WHAT IS BI

Business Intelligence (BI) refers to the set of processes, technologies, and applications used to gather, analyze, integrate, and present business data in a meaningful and actionable way. BI is a crucial component of any organization's decision-making strategy as it enables businesses to access and analyze data to make informed decisions and improve their overall performance.

The primary objective of business intelligence is to transform raw data into valuable insights that can be used to make informed decisions. This involves gathering data from various sources, cleaning and integrating the data, and then analyzing it using various tools and techniques to identify patterns, trends, and relationships. The results are then presented in a meaningful and user-friendly way, such as through dashboards, reports, or visualizations.

Business intelligence tools and technologies include data warehouses, data mining, data visualization, and analytics tools, among others. These tools are used to gather data from various sources, transform it into usable formats, and then present it in a way that can be easily understood by stakeholders, including executives, managers, and analysts.

Some of the benefits of business intelligence include improved decision-making, increased efficiency, reduced costs, enhanced customer satisfaction, and improved competitiveness. By providing valuable insights and enabling businesses to make informed decisions, BI can help organizations to achieve their goals, reduce risk, and drive growth.

Over the past few years, business intelligence has evolved to include more processes and activities to help improve performance. These processes include:

Data mining: Using databases, statistics, and machine learning (ML) to uncover trends in large datasets

Reporting: Sharing data analysis to stakeholders so they can draw conclusions and make decisions

Performance metrics and benchmarking: Comparing current performance data to historical data to track performance against goals, typically using customized dashboards

Descriptive analytics: Using preliminary data analysis to find out what happened

Querying: Asking the data-specific questions, BI pulling the answers from the data sets

Statistical analysis: Taking the results from descriptive analytics and further exploring the data using statistics such as how this trend happened and why

Data visualization: Turning data analysis into visual representations such as charts, graphs, and histograms to more easily consume data

Visual analysis: Exploring data through visual storytelling to communicate insights on the fly and stay in the flow of analysis

Data preparation: Compiling multiple data sources, identifying the dimensions and measurements, and preparing it for data analysis

Some examples of BI tools and technologies include Microsoft Power BI, Tableau, QlikView, and SAP BusinessObjects.

BI ARCHITECTURES

Business intelligence (BI) architecture is the framework that a company uses to deploy business intelligence and analytics software or applications. This framework includes a variety of components including IT systems and different software tools that the company plans to use to collect, integrate, store and analyze data. Companies often use the data stored by these systems to inform corporate executives and other key stakeholders about company performance, trends and business operations. Some key components of a business intelligence architecture include:

Source systems

Source systems in Business Intelligence (BI) refer to the various applications, databases, and systems that store the raw data that is used for BI reporting and analytics. These source systems can be classified into two categories:

Operational source systems: These systems are responsible for running the day-to-day operations of a business. They include transactional databases, customer relationship management (CRM) systems, supply chain management systems, human resource management systems, financial systems, and other business-specific applications.

External source systems: These systems are not part of the organization's internal IT infrastructure. They include publicly available data sources such as government databases, industry reports, social media data, and other data sources that can provide insights into the business environment.

Extract, transform and load (ETL) processes

To be able to use data from these source systems for BI purposes, they need to be extracted, transformed, and loaded (ETL) into a data warehouse or data mart. This process involves the following steps:

Extraction: Data is extracted from the source systems using tools such as SQL queries or data integration tools.

Transformation: The extracted data is transformed into a format that is suitable for analysis. This may include cleaning and filtering data, applying business rules and calculations, and creating derived measures and dimensions.

Loading: The transformed data is loaded into a centralized data repository such as a data warehouse or data mart, where it can be accessed by BI tools for analysis and reporting.

Data modeling

Data modeling is the process of creating a conceptual representation of data objects, relationships between them, and the rules that govern those relationships. It helps in organizing and understanding complex data and information systems. Data modeling is essential in Business Intelligence (BI) because it provides a visual representation of the relationships between data, which in turn helps in the design and implementation of the BI solution.

There are different types of data models used in BI, including:

Conceptual Data Model: This type of data model represents high-level business concepts and the relationships between them. It helps in understanding the requirements of the business and defining the scope of the data that will be used in the BI solution.

Logical Data Model: This model represents the data structure that will be used in the BI solution. It defines the tables, columns, and relationships between them. It helps in defining the data requirements and designing the data warehouse or data mart.

Physical Data Model: This model represents the physical implementation of the logical data model. It defines the storage structures, indexes, and other physical properties of the data. It helps in designing the physical database and optimizing its performance.

Data warehousing

Data warehousing is the process of collecting, storing, and managing data from various sources to support business intelligence and analytical activities. It involves the extraction, transformation, and loading (ETL) of data from different sources, cleaning and transforming the data to create a single, comprehensive view of the organization's data, and storing it in a central repository known as a data warehouse.

The data warehouse is a large, centralized database that is optimized for analytical querying and reporting. It is designed to support complex queries that involve large amounts of data and require fast response times. The data warehouse is typically organized by subject areas, such as sales, marketing, finance, and human resources.

Enterprise information management (EIM)

EIM stands for Enterprise Information Management. It is a framework that helps organizations manage their information assets effectively. EIM includes a set of policies, processes, and technologies that are used to manage an organization's information throughout its lifecycle, from creation to destruction.

EIM encompasses several disciplines, including data governance, data quality management, metadata management, master data management, content management, and information security. The primary goal of EIM is to ensure that an organization's information is accurate, consistent, and secure.

DECISION SUPPORT SYSTEMS

Decision Support Systems (DSS) are computer-based information systems that are designed to assist decision-making activities within an organization. DSS use a variety of data analysis tools and techniques to support managerial decision-making in complex and dynamic environments. These systems are designed to help managers and executives identify and solve problems, make strategic decisions, and optimize business processes.

DSS typically provide interactive interfaces that allow users to explore data, generate reports, and perform "what-if" analysis to evaluate different scenarios and options. They often use advanced analytical techniques, such as data mining, artificial intelligence, and machine learning, to analyze large and complex data sets and generate insights and recommendations.

DSS can be used in a variety of industries, including finance, healthcare, marketing, and logistics. They can help managers make decisions related to product development, customer segmentation, risk management, and supply chain optimization, among others. The goal of a DSS is to provide decision-makers with the information they need to make informed, timely, and effective decisions that contribute to the success of the organization.

DEVELOPMENT OF BI SYSTEMS

The development of BI systems involves several steps, including:

Requirements gathering: The first step in developing a BI system is to gather requirements from the business users. This involves understanding the business processes, identifying the key performance indicators (KPIs), and determining the data sources required to support the analysis.

Data integration: The next step is to integrate the data from the various sources into a single repository. This involves data cleansing, transformation, and loading into the data warehouse.

Data modeling: Once the data has been integrated, the next step is to model the data. This involves designing the data warehouse schema, defining the dimensions, and creating the measures.

OLAP cube design: After the data has been modeled, the next step is to design the OLAP cubes. This involves creating the hierarchies, defining the aggregation levels, and setting up the security.

Reporting: Once the OLAP cubes have been designed, the next step is to create the reports. This involves selecting the appropriate reporting tool, designing the reports, and setting up the delivery mechanism.

Analysis: In addition to standard reporting, BI systems also provide advanced analytics capabilities. This includes data mining, predictive analytics, and statistical analysis.

Dashboard design: The final step in developing a BI system is to design the dashboards. This involves creating interactive dashboards that allow users to drill down into the data, slice and dice the data, and perform what-if analysis.