Cloud Computing

Cloud computing is a method of delivering computing resources—such as servers, storage, databases, networking, software, and analytics—over the internet. Instead of relying on physical computers or local servers, users can access these services anytime and from anywhere without managing the infrastructure themselves.

Before Cloud Computing

- Businesses depended on physical servers and on-premises infrastructure.
- Setting up and maintaining IT resources required significant time and effort.
- High costs were involved in purchasing hardware, software, and maintaining data centers.
- Data recovery was challenging and time-consuming in case of server failures.

After Cloud Computing

- Companies no longer need to invest in expensive hardware.
- Resources can be scaled up or down based on demand.
- Cloud providers such as **AWS, Azure, and GCP** manage infrastructure and services.
- Backups and disaster recovery are automated, ensuring data safety.

Cloud Subscription Models

Cloud providers offer different payment options for users to access their services.

(a) Free Trial Account

- **Duration:** 30 days

- **Credits:** Users receive $200 in free credits to explore services.
- **Verification Required:**
    - Credit Card (Visa/Mastercard)
    - Email & Mobile Number
    - **Note:** International transactions may need to be enabled.

(b) Pay-as-You-Go

- Users pay only for the services they use.
- No fixed costs; billing is based on:
    - The services utilized
    - The duration of usage
- Charges are calculated monthly based on actual consumption.

(c) Azure for Students

- Offers $100 in free credits exclusively for university students.
- No credit card is required for verification.

(d) Azure Coupons/Vouchers

- Users can claim up to $200 in free credits.
- Additional benefits may include:
    - A **1-month free trial**
    - **Free access to Microsoft webinars**
    - **Free entry to Microsoft certification exams**

Cloud Service Models

Cloud computing services are categorized into three main models:

(a) Infrastructure as a Service (IaaS)

- Provides **virtual machines, storage, and networking** over the internet.
- Users can install and configure operating systems and applications as needed.
- **Examples:** Amazon EC2, Google Compute Engine, Microsoft Azure VMs.
- **Use Cases:** Development, testing, and storage.

(b) Platform as a Service (PaaS)

- Designed for **developers** to build applications without managing infrastructure.
- Cloud providers handle hardware and operating systems.
- **Examples:** Google App Engine, AWS Elastic Beanstalk, Azure App Services.
- **Use Case:** Developing and deploying web applications.

(c) Software as a Service (SaaS)

- Offers **ready-to-use software** without installation or management.
- Limited customization compared to other models.
- **Examples:** Google Drive, Dropbox, Slack, Microsoft Office 365.

Cloud Deployment Models

Cloud services can be deployed in different ways based on security, cost, and performance requirements.

(a) Public Cloud

- **Owned by providers** like AWS, Azure, GCP, and IBM.
- Resources are **shared** among multiple organizations.
- **Cost-effective** and highly scalable.

(b) Private Cloud

- Dedicated to a **single organization** for greater control and security.
- More **expensive**, as the organization manages the infrastructure.
- **Examples:** IBM Private Cloud, VMware vSphere.

(c) Hybrid Cloud

- A **combination** of public and private cloud services.
- Offers both **cost savings and security** by using public cloud for scalability and private cloud for sensitive data.
- **Examples:** AWS Outposts, Google Anthos, Azure Stack.

Cloud Computing Responsibility Model

The responsibility of managing cloud infrastructure varies based on the service model.

- **IaaS:** Users manage applications, data, runtime, middleware, and OS, while the provider handles virtualization, servers, storage, and networking.
- **PaaS:** Users only manage applications and data, while the provider takes care of everything else.

- **SaaS:** The provider manages the entire infrastructure, and users simply use the software.
