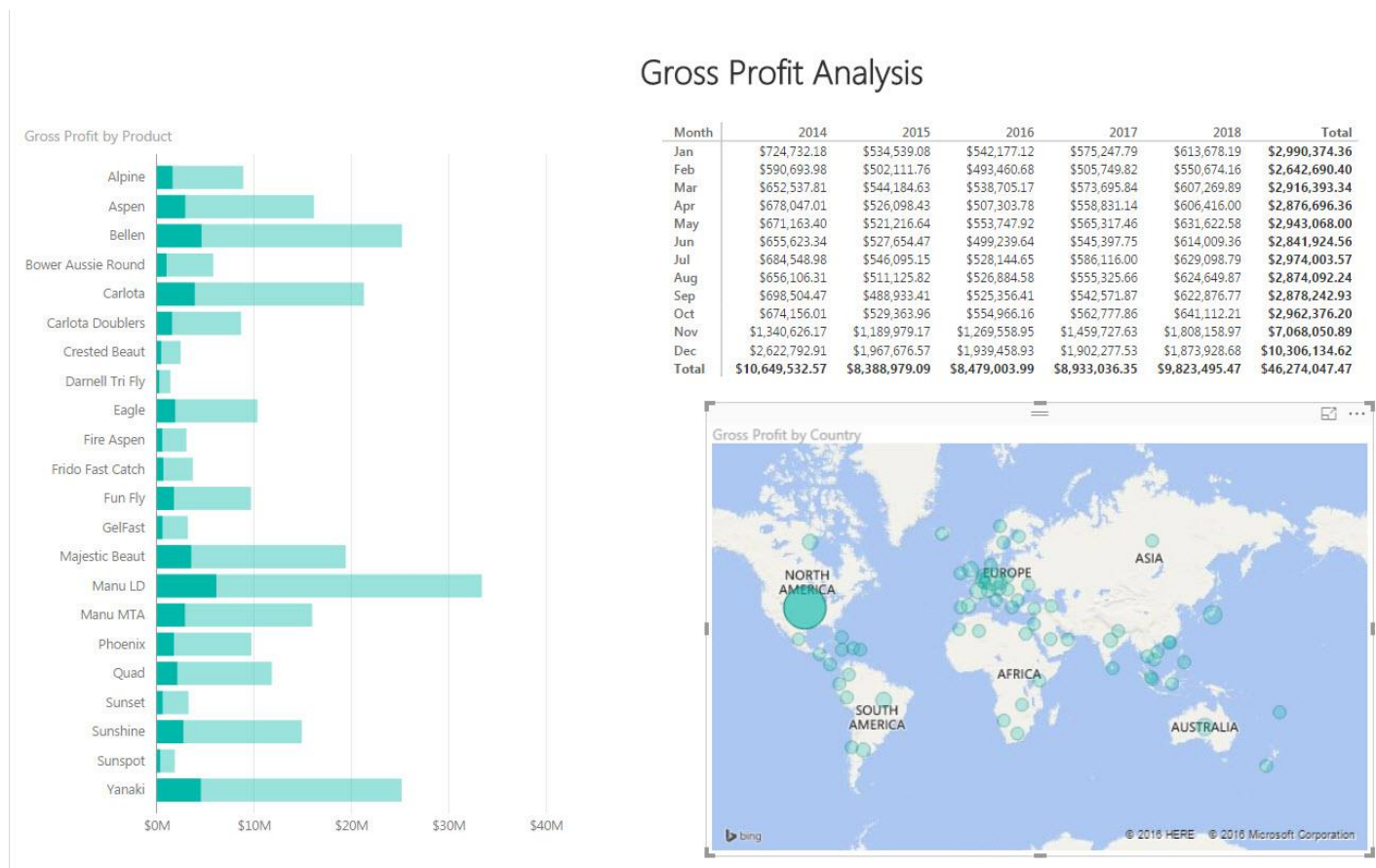


Highline Excel 2016 Class 23: Introduction to Power BI Desktop to Create Data Model & Visualization

Table of Contents

Visualization Goal:	1
Power BI Desktop	2
Download Power BI Desktop for FREE – Don't need to buy Excel Power Pivot.	2
Steps to Data Modeling with Power BI Desktop:	2
Data Model Step 1: Import Data into Power BI Desktop	2
Data Model Step 2: Create Relationships between Dimension & Fact Tables	4
Data Model Step 3: Create DAX formulas: Calculated Columns & Measures	5
Step 4: Hide Tables and Fields that are not used in Reports and Visualizations	6
Step 6: Create Reports and Visualizations	7

Visualization Goal:



Power BI Desktop

- 1) Free Data Analysis / Business Intelligence Program from Microsoft that works similarly to Excel Power Pivot
- 2) If you know Excel Power Pivot, the learning curve is easy.
- 3) Not need to have Excel or Power Pivot and when you create a new file it has the extension “pbix”.
- 4) Importing tables is just like Power Query
- 5) Creating Relationships is similar to Power Pivot
- 6) DAX Formulas are the same as Power Pivot.
- 7) Power BI Desktop is a great tool for visualizing data.

Download Power BI Desktop for FREE – Don’t need to buy Excel Power Pivot.

<https://powerbi.microsoft.com/en-us/desktop/?gated=0&number=1>

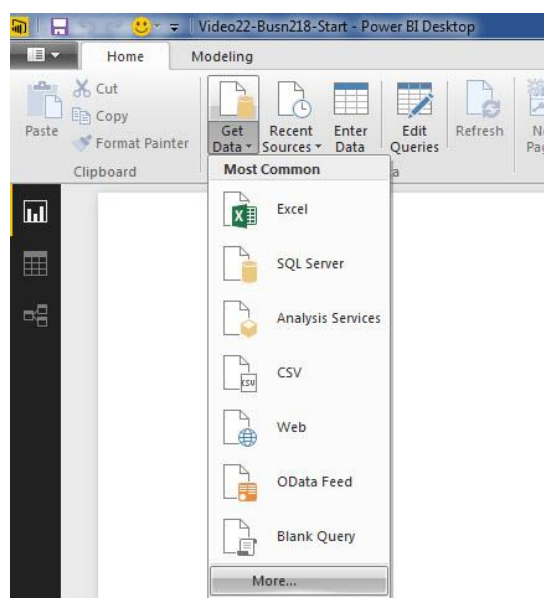
Steps to Data Modeling with Power BI Desktop:

- 1) Import Data into Power BI Desktop.
- 2) Create Relationships between Dimension & Fact Tables.
- 3) Create DAX formulas: Calculated Columns & Measures.
- 4) Hide Tables and Fields that are not used in Reports and Visualizations.
- 5) Create Reports and Visualizations.
- 6) Refresh Data Model when source data changes.
- 7) Edit Data Model as necessary.

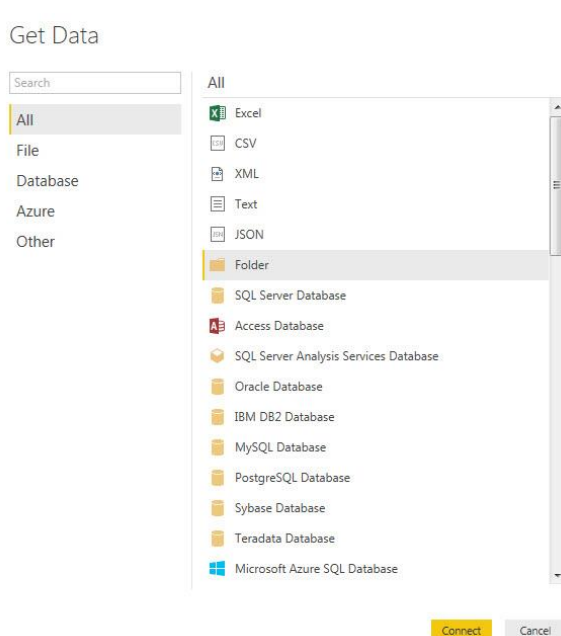
Data Model Step 1: Import Data into Power BI Desktop

- 1) Download Power BI Desktop
- 2) Open Power BI Desktop
- 3) Save As and name your file. We called our file “Video22-Busn218-Start.pbix”

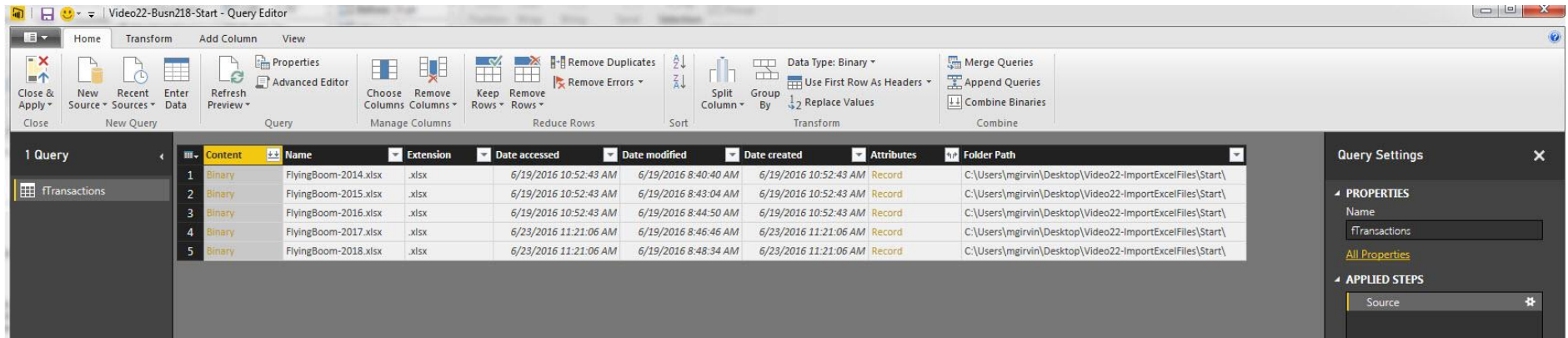
4) In the Power BI Desktop Home Ribbon Tab, in the External Data group, click on the Get Data drop-down, then click on More.



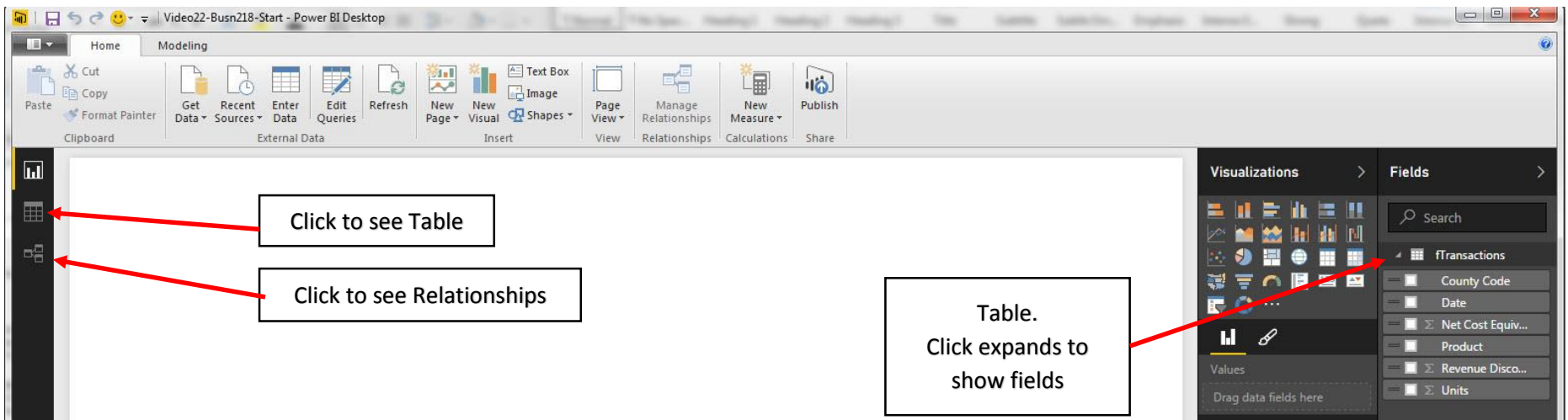
5) Then click on Folder. Then click on Connect.



- 6) After you click on Content, just as we did with Power Query, point the Get Data feature to the folder name “Video23-Import5ExcelFiles”. Inside there are the same five Excel files we used in the last video.
- 7) The Query Editor looks almost exactly the same as Power Query:



- 8) Complete the steps to get the 5 Excel files into a single Proper Data Set (Same steps as last video). When you are done with Query, Click the Close and Apply Button.
- 9) When the query loads the window looks like this:



- 10) To import Excel tables (dProduct, dCalendar, dCountry), go to Power BI Desktop Home Ribbon Tab, in the External Data group, click on the Get Data drop-down, then click on Excel. Navigate to the file “Busn218-Video23.xlsm”. In the Navigator window, check the checkboxes for the three dimension tables. Then click the Load button.

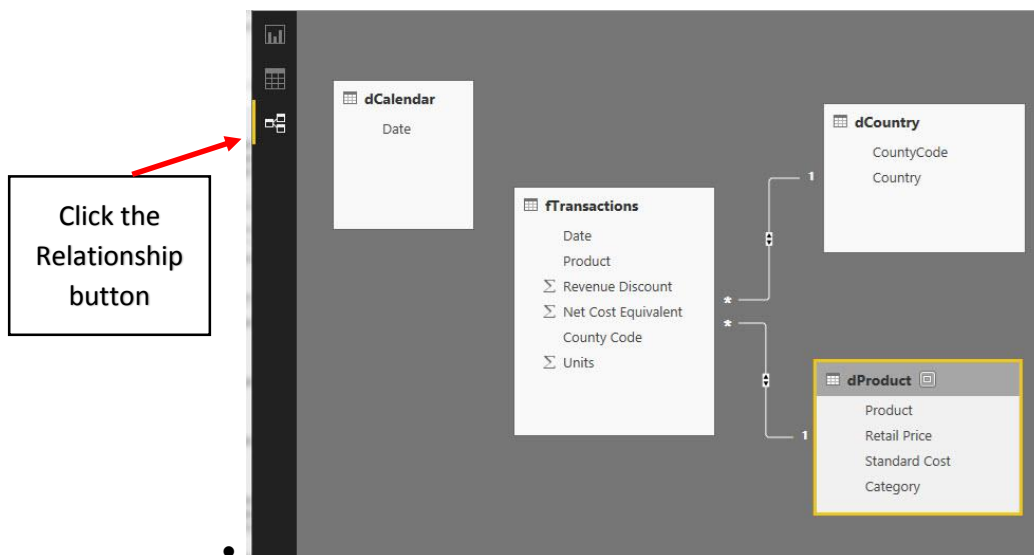
Check tables

Click Load

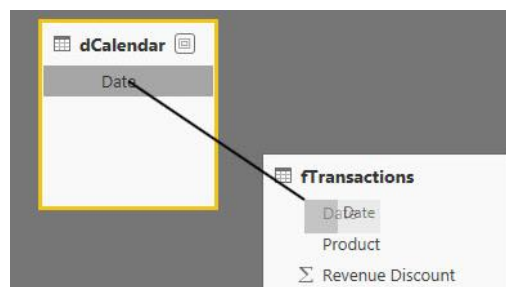
Product	Retail Price	Standard Cost	Category
Alpine	23.95	10.09	Beginner
Aspen	23.95	9.48	Beginner
Bellen	26.99	10.75	Beginner
Bower Aussie Round	45	18.45	Competition
Carlota	21.95	8.48	Beginner
Carlota Doublers	71	30.25	Freestyle
Crested Beaut	19.95	8.5	Intermediate
Darnell Tri Fly	11.95	5.25	Beginner
Eagle	23.95	8.97	Intermediate
Fire Aspen	23.5	9.55	Advanced
Frido Fast Catch	41.95	21.45	Competition
Fun Fly	6.99	3.25	Beginner
Gelfast	26	11.04	Competition
Majestic Beaut	28.95	11.49	Intermediate
Manu LD	252	100.25	Advanced
Manu MTA	122	49.78	Competition
Phoenix	25.95	10.85	Intermediate
Quad	41.95	16	Freestyle
Sunset	25.5	10.51	Competition
Sunshine	21.95	8.65	Beginner
Sunspot	14.5	6	Novelty
Yanaki	25.99	10.02	Intermediate

Data Model Step 2: Create Relationships between Dimension & Fact Tables

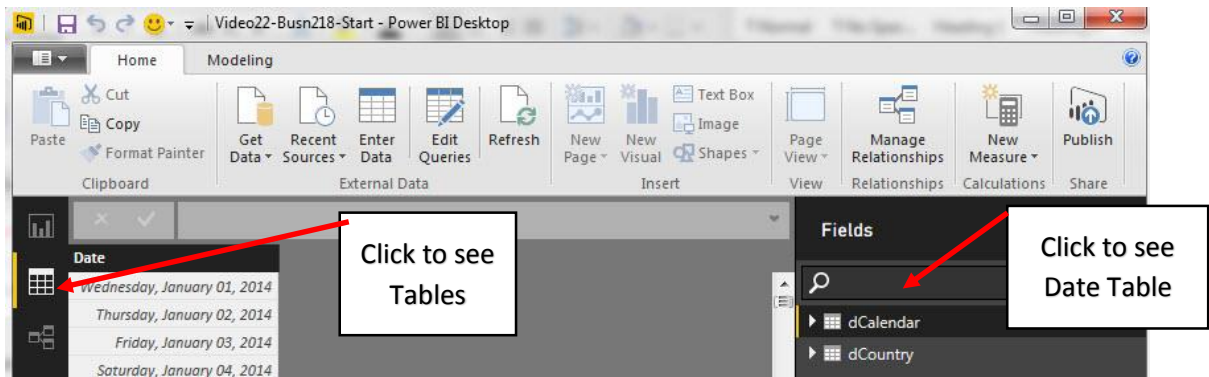
- 1) After you import Excel Tables, click on the relationship button to see that two relationships were automatically detected and created.



- 2) For the relationship between the two Date Columns, drag Date to Date:



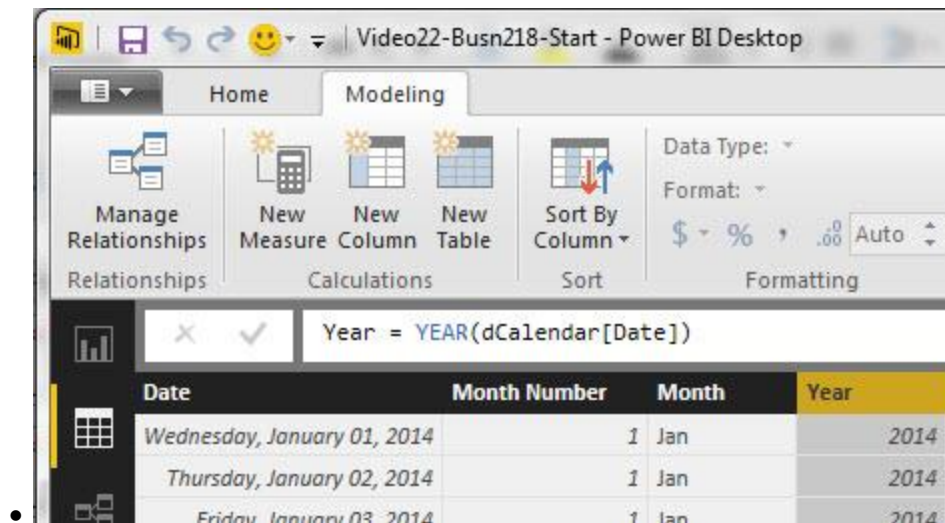
- Click to see the dCalendar Table.



-

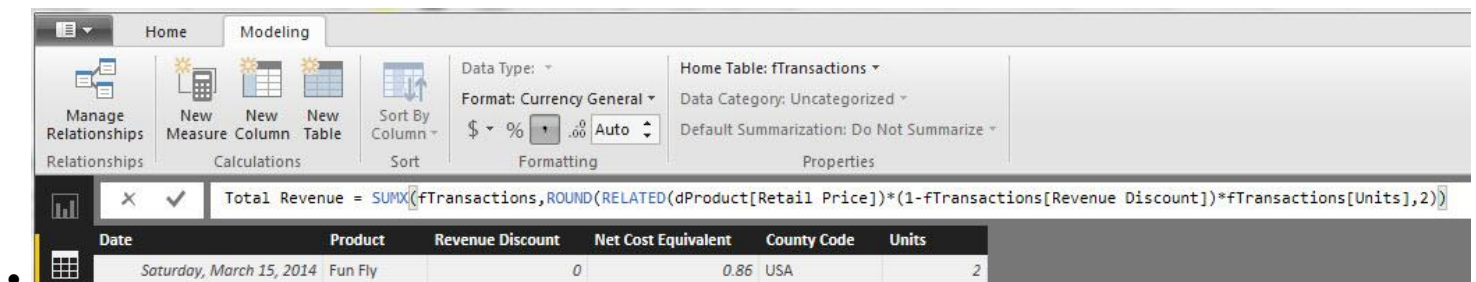
Data Model Step 3: Create DAX formulas: Calculated Columns & Measures

- From the Modeling Tab, click the New Column button and create Month Number, Month and Year Calculated Columns (same as last video). Remember to Sort Month Field by Month Number.



- Go to the fTransaction table. Make sure it is selected.
- From the Modeling Tab, click New Measure and then create Measures for Total Revenue, Total COGS and Total Gross Profit (same as last video). The assignment operator is an equal sign for both the Calculated Columns and Measures.

- Total Revenue formula:



5) Total COGS formula:

The screenshot shows the Power BI Desktop interface with the 'Modeling' tab selected. The formula bar contains the following DAX formula:

$$\text{Total COGS} = \text{SUMX}(\text{fTransactions}, \text{ROUND}(\text{RELATED}(\text{dProduct}[\text{Standard Cost}]) * \text{fTransactions}[\text{Net Cost Equivalent}] * \text{fTransactions}[\text{Units}], 2))$$

Below the formula bar, a data table is displayed with the following columns: Date, Product, Revenue Discount, Net Cost Equivalent, County Code, and Units. The table contains two rows of data:

Date	Product	Revenue Discount	Net Cost Equivalent	County Code	Units
Saturday, March 15, 2014	Fun Fly	0	0.86	USA	2
Wednesday, December 17, 2014	Fun Fly	0	0.86	USA	2

6) Gross Profit formula:

The screenshot shows the Power BI Desktop interface with the 'Modeling' tab selected. The formula bar contains the following DAX formula:

$$\text{Gross Profit} = [\text{Total Revenue}] - [\text{Total COGS}]$$

Below the formula bar, a data table is displayed with the following columns: Date, Product, Revenue Discount, Net Cost Equivalent, County Code, and Units. The table contains two rows of data:

Date	Product	Revenue Discount	Net Cost Equivalent	County Code	Units
Saturday, March 15, 2014	Fun Fly	0	0.86	USA	2

7) The Table now looks like this:

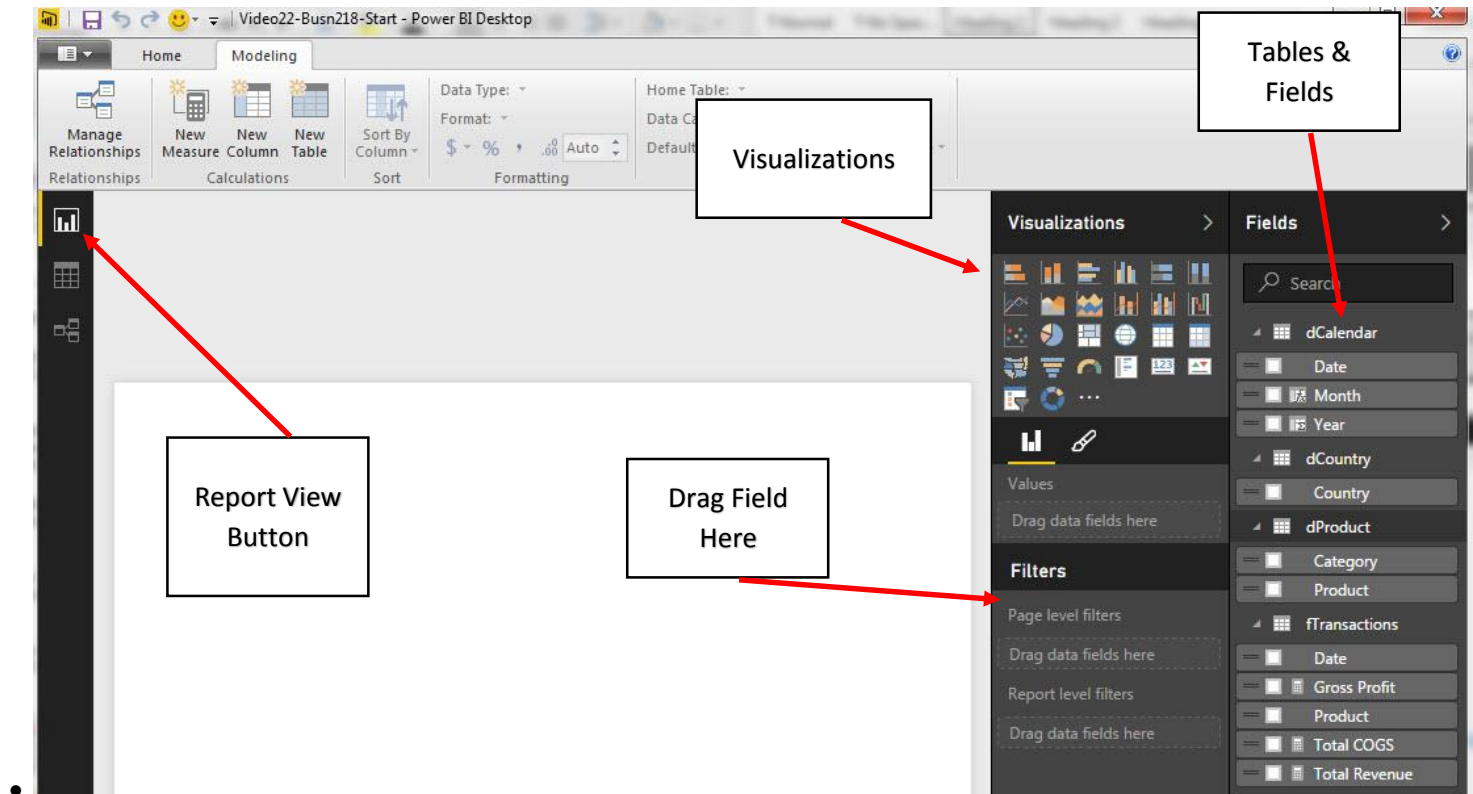
The screenshot shows the Power BI field list for the 'fTransactions' table. The columns listed are: Date, Product, Revenue Discount, Net Cost Equivalent, County Code, and Units. The calculated measures listed are: Total Revenue, Total COGS, and Gross Profit.

Step 4: Hide Tables and Fields that are not used in Reports and Visualizations

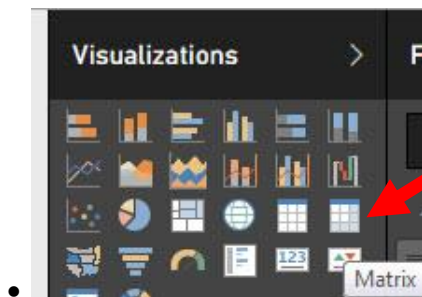
The screenshot shows the Power BI field list for the 'dCountry' table. The columns listed are: CountyCode and Country. A context menu is open over the 'Country' column, showing the following options: New Measure, New Column, Rename, Delete, and Hide in Report View. The 'Hide in Report View' option is highlighted.

Step 6: Create Reports and Visualizations

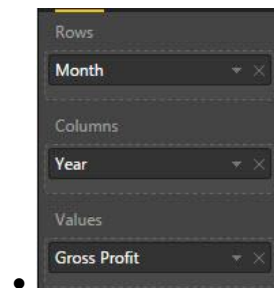
1) Click on Report View.



2) In the Visualization area, click Matrix:



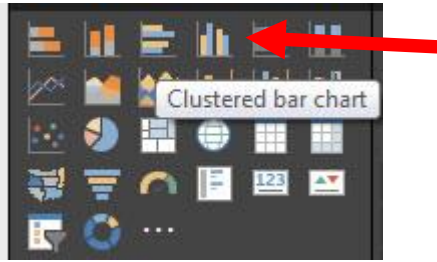
3) Drag Fields to Row, Column and Value areas, like:



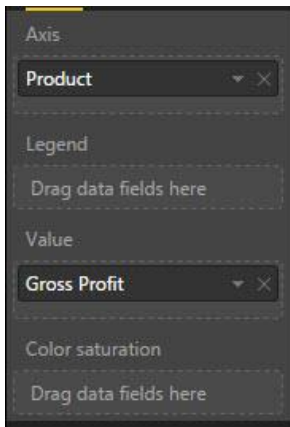
4) Matrix is really a Cross Tabulated Report (just like a PivotTable):

Month	2014	2015	2016	2017	2018	Total
Jan	\$3,819,934.48	\$2,940,163.85	\$2,946,949.85	\$3,105,701.47	\$3,457,254.87	\$16,270,004.52
Feb	\$3,462,427.50	\$2,642,332.13	\$2,727,644.32	\$2,823,563.35	\$3,077,759.31	\$14,733,726.61
Mar	\$3,812,849.72	\$2,936,235.71	\$2,914,122.05	\$3,139,866.31	\$3,398,848.24	\$16,201,922.03
Apr	\$3,700,766.60	\$2,880,375.79	\$2,839,063.00	\$3,037,409.14	\$3,304,950.38	\$15,762,564.91
May	\$3,870,594.57	\$2,915,313.61	\$2,979,399.46	\$3,081,124.31	\$3,395,053.73	\$16,241,485.68
Jun	\$3,702,897.60	\$2,850,490.89	\$2,834,135.23	\$3,001,765.92	\$3,255,337.88	\$15,644,627.52
Jul	\$3,906,380.55	\$2,930,938.14	\$2,956,157.04	\$3,078,284.69	\$3,377,164.18	\$16,248,924.60
Aug	\$3,845,931.77	\$2,901,416.56	\$2,958,017.16	\$3,088,589.69	\$3,400,877.05	\$16,194,832.23
Sep	\$3,760,355.19	\$2,805,607.99	\$2,871,190.52	\$3,007,166.01	\$3,331,085.84	\$15,775,405.55
Oct	\$3,774,079.80	\$2,923,778.29	\$2,965,419.68	\$3,124,030.41	\$3,449,790.89	\$16,237,099.07
Nov	\$7,726,558.00	\$6,580,164.93	\$6,879,830.89	\$7,981,931.47	\$9,848,292.19	\$39,016,777.48
Dec	\$14,999,566.40	\$10,696,836.32	\$10,533,006.06	\$10,393,263.01	\$10,216,640.10	\$56,839,311.89
Total	\$60,382,342.18	\$46,003,654.21	\$46,404,935.26	\$48,862,695.78	\$53,513,054.66	\$255,166,682.09

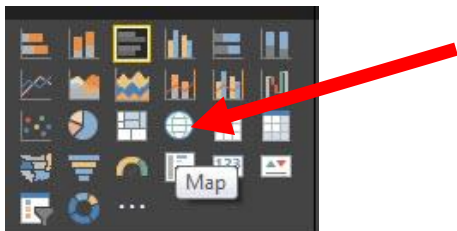
5) In the Visualization area, click Clustered Bar:



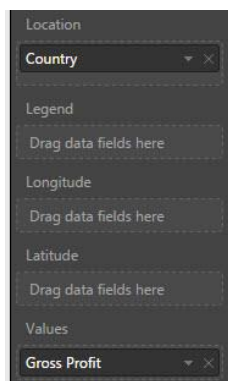
7) Drag Fields to Row, Column and Value areas, like:



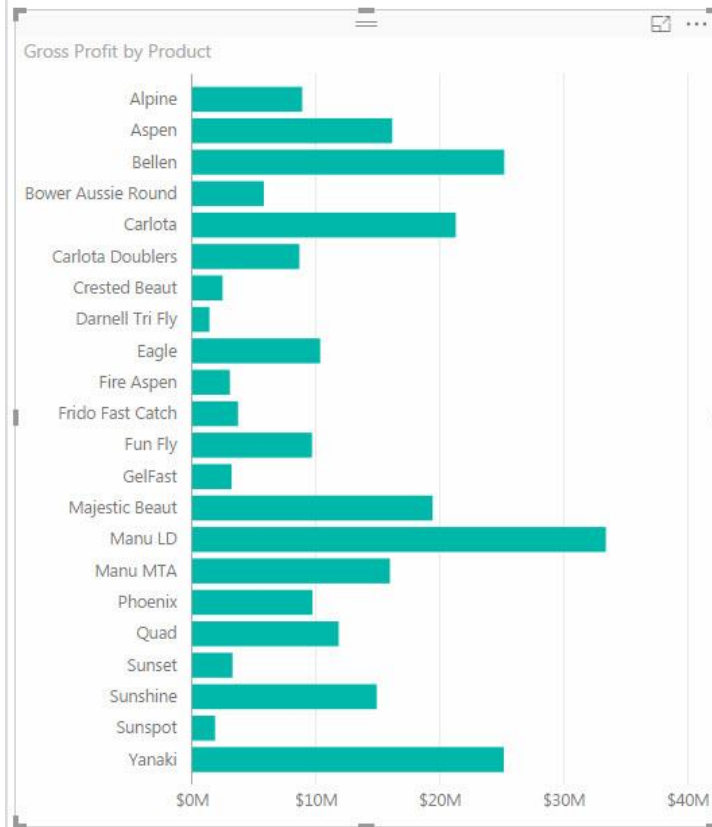
8) In the Visualization area, click Map:



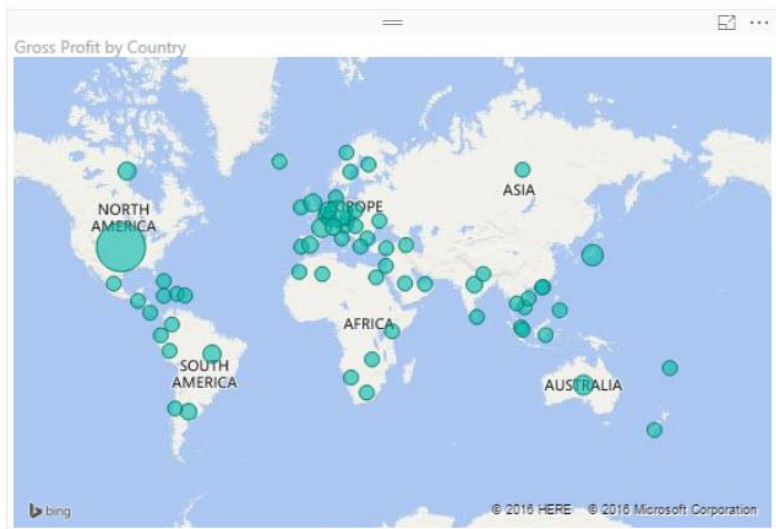
10) Drag Fields to Row, Column and Value areas, like:



6) Chart:



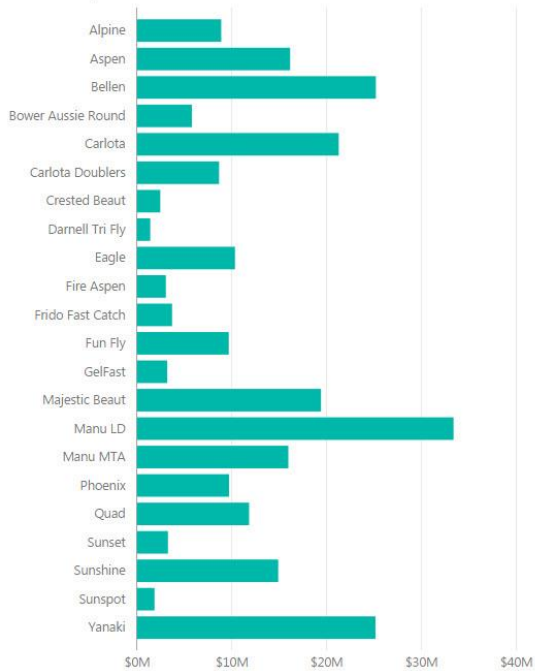
9) Map:



11) Finished Visualization:

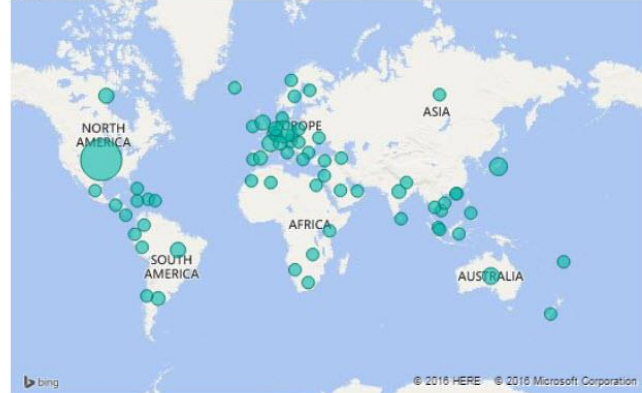
Gross Profit Analysis

Gross Profit by Product



Month	2014	2015	2016	2017	2018	Total
Jan	\$3,819,934.48	\$2,940,163.85	\$2,946,949.85	\$3,105,701.47	\$3,457,254.87	\$16,270,004.52
Feb	\$3,462,427.50	\$2,642,332.13	\$2,727,644.32	\$2,823,563.35	\$3,077,759.31	\$14,733,726.61
Mar	\$3,812,849.72	\$2,936,235.71	\$2,914,122.05	\$3,139,866.31	\$3,398,848.24	\$16,201,922.03
Apr	\$3,700,766.60	\$2,880,375.79	\$2,839,063.00	\$3,037,409.14	\$3,304,950.38	\$15,762,564.91
May	\$3,870,594.57	\$2,915,313.61	\$2,979,399.46	\$3,081,124.31	\$3,395,053.73	\$16,241,485.68
Jun	\$3,702,897.60	\$2,850,490.89	\$2,834,135.23	\$3,001,765.92	\$3,255,337.88	\$15,644,627.52
Jul	\$3,906,380.55	\$2,930,938.14	\$2,956,157.04	\$3,078,284.69	\$3,377,164.18	\$16,248,924.60
Aug	\$3,845,931.77	\$2,901,416.56	\$2,958,017.16	\$3,088,589.69	\$3,400,877.05	\$16,194,832.23
Sep	\$3,760,355.19	\$2,805,607.99	\$2,871,190.52	\$3,007,166.01	\$3,331,085.84	\$15,775,405.55
Oct	\$3,774,079.80	\$2,923,778.29	\$2,965,419.68	\$3,124,030.41	\$3,449,790.89	\$16,237,099.07
Nov	\$7,726,558.00	\$6,580,164.93	\$6,879,830.89	\$7,981,931.47	\$9,848,292.19	\$39,016,777.48
Dec	\$14,999,566.40	\$10,696,836.32	\$10,533,006.06	\$10,393,263.01	\$10,216,640.10	\$56,839,311.89
Total	\$60,382,342.18	\$46,003,654.21	\$46,404,935.26	\$48,862,695.78	\$53,513,054.66	\$255,166,682.09

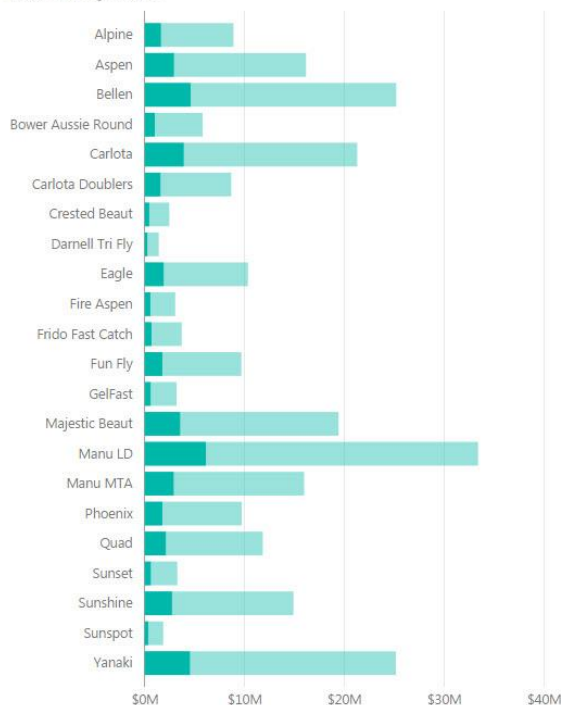
Gross Profit by Country



12) Click an element (like United States):

Gross Profit Analysis

Gross Profit by Product



Month	2014	2015	2016	2017	2018	Total
Jan	\$724,732.18	\$534,539.08	\$542,177.12	\$575,247.79	\$613,678.19	\$2,990,374.36
Feb	\$590,693.98	\$502,111.76	\$493,460.68	\$505,749.82	\$550,674.16	\$2,642,690.40
Mar	\$652,537.81	\$544,184.63	\$538,705.17	\$573,695.84	\$607,269.89	\$2,916,393.34
Apr	\$678,047.01	\$526,098.43	\$507,303.78	\$558,831.14	\$606,416.00	\$2,876,696.36
May	\$671,163.40	\$521,216.64	\$553,747.92	\$565,317.46	\$631,622.58	\$2,943,068.00
Jun	\$655,623.34	\$527,654.47	\$499,239.64	\$545,397.75	\$614,009.36	\$2,841,924.56
Jul	\$684,548.98	\$546,095.15	\$528,144.65	\$586,116.00	\$629,098.79	\$2,974,003.57
Aug	\$656,106.31	\$511,125.82	\$526,884.58	\$555,325.66	\$624,649.87	\$2,874,092.24
Sep	\$698,504.47	\$488,933.41	\$525,356.41	\$542,571.87	\$622,876.77	\$2,878,242.93
Oct	\$674,156.01	\$529,363.96	\$554,966.16	\$562,777.86	\$641,112.21	\$2,962,376.20
Nov	\$1,340,626.17	\$1,189,979.17	\$1,269,558.95	\$1,459,727.63	\$1,808,158.97	\$7,068,050.89
Dec	\$2,622,792.91	\$1,967,676.57	\$1,939,458.93	\$1,902,277.53	\$1,873,928.68	\$10,306,134.62
Total	\$10,649,532.57	\$8,388,979.09	\$8,479,003.99	\$8,933,036.35	\$9,823,495.47	\$46,274,047.47

