Digital Transformation for Leaders

Business Analytics and Big Data

Learning Objectives

By the end of this lesson, you will be able to:

- Define Big Data and the four V's of Big Data

- Explain big data analytics and its importance

- Discuss different types of business analytics

- Describe the analytics process flow

- Explain how companies use Big Data

Case Study: Disney

Case Study: Disney

In the 2000s, Disney's customer experience began to fade as ticket prices climbed and the customer base increased.

In response, Disney created the next generation experience project aimed at creating personalized experiences for its guests.

Case Study: Disney

Launched in 2013, **MyMagicPlus** allows guests to book ride times, restaurant reservations, and shows in advance using the website.

The magic bands given to the guests act as admission tickets and can also be connected to guest's credit cards for payment across the park and resorts.

Case Study: Disney

Disney's success story gives us insights into how technology proves very important in improving customer experience and in retaining customers.

"Technology is lifting the limits of creativity and transforming the possibilities for entertainment and leisure"

-Bob Iger, Chairman and CEO, Walt Disney Company

Case Study: Disney

- Despite the big customer base resulting in huge data, Disney was able to extract outcomes to create magic again.

- It would have been difficult for Disney to provide any solution for the problem, without analyzing the data

- It is crucial for businesses to manage their data flow and gain insights to improve their business.

Big Data: Overview

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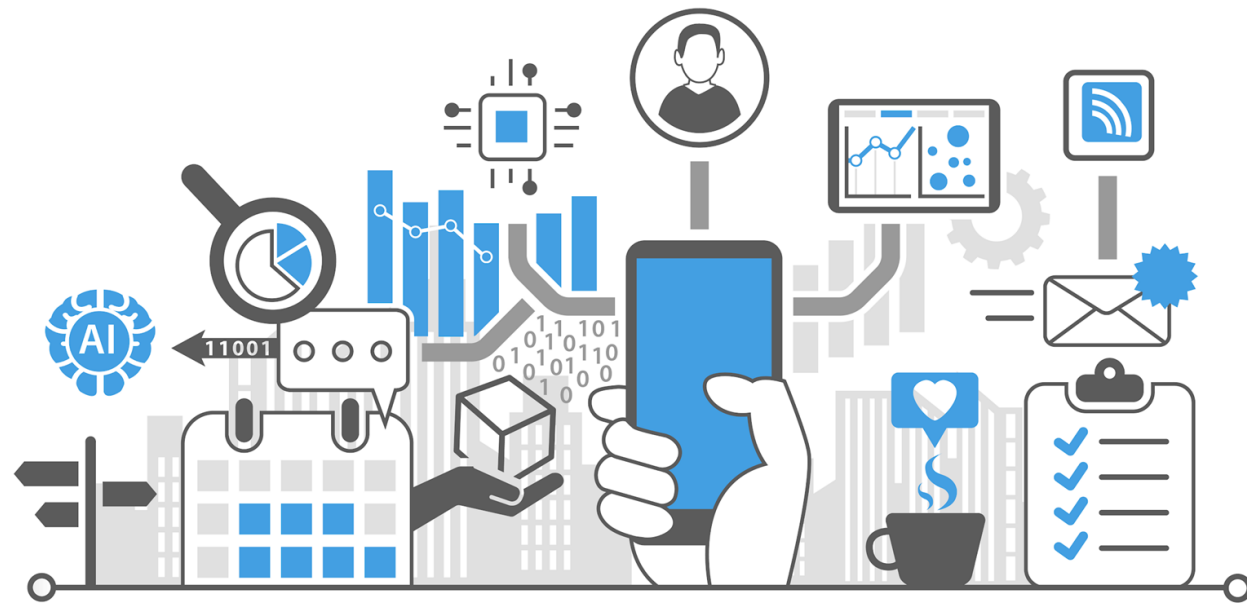
- Large organizations have a huge customer base, resulting in a huge amount of incoming data, also known as big data.

- Big data represents extremely large datasets analyzed computationally to reveal patterns, trends, and associations.

- It describes any voluminous amount of structured, semi-structured, or unstructured data.

Four V's of Big Data

Big Data is defined by four important features, also known as the **Four V's of Big Data**:

Volume

Variety

Velocity

Veracity
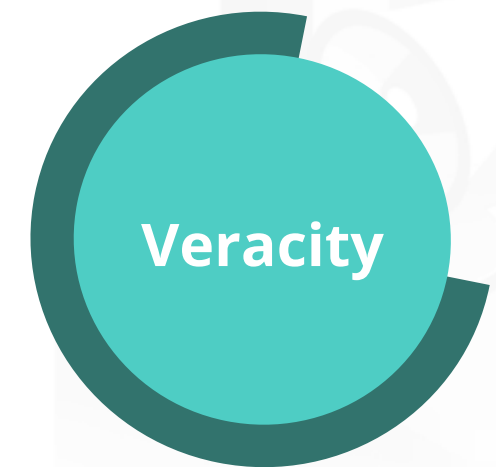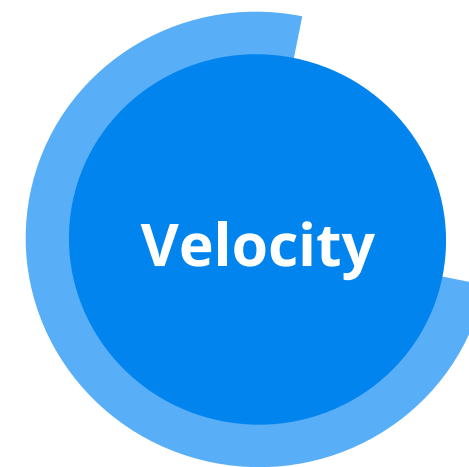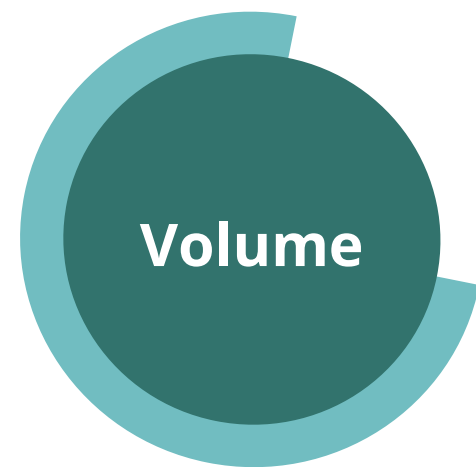
Four V's of Big Data
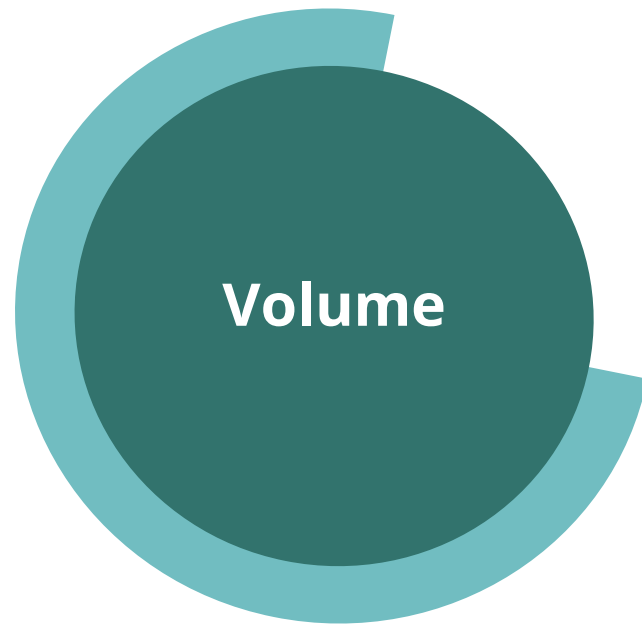
Volume

- Volume refers to the scale of data as it is the main characteristic that makes data big.

- Everyday, data volumes rise exponentially as organizations have multiple internal and external sources such as transactions, enterprise content, sensors, etc.

Four V's of Big Data
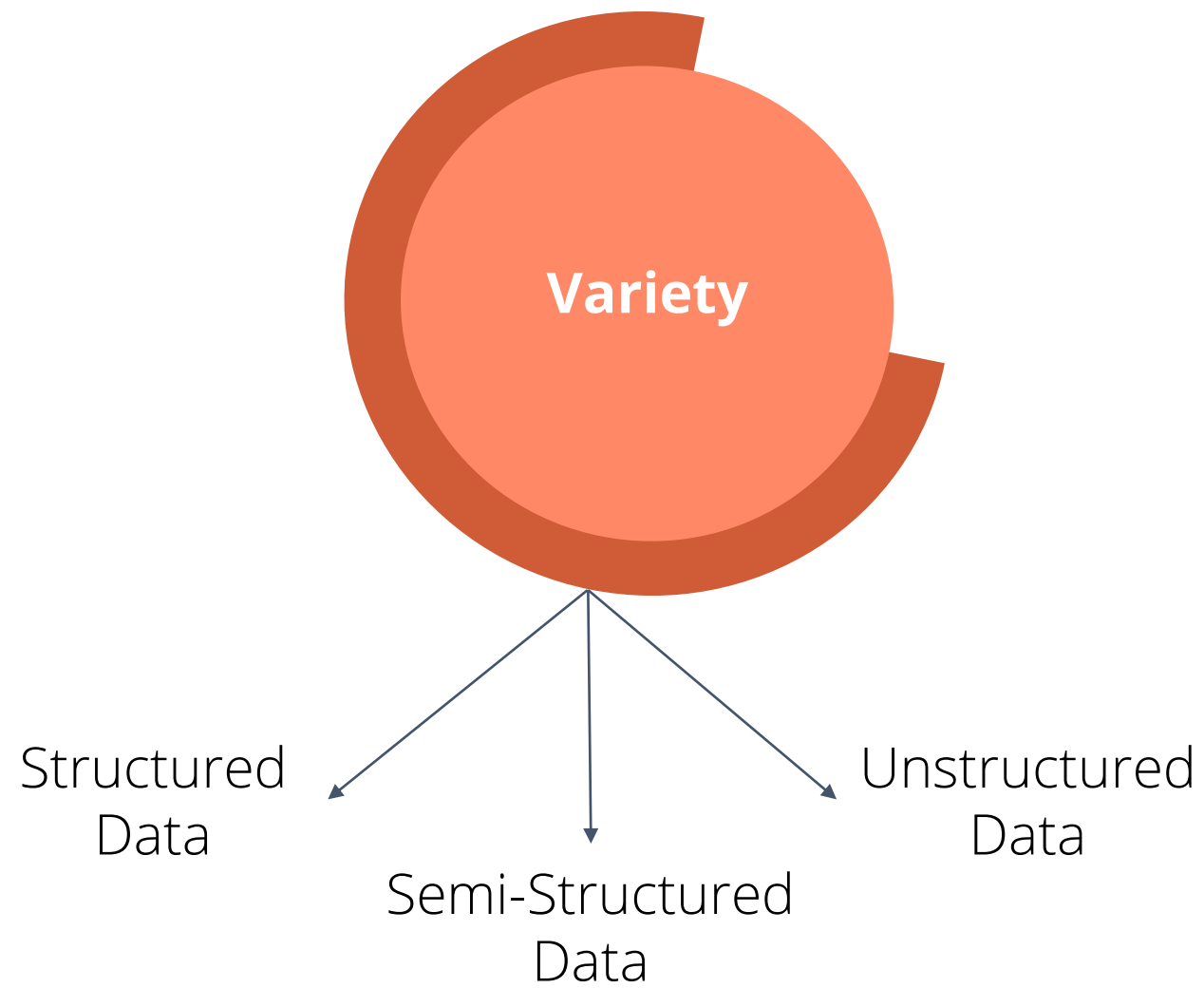
Variety

- Variety refers to the different forms of data as the data is captured from multiple sources in multiple formats.

- Data can be structured, semi-structured, or unstructured.

Structured Data

Semi-Structured Data

Unstructured Data

Four V's of Big Data

Variety

Structured Data

Semi-Structured Data
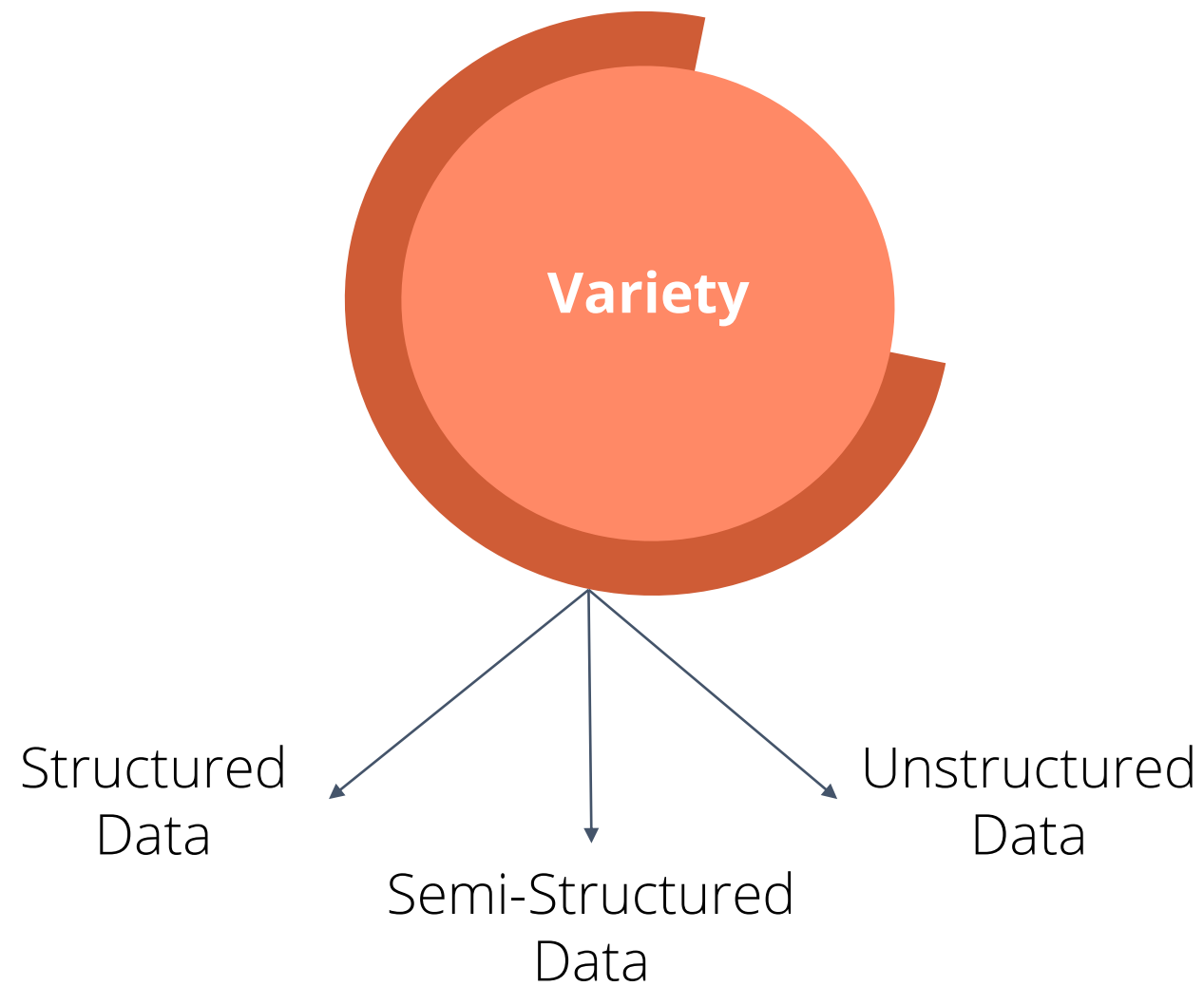
Unstructured Data

- Structured data refers to information with a high degree of organization.

- Semi-structured data is a form of structured data that does not conform with the formal structure of data models but contains tags or other markers.

- Unstructured data is data that either does not have a predefined data model or is not organized in a predefined manner.

Four V's of Big Data
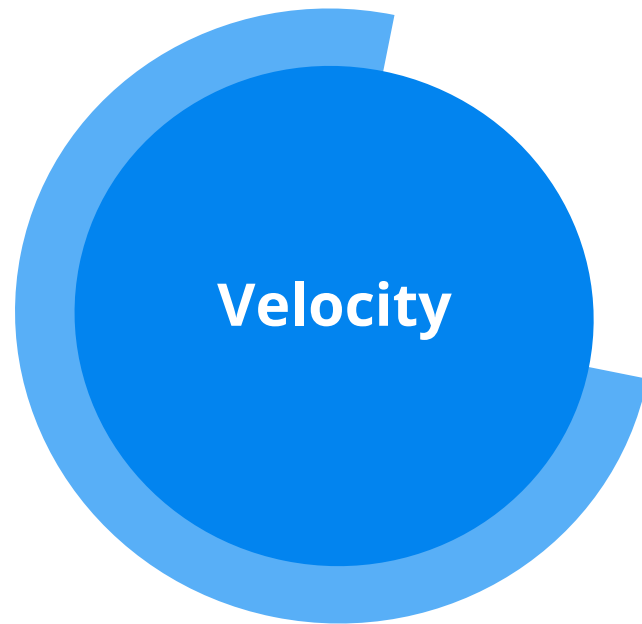
Velocity

- Velocity refers to the frequency of incoming data that needs to be processed.

- Example: SMS messages, Facebook status updates, or credit card swipes, sent on a particular telecom carrier every minute of every day.

Four V's of Big Data
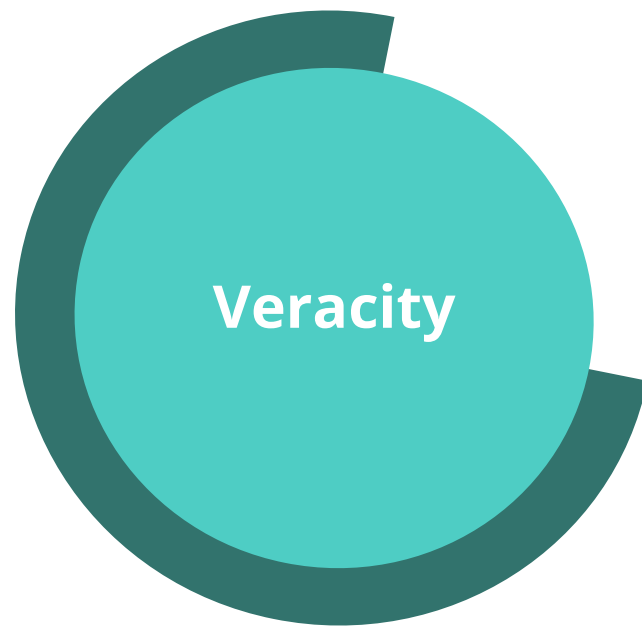
Veracity

- Veracity refers to the biases, noises, uncertainty or abnormality in data.

- Huge amounts of data can be increasingly utilized with big data analytical tools for harvesting insights and supporting business decisions.

Big Data: Applications

- Big data technologies are a popular platform for data analytics and data exploration.

- They are used to implement data mining and data processing techniques.

- It handles data at an extremely large scale and is characterized by massive parallel computing.

Data Science and Data Analytics

Data Science: Overview

Big Data technologies allow organizations to make new predictions, uncover patterns in business, and unlock new sources of value, also scientifically known as **Data Science**.

Data science is an interdisciplinary field of scientific methods, processes, algorithms, and systems to extract insights from data in various forms, similar to data mining.

Data Analytics: Overview

Data analytics is the discovery and communication of meaningful patterns in data to drive smart decisions.

Companies use different analytics solutions to uncover hidden patterns, meanings, and other insights from the huge volume of data to improve decision-making.

Data Analytics: Applications
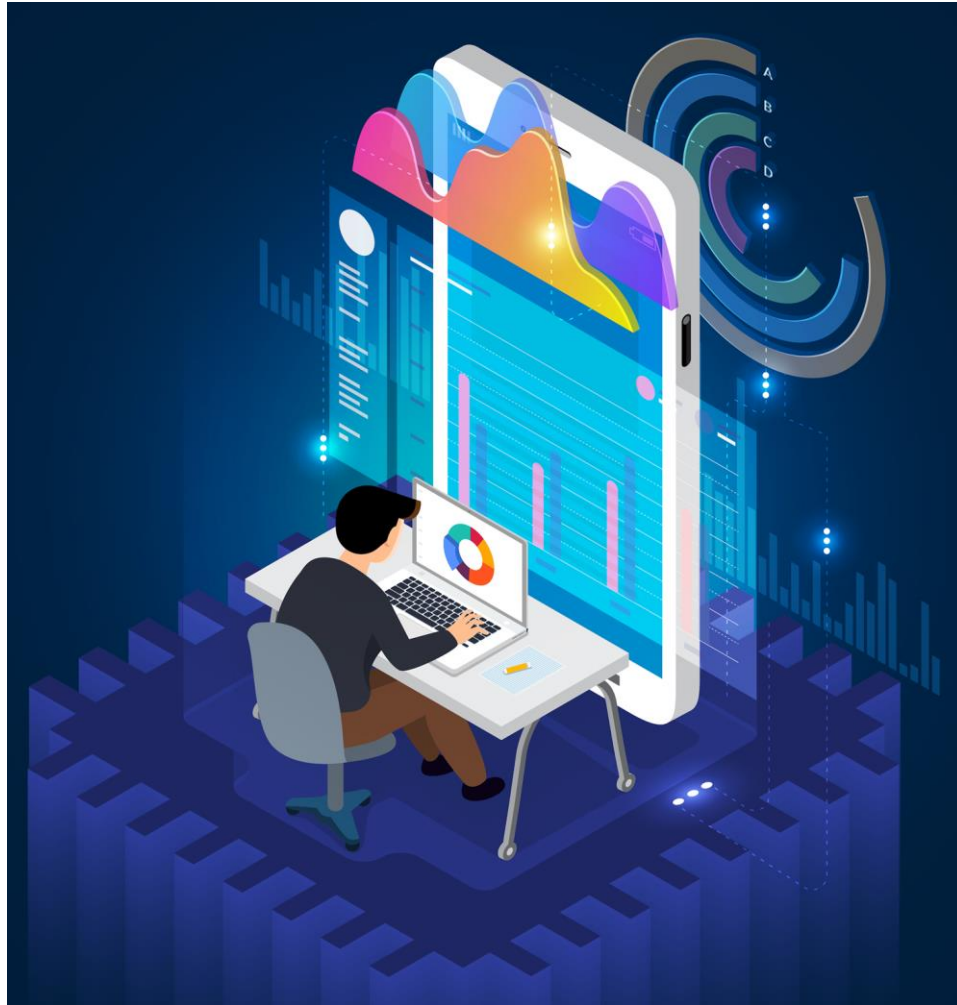
- Data has become a strategic asset to be mined for business intelligence and to differentiate products in the market.

- Businesses use data analytics to get value from the existing data, provided they have the right analytical talent.

- Incorrect data and unsuitable data science talent results in poor business decisions.

Types of Data Analytics

Types of Data Analytics

To perform big data analysis, companies use a robust analytic environment that includes:

Descriptive Analytics	Predictive Analytics	Prescriptive Analytics
Descriptive analytics uses tools like data aggregation and data mining to summarize the results.	Predictive analytics uses statistical models and simulation to make educated guesses at likely results.	Prescriptive analytics uses tools like optimization models and heuristics to derive important, complex, and sensitive decisions.

Types of Data Analytics

Descriptive Analytics

- Descriptive analytics is regarded as the first stage in data analytics, involving consolidation and summarization of data for further analysis.

- It includes techniques that explain what has happened in the past: reports, data queries, data dashboards, etc.

- The data received from descriptive analytics is further used in predictive analytics to predict future unforeseen events.

Types of Data Analytics

Predictive
Analytics

- Predictive analytics includes techniques that use models created from past data, to predict the future or determine the impact of one variable on another.

- **Examples**:

  - A company can create a mathematical model for predicting the future sales by using past data on product sales.

  - A food manufacturing company can estimate the measurement and quantity of unit sales by using the point-of-sale data from retail outlets.

Types of Data Analytics

Prescriptive Analytics

- Prescriptive analytics specifies the best course of action for a business activity in the form of prescriptive model, also called **Optimization Models**.

- **Examples**:

  - The airline industry chooses the best pricing strategy by analyzing revenue management models and past purchasing data.

  - Finance companies decide on a certain mix of investments by analyzing portfolio models that utilize historical investment return data.

Application of Business Analysis: Example

Earlier, credit cards had uniform pricing because the companies did not have the appropriate information systems to deal with differential pricing on a large scale.

Richard Fairbanks and Nigel Morris approached big banks to offer predictive modeling consulting and finally got the Signet Bank, a Regional Virginia Bank, to agree.

Application of Business Analysis: Example

Using predictive modelling, the bank:

- Offered different terms to different customers at random which increased the numbers of bad accounts

- Changed to about 6% charge-offs from the prevailing charge-off

- Built the predictive models from the data, evaluated them, and continuously improve them to increase profits despite the initial losses

- Eventually turned around the credit card portfolio into its most profitable operation

Analytics Process Flow

Analytics Process Flow

The analytics process flow diagram has five stages.
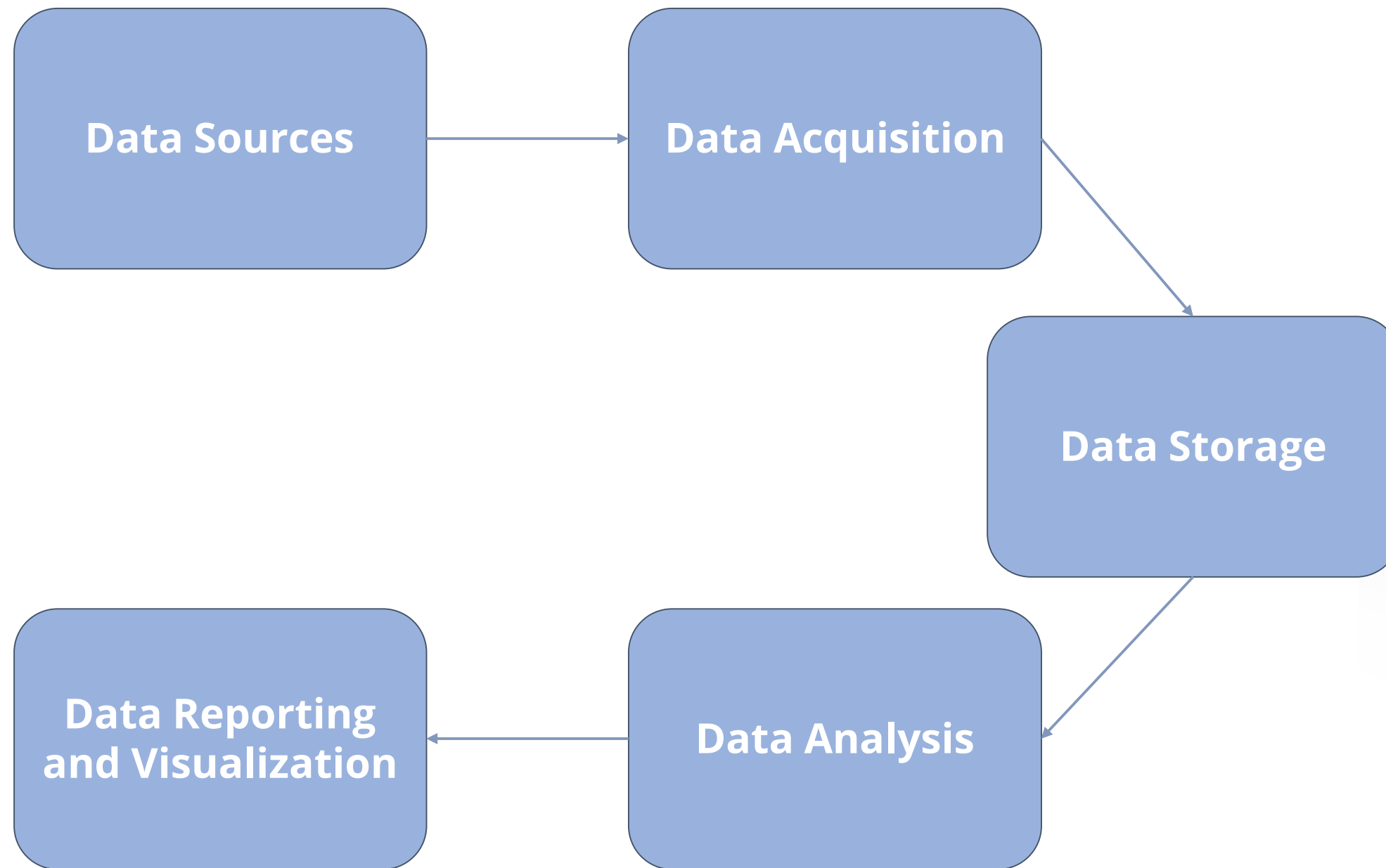
Analytics Process Flow

**Data Sources
(ERP, CRM, Excel, etc)**

- Data source acts as a primary location for the data source.

- It has numerous forms like a data set, a program, or perhaps hard coded data.

- Organizations might leverage multiple sources of data together with ERP, CRM, and alternate systems.

Analytics Process Flow

Data Acquisition (ETL)

- Data Acquisition involves extract, load, and rework.

- It is an information integration method for transferring raw data from supply systems to a target information.

- It makes the data ready for downstream uses, primarily in business intelligence and analytics applications.

Analytics Process Flow

Data Storage
(Data Warehouse)

- Data storage is a method of archiving data in an electromagnetic or alternate forms by a laptop or associate degree device.

- It is regarded as a central repository of integrated information, from one or additional disparate sources.

- It is a system used for reportage and information analysis.

Analytics Process Flow

Data Analysis

- Data analysis is the process of inspecting, cleansing, transforming, and modeling data.

- The main goal is to discover useful information, suggest conclusions, and support the decision-making process.

Analytics Process Flow

<div style="border:1px solid; padding:10px">Data Visualization</div>

- Data visualization is the procedure of exhibiting and presenting data in a graphical format.

- It is used as a measure to deliver visual reports to users.

- It gives insights related to performance operations or general statistics of an application.

Big Data Analytics: Case Studies

Case Study: Rolls-Royce

- Rolls-Royce has put big data analytics to use in three key areas of its operations: design, manufacturing, and after sales support.

- Adopting big data driven approach has helped the company diagnose faults, correct them, and prevent them from occurring again.

- It has also helped in taking the right business decisions, resulting in significantly reduced costs.

Analytics Process Flow

Amazon use big data analytics in two key areas of its operations: **Data warehousing** or **Redshift** and **Hosted hadoop solution** or **Elastic MapReduce**.

It uses big data analytics to create a personalized recommendation system and improve customer service operations in order to serve its customers effectively and improve sales.

Key Takeaways

- Big data is a term that describes the large volume of data that inundates a business on a day to day basis.

- Volume, variety, velocity, and veracity are the four V's of big data.

- Analytics is the discovery and communication of meaningful patterns in data to drive smart decisions.

- To perform analysis of big data, companies use an analytic environment that includes descriptive, predictive, and prescriptive analysis