



Data Visualization Laboratory

Subject Code:
BAIL504

Introduction to Power BI

From data import and modelling to visualization, filtering and publishing

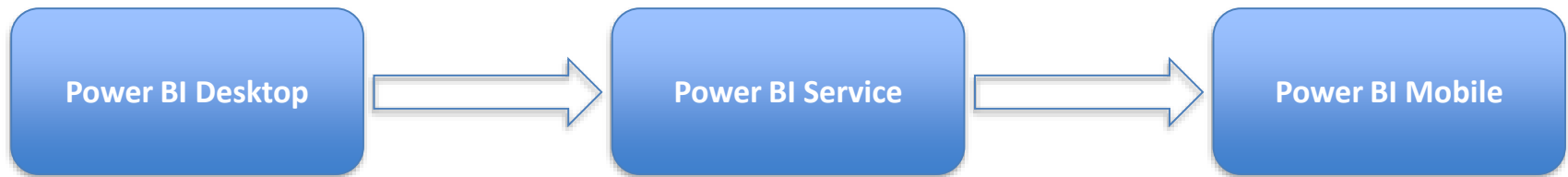
Course Roadmap

- Introduction to Power BI
- Importing datasets and modelling data
- Plotting and creating visualizations
- Filters, slicers and visual interactions
- Saving, exporting and publishing reports
- Next steps and further learning

1. Overview of Power BI

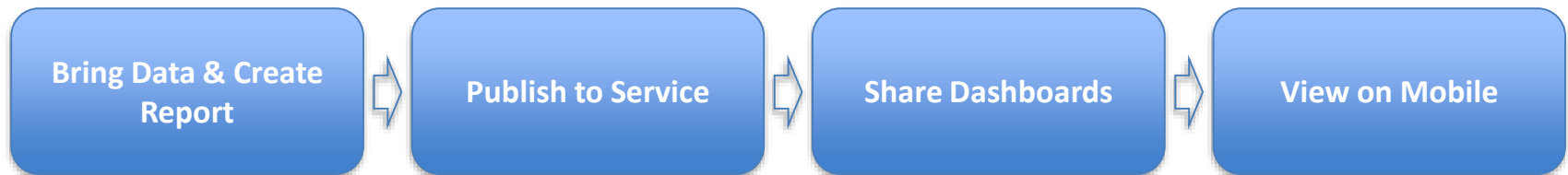
- Microsoft Power BI is a collection of apps, software services and connectors.
- It turns unrelated data into visually engaging and interactive insights.
- It can connect to Excel, local databases, cloud services and on-premises or hybrid data warehouses.
- Power BI supports data connection, visualization, modelling, sharing and publishing.
- It can be used for personal reporting as well as enterprise analytics and decision-making.

2. Parts of Power BI



- Desktop: create, model and visualize reports.
- Service: publish, share and consume reports and dashboards online.
- Mobile: view and interact with shared reports and dashboards on the go.

3. Power BI Flow and User Roles



- Developers commonly work extensively in Power BI Desktop.
- Stakeholders may primarily use Power BI Service or Mobile to monitor performance.

4. Building Blocks of Power BI

- Visualizations – graphical representations of data such as charts, maps and numbers.
- Datasets – collections of data used to create visualizations.
- Reports – collections of related visualizations arranged on one or more pages.
- Dashboards – selected visuals from a single page for quick insight and sharing.
- Tiles – individual visual elements used within dashboards.

5. Data Sources and Connectors

- Power BI can connect to many different data sources.
- Examples include Excel, Microsoft SQL Server, Azure, Oracle and cloud-based services.
- CSV, text, XML and ODBC sources can also be connected.
- Multiple sources can be combined into a single dataset.
- Built-in connectors simplify connecting, filtering and bringing data into Power BI.

6. Power BI Desktop Interface

- Ribbon – provides common tasks for reports and visualizations.
- Report view / Canvas – workspace where visualizations are created and arranged.
- Pages tab – used to select or add report pages.
- Visualizations pane – change chart types, customize visuals and apply fields/filters.
- Fields pane – provides query elements and fields that can be dragged into visuals.
- Report, Data and Model views are accessible from the left side.

7. Power BI Service and Licence

- Power BI Service is the online component for publishing and viewing reports and dashboards.
- Published reports and underlying data are stored on Microsoft servers; privacy and confidentiality should be considered.
- The free Power BI Desktop version supports loading, analysing and visualizing data.
- Publishing and sharing reports online requires an appropriate Power BI licence.
- Reports and data files can also be shared through other means such as shared drives.

8. Importing Data into Power BI Desktop

- Select Get Data from the Home tab on the Power BI Desktop ribbon.
- Choose the required data source, such as CSV.
- Browse for the required file and select Connect.
- Preview the data and select Load to import it.
- Any detected errors can then be reviewed and corrected.

9. Dealing with Data Errors

- Use View errors or Edit queries to inspect detected problems.
- Power BI may automatically assign an unsuitable data type based on early rows.
- Change columns to relevant types, for example text to Decimal Number.
- Handle null, missing and error values using Replace Values or Remove Errors.
- Clean the source data as much as possible before importing to reduce repeated transformation work.

10. Applied Steps and Data Modelling

- Applied Steps records the transformations performed on the data.
- Rename columns to meaningful names for easier analysis and presentation.
- Remove unnecessary columns to reduce clutter.
- Add or duplicate columns when calculations are required.
- Custom Columns can be used for calculations such as $\text{Total GDP} = \text{Population} \times \text{GDP per capita}$.
- Steps can be reordered or removed to undo transformations.
- Refresh the data and use Close & Apply when modelling is complete.

11. Visualization Panel

- The Visualization panel provides chart types for presenting data.
- Examples include stacked bar, line, area, scatter and pie charts.
- Custom visuals can also be imported from the marketplace.
- General procedure: select a visual type, then drag fields into the appropriate areas.

12. Scatter Plot

- Example: examine how life expectancy varies with year.
- X-Axis: Year
- Y-Axis: Life expectancy
- Legend can be Country or Region.
- Size can represent Population.
- Check automatic summarization of numerical fields; use Don't summarize when appropriate.

13. Bar and Line Charts

- Bar chart example: Axis = Year; Value = GDP per capita; Legend = Region.
- Line chart example: Axis = Year; Values = Life expectancy; Legend = Region.
- Power BI can calculate averages for measures such as life expectancy.
- Existing visualizations can be changed to another chart type without recreating the data from scratch.

14. Formatting and Analytics

- Use the Format tab to improve readability and presentation.
- Edit chart titles, legend labels and axis labels.
- Clear titles are more meaningful than default column names.
- The Analytics tab can add reference lines such as trend lines.
- Available options depend on the visualization type.

15. Pages and Marketplace Visuals

- Power BI reports can contain multiple pages when many visuals need to be organized.
- Visuals can be moved between pages using cut and paste.
- The visualization marketplace provides additional custom visual templates.
- Example from the course: import a Word Cloud visual.

16. Map Charts, Measures and Quick Measures

- Map charts can use Longitude and Latitude for geographic positioning.
- Bubble size can represent Population and Legend can represent a category such as OECD membership.
- Quick Measure provides predefined calculations that can be used in visualizations.
- Measures are identified by a calculator icon and use DAX formulas.
- New Measure can be used when a custom DAX calculation is required.

17. Filters

- Filters help focus on specific parts of a dataset and communicate the story more clearly.
- Visual-level filter: affects only one visual.
- Page-level filter: affects all visuals on a page.
- Report-level filter: affects all pages in the report.
- Example: filter Year to 2010 or Region to Americas.

18. Slicers

- Slicers are interactive controls that allow users to explore data selections.
- A Region slicer can be used to view results for each region.
- Slicer selections can affect multiple visuals.
- Hold CTRL to select multiple options.
- Slicer appearance and orientation can be changed using the Format tab.

19. Edit Interactions

- Selecting a data point in one visual can affect other visuals on the same page.
- Edit interactions controls how visuals respond to selections and slicers.
- Use None when a visual should not respond to another visual.
- Use filtering/highlighting behavior where appropriate.
- Check interactions for each visual so the report behaves as expected.

20. Saving Power BI Files

- Use File → Save to save the Power BI report.
- Power BI report files use the .pbix extension.
- .pbix files contain report graphics and the actual data.
- Sharing a .pbix file can therefore share the underlying data as well.

21. Publishing and Sharing Reports

- Use File → Publish → Publish to Power BI.
- Choose a destination workspace, such as My workspace.
- After publishing, open the report through Power BI and sign in with your Microsoft account.
- The Power BI Service provides Reports, Dashboards, Workbooks and Datasets areas.
- Reports can be edited in the service and shared with other users.

22. Key Takeaways

- Power BI connects to diverse data sources and converts data into interactive insights.
- Desktop is used heavily for importing, modelling and creating reports.
- Visualizations, reports, dashboards and slicers help communicate data effectively.
- Filters and interactions make reports exploratory and focused.
- The Power BI Service supports publishing and sharing.
- Good source-data cleaning improves reliability and efficiency.

23. Next Steps

- Deepen understanding through Power BI guided learning and tutorials.
- Explore the Power BI blog for updates and visualization options.
- Use community forums and data-science learning communities for discussion.
- Practice by importing datasets, creating visuals, applying filters and publishing reports.

Source

- Prepared from the uploaded course notes: “Introduction to Power BI”.
- The source covers setup, Power BI fundamentals, importing/modelling, plotting, filters, saving/exporting and next steps.
- Content has been condensed into lecture-ready slides while retaining the source's terminology and examples.