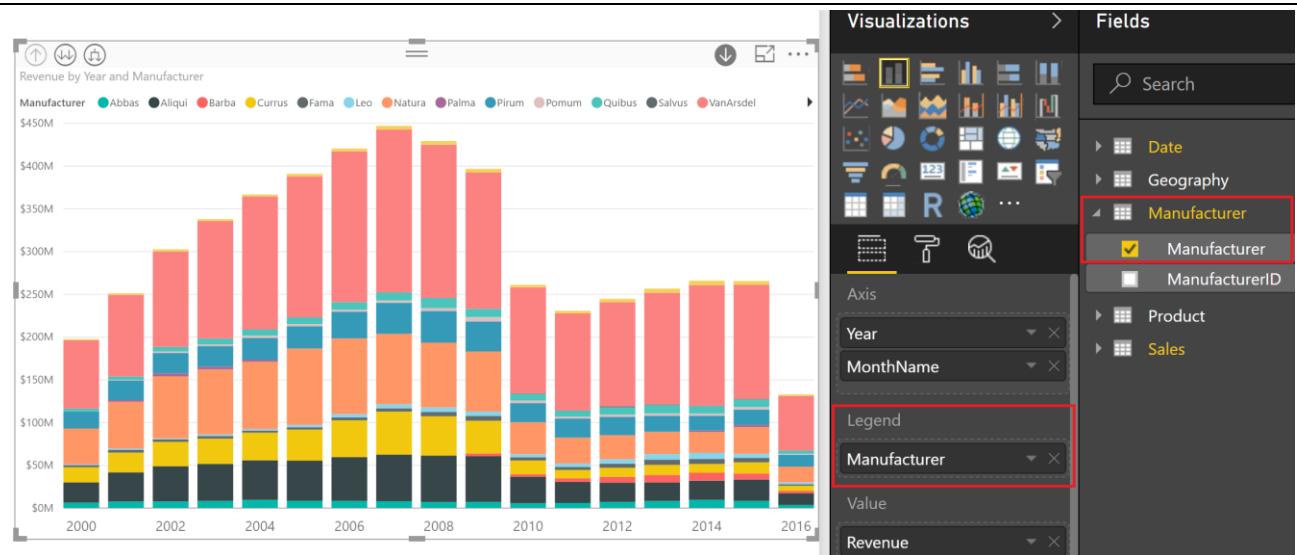
19. You should now see the revenue breakdown by month for 2016. You can again go back up to Year level revenue numbers by clicking on the **up arrow** in the top left corner.



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

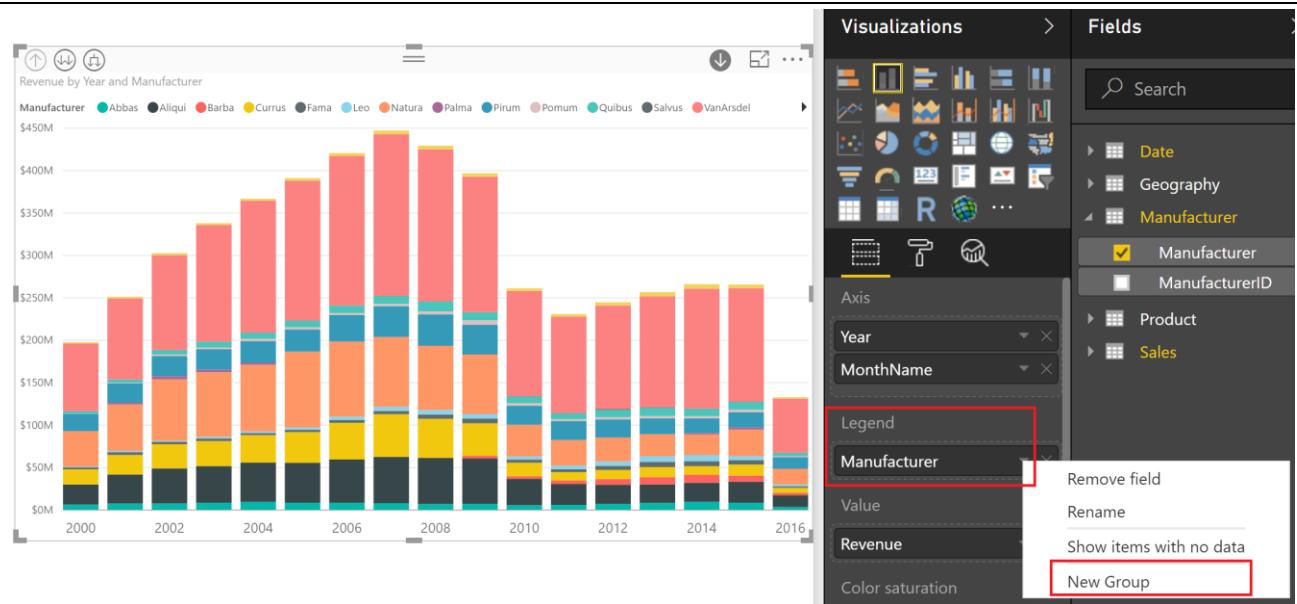
20. From the **Fields** section, expand **Manufacturers** table and drag and drop **Manufacturer** column to the **Legend** section as shown in Figure.

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**.

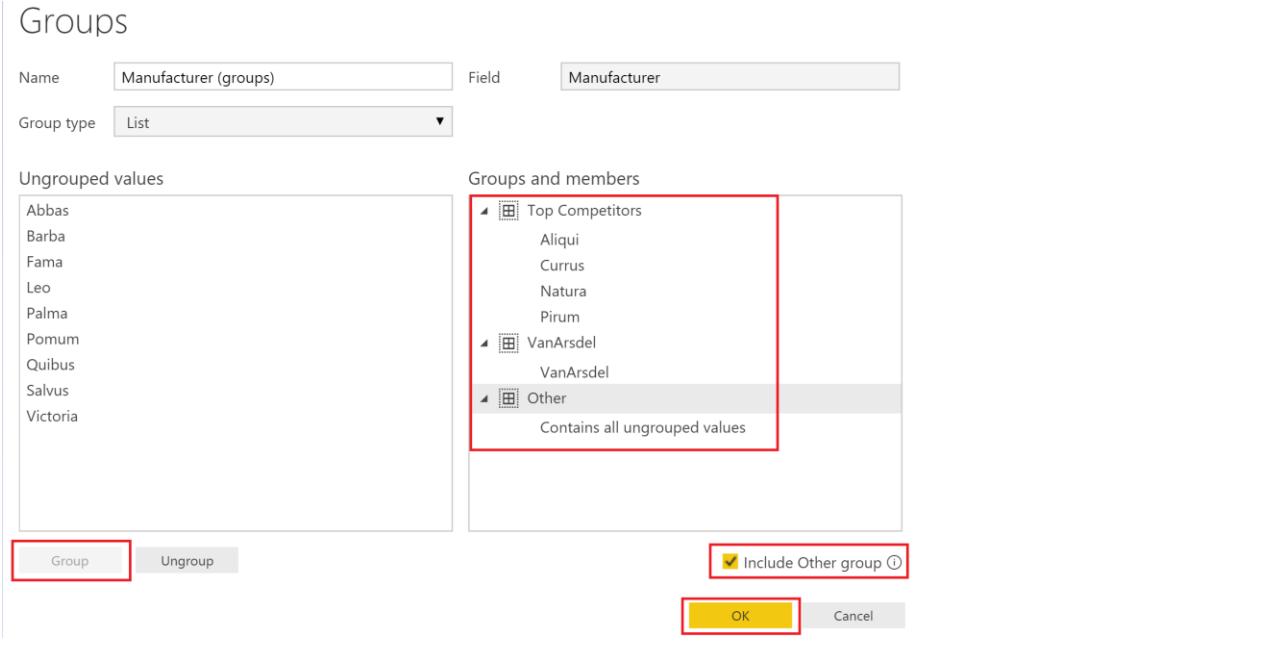
23. Select **Group** button. Notice a new group is added in the Groups and members section.

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.

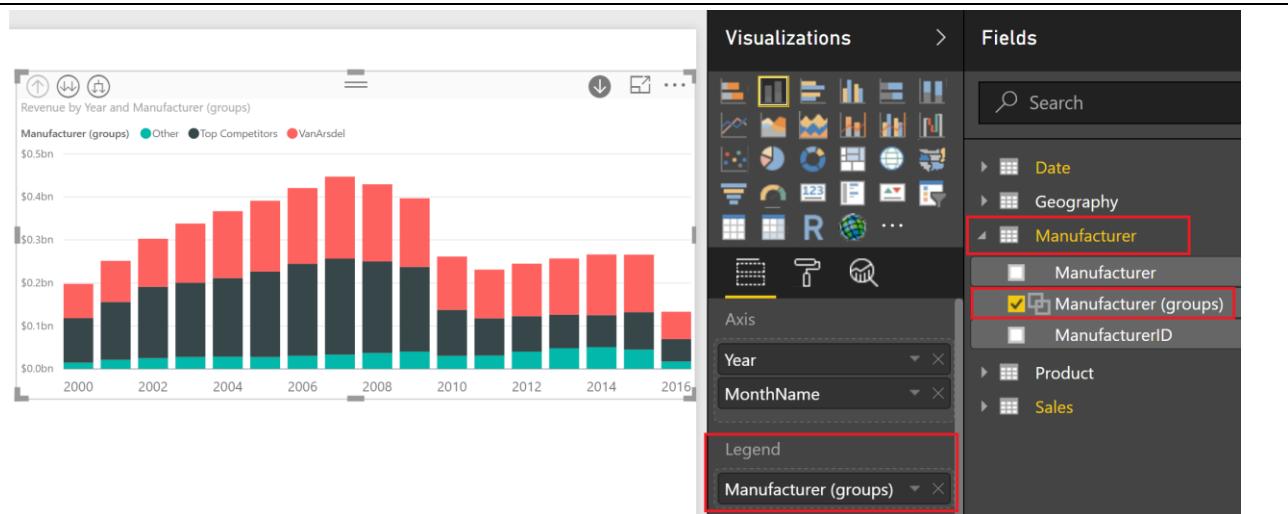
27. Select **OK** to close Groups dialog.



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

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

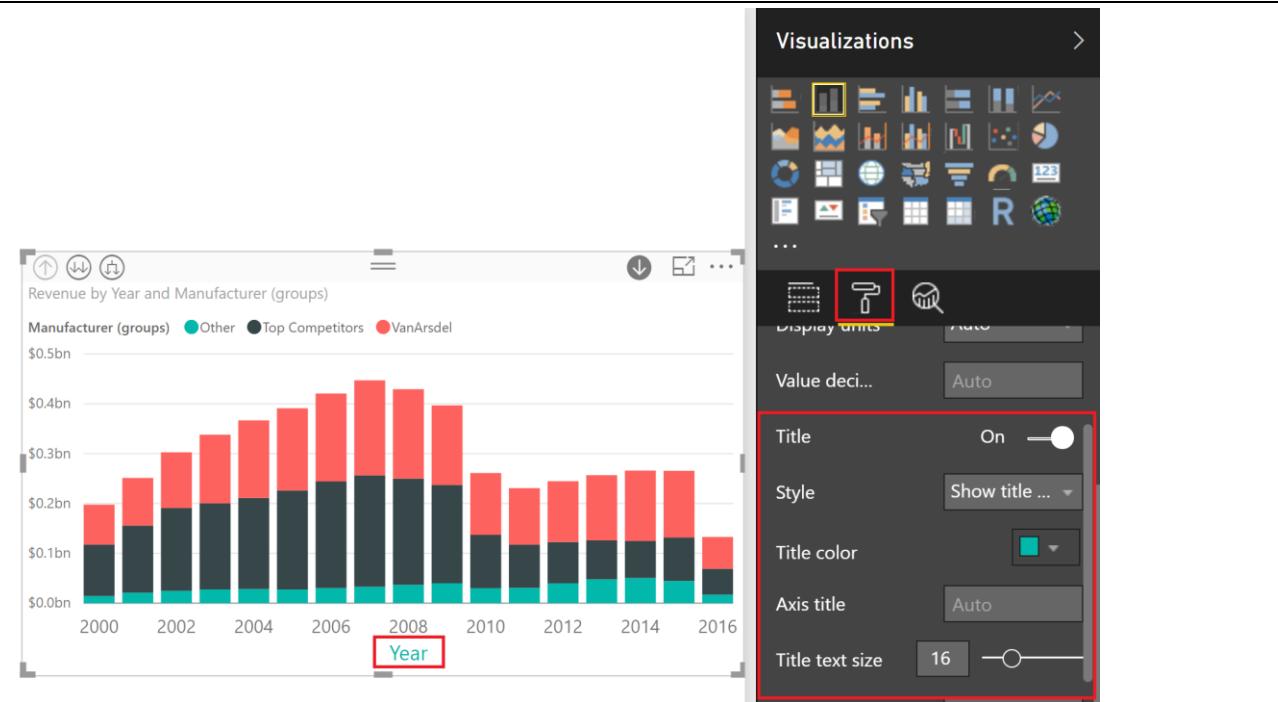
Now we have a visual that shows Revenue by Year for VanArsdel, the top competitors and the rest of the competitors.



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.

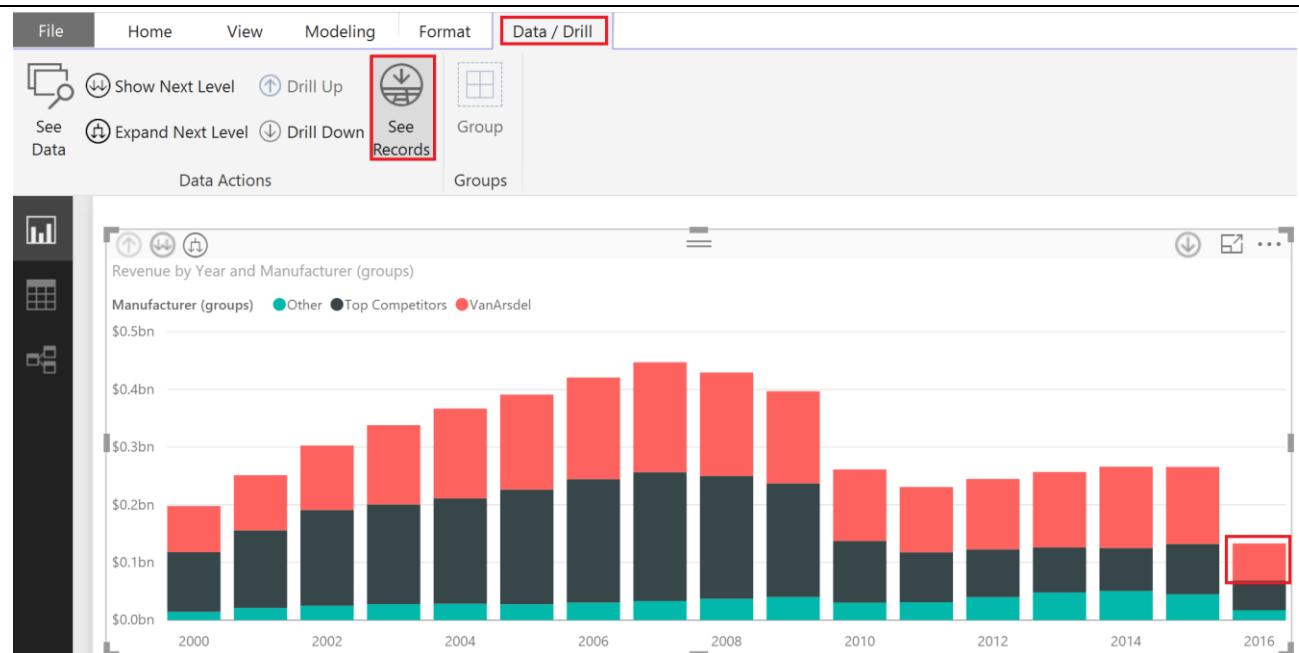


Suppose you want to investigate the records that make up VanArdel's sales for the year 2016.

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.

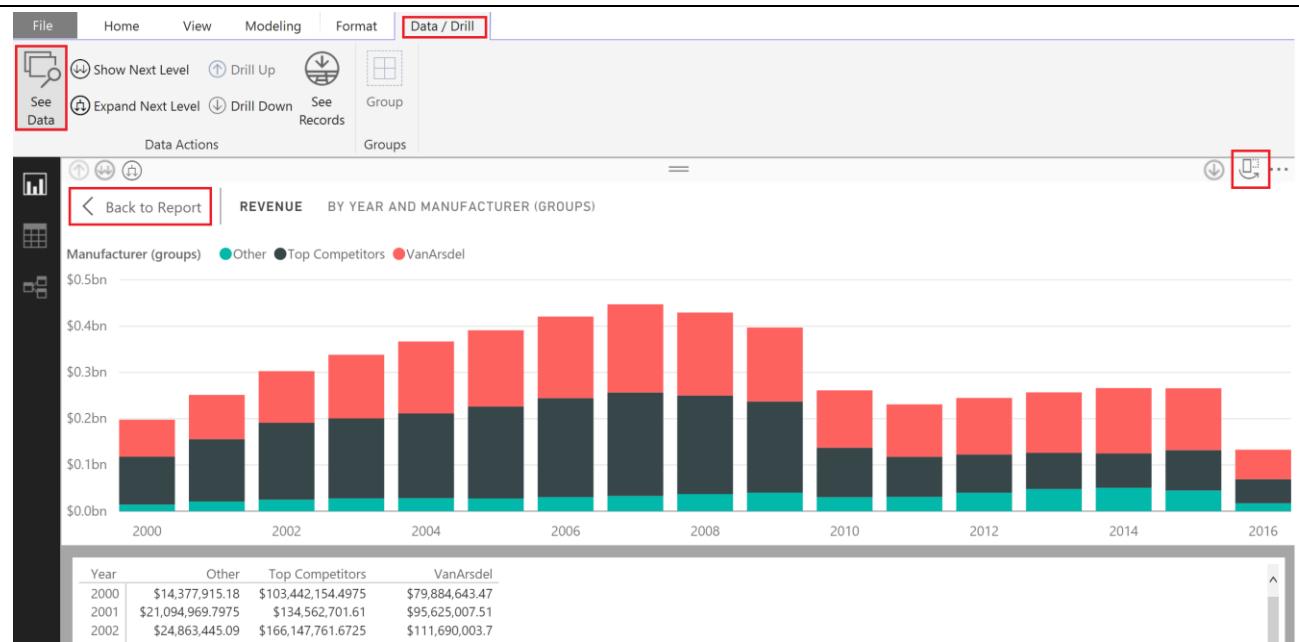
Year	MonthName	Revenue	Manufacturer (groups)	Date	Zip	Country
2016	Mar	\$49,084.6125	VanArdel	Tuesday, March 22, 2016	33311	USA
2016	May	\$12,126.9225	VanArdel	Monday, May 30, 2016	60026	USA
2016	May	\$11,969.37	VanArdel	Monday, May 30, 2016	60026	USA

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.

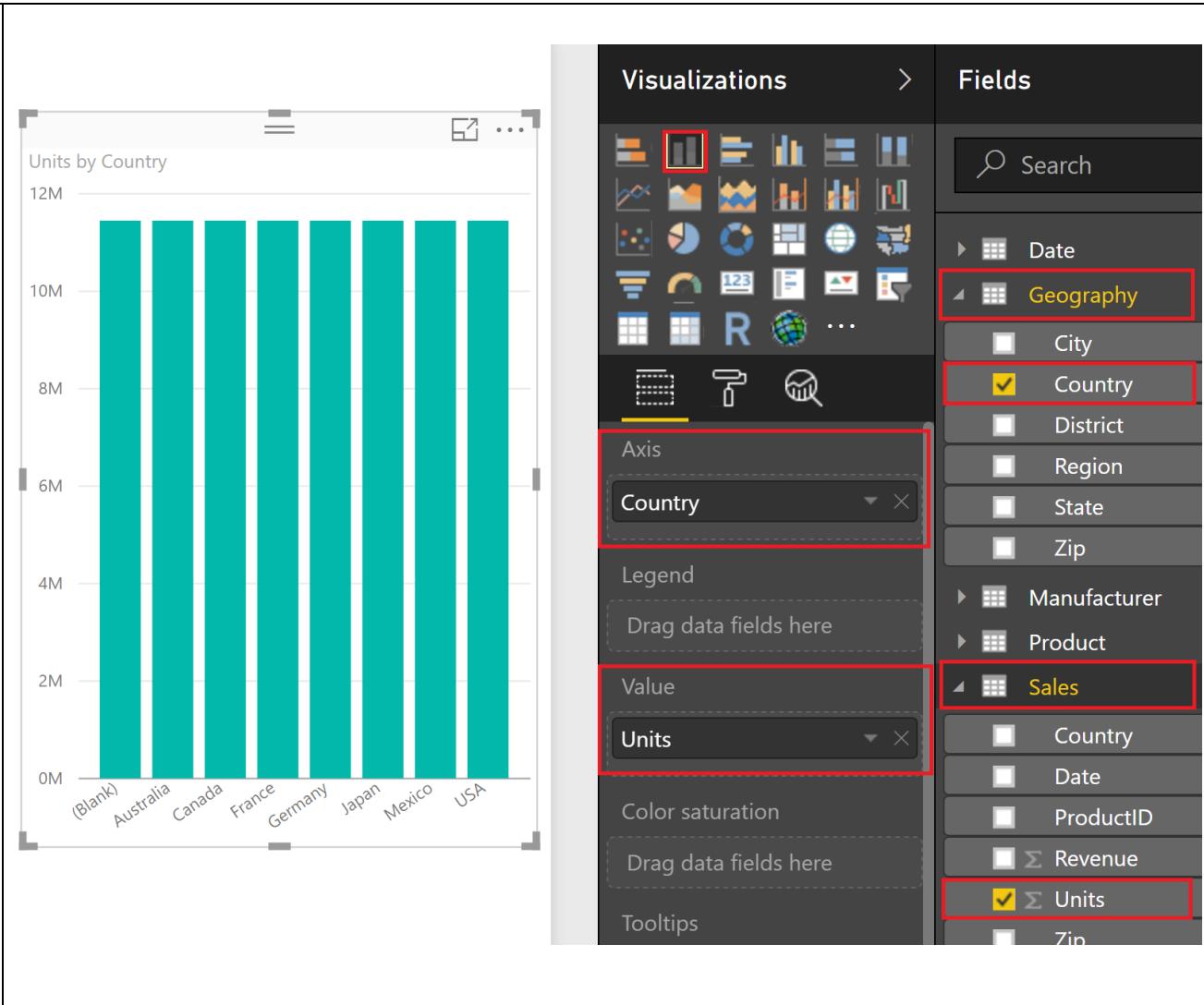
41. From **Visualizations** section, select **Stacked column chart**. You will see the column chart appear.

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.



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.

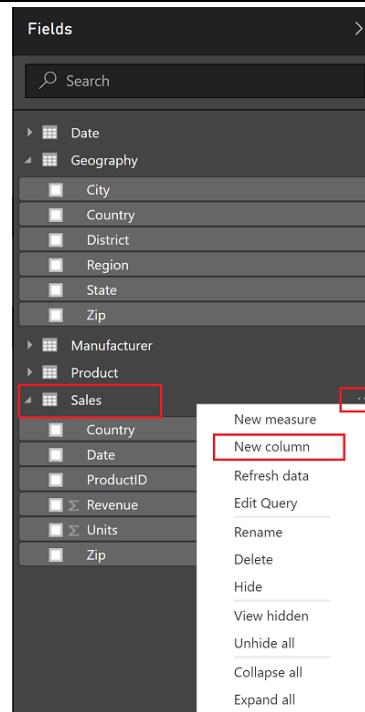
44. In the **Fields** section, click on the ellipsis next to **Sales** table. Select "**New Column**" as shown in the figure.

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]

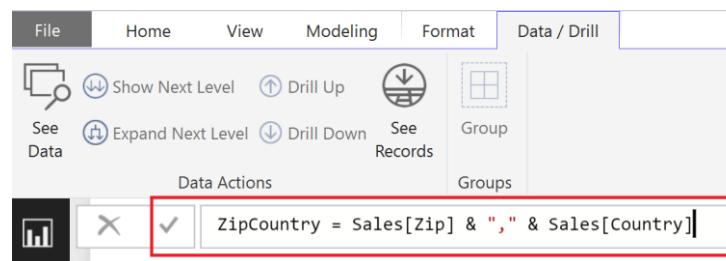
46. Once you are done entering the formula click in the check mark on the left side of the formula editor.



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!

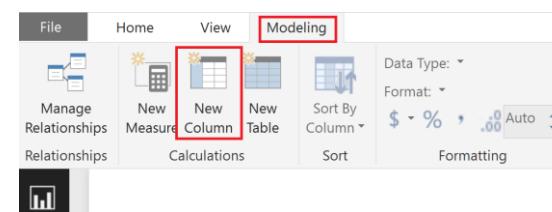
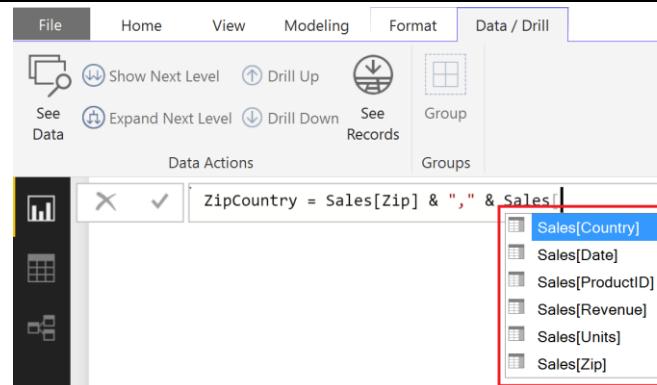


You will notice that as you type the expression the Power BI desktop guides you to choose the right columns using a Technology called Intellisense. As you type half way through you can select the right column by double clicking on it using your mouse or by continuing to hit tab until you see the correct 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 Power BI desktop interface. The ribbon is at the top with tabs: File, Home, View, Modeling (which is highlighted with a red box), Format, and Data / Drill. In the 'Relationships' group of the ribbon, the 'New Column' button is also highlighted with a red box. The formula bar below contains the DAX expression: ZipCountry = Geography[Zip] & "," & Geography[Country]. To the right of the formula bar is the 'Properties' pane. On the far right is the 'Visualizations' and 'Fields' pane, where 'Geography' is selected under the 'Fields' section. The main workspace is visible at the bottom.

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

The screenshot shows the Power BI desktop ribbon with the 'Modeling' tab selected (highlighted with a red box). In the 'Relationships' group, the 'Manage Relationships' button is also highlighted with a red box. The other buttons in the group are 'New Measure', 'New Column', 'New Table', and 'Sort By Column'. The main workspace is visible at the bottom.

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.

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)

New... **Autodetect...** **Edit...** **Delete**

Close

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.

Create relationship

Select tables and columns that are related.

Geography

Zip	City	State	Region	District	Country	ZipCountry
68274	Oaxaca		null	Oaxaca de Juarez	Mexico	68274,Mexico
68275	Oaxaca		null	Oaxaca de Juarez	Mexico	68275,Mexico
68276	Oaxaca		null	Oaxaca de Juarez	Mexico	68276,Mexico

Sales

ProductID	Date	Zip	Units	Revenue	Country	ZipCountry
2388	Saturday, April 15, 2000	56438	1	\$309.6975	USA	56438,USA
2388	Saturday, April 15, 2000	78613	1	\$309.6975	USA	78613,USA
2388	Saturday, April 15, 2000	06242	1	\$309.6975	USA	06242,USA

Cardinality

One to many (1:*)

Cross filter direction

Single

Make this relationship active

Apply security filter in both directions

Assume referential integrity

OK **Cancel**

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.

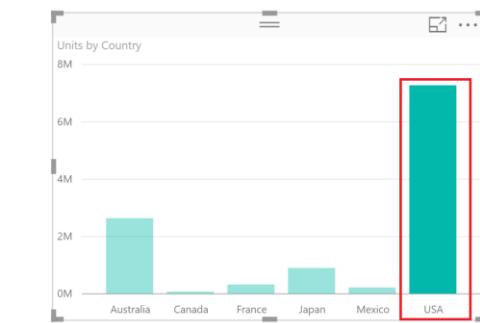
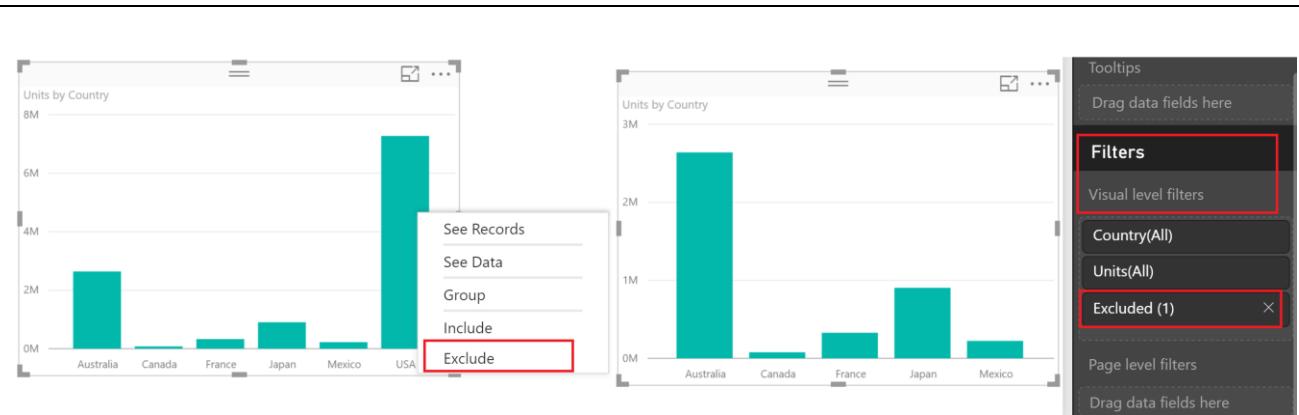
62. Click on bar for **USA** in the bottom graph to analyze what portion of the units sold in USA contributes towards to overall Sales.

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.



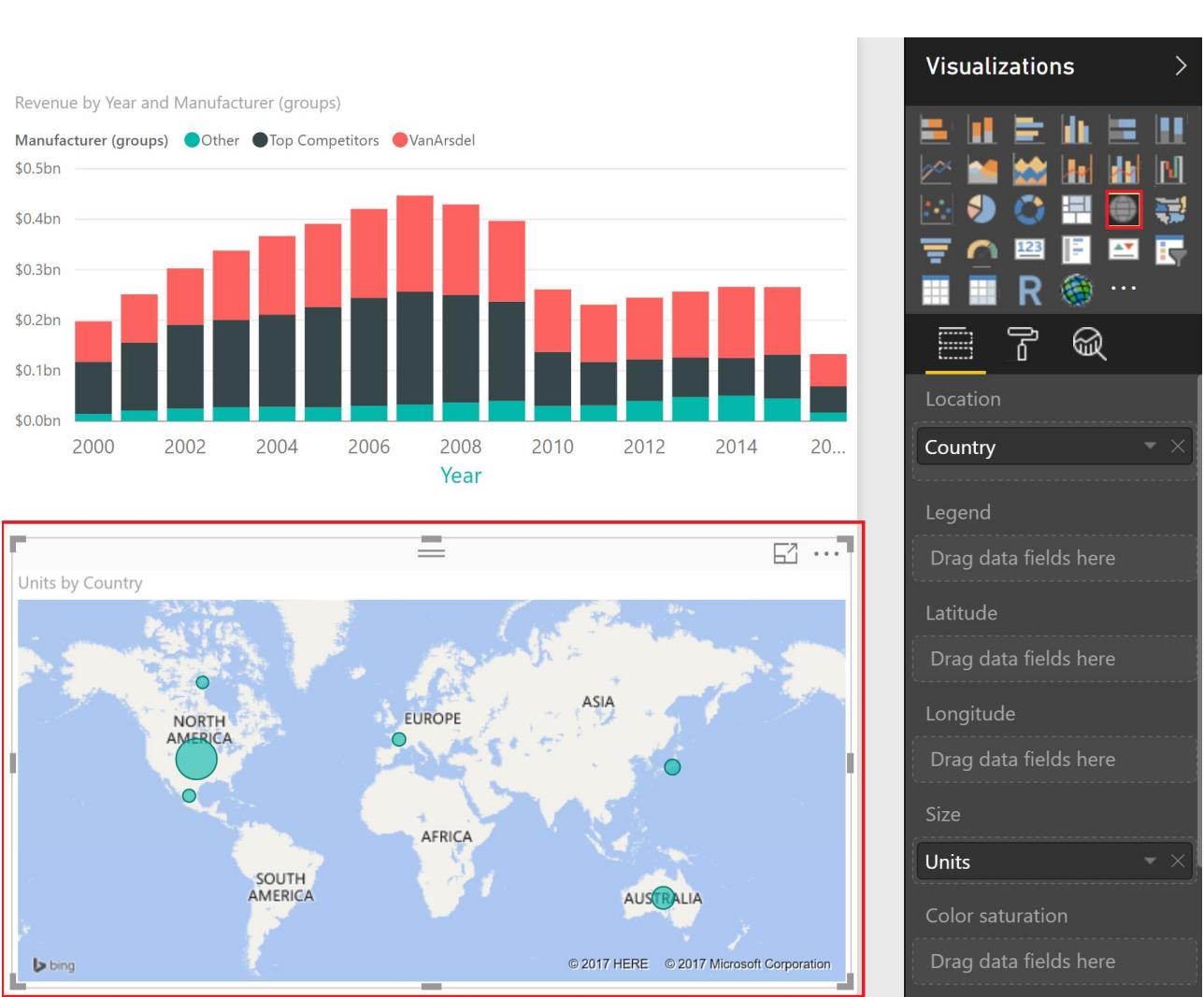
Since the units sold are by country, you can easily map your sales.

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.



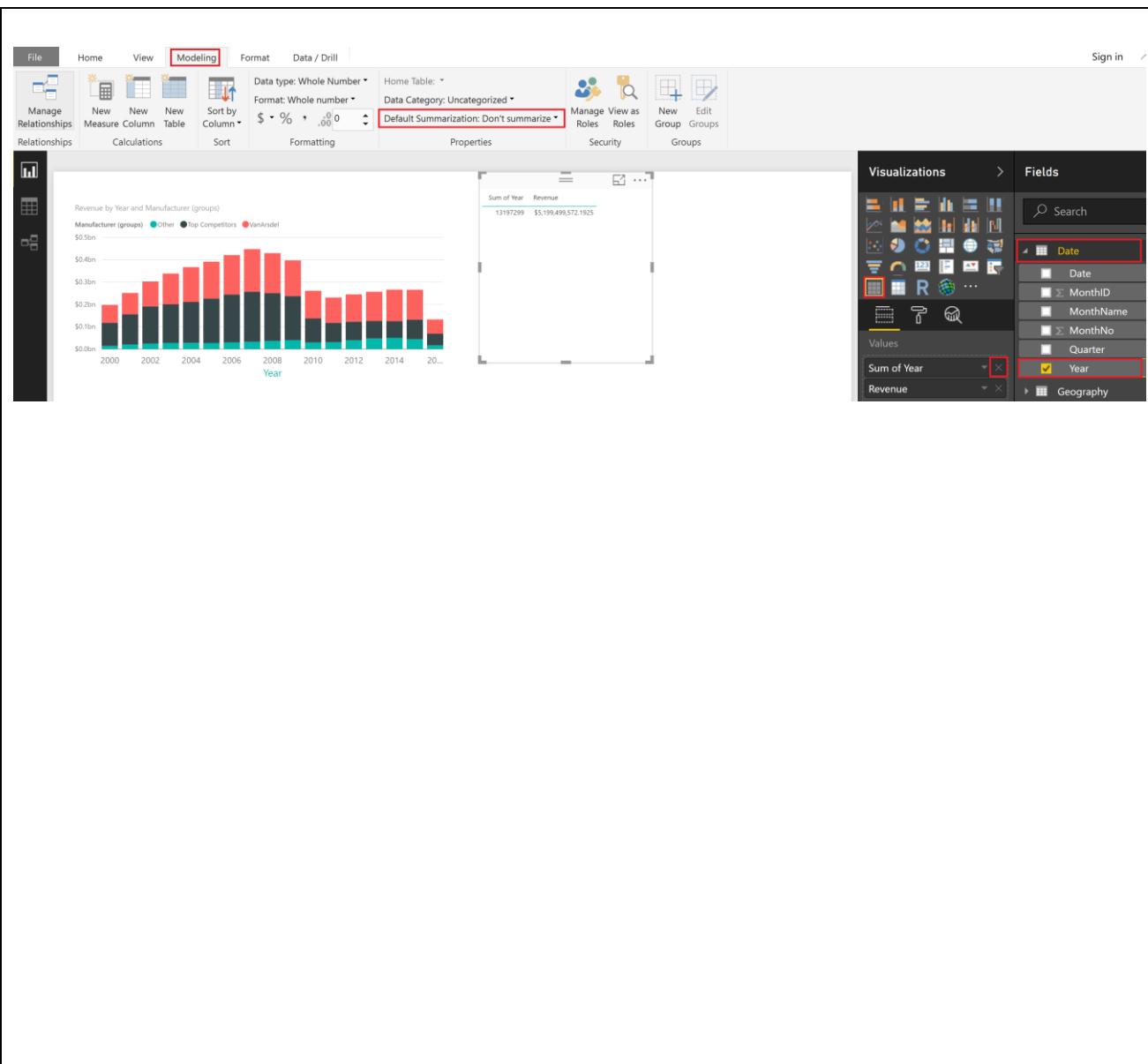
Let's assume we want to create a table visual to display the Revenue by year and add a column that displays the % of revenue for each year to help figure out the years where sales were high.

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 **Values** section, select the arrow next to **Revenue** field.
73. Select **Conditional formatting -> Data bars**.
74. Data bars dialog opens. There are options to format the data bar. Select **OK**.

Notice data bar helps to easily identify the years with high revenue and those years with low revenue.

The screenshot shows the 'Data bars' configuration dialog. In the 'Base value' section, 'Revenue' is selected. Under 'Positive bar', 'Lowest value' is set to '(Lowest value)' and 'Highest value' is set to '(Highest value)'. Under 'Negative bar', 'Bar direction' is set to 'Left to right'. The 'OK' button is highlighted with a red box.

75. 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.
76. Click the **arrow** next to the newly dropped **Revenue** field.
77. Select **Sum**.

Notice now both the Revenue fields are summed.

78. Click the **arrow** next to the second **Revenue** field.
79. Select **Show value as -> Percent of grand total**.

The screenshot shows the 'Fields' dialog for the Sales table. The 'Revenue' field is selected. In the 'Sum' section, 'Percent of grand total' is checked. The 'OK' button is highlighted with a red box.

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

Let's rename the field.

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

81. From the menu select **Rename**.

82. Rename the field to **% of Total Revenue**.

Year	Revenue	%GT Revenue
2000	\$197,704,713.1475	3.80%
2001	\$251,281,678.9175	4.83%
2002	\$302,700,895.515	5.82%
2003	\$338,020,094.0275	6.50%
2004	\$366,785,005.055	7.05%
2005	\$391,029,032.425	7.52%
2006	\$420,593,780.11	8.09%
2007	\$447,096,083.19	8.60%
2008	\$429,293,079.0375	8.26%
2009	\$396,834,759.75	7.63%
2010	\$261,165,724.965	5.02%
2011	\$230,811,969.9675	4.44%
2012	\$244,761,416.34	4.71%
2013	\$256,810,540.4075	4.94%
2014	\$266,059,436.5525	5.12%
2015	\$265,644,300.89	5.11%
2016	\$132,911,064.2125	2.56%
Total	\$5,199,499,572.1925	100.00%

Alternately, we can use Color scales on the table so we can easily identify the years where sales were good versus bad.

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

84. From the menu select **Conditional Formatting -> Color Scales**.

Year	Revenue	% of Total Revenue
2000	\$197,704,713.1475	3.80%
2001	\$251,281,678.9175	4.83%
2002	\$302,700,895.515	5.82%
2003	\$338,020,094.0275	6.50%
2004	\$366,785,005.055	7.05%
2005	\$391,029,032.425	7.52%
2006	\$420,593,780.11	8.09%
2007	\$447,096,083.19	8.60%
2008	\$429,293,079.0375	8.26%
2009	\$396,834,759.75	7.63%
2010	\$261,165,724.965	5.02%
2011	\$230,811,969.9675	4.44%
2012	\$244,761,416.34	4.71%
2013	\$256,810,540.4075	4.94%
2014	\$266,059,436.5525	5.12%
2015	\$265,644,300.89	5.11%
2016	\$132,911,064.2125	2.56%
Total	\$5,199,499,572.1925	100.00%

Color scales dialog opens. By default, there are options to format minimum and maximum.

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

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

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

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

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

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

Color scales

Format cells with color based on their values.

Base value

% of Total Revenue

Format blank values

As zero ▾

Minimum	Center	Maximum
Lowest value ▾	Middle value ▾	Highest value ▾
(Lowest value)	(Middle value)	(Highest value)

Diverging



OK Cancel



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

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

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

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

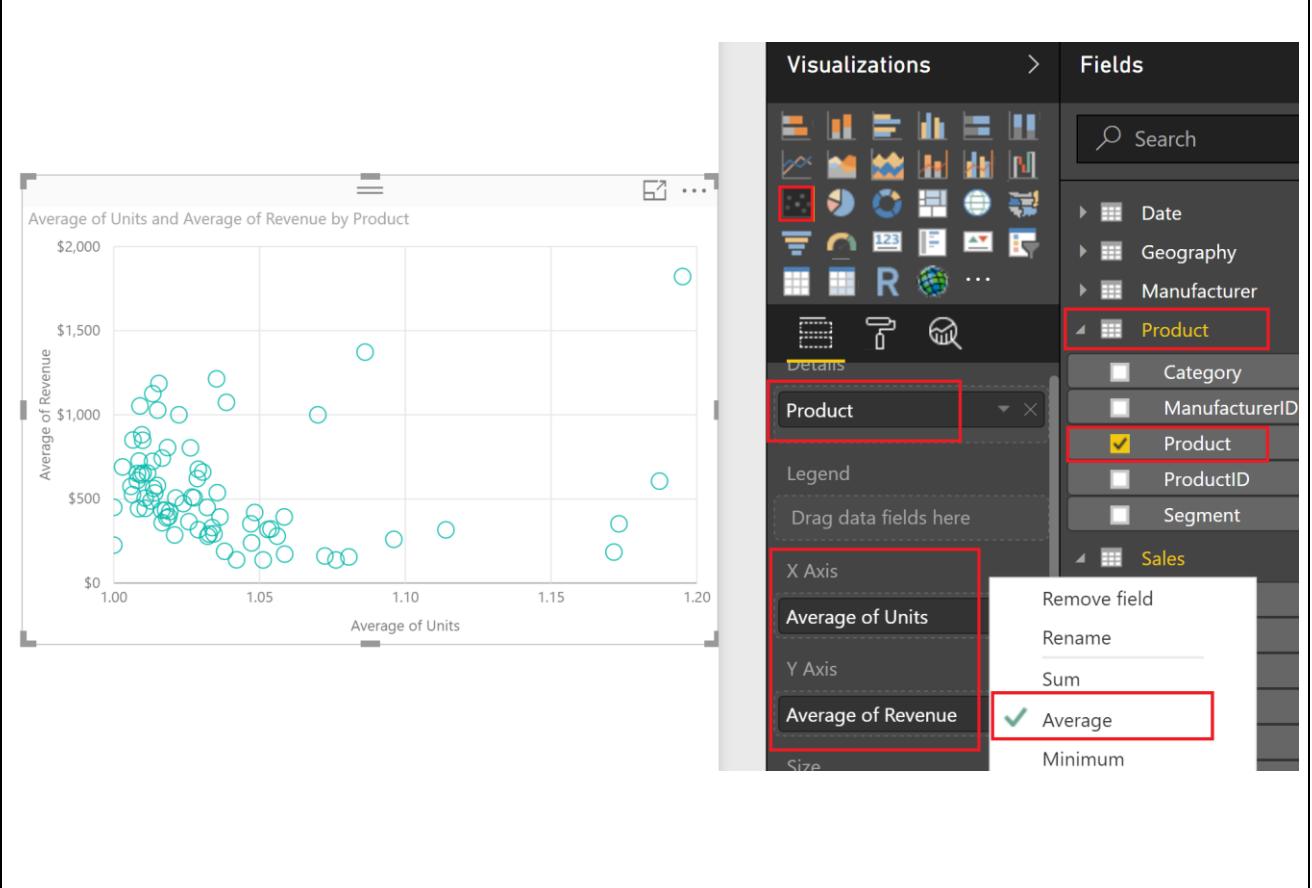
Clicking on the date field opens a **date picker** which provides the ability to pick a date.

Hover on the visual and select the arrow on the right corner. Notice there are options to display the date slicer in the following formats: **Between**, **Before**, **After**, **List**, **Dropdown**, **Relative**.

The screenshot shows the Power BI desktop interface. On the left, a Date Slicer visual is displayed, showing two date inputs (1/1/1999 and 12/31/2016) and a dropdown menu with options: Between, Before, After, List, Dropdown, and Relative. A red box highlights the dropdown menu. On the right, the ribbon is visible with 'Visualizations' selected. The 'Fields' pane is open, showing the 'Date' table expanded. Under 'Date', 'Date' is selected and highlighted with a red box. Other fields in the Date table include Month, Quarter, and Year. Below the Date table, other tables like Geography and Manufacturer are listed. A red box also highlights the 'Date' field in the 'Fields' pane.

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.

94. From **Visualizations** section, select **Scatter chart**.
95. From **Fields** section, expand **Product** and drag and drop **Product** field to **Details** section.
96. From **Fields** section, expand **Sales** and drag and drop **Units** to **X-Axis** section.
97. From **Fields** section, expand **Sales** and drag and drop **Revenue** to **Y-Axis** section.
98. Click on the **dropdown** next to **Units in X-Axis**. Select **Average**. This will provide Average Units Sold.
99. Similarly, click on the **dropdown** next to **Revenue in Y-Axis**. Select **Average**. This will provide Average Revenue.



Next let's create clusters.

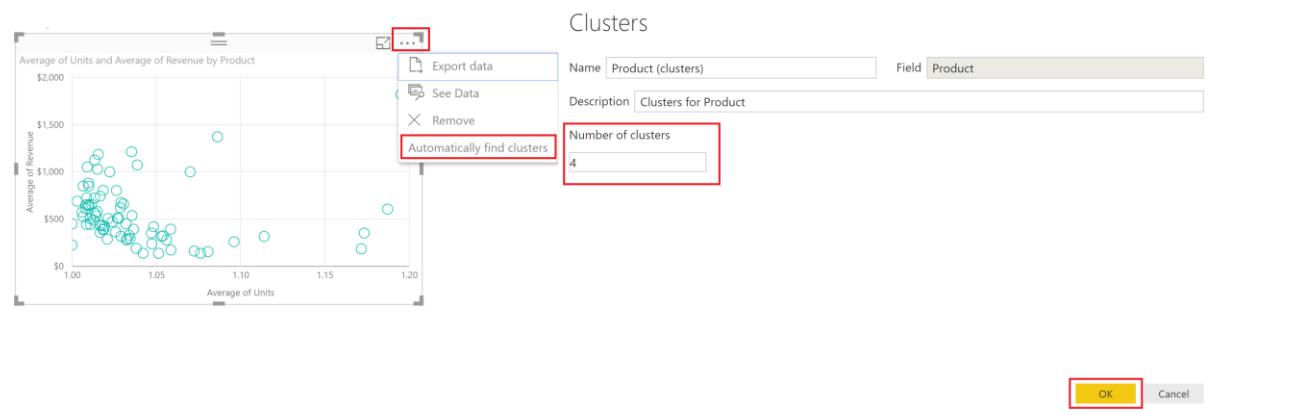
100. Click on the **ellipsis** on the top right corner of the **Scatter chart**.

101. Select Automatically find clusters.

102. Clusters dialog opens. We have option to provide cluster Name and Description and the Number of clusters.

Enter **4** for **Number of Clusters**.

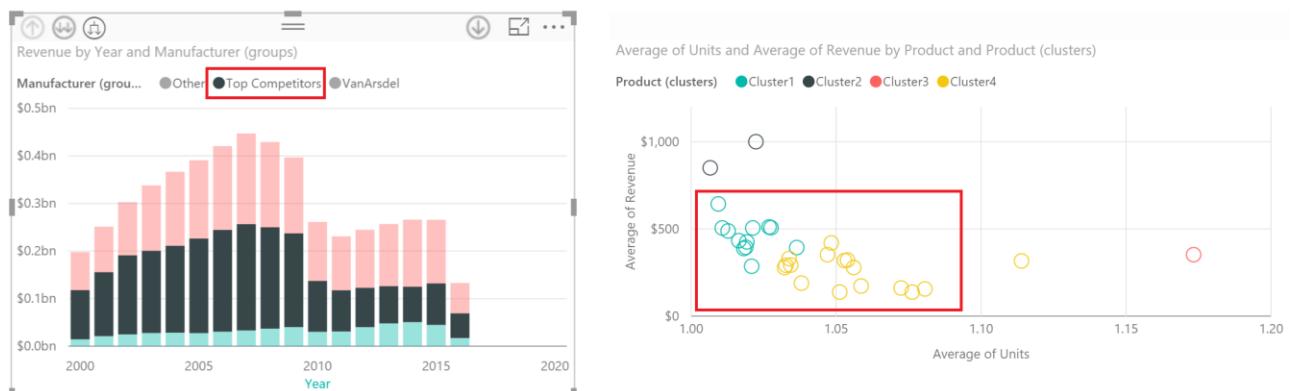
103. Click **OK**.



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.

104. 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.

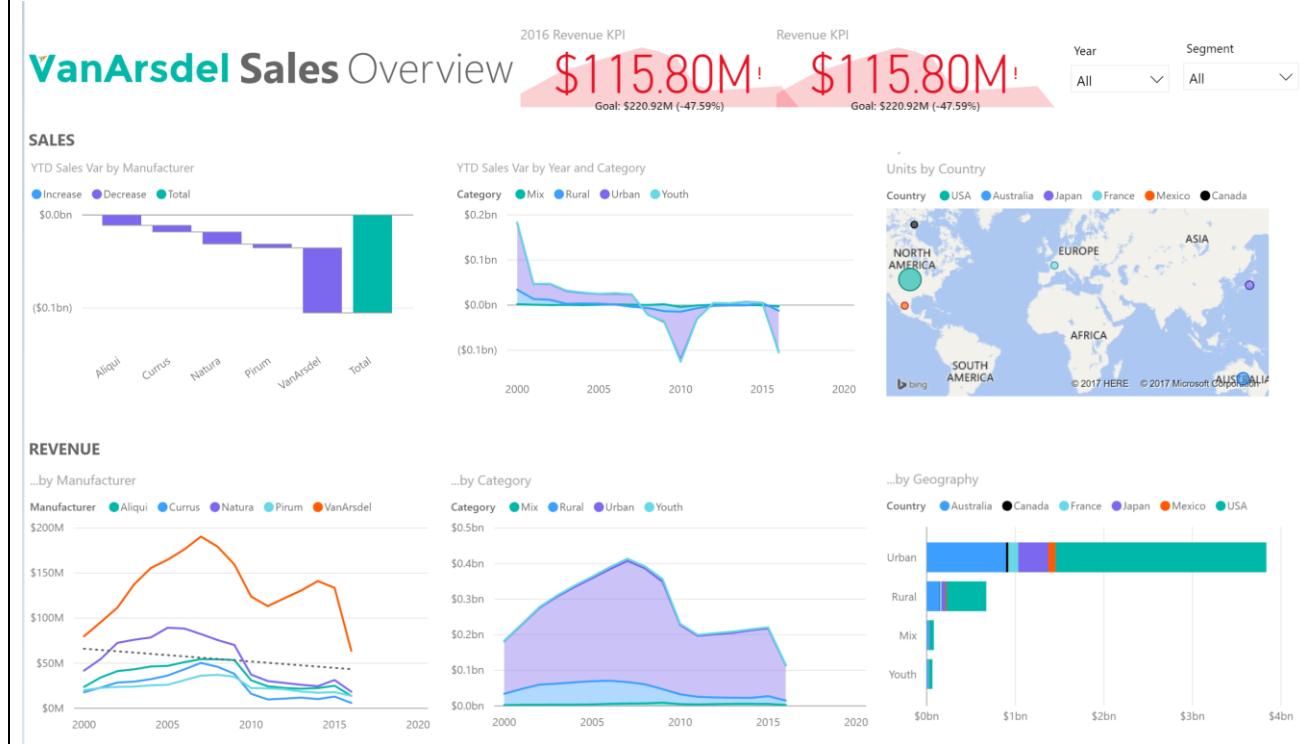
You can change the number of clusters to see how the distribution changes.



Power BI Desktop - Report Authoring

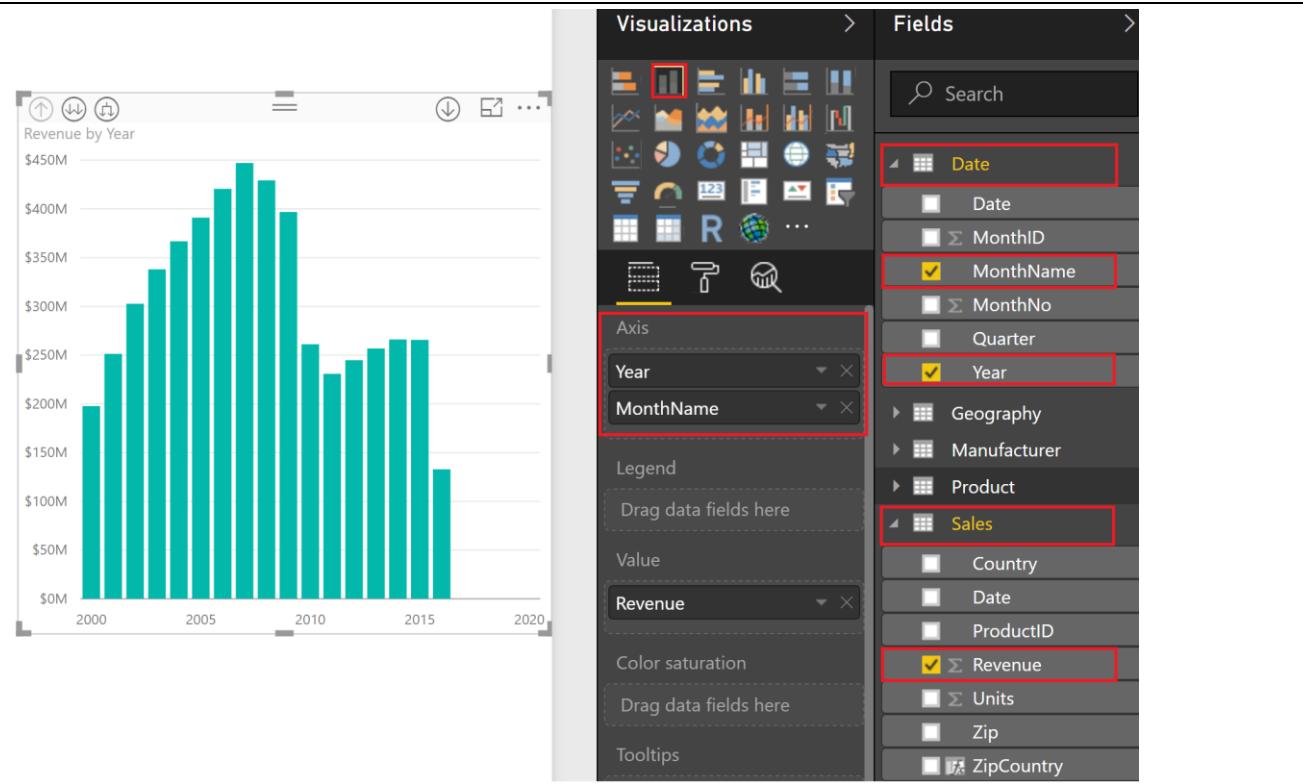
Having done some initial data exploration and visualization you are now finding good insights to share with your team. In this section, you will create a professional report that you and your entire team can benefit from on a daily basis. You will be creating a report that can give quick insights into 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.



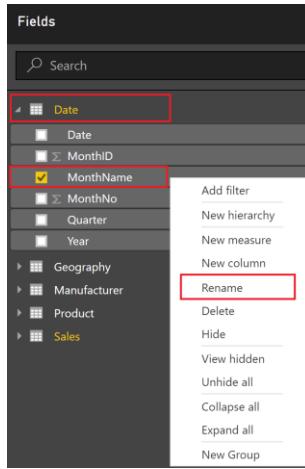
Let us start with a clean slate again for this section. To do this, select each visual in the page that we created in the previous section and **delete** it. Now we should be ready to move to the next section.

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**.

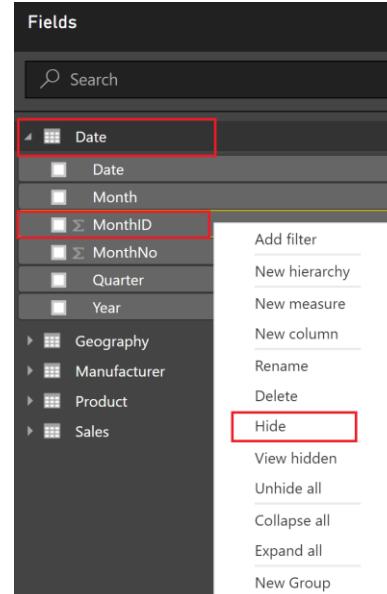


Several of the ID columns in the tables are not useful to the end-users. Let's hide some of the fields to present a clean user experience.

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.

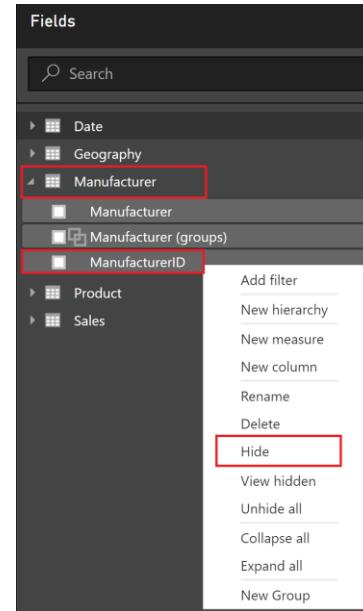
Note: You can still see this column in the data view and relationship view.

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



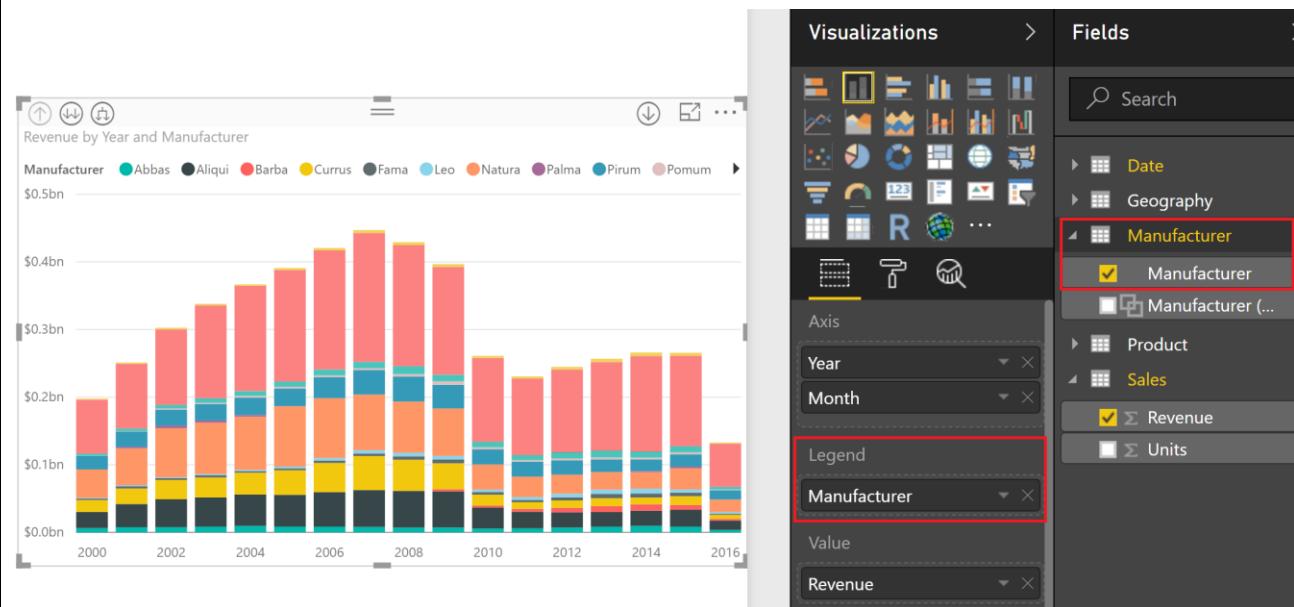
9. In the **Manufacturer** table, **Hide** **ManufacturerID** column.
10. In the **Product** table, **Hide** the columns **ManufacturerID** and **ProductID**.
11. In the **Sales** table, **Hide** the columns **Country**, **Date**, **ProductID**, **Zip** and **ZipCountry**.
12. Select **Geography** table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

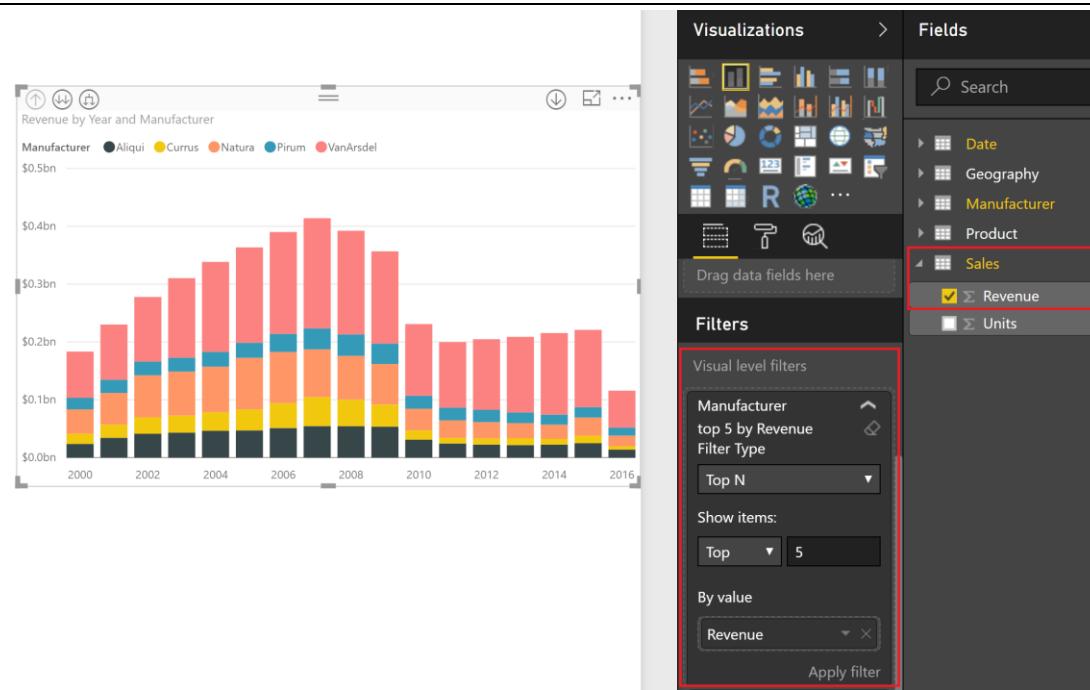
16. Expand **Manufacturer** and from the **Filter Type** drop down select **Top N**.

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**.

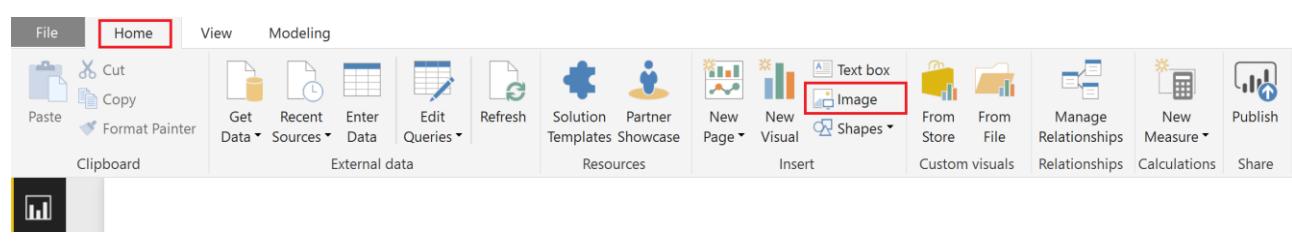
Notice the column chart updates to compare data for the Top 5 competitors.



You need the company logo in most reports.

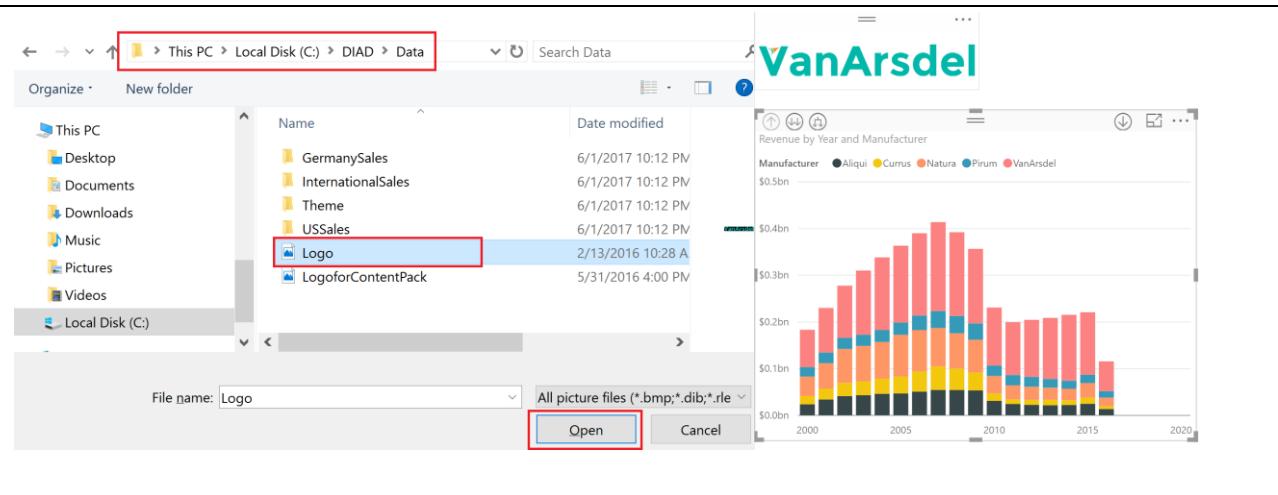
20. Click on the white space on the canvas.

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 a preview feature, we need to enable it.

24. To enable preview feature, from the ribbon select **File -> Options and settings -> Options**.

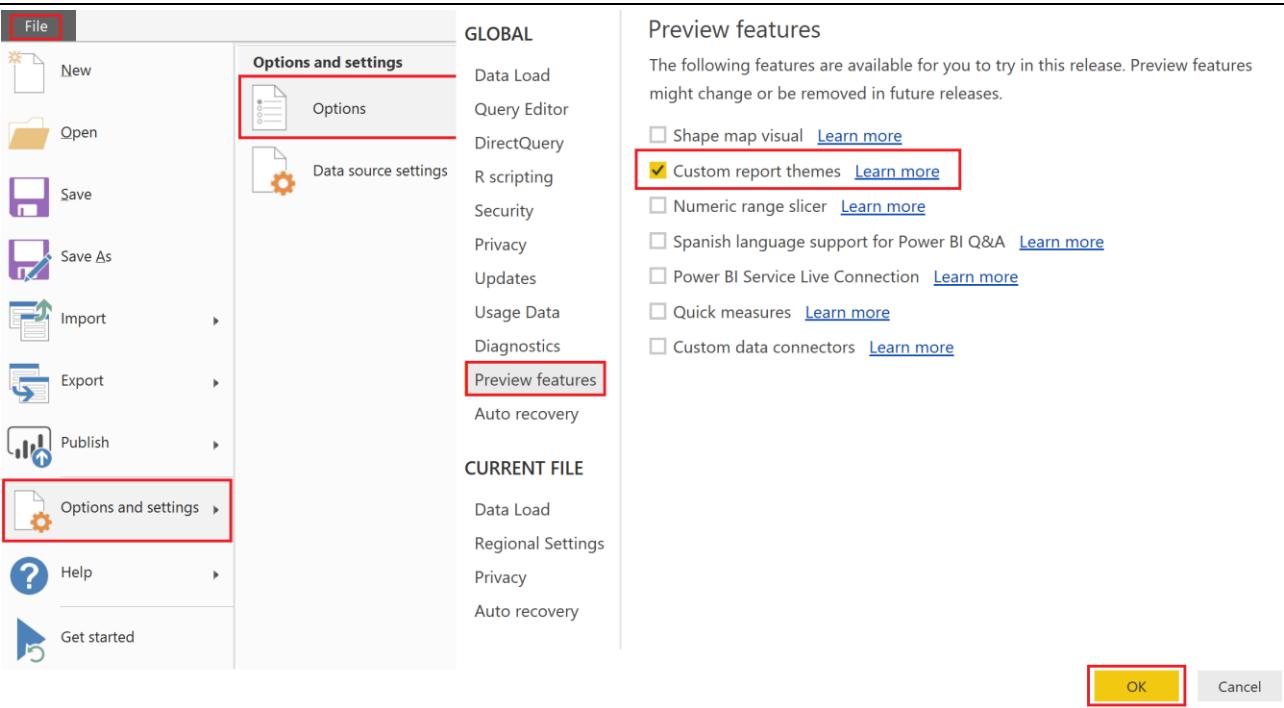
25. Options dialog opens. Select **Custom report themes** from the Preview features list.

26. Select **OK**.

27. A message requesting a **restart** of Power BI Desktop to enable the preview feature is displayed. Click **OK** on the message dialog.

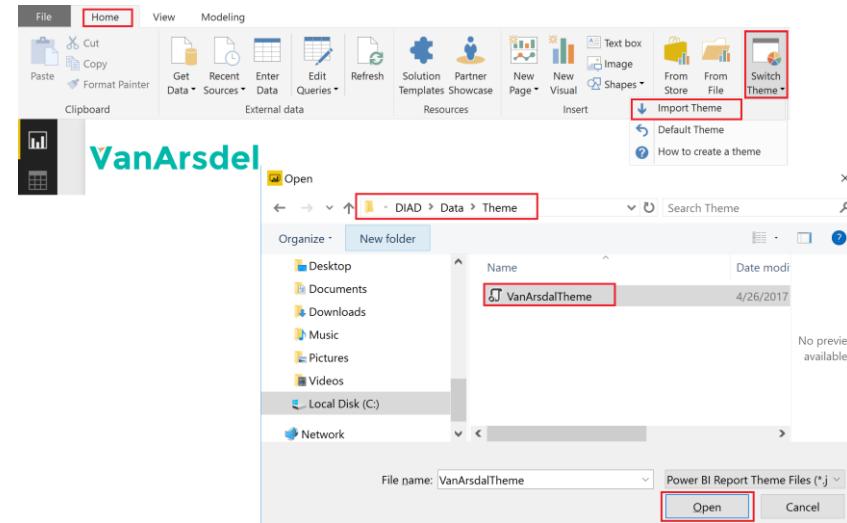
28. Let's save the file before restarting.

Select **File -> Save**



29. From the ribbon select **File -> Exit** to close Power BI Desktop.
30. Navigate to the location where you saved the pbix file (**(MyFirstPowerBIModel.pbix)** file). Double click on the file to open it.

31. From the ribbon, select **Home -> Switch Theme -> Import Theme**.
32. Navigate to **/DIAD/Data/Theme** folder and select **VanArsdelTheme.json** file.
33. Once the theme is imported, a success dialog appears. Click **Close**.



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.

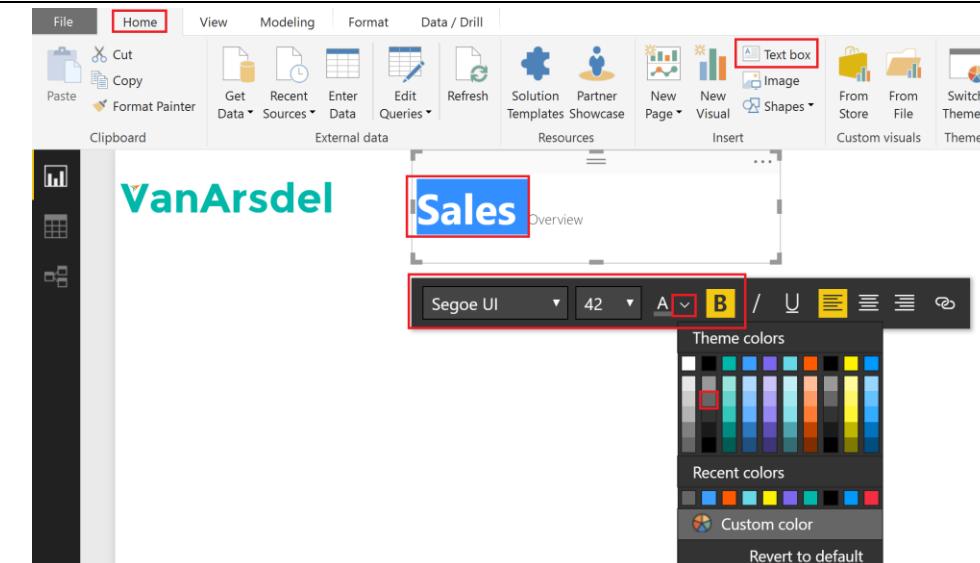
38. Enter the title "**Sales Overview**".

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.

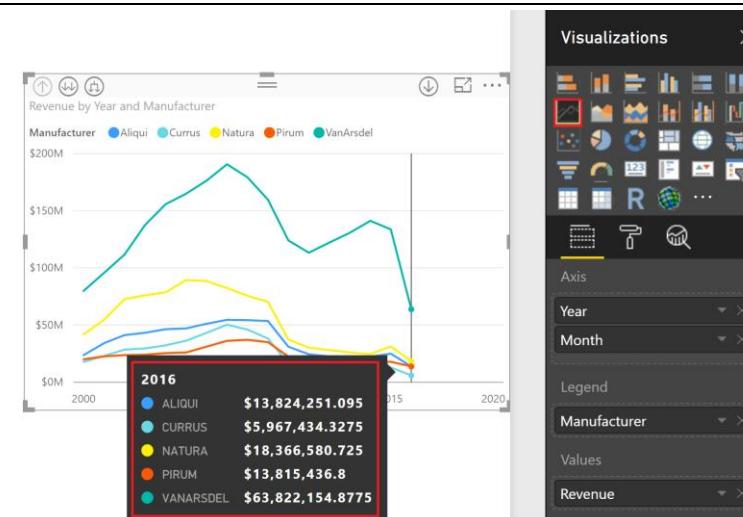
The screenshot shows the Power BI interface with the following components:

- Visualizations pane:** Shows various chart and table icons.
- Fields pane:** Displays the **Date** table with columns: Date, Month, Quarter, and Year. The **Year** column is selected and checked.
- Slicer configuration:** A dropdown menu is open for a slicer, with the "List" option replaced by "Dropdown". The slicer itself is labeled "Year" and is positioned in the top right corner of the canvas.

To compare the revenue by competitors over time line charts are more helpful.

48. Select the **column chart** visual and change it to **Line chart** visual in the **Visualizations**. Your report should be like the one on the right.

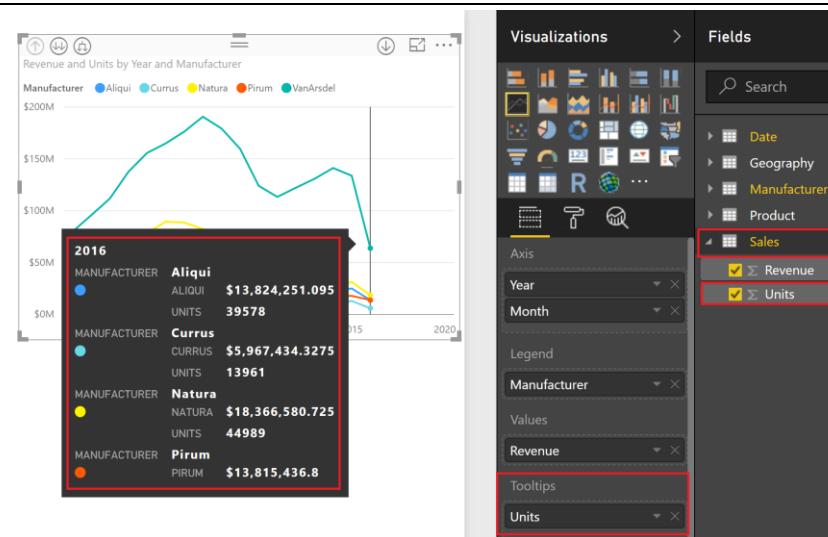
Hover over the visual and notice a tooltip appears displaying the Revenue numbers for each of the manufacturers.



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.



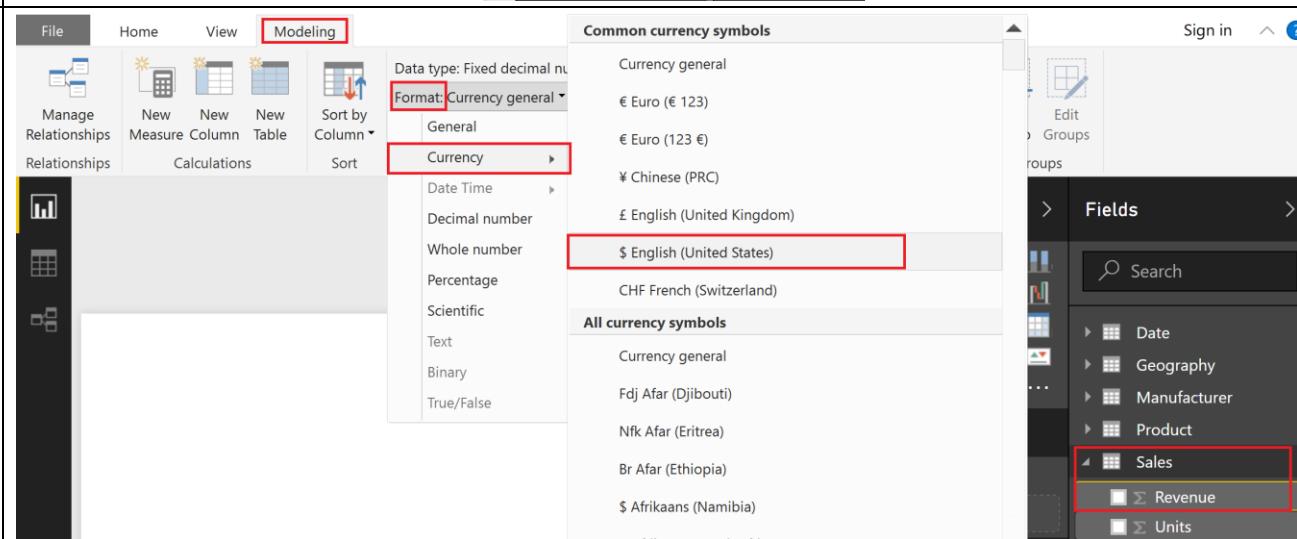
50. Click on the white space on the canvas. From the **Fields** section, expand **Sales** select **Revenue** field.

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)

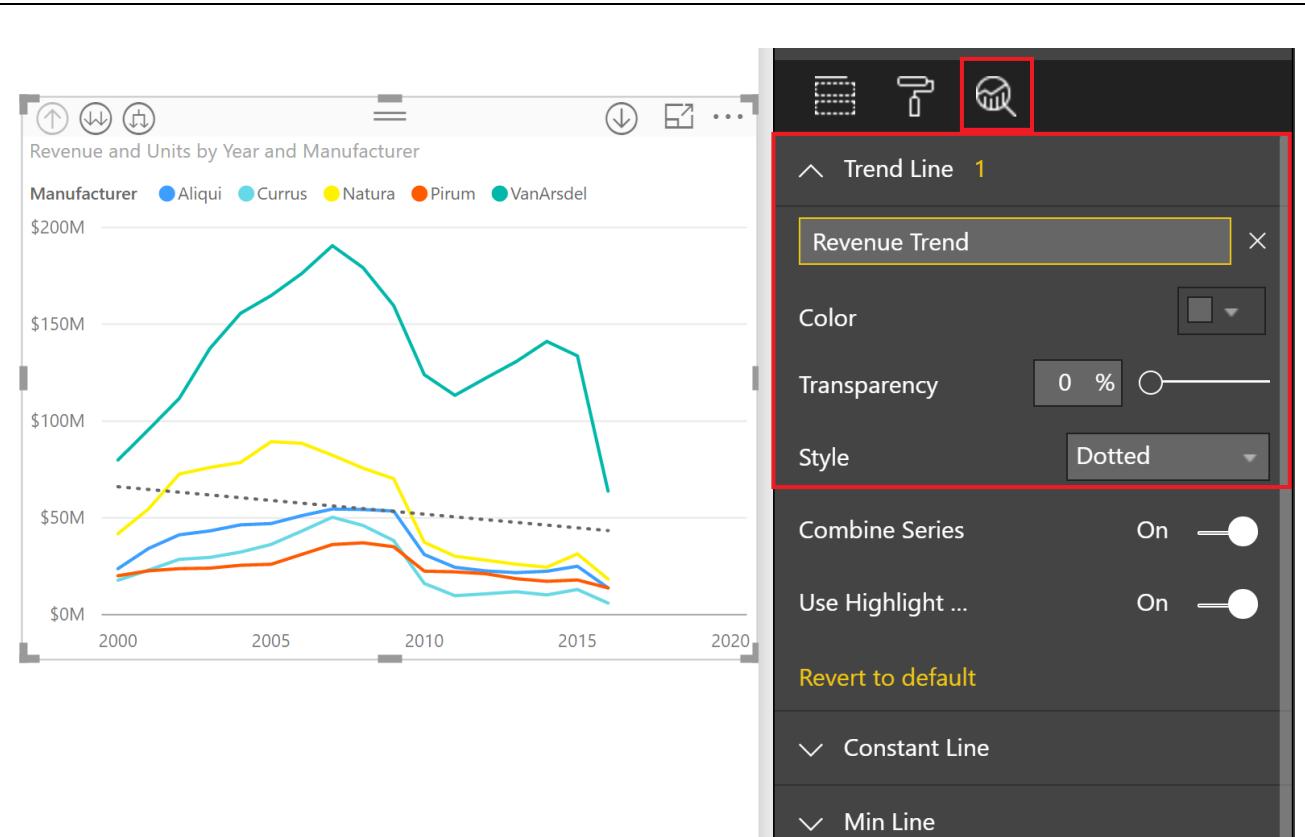
Hover over the line chart and notice the tooltip, both Revenue and Units is formatted.



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.

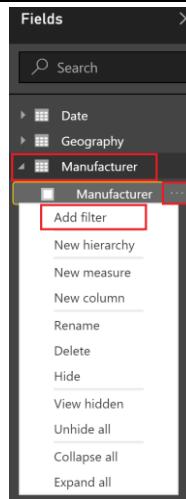
54. With the Line chart selected, from the **Visualization** click on the **Analytics** icon.
55. Notice there is options to add Trend, Constant, Min, Max, Average, Median and Percentile Line. We need to add a Trend Line. Expand **Trend Line** and select **+ Add**.
56. Double click on the **text** area 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.

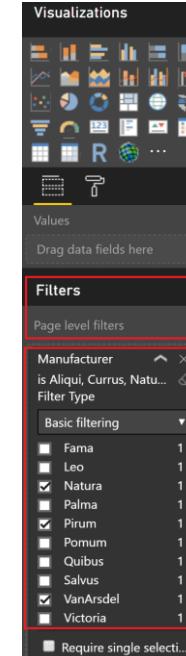


Earlier we used Top N feature to filter the column chart down to Top competitors. Suppose we want to apply this filter to all the visuals in a page, here is how we do it.

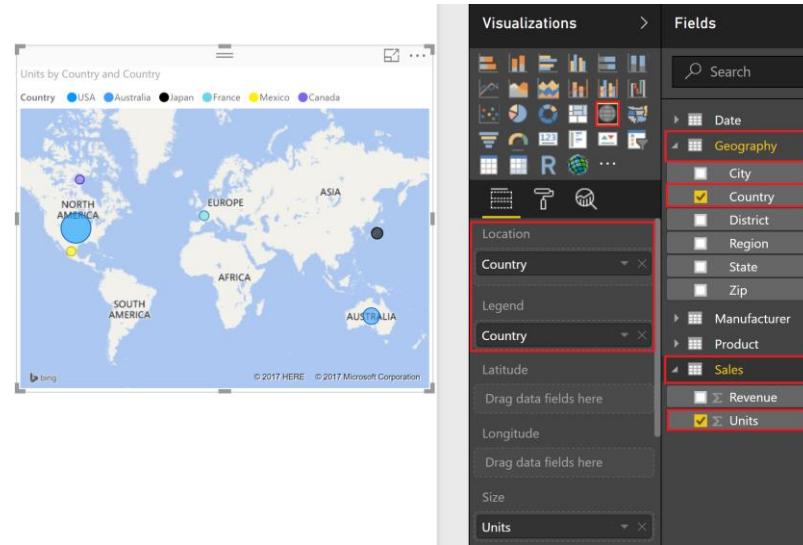
59. To apply a global filter for the entire page, **click on the white space on the canvas**
60. In **Fields** section, select the ellipsis next to **Manufacturer** column in **Manufacturer** table and click **Add Filter**. This will add the **Manufacturer** column to Page filter.



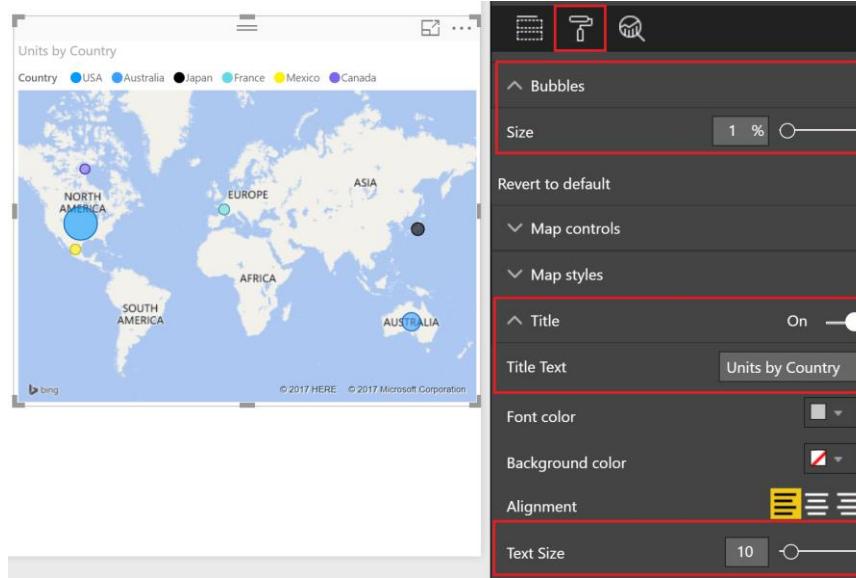
61. In **Visualizations** section, scroll to **Page level filters**.
62. Expand **Manufacturer** and select the manufacturers **Aliqui, Currus, Natura, Pirum** and **VanArsdel** in the filter.



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 to **Location** section 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 roller) 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 screenshot shows the Power BI interface with the following elements:

- Slicer Configuration:** A Slicer titled "Segment" is displayed. The dropdown menu is open, showing "List" and "Dropdown". The "Dropdown" option is highlighted with a red box.
- Visualizations:** A panel showing various visualization icons, with a red box highlighting the icon for a Slicer.
- Fields:** A pane on the right containing a search bar and a list of fields categorized by table:
 - Date
 - Geography
 - Manufacturer
 - Product** (highlighted with a red box):
 - Category
 - Product
 - Product (cluster...)
 - Segment** (highlighted with a red box and checked)

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.

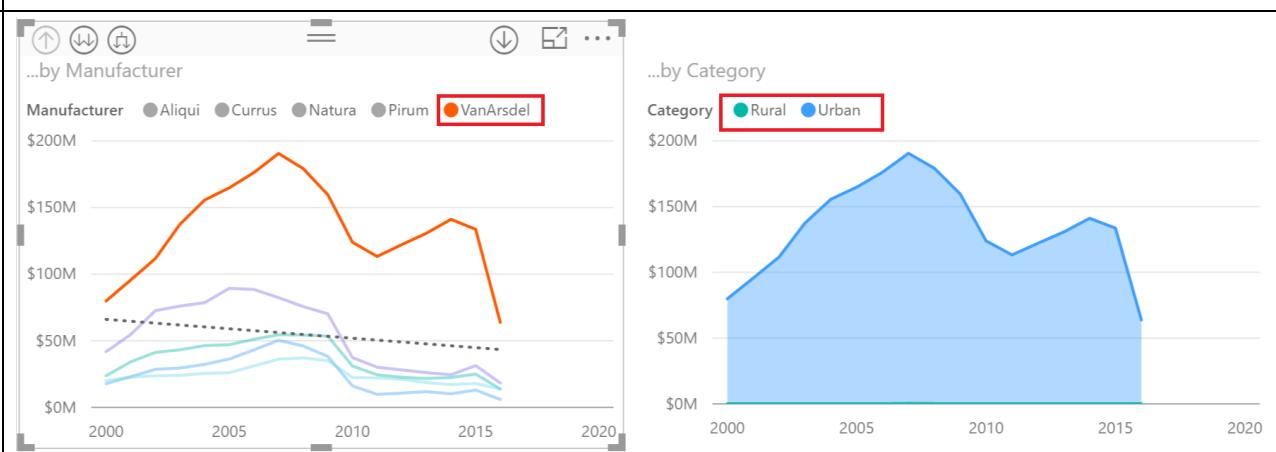
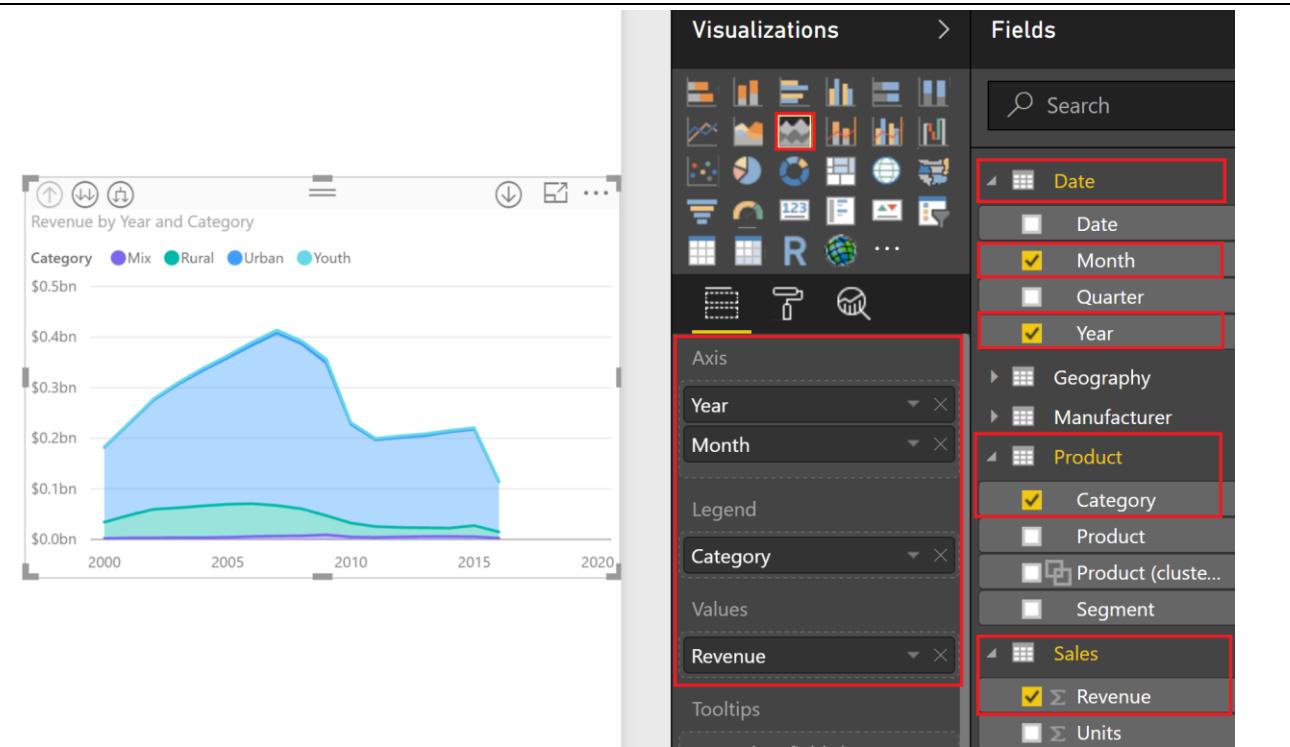
85. In the **line chart**, select **VanArsdel** from the Legend and notice the newly created Stacked area chart is updated.

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.



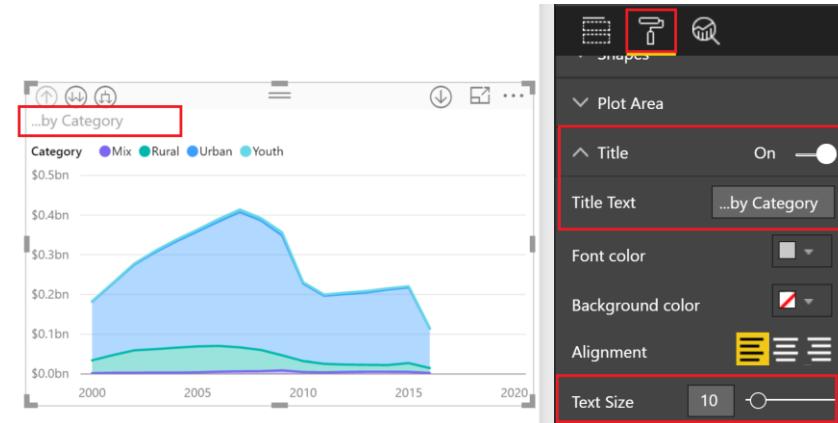
89. With the newly created **Stacked area chart** selected, click on the **Format** (paint roller) option.

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 Value.
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**.

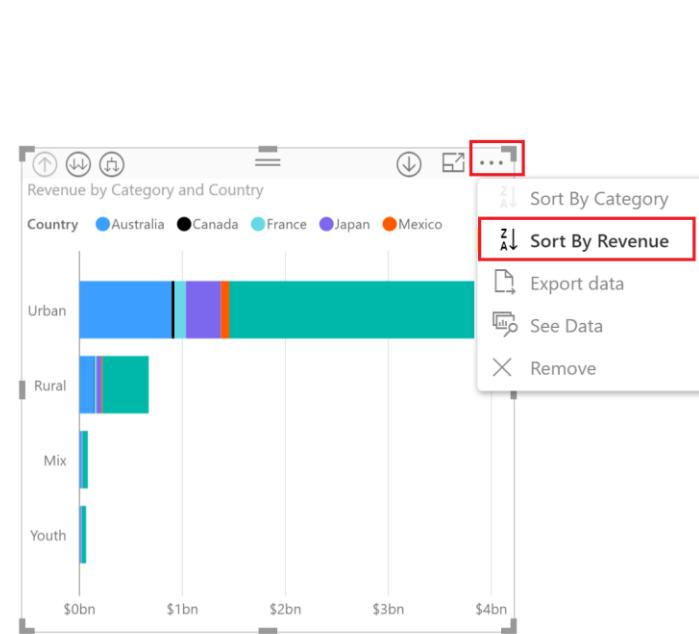
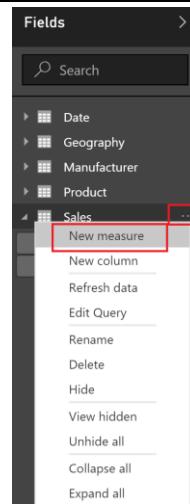


Table	Field
Date	
Geography	Country
Product	Category, Product, Segment
Sales	Revenue
Units	

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.

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

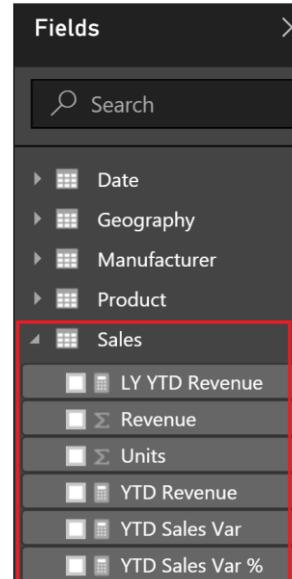
106. Please create the two additional **Measures** in the **Sales** table.

```
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.

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



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**.

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.

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.



The screenshot shows the Power BI interface with the 'Visualizations' and 'Fields' panes open. The 'Visualizations' pane has a 'Stacked Area' icon highlighted with a red box. The 'Fields' pane shows the Date, Product, and Sales tables expanded. The 'Date' table has 'Year' and 'Month' selected. The 'Product' table has 'Category' selected. The 'Sales' table has 'YTD Sales Var' selected. The 'Values' section also lists 'YTD Sales Var'. The 'Filters' section has 'YTD Sales Var' selected.

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.

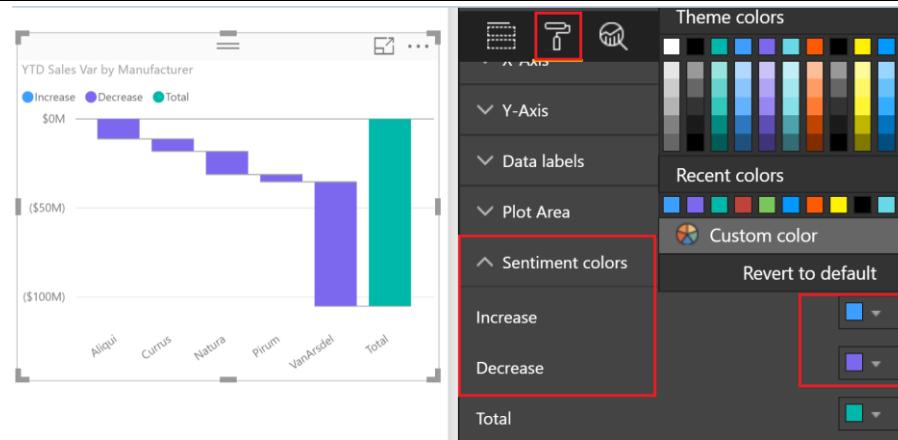
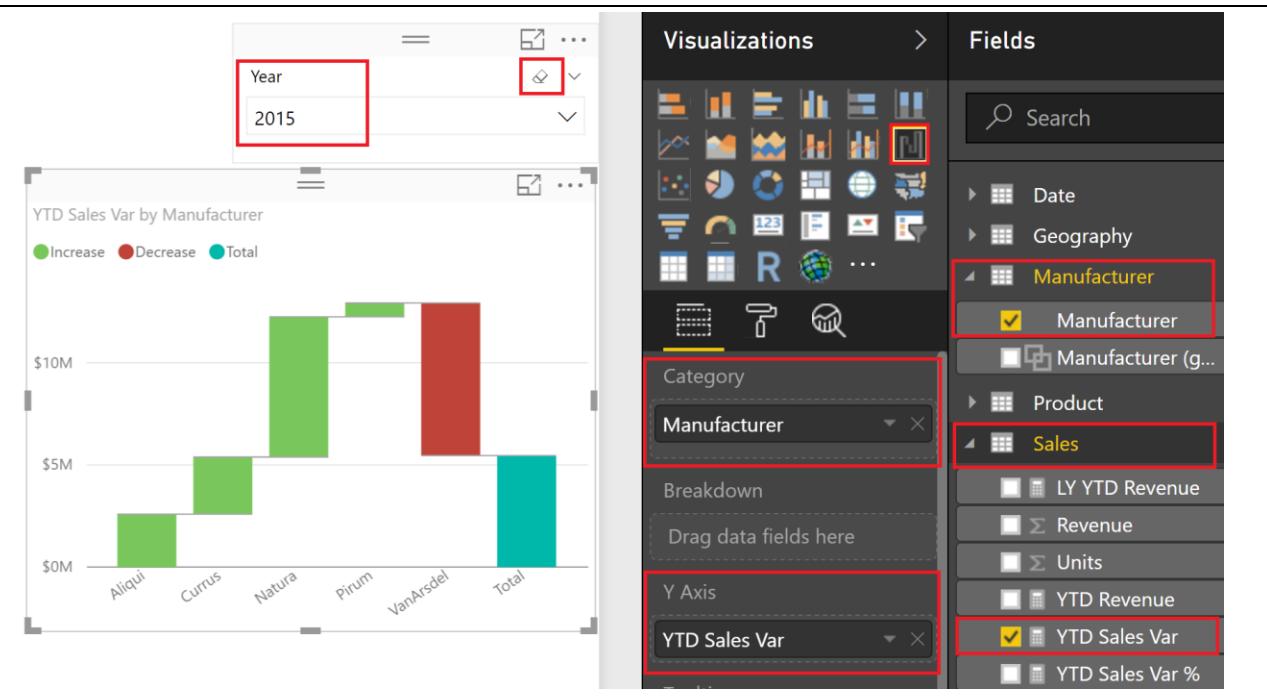
Let's change colors of the waterfall chart to match the rest of the visuals.

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

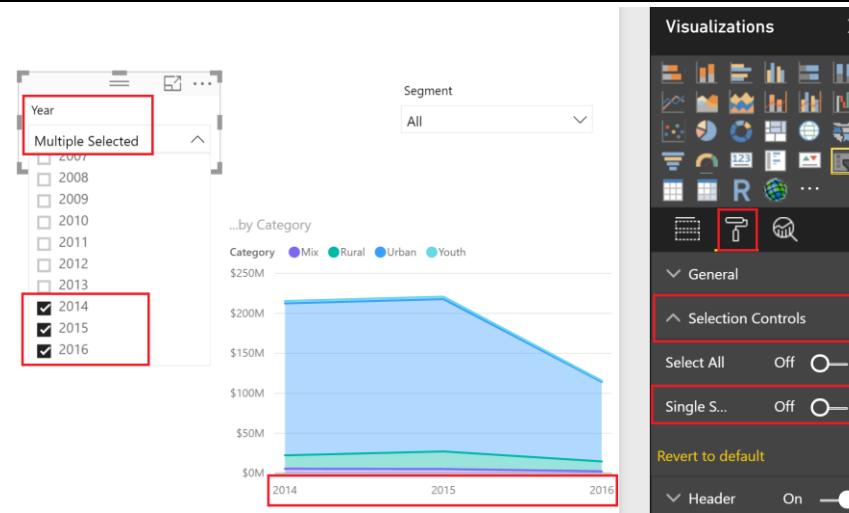
129. By default, a slicer is single select. To enable multi select, highlight **Year slicer**.

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

131. Expand **Selection Controls**.

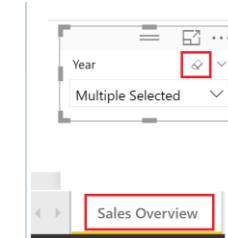
132. Turn **Single Selection Off** by moving the slider bar.

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** 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 Visualizations pane on the left with various chart icons. On the right, the Fields pane is open, showing the Date and Sales tables. The Date table has 'Year' selected. The Sales table has 'LY YTD Revenue' and 'YTD Revenue' selected. The KPI visual on the canvas displays '\$115.80M' with a goal of '\$220.92M (-47.59%)'.

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 are 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 (Direction set to 'High is good'), Title (Title Text set to 'Revenue KPI', Font size set to 10), and Alignment. The KPI visual on the canvas now has a title 'Revenue KPI'.

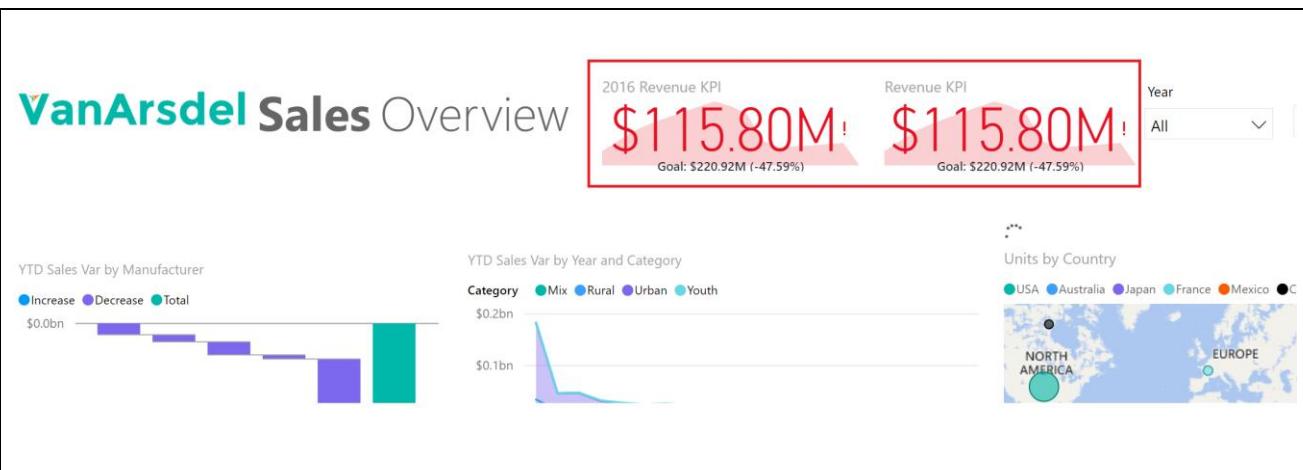
Let's create the KPI that will always show the progress for the latest year in the dataset.

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**".

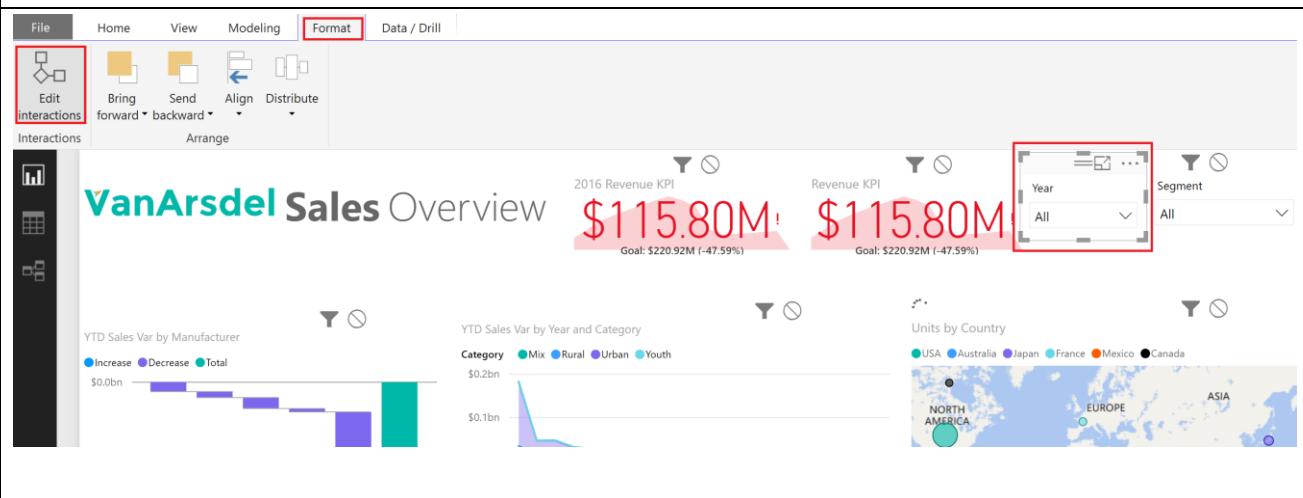
149. Resize the visuals and move it so that it looks similar to the screenshot.



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.

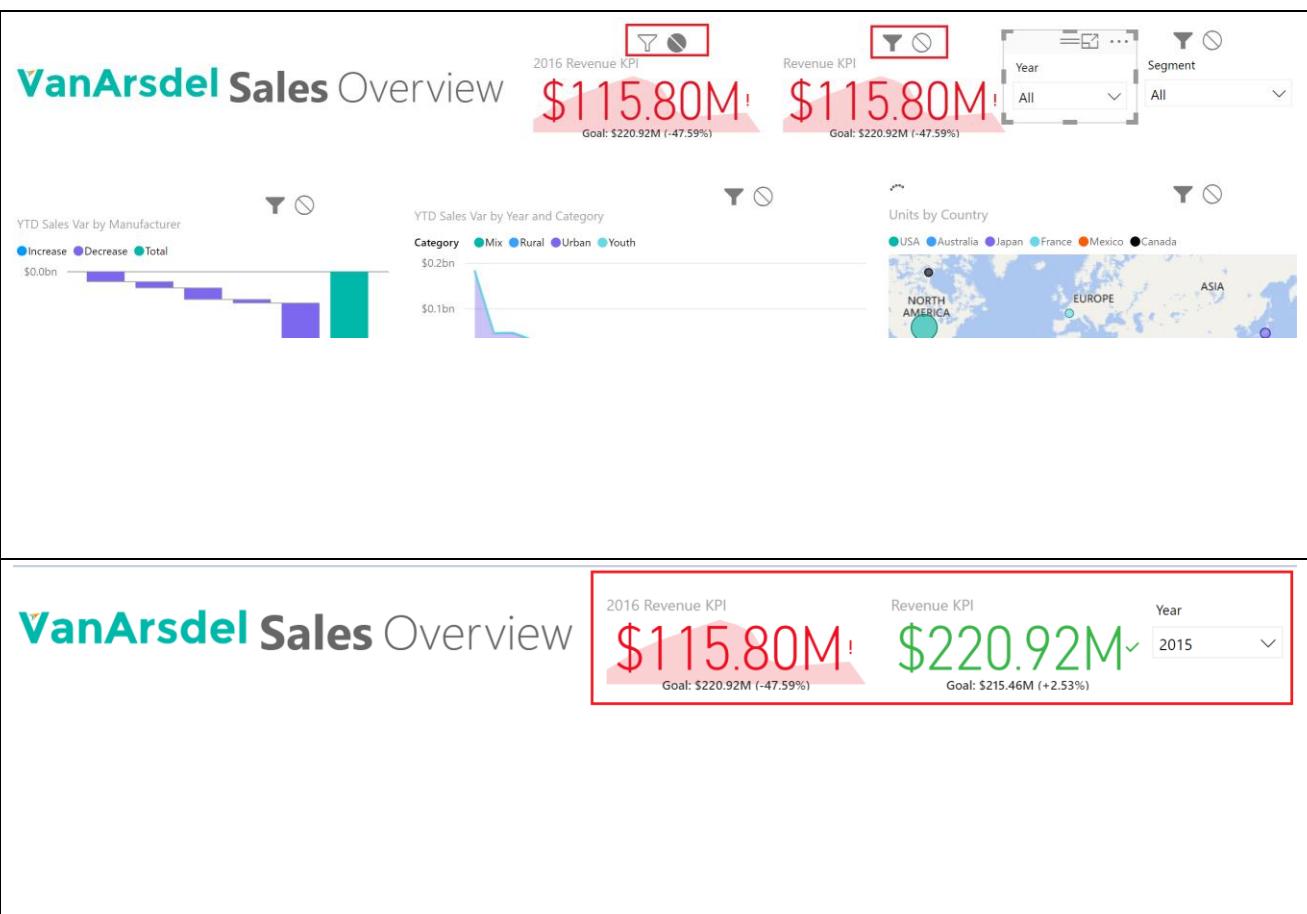
152. Select **None** for the **2016 Revenue KPI**.
153. Click on **Edit Interactions** again to turn off Edit Interactions view.

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.

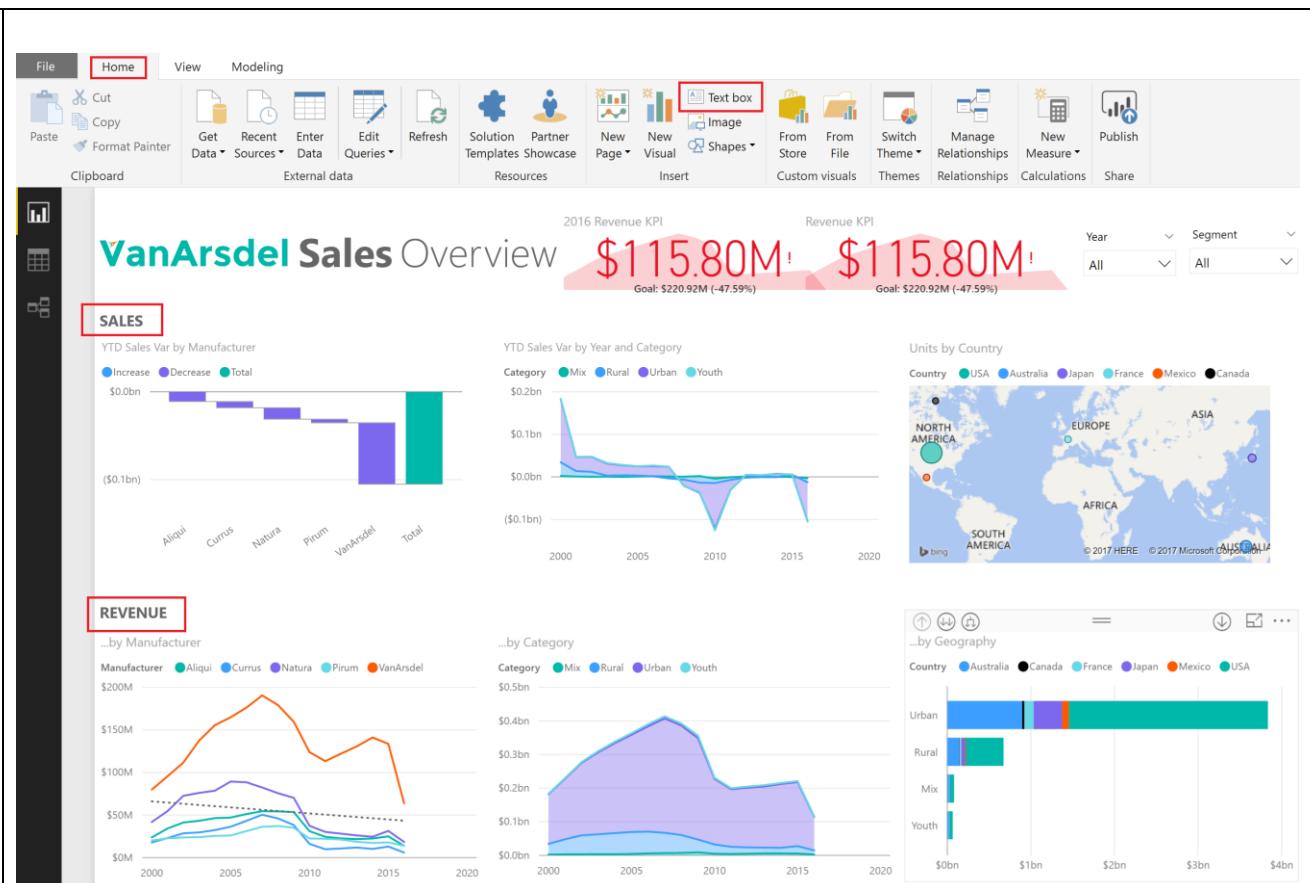
163. From the ribbon select **Home -> Textbox.**

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**.

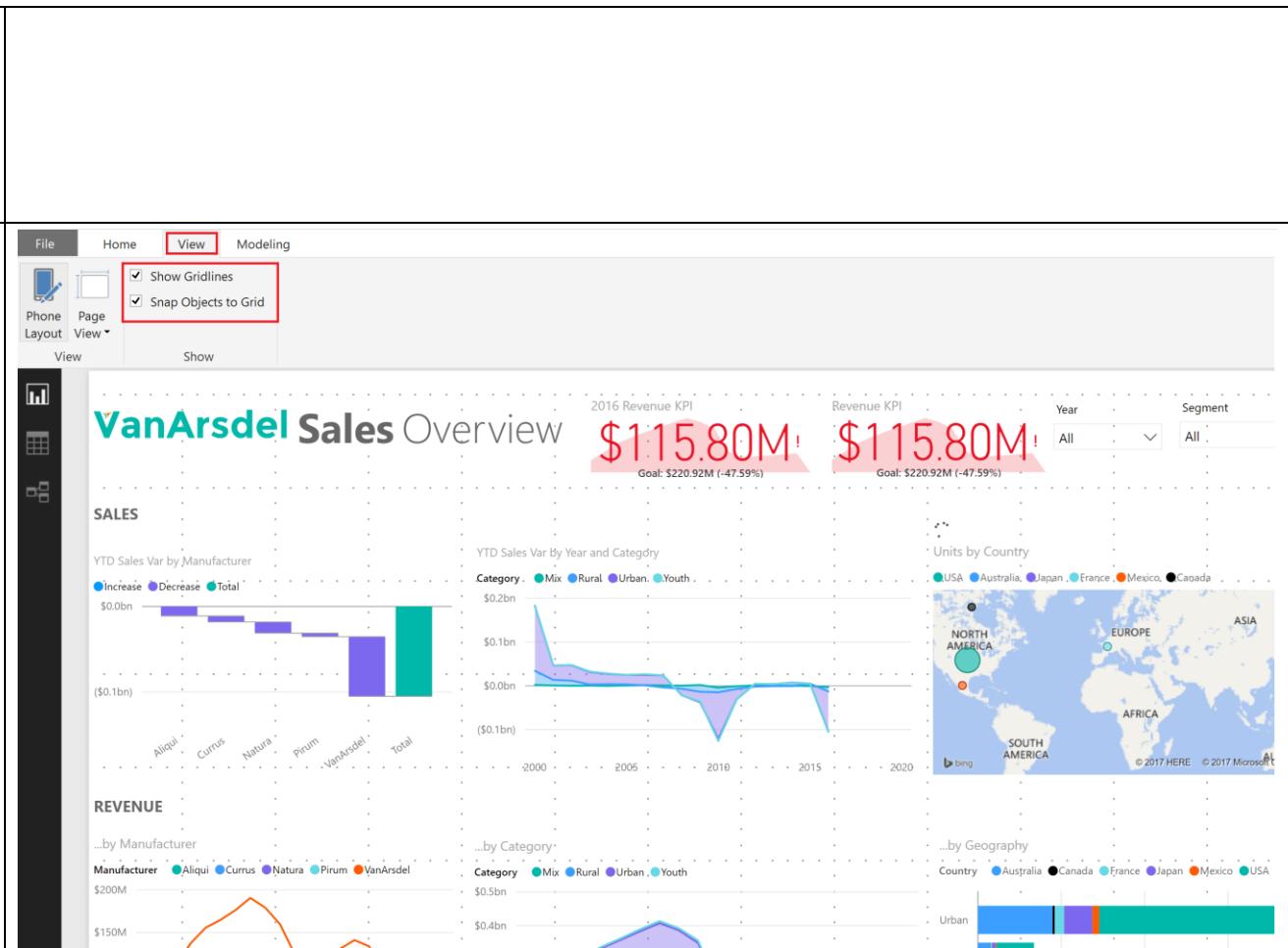
167. Resize and move the text box **above the middle row** as shown in the screenshot.



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]**.

Notice a DAX Expression appears in the text area.

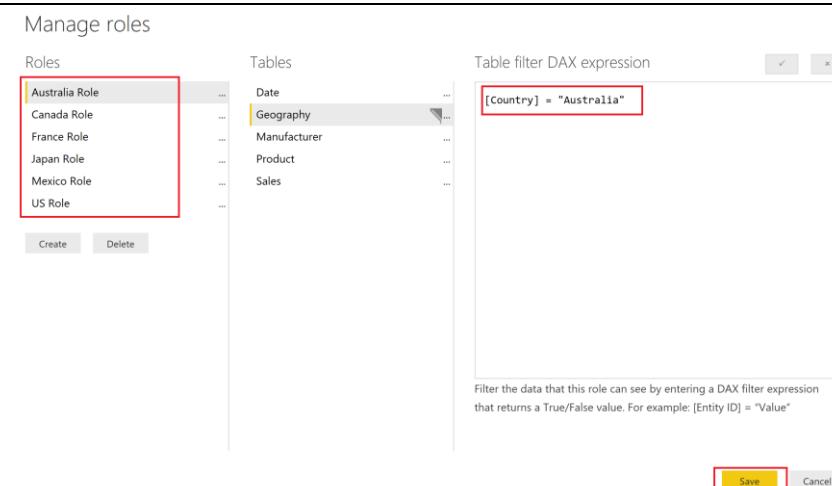
180. Edit the DAX Expression to **[Country] = "USA"**.

181. Click on the **check mark** on the top right corner. This will validate the DAX expression.

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.

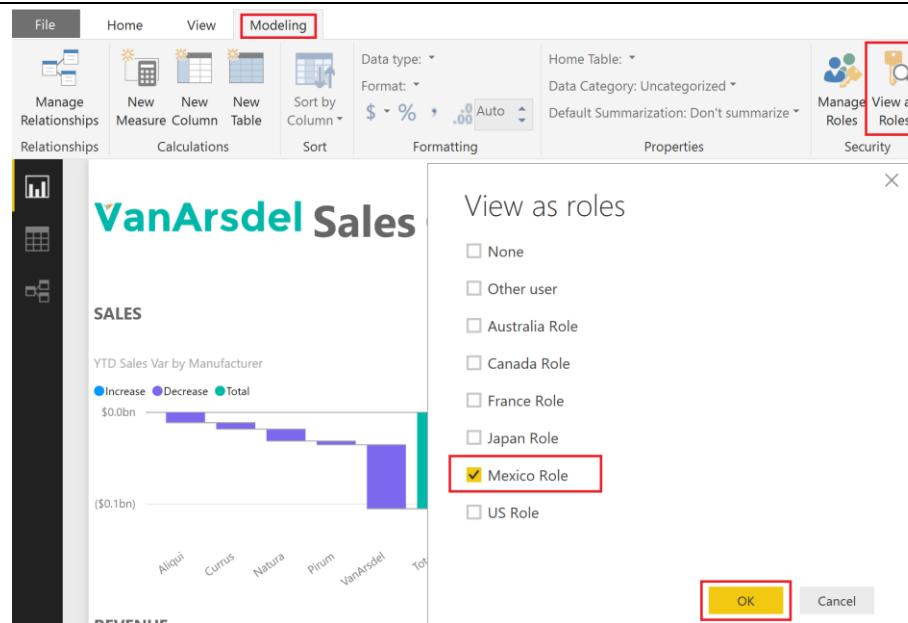


Power BI Desktop provides the capability to validate the roles you created. This helps us view the reports as a different role and make sure it's formatted right for that role.

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

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

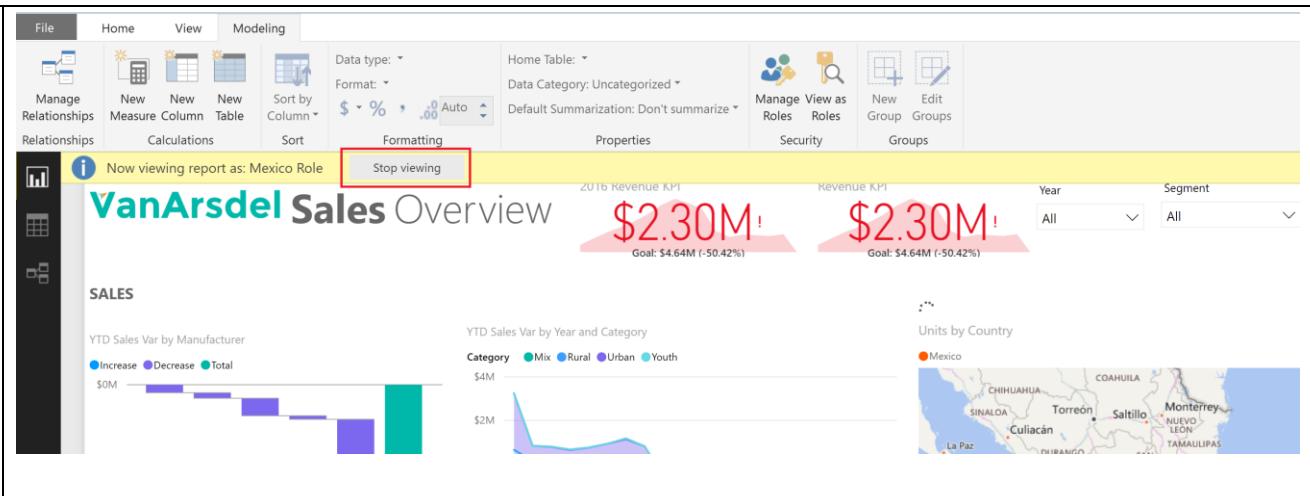
185. Click **OK**.



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

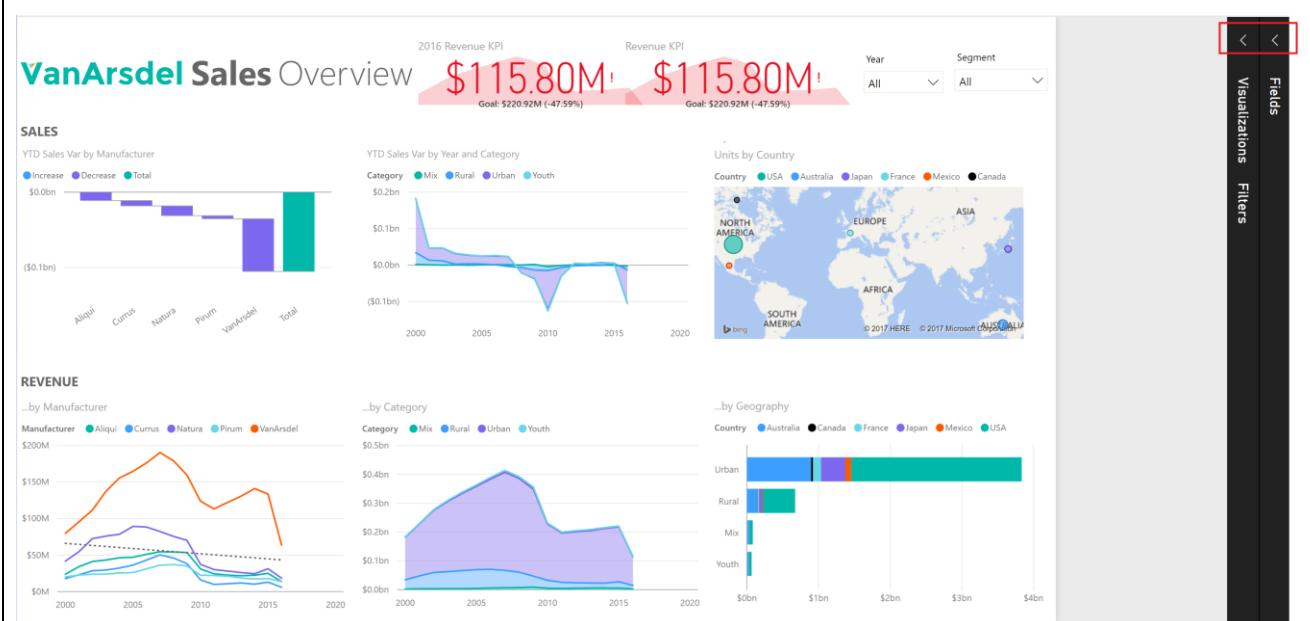
186. Click on **Stop viewing** to exit Mexico Role view.

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.

The screenshot shows the Power BI Service interface. On the left, there is a sidebar with navigation links: Favorites, Recent, Apps, Shared with me, Workspaces, and My Workspace (which is currently selected). The main content area has a title 'Welcome to Power BI'. Below the title, it says 'You're on your way to exploring your data and monitoring what matters.' and 'Let's start by getting some data.' It also includes links 'Need more guidance? Try this tutorial or watch a video'. Below this, there are three sections: 'Microsoft AppSource' (with 'My organization' and 'Services' options), 'Import or Connect to Data' (with 'Files' and 'Databases' options), and two large yellow 'Get' buttons.

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

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

The screenshot shows the Power BI Settings interface. The top navigation bar includes icons for message, settings, and download. Below it, the main menu has tabs: General (selected), Dashboards, Datasets, Workbooks, Alerts, and Subscriptions. On the left, a sidebar lists Privacy, Language, Close account, Developer, and ArcGIS Maps for Power BI (Preview). The main content area is titled 'Preview feature settings' and contains a section for 'New navigation'. It says 'Get easy access to the content that's most important to you.' with a link to 'Learn more'. There are two radio buttons: 'On' (selected) and 'Off'. At the bottom are 'Apply' and 'Discard' buttons.

8. Refresh the browser screen.

9. 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.

Apps: List all the apps you have installed.

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.

The screenshot shows the Power BI Settings interface with the left navigation expanded. The sidebar now includes Favorites, Recent, Apps, Shared with me, Workspaces, and My Workspace. The 'My Workspace' item is highlighted with a red box. The main content area is mostly blank.

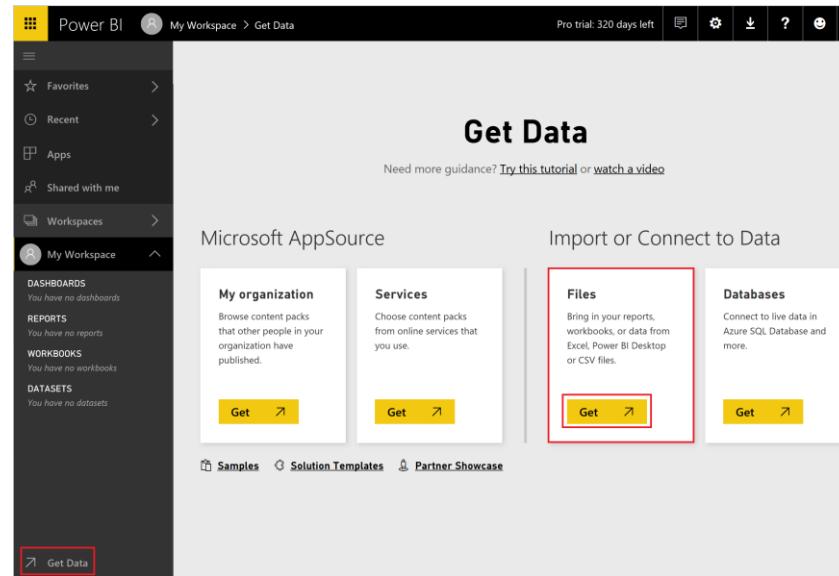
10. Select the down arrow next to **My Workspace**.

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.

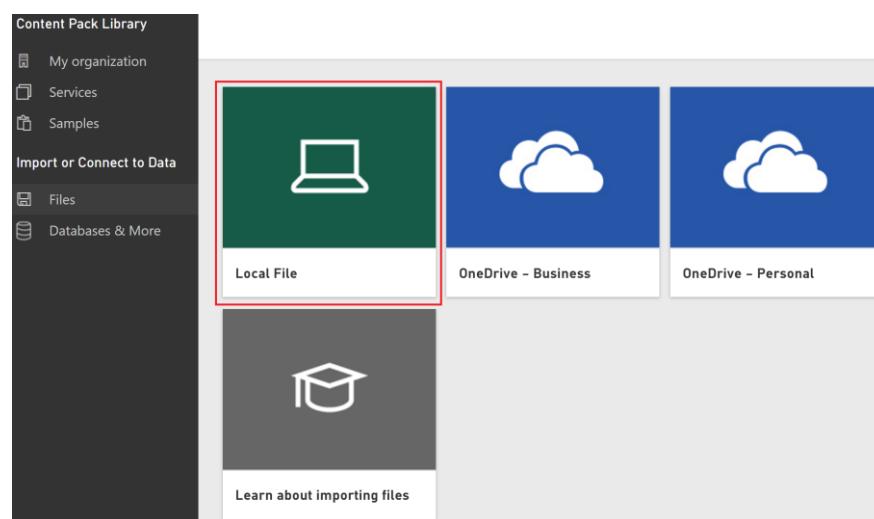
Notice DASHBOARDS, REPORTS, WORKBOOKS and DATASETS section are empty. Let's import a Power BI Desktop file and create dashboards.

11. Select **Get Data** in the bottom left of the screen.

12. Select **Get** under **Files**.



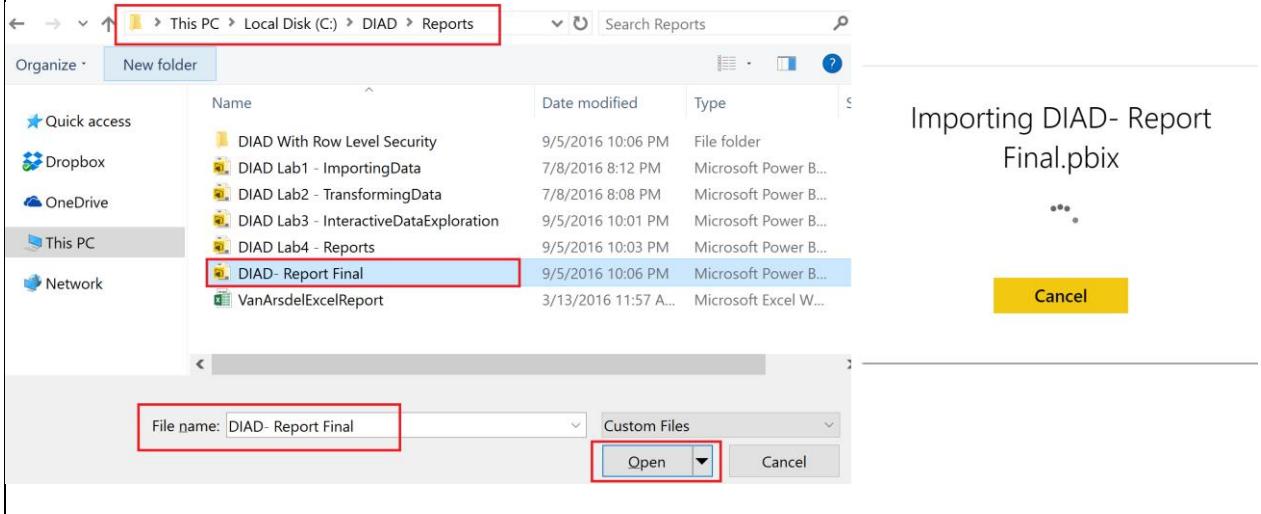
13. Select **Local File** as shown in the Figure.



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

15. 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.



Importing DIAD- Report Final.pbix

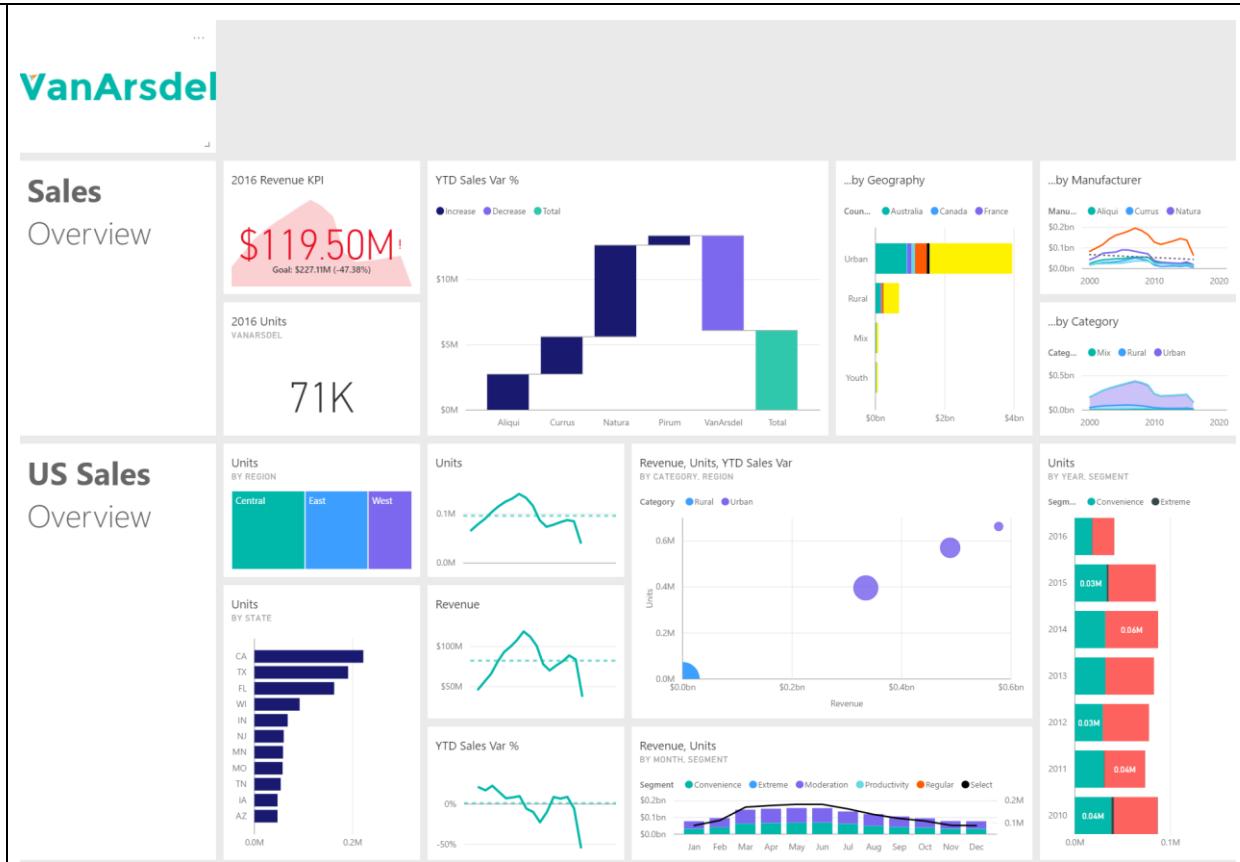
Power BI Service - Operational Dashboard and Sharing

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. At the top, there is a navigation bar with options like 'Add tile', 'Usage metrics', 'View related', 'Set as featured', 'Favorite', 'Subscribe', 'Share', 'Web view', and a '...' menu. A message box on the right says 'Your dataset is ready!' with a 'View dataset' button. The main area has a search bar 'Ask a question about your data'. Below it, there is a tile for 'DIAD- Report Final.pbix' with a chart icon. On the left, there is a sidebar with sections for 'Favorites', 'Recent', 'Apps', 'Shared with me', 'Workspaces', and 'My Workspace'. Under 'My Workspace', there are sections for 'DASHBOARDS' (containing 'DIAD- Report Final.pbix'), 'REPORTS' (containing 'DIAD- Report Final'), 'WORKBOOKS' (with a note 'You have no workbooks'), and 'DATASETS' (containing 'DIAD- Report Final'). The 'DASHBOARDS' section is highlighted with a red box.

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

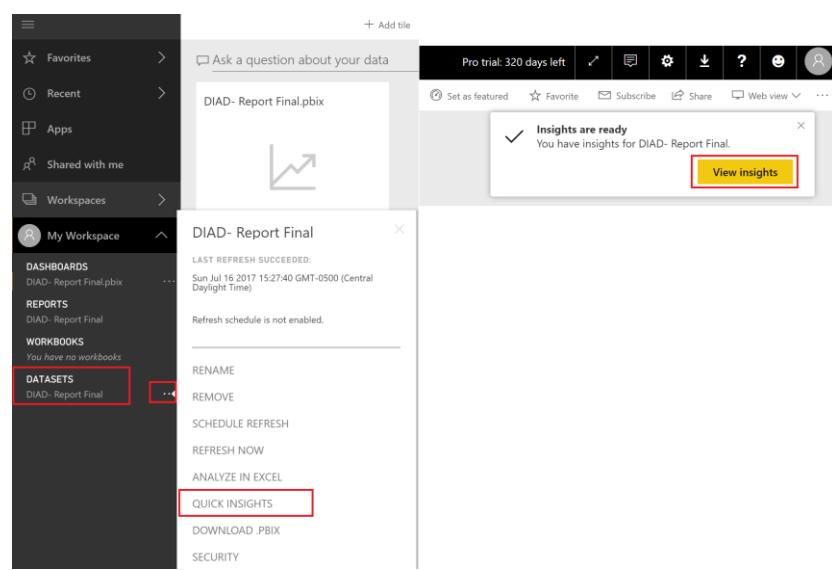


Once the dataset is loaded, Power BI provides an option to get quick insights into the data.

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**.



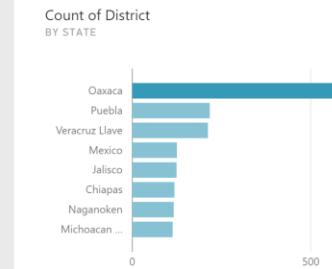
A quick insights report is displayed based on the dataset. This provides insights into data you may have missed and helps to get a quick start with creating dashboards.

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

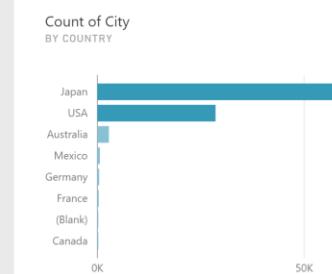
A subset of your data was analyzed and the following insights were found. [Learn more](#)



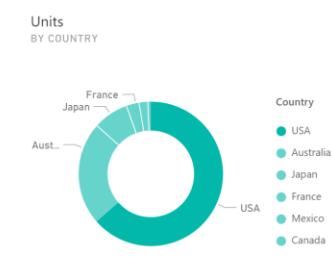
CATEGORY OUTLIERS
'Oaxaca' has noticeably more District.



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

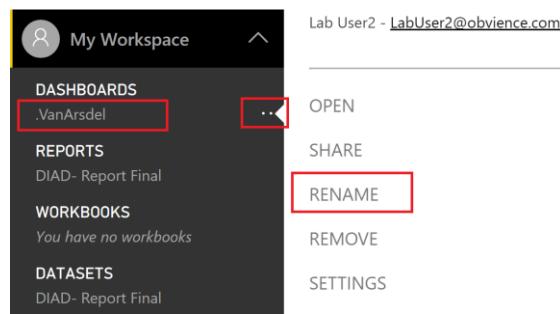


CATEGORY OUTLIERS
'Japan' and 'USA' have noticeably more City.



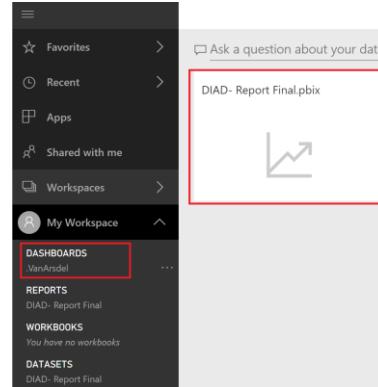
MAJORITY
'USA' accounts for the majority of Units.

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**.

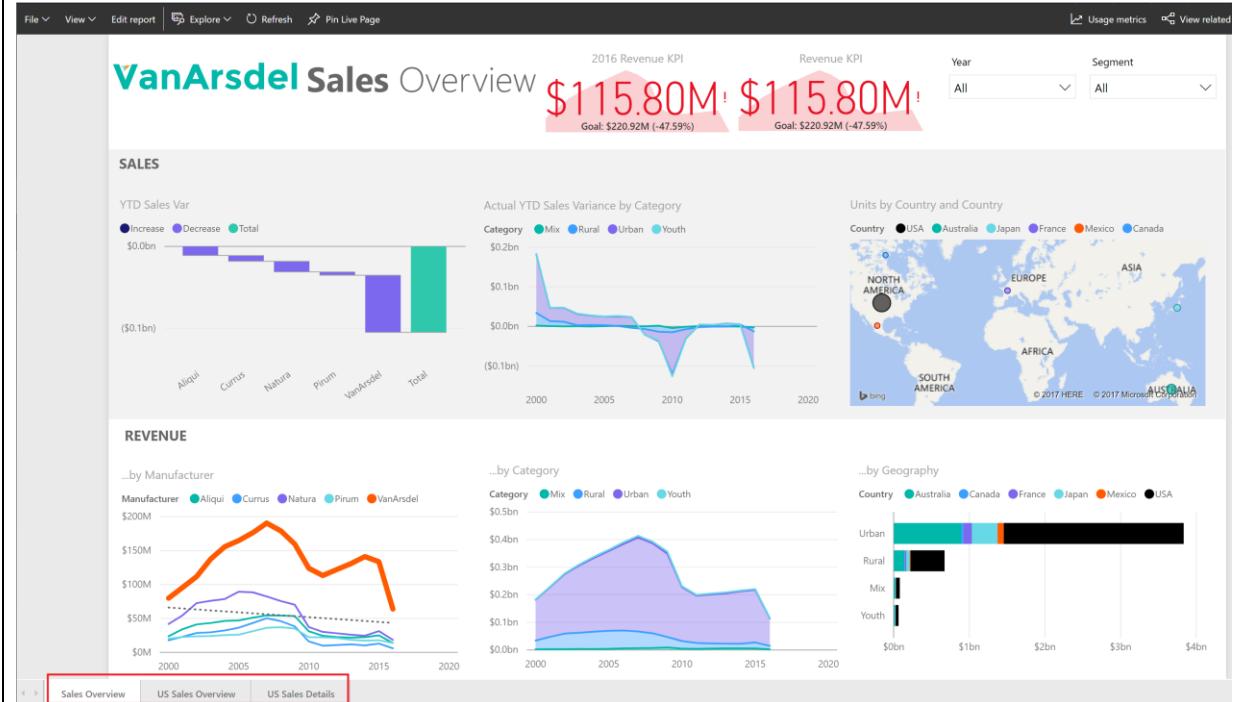


To create an operational dashboard, you need to open the report and select visuals that provide metrics for the organization.

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).



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.

9. 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.

10. 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.

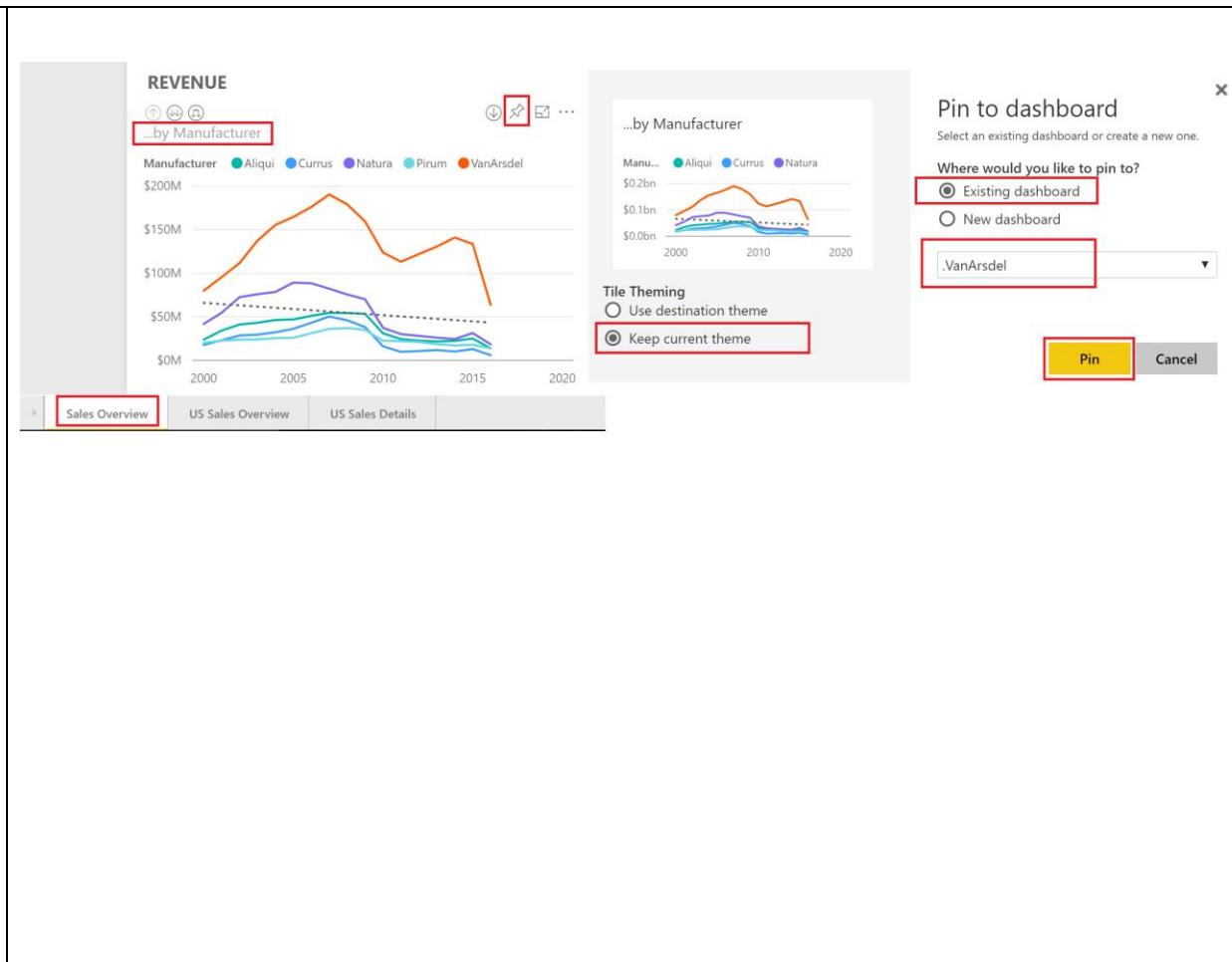
By default Power BI selects the last viewed Dashboard, **.VanArsdel**. There is an option to create a new dashboard or select another dashboard.

11. Select **.VanArsdel** from the dropdown.

12. There is an option to use default destination theme or the current theme. Pick **Keep current theme** radio button.

13. Select **Pin** button.

Once pinning is successful a confirmation dialogue displays.



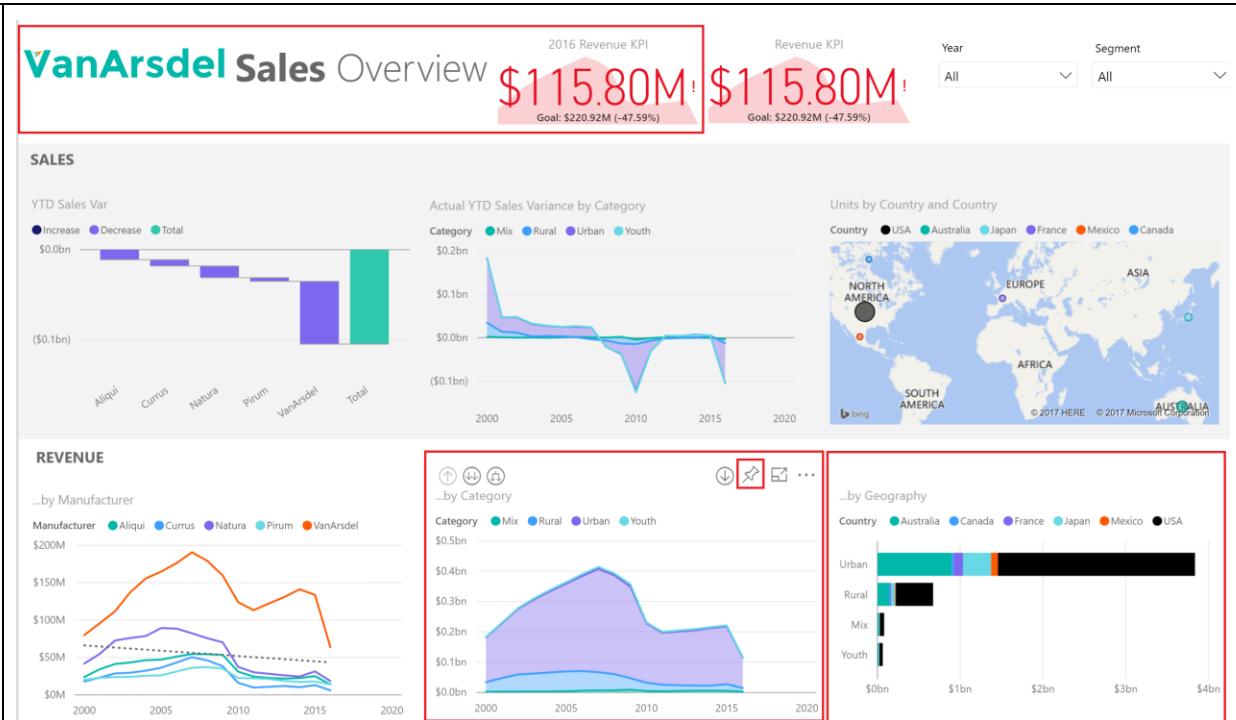
14. Hover over the **logo** visual and click on the **Pin** icon and pin it to **.VanArsdel dashboard**.

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

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

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

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



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

20. Hover over **Waterfall** visual and click on the **Pin** icon and **repeat step 12**.

21. **Clear the 2015** selection in the slicer.



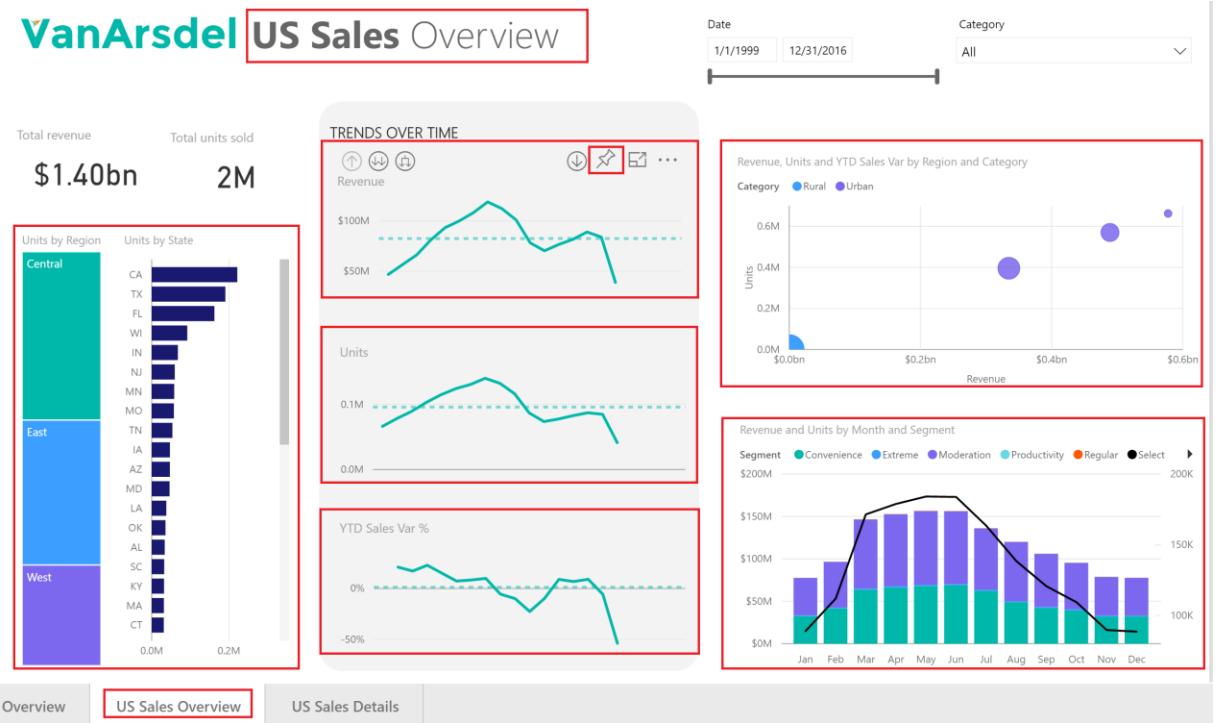
22. Navigate to **US Sales Overview** report page.

23. 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!



24. 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". The main area contains three visual tiles: a line chart showing sales over time by manufacturer, a summary card for "Sales Overview" with a value of \$115.80M, and a KPI section for 2016 Revenue. The left sidebar lists various workspace items, with "DASHBOARDS" and ".VanArsdel" being the active selection.

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

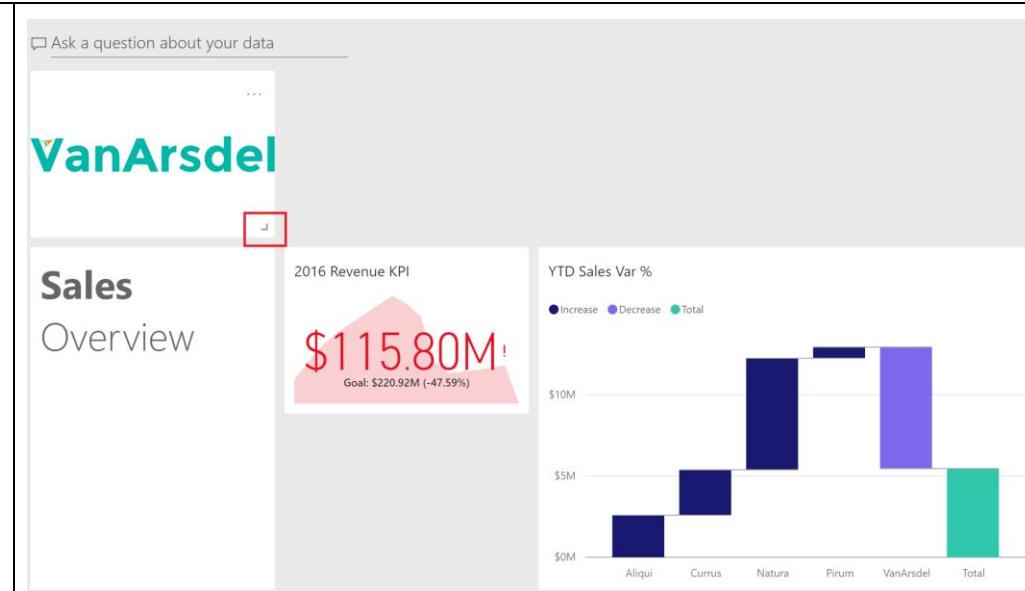
25. Highlight **DIAD-Report Final.pbix** tile and click on the **ellipsis** on the top right corner.
26. Click on the **delete** icon.

This screenshot shows the "DIAD- Report Final.pbix" tile selected in the dashboard. A red box highlights the ellipsis icon in the top right corner of the tile. Below the tile, there is a delete icon (a trash can) which is also highlighted with a red box.

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

28. 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.



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

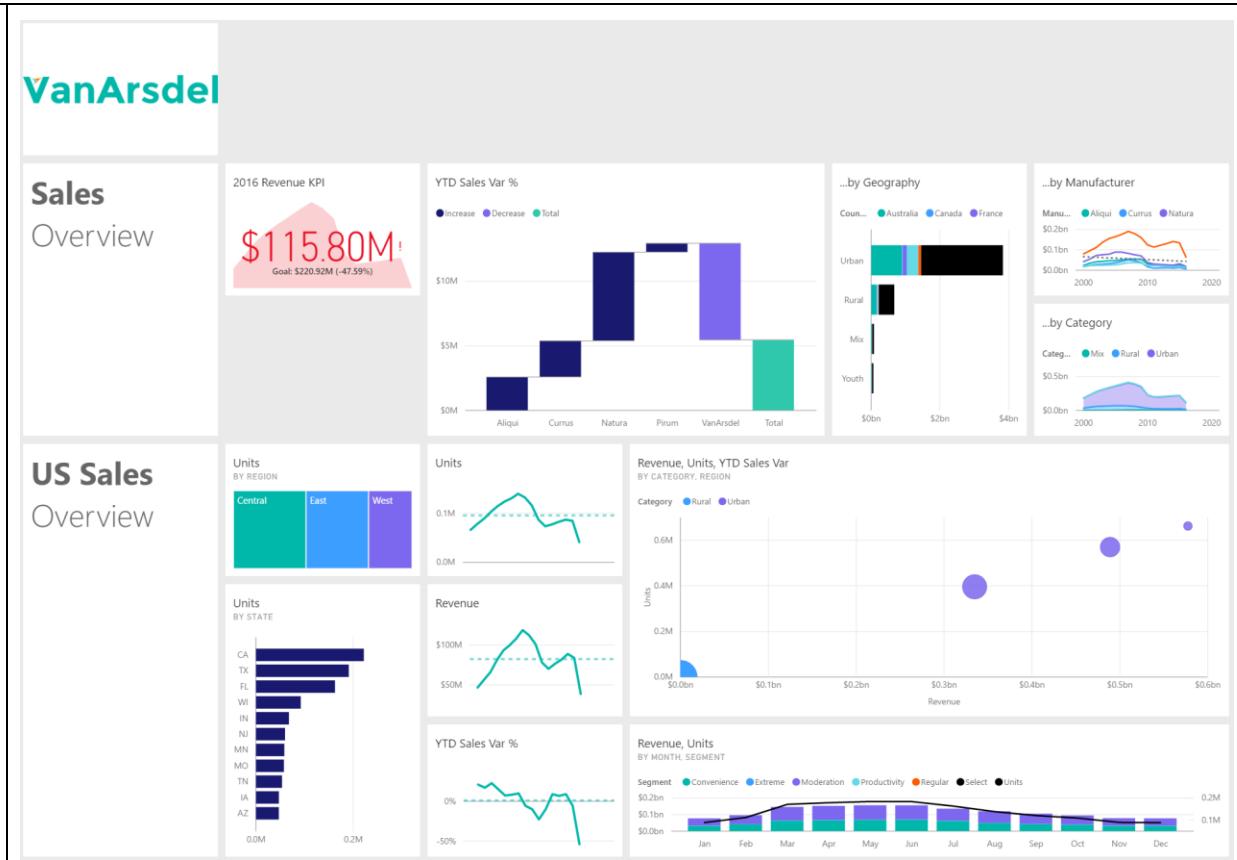
Logo is in the top row. Below that is the Sales Overview information and the bottom row is US Sales Overview information.

Note: The tiles can be of various sizes.

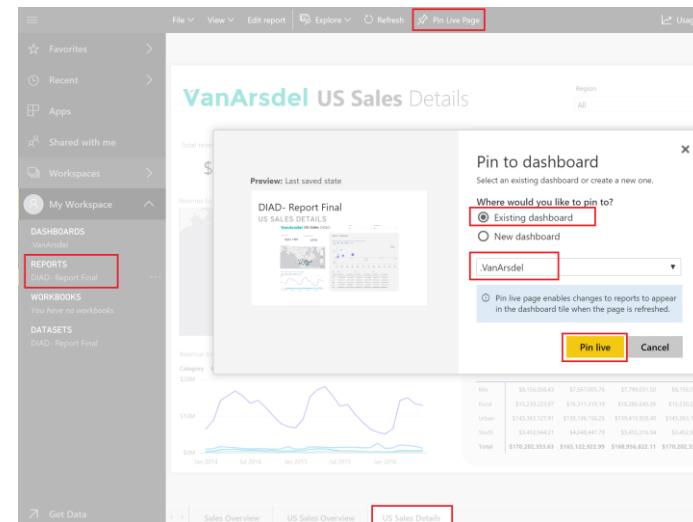
Notice clicking on a tile navigates you to the underlying report. Tiles are not interactive.

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.

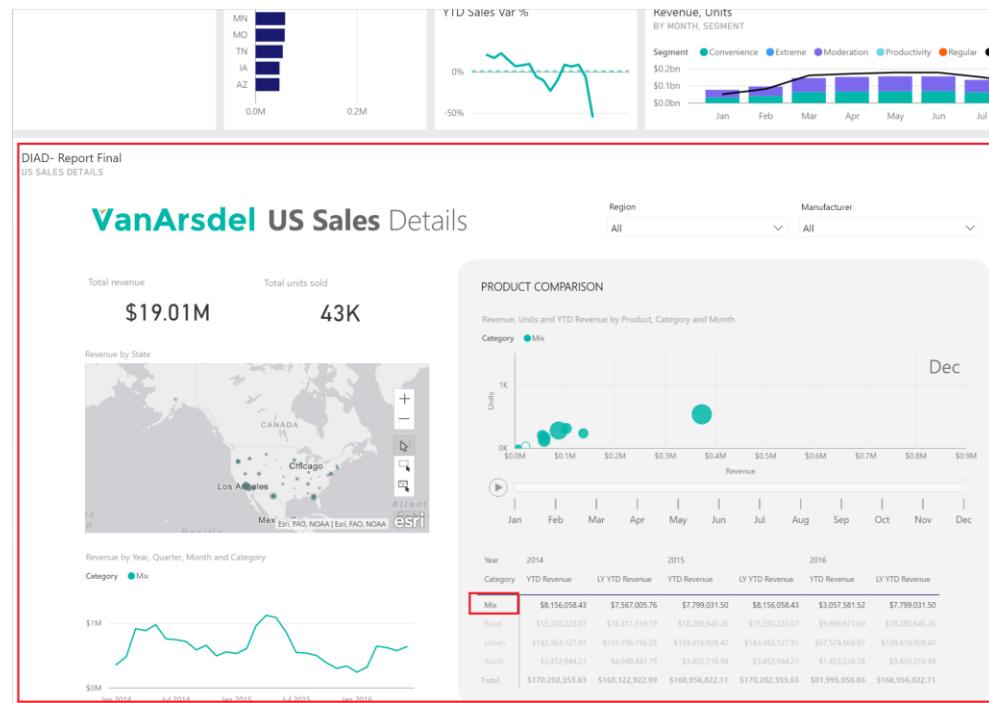
We can pin a complete report to the dashboard. This report tile will be interactive. Let's do this.



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



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



37. 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.

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

38. 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.

39. 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**.

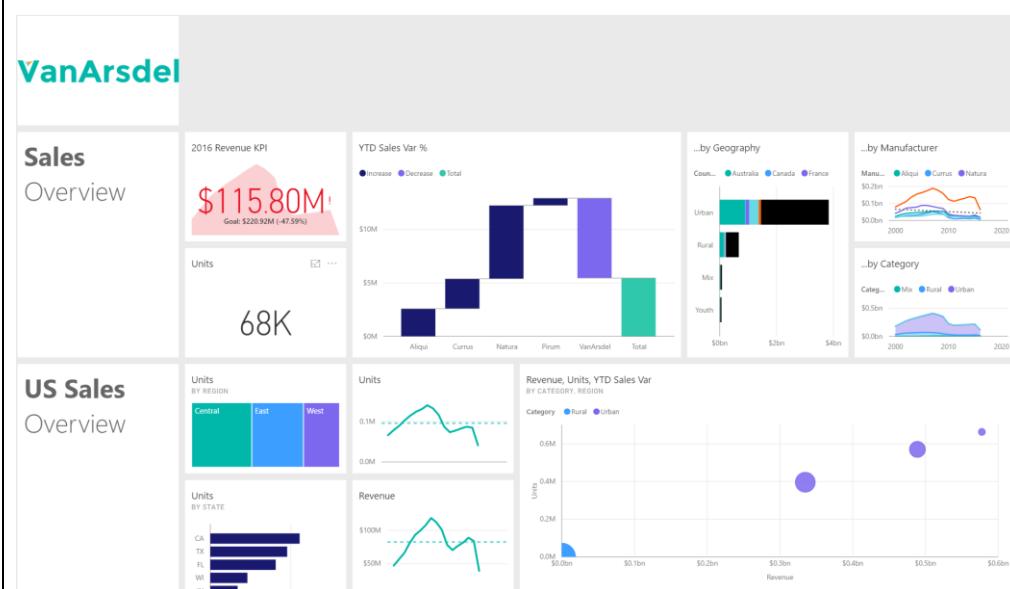
40. Click on the < **Exit Q&A** or Power BI or the dashboard name to get to the dashboard

The screenshot shows the Power BI Q&A interface. On the left is a sidebar with navigation options: Favorites, Recent, Apps, 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 displays the query "Total units in 2016 for VanArsdel" in a text input field. Below it is a card visualization showing the number "68,071" with the unit "Units" underneath. A red box highlights both the query text and the card visualization.

The screenshot shows the Power BI interface. The main area displays the query "Total quantity in 2016 for VanArsdel" in a text input field. Below it is a card visualization showing the number "68071" with the unit "Units" underneath. A red box highlights both the query text and the card visualization. To the right, a "Pin to dashboard" dialog box is open. It asks "Where would you like to pin to?" with two options: "Existing dashboard" (radio button selected) and "New dashboard". A dropdown menu shows ".VanArsdel" with a red box around it. At the bottom of the dialog are "Pin" and "Cancel" buttons, with the "Pin" button highlighted by a red box.

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

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



You can hover over a tile to edit it.

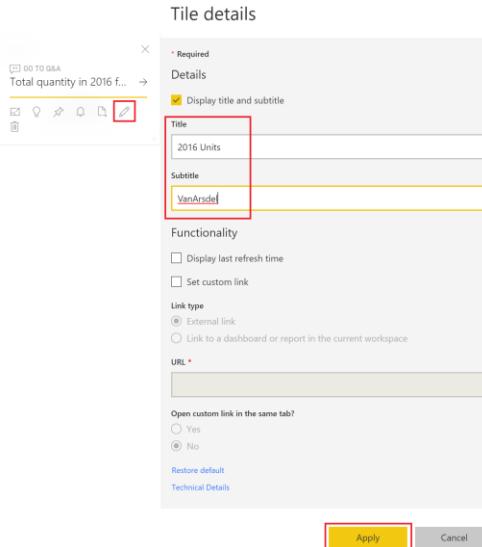
42. Hover over the newly created **Unit** tile and click on the **ellipsis** on the top right corner.

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

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

45. Add a Subtitle as **VanArsdel**.

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



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.

47. Hover over the newly created **Unit** tile and click on the **ellipsis** on the top right corner.
48. Select the **bell** icon. Notice Manage Alerts dialog opens on the right.
49. Select **Add alert rule**.
50. Update Alert title to **Alert for 2016 VanArsdel Units**.
51. Update Threshold to **69000**.
52. 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 a '+ Add alert rule' button. Below the header, it shows an active alert for '2016 VanArsdel Units'. The alert is titled 'Alert for 2016 VanArsdel Units' and is set to 'On'. 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 this, a note says 'By default, you'll receive notifications on the service in the notification center.' with a checked 'Send me email, too' checkbox. At the bottom of the dialog are 'Save and close' and 'Cancel' buttons, both highlighted with red boxes.

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.

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

54. Click on light bulb icon.

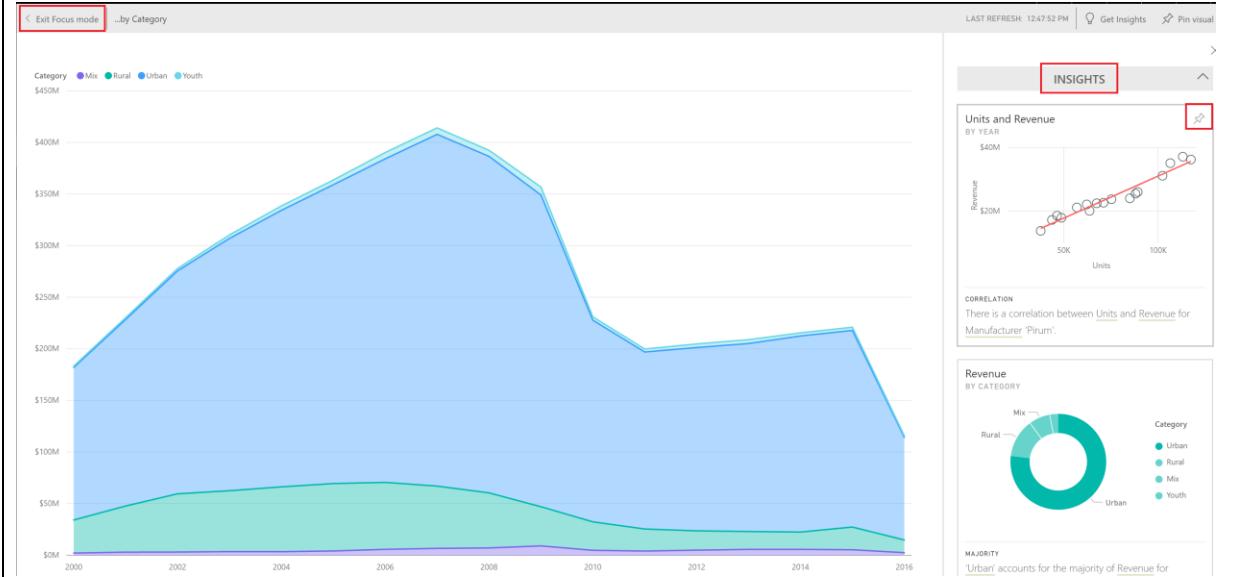


You will be navigated to **focus mode** and on the right panel you will find quick insights into the data that makes up the tile.

55. **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.

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



57. In the left panel, click **REPORTS -> DIAD-Report Final** to navigate the report.

58. Navigate to **US Sales Details** page.

59. The bottom right visual is the matrix visual. Let's look at the visual's behavior.

60. Click **Category Mix** in the **Matrix** visual. Notice all the other visuals updates. Now all the visuals are filtered by Category of Mix.

61. Click on **Year 2015** in the **Matrix** visual. Now all the visuals are updated to filter data for the Year 2015.

62. 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.

63. Hover over the **Matrix visual** and click on the **In Focus mode** icon on the top right corner.



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

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

65. 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	YTD Revenue				
Abbas MA	\$2,423,286.86		\$2,638,592.88	\$1,021,822.62	\$2,423,286.86
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
Alqui MA	\$1,009,318.96	\$972,645.27	\$867,860.18	\$1,009,318.96	\$228,452.33
Alqui RP	\$2,036,570.45	\$2,166,440.54	\$2,259,604.41	\$2,036,570.45	\$1,252,565.26
Alqui RS	\$1,461,208.98	\$1,302,583.17	\$2,043,932.42	\$1,461,208.98	\$1,324,757.80
Alqui UC	\$4,336,938.27	\$4,173,433.74	\$4,681,395.76	\$4,336,938.27	\$2,843,006.09
Alqui UE	\$3,538,249.73	\$3,812,727.35	\$4,439,983.38	\$3,538,249.73	\$2,311,820.81
Alqui UM	\$1,083,198.38	\$637,022.19	\$764,749.49	\$1,083,198.38	\$443,983.38

66. 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).

67. 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	YTD Revenue				
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		
Alqui 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

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

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

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

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

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

Feel free to explore **See Data** feature. **See Records** feature is currently not available for the matrix visual. You can use any of the other visuals to explore this feature. The behavior of this feature is like what we explored in Power BI Desktop.

The screenshot shows a 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' as columns. The first row shows '2014' and 'Rural' with a value of '\$15,230,223.07'. A context menu is open over this cell, with several options: 'Back to Report', 'See Data', 'Show Next Level', 'Expand to next level', 'Drill Up', and 'Drill Down'. The 'Drill Down' option is also highlighted with a red box. The matrix visual itself contains YTD Revenue data for various categories across years.

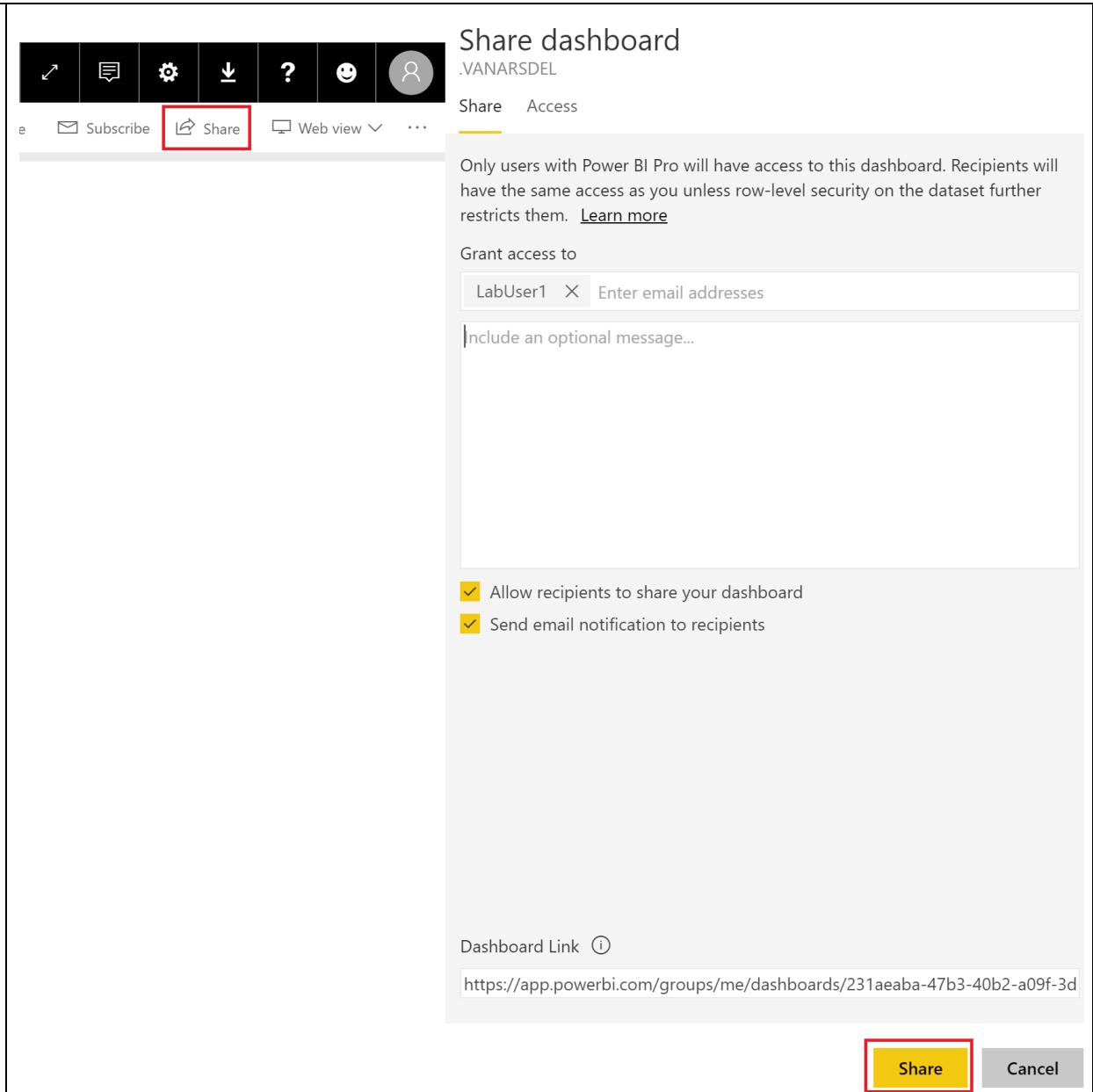
Year	Category	YTD Revenue	2014	Rural	\$15,230,223.07
2014	Abbas RP	\$46,623.46			
2014	Abbas RS	\$608.89			
2014	Aliqui RP	\$21,060.81			
2014	Aliqui RS	\$2,259,604.41			
2014	Currus RP	\$183,950.34			
2014	Currus RS	\$741,641.88			
2016	Abbas RP	\$18,285,645.26			
2016	Abbas RS	\$40,439.91			
2016	Aliqui RP	\$1,252,565.26			
2016	Aliqui RS	\$1,324,757.80			
2016	Currus RP	\$119,168.28			
2016	Currus RS	\$290,537.26			

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

72. Select **DASHBOARDS** -> **.VanArsdel** to navigate back to the dashboard.
73. You can share your dashboard with your team using their email address. Click on **Share** in the top right of the screen.
74. Enter **email address** of the members of your team separate by ";". Power BI is connected to Azure Active directory.
75. Enter appropriate **message** in the text box below the email addresses.
76. 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.



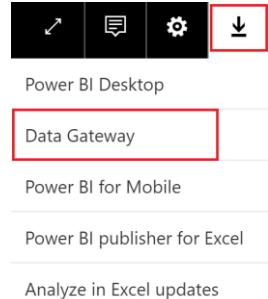
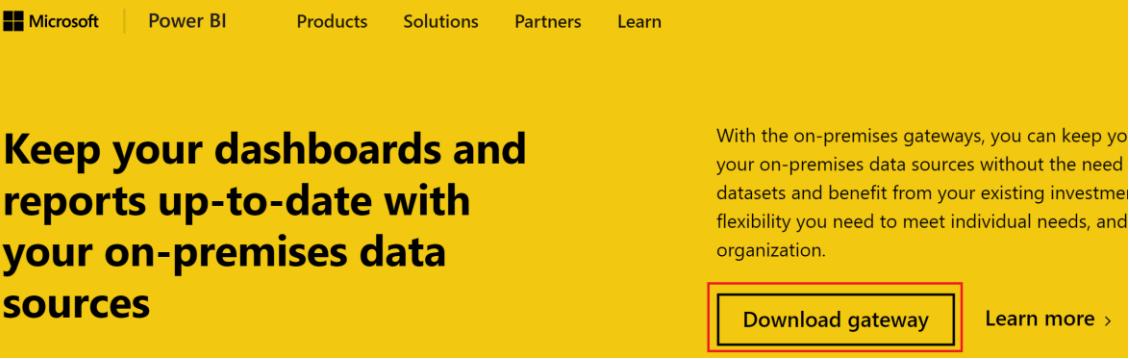
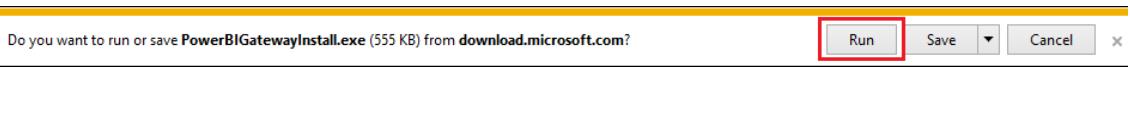
77. Navigate back to **.VanArsdel** dashboard.
 78. Notice on the top right of the menu bar, there is options to add this dashboard to the favorites. Click on **Favorite** option.
 79. Now click on **Favorite** in the left panel. Notice the dashboard is added to the list. This is an easy way to access all your favorite or most used dashboards quickly.
 80. 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**.

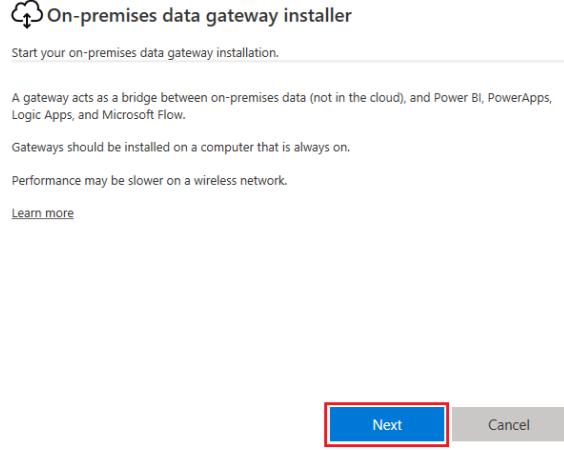
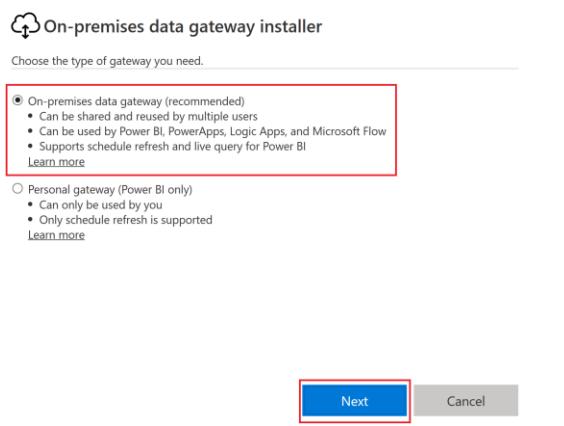
On the top right corner of the screen, next to Favorite, there is Set as featured option. Set as Featured dashboard sets the dashboard as the default dashboard that user will land every time they login.

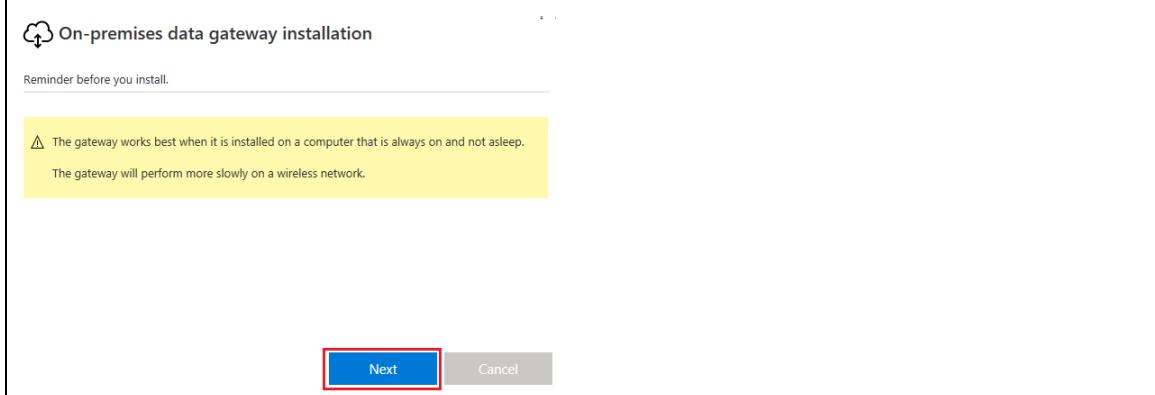
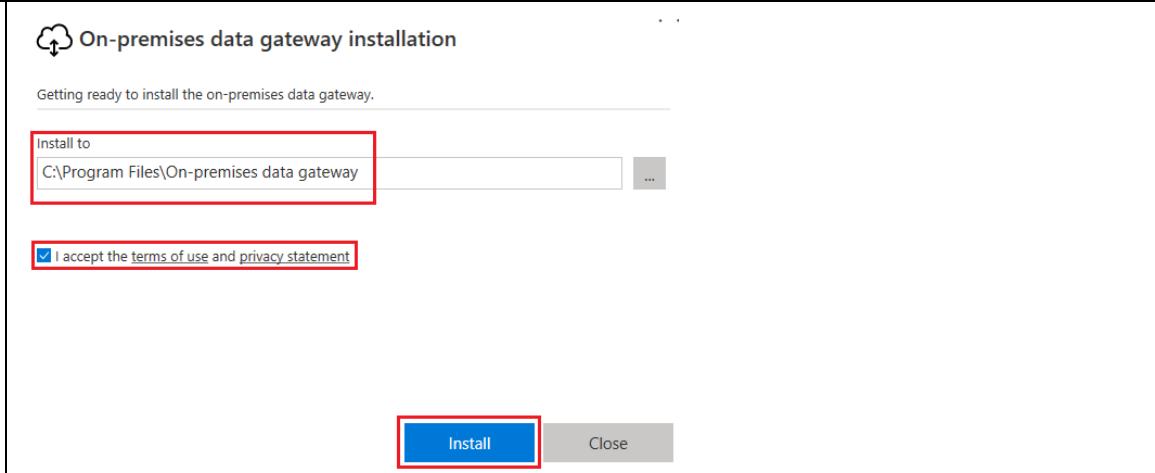
81. Select **Set as Featured**.
 82. A confirmation dialog is displayed. Select **Set as Featured Dashboard**. This sets VanArsdel as the featured/default dashboard.

Power BI Service - Refreshing data on the Dashboard

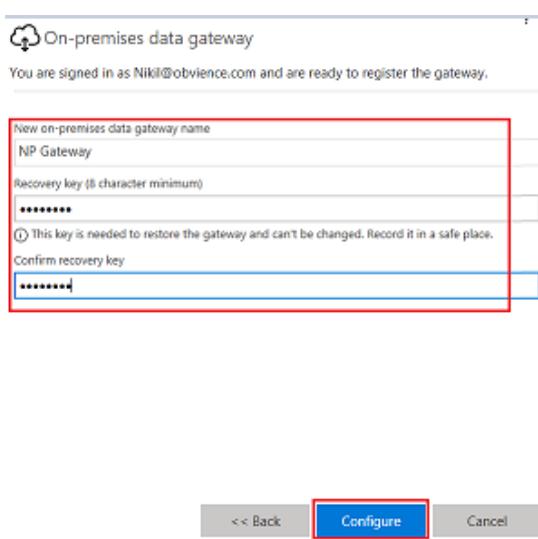
Once the dashboard has been shared with the members of the team, one of the key benefits of Power BI is the ability to setup automated data refresh. This enables the dashboard to be live and operational for the organization. If your data is being retrieved from a cloud data source such as SQL Azure, 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 several icons. The fourth icon from the left, which is a downward-pointing arrow, is highlighted with a red box. Below the ribbon, a vertical menu is displayed with the following options: Data Gateway (highlighted with a red box), Power BI for Mobile, Power BI publisher for Excel, and Analyze in Excel updates.</p>
<p>This opens a new browser window which provides details regarding the On-Premises gateway.</p> <ol style="list-style-type: none">3. Select Download gateway.	 <p>The screenshot shows the Microsoft Power BI homepage. At the top, there is a navigation bar with links to Microsoft, Power BI, Products, Solutions, Partners, and Learn. The main content area features a large yellow banner with the text: "Keep your dashboards and reports up-to-date with your on-premises data sources". To the right of the banner, there is a paragraph of 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." Below the banner, there is a call-to-action button labeled "Download gateway" (highlighted with a red box) and a link "Learn more >".</p>
<ol style="list-style-type: none">4. Click on Run once the download is complete.5. Click on Yes on the alert message box.	 <p>The screenshot shows a standard Windows file download dialog box. It asks the user if they want to run or save a file named "PowerBIGatewayInstall.exe" (555 KB) from "download.microsoft.com". There are three buttons at the bottom: "Run" (highlighted with a red box), "Save" with a dropdown arrow, and "Cancel".</p>

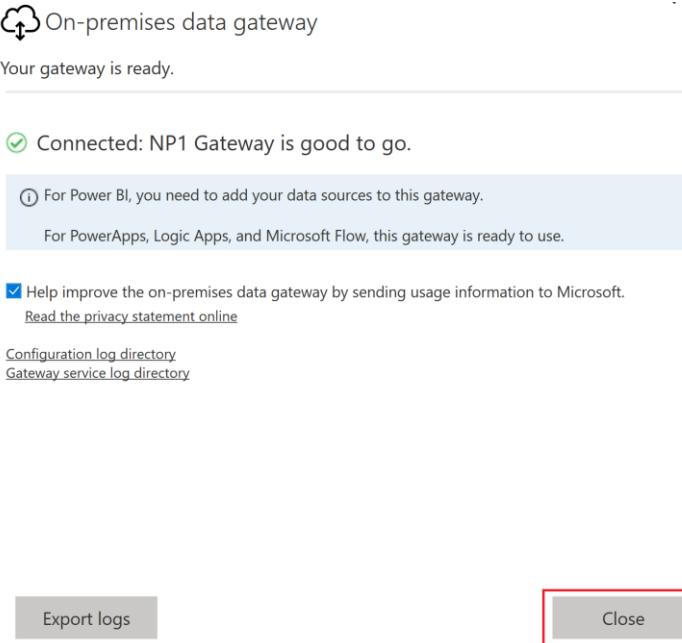
	<p>6. Installation wizard will start. Click on Next as shown in the figure.</p> 
<p>You are provided with 2 options:</p> <p>On-premises gateway that can be shared with multiple users and used by other apps like Power Apps, Logic Apps, etc.</p> <p>Personal gateway is used by Power BI only and can only 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**.

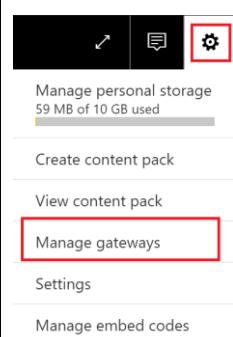


17. Your gateway is now installed and configured. Click on **Close** to close the dialog.



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 'Gateway Settings' and 'Administrators' sections for the selected gateway. The third screenshot shows a context menu for the 'NP Gateway' entry, with the 'ADD DATA SOURCE' option highlighted with a red box.

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

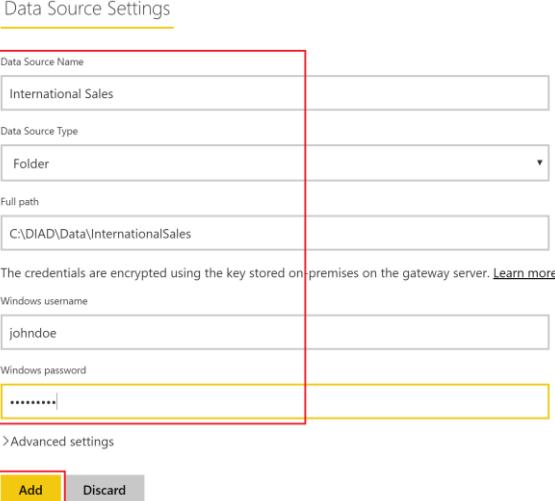
The credentials are encrypted using the key stored on-premises on the gateway server. [Learn more](#)

Windows username
johndoe

Windows password

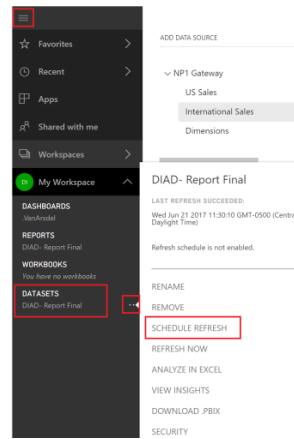
>Advanced settings

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>	 <p>The screenshot shows the 'Data Source Settings' page. A red box highlights the 'Data Source Name' field containing 'International Sales'. A yellow box highlights the 'Windows password' field, which contains '.....'. At the bottom, there are 'Add' and 'Discard' buttons, with 'Add' being highlighted by a yellow box.</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.



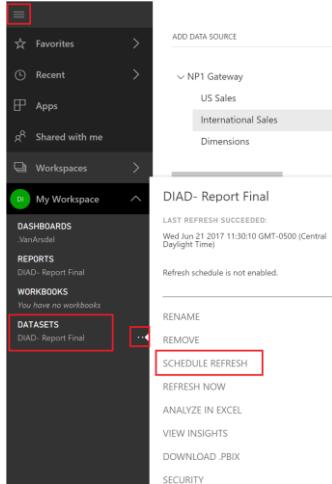
40. Scheduling a refresh from on-premise data sources is a **pro feature**. However, Microsoft is offering pro features for free for a limited time.

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).

<ul style="list-style-type: none"> Ability to refresh on premise data sources. Ability to create content packs. Ability to collaborate using App feature. Live connectivity to various sources. 	
<p>46. Navigate back to Datasets section and locate the data set called DIAD-Report Final, click on the ellipses.</p> <p>47. Click on Schedule Refresh as shown in the Figure.</p> <p>Notice that this time you are redirected directly to the Datasets page.</p>	 <p>The screenshot shows the Power BI service interface. On the left, there's a navigation sidebar with options like Favorites, Recent, Apps, Shared with me, Workspaces, and My Workspace. Under DASHBOARDS, there's one item: VanKessel. Under REPORTS, there's one item: DIAD- Report Final. Under WORKBOOKS, it says 'You have no workbooks'. Under DATASETS, there's one item: DIAD- Report Final, which is highlighted with a red box. To the right of the sidebar, there's a detailed view of the dataset 'DIAD- Report Final'. It shows 'LAST REFRESH SUCCEEDED: Wed Jun 21 2017 11:30:10 GMT-0500 (Central Daylight Time)'. Below that, it says 'Refresh schedule is not enabled.' There are several buttons and links: RENAME, REMOVE, SCHEDULE REFRESH (which is also highlighted with a red box), REFRESH NOW, ANALYZE IN EXCEL, VIEW INSIGHTS, DOWNLOAD .PBIX, and SECURITY.</p>

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.

Settings

General Dashboards Datasets Workbooks

DIAD- Report Final

Settings for DIAD- Report Final

Your data gateway (Power BI – personal) is offline, but a data gateway is available.

Refresh history

Gateway connection

To use a data gateway, make sure the computer is online and the data source is added in [Manage data sources](#).

Use your data gateway (Power BI – personal)
([offline](#), running on OBV000001)

Use a data gateway

Status	Department	Gateway	Contact information	Description
online		NP Gateway	Nikil@obvience.com	

Apply Discard

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

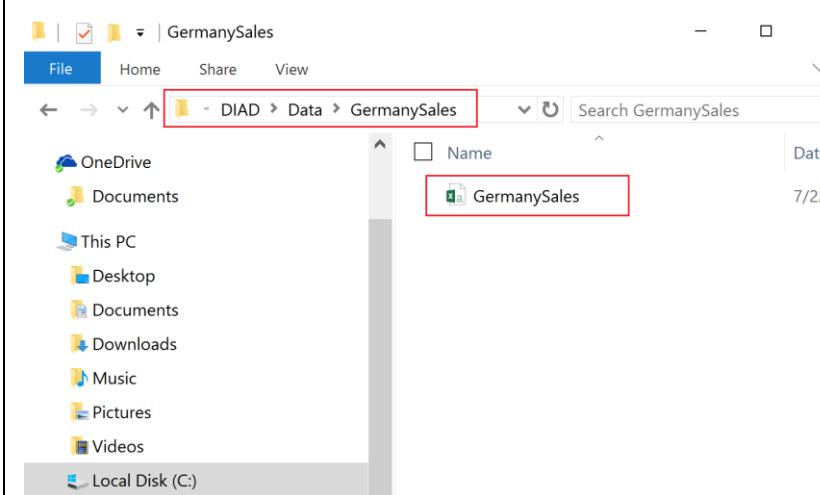
Add another time

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.

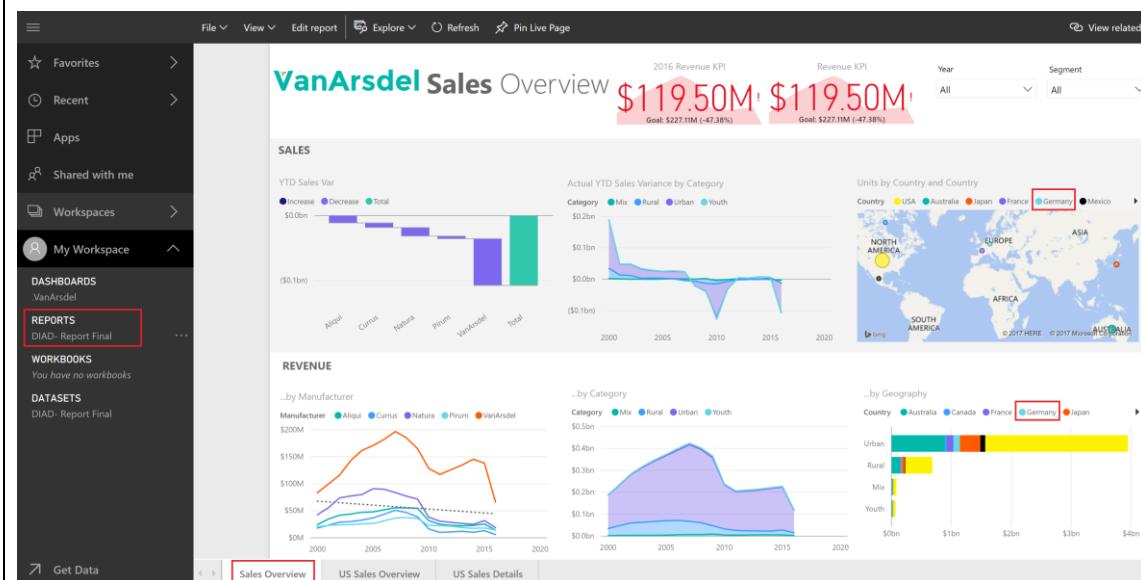
Note: If your file is in a different location change the path accordingly.



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.

Power BI Service - 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.

Ability to share using content pack will be deprecated and replaced with APPS. For the purposes on this lab we will be using content pack. Towards the end of the lab, an introduction to APPS is provided.

3. INTRODUCING APPS dialog appears. Select “X” on the top right corner to close the dialog.

The screenshot shows the Power BI Service interface. On the left is a navigation sidebar with sections like Favorites, Recent, Apps, Shared with me, Workspaces, My Workspace, DASHBOARDS (.VanArsdel), REPORTS, WORKBOOKS, and DATASETS. The 'DASHBOARDS' section is highlighted with a red box. On the right is a dashboard titled 'Sales Overview' featuring a KPI card for '2016 Revenue KPI' showing '\$119.50M!' and 'Goal: \$227.11M (-47.38%)', and a bar chart for 'YTD Sales Var' comparing actual vs. total sales. At the top right of the main area, there is a settings gear icon with a red box around it. A dropdown menu is open from this icon, listing options: Create content pack (highlighted with a red box), View content pack, Admin portal, Manage gateways, Settings, and Manage embed codes.

4. Enter a valid **email address** with whom you want to share the content pack.
 5. In the create content pack page enter the “**VanArsdel Sales Report**” under Title as shown in the figure.
 6. Enter “**This report contains VanArsdel revenue and unit shares over the years along with competitor information**”.
 7. Select the Upload text below Image and choose **LogoforContentPack** file from **\DIAD\Data** folder
 8. 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.
 9. 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.**
- 10. Click on Publish.**

Choose who will have access to this content pack:

Specific groups My entire organization

LabUser1

Title
VanArsdel Sales Report

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

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

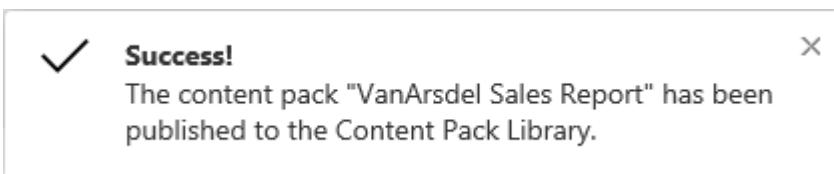
Select items to publish

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](#)

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

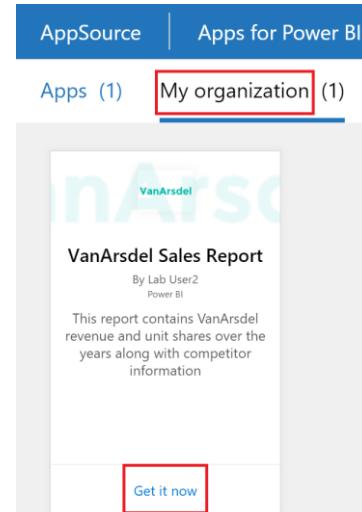


Identify the user from your company with whom you shared the content pack. This user can be you as well.

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.

A screenshot of the Microsoft AppSource "Get Data" page. The page title is "Get Data". Below it is a sub-header "Microsoft AppSource" and a sub-sub-header "Import or Connect to Data". There are four main sections: "My organization" (with a red box around its "Get" button), "Services", "Files", and "Databases". Each section has a brief description and a "Get" button. At the bottom of the page are links for "Samples", "Solution Templates", and "Partner Showcase".

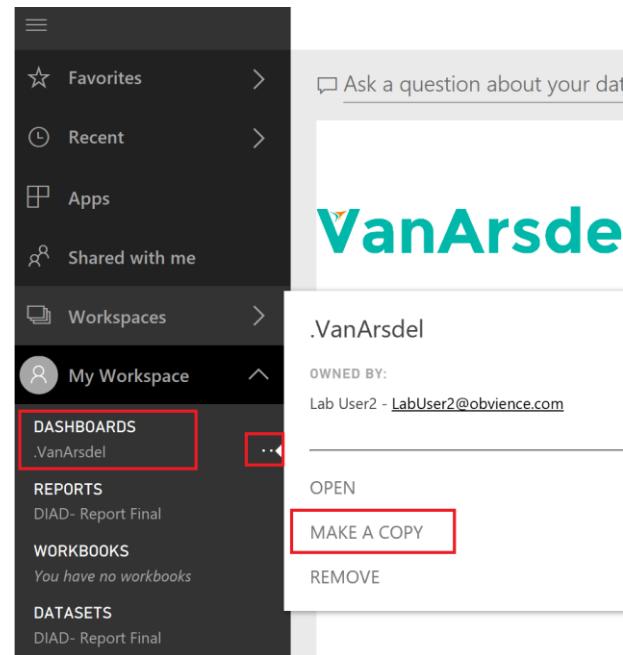
12. In **My Organization** page you will see the VanArsdel content package as shown in the figure.
13. Request the end user to click on **Get it Now**.



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.



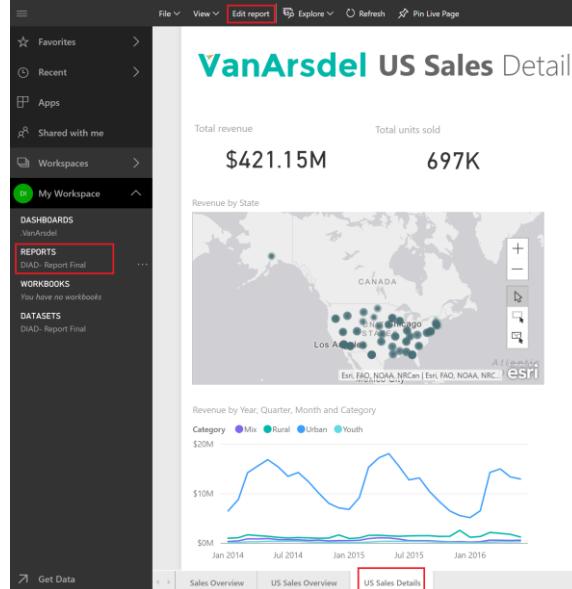
Power BI Service - Updating a content pack

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.

Your organization has requested a KPI representation of Units and Revenue trend for VanArsdel. We will download **Dual KPI** visual to satisfy this requirement.

1. Navigate back to your Power BI service.
2. From the left menu select **REPORTS -> DIAD – Report Final**.
3. Navigate to **US Sales Details** report page.
4. Click on **Edit Report** on the top menu bar.



- In the **Visualizations** section click on the **ellipsis** in the last row of the visuals and select **Import from store**.
- Custom Visuals dialog opens. In the **search box** type **dual kpi** and search.
- Select **Add** next to Dual KPI visual.

Notice the new visual is added to the Visualizations section.

The screenshot shows the Power BI desktop interface. On the left, the 'Visualizations' pane is open, displaying various visualization icons. A red box highlights the ellipsis icon at the bottom right of the list. A context menu is open over the ellipsis, with 'Import from store' highlighted in red. To the right of the visualizations pane is the 'Fields' pane, which includes a search bar and filter options like Date, Geography, and Manufacturer. The main area is titled 'Custom Visuals' and shows a card for 'Dual KPI'. The card includes a preview showing two trends over time, a rating of 4 stars, and a yellow 'Add' button which is also highlighted with a red box.

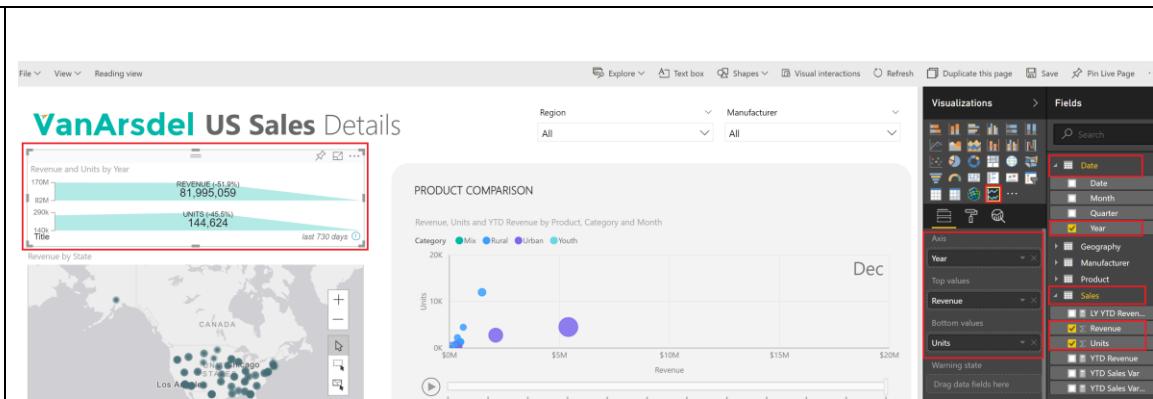
Let's delete the existing card KPI visuals before adding the new visuals.

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

The screenshot shows the Power BI workspace with a report titled 'VanArsdel US Sales Details'. On the left, there is a card visual labeled 'Total revenue' showing '\$421.15M'. A red box highlights the ellipsis icon in the top right corner of the card. A context menu is open over the ellipsis, with 'Remove' highlighted in red. Below the card is a map titled 'Revenue by State' showing data points across the United States. To the right is a 'PRODUCT COMPARISON' chart showing Revenue, Units, and YTD Revenue by Product category (Mix, Rural, Urban, Youth) over time (Jan, Feb, Mar, Apr). The chart has a red box highlighting the 'Remove' button in its context menu.

12. From the **Visualizations** section select the newly added **DualKPI** visual and move it to the space available in the top left corner
13. From the **Fields** section expand **Date** table and drag **Year** column to **Axis** section.
14. From the **Fields** section expand **Sales** table and drag **Revenue** column to **Top values** section.
15. 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.

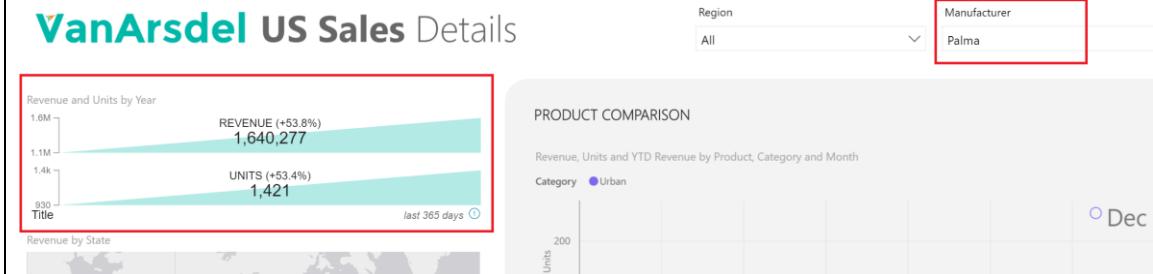


Let's check if the trend is similar across Manufacturers

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

Notice, the trend for Palma is the opposite direction.

17. Clear **Manufacturer** slicer.



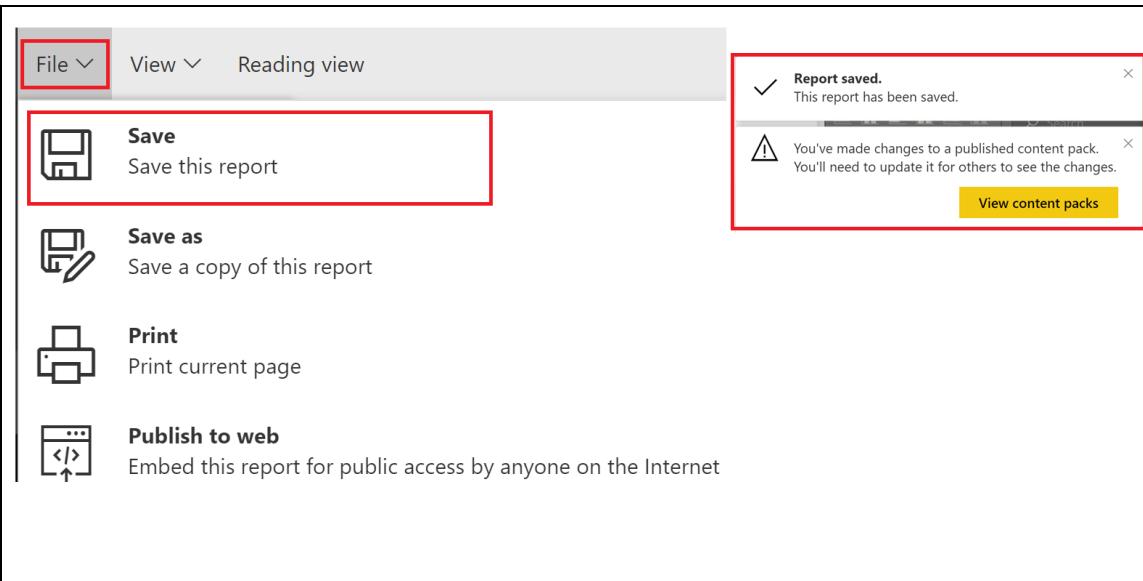
18. From the report menu, select **File -> Save**.

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 pin custom visuals to the dashboard.

Custom visuals behavior is like other visuals.



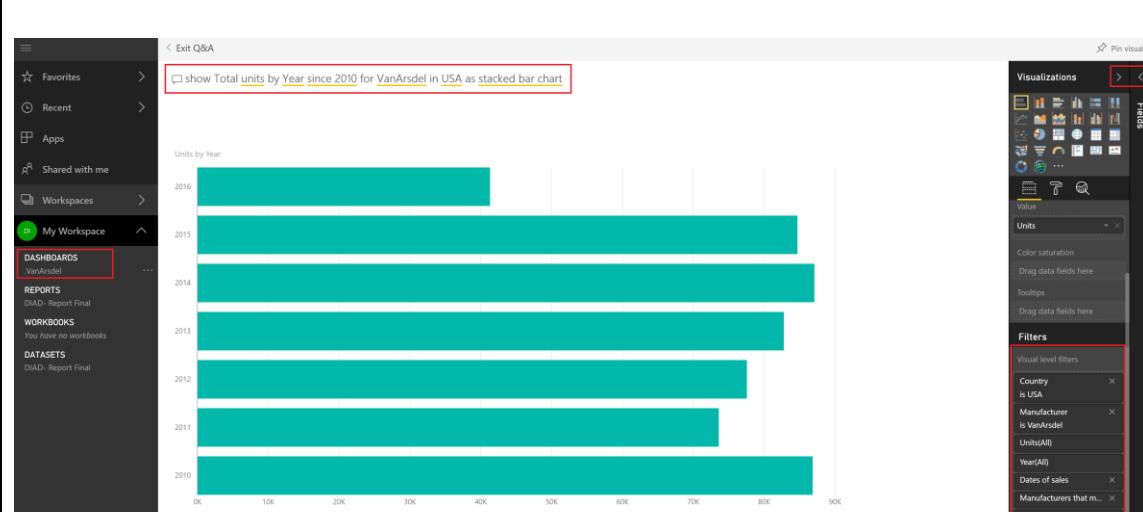
Your organization has requested you to add the **total units sold since 2010 for United States** as top level metric.

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

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

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

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



23. 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.

24. 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.

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

26. Click on the **formatting brush**.

27. Enable **Data Labels**.

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

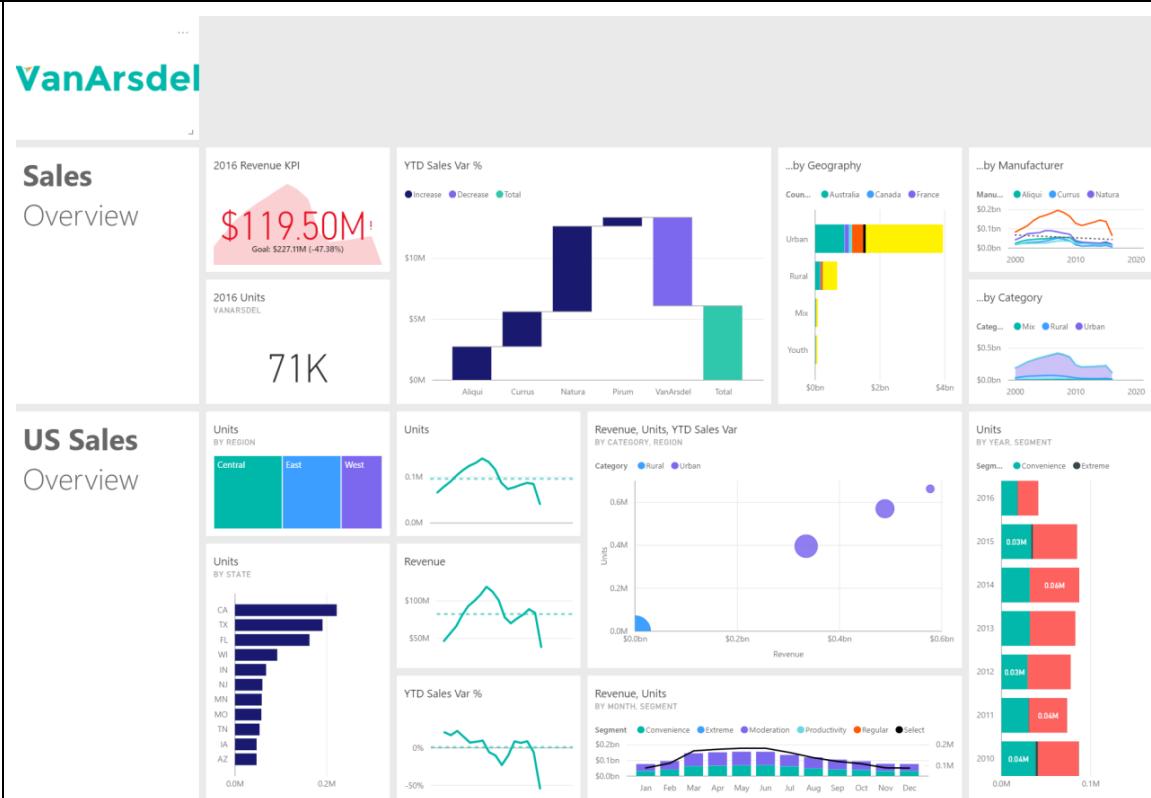
29. **Pin** the tile to your dashboard.

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

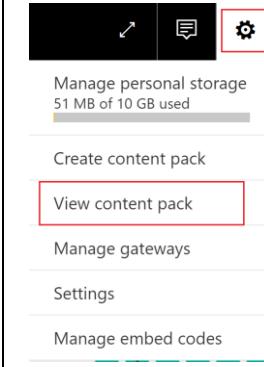


30. Navigate to **.VanArsdel** dashboard
 31. Re-organize your dashboard by moving tiles as shown in the Figure.

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



32. 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.

33. You can edit or delete content pack to make changes. Click **Edit**.
34. Click on “X” on the top right corner of INTRODUCING APPS dialog to close it.

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

35. 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

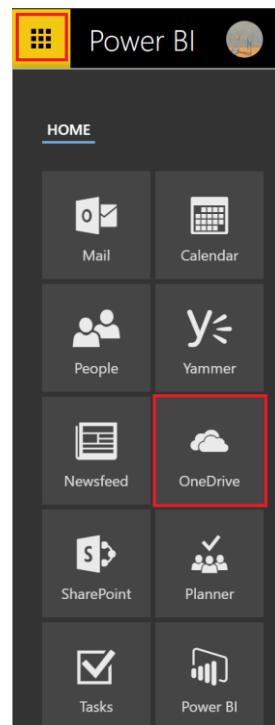
The content pack will be available in your organization's content gallery. [Learn more](#)

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

Power BI Service - 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.

Get Data

Need more guidance? [Try this tutorial](#) or [watch a video](#)

The Microsoft AppSource 'Get Data' page features a 'Import or Connect to Data' section. Within this section, the 'Files' category is highlighted with a red box. The 'Files' section contains the following text: 'Bring in your reports, workbooks, or data from Excel, Power BI Desktop or CSV files.' Below this text is a yellow 'Get' button with a right-pointing arrow. To the left of the 'Files' section are other categories: 'My organization' (with a 'Get' button), 'Services' (with a 'Get' button), and 'Databases' (with a 'Get' button). At the bottom of the page are links for 'Samples', 'Solution Templates', and 'Partner Showcase'.

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

The screenshot shows the 'Get Data Files' page. On the left is a sidebar menu with options: 'My organization', 'Services', 'Samples', 'Import or Connect to Data' (which is expanded to show 'Files'), and 'Databases & More'. The main area displays four icons: 'Local File' (green background), 'OneDrive – Business' (blue background with a white cloud icon), 'OneDrive – Personal' (blue background with a white cloud icon), and 'SharePoint – Team Sites' (blue background with a white 'S' logo). The 'OneDrive – Business' icon is highlighted with a red box.

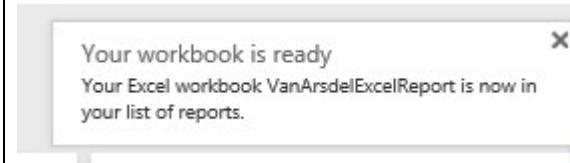
7. Select the **VanArsdelExcelReport.xlsx** you uploaded to your Onedrive for Business and click **Connect** as shown in the figure.

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 details: Name, Modified date (4 minutes ago), and Size (1.28MB). The 'Connect' button at the top right of the file card is highlighted with a red box.

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 'Choose how to connect to your Excel workbook' dialog in Power BI. It offers two options: 'Import Excel data into Power BI' and 'Connect, Manage and View Excel in Power BI'. The 'Connect' button is highlighted with a red box.

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					
ALIQUI	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.

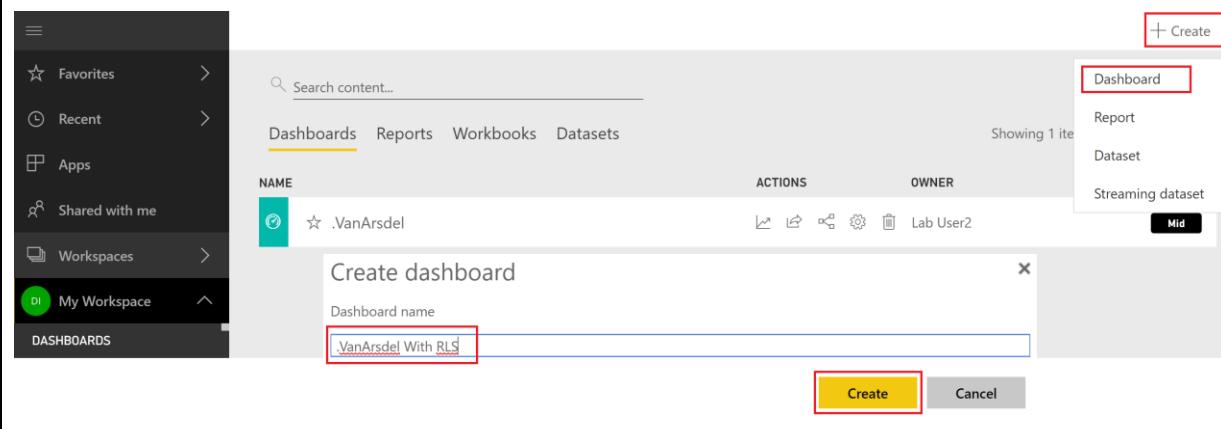
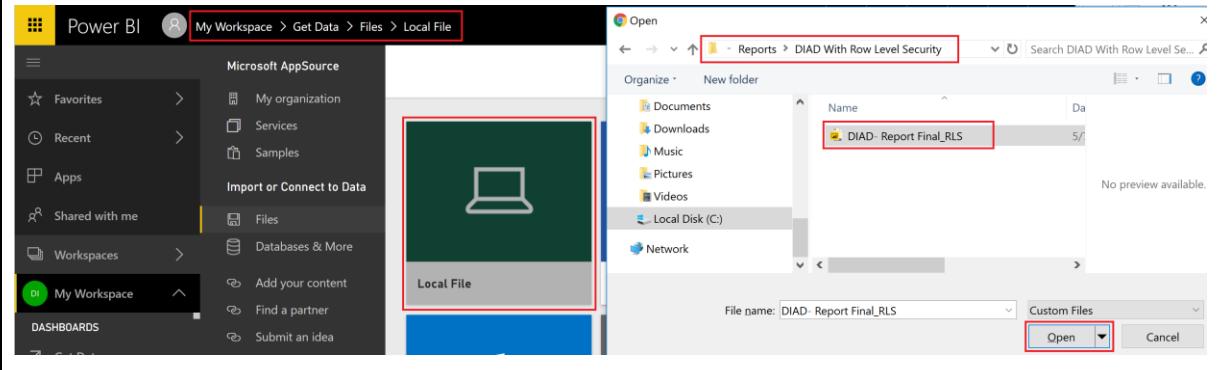
16. To schedule a refresh for your Excel workbook click on the **ellipsis ...** next to your Excel report and click **Schedule Refresh**.

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.

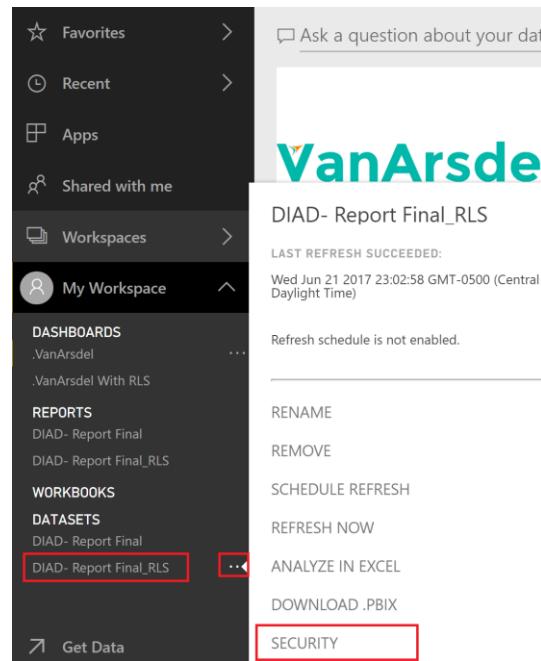
Power BI Service - Row-Level Security

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 navigation bar with 'My Workspace' selected. In the top right, a 'Create' button is highlighted with a red box. A dropdown menu is open, showing options: 'Dashboard' (also highlighted with a red box), 'Report', 'Dataset', and 'Streaming dataset'. Below this, a 'Mid' button is shown. The main area displays a list of dashboards with one item: '.VanArsdel' by 'Lab User2'. At the bottom, a 'Create dashboard' dialog box is open, with the 'Dashboard name' field containing '.VanArsdel With RLS' and the 'Create' button highlighted with a red box.</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 application. On the left, the navigation bar has 'My Workspace' selected. In the center, the 'Get Data' page is open, showing the 'Files' section with a 'Local File' icon highlighted with a red box. On the right, an 'Open' file dialog box is displayed. The path 'DIAD - Reports > DIAD With Row Level Security' is shown in the title bar. The file list shows a single item: 'DIAD- Report Final_RLS.pbix'. The 'Open' button at the bottom right of the dialog box 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

Australia Role (0)	Members (0)
Canada Role (0)	People or groups who belong to this role
France Role (0)	Enter email addresses
Germany Role (0)	
Japan Role (0)	
Mexico Role (0)	
US Role (0)	

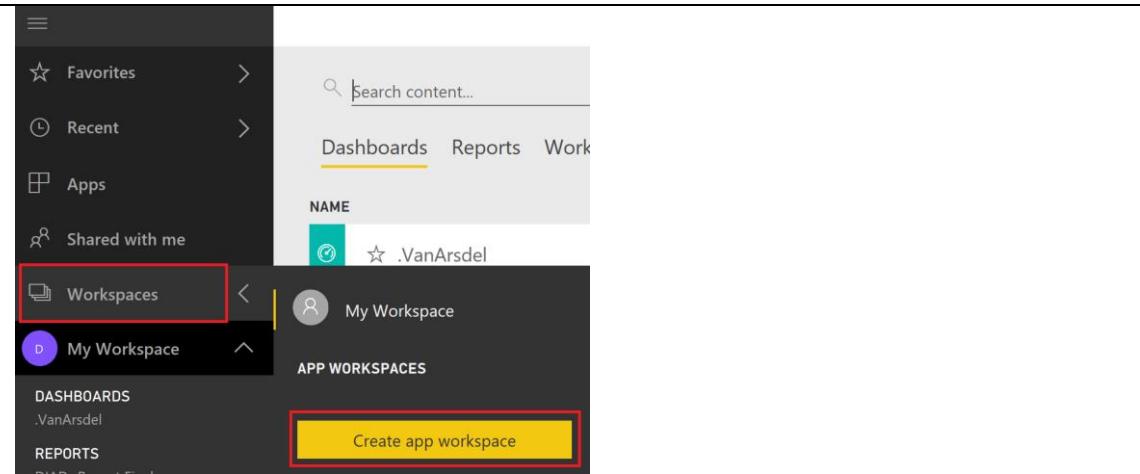
Add

Power BI Service - 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 app functionality in Power BI. In this section, you will learn how to create apps 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 App Workspace

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 workspaces those workspaces will be displayed here.
4. Select **Create app workspace**.



Notice Create an app workspace panel opens on the right side of the screen.

5. Enter a **name** for your workspace.
6. Select if you want the workspace to be private or public. We recommend using **private**.
7. Select if you want the members of the workspace can edit content.
8. Enter the email addresses of users of your organization who need to be part of this workspace 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 workspace created.

Create an app workspace

Name your workspace
DIAD

Workspace ID
dial

Available

Private - Only approved members can see what's inside

Members can edit Power BI content

Add workspace members

Enter email addresses

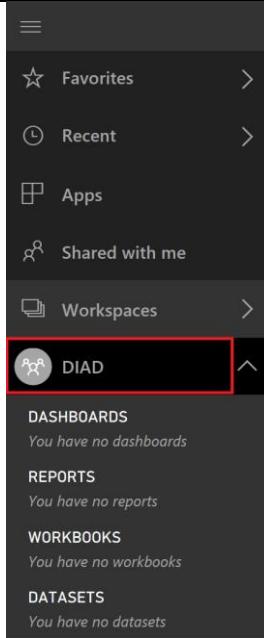
Add

Advanced

Save Cancel

Notice that you are navigated to the new workspace you just created. In this example, we created a workspace called DIAD.

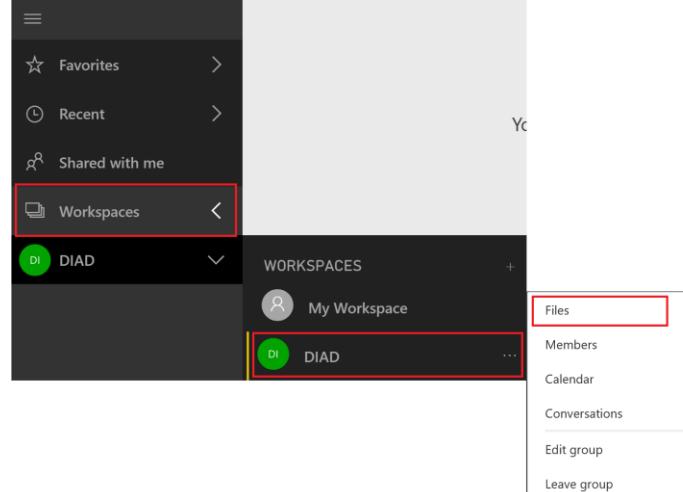
In DIAD workspace, you have separate set of Dashboards, Reports and Datasets. You and your co-workers can bring content into the workspace, create dashboards together and package the set of dashboards, reports and datasets and share them as **apps**.



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

You can get to the workspace's OneDrive account by clicking on the ellipsis next to the 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.



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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