CSS 330 Data wrangling and visualization

Lecture 12
Data visualization with Tableau, Power BI
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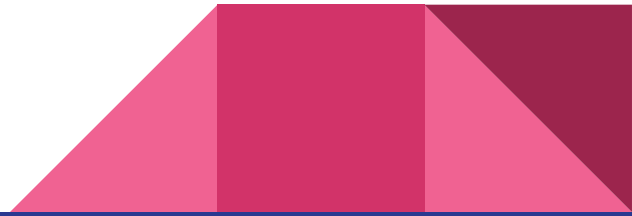
Tableau

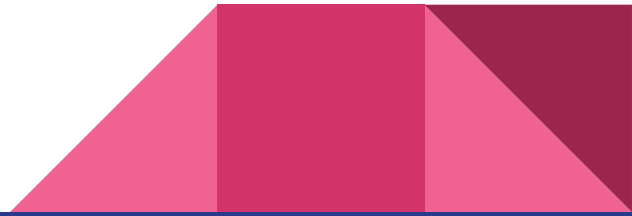
Tableau is a powerful and fastest growing data visualization tool used in the Business Intelligence Industry. It helps in simplifying raw data in a very easily understandable format. Tableau helps create the data that can be understood by professionals at any level in an organization. It also allows non-technical users to create customized dashboards. Data analysis is very fast with Tableau tool and the visualizations created are in the form of dashboards and worksheets.



Tableau

The best features of Tableau software are

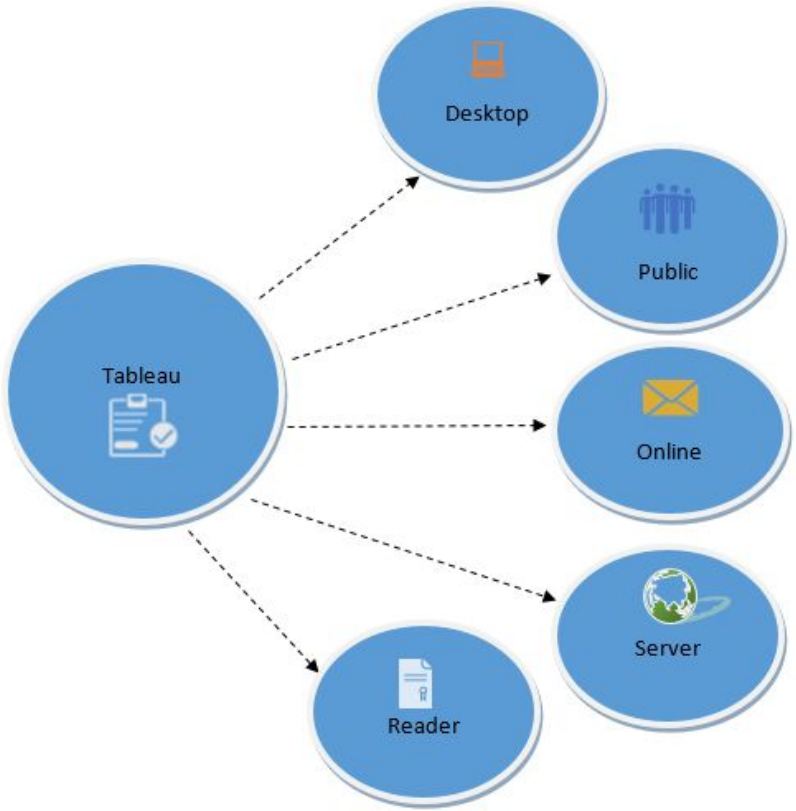
- Data Blending
- Real time analysis
- Collaboration of data



Tableau

The Tableau Product Suite consists of:

- Tableau Desktop
- Tableau Public
- Tableau Online
- Tableau Server
- Tableau Reader



Data analytics in Tableau tool can be classified into two section.

1. **Developer Tools:** The Tableau tools that are used for development such as the creation of dashboards, charts, report generation, visualization fall into this category. The Tableau products, under this category, are the Tableau Desktop and the Tableau Public.
2. **Sharing Tools**: As the name suggests, the purpose of these Tableau products is sharing the visualizations, reports, dashboards that were created using the developer tools. Products that fall into this category are Tableau Online, Server, and Reader.

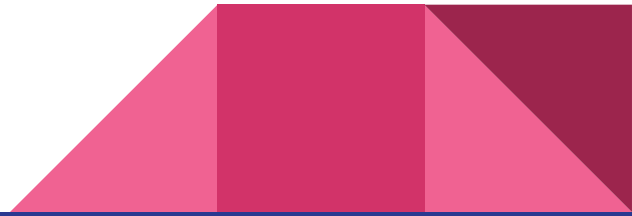
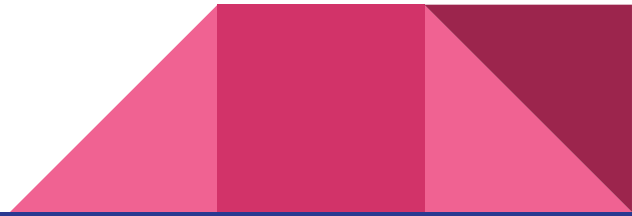


Tableau Desktop

Tableau Desktop has a rich feature set and allows you to code and customize reports. Right from creating the charts, reports, to blending them all together to form a dashboard, all the necessary work is created in Tableau Desktop.

For live data analysis, Tableau Desktop provides connectivity to Data Warehouse, as well as other various types of files. The workbooks and the dashboards created here can be either shared locally or publicly.



Based on the connectivity to the data sources and publishing option, Tableau Desktop is classified into

- **Tableau Desktop Personal:** The development features are similar to Tableau Desktop. Personal version keeps the workbook private, and the access is limited. The workbooks cannot be published online. Therefore, it should be distributed either Offline or in Tableau Public.
- **Tableau Desktop Professional:** It is pretty much similar to Tableau Desktop. The difference is that the work created in the Tableau Desktop can be published online or in Tableau Server. Also, in Professional version, there is full access to all sorts of the data type. It is best suitable for those who wish to publish their work in Tableau Server.

Tableau Public

It is Tableau version specially build for the cost-effective users. By the word "Public," it means that the workbooks created cannot be saved locally; in turn, it should be saved to the Tableau's public cloud which can be viewed and accessed by anyone.

There is no privacy to the files saved to the cloud since anyone can download and access the same. This version is the best for the individuals who want to learn Tableau and for the ones who want to share their data with the general public

Tableau Server

The software is specifically used to share the workbooks, visualizations that are created in the Tableau Desktop application across the organization. To share dashboards in the Tableau Server, you must first publish your work in the Tableau Desktop. Once the work has been uploaded to the server, it will be accessible only to the licensed users.

However, It's not necessary that the licensed users need to have the Tableau Server installed on their machine. They just require the login credentials with which they can check reports via a web browser. The security is high in Tableau server, and it is much suited for quick and effective sharing of data in an organization.

The admin of the organization will always have full control over the server. The hardware and the software are maintained by the organization.

Tableau Online

As the name suggests, it is an online sharing tool of Tableau. Its functionalities are similar to Tableau Server, but the data is stored on servers hosted in the cloud which are maintained by the Tableau group.

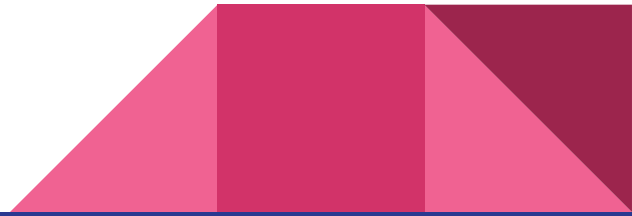
There is no storage limit on the data that can be published in the Tableau Online. Tableau Online creates a direct link to over 40 data sources that are hosted in the cloud such as the MySQL, Hive, Amazon Aurora, Spark SQL and many more.

To publish, both Tableau Online and Server require the workbooks created by Tableau Desktop. Data that is streamed from the web applications say Google Analytics, Salesforce.com are also supported by Tableau Server and Tableau Online.

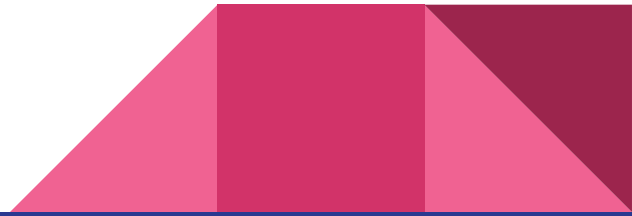
Tableau Reader

Tableau Reader is a free tool which allows you to view the workbooks and visualizations created using Tableau Desktop or Tableau Public. The data can be filtered but editing and modifications are restricted. The security level is zero in Tableau Reader as anyone who gets the workbook can view it using Tableau Reader.

If you want to share the dashboards that you have created, the receiver should have Tableau Reader to view the document.



Dashboard example on Tableau



PowerBI

Microsoft Power BI is a business intelligence platform that provides nontechnical business users with tools for aggregating, analyzing, visualizing and sharing data. Power BI's user interface is fairly intuitive for users familiar with Excel and its deep integration with other Microsoft products makes it a very versatile self-service tool that requires little upfront training.

PowerBI

Microsoft Power BI is used to find insights within an organization's data. Power BI can help connect disparate data sets, transform and clean the data into a data model and create charts or graphs to provide visuals of the data. All of this can be shared with other Power BI users within the organization. The data models created from Power BI can be used in several ways for organizations, including telling stories through charts and data visualizations and examining "what if" scenarios within the data. Power BI reports can also answer questions in real time and help with forecasting to make sure departments meet business metrics. Power BI can also provide executive dashboards for administrators or managers, giving management more insight into how departments are doing.

PowerBI features

Microsoft has added a number of data analytics features to Power BI since its inception, and continues to do so. Some of the most important features include:

Artificial Intelligence - Users can access image recognition and text analytics in Power BI, create machine learning models using automated machine learning capabilities and integrate with Azure Machine Learning.

Hybrid deployment support - This feature provides built-in connectors that allow Power BI tools to connect with a number of different data sources from Microsoft, Salesforce and other vendors.

Quick Insights - This feature allows users to create subsets of data and automatically apply analytics to that information.

Common data model support - Power BI's support for the common data model allows the use of a standardized and extensible collection of data schemas (entities, attributes and relationships).

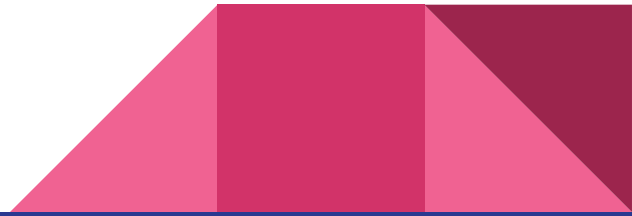
PowerBI features

Cortana integration - This feature, which is especially popular on mobile devices, allows users to verbally query data using natural language and access results, using Cortana, Microsoft's digital assistant.
Customization -This feature allows developers to change the appearance of default visualization and reporting tools and import new tools into the platform.
APIs for integration - This feature provides developers with sample code and application performance interfaces (APIs) for embedding the Power BI dashboard in other software products.
Self-service data prep - Using Power Query, business analysts can ingest, transform, integrate and enrich big data into the Power BI web service. Ingested data can be shared across multiple Power BI models, reports and dashboards.
Modeling view -- This allows users to divide complex data models by subject area into separate diagrams, multiselect objects and set common properties, view and modify properties in the properties pane, and set display folders for simpler consumption of complex data models.

PowerBI components

Included within Power BI are several components that help users create and share data reports.

- **Power Query:** a data mashup and transformation tool
- **Power Pivot:** a memory tabular data modeling tool
- **Power View:** a data visualization tool
- **Power Map:** a 3D geospatial data visualization tool
- **Power Q&A:** A natural language question and answering engine



Key differences between Tableau and PowerBI

- Tableau deploys MDX for measures and dimensions while Power BI uses DAX for calculating and measuring columns.
- Tableau platform is known for its data visualization functionality whereas Power BI offers numerous data points to offer data visualization
- Tableau BI can handle a huge volume of data with better performance while Power BI can handle a limited volume of data.
- Tableau works best when there is a vast data in the cloud but Power BI doesn't work better with a massive amount of data
- Tableau is used by analysts and experienced- users mostly use for their analytics purposes and Power BI is used by both naive and experienced users.
- Tableau is a little difficult whereas Power BI Interface is very easy to learn.

Useful links

Check following links for info:

- Tableau - https://www.guru99.com/what-is-tableau.html
  - https://github.com/tableau/
  - https://docs.google.com/document/d/1cSG5C9jkiDhES8VpM0wseQAYJOmRpmpolN-ITgAnF8A/edit?usp=sharing
- Power BI - https://searchcontentmanagement.techtarget.com/definition/Microsoft-Power-BI
- Difference between Tableau and Power BI - https://www.guru99.com/tableau-vs-power-bi-difference.html