Cloud Computing Essentials with Azure and AWS

# **1.1 Introduction to Cloud Computing**

## What is Cloud Computing?

* **What is Cloud Computing?**
  + Cloud computing delivers computing services over the internet like:
    - Servers
    - Storage
    - Databases
    - Software
    - Analytics
  + Reduces upfront costs and lets companies focus on business priorities.
    - You don’t have to buy all these computing services (on-premise).
    - You can simply rent them out using cloud computing services.
    - Cloud can get expensive over time.
  + Services can be scaled up or down based on user needs.
  + Offers flexibility, reliability, security, and cost savings over traditional methods.
* **Types of Cloud Computing** 
  + **Cloud computing types**:
    - Infrastructure as a Service (IaaS)
      * Amazon Web Services (AWS EC2)
      * Microsoft Azure
      * Google Compute Engine (GCE)
      * IBM Cloud
    - Platform as a Service (PaaS)
      * Google App Engine
      * Microsoft Azure App Services
      * Heroku
      * AWS Elastic Beanstalk
    - Software as a Service (SaaS)
      * Salesforce
      * Microsoft 365
      * Google Workspace (e.g., Gmail, Google Docs)
      * Dropbox
      * Slack
  + **IaaS**: Offers virtual computing resources online, scalable as needed.
  + **PaaS**: Provides platforms for building and deploying apps without managing infrastructure.
  + **SaaS**: Delivers ready-to-use software hosted by third-party providers.
* **Benefits of the Cloud**
  + Saves money by removing the need for physical hardware (upfront cost).
  + Scales easily to match business needs.
  + Accessible from anywhere, making remote work simple.
  + High security with strong measures to protect data.

## Introduction to AWS and Azure

* **Amazon Web Services (AWS)**
  + AWS is the largest and most popular cloud platform in the market.
  + Provides services like computing, storage, and databases.
  + Operates a global network of data centers.
  + Used for web hosting, app development, data storage, and machine learning.
* **Microsoft Azure**
  + Microsoft Azure is a leading cloud platform.
  + Integrates well with Microsoft tools like SQL Server and Office 365.
  + Offers scalability, flexibility, and strong security.
  + Widely used by enterprises and startups.

## Why Data Analysts Use the Cloud?

* **Why do data analysts use the cloud?**
  + Store, process, and analyze large datasets.
  + Collaborate and share data in real-time across sources.
  + Ensure secure and reliable storage with backup options.
* **What data analysts use in Azure?**
  + **Azure Blob Storage**: Used for storing data (storage service)
  + **Azure Database and Data Lake**: Store structured and unstructured data.
  + **Azure Data Factory**: Create and manage data pipelines across sources.
    - Cloud-based data integration service
    - Create, schedule, and orchestrate (automate) pipelines across on-premises and cloud data sources.
* **What data analysts use in AWS?**
  + **Amazon S3:** Popular for storing data.
  + **Amazon Redshift:** Data warehouse for fast queries and large dataset analysis.
  + **AWS Glue:** Builds and manages ETL pipelines for data lakes.