



Creating Visualizations using Microsoft Power BI

Hands on Activity

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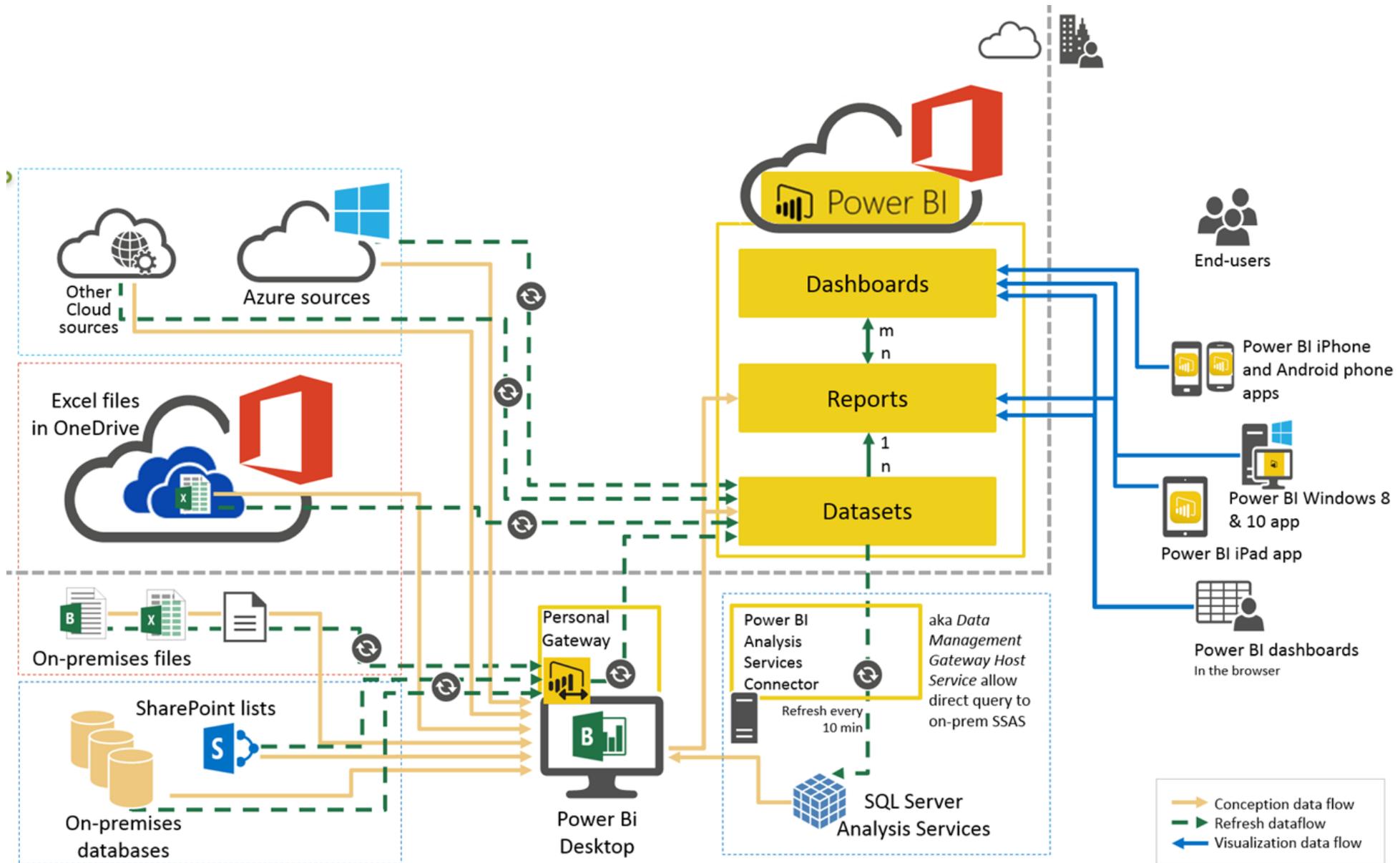
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Contents

- Introduction to Microsoft Power BI
- Architecture – How it works?
- Understanding features of the Power BI Desktop Application -1
- Understanding features of the Power BI Desktop Application -2
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- Editing and cleaning data in Power BI – Changing values / data types
- Writing queries
- Creating different types of charts
- Bringing it all together
- Deploying cloud workspace on Power BI online
- Asking questions about the data from reporting engine.
- conclusion

Power BI Architecture



The Data Perspectives

PAST: What Happened?

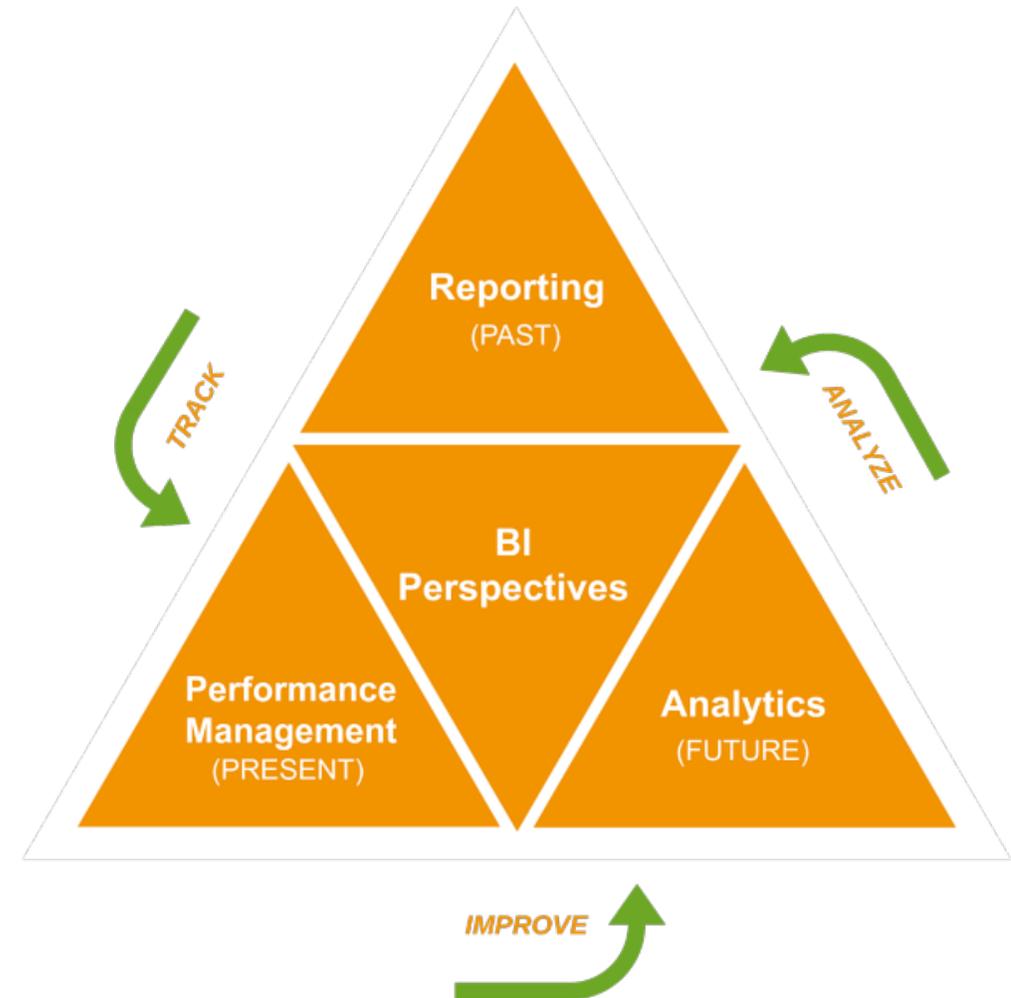
- Reactive reporting
- Common among most companies

PRESENT: What is Happening?

- KPI's and CPM Concepts
- Streaming analytics

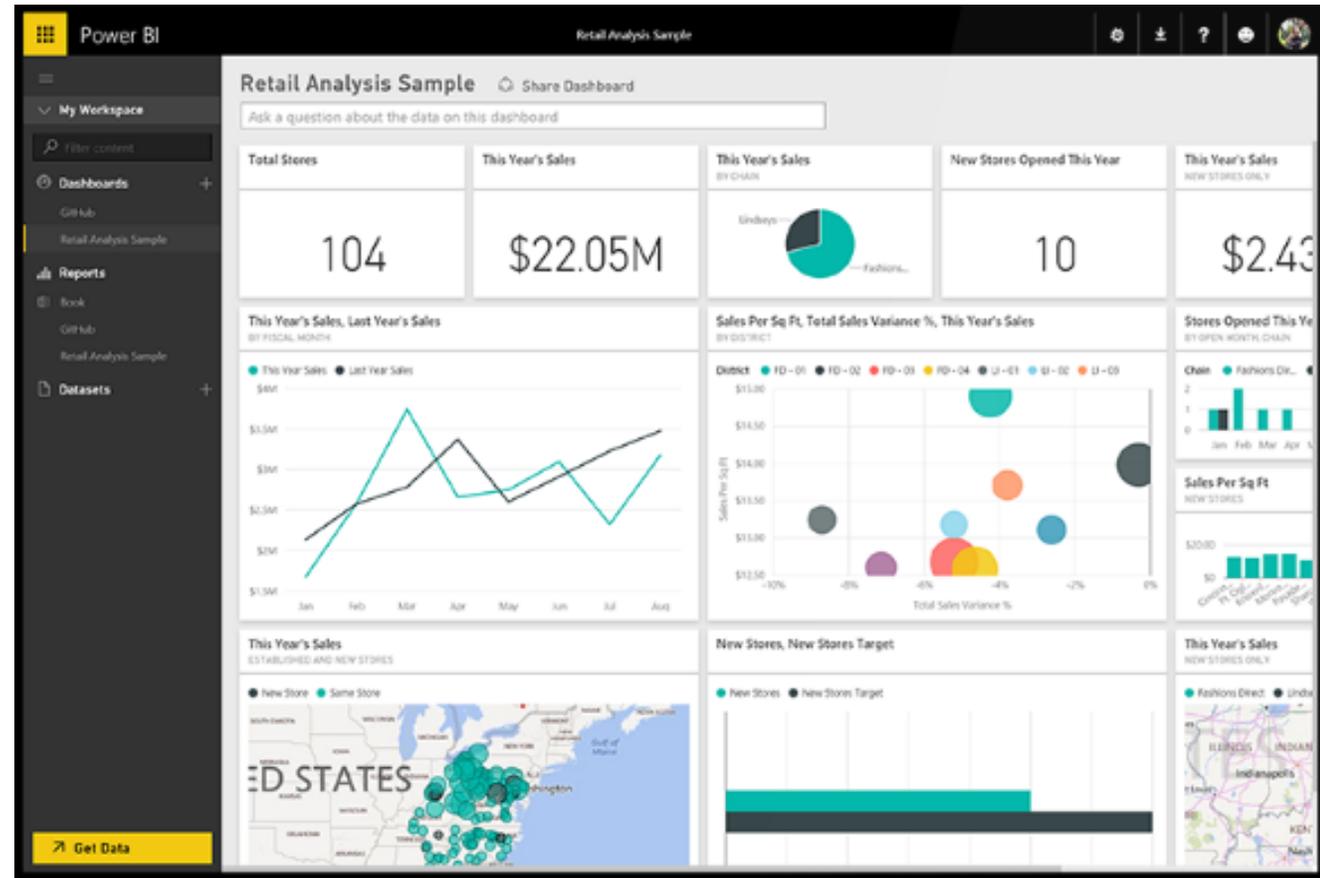
FUTURE: What will Happen?

- Predict based on trends and external data
- Understand impact and what-if analysis



Power BI Online - Introduction

- Cloud based service (Part of Office 365)
- Access your data, wherever it may exist
- Ask questions, integrate with Cortana analytics and more
- Create curated content based on your organizational needs
- Share insights across web, mobile and embedded within your own applications



Power BI Desktop - Introduction

- Free download that starts your Power BI experience.
- Not an end user tool, but a power user and designer tool.
- Can be used to mash, model and design engaging experiences.
- Transform and clean data
- Design once and view anywhere



Power BI Desktop – Hands On

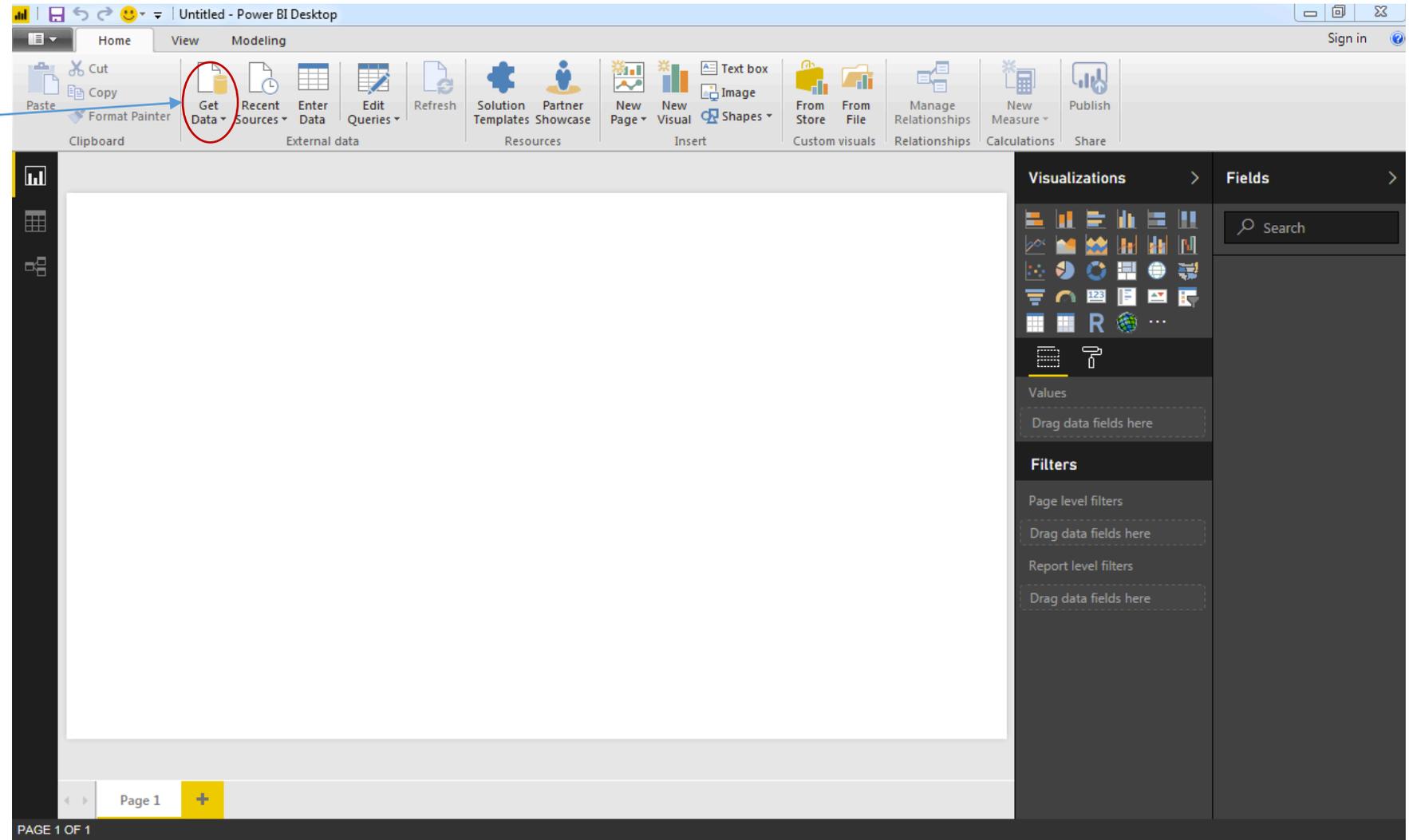
- Before we start with the hands on exercise; download the data set that we will be using for creating visualizations in Power BI from the given link:
- <http://icts.ictp.it/Members/oayub/Lab%205%20-%20Canada.xlsx/view>
- Alternatively; you may use the other data set that can be accessed through the following link:
- <http://icts.ictp.it/Members/oayub/Financial%20Sample.xlsx/view>
- Or; you may use a data set of your choice.

Understanding Power BI Features - 1

Step-1:

We need to load some data from any file or online data source.

To load data into the Power BI Application; click Get Data

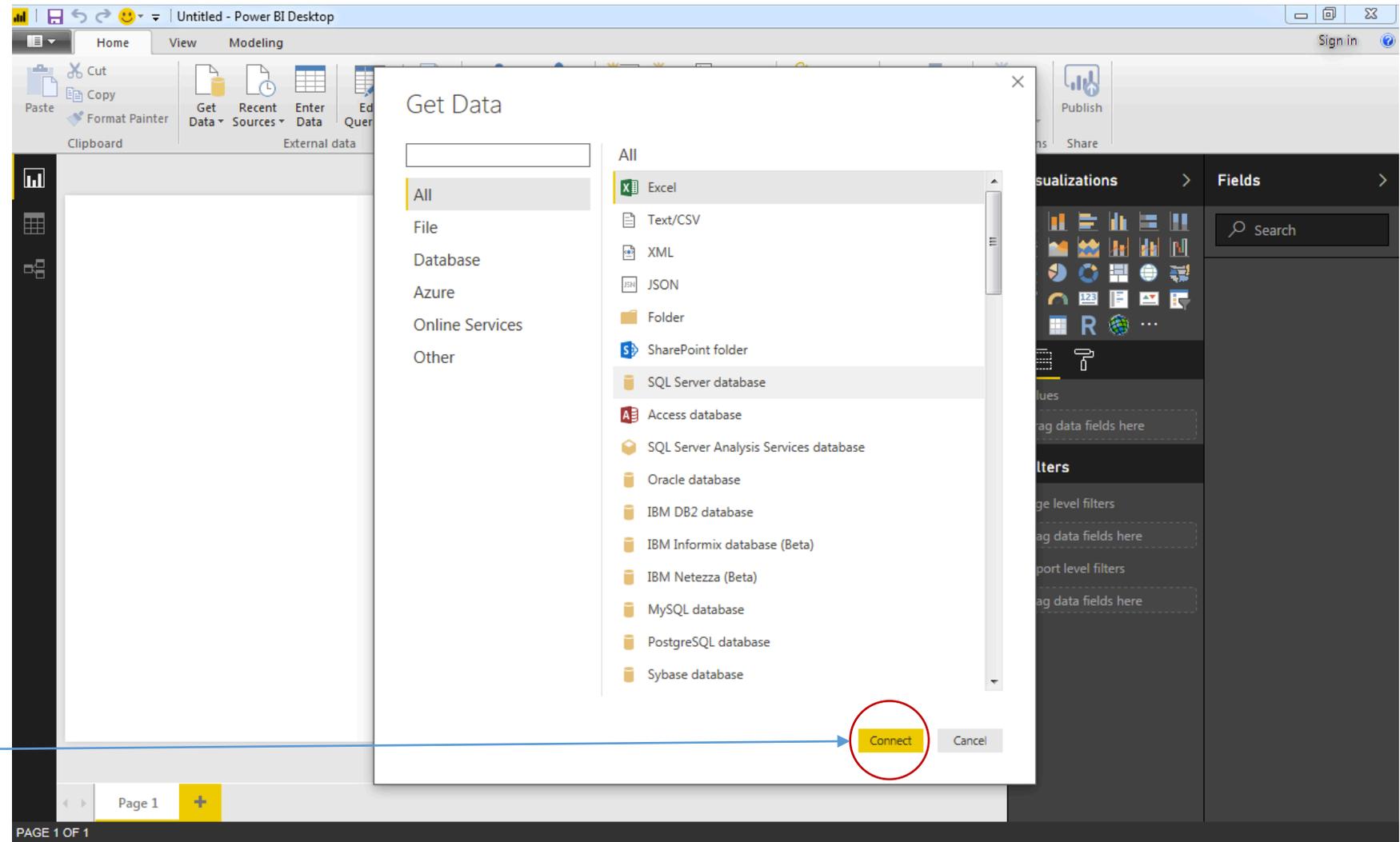


Understanding Power BI Features - 2

Step-2:

You will come across a dialog box with variety of options with different file types to load. Select the file type of your choice and proceed with "Connect"

In this case; we choose excel file

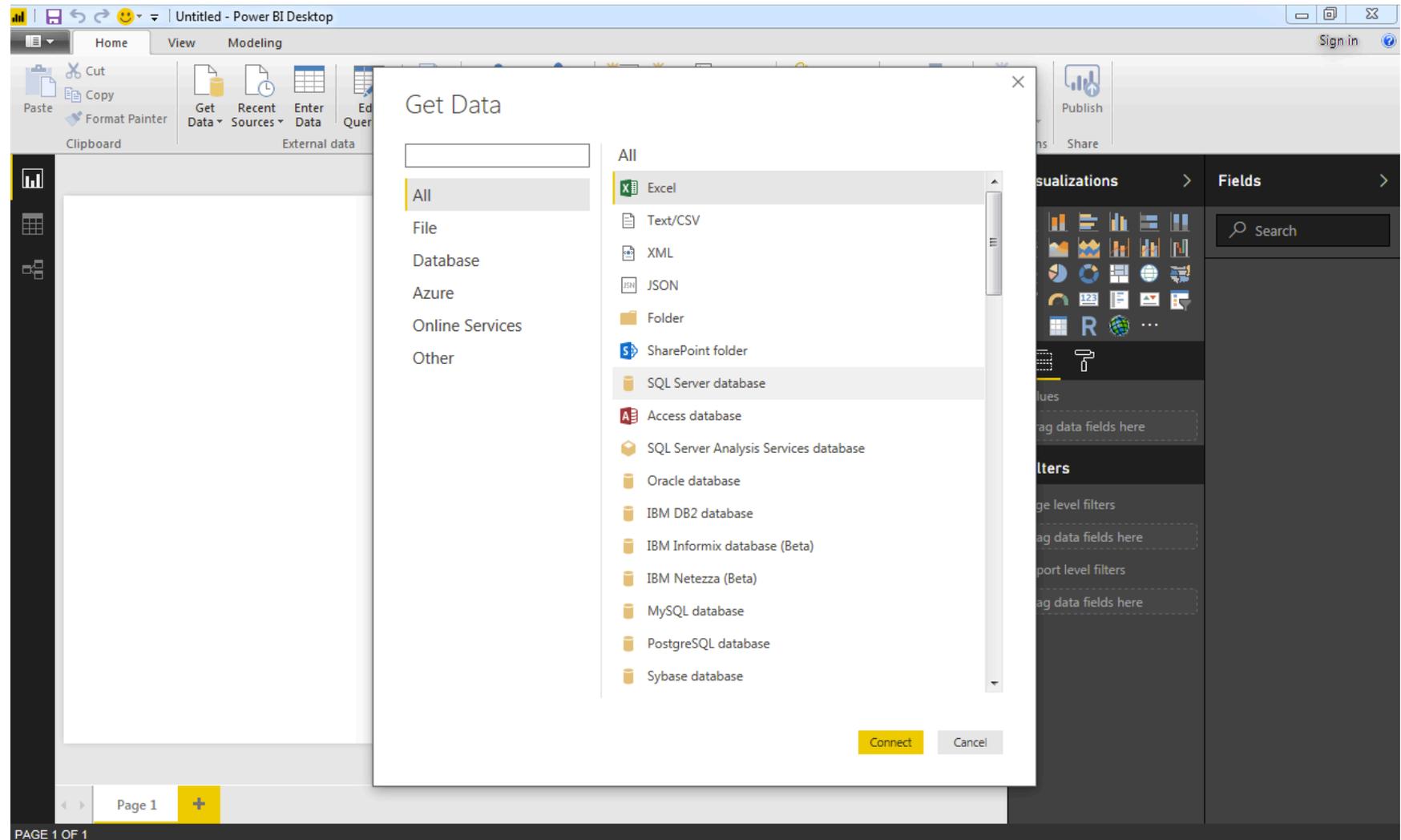


Understanding Power BI Features - 3

Step-3:

You will come across a dialog box with variety of options with different file types to load. Select the file type of your choice and proceed with "Connect"

In this case; we choose excel file

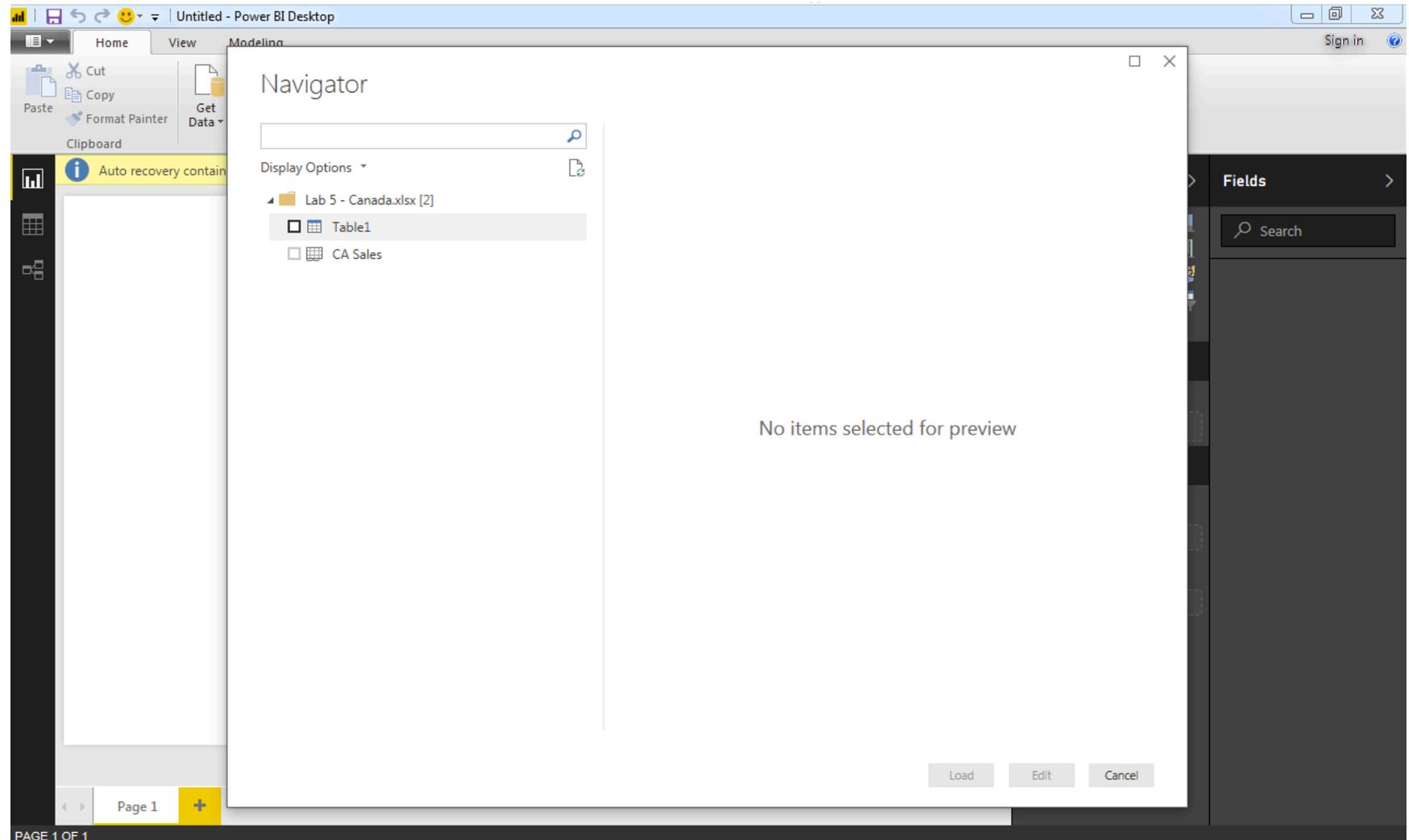


Understanding Power BI Features - 4

Step-4:

Choose the sheet you want to import from the file you selected. In this case; we have selected "CA Sales"

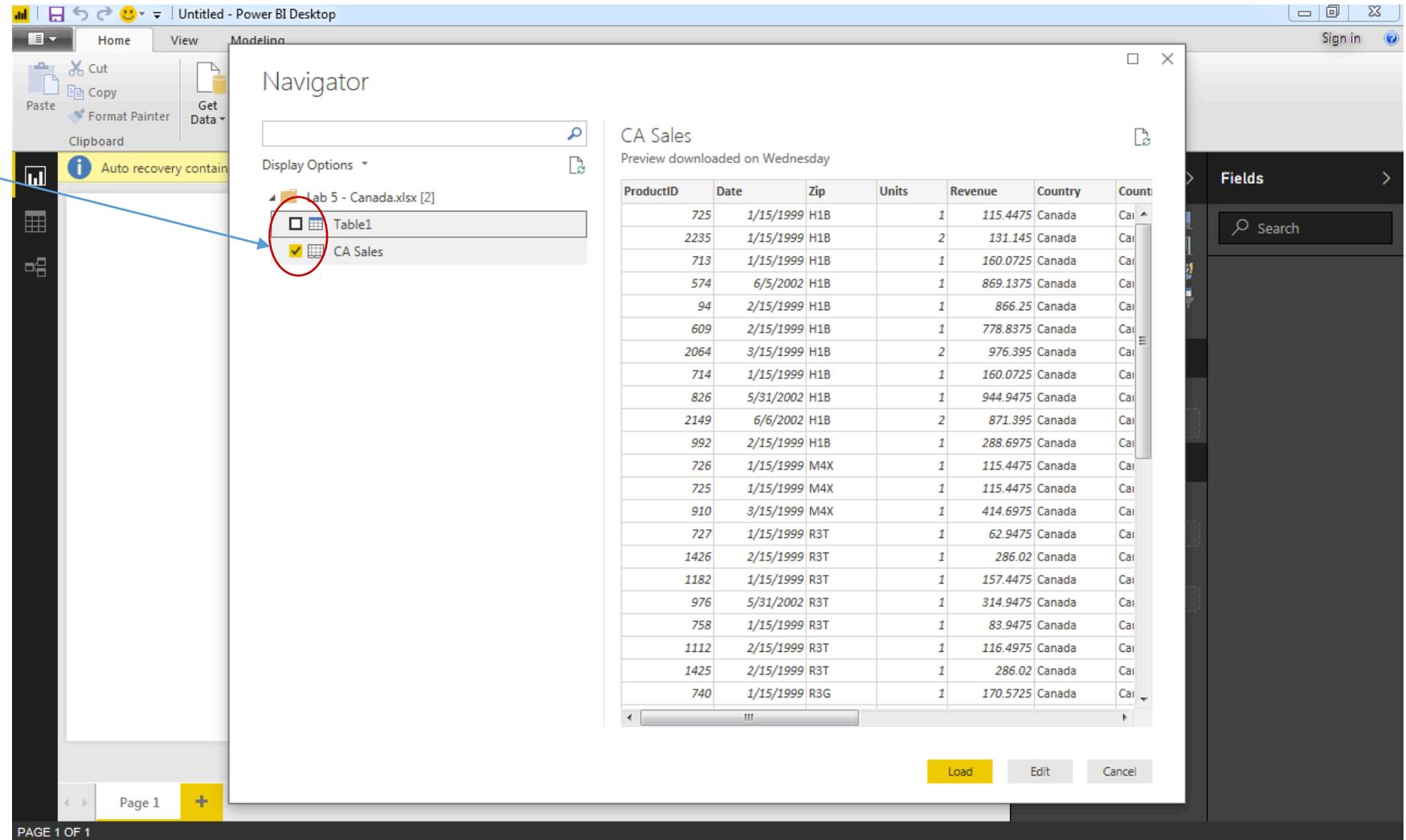
Once file is selected; it will provide you the data preview in the dialog window and also it will allow you to edit the data or load it as the way it is.



Understanding Power BI Features - 5

Step-5:

Select the file by ticking the box at the left of each sheet in the file you selected. It will preview the data and its current format in the right pane. Should you need to modify, edit data, change data types, add custom values or any operations on data; click Edit



The screenshot shows the Power BI Desktop interface. The Navigator pane on the left displays a file named 'Lab 5 - Canada.xlsx [2]' with two tables: 'Table1' and 'CA Sales'. The 'CA Sales' table is selected, and its data is previewed in the right pane. The preview table has columns for ProductID, Date, Zip, Units, Revenue, Country, and Count. A blue arrow points from the text 'Select the file by ticking the box at the left of each sheet...' to the checkbox next to 'CA Sales' in the Navigator pane.

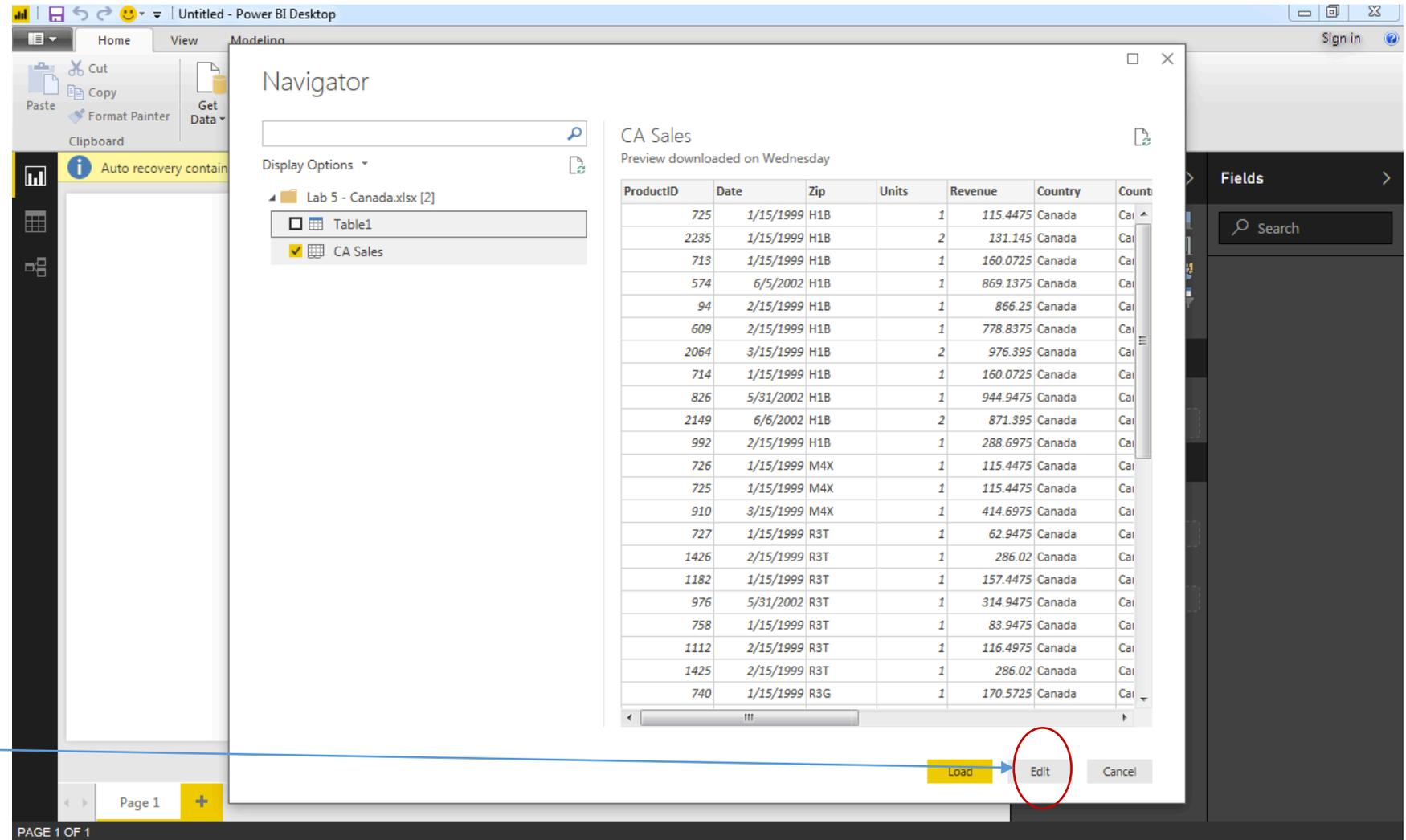
ProductID	Date	Zip	Units	Revenue	Country	Count
725	1/15/1999	H1B	1	115.4475	Canada	1
2235	1/15/1999	H1B	2	131.145	Canada	2
713	1/15/1999	H1B	1	160.0725	Canada	1
574	6/5/2002	H1B	1	869.1375	Canada	1
94	2/15/1999	H1B	1	866.25	Canada	1
609	2/15/1999	H1B	1	778.8375	Canada	1
2064	3/15/1999	H1B	2	976.395	Canada	2
714	1/15/1999	H1B	1	160.0725	Canada	1
826	5/31/2002	H1B	1	944.9475	Canada	1
2149	6/6/2002	H1B	2	871.395	Canada	2
992	2/15/1999	H1B	1	288.6975	Canada	1
726	1/15/1999	M4X	1	115.4475	Canada	1
725	1/15/1999	M4X	1	115.4475	Canada	1
910	3/15/1999	M4X	1	414.6975	Canada	1
727	1/15/1999	R3T	1	62.9475	Canada	1
1426	2/15/1999	R3T	1	286.02	Canada	1
1182	1/15/1999	R3T	1	157.4475	Canada	1
976	5/31/2002	R3T	1	314.9475	Canada	1
758	1/15/1999	R3T	1	83.9475	Canada	1
1112	2/15/1999	R3T	1	116.4975	Canada	1
1425	2/15/1999	R3T	1	286.02	Canada	1
740	1/15/1999	R3G	1	170.5725	Canada	1

Understanding Power BI Features - 6

Step-6:

Choose the sheet you want to import from the file you selected. In this case; we have selected "CA Sales"

Once file is selected; it will provide you the data preview in the dialog window and also it will allow you to edit the data or load it as the way it is.



The screenshot shows the Power BI Desktop interface. The Navigator window is open, displaying a file named 'Lab 5 - Canada.xlsx' with two tables: 'Table1' and 'CA Sales'. The 'CA Sales' table is selected, and a preview window shows the following data:

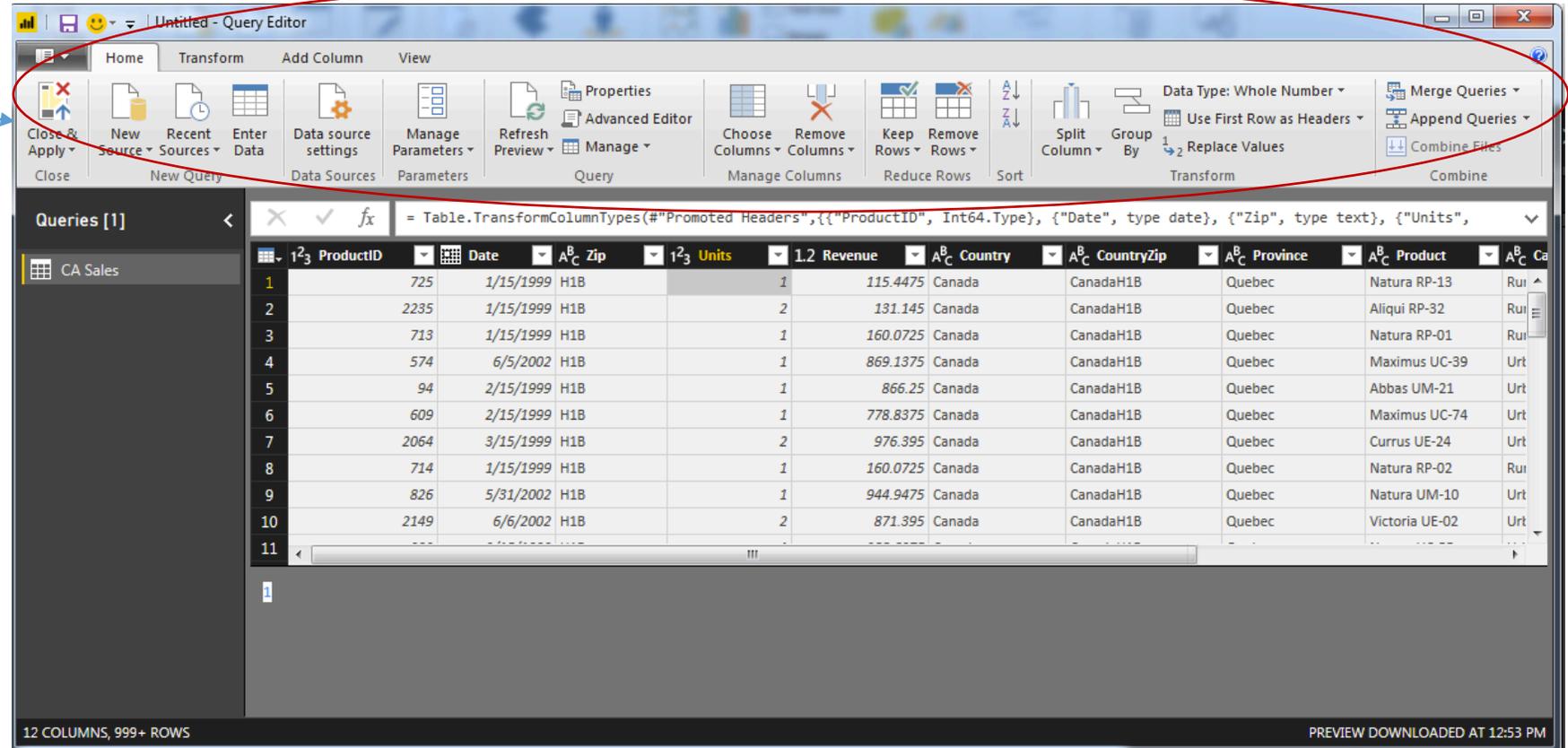
ProductID	Date	Zip	Units	Revenue	Country	Count
725	1/15/1999	H1B	1	115.4475	Canada	1
2235	1/15/1999	H1B	2	131.145	Canada	2
713	1/15/1999	H1B	1	160.0725	Canada	1
574	6/5/2002	H1B	1	869.1375	Canada	1
94	2/15/1999	H1B	1	866.25	Canada	1
609	2/15/1999	H1B	1	778.8375	Canada	1
2064	3/15/1999	H1B	2	976.395	Canada	2
714	1/15/1999	H1B	1	160.0725	Canada	1
826	5/31/2002	H1B	1	944.9475	Canada	1
2149	6/6/2002	H1B	2	871.395	Canada	2
992	2/15/1999	H1B	1	288.6975	Canada	1
726	1/15/1999	M4X	1	115.4475	Canada	1
725	1/15/1999	M4X	1	115.4475	Canada	1
910	3/15/1999	M4X	1	414.6975	Canada	1
727	1/15/1999	R3T	1	62.9475	Canada	1
1426	2/15/1999	R3T	1	286.02	Canada	1
1182	1/15/1999	R3T	1	157.4475	Canada	1
976	5/31/2002	R3T	1	314.9475	Canada	1
758	1/15/1999	R3T	1	83.9475	Canada	1
1112	2/15/1999	R3T	1	116.4975	Canada	1
1425	2/15/1999	R3T	1	286.02	Canada	1
740	1/15/1999	R3G	1	170.5725	Canada	1

At the bottom of the preview window, there are three buttons: 'Load', 'Edit', and 'Cancel'. The 'Edit' button is circled in red, and a blue arrow points from the text 'it will allow you to edit the data or load it as the way it is.' to this button.

Understanding Power BI Features - 7

Step-7:

With the "Edit" mode; the editor allows you to change different properties of the data; change record values; add new values; execute queries and many other options as can be seen above at the pane. You may scroll through the other options as "transform", "Add Column" and "View"



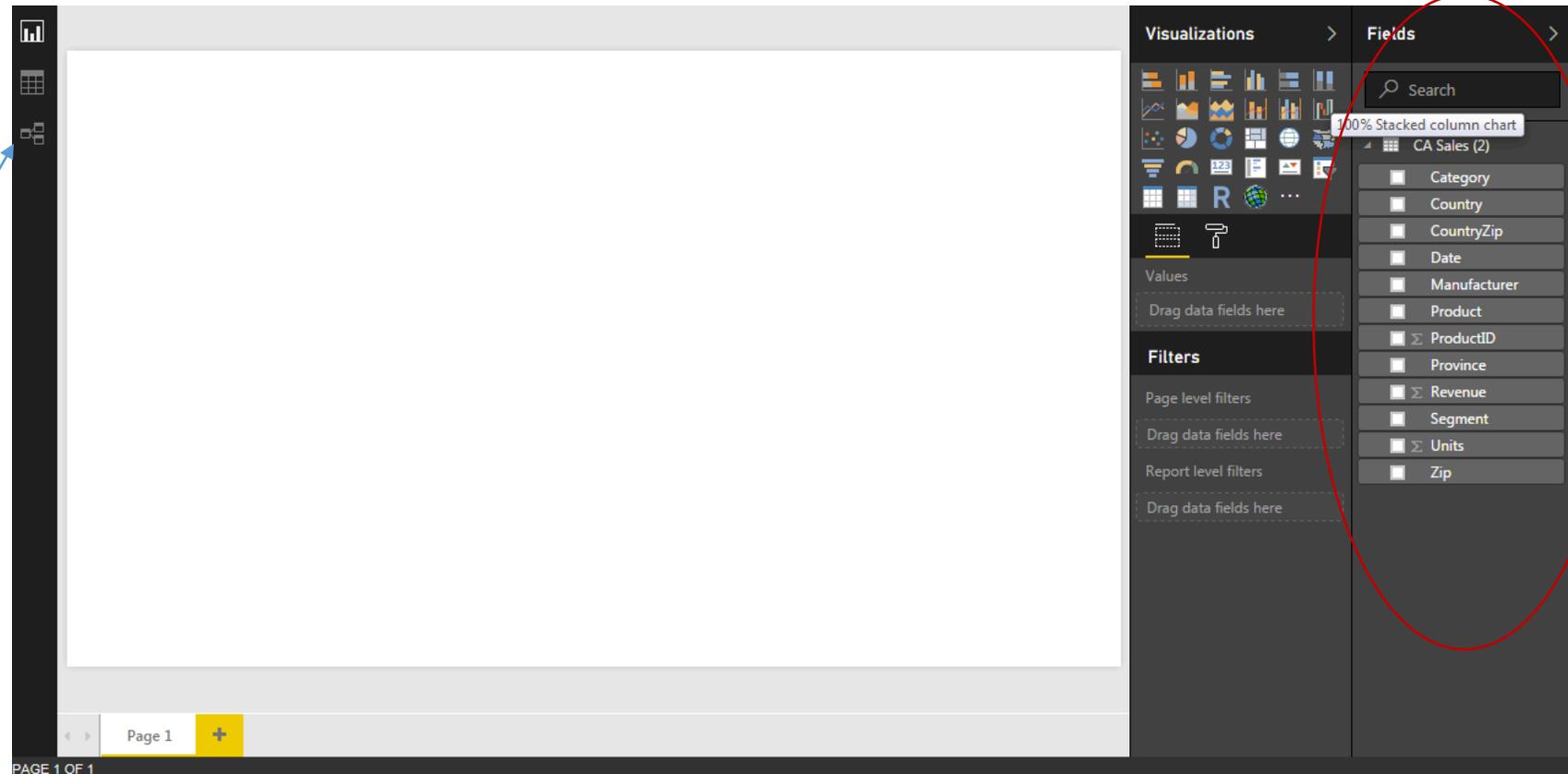
The screenshot shows the Power BI Query Editor interface. The ribbon is expanded to show various transformation options. A red oval highlights the ribbon area. Below the ribbon, a data table is visible with columns like ProductID, Date, Zip, Units, Revenue, Country, and Province. The status bar at the bottom indicates "12 COLUMNS, 999+ ROWS".

	ProductID	Date	Zip	Units	Revenue	Country	CountryZip	Province	Product	Ca
1	725	1/15/1999	H1B	1	115.4475	Canada	CanadaH1B	Quebec	Natura RP-13	Rui
2	2235	1/15/1999	H1B	2	131.145	Canada	CanadaH1B	Quebec	Aliqui RP-32	Rui
3	713	1/15/1999	H1B	1	160.0725	Canada	CanadaH1B	Quebec	Natura RP-01	Rui
4	574	6/5/2002	H1B	1	869.1375	Canada	CanadaH1B	Quebec	Maximus UC-39	Urt
5	94	2/15/1999	H1B	1	866.25	Canada	CanadaH1B	Quebec	Abbas UM-21	Urt
6	609	2/15/1999	H1B	1	778.8375	Canada	CanadaH1B	Quebec	Maximus UC-74	Urt
7	2064	3/15/1999	H1B	2	976.395	Canada	CanadaH1B	Quebec	Currus UE-24	Urt
8	714	1/15/1999	H1B	1	160.0725	Canada	CanadaH1B	Quebec	Natura RP-02	Rui
9	826	5/31/2002	H1B	1	944.9475	Canada	CanadaH1B	Quebec	Natura UM-10	Urt
10	2149	6/6/2002	H1B	2	871.395	Canada	CanadaH1B	Quebec	Victoria UE-02	Urt
11	...	...	...	...	...	...	...	...	...	...

Understanding Power BI Features - 8

Step-8:

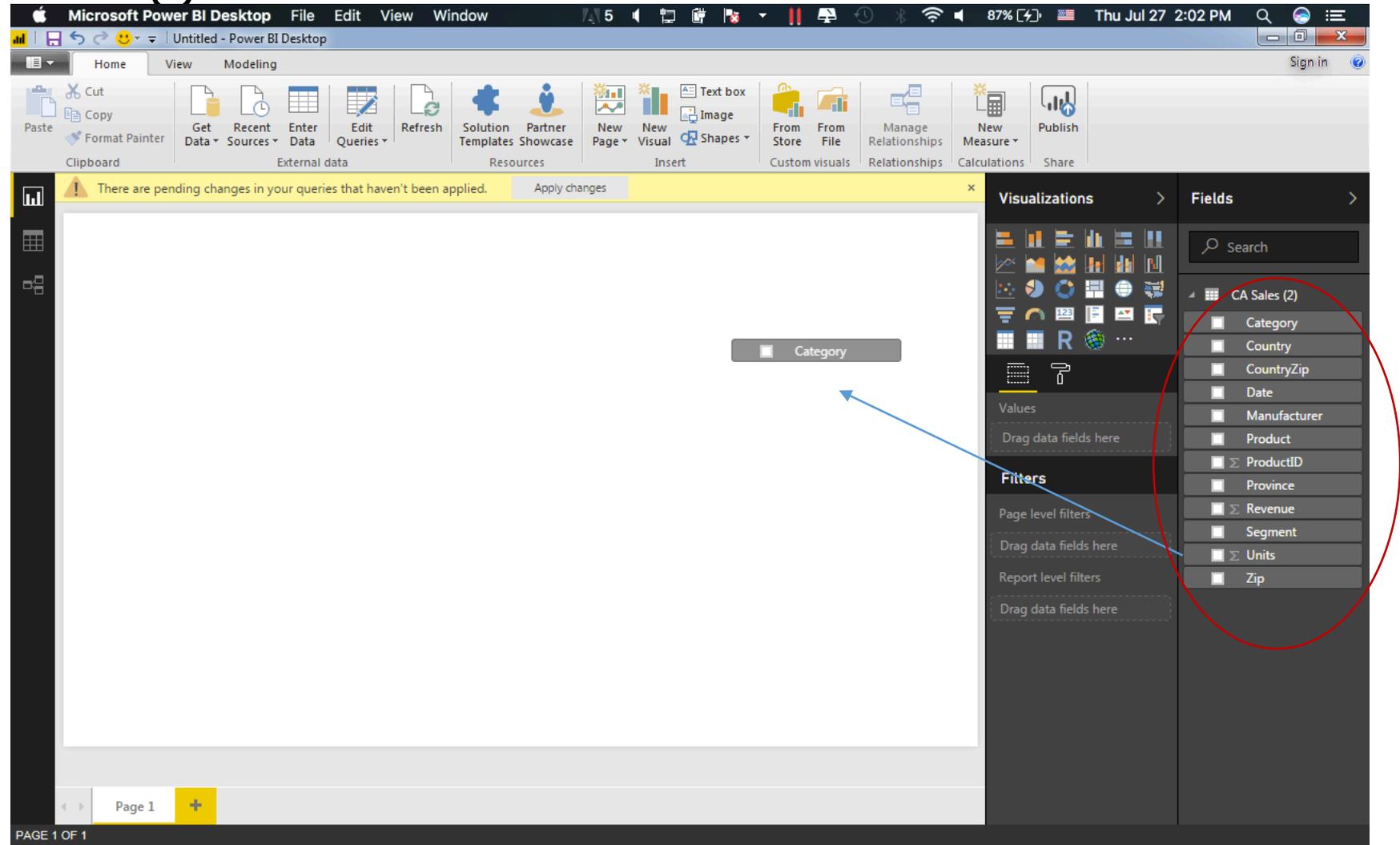
Once you close and save the changes; your data columns will be visible at the rightmost pane of the window. You can view the relationships between multiple data sets; view the data itself and scroll back to visualization window using the left side menu pane.



Understanding Power BI Features - 9

Step-9:

Drag one of the fields from the "Fields" section to the canvas and it will display the data it contains. Repeat the same procedure for another column and drag it to the existing column.

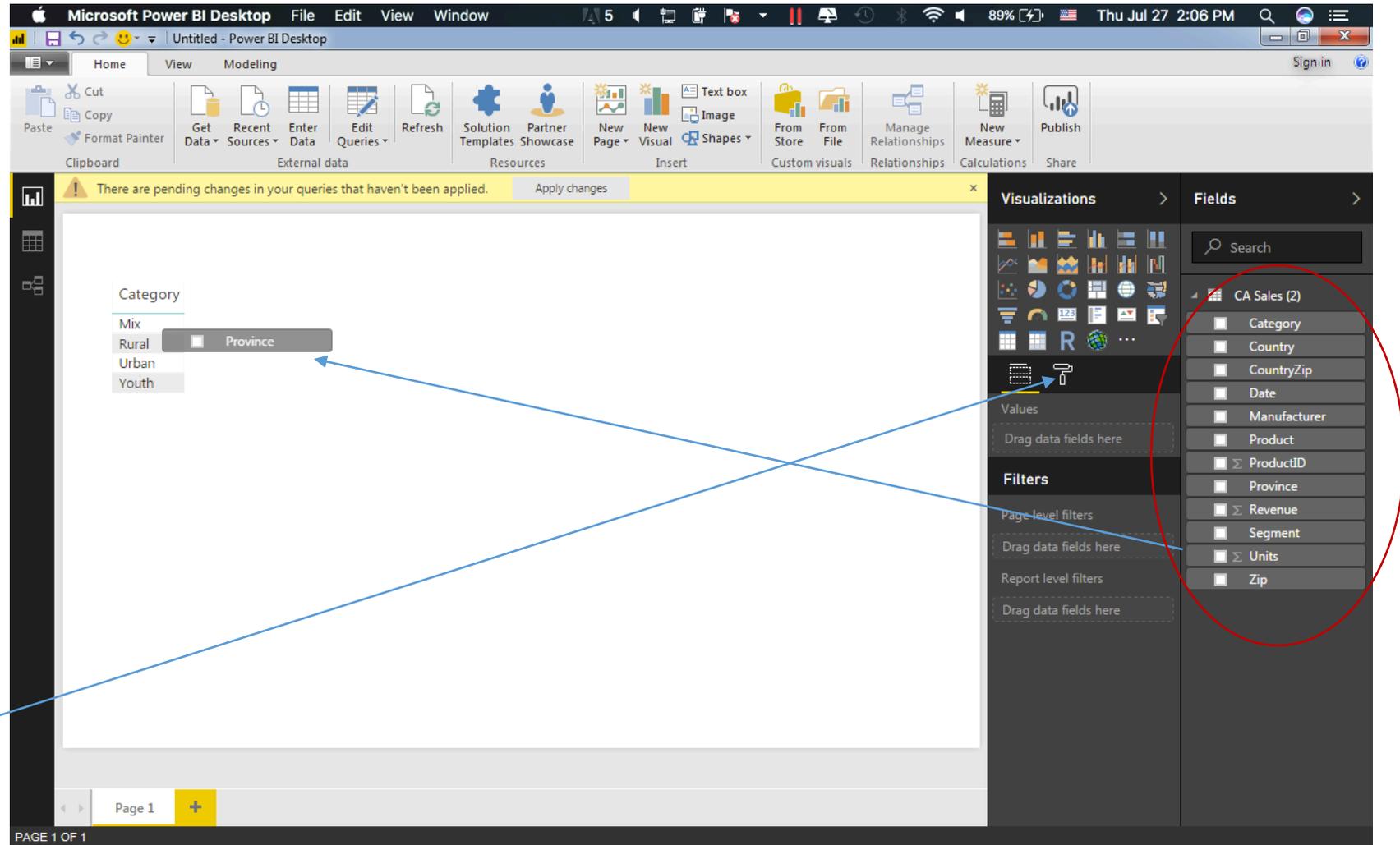


Understanding Power BI Features - 10

Step- 10:

Drag one of the fields from the "Fields" section to the canvas and it will display the data it contains. Repeat the same procedure for another column and drag it to the existing column.

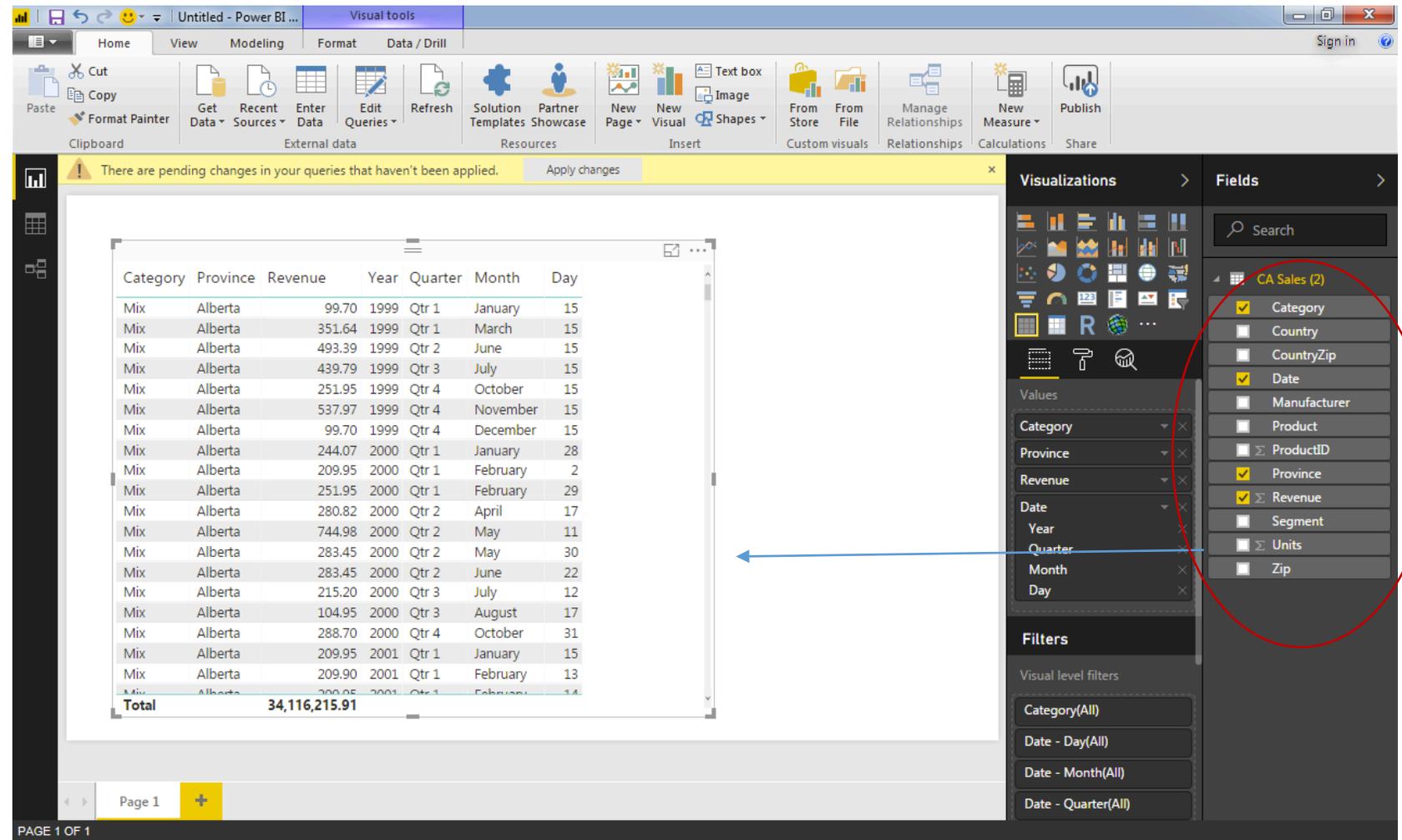
You can change the data text size and color by using the menu below visualizations



Understanding Power BI Features - 11

Step- 11:

Similarly, following the same procedure; drag more fields from the "Fields" area onto the existing field area. If you drop them somewhere else on the canvas, they would plot individually as a unit parameter and will not contribute to the group plotting.



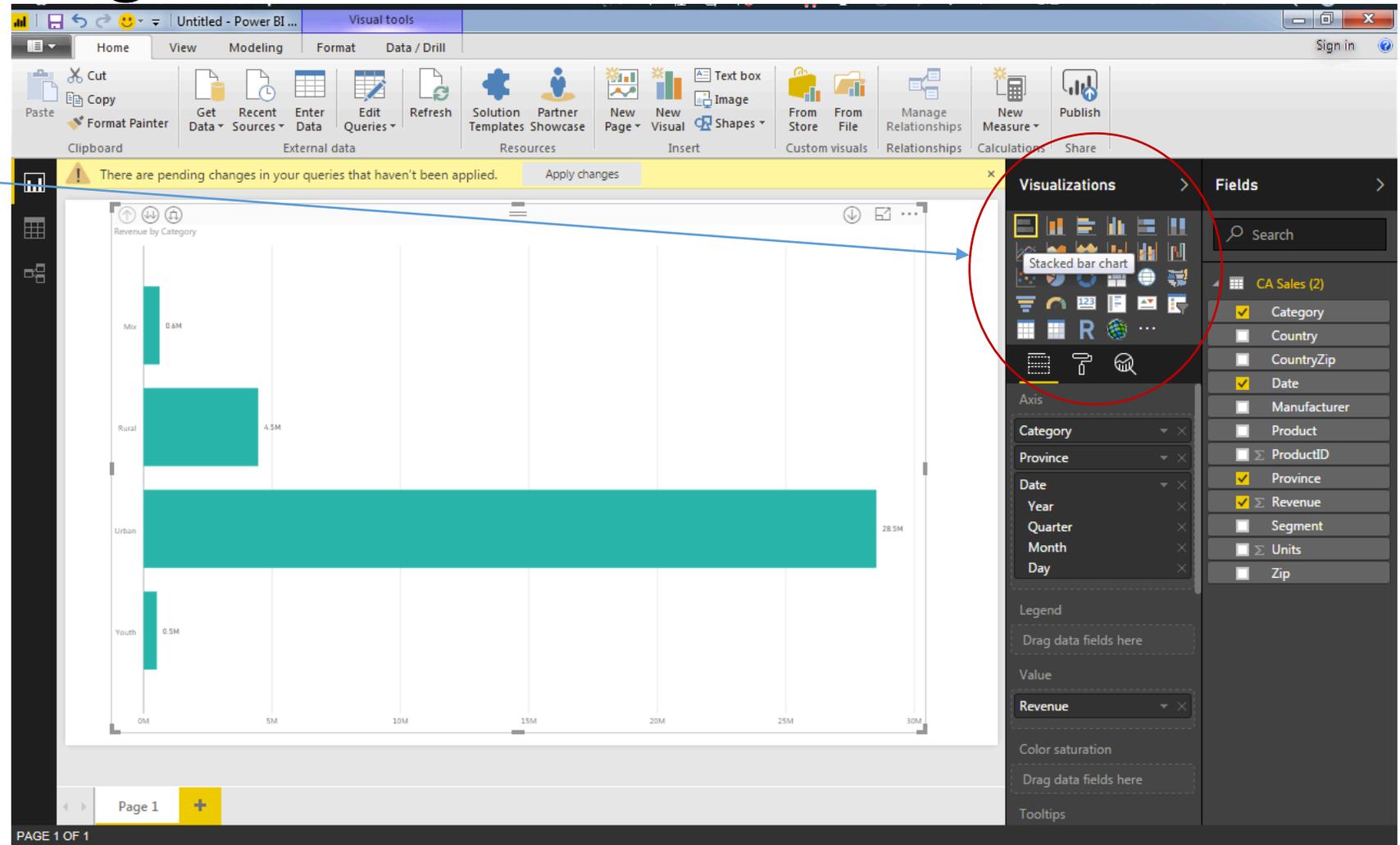
Category	Province	Revenue	Year	Quarter	Month	Day
Mix	Alberta	99.70	1999	Qtr 1	January	15
Mix	Alberta	351.64	1999	Qtr 1	March	15
Mix	Alberta	493.39	1999	Qtr 2	June	15
Mix	Alberta	439.79	1999	Qtr 3	July	15
Mix	Alberta	251.95	1999	Qtr 4	October	15
Mix	Alberta	537.97	1999	Qtr 4	November	15
Mix	Alberta	99.70	1999	Qtr 4	December	15
Mix	Alberta	244.07	2000	Qtr 1	January	28
Mix	Alberta	209.95	2000	Qtr 1	February	2
Mix	Alberta	251.95	2000	Qtr 1	February	29
Mix	Alberta	280.82	2000	Qtr 2	April	17
Mix	Alberta	744.98	2000	Qtr 2	May	11
Mix	Alberta	283.45	2000	Qtr 2	May	30
Mix	Alberta	283.45	2000	Qtr 2	June	22
Mix	Alberta	215.20	2000	Qtr 3	July	12
Mix	Alberta	104.95	2000	Qtr 3	August	17
Mix	Alberta	288.70	2000	Qtr 4	October	31
Mix	Alberta	209.95	2001	Qtr 1	January	15
Mix	Alberta	209.90	2001	Qtr 1	February	13
Mix	Alberta	209.95	2001	Qtr 1	February	14
Total		34,116,215.91				

Understanding Power BI Features - 12

Step- 12:

With the data selected on the canvas; you may click on the first visualization option and it will transform the table into a simple bar chart.

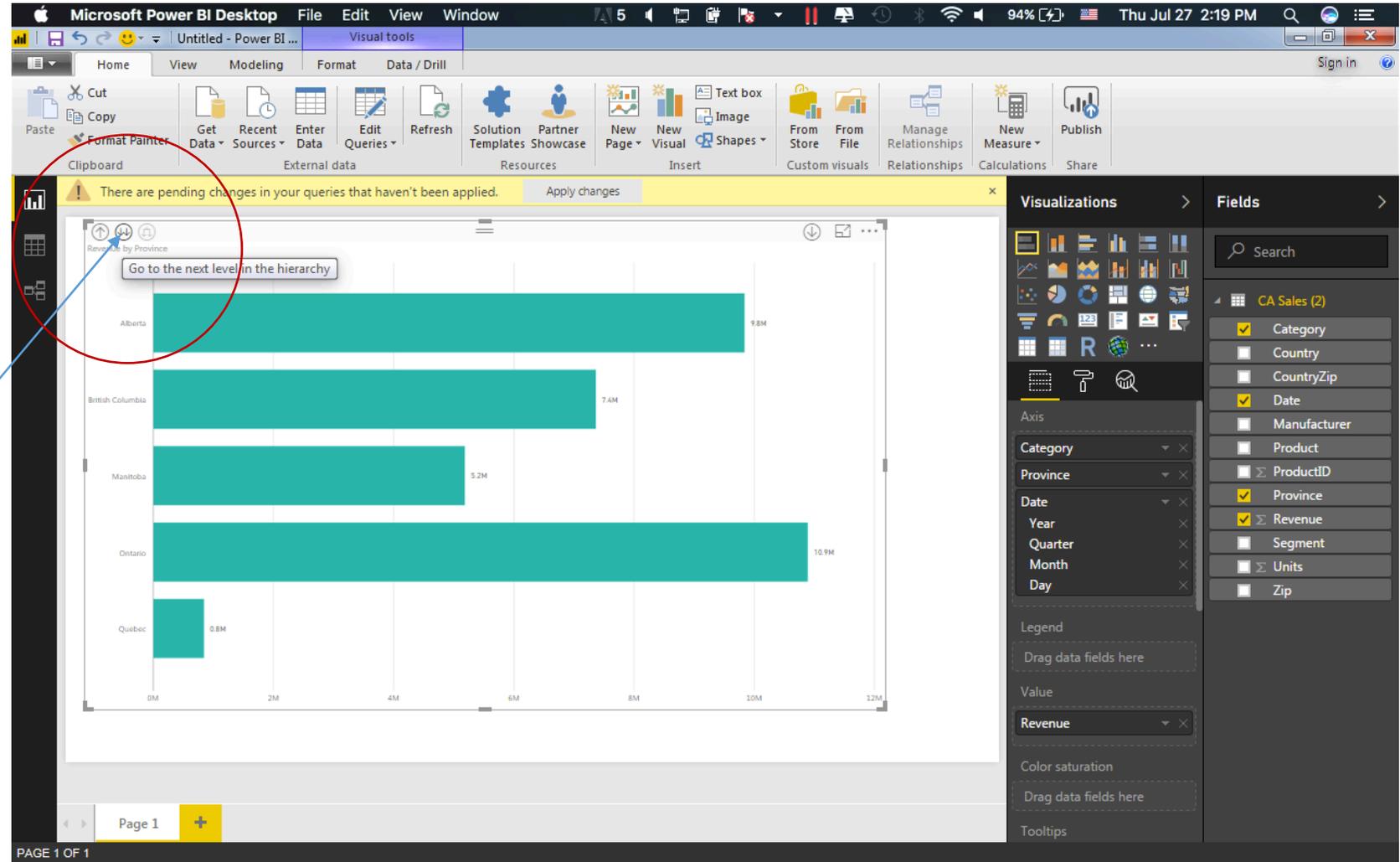
You may choose to plot it differently either as stacked bar chart, line chart, pie chart or any other type; is solely your own choice to try.



Understanding Power BI Features - 13

Step- 13:

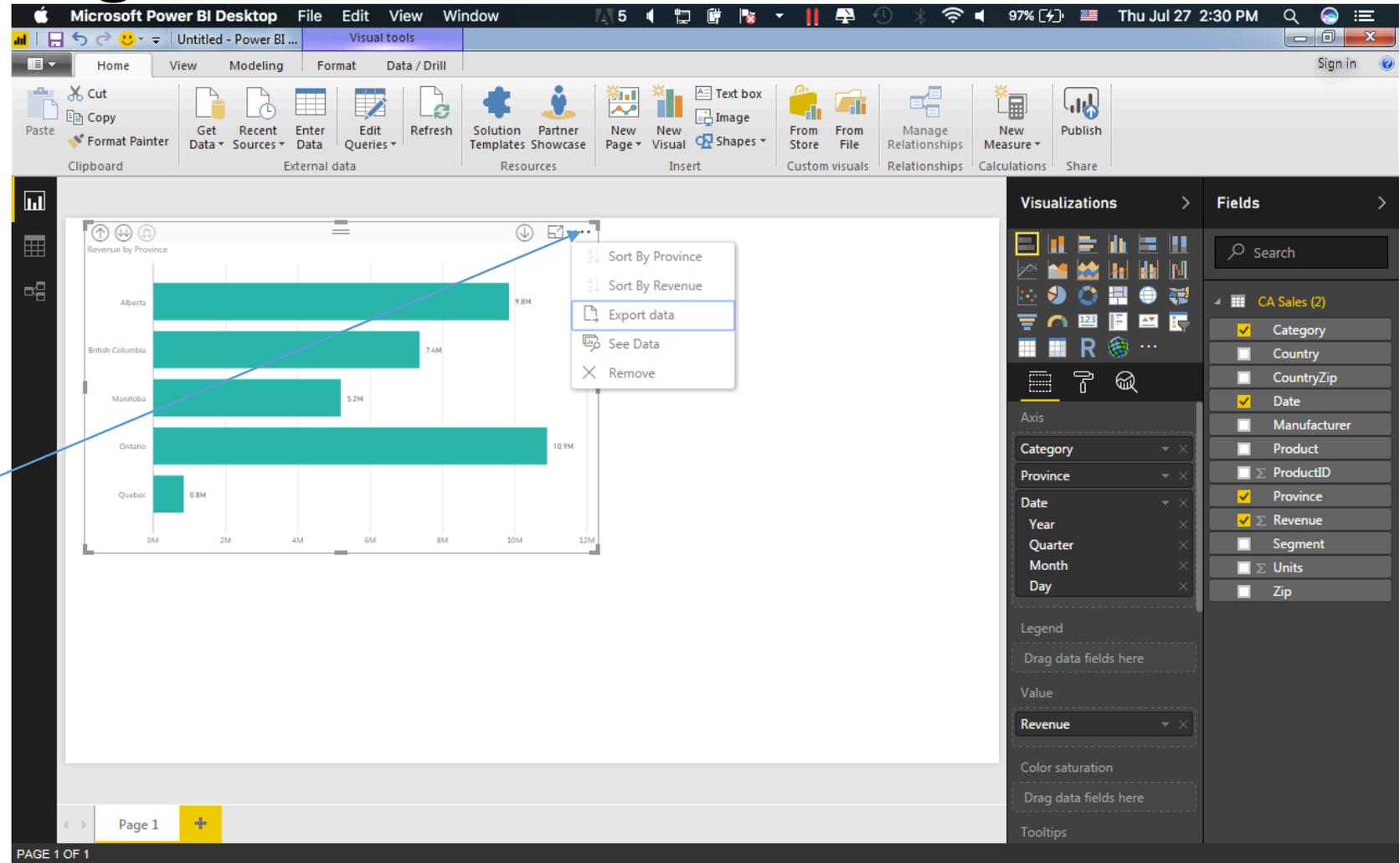
Since you selected to plot revenue by different provinces, in different years and by different categories; the single plot allows you to scroll through the other visuals in the same plot. Click on the double down arrow to scroll between different views for the parameters mentioned.



Understanding Power BI Features - 14

Step- 14:

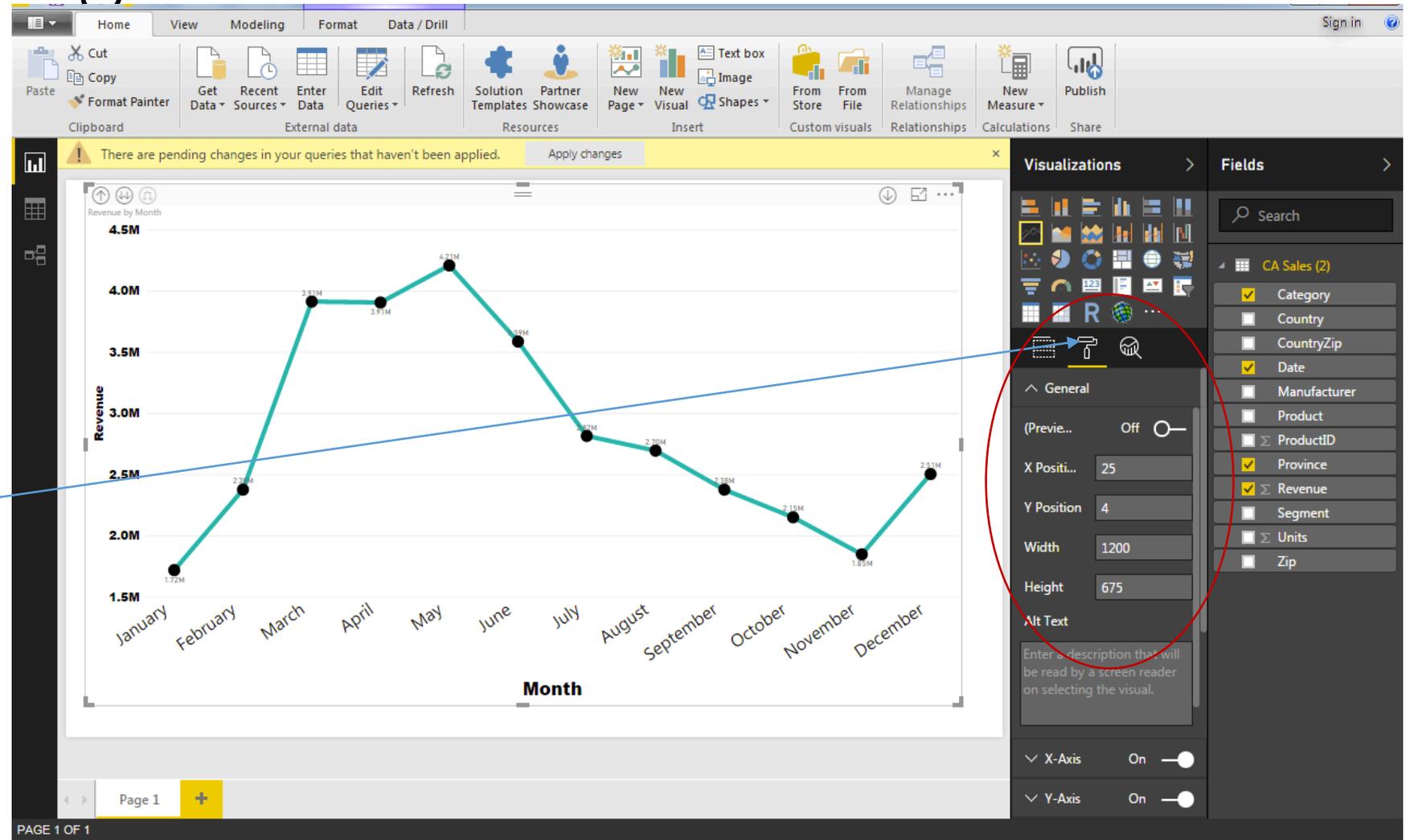
You can even view the data associated to the plot by clicking on the right most option that appears if you hover on the visualization; Select "See Data" and it will open a new tab below the visualization that will contain the data figures plotted above in the graph.



Understanding Power BI Features - 15

Step- 15:

Changing the axis style, line color, points on the canvas, font-size, font-style and height of the graph or visualization can be accustomed according to users' choice. Simply click on the "Format" icon below the visualization types and you will get access to all features



The screenshot shows the Power BI Desktop interface. The main area displays a line chart titled "Revenue by Month" with data points for each month from January to December. The Y-axis is labeled "Revenue" and ranges from 1.5M to 4.5M. The X-axis is labeled "Month". A red circle highlights the "Format" icon in the Visualizations pane, which is used to access the formatting options for the selected visualization.

Month	Revenue (M)
January	1.72M
February	2.31M
March	3.91M
April	3.81M
May	4.21M
June	3.61M
July	2.81M
August	2.71M
September	2.38M
October	2.11M
November	1.85M
December	2.51M

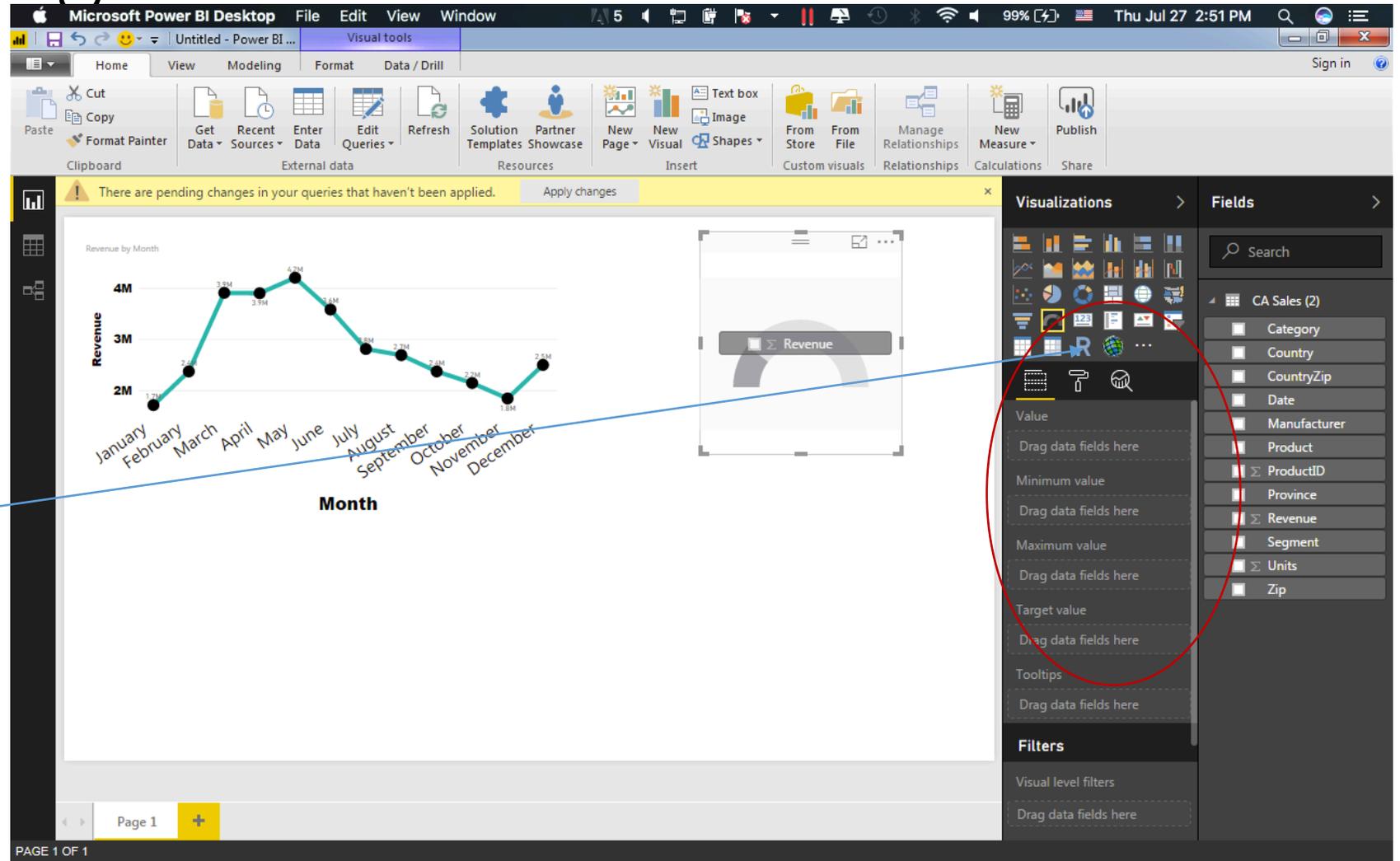
The Format pane shows the following settings for the selected visualization:

- General: (Previous) Off
- X Position: 25
- Y Position: 4
- Width: 1200
- Height: 675
- Alt Text: Enter a description that will be read by a screen reader on selecting the visual.
- X-Axis: On
- Y-Axis: On

Understanding Power BI Features - 16

Step- 16:

Alternative method to plot something is by selecting on the type of visual you want to plot; It will plot a vague or dim visual representing the prototype of actual visual. Now you may choose the field from the "Fields" section and drop on the visual to generate an actual visual based on the data.



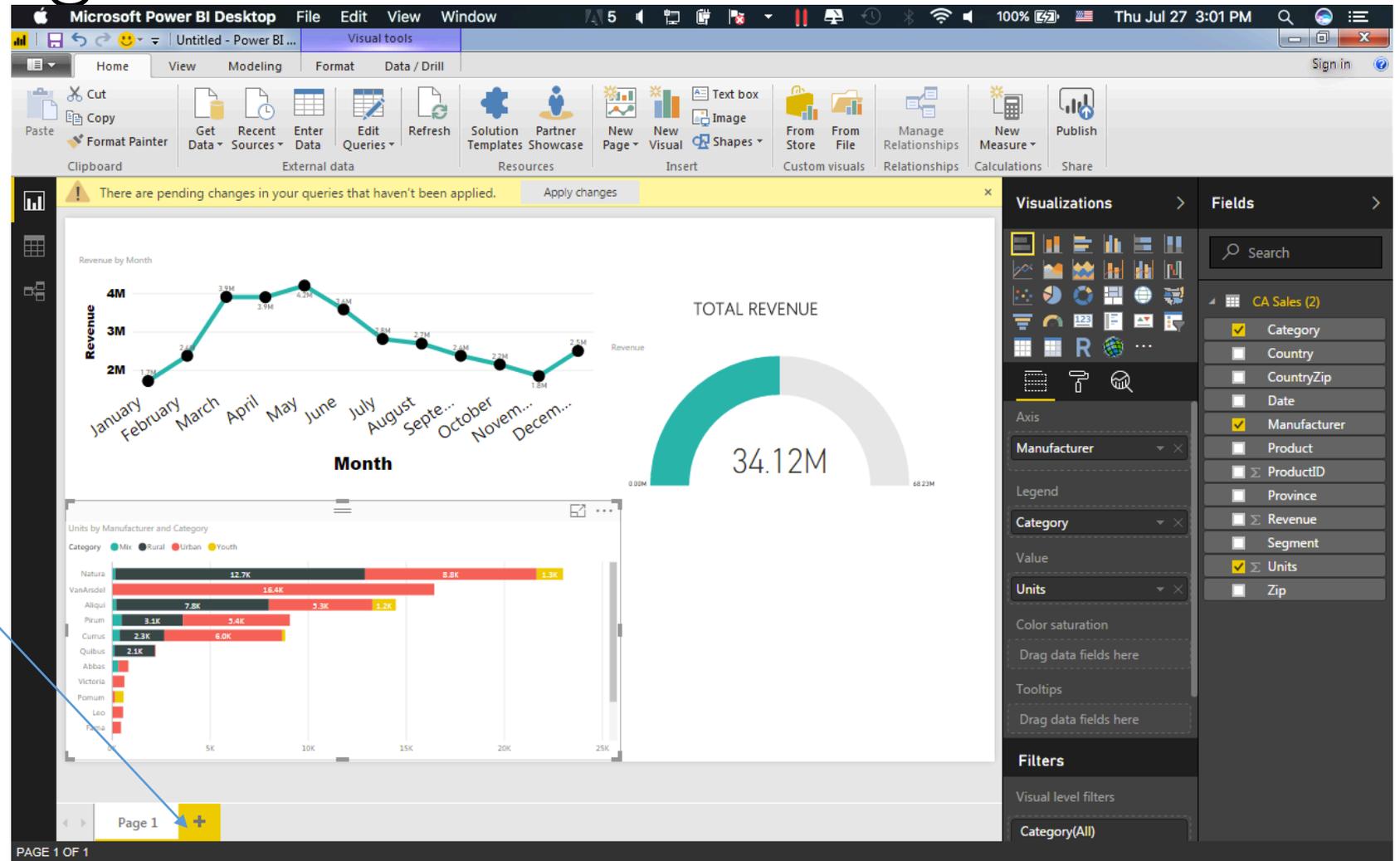
The screenshot shows the Microsoft Power BI Desktop interface. The main canvas displays a line chart titled "Revenue by Month" with data points for each month from January to December. The Y-axis is labeled "Revenue" and ranges from 2M to 4M. The X-axis is labeled "Month". A red circle highlights the "Fields" pane on the right side of the interface, which contains a list of fields for the "CA Sales (2)" dataset. The "Revenue" field is highlighted in the Fields pane, and a blue arrow points from this field to the "Revenue" field in the chart's data source area.

Month	Revenue (M)
January	1.7M
February	2.5M
March	3.8M
April	3.9M
May	4.0M
June	3.4M
July	2.8M
August	2.7M
September	2.4M
October	2.3M
November	1.8M
December	2.6M

Understanding Power BI Features - 17

Step- 17:

Experiment yourself by creating new visualizations, adding new categories of data and varying between different types for same data set. If you fall short of space on the first page, you can always create additional pages by clicking on the + button and rename them by your choice

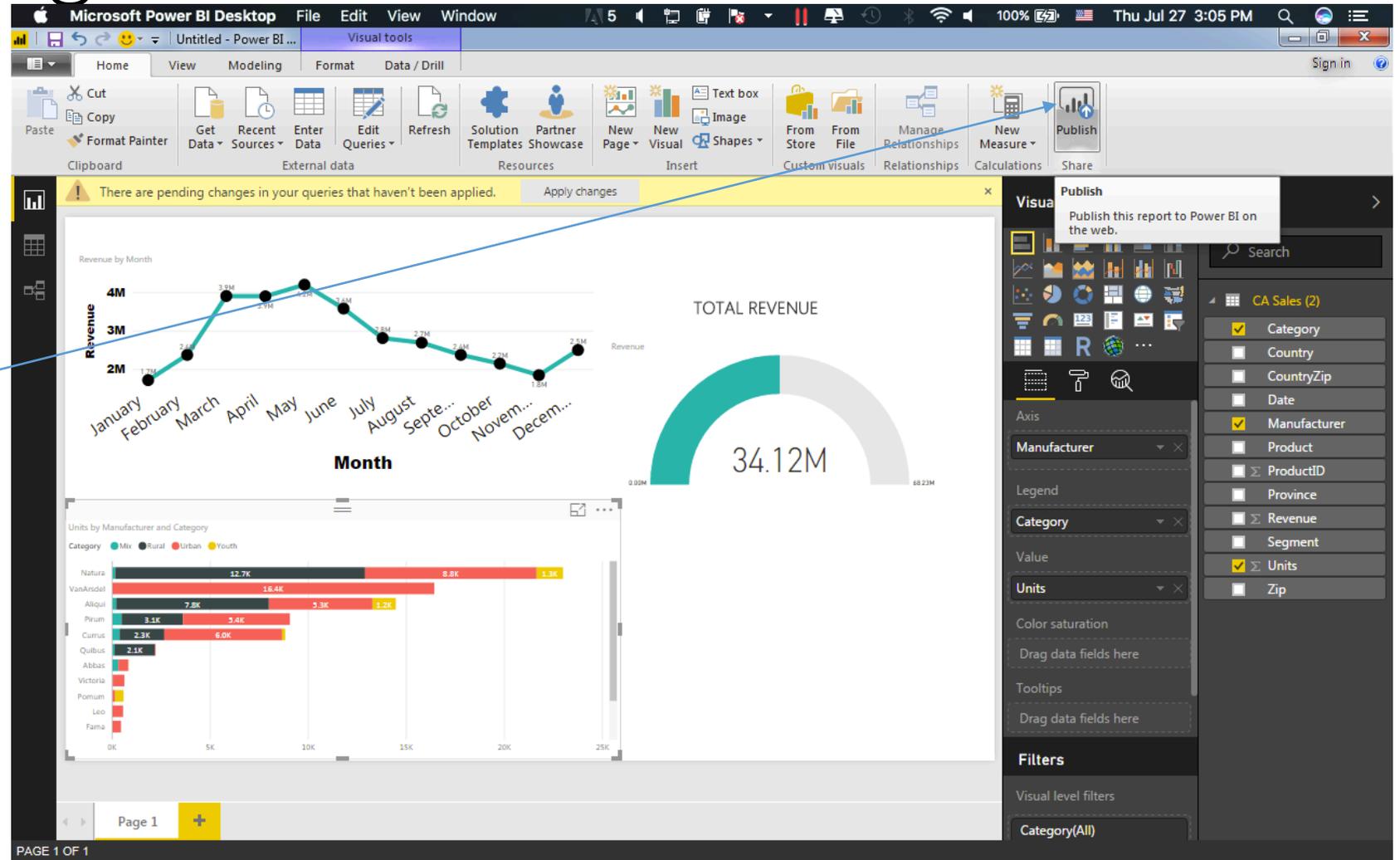


Understanding Power BI Features - 18

Step- 18:

Now that we have done some of the visualizations and we would like to export them or use them in our reports; click on "Publish".

It will ask you to save your project as ".pbix" extension. Name your project and save it on your local disk.



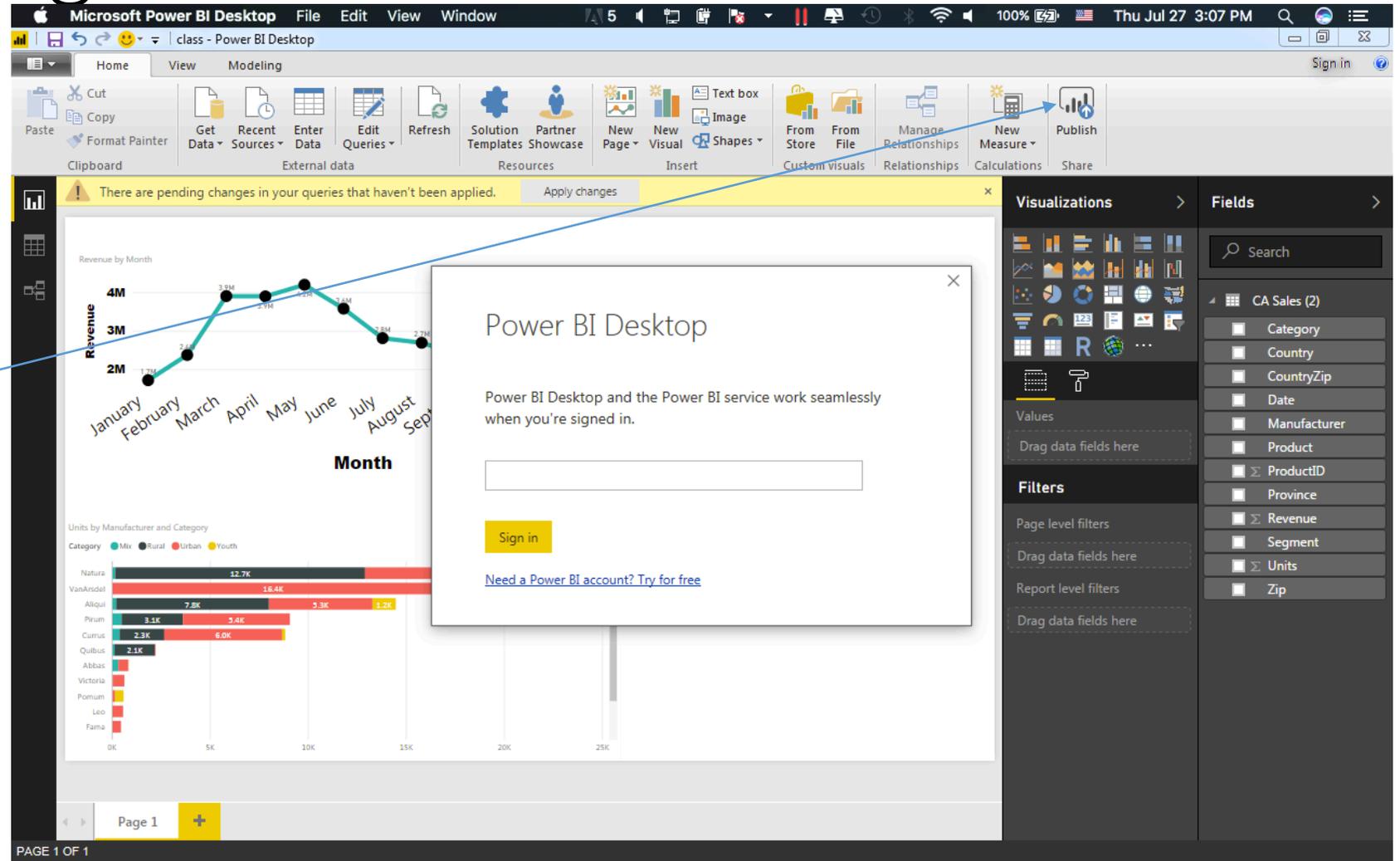
The screenshot shows the Microsoft Power BI Desktop interface. The main workspace contains three visualizations: a line chart titled 'Revenue by Month' showing monthly revenue from January to December; a donut chart titled 'TOTAL REVENUE' showing a total of 34.12M; and a horizontal bar chart titled 'Units by Manufacturer and Category' showing units for various manufacturers across different categories. A yellow banner at the top of the workspace indicates 'There are pending changes in your queries that haven't been applied.' A 'Publish' dialog box is open in the top right corner, with the text 'Publish this report to Power BI on the web.' The 'Publish' button is highlighted with a blue arrow. The right-hand pane shows the 'Visual' toolbars and the 'Fields' task pane with various data fields listed.

Understanding Power BI Features - 19

Step- 19:

Upon saving your file, a new dialog box will appear asking you to enter your sign in information to Microsoft Power BI Pro version (cloud version) of the same product.

To sign in; please enter the information in the next slide:



The screenshot shows the Microsoft Power BI Desktop application window. The title bar reads "Microsoft Power BI Desktop" and the window title is "class - Power BI Desktop". The interface includes a ribbon with tabs for Home, View, and Modeling. A yellow warning banner at the top states "There are pending changes in your queries that haven't been applied." with an "Apply changes" button. The main workspace displays two visualizations: a line chart titled "Revenue by Month" and a horizontal bar chart titled "Units by Manufacturer and Category". A "Sign in" dialog box is overlaid on the workspace, containing the text "Power BI Desktop" and "Power BI Desktop and the Power BI service work seamlessly when you're signed in." Below this text is an input field and a yellow "Sign in" button. A link "Need a Power BI account? Try for free" is also present. The right-hand side of the interface features the "Visualizations" and "Fields" panes. The "Fields" pane shows a table of fields for "CA Sales (2)".

Field Name	Field Type
Category	Category
Country	Category
CountryZip	Category
Date	Date
Manufacturer	Category
Product	Category
ProductID	Category
Province	Category
Revenue	Measure
Segment	Category
Units	Measure
Zip	Category

Understanding Power BI Features - 20

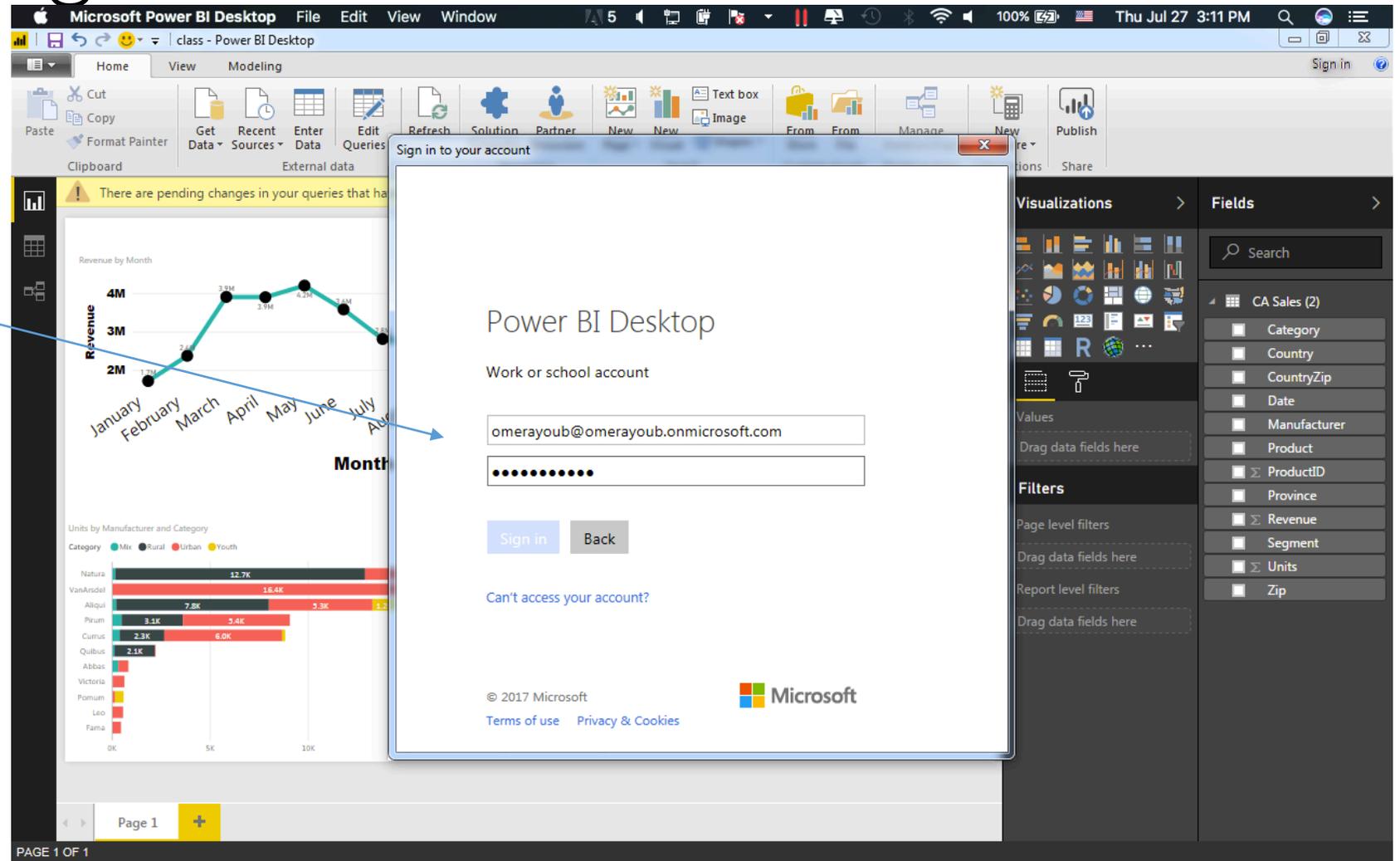
Power BI Pro Accounts (Cloud Access) for ICTP Codata Workshop

Username	Password
ictp01@omerayoub.onmicrosoft.com	Codata2017
ictp02@omerayoub.onmicrosoft.com	Codata2017
ictp03@omerayoub.onmicrosoft.com	Codata2017
ictp04@omerayoub.onmicrosoft.com	Codata2017
....
ictp50@omerayoub.onmicrosoft.com	Codata2017

Understanding Power BI Features - 21

Step- 21:

Using the information provided in the above slide; login through this window to access live cloud based version of your visualization



The screenshot shows the Microsoft Power BI Desktop interface. A 'Sign in to your account' dialog box is centered on the screen, overlaying a dashboard. The dialog box contains the following text and fields:

- Power BI Desktop
- Work or school account
- Input field: omerayoub@omerayoub.onmicrosoft.com
- Input field: Password (represented by dots)
- Buttons: Sign in, Back
- Link: Can't access your account?
- Footer: © 2017 Microsoft, Terms of use, Privacy & Cookies, Microsoft logo

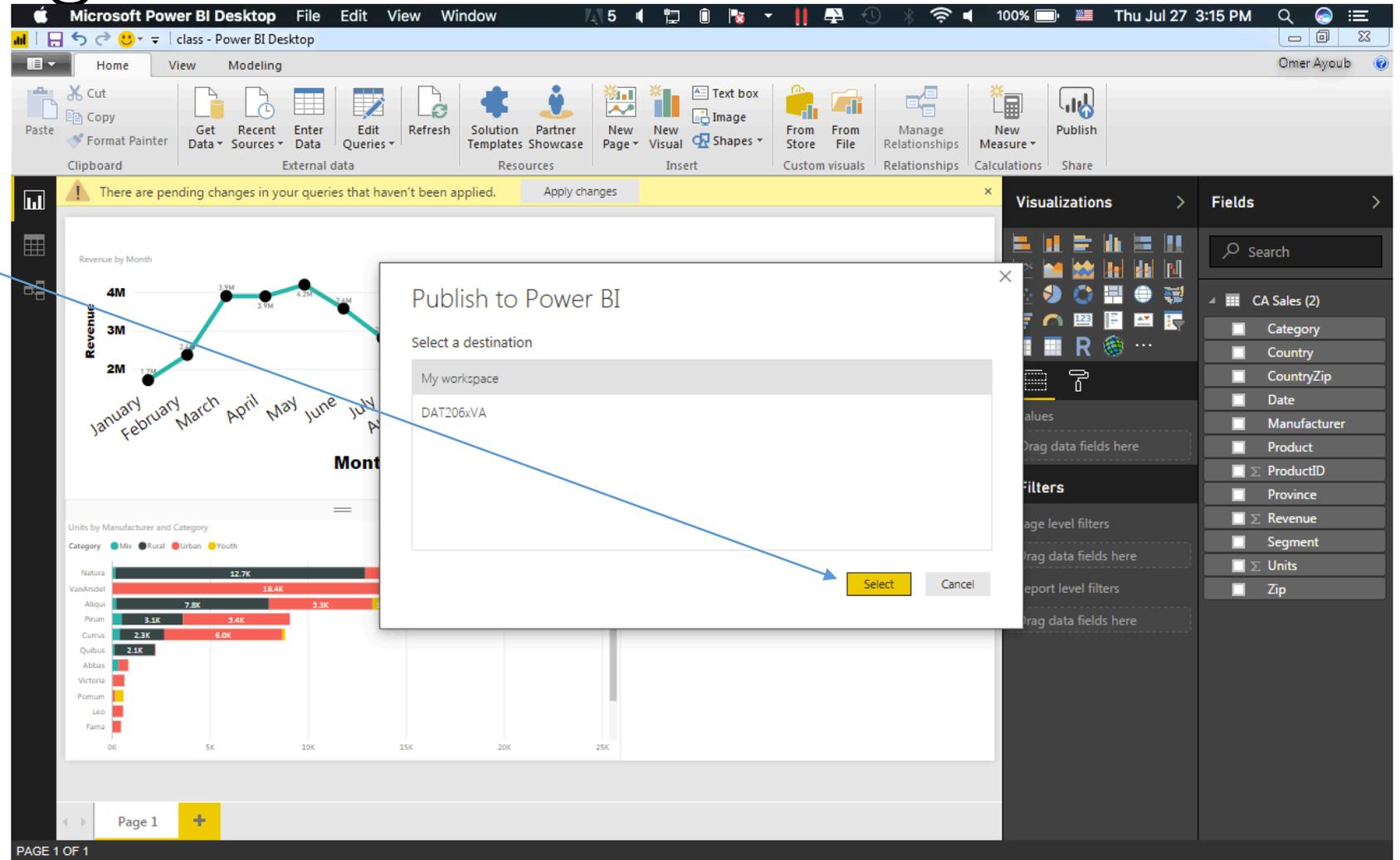
The background dashboard features two visualizations:

- Revenue by Month:** A line chart showing revenue from January to August. The y-axis is labeled 'Revenue' and ranges from 2M to 4M. The x-axis is labeled 'Month'.
- Units by Manufacturer and Category:** A horizontal bar chart showing units for various manufacturers (Natura, VanAnsdell, Aliqui, Pirum, Curtus, Qulbus, Abbas, Victoria, Pomum, Leo, Fama) across four categories: Mix, Rural, Urban, and Youth. The x-axis is labeled 'Units' and ranges from 0K to 10K.

Understanding Power BI Features - 22

Step- 22:

You will be asked to select the workspace where you want to save and publish your visualizations. Select the default "My Workspace" and proceed further.

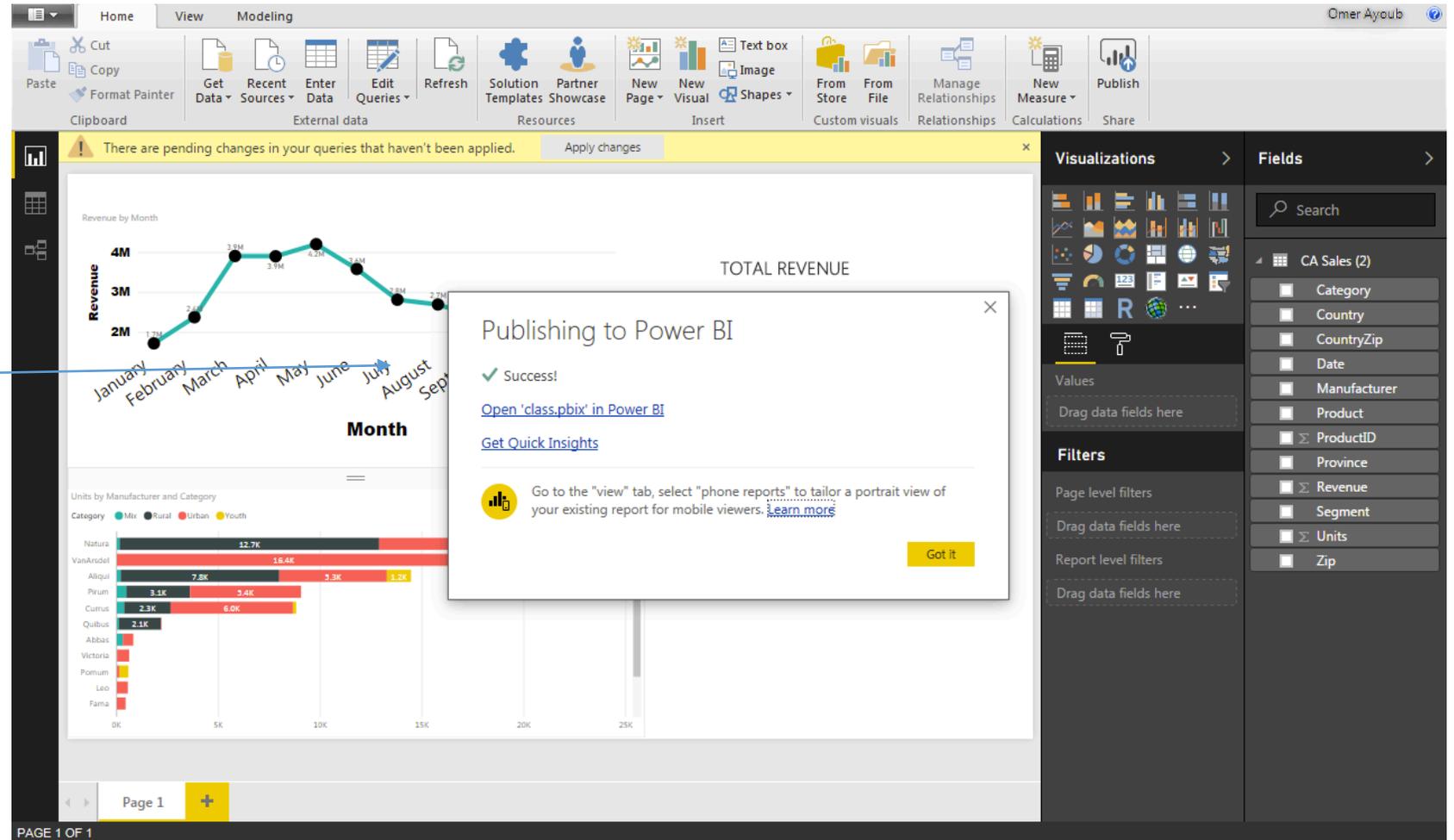


The screenshot shows the Microsoft Power BI Desktop interface. The main window displays two visualizations: a line chart titled "Revenue by Month" showing revenue from January to July, and a horizontal bar chart titled "Units by Manufacturer and Category" showing units for various manufacturers. A "Publish to Power BI" dialog box is open in the center, prompting the user to "Select a destination". The dialog box lists two options: "My workspace" (which is selected) and "DAT206xVA". The "Select" button is highlighted with a yellow border, and a blue arrow points from the text on the left to this button. The background interface includes the Power BI ribbon with tabs for Home, View, and Modeling, and a right-hand pane with Visualizations and Fields sections.

Understanding Power BI Features - 23

Step- 23:

Once your project is successfully published, you will get a success message informing you that you can get quick insights about your data and learn more about reporting tools using the Power BI mobile and Pro version.



The screenshot shows the Power BI Desktop interface with a success dialog box titled "Publishing to Power BI". The dialog box contains the following text:

- Success!
- [Open 'class.pbix' in Power BI](#)
- [Get Quick Insights](#)
- Go to the "view" tab, select "phone reports" to tailor a portrait view of your existing report for mobile viewers. [Learn more](#)
- Got it** button

The background interface shows a line chart titled "Revenue by Month" with data points for January through September. Below it is a horizontal bar chart titled "Units by Manufacturer and Category" showing data for various manufacturers like Natura, VanArsdel, Aliqui, Pirum, Curus, Quibus, Abbas, Victoria, Pomum, Leo, and Fama.

Understanding Power BI Features - 24

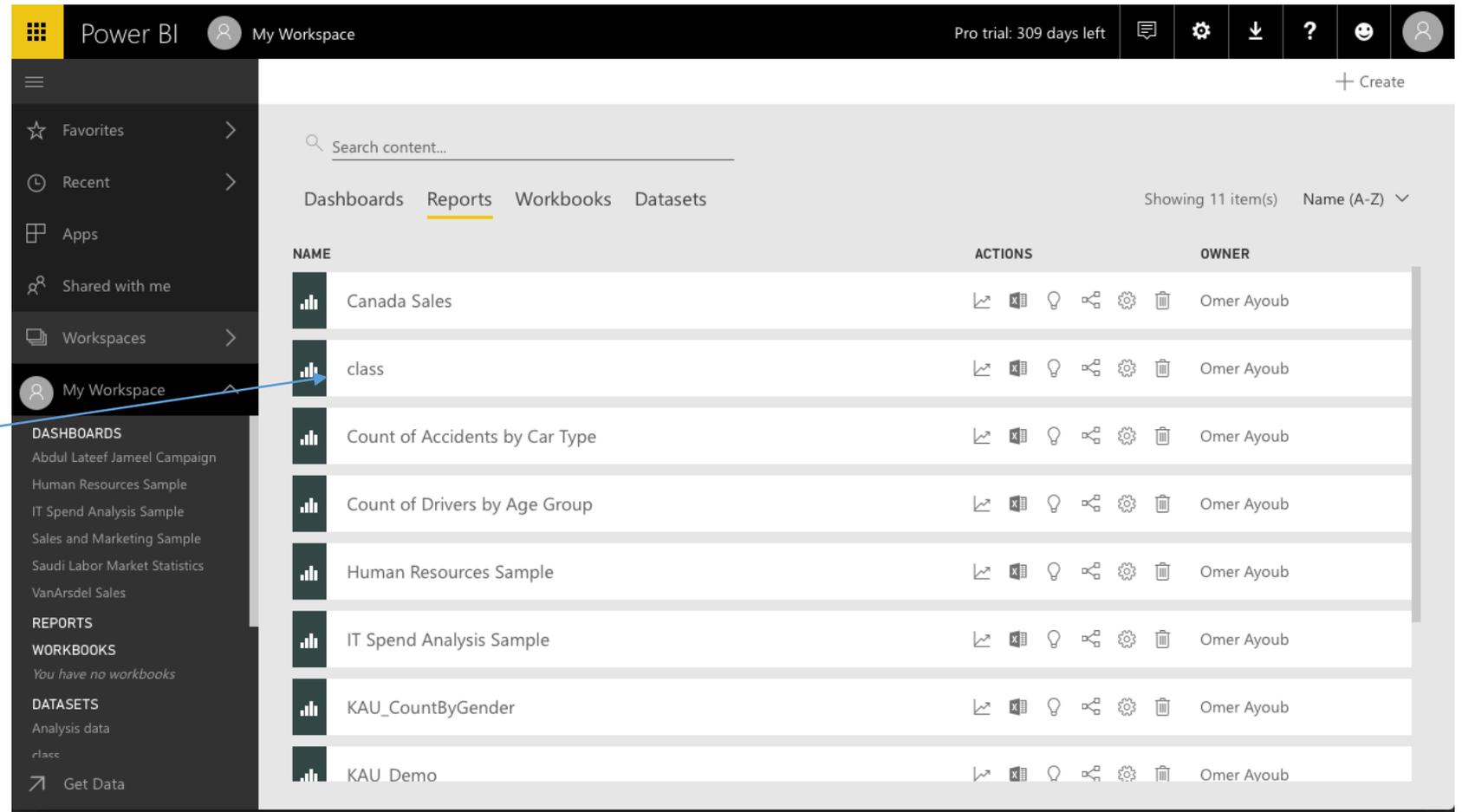
Step- 24:

- After you have successfully published your project; go to: <http://powerbi.microsoft.com>
- Login with your Power BI Pro account details
- You will get to see the same project uploaded under the Tab “My Workspace”

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Step- 24:

Click on “My Workspace”. It will load a list of all the Dashboards, Reports, Workbooks and Datasets that have been created so far by the logged in user. Since we exported or published our Report; select “Reports” and you will find your project there. I saved it as “class.pbix”



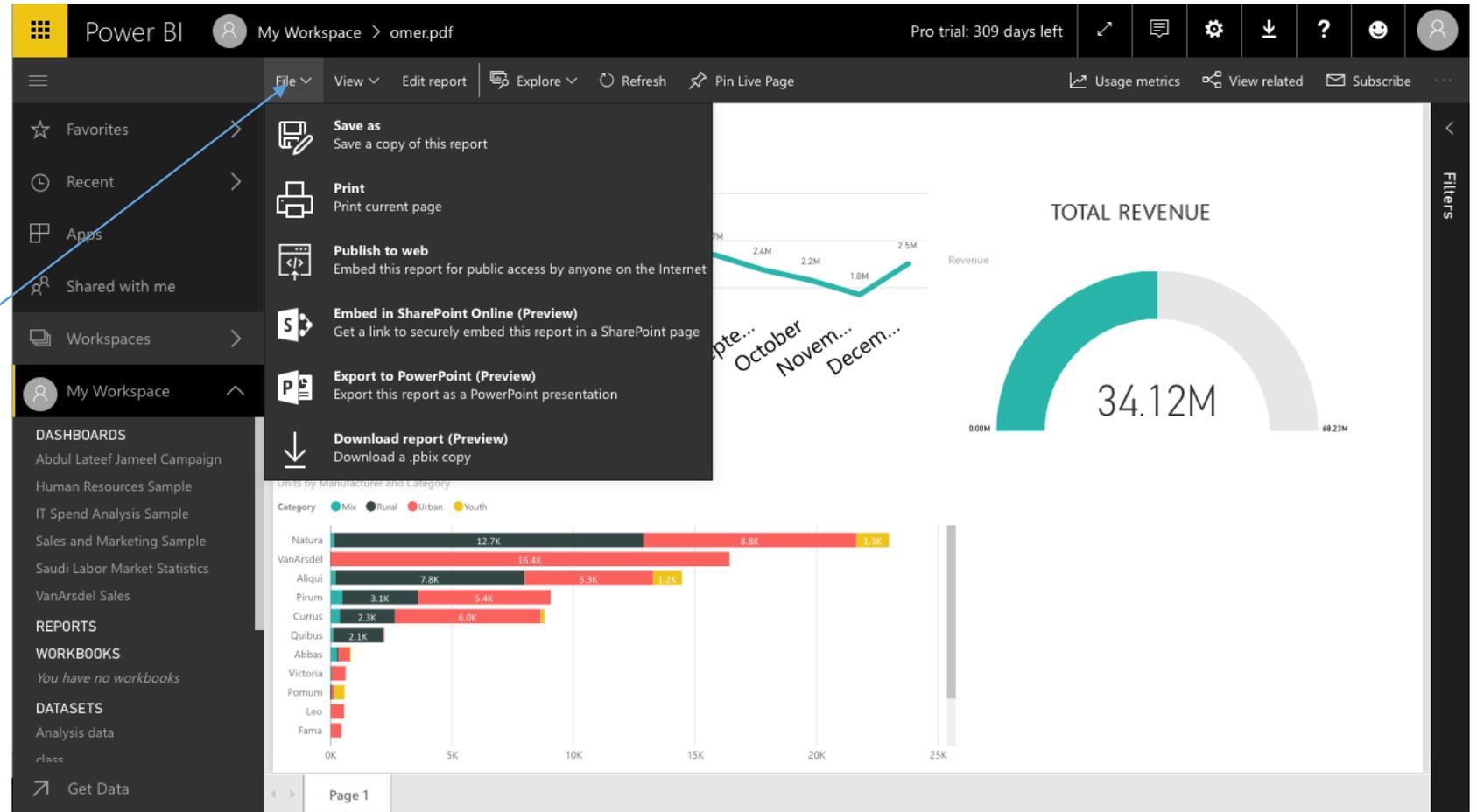
The screenshot shows the Power BI interface with the 'My Workspace' view selected. The left sidebar contains navigation options: Favorites, Recent, Apps, Shared with me, Workspaces, and My Workspace (highlighted). Below these are sections for Dashboards, Reports, Workbooks, and Datasets. The main area displays a list of reports under the 'Reports' tab. A blue arrow points from the text 'I saved it as "class.pbix"' to the 'class' report in the list.

NAME	ACTIONS	OWNER
Canada Sales	     	Omer Ayoub
class	     	Omer Ayoub
Count of Accidents by Car Type	     	Omer Ayoub
Count of Drivers by Age Group	     	Omer Ayoub
Human Resources Sample	     	Omer Ayoub
IT Spend Analysis Sample	     	Omer Ayoub
KAU_CountByGender	     	Omer Ayoub
KAU Demo	     	Omer Ayoub

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Step- 24:

Select the Report and click on File. Now you can export your report as an “interactive report” to be used in powerpoint or for embedding as html iframe in your website for live interaction.



The screenshot shows the Power BI interface with the 'File' menu open. The menu options are:

- Save as: Save a copy of this report
- Print: Print current page
- Publish to web: Embed this report for public access by anyone on the Internet
- Embed in SharePoint Online (Preview): Get a link to securely embed this report in a SharePoint page
- Export to PowerPoint (Preview): Export this report as a PowerPoint presentation
- Download report (Preview): Download a .pbix copy

The dashboard in the background features two main visualizations:

- TOTAL REVENUE:** A line chart showing revenue for October, November, and December. The values are 2.4M, 2.2M, and 1.8M respectively. A gauge chart below it shows a total revenue of 34.12M out of a possible 48.23M.
- Units by Manufacturer and Category:** A horizontal stacked bar chart showing units for various manufacturers (Natura, VanArsdel, Aliqui, Pirum, Currus, Quibus, Abbas, Victoria, Pomum, Leo, Fama) across four categories: Mix, Rural, Urban, and Youth.

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To preview a web based report version that can be embedded as iframe object; Click [here](#)

