ABDELGHAFOR'S VIRTUAL INTERNSHIP

DATA ANALYSIS PROGRAM

SESSION (5)

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Agenda Overview

WHAT IS BI?

- The BI term refers to **Business Intelligence**. It is a data-driven **decision support system (DSS)**, which helps you to analyze the data and provide actionable information. It helps the business manager, corporate executives, and other users in making their decisions easily.
- Business intelligence refers to the applications, technologies, and practices for the collection, analysis, integration, and presents the business information. The purpose of business intelligence is to support better decision making.
- Sometimes the business intelligence is used interchangeably with briefing books, reports, query tools, and executive information systems.

IMPORTANCE OF BI

- Business intelligence is used to improve all parts of a company by improving access to the firm's data and then using that data to increase profitability. Companies that practices BI can **translate** their collected **data into insights** their business processors.
- Then the insights can be used to create strategic business decisions that improve productivity and accelerate the growth.
- Some more potential benefits of business intelligence tools include:
  - Driving new revenues.
  - It increases operational efficiency.
  - It optimizes internal business processes.
  - It improves decision making.
  - It is gaining a competitive advantage over business rivals.
  - It is used in spotting business problems that need to be addressed.
  - It can be used in assisting companies in the identification of market trends.

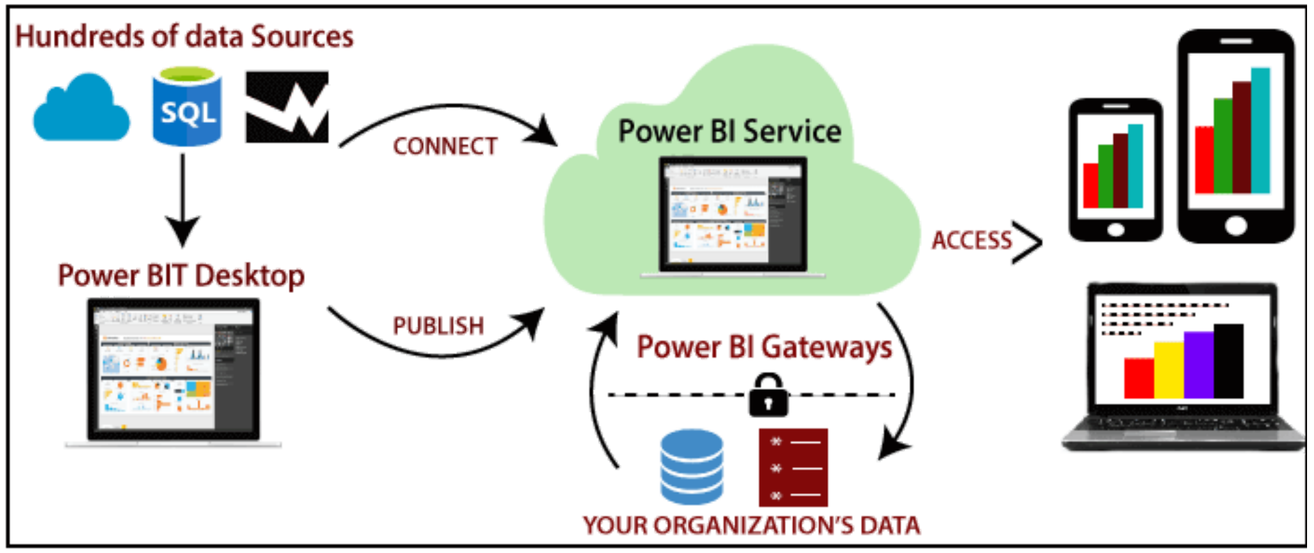
TYPES OF BI TOOLS

BI combines a broad set of data analysis applications that includes:

- Mobile BI
- Real-time BI
- Operational BI
- Open-source BI (OSBI)
- Collaborative BI
- Location intelligence (LI)
- Software-as-a-service BI (SaaS BI)
- Online analytical processing (OLAP)
- Ad hoc analytics

WHAT IS POWER BI?

- Power BI is a **Data Visualization**, and **Business Intelligence** tool which helps to convert data from different data sources into interactive dashboards and BI reports. It provides interactive visualizations with self-service business intelligence capabilities where end users can create reports and dashboards by themselves, without having to depend on information technology staff or database administrators.
- Power BI provides multiple connectors, software, and services. These services based on the **SaaS** and mobile Power BI apps which are available for different platforms. These set of services are used by business users to consume data and to build BI reports.



WHY POWER BI

- It allows real-time dashboard updates.
- It provides secure and reliable connections to the data sources in the cloud.
- It allows data exploration using a natural language query.
- Power BI provides a hybrid configuration, quick deployment, and secure environment.
- It provides features for dashboard visualization regularly updated with the community.
- It provides pre-built dashboards and reports for SaaS solutions.

POWER BI HISTORY

- Power BI was thought by Ruler and Dhers Netz of the SQL server coverage services team at Microsoft.
- Power BI was designed by the West Chadic George in 2010 and named as a Project Crescent. In 2011, it was tied up with SQL server codenamed Mount McKinley.
- In September 2014, Microsoft revealed the first preview to Power BI.
- The first version of Power BI is released on 24 July 2015. It was based on Excel-based Add-ins such as Pivot, view, Power Query, and Map.

POWER BI COMPONENTS

1. Power Query: It is used to access, search, and transform public and internal data sources.

2. Power Pivot: Power pivot is used in data modeling for in-memory analytics.

3. Power View: By using the power view, you can analyze, visualize, and display the data as an interactive data visualization.

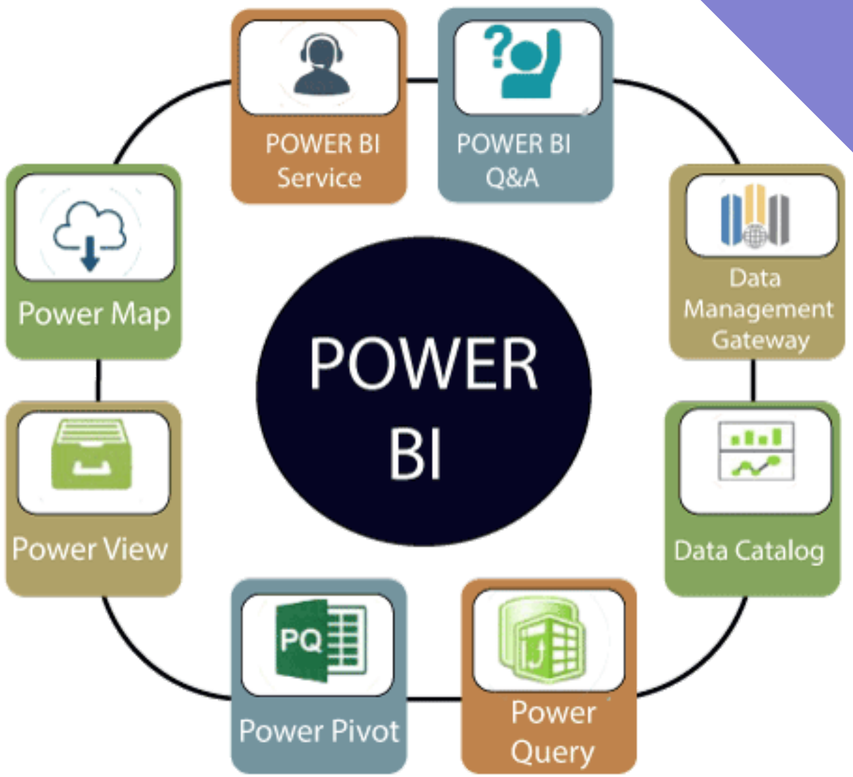
4. Power Map: It brings the data to life with interactive geographical visualization.

5. Power BI Service: You can share workbooks and data views which are restored from on-premises and cloud-based data sources.

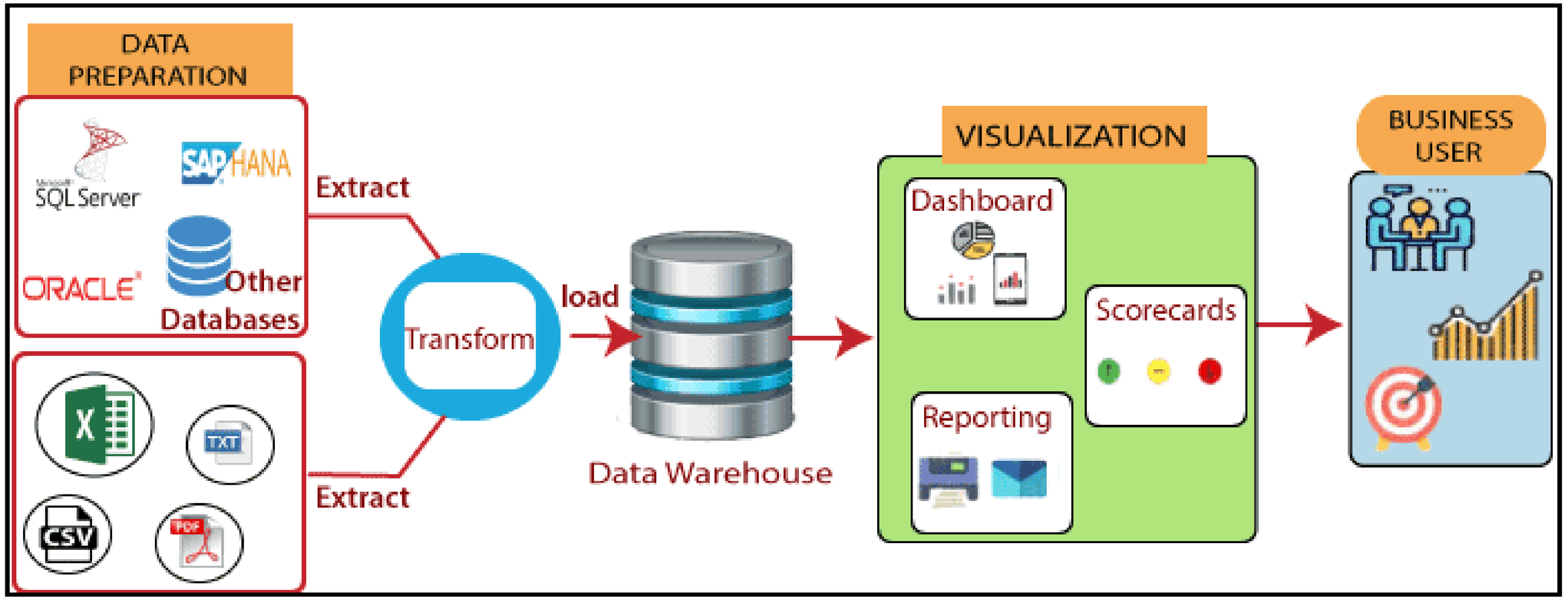
6. Power BI Q&A: You can ask any questions and get an immediate response with the natural language query.

7. Data Management Gateway: You get periodic data refreshers, expose tables, and view data feeds.

8. Data Catalog: By using the data catalog, you can quickly discover and reuse the queries.



POWER BI ARCHITECTURE

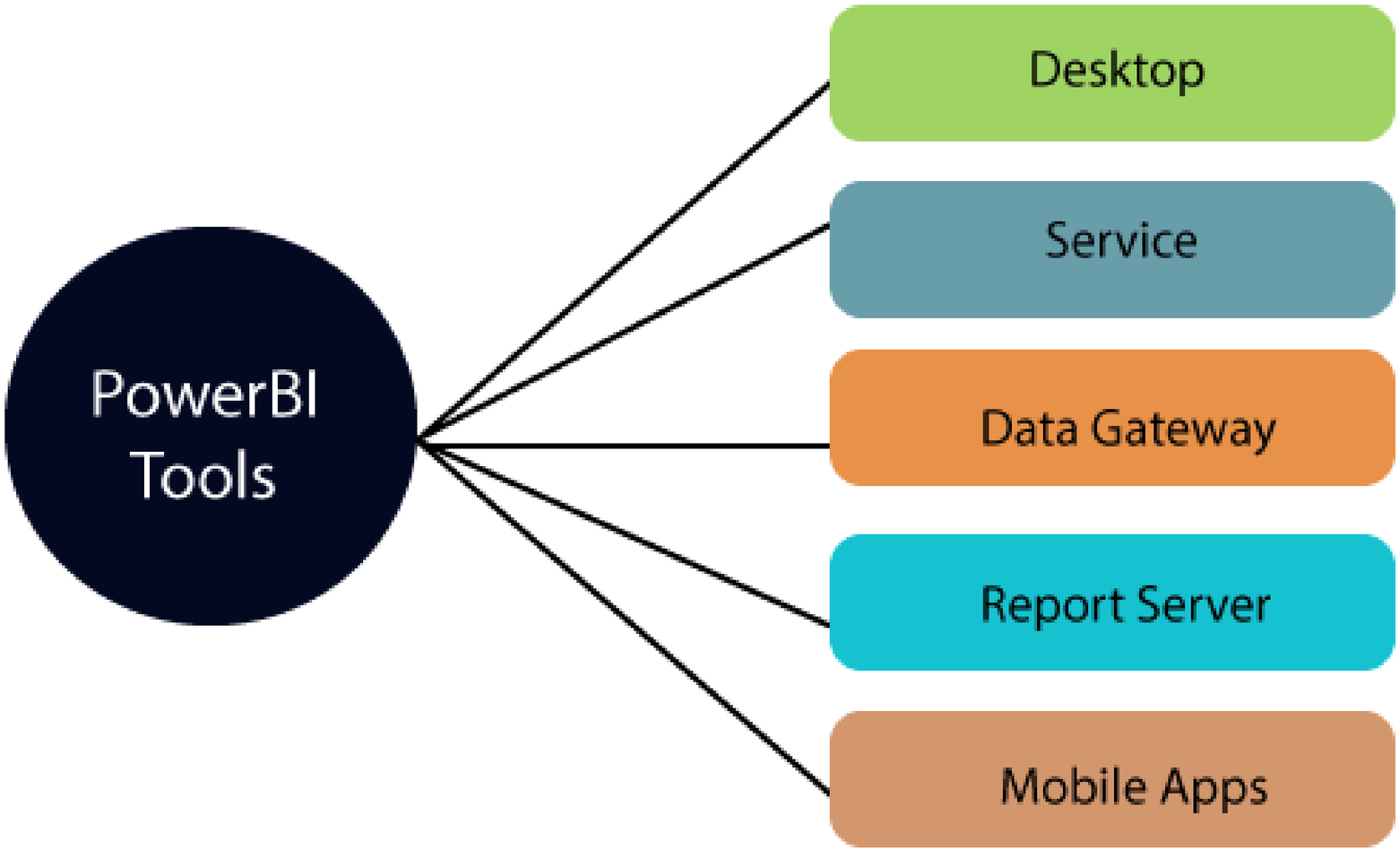


POWER BI ARCHITECTURE

Power BI architecture has **three phases.** The first two phases use **ETL** (extract, transform, and load) process to handle the data.

1. **Data Integration:** An organization needs to deal with the data that comes from different sources. First, extract the data from different sources which can be your separate database, servers, etc. Then the data is integrated into a standard format and stored at a common area that's called **staging area.**
2. **Data Processing:** Still, the integrated data is not ready for visualization because the data needs processing before it can be presented. This data is pre-processed. **For example,** the missing values or redundant values will be removed from the data sets. After that, the business rules will be applied to the data, and it transforms into presentable data. Then this data will be loaded into the data warehouse.
3. **Data presentation:** Once the data is loaded and processed, then it can be visualized much better with the use of various visualization that Power BI offers. By using of dashboard and reports, we represent the data more intuitively. These visual reports help business end-users to take business decision based on the insights

POWER BI TOOLS



POWER BI ADVANTAGES

1. Secure Report Publishing: You can automate setup data refresh and publish reports that allowing all the users to avail the latest information.

2. No Memory and Speed Constraints: To Shift an existing BI system into a powerful cloud environment with Power BI embedded eliminates memory. Speed constraints ensure that data is quickly retrievable and analyzed.

3. No Specialized Technical Support required: The Power BI provides quick inquiry and analysis without the need for specialized technical support. It also supports a powerful natural language interface and the use of intuitive graphical designer tools.

4. Simple to Use: Power BI is simple to use. Users can easily find it only on behalf of a short learning curve.

5. Constant innovation: The Power BI product is updated in every month with new functions and features.

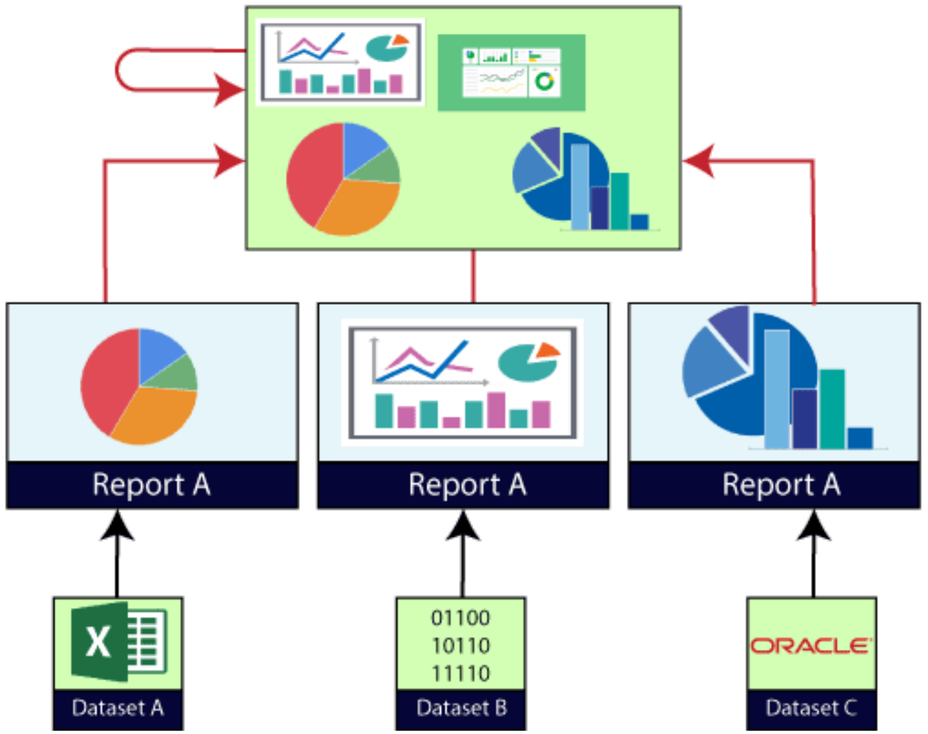
6. Rich, personalized dashboard: The crowning feature of Power BI is the information dashboards that can be customized to meet the exact need of any enterprise. You can easily embed the dashboards, and BI reports in the applications to provide a unified user experience.

POWER BI DISADVANTAGES

- Dashboards and reports are only shared with the users who are having the same email domains.
- Power BI will not merge imported data that is accessed from real-time connections.
- Power BI only accepts the file size maximum 250 Mb and the zip file which is compressed by the data of the x-velocity in-memory database.
- Dashboard never accepts or pass user, account, or any other entity parameters.
- Very few data sources permit real-time connections to Power BI reports and dashboards.

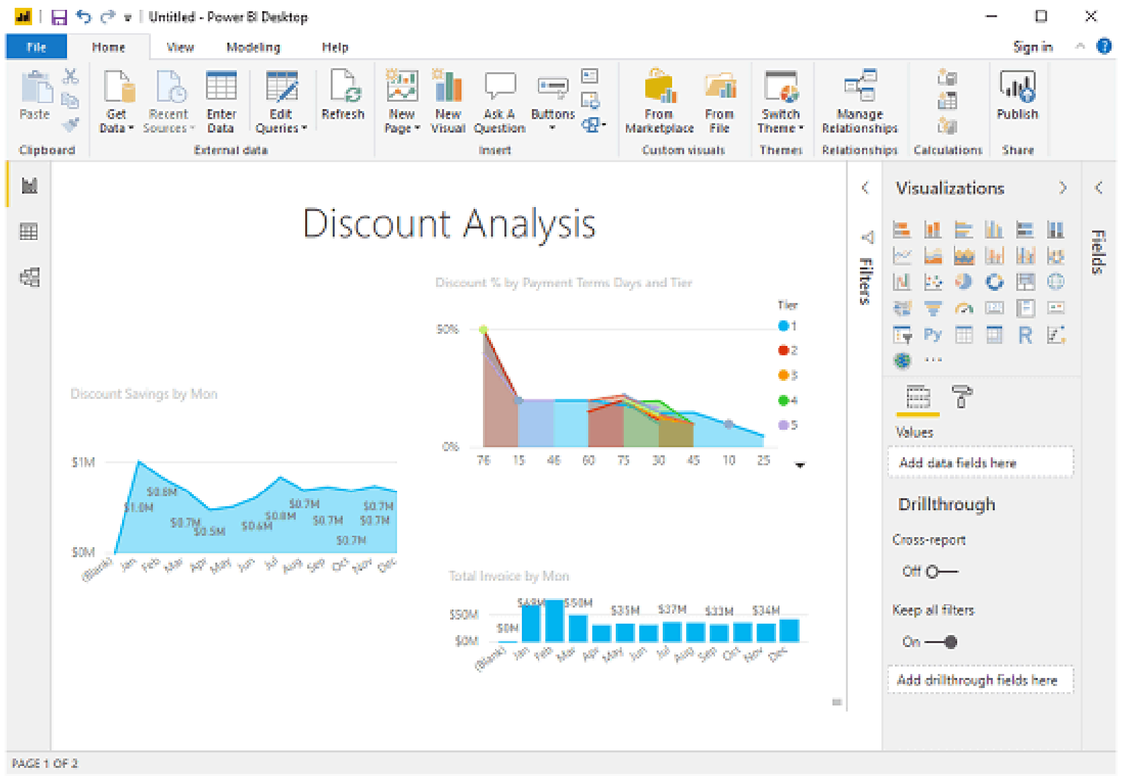
POWER BI DASHBOARD

- Power BI dashboard is a single page, also called a **canvas** that uses visualization to tell the story. It is limited to one page; therefore, a well-designed dashboard contains only the most essential elements of that story.
- The visualizations visible on the dashboard are known as tiles. These tiles are pinned to the dashboard from reports. The visualizations on a dashboard come from reports, and each report is based on one data set.
- A dashboard can combine **on-premises and cloud-born data.** And they are providing a consolidated view regardless of where the data lies.



POWER BI REPORTS

- A Power BI report is a **multi-perspective** view into the dataset, with visualizations which represent different findings and insights from that dataset.
- A report can have a single visualization or multiple visualizations. The visualizations in a report represent something like a dashboard does but serve a different purpose.
- These visualizations are not static. These are **highly interactive & highly customizable visualizations** which update, as the underlying data changes. You can add and remove the data, change visualization types, and apply filters in your model to discover insights.



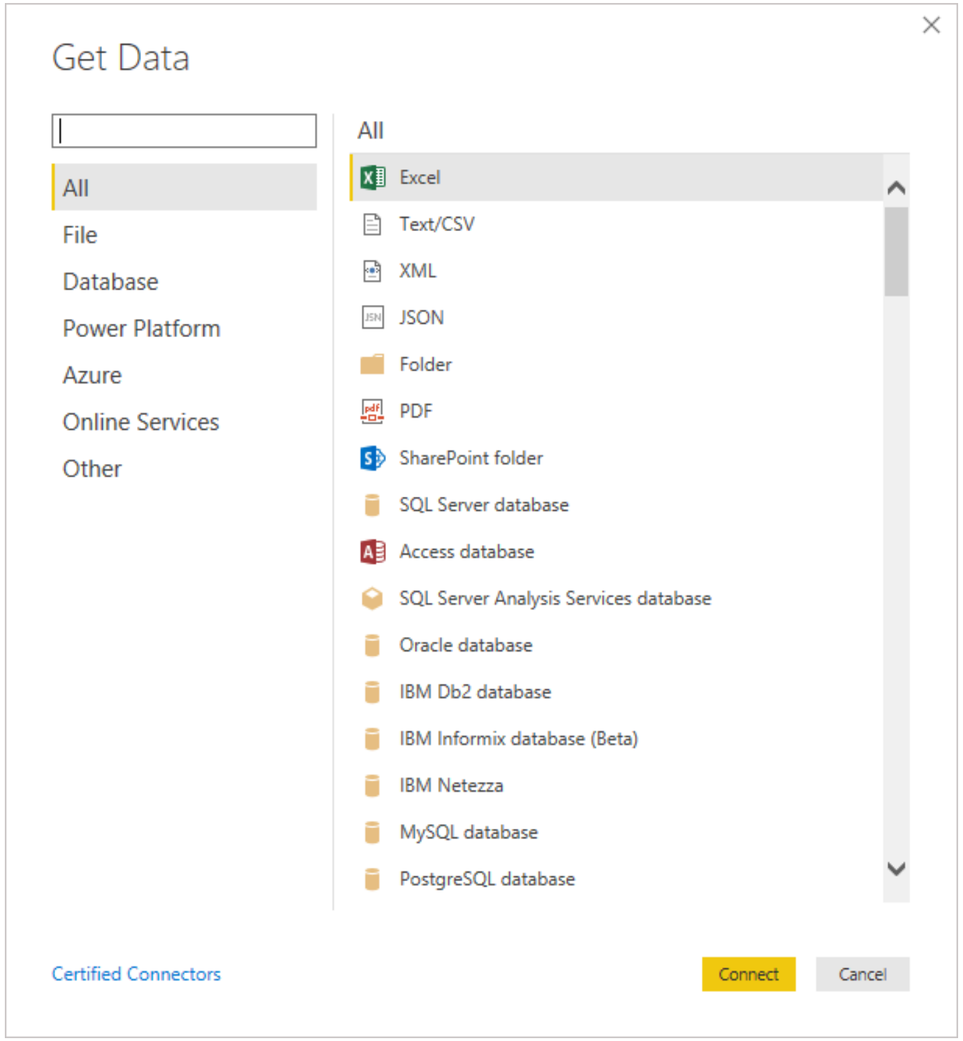
DASHBOARDS VS REPORTS

Capabilities	Dashboards	Reports
Pages	It has only one page.	It can have one or more pages.
Data Sources	It has one or more reports and datasets per dashboard.	It has only a single dataset per report.
Pinning	It can pin existing visualizations only from the current dashboard to your other dashboards.	It can pin visualizations to any of the dashboards. And also can pin entire report pages to any of the dashboards.
Filtering	It can't filter or slice.	It has many different ways to filter, highlight, and slice.
Feature	It can set one dashboard as the featured dashboard.	It cannot create a feature report.
Change visualization type	No, if a report owner changes the visualization type in the report, the pinned visualization on the dashboard does not update.	Yes, it can change the visualization type.

POWER BI DATA SOURCES

Power BI Desktop and Power BI Services support a large range of data sources. Click on the Get Data button, and it shows you all the available data connections. You can connect to different Flat files, Azure cloud, SQL database, and Web platforms, also such as Google Analytics, Facebook, and Salesforce objects. It includes an ODBC connection to connect to other ODBC data sources.

On the left side, it shows a category of all the available data sources. You also have an option to perform search operation at the top.



POWER BI DAX

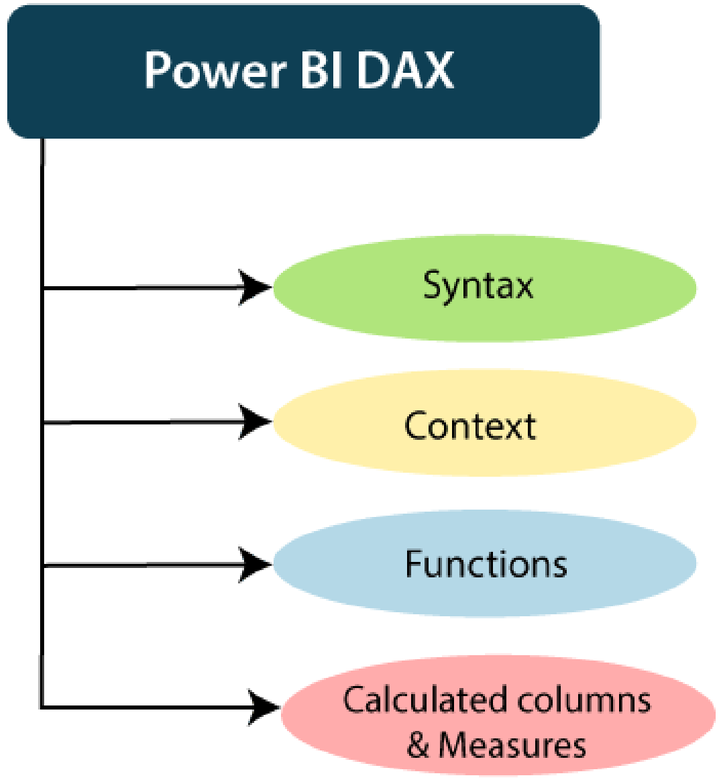
DAX (**Data Analysis Expressions**) is a formula expression language. It can be used in different BI and visualization tools. DAX is also known as **function language** in which the full code is kept inside a function. DAX programming formula contains two data types such as **Numeric** and **Other**.

Numeric includes currency, integers, and decimals, where **Other** includes string and a binary object.

How does it work?

For understanding the Power BI DAX, it has main **three** fundamental concepts such as:

- **Syntax**
- **Context**
- **Functions**



POWER BI DAX

1. Syntax

the syntax consists of various components that make up a formula.

```
Total Sales = SUM (Sales [SalesAmount])
```

- Total Sales is the measure name.
- The equal sign (=) operator indicates the beginning of the formula.
- The DAX function SUM adds up all the numbers in the Sales[SalesAmount] column.
- Parentheses () surround an expression containing one or more arguments. And all function requires at least one argument. An argument passes a value to a function.
- The reference table Sales.
- The referenced column [SalesAmount] in the Sales table. With this argument, the SUM function knows on which column to aggregate a SUM.

POWER BI DAX

2. Context

Context is one of the essential concepts of DAX. It is categorized into two parts; **Row context** and **Filter context.**

The **Row-Context** is the easiest thought of as the current row. It applies whenever a formula has a function which uses the filters to identify a single row in a table.

The **Filter context** is a little more challenging to understand than the Row context. You can most easily think of the Filter-Context as one or more filters applied in a calculation. The Filter-Context doesn't exist in the Row-context's stead. Instead, it uses in addition to the former. Look at the following DAX formula.

POWER BI DAX

3. Functions

Functions are predefined and ordered formula. They can perform calculations using arguments passed on to them. These arguments can be text, numbers, logical values, or other functions.

Types of Functions:

1. **Aggregate Functions**
   - **MIN**

     This DAX function returns the minimum numeric value in a column, or between the two scalar expressions.

     ```
     MIN(<column>)
     ```

   - **MAX**

     This DAX function returns the maximum value in a column, including any logical values and numbers.

     ```
     MAX(<column>)
     ```

POWER BI DAX

3. Functions

Functions are predefined and ordered formula. They can perform calculations using arguments passed on to them. These arguments can be text, numbers, logical values, or other functions.

Types of Functions:

1. **Aggregate Functions**
   - **AVERAGE**

     This DAX function returns the arithmetic mean of the values in a column.

     ```
     AVERAGE(<column>)
     ```

   - **SUM**

     This DAX function adds all the numbers in a column.

     ```
     SUM(<column>)
     ```

POWER BI DAX

3. Functions

Types of Functions:

2.**Count Functions**

- **COUNT**

  This DAX function is used to return the count of items in a column. If there are multiple numbers of the same thing, this function will count it as separate items and not a single item.

```
COUNT(<column>)
```

- **DISTINCTCOUNT**

  This DAX function is used to return the distinct count of items in a column. If there are multiple numbers of the same thing, this function will count it as a single item.

```
DISTINCTCOUNT(<column>)
```

POWER BI DAX

3. Functions

Types of Functions:

3.**Date time Functions**

- **DATE**

  This DAX function returns the specified date in Date-Time format.

```
DATE(<year>, <month>, <day>)
```

- **HOUR**

  This DAX function returns the specified hour as a number from 0 to 23 (12:00 A.M. to 11:00 P.M.)

```
HOUR(>datetime<)
```

POWER BI DAX

3. Functions

Types of Functions:

4.**Logical Functions**

- **AND**

  This DAX function performs logical AND(conjunction) on two expressions. For AND to return true, both conditions specified have to be fulfilled.

  ```
  AND(<logical argument1>,<logical argument2>)
  ```

- **OR**

  This DAX function performs logical OR(disjunction) on two expressions. For OR to return true, either of the two conditions specified has to be fulfilled.

  ```
  OR(<logical argument1>,<logical argument2>)
  ```

POWER BI DAX

3. Functions

Types of Functions:

5.**Text Functions**

- **CONCATENATE**

  This DAX function joins two text strings into one text string.

```
CONCATENATE(<text1>, <text2>)
```

- **FIXED**

  This DAX function rounds a number to the specified number of decimals and returns the result as text.

```
FIXED(<number>, <decimals>, <no_commas>)
```

- **REPLACE**

  This DAX function rounds a number to the specified number of decimals and returns the result as text.

```
REPLACE(<old_text>, <start_num>, <num_chars>, <new_text>)
```

CALCULATED COLUMNS AND MEASURES

The Power BI DAX formulae are used in calculations, in Measures and Calculated Columns.

Calculated Columns

When you create a data model on the Power BI Desktop, you can extend a table by creating new columns. The content of the columns is defined by a DAX expression, evaluated row by row or in the context of the current row across that table.

Measures

There is another way of defining calculations in a DAX model, useful if you need to operate on aggregate values instead of on a row-by-row basis. These calculations are measures. One of the requirements of DAX is a measure that needs to be defined in a table. However, the action does not belong to the table. So, you can move a measure from one table to another one without losing its functionality.

ANY QUESTIONS ?

DATA ANALYSIS PROGRAM

THANK YOU

UPCOMING NEXT WEEK : SESSION (6)