BUSINESS INTELLIGENCE

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MICROSOFT POWER BI

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INTRODUCTION TO POWER BI

▶ Power BI is a powerful business intelligence and data visualization tool developed by Microsoft. It enables users to transform raw data into interactive and visually appealing reports, dashboards, and insights.

▶ With its user-friendly interface and robust functionality, Power BI has become a popular choice for businesses of all sizes to analyze, interpret, and share data.

INTRODUCTION TO POWER BI

▶ Power BI is an all-in-one data analysis and visualization solution that empowers organizations to make data-driven decisions.

▶ Its user-friendly interface, broad data connectivity options, interactive dashboards, and powerful analytics capabilities have made it a popular choice for businesses across various industries.

▶ Whether you are a data analyst, business user, or decision-maker, Power BI can help you uncover valuable insights and gain a competitive edge in today's data-driven world.

KEY FEATURES OF POWER BI

▶ **Data Connectivity:**

   Power BI allows users to connect to a wide range of data sources, including Excel files, SQL databases, cloud-based services (such as Azure, SharePoint, and Salesforce), and other popular applications, making bringing together data from different sources easy.

▶ **Data Transformation:**

Once the data is imported into Power BI, users can clean, shape, and transform it using Power Query Editor. This feature helps to ensure that the data is accurate and ready for analysis.

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KEY FEATURES OF POWER BI

▶ **Data Modelling:**

Power BI's Data Modelling capabilities allow users to create relationships between different tables and define calculated columns and measures. This helps in establishing a logical structure for the data, enabling more efficient analysis.

▶ **Data Visualization:**

The core strength of Power BI lies in its ability to create stunning visualizations. Users can build various charts, graphs, maps, tables, and custom visuals to represent data in meaningful ways, allowing for easy interpretation and decision-making.

KEY FEATURES OF POWER BI

▶ **Interactive Dashboards:**

   Power BI allows users to create interactive, dynamic dashboards that update in real-time. These dashboards can be shared with stakeholders and embedded into websites and applications, enabling easy access to crucial business insights.

▶ **Natural Language Queries:**

   With the help of Power BI's natural language processing capabilities, users can ask questions using plain English and get instant responses in the form of visuals or data summaries. This feature makes it easier for non-technical users to explore data without writing complex queries.

KEY FEATURES OF POWER BI

▶ **Collaboration and Sharing:** Power BI allows users to collaborate with colleagues by sharing reports and dashboards. Additionally, you can control access permissions to ensure data security and manage content in workspaces effectively.

▶ **Mobile Accessibility:** Power BI offers dedicated mobile apps for iOS and Android devices, allowing users to access and interact with reports and dashboards on the go.

▶ **Power BI Service:** Apart from the Power BI Desktop application used for report creation, there is the Power BI service—a cloud-based platform that allows users to publish, share, and collaborate on reports and dashboards. It also provides additional features like data refresh, scheduling, and more.

INTELLIGENT DATA ANALYSIS

▶ Intelligent data analysis in Power BI refers to the use of advanced analytics and machine learning techniques to gain deeper insights from data and make more informed decisions.

▶ Power BI provides several features and integrations that enable intelligent data analysis, allowing users to go beyond traditional data visualization and explore predictive and prescriptive analytics.

KEY COMPONENTS OF INTELLIGENT DATA ANALYSIS

▶ **Machine Learning Integration:** Power BI allows users to integrate with Azure Machine Learning models and run predictive analytics on their data. Users can use pre-built machine learning models or create their own custom models to make predictions, classify data, detect anomalies, and more.

▶ **Automated Insights (Quick Insights):** Power BI's "Quick Insights" feature uses machine learning algorithms to automatically analyze data and identify potential patterns, trends, outliers, and correlations in the dataset. It saves time by providing valuable insights without the need for users to build complex queries or visualizations manually.

KEY COMPONENTS OF INTELLIGENT DATA ANALYSIS

► **Key Influencers Visual:** This feature in Power BI helps identify factors that influence a particular data point. It uses machine learning algorithms to analyze the impact of various variables on the selected data, making it easier to understand the driving factors behind specific outcomes.

► **Natural Language Query (Q&A):** As mentioned in the previous introduction, Power BI's natural language query allows users to ask questions in plain English and receive visualizations or data summaries as responses. The underlying technology employs natural language processing and machine learning to understand the user's intent and deliver relevant insights.

KEY COMPONENTS OF INTELLIGENT DATA ANALYSIS

▶ **Anomaly Detection:** Power BI offers built-in anomaly detection capabilities that automatically identify unusual patterns or outliers in data. This feature helps users quickly spot deviations from normal behavior and investigate potential issues or opportunities.

▶ **Data Insights in Excel:** Power BI and Excel integration enable users to leverage Excel's powerful data analysis tools and use Power BI-generated data insights directly within Excel. This integration provides users with a seamless experience for in-depth analysis using familiar tools.

▶ **Dataflows for Data Preparation:** Power BI Dataflows allow users to build ETL (Extract, Transform, Load) processes to prepare and clean data before it's loaded into Power BI. By integrating Power Query Editor, users can apply machine learning-based data profiling and transformation to enhance data quality and accuracy.

NATURE OF DATA IN POWER BI

► The nature of data in Power BI is versatile, spanning structured, semi-structured, and, to a limited extent, unstructured data.

► It can handle real-time data streams and integrate with big data sources, empowering users to gain insights from diverse data sets.

► With its flexibility and scalability, Power BI is a powerful tool for data analysis and visualization across various industries and business scenarios.

NATURE OF DATA IN POWER BI

▶ **Structured Data:** Power BI primarily deals with structured data, which is organized and follows a predefined format. Structured data typically resides in relational databases, spreadsheets, and other tabular formats.

▶ **Semi-Structured Data:** Power BI can handle semi-structured data in addition to structured data. Semi-structured data has some level of organization, but it may not conform to a strict schema like structured data. Examples of semi-structured data include JSON files and XML files. Power BI can parse and process such data, allowing users to extract relevant information for analysis.

▶ **Unstructured Data:** Although Power BI's core strength lies in structured and semi-structured data analysis, it also provides limited capabilities for unstructured data analysis. While Power BI is not a full-fledged unstructured data analytics tool, it can leverage other Azure services like Azure Cognitive Services to perform sentiment analysis, image recognition, and other cognitive tasks.

NATURE OF DATA IN POWER BI

▶ **Real-Time Data:**

Power BI can handle real-time data streams by connecting to streaming sources like Azure Stream Analytics, Kafka, or other APIs. This enables users to create live dashboards and reports that update in real-time, providing immediate insights on rapidly changing data.

▶ **Big Data Integration:**

Power BI can also connect to big data sources like Azure Data Lake Storage and Hadoop clusters, allowing users to process and analyze large volumes of data. This integration enables businesses to gain insights from their big data assets and combine them with traditional data sources for a comprehensive view of their operations.

NATURE OF DATA IN POWER BI

▶ **Data Models:** Power BI allows users to create data models to establish relationships between different tables and entities in the data. The data model enhances the organization and structure of the data, facilitating more efficient analysis and visualization.

▶ **Data Security and Privacy:** Power BI provides robust data security and privacy features to protect sensitive information. It supports row-level security, data encryption, and integration with Azure Active Directory for access control.

▶ **Data Refresh:** Power BI enables scheduled data refresh for datasets, ensuring that reports and dashboards stay up-to-date with the latest data from the source.

ANALYTIC PROCESSES AND TOOLS

▶ The analytic process in Power BI involves several stages, from data preparation and modeling to data analysis, visualization, and sharing insights. Throughout this process, Power BI provides various tools and features that aid users in transforming raw data into meaningful insights.

▶ **Data Connectivity and Transformation:**

- Power Query Editor: This tool allows users to connect to various data sources, transform, and clean the data before loading it into Power BI. It provides a user-friendly interface to perform ETL (Extract, Transform, Load) operations on the data.

ANALYTIC PROCESSES AND TOOLS

▶ **Data Modelling:**

Power BI Desktop: The main tool for creating data models. It enables users to define relationships between tables, create calculated columns and measures, and shape the data for analysis.

▶ **Data Analysis:**

DAX (Data Analysis Expressions): A formula language used in Power BI to create custom calculations and aggregations. DAX functions help in performing complex calculations and building business metrics.

ANALYTIC PROCESSES AND TOOLS

▶ **Data Visualization:**

- Power BI Visualizations: Power BI offers a wide range of interactive visualizations, including charts (bar charts, line charts, pie charts, etc.), maps, tables, matrices, and custom visuals. Users can choose the most suitable visualizations to represent their data effectively.

▶ **Insights and Analysis:**

- Quick Insights: Power BI's machine learning-driven feature that automatically generates valuable insights, correlations, and patterns in the data, helping users gain deeper understanding quickly.

ANALYTIC PROCESSES AND TOOLS

▶ **Analytical Expressions:** Key Influencers Visual: This tool allows users to identify the key factors that influence specific data points or metrics. It employs machine learning algorithms to analyze data and identify significant influencers.

▶ **Machine Learning Integration:** Azure Machine Learning: Power BI integrates with Azure Machine Learning, enabling users to use pre-built machine learning models or build custom models for predictive analytics on their data.

▶ **Natural Language Query:** Q&A (Natural Language Query): Allows users to ask questions using natural language and receive instant visualizations or data summaries as responses. It employs natural language processing to understand user queries.

ANALYTIC PROCESSES AND TOOLS

▶ **Sharing and Collaboration:**

- Power BI Service: The cloud-based platform where users can publish and share their reports and dashboards with colleagues or stakeholders. It supports real-time collaboration and access control.

▶ **Mobile Accessibility:**

- Power BI Mobile App: Users can access and interact with their reports and dashboards on iOS and Android devices, enabling them to stay connected and make data-driven decisions on the go.

REPORTING

▶ Reporting involves the process of organizing and presenting data in a structured format to provide a snapshot of the current or historical performance of a business or specific metrics.

▶ Reports are generally predefined and follow a standardized layout, displaying data in tables, charts, graphs, and other visualizations.

▶ They are often used to summarize data and deliver information to stakeholders in a concise and easy-to-understand manner.

KEY CHARACTERISTICS OF REPORTING

▶ **Static**: Reports are typically static and do not change unless manually updated. They are generated based on predefined templates and data sources.

▶ **Scheduled**: Reports are often generated on a regular schedule (daily, weekly, monthly) to provide consistent and up-to-date information.

▶ **Descriptive**: Reporting focuses on describing what has happened in the past, providing insights into historical performance.

▶ **Key Performance Indicators (KPIs)**: Reports often highlight essential performance metrics, KPIs, and trends to assess business performance.

▶ **Visualizations**: Reporting uses visualizations to present data in a structured and organized manner, making it easier for stakeholders to interpret the information.

ANALYSIS

▶ Analysis involves a deeper examination of data to uncover patterns, relationships, and insights that might not be immediately apparent.

▶ It goes beyond simple summarization and involves examining data from various angles, applying statistical techniques, and performing calculations to draw meaningful conclusions..

KEY CHARACTERISTICS OF ANALYSIS

▶ **Data Import and Connectivity:** Data analysis tools can connect to various data sources, such as databases, spreadsheets, cloud services, and web APIs, to import and integrate data from different sources.

▶ **Data Cleaning and Transformation:** These tools often include functionalities to clean, filter, and transform data, ensuring data quality and consistency.

▶ **Statistical Analysis and Aggregation:** Data analysis tools can perform statistical calculations and aggregations, allowing users to summarize data and calculate key metrics.

▶ **Data Visualization:** Data visualization is a crucial aspect of data analysis. These tools offer various charts, graphs, and visualizations to represent data in a visually appealing and insightful manner.

MODERN DATA ANALYTICS TOOL

► Modern data analytics tools refer to advanced software platforms designed to handle the complexities of big data, perform real-time analysis, and enable data-driven decision-making.

► These tools leverage cutting-edge technologies, such as cloud computing, machine learning, and AI, to deliver powerful capabilities for data integration, analysis, and visualization.

MODERN DATA ANALYTICS TOOL

▶ **Big Data Integration:** Modern data analytics tools can connect to and analyze large volumes of data from various sources, including structured, semi-structured, and unstructured data. They can efficiently process and store big data, enabling businesses to derive insights from vast datasets.

▶ **Real-time Analytics:** These tools offer capabilities for real-time or near-real-time data processing and analysis. They can handle streaming data, enabling organizations to make immediate decisions based on up-to-date information.

▶ **Machine Learning and AI:** Modern data analytics tools often incorporate machine learning and AI capabilities to automate data analysis, identify patterns, predict trends, and detect anomalies. These technologies enhance the efficiency and accuracy of data analysis.

MODERN DATA ANALYTICS TOOL

▶ **Data Visualization and Dashboards:** User-friendly and interactive data visualization is a hallmark of modern data analytics tools.

▶ **Self-Service Analytics:** Many modern data analytics tools emphasize self-service analytics, allowing non-technical users to perform data analysis without extensive knowledge of coding or statistical methods. These tools typically have intuitive interfaces that make data exploration accessible to a broader audience.

▶ **Cloud-based Solutions:** Cloud-based data analytics tools leverage the scalability and flexibility of cloud computing to process and store data. They often provide easy sharing and collaboration capabilities, making it convenient for teams to work together on data projects.

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MODERN DATA ANALYTICS TOOL

▶ **Data Security and Governance:** As data privacy and security are crucial concerns, modern data analytics tools incorporate robust security measures to protect sensitive information. They also support governance and compliance requirements.

▶ **Integration and APIs:** These tools often offer integration with other business applications, data warehouses, and data lakes through APIs, enabling seamless data flow across different platforms.