Introduction To Cloud Computing

1. What is Cloud Computing?

Cloud computing is the delivery of computing services—such as servers, storage, databases, networking, software, and more—over the **internet** ("the cloud"). Instead of owning and maintaining physical data centers or servers, users can rent computing resources from a cloud provider on a **pay-as-you-go** basis.

Example: Using Google Drive, Microsoft Azure, or Amazon Web Services (AWS) to store files or run applications.

2. Describe Cloud Computing Deployment Models

There are **four main deployment models** in cloud computing:

a. Public Cloud

- Services are offered over the public internet.
- Owned and operated by third-party providers (e.g., AWS, Microsoft Azure, Google Cloud).
- **Example:** Gmail, Dropbox.

b. Private Cloud

- Cloud infrastructure is used exclusively by one organization.
- Can be managed internally or by a third party.
- **Example:** A bank using its own private data center.

c. Hybrid Cloud

- Combines public and private clouds.
- Allows data and applications to move between the two.
- **Example:** Sensitive data in a private cloud; other services in a public cloud.

d. Community Cloud

- Shared infrastructure for a specific community (e.g., universities, government agencies).
- Managed internally or by a third party.

3. What are Components of Cloud Computing?

The main components of cloud computing are:

a. Frontend (Client-side)

- Interface through which users interact with the cloud.
- Includes web browsers, mobile apps, or client software.

b. Backend (Server-side)

- Includes servers, databases, storage, and software that make the cloud functional.

c. Cloud Infrastructure

- Physical hardware like data centers, networks, and storage.

d. Cloud Storage

- Stores and manages data (e.g., Amazon S3, Google Cloud Storage).

e. Cloud Services

- **IaaS (Infrastructure as a Service):** Virtual machines, storage, networks.
- **PaaS (Platform as a Service):** Platforms to build and deploy apps.
- **SaaS (Software as a Service):** Ready-to-use software applications.

f. Network

- Ensures communication between frontend and backend via the internet.

4. Advantages and Disadvantages of Cloud Computing

Advantages:

1. **Cost-Effective:**
    - No need to invest in hardware or software; pay only for what you use.
2. **Scalability:**
    - Easily scale resources up or down based on demand.
3. **Accessibility:**
    - Access services and data from anywhere with an internet connection.
4. **Automatic Updates:**
    - Providers manage and update systems automatically.
5. **Disaster Recovery:**
    - Data backup and recovery options are built-in.
6. **Collaboration:**
    - Teams can collaborate in real-time across geographies.

Disadvantages:

1. **Internet Dependency:**
    - Requires a stable internet connection for access.
2. **Limited Control:**

- Users have less control over the backend infrastructure.

3. **Security and Privacy Risks:**
   - Data stored in the cloud may be vulnerable to breaches.
4. **Downtime:**
   - Outages or downtime at provider's end can affect availability.
5. **Hidden Costs:**
   - Unexpected charges for bandwidth or additional services.