

INTRODUCTION TO POWER BI

Unit: 5

Business Intelligence and Data Visualization
(ACSAI0519)

Course Details
(B Tech 5th Sem)



SONAM
Assistant professor
CSE-DS

- B. Tech (IOT)
- 5th Semester
- Professional Course

BUSINESS INTELLIGENCE AND DATA VISUALIZATION

L T P	Credits
3 – 0– 0	3

Evaluation Scheme

**NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)**

**Bachelor of Technology
Computer Science And Engineering (Internet Of Things)
EVALUATION SCHEME
SEMESTER-V**

Sl. No.	Subject Codes	Subject Name	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	TOTAL	PS	TE	PE		
WEEKS COMPULSORY INDUCTION PROGRAM													
1	ACSIOT0501	Arm Architecture for IoT	3	1	0	30	20	50		100		150	4
2	ACSE0502	Computer Networks	3	1	0	30	20	50		100		150	4
3	ACSE0503	Design Thinking-II	2	1	0	30	20	50		100		150	3
4	ACSE0505	Web Technology	3	0	0	30	20	50		100		150	3
5		Departmental Elective-I	3	0	0	30	20	50		100		150	3
6		Departmental Elective-II	3	0	0	30	20	50		100		150	3
7	ACSIOT0551	Arm Architecture for IoT Lab	0	0	2				25		25	50	1
8	ACSE0552	Computer Networks Lab	0	0	2				25		25	50	1
9	ACSE0555	Web Technology Lab	0	0	2				25		25	50	1
10	ACSE0559	Internship Assessment	0	0	2				50			50	1
11	ANC0501 / ANC0502	Constitution of India, Law and Engineering / Essence of Indian Traditional Knowledge	2	0	0	30	20	50		50		100	
12		MOOCs(For B.Tech. Hons. Degree)											
		GRAND TOTAL										1100	24

Course objective

B. TECH. (IOT)			
Course code		L T P 3 0 0	Credits 3
Course title	Business intelligence and Data visualization		
Course objective:			
This course covers fundamental concepts of Business Intelligence tools, techniques, components and its future. As well as a bit more formal understanding of data visualization concepts and techniques. The underlying theme in the course is feature of Tableau, its capabilities.			

UNIT-V	INTRODUCTION TO POWER BI	8 HOURS
	<p>Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow, Differentiate between the various data sources, Connect Power BI to a data source, Clean and transform data to ensure data quality, Load the data to the Power BI Data Model, Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow.</p>	

Course Outcomes

Course outcomes : After completion of this course students will be able to

CO 1	Apply quantitative modelling and data analysis techniques to the solution of real-world business problems	K1, K2
CO 2	Understand the importance of data visualization and the design and use of many visual components	K2
CO 3	Understand as products integrate defining various analytical process flow.	K2
CO4	Learn the basics of troubleshooting and creating charts using various formatting tools.	K3, K4
CO 5	Learn basics of structuring data and creating dashboard stories adding interactivity dashboard stories.	K5, K6

(c) Copy the .PBIX file to a file folder, and give coworkers access to that folder

6. Answer any one of the following:-

(a) ISNUMBER

Previous Year Question Paper

- (b) AVERAGE
(c) AND
(d) CONCATENATE
- 1-j. The expression used to indicate the table where the values would be searched from is _____. (CO5) 1
- (a) WHERE
(b) FROM
(c) TABLE
(d) SELECT

2. Attempt all parts:-

- 2.a. Discuss the advantages of making decision using business intelligence over making decision without business intelligence.(CO1) 2
- 2.b. Define Software Development Kit(SDK). (CO2) 2
- 2.c. Enlist the various data file formats in TABLEAU.(CO3) 2
- 2.d. Write down the steps to publish visualization in TABLEAU online.(CO4) 2
- 2.e. Elaborate about Workspace in Power BI.(CO5) 2

SECTION B

30

3. Answer any five of the following:-

- 3-a. Explain in detail the features of Data Warehouse.(CO1) 6
- 3-b. Define data mining and its application in Business Intelligence.(CO1) 6
- 3-c. Explain Risk Mitigation with suitable diagram.(CO2) 6
- 3-d. Differentiate between dashboard and scorecard in detail.(CO2) 6
- 3.e. State some ways to improve the performance of Tableau.(CO3) 6
- 3.f. Discuss the various ways in which data can be manipulated in TABLEAU.(CO4) 6
- 3.g. Describe how the Power BI products integrate.(CO5) 6

SECTION C

50

4. Answer any one of the following:-

- 4-a. Discuss the architecture and the various components of BI with help of diagram.(CO1) 10
- 4-b. Differentiate between BI traditional tools with Modern BI tools in detail.(CO1) 10

5. Answer any one of the following:-

- 5-a. Discuss the need of Business Intelligence Reporting Tools in various business with suitable examples.(CO2) 10

- 5-b. Discuss the various trends and technologies used in Business Intelligence.(CO2) 10

6. Answer any one of the following:-

- 6-a. Explain in detail the various ways to connect your data to TABLEAU.(CO3) 10
- 6-b. Describe the various types of charts used in TABLEAU with suitable diagrams.(CO3) 10

7. Answer any one of the following:-

- 7-a. Discuss in detail the steps to create a story and dashboard in TABLEAU.(CO4) 10
- 7-b. Explain the steps of sorting and filtering data in TABLEAU.(CO4) 10

8. Answer any one of the following:-

- 8-a. Discuss the Power BI ecosystem in detail.(CO5) 10
- 8-b. Define Power BI and its relationship with Excel in detail.(CO5) 10

NIET

- Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite
- of products, Describe how the Power BI products integrate, Explain the typical analytics process flow,
- Differentiate between the various data sources, Connect Power BI to a data source, Clean and transform data to
- ensure data quality, Load the data to the Power BI Data Model, Describe the Power BI ecosystem, Define Power
- BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products
- integrate, Explain the typical analytics process flow

Course Objective

- This course introduces data visualization theories, techniques, and tools particularly for analyzing and presenting business data. Students will design, develop, and evaluate effective visualizations and dashboards, using various development tools.
- This course focuses on how business intelligence in Tableau uses business analytics tools that make it easy to combine data from multiple sources, analyze and visualize information. It helps trainees in making more informed and better decisions to guide the business. After the completion of the course trainee will be through with all the concepts of business intelligence and Tableau.
- The objective of this course is to assist the folks in running a business strategically. One of the main objectives of this training is to train you on all the concepts that are related to business intelligence and Tableau. The purpose of the Business Intelligence using Tableau training program is to support better business decision-making. Topics like BI – Business Intelligence, Business Intelligence with Tableau, are covered in the training program.

- **Power BI Ecosystem**

- The “BI” in Power BI stands for Business Intelligence; it's software that makes reporting easier and more visually appealing. This platform is awesome for creating interactive dashboards that users can easily share.
- There are three major components of Power BI ecosystem.
 - 1. Power BI Desktop
 - 2. Power BI Service
 - 3. Power BI Mobile

CO-PO and PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1		2	2				1		1	1	1	
CO2	1	2	2	1	3	1		1	1	2	1	2	2	2	1
CO3	1	2	1	1	1	2				1	2	2		1	1
CO4	1	2			1	1			1	1	1	1	1	2	2
CO5	1	3	1	1	1		1	1				2		1	2
AVG	1.2	2	1.25	1	1.6	1.5	1	1	1	1.25	1.33	1.6	1.33	1.4	1.5

Prerequisite and Recap

- Basic Knowledge Of Business Intelligence.
- Knowledge about Data mart Data warehouse.

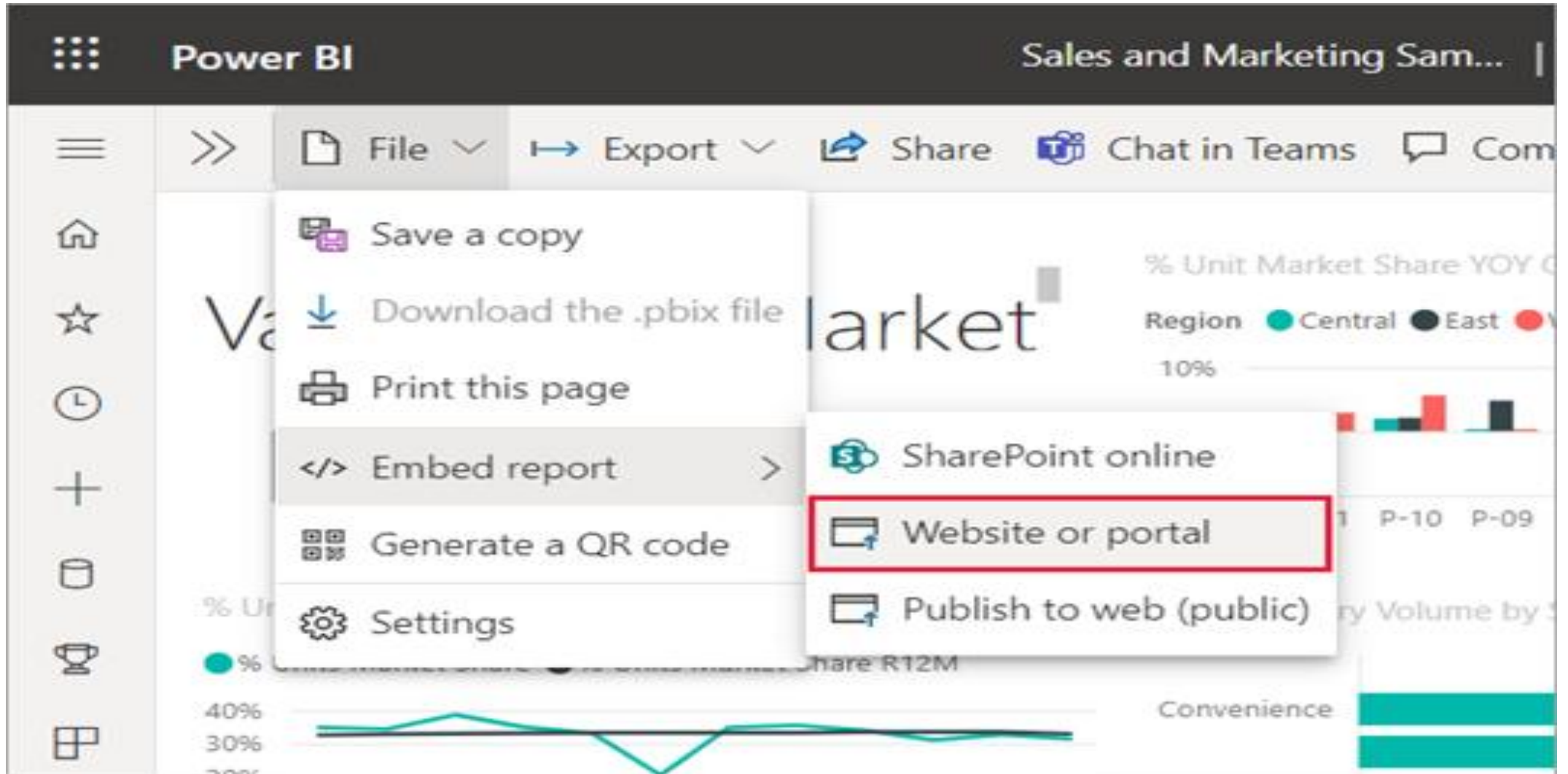
Power BI and its relationship with Excel

- Excel is a spreadsheet application that can do just about ANYTHING (including interactive dashboards). But that doesn't mean there aren't advantages to using Power BI, especially in conjunction with Excel. Let's take a look at some of the advantages and disadvantages of each application.
- Business intelligence (BI) is essentially the collection of tools and processes that are used to gather data and turn it into meaningful information that people can use to make better decisions.
- Many of the BI capabilities that are available in Excel are supported in Excel Services
 - Refreshing external data
 - Viewing workbooks that contain a Data Model
 - Viewing, sorting, and exploring data in reports in a browser window
 - Displaying a single item in a workbook in its own SharePoint Web Part

Power BI suite of Products

- Creating and editing customized reports for every level of expertise
- Data ingestion from hundreds of supported data sources.
- Data transformation, cleaning, data model creation with built-in Power Query Editor.
- AI-driven analytics.
- Interactive reporting with pre-built or custom visuals.

How the Power BI products integrate



How the Power BI products integrate

Secure embed code

Here's a link you can use to embed this content.

XVzLWNlbnRyYWwtYS1wcmltYXJ5LXJlZGlyZWN0LmFuYWx5c2lzLndpbmRvd3MubmV0LyJ9

HTML you can paste into a website

```
<iframe width="1140" height="541.25" src="https://app.powerbi.com/reportEmbed?report
```

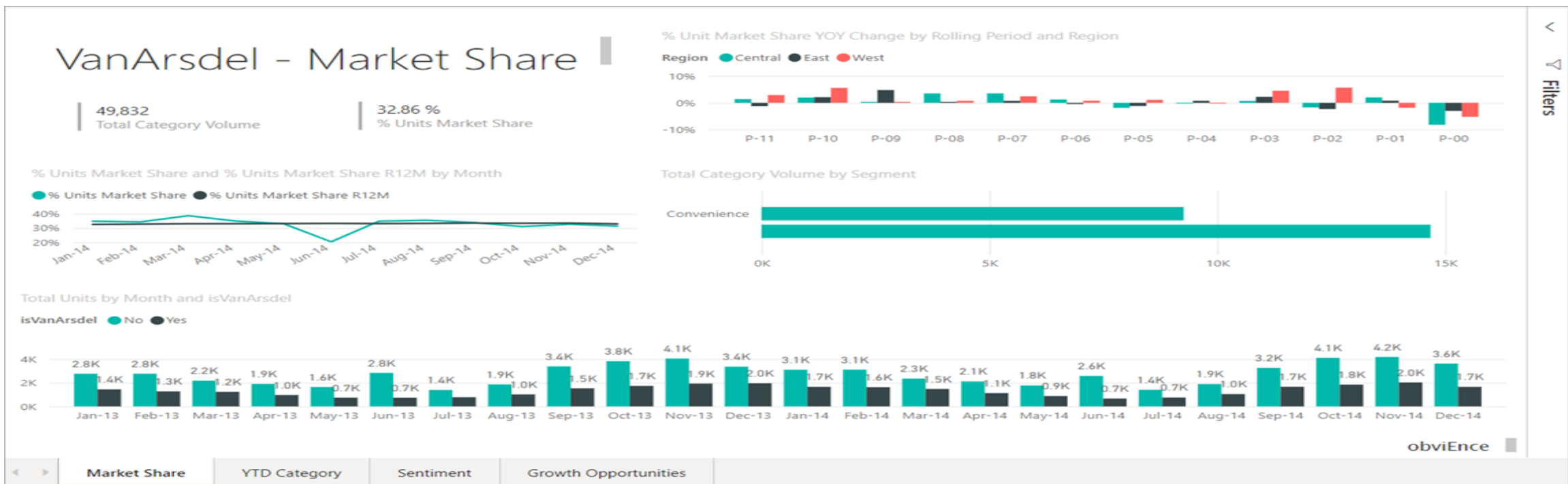
Close

How the Power BI products integrate

- Whether a user opens a report URL directly, or one embedded in a web portal, report access requires authentication. The following screen appears if a user has not signed-in to Power BI in their browser session. When they select Sign-In, a new browser window or tab could open. Have them check for pop-up blockers if they don't get prompted to sign in.
- In the Secure embed code dialog, select the link you can use to embed this content, or the HTML you can paste into your blog or website in an iFrame

How the Power BI products integrate

- After the user has signed in, the report opens, showing the data and allowing page navigation and filter setting. Only users who have view permission can see the report in Power BI. All row-level security (RLS) rules are also applied. Lastly, the user needs to be correctly licensed – either they need a Power BI Pro or Premium Per User (PPU) license, or the report must be in a workspace that is in a Power BI Premium capacity. The user needs to sign in each time they open a new browser window. However, once signed in, other reports load automatically.



How the Power BI products integrate

- When using an iFrame, you may need to edit the height and width to have it fit in your portal's web page

```
<iframe width="1080" height="760"  
src="https://app.powerbi.com/reportEmbed?reportId=3b998909  
-65d9-4624-98ce-41da56af1404&autoAuth=true"  
frameborder="0" allowFullScreen="true"></iframe>
```

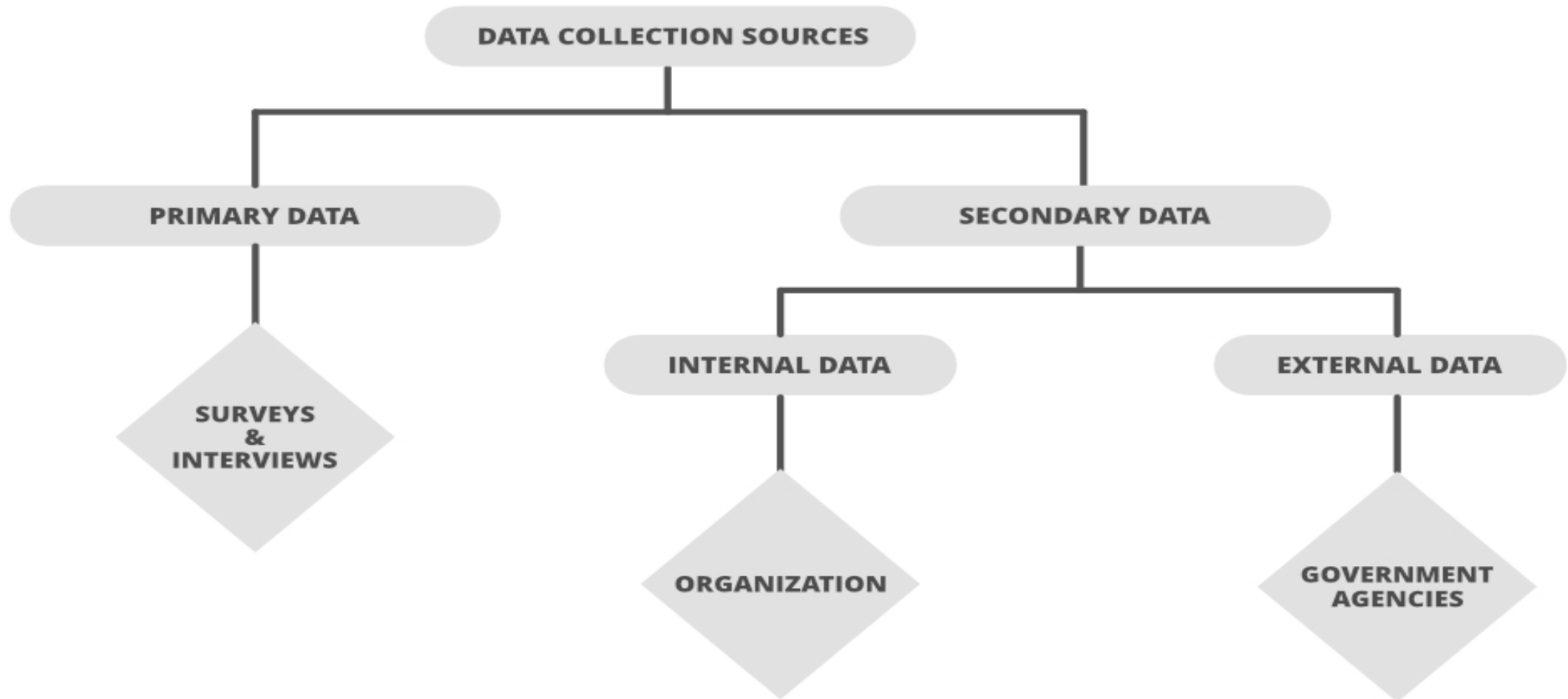
Typical analytics process flow

- Real-time analysis is an emerging business tool that is changing the traditional ways enterprises do business. More and more organisations are today exploiting business analytics to enable proactive decision making; in other words, they are switching from reacting to situations to anticipating them.
- Essentially, business analytics is a 7-step process-
 - Step 1. Defining the business needs
 - Step 2. Explore the data
 - Step 3. Analyse the data
 - Step 4. Predict what is likely to happen
 - Step 5. Optimise (find the best solution)
 - Step 6. Make a decision and measure the outcome
 - Step 7. Update the system with the results of the decision

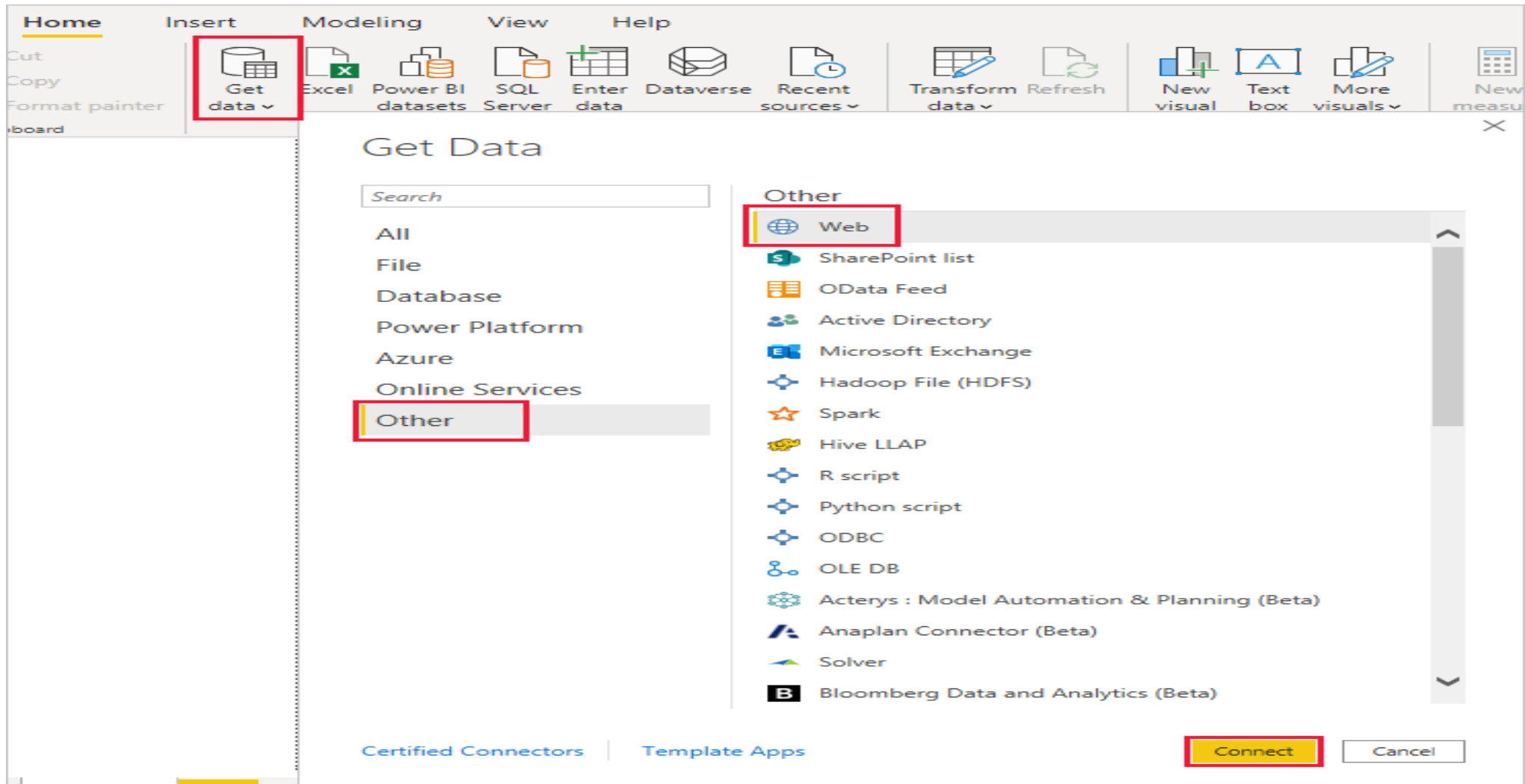
Differentiate between the various data sources

- Data collection is the process of acquiring, collecting, extracting, and storing the voluminous amount of data which may be in the structured or unstructured form like text, video, audio, XML files, records, or other image files used in later stages of data analysis.
- The actual data is then further divided mainly into two types known as:
 - **Primary data**
 - The data which is Raw, original, and extracted directly from the official sources is known as primary data.
 - **Secondary data**
 - Secondary data is the data which has already been collected and reused again for some valid purpose.

Differentiate between the various data sources continue



Connect Power BI to a data source



Clean and transform data to ensure data quality

- Data cleaning is the process that removes data that does not belong in your dataset. Data transformation is the process of converting data from one format or structure into another.
- Here is a 6 step data cleaning process to make sure your data is ready to go.
- Step 1: Remove irrelevant data.
- Step 2: Deduplicate your data.
- Step 3: Fix structural errors.
- Step 4: Deal with missing data.
- Step 5: Filter out data outliers.
- Step 6: Validate your data.

Clean and transform data to ensure data quality

- Data transformation is the mapping and conversion of data from one format to another. For example, XML data can be transformed from XML data valid to one XML Schema to another XML document valid to a different XML Schema. Other examples include the data transformation from non-XML data to XML data.
- **Data Transformation Features**
- Data transformation
- Integration with business processes.
- XQuery Mapper
- Format Builder

Load the data to the Power BI Data Model

- Data transformation is the mapping and conversion of data from one format to another. For example, XML data can be transformed from XML data valid to one XML Schema to another XML document valid to a different XML Schema. Other examples include the data transformation from non-XML data to XML data.
- 1. To import an Excel workbook into Power BI Desktop, select File > Import > Power Query, Power Pivot.
- 2. From the Open window, select an Excel workbook to import.
- 3. From the import dialog box that appears, select Start.
- 4. Select Close.

WEEKLY ASSIGNMENT

- Q.1 Explain Power BI
- Q.2 Discuss the difference between power bi and tableau
- Q.3 Explain all types of graph or charts in power bi
- Q.4 Consider a data set of your choice and visualise with the help of power bi
- Q.5 Discuss power bi suits of products

1. Which of the following does not visualize data?
 - a. Charts
 - b. Maps
 - c. Shapes**
 - d. Graphs

2. Which of the following type of chart is not supported by pyplot?
 - a. Histogram
 - b. Boxplot
 - c. Pie
 - d. All are correct**

3. To display histogram with well-defined edge we can write
 - a. `df.plot(type = 'hist', edge = 'red')`
 - b. `df.plot(type = 'hist', edgecolor = 'red')`**
 - c. `df.plot(type = 'hist', line = 'red')`
 - d. `df.plot(type = 'hist', linecolor = 'red')`

4. Plot which is used to given statistical summary is

- a. Bar
- b. Line
- c. Histogram
- d. Box plot**

5. What is true about Data Visualization?

- A. Data Visualization is used to communicate information clearly and efficiently to users by the usage of information graphics such as tables and charts.
- B. Data Visualization helps users in analyzing a large amount of data in a simpler way.
- C. Data Visualization makes complex data more accessible, understandable, and usable.
- D. All of the above**

Thank You